THE ADDRESS BUS

PORT TO PORTAL -- Editorial

The biggest news at this end of the "horn" is that, with assistance from Dan Jerome and Quikdata, I've brought up **one** 96-tpi (80-track), double-sided Mitsubishi floppy drive. My intent in doing this is to provide better service to those of you who run **only** 80-track drives off the **soft-sector** controller. When Heath first sold the H-37, that was the **standard** format for soft-sector; all other variations (single-sided and 48-tpi) depended more on the particular drives at hand (many users simply disconnected their Siemens/Wangcos from the hard-sector controller and hooked them up to the H-37) or preference (as in my case).

But for those of you with 80-track drives, I've brought up HDOS (2.0 and 3.0x) and Magnolia's CP/M for file transfer purposes to and from the new drive. The drive is out at the end of the drive chain (that is, it's the fourth) so, for the moment, isn't accessible to Heath's standard CP/M BIOS (which only recognizes three drives). But that won't make any difference when copying files for you.

Please note that the **standard** track density for material I distribute **continues** to be **40-track**! The only way you can induce me to prepare 80-track for you is to send me a disk **pre-formatted** at that density!

The second biggest event I have to report is the public domain release, by Pete Shkabara, of Anapro's proprietary materials for his Z-System package. From that core, I've assembled a complete package as you'll read in this issue's software listing. But while Anapro's BIOS's and custom utilities were released, major portions of the system still have to be licensed! For those portions (ZCPR3 and ZRDOS),

I've made arrangements with Joseph Wright of Alpha Systems. (My thanks to Joe!) So you can now obtain upgrades to **both** basic OS's for that '8 or '89 from your "software source," **The Staunch 8/89'er**, and I'm no less flabbergasted about that than you are.

Actually, when I first began handling software, I didn't think I'd become so deeply involved with operating systems. Providing application and utility software is moderately easy; all you have to do is duplicate disks! Operating systems are a different story entirely. The complexity of an OS package can be awesome, as I learned while pulling HDOS 3.02 together. Further (and unlike 3.02), I've had to do some scratching for this one. But I've managed to come up with suitable documentation to supplement the on-disk material provided by Pete.

For the benefit of those just getting into Z-System, could readers who've been running it for some time suggest informational resources novices could tap about the system? Since I place myself in that novice classification, too, you would be assisting two birds in the proverbial briar bush.

I'm also trying an experiment with this mailing. You may have noticed the self-adhesive label with your address on the envelope. I would like to simplify mailing, if I could, by eliminating the drudgery of hand-feeding envelopes through the printer to address them. Let me know if your label is torn up by the Postal Service. Whether I continue with labels will depend on your response.

Finally, this year's issues will be printed on recycled paper and with soybean oil-based ink. Something to help the environment. Let me know what you think.

Kirk L. Thompson

THE EIGHT-BIT R/W -- Letters

Unbranded Vendetta. [From Dan Jerome, Burnsville, MN] "As you know I have been using my H89A since I purchased it in kit form back in 1981. During that time I have done a whole lot of writing and managed to use hundreds - maybe even thousands - of disks. With all that experience behind me, I can safely say that I feel unbranded disks are of very "spotty" quality. Often they are "seconds" in quality. This might be okay with items of clothing, but my data is important to me and I will do everything I can to maintain it. That old saying: 'you get what you pay for' applies to computer disks.

"For about 7 years I was the 'CP/M Librarian' of our Minneapolis/St. Paul Heath Users' Group. I kept the 45 original masters on 90k branded disks. I also made a set of our public domain disks using the 'user-area' technique to stack 5 90k disks on one 80-track soft sector disk. One archived set of 80-track disks used unbranded MEI disks. I followed this up with a second set of 80-track disks that were branded (DataLife). In one year the first set of unbranded disks had 'grown' so many errors they were useless. However, the DataLife disks are still being accessed with no problems. We have experienced

SOFTWARE LISTING
>--<

General Software Catalog

A catalog of **Staunch** software is available. Initially prepared by Ralph Money, the disk files include listings for **both** HDOS and CP/M. The files are "squeezed" to conserve disk space and an unsqueezer is provided to recover them. This catalog requires only one (1) disk in any format. See the "Placing an Order" section, below, for information on available formats.

FOR BOTH CP/M AND HDOS

Six-Drives Hardware Modification
(By Chaos Computer)
(Provided by Mark Hunt)

This disk describes how to **modify** your hard-sector controller or prepare a special cable and how to program drives so you can increase the number of hard-sector drives on your system to six. Patches are included for CP/M's BIOS.ASM; an assembled driver with source code is provided for HDOS. You should have prior hardware construction experience if you undertake this modification. For CP/M, some assembly language experience is also necessary. These modifications are **only** for HDOS 2.0 and CP/M 2.2.03. If ordered on **standard hard-sector**, the supplied disk is **dual-format** only and can be read from **either** HDOS and CP/M. (See elsewhere in this issue for descriptions of "dual-format.") The CP/M files only occupy 14K; the HDOS material requires 229 sectors. NOTE: **Staunch** accepts no responsibility for damages incurred if you make this mod!

Doctor T Diagnostic Disk
(By Tom Snoblen for TMSI)
(Provided by Lee Hart)

A menu-driven set of diagnostic programs that tests the '89's static and dynamic RAM, the TMSI H-1000's static and dynamic RAM, a Z80 "slow" memory test (requiring several hours to run), a 2 ms interrupt check, and a TLB escape code test. This disk is supplied **only as standard hard-sector** and boots directly into a test selection menu. Though the disk is formatted for HDOS, the programs are **independent** of the directory, **so no other material should be written to this disk!** It is write-protected to prevent unintentional file transfer!

FOR HDOS

Famous Public Domain Utilities
(Selected by Dan Jerome, with additions)
(from John Toscano via Mark Hunt)
(and Kirk Thompson's p.d. library)

Like its "companion" for CP/M listed in issue #19, this is an extensive collection of utilities for HDOS. Some of these programs are intended only for use with hard-sector and some only for HDOS 2.0 or earlier. In most cases, documentation (sometimes minimal) is provided. The utilities here will: change all letters in an ASCII file to caps; recover a deleted file; count the number of characters, words, and lines in a file; overwrite a file to **destroy** its contents to make it irrecoverable; encrypt and decipher a file for security purposes; double-, triple-, or quadruple-space a text file; convert all uppercase letters in a file to lower-; read, sort, and display or print disk directories in a number of ways; squeeze and unsqueeze files to conserve disk space; add a CP/M CTRL-P-like dump of the screen display to your LP: printer; a general utility for breaking large text files into smaller ones, filtering out garbage, sorting, converting TABs to spaces, and numbering output lines; catalog your disk library; split huge files into easier-to-use smaller ones; display the information in HDOS's device driver table; compare the contents of two similar files on-screen; perform a **non-destructive** media check on a questionable disk; increase the number of available file channels from 7 to 12; dump files or disk sectors in decimal, octal, or hex to screen or a file; display a text file in large block letters; duplicate hard-sector disks; and perform sequences of commands for "batch" execution. Also included are a few (undocumented) utilities for changing terminal baud rate, volume label, and volume number; for resetting SY: drives; and to concatenate or **insert** one text file with another. Some C and assembly source is included. Some of this material has already appeared in earlier **Staunch** releases. This package occupies 1860 sectors, so requires 6 **(six)** std. hard-sector, 2 DS/40-track soft-, or 1 DS/80-track soft-sector disk(s).

Life
(By David A. Shaw)

Here's the first of the custom HDOS software that Dave Shaw passed along to **Staunch** for general distribution, as noted on p. 23 of the last issue. This is a "game" illustrating "evolution" and is based on simple rules. The game is played out on the 80-character-by-24-line screen and you may either position the "cells" as you desire, retrieve a previously-saved game, or load one of the 16 different ones supplied with the package. Assembly source (for Dave's custom assembler) is included. Will run under any version of HDOS. Requires the H/Z-19/89 terminal. This package only occupies 243 sectors.

FOR CP/M

Freeware Collection
(From Logic Associates)

Logic Associates (1433 W. Thome, Chicago, IL 60660) is one of the few vendors that continues to support CP/M with commercial software. This collection includes both materials it has developed and is releasing for p.d. **non-commercial** distribution and software already available that it has found useful. In the former category are: HOST-ALL and PASSWORD (for setting up a simple BBS), DDTF5 (locates ASCII/hex strings or machine and assembly commands when loaded above DDT), ECHO31 (turns off console output), BACK2DDT (returns to DDT from another

program by pressing CTRL-B), BLISTER (adds 22-line paging to MBASIC's LIST command), SAFRAM6 (lowers the top of the TPA), SUPERMT6 (adds BASIC-like commands to SUBMIT files), and RAP (redirects printer output to disk). In the latter category are: AL (shows allocation of sectors on disk), APPEND (adds text to a file), CRUNCH ("crunch" and "uncrunch" files to conserve space), DUU (disk dump utility), EX15 (a combination of SUBMIT with XSUB that even runs faster), MFT (use a single drive for multiple file copying), REDIR31 (redirects console I/O to/from disk), SYNONYM4 (turns a complex command line into a short command), and TABSET (converts TABs to spaces). Some of this material may **not** be relevant to our H/Z hardware environment; Logic Associates uses Kaypros. NULU, UNCR, and USQ are included to recover the files. Some of this material also requires assembly; LASM is included for that. This package occupies 362K.

Z-System
(By ANAPRO Corp. and Alpha Systems)
(BIOS and utilities from Peter Shkabara)
(ZCPR3 and ZRDOS licensed from Alpha Systems)

This package is the last version of the Z-System prepared by Peter Shkabara (see Pete's description in his column later in this issue). It consists of the following: a modified BIOS, an enhanced console processor (CPR), ZRDOS (an enhanced BDOS), and a large set of support utilities. All of these parts work together to give you greater processing power and convenience than you have had under standard CP/M. At the same time, the ability to run normal CP/M programs is retained.

The Heath BIOS from version 2.2.04 has been extensively rewritten for this release of the Z-System. All standard features of the Heath BIOS have been retained and additional improvements added. The assembled BIOS's include: a "regular" (for the '89), pre-patched 4 and 6 MHz versions that switch clock speeds during cold boot (if speedup hardware is installed), a patched version for ANAPRO's EMULATE ver. 2.3, and one for the H-8. The supplied BIOS's support **both** hard- and soft-sector drives.

Documentation with this package includes: **ZCPR3: The Manual** (by Richard Conn, a 340-page softcover book, now out of print), a ZRDOS programmer's guide, and various on-disk files.

The software consists of a bootable main system disk in either standard H-17 or single-sided, **40-track** H-37 format and a **large** set of accessory disks that contain other system and utility files. Total size of the software package is roughly 1900K! (As this issue goes to press, there are still a few loose ends to tie up.) Hence, the number of disks included depends on disk format. Files on non-bootable disks will be custom-copied to the format you require. Source code to the BIOS's and most system and ancillary utilities is included.

Basic installation of the Z-System is easy. It has been incorporated into modified MOVCPMnn files, now called MOVZRnn. (These modules contain the **licensed**, enhanced CPR and ZRDOS.) To create bootable disks, you may proceed as you have before with regular CP/M by using MOVZRnn and SYSGEN as needed. The code has been made relocatable so that

you may create a Z-System of any size you may require (such as needed for the C.D.R. RAM board). However, because many of the support utilities require knowledge of the system address locations, you will need to patch them for the BIOS base address, if that is other than for a 64K system, with Z3INS (included). Instructions for doing this are given in the on-disk documentation and the ZCPR3 manual.

There are many options available in the Z-System which required trade-offs in the selection process. ANAPRO has picked those options which seemed to make the most sense without sacrificing memory space (TPA). Much time was spent in code shortening. The total BIOS size is only about 3/4 kilobyte larger than standard.

In using the Z-System, you should be aware of the functions included. The following is a listing of features in the distribution package:

- Named directories - 5 available
- Flow Control Package
- External File Control Block - 36 bytes
- Shell Stack - two 32 byte stacks
- Z3 Message Buffer - 84 bytes
- External Stack - 48 bytes
- External Environment Descriptor
- External Path at address 50H - 5 pairs of bytes
- Wheel Byte at address 5BH
- External Command Line - space for 200 characters

In addition to the command line buffer, there is an auto run mode. A program named STARTUP.COM may be run on cold or warm boot as specified in the CONFIGZ system configuration procedure.

A defect (the "S" option for the SAVE command) in ZCPR3 as originally distributed by Echelon has been fixed in this release. In addition, ANAPRO has added three features: LF and FF to send line feeds or formfeeds to LST: and CLS to clear the terminal screen. The last **presumes** an H-19/89 terminal.

This package has several restrictions. Display of named directories is included in the CPR, but changing directories by name is not. This was done to conserve TPA space. ANAPRO has modified the CD program to provide this feature. Entry of DU: or DIR: format is allowed with this CD.COM version.

The standard Z-System is configured to include **both** H-17 and H-37 drivers. If you wish to change this to a single type, you will need to reassemble the BIOS after setting the appropriate equates. The ZCPR3.MAC files will also need to be reassembled and installed into the appropriate MOVZRnn program. ZEX files are included to make this procedure fairly simple. Only the H37 and H17 disk types may be made bootable with the files supplied. On-disk documentation describes how to modify the BIOS source to boot from H-47 (8-inch) and H-67 (hard-disk) media. Because the code has been written in Z80 mnemonics, you will need a Z80-compatible assembler. The source files were designed to assemble using Microsoft's M80/L80 package (version 3.44), but could be modified for other Z80 assemblers.

The BIOS provides for two versions of the Flow Control Package (FCP). All of the pre-assembled BIOS.SYS modules contains a resident FCP. Not all IF functions described in the ZCPR manual are resident in the distribution BIOS. If you desire IF.COM

processing, the BIOS will need to be reassembled. The version of FCP is shown as part of the cold boot message.

Finally, price of this package is **$75 postpaid**, no matter what type of disks you require for distribution. Also be aware that the ZCPR manual is in short supply; I presently stock five (5) copies and will order replacements from the publisher as needed. Portions of the package are "archived" to conserve media and UNARC10 included to recover those files.

Placing an Order

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) or double-sided (DS/SD), 48-tpi hard-sector and single- or double-sided, 48- or **96**-tpi soft-sector for both HDOS and CP/M. **Eighty-track soft-sector is now supported**; see the comments in this issue's editorial! Please clearly indicate the format you are supplying or require. With the **exception** of the Z-System package, if you desire DS hard- or any soft-sector format, I will pack multiple items onto one disk. I will **not** subdi
vide a disk. Send mailorders to:

Kirk L Thompson / **The Staunch 8/89'er** / P.O. Box
    548 / West Branch, IA 52358

ADDITIONAL MATERIALS

Hardcopy Articles
(From Quikdata, Inc.)

Note 1) These articles date to '79 and '80, but the **principles** involved haven't changed over the last decade. QUANTITIES ARE LIMITED!
Note 2) Most of these articles involve hardware construction. **Staunch** assumes NO responsibility for coincidental damage to your computer system, peripherals, or you while building, troubleshooting, or using these projects.
Cost: These articles are **FREE**, through the courtesy of Henry Fale, but please include $1.00 (U.S. and Canada) or $3 (overseas) per ARTICLE to cover shipper and postage.

