NORTHERN BYTES

Volume 6 Number 4

Greetings! Summer is finally here again and I am starting to get caught up with the backlog of mail, articles, etc. from last winter. If you sent me something and haven't yet seen it in NORTHERN BYTES and think that I forgot about it - well, you may be right (I hate to say it, but I'm not the world's most organized person!). Please feel free to drop me a postcard and say "Whatever happened to the article I sent you on .....?" If I have it, I'll dig it out of the pile and try to get it into an upcoming issue, otherwise I'll drop you a card back and let you know that I never received it.

It's not that I don't appreciate the articles you send, but this last winter was unreal. It wasn't just articles, of course, but there was plenty to keep me busy. At times I thought I was going to need a bigger mailbox! So, please forgive me if your article got lost in the shuffle, and please drop me a note if you sent something and haven't seen it yet.

This issue is sort of a "catch up" issue, and contains many articles that I've had around for a while. Because it is being prepared shortly after the previous issue, some of our regular features are shorter than usual or absent altogether. Hopefully these features will return next issue.

I mentioned last issue that we were looking at the idea of putting a BBS type operation for TRS-80 users on a packet network. We've examined various options but haven't found anything we could offer at a super good price. So, if you were hoping this would come to pass, please drop me a line immediately. Unless I hear from several people, I won't go any further with this idea. If I <u>do</u> hear from a number of readers, I will send you a mailing describing the options we have, and let you have some input as to which system we go online with.

The future of NORTHERN BYTES is very much in question. As have mentioned, we're trying one last publicity fling by running a classified ad in <u>Computer Shopper</u>. Unless I get quite a few responses, the next issue may be the last. If you want to see NORTHERN BYTES continue, get your TRS-80-owning friends that have a VISA or Mastercard to send in their card numbers. Remember, this is safe - we do not bill your account until we have actually mailed your copy of NORTHERN BYTES. The cost is $2.00 per issue ($3.00 if you live outside North America and want airmail delivery - you must specify that you want airmail, otherwise we assume surface mail is okay). We will continue to mail you each new issue (and bill your credit card) until you tell us not to, your card expires, or we quit publishing, whichever comes first.

I made a couple of statements last issue that could have been a bit misleading in regard to our circulation. So, here's the straight story: We <u>print</u> about 1500 copies of each issue of NORTHERN BYTES, and eventually these are all distributed. However, we have an actual mailing list of about 350. Of those, somewhere between 50 and 100 are folks who have sent us their card numbers as mentioned above. The rest of the 350 are clubs and user groups, folks who have issues coming because they contributed an article or because they were subscribers to <u>Opinion-80</u> (only a few of those left!), and a few others who get copies for various reasons. The remainder of the 1500 are issues sent free with orders from The Alternate Source, and issues purchased from TAS. Now, as you can see, that means that there are probably about half a million TRS-80 owners out there that don't even know we exist, so tell somebody. We really need at least 2,000 paid (credit card) readers to be able to continue. This would allow the editor to make some money (which would be a brand new experience!) plus it would allow us to eventually get some better equipment (including a Near-Letter Quality printer, which we sorely need).

Note that if we do get two or three thousand credit card subscribers, we will consider that a mandate and will start taking eal "subscriptions". Until then, the credit card method is the only way we have to assure you of getting each new issue as it is published. So, the question arises, what do you do if you don't have a credit card? Well, Charley Butler at The Alternate Source (see their ad at the back of this newsletter for their address) has indicated some willingness to consider sending issues on an "open account" type basis. In other words, he sends you an issue, you send him $2.00. If you don't send the $2.00, you don't get the next issue. This is a lot of hassle and we'd prefer <u>not</u> to use this method, but if you don't have a credit card drop Charley a line and maybe he'll do it for you on an individual basis.

Occasionally someone will send, say, $6.00 and say "Please send the next three issues." What <u>sometimes</u> happens then (depending on who is processing the mail and which address the order is sent to) is that we keep the money and put that person on the mailing list for the three issues, BUT we do not keep any record that money was sent (it appears in our records as if you were an Opinion-80 subscriber with three issues of subscription fulfillment remaining). So, in effect, that person is gambling that we will publish three more issues. If we were to discontinue publication, we would NOT be able to issue a refund since we would have no record that money was sent (and besides, the money would probably have already been spent!). That is why we keep saying that we do NOT take subscriptions. If you have sent money this way in the past, you are hereby advised that you have been playing "Northern Bytes Roulette" and may want to consider switching to the credit card method.

By the way, when ordering copies of Northern Bytes (current or back issues), <u>do not</u> make checks out to "Northern Bytes!" As far as the banks are concerned, we don't exist, so it's an added hassle if you make a check out to us. If you're ordering from The Alternate Source, make the check out to them, <u>not</u> to NORTHERN BYTES.

These opening paragraphs are usually my reflections on various things, and in many cases serve as a letter to all of you since I don't have the time to answer all my mail personally. If you have a question of general interest to Northern Bytes readers that you'd like to see me discuss here, why not drop me a postcard? I'm open to ideas. In the meantime, I hope all of you have a nice summer. I plan to stay away from my computer as much as possible this summer, so if you call me and I say "What's a TRS-80?", you'll know I've been out in the sun too long. Don't worry, summers aren't that long up here - I'll get back to reality sooner or later!

NEWDOS/80 TIME/DATE PATCH

by Paul Fransen

In Northern Bytes Volume 5 Number 4 there is a patch for the date. Instead of the MM/DD/YY format you can use the DD/MM/YY format. This patch fails if the time jumps from 23:59:59 to 00:00:00. If that happens, the month will be incremented instead of the day.

As you probably know, the date you input will be checked (month<13, day<32 and year<99). This is done by comparing with control bytes. The patch mentioned above only disregards the check. A better way is to change the control bytes, so the check can still be done.

The problem can be solved so that the day will be incremented instead of the month, as follows:

The time and date values in memory are in the sequence: seconds, minutes, hours, years, days and months. When the time is updated that sequence is followed. If the time becomes 00:00:00 then the day will be incremented. So the program jumps over the years. We now have changed places (day and month), so there should be an extra jump. It will cost you only one byte, but there is no room left in the program. So, I have searched and found a few free bytes. The bytes can be found at 4CFC. Before you install this patch you had better check to make sure that space is not used by an earlier patch. If it is, then look for other free space.

The patch now is:

SYS0/SYS, sector 01, byte D5: 23 34 C9 becomes C3 FC 4C
(instead of incrementing the month, you will jump to 4CFC)

SYS0/SYS, sector 10, byte 0D: 00 00 00 00 becomes 23 23 34 C9
(the day is incremented and then a jump back)

→

SYS0/SYS, sector 13, byte 88: 4D 4D becomes 44 44
SYS0/SYS, sector 13, byte 8B: 44 44 becomes 4D 4D
(Text "MM/DD" becomes "DD/MM")

SYS0/SYS, sector 13, byte BA: 0C becomes 1F
SYS0/SYS, sector 13, byte BC: 1F becomes 0C
(Control bytes are exchanged)

LETTERS DEPARTMENT

Reminder: Persons sending letters intended for publication should send them on magnetic media or via MCI Mail (especially if longer than a couple of paragraphs). If you are NOT using Allwrite (or Newscript) and your word processor offers the option to save your file in ASCII format, please do so (especially if using SuperScripsit!). Your cooperation in this matter will help us to bring you a better newsletter!

Dear Jack,

I've been meaning to write for some time and tell you how much I appreciate receiving Northern Bytes. Volume 6, Number 1 arrived today, and I'd like to thank you for the kind words about my 80 Micro article.

I also thought I might contribute something to the fray—both an opinion and some information.

First, the opinion: You said in an answer to Jim Smith's letter, "I don't use TRSDOS 6 any more than I can possibly help it." That's too bad, because I think that TRSDOS 6, and especially version 6.2, is without a doubt the best operating system available on any Z-80 system today (and also far better than PC/MS-DOS, but that's another story). If you or any readers don't have version 6.2, RUN, don't walk, to your local RSCC and demand a copy including the new documentation.

Some support for the opinion: first, I have used every DOS that I know of for the Models I/III/4 except TRSDOS 2.7 and an extinct thing called DoubleDOS. I have found no system that is easier to program in, that will do more at a user level, that has as much flexibility and power, as TRSDOS 6.2.

Now before every grabs a poisoned pen to argue vehemently against my praise of TRSDOS 6.2, please realize that I am talking about the DOS, not BASIC, though with the Alternate Basic as well as LSI's BEEP or Micro-System's 6.x PLUS, I prefer 6.2 for BASIC programming as well.

Also, please realize that this comes from someone who was a dyed-in-the-wool NEWDOS 80 fan for a long time. Apparat is still the only company that has realized (on a TRS-80) that files can be longer than a sector, and that there are other possibilities than sequential and "random" access. But Apparat never figured out device independence nor a decent method for programmers to communicate with DOS routines, and their BASIC overlay system is just short of Byzantine.

Anyway, if you decide to print my opinion of TRSDOS 6.2, please ask folks not to write me to argue. I get too much mail as it is, anyway.

Now for the information. Jim Smith asked for an explanation of the TRSDOS device commands: SET, ROUTE, LINK, and FILTER. These commands are more clearly presented in the new 6.2 documentation, but still could use some further explanation. My description will be from both a system and a user's point of view, since I've always believed that understanding how something works is the best way to getting the most out of a system.

The first concept is that absolutely all byte (or character) I/O is completely device-independent under 6.2. The keyboard, the screen, printer port, the RS-232 port, disk files (if you wish—they can also be set up for record I/O), and anything else you can think of are completely independent. The structure of the DOS is such that each device sends and receives bytes in a standard way with standard register configurations.

The importance of that independence is that no device needs to know what other device it is talking to. Want to type directly to a file? No problem. Want to send printer output to your modem? No problem. Want the input from a plotter to go directly to disk file in Memdisk? Again, no problem.

Now to handle all this there are two closely-related data structures: the device control block (DCB) and file control block (FCB). Each is 8 bytes long, and the only difference between the two is a single bit. Any DCB can be set to allow calls for input, output, and/or control sequences. Each DCB is known to the system (and to the user) by a two-character name (which is preceded by an asterisk when TRSDOS and a user talk about them).

Since only a device can be concerned with byte I/O according to the rules of TRSDOS, anytime we want to create a filter or a new device driver, it first must be associated with a device name. The SET command establishes a new device name in the t able of DCBs, and links that device to a /FLT or /DVR program (which are nothing more than /CMD files with a few extra bytes of initialization).

After the DCB has been established and the program moved either to the low-memory driver area or to protected high memory, it must still be attached somehow to the rest of the system. That's where ROUTE, LINK, FILTER and RESET come in. By changing a few bits in each affected DCB, they redirect the flow of byte I/O (and control) requests.

ROUTE simply redirects all I/O from one device to another device. For example, ROUTE *PR *DO sends all printer requests to the screen. The connection stays in place until the first device is RESET.

LINK sends I/O directed to the first device to the second one as well. Again, an example: LINK *DO *DU will send everything that would normally go to the screen to device *DU (whatever that has been SET to) as well.

FILTER is very much like ROUTE — everything that would normally go to the first device is sent to the second instead — except that the system inserts the second device into the I/O path ahead of the first device, and expects that new device to communicate with the second (there are fundamental differences here for a programmer, not a user).

What's interesting about all of this is that no device needs to know ahead of time what other device it is being substituted for or what type of I/O path it is filtering. For example, it is quite easy to set SET *CF CLICK/FLT and then filter the keyboard, the printer, the display, or the RS-232 port with CLICK. Why would anyone want to? Well, I've filtered RS-232 input with CLICK when I was waiting for someone to show up in a CompuServe conference area. As soon as that person does show up, the computer starts clicking and I can return from whatever else I'm doing to talk to them (I usually stop for a second to RESET the RS-232 line first).

There is so much power in these device commands, however, that one must exercise some caution using them. It is quite possible (and very frustrating) to set up a complex series of ROUTEs, LINKs, and FILTERs that wind up as an infinite loop. That's what the DEVICE command is for: it gives a concise description of what everything is doing. Also, note that all these commands are available from BASIC with the SYSTEM command. In several programs, I've included a prompt that asks a user if a report should be sent to the display or printer. If the user wants a printed report, I simply LINK the display and printer in a single command (or ROUTE the display to the printer) instead of having to hassle writing both PRINT and LPRINT statements. Another solution would be to "OPEN" a buffer to device instead of a disk file, and then use PRINT# to send data to that device.

Three other comments about TRSDOS, and what folks will see soon in Micro 80. In my May column, I show how to redesign the user interface. It is easy to add commands, change the way a user sees the system, filter out entire commands, etc. In other words, TRSDOS 6 supports extensive use of shells, and it's a shame that no one has created an extensive series of user shells.

Second, the Model 4 can do windows. In my upcoming June, July, and August columns, I demonstrate a complete window-handler, that allows up to fifteen overlapping windows of any size and restores both the previous screen display and cursor position when window is closed.

I haven't figured out any practical method of mult-tasking on a Model 4 yet (after all, 64K of workspace and a 4 meg clock on a Z-80 are somewhat restrictive), but then I haven't seen really useful multitasking on anything short of a 68000 chip or a VAX anyway.

Last comment: some people have objected to pay to upgrade to 6.2. How much did Apparat charge to change from NEWDOS 2.1 to 80? From 80v1 to 80v2? How much does IBM charge for any DOS at all? Are upgrades from PC/MS-DOS version 1 to version 2 free? How much did Apple users pay to update to PRO-DOS? (only useful with a hard disk, since pathnames on a 128K floppy are superfluous). The new documentation for 6.2 is worth the $20 that registered owners are asked to pay, and the DOS is much better and faster, though you must turn off SMOOTH if you want reliable type-ahead.

Sorry this is so long. You certainly have my permission to publish any, all, or none in Northern Bytes as you see fit. But give 6.2 a serious try--I didn't like 6.0 at first, but I now avoid everything else as much as possible.

Sincerely,
Hardin Brothers

[Just in case any of our readers are so out of touch with the TRS-80 world that they don't recognize the name, Hardin Brothers writes The Next Step column for 80-Micro (and has authored many other useful articles as well). Thanks for all the nice comments, Hardin, and we'll be looking forward to your window-handler series!

By the way, my dislike of TRSDOS 6 is in many ways related to my dislike of LDOS (the father of TRSDOS 6), which I found was a simply awful DOS to try and use on a Model I (that's my opinion, I know others would disagree). But also it has to do with the attitude of some (and I emphasize some) of the people at Logical Systems, Incorporated toward programmers. The attitude I'm referring to is this: "If you are a programmer and write a program and it doesn't work with LDOS, the fault is in your program (EVEN IF IT WORKS FINE UNDER EVERY OTHER DOS) because, after all, LDOS is the only "real" DOS for the TRS-80. You must rewrite your program to work with LDOS."

Under TRSDOS 6 this attitude might be expressed as: "You must NOT directly interact with the DOS or the computer hardware (keyboard, video, printer) in any way other than by using the SVC calls we have provided. For example, if you have a program that requires the user to press a certain combination of keys and our keyboard driver does not decode that combination properly, you will change your program. You must not attempt to directly access the keyboard." Now I can understand that things like ROUTE, LINK, and FILTER won't work properly if you go around bypassing the Device Control Blocks. But in that case you should be able to use an alternate keyboard driver that will provide the needed key combinations, and should not be arbitrarily limited to the combinations that LSI thinks you should be able to use.

I should point out that the portions of the above paragraphs within quotation marks are my interpretation of LSI's attitude toward programmers, and not a direct quotation by any LSI official. I base my interpretation on various writings in the LSI Journal and on conversations with some of the folks at LSI during an "industry get-together" in the summer of '83.

Finally, I have noticed a tendency of both LDOS and the early versions of TRSDOS 6 to go into "silent death" mode (locking up the computer rather than making a graceful exit to an error routine) under some circumstances, while this does not occur on other DOSes. This was a particular problem with Model I LDOS and one reason I finally decided to avoid using it. Perhaps my experiences were not typical, but after all those early frustrations it's pretty hard for me to be objective about the newer versions of TRSDOS 6, especially when I am quite satisfied with the DOS I'm now using. But isn't it nice that we all have a choice - just as you can buy a Chrysler, Ford, or General Motors automobile, you also have your choice of DOSes for the TRS-80, and that competition is probably the main reason that almost ALL of the TRS-80 DOSes are so much better than CP/M or PC/MS-DOS!

I want to make it very clear that regardless of my personal opinion of LDOS/TRSDOS 6, I am still very happy to get submissions for NORTHERN BYTES from users of those DOSes! It may seem at times as though we are only supporting one or two DOSes, but that's only because the users of the other DOSes don't send us much. Believe me, I do NOT throw articles that have anything good to say about a DOS that I don't happen to prefer into the trash can!]

Jack:

Just a note to tell you how much I appreciate Northern Bytes. It is a super newsletter. I am sending the following code for the Model 4 BASIC because it saved my life once:

On the Model 4 you may "protect" BASIC code by using the ,P option. If you ever need to look at that code, you are out of luck unless you unprotect your listing with the following:

```
BASIC 1.1.0  SYSTEM "MEMORY (ADD=X'72CB',WORD='0000')"
BASIC 1.0.0  SYSTEM "MEMORY (ADD=X'6247',WORD='0000')"
```

I can't take credit for locating this, I saw it on the LSI SIG on Compuserve. I have used it, and like I said, it saved me many hours after an oops.

Keep up the good work.

Sincerely, William C. Huffman
2444 39th Court, New Port Richey, Florida 33552

P.S. Question: How do you disable password protection and checking under TRSDOS 6?

[Thanks for the zap! I'm sure others will find it useful. As for your question about password protection, I thought maybe I had published that before, but can't seem to locate it if I did. Readers, can you help?]

Dear Jack:

I found the control of stepping rate in the new Model 4 TASMON very difficult to use. There was no 'smooth' transition from the high speeds (6 and 7) to the low range (which seemed to almost die!). I have patched my version as follows. I now have a smooth slowdown or speedup.

Use the 'Find' command to locate 5F 3D 57 1B. Go BACK three bytes from the located address to see 3A nnnn (the disassembled instruction will be LD A,(nnnn). Now, use the Modify H command, starting at the address of the 3A to change TASMON as follows:

Old	Change to
3A	16
?	00
?	1E
5F	6C
3D	00
57	00
1B	<BREAK>

```
This disassembles to: LD   D,0
                      LD   E,6CH
                      NOP
                      NOP
                      DEC  DE
                      etc.
```

Change the 6CH byte to change the stepping rate if you don't like what you get with my preference.

Best regards, Nate Salsbury
610 Madam Moore's Lane, New Bern, North Carolina 28560

[Nate says this patch should work with all Model 4 versions of TASMON. Thanks, Nate!]

WHERE AM I ?

by A.J. Hagers, Rotterdam, Holland
Translated by Paul Fransen

In some books the ROM code at the addresses 0BH and 0CH is 'not used' and so it is not explained. But it is an interesting segment of code. In the LDOS manual it is documented under the system label @WHERE.

A CALL 0BH will give you in HL the address of the instruction following the CALL. It is the RET address of the CALL. So what? In the appendix of the TRSDOS 6.1 manual you will find an interesting example of its use (program F).

Sometimes you might like relocatable code. But the Z-80 instruction set does not have relative calls. With @WHERE it is possible to simulate a relative call. Here's an example of a relative call to a subroutine named SUBR:

```
        PUSH  HL       ;save...
        PUSH  BC       ;the...
        PUSH  AF       ;registers
        CALL  @WHERE   ;where we are (in HL)
        LD    BC,9     ;number of bytes after the call
        ADD   HL,BC    ;add HL = RET for relative call
        POP   AF       ;restore...
        POP   BC       ;registers
        EX    (SP),HL  ;RET address to stack (HL=original value)
        JR    SUBR     ;jump to subroutine
        ...            ;this is where the return of SUBR
        ...            ;will lead you to

SUBR    ...            ;start of routine
        ...
        RET            ;end of routine

@WHERE  POP   HL       ;address 0BH
        JP    (HL)     ;address 0CH
```

This will cost you 15 bytes, but sometimes it will come in handy. A disadvantage is that relative data fields are not possible. You can solve that by using the IX register (and using an index to call the data). But if there is more than one call, then IX will not be a constant.

SOUP UP GOOD OL' SCRIPSIT

Converting the Grandpa of TRS-80 text processors into a comfortable calculating text editor using NEWDOS/80 version 2

by Joachim Kelterbaum
Frankenstr. 305, 4300 Essen 1, West Germany

Though Scripsit is a very old word processing program, it still is quite useful. I mainly use it for writing short memos, program sources, ASCII- and JCL-files. Recently, a friend of mine asked me for help in his particular application of Scripsit. He processes texts containing quite a few calculations. As these texts do not have fixed formats, there is no way that Visicalc, etc. could be used. While editing the texts with a computer he still needs a pocket calculator to compute the results of calculations done in the text. Seems ridiculous, eh?

I thought of combining the computational capabilities of the BASIC ROM with Scripsit. There should also be a way to pass numbers to the calculating facility without retyping them. Some sort of user keys should be established to pass results back to the text. The routine and zaps supplied below do all this and more. First, a description of how to use this routine so you can figure out whether it's of any use to you:

Function of the calculating Mode

Directly after entering Scripsit by

DO SPS <Enter>

press @I. This will save the tab-line (second line from the bottom) in case you'll need it again for an orientation. It may be restored at any time by pressing @O.

The calculator mode makes use of the two bottom lines of the screen. These will be overwritten with the following text as soon as the calc-mode is entered:

```
C:        V:         ACCU = 0   USER KEY = 0   DEC. = 2
T:             A0: 0.00         A1: 0.00
```

The fields of this command line have the following purposes:

C:	Command field. If you invoke a command from within calc-mode, it will be echoed here.
V:	Value-field to place a temporary constant which can be entered directly.
ACCU = 0	indicates that A0 is currently selected. You can also select A1.
USER KEY = 0	indicates that user key 0 is currently selected. You have access to UK0...UK7.
DEC. = 2	means that results of computations will be transferred with 2 places after the decimal point into the user key buffers. The values transferred will be rounded to 2 places. Calculations are performed with 4 places internally. You may select a transfer of 4 places here.
T:	Temporary register. Each time you enter the calc-mode the value transferred from the text (right after the cursor) will be displayed here. If the text after the cursor does not contain a numerical value, T: will contain 0.
A0: , A1:	are the two accumulators you may select. Results of computations you have invoked are always displayed in the selected accum. After each calculation the result will also be transferred into the buffer of the selected user key.

