

**PORT TO PORTAL -- Editorial****ABSOLUTELY, POSITIVELY, READ ME FIRST!**

Amongst some people, it's customary for an individual celebrating a birthday to give gifts to his or her **guests**, rather than the other way around. Such is the case now, as **Staunch** observes its second anniversary. Because all the news is exceptionally good, I'm fair bursting at the seams to tell you about it!

First, the circulation building campaign I mentioned last time is going quite well. Though we haven't yet reached my goal of 500 subscribers, I fully expect to achieve it by the end of the year. So I would like to thank those who have helped, specifically, Lee Hart (of TMSI), the national HUG, Peter Shkabara (of Anapro Corp.), and Dave Powers (of Generic Computer Products). Without their assistance, the campaign would not have been as fruitful as it has. You might just write them--addresses for the first three are well-known, but you'll find a two-page ad from GCPI in this issue's insert--to thank them for supporting **Staunch** and, by extension, you. Because the dramatic boost in circulation means something else.

That is that this "rag" becomes **bimonthly** in January! Yes, you'll receive two more issues per year next year. Further, it will appear about the middle of the first month in each two-month period. Now this **will** entail an increase in our subscription rate. That rate will be \$12 per year (overseas please add \$4 for **air mail** postage). But before you dig out your checkbook or perhaps groan about inflation, let me proceed to my third point.

Which is that you are entitled to a **premium** if you renew **before** 31 December. In fact, you can select **exactly** what you want as your gift (no unwanted or garish neck ties, here) while **Staunch** celebrates its second! Your options are:

- 1) a '19/89 terminal escape code and graphics symbol reference chart, formerly sold commercially by Studio Computers as "THING" or
- 2) **any** item of public domain software in **Staunch's** growing library.

The only packages specifically **excluded** from this offer are Skip Chambers' OMDOS, described in issue #'s 6 and 7, and Rick Streeter's HDOS 3.0 Enhancements, covered in this issue's insert. The reason, of course, is that these aren't public domain. And if you should settle on the software, be sure to specify the disk format you require. Just make sure you look over the lists in this and earlier issues. You'll find some real goodies, including the crown jewel in my collection, Lucidata Pascal for HDOS and CP/M, recently released by Larry Reeve of Polybytes.

And you'll find one other bonus for those of you new to HDOS in this issue's software list. Heath has put the manual in the public domain, as well as the source and object code. (I've heard no word, yet, on when the latter will become available.) But I've commissioned Dan Jerome to key in the manual. He and John Toscano (members of SMUGH) are supplementing it and the first two chapters can now be ordered from me. So check the insert. A chapter of this material **also** qualifies as a premium for your renewal!

Further, to give you an idea of what you can relish on these pages early next year, the insert for #10 will be filled by a complete and detailed index to **Staunch's** first two years. Dan Jerome also returns in January, instructing us on floppy drive maintenance. And Lee Hart will present a program for doing **fractals** on the '19/89 terminal in #11. I've been intrigued by these images since reading Ed Byrnes' article in **Sextant** #23 (Jul/Aug, '86), but

my adapted MBASIC program painted the screen like a snail. Lee's runs like a rabbit!

Anyway, now is the time to send your renewal and select your premium. If you have something you would like included in the next issue, the deadline is the 15th of December.

I also have four observations for those of you who are new to these pages. The first is a hearty **welcome**. Second, I should note that, unlike most other publications, a subscription to **Staunch** is based on the **calendar** year. In other words, it runs from January through December and **everyone** renews at the same time, now. Thirdly, if you might be interested in writing for this newsletter, making some money on the side, write and ask for my author's guide. Lastly, if you have some software you would like distributed internationally--yes, that's right, internationally--let me know. Hank Lotz, creator of this rag and currently contributing editor, noted in a recent letter to me that **Staunch** is becoming "the software place." Although somewhat accidental, this is another service **Staunch** provides to its subscribers. Indeed, the library is growing enough that I'm considering doing a catalog early next year. So I would, by all means, like to hear from you!

But as you can see, **Staunch** is celebrating its second birthday in grand style. And we have something to look forward to, as well. **Next year is the year of the '89!** What more could an old, devoted, **staunch** 8-bitter ask for! To say nothing of the year after...!

-- Kirk L Thompson

**THE EIGHT-BIT R/W -- LETTERS****New-reader input**

[From Tom Jones, Silver Bay, NY] I am new (this year) to the H-89. (It took me a long time to finish the correspondence course thru which I built my rig.) As a neophyte it is gratifying to me, and I'm sure to many others, to learn that you and guys like Lenny Geisler (who prepares and publishes the **SEBHC Journal**) are spending the time and effort to help those of us who feel that we do not have the latest and greatest in computer power.

A particular thanks goes to the authors who write those very helpful and informative articles and to the vendors who continue to support our favorite hardware.

Keep the faith on the '89.

[From William H. Johnson, 7404 Demica Place NE, Albuquerque, NM 87109] I have an H89 computer and I know what you mean [on your promotional postcard] about hard to find information [on the '8 and '89]...

I also have an H8 computer with terminal and some additional cards, 16K expansion boards, and hard sector controller. If you know of anyone that wants an H8, please let me know.

I am also interested in a Z67 Winchester Disk System....

**SUPER19 ROM**

[From Dan Jerome, 801 E. 132nd St., Burnsville, MN 55337] [H]ave you ever heard any reports from anyone as to how the SUPER19 ROM set works out? I have a set of these ROMs but have never installed them because I am afraid that they might cause some problems to any software that you might wish to run on the computer. [I have no direct experience with this terminal ROM chip set, so can anyone help Dan out? -Ed.]

**The ROOTS of genealogy**

[From Robert Benson, Huntington, NY, for Roger

Dubois, Longueuil, Quebec, Canada] I've had a copy [of ROOTS/89] since 1981, and received an update in 1984. It worked well but I ran out of time and haven't finished putting all the data I've collected from the family. I hope to return to the task soon.

The program was obtained from:

COMMSOFT  
665 Maybell Avenue  
Palo Alto, CA 94306  
415-493-2184

One doesn't know if they are still extant, however.  
Another reference might be the

Roots Users Group  
P.O. Box 2246  
Woodbridge, VA 22193-0246

I last heard from them 28JUL86. They were a good source of information for ... ROOTS/89 users...

I hope the above is of some help....

### Last call on '89 hardware!

[From Dan Jerome, Burnsville, MN] ...I would suggest that you might want to issue in **Staunch** a "last call" on some H89 hardware. I just received a letter from Dave Brockman of FBE [Research, 11648 Military Road S, Seattle, WA 98168] that he is down to just a few Spooldisks and has dropped the price of them to \$55. Also, TMSI [see the ad in the last issue -Ed.] is still offering soft sector cards and if anyone wants them they better order one while the getting is good. The price of blank hard sector disks is going steadily higher and higher. At this time they cannot compete with the rather low costs of the soft sector disks. Also Henry Fale [Quikdata, P.O. Box 1242, Sheboygan, WI 53082-1242, 414-452-4172] has a few ANAPRO 2/4 MHz speed mods and keyboard repeaters. When these are gone, that's all she wrote. The end of hardware products being easily available for the H89 is in sight.... [Thanks for the warning, Dan. **Staunch** creator and contributing editor Hank Lotz recently wrote and vouched for the quality of the hard-sector Sentinel diskettes he continues to buy from Quikdata.]

