TABLE OF CONTENTS

PORT TO PORTAL -- Editorial

This issue marks several important events. For one, this is **Staunch**'s third birthday. And let me say that I'm very pleased that this small newsletter has survived so long and still amazed at the support and encouragement you've given me since I assumed its editorship from Hank Lotz two years ago. I couldn't have done it without your letters, articles, software, and (of course) checks. Some of you have asked me how I manage to do it and I sometimes ask myself the same question!

On a more personal note, this issue also marks another birthday; it's been 10 years since I bought the '89 I'm keying this file into. And though it has certainly seen a fair number of changes to its innards, it's still the same friendly, useful, hardworking computer the day I finally got the whole kit together. Despite the multitude of changes that have occurred in the computer industry since the momentous day I ordered it from Heath, I have not regrets. The '89 was, without doubt, the best 8-bit machine produced. And its longevity is aptly demonstrated by you and your support for **Staunch**. Even more telling, I think, is that I'm **still** learning about it and its uses. **Staunch** has been an important part of that learning process.

The third important event, as I discussed here last issue, is renewal. As I write this, I'm pleased to report that a healthy one-quarter of you have already done so. As I mentioned last time, I'll accept checks for the next two years. We've reached a plateau in terms of bimonthly publication and size that will hold through 1991. If you've already renewed for two years, you'll see on the envelope that your subscription is good through #27; if for one year, that will be through #21.

If you **haven't renewed**, now's the time to do it! One year is $12 (overseas please add $4 for air mail postage); two years goes for $24 (overseas please add $8).

Finally, I have a fair number of the terminal escape code and graphics symbol charts that Studio Computers (Birmingham, MI) gave me a year ago. They list the terminal escape codes, mnemonics, equivalents using BASIC's CHR$(), definitions, and a chart of the standard H/Z-19/89 graphics. They're printed double-sided in color on heavy-weight paper. While they last, these are free for the asking. Just send me a postcard or short letter if you'd like one.

Kirk L. Thompson

THE EIGHT-BIT R/W -- LETTERS

Encouragement. [From S.K. Magee, Audubon, NJ] "You are doing a great job with **Staunch 8/89'er**. I would not want to miss a single issue ... Hope the extended renewal will encourage you to keep this great little paper going on for a long time. We 8/89'ers all are greatly indebted to you for this fine service." [Thanks to you, Sanford, and the surprising (but gratifying) number of you other readers who took me up on my offer of a two-year renewal. Both the two **and** one year renewals imply that you think I'm supplying you the right information and services. On that basis, you can be assured I'll be around for some time yet. -Ed.]

FORTRAN Resources. [From Ronald Pannatoni, Franklin, NC] "I am writing this note for the readers of **Staunch** who want to use Microsoft FORTRAN-80 on their H89's; to do scientific calculations.

"First, let me point out the availability of an excellent book from the Cambridge University Press that lists and discusses many FORTRAN computational routines. It is **Numerical Recipes: The Art of Scientific Computation**, by William H. Press, Brian P. Flannery, Saul A. Teukolsky and William T. Vetterling. It is published in hardback and costs about $45.

The routines in this book are written in FORTRAN-77 and make extensive use of the 'IF-THEN-ELSE-ENDIF' construction in this version of FORTRAN. Microsoft FORTRAN lacks this construction, but there is a pre-processor program that enables one to include similar constructions in Microsoft FORTRAN-80 programs. This pre-processor program is called 'RATFOR' and was written by Software Toolworks. It costs about $40. It is listed among the 8-bit software sold by Quikdata [2618 Penn Circle, Sheboygan, WI 53081-4250, 414-452-4172].

Using 'RATFOR' one can easily adapt every routine in **Numerical Recipes** to ... run under Microsoft FORTRAN-80 on the H89. Note that there are two editions of **Numerical Recipes** in print: get the one with routines written in FORTRAN, not the one with routines written in C. There are also two versions of 'RATFOR', to be used under CP/M or HDOS, respectively." [Thanks for the hint, Ron, for FORTRAN (and C) programmers. -Ed.]

Missing C/80 Librarian. [From Gary A. Appel, San Jose, CA] "...I don't know if you're 'into' programming [with Software Toolworks C/80], but a problem exists under HDOS in that a version of the

SOFTWARE LISTING
>--<
For CP/M Only

dBASE II PROGRAMMER'S NOTEBOOK
(By Steven G. Meyerson)

Originally published as a booklet in '83 and '84, this is a collection of tips and routines for using dBASE II and writing applications in its command language. Included are hints for using FIND, DO CASE, QUIT TO, semicolons, justification, report column headings, the STR and TRIM functions, terminal and printer commands, sorting, debugging, displaying logical fields, linking database files, two-column printing, menus, error checking, and even a flashing display using H/Z-19/89 terminal codes.

As an extra bonus, it also includes S-MAIL, a mailing list package for dBASE II that features menu-driven operation; adding, listing, deleting, reviewing and altering records; printing labels; and archiving deleted records. This package includes 13 CMD modules and 11 auxilliary files. The structure of each record includes:

NAME	WIDTH	NAME	WIDTH
First	030	Altph	013
Last	015	Rmks	030
Company	030	Data1	001
Addr	025	Data2	001
Addr2	025	Data3	001
City	020	Data4	001
St	002	Data5	001
ZIP	005	Data6	001
Phone	013	*Total*	00215

All fields are character. The trailing DATAx fields will be useful for one-character flags of your devising. Documentation for S-MAIL is included with the dBASE notebook text. This entire package covers 116K.

Z8E
(By Rick Surwilo)
(Provided by Dave Haube)

This package is a Z80 assembly language, professional-quality, interactive debugger, loosely based on DDT/SID/NDDT. It features a full-screen display; inline assembler/disassembler using Zilog mnemonics; single-stepping; 16 user-settable breakpoints; symbolic debugging using input from .PRN and .SYM files; and dynamic relocation to the top of the TPA, regardless of memory size, when loaded. It does **not** immediately support the H/Z-19/89 (VT-52) terminal, but may be patched for it. A version included in the archive file supports the VT-100 terminal, which is an update to the VT-52. Commands within the debugger number 24 in all and it occupies 9K of memory when loaded. Source code is included, but this takes up 174K when de-ARC'd. This package occupies 200K on disk, ARC'd, and the voluminous documentation file (166K when uncrunched) has been split roughly in half to accomodate hard-sector distribution. UNARC10 is included for recovering the files.

For HDOS Only

ACANAL
(By Gary Appel)

This is the HDOS version of ACANAL described in the software listing in the last issue. Check there for a description of the package and its capabilities. Written in C/80, it occupies 456 sectors and includes on-disk documentation and sample files and eight pages of hardcopy diagrams, circuit samples, and figures. This version **requires** 56K memory.

B.H. BASIC Source Code
(By Heath Co.)
(Provided by Bob Olson)

Source code for Benton Harbor BASIC, the dialect Heath supplied as a part of the HDOS operating system package. See Bob Olson's comments in his letter later in this issue. This code is based on the published listing Heath sold years ago. This package occupies 634 sectors.

HOW TO ORDER

Your cost for the software described above depends on what you supply:

Formatted disk(s) and self-addressed, stamped return
    mailer .... $2.00 each
Formatted disk(s) without mailer ...... $4.00 each
No disk(s) or mailer .... $6.00 each

Disk formats available are standard (SS/SD) and double-sided (DS/SD), 40-track (48-tpi) hard-sector (see this issue's MISCELLANY section) and 40-track soft-sector, single- or double-sided, for both CP/M and HDOS. Please clearly indicate the format you are supplying or require. If you desire double-sided hard-sector or any soft-sector format, I will pack multiple items onto one disk for the **single-disk** charge. But I will not subdivide a disk. Send your order to:

Kirk L. Thompson / **The Staunch 8/89'er** / #6 West
    Branch Mob Hom Vil / Rte. 1 / West Branch, IA
    52358

>--<
CP/M librarian was never provided for HDOS (so far as I know). As a result, it is impossible to create or modify libraries under HDOS. But there is a way to do it, and you might want to publish this. If the library and/or modules are copied over to CP/M, the CP/M librarian can be used to create or modify the HDOS library. When you're done, you copy the new library back to HDOS. It's awkward, but it works. I've created my own library of C/80 functions this way." [I checked my C/80 distribution disks for **both** HDOS and CP/M and there is no library manager provided with either, Gary. I suspect you're using L80 from Microsoft's M-80 macro assmbler. L80 was **also** provided with the HDOS version of this now hard-to-find assembler; I got a copy of it during a close-out but have never used it! Transferring library files **either** way should work. -Ed.]