COMPUTER CONTROL OF EXTERNAL DEVICES
This article deals with how to build a simple computer-driven controller which will be able to control up to 32 different electrically operated items; turn on or off the items from the computer with 6 or 8 bits of a parallel output port. Applications include controlling lights, bells, sound devices, motors, valves, furnaces, burglar alarm systems, etc. You will be able to control a complex sound generator, adding realism and excitement to games, etc. The parts of the basic controller cost under $20. To this, add relays, transistor drivers, solid state relays, etc., to control the loads you

desire. Includes schematics for many hardware circuits, along with all necessary interfacing information. Includes a simple BASIC program illustrating turning the devices on and off. Requires knowledge of electronic circuitry, breadboarding, and a parallel I/O board such as the H8-2. Oriented toward the H-8, but the information could be used with the H-89 as well if a parallel port board is available. (12 pages)

ANALOG TO DIGITAL TO ANALOG CONVERTER
Similar to the article above, except using one 8 bit I/O channel of the parallel board, up to 8 channels of analog data can be used with the computer to measure analog voltages such as from photocells, thermisters, etc., or output analog voltages from a digital word generated by the computer. Costs under $30 to build the 8 channel version. Includes a simple BASIC program for reading and writing to the converter. Requirements as above. (7 pages)

THE H-8 AS A JOGGING COMPUTER
You can make a sophisticated indoor jogging computer for about $10 in parts using 1 input bit of a parallel port. This project is comparable to a dedicated computer system selling for about $170 seen in magazines. The H-8 front panel display is used to display your time and distance jogged. When you're finished jogging (you select the parameters), final statistics are displayed on your CRT: total steps taken, total time, average MPH, and total mileage. For the H-8, but could be modified for the '89. Requires a parallel port and includes a simple BASIC program for reading the input from a sensor, tracking the computer system clock for time-keeping, and updating the display. (5 pages)

EASY, INEXPENSIVE H-8 TO SELECTRIC I/O
TYPEWRITER INTERFACE
A very easy-to-build interface for driving a standard IBM I/O Selectric typewriter such as the model 735 or 745, for quality print, very desireable for word processing. Interface uses 8 bits of the parallel I/O board and costs about $20 to build. Software is supplied in ASM SOURCE code with generous comments so you can see how it works and make any changes you desire. The device driver assembles in ABS.DVD code using 4 HDOS sectors of the disk, and is compatible through HDOS 2.0. This could be modified for CP/M. ASCII to IBM Correspondence conversion is done in the software which is explained in the source code, and a short description of the operation of the Selectric is included. Requires knowledge of electronic circuitry and a parallel I/O board. The Selectric driver on HS-008 (see **Staunch** #12:Insert) could possibly be used here. (18 pages)

SOUND GENERATOR FOR THE H-8
A simple circuit, easy to build, and costing under $10, based on the SN76477 complex sound generator IC, designed to be used with the 32 channel ON/OFF controller (first article above), but will work directly with an 8 bit parallel port. Under computer control, generates various sounds such as beep tones, hissing sounds, warble sounds, etc. Great for sound effects in games, CAI programs, warning sounds, etc., or just to play with. Not designed for

music! Requires knowledge of electronic circuitry and a parallel I/O board. (4 pages)

H-8 SOFTWARE CLOCK FOR USE WITH DISK

Source code supplied as assembler listing utilizing the H-8/H-89 2ms interrupts running with HDOS to provide an hours and minutes clock. Times can be called by assembly level language and BASIC programs. Has some limitations which are discussed in the article. (5 pages)

TELEPHONE CONTROL WITH THE H-8 --
FOR USE WITH DIAL PHONES

These circuits can be used individually or as a package to completely automate your telephone system. Requires a parallel I/O board using 2 input and 4 output bits. Circuits include: dialer, place ON HOLD, ringback/busy detector, and auto-answer circuit, with all associated software in BH BASIC. A description of general telephone systems is included with waveforms and voltage levels. Though written for the H-8, this could be used with the '89. (16 pages)

UP YOUR DECWRITER (LA-36) TO 600 BAUD

A simple timing circuit is added to the LA-36 to double the speed. Works well, easy to construct and calibrate (you should have access to a frequency counter to make it easier). Costs about $10 in parts. Easy to install. (4 pages)

64K MEMORY FOR H-8 FOR UNDER $350
USING ONE SLOT

This project tells you how to build a 64K memory card for the H-8 using the SD Sales dynamic memory kit and a simple interface card using only 6 IC's. One IC is added to the H-8 CPU which does not interfere in any way with any other memory cards or other products. Complete with article describing how to do it, parts list, and interface schematic. Consumes only 5 watts of power. The interface card actually generates an S-100 bus to drive the SD S-100 card. The concepts behind this project could be used to interface other S-100 bus cards (many of which can still be obtained) to the H-8's custom bus. (For a recent description of the S-100 bus, see Herbert Johnson's "What is S-100 to Me?" in **The Z-Letter** #11 [April, 1991], the first in a series on this vintage bus.) For the H-8 ONLY! (17 pages)

>--<

THE EIGHT-BIT R/W (Continued from p. 1)

problems with our unbranded disks going out to purchasers at home and abroad. Then the club switched to branded disks and the 'return problem' went away."

"Further, last week one of my unbranded HDOS 3.02 system disks DIED for no apparent reason. I now have a VENDETTA against unbranded disks since the unbranded ones seem to give up just at the wrong time, and this has happened to me too many times. Therefore, I am in the process of replacing my important soft-sector disks with branded disks such as Dysan, 3M, DataLife, etc. I feel much safer with these. Incidentally, my hard sector disks have been around for 9 years, and they are still going strong. The only problem I have with them so far is storage space.

"I would say 'not to worry' about disks fading, assuming you stay with quality branded disks. If you store them in a place with decent temperature and humidity (definitely not in the basement) you shouldn't expect any problems. I have all of mine stacked in order inside color-coded plastic storage cases on shelves in our bedroom and in my computer room.

"If you are concerned about "fading" magnetic tracks on disks, it was suggested to me by our HUG club 'computer doctor' to try formatting them twice! This is supposed to put a more definite formatting pattern on the disks. I can't vouch for this treatment, since I have been 'as busy as a one-armed paper hanger with the seven year itch,' and haven't had time to double-INIT my disks! But it is worth a try for those with special concerns!!!"

Siemens Drive Parts Source. [From Joseph Szokolszky, Milwaukee, WI] "Parts for Siemens drives can be obtained from:

Princeton Computer Products / 11 Deer Park Drive / Building 4, Suite 118 / Monmouth Junction, NJ 08852

I hope this information [will] prove useful to your readers...."

S-100 and Assembler Madness. [From Lee Hart, TMSI, 323 W. 19th St., Holland, MI 49423] "Through an act of madness I now have over 400 S-100 boards from SD Systems. CPUs, memories, disk controllers, serial boards, and more, all new and with documentation. Anyone who is looking for good prices on S-100 stuff should contact me.

"Rick Swenton converted my Superset source code to Z80 mnemonics, and discovered a bug in the process. The Z80 macros that Heath distributed with the DRI MAC assembler have an error. The Z80 LD (IX+d),n and LD (IY+d),n opcodes (MVIX d,n and MVIY d,n in pseudo-8080 mnemonics) reverse the displacement d and immediate byte n. Correct as follows:

Was	Should be
MVIX MACRO ?N,?D	MVIX MACRO ?D?N
MVIY MACRO ?N,?D	MVIY MACRO ?N?D

Also, this assembler will NOT reliably flag relative jumps greater than +127 or -128 bytes as an error. These create nasty bugs to find.

"If you do much assembly language work, I highly recommend SLR Systems assemblers. I have SLR180, which is $49.95 from Z-System Associates, 1435 Centre Street, Newton, MA 02159. It supports the 8080, 8085, NSC800, Z80, and HD64180 using Z80 mnemonics. It's over 3 times faster than MAC, M80, or ASM; and directly generates XREF tables, .COM and .REL files (as well as .HEX and .PRN files)."

Socked In. [From Terry Hall, Wheaton, IL] "Hope all is well with you. I was cleaning out some files last nite and thought you might like to see all the enclosed vendor stuff rather than my just tossing it out. Might give you some leads on advertisers, new subscribers, etc. Nothing at all here I want back. Have fun!

"I've been plugging away day and night at a big contract to produce 150 Bible crossword puzzles to come out for '92 on a desk calendar as well as in 2 separate books. Am now on #89! Have gotten into Macintosh's for this project. Have rented a Mac for 3 mo and will buy my own next mo. Thanks to PC89LINK and LapLink Plus I can easily xfer files back and forth across all 3 machines on my disk now. Yes, am still running my HDOS on H89 w/big hard drive. Are still some things I can only do on EDIT19, for example, that [I] haven't found a way to do on [a] PC--such as set editing zones (such as to take out all periods in only columns 2 and 3).

"Keep up your good work--and take some time to smell the new Spring Flowers." [Thanks for the note, Terry. It's nice to know old software like EDIT19 can out-feature the new PC stuff. -Ed.]

BASCOM Patch and Clocks. [From Biff Bueffel, 19820 NW Metolius Drive, Portland, OR 97229] "In this letter is a discussion of three subjects that other H89 users may find of interest.

"1) 'Echo on Delete' is an anachronism left over from the days of TTYs, but you can find it lurking in CP/M run with a CRT. You can use CONFIGUR to get rid of it from BDOS, however some programs such as MBASIC and BASCOM do their own character I/O. Pat Swayne had a patch in **REMark** several years ago for MBASIC, but I have searched in vain for a patch to use with BASCOM. I decided to attempt the patch myself!

"It was not BASCOM.COM that needed to be patched, but BASLIB.REL, which contained the basic routines. I tracked down the patch points and an anonymous friend in Seattle helped to install it in BASLIB.REL. This patch is for the BASLIB that was distributed with the Heath version of Microsoft BASIC Compiler Version 5.0. This may not be the BASLIB distributed with non-Heath versions. If you do not find the bytes to patch at the same place in your BASLIB.REL, then proceed at your own risk. Remember to NEVER patch your original file of ANYTHING; always use a backup copy!

"If you use PATCH, ZPATCH or ZP to do the patch, set the OFFSET to 100h. If you use DDT, you will SAVE 187 records.

```
Beginning at 8705h change --> 0B 71 F1 70 65
                          to --> 03 E0 41 3D 93
Beginning at 874Eh change --> 95 45 C0
                          to --> 99 46 80
```

Delete (7Fh) is trapped by the second routine and then the first routine converts it to backspace (08). Microsoft REL files are 'bit encoded' so the values entered are NOT assembly language instructions.

"2) I recently added a clock to my C.D.R. SuperRAM89. All but two parts may be ordered from Digi-Key for under $20. The schematic and parts list for the expansion board contain all the information you need. This is basically the same circuit as the Anapro clock, but it is addressed at port A0h rather than 80h. If you need help with the parts order or want any construction hints, send me a note.

"3) Are you tired of entering the date for your dBASE II programs from the keyboard? If you have an Anapro or C.D.R. SuperRAM89 clock I can help.

Several years ago, I wrote a short assembly language program and a CMD file to load and run it. This routine will read your clock and put today's date in the dBASE DATE variable. Send me a SASE if you would like a copy."

Of DUPs, Drive Stepping, and Head Cleaning. [From J. Jagodzinski, Montreal, Canada] "First I wish to thank you for the lightning fast delivery of the software I ordered. I purchased the TEST17 program from you on a hard-sectored diskette.

"There are some problems with the package documentation however. On page 1, item 2. The phrase 'such as DUP for any operating system' is wrong. I use CP/M 2.2.03 with Livingston BIOS ver 5 on my H/Z-89. I ran DUP with [the] verify option. The resulting copies do not work. One gets as far as 'ACTION? <BOOT>'. Pressing <RETURN>, there is a lot of clicking from the disk drive which dies down after awhile and the message

```
?00 DISK READ ERROR DURING BOOT.
BOOT ABORTED.
```

appears. Remembering that you don't have [the] Livingston BIOS, I next tried CP/M 2.2.03 with Heath BIOS. I used FORMAT on a blank diskette and ran DUP with verify again. The result was the same. So it was not Livingston BIOS (BIOS-80) or its FORMAT80 that was causing the problem.

"Using the original diskette with [a] write protect tab, I got as far as the instructions said I would with the tab on. So the original was not defective. Eventually I ran HUG's DUP17. That produced working copies.

"The question remained why your instructions did not work. I dumped tracks 0 and 1 from both the original and the bad copies using both HUG's SDUMP and DDEU. They were identical of course. That doesn't leave much. I determined that both DUP and the Heath BIOS read the Track/Sector ID Header that precedes each sector. I did this by asking them to read a 2 sided diskette. SDUMP and DDEU go through the BIOS, so that tests the BIOS. I determined BIOS-80 read the Header rather than the backside tracks by first formatting a diskette 2 sided, then 1 sided. That leaves the odd numbered tracks on the backside, but BIOS-80 knew the diskette was one sided.

"I looked at the sector layout in the H89A illustration booklet. It does not say if it is HDOS or CP/M, but regardless there does not seem to be much opportunity to alter anything and have the sectors readable under CP/M, but not quite readable under HDOS.

"In conclusion, the phrase in item 2 needs to be changed. And I would be interested in knowing why [DUP] doesn't duplicate, if you know.

"A related, but irrelevant fact I discovered was that DUP does not need a formatted diskette to copy to. It works just as well on blank, unformatted diskettes. I had always believed you had to format a diskette before you could DUP to it. I will probably stick with my old method, however. DUP does not perform the media check FORMAT80 and FORMAT do.

"Next, you have a 'word processing error' in INIT.DOC. Paragraphs B10 and B11 are identical except for the position of a phrase.

"Also there are 2 things I disagree with in your instructions. You make a recommendation in the FEEDBACK section, page 4, regarding adding 2 or 4 milliseconds to the minimum step times for each drive for use in the configuring utility [CONFIGUR]. TEST17 gives back 10ms. for my TEC 504 drives. (They are rated at 3ms., but being 'surplus' they don't even work at 4ms.) I have CONFIGUR set at 6ms. This gives a soft error rate of between 1 and 3 per half hour. This soft error rate is apparently independent of drive usage. Programs such as TEXT and ASM which keep the drive lights on for twenty minutes or so do not increase the error rate noticeably. I get the soft error rate from HUG's ERRORS. I consider the error rate quite acceptable and do not intend to slow down my set rate. It it were not for ERRORS I would not even be aware of soft errors occurring. Adding something to TEXT17's value would be real overkill.

"Finally, in TEST.DOC you tell people to stay away from option C - CLEAN DRIVE HEADS unless you are a technician. This is really over-cautious. The procedure consists of inserting a head cleaning diskette into the drive. It is not that hard! If you can insert a regular diskette, you can perform this.

"Before, I had to drill 10 accurately-spaced sector holes in my head cleaning diskette to use it in my hard sectored drives. Else the head would not stay engaged. I am delighted I can now use regular head cleaning diskettes right out of the box.