### Other CP/M anomalies

[From William S. Derby, Box 2041, Livermore, CA 94550] ...I want to ... address some anomalies of CP/M I have recently resolved...

A CP/M anomaly I discovered is similar to the one described by Hank, and by Pat Swayne on page 8 in **Staunch** #8; it causes the cursor position to be incorrect if a BDOS function 2 is used to send a carriage return when a linefeed is not desired; this capability is needed to 'overwrite' an existing line. Fortunately, the 'direct' BDOS function 6 is unaffected by this phenomenon. My further observation on this problem is that it may be caused by an oversight in the CP/M design that can be corrected by a simple patch to the BDOS; the end-of-line character is detected as a linefeed instead of a carriage return at BDOS+17AH. Simply changing the linefeed (OAH) at this address to a carriage return (ODH) seems to make the problem vanish. Unfortunately, this is embedded in the BDOS that is distributed with all versions of CP/M 2.2, but the observation may give the insight needed to understand a problem very basic to CP/M.

The other observation I want to mention is [about] Pat Swayne's CP/EM program that emulates CP/M 2.2 on an MS/DOS system. This is the best emulator of its type I have seen. Unlike the others, it handles SUBMIT files; and it handles the BDOS function 31 needed by programs that list file sizes. For BDOS function 17 also needed to list files, however, it returns the disk identifier in the field normally used to indicate the user number. To get my SD program to list files correctly with CP/EM, I had to come up with a two-byte patch to overcome this

anomaly. [Bill mentioned in his letter that he is nearly finished with yet another utility, a BCD or HEX/BCD screen editor. Keep them coming, Bill! And thanks for the info, above, as well as your contribution to this issue's **Q and A** column. -Ed.]

### More on the Z-47 controller

[From Ralph Money, Omaha, NE, via OMAHUG's QNED BBS] Unless you have the hard-sectored controller or the Z67 controller in the far right-hand slot (properly jumpered), you MUST have a 4700 ohm pullup resistor connecting pins 1 12 of P512, whether you have anything in the slot or not. (Requires modifying the Z47 controller by adding the resistor.) It is rumored that your system will not work (properly) unless this is done. The hard-sectored controller uses pin 12 of P512, but nothing else does, so the signal on pin 12 must be brought high. [Thanks for the correction to my editorial edition to your note in the last issue, Ralph. I readily concede I know nothing about the H/Z-47, except the size of the disks that go into the drives! -Ed.]

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### The Wonders of A Winchester

by Terry Hall

**Why I Took the Hard Road.** When I secured my first pre-owned H-89 in 1981 for word processing as an author of books and magazine articles, I had only the internal single-sided, 10-hard-sector H-17 drive (360 sectors [S], in HDOS or 90 kilobytes [K] storage under CP/M). With the HDOS operating system (which I use almost exclusively), utilities, and my favorite text editor/formatter combo, PIE and TEXT from Software Toolworks, I only had room for one or two book chapters per disk. With an entire book spread over multiple disks, I couldn't easily move text from one chapter to another.

Quickly tiring from swapping disks and using ONECOPY (HDOS) utility for copying disks in one drive) to make backup copies, I added an outboard pair of hard-sector drives. Now I could use DUP to easily make backup copies and input text without fear of running out of disk space, since PIE has a working file limit of about 120 sectors, but lets me save it to any mounted disk drive. BIBLE PANORAMA, my largest book, was produced with PIE on my three hard-sector drives, treating each chapter as a separate file, and using TEXT to call the files one at a time for formatting and printing. I couldn't have done it without the excellent article in **Sextant's** first issue, "Hugh Kenner and His '89: A Professional Writer Looks at Budget Word Processing." Read this article to get the most out of PIE and TEXT for any kind of writing under HDOS or CP/M.

As I wrote more, I wanted larger databases on line: all my previous writing, the complete Bible in two versions (purchased as ASCII text files), word lists, etc. I became acutely aware that dozens of disks aren't accessible unless they are actually spinning in a mounted drive. Adding the H-47 dual 8-inch drives boosted my on-line capacity almost eight-fold (from 1080 to 8888 S in HDOS; from 270 K to nearly 2.5 megabytes [MB] in CP/M)!

Now I could sort long word lists using DISKSORT (HDOS) or SUPERSORT (CP/M) and run some custom BASIC programs for creating word puzzles created by a computer wizard friend from Bell Labs. But I still kept running out of disk space. Even in compressed form, the Bible filled two 8-inch disks. The new sorting and searching programs also made me aware of my system's speed limitations. Adding Kres Engineering's DSM-240 4-Mhz mod doubled my CPU speed, but disk-intensive searching through the whole Bible still took all night!

Searching for an HDOS editor that would allow me to work with files limited only by disk space, I was thrilled to discover Steve Robbins' EDIT19 (now in public domain and available from various sources;

I'll be reviewing this premier editor in a future issue of **Staunch**). Now I could edit a whole book as one file, moving effortlessly back and forth throughout the whole. EDIT19 also lets me read to and write from any on-line disk file while editing. This new capability made me even more eager for more on-line disk space.

My wizard friend said I was ready for a hard disk (Winchester technology) and custom-designed one for me with 72 MB, boosting my disk space by a factor of 28! And the hard disk's 30 milliseconds (millionths of a second) average seek time seemed like greased lightning to me. And a pleasant surprise was the quiet working environment; no more clicking and clacking of floppy drive hardware.

Now I only use the 8-inch drives for backup storage from the winchester (WC). Formatted double-side, double density, each 8" disk holds 3904 S (980 K; choosing "E" for Extended Density when formatting under CP/M boosts it to 1208 K). I use the 5.25-inch drives for program storage (to keep original distribution disks as separate entities) and exchange with other users. Disks are cheap compared to what's on them, so I back up onto two floppies each day's work.

**Meet My Winnie.** My winchester drive is a 5.25 inch V170 (72 megabyte which formats to 60 MB) from Vertex Peripherals in a stand-alone cabinet with a super heavy-duty power supply. There's provision for adding a second drive with no additional hardware or software required.

The controller attached to the hard drive itself is a Xebec S1410 (compatible with Seagate ST-506 standard). Inside my H-89 is Magnolia Microsystems' 77320 SASI-bus interface, which includes Heath's three standard serial ports and installs in the center slot on the computer's right side in place of Heath's serial I/O (input/output) card.

I had to remove the hard-sector (H-17) controller, which electrically conflicts with my WC. But I now have a second H-90 with these disk drive controllers: H-37 (5.25-inch soft-sector, attached to two 40-track and two 80-track drives selectable by an easy cable switch), H-47 (8-inch Remex), and H-17 (5.25-inch 10-hard-sector attached to three drives in a separate cabinet). Thanks to Anapro's EMULATE program, I can read and write to most 8-bit formats. Anapro's CPC program also lets me read, format, and write in 360 K MSDOS 5.25-inch format.

Sigmasoft and Systems' WC card mounts in one of the H-89's left-hand expansion slots and contains the equivalent of the Z-37 soft-sector controller, freeing two right-hand slots. Hence, what I have housed in two computers could be in one if I had this WC system.

After installing the WC, the H-19 terminal became the slow link in my system. That was solved by installing TMSI's Superset (including Superfont and Superclock). My terminal now runs at 38,400 baud with no flicker or flecks--and even has windows!