Assembling the HDOS Source. [From Bob Olson, Hemet, CA; compiled from two letters] "I have

assembled all the programs [in the HDOS 2.0 source, see issue #12 -Ed.] (using the **HDOS ASSEMBLER**) and everything seems to work fine. I did run into a few (very minor) problems and have listed the fixes below.

Code	Fix
ASM.V21	Added 'XTEXT ZEROS'
HDOSOVL0.V21	Added 'XTEXT ZEROS'
HDOSOVL1.V20	Added 'XTEXT ZEROS'
	Deleted 'ERRNZ IOC.UNI-IOC.-NAM-2'
PATCH.V21	Deleted 'XTEXT DATA2' (not needed, included in DADA.-ACM
SYSCMD.V20	Deleted 'ERRNZ 1'
FERROR.ACM	Changed 'BEL' to 'BELL'
Added H17ROM1.ACM	By combining 'H17ROM.ACM', 'H17DEF.ACM', and 'HDSROM.-ACM'
ASCII.ACM	Added 'QUOTE EQU 39'
HOSDEF.ACM	Deleted '.RESNMS EQU Added back '.CLEAN EQU'
INCHA.ACM	Deleted 'ERRNZ (OBSOLETE MSG)'. This ACM is needed by EDIT.V20.

Since the HDOS ASSEMBLER does not have the option to set 'DS' areas to a preset value, I had to add the following code in HDOS.V21 after the label 'HOSB001' to zero out a couple of locations.

```
        XRA     A
        STA     OVLTAB+6
        STA     OVLTAB+14
```

Also, in order to get SET.V21 to assemble, LBD.ACM had to be changed. The 'DB's' with the formulas for computing the baud rate divisor key were deleted and replaced with 'DB's' that contained the equivalent number...

"After I checked out the HDOS source code that I received from you I felt inspired to add the HEATH BASIC code to it. [The enclosed] disk has the source code I keyed in from the hardcopy [Heath sold years ago]. Most of the required XTEXT files were available on the disks I got from you. Those that weren't I keyed in and included on this disk. The code is almost identical to the hardcopy. A few changes were required to get it to assemble without errors (using the HDOS ASSEMBLER). I can't guarantee that the code is entirely bug free but I do feel pretty good about it.

"Feel free to do whatever you want with it. Also, if any of our fellow STAUNCHER'S who would like a copy will send me a formatted disk (or disks) with return postage I will be happy to put the code on them at no cost. I believe I can handle any soft sector format but I am limited to 40trk, single side, single density hard sector format. The code takes up 634 sectors so it will take two 40trk single sided disks." [Thanks, indeed, for the information and the BH BASIC source, Bob. Readers will find it included in this issue's software listing and may order it from me. Of course, I charge more than you do! -Ed.]

HDOS 3.02. [From Russel LeBer, Providence, RI] "I have HDOS 3.0. One complaint is too much head banging. I have been using HUG 885-1095 SY.DVD with HDOS 2.0 (very little head banging). Please reserve a copy of HDOS 3.02...." [I've added you to the list, Russ. And HUG's hard-sector driver is a good one, though the part number has changed to 885-1121. I'm using it myself. This also gives me a chance to mention that the first draft of the HDOS 3.02 documentation is now complete. Dan Jerome reports that it will occupy something like 600 (!) pages when printed from disk. A few unforeseen delays have cropped up, but are under control. As this issue goes to the printer, reservations number 18 and are growing, so if you're interested, let me know. -Ed.]

=====

CONTACTS
(A Wanted/For Sale/Swap Column)

Ronald Jackson (201 Mortimer Ave., Rutherford, NJ 07070-0466, 201-939-2421) "H89 w/built in hard sector drive. Serial Board. Double density controller board. S 1410 hard disk controller and software for H89. Works with most 5 inch hard drives. Make offer on all or part."

Nancy D. Michaels (23601 Outwood Drive, Southfield, MI 48034, 313-356-4326) [Compiled from extensive inventory -Ed.] H/Z-89 with 2 external standard hard-sector and 3 (2 external) soft-sector drives. Hard- and soft-sector controllers, serial board, UDS 300-baud stand-alone modem, C.Itoh 8510A dot-matrix printer, 2/4 MHz mod. System software: HDOS and CP/M. Software: too much to list individually, but includes MBASIC interpreter and compiler, FORTRAN, Pascal MT, Turbo Pascal, C/80, WordStar, Magic Wand, Query, most Software Toolworks packages, MultiPlan, and ZLYNK. Various books and Heath Continuing Ed. courses. $700 or best offer, plus shipping.

William A. Jacob III (10220 66th Ave. SE, Olympia, WA 98503) "I'm ... looking for an easy way to change ports on my H&H Computer serial/parallel I/O board. It came with an MBASIC sample program but I would like to know if it is possible to change ports from within dBASE, SuperCalc or New Word."

Dick Shotwell (546 Grandview Drive N., Twin Falls, ID 83301) "I had been using a Z-67 8" Winchester disk system for years but last spring it finally quit. Something in the controller I think. I tried to troubleshoot it, but had no luck. As you may know, the documentation on that system is very skimpy. So I built up what I refer to as my H-89 Super Computer which includes among other nice things, a SigmaSoft external 10 MB hard disk subsystem. The Super Computer is really nice although I am really not taking full advantage of its many capabilities yet. But I am learning with the help of **Staunch!** I do have one serious problem. Much of my software was on 8" media and now I don't have any way to retrieve it. Do you know of anyone who can copy the 8" [CP/M] disks to 5-1/4" soft sector 96 tpi media?"

John J. Dyson (528 S. Franklin St., Janesville, WI

53545) "I would be interested in hearing from any amateur radio operators with a common interest in the 8/89'er. I can be reached at the above address or 608-754-4609. My radio call is W9MX. Hopefully we could get together on the air from time to time...."

Harry Bailey (P.O. Box 6487, Panama City, FL 32404, 904-769-5081) "For sale: two Z89 computers. One computer was a kit from on the G.I. Bill and has one drive, 32K and hard sector board. The other Z89 has three drives, one drive on the hard-sector board and two 96 tpi drives mounted in a Z77 case with Z37 soft sector board installed and expanded memory kit. I have extra drives and parts, also software. Also a damaged Z19 terminal and extra logic board. Will sell in one lot or separate, make reasonable offer."

Cleon E. Dean (NE 517 Norton St., Pullman, WA 99163) "...I am still unable to boot that Z80 Trionyx H8 I have upstairs. I have installed an H17 controller board in it and have learned the boot keypad sequence for H17 drives. But after a little while of spinning ... around, an error message comes up on the LED display, and the drive shuts off. I have similar problems with booting from the soft sector drive. I may have a problem with the soft sector software I received with the hardware. I was advised that the disk might be corrupt. I was told that the unit should boot with the hard sector disks I was given, especially with a separate H17 controller installed. (The soft sector drives run off a Trionyx board that is supposed to run anything, but which must have its EPROMs properly programmed and from the specs seems a bit tempermental about temperature, etc.) I would appreciate any help from people familiar with the Trionyx line. I am also interested in an X/2 H8 memory bank select board if I can ever get this unit up and running...."

William J. Wayland (670 Andrews St., Southington, CT 06489) "...I read somewhere, but have had no luck finding it again, that the H-89 can be reset when it locks up without doing a hard reset (shift reset). It was some other combination of keys. Thanks for any assist."

David H. Gill (Attorney at Law, 164 Forest Ave., Pacific Grove, CA 93950, 408-373-3283) "I have a Zenith Z-90 computer and I believe a Z-37 extra cabinet drive. I am advised that although obsolete, this has collector's value and that you may be able to help me locate someone who wants it."

Hank Lotz (2024 Sampson St., Pittsburgh, PA 15221) Hank recently bought a used Siemens single-sided drive (for use as hard-sector, see my comments in MISCELLANY this issue), but the felt pressure pad is well worn. "...I **would** like to know how to put in a "new" ... [one]--I've **always** wanted to know that ... (I could not find it [described] in Dan's articles [in issue #'s 10 and 11].)...."

