

# Computer News 80

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## EDITORIAL COMMENTS

Last month we mailed the issues four days earlier than what our schedule shows and still many did not receive their issues for three weeks. We don't have an answer to this except to switch to first class mail. To do this send .75 cents times your remaining issues. This may be the only way to speed your issue thru the mail system, which by the way is adding 30% to our bulk mail postage cost starting in February 1991.

Many late hours have gone into this issue, by us and the many authors who have contributed their articles. We think that the effort is worth it, to bring you all the new programs for your TRS-80 enjoyment.

Also, many new items have been added to our inventory to serve you, such as 3-1/4 disks, disk cleaning kits. A-B switches for the RS232 port, along with modem cables with male to female or male to male connectors. Four inch by 1-7/16 labels have been added for your convenience in using the new PostMaster program. Printer dust covers and a whole new batch of disk volumes to the File Cabinet Library have been added, plus a new book to the Chris Fara collection.

We also enjoyed a visit from John G. Clark and wife from Wayne City, Illinois, who stopped in on their way thru Wyoming to Yellowstone and Salt Lake City. We hope you enjoyed your trip and had a safe return.



## NEWS ITEMS

=====

### NEW TRS-80 SPEED-UP KIT

Doubles Your Processing Speed

by Peter Ray (Anitek)

Are you tired of waiting for your computer to finish running your programs? Would you like your programs to finish running in less than half the time as before? If so, keep reading. Anitek Software Products has just broken the 2X speed barrier with their new 6.7 MHz CPU Speed-Up kit for the non-gate-array TRS-80 4's and 4P's. This amazing new speed-up kit will actually enable your computer to run at over twice the processing through-put speed of its original so-called "4 MHz" speed (the fastest that your computer was able to run without a speed-up kit). The chart below shows the bench-test results that prove this.

The new 6.7 MHz Speed-Up kit is a breeze to install. The kit consists of just three chips that easily replace three socketed chips on your mother board: the CPU chip, the clock generator chip, and the data bus buffer chip. There is no cutting, soldering or modifying the mother board required to install the kit in standard, 6.7 MHz, configuration. Just plug in the three chips and begin processing at lightning fast speeds.

For computers with slower RAM chips and/or other board components, this new Speed-Up also allows the user the option of running at 6.1 MHz or at 5.1 MHz by just connecting one jumper wire to the clock generator chip.

To verify the dramatic increase in processing through-put speed of the new 6.7 MHz Speed-Up kit, we ran a memory test program that read and verified 4480K of memory on a non-gate-array Model 4 at various speed configurations and then compared the results. The first entry in the chart below is the results with the new 6.7 MHz Speed-Up kit installed. The next two entries are the results of the same kit jumpered for 6.1 MHz and 5.1 MHz, respectively. The last two entries are the results of the computer running in its original "fast" and "slow" speeds, without the Speed-Up kit installed. The first column

is the running time of each test, in seconds. The second column is the relative processing speed as compared to the normal "4 MHz" speed of the computer. As shown by the chart, Anitek's new 6.7 MHz Speed-Up kit gave the computer over twice the processing speed (202%) as it had at its fastest speed without a speed-up kit.

	running time (sec)	bench mark
6.7 Mhz	55	202 %
6.1 Mhz	61	182 %
5.1 MHz	70	159 %
4.0 MHz	111	100 %
2.0 MHz	176	63 %

As you can see by the above chart, the test took less than 1/2 the amount of time to complete with the new 6.7 MHz Speed-Up kit installed than it did at the fastest speed possible without a speed-up kit. What this means to you is that you don't have to wait so long for your programs to run any more. For example, if you have a very long document that takes 2 minutes to spell-check, it will now take only 1 minute. If you have a spread sheet that takes 60 seconds to calculate, it will now take only 30 seconds. In fact any program you run that takes some measurable amount of time to complete some internal processing, will now take half the amount of time as before. This means hours of your valuable time saved every week. This means real dollars and cents back in your pocket.

The no-worry, no-hassle, 100% customer satisfaction, money-back guarantee: Try the new 6.7 MHz Speed-Up kit in your computer for 30 days. If you don't see real processing speed increases of up to twice what you were seeing before, or if for any reason you decide to change your mind, just return the kit 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. The 6.7 MHz Speed-Up kit also comes with free technical support and is covered by a 90-day fix or replace warrantee.

Your ticket to the fast lane in computer processing is only a phone call away. For more information, or to order your new 6.7 MHz Speed-Up kit, call Anitek Software Products at 1-407-259-9397. The new 6.7

MHZ Speed-Up kit is only \$45. VISA and MasterCard orders taken over the phone. Or write us at PO Box 361136, Melbourne FL 32936. Please include \$4 for shipping and handling per kit. Florida residents add 6% tax. The 6.7 MHZ kit works with computer models 26-1067, 26-1068, 26-1069 and 26-1080. CPU speed-up kits do not decrease the access time of mechanical devices such as printers, floppy drives and hard drives.

In addition to the new 6.7 MHZ kit, Anitek Software Products is also offering two other speed-up options for your TRS-80: the 6.3 MHZ speed-up kit for the gate-array model 4's and 4P's and the 5.1 MHZ speed-up kit for the non-gate-array Model 4's and 4P's. These two kits are both only \$35 each, and come with a 30-day money-back guarantee, a 90-day warrantee, and free technical support.

-Peter Ray (Anitek)

#### HYPERSVC GIVES MANY PROGRAMS ACCESS TO HYPERMEM AND SUPERMEM by Peter Ray (Anitek)

There is a new program from Anitek Software Products, called "HyperSVC", that modifies LS-DOS or TRSDOS 6 so that any program that accesses expanded memory through the DOS's bank switching supervisory calls can now access both HyperMem and SuperMem memory. According to one authority, some of the popular application programs that do access expanded memory through the DOS this way, and as such would now be able to access HyperMem and SuperMem memory with the aid of "HyperSVC", are: PRO-WAM, The New Double Duty, Little Brother Data Base, Busy-Calc and Busy-Calc Extra spread-sheet, Fast Term communication program, M-RAS Assembler, M-C Compiler, and PRO-ENH BASIC Compiler, and with more programs being written all the time. What this means to you is that if you have HyperMem or SuperMem memory in your computer you are no longer limited to just LeScript and HyperDrive as the programs that will work with it. "HyperSVC" opens the door to a vast new world of TRS-80 power for you.

"HyperSVC" is like a patch to the DOS, only smarter and better than a patch. "HyperSVC" is what they call an "intelligent patch". This means that before "HyperSVC" modifies the DOS, it first checks to see whether or not your computer actually has HyperMem memory or SuperMem memory in it, and if so, it checks how much memory is there. Then "HyperSVC" modifies the DOS in memory according to the type and the amount of expansion memory that you have (up to a maximum of 7 32K-banks, the limit set by the DOS). If you don't have HyperMem or SuperMem memory in your computer, then "HyperSVC" exits without changing the DOS.

That is how "HyperSVC" is smarter than a standard DOS patch. How it is better than a patch is in the fact that you can take the same LS-DOS or TRSDOS 6 disk with "HyperSVC" on it and, without changing anything, you can use it one day on a computer with HyperMem expansion memory, the next day on a computer with SuperMem, the next day on a computer with a lot of expansion memory, the next day on a computer with a little expansion memory, and the next day on a computer with no expansion memory. All without changing anything with the DOS disk or with the application program that's accessing the expanded memory. That's an intelligent patch.

Another way that "HyperSVC" is smarter and better than a standard DOS patch is in the fact that the location of the patch area in the DOS can change from one version of the DOS to the next. This means that with a standard DOS patch you would need a different patch for each new version of the DOS that comes out. This is not so with "HyperSVC". This intelligent patch scans your DOS and finds the exact location of the patch area, and installs itself correctly every time. "HyperSVC" has been tested on almost every TRSDOS 6 and LS-DOS ever released, from version 6.3.1 all the way back to 6.0.1, and it installed itself correctly on each DOS, even though the patch locations were not all the same.

This is how it simple "HyperSVC" is to use: Copy HYPERSVC/CMD from the distribution disk to your LS-DOS or TRSDOS 6 disk. Then, at the DOS READY prompt, type: AUTO :0 HYPERSVC<enter>. That's it! Now

every time you boot up with that DOS disk, "HyperSVC" automatically configures the DOS so that it can access the HyperMem or SuperMem memory that is in the computer.

Concurrent with the release of "HyperSVC", Anitek is also releasing an updated version of "HyperDrive", the RAM disk driver software that works with both HyperMem and SuperMem memory expansions. "HyperDrive" version 1.04 now tests to see if the DOS is providing access to HyperMem or SuperMem, and if so it won't use any of the banks that the DOS says are already being used. This was a function that only became necessary to add to "HyperDrive" since "HyperSVC" came along to give the DOS the capability to directly access this extra memory.

"HyperSVC" and "HyperDrive" version 1.04 are sold together on the same disk for only \$19.95. Those who are registered HyperMem owners may return their old "HyperDrive" disk and purchase the new "HyperSVC"/"HyperDrive" disk for the reduced price of only \$10. For a limited time the new "HyperSVC"/"HyperDrive" disk is being offered at no charge with the purchase of any size HyperMem memory expansion kit.

The HyperMem memory expansion kit is still only \$64.95 with 0K of RAM. The 384K kit is only \$99.95. The 640K kit is only \$134.95. The 832K kit is only \$169.95. And the 1 megabyte kit is only \$199.95. HyperMem comes with a 30-day money-back guarantee, 90-day warrantee and free technical support. If for any reason you decide not to keep your HyperMem kit, return it within 30-days in the condition you received it, and the purchase price will be quickly and cheerfully refunded. Kit sizes are the total RAM when installed on a 128K TRS-80. HyperMem can be installed on 64K TRS-80.

For more information, or to order your new "HyperSVC"/"HyperDrive" disk or your HyperMem memory expansion kit, call Anitek Software Products at: 1-407-259-9397. VISA and MasterCard orders taken over the phone. Please include \$4 for shipping and handling. Florida residents add 6% tax. Prices guaranteed through October 31, 1990.  
-Peter Ray (Anitek)

## NEWDOS86 REVIEW

by Donald W. Ady

This will be the first of two installments describing a new DOS version called NewDos86. (Next month: BASIC enhancements). Written by Australian software author Warwick Sands, NewDos86 is now published and distributed by Computer News 80, with support by the author. NewDos86 provides a substantial set of new features. I'd recommend it highly, whether or not you are a NEWDOS 80 version 2 user.

The original NEWDOS80 distributor, APPARAT, released many versions such as NEWDOS, NEWDOS+, NEWDOS80 V1, NEWDOS80 V2, and then V2.5 with hard drive support. Soon thereafter, Apparat disconnected its phones and vanished. There is no M4 version. But, NewDos86 does support some M4 hardware features from M3 mode.

The author presumes that you own NEWDOS80 V2 and know it from its manual of some 290 odd pages. The NewDos86 manual of about 160 pages covers the enhancements. Freebie goodies that came with NEWDOS80 like EDTASM version or SUPERZAP/CMD are not part of NewDos86. They could be used from ND80V2 versions. NewDos86 has its own add on of utilities and document files.

If you can't get the Apparat manual, then what? NewDos86 has an excellent on the disk HELP system that could get pretty far in casual use of the DOS in a pinch. HELP starts from almost any running program by holding down SHIFT and 123 keys together. It is easy to follow at first sight.

### NEW FEATURES:

SYSTEM options: 27 new ones added to 30 old ones. Many can install optional features. Typahead, for example. A program called PATCH/BAS leads you through painless prompts on most of the new ones, and also fixes certain utilities if present for NewDos86 changes. BASIC: 51 new keywords added to 127 old ones; ELE enhanced line editor. DOS has at least eight new commands plus many enhancements in ATTRIB, BOOT, CLEAR, DATE, COPY, DIR, FORMAT, FORMS, FREE, PDRIVE, and PURGE. There are a number of

separate new utilities like HELP and a RAM drive.

Memory use: Like NEWDOS80, NewDos86 reduces the RAM cost of add ons in part by disk overlays. However a configuration using most new features all at once did eat up nearly 4K in low RAM plus 4K in HIMEM vs ND80V2. HIMEM ones can all be temporarily cancelled by doing BOOT with SHIFT key depressed, getting HIMEM FFFFH.

#### DOS enhancements and additions

There is an optional editor for DOS commands. When you get an error message, the cursor comes on the incorrect command and can be changed. It works much like the old BASIC EDIT, but using the CLEAR key with EDIT keys like <D> DELETE. A shifted BREAK key aborts the command. The CLEAR key no longer clears the screen unless used with SHIFT. The DOS command SLEEP will blank the screen completely, but not lose its contents.

DIR is vastly revised. It sorts alphabetically. Slow on a first pass if the directory is excessively large, it goes fast the next time. A utility SORTDIR permanently sorts, and can be used on many types of foreign disks like LDOS etc. DIR has a number of new letter options. For instance the unique DIR K lists only KILLED files. UNKILL restores them if possible! DIR X or OLDIR gives the old type of unsorted listing. Almost two manual pages describe partspecs to get or omit selective listings.

A foremost new feature is ADFR: automatic format and density recognition. It can without any warning read many alien formats including LDOS and any kind of TRSDOS or LSDOS. It can by and large even use those formats as data disks. TRSDOS 1.3 is limited to only DIR and FREE and COPY usage. ND80V2 had been COPY only for TRSDOS 1.3 and no access at all to the others. ND80V2 and NewDos86 allow changing of many parameters in their own format. For ND80V2 this can be a trap as it can't read one not defined exactly right by change of PDRIVE table. NewDos86 makes this almost wholly automatic and convenient with PDRIVE rarely needed at all. A new LOGON command helps for problem cases to tell the system disks the number of sides to

ask for.

#### NEW DOS COMMANDS:

ATTRIB myfile,PSF=Y helps arrange a pseudo system file that can be set up to load as an overlay like system files can. Users may need the (separate) technical package sold for NewDos86; there is also a separate hard drive package. DAY prints date on screen. LOGON, tells the system about drive capacities. OLDIR gives DIR in the old style. SETSYS with SYSRES and RAM can set up a system RAM disk. FORMAT 4 then RAM 4 set up a 64K RAM disk for any purpose on an 128K machine. SLEEP saves and blanks the video. UNKILL restores a killed file. VID sets up 80X24 displays if on a Model 4. SORTDIR alphabetically sorts entries on the DIR/SYS itself for alphabetic listings.

I used the M3 version on M4D mainly, but also tried the M1 version. It came in 35T SSSD format. To create a 39T DSDD version, the following commands were used: PDRIVE 0 9=0,A then PDRIVE 0 9 TI=CK TD=G TC=39 SPT=36,A then COPY 0 0,,DPDN=9. That did a one drive copy using table entry 9 for DDPDN, destination PDRIVE number. A second drive if present would have made it easier. M4D on which I have several DS drives has never made a usable M1 39T format. It has however duplicated M1 disks when skipping a FORMAT step that the M1 already had done. This also worked on NewDos86, going from 35T source to 39T with prior format under NewDos86 on M1. On the M4D I mounted the 35T source on :1 and a 39T with FORMAT already done by M1. A LOGON command was used with option to reset PDRIVE table specifics after successful disk IDs. COPY 0 1 and <N> for no new format then made a working M1 disk with 39T. There was an alarming tail end message of DIRECTORY ERROR, but it meant nothing.

-Don Ady

(Editors Note:) NewDos 86 is available from CN80 the price is \$70.00 US, which includes program disks and manual, add \$4.00 for shipping and handling in the US. Add \$6.00US for shipment to Canada. Add \$7.00US for shipments to other countries. Full support from the author via mail.

Move over a bit...

Eleven Z-80 instructions exist solely for the purpose of playing a sort of "musical chairs" with individual bits. To refresh memory and be prepared for today's subject, the reader may want to review "Bits and Bytes" in CN80 8/89:5 or Z80 Tutor I:19. The common idea in those instructions is to move all bits over by one position. In a move to the LEFT bit #0 (the rightmost bit) moves to the left, to position #1, which in turn moves to #2, and so on. At the end of the chain the leftmost bit #7 always "falls out" into the Carry flag. If that bit was "one" to begin with, then after the instruction the Carry flag is set C. If it was "zero" then C-flag is reset NC. The opposite happens in a move to the RIGHT. Bit #7 (the leftmost bit) replaces bit #6 which replaces #5, and so on, until the rightmost bit #0 falls out into the Carry flag. Instead of "musical chairs" we could also think of "domino effect" to visualize those "moves".

- RL 'byte' Rotate Left
- RLC 'byte' Rotate Left Circular
- RR 'byte' Rotate Right
- RRC 'byte' Rotate Right Circular
- SLA 'byte' Shift Left Arithmetic
- SRA 'byte' Shift Right Arithmetic
- SRL 'byte' Shift Right Logical

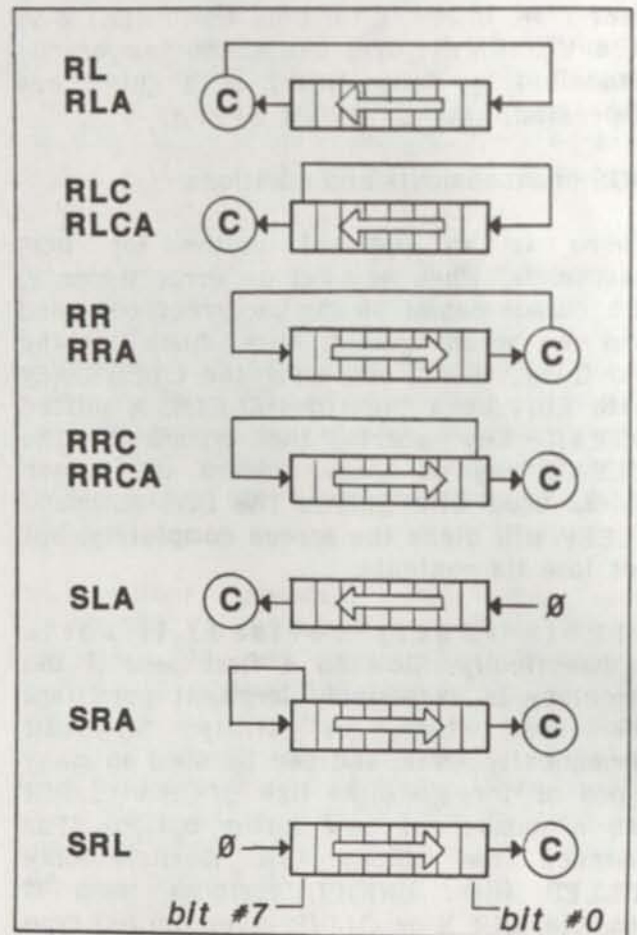
The 'byte' can be any single register (except F) or a location in memory addressed by the register pair HL.

- RL C
- RR (HL)

Each of the above instructions generates two bytes of code and sets or resets all four principal flags depending on the result (Sign, Zero, Parity, Carry). The "rotate" instructions have also special one-byte form for the register A (the "Accumulator"). These special cases affect only the Carry flag. The other three principal flags are not changed. Since the 'byte' is always register A, it is not spelled out in the operand field.

- RLA Rotate Left Accumulator
- RLCA Rotate Left Circular Accum.
- RRA Rotate Right Accumulator
- RRCA Rotate Right Circular Accum.

The differences between the instructions result from different ways the end bits are handled (leftmost #7 and rightmost #0). The best way to understand it is to look at a picture.



For example assume that the Carry flag is set C, and the bit pattern in a register looks like this

0001 1110

After RR the previous Carry moves into the leftmost position (ie. bit #7 will be set 1), while the rightmost bit 0 "falls out" into the C-flag which now will be reset NC. The bit pattern in the register will look like this

1000 1111

In a "circular" rotation RRC bit #0 also "falls out" into Carry, but at the same time moves "in a circle" to the leftmost position #7. The previous Carry does not replace bit #7 and is lost. The resulting bit pattern 00001111 is different than after RR. In SLA a "zero" moves into the rightmost bit, and in SRL a "zero" replaces the leftmost bit.

And in SRA the leftmost bit moves to the right as usual, but also "replaces itself" again (ie. SRA will never change the leftmost bit). And so on. Take a few bit patterns and see what each of those instructions would do to it, and what the Carry flag does before and after each operation.

### Shifty calculations

No, we're not trying to cheat, but shifts are ideal for quick multiplications and divisions by powers of two (by 2, 4, 8 etc). Suppose, for example, that the register E has this bit pattern

```
0100 0001
```

which represents  $64+1=65$ . To multiply by 2 we can add E to itself. Since addition requires the use of register A we must write three instructions

```
LD A,E
```

```
ADD A,A
```

```
LD E,A
```

or we could simply write

```
SLA E
```

and the resulting bit pattern

```
1000 0010
```

now represents  $128+2=130$ . Since before the shift the leftmost bit was 0, Carry flag remains reset. But try SLA one more time

```
0000 0100 = 4 ???
```

and now the Carry flag is set, because the leftmost 1 "fell out" into it. The status of C-flag tells us that the multiplication overflowed the limit of a single byte and the result is wrong. But don't despair. Suppose the value of 130 is not in the single register E, but in the pair DE (which means that D is zero). The combined bit pattern is

```
0000 0000 1000 0010
```

Now to multiply 130 by 2 we would perform a pair of instructions

```
SLA E
```

```
RL D
```

Look at our picture to visualize what happens. SLA moves bit #7 from E to Carry, and RL forwards this Carry into bit #0 of register D. Thus both registers shift to the left in a "synchronized" way. There is no overflow because the offending Carry from register E is now safely tucked into register D

```
0000 0001 0000 0100
```

and the register pair DE holds the correct result  $256+4=260$ .

Division by powers of two moves bits to the right. Take for example the value of 6 in register E

```
0000 0110
```

After

```
SRA E
```

The bit pattern will be

```
0000 0011
```

which is the correct result 3. Carry flag is reset because the rightmost bit 0 fell into it. Now do SRA again to divide 3 by 2

```
0000 0001
```

The exact result would be 1.5 but since integers can't have fractions, the result is rounded off to 1. The Carry flag is now set because the rightmost 1 fell into it, which tells us that the exact result cannot be represented in integer form.

### Bit conversions

To display a binary value in decimal or hex form we have been using our subroutines BINDEX (CN80 89/9:9, Z80 Tutor I:24) and BINHEX (CN80 89/11:9, Z80 Tutor I:31). Similar routines could display bit patterns of binary values. The "rotate" instructions make it a breeze. Suppose we want to convert register A.

```

;-----
;BINBIT convert A to 8-bit string
; DE=address ASCII hold buffer
;-----
BINBIT: LD B,8 ;8 rotations
PLUCK: RLCA ;rotate
        PUSH AF ;save A
        LD A,'0' ;assume bit 0
        JR NC,ASCOK ;yes, else
        INC A ;make it '1'
ASCOK: LD (DE),A ;store it
        POP AF ;get back A
        INC DE ;next hold slot
        DJNZ PLUCK ;more, else
        RET ;done
;-----

```

The routine is a DJNZ loop of 8 rotations which "pluck" one-by-one each bit. After each rotation the status of Carry indicates whether 0 or 1 "fell out" of the leftmost bit position. You could modify our ASKEY program (CN80 89/9:11, Z80 Tutor I:25) to see in binary form the codes generated by pressing any key: make the HOLD buffer 8 characters long plus the terminator, delete two lines LD L,A and LD H,0 just after JR Z,EXIT and replace all references to BINDEX by BINBIT.

Conversion of a 2-byte value in HL is a "synchronized" rotation of all 16 bits.

```
-----  
;BINBIX convert HL to 16-bit string  
; DE=address ASCII hold buffer  
-----  
BINBIX: LD B,16 ;16 rotations  
PLUCK: RL L ;low byte  
RL H ;high byte  
LD A,'0' ;assume bit 0  
JR NC,ASCOK ;yes, else  
INC A ;make it '1'  
ASCOK: LD (DE),A ;store it  
INC DE ;next hold slot  
DJNZ PLUCK ;more?  
RET ;done  
-----
```

Finally the reverse conversion of an ASCII string of 0's and 1's might look like this:

```
-----  
;BIXBIN convert bit string to HL  
; DE=address of string buffer  
-----  
BIXBIN: LD B,16 ;max 16 bits  
LD HL,0 ;initialize  
BIX2: LD A,(DE) ;get character  
CP '0' ;is it '0' ?  
JR Z,BITOK ;yes  
CP '1' ;is it '1' ?  
RET NZ ;no, quit, else  
SCF ;set carry  
BITOK: RL L ;stuff carry  
RL H ;and rotate  
INC DE ;next hold slot  
DJNZ BIX2 ;more?  
RET ;no, all done  
-----
```

If a character in the buffer is equal to '0' then the first CP instruction sets Z-flag, but also resets Carry (carry is always reset when the comparison is equal) and we jump directly to BITOK (bit okey). If not '0' then check if '1' and quit if any other character has been found. If it is '1' then Carry would be again automatically reset by the comparison. So we must "manually" force it to be set.

#### SCF

Set Carry Flag. Simply does what it says. Speaking about SCF we should also mention its friend:

#### CCF

Complement Carry Flag. The flag is changed to its opposite: if it was set before then after CCF it's reset, and the other way around.

Anyway, at the label BITOK we "stuff" the Carry flag (0 or 1 as the case may be) into the rightmost bit of the low register, while its leftmost bit is forwarded by the next RL instruction into the high register. The DJNZ loop stops when a character other than '0' or '1' is found in the buffer, or when 16 characters have been converted.

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POSTSCRIPT to Don Ady's EXTERNAL DRIVE INSTALLATION (Vol 3 No. 7, Page 1)

PS on the replacing external drives: some oddballs.

Most external drive replacements are simple plug and run. Now I have tried two more that would not work. In one case, the power supply had normal wires with +12V, +4V, and two return lines as is normal. It wouldn't run anything new I tried. The one oddity noticed: an isolation transformer. +12V for instance measured zero volts to chassis ground.

Some drives work on M1 in double density, but not all will. One removed from M4D, made by TEC, will not. At first it seems to give a good disk for COPY 0 1 with DIR looking normal enough. But, the disk won't BOOT. Text files read back have all the wrong data (sector numbers scrambled). Used on drive :0, it can not BOOT perfectly good diskettes that normally work there.

-Don Ady

#### REMINDER TIME AGAIN

If the last four digits on your mailing label is 90/09 this is your last issue.

Time to send in your renewal.



## BUSY CALCULATIONS

by David Goben

In this semi-regular column I hope to address those aspects of using a spreadsheet which concern you, as a user. My main focus will be on the new user, and the user of Busy-Calc in particular. However, due to Busy-Calc and VisiCalc being better than 95 per cent compatible, the VisiCalc user can follow as well. Other spreadsheets will be covered as needed.

One of the big "introductory" features in this column is a program that will convert VisiCalc files to Busy-Calc format — a feature that many of you have been asking for. In the future other useful utilities will be provided as they are developed.

But the content of this column will depend solely upon you, your idea submissions, and your questions. So if you want to see more of this column, it will be up to you to submit material, either in the form of questions, or as hints and tips for using spreadsheets.

Since the release of Busy-Calc, I have received numerous inquiries about my Busy-Calc package (and many complements — thank you) about the Busy-Calc spreadsheet program. I will attempt to answer them enmasse here.

### WHAT IS A SPREADSHEET

A Spreadsheet, in the form of an "electronic" spreadsheet, as it is presented in Busy-Calc, is a matrix of intersecting columns and rows. Each intersection is called a cell, and the column and row common to each cell is called its coordinate. Each cell can contain a label, a value, or a formula. A label is a non-calculating string of text that you can use to indicate within the spreadsheet what values are for, such as headings, or even separating lines. A value is a numerical constant. A formula is an mathematical equation that results in a numerical value.

The real power behind Busy-Calc is in its ability to reference the values of other cells within any given formula. This is much like using variables within a BASIC program. This feature allows you to change a single value, and any cell that references the value of that cell can be automatically

updated without you having to pull out an eraser and calculator to recompute the spreadsheet. Busy-Calc will do all of this for you. This is why spreadsheet programs are so popular: They save us literally -hours- of time that would have otherwise been spent refiguring the entire sheet.

### WHAT IS BUSY-CALC

Busy-Calc is a full-featured electronic spreadsheet program, which provides you with all the editing tools you need to write, save, and reload powerful, sophisticated templates and layouts. Busy-Calc supports an extensively wide range of commands and functions, which surpass most spreadsheet programs, and brings it upon a par with that of VisiCalc and Multiplan.

When I was first approached by Stan at CN80 in November of 1989, and was asked if I would be interested in writing a spreadsheet program, I had at the time quickly declined. Although I was sure that I could write one, the one thing I dreaded most from such a project was the "flack" I would receive from "heavy" users of other spreadsheet programs, who would pointlessly expound upon this feature or that feature. Or those who would want to compare programs feature for feature. This is a very infantile approach, and should never be brought into the evaluation of a product, as a product should always be graded upon its ability to perform a task that it was designed to do, not upon its ability to do a task in a way even remotely similar to some other program. My feeling is, if you are happy with your spreadsheet, stick with it, and not some other. Besides, users who cut their teeth on Busy-Calc can easily take the same tact against other spreadsheet programs.

Regardless, the concept of writing such a program, and the fact that current users of the Model 4 were now in need of one (due to VisiCalc and Multiplan being pulled off the market) was just too much to ignore, and I was soon designing flowcharts that eventually became program segments, and finally formed into a functioning application program.

Busy-Calc was never meant to be a replacement for any other full-featured spreadsheet program. My advise to anyone who is presently happy with their current

spreadsheet program is to not invest in Busy-Calc. Busy-Calc was designed to fill the gap left by VisiCalc and Multiplan being taken off the market, giving the opportunity to those who presently need a spreadsheet to obtain one. Of course, one good thing about Busy-Calc is that it is currently the -only- full-featured spreadsheet program on the market that is -still- fully supported.

The fact is, although Busy-Calc is better than 95% compatible with VisiCalc, I had originally never meant for it to be so. My intent was to develop a spreadsheet program that simply did what spreadsheets were expected to do. But as the development of Busy-Calc progressed, I realized that as far as functions and commands were concerned, Busy-Calc and VisiCalc were becoming more and more similar. I think this was due mainly to the "common sense" approach that VisiCalc had taken. It provided the commands you would expect to perform a task, and in general provided the functions that most people would need. What I ended up with was a program that looked like VisiCalc, and in most respects functioned like VisiCalc (though MUCH faster).

The only commands that differ from VisiCalc is that Busy-Calc does not support windows (though it does support the more commonly used Titles feature), and due to lack of program space, the replication feature is more limited. Busy-Calc support all VisiCalc functions except for @CHOOSE (which can be emulated using @LOOKUP), and @NPV, which is probably the least-used function in VisiCalc (the fact is, when I asked several VisiCalc "power users" about the @NPV function, not one of them knew that VisiCalc even supported such a function -- let alone the fact that they did not know what such a function would be used for, though I'm sure there are a few out there who might).

Of course Busy-Calc also supports many features which VisiCalc lacks. For example, being a -former- VisiCalc user, I was always frustrated with the fact that the @SUM function allowed you to only sum on a single row or column, when what I actually needed to do was sum a whole range of rows and columns. Because many other users were just as frustrated, I built this ability into Busy-Calc.

#### VARIABLE WIDTH COLUMNS

A question a few asked was if Busy-Calc supported variable width columns. No, it does not. Like VisiCalc, it uses fixed-width columns, which can be varied enmasse. When I was first developing Busy-Calc, I experimented with this, and found that, like Multiplan, using variable width columns not only ate up a tremendous amount of program space, but also slowed the program down -considerably-. Because of this I chose not to support this feature. Also, because the space I allotted myself for program use was limited, supporting such a feature would also force me to drop other features. This I would not allow. I had considered using overlays to combat this problem, but several tests proved that this slowed the program down even more.

#### READING VISICALC FILES

Busy-Calc cannot read VisiCalc files. Those new to spreadsheets will not have your hearts broken over this, but those who may have a large VisiCalc layout library, and are wanting to move up from the Model III version of VisiCalc to the Model 4 mode (and no availability of Model 4 VisiCalc in sight), may be concerned. Because of this, included in the program listing section of this issue of CN80 is a BASIC program (see program listing number one) called VC2BC/BAS, which will convert a VisiCalc file (written using the /SS VisiCalc Storage Save command), to a form readable by Busy-Calc.

To use the program, type it into Model 4 Disk BASIC, save it to a file called VC2BC/BAS, and RUN it. You will be prompted for the VisiCalc file to convert. If you do not include an extension, /VC will be automatically added. You can include a drive extension if you desire. VC2BC will then take the name of the file and add a /BC extension for the Busy-Calc conversion file. You will then be asked which drive you wish it to be placed on. It can be the same drive as the VisiCalc file, since the VisiCalc file will not be altered. Once you answer the prompt, VC2BC will scan the VC file for format settings, and then begin translating the data to a form readable by Busy-Calc, and writing this data to the BC file. As VC2BC works on each cell, it will display the cell coordinate name it is currently working with. When VC2BC/BAS is finished, the BASIC Ready prompt will be

returned to. Now you can return to DOS by entering SYSTEM and then execute Busy-Calc and load the new file. Be aware that since the file will not have any pre-figured values present, as a normal Busy-Calc file will, you will need to type "!" to recalculate the spreadsheet in order to update its stored values.

Please be aware that VC2BC/BAS does not do any form of formula modification, except in the case of the VisiCalc @CHOOSE and @NPV functions, which will be converted to @ERROR. Also, be sure that the limits of the VisiCalc program does not exceed Row 63, as Busy-Calc supports only a spreadsheet size of 64 x 64 (40 x 100 if you applied the patches presented in Volume 3.7 of CN80).

Though most VisiCalc programs will translate without a problem, you should check to ensure that the formulas used in the VisiCalc program are compatible with the syntax required by Busy-Calc. Although VisiCalc can use the formulas used by Busy-Calc, Busy-Calc is more restrictive in order to "idiot-proof" the formulas. For example, in VisiCalc, you could use a formula such as @LOOKUP(A23/7,B8...B15). Busy-Calc will require that the "A23/7" sub-formula be stored in a separate coordinate, such as A22, stored (as expected) as +A23/7, and then you could use @LOOKUP(A22,B8...B15). VisiCalc can also use this latter format, which is also more commonly used.

One way to check for proper syntax is to compare the formulas against what is expected in the Busy-Calc Quick Reference Guide. However, I usually use the "bulldog" approach, which is to convert the file, load it into Busy-Calc, recalculate, and then look for cells reporting an ERROR (it seems to be much faster, as I seldom find error reports).

#### CONCLUSION

Now that we have been properly introduced to Busy-Calc, and now have a program to convert our favorite VisiCalc layouts to Busy-Calc format, we are ready to get into more general material. Send any spreadsheet tip, hints, or questions to me in care of Computer News 80. Lets get to building that next column. Happy spreadsheeting!  
-David Goben

## MODEL 4 PLAYS WITH THE BIG BOYS

by Douglas Kelly

### SHARING DATA

At the company I work for, "Do the job once" is an important concept. Computers can help by allowing a user to entering data just once and share that data.

### STANDARDS: Computers and Software

It helps to have a "standard" type of computer and software, but it is not always practical. Standards change over time. We now have at least three standards caused by advances in hardware and software. We have standard CP/M computers from the early 1980's, standard PC/XTs from the mid 1980's, standard ATs and Macintoshes from the late 1980's. Our software has also evolved over time. We started with Wordstar and Supercalc (in the early 1980's) we added Lotus 123 (in the mid 1980's) Now we have added Microsoft Word and Excel for compatibility between our MACs and ATs. We have many other types "non-standard" of software to contend with as well.

Many PC magazines talk about the "need" to upgrade to the latest and greatest. The cost of replacing the old hardware and software is often prohibitive. In our company (like many others) the PCs are used until they "fall apart" then they are replaced.

### MODEL 4: Still On The Job.

Trying to keep up with these "new" standards is difficult and expensive, especially when the money comes out of your own pocket. I have found it to be very cost effective to use my Model 4 for work-at-home projects.

I use my Model 4 to create text files that are incorporated into engineering reports, work instructions, and documentation. I transfer these files to MS-DOS disk using the Supercross version of Hypercross (I also have PC Cross-Zap). I take the disk up to the PC lab and upload the to files to a VAX 8810 via Kermit file transfer.

I can upload files from home via modem, but the dial-in lines are limited to 2400 baud. The direct lines in the PC lab are 9600 baud. Most of the time, I bring a disk to the lab and transfer my files. When using

my Model 4, Fast Term and a 2400 baud modem connects me to the VAX. Fast Term does not support Kermit protocol, but it is menu driven and easy to use. Fast Term also features VT100 emulation. I have not had the need to test this mode yet.

#### GENERATING TEXT.

On my Model 4 I generate text files using Scripsit. The Vax requires that certain codes be included in the text to make "pretty laser prints". I insert these codes into my text. Many are as simple as ".b" for blank line and ".p" for page break. Scripsit ignores these codes, so I can make check prints at home. No Scripsit formatting commands are included in the file, since that would confuse the Vax.

#### TRANSFERRING FILES.

##### FROM MODEL 4 TO PC (Supercross).

I save the text file to a working copy of my Supercross disk. After exiting Scripsit, I type SX4. Supercross is menu driven. The first menu asks what kind of DOS is on the Model 4, TRSDOS 6.X is my response. The next menu asks what kind of "foreign" disk I have. MSDOS 2X/3X single sided is my response.

This brings me to the main menu. The main menu contains functions for formatting a "foreign" disk, transferring files to a foreign disk, transferring files from a foreign disk and other options. If I do not have a MSDOS disk handy, I put a blank disk in drive 1 and choose the format foreign disk option. Next I choose the option for transferring files to a foreign disk. Supercross asks if I want to transfer just ASCII or an image. Since it is just text, I choose ASCII. Image can be used for basic programs, Multiplan files, Visicalc files, etc. When the transfer is complete, I exit Supercross.

##### FROM PC TO VAX (via Kermit).

I take the MSDOS disk to the PC lab. I put the disk into the floppy drive and type Kermit. Kermit responds with the MS-KERMIT> prompt. I type CONNECT and press the return key a couple of times. The terminal server responds with the LOCAL> prompt. I type C VAXA. The Vax then ask me for my user name and charge number. The Vax responds with the VAXA> prompt. At the VAXA> prompt I type KERMIT.

Kermit responds with the VAX-KERMIT> prompt. With both the PC and Vax talking "Kermit" I can transfer my file. At the VAX-KERMIT> prompt I type SERVER. Next I press the <CTRL> (right bracket"]") and <C> keys. This returns me to the MS-KERMIT> prompt. Now the Vax will do what the PC tells it. I type SEND FILENAME.TXT. Kermit transfers the file to the Vax. When it is done, I type the command BYE. This disconnects the PC from the Vax and exits Kermit. From the terminal at my desk, I do any final editing. Then I tell the Vax to format and laser print my document.

You can also move files from the Vax to the PC to the Model 4. Basically, you just reverse the process above. Most of the time, I need to send data up to the Vax. This procedure could be used with most any mainframe or mini computers, since Kermit is available on most of them. There are also CP/M versions of Kermit. The generic CP/M version of Kermit should work with Model 4 CPM. Using CPM-KERMIT> You can use the procedure above to transfer files.

#### USING MODEL 4 FILES ON PC

##### FROM SCRIPSIT TO MICROSOFT WRITE AND WORD.

It is also possible to use Model 4 files directly on a PC. The PC word processor I use is Microsoft Write. It is included with Microsoft Windows. To make the transfer easy I give my Scripsit files the extension /txt. Write looks for the \*.txt extension when it opens ASCII files.

To open the file inside Write, select the file menu. Choose open from the menu. Type the name of the file you want to open (i.e. A:FILENAME.TXT) and press return. Microsoft Write is used for simple text editing. When we consolidate documents into master report, we save our file in Microsoft Word format. From inside Write, select the file menu. Choose save as from the menu. Select Microsoft Word format. Type the name of the file you want to save (i.e. A:FILENAME.DOC) and press return. A secretary then consolidates and formats the final report. A couple of our Mac SE computers even read MSDOS disk, so the report can be "dressed up" and laser printed.

#### FROM MODEL 4 MULTIPLAN TO MICROSOFT EXCEL

I have not gotten a chance to test this out but the instructions below are based on the Excel Reference Guide. Save the Multiplan worksheet as a Sylk file. Select the Multiplan menu for TRANSFER OPTIONS COMMAND TRANSFER SAVE. Move the /SLK file to an MSDOS disk. To open the file inside Excel, select the file menu. Choose open from the menu. Type the name of the file you want to open (i.e. A:FILENAME.SLK) and press return. Excel automatically converts formulas and displays messages for formulas it can not convert. It will preserve values of formulas it can not convert.

You can even send data back from Excel. Select the file menu. Choose save as from the menu. Choose options and under file format select Sylk. Type the name of the file you want to save: (i.e. A:FILENAME.SLK) and press return.

Transferring to and from Excel works best with plain data (even for the MSDOS version of Multiplan). Some formulas may not transfer.

#### FROM MODEL 4 VISICALC TO MICROSOFT EXCEL - DIF FILES:

Visicalc DIF files provide a direct route to Excel. Save the Visicalc worksheet as a DIF file. Move the /DIF file to an MSDOS disk. To open the file inside Excel, select the file menu. Choose open from the menu. Type the name of the file you want to open (i.e. A:FILENAME.DIF) and press return.

You can even send data back from Excel. Select the file menu. Choose save as from the menu. Choose options and under file format select DIF. Type the name of the file you want to save (i.e. A:FILENAME.DIF) and press return.

#### FROM MODEL 4 DATABASES TO MICROSOFT EXCEL

Excel can also open and save a document that is normal text (ASCII), comma separated values (CSA), and dBase II. To load the files you use use the method listed under "DIF Files" (above). Substitute A:FILENAME.CSA (or DBF) for the file name. Using dBase II requires Model 4 CPM. Some Model 4 data bases can also write DIF files.

#### FROM MODEL 4 VISICALC TO LOTUS 123 TO EXCEL

Lotus 123 can import Visicalc via the Translate utility. Make sure the disk that contain the Translate utility is in the correct drive. Type TRANS at the DOS prompt.

Translate will ask "What do you want to translate FROM". Select Visicalc from the menu.

Translate then asks "What do you want to translate to". You may Select 123 release 1A (or 2) from the menu. You can also translate to Symphony.

DIF FILES: Visicalc DIF files are translated the same way. Translate will ask "What do you want to translate FROM". Select DIF from the menu.

When the Visicalc worksheet is saved in Lotus \*.WKS (or \*.WK1) format, it can be it can be directly loaded into EXCEL. Just use the method listed under "DIF Files" (above in the Excel section). Substitute A:FILENAME.WKS (or WK1) for the file name.

#### FROM MODEL 4 DATA BASES TO LOTUS 123

Model 4 dBase II files are translated the same way. Translate will ask "What do you want to translate FROM". Select dBase II from the menu. Using dBase II requires Model 4 CP/M.

Some Model 4 data bases can write DIF files. The DIF files can be imported via the Translate utility.

Lotus 123 can directly import ASCII files. Inside 123 press the slash "/" key. Select File Import. You have two options. The "Numbers" option treats each line of the file as Numbers and quoted labels. Everything else is ignored. You then enter the filename. It should have a .PRN extension.

The "Text" option treats each line of the file as a single label. The /Data Parse command is used to this column of labels into several columns of labels or numbers. The 123 manual details the use of this command. Lotus Magazine often runs article and letters the import and Parsing of ASCII

data.

I think 123 data can be converted to DIF and dBase II format. I do not have software or a manual, so I can not verify that is included with the 123 package. ASCII files can be created via the /Print File command, so it is possible to export data that way.

#### MODEL 4, THANKS FOR YOUR SUPPORT

I deal with computers so much during work, I have no interest in purchasing an MS-DOS PC for home use. Thanks so much for Computer News80. It allows me to get the maximum use out of my Model 4 when I do work at home. My computer usage includes VAX, Macintosh, IBM XT and AT clones. Of all the computers I use, the Model 4 is still my favorite.

-Douglas Kelley

(Editors Note:) As the article by Mr. Kelley points out, there is really no need to feel that your TRS-80 computer can not talk to other computers and as Lee Rice's work with laser printers also points out. There is no need to switch to an IBM just because you don't think that it will do the job that an MS-DOS machine will do.

The price of the MS-DOS computers is falling every day, but still quite expensive, and the price of any major piece of software that is being pushed for them is out of sight.

Therein lies the food for thought. At one point in time you could get quite a bit for your used TRS-80 - not so any more. It only makes sense that you could be a two DOS user, many of our subscribers to CN80 are. And the reports keep flooding in to the effect that people are really glad they kept their TRS-80 computer even though they have added an MS machine. The bulk of the messages we get say "I can do so many things on the TRS-80, faster, simpler and without a lot of expensive hardware. For a lot of applications I use it more than I do my MS computer." It is really a shame that so many have practically given their Model 4s away for a few dollars, only to find out after they get started on a new MS computer that they wished they still had their TRS-80. As we said the prices are such now that you can afford to be a TWO-DOS user. And if you can't afford to be a TWO-DOS user now, then don't fret

your good ol' TRS-80 will do a lot of things I bet you didn't know it would do. Even things that Mushy/Messy Dos can't do. -Ed.

#### A VISIT WITH DAVID GOBEN

by David Goben

#### PROGRAM BUGS

In my DEA package, I found an obscure bug in my CREF Cross Referencing program. It is small, and you will not find it if it is processing referenced or included files that are less than 128 sectors (16K) in length. Because of this, I think that is why no one has yet reported this problem. Needless to say I write big ones, and that is probably why I found it first. By the way, those of you who do machine language programming with DEA and have not used CREF don't know what you are missing. This program gives you a -highly- detailed map of what labels are used where, and by what files at any location. Using such a "map" allows you to make major changes in a program without missing anything, because you can check the list to see what other routines might be affected by each change.

Anyway, to fix this bug for CREF version 1.0.0, from the DOS level, use the PTCH/CMD included in the DEA package to apply the following 4 patch lines (notice that PTCH uses the same syntax as Model III TRSDOS 1.3 PATCH):

```
PTCH CREF (5A60,FIND=F2,CHG=C3)
PTCH CREF (5A8F,FIND=20,CHG=32)
PTCH CREF (5B99,FIND=CD,CHG=C4)
PTCH CREF (5E93,FIND=30,CHG=31)
```

If you have obtained the Version 2 enhancement upgrade, you should instead use the following 4 patch lines:

```
PTCH CREF (5A60,FIND=F2,CHG=C3)
PTCH CREF (5A8F,FIND=20,CHG=32)
PTCH CREF (5B90,FIND=CD,CHG=C4)
PTCH CREF (5E89,FIND=30,CHG=31)
```

Be sure you are using the right patch. If the patch did not 'take', then you probably used the wrong version of CREF (or the problem as already been fixed). Simply type

CREF and the version number will be displayed.

While I am on the subject of CREF, you may notice that it will not accept a "\*GET" or ".GET" command, although it will accept "\*INCLUDE" or ".INCLUDE". CREF had been written before I had decided to add "\*GET" as an alternative to "\*INCLUDE". Therefore, if you plan on using CREF, be sure to use the \*INCLUDE directive instead of the shorter \*GET. If you, on the other hand, prefer using \*GET, then you can patch CREF to accept it, but you cannot afterward use \*INCLUDE, unless you "reverse" the patch. The patch for version 1 of CREF is PTCH CREF (ADD=6123,FIND=49,CHG=47). For version 2 of CREF, the patch is PTCH CREF (ADD=6119,FIND=49,CHG=47).

#### PRINT/CMD BUG

In DAVID'S MODEL 4 SYSTEMS UTILITIES PACKAGE, version 1.3 of the PRINT/CMD program has a bug in it. Apparently when I was adding comments to the source listing, I added a couple of misplaced block comment markers that caused a portion of the program not to be assembled (and I thought I was doing myself a favor by clarifying the program comments). This patch upgrades PRINT/CMD to version 1.4. You can check your version of the program by simply entering the command PRINT from the DOS level (providing PRINT/CMD is on a mounted disk). If the version is 1.4, then the patch has already been applied. If it is version 1.3, you must build a file called PRINT/FIX, and enter the following lines:

```
. PRINT/FIX
. UPDATE PRINT/CMD 1.3 TO 1.4
. DAVID M4 FILE UTILITIES
. Apply using:
. PATCH PRINT PRINT
.
X'2649'=00 03
X'2656'=CD A1 29
X'265E'=00 02
X'2671'=CD AB 29
X'26C1'=34
X'29A1'=57 79 87 87 81 87 82 4F 23 C9
X'29AB'=57 79 87 87 87 18 F4
. EOP=====
```

Press BREAK or SHIFT-CTRL-@ and apply the patch using the command PATCH PRINT PRINT.

## DOING IT ON A LASER -- PART 3

Some of you are probably aware that I have been working on a SuperSCRIPSIT and a Scripsit PRO driver for the laser printers. I have recently completed a test version of my FX-80 mode support version. What's nice about it is that even though the FX-80 (mode) does not support proportional spacing, I have made use of the double density graphics mode within the FX-80 command structure to in fact do this, so that the FX-80 will in fact support such a feature. I've also been testing this driver on my Epson Apex 80 (also called the Action Printer). In fact, it will support any Epson dot matrix printer that supports the double density graphics mode (120 dots per inch). The results are quite impressive. The only draw-back is that it prints much slower, since it is actually sending more data to the printer because of the constant switching between text and graphics modes. I also have a test version that will support the LaserJet (mode). The next step is to allow changing fonts in justified text (currently possible within the same point-sizes). This project is getting pretty exciting. So stay tuned to this column.

In our last installment, we learned how to make the laser printer friendlier to our TRS-80's by sending automatic linefeeds after carriage returns. We also learned how to cause it to do line wrap, in case we may be printing long program lines in a listing.

The next thing we must be aware of is how the printer works with paper, as far as it kicks out printed text goes. No, I am not going to bother telling how the photoconductors do their thing, or talk about corona wires and other esoteric trivia -- leave that for the many books already published on the subject, as though that info concerns us daily joes. What we will cover is what you see on the paper after it has been printed.

#### TEXT FIELDS

We have learned in our last installment that the start-up defaults are 10 pitch (fixed) Courier. We also learned that we could change this to 12 pitch using the CHR\$(27)"&k10H"; lprint command, which tells the Horizontal Motion Indexing mechanism that each character will fit in a space 10 "units" wide, rather than 12 (10

units gives it a narrower space, so more characters can fit on a line). We could change this to 15 pitch by reducing the Horizontal Motion Index to 7.

The formula for setting the "pitch" value using the standard Courier 10 font is  $10 - nn + 12$ , where  $nn$  is the desired pitch value. Thus for 12 pitch,  $10 - 12$  equals  $-2$ , plus 12 equals 10. Thus we use `LPRINT CHR$(27)"&k10H"`; to select 12 pitch. Of course this range is limited, because we are still using the same point-sized (12 point) font. If you noticed, the previous statement gave you an important clue about laser fonts: the point size is also the Horizontal Motion Index offset!

But going on, we should also be aware of the printable text limits upon the page. The start-up default on the laser is 6 lines per inch of vertical space on a standard 11 x 8.5 inch sheet of paper. Also, the printable field is limited to 1/2 inch below the top of the page, and 1/2 in. above the bottom of the page. Horizontally, text begins 1/4 inch in from the left edge of the paper, and 1/4" in from the right edge of the paper. What this means is that when using a laser printer, we should also work with "logical" page dimensions rather than "physical" page dimensions. Thus we should see an 11 x 8.5 sheet of paper as a logical 10 x 8 sheet of paper. What all this ends up being is 60 lines (10 inches) of text that is (at 10 pitch) 80 characters across. At 12 pitch we have 12 times 8, or 96 characters on a line.

The important thing you must remember about these margin limits for our "logical" page is that you must adjust your document defaults within your word processor accordingly, since the text output will start 1/4 inch from the left of the page, and 1/2 inch down from the top of the page by default.

If you desire to change the number of lines per page, you can do so quite easily. First, suppose you want to print text as 6 lines per inch on legal sized paper, which is 14 inches long, or 84 physical lines (14 times 6), we must tell the printer to change the page length from the default of 66 lines (60 printable). We do this using the `CHR$(27)"&/48P"`; command (please NOTE that the slash "/" should be typed in as a lower-case L, as I explained in my last

installment, as the lower case L and the number 1 (one) are almost indistinguishable on the printed page). This sets the page up for 48 lines (42 printable).

If, however, you wish to change the lines per inch instead of the page length, you would use the `CHR$(27)"&/nD"`; command, where "n" represents the desired lines per inch. By default, the printer is set to 6 lpi, but we can easily change it to 8 lpi by using `CHR$(27)"&/8D"`; . We can change it back to 6 lpi by using `CHR$(27)"&/6D"`;

Another feature worth examining is forward and reverse half linefeeds, important for superscripting and subscripting. The LaserJet PCL contains a command that allows you to control the positioning of the cursor position (print position) in relation to the currently set lines per inch setting. This command is in the form `CHR$(27)"anR"`; , where "n" is the number of lines to move the print position, led by "+" or "-". For reverse (upward) motion, you would use a negative value. You can also use fractions. For a reverse 1/2 line feed, you would use the `CHR$(27)"a-.5R"`; command. A forward 1/2 linefeed is even easier, since the LaserJet PCL contains another command specifically for this purpose, which is `CHR$(27)"a+.5R"`; . This is -much- shorter than using `CHR$(27)"a+.5R"`; to accomplish the same thing. Another feature that you may wish to take advantage of is the Specify Top Margin command. This may be important if your word processor simply begins printing at the currently set printer head position, and does not do any initial line advanced for a top margin. This may work fine on continuous feed paper, but unlike standard printers, when the laser ejects a page, it does not automatically roll the "pinch roller" forward. The LaserJet PCL contains the `CHR$(27)"&/nE"`; command, where "n" specifies the number of lines to be skipped (and "/" should be a lower case "L"). If you wish the top margin to be 1 inch from the top at 6 lines per inch, you would use the `CHR$(27)"&/6E"`; command. Of course you must also adjust your page length accordingly. Experimentation may be in order to get the right compensation.

Of course, even though the laser does not operate on paper the same way that a continuous feed printer might, the laser



=does= have, oddly enough, a Perforation Skip Mode. This is handy because when printing to the laser, the "printer head" might enter into the "invisible" bottom margin area, where it will "think" it is still printing. A way to avoid this is with the CHR\$(27)"&/1L"; command. This tells the laser to stop printing at the bottom margin and continue printing on the top (visible) margin of the next page.

#### CONCLUSION

We now have enough information to properly format the printed text on our printers and to communicate in a friendly fashion with the TRS-80, although you should look on your own at your printer manual and study some of the "neat" featured not covered here, such as how to set horizontal margins, or setting text length (as opposed to page length). Things will get more interesting when we get into downloading fonts from disk, which will be covered in my next visit. So stay tuned, and happy computing!

-David Goben

(Editors Note:) The following are Dot Matrix and Laser Print drivers currently available which are published and distributed by Computer News 80. More are to follow such as an Allwrite print driver for the inkjet printers and other possible drivers based upon the demand.

David Goben's Laser Print Drivers and Dot Matrix FX-80 drivers presently consists of four separate disk packages with documentation. These drivers will also support Laser Printers in the FX-80 mode, but for the best results you should use the print drivers programmed to support the HP mode on your laser printer. They are:

SuperScripsit HP Laser driver for Model I, Model III, and Model 4/4P/4D SuperScripsit.  
Price: \$20.00

Scripsit Pro HP Laser driver for Model 4/4P/4D Scripsit Pro.  
Price \$20.00

SuperScripsit driver for FX80 (compatible) Dot Matrix printers for Model I, Model III and Model 4/4P/4D Superscripsit.  
Price \$17.95

Scripsit Pro driver for FX80 (compatible) Dot Matrix printers, for Scripsit Pro Model 4/4P/4D.

Price \$ 17.95

Lee C. Rice and Gary Shanafelt's HP Laser Support Package for Allwrite consists of one set of disks and documentation.

Price \$20.00

Add Shipping and Handling for the above packages. \$2.00 for delivery in the US, \$3.00 for AK,HI,FPO,APO and Canada. Others add \$4.00 per package.

All of these drivers will support proportional print spacing with right hand justification. Proportional printing with right hand justification has been lacking in all the previous print drivers that were produced for these word processing programs.

The File Cabinet will have a separate section devoted to Downloadable Softfonts that can be used on Laser printers. We hope to have most of them available in time to publish the list in our next issue.

We welcome your suggestions and requests concerning these packages. A Custom print driver service is also in the works, but more on that in later issues.

We certainly appreciate all the work that has gone into the development of these support packages by the various people involved. We sincerely hope that you will appreciate them too.

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## Times Roman

Proportional pitch, with serifs

normal 24 point

## Helvetica

Proportional pitch, without serifs

normal 24 point

**BOLD TIMES ROMAN 10 POINT**

*ITALICSS TIMES ROMAN 10 POINT*

TYPEWRITER Typewriter

Typewriter bold

## MARK REED'S MODEL 4 UTILITY DISK REVIEW

by Henry H. Herrdegen.

Mark has come up with 6 short (1.5K each) programs, for TRSDOS 6.2 or LS-DOS 6.3, which could close a gap in your file of the many published utilities for those DOSS.

The first one, CMDEDIT, lets you correct a typed DOS command in the manner of a word processor, move the cursor left and right, insert, delete and over type. If the machine comes back with an error, up arrow will bring the bum command back on the screen, to correct it without retyping the whole shebang. But, most disturbing to me, it cancels the command repeat feature, <CTRL><R>, if you have it. Once installed, it announces itself by a colon after the ready prompt, and it can be SYSGEN'ed. It requires the SYS13/SYS file be on the disk.

The second, CMDSTORE, could be of use if you are using a limited number of long DOS commands a lot. If activated, it stores any command you type in high memory, and you can scroll thru this list with the up/down arrows, then just punch <ENTER> to invoke the shown command. The default is five, but it can store up to 16 commands. It's quicker to type DIR then to scroll thru 16 commands, the trouble is, that if your pre-set command file is full, and you type another command, it will replace one in storage, but which one, you will not know, unless you look at the list again. CMDEDIT can alter stored commands, as they are recalled.

The MAPMEM command will show you the memory modules presently installed in low and high memory. It will show for instance, that CMDSTORE (the module for some unclear reason called CMDEDIT), set to 16 lines, occupies high memory from X'FBFE to X'FFFF, 1281 bytes.

RECLAIM can remove high memory modules, especially filters which, to quote the author, "are not smart enough to remove themselves". You have a choice to state the number (default=1) of modules you want removed, up to 255, or an "A" option, which will try to remove all unused modules, and, if encountering one still in use, will show an error, and return to DOS.

The next, SWAP, is supposed to exchange disk drive numbers. The manual implies, by not mentioning dr 0, that 1, 2 & 3 can be swapped. Which appeared to be true, since a SWAP :0 :1 results in the infamous ERROR 07H. Having only 2 drives, I could not verify this item. The idea is, if your program wants to save data on dr 1, but you want them on a disk in dr 3, you could fool it by swapping drive numbers.

The last, UNFILTER, lets you selective remove filters from a device, without using the general RESET command, removing all filters, and then re-installing the ones you wanted to keep. It does not remove the memory module, that has to be done with the RECLAIM, and the name of the module will be shown by MAPMEM, if you haven't documented it.

The slim, 10 page manual is professionally printed, stating what each file does and how the command syntax is arrived at, but gives no command examples, as Chris Fara's manuals did so enlightening. But then, it's not really necessary, for the simple commands used.

All in all, a useful addition to ones utility library, albeit a bit pricey at \$14.95 the disk \$2.00 S&H, as advertised in CN80.

An afterthought: if you run LS-DOS 6.3.1, the password required to install the CMDEDIT is not "LSIDOS", but "SYSTEM6", as Mark has written in his "CORRECTION" in the August CN80. This is not a "BUG", but something the powers to be try to confuse us with, by changing passwords, writing hex numbers with a trailing H or a leading X', and so forth.

-Henry H. Herrdegen

## LIVING IN A WELL-DEFINED WORLD

(Back to the Basics...)

by David P. Miller

It would seem that I fell into a common trap in last month's issue. People like myself that work in highly technical areas tend to forget the many years it took to learn what we now take for granted. After

all, once I thought I knew everything and actually knew nothing; now I know a little more and begin to realize how ignorant I truly am! In writing articles this leads to assumptions about the knowledge of the reader and I sometimes forget that the audience ranges from the novice to the expert. This is especially true in the light of the recent "fire sale" of Model 4D's. If my previous article was excessively technical for anyone, please accept my apologies; this month I'll address some of the basic concepts of high-resolution programming.

#### A HISTORY LESSON

When the TRS-80 Model I was first produced, memory chips were quite expensive and most home computers (all kits!) contained less than one kilobyte (1,024 bytes) of useable memory. In fact, the Model I was manufactured without lower-case character display capabilities to save the cost of 64 BYTES of memory! Anything displayed on a computer screen is a reflection of information stored somewhere in the computer, so a screen display of 64 columns wide by 16 rows high required a minimum of 1K of dedicated memory. In order to provide some sort of graphics capability, a special character set, called "block graphics" was provided. Since the character codes from 0 to 127 were defined in the ASCII standard according to how they had been used in the bad old days of teletypewriters, and the maximum value of a byte is 255, this left the remaining 128 ASCII values available for graphics and other uses.

However, the fact that graphics data had to be represented by values higher than 127 meant that only 7 bits could be used to tell the Cathode Ray Tube Controller (CRTC) which dots to display. A character position is a rectangle, and it would be impossible to evenly break a rectangle into 7 parts, so a convention of six dots per character position was developed. This is the low-resolution graphics mode provided in all TRS-80's. A character position was broken down to corresponding values in the following manner: a '1' meant to turn on a dot in the upper left corner of the character position, '2' for the upper right, '4' and '8' for the left and right center, and '16' and '32' for the bottom two dots. Adding 128 told the computer to process

the byte as graphics data. This still left the values from 192 to 255, which were used for tabbing codes.

In the Model III and 4, the values from 192 to 255 were replaced with special characters, but a mode was provided to permit compatibility with the old Model I tabbing characters.

When RAM prices started to drop, high-resolution boards were developed containing more video-dedicated memory, and a convention of 8 dots across a character position by 10 dots high was developed, corresponding to the maximum capabilities of the display. The smallest dot your TRS-80 screen can display can be seen by looking at the size of a period. In the Model 4, a connector and additional logic was provided to make installation of such a board simple. The methods of addressing the H/R board were covered in the last column, and I trust will make more sense now if they were confusing before.

#### ABOUT PRINTERS

Up until about 1979, the capabilities of most desktop computers were pretty much on a par. The main difference was that some computers were capable of color while others remained in monochrome (black and white, at that time). From the period 1980 on, the elements used for graphics (called 'pixels') became small enough to be called "dots" instead of "blocks". With these improved graphics display capabilities it was only a matter of time before printer manufacturers provided corresponding modes, referred to as "bit image graphics modes" to print out images. The first such mode was "normal density" or 60 dots per inch across the paper by 72 dots per inch vertically. When an image was printed turned on its' side, the result was fairly close to the screen display. This close approximation resulted from 'aspect ratios', or vertical dot density vs. horizontal dot density being similar on paper and video screen.

As the resolution of screen displays increased, more such modes were provided on printers. The standards today are "normal density" to maintain compatibility with older programs, "double density" or 120 dots per inch, and "quad density" or 240 dots per inch. At this point the printer

manufacturers stopped coming up with names and just specified the maximum dots per inch in their documentation. In addition, several printers (especially the older ones) provide some form of "block graphics" similar to the original concept used in low resolution displays. These block graphics are actual characters that can be printed in the same way as "A" to "Z", as opposed to the various bit-image graphics in which placement of each individual dot on the paper is controlled by the program.

All graphics-capable printers can print something close to normal density to obtain screen prints, and most are capable of double density for more detailed work. Most also use Epson/IBM escape codes to tell the printer to perform these functions. Quad density, while providing much better print quality, is not as universal and so is less often used by programmers wishing to market their products to as many people as possible.

-David P. Miller

#### THE ULTIMATE MODEL 4 by Christen M. Jespersen

Have you ever wished that you could get more on your single sided 180K disks? A case in point is trying to put additional files on the LSDOS 6.3 system disk. Unless you remove some of the files there are only 1.5K available to put any applications on the boot disk.

This problem has been resolved by many Model 4 owners by removing the 180K drives and installing 360K two sided drives, thus making an additional 180K available for programs, as well as accompanying data files. Even here it is possible to run out of disk space, especially with things like data base or word processing programs.

Being a tinkerer, I was intrigued with the prospect of carrying updating of the Model 4 to its ultimate lengths by going the next step short of getting into hard drives. This, of course, is the 3 1/2 inch 720K drive, and much to my surprise involves no more effort than putting in the 360K's. For those of you

who have not done anything along this line I will outline the steps necessary in moving up from the single sided 180K drive setup.

The first step is to lift the top off the computer by removing the ten screws from the bottom, paying attention to which of the three different types go where, and then the one which resides at the top of the back. As has been pointed out many times before, pull the power plug first, give the CRT time enough to lose its charge, and make sure the the terminal end does not snag the wires at the inside top rear when lifting off.

If the original drive cable is still hooked up it will be necessary to remove the cover from the motherboard in order to make the substitution with a revised one. This must be done for two reasons. First, the present cable must be twisted, since the card edge connectors on the new drives have the number one pin on the opposite side from the original equipment. Since the old cable is not long enough to reach after the 180 degree twist it cannot be used. In addition, there is no connection on pin 32 of the old cable, and this must be corrected when the new connectors are installed.

If your machine has already been updated with two sided drives there is no further work to be done on the cables.

My experience has been limited to Teac 720K drives, but most of the manufacturers follow the same standards so as to allow drop-in installations in the IBM compatibles. Just make sure that whatever you buy includes the 5 1/2 inch adaptor package. Although the 3 1/2 inch drives use only 5 volts the connectors are keyed properly for the standard power source that is found on the Model 4. You will notice that there are only two wires on the new drive plugs, the 12 volt line being absent.

Now, before installing the new drives they must be configured correctly. Normally, they come through jumpered for drive :1 which is usually indicated as D2. They will work very nicely as is in the drive :1 position, but drive :0 must be jumpered for D1. To make matters worse, some drives are marked D0, D1, D2, and D3. If this be the case then simply use the first two positions, D0 and D1. The drives can now be inserted

in the appropriate bins, hooked up with power and signal lines, and checked for proper operation. If there is any problem at this time it is more than likely a case of the drives not being jumpered correctly.

Assuming that all is well, the computer can now be put back together again, once more being careful not to snag the terminal end of the CRT on the wires at the top of the motherboard. The spaces at the top of the drives can be covered very nicely by using the filler plates advertised in the February 90 issue of Computer News 80 in the classified section. The kit also includes the required metric screws used to secure the drives to the tower. These filler plates must, of course, be installed before the drives are locked in place.

It is suggested that initially only Drive :1 be installed. This allows the backing up of your system and application files to the new 3 1/2 inch disks. Formatting is quite simple, and consists of typing the FORMAT command and responding to the various queries by entering "D" for density, "2" for sides, and "80" for number of cylinders. Once the disk has been formatted it can be backed up by entering the command "Backup :0 :1(I,S)." The computer automatically goes into the "Backup Reconstruct" mode to allow for the difference in disk capacity.

Once a boot disk has been created and several copies made it becomes possible to change both drives to the 3 1/2 inch type, thus allowing for 1.4 megabytes of capacity on line. The practical effect of all this is that all word processing files can be kept on the same disk as the complete DOS system and the word processing program. The same would, of course, apply to data base programs as well as any others that have extensive data files.

Another benefit resulting from this conversion is that the quality and structure of the new disks are considerably better than that of the 2S-DD 5 1/4 inch type. The 3 1/2 inch disks offer more convenience of operation and better protection for the valuable data which they contain. And, if nothing else, think of the fun you will have with this project!