Invoking the calculator-mode

@P	will transfer the value directly after the cursor position in your text into the T: register. The command lines of the calc-mode will be displayed at the bottom of your screen (if not already there).
@T	acts just as above, but it will also move the contents of T: to the selected accum.
@+	acts as @P, but will also add the contents of T: to the selected accum. Analogous functions may be invoked by: @- , @* , @/ (You need not use the shift key for the selected function: i.e. @; works just like @+).

You may invoke additional functions while being in the calc-mode. These will be discussed later.

Leaving the calculator-mode

<Space>	will leave the calc-mode and leaves the cursor position unchanged. You may go on processing your text.
<right arrow>	performs a tab after leaving calc-mode.
<left arrow>	positions cursor to start of line after leaving.
<down arrow>	advances 1 line after leaving.
<up arrow>	(analogous).

Placing results back into your document (user keys)

If you selected user key 3 (at some time in the calc mode), pressing @3 will write the result of the last calculation into your document at the cursor position.

Caution: As many applications prefer alignment of decimal points, the results will be transferred backwards into the text (as you have a fixed number of places after the decimal point this will be quite handy if combined with tabbing).

If you selected other user keys previously, the contents of their buffers remain unchanged and may be recalled at any time. If you recall a user key that has not been defined yet, nothing will happen. You may call @0...@7.

Commands in calculator mode

Ax	selects accumulator Ax	x = 0...1
Ux	selects user key x	x = 0...7
T	transfer contents of T: register into selected accumulator	
+ , - , * , /	selected accum := selected accum + - * / T: register	
I	Input value into intermediate value register V: Terminate input by <Enter>	
V	transfer V: register to T: register	
0	transfer A0: to T:	
1	transfer A1: to T:	
!	copies A0: to A1:	
R	rounds selected accum to 2 places after decimal point.	
2	Results of calculations will be transferred into the selected user key with 2 places after decimal point.	
4	same as above, but transfers 4 decimal places.	

Actually, it's more complicated to describe the actions than using them. If you combine the above facilities with defining your own tabs, you'll soon feel comfortable with them.

One hint: For a reason I can't explain, you must not use @T as your first invocation of calc-mode. Use @P instead. The program will get stuck if you do @T as your first action. I have not encountered any other bugs so far.

Well, how does all this work?

As I mentioned above, I used the calculating facilities of the BASIC interpreter in the ROM. This has the great advantage of not eating up too much RAM for the additional code needed. It has another disadvantage, though, that at first caused some headaches: Scripsit uses its own stack right in a memory region where BASIC performs some of its vital functions: i.e. 41FCH and below.

First, I had to move the stack out of this area. Another minor problem was the honoring of HIMEM so I could protect my additional code. This was taken care of by Zap 003 supplied by Apparat. Another point was the interception of the @-key to get hands on the invocation of the additional functions. Then, the screen driver had to be intercepted, so I could process the user keys. I disabled the initialization of the tab-line, so I could enter Scripsit with a predefined tab-line. One routine kept clearing the bottom line each time a character was entered. This was uncomfortable, so I disabled it. There still are occasions where the calc-mode command lines are overwritten (for example when moving to the top of text with shift-up arrow or when entering commands via <break>). These disturbances are rare, though. You can always restore the calc-mode command lines by entering this mode. Finally, BASIC had to fix up its pointers properly in order to work correctly. That was an easy one: I started the program with a /JCL file (see below).

Now let's get into detail

Below you find a list of all the Zaps needed to link Scripsit to the calc-mode driver:

Format an empty diskette.

Copy a version of the original SCRIPSIT/LC (version 1.0) to SCRIPSIT/BAK on that disk (use this name!).

Apply the following Zaps to SCRIPSIT/BAK. These Zaps contain ZAP 003 supplied by Apparat (don't panic, if those are applied already).

FRS	rel.Byte	old	new	Comment
00	64	21 FF 00 25 7E 2F 77 AE 20 F9	2A 49 40 00 00 00 00 00 00 00	ZAP 003
00	B8	CD 1D 69	00 00 00	DON'T CLEAR TAB LINE
00	C4	F3	00	ZAP 003
00	D5	41	FF	RELOCATE STACK
04	34	41	FF	RELOCATE STACK
07	02	41	FF	REL. STACK
11	77	CD 6E 7A	3A B9 7C	ZAP 003
11	FC	C4 EF 5D 79	32 B6 7C C4	ZAP 003
12	00	32 B9 7C	EF 5D 00	ZAP 003
12	65	41	FF	REL. STACK
14	9D	21 36 40	C3 03 F6	INTERCEPT USER KEY-REQUEST
15	7D	3A 01 38	C3 00 F6	KEYBOARD INTERCEPT @
17	54	41	FF	REL. STACK
19	E5	00 00	2D 40	EXIT-ZAP
26	55	E5	C9	DISABLE CLEAR CMD-LINE SBR.
28	CF	41	FF	REL. STACK
30	EF	41	FF	REL. STACK
40	E7	41	FF	REL. STACK

Part 2 of the preparations is easy: Write a /JCL file SPS/JCL with the following contents:

```
BASIC
CMD"S
SPSMOD
```

The last part of the necessary modifications is just a little harder: Enter the program at the end of this article into your EDTASM and save the compiled code as SPSMOD/CMD.

Now you're all set. If you didn't make any mistakes, you invoke your brand new 'old Scripsit' by

DO SPS <Enter>

If you don't have the patience of entering all this stuff into your computer, ask Jack, if he'll put it into one of the public domain disks to come out.

[Will do, as soon as I can find enough spare time to put another PD disk together! -Jack]

```
                00100 ;-----------------------------------------------
                00110 ;
                00120 ;             SPSMOD/SRC
                00130 ;
                00140 ;a Driver Program to add calculator-mode capability
                00150 ;             to SCRIPSIT/LC
                00160 ;
                00170 ;                 VER 1.2   04-03-1985
                00180 ;
                00190 ;by Joachim Kelterbaum, Frankenstr. 305, 4300 Essen 1
                00200 ;                       W. Germany
                00210 ;
                00220 ;Comments in this source code rather refer to logical
                00230 ;segments than to each single statement. Please, refer
                00240 ;to Jack Decker's 'TRS80 Rom Routines Documented' for a
                00250 ;detailed explanation of the ROM-calls referenced here
                00260 ;(That book is well worth it's weight in gold)!
                00270 ;
                00280 ;----------------------------------------------
                00290 ;
7EB3            00300        ORG    7EB3H   ;Initialization of a predefined
7EB3 0101       00310 TABTBL DEFW   0101H   ;Tab-Line in Scripsit
7EB5 0101       00320        DEFW   0101H
7EB7 0101       00330        DEFW   0101H
7EB9 0100       00340        DEFW   0001H
7EBB 0000       00350        DEFW   0H
7EBD 0000       00360        DEFW   0H
7EBF 0000       00370        DEFW   0H
7EC1 0000       00380        DEFW   0H
7EC3 0000       00390        DEFW   0H
7EC5 0000       00400        DEFW   0H
7EC7 0000       00410        DEFW   0H
7EC9 0000       00420        DEFW   0H
7ECB 0000       00430        DEFW   0H
7ECD 0000       00440        DEFW   0H
7ECF 0000       00450        DEFW   0H
7ED1 0000       00460        DEFW   0H
                00470 ;
                00480 ;
5200            00490        ORG    5200H
5200 21AAF6     00500 START  LD     HL,BUFRT         ;Initialize user key
5203 2B         00510        DEC    HL               ;buffer with 0's
5204 0680       00520        LD     B,128
5206 3E00       00530        LD     A,0
5208 77         00540 MLT    LD     (HL),A
5209 23         00550        INC    HL
520A 10FC       00560        DJNZ   MLT
520C 2100F6     00570        LD     HL,SCRMOD        ;update HIMEM value
520F 2B         00580        DEC    HL
5210 224940     00590        LD     (4049H),HL       ;plug into HIMEM
                00600 ;
5213 211952     00610        LD     HL,TX            ;start SCRIPSIT/BAK
5216 C30544     00620        JP     4405H
5219 53         00630 TX     DEFM   'SCRIPSIT/BAK'
     43 52 49 50 53 49 54 2F 42 41 4B
5225 0D         00640        DEFB   0DH
                00650 ;
                00660 ;
F600            00670        ORG    0F600H
F600            00680 SCRMOD EQU    $
F600 C306F6     00690 KBDINT JP     KBDI    ;link address KBDINT in Scripsit
F603 C3EAF7     00700 UKREQ  JP     UKRQ    ;  "     "     UK-request  "
                00710 ;                      (see Zap-table)
                00720 ;
F606 3A0138     00730 KBDI   LD     A,(3801H);this instruction was overzapped
                00740                       ;by JP KBDINT in Scripsit. It
                00750                       ;will be executed here.
F609 E601       00760        AND    1       ;NZ = '@' was pressed
F60B 7A         00770        LD     A,D     ;get key pressed with '@', if so
F60C 2003       00780        JR     NZ,WTX
F60E C36761     00790        JP     6167H   ;back to Scripsit, if no '@' key
                00800 ;
F611 FE50       00810 WTX    CP     'P'     ;was it '@P' ?
F613 2869       00820        JR     Z,CLCMOD        ;if so, enter CLCMOD
F615 FE54       00830        CP     'T'     ; same as above
F617 2865       00840        JR     Z,CLCMOD
F619 FE2B       00850        CP     '+'
F61B 2861       00860        JR     Z,CLCMOD
F61D FE3B       00870        CP     ';'
F61F 285D       00880        JR     Z,CLCMOD
F621 FE2D       00890        CP     '-'
F623 2859       00900        JR     Z,CLCMOD
F625 FE2A       00910        CP     '*'
F627 2855       00920        JR     Z,CLCMOD
F629 FE3A       00930        CP     ':'
F62B 2851       00940        JR     Z,CLCMOD
```

```
F62D FE2F      00950         CP      '/'
F62F 284D      00960         JR      Z,CLCMOD
F631 FE4F      00970         CP      'O'
F633 2850      00980         JR      Z,RSTIT ;restore tab-line
F635 FE49      00990         CP      'I'
F637 2862      01000         JR      Z,INIT  ;initialize tab-line
F639 FE38      01010         CP      38H     ;else, if not 0...7 -> NOTHG
F63B 3008      01020         JR      NC,NOTHG
F63D FE2F      01030         CP      2FH
F63F 3804      01040         JR      C,NOTHG
F641 D630      01050         SUB     30H     ;0...7 pressed
F643 1803      01060         JR      DSPUSK  ;display that user key
F645 C34561    01070 NOTHG   JP      6145H   ;->Scripsit,if none of the
               01080 ;                          above keys
F648 C5        01090 DSPUSK  PUSH    BC      ;display user key routine
F649 D5        01100         PUSH    DE      ;save reg's
F64A E5        01110         PUSH    HL
F64B 010000    01120         LD      BC,0    ;initialize BC
F64E FE00      01130         CP      0       ;is it the termination char 0 ?
F650 280C      01140         JR      Z,NULLX ;yes -> NULLX
F652 47        01150         LD      B,A     ;get # of user key to B
F653 210000    01160         LD      HL,0    ;add 16 to HL # times
F656 111000    01170         LD      DE,16   ;16 is the length of each user
F659 19        01180 ADRIX   ADD     HL,DE   ;key buffer
F65A 10FD      01190         DJNZ    ADRIX
F65C E5        01200         PUSH    HL
F65D C1        01210         POP     BC      ;put result into BC
F65E 21AAF6    01220 NULLX   LD      HL,BUFRT;calculate start address
F661 09        01230         ADD     HL,BC   ;of user key buffer
F662 011000    01240         LD      BC,16   ;search for 0 terminator
F665 3E00      01250         LD      A,0     ;within this buffer
F667 EDB1      01260         CPIR
F669 2B        01270         DEC     HL
F66A 2B        01280         DEC     HL      ;points to last char in UK-buf
F66B 22A6F6    01290         LD      (PTR),HL;-> PTR (key will be processed
F66E 3E01      01300         LD      A,1     ;/backwards/ init. flag for
F670 32A8F6    01310         LD      (FLAG),A;user key not yet processed
F673 3E00      01320         LD      A,0     ;init. flag of
F675 3230F8    01330         LD      (JMPFLG),A;count for backspaces
F678 E1        01340         POP     HL
F679 D1        01350         POP     DE      ;restore reg's
F67A C1        01360         POP     BC
F67B C36761    01370         JP      6167H   ;back to Scripsit
               01380 ;                  Processing of the actual user
               01390 ;                  key will be taken care of by
               01400 ;                  the intercepted screen-driver
               01410 ;
F67E 08        01420 CLCMOD  EX      AF,AF'  ;call to calc-mode: save A
F67F CD31F8    01430         CALL    CALCUP  ;call it
F682 C37961    01440         JP      6179H   ;back to Scripsit
               01450 ;
F685 E5        01460 RSTIT   PUSH    HL      ;restore tab-line
F686 D5        01470         PUSH    DE      ;it's a simple LDIR
F687 C5        01480         PUSH    BC
F688 21AAF7    01490         LD      HL,CURSAV
F68B 11803F    01500         LD      DE,3F80H
F68E 014000    01510 MOVEX   LD      BC,64
F691 EDB0      01520         LDIR
F693 C1        01530         POP     BC
F694 D1        01540         POP     DE
F695 E1        01550         POP     HL
F696 3E00      01560         LD      A,0     ;simulate: no key pressed
F698 C36761    01570         JP      6167H   ;back to Scripsit
               01580 ;
F69B E5        01590 INIT    PUSH    HL      ;save tab-line
F69C D5        01600         PUSH    DE      ;same as above
F69D C5        01610         PUSH    BC
F69E 21803F    01620         LD      HL,3F80H
F6A1 11AAF7    01630         LD      DE,CURSAV
F6A4 18E8      01640         JR      MOVEX
               01650 ;
               01660 ;
F6A6 AAF6      01670 PTR     DEFW    BUFRT   ;pointer to actual byte pro-
               01680 ;                   cessed by user key
F6A8 00        01690 FLAG    DEFB    0       ;UK-processed flag
F6A9 00        01700         DEFB    0       ;safety UK buffer delimiter
F6AA           01710 BUFRT   EQU     $
0080           01720         DEFS    128     ;USER KEY BUFFER
               01730 ;
               01740 ;
```

```
F72A 43        01750 CMDLIN  DEFM    'C:          V:          ACCU = 0   USER KEY
                                                           = 0   DEC. = 2      '
     3A 20 20 20 20 20 20 20 20 20 20 56 3A 20 20 20
     20 20 20 20 20 20 20 41 43 43 55 20 3D 20 30 20
     20 20 55 53 45 52 20 4B 45 59 20 3D 20 30 20 20
     20 44 45 43 2E 20 3D 20 32 20 20 20 20 20 20
F76A 54        01760         DEFM    'T:                   A0: 0.00          A1:
                                                     0.00
     3A 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
     41 30 3A 20 30 2E 30 30 20 20 20 20 20 20 20 20
     20 20 41 31 3A 20 30 2E 30 30 20 20 20 20 20 20
     20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
0040           01770 CURSAV  DEFS    40H     ;CURSOR LINE BUFFER
               01780 ;
               01790 ;
F7EA F5        01800 UKRO    PUSH    AF      ;process user key call via 0x
F7EB 3AA8F6    01810         LD      A,(FLAG)
F7EE FE00      01820         CP      0       ;is UK being invoked
F7F0 2837      01830         JR      Z,OUT   ;no -> OUT
F7F2 3A30F8    01840         LD      A,(JMPFLG);backspaces processed
F7F5 FE00      01850         CP      0
F7F7 280F      01860         JR      Z,CHRDS ;yes, display next char
F7F9 3C        01870         INC     A       ;inc. backspace count
F7FA FE03      01880         CP      3       ;is it 3 yet ?
F7FC 2002      01890         JR      NZ,KLAR ;no , backspace
F7FE 3E00      01900         LD      A,0     ;yes, reset count to 0
F800 3230F8    01910 KLAR    LD      (JMPFLG),A;save count of backspaces
F803 F1        01920         POP     AF      ;perform
F804 3E9E      01930         LD      A,9EH   ;1 backspace
F806 B7        01940         OR      A       ;simulate: no key pressed
F807 C9        01950         RET             ;back to Scripsit
               01960 ;
F808 3C        01970 CHRDS   INC     A       ;display next char of UK-buffer
F809 3230F8    01980         LD      (JMPFLG),A;inc backspace counter
F80C F1        01990         POP     AF
F80D E5        02000         PUSH    HL
F80E 2AA6F6    02010         LD      HL,(PTR);get pointer to UK-char
F811 7E        02020         LD      A,(HL)  ;put into A
F812 FE20      02030         CP      ' '     ;is it a space ?
F814 280B      02040         JR      Z,OUT2
F816 FE00      02050         CP      0       ;or a 0 ?
F818 2807      02060         JR      Z,OUT2  ;then terminate
F81A 2B        02070         DEC     HL      ;update
F81B 22A6F6    02080         LD      (PTR),HL;pointer
F81E E1        02090         POP     HL
F81F B7        02100         OR      A       ;clear flags
F820 C9        02110         RET             ;return to Scripsit. Display
               02120 ;                  char. in A
F821 3E00      02130 OUT2    LD      A,0     ;reset
F823 32A8F6    02140         LD      (FLAG),A;flag
F826 E1        02150         POP     HL
F827 1801      02160         JR      OK
               02170 ;
F829 F1        02180 OUT     POP     AF
F82A 213640    02190 OK      LD      HL,4036H;back to Scripsit with no
F82D C36460    02200         JP      6064H   ;key pressed
               02210 ;
F830 00        02220 JMPFLG  DEFB    0       ;counter for backspaces
               02230 ;
               02240 ;
               02250 ;
F831           02260 CALCUP  EQU     $       ;calc-Subroutine
F831 F5        02270 SPZ     PUSH    AF
F832 C5        02280         PUSH    BC      ;save reg's
F833 D5        02290         PUSH    DE
F834 E5        02300         PUSH    HL
F835 D9        02310         EXX             ;get cursor-
F836 22ABFB    02320         LD      (CADR),HL;address of Scipsit
F839 D9        02330         EXX             ; (in HL')
F83A CD0FFB    02340         CALL    UNPLUG  ;disable disk BASIC exits
F83D CDACFA    02350         CALL    DSPBUF  ;display CMD-line
F840 CDA0FA    02360         CALL    CLRCMB  ;clear CMD-buffer
F843 21C23F    02370         LD      HL,TAD  ;clear T:-field
F846 060F      02380         LD      B,15
F848 CDA5FA    02390         CALL    CLIT
F84B 2AABFB    02400         LD      HL,(CADR);point to char
F84E 23        02410         INC     HL      ;behind cursor position
F84F 11C23F    02420         LD      DE,TAD  ;and transfer num. value in
F852 CDD0FA    02430         CALL    TFER    ;Scripsit text into T: buffer
F855 CDDDFA    02440         CALL    TKOVR   ;edit value with 4 dec. places
F858 08        02450         EX      AF,AF'
```

```
F859 FE50     02460        CP     50H     ;was it called by @P ?
F85B 2802     02470        JR     Z,GETKY ;yes -> get second CMD
F85D 1803     02480        JR     GETKA   ;else:
F85F CD4900   02490 GETKY  CALL   49H     ;calc-mode CMD-input loop
F862 FE2B     02500 GETKA  CP     '+'     ;was it @+ ?
F864 CA3EF9   02510        JP     Z,ADDI  ; so -> ADDI
F867 FE3B     02520        CP     ';'     ;was it @; ?
F869 CA3EF9   02530        JP     Z,ADDI  ; so -> ADDI
F86C FE2D     02540        CP     '-'     ; ... etc.
F86E CA61F9   02550        JP     Z,SUBTR
F871 FE2A     02560        CP     '*'
F873 CA6CF9   02570        JP     Z,MULTP
F876 FE3A     02580        CP     ':'
F878 CA6CF9   02590        JP     Z,MULTP
F87B FE21     02600        CP     '!'
F87D CABCFA   02610        JP     Z,TON1
F880 FE2F     02620        CP     '/'
F882 CA77F9   02630        JP     Z,DIVP
F885 FE5B     02640        CP     91      ;UPAR
F887 CA23FA   02650        JP     Z,UPARR
F88A FE0A     02660        CP     0AH
F88C CA27FA   02670        JP     Z,DOWARR
F88F FE09     02680        CP     9
F891 CA2BFA   02690        JP     Z,TABI
F894 FE08     02700        CP     8
F896 CA2FFA   02710        JP     Z,BACKAR
F899 FE20     02720        CP     ' '     ;blank goes back to Scripsit
F89B CA1BFA   02730        JP     Z,BACK0
F89E FE30     02740        CP     '0'     ;see manual for detailed
F8A0 CAFCF9   02750        JP     Z,AC0T  ;description of commands
F8A3 FE31     02760        CP     '1'
F8A5 CA10FA   02770        JP     Z,AC1T
F8A8 FE32     02780        CP     '2'
F8AA CA6CFA   02790        JP     Z,ZWEI
F8AD FE34     02800        CP     '4'
F8AF CA7EFA   02810        JP     Z,VIER
F8B2 E65F     02820        AND    5FH
F8B4 FE41     02830        CP     'A'
F8B6 CAF2F8   02840        JP     Z,SLACC
F8B9 FE54     02850        CP     'T'
F8BB CA18F9   02860        JP     Z,TFACCU
F8BE FE55     02870        CP     'U'
F8C0 CA82F9   02880        JP     Z,UKSEL
F8C3 FE49     02890        CP     'I'
F8C5 CAB3F9   02900        JP     Z,INPUT
F8C8 FE56     02910        CP     'V'
F8CA CAE0F9   02920        JP     Z,KSTTF
F8CD FE52     02930        CP     'R'
F8CF CA34FA   02940        JP     Z,ROUND
F8D2 C35FF8   02950        JP     GETKY   ;illegal CMD -> input loop
F8D5 CDA0FA   02960 BACK   CALL   CLRCMB  ;clear CMD-buffer
F8D8 CDB8FA   02970        CALL   SAVBUF  ;save CMD-line
F8DB 3A8038   02980 REPT   LD     A,(3880H);make shure, no more
F8DE 214038   02990        LD     HL,3840H;shift or arrow keys are
F8E1 B6       03000        OR     (HL)    ;pressed
F8E2 20F7     03010        JR     NZ,REPT
F8E4 010003   03020        LD     BC,300H ;debounce delay
F8E7 CD6000   03030        CALL   60H
F8EA E1       03040        POP    HL
F8EB D1       03050        POP    DE      ;restore reg's
F8EC C1       03060        POP    BC
F8ED F1       03070        POP    AF
F8EE 3A33FA   03080        LD     A,(FCB) ;load cursor-pos. char into
F8F1 C9       03090        RET            ;Scripsit accu and -> back
              03100 ;
F8F2 212DFC   03110 SLACC  LD     HL,ACMS ;select accu routine
F8F5 CDC4FA   03120        CALL   DISPL   ;display CMD-text
F8F8 CD4900   03130        CALL   49H     ;input # of accu
F8FB D630     03140        SUB    30H
F8FD E601     03150        AND    1
F8FF F5       03160        PUSH   AF
F900 C630     03170        ADD    A,30H
F902 329F3F   03180        LD     (ACAD),A;dislpay at ACCU = field
F905 F1       03190        POP    AF
F906 FE01     03200        CP     1       ;was it #1 ?
F908 2809     03210        JR     Z,AC1S  ;so -> AC1S
F90A 21D43F   03220        LD     HL,A0AD ;select A0
F90D 2274FB   03230 OK1    LD     (ACTACC),HL;store accu selected to ACTACC
F910 C35FF8   03240        JP     GETKY   ;back to input loop
F913 21E63F   03250 AC1S   LD     HL,A1AD ;select A1
F916 18F5     03260        JR     OK1
```

```
              03270 ;
F918 2130FC   03280 TFACCU LD     HL,TFMS ;T:->sel. accu routine
F91B CDC4FA   03290        CALL   DISPL   ;display CMD-text
F91E 2A74FB   03300        LD     HL,(ACTACC)
F921 060F     03310        LD     B,15
F923 CDA5FA   03320        CALL   CLIT    ;clear sel. accu
F926 21C23F   03330        LD     HL,TAD
F929 ED5B74FB 03340        LD     DE,(ACTACC);transfer T: to that
F92D 010F00   03350        LD     BC,15   ;accu
F930 EDB0     03360        LDIR
F932 010010   03370        LD     BC,1000H;pause for a while
F935 CD6000   03380        CALL   60H
F938 CD3FFB   03390        CALL   UKTFR   ;update selected user key
F93B C35FF8   03400        JP     GETKY   ;back to input loop
              03410 ;
F93E 2143FC   03420 ADDI   LD     HL,ADMS ;add to sel. accu routine
F941 CDC4FA   03430        CALL   DISPL   ;display CMD-line
F944 3ECD     03440        LD     A,0CDH  ;load '+' token to
F946 328CFB   03450 GOON   LD     (TOKEN),A; (TOKEN)
F949 CD1CFB   03460        CALL   TRANS   ;transfer operands ->OP1,OP2 fields
F94C C34FF9   03470        JP     EVAL    ;evaluate expression
              03480 ;
F94F 2176FB   03490 EVAL   LD     HL,OP1  ;eval. expr. text at
F952 CD3723   03500        CALL   2337H   ;OP1+TOKEN+OP2
F955 2A74FB   03510        LD     HL,(ACTACC);display result in
F958 CDF2FA   03520        CALL   ACDSP   ;sel. accu
F95B CD3FFB   03530        CALL   UKTFR   ;update user key
F95E C35FF8   03540        JP     GETKY   ;back to input loop
              03550 ;
F961 214EFC   03560 SUBTR  LD     HL,SUBMS; analogous to ADDI
F964 CDC4FA   03570        CALL   DISPL
F967 3ECE     03580        LD     A,0CEH
F969 C346F9   03590        JP     GOON
              03600 ;
F96C 2159FC   03610 MULTP  LD     HL,MUMS ;see above
F96F CDC4FA   03620        CALL   DISPL
F972 3ECF     03630        LD     A,0CFH
F974 C346F9   03640        JP     GOON
              03650 ;
F977 2164FC   03660 DIVP   LD     HL,DIMS ;see above
F97A CDC4FA   03670        CALL   DISPL
F97D 3ED0     03680        LD     A,0D0H
F97F C346F9   03690        JP     GOON
              03700 ;
F982 216FFC   03710 UKSEL  LD     HL,UKMS ;select user key routine
F985 CDC4FA   03720        CALL   DISPL   ;display CMD-text
F988 CD4900   03730        CALL   49H     ;input UK #
F98B D630     03740        SUB    30H
F98D E607     03750        AND    7       ;mask 0...7
F98F F5       03760        PUSH   AF
F990 C630     03770        ADD    A,30H
F992 32AE3F   03780        LD     (UKAD),A;display sel. value in USER KEY
F995 F1       03790        POP    AF      ;/field/ calculate start address
F996 010000   03800        LD     BC,0    ;of sel. user key buffe
F999 FE00     03810        CP     0       ;(base = BUFRF + # * 16)
F99B 280C     03820        JR     Z,NULL
F99D 47       03830        LD     B,A
F99E 210000   03840        LD     HL,0
F9A1 111000   03850        LD     DE,16
F9A4 19       03860 ADRIT  ADD    HL,DE
F9A5 10FD     03870        DJNZ   ADRIT
F9A7 E5       03880        PUSH   HL
F9A8 C1       03890        POP    BC
F9A9 21AAF6   03900 NULL   LD     HL,BUFRT
F9AC 09       03910        ADD    HL,BC
F9AD 2276FB   03920        LD     (USRKAD),HL;put result there
F9B0 C35FF8   03930        JP     GETKY   ;back to input loop
              03940 ;
F9B3 217AFC   03950 INPUT  LD     HL,INMS ;input value to V: routine
F9B6 CDC4FA   03960        CALL   DISPL   ;display CMD-line
F9B9 210E3F   03970        LD     HL,KAD  ;clear V: buffer
F9BC 060A     03980        LD     B,10
F9BE CDA5FA   03990        CALL   CLIT
F9C1 210E3F   04000        LD     HL,KAD  ;place cursor there
F9C4 222040   04010        LD     (4020H),HL
F9C7 CD4900   04020 WTR    CALL   49H     ;input char string
F9CA FE0D     04030        CP     0DH     ;up to <Enter>
F9CC 280F     04040        JR     Z,ENTER
F9CE CD3300   04050        CALL   33H
F9D1 E5       04060        PUSH   HL
F9D2 C5       04070        PUSH   BC
```

```
F9D3 010010   04080          LD     BC,1000H
F9D6 CD6000   04090          CALL   60H
F9D9 C1       04100          POP    BC
F9DA E1       04110          POP    HL
F9DB 18EA     04120          JR     WTR
F9DD C35FF8   04130 ENTER    JP     GETKY   ;back to input loop
              04140 ;
F9E0 2185FC   04150 KSTTF    LD     HL,KTMS ;transfer V: to T: routine
F9E3 CDC4FA   04160          CALL   DISPL   ;display CMD-line
F9E6 21C23F   04170          LD     HL,TAD  ;clear T: field
F9E9 060F     04180          LD     B,15
F9EB CDA5FA   04190          CALL   CLIT
F9EE 218E3F   04200          LD     HL,KAD  ;transfer
F9F1 11C23F   04210          LD     DE,TAD
F9F4 010A00   04220          LD     BC,10
F9F7 EDB0     04230          LDIR
F9F9 C35FF8   04240          JP     GETKY   ;back to input loop
              04250 ;
F9FC 2190FC   04260 AC0T     LD     HL,A0MS ;transfer A0->T: routine
F9FF CDC4FA   04270          CALL   DISPL
FA02 21D43F   04280          LD     HL,A0AD
FA05 11C23F   04290 MOVE     LD     DE,TAD
FA08 010F00   04300          LD     BC,15
FA0B EDB0     04310          LDIR
FA0D C35FF8   04320          JP     GETKY
              04330 ;
FA10 219BFC   04340 AC1T     LD     HL,A1MS ;transfer A1->T:
FA13 CDC4FA   04350          CALL   DISPL
FA16 21E63F   04360          LD     HL,A1AD
FA19 18EA     04370          JR     MOVE
              04380 ;
FA1B 3E00     04390 BACK0    LD     A,0     ;back to Scripsit (cursor unchanged)
FA1D 3233FA   04400 BCOT     LD     (FGB),A
FA20 C3D5F8   04410          JP     BACK    ;back to Scripsit with:
FA23 3E9B     04420 UPARR    LD     A,9BH   ;cursor up 1 line
FA25 18F6     04430          JR     BCOT
FA27 3E9C     04440 DOWARR   LD     A,9CH   ;cursor down 1 line
FA29 18F2     04450          JR     BCOT
FA2B 3E1F     04460 TABI     LD     A,1FH   ;cursor to next tab
FA2D 18EE     04470          JR     BCOT
FA2F 3E8E     04480 BACKAR   LD     A,8EH   ;cursor to start of line
FA31 18EA     04490          JR     BCOT
              04500 ;
FA33 00       04510 FGB      DEFB   0
              04520 ;
FA34 21A6FC   04530 ROUND    LD     HL,RDMS ;round sel. accu to 2 dec's
FA37 CDC4FA   04540          CALL   DISPL   ;display CMD-line
FA3A CD1CFB   04550          CALL   TRANS   ;sel. accu ->OP1; T:->OP2
FA3D 2171FB   04560          LD     HL,NULLST;simulate "OP1 + 0"
FA40 118CFB   04570          LD     DE,TOKEN
FA43 010300   04580          LD     BC,3
FA46 EDB0     04590          LDIR
FA48 2178FB   04600          LD     HL,OP1  ;evaluate
FA4B CD3723   04610          CALL   2337H
FA4E 2A74FB   04620          LD     HL,(ACTACC)
FA51 E5       04630          PUSH   HL      ;edit accum
FA52 0609     04640          LD     B,9     ;with 2 dec's after '.'
FA54 0E03     04650          LD     C,3
FA56 3E80     04660          LD     A,80H
FA58 CDBE0F   04670          CALL   0FBEH
FA5B D1       04680          POP    DE
FA5C 010C00   04690          LD     BC,12
FA5F EDB0     04700          LDIR           ;result back to sel. accu
FA61 3E20     04710          LD     A,' '
FA63 12       04720          LD     (DE),A
FA64 13       04730          INC    DE
FA65 12       04740          LD     (DE),A
FA66 CD3FFB   04750          CALL   UKTFR   ;tranfser to user key
FA69 C35FF8   04760          JP     GETKY
              04770 ;
FA6C 21B93F   04780 ZWEI     LD     HL,NKAD ;select 2 dec's user key routine
FA6F 77       04790          LD     (HL),A  ;display '2' at 'DEC. ='
FA70 21B1FC   04800          LD     HL,ZWMS ;display CMD-line
FA73 CDC4FA   04810          CALL   DISPL
FA76 3E00     04820          LD     A,0     ;STFLG=0 means 2 dec's
FA78 32A2FB   04830 ZWENT    LD     (STFLG),A
FA7B C35FF8   04840          JP     GETKY
              04850 ;
FA7E 21B93F   04860 VIER     LD     HL,NKAD ;same as above with 4 dec's
FA81 77       04870          LD     (HL),A
FA82 21BCFC   04880          LD     HL,VIMS
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```
FA85 CDC4FA   04890          CALL   DISPL
FA88 3E01     04900          LD     A,1     ;STFLG=1 means 4 dec's
FA8A 18EC     04910          JR     ZWENT
              04920 ;
FA8C 21C7FC   04930 T0A1     LD     HL,T01MS;transfer A0->A1 routine
FA8F CDC4FA   04940          CALL   DISPL
FA92 21D43F   04950          LD     HL,A0AD
FA95 11E63F   04960          LD     DE,A1AD
FA98 010F00   04970          LD     BC,15
FA9B EDB0     04980          LDIR
FA9D C35FF8   04990          JP     GETKY
              05000 ;
FAA0 21823F   05010 CLRCMB   LD     HL,CAD  ;clear CMD-buffer
FAA3 060A     05020          LD     B,10
FAA5 3E20     05030 CLIT     LD     A,20H   ;write (B) blanks into it
FAA7 77       05040 CLCB     LD     (HL),A
FAA8 23       05050          INC    HL
FAA9 10FC     05060          DJNZ   CLCB
FAAB C9       05070          RET
              05080 ;
              05090 ;
FAAC 212AF7   05100 DSPBUF   LD     HL,CMDLIN;display CMD-line routine
FAAF 11803F   05110          LD     DE,3F80H ;i.e. char's after C: in
FAB2 018000   05120          LD     BC,128  ;CMD-line
FAB5 EDB0     05130          LDIR
FAB7 C9       05140          RET
              05150 ;
FAB8 21803F   05160 SAVBUF   LD     HL,3F80H;save CMD-line
FABB 112AF7   05170          LD     DE,CMDLIN
FABE 018000   05180          LD     BC,128
FAC1 EDB0     05190          LDIR
FAC3 C9       05200          RET
              05210 ;
              05220 ;
FAC4 E5       05230 DISPL    PUSH   HL      ;display message in (HL)
FAC5 21823F   05240          LD     HL,CAD  ;at C: field
FAC8 222040   05250          LD     (4020H),HL; on screen
FACB E1       05260          POP    HL
FACC CD6744   05270          CALL   4467H
FACF C9       05280          RET
              05290 ;
FAD0 060F     05300 TFER     LD     B,15    ;transfer 15 bytes
FAD2 7E       05310 TF2      LD     A,(HL)  ;from (HL) to
FAD3 FE20     05320          CP     ' '     ;(DE) upto blank
FAD5 2805     05330          JR     Z,OUTG
FAD7 12       05340          LD     (DE),A
FAD8 23       05350          INC    HL
FAD9 13       05360          INC    DE
FADA 10F6     05370          DJNZ   TF2
FADC C9       05380 OUTG     RET
              05390 ;
FADD 21C23F   05400 TKOVR    LD     HL,TAD  ;(HL)-> T: field
FAE0 CD650E   05410          CALL   0E65H   ;doubl.prec. ASCII const->accum
FAE3 21C23F   05420          LD     HL,TAD  ;clear T:
FAE6 060F     05430          LD     B,15
FAE8 CDA5FA   05440          CALL   CLIT
FAEB 21C23F   05450          LD     HL,TAD  ;restore T: with
FAEE CDF2FA   05460          CALL   ACDSP   ;rounded value (4 dec's)
FAF1 C9       05470          RET
              05480 ;
FAF2 E5       05490 ACDSP    PUSH   HL      ;display ACCUM at place
FAF3 21A3FB   05500          LD     HL,SECACC; of sel. accu
FAF6 CDFF09   05510          CALL   09FFH
FAF9 0609     05520          LD     B,9     ;edit (ACCUM) numeric with
FAFB 0E05     05530          LD     C,5     ;9 dec's , 4 dec's after '.'
FAFD 3E80     05540          LD     A,80H
FAFF CDBE0F   05550          CALL   0FBEH
FB02 D1       05560          POP    DE
FB03 010E00   05570          LD     BC,14   ;and transfer back
FB06 EDB0     05580          LDIR           ;from
FB08 21A3FB   05590          LD     HL,SECACC; sel. accu to
FB0B CDF709   05600          CALL   09F7H   ; (DE) = T: field
FB0E C9       05610          RET
              05620 ;
FB0F 21A641   05630 UNPLUG   LD     HL,41A6H;disable DISK BASIC exits
FB12 0615     05640          LD     B,15H
FB14 36C9     05650 LOOP     LD     (HL),0C9H
FB16 23       05660          INC    HL
FB17 23       05670          INC    HL
FB18 23       05680          INC    HL
FB19 10F9     05690          DJNZ   LOOP
```