Mark Hunt (U.S. PHS Alaskan Native Hospital, Barrow, AK 99723) Mark is interested in trying to break the HDOS MBASIC interpreter and compiler, FORTRAN compiler, and M80 macro assembler free from of Microsoft for some kind of distribution, though probably **not** public domain circulation. (I would be happy to arrange a low-volume distribution agreement with Microsoft just to make these packages available again.) To help in his effort, he needs a copy of the MBASIC compiler (on standard hard-sector) and the documentation. Could someone supply these? I've already sent him Microsoft's address.

Dave Haube (P.O. Box 23076, Seattle, WA 98102) "Do you have or know where to find [assembler] source for a simple text editor? I want to find out how they work and modify it to take advantage of [TMSI's] Superset and Superclock...."

=====

How to Get the Most Out of
EDIT19, Version 3.10
by Dan Jerome

[This is the last of a series of three articles about using EDIT19.]

(24) **THE HAND**--CUTTING AND PASTING PORTIONS OF THE FILE: The HAND is a temporary storage buffer which enables you to manipulate parts of the text, and rearrange the order of sentences and paragraphs. A series of related commands include: AUTHAND, EMPTY, GRAB, HANDAP, HANDDSK, HANDMEM, PICK, POINT, and PUT. Only the most useful commands will be discussed in this summary. For more details, refer to the printed documentation. (NOTE: Although it may seem complex at first, the technique for using the HAND is a real "pussycat" once you have had a little experience with using it.)

(A) PICK n: Picks up **n** lines of text starting with the line that the cursor is on, and puts them into a temporary storage buffer called the "HAND." PICK leaves the original lines intact.

(B) GRAB n: Similar to PICK, except GRAB immediately deletes the original lines.

(C) PUT: Lays down the lines picked up by either PICK or GRAB at the line where the cursor rests. No argument is needed.

(D) EMPTY: Discards all data in HAND and empties it to make it ready for the next use.

EXAMPLES OF USING THE HAND TO HELP YOU
CUT AND PASTE WITHIN YOUR FILE:
EXAMPLE 1: You are writing a multi-page file and would like to have the convenience of being able to drop the page number and header at the top of each page, without having to go backward to see what was used before, and then typing it each time. To accomplish this menial task the easiest way, place the cursor on a typical page/header line and hit ENTER PICK 2<RTN>. From this time on whenever you want to drop in a new page/header line, just place the cursor one line before the line you want to drop it on and type ENTER PUT<RTN>. Now all you have to do is to insure the correct page number is on the appropriate line. This process, although simple, saves a lot of time.
EXAMPLE 2: You are writing a file and notice a certain 5-line paragraph that would make more sense

if it were transported to a different location. You can avoid retyping it by moving the cursor to the first line of the sentence or paragraph and type ENTER PICK 5<RTN>, or ENTER GRAB 5<RTN> if you are absolutely sure that you won't want to move it back to where it was before.

Now move the cursor to the place which you deem to be more appropriate. Type ENTER PUT<RTN>. The five lines that you selected will be dropped beginning on the line below where the cursor is positioned. Now type ENTER EMPTY<RTN> to delete the data from the HAND.

(25) TWO METHODS OF WRITING OR EDITING A FILE LARGER THAN THE BUFFER:
(A) LARGE: Enter this command to let EDIT19 know that you want to work a file that is larger than the buffer. (NOTE: Since EDIT19 is so large, the buffer is correspondingly shorter.) EDIT19 loads overlay 0, and establishes a number of scratch files that it reads in and out as you go along. If you want you can lock the command "LARGE" into your default list with the command: DEFSAVE. Then it will become a standard feature of your copy of EDIT19.

CAUTION
If you want to use "LONGFILE," first you have to turn off "LARGE."

(B) LONGFILE: There are five commands that are available for working with very large files. These commands are as follows: APPEND, OUTFNAME, MORE, LONGFILE, and NOMORE. We will briefly discuss each of these.

OTHER COMMANDS WITH LARGE FILES
(A) APPEND DVn:FILENAME.EXT n: The n lines starting with the current line are appended to the working file, which must already exist. This is one way to develop huge files.

(B) OUTFName DVn:FILENAME.EXT: The first step when working with LONGFILE is to establish the drive and the filename for LONGFILE to write to. The input file and the output file may be on two different disks.

(C) MORE n m: This command writes n lines to disk and reads m lines from disk. Use this command frequently if you don't want the computer to lock up on you because it is too full!

(D) LONGFILE DVn:FILENAME.EXT: This command informs EDIT19 what filename will be used as the input file, what drive it resides on, and what its new filename will be.

(E) NOMORE: This command aborts the LONGFILE process. Use only in case of fire or civil insurrection. (I JEST!)

These three articles briefly described the following EDIT19 commands:

Command	Brief Description
ALOCMSG	Messages generated by "scratch file" usage
CAT	Provides a disk directory of SY0:
CENTER	Centers a title
COMMAND MODE	Allows you to issue special commands
DEFSAVE	Freezes present options and settings
DELETE	Deletes n lines
DELWARN OFF	Turns off ALOCMSG writing to screen
ERASE	Toggles editor between COMMAND SCREEN modes
FILE	Sends a copy of your work file to disk
FILL	Justifies right margin
FORMAT	Processes text between margins
GET	Pulls in a disk file to work on
GO	Sends the cursor to line n
HAND	A temporary storage buffer
EMPTY	Delete data in hand
GRAB	Puts n lines of text into hand, deletes old
PICK	Puts n lines of text into hand, keeps old
PUT	Places data in Pick or Grab into text
INDENT	Indents for a new paragraph
INPUT MODE .	Turns on WRAP
JUSTIFY	Smooths right margin
LARGE	Permits EDIT19 to work LARGE files
LEFT	Scrolls screen to the left n columns
LOCATE	Locates a string
LONGFILE ...	Manipulates long files: a second method
APPEND ...	Data added to the given file
MORE	Brings in more data from disk
NOMORE ...	Stops bringing in more data
OUTFName .	The destination filename on disk
MACRO	A mini-command to instruct EDIT19
MARGIN	Sets left and right margins
QUIT	Leaves the editor and loses file
READ	Enables you to read in a file from disk
RESET	Mounts any drive on your system
SAVE	Saves your work to disk
SCREEN MODE	EDIT19 mode to permit typing files
SETKEYS.MAC	MACRO for setting special function keys
TABS	Sets tabs just like a typewriter
WRITE	Writes n lines to disk

The command descriptions provided above are just a few of the most essential commands that will allow you to start to use EDIT19 with ease. As you go along, you will find yourself adding new commands to your work library as you need them.

Appendix. [From Terry Hall via Dan Jerome]
(1) Rename the SETKEYS.MAC file to EDIT19.PRO. After you boot, you will find that everything is completely automatic--as it should be. Now, when you call up a file such as SY1:HDOSDOC3.1A, the computer will load EDIT19 **and** EDIT19.PRO, and then go on to call the file up, and bring you to the SCREEN MODE, ready to start typing. This works best if you really have a file that you want to modify or increase. However, if you are just starting a new file, the process hangs in the COMMAND MODE, and the computer asks some dumb question about No Such Filename? Then all you have to do to unscramble things is to hit a <RTN> and you are in the SCREEN MODE. Anyhow, I like this method better because you no longer have to load SETKEYS.MAC from the COMMAND MODE. NOTE: EDIT19 is clever enough to find a file on SY2: if I give it the wrong DVn: command!
(2) You can use EDIT19 to make smaller files out of large ones. (I assume that you already know how

to concatenate files, i.e., first, while in SCREEN MODE, you put the cursor at the place where you want to insert the file. Then you hit the ENTER key to go into COMMAND MODE and you type: GET SY1:NEWFILE.DOC<RTN>. EDIT19 loads this new file no matter how large the original file is, or how large the new file is, just below where you place the cursor.)

To chop up a large file, the idea is to first plan how you want to split it. To begin, you have to work from the **bottom** of the huge file. You place your cursor just where you want to chop off the first smaller file, and you hit the ENTER key to get into the COMMAND MODE. Then you type: WRITE SY1:SARAH.DOC *<RTN>. You can hear the file being sent to the drive. The next step is to type: DEL * and EDIT19 faithfully erases all the lines from the buffer that you just sent to the file. You can repeat this process as many times as you like. Just remember to use a new filename for each file that you send out. When you are done, the original file will retain its original filename, but when you CAT the disk, you will find your new files on it: SARAH.DOC, JANE.DOC, NANCY.DOC, etc.

