

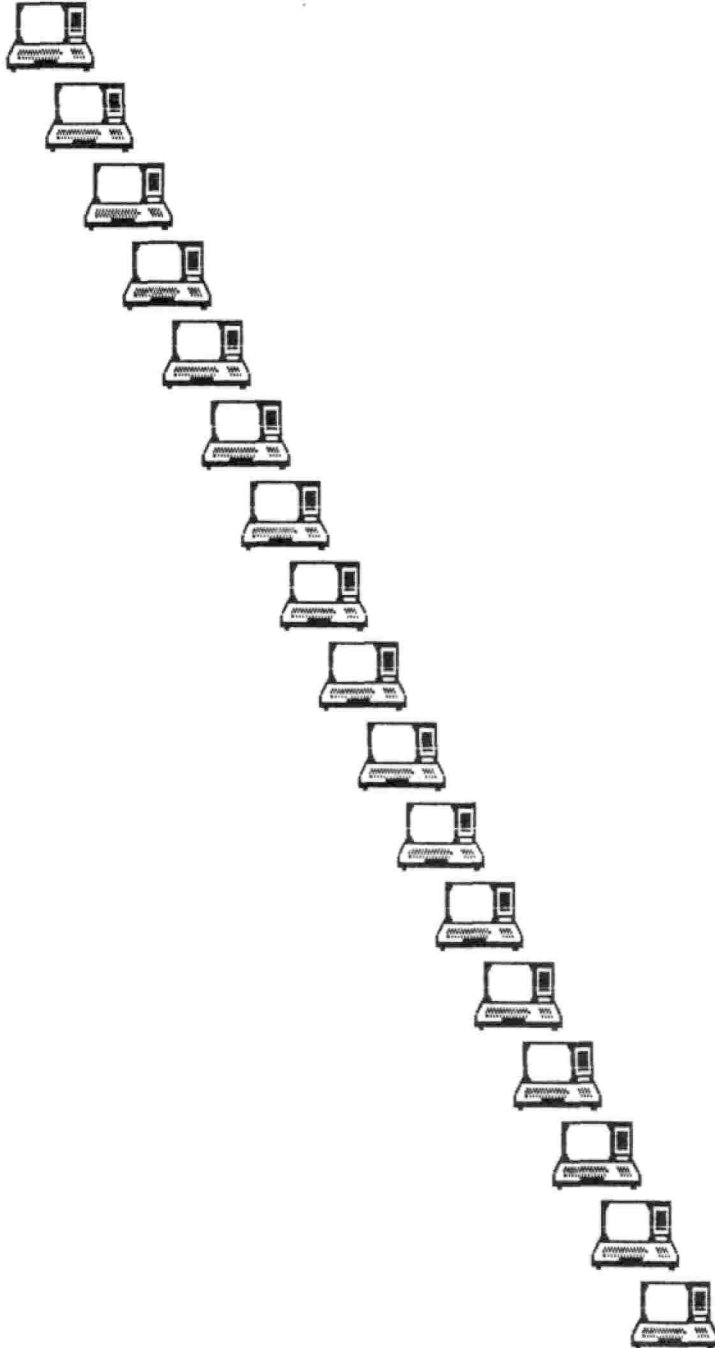
Saving Our HEATH Eight-Bit Machines!

SEBHC JOURNAL

Volume IV, Number 7

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February, 1990



We SEBHCers LOVE Those
"CLASSIC COMPUTERS"
Our H/Z 8-Bit Machines!

SEBHC JOURNAL

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The Readers' MAILBOX

Lennie,

Many years ago I bought the Livingston Logics Lab's BIOS upgrade which allowed using 80-track discs under CP/M. Some files were included which allowed one to insert a primitive form of ZCPR. But now that I've resuscitated a soft sector interface board and it's alive and well, I find I'm unable to transfer LLL's BIOS upgrade to a soft-sector boot disc! The result is that I'm stuck with booting up from hard sector and then changing operation to the soft sector drives. It sure would be convenient to boot from soft sector, but how do I get the thing going?! Help!!!

You may ask: why don't I upgrade to one of the more recent versions [of ZCPR]? Two reasons: I prefer to keep my memory overhead to the minimum, and, doggone it, it's a problem.

Now we're going to say a couple of very nasty words, the first one is Commodore 64! There, I said it! Wash my mouth with soap. But, if any amateur radio operator owns any other than a C(nasty word) machine, they're missing out on a fantastic piece of software. Some genius created totally in software a Terminal Node Controller (TNC). [Note: This is a type of modem-with-program for use with amateur radio which permits two-way computer contacts over the air. -- ed] No other computer can brag of this, not even those (Ahem! Another nasty word) peesees. It really grinds my tuther end to know that our H/Z89 is so much better, that many hams bought this model as their first computer, and yet we must take a back seat to a C(nasty word) [machine].

I'm too dumb to write the necessary software or even know if it's possible, but I do wish that someone competent who is a programmer-plus-ham will take the time to study this unique TNC program. Whenever I discuss the TNC mode for the C(nasty word) with someone who hasn't seen it, they assume I'm talking about a terminal program. NO WAY, JOSE! There's only one piece of hardware, and that's a device for changing voltage levels between the [ham radio] transceiver and computer [I/O channel]. If this can be emulated for use with the H/Z89 it surely would bring many of these old work horses back to life.

(Sigh) onward to the next bit of rantin' & ravin'. Can't chase it down, but this might stir a neuron in someone's memory: A gentleman running a bulletin board uses a Xerox [computer] with a standard hard drive. The controller needs one address line from the Z80 [cpu]. And it's economical! The board is around \$100. This gentleman stated that he saw no reason that this [scheme] wouldn't work on the '89. The device maker is located somewhere in the Northwest. Hey! Do I ever need a detective?!

CUL es 73's!