**Software for Hard Drives.** I use the Quikstor WC driver and associated utilities from Henry Fale's Quidata, Inc. The HDOS software was developed by Dean Gibson (Ultimeth Corp.) and the CP/M by Ray Livingston (Livingston Logic Labs). Both are world-class products, the latter including Ray's famous BIOS-80 and ZCPR. Under either operating system, the complete software package enables you to divide the WC into partitions, which act as separate drives.

Both Quikstor systems supports multiple WC's of multiple sizes, 2/4 MHz operation, TLB ROMs without ANSI code, H-19 and H-29 terminals. CP/M allows four active partitions (though the WC can be divided into more than that) and works with both CP/M 2.2.03 and 2.2.04, with and without ZCPR.

Thanks to Quikstor's super software and HDOS 3.0's allowance of a seemingly unlimited number of device drivers, I have 15 HDOS WC partitions (SY0:--

SY7: and SX0:--SX6:), ranging in size from 1 to 10 MB. Running the same device driver under two names gets around HDOS's old 8-drive limit. I'm currently running 16 device drivers simultaneously under HDOS 3.0! Actually more than that, since Jim Teixeira's (Softshop's) UD.DVD (universal device driver) contains 8 separate printer driver configurations within the one.

Two large bootable partitions of equal size are my main work areas, and I back up 0: to 1: for safety's sake. I have allocated each of the other partitions to a subject work area: QUERY!3 files, correspondence, articles, books, boiler plate insertions, several types of data bases, etc. It's all spinning and instantly accessible. All partitions should be bootable as a safety precaution, though I can also access any and all WC partitions when booting from a floppy.

Most programs are stored on 5 1/4" disks as distributed (and DUPed backups) and alphabetically arranged in flip-file cases. My 8" disks are similarly arranged, but according to narrowly-allocated data topics. In my case, each of the Bible's 66 books has one or more disks containing the text in different versions, questions-and-answers, crosswords, word lists, etc. Each book I've written, article series, publisher, etc., has its own disks.

With EDIT19's virtual memory processing, I have edited files up to 8 MB as one unit. Mainly because of the WC's blindingly fast disk I/O, I could move easily and rather quickly anywhere in the file.

The only disadvantage of the larger partitions is the larger file cluster size (the minimum size of any file). Appending "/ALL" to a DIRectory call shows the actual space each file consumes. My clusters range from 20 to 76 S. Hence, a lot of small files eat up disk space fast.

HDOS 3.0 has been one of my greatest productivity boons in using my WC. Bill Parrott and Rich Musgrave have brought many of MS-DOS's features to HDOS in their version 3.0! Some of PIP's 50 switches, for example, allow backup of files created on, before, or after a certain date. Or those accessed a specified number of times and of special interest to WC users is Rick Streeter's modification to allow user areas (described in **Staunch** #8 [and this issue -Ed.]). Now I can have subdirectories within one partition, grouping related work files, and "hiding" them from the main directory display unless requested.

Command files need be only in one partition or user area because HDOS 3.0 allows specified search paths, causing SYSCMD to search for commands not on the default device (or area).

HDOS 3.0 also allows sorting of directory displays in many ways. Otherwise, SD.ABS (SD = Sorted Directory) by John Stetson (public domain) is a valuable tool for WC users.

While memory chip prices have soared, WC storage device prices have fallen dramatically. If I didn't already have a WC system (which has operated thousands of hours without so much as a hiccup), I'd grab a complete WC system while they are still available from one of the following: 1) Quikdata (Henry E. Fale, 2618 Penn Circle, Sheboygan, WI 53081; 414-452-4172) or 2) Sigmasoft and Systems (Clay Montgomery, 17000 Dallas Parkway, Suite 207, Dallas, TX 75248; 214-380-6187). See ad and reduced prices in **Staunch** #8.

I recently accepted an offer for a two-week free trial of a Zenith SupersPort. It was a slow dog compared to my souped-up H-89 and WC. I quickly returned the laptop, more convinced than ever that what I have is by far the best for my needs.

Finally, I'd be happy to correspond with anyone regarding H-89 WC's, HDOS 3.0, etc. My address and phone number are 516 E. Wakeman, Wheaton, IL 60187; 312-665-4594 anytime).

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### QUESTIONS and ANSWERS

Today's entries were printed before in the **Q minus A** section. We are indebted to Brad Gjerding of Magnolia Microsystems (Seattle, WA), Brian Hansen (Killingworth, CT), and Bill Derby (Livermore, CA) for graciously supplying the info from which we took the first two answers.

**Q — On a cold bootup of an H-89 right after powerup, vast stretches of 00's and FF HEX (000 or 377 Octal) values are present in memory. How do these get there?**

**A —** These values are just how dynamic RAM tends to come up, possibly as a RAM check. You can confirm this with the "S"ubstitute command (from MTR-88 or -89) even **before** booting the H89 (but display will be in split octal instead of HEX if not using a Magnolia ROM). Use the "V"iew command for this with the MTR-90 monitor ROM.

**Q — The last byte (2 HEX digits) at the end of each record in a HEX file (output by CP/M's ASM.COM) forms a "checksum." How is this checksum byte arrived at?**

**A —** The value of this byte is the two's complement of the sum of all other bytes in the record. The sum is done modulo 256 so any carry-out of an 8-bit result is ignored. If you were to add the check byte to the sum of all the other bytes you'd get zero.

**Q — What changes need to be made when converting an HDOS assembly language program to CP/M -- and vice versa?**

**A —** To quote loosely from the documentation for HUG disk #885-1212: DISASM.COM (on that disk) can disassemble either 8080 or Z80 programs, creating a source disk file that can be reassembled. Input must be a HEX file. The thing is, you can use the IHEX utility from disk #885-1089 to make your HEX file **from an HDOS program**, then transfer that to CP/M with the HTOC utility (on #885-1212). It's then a simple matter to disassemble the HEX file with DISASM, and you have a CP/M assembly source! Unfortunately this doesn't solve going the other way, from CP/M to HDOS.

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### The Z80 Alternate Register Set

by Hank Lotz

Sometimes we're so intent upon whether we program in BASIC, or C, or PASCAL, or assembly language, or upon whether we run HDOS or CP/M, that certain wonders escape us entirely. For example, when I found out that a Z80 CPU chip contains a **duplicate set** of registers I was skeptical, as in: "You can't mean the Z80 on my very own H-89's CPU board, can you? ...Yeah?! ...Well even though the chip is **designed** that way, maybe Heath didn't actually wire the second set of registers into the circuit? ...Oh, they did?!"

What a well-kept secret! Why doesn't anybody ever **talk** about this? Maybe because CP/M (for example) so closely relates to the 8080 chip. Or maybe because so many H-8's use 8080's and we want our software "portable." Those are good reasons, but it **is** acceptable to market software that requires a Z80 if you so stipulate in your advertising. And there are a lot of Z80 computers around.

Besides, even those of us concerned about portability must agree -- having the extra registers is an exciting prospect! And it's true; they exist and they work! I tested it out for myself. Not **all** the registers in the Z80 have dups, but there are **two** accumulators, **two** flag registers, and the BC,

DE, and HL register pairs are all duplicated! To help us distinguish them, they have slightly different names. The duplicate (or "alternate", or "complementary") registers are named using the "prime" symbol, that is, BC', DE', HL', and the accumulator-flag coupling, AF'. But these names are used only in discussion. In assembly language, the register names are written the same whichever set is currently in use -- the prime symbol is omitted. And, yes, you **can** actually use these registers in your assembly-language programming. They are independent of the main register set. It is just like having more registers at your disposal. There is only one stack pointer (SP) and only one program counter (PC).