Now that's what I call neat!

=====

Stop Your Clock!
Or Reading HDOS 3.0 Disks Under HDOS 2.0
by Terry Hall

Sometimes HDOS 2.0 says it can't locate files which are known to be on an HDOS 3.0 disk (or written with HDOS 3.0 to an HDOS 2.0-INITed disk). The problem normally doesn't arise if the HDOS 3.0 files were copied WITHOUT a hardware or software clock running (though sometimes it still occurs). HDOS 3.0 uses the two hex bytes immediately after the file name in DIRECT.SYS to record the clock time when the file was either created or copied, depending if the /DATE switch was set when copying the file.

Using UDUMP, or similar disk dump and edit utility, in the file-edit mode, access the file DIRECT.SYS on the HDOS 3.0 disk, and change the 2 hex bytes after each filename to 00 00. If the file is time-stamped, these two bytes in HEX will appear as the hour and minutes, respectively, in military 24-hour time (i.e., a file created at 4:31 pm will have 16 31 as the two hex bytes after the filename). Changing these 2 bytes to 00 00, zeroes out the time-of-day entry and works fine to make HDOS 3.0 files with time stamps now readable under HDOS 2.0.

You need do this only to the files you wish to read or copy under 2.0. Accessing these files under 3.0 would now show their creation date as 12:00a (midnight) or just blanks in the "time" space after those filenames.

If you have both versions of HDOS, an even easier way is to mount the HDOS 2.0 disk under HDOS 3.0 with the clock OFF. The easiest way is to reboot without starting any task that reads either the software or hardware clock (such as Superclock). Then copy the files to another disk, (doesn't matter if INITed under 2.0 or 3.0) using the PIP "/DATE" switch. This switch is crucial because it uses the current system date and time (which will be 12:00a, or 00 00 hex) on the copy. Otherwise, the source

file's original creation date and time will be carried over. Of course, no time is recorded under 2.0.

If neither of these two alternate methods doesn't do the trick for you, try using the appropriate "stock" disk driver from the HDOS 2.0 distribution disks. You'll have to copy it to your bootable system disk as either SY.DVD (for reading a disk in your primary-boot drive chain) or DK.DVD for reading a disk in your alternate drive chain. If you are booting from H37 soft-sector drives in HDOS 2.0, for example, and want to read an H17 hard-sector HDOS 3.0 disk, copy H17.DVD to DK.DVD on your system disk. Exit with BYE, do a SHIFT-RESET and reboot so your system will recognize the new driver.

The moral of this story is: If you're sending an HDOS 3.0 disk to an HDOS 2.0 user, stop your clock! [Read on for another approach to this problem. -Ed.]

=====

HDOS 3.0 to HDOS 2.0 File Transfer
By William Lindley, Lindley Systems
4257 Berwick Place, Woodbridge, VA 22192

A tip to those of us who use both HDOS 2 and HDOS 3. You may know that HDOS 3 can read and write on a disk formatted with HDOS 2. But when you try to read that disk back under HDOS 2, although the directory lists all the files, whenever you try to access one, you get an error.

Why is this? The reason is pretty simple. HDOS 3 uses two bytes in the directory entry to save the file access Time. HDOS 2 expects those bytes to contain zeros. Furthermore, HDOS 2 sees those two bytes as part of the filename! So when you try to access a file with those bytes set, it can't find it.

The solution is simple, too. There is only one place in the HDOS code that needs to be patched to ignore those two bytes when reading a file. (See note at the end.)

The Patch: To fix HDOS 2 so it can read files written by HDOS 3, use a sector dump utility to change file HDOSOVLO.SYS, sector 19, byte C2 hex for 0D hex to 0B hex. This changes the number of directory name bytes that the OPEN code compares from 15 to 13.

When using this patch, remember that only 'patched' HDOS 2 systems can read these HDOS 3 files. If you want to make the disk readable by an 'unpatched' system, you must remove the Time information from the directory. There are two ways of doing this: by using a sector dump utility to patch the directory [as Terry Hall describes above -Ed.] (dangerous!) or by simply making a copy of the files to another disk (or under a different name).

Note: There are many more references in the HDOS code to the symbol DIRIDL, which is set to 15 in HDOS 2, 13 in HDOS 3. However, so long as we make it smaller, AND so long as you don't try to put times on any of the system files (such as overlays or HDOS.SYS, etc.) just changing the one byte will work fine.

One question comes to mind. Under HDOS 3, if you do a DIR/F of a disk which was formatted under HDOS 2, it tells you right at the top of the listing.

CP/M-80 Software Liquidation Sale

While quantities last, *Generic* is offering 30% off retail on all CP/M-80 software.

This offer is a special inventory liquidation sale, and will only be extended until our current stock is gone. Although *Generic* will continue to support these products, production has been stopped. This is the last chance for CP/M-80 users to obtain copies of these fine software products. Once it's gone, it's gone!! Call and order today!

The following CP/M-80 software products are in stock and available for shipment:
(** soft-sector only!!**)

	List	Special
ARCHIVE—File archival program.	$ 39.95	$ 27.95
C.A.K.E.—Keypad And Cursor Editor.	$ 49.95	$ 34.95
CATALOG MASTER—Multiple floppy Cat.	$ 39.95	$ 27.95
F.C.E.U.—File Compress Utility.	$ 39.95	$ 27.95
FILE-EDIT—Binary file editor	$ 39.95	$ 27.95
FINANCIAL-PAK—loan, stock, annuity	$149.95	$104.95
FOOTBALL—football action game	$ 24.95	$ 17.45
FOOTBALL PICKS—point spread program	$ 24.95	$ 17.45
FORMS-KIT—data entry screens.	$ 49.95	$ 34.95
F-TRANS—file transfer to MS-DOS.	$ 59.95	$ 41.95
INVESTMENT-MASTER—annuities	$ 49.95	$ 34.95
LOAN-MASTER—loan amortization	$ 49.95	$ 34.95
SPIN-FOR-MONEY—Wheel-of-Fortune game	$ 24.95	$ 17.45
STOCK-MASTER—stock buy/sell aid.	$ 49.95	$ 34.95

Please use the handy order form below or call (906) 249-9801 for faster delivery.

FREE CATALOG OFFER

-- DETACH HERE & MAIL --

Do you want a FREE catalog of computer hardware & software products?

☐ YES, I still use my CP/M system.

☐ YES, I have upgraded to a MS-DOS based computer system.

Order Form

Name _____ Phone # _____

Address _____ City _____ State _____ Zip _____

Computer Brand/Model _____ Operating System _____ Disk Format _____

☐ VISA ☐ M/C # _____

Signature _____ Exp. Date _____

Quantity	Model Number/Item Description	Unit Price	Amount

VISA®

MasterCard

G.C.P.I.
P.O. Box 790 • Dept. 88C
Marquette, MI 49855
For Faster Delivery,
Call (906) 249-9801
10 a.m. - 5 p.m. EST
Weekdays (except holidays)

Sub-Total	
C.O.D. Shipping ($2.00)	
Foreign Orders Add 15%	
Shipping & Handling ($4.00)	
Michigan Residents Add 4%	
Total Amount	

HOW TO ORDER: Please specify disk format, operating system and computer brand/model when ordering.

MISCELLANY

When the main menu reappears, move the cursor down to "Z17 Hard Sector Controller" and press return. The display now on the screen lets you set the physical characteristics of the logical drives. So move the cursor down to the unit with the same physical drive number that you used above (or that of the drive you're replacing), then tab across to the number of sides and track density columns and alter these as required by the new drive. Again, exit with the <BLUE> function key to patch MOVCPM. Now return to the system.

At this point, you must run MOVCPM to create a new system image in memory and re-SYSGEN any or all of your bootable disks. Once done, you're ready to use those higher-capacity drive(s). And I should note one further thing; double-sided drives will usually access **faster** than the old Siemens'. One test I made was to run the **QUERY!3** database summary program I described in issue #13 with the **Staunch** database file on both soft-sector and double-sided hard-sector floppies after I installed the "new" Shugarts. (The file is too large for storage on standard hard-sector.) I was amazed when timings from the two were almost identical!