MARION R DAVIDSON WARHFL, 30 Mill Road, Battle Creek, MI 49017; phone 616-962-7145

[K, read y'strong and clear! In connexion with the TNC software device, I'm a complete idiot about how the C(nasty word)

machines work, so I called a chum who runs packet radio on the UHF ham bands with his Kaypro, a modem and an expensive TNC interface between transceiver and computer. He says the computer software is essentially just another telephone-type Audio Frequency Shift Keying (AFSK) modem program, but that the TNC changes this output and sends it out over the air in very short 'bursts'. He also says that these bursts are redundantly checked by the TNC for transmitted accuracy, and if the TNC detects any errors it will either retransmit the burst or shut the whole sequence down. For more information I looked through a few recent issues of "73" magazine and read a couple articles on Packet Radio. Looks to me that it's a newer digital version of High Frequency Radio Teletype with no black magic involved. There are some articles in old REMarks about RTTY and our 8-bit machines but I haven't any time to look them up.... Readers? -- ed]

Dear Len,

Just received the January issue--I presume it is the one from last month, even though it says "January, 1989"?! [Just a mere oversight, m'lud. It's our Jan '90 edition! -- ed]

Your exchange with Spring Smith regarding COBOL--especially your comments--caught my eye. Having been a "dedicated" COBOL programmer on the mainframe since 1968, and being an instructor in--among other things--COBOL at a local community college, I'd be more than happy to share my knowledge with the H/Z eight-bit community. Perhaps a series of three or 4 articles for the JOURNAL would be appropriate? I shall be teaching COBOL next term (Spring, which starts late in March) so this would also go right along with my lesson plans there. Let me know--it wouldn't be any bother on my part--and it might help you or other members of the [8-bit] group.

If anyone is interested, I have an article coming out in May (they think!) in PCM, a magazine devoted to 16-bit machines. My article talks about an automated cash register program/system which I designed and wrote around my Tandy 102 laptop. I think the instructions and accompanying program are modularised enough--and (I hope) clear enough--that anyone knowing even a smattering of BASIC can adapt it to their 8-bit system. So, if there's anyone looking for something along that line and is interested, check out the magazine. I also have an MBASIC version of the program which can be easily adapted for just about any printer; I don't know why it wouldn't also transfer to HDOS. Food for thought....

On the software development side, things haven't gone too well here. My associates and I have been so darned busy paying the bills (my wife bought two horses, and MAN, do they eat!!) and in connexion with our full-time jobs we're WAY BEHIND on getting the new products out the door. I'm hoping--with the pace at work beginning to slack off a bit--to get back into the development/testing/documentation cycle within the next month or two. Meanwhile, I still have the same products available, and so far I haven't had any complaints.

But there is ONE problem--a gentleman in Arizona is having trouble with the public-domain diskette cataloging system I

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sent him--other than that my/our software seems to be running OK as is. When I get back into it semi-full time, I'll drop the JOURNAL a note. But if there's anyone who'd like more information, they can write me directly and I'll send it right out.

TOM BOHON, P.O. Box 293, Olympia, WA 98507

[Hey, Tom! Nice to hear from you. Even nicer to hear that you're planning on submitting a text file on COBOL for the JOURNAL! From what I've seen of it, COBOL seems to be quite unnecessarily complex and tedious to work with. That doesn't mean it's no good; Domino Pizza uses COBOL for their book-keeping--even my son-in-law programmed in COBOL for a number of years on the Domino main-frame here in Ann Arbor and made a fairly good living from it. I'm fairly sure that a "how-to love COBOL and stay sane" series would make a lot of our subscribers reasonably happy. Hope your missus finds a good, cheap, local source of hay for your livestock, Real Soon Now! One of my daughters has a Thoroughbred hay burner which blots up considerable moola every month.... Do continue the good work otherwise! -- ed]

Dear Lenny,

Just received (7 Feb) my November '89 issue of the JOURNAL yesterday, about two weeks after receiving the Dec '89 issue! No wonder postage rates are going up; it costs more money for the Post Office to store mail than delivering it! (What is the price breakdown now, five cents for delivery and 20 cents for storage?!!)

Nevertheless, I'm happy to have gotten the November issue. I too have been having Vanishing Video problems. I'll let you know if the procedures you've suggested help, or if I have more serious problems.

Please check your log of issues sent me; for some reason I don't have III:5 (Dec '88). What was that issue's cover as I can't remember it. It may be that my house (or computer) ate it! [Dec '88 cover was a wood-block-type Victorian Christmas scene (clipped from a local newspaper display ad). -- ed]

JAMES R MINSTERL, 8637 Woodview Drive, Springfield, VA 22153

[Jim, we're mailing you a copy of the Dec '88 JOURNAL gratis --can't have our loyal subscribers working without a full library! Good luck with the Vanishing Video hex/curse! - ed]

Hi, Lenny,

Thank you for printing the letter I wrote to Rick Swenton regarding my problems with CDR hardware/BIOS and NZCOM. Rick had the right idea about how to make this combo work. So for those H/Z89 owners with CDR mods who may be having trouble getting a CDR hard disc to operate under NZCOM, pay attention: Read Rick's letter in the JOURNAL (IV:4, Nov '89).

I've had NO problems with CDR systems and NZCOM running on the floppy drive system. To get the SASI hard disc system to

accept NZCOM, boot your SASI disc first, bring up the hard disc, THEN (assuming you've copied the NZCOM files to A0: on the hard disc) use MKZCM to assemble an NZCOM system which will load.

You may have to try a couple times to get one small enough --I just removed the I/O and trimmed the NDR down to seven entries, and away we went. Realise that, with both NZCOM and CDR, your TPA is going to be pretty skinny, so before using a memory-hungry application program, either trim it down some or go back to CP/M to run such programs.

I am most grateful to Rick Swenton and Jay Sage for putting me onto the right track.

Now comes more brain straining (at least for me). I wanted to put my old Wordstar ver 3.3 on the hard disc because a couple authors have indicated that they do it. They say that they (for example) put WS on say, B0:, and all DOC, TXT, DaTA and other files on C1: or whatever. My problem is that WordStar REFUSES to recognise user areas! How about a quick how-to course in such matters from some knowledgeable SEBCHer? I've pestered Rick and Jay about enough. (Maybe they use WS V4?!!)