But you are of course wondering how to get at these alternate registers. The Z80 instruction set has opcodes which select the set of registers you work with. True, CP/M uses the 8080 instruction set, and the 8080 set doesn't contain mnemonics for those critical opcodes, but we'll see how to get around that.

Specifically, there are two independent 1-byte Z80 opcodes to handle the selection of register sets. They are called "exchange instructions". The first Z80 instruction EX AF,AF' has an opcode of **08 hex** and exchanges the accumulator and flag registers (AF) with their counterparts (AF'). The second, EXX, has the opcode **D9 hex**. It exchanges **all three** of the register pairs BC, DE, and HL with their counterparts BC', DE', and HL', all at one crack. (Note that it's possible to exchange those three pairs **without** exchanging the A register and flags, or to exchange only AF without swapping the three register pairs.)

Whatever is in one set of registers when the exchange is executed stays there untouched while you are using the **other set** of registers. If you need a value from the original registers, just execute the EXX (D9) again and everything switches back. The catch is, it's a toggle so **you** have to keep track of which set you're currently using. The same goes for the 08 opcode. But, again, whichever register set you are **not** using remains safe for later access.

As a test, I went into DDT and loaded up the **alternate** Z80 registers with arbitrary numbers. I switched back to the original registers before I hit the CTRL-C that exits DDT. I then ran a major applications program (a word processor). At the end, I went back into DDT, switched to the alternate registers, and my crazy values were all **still there!**

For a demo of the kind of thing I just described, type the boldface:

```
A>DDT
DDT VERS 2.2
-S2000
2000 nn D9      (nn is whatever is there)
2001 nn .
-X              (displays what's in registers)
-G2000,2001     (executes only the opcode D9)
*2001           (DDT shows next address)
-X              (displays alternate registers)
-XB             (display/alter BC reg pair)
B=nnnn 0102     (puts 01 into B' reg, 02 into C')
-XD             (display/alter DE reg pair)
D=nnnn 0304     (03 into D', 04 into E')
-XH             (display/alter HL reg pair)
H=nnnn 0506     (05 into H', 06 into L')
-X              (shows all the registers)
-G2000,2001     (toggles back to orig regs)
*2001
-X              (displays them)
-C              (CTRL-C to exit)
```

You can then run some other program. Afterwards, repeat all the above commands up to the XB. The values you put in before should still be displayed.

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

### HDOS 3.0 Enhancements (By Dr. Rick Streeter)

**HDOS 3.0 Enhancements** -- Modified system command processor (SYSCMD.SYS), peripheral interface program (PIP.ABS), terminal device driver (TT.DVD), and line editor (EDIT.ABS). These enhancements support USER areas and numbers, new commands in both SYSCMD and PIP, and the special function keys are enabled at the command prompt (>) and type SYSHELP.H19 to the terminal (red), clear the screen (ERASE), or run an .ABS or .BAT program as set by the user. These enhancements **presume** an H/Z-19 or -89 terminal and are supplied in both 8080 or Z80 code. The 8080 versions use more memory.

**HDOS 3.0 Enhancements Source** -- Full source for the above package, including a set of modified .ACM files. Assembly of these enhancements **requires** the UtiMeth HDOS assembler (UASM.ABS) from Quikdata, Inc.

**UD.DVD Object and Source** -- Universal printer device drivers for HDOS 3.0 only or HDOS 1.6 through 3.0. These drivers support the following: baud rates to 38,400 (provided by included enhanced SET.ABS); multiple SET options allowed on the same command line; and SET options for the HDOS 3.0 (only) driver are written to **both** disk and memory, so they take effect immediately in a LOAded driver. Assembly of the source in this package requires the UtiMeth assembler. This disk also includes a revised Votrax TYPE 'N TALK demo for Jorgenson's T.N.T. DRIVER/DEMO described on the software list in the last issue.

(Each of these packages is available for \$12 postpaid. Please specify the HDOS version (2.0 or 3.0) and format you require (standard hard-sector or single- or double-sided **40-track** soft-sector). These packages are **not** in the public domain; **Staunch** serves only as distributor.)

### LUCIDATA PASCAL (Courtesy of Larry Reeve)

For both HDOS and CP/M

**Lucidata Pascal** is a substantial subset of the Pascal language, originally developed by Niklaus Wirth. The compiler translates Pascal source code (created with a text editor) into a file of p-code ("pseudo"-code). This file is then interpreted by a run-time system (PRUN or RUNCOM). This results in a language package which is faster executing than conventional interpreters, yet the p-code file is generally smaller than equivalent code produced by a conventional assembler. If execution speed is critical, this package also includes a p-code program which will translate p-code files to source code for Microsoft's M80 assembler and linker.

Lucidata Pascal generally follows the ISO standard for the language. Two additional variable types are predefined, ALFA (an 8-character array) and BYTE (an integer from 0 to 255). Other extensions are too numerous to mention here.

Though not as extended as **Turbo Pascal**, this implementation is more than adequate for most programming tasks. It is the fullest implementation of Pascal presently available for HDOS at this price. It is also a very reasonable alternative to Borland's out-of-production **Turbo** for CP/M.

(This two- or three-disk package is available on either standard hard-sector or single- or double-sided, **40-track**, soft-sector disks for \$25 postpaid. It **includes** a 100-page hardcopy manual. Please specify operating system (HDOS or CP/M) and disk format you require. This package is in the public domain.)

### More from STUDIO COMPUTERS (Courtesy of the authors noted below)

#### WHILE SUPPLIES LAST, THESE INCLUDE HARDCOPY DOCUMENTATION

For both HDOS and CP/M

B-XREF  
(Written by David Powers)

A cross-reference utility for MBASIC, it generates output of MBASIC key words, user-named variables, or statement line numbers. Output can be directed to either the console, printer, or disk. The disk file may be merged with the source program for in-program documentation. The utility is menu-driven and requires that the input source file be in ASCII, not the binary code in which MBASIC normally does its saving. Indispensable for documenting and debugging. Requires HDOS or CP/M MBASIC.

KEY-IT!  
(Written by David Powers)

A cross-referencing retrieval system for ASCII files created with a text editor, such as information on magazine articles, periodicals, books, etc. The cross-reference can be sent to console, printer, or disk. Also produces a "key-word-in-context" (KWIC) output for a single, user-specified keyword which will display all references in the file to that word. Output to the console is "windowed" for easy perusal of large quantities of data. Requires MBASIC under HDOS; the CP/M version is a stand-alone program.

MONEY\$WORTH  
(Written by David Powers)

A financial package for setting up categories, recording, and summarizing income and expense transactions. The user defines his own categories in parameter files. The report generator summarizes transactions monthly, quarterly, year-to-date, or annually. A budget forecasting feature uses a spreadsheet-like display, using either single- or double-precision arithmetic. And because the data files are ASCII, editing can be done with a text editor. Transaction files are limited to the size of your disk storage. This package is useful for income tax records, analyzing your present financial condition, and forecasting your future condition. Requires HDOS or CP/M MBASIC and the H19/89 terminal.

For HDOS Only!