Anyway, the moral of the above story is that, with few exceptions (see Lee Hart's traversal of these in **SEBHC Journal**, vol. 1, #5), the **controller** board defines the format a particular floppy drive can read/write. As I mentioned, the Shugarts originally were running off Zenith's soft-sector controller. And the old Siemens drive **will** run from that controller, too, using soft-sector diskettes and providing some 140K capacity. But you have to exercise care when selecting new or replacement drives. Though some are rated for 48-tpi, they will only read 35 tracks, and there are 96-tpi drives that can only read 77. Finally, though I've gotten reliable performance out of my full-height, 48-tpi, double-sided Tandon TM-100-2's, I've heard disparaging remarks particularly about Tandon's half-height models, even from dealers such as my local Kaypro! Could those of you with experience in this area pass along makes and models of reliable 48- and 96-tpi, full- and half-height drives? I think readers interested in expanding disk capacity through **either** hard- (discussed above) or soft-sector (as Witham Reeve describes elsewhere in this issue) would like this information, myself included.

Using Terminal Codes with QUERY!3's CALC. Recently I investigated using **terminal** escape codes imbedded in a CALC command file when output is sent to the CRT. This **can** be done using the printer sequence (Pi) command described in the CALC manual.

I used only four terminal codes in my application, but I'm sure others could also be utilized. The four I used were clear screen (ESC E), reverse video on (ESC p) and off (ESC q), and ringing the terminal bell (ASCII code 7). Setting up these codes in the definition section is done just as for a printer. The order given below is the same as that immediately above:

```
D        ;definition section
P1=27,69
P2=27,112
P3=27,113
P4=7

    .   .   .

E
```

While experimenting, I discovered that the report header section (bracketted by H and E) is a good location to put a clear-screen and a remark to hide the activity "behind" the scenes while CALC collects the data for later display. Mine looks like this:

```
H        ;header
P1
X32
B... WORKING ...
E
```

Notice that I **didn't** include the P (next page) command recommended in the CALC manual for terminating this section. While playing with it, I also noticed that the Ci command (to position the cursor to column i) isn't always reliable right after a clear-screen. That's the reason for **spacing** over with the X command.

Finally, the summary section of the report is where the information I'm after is displayed. Because of the comparatively long delay between starting the report program and the summary's display, I embedded the terminal bell in the report to tell me when processing is complete. And I used reverse video to highlight some of the information. Sections of the summary appear as:

```
S        ;summary
P1
P4
N2
X5
P2
B--- Summary of STAUNCH.DTB ---
P3
N2

    .   .   .

P2
BPercent. of those for '90
X6
P3
B:
A3*5/7.1
B%
N

    .   .   .

E
```

As you may infer, with the exception of clearing the screen, terminal codes work just like printer codes. The only thing you must beware of is that these aren't sent to your printer. Not that damage necessarily will occur, just the results will be highly unpredictable. An AUTOPRO file is a convenient safeguard in this situation.

Why, then, doesn't it know enough not to Timestamp files on HDOS 2 disks? (HDOS 3 authors, are you listening?)

=====

A Very Welcome Mod for HUG's HSORT Utility
by Hank Lotz

HSORT is a very fast, in-memory sorter, and although it can't sort files larger than memory it's a great value for the price! But in my initial stages of working up the index for issues 1 to 9 of **The STAUNCH 8/89'er**, I let HSORT put the index in alphabetical order for me and I met with a slight "gotcha." You see, some of my entry words were **all** capital letters, and some had lowercase in them. Since HSORT sorts things according to the ASCII table, all capital letters come before all small letters. For example, a capital "Z" would be put **before** a lowercase "a". Not what I needed! (In fact, I have yet to **imagine** a good, legitimate use for HSORT's priority handling of caps.) Now, as it happened, the assembly-language source was supplied right on the HUG disk, so I thought I'd see if I could touch it up a bit **without** having to unravel its Shell-Metzner sort algorithm. And (voila!) it turns out this **is** possible!

Do you run CP/M or HDOS? I gather from the HUG literature that the HSORT utility originally appeared on an HDOS disk, HUG Part No. 885-1044[-37]. The CP/M version was done by Pat Swayne and is available on CP/M UTILITIES DISK I, HUG Part No. 885-1212[-37]. (As always, the square brackets mean you can omit the -37 and get hard-sector.) Therefore, since both HDOS and CP/M versions are available, and since I managed a simple fix for the problem, someone with the HDOS version should be able to apply the same principle I show here for my CP/M.

Before we look at the solution, here's an example to clarify the exact nature of the problem. Suppose you have the following file to sort into alphabetical order:

```
        ZEBRA
        groundhog
        CANARY
        yak
        canary
        WALRUS
        DOG
```

Some entries are uppercase and some are lowercase. (Notice, "canary" appears twice, once in lc and once in uc.) If you want to sort this list **without** regard to uppercase or lowercase, one **desirable** sort could be:

```
        canary
        CANARY
        DOG
        groundhog
        WALRUS
        yak
        ZEBRA
```

The problem is, with HSORT you do **not** get that! It gives this instead:

```
        CANARY
        DOG
        WALRUS
        ZEBRA
        canary
        groundhog
        yak
```

As you can see, all the uppercase entries are put in order at the top, and the lowercase entries start only after ZEBRA.

My mod, which I call HSORT2, happily **does** produce the **previous** listing, merging the lc and uc entries where proper alphabetizing calls for it -- and we now arrive at how to make HSORT2. I don't claim the most elegant method, but it worked when I needed to get the job done. Make these changes to a **copy** of your CP/M HSORT.ASM assembly-language source, and you shall have HSORT2.ASM.

First, add these lines to the **very beginning** of your **copy** of the file, so you'll know it's the changed version. Also, then, you'll have the **description of what it does**, you'll have a memo of **how to find all code differences** in the listing, and last (and alas, least) my name will be in your copy giving me credit and recognition for my hard labor!

```
; *** HSORT2: MOD TO IGNORE WHETHER UPPER OR LOWER
; *** HSORT2: CASE.  BY HANK LOTZ.
; *** HSORT2: ALL CODE CHANGES CONTAIN "HJL" IN
; *** HSORT2:   THE COMMENT FIELD.
```

Next, locate the label COMP: in your source. Compare the following code to your source to know what to insert:

```
COMP: INX    H         ;C = LENGTH OF SHORTER STRING
      INX    D ;HL & DE POINT TO STRT OF LABL STRNGS
;
      MOV    A,M        ;HJL (COPY CHAR TO THE A REG)
      CPI    97         ;HJL (IS 'a' > A REG?)
      JC     MUPC       ;HJL (YES, GO TO MUPC)
      CPI    123        ;HJL (NO,THEN IS 'z'+1>A REG?)
      JNC    MUPC       ;HJL (IF NOT, GO TO MUPC)
      SUI    32         ;HJL (YES,CNVRT LC COPY TO UC)
MUPC: STA    MCHAR      ;HJL (STORE OUR COPY OF CHAR)
;
      LDAX   D
;
      CPI    97         ;HJL (DITTO FOR COMPARE CHAR)
      JC     AUPC       ;HJL
      CPI    123        ;HJL
      JNC    AUPC       ;HJL
      SUI    32         ;HJL
AUPC: SHLD   MTEMP      ;HJL (STORE HL REG AT MTEMP)
      LXI    H,MCHAR    ;HJL (POINT TO COPY OF CHAR)
;
      CMP    M          ;COMPARE STRINGS
;
      LHLD   MTEMP      ;HJL (RESTORE HL REG)
;
      JNZ    NOMACH     ;IF NO MATCH
```

Finally, find the area around STAK near the end of the source. Adding two lines will make it read as follows:

```
        DS    128
STAK    EQU   $
MCHAR:  DS    1     ;HJL (TO STORE M BYTE)
MTEMP:  DS    2     ;HJL (TO STORE HL REG)
DFCB:   DS    33    ;DESTINATION FILE NAME
```

Save your new source under the name HSORT2.ASM. Assemble and LOAD it. The finished product is HSORT2.COM.

The job is done, but I have some miscellaneous closing comments:

To eliminate possible confusion let me point out that, in my example with the animal names, it was not really necessary to use **all** capitals in those four uppercase words. It would also have provided a good demo if we capitalized only their first letters.