"But I would like to put in my 2 cents worth on the use of head cleaning diskettes. Some of this information would be vital to some users.

"1. TEST17 runs the head cleaning procedure for 30 sec. It is obvious when the procedure is over. The cleaning diskette keeps rotating, but I believe the head lifts. I recommend releasing the diskette at this point just to be sure.

"2. Do not run the cleaning procedure every day like some cleaning diskette manufacturers recommend or even every week. They are just trying to sell more cleaning diskettes. Some manufacturers now recommend using them every 40 hours of drive use. Forty hrs. of drive use works out to a lot more than 40 hrs. of computer use. I recommend, depending on how much you use your computer, once every 3 or 6 months! Or when you notice the soft error rate has suddenly gone up.

"If you don't have a program to check the soft error count, you can still tell when the shot error rate has gone up. The indication is the drive retrying accesses repeatedly. If this is associated with more than one file, it is the drive and cleaning can make a dramatic improvement in such cases. If it is only associated with 1 file, it is the diskette. Try copying the diskette and reformatting it.

"As a matter of interest, when there is no problem with the drive, the soft error rate actually goes up if I run the cleaning procedure on my drives. This lasts about 15 minutes.

"Look at the material of the head cleaning diskette. The material it most resembles is a finer version of the plastic pot **scouring** pad! Excessive use will wear down the head.

"3. For single sided drives, do not remove the tab which covers one side [head access slot] of the cleaning diskette. If your brand does not cover one side, do not use it in your single sided drives. Get another brand. The cleaning diskette will wear away your pressure pad in short order if it touches it. Dirt on the pressure pad will not effect your drive reliability. If you have both single and double sided drives, you will need 2 head cleaning diskettes, one with the tab removed and one without.

"4. Make sure the cleaning diskette is centered in its jacket before inserting it in the drive. The material is not as stiff as a regular diskette and does not move as easily in the jacket. You could engage the center hub on the edge rather than in the center hole. If you do, you will hear a sound like someone whipping a dry rag against something. Release the diskette at once!

"5. Follow the cleaning diskette manufacturer's recommendation on how much fluid to use, but if it soaks the outside of the jacket, use less.

"I hope my letter proves of some use to you." [Thanks, indeed, for your comments. I plead "guilty" to the errors in the documentation for the hard-sector diagnostic disk, particularly my mistaken recommendation for duplicating the original. I repeated and confirmed the problems you discovered after "replicating" the disk with CP/M's DUP.COM. Even more interesting, I think, is that the "replicated" disk won't even "MOUNT" (log) under HDOS! This suggested to me that the **disk directory** of the DUP'd disk was corrupt. The error messages you and I saw when attempting to boot the disk provides evidence, too. HDOS loads information from the directories of "mounted" (logged) disks into a buffer and the "DISK READ ERROR" message we got would be just the type of minimal message I would expect during boot. I've also looked at the putative HDOS directory on track 13 of the DUP'd disk with DDEU and discovered a large gap in it filled with 00hex and FFhex, a gap that isn't there on my source!

[Hence, I can only recommend that HUG's or similar **whole-disk** copy programs be used when preparing disks of "foreign" format. In particular, do **not** use CP/M's DUP.COM to prepare HDOS disks! For duplicating standard hard-sector, I use a public domain program I obtained from OMAHUG (my "local" HUG) that runs under HDOS and I've included it in the set of HDOS utilities listed on p. 2 of this issue. This utility will replicate **either** HDOS or CP/M disks. But I have **not** tried it with double-sided or 96-tpi drives, so can't vouch for its abilities in those cases. For soft-sector, I use HUG's SDUP37 in its HDOS soft-sector support package (885-1127). That program also does a nice job with either HDOS or CP/M disks and only gags (as I noted way back in issue #3, p. 4) when attempting to duplicate the 18-sector-per-track format provided by some drivers for HDOS.

[As for your disagreement with my recommendation in the TEST17 documentation to set drive step rate two or four milliseconds greater that that determined by the diagnostic utility, I had two things in mind when I wrote it. First, most users will be running (stock) Siemens/Wangco drives for hard-sector. The worm-gear head positioning system used in these drives is **known** to be troublesome if not cleaned periodically. (See Dan Jerome's traversal of that procedure in issue #10, p. 8.) By setting the step rate somewhat higher than that

indicated by TEST17, you can prolong the service life of the drive between cleanings. Second, I personally prefer as error-free an environment as possible and setting a slower (higher) drive step rate discourages both soft and hard errors. But as your remarks indicate, this preference is not universal.

[Finally, my comments about using the "CLEAN DRIVE HEADS" option in TEST17 was simply a repeat of the recommendation included in Heath's original documentation. I may, indeed, have been "over-cautious"! -Ed.]

Banked BASIC and HDOS 3.02 Questions. [From Mark Hunt, Ray Brook, NY] "Have a few thoughts/-questions for you/your readers.

"When I first encountered computers, back in 1980, I was struck by the fact that DEC's BASIC Interpreter was always on-line with the operating system. Adding to that is the fact that, although I've played around with Assembly and FORTRAN, I never-never-never will be a programmer. Don't have the extra time ... about the best that I can hope for is BASIC.

"In **Staunch** #20/21, Lee Hart mentioned that the H/Z-89[A] could handle three banks of 16k RAM Expansion Boards. Also, Lee has been wondering what to do with the extra memory inherent in his H/Z-19[A] enhancements.

"I would like to suggest that a PD BASIC Interpreter, Compiler (TINY BASIC?), B-XREF, along with any other useful BASIC utilities, be placed upon such a board. It would always be handy, as well as classie.

"Alternatives would be PIP and SYSCMD. What do you think about this?

"Concerning HDOS 3.02 -

1. HDOS 3 should be able to monitor Lee's SUPERCLOCK.
2. Suggest that EDIT19 (modified for HDOS 3.0) be the 'default' editor for HDOS, not EDIT. The documentation is already on disk - and it is a nice editor!
3. HDOS 3 - being ORG-0 - might be able to run CP/M programs - either directly, or through a process similar to that used with HRUN. (This is important, folks!)
4. Am not clear how pseudo DVD's such as HELP.DVD or FBE's SPOOLDISK may be used with HDOS 3. Have any advice?
5. Both HS and SS SY: should really operate much the same - I refer to the now-standard media-testing portion of these fine drivers.
6. Need something that will change our .BAT files into .EXC files.
7. Who designed the single board that replaced Heath's three: H-17, H-37, and H-47 boards?

"Thanks!" [Mark, I think you may be confused on one point about HDOS 3.0x and an explanation will probably clarify your question 3 about running CP/M programs under HDOS 3. Although 3.0x remaps memory, as does CP/M, the resulting system memory map is **entirely** different from that produced by CP/M. Under the latter, most programs load at and run from 100hex, with some system functions located **below** that address. Most of the CP/M system (BIOS, BDOS,

and CCP) are loaded at the top of memory. Under HDOS 3, the system (HDOS30.SYS) is loaded at the **bottom** of memory and occupies some 6K, with drivers, various tables, and buffers located at the top of memory. (For a graphic illustration of the latter, see the HDOS memory maps on the insert to issue #8.)

[When developing 3.0, Bill Parrott and Richard Musgrave intended to **preserve** the standard HDOS load and entry address (2280hex) so that most software could be run under the new system. Because of the different load addresses, CP/M programs will not run "out-of-the-box" under HDOS 3.0x. An HDOS program attempting to make them do so would not only have to alter the load address, it would also have to intercept CP/M's BIOS and BDOS calls and change them to HDOS's SCALLs before passing them on to the system. I don't have Pat Swayne's HRUN, but I suspect it works by doing the reverse: it loads at CP/M's standard 100hex, lets HDOS programs load at their normal 2280hex, and intercepts SCALLs and changes them to BIOS and BDOS calls. HRUN's environment thus simulates a standard HDOS 1.5, 1.6, and 2.0 (**not** 3.0) configuration, with 8K of ROM and RAM at the bottom of memory.

[As for your question 5, I, too, would have preferred that a media testing routine be included in the standard hard-sector device driver for HDOS 3.0x. -Ed.]

Dual-Format Hard-Sector: A Tutorial. [From Charles E. Horn, Horn Engineering Assoc., Garland, TX; also see Mark Hunt's article later in this issue] "I have received a copy of a letter to you from Mark Hunt of Barrow, Alaska [now Ray Brook, NY], with a number of suggestions for future content of the '89er. He highlighted a suggestion about publishing directions for creating a CP/M-HDOS dual format disk. I think that I made some reference to making such a disk in previous correspondence.

"I do not know of what use the dual format disk might be, except for distribution of software that happens to be written for both operating systems. First, I will say that the creation of such as disk was, for me, a tedious process that I was glad to have done only once. After that, I took very good care of my master disk!

"I only know of 'duals' being made on hard-sector H-17 floppies. Even though the format of H-17 disks is essentially the same for CP/M and HDOS disks, HDOS cannot mount a CP/M disk and CP/M cannot detect available directory space on an HDOS disk. HDOS expects to find the DIRECT.SYS and GRT.SYS files, as created by the HDOS INIT process. CP/M simply expects to find the hex character E5 in unused directory space. INIT.ABS places somewhat random garbage in this space. [The HDOS and CP/M directories are also located on different tracks on the disk. -Ed.] The Group Reservation Table (GRT) serves a purpose similar to that of the File Allocation Table (FAT), as used by Microsoft in MS-DOS. That might be because they had at least one common author [J. Gordon Letwin], but that is another story.

"I will not describe how to make a dual format disk in the greatest detail [see **REMark** #21 (Oct., '81), pp. 5-7, for doing it under HDOS 2.0], but here are the general principles. HDOS (INIT.ABS) does not initialize DIRECT.SYS and its companion

GRT.SYS and RGT.SYS support files at the first tracks of the disk. The general idea of the dual format disk is to initialize the disk under HDOS and create a dummy file as its first directory entry. This file should fill all of the available space that is represented by the tracks that precede the directory tracks. This file should consist entirely of hex E5 characters, so that these tracks will appear to have been formatted under CP/M. All of the sectors that this file occupies must be linked in the GRT to represent a valid HDOS file. This file is then flagged for read-only and hidden with a SYS flag. Now, only the space that follows the directory tracks is available for additional HDOS files. When this disk is examined under CP/M, the DIR command will show an empty directory and the STAT command will show the entire disk to be empty.

"This process leads to two problems. First, under HDOS 2.0, the directory file is placed by INIT.ABS on track 13 of the 40 track disk (as numbered from 0) which would leave less than 12 tracks [28.5K] available for CP/M. Second, to CP/M, the disk appears to be completely blank and is vulnerable to being completely filled with CP/M files. [This could **overwrite** the HDOS directory and files. -Ed.]

"The first problem is easily solved. Just INIT the disk under HDOS 1.6, which places the directory files on track 22. Since HDOS is upward compatible, HDOS 2.0 will have no problem reading the disk and about half of the tracks [45K] will be available to CP/M.

"The second problem could be solved by creating a dummy file under CP/M and allocating all of its sectors to those occupied by the HDOS directory files and all sectors to follow. In practice, this was probably never done on commercial distribution disks. The distributor knew to avoid over-writing the HDOS files. Such disks were often accompanied with a warning to not attempt to write to the disk, and were usually write protected. Now you know the reason for the warning.

"The mechanics for creating a 'dual' disk is simple. First, INIT the disk under HDOS 1.6. Remember that tracks 0, 1, and 2 are reserved as system tracks under both HDOS and CP/M. Then, if my arithmetic is correct, fill tracks 3 through 21 (190 sectors) with E5 characters (a total of 48,640 bytes), written to the disk as one or more dummy HDOS files.

"As I remember, I used a program called CRASH.ABS from Viking Software to fill the disk sectors with E5's, then patched the dummy HDOS file name into DIRECT.SYS. The sector allocations in GRT.SYS were also patched in. I suppose one could create under HDOS an assembler source file, containing 48,640 DB 0E5H statements, and assemble it to a .ABS file. It could then simply be copied to the 'dual' disk. No directory or GRT patching would be required. Any number of separate similar or identical files, each with a different name, could be used for this purpose, but the total number of bytes must be correct.

"Other tricks might be used. I remember a program called REDUCE.ABS by Burton Hulland (Hulland Engineering) that can be used to reduce the DIRECT.SYS file length from 18 sectors down to 1 or 2. This can free up a lot of HDOS disk space (on any

HDOS disk).

"All of this might be of some historical interest, but why go to all that trouble? Most '89ers are likely to have a dual format from somewhere - why not just clone it? One way to do that would be to copy it with a track-to-track disk copy utility, like Barry Watzman's FTCOPY.ABS for HDOS. This utility will copy a 40 track hard-sector disk from SY1: to SY2: where the destination disk does not even need to be formatted. It is so insensitive to format that it will copy a CP/M disk under HDOS! [The DUP utility in the HDOS program package listed on p. 2 of this issue is an enhanced p.d. version of FTCOPY and requires only two drives to function. -Ed.] The next step would be to verify that the read-only flag is set on the dummy HDOS file, then delete all other HDOS files. Go to CP/M and delete all the CP/M files. You now have a useful blank dual format disk.

"Since most of my memory of HDOS mechanics has faded, I hope that this information is correct and useful. I doubt that many readers have access to HDOS 1.6 (or ever heard of it). However, dual floppy disk are fairly common and should be available in some form to almost everyone. I would even be willing to send you a dual floppy master if you would like to create them in bulk for distribution. FTCOPY.ABS might be more difficult to find ... [but see above, -Ed]. I also know that it was written to run under Heath (Lifeboat Associates) CP/M 1.4, but I have never seen it for "real" CP/M [2.2].

"I will leave it to you to condense this information for your readers. It is mostly for the 'record'. I have no idea that very many of your readers are likely to have an interest in it except for its historical value." [Thanks very much for the excursion, Chuck. Actually, as far as I was able to determine, your recollection of "HDOS mechanics" was very much on the money. If any readers are interested in obtaining a "master" dual-format disk prepared with HDOS 1.6, let me know. I'll get a copy from Chuck and add it to **Staunch**'s library. -Ed.]

=====

SUPERCALC SUPERSET SUPERCLOCK
By Bernard Waltuck

Supercalc, by Sorcim, has been around for the H8/89 for a long time. It is a full function spread sheet which even allows "if/then" functions and "lookup tables" within larger formulas. It is so well documented, both within the distribution documentation as well as help screens included within the program, that there has been little need to write about it until now. (Incidentally, it is still listed as available from Quikdata for only $49 in limited quantities as of Sept., '89, soft sectored only.)

If you have had your head in the sand, then you probably have not yet heard of Lee Hart's Superset, Superclock and Superfont [reviewed is **Staunch** #19]. If you are wondering whether to invest or not, DON'T WAIT. At least get the Superset and Superclock. I never want to be without them. Superset does lots of things. But the one indispensible function is the "white screen" mode. If you have used any of the modern machines you will notice many of them work in "reverse video" all the time. This is much easier on

the eyes. If you try it and find it strange at first, adjust the brightness, inside the console, to your liking and you won't ever want to work without it. It reduces eyestrain dramatically.