UTILITY ONE  
(Written by Frank Adams)

A set of 10 utilities, written in HUG's HDOS Tiny Pascal, and useable with any floppy disk type (standard H17, 400K H17, H37, and H47). The programs include UNDELETE (for recovering deleted files), SFLAGS (controls file flags, including L and C), NSPACE (for double-, triple-, and quadruple-spacing ASCII files), CAP (changes all lower case letters to upper), UNCAPR (changes all upper space to lower), UNCAP (changes upper to lower except at beginning of a sentence), COUNT and COUNTF (counts characters, words, and lines in an ASCII file), ENCIPH89 and DECIPH89 (en/deciphers files for security), and COVER (overwrites a deleted file with garbage so it's irrecoverable). Some of these programs will run under HDOS 3.0. Source code not originally available, but I expect to have it shortly.



**Additional HDOS Material****HDOS 2.0 MANUAL**  
(Keyed by Daniel Jerome)

Since the HDOS 2.0 manual is now in the public domain, Dan Jerome is keying it in as a ongoing project. It is heavily supplemented with new material by Dan and by John Toscano, both members of SMUGH. At present, I have Chapter One (System Configuration) and Chapter Two (General Operations). (The remainder of the manual--ASM, DEBUG, EDIT, and BASIC--will be transferred.) Chapter One and Chapter Two each occupy **three** standard hard-sector, two single-sided soft-sector, or one double-sided soft-sector disks. This material is available **either on disk** as printer-ready ASCII files **or as hardcopy** if you have no printer. Cost of **either** of these is **\$12 per chapter**, postpaid. Please specify whether you want disks (and which format) or hardcopy.

**Printer Device Drivers**  
(By John Smith)

The programmer mentioned by Parks Watson in the last issue's "Letters" column has supplied me with over **thirty-five** printer device drivers for HDOS 1.6 and 2.0. His material covers **eight** hard-sector disks! The drivers are for (serial unless otherwise noted): LA34 and LA36; Heath H-14 and H-25; Smith-Corona TP-1; IDS 440 and 460; NEC 8023A (parallel); Diablo 1640; baudot (TTY) printers; C.Itoh Comet I, 8510 Prowriter, and StarWriter; Base 2 Model 600; IBM Selectric (parallel); Epson MX-80 (parallel and serial), MX-100, and RX-80 (parallel); Eaton LRC 7000+; Teletype Model 43; MPI 886 and 996; Centronics 737; TI 810; Anadex DP 8000; Okidata 82A; Gemini 10; Juki 2100/2200; a special purpose one to write data to disk rather a printer; and another for use with Heath's old AutoScribe word processing package. Most of these feature the commandline argument feature Parks mentioned. When ordering, let me know which printer(s) you are trying to interface.

**Updates to Previous CP/M Releases****Hank Lotz's MCOLS, Ver. 2.0**  
(Written by Hank Lotz)

Hank just sent me an upgrade to his utility which creates a multiple-column listing from a single-column input file. This new version lets you direct the output to a disk file as well as console and printer. Includes six-page documentation and compiled and interpreted MBASIC files. If you have version 1 and want this new one, return your distribution disk to me with sufficient return postage and I will do the transfer at no charge.

**Magic Wand/PeachText HELP Disk**

Randall Stokes' PROCESS print preprocessor for Magic Wand/PeachText has been added to this disk. This program lets you directly support the custom features of your dot-matrix printer, such as underlining and italics, from Magic Wand. Randy described this preprocessor in **REMark**, vol. 6, no. 11 (Nov., 1985). The program directly supports Gemini printers. If you have another make, instructions are included on disk for editing the ASM file and assembling a custom version for your printer.

**Placing an Order**

**Except** for Rick Steeter's HDOS 3.0 Enhancements, Lucidata Pascal, and the HDOS manual, your cost for

this software depends on what you supply:

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

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

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

**\*\*\* BE A STAUNCH RENEWER! \*\*\***

Renewals for 1989 now being accepted!  
**RENEW** by 31 Dec. and qualify for a  
**PREMIUM!** (See the editorial for details)  
Make checks payable to "Kirk L. Thompson"

**VENDOR.UPDATE (Part 2)**

**Cranberry Software Tools** [P.O. Box 681, Princeton Junction, NJ 08550-0681] Now this one is certainly a little-known CP/M-oriented operation! Its products include an "integrated text processing system" with a menu-driven front end, editor, formatter, spelling checker (with either a 34,000- or 80,000-word dictionary), a font generator for Epson dot-matrix printers, and associated utilities. One of the last supports two-column printing. My correspondence with Michael Richards suggests that the word processing system is "almost TOTALLY VIDEO-INDEPENDENT." The exceptions, the main menu and text preview feature, can be patched or otherwise configured for your terminal. Other products include some useful for C language programmers and a file dump utility. However, the disk formats it supports are only soft-sector, in any combination of Heath/Zenith, Magnolia, and C.D.R. formats or 40- and 80-track. And prices are **extremely** reasonable! Indeed, if one of you purchases Cranberry's word processor, I would like to see your comments or even a review.

**WordStar 4.0.** I'd been hearing rumors that Micropro was about to release a new version of this old and tried word processor, and this was confirmed by Frank Hutchison's review in **Sextant** #37 (early fall, '88). The price is certainly right, only \$89 plus \$10 shipping. However, according to the brochure I recently received, the formats available are limited to Apple, Kaypro, Morrow, Osborne, Televideo, and generic 8-inch. Moreover, the system requirements to run it include 50K of TPA and two **double-density** drives minimum. Hutchison's review also suggests that a key remapper be used with it. For more information, contact:

MicroPro International Corp.  
33 San Pablo Ave.  
San Rafael, CA 94903-0040  
415-499-1200

Credit card orders can be placed toll-free at 1-800-227-5609.

**The Staunch 8/89'er** wishes you are able to celebrate as happy a birthday as we on this, our second! **HAPPY BIRTHDAY, Staunch!**



(Every time you type a single X above, all register contents will be shown. I do not reproduce that display here.)

The two Z80 opcodes, 08 hex and D9 hex, are not implemented in the 8080 chip. To that chip those two values, as opcodes, are meaningless. This is why they are not included in the 8080 assembler instruction set. If you have a Z80-based machine and want to execute the opcodes in 8080 assembly language, you have to simulate them in a way the assembler will not reject. This can be done by placing a DB (Define Byte) assembler directive at a location within the flow of execution. (Normally, DB statements are placed only where there is **not** a path to them during execution, as after a JMP or RET instruction.)

```
DB 08H ;exchange AF with AF'
```

```
DB 0D9H ;exchange BC,DE,HL with BC',DE',HL'
```

For a more mnemonic way of doing this, you can first set up some meaningful labels, using EQU directives:

```
EXAF EQU 08H
```

```
EXX EQU 0D9H
```

Then, at the appropriate time, call them forth with:

```
DB EXAF
```

and/or:

```
DB EXX
```

To show one of these homespun instructions in context, I've whipped up a little program that actually runs. It's not intended to be "useful", but it demonstrates the matter at hand by displaying ASCII chars from the H and H' registers.

```
ORG 0100H
EXX EQU 0D9H ;Define reg exchange instr.
MVI H,'X' ;Load the "main" H register
; with an X, as simple demo
DB EXX ;Use our new "opcode" to
; select alternate regs
MVI H,'Y' ;Now put a Y into H' reg
DB EXX ;Toggle back to main regs
CALL DISPLAY ;This prints our X
DB EXX ;Select alternate reg set
CALL DISPLAY ;This prints Y from H' reg
JMP FINISH ;
DISPLAY PUSH B ;Saving everything before a
PUSH D ; BDOS call is standard
PUSH H ; operating procedure.
MVI C,02H ;BDOS function 2=CRT output
MOV E,H ;Put the X or Y into E reg
CALL 05H ;Call BDOS to show char
POP H ;Restore all the registers
POP D ; before returning
POP B
RET ;End of DISPLAY subroutine
FINISH DB EXX ;Get main regs before exit
JMP 0 ;Warm-boot CP/M
END
```