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FB1B C9         05700         RET
                05710 ;
FB1C 2A74FB     05720 TRANS   LD      HL,(ACTACC); sel. accu -> OP1
FB1F 1178FB     05730         LD      DE,OP1
FB22 CD2FFB     05740         CALL    MOVBFR
FB25 21C23F     05750         LD      HL,TAD  ; T: -> OP2
FB28 118DFB     05760         LD      DE,OP2
FB2B CD2FFB     05770         CALL    MOVBFR
FB2E C9         05780         RET
                05790 ;
FB2F 060F       05800 MOVBFR  LD      B,15
FB31 0E2D       05810         LD      C,'-'   ;REPLACE - BY ITS TOKEN
FB33 7E         05820 TFLP    LD      A,(HL)
FB34 B9         05830         CP      C
FB35 2002       05840         JR      NZ,NTRLT
FB37 3ECE       05850         LD      A,0CEH
FB39 12         05860 NTRLT   LD      (DE),A
FB3A 23         05870         INC     HL
FB3B 13         05880         INC     DE
FB3C 10F5       05890         DJNZ    TFLP
FB3E C9         05900         RET
                05910 ;
                05920 ;
FB3F 3AA2FB     05930 UKTFR   LD      A,(STFLG); transfer sel. accu to user k
FB42 FE00       05940         CP      0       ;is it 2 dec's ?
FB44 2008       05950         JR      NZ,KLTRF
FB46 0609       05960         LD      B,9     ;edit with 2 dec's after '.'
FB48 0E03       05970         LD      C,3
FB4A 3E80       05980         LD      A,80H
FB4C CDBE0F     05990         CALL    0FBEH
FB4F 1803       06000         JR      KLSKP
FB51 2A74FB     06010 KLTRF   LD      HL,(ACTACC); transfer sel. accu into
FB54 ED5B76FB   06020 KLSKP   LD      DE,(USRKAD); USRKAD = buffer of selected
FB58 060F       06030         LD      B,15            ; user key
FB5A 7E         06040 SKIP    LD      A,(HL)  ; upto
FB5B FE20       06050         CP      ' '     ;blank
FB5D 2004       06060         JR      NZ,FDNUM
FB5F 23         06070         INC     HL
FB60 05         06080         DEC     B
FB61 18F7       06090         JR      SKIP
FB63 12         06100 FDNUM   LD      (DE),A
FB64 23         06110         INC     HL
FB65 13         06120         INC     DE
FB66 7E         06130         LD      A,(HL)
FB67 FE20       06140         CP      ' '
FB69 2802       06150         JR      Z,ENDTF
FB6B 10F6       06160         DJNZ    FDNUM
FB6D 3E00       06170 ENDTF   LD      A,0
FB6F 12         06180         LD      (DE),A
FB70 C9         06190         RET
                06200 ;
                06210 ;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
FB71 CD         06220 NULLST  DEFB    0CDH
FB72 30         06230         DEFM    '0:'
     3A
                06240 ;
FB74 D43F       06250 ACTACC  DEFW    A0AD
FB76 AAF6       06260 USRKAD  DEFW    BUFRT
000F            06270 OP1     DEFS    15
FB87 30         06280         DEFM    '00001' ;adjust for round off errors
     30 30 30 31
FB8C 00         06290 TOKEN   DEFB    0
000F            06300 OP2     DEFS    15
FB9C 30         06310         DEFM    '00001' ; same as above
     30 30 30 31
FBA1 3A         06320         DEFB    ':'
FBA2 00         06330 STFLG   DEFB    0
                06340 ;
                06350 ;
                06360 ;
FBA3 0000       06370 SECACC  DEFW    0
FBA5 0000       06380         DEFW    0
FBA7 0000       06390         DEFW    0
FBA9 0000       06400         DEFW    0
FBAB 0000       06410 CADR    DEFW    0
0080            06420 BUFR    DEFS    128
                06430 ;
3FB2            06440 CAD     EQU     3FB2H   ;addresses of CMD-line fields
3F8E            06450 KAD     EQU     3F8EH
3F9F            06460 ACAD    EQU     3F9FH
3FD4            06470 A0AD    EQU     3FD4H
3FE6            06480 A1AD    EQU     3FE6H
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3FC2            06490 TAD     EQU     3FC2H
3FAE            06500 UKAD    EQU     3FAEH
3FB9            06510 NKAD    EQU     3FB9H
                06520 ;
                06530 ;
FC2D 73         06540 ACMS    DEFM    'sel. Accu '
     65 6C 2E 20 41 63 63 75 20
FC37 03         06550         DEFB    3
FC38 54         06560 TFMS    DEFM    'T->sel.Acc'
     20 3E 73 65 6C 2E 41 63 63
FC42 03         06570         DEFB    3
FC43 61         06580 ADMS    DEFM    'add      '
     64 64 20 20 20 20 20 20 20
FC4D 03         06590         DEFB    3
FC4E 73         06600 SUBMS   DEFM    'subtr    '
     75 62 74 72 20 20 20 20 20
FC58 03         06610         DEFB    3
FC59 6D         06620 MUMS    DEFM    'mult     '
     75 6C 74 20 20 20 20 20 20
FC63 03         06630         DEFB    3
FC64 64         06640 DIMS    DEFM    'div      '
     69 76 20 20 20 20 20 20 20
FC6E 03         06650         DEFB    3
FC6F 73         06660 UKMS    DEFM    'sel. UK  '
     65 6C 2E 20 55 4B 20 20 20
FC79 03         06670         DEFB    3
FC7A 69         06680 INMS    DEFM    'input    '
     6E 70 75 74 20 20 20 20 20
FC84 03         06690         DEFB    3
FC85 56         06700 KTMS    DEFM    'V -> T   '
     20 2D 3E 20 54 20 20 20 20
FC8F 03         06710         DEFB    3
FC90 41         06720 A0MS    DEFM    'A0 -> T  '
     30 20 2D 3E 20 54 20 20 20
FC9A 03         06730         DEFB    3
FC9B 41         06740 A1MS    DEFM    'A1 -> T  '
     31 20 2D 3E 20 54 20 20 20
FCA5 03         06750         DEFB    3
FCA6 72         06760 RDMS    DEFM    'round    '
     6F 75 6E 64 20 20 20 20 20
FCB0 03         06770         DEFB    3
FCB1 55         06780 ZWMS    DEFM    'Uk 2 Dec'
     6B 20 32 20 44 65 63
FCB9 27         06790         DEFB    39      ;Apostrophe
FCBA 73         06800         DEFB    's'
FCBB 03         06810         DEFB    3
FCBC 55         06820 VIMS    DEFM    'Uk 4 Dec'
     6B 20 34 20 44 65 63
FCC4 27         06830         DEFB    39      ;Apostrophe
FCC5 73         06840         DEFB    's'
FCC6 03         06850         DEFB    3
FCC7 41         06860 T01MS   DEFM    'A0 -> A1 '
     30 20 2D 3E 20 41 31 20 20
FCD1 03         06870         DEFB    3
5200            06880         END     START
00000 TOTAL ERRORS