-Christen M. Spersen

Chris' article arrived just in time for this issue, as we are announcing the availability of 3-1/2" disks, double sided, double density 720 K disks in this issue at a fantastically low price of 73 cents each. And as usual you don't have to buy a boat load to get this price. These 3-1/2 disks are unmarked, but they are manufactured by a major US disk manufacturer and are the same disks that they put in their marked boxes. The best retail price we found for these or disk of equal quality was \$1.19 for 10 or more. Add \$2.50 S&H in the US for up to the first 10 3-1/2 disks and an additional \$ 2.00 for additional 10 disks per order.-CN80

#### TIPS FOR UNDERSTANDING PRINTER TERMS AND USING PRINTER FONTS. by CN80

A font is a collection of characters with a consistent size and typeface style. Typeface refers to the appearance of the character. Most typefaces available today on most printers come in two styles.

ROMAN TYPE, of which this magazine uses for the main text section is PROPORTIONALLY spaced, with SERIFS. The Roman type style originated in the carvings of ancient Rome. Proportionally spaced means that each letter is a different width and Serifs are the little feet or marks at the end of the main body strokes of the letter. Roman type is the most readable kind of type because the serifs added to the letter lead the eye from one letter to the next, and forms a visual line to follow. This type is generally used in most printed books and magazines. Roman type should never be underlined, it is common to use italics or bold printing to emphasize a word or phrase. Originally underlining was used on typewriters to replace the fact that they did not have italics or bold letters on their strike arm.

Helvetica, Gothic, Geneva and others are SANS-SERIF typefaces. Our program listings use this style of type in the standard 12 pitch mode. That is 12 characters per inch, each using the same amount of space per character. Sans-Serif do not have any fancy

feet or added strokes to the end of the main body strokes. This style of type can be very tiring to read for long periods of time. It is well adapted for use with short captions, headlines, ad copy, and for program listing because it has a cleaner or more distinct look per letter. And of course is easier read by electronic postal scanners so it makes the perfect type style for address labels.

Other novelty typefaces include such type as old english, hollow, and shadow type should be used sparingly or for posters or for attention getting titles in advertising copy, or letterheads.

#### POINTERS TO AVOID COMMON TYPESETTING MISTAKES.

When using proportional spaced fonts, you should remember that all letters are a different width, and when laying out your document you should use tabs and not spaces as you would on a typewriter, or when using fixed pitch spacing, such as 12 or 10 pitch, to line up columns.

Don't justify everything, unless you are using a proportional spaced setting. With fixed pitch a ragged right is easier to read because there is less space variation in the line of the text. Most printers that have proportional settings or if you are using a word processing print driver with proportional spaced print settings, will have right hand justification already built into the printer or print driver.

Don't use more than one or two fonts in a single document. (Typeface style, italics, boldface, and different point size heights, count as one font.) Multiple-font documents are almost always ugly. Novelty typeface styles can be very hard to read.

Last but not least, it is nice to be fancy, but you should standardize your documents, pick a style you like and stick with it. Don't face each document as if it is a new painting by Michael Angelo. Individually designing each new document takes time. But you can have the pleasure of seeing your work under different typeface (font) styles. Print your whole document several times using several different fonts and point sizes, (one font per document, remember) pick the one you like the most, rather than include several fonts on a single page.

The discussion above is not intended for or in reference to desktop publishing, which is a whole different ball game, it is intended for use in the creation of business letters, letters to friends and family, screen dump print outs, program printouts etc. -CN80

#### HBUILD6 and XROM/XDROM/4P-ROM by Arthur N. McAninch, Jr.

M. A. D. Software, P.O. Box 331323, Ft.Worth, Texas 76163, is producing specialized replacement ROM's for the Model 4/4P/4D computers along with some very helpful software and utilities.

This is a review of their XROM which replaces the "C" ROM in the Model 4 and allows it to boot directly from the Hard Disk drive without using a "Start-Up Diskette." As far as this author is concerned, this is the greatest little addition to the Model 4 since it was first plugged it in.

The XROM, XDROM or 4P-ROM is a single 24 pin EPROM which M.A.D. Software programs in several different versions. The specific version you need to order will depend upon whether you have a Model 4 non-gate-array, Model 4 gate-array, or a Model 4P. The other important criteria is what kind of Hard Disk Driver you are using: R/S TRSHD6, Misosys RSHARD6, Misosys MSCSI6, Powersoft Series RS, or Powersoft Series I.

When you initially order the ROM, you should order it with the software, HBUILD6. This software is also tailored to your particular hardware configuration. The software includes several valuable utilities. HBUILD6/CMD is the primary piece of software that modifies the SYS0/SYS and the BOOT/SYS on the first head of your Hard Disk. It supports placing the hard disk drivers in low or high memory. There is a new utility, FORCEHI, that allows you to force drivers to be placed in high memory instead of low memory. Another utility, XLR8SET applies the Houde patches to a system at run-time. FINDZERO locates which logical disk drive starts on head 0

(zero-based) of the primary hard disk drive.

Ordering information specifies that you should order a new "A" ROM if your non-gate array Model 4 was manufactured in 1983. The new "A" ROM has the checksum of 8F46. In addition, the older non-gate arrays have an outdated character generator which M.A.D. can supply a replacement for. My primary Model 4 is such a machine, so I ordered a new "A" ROM, a new character generator, and the HBUILD6 and XROM for the Misosys RSHARD6 driver (their part number 4BHB652). Since I am a Texas resident, I had to add the 6.25% Texas sales tax. I also added \$3.00 for shipping as per M.A.D.'s instructions. I enclosed a check, and I mailed the order on July 5. According to the Invoice that accompanied the shipment, M.A.D. received the request on July 9, processed the order on July 14, and shipped it on July 17. I received it July 18.

The order arrived safely packaged in a cushioned envelope. There were the three EPROMs in separate plastic chip holders along with some of the best documentation I have ever received. The installation of the XROM is about as straight forward and as simple as it can be; however, if you have never opened up your computer before, PLEASE take time to read through the instructions COMPLETELY and CAREFULLY BEFORE you begin. Separate instructions were provided for installing the "A" ROM, for installing the Universal Character Generator, and for installing the XROM. With each set of instructions, you are told that the installation will take about 30 minutes. Since I have opened and modified my computers numerous times, I skimmed the instructions to be certain there were no unusual requirements, and then proceeded to install all three chips at the same time. A total of 30 minutes were required from the time I disconnected all peripherals, opened it up, replaced the chips, closed it back up, and reconnected all peripherals. I then turned it on and performed the checks M.A.D. suggests. Absolutely no problems were experienced.

Then I read the documentation for HBUILD6/CMD as well as the READ/ME file and the HBUILD6/UPD file on the diskette that came in the package. After backing up the diskette and storing the original, I

issued the command HBUILD6. I was soon informed that I needed to replace SYS0/SYS on my Hard Disk with an unpatched copy of the original! This I promptly did. I then reissued the command HBUILD6, and within seconds I saw the message "Hard Disk Boot Track Installed Successfully." I had my original SYS0/SYS file patched to allow easy DATE and TIME entries on boot-up as well as a personalized boot-up greeting based on some of David Goblen's patches he released for LS-DOS 6.3.0. I am running 6.3.1, and I had reworked the patches for the new locations. Obviously, the HBUILD6 patches conflicted with mine, so I spent the rest of the evening working out why, where, and how to change them. The next evening I installed my new personalized patches, and realized I don't even need to have physical drive 0 even on line at all. So I used SYSTEM(DRIVE=2,DISABLE,DRIVER="FLOPPY") and assigned one of my external 80 track double-sided drives to that slot and then SYSGEN'd the result. Now, I leave nothing in physical drive 0 and the door open, simply turn on my computer, and SHAZAM! The screen is instantly filled with the boot-up greeting which reflects the M.A.D. copyright notice. No more waiting for the floppy drive to read in the boot track and then read in the SYS0. It's all done from the hard disk in a flash.

For those who may have the NETWORK 3 or the NETWORK 4, by simply holding down the 3 key or the 4 key, the XROM will cause the computer to boot from either of those networks, respectively. Also, by holding down the BREAK key, you can boot to CASSETTE BASIC. According to the documentation, another feature to the XROM is that by using the CTRL key you can obtain all 128 ASCII characters on the screen from the keyboard; however, mine doesn't work that way. I have to press the CLEAR key with their given keys to obtain the specified characters. The XROM and HBUILD6 are compatible with LS-DOS 6.3.1, LS-DOS 6.3.0, and TRSDOS 6.2. The interrupt handler will process more than one event per hardware interrupt thus making RS-232 communications more reliable. The clock and date functions in the Model III mode will run at the correct speed regardless of what speed the CPU is running at.

The OOPS utility is extremely handy for

those of us who are poor typists, and still try to peck away at 40 wpm with mistakes. Ever enter a DOS level command that is involved and press ENTER, and only then realize you misspelled the command? After the "File Not Found" or "Syntax Error" message, you have to retype the whole command with gritted teeth! Not any longer! Simply type in OOPS, press enter, and use the arrow keys to move the cursor to the line on the screen you wish to edit and press ENTER again. Now, edit the command to your desire, and press ENTER once more. EUREKA! It works. The documentation indicates that M.A.D. has a version of OOPS/CMD available for LDOS.

M.A.D.'s documentation explains that the only software that has been found to be even partially incompatible with this ROM is Model III Superscript, but they furnish a patch for it to run normally. For those of you that have 4P's, you may have a personalized identification installed on a customized ROM for an additional fee of only \$10. This custom ID may have up to 92 characters such as your name, address, telephone number, social security number, and driver's license number.

**SUMMARY:** The XROM, XDROM, 4P-ROM is the most valuable modification you can install on your Model 4 if you have a hard disk. For approximately \$30 or so, you can sit back and relax and let the thing do it for you! As soon as I finish typing this review, I'm ordering an XDROM for my gate-array Model 4.\*

Imagine my surprise, when I received in the mail a letter from M.A.D. software only a few days after mailing them my order for another XROM for my gate-array machine! I had sent them a copy of the review I wrote (\* the preceding paragraphs) along with the order, and they responded instantly with the answer to my question about my inability to get the special characters from the keyboard using the <CTRL> key. Allow me to quote their response:

"We suspect the problem you are having with the new keyboard driver is caused by a misunderstanding of how to use it. The keyboard driver in the ROM (ours or the original) is only used when the machine is running in Model III mode. So TRSDOS 1.3, ROM BASIC, LDOS 5 and other Model

III-mode operating systems are the only places where you will see a difference. All Model 4 operating systems provide their own drivers, and you will not see a change in those environments.

"If you are using LDOS 5, the ROM keyboard driver is used unless you load the LDOS keyboard driver with the command SET \*KI KI. This overrides the ROM keyboard driver, and the improvements are no longer available.

"To test the keyboard driver changes, hold down <BREAK>, press RESET and go into ROM BASIC. At the READY prompt, hold down <CTRL> and press any of the keys noted in the documentation. The characters listed will be produced.

"We hope this explains the situation you have noted. If this does explain the problem, you may want to update your review.

"One other comment about your review. You state 'When you initially order the ROM, you should order it with the software, HBUILD6.' To us, it seems that you are suggesting that a person should just buy ROMs for additional machines and use the same copy of HBUILD6 to initialize these machines. This is not correct. The license agreement for HBUILD6 allows it to be used on a single CPU only.

"The ability to order individual ROMs was intended only for persons who wanted the other features of the ROM and did not own a hard disk. Since we want to keep the prices down, we ask that your article respects this policy. If this was not your intent, our apologies, but we are sure you can see how this statement could be mis-interpreted."

Indeed, I stand corrected! In fact, I have egg on my face! I know full well that the Model 4 operating systems have their own keyboard drivers, and that the ROM keyboard driver is not used in the Model 4 mode. I just wasn't thinking straight. Sure enough, the XROM will provide all the special characters right from the keyboard IN THE MODEL III MODE using the <CTRL> key just as M.A.D. says it will!

As to the ordering of the individual



XROM's: be certain to order the PACKAGE of HBUILD6 with the appropriate ROM for each Model 4/hard disk set-up you intend to utilize this superior soft/hardware on. I have inquired about a site license for the HBUILD6, and I feel certain this would be available. I am currently running 5 Model 4's of which 2 have hard disks. I'll let you know what their response is to this request. They have certainly demonstrated (to me, at least) superior bug-free products and a desire to support them.

In summary, I AM SOLD! If you are running a Model 4 with a hard disk, and you don't have HBUILD6/XROM, then don't buy another thing for your system until you get your first order off to:

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

Have a great forever, -Art McAninch

(Editors Note: In the index listing of our last issue we left out the Mc of Art's last name - sorry Art. Also, there were several periods in the listing that the conversion to print program turned into Mexican jumping beans. So, if you are not into programming that much, get our disk number 10 which will have all the patches in Art's original form, already typed in correctly and ready to use. The errors are CN80 and not that of the author. -Ed.)

#### PRO4P FOR PROFILE 4 PLUS

by Charles Harris, MD

After reading the review on Ultima it is not clear whether or not there is a FORMS module, one that will permit letters and other types of forms to be designed and which will pick up fields from the various records. (Not to be confused with the Forms Filter which is a Model 4 utility, that Blumenthal complains about).

From the review I gather that Ultima has more math facility than does Profile 4.

Profile 4 Plus is quite an excellent data base, easy to program with, easy to use and

quite immediately handy for numerous small data base chores, such as mail lists and so forth that people can use daily.

However, Small Computer got busy with MSDOS soon after they published Profile 4 Plus, and never got around to writing a module that would allow the user to create "forms" that could be merged with the data.

Towards this end, Clay Watts (68C North Loop Cedar Hill Texas 75104) came to the rescue with a neat Forms module called Pro4P that also is a look-up. In other words, if for example, you want a mail-merge, Profile and Pro4P will do the trick. Just use Profile to create the mail list, and then pull those fields simply into the form letter that Pro4P allows you to write. You can also, by measuring 10 or 12 cpi and 6 lines to the inch, place fields into prearranged forms.

The Forms module is written in Basic, and the documentation is quite explicit. Furthermore, Watts is courteous and helpful in providing a backup service by phone if help is needed.

The program is menu driven. It opens the files of Profile to extract fields that will be used by the form you are preparing. It also can create a composite of two data base files as long as they each provide a key file in common.

The original program had one module, but an update provides two modules, one for printing, which can be accessed from each other. To work it the file Pro4P is loaded into basic and run. A menu with a number of options, including one that will eliminate unneeded files to increase memory, appears. The options permit you to create a file, print an existing screen, look-up and combine two data base files, increase memory and exit.

Profile 4 Plus is a wonderful stand-alone program, but with the addition of Watt's Pro4P it completes Profile, to make it one of the more powerful and satisfying programs in the Model 4 world.

-Charles Harris, MD

OPEN FORUM

=====

GRIBE LTR:

Recently a new subscriber who has been with us since March of this year sent us the following letter.

"The 'article' by Peter Ray on MegaMem in the August issue was a blatant promotion for several Anitek products yet it masqueraded as a news item. When you permitted words like 'FREE BONUS OFFER' and 'bargain' and 'only' to appear, you violated our trust that we are being given neutral information on new developments in the articles. Are you so busy that you can't edit these self serving releases."

-D. V. O. Sanford NC 27330

A: The News Items section of CN80 is where we print News Releases from anyone who wishes to submit them. There is a vast difference between an "article", "a third party review", or a "monthly column", and it is not our place to edit a news release, just as it is not our place to edit an advertisers ad. After all in this case there is in this issue two more news releases by Peter Ray, and it is important to our readers to have this information presented as soon as possible. Third party reviews may follow, that is, when someone volunteers one, or sends a letter telling if he likes the new product or not.

One other point to ponder, Peter Ray, like a handful of others, has chosen to continue his support to the TRS-80 community and CN80. He deserves our support in turn. We do not feel that there was any 'masquerade' intended as you state, the News Releases are clearly identified 'by Peter Ray (Anitek)' and we would assume that any reader would recognize them for what they were. Besides much more can be said about a product in a news release than can be said in an ad. If the author of the news release gets carried away about his own product it is understandable. But for us to edit — or not print them — then we have to say sorry. How say you - CN80 readers?

Our publication is open to all regardless of differences of opinion, CN80 is here to support, inform and hopefully to add to the enjoyment of your TRS-80 computing. -CN80

Q: The screen dump shown below is my attempt to shorten the tone sound under the new LS-DOS 6.3.1. It will not take and I think this was one of the great patches, listed in CN80 Vol 1 No. 6, pg. 13, from Paul Jaeger. Designed for LS-DOS 6.3.0, I have grown accustomed to it, using little beeps and chirps in my programs. Now they are really dragging out as blops. Can this patch be made to work with 6.3.1 ? I've tried both the new and the old password in the patch, to no avail.

\*\*\* FIX5/JCL \*\*\*

.This patch shortens the tone of the sound command.

.It comes from CN80 Vol 1 No. 6, pg. 13.  
PATCH SYS0/SYS.SYSTEM6 (D10,83=00 00  
00 00 00 00:F10,83=CB 24 CB 25 CB 21)

When applying the patch the results were:

```
Reading input
F10,83=CB 24 CB 25 21
FIND line mismatch
Job aborted
```

Another question is. My model 4 has an amber crt from Langley-St.Clair that I installed. The crt is about 6 yrs old, the computer about 7 yrs. The computer power supply was replaced about 5 yrs ago. I think I also remember that a "flyback"? transformer was one time hissing and was replaced. Two internal DD/DS drives were installed a year ago to replace single side drives. The problem in question - evident for at least 10 months, maybe a little more - is the brightness on the screen that will fluctuate, and the drives -do not- have to be operating. It will do it just sitting there not being touched. It will dip low and maybe stay for a minute or two before coming back in brightness, or flicker up and down, quickly. Sometimes if it stays dim for awhile I turn up the contrast (front pot left side-under) to just below where the rasters won't show, but I don't like doing that. I don't feel that the brightness (rear pot left side-under) is operating solidly, but I don't know if that is the problem or that my power supply or something else is bad. Any guesses?, they would be appreciated. I also have a fairly new 4P with the green screen. I would sure like an amber screen for the 4P. Do you know if they are available?. Thanks for your continued help and support.  
-Dick Burwell, New Ipswich, NH

How about it folks, any answers or suggestions out there? All replies will be forwarded and published -CN80

---

LTR & A: In the May 1990 (Vol 3 No. 5) issue of CN80 there was a reply to W. M. of Sanford, N.C. from A. S. of Seattle, Wa. The subject was "Print Options" using Multiplan. Also in that same letter "A. S. " asked another question about the setup sub option of Print Options. Since no answer appeared in the June (Vol 3, No. 6) issue, I would like to add a little information about the use of Multiplan's little idiosyncrasies. Turning off the "recalc" option as described is right on target. It is the first thing I do everytime I call up MP. I might add a reminder that the "recalc" key is "!" (shift-1), which can be used for a one time recalculation of the spread sheet as you enter your data. As for the use of the "setup" sub option, there was a good article in the September '87 issue of "80 MICRO" on page 23. If you don't have it I will try to summarize it for you. I also have a RS DMP 200 printer. First you need to know your printer control codes. For the DMP 200 look on page 45 of your printer operation manual for appendix A. Under the column headed code, look for dec. 27 & 20, forget the hex numbers for now, and note this is the code for condensed printing. Now add 64 to each of those numbers, and it becomes 91 & 84. Look in the appendix of your computer manual and find the table of ASCII characters. Note that the character for ASCII code dec 91 is video display "[" which is key strokes (clear - coma) at the same time. Likewise code dec 84 is "T", (uppercase please note). Evidently Multiplan wants to know when a printer control code is coming and the way to tell it that is to send it ASCII code 94 which is "^" which you get by key strokes (clear - semicolon). This little "^" (no quotes) is needed preceding each ASCII control code number. So therefore to print a Multiplan sheet in condensed printing enter in the setup sub option " ^T ". No quotes or spaces. What is not obvious from the article in "80 MICRO" is that the controls can be stacked. For example the printer code 27 & 56 for the DMP changes the line spacing to 1/8". Going thru the same calculations as

before we wind up with the following, "^[^x". Note lower case of x. So by putting " ^T^x " in the Print Options setup: and going to Print Margins and setting left: 1, top: 1, print width: 132, print length: (whatever) and page length: 88 you can cram a lot more information on a single sheet of paper.

Now my question is does anybody have a patch that would change the default of "Options" recal: to No, so I wouldn't always have to go through that routine everytime I want to use MP?

-R. A. C. Fairfax, VA.

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Q: Could anyone tell me the status of Acec 13. I have written to the (assumed) distributors, but haven't gotten any response (as yet 7/3/90). Their address is Allen Gelder Software, Box 11721, Main Post Office, San Francisco, CA 94101.

I would very much like to know whether it is still being supported or whether it has been discontinued and (hopefully) released into the Public Domain.

(And what I would like most is the source, naturally.)

For those of you wondering what I am babbling on about, Acec 13 (short for: accelerator) is an intelligent compiler for Basic on the Model III. Intelligent in that it will fall back into Basic for those statements that it doesn't know. Thus usable with virtually any version or brand of Basic.

-H. V.P. Chelser Heights, Victoria, Australia

A: As usual if anyone can shed any light on the request all replies will be forwarded. The person who answered the the phone number we were given for Allen Gelder by calling information, said that the Software operation had been out of business for sometime. Well we tried! CN80

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LTR: Sometime ago, a long time ago, I wrote to you to have a problem published in the Computer News 80 regarding our TRS-80 Model 4 computer. The problem was

due to DOS not accessing all the banks of memory.

You referred our problem to Mr. Peter Ray, (Anitek) who in turn contacted us. We did come to an agreement on the terms of the method of solving the problem. We sent in the mother board for his analysis and he was able to solve the problem. We would like to thank you and especially Mr. Peter Ray for the services.

If you wish we would greatly like to publish the above; maybe edit it; in the Computer News 80 to let all the readers know that it is still possible to get the required services to keep the TRS-80 computers up and running. Yours truly,  
-M. A. Portal, ND

(This letter was published as it was received, un-edited.)

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**Q:** In the last issue of CN80 I've read your laser-printer article. I found the part that deals with Allwrite and laser-printer most interesting because I have a problem and maybe it could be solved now.

I'm using a Star LC-10 printer (that's the NX-1000 in the USA) and Allwrite. I like Allwrite but it has one drawback: It doesn't allow me to do everything my printer can do. I've 'played' for sometime with a width-table to at lease give me minimum proportional capabilities - but I'd like to have full-printer control via Allwrite's commands (and not with those 'cryptic' @SY-commands).

Because of this I have raised a question sometime ago on CIS' LDOS-Forum that asked if someone has dis-assembled Allwrite's printer-driver so it could be customized to work with the LC-10 or if one even has written a driver for that printer. I only got the question of another user who was interested in the same thing.

Ron Malo wrote me to install the Epson-printer-driver, but that won't solve the problem of proportional-printing and missing printer-codes.

My question: Do you know of anybody who

has written a custom-printer driver for Allwrite? At least the people who adapted it for a laser should be able to do it.  
R. F. Ganderkese, FR of Germany.

**A:** In this issue you will find that we now have custom drivers that support the dot matrix printers using their FX-80 Mode that will support proportional printing. These drivers are for SuperScript and Script Pro. The Allwrite package is for Laser printers. However, we are working on being able to supply a custom print code service. If you would send us a copy of your printer manual, (we need only the part that deals with print codes plus a \$5 service fee.) we will see if we can come up with a print driver for you. If we can we will quote a price for the program and deduct the \$5 service fee. Before everyone gets bent out of shape over the service fee, the service fee is to cover the cost of mailing copies to our programming staff, and for research, if you feel that the cost of having the print drive is to expensive to have one written, or the print driver can not be written to be compatible with your printer. -CN80

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**Q:** Advice Requested. I took two Basic Language programs (one a ham radio contest logging program and one a morse code sending program) and combined them. In the last contest I actually made a bunch of contacts and ran out of memory. After checking, I found that only 3K of free memory existed by the time the program was ready for my first contact. Then I went thru it and combined as many lines as possible to eliminate the 5 bytes per line number. That helped very little. I then tried to break into the realtime and prep/print portions and use CHAIN MERGE ALL to reduce the amount of program in memory. Because the MERGE requires the program to be saved in ASCII, the realtime portion did not fit into memory after the first part had created the variables and had been over written. I have 128K and would like to know if anyone has a way to use the "second 64K" in realtime from BASIC.  
-P. E. H. Long Beach, MS

**Q:** Recent issues deal with printer settings that are obtained by invoking a consecutive series of BASIC statements like LPRINT CHR\$(27)CHR\$(mm)CHR\$(nn) to secure certain special effects like double height and/or double width. On my Olivetti PR2300 Inkjet unit, I use both mm=39 and nn=14 to secure a 2X magnification on both height and width. In contrast, to secure the Micro-Sized 18 CPI ANSI characters I use mm=20 (nn is not required). My added interest at this time is how to "talk to my printer" in a language other than basic.

Since developing further expertise in the use of my Fortran-66 Compiler, obtained from Tandy, I would very much like to be able to address the PR2300 in some such manner as: write (2,10)X,Y,X,Z together with :10 Format (1x,4A4) to secure the double height/double width mode directly off the Fortran Program. Does any CN80 reader have any suggestions.  
-R. M. Westmont, IL

**LTR:** Re: Eric Bagai's Book review; August 1990 issue. I certainly wish that Henry Blumenthal had a better sense of humor for perhaps then he could have appreciated Eric's "What I Did with My Trash". On today's market I feel it was worth the price and it brought back some nostalgic moments of how I got where I am today with my Model 4.

It was tongue-in-cheek to be sure but it was also on the mark even if old stuff!

I for one did not have my Model 4 back in 1980. I still use Superscript because I cannot afford to redo all the good things that have been done with the disks I do have. Neither can I financially justify the need for a hard drive nor high resolution board but if I could.....I would! But I still have a kind of love affair with my outdated equipment.....And that is what I thought Eric had to say. How many other models have survived such a test of time?

I wish all of you Happy Computing with your TRS-80 and even though it may not be highly sophisticated.....It is fun!  
-H. H. San Gabriel, CA.

**A:** As we said there is room in CN80 for everyone's opinion. We are of the opinion to agree with Mr. Blumenthal's review. Mr. Bagai's book seems to be over priced in the relation to any real assistance to the user, but then again it may not be over priced for a book of humor. -Ed.

**LTR:** While many TRS-80 users are aware of LS-DOS and LDOS operating systems, I'm not sure that very many are aware of the MultiDos operating system. MultiDos is available for the Model III or the Model 4. It operates in Model III mode on the Model 4 but allows many Model 4 features including 80 x 24 and reverse video. The latest version of MultiDos is now compatible with the XLR8er. It works fine with my 20 meg hard drive XLR8er equipped Model 4D.

I use LDOS as my primary Model III mode operating system. But when I want to use certain programs or features I MultiDos. It is a welcome addition to my TRS-80 library. The support I received from Vern Hester and David Welsh has been excellent. I urge all Model III mode users to try out this DOS.  
-J. G. G. Parkhill, PA

**A:** If you are interested in MultiDos Model III operating system, it has been around for a long time and is not a new program. Most users should recognize the name if they were around in the heyday of the Model III. For more information contact:

David Welsh  
Alpha Bit Communications  
Box 20067  
Ferndale, MI 48220  
Phone (313)581-2896

He is the supplier and author of Lazy Writer word processing program, and several others that have been reviewed in CN80. The last price we had for the MultiDos program was \$99.95 for the MultiDos 80/64 for the Model 4, and \$89.95 for the MultiDos for Model I and Model III.

We would also be happy to publish any articles on MultiDos' use if anyone would care to submit them. -CN80

VC2BC/BAS PROGRAM LISTING NUMBER ONE by David Goben

```

10 '*****
20 'VC2BC/BAS:  CONVERT VISICALC FILES TO BUSY-CALC FORMAT
30 'COPYRIGHT (C) 1990 BY DAVID GOBEN. ALL RIGHTS RESERVED
40 '*****
50 CLEAR:DEFINT A-Z:CLS:DIM HD(20),TK$(52)
60 PRINT STRING$(79,"=")
70 PRINT TAB(12)"VC2BC 1.0 -- Convert VisiCalc File to Busy-Calc Format"
80 PRINT TAB(12)"Copyright (c) 1990 by David Goben. All rights reserved"
90 PRINT STRING$(79,"-")
100 PRINT"This program will convert a VisiCalc program, saved using the usual"
110 PRINT"/SS Storage Save command, to a format readable by Busy-Calc.":PRINT
120 PRINT"Enter the name of the VisiCalc file (it will default to a /VC
    extension"
130 PRINT"if none is provided) and convert its data to a file of the same name,"
140 PRINT"but with a /BC extension. The original file will not be altered."
150 PRINT"Usage of drive numbers is allowed."
160 PRINT STRING$(79,"=")
170 LINE INPUT"Enter VisiCalc file to convert: ";A$
180 IF A$=""THEN 170
190 FOR X=1 TO LEN(A$):B$=MID$(A$,X,1)
200 IF B$>="a"AND B$<="z"THEN MID$(A$,X,1)=CHR$(ASC(B$)-32)
210 NEXT X
220 DR$="" :X=INSTR(A$,":"):IF X THEN DR$=MID$(A$,X):A$=LEFT$(A$,X-1)
230 EX$="" :X=INSTR(A$,"/"):IF X THEN EX$=MID$(A$,X):A$=LEFT$(A$,X-1)
240 IF EX$=""THEN EX$="/VC"
250 SF$=A$+EX$+DR$:DF$=A$+"/BC"
260 ON ERROR GOTO 270:OPEN"I",1,SF$:GOTO 280
270 PRINT:PRINT"Error! "SF$" does not exist":PRINT:END
280 ON ERROR GOTO 0:IF DR$=""THEN DR$=":"
290 A$="SOURCE FILE: "+SF$:B$=STRING$(LEN(A$),"*"):PRINT B$:PRINT A$:PRINT B$
300 PRINT"Place "DF$" onto which drive ("DR$" = default)? ";;
310 LINE INPUT A$:IF A$=""THEN 340
320 B$=LEFT$(A$,1):IF B$=":"THEN A$=MID$(A$,2)
330 A$=LEFT$(A$,1):IF A$<"0"OR A$>"7"THEN 300 ELSE DR$=":"+A$
340 DF$=DF$+DR$
350 'check Visicalc file for validity
360 LINE INPUT#1,A$:IF LEFT$(A$,1)<>">"THEN PRINT"Error! "SF$" is not a VisiCalc
    file!":END
370 PRINT:PRINT"Scanning "SF$"...":PRINT
380 LINE INPUT#1,A$:IF LEFT$(A$,2)<>"/G"THEN 380
390 'build BC header section
400 GD=0:FOR X=0 TO 20:READ HD(X):NEXT X:GOTO 430
410 DATA 0,0,8,0,2,0,0,2,4,9,78,8,20,0,0,0,0,0,240,37
420 LINE INPUT#1,A$:IF LEFT$(A$,2)<>"/G"THEN 550
430 B$=MID$(A$,3,1):A$=MID$(A$,4)
440 IF B$="O"THEN IF A$="R"THEN HD(0)=HD(0)+64 'GLOBAL ORDER OF RECALC
450 IF B$="C"THEN HD(9)=VAL(A$) 'GLOBAL COLUMN WIDTH
460 IF B$="R"THEN IF A$="M"THEN HD(0)=HD(0)+32 'GLOBAL RECALC PRIORITY
470 IF B$<>"F"THEN 420
480 B$=A$ 'PROCESS GLOBAL FORMATS
490 IF INSTR("DGR",B$)THEN 420 'IGNORE THESE
500 IF B$="I"THEN GD=GD+3:HD(0)=HD(0)+3 'INTEGER
510 IF B$="L"THEN GD=GD+32:HD(0)=HD(0)+128 'LEFT-ALIGN
520 IF B$="$"THEN GD=GD+1:HD(0)=HD(0)+1 'DOLLAR

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530 IF B$="*" THEN GD=GD+16          'GRAPH
540 GOTO 420
550 X=INSTR(A$,"/G"):IF X THEN A$=MID$(A$,X):GOTO 430
560 'now open VisiCalc file for "Business"
570 CLOSE 1:OPEN"I",1,SF$:MR=0:MC=MR
580 ON ERROR GOTO 590:OPEN"O",2,DF$:GOTO 600
590 PRINT"Error! Cannot open "DF$!":END
600 ON ERROR GOTO 0
610 FOR X=1 TO 52:READ A$:IF X<16 THEN TK$(X)=A$ ELSE TK$(X)="\"+A$:IF X>20 THEN
    TK$(X)=TK$(X)+"("
620 NEXT X:DATA +,-,*,/,^,%,<=,<>,<,>,>=,>,(,),...
630 DATA PI,ERROR,NA,TRUE,FALSE,ISERROR,ISNA,CCMT,RCMT,SGN,?,ABS,TAN,ATAN,SIN
640 DATA ASIN,COS,ACOS,INT,ROUND,LOG,LN,EXP,SQRT,SUM,AVERAGE,COUNT,MAX,MIN
650 DATA LOOKUP,ENTRY,TABLE,IF,AND,OR,NPV,CHOOSE
660 'now build header on busy-calc file
670 PRINT"Building "DF$" heading section...":PRINT
680 PRINT#2,CHR$(194);CHR$(195);
690 HD(2)=HD(10)\HD(9):HD(11)=HD(2)
700 FOR X=0 TO 20:PRINT#2,CHR$(HD(X));:NEXT X
710 'now process lines in VisiCalc file
720 PRINT"Processing coordinates:"
730 LINE INPUT#1,A$:IF LEFT$(A$,1)<>">" THEN 1450
740 GOSUB 930 'GET COORDINATE
750 GOSUB 810 'GET FORMAT
760 IF F<128 THEN PRINT#2,CHR$(F);A$;:GOTO 730 'is label
770 PRINT#2,CHR$(F);STRING$(8,0); 'set up for value
780 IF A$>"" THEN GOSUB 1050:GOTO 780 'PROCESS FORMULA
790 PRINT#2,CHR$(0);:GOTO 730
800 'get format for data
810 IF LEFT$(A$,2)="/-" THEN A$=MID$(A$,3):F=64+LEN(A$):RETURN ELSE F$=""
820 IF LEFT$(A$,2)<>"/F" THEN 840
830 F$=F$+MID$(A$,3,1):A$=MID$(A$,4):GOTO 820
840 IF LEFT$(A$,1)=CHR$(34) THEN A$=MID$(A$,2):F=LEN(A$):RETURN
850 IF F$="" THEN F=128+GD:RETURN ELSE F=128+64
860 FOR X=1 TO LEN(F$):B$=MID$(F$,X,1)
870 IF B$="I" THEN F=F+3
880 IF B$="$" THEN F=F+1
890 IF B$="L" THEN F=F+32
900 IF B$="*" THEN F=F+16
910 NEXT X:RETURN
920 'get current coordinate
930 X=INSTR(A$,":")
940 C$=LEFT$(A$,X-1):PRINT MID$(C$,2);CHR$(9);
950 A$=MID$(A$,X+1)
960 C=ASC(MID$(C$,2,1))-65 'get col value
970 C$=MID$(C$,3)
980 IF LEFT$(C$,1)<"A" THEN 1000
990 C=C*26+ASC(LEFT$(C$,1))-65:C$=MID$(C$,2)
1000 R=VAL(C$) 'get row value
1010 IF C>MC THEN MC=C
1020 IF R>MR THEN MR=R
1030 PRINT#2,CHR$(C);CHR$(R);:RETURN
1040 'process a token
1050 B$=LEFT$(A$,1)
1060 IF B$="@ " THEN 1200
1070 B=INSTR("+*/%^()"),B$):IF B>6 THEN B=B+6

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```

1080 IF B THEN A$=MID$(A$,2):GOTO 1180
1090 X=0:Y=INSTR("<=>",B$):IF Y=0 THEN 1260
1100 X=INSTR("///<=>/=>",\""+LEFT$(A$,2))/3
1110 IF X THEN Y=0:A$=MID$(A$,3) ELSE A$=MID$(A$,2)
1120 IF Y=1 THEN B=9
1130 IF Y=2 THEN B=11
1140 IF Y=3 THEN B=12
1150 IF X=1 THEN B=7
1160 IF X=2 THEN B=8
1170 IF X=3 THEN B=10
1180 PRINT#2,CHR$(B+128);:RETURN
1190 'PROCESS TOKENS
1200 B$=\""+MID$(A$,2):B=16-1
1210 B=B+1:IF INSTR(B$,TK$(B))=0 THEN 1210
1220 A$=MID$(A$,LEN(TK$(B))+1)
1230 IF B>50 THEN B=17 'set @ERROR token if too high
1240 GOTO 1180
1250 'get a value
1260 IF B$=\"",\" THEN PRINT#2,B$;:A$=MID$(A$,2):RETURN
1270 IF B$=\".\" AND LEFT$(A$,3)=\"...\" THEN B=15:A$=MID$(A$,4):GOTO 1180
1280 IF B$>=\"A\" AND B$<=\"Z\" THEN 1380 ELSE C$=\"\"
1290 B$=LEFT$(A$,1):IF (B$>=\"0\" AND B$<=\"9\") OR B$=\".\" THEN
  C$=C$+B$:A$=MID$(A$,2):GOTO 1290
1300 V#=VAL(C$):X=INSTR(C$,\".\"):IF X THEN 1350
1310 IF V#<10 THEN PRINT#2,CHR$(CINT(V#)+16);:RETURN
1320 IF V#<256 THEN PRINT#2,CHR$(26);CHR$(CINT(V#));:RETURN
1330 IF V#<32768! THEN B=CINT(V#):PRINT#2,CHR$(27);CHR$(B AND
  255);CHR$(B\256);:RETURN
1340 'process floating point values and values > 32767
1350 B$=MKD$(V#):IF LEFT$(B$,4)=STRING$(4,0) THEN B$=MID$(B$,5):F=28 ELSE F=29
1360 PRINT#2,CHR$(F);B$;:RETURN
1370 'process coordinate values
1380 C=ASC(B$)-65:A$=MID$(A$,2)
1390 B$=LEFT$(A$,1):IF B$<\"A\" THEN 1410
1400 C=C*26+ASC(B$)-65:A$=MID$(A$,2)
1410 C=C+64:R=0
1420 B$=LEFT$(A$,1)
1430 IF B$>=\"0\" AND B$<=\"9\" THEN R=R*10+VAL(B$):A$=MID$(A$,2):GOTO 1420
1440 PRINT#2,CHR$(C);CHR$(R);:RETURN
1450 PRINT#2,CHR$(255):CLOSE 1,2:PRINT:PRINT\"Conversion complete\"
1460 X=MC\26:MC=MC-X*26:PRINT:PRINT:PRINT\"Max Col name used was : \";
1470 IF X THEN PRINT CHR$(X+64); ELSE PRINT\" \";
1480 PRINT CHR$(MC+65):PRINT\"Max Row name used was :\"MR:END

```

If you are writing programs to be published in CN80 please take the following into consideration. You should supply your basic program in the saved basic mode and also in the ASCII save on the same disk, along with a hard copy printout of the program listing. All 10 pitch printouts which are 80 columns wide are converted to 12 pitch, which does not have any effect on your program listing. Wrap around program lines should be avoided whenever possible.

TEST PATTERN FORMAT FOR 80 COLUMN TEXT PRINTED IN 12 PITCH

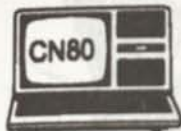
```

1234567890123456789012345678901234567890123456789012345678901234567890
  1           2           3           4           5           6           7           8

```

Write program listings so that if a line is over 80 characters, place the over-run on the next line with a new line number if possible. 7-1/4" line length is maximum in any pitch.





# NEW ADDITIONS TO CN80'S FILE CABINET LIBRARY

Volume Disk Number      Description

## NEW ADDITIONS TO THE MODEL 4 CATALOG

- MD4UTL59    This disk contains programs to manipulate your Profile 4 Plus data files.
- MD4UTL60    This disk contains several SHAREWARE de-arc programs for models 1,3,4.
- ARC2CMD/CMD    Create your own File Extraction Program.
- ARCL31/CMD    File Extraction Program
- ARCL4/CMD    File Extraction Program
- DEARC/CMD    File Extraction Program
- DEARC/DOC    Documentation for Dearc programs.
- DEARCV1/CMD    File Extraction Program
- EPSON4/CMD    Epson printer set up program.
- EPSON4/SRC    Assembly Language Source Code for EPSON4/CMD
- MUSIC/BAS    Basic Music generating program.
- MD4BUS31    This disk contains Danny C. Mullens' Calendar programs.
- MD4BUS32    This disk contains David P. Millers check writing program.
- READCHEK/DOC    Authors program comment file.
- CHEX/DOC    Program manual.
- CHEX/CMD    Check writing program
- ACCOUNTS    A blank master data file for CHEX/CMD
- MD4EDU29    This disk contains programs to print out state maps with interesting information on them. It was written by Dale Hill and requires the Rembrandt program to print out the files.
- STATES/DOC    The authors instruction file.
- Plus files for each individual state.

Volume Disk Number      Description

- MD4COM25    This disks contains the EZPACKET Ham radio files.
- EZPAC/DOC    Packet radio program documentation.
- EZPAC80/CMD    Easy Packet radio program.
- EZPACMAN/N1    Easy Packet radio manual printout program part 1.
- EZPACMAN/N2    Easy Packet radio manual printout program part 2.
- MORSE/BAS    Basic program to teach Morse Code.
- MD4COM26    This disk contains two communication programs.
- FASTERM/CMD    Mel Patrick's latest version of his communication package Version 14.9
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- SCOTTY/HR    Star Trek's Scotty picture.
- SHOW/TXT    Slideshow file.

## NEW ADDITIONS TO THE MODEL 1/3 CATALOG

- MD3COM24    This disk contains the EZ Packet Radio program for model 3.
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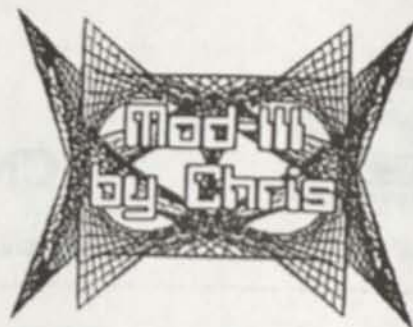
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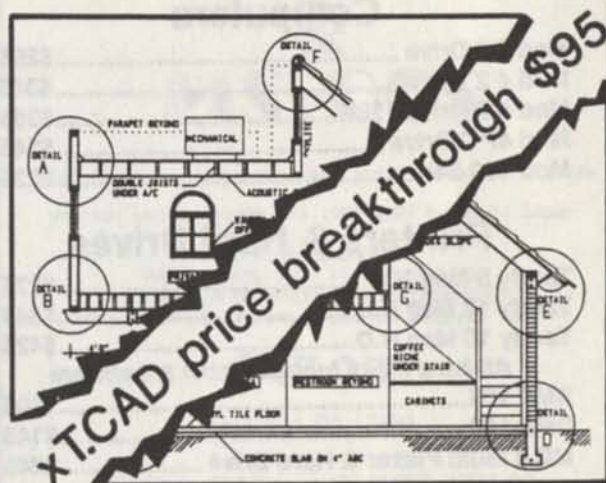
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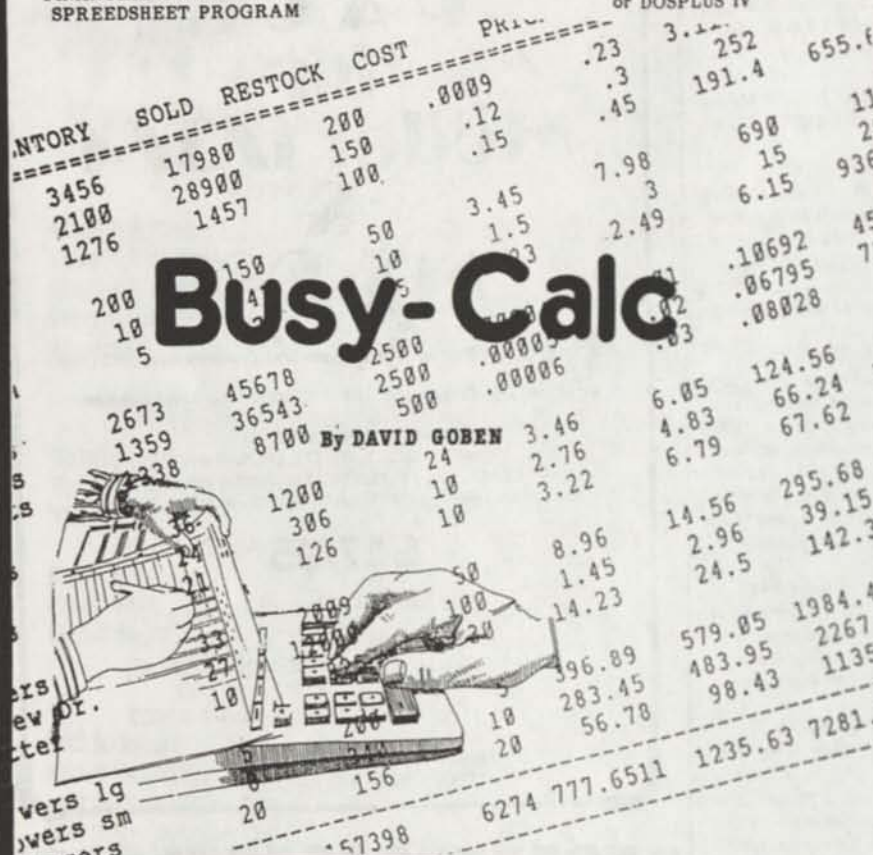
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for MODELS I/III/4

by David Goben

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# Our LS-DOS 6.3.1 release has a little something for everyone



- ☆ The DATE command, "Date?" prompt on boot, and the @DATE SVC now support a date range of 32 years: from January 1, 1980 through December 31, 2011.
- ☆ Enable or disable the printer time-out and error generation with SYSTEM (PRTIME=ON|OFF)
- ☆ Customize the display of the time field in the DIR command to display 12-hr or 24-hr clock time with SYSTEM (AMPM=ON|OFF).
- ☆ Both ASCII and hexadecimal display output from the LIST command is paged a screen at a time. Or run it non-stop under your control.
- ☆ MEMORY displays (or prints) the status of switchable memory banks known to the DOS, as well as a map of modules resident in I/O driver system memory and high memory.
- ☆ Specify SYSTEM (DRIVE=d1,SWAP=d2) to switch drive d1 for d2. Either may be the system drive, and a Job Control Language file may be active on either of the swapped drives.
- ☆ The TED text editor now has commands to print the entire text buffer, or the contents of the first block encountered. Obtain directories from TED, too!
- ☆ Have extended memory known to the DOS? The SPOOL command now permits the BANK parameter entry to range from 0-30 instead of 0-7.
- ☆ Alter the logical record length of a file with "RESET filespec (LRL=n)"
- ☆ Specify "RESET filespec (DATE=OFF)" to restore a file's directory entry to the old-style dating of pre-6.3 release. Specify "RESET filespec (DATE=ON)" to establish a file's directory date as that of the current system date and time.
- ☆ Felt uncomfortable with the alleged protection scheme of 6.3? LS-DOS 6.3.1 has no anti-piracy protection! MISOSYS trusts its customers to honor our copyrights.
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MARK REED'S MODEL 4 UTILITY DISK is fully supported by the author, and it is available now from *Computer News 80* for only \$14.95, plus \$2.00 for shipping and handling. Order your copy today!



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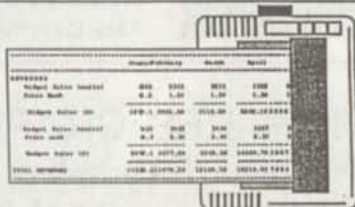
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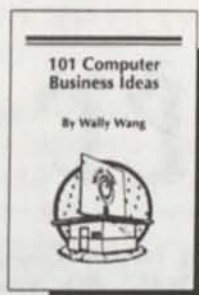
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Wally Wang is the author of numerous books on software and hardware, as well as the Co-Editor of *ComputerEdge*, San Diego's Computer Magazine, where he has a regular column and is a frequent contributor.

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## EDITORIAL COMMENT

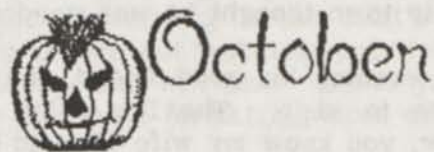
PostMaster by David P. Miller is rapidly proving to be the PrintMaster and Print Shop for the TRS-80 community. Something that we TRS-80 users never had before.

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If you would like to receive the Icon Reference Guide before ordering Icon disks send \$10 which will cover the cost of printing the manual and shipping costs. The \$10 will then be credited to your first order of 15 or more disks. The reference manual alone is worth \$10 if you consider the time it will take you to print out the icons. A free Icon Reference Guide has already been sent to everyone that ordered a full set of the first 15 icon disks.

With all the new products being produced for the TRS-80 computers, it is really an exciting time to be a TRS-80 user.



## NEWS ITEMS

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Mel Patrick has released his new version 3.xx of FastTerm II BBS system. It is shareware and the registration price is \$15 and comes with a 50 page manual. FastTerm II BBS runs on any Model 4/4P/4D - 128K with RS232. LS-DOS 6.3 is recommended.

Mel's new address is  
Mel Patrick 8056 -164A Street, Surrey, B.C.  
Canada.

---

We just received the latest LS-DOS 6.3.1 from Misosys and it is now updated to Level H-1.

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### THE GOOD BAKER A TALE FROM SYSOPS FABLES

by Unknown Author

A long long time ago in the city of Puterville there lived a good baker. And a toaster manufacturer who developed a two slice pop-up toaster.

The toaster was so popular that everyone in town bought one. But there was no sliced bread available. Everyone had to slice his own bread by hand. This made it difficult to get even nice slices that would fit in the toasters that everyone had.

So the good baker thought he had an idea that would benefit everyone in town. He went to the bank and laid out his proposal, where upon the banker advanced him the money to build a bread slicer.

After many long hours late into the evening when he wasn't baking bread, the good baker developed his bread slicer. Soon he had his shop windows full of sliced bread for the people to put in their pop-up toasters. It was a great success and everyone in town thought he was wonderful.

Then one evening his good friend, the fire chief came to visit. The fire chief said, "Say baker, you know my wife likes to bake her own bread sometimes. Would you make me a copy of your bread slicer for her?" The good baker could not refuse his good

friend the fire chief, so he made a duplicate of his slicer and gave it to the chief.

The fire chief was so proud that he too had a bread slicer that he took it to the town meeting, where upon everyone wanted to use it. The fire chief said, "Sure go ahead."

The good baker then began to watch his shop windows, his display cases, and his back room fill with day old and moldy sliced bread. No one was buying his bread anymore. The bank came and repossessed his slicer and the baker closed up his shop.

Now there were only two bread slicers in town, one in the bank vault that no one was using and one in the town hall that every one was using, and everyone had to bake his own bread.

Later, as the good baker was standing in the unemployment line, with his patent in one hand and his unemployment application in the other, the fellow in line behind him tapped him on the shoulder and said, "Say, aren't you the good baker that built the bread slicer?" The baker said, "Yes," and showed the fellow his patent. Where upon the fellow said, "You know, my wife and many of her friends would like to make potato chips, but we have no potato slicer. Could you be so kind as to build us one?"

Where upon the good baker said, "Let them mash them," and turned to take his place at the unemployment window.

---

### CN80 Disk Series Number 10

Disk number 10 is now ready to be mailed which has all the program and patch listings for Volume 3 Number 7, 8, and 9, plus a bonus patch to LS-DOS 6.3 which will page your LIST command. This stops the continuous scrolling up of the screen. It requires you to hit enter after each screen is filled. But it does not effect the LIST command if you are sending anything under LIST (P) to the printer.

We have also included a program to rename a data or system disk after it has once been formatted and named using TRS 1.3.

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## ALLWRITE LASER PRINTING Part 2

by Lee C. Rice

By the time that this second installment appears in the pages of Computer News 80, we will have the ALLWRITE LASER UTILITY PACK ready for distribution also. This three-disk set, and accompanying manual, results from several years of effort on the part of Gary Shanafelt and myself to allow Allwrite to "tame" the laserjet printer. It includes a set of generic utilities for Allwrite (Disk #1) which will meet the needs of about 95% of users, some special utilities designed for less frequent formatting tasks and/or less compatible printers (Disk #2), and a set of public domain soft fonts (Disk #3) to get you started using your laser printer as a typesetter.

You -must- be a licensed owner of Allwrite, Version 1.12 or 1.13 to make any use of the Utility Pack. Allwrite drives the laser printer by means of the pitch selection command (;PI), and full explanation for the use of this command is contained in the Allwrite Manual itself. If you do not own Allwrite, the Utility Pack won't help. The earlier survey of CN80 readers indicated over 1,000 Allwrite users among CN80 readership. If you are not one of these, note that ProSoft no longer sells Allwrite. Some vendors do still have copies in stock, and it is perfectly legal to purchase the software (Manual and master disks) either from a vendor, or from a individual owner who is disposing of his/her machines or software. Copyrighted software cannot be "Copied" for the use of others, but it can be "Transferred" by sale or other means if the original user has no use for it and does not retain copies.

ProSoft originally marketed a Laser Software Package in the late 1980s. This was not widely distributed, and is no longer available. If you do have a copy, some of the utilities in it are perfectly usable in conjunction with our Utility Pack; but you do not need any of them to take full advantage of the new software.

Support for the Laser Utility Pack will be primarily through CN80, which is its sole authorized publisher. If you have problems, and CN80 staff conclude that these are due to some bug(s) in the software, they will

contact us or ask you to do so; and we will make every effort to correct the problems -provided that they arise in a context of INTENDED USE (Allwrite formatter Version 1.12 or 1.13, 100% HP-compatible laser printer, and fully HP-compatible soft fonts).

As I pointed out in the first article, full HP-compatibility cannot be taken for granted; and many soft fonts, especially those in the public domain, fall short of complinace with the full HP standards. Font problems are not so serious. In the near future we'll be offering some public domain fonts through The File Cabinet which have been tested with Allwrite; and, in future installments of this column, I'll give you some information about font vendors upon whose products and service you can rely.

### FONT MANAGEMENT

As I indicated in the last article, the main difference between laser printers, which are true typesetting devices, and other printers, which are more like typewriters, is fonts. The quality of the Fonts is superb (300 dots per inch, or 720 decipoints per inch resolution), the number and type of fonts is virtually unlimited; and, of course, the means by which Allwrite "talks to" the printer about fonts and font management becomes more complicated than with simpler devices. Printer-computer communication is not a unique situation for Allwrite.

No matter what your software, certain things have to be known to the computer before it can print a document on a laser printer. This month's column is devoted to a generic approach to font management. Whether you are using Allwrite and a Model 4, PageMaker and an MSDOS machine, or TROFF and a UNIX mainframe, the basic principles are the same. Although good (not just good: magnificent!) software like Allwrite will do most of the complex house-cleaning, management, and communications with the printer behind the scenes, so that you the user don't have to worry about the gritty details, it is useful to know something about what's going on. Doing so will not just help you trouble-shoot problems, but will also enable you to plan your document formatting more efficiently.

Each laser font which is to be used by the printer has a unique escape code associated with it, and which is used by Allwrite to

tell the printer when to begin using that font. Since most fonts available for the laser family are also proportional fonts, Allwrite will also have to know the individual widths associated with each LETTER in the font. So-called seven-bit fonts have the standard Ascii letterset of 96 characters (codes 32-127), and eight-bit fonts have extended character sets (codes 32-127, and 128-255) which may include foreign characters, special symbols for mathematics and other systems, and even graphics symbols. In addition to escape code and individual character codes, certain other information is contained in the font header (horizontal motion index, etc.), details of which are in the HP Technical Manuals. This information is all encoded for Allwrite in a FONT DESCRIPTOR FILE (FDF). Allwrite, unlike many other formatters, wants the FDF file for each font in a special packed binary form. That means that you can't edit them directly, and you need a special program to create them.

In the Utility Pack, we provide a program, HPFONT/CMD, which can both create and edit particular font descriptor files. The easiest way to use HPFONT is with soft fonts: it will read a soft font and create an FDF file for you without your having to know anything whatever about the font. For cartridge or internal fonts, you can use HPFONT to create the necessary FDFs also, "but" you'll have to type in the escape code (usually in the documentation for the cartridge or printer) and each of the character widths (which you can usually get from the manufacturer). However you do it, you'll end up with one FDF file for every font in your library.

FDF files are the unique part of laser printing. One feature the laser printer shares with any other printer is that, in order to use it, your software must have a Printer Driver, which I call a "Printer Control File (PCF)". Allwrite names these files with the extension /TAB (FX80/TAB, HPLASER/TAB, etc.). They must contain information on the printer command language (in this case PCL, many of whose commands are being described for you in the very useful articles by David Goben appearing in CN80) itself, AND on the fonts which you expect to use. For an Epson or other typewriter-like printer, there is a

single unique PCF which does the trick nicely. For laser devices, there are unlimited possibilities for fonts; so you would quickly run out of memory if you tried to include information on every possible font in a single PCF.

The solution to this, whether for Allwrite or any other laser-driving software, is to have custom PCFs which handle the groups of fonts which you are likely to be using in a single printing session. Each PCF contains all that Allwrite needs to know about the PCL commands, a list of fonts which are to be used, identifiers for each font, escape sequences for each font, with assignments (if they are proportional) for each character in each font, and some other technical information. Incidentally, even if you have a thousand fonts, only so many of them can fit into the printer memory at one time, and the printer will also have a per-page limit for fonts (consult your printer manual). If you are satisfied with a single family of a dozen or so fonts of some kind, and expect to use nothing else, then one PCF will do fine. If you have (as we do here at Marquette) over 300 fonts, then you can produce a PCF for each family or combination.

There is one hitch. For Allwrite, the current PCF for a session -must- be named HPLASER/TAB. In practice, that means simply copying whatever PCF you want to use onto your lowest available drive as HPLASER/TAB for a printing session. Some users have evolved other tricks also, and Gary or I will be mentioning these as tips in future columns.

HPADMIN/CMD is the program in our Utility Pack which will produce the PCF for you (we have provided a custom PCF already on the disk for the public domain fonts in the set). HPADMIN reads a file containing the identifiers and fonts, locates the PCF for each font, and builds the PCF for you. It's that simple. You don't have to know anything about the complex PCF structure at all.

#### FONT IDENTIFIERS

Allwrite expects you to assign one or two-digit identifiers to the fonts you expect to use; and these must be in the range of 0 to 63 inclusive. When the font is downloaded to the printer, the downloading

software must also tell the printer the identifier which is to be associated with the font. Allwrite tells the printer which fonts to use simply by referring to these identifiers. (For technical types, I should note that this is not the only way to select fonts. You can also send the printer information about the type, size, and pitch structure of the font you'd like to use, and let it choose the closest match. I like Allwrite's method, since I'd rather not have the printer do the selecting on my behalf.)

Note that pitch numbers used for identifiers are "meaningless labels." The Allwrite command `;PI27` just tells the printer to switch to the font number which you have labelled "27" - it doesn't have to be 27th in your list, or 27-anything-else.

`;PI28` may be a larger font, a smaller font, or anything else which you labelled "28". Of course it's a good idea to use some consistent naming pattern to distinguish size, stroke, weight, etc.; but Allwrite doesn't care what it is. Also note that BOLD fonts are different fonts for Allwrite.

Allwrite can also use internal emboldening via the `@*2` command. Use bold font selection for extended passages, internal emboldening for occasional words. NEVER use internal italicization (`@/`). That would cause Allwrite to switch to the italics font (if one is available), but to continue to use the regular width tables, which would make justification very ragged. If you have an italics font, you must reference it using the `;PI` selector. Since Allwrite allows you to change pitch within a single word, if a NEW word follows a pitch change, the line on which the new word occurs should begin with a space to tell Allwrite that it is a new word.

Internal emboldening is very useful if you have regular, bold, and italics versions of a font, but want bold italics. You can call up the italics font via the `;PI` command and then use internal emboldening to produce the desired bold italics.

Finally, note that landscape and portrait modes require "different" fonts. If you want to print landscape (11x8.5), you need specific landscape fonts to do the job. Allwrite supports both landscape and portrait printing on the laser printer; and, like the printer itself, it defaults to

portrait. You cannot mix the two modes on a single page (printer limitation), but you may mix pages in the two modes within a single document.

#### LIFE IN THE FAST LANE

Enough technicalities. The documentation for the Laser Utility Pack contains more details and tricks. The above is just an overview. Let's look briefly before closing at a session with the laser printer. We'll assume that you have a working PCF which is named HPLASER/TAB which contains the information about the printer and the fonts you intend to use.

Your first step must be to download the fonts to the printer. We provide a utility (HPDOWN/CMD) which will do that for you, and which understands Allwrite's use of font identifiers. David Goben has been giving you information on font selection codes within PCL also, so you could write your own utility in BASIC or any other language if you desired. If the fonts are HP-conformable, they will contain most of the information which the printer needs in the header. All that the software does is tell the printer the ID of the next font to be downloaded, and then copy that font to the printer port.

Once the printer has the fonts, load Allwrite, edit your document, and send it to the printer. It's that simple. No new commands (except for the `;PI` command itself), no specific needs. ALL of the complicated interface is handled behind the scenes and quite smoothly by ALF/CMD (the Allwrite formatter) itself. We provide a sample file in the Utility Pack to get you going right away. You will also have a good selection of fonts in sizes ranging from 10 to 18 points.

Once you've seen how beautifully Allwrite handles the laser printer, you'll probably be tempted to do two things: (1) throw away your old printer; and (2) start looking for more soft fonts to build a font library. Let's look at the first point now, and I'll devote my next installment in CN80 to soft fonts.

If you had an Epson or other usable printer before buying your laser or Deskjet printer, you probably have gotten much use from it. A standard dot matrix printer may be

slower and noisier than a laser or Deskjet, but it offers something neither of those technological wonders can: very cheap per-page printing. My suggestion is to invest in a parallel AB switch (CN80 is selling them at a nice price!) and a couple of additional cables. Hook up BOTH your old printer "and the new printer" to your Model 4. Use the laser for finished copy, use your dot matrix printer for rough copy, program copy, or anything for which typesetting is inappropriate. Not only will you save money, but you'll save wear and tear on your new printer. At home my Model 4 is connected to an ABC switch on line to a Tandy LP1000 laser printer (my newest acquisition), an Epson FX80 printer, and my oldest printer (an Epson MX80). I use the laser for typeset copy, the FX80 for program code and rough copy, and I keep the MX80 loaded with mailing labels. [Actually, the LP1000 is also connected via a second switch box to two other computers, but that's another story.]

If you are using your laser printer as your only printer, you may want to send output to it via DOS (e.g., using the (P) command with DIR) or from BASIC (via LPRINT). The laser family defaults to MSDOS line termination (which means that the printer expects a carriage return <CR> and linefeed <LF>), rather than the more sensible TRSDOS and UNIX standard (which is a <CR> only). You can and should initialize Allwrite to add the <LF>. One way to handle the problem if you are not using Allwrite is to use the TRSDOS/LSDOS PR/FLT filter with ADDLF added. I don't like a lot of filters in memory, though, and PR/FLT doesn't work properly with some software which addresses the printer port directly. All of the HP laser printers, and MOST clones, understand TRSDOS conventions; so you can simply tell the printer to add the <LF> rather than making your computer do it. This must be done every time the printer is turned on, and should be cancelled for Allwrite sessions (since Allwrite adds a <LF>). A utility, LJSET/CMD, is also provided in the Utility Pack to allow you to do this, and also to set various margins and other features of the printer directly from DOS. You NEVER need this utility if you are using only Allwrite to print, but it is handy in the event that you need access to your laser printer from other software or directly from

DOS. Next time we'll look at soft fonts. Upcoming also will be articles devoted exclusively to the Deskjet, and a shorter series of columns devoted to tips for getting the most out of your laser or Deskjet printer.

-Lee C. Rice

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## M.A.D. SOFT/HARDWARE FOLLOW-UP REPORT

by Art McAninch

Just received the XDROM and installed it in my gate-array '4. Double Wow! Now I walk into my computer room, snap on the master power strip, and Shazam! Before I can sit down, I am instantly greeted by the sign-on screen on both computers I have on hard disks! Just like the Messy-Dos machines!

In addition, I received OOPS/CMD for the Model 3 mode. Man, this is a great little "sleeper". They told me I was the only one ever to order this product for the Model 3. It runs on TRSDOS 1.3 as well as LDOS. At the DOS level, if you ever type in a rather long DOS command, press ENTER, and discover you have made a typing error when you see the FILE NOT FOUND error, all you have to do is type OOPS, press ENTER, and then edit the original command to your liking and press ENTER again. Wahlah! Everything works great!

OOPS/CMD comes with HBUILD6 and your XROM for the Model 4 and this OOPS/CMD works with all versions of TRSDOS/LS-DOS 6. It will not work with DOSPLUS IV, however.

I have also discovered that with the XROM/XDROM installed, I can no longer boot NEWDOS 80 nor MULTIDOS. I will write to M.A.D. software and see if they have patches for these DOS's.

As I indicated in my previous review, I did order and receive a "Site License" for HBUILD6. They stated in their reply to me:

"Our site license pricing for HBUILD6 is as follows:

Original copy (use on 1 system) \$15 to \$35  
(depending on support ROM)  
Use on 2 to 5 (total) systems add \$20  
Use on 6 to 10 (total) systems add \$30  
Use on 11 to n (total) systems add \$30  
plus \$1 per system.

"Since you indicate you have 5 systems, your site license would cost an additional \$20. The site license covers any combination of HBUILD6 versions."

This pricing is extremely reasonable, and I have taken advantage of it. Now, all I need to do is order additional XROM's for my other 3 Model 4's that I intend to use with hard disks and HBUILD6.

In addition I asked M.A.D. about TRSDOS/LS-DOS 6 operation on the Network 4. Network 4, as released and supported by Radio Shack, worked on a modified TRSDOS 1.3 in the Model III mode. Since I have the kits necessary to modify 5 Model 4's to function with this system, I was interested in the possibility of running such a Network in the native Model 4 mode.

Their response: "We had working support for TRSDOS 6 (on Network 4) a few years ago. However, we have not seen sufficient interest to justify finishing the product — write a few more utilities and the documentation —, so I cannot give you a date when it will be offered. We really do not have a feel for how many people have access to the Network 4 hardware out there. Since this hardware is no longer available in any form from Radio Shack, the hardware in the field is our only market. If you have a large quantity of these systems, or know that they exist in a school or other institution that is interested in using TRSDOS 6, we would be interested in hearing about that."

A plea to readers: if you have Network 4 hardware or you know of a school near you still using Model 4's with Network 4, please let Stan Slater at Computer News 80, or myself, know about it. If you hear of a school selling Model 4's/Network 4's, and you don't want to buy them yourself, let me know!

If you appreciate speed, and you dislike waiting for your Drive 0 to spin, load "BOOT/SYS", spin again and load SYS0/SYS,

then fire up your word processor and write an order to M.A.D. Software in Ft. Worth and order their XROM/HBUILD6 kit before you buy another thing! It will be the best \$15 to \$35 you ever invested!

Their mailing address:

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

Have a great forever,  
-Art McAninch

### ASSEMBLY LANGUAGE TUTOR Part 21 by Christopher Fara (Microdex Corporation)

#### Signed integers

So far we have been dealing with positive integers only. A byte can hold an "absolute" value up to 255 when all bits are set "one". Similarly a "word" (a pair of two bytes) can hold an integer up to 65535. But programmers familiar with BASIC have been drilled to memorize that an integer (encoded in a pair of bytes) is a value in the range from -32768 to +32767. What gives?