And Jay Sage sent me a about a megabyte of HLP files pertaining to Z-Systems--dating, it seems, back to its' beginnings. Most of these files are pretty heady stuff, not what I Really Wanted, such as actual EXAMPLES of ARUNZ/ALIAS.COM, so as to get an idea about how to write them. My efforts so far seem to laugh right back in my face--as Naj Najarian writes in The FOGHORN for July, 1989: "ECHO DON'T KNOW HOW TO '\$0', YOU MORON"--and I get similar [nasty] messages. (Sigh), I'll just keep poking away at it, perhaps getting to the meat of it someday. I'd like to try [logging onto] some of the Z-nodes, but the long-distance phone charges are ridiculous....

BOB EVANS, 44115 Palm Avenue, Hemet, CA 92344

[Thanks for the update, Bob. It's nice to know that the JOURNAL has helped, even a little bit, and it's even nicer to have such compassionate Good Guys as Rick and Jay also helping. About your user-area problem: Although I'm not Really Hip to many of CP/M's special features, I've been able to get many programs to access user areas simply by copying them into the area of choice and then switching to that area whenever I want to run the program. Example: I boot on A0:, use SWEEP to put a copy of TXTPRO.COM and some text files in user A5:, then switch to A5: and run TXTPRO. Works for me! -- ed]

Dear Mr Geisler,

On page 6 of the SEBHC JOURNAL IV:6 you speak of "a COBOL package for someone who needed it on hard-sectored discs..." in your reply to Spring Smith.

I didn't see any HDOS COBOL in your software listing on page 11, but sure would pay for it--if available in HDOS 2.0, hard sector, dsdd 5-1/4" format! My first language was COBOL on a big mainframe, but I wouldn't advise it for other users

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unless there is a good reason for using it in a business setting.

Here's another one for you: Can I read in a CP/M disc to a HDOS file then feed the HDOS file to TXTPRO to make executable HDOS programs?

HAROLD W BRETZ, 1215 East Castle Avenue, Indianapolis, IN 46227

[You're just FULL of questions today, Hal! Hate to break yer heart, but to the best of my knowledge there isn't an HDOS version of COBOL available. (If any of our readers know of such, Please Write It Up For The JOURNAL At Once!) I have a "donated" copy of Nevada COBOL which I've never looked at (it's on an 8-inch disc), and haven't the slightest clue about its' condition. There's a manual which came with it which I believe is written in transliterated Sanskrit.... Regarding your query about converting a CP/M file to HDOS and running it through TXTPRO, the answer is yes, if it is an ASCII file or MICROSOFT BASIC program which was SAVED in ASCII. (Use HUG's CTOH.COM program for the conversion.) Of course you understand that HDOS has different SCALLs from CP/M, so you'd have a lot of changes to make to an .ASM listing--but that's easy with TXTPRO's FIND/REPLACE function. And the same goes for replacing CP/M MBASIC 'LPRINT' statements with HDOS's 'PRINT #1,'. In the latter case you also must insert an 'OPEN,O,"LP:"' command somewhere near the top of the program and a simple 'CLOSE' command at the bottom. It's tedious, but I've often done it without much "skull drudgery" or many tears.... -- ed]

Dear Lenny,

I wonder how come no one seems to refer to the exquisite modem program specifically designed for the H89 (and reviewed in Sextant before its' demise) called H-Modem, written by Harold Maney. I picked up the shareware version from GENIE last Spring, then sent in my \$25 cheque and words of gratitude to Hal for such a super program. Not only does it support X-Y and Z-modem protocols, but it has a phone directory, macros, and even a host mode!

After Hal received my cheque he sent me a revised version, along with complete documentation! I know there is some interest in Micronics Technology's Modem Program (MTModem) which I have yet to try, but I can testify that H-Modem II is as polished as some of the best commercial 16-bit communications software in its' capabilities. So you H/28/89/90 folks who haven't tried it ought to give it a go! Hal Maney's address is: 510 Barrack Hill Road, Ridgefield, CT 06877.

Keep up the good work, Lenny. Truly the SEBHC JOURNAL is one publication I devour upon arrival (and refer back to often).

NELSON HOWARD iii, P.O. Box 114, East Derry, NH 03041

[Hey, Nelse! Thanks for the tip about H-MODEM! I shall now

mail an order directly to Hal for the latest version. (I'd log onto GENIE and down-load the shareware version, but I've never had much luck with any of my modem programs and GENIE's protocols....) And if any other SEBHCer has tried H-MODEM, drop us a line about how it works for you; we're all for any 8-bit software which Works As Advertised and is reasonably inexpensive. (Your mailing label complaint has been corrected. Please let us know if you're getting the JOURNAL again!) -- ed]

Dear Len,

I've included a disc with this note with an article on it which I hope you'll consider for publication. There also is a hard-copy printout of the article made by the program I've described in the article. When I saw in an earlier edition of the JOURNAL that Lee Hart had an Okidata printer I gave a copy of the program to him. Lee then suggested that I submit it to you for publication. (Since you probably don't have an Okidata printer, you can verify with Lee that the program does work.)

For your own edification run either the stand-alone compiled '.COM' program or load MBASIC and the '.BAS' program to see how they are set up and get a general feel of the screen inter-action.

If there is sufficient interest in this program (it lets one painlessly "micro-justify" text files on the printer) I'd be happy to release the program to the JOURNAL for publication of a complete listing, or on disc for sale through the JOURNAL's catalogue page.