To help demo this for people who aren't in the habit of playing with assembly language, here are directions, using drive B:. Type the above listing into a file and name it TEST.ASM. Put a copy of LOAD.COM, ASM.COM, and TEST.ASM all on drive B:. Then, the 3 command lines,

```
B>ASM TEST.BBZ
```

```
B>LOAD TEST
```

```
B>TEST
```

will assemble, load, and run the program, respectively! That's all there is to it -- surprisingly simple isn't it? I hope that, because guidelines can be stated so concisely, and because this is fun, novices will be enticed into trying assembly language, and that they'll get hooked.

If you like what you see, and you get excited and want to add to and play with the program, I should warn you that you should set up your own stack before doing further CALL's or PUSHes, etc. The above uses the existing CP/M stack which doesn't have a lot more reserve space left in it. Setting up a local stack is illustrated all over the place in past issues of REMark. For example, you could try

the May 1983 issue, page 36, or the June 1984, page 48.

Having disclosed, described, and demonstrated this Z80 information, I leave effective applications to your imagination. If you already program in assembly language, you'll know when the need strikes, and you'll use these gems when the right opportunity arises.

=====

### Q minus A

(An open-forum "Q-only" column. Answers are solicited from readers!)

**Q** — Is there any way to patch an OOPS command into the MAGIC WAND editor, using perhaps the ERASE key to trigger it?

**Q** — Why doesn't someone do an article on the mechanics of floating point calculations at the 8-bit level?

=====

### OF RESERVED TRACKS, PIE, AND WAND

By Lee Hart

28612 Middle Crossing Road

Dowagiac, MI 49047 (616-782-3980)

**Using the Reserved Track in CP/M.** I can shed some light on using the "boot" tracks on a CP/M disk for extra storage [see the question on p. 6 of issue #6 -Ed.]. The CP/M ghost disk for the H-1000 used them by just filling out the CP/M disk parameter tables for 0 reserved tracks. It worked great; disk storage increased and there were never any compatibility problems.

CP/M uses a set of Disk Parameter Tables to define how a disk is laid out (see the Digital Research "CP/M 2.0 Alteration Guide", supplied with Heath's CP/M manuals). The BIOS is responsible for giving CP/M the values for this table. In the Heath 2.204 BIOS listing, they come from the Disk Parameter Blocks. For H17 (hard sector) for instance, they are at the label DPB17S: on page 130.

```
DPB17S: DW 20 ;SPT=no. of 128-byte sectors/trk
        DB 3 ;BSH \
        DB 7 ;BLM > these set a 1K block size
        DB 0 ;EXM /
99 ---> DW 91 ;DSM=disk size (in K) -1
        DW 63 ;DRM=no. of directory entries (-1)
        DB 192 ;ALO
        DB 0 ;AL1
        DW 16 ;CKS
0 ---> DW 3 ;OFF=number of reserved tracks
```

The last entry is the one we want. Change this to 0 and your H17 disks will have 0 reserved tracks. DSM must also be increased to 99, because your H17 disks now store 100K, not 92K. CP/M will start the directory on track 0, and you will have 98K available for storage.

Note that if you make this change in your BIOS, you are creating a new, incompatible disk format. You can no longer read "normal" H17 format disks. You can't boot from H17 disks; you'd have to boot from a soft-sector or 8" disk. Also, running SYSGEN on such disks will destroy their directory.

A clever change would be to make the BIOS check somehow for the disk format, and set the values in the DPE table accordingly. The BIOS already does this for the other disk formats (soft-sector, 8", etc.).

The H17 controller is capable of some amazing things. With the right software it can put up to 800K on a 5-1/4" disk, and even read/write soft-sector disks. See my article on the H17 controller in the Dec., '86, **SEBHC Journal**.

**Easy as PIE.** The Software Toolworks' text editor PIE is one of the most popular text editors for "quickie" applications. But did you know it can format paragraphs within desired left/right margins, and even justify text? It's not described in the manual, but it follows from innovative use of its REPEAT, SEARCH, and RECORD commands. It can even format text into two or more columns!

1. Enter your text normally, with no spaces at the left margin and a ragged right margin.
2. To format text to a given column width (for example 60 columns):
  - a. Hit IC to turn on the "Insert" mode.
  - b. Put the cursor in column 60.
  - c. Hit "ctrl-W" to turn on "Word-Wrap" in the 60th column.
  - d. Move the cursor to the first character of the first paragraph.
  - e. Hit the SPACE bar to insert 1 space.

Any characters past the 60th column will be "wrapped" to the start of the next line. If this causes that line to go past column 60, it wraps too. The process continues until the whole paragraph is formatted 60 columns wide. Then delete the first space added, and repeat steps d. and e. for each paragraph.

You can format narrow columns back into wider columns, too. Just keep entering SPACES at the start of the line until the entire line is wrapped into the following ones. The paragraph thus gets reformatted to fit the new wider word wrap boundary. The extra blank line at the beginning is then deleted.

3. To format text to a given left margin (for example, column 8):
  - a. Hit "ctrl-W" to turn off Word-Wrap.
  - b. Be sure the "Insert" mode is enabled.
  - c. Move cursor to the leftmost column of the 1st line in the 1st paragraph.
  - d. Hit the ENTER key, then the BLUE key. The message "Recording Initiated" appears on the bottom line.
  - e. Type SPACES until the line is moved to the new left margin (i.e. 8).
  - f. Hit RETURN to move to the next line.
  - g. Hit the BLUE key again. The message "Recording Completed" appears. This creates a "macro" key that adds 8 spaces to the start of a line.
  - h. Hit ENTER 999 BLUE.

This says to do our "macro" function 999 times, which shifts every line 8 columns to the right. When you reach the end of your document, hit any key to stop (or repeat if 999 lines isn't enough).

4. To justify each line (i.e. add spaces to get an even right margin):
  - a. Be sure Word-Wrap is off.
  - b. As in 3. above, set the left margin so the last character of a full line (the 60th character in my example) is in the rightmost (80th) column. The "bell" rings if you try to insert too many spaces. When done, the left margin will still be straight, and the right margin ragged.
  - c. Now pick a rule to add spaces. An easy one is after every period: Hit ENTER, keypad-0. Now each time you hit keypad-0, PIE searches for the next "." in your document.
  - d. Turn on the "Insert" mode.
  - e. Position the cursor at the start of the first paragraph.
  - f. Hit ENTER BLUE (record a "macro" sequence)  
keypad-0 (find the next ".")  
. SPACE SPACE (put two spaces after the  
"." if it fits)  
BLUE (sequence is completed)

- g. Hit ENTER 999 BLUE to put an extra space after every "." where it fits.

This will justify many lines, since a period is very common. Repeat 4. with the other punctuation symbols, like , ; : ? and !. Clean up the few remaining ragged lines manually, or try adding spaces before capital letters, etc. It's too bad PIE won't search for a single SPACE; it would be so much easier.