The computer has no way to represent plus or minus like we do on paper by a little cross or dash, so in "signed" integers the leftmost bit is reserved to substitute for a sign. The remaining bits represent powers of 2 as usual (CN80 8/89:5, Z80 Tutor I:19). If the "sign bit" is "zero" then the number is positive. Hence the upper limit for signed bytes

+127 = 0111 1111

or for pairs

+32767 = 0111 1111 1111 1111

In negative numbers the "sign bit" is "one" and its value (128 in a byte, 32768 in a pair) represents a "borrowed" quantity, as we'll see in a moment.



## Don't Forget

This may be your last issue  
if your label ends in 90/10  
time to renew.

A negative number is a positive value subtracted from zero. For example  $0 - 8 = -8$ . Let's try it in binary:

0000 0000 = 0  
0000 1000 = 8 subtract

---

1111 1000 = -8

Binary math is just like decimal. We proceed from the rightmost column to the left. The subtraction of the 3 rightmost zeros presents no problem: the results are zeros. But to subtract 1 from zero we must borrow from the next column to get 10 which in binary means 2. Now  $2-1=1$ , write 1 in the result. The column from which we borrowed was 0 to begin with, so it also borrowed from the next column which borrowed from the next, etc. So obviously from this point on all remaining bits in the result must be 1. The final borrow comes from "outside" (actually from the Carry flag). We put it in the leftmost column as bit #7, so its absolute value is 2 to 7th power or 128. But since it's borrowed from "outside", this "sign bit" really represents a permanent "debt" of -128. The remaining bits are "real money" and represent as usual the powers of two  $64+32+16+8=120$ . Therefore the "net worth" of the result is  $-128+120=-8$ .

So far so good, but keeping track of those borrows is tiresome, so let's approach the job differently. Consider

$0 - 8 = 0 - 1 - 8 + 1$

On the right side of the equation we first subtract "one" from zero, then subtract our 8 from that, and finally add back "one". The end result is of course the same as on the left side of the equation. In binary

0000 0000  
0000 0001 = 1 subtract

---

1111 1111 = -1

This is easy, because we know from our first experience today that, once we start borrowing from zeros, the result is always a series of "ones" all the way to the end. Now it's also much easier to subtract 8 because no borrowing is necessary:  $1-1=0$  and  $1-0=1$  and that's it

1111 1111 = -1  
0000 1000 = 8 subtract

---

1111 0111 = -9

Actually this step is even easier than we thought: all bits in the result are always simply the opposite of the bits in the

"subtrahend" (the value we are subtracting). Finally add "one" back to that intermediate result

1111 0111 = -9  
0000 0001 = 1 add

---

1111 1000 = -8

Adding is always more fun than subtracting. Starting from the right  $1+1=2$  which is binary 10, write 0, carry 1. In the next column add  $\text{Carry}+1+0=2$  which is again binary 10, write 0, and so on until we get to bit #3. Here  $\text{Carry}+0+0=1$ , write 1 and no more Carry. The rest is simply  $1+0=1$  all the way to the end. But the big shortcut here is that we really don't need the first two steps. The intermediate result can be quickly produced by simply flipping all bits in the original number. Then add "one" to that intermediate result and the job is done.

That is the basis of the famous "Two's Complement Method" used to generate bit patterns of negative numbers. After the bits are flipped in the original value we get what's called "one's complement", and then the "two's complement" is the result of adding "one". Those names are rather silly, but since we now understand why the method works, we can ignore the jargon and just do it. The same method applies to 2-byte integers, and indeed to any number of bits. For example to encode -32769 start with "absolute" 32769 (2 to 15th power plus 2 to "zeroth" power):

1000 0000 0000 0001 = 32769  
0111 1111 1111 1110 flip  
0000 0000 0000 0001 add one

---

0111 1111 1111 1111 = ???

Ooops! Something went wrong. The leftmost "sign bit" is still 0 and it should be 1 to indicate a negative value. So apparently we didn't succeed in encoding -32769. That's why the lower limit of 2-byte "signed integers" is -32768

1000 0000 0000 0000 = -32768

Any attempt to encode a lower negative value stubbornly keeps the leftmost bit "zero" and just can't be done. For the same reason a "signed" negative value of a single byte cannot be lower than -128

1000 0000 = -128

If you don't believe it then just keep trying and good luck.

To convert a negative integer to positive we can also subtract it from zero because,



for example

$$0 - (-8) = 8 = 0 - 1 - (-8) + 1$$

So we can again use the "two's complement" method

```

1111 1000 = -8
0000 0111 flip
0000 0001 add one

```

```

-----
0000 1000 = +8

```

As you can see, this mechanical method works both ways.

In actual programming we don't need to do the "one's" and "two's" because Z-80 handles signed integers automatically just like the unsigned ones. But if you ever need to do the "complements" then two assembly instructions may come in handy.

.....

**CPL**  
Complement. Flips all bits in register A. The result is the "one's complement" of the original value.

**NEG**  
Negate. Converts a positive value to negative in register A. The result is the "two's complement" of the original value.

.....

No such instructions exist for 2-byte integers. The "one's complement" can be done by flipping each "half" of a register pair separately. For example to create "one's complement" of the pair DE:

```

LD A,E
CPL
LD E,A
LD A,D
CPL
LD D,A

```

To change the sign of a register pair such as DE (ie. to create it's "two's complement") just subtract it from zero:

```

LD HL,0
XOR A
SBC HL,DE
EX DE,HL

```

and now DE is negative. This would automatically do all the correct "complementing", as long as the original value was not greater than "absolute" 32768.

If you see a strange bit pattern of a negative integer (it has 1 in the "sign" bit) and wonder what its value is, simply figure out the value of the "debt" in the "sign" bit and add the combined value of the

remaining bits. For example

1000 0000 0000 1111

In 16-bit (2-byte) integers the absolute value of the leftmost bit is 2 to 15th power or 32768, so it represents a "debt" of -32768. The four rightmost "ones" represent 8+4+2+1=15, so this bit pattern represents -32768+15 or -32753.

### Signed arithmetics

All arithmetic operations on signed integers work just like the un-signed math. For example add two negative numbers

```

1100 0000 = -64
1111 1000 = -8 add
-----
1011 1000 = -72

```

Check the result: the "debt" of -128 plus 32+16+8. If you do this addition by hand, you'll see that a carry "falls out" of the leftmost bit. So the Carry flag is now set, but in this case it does not mean overflow. In our original discussion of Flags (CN80 89/8:6, Z80 Tutor I:20) we have noted that Parity flag is used instead of Carry to detect overflow in "signed math". Actually the "official" full name of this flag is "Parity/Overflow Flag" (P/O flag) but we will continue referring to it as "Parity" or P-flag for short. For example suppose we write

```

LD A,127
ADD A,1

```

The result +128 exceeds the limit for signed bytes (+127) and the Parity flag is set PE after this operation. But the result is still correct if we are only interested in the absolute (un-signed) addition. The Carry flag remains reset. It would be set only if the absolute result exceeded 255.

Last month we have observed that SLA and SRA instructions are used to multiply and divide by powers of 2 (2, 4, 8, etc). This also works with "signed" integers. Take, for example our -8

1111 1000

To multiply by 2 use SLA (Shift Left Arithmetic). The result is

1111 0000

Now the leftmost bit is the usual "debt" of -128, the remaining bits represent 64+32+16=112, so the "net worth" of the result is -128+112=-16 as it should be. To

multiply this by 8 we would SLA three more times

```
1110 0000 = -32
1100 0000 = -64
1000 0000 = -128
```

Only the "debt" remains, so we have -128 as expected (-16\*8=-128). Now try SLA one more time

```
0000 0000 = ???
```

The result can't be correct because -128 multiplied by 2 (-256) would exceed the limit of a signed negative byte (-128). The error can be detected by checking the "Sign Flag" which is basically a duplicate of the leftmost bit (the sign bit) of the result. It is set M (minus) as long as the result remains negative and changes to P (plus) when positive. Error would be detected in a similar way on "signed" positive integers. For example multiply +64 by 2 using SLA

```
0100 0000 = +64
1000 0000 = +128 ???
```

The sign bit changed from positive to negative (Sign flag is now set M) so the result is wrong (+128 exceeds the upper limit +127 of signed bytes). But as in the earlier addition example, the result is still correct if we are only interested in "absolute" integers, because the Carry flag is still reset (the original leftmost 0 "fell out" into Carry).

As you recall, the SRA instruction (Shift Right Arithmetic) is used to divide by powers of 2. It shifts bits to the right, but also preserves the status of the leftmost "sign" bit. For example divide -64 by 2

```
1100 0000 = -64
```

After SRA it becomes

```
1110 0000 = -32
```

The "sign bit" replicated itself, and the result is correct. A positive "sign bit" would be preserved in the same way.

The SLA and SRA instructions are called "arithmetic" because they correctly handle "signed" arithmetics. In SLA the multiplication is valid as long as the leftmost bit keeps its original "sign" value. In SRA the division is always valid, because the "sign" bit never changes.

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## TALKER WITH VS100 VOICE SYNTHESIZER by Donald W. Ady

Alpha Products who made the well known TALKER VS100 speech synthesizer for the TRS80 dropped from sight some time ago. But, I just found out they had only moved, and then got the Model 3/4/4P version from them: Alpha Products, 242 West Ave., Darien CT 06820, phone (203) 656-1806. Price \$79.95 plus \$4 S&H. Model 1 version is I think \$49.95. A great bargain. They have 20 units still for M3/M4, and some for M1. Can they do repairs? Yes. Can they make more new ones? Almost certainly yes if there were enough demand for a minimum run of about 20 or more.

The unit plugs directly onto the 50 pin PCB expansion card edge on M3/M4. M1 40 pin bus needs different TALKER model. M4P needs an extension cable to reach inset of expansion card edge. Simple instructions are given for file copies and for the hardware. Power supply and speaker jacks plug into the small TALKER PCB. The board has a volume knob. For M4D: use an extension handle so knob reaches easily.

When the speaker is connected to its power supply with voltage and computer is off, the speaker yowls. If turned on together that's momentary if you use the BOOT setup AUTO QUIET. Next type TALKER, go into BASIC, and RUN"DEMO/BAS. That shows off the capabilities. For M4 mode: use QUIET4 and TALKER4 commands.

Speech is fairly understandable for ordinary text as-is. For canned messages you can easily touch it up a little by spelling changes. Perfectionists can with more effort build in more detailed pronunciation control. There is some pitch inflection by default, though not much. Pitch: four tone settings by software. Volume: knob and 14 software settings.

A program VEDIT/BAS creates message subroutines that MERGE and do speech independent of any other software driver. For most casual purposes, TALKER/CMD is invoked from DOS by typing TALKER, with or without argument switches for options. For instance: TALKER /VW/ will subsequently read to you anything that displays on the screen using the system video PRINT driver. DIR for example of

LIST MYFILE or any PRINT display in BASIC.

All such switches can and most conveniently are used in BASIC programs with a new PRINT\* syntax like: PRINT\*"/VW/". Or use a direct mode irrespective of most switches PRINT\*"Hello" for direct speech. That form does not display. PRINT!"Hello" with exclamation mark does both: talks and also displays. PRINT! @, or PRINT! USING N\$ or PRINT! TAB(X) also work in controlling the display function.

A partial list of options: audible echo letter by letter or by whole word of video and/or keyboard; silence, 4 pitches, 14 volumes, speed variations, silent or pronounced punctuation or math mode: eg "/" is silent or says "slash" or says "divided by" via /PY/ or /MY/ punctuation or math YES switches.

TALKER can't talk fast enough and you can't listen fast enough to keep up with a rapidly scrolling screen. The display does get somewhat ahead, usually, but not more than the default buffer size of 256 bytes. Talk catches up when the display is finished. But, the display itself slows down rather than letting the buffer overflow. Invocation by TALKER N sets buffer size of N\*256 bytes. TALKER 0 gives zero size so you immediately see the effect. TALKER 1 is same as default TALKER with no number.

TALKER 40 would give 10K buffer and keep talking a long time if you let it. If you should tire of listening, just hold down the SHIFT-SPACE keys together. Program control can also execute PRINT\*"/CB/" to do the same thing, or PRINT\*"/TN/", for TALK NO.

Many listeners will miss some of the words at least now and then without some rework. For canned speech, all you most often need is to experiment with odd spellings that sound right when TALKER says them. "Read" will always sound like "reed". To say the past tense, spell it "red" to be spoken that way. I've been using some Spanish drill pending a vacation trip there, and not previously knowing a single word. Most vowels came out wrongly until spelled some funny way: "oh" for "a", "ee" for "i", "ow" for "o", and "oo" for "u" often did the right trick.

For more detailed control, there is a set of "phonemes" that produce particular sounds. Code numbers 0-255 are used. The two high bits set 4 levels of pitch of 64 phonemes. OUT 11,N sends signals to the VS100. VSEDIT/BAS is a program to make that a whole lot easier. With that you can combine and try natural spelling with phonemes. Furthermore, the program cans them with port signals contained in mergeable BASIC. Messages encoded that way get spoken by a simple GOSUB in your application program with no need to invoke TALKER/CMD.

Alpha Products has a whole line of Data Acquisition and Control Devices for controlling the outside world from computers. Bus connections are also sold to come out of a variety of computers such as TRS80 M1/3/4, Cocom, Apple, Commodor, IBM's, and others. They promote an "A-Bus" and peripherals to implement sensing, signalling, timing, motion control, and so forth.

#### 80 TRACK 720K 5.25 INCH FLOPPY DRIVE

What's the advantage or disadvantage of an 80T drive? Obviously it holds more. If you archive lots of stuff on the shelf, then you can do it with half as many diskettes. Ditto if you back up a hard drive onto floppies instead of a tape drive. It provides a way to increase your file space for large applications, or you can use a file bigger than 360K. And what's the downside? If you have only one such drive, then a full disk backup would be a hassle. There's no simple way to set up a BOOT on 80T drive :0. Disk swapping with 40T drives: often incompatible or unreliable.

Most 80T drives today are made in the 3.5 inch size. Those are probably your best bet, and will work on your TRS80 DOS if it supports 80T. Why won't the new 1.2MB or 1.44MB floppies work on a TRS80? It's because they transfer data too fast for a Z80 to keep up. For the same reason they don't work on older MSDOS machines with slower CPUs.

I recently saw my first 80T drive when I bought it, a Fujitsu model M2552A, a half height 5.25 inch unit. Separate to the bare drive I bought a half height case and power supply that happened to have an IBM style

external cable harness that is unusable here. The drive had mounting rails that would work on either TRS80 or IBM style mounts as this case required. The PS four pin plug was exactly the same with the same voltages as used by TRS80 drives, and it has the same conventions on the 34 pin PCB edge connector.

A drive cable that would be barely long enough to work on the usual TRS80 setup would not be long enough for this case. The cable from the computer enters the case through a slot where it is clamped, then forward about 4.5 inches to reach the drive PCB. There is no internal flat cable extender in the drive. It was difficult to barely make it with a cable I had. Now it has a longer home made one. The plug crimper tool came from a Radio Shack store. My first try at that. It seemed to take a table vise to make crimp plug contact on the center pins. Off center recrimping with the hand tool did nothing but shatter a plug.

#### Incompatibility

My 80T 5.25 inch drive using 40T format is totally incompatible with my 40T TRS80 drives. It may as well have been of 3.5 inch size for all I could do swapping of disks. When it makes a 40T format, I can't get any DIR in the 40T drives. Disks formatted in those drives don't give DIR in the 80T drive set for 40T specs. SUPERZAP also failed to read anything in the crossovers. Exception: the TRS80 using 80T drive created and read 40T MSDOS format disks, with a utility from Hypersoft. There was no problem in swapping these diskettes between the 80T drive and the drives in my IBM clone.

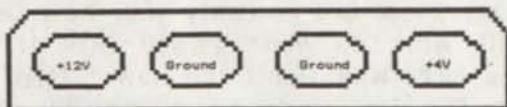


Illustration of the Disk drive Power Supply Plug.

Orientation: looking at end from power supply, the mating end mounted on the drive PCM is the mirror image.

-Donald W. Ady

## NEW EXTERNAL DRIVES AND OTHER HARDWARE PROJECTS

by CN80

At one of our work stations we had one external drive with two TEAC half height drives mounted in it. One 40 track 5-1/4 floppy disk drive and one 80 track 5-1/4 floppy disk drive. The original reasoning behind purchasing this particular setup at the time was to cut down on the number of disks needed to archive files. At that time we went with the 5-1/4 80 track floppy disk drive because the cost of the 3-1/2 disks were about four times that of 5-1/4 floppies. The cost would have been considerably higher for just storing files, and making backups of our hard drives to use 3-1/2 disks. But in using the drives with standard floppy disks we found the 80 track drive to be very finicky. It would give us no problem if we simply copied files to it sequentially. If we used the files very much to change or modify the contents of the files we would get file not found errors, or parity error on read, and not be able to get into the files again. We never did find what was causing the problem and assumed that the directory or the files were becoming too fragmented on the disk. We had no problem copying or using BACKUP :x :x (NEW) to copy files from the 40 track drives to the 80 or in reverse, to copy from the 80 track to 40s. Once in awhile we would have a program that had a data file that was just too large for a 360 double sided 40 track disk, but not so big or used so often that we needed to install it on a hard drive.

With these problems, plus the frustration of having a file on the 80 track floppy disk that we could not work with, we decided to change it out. And because now that good quality 3-1/2 disks are available at a reasonable price the cost of archive disks is not so high.

We purchased a replacement external drive with one 5-1/4 floppy 40 track drive and one 3-1/2 80 track drive from Misosys, complete with all the cables necessary to just plug it in on arrival and get back to work. As of this writing the new external drive has been in operation for two days, so we can not report on it yet in depth. The Fujitsu drives that Misosys supplies are quieter than the TEAC drives. One thing we

have experienced over the past two years is that the Fujitsu 5-1/4 double sided drives work better with floppy disks than our TEAC double sided drives. The Fujitsu drives gave us fewer error reports when copying to the back side (actually the front side where the label is applied) of a floppy disk. We can only assume that this is because the read-write heads ride differently when the floppy disk is put into the guides and the actual distance between the upper drive head, which would be the pressure pad on a single side drive, is different. We have never experienced this problem using floppy disks with single sided drives, regardless of the manufacturer. We would appreciate hearing from our readers if they have experienced any of the same problems.

So far we have changed out several Model 4 single sided drives with Fujitsu double sided half height drives and are very well pleased with their performance. There are two small problems with the Fujitsu when putting them into a Model 4, because the housing of the Fujitsu is about a eighth of an inch longer than the drives that Tandy installed, and because the lock down handle is larger and longer than the one that Tandy installed and larger than the TEAC handle. Because the handle is longer it will not clear the opening in the Model 4 housing. This is simply solved by placing two small washers under the four screws that mount the drive tower to the bottom of the case. This raises the drives enough to clear the opening in the case and still cover the opening with its face plate.

The problem of length of the drive being longer is easily solved by cutting out the upper and lower half of the drive tower, letting the drives stick past the back of the drive tower. There is plenty of room left for cables etc. Cut out only enough to clear the edge of the drive, leaving the middle of the drive tower intact as support. The mounting holes in the tower matched perfectly with the holes in the new drives, but the new drives have metric threads, and the screws Tandy provided will not work. So you have to locate some small metric thread screws or re-tap the holes in the drives.

Fortunately for us we had a package of the right screws on hand supplied by Joe Zanetti along with his filler plates. (See Vol

3, No. 2 page 17 and his ad in the classified section of that issue.) His half height filler plates are still the best we have ever seen, and he supplies a set of 16 metric screws with the package for an additional 50 cents. His cover panels are \$9.95 plus \$2.00 shipping, with the screw package extra.

Contact: Joseph L. Zanetti, 307 Morton Ave, West Berlin NJ 09081.

So far our Saturday/Sunday projects have included changing out power supplies, disk drives, putting in new screens and installing memory chips. The easiest job of all was installing the hi-resolution board it just plugs on to the existing pin socket. All of these projects require no real skill, and no soldering, except for installing the memory chips on the mother board that has the little blue wire instead of the shunt block.

By the way, the Astec 65 watt power supply for the Model 4 and 4p is still being manufactured by Astec, we now keep three or four on hand just in case. Our price is \$65.00 plus \$4.00 S & H the same as Tandy National Parts charges us, so if you need one in a hurry you can order it from CN80. We have been looking for a supplier that had a better price, but we have not found one yet. The one requirement we make is that it is exactly the same size and shape as the original board, which takes only the removal of two cable connectors and four mounting screws. Then putting in the new board on the same four mounting screws, and plugging on the two cable connectors, which are the same pin to pin configuration as the original. That should give you an idea of how simple it is to replace a power supply. It's about as easy as plugging in your floor lamp.

Like most of you it took us a long time to get up the courage to open up the computer, not having any knowledge of what was inside. But once you do look inside it is not all that difficult to do your own repair work. That is the replacement of complete parts, like fixing a flat tire. Remove the lugs take off the flat and put on the spare. Of course we are not talking about the repair of these boards, or the repair of a disk drive that is shot. Even Tandy doesn't do that, they simply replace the whole module and replace it with a new one. Like so many other things in today's

economy it is cheaper to replace a part with a new factory part than to pay the labor involved to locate a problem and repair it.

Look at so many of the IBM clones that have a hinged cover, just like the trunk of your car, so you can pop the hood open and get right in there and tinker.

Once you get a working knowledge of what is in your computer (the parts may be expensive, but the labor is for free) you will feel better about keeping your TRS-80 going for a long long time.  
-CN80

## REMBRANDT - BEYOND BUSINESS GRAPHICS

by Dale Hill

"That's pretty sharp," the director of our school's Indian Education program, who has a relatively unused Model 4 setting on his desk, said as he watched my 'Computerized Christmas Card' which I had created using Rembrandt, LSDOS's Text Editor (TED), and my handy little MODEL 4P that sat on my cluttered, computer-desk back home.

"That was done by a program called 'Rembrandt' which you can order through Computer News - 80."

"Do you have to use math to figure out all of the graphic screens?" my friend said as another screen came into view.

"Not a bit. The program tells you how to do it, and the rest is left up to you and your imagination," I said as the final screen spiraled out and the machine went back to Stephen Milliken's 2.0 Shell.

When I first received my copy of Rembrandt, I was a bit leery about learning it and finding it worthwhile. The advertisement in CN-80 states "Complete Business Graphic Toolkit", which leaves me out. I use my Model 4P for home use and very little commercial business.

The program comes on two single sided

diskettes bulging with useful files - so many files, though, that I am not going to attempt to review the entire product right now. Basically, what I want to do is discuss only one application: Rembrandt graphics for educational and family applications. Let me say this up front, if you haven't purchased Rembrandt for your home applications, you are missing the boat.

Rembrandt includes the following files that can be entered from your DOS line: BOARD/CMD, BRIEF/CMD, CHANGE/CMD and then 4 'graph/CMDs called PIE, HBAR, VBAR and XY. Also a minor file called CHANGE/CMD is included, which allows importation of ASCII files generated by other programs, and of course the Printer commands. All of this may seem complicated to the unbaptized, but stick with me, I will make it easier.

With a double-sided drive, the operator can get the whole package onto a 2.0 Shell diskette which can be booted in drive one, if a very minimum system diskette is created. Needed on that diskette would be the TED program, Text Editor, included in your LSDOS package. The editor takes up only about 5k of your diskette storage and is needed to make the control files.

If operating on single sided diskettes, then a couple of diskettes would be needed: one to develop slide shows and one for the graph files. On both diskettes, a copy of the printer command will be needed, since one has to exit the Rembrandt program and enter the printer command to print a file - a bit clumsy, but it works beautifully by printing out your created screens on paper. Eight printer programs are included, with one that even works for the Apple Imagewriter and compatibles.

At the heart of REMBRANDT is the BOARD/CMD which allows you to create, what I call, low-resolution graphic screens WITHOUT the need of a graphics board. If you can wordprocess, you can create the screens.

Commands to produce the pictures are generated by pressing the 'Control Key' in combination with other keys - easy as slippin' on ice in cold weather. To give you an idea, Control-B marks a block beginning and Control-E marks the block end and then

Control-C copies the block anywhere you want it on screen. Thus, if you have created an alien, copy him all over the screen.

Making circles is easy to. First using a Control-OC sequence, the center of the circle is established. After that decide how wide you want the circle and establish the radius with Control-OR. (Remember, the radius is 1/2 the diameter; thus your circle will be twice as wide as your radius.) Then using another Control-O sequence, the circle appears on screen.

Look in the back of your system operating manual under graphics. Every TRS-80 graphic found there can be printed on your screen using a simple programming device which is activated by the Control-P command. Within 15 minutes after I had created my boot diskette, I was making fancy screens. That is how easy Rembrandt is to use.

The BREAK key toggles the menu when you are in the board area. Thus, if you have a screen you like, hit BREAK, move the cursor to the save file and give your screen a name with a :1 extension and save it on a data diskette. You can also load screens as well as load screens over screens. An example border screen is included in the package that can be loaded over an existing screen.

Once you have several screens defined and saved, use the TED program to generate a file which tells BRIEF what you want to do with the screens. BRIEF includes fancy display operations from fading away, striping away, spiraling away and pulling up or pushing down. With TED, type the screen's name, the display operation number and the time separated by commas, and you are ready to go. Typing END at the end of the file ends the program and typing REPEAT makes the display perpetual. Typing 99 for the time activates the "Press Any Key To Go On" display. I love it.

So now, how can it be used. Besides just the fun of creating fancy slide shows and "Computerized Christmas Cards", the program can allow a teacher or parent to make a "Programmed Reader" application on screen. Our daughter is in our Learning Disability class and is a struggling reader. I

had considered buying an Apple just to get their educational reading programs. Forget it. With the BRIEF/CMD and REMBRANDT, I can create my own reading program, individualize for reading levels, and change it often. I do wish there was a RANDOM command that would randomize the screen displays, but I am not complaining. Editing with TED allows you to speed-up the display or slow it down.

This program is educationally solid as a rock and works without a hitch. If I can do it, anyone can. Each screen takes up 3k of space on a diskette, so on a single-sided, system diskette with a shell, approximately 22 slides can be accommodated along with the control text. If the BRIEF/CMD was made public domain and distributed to every TRS-80 owner along with a slide program, I guarantee every TRS-80 owner would plow down the \$40.00 for the entire program.

My next submission will review the powerful graphing functions of this program. After I began looking at the program, I dropped everything I was doing to write this review and send CN-80 a "Computerized Christmas Card".

I gave my principal and his family, who has a TRS-80, one of my "Computerized Christmas Cards" activated by the BRIEF/CMD. The next day my boss stopped me unexpectedly in the hall. Here is a man who wouldn't be caught dead at a computer terminal, unless of course it was a terminal that monitored his heart in an ICU room at a hospital.

"Mr. Hill, my family loved your Christmas Card," he surprised me. "I guess I am going to have to go turn that computer on and watch your Christmas Card."

Give me a TRS-80 and Rembrandt in the classroom, and I'll give you a teacher's and a parent's friend.

-Dale Hill

(Editors Note) Dale Hill sent us this review last December, and for some reason it got lost in the pile of Christmas wrappings and activities. Since I remembered his electronic card, but didn't remember that his review was on the same disk - that is until Dale sent us a gentle note to remind us that he hadn't seen his review in print.

Also since Christmas is just around the corner again, I thought I better get on the move and get it published. Thanks Dale, we are looking forward to your next ElecXmas card. Besides it gave us a chance to have a little bit of Christmas in September. As the old saying goes, "We'll get the job done if it takes till Christmas." -CN80

## HINTS AND PROGRAMS

by Robert D. Gore

You have asked for hints and programs so I thought I would try to put my two-cents worth in.

First, in last December's issue the question was raised about how to get the model 100 talking to the model 4. Well, here is the way I do it. It will require DESKMATE for the model 4 and a null modem cable. Both can be obtained from Radio Shack. Connect one end of the cable to the RS-232 port of the model 4 and the other end to the RS-232 port of the model 100. Now boot up the DESKMATE disk and enter "DM" to start the program. Press clear and 4 keys to bring up the HOST subprogram. Now bring up the model 100 TELECOM and enter the status of 38N1E to open the RS-232 port to 300 baud I/O. You may want to use a higher speed but as for me, I'm in no hurry. Now enter the 'terminal' state on the model 100. Press 'enter' twice and you should see the model 4 Host answer with a menu on the model 100 screen. You have access to all the files in the model 4 Deskmate. If you wish to upload an ASCII file to the M4 then choose the menu choice to 'Send a file to Host'. The M4 will respond that it is ready to receive. Press the 'upload' function key on the M100. It will ask you what file and what width you wish to send. For Basic programs (in ASCII) I use the default setting (40) if I wrote it in the M100. For all other text files I use a width of 70. When you have answered this the M100 commences to send the file up to the M4 which takes it in and stores it on the disk. When the M100 completes sending the file, press control C to indicate to the M4 that it has got all it is going to get. Basically that is all there is to it. You can also download a file from the

M4 to the M100. Just follow the on screen menu and instructions on the M100. Everything is controlled from the M100. The M4 just responds like a remote mainframe.

I use this quite often as I like the portability of the M100 to go somewhere where it's nice to write letters, science fiction stories, or programs. I even write M4 programs on the M100 and upload them via this method. It works great.

Another question I seem to remember was how to update the Deskmate program to LSDOS 6.3 version. Here is how I did it.

Boot up the M4 with LSDOS 6.3 or 6.3.1. Make a backup copy of your Deskmate disk and use it to work with. Now place the backup copy of Deskmate into drive :1. Type in 'Backup :0 :1 (I,S,OLD)'. This will change only those files that are on the Deskmate disk already. When this is completed type in 'DATECONV :1'. This will convert the Deskmate disk to the new dating system of 6.3.X. OK, now remove the system disk from drive :0 and place the new Deskmate disk into drive :0 and press the reset to boot up the Deskmate disk. When it is up type in 'SYSGEN (NO)'. Then type in 'reset \*cl' to clear any old configuration file out. Now type in 'SET \*CL to COM/DVR'. Type in 'SYSGEN (YES)'. A new configuration file will be built by system onto the new Deskmate disk. OK, you should now have a model 4 Deskmate that is good till next century or a little way into it, depending on whether you are updating to 6.3 or 6.3.1 version DOS. I've used this procedure when I went to LSDOS 6.3 and again recently when I upgraded to 6.3.1. Works great!

In another recent issue where some games from a File Cabinet disk were reviewed it was asked how to play one called AWARI. I'm not familiar with that particular program but I do have a couple of versions of it on my machines. Awari is an ancient African game of strategy. In its original version it was played using small holes or depressions in the ground as the game board with small pebbles as the game pieces. It is a two player game. Each player has, I think, five depressions on his side. Each depression has four pebbles in it to start. Each player in his turn chooses one of his slots that has pebbles in it, picks up those pebbles and



drops one into each of the succeeding slots in a counter-clockwise direction. The object is to drop the last pebble into your opponents slot that has only one or two pebbles in it at the time. If you do this you capture all the pebbles in that slot plus any others behind it that had only one or two to start with. Whichever player captures 24 pebbles first is the winner. Of course at the beginning of the game there is a lot of maneuvering for position but with the right strategy you can get your opponent into the configuration you want. Sounds simple, doesn't it. Well its simplicity belies its complexity. There is more strategy involved than a game of chess. I've played this game against this computer many times and can seldom beat it. But it is a fun game and I do recommend it to anyone who enjoys games of strategy.

On the enclosed disk I have copied two programs that I've written. I am a very amateur programmer so I'm afraid they're not the most well written. But they are somewhat experimental ones that I come back to and improve at times so you might say they are unfinished. But they work on the model 4 system and with some modification I'm sure they will work on the M1 or M3 systems.

The first program is called GUESSAI/BAS (see program listing number one) and is a guess the number between 1 and 100 type. But this program has the human player taking turns with a computer guessing the number. I have a curiosity about artificial intelligence in computers. I feel that any program in which the computer takes the part of opponent is somewhat an A.I. program. I have played many games against a computer and most play better than human opponents playing the same game. So I devised this little bit of nonsense. The program is very simple to play. Just follow the menu requests. I'm really interested to see if someone of the CN80 readers could improve on it. I'd be interested to see what they do and the results. I'm still thinking of ways to improve the computer guessing routine. Any suggestions from out there would be welcome.

The other program resulted from reading an article in the Computer Recreations section of Scientific American magazine. It was about a program that was designed to fight

it out with another program using the computers memory as the battleground. It was called Core-War and was written by some professional programmers at some college. It of course was written in machine language. Since I'm not a machine language programmer, I got to wondering if something like it could be written in the Basic language using peeks and pokes.

What you see in COREWAR/BAS (see program listing number two) is the result. It has two program sections called "X" and "Y" that do battle over a 100 address section of higher memory. The intelligence of the two sections are pretty much the same but I think each could be given more capability to win over the other. As it is now, the winner is pretty much a 50/50 chance although "Y" seems to win a little more often. The program is easy to use. Just protect memory at 52000, load, and run it. Or use the COREWAR/JCL to start.

-Robert Gore

#### TRSLink UPDATE

By the time you receive this issue of CN80, we should have TRSLink issue number 35 available.

Single issues are \$1.50 each and are placed on LS/TRS DOS 6.3 formatted single sided disks.

Orders for 6 or more issues are available on floppy disks; one issue per side, formatted with LS/TRS DOS 6.3 and are priced at 75 cents per issue or \$ 1.50 per disk of two issues. All prices include postage.

Model III people who do not have a modem, or who do not wish to pay for the long distance call to download the issues directly from the TRSLink bulletin board, feel that they were left out on our last offer for multiple copies of TRSLink. TRSLink issues can be read on Model III computers, so if you want us to Convert the issues to TRSDOS 1.3 and place them on Single Sided 40 track disks, we will do that too, just add an extra \$4.00 to your order for the conversion service. We don't want anyone left out from receiving this valuable source of information. -CN80

## LIVING IN A WELL-DEFINED WORLD

by David P. Miller

Last time we discussed the aspects of controlling the graphics boards through the use of the OUT pp,nn statement. As we saw, sending control bytes and data to and from the H/R boards is a simple and straightforward matter. However, all we did was take existing data from a disk file and send it to the H/R memory. Since the process filled the entire screen, there was no need to clear the screen of existing data first. In this session, we'll be generating a graphics image, and will therefore need to clear the graphics screen first.

This is accomplished by setting the 'X' and 'Y' coordinates, telling the H/R board to auto-increment 'Y', sending 240 bytes of X'00' out the data port (all bits off), bumping the 'X' coordinate by one, and repeating the process until all 80 columns have been filled with X'00'. Because of the speed of BASIC, the overall process takes a little time. The same method is used in Assembly language and during operation of GBASIC's "@CLS" and BASICG's "CLR" commands, but machine language is used, which can be up to 300 times faster. We're turning graphics on in this example so you can see what is happening; the normal practice is to leave the text screen on and graphics off during screen clearing for a more professional look.

(See WORLD2/BAS Program Listing Number Four in the program listing section.)

Once the screen is cleared, the program requests a factor to use during generation of the image. This image is a function of a mathematical value filling one quarter of the screen, and duplicated in the other four quarters both directions as appropriate to obtain an image that is symmetrical in all of the screen. Although the program calculates the dots to be turned on one at a time, we're accumulating the results in a byte before sending it to the graphics screen to decrease execution time. To set on a single dot without disturbing the other seven dots in a one-byte screen position, we would have to set the X/Y coordinates, read a byte from the screen, set on the appropriate bit, and rewrite the byte to the same X/Y position. The additional instructions required could take up to 20

times as long. Line drawing requires this approach, but we won't use it in GBASIC or BASICG; when the time comes to draw lines, we'll use the appropriate Graphics BASIC commands to do the job so the programs won't be painfully slow.  
-David Miller

## VOLUME X: REFERENCE REVIEW

by Jane A. Layman

Readers of CN80 will be aware of the Assembly Language Tutor articles by Christopher Fara which began in the January 1989 issue. These articles, which assume virtually no background in assembly language programming, help an aspiring programmer to make a start in using the language. Now Chris has produced Volume X: Reference for his Z-80 Tutor series. It is for use with any computer with a Z-80 processor and contains the standard reference material, that is, a description of the Z-80 instruction set and basic information about its registers and manner of operation.

Volume X: Reference comes as a spiral bound book with 8 1/2 by 11 inch pages that will stand up easily on a book or typing stand next to your computer. The print is large and easy to read, yet Chris manages to cover in 62 pages of uncrowded text what is spread over several hundred pages in Radio Shack's EDTASM manual.

The disparity in size between the two presentations of essentially the same material is due to Chris's superior organization of it. Chris's coverage of the Z-80 instruction set is confined to 34 pages compared to 189 pages in the EDTASM manual. This condensation of the material has been accomplished by avoiding unnecessary repetition rather than eliminating important information.

The Z-80 instruction set falls into distinctive groups such that members of a specific group operate in much the same way except for minor differences. Rather than repeating for each instruction in a group what they all have in common, Chris merely remarks that it is the "same as

(whatever instruction) except . . . ." This manner of presentation manages to focus the reader's attention on both the common operation that makes a "group" a group at the same time that it highlights the differences among the group's instructions.

The Technical Notes section of the Volume X: Reference contains information on the Z-80 registers, flags, and other subjects of interest. Most of the Z-80 registers are described briefly while the FLAGS register, which you must understand intimately to correctly use all the Z-80's conditional instructions, is described in considerable detail.

The "other subjects of interest" include such topics as source code, assembled code, addressing modes, and instruction patterns. It is all highly readable and of general interest. An important topic that seems to have been omitted, however, is an explanation of the Z-80 stack. (Chris did cover this topic in one of his tutorial articles.) The final section of the book provides the alphabetic and numeric listings of the Z-80 instruction set that are helpful while debugging code.

In summary, Volume X: Reference lays out the essential information about the Z-80 processor in a "plain language" and easy to find fashion. In fact, it was not until I started comparing the presentation in Volume X: Reference with that in the EDTASM manual for this review that I realized how much I had been missing in the EDTASM manual.

-Jane A. Layman



# Tasha

That's our 97 pound lap dog!  
Icon file M4PMLAE



# Foxy

Mickey Slonaker's  
Best Friend

## A VISIT WITH DAVID GOBEN

By David Goben

In my BUSY CALCULATIONS column last month, I found a typo in the program listing in line 1100 on page 32. In the line there was a backslash "\" where it -should- have been a forward slash "/". So replace the "\" with a "/" and all will be OK. The problem would not cause any problems in most conversions, because few people use logical operations. This bug rests entirely with me, and not with CN80.

### FUTURE PRODUCTS FROM CN80

I have received numerous queries from some of you as to what programs I am coming up for future release. Normally I do not comply, because it will usually result in a bunch of hackers "taking the challenge" and trying to produce a similar program before I can get mine out, or numerous others who blatantly demand that I make such efforts public domain so that they can be cheap and not have to pay for my cost in time for developing these often very complex and demanding products. But I will reveal three projects I am working on, simply because I have the programs finished, but the documentation is not yet complete.

#### PROJECT #1:

The first is of course the Laser Soft Font Drivers for Model III and 4 SuperSCRIPSIT, and Model 4 SCRIPSIT Pro. (Model I SS versions by request and at a slight additional cost.)

Currently I have seven Soft Font Print Driver Packages completed. Each soft font print driver package will feature one of the following type styles: Times Roman, Century Schoolbook, Helvetica, Optimis, Legal, Script, and Amertype.

Each Soft Font Print Driver Package will print the one type style supplied with the package in 10 point normal, bold and italics. Each package will have a super-fast downloading program that will quickly load the soft fonts into the laser printer, and an automated job control file which to do the downloading work for you.

#### PROJECT #2:

Another project is a fast Model 4 disk backup utility. One of the greatest burdens

we face, especially hard disk owners, is the drudgery of backing the hard disk up. On some installations this can take hours, and so it often happens that users after a while do backups far too few times over long intervals (and usually suffer later for it). But recently I have completed a program that works equally well on hard disk and floppy-based systems, so that no matter what Model 4 computer set-up you have, to include a 1-disk system, you can have a fast, efficient file transfer utility. This is also great news for 1-disk users who need to transfer data from a commercial data disk to a system disk.

How fast is it? Well, using the standard BACKUP/CMD utility provided with LS-DOS 6.3 on my Model 4D I backed up my main DOS partition, consisting of 211 files totally over 1780K of space, in a period of 38 minutes and 15 seconds (21 minutes and 30 seconds if I patched BACKUP to do standard writes rather than verify writes). And this was on a computer with an XLR8er from MYSOSYS running at 6.144 MHz (Z80 8 MHz equivalent). Using my new fast backup program, I can do the very -same- backup in 4 minutes and 40 seconds. And in alphabetical order if I use the ALPHA parameter! When I did my first test run with it, it ran so fast that I thought it "obviously" had a bug. But it didn't. It's that fast.

Of course, some of this speed is due to the fact that my program also takes advantage of any unallocated expanded memory recognized by DOS. With the addition of the 256K on my XLR8er to my normal 128K expansion, I have 384K to work with, which can hold more than enough data to fill a double-sided 40 cylinder (track) disk. Even a standard 128K system shows significant speed. And before you ask, even a 64K system shows substantial speed when using my new utility rather than BACKUP. So if you ever thought of expanding the memory in your system, now is the time to do it. You can obtain the 128K expansion chips from CN80, the XLR8er with 256K from MISOSYS (you will want to also obtain the 128K chips for a total of 384K), or you can get HyperMEM from ANITEK (be sure to get the HYPERDRIVE disk with HYPERSVC, so that DOS will access the expanded banks). Users of the SuperMEM 1-megabyte expansion can use either the DOS patches

from MISOSYS, or the HYPERSVC program.

I think that if the computer were running at 4MHz, it would have taken around 9 minutes, rather than 4 1/2 minutes. But with that being the case, using BACKUP would have taken -well- over an hour.

An additional feature of my program is that it can even do this type of copy-by-file backup between two disks on a single drive, even between different densities, side counts, and cylinder counts, and even on removable hard disk cartridges (single drive backups on fixed hard disks are not allowed). It even provides a TEST parameter, so that you can see how many disks it will take for a backup, based upon the size of the disks you wish to back them up to (the program will automatically figure this out by taking a peek at a sample destination disk). You can even produce SYSTEM disks with it in a matter of a few seconds. An additional CYLSTART parameter allows you to place the data on the destination disk starting at a particular cylinder number (this will override the system's internal "A" flag, which my program would otherwise use). Another parameter, ZERODISK, allows you to do fresh backups to a disk containing unneeded data by -instantly- purge all files from the disk. Great for when you want to do a fresh, complete backup. Otherwise the data will be written into unallocated space, unless the file already exists on the destination disk, where the old data will be over-written. All other parameters, such as INV, SYS, MOD, DATE, NEW, OLD, QUERY, and so on operate the same as they did for BACKUP (QUERY will, however, prompt you for all files -before- it even begins to copy files, thus speeding the process even more).

#### PROJECT #3:

The third project is a -new- spreadsheet program. No, this is not to replace BUSYCALC, which most of you who have obtained it are happy with, as I am. This new program, although it is -much- more powerful, it will also be -much- more expensive (development time does cost me a lot, which should be compensated). This new version will blow VisiCalc out of the water. To list all the enhanced features would take several pages. But in brief it supports a 64 x 256 cell matrix, it supports greater printer control and initialization, macro

keys, automatic job files, built-in help, it can read and write VisiCalc files, it supports ALL VisiCalc functions, it supports the convenient crosshatch "#" coordinate 'point and shoot' definition feature, file merging so that you can utilize "boiler plate" templates, a moving menu display so that it will stay out of the way of your work, scrolling menu bars with point and select or hot key select capability, it can even use up to 1 megabyte of extended memory to store those -really- large templates (though few will require any more than the standard 128K expansion), and dozens of other great features. This new program will also support "add-on" programs, so that enhancement programs can be run from it, such as data sorters, a graph pack, trade data between spreadsheets, and so on.

This new spreadsheet will -not- be an upgrade to BUSYCALC, and may well be out of range of most of your budgets. I'm writing this version to support the "power user" and the business person. Also, this program will -require- a minimum of 128K to operate. So if you are the average "Joe", BUSYCALC will be enough for you. It certainly is for me. For most people, the colossal power available in this new spreadsheet will go to waste, as you would not have a use for its unbridled capabilities, as a power user might have a desperate need for. This project may not be out the door for a while, because I have yet to find the time to write the docs, so don't expect an immediate announcement. I have been pushing myself too hard lately, and have got to start relaxing before I burn out.

#### BONUS PROJECT #4:

A fourth product -will- be made Public Domain as soon as it is fully tested. Most of you are aware of the HYPERSVC/CMD program that is provided on the new HYPERDRIVE disk for use with the HyperMEM and SuperMEM memory expansions. With HYPERSVC, you can access up to 7 extended banks of memory using the system's @BANK SVC. Most well-behaved programs use this SVC to perform bank switching, such as my XMEMDISK/DCT program on DAVID'S MODEL 4 SYSTEM UTILITIES disk. My new program, HYPERBNK, is based upon HYPERSVC, but will allow you to access up to 30 of the extended banks, thus giving

you full access to up to 1 megabyte of memory! And it works with -both- SuperMEM and HyperMEM memory expansions. This is great news, because now you can use these expansions with BUSYCALC, or, when the new spreadsheet comes out, you can take -full- advantage of it, because the spreadsheet program can use up to 1 megabyte of memory to hold its templates. HYPERBNK will be made available through THE FILE CABINET as soon as it is ready.

#### FILE CABINET GOODIES

Speaking of The File Cabinet, I have just submitted a new version of UTILITY4, a very popular Public Domain Model 4 disk/file/memory examiner/modifier program. The exciting news about this new version (Version #1.3) is not only its revised docs, but the fact that it now works perfectly with all disk, memdisk, and hard disk configurations! So if you have been looking for such features, or for a powerful zapper in general, The File Cabinet now has it.

Also, recently I was going through some of the utility disks that I had just obtained from The File Cabinet, and among them I found a few real dandy programs:

On MD4UTL02 I found a program called M/CMD, which is a multiple command processor. This allows you to enter several commands on a line, separated by semicolons (;). This runs like a JCL file, but MUCH faster.

On MD4UTL03 there is a filter program called SCREEN/FLT. You install it by using the the SCREEN/JCL file to load it into memory. Thereafter, when the computer sits idle for a period of time, the screen blanks out to prevent burning any text permanently into the screen. Tapping any key returns the screen as it was before it was saved.

If you need help, you can obtain quick reference summaries for you DOS from MD4UTL06 and MD4UTL07. These two disks contain Quick Reference "cards" for DOSPLUS 3.4, 3.5, LDOS 5.1.4, NEWDOS80, MULTIDOS, TRSDOS 1.3, TRSDOS 6.2, and the TANDY 1000.

And if you are into back issues of 80 MICRO, MD4UTL08 and MD4UTL09 contain a database for the years 1982, 83, and 84.

Finally, if you are running your Model 4 in the III mode, MD4UTL10 contains VID80X24, which allows you to use the 80 by 24 screen in the III mode! This disk also contains an interesting little program called CLKSPD, which will tell you exactly how fast your computer is running. It will only work with Z80 chips, so if you have the XLR8er, it won't work. Lastly, also on this disk is a program called COPYF/CMD, and a CP/M program called COPYF/COM, which allows you to transfer files back and forth between DOS 6 and CP/M. Hm. Now if I only knew how to get COPYF/COM onto my CP/M disk.

#### QUOTE OF THE MONTH:

"I hate all these self-proclaimed experts. All they ever offer is criticism, and usually provide little or no useful work themselves." (Over-heard at a party recently in Hartford, CT between two self-proclaimed experts.)

#### DOING IT ON A LASER, part 4

Downloadable soft fonts are a dream to work with. Better yet if you have these fonts on a card that simply plugs into your printer. But soft fonts will be our focus in this installment.

If you have a laser printer, you will probably have a minimum of 512K memory. This is fine for most cases, and you can install quite a few soft fonts without filling it up. However one of the other advantages of the memory is that most lasers also use what is not allocated to soft fonts as a printer buffer. I have 2 Megabytes in mine, an ALPS LPX600, and its operation is much faster than the 512K HP LaserJet II's I have at work, even though the LJII boast 8 pages a minute and my ALPS claims 6, simply because of this buffer space.

Regardless, the problem in your mind is probably "Right! But how do I get the soft font -into- it from my TRS-80?" Another question might be, "Where do I get soft fonts?" In answer to the second question, a special section in The File Cabinet will soon be making numerous soft fonts available for your use. These have already been converted to TRS-80 data and so you will not need to trouble yourselves with converting them from MS-DOS disks (unless of course you want to). Also, you can

usually find soft font files on numbers BBS's. They are usually quite large, and may cost you quite a few nickels to download them all on the phone from a BBS. But if you can afford it, go to it.

As to how to get them into the printer from a TRS-80, this process is actually -very- easy, and can in fact be done from a simple BASIC program (the machine language program that will be supplied with the SS and Pro drivers features FAST operation and numerous bells and whistles, including multiple font downloads).

The first step is for you to decide what to "name" the soft font. You can give it a numerical name of zero through 32767. Suppose, you wanted to name it 32. Thus from BASIC, the first thing you would do would be to enter the command LPRINT CHR\$(27) "\*"c32D";. The "32" in that mess is our font name.

The next step is to download the soft font to the printer. The printer will assign all this data to the last-specified font name. The process of downloading the font is as simple as writing the font file byte for byte to the printer. From LDOS 5.3 and TRSDOS/LS-DOS 6 you can use the DOS level's LIST command. From BASIC enter the command SYSTEM"LIST fontfile (P,ASCII8,TAB=)" (LDOS users use CMD instead of SYSTEM). This command causes the font file (fontfile) to be listed to the Printer (P parameter). The ASCII8 parameter allows the data in the file to be sent without converting graphics or control characters to periods (this is a little-known, though documented DOS feature!). The TAB= parameter turns off tab expansion. So what results is a -perfect- copy of the font file being sent to the internal workings of the laser printer.

The final step in the downloading process is to tell the laser what kind of font this will be. To make it permanent (meaning that it will not be deleted when you do a printer reset), you can use the command LPRINT CHR\$(27) "\*"c5F";.

Let's go through a sample session on the Model 4. Suppose we have a 10-point proportional normal-upright Helvetica soft font named HELV10PN/SFP, and we want to give it a "name" of 1. We could use the

following short BASIC program to load it (remember, you have to be in BASIC to run it):

```
10 'Dload HELV10PI/SFP on Model 4
20 LPRINT CHR$(27)"*c1D";
30 SYSTEM"LIST HELV10PN/SFP(P,AS
  CII8,T=)"
40 LPRINT CHR$(27)"*c5F";
50 LPRINT CHR$(27)"(1X";
```

(Note continue line 30 as shown on one line with no space between ASCII8,T=)"

That's all there is to it. By the way, the additional command in line 50 tells the laser to select the font named "1" to be the currently active font. Thus any text sent to the printer afterward will be printed using that font.

Of course, you may wish to load more than one font if you really want to "go to town", selecting between the various fonts by using a variation of the command in line 50. Additionally, you may wish to set the laser printer up to advance lines using a carriage return, for line wrap, perforation skip, and other features as had been outlined in previous installments of this column.

If you can embed codes into text within your word processor, which you can do with MODSCRIP as non-printable codes, you can use the code sequence 27, 40, x, 88 to select a different font, where "x" represents the ASCII codes for the font name's digits (49 for "1", 50 for "2", etc), to select each font. (MODSCRIP modified Model I Disk Scripsit to work on the I/III, and 4 in the 4-mode (80 x 24) and features unbelievable enhancements. Available as MD4UTL58 from THE FILE CABINET.)

When you use soft fonts, as you can see, we no longer have to be specific to the printer about specifying a font to select using all the many parameters as may be required to call up either a font on a card or those that are built into the printer, although you -can-.

#### DESCRIBING A FONT

If you choose to select fonts by way of description, thus telling the laser printer the type of font to select, you must follow a set of rules, as set down by Hewlett Packard. You can ignore each step in this

list if the printer is already in the desired state. These steps are:

- 1) Orientation. You must select either Portrait or Landscape (sideways). By default this is Portrait.
- 2) Select character set. This is by default USASCII, which most fonts are, anyway.
- 3) Pitch. Select proportional space or fixed pitch. It is fixed by default.
- 4) Point size. It is 12 by default.
- 5) Style. This can be upright (default) or italics.
- 6) Stroke weight. This can be light, normal (default), or bold.
- 7) Typeface. This is Courier by default.

Now would be a great time to explore your laser printer manual and discover the escape codes required to select each of these features. Don't be afraid to try them. Your printer will not blow up. The least it will do is refuse to carry out your command. So try again. Once you get your feet wet (it is a bit scary the first time), you will find this to be child's play. Before you know it you will be expertly helping a terribly confused friend out, chuckling at their ignorance with knowing eyes.

Until next time, Happy computing!  
-David Goben

#### GRAFDISK FOR LS-DOS 6.3.1 by Jane A. Layman

I saw in the Summer 1990 issue of The Misosys Quarterly (Vol. IV, iv, pp. 27) a letter from Pieter J. Plomp of Amsterdam, Holland, who was having problems with a GRAFDISK program obtained through CN80. Apparently he obtained the program after reading the GRAFDISK review in the March 1990 issue of CN80. Pieter could successfully install GRAFDISK under LS-DOS 6.3.0, but not under 6.3.1. The problem, according to Roy Soltoff, was that

GRAFDISK/DCT, ORGed at 2C00H, was overwriting LS-DOS 6.3.1's expanded SYSTEM command.

The problem can be solved by changing the ORG statement in the source from 2C00H to 3000H and reassembling it. Since the author of GRAFDISK (William R. Bowman) does not appear to be any longer available, I undertook to disassemble GRAFDISK/DCT and reassemble it at the higher address. Fortunately, the bulk of the GRAFDISK code was modeled closely on MEMDISK, which source code was available to me in THE SOURCE. I am enclosing on disk both the source code and the reassembled GRAFDISK/DCT. It's companion programs (GDSAVE and GDLOAD) did not require any changes because they were already ORGed at 3000H.

The original GRAFDISK was designed to format as a ramdisk both the extra 64K in a 128K Model 4 and the additional 32K available in Radio Shack's hi-res board. Gary Shanafelt, co-author of the AllWrite HP Laser Support package, developed patches for GRAFDISK, GDSAVE, and GDLOAD that enabled their use with the non-Radio Shack hi-res boards with less than 32K memory, e.g. the Micro-Labs hi-res board. The MICROLAB/JCL (See program listing number 5) explains how to install these patches.

A final note re GRAFDISK /IMG files: users should generally not have to redo such files created with GRAFDISK running under LS-DOS 6.3.0. If such /IMG files come up as the SYSTEM drive, however, they should either be redone from scratch using LS-DOS 6.3.1 or should be updated with the new system and resaved. For this latter approach, the following sample steps (by Lee Rice) have worked.

Boot up with LS-DOS 6.3.1

```
GDLOAD GRAFSYSB/IMG
{in this example, loads image as drive :0
and makes 1st floppy drive :2}
```

```
BACKUP $:2 :0 (I,S,O)
```

```
GDSAVE GRAFSYSB/IMG
```

-Jane A. Layman

## DISK CATALOG PROGRAM REVIEW by CN80

TRSCAT is a shareware program written in machine language for Model 4/4D/4P, by Mel Patrick that will create a catalog of all your disks. This program has been a sleeper in the File Cabinet (it's on disk MD4UTL43, in the Model 4, Utility Series).

To give you an idea of the power of the program the menu driven commands include Build a Catalog, View File on Video, Print file on Line Printer, Sort Catalog, Directory of Drive, Manual Filename Entry, Find File or ID Code, Write Catalog to Disk, Load Catalog from Disk, Kill file on Disk, Exit to Dos Ready, Configure System, Remove Disk Entry, Disk Space Map.

With these menu commands you place each disk in your collection in drive one and give it an alphanumeric designation, the TRSCAT program reads all the files on the disk and stores them in a catalog file.

Once these disks are stored in the catalog file, you can do a lot with it. You can print a four column printout of the disk catalog in either alphabetical order or in disk name order. You can search for and find an individual file by the file name, or you can find a file by the ID Code.

Other options from the menu allow you to remove a file on an individual disk, which allows you to get rid of files that you no longer want while building your disk catalog file. You can remove a file from the catalog file also by using the menu Remove Disk Entry. And while your in the process of building your disk catalog data base file, you can view the disk directory on the disks that you are cataloging as you insert them in drive one.

After building and saving the disk catalog data base file, you save it to any disk that you have in your system, to be called up and used for adding new disks or new files to disks that have already been cataloged.

The maximum number of entries per Disk Catalog file is 1600 filenames on a 64K computer and 2500 on a 128K computer. On our 128K computer the menu showed 2638 entries available at startup. A header on the program menu screen will tell you how



many entries you have left. The menu header also tells you how many disks are in the file, the number of programs, file length and other information.

Printing of the list of disks that you have cataloged is very versatile, because you can send printer codes to your printer for special effects at the start and end of each line, like condensed on and condensed off. The program stores your printer options once installed so you don't have to redo your set up each time.

TRSCAT can be used with DOSPLUS 4.0, TRSDOS 6.2.x or LSDOS 6.3 and both floppy and hard disk drives are supported.

Since this is a SHAREWARE PROGRAM there is no real manual on the File Cabinet disk, but there is a /TXT file that will explain most of the features of the program. If you use this program or are using it we hope that you will honor the request to send the author \$15 as asked. In return you will receive a registration for the program and a fairly large manual. Watch the File Cabinet for notices of changes or update versions.

Since this program is fairly simple to use as is it is tempting to use the program without sending the requested shareware price, but without doing so you fail to support those who are still supporting our TRS-80 computers and there is no reason that they should continue to write new programs for us.

Mel Patrick's address that is in the text file on the File Cabinet disk has been changed to:

Mel Patrick  
8056 - 164A Street  
Surrey, B.C. Canada  
V3S 7S7

---

#### OPEN FORUM

=====

A: RESPONSE TO R.M. OF WESTMONT, IL  
On page 19 of the September 1990 issue of CN80, a reader asked how he could send control codes to his printer using Radio Shack's FORTRAN4 program. One method by which this can be accomplished is as

follows:

- 1) Storage for the printer codes should be declared as BYTE variables
- 2) Use a DATA statement to plug in the values for your printer codes
- 3) Send control codes to the printer with the FORTRAN WRITE statement using the A field descriptor type.

(See Example Program Listing Six.)

-Jane A. Layman

---

LTR: I just received my LS-DOS 6.3.1, Level F, upgrade disk and decided to experiment with it prior to placing it in general use. There are, after all, just some things I've become accustomed to having and have become absolutely necessary to my system disks.

Primarily among those is Steve Millikens' SHELL/CMD, this installs without any hitches and operates normally (contrary to what happened when LS-DOS 6.3.0 was first released).

Secondly, my 4P runs double sided drives internally so having to type all the needed parameters each time I formatted a disk for use increased the number of keystrokes required prior to initiation of the task (isn't the object of using a computer task simplification?). I had patched FORMAT/CMD to automatically format two sided, 42 track disks after just answering the disk name/password prompts.

Roy had changed the locations in FORMAT/CMD where this information is stored by a few locations so writing the new patches was relatively easy.

To format double-sided disks automatically (without the "SIDES = ?" prompt) use this patch:

```
PATCH FORMAT/CMD.UTILITY  
(D09,57=02;F09,57=00)
```

(Note: Type as one line with space between ITY and (D09---).

Storage space being at a premium, even on two-sided disks, I've found that formatting 42 tracks per disk advantageous. I've used 42 track disks for several years now without any hitches. On single-sided disks

this gives an extra 9K of data storage; an extra 18K on double-sided disks. The only drawback (if it can be called that) is the directory is placed on track 21 instead of track 20. The proper directory track location gets stored in the BOOT/SYS file so the drive has no problem reading the directory.

To format 42 track disks, install this patch:

```
PATCH FORMAT/CMD.UTILITY
(D09,5C=2A;F09,5C=00)
```

(Note: Type as one line with space between ITY and (D09----).

Both these patches I've become accustomed to being part of my system disks and are offered to those choosing to use them as they deem best meets their needs.

-J. C. B. Gary, IN

LTR: I just received my July issue of CN80 and was extremely surprised and excited to find your first article on Printer Drivers. This is a field that most of us that use computers have contact with (most of us use software and printers) however, I have found no one that could give me any help marrying the two. I have and like to use a program called Business Analysis that produces very nice, easy to read graphs. The problem is that the program will only work on my DMP130 printer not our DMP400, or Star NX1000, or Olivetti PR2300 Spark Jet printer; so when the DMP130 had to go to the doctor for three months I couldn't use the program. Or when you have to scramble in the office to use the TRS80 and printer combination that will work with whatever program that you want to use. I don't think we're alone with this dilemma, and for this reason I really want to applaud you for this series of articles.

One thing that you could go into, if it would be something us users could understand, is where to look for the printer driver in a program that does not have a user menu, such as disk Scripsit?

#### Hints And Tips

I found a way to keep track of disk sleeves and the disks also. I buy inexpensive 3 ring binders and a couple of packs of binder

organizer cards (they're thicker than regular paper and hold up under the abuse quite well.) I then glue the disk sleeves to the pages two to a page and sleeves on both sides of a page. Each program like Super Scripsit can have it's own binder with the first pages holding working copies of the programs and the remaining pages containing data disks. We have five TRS80 work stations and each has 4 to 10 binders of the programs most used at that station plus one large binder full of miscellaneous programs (it's here that you can stash your games and if anyone see's them just say "Oh that's for the kids when they come by.") I have found binders made of heavy construction board for \$.49 ea. and with the heavy organizer sheets at \$1.50 for 25, you can see that making the program books is quite inexpensive.

-E. H. Eureka CA.

LTR: I got tired of having trouble with my check book so I worked this little gem out, it took me a month of little here and a little there. It works so well on my model 4D that I would like to share it with your readers. I say share but I don't expect anyone to send me money. If it works for them as well as it does for me they can have it with my blessings.

To start with put the program in just the way it is written leave nothing out, when you type RUN the program will say <enter base number>, this is the amount from the last time you balanced your check book, then it will say <Enter amount to subtract> this is the amount of the check. Then it will say <Enter cost of Check>. Some people must pay for each check they write, if you do not then take out line 41 and take out -C from line 50, when you come to a deposit press <enter> until the balance comes up. Then the program will say <Enter amount to add>, when you are through with deposits press <enter> comes up.

Then the program will say <Enter amount to subtract>. You can do this all day long and when you are through press <Enter> until the balance comes up. To exit the program press break.

```
10 'program to subtract and add numbers
20 INPUT"ENTER BASE NUMBER";A
30 WHILE A
```

```

40 INPUT"ENTER AMOUNT TO
SUBTRACT";B
41 INPUT"ENTER COST OF CHECK";C
50 A=A-B-C
60 IF B>0 THEN WEND
70 PRINT A
80 WHILE A
90 INPUT"Enter amount to add";B
100 A=A+B
110 IF B> 0 THEN WEND
120 PRINT A
130 GOTO 40

```

-Robert M. Knowles, Centerdale, RI

(Editors Note) If you want to have a good look at how your computer can handle numbers, enter the above program and give it a try. It is simple and short, but works like a charm. It would be good for any quick calculations of adding and subtracting numbers. We nominate this one as the hint of the month and a free box of disks are on the way to Robert.

Where is your hint submission? It's worth a box of disks if yours is selected for the month. Plus you can get the enjoyment of blessing your fellow users with your experience as Mr. Knowles has. -CN80

Here is a hint from CN80. If you have the problem of having a lot of disks scattered out on your computer desk while working on disks that are in your computer. Then pick up one of the small plastic card file boxes that hold the 6 x 4 index cards. Cut the lid off. Most have just a thin plastic hinge and cut very easily with a small pocket or paring knife. Be sure to look in the bottom of the box when buying it. It should have raised ridges that would hold the index cards from slipping down. These ridges hold the disks from slipping down. -CN80

LTR: Thanks for publishing Hubert L. Johnston's "PFS File and PFS Report" review. We thought we were the only ones using those 2 programs to such an extent.

First, an explanation. We are the owners of a small town radio station and began using the Model 4 several years ago became comparatively inexpensive software was

available to prepare our daily program logs.

Here in Texas we are forbidden access to law enforcement agency's "rap sheets", where criminal records are stored, so we wrote a simple program to keep records of our own. We use the information for background on news stories.

Tandy had a sale on PFS File and we bought it to see if it would be easier to use. What a surprise! It not only did what we wanted it to do, but much more. Today, we have more than 3,000 people entered and the information is invaluable.

Then, we discovered more uses. We now write all of our advertising copy on PFS files, saving untold hours and filing drawers.

All of our local news is stored by the PFS File program, another resource for background information.

We then had too much going form just one Model 4, so we bought another one.

Next, came several other uses for PFS File.

1. Write Editorials.
2. Put records on file by title, artist, composer (form BMI and ASCAP reports,) year of popularity, and length.
3. Mailing list coded for specialized mailings to advertisers.
4. A birdwatching list of feathered friends observed at the station.

Then we added PFS Report and found more uses.

1. A file for ordering records and printing our current playlist.
2. An inventory of assets.
3. A file of all Football sponsors for the past 20 years.
4. Weather records that are used by local government agriculture agencies.

Then, I decided that it would be nice to have a third model 4 at home, so that when I get a bright idea, I can put it in the computer before I forget it, and that's where I am writing this.

Thanks for your publication and thanks to Mr. Johnston for the un-documented commands.