A0AD    3FD4   A0MS    FC90   A1AD    3FE6   A1MS    FC9B   AC0T    F9FC
AC1S    F913   AC1T    FA10   ACAD    3F9F   ACDSP   FAF2   ACMS    FC2D
ACTACC  FB74   ADDI    F93E   ADMS    FC43   ADRIT   F9A4   ADRIX   F659
BACK    F8D5   BACK0   FA1B   BACKAR  FA2F   BCOT    FA1D   BUFR    FBAD
BUFRT   F6AA   CAD     3FB2   CADR    FBAB   CALCUP  F831   CHRDS   F808
CLCB    FAA7   CLCMOD  F67E   CLIT    FAA5   CLRCMB  FAA0   CMDLIN  F72A
CURSAV  F7AA   DIMS    FC64   DISPL   FAC4   DIVP    F977   DOWNAR  FA27
DSPBUF  FAAC   DSPUSK  F648   ENDTF   FB6D   ENTER   F9DD   EVAL    F94F
FDNUM   FB63   FGB     FA33   FLAG    F6A8   GETKA   F862   GETKY   F85F
GOON    F946   INIT    F698   INMS    FC7A   INPUT   F9B3   JMPFLG  F830
KAD     3F8E   KBDI    F606   KBDINT  F600   KLAR    F800   KLSKP   FB54
KLTRF   FB51   KSTTF   F9E0   KTMS    FC85   LOOP    FB14   MOVBFR  FB2F
MOVE    FA05   MOVEX   F68E   MULTP   F96C   MUMS    FC59   NKAD    3FB9
NLT     5208   NOTHG   F645   NTRLT   FB39   NULL    F9A9   NULLST  FB71
NULLX   F65E   OK      F82A   OK1     F90D   OP1     FB78   OP2     FB8D
OUT     F829   OUT2    F821   OUTG    FADC   PTR     F6A6   RDMS    FCA6
REPT    F8D8   ROUND   FA34   RSTIT   F685   SAVBUF  FA88   SCRMOD  F600
SECACC  FBA3   SKIP    FB5A   SLACC   F8F2   SP2     F831   START   5200
STFLG   FBA2   SUBMS   FC4E   SUBTR   F961   T01MS   FCC7   TW01    FA8C
TABI    FA2B   TABTBL  7EB3   TAD     3FC2   TF2     FAD2   TFACCU  F918
TFER    FAD0   TFLP    FB33   TFMS    FC38   TWOVR   FADD   TOKEN   FB8C
TRANS   FB1C   TX      5219   UKAD    3FAE   UKMS    FC6F   UKRED   F603
UKRQ    F7EA   UKSEL   F982   UKTFR   FB3F   UNPLUG  FB0F   UPARR   FA23
USRKAD  FB76   VIER    FA7E   VIMS    FCBC   WTR     F9C7   WTX     F611
ZWEI    FA6C   ZWENT   FA78   ZWMS    FCB1
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THE EXPLOITED MEDIA, AND HOW NOT TO BE ONE OF THEM

A book review by exploited editor Jack Decker

Recently we were offered a review copy of THE UNABASHED SELF-PROMOTER'S GUIDE - What every man, woman, child, and organization in America needs to know about getting ahead by exploiting the Media by Dr. Jeffrey Lant. This is a very long title that describes the contents of a rather long book. Having waded about 2/3 of the way through its 366 pages, I know know why we got a review copy. We were just another media source to be exploited. Dr. Lant is hoping for just the sort of publicity I'm giving him by writing this column. And, I actually don't think he much cares whether I give the book a good or bad review (though I'm sure he'd prefer a good one), just as long as I give him some publicity. In the promotion business, getting your name known is half the battle.

So why am I letting Northern Bytes be exploited in this manner, especially when the book has (on the surface, at least) nothing at all to do with computers?

Well, first of all, many of our readers have secret dreams of writing a software package that will become as popular and well-known as Pac-Man or VisiCalc. Or perhaps you'd like to write a book on the rise and fall of the TRS-80 (with a chapter on NORTHERN BYTES included therein, I'm sure). You will need to promote it somehow and this book could be helpful in that regard.

Second, many of our readers have some connection with the media - either radio, television, or the press. If that describes you, you need this book in self-defense! There are thousands of self-promoters similar to Dr. Lant out there, just looking for ways to get free publicity. This book describes just about every "trick of the trade" of self-promotion that you'll ever come across. At least if you've read the book, you can recognize the various ploys when you see them coming.

And third, a self-promoter is a natural customer for word processing and computer services or equipment. Dr. Lant frequently advises readers to send out letters of various types, media releases, sample newspaper articles, and various other types of paperwork. In many cases the core of this material remains the same, but different versions are produced for different types of media, different localities, etc. The book gives numerous samples of various types of paperwork that the self-promoter must generate. Anyone that follows Dr. Lant's advice will either have to have word processing equipment (or hire someone that has it to do the work for him) or spend an awful lot of time retyping basically the same material over and over and over.....

Then, too, it is necessary for the self-promoter to keep records of various contacts he has made throughout the media. A natural function for a good relational database type program.

Okay, I have now successfully tied in the relationship of Dr. Lant's book to the readership of NORTHERN BYTES (which, if Dr. Lant were as good as he says he is, he would have made this connection for me in the materials he sent. But then, maybe he doesn't know that much about the capabilities of computers!). But, you may be asking, is the book worth the $31.50 asking price? Well, I have to answer a qualified yes. The qualification depends on who you are, what you want to promote, and how hard you are willing to work at it. It also, to some extent, depends on your sense of what is right and wrong, what is acceptable behavior and what is not.

This last point deserves some attention. The term "unabashed self-promoter" is the key. Webster says that the term ABASH means "to make ashamed and uneasy; make self-conscious and embarrassed", so an UNABASHED self-promoter would be one who does not get embarrassed, ashamed, or self-conscious. And the word "self" is also important. The theme of this book is that you promote yourself first (as an expert in your field) and your book, product, service, etc. will be seen as more valuable because it has been produced by an obvious expert. Well, I have a couple of problems with this. Apparently Dr. Lant feels no shame or embarrassment in using his friends and associates to help promote himself, but I think most of us would draw the line at least in using our friends in this way. And then there is the whole matter of self-promotion, which more often than not turns into blowing one's own horn. At this point it might be appropriate to quote from the Bible: "Let another praise you, and not your own mouth; someone else, and not your own lips." (Proverbs 27:2, NIV). Or, as The Book puts it: "Don't praise yourself; let others do it!" The problem with praising yourself is that it leads to pride in one's self, and to once again quote from Proverbs, "Pride goes before destruction, a haughty spirit before a fall." (Proverbs 16:18, NIV).

Even if you feel that you can avoid the entrapment of pride (which isn't at all easy for most of us), there's still the matter of whether you have what it takes to be a self-promoter. If you follow the advice in Dr. Lant's book, your name will be constantly appearing in newspapers and magazines and your voice and face will be familiar to radio and television audiences. Many of us wouldn't be comfortable with that kind of exposure. Some people thrive on being in the public view, however, and maybe you are one of them (or could learn to be).

Dr. Lant tells the reader a lot about himself in the pages of this book. Much of this information is designed to enhance his image as an "expert", but he lets us in on a lot of his personal views and feelings as well. This may have been a tactical error. About the only common ground that I could find with him is that he "feels uncomfortable in a suit or anything resembling standard business clothing." Other than that... well, I was always told that if you can't say something good about someone, don't say anything at all. The bottom line, however, is that Dr. Lant does not impress me as being a person I'd want to emulate or in any way pattern my life after. One particular quotation from page 93 of Dr. Lant's book stands out in my mind:

> "The associates in your existing circle of friends, acquaintances and business colleagues belong to dozens of organizations. It is now your responsibility to find out which ones they are and to decide which of them are appropriate for you.
>
> "I meet hundreds of people every year. With each of them I launch a networking conversation so that I can decide where they fit in my life and which contacts and associates they possess which may be of use to me. You do the same."

In other words, if I am reading correctly Dr. Lant is commanding me to choose my friends and associates according to what they can do for me, or how much use I may be able to make of them. No, thanks. I suspect that even if these people really wanted to be my friend to begin with, that desire would probably quickly leave them once I had "used" them a few times. Unless, of course, they figured that they could similarly use me to further their causes. Either way, it's not the sort of foundation I'd want to build a friendship on.

Also, it seems that at times Dr. Lant does not follow his own advice. At one point in the book, when writing about "Problem-Solving Process Articles", Dr. Lant advises the reader to "Keep the language simple, compelling. Readers rightly mistrust experts they cannot understand." Yet throughout the book (and especially in the first few chapters) Dr. Lant uses words that would probably not be in the vocabulary of someone that does not have at least a college education. Perhaps he is trying to impress us with his command of the English language, but it is my opinion that writers of self-help books should try to use language such that the average reader (who possibly has only a high-school education) will not have to sit with a dictionary at his side while reading the book.

So I have very mixed feeling about this book. I think it contains some very good advice and some simply awful advice, all within the same cover. And I do not think that it has the universal appeal that Dr. Lant seems to think it should have (I can't imagine too many children that would have the need or desire to exploit the media, for example). On the other hand, I would consider it "must reading" for editors (and other personnel) of magazines, newspapers, TV and radio news programs, etc. Between those two extremes, most of us would find the book interesting (and shocking in places!), but might have a tough time separating the "meat" from the "bones".

If, in spite of this review (or perhaps because of it?!) you would like to obtain The Unabashed Self-Promoter's Guide, it is available for $31.50 (price includes shipping) from Jeffrey Lant Associates, Inc., 50 Follen Street, Suite 507, Cambridge, Massachusetts 02138 or telephone (617) 547-6372.

MODEL III NEWDOS/80 ROUTINES

by Tony Domigan

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MCI-ID : 254-5121

Here's some useful unpublished NEWDOS/80 version 2 (Model III) routines:

4C37H - Multiply H register by A register - result in HL
4C39H - Multiply HL Register by A register - result in HL
4C57H - Divide HL by 5, quotient in HL and remainder in A
4C59H - Divide HL by A, quotient in HL and remainder in A
44D2H - Convert DE to ASCII string pointed to by HL
44D7H - Convert A to ASCII string pointed to by HL

MAGIC MATH PLUS

A continuing series feature in Northern Bytes
by Dr. Michael W. Ecker

THE TRIANGLE NUMBER TRICK

[Dr. Michael Ecker, an Associate Professor of Mathematics and Computer Science at the University of Scranton, is a columnist/contributing editor of Creative Computing, Electronic Education and Soft Sector, and formerly of Byte, Popular Computing and Computer Gaming World. He writes columns on mathematical and computer recreations. A book based on material similar to that in his columns, "Gems of Recreational Computing", is scheduled for release by Arco Publishing in the Fall of 1985. He also does occasional freelance pieces on financial mathematics, and software reviews. As the alter ego of Recreational Mathemagical Software, Dr. Ecker offers this serialization of some of his Magic Math Plus software, a collection of programs of "mathemagic", games, educational programs, financial utilities and numerous number tricks. At least one program from Magic Math will be offered in each installment. Readers who would prefer not to type in programs can purchase a disk directly from him. Northern Bytes is pleased to extend its coverage of useful information for TRS-80s to basic Basic applications and recreations. Information regarding questions for Dr. Ecker and/or ordering will be provided at the end of each article.

Incidentally, for those of you who missed Dr. Ecker's column last issue, your editor must offer profuse apologies. We moved the deadline up one week at the last minute, without giving proper notice to Dr. Ecker. This installment of Magic Math Plus arrived in plenty of time for the old deadline. It was your editor's fault only, and I will accept being stoned with abacus beads (preferably plastic ones!) as my punishment.]

The Triangle Number Trick is a cute program named for the configuration achieved by the numbers used. Readers may find it reminiscent of Pascal's triangle. Indeed, the trick is based on a theorem which is both combinatorial and number-theoretic in nature. Roughly, it says that binomial coefficients C(p,k) - the number of ways of choosing k things from p without regard to order - are all divisible by p if p is prime. This program exploits the p=5 case.

It doesn't really matter whether or not any of the above makes any sense to you. This is because the program is self-contained. Furthermore, if you are unfamiliar with Pascal's triangle, one of the programs on the software I am marketing contains a tutorial on it. In fact, readers who desire a fuller explanation of the Triangle Number Trick may purchase Magic Math Plus, which contains this trick's program with full explanation. The software containing the Triangle Number Trick is also accompanied by numerous other mathematical recreations and bonuses. Furthermore, Northern Bytes readers may obtain Magic Math Plus for 20% off. See the note at the end of this article for more information.

Triangle will run on any level 2 system (Model 1,3,4, tape or disk), possibly others. The program begins with your TRS-80 predicting, before you do anything, what will be the final answer to the calculations which are going to be performed. What is remarkable about this is the fact that the calculations are based on your inputs to a very large degree. Nevertheless, in spite of this, the computer provides you with the correct answer in advance. The computer selects two integers (whole numbers) and then requests that you provide four integers of your own choosing. The computer then displays the six numbers on a line.

Next, your 80 will add every two adjacent pairs of numbers and, via some more liberal use of the Print @ command, print the sum under and in between the two numbers. If the sum is larger than 5, the computer will only display the result for a brief moment, and then will subtract 5. It will keep doing this until the result is no longer greater than 5. So, if the two numbers are 13 and 8, for example, the computer will display 21 (the sum) under and between the 13 and the 8, but only for an instant, as 21 is larger than 5. Then, 21 will vanish and be replaced by 16 (as 21-5=16). Since 16 is still larger than 5, it too will vanish and in succession you will see 11, then 6, and finally 1.

This process is repeated for every pair of adjacent numbers in the top row until a second row of answers appears. This row will then contain five numbers. Now what? Well, the computer now repeats the process using pairs of adjacent numbers from the second row. This is turn yields a third row of four numbers, to be followed by a fourth row of three numbers, a fifth row of two numbers, and then - the moment of anticipation - the final row bearing the final answer... the one somehow picked by the computer!

I have little doubt that many readers will have little or no trouble figuring out what the computer does, but this still does not fully explain why the trick works. Ah, but you will allow me that one small mystery - at least for a little while - won't you? For now, enjoy the trick! See if you can't figure it out for yourself!

I actively solicit your comments, pertinent questions, suggestions, improvements (always plenty of room for them!) and so on. Write to me directly at the address above. For those who own TRS-80 Model 3, 4 or 4P and who would prefer not to type in the program, send me a disk and $7.50, or $10 alone, and I'll include the program, plus an extra half dozen programs in a menu-generated format on a self-booting disk with a licensed DOS. Only one disk drive is needed. Ask for Magic Math Plus sampler disk with Triangle Trick. If you don't ask for Triangle Trick explicitly, it will not automatically be included as it's not ordinarily on the demo disk, so please do ask! You may also obtain Triangle Trick, previous issue's Super-Blackjack, and earlier issue's loan amortization, as part of the 36 program, double volume collection available on Magic Math Plus.

Magic Math comes on a self-booting disk with XDOS, a licensed disk operating system compatible with TRSDOS 1.3, from Mr. Jim Kyle of the Software Factory. The collection is totally menu generated (again, courtesy of software from the Software Factory - and available from Recreational Mathemagical Software). This combination makes use of Magic Math almost automatic.

Volume 1 contains approximately 20 programs, including Fastloan, Compound Interest, Super-blackjack, Super-Trick, Super-Fast Prime Number Cruncher, The Game of N, Fibonacci Numbers, Additive Sequences, Base Two (a trick with explanation) and loads of other goodies!

Volume 1 sells for $24.95 plus $1 for shipping and handling. A volume 2, written by programmer/writer Mr. David B. Lewis (who writes in the likes of 80 Micro and others), is available with lots of other numerical curiosities involving convergence, as in the Collatz conjecture, and with graphic and other games (as in Hexapawn, Repeater, etc.), with at least 15 programs available for the same price. Same menu generated format available for Volume 2.

Special offer: Volumes 1 and 2 combined, with the self-booting disk, XDOS, a minimum of 36 programs (including some bonuses and tutorials) in a menu generated format, a title page and four menu programs / pages - usually all for $36 + $1 S&H - now 20% off! Send just $29.75 - postpaid. That's just $4.80 above the cost of either volume alone.

Lastly: I will be pleased to send anybody who wishes further information a catalog if you send a self-addressed stamped envelope. Please specify your computer brand/model. I remind you again that your comments and questions are welcome and appreciated. Until next issue! Happy Computing!

Dr. Michael W. Ecker
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129 Carol Drive
Clarks Summit, Pennsylvania 18411
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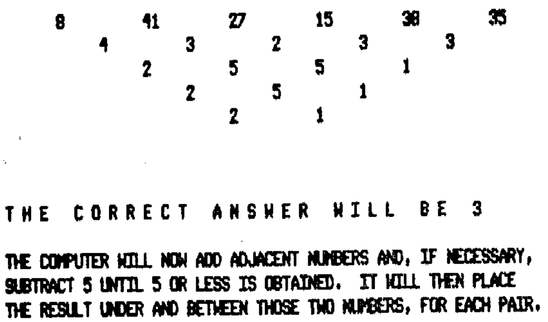
[Screen dump of program, just before final answer (3 in this case) is placed at bottom point of triangle. In this example, the computer provided the numbers 8 and 35, while the user provided the numbers 41, 27, 15, and 38. The computer predicted that the answer would be 3 before the user's numbers were entered!]



```
8       41      27      15      38      35
    4       3       2       3       3
        2       5       5       1
            2       5       1
                2       1



THE CORRECT ANSWER WILL BE 3

THE COMPUTER WILL NOW ADD ADJACENT NUMBERS AND, IF NECESSARY,
SUBTRACT 5 UNTIL 5 OR LESS IS OBTAINED.  IT WILL THEN PLACE
THE RESULT UNDER AND BETWEEN THOSE TWO NUMBERS, FOR EACH PAIR.
```

[Program listing:]

```
100 CLEAR500:S$=STRING$(23,42)
110 CLS:PRINT@342,S$:PRINT@406,"*TRIANGLE NUMBER TRICK*";:
PRINT@470,S$;
115 PRINT @960,"RECREATIONAL MATHEMAGICAL SOFTWARE   (C
) 1985 DR. MICHAEL ECKER"
```

```
120 FORJ=1TO1500:NEXTJ
200 CLS
205 PRINT:PRINT
210 PRINT "In this trick, the computer will display numbers you INPU
T as"
220 PRINT "the top row of a triangle.  It will add adjacent numbers a
nd"
230 PRINT "then subtract multiples of 5 until the answer is 5 or less
."
240 PRINT "Each answer will be placed between and below the numbe
rs so"
250 PRINT "as to form a new, smaller row of numbers."
260 PRINT "This process will be repeated until a single number is ob
tained."
270 PRINT "Before you even begin INPUTing the numbers, the compu
ter"
280 PRINT "will provide what will ultimately be the final answer!!"
290 PRINT
300 INPUT "PRESS <ENTER> WHEN YOU ARE READY TO CONTINUE
";X
305 DIM A(100)
310 RANDOM
320 A(1)=RND(40):A(6)=RND(50)
330 Q=A(1)+A(6):Q=Q-5*INT((Q-1)/5)
340 CLS
350 PRINT @512,CHR$(23)"THE CORRECT ANSWER WILL BE";Q:FOR
Z=1 TO 2000:NEXTZ
355 PRINT @630,CHR$(28)""
360 PRINT CHR$(28)"THE COMPUTER HAS NOW PICKED TWO NUMB
ERS":FOR Z=1 TO 1500:NEXTZ
365 PRINT CHR$(28)"                                          "
366 PRINT @5,A(1):PRINT @55,A(6):FOR Z=1 TO 1200:NEXT
370 PRINT @640,"PLEASE INPUT FOUR WHOLE NUMBERS (SAY, 5 TO
 50) ONE AT A TIME"
380 PRINT @704,"HIT <ENTER> AFTER EACH NUMBER"
390 INPUT A(2):PRINT @15,A(2):PRINT@767,"":INPUT A(3):PRINT @25
,A(3):PRINT @767,""
395 INPUT A(4):PRINT @35,A(4):PRINT @767,"":INPUT A(5):PRINT @4
5,A(5)
400 PRINT @768,"                                         "
410 PRINT @640,"THE COMPUTER WILL NOW ADD ADJACENT NUMB
[illegible] AND, IF [illegible], "
420 PRINT "SUBTRACT 5 UNTIL 5 OR LESS IS OBTAINED.  IT WILL
THEN PLACE"
430 PRINT "THE RESULT UNDER AND BETWEEN THOSE TWO NUMB
ERS, FOR EACH PAIR."
440 PRINT
450 INPUT "PRESS <ENTER> WHEN YOU ARE DONE READING THIS"
;X
460 PRINT @832,"                                         "
470 FOR I=7 TO 11
480 A(I)=A(I-6)+A(I-5)
490 READX
510 PRINT @X,A(I)
520 IF A(I)>5 THEN GOSUB 800:GOTO 510
530 NEXT I
540 FOR I=12 TO 15
550 A(I)=A(I-5)+A(I-4)
560 READ X
570 PRINT @X,A(I)
580 IF A(I)>5 THEN GOSUB 800:GOTO 570
590 NEXT I
600 FOR I=16 TO 18
610 A(I)=A(I-4)+A(I-3)
620 READ X
630 PRINT @X,A(I)
640 IF A(I)>5 THEN GOSUB 800:GOTO 630
650 NEXT I
660 FOR I=19 TO 20
670 A(I)=A(I-3)+A(I-2)
680 READ X
690 PRINT @X,A(I)
700 IF A(I)>5 THEN GOSUB 800:GOTO 690
710 NEXT I
800 IF A(I)>5 THEN A(I)=A(I)-5:FOR Z=1 TO 500:NEXT:RETURN
980 FOR Z=1 TO 1200:NEXT
990 PRINT @640,"OKAY, AS PREDICTED, HERE COMES THE ANSWER
 OF";Q;"                              "
1000 PRINT @704,"                                        "
1010 PRINT @768,"                                        "
1020 PRINT @832,"                                        "
1025 FOR Z=1 TO 1500:NEXT
1030 Q=A(19)+A(20)
1040 PRINT @350,Q
1050 IF Q>5 THEN Q=Q-5:FOR Z=1 TO 500:NEXT:GOTO 1040
1060 FOR Z=1 TO 1500:NEXT
1070 PRINT @848, "TO PLAY AGAIN, TYPE THE LETTER P"
1100 I$=INKEY$:IF I$="" THEN 1100 ELSE IF I$="P" THEN RUN
1200 DATA 74,84,94,104,114,143,153,163,173,212,222,232,281,291
```

* * *

ATTENTION HARDWARE HACKERS

As this issue of Northern Bytes was going to layout, I got a letter from Don McKenzie, 29 Ellesmere Crescent, Tullamarine, Victoria 3043, AUSTRALIA. Don had read my plea for a low-cost 1200 baud MODEM and wrote to advise me that Mick Gulovsen sells such a unit in kit form for $130 Australian (The Australian dollar is worth around 62 cents at present, so at the time of this writing such a modem could be purchased for somewhere around $80 U.S. plus shipping).