BERNARD L WALTUCK md, 1411 North Flagler Drive Ste 7700, West Palm Beach, FL 33401

[Thanks for your vote of confidence in us, Bernie! We have printed your article and sample listing elsewhere in this issue. I followed your suggestion and tried JUSTIFY.COM on the screen only. It looks Quite Professional! Now--although we don't own an Okidata--we think your utility is a Real Winner! We've been looking for something along this line which would let us access some unique control codes for our Nippon Electric Company Pinwriter P2200. It looks as if we could edit your utility to match the P2200's commands which are almost--but not quite--"Epson compatible". For example, the NEC printer lets you print double wide (standard Epson stuff) and not-Epson DOUBLE HIGH and TRIPLE WIDE! We tried embedding NEC printer escape code groups in a text file, but they didn't work. But they DO work when called up through a standard HDOS or CP/M MBASIC program. The NEC also has an built-in "gotcha!": prints a line of text double wide, but ends the line with an upper-case Greek Omega character! That means we must use our Epson LQ-800 printer to print reproducible SEBHC JOURNAL text pages! Bernie, we'll be delighted to offer your "JUSTIFY" utility to our subscribers. How much do you think we should charge? And one more thing: Do check this issue's mailing label; it'll make you Feel Really Good. -- ed]

A DIFFERENT CP/M PRINTER ROUTINE!

Proportional Spacing on an Okidata 92 Printer
(Can you do it with a different printer?)

by

Bernard L. Waltuck

Suite 7700

1411 North Flagler Drive

West Palm Beach, FL 33401

The Heath Eight Bit community members have always produced an abundance of programs to support their hardware and software. In my case, I have had an uncommon combination of the Okidata Microline 92 printer running with my H-8/19. I purchased this printer because of its' reputed excellent graphics capability and variable character spacing ability (generally called "true proportional spacing"). This results in text having a straight right hand margin without added spaces inserted between words as usual with "generic" text formatters.

(Text editors create the text. Many can move text around within the work with different degrees of ease. Text formatters accept a text file and send it to the printer as dictated by the text according to the printer's capabilities. A word processor combines the two functions into one program, or one set of automatically linking programs.)

In my case, I had been unable to find a text formatter which would support my printer's proportional spacing capability, so I wrote one in MBASIC and then compiled it for speed and space. But, after encountering another individual with an Okidata printer we thought there might be others out there, so I submit the following subroutines for your use. The entire program consists of over 420 lines of BASIC code, so unless there is a clamor, I doubt that there will be space allotted in the SEBHC JOURNAL for the entire listing. Several subroutines given below describe its' main features.

My program allows both initial setup options and "DOT commands", so that any line starting with a period is processed without sending the line to the printer. This lets me turn on or off right hand justification, change margins, pitch, line spacing, and character set, and center one or more succeeding lines, plus a whole host of other options. These require simple processing of the symbols and is omitted here.

What I do show is how I count the number of characters in a line and subtract two for each ESC character since the Okidata uses two-character sequences for underlining, enhanced and emphasized printing, and for super- and sub-scripting. Since I may indent either through "DOT" commands or through leading spaces on the line, I must be sure that the "spaces" between the spaces are all the same. Of course, I could just use normal spacing between them, but I count them and then justify the line's remainder. The added microspacing between characters must be in whole numbers of dot columns so I just count the number of characters needed to fill the line, divide by the number of characters minus 1 for the number of "spaces to fill" and send the proper sequence to the printer.

Except that it probably will not often be an even number so I calculate how many characters are at one spacing and how many at one more. I separate the line into two parts accordingly, then make sure I'm not dividing in the middle of a two-character escape sequence, then print the two strings. SIMPLE?

Examine the programs lines of Listing 1. Please note that if your printer uses a different escape sequence just insert your own set of strings. The math will be the same....

After I went through all my work I was shown a version of Wordstar 4.0 that supported The Okidata 92's microspacing! But that didn't stop me. I ran a sample nine-page paper I'd previously written through both programs, with the printer handshaking disabled so that a full printer buffer wouldn't slow the calculations. Here are the results:

| | |
|----------------------------|-------------|
| JUSTIFY MBASIC Interpreted | 763 Seconds |
| Wordstar 4.0 | 257 Seconds |
| JUSTIFY MBASIC COMPILED | 97 Seconds |

Even I was impressed. With the printer on and typing Near Letter Quality (NLQ)--which slows the printer to 1/4 its usual speed--the compiled program was about 25% faster than Wordstar!

If any of you readers are interested, I can send you a copy of the full program--both interpreted and compiled--if you will send me a disc, mailer and return postage. The compiled program is a standalone program but can only be used on 100% Okidata 92 and 93 printers. The interpreted program can--of course--be modified to your heart's content. It is presently available in CP/M, but if there is enough interest I would consider converting it to HDOS (but that could take some time). Normally I just use an HDOS-to-CP/M converter if I have an HDOS file to print. I can support double sided 48 and 96 tpi soft sector, and single sided 48 tpi hard sector discs.

LISTING 1 -- Justification counting routine

```

10 REM *****
20 REM ***** JUSTIFY.BAS ver 6.00 *****
30 REM ***** Parts of program for Publication *****
40 REM ***** Bernard L. Waltuck *****
50 REM ***** SUITE 7700 *****
60 REM ***** 1411 No. Flagler Dr. *****
70 REM ***** West Palm Beach, Fl 33401 *****
80 REM *****
90 REM ***** JUNE 24, 1988 *****
100 REM *****
110 REM
120 REM
200 E$=CHR$(27):REM      Escape key code
210 TAB$=CHR$(9):REM     Tab Character
220 CLS$=E$+CHR$(69):REM Clear-Screen Command
230 DEFINT A-Y