-J. F. KKUB, Brownfield TX

GUESSAI/BAS Program Listing Number One by Robert Gore

```

95 '*****
96 '*          G U E S S A I / B A S          *
97 '*          by R.D.GORE          *
98 '*          1989          *
99 '*****
100 CLS:RANDOM
110 NUM=INT(RND(100)):ATTEMPTS=0
120 PRINT "PLEASE MAKE A GUESS OF A NUMBER BETWEEN 1 AND 100:"
130 INPUT A:ATTEMPTS=ATTEMPTS+1
140 IF A>100 OR A<1 THEN PRINT "INVALID.....1 TO 100 PLEASE....TRY AGAIN:"
:GOTO 120
150 IF A=NUM THEN PRINT "RIGHT ON.....CORRECT!!!":GOTO 225
160 T1=(100-NUM):T2=(100-A):IF T1>T2 THEN T4=T1-T2 ELSE T4=T2-T1
165 IF T4<5 THEN PRINT "HOT....HOT..":GOTO 220
170 IF T4<10 THEN PRINT "GETTING VERY WARM...":GOTO 220
180 IF T4<20 THEN PRINT "GETTING WARM.....":GOTO 220
190 IF T4<50 THEN PRINT "COLD....":GOTO 220
200 IF T4>=50 THEN PRINT "VERY COLD.....":GOTO 220
220 PRINT "NOPE....TRY AGAIN":GOTO 120
225 PRINT "YOU GOT IT IN ";ATTEMPTS;" ATTEMPTS.":TURN=1:INPUT "PRESS
<ENTER>>>>";A
230 IF TURN=0 THEN PRINT "AGAIN....YOUR TURN (Y/N) >>";:INPUT A$:IF A$="Y" THEN
GOTO 110 ELSE PRINT "MAY I GO AGAIN , PLEASE ????? (Y/N) >>";:INPUT A$:IF
A$="Y" THEN TURN=1:GOTO 250:ELSE GOTO 240
235 IF TURN=1 THEN GOTO 250
240 PRINT:PRINT "BYE ALL.....":END
250 CLS:PRINT "O K ! MY TURN....YOU PICK THE NUMBER AND I'LL GUESS IT."
260 INPUT "PRESS <ENTER> WHEN YOU HAVE CHOSEN THE NUMBER (1-100)";A
270 GUESS=INT(RND(100)):ATTEMPTS=0:COUNT=0
280 PRINT:PRINT "IS THE NUMBER ";GUESS;" ?":ATTEMPTS=ATTEMPTS+1
290 PRINT:PRINT "ENTER:  1=HOT"
300 PRINT "      2=VERY WARM"
310 PRINT "      3=WARM"
320 PRINT "      4=COLD"
330 PRINT "      5=VERY COLD"
340 PRINT "      6=CORRECT"
350 INPUT ">> ";R:RR=R
360 GOSUB 500:PRINT
370 IF R=1 AND R$="H" THEN GUESS=GUESS+1:COUNT=COUNT+1:GOSUB 600:GOSUB 700
:GOTO 280
380 IF R=1 AND R$="L" THEN GUESS=GUESS-1:COUNT=COUNT+1:GOSUB 600:GOSUB 700
:GOTO 280
390 IF R=2 AND R$="H" THEN GUESS=GUESS+5:GOSUB 600:GOTO 280
400 IF R=2 AND R$="L" THEN GUESS=GUESS-5:GOSUB 600:GOTO 280
410 IF R=3 AND R$="H" THEN GUESS=GUESS+10:GOSUB 600:GOTO 280
420 IF R=3 AND R$="L" THEN GUESS=GUESS-10:GOSUB 600:GOTO 280
430 IF R=4 AND R$="H" THEN GUESS=GUESS+20:GOSUB 600:GOTO 280
440 IF R=4 AND R$="L" THEN GUESS=GUESS-20:GOSUB 600:GOTO 280
450 IF R=5 AND R$="H" THEN GUESS=GUESS+40:GOSUB 600:GOTO 280
460 IF R=5 AND R$="L" THEN GUESS=GUESS-40:GOSUB 600:GOTO 280
470 IF R=6 THEN PRINT "H O O R A Y. . . . I GOT IT IN ";ATTEMPTS;" ATTEMPTS."
480 TURN=0:GOTO 230
500 IF ATTEMPTS=1 THEN PR=RR
510 IF ATTEMPTS>1 THEN GOTO 540

```

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```

520 HL=INT(RND(0)*2):IF HL=0 THEN R$="L" ELSE IF HL=1 THEN R$="H"
530 RETURN
540 IF RR=PR THEN RETURN
550 IF RR<PR THEN PR=RR:RETURN
560 IF RR>PR THEN IF R$="L" THEN R$="H":PR=RR:ELSE IF R$="H" THEN R$="L":PR=RR
570 RETURN
600 IF GUESS<1 THEN GUESS=1:IF R$="L" THEN R$="H":RETURN
610 IF GUESS>100 THEN GUESS=100:IF R$="H" THEN R$="L":RETURN
620 RETURN
700 IF COUNT=4 THEN IF R$="H" THEN R$="L" ELSE IF R$="L" THEN R$="H":COUNT=0
710 RETURN
9999 END
10000 SAVE "GUESSAI/BAS:1"
10001 END

```

COREWAR/BAS Program Listing Number Two by Robert Gore

```

1 '*****
2 '*
3 '*          *
4 '*          *
5 '*          *
6 '*          *
7 '*****
8 '***** reserve memory at 52000
99 '*****INITIALIZE
100 RANDOM:DIM ENELOC(100),XLOC1(100),YLOC1(100):ITER=0:XITER=0:YITER=0
110 DIM YLOC(100),XLOC(100):SLOT=0:ADR=52000!:TURN=INT(RND(10))
120 FOR XX=1 TO 100:POKE (ADR+XX),0:NEXT
130 POKE (ADR+1),100:POKE (ADR+100),200
140 CLS:XTS=100:YTS=100
150 IF TURN>5 THEN TURN=1 ELSE TURN=0
154 '***** MASTER CONTROL
155 ITER=ITER+1:IF ITER=201 THEN END
160 IF TURN=0 THEN GOSUB 170
163 IF TURN=1 THEN GOSUB 500
165 GOTO 155
169 '***** X-CONTROL
170 PRINT "*** X-TURN ***":XITER=XITER+1:GOSUB 1000
180 FOR X=1 TO SLOT:YLOC(X)=ENELOC(X)+ADR:ENELOC(X)=0:NEXT
190 PRINT "* Y-LOCATION-","-STRENGTH ****",ITER
200 PRINT "  -----","-----","-----"
201 PRINT TAB(50),XTS;" ";YTS
210 FOR X=1 TO SLOT
230 IF PEEK(YLOC(X))>100 THEN PRINT YLOC(X),(PEEK(YLOC(X))-100)
:YLOC1(PO)=YLOC(X):PO=PO+1
240 NEXT:PO=PO-1
241 IF XITER<2 THEN POKE(ADR+5),10:POKE(ADR+1),(PEEK(ADR+1)-10):GOTO 490
250 IF XTS<20 THEN GOTO 310
260 IF RND(10)<3 THEN GOTO 310
270 FOR X=1 TO PO:IF YLOC1(X)<25 THEN DF=YLOC1(X):X=PO:GOTO 300
280 IF YLOC1(X)<51 AND RND(10)>5 THEN DF=YLOC1(X):X=PO:GOTO 300
290 IF YLOC1(X)>50 AND RND(10)>7 THEN TS=XTS:DF=YLOC1(X):X=PO
300 NEXT:GOSUB 1100
310 IF YPEACE=1 AND XTS<40 THEN PRINT "* X TO Y....YES TO PEACE.....":END

```

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```

320 IF YSURR=1 THEN PRINT "* X TO Y.....I ACCEPT YOUR SURRENDER.....":END
330 IF XTS<15 THEN PRINT "** X TO Y.....I SURRENDER TO
YOU!!!!!!!!!!!!!!":XSURR=1:XPEACE=0:GOTO 490
340 IF XTS<20 THEN PRINT "* X TO Y.....WILL YOU MAKE
PEACE?????????":XPEACE=1:GOTO 490
350 XMOVE=RND(100):IF PEEK(XMOVE+ADR)=0 AND XTS>5 THEN POKE(XMOVE+ADR),5
ELSE GOTO 490
360 IF (PEEK(ADR+1))>5 THEN POKE(ADR+1),(PEEK(ADR+1)-5):GOTO 490
370 FOR XX=1 TO 100:IF PEEK(ADR+XX)<100 AND PEEK(ADR+XX)>5 THEN
POKE(ADR+XX),(PEEK(ADR+XX)-5):XX=100
380 NEXT
490 TURN=1:PO=0:DF=0:RETURN
499 '***** Y-CONTROL
500 PRINT "*** Y-TURN ***":YITER=YITER+1:GOSUB 1000
510 FOR X=1 TO SLOT:XLOC(X)=ENELOC(X)+ADR:ENELOC(X)=0:NEXT
520 PRINT "* X-LOCATION-","STRENGTH ****",ITER
530 PRINT " -----","-----","----"
540 FOR X=1 TO SLOT
550 IF PEEK(XLOC(X))<101 THEN PRINT XLOC(X),PEEK(XLOC(X)):XLOC1(PO)=XLOC(X)
:PO=PO+1
560 NEXT:PO=PO-1
570 IF YITER<2 THEN POKE((ADR+100)-4),110:POKE(ADR+100),(PEEK(ADR+100)-10)
:GOTO 990
580 IF YTS<20 THEN GOTO 640
590 IF RND(10)<3 THEN GOTO 640
600 FOR X=1 TO PO:IF XLOC1(X)>75 THEN DF=XLOC1(X):X=PO:GOTO 630
610 IF XLOC1(X)>50 AND RND(10)>5 THEN DF=XLOC1(X):X=PO:GOTO 630
620 IF XLOC1(X)<51 AND RND(10)>7 THEN DF=XLOC1(X):X=PO
630 NEXT:GOSUB 1200
640 IF XPEACE=1 AND YTS<40 THEN PRINT "* Y TO X....YES TO PEACE.....":END
650 IF XSURR=1 THEN PRINT "* Y TO X....I ACCEPT YOUR SURRENDER.....":END
660 IF YTS<4 THEN PRINT "* Y TO X.....I SURRENDER TO
YOU.....":YSURR=1:YPEACE=0:GOTO 990
670 IF YTS<20 THEN PRINT "* Y TO X.....WILL YOU MAKE
PEACE?????????":YPEACE=1:GOTO 990
680 YMOVE=RND(100):IF PEEK(YMOVE+ADR)=0 THEN POKE(YMOVE+ADR),105 ELSE GOTO 990
690 IF (PEEK(ADR+100))>105 THEN POKE(ADR+100),(PEEK(ADR+100)-5):GOTO 990
700 FOR YY=1 TO 100:IF PEEK(ADR+YY)>100 AND PEEK(ADR+YY)>105 THEN
POKE(ADR+YY),(PEEK(ADR+YY)-5):YY=100
710 NEXT
990 TURN=0:PO=0:DF=0:RETURN
999 '***** SCAN PROCEDURE
1000 SLOT=1:FOR SCAN=2 TO 99:CONTENT=PEEK(ADR+SCAN)
1010 IF CONTENT>0 THEN ENELOC(SLOT)=SCAN:SLOT=SLOT+1
1020 NEXT:SLOT=SLOT-1:PO=1:RETURN
1099 '***** X-ATTACK PROCEDURE
1100 ATK=0:IF DF<1 THEN RETURN
1110 FOR Y=DF TO (ADR+2) STEP-1:IF PEEK(Y)<100 AND PEEK(Y)>0
THEN ATK=Y:Y=(ADR+2)
1120 NEXT:IF ATK>0 THEN GOTO 1150
1130 FOR Y=DF TO (ADR+100):IF PEEK(Y)<100 AND PEEK(Y)>0 THEN ATK=Y:Y=(ADR+100)
1140 NEXT:IF ATK=0 THEN GOTO 1190
1150 WIN=RND(100):IF WIN>50 THEN GOTO 1170
1155 MD=RND(10):IF MD=4 THEN RS=" DESTROY EACH OTHER " ELSE GOTO 1160
1157 XTS=XTS-(PEEK(ATK)):YTS=YTS-(PEEK(DF)-100):POKE ATK,0:POKE DF,0:GOTO 1180

```

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```

1160 YTS=YTS-1:XTS=XTS-(PEEK(ATK)):POKE ATK,0:POKE DF,(PEEK(DF)-1):R$="
LOSES ":GOTO 1180
1170 YTS=YTS-(PEEK(DF)-100):XTS=XTS-1:POKE DF,(PEEK(ATK)-1):R$=" WINS "
1175 XTS=XTS+3:POKE(ADR+1),(PEEK(ADR+1)+3)
1180 PRINT "X ";ATK;" ATTACKS ";DF;" AND ";R$:PRINT "XXXXXXXXXXXXXXXXXXXXXXXXXXXX"
1190 DF=0:RETURN
1199 '***** Y-ATTACK PROCEDURE
1200 ATK=0:IF DF<1 THEN RETURN
1210 FOR Y=DF TO (ADR+99):IF PEEK(Y)>100 THEN ATK=Y:Y=(ADR+99)
1220 NEXT:IF ATK>0 THEN GOTO 1250
1230 FOR Y=DF TO (ADR+1) STEP-1:IF PEEK(Y)>100 THEN ATK=Y:Y=(ADR+1)
1240 NEXT:IF ATK=0 THEN GOTO 1290
1250 WIN=RND(100):IF WIN>50 THEN GOTO 1270
1255 MD=RND(10):IF MD=7 THEN R$=" DESTROY EACH OTHER " ELSE GOTO 1260
1257 YTS=YTS-(PEEK(ATK)-100):XTS=XTS-(PEEK(DF)):POKE ATK,0:POKE DF,0:GOTO 1280
1260 YTS=YTS-(PEEK(ATK)-100):XTS=XTS-1:POKE ATK,0:POKE DF,(PEEK(DF)-1)
:R$=" LOSES ":GOTO 1280
1270 XTS=XTS-(PEEK(DF)):YTS=YTS-1:POKE DF,(PEEK(ATK)-1):R$=" WINS "
1275 YTS=YTS+3:POKE(ADR+100),(PEEK(ADR+100)+3)
1280 PRINT "Y ";ATK;" ATTACKS ";DF;" AND ";R$:PRINT "YYYYYYYYYYYYYYYYYYYYYYYYYYYY"
1290 DF=0:RETURN

```

COREWAR/JCL Program Listing Number Three by Robert Gore

BASIC COREWAR/BAS (F=1,M=52000)

WORLD2/BAS Program Listing Four by David P. Miller

```

1 REM Generate a pseudo-moire pattern as a function
3 REM Does NOT require Graphics Basic.
4 REM Written by David P. Miller
5 REM For Computer News 80 Magazine, 1990
6 REM Original concept by Timothy J. O'Malley
10 OUT 131,1+2+64:' Set screen on, auto-inc Y
20 FOR X=0 TO 79:OUT 128,X:OUT 129,0:' Set X/Y
30 FOR Y=1 TO 240:OUT 130,0:NEXT Y:' 0 column
40 NEXT X:' Bump column# till screen erased
50 OUT 131,0:CLS:' Text on; clear screen
51 REM Draw graphics figure
60 INPUT "Factor value (1 to 9, 0 to quit)",FV
70 IF FV=0 THEN SYSTEM ELSE FV=FV*.02+.2
80 CLS:OUT 131,1+2:' Clear screen
90 FOR Y=0 TO 119:YY=Y*Y:' Top half, Y^2
100 FOR X=0 TO 39:B1=0:B2=0:' Left half, start w/0
110 FOR XB=0 TO 7:XX=X*8+XB:' X^2
120 XX=INT((1E+06*(YY+XX*XX))^FV) MOD 2:' Function
130 B1=B1 OR (XX*2^XB):' Set bit if needed
140 B2=B2 OR (XX*2^(7-XB)):' Ditto
150 NEXT XB:' Finished building bytes
160 OUT 128,39-X:OUT 129,Y+120:OUT 130,B1:' To screen
170 OUT 128,X+40:OUT 129,Y+120:OUT 130,B2
180 OUT 128,39-X:OUT 129,119-Y:OUT 130,B1
190 OUT 128,X+40:OUT 129,119-Y:OUT 130,B2
200 NEXT X:' Finish horizontal line, left/right
210 NEXT Y:' Finish vertical column, top/bottom
220 T$=INKEY$:IF T$="" THEN GOTO 220 ELSE GOTO 10

```

MICROLAB/JCL Program Listing Number Five by Jane A. Layman

- . MICROLAB/JCL--When this JCL file is run, it will patch William R. Bowman's
- . GRAFDISK program so that it will run on a Model 4 equipped with the smaller
- . Micro-Labs hi-res board. ...
- .
- . These patches were developed by Gary Shanafelt. They work by reducing the
- . number of cylinders that the GRAFDISK program will format and the amount
- . of memory that will be saved and loaded with GDLOAD & GDSAVE. This version
- . of W. R. Bowman's utilities uses 19.2K of the 20K Micro-Labs board.
- .
- . This file is executed by typing DO MICROLAB at LS-DOS Ready. Note that the
- . first copies of GRAFDISK/DCT, GDLOAD/CMD, & GDSAVE/CMD that the system
- . finds are the ones that will be patched.
- .

```
PATCH GDSAVE (D00,A8=00 4B;F00,A8=00 7A)
PATCH GDLOAD (D00,D1=00 4B;F00,D1=00 7A)
PATCH GRAFDISK/DCT (D04,71=12;F04,71=15)
.end JCL
```

OLIVETTI PR2300 PRINTER EXAMPLE Program Listing Number Six by Jane A. Layman

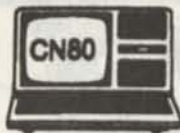
An example using printer codes for the Olivetti PR2300 is:

```
C ESC = escape, DWON = double width on, DHOFF = double height off, etc.
BYTE ESC,DWON,DWOFF,DHON,DHOFF,CR
REAL W,X,Y,Z
DATA ESC/27/DWON/51/DWOFF/52/DHON/39/DHOFF/37/CR/13/
DATA W/'THIS'/X/' IS '/Y/'BIG!'/Z/'NOT.'/
WRITE (2,10) ESC,DWON,ESC,DHON,W,X,Y,ESC,DWOFF,ESC,DHOFF
WRITE (2,20) W,X,Z,CR
10 FORMAT (1X,4A1,3A4,4A1)
20 FORMAT (1X,3A4,A1)
END
```

Note that the printer code value to store is either the DECIMAL value of the character or the character itself. That is, the same rules apply as do those for the value in BASIC's PRINT CHR\$(value) statement.







# NEW ADDITIONS TO CN80'S FILE CABINET LIBRARY

Volume Disk Number	Description	Volume Disk Number	Description
MD4UTL60	MODEL 4 UTILITIES BY David Goben UTILITY4/CMD Util. program command. UTILITY4/DOC Documentation file.	<b>POSTMASTER ICON LIBRARY</b>	
MD4BUS33	SNAP Business Accounting System Shareware by Mel Patrick SNAP/TXT Documentation for Snap SNAP/CMD Snap command program.	A NEW DIVISION OF THE FILE CABINET HAS BEEN CREATED FOR ICONS THAT ARE READY TO LOAD AND USE BY THE PostMaster Program, Model 4 w/HiRes Boards.	
MD4BUS34	Small Account Bookkeeping Programs ANNUITY/BAS Basic Program for annuity calculations by Kent Clark CF4/CMD Simple Program for small accounts, a shareware program by Rev. R.S. Wilson, England. CF4/DOC Documentation for CF4/CMD CF4A/CHN Chain files used with CF4 CF4B/CHN ditto above CF4E/CHN " CF4L/CHN " CF4M/CHN " CF4N/CHN " CF4S/CHN " CF4T/CHN " CF4V/CHN " SAMPLE/CF4 Sample file for CF4	M4PMLA	7 files with 210 icons.
		M4PMLB	4 files with 83 icons.
		M4PMLC	4 files with 80 icons.
		M4PMLD	4 files with 120 icons.
		M4PMLE	4 files with 120 icons.
		M4PMLF	4 files with 120 icons.
		M4PMLG	4 files with 120 icons.
		M4PMLH	4 files with 120 icons.
		M4PMLI	4 files with 120 icons.
		M4PMLJ	4 files with 120 icons.
		M4PMLK	4 files with 120 icons.
		M4PMLL	4 files with 120 icons.
		M4PMLM	4 files with 120 icons.
		M4PMLN	6 files with 180 icons.
		M4PML0	3 files with 80 icons. 2 files of additional borders.
		New Additions:	
		M4PMLP	9 files with 215 icons.
		M4PMLQ	6 files with 140 icons.
		M4PMLR	9 files with 270 icons.
		M4PMLS	9 files with 230 icons.
		M4PMLT	9 files with 253 icons.
		M4PMLU	8 files with 222 icons.
		M4PMLV	8 files with 201 icons.
		M4PMLW	7 files with 179 icons.
		M4PMLX	8 files with 240 icons.
		M4PMLY	10 files with 230 icons.
		M4PMLZ	8 files with 191 icons.
		M4PMLAA	9 files with 219 icons.
		M4PMLAB	9 files with 200 icons.
		M4PMLAC	9 files with 226 icons.
		M4PMLAD	9 files with 242 icons.
		M4PMLAE	9 files with 219 icons.
		M4PMLAF	9 files with 199 icons.
		M4PMLAG	9 files with 255 icons.
MD4HRZ21	Hi Resolution Programs for Laser and DeskJet Printers by Gary W. Shanafelt BCHRLOAD/CMD Hi Res Utility Program. HPPRINT/BAS Hi Res Print Program in Basic. HPPRINT/DOC Documentation for HPPRINT/BAS program.	-----	
MD3BUS34	Model III CN80 Electronic Order Blank by Danny C. Mullen CN80/CMD Computer News 80 Electronic order blank. CN80/SRC Source code for CN80/CMD CN80/DOC Documentation File for CN80/CMD program.	33 TOTAL DISKS      5,764 ICONS	
		ICON REFERENCE GUIDE      \$10 includes shipping. Free if ordered with 15 or more disks and shipped with order. If the Reference Guide is ordered by itself, a credit of \$10 will apply to your first order for 15 or more disks.	

New additions to the File Cabinet Library will only be printed once, so save your issues.

## Books by Christopher Fara

MICRODEX

**MOD-4 BY CHRIS** for TRS/LS-DOS 6.3, 232 pages

**MOD-III BY CHRIS** for LDOS 5.3, 234 pages

**MOD-III BY CHRIS** for TRSDOS 1.3, 210 pages

\$24.95 each, \$39.95 any two, \$59.95 any three

Complete Owner's Manuals for Models 4/4P/4D and Model III, fully updated for all current DOS versions. These beautifully designed books replace obsolete and confusing Tandy and LDOS manuals and addenda. Mod-III editions combine both the "Basic Operations" and "Disk System" manuals in one book. Mod-4 edition has chapters on DOS SuperVisor Calls previously not accessible without a separate "technical" manual. No more fumbling between pages: each subject is contained under a logical, bold heading on one page or on pages facing each other when the book is open, with plenty of blank space for notes.

Written in plain English, the manuals are better organized, with more and better examples for use of DOS, JCL and BASIC; include chapters with examples on interfacing of DOS and BASIC with assembly language; describe in detail popular ROM, RAM and DOS subroutines; and provide lots of useful extra information never before published in the Model III and Model 4 manuals.

"... no matter how long one is using a system, there will be times to look up the manual ... nothing easier than looking into Chris' comprehensive, beautifully arranged and printed treatise ... the organization is exceptional good ..."  
[ Review by Henry H. Herrdegen ]

"... excellent alternative ... not only does it offer information I have not been able to find in the regular and BASIC manuals, it explains in better detail what some of the more arcane commands are good for, or not good for ... here is a manual where you can find it all ..."  
[ Review by Henry A. Blumenthal ]

**JCL BY CHRIS** 30 pages, \$7.95

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Introduction to assembly language programming for beginners, based on Chris' popular essays in Computer News 80 (1989 volume) and revised in a book form. Covers memory and machine code concepts, typical steps in assembling, and application of basic Z-80 instructions and subroutines in Mod-III and Mod-4. Plain talk will quickly ease you into useful programming, and practical examples will give immediate satisfaction.

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## ASSEMBLY LANGUAGE TUTOR VOLUME X: REFERENCE

by Chris Fara

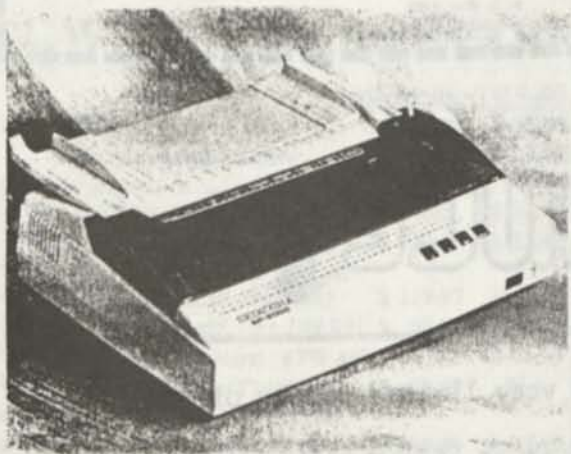
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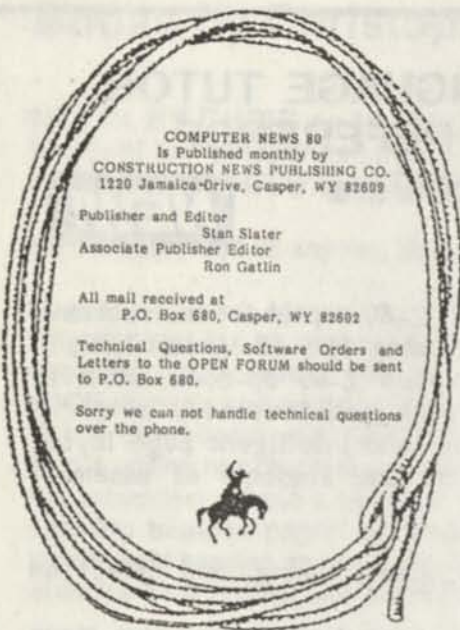
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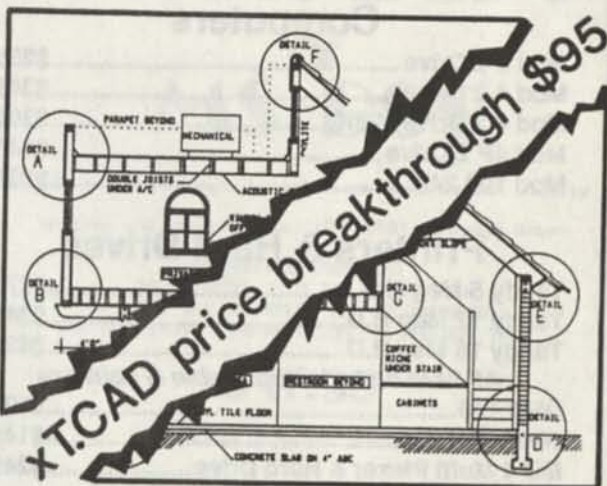
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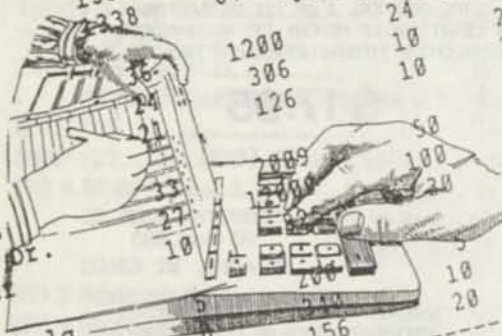
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**CAL** Display of desktop calendar. **CLEANUP** Ensures data security by over-write of unallocated disk space. **CLOSE** reset of "file open" on individual files or all the files on a disk. **DATECONV** Extends dating of a disk created prior to LS-DOS 6.3, more versatile than DATECONV supplied on LS-DOS 6.3 or T62DOSXT. **DISKKEY** allows manual lock and unlock of disk space. **MAKE1** convert double-sided formatted disks back to single-sided. **MEMCHK** See what driver and filters are installed in your system. Check expanded memory. **ONEPASS** new version 1.6, more powerful than Diskcopy or QFB to format and backup floppy disks, SubDisks, DiskDisks, and ramdisks (memdisks) in a single pass. **PRINT** Send text and special printer codes from DOS ready to the printer. **SYSDRV** change the drive number that contain SYS files, without swapping logical drive numbers. **UNDATE** Convert individual files or disks back to the dating format prior to LS-DOS 6.3 **VERDISK** Verify entire floppy or hard disk and display any errors. **XDRIVE** Makes a single floppy disk drive act like it is two separate disk drives. **XMEM** Allows BASIC programs and C to access extended memory banks. **XMEMDISK** The most powerful memdisk utilities on the market, install as many memdisks as your system will support. **YANKRES** Allows you to de-install SYSRESed SYS files from memory with out re-booting. Fully Supported by the author. Complete with manual.

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for MODELS I/III/4

by David Goben

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# LS-DOS 6.3.1: The latest for your Model 4

- ☆ The DATE command, "Date?" prompt on boot, and the @DATE SVC now support a date range of 32 years; from January 1, 1980 through December 31, 2011.
- ☆ Enable or disable the printer time-out and error generation with SYSTEM (PRTIME=ON|OFF)
- ☆ Customize the display of the time field in the DIR command to display 12-hr or 24-hr clock time with SYSTEM (AMPM=ON|OFF).
- ☆ Both ASCII and hexadecimal display output from the LIST command is paged a screen at a time. Or run it non-stop under your control.
- ☆ MEMORY displays (or prints) the status of switchable memory banks known to the DOS, as well as a map of modules resident in I/O driver system memory and high memory.
- ☆ Specify SYSTEM (DRIVE=d1,SWAP=d2) to switch drive d1 for d2. Either may be the system drive, and a Job Control Language file may be active on either of the swapped drives.
- ☆ The TED text editor now has commands to print the entire text buffer, or the contents of the first block encountered. Obtain directories from TED, too!
- ☆ Have extended memory known to the DOS? The SPOOL command now permits the BANK parameter entry to range from 0-30 instead of 0-7.
- ☆ Alter the logical record length of a file with "RESET filespec (LRL=n)"
- ☆ Specify "RESET filespec (DATE=OFF)" to restore a file's directory entry to the old-style dating of pre-6.3 release. Specify "RESET filespec (DATE=ON)" to establish a file's directory date as that of the current system date and time.
- ☆ Felt uncomfortable with the alleged protection scheme of 6.3? LS-DOS 6.3.1 has no anti-piracy protection! MISOSYS trusts its customers to honor our copyrights.
- ☆ Best of all, a 6.3.1 diskette is available as a replacement for your 6.3.0 diskette for \$15 (plus \$2 S&H in US). There's no need to return your current master.
- ☆ The 6.3.1 diskette comes with a 30-day warranty; written customer support is available for 30 days from the purchase date. Versions for the Model 4 and Model II/12 are available. If you do not already have an LS-DOS 6.3.0, order the 6.3.1 Upgrade Kit with 90 days of customer support for \$39.95 (+\$2 S&H).



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Twenty megabyte drive packages are currently built with a Kalok 3.5" hard drive; Forty megabyte packages use a Seagate ST251-1 28 millisecond drive. Drive packages are offered as 'pre-assembled kits'. Your 'kit' will be assembled to order and fully tested; all you will need to do is plug it in and install the software. Drive kits include a 50-pin host interface cable and the hardware clock. Add a joystick for but \$20 additional (see price schedule).

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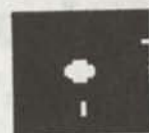
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MARK REED'S MODEL 4 UTILITY DISK is fully supported by the author, and it is available now from *Computer News 80* for only \$14.95, plus \$2.00 for shipping and handling. Order your copy today!



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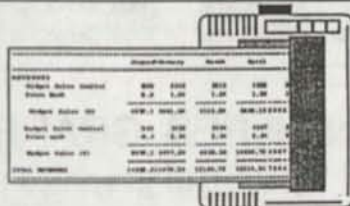
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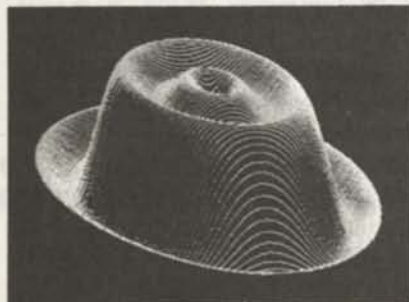
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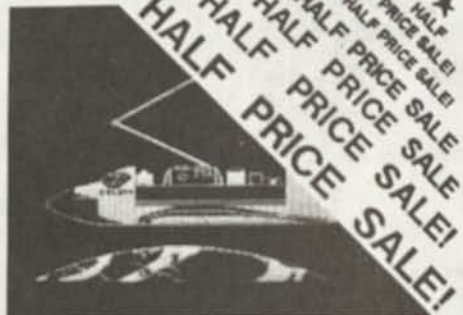
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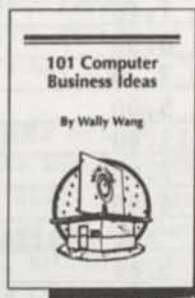
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120 pages

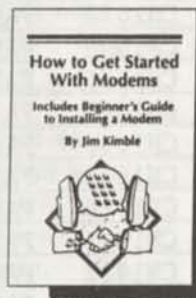
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Wally Wang is the author of numerous books on software and hardware, as well as the Co-Editor of *ComputerEdge*, San Diego's Computer Magazine, where he has a regular column and is a frequent contributor.

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Jim Kimble writes for *ComputerEdge*, San Diego's Computer Magazine. He is a widely respected networking and telecommunications expert, and an experienced Bulletin Board user.

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## EDITORIAL COMMENTS

If all goes well - and at this writing it's not, because we are still in the learning mode - this issue will be our first done on the laser printer. If it looks just like your last copy of CN80 that's intentional. We are still working out some of the format design to select headline fonts. We now have italics and hopefully a better photo ready copy to send to the printers. But don't expect anything any fancier than what you have seen in the past. We feel that the content of the information is a better investment of our time and the readers, than layouts with a lot of boxes, background shading, ten different typefaces and sixteen point sizes all in the same issue. Even though it can be done, that belongs in the display advertising section. We promise to keep our large, easy to read type style.

Many subscribers have asked "Do you really use TRS-80 equipment to produce CN80 and keep all your records?" The answer is yes. Also, we have put out two weekly publications for the past eight years and we have used TRS-80 Model 4s to do that job since 1984. And for those interested, all the clip art in our last issue came from the PostMaster Icon Library printed with a Dot Matrix Printer.



*Ol' Cottin Picken wasn't in very good shape when he returned to Casper, but he had that poke!*

## PROSPECTING TANDYLANDS OUTBACK

by A Cottin Picken/Maverick

Late one night while on our last prospecting trip to Tandyland, deep in the heart of Texas, we were wandering through the streets of Tandyland's Outback. It's surprising how soon a vibrant industrial complex can become a ghost town. This is the area that the famous TRS-80 computers were produced. Now nothing but empty warehouses and shut down assembly lines. I was beginning to feel like the guy in Detroit trying to buy parts for his Model T Ford. Nothing here but dust devils and tumbleweed filling the wide dusty streets. And a few old Radio Shack stores, with their signs swinging in the wind while hanging from one hook, their double doors creaking with an eerie, "here's to yesterday" sound.

We were here, too hot to stay in the motel room, about forty miles from nowhere, wondering just what we were going to fill up that brand new three and half 80 track external disk drive with. Tomorrow we would be on our flight back to Wyoming, with nothing to show for the trip. Oh well, it's too hot to be inside, and it is kind of fun wandering the streets of these old ghost towns. Might even find a gold nugget that fell through the cracks of the floor, where one of these ol'boys did their daily TRS-80 gamblin.

Just as we were about to call it a night there appeared at the end of the street this huge cloud of dust and it was headed our way. Had to be headed our way, nobody else was around. We turned on our heel and was startin to make tracks, when suddenly that cloud of dust was all around us, and a bony hand had a tight grip on our coattail.

As the dust started to clear, just enough to see, here was this ragged, disheveled individual with the fire of ancient Aztec gods flashing from his eyes. "Here you gotta take my poke," he said, holding out a bundle in worn leather pouch, which was covered with strange Aztec hieroglyphics.

I grabbed the pouch just as a Texas Marshall rode up on the biggest IBMblue I ever saw and right behind him was a paddy wagon out of which jumped what looked to be two nine foot tall Texans in white coats.

"What's goin on," I said to the Marshall as he grabbed the stranger. "We're lockin this guy up. Anybody who still thinks there is a Model 4 still operating out there must be crazy," he replied. Turning the stranger over to the two in white coats, he muttered "Come on Monte, it's time to go." With that the marshall was back on his horse, the stranger was locked in the paddy wagon. And they disappeared in a cloud of dust at the end of the street. All that was left was the echo of "Hi Ho MSDOS" sounding across the Outback.

They didn't see Monte's poke, which I had already stashed in my ten gallon hat. Yes, we still wear ten gallon hats in Wyoming. But we wouldn't get on a horse as big as that IBMblue for the world. I felt like Indiana Jones clutching that poke as we returned to the Motel. I knew that I had seen those strange markings on that poke before and I couldn't wait to get back to our archives in Casper to check it out. I wondered if I could change my reservations to an earlier flight in the morning.

Back in the motel I couldn't wait, I broke open the seal on Monte's poke. All the time thinking if I would evoke the curse of Montezuma by doing so. No risk was too great, I had to see what was in that bundle.

Reaching into that bag took a lot of intestinal fortitude, coupled with the consoling thought that "after the first bite, the others don't count, because you were dead already." But there were no spiders, rattlesnakes or Aztec ancestors in it. The first hard object I pulled from the bag was a copy of Montezuma Micro's CP/M for the Model 4. Then out fell Monte's Menu, Monte's Window, Monte's Bascom, Monte's Toolkit, Monte's Hardback and a copy of Montezuma's CP/M System Programmer's Manual. Wow, how long had this nut Monte been hiding these?

I knew that we had plenty of CP/M back in the archives, but here it was all ready to go. So I plugged in the Model 4P, and stuck a disk in. I have to tell you here that about five years ago we purchased an electrical estimating program that had a 5 meg data base for our Model 4. The only problem was that it only worked with CP/M, so we had to spend another \$169 for Montezuma Micro's CP/M for the Model 4, plus 30 more bucks

for the hard drive package and \$500 more bucks for a 5 meg. hard drive. The estimating package already had cost us \$998. That was our introduction to CP/M and after days of calling the support group we finally got the hard drive formatted, the estimating program installed and running. We put the CP/M operating system package on the shelf where it could be covered with dust and never cracked its pages again. Fortunately the estimating package was menu driven, and the boot disks were made for the hard drive on the first format. But oh, that code syntax! It must be written for cotton pickin/masters. Since then we have had a little more experience with computers and gained a little understanding of strange syntax structure.

In about 30 minutes, (after reading Monte's instructions in the front of the CP/M manual). I had four backup working system disks copied from the CP/M program disk, two configured for a two drive system and two configured for a four drive system. Monte had put hot key controls in his version calling up a menu driven program that does all your formatting, disk checking, and disk copies with one pass formatting and copying. Now what was I going to do with it for application programs?

Grabbing Monte's poke again I shook it hard to see if there was anything more in it. Out fluttered a tattered piece of paper. Scribbled on that piece of paper was a map with a big X at the end of some rather wandering lines for directions. Oh well, that plane reservation would have to be put off one more day. Couldn't leave the Outback before checking this out.

The next morning shovel in hand we were in the middle of the Outback trying to figure out that map. When we showed it to the mule we had rented. He took one look and lead us right to the spot where the X was located. For the next hour the dirt and sand flew, till we hit the top of a metal box. Could this be it? Was this where Monte hid the treasure?

Back in the motel again, having returned the mule and the rented prospectors shovel and pick, we pried open the metal box. It was nice that we could shoot the lock off with one shot. More shots probably would have attracted the attention of the motel

management, but I guess they were used to strange gunshots going off in the rooms in the middle of the night.

With the lid to the metal box finally open a strange orange light shined upward. Strange color we noticed, not quite orange, not quite pumpkin and not quite anything we had seen before. Looking up on the ceiling of the room where the light was shinning was MONTEZUMA MICRO CP/M PUBLIC DOMAIN LIBRARY enblazoned on the ceiling, complete with Monte's hieroglyphic. How were we to know that Monte was a direct descendant of Montezuma! And here was his treasure.

Back to Casper on the next available flight, with all this stuff burnin a hole in our jeans. Just can't wait to tell all the folks about this one! And most important of all to make it all available to CN80 subscribers at super low prices. By the way, before we left we were able to get the private phone number to Monte's padded cell, so he will be available for support. Can't give you that phone number, but he said he would be glad to write you back if you write to him in care of CN80, as long as they don't take his crayons away.

C. P. Maverick, for CN80

## MONTEZUMA MICRO HISTORY AND REVIEW

by CN80 a Staff Report

John Lancione, President of Montezuma Micro and CN80 have come to an agreement that gives CN80 exclusive rights to distribute Montezuma Micro's CP/M for the Model 4 along with the Montezuma Micro's CP/M public domain library. Support for hard drives will still come from Montezuma/Aerocomp, but support for the MM-CP/M DOS system will be by CN80.

We have many times mentioned in CN80 columns that your Model 4 is really three machines in one. It runs in the Model 4 mode, using TRSDOS, LS-DOS or CP/M and it runs in the Model III mode using the TRSDOS and LDOS and several other

DOSs. So many really great programs and commercial packages were written to operate under CP/M that were never available to operate under any other DOS version that we always felt that it was a shame that more people were not aware of the added potential of their Model 4s. Now we have the NewDOS 89/90 Basic enhancement package for the Model 3 user and MM-CP/M for the model 4 user.

It might be well here to give a brief history of CP/M for those of you who are not familiar with it. For those of you who are long time users, we would like to invite your input in the way of articles, suggestions and hints and tips for CP/M that would help us who are just starting out with the DOS.

The CP/M operating system was created by Gary Kildall in 1974 and has now evolved to version 2.2 and is copyrighted by Digital Research. Digital Research has had a history of licensing third parties to use CP/M as either the operating system for their programs or to enhance as Montezuma Micro has done. Reviews in 80 Micro Magazine gave the MM-CP/M version a five star rating in all categories, easy to use, good docs, bug free and does the job were all rated with five stars.

CP/M was the underlying DOS structure that MS-DOS was built on, and you will see the many similarities between the two DOS command syntax. Although seemingly difficult at first, it really turns out to be quite simple to change between MM-CP/M and other DOSs and back again when the application requires it.

MM-CP/M supports over 40 disk formats, including both 40 and 80 track drives which makes it possible for your Model 4 to read a disk formatted in another machine, such as Kaypro and move the data to your CP/M formatted disk.

For better understanding here is a very brief glossary of terms used:

DOS Disk Operating System.

CPM Control Program for Microcomputers.

BDOS Basic Disk Operating System. Which handles all tasks and transactions involving disks.

#### BIOS Basic Input/Output System

Handles all I/O (input/output) devices such as disk controllers, terminal and printer. This section of CP/M is machine specific and must be revised for each type of computer Manufactured.

Sound confusing, really not. Montezuma Micro has designed the BIOS to allow CP/M to work on the Model 4 and that's really all there is to it.

With the program utility menu's installed by MM, you really don't have to worry about that thick book of CP/M instructions. You simply call up the menu make a selection and you are off and running. DUP for Disk Utility Program, makes one pass format, read, write, verify backup for you. It will format a disk, and check a disk for you and you don't have to know a single DOS ready command. (In this case CP/M calls drive zero "A" and drive 1 "B", just like Tandy 1000, and IBM clones do).

Future issues of CN80 will devote space to reviews of the several packages that are available to enhance MM-CP/M. But for now lets review some of the outstanding features of the DOS package itself.

Montezuma's Super Data Format which allows 220K storage on a single sided disk.

Supports an 80 character by 24 line screen.

Operates many of the specialized business and professional applications which were written to run under CP/M.

Supports the Montezuma Public Domain Library of 355 disks. But don't let that fool you many of the disks have arced programs on them. The catalog disk prints out a ninety page catalog of de-arc'd programs.

To many of you all this is not new, but here is your chance to really get those extras like Monte's Windows or Monte's Menu at a real savings. Not to mention that you can get the public domain disks for as low as \$3.00 each.

We really hope that our rescue efforts of this DOS and public domain library will really be worth it to the CN80 subscribers. We are certainly having fun learning about all this (to us) new stuff. -CN80

## LIVING IN A WELL-DEFINED WORLD

by David P. Miller

Last issue we covered setting on individual points of the graphics screen. As mentioned, the process of turning on a single dot without disturbing the existing contents of the byte at that screen location entails several steps: setting the X/Y coordinates, reading a byte, setting the appropriate bit, and rewriting the byte to the same location. This approach is required in Assembler if a copy of the graphics screen is not kept in user RAM, but graphics BASIC provides several commands to set points and draw shapes and lines without worrying about it. Of course, the routines called by graphics BASIC to perform these functions go through the steps outlined above, but this is transparent to the BASIC programmer. Since these functions are provided, we won't attempt to bypass graphics BASIC to do the job; this technique will only be used if and when an Assembly-language example is given.

Last time, we filled the screen with a graphic display corresponding to a mathematical function. The function was pretty to look at, but was rather abstract and had no correspondence to the real world. This month we will again use the concept of graphically displaying a mathematical function, but will use it to demonstrate cycloid forms. A cycloid is described as the path taken by a fixed point on a circular object while the object is rolling. Picture a small reflector attached to the rim of a bicycle wheel while the bicycle is moving, and the lines described by the reflector will be a cycloid.

Since we are limited to displays within the graphics screen, this month's program (see program listing number one) will generate a variation of the cycloid, called a hypocycloid. This is the path taken if the circular object is rolling around the inside of a larger circle. In case you're interested, the formulas are:

$$x=(B-A) \cos (At/B)-A \cos (B-A/B)t$$

$$y=(B-A) \sin (At/B)+A \sin (B-A/B)t$$

If you've ever played with a "Spirograph" you know what a hypocycloid looks like.

What makes this process most interesting on a computer screen is the fact that computers generate a certain amount of error on extremely large and small numbers, and an additional error is generated in the transfer to the screen due to the limits of resolution. Although a mathematician might shudder at the results, the rest of us can appreciate the beauty of the intricate patterns developed. The program will request two numbers from 1 to 32767 for the large and small radii, draw the corresponding figure, wait for you to press a key, and repeat the process. Use World Program Listing Number One for Microlabs' GBASIC, replace lines as noted in World Program Listing Number Two for Radio Shacks' BASICG.

-David P. Miller

## THE ALLWRITE DESKJET SUPPORT PACK

by Gary W. Shanafelt, McMurry University

Unless you're a power user, there are only two reasons to go out and buy a new computer. First, something in your current machine breaks and to repair it would cost more than the system is worth. Second, you reach a point where you need to do things on your computer which you simply can't do with your present system, or at a price that you can justify.

Model 4's have been upgraded to do a lot of new things with higher-capacity drives, hard disks, speed-up kits, graphics cards, and add-on memory boards. What they appeared until recently to be left out of, though, was the revolution taking place in printer technology. The new standard is 300 dots per inch. I teach history at a small university in Texas, and increasingly the manuscripts I read, and the professional resumes, and the memos, are appearing at 300 dpi. Dot matrix looks like the work of rank amateurs anymore, and even daisy wheel printout doesn't come close to the sharp, professional output of a laser printer. So, as the new printers reached my price range, I began considering whether it was time to junk my TRS-80 and buy a wholly new system capable of powering a 300 dpi printer: for if the competition is submitting grant proposals

at this professional level, and you aren't, it's not hard to guess which submission will get the most careful attention from the Powers That Be.

That was a year ago. I now have a Hewlett-Packard DeskJet Plus printer. And I still have my Model 4 TRS-80. I bought Prosoft's Allwrite Laser Support Package to interface the two machines, not because I like Allwrite as a text editor (I don't: my first preference is still LeScript, which I'd used ever since I bought my Model 4 in 1984), but because only Allwrite had the capacity for customizing its printer drivers to handle virtually any combination of printer fonts. Lee Rice of Marquette University helped me with a lot of initial problems, and then we began writing our own utilities to supplement what the Prosoft package provided. At the same time, other TRS-80 users bought LaserJet or DeskJet machines, contributing further insights and utilities. Since no one else was providing software to do what we wanted to do on the new printers, we and the other new users ended up doing it ourselves. Prosoft has now left the TRS-80 market entirely. Lee felt that Model 4 users should still be able to take advantage of the Allwrite laser interface, and so proposed combining the new utilities with functional equivalents of the original (copyrighted) Prosoft programs for registered users of Allwrite. The Allwrite LaserJet Support Pack has already been announced; if you have (or want to get) a DeskJet, you can now interface it with Allwrite and a Model 4 with the Allwrite DeskJet Support Pack.

That's the historical background part of this article (you'll remember I said I was a history instructor). Hans de Wolf presented an excellent analysis of the DeskJet printer in the August issue of this publication; if you're thinking of buying this machine, you should read it closely. The DeskJet really is more of a "personal" printer than its LaserJet relation; it is slower, less suited to high volume printout, but also smaller (it fits easily on a bookshelf). Its main advantage over the LaserJet is its lower purchase price. The new DeskJet 500 has a list price of \$729, which translates to a street price of under \$500. But it also has some rather more subtle advantages. An envelope feed is built in; you have to pay extra to get one on most of the laser printers. And because of the nature of

the DeskJet font format, which allows fonts to be generated from the original code in either half size or boldface, a standard DeskJet font cartridge generally contains more fonts than a standard LaserJet cartridge. The HP 22706R TmsRmn cartridge has fonts ranging from 4 to 14 points, with many in boldface and Italic as well as in normal configurations. And these are all 8-bit fonts, with a variety of extended character sets. The DeskJet is an inkjet printer. Real DeskJet groupies refill the ink cartridges themselves with different colors of ink (it comes only in black) and then manually switch them at print time for multi-color output.

Of course, there are also LaserJet features you do without on the DeskJet. PCL (Printer Control Language) commands involving the drawing of lines or boxes, or shading portions of a page -- in general commands requiring enough memory to format a whole page before printing begins -- are not available. The ink is water soluble, though Hewlett-Packard has announced new insoluble ink cartridges which should be in the stores by the time this article is in print. And fewer fonts can be had on cartridge, while getting soft fonts on disk is more involved because, though you can convert LaserJet fonts to DeskJet format, you need access to an IBM-compatible computer to run the conversion program. (Note: The File Cabinet is beginning a collection of public domain DeskJet soft fonts on TRS-80 data disks for those who want to avoid the hassle of converting fonts themselves. There should be about 10 disks of fonts by the time you read this).

If you're considering getting a DeskJet printer, there's a further item to keep in mind. The first two DeskJets came with only one type face built in, mono-spaced Courier, so their output looked just like that of a much cheaper typewriter. The latest DeskJet 500 adds CG Times and Letter Gothic to Courier as standard fonts, as well as allowing kerning of letters (which is necessary for proper spacing with most Italic typefaces). CG Times is a proportional face and will thus allow documents with a "typeset" look -- but you get only two sizes of it built into the printer. To really take advantage of the DeskJet's special features, you have to fill one or both of the two cartridge slots in the machine. This is sort of

like buying a car with the engine being "optional" equipment. HP sells a number of font cartridges (TmsRmn and Helvetica being the most common) if you want to do proportional printing. If you desire to use the greater selection of soft fonts on disk (and have access to an IBM-compatible for the conversion process) you have to buy a 128K or 256K memory cartridge. My machine, incidentally, has both: 256K of memory for downloading soft fonts, and the 22706R TmsRmn cartridge which I use for most printing jobs. I use the IBM-compatible computers we have at school to convert the fonts.

Whether you buy a LaserJet or a DeskJet really depends on how much money you have and what your needs are. Owners of both machines love the kinds of things they can do with their printed work.

The Allwrite DeskJet Support Pack is designed for people who want to run Allwrite with a DeskJet printer. (And at the moment Allwrite is the only TRS-80 word processor that can support the DeskJet; the other available drivers are for LaserJet fonts. However, Anitek is considering DeskJet support for LeScript if there is enough demand for it). It has a number of programs in common with the Allwrite LaserJet Support Pack. It has some other programs not available in the other package. And it has a 30-page manual explaining how all the programs work on the DeskJet family of printers.

More specifically, the DeskJet Support Pack includes an Allwrite printer driver which supports the major built-in Courier fonts and a number of the Times Roman fonts on HP cartridges 22706D and 22706R (point sizes 8, 10, 12, and 14, plus 10 and 12 point Italic and 14 point bold). The driver also supports the CG Times and Letter Gothic fonts internal in the DeskJet 500. Finally, it supports seven public domain DeskJet soft fonts which are included in the package. So you have but to install the driver on your Allwrite disk and, depending on what cartridges you have, you can start printing. All the width tables used to generate the driver for these fonts are part of the package.

The pack also includes utilities to customize the driver for any font combination you

want. HPWIDTAB/BAS will automatically read a DeskJet (or LaserJet, for that matter) soft font on disk, calculate all the character widths, and create an Allwrite-format width table file for that font. It will also print the widths on a sheet of paper, if you need them for some other application. If you're working with cartridge fonts, you have to type in the character widths manually. This actually makes it easier to add fonts to Allwrite than for much more expensive MS-DOS word processors. If you've ever tried to use WordPerfect's PTR.EXE utility to add fonts to that system, for example, you'll already know that ALL font widths must be input by hand, not just those of cartridge fonts. HPINSTAL/CMD in the DeskJet Support Pack processes the width table files you select to create a new printer driver, which you can do whenever you need different font combinations (a single driver can have up to 64 font definitions). Finally, HPDOWN/CMD is a simple font downloader. It can be used either to load soft fonts into the printer one at a time, or to batch-process a whole list automatically. It can be used with any word processor that supports soft fonts, not just Allwrite.

The DeskJet Support Pack includes two other utilities which are not specifically designed for use with word processors or fonts. One is DJSET/CMD, which allows you to send the most common DeskJet escape codes to the printer from a menu rather than having to key them in by hand as LPRINT statements from BASIC. From the menu, you can set the primary font ID, add linefeeds to carriage returns, turn end-of-line wrap on (necessary for printing BASIC program listings), select internal fonts, print a line of text, turn off bi-directional printing, or carry out a number of other functions. The other utility is HPPRINT/BAS. This was originally written a year ago to allow printing Model 4 hi-res screens on the DeskJet or LaserJet printers, and is available on many BBS's. The new version 2 allows hi-res files on disk to be sent directly to the printer, so that anyone with a Model 4 can now print these graphics whether he has a hi-res board or not. Three standard HR hi-res files are included if you've never seen one before.

The package consists of 2 disks plus the manual and is being distributed for \$20.

A growing number TRS-80 owners are

buying DeskJet or LaserJet printers and learning how to use them. This means two things. First, it means an increasing number of TRS-80 users familiar with the new technology who can troubleshoot problems. Second, it means more people who will either write their own programs to get the new printers do what they want, or will encourage others to write the programs for them. In the last year, Lee Rice and I have written the utilities in the Allwrite Support Packs; Frank Slinkman has created a print utility for GIF files; and David Goben has composed drivers for Scripsit. Lee and others are working on utilities to handle the new LaserJet III scaleable fonts, and further projects may be in the works. I've asked people with Apples or Commodores or CP/M machines what kind of support their computers have for the new 300 dpi printers. It's zip. These other "classic" computers, which once outsold the TRS-80, are dying. If I'd bought one of them back in 1984, I would be tossing it into the junk heap right now. But I expect to be using my trusty Model 4 well into the 1990's.

If you have any questions, feel free to write me.

Gary W. Shanafelt  
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**ASSEMBLY LANGUAGE TUTOR Part 22**  
 by Christopher Fara (*Microdex Corporation*)

Bit "peeks and pokes"

After struggling for two months with all those bits, the time is as good as any to get to the bottom of the matter and be done with it. The rotate and shift instructions, as well as such instructions like AND, OR, XOR, gave us indirect means to manipulate bit patterns. But we can also address directly any individual bit in the computer.

BIT number,byte  
 Bit test. 'Number' is any bit number from 0 (lowest, least significant, rightmost) to 7 (highest, most significant, leftmost). 'Byte' is any single register (except F) or memory

location addressed by the register pair (HL). If the bit is 0 then Zero flag is set Z, otherwise it is reset NZ. Sign and Parity flag are also altered, but their status cannot be predicted. Carry flag is left undisturbed.

BIT 0,A  
 BIT 3,(HL)

The other two instructions are used to alter the bits and have a similar format.

SET number, byte  
 Set bit. Sets the designated bit 'number' in 'byte' to "one".

RES number, byte  
 Reset bit. Resets bit 'number' in 'byte' to "zero". Both SET and RES don't alter any flags.

SET 3,B  
 RES 5,(HL)

The bit 'numbers' are written as digits (not labels). For example in our CAP routine (CN80 90/1:8, Z80 Tutor I:35) we used AND to convert to upper case an ASCII character stored in register A

AND 0DFH

This instruction applied a "mask" of bits 11011111 to register A and the result was that all bits in A remained unchanged except #5 which was ANDed with 0 in the mask and therefore became reset to zero. The same thing could be done with

RES 5,A

Both instructions generate 2 bytes of code. The RES is a fraction of a microsecond slower than AND, but not enough to make any practical difference. And many programmers might prefer RES because it pinpoints the bit in question directly, and avoids the bother of figuring the bit pattern of the required mask. Similarly to convert to lower case we could write

SET 5,A  
 instead of OR 20H. Depending on the program logic, another advantage of SET or RES could be that they don't affect any flags.

Index registers

A long time ago we mentioned special "index registers" and to avoid unnecessary confusion decided not to bother with them until we get a better overall understanding of assembly programming. Most programming can do just fine without them, as we have done for almost two years now. Those two index



registers are called IX and IY. Both are 2-byte "word" registers like HL or DE, but their "halves" are never used separately. Well, not quite never. Some assemblers do provide "undocumented" instructions such as INC XH (increment the "high" half of IX) or LD A,YL (load the "low" half of IY into register A) and so on. But it's a risky business because apparently not all Z-80 chips recognize the code assembled by such instructions.

The index registers can be used in some (but not all) instructions which also allow the use of the register pair HL:

```
DEC IX
INC IX
JP (IX)
LD IX,word
LD IX,(address)
LD (address),IX
POP IX
PUSH IX
```

The same instructions can be used with IY. The instruction ADD can also use the index registers instead of HL, but only for adding BC or DE or the index register to itself

```
ADD IX,DE
ADD IX,IX
ADD IY,IY
```

But ADD IX,HL or ADD IX,IY are illegal.

The index registers can also replace HL in all instructions (without exception) which allow (HL) as a pointer to a byte in the general memory. This usage has a peculiar form which also explains why these registers are called "indexes". For example, we have used many times a typical sequence of instructions

```
LD HL,ADDRESS
LD E,(HL)
INC HL
LD D,(HL)
EX DE,HL
```

to transfer a "word" from memory location addressed by (HL) to register pair DE and then swap DE with HL to get that "word" into HL. If we put the memory address into an index register we could get the same result with these instructions (IY could be used as well)

```
LD IX,ADDRESS
LD L,(IX+0)
LD H,(IX+1)
```

The expressions in the brackets must always consist of an index register and a "displacement" value. The "displacement" can

range from -128 to +127 (some assemblers allow omitting the displacement when it is +0). In our example IX+0 points to a byte stored at ADDRESS (the displacement is 0) and IX+1 points to the next higher memory location. Thus we can get both bytes without INCrementing the pointer, and the EXchange instruction is not needed because we put the bytes directly into H and L. Now suppose in our example in the memory location just below ADDRESS we have another "word" we want to get into register DE, and below that yet another "word" we need to copy to BC. We could leave IX as is and continue writing

```
LD D,(IX-1)
LD E,(IX-2)
LD B,(IX-3)
LD C,(IX-4)
```

In all those cases the "displacement" is added to (or subtracted from) the value of the index register, and the resulting address is used to point to a byte in the general memory. The address is "indexed" relative to IX or IY.

On the face of it this looks like a good deal. But we pay for the convenience with memory and speed. When assembled, the indexed form of addressing is typically two bytes longer and about 50% slower than any equivalent instruction using (HL). The programmer must decide whether the trade-off is desirable. A common temptation is to use these registers when we "run out" of the "normal" registers to hold all values needed for processing. Before plunging ahead, try and see if a routine could be designed with some PUSHes, POPs and EXchanges to avoid the index registers. The source code listing may be longer on paper, but the assembled program is often shorter. And generally the shorter the assembled routine, the faster it runs.

One case where an index register is always used should be mentioned for Mod-4 programmers. Unlike in Mod-III, various system control bytes are not found in fixed memory locations, but in a "system flags table". To examine or alter those bytes we use SuperVisor Call 101 which returns the address of the beginning of that table in the index register IY. For example to lock caps we would write

```
LD A,101
RST 40
SET 5,(IY+10)
```

The caps flag is bit #5 in the K-flags byte

(Keyboard flags) which is the 11-th byte in the flags table. When this bit is set "one" then caps are locked, otherwise the keyboard is in lowercase mode. Since on return from SVC 101 the index register IY points to the first byte in that table, IY+10 points to the 11-th. The general rule applies here that in any instruction which allows (HL), such as SET, the indexed address can be used as well.

In Mod-III we would lock the caps simply by loading any non-zero value into memory location 16409

```
LD HL,16409
LD (HL),H
```

The most frequently used system control locations and flags are described in "Mod-III by Chris" and "Mod-4 by Chris".

### E x c h a n g e s

Having encouraged EXchanges as an alternative to the indiscriminate use of index registers, we should also point out that in addition to the familiar EX DE,HL other similar instructions are available to help preserve values during processing.

```
EX AF,AF'
```

Exchange register pair AF for its "primed" equivalent.

```
EXX
```

Exchange B C D E H L (all 6 registers at once) for their "primed" equivalents. Both instructions must be always written just as shown here.

As with the index registers, we mentioned the "primed" registers before, but didn't want to add to the confusion at that time, and let the subject rest. Each of the single registers A F B C D E H L has also an equivalent which is called "primed" because we mark it with an apostrophe. However, these registers are "hidden" and can't be accessed by any instruction except the EXchanges. We can't write LD A',13 or anything like that. You know those rotating displays of small merchandise (such as cigarettes or postcards) which are often found on the counters in drug stores? You can only pick the items facing you. The items on the back side of the carousel are "primed" as far as you are concerned. When you turn the display around, the back side becomes accesible ("non-primed") while the former front side becomes "primed".

Only one register set is accessible at any time. When a program starts running, the active set is "non-primed" and accessible. The "primed" set contains unknown values. The exchange instructions swap the "non-primed" with "primed" set. Therefore the first EXchange in any program brings forward AF (or B C D E H L) with meaningless values. The "primed" registers will be only useful if we first load some known values into the "non-primed" set and then EXchange to store it away for future EXchanges.

Finally one more EXchange instruction deals with the stack.