Included with Superset is an on-screen clock that must be reset every time you turn on your set (a minor inconvenience, since it saves you computer processing time if you have a device driver or other task that keeps time for you on screen). I find it quite helpful. Now comes Superclock. A battery operated clock that continues to keep time even when the terminal is turned off. (Neat, but not earthshaking.) However you also get a second page of screen memory, good for keeping memos, help screens, or directory listings that you can refer to very easily. Neater, but not indispensible. What Superclock does, that I do find indispensible, is that it allows you to program your function keys (almost) any way you like. You are limited to a total of 40 characters which I can live with. For PIE, it's of only little help since all the function keys are used. You can, however, use "shifted" function keys to add extra capabilities and still not interfere with the regular function key action.

But what about SUPERCALC? Supercalc uses only 2 function keys, the BLUE key to unshift and shift the keypad and the RED key to bring up the help screens. I have programmed the remaining function keys to do what I think single stroke keys should do: save keystrokes for your most frequently used commands. I usually use a lot of exponential equations in my spreadsheets. Large sheets take time to change, so I set the program to only calculate the entire sheet when forced to do so, by the "!" command. This is a two hand operation, so I have programmed the f1 key to "!". Next, I am always revising something and I then like to return to the upper left hand corner. So f2 is "=A1" (goto A1). The only control character used by Supercalc is the ^Z (restart line or exit from the directory listings). So, you guessed it, f3 is ^Z. I also like to print out my spreadsheets, and have programmed the white key to O(utput the) D(isplay sending) ALL,(to the) P(rinter). So the WHITE key is programmed to "/ODALL,P". Since f4 and f5 are not used yet I have programmed them to "/C(opy) [esc]" and "/R(eplicate) [esc]". (The [esc] key triggers the "current cell" which can be moved around with the cursor controls until another [esc], semicolon, comma, or return key is entered.

Now for the first trick. You must program the BLUE key to send "[esc] P" and the RED key to send "[esc] Q" or they will send nothing. Lee doesn't mention that in his documentation, but if you program the keys right it works just fine.

Now for the second trick. And this concept is transferable to other software. **Program the keys from within the applications program.** Now every time you run the program the function keys can be active. Here's how:

If you have room in the opening logo you can replace unnecessary text with your commands. In this case, I replace many spaces and the address of Sorcim. So instead of sending words to the terminal screen, I am sending instructions to the terminal console.

Put a copy of Supercalc and DDT on the same disk. Do not ever modify your distribution disk. Go to that disk as your default disk. Enter: "DDT

SC.COM". This will display the area to be sure you are not using a different version with program material at this location. So enter:

D6120

You should see lots of spaces and then Santa Clara, CA. If so, then alter the program by entering: "S6120" and then if you use my particular functions enter the following with a "RETURN" between each hex number:

```
1B 78 31 1B 59 38 20 1B 70 21 1B 43 3D 41 31 1B
esc x  1 esc Y  8     esc p  ! esc C  = A  1 esc

46 6D 1B 43 7A 1B 43 2F 43 7B 1B 43 2F 52 7B 1B
 F  m esc C  z esc C  / C  { esc C  / R  { esc

43 7B 50 46 1B 43 7B 51 1B 43 2F 4F 44 41 4C 4C
 C  { P  F esc C  { Q esc C  / O D  A L  L

2C 50 1B 47 1B 71 1B 66 35 1B 66 34 1B 68 3D 1B
 ,  P esc G esc q esc f  5 esc f  4 esc h  ; esc

79 31 00 .
 y  1
```

After the period/return then enter "D6120" again to review that you have entered the exact sequence you prefer. Finally exit DDT with ^C (CTRL-C) and immediately save with SAVE 98 SC.COM <RETURN>.

Most of how it works is in the manual except to know that [esc] C moves the cursor one space to the right which is how you separate the items on the 25th line rather than hitting the right arrow key. There is one side effect you may or may not like. I have disabled the 25th line so that I can continue to view the date and time. When you press the blue key to shift or unshift the keypad, the message appears on the command line. No problem just strike ^Z or now the f3 key. I like it better this way. You can always omit the sequence "1B 79 31" from the end and the 25th line will remain active. It's your choice. But if you do leave the 25th line active, also omit the "F" (hex 46) after [esc] P (hex 7B 50).

This modification only works when **both** Superset and Superclock installed. Otherwise you will need a utility like HUG's Keymapper to do this. But with Superset and Superclock installed you are not using any computer memory and any program can configure its own keys. Just remember to have the blue key send [esc] P and the red key send [esc] Q.

P.S. Before running DDT to modify any program run STAT to see how many RECORDS are in the program. Divide by 2 and that's the number of pages you will save with SAVE XX FILENAME. That's a lot easier than calculating the number of records by converting from hex to decimal.

=====

VENDOR.UPDATE

H/Z Service. The word I have is that Heath has **finally** discontinued service on the '89. I'm not terribly surprised since the latter has now been out of production for seven years. But one long-time vendor, SignaSoft and Systems, is stepping into the

gap left by Heath. An ad from SigmaSoft in the March **SEBHC Journal** included prices for a parts clearance **and** standard costs for service of the '89. The latter ranged from $95 plus $50 shipping for a **complete** computer to $45 plus $5 shipping for the CPU and terminal boards. Also noted in the ad was the offer of "free" phone consultation (for the cost of the call) to narrow your problem to a specific board. For further information contact:

Clay Montgomery / SigmaSoft and Systems / 2433 Winterstone Dr. / Plano, TX 75023 / 214-596-0116

Besides SigmaSoft, spare parts can still be obtained from Lee Hart (TMSI) and Quikdata. The "CONTACTS" column of this rag also includes sources for a range of items. And don't forget the first parts of the hardware troubleshooting series you'll be seeing here later in the year!

TCJ Changes Editor/Publisher. Staunch went through it four years ago and survived. A large number of magazines have also endured it; some are still with us. Now **The Computer Journal** has seen its way through the same transition and seems to be on its way to further growth. I'm referring, of course, to a change in editor/publisher. Art Carlson, founder of **TCJ** and its editor for eight years has finally hung up his typesetter's apron. Replacing him is Chris McEwen, a Z-NODE sysop. The change was announced in the Jan/Feb issue (#48). And Chris's first issue reminds me very much of **my** first **Staunch** (#6) and even my last issue (#20/21); quite a few typos of the kind that wouldn't normally slip by an editor unless he's in a hurry (as #20/21 was) or new to the job as I was with #6 or Chris with **TCJ**'s #48.

Further, he called early in May to discuss the ad you'll find on this issue's insert. Among other things, he mentioned that the **size** of TCJ will be building to some 60 pages later this year. Even his second issue (#49) was four pages longer than Art typically put out. As I've mentioned before (#'s 15 and 17), **TCJ** is a magazine for advanced CP/M (specifically Z-System) users and embedded controller design. However, much like **Staunch**, almost anything can appear, depending on what crosses the editor's desk. You may recall my brief history of HDOS in #43. The latest issue I have (#49) included coverage of the myths and dangers of surge protection techniques, floppy drive alignment using the RTX2001A microprocessor, motor control with NewMicros F68HC11, controllers for home heating and lighting, jumping from high-level languages to assembler, local area network basics, and three articles related to Z-System (one of them part of a continuing series by Jay Sage). This issue also included a four-page ad from Z-SUS, a Z-System update service. Though nothing here is specifically H/Z, I highly recommended **TCJ** for the advanced user or experimenter. Subscriptions are $18/year. For more information, contact:

Chris McEwen, Editor/Publisher / **The Computer Journal** / P.O. Box 12 / South Plainfield, NJ 07080-0012 / 908-755-6186

National PC Systems. A lot of junk mail flows through my post office box, as you might expect. Earlier this year, I received an offer for a computer maintenance service contract from National PC Systems, Indianapolis. One of the first things I did was read the fine print! In part, that ran, "It is agreed that the computer is an IBM PC/XT/AT or COMPATIBLE OF ANY MANUFACTURE. In the event the computer is not such NPCS will still be obligated to perform all services herein at its discretion and additional charges may apply."

Notice the words "discretion" and "additional charges"! The outfit also offers to arrange for a free loaner during the repair period. But where is it going to find something compatible with what you've got? The same place you got yours? At a flee market?

If you have a PC, this **might** be worth considering, but I thought the annual fee ($178.31) was steep. And it could be even higher since the quote **doesn't** include hard drives, printer, external monitor, nor even **shipping** of the malfunctioning machine to the service agency. On second thought, you should probably circular file the mailing. A better alternative is to consider a standard insurance policy such as SAFEWARE, discussed by Dan Jerome in issue #17, p. 10.

WordStar 4.0. I got a recent call from reader Tom Slavik (Waco, TX). He's been trying to locate a version of MicroPro's MAILMERGE that will work with his WordStar 3.3. In prior calls, we'd discussed his options and one of those was to obtain a copy of WordStar 4.0. Well, he called the toll-free number I gave him. And it seems that the window of opportunity to buy ver. 4.0 at a reasonable price has closed. MicroPro (now named WordStar International, as I noted in #14) no longer handles it. The only known source for it now is Elliam Associates (P.O. Box 2664, Atascadero, CA 93423, 805-466-8440) at a substantially inflated price.

Lindley Systems About to Move. As I assembled this issue, I got a change of address card from William Lindley. He's about to move from Woodbridge, VA, to the southwest. His new address will be:

William Lindley / Lindley Systems / 8139 E Mawson / Mesa, AZ 85207

Effective date is the 15th of June. He didn't give a new phone number, but I'll pass that along to you when I have one.

The Computer Monthly. Sources of information about 8-bit systems continue to get scarcer, although not as bad as resources specific to our H/Z systems. Actually, we aren't as bad off as some. Back in December, I got a letter from a guy in North Carolina looking for system information about his three NCR Worksaver CP/M-86 systems, operating as a network. He said he wrote to NCR, but it "considers [my system] obsolete and myself of so little value as a potential customer as to be a nuisance to them." (Now, if that's the way NCR treats its old customers, perhaps, when you "trade" up to a PC, you'd better stay away from any machines manufactured by the new union of NCR with AT&T!) The best I could do was direct him to FOG International (P.O.

Box 3474, Daly City, CA 94015, [data] 415/755-8315), a "generic" computer group supporting both IBM-compatible and CP/M machines. (If you want information about this group yourself, send it a business-sized SASE.)

At various times in the past, I've passed along references on potential resources to you, usually of the newsletter or magazine variety. **TCJ**, above, rates as one of those, as does mention of **Eight Pieces and Change**, **SEBHC Journal** and **The Z-Letter** in the last issue. These publications carry information that bears reasonably directly on the operating systems and/or hardware we run. And while other large, national publications (**Byte** and **The Computer Shopper** come to mind) have abandoned us (except for classified advertising), there's one magazine in the same "class" as the last two I mentioned that still makes some effort to cover systems other than the PC variety. This is **The Computer Monthly**; it changed its name from **Vulcan's Computer Monthly** about a year ago and you may have hear something about it under that name.

Variety is certainly the word in this hefty magazine--the issue I have before me runs to 186 pages. In terms of style, it's a "clone" of **The Computer Shopper**. That is, there's a lot here, both advertising and articles, for the PC user. What sets it apart from its twin is the range of regular columns for non-PC systems. These include: Adam, Amiga, Apple, Commodore, Macintosh, Radio Shack's Color Computer and TRS-80, Sanyo 55X, TI-99, and Timex-Sinclair. CP/M coverage is provided by FOG International and usually runs to two or three short articles. There's nothing here as substantial as you'll find in other, smaller-circulation publications. So you might want to look at an issue or three at your local newstand before you put out bucks for it. However, introductory subscriptions are easy on the wallet, only $15.95 for 12 months, $22.95 for 24. For further information, write to:

Vulcan Publications, Inc / One Chase Corporate Drive, Suite 300 / Birmingham, AL 35244

For subscriptions, send a check to:

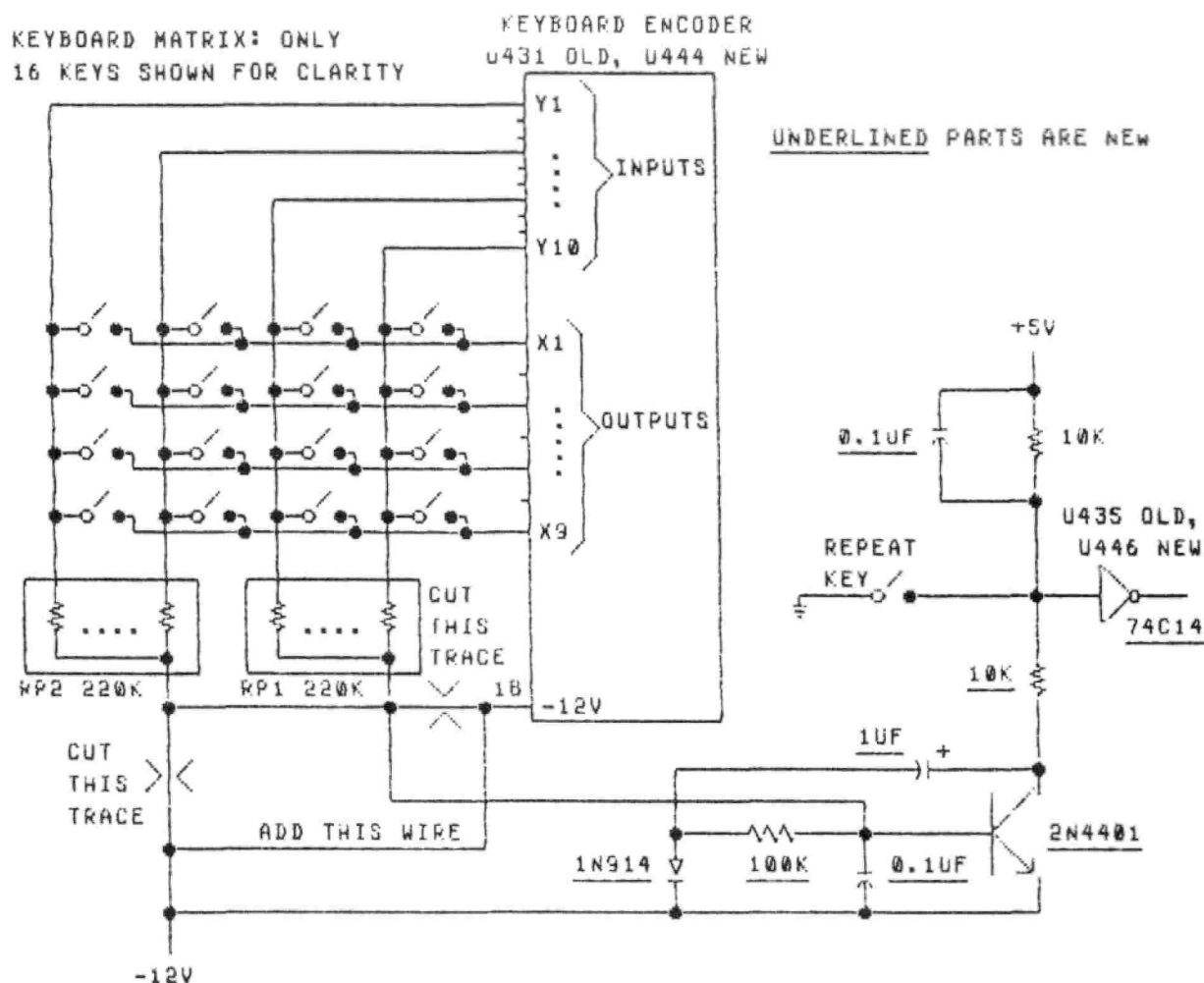**Computer Monthly** Subscriptions / P.O. Box 7062 / Atlanta, GA 30357-9827