```


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LP: Routine end / TRACKER BALL HOW-2

```
240 DEFSNG Z
250 DIM J$(11)
260 LENGTH = 60
270 REM Define the strings to change character spacing
280 FOR X=0 TO 11:J$(X)=CHR$(27)+"N"+CHR$(X):NEXT X
290 REM
300 REM Insert routine for selecting & opening file to print
310 REM
400 REM ***** Main Print Sequence *****
410 IF EOF(1) THEN 1000
420 LINE INPUT #1,L$
430 S=0:Q=0:P=0
440 IF LEFT$(L$,1)=". " THEN PRINT L$:GOTO 700:
REM Go to DOT routines (Not Shown)
450 GOSUB 920:REM Strip leading and trailing spaces
460 FOR X=1 TO LEN(L$)-1
470 IF MID$(L$,X,1)=E$ THEN P=P+2
480 NEXT X
500 REM ***** Justification Routine *****
510 PRINT L$
520 IF (LEN(L$)-P)>LENGTH THEN PRINT
"...LINE TOO LONG...":LPRINT J$(0);L$:GOSUB 800:GOTO 410
530 IF LEN(L$)<(LENGTH*2/3) THEN LPRINT J$(0);L$:GOSUB 800:
GOTO 410
540 Q=(LENGTH-S-LEN(L$)+P)*12
550 H=Q\((LEN(L$)-P):K=Q MOD (LEN(L$)-P)
560 IF MID$(L$,LEN(L$)-K,1)=E$ THEN K=K+1
570 R$=RIGHT$(L$,K)
580 L$=LEFT$(L$,LEN(L$)-K)
590 IF S>0 THEN LPRINT J$(0);:FOR C=1 TO S:LPRINT " ";:NEXT C
600 LPRINT J$(H);:LPRINT L$;
610 LPRINT J$(H+1);R$
620 GOSUB 800
630 RETURN
640 REM
700 REM ***** DOT Setup Subroutines *****
710 REM This is a long routine and is not shown here
720 RETURN
800 REM Line Counting, Page Counting, Page Number Printing
810 REM This is a long routine and is not shown here
820 RETURN
900 REM Strip leading and trailing spaces from line
910 REM
920 IF LEFT$(L$,1)=". " THEN L$=RIGHT$(L$,LEN(L$)-1):S=S+1:
GOTO 920
930 IF LEFT$(L$,1)=CHR$(9) THEN L$=RIGHT$(L$,LEN(L$)-1):
S=S+8:GOTO 920
940 IF RIGHT$(L$,1)=". " THEN L$=LEFT$(L$,LEN(L$)-1):GOTO 940
950 RETURN
960 REM
1000 REM ***** END ROUTINE *****
1010 PRINT CLS$:CLOSE
1020 END
```

Z80 Tracker Ball Control Routines

by Robin Luxford in Personal Computer Magazine (UK), May 87
[Text courtesy of Dick Butler, Springvale, ME]

[Editor's Comment: Although this article was written for other than our H/Z computers we feel that it has considerable potential for our subscribers. Mr Butler's cover letter contained a very practical suggestion to use FBE Research's PIP-H89 parallel I/O card to interface a similar optical tracker ball to our favorite "old grey box". We hope you subscribers agree and that at least one of you will do exactly that, then write an article for the JOURNAL to publish. Your Editor has wanted to interface a mouse with his main 8-bit computer for many years but didn't have sufficient initiative to do so; he'll now be doing something instead with a tracker ball, Real Soon Now....]

In many computer applications such as word processing and graphics, it is a great convenience to be able to move the cursor around the screen quickly and freely. Some business systems use a mouse--a device which, when moved across the desk, sends signals to the computer to move the cursor by a corresponding amount in the same direction. The snag with a mouse is that you need desk space close to the keyboard to move it around, so many users prefer the tracker ball. Since the base of this device stands on the desk and only the ball itself moves, it requires less space to operate.

A popular example of the tracker ball, which is advertised for use with BBC Micro is the Marconi RB2. This has a heavy, highly polished ball, similar to a billiard ball, which sits on two ground steel shafts running in roller bearings to provide a third support point. The two shafts are at right angles to each other so as to interpret ball movements in the X and Y directions. On the shaft ends are thin metal discs with slots cut in them, rather like a wheel's spokes; and on one side of each disc are two light or infra-red emitting diodes, and in line with these, two sensors. The diodes and their respective sensors are displaced slightly so that as the disc revolves, the path to one sensor is interrupted or restored before the path of the other one. This makes it possible for the electronics to determine in which direction the disc is revolving. The whole assembly of disc, emitting diodes and sensors is known as an "optical encoder".

The output of the four sensors goes to some electronics in the trackball housing which shapes the pulses to give four trains of square pulses, two X and two Y, from which the direction can be determined. The ball housing also has three button switches which are polled by the software and converted into any desired ASCII characters such as carriage return, space, backspace, and so on.

As marketed for the BBC Micro, the RB2 comes complete with programs in BBC Basic and 6502 machine code for use with that

--==<<[[8]]>>==--

Tracker Ball How-2

machine. However, there doesn't seem to be anything available in Z80 code and I decided that if I wanted to use the RB2 with a micro running CP/M, I would have to write the code myself.

But before considering the software it is necessary to look at the connection with the computer. The tracker ball is supplied with a metre of cable terminating in a 20-pin connector which fits the BBC user port. If this will not fit your machine, you can either make an adaptor or cut off the connector and fit a plug compatible with your user port. If your computer uses a PIO (Programmable Input/Output IC)--the parallel I/O controller of the Z80 family--interfacing is very simple. Figure 1 shows how I have connected the tracker ball to my machine's user port B. You can modify these connections to suit your own requirements. [We regret that Figure 1 did not accompany this text. -- ed]

THE SOFTWARE

Three separate routines are required, the first of which is only run once and sets the CPU to interrupt mode 2, loads the interrupt register and then initialises the I/O port. The other two routines are: an interrupt routine which is called whenever the ball is moved; and another which is called whenever convenient, usually before or after polling the keyboard. The reason an interrupt is required is because whenever the ball is moved, the computer must immediately stop whatever it's doing and see whether the other pulse-train is ahead or behind the one that caused the interrupt, in order to determine the direction of motion (as explained above).

There is less urgency to detect when a button has been pressed than to detect ball movement, so the routine to do this and also return any cursor move characters can be called on a regular basis along with keyboard scanning, sending output to screen, and other operating system housekeeping chores. As this polling can take place many times per second, the button routine ensures that a button, once operated, is released before it responds to the second press.

Listing 1 shows the initialisation routine source code, and Listing 2 the interrupt and polling routines. The location of the routines and the addresses referred to by them will almost certainly need changing to incorporate them into a different system, as will the port addresses; the only other changes that might be necessary are to the 'set carry flag' instruction at the end of the polling routine and the ASCII codes for the cursor move characters.