By now, you may have observed how my routine works. It forces each sort comparison of two **letters** to be done at the uppercase level regardless of the actual case of either letter. It checks to see if the byte copied into the A register is a lowercase letter before converting to upper-case. The conversion is done by subtracting 32 (decimal) from the character. I used care when writing this test because if the byte was other than a **lowercase letter**, subtracting 32 could not give uppercase, but would substitute a wrong symbol or numeral.

As I tried to imply in the comments, my lower-to-upper case-conversion will **not** appear in the sorted output file, nor will it alter the input file. This is because the conversions are done only to memory **copies** of the characters being compared.

If you ever need case-insensitive sorting you'll probably wonder what you would have done without HSORT2. Unless maybe you run SuperSort or something?

=====

VENDOR.UPDATE

ARKAY Engravers. James Schmidt (Sunnyvale, CA) enquired about the current address of this company that "makes custom key caps [for the '19/89/90] in small amounts and used to advertise in **Sextant** and other H-89 related journals." Shortly thereafter, he send the new address:

Ken Kaplan / ARKAY Engravers / 10-3 Drew Court / Ronkonkoma, NY 11779

HUG Software. The national HUG is running its almost "traditional" fall software sale again. Pricing is 30% off through the end of November. Though **REMark** no longer supports us with articles (except on a very occasional basis), HUG remains a valuable software source for both CP/M and HDOS (see Hank Lotz's patch for HSORT elsewhere in this issue). Check it out at:

HUG / P.O. Box 217 / Benton Harbor, MI 49022-0217 / 616-982-3463

Three Other Newsletters. Prompted by Al Bjorling (Melville, NY) and a later nudge from Lee Hart (Dowagiac, MI), I brought another newsletter (almost a magazine) to your attention last issue (p. 4), **The Computer Journal.** As I mentioned there, I

hadn't heard of it before, so I sent a check to get a subscription going and ordered a bunch of back issues in the process. Like **Staunch**, **TCJ** is bimonthly, but in size it runs over 40 pages per issue. And though there are MSDOS articles, most of its pages are devoted to advanced CP/M and programming topics. In past issues, it's had articles on assembler (including one on the Z80 by Lee Hart), C, FORTH, and Turbo Pascal. Interesting to me has been the coverage of ZCPR and ZSDOS, CCP and BDOS replacements (respectively) for CP/M. CP/M for the '8 and '89/90 is becoming much harder to get and I think a system built from the above components, combined with Heath/Zenith's BIOS (as suggested by Pat Swayne in issue #12), is definitely worth considering. If someone out there is working on this, please let me know!

But returning to my topic, I'm impressed by both the content and quality of **TCJ**. It was also refreshing to see commercial ads for 8-bit hardware and software, though none were specific to H/Z. If you have an interest in programming and advances beyond plain-jane commercial CP/M 2.2, I recommend it. Subscriptions are $16/year domestic, $22 in Canada, and $24 for overseas (surface). Most back issues are also still available. For subscriptions or more information, contact:

Art Carlson, Publisher / **The Computer Journal** / 190 Sullivan Crossroad / Columbia Falls, MT 59912 / 406-257-9119

A second newsletter I recently began taking is **The Z-Letter**, published by Alpha Systems of San Jose, CA. This is something of a house-organ and specializes in Z-System CP/M and Turbo Pascal. (As I noted in issue #11, Alpha Systems has assumed distribution and support for Borland's Turbo for CP/M.) The only issue of **The Z-Letter** I've received so far (#4) is half the size of **TCJ** and includes information on vendors for some of the other, off-brand CP/M machines, but nothing specific to H/Z. I found it less impressive, but this issue also appears to have been something of a rush job. Anyway, subscriptions are $24 for 12 issues. To subscribe or get more information, contact:

Joseph W. Wright / **Alpha Systems Corp.** / 711 Chatsworth Place / San Jose, CA 95128 / 408-297-5594

The third newsletter, **Algorithm**, is brand-new and edited by A.K. Dewdney, writer of **Scientific American**'s "Computer Recreations" column. This is a **very** slick publication and its intent is to encour-age programming by both beginners and professionals through emphasizing the **algorithms** behind programming. This first issue has articles exploring "hailstone" numbers in BASIC, the interior of the Mandelbrot set, and artificial life. But be warned that this newsletter is considerably more "generic" than the two described above; I expect to see quite a bit which is specific to MSDOS systems. And though bimonthly, it also costs much more, partially because of where it's published. Subscriptions are $29.95 (U.S.), $35.95 (Canadian), overseas add $4. For more information or a subscription, write:

Algorithm / P.O. Box 29237, Westmount Postal
Outlet / 785 Wonderland Rd. / London, Ontario /
CANADA N6K 1M6

Advanced Turbo Pascal Book. One of the things
I've managed to locate for you was a source of a
book on Turbo Pascal that I bought several years ago
myself. It's worthwhile because it's one of the few
still available which contains material specific to
the last CP/M version of the language, 3.0. The
title is **Turbo Pascal Advanced Applications**,
edited by Judie Overbeek (one of the staff of **The
Computer Journal** coincidentally), and published by
Rockland Publishing, formerly of Columbia Falls, now
located in Kalispell, MT. Though it includes MSDOS
material, I strongly recommend it.

In brief, the topics covered relevant to CP/M
are: optimization methods, tools at the system
level, library management, command-line arguments,
binary search, data compression, and linked lists.
But in my judgment, the most important chapter is
that on dealing with CP/M memory. Techniques are
discussed by Dennis Hamilton for controlling the
size of the TPA a program uses and dynamically
allocating space for the heap. Though relatively
short, this chapter alone is worth the price of the
book. There's also, as you would expect, a lot of
code here.

And the price is even less than when I bought
it. While supplies last, you can order it for $10.00
postpaid (add $2.50 for foreign surface mail; Visa
and MasterCard also accepted) from **TCJ**. The address
and phone are given above. And when you order, be
sure to mention **Staunch.**

Horn Engineering. [From Charles Horn, **Horn
Engineering Associates**, 1714 Patricia Lane,
Garland, TX 75042] "...[W]e have a couple of HDOS
software products that we wish to release to the
public domain; namely our Epson MX-80 device driver
(that displays current settings in the HELP screen)
and the software support for our 1K Low Memory Kit
for the H-89, as mentioned in the **Sextant** #19
article [Nov-Dec, '85, 'A Software Clock for HDOS'].
If you have any ideas about how we might get these
products into circulation, please let me know. [I've
already volunteered **Staunch**'s services. -Ed.] I
really believe that vendors who have old 8-bit
products that have run their commercial course
should release them and at least derive some PR
benefit from them. It might be that some software
authors have been poorly rewarded for their efforts
but I believe that, by and large, most of the
hobby-level users have been about as fair as their
pocket-books would permit.

"We have discontinued the manufacture and
support of our 8-bit products, without any regrets
or complaints. We did not accumulate any wealth from
it (and did not expect to), but it has been a lot of
fun. The 8-bit spirit, and at least the 16-bit
spirit that came with the Z-100, has not been
replaced by anything in the PC world. We intend to
keep our 8-bit capabilities for a while and use them
in a profitable way, if possible. We are available
to perform limited disk production or format
translation, and can still produce dual format H-17
HDOS and CP/M disks (this might be a lost art, with
its origins in HDOS 1.6).

"We still have a limited supply of bare pc
boards (without parts) for our H-89 hardware clock
board as described in **Sextant** #27 [Mar-Apr, '87,
'Build a Clock/Calendar for Your '89']. We will ship
a board and a dual format HDOS-CP/M software support
disk (H-17 hard sector only), postpaid, for $14.95.
We can not ship and handle for less than this."

SIG/M. A number of you have complained to me about
problems with order filling or even simple
correspondence with SIG/M, the p.d. CP/M software
source, and its box in Easton, PA, that I gave in
issue #9 a year ago. Reader Al Bjorling recently
sent me an extended blurb written by SIG/M's
distribution coordinator, Robert Todd, Jr. In it,
Bob mentions that that box has now been closed! I
received confirmation of the fact from Terry Hall a
few days before Al's information arrived. According
to Bob Todd, the primary reason for the closing was
SIG/M's poor support (training and otherwise) for
the person supposed to pick up and process the mail!
But the nation-wide distribution **network** still
seems to be in business and SIG/M is trying to get
its act back in order. I **don't** think SIG/M is going
under. Rather, personnel changes are creating
difficulties for the group. And I'll keep you
posted.