This monthly was brought to my attention by Lenny Geisler (editor of **SEBHC Journal**) and Bernard Waltuck.
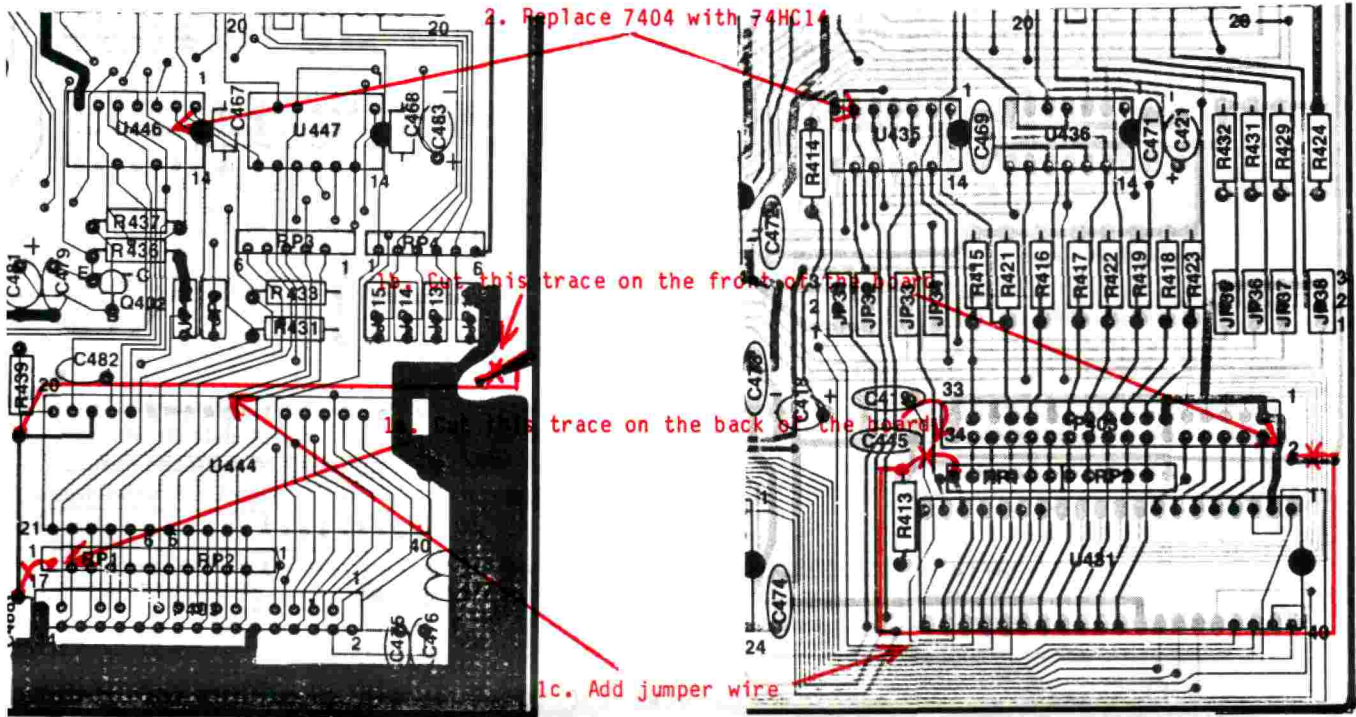
=====

A Quickie Auto-Repeat Circuit
By Lee Hart

The computer is a real godsend to lousy typists like me. I can enter text at a blistering 20epm (errors per minute), and go back later to kerrekt
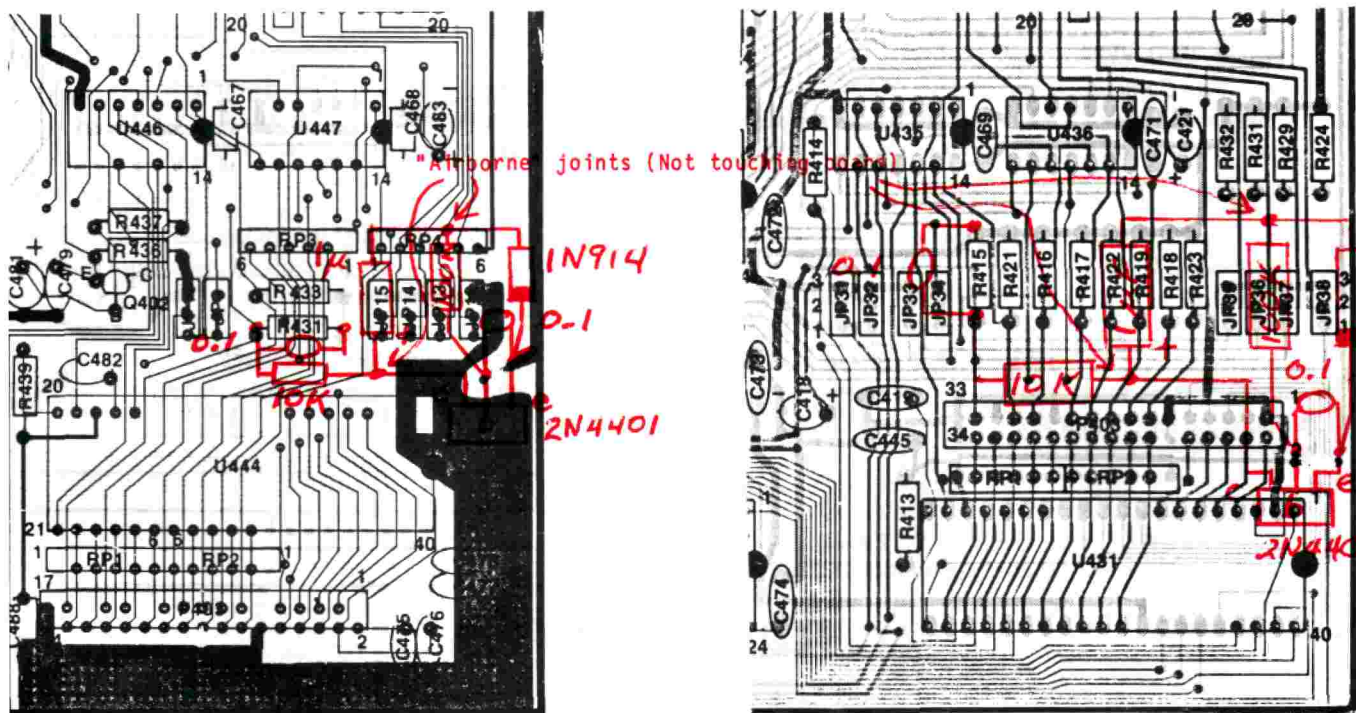

KEYBOARD MATRIX: ONLY 16 KEYS SHOWN FOR CLARITY

KEYBOARD ENCODER
U431 OLD, U444 NEW

UNDERLINED PARTS ARE NEW

Figures for Lee Hart's "A Quickie Auto-Repeat Circuit"

NEWER H-19/89A BOARDS
(Front view, lower right)

OLDER H-19/89 BOARDS
(Front view, lower right)

3.   A D D   N E W   C O M P O N E N T S

the misteaks. This tends to require moving the cursor all over the screen. Though the REPEAT key helps, I've often wished the H89 had auto-repeat like many other computers.

A couple of firms have offered auto-repeat boards (ANAPRO and Quikdata come to mind), but they seemed overpriced for what they did. I've seen construction articles, but there were a lot of parts to add, circuit boards to build, etc. The problem just didn't seem worth the effort to fix it.

Then I remembered the old 90-10 rule; the last 10% of a project takes 90% of the work. If I didn't try to make it universal, lay out a PC board, etc. it might be much simpler. So I dug out the H19 circuit diagrams, and started experimenting. The result is a quick-and-dirty circuit that provides 90% of the performance of a "real" auto-repeat, for about $1 worth of parts.

Parts list:

1 - 40106, 74C14, 74HC14, or 74HCT14 CMOS hex inver-
    ter IC
1 - NPN signal transistor, 2N4401 or equivalent
1 - switching diode, 1N914 or equivalent
1 - 100K 10% 1/4W resistor
1 - 10K 10% 1/4W resistor
2 - 0.1uF 25v disk ceramic capacitor
1 - 1uF 10% 25v tantalum, ceramic, or film capacitor

Installation: This will be a "glob" circuit; the parts are soldered directly to the terminal logic board (TLB), and supported by their leads. It ain't pretty, but it works. We'll change an IC, cut two traces, and add seven new components.

There are at least 3 different TLB layouts. Look for the copyright date etched into the foil; a "new" board is dated 1981, "old" is 1979, and "antique" is 1978. The instructions are basically the same for all 3, with differences noted in the text below. [A circuit diagram is on the preceding page; illustrations for "old" and "new" TLB's are on the insert. -Ed.]

1. Isolate pin 1 of resistor networks RP1 and RP2

a. Remove the terminal logic board from your ma-
   chine. Find resistor networks RP1 and RP2, right next to keyboard connector P403. On the back of the board, cut the trace going down from RP1 pin 1. When finished, the only trace remaining on RP1 pin 1 will go to RP2 pin 1. On antique TLBs, there is a hidden trace on the top side of the board from RP1 to pin 18 of keyboard encoder U431; so remove U431, bend out pin 18, and replace the chip in its socket.

b. Locate the trace running along the extreme right edge of the board on the front side (back on an antique TLB). This is the -12v supply. The bottom end ends at a plated-thru hole near the keyboard encoder IC. Cut this trace near the plated-thru hole.

c. Solder one end of a 2-1/2" piece of wire to the cut end of this trace (not the hole). Stay at least 1/8" from the edge of the board, or it will interfere with the card guides.

d. Solder the other end of this wire to the 10K resistor immediately left of the keyboard encoder

IC. Which end of the resistor? The end CLOSEST to resistor network RP1 (upper end on old or antique boards, lower end on new TLBs). On an antique TLB, also solder a wire from this point to U431 pin 18. This should re-connect the -12v supply to pin 18 of the keyboard encoder (disconnected in steps 1a and 1b). Confirm it with your ohmmeter.

2. Replace the 7404 IC

a. Remove the 7404 IC about 2" above the keyboard encoder IC. It is U435 on old or antique boards, and U446 on new ones.

b. Replace it with a 74C14 (or equivalent, see parts list).

3. Mount the rest of the components as shown. Everything goes on the front side of a new or old board, or the back side of an antique. You can use super-glue or a piece of double-sided tape to stick the parts down if you like. Or, mount the parts in the following order so each one holds the next. [See the figures on the insert.]

a. Solder a 0.1uF capacitor across the cut in the -12v supply trace.

b. Solder the transistor in by its base and emitter leads. The base goes to the isolated hole at the end of the -12v trace and the 0.1uF capacitor. The emitter goes to the -12v trace, wire, and 0.1uF capacitor.

c. Solder one end of the 10K resistor to the tran-sistor's collector lead.

d. On an old or antique TLB, the other end of this 10K resistor goes to the lower lead of the leftmost 10K resistor in the group of 8 just above the keyboard connector. On a new TLB, it goes to the left end of the 10K resistor just above the keyboard encoder IC.

e. Solder the two leads of the second 0.1uF capacitor across the same 10K resistor in step 3d (the one already on the board, not the one added).

f. Solder the cathode (banded) end of the diode to the transistor's emitter lead, 0.1uF capacitor, and wire on the -12v trace.

g. Solder one end of the 100K resistor to the base lead, and the other end to the diode's anode (unbanded) end.

h. Solder the 1uF capacitor "+" lead to the junction of the 10K resistor and the transistor's collector. This lead should stay "airborne", and not touch any other circuitry.

i. Solder the 1uF capacitor "-" lead to the junction of the 100K and diode. This junction also must not touch any other circuitry.

Checkout and operation. That's it! Check your work carefully, and re-install the board. The system should operate completely normally, EXCEPT if you hold a key down. After about 1/2 second, the key should automatically repeat, as if you had pushed the REPEAT key. When you let the key up, it stops.

The REPEAT key still works normally, so you can start repeating early by pressing it. Once started, you don't have to hold the REPEAT key down.

The 1uF capacitor sets the delay before auto-repeat begins. I used a 10% unit which is a little harder to get. The more common parts often vary 20% or even 100% from their nominal value, so

you may have to play with the value to get a delay you like. Smaller values make it shorter; larger makes it longer.

The auto-repeat circuit only knows that SOME key is down; not which one. Fast typists will often hit the next key before the previous one is released. If this lasts 1/2 second, the auto-repeat can start accidentally. Either type with a lighter touch (so there is at least a moment when all keys are up), or increase the delay.

Particularly on newer H19-A boards, the auto-repeat delay is slower on some keys. That's because Heath added noise filter capacitors to SOME of the lines, making them slower and mushier.

How it works. Referring to the circuit diagram, you'll see the H19 keyboard is wired as a matrix. The keyboard encoder IC sequentially outputs pulses on lines X1-X9, and looks for them on input lines Y1-Y10. If no key is down, the resistors in networks RP1 and RP2 pull the Y1-Y10 lines low. When a key is pressed, a positive pulse from one of the X lines appears on one of the Y lines. By knowing X and Y, the keyboard encoder IC can figure out which key was hit.

Now look at resistor networks RP1 and RP2. If no key is down, there is no source of current, so nothing flows through any resistor in RP1 or RP2. Thus there is no base drive for the transistor; it must be off. The repeat line is high, and the 1uF capacitor is fully charged.

When a key is pressed, positive-going pulses appear on one of the Y lines. The pulses are filtered to a DC voltage by the 0.1uF capacitor. It starts to turn the transistor on, but the 1uF capacitor provides negative feedback. Any drop in the collector voltage gets coupled back to the base by the 1uF and 100K. Thus, the transistor turns on verrrry slooowwwwwly. This provides the 1/2 second pause before the auto-repeat takes effect.

If the key is held down long enough, the 1uF eventually discharges, and the transistor turns fully on. This pulls the repeat line low, just as if the REPEAT key was pressed.

When you let up the key, again there can be no current from RP1-RP2. The 0.1uF quickly discharges, and the transistor starts to turn off. As the collector voltage rises, the 1uF again resists the change. But this time, the diode prevents this current from reaching the base of the transistor. The repeat line goes high much quicker than it came down.