The system that this program was written for has a routine (called 'inscan' in these listings) which scans input sources such as keyboard, RS232 interface, and so on, and any routine returning an input sets the carry flag to indicate that it

has done so. Consequently the tracker ball polling routine follows this convention, but other systems may need a different indication that a valid input is being supplied. The cursor move codes in the listing are to the commonly used ADM3 protocol.

There are several ways in which these routines could be incorporated into your existing software. Since a CP/M system is booted from disk, it is likely to be one of the easiest to modify. The CP/M BIOS always starts with a jump table, and the fourth jump (console input jump) will lead to the input scanning routine. The interrupt and polling routines must be placed in RAM where they will not be overwritten; one place is in high memory, see Listing 2.

TABLE 1 - Z80 TRACKER BALL PROGRAM

| BBC user-port designation | 20 way conn. pin number | T-ball function | PIO port bit no. |
|------------------------------|----------------------------|--------------------|---------------------|
| CB1 | 2 | X1 | 2 |
| CB2 | 4 | Y2 | 1 |
| PB0 | 6 | Left sw. | 4 |
| PB1 | 8 | Centre sw. | 5 |
| PB2 | 10 | Right sw. | 6 |
| PB3 | 12 | X2 | 3 |
| PB4 | 14 | Y1 | 0 |
| +5V | 1 & 3 | +5V | +5V |
| 0V | 5-13 odd | 0V | 0V |
| PB5,6,7 not used | | | bit 7 tied to 0V |

; LISTING 1 - Z80 TRACKER BALL PROGRAM

; Initialisation routine

;

; This routine can be placed any where in memory and is
; called once from the operating system.

.Z80
ORG 100H

```
pdat equ 5h      ; Port B, data
pcon equ pdat+2  ;      control

hivec equ OFEH   ; high byte of interrupt vector
livec equ 00H    ; lo byte
```

; Prog CPU, but do not enable interrupt yet

```
start: di
      ld a,hivec
      ld i,a
      im 2
```

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Tracker Ball How-2

```
; Prog PIO
ld hl,pstr
ld c,pcon
ld b,pstre-pstr
otir

; Enable CPU
ei
reti          ; ensuring interrupt latch reset

; PIO initialisation string
pstr defb livec      ; lo byte vector address
      defb 0ffh      ; bit control mode
      defb 0rfh      ; all bits input
      defb 097h      ; int control
      defb 0f5h      ; mask bits 765420

pstre:

      end

; LISTING 2 - Z80 TRACKER BALL PROGRAM
; Interrupt and polling routines

      .z80

pdat equ 5h          ; Port B, data
pcon equ pdat+2      ; control

; 62k BIOS address, will be different in other systems.
inscan equ 0f02bh    ; patch to 'poll' (see text)
scankb equ 0f044h    ; this was the adress at inscan

; Interrupt vector - this address must be an even number
; see books on Z80 interupt programming for explantion.
ORG 0FE00H
ivec: defw irout

xcuont: defb 8
ycuont: defb 8
chstor: defb 0      ; character stored here until polled
butflg: defb 0      ; flag for buttons pressed/released
buttab: defb 8,0dh,20h ; button table - backspace, CR, space

      defs 4
stack: defs 2

irout: ld (stack),sp ; save old SP
      ld sp,stack    ; set new SP
      push af
      push hl

; Find which bit causes interrupt
ld hl,ycuont
in a,(pdat)

ty: bit 1,a
jr nz,tx
bit 0,a
jr nz,ty1
inc (hl)
jr ty2

ty1: dec (hl)
ty2: ld a,leh      ; cursor up
      bit 7,(hl)   ; test for -9 Y moves
      jr nz,storch
      inc a        ; lfh - cursor down
      bit 4,(hl)   ; test for +8 Y moves
      jr nz,storch

tx: dec hl          ; now points to x count
      bit 3,a
      jr nz,eint
      bit 2,a
      jr nz,tx1
      inc (hl)
      jr tx2

tx1: dec (hl)

tx2: ld a,lch      ; cursor left
      bit 7,(hl)   ; test for -9 X moves
      jr nz,storch
      inc a        ; ldh - cursor right
      bit 4,(hl)   ; test for +8 X moves
      jr z,eint

; Store cursor move for polling
storch: ld (hl),8
        ld (chstor),a
eint: pop hl
      pop af
      ld sp,(stack)
      reti

; Polling routine
poll:: ld hl,chstor
      bit 4,(hl)
      jr z,buts    ; no cursor move waiting
      ld a,(hl)
      res 4,(hl)
      scf
      ei
      ret

; Test buttons
buts: ei
      inc hl        ; HL = butflg
      in a,(pdat)
      bit 0,(hl)
      jr z,but2
```


Ball How-2 end / HDOS & CP/M NOTES

```

        and 70h          ; button flag set
        xor 70h
        jr z,but1        ; buts not restored so ignore
        res 0,(hl)
but1:   jp scankb

but2:   inc hl            ; now points to button table
        bit 6,a           ; right button
        jr z,but3
        inc hl
        bit 5,a           ; centre button
        jr z,but3
        inc hl
        bit 4,a           ; left button
        jr z,but3
        xor a             ; on button pressed
        jp scankb

but3:   ld a,(hl)
        ld hl,butflg
        set 0,(hl)
        scf              ; see text
        ret

        end

```

---<<[[8]]>>---

A NEAT CP/M UPGRADE FOR HDOS USERS
by
A. Stapher, Contributing Editor

If you're more accustomed to using HDOS (any version) than CP/M, but have to use CP/M because some programs you need are not available in HDOS form, here's a simple modification which can make CP/M less intimidating for you. We hope you'll try it and report back on how it works for you. Note: You'll need a copy of SEBHC JOURNAL CP/M GAMES DISC #0 for the XDIR.COM or SD.COM file called for below.