5. To format text in two columns (i.e. columns 1-35 and 45-80). A page is 60 lines long, thus we want to put line 61 at the end of line 1, line 62 at the end of 2, etc.
  - a. First, format and justify the whole document into columns 1-35 as above.
  - b. Turn Word Wrap "on" in column 70 (2 x the column width).
  - c. Move the cursor to the start of line 60 (last line on 1st page).
  - d. Hit ENTER BLUE to begin recording a "macro" key.
  - e. Move to line 121 (last line of 2nd page). Hit DL to delete the line.
  - f. Move to line 61 (first line of 2nd page). Hit WHITE to insert line.
  - g. Move cursor up a line (to line 60, last line of 1st page).
  - h. Insert spaces until all of line 60 wraps into the line below.
  - i. Move up 1 line, and use DL to delete the blank line.
  - j. Hit BLUE again to complete the macro.

Now each time you hit the BLUE key, PIE moves a line from the 2nd page to the right column of the 1st page, working from bottom to top. Hitting ENTER 60 BLUE will thus do an entire page automatically!

You will have to add the blank spaces between columns after this process. This is easier if you deliberately insert a special character at the start of each line before beginning. Also, the left column will have to be re-justified as described above.

To anyone with a good word processor, this procedure must seem awfully cumbersome. In fact, it is quicker and easier than Magic Wand, Wordstar, or Vedit could do it because you can see what you're doing! I discovered this when I had to format 300K of 1-column .ASM listings into 8-column-per-page printouts for my Superset manual's character sets. (See the character sets at the end of Superset manual; they began as .ASM files with 1 character per column.)

[To be continued next issue! -Ed.]

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#### VENDOR.UPDATE (Part 1)

**SIG/M.** Last issue I mentioned my contacts with SIG/M's distribution manager, Robert Todd, in my coverage of this year's CHUGCON. Bob returned my self-addressed postcard with the new SIG/M address as follows:

Susan Ward, Order Coordinator  
SIG/M  
P.O. Box 3028  
Easton, PA 18043

SIG/M has the largest public domain CP/M library in, I suspect, existence! The cost per disk is \$7.00 per volume in the U.S. and Canada, \$10 elsewhere, and Bob added that "All monies [should be] in U.S. funds drawn on U.S. banks...." Volumes in this context are SS/SD 8" disks, but SIG/M has extensive media conversion facilities. I recommend ordering the **catalog** volume first to get an overview of the entire library.

**HDOS 3.0-related.** I recently wrote to Bill Parrott at his Shawnee, KS, address, the same one Rick Streeter gave in his introductory HDOS 3.0 column last issue. **My letter was returned!** If anyone is interested in HDOS 3.0 and has the same problem, contact me. I would be happy to supply it for the same price Bill did, \$25 postpaid. Be sure to mention the type of media you require. But I **don't** have the source code! If interested in that, let me know and I'll see what I can do.

**HUG Software Sale!** Now is the time to buy software from HUG (P.O. Box 217, Benton Harbor, MI 49022, 616-982-3838). The November issue of **REMark** I just received has "30% OFF Thru December 1988" splashed across its center-fold price list. However, not everything is listed there! Last summer Parks Watson sent me a hardcopy of unlisted HDOS products and I've confirmed with HUG's Jim Buszkiewicz that much of it is still available. I don't have the room to include it in this issue, but if you sent me an SASE, I'll mail you a copy of the page and a half list. **Do it now before you forget!**

**More CP/M software.** Another source of public domain and commercial material is: Elliam Associates, P.O. Box 6922, Los Osos, CA 93412, 805-528-5871. Besides p.d. stuff from SIG/M, CP/M Users' Group, and C User Group, Elliam carries such commercial products as Tarbell's Database System, file recovery and cataloging packages, a Z80 assembly language development system, a font generator for Epson printers, and "MagicSeries", a laser printing package for WordStar or ASCII files. CP/M disk formats available number something like 300 and should include hard-sector.

**Further CP/M software.** "MagicSeries" is also carried by: KaftorWare Corp., P.O. Box 1674, Chicago, IL 60690, 312-965-8144. Another item this company offers is PC-File 80, a database package. But based on my correspondence with Benjamin H. Cohen, I **cannot** recommend it! Though powerful and reasonably priced, it doesn't possess the "right stuff" to configure the '19/89 terminal. KaftorWare also only supports a limited number of **soft-sector** formats: Kaypro, Osborne, 8-inch, Apple, and some 96-tpi.

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#### USING HDOS 3.0

by Dr. Rick Streeter, D.D.S.  
4404 Willmary Ct., Kingsport, TN 37664

In this installment I will discuss a few issues which slowed my acceptance of HDOS 3.0 as my main operating system in hopes of helping others get over their reticence about it. Since the source code for HDOS 2.0 had been available for some time [though not public domain -Ed.], many people made use of some of its "features" to enhance its usefulness.

One of the design problems of the Heath operating systems up through HDOS 2.0 was the hole in its memory map giving the user only 56k to work with. This area located at 0800H to 13FFH was not even populated by RAM in most H89s. There were, however, some very interesting things done with this RAM by various authors. Lee Hart's (TMSI's) H-1000 Ghost Disk wrote to this RAM and then remapped it for the 8086 to use in its memory management of this RAM disk. Skip Chambers wrote a version of his HDOS [OMDOS, distributed by **Staunch** -Ed.] to live in this area, in effect using no RAM. Charles Horn wrote in Sextant #19 about a technique to use this RAM for a screen clock. Anyway the point is that this RAM could be quite useful to an imaginative programmer to expand the usefulness of the somewhat limited pre-3.0 system. I put many pseudo device drivers into this area to intercept the various

interrupts and made some quite interesting extensions to my HDOS 2.0 system.

HDOS 3.0, though, uses the entire 64k memory map and doesn't leave any room for my pet enhancements. I was devastated. I had an apparently much expanded HDOS but I couldn't use it the way I had been accustomed. But much to Mr. Parrott's and Mr. Musgrave's credit, they gave us a TASK facility. While it doesn't address my loss of TMSI's Ghost disk, it does allow the implementing of many of the same system extensions I had been used to and in addition puts them into protected memory. The HDOS 3.0 tasks supplied with the distribution package are software clocks. They are written to privately process the 2ms. clock interrupt and update the HDOS 3.0 time location (S.TIME) when loaded with the "START" command.

**TASKS.** A TASK is essentially a "PIC" format file (in UtiMeth assembler language it is called a CODE TSK file). It is similar to a device driver but is without a device driver's strict format. TASKS usually contain a setup portion (in CLOCK.TAS it is the time set code) and a loadable portion which does the work. When started the setup portion is entered, does its thing and then loads the driver directly below any and all device drivers presently in high memory. When a TASK file is loaded, it "LOCKS" and "FIXes" into memory any device driver above it. There is presently no provision in HDOS 3.0 to unload a TASK. The result is that any memory which could have been regained by UNLOADing a no longer needed device driver cannot be released to the user. A good practice is to load any tasks right under the TT: and SY: devices in an HDOS 3.0 system by "STARTing" a task before any other device driver is accessed and therefore placed into memory. I will be looking at tasks and their format in much greater depth in future installments.