Bull Buys ZDS. Heath Co. has changed hands, again!
(About the time I bought my "Neanderthal" from
Heath, Zenith bought Heath from Schlumberger, Ltd.)
You probably read or saw news reports of the sale of
Zenith Data Systems to Group Bull, based in Paris,
France. I read some brief reports in my local
newspapers (and saw an announcement on the PBS TV
program, "The Computer Chronicles"), but Lee Hart
sent fuller coverage from one of his sources. And
Henry Fale gave extensive coverage to it in **H-SCOOP**
#116. After surveying this information, I think that
this is the best move possible for Heath and ZDS.
Bull manufactures and distributes mainframes and
minis mainly in Europe and the acquisition of ZDS is
certainly a significant addition to its line of
computing equipment.

On the other hand, Zenith Electronics plans to
continue with its consumer electronics and tele-
vision business. And I'm not the only one who thinks
that this could well be the death rattle of
America's last TV manufacturer. Mainly because Japan
and even Europe already have such a lead in high-
definition TV (HDTV), the future of that medium. I
wish Zenith lots of luck, but won't hold my breath.

Anyway, things are looking up for Heath. I think
the quality customer service and documentation which
Heath had a excellent reputation for when I bought
my '89, but Zenith downplayed over the past decade,
will return. And though we owe considerable grati-
tude to Heath for its past support, our situation
still remains substantially unchanged: we have to
support each other to get the most out of our '8's
and '89's.

Hard-Sector Disk Suppliers. Last issue I in-
cluded some information I gleaned from Lenny Geis-
ler's **SEBHC Journal** on a supplier of bulk
diskettes. When my own supply of hard-sectors
dropped low enough, I called the phone number in
Skokie, IL, he provided and was told I had the wrong

number. Then I asked directory assistance for the number of the contact person at the address Lenny gave, but struck out there, too. So I ordered from Lyben Computer Systems in Troy, MI.

But wouldn't you know, a couple days later I received a tear-out page from **Vulcan's Computer Buyer's Guide** from Bernie Waltuck! The ad on it was from an outfit in my own backyard, **Midwestern Diskette** of Creston, IA. I called and talked with Gary Riley to confirm the ad's contents. And the upshot is that Midwestern sells bulk soft- and hard-sector for prices ranging from 31 to 38 cents apiece for the former, 46 to 51 cents apiece for the latter, depending on quantity. The breakpoints on the last are 50, 100, and 500. Branded disks can also be had from there for less than 60 cents apiece and the prices on bulk or branded 8" disks also appear to be extremely reasonable. Midwestern sells ribbons for a slug of popular-model printers, too.

The company accepts plastic, but using a credit card **may** incur a surcharge. There's a $5 fee for any order under $30. Shipping also struck me as a bit steep: $3/100 disks (or fraction) continental; $9/100 to APOs, FPOs, AK, HI, PR, and Canada. The same shipping charge applies to ribbons in quantities of a dozen. But the prices are the best I've seen. Contact:

Midwestern Diskette / 1301 Clayton Rd. / Creston, IA
    50801 / Nat'l: 800-221-6332, IA: 800-332-3035
=====

Retrofit the H89/H77 for Double-Sided, 96-TPI Drives
by Whitham D. Reeve

If you have a Heath H89 computer with the add-on H77 dual disk drive system, you can easily and inexpensively upgrade your system to double sided, 96 tpi (tracks per inch) disk drives. These drives have a formatted capacity of 640 kBytes each, so a dual drive system converted according to this article will have over 1 MegaBytes of capacity. This is a four-fold increase over the 48 tpi Siemens FDD100-5B (Heath H17-1) drives, which are usually installed in the H77.

The conversion I describe in this article modifies the H77 dual drive system only. When completed you will essentially have an H37 equivalent, which was the Heath version of the high capacity drive system. The internal drive in the H89 is left unchanged, although it is possible to install a 96 tpi drive internally if you have material to shield the drive. For awhile Heath sold a shielding kit, but I won't cover that here. [See Lee Hart's offer in issue #13, p. 6, for an alternative. -Ed.]

A soft-sectored disk controller (Heath Part No. Z-89-37 [or equivalent -Ed.]) is required as well as one or two Tandon TM100-4 drives (Heath called them H-17-4). If your system is not already equipped with this controller, you will have to find one as well as replacement chips for the ICs in positions U516, U518, and U55 on the CPU board. The replacements are Heath P/N 444-83, 444-84 and 444-61, respectively. You should also replace voltage regulator U101 with a 78H05 or 78T05 (with heat sink) and install heat sinks on U102 and U103. When doing work on the power

supply, replace the Molex connections with solder joints. You will also need CP/M Version 2.2.03 (or later) or HDOS Version 2.0 with updates (or later) for Z37 disk drives. Finally, I assume you have the original Heath documentation that came with the H89.

The Tandon drives are available from many sources. When I made this original conversion back in 1980 or so, I paid $350 each. I saw a recent mail order advertisement for $50 each. Heath use to sell the drives for $550 each. The Tandon drives are plug-in and mechanically interchangeable with the Siemens drives.

Installing the Soft-Sectored Controller. Although installing the new controller is straight forward and only takes a few minutes, the instructions originally supplied by Heath for configuring the various programming jumpers and connectors may not be completely clear. I have provided some supplementary information below that should clear things up.

Start by configuring your internal drive. Assuming you do not attempt to install a 96 tpi unit here and will continue to use the original 48 tpi unit, configure it as desired for soft-sector or hard-sector.

If you want a hard-sectored internal drive, connect the existing hard-sectored controller (H88-1) to the internal drive with cable P/N 134-1074. This is the short cable supplied with the soft-sectored controller. Set the programming plug on the internal drive for Hardware Unit 0 by opening DS1, DS2, and MX pins. The DS3 and HS pins must remain shorted. I just bend the pins up on one side of the programming plug rather than cut the programming straps. See Table 1.

If the internal drive is to be soft-sectored, connect it to the top connector (P3) of the soft-sectored controller with cable P/N 134-1074. The bottom connector (P4) goes to the external drives via the back-plate with cable P/N 134-1163. Option the programming plug on the internal drive according to Table 1 for the hardware unit of your choice.

Program the soft-sectored controller as follows: if the internal drive is hard-sectored, set drive programming jumper on the soft-sectored controller to J6. If the internal drive is soft-sectored and it is to be Hardware Unit 0, set the drive programming plug (on the soft-sectored controller) to J4; otherwise, set this plug as required to the desired unit as shown in Table 2. Be sure to set the programming plug on the drive according to the desired hardware unit as shown in Table 1.

Set a plug at position J3 to "1" and plugs at positions J1 and J2 to "170". These plugs set precompensation and port location for the soft-sectored controller. Table 2 summarizes the programming plug positions on the controller.

Finally, set switch SW501, section 4 on the CPU board to "1" if the primary drives will be the ones connected to the soft-sectored controller. If the primary drives will be hard-sectored, this switch should be set to "0". When the switch is set to "1", the soft-sectored drive designated Hardware Unit 0 will be the primary boot device. When SW501-4 is set to "0", the hard-sectored drive will be primary and the soft-sectored drives will be secondary. See Table 3.

Disk Drive Installation. Remove the existing Siemens drives from the H77 by removing the four mounting screws on each device. Set the programming plug on the new Tandon drives as shown in Table 4. Refer also to Table 5 for pin designations. Note that DS0 (Drive Select 0) on the Tandon drive is the same as DS1 on the Siemens drive. Similarly, DS1 and DS2 on the Tandon drive are the same as DS2 and DS3 on the Siemens drive. Keep this in mind when setting the plug for your specific application.

Install the Tandon drives using the hardware previously removed and connect the signal and power connectors. The Tandon drives should be mounted with the drive activity LED on the front panel set to the lower right-hand corner (printed circuit board on the left when facing the drive). Be careful not to disturb any of the connections on the printed circuit board and check that the pins at position P7 are not bent and shorted.