The collector voltage rises and falls slowly, and is somewhat noisy. So the 7404 is changed to a Schmitt-trigger device, and a 10K resistor and 0.1uf capacitor are added to its input to filter noise. This provides a nice clean transition between the repeat and no-repeat states. The CMOS parts reject noise the best, and incidentally reduce power consumption.

=====

HELP.HLP
By Hark Hunt

Kirk, I've been sorting through my HELP.HLP file - found some data that I thought you might appreciate reading - doubt that you have any trouble

filling your pages, and some of this stuff is pretty simple, but some isn't - perhaps your readers would find it to be of some small value.

Would like to stress that little of the credit for this information is due to me ... as I've read through **Buss, Sextant, The Staunch 8/89'er**, the **SEBHC Journal, REMark**, I've extracted bits and pieces that I didn't want to forget ... I've tossed a few of my thoughts in as well, but I don't imagine that they are original to me.

By the way. I didn't mention Henry Fale's excellent **H-Scoop** - although I had read a few issues, I never got around to subscribe to it (figured that I was already subscribing to five Heath-orientated magazines and newsletters, and that that was enough) - I've since ordered a year's subscription, and all of the available back issues.

Well, here it is. Hope that you feel it to be of value.

Disks -
1. Write-protection via notch-stickering is ineffective if the sticker has even the smallest hole in it.
2. Mostly, the differences in single-sided and DS disks are in burnishing and testing. The "odd" side of SS disks are not prepared for use. They may work - for a time. However, in a DS drive, they may cause, in addition to lost data, excessive head wear/contamination by media particles.
3. HS'ed disks have higher data integrity than soft-sectored, because the ten holes punched in the disk allow a system to definitively locate a given sector. Soft-sectored disks have no recovery protection at the sector level. The index hole allows one to locate the START of a track, but SECTORS are located by software, not by mechanical holes. Will likely, then, loose entire tracks of 20 or 18 sectors, not just one sector. Partial recovery of a damaged track, therefore, is rare (almost always possible with a HS'ed disk).
4. High-Capacity Disks -
   1. Double-sided, hard sectored, 40 tracks per side - no problems.
   2. DS'ed, HS'ed, 80T - some such disks actually use a different media. Others are simply tested more extensively.

   80T read/write heads are perforce smaller than in 48tpi drives, so head read current is much lower. This means that any electro-magnetic interference radiated by the horizontal flyback transformer and switching transistors will tend to jam drive signals. (Less of a problem with the H/Z-90 because the drives are well-shielded.) Also, the width of a 96 tpi-recorded track is only 1/2 of a 48tpi-recorded track. (This is probably why 40T drives write disks that are more easily read by another's computer.)

   So, an 80 track DVD may read, but (normally) not write, a disk formatted for 40 tracks.

   Actually, I'll bet that one COULD create a 40T disk in an in an 80T device - simply double (duplicate(each track! That is, both the "0" and the "1" tracks (if single sided

80T), or the "0" and "2" tracks (if double sided 80T) would need to have the same data (including the sector numbering) on them. (Might be possible to do this with one of the media-inspection/alteration utilities.)

This should be fairly easily done, I think, as a utility (possibly one of the disk copying utilities could be modified), or as a modification to the operating system (that is, to SY:DVD and wherever) so that the operating system itself handled these really very small details.

"It is not uncommon that a 48TPI drive recognizes a trace written on a 96TPI drive. While the reliability of such transfers is unpredictable, it is possible to format a Kaypro compatible 48TPI disk on an H-89 96TPI drive. The H-89 will find and read whatever a 48TPI equipped Kaypro has written on such a disk, but the reverse is not guaranteed. Success will depend on the sensitivity of the Kaypro drive the transfers will be attempted from. To format such a disk on a 96TPI drive requires a custom-made routine, writing to each track the sequences provided above." (Hemelryck, Ludovic Van, "Disk Exploration". **The Staunch 8/-89'er**. Issue 12 - May/June 1989: pages 2 to 5. This article discusses the EMULATE software of ANAPRO Corporation [P.O. Box 1987, Blythe, CA 92226 - 619/922-3919]) <MH>

3. Soft-Sectored disks -
   1. Regards Density -
      1. Single Density (FM) - software, not holes, assign sector starting positions (saves space for data)
      2. Double Density (MFM) - pack twice as much data into a unit track length as in single density
      3. Extended Density (?) - fewer sectors per unit length of track, therefore less data space lost in sector-book-keeping
   2. Soft-sectored/80T disks DO allow more storage.
   3. So one has a choice: do you want mega-storage, or do you want to be able to keep what you have?
5. NOTE: If a single-sided disk, track numbering will simply be from outside to inside, on the "0" side. If odd, tracks will alternate between side "0" and side "1" (with the "0" track being considered even, and on the "0" side).
6. What do we call these things?

INIT'ed	Called	Stores	Comments (HS'ed disks)
SS/SD = 40T	"40T"	100K	Reliable
SS/DD = 80T	"80T"	200K	Less so (virtually un-used)
DS/SD = 80T	"DS40T"?	200K	Still reliable w/good, DS'ed disks
DS/DD = 160T	"80T"?	400K	Least reliable, but handy for BOOTable Sys-tem disk (NOT for data!)

7. HS'ed disks are available from -

ATT: Mariam Campbell
Disk Mover   Lyben Computer Systems
8534 McCormick Blvd   1050 E Maple Road
Skokie IL 60076   Troy MI 48083
312/769-3727   313/589-3440

ATT: Henry Fale
Quikdata, Inc.   Midwestern Diskette
2618 Penn Circle   1301 Clayton Road
Sheboygan, WI 53081   Creston IA 50801
414/452-4172   800/221-6332

Drives -
1. Drives need to be programmed for the appropriate physical SY: number. Want to remember that the PHYSICAL drive number doesn't necessary relate to the LOGICAL drive number - example: post booting from SY1: or 2:. (LOGICAL drive numbers, then, change in a "round-robin" fashion.) TEST17/40/80 and TESTINIT, though, REQUIRE that you select PHYSICAL drive numbers, regardless of where you BOOTed from.
2. REMEMBER that the computer MUST NOT be operated unless the H77 is turned on - otherwise, all information on the boot track of the boot drive will be wiped. Also - should you unplug the H77, and then replug it backwards - all of the drives will turn on - then, simply unplug, invert, and replug again. Finally, the last drive on a chain must contain a terminating resistor - and the others must not. (It is a good practice to secure power to the drives (H77) prior to shutting the computer down - avoids drive head-banging.)
3. Drives can be either 40 track or 80, single-sided or double-, and capable of different degrees of soft-sectoredness, or not at all. 40T drives should be rated at 48TPI, and 80T drives should be rated at 96 TPI. Be aware that there are 96 TPI drives that can handle only 77 tracks, and also 48 TPI drives that have only 35 tracks.

Actually, drives weren't made that could advance one full inch - just 3/4" - hence, "40T". Another thought - the UDUMP manual states:

"Some device drivers initialize disks with a cluster size that is not evenly divisible by the number of sectors per track. This will sometimes result in 'orphaned' sectors on the last track of the disk. These sectors are not accessible to HDOS, and consequently are not readable with UDUMP. In order to protect the drive, UDUMP will never attempt to read beyond the highest number of sectors as specified in the label sector of your disk."

And, the COPIER manual warns against trying to copy a 80T disk to a 40T drive - states that the head may be damaged.

So. Why does "head-banging" occur? Maybe the DIRECT.SYS is corrupt - lists an improper sector, located further inward than should be ... alternately, maybe the drive is out of alignment - and the head is looking for a righteous track, but in the wrong place. Somebody help me out here, please! <MH> [The reason is probably **closer** to the latter, Mark; the whole-disk copy

program thinks the **destination** drive has the same number of tracks as the source drive, so it attempts to write **more** than 40 tracks on the 40-track drive. -Ed.]

4. NOTE: The centering mechanisms in some drives, particularly Tandon, are not as good as those in others. It is recommended that you either use disks with hub re-inforcing rings installed, install the rings yourself, or follow this procedure when inserting disks into the drives:

"Insert disk, close door, open door, and close door again."

5. Some FDD shops:

JB Technologies	Hard Drives Int.
5105 Maureen Lane	1912 W 4th Street
Moorpark CA 93021	Tempe AZ 85281
805/529-0908	800/736-DISK
QuikData	Rex Service Company
2618 Penn Circle	7030 West 111th St
Sheboygan WI 53081	Worth IL 60482-1827
414/452-4172	312/448-5558

Floppy Disk Computer Service	1st Capital Computer
39 Everett Drive - Bldg D	a6 Algana Drive
Lawrenceville NJ 08648	St Peters MO 63397
609/799-4440	314/447-8697

6. A number of people have discussed, in the literature, their installation of a 3-1/2" drive in their H89 or H77. If not actually stated (and it often was), the implication was that the installer used these drives under a soft-sector controller.

A writer in The **SEBHC Journal** - sorry, I forget his name - suggested that we could also run the 3-1/2" drive under the H-17 HARD-SECTOR controller. He suggested that the SY.DVD software would need to be rewritten, and that only single-density would be possible - but that that was alright (half-a-loaf, etc.). This brings to mind an article that I read in an early **Sextant** (#23, page 25) "Adopt your soft-sector controller to use hard sectors".

The point here is - why can't we use 3-1/2" peecee disks w/our hard-sector controllers, and also - why aren't we also using soft-sectored 5-1/4" disks with 'em as well? I'd settle for single-density. I'm sure that there is a reason - I just don't know what it it. <MH> [Would a reader care to tackle this? -Ed.]

Dual Format CP/M:HDOS Disks -

Would very much like to see one of your readers let the rest of us know how to create such a disk - and I would prefer that the instruction be "written in HDOS". Such an answer could help to solve much of the incompatability - not to mention the obso - obsol - (I can't say it!) - the out-datedness of HDOS and the H89. Someone help me, will you? <MH> [Mark, see the letter by Charles Horn elsewhere in this issue. You should also dig out **REMark** #21 (Oct., '81). Bob Ellerton, in an article titled "Making Neighbors Out of HDOS and CP/M" (p. 5-?), describes dual-format standard hard-sector and gives

two programs for preparing the reserved CP/M section of an HDOS disk, in MBASIC and assembler code (the latter by Pat Swayne). If your **REMark** set doesn't go back that far, let me know. I **don't** believe dual-format can be prepared on soft-sector because **both** HDOS and CP/M need information **at different locations** on track 0. Also notice the "dual-format" disk listed in this issue's software releases. -Ed.]

Well, Kirk, that's about all that I've got for you. Remember, please, to credit **REMark**, the HDOS Operating Manual (old and revised), **Buss**, **Sextant**, **The Staunch 8/89'er**, the **SEBHC Journal**, Viking Software (for their excellent write-ups of disk structure), and most everyone else, for the information in this letter - I offered few original contributions.

By the way. I've moved - why not list my address here as: Mark Hunt - P.O. Box 357 - Ray Brook NY 12977.

=====

This 'n' That
by Hank Lotz / 2024 Sampson St. / Pgh, PA 15221

MBASIC topics always were extremely popular with hobbyists. I haven't lost interest and hope you feel as I do. Here's some MBASIC talk reminiscent of the "favorite subroutines" idea in the old REMarks.

Routine to Add Leading Zeros: I don't know about you, but I've worked on programs where I wanted to print leading zeros on output integers. With this routine you set a field width, and enough zeros will be annexed to the left of your output number to bring it up to that width. Depending on the size of a given number you want to print, more or fewer zeros are supplied. Thus, all the numbers in a mixed list are printed at the same desired width. For example, if your numbers are 1, 2, 106, 15, 342, and 2777, and you set your width to 4, they'll be output as 0001, 0002, 0106, 0015, 0342, and 2777. Or, if 5 is your width: 00001, 00002, 00106, etc. Merely adjust the width parameter W in line 3.

```
1 DEFINT A-Z
2 DATA 1,2,106,15,342,2777
3 W=4
4 READ N : GOSUB 6
5 GOTO 4
6 PRINT RIGHT$(STRING$(W,"0")+RIGHT$(STR$(N),
                      LEN(STR$(N))-1),W)
7 RETURN
```

Line 6 (which overflowed our column here) is really all you need, where N is your output number and W is your desired print width. The rest, of course, can be tailored to your needs -- N may come from a DATA statement, from the keyboard, from a data diskfile, or be generated by the program. Naturally, W must be set to at least the width of your widest number or you'll truncate on the left. Also, be aware that the "sign space" to the left of each number gets stripped, even if it is a minus; the routine is for positive numbers only.

Case-conversion Within MBASIC: If you have a REM statement in lower case, and want it UPPER CASE, you

don't have to retype it. Use MBASIC's EDIT mode to **remove** just the letters "REM". Then hit RETURN to leave EDIT mode. LIST the line and you'll see it now stays in upper case. Now enter EDIT again to reinsert the letters "REM". This works because MBASIC doesn't permit lower case anywhere BUT in REMs. So when you take **out** the "REM", MBASIC thinks it's an executable statement and converts it to upper case. MBASIC doesn't know the line (probably) won't execute, unless you actually try to RUN it, which you aren't going to do.

Making Quotation Marks Work in DATA Statements
: If you've ever tried this you know it doesn't work:

```
1 DATA "OPINION: Wow, it's a "TOUGH" problem!"
2 READ A$ : PRINT A$
```

If you're skeptical try it. The quotes around TOUGH just don't print (to say the least)! If you omit the **outer** (delimiting) quotes (and in this case some of the other punctuation marks also) it'll print. But you lose your punctuation. In other words, **omitting** the delimiting quotes cripples your capacity to house serviceable text as strings in DATA statements. So you'll have to live **with** the outer quotes, and find a way to deal with the problems they bring.

Here's how. Change the **inner** quotes (the ones you want to see **print out**) to something not used elsewhere. Here we'll use @ as a substitution char. (HDOS users, better pick something other than @.)

```
1 DATA "OPINION: Wow, it's a @TOUGH@ problem!"
2 DATA END
3 Q$=CHR$(34) 'ASCII 34 is a double quotation mark
4 READ A$ :IF A$="END" THEN PRINT"END OF DATA" :END
5 K%=INSTR(A$,"@") : IF K%=0 THEN PRINT A$ :GOTO 4
6 MID$(A$,K%,1)=Q$ : GOTO 5 'see if any more @'s
```

This works like a charm.

Embedding Reverse Video in DATA Statements:
This is similar to the above, and can probably be extended to other terminal codes (e.g., graphics mode switching). One "gotcha" **here** is you need to substitute **two** bytes for your little substitution character, and the MID$ function won't do that. It **will not insert extra bytes**; it will only **replace** them. So I solved this by using **two substitution characters**! Maybe you have a better way. But using 2 chars gives this neat "extra": it makes a fairly **noticeable** indication (without running the program) of where the highlighting will occur -- if you're just browsing through lengthy DATA lines.

```
1 DATA "OPINION: [[WOW]], it's a [[TOUGH]] problem"
2 DATA END
3 RV$=CHR$(27)+"p" : NV$=CHR$(27)+"q"
4 READ A$ :IF A$="END" THEN PRINT"END OF DATA" :END
5 K%=INSTR(A$,"[[") : IF K%=0 THEN PRINT A$ :GOTO 4
6 L%=INSTR(A$,"]]")
7 MID$(A$,K%,2)=RV$ : MID$(A$,L%,2)=NV$ : GOTO 5
```

Again, you'll adapt this to your own needs. I made simplifications here for ease of presentation. For example, I assumed in my coding, that "[[" (which gets converted to the reverse-video switch) always alternates with "]]" (the normal-video switch), which of course it really **should**, but this version wouldn't catch it if it **didn't**. Also, in this simple example each r-v OFF has to have an r-v ON **in the same READ!** But it's cute -- run it!