```
EX (SP),HL
```

Exchange the "word" which was last stored on stack with the register pair HL. The "word" from stack goes into HL, and the former contents of HL replaces it on the stack. The Stack Pointer (SP) remains unchanged, ie. still points to the same place in memory, but now the former contents of HL sits there.

This may be handy if we need to use HL for two different values, because it saves many PUSHes and POPs. For example suppose we have stored VALUE2 on stack and have VALUE1 in HL. This series of instructions

```
... process VALUE1
EX DE,HL
POP HL
PUSH DE
... now process VALUE2
EX DE,HL
POP HL
PUSH DE
... and so on
```

can be replaced by

```
... process VALUE1
EX (SP),HL
... now process VALUE2
EX (SP),HL
... and so on
```

which would be much shorter and faster. We can also exchange the index registers with the contents of the stack

```
EX (SP),IX
EX (SP),IY
```

As with any stack operations we must keep good track of what's there before and after EXchanging. But after 2 years of our tutorials this warning should sound like a broken record: of course we always keep track of what's on the stack, in the registers, and in any relevant portion of the

computer's memory.

In our "Tutor" essay instructions are introduced and described to the extent required by our tutorial objectives. But programmers often need to know all the details of an instruction, what operands it allows, how many bytes it uses when assembled in the machine code, how fast it is, what is the effect on flags, etc. The recently published "Z-80 Tutor X" is a detailed reference manual of Z-80 "op-code". All readers of this "Tutor" series should get one (see ad in the ad section, reviewed in CN80 Volume 3 No. 10, pg. 18).

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## THE ALLWRITE COLUMN

by Lee C. Rice  
Marquette University, Milwaukee

This will be the first of a series of short columns devoted to support for Allwrite and the Allwrite laserjet and deskjet utilities. Its frequency will depend on available space in CN80 as well as upon reader reaction. In it Gary Shanafelt (Deskjet support) and I (Laserjet support) will hope to answer readers' questions and suggestions, and to provide tips for using Allwrite as a text formatter.

Since the appearance of my articles on Allwrite and the Laserjet, Gary's on the Deskjet, and the announcement of CN80's distribution of Allwrite Support Packages for both families of machines, I've received several inquiries from Model 3 Allwrite users. There are currently no plans to produce Allwrite Support Packages (Laserjet or Deskjet) for the Model 3. I own a Model 3 myself, and have always liked the machine and LDOS. The fact is, however, that memory space on the Model 3 is cramped at best with Allwrite, even without additional laserjet complications. The utilities we wrote for the Model 4 dos would not simply have to be recompiled in many cases, but would have to be rewritten from scratch using overlays and other means of economizing on memory use. There just is not time for that

sort of project. My own current programming projects include additional Model 4 support for the new scalable fonts appearing for Laserjet-3 and compatible machines. Look for that support (for which "hooks" have already been provided in the current Laserjet Support package) in the spring. The scalable fonts are a rather exciting development which promises to add even more power to the Allwrite-Laserjet combination.

You can use a Model 3 system with Allwrite to drive a laserjet or Deskjet printer, provided you have the Model 3 Allwrite in either Version 1.12 or 1.13, and can run ALINSTAL to initialize it for the laserjet. If you are running under LDOS, the HPLASER/TAB supplied on the Laserjet Support Disks from CN80 will work with the Model 3 Allwrite, and the fonts supplied will also work. In an earlier article, David Goben has explained how to download soft fonts from BASIC, and his sample programs (which appeared in the October issue of CN80) will work for the supplied fonts for Allwrite.

What you will miss with this approach is the ability to add or manipulate additional soft fonts. If you are running a Model 4 in Model 3 mode, or have access to a Model 4, you can use the software which Gary and I provide in the two CN80 packages (one for the Deskjet, one for the Laserjet) to customize and create new printer control files, and then move to the Model 3 environment for editing and printing. This is a bit cumbersome if you are working with a large library of soft fonts, but several of the people who tested the programs which went into the Support Packages have used them successfully this way.

With this column CN80 is also pleased to announce two new families of disks for THE FILE CABINET. Gary Shanafelt and I have agreed to collect a series of public domain fonts for both the Deskjet (Gary) and Laserjet (me), and to make them available to CN80 and Model 4 users through THE FILE CABINET. The first five laserjet disks are ready now. Of these, the first three are public domain Palatino fonts, in point sizes 8, 10, 12, 14, 18, and 24. These are seven-bit fonts, so you don't get any of the special characters such as graphics, foreign accents, or special symbols; but they are lovely fonts, and will serve well the needs of most routine formatting. The Palatino Font

is in the Roman category. Disk #1 contains sizes 8 through 18 points in regular and italics only. If your need for bold is only occasional, you don't need Disk #2, which contains the same sizes in bold and italics-bold. Remember that Allwrite allows you to embolden words without changing fonts. Disk #3 contains the 24-point font (regular, italics, bold, and bold italics). I have provided the same single HPLASER/TAB printer control file (PCF) on each disk, and a README/TXT file indicating the Allwrite identifiers built into it.

The fourth FILE CABINET disk contains a set of Optimis fonts. This is a sans serif font similar to Helvetica (sometime called Swiss or Optima). Point sizes are 10 and 12 for regular, bold, and italics, and 18 and 24 for regular. Provided on this disk is a working version of HPLASER/TAB, a file HPDOWN/JCL for downloading the fonts to the printer, as well as font descriptor files in dot widths.

The fifth and last disk contains Calligraphic fonts in sizes 6, 8, 10, 12, 16, 20, and 24 points - together with a customized HPLASER/TAB, d JCL file for downloading to the printer, some documentation, and a complete set of font descriptor files. These fonts are primarily for special duty or fancier layouts.

All of these fonts have been tested on the Hewlett-Packard models HP+, HP-2, and HP-3. They have been thoroughly edited to make sure that the header files are in complete conformity with the H-P standards for soft fonts (public-domain fonts usually are not), and they have been tested with Allwrite extensively, as well as Troff (under UNIX). They should work with any other formatter capable of handling proportional download fonts for the laserjet family of printers. But please don't write to me if you can't get them to work with Electric Crayon running under Zortdos, or some such. If you are not using Allwrite, getting them to work under any other formatter is strictly your own problem. I'm sure that it can be done in most cases, and equally sure that I wouldn't know how. If you have any problems with them under Allwrite, I will provide whatever assistance I can. Again, however, I emphasize that they have been extensively tested under Allwrite; so there should be nothing but

smooth sailing.

Finally, since this column is supposed to be in reponse to Allwrite users' needs, the frequency of its appearance will depend to some extent on how many questions we receive and how much reader interest there is. I am tentatively planning to add to THE FILE CABINET soft font disks at the rate of about one per month until there are at least 20 disks. Whether CN80 will be interested in that many fonts depends on you, the reader, and your feedback. So write to CN80 with suggestions and comments.

If you contact me, I'll try to cover questions in these columns, or else contact you directly. This may take some time. I teach full time, and also edit two quarterly journals for Marquette University Press. Contacting me via email is fastest and most reliable. By BITNET, I can be reached at: IN%"6802RICEL@MUCSD.BITNET"

or, if you are on or have access to a UNIX system, I can also be reached on INTERNET: ricel@math.mscs.mu.edu I have been told that there are ports to both BITNET and INTERNET on Compuserve and Genie, as there are on many other public boards (check with your sysop). Until next time.

-Lee C. Rice

## A VISIT WITH DAVID GOBEN

by David Goben

### HARD DISK STRANGENESS

It seems like every time I turn around, someone has a hard disk that is running under a driver that fails to abide by the 'rules' set down for compatibility with the diskette structure established by Logical Systems, Inc. for conformity with the LDOS standard. Sometimes I wonder why they even run? But for some reason they do, and as long as the user is satisfied, it must be OK. But this does not make it any easier on the general programmer, who, when writing a program, is "expected" by everyone to take all of these possible variations into account, in order that everyone's personal computer system configuration, no matter how renegade, should be supported. Perhaps it is selfish for me to think so, but I feel such expectations are stupid. It would be much

easier if the driver authors (for hard disks and otherwise) would just stick by the rules, instead of establishing their own standard, and then expect those who would choose to abide by the rules to in turn force themselves to also vary from them in order to support the nonconformity. I've seen this renegade coding done mostly by kitchen table hackers who would much rather trust their own coding long before they would trust the criteria established by the authors of the DOS, even though these friday-night hackers may not fully comprehend all the intricate factors involved in supporting such a driver (but try an tell -them- that). Oh, for the days when the -only- format was cassette. But even then, some software manufacturers employed crude "protection" schemes -- though easily broken -- to prevent the user from tampering with the software (but then again, most of those manufacturers in those days were these same kitchen table hackers). Now, before you start pounding out a letter of indignations, spitting venom, I must clarify that I -support- kitchen table hacking! The fact is, I'd love to see one of them develop a hard disk driver for TRSDOS 1.3, considering the vast number of people who use the DOS. Personally, I think it's impossible (hint).

The main thrust of what I'm driving at, is that I have finally decided to quit fighting with these renegades, and to simply ignore them. I hate it when I write code that conforms to the rules, and get complaints from these nonconformists when my software does not work with their system, even though the problem lies in their own coding practices (God forbid that they should stoop to correct their own code, when they feel that by whining I may relent and change my code to be just as nonconformist as theirs).

Of course, my compassion still lies for those who unknowingly utilize such non-standard programs. I think that is why I have put up with it for so long. When a person has a problem, I cannot help but try to assist them in solving it. That is my nature. They cannot be held to blame for putting their trust into something that at the time seems to accomplish what they require of it, but only later proves to be a bane, in the guise of making it appear that conformist programs seem to be operating incorrectly. To overcome this inconsistency, it is imperative that program authors know what the rules

are, and have the resources and references to help them stick by it.

#### IMPORTANCE OF RESOURCES

To be a good programmer requires that you have all essential resources available. What might these resources be? It depends upon the programming language you are using. If you write in BASIC, you will want to have the BASIC manual at hand. For the Model 4, this is usually the user's manual which came with the DOS. For a Model III, this would involve both the OPERATION AND BASIC LANGUAGE REFERENCE MANUAL which came with the computer, as well as the DISK SYSTEM OWNER'S MANUAL which is supplied with TRSDOS 1.3, or the Disk Operating System of your choice, such as LDOS. Of course, you could also garner more comprehensible information in the MOD-III BY CHRIS and MOD-4 BY CHRIS manuals from CN80.

For Z80 machine language programmers who desire to cooperate with the DOS as much as possible, it would be wise to have on hand THE SOURCE, a 3-volume set which contains the source code for TRSDOS 6.2 (and the basis for LS-DOS 6.3.x.), which is available from MISOSYS. MISOSYS also sells THE PROGRAMMER'S GUIDE TO LDOS/TRSDOS VERSION 6, and any serious programmer should have this manual on hand and well-thumbed. Another source is of course the MODEL 4/4P TECHNICAL REFERENCE MANUAL. Another book I always keep on hand is the Sybex book: PROGRAMMING THE Z80, by Rodney Zaks, though most any Z80 programming manual is good. It is also a good idea to go ahead and read the usually boring application chapters in these books. It is amazing what new tricks you can learn from them. A recent book that fills the gap in the current lack in the availability of such book's is Chris Fara's Z-80 TUTOR, Volume X: REFERENCE, which CN80 publishes.

Of course, to understand all this gobbledy-gook, you must first know the language. There is no single-best way to learn a language, although a common formula that I have seen arise from most of the more prolific programmers is that they did not start programming cold turkey, but rather started simply, with programmable calculators, or pocket computers, for example. Although I started this way, I don't

boast at being a prolific author (I think I make too many mistakes). But hey, if you already have a computer, then BASIC is probably the best starting point.

If you have ever worked out formulas on a calculator, then you have already tasted the cousin of machine language. I started on a Texas Instruments SR-56 programmable calculator. It contained 10 data-memory registers, 100 retainable program steps, 23 preprogrammed functions, conditional transfer instructions, the ability to transfer program control to instruction addresses, and numerous other features. I then moved to a TI-58, and finally a TI-59. The TI-59 held up to 960 program steps, or up to 100 memory registers, and the ability to transfer control not only to specific instruction addresses, but to definable labels as well. It featured well over 100 functions, and was a true work of art. The best part was its use of insertable solid state software modules which held up to 5000 program steps, and the fact that the "calculator" used the straightforward algebraic entry method, as opposed to the more confusing (at least to me) Reverse Polish Notation, featured in the Hewlett-Packard programmable calculators, such as the HP-41 and HP-25. If I just defamed your favorite calculator, please forgive my ignorance -- we program in the manner we are most comfortable with. Who knows? Maybe RPN is the best. Basically, what these, and the pocket computers such as my CASIO FX-720P (Radio Shack carries this under their own label), teach us is to think in a logical manner, which is -imperative- for good programming. Although most of us write in a method lovingly called "spaghetti code," which is to say that we write it as we think it up, inserting new bells and whistles as they meet our fancy, eventually, to produce the best possible code (at least for debugging purposes) we must settle into a structured form that divides each task into an individual routine. By doing this, when a bug creeps up in a certain part of the program, it is usually much easier to track down and squash.

Some people get apprehensive when they hear the term "Structured Programming". Most people associate this with the people who condemn users of the evil GOTO or JP commands. Well, in my opinion, those bastions of program purity can go smoke my socks, because no real program can do

without a GOTO, even though most of the recent "high level" languages hide its use from us. And when you program in languages such as assembly, you -cannot- do without the all-important JP (Jump) instruction, or its conditional kin. Sure, you might be -able- to write a program without it, but chances are it will also be -much- larger and slower, and in fact be much more incomprehensible than a program that simplifies the structure by using them. This is just the nature of programming in assembly.

Like all things, programming style is basically a matter of personal preference, and just as each person is different, so is their approach to programming. The great thing about this variability is that what would be impossible for one programmer using their own personal style is not only possible in another's style, but could actually be child's play. More than once I've seen a total novice outshine the skills of an old veteran, simply because of a fresh perspective toward a problem. The fact is, I enjoy the challenge of attacking an "impossible" task. Whether it is just to make the self-righteous pontificator of such a bold assertion eat crow feathers, or just because I like to find new ways of doing things. No joke, but I often learn more from trying to work the bugs out of one of my programs than some programmers learn from reading a book on programming. A programmer that is dedicated to his or her "art" is one who is always thirsty to learn more about it (not profess that no one can teach them anything), is always trying to improve upon what they have already created (a true programmer is never satisfied with a program that simply works -- they always want to make it the best that they can make it; thus making themselves their own worse critics), they will not rest until they can be proud to put their name on what they have created (even though they may work at improving it later due to fresh knowledge garnered), and each consecutive project is always better than the previous one. This improvement in skill is due to their continuously new-learned methods of approach to a problem, thus giving them greater mastery in their skill as a programmer, learning from their new "tricks", and learning even more from the pitfalls, which really makes them scramble for solutions that not only work, but

improve it as well. A good programmer is not built in a day (and in some cases may not even be considered sane).

The part I like is to look back at a program that I had written some time ago, remembering how proud I was of it at the time, and am now almost humiliated that I dared tell people I had written that piece of balooie. The only way to save face is to apply the new techniques I've learned since then, announce a new version, and display "NEW & IMPROVED" on it like a box of detergent.

But no matter how well we construct something, because humans are not logically thinking beings with pointed ears, beaming up and down from star ships, and telling each other to "Live long and prosper," we will err. So no matter how "perfectly" a program is written, someone will always, usually by the brute power of their pure innocent ignorance, make an impossible-to-find bug so apparent that it screams like headlines declaring the world at war. THANK GOD FOR THEM! These people don't just point out bugs, but at the same time make us better programmers, as we sort of defend our program from certain ruin by fixing the problem. Often in desperation. VICTIM OF ODD STANDARDS Ah, well. UNREMOVE/CMD, a program in DAVID'S MODEL 4 FILE UTILITIES PACKAGE, has fallen prey to the problem of nonconformity to standards. Although it works on 99.99% of the installations (read as "computer setups") they are used on (I have received only -one- verifiable problem report so far), on some of the stranger hard disk formats, although it still works, it can present some garbage at the end of a listing of removed files on a hard disk. If you have this problem, you may want to add this patch:

```
. UNREMOVE/FIX # 1
. Fix UNREMOVE for all hard disk types
. Changes version 1.3.1 to 1.3.2
. Apply using :
. PATCH UNREMOVE UNREMOVE/FIX
X'25E0'=FD CB 03 5E 20 07 FD CB 04 6E
X'25EA'=28 01 87 FE 23 38 02 3E 22 47 C9
X'2960'=C3 E0 25
X'29AE'=32
. eop
```

Create this file in a word or text processor

and save it in ASCII under the name UNREMOVE/FIX. Apply it using the command PATCH UNREMOVE USING UNREMOVE.

Now that didn't hurt at all. Make sure your version of UNREMOVE is version 1.3.1 before applying this patch. If it is already 1.3.2, then the patch has already been applied.

#### BUGS OF A DIFFERENT COLOR

CLEANUP/CMD, a program on DAVID'S MODEL 4 SYSTEM UTILITIES PACKAGE has a bug in it. This "bug" is kind of embarrassing, because before production I had decided to -remove- the HARDDISK parameter, and did so, but forgot to remove the parameter from the documentation. Thus the bug reports from users. The reason why I chose to remove it was simply because to clean up a hard disk takes a -lot- of time (that is why CLEANUP will only clean up just the directory, and not the entire hard disk partition, like it will a floppy disk). And besides, it's generally better to leave the bulk of the hard disk alone. After all, most people seldom back up their hard disks as it is (I do it every day), and if for some reason a file was misallocated, it might just get -zapped- and rendered unusable instead of simply recoverable. Water under the bridge. The problem with this change was that if you try to specify the HARDDISK parameter, it tells you that you have selected an illegal drive number. Not exactly a clean exit, but it does prevent the HARDDISK function from being used. However, reconsidering this, and deciding my warnings in my documentation were adequate, I have decided to reinstall the HARDDISK feature. If you wish to add it as well, use the

following patch:

```
. CLEANUP/FIX # 1
. Fix problem with HARDDISK parameter
. Changes version 2.1.0 to 2.1.1
. Usage:
. PATCH CLEANUP using CLEANUP/FIX
X'2663'=CD B6 29
X'280E'=31
X'29B6'=C5 3E 11 EF C1 C9
. eop
```

Use a text or wordprocessor to create an ASCII file with this data under the name CLEANUP/FIX, and apply the patch using the command PATCH CLEANUP USING

## CLEANUP.

As stated for UNREMOVE, check to ensure that the version is 2.1.0 before applying the patch. If it is already 2.1.1, then the patch has already been applied.

## NOTES ON XMEMDISK/DCT

Those of you who are upgrading to LS-DOS 6.3.1 and are using my XMEMDISK/DCT from DAVID'S MODEL 4 SYSTEM UTILITIES PACKAGE, should make sure that the version is 3.01 before using it. If it is 3.00, you will need to upgrade your disk to obtain the new version. This new version operates at a base of hex address 3000 rather than 2C00. Because of the need to extend SYS8/SYS in LS-DOS 6.3.1 in order to add some extended features, Roy Soltoff, the DOS's author, has made notice that drivers must have their base moved up to X'3000'. This is the same problem that a program called GRAFDISK/DCT fell prey to. Many other drivers were caught just the same.

If you are using it under a previous version of DOS, then XMEMDISK/DCT will work OK, and so there is no reason to upgrade. If you are using LS-DOS 6.3.1, simply send the original disk back to Computer News 80 in a disk mailer (and not wrapped with 3 rolls of tape). Please be sure to include a note stating that you need the upgrade. Please include return postage (65 cents) if you do -not- need the upgrade due to having an older DOS, but simply want it. However, before you send it, ensure that the version is not already the upgraded version. You can do this by simply entering XMEMDISK/DCT from the DOS Ready prompt. There are some people who have the knee-jerk reaction to send their disk back without first checking the version number. More than once I have personally received requests for upgrades on other products when what they sent me was -already- the upgraded version.

## LS-DOS 6.3.1 SUBJECTS

Speaking of LS-DOS 6.3.1, I have noticed that the latest version, as of this writing, is Level 1H. Seems to me that all those little buggies, which you can expect in such a complex product, are just about all squished. As a credit to Roy Soltoff at MISOSYS, virtually all of these bugs have been negligible, and 99% of its users would have -never- noticed them. The only serious bug was caught at the very beginning, when only

a few packages actually got out the door (credit Stan for catching it first -- Roy fixed it the same day).

I have received numerous complaints from people stating that if the DOS was so full of bugs, why did Roy bother putting it out in the first place? Why not wait until all the bugs were removed?

Come on! Be -real-! It is a basic fact of life that no matter how much you perfect a product, someone out there will -always- try something that you did not, and as a result they will find a bug that the author could not have found if their life had depended on it. Chances are, any sophisticated program you use has a bug in it. It may be that you just haven't come across the right "combination" to bring it to light, or it is a well-hidden one, and may -never- be found. But before we stray too far and cast a shadow of doubt upon the latest release of LS-DOS, I must point out that no matter what release or level people have, chances are mighty strong that they will -not- find a bug, notice a bug, or realize that one might be there. Even before all these patches were released, most everyone was already swearing by it, bespeaking of its greatness. I agree 100%! After all, LS-DOS 6.3.0 is at Level L. How do you think it got to Level L? It seems to me that when the DOS was first released, it was at Level A, wasn't it? And if you received THE MISOSYS QUARTERLY in its first year, you probably noticed that the LSI COLUMN was -literally- filled with patches to fix bugs in 6.3.0.

The facts are, the patches to LS-DOS 6.3.0 were -far- more serious than the ones that have been released for 6.3.1. So far 6.3.1 has required only small band-aids, most of which I personally feel are negligible, because the DOS will still run fine without them. These new patches only act to "fine-tune" the DOS. This is opposed to the early patches to 6.3.0, which in some cases were quite serious! But at the same time, most of them were still obscure and unnoticed by the majority of its users. Even TRSDOS 6.2.1 was released to not only enhance TRSDOS 6.2.0, but also to fix -major- bugs.

Recently, Frank Durda IV (that 'odd' FDIV some of you hackers may have encountered in the boot ROM on the 4P, and even subroutine names in the source code for the



RS HiRes programs) fixed a bug in LS-DOS 6.3.0 that corrected the problem of multiple files being created on the Gate Array Model 4's. This fix came built into 6.3.1.

A bug I discovered that has existed all the way back to LDOS 5.0 is the problem that the leap-year bit will not be updated from its 'boot-up' state if you change the date using the DATE command. What I mean by this is that after you have answered the boot-up date prompt, the leap year bit will be properly set. But if you later use DATE to change the date, the proper leap year flag will -not- be updated (no great loss to most folks). I presented the patch for TRSDOS 6.2.x LS-DOS 6.3.0 in CN80 Volume 1, number 11 on page 9. If I recall, it hasn't yet been "officially" fixed, or even applied to LS-DOS 6.3.1. Of course, as Roy explained, "Why bother? I don't think there are any applications that use it." Well, actually, version 1.0 of my CAL/CMD program did. But I later changed CAL in subsequent versions to internally compute leap years. The point I am getting at with these examples is that many of you who are condemning 6.3.1 because someone has dared to mention the nefarious word that a bug was found, and at the same time boast the reliability of 6.3.0, probably are not aware that bugs exist within the DOS they venerate. But even with the bugs, they are still considered reliable and trustworthy. LS-DOS 6.3.1 should be seen in the same light. As a matter of fact, I feel 6.3.1 is more bug-free than 6.3.0. But if per chance more bugs are found in 6.3.1, then they will, as in the past, be just as quickly fixed by the ever creative mind of Roy Soltoff, and the many resourceful hackers out there who freely lend their assistance in coordinating workable patches to correct any foul doing within the DOS.

#### ABOUT CREF

CREF, a program in my DEA package, is a great help to programmers whose projects takes up more than one source file. I have received a "bug" report from one user who states that CREF does not work at all. I thought this was odd, because I use it all the time, and have yet to have it fail on me. I finally figured out that this individual was trying to use it on source files that had line numbers saved on it. I must point out that CREF works with files that are saved in -standard- DEA format, which does -not-

have line numbers in it (only when the file is loaded into DEA will you see those). The line numbers CREF displays are those that would be created for the file if it were loaded into DEA for editing. So if you want to use CREF, be sure that the files are saved using the standard "W" command (not the non-standard "W#" command).

#### SUBDISK, DISKDISK

Take this information as you will, but here is something I think many of you Model III and 4 hard disk users will find of value. I sure do.

If you have a hard disk on your Model III or Model 4, the problem with running out of file slots in your partitions gets to be a big pain. In answer to this, Roy Soltoff had some time ago come out with DiskDISK, which allowed you to create pseudo disk partitions within an individual hard disk partition. It is named SubDISK in the Model III and 4 versions of the support software for his 20Meg and 40Meg hard disk kits. It's still the same program. This is a truly -great- utility. I have my hard disk partitions littered with subdisk files. I set up each subdisk so that each contains a separate project I am working on, and I usually format them to be the same size, or smaller, as a standard floppy disk on my system. This way when I back up from a subdisk to a floppy disk, I can be sure to know I will have enough room for the backup (I use the ONEPASS program in DAVID'S MODEL 4 SYSTEM UTILITIES PACKAGE to create a mirror image of the subdisk on a floppy disk, for an even faster backup).

The best part is that when I use one of these subdisk partitions, I don't have to wade through the clutter of various other files on the 'disk'. I can keep only the files I want on it. Also, because a subdisk partition is accessed just like a separate disk drive, I have plenty of free file slots available within it, and don't have to fret about lack of filename space.

A case in point. Most people have their various CMD files, overlays, filters, and drivers in their main DOS partition on their hard disk. In most installations, I find that people set aside 5 megabytes worth of the hard disk for this partition. I also notice that they may have in excess of 200 file slots used, and they have only used up maybe 1/3

of the available room in that partition. That means that once they have used up all 255 possible file slots, they will still have 2.5 meg or more of space unallocated in that partition. Here is where DiskDISK and SubDISK come in handy. Why not set aside some of this space as a subdisk? You could actually create several of them before the space is used up in the main partition. But once you activate a subdisk file, within it you have a great amount of free space available, and "loads" of free file slots. You could even set it up as a 'system' drive by backing up the SYS files to it. Next you may want to place a particular application, such as your wordprocessing system, a database, or whatever into it. The advantage to running it from this partition on the hard disk is of course the speed at which the files will load and save because they are located on a hard disk, in comparison to the slower floppy disks. You can even format the subdisk using an included format utility to take greater advantage of "disk" space. For example, you could select a format that allocates only 1 sector to a granule. This means that a granule will only use up .25K of disk space. The standard format is type 5, which represents a 5" disk, which allocates 6 sectors to a granule, and 3 granules to a "side". Using type 5, you can have a maximum 96 cylinder disk with 2 sides and double density, having a capacity of 864K. This has a granule size of 1.5K. You can also select 8 to emulate an 8" disk. Using type 8, you can create a maximum 77 cylinder disk with 2 sides and double density, granting you 1155K of disk space. This has a granule size of 2.5K. When I first got my hard disk kit from MISOSYS, I never bothered with the SubDISK utility. Now I don't know what I would do without it! (Kind of like a microwave, huh?) If you already have a hard disk, and are in dire need of more file slots, but have plenty of space free, you should seriously consider DiskDISK. These utilities have definitely returned some sanity to my life. Both are available from MISOSYS, who are also regular advertisers in this magazine. Well, look at the time! Until we meet here again, HAPPY COMPUTING!

-David Gobin

## XLR8er Boost/ASM/CMD

by Mel Patrick

I have been the very pleased owner of an XLR8er board for almost two years now. I originally obtained my XLR8er from HiTech but now I see that Misosys has taken over the product. Hopefully it will be available to everyone for sometime yet.

When I initially received my board it came with a disk of utility programs to support the board. FIXBANK, FIXALL, SET180 and RAMDISK. The manual stated that due to slow keyboard access a 70% increase in speed was possible with no software modifications. Since I write a lot of machine language code the 70% increase was more than appreciated. I had already added a hard drive to speed up things and coupled with the XLR8er board made normally time consuming assemblies much faster.

At the time the reason I didn't use the FIXALL filter was that my LOW CORE RAM was already full and I couldn't fit it in. So until about May 89 I had settled for only a 70% increase. Hi-tech had promised a new PAL chip which would replace the slow one in the Model 4 but for whatever reason it never materialized.

In May this year two things happened. First I managed to remove some filters which I rarely, if ever, used anymore. This in turn freed up some low memory space for other things. The first thing I tried was to install the FIXALL/FLT to allow me a 100% speed increase expect on keyboard access. Needless to say it does work, but like the original HI-TECH manual pointed out, it will drop the speed back on ANY interrupt and then return it to normal 100% after the interrupt is completed. Which means that RS232 interrupts, clock interrupts, disk interrupts, and keyboard interrupts all caused a slow down, when all that really should have caused it was during keyboard access. As a programmer I was willing to accept the drop in speed during keyboard access but not satisfied with the other set backs as well.

Hi-Tech admitted that their FIXALL/FLT was not very "pretty" and if there was another documented way in which it could have been done, they would have done it that way. Which is the correct attitude for a company writing software. I.E. if it's

not documented, don't try short cuts.

As a programmer myself I can appreciate the concerns but as everyone knows where there is a will there is a way. Even if it doesn't abide by the LSDOS programmers guidelines. Which be assured my program does not and I freely admit it. I apologize to Misosys for hacking their code in a way they no doubt think very little of to accomplish my task. Enough said.

I used a book called the "Source" (System) from Misosys to find the address of the KISCAN routine. My routine inserts a JP to my driver at the KISCAN entry point. At my driver routine it simulates the original contents of the KISCAN entry point for proper setup, slows down the XLR8er board, does a CALL to the KISCAN routine, and when KISCAN is done, it returns with a character to my driver. At this time, I temporarily save the character, speed the XLR8er back up to 100%, restore the character and continue. The whole driver is only 25 bytes long and doesn't bother any other interrupts like the FIXALL/FLT does. Which is the way it should have been in the first place. I checked the address my program uses on TRSDOS 6.2 and it is still the same code so my driver will work on either 6.2.x or 6.3. Unless there is some major changes made to the low core routines by MISOSYS it will probably even work if we ever see a 6.4.

To use BOOST/CMD (see program listing three) you have to remove the FIXALL/FLT if you have been using it to get the 100% speed up. The easiest way is to hold down the CLEAR key when you boot the DOS. No configuration files are loaded when you do that so no filters will be included during the load. Of course this means you have to replace any filters which you do want to use (or low mem hard disk drivers) but it is sometimes the easiest way. If you just want to reset the FILTER to remove it, that can be done as well. BOOST/CMD sits in memory right at the very end of the LOW RAM area (the last 25 bytes). Usually you always have some free space left over and it may be enough to have BOOST installed.

The BOOST/CMD program itself checks the LOW memory area for sufficient room before it copies itself there so if your low filter is full you don't have to worry about over-

writing something. Secondly, it is not possible to SYSGEN the driver. It is NOT a filter, it's only a patch and must be used either from the LSDOS Ready prompt or as an AUTO BOOST/CMD at boot up. At present in the current version there is no way to remove the patch. If there is sufficient interest I will write one that will take it back down to a 70% speed mode and remove the driver patches. Contact me by mail or via my BBS with your requests.

And now the disclaimer time. Please be aware that with ANY software there is a chance that it can cause some very strange things to happen which you may definitely not find desirable. There are enough patches, filters and drivers to fill the Model 4 many times over and obviously many of these aren't too happy with each other. I have tested BOOST/CMD with all that programs that I own but bare in mind I don't own them all. I know all my software that I have written works with no problems, but there may be other software programs which don't feel quite the same. If you find a program like this, I would like to be made aware of it (and maybe even possibly change the driver to make it work) but the best advice I would give you is to take the driver OFF your disks and REMOVE whatever copies you have elsewhere. After all it didn't cost you anything to try it and if it didn't work you shouldn't use it.

The BOOST/CMD file is on my BBS for anyone that doesn't own an editor assembler program, or doesn't know anything about machine language. I make this offer since even those who own an editor assembler program may not be able to figure how to enter it and make it work (I have BASIC and can not program in it so we're even).

In closing, I have enjoyed using the additional 30% speed up for the last month and a half with no problems and that 30% does make a sizable difference in some processes. It would have been nice if the Model 4 had run at this speed all the time when it was designed.

-Mel Patrick

(Editors Note:) Mel sent us this article and program in 1989, so his reference to LS-DOS 6.4 does not place him out of date, it's just that sometimes CN80 is slow to get it all done. If you are still working under

TRSDOS 6.2 or LS-DOS 6.3 you should find this article interesting. And if you have graduated to LS-DOS 6.3.1 then you can let us know if the program works under the latest dos or not. We certainly hope to see more articles in CN80 by Mel who is one of the more creative authors still supporting the TRS-80 user with his work and deserves our support in return.-CN80

### NEWDOS 86 Review - BASIC

by Donald W. Ady

This months installment wraps up this ND86 review. It covers the ENHANCED BASIC enhancements as implemented by the ND86 authors, Warwick S. Sands and D.S. Sands. First developed some years ago as a tape patch, it is still available in PATCH versions for various systems.

EDIT works much as it always did, if you want it to. In its ELE EXTENDED LINE EDITOR mode there is a full screen editor with its own commands works well. You can even split a line into two new ones, or paste two together. Keys can be defined to type at least 26 keywords; eg shifted <G> to type GOSUB. Linelength can be 255 bytes, not just 240. ND80 commands DU or DI to duplicate or move single lines will work for blocks of lines in ND86.

If you get ND86, there's more than enough new BASIC to keep you up all night. For starters, here is a simplified list of new keywords and commands. Arguments in most cases can be a constant or variable or expression:

```
AND$(A$,B$) 'Logical bit test on strings
BASIC !300 'From DOS - reserve LOWMEM
BEEP N1,N2 'Notes on miniamplifier
CALL X USING A%(0) 'USR call w/Z80
regs
CASE ... ENDCASE 'Alternate to IF THEN
CHR$(64) 'Cancel CHR$(23) w/o CLS
CMD 'Same as CMD"S - GOTO DOS
CMD"F=POPx" - ND80 stack purge improved
DEC X 'Same as X=X-1
#DO A$ 'A$ can be BASIC command
DO ... UNTIL 'Type of looping
```

```
#DRAW S X1,Y1 TO X2,Y2 [TO X3,Y3 TO
...
#GOTO N 'Or #GOTO N*10 etc.
EDIT 'New full screen processes
ERR$(N) '=> Any ERROR #N
ERROR N 'Ditto
FIELD@6441,A$ LEN 5 'A$ =>"READY" on
ROM
FILL 6441,5,15360,64'=>READYREADY on
vid
X=FCB(1) 'X=ADDRESS(File buffer #1)
INC X 'X=X+1
INPUT @512,>"Enter name & age";N$,A
INPUT TO @512,"Phone number";A$;USING
B$
INSTR(A$,N,TF) 'Bit testing in string
KTA=A$ 'Set typeahead status with flags
SLET A$=UPCASE(A$) 'Convert letter case
A$=LSTRIP(" A BC",32) '=> A$="A BC"
LINE LET A$=HI, "SAM" 'A$ contains ""
X=MOD(8,3) 'X=2, remainder of 8/3
#MOV &H3C00,&H3E00,512 'Duplicate
bytes
#PLOTS A%(0) @ (64,24) 'Array drawing
PRINT @[16,32],A$ '@[row,column] works!
A$=ORS(B$,C$) 'Bitwise string logic
#RESTORE N*10 'RESTORE at calc. line #
#REV 'Graphic pixel & blank inversion
A$=ROTS("ABCDE",2) 'Rotate 2 =>
"CDEAB"
$=RSTRIP("A BC ",32) '=> A$="A BC"
SETKEY G=GOSUB 'Then <G> key types
GOSUB
A#=SUM A!(0),10 'Add 11 array elements
#SWP 15360,15872,512 'Swap 512 bytes
A$="12345":$SWP A$,1,3,2 'A$="45312"
?UPCASE$("abcd") '=>"ABCD"
USR0= ... Z80 program bytes ...
VID(80) '=> 80X24 screen
WAIT @512,>"Hit ENTER";CHR$(13)
WHILE ... WEND 'Type of looping
X=WPEEK(&H4001) 'Two byte PEEK
WPOKE &H4001,X 'Two byte POKE
N=XOR(8,24) 'N=24, BOOLEAN XOR
?&O77 '=> 63, octal to decimal
?&I111 '=> 15, binary to decimal
?&D15360 '=> 3C00H decimal to hex
A$="3C00":? &H(A$) => 15360
?&! -1 '=> 65535, unsigned INT
?&% 65535 '=> -1, signed INT
```

What's the best thing here? That depends on your tastes. To many it may be new INPUT controls which the author explains in a dedicated chapter can save a lot of conventional INKEY\$ logic. There is position control with @ position by count or by column and row. The ;USING B\$ sets

maximum keying LENGTH.

There are many simple new tools: string operations, conversions of number bases, two byte PEEK and POKE, and others.

For debugging: no more UNDEFINED ERROR message - info is complete, and has new functions that PRINT can use. Not shown above is a programmed SETKEY usage that can define "hot keys". The defined keys can work like a BREAK as an interrupt at any time, and can be set up for some error service subroutine you write using GOSUB via a hot key. The ND80 CMD"F=POPx",line usage that purges GOSUB stacks has been extended to work on the new structures: CASE, WHILE, and DO ... UNTIL. NOTE: DEBUG is entered in ND80 by pressing 123 keys together, and <G> exits. <M><address> to type until ENTER. <+> or <-> to page.

Positioning: Any usage such as PRINT @512 now also can be done in M4 fashion by column and row like PRINT @[8,0]. The braces must be SQUARE ones, unfortunately, the [] set, normally not typeable. I think it takes a special KBD driver or a word processor, or else I've missed some common knowledge. To test these in a program, I typed them via DEBUG.

80X24 Video: works if you install driver, via VID command when in DOS, the in BASIC execute VID(80). It works during a RUN after the VID(80), but reverts to 64X16 when you STOP or if stopped in command mode. VID(64) switches back while running.

80X24 support works for any PRINT or SET/RESET/POINT, or #DRAW, #PLOT, or #REV ... full support. Maximum @ coordinates go up to row 23, column 79 for row,column. However PRINT@ still is limited to 1024.

Graphics: #DRAW S 0,0 TO 159,0 TO 159,71 TO 0,71 TO 0,0 is an example that if in 80X24 mode almost instantly draws a pixel border on the video edge. MAX SET coordinates go from 127,47 to 159,71 when changing modes via VID(80). The same technique could be used to draw anything like the explicit way above, or with variable coordinates stored in arrays, etc. The flag letter "S" is for SET, R RESET or X for XOR (invert). #REV inverts the whole screen, including nongraphic blanks. PLOTS

A%(0) @ (X,Y),size,rotation is a more elaborate and efficient tool. The array can be built with program PLOTMATH/BAS and uses 5 bits per pixel set: 5 bits sometimes for up to 32 pixels of same direction repeat. Size or rotation params if used can make the object larger, or turn it eight ways.

Memory manipulation: MOV, #FILL, and FIELD @ provide powerful tools. MOV handles overlapping moves, but #FILL does not. The string command FIELD @ defines a string anywhere in memory. You could for instance use it to point to ROM and then PRINT# to disk for a literal ROM image file.

Among the best additions for those of us who would use them are new USR tools. For the more advanced, an overlay file can be established from DOS, much like a system overlay. BASIC !n such as BASIC !500 on entry reserves the specified bytes below file buffer #1 for any purpose. Two other forms if used will eliminate need of DEFUSR. CALL X USING A%(0) calls address X and passes all 10 Z80 register pairs to and fro in the array. USR0= ... Z80 code ... on the end of a line when executed defines the byte after equals sign as USR0. How to get the untypeable bytes in place? Various methods could be used. You should type some typeable placeholder bytes first like "\*\*\* .." in place of Z80 code. In ND86 if you execute the USR line then type 123 for DEBUG, it lands on the start of the to-be USR literal. Then you could type the HEX there. <M><addr> to start typing, ENTER to stop, and <G> to return to BASIC. If you have any line already in a form A\$=" ... Z80 code ... then ND86 has a special CONVERT process to convert it for you.

-Donald W. Ady

#### A REMINDER

If your label ends in 90/11 this is your last issue and it is time to renew.

Don't forget to send a **CHRISTMAS GIFT SUBSCRIPTION** to CN80 computer friends. Or if someone has really given you a helping hand with a problem this year, why not send him a years extension to his subscription to CN80?

## WHERE SHOULD THE DIRECTORY GO? (ON MODEL III FORMATTED DISKS.)

by Warwick Sands

This article is the end result of some thought on how to make the Automatic Disk Format determination routine work most efficiently. NewDos90 allows a dialogue with the user during COPY and FORMAT and provides default pdrive parameters. So where should the directory go? Please read on.

The placement of the directory starting sector should be chosen so that if disks are swapped in a drive then a DIRECTORY READ ERROR will always occur. This will force the ADFR into updating the pdrive tables.

In considering where to put the directory, thought must be given not only to single or double sided drives but also to the circumstance of a 40 track disk in an 80 track drive. Also for Model I users with Double Density, the effect of the K flag must also be taken into account.

Since LSDOS/TRSDOS insists that all directories should exist at the same physical location on every disk, ensuring that these disks are always accessed correctly is nigh on impossible. Solution do a LOGON or a DIR m before you try to read/write data to the drive.

Some preliminary information for those who came in late. In the beginning there was model I TRSDOS, this handled single density single sided disks. Each disk had 35 physical tracks. Each track could hold 10 sectors. To allow more efficient allocation of disk space, each track was divided into 2 grans. Obviously each gran held 5 sectors. A file was always allocated space in grans, i.e. multiples of 5 sectors. The directory started on track 17 and occupied the entire track. Double sided drives appeared and since there was a track on each side of the disk, the term cylinder was coined. A cylinder comprises the total disk sectors that can be read before the head assembly has to moved. For double sided single density drives there were now 4 grans per track.

Then along came double density. This exposed the basic difference in design philosophy between NewDos and everyone else. The authors of NewDos considered a

disk to be nothing more than a number of consecutive 256 byte 'records' which were grouped into 'things' called grans and lumps. (To avoid semantic confusion NewDos called a logical track a 'lump'). The physical attributes of the disk itself was of no relevance whether an 80K floppy or a 40M hard drive. So when NewDos wanted to read a 'sector' of the disk it computed the logical record number based on how the disk was logically divided up. It then called the disk in/out routine which mapped this logical number to a physical sector on the disk. It was the i/o driver which concerned itself with the characteristics of the physical device.

This is in stark contrast to the other DOS's. These are intrinsically tied to the underlying physical media. Rather than letting the i/o driver map a logical address to the physical address, they must pass the i/o driver the physical address of the sector to be read. So when Double Density arrived, the other DOS's were forced to change their concepts. A single-sided disk now had 18 sectors not 10. This meant that there were 3 grans to the track and each gran held 6 sectors. (It gets really messy when hard drives are used since each cylinder stores up to 48K of data).

While single density only was involved, disks between the various DOS's were compatible. This was because a logical track (lump) was exactly the same size as a physical track. Once the size of the gran changed, this nexus disappeared and disks were no longer compatible. This was because NewDos80 hard wired the size of the gran into the code. It was not a parameter that could be changed. NewDos86/90 has fixed that.

Getting back on track. I want to be able to set up default directory starting addresses so that whenever we change disks in the drive, the ADFD will be triggered into action. A change in Density will always trigger the ADFD, so we must make certain that the directory position of single vs double sided drives are different. I have assumed that NewDos style disks will have 5 Sectors per gran. The other values appear below:

Sides	Tracks	Grans	Directory size
1	40	2	3
2	40	4	3
1	80	4	6
2	80	8	6

These values are not affected by density. For single sided single density disks the directory size is 2 grans.

Lets now examine where the various directories can be located. Since we have to cope with TRSDOS style disks, we shall talk in terms of sectors and convert to lumps later on. We must allow the fact that someone may wish to have a full 30 sector long directory.

We must also consider the fact that the 40 track disks have a track width twice that of 80 track disks. Lets examine 40 track disks first. The figures in brackets are the physical track numbers.

Density	1 Sided	1 Sided
	NEWDOS	LDOS
Single	210-239 (21)	200-209 (20)
Double	310-339 (17)	360-378 (20)

Density	2 Sided	2 Sided
	NEWDOS	LDOS
Single	400-419 (20)	360-389 (18)
Double	720-755 (20)	760-789 (21)

The TRSDOS directory is in the centre of the disk. Notice that the relative positions of the Newdos directories change as we go from single to double sided? This means that a density change occurs whenever the number of sides is changed. To allow booting Model 1 disks in double density some tricks are played. Physical track 0 of the disk is formatted in single density, and then the rest of the disk is formatted double density. So the track 0 of a double density system disk is really on physical track one of the disk. We must allow for this extra track and this is why the single sided double density disk has its directory starting at track 17.

Now to look at 80 track drives. Since we want to be able to detect 40 track disks in 80 track drives, the directories of 80 track disks must be outside the area occupied by the forty track disks. Therefore no directory can appear between tracks 33 and 43 on the 80 tracker. So in this instance we don't have

to worry about TRSDOS disks since their directory is on track 40.

Density	1 Sided	2 Sided
	NEWDOS	NEWDOS
Single	300-329 (30)	880-889 (44)
Double	560-589 (30)	1560-1589 (43)

40 Track Directories become

	NEWDOS
Single	17 - 21
Double	33 - 43

If you check the figures you would notice that I have modified them slightly so that the Directory begins at the start of a lump (logical track). This allows us to now work out the suggested default starting spot for the directories. I would suggest that you change your PDRIVES to suit the following. If you use the prompts for COPY and FORMAT that ND86 provides, these values will be used.

Single Sided 40 Track Drive Single Density  
PDRIVE 0 x TD=A SPT=10 SPG=5 GPL=2  
DDSL=21 DDGA=2

Double Sided 40 Track Drive Single Density  
PDRIVE 0 x TD=C SPT=20 SPG=5 GPL=4  
DDSL=18 DDGA=3

Single Sided 40 Track Drive Double Density  
PDRIVE 0 x TD=E SPT=18 SPG=5 GPL=2  
DDSL=31 DDGA=3

Double Sided 40 Track Drive Double Density  
PDRIVE 0 x TD=G SPT=36 SPG=5 GPL=4  
DDSL=38 DDGA=3

Single Sided 80 Track Drive Single Density  
PDRIVE 0 x TD=A SPT=10 SPG=5 GPL=4  
DDSL=15 DDGA=6

Double Sided 80 Track Drive Single Density  
PDRIVE 0 x TD=C SPT=20 SPG=5 GPL=8  
DDSL=22 DDGA=6

Single Sided 80 Track Drive Double Density  
PDRIVE 0 x TD=E SPT=18 SPG=5 GPL=4  
DDSL=28 DDGA=6

Double Sided 80 Track Drive Double Density  
PDRIVE 0 x TD=G SPT=36 SPG=5 GPL=8  
DDSL=39 DDGA=6

The DDGA value may be changed to suit your requirements.

-Warwick Sands, *Author of NewDos 89/90*

## SOUND FOR YOUR MODEL III

by CN80

New owners of Model III sooner or later want to have sound coming from their computers like their Model 4 friends do. Then are disappointed to find out that the Model III has no internal speaker or provisions for sound as the Model 4 does.

There are many games that were on the market like Frogger that produced very nice music, and the File Cabinet Mod 1/3 Library has many games with sound and several music producing programs in it.

Both the Model III and Model 4 computers come equipped with a cassette port, and in the case of the programs with sound for the Model IIIs the sound is sent to the cassette port, whereas sound for the Model 4 may be sent either to the cassette port or sound may be sent to the internal speaker circuits. Running a Model 3 game on the Model 4 in the 3 Mode produces nothing either in the way of sound unless you have an external amplifier and speaker.

You can use some of the cassette recorders to provide you with the the sound, provided that the recorder has the ability to override the record only circuit and allow you to hear while it records. Most small portable cassette players do not allow you to do this and the Tandy Computer Cassette player (cat. # 26-1207) will not. You wouldn't want to listen to the sound of a computer program being installed on tape. But stereo systems that have a setup where you can listen to the input audio while you record to cassette will generally allow you to input from the computer and hear what is being produced. You could with the computer cassette recorder and others record the sound to tape and then play it back. This is practical when the sound produced is music, but not so good when the sound is associated with the interaction of a game and the player.

The simple and inexpensive way to add sound to your Model III is to purchase a small Mini Audio Amp/Speaker Cat. # 277-1008 for \$11.95. You will find this unit in Tandys full line 1991 Catalog #459 on page 122. This is a small battery operated amplifier and speaker, with an aux. jack to plug in a larger speaker if you want. But the additional speaker is really not

necessary. We have a small 4" speaker plug in to ours for better volume, but the sound improvement is slight.

You will need to buy the three prong computer cassette recorder cable, if you do not already have one. (RS Cat. # 26-1207 for \$5.95.) Plug the large gray plug of this cable into the Mini Amp/Speaker's InPut Jack and the round five pin connector into the cassette jack on your computer and you are ready to listen to some of the great sounds produced by such popular games as Frogger and others. Or using the ORGAN/CMD sound generator program that is in the FILE CABINET MOD 1/3 LIBRARY =Games Disk # MD3GAM04, and create some of your own organ compositions. This disk also has several sound demo programs and make/music programs on it besides the other programs already mentioned.

One demo program we received in the IBM junk mail, suddenly started playing the 1812 Overture through our IBM clone, cannons and all. Quite surprisingly, fairly good sound was produced. It should be, they only wanted \$685 for the *onscreen-only* presentation building program. To say nothing about the \$3,000 piece of equipment it was being played over. Nice but we would just as soon listen to Ken Gordon's Orch-90 bag pipe music over our 150 watt living room stereo. That is what we have our Orch-90 interface connected to via 25ft single wire patch cords.

If you have not heard this music before, wait a minute till we turn up the volume. There, the windows are breaking the walls are shaking but you should be able to hear the pipers coming over the moor. Can't you?  
-CN80

### TRSLINK UPDATE

We have just received Volume 36. And we have a new offer for copies.

Through the Month of November we will ship you all 36 Volumes on single sided floppy disks for \$18, plus \$2.00 S&H.

Regular copy fees are still 75 cents per volume for six or more volumes on floppies. Postage included. Or \$1.50 per volume on single sided disks, postage included.

*Makes a wonderful Christmas Gift.*



## OPEN FORUM

=====

**Q:** Help! Does anyone know the patches to TRS-DOS 2.7DD, 2.8 that will allow it to boot with the LN-Doubler Model I?

J. McL, Cambridge, MA

-----

**LTR:** This is an answer to Donald W. Ady in the October 1990 issue about incompatibility of data formatted on 40 tracks for reading an 80-track drive.

Misosys sells READ40/CMD, part of its LS-Utility Disk package, that will do that. To quote the manual: "Once READ40 has been installed (into high memory), you may place a 40-track diskette in the 80-track drive, and perform any read operation (such as DIR, BACKUP, COPY OR CONV)." Not surprisingly, READ40 will not allow a 40 track drive to read a disk formatted for 80 track.

A tip to who asked for a way to have recalculation suppressed when Multiplan is loaded. If you use KSM, write a line that will load Multiplan, then select the option NO recal. I wrote the following instructions to be evoked when CLEAR-M is pressed:

```
mp;on;
```

That's all there is to it. Try it and watch Multiplan tell itself, like a player piano, to suppress recal.

You can't accomplish the same thing with a JCL file, because the computer can't read anything beyond the first instructions to load Multiplan, because JCL works only at DOS level. But KSM files are read as keystroke instructions.

H. A. B. Jacksonville, FL

-----

**LTR:** In regards to your answer to D.V.O. of Sanford NC gripe ltr about the "News Item" article; I concur with you. I read CN80 cover to cover (whether I fully understand all of it or not) and have done so ever since I began subscribing in its infancy. I am fully aware of what the "News Items section" is and welcome detailed info usually provided that advertisements don't. I can easily see the difference between a third party review

and product information releases. I also appreciate and applaud those few still laboring to support and give us die-hard TRS-80 users new software and hardware and I pray that it continues for a while yet. I pray also that both CN80 and TRSTimes stay around for awhile. I am also a charter subscriber of CodeWorks and saddened to see them leaning heavily to MS-DOS. To those of you not familiar with this mag and who enjoy computing in or perhaps just learning BASIC program writing, their recent ad offer of full year back issues with disks is a good deal.

On another note .....

**HELP!** I recently installed 1 full meg of HyperMem from Anitek in my gate array 4P. This is the memory expansion that requires a good bit of soldering and IC leg cutting. (It had been some time since I last had a soldering iron in my hand and I enjoyed it.) I also installed their speed-up kit at the same time. During installation a few questions were raised and answered promptly by phone calls to Anitek. However, there seems to be a problem with my particular computer in that HyperMem will not operate under fast mode of the speed-up kit. Two suggestions from Peter Ray (Anitek); a) shorten certain crucial wires installed to absolute minimum; and b) install a 51 ohm resistor in the lines of the two Ram banks did not help. It was thought a possible "ringing" was occurring and might be the culprit. With no other solutions, Peter Ray suspects that a component in my computer may be borderline on its specs. The HyperMem works great in standard or slow mode 4 MHz speed, but I would really like the faster speed. Anitek gladly took back the speed-up kit, but I am asking, here, if anyone has had a similar situation and solved it or has any suggestions.

(As an aside- I truly enjoy using HyperMem and feel any extra RAM expansion is ideally suited for the model 4P. It supplants the lack of possible external drives for the 4P which can at times be a little limiting. I have a DBM system I wrote in BASIC and specific for my postcard collection of over 8,000 cards. I can now load a total of 5 floppies of data to the RAM expansion and search all the files without 'flinging floppies' all over the place. Here's were I would love to have that 6MHz speed. I also just bought a Hi

Resolution board for the 4P, finally, and use the memory expansion to load a number of HR pics. Better still, when running David Millers PostMaster program, (that I could rave about for another 1/2 hour), I load 4 or more disks worth of clip-art files into the memory expansion RAM disk to have instant access to a huge library of icons.)

In lieu of the problem with sound patch problem in DOS 6.3.1 that I mentioned in the September issue (p26), I re-discovered an article in the February 1986 issue of 80 Micro, titled 'Sounds Incredible' by Robert Anderson. I took the time to type two short basic programs in the article and was well rewarded for my patience with the keyboard. The sounds you can get are quite amazing. The standard model 4 Sounds command only supports 8 tones and 32 durations with the shortest of about .37 seconds, kinda draggy. Bob Andersons program provides many more possible durations and begins with a much shorter and quick .04 second note. He claims to provide 2,000 possible tones and though I have not attempted to count or check this out I can say that nearly every key on your board will produce at least 2 different tones; and I know from counting on my fingers that's 5 times more than the standard DOS Sound command gives out. It is easy to use in your BASIC programs. I'm not terribly technically handy to understand such things, but because it sits in HIGH MEMORY someplace it may not be compatible with every single program you might use. For instance I discovered that it cannot be installed if I'm to run PostMaster which requires about all the memory you have. No matter, I recommend you dig back through your 80 Micro library and check this one out if your not already using it.

If you would like to have more information on this article and program write to me, enclose stamped self addressed envelope and I will be happy to assist with more information.

I'm on a role, it seems .....

With some fear of standing with egg on my face for not being able to see something at the end of my nose, I would like to pass on an accidental discovery I have not found mentioned in Christopher Fara's book, JOB CONTROL LANGUAGE. A really good book, by the way. Either one of the two

lines listed below will cause your JCL to abort with the message, "Invalid JCL Format, processing aborted."

. The following Patch comes from CN80 vol 3 #8 p38.

. allows 100% use of lowercase for disk name in formatting.

The culprits are the # and % symbols which apparently JCL's do not allow to be used in a comment line as the example here. I tested the use of other symbols in a comment line, also used by the JCL's but encountered no abort problems.

Dick Burwell  
P.O. Box 114  
Greenville, NH 03048

LTR: Dear Sirs,  
Well I'm back from my vacation and if ya'll reclect my Mom moved and didn't know our new address. That is why I'm ritting to ya now. Just look up in the corner of this here envelope and copy it down cause i couldnt hardly stand to miss an issue of CN80.

I had to look up Bubba to find where i live now. It's not to far from our old house. Just past the First Babtist Church and down the road apiece on the left. Just two houses down from Harry Goober the mayor. Anyone wanting to visit is welcome.

Mr. Harry says we are going to get our street paved fore summers over. And next summer they're goin to paint the line down the middle. We sure got lucky movin on the same street as the mayor.

I had to go to town today. And i saw Big Ben there. Big Ben is the largest man i ever saw and some say he weights over 300 pounds. I dont know what he doesfor a livin but he spends most of his time at the Rexall playing checkers and eatin. Doc Williams walked in and saw him eatin another candy bar and told him that he just had to diet. Big Ben looked down at his tummy and said, "Ok, Doc, what color?" Everybody laffed.

When i got back from the Rexall, Momma sent me to the creek to fetch my littlesister for supper. But when i got close i herd her talking to someone. So i peeked tween the

bushes and saw Sally soakin wet from head to toe and this yankysayin, "How did you come to fall in?" My sister said firmly, "I didnt come to fall in! I came to fish!" She'll get a whuppon for losin that fishin pole. Well, supper was good. We had fried okra and chitlins and buttermilk biscuits. So i better go and finish my chores fore the days done. Momma wants me to make another wooden leg for our prize hog, Tuf-Nut, fore dark.

Oh, by the way, since ya'll know me so well, why dont ya just call me JB Jr. for short. All my frends do.

Dont forget, to err is human but if ya'll really want to screw things up, use a computer.

Your frend,  
JB Jr.

(Editors Note:) This letter was printed intact and unchanged as received from our friend, at least it is on a disk in ASCII format, since JoBob writes in pure Arcansaweze, we would have trouble typing it all in. But we sure enjoy hearing from him, we hope you do too. Computing like life should contain a little fun in it. -CN80

LTR: Recently, several references in your great publication have been made to PFS:file and PFS:report. Apparently these packages are still in widespread use and I'd like to pass on a hint pertaining to their use. As you are no doubt aware, both of these programs are "protected" by a "limited backup" scheme. There are several methods of defeating this limitation, the easiest of which involves removing the password protection: I use SuperUtility. In the early 80's someone (I forget who) described how this could also be accomplished with the DEBUGGER. At any rate, this is an easy method of extending the life of a pair of excellent software packages that I hope your readers will find useful.

D. H. El Paso, TX

(Editors Note:) One other way is use DISKCOPY in LS-DOS 6.3.x and make a working copy of your original. It will override the protection scheme, and provide as many backups that you need. The only

problem with this is when placing this disk on a hard drive you can not use DISKCOPY, so if you have any copies left on the original, make a new working disk with DISKCOPY and use that to restore the program to your hard drive. Thus saving your original from running out of available backups. Even though the publishers of PFS:File and PFS:Report no longer produce these programs, please respect their copyrights and only use these procedures to make backup copies for your own use. To make copies for friends and neighbors, or for commercial gain is illegal.-CN80

LTR: This letter is being sent to thank you for the helpful hints supplied to me one, night after hours, when I called in frustration after Drive-0 quite on my Model III.

As long as I'm writing, I would also like to put my two cents in about articles being published by such people as Mr. Peter Ray of Anitek Software. I think they are informative to novice computer people like me. As a matter of fact one led to my purchasing the Megamem added memory for my Model III. Mr. Ray was very helpful in the installation as I never had seen the inside of a computer before.

Getting back to my call of frustration one Saturday evening when D-0 bit the dust. Who ever it was calmed my fears and explained what had to be done and what the options were. I also expressed my concern to this person that Model III owners were being left out in the cold as has happened with other publications. His response was for Model III owners to write and request what they needed. That is the other reason for this letter.

I don't know enough about this stuff to even ask questions without feeling foolish. How about starting with stuff for beginners that explain what is going on inside these black boxes. Once Peter Ray convinced me to take the cover off mine, a lot of black magic seemed to disappear.

R. A. M. Southington, CT

(Editors Note:) You were lucky, we just happened to be in the office that night, to pick up the phone.

WORLD3/BAS PROGRAM LISTING NUMBER ONE by David P. Miller

```

1 REM Generate a Hypocycloid figure
2 REM Requires Microlabs' GBASIC
3 REM Written by David P. Miller
4 REM for Computer News 80 Magazine
5 REM Original concept by
5 REM Florence & Sheldon Gorden
10 @OFF:CLS:@CLS
20 INPUT "Large radius (1-32767, 0 to quit) ";AA
30 IF AA>32767 THEN GOTO 20 ELSE IF AA=0 THEN SYSTEM
40 INPUT "Small radius (1-32767) ";BB
50 IF BB>32767 THEN GOTO 20
60 IF BB>=AA THEN CC=AA:AA=BB:BB=CC
70 C1=AA-BB:C2=C1/BB
80 DEF FN X(T)=C1*COS(T)+BB*COS(C2*T)
90 DEF FN Y(T)=C1*SIN(T)-BB*SIN(C2*T)
100 A=0:B=6.28*BB:N1=-AA:N2=AA:M1=N1:M2=N2
110 D=(N2-N1)/600:E=(M2-M1)/200
120 NR=10*(AA+BB):IF NR>400 THEN NR=400
130 OH=INT((FNX(A)-N1)/D+.5)
140 OV=200-INT((FNY(A)-M1)/E+.5)
150 ST=(B-A)/NR:@ON1
160 FOR T=A+ST TO B STEP ST
170 X=FNX(T):H=INT((X-N1)/D+.5)
180 Y=FNY(T):V=200-INT((Y-M1)/E+.5)
190 @LINE (OH,OV,H,V,1):OH=H:OV=V
200 NEXT T
210 T$=INKEY$:IF T$="" THEN GOTO 210 ELSE GOTO 10
    
```



CP/M  
ARTICLES  
Signed  
Cottin Picken Maverick

WORLD PROGRAM LISTING NUMBER TWO by David P. Miller  
by David P. Miller

```

10 SCREEN 1:CLS:CLR
150 ST=(B-A)/NR:SCREEN 0
190 LINE (OH,OV)-(H,V):OH=H:OV=V
    
```

BOOST/CMD PROGRAM LISTING NUMBER THREE by Mel Patrick

```

;This short routine will replace the FIXALL/FLT in low memory
;so you can use the XLR8er at MAX speed except during keyboard access
;Copyright 1989 by Mel Patrick
;Filename - BOOST/ASM
;
    
```

```

;
;      ORG      3000H      ;origin of program
;      GET      MASTER/SVC ;svc codes
;
dctrl EQU 32H      ;port address
rcr EQU 36H      ;port address
@gtddb EQU 52H      ;locate a device control block
@dsply EQU 0AH      ;msg to video, 13/3 terminates
    
```

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```

@exit EQU 16H ;HL=error code, return to DOS
;
;begin LD DE,'IK' ;find keyboard control block
LD A,@gtdcb ;find device control block
RST svc
DEC HL ;HL=dcb of KI, so back down
LD D,(HL) ;get MSB of low ram free space
DEC HL ;back down one more
LD E,(HL) ;get LSB of low ram free space
LD HL,12FFH ;top of LOW RAM FREE SPACE
XOR A ;clear the carry flag
SBC HL,DE ;HL=free space left in LOW RAM
LD DE,19H ;size of driver routine
XOR A ;clear the carry flag for subtract
SBC HL,DE ;if CARRY set, no room left for my driver
JR NC,ok2use ;else its ok to install and use
LD HL,sorry ;else display sorry msg
LD A,@dsply ;show it
RST svc
JR todos ;don't install, just exit to DOS

```

```

;
;The next section sets R=80 for refresh rate, copies the short
;25 byte (19H) driver to LOW SPACE RAM since there is room for it
;and then "borrows" the normal KYSCAN address and patches it
;to allow insertion of my driver.
;

```

```

ok2use LD A,11000011B ;refresh and refresh cycles
CALL ctr11 ;do it
LD A,01010000B ;set M=1,I=2
CALL ctrl ;and set it
LD HL,mydrv ;so we can copy the code now
LD DE,12E7H ;where we are going to move it to
LD BC,19H ;length of program
LDIR ;copy it to LOW SPACE RAM
DI ;turn off all INTERRUPTS first
LD A,0C3H ;a JP byte
LD (0983H),A ;stuff in KISCAN start
LD HL,12E7H ;point to my routine
LD (0984H),HL ;stuff new address in
EI ;enable interrupts now
LD HL,bmsg ;point to installed msg
LD A,@dsply ;and show it
RST svc

```

```

;
;At this point the driver is now active and the message has
;been displayed to inform you of this. Therefore we just
;exit back to DOS READY for further processing.
;

```

```

todos LD HL,0 ;exit to DOS
LD A,@exit
RST svc

```

```

;
ctr11 DB 0EDH,39H,rcr ;refresh cycles
RET ;and back after sending out
;

```

```

bmsg DM 10,'XLR8er Booster *ACTIVE* in Filter RAM 12E7H'

```

con't on next page



*We'll be cookin up som'thin  
better'thin turkey for next month.*

```

DM      10,'      Copyright 1989 by Mel Patrick'
DM      10,'FastPlus Master BBS - (604) 594-7398 3/12/24'
DM      13
;
sorry   DM      10,'Sorry, your LOW RAM area is FULL and the'
        DM      10,'XLR8er driver can not be installed.'
        DM      10,13
;
;The next section is the actual driver. It slows down to
;M=1, I=1 on a keyboard access and on exit speeds back
;up to M=0, I=1.
;
mydrv   LD      IX,08FCH      ;KIDATA$ in memory
        LD      A,01010000B   ;slow down the process first
        JR      ctrl         ;before scanning keyboard
cont1   CALL    0987H        ;KISCAN + bypass around patch
        PUSH   AF           ;save reg first
        XOR    A            ;load a with ZERO, max speed
        JR      ctrl         ;and speed it back up
cont2   POP    AF           ;restore AF
        RET                ;and go back with result for now
;
ctrl    DB      0EDH,39H,dctrl ;control to wait states
        OR      A            ;see which section we are using
        JR      NZ,cont1     ;continue if not from keyboard yet
        JR      cont2       ;else we have a keyboard char, speed UP!
;
        END      begin      ;end of program

```

#### Reminder:

All programs in our publication are available on our CN80 disk series which is published every three months. The above assembly language program, assembled and ready to run, will be available on our disk number 11 which will be available in December.

BASIC programs (programs with the /BAS extension) can be typed into BASIC while you are in your system's BASIC MODE, just as they appear in the listings. Be sure you SAVE the typed in listing before you RUN it. The program can then be RUN using your system BASIC. Assembly language programs (programs with the /CMD extension must be assembled which create a machine language program. The DEA (Davids Editor Assembler) is a very good program package for assembling programs of this type.

A helpful hint for those of you who are not comfortable with the edit features of BASIC, use your word processor to type out the BASIC listing, edit it and then save it in ASCII to a file with the name you choose. Then LOAD it in to BASIC, then SAVE it to a file name. It will be saved in the compressed basic format just as if you had used BASIC to enter the listing originally. If a line error needs to be corrected SAVE your listing again using SAVE "filename/bas:n",A <Enter> This will save the file back to ASCII that you can reload into your word processor to do your editing.

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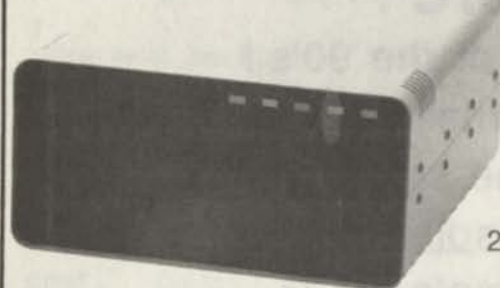
Exp Date \_\_\_\_\_ Signature \_\_\_\_\_

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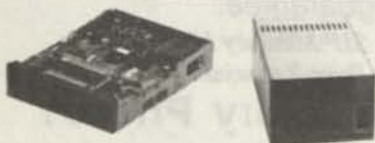
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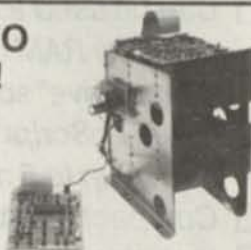
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720K 3.50" TEAC 35F bare drive 80k .....	69	TRS-80 2-drive floppy cable .....
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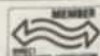


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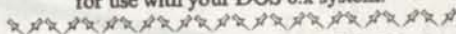
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MARK REED'S MODEL 4 UTILITY DISK is fully supported by the author, and it is available now from *Computer News 80* for only \$14.95, plus \$2.00 for shipping and handling. Order your copy today!



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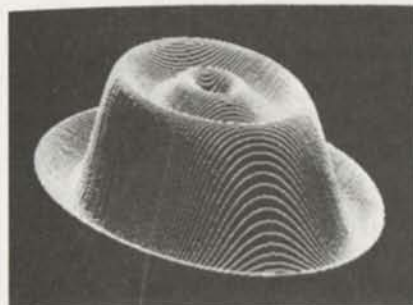
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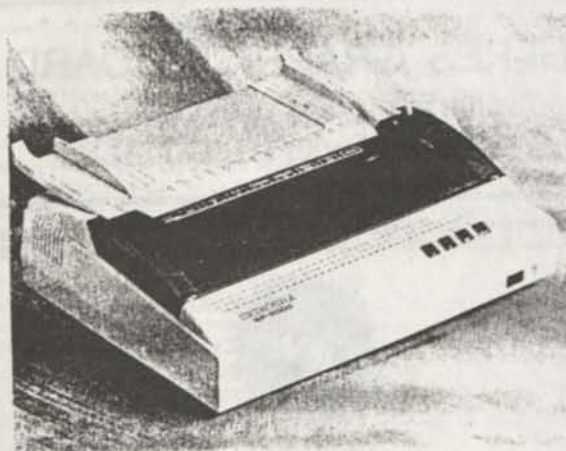
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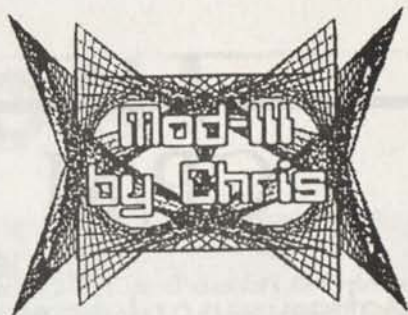
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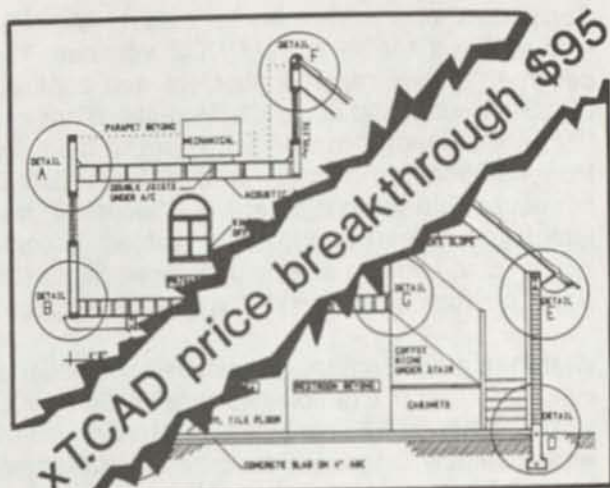
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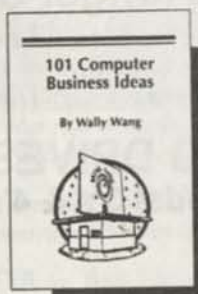
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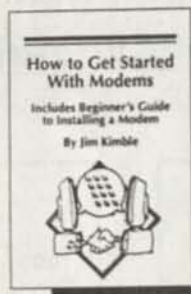
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Wally Wang is the author of numerous books on software and hardware, as well as the Co-Editor of *ComputerEdge*, San Diego's Computer Magazine, where he has a regular column and is a frequent contributor.