**CLOCKS.** HDOS 3.0's support of time stamped files brings up the question of clocks. Since the current time is maintained in RAM, little more than the software clocks "CLOCK.TAS" and/or "CLOCK89.TAS" are needed to time stamp a file. A real hardware freak, though, might want a clock which doesn't have to be reset at every BOOTup. This can be accomplished by adding an H8/H89 battery backed up hardware clock to the system. The major problem is that since the H8/H89 systems are at this time very poorly supported if at all, there is no commercial software available (at least that I know of) to read these clocks and write it to HDOS 3.0's S.TIME location. I had to write my own front end to the CLOCK.TSK program for my system and anyone who wishes to have his system time automatically set by an on-board clock will have to do similarly. A good source of information as to how this is accomplished is the source code for these two TASKs which were supplied by Mr. Parrott. If interest warrants I will be happy to write more about hardware specific clock tasks in future installments. Let Kirk know.

**INCOMPATABILITY.** Some people have learned (often with very sad results) that all programs which run under HDOS 2.0 may not run under HDOS 3.0. Indeed a popular printer device driver (UD.DVD) often trashed a disk or crashed a system. The UD: problem was due to the fact that it interacted closely with pre-3.0 PIP.ABS and modified PIP to implement some of its features. The moral to this story is that a pre-3.0 device driver should be thoroughly tested with write protect tabs in place before being routinely used. Though HDOS 3.0 device drivers are somewhat different in their preamble and format, there is in some non-interrupt processing device drivers a large measure of compatibility between HDOS 3.0 drivers and drivers for previous versions. [For example, T & E Associates' "Maxi-Print" drivers; see the "Miscellany" section for this vendor's address. -Ed.]



HDOS 3.0 accesses the type-ahead buffer quite differently than pre-3.0. This is the reason that EDIT19 won't work in HDOS 3.0.

A pre-3.0 HDOS program uses the type-ahead buffer as follows:

Assembly code	Comments	Obj code
BEGIN LHLD S.DLINK		2A E6 20
XCHG		EB
LXI H,0.LC	;OFFSET TO LINE COUNT	21 02 00
DAD D		19
SHLD LCPTR	;LINE COUNT POINTER	22 xx xx
LXI H,0.TPT	;OFFSET TO TAIL PTR	21 06 00
DAD D		19
SHLD TPT	;TAIL POINTER	22 xx xx
LXI H,0.HPT	;OFFSET TO HEAD PTR	21 08 00
DAD D		19
SHLD HPT	;TAIL POINTER	22 xx xx
LXI H,0.STPT	;OFFSET TO START PTR	21 0A 00
DAD D		19
SHLD STPT	;START POINTER	22 xx xx
LXI H,0.ENPT	;OFFSET TO END PTR	21 0C 00
DAD D		19
SHLD ENPT	;END POINTER	22 xx xx

This code can be patched for HDOS 3.0 as follows:

BEGIN LHLD S.DLINK		2A E6 20
CALL \$INDL	;INDEXED LOAD OF DE	CD 9C 18
DW M.CSL	;OFFSET TO CON DATA	02 00
SHLD LC	;LINE COUNT	22 xx xx
LXI H,0.SCIIN	;OFFSET TO IN PTR (04)	21 04 00
DAD D		19
SHLD TPT	;TAIL POINTER	22 xx xx
LXI H,0.SCIOUT	;OFFSET TO OUT PTR(06)	21 06 00
DAD D		19
SHLD HPT	;HEAD POINTER	22 xx xx
LXI H,0.SCIFWA	;OFFSET TO BUFFER FWA	21 08 00
DAD D		19
SHLD STPT	;START POINTER	22 xx xx
LXI H,0.SCILWA	;OFFSET TO BUFFER LWA	21 0A 00
DAD D		19
SHLD ENPT	;END POINTER	22 xx xx

Just look for the former code (the xx's don't matter and are program specific) and patch in the latter code. The program will then use the type-ahead buffer in HDOS 3.0 as it did in pre 3.0. A program thus patched WILL NOT work in pre-3.0. This is an argument for putting the .VERS SCALL in a 3.0 program. In EDIT19 the address of the start of the routine is 165140A (7560H) and the first patch address is 165043A (7563H).

Many times if the source code of a non-functional program is examined, you will find an EQU at the beginning of the code for locations less than 020.000A (1000H). These are usually references to the H88/89/90 monitor which no longer exists in HDOS 3.0. A CALL or a JMP to these locations will usually crash any program when run in HDOS 3.0. The solution is to drag out your monitor source code and hard code this into your program. For example: a few game programs such as HUG's MAZEMAD used the monitor character output routine WCC to write a character directly to the screen for speed. This can be simply fixed by hard coding WCC in the program as follows:

WCC	PUSH	PSW	;SAVE CHARACTER
WCC1	IN	SC.ACE+UR.LSR	;INPUT ACE STATUS
	ANI	UC.THE	;HOLDING REG. EMPTY?
	JR	Z,WCC1	;(OR JZ WCC1 IN 8080 CODE)
	POP	PSW	;GET CHARACTER
	OUT	SC.ACE+UR.THR	;OUTPUT TO CON
	RET		

When this program is reassembled it works correctly. Some programs want to find the device driver in memory so that it can CALL or JMP to it. Since HDOS 3.0 device drivers can be UNLOADED, this is not the

same as it was before. The correct way to do it now is by using a new HDOS 3.0 SCALL ".GDA" (Get Driver Address) as follows:

FINDDEV EQU	*	
LXI	D,'VD'	;DEVICE NAME IS "DV.DVD"
		;(the name is supposed to be reversed)
SCALL	.GDA	;GET DVD ADDRESS INTO HL
JC	ERROR	;IF ERROR
SHLD	DRIVER	;DVD ADDRESS AREA
RET		
DRIVER DW	0	;DVD ADDRESS

Since a call to DRIVER could crash the system if the driver doesn't exist (leaving HL = 00), a CALL or JMP to the device driver should only be attempted after the device has been found and loaded by a program which uses this SCALL.

Programs which use the pre-3.0 method of finding a device driver will generally not work.

Well, Kirk told me that my word count is quite rigid and I have probably passed it so I must quit for now. Please let Kirk know what you would like me to cover in more detail and what you would like discussed in the future.

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#### MISCELLANY

**Interfacing an SCM Typewriter.** [From Dave Stoner, Tiffin, IA] Having just hooked up my H89 to an electronic typewriter via an interface module, I thought I might save someone a lot of trouble and frustration by explaining the set-up. Using T & E Associates' GP: device driver on its HDOS Enhancements 2 disk, I connected the serial port to a Smith Corona Messenger Module and the Messenger Module to a Smith Corona DeVille 210 electronic typewriter.

The final Messenger Module dip switch settings were set for the following options: (1) ASCII, (2) 1200 Baud Rate, (3) 8 Bits Character length, (4) No Parity, (5) Inverted Serial, (6) ASCII CR/LF Options, (7) ASCII Daisy Select and (8) Activate Auto CR. On this particular application the left dip switch is set for switches 2, 3, 4 and 6 switched on with 1, 5 and 7 off. The right switch settings are 6 on and the rest off.

Please note that when an electronic typewriter is driven by a computer, you are limited to the typewriter keyboard with the standard daisy wheel in place. To clone your computer keyboard you need to purchase an ASCII daisy wheel. [Thanks for the applications note, Dave. T & E Associates is still actively selling HDOS drivers and enhancements at P.O. Box 362, Millersville, MD 21108, 301-987-4748.]

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