The kit uses an Am7910 WORLD-CHIP^{tm} Modem IC, op amp, and 2716 for control logic switching. The Am7910 is capable of operation using both the Bell and CCITT standards, so the modem should be usable within the U.S. (possibly with a bit of very minor modification - I haven't seen the kit so can't say whether any modification would be necessary or not). It does not include front panel switches, LED, or phone jacks, and does not have an auto-answer feature. It is designed to mount inside your computer (or expansion interface) and draw power from your computer's power supply, but an external power source (using a 7905 regulator) may be used if necessary.

Of course, such a unit would not be F.C.C. registered and thus could not be legally connected to the telephone system, but if you have your own PBX system (or like to live dangerously and figure it's none of the phone company's business what you connect to your phone lines), you may want to contact Mick Gulovsen, 14 Sutherland Street, Glenroy, Victoria 3046, AUSTRALIA for more information.

Don has also been busy lately. He has developed a 8K-6 [illegible] line to your printer using standard Centronics male and female connectors. It uses a Z80A CPU and can be configured for 8K, 16K, 32K, or 64K simply by adding extra 4164 (64K) memory chips. Don is selling what he calls a "PBUFF SHORT FORM KIT" which consists of a bare single sided printed circuit board and one 2716 EPROM programmed with PBUFF software (version 1.0). You also get full assembly instructions (including debugging information in case you get into trouble) and free hardware debugging advice via phone or mail. You must provide the other parts - a suitable case, power pack (+5 volts stolen from your computer or a cheapie external power supply capable of putting out 9 volts AC or DC at 400 ma or more), Centronics male and female connectors, as many 4164 memory chips as you care to use, and about $20 worth of additional components.

The PC board is designed to mount directly into a DICK SMITH ELECTRONICS catalog # H-2505 instrument case. Dick Smith Electronics has stores in Australia and New Zealand and has just recently started opening stores and "authorized re-sellers" here in the U.S. (they had a number of pages in a recent issue of Radio-Electronics magazine).

Don sells the PBUFF kit for $35.00 Australian (around $22 U.S.) plus $5 for postage to North America. If you need a 3.58 MHz crystal, Don can supply that for $2.90 [illegible]. He also [illegible] supply of 4164 memory chips available but as he notes, the prices on those fluctuate on a daily basis (and most likely are sold for less here in the U.S.).

Don also offers several other hardware modifications for the TRS-80 Model I and the "clones" (PMC-80, Dick Smith SYSTEM-80, Video Genie, etc.). He puts out a catalog but as he is basically a hobbyist (not a large corporation) and airmail postage is expensive, I'd suggest you include two or three dollars for postage if you want the catalog. If you tell him what kind of system you have (or what you might be looking for in the way of hardware mods) he may be better able to advise you as to what he has that might be interest to you. Once again, Don's address is: Don McKenzie, Ellesmere Crescent, Tullamarine, Victoria 3043, AUSTRALIA and his telephone number is (03) 338-6286 (from the U.S. dial 011+61+3+338-6286, and remember the time difference - no one likes to be awakened at 3 A.M.!)

THE FUTURE OF COMPUTER TELECOMMUNICATIONS

by Jack Decker

When you stop and think about it, many "advances" in science and technology are very simple once you understand how they work. For example, the basic idea behind the telegraph is so simple that just about any junior high school science student can put a crude model together using blocks of wood, nails, wire, strips of metal cut from tin cans, and a battery. Yet we still remember the name of Samuel Morse as the inventor of the telegraph.

Or, take a more recent example. Today's communications satellites, which orbit in a fixed position above the equator, are said to be located in the <u>Clarke Orbit Belt</u>. This belt is named after Arthur C. Clarke, a science fiction writer who first envisioned the belt of satellites orbiting above the earth in a geosynchronous orbit (that is, each satellite appears to be in a stationary position in the sky, as viewed from the earth). The idea of a band of orbiting satellites is one that any high school science student can understand, yet it was significant enough to have Mr. Clarke's name forever attached to the satellite belt above the equator.

Point is, some ideas seem so obvious once you think about them a little, yet they revolutionize the way we live once they are implemented.

Well, I have a modest proposal. This idea is also one which seems simple once you think about it, yet it could revolutionize communications. Moreover, it uses no new technology. The system could be implemented on existing hardware, once the software were written.

Please note that the benefits of this system are partly artificial. If the pricing structure of telecommunications services (particularly the long distance telephone network) were different than at present, there might be no need for this proposal. The one thing that could eliminate the usefulness of this proposal is if telephone charges were not distance-sensitive (in other words, if the charge were the same to call a telephone 20 miles away or 3000 miles away). Although some feeble motions in that direction have been made by some of the long distance carriers, I really don't foresee the elimination of distance-sensitive pricing in the near future. In addition, new technology (a two-way cable or satellite link to <u>every</u> home, for example) could eliminate the need for what I propose. But then, Morse's telegraph had a limited lifespan, yet it was still the only practical means of long distance communications for a number of years.

So, with that in mind, here's the proposal!

At the present time, most computer services (those provided via mainframe computers) are accessed via the telephone network. That is, you sit at your computer, and you (or your "smart" telephone modem) dial a number that connects you with the computer. Now, if the computer in question happens to be in the same city that you're in, there are no long distance phone charges incurred by either you or the host computer. This is the ideal situation (remember this, we'll be coming back to it).

However, let's suppose you're in Chicago and the computer you want to access is in New York. At this point you will probably have two choices. One choice, which is always available, is to simply dial up the computer over a regular long distance network, such as AT&T, MCI, GTE Sprint, or any of the other numerous long distance carriers. In this case your call will be charged according to both time and distance - in other words, you will pay for each minute online, and the charge per minute will be based on the distance between you and the mainframe computer. However, you will NOT be charged according to the number of characters transmitted and/or received, nor will you incur a surcharge for using a higher baud rate.

Your second option, assuming that you are communicating with a major supplier of computer services (an information utility, for example) is to communicate using a packet network. In this case you would dial a local number in Chicago, and be connected to a small "front-end" computer which would assemble your messages into data "packets" for transmission at very high speed to the "host" computer. I'm not going to get into a discussion of packet network theory here, but the bottom line is that from the Chicago user's standpoint, he has made a local telephone call to access the computer in New York. However, the company which owns the computer in New York is billed by the packet network according to time and the number of characters transmitted and/or received. The computer services company in New York usually turns around and bills this back to our Chicago user on his monthly statement. HOWEVER, because the formula for calculating characters transmitted/received can be a bit complicated, most computer services companies (especially the information utilities) simply opt to bill their customers for packet network usage on a per-hour basis. The per-hour rate is then based on the packet network's per-hour charge, the <u>average</u> user's per-hour character usage multiplied by the packet network's character charge, plus a little profit for the computer services company.

Let's review for a moment. If the computer to be accessed is local, there is no charge for time, distance, or characters transmitted/received (except perhaps in some major metropolitan areas where "measured service" is in use). If the computer is accessed via the long-distance telephone network, then we are charged for time and distance but not for characters transmitted/received. If the computer is accessed via a packet network, then we are charged (directly or indirectly) for time and characters transmitted/received but not for distance.

But even in the case of packet networks, distance can be a factor. Certainly the packet network must pay for the lines it leases from other communications carriers according to distance, and that affects the rates they must charge. Also, it may be a toll call to the nearest packet network node, and there will be an additional charge if access is made from a very distant point (another country, for example).

One thing that does NOT change whether long distance telephone or packet switching networks are used is the <u>amount</u> of information transmitted from New York to Chicago. If the <u>amount</u> of information to be sent could be reduced, the charges would naturally be less.

One suggestion that immediately comes to mind is text compression - that is, compress all common words (of the English language, for example), to two-byte codes and send only the codes. This is worth considering but is difficult to do in practice, especially on a public system where various users may wish to send vastly different types of information.

However, larger savings are possible on most public-access systems. In order to understand this, let's visualize a system that many home computer users are familiar with - the Compuserve Information Service.

On Compuserve, almost all of the information is designated by "page numbers". For example, at a given prompt a user might say GO PCS-1 which would display the information on that page. Now, the information on that page might change on an hourly basis. Then again, it might not be changed for several months. Let's suppose a user in New York connects to Compuserve (which is located in Ohio) and reads that page. Whether he is making a regular long-distance phone call or using a packet network, the information on that page is transmitted, character by character, from Ohio to New York.

Now suppose our New York user calls back the next evening and for some reason reads the same page, which, as it happens, has not been changed since the last time he read it. The page is again transmitted from Ohio to New York, character by character, and again the long distance company or packet network makes money on it (Compuserve happens to own its own packet network, which is unusual, but that really doesn't affect the principle being discussed here). Now suppose 50 other New Yorkers call Compuserve that same evening and happen to read the same page. Again it is transmitted between Ohio and New York fifty more times. Somebody makes money on all that repetitive transmission!

"But", one might wonder, "computers are getting cheaper. Memory is getting cheaper. Wouldn't it be more cost-effective to put a computer in New York, let it store each of the 'pages' and transmit them to local users as required, and only transmit a 'page' from Ohio to New York when the page is updated?"

Well, why not? The more information that can be provided locally, without accessing the host computer in Ohio, the closer we can get to our "ideal situation" of not having to pay for time or distance.

Perhaps what we are talking about here is the next generation of "front-end" computers. In present terminology, the "front end" computer is basically a "concentrator" for a larger host computer. For example, there is, no doubt, a "front end" computer in, say, Chicago (and in every other major city), that has maybe 24 (to pick an arbitrary number) modems connected to it. In fact, each of the packet networks will have a "front end" computer of this type (it's sometimes called a "pad"). As users dial into the modems, the "front end" computers handle the data communications to and from each individual modem. The "front end" then "concentrates" all this data and transmits it (at a much higher baud rate) over the packet network's leased circuits. Today's "front end" computer, however, does little or nothing with the actual data. It simply re-transmits it at a higher or lower baud rate (well, yes, it's actually a little more intelligent than that, and can usually be configured to adapt itself to the end user's terminal requirements, but that's about it).

My idea is to give the "front end" computers a lot more to do. In the system I envision, each "front end" computer would provide as much of the computing power as possible, without accessing the "host" mainframe computer except when absolutely necessary.

Before I go on, however, a word about terminology. A few paragraphs back I talked about using "pages" of information. I used this example because the concept is familiar to many computer users, especially those that access Compuserve. With other services, other ways might be used to identify a given block of text. Text or data can be transmitted using "pages", "messages", "packets", or even "blocks of memory" in the main "host" computer as the logical divisions. The basic idea is that once a given block of text or data has been sent to a "front end" computer, it is stored there for future access and not re-transmitted by the host computer unless it has been changed or modified.

Let's jump a step further. Suppose we have a main "host" computer, located in New York, and, say, 500 "smart front-end" computers located in major cities around the country. Let's further suppose that our "host" computer is running an electronic mail and bulletin-board type system. In this case, our blocks of text - the "coin of the realm", as it were - will be messages. Once a message is transmitted to a given "front end" computer, it will not be re-transmitted unless the message is changed. How will this save transmission time? Two ways immediately come to mind:

1) In the case of public (bulletin board) messages, once a message has been transmitted to a given local "front end", it would be stored there for reading by other local area users. It could be read hundreds of times, but would only have been transmitted over the long distance or packet network once.

2) In the case of a private message, it would be available for re-reading as many times as necessary, even though it was transmitted to the "front end" only once.

I've deliberately avoided going into specifics about the system because the implementation would necessarily be varied depending on the type of service and software available (though using "packets" would be an option no matter what the end use). But to give an example, let's suppose an electronic mail user wants to read his mail. Let's further suppose that he has four messages waiting, two of which have been previously transmitted to the "front end" (either on the request of that user or perhaps another local user who got a "copy" of those two messages). The dialogue might go like this:

1) User logs in. Login information transmitted to host computer for verification.

2) Host OK's login, and searches message base. It discovers that the user has four messages waiting. The message numbers are 10234, 11442, 11616, and 12092. Host transmits this information to "front end".

3) "Front end" computer searches its memory bank and discovers it already has messages 10234 and 11616. It sends request to host to transmit messages 11442 and 12092, which it stores for possible future use.

4) "Front end" transmits all four messages to electronic mail user, plus it handles all the normal menu options and other "busy work", inquiring of the host only when it needs data it does not already have or data that may have changed.

5) When user logs off, "front end" computer transmits to host the associated billing data plus the information that the user has now read the four messages (if in fact he did read them).

6) When messages are deleted from the system, the host computer transmits this information to the "front end" computers as a background task (done during "non-busy" intervals).

At this point you may be wondering what happens when the memory in a "front end" computer is full (assuming that the "front ends" have less memory capacity than the host). Simple, messages are dropped. Either the oldest messages or the least-frequently-read messages can be dropped. If someone requests one of these dropped messages, it can always be retrieved again from the host.

Note that there are a lot of possible permutations of this system. For example, a system could be designed where the "front end" computer only connects with the host for, say, five minutes out of each hour. This type of setup might be very cost-effective for a service that does not require instantaneous delivery. For example, on a bulletin board type service, the fact that others might not be able to read a message until an hour or two after it is posted might be quite acceptable, if the cost of the service can be lowered. In this case each "front end" computer could store the entire current message base, receiving an update from the host (and transmitting new messages it has received to the host) once an hour. For a hobbyist type system, this could even be stretched out to once a day, with communications between the "front ends" and the host taking place only during off-peak rate periods.

When you consider that the same block of text may be transmitted from place to place on a repetitive basis, it makes sense that if these repeat transmissions can be avoided, substantial savings in costs are possible. If you use an information utility such as Compuserve, think how many times some of the menus must be re-transmitted. If you live in a large city, these same menus may be re-transmitted to your area many times a day. This may make the phone companies and packet network people happy, but not the end user when he gets the bill. So, why not transmit the information once, then store it in a computer in the local area for additional accesses?

That's about as far as I intend to take this idea right now. Actually, I can't believe that I'm the first person to propose something like this. The idea seems so simple, so obvious. But, just in case... if anyone gets the notion to name this system after me, keep in mind that I never went to college and wouldn't be caught dead (or alive) in a necktie. Is that really the type of person whose name you want mentioned in tomorrow's computer textbooks?!

ZAPS

Provided and translated by Paul Fransen

The program THE ARRANGER is a very nice program to catalog your programs on diskette. The only problem is that the program assumes that on a Model 3 you use disk drives with a track stepping rate of 3 ms. If you have older (and slower) drives, then there could be trouble. However, you can fix it with the following zap:

```
Track 3, sector 8, byte 77: E6 FC becomes F6 03.
```

(provided by Karel Honings, Holland).

If you have the programs CODIR/CMD and DIS/CMD or DIC/CMD then you may find that the following zap can be handy:

```
CODIR/CMD, sector 11, byte 8A: 52 becomes 53
                      byte ED: 52 becomes 53
```

Now CODIR works with DIS/CMD instead of directly with DIR, so the files will be sorted before they appear on the screen (provided by Stef Taartmans, Holland).

You can do the same thing with CAT/CMD and DIS/CMD:

```
CAT/CMD, sector 3, byte FC: 52 becomes 53
```

You scroll in Superzap with the + and - keys. It is nicer to do this with the arrow keys:

```
SUPERZAP/CMD, sector 3, byte BD: 3B becomes 5B
              sector 4, byte 17: 2D becomes 0A
                        byte 35: 2D becomes 0A
```

(provided by Joop van Dam, Holland).

SCRPRT FAST SCREEN PRINT PROGRAM
for Radio Shack dot matrix printers
by Serge Y. Calmettes

Have you ever worked on a fancy screen graphics display, and wished that you could make a printed copy of it? Well keep on reading because SCRPRT does exactly that!

The program works with the TRS-80 Models III and 4 (in the Model III mode) [Model I users, see editor's note at end of this article], with or without disk and with the following line printers: LP V, VII, VIII, and DMP 100, 200, and 400.

SCRPRT can be activated either from the disk operating system (DOS), or from BASIC by pressing simultaneously the up and down arrow keys.

A full screen is printed in 30 seconds or less. This program is transparent to the user and can be activated at any time from DOS or BASIC.

Once the program is installed, the keyboard driver is intercepted, and therefore SCRPRT can be triggered anytime that the keyboard is interrogated. SCRPRT scans the video memory, and the printer mode is switched from characters to graphics on a line per line basis as required by the type of display. When the last line is printed, the operation returns to the program that was running when SCRPRT was called in.

Use EDTASM or an equivalent program to assemble SCRPRT (listing 1). You can also use a monitor such as DEBUG, MON3, or TASMON to enter the machine code. For 48K systems the start address is 0FE80H; the end address, 0FFF6H; and the entry point, 0FE80H. At any rate save SCRPRT on disk or cassette. From DOS, to install SCRPRT, type SCRPRT<enter>; from BASIC load and run SCRPRT using the SYSTEM command.

Listing 2 lets you enter the program from Level II BASIC. Make sure to SAVE the program before running it - a typing error can have some very unpredictable effects with machine language programs! The disk version is self-protecting, but not the Level II BASIC one (answer 32382 to the MEMORY SIZE prompt if under Level II BASIC).

At times, a left bracket is displayed and printed when the up and down arrow keys are depressed. If you find this objectionable, instead use the down arrow and space bar keys. Change line 470 of listing 1 to:

```
    CP      90H          ;DOWN ARROW & SPACE BAR
```

or line 150 of listing 2 to:

```
   DATA 174,025,058,064,056,254,144,194,073,000,245,197
```

Now you will be able to enjoy all those fancy displays even when your computer is turned off!

[EDITOR'S NOTE: Model I users should be able to make this program run under disk-based systems (not Level II) by changing the following four lines of listing 1:

```
00200 VDLINE  EQU     4467H           ;WORKS UNDER DOS ONLY!!
00210 CKPRT   EQU     05D1H
00240 MEMPRT  EQU     4049H           ;*** FOR DISK ONLY ***
01880         LD      (37E8H),A       ;PRINT IT
```

Model I cassette-based system users can also use the above changes except that line 200 should be changed as follows:

```
00200 VDLINE  EQU     2B75H           ;VALID UNDER BASIC ONLY
```

Please note that the above changes have not been tested, but should be all that is required for Model I users!]