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- C048 MODEM V7.6, BYE V7.8: Modem programs with source
- C049 Overflow from disk #C048
- C050 RESOURCE disassembler V7.3; Small FORTH; FINDBAD volume flaw utility
- C051 Overflow from disk #C050
- C052 Full screen editor in C — originally developed for H19
- C053 Overflow from disk #C052
- C054 ZCPR V1.6: A Z80 replacement for the CP/M CCP (SQ)
- C055 Overflow from disk #C054
- C056 Benchmarks in C, Fortran, BASIC; Shell sort; CBASIC2 game
- C057 Overflow from disk #C056
- C058 A complete database system in PL/I-80
- C059 Overflow from disk #C058
- C060 In Context Editor in PL/I-80; Typing Tutor in BASIC (both for ADM-31)
- C061 Overflow from disk #C060
- C062 Remote Bulletin Board System in BASIC and ASM
- C063 Overflow from disk #C062
- C064 The FED: CBASIC2 program used by Fed Reserve to test money supply policy
- C065 Overflow from disk #C064
- C066 SYSLIB: A library of over 130 M80 ASM subroutines Vol. 1 of 3
- C067 Overflow from disk #C066
- C068 SYSLIB: A library of over 130 M80 ASM subroutines Vol. 2 of 3
- C069 Overflow from disk #C068
- C070 SYSLIB: A library of over 130 M80 ASM subroutines Vol. 3 of 3
- C071 Overflow from disk #C070
- C072 Disassembler for Z80; Translate Intel 8080 code to Zilog Z80
- C073 Overflow from disk #C072
- C074 68000 cross assembler; Tiny ADA compiler written for Poly-morphic system
- C075 MODEM V7.98: Modem communications program with source
- C076 Overflow from disk #C075
- C077 ZCPR2: Improved CP/M command processor Vol. 1 of 10
- C078 Overflow from disk #C077
- C079 ZCPR2: Improved CP/M command processor Vol. 2 of 10
- C080 Overflow from disk #C079
- C081 ZCPR2: Improved CP/M command processor Vol. 3 of 10
- C082 Overflow from disk #C081
- C083 ZCPR2: Improved CP/M command processor Vol. 4 of 10
- C084 Overflow from disk #C083
- C085 ZCPR2: Improved CP/M command processor Vol. 5 of 10
- C086 Overflow from disk #C085
- C087 ZCPR2: Improved CP/M command processor Vol. 6 of 10
- C088 Overflow from disk #C087
- C089 ZCPR2: Improved CP/M command processor Vol. 7 of 10
- C090 Overflow from disk #C089
- C091 ZCPR2: Improved CP/M command processor Vol. 8 of 10
- C092 Overflow from disk #C091
- C093 ZCPR2: Improved CP/M command processor Vol. 9 of 10
- C094 ZCPR2: Improved CP/M command processor Vol. 10 of 10
- C095 ZCPR2 Update disk
- C096 Overflow from disk #C095
- C097 Simple word processor program in ASM with doc & source
- C098 Overflow from disk #C097
- C099 A demonstration system for dBASE II
- C100 Hard vol. backup programs (may be hardware-specific)
- C101 Remote Bulletin Board System in BASIC (SQ)
- C102 Overflow from disk #C101
- C103 KERMIT: Modem communications for CP/M to mainframe, source in C
- C104 Overflow from disk #C103
- C105 PISTOL: Portably Implemented Stack Oriented Language similar to FORTH
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- C109 LU, LDIR, LRUN: Library filing and utility system for LBR files
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- C111 ZCPR2 Upgrades Vol. 1 of 2
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- C113 ZCPR2 Upgrades Vol. 2 of 2
- C114 Overflow from disk #C113
- C115 ROFF4 V1.50: A text formatting package in C
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- C117 Utilities: Communications program with XMODEM protocol; DIR sort & pack
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- C119 Mini Bulletin Board System in BASIC (SQ) from Australia
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- C125 Software Tools of Australia Vol. 17 - Programs in C, BAS, ASM
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- C127 California Energy Commission Building Energy Design Analysis Vol. 1 of 2
- C128 Overflow from disk #C127
- C129 California Energy Commission Building Energy Design Analysis Vol. 2 of 2
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- C131 68000 Cross Assembler from Dr. Dobbs Journal 6800 Cross Assembler
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- C133 BASIC games extracted from Software Tools of Australia
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- C143 FORTH-83: Editor, assembler, & documentation
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- C145 Atlanta Database User Group: Member records & banking systems
- C146 Overflow from disk #C145
- C147 Utilities: Extended ERASE; Cross ref from .PRN files (LBR)
- C148 Overflow from disk #C147
- C149 Compilers: Concurrent Pascal-S; PL/0 — written in Pascal (not Turbo)
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- C151 CBASIC Users Group: Assorted programs in CBASIC
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- C153 Regular Expression Compiler (REC) in ASM Vol. 1 of 4
- C154 Overflow from disk #C153
- C155 Regular Expression Compiler (REC) in ASM Vol. 2 of 4
- C156 Overflow from disk #C155
- C157 Regular Expression Compiler (REC) in ASM Vol. 3 of 4
- C158 Overflow from disk #C157
- C159 Regular Expression Compiler (REC) in ASM Vol. 4 of 4
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- C161 8080 to 8086 conversion utilities
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- C163 A/R template for SuperCalc; Bulk ERASE of .BAK, .HEX, etc.
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- C165 Programs for BDS C: Functions in ASM, Bulletin Board, CRT I/O (LBR)
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- C167 C programs: File archiver; Brace matcher; Calls for Aztec C; More (LBR)
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- C169 Utilities: Forth to CP/M screen - file xfer; Synonyms for COM files (LBR)
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- C171 ZCPR3: Z80 replacement for CP/M command processor Vol. 1 of 9
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- C179 ZCPR3: Z80 repl. for CP/M command processor Vol. 5 of 9
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- C181 ZCPR3: Z80 repl. for CP/M command processor Vol. 6 of 9
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- C184 Overflow from disk #C183
- C185 ZCPR3: Z80 repl. for CP/M command processor Vol. 8 of 9
- C186 Overflow from disk #C185
- C187 ZCPR3: Z80 repl. for CP/M command processor Vol. 9 of 9
- C188 Utilities: Paged file list; MX80; Passwords; Z80 debugger (LBR)
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- C347 Utilities: String replacement in file; Turbo Pascal cross reference (LBR)
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- C350 Another comprehensive Help system (LBR)
- C351 Utilities: MX-80 setup; Gothic letter banner; Word\* PS on Prowriter (LBR)
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- C354 MODEM7 version 4: Program, source code, & utilities

### Monte's SELECT Disk #C900: Essential CP/M Utilities

This is a collection of utilities that Monte feels no CP/M user should be without. Each of these programs has been unsqueezed, de-librariated, and installed as needed to be usable on your system immediately. Source code is included when available. Here's what you get:

**NSWEEP:** Probably the most-used CP/M program ever written, this handy utility will copy, erase, list, squeeze, and unsqueeze files either singly or in groups. You'll need this program for any public domain disk listed in the catalog with (SQ).

**UNERA:** Have you ever typed "ERA ".BAS" when you meant to say "ERA ".BAK"? For those terrifying moments when programs or data disappear right before your eyes you need UNERASE. This program will resurrect the lost file or files with the same amount of ease that it took to ERAse them in the first place.

**FINDBAD:** Now you can recycle all those diskettes you were too cheap to throw away. You know, the ones with one or two bad sectors on them. FINDBAD will scan a disk and put all of the bad sectors into a dummy file so that CP/M won't try to use them.

**NULU:** CP/M isn't all that thrifty with disk space when writing small files. NULU solves that problem by collecting a number of small files into a single library file. Many public domain programs are distributed in libraries. Disks that contain libraries are listed in our public domain catalog with (LBR). You'll need NULU to extract the programs so that they may be used.

Monte's Public Domain Prices	Add S/H in US
1 to 10 disk volumes \$ 4.00 ea.	\$ 2.00
11 to 20 disk volumes \$ 3.75 ea.	\$ 2.50
21 to 40 disk volumes \$ 3.50 ea.	\$ 3.50
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FOR SALE: Model 4 w/2 drives & LS-DOS 6.3 - looks & works great. Other goodies: modem, Orch 90 (including synthesizer module), Scripsit, Deskmate, T/Maker, Checkriter, lots of public domain stuff, VisiCalc & more. All this PLUS past 2 1/2 years of CN80! The first \$450 or best offer takes it all. Call Thom at (818)761-1315

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STARTING SUPPORT GROUP FOR MODELS II, 12 ...6000 SERIES & also small Newsletter & BBS (Xenix/Unix oriented, 9600 bps). 1st issue due out in September & FREE. WRITE TO: R. Yves Breton, PO Box 95, Stn Place d'Armes, Montreal, Que., Canada H2Y 3E9

FOR SALE TRS-80 Model 4P, & Model 3. Epson MX-80 Printer & 11 year collection of software, books & magazines for TRS-80 1/3/4. Send a LSASE to: Dennis Barnes, 911 River Rd., E., Traverse City MI 49684

FOR SALE: 1 Copy TRS80 Model 4 TRSDOS & BASIC Interpreter 06.01.02 catalog #26-0313 \$25. R.E. Musser, 547 Normandy Way, Grand Junction, CO 81501; 303-242-5872

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Because of the length of these articles our OPEN FORUM section has suffered from being pushed aside again in this issue. But it will be back in the CN80 January issue as usual.

## HAVE A MERRY TRS-MAS

## EDITORIAL COMMENTS

This issue closes three years of publishing CN80, and opens the way for all the great things that we have planned for 1991 and beyond for years to come. New software is being developed for the TRS-80's even today. Who would have thought that three years after Tandy and all the major publications decided to dump all of us TRS-80 users, that there would be new software being written for us. For those of us who have stuck with these machines the cost of expanding our software library couldn't be better.

Just read Peter Ray's article on the use of the Z-280 and you will get an idea of how bright the future can be for these computers. We already have the super memory expansion available. Interfacing with Laser printers, soft font download capability, and soon we will have new programs such as dos/directory management programs and upgraded music play/write programs for the model 4s and if demand is there for the Model IIIs.

Some of the Model III people have written in saying that we have abandoned coverage of their machines. We have no intention of doing so, but right now the new stuff being developed - and more importantly *written about* seems to have been centered around the Model 4. But again we must point out that everything written about TRSDOS 1.3, NewDos 86, LDOS 5.3 and other DOSs are applicable to the Model 3 user, as well as the Model 4 user (in the 3 Mode). We ask for the Model 3 owners to contribute their experience in the way of articles, programs etc. along with their wish list letters. It all helps guide us in what to cover in CN80.



## TRX-280

### The Next Generation of TRS-80

by Peter Ray (Anitek)

How would you like it if your TRS-80 had the expandability of an IBM XT, yet had more built-in features, ran faster, had more on-board memory, and all without having to make a single modification to your TRS-80 mother board? Sound fantastic? It is actually possible, and may soon even become a reality, with the proposed "Next Generation" replacement mother board, called the "TRX-280". This marvel of modern technology is already in the earlier stages of development as this article is being written.

Anitek Software Products has already begun developing a totally new replacement mother board for the TRS-80 that would empower your Model 4 and 4P to new levels of performance that were only before dreamed about by TRS-80 enthusiasts, like yourself. Our design criteria for the TRX-280 were simple. First, design a mother board the same size and dimensions of the TRS-80 mother board that would already have built into it most, if not all, the features that could, up until now, only be added to a TRS-80 by purchasing and installing a full compliment of the currently available modification kits. Second, design into the TRX-280 mother board many features that are not currently available to TRS-80 users even as modification kits - features that the original TRS-80 designers should have designed into it in the first place, but didn't - features like on-screen underlining, bold and italic which is a most needed feature in both the word processing and data processing environments. And third, even with all this new power, the TRX-280 had to be designed to continue to be totally TRS-80 compatible so that any programs that now run on a stock TRS-80 Model 4 or 3 will still run on the new TRX-280 mother board (except programs that use the cassette port).

The following is a list of the proposed features that Anitek believes can be designed into the TRX-280 replacement mother board, the size of the TRS-80 mother board, using the state-of-the-art technology that is available today.

1. A Z-280 microprocessor running at 10 MHz (which is equivalent to the speed of a Z-80 running at about 15 MHz).
2. On-board RAM expandable to 4 megabytes (possibly even 16 Meg).
3. Built-in bit-mapped graphics.
4. Built-in clock/calender.
5. Built-in hard drive host adapter.
6. On-screen text underlining.
7. On-screen text bolding.
8. On-screen italics.
9. On-screen expanded text.
10. Ability to display IBM characters, TRS-80 characters, block graphics, bit-mapped graphics, inverse video, bold text, underlined text, italics, expanded characters and normal size characters all on the screen at the same time.
11. A floppy disk controller that is capable of handling 180K, 360K, 720K, 1.2 Meg, and 1.4 Meg floppy drives.
12. Ability to boot directly from a hard drive without the need to first insert a floppy.
13. Ability to boot Model 3 DOSs directly on a 4P without MODELA/III.
14. One, or possibly even two, expansion slots, compatible with the IBM PC 8-bit expansion card architecture.

The on-board expansion slots would make it possible for the user to further expand his system with inexpensive half-size expansion cards currently available for the IBM PC. Some examples might include: hand scanners, modem cards, color monitor cards, mouse cards, and hard drive interface cards, just to name a few.

Sound too good to be true? Admittedly, it sounds fantastic, but it is absolutely possible! Much of the conceptual design work has already been done. In fact, about one year from today it could even be possible for you to purchase one of these new TRX-280 mother boards and have all of these features in your TRS-80.

Parenthetically let me state that even though we are very sure that we could design and build a multi-featured mother board the size and dimensions of the TRS-80 mother board, and even though we are very sure we could design a mother board with all the above features, it is still a little early yet to know for sure whether or not we can do both - i.e. make the mother board the size of TRS-80 mother board and at the

same time give it every one of the new features mentioned above. The physical size of the mother board may impose a limit on the number of new features that we could design into it. However the TRX-280, if produced, will be the size of the TRS-80 mother board (that is a must) and it will have most, if not all, the above-mentioned features - all of the most important features for sure.

Yet, before Anitek Software Products can move from the safe and cozy arena of conceptual design on the TRX-280 project into the financially risky arena of actually developing and manufacturing such an awesome product, it will be necessary to first do a some careful market analysis to determine just how successful a product like the TRX-280 mother board will be in the TRS-80 marketplace. We already know that a mother board could be designed that could have most, if not all, of the features mentioned above, plus possibly even some additional features that were not mentioned. What we don't know is, are there enough people like yourselves who own TRS-80s that would be interested in buying the new TRX-280 mother board to justify to us the huge investment of time and money that it would take to develop and produce it. This is where you can help us out.

We would like to see what kind of interest a proposed product of this type will generate in the TRS-80 marketplace. If the TRX-280 is to become a reality, we will need to have this information early on, before we begin full-scale development. If the TRX-280 mother board were available today, would you buy it for your computer? Why or why not? If it were available a year from now (which is about the earliest it could be ready) would you buy it? Do the features sound interesting to you? Do you feel that some of the proposed features are of more value to you than other features? If so, which features do you rate the highest and which the lowest? Does the fact that you could have virtually every modification known for the TRS-80 built right into the mother board as standard equipment interest you? Would having a TRS-80 that you could plug off-the-self IBM compatible expansion card into interest you? Does a TRS-80 that could out perform an IBM XT interest you?

What other features have you thought would be nice to have built into a TRS-80 that are not mentioned in the above list?

We want your responses. If you have questions or comments regarding the TRX-280 mother board project, we want to hear from you. But we need to have you write your letter to CN 80. The editors have very graciously and enthusiastically agreed let us use this publication as an open forum for sharing ideas and questions regarding the TRX-280. By you sharing your thoughts with the magazine, you will also be giving the other readers the opportunity to see what you are thinking about the "Next Generation", TRX-280 concept. And at the same time, you will have the advantage of seeing what others are saying about this fantastic idea, as well. If any of the letters submitted to CN 80 need our attention for commenting on, the editors will make sure Anitek sees a copy of the letter ahead of time so that our comments can be published along with your letter.

If you are feeling like you can't live another day without one of these TRX-280 mother boards for your computer, or if you just think the concept sounds interesting, please let me strongly encourage you to, in the next day or two, write it down on a piece of paper and send it in to CN 80. And when you read the comments from other readers in next month's issue, if you have anything other ideas you would like to voice, write those down, too, and send them in. Your positive interest and enthusiasm shared in this publication is what it may take to generate in the other readers a strong interest as well. Excitement breeds excitement. Enthusiasm breeds enthusiasm. This way we can get the fires of interest in this "Next Generation" of TRS-80s burning faster and hotter. No comment or question is too small. If you have something you wish to voice about the TRX-280 before we begin development, please send it CN 80. It's going to take all of us to turn the TRX-280 from merely a great possibility into a great reality.

In anticipation of some of the questions that you might already have, I have answered what I feel may be the more obvious questions. Keep in mind though that no one can predict the future with absolute certainty. The answers given below are

based on possibilities and expectations of future events.

Q. How much will the new TRX-280 mother board cost?

A. Probably somewhere between \$700 to \$900 depending on the number of boards that we feel will be purchased. We will have a better idea after we have had the chance to measure the market interest and to tally the advanced orders before we go into the final design stages of production. The price could even be considerably less if a good number of people commit ahead of time to the purchase of the TRX-280 board by placing advanced orders. We are also looking into the possibility of offering an extra discount as an incentive to those who are able to place advanced orders, probably in the form of granting a discount equal to 1/2 the purchaser's advanced down payment. This could bring the price down to as little as \$500 - \$600 for those who are able to put that much down on an advanced order. Under this proposed plan a customer making an advanced payment of 2/3 of the cost of a TRX-280 mother board would get the last 1/3 free. This would be a fantastic way to substantially lower the cost of owning a TRX-280 mother board. But even at the expected normal price of \$700 to \$900, this is really still quite a bargain when you consider that it would cost over twice this amount to buy even half these features as individual modification kits, not to mention the days or weeks it would take you to install each one. By the way, if advanced orders are received with advanced payment but the number of which is not large even to justify the final development and manufacturing of the TRX-280, then the advanced payments would be returned.

Q. Will my other TRS-80 programs still work on the new TRX-280 mother board?

A. Yes. This is our number one most important design objective. We will do everything in our power to ensure that all TRS-80 Model 3/4 software (except programs that access the cassette port) will work as well or better on the new replacement mother board as they do on a stock TRS-80. It is a little early yet to know whether or not any DOS device drivers might require patches to work at the faster CPU speed. If there is any clever

way to design around this in hardware, we will.

Q. Will the bit-mapped graphic circuitry of the TRX-280 be compatible with the Grafyx Solution board.

A. Yes. It is our number two most important design objective to make sure that all your Grafyx Solution programs work as well on the TRX-280 as they do on the TRS-80 mother board.

Q. How soon will the new TRX-280 mother board be ready to buy?

A. Once we begin full-scale development we expect it will only take about 12 months. The sooner we know that the TRX-280 is a product that that TRS-80 marketplace will buy, the sooner we will be able to start the full-scale development phase, and the sooner it will be available for you to purchase.

Q. Will I have to put a heavier power supply in my computer?

A. At this point we feel that it won't be necessary to change the power supply as long as it is in good condition and is not one of the earlier supplies that were small and under powered. Our objective is to design the board in such a way that it will work with the same power supply that you now have.

Q. Can I trade in my old mother board and get a credit toward the purchase of a TRX-280 mother board?

A. We may offer some sort of credit if you wish to trade in your old mother board, but it may only be for about \$25 to \$50. The fact is that the technology will be so much more advanced on the new mother board that there will be only a few components on the old TRS-80 mother board that will be usable on the new TRX-280 boards.

Q. Can I put one of the new TRX-280 mother boards in my Model 3.

A. Yes. Since the Model 3 has basically the same case and mother board housing as the non-gate-array Model 4, as far as we can tell you would be able to put a TRX-280 mother board in a Model 3.

Q. Will technical information be published to explain how to take advantage of all

the new features?

A. Yes. We want you to get the most out of the product as possible, so we will publish what all the port addresses are and what they do, and the memory maps and all hardware technical info we can think of to benefit those who want that type of information.

Q. Will the TRX-280 mother board be available for the Model 4 first, or for the 4P?

A. That all depends on which one of the two versions we get the most advanced orders for before we begin final development.

Q. Will the new mother board be able to run MS-DOS programs?

A. No. We don't feel that there is any need for us (or anyone else) to come up with another IBM clone. If we thought you wanted a computer that could run MS-DOS programs we would have thought that you would have bought an MS-DOS computer. The TRX-280 mother board is for people who love their TRS-80s and don't care to switch over to the MS-DOS world. Yet, at the same time, they see what the MS-DOS machines can do and they long for a way that they could have the same power and performance on there TRS-80.

If you have any other questions, and I am sure you do, please send them into CN 80 as soon as possible so they can get into the next issue.

In closing, let me stress that the outcome of the TRX-280 replacement mother board project is now in the hands of you, the readers. I know you have a great attachment to your TRS-80, or you wouldn't be reading this magazine. We at Anitek also share in this love for what was and is still one of the greatest little computers ever made. But our strong appreciation for the TRS-80 only makes us more keenly aware of its several designed-in limitations and makes us long for the TRS-80 that could be, the TRS-80 that is now possible with the advent of the TRX-280 replacement mother board. But the bottom line is this, we know that we can design and build the TRX-280, but whether this product ever sees the light of day is something that you now have the

opportunity to decide. Are you ready to usher-in the "Next Generation" of power, speed, features, capabilities, and expandability - or are you satisfied with the current generation of TRS-80 just the way it is? Cast your vote of support for the TRX-280 by writing a letter to this publication. And if you are already sold on the idea and would like to place an advanced order to lock-in a lower price for yourself, let us know that too, so we can send you the details on how to place an advanced order. But again, please do so through CN 80 so that all readers can see the degree of interest this new product is generating. I am eager to hear your votes, answer your questions, respond to your comments, and discuss more of the aspects of the "Next Generation" with you again next month.

-Peter Ray (Anitek)

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**MOUSE ON YOUR MODEL 4**  
**(Without an Interface) Part II**  
by David Gobin

I've received numerous complaints that I did not follow my first mouse article with the follow-up in the very next issue, or the one after that. Actually, I had only said that I would cover some things in my -next- article on the mouse, and did not promise to cover it immediately. Finally, I apologize for the technical depth of this article, but due to space constraints, I cannot expect to be able to use the entire issue of CN80 to explain the intricate working of a mouse in a more comprehensible format.

The idea of communicating with a serial mouse may have seemed complicated, because no one seemed to think it could be done. It was probably just one of those things where one simply assumes that such a task to be incredibly complex. Fortunately, Scott McBurney did not think so, and blazed the trail toward using a mouse on a TRS-80, thus sparking my own underlying interest. My contribution to this effort was to improve on the basic driver design, simplify the interfacing process, give it more sophisticated commands, and allow it to work on both a 2-button and a 3-button

serial mouse. Recently I had the opportunity to modify Scott's MDRAW/BAS hires drawing program to use my new mouse driver, and the impressive results of using a mouse in the hires mode are astounding.

Contrary to popular belief, the process of interfacing with the serial mouse is actually quite simple. Problems only arise when you try to write one driver to support both 2- and 3-button mice, since the hardware interfacing could not be more different. But I wrote my driver to support both, and to provide identical results. Thus a program that would use my mouse driver would not have to concern itself with which kind of mouse, and simply follow the interface specifications laid down for the driver.

First of all, the mouse, when connected to the computer's 25-pin serial interface port (9 pins are actually all that are used), is constantly sending information concerning its button and ball movement status. Because it is constantly sending information, it cannot wait for the user to access it before it sends more data. Therefore an internal program must be linked into the interrupt structure of the computer to constantly monitor the various mouse actions, so that an accurate report of a button or ball movement on the X or Y axis can be maintained. Otherwise the mouse would report useless information.

#### SYSTEM INTERFACING

The interface procedure cannot be done through normal channels. The first obvious interfacing choice is to link this control routine through the interrupt task slots, which LDOS and TRSDOS/LS-DOS 6 have 12 (0-11) available. Most tasking routines use the Real Time Clock task interrupt slots. However, because interrupt tasks are not executed during disk input/output, this method must be cast aside. By linking through the keyboard tasker, we may be able to perform the required function, but again, if the type ahead feature is turned off, then we again lose. Also, this avenue becomes unreliable even when type ahead is active, because keyboard interfacing is slowed down tremendously when the disks are accessed, thus also providing unreliable results. The final recourse is to take advantage of the little-documented IMI

(INTERRUPT MODE 1), which the Model III and 4 operate under. This causes a branch to INT 38H anytime a hardware interrupt is detected. As designed, the Model III and 4 permit only 8 interrupt latches (0-7), which are (fortunately for us) designed to work off of the RS-232 interface. These 8 individual latches are activated by setting the desired bit, zero through 7, of port E0H. Active latches are also detected by the computer by reading port E0H. For technical thoroughness, when reading from port E0H, a reset (off) bit indicates that the corresponding latch is active (kind of backwards, I guess).

What we are interested in is forcing an interrupt each time that the mouse is ready to send us some information. If we put on our hard hats and dig through several technical manuals, we will discover that to do this we need to connect ourselves to interrupt latch # 5. By activating this latch (bit 5 of port E0H), this will enable RS-232 receive data interrupts. As stated earlier, when one of these interrupts occur, control is transferred to interrupt vector 38H in the form of placing the address of the program instruction about to be executed onto the stack (so that a return code will then continue normal program execution) and going to the transfer address at address 38H.

TRSDOS/LS-DOS 6 store the vectors for the eight interrupt latches as 8 groups of 2 bytes (an address consists of 2 bytes) starting at memory address 3EH. The address for our routine will have to be placed in slot 5, or at address 48H. Also, we will have to look at the WRINT\$ flag in the FLAG\$ section (flag "W"), set bit 5, and send the new byte value out through port E0H, to enable the desired interrupt.

This sounds complicated, but it is not. As a machine language example, suppose that register HL contained the address for our interrupt latch routine. We could activate it using the following code sequence using DEA:

```
DI                ;turn off ints
LD   (48H),HL    ;set new vector
SVC  101        ;@FLAGS
SET  5,(IY+22)  ;set latch 5
LD   A,(IY+22)  ;get new image
OUT  (0E0H),A   ;set to mask
EI                ;turn ints on
```

Of course, if your installation routine will later be able to remove itself, as my mouse driver does, it would be a good idea to save the original contents of latch 5's vector contents, as well as a copy of the original flag W value.

Model III users will find interrupt latch 5's transfer vector at 420AH. LDOS users will find latch 5's address at 447FH. As you can see, a Model III program must be able to detect where it is operating from. If I recall, TRSDOS 1.3 uses 420AH for latch 5. Since there is no W flag for the Model III, you must remember this, which is identical to the Model 4: Bit 0 is used for the 1500 baud rising edge, bit 1 is used for the 1500 baud falling edge, bit 2 is used for enabling and disabling the real time clock, and bit 4 is used to enable the external I/O bus interrupts. For all practical purposes, you need only to remember bit 2 (a value of 4), in addition to bit 5 (a value of 32). Thus, sending a value of  $32 + 4$ , or 36, should be adequate to activate the interrupt latch and keep all things running smoothly.

#### THE MOUSE INTERFACE

Of course, all this is assuming we already have our routine written. But what does this "routine" consist of? This again can be tricky to describe, but is also quite simple.

We must read the mouse in three separate passes. First for reading the buttons, next for reading the X (left-right) vector, and finally to read the Y (up-down) vector. Basically what this means is that each time the interrupt latch is executed, we must perform a different task. This calls for maintaining a flag which would tell us which pass we are currently on. For example, on entry to our routine (registers AF, BC, DE, HL, IX, and IY are automatically saved previous to entry, so we can be "barbaric" and do whatever we want to the main registers without care), we should pick up our flag to check which state we are going to process. As my mouse driver is designed, a value of zero indicates we are checking for the buttons, 1 if for the X-vector, and 2 if for the Y vector. Once a certain task is completed, the flag is looped to the next task: Buttons to X-vector, X-vector to Y-vector, and Y-vector to Buttons.

#### CHECKING BUTTONS

The check for the buttons is the most important, since we must not process anything until we have detected the value which tells us that we are in fact reading the buttons. We do this by reading a byte from port EBH. This is the RS-232 data register; the stuff the mouse is sending us.

On a 2-button mouse, we check to see if bits 7 and 6 are both set. If they are not, then we are not reading the buttons, and so return to the caller without advancing the procedure flag. If it is, then bit 5 being set tells us that the Left button is pressed, and bit 4 being set indicates that the Right button is pressed. Obviously, if both are set, then both buttons are pressed. Bit zero indicates the X direction. If reset, then we are moving to the right (positive). If set, then we are moving to the left. Bit 3 indicates the Y direction. Reset indicates down (negative), and set indicates up (notice the contradiction between X and Y).

On a 3-button mouse, we check bits 7 through 3. If only bit 7 is set, we are getting the button status. Unlike the 2-button mouse, a 3-button mouse indicates a button press by have a bit reset instead of set. If bit 2 is reset, then the Left button is pressed. If bit 0 is reset, then the Right button is pressed. If bit 1 is reset, then the Middle button is pressed.

Once the button status is read, the procedure flag is updated to 1, so that the next time the latch is executed, we will be checking for the X-Axis value.

The next byte read will represent the number of "Mickies", or units, that the ball within the mouse has moved since it was last read. On a 2-button mouse, this variance is read as rightward if the button status byte (which we had to obviously save to do this) indicated that bit 0 was reset. On the 3-button mouse, we simply have to check bit 7 of the X-axis byte. If set, we are moving left. Reset indicates right. We then apply this value to a stored X value accumulator. If after applying the new value, it exceeds a limit, such as 4095, then the "top" is locked at 4095. If it goes below zero, then we lock it at zero. Once the X value is processed and stored, we set our flag to 2 so that the Y value will be read.

When the Y value is read, on a 2-button mouse we check bit 3 of the button status. If reset, we are moving rightward, in a positive direction. On a 3-button mouse, we again check bit 7 of the Y value. If set, we are moving down (negative -- again, notice the difference from that for the 2-button mouse). Once the Y value is applied to the stored Y value and saved, we reset the flag to zero and leave. Thus the cycle continues.

#### TRICKS AND TRAPS

Of course, following this procedure will give you the basic theory of the mouse operation, but it will not provide smooth movement. It took me quite some time, laced with a -lot- of trial and error, before I was finally able to glean smooth movement from the mouse.

I have found that smooth operation comes from fancy coding tricks. For example, I've enhanced the flagging procedure to contain 5 steps instead of 3. Step zero checks the buttons. Step 1 checks the X vector. Step 2 checks the Y vector. Step 3 checks the X vector again, but first checks to see if the button status is present. If so, then the button check, step zero is gone to. Step 4 checks the Y vector again, but first checks to see if the button status is present. Again, if so then step zero is gone to. Why do I do this? Because after long hours of hair pulling, I discovered that in most cases, we get a button byte, followed by an X byte, then a Y byte, then another X and Y byte. But once in a while we are fooled by the button status popping up amidst the second volley of X or Y values. Sure, we could go ahead and do the 3 step process, and simply wait for the button status to come after reading the first Y value, but the mouse motion will become wildly unsteady.

Another problem is that the "mickey" report is often erratic. In order to smooth it down, X and Y reports of -zero and 255 are interpreted as no motion at all. Also, by anding a value of 3EH to each report, we can "tame" the value to a more manageable level. I've also found that dividing the result by 2 for Y values smooths the Y motion a lot.

Of course, you can get fancy like I did and perform sensitivity factoring, so that mouse motion can be sped up or down. This was done by taking the value after anding 3EH

to it, and adding a value of 12 to it for the factor count plus 1.

My mouse driver also features scaling, so that the X and Y ranges of zero through 4095 can be scaled to relative ranges, such as 80 x 24 for the standard Model 4 text screen, to 160 x 72 for the lo-res graphics screen, or 640 x 240 for the hires graphics screen, not to mention any other scale you would wish to use.

#### READING THE MOUSE

The final step is reading this information. By picking up the stored button status, you can take advantage of it at the hardware level, and so test the button bits without interpretation for either type of mouse, or apply a translation to meld the results of either mouse to provide the caller with identical results. The X and Y values can be factored either manually by you, or by the driver, as mine does. If you look back to CN80 Volume 3 no. 8 (August 1990) to my first article, you will see how you can interface with my driver. It features the ability to set up for either a 2- or 3-button mouse, install itself into high memory, remove itself if desired, report its current status, allows you to change its status, assign factoring and even sensitivity, either from the DOS Level or by using SVC 120, the @MOUSE interface. This mouse driver is available from CN80 for only \$5, and includes a couple of sample programs, along with the source code for the samples, fully commented. Of course you also get the MOUSE/CMD driver.

#### BASIC INTERFACING

If you would like to use the mouse interface from Model 4 BASIC, you will need the BASIC that came with LS-DOS 6.3.0 or 6.3.1. This is because we will be using the SVC interfacing function : USR11.

To begin with, in your program you must create an integer array to store or register values in. This can be accomplished with the command DIM SVC%(5). In element zero you store the SVC number. In our case this is always 120. Thus SVC%(0)=120 accomplishes this task. Element 1 contains the desired HL value, if needed. Element 2 holds any value for DE. Element 3 holds BC. Elements 4 and 5, for IX and IY, are not needed, but must be included in the DIM statement, or we will have program accidents. The only tricky



part here is in the part of the registers B and C, because they are used separately. The value for B must be multiplied by 256. If a C value is required, it must be added to this. This also extends to AF, the Accumulator and Flag register, but this is only upon return to the caller. Lets do some examples.

As a first example, we should ensure that the @MOUSE interface is present. We can do this by trying to read the mouse status, thus:

```
SVC%(0)=120 'set SVC to 120
SVC%(3)=1*256'set B to 1
A=USR11(VARPTR(SVC%(0)))
A=SVC%(0)\256 'get A value
IF SVC%(0) AND 64 GOTO error
```

In the above example, the routine "error" will be gone to if the result of anding 64 to the value stored in SVC%(0) is non-zero. What we have just done is test the computer's internal Z/NZ (Zero/Non-Zero) flag. Non-Zero indicates an error. Of course, you should replace "error" with an appropriate line number which will handle the error, such as printing a message stating that the mouse driver is not present.

Enhancement of this example: Function 1 returns the current mouse status and the X/Y offsets. The BASIC program lines to accomplish this are:

```
SVC%(0)=120 'set SVC to 120
SVC%(3)=1*256'set B to 1
A=USR11(VARPTR(SVC%(0)))
A=SVC%(0)\256 'get A value
X=SVC%(1) 'get X value
Y=SVC%(2) 'get Y value
```

In this example, we have executed @MOUSE function 1. On return, variable A contains the button status, variable X holds the X offset, and variable Y contains the Y offset. To check buttons is easy.

If you AND variable A with 7 and the result is 7, then no buttons are pressed. If you and A with 0 and get zero, then the right button is set. If A anded with 2 is zero, then the middle button is pressed (or both buttons on a 2-button mouse). If A anded with 4 is zero, then the left button is pressed.

Now lets do a more involved example. Suppose we want to set up the screen for text mode 80 x 24, and place the mouse pointer in the center of the screen. We would do this by first setting HL (X) to 80, and DE (Y) to 24 using function 4. Since we also need to set C to the sensitivity factor, lets set it at 0, for normal motion.

```
'FIRST SET XSIZE/YSIZE
SVC%(0)=120 'set SVC number
SVC%(1)=80 'set XSIZE
SVC%(2)=24 'set YSIZE
SVC%(3)=4*256+0
A=USR11(VARPTR(SVC%(0)))
'NOW SET LOCATION
SVC%(0)=120 'set SVC number
SVC%(1)=80\2'set to middle of screen
SVC%(2)=24\2
SVC%(3)=2*256
A=USR11(VARPTR(SVC%(0)))
```

And there you have it.

By the way, in case you are wondering, you will have to control the "visibility" of the mouse pointer on the screen. Of course, you will want the mouse pointer to be non-destructive if you are just moving it around the screen. You can use USR11 to save the current character at the pointed position by using function 1 of the @VDCTL (15) SVC. Suppose we wanted to use rocket ship character (255) as the pointer? Also, we have the current character at the last X/Y position stored in variable C, and the old X and Y values stored in variables X and Y. We could update the non-destructive cursor by placing the old character back into its old position, and pointing to the new position, storing the character that was there, and place our mouse pointer there. This of course loops until a certain action, such as a button press, for example, causes another action. For that reason, let's save the button status to variable B.



\*\*\*\*\*

'Restore Old Char

\*\*\*\*\*

SVC%(0)=15  
SVC%(1)=X\*256+Y  
SVC%(3)=2\*256+C  
A=USR11(VARPTR(SVC%(0)))

\*\*\*\*\*

'Get New Mouse Position

\*\*\*\*\*

SVC%(0)=120  
SVC%(3)=1\*256  
A=USR11(VARPTR(SVC%(0)))  
B=SVC%(0)\256  
X=SVC%(1)  
Y=SVC%(2)

\*\*\*\*\*

'Get Character There

\*\*\*\*\*

SVC%(0)=15  
SVC%(1)=X\*256+Y  
A=USR11(VARPTR(SVC%(0)))  
C=SVC%(0)\256

\*\*\*\*\*

'Put Mouse POINTER

\*\*\*\*\*

SVC%(0)=15  
SVC%(1)=X\*256+Y  
SVC%(3)=2\*256+255  
A=USR11(VARPTR(SVC%(0)))

As always, this only looks tricky, but is actually quite simple.

### CONCLUSION

You now have more than enough ammunition to take full advantage of the serial mouse, either by your own constructed from the information provided in this article, or the @MOUSE interface provided on the CN80 MOUSE Driver. If you have trouble interfacing with the @MOUSE driver, or are having technical problems in developing your own, drop me a line in care of CN80 and I will help you as best I can. Due to lack of interest on the Model III reader's part, I have not yet developed a Model III version. I will write it if this attitude changes.

Happy Mousing!

-David Goblen

## ANNOUNCING TWO NEW BOOKS BY CHRIS

Z-80 TUTOR II Toolbox, 33 pages.

Z-80 TUTOR III Applications, 37 pages.

These two new books combined with Z-80 Tutor I and Z-80 Tutor X make a complete four volume set. A must for any Assembly Language user. (See ad section for details.)

### ASSEMBLY LANGUAGE TUTOR Part 23 by Christopher Fara (Microdex Corporation)

#### Programmer's Toolbox

Many "chores" in programming are so common that we'd often wish for more instructions like LDIR to do a job in "one shot". Unfortunately there aren't many like that, so we gradually accumulate our own mini-procedures to substitute for non-existent instructions. For example CP compares one byte at a time. Wouldn't it be nice to have an instruction to compare strings of any length? A substitute for such "eXtended CP" could be called XCP. On ENTRY

HL=> first string

DE=> second string

BC = length to compare (1 or more)

XCP:	LD	A,(DE)	;2nd string
	CP	(HL)	;match 1st?
	RET	NZ	;no, quit
	LDI		;next
	JP	PE,XCP	;more?
	RET		;all match

-----  
This is an interesting "creative" use of the LDI instruction. If there is a match then LDI automatically does three things for us: increments HL and DE to point to the next character, and decrements the counter BC. It also "loads" the byte from first string into the corresponding byte of second string. But this doesn't bother us. We just compared these bytes and they were identical, so the "load" won't change anything. The loop stops when the first mismatch is found, or after all characters are successfully matched. On return inspect Carry and Zero flags:

C and NZ: 2nd string is "smaller".

NC and NZ: 2nd string is "greater".

NC and Z: strings are "equal".

Note that the length to compare must not be zero. Otherwise on the first pass BC could be decremented to -1 (same bit pattern as 65535) and the loop might run wild past the length of strings. If there is a possibility of "null" length, then before calling XCP check the length, for example:

```

;-----
LD      A,B      ;high byte
OR      C        ;both zero?
CALL   NZ,XCP   ;no, else...
;-----

```

If the length turns out to be zero, then the call is skipped and program continues. Since OR always resets Carry and Z-flag is now set, the program gets the same flags as in an "equal" comparison, even though XCP was skipped. This is correct, because "null" strings are obviously equal.

Or take for example EX which handles 2 bytes at a time. How about exchanging any number of bytes in non-overlapping blocks of memory? Call this XEX (eXtended EXchange). On ENTRY

```

HL=> begin 1st block
DE=> begin 2nd block
BC = size to exchange (1 or more)
;-----

```

```

XEX:  LD      A,(DE) ;2nd block
      LDI     ;1st to 2nd
      DEC    HL      ;back off 1st
      LD     (HL),A ;2nd to 1st
      INC    HL      ;adjust HL
      JP     PE,XEX
      RET
;-----

```

A character from 2nd block is temporarily held in register A, the LDI instruction makes a copy from 1st block to 2nd, increments HL and DE, and decrements BC. Since now HL already points to a next byte, we must DECrement it before we put into 1st block the byte saved in A, and then INCrement again to continue the loop.

Another typical job is to fill a block of bytes in memory with some "filler" character, such as "blank" or "zero" or whatever. On ENTRY

```

DE=> start of fill area
BC = size to fill (1 or more)
A = filler character
;-----

```

```

;-----
FILLS: PUSH    DE      ;start
          POP    HL      ;HL=start
          LD     (HL),A ;fill 1st
          INC    DE      ;point 2nd
          DEC    BC      ;count down
          LD     A,B
          OR     C        ;zero?
          RET    Z        ;done,else
          LDIR   ;propagate
          RET
;-----

```

Insert filler in the first slot, increment DE to point to the next slot, and decrement the counter. Now test if any more remain and return if only one filler was needed (in which case BC=0 now). Otherwise LDIR to "propagate" the filler from first slot to second, from second to third, and so on throughout the rest of the fill area.

A reverse task is to "strip" some filler characters from the "tail-end" of a block in memory. A typical application is to strip excess blanks from the end of a string. On ENTRY

```

HL=> begin of block
BC = size of block
A = character to strip
;-----

```

```

STRIP: PUSH    HL      ;save begin
          ADD    HL,BC  ;add size
STRIP2: DEC    HL      ;back down
          EX     AF,AF' ;save A
          LD     A,B
          OR     C        ;null?
          JR     Z,STRIP4 ;yes, done
          EX     AF,AF' ;restore A
          CP     (HL)    ;strip it?
          JR     NZ,STRIP4 ;no, done
          DEC    BC      ;count down
          JR     STRIP2  ;more
STRIP4: POP    HL      ;get begin
          RET
;-----

```

After adding size to the beginning address of the block the pair HL points to the address one byte above the last byte of block, so DECrement it to point to the end byte. Save the test character, check if size of block at this point might be zero and if so then quit. Else get the test character and compare with the end byte of the block. If different then we're done. Otherwise DECrement the size of block and go see if there is more. On return HL again points to the beginning of the block, and BC has its remaining length

(BC=0 if nothing remains). Also Z-flag is set Z if nothing remains, otherwise it's NZ. Of course the "stripped" tail-end of the block does not disappear from memory, but we now know the size of its "valid" front part.

But why not use CPD here? It would seem natural. Maybe, but our approach has two advantages: it prevents errors if we have a "null string" to begin with, and on return Zero flag conveniently tells us if the remaining string has any characters left at all.

The same idea could be used to strip "leading" blanks, etc. One ENTRY

HL=> begin of block  
BC = size of block  
A = character to strip

```

-----
STRIP1:  EX    AF,AF' ;save A
         LD    A,B
         OR    C      ;BC=0 ?
         RET   Z      ;yes, else
         EX    AF,AF' ;restore A
         CP    (HL)   ;strip it?
         RET   NZ     ;no, done
         DEC   BC     ;count down
         INC   HL     ;next byte
         JR    STRIP1 ;more
-----

```

Again, on return HL points to the first valid character, BC=length remaining, and Z-flag is set Z if nothing remains.

Sometimes we don't want to "strip" but only "skip" some characters before displaying a string. For example to skip leading zeros in a string of digits terminated by "carriage return" byte 13:

HL=> beginning of string

```

-----
SKIPS:  LD    A,(HL) ;character
         CP    13    ;terminator?
         JR    Z,SKIP2 ;yes, else
         CP    '0'   ;skip it?
         RET   NZ     ;no, not '0'
         INC   HL     ;else next
         JR    SKIPS
SKIP2:  DEC   HL     ;back off
         RET
-----

```

On return HL points to the remaining portion of the string, ready for display. If there were only zeros then we hit the terminator and back off to display at least

one zero. Or modify that to skip leading blanks, etc.

Often we need to know if a byte is within certain range of ASCII codes. For example to see if it's a digit:

```

-----
RANGE:  CP'0'      ;is it >= 0?
         RET   C      ;no, else
         CP    '9'+1 ;is it <= 9?
         CCF      ;flip carry
         RET
-----

```

If the byte in register A is '0' or greater then maybe it's a digit and we check if it's greater than '9' (compare it with the next higher character). If it's greater then Carry is reset, so we "complement" it. Thus in any case on return Carry is set C if the byte is out of range, and reset NC if within range. To test for upper case alpha characters we would first compare with 'A' and then with 'Z'+1 and so on.

Finally a challenge for the Holidays: the first bona-fide student of our tutorials (no seasoned experts, please) who correctly provides a brief description of the logic and missing comments for the following monster, will receive from "Computer News 80" a free copy of any one book by Christopher Fara. This procedure converts a string of decimal ASCII digits into "fixed point" format. Excess decimal places are chopped off and missing decimal places are "padded" with '0's. On return B=length of "fixed" string. If the "fixed" length should run over 255 bytes (why can that happen?) then on return B=0 and Zero flag is set Z. What happens if on entry B=0 ("null" string)? If no decimal places are desired, the procedure is called with A=0 and returns an "integer" string without decimal point. On ENTRY:

HL=> string  
B = length of string (0-255)  
A = number of decimal places

(Ed. Note:) So that the contest program would not be broken by the end of the page we have placed the complete listing on the following page. Good Luck.)



```

;-----
DEXFIX: PUSH  HL
        OR    A
        EX    AF,AF'
        LD    C,B
        LD    B,0
        INC   C
DEXFI1: DEC   C
        JR    Z,DEXFI4
        LD    A,(HL)
        CALL  RANGE
        JR    C,DEXFI2
        INC   B
        INC   HL
        JR    DEXFI1
DEXFI2: CP    '.'
        JR    NZ,DEXFI4
        EX    AF,AF'
        JR    Z,DEXFI8
        EX    AF,AF'
DEXFI3: INC   B
        INC   HL
        DEC   C
        JR    Z,DEXFI6
        LD    A,(HL)
        CALL  RANGE
        JR    C,DEXFI6
        EX    AF,AF'
        JR    Z,DEXFI8
        DEC   A
        EX    AF,AF'
        JR    DEXFI3
DEXFI4: EX    AF,AF'
        JR    Z,DEXFI8
        EX    AF,AF'
        LD    (HL),'.'
DEXFI5: INC   B
        JR    Z,DEXFI9
        INC   HL
DEXFI6: EX    AF,AF'
        JR    Z,DEXFI8
DEXFI7: DEC   A
        EX    AF,AF'
        LD    (HL),'0'
        JR    DEXFI5
DEXFI8: OR    B
        JR    NZ,DEXFI9
        INC   A
        JR    DEXFI7
DEXFI9: LD    (HL),13
        POP   HL
        RET
;-----

```

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## WHAT IS IT? "How To Identify A TRS-80 Model I Microcomputer" Part One

by Arthur N. McAninch, Jr.

One day the phone rang, and the voice of a stranger told me he had a Radio Shack Model III computer he needed help with. After getting his name and address, I gathered up a box of diskettes for the Model III, and hopped in the car for the short trip to his home. Upon arriving, he showed me into a small den where a strange assortment of grey boxes with dangling cords resided on a card table. It was quite obvious that this was not a Model III. What the gentleman had was a Model I keyboard, a Model I monitor, a Micro Mint Expansion Interface, an MTI disk drive, and a Model III Disk Owner's Manual! Fortunately, he also had a diskette copy of TRSDOS 2.2, so I had him up and running in short order with his Model I! This fellow had assumed that the manual must be the right one, and since the Model I does not have a model number anywhere on it, he was certain that he had a Model III. I only needed to show him the pictures in his manual for him to discern that there was an obvious difference between the manual and the actual computer he had.

More recently, I received a long distance call from a fellow who had purchased a TRS-80 keyboard, monitor, and an expansion interface at a Ham Trade Fest. He was unable to get it to do anything with the disk drive. A fellow ham had a Model III, and had kindly brought over a TRSDOS 1.3 disk to try out. Naturally, the TRSDOS 1.3 would not boot up at all. After sending him a copy of TRSDOS 2.3, a Model I TRSDOS and DOS BASIC Manual, he called again saying it would not work. It turned out that he had a bad power transformer for the expansion interface. Yet another phone call was from a similar case who had one too many power transformers, and didn't know where to plug the third one in!

Well, let's get some basics out of the way. So you fell heir to a Radio Shack computer, and you don't know how to turn it on? The first thing to do is to attempt to identify what type it is, then figure out how to connect all the wires, and then how to turn it on. Next, you will want to make it "do something." In later articles, we will help you identify just what modifications your

computer has or does not have, several modifications you can make, Double Density, and differences between different DOS's, as well as detailed instructions to get the most out of TRSDOS 2.3.

If you have several grey boxes with a number of wires and cables, and each grey box says "Radio Shack TRS-80 .....", chances are good that you have a Model I. Don't jump to conclusions if you have never seen one before. It could be a Model III, a Model II, or an early COCO I. Now, if each separate unit weighs about 100 pounds, is as big as a filing cabinet, and you get a hernia each time you look at it, chances are pretty good that you have a Model II. If so, it will probably say "Radio Shack TRS-80 Model II Microcomputer" on the front of the main unit. This article will not deal with the II/12/16/6000 family of computers. If the keyboard, monitor, and disk drives (or at least designated space for disk drives) are all contained in one grey case, then you probably have a Model III. The name plate should say "Radio Shack TRS-80 Model III Microcomputer." If the case is white, then this is probably a Model 4 or 4D, and the name plate says, "Radio Shack TRS-80 Model 4 Microcomputer" or "Tandy TRS-80 Model 4D Microcomputer System." If the screen is about 5" wide and there is a slot under the screen where the keyboard can be stored, and there is a cover to go over the screen and the disk drives, then you probably have a Model 4P. This article will not deal with the III or the 4, nor will we discuss the COCO I/II/III.

If one of the boxes says "Radio Shack TRS-80 Expansion Interface", then you may conclude that this is a Model I Interface. Hopefully, the keyboard and the monitor are for the Model I, also. If the monitor says "Radio Shack TRS-80 Video Display", then it is for the Model I as well. If it looks like an old RCA black and white TV set in a grey case without a channel selector, that is exactly what it is.

There should be a grey cable coming out of the front of the monitor with a male 5 pin "din plug" on the end of it.

Let's take a look at the monitor. On the back of the monitor you should find a manufacturer's plate that indicates it was

made in Taiwan. This plate is usually white and not like the ones on the keyboard and E/I. There should be a catalog number 26-1201 stamped on it. Just like everything else with the Model I, don't be too surprised to find this plate missing and several strange modifications. I have one monitor in which someone installed an internal audio amplifier with a loud speaker to provide sound from the cassette jack of the keyboard. I saw another one that had been used on the Radio Shack assembly line as a test bed that had provision to function as a monitor to test Model III chassis! Basically though, the monitor should be in a grey case and is, in reality, a modified old RCA black and white TV set.

On the bottom of the expansion interface you should find a manufacturer's name plate. If so, look at the Catalog Number and the serial number. Write both of these numbers down. The catalog numbers for E/I's manufactured by Radio Shack were 26-1040, 26-1041, and 26-1042. All three are basically the same with the distinction of the amount of RAM memory that was factory installed. If you don't have an Expansion Interface (E/I), then you will not be able to operate disk drives. You will be limited to programs that you type in or load from cassette tape. Ignore all mentions of the E/I.

Now look at the keyboard. If it says "Radio Shack TRS-80 Microcomputer System" just above the top row of numeral keys, and on the right end of the keyboard is a separate set of numeral keys, then you probably have a Model I computer with a decimal keypad. If the keyboard says on the right end within a rectangular block about 2 by 3 inches, "Radio Shack TRS-80 Micro Computer System", then you probably have a Model I without the decimal keypad.

Next, turn the keyboard over and look for the manufacturer's name plate with serial number. Here you will find the deciding factor. If you have a Model I, you will find one of these catalog numbers: 26-1003, 26-1004, or 26-1006. Write this number down, and while you are at it, write down the serial number. Note also any suffix after the catalog number such as 26-1006D. This will be helpful later when you talk to some knowledgeable person. Don't be

alarmed if the catalog number is something like 26-10040-1, as this is a 26-1004 with a later modification. It is possible you may have stumbled upon a keyboard with no manufacturer's name plate. This is either a stolen computer or it may very well be one of Tandy's own for internal use that was finally released when they totally dropped support of the Model I. You should look to see if there is evidence of scratches where a name plate may have been scratched off. I have several of these without name plates myself, but all of the ones I have were used internally by Radio Shack in their production testing, Quality Control, Engineering, or Executive divisions, and were never intended for sale.

The catalog numbers will indicate what configuration it had when the keyboard left the factory. The original Model I had only a keyboard unit and a monitor. The keyboard had only a Level I ROM, only 4k of RAM memory, no decimal keypad, and UPPER CASE letters only. Most -- but certainly not all -- keyboard units still in circulation have had Level II ROM, 16k of RAM, a decimal keypad, and lower case capability installed as upgrades from Radio Shack. Some have had 64k of RAM, and a few have had even a megabyte of RAM installed within the keyboard as individual hardware hackers and a few "after market" companies have marketed their own modifications. Other such modifications have included CP/M adaptors, speed ups, and alternate character sets. I have one with alternate Greek characters as well as a CP/M adaptor, and another with alternate French characters.

All right, you have tentatively identified your find as a Model I keyboard with a monitor. Let's hook them up, turn it on, and see for certain what it can do. First of all, connect the grey cable from the monitor to the keyboard with the din cable. If you orient the keyboard in a manner that you would most conveniently type on it, then the monitor (video display) connector is the center one of the three female din connectors to the right on the back edge of the keyboard. Note that these three connectors are identical! Look very carefully at these three din sockets on the back of the keyboard in good light. You will see that each one is labeled. One is labeled TAPE (the outboard socket), another VIDEO (the one in the middle of

the three), and one POWER (the inboard socket). Next to the POWER socket is a push button labeled "ON". This push button is the Power ON-OFF switch. While looking on the back edge of the keyboard, look down near the other end where you will find the edgcard connector that is called the Expansion Interface Connector. This is where we will connect the cable to the Expansion Interface shortly. Just near the outboard end of this connector and just below it is another push button switch that is not labeled. This is the RESET button. Remember where this is -- you will use it very, very often!

**CAUTION: DO NOT CONNECT THE POWER TRANSFORMER TO THE WRONG PLACE!** If you do, when the smoke clears, you will find that you have done major damage to the circuit board! Now find the power transformer. It is usually black, about 2 1/2 inches by 3 1/2 inches and about 3 inches high with an AC power cord and a grey cord to a din plug. Plug the din plug into the inboard most 5-pin female din jack on the keyboard unit. You may not be immediately aware of a power transformer. The Expansion Interface made by Radio Shack has space within it to mount two such transformers internally in an attempt to make things look a little neater (this is hopeless with a Model II!).

Take a good look at the E/I. If there are three wires hanging out of the back of the E/I, then you probably have two transformers inside. Go ahead and remove the four screws on the top of the E/I for the panel on the right end. This is the panel that covers the transformer compartment. The other panel covers the RS-232 interface compartment. You may want to take a look inside this compartment while you are at it. If you open the RS-232 compartment, just note whether or not there is a circuit board installed there. DO NOT loosen the screws that mount the RS-232 board! As you open the transformer compartment, see if there are two transformers there. If so, one of them should have its din cord plugged in to a din socket within the E/I. This one is to provide power for the E/I. The other transformer should be just sitting there with both its AC line cord and its din cord hanging out the back. If you so desire, you may remove both transformers and let them sit on the

table behind the E/I. This will allow the E/I to run a lot cooler. Heat is one of the big problems with the Radio Shack design. Re-install the panels. If there are little plastic doors covering all the edgcard access ports on the E/I, you should remove them and get rid of them. The openings will allow the E/I to run cooler, as well. The transformer that is NOT connected to the E/I is intended to provide power for the keyboard. Its din cable needs to be connected to the inboard din socket on the keyboard as we said in the previous paragraph. Just as we mentioned before, don't be surprised to find some strange modifications. I ran across one E/I that had a home made transformer circuit board installed in place of the removable transformers. This is an excellent way to replace burned out Radio Shack transformers, but it is not factory original.

A note about burned out transformers. Should one ever fail you, unplug it from the piece of equipment and from the AC wall plug. Then carefully remove the wax or soft plastic covering the screws on the bottom, and remove the screws. If your transformer was not assembled with screws (and most of them were not), then carefully cut the seal around the bottom with an X-Acto knife. Once you open the transformer case, you will see a fuse soldered into the circuit with solder pigtailed. If the fuse is blown, replace it either with a new one just like it or with a fuse holder in which you should install a fuse of like rating as the original. Why they sealed a fuse inside a case, I'll never know.

Now, we need to connect the keyboard to the E/I -- of course, if you don't have an E/I, you can skip this step! You should have a flat, grey, cable about 6 to 8 inches long. It may be very plain or it may have a black box about 2 inches by 3 inches and a half inch thick in the middle of it. If your short cable has the box, this is called a "buffered" cable. Look on the front of your E/I above the port on the front panel that is nearest the left side. If there is a label glued on there that says, "WARNING Use Only With Buffered Expansion Interface Cable", then you MUST use a cable that has the black box in the middle of it. Connect your short cable to the edgcard connector on the back edge of

your keyboard so that the cable naturally comes down towards the table from the connector. The smoothest side of the cable should be up, and the ribbed side down. Then connect the other end of the cable to the left edgcard connector on the front of the E/I.

Next, we need to connect up your disk drive(s). Find a long 34 wire cable that has one edgcard connector on one end and two or more edgcard connectors on the other end. The end with the single connector connects to the E/I at the edgcard connector on the back of the E/I next to the left end. Now, the other end of the cable must be connected to your drives. If you have only one disk drive, It should be connected to the connector closest to the E/I. If you have more than one drive (could have as many as four), there must be one connected to the connector closest to the E/I, and then one connected to the next one out, and so on until all four (or less) are connected. Now, there must be at least ONE of the drives with a "termination resistor" installed, and this drive should be the last one in the chain. The Radio Shack drives will be 26-1160 or 26-1164 (had factory installed termination resistor), 26-1161 (no resistor installed -- at least when they left the factory!), 26-1184 (will probably have a resistor). The Radio Shack drive cable had keys in the connectors that connected to the drives and the drives had little slots cut in their connectors so that you couldn't connect the cable in the wrong way. If your drives are not Radio Shack drives and they don't have the slots in their connectors, you will not be able to connect a Radio Shack cable to them until you remove the little keys in each connector. Do NOT jump to conclusions and immediately remove these keys. Chances are pretty good that all of the stuff you received (if you obtained it all from the same person at the same time) all worked together as they are at one time. Your task is to figure out the puzzle so that it will all work again! If you do have a mixture of Radio Shack and other manufacturers' drives and cables, a general rule of thumb is to look carefully at the cable itself. On one edge there should be a dark stripe that is most often red. For Radio Shack drives, this stripe should be down at the disk drive end. For many of the other makes of drives, the stripe needs to be up. Go ahead and hook the drives up



in the most logical manner you can. If they don't work, you can reverse the drive connectors without doing harm (provided you don't have the keys and slots we mentioned before.

You will need to locate a din cable that has a din plug on one end and three small phone type plugs on the other. Also locate the cassette recorder and its power cable. The din plug connects to the outboard din connector on the keyboard. The larger grey plug should be plugged in to the MIC socket of the cassette recorder. The smaller grey plug goes in the REM socket. The black plug goes to the EAR jack. If you didn't get a cassette tape recorder with this special cable in your "deal," you can obtain one later. Don't worry about not having one at the moment.

Finally, you need to locate all the AC cords and connect them to a power strip that has a built in spike line filter. You may have one of the original Radio Shack power strips that is black. This one has each AC outlet labeled with the one next to the switch designated for the MONITOR, the next one for the E/I, then one for the CPU, and 5 more numbered 5 through 1 for other accessories such as the disk drives, and a cassette tape recorder. This special power strip electronically insures that all the peripherals are turned on before the CPU (keyboard) is turned on.

Well, you are almost ready to turn on the power. Recheck all cables to insure that they are connected properly. **MAKE CERTAIN THAT THERE ARE NO DISKETTES IN ANY OF THE DRIVES!** I say again, NEVER turn on or off a Model I computer with diskettes in any of the drives! There is a momentary pulse of current to each disk drive that is guaranteed to erase whatever happens to be under the disk head at the moment! Please observe this WARNING! O.K., turn on the toggle switches on the back of each disk drive. Push in the orange/red power switch of the monitor, push in the orange/red power switch of the E/I (this power switch is recessed and difficult to push unless you use a pencil), push in the power switch on the back of the keyboard next to the POWER din cable. Now, turn on the master switch on the power strip. If you are fortunate, the little red pilot light

on the keyboard will come on, and in a few moments the screen will light up on the monitor. If you are watching, the little red indicator light on each disk drive will flash on momentarily and normally in sequence; however, if you happen to have a CP/M modification installed, the disk drive lights will all come on together for a few moments and then go out. The screen will be filled with "garbage" unless you have one of the CP/M modifications that interrupts the normal reset sequence (with this one, you will probably see a readable prompt on the screen). If your screen comes on just saying "READY", then you probably have a Level I keyboard, and this one will NOT function with disk drives. Don't dispare, you may have a keyboard that has been modified with both Level I and Level II within. Check to see if there is a small toggle switch on the back lip of the keyboard or a small slide switch on the right end. If so, switch to the other position and try the RESET again. (I have one that was modified by the Tandy engineers for Ed Juge's personal use!). before you attempt to boot a diskette, make this little test first. Hold down the "BREAK" key, while you push the keyboard RESET button (remember, this is the button that is almost impossible to reach on the left end of the back side of the keyboard).

You should see a prompt on the screen such as "MEM SIZE?", or "MEMORY SIZE?" Just press the ENTER key once, and wait a moment. You should see either "RADIO SHACK LEVEL II BASIC" followed by "READY" on the next line, or you may see "R/S L2 BASIC" followed by "READY" on the next line. The second of these presentations indicates the latest ROM BASIC. The first will be an earlier version, but either one is quite fine. Now, type in: P.MEM and press the ENTER key. You should see "?SN ERROR" which stands for "SYNTAX ERROR" if you have Level II, but if you are stuck with Level I, this will tell you how much RAM memory you have. If you do see the ?SN ERROR, then type in: PRINT MEM and press the ENTER key. Write down the number that appears on the screen. 15871 indicates a Level I keyboard with 16k RAM in the keyboard only. 15575 indicates a Level II keyboard with 16k RAM in the keyboard only. 48331 indicates a Level II keyboard with 16k in the keyboard plus an additional 32k in the E/I. You may

have a number around 4000 which would indicate one of the original keyboards with only 4k of RAM. You may have a number near 32000 which would indicate 16k in the keyboard and an additional 16k in the E/I. With aftermarket modifications, you may very well see some different numbers. Whatever number you see, write it down!

If you have a Level II keyboard, and you have at least 32k of RAM memory, you are ready to try booting up a DISK OPERATING SYSTEM (DOS). If you have made it this far, you do have a Model I which should be a very functional and useful computer. Look through the various books, notebooks, and diskettes you received with the computer. You are looking for a diskette that is labeled TRSDOS 2.3. The original factory distribution diskette is a commercially printed label the width of the diskette. The label is black and white, and on the left end of the label says, "Radio Shack TRS-80 Microcomputer System," and on the larger portion at the right says, "TRSDOS TM REV 2.3". Chances are that you can not find an original distribution diskette, but if you have one that says TRSDOS 2.3 handwritten, that will do. Failing this, if you can find a TRSDOS 2.2, or (heaven forbid!) TRSDOS 2.1, these will do for now. It is possible that you have some other Disk Operating System such as, DOSPLUS, LDOS, MULTIDOS, NEWDOS, ZDOS, ULTRADOS, or VTOS (there are a few others, as well). Whatever DOS's you have, protect them! *DO NOT ERASE THESE DISKETTES! DO NOT EVER WRITE TO OR MODIFY A MASTER OR DISTRIBUTION DISKETTE!* Once you do, you can never go back! Most of the software for the Model I is no longer produced. You may possess the ONLY copy in existence! Don't destroy it! Assuming you have found a Distribution Copy or at least a Master Copy of TRSDOS 2.3 (or 2.1 or 2.2), you have your computer all turned on, and you have checked that you have at least 32k RAM, you are ready to boot up with the TRS Disk Operating System. Insert the disk into the drive that is connected closest to the E/I with the disk notch up and the label to your right. You should have a write protect tab on this diskette! Close the door. Now, with your little finger on your left hand press the RESET button and release it. The disk

drive light should come on, the disk drive should whirr, and the screen should change to say:

TRSDOS - DISK OPERATING SYSTEM  
VER 2.3

DOS READY

Next month Part Two of this article will continue with a discussion on DOS 2.3 on your Model I.

Have a great forever.  
-Art McAninch

### A VISIT WITH DAVID GOBEN

by David Goben

#### NEW PROJECTS, SOUND, HIRES, ETC.

A lot of territory will be covered here and in following columns. For article "ammunition", I purchased MC, the "C" language (a MISOSYS product), and version 1.6.x of DoubleDuty. Also, I purchased a pre-assembled external drive kit from MISOSYS for my Model 4, consisting of a 5 1/4" halfheight 360K drive, and a 3 1/2" 720K halfheight microflop drive (these 720K drives are like economical hard disks for budget III and 4 users). These will be covered in detail in the future.

Additionally, you may already know that the Orchestra-90 type music hardware interface can be readily produced through CN80, but the actual driver program is in short supply. To solve this, I am working on a driver that will work on both Model III and Model 4 DOS systems. (If you have already written one, let CN80 know -- and give me a break!). Also, -if- enough interest is generated, I will cover composing your own musical selections in future installments of this column.

Stan sent me a MegaMEM board (ANITEK product) on short loan for detailed evaluation, and to see if I could get my yet to be released new spreadsheet (Business Calculator for eXtended Memory -- BCX) to work with it. I did. I will in the future relate programming examples in using

MegaMEM, as well as HyperMEM, SuperMEM, and the XLR8er.

Some of you have been biting at the bit about the second part of my MOUSE article. Well, so have I. I've had so little time recently, due to having so many other irons in the fire. Well, you will find it in CN80 this month. Because of this, I will cut this column a bit short.

#### MODEL III/4 SOUND

Most of you Model I/III users know that sound is produced by sending data to port 255 (hex FF). Normally this procedure consists of turning on and off bit 0 of port 255 in rapid succession to produce a sound.

This is also true on the Model 4. Like with the Model III, you must connect a sound amplifier to the large gray cassette interface plug. However, also on the Model 4 you can manipulate port 144 (hex 90) to access the internal speaker built into the computer (on the Model 4P, ports 255 and 144 are tied together, so you can use either).

If you have a large collection of Model III machine language games, such as the old STARFIGHTER, ZAXXON, TALKING ADVENTURE, and others, and you are using them from the Model III mode of your Model 4, you might possibly like to convert the programs so that they send the sound out through the Model 4 internal port, rather than through the cassette port. This is actually quite easy to do. Using a file monitor, Super Utility, or another disk/file zapper, you can use them to search through the file for the hex byte sequence D3 FF and change this to D3 90. It's that simple. Of course, if you are not a hacker, it may not be.

Sound is produced by sending a rapid succession of control bytes to the sound port. These control bytes consist of the values 1 and zero. You vary the sound by using two delays inserted in the sound routine. The basic theory is to send a 1 value to the sound port, do a delay, send a zero, do another delay, and then loop for a specified count to establish a duration. By changing either of the delay values, you alter the tone.

#### O=N PATCH PARAMETER

Recently a subscriber saw a patch that I had written in CN80 which used the O=N (OH equals NO) parameter. Since he did not find any documentation in his DOS manual concerning this odd parameter, he refused to use it, and then complained that the patch did not work. Well, the patch WOULD work if he had used the parameter. The O=N parameter tells the patch program not to use the Find line data to first check the information that is already in the file. "O" stands for OPTION. It can only be used with /FIX type files (patch files saved as ASCII data, used in the form: PATCH file USING fixfile).

#### HYPERMEM AND SUPERMEM

Let's conduct an experiment. Included on the Disk Series disk for this quarter is my program HYPERBNK/CMD. This program performs a non-destructive patch to the Model 4 TRSDOS/LS-DOS 6 system (no file changes), and allows the system to recognize up to 30 banks of extended memory, if you have either the HyperMEM or SuperMEM memory enhancements installed in your computer (available from ANITEK). After installing it, you should be able to use such programs as XMEMDISK/DCT on DAVID'S MODEL 4 SYSTEM UTILITIES DISK to make huge RAM disks, and to take advantage of other programs that use extended memory, such as DoubleDuty, SCRIPSIT Pro, Multiplan, VisiCalc, Busy-Calc, and many others.

What I want you to do is test it for me, and find any bugs that might exist that I may have missed. If by chance a bug does exist, please report them to CN80, and I will personally fix them and provide you with a free update. Of course, you should be sure that it is a bug, and you can describe in intricate detail how to reproduce the bug. You will also need to provide a disk containing a program where it fails to work, and so on. Bear in mind that HYPERBNK will not install itself if 1) HyperMEM or SuperMEM are not installed, or 2) if extended banks are already allocated. Please remember (people will try this), HYPERBNK will -not- work with MegaMEM, and will -not- work with the 128K memory expansion (in fact, it will ignore it). Also bear in mind that HYPERBNK interfaces with the @BANK supervisory call, and so only

programs that access extended memory via the @BANK SVC (as they should) can utilize this. If they directly access the hardware, then they may not work, unless you also happen to have installed the sort of memory they expect to work with. Finally, be sure that the DOS disk does not contain any other memory enhancement patches. Installing HYPERBNK is as easy as entering HYPERBNK from the DOS Ready mode.

#### MULTIPLAN

The reason that Multiplan runs so slow (and I mean S-L-O-W -- even with a speed-up board) is because of its variable width column format. Each time the screen shifts, the video screen display must be completely reconstructed, primarily due to the unpredictability of the variable width columns (fixed column formatting, on the other hand, can be computed out in just a few microseconds). This process is made even slower by the fact that Microsoft did not utilize an "internal" screen, which can be directly written to, and once updated, dumped instantly to the video. They instead chose to use the much slower individual character write supervisory call (@DSP). This means that each character "cell" within the 80 x 24 screen (up to 19,200 characters) must be each written individually to the screen. This is one of the primary reasons why Microsoft scrapped Multiplan, not only for the TRS-80, but for the PC's and others -- too many people complained about its slowness. This is also the reason why Busy-Calc (and BCX) do not support variable width columns, and support internal screen updating.