Testing. To adequately test the new 96 tpi drives, you will need double-sided, 96 tpi disks. The following assumes that the drives (or drive if you only installed one) in the H77 cabinet are secondary drives (SW501-4 set to "0"). If your new drives are primary drives (SW501-4 set to "1"), boot in the normal way.

With power on all equipment, insert the soft-sectored Diagnostic Utilities disk supplied by Heath with the controller [and available from **Staunch**; see the software list in issue #11 -Ed.] into the new drive that is designated Hardware Unit 0. Press "B" and "S" for Boot Secondary drive. If your new drives are primary drives (SW501-4 set to "1"), just press "B" for Boot. Alternately, these tests may be run by using the TEST37 program supplied by Heath with the HDOS 2.0 update.

The LED on the drive should come on and in a moment you will be asked to select option "1" Disk Controller Checkout or "2" General Drive/Controller Checkout. If you just installed the controller, run option "1"; otherwise, select option "2". Option "1" is used to confirm that the soft-sectored controller can actually access the drives.

When you select option "2", you will be presented with another list of options. Select option "F" for Format Disk and proceed as instructed to format a test disk. When the test disk is formatted, select option "T" for Display Drive Rotational Speed. Perform the speed test for both drives and adjust them if required.

Next, select option "S" for Perform Seek Time Checkout. This test takes a few minutes. Your new drives should test successfully down to 6 milliSeconds (6 mS), which is the fastest step time available from the diagnostic utility.

Finally, select option "D" for General Drive Checkout. This test takes several hours and should be performed on both drives.

If all tests are successful, put the cover on the H77 cabinet. You are now done with the conversion.

Some Additional Information. The 96 tpi drives will read soft-sectored disks that were made from the Siemens 48 tpi drives, but will not write to them. You will get the usual cryptic error messages if you attempt to write to a 48 tpi disk when it is

in a 96 tpi drive. This is not a problem because the individual files on a 48 tpi soft-sectored disk can be transferred to the 96 tpi disk.

If you use CP/M you can configure each drive to its optimum step time. The guaranteed step time is 6 mS for the Tandon drive used in this conversion. The step time is 30 mS for the Siemens 48 tpi drive. With HDOS all drives are set to the same step time; therefore, if you use a soft-sectored 48 tpi drive with the 96 tpi drives (under HDOS 2.0), the step time must be set to 30 mS to accommodate the slower drives. Faster step times may be possible with individual Siemens drives, but proceed with caution if you want to set the times faster than 30 mS.

Also, the original Heath documentation for the Z-89-37 controller mentioned that 48 tpi drives should not be connected to the same controller as 96 tpi drives due to pre-compensation differences. Actually, this only applies to Wangco 48 tpi drives shipped with very early units. So, unless you have Wangco drives, don't worry about it. Siemens 48 tpi and Tandon 96 tpi drives are compatible with respect to pre-compensation--neither type require it.

If you run into problems with the soft-sectored controller or the 96 tpi drives, work backwards. That is, set up the soft-sectored controller for use with the original 48 tpi drives, which presumably were working okay before the conversion. If they do work okay, then the controller is okay, too, and the problem is with the 96 tpi drives--probably the programming plug. Also, be sure to check all jumpers and switch settings on the CPU. The original Heath documentation will adequately tell you how these should be set up.

After I made this original conversion many years ago, I discussed it with a Heath customer service representative. He told me that Heath originally replaced the Siemens drives with the Tandon drives exactly as described here, but later models of the H37 had additional ventilation holes in the cabinet. I checked my drives after they had power on them for over 24 Hours and noted no unusual problems with heat. In fact, the cabinet runs quite cool. If you are in doubt, just drill more ventilation holes in your cabinet.

Table 1
Internal Drive Programming Plug
("X" means open, "-" means shorted)

Config.	Unit	HS	DS1	DS2	DS3	MX	Blank	Drive Conn. to
Hard	0	-	X	X	-	X	-	H-88-1
Soft	0	-	-	X	X	X	-	H-89-37,P3
	1	-	X	-	X	X	-	H-89-37,P3
	2	-	X	X	-	X	-	H-89-37,P3

Table 2
Z-89-37 Controller Programming
("X" means open, "-" means shorted)

Internal Drive

Unit	J1	J2	J3	J4	J5	J6	J7
0	170	170	1	-	X	X	X
1	170	170	1	X	-	X	X
2	170	170	1	X	X	-	X

Table 3
CPU Board Programming, SW501-4

Primary Boot	SW501-4	Secondary Boot
Soft (Port 170)	1	Hard (Port 174)
Hard (Port 174)	0	Soft (Port 170)

Table 4
Tandon TM100-4 Programming Plug
("X" means open, "-" means shorted)

Unit	HS	DS0	DS1	DS2	DS3	MX	Blank
0	-	-	X	X	X	X	-
1	-	X	-	X	X	X	-
2	-	X	X	-	X	X	-

Table 5
Tandon Programming Plug, Pin vs. Function

Pins	Function
1-16	HS
2-15	DS0
3-14	DS1
4-13	DS2
5-12	DS3
6-11	MX
7-10	Blank
8-9	HM*

* Note: The programming plug does not occupy this position (there is always an open circuit between pins 8 and 9).

=====

MISCELLANY

Doubling Hard-Sector Capacity. If you were observant, you may have noticed the **additional** disk format I can now handle described in the last two issues' software listings. This is **double-sided**, 48-tpi hard-sector. I "came into it" by the back door, so to speak. The disks on which Mark Hunt supplied the HDOS FORTRAN libraries listed in #13 were exactly this format. At the time of their receipt, I couldn't read them! But I had a pair of half-height, double-sided, 48-tpi Shugart SA455-3AA drives that were running off a **soft-sector** controller from a spare machine. So I decided to apply these to the problem.

Installation was comparatively easy: pull out one of the old Siemens I had in an external cabinet, install drive select jumpers (so, in my case, one of the new drives was the **third** hard-sector unit), and physically mount the two half-heights in place. I also picked up a crimp-on cardedge connector to hook the third drive to the ribbon cable. One thing I **almost** muffed was installing this connector; fortunately, pin one is clearly marked on the Shugarts and the connectors already on the ribbon cable and I used this as a guide. After the physical process came system software configuration.

Unfortunately, neither "off-the-shelf" HDOS 2.0 nor Zenith's CP/M's will recognize double-sided hard-sector drives. In the former case, I had the foresight some years back to buy the UltiMeth DK device driver from HUG (885-1121). (This driver can also be had from Quikdata as part DKH17.DVD for $40; HUG is somewhat cheaper, particularly during its

current sale.) It supports double-sided **and** 48- or 96-tpi drives and as an extra bonus circumvents the dependence Heath's original had on the system's 2 MHz clock. (This driver will run at 4 MHz without modification.) Installing and then configuring the driver with SET is easily accomplished. In other words, quick as a flash, I was able to read and copy Rick Lutowski's FORTRAN libraries that Mark graciously supplied.

But CP/M is a somewhat tougher nut. If you're running Zenith's 2.2.03 or 2.2.04, you **must** purchase an upgraded BIOS. (Ver. 2.2.02 **only** supports standard hard-sector.) This is available from Quikdata as Livingston Logic Labs' BIOS-80 V5 and costs the same $40 as the HDOS driver. Again, this supports double-sided and 48- or 96-tpi drives and automatic sensing of system speed (2 or 4 MHz). I don't have this product, but from all I've heard, I highly recommend it. Installation is covered in the documentation and BIOS versions on disk support both hard- and/or soft-sector (H/Z-37) drives. Source code is also supplied if you need to configure a custom edition.

The reason I don't have LLL's BIOS-80 is because my principal CP/M system is Magnolia Microsystems' version 2.24. It directly supports double-sided and 96-tpi hard-sector. If you have this implementation, after hardware installation, you should boot and reconfigure the system with SETUP, MOVCPM, and SYSGEN so it will recognize the higher-capacity drive(s). First, if this is an additional drive (as mine was), you must assign the logical/physical unit. Call SETUP and move the cursor down to "SET LOGICAL/PHYSICAL DRIVE ASSIGNMENTS" with the down-arrow on the keypad and press return. To revise the assignment table that is now displayed, all you will usually have to do is **increment** the number of the last physical hard-sector drive number by one and place this new number in the first unassigned slot. Now press the <BLUE> function key to patch MOVCPM. If you are only **replacing** an existing drive, you can ignore this step.