LISTING 1

```
            00100 ;SCRPRT
            00110 ;
            00120 ;         BY SERGE Y. CALMETTES, MAY 1982
            00130 ;FOR TRS-80 MODEL III
            00140 ;TO PRINT CONTENTS OF SCREEN, INCLUDING
            00150 ;GRAPHIC CHARACTERS
            00160 ;*** SEE REMARKS FOR LEVEL II NON-DISK SYSTEMS ***
            00170 ;
FE80        00180         ORG     0FE80H          ;0BE80H FOR 32K
0049        00190 KEYSCN  EQU     0049H
021B        00200 VDLINE  EQU     021BH
044B        00210 CKPRT   EQU     044BH
3840        00220 KEYS    EQU     3840H
4016        00230 KYPNTR  EQU     4016H
4411        00240 MEMPRT  EQU     4411H           ;*** FOR DISK ONLY ***
            00250 ;
FE80 2A1640 00260 SETUP   LD      HL,(KYPNTR)     ;SET POINTERS
FEB3 22B9FE 00270         LD      (KYDVR+1),HL
FEB6 21B5FF 00280         LD      HL,PRINT
FEB9 2212FF 00290         LD      (PR1+1),HL
FEBC 22A6FF 00300         LD      (PRCR+1),HL
FEBF 225CFF 00310         LD      (PR2+1),HL
FE92 2296FF 00320         LD      (PR3+1),HL
FE95 220EFE 00330         LD      (PR4+1),HL
FE98 22E3FE 00340         LD      (PR5+1),HL
FE9B 22A0FF 00350         LD      (PR6+1),HL
FE9E 229BFF 00360         LD      (PR7+1),HL
FEA1 21B3FE 00370         LD      HL,ENTRY
FEA4 221640 00380         LD      (KYPNTR),HL
FEA7 221144 00390         LD      (MEMPRT),HL     ;*** FOR DISK ONLY ***
FEAA 21C0FF 00400         LD      HL,MSG          ;POINT TO MESSAGE
FEAD CD1B02 00410         CALL    VDLINE          ;DISPLAY IT
FEB0 C32040 00420         JP      402DH           ;*** FOR DISK ONLY ***
            00430 ;***    LD      BC,1A18H         FOR NON-DISK SYSTEMS ***
            00440 ;***    JP      19AEH            LEVEL II BASIC ***
            00450 ;
FEB3 3A4038 00460 ENTRY   LD      A,(KEYS)
FEB6 FE18   00470         CP      18H             ;UP & DOWN ARROWS
FEB8 C24900 00480 KYDVR   JP      NZ,KEYSCN       ;EXIT IF NOT PRESSED
            00490 ;PRINT THE SCREEN
FEBB F5     00500         PUSH    AF              ;SAVE REGISTERS
FEBC C5     00510         PUSH    BC
FEBD D5     00520         PUSH    DE
FEBE E5     00530         PUSH    HL
FEBF 21003C 00540         LD      HL,3C00H        ;START OF VIDEO MEMORY
FEC2 1611   00550         LD      D,17            ;16+1 LINES OF THE SCREEN
FEC4 15     00560 NXTLIN  DEC     D
FEC5 CAA9FF 00570         JP      Z,FIN           ;TERMINATE IF FINISHED
FEC8 0640   00580         LD      B,64            ;64 CHR. PER LINE
FECA 4E     00590 NXTCHR  LD      C,(HL)          ;C CONTAINS NEXT CHR
FECB 79     00600         LD      A,C             ;TRANSFER IT TO A
FECC FE80   00610         CP      128             ;TEST FOR GRAPHICS
FECE DA05FF 00620         JP      C,CALLP         ;IF NOT, PRINT AS IS
FED1 78     00630         LD      A,B
FED2 FE80   00640         CP      128             ;CHECK IF FIRST GRAPH CHR
            00650                                 ;ON THIS LINE
FED4 3802   00660         JR      C,PRINGR
FED6 180D   00670         JR      LAB
FED8 C680   00680 PRINGR  ADD     A,128
FEDA 47     00690         LD      B,A             ;EXTEND LINE TO 128 CHR
FEDB 0E1B   00700         LD      C,27            ;1/2 LINEFEED
FEDD CD0000 00710 PR4     CALL    $-$
FEE0 0E1C   00720         LD      C,28            ;SECOND PART OF PRINT CTL
FEE2 CD0000 00730 PR5     CALL    $-$
FEE5 4E     00740 LAB     LD      C,(HL)          ;RELOAD CHR IN C
FEE6 79     00750         LD      A,C
FEE7 E603   00760         AND     3               ;CLEAR ALL BIT BUT 0 & 1
FEE9 FE00   00770         CP      0               ;BIT 0 OFF?
FEEB 280A   00780         JR      Z,GR32
FEED FE01   00790         CP      1               ;BIT 0 ON?
FEEF 280A   00800         JR      Z,GR351
FEF1 FE02   00810         CP      2               ;BIT 1 ON, 0 OFF?
FEF3 280A   00820         JR      Z,GR352
FEF5 180C   00830         JR      GR357           ;BIT 1 AND 0 MUST BE ON!
FEF7 0E20   00840 GR32    LD      C,32
FEF9 180A   00850         JR      CALLP
FEFB 0EE9   00860 GR351   LD      C,233           ;LEFT PIXEL
FEFD 1806   00870         JR      CALLP
FEFF 0EEA   00880 GR352   LD      C,234           ;RIGHT PIXEL
FF01 1802   00890         JR      CALLP
FF03 0EEF   00900 GR357   LD      C,239           ;BOTH PIXEL
FF05 CDA5FF 00910 CALLP   CALL    PRCR
FF08 23     00920         INC     HL
FF09 05     00930         DEC     B
FF0A 78     00940         LD      A,B
FF0B FE00   00950         CP      0               ;REG A IS 0 IF NO GRAPH
FF0D 2008   00960         JR      NZ,NXTTST       ;CHAR ON THIS LINE!
FF0F 0E0D   00970         LD      C,0DH           ;CARRIAGE RETURN
FF11 CD0000 00980 PR1     CALL    $-$
FF14 C3C4FE 00990         JP      NXTLIN
FF17 FE80   01000 NXTTST  CP      128
FF19 CA1FFF 01010         JP      Z,SAME2
FF1C C3CAFE 01020         JP      NXTCHR
FF1F 0E0D   01030 SAME2   LD      C,0DH           ;REPROCESS SAME LINE
FF21 CDA5FF 01040 PR8     CALL    PRCR
FF24 D5     01050         PUSH    DE
FF25 114000 01060         LD      DE,64
FF28 ED52   01070         SBC     HL,DE
```

```
FF2A D1         01080           POP     DE
FF2B 4E         01090 SSCND     LD      C,(HL)
FF2C 79         01100           LD      A,C
FF2D FE80       01110           CP      128
FF2F 3810       01120           JR      C,GA32
FF31 E60C       01130           AND     12
FF33 FE00       01140           CP      0
FF35 280A       01150           JR      Z,GA32
FF37 FE04       01160           CP      4
FF39 280A       01170           JR      Z,GA351
FF3B FE08       01180           CP      8
FF3D 280A       01190           JR      Z,GA352
FF3F 180C       01200           JR      GA357
FF41 0E20       01210 GA32      LD      C,32
FF43 180A       01220           JR      CALQ
FF45 0EE9       01230 GA351     LD      C,233
FF47 1806       01240           JR      CALQ
FF49 0EEA       01250 GA352     LD      C,234
FF4B 1802       01260           JR      CALQ
FF4D 0EEF       01270 GA357     LD      C,239
FF4F CDA5FF     01280 CALQ      CALL    PRCR
FF52 23         01290 SCND      INC     HL
FF53 05         01300           DEC     B
FF54 78         01310           LD      A,B
FF55 FE40       01320           CP      64
FF57 2007       01330           JR      NZ,SCND2
FF59 0E0D       01340           LD      C,0DH
FF5B CD0000     01350 PR2       CALL    $-$
FF5E 1802       01360           JR      SAME3
FF60 18C9       01370 SCND2     JR      SSCND
                01380 ;
FF62 D5         01390 SAME3     PUSH    DE                      ;REPROCESS SAME LINE
FF63 114000     01400           LD      DE,64
FF66 ED52       01410           SBC     HL,DE
FF68 D1         01420           POP     DE
FF69 4E         01430 STHRD     LD      C,(HL)
FF6A 79         01440           LD      A,C
FF6B FE80       01450           CP      128
FF6D 3810       01460           JR      C,GN32
FF6F E630       01470           AND     48
FF71 FE00       01480           CP      0
FF73 280A       01490           JR      Z,GN32
FF75 FE10       01500           CP      16
FF77 280A       01510           JR      Z,GN351
FF79 FE20       01520           CP      32
FF7B 280A       01530           JR      Z,GN352
FF7D 180C       01540           JR      GN357
FF7F 0E20       01550 GN32      LD      C,32
FF81 180A       01560           JR      CALR
FF83 0EE9       01570 GN351     LD      C,233
FF85 1806       01580           JR      CALR
FF87 0EEA       01590 GN352     LD      C,234
FF89 1802       01600           JR      CALR
FF8B 0EEF       01610 GN357     LD      C,239
FF8D CDA5FF     01620 CALR      CALL    PRCR
FF90 23         01630 THIRD     INC     HL
FF91 10D6       01640           DJNZ    STHRD
FF93 0E0D       01650           LD      C,0DH
FF95 CD0000     01660 PR3       CALL    $-$
FF98 0E1B       01670           LD      C,27                    ;BACK TO NORMAL LINEFEED
FF9A CD0000     01680 PR7       CALL    $-$
FF9D 0E36       01690           LD      C,54
FF9F CD0000     01700 PR6       CALL    $-$
FFA2 C3C4FE     01710           JP      NXTLIN
                01720 ;
FFA5 CD0000     01730 PRCR      CALL    $-$
FFA8 C9         01740           RET
FFA9 0E0D       01750 FIN       LD      C,0DH
FFAB CDA5FF     01760           CALL    PRCR
FFAE E1         01770           POP     HL
FFAF D1         01780           POP     DE
FFB0 C1         01790           POP     BC
FFB1 F1         01800           POP     AF
FFB2 C34900     01810           JP      KEYSCN
                01820 ;
FFB5 F5         01830 PRINT     PUSH    AF
FFB6 CD4B04     01840 PRTRDY    CALL    CKPRT                   ;CHECK FOR PRINTER READY
FFB9 20FB       01850           JR      NZ,PRTRDY               ;WAIT IF NOT
FFBB F1         01860           POP     AF
FFBC 79         01870           LD      A,C                     ;LOAD CHR
FFBD D3F8       01880           OUT     (0F8H),A                ;PRINT IT
FFBF C9         01890           RET
FFC0 53         01900 MSG       DEFM    'Screen print installed, (by S. Calmettes, 613-3843729)
     63 72 65 65 6E 20 70 72 69 6E 74 20 69 6E 73 74
     61 6C 6C 65 64 2C 20 28 62 79 20 53 2E 20 43 61
     6C 6D 65 74 74 65 73 2C 20 36 31 33 2D 33 38 34
     33 37 32 39 29
FFF6 0D         01910           DEFB    0DH
FEB0            01920           END     SETUP
00000 TOTAL ERRORS

CALLP   FF05   CALQ    FF4F   CALR    FF8D   CKPRT   044B   ENTRY   FEB3
FIN     FFA9   GA32    FF41   GA351   FF45   GA352   FF49   GA357   FF4D
GN32    FF7F   GN351   FF83   GN352   FF87   GN357   FF8B   GR32    FEF7
GR351   FEFB   GR352   FEFF   GR357   FF03   KEYS    3840   KEYSCN  0049
KYDVR   FEB8   KYPNTR  4016   LAB     FEE5   MEMPRT  4411   MSG     FFC0
NXTCHR  FECA   NXTLIN  FEC4   NXTTST  FF17   PR1     FF11   PR2     FF5B
PR3     FF95   PR4     FEDD   PR5     FEE2   PR6     FF9F   PR7     FF9A
PR8     FF21   PRCR    FFA5   PRIMGR  FED8   PRINT   FFB5   PRTRDY  FFB6
SAME2   FF1F   SAME3   FF62   SCND    FF52   SCND2   FF60   SETUP   FEB0
SSCND   FF2B   STHRD   FF69   THIRD   FF90   VDLINE  021B
```

LISTING 2

```
10 'SCREEN PRINT (SCRPRT)
20 'BY SERGE Y. CALMETTES,
30 'FOR THE TRS-80 MODEL III, TO PRINT THE CONTENTS OF THE
40 'SCREEN, INCLUDING GRAPHIC CHARACTERS.
50 'LEVEL II BASIC VERSION FOR 16K
60 FORI=32384TO32758
70 READA:POKEI,A
80 NEXTI
90 INPUT"Press enter to activate SCREEN PRINT";EN
100 POKE16526,128:POKE16527,126:X=USR(Y)
110 DATA 042,022,064,034,185,126,033,181,127,034,018,127,034
120 DATA 166,127,034,092,127,034,150,127,034,222,126,034
130 DATA 227,126,034,160,127,034,155,127,033,179,126,034
140 DATA 022,064,033,192,127,205,027,002,001,024,026,195
150 DATA 174,025,058,064,056,254,024,194,073,000,245,197
160 DATA 213,229,033,000,060,022,017,021,202,169,127,006,064
170 DATA 078,121,254,128,218,005,127,120,254,128,056,002
180 DATA 024,013,198,128,071,014,027,205,000,000,014,028,205
190 DATA 000,000,078,121,230,003,254,000,040,010,254,001,040
200 DATA 010,254,002,040,010,024,012,014,032,024,010,014,233
210 DATA 024,006,014,234,024,002,014,239,205,165,127,035,005
220 DATA 120,254,000,032,008,014,013,205,000,000,195,196,126
230 DATA 254,128,202,031,127,195,202,126,014,013,205,165,127
240 DATA 213,017,064,000,237,082,209,078,121,254,128,056,016
250 DATA 230,012,254,000,040,010,254,004,040,010,254,008,040
260 DATA 010,024,012,014,032,024,010,014,233,024,006,014,234
270 DATA 024,002,014,239,205,165,127,035,005,120,254,064,032
280 DATA 007,014,013,205,000,000,024,002,024,201,213,017,064
290 DATA 000,237,082,209,078,121,254,128,056,016,230,048,254
300 DATA 000,040,010,254,016,040,010,254,032,040,010,024,012
310 DATA 014,032,024,010,014,233,024,006,014,234,024,002,014
320 DATA 239,205,165,127,035,016,214,014,013,205,000,000,014
330 DATA 027,205,000,000,014,054,205,000,000,195,196,126,205
340 DATA 000,000,201,014,013,205,165,127,225,209,193,241
350 DATA 195,073,000,245,205,075,004,032,251,241,121,211,248
360 DATA 201,083,099,114,101,101,110,032,112,114,105,110,116
370 DATA 032,105,110,115,116,097,108,108,101,100,044,032,040
380 DATA 098,121,032,083,046,032,067,097,108,109,101,116
390 DATA 116,101,115,044,032,054,049,051,045,057,054,054,049
400 DATA 053,048,054,041,013
```

TIPS FOR VIDEOGENIE (PMC-80, SYSTEM-80)

by H. Delahaye, Veenendaal, Holland

Translated by Paul Fransen

When using a Videogenie the printer is port addressed. That's why you can't get a hardcopy with the Tandy EDTASM program. You can fix this by making the following changes:

Load the system tape. Don't start the program but instead press BREAK. Then change the following bytes:

POKE 19002,253	HEX: 4A3A,FD
POKE 19029,253	4A55,FD
POKE 19082,0	4A8A,00
POKE 19083,219	4A8B,DB
POKE 19084,253	4A8C,FD

Then start again by entering SYSTEM. When you see the '*?' enter '/' and ENTER.

With the right Debug program you can save the changed program on tape.

BASIC WORD SEARCH PROGRAM

by Jim Mumaugh

I was pleased to see that you were interested in some BASIC language programs for the Northern Bytes. I have written a few and will send them along. I thought your readers were more interested in Assembly so I never bothered to ask before.

This name of this program is WRDSRCH/BAS. I altered a program a teacher at our high school had. Several teachers wanted a wordsearch program which would intertwine the words. When I got this program, it also did not mix the words. I don't know who those other guys are, but I left their names in anyway because I used their basic ideas. The actual program has little resemblance to the original.

FEATURES OF WRDSRCH/BAS

You are not limited as to the number of words you insert. Of course, the total letter count needs to be about 100 less than available space in order to get the words into the puzzle.

You are limited to 40 characters wide because of the standard 80 character width of most printers. The length should be greater than 20 but there is no actual limit.

Occasionally you will be unable to fit all words into a puzzle. You can request the program to retry as many times as you like but somewhere there will be a situation when one or two words don't fit. I have planned for that in lines 19622 and 19624. This way a teacher could have a word needed "searched for" by the student even if it was not actually in the puzzle.

I included some data to use as a demonstration. It's easier when showing someone if you don't have to think up 40 or 50 words before you show it off.

I added some entertainment while the program worked, while keeping the user abreast of the current status of the program. Everybody seems to enjoy the comments.

The most important items I added were the "save to disk" routines. Once you type in a word list, you can save and recall it. This is especially useful when a teacher wants two or more puzzles with the same words. I also offer to write the puzzle and its solution to disk (or to the printer). I prefer the disk save because I only need to keep the disk version and can print it on a ditto master when needed using PRINT flname/PZL from DOS ready.

I think the solution is actually worthless. I used it while debugging the program to be sure it would interlock the words. If you get a ratio of used spaces to available spaces near 1 you will have most words interlocked in 2 or more spaces. I recommend than you press break when I announce that I am ready to write the solution to disk. The program is over at this point and the solution just takes up disk space.

The actual interlocking is random. Sometimes you will get lots of it and other times only a few. I simply pick a random spot in the grid to begin my word. Then I look at each letter in my word and compare it with the next space. If there is no conflict I continue. (The same letter as I am currently looking at or a blank is OK.) If there is a conflict, I retry at another location in the same direction. I try 20 times then pick a new direction. If after 160 tries I still don't get it in, I say it's impossible but offer to try another 160 times. Many times I have tried over 300 times and then it would fit, so have patience.

One last feature I added (because many of the teachers using this program are not more than very casual users) is that I pick the puzzle name, solution name and word list names for them. You do have the option to override these, however, when you use two puzzles with the same first word in their titles.

I hope you find this interesting and useful.