DIRECTORY DISPLAY UPGRADE

You like HDOS's DIR command or John Stetson's SD.ABS (on the SEBHC JOURNAL HDOS Programmer's Helper Disc #1) because they tell you virtually everything about file size, flags and remaining disc space at a glance, but CP/M's "intrinsic" DIR displays only file names and extensions. Quite uninformative and unimaginative to say the least.

To get around that problem, just make this simple patch to MOVCPMnn.COM (nn means 17, 37, 47 or 67) which changes CP/M's "intrinsic" DIR command word to CAT (which now brings up the old uninformative directory display--if you Really Want to See It). Note: The patch--which does not take effect until you've run the patched MOVCPMxx and SYSGENed a disc--also re-

quires renaming the SEBHC JOURNAL's XDIR.COM or SD.COM file to DIR.COM:

```

You enter
A>REN DIR.COM=SD.COM<cr>      (<cr> means RETURN key)
A>DDT MOVCPMnn.COM           (nn means 17, 37, etc.)

Computer prints
DDT VERS 2.2
NEXT PC
nnnn 0100                    (nnnn = START location)

You enter
-SD10<cr>
Onnn 44 43<cr>               (changes ltr D to C)
Onnn 49 41<cr>               (changes ltr I to A)
Onnn 52 54<cr>               (changes ltr R to T)
Onnn 20 .<cr>                (period ends entries)
^C                             (CTRL-C exits DDT)

You enter
A>SAVE 42 MOVCPMnn.COM       (nn means 17, 37, etc.)

End of patch routine

```

Now when you run MOVCPMnn followed by SYSGEN, the modified system put on the target disc in a manner that entering DIR<cr> gets a nicely alphabetically-sorted and columnised DIRectory display. It also displays Read Only file flags with an asterisk (*) after them. If you want to see hidden or SYS files, enter DIR /S<cr> (be sure to include the space between DIR and slash). This gives the same type display but files set to SYS status are identified by bullets instead of asterisks. (No symbol means a file is R/W.)

Please let us know if you make this patch and how you like it. We shall soon be publishing more patches and operating-system hints in future editions of the SEBHC JOURNAL, your eight-bit newsletter. Keep tuned!

=====
ANNOUNCEMENT.... ANNOUNCEMENT.... ANNOUNCEMENT.... ANNOU
=====

PC89LINK, Lindley Systems file-transfer utility, now lets users of all H/Z computers transfer files easily to any other H/Z computer or PC compatible. Supported operating systems now include: HDOS; CP/M on H8 or H/289/90; MS-DOS on Z100 or PC compatibles. Instructions are include on how to make file transfers over a simple serial cable between any two supported computers. Using wild cards, you can send an entire disc or subdirectory with only one command. PC89LINK also transmits binary files or performs necessary translations on text files.

PC89LINK is distributed on two discs. Specify two: Hard or Soft Sector 8-bit disc (dual format, HDOS and CP/M on one disc); 5.25" MS-DOS disc for Z100 and PC; 3.25" MS-DOS for PC. \$25 postpaid. Contact: LINDLEY SYSTEMS, 4257 Berwick Place, Woodbridge, VA 22192-5119 or phone 703-590-8890 and ask for a FREE catalogue. Please mention the SEBHC JOURNAL!

Make Moola With Your Micro

MAKE MOOLA WITH YOUR H/Z 8-BIT MACHINE

Part III of a Series

by

Contributing Editor A. Stapher

Here are more ideas on how to make money: Temporarily loan or rent out a machine with specific application software and a printer to someone who doesn't know he or she needs one.

For example, our publisher's son recently married and his new wife provided him with a "ready made" son. The kid is quite brilliant even though he's just turned seven. He can read, write, and do fairly complicated arithmetic problems. But he has a very short attention span for those activities (what kid that age doesn't). Recently the boy's mother severely injured her knee and is now laid up from the resulting major surgery performed on it. (She'll be hors-de-combat for most of this year.) I suggested to our publisher that he could lend his son one of those "spare" H90 units gathering dust, throw in a few discs of software and a couple of Heath's Continuing Education modules. Having a big computer to play with at home should help keep the little guy occupied and out of his mother's hair--if nothing else. Much to his son's surprise, the step-son glommed onto the 290 as if it were his favorite-most teddy bear! The kid's mother also was pleasantly surprised; the computer and about a dozen HDOS games keeps the boy quiet for hours on end. She noted that the boy's attention span for schoolwork has improved as well. It appears that our favorite grey box (the old H/Z 8-bit machine) is an excellent baby sitter which doesn't have to be paid megabucks an hour to take care of someone's kid!

It's also worth looking into promoting low-cost weekly or monthly computer-plus-specific application software rentals to patients in VA or other hospitals; perhaps even to hospital staff members who don't have Big Bux name-brand personal computers of their own. Try to work up some kind of equipment and software demonstration which you can present at staff, PTA or PTO meetings, quoting our publisher's experience. Point out that an old grey all-in-one isn't a high-cost item, but that it is quite economical to use, that there's plenty of public domain software around, and that this all-in-one unit doesn't tie up the family TV as any other popular computers (Commodore, Radio Shack, etc.) do. Emphatically point out that it is quite easy to learn to use. If a just-turned-seven kid can boot HDOS, load MBASIC and a game, run the game, then quit, exit and properly shut down the computer, adults should be able to do the same (perhaps with a little coaching)!

If you have any programming ability at all, consider writing some of your own programs in BH-BASIC or MBASIC. Check through all those back issues of REMark, Kilobaud/Micro-computing, and other magazines you have gathering dust. So

what if the BASIC listings are different than you're accustomed to; buy a copy of "The BASIC Handbook, Encyclopaedia of The BASIC Computer Language" by David A Lien, COMPUSOFT Publishing, San Diego, CA 92119. Why am I suggesting this? Simple: You're going to find at least ONE program listed which will excite your imagination that you'll want to try translating it to run on your H/Z grey box, "just to see what it does". A little digging almost always will get you through an Applesoft BASIC or some other one of hundreds of BASIC dialects you'll find in those dusty magazines. Don't worry about copyrights; by the time you've gotten the program to run under a Heath operating system, it will resemble the original listing in name only. It WON'T be the same program!