#### NEW FILE CABINET HIRES UTILITIES

I have just submitted a new disk for inclusion in the Model 4 section of The File Cabinet (*File Cabinet Disk Number M4HRZ22*, Model III versions will be written if there is enough interest). It consists of 6 machine language utilities, a documentation file, and several sample hires picture files.

HRFXPRT/CMD is for dot matrix printers. HRLSRPRT/CMD is for both laser and deskjet printers. These two programs will print the hires graphics screen to a printer. You can also optionally load a hires file by following the designated command name with the hires file (the hires files will be

loaded amazingly fast). These two program can automatically detect and load three different hires file types: 1) standard hires files (usually using the extension /HR), 2) crunched hires files (using the extension /CHR), and 3) supercrunched hires files (using the extension /SHR). Crunched hires file are compressed hires files, which take up much less disk space than normal hires files. Supercrunched hires files, a creature of my own personal creation, are even more compact, and take up a lot less disk space than crunched files.

In addition to simply loading and printing hires files, you can also add special effects by including a number of parameters within parenthesis. Option PAUSE will allow the picture to be displayed on the screen, and wait for you to press any key before printing it. Pressing BREAK will abort this command and return you to DOS. Pressing the slash "/" key will cause the image to be "flipped" on printout. Normally whatever is white on the screen will be white on the printout, and whatever is black on the screen will be black on the printout. This command will flip this state for printer output. You can also use the INV parameter to do this. If the printed picture appears "scrunched", you can use the DOUBLE parameter to double the picture's height by printing each line twice. Other special effects parameters can also be used.

The dot matrix program, HRFXPRT/CMD, will print all files "sideways" at 120 dots per inch.

The laser/deskjet printer program, HRLSRPRT/CMD, will print images "sideways" by default, but by including the XAXIS parameter, the image will be printer horizontally (on its X-axis). By default the images will be printed at 75 dots per inch. But by including the RES=nnn parameter, where "nnn" represents 75, 100, 150, or 300, you can changes the dots per inch resolution. For example, using RES=300 will print the image at 300 dots per inch. Other programs included on this disk include HRCLS/CMD, a program that quickly clears the hires screen. HRVIEW/CMD turns on the hires screen, so you can view it. It will wait for you to press any key before returning you to DOS. HRLOAD/CMD will load hires files very quickly, then wait for you to press any key before returning to DOS

(allowing you to view the file on the hires screen). Like with the printing programs, HRLOAD/CMD can automatically detect any of the 3 hires file formats described above. HRSAVE/CMD allows you to save the hires screen to a disk file by following HRSAVE with the desired filename. The file will be saved in standard hires format (you should use a /HR extension for this), unless you include the CRUNCH or SUPER parameters within parenthesis. CRUNCH will cause the file to be saved in crunched format (you should use a /CHR extension for this). SUPER will cause the file to be saved in supercrunched format (you should use a /SHR extension for this). So if you are into high resolution graphics on your Model 4, you should take a look at this disk.

Well, if I don't stop now, the column will be longer than I promised. So let's shut the doors on this month's installment. See you next month. HAPPY COMPUTING!  
-David Goblen

#### UPGRADES - RESULTS OTHERS CAN SEE

-by Douglas Kelley

**MODEL 4 AND ME** In a corner of my little house sits my Model 4. I am about the only one who ever sees it. Many people do see the visible results of its work. Through the years I have generated a variety of reports, analysis, and a whole host of printouts. A few weeks ago I was looking at some reports I had done on a PC, a Vax Minicomputer, and my Model 4. Laying the printouts side by side, I noticed that you can't tell which reports were generated by which computer.

#### UPGRADES--THE RESULTS OTHERS CAN SEE: PRINTERS

Upgrading your printer is one method that produces results that are visible to others. My first printer was a Tandy Line Printer VIII. It served me many years and it now serves as my parents' printer. While my friends were still producing printouts in all upper case text in a 5X7 matrix, I had the

then "state of the art" 9 pin, lower case, true descenders, compressed printing, and graphics. I could have gotten a cheaper less capable printer, but I made this upgrade as part of my first purchase. This was my first upgrade that others could see.

#### DAISY and 24 PIN

Daisy wheel and 24 pin printers provided the next level of "visible" upgrade. The advent of laser printers helped push the prices of the other printers down. It was hard deciding which upgrade path to take or even if I should upgrade at all. My old nine pin was banging away as it always had. Since I had it for doing graphics, I chose a Tandy DWP 520 daisy wheel printer as my next visible upgrade. The carbon ribbon and fully formed characters provided easy reading, high quality paper completed the effect.

#### LASERS

Now that laser printers are becoming more affordable, it is possible to make further visible upgraded. I have enjoyed Computer News 80's article about using laser printers with the Model 4. To laser print, I transfer data to a Vax mini-computer. My article in the September 1990 issue of Computer News 80 describes how to move data from a Model 4 to a Vax computer.

#### JUST THE FAX MA'AM

There's no need to envy those PCs with Fax Cards. Your laser printer can even do double duty receiving and printing faxes using products like Tall Tree Systems' Fax-O-Matic. Fax-O-Matic sits between your Model 4 (or any computer) and your HP (or compatible) laser printer. It receives the fax and directs it to laser printer. It does not interfere with your use of the Model 4. You do not even have to own a computer to use the Fax-O-Matic. An HP (or compatible) laser printer is all you need. If you had a Model 4P you could disconnect it and take it with you at night (for "homework"). This leaves the Fax-O-Matic and your laser printer to collect faxes for you. While your associates are fumbling with their fax paper rolls, you will have your laser quality fax prints. To send faxes, you can get a cheap fax machine. Using this fax for send only (or send-mostly) reduces your fax paper cost. You would need little (if any) fax paper. The portable PC world has send-only (external) fax modems. These are about half

the cost of send/receive (external) fax modems. With the proper driver a Model 4 should be able to use them, since these units connect to the serial port. Here is a project for someone. Write a driver for a popular send-only fax modem. A limited "shareware" version could go into the File Cabinet Collection. Lets say this version can send ASCII text over the fax. The "full" version can send graphics (i.e. Rembrandt, xTcad, ect). Maybe someone could work out a deal with a supplier of a send-only fax modem. Obtain the fax modems (stripped of PC software drivers) at a discount. Provide Model 4 (and Model III) drivers. Sell the "new" products through ads in Computer News 80. Okay you potential entrepreneurs, time to get to work. A send/receive fax modem driver is also an option. This was of interest to a friend of mine. He is putting the idea in the CP/M section of CompuServe to see if there are any takers. Those of you with CompuServe memberships may want to take a look to see if anyone "bites".

#### PLOTTERS

My company uses a variety of Computer Aided Design (CAD) equipment. This range includes sophisticated design stations to "relatively" cheap 2D drafting stations. Few people see the CAD equipment, but many people see the drawings. You can not tell which stations produced which drawings. You can produce many of the same outputs with your Model 4, software (for example xT.CAD), and a quality plotter.

#### MULTIPROCESSING

In the plotting example (above) you can use one Model 4 to control your plotter while you are doing your layouts (or any of your other work) on another Model 4. With a laser (or any printer) you can turn one Model 4 into a print station and use another for interactive task. The print spooling software included with the Model 4 DOS can assist in automating this function. Set up the spooling software, per the instruction in your DOS manual. Load your word processor. Print your cover memo to the spooler. Load your spreadsheet. Print your summary to the spooler. Load your data base. Print your report to the spooler. While these jobs are printing on one model 4, you can start work on your next report on another Model 4. With the Model 4 you

can spool to memory or disk. Extra disk drives or a hard disk will give you more room to spool your larger jobs. Memory expansion will also give you capacity to spool larger print jobs. Model III LDOS also permits print spooling. I believe DOSPLUS also has a print spooler. I do not know about NEWDOS MODEL 4.

#### WORKBENCH

I met a self-employed accountant who has an interesting "multiprocessing" set up. The basement (his office) in the old house he bought has a large workbench. He has five Model 4s (and printers) set up on the workbench. Each is dedicated for a different client. The cost of operating each (paper, disks, and ribbons) is billed to the individual client. He wrote the original accounting program (in basic) on a used Model III. He bought extra Model 4s as he was able to get a good buy. He was able to speed up the basic program by using a utility that permitted the Model 4 to run at 4 mhz (in the Model III mode). Finally, he got a good deal on the Microsoft basic compiler (for Model III). He told me that he would still use the system (even without the speedups) because it was a cheap solution. Since the computers are dedicated, they are NOT holding up the next job. Within reason, it does not matter when they complete the task. His clients only see the computer's monthly printouts.

#### MODEMS

Upgrading your modem is another method that produces results that are visible to others. My first modem was inside a Model 4p. It had a 300 baud speed. Communicating with others is noticeable faster with my current modem. It is a clone of a Hayes 2400 baud modem. I can call our Vax computer at night (when the Vax's work load is light) and the screen response seems to be as fast as an inside line (at 9600 baud) during a daytime full workload session. One department, in my company, uses modems to send specifications for test fixtures to the supplier. They used to send the data via floppy disk either through regular mail or overnight mail. The floppy disk were supposed to be returned for re-use but often they were not. Floppy disks would be sent by overnight mail when there was no hurry. Rush jobs would be sent by regular mail by mistake. Sometimes disks were lost. All these factors increased cost. These cost were also

hard to trace because they were buried in the general mail cost and general office supply cost. Using the modems made the cost of fixtures traceable. The supplier's phone number (and cost) now show up in telephone accounting. There are no floppy disk to return. The files get to their destination immediately, none are lost in the mail. This cost and time savings is a result that their managers can see.

#### SPELL CHECKERS

Spell checker software is another method that produces results that are visible to others. My fingers seem to think that I can type faster than I actually can. Since I have "fumble fingers", I find spell checkers useful for finding typos such as transposed characters. Since most of my "finishing" work is on Vax I use one of its spell checkers. There are a number of products available for the Model 4. Some word processors (i.e. LeScript and Type-it-All) have spell checkers built in. I have friends and family members that use Electric Webster as their spell checker. One person I know even has the Electric Webster grammar checker. I have seen Electric Webster work with Scripsit. I have not seen it work with other brands of word processors.

#### SCRIPTSIT and ELECTRIC WEBSTER

To spell check your document, run your Electric Webster modified version of Scripsit (it is called Escript). Load your documents as you would with Scripsit. To spellcheck and grammar check your document press the <break> key. Type the letter "E" for (Electric Webster) and the name of a temporary file (the manual suggests) kill/tmp. Electric Webster will review your document and highlight words it does not recognize. You are given the usual options of skipping the word, replacing the word (with EW's best guess), editing the word, or you can see the word in context (and correct it) during a later part of the program. The grammar checking portion offers suggestions and alternatives. You may accept or reject these alternatives. When checking is done, Electric Webster will re-load your word processor and your "corrected" document. You may review and edit the document, then save it. In Scripsit you save the document by pressing the <break> key, typing "S", press <spacebar>, type the filename and extension (i.e.

filename/ext) and press <enter>. Then you exit Scripsit pressing the <break> key, typing "END" and pressing <enter>. Remove your Electric Webster temporary file (i.e. kill/tmp). Be careful with spell checkers. It is possible to introduce errors into your document by replacing a correct word (not recognized by the spell checker) with an incorrect word (that is recognized by the spell checker).

#### FILE TRANSFER SOFTWARE

The transfer of data is another method that produces results that are visible to others. My department was sent some data (from an old project that was being resurrected) on a CP/M floppy disk. The old computer was gone so we could not generate a printout. I took the disk with me. Using my Model 4 (and the the Supercross version of Hypercross) I was able to transfer the data to a MS-DOS disk. I took the MS-DOS disk to the PC lab and transferred the data to the Vax computer.

#### THANKS FOR THE DATA

The data was updated and used for a cost estimate for the resurrected project. As a sign of appreciation, one of the people involved brought me a disk call PD Games (public domain) for MS-DOS (he also had a MAC version). I thanked him and said I don't have an MS-DOS computer. This confused him, since I had provided the MS-DOS disk for the project. I explained what I did with Supercross. He let me keep the disk. I reformatted it to Model III. Now it is home for Tankzone 2000 and some of my other favorites. My article in the September 1990 issue of Computer News 80 describes how to move data from a Model 4 using the Supercross version of Hypercross.

#### UPGRADES - - REAL WORLD CONNECTIONS.

Real world applications provide another method that produces results that are visible to others. Alpha Products has previously been mentioned in Computer News 80. Their products can be used for a variety of projects. Some examples include measurements (voltage and temperature), remote control, event timing, Lab experiments, motion control, and others. They even have a card that will decode all standard touch tone signals from a telephone.

## HOW MANY CARDS -- WHICH COMPUTER:

These cards can be used by themselves or up to five cards can be plugged into their A-bus motherboard. Five motherboards can be linked to provide a total capacity of 25 cards. Alpha products has adapters for Model III/4/4p, Model I, Model 100/200, Tandy Color Computer, Commodore 64, Apple II/II+/IIe, IBM PC/XT/AT (or compatible). There is even a serial port adapter if you don't have one of the computers listed above.

## AFFORDABLE

Alpha Products systems are really affordable. The real world products (listed in the various catalogs we use here at work) can cost thousands of dollars. Many of these cards will only work with an AT class computers. Alpha Products has many items under \$100, and More in the \$100 to \$200 range. Their Smart Stepper Controller (at \$299) was the most expensive product I saw. Other companies stepper controller can cost \$499 and up. Further savings are realized in that you can use just any old computer you happen to have around. There is no need to get an AT class computer. This is another cost saving result that others can see. Many of the visible upgrades (mentioned in this article) are also available to users of Model III. You can take advantage of these many upgrades, and you do NOT have to buy a new computer to use them.

*Mentioned in this article is Tall Tree Systems, 2585 E. Bayshore Road, Palo Alto, CA 94303; (415)493-1980. The other products mentioned in this article are frequently seen in articles and Ads in Computer News 80.*

-Douglas Kelly

## LIVING IN A WELL-DEFINED WORLD By David P. Miller

Last issue we demonstrated the use of mathematical formulas to generate graphics in the form of hypocycloids. If you spent much time playing with the possible combinations of radii, you will have seen that large numbers, especially when the smaller divides evenly into the larger, create quite complex and beautiful displays. The same holds true for the demonstration program in this issue. This month we'll investigate another form of cycloid called epicycloids. An epicycloid, like a hypocycloid, is the representation of the path taken by a point on a circular object moving on a surface. However, the surface in this case is the outside of the larger circle rather than the inside. The formulas used to generate an epicycloid are:

$$x=(A+B) \cos (T)-B \cos ((A+B / B) T)$$

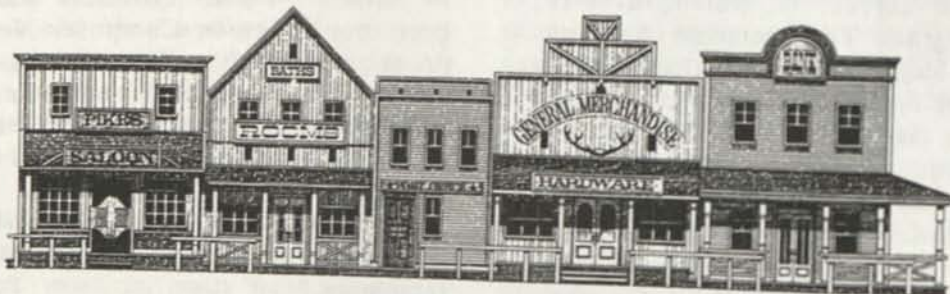
$$y=(A+B) \sin (T)-B \sin ((A+B / B) T)$$

As with last months' program listings, use World Listing Number One for Microlabs' GBASIC, replace lines as noted in World Listing Number Two for Radio Shacks' BASICG. My apologies for the extreme brevity of this month's column; I promise to have more next time, but the concepts of cycloids have already been explained, and you'd probably rather get at the program and see what it does, anyway, wouldn't you? Until next time - enjoy!

-David Miller

## REMINDER

If your label ends with 90/12 this is your last issue. Time to send your renewal payment.





## CURING THE KEYBOARD WOES.

by Fred Oberding

I have seen a number of letters and articles on keyboard repair in back issues of CN-80 and thought it was time I added my two cents worth. I don't really recommend using any kind of liquid cleaner or spray on any keyboard, except possibly the printed circuit board and open switches of the 4P, once it is separated from the frame and plungers. The desktop TRS-80 computers with one exception all use semi sealed keyswitches ..... they will let dirt and dust in, but are reluctant to let it back out. Any liquid will just make a gummy mess inside.

The best preventative measure is to keep the keyboard covered when not in use and vacuum in, around, over and under your computer frequently. Hmm, Radio Shack use to sell a hard plastic cover just to cover the keyboard of a 3 or 4; I wonder where I can get one of them now? Also, buy yourself a small one inch wide paint brush and keep it near the computer to brush off the keyboard occasionally. Keep the outside of the keyboard clean and you won't have any problems with your keyboard. The majority of computers I have seen with keyboard problems were usually operated in a filthy environment. Their key caps were black and so covered in grime that you could hardly read the lettering and you felt you should be using rubber gloves to touch it.

I don't want to offend anyone, but this has been my experience in over ten years of repairing computers. I have also seen old Model III's in pristine condition, as if they had just came out of the packing box, except the key cap lettering was all but worn off from heavy use, yet the keyswitches were in good working order. I do not recommend replacing more than 3 or 4 keyswitches, as you will be replacing more next week or next month . . . replace the complete keyboard now. If the top of the keyboard, under the bezel is filthy with dust balls and cracker crumbs . . . replace the complete keyboard and start using common sense preventative maintenance procedures.

The most important preventative measure I can give you, is never, never get so angry

and frustrated at your computer, that you hit the center of the keyboard with your fist. Situated under the "H" in all Model III's and 4's, is a post, that is molded into the bottom of your computer case to support normal finger pressure and then some. When the keyboard is wacked hard, that post goes straight through the keyboard pc board and you now need a new keyboard. You may think that I have made this story up, but I have seen at least a dozen such keyboards and have gotten half the owners to admit what they did.

Enough of the lecture, lets get on with keyboard repair. The late Model I, Model III, the early 4 and all 4D's used ALPS keyboards, with easily replaceable keyswitches. Mid Model 4's used MAXI keyboards which also used replaceable keyswitches, but slightly different then the ALPS. How do I tell which keyboard I have, simple, its silk screened on the keyboard pc board. Late Model 4's and all the 3 to 4 Upgrade Kits used a one piece membrane keyboard with attached bezel and cable assembly, which is a throw away with no replaceable parts.

The late Model I and early Model III ALPS use a 2-pin keyswitch, where the late Model III, early 4 and 4D ALPS use a 4-pin keyswitch, as well as does the MAXI keyboard, although it has a different spacing for the pins and is not interchangeable with the ALPS keyswitches.

So much for history. I stated earlier that replacing the keyswitches on these keyboards was easy . . . well, I lied a little. The ones located around the perimeter of the keyboard are easy, but they get more difficult as they are located towards the center of the keyboard. Start by unsoldering the 2 or 4 pins from the keyboard printed circuit board. Use a low wattage iron with a good clean small tip. Too much heat can lift the pc trace and you will have to jumper with wire wrap wire. Make sure you are de-soldering the correct pins for the keyswitch you want to remove. Its easy to de-solder half the pins from one keyswitch and half from its neighbor. Use a solder sucker to start and clean-up the joint with solder wick braid. Test to see if the pins are free by trying to move them with your finger nail. If they do not move, use the soldering iron and some more solder wick

until they are free.

Now the fun begins. Remove the key cap, either with a key cap removal tool (available from Jensen Tools P/N X797B020 @ \$5.50) or a flat bladed screwdriver on the front edge of the cap and your fingers on the back edge. If you are lucky the keyswitch will come out with the cap, but not likely. With the cap removed you will see the plunger sticking up from the switch and the square shoulder base of the keyswitch. In the center of top and bottom edges of the base you should see the indented part of the base that clips the keyswitch to the metal keyboard frame. Moving these towards the plunger will release the switch, but that's easier said than done. For the keyswitches near the edge of the frame, you can slide a small flat bladed screwdriver between the switch and the printed circuit board. Now, as you move the clip towards the plunger, that side of the switch will be forced out of the frame by the pressure of the screwdriver between the bottom of the switch and the pc board . . . repeat for the other side. With a little ingenuity you can use this same procedure for those switches located further in from the edge. Once you have the old switch out you can install the new one, after making sure the pins are straight. You don't want to have to remove this new switch just to straighten the pins. Now, did you install a new switch or put the old one back in! If you are positive you have a new switch installed you can solder the pins that are sticking through the pc board, if the pins aren't sticking through the pc board . . . guess what! OK, now that we have our new switch properly installed we can put our computer back together. Those of you that don't want to take my advice on replacing the entire keyboard, can now finish replacing the other 20 keyswitches, while we get back to enjoying our computer again.

Not to leave you 4P owners out, but you shouldn't experience as many keyboard problems as desktop owners. I have probably replaced 4P keyswitches on a ratio of 1 to 100 desktop switches. The 4P key switches are of an open contact construction, but tend to be more reliable than the sealed or semi-sealed type.

To open up the 4P keyboard case, remove the eight screws from the bottom of the case. Only see seven, you say. Number eight is under the center of the black rubber anti-skid strip at the front bottom edge of the keyboard. You should be able to put finger pressure on the center of the strip to find the screw hole and either use an X-acto knife to trim the hole or peel the entire rubber strip off. Once you have the keyboard open, note how the folding legs are situated so you can put them back in correctly.

You will need to remove the printed circuit board from the frame to get at the keyswitches. First remove the screw and nut attaching the ground strap, then remove the 17 tiny phillips screws and try not to lose any. De-soldering the old keyswitch is straight forward, but the new switch might give you a fright and cause you to swear at Radio Shack for sending the wrong part. If you will sit the old and new switches side by side, you will note that the only difference is the extra strip of metal between the solder pins on either side. Just bend this strip back and forth and it will break off, but be careful not to break off the solder pins also. Some switches may come with this extra strip of metal already removed, so if your new switches look exactly like the old ones, don't worry. Solder in the new switch and put the keyboard case back together again.

So, now where do I get these new keyswitches and keyboard parts you ask, well from Radio Shack National Parts of course. You can call them at 800-442-2425 and use your plastic charge card and if you are in a hurry, and want to pay for it, they will send them over night express. If you want to chance fate, you can still let your helpful local Radio Shack store order them for you. Listed below are the Radio Shack part numbers you will need to order your parts and they will want to know the catalog number of your computer, the 26-xxxx number from the label on the bottom.



**FILE CABINET UPDATE**  
A CN80 Staff Report

Nomenclature	Part Number	Cost o/a 10/01/90
Model 3/4 reset switch	AS-2761	\$2.07
2-pin ALPS keyswitch	AS-2762	1.30
4-pin ALPS keyswitch	AS-7567	1.00
4-pin MAXI keyswitch	AS-3069	2.98
Model 4P keyswitch	AS-0001	1.00
Keyboards:		
Model I 65-key ALPS	AXX-0202	95.00
Model I 53-key ALPS	AXX-0203	21.00
Model III ALPS	AXX-0217	57.56
Model 4 ALPS	AXX-0216	NLA
Model 4P	AXX-0299	50.34
Model 4D ALPS	AXX-0243	37.98
Model 4D bezel	Z-8553	9.39
Model 3/4/4D cable	WA-0260	11.34

As you will note from the above, the Model 4 ALPS keyboard is no longer available, this is also true of the Model 4 MAXI and one-piece membrane keyboards. (For you doubting Toms, the part numbers for the Model 3 and 4 keyboards have not been transposed, the 3's number is the higher one.) Model 4 owners that need a new keyboard will have to replace with a Model 4D keyboard and bezel. The keyboard cable listed has a built in header at the keyboard end, and not a socket like the older 3/4 cables; you will have to desolder the right angle connector from the keyboard and solder the cable directly to the keyboard. As always with these keyboard printed circuit boards, be very careful and don't use too much heat, or you will lift the traces, particularly around the cable connector.

Key caps are also available for just about all of the keyboards, but they are no longer sold individually. They are sold as sort of a grab bag assortment for about two bucks or so, a bargain as the individual caps use to be a buck each. They are too numerous to list here and the National Parts 800 number may refer you to Parts ID. Call 817-870-5600 which is National Parts' switchboard and ask for Computer Parts ID. Have your computer model number (26-xxxx) ready and whether its an ALPS or MAXI keyboard. If you don't have any luck, you can contact me through CN-80 or give me a shout on CompuServe on the LDOS SIG (GO PCS49), my PPN is 72177,1106.

-Fred Oberding

We are working steadily on improving the File Cabinet Library Collection and so far we have cleaned up the Utility files of the Mod 4 Catalog and soon hope to have the Business, Games, Education and Communication sections completed. Until they are completed we will not be issuing a new catalog disk. What we have accomplished is going thru all 1400 of the existing Model 4 Utility programs and trashing any junk files, or files that were written for a specific users system that might reconfigure your system when running the program. We have added documentation where docs were missing for the programs that were left.

This has been a major project and has taken longer than expected. So if you order Model 4 Utility Volumes you may find that the list on that disk does not match with your existing Mod 4 Catalog. All the files that were kept are on the same disk as they were originally. Only the junk or programs that did not run properly were taken off. Rest assured that now if you order a disk of programs that the programs will run.

As soon as this process is completed with the other classifications in the Model 4 Collection, (about February of next year, we hope) then we will issue a complete new Model 4 Catalog, and start on the cleanup of the Model 3 and Orchestra 90 Catalogs.

While we are waiting for the new catalogs to be completed all new listings to the File Cabinet will be published in CN80, so you can have access to them. They will only be listed once, so you need to save each new list. As soon as the new catalog is ready we will announce it in CN80 and you can then send in your old catalog for upgrading. There will be no charge when this takes place. You have to send us your existing catalog disk and pay the postage to us. We will upgrade your disk and return it to you. Please do not send all the Catalog Disks that you have. Only the Catalog announced. It will be awhile till the Mod 1/3, and Orch 90 catalogs will be ready for upgrade. If you send in all your catalogs it would only cost you and us extra postage and you will get the same disk back if a new catalog is not upgraded yet.

## CLAN UPDATE

The Clan Genealogy program by Arthur C. Hurlburt (*File Cabinet Disk Number MD3EDU38*) is the original version of the Clan Program and operates only under TRSDOS 1.3. This disk is sent with the disk formatted with TRSDOS 1.3 so it does not have to be converted from the single-sided single-density 35 track format that the rest of the Model 1/3 Library uses.

As users of the Clan program already know, the program is written in BASIC and has the print driver commands that were for the author's C.Itoh printer. Thus you had to rewrite the print driver program lines to fit your printer. A little tricky if you aren't an experienced Basic programmer. Plus, you have to create four disks to use the program, each of which uses a different basic program. So you have to rewrite the printer command lines in three basic programs with your printer instructions.

We asked David P. Miller, author of PostMaster if he would take a look at the program and write it using generic printer commands for the printers that emulate the Epson FX80 mode. These are third party printers such as the Seikosha and Panasonic printers. Radio Shack printers do not have an exact Epson FX80 mode, Tandy uses a code that they call the "Tandy Standard Mode", which is a modified Epson standard.

David went one step further. He created the four disks for us. Rewriting the printer driver codes in each basic program module with pure ASCII codes, so that the the CLAN should work on about any printer. But it still requires the TRSDOS 1.3 operating system and its BASIC.

These four disk have not been placed in the File Cabinet. If you would like to order the CLAN program on the rewritten four disks, then send us a note telling us you would like the FX80 Version of Clan on Four Disks, and include \$10.00. We will pay the postage to send you the four disks.

After being exposed to the program David Miller might now be in the mood to write a Model 4 genealogy program for us. So far we have not found a genealogy program for the Model 4 which comes close to the way that CLAN handles the subject and will build a family "tree" printout. We also have David's

mother who is actively interested in genealogy to help us push the idea along. If he does get the bug and write a genealogy program, looking at his PostMaster product, it certainly would be well worth having.

Stay tuned, we also have a couple of other expert programmers who have been bitten by the genealogy bug.

-CN80

## MONTEZUMA CP/M UPDATE

Not enough space has been left in this issue to cover all the amazing things (for someone new to MM-CP/M) that Montezuma Micro's CP/M package will do. But we can tell you this, there will be much more about CP/M in our coming issues.

Experienced users of CP/M are invited to send in their experiences, and to share their knowledge with us.

## Monte's PUBLIC DOMAIN LIBRARY

If you noticed, these disks are on Montezuma Micro Single Sided Super Data Format which allows 220K of a single sided 5-1/4 disk. Many of these files are arched (compressed program files) that need to be de-arched with the program which is supplied either on the Catalog Disk #C000, or #C900 Monte's Essential CP/M Utilities. This compression along with the 220K storage space allows many more large programs to be place on a disk than could be placed on a standard format. If you are new to CP/M or to de-arching files, don't let that scare you. It is a simple fool-proof system, menu driven that Monte has supplied and is very simple to use.

If you order the Catalog disk; use the de-arch program provided on it; then print out the catalog, you will get a catalog of 90 single spaced, 60 lines per page, full descriptions of each program available, from Adventure to Zilog mnemonic assembler.

We had considered printing this catalog for you in the same fashion that we have printed the PostMaster Icon Catalog, but the cost would be much more than the \$4.00 for the CP/M Library Catalog Disk. If there is enough interest we certainly would consider printing it, so let us know.

-Cottin Picken Maverick

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WORLD LISTING NUMBER ONE - WORLD4/BAS By David P. Miller

```
1 REM Generate an Epicycloid figure
2 REM Requires Microlabs' GBASIC
3 REM Written by David P. Miller
4 REM for Computer News 80 Magazine
5 REM Original concept by
6 REM Florence & Sheldon Gorden
10 @OFF:CLS:@CLS
20 INPUT "Large radius (1-32767, 0 to quit) ";AA
30 IF AA>32767 THEN GOTO 20 ELSE IF AA=0 THEN SYSTEM
40 INPUT "Small radius (1-32767) ";BB
50 IF BB>32767 THEN GOTO 20
60 IF BB>=AA THEN CC=AA:AA=BB:BB=CC
70 C1=AA+BB:C2=C1/BB
80 DEF FN X(T)=C1*COS(T)-BB*COS(C2*T)
90 DEF FN Y(T)=C1*SIN(T)-BB*SIN(C2*T)
100 A=0:B=6.28*BB:N1= -C1-AA:N2=-N1:M1=N1:M2=N2
110 D=(N2-N1)/600:E=(M2-M1)/200
120 NR=20*(AA+BB):IF NR>400 THEN NR=401
130 OH=INT((FNX(A)-N1)/D+.5)
140 OV=200-INT((FNY(A)-M1)/E+.5)
150 ST=(B-A)/NR:@ON1
160 FOR T=A+ST TO B STEP ST
170 X=FNX(T):H=INT((X-N1)/D+.5)
180 Y=FNY(T):V=200-INT((Y-M1)/E+.5)
190 @LINE (OH,OV,H,V,1):OH=H:OV=V
200 NEXT T
210 TS=INKEY$:IF TS="" THEN GOTO 210 ELSE GOTO 10
```

WORLD LISTING NUMBER TWO Changes for Radio Shacks' BASICG

```
10 SCREEN 1:CLS:CLR
150 ST=(B-A)/NR:SCREEN 0
190 LINE (OH,OV)-(H,V):OH=H:OV=V
```





## NEW ADDITIONS TO

# CN80'S FILE CABINET LIBRARY

Volume Disk Number      Description

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ICON REFERENCE GUIDE      \$10 includes shipping. Free if ordered with 15 or more disks and shipped with order. If the Reference Guide is ordered by itself, a credit of \$10 will apply to your first order for 15 or more disks.

### NEW ADDITIONS TO THE MODEL 4 CATALOG

M4EDU30	INDEX PROGRAM AND DATA FILES FOR ALL OF THE 80 MICRO MAGAZINES	
	MICRO80/BAS	Index Basic Program Load into Basic to read /DAT files.
	MICRO80/DAT	Data files for 1980
M4EDU31	MICRO81/DAT	Data files for 1981
M4EDU32	MICRO82/DAT	Data files for 1982
	MICRO83/DAT	Data files for 1983
M4EDU33	MICRO84/DAT	Data files for 1984
	MICRO85/DAT	Data files for 1985
M4EDU34	MICRO86/DAT	Data files for 1986
	MICRO87/DAT	Data files for 1987
	MICRO88/DAT	Data files for 1988

### NEW ADDITIONS TO THE MODEL 1/3 CATALOG

M3EDU39	MODEL 3 INDEX PROGRAM AND DATA FILES FOR 80 MICRO MAGAZINES	
	M3INDEX/BAS	Index Basic Program Load into Basic to read /DAT files.
M3EDU40	MICRO80/DAT	Data files for 1980
M3EDU41	MICRO81A/DAT	Data - Half of 1981
M3EDU42	MICRO81B/DAT	Data - Half of 1981
M3EDU43	MICRO82/DAT	Data files for 1982
M3EDU44	MICRO83/DAT	Data files for 1983
M3EDU45	MICRO84/DAT	Data files for 1984
M3EDU46	MICRO85/DAT	Data files for 1985
M3EDU47	MICRO86/DAT	Data files for 1986
M3EDU48	MICRO87/DAT	Data files for 1987
	MICRO88/DAT	Data files for 1988

The M3EDU39 program disk and the data files can be copied to a TRSDOS 1.3 formatted disk using the Convert program of TRSDOS 1.3. The Index program was written for TRSDOS 1.3 Basic

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Volume Disk Number      Description

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### ADDITIONS TO THE ICON CATALOG

M4PMLAH	Additional Boarder Files
M4PMLAI	Additional New Fonts
M4PMLAJ	Additional New Fonts

### ADDITIONS TO THE MODEL 4 CATALOG

(CORRECTION: MD4UTL60 Listed in V3#10 should be MD4UTL61) David Goblen's latest version of his UTILITY4 program.

	UTILITY4/CMD	Utility program command file.
	UTILITY4/DOC	Documentation file for Utility 4 program
M4HRZ21	Hi Resolution Programs for Laser and DeskJet Printers by Gary W. Shanafelt	
	BCHRLD/CMD	Hi Res Utility Programs
	HPPRINT/BAS	Hi Res Print Program in Basic
	HPPRINT/DOC	Hi Res Documentation for HPPRINT/BAS
	BWLADY/HR	Hi Res Picture File
	GEISHA/HR	Hi Res Picture File
	MANDRILL/HR	Hi Res Picture File
	ROBBIE/HR	Hi Res Picture File
	TRS80/HR	Hi Res Picture File
	MAST/HR	Hi Res Picture File
	MERCEDES/HR	Hi Res Picture File

M4HRZ22 Assorted Model 4 High Resolution Utilities by David Goblen

	HRPGMS/DOC	Doc file for HiRes Utility programs
	HRLSRPT/CMD	Laser Printer HiRes printer utility
	HRFXPRT/CMD	FX/RX (and other EPSON) HiRes printer utility
	HRLOAD/CMD	HiRes file loader
	HRSAVE/CMD	Save HiRes screen Data to a disk file
	HRCLS/CMD	Clear HiRes screen from DOS level

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# NEW ADDITIONS TO CN80'S FILE CABINET LIBRARY

Volume Disk Number	Description
	HRVIEW/CMD View HiRes screen from DOS
	BWLADY/SHR Enchanting lady
	CHEETAH/SHR Mellow cat
	LADY/SHR Mysterious lady
	MODEL4/SHR Beloved Model 4
	MODEL4P/SHR Beloved Model 4P
	TIGER/SHR Friendly tiger
	VANNA/SHR Vanna smiles
HRPIC14	Hi Resolution Pictures by R. M. Gilfillan
	ALFRED/HR Alfred E. Newman (Mad Magazine)
	BAT/HR The Bat Symbol
	BULL/HR No Bull Symbols
	COKE/HR Coca Cola (Classic)
	HITEK/BLK HiTech alphabet block file for Draw Program
	KNIGHT/HR Knight on a horse
	MICKEY2/HR Mickey Mouse
	PIRATES/HR Pittsburgh Pirates
	ROYALS/HR K. C. Royals emblem

All of the above are originals, created with Micro-Labs Draw program (Model 4 mode). Nothing has been copied from other public domain disks or other sources. - R. M. Gilfillan

These are really exceptionally good graphics, by an exceptional hi-res artist (CN80-Ed.)

Volume Disk Number Description

## MODEL 4 LIBRARY SOFT FONTS

This is an entirely new division to the Model 4 File Cabinet Library and it contains the downloadable soft font files for Laser and Deskjet printers.

M4FON1	Laser - Palantino Soft Fonts Disk #1.
M4FON2	Laser - Palantino Soft Fonts Disk #2.
M4FON3	Laser - Palantino Soft Fonts Disk #3.
M4FON4	Laser - Optima Soft Fonts - One Disk.
M4FON5	Laser - Calligraphic Fonts- One Disk.
M4FON6	DeskJet- Times Roman Fonts- One Disk.
M4FON7	DeskJet- Helvetica Fonts -- One Disk.
M4FON8	DeskJet- Optima Fonts ---- One Disk.
M4FON9	DeskJet- Chancery Fonts ---- One Disk.
M4FON10	DeskJet- Palantino Fonts -- One Disk.
M4FON11	DeskJet- Gramond/Hobo ----- One Disk.
M4FON12	DeskJet- Century Fonts ---- One Disk.
M4FON13	DeskJet- Deutsche Fraktur -- One Disk.
M4FON14	DeskJet- Avant Garde Fonts -One Disk.
M4FON15	DeskJet- Blippo Fonts ----- One Disk.

As more soft font disk become available they will be added to this section. Because it is not possible to print samples of the fonts in an electronic disk catalog, or in CN80 because of the space it would consume. We are preparing a soft font reference guide and catalog. Anyone who would like to have this catalog, please send \$2.00 with your request to cover postage and handling.

Avant Garde, Baskerville, **Benguiet Bold**,  
**Broadway**, Broadway Engraved, Hobo: 10, 15.

Deutsche Fraktur: 10, 12, 20, 12 bold, 20 bold. Times Roman: 8, 10, 12, 14, 18, 24

Galaxy, Rockwell, **Blippo** University Roman. **Cooper** Century

Helvetica: 8, 10, 12, 18, 24

Chancery

Optima

Palatino

Garamond

Public Domain Soft Fonts



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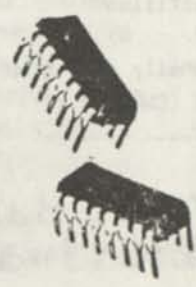
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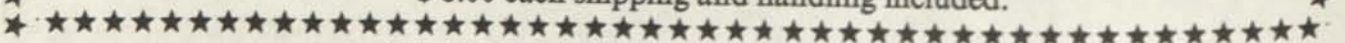
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10	4	10	1.5	3		15
5		2500	.00005	2.49		936
2673	45678	2500	.00005			18692
1359	36543					86795
						88028
						1.56
						5.24
						7.62
						5.68
						9.15
						42.3
						4.4
						167.
						135
						6274
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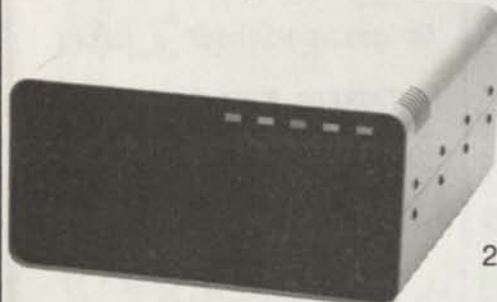
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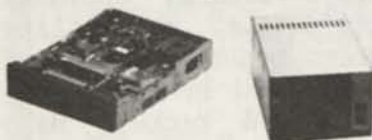
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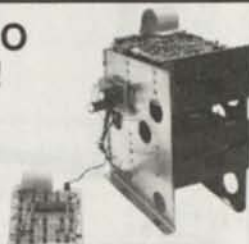
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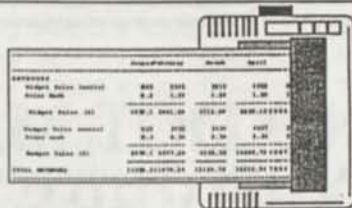
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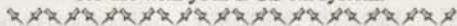
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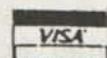
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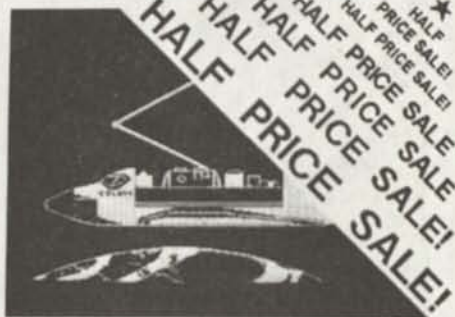
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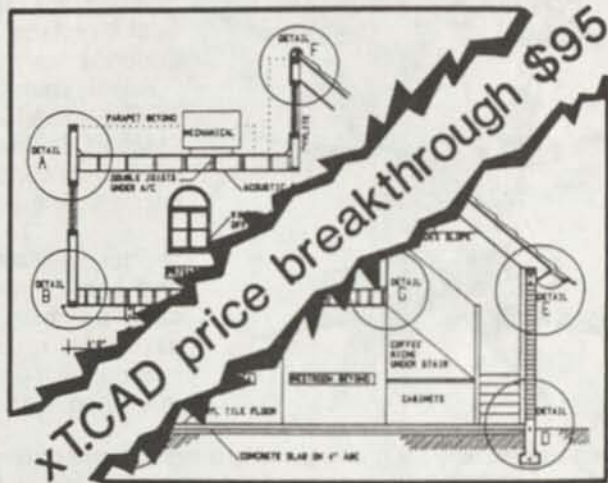
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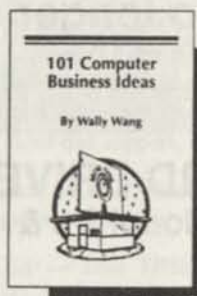
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- C042 Volume cataloging system
- C043 Overflow from disk #C042
- C044 SAM76: An interactive text manipulation language
- C045 Utilities: File transfer; USER / assist; Remote Bulletin Board System
- C046 Overflow from disk #C045
- C047 DIMS: Dan's Information Management System database in BASIC
- C048 MODEM V7.6, BYE V7.8: Modem programs with source
- C049 Overflow from disk #C048
- C050 RESOURCE disassembler V7.3; Small FORTH; FINDBAD volume flaw utility
- C051 Overflow from disk #C050
- C052 Full screen editor in C — originally developed for H19
- C053 Overflow from disk #C052
- C054 ZCPR V1.6: A Z80 replacement for the CP/M CCP (SQ)
- C055 Overflow from disk #C054
- C056 Benchmarks in C, Fortran, BASIC; Shell sort; CBASIC2 game
- C057 Overflow from disk #C056
- C058 A complete database system in PL/I-80
- C059 Overflow from disk #C058
- C060 In Context Editor in PL/I-80; Typing Tutor in BASIC (both for ADM-31)
- C061 Overflow from disk #C060
- C062 Remote Bulletin Board System in BASIC and ASM
- C063 Overflow from disk #C062
- C064 The FED: CBASIC2 program used by Fed Reserve to test money supply policy
- C065 Overflow from disk #C064
- C066 SYSLIB: A library of over 130 M80 ASM subroutines Vol. 1 of 3
- C067 Overflow from disk #C066
- C068 SYSLIB: A library of over 130 M80 ASM subroutines Vol. 2 of 3
- C069 Overflow from disk #C068
- C070 SYSLIB: A library of over 130 M80 ASM subroutines Vol. 3 of 3
- C071 Overflow from disk #C070
- C072 Disassembler for Z80; Translate Intel 8080 code to Zilog Z80
- C073 Overflow from disk #C072
- C074 68000 cross assembler; Tiny ADA compiler written for Poly-morphic system
- C075 MODEM V7.98: Modern communications program with source
- C076 Overflow from disk #C075
- C077 ZCPR2: Improved CP/M command processor Vol. 1 of 10
- C078 Overflow from disk #C077
- C079 ZCPR2: Improved CP/M command processor Vol. 2 of 10
- C080 Overflow from disk #C079
- C081 ZCPR2: Improved CP/M command processor Vol. 3 of 10

- C082 Overflow from disk #C081
- C083 ZCPR2: Improved CP/M command processor Vol. 4 of 10
- C084 Overflow from disk #C083
- C085 ZCPR2: Improved CP/M command processor Vol. 5 of 10
- C086 Overflow from disk #C085
- C087 ZCPR2: Improved CP/M command processor Vol. 6 of 10
- C088 Overflow from disk #C087
- C089 ZCPR2: Improved CP/M command processor Vol. 7 of 10
- C090 Overflow from disk #C089
- C091 ZCPR2: Improved CP/M command processor Vol. 8 of 10
- C092 Overflow from disk #C091
- C093 ZCPR2: Improved CP/M command processor Vol. 9 of 10
- C094 ZCPR2: Improved CP/M command processor Vol. 10 of 10
- C095 ZCPR2 Update disk
- C096 Overflow from disk #C095
- C097 Simple word processor program in ASM with doc & source
- C098 Overflow from disk #C097
- C099 A demonstration system for dBASE II
- C100 Hard vol. backup programs (may be hardware-specific)
- C101 Remote Bulletin Board System in BASIC (SQ)
- C102 Overflow from disk #C101
- C103 KERMIT: Modem communications for CP/M to mainframe, source in C
- C104 Overflow from disk #C103
- C105 PISTOL: Portably Implemented Stack Oriented Language similar to FORTH
- C106 Overflow from disk #C105
- C107 XLISP: An Experimental LISP compiler in ASM & C
- C108 Overflow from disk #C107
- C109 LU, LDIR, LRUN: Library filing and utility system for LBR files
- C110 Overflow from disk #C109
- C111 ZCPR2 Upgrades Vol. 1 of 2
- C112 Overflow from disk #C111
- C113 ZCPR2 Upgrades Vol. 2 of 2
- C114 Overflow from disk #C113
- C115 ROFF4 V1.50: A text formatting package in C
- C116 Overflow from disk #C115
- C117 Utilities: Communications program with XMODEM protocol; DIR sort & pack
- C118 Overflow from disk #C117
- C119 Mini Bulletin Board System in BASIC (SQ) from Australia
- C120 Overflow from disk #C119
- C121 A complete order and inventory system in dBASE II (LBR)
- C122 Overflow from disk #C121
- C123 SIGNON: A system of programs for running an RCP/M bulletin board
- C124 Overflow from disk #C123
- C125 Software Tools of Australia Vol. 17 - Programs in C, BAS, ASM
- C126 Overflow from disk #C125
- C127 California Energy Commission Building Energy Design Analysis Vol. 1 of 2
- C128 Overflow from disk #C127
- C129 California Energy Commission Building Energy Design Analysis Vol. 2 of 2
- C130 Overflow from disk #C129
- C131 68000 Cross Assembler from Dr. Dobbs Journal 6800 Cross Assembler
- C132 Overflow from disk #C131
- C133 BASIC games extracted from Software Tools of Australia
- C134 Overflow from disk #C133
- C135 Depreciation in BASIC; WordStar indexing program in Pascal
- C136 Overflow from disk #C135
- C137 Graphing ASM subroutines for MX80; Intel to Zilog source translator
- C138 Overflow from disk #C137
- C139 Utilities: Text display; Super DIR; VFILER - Screen-oriented file util.
- C140 Overflow from disk #C139
- C141 CITADEL: A complete bulletin board system in C
- C142 Overflow from disk #C141
- C143 FORTH-83: Editor, assembler, & documentation
- C144 Overflow from disk #C143
- C145 Atlanta Database User Group: Member records & banking systems
- C146 Overflow from disk #C145
- C147 Utilities: Extended ERASE; Cross ref from .PRN files (LBR)
- C148 Overflow from disk #C147
- C149 Compilers: Concurrent Pascal-S; PL/0 — written in Pascal (not Turbo)
- C150 Overflow from disk #C149
- C151 CBASIC Users Group: Assorted programs in CBASIC
- C152 Overflow from disk #C151
- C153 Regular Expression Compiler (REC) in ASM Vol. 1 of 4
- C154 Overflow from disk #C153
- C155 Regular Expression Compiler (REC) in ASM Vol. 2 of 4
- C156 Overflow from disk #C155
- C157 Regular Expression Compiler (REC) in ASM Vol. 3 of 4
- C158 Overflow from disk #C157
- C159 Regular Expression Compiler (REC) in ASM Vol. 4 of 4
- C160 Overflow from disk #C159
- C161 8080 to 8086 conversion utilities
- C162 Overflow from disk #C161
- C163 A/R template for SuperCalc; Bulk ERASE of BAK, HEX, etc.
- C164 Overflow from disk #C163
- C165 Programs for BDS C: Functions in ASM, Bulletin Board, CRT I/O (LBR)

- C166 Overflow from disk #C165
- C167 C programs: File archiver; Brace matcher; Calls for Aztec C; More (LBR)
- C168 Overflow from disk #C167
- C169 Utilities: Forth to CP/M screen - file xfer; Synonyms for COM files (LBR)
- C170 Overflow from disk #C169
- C171 ZCPR3: Z80 replacement for CP/M command processor Vol. 1 of 9
- C172 Overflow from disk #C171
- C173 ZCPR3: Z80 repl. for CP/M command processor Vol. 2 of 9
- C174 Overflow from disk #C173
- C175 ZCPR3: Z80 repl. for CP/M command processor Vol. 3 of 9
- C176 Overflow from disk #C175
- C177 ZCPR3: Z80 repl. for CP/M command processor Vol. 4 of 9
- C178 Overflow from disk #C177
- C179 ZCPR3: Z80 repl. for CP/M command processor Vol. 5 of 9
- C180 Overflow from disk #C179
- C181 ZCPR3: Z80 repl. for CP/M command processor Vol. 6 of 9
- C182 Overflow from disk #C181
- C183 ZCPR3: Z80 repl. for CP/M command processor Vol. 7 of 9
- C184 Overflow from disk #C183
- C185 ZCPR3: Z80 repl. for CP/M command processor Vol. 8 of 9
- C186 Overflow from disk #C185
- C187 ZCPR3: Z80 repl. for CP/M command processor Vol. 9 of 9
- C188 Utilities: Paged file list; MX80; Passwords; Z80 debugger (LBR)
- C189 Overflow from disk #C188
- C190 Dot-matrix printer plotting package for C. Itoh, Epson, Okidata
- C191 Overflow from disk #C190
- C192 Fluff minimax algorithm Dr. Dobbs 7/84; Simplex algorithm Byte 5/84 (LBR)
- C193 Overflow from disk #C192
- C194 Utilities: LBR extract; SUBMIT replacement; Super DIR; DDT improved
- C195 Overflow from disk #C194
- C196 Utilities: FIND files; Squeeze/unsqueeze (SQ)
- C197 Overflow from disk #C196
- C198 A complete property management package using dBASE II Volume 1 of 2
- C199 Overflow from disk #C198
- C200 A complete property management package using dBASE II Volume 2 of 2
- C201 Overflow from disk #C200
- C202 Utilities for ZCPR3: DIR sort/pack; Vol. zap; File utility; More (SQ)
- C203 Overflow from disk #C202
- C204 Source code for ZCPR3 utilities (SQ)
- C205 Overflow from disk #C204
- C206 ZCPR3 macro library for video screen manipulation; Cryptography (LBR)
- C207 Overflow from disk #C206
- C208 CP/M-80 to CP/M-86 Xlate; FIND with cross reference capability
- C209 Overflow from disk #C208
- C210 Forth 83 system with example, documentation, & utilities
- C211 Overflow from disk #C210
- C212 Utilities: Columnar listings; Sort files; TYPE command improved (LBR)
- C213 Overflow from disk #C212
- C214 Utilities: ERASE improved; NSWP file handler; improved TYPE (LBR)
- C215 Overflow from disk #C214
- C216 Regular Expression Compiler with floating point (LBR)
- C217 Overflow from disk #C216
- C218 Regular Expression Compiler without floating point (LBR)
- C219 Overflow from disk #C218
- C220 MEX V1.12 modem communications program (SQ)
- C221 Overflow from disk #C220
- C222 Assorted overlays for use in constructing MEX system (SQ)
- C223 Overflow from disk #C222
- C224 Assorted overlays for use in constructing MEX system (SQ)
- C225 Overflow from disk #C224
- C226 Inventory system for dBASE II (LBR)
- C227 Overflow from disk #C226
- C228 dBASE patches; Area code lookup; 8080 disassembler; DIR repair
- C229 Overflow from disk #C228
- C230 Ron Cain's Small C compiler complete with floating point math package (LBR)
- C231 Overflow from disk #C230
- C232 Extra char set for WordStar/FX-80; Scientific font for MX-80
- C233 Overflow from disk #C232
- C234 dBASE II programs: Checkbook; Church management; Genealogy
- C235 Overflow from disk #C234
- C236 C programs: File archiver; Flow listing; Editor; FIND; Split files
- C237 Overflow from disk #C236
- C238 Databases: Article retrieval; Ref books; Ref material (LBR)
- C239 Overflow from disk #C238
- C240 Kermit communications V3.9; Updated 8080 to Z80 source translator
- C241 Overflow from disk #C240
- C242 Utilities: C cross ref; Super DIR V7.7; Print utility in C (LBR)
- C243 Overflow from disk #C242
- C244 Pilot system in Pascal/VZ; Deductive reasoning helps (LBR)
- C245 Overflow from disk #C244

- C246 Full screen Z80 debugger Lots of features, documentation (SQ)
- C247 Overflow from disk #C246
- C248 MEX V1.14: Update to XMODEM & MEX; Turbo Pascal Bulletin Board (LBR)
- C249 Overflow from disk #C248
- C250 Z80 small Prolog with doc; Z80 screen file manager (LBR)
- C251 Package of statistical software: Utilities, game, etc.
- C252 Overflow from disk #C251
- C253 LINPAK single prec. in C; Pascal; Whetstone benchmarks; Turbo LIFE (LBR)
- C254 Overflow from disk #C253
- C255 CNVRT prog. language with example to solve mazes (LBR)
- C256 Overflow from disk #C255
- C257 CNVRT Runtime library, compiler, and help files
- C258 Overflow from disk #C257
- C259 Source programs in ASM for a variety of CP/M functions
- C260 A complete General Ledger system in BASIC
- C261 PILOT language interpreter with ASM source & examples
- C262 Assorted games in Microsoft BASIC and BASIC-E, forerunner of CBASIC
- C263 Z80 assemblers, with source; Simple editor
- C264 Overflow from disk #C263
- C265 Assorted BASIC games: Biorhythm; Chess; Maze; StarTrek; More
- C266 Overflow from disk #C265
- C267 CP/M STOIC: A threaded interpretive language like Forth
- C268 Overflow from disk #C267
- C269 Games in BASIC: Baseball; Civil war; Craps; Swarms; Etc.
- C270 Overflow from disk #C269
- C271 More BASIC games: Drag race; Football; Hangman; Mastermind; More
- C272 Overflow from disk #C271
- C273 Simple database system; ALGOLM compiler; a subset of the ALGOL language
- C274 Search & Rescue programs in BASIC
- C275 Educational programs in CBASIC
- C276 Overflow from disk #C275
- C277 Utilities: Quick SUBMIT; Vol. catalog; File compare; Checksum
- C278 Overflow from disk #C277
- C279 Assorted programs for Ham radio in BASIC
- C280 Overflow from disk #C279
- C281 The Osborne Accounts Receivable & Accounts Payable systems in BASIC
- C282 Overflow from disk #C281
- C283 The Osborne General Ledger system in BASIC
- C284 The Osborne Payroll system in BASIC
- C285 Overflow from disk #C284
- C286 A complete adventure game in BDS C
- C287 Overflow from disk #C286
- C288 Another collection of games in BASIC
- C289 Overflow from disk #C288
- C290 Math package for Microsoft muMATH
- C291 Overflow from disk #C290
- C292 BusinessMaster II accounting package - Vol. 1 of 5 - Documentation
- C293 Overflow from disk #C292
- C294 BusinessMaster II accounting package - Vol. 2 of 5 - Initial, Startup
- C295 Overflow from disk #C294
- C296 BusinessMaster II accounting package - Vol. 3 of 5 - Sample files, Payroll
- C297 Overflow from disk #C296
- C298 BusinessMaster II accounting package - Vol. 4 of 5 - PO/AP; Order entry/AR
- C299 BusinessMaster II accounting package - Vol. 5 of 5 - General ledger
- C300 Utilities: Volume catalog & cross reference; ERAse/UNERase; Vol. ZAP (SQ)
- C301 Overflow from disk #C300
- C302 More than 50 games in Microsoft BASIC
- C303 Overflow from disk #C302
- C304 Financial planning in CBASIC; AP & AR in CBASIC; Many BASIC games
- C305 Overflow from disk #C304
- C306 Original ADVENTURE and other games in BASIC (SQ)
- C307 BASIC benchmark; Bibliography in BASIC; Many BASIC games
- C308 Cross assemblers for the 6800 and 1802
- C309 Utilities: File archive; Bad sector lockout; Help system; More
- C310 Overflow from disk #C309
- C311 Functions for BDS C: Floating point; Console I/O; Redirected I/O
- C312 Assorted programs, functions for BDS C
- C313 BDS C programs: Higher math functions; File directory; Floating point
- C314 BDS C programs: DIR; Program list; File compression; Word Count program
- C315 Overflow from disk #C314
- C316 BDS C programs: File concatenation; File compare; Text processor
- C317 Overflow from disk #C316
- C318 BDS C programs: Benchmark; Curly brace matcher; Modem program
- C319 Overflow from disk #C318
- C320 BDS C programs: File squeeze/unsqueeze; TYPE for squeezed files
- C321 Overflow from disk #C320
- C322 Software Tools in RATFOR: Complete package in FORTRAN
- C323 BDS C programs: File conversion; Text formatter; Software tools
- C324 A large collection of games in BDS C
- C325 Overflow from disk #C324
- C326 Utilities: Bad sector lockout; Sorted DIR; Z80 disassembler (LBR)
- C327 Utilities: Catalog; Simple vol. ZAP; Editor; File printer; BASIC cross reference
- C328 Games in BASIC: Wizard's Castle; Eliza; Lost Gold; Zodiac (SQ)
- C329 Games in Z80 code, written for Kaypro; Z80 Chess
- C330 Printer art: Assorted pictures to print on your printer (SQ)
- C331 Games and programs in BASIC -- a mixed bag
- C332 BASIC games: DC10; Fireman; Kolossus; Rental property program
- C333 Utilities: Fast SUBMIT; File FIND; File FIX; Password
- C334 MYSTERY -- a large ADVENTURE type game (LBR)
- C335 Utilities: A collection for creation/maintenance of libraries (LBR)
- C336 ALGOLM compiler; FORTH interpreter; Ham programs; Key utility (LBR)
- C337 Printer Spool & Despool (LBR)
- C338 Utilities: Library; Help system; Super DIR; Improved TYPE (LBR)
- C339 Ron Cain's Small C; A collection of WordStar notes & utilities (LBR)
- C340 Extensive Help system (LBR)
- C341 Games developed for the Kaypro 2 -- some video functions may not work
- C342 Games developed for the Kaypro 2 -- some video functions may not work
- C343 Original ADVENTURE as implemented for the Kaypro 2
- C344 Utilities: Super DIR V8.8; TYPEN V3.1 (LBR)
- C345 Utilities: Lower to upper case; CP/M POWER; Memory to vol. (LBR)
- C346 Z80 assembler system (LBR)
- C347 Utilities: String replacement in file; Turbo Pascal cross reference (LBR)
- C348 Extensive graphic plotting package for Epson MX-80 (LBR)
- C349 WordStar utilities: Footnotes; Document to non-document & back (LBR)
- C350 Another comprehensive Help system (LBR)
- C351 Utilities: MX-80 setup; Gothic letter banner; Word\* PS on Prowriter (LBR)
- C352 HANDY V2.0: A collection of desktop tools in CBASIC (LBR)
- C353 Turbo Pascal: Source code from 7 books; Montezuma cursor control (LBR)
- C354 MODEM7 version 4: Program, source code, & utilities

### Monte's SELECT Disk #C900: Essential CP/M Utilities

This is a collection of utilities that Monte feels no CP/M user should be without. Each of these programs has been un-squeezed, de-liberated, and installed as needed to be usable on your system immediately. Source code is included when available. Here's what you get:

**NSWEEP:** Probably the most-used CP/M program ever written, this handy utility will copy, erase, list, squeeze, and unsqueeze files either singly or in groups. You'll need this program for any public domain disk listed in the catalog with (SQ).

**UNERA:** Have you ever typed "ERA \*.BAS" when you meant to say "ERA \*.BAK"? For those terrifying moments when programs or data disappear right before your eyes you need UNERASE. This program will resurrect the lost file or files with the same amount of ease that it took to ERAse them in the first place.

**FINDBAD:** Now you can recycle all those diskettes you were too cheap to throw away. You know, the ones with one or two bad sectors on them. FINDBAD will scan a disk and put all of the bad sectors into a dummy file so that CP/M won't try to use them.

**NULU:** CP/M isn't all that thrifty with disk space when writing small files. NULU solves that problem by collecting a number of small files into a single library file. Many public domain programs are distributed in libraries. Disks that contain libraries are listed in our public domain catalog with (LBR). You'll need NULU to extract the programs so that they may be used.



Monte's Public Domain Prices	Add S/H in US
1 to 10 disk volumes \$ 4.00 ea.	\$ 2.00
11 to 20 disk volumes \$ 3.75 ea.	\$ 2.50
21 to 40 disk volumes \$ 3.50 ea.	\$ 3.50
41 to 60 disk volumes \$ 3.25 ea.	\$ 4.00
61 or more volumes \$ 3.00 ea.	\$ 5.00

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SWAPPING MOSTLY, programs from R/S, Orchestra 90, Hypermen Kit (384), File Cabinet disks FOR Mod III/IV & II/6000 programs, books. WRITE & make me an offer at: R. YVES BRETON; PO Box 95, Stn Place d'Armes; MONTREAL, QUE., CANADA H2Y 3E9.

Need to know more, read my write-up "SAMPLE JUST IN TIME" in the Feb. 1990 issue of Computer News 80. Send orders to: Joseph L Zanetti, 307 Morton Ave., West Berlin, NJ 08091

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# Accounts Payable System

(Model II, 26-4505)

## Answers to Commonly Asked Questions

This discussion will cover Accounts Payable (APS) 26-4505. APS is the program with the second highest number of phone calls to Computer Customer Services.

Read the APS manual first. You should make sure that your copy of APS has been upgraded to correct all known errors by entering all corrections to the program. Your Computer Center can provide you with a list of these corrections, or you may want to ask the Computer Center to help you make the corrections. Then take your list of General Ledger accounts, as provided by your General Ledger program, and a backup copy of Accounts Payable and begin the program.

The APS will print checks, cash requirements, aging reports, and totals for posting to your company's General Ledger.

### SETUP CYCLE

1. SETUP
  - A. Initial Setup
    1. Enter Company Information
    2. Assign General Ledger Codes.
2. ADD VENDORS
3. ADD INVOICES

### MONTHLY WORKING CYCLE

1. ADD/CHANGE VENDORS
2. ADD/EDIT INVOICES
3. INVOICE SELECTION
4. POST INVOICES
5. INVOICE SELECTION
6. CASH REQUIREMENTS
7. AGING REPORT
8. PRINT CHECKS
9. END OF PERIOD

On power-up, enter the TRSDOS date to correspond to the date of the activity you plan to enter. The printer should be ready before running the program. When TRSDOS Ready appears type in APSETUP and press <ENTER>. This will be the initial setup. You are allowed to change your information later. Enter your company information and indicate which accounting method you wish to use - Cash or Accrual. You will be asked to enter a password. This password is assigned to your data files, and may be the same as or different from your diskette Master password. This password should not contain punctuation characters or blank spaces! Next, enter the General Ledger Codes (GL Codes). GL Codes 1 & 2 are already assigned for the Accounts Payable account debits and credits. GL Code 3 is your Cash (banking) account. GL Code 4 is Purchase Discount. The General Ledger Codes 5 - 100 may be defined by you. The GL Code is automatic. You enter a five letter abbreviation for the GL Account Name, and the GL Account Number to match the same account in the General Ledger program (26-4501).

You should understand the difference between GL Codes and GL Account Numbers, and the difference between GL Code Names and the GL Account Names. Some examples are:

GL Codes	GL Code Names	GL Acct. Number	GL Acct. Names
GLC 5	MERC1	1300	Merchandise Dept 1
GLC 6	MERC2	1301	Merchandise Dept 2
GLC 7	MERC3	1302	Merchandise Dept 3
GLC 8	OFFS	1320	Office Supplies
GLC 9	OFFE	1330	Office Equipment
GLC 10	SLTAX	2100	Sales Tax Payable
GLC 11	SHIPN	2200	Ship & Freight
GLC 12	MISC	1350	Miscel Expenses

You should print a General Ledger Code list and have it available when you enter invoices later.

If you get an error message of "Bad File Mode" while information is being stored, you did not follow the rules concerning the password. If you get a "Disk I/O" error, then the write enable tab is not on the diskette.

You may change the name of the GL Codes and GL Acct. No. if you need to. This must be done immediately after End of Period processing by going back to SETUP and indicating that you want to Change System Information.

To start the main program type in "APS" at TRSDOS Ready. The Main Menu displays the current status for invoices, vendors, and amount payable. Begin by adding vendors. The vendor name and number should be unique, because the program sorts on these two fields. If it finds either of these fields duplicated, the file organization is confused and this renders the diskette useless.

You are not allowed to enter YTD purchases and payments or the amount and date of last payment when adding the vendors. The YTD Purchases and Credits field is updated by posting invoices. The YTD Payments and Debits field is updated by posting payments. When you first begin to use this Accounts Payable system you must enter all outstanding invoices, which will update the YTD Purchases and Credits field. If you begin to use APS after the beginning of the year, the YTD figures in APS plus the YTD figures from your previous records will be the correct YTD figures. After Year End Close Out, the YTD Purchases and Credits and YTD Payments and Debits fields will be set to zero. The APS system will then move the new year beginning balances into the YTD purchases and credits field.

One suggestion: Add all of your vendors, then make a BACKUP that has only the Company Setup and Vendor Information. Should you be forced to start over for some reason, this will save you several hours of entering this information into the system again.

Invoice Maintenance allows you to Add, Search, Edit, and Delete invoices. When adding the invoice, you enter the vendor number you assigned to this company, the invoice number, and due date.

If the vendor allows a discount when paid by a certain date, enter the discount date. The discount amount may be either a percentage or a dollar amount which you enter. If you enter "5" for a five percent discount, the discount will be calculated on the gross amount you enter for this invoice. It is possible that you may not be allowed a discount on freight. To calculate the proper discount, you can enter the discount as a percentage, then add on the items which are allowed a discount amount. When asked if this invoice is correct, answer

NO, then enter the discount as a dollar amount instead of as a percentage. Use the dollar value the computer calculated and then add the other (non-discounted) items.

When adding an invoice APS requests the GL Code, not GL Acct. No. The program allows four entries per invoice. If your invoice uses more than four GL Codes you will need to create two or more separate invoices (invoice numbers 1000A, & 1000B for example).

The Edit function creates a second invoice that offsets an old posted invoice. If the invoice has not been posted, delete the incorrect invoice and re-enter it correctly. The adjusted invoice created by editing allows you to change the discount date and following entries. Since the old invoice is not cancelled, on the adjusting invoice you should enter only the amounts you need to increase or decrease the original entries to get the correct amount.

The APS manual, pages 41-43, describes some special entries such as debit memos for the return of merchandise before you pay the invoice, and for return of merchandise after you pay the invoice and then receive a check from the vendor.