Jim Mumaugh
J & J Computer Consultant
(also Vacaville High School Advanced Mathematics teacher)
244 North Alamo Drive
Vacaville, California 95688

```
1000 '*****************************
1050 '*           12/17/84  6:05 PM            *
1100 '*             WRDSRCH/BAS                 *
1150 '*                                   *
1200 '*         WRITTEN BY RON BENNINGHOF          *
1250 '*        MODIFIED BY JIM LARISON (9 FATAL ERRORS) *
1300 '*         REWRITTEN BY JIM MUMAUGH           *
1400 '*                                   *
1450 '*****************************
1500 '
1550 '
1700 CLEAR10000:CLS:RANDOM:DEFINTA-
Z:FORI=1TO10:READEX$(I):NEXT
1720 DATA Zounds!,Ah Ha!,Yippee!,Umph!,Aargh!,Finally!,Whew!,Of co
urse!,Can't fool me!,Naturally
1800 '-----------------------SET UP MATRIX------------------
1840 PRINT"Do you want a demonstration?  Y/N  ";:LINEINPUTY$:IF
LEFT$(Y$,1)="Y"THENDIMA(26,21),D$(50):A1=25:B1=20:NA$="DEMON
STRATION":WN=50:FORI=1TOWN:READD$(I):NEXT:GOTO2700
1850 INPUT"ENTER PUZZLE NAME";NA$
1860 INPUT"Do you have a word list ALREADY on disk";W$:IFW$<>"Y
"THEN1900
1870 INPUT"What file name does it have";F2$:OPEN"I",1,F2$:INPUT#
1,WN:DIMD$(WN):FORI=1TOWN:INPUT#1,D$(I):NEXT:CLOSE
1900 PRINT"What size of matrix would you like?    I recommend a 20
 X 20 with about 40 words       Enter two numbers, separated with co
mmas.
1905 INPUT"What are your two numbers";A1,B1
2000 IFA1>40THEN1900'::::1/2 LENGTH OF LINE PRINTER
2100 DIM A(A1+1,B1+1)
2200 '-------------------ENTER NUMBER OF WORDS--------------
-----
2300 D=INT(A1*B1/10)
2305 IFW$="Y"THEN2700
2310 PRINT"You have room for about"D"words (give or take 10).   Ho
w many words shall we use";:INPUTWN
2500 DIM D$(WN)
2600 FOR Q=1TOWN:PRINT"ENTER WORD NUMBER";Q;:INPUT D$(Q):
NEXTQ
2700 GOSUB9900:Q=0:CLS:GOSUB11000
2705 INPUT"Shall I save this word list to disk";W$:IFW$<>"Y"THEN2
800
2720 IFVAL(NA$)<>0THENN$="Z"+NA$ELSEN$=NA$
2730 IF LEN(N$)>8THENN$=LEFT$(N$,8)
2740 X=INSTR(N$," "):IFX=0THENX=8
2750 WR$=LEFT$(N$,X-
1)+"/WRD":PRINT"The word list will be called "WR$"."
2760 PRINT"Is this satisfactory with you?  ";:LINEINPUTY1$:IFY1$
<>"N"THEN2765
2763 INPUT"What filename shall I use";WR$
2765 OPEN"O",1,WR$:PRINT#1,WN",";:FORI=1TOWN:PRINT#1,D$(I)"
,";:NEXT:CLOSE
2800 TY=0
2810 Q=Q+1:A$=D$(Q)
2820 PRINT"I am working on : "A$".  ";
2900 '----------------------PICK DIRECTION--------------------
---
3000 DI=RND(8)
3010 ON DI GOTO3300,3800,4300,4800,5300,5900,6500,7100
3100 '---------------------SET UP ARRAY----------------------
----
3200 '        FORWARD    FIXED/JIM
3300 F1=0:A=RND(A1):B=RND(B1):IF A+LEN(A$)>A1THEN3300
3400 I=0:FORT=A TO A+LEN(A$)-1
3405 I=I+1
3410 B$=MID$(A$,I,1):IF (A(T,B)=0 OR ASC(B$)=A(T,B))  THEN 3420
3415 T=A + LEN(A$):F1=1
3420 NEXT T
3430 IF F1=1 THEN 10800
3500 FORT=1 TO LEN(A$):B$=MID$(A$,T,1):A(A,B)=ASC(B$)
3600 A=A+1:NEXT T:GOTO7600
3700 '        BACKWARD   FIXED/JIM
3800 F1=0:A=RND(A1):B=RND(B1):IF A-LEN(A$)<0 THEN 3800
3900 II=LEN(A$)+1:I=0:FORT=A-LEN(A$)+1 TO A
3905 I=I+1
3910 B$=MID$(A$,II-I,1):IF (A(T,B)=0 OR ASC(B$)=A(T,B))THEN3920
3915 T=A:F1=1
3920 NEXT T
3930 IF F1=1 THEN 10800
4000 FOR T=1TO LEN(A$):B$=MID$(A$,T,1):A(A,B)=ASC(B$)
4100 A=A-1:NEXT T:GOTO 7600
4200 '        DOWN   FIXED/JIM
4300 F1=0:A=RND(A1):B=RND(B1):IFB+LEN(A$)>B1THEN4300
4400 I=0:FOR T=B TO B+LEN(A$)-1
4405 I=I+1
4410 B$=MID$(A$,I,1):IF (A(A,T)=0 OR ASC(B$)=A(A,T)) THEN 4420
4415 T=B+LEN(A$):F1=1
4420 NEXT T
4430 IF F1=1 THEN 10800
4500 FOR T=1TOLEN(A$):B$=MID$(A$,T,1):A(A,B)=ASC(B$)
4600 B=B+1:NEXT T:GOTO 7600
4700 '        UP   FIXED/JIM
```

```
4800 F1=0:A=RND(A1):B=RND(B1):IFB-LEN(A$)<0THEN4800
4900 I=0:II=LEN(A$)+1:FORT=B-LEN(A$)+1TOB
4905 I=I+1
4910 B$=MID$(A$,II-I,1):IF (A(A,T)=0 OR ASC(B$)=A(A,T))THEN4920
4915 T=B:F1=1
4920 NEXT T
4930 IF F1=1 THEN 10800
5000 FORT=1TOLEN(A$):B$=MID$(A$,T,1):A(A,B)=ASC(B$)
5100 B=B-1:NEXTT:GOTO7600
5200 '        DOWN DIAGONALLY
5300 F1=0:A=RND(A1):B=RND(B1):IFA+LEN(A$)>A1THEN5300
5400 IFB+LEN(A$)>B1THEN5300
5500 I=0:FORT=0TOLEN(A$)-1
5505 I=I+1
5510 B$=MID$(A$,I,1):IF ( A(A+T,B+T)=0 OR ASC(B$)=A(A+T,B+T)) TH
EN5520
5515 T=LEN(A$):F1=1
5520 NEXT T
5530 IF F1=1 THEN 10800
5600 FORT=1TOLEN(A$):B$=MID$(A$,T,1):A(A,B)=ASC(B$)
5700 A=A+1:B=B+1:NEXT T:GOTO7600
5800 '        UP DIAGONALLY
5900 F1=0:A=RND(A1):B=RND(B1):IFA+LEN(A$)>A1 THEN 5900
6000 IF B-LEN(A$)<1 THEN 5900
6100 I=0:FOR T=0 TO LEN(A$)-1
6105 I=I+1
6110 B$=MID$(A$,I,1):IF (A(A+T,B-T)=0 OR ASC(B$)=A(A+T,B-
T))THEN6120
6115 T=LEN(A$):F1=1
6120 NEXT T
6130 IF F1=1 THEN 10800
6200 FOR T=1 TO LEN(A$):B$=MID$(A$,T,1):A(A,B)=ASC(B$)
6300 A=A+1:B=B-1:NEXT T:GOTO 7600
6400 '        UP DIAGONALLY
6500 F1=0:A=RND(A1):B=RND(B1):IFA-LEN(A$)<1THEN 6500
6600 IF B-LEN(A$)<1 THEN 6500
6700 I=0:FOR T=0 TO LEN(A$)-1
6705 I=I+1
6710 B$=MID$(A$,I,1):IF (A(A-T,B-T)=0 OR ASC(B$)=A(A-T,B-
T)) THEN 6720
6715 T=LEN(A$):F1=1
6720 NEXT T
6730 IF F1=1 THEN 10800
6800 FOR T=1 TO LEN(A$):B$=MID$(A$,T,1):A(A,B)=ASC(B$)
6900 A=A-1:B=B-1:NEXT T:GOTO7600
7000 '        DOWN DIAGONALLY
7100 F1=0:A=RND(A1):B=RND(B1):IFA-LEN(A$)<1THEN 7100
7200 IF B+LEN(A$)>B1 THEN 7100
7300 I=0:FOR T=0 TO LEN(A$)-1
7305 I=I+1
7310 B$=MID$(A$,I,1):IF (A(A-T,B+T)=0 OR ASC(B$)=A(A-
T,B+T))THEN7320
7315 T=LEN(A$):F1=1
7320 NEXT
7330 IF F1=1THEN10800
7400 FOR T=1 TO LEN(A$):B$=MID$(A$,T,1):A(A,B)=ASC(B$)
7500 A=A-1:B=B+1:NEXT T
7600 IF Q<>WN THEN PRINTEX$(RND(10))"  I got it.":GOTO2800 ELS
E PRINT"I got the last one!":TB=(80-A1*2)/2:CMD"O",WN,D$(1)
7700 '---------------------------PRINT OUT MATRIX----------
------
7705 PRINT"Now that that job is finished, I need to know if you want
 me to save this puzzle to disk or write directly to the printer.":PRIN
T"If you want to write it to DISK then type 'DISK' otherwise type 'P
RINTER' ==>  ";:INPUT CH$
7710 IF CH$="DISK" THEN GOTO 17700 ELSE IF CH$<>"PRINTER" T
HEN GOTO7705
7750 Q=((80-
LEN(NA$))/2):LPRINTTAB(Q)NA$:LPRINT:PRINT"PRINTING PUZZLE
NOW"
7800 FOR B=1 TO B1:FOR A=1 TO A1:LPRINTTAB(TB);
7900 IF A(A,B)=0 THEN LPRINT CHR$(64+RND(26));:GOTO8100
8000 LPRINTCHR$(A(A,B));
8100 LPRINT" ";:NEXT A:LPRINT:LPRINTTAB(TB);:NEXT B:GOSUB96
20
9000 '----------------------GIVE SOLUTION--------------------
---
9010 PRINT"Press <ENTER> to print the solution";:LINEINPUTY$
9100 PRINT:PRINT"NOW FOR THE SOLUTION. . ."
9250 LPRINTNA$+": SOLUTION":LPRINT
9300 FOR B=1 TO B1:FOR A=1 TO A1:LPRINTTAB(TB);
9400 IF A(A,B)=0 THEN LPRINT".";:GOTO9600
9500 LPRINTCHR$(A(A,B));
9600 LPRINT" ";:NEXT A:LPRINT:LPRINTTAB(TB);:NEXT B:GOSUB96
20:GOTO9700
9610 '--------------------PRINT OUT THE WORDS---------------
------
9620 IF WR=0GOTO9630
9622 LPRINT:LPRINT"Only"WR"of these words are NOT in the puzzle
.";
9624 IFWR=1LPRINT"Which word is it?"ELSELPRINT"Which words ar
e they?"
9630 LPRINT:LPRINTTAB(5);:A=0:FOR Q=1 TO WN:A=A+1
9632 IF A=5 LPRINT:LPRINTTAB(5);:A=1
9640 LPRINT D$(Q);:IF A<>4 LPRINTSTRING$(20-LEN(D$(Q))," ");
9650 NEXT Q:LPRINT:LPRINT:PRINT:PRINT:RETURN
9660 '--------------SHALL WE QUIT?---------------------------
-
9700 INPUT"ANOTHER COPY OF SAME PUZZLE";OO$
9710 IF LEFT$(OO$,1)="Y"THEN 7700 ELSE END
9800 '----------------------EDIT SUBROUTINE------------------
------
9900 CLS:FOR Q=1 TO WN:PRINT Q;"= ";D$(Q),:NEXT Q
10000 PRINT:INPUT"DO YOU WANT TO CHANGE ANY WORDS (Y OR
 N)";D$
10100 D1$=LEFT$(D$,1):IF D1$="N" THEN RETURN
10200 INPUT"WHICH WORD DO YOU WANT TO CHANGE";Q
10300 INPUT"TYPE THE NEW WORD ";D$(Q):GOTO9900
10700 '--------------------ATTEMPTED TRIES--------------------
------
10800 TY=TY+1
10810 IF TY/160=INT(TY/160) THEN PRINT"I think this one's impos
sible!   Shall I try again?  Y/N   ";:INPUTY$:IFY$="N"THENWR=WR+
1:GOTO2810ELSE2820
10820 IF TY/20=INT(TY/20) THEN PRINT"It wouldn't fit.":GOTO300
0
10825 GOTO3010
11000 '--------SORT FROM LONGEST TO SHORTEST WORD
11010 FOR I=1 TO WN
11020 D$(I)=STR$(100+LEN(D$(I)))+D$(I)
11030 NEXT
11040 CMD"O",WN,-D$(1)
11050 FOR I=1 TO WN
11060 D$(I)=RIGHT$(D$(I),LEN(D$(I))-4)
11070 NEXT
11080 RETURN
11090 '
17700 '-------------WRITE TO DISK----------------------------
--
17710 IFVAL(NA$)<>0THENN$="Z"+NA$ELSEN$=NA$
17712 IF LEN(N$)>8THENN$=LEFT$(N$,8)
17715 X=INSTR(N$," "):IFX=0THENX=8
17718 PZ$=LEFT$(N$,X-1)+"/PZL":SL$=LEFT$(N$,X-
1)+"/SOL":PRINT"The puzzle will be called "PZ$" and the solution wil
l be called "SL$"."
17719 PRINT"Is this satisfactory with you?  ";:LINEINPUTY1$:IFY1
$<>"N"THEN17745
17730 INPUT"Ok.  What name would you like";N$
17735 IF LEN(N$)>8 THEN PRINT"Eight letters and/or numbers, plea
se.":GOTO17730
17736 X=INSTR(N$,"/"):IF X<>0 THENPRINT"I will supply the extens
ion.":GOTO17730
17737 IF VAL(N$)<>0 THEN PRINT"The name must begin with a lette
r.":GOTO17730
17740 GOTO17715
17745 OPEN"O",1,PZ$
17750 Q=((80-
LEN(NA$))/2):PRINT#1,TAB(Q)NA$:PRINT#1,:PRINT"PRINTING PUZ
ZLE NOW"
17800 FOR B=1 TO B1:FOR A=1 TO A1:PRINT#1,TAB(TB);
17900 IF A(A,B)=0 THEN PRINT#1, CHR$(64+RND(26));:GOTO18100
18000 PRINT#1,CHR$(A(A,B));
18100 PRINT#1," ";:NEXT A:PRINT#1,:PRINT#1,TAB(TB);:NEXT B:G
OSUB19620:CLOSE
19000 '---------------------GIVE SOLUTION--------------------
----
19010 PRINT"Press <ENTER> to print the solution";:LINEINPUTY$
19100 PRINT:PRINT"NOW FOR THE SOLUTION. . ."
19200 OPEN"O",1,SL$
19250 PRINT#1,NA$+": SOLUTION":PRINT#1,
19300 FOR B=1 TO B1:FOR A=1 TO A1:PRINT#1,TAB(TB);
19400 IF A(A,B)=0 THEN PRINT#1,".";:GOTO19600
```

```
19500 PRINT#1,CHR$(A(A,B));
19600 PRINT#1," ";:NEXT A:PRINT#1,:PRINT#1,TAB(TB);:NEXT B:G
OSUB19620:CLOSE:END
19610 '-------------------PRINT OUT THE WORDS---------------
------
19620 IF WR=0GOTO19630
19622 PRINT"There were"WR"words NOT included in the puzzle.":PRI
NT#1," ":PRINT#1,"Only"WR"of these words are NOT in the puzzle.";
19624 IFWR=1PRINT#1,"  Which word is it?"ELSEPRINT#1,"  Which w
ords are they?"
19630 PRINT#1,:PRINT#1,TAB(5);:A=0:FOR Q=1 TO WN:A=A+1
19632 IF A=5 PRINT#1,:PRINT#1,TAB(5);:A=1
19640 PRINT#1, D$(Q);:IF A<>4 PRINT#1,STRING$(20-
LEN(D$(Q))," ");
19650 NEXT Q:PRINT#1,:PRINT#1,:PRINT:PRINT:RETURN
20001 DATA MUMAUGH,SANFRANCISO,CLEVELAND,MIAMI,PHILAD
ELPHIA,NEWENGLAND,BUFFALO,ATLANTA,NEWORLEANS,KANSAS
CITY,HOUSTON,GREENBAY,MINNESOTA,NYJETS,INDIANAPOLIS,ST
LOUIS,DALLAS,WASHINGTON,DETROIT
20002 DATA PITTSBURG,CINCINNATI,NYGIANTS,TAMPABAY,DENV
ER,SANDIEGO,CHICAGO,LARAMS,SEATTLE,LARAIDERS,FOOTBALL
20003 DATA IOWA,YALE,ARMY,NAVY,OHIOST,ARIZONA,OREGON,R
ICE,BAYLOR,STANFORD,CORNELL,BROWN,CLEMSON,TEXAS,KENTU
CKY,FLORIDA,PURDUE,GEORGIA,COLLEGE,RUTGERS
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* * *

OVERSEAS EXPERIENCE

by "Computer Nut"

(Part 4 of a series)

Once you have purchased the software and hardware you require, then comes the question of support. Support should never be more than a phone call away, but a phone call from another country can be an expensive business, even costing more than the software itself.

I know software publishers get calls and letters from all sorts of people, with questions ranging from which way to orient the disk when mounting it in the drive, to why printer I using buffer J and filter K on operating system L (no, not necessarily 'elldos) using computer M drops the first character after a form feed spacing more than N lines. It can be a frustrating job answering all these questions, especially those which are already answered within the first few pages of the documentation.

It should be important, both to yourself and to the publisher, that you fill in the registration card and send it off when you have bought some software. Some publishers apparently throw registration cards in the nearest bin, and you never hear another word from them, while others use the information for sending newsletters and notice of new updates to programs. I don't expect publishers to support users who do not bother to register their purchase, or users who have not obtained their copy of the program legitimately.

I do, however, expect publishers to answer genuine and legitimate questions from registered users concerning their products, whether it be by phone or by letter. A software publisher who does not bother to answer my questions or even acknowledge the receipt of them cannot expect to sell me any more products, or expect me to recommend the product to others. Despite this, several of them seem to survive or even thrive.

I also expect publishers to inform me when they upgrade their products, and provide me with the possibility of upgrading at a reasonable price. One of the larger software publishers, no longer in the TRS-80 business, provide an update possibility within the same version number, but require a new purchase for major revisions of the product. I bought one of their products about 2 months before a major update, and now I have to purchase the product again at full price if I want the new features. They probably won't notice it, but if I can avoid buying any of their products in future I will do so. Also, since their license agreement bound them to an upgrade policy and since they have not kept their part of the agreement, I no longer feel bound by my signature on the agreement.

Another feature which I appreciate from publishers is a newsletter. This could be provided free of charge for a certain period after a software purchase, or at a nominal fee. Newsletters can provide useful information such as corrections to known bugs, restrictions, feedback from users, notice of upgrades, and useful information which was not included in the manual. The newsletter does not have to be a large, bound volume. One or two photocopied sheets would be sufficient for most products.

For overseas users Tandy/Radio Shack has a lot to learn about user support. Apparently they assume that all users have ready access to a local store where update notices and correction reports can be read at leisure. At the moment I don't even know if there is a Tandy store in the country where I live, let alone in the same area. I have registered several Tandy software products, but only after direct correspondence concerning serious bugs have I received the patches required. I have no idea what they use the registration cards for, since I have never received any mail from them except after writing and asking for information.

I don't know if they expect me to write every few months asking if there are any updates to their products, or how they expect me to get the disks containing new releases. Until now I have been fortunate enough to have friends who traveled regularly to the U.S. who could get copies as and when required, but surely they can't expect all users to be in that situation.

For the time being this will be the last installment in this series. If you have any comments or suggestions please send them to me care of Jack Decker. The address is on the back of this issue of Northern Bytes.

* * *

SZAP80/CMD

A program to patch Model III SUPERZAP to work with VIDEO4

by Tony Domigan

If you own a Model 4 or 4P and use a program such as VIDEO4 to enable the 24x80 screen display while in the Model III mode, you may find this program useful. It patches the SUPERZAP program of NEWDOS/80 to permit operation in either the normal 64x16 or in the 80x24 mode. Although this patched version of SUPERZAP is 100H longer than the original, it is entirely self-contained. To use it normally, you simply enter 'SUPERZAP' as usual; but if you wish to use it in the 80x24 mode, you enter 'SUPERZAP 4'.

The LDAHL, LDHLA and CONVRT routines have been borrowed (with permission) from VIDEO4. Further instructions for installation and operation may be found in the source code comments below.

```
               00010 ;        SZAP80/ASM - Model 4
               00020 ;         80x24 mods for Superzap
               00030 ;   For Northern Bytes & the Public Domain
               00040 ;              by Tony Domigan
               00050 ; P.O. Box 150, Thomastown, Victoria, 3074, AUSTRALIA.
               00060 ;              MCI-ID 254-5121
               00070 ;
               00080 ;Instructions to create a dual version (64x16 and 80x24)
               00090 ;   1. From DOS 'LOAD SUPERZAP/CMD'
               00100 ;   2. From DOS 'LOAD SZAP80/CMD'
               00110 ;   3. From DOS 'DUMP SUPERZAP/CMD 5200H,6FFFH,5300H'
               00120 ;             To execute -
               00130 ;    Enter 'SUPERZAP' for normal SUPERZAP
               00140 ;    Enter 'SUPERZAP 4' for 80x24 SUPERZAP
               00150 ;
               00160 ;This patch has been tested with VIDEO4 & VID80x24
               00170 ;------------------------------------------------
               00180 ;Throw-away code - placed in SUPERZAP buffer
               00190 ;Checks for '4' and   executes patch if so.
               00191 ;------------------------------------------------
5300           00200         ORG     5300H          ;SUPERZAP buffer
5300 7E        00210 CHECK   LD      A,(HL)         ;'SUPERZAP 4<cr>' ?
5301 FE34      00220         CP      '4'            ;80x24 patch?
5303 CA0953    00230         JP      Z,START        ;Yes, Execute Patch
5306 C3C554    00240         JP      54C5H          ;Exec Superzap
5309 3EC3      00250 START   LD      A,0C3H         ;Place Jumps
530B 32D656    00260         LD      (56D6H),A
530E 32DB5D    00270         LD      (5DDBH),A
5311 321560    00280         LD      (6015H),A
5314 321E60    00290         LD      (601EH),A
5317 320B62    00300         LD      (620BH),A
531A 3ECD      00310         LD      A,0CDH         ;Place Calls
531C 32DB56    00320         LD      (56DBH),A
531F 32F35F    00330         LD      (5FF3H),A
5322 323560    00340         LD      (6035H),A
5325 323E60    00350         LD      (603EH),A
5328 325061    00360         LD      (6150H),A
532B 3E50      00370         LD      A,80           ;80 Columns
532D 32FE60    00380         LD      (60FEH),A
5330 32105E    00390         LD      (5E10H),A
5333 87        00400         ADD     A,A            ;2x80 Column Lines
```

```
5334 32F760   00410          LD     (60F7H),A
5337 21206F   00420          LD     HL,RTNE1         ;Place Addresses
533A 221F60   00430          LD     (601FH),HL
533D 212C6F   00440          LD     HL,RTNE2
5340 22F45F   00450          LD     (5FF4H),HL
5343 21336F   00460          LD     HL,RTNE3
5346 220C62   00470          LD     (620CH),HL
5349 21386F   00480          LD     HL,RTNE4
534C 221660   00490          LD     (6016H),HL
534F 213F6F   00500          LD     HL,RTNE5
5352 223660   00510          LD     (6036H),HL
5355 214A6F   00520          LD     HL,RTNE6
5358 223F60   00530          LD     (603FH),HL
535B 21526F   00540          LD     HL,RTNE7
535E 220C5D   00550          LD     (5D0CH),HL
5361 218D6F   00560          LD     HL,RTNE8
5364 225161   00570          LD     (6151H),HL
5367 21936F   00580          LD     HL,RTNE9
536A 220C56   00590          LD     (560CH),HL
536D 219B6F   00600          LD     HL,RTNE0
5370 220756   00610          LD     (5607H),HL
5373 21403D   00620          LD     HL,3D40H
5376 22B660   00630          LD     (60B6H),HL
5379 21803E   00640          LD     HL,3E80H
537C 22DB60   00650          LD     (60DBH),HL
537F 21C03F   00660          LD     HL,3FC0H
5382 22EB60   00670          LD     (60EBH),HL
5385 21B140   00680          LD     HL,40B1H
5388 22F160   00690          LD     (60F1H),HL
538B C3C554   00700 EXEC     JP     54C5H            ;Start SUPERZAP
              00710 ;-----------------------------------------------------
6F20          00720          ORG    6F20H            ;Patch Area
6F20 E1       00730 RTNE1    POP    HL
6F21 D5       00740          PUSH   DE
6F22 111000   00750          LD     DE,16            ;+64=80 Columns
6F25 19       00760          ADD    HL,DE            ;New Pointer
6F26 08       00770          EX     AF,AF'
6F27 D1       00780          POP    DE
6F28 3D       00790          DEC    A
6F29 C32160   00800          JP     6021H
6F2C D5       00810 RTNE2    PUSH   DE
6F2D 112800   00820          LD     DE,0028H         ;Offset to Ascii Side
6F30 19       00830          ADD    HL,DE
6F31 D1       00840          POP    DE
6F32 C9       00850          RET
6F33 CDAE6F   00860 RTNE3    CALL   LDHLA            ;LD (HL),A
6F36 23       00870          INC    HL
6F37 C9       00880          RET
6F38 CD336F   00890 RTNE4    CALL   RTNE3            ;LD (HL),A
6F3B E3       00900          EX     (SP),HL
6F3C C31860   00910          JP     6018H
6F3F F5       00920 RTNE5    PUSH   AF
6F40 7B       00930          LD     A,E
6F41 CD336F   00940          CALL   RTNE3            ;LD (HL),A
6F44 7A       00950          LD     A,D
6F45 CDAE6F   00960          CALL   LDHLA            ;LD (HL),A
6F48 F1       00970          POP    AF
6F49 C9       00980          RET
6F4A 3E14     00990 RTNE6    LD     A,14H            ;Page 1 of Video
6F4C D384     01000          OUT    (84H),A          ;Select Page 1
6F4E 11003C   01010          LD     DE,3C00H         ;Top of page
6F51 C9       01020          RET
6F52 D5       01030 RTNE7    PUSH   DE
6F53 C5       01040          PUSH   BC
6F54 11083C   01050          LD     DE,3C08H
6F57 19       01060          ADD    HL,DE            ;Mod/Find Posn
6F58 E5       01070          PUSH   HL
6F59 11003C   01080          LD     DE,3C00H         ;Start of Screen
6F5C ED52     01090          SBC    HL,DE            ;Displacement
6F5E 3E40     01100          LD     A,64             ;Normal Columns
6F60 CD594C   01110          CALL   4C59H            ;Calc Number of rows
6F63 F5       01120          PUSH   AF               ;save remainder
6F64 3E50     01130          LD     A,80             ;New Columns
6F66 CD374C   01140          CALL   4C37H            ;New Displacement
6F69 F1       01150          POP    AF               ;Restore Old Rows
6F6A 5F       01160          LD     E,A              ;DE=Start+Remainder
6F6B 163C     01170          LD     D,3CH
6F6D 19       01180          ADD    HL,DE            ;80x24 Screen Pos
6F6E CDA76F  `01190          CALL   LDAHL            ;LD A,(HL)
6F71 4F       01200          LD     C,A              ;Save screen char
6F72 3AE15D   01210 PLACIT   LD     A,(5DE1H)        ;Store Mod/Find Char
6F75 CDAE6F   01220          CALL   LDHLA            ;LD (HL),A
6F78 AF       01230          XOR    A
6F79 CDEC5D   01240          CALL   5DECH            ;KBSCAN
6F7C F5       01250          PUSH   AF
6F7D 79       01260          LD     A,C              ;Restore screen char
6F7E CDAE6F   01270          CALL   LDHLA            ;LD (HL),A
6F81 F1       01280          POP    AF
6F82 CCEC5D   01290          CALL   Z,5DECH
6F85 28EB     01300          JR     Z,PLACIT         ;No Key
6F87 E1       01310          POP    HL
6F88 C1       01320          POP    BC
6F89 D1       01330          POP    DE
6F8A C3EB5D   01340          JP     5DEBH
6F8D CDA76F   01350 RTNE8    CALL   LDAHL            ;LD A,(HL)
6F90 FE20     01360          CP     20H
6F92 C9       01370          RET
6F93 3E14     01380 RTNE9    LD     A,14H            ;Select vid page 1
6F95 D384     01390          OUT    (84H),A
6F97 CD1462   01400          CALL   6214H
6F9A C9       01410          RET
6F9B CDBC5D   01420 RTNE0    CALL   5DBCH            ;Mod/Find Rtne
6F9E F5       01430          PUSH   AF
6F9F 3E14     01440          LD     A,14H            ;Select vid page 1
6FA1 D384     01450          OUT    (84H),A
6FA3 F1       01460          POP    AF
6FA4 C3DE56   01470          JP     56DEH
              01480 ;-----------------------------------------------------
              01490 ;       The following Routine was taken from
              01500 ;       VIDEO4 by Jack Decker (avail from TAS)
              01510 ;-----------------------------------------------------
              01520 ;
6FA7 E5       01530 LDAHL    PUSH   HL               ;LD A,(HL) rtne
6FA8 CDB76F   01540          CALL   CONV
6FAB 7E       01550          LD     A,(HL)
6FAC E1       01560          POP    HL
6FAD C9       01570          RET
6FAE E5       01580 LDHLA    PUSH   HL               ;LD (HL),A rtne
6FAF F5       01590          PUSH   AF
6FB0 CDB76F   01600          CALL   CONV
6FB3 F1       01610          POP    AF
6FB4 77       01620          LD     (HL),A
6FB5 E1       01630          POP    HL
6FB6 C9       01640          RET
6FB7 7C       01650 CONV     LD     A,H              ;Screen Ptr Conversion
6FB8 E603     01660          AND    03H
6FBA F63C     01670          OR     3CH
6FBC CB74     01680          BIT    6,H              ;Page 1
6FBE 67       01690          LD     H,A
6FBF 3ACE6F   01700          LD     A,(FLAG)
6FC2 CBFF     01710          SET    7,A              ;Page 2
6FC4 2002     01720          JR     NZ,LOWER
6FC6 E67F     01730          AND    7FH
6FC8 32CE6F   01740 LOWER    LD     (FLAG),A         ;Select Page
6FCB D384     01750          OUT    (84H),A
6FCD C9       01760          RET
6FCE 05       01770 FLAG     DEFB   05H              ;Video Mask
0000          01780          END
00000 TOTAL ERRORS