A Filename Input Routine :
If you write a program that asks the user for a filename, and you want it to reject filenames with syntax errors, etc., here's a little jobber for CP/M MBASIC that'll check everything for you, **and** convert to upper case.

CP/M MBASIC's "Bad file name" error detects spurious commas in a filename, but does **not** catch embedded blanks, multiple colons, or a colon in the wrong place. It will even **create** entries in your disk directory that contain these glitches. And it'll also accept, and create, filenames containing * or ? or lower case letters! Some of these things cannot be accessed by CP/M's TYPE or ERASE. And if, in my MBASIC, I create a file named ? (a single question mark), just **creating** it **kills all the other single-character filenames on disk!**

This subroutine, which I call FNAM.BAS, completely checks the syntax of your filename before MBASIC creates or OPENs the file. It will permit neither BLANKs, TABs, UNDERLINEs, nor the chars in these parentheses (; * ?). It will not permit illegal strings (such as :: or ..). And it will not accept a **misplaced** colon or period. It will not accept a filename if it or its extension is too long. I decided not to filter out commas, and I did not attempt to filter out the DELETE character because MBASIC doesn't let you type it. As for drive names, FNAM presently accepts the standard 16 CP/M drives, A thru P (line 8130). More than we need, to be sure, but where do you draw the line -- some users have 2 drives, some have 5, etc! FNAM.BAS has been honed over years, and I am not afraid to claim it as totally debugged! (Now **there's** a challenge for you beta-testers!)

To use it in your CP/M MBASIC program, you first load your prompt message into the variable, M$. (Example: M$="Please enter filename--".) This is so the subroutine can be used for different filenames in the same program. Then you call the subroutine. Notice that the entry point is not the first line of the subroutine, but is instead at line 8050. (Example: GOSUB 8050.) After the GOSUB, the variable F$ will contain a syntactically correct, uppercase filename. You transfer that to whatever variable you like. (Example: A$=F$.) The subroutine may of course be renumbered. A sample use:

```
1 M$="Please enter your input filename-- "
2 GOSUB 8050
3 INFILE$=F$
4 OPEN "I",#1,INFILE$
5 M$="Please enter your output filename-- "
6 GOSUB 8050
7 OUTFILE$=F$
8 OPEN "O",#2,OUTFILE$
  ...
  END
8000 REM SUBROUTINE GETS FILE F$, CHECKS SYNTAX,
8010 REM UPSHIFTS L.C., OCT.90, HJL
8020 REM USES A%,C%,D$,F$,K%,L%,M$ (prompt),PE%,Z$
```

```
8040 PRINT"Illegal filename."'ENTRY POINT NEXT LINE
8050 PRINT M$;:LINE INPUT F$
8060 IF INSTR(F$," ")>0 THEN PRINT
     "No blanks please.":GOTO 8050
8070 IF F$="" GOTO 8040
8080 IF INSTR(F$,"?")>0 OR INSTR(F$,"*")>0 OR
     INSTR(F$,";")>0 OR INSTR(F$,CHR$(95))>0 OR
     INSTR(F$,CHR$(9))>0 GOTO 8040
8090 L%=LEN(F$):C%=INSTR(F$,":"):IF
     INSTR(C%+1,F$,":")>0 GOTO 8040
8092 FOR K%=1 TO L%:A%=ASC(MID$(F$,K%,1))
8095 IF A%>96 AND A%<123 THEN
     MID$(F$,K%,1)=CHR$(A%-32)
8097 NEXT K%
8100 IF C%=0 GOTO 8180
8110 IF C%<>2 GOTO 8040
8120 IF L%<3 GOTO 8040
8130 Z$=LEFT$(F$,1):IF Z$<"A" OR Z$>"P" GOTO 8040
8140 D$=LEFT$(F$,2):L%=L%-2:F$=RIGHT$(F$,L%)
8180 PE%=INSTR(F$,"."):IF INSTR(PE%+1,F$,".")>0
     GOTO 8040
8190 IF PE%>0 GOTO 8210
8200 IF L%>8 GOTO 8040 ELSE 8220
8210 IF PE%=1 OR PE%>9 OR L%-PE%>3 GOTO 8040
8220 IF C%>0 THEN F$=D$+F$
8230 RETURN
```

Fun Time: All of the above ideas are potentially useful; so now for a pure diversion! A little bit of nothing. This is what is called a "one-liner." The whole program is all one big long line. (One-liners are **allowed** to have multiple statements separated by colons.) My line breaks are arbitrary to make it fit our column size. I chose some parameters a little crazy because I was trying to trim it down. No doubt you can pack it further, or even find a shorter algorithm. The two **empty** FOR/NEXT loops just give time-delays. The ?-signs mean "PRINT" in most BASICs so you can type them as-is. Now -- what does this thing **do**? Ha! Sorry, you'll have to type it in! (But some of you enjoy analyzing what things do just by studying them.) I call it "catch," and you'll have to stop it with CTRL-C. One small caveat: running this will leave your terminal in the graphics mode. Go OFF LINE and hit ESC G to put things right.

```
1 B$=CHR$(8) : ? CHR$(27)+"F"; : FOR J=1 TO 78
  : ?"^"; :FOR I=1 TO 9:NEXT I:? B$;" ";:NEXT J:FOR
  J=1 TO 78:? B$;" ";B$;B$;"^";:FOR I=1 TO 9:NEXT I
  : NEXT J : ? B$; : GOTO 1
```

This ought to start the one-liners flying around. A lot can be crammed into 1 line. Let's have yours!

=====

CONTACTS
(A Wanted/For Sale/Swap Column)

Lee A. Halgren (60 Preston Drive, Platteville, WI 53818, 608-348-3849 after 5:00 p.m.) "It was good to talk with you on Tuesday night about an advertisement in the H-89 newsletter that you publish. I'm anxious to find a good home for my system since my father-in-law built lmost of it and it has a lot of positive memories. I believe the ad might read as follows:

FOR SALE. H-88 upgraded to H-89 (manuals included), L-25 printer (manuals included), HDOS and CP/M Software (word processing, spreadsheet, database, etc.). There is also a 2nd disk drive that needs repair that would be included. Best Offer."

Harold D. Harfoot (Electronic Control Service, 4430 SW 34th Drive, Ft. Lauderdale, FL 33312, 305-983-8193) "Thanks for the contact via the paper. I swapped with Mr. Frank. I have the second H-89/H-1000 to get set up and I had to build 20' of shelving to hold the manuals, etc. How I have (2) H-1000, (1) with 256K RAM and 8086, (1) with 1Meg RAM and 8085. Will Condor help me with inventory and tape library? Still need CP/M and MSDOS programs on same. I got Quattro Pro form $90, but it really loads hard drives with program. Will continue to use H-89 with SUPERCALC to do daily bookkeeping.

"Need info to use H-8 to burn EPROMs! I still need info to build a Z-67; have controller card in unit, 2 Memorex 101 8" Winchester EOM drives; need power supply and 8" drive. I sent $130 for manual and all I got was 2 small service manuals. They refunded me $110 after I complained."

Don Naples (1933 Kofman Pkwy, Alameda, CA 94501; 415-535-6257 [work], 415-522-5802 [home]) "My subscription expired about a year ago, but I thought I'd check in to see if you know of anyone who needs H-89's, whole or parts. I'm moving soon and have two units, both with dual floppy drives, 64k, parallel printer driver card, and hard-sector controller. One has both C.D.R. boards, giving it a clock and up to 1 MB of memory for a RAM drive. I also have over 100 disks and a load of software, including MULTIPLAN, NewWord (WordStar clone), DateStamper, and BIOS-80, as well as a 90-foot printer cable and extra keyboard.

"I'd be happy to part with this stuff cheap, but there's no Heath user's group out here, so I can't find a good home for it. Any ideas? I'd hate for it to go to waste if someone could use it."

Wing Hong Ho (P.O. Box 72827, Kowloon Central Post Office, Hong Kong; FAX 852-7861076) "Please help me to raise an advertisement for the following H-8 items:

1) Z80 CPUs for H-8 (Heath or others)
2) H-8-4 4-port serial interface
3) H-8-17 disk controller
4) H-8 chassis

I need these boards and chassis to construct at least four systems for a high school electronics club as microprocessor theory demonstrators. Thank you."

Joseph Caruana (TEL/S3 Corp., P.O. Drawer 337, Mt. Pleasant, SC 29465, 803-381-0576 [any time]) "Please place the following classified ad as soon as possible:

FOR SALE--2 DIABLO 630 API PRINTERS IN MINT CONDITION IN THE ORIGINAL CARTONS. DATA AND POWER CABLES INCLUDED WITH EXTRA RIBBONS AND FONT WHEELS. ONE OR BOTH, NO REASONABLE OFFER REFUSED....

Thanks for all your help in the past...."

Dan Jerome (801 132nd St., Burnsville, MN 55337-3870) "I have the following items that were give to me when Minneapolis Heath 'died,' 7 Mar 91.

PART NO./QUANT. ITEM DESCRIPTION

HARDWARE
Unk — Some kind of fancy circuit card, carefully covered with anti-static plastic
181-3263 — H-25 printer card
85-2475-1 or 181-3264-99 — Head driver card, H-8?
85-2628-1 — H-89 Winchester Piggy-back interface card.
1 each — H-89 Winchester full-size drive front cover
1 each — H-89 Winchester half-height drive front cover

MANUALS
NOTE: All manuals are in fine condition, except for the large H-100 manuals, which are in good condition.
1 each — H-89/Z-90 Service Manual
2 each — H-100 Service Manual, 8.5 by 11 by 4 inches high
2 each — Z-100, Z-207, Z-205 service manuals
1 each — Z-25, Z-89-11, Z-67, Z-89-90 service manuals
1 each — Z-204, Z-217, Shugart Drives, service manual
1 each — H-100 User Manual
1 each — Heath Winchester hard drive manual with disk

SOFTWARE
Most of the software was for H-100 and up computers. Some of it was treated with a magnet [that caused] partial loss of contents. I now have about 40 retreadable 40-track disks. Some hardly used and some badly used. I am about to place the badly used disks in file 13."

Michael Tarrant (30271 West Gate Road, Farmington Hills, MI 48334, 313-626-3594 after 5:30 PM EST) "I have a Heath H-89 for sale which I would like to advertise in your newsletter. Enclosed is a copy of the proposed advertisement.

"H-89: 64K; 2/4 MHz Switch Selectable; H-88-3 serial card; H-88-1 disk I/O board; C.D.R. FDC-880H disk controller; 380K drive (internal); 183K and 780K drives (H-77 cabinet); 8" Shugart 1.2M drive/cabinet; C.D.R. SuperRAM89 with 1M memory (928K RAM drive); KRES Backplate; Super19 Terminal ROM; T-PROM Character Generator; CRT Blanker; TMSI Flicker-Free Kit; Auto Key Repeat; Heavy Duty Power Supply; Detached keyboard; Cooling/airflow improvements; C.D.R. CP/M with ZCPR CCP; all hardware manuals; EXCELLENT condition; ALL MODIFICATIONS HAVE BEEN DONE IN A PROFESSIONAL MANNER. THIS IS NOT A HACKED UP MACHINE. MUCH MUCH MORE! - Send business size SASE for complete list. $550 including U.P.S. shipping." [Mike's inventory includes a lot of additional parts, boards, drives, and CP/M software. -Ed.]

Steve Holle (3843 Emerson Ave N, Minneapolis, MN 55412, 612/542-9545 [work], 612/521-8180 [home]) "As I've recently defected to the DOS crowd I have the following equipment looking for a loving home:

1) Z-90 computer with internal double-sided drive
2) H-89 computer with internal single-sided drive
3) External dual single-sided drive set up
4) One soft-sectored and two hard-sectored controllers
5) Triple-parallel output card
6) Heath parallel/serial card
7) Spooldisk RAM-disk/printer card
8) C/80 compiler with MATHPAK
9) MYCALC spreadsheet
10) TEXT text formatter and SPELL spelling checker
11) Lucidata Pascal compiler
12) HDOS 2.0 and the latest version of HDOS 3
13) CP/M v2.2
14) Microsoft BASIC-80
15) SuperCalc
16) Magic Wand
17) All original manuals
18) Years of **REMark, Staunch, SEBHC** and many others

The first offer over $250 takes the whole kit and caboodle, not including shipping and handling. I've also got a Micronics Technology 20MB hard drive set up I never got around to installing. I'll throw [that] in for another $175. You might need to contact Micronics to get the latest version of ROMs to get this system up and running. All hardware and software is in working order.

"This has been my computer for better than 10 years and it's sad to see it go but go it must."

Fred Sandefer (R.D. #3, Box 1956, Delevan, NY 14042) "I as still interested in selling or giving away to a non-profit organization my computer (Z-89) and expansion drive (Z-87). I am asking $166, which is what it cost me to buy the CP/M 2.24 operating system and have 6 memory chips replaced."

=====

Top CP/M Public Domain Programs
By Dan Jerome
801 E 132nd St, Burnsville, MN 55337-3870

COPY.COM A modified version of the standard Digital Research PIP.COM. It is nearly identical to standard PIP, with the advantage that it is quicker. Two new commands are available:

R - set all drives to R/W. Use to swap output disks without exiting.
! - repeat the last command that was entered. Use to transfer files to several disks.

The verify option is always set. If you have several files to copy, you may enter COPY as follows: COPY<RTN>. The familiar PIP asterisk will appear. When done copying, type CTRL-D to exit PIP.

If you only have one or two files to copy, the command is: COPY B:FOO.DOC=A:<RTN> or COPY B:=A:FOO.DOC<RTN>. In this case, the PIP asterisk does not appear. Author: unknown.

CRUNCH.COM/UNCRUNCH.COM This program takes either a binary program or an ASCII file and compresses it. The size and the density of the file determines the percentage of compression, but typically compression is from 50 to 60 percent. This means that CRUNCH is significantly more efficient than SQUEEZE. UNCRUNCH restores the file to normal. What is neat about this program is to watch the compression taking place on the screen.

If you attempt to CRUNCH a file which has a size of from 2 to 6k, you may end up with a file that is the same size as the original. That is, the CRUNCH program works better on larger files. Typical usage: CRUNCH SY1:FOO.DOC<RTN>. Author: Unknown

FINDBAD.COM Version 4.4 A non-destructive program that finds all bad blocks on a disk (if any) and locks them out by building a file called [UNUSED.BAD]. This file can be seen when you do a disk directory. Typical starting command is: FINDBAD B:<RTN>. If you do not specify a drive, it will perform a quality test on drive A:.