The invoice selection function is a two menu process. Select and Exclude invoices are opposites just as Hold and Release are opposites. You may use these functions to select a group of invoices on a particular due date or all the invoices for an individual vendor. You may select all posted invoices to print checks or you might select all invoices currently unpaid. If you have several invoices selected for various reasons, you may want to exclude all invoices then select a new group by a different status. You may post without selecting the invoices but you must select the invoices before printing checks. The Hold and Release options are specifically for printing checks. If an invoice is selected but is held, the invoice will not be paid.

The second menu shows the range of invoices you may choose (Select, Exclude, Hold, Release). The All Invoices option will choose all invoices. The posted invoices will choose only those that are currently posted. The Vendor/Invoice allows the operator to choose a vendor and choose the invoices one at a time or all of the invoices for this vendor. The Discount Date allows the operator to choose the invoices with a discount on and before this date. You may skip the discount date and choose by Due Date by pressing <ENTER> for Discount Date. The Due Date chooses the invoices due on and before this date. You may choose by both Discount Date and Due Date or by just one.

If you press <ENTER> for discount date and then enter a date for Due Date, all invoices due on or before the due date you entered will be selected EXCEPT those invoices with a 00/00/00 (i.e. no discount) discount date. For Example:

To select all invoices due on or before March 1, 1982 (including invoices both with and without discounts) follow these steps:

1. Select invoices by pressing <ENTER> for discount date and type 03/01/82 for due date. This will select all invoices due on or before March 1, 1982 which have discounts.
2. Make an additional selection by typing 00/00/00 for discount date and then type 03/01/82 for due date. This will select all invoices due on or before March 1, 1982 which have no discount.

If you have already selected a posted invoice by the Vendor/Invoices option, and then select all posted invoices, this invoice will not be selected twice. You can use Invoice Selection for posting then exclude all and use it again for Printing Checks.

Now would be a good time to get a list of invoices. This may be done by Complete List which prints all invoices or by Selected List which prints only selected invoices. You might want a list of your vendors as well. This can be Complete or it

will select vendors who have invoices selected.

Posting is the next required step. Before you begin this step PLEASE make a BACKUP. Posting and printing checks are the two functions that involve the maximum amount of disk activity, with several files opened and closed, reads and writes back and forth to the data files, etc. If you should encounter an error condition, type in the command CLOSE and press <ENTER>, then remove the diskette and turn the computer off. Contact the store that sold you the computer system and ask if any program changes have been made for this error. They will need to know which function you were performing, the Error Code number and the program line number. Example: "I was posting invoices and got an Error 5 in line 350".

The posting process will distribute the dollar values to the GL Codes involved and to the vendors. This will increase the amount payable on the Main Menu. Printing checks decreases the amount payable.

If you are on an accrual accounting method, you should wait until the end of the month and enter information from the General Ledger Recap - End of Period Report into the General Ledger or do the transfer if you have two drives.

A couple of reports you might want to do after posting are Cash Requirements and Aging. The Cash Requirements report gives a list of all posted invoices in order by Due Date except for those invoices being held. The Cash Requirements report takes a very long time to complete. APS may appear to hang up on the last vendor, but it is sorting the information. Do Not Hit the BREAK Key or the RESET Switch! Remember, patience is a virtue which you need when working with computers.

Before you print checks, you may print a preview of invoices to be paid. You may preview the checks and decide to exit because you need to hold some of the invoices or post more invoices. After printing the checks you have began a cycle that must be completed in an exact sequence. In this sequence, the checks are printed, a check register is printed showing check number, vendor name and number, the net amount of the invoice and checks, and whether a discount was taken. You then update the vendors balances.

If your accounting method is cash, you will record the General Ledger distributions only when the invoices are paid. When an invoice is paid, take the results from the posting summary and create a document in the General Ledger for the appropriate expense accounts and cash account.

The final step of the month for APS is to run the End Of Period (E-O-P). If you plan to use the automatic transfer from APS to GL, the transfer must be done before the E-O-P processing and must only be done once per month. At TRSDOS Ready type in APGL and press [ENTER]. Your APS should be in drive 0 and GL should be in drive 1. When the transfer is complete, exit to TRSDOS. Remove the GL diskette from drive 1. Go to the APS E-O-P Menu and do function # 1. Exit from APS. Put the GL diskette in drive 0 and run the GL program. Post the documents that were created by the transfer.

### MOST FREQUENTLY ASKED QUESTIONS

Question 1: When storing Setup Information I get an Error 52 or 54, why?

Answer: You used a bad password. The password should not contain blanks or punctuation characters.

Question 2: The Main Menu shows I have a negative number of invoices, why?

Answer: You probably received an Error Code and failed to stop and go to a previous backup.

Question 3: The Main Menu shows I have a negative number selected invoices, why?

Answer: You deleted some invoices before they were posted, yet they were selected. You should exclude your invoices before deleting them.

Question 4: I have an invoice which I plan to pay on the installment plan, or I want to make partial payments. Can I?

Answer: The program only prints checks for the full amount of the invoice. When you enter the invoice, create separate invoices with the dollar amount you plan to pay during each month. If you do not know how much the payment will be, add the invoice for the full amount but do not post it. Each time you plan to print a check for this invoice create another invoice, (100X, 100Y, 100Z), with the amount you plan to pay this month. Delete the original invoice after it has been completely paid.

Question 5: My End of Period Report bottom line does not print "Net AP \$0.00," why?

Answer: During the month when you purchase and post more than what you pay out, the result will be a net Credit amount to Accounts Payable. During the months when you pay more invoices than you record purchases, the net result to Accounts Payable will be a debit figure. The only time you will have a "Net AP \$0.00" is when you record purchases (Credit AP) and payments (Debit AP) of exactly the same amount.

Question 6: "I try to print checks but APS does not go beyond Preview of Checks, why?"

Answer: You may not have any posted invoices. You may not have selected any invoices. You may have the invoices on hold.

#### MODEL I/III QUESTIONS

Question 7: The May, 1979 Newsletter contained several line changes to Model I Tape Mailing List (26-1503) which allow the Sort to be optional, as well as allowing a sort by Zip Code. I made these changes but now the Search function does not seem to be reliable. What can I do?

Answer: The following additional changes were provided by one of our customers to correct this problem and allow the search function to work reliably:

Old Line: 95Ø J=1: K=N

New Line: 95Ø I=1: K=N

Old Line: 96Ø IF K<J THEN ...

New Line: 96Ø IF K<I THEN ...

Old Line: 97Ø I=INT((J+K/2):B\$(1)= ...

New Line: 97Ø B\$(1)= ...

(Delete the first statement in the line)

Old Line: 98Ø IF B\$(Ø)<B\$(1) THEN K=I-1:GOTO 96Ø

New Line: 98Ø IF B\$(Ø)<>B\$(1) THEN I=I+1:GOTO 96Ø

DELETE LINE 990 ENTIRELY

### Computer Customer Services Address and Phone Numbers

8AM to 5PM Central Time

Computer Customer Services  
400 Atrium, One Tandy Center  
Fort Worth, Texas 76102

Model I/III Business Software  
Outside Texas 1-800-433-5641  
In Texas 1-800-772-5973

Model II Business Software  
Outside Texas 1-800-433-5640  
In Texas 1-800-772-5972

Education Software  
Outside Texas 1-800-433-1679  
In Texas 1-800-772-5914

All Other Calls Related to Computers  
Outside Texas 1-800-433-1679  
In Texas 1-800-772-5914

Switchboard—1-817-390-3583

## Model II Scripsit 1.0 Underline

Anne McCoy  
SECURITY MUTUAL LIFE INS., CO.  
P.O. Box 82248  
Lincoln, NB 68501

I have just finished reading the October, 1981 issue of TRS-80 Microcomputer News. The Answers portion of the Model II SCRIPSIT section caught my eye. John Hawkins of K-Fox Radio wanted to print just an underline or line rather than underscore characters using Model II's SCRIPSIT 1.0.

I battled with this very problem several months ago and after many hours came up with what I feel could be an easier method to print a line such as a fill-in-the-blank type of line or several lines.

I first type the normal SHIFT HYPHEN code for underline begin. Then I type SHIFT HYPHEN code to end the underline next to the begin code. I then use the left arrow to go back one space to the end code. Using the F1 key I "open up" the codes. Then using the right arrow I space over however many spaces I want my blank line to be. Pressing the F1 several times will make several lines of "blank lines." Then I press the F2 key to "close" the underline.

I have programmed a user control key to automatically make a 5-space blank line for me. We use this function quite often when a figure or word is to be filled in later. My code for the user control key is: SHIFT HYPHEN/SHIFT HYPHEN, LEFT ARROW/F1/RIGHT ARROW/RIGHT ARROW/RIGHT ARROW/RIGHT ARROW/RIGHT ARROW/F2/RIGHT ARROW. The last right arrow allows me to continue typing in the correct position after the blank line. The code for the user control key looks like this on the screen: — LEFT F1 RIGHT RIGHT RIGHT RIGHT RIGHT F2 RIGHT. What appears on the screen when using this key looks something like this: \_\_\_\_\_

The arrow keys must be used rather than the space bar or it will not work. If you think my solution merits printing in the Microcomputer News, you may use it. I think it may be less confusing than the CONTROL 9 6 2 etc.

# New Services

## The Multiple Choice, Standard & Poor's General Information, Archer Commodities

*Editor's Note: The CompuServe Information Service is one of the largest information and entertainment services available to owners of personal computers and computer terminals. With each issue of TRS-80 Microcomputer NEWS, various features of CompuServe will be discussed. The CompuServe Information Service is sold at Radio Shack stores nationwide and in Canada.*

One of the newest providers of information to the CompuServe Information Service sees to it that you always have a choice.

### QUIZZES, TRIVIA AND MUCH MORE

The Multiple Choice, an organization that provides recreational and educational multiple choice tests, is now an information provider to the CompuServe Information Service.

Trivia buffs will especially enjoy The Multiple Choice. Once in the program, they can choose a test with topics ranging from sports to movies to history for sharpening their trivia skills.



Students on the CompuServe network may gain that extra edge by quizzing themselves on a variety of subjects, including science and literature. And for those contemplating something a little tougher, The Multiple Choice offers an analogy quiz that is similar to those taken by college students seeking admission to graduate school.

The Multiple Choice plans to add additional tests in the future including a children's series with programmable skill levels. Programmable skill levels ensure that the test material offers the greatest challenge and therefore, the greatest progress.



Offerings on The Multiple Choice are designed to involve the entire family with the computer in a family learning atmosphere.

CompuServe subscribers can access the service provided by The Multiple Choice through main menu item 8, Education.

### STANDARD & POOR'S GENERAL INFORMATION FILE

Standard & Poor's General Information file is an easy and inexpensive way to obtain information on many companies.



Information, available for 25 cents per company access, is plentiful and varied. The S & P datafile for each company listed includes a Business Summary, Important Business Developments, Product/Service Line contributions to revenue/profits and selected financial items. More general information includes a corporate address and telephone number, list of directors and principal officers and stock transfer agents.

The specific categorical information contained in Standard & Poor's Business Summary section includes company products, size, recent financial developments and, in many cases, the long-term outlook.

The Important Developments section describes recent events such as any recent contracts awarded to a company, or new product developments. The information is as current as possible.

On the Product/Service Line breakdown, Standard & Poor's indicates what percentage of total profits or sales is made up of a certain product or service. In the case of Norton Co., as an example, abrasives may make up 61 per cent of total sales and 47 per cent of total profits, while diversified products and subsidiary companies provide the remainder.

Financial information includes the latest available figures on net sales and net income, plus three years of earnings-per-share history, including current year estimates when available.

Standard & Poor's also provides a five-year earnings-per-share growth rate and assigns a Standard & Poor's Earnings and Dividend Rank, which is a letter ranking system (A-, B+, etc.) based on history.

Users may access information on the database using three methods: company name, ticker symbol (e.g., HRB for H & R Block), or unique industry code. The latter, for example, might be Industry Code 4300 which provides an alphabetized

(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.

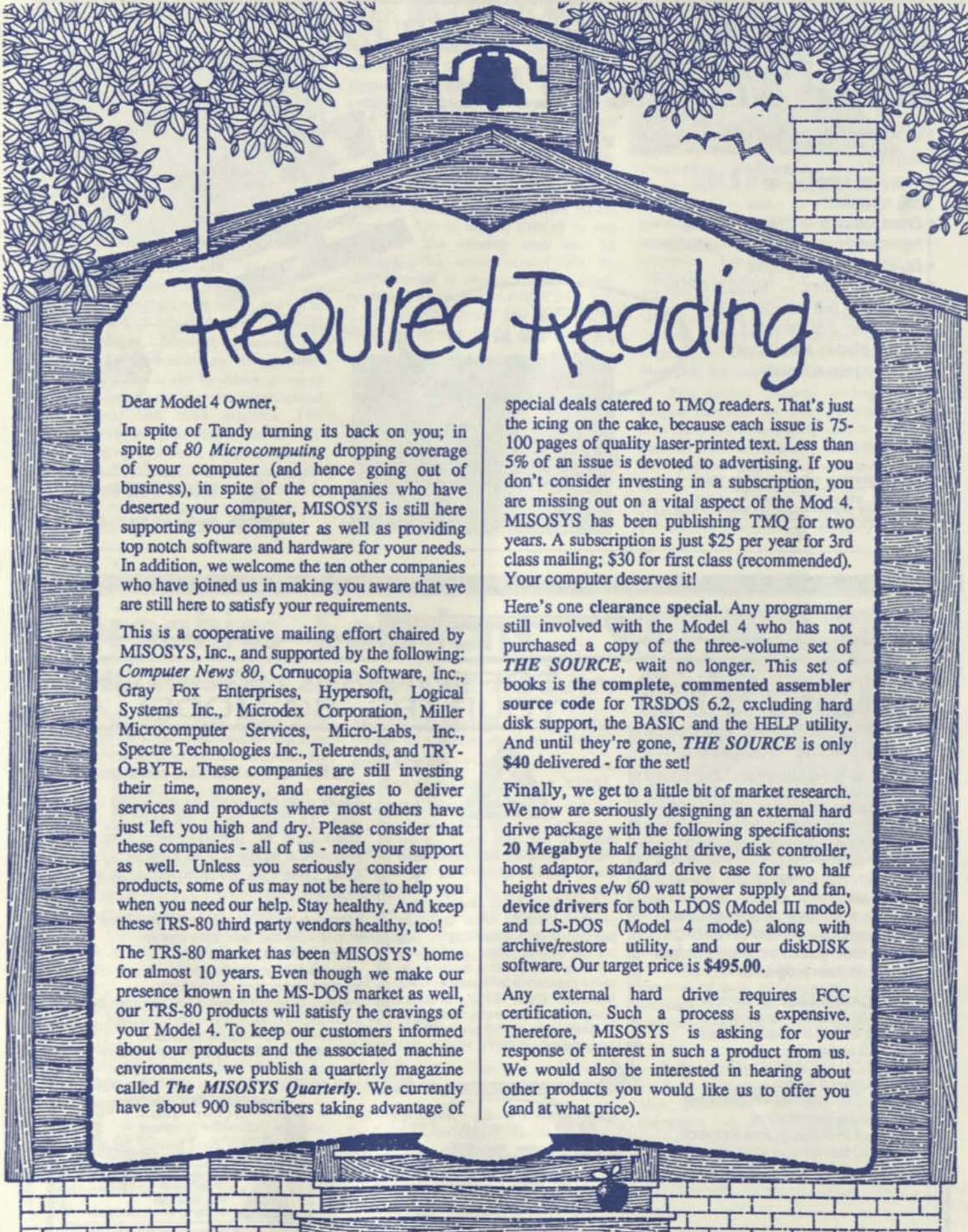
My question is, can someone provide me with the commands or codes(?) that can be used with the "set up:" sub-option under the "Print Options" within the "Print" Command? I am using a DMP 200 printer.  
-A. S. Seattle, Washington

```
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



# Required Reading

Dear Model 4 Owner,

In spite of Tandy turning its back on you; in spite of *80 Microcomputing* dropping coverage of your computer (and hence going out of business), in spite of the companies who have deserted your computer, MISOSYS is still here supporting your computer as well as providing top notch software and hardware for your needs. In addition, we welcome the ten other companies who have joined us in making you aware that we are still here to satisfy your requirements.

This is a cooperative mailing effort chaired by MISOSYS, Inc., and supported by the following: *Computer News 80*, Cornucopia Software, Inc., Gray Fox Enterprises, Hypersoft, Logical Systems Inc., Microdex Corporation, Miller Microcomputer Services, Micro-Labs, Inc., Spectre Technologies Inc., Teletrends, and TRY-O-BYTE. These companies are still investing their time, money, and energies to deliver services and products where most others have just left you high and dry. Please consider that these companies - all of us - need your support as well. Unless you seriously consider our products, some of us may not be here to help you when you need our help. Stay healthy. And keep these TRS-80 third party vendors healthy, too!

The TRS-80 market has been MISOSYS' home for almost 10 years. Even though we make our presence known in the MS-DOS market as well, our TRS-80 products will satisfy the cravings of your Model 4. To keep our customers informed about our products and the associated machine environments, we publish a quarterly magazine called *The MISOSYS Quarterly*. We currently have about 900 subscribers taking advantage of

special deals catered to TMQ readers. That's just the icing on the cake, because each issue is 75-100 pages of quality laser-printed text. Less than 5% of an issue is devoted to advertising. If you don't consider investing in a subscription, you are missing out on a vital aspect of the Mod 4. MISOSYS has been publishing TMQ for two years. A subscription is just \$25 per year for 3rd class mailing; \$30 for first class (recommended). Your computer deserves it!

Here's one clearance special. Any programmer still involved with the Model 4 who has not purchased a copy of the three-volume set of *THE SOURCE*, wait no longer. This set of books is the complete, commented assembler source code for TRSDOS 6.2, excluding hard disk support, the BASIC and the HELP utility. And until they're gone, *THE SOURCE* is only \$40 delivered - for the set!

Finally, we get to a little bit of market research. We now are seriously designing an external hard drive package with the following specifications: 20 Megabyte half height drive, disk controller, host adaptor, standard drive case for two half height drives e/w 60 watt power supply and fan, device drivers for both LDOS (Model III mode) and LS-DOS (Model 4 mode) along with archive/restore utility, and our diskDISK software. Our target price is \$495.00.

Any external hard drive requires FCC certification. Such a process is expensive. Therefore, MISOSYS is asking for your response of interest in such a product from us. We would also be interested in hearing about other products you would like us to offer you (and at what price).

\_\_\_\_\_

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# Drive your Model 4 into the future with the XLR8er

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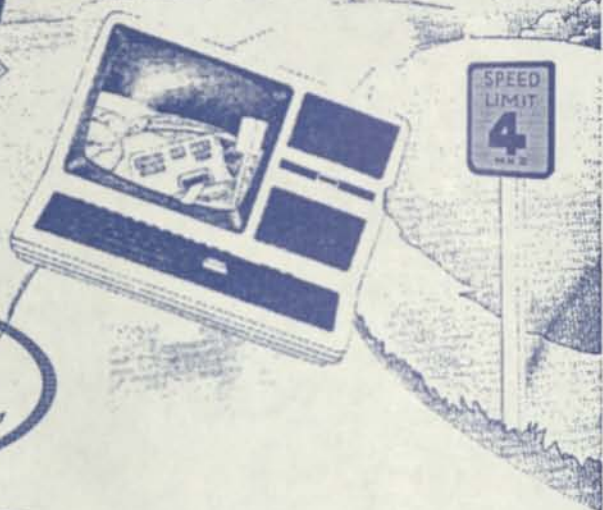
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When ordering, please specify computer model (i.e. 26-1069, 26-1069A, 26-1070) and if HIRES graphics is installed. For 26-1069, note Revision # of motherboard.



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**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 x 240, 320 x 240, 160 x 240, and 160 x 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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The following eleven programs run on a Model 4/4D/4P/III equipped with a Radio Shack graphics board and GBASIC 3.0 or a Micro-Labs Grafyx Solution board:

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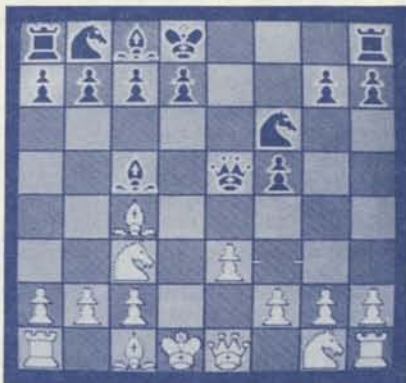
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**GRAFYX SOLUTION** - A plug-in, clip-on board enhances any Model 4/4D 4P/III to provide 640 x 240 dot graphics. (512 x 192 on a Model III) The board comes with a 56 page manual and a disk containing both model 3 and 4 mode versions of over 40 programs and files including GBASIC 3.0 which adds over 20 graphics commands to Basic. \$129.95.

Please specify your exact system configuration when ordering or requesting information. Payment may be by check, Visa, Mastercard, or COD. Domestic shipping is free on pre-paid orders. Texas residents add 7% sales tax.

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## TRS-80 Software from Hypersoft.

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Runs on PCs, PS/2s, compatibles and laptops with at least 384K of memory. Supports TRS80 Printer and Serial Ports through your PC. ONLY emulates Model 4 mode of Model 4. Call for availability of Model III version. To use PC-Four you must first transfer your old programs and data files to MSDOS disks using PCXZ or Hypercross.

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* T1200EX	3/1200 bps external	RS-232-C	\$159.95
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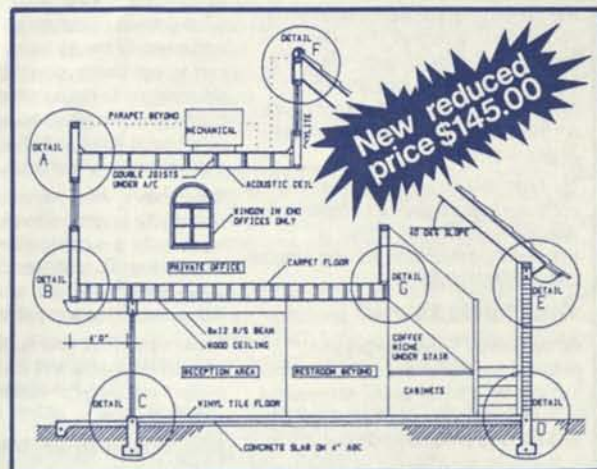
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## Professional results with TRS-80 Fully supported products for Models III and 4 4p 4D PC/XT/AT, Tandy, and 100% compatibles (MSDOS)



**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 or mouse. Friendly, competent support since 1984. Software is backup-free. Was \$345 in 1986 catalog.  
**Model III or 4 4p 4d or MSDOS** \$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** character by Microdex. Enables disk directory review and special character printing from within standard Scripsit.  
**Model III or 4 4p 4d** \$15.00

**GRAFYX Solution** by Micro-Labs. Easy to install board provides hi-res similar to Radio Shack boards. Includes popular GBASIC software and manual. Supports xT.CAD and other graphic programs.  
**Model 4 4p 4d (640x240 pixels)** \$125.00

**MOUSE** interface by Micro-Labs connects to 50-pin I/O port and allows the use of Tandy Color Mouse 26-3025 or 26-3125 (not included) with xT.CAD and other programs.  
**Model III 4 4p 4d** \$115.00

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# Rembrandt

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### What did the experts say?

Computer Shopper Magazine said, "...you'll be impressed with the drawing and graphic capabilities REMBRANDT puts at your fingertips. It's very powerful, yet easy to learn. Devote a few hours to getting familiar with REMBRANDT and you'll find your good ol' TRS-80 4 or 4P is a handy business graphics tool."

The New York Times said, "The personal computer makes graphics simple and Spectre Technologies makes a wonderful graphics and drawing program called REMBRANDT."

### What'll it do for me?

REMBRANDT is the only graphic software you'll ever need for your Model 4 computer. Hi-Res board not required — it works with the graphics capabilities built into every Model 4, 4P or 4D.

Just look at these advanced features:

**Freehand drawing:** You can draw lines, boxes, circles, and type on the screen in standard or extra large characters. Full block operations are supported —

move blocks of graphic, fill them, copy and delete them and more!

**Business graphics:** It can read your hand-entered or disk based data and automatically create horizontal and vertical bar charts, pie charts and xy plots with up to three variables. The charts are created on-screen, auto-scaled and labelled — but you can still customize any chart to your specs.

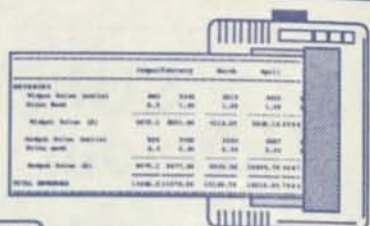
**Slide shows:** After you've built and saved your graphic screens, put them together for a dazzling on-screen slide show. Move from screen to screen using eleven cinematic special effects like wipes, fades and spirals.

**Hard copy:** Print your graphic screens on most dot-matrix and daisy wheel printers including the Radio Shack LP and DMP series.

### How can I get REMBRANDT?

REMBRANDT is only \$39.95 and is available for the Model 4 (specify the CP/M or TRSDOS/MSDOS version), or get both the CP/M and TRSDOS/MSDOS versions for just \$59.95. Add \$4 S/H.

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And for "outside jobs", MMS offers a wide variety of high-level applications, most of which come complete with MMSFORTH source code for custom mods. Such as FORTHWRITE (which printed this), a lightning-quick file manager, an expert system, a general ledger. A sophisticated language, great support and, if you thought DOS was the only way to see your computer, some nifty surprises!

Personal licensing on IBM PC/XT/AT/PS2 or TRS-80 1/3/4 starts at \$180. Please ask for our free brochure so we can tell you more. And ask about our free offer of the \$40 MMSFORTH GAMES disk.

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# TRS-80 Model I/III/4 Language Software from MISOSYS

## Z80 RELocatable Assembler

### MRAS [DOS 6.x M-21-083] [LDOS 5.x M20-083]

An advanced Z80 assembly package for the programmer who wants a powerful and flexible development system. It includes a macro assembler which generates either **relocatable object code** modules or CMD files directly, a linker, a librarian, a full-screen text editor, a utility for converting to/from line-numbered files, and a cross reference tool for directly generated CMD files.

MRAS generates M80 compatible /REL files. Supports REPT, IRP, and IRPC macros; nested includes, and a full range of nested conditionals. It has flexible output redirection of listing and symbol table.

MLINK supports virtual memory bit-stream buffering, REL and IRL library searching, zero disk space for DEFS in DSEGS and COMMONs, generation of program overlays, special link items: 0-3, 5-7, 9-11, 13-15.

Includes MLIB, our REL module librarian, and our SAID advanced full screen text editor which can be used to generate your assembler source code, C-language source code, or edit any type of ASCII file.

## BASIC Compiler

### EnhComp [DOS 6 M-21-072] [LDOS 5 M-20-072]

Released in 1986 and reviewed in the March 1987 issue of *80 Microcomputing* and October 1987 issue of *COMPUTER SHOPPER*. EnhComp has lots of great features; handles the bulk of Model III Microsoft BASIC and supports additional commands and functions. Standard is floating point with both **single and double precision** functions; random file access ("X" mode for reels to 32767), turtle graphics, pixel graphics, keyed array sort, multi-lined functions, user commands, REPEAT-UNTIL, line labels, and more.

A supervisor program automates the edit-compile-test phases inherent when using compilers; this makes using EnhComp almost as easy to use as your BASIC interpreter.

With its built-in Z80 assembler, you can easily create hybrid programs of BASIC statements and in-line assembly code which **completely eliminate** contorted string packing and DATA statement high-memory module techniques for your BASIC program to access a machine code module.

You'll have to edit existing BASIC programs, but the power and completeness of EnhComp make that an easy task.

## RATFOR Compiler

### RATFOR-M4 #M-21-073

RATFOR compiles to FORTRAN; is **fully structured** facilitating modification and debugging; comments are simpler and more versatile than in FORTRAN, simplifying self-documentation. This allows changes without the subsequent debugging tolerated when modifying FORTRAN. RATFOR compiles source code to an *object* of FORTRAN; use your existing FORTRAN compiler to convert this to executable.

RATFOR is an excellent language for general purpose use, but it is vastly superior to FORTRAN when working with a large number of modules without documentation, as is necessary when producing very large programs.

Extensions supported include the "arith" macro to perform binary arithmetic operations, read and print macros for short form READ and PRINT, and support of any valid FORTRAN expression for "switch" and "case" operands.

This package includes the language translator, a batch file to automate compilation, a language Reference Manual, an Installation Manual, application programs in source code on disk, and our LED text editor for source code preparation.

## Z80 Assembler

### EDAS [DOS 6 M-21-082] [LDOS 5.x M-20-082]

This powerful combined disk-based **line editor** and Z80 **macro assembler** assembles from nested source files or memory buffer; nested conditionals with ten pseudo-ops, nested MACROS with parameters both positional and by keyword, cross reference listings; and a separate **full screen text editor**.

If you are writing system software, support software, applications - big or small, EDAS will provide the power to make your job easier, faster, and more worthwhile.

## Z80 Disassembler

### DSMBLR [DOS 6 M-31-053] [LDOS 5.x M-30-053]

Provides direct disassembly from CMD disk files, automatic partitioning of output disk files, data screening for non-code regions, and **full label generation**. It even generates the ORGs and END statement - the complete ball of wax. You will find that the use of this disassembler - *even by a beginning assembly language programmer* - will be paying handsome rewards with the ease of its use and clarity of the documentation. It's a professional tool for your use.

The disassembler allows you to build a **screening data file** telling what segments of the program are to be interpreted as data regions. You enter the addresses of the "segments" after analyzing the target program's disassembly.

Output to DISK produces a file suitable for MRAS/EDAS and is automatically segmented into manageable file sizes.

## REL Disassembler

### UNREL [T80 M-30-054] [CPM M-32-054]

Decodes an M80-type relocatable object module and outputs an MRAS/M80 assembler source file. We bundle in SPLITLIB to split a library into separate modules and DECODREL to display the *bit stream* of a REL file.

UNREL assumes anything in a code segment is code, and anything in a data segment is data. It supports special link items: 0-3, 5-7, 9-11, 13-15.

UNREL should be the perfect professional assembler's tool for your bag of tricks.

## Full C Compiler

### MC [DOS 6.x M-21-064] [LDOS 5.x M-20-064]

If you are looking for a **full C compiler**, look no further. If you are looking for a well stocked UNIX System V standard library, look no further. MC, reviewed in the January 1987 issue of *80 MICROCOMPUTING*, is a complete C compiler which adheres to the standards established by Kernighan and Ritchie. The library of functions is extensive and System V compatible. The compiler generates Z80 relocatable macro assembler code (M80 or our MRAS). The libraries are files of relocatable object modules. MC is a full-featured compiler for the discriminating programmer!

MC supports command line **I/O redirection** for compiled programs, **wild-card** file specifications, parsing for UNIX "\*" extensions in file specifications, **overlay** support (requires MRAS), a full pre-processor, lots of options, and is designed for the programmer wishing the ultimate in C compilers. 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.

## Special Sale Prices

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RATFOR		\$99.95	\$59.98 \$5
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40% off price on one language is good through 8/31/88: You must include this notice. Add S&H. MC & VISA acceptable. No COD's. 30-day refund on product if not acceptable.

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## FORTH Compiler

### HartFORTH [DOS 6 M-21-071] [DOS 5 M-20-071]

HartFORTH is a **full FORTH** that conforms to the **79-STANDARD**. The Model I/III version is an indirect threaded version; the DOS 6 version is a direct threaded implementation providing greater execution speed of 10%-40% depending on the details of the actual program. The kernel contains some additional useful words and utilities which turn HartFORTH into a full-fledged development system.

HartFORTH is designed to **run under an operating system** which is totally transparent to the programmer or user. The virtual Memory that it accesses for storage and retrieval purposes is a normal DOS file that is requested by the FORTH system when it is first entered. Doing this has several advantages in that it provides for FORTH files to be used in other language application programs and vice-versa. Enhancements have been built into the kernel in the form of functions to call the operating system file handling routines so that other files may be created or accessed.

HartFORTH supports double length integers, string handling, cursor manipulation, graphics, random numbers, and floating point.

# Take any ONE language product at 40% off!

Note: MISOSYS will be closed from August 8th through August 12th

# ANNOUNCING

Important news from Logical Systems Inc.

LSI will be leaving the TRS-80 market place on JUNE 30th 1988. No, LSI is not going out of business. We will be directing our attentions to other things and **MISOSYS will be selling and servicing LS-DOS 6.3**, so you need not worry about support.

As of June 1st you **must** direct all LS-DOS 6.3 sales and support inquiries directly to MISOSYS only at:

**MISOSYS, Inc.**  
P.O. Box 239  
Sterling, VA 22170-0239  
(703) 450-4181 (9a-5p Eastern time)

You can still contact LSI directly if you feel you must by writing to LSI c/o MISOSYS, or to MISOSYS, Attention: Bill. I will try to answer all letters.



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## SUPPORT FOR YOUR TRS-80

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Dear Computer User:

Since 80 Micro and other magazines have dropped their coverage of TRS-80 systems, in January of 1988 we launched a monthly magazine (the latest issue is 48 pages) in support of TRS-80 computers and application programs.

Our publication content is directed to the "user" rather than the programmer. We publish short useful programs, along with tips, hints, and patches that you can use to get the most out of your TRS-80 software and equipment.

Monthly columns and reviews of software and hardware are written by qualified writers who have written for other magazines on the use of TRS-80. We also, actively encourage reader participation by publishing articles and programs submitted by readers.

In the question and answer section called "Open Forum" we publish TRS-80 problems sent in to us by subscribers. The answers are provided by our authors or by readers who have solved the problem before.

There is a classified section where you can advertise your hardware, programs, or other items for sale, at the very low cost of \$3.00 per column inch.

Suppliers of software, hardware and other products who continue their support for the TRS-80 user advertise their products in our display advertising section.

Also, in an effort to support our readers and fellow TRS-80 users we occasionally buy inventory clearances from Radio Shack stores, and TRS-80 programs, manuals and books from users who no longer have a need for them.

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## BOOK REVIEW

Recently I bought a book called Mod-4 by Jack<sup>©</sup>, it was the last one Discount Data in Plano, Texas had in stock. I didn't know this at the time and I had been seeing the ad for it for a long time. After I finally bought the book, I liked it so much that I called Discount Data to buy some more as Christmas gifts for a few users friends and found out that they were no longer in stock, and that they were no longer in print either. "We just sold the last one a couple weeks ago was the reply." A couple of weeks ago is when I ordered my copy.

What put me off from buying it before was a review in 80 Micro (August 1985, pg 114, by Mark D. Goodwin) that said "The books only reference to the TRSDOS job control language (JCL) states that the JCL is useful and that you should read the manual for more details." earlier he said " Jack's organization is identical to that of the Disk Systems Owner's Manual" by Tandy.

Having little use for the JCL, or as the review stated "Mod-4 by Jack doesn't provide any machine language programming information."

One comment in favor was "While missing some information, it is a good source for day-to-day needs." Well with a review like that - sorry Mr. Goodwin, we are not all programers and something simple might just be what I need.

With a lukewarm review like that and the put-down because it wasn't a programers guide to heaven, and because I had in my confusion bought duplicate material in book after book, I didn't buy one.

But what a surprise, I learned more in a few hours of just looking thru Mod 4 by Jack, than I had in years of reading the Tandy Disk Operators Manual.

This handy book is at the side of my computer all the time now. Its 8-1/2 x 11 inch pages has large type and lots of space to write notes.

Its convenient size and layout gives fast simple explanations of DOS commands for TRS-80, with a short concise statement of what the command is all about. With examples of how to apply the command, with non technical examples.

The sequence of TRS-DOS and BASIC commands follows the Tandy Manual, but the explanation and examples are much more clearly written.

The first section is devoted to the explanation of TRS-DOS commands.

The second section is an Introduction to Basic statements, with an explanation of terms that anyone can understand.

Some examples:

<ENTER>

Means "I'm done with this line!  
Enter it into the mechanism now!

EDIT 100

Calls up the editor, puts line 100 in the editing buffer, and shows "100" on the screen. You can then use the editing commands at this point.

EDIT.

The EDIT command followed by a period allows you to edit the last line edited, run, or somehow mentioned or used.

The next section explains Basic Terms, with examples.

STRING EXPRESSION

String expressions express information in the form of one or more characters "strung" together in strings of characters.

X\$

X\$ is a string of 1 or more characters.

JERRY

The name JERRY is a string. Many times it is shown or defined as a string by being enclosed in quote marks.



The next section lists all the Basic Commands with clear definitions and examples.

The next section lists in numerical order all the Basic Error Messages, and what they mean.

TRSDOS Errors are listed on the back of this page the same way.

The next page has a cross reference chart of Character Codes, Dex, Hex, OCT, Binary, ASCII Abrv. and Keyboard

The next section explains, again in simple straightforward language SYSTEM FILES (/SYS)

"TRSDOS 6 for the model 4 is made up of a number of individual modules that are shuffled in and out of memory on an "as needed" basis rather than having all of the operating system in memory at all times. This has the effect of preserving a large amount of (RAM) memory for application programs. The implications pertain not only to volatile memory, but also to floppy (or hard) disk storage. By PURGEing or REMOVEing unneeded modules from your disk, you can streamline the disk to handle only those functions needed and free up more of the disk for potential applications."

"All of these files have the /SYS extension and are normally invisible on the directory listing"

"Note that it is possible to put needed SYSTEM files in high memory (using SYSRES) so that additional disk storage space can be opened up for other applications."

Followed by an explanation of what each TRSDOS file such as SYS4/SYS is used for and which ones you can safely remove if you are not using its function to make more room in your memory.

The next section shows the full list of "BUILT-IN TRSDOS PROGRAMS" with explanations. Such as MEMDISK, CLICK/FLT, COM/DRV, FORMS/FLT.

The next section is a Glossary of common computer terms in use, with explanations such as,

.password - An optional word used in protection schemes. It is made up of up to 8 characters, the first of which must be a letter. Note that a password is preceded with the period symbol.

We have covered just a little of what the book provides. It has a 10 page index and to have a handy reference manual such as this within an arms reach has proved invaluable to us.

In the words of the immortal Mr. Remington Shaver, "we liked the book so much we bought the copyrights".

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BOOK REVIEW

Z-80 MACHINE LANGUAGE TECHNIQUES  
FOR THE TRS-80 by Donald W. Ady

Reviewed by Christopher Fara (Microdex)

Computer users often ask -- why should I bother with machine language? There is really only one sensible answer to that question -- you'll never find out unless you try. It's a little bit like dating. It may take some doing to arrange that first date, but often a delightful and long-lasting relationship develops. Ady's book is a personal account of a rewarding involvement with machine language, and his enthusiasm may well encourage many people to take the plunge. The text is conversational and lively, a pleasant rarity among computer books which all too often are full of useless buzzwords. The author starts by presenting all the required fundamentals of machine language programming, and then quickly proceeds to practical applications.

The book deals with machine language almost exclusively in the context of BASIC programming. The discussion of stand-alone programs (i.e. programs which can be executed directly from DOS) is short and partly misleading. But for many computer users the interfacing with BASIC is the main, and often the only reason to try machine language. While almost any job can be done in BASIC alone, some procedures are many times faster, shorter and, believe it or not, easier in machine code. Much of the improvement results from the fact that a BASIC interpreter does a lot of double-checking and verifying before performing any desired operation, and warns the programmer with civilized error messages in case there is a problem. On the other hand, a machine language program executes every command instantly. Therein, however, next to the beauty dwells the beast: absolutely nothing in machine language is verified by the computer. If the command produces garbage, garbage it will be and you'll never know it, except that in

most cases your program will suddenly crash without any explanation. In this respect Ady's book is also outstanding. It describes extensively many potential problems and ways to avoid them.

The connection between a BASIC program and machine language routines can be made in many different ways. Ady presents one which is quite unique and for many purposes more efficient than some other methods. After a machine language routine is written, it can be saved on a disk in a form which to the BASIC interpreter looks like an ordinary program line. When needed, any number of such "lines" can be simply MERGED into any BASIC program, and the machine code "imbedded" in those lines can then be executed directly from within that BASIC program. Although the procedure for creating such mergeable files is somewhat cumbersome and imposes some restrictions on programs used in this manner, the convenience of merging is remarkable and well worth the effort of the initial setup.

The programming techniques are illustrated by numerous examples which in many cases can be applied directly in programming practice. Since the book has been written with the Models 1 and 3 in mind, some applications will require revisions to run in Model 4 mode. The differences involve primarily the use of various "pre-cooked" routines built into those computers or supplied on their DOS system disks, and especially the interfacing with screen, keyboard, printer and disk. A brief outline of those differences is provided in the last chapter, but in order to take the full advantage of Model 4 mode, the user will need to consult additional literature. Of particular interest to many users may be the chapters dealing with TRS-80 block (not hi-res) graphics and fast animation, and showing how to print such graphics on non-Radio Shack printers. But my favorite is the chapter on "Miscellaneous Short Cuts and Tricks". Most people who deal with machine language gradually discover various ways to either shorten and speed up the code, or to make it simpler and more

"elegant". Ady's long list contains a great variety of such tricks, and even experienced programmers will find many useful ideas in this chapter.

This brings up a question whether this book is a machine language "primer" or an advanced text. While Ady suggests that it teaches machine language for all levels of programmers, from novices to experts, I feel that it falls somewhere in the middle. For people who never used machine language before, the main initial problem is usually to develop sufficient hands-on confidence that the strange abbreviations and symbols will actually produce the expected results. A novice can find in Ady's book nearly all there is to know about machine language, but the progress from the compact introductory information to the practical applications might be just a little too fast-paced for all but the most courageous readers. A few more simple, stand-alone examples, gradually introducing more complex commands, would help to ease the beginner into the subject. For the expert, the "imbedding" of machine language in interpreted BASIC, or the question of "relocatable" code may be not as relevant as some of the tricks of the trade shown throughout the book. Both levels would benefit from more emphasis on program structure. Indeed, some techniques recommended by Ady, such as "discarding return" to "simplify" code will work all

right, but are not a very good habit to learn, and in the long run can actually make programming more difficult. This is especially true if the reader should ever move on to the machine language of other processors such as Intel-8086 (used by IBM and clones) which are more complex and not as forgiving as our trusty Z-80 processor.

**S u m m a r y :** Ady's book provides a complete description of machine language programming for the TRS-80 family of computers. It demonstrates many useful techniques and applications with a particular emphasis on Model 1 and 3 video, graphics and keyboard routines. It is a worthwhile addition to the library of any computer user who is seriously interested in improving the performance of BASIC programs through the use of machine language routines.

-Chris Fara

About the reviewer: Christopher Fara is a programmer with Microdex Corporation, and a co-author of xT.CAD and other programs published by his company. He has been involved with machine language programming on TRS-80 and IBM computers since 1983, when an "expert" told him that some particular thing "could not be done". Ignoring the advice, Chris quickly discovered that there was nothing that could not be done in machine language and has had much fun with it ever since.

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### Z-80 MACHINE LANGUAGE TECHNIQUES for the TRS-80 by DON ADY

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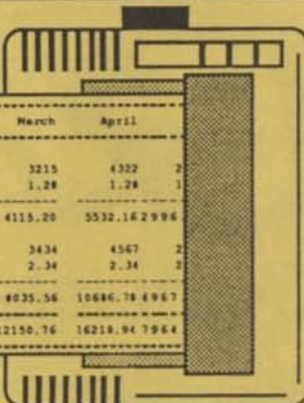
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Now you can run your favorite TRS-80 Model III Operating System and programs on your PC with **PC-Three**. When you run this program on your PC, XT, AT or compatible it emulates a TRS-80 Model III with its Z80 microprocessor, floppy disk controller and 48K of memory. It also supports the printer, serial port and cassette output for sound.

How does it work? You copy your Model III disks onto PC formatted disks using a special version of PC Cross-Zap (included). Each TRS-80 disk is now in the form of a file which represents the entire contents exactly. Then you run PC-Three and you have a TRS-80 Model III on your screen ! PC-Three works with the following operating systems: TRSDOS 1.3, LDOS 5.1.4, LDOS 5.3, DOS+ 3.4, 3.5, NewDOS 80 V2, and MultiDOS. You have the equivalent of 4 floppy disk drives, 3 of which support disks up to 1.8 Mbytes for LDOS, NEWDOS, DOS+ & MultiDOS.

PC-Three has been tested and found to run many popular Model III packages. It is not guaranteed to run everything, however we are working on filling the gaps. At present it will not run programs on non standard or protected disks.

Examples of programs that run on PC-III: AIDS, ALLWRITE, BASIC, BASCOM, C, CHECKWRITER, COBOL, EDTASM, FORTRAN, HOME ACCOUNTANT, MZAL, OMNITERM, PROFILE III, SCRIPSIT, SUPERZAP, TASMOM, VISICALC, XMODEM, ZEUS

To run PC-Three you must be the legal owner of a Model III DOS. You also need a BASIC ROM file image which must be either the file MODEL3/III or a copy of the ROM on a Model III you legally own. We provide instructions on how to obtain the ROM image file.

Runs on PCs, PS/2s, compatibles and laptops with at least 384K of memory. Works even better if you have a hard disk. PS/2 owners must have access to a non PS/2 machine to run PCXZ to transfer disks.

Price: Order #PC3, PC3 with PCXZ ..... \$109.95.

## PC-Four Emulates a TRS-80 Model 4 on a PC !

Now you can run your favorite TRS-80 Model 4 programs on your PC with **PC-Four**. Not just BASIC but machine language programs as well. This is another Hypersoft FIRST! PC-Four is a program that makes your PC or Compatible behave like a TRS-80 Model 4 complete with operating system, Z80 microprocessor and 128K of memory so you can run many of your favorite Model 4 programs such as ALCOR C, COBOL, MULTI-BASIC & PASCAL, ALLWRITE, BASCOM, ELECTRIC WEBSTER, FED, FORTRAN, Forth, Little Brother, PFS FILE, PowerMail, Payroll, PROFILE, SUPERSCRIPSIT, VISICALC, Model 4 BASIC, and many more. Recommended by Prosoft for running Allwrite on your PC.

PC-Four even works with assemblers such as ALDS, EDAS, MZAL and ZEUS and debugger/monitors such as TASMOM so you can write, assemble, debug and run Z80 machine code programs on your PC. To use it you must transfer your old files to MSDOS disks first. For this we recommend PCXZ or Hypercross - see below for details.

Runs on PCs, PS/2s, compatibles and laptops with at least 384K of memory. ONLY emulates Model 4 mode of Model 4.

Prices: Order #PC4 \$79.95 alone, #PC4H \$104.95 with Hypercross SX3PCM4, #PC4Z \$119.95 with PCXZ. Send \$3 for PC4/PCXZ demo disk - refundable on order. Available on 3.5" disk format on request.

## PCXZ reads TRS80 disks on your PC

PC Cross-Zap (PCXZ) is a utility that runs on your PC or PC-compatible. With it you can copy files to or from TRS-80 disks at will. Suitable for all types of files, BASIC, ASCII and Binary. Converts BASIC and text files automatically as you copy. You can also format a disk, copy disks, explore, read and write sector data, repair bad directories and much more. Long after your TRS-80 is gone you will still be able to read your old disks. **Formats Supported:** Model I double density: DOS+ 3.4, DoubleDOS, LDOS (SOLE), MultiDOS, NEWDOS 80 V2, TRSDOS 2.7/8; Model I/III Double Density: DOS+ 3.5, LDOS 5.x. Model III: DOS+ 3.4, MultiDOS, NewDOS 80, TRSDOS 1.3; Model 4/4P: MultiDOS, DOS+ 4, TRSDOS 6., LSDOS 6.3; Max-80: LDOS 5.1. PCXZ supports single or double sided, 35, 40 and 80 track formats. **Requires:** PC, XT, AT or compatible, Tandy 1000 (1000EX needs DMA), 1200, 3000. You must have at least one 5-1/4" 360K, 720K or 1.2M drive and 256K memory. Not for PS/2s: Order # PCXZ .. \$79.95

**The Ultimate Cure:** Some TRS80 disks may be formatted such that the first sector on each track cannot be read on some computers by ANY transfer program. We offer several remedies for this including a hardware adapter that provides a permanent fix. Requires internal installation. Will NOT work with TRSCROSS. Order # A001 .....\$15.00

## Also may we recommend for your PC:

**XenoCopy II** runs on PCs and reads, writes and format 300 different CP/M, CoCo, P-System and other formats. Order # Xeno .....\$81.95

**Uniform-PC** runs on your PC and lets you read, write and format approx. 200 different CP/M and MS-DOS formats. Supports Matchpoint, and Compaticard (see below). Order # UFFC .....\$69.95

**COMPATICARD** disk controller card lets you attach 3.5" (720K or 1.44 Meg), 5.25" (360K, 720K or 1.2 Meg), and 8" disk drives to your PC, XT or AT. Control up to 16 drives with 4 Compaticards. May require Uniform-PC. Order # CCRD .....\$125.00

**UniDOS Z-80 CP/M card** installs in your PC and lets you run CP/M programs on its built in 8 MHz Z80. Includes a free copy of Uniform-PC to transfer your old CP/M programs. Order # UZ80 .....\$175.00

## For the TRS-80.

### Read CP/M CoCo & PC disks on your TRS80

Use **HYPERCROSS** to COPY files between TRS-80 disks and those from many CP/M and IBM-PC type computers on your TRS-80 I, III, 4/4P or Max-80. You can FORMAT alien disks, read their directories, copy files to and from them, copy directly from one alien disk to another. Converts tokenized TRS80 BASIC to MSDOS or CP/M as it copies.

**Formats supported:** IBM-PC and MS-DOS including DOS 1.1, 2.0-3.2 Tandy 2000, single and double sided, 3.5 and 5 inch. CP/M from Aardvark to Zorba, including all popular TRS80 CP/M formats such as Holmes, Montezuma, and Omikron. Also supports CoCo format.

Tried and Tested in 1000s of installations world wide, by Industry, Universities, Government Institutions. Includes 40 page manual.

**HyperCross 3.0 PC** reads/writes MSDOS 1.1-3.x formats only - Order SX3PCM1, SX3PCM3 or SX3PCM4 .....\$49.95

**HyperCross XT/3.0** reads 90 different CP/M and PC formats - Order SX3XTM1, SX3XTM3 or SX3XTM4 .....\$89.95

**HyperCross XT/3.0-Plus** Reads over 220 formats inc CoCo - Order SX3XTM1+, SX3XTM3+ or SX3XTM4+ .....\$129.95

Specify TRS-80 Model I (needs doubler), III, 4/4P or MAX-80. Dual model versions e.g. Mod 3/4 on one disk add \$10 extra.

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# PowerSoft's World Famous Utilities and Software for TRS-80 Computers with Floppies and/or Hard Disks.

**NEW POLICY:** You may buy and examine the manual to any PowerSoft program for only \$10 (plus \$2 shipping). If you decide to purchase the program, we will allow the full \$10 credit against the purchase price.

## **SUPER UTILITY PLUS** • *The greatest utility ever written for the TRS-80. Every TRS-80 magazine said so!*

Five-Star Excellent Reviews in *80-MICRO*, *80-US*, *INFOWORLD*, *POPULAR ELECTRONICS*, *FAMILY COMPUTING*, *Creative Computing* & more!

**"The King of Utilities"** - Reads, repairs and works with all popular TRS-80 operating systems Models I, III, 4.

If you use a TRS-80 with disk drives, then this is a must-have program that you will wonder how you did without for so long! Super Utility has won numerous awards, has received many 5-Star reviews and this could be your last chance to purchase a copy at this unheard of price. Super Utility does so many things, you will never use its full potential, but it isn't that hard to use since it is completely menu-driven with the most common defaults built right in. It is configurable for all the popular TRS-80 operating systems and will even allow you to set one drive for one system and another drive for a different operating system and copy files easily between the two. Even between Model I and III or 4, regardless of density, track number, number of sides, or system used. We have thousands of letters in our files over the years about how Super Utility has saved the user from various problems. Super Utility removes or decodes passwords (strips them right off a disk in one pass), reformats a disk without erasing the data, fixes problems, backs up most protected disks, etc. This was the very best utility ever written for the TRS-80 and now is the time to get your own copy. Super Utility has over 65 functions and features. Too many to describe! A fantastic buy. Does not work on hard disks. Our ToolBox or ToolBelt has similar features for hard drive use, as well as floppy. SU+ does not support Newdos/80 double-sided disks.

**Super Utility Plus (Mod III & I)** - Disk repair, password removal plus 65 other functions with manual. **Wow!!**  
**\$34.95**

**Super Utility Plus 4/4P/4D** (same as above for TRS-80 Model 4, 4P, 4D - Reads/Writes 4, III & I.) **\$34.95**

*Original 1986 price: \$79.95*

The Model 4 version of Super Utility has all the features of the Model I/III version, but more! It uses the larger amount of memory for quicker operations, plus utilizes the three function keys. One key is even defineable by the user to go right to their favorite or most used function in Super Utility 4. Also, boots right up in a Model 4P without having to first load the ModelA/III rom file. Many other niceties for the 4 have been implemented in this version of Super Utility.

## **Extra Super Utility manuals, disks or unprotected disks:**

Need an extra manual for your SUPER UTILITY? Pick up an extra manual (3-hole punched) for only \$10. Need an extra disk? Send \$10 (if registered) for an extra copy. Want the unprotected CMD file version? Send \$20 and your serial number (if registered) and we'll send you the unprotected CMD file version.

**LDOS ToolBox (Hard Disk Check, Repair, Modify, much more! Like a "SU+" for hard disk)** **\$24.95**

> Original 1986 price: \$49.95 - by Kim Watt, author of Super Utility+, PowerMail+ and many more great programs!

If you own a hard disk and use LDOS, this is the perfect insurance policy for your data. The LDOS TOOLBOX is like a Super Utility+ for hard disks. Features Disk Check and Disk Repair, Sector Modification, plus many, many other useful utilities that makes using a hard drive even easier. Each program contains a built-in Help command, so many times you don't even need to look things up in the manual - just press <Enter> for help! A very wise buy for hard disk users.

**Model 4 ToolBelt (same for Model 4 TRSDOS 6 use. OK for 6.3. Like a "SU+" for hard disk)** **\$24.95**

> Original 1986 price: \$49.95 - by Kim Watt, author of Super Utility+, PowerMail+ and many more great programs!

This is similar to The LDOS TOOLBOX, except it is for the Model 4 TRSDOS 6 operating system (all versions).

>>>> BOTH LDOS TOOL BOX AND MODEL 4 TOOLBELT FOR ONLY \$44.95! <<<<

**Back/Rest - Super Fast Hard Disk Backup and Restore. Saves hours of time! For I, III or 4.** **\$34.95**

> Original 1986 price: \$99.95

Initially written for ourselves, BACK/REST has proven to be a great time-saver for thousands of TRS-80 hard drive users. When reviewed by *80-MICRO*, they gave it FIVE STARS - perfect! It saves hours of time and is very easy to use. BACK/REST can back up 10 megabytes in about 18 minutes and 20 meg in about 30-40 minutes. It also tells you how many disks to have ready. Works under LDOS or TRSDOS 6 (both versions on same disk). Great utility for hard disk users!

**Superior Hard Disk Drivers for Tandy disk systems. Mix Model III and 4 easily.** **\$49.95**

> Original 1986 price: \$99.95

Our hard disk drivers are considered the best in the industry. Out-performs the Tandy drivers in many ways. Our drivers allow you to combine LDOS and TRSDOS 6 on the same drive and boot from either system. They run faster and take much less memory from the system. Only for use with Tandy Hard Drives.

**PowerMail Plus (Please specify Model 4, III /I.) 5 Star mailing list-data system!** **\$34.95**

> Original 1986 price: \$99.95

This program was also written for ourselves when all the other mailing list/data base systems couldn't keep track of all the types of data we wanted to keep track of. We needed speed, we needed hard drive support and we needed a crash-proof data structure. PowerMail+ was top-rated (5 stars) in several publications and has never been topped. Works on floppies or hard disk under all popular TRS-80 operating systems. Allows importing of data from several other once popular mailing systems to avoid re-typing. Written in machine language by the author of Super Utility, this program is FAST and sorts up to 10 levels very quickly. If you keep track of names and addresses along with associated data for any situation, this is the one to use. Many churches, organizations and businesses use PowerMail+ for all the different kinds of lists they need to pull from. Each record has 24 user-defineable "flags" to allow total customization for your exact needs.

**Text-Merge Form Letter Module for customized "form letters" for PowerMAIL!** **\$15.00**

This optional module for PowerMail allows you to create customized "form letters" or custom labels, lists, etc. with PowerMail Plus and any word processor that saves text in ASCII format. Very easy to use and really gets the effect you want. Allows completely defineable report generating from your PowerMail+ data.

(Continued on back side)

## PowerSCRIPT - A Major Enhancement for SCRIPSIT 4, III and I (not SuperScripts)

\$24.95

> Original 1986 price: \$39.95

One of our very best sellers, this modification for Radio Shack's SCRIPSIT program turns it into a POWERHOUSE! Our program merges with your copy of SCRIPSIT to create a new program that outperforms most other TRS-80 word processors without relearning a new program! PowerScript adds new features in two important areas. The first area is in the printer control. PowerScript allows you to add printer control codes directly in the body of your text! Now it is easy to add underlining, bold face, the different sizes of print, etc. Initially set up for the EPSON type dot-matrix printers, it is configureable to just about any printer during set-up. If you have more than one printer type, then just set up a copy of PowerScript for each printer you have. The second area of improvement is in disk and file control. PowerScript adds several neat features to SCRIPSIT, including the ability to see an alphabetized directory without exiting the program, seeing how much free space you have, and others. This has been one of our most popular programs and we have received many, many complimentary letters on its performance. It works on the Model I, III or 4 versions of SCRIPSIT. It will even make a Model I version of SCRIPSIT work on a Model III or 4 (in the III mode). Lastly, PowerScript removes the limited copy "feature" of SCRIPSIT so that you may make as many copies as you need or copy it to your hard disk without hassle.

## PowerDraw (animated TRS-80 screen graphics! Easy to use. Great for kids or adults!)

\$19.95

> Original 1986 price: \$39.95 - by Kim Watt

INFOWORLD, 80-MICRO and 80-US magazines really loved this program when they reviewed it. It does many things and is fun to use as well. First, PowerDRAW allows you to create graphics (mixed with text if desired) and save them to disk. It also allows you to create up to 33 "frames" of animation and "play" them like a movie. It also allows you to save the graphics in several modes, including BASIC listings, CMD file format, and others. These can then be merged into your own programs, etc., either in BASIC or machine language! Many of PowerSoft's opening screens were created with PowerDraw. In fact, it even creates animated opening screens (like we use in Super Utility, PowerTool, etc.) to really pep up the program. It also allows you to print the screens on Epson-type and several other types of printers. Lastly, PowerDraw has the ability to load in many types of TRS-80 graphic's and convert them to BASIC listings like a BASIC program generator!

## PowerDOT 2.0 for printers. Mix text with graphics - no problem. Build new fonts.

\$19.95

> Original 1986 price: \$49.95

This program is similar to PowerDraw, but quite different. It allows you to create "hi-res" type screen graphics combined with text, and allows you to create drawings much larger than your screen. The screen is a "window" to a much larger drawing area and you use the arrow keys to move about the drawing. In a way, it is similar to Macpaint for the Macintosh computer. It also allows you to create custom fonts for ads, etc. Many of our early ads were created with PowerDot. It creates the hi-res effect due to each TRS-80 block pixel being printed as a single dot. Please specify if EPSON, Okidata, ProWriter, or Radio Shack printer.

## PowerDriver Plus for SuperSCRIPSIT and SCRIPSIT PRO and Epson printers

\$17.95

Allows EPSON or compatible printers to be fully utilized with SuperScripts.

This is a replacement driver for the ones you got with SuperScripts. It fully supports the various Epson and Epson compatible printers to the limits of their capabilities. Model I, III or 4 is supported in the same package. Easy to install. Once installed, works without any extra thinking. Thousands of happy customers!

## TRS-80 GAME COLLECTIONS ON DISK - for Mod I, III, 4 (in III mode) - Special! All 3 Sets for \$29.95

### Leo Christopherson TRS-80 Animated Game Disk with sound (*Leo's Greatest Hits*)

\$12.95

This is one of the greatest values in games ever produced. Leo Christopherson wrote the very first animated game for the TRS-80 and the country went wild for it, *Android Nim*. To watch these life-like creatures will make everyone laugh as they shake their heads up and down or side to side and blink at you stupidly as it waits for you to make a move. Then Leo invented how to make the TRS-80 produce sound and added it to NIM. He then followed *Android Nim* with the other games, even getting Radio Shack to sell *Dancing Demons*, which is a real scream. It alone is well worth the price of this disk, but you get ALL of Leo's programs on one disk for one great low price. If you haven't yet bought this disk, do it now! It is a classic! Each one of these games originally sold for \$9.95 - \$19.95 EACH. The disk includes the famous games: ANDROID NIM, BEEWARY, DUELING DROIDS, DANCING DEMONS (once sold by Radio Shack for \$14.95), SNAKE EGGS and ANIMATED LIFE. All games feature full sound effects and some of them are even in 3-part harmony! You and your family will just love this disk! *Dancing Demon* even features saving your song and dance routines to disk and four of them are included! The possibilities are endless and it is always entertaining. A great way to "show off" what your computer can do and always fun.

### KIM WATT GAME DISK - Space Colony, Symon, Capture, Horse Race Slots - 3 with Sound

\$ 7.95

Kim Watt, author of *Super Utility* and other famous programs wrote some games that *Adventure International* published back in the early 70's. They are interesting in that most people have never seen these, as by the time *SUPER UTILITY* was established in the market, these games, as well as *Adventure*, were gone. Originally these were sold on three separate diskettes (or tapes), but we have combined them all on one disk for you collectors.

### LANCE MICKLUS' GREATEST GAMES - 3 Disk Set!

\$17.95

This is a great collection as it features space games (*Space Trek*), adventure games (*Dog Star Adventure*), gambling games (*The Mean Craps Machine*, which also includes a *Craps tutorial* booklet on disk), board games (*Mean Checkers Machine*), as well as some darn useful programs that you might use for real purposes. Also has some educational games for the kids. You will enjoy owning this set of programs by one of the early pioneer programmers for the TRS-80, Lance Micklus.

Special! All 3 Game Disk Sets for only \$29.95! Five disks crammed full of games that you and your family will really enjoy!  
If ordering the single density, Model I version of game set, the price is \$34.95.

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## BRAND NEW RELEASE !

- Drivers for HP LaserJet II and other compatible laser printers. Supporting proportional printing, hundreds of type faces, point sizes, symbol sets, bold, medium, light, underline, portrait and landscape, boxes, rules, dotted lines, borders, and shaded backgrounds.
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- Instant "pop-up" display-screen for Key Macro definitions. See how your key macros and special characters are programmed without leaving what you are working on.
- Four Text Editing Windows. Work on four separate documents at the same time. Reference one file while working on another. Move or copy blocks of text from one window to another.
- Automatic display of the Page and Line number of your cursor is on. You don't have to guess what page you are working on or how far to the next page - LeScript tells you automatically.
- Print-to-Disk. Route print output to a disk file instead of to the printer. Great for sending preformatted text to bulletin boards or for checking how LeScript is decoding your commands.
- Built-in warning system alerting you if you try to exit LeScript before saving your text.
- Justification-off command for times when you don't want the between-word spaces to be changed.

LeScript 2.00 also includes built-in 70,000-word spelling checker, automatic footnoting for term papers, multiple columns for newsletters, key-word-search disk file directory for quickly finding files when you don't know their names, proportional space printing on over 250 different printers, and more.

LeScript 2.00 is only \$199.95 for IBM-PC compatible computers, and only \$129.95 for the TRS-80 models 1/3/4/4D/4P. Updates to version 2.00 are available to current registered LeScript owners for only \$40 from version 1.8, \$60 from version 1.7, \$70 from version 1.6, and \$80 from version 1.5 and earlier. Updates come with free instruction addendums, or you can purchase a new LeScript manual for only \$15.00.

**Pick up the phone and call today!**

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Comes with 140-page user manual \_\_\_\_\_

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## UPGRADES FOR YOUR TRS-80 MODELS 1/3/4/4D/4P

### EXPAND YOUR RAM MEMORY UP TO 1,000,000 BYTES

Have you found that 64K just isn't enough? Now you can increase your TRS-80 computer's memory up to 1000K bytes on a Model 4/4D/4P, 768K bytes on a Model 3, and 512K bytes on a Model 1. Can be used as a super-high-speed RAM disk (software included free) - 50 times faster than a floppy drive and 10 times faster than a hard drive. Also increases the amount of text buffer space in the LeScript word processing system - loads files that are as large as 950K. LeScript can also use this extra memory space to hold its 70,000-word dictionary for instant spell checking. A must for the serious computer user. Uses standard 41256 memory chips (not included, call for chip prices). Installs inside your computer and takes only about 1 to 2 hours.

**WAS \$209.90** ..... **Now only \$109.00**

### INCREASE YOUR CPU SPEED TO 6-MHZ

Have you found that you are waiting on your computer to finish a task and wished that it could run just a little bit faster. Now for a small investment, you can increase the internal processing speed of your computer by 50%. Move from only 4MHz up to 6MHz on a gate-array Model 4/4P or from only 3.5-MHz up to 5MHz on a non-gate-array Model 4/4P (older type). Kick your computer out of first gear and up into over-drive. Move into the fast lane and breeze through your work in less time. Kit comes complete with and the parts you need and takes only about 30 minutes to install.

**WAS \$39.95** ..... **Now only \$35.00**

### "PC-SET" IBM PC CHARACTER SET FOR YOUR TRS-80

Now you can have the best of both worlds, TRS-80 characters and IBM-PC characters in one computer. "PC-set" works with LeScript's Line-Draw functions to produce boxes, rule-lines, shaded backgrounds, bar-charts, etc. - right on the screen. A must for publishing flyers, forms, display ads, and the like. Can be used with other programs too. You can select between IBM-PC or TRS-80 characters manually or through software control. You'll love this unique and valuable upgrade. "PC-set" comes complete with all the parts you need, and takes only about 1 hour to install.

"PC-set" for Model 3 and non-gate-array Model 4/4P ..... **Now only \$39.95**

"PC-set" for non-gate-array Model 4/4P ..... **Now only \$59.95**

All our upgrades come with a 30-day, no-questions-asked return guarantee. If for any reason you change your mind after you receive your upgrade, return it within 30 days for a full refund. Our upgrades are also backed by our 90-day fix or replace warrantee. Should any part of your upgrade fail due to manufactured defect, return it within 90 days for a prompt replacement or repair.

Start today with a burst of new power in your TRS-80.

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Please send me these upgrades today.**

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Memory Expansion Upgrade (\$109.00) \_\_\_\_\_

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"PC-set" upgrade (\$39.95/\$59.95) \_\_\_\_\_

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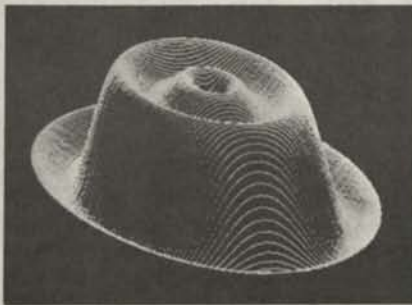
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Exp Date \_\_\_\_\_ Signature \_\_\_\_\_

# Grafyx Solution™ Save \$170.00

## Hi-Resolution Graphics for Mod 4/4D/4P/III



**Superior Hardware.** The Grafyx Solution provides 153,600 pixel elements which are arranged in a 640 x 240 or on the Model III a 512 x 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 x 240, 320 x 240, 160 x 240, and 160 x 120, all of which can be used in the same display.



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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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