CHECK   5300   CONV    6FB7   EXEC    538B   FLAG    6FCE   LDAHL   6FA7
LDHLA   6FAE   LOWER   6FC8   PLACIT  6F72   RTNE0   6F9B   RTNE1   6F20
RTNE2   6F2C   RTNE3   6F33   RTNE4   6F38   RTNE5   6F3F   RTNE6   6F4A
RTNE7   6F52   RTNE8   6F8D   RTNE9   6F93   START   5309
```

MULTIDOS 1.7 CHANGES

Information provided by Vern Hester

A new version of MULTIDOS (version 1.7) has recently appeared on the scene. Since many NORTHERN BYTES readers use the previous version of MULTIDOS (version 1.6), I asked MULTIDOS author Vern Hester to provide our readers with a list of the differences between the two versions. Listed here are the changes that were made to version 1.6 to come up with the new version 1.7:

1. Provisions for 8" drive support and HARD disk support, also has been modified to handle floppies in two headed drives as one or two volumes (most other DOSes handle double-sided drives as a single volume, MULTIDOS 1.7 is now compatible with this format).
2. Drives can be configured independently logical and physical.

3. Initialization code reads hardware clocks.
4. BUILD will overwrite as well as append to a "DO" file.
5. Wildcard in DIR and CAT/CMD.
6. Margin added to FORMS.
7. Print directly from DOS command mode.
8. ROUTE an output device to a disk file.
9. Five additional single letter commands in BASIC.
10. BASIC program RAM resident unpacker.
11. Renumber a block of text to a new location.
12. Send control codes to printer from Minidos (MOD I/III).
13. ZAP enhanced to copy sectors, verify sectors, and format a single track.
14. VFU enhanced to permit retries on a function error. (i.e. Write protected diskette)
15. CAT enhanced to indicate granule allocation. (File map)
16. DEBUG enhanced to move one byte at a time and full arrow movement for modification.
17. DDT/CMD enhanced to slow down a MODEL 4 clock when running in the MODEL III mode.
18. Forms filter (MOD I/III) to trap unwanted codes.
19. PACKER modified to absorb blank lines, and not pack lines with open quotes.
20. Enhanced to read double sided NEWDOS/80 diskettes.
21. FORMAT/CMD and BACKUP/CMD made more user friendly by informing user of write protected media instead of exiting.
22. VFU/CMD modified to remove a partial file when disk space is full.
23. Minidos enhanced to turn DEBUG on.

Now here are some specifics of the DOS enhancements:

1. a) Resident module and support overlays have been modified to handle double-sided diskettes as one or two volume.

b) Drive control table (DCT) has been expanded to ease the incorporation of Hard disk interface, and 8" drive interface.

c) To make room for the DCT, 'FORMS' has been removed and placed in the command file PRT/CMD. The SPOOLER and library command FORMS require PRT/CMD to be loaded. (MOD I/III)

d) The initialization code has been modified to read standard hardware clocks (TRSWATCH, NEWCLOCK, etc), and load this information into the software clock. No further reading is performed by MULTIDOS after initialization.

2. System files have been renamed to their primary function and extensions have been changed to DOL (Dos OverLay). BASIC overlays have the extensions changed to BOL (Basic OverLay)

Version 1.6	Version 1.7
DIR/SYS	DIR/SYS
DOS/SYS	SYSRES/SYS
DOS0/SYS	Allocate/DOL
DOS1/SYS	Command/DOL
DOS2/SYS	Open/DOL
DOS3/SYS	Close/DOL
DOS4/SYS	Error/DOL
DOS5/SYS	Debug/DOL
DOS6/SYS	Library1/EXT
DOS7/SYS	Minidos/DOL
DOS8/SYS	Library2/EXT
DOS9/SYS	HELP/DOL or HELP/CMD

Library Commands (Functional changes)

The following DOS library commands have NOT been changed: Append, Attrib, Auto, Blink, Boot, Clear, Clock, Cls, Date, Ddam (command exists on MODEL I only), Dead, Device, Do, Dump, Free, Kill, Lib, Link, Load, Prot, Rename, Restor, Setcom (command exists on MODEL III only), Time, Topmem, Verify.

The following DOS library commands have been ELIMINATED: Break, Hash, Help (Now HELP/CMD),

The following DOS library commands have been CHANGED:

Build - Changed to overwrite file unless the A parameter is added.
BUILD filespec (A)
Clrdsk - Changed to place 6DB6 pattern on double density sectors or E5E5 pattern on single density sectors.
Config - Changed to write only if "X" parameter specified.
CONFIG[[[:]d] (m,ST=st,SI=si,V=v,wp/we,P=p,n)]<ENTER>
d = logical drive number, 0 to 7
m = 5 for 5 1/4" floppy, 8 for 8" floppy, or H for hard disk.
st = 6, 12, 20, 30, (track to track step rate -
MODEL I 30 = 40 ms.)
si = 1, or 2 for floppies (number of sides)
v = 1, or 2 for floppies (volume)
wp = write protect
we = write enable
p = physical drive, 0 to 7
n = nil (logical drive not in system)

Debug - Automatic modes E, N & U are cancelled via <SHIFT><SPACE> vs <SPACE> only. Modification mode enhanced to use all four arrow keys. Page display can now be on exact byte with 8 movements using the shift key and all four arrow keys.

Dir - Added wild card (modified CP/M format).
? = character position can be anything.
* = balance of "field" can be anything.
DIR ?K??????/* same as DIR ?K*/*
this will display files with "K" in second position of filename "field" and anything in extension "field".
DIR */CMD display files which end with "/CMD".
DIR */ display files without an extension.
DIR ???/* display files with a max of 3 characters in filename.

Forms - M parameter added for left margin, S parameter dropped. (Requires PRT/CMD loaded - MOD I/III)

Keybrd - reduced to only effect whether case will be in upper or upper/lower case during power-up, and cursor character. (MOD I/III)

List - Modified to convert graphic character to periods unless the G parameter is added.
LIST Picture (G)<ENTER>
D parameter added to perform a sector dump.
LIST DIR/SYS (D)<ENTER>

Patch - T option added.
Patch file (Rec=nn) T= t1.t2.t3>b1.b2.b3<ENTER>
T=target. t1 t2 t3 = target bytes which MUST be found in order to change to b1 b2 b3
Patch DOS/SYS (REC=9) T= 32;194;68>32;194;64

Print - Modified to send string to printer if one double quote is immediately after the "T" in PRINT

PRINT"TEST	lprints TEST
PRINT" TEST"	lprints TEST"
PRINT""TEST"	lprints "TEST"

Route - Enhanced route in output device to a disk file.
Route PR to SCREEN/TXT

Skip - Modified to skip on logical drive zero.

The following DOS library commands have been ADDED:

Reset - Resets devices and TOPMEM to the power-up/re-boot status.

Screen - Dump screen contents to printer.

SUPERBASIC

1. BASIC changes include the implementation of addition single letter commands: A for AUTO, L" for LOAD, K" for KILL, S" for SAVE, and I for AUTO (current line+1), 1 (if the current line is 600, I <ENTER> performs an AUTO 601,1 but I300<ENTER> does not perform an AUTO 301,1.

2. a) CMD "O" to open an additional file buffer, has been eliminated

b) CMD"U" to remove remarks has been changed to CMD"X"

c) CMD"X" to transfer the Disk BASIC program to LEVEL II BASIC has been changed to CMD"W"

d) CMD"U" now performs an Unpack. The unpacker breaks each line down to as many single statement lines as possible, inserts spaces around each key word, and renumbers the program 10, 20, 30, etc.

3. RENUM/SYS renamed RENUM/BOL will move a block of lines to another location provided the new area has room for the new increment.

Syntax: new line, increment, start line, end line

Note: Previous RENUM/SYS would not renumber the end line.

4. BASIC system files:

Version 1.6	Version 1.7
CREF/SYS	CREF/BOL
EDIT/SYS	EDIT/BOL
ERROR/SYS	ERROR/BOL
PACK/SYS	PACK/BOL was in MOD III as a file.
RENUM/SYS	RENUM/BOL
	UNPACK/BOL
	UTIL/BOL

4. UTIL/BOL has been created to keep all of BASIC extended functions in "/BOL" files. This removed the SORT function, CMD"C", M direct command and N direct command from DOS7/SYS; removed the direct command F, and CMD"U" (now CMD"X") from DOS4/SYS; and removed the CMD"UUUUU" initialization routine from DOS0/SYS.

REWRITE OF NEWDOS/80 DISK BASIC AMPERSAND (&) ROUTINE

by Gil Spencer VK2JK

I never think in octal. It's hard enough to work in binary, hex, and decimal. It always seemed to me that the default for the '&' function should be hex, not octal. I finally dug out the source code (from Apparat's Disk BASIC) which I found in SYS20/SYS. My rewrite fits within the required extra space. Although a quantity of bytes are changed, this is because the code is "re-arranged" more than because it is "re-written".

First, here is the Disk BASIC (&) routine found in Apparat's NEWDOS/80 version 2.0 - specifically SYS20/SYS, addresses 54C5H-5503H. If you are using SUPERZAP, address 54C5H is found at FRS 2, byte D1H and address 5503H is at FRS 3, byte 13H. Note that the four bytes at FRS 3, bytes 06H-09H (which are 01 00 FA 54) are loader codes and must NOT be changed.

```
54C5             00100          ORG     54C5H
54C5 D7          00110          RST     10H
54C6 4F          00120          LD      C,A
54C7 110000      00130          LD      DE,0000H
54CA 79          00140 Q54CAH   LD      A,C
54CB FE48        00150          CP      48H
54CD 2022        00160          JR      NZ,Q54F1H
54CF D7          00170          RST     10H
54D0 EB          00180          EX      DE,HL
54D1 D630        00190          SUB     30H
54D3 FE0A        00200          CP      0AH
54D5 3808        00210          JR      C,Q54DFH
54D7 D611        00220          SUB     11H
54D9 FE06        00230          CP      06H
54DB 3022        00240          JR      NC,Q54FFH
54DD C60A        00250          ADD     A,0AH
54DF 29          00260 Q54DFH   ADD     HL,HL
54E0 3807        00270          JR      C,Q54E9H
54E2 29          00280 Q54E2H   ADD     HL,HL
54E3 3804        00290          JR      C,Q54E9H
54E5 29          00300          ADD     HL,HL
54E6 3801        00310          JR      C,Q54E9H
54E8 29          00320          ADD     HL,HL
54E9 DAB207      00330 Q54E9H   JP      C,07B2H
54EC 85          00340          ADD     A,L
54ED 6F          00350          LD      L,A
54EE EB          00360          EX      DE,HL
54EF 18D9        00370          JR      Q54CAH
54F1 0E4F        00380 Q54F1H   LD      C,4FH
54F3 B9          00390          CP      C
54F4 2801        00400          JR      Z,Q54F7H
54F6 2B          00410          DEC     HL
54F7 D7          00420 Q54F7H   RST     10H
54F8 EB          00430          EX      DE,HL
54F9 D630        00440          SUB     30H
54FB FE08        00450          CP      08H
54FD 38E3        00460          JR      C,Q54E2H
54FF CD9A0A      00470 Q54FFH   CALL    0A9AH
5502 EB          00480          EX      DE,HL
5503 C9          00490          RET
```

This is the rewrite of the Disk BASIC ampersand (&) routine. Now the octal argument must be specified by '&O'. Hex argument may be specified by '&H'. No suffix (i.e. '&') now defaults to hex rather than octal.

```
54C5             00100          ORG     54C5H
54C5 D7          00110          RST     10H
54C6 4F          00120          LD      C,A
54C7 110000      00130          LD      DE,0000H
54CA 79          00140 Q54CAH   LD      A,C
54CB FE48        00150          CP      48H
54CD 2022        00160          JR      NZ,Q54F1H
54CF D7          00170          RST     10H
54D0 EB          00180          EX      DE,HL
54D1 D630        00190          SUB     30H
54D3 FE0A        00200          CP      0AH
54D5 3808        00210          JR      C,Q54DFH
54D7 D611        00220          SUB     11H
54D9 FE06        00230          CP      06H
54DB 3022        00240          JR      NC,Q54FFH
54DD C60A        00250          ADD     A,0AH
54DF 29          00260 Q54DFH   ADD     HL,HL
54E0 3807        00270          JR      C,Q54E9H
54E2 29          00280 Q54E2H   ADD     HL,HL
54E3 3804        00290          JR      C,Q54E9H
54E5 29          00300          ADD     HL,HL
54E6 3801        00310          JR      C,Q54E9H
54E8 29          00320          ADD     HL,HL
54E9 DAB207      00330 Q54E9H   JP      C,07B2H
54EC 85          00340          ADD     A,L
54ED 6F          00350          LD      L,A
54EE EB          00360          EX      DE,HL
54EF 18D9        00370          JR      Q54CAH
54F1 0E4F        00380 Q54F1H   LD      C,4FH
54F3 B9          00390          CP      C
54F4 2801        00400          JR      Z,Q54F7H
54F6 2B          00410          DEC     HL
54F7 D7          00420 Q54F7H   RST     10H
54F8 EB          00430          EX      DE,HL
54F9 D630        00440          SUB     30H
54FB FE08        00450          CP      08H
54FD 38E3        00460          JR      C,Q54E2H
54FF CD9A0A      00470 Q54FFH   CALL    0A9AH
5502 EB          00480          EX      DE,HL
5503 C9          00490          RET
```

CREATE A SELF-BOOTING DISK USING LDOS

by Gary Bryce

[Reprinted from SYDTRUG NEWS, P.O. Box 297, Padstow, New South Wales 2211, AUSTRALIA]

This should be the last word on this subject. Back in the August issue of the [SYDTRUG] newsletter I detailed a method of creating a self booting disk using NEWDOS/80 on the Model I (Leon Yates followed this with the details for the Model III in December) [See NORTHERN BYTES Volume 5, Number 4, page 11; Volume 6, Number 1, page 3, plus THE EXTERMINATOR column in Volume 5, Number 6, page 2, and THE EXTERMINATOR in this issue for these past articles], there was quite a bit of zapping and general playing around to do it, but it did work. One evening recently I was pondering on how to do the same thing with an LDOS disk when I realised how much simpler it would be using an LDOS formatted diskette.

Why is it simpler? Well what we are doing is substituting the file to load for SYS0 and using the normal SYS0/SYS loader in BOOT/SYS to load and execute our file. NEWDOS doesn't look at the directory to load SYS0/SYS, it depends on the Track and Sector numbers at the start of SYS0 being in the BOOT/SYS file, after loading SYS0/SYS it performs a check to ensure a correct load. Therefore I had to ensure that the correct Track & Sector numbers for the file are correct and also bypass the check. LDOS accesses the directory to get the position of SYS0/SYS on the disk, so if we put the file in the directory slot normally used by SYS0/SYS the Boot loader will load our file and execute it! How do we do it? As I said, it couldn't be simpler - copy the file to SYS0/SYS!

The procedure is very easy, just follow the steps listed below and you can't go wrong, and it works for the Model I and Model III.

1. Format a diskette using LDOS.
2. Create the SYS0/SYS file on the diskette using the following command:

```
BACKUP SYS0/SYS:0 :d
```

where d is the destination drive number.

3. Copy the required file to the diskette:

```
COPY FILENAME/CMD:s SYS0/SYS.RS0LT0FF:d
```

where s is the source drive and d is the destination drive.

4. Optionally you may then rename SYS0/SYS back to the original filename by:

```
RENAME SYS0/SYS.RS0LT0FF:d TO FILENAME/CMD
```

And there you have it, no zapping or calcs required. Why do it at all? Most of us use a directory indexing program of some description; conventional self booting diskettes don't have a directory and therefore can't be read and must be added manually. Using this method the diskette has a conventional directory and can be read by the indexing program.

MODULA-2!

NOW AVAILABLE

The Alternate Source Information Outlet is now the North American distributor for the Hochstrasser Computing Modula-2 System for Z80 CP/M! If you thought that Modula-2 wasn't possible on an 8-bit machine, keep reading! The programmer goals were to create a full Modula-2 compiler for an 8-bit machine that generates a reasonably small amount of code in a reasonably small amount of time leading to reasonably short execution times. These goals are now realities!

WHAT MAKES MODULA-2 SO GREAT?

In several PASCAL dialects, there exists possibilities to split programs apart into different "modules". These modules are compiled as if they were complete programs just lacking the main program. You can freely use procedures declared in one such "module" in others. All you have to do is to declare how this procedure looks and indicate that it is "external". It is a tool that is indispensable for the successful mastery of large programming projects. It is especially helpful for projects that are carried out by groups of programmers. In programmer terms, Modula-2 takes the concept of "local" and "global" variables to new dimensions. The programmer has complete control.

THE DOCUMENTATION

Manual Release 3-28-85/pwh -- almost 300 pages -- is very complete and well indexed (nine pages of carefully thought out subjects and subdivisions). It is presumed that the user has a some familiarity with PASCAL. Please note that the current documentation has been updated since an older version of this product was critiqued in an issue of BYTE. For persons who get squeemish at the thought of spending money, we have constructed a "Modula Sales Kit" which includes the complete Table of Contents and other information from the manual. One of these is free upon request.

POWER IS WHAT YOU GET

The Modula-2 Compiler Package for Z80 CP/M includes a linker, a reference lister, a converter, a system configuration package, two libraries (detailed below) and three test programs. Complete step-by-step instructions are included for assembling the test programs. The System generates fast, ROMable, reentrant Z80 native code. Assembly language integration is supported, as well as assembly language compiler output.

SOFTWARE SUPPORT

Included with this version of Modula-2 is a complete set of source code library routines including TERMINAL, SEQIO, TEXTS, REALTEXTS, INOUT, REALINOUT, MATHLIB, SYSTEM, ASCII, CHAINING, CMDLIN, CONTROLS, STRINGS, LONGSETS, CONVERSIONS, CONVERTREAL, FILENAMES, FILESYS, FILES, MOVES and OPSYS. The new documentation includes a START-UP GUIDE, INTRODUCTION TO MODULA-2, IMPLEMENTATION GUIDE, ADVANCED PROGRAMMING GUIDE and APPENDICES that detail error messages, object code format considerations, reserved words and symbols, the ASCII character set, language definition, a bibliography and 9 pages of index. A special section is devoted to Programming With Better Efficiency. The documentation is filled with small sample Modula-2 programs.

SYSTEM CONSIDERATIONS

Please note that this is a large system. The compiler itself uses about 170k of disk space. It is desirable to have at least two drives holding 350 Kilobytes of disk storage each to work comfortably with the system. A single double-sided eighty (holding 700k) would be ideal. Unless otherwise requested, the Modula-2 Compiler for Z80 CP/M will be shipped using the Montezuma Micro 40-track, single-side format. The compiler is only tested under CP/M 2.2. Eight inch CP/M formats are also available upon request.

FOR NEW MODULA-2 PROGRAMMERS

Folks near the mid-Michigan area: This summer we are planning at least one seminar detailing the use of Modula-2. We have a special package price on the seminar, which includes the price of the compiler and complete documentation, along with PERSONAL INSTRUCTION and enough diskettes to make a backup of your software and for working/scratch purposes. The price of the Modula-2 Compiler Package for CP/M, including the seminar and all mentioned above is $200. This price requires that you bring YOUR OWN CP/M computer. The price for the seminar with OUR computer is $300. The price for the software without the seminar is $165. The seminar without the software (you provide your own Modula-2 compiler and computer) is $59.95 if you make your reservations by August 1st, $99.95 after that date. The 8-hour seminar will take place in Lansing on Saturday, August 10th, and include lunch. Advanced seminars are planned and will depend on the success of this seminar, naturally.

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