If you're thinking of juvenile or inexperienced computer users, concentrate mainly on programs which teach basic computer skills. Of course, you can also write programs for teaching or improving other things as well, such as touch-typing, math practice, basic English spelling or grammar--or both--any one of a myriad subjects, in one or more of which you may have expertise. Let your imagination run wild--something exciting surely will happen!

Once you've written and thoroughly debugged a program or two, think about their commercial possibilities. Even though you've written an MBASIC program for your H/Z89/90, it's quite possible work with someone having a Big Bux machine which runs a later MBASIC version and convert your programs for that machine. Once that's done, you should then prepare several demo discs for submitting your output to several of the various software vendors advertising in popular, non-H/Z-oriented publications. Don't send them the software until AFTER you've called someone and gotten an ok or instructions on how to do it. [To be continued....]

=====
T.... ANNOUNCEMENT.... ANNOUNCEMENT.... ANNOUNCEMENT...
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Lee Hart of TMSI now has a new address, as follows:

Lee Hart
323 West 19th Street,
Holland, MI 49423
phone, 616-396-5085

Lee's been commuting 140 miles daily (in Western Michigan's nasty winter weather no less) and it was grinding him down almost to the vanishing point! Hence the mandatory move. He sends his apologies to all his friends and customers who've been having difficulty communicating with him recently. He's now back in business with Write-Hand-Man, Superset, soft-sector controllers and other H/Z89 parts and services. Place credit card orders and get quick delivery by calling Henry Fale of Quikdata at 414-452-4172, Sun thru Fri.

The JOURNAL's CATALOGUE Page

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"CLASSIC" H/Z Eight-bit CP/M software in Original Factory-Sealed Packages. Warranties WILL BE HONORED by Heath. All "Demo" software runs EXACTLY AS WARRANTIED PACKAGES DO, but updates are not available (usually doesn't matter). Continuing Education (EC) packages complete w/lectures on cassette & final (college-acceptable credits) examination.

=====

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- 1 - Prices include shipping inside continental U.S.A. only.
- 2 - We WILL NOT accept opened returns.
- 3 - All "Demo" software packages work EXACTLY as warrantied versions except manual pages are red over-stamped. (They're readable through red cellophane.)
- 4 - Some programs may not work on non-Heath machines, but usually can be patched to run ok.
- 5 - If requested we'll convert between hard- and soft-sector formats, between H/Z 5.25" and 8" formats (KAYPRO ss, sd 5.25" discs on special order) at \$5 each 5.25" target disc. Original distribution disc(s) will be included with converted discs. (Caveat: Some Heath Terminal escape codes aren't Kaypro 8-bit-machine compatible.)

Contact Gus Bakalis at D:KUG.DOC, 313-755-2060, or L Geisler at SETHC JOURNAL, 313-662-0750 for more information. Note: Profits from any software sales made thru D:KUG.DOC go toward D:KUG.DOC's operating expenses.

NOTE: "*" means 10% off both packages if ordered with matching course--example: MBASIC and Programming in MBASIC.

=====

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LINDLEY SYSTEMS is continuing its tradition of support of the Heath/Zenith 8-bit computers. Proof of this is our newest product, PC89LINK. In addition, our printer drivers, the Ultimate and the UPC, are still available. The DOS versions have been updated to include support for DOS 3 features like UNLOAD.

PC89LINK — Now for CP/M

This new product allows you to transfer files between an H-8 or H/Z-89/90 (running HDOS, CP/M or ZCPR) and a Z-100 or PC compatible computer (under MSDOS) at baud rates up to 38400. (Also between two '89s, a Z-100 and a PC, two PC's, etc.)

- Wildcards are supported, so sending "*. *" sends the entire disk or subdirectory
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- Supports all serial ports on H/Z-8/89/90, Z-100, and PC.
- HDOS version supports disk mount, dismount, and reset for flexibility. CP/M version supports disk change. MSDOS version allows change directory and current drive.
- Only a simple three connection serial cable is needed.

Order #150, \$25.00 postpaid (two disk set, one dual-format HDOS&CPM; one MSDOS). Specify Hard or Soft Sector HDOS disk and 5.25" or 3.5" disk for MSDOS. Or specify one 5.25" and one 3.25" MSDOS disk (for laptop to desktop use)

Commonly-Asked PC89LINK Questions

- Q: What versions of CP/M are supported?
A: It has been tested with Heath CP/M 2.2 and ZCPR. It should also work with Magnolia CP/M as well.
- Q: What type of cable do I need, exactly?
A: Just three wires: pins 2, 3, and 7. Some connections require pins 2 and 3 cross over (a "null modem" cable); complete directions and examples are included.

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For the H-8 and H/Z-89/90 Computers

Ultimate Drivers include:

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- Source code is included.

Please specify operating system (HDOS or CP/M), printer type, and whether you would like Hard or Soft sector disks. \$20.00 postpaid. (See SPECIAL OFFER below)

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Special Offer to SEBHC Journal Readers: Order both the Ultimate and UPC drivers for a combined price of \$35.00 (HDOS or CP/M). Or order all four drivers for your printer (Ultimate and UPC for HDOS and CP/M) for \$45.00.

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LETTERS POLICY

Our "MAIL BOX" feature has been provided as an open forum for the free exchange of H/Z 8-bit computer information between all subscribers and readers of the SEBHC JOURNAL. We ask all correspondants to keep their letters reasonably concise and preferably around 250 words maximum length (about six screens, 24 lines on screen of ASCII text). The JOURNAL shall exercise its' right to condense letters exceeding this recommended maximum unless that might destroy their intent or meaning. In such cases we shall contact the writer.

The SEBHC JOURNAL RESERVES THE RIGHT TO REFUSE TO PRINT any letter containing profanity, derogatory racist, or sexist remarks, specific political or libelous statements of any nature directed toward any individual or organisation. The JOURNAL will not knowingly publish malicious fabrications, lies, or distortions of fact, but will take appropriate legal action against any individual(s) uttering them.

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