When executed, FINDBAD will begin testing the system tracks and then the directory blocks. If any errors occur here, the program aborts and returns to the CP/M prompt. No other data blocks are checked, since errors in the directory will render the disk useless. If no errors are found in the directory check, it goes on to test the remainder of the disk. As it tests, it prints a series of asterisks on the screen. At the end of its check, it prints out a message: "xx bad blocks found." If no bad blocks are found, no such message is printed. Author: Gene Cotton.

FIND40.COM Locates strings of characters in a file, then displays the entire line(s) where that string was found. It may be used with wildcards to look through numerous files automatically, searching for a particular combination of characters. When directed to check a MASTER.CAT, it shows how many copies of a file are available, thus enabling you to delete extra copies. Because it displays every line, it is more useful than a text editor. It also permits printing the lines that are found.

Examples of typical commands:
(1) FIND40<RTN> or FIND40 ?<RTN> → Displays a short built-in set of instructions.
(2) FIND40 HELLO.ASM<RTN> → Prompts for a string to find.
(3) FIND40 MAST.LST MODEM<RTN> → Typical use of the program. Displays all lines with sequential characters MODEM or modem.
(4) FIND40 *.ASM HELLO<RTN> → Due to wildcard [*], the name of each .ASM file is printed as it is being searched.
(5) FIND40 HELLO.DOC MDM12[N]<RTN> → Since [N] is added, line numbers will be printed. These line numbers are those of the requested string.
(6) FIND40 MAST.LST MDM7 CTRL-P<RTN> → Turns the line printer on to make a hardcopy.
Author: Irv Hoff.

H89STAT.COM Provides a screenful of data in tabular form concerning the status of your computer. Lists the following items: CP/M version, Serial Number, CCP address, BDOS address, BIOS address, TPA, and current user number. One table lists each

drive by type (i.e., H-37 or H-17), shows the currently logged drives, and the allocation status. Another table lists the active I/O ports in hex. Author: Unknown.

MODEM9 This is the "latest and greatest" public domain modem program, and it contains more features than its predecessors. Author: Unknown.

QSORT.COM A quick sorting program designed to place the lines of a text file in order. It begins by reading the whole file into memory. The size of the file to be sorted is limited by the size of the computer memory.

When the sorting is done, the sorted file is written on disk with a new filename ending in .SRT. This file will be written in ASCII order, which lists control characters before printable characters, and upper case words appear before lower case words. It does not allow the sorted file to be placed on a second disk. Author: C.A.R. Hoare.

SAP36.COM Version 3.6 A directory sort and pack utility. It reads in the existing directory, deletes all erased files, and then sorts the directory in alphabetical order and writes it back to disk. Typical usage: SAP36 B:<RTN>. Author: Unknown.

SPLIT.COM Inputs a large file and splits it into shorter files. The user has complete control of the splitting process at all times and may designate not only where the large file is split, but also may designate his own filenames.

To make this program easier to use, one logs onto the drive where SPLIT.COM resides and copies the file to be split to the same drive. Typical usage: SPLIT BIGFILE.DOC<RTN>. Author: John Toscano.

UNSQZ13.COM This program goes the usual UNSQUEEZE programs one better. (A) It allows the source file(s) to be deleted after unsqueezing and (B) it allows unsqueezing across drive user areas.
Typical commands:
(1) UNSQZ13 B7:*.* A5: $E<RTN> → Unsqueezes all squeezed files from drive B:, user 7, places the output files into drive A:, user 5, and deletes the squeezed source files.
(2) UNSQZ13 *.*<RTN> or UNSQZ13 *.* $Q<RTN> → Provides a "query" unsqueeze, where each file name is brought up on the screen and then you have the option of unsqueezing it or not.
Author: ESKAY Software Service.

WHAMMY.COM A super disk-handling program which will perform the following tasks:

L   Log onto another drive/user area.
C   Copy a file from one drive/user area to another drive/user area. If the destination file already exists, the program will advise you.
S   Stat any drive to determine the amount of free space.
D   Query-delete files on any drive/user area.
T   Tag one file and a group of files one at a time so that they can be mass-copied to another drive or user area.
B   Move backward one line in the list of files.
U   Untag any file which is tagged.

F   Lists the size of any file on any drive.
P   Send any ASCII file to the printer.
R   Rename any file on any drive or user area.
V   View any text file on the screen.

When WHAMMY comes up, it prints a menu on the screen. Then it moves down a couple of spaces and gives you the amount of free space on the drive that it comes up on (usually the boot drive). Then it moves down a couple of spaces and starts to display the files on disk, one at a time.

Press the RETURN key to continue the file display. Each time you press the RETURN, another file comes into view. Each time a file is shown, you can use whatever option that you want to manipulate that file.

WHAMMY makes handling user areas very easy. It will allow you to access any drive and user area. Whichever drive and user area WHAMMY is logged onto becomes the source. For example, to copy a file to another drive, you have to provide the destination drive and user area.

If you wish to change disks, just remove the old disk and log WHAMMY onto the new disk. This process does a CTRL-C automatically. Typical usage: WHAMMY B:<RTN>. Author: Unknown. (Note: This program has been renamed from DISK76.COM.)

WORM.COM A very practical program for checking your computer's RAM. The "worm" is a short 12-byte routine, and this breaks away from the main body of the program and crawls up through memory space, giving a running travelogue as it goes. If it stops talking, you know something bad happened, and where. Typical usage: WORM<RTN>. Author: Jim Eccleston.

XDIR.COM An extended disk directory program which provides a list of files and their sizes in three columns. There are many different options that one could use with XDIR.COM. For example:
(1) XDIR B:/AA<RTN> - Display both non-system and system files.
(2) XDIR B:/AN<RTN> - Display only non-system files.
(3) XDIR B:/AR<RTN> - Display the read only files of the non-system files indicated.
(4) XDIR B:/AS<RTN> - Display only system files.
(5) XDIR B:/C<RTN> - Enter Command mode.
(6) XDIR B:/Un<RTN> - After entering Command mode, display all files in user area n. User area n may be any user area from 1 thru 16.
Typical usage: XDIR B:<RTN>. Author: Richard Conn.

NOTE: The foregoing programs may be obtained from SMUGH, Inc. [A good share of them were also included in Dan's p.d. program selection listed in issue #18. For more information, contact Dan at his address, above. -Ed.]

===:::

My Most-Used HDOS 3.02 System Commands
by Terry Hall

CF filename(s)=flags (CLEAR selected FLAGS from selected files)
CO dev:=source (COPY source to dest dev: [.= syO: is dest.]
DEL dev: (DELETE all files on dev:; gives a verification query first)

DEL filename(s) (DELETE selected files)
Dn (DISMOUNT unit n of default dev:; n = 0..7; ";D" = D DK0:; "D1 = DK1:")
HA (HALT) (runs SHUTDOWN.BAT first, then shuts down system)
MD (MULTI-DISMOUNT default device, all units above 0:)
MD xx (MULTI-DISMOUNT specified device; ";MM" = secondary device, all units)
MM (MULTI-MOUNT default device, all units above 0:; ";MM" = secondary device)
MM xx (MULTI-MOUNT specified device)
Mn (MOUNT unit n of default dev:; n = 0..7; see Dn above)
MOV dev:=source (MOVE source fname[s] to dest. dev: AND DEL source if CRC OK)
REN destination=source (RENAME)
R xx: or R xxn: (RESET unit 0 or n of specified drive)
Rn (RESET unit n [= 0..7] of default device)
SF filename(s)=flags (SET selected FLAGS on selected filenames)
ST taskname (START A TASK)
T filename(s) (TYPE selected files to TT; ".T fname" clears TT and holds screen)
Un (SET active USER area, n = 0..7)
PU filename(s)=users (PUT selected files into selected user areas)
RU filename(s)=users (REMOVE selected files from selected user areas)

NOTES
1. A lot of HDOS 3 internal commands are duplicated in PIP as switches, but I generally use the syscmd internal commands as listed above (i.e., run directly from system command prompt).
2. My use of the above command syntax differs depending on whether I have booted my hard disk or am using one of my secondary systems (on which I may have booted on H17, H37, or H47 and have access to BOTH other devices through drivers DK: and DL:). [See Terry's discussion of his hard disk experience in issue #9. -Ed.]
3. CATaloging or DIRectory commands are missing from the list because I use Stetson's excellent public-domain utility SD.ABS for this.

=====

Pete on CP/M
By Peter Shkabara
P.O. Box 1987, Blythe,
CA 92226, phone: 619-922-3919

As you may have read in **H-Scoop** by now, I have once again moved. Please publish the info on my new address. [That's given above and in VENDOR.UPDATE in the last issue, Pete. -Ed.] The move was prompted by the availability of a teaching position at a community college. Although it may not have been the best choice from an economic standpoint, I do enjoy teaching and it does give me a lot of free time to pursue other interests (such as writing for **The Staunch 8/89'er**).

For the moment I will skip adding any new dialogue to my tutorial sequence. That will have to wait for the next installment. Today I wish to pass on to you my contribution to the Heath community. Enclosed you will find a set of disks which contain

my implementation of the Z-System. I cannot offer the complete system to you for distribution since the ZRDOS and a few other parts are copyrighted commercial products of Echelon (now owned by Joe Wright of Alpha Systems). However, I did do a large amount of work in rewriting the Heath BIOS. It is this product that I am now making available to you. You may distribute it as you see appropriate, but I will not support it except through your newsletter. Any queries about it may be addressed by users to you or directly to me in writing. I will submit any responses to the **Staunch 8/89'er** for publication. [Readers will find Pete's Z-System package listed in this issue. -Ed.]

I will leave it to you to describe the package offering in more detail, but here I will give some of the history of its development and philosophy of design.

In the beginning there was CP/M. A new frontier was just opening with the microprocessor making possible a computer on top of a desk. We must recognize that development of CP/M itself was driven by the need to control the newly developed floppy disk drives. Even in those ancient days, it was recognized (by Gary Kildall, at least) that there would be enough storage on a disk drive to make a directory quite cluttered. To help organize the disk, CP/M included the concept and capability of defining USER AREAS. With the CP/M USER command, you could effectively hide all directory entries except for the ones you wanted. There was provision for 16 different user areas (0 to 15).

There were several problems with user areas. For one, to get something 'into' a user area, you would have to devise some ingenious way to copy it from some other disk. There was no provision for moving or copying files between user areas. Also, any program files you had in one user area on the disk could not be used while you were logged onto another area. This necessitated the duplication of programs. Since disks had limited capacity (don't they always) this duplication was intolerable. The result was that few people used the USER capability.

Along comes Richard Conn (and Joe Wright and others). These are professional programmers who had contact and knowledge of better computers. With a quick movement of fingers on the keyboard of a CP/M computer, ZCPR was born! Well, maybe it didn't happen quite that quickly, but almost. I won't get into a detailed description of the history and operation of ZCPR since many articles can be found on the subject. Rick Swenton is a particularly good source of info on the subject in the Heath community. For a description of what my implementation of the Z-System does, see the article that Rick wrote in the September, '86, issue of **REMark**. He also has articles on the Z-System in the November, '85, and January, '86, issues. [Rick also has a regular column in **SEBHC Journal**; another source of information on the Z-System is **The Computer Journal**. -Ed.]

Back to the topic at hand. What ZCPR did was to make the different CP/M user areas transparent to the system. You could move files between user areas. You could read files in other user areas. You could even run programs which were in other user areas. Now, ZCPR was not the only product to make good use of the user areas. There were many other public

domain as well as commercial products which eventually appeared in the marketplace to do this. However, ZCPR became **the** most popular.

At this point in time, ZCPR was only (somehow the word 'only' does not seem right) a replacement for the CCP (Console Command Processor) also known as CPR (command processor) portion of CP/M. If you don't understand what I am talking about, be patient. The command processor is a 2 kilobyte program which is part of the CP/M boot tracks. It is loaded into memory and run every time the system does a warm boot. If you do not know what warm boot is, refer to the CP/M manuals (pressing control-C causes a warm boot as does the termination of most programs). With only 2K to work with, it took clever programming to add so many new features. One of the things which made this possible is the use of the added capabilities of the Z80 microprocessor. Remember that CP/M was written for the Intel 8080. Hence the name 'Z' CPR. Yes, Amy, the Z80 is a much more powerful processor than the 8080.

Once the added capabilities were being used, there was no stopping. The cry went out: more! more! more! And to deliver, more space was needed for the program code. After all, even we capable programmers can only fit so much into the 2K package! The 2K limit was an absolute boundary set by the design of CP/M. Oh, it would have been possible to change that, but it would also have created a major incompatibility problem. Instead, the designers (hackers?) of ZCPR decided to put some of the code into the BIOS. Now, BIOS is that portion of CP/M which is custom for each piece of hardware (Heath, Kaypro, Morrow, Osborne, etc., all have a different BIOS). However, the BIOS is loaded into memory only once during the boot process. After that it stays (if it doesn't, your system crashes).

Putting the added code into the BIOS was fine for the added features, but it also made the BIOS larger. Since the BIOS stays in the memory as long as CP/M is running, a large BIOS leaves less room for programs to run. This available program area is called TPA (Transient Program Area). At the same time as ZCPR was making the BIOS larger (and TPA smaller), application programs were wanting larger and larger TPA space to run in. Do we see a problem here? By the way, it was ZCPR3 that really made heavy use of the BIOS space.

Well, here I come into the picture. I was enjoying the benefits that ZCPR would bring. I also wanted more TPA for my more sophisticated programs such as NewWord. By now I had become a fairly competent Z80 programmer. As it happens, the Heath BIOS was written in 8080 code since the original H-8 used an 8080. Heath did not put the effort into upgrading the BIOS when Z80 machines were released, so there was plenty of room for improvement. Further, the Heath code included support for both the H-89 as well as the H-8. In many cases, the H-8 support was not needed. On this I went to work.

For those who have looked at the Heath BIOS.ASM file, you will note that it is a monster in size (well there are larger programs to be sure, but it is still quite gross). My first step was to break down the BIOS into function modules. This was fairly easy since I had been doing a lot of work with the C.D.R. BIOS package which already was modular (credit goes to Mark Brooks of C.D.R.). By the way,

hello Mark if you are reading this. I'll give you a call sometime.

Next step in the process was to rewrite the code in Z80 mnemonics. Then rewrite it again to make it more efficient where possible. A number of features in the BIOS were made optional. H-8 support was one of them. The emphasis was on code size. Note that small size is not always faster code. My goal was to have a large TPA. Speed was achieved with my 6MHz modification! Actually, the new BIOS is not bad at all in speed.

Finally the Z-mods went in. I optimized the CPR portion, fixed some bugs in it and was able to add new features such as LF and FF (line feed and form feed to the printer). Support for my 4MHz and 6MHz mods as well as EMULATE was also added. Note that these options have been deleted from the BIOS version I have sent to Kirk Thompson. Owners of those products will need to contact me directly.

When I was done, I had a lean and mean machine going. Some fancy features of ZCPR were restricted or dropped due to their hunger for precious memory space. The decision on what to drop was of course based on my judgment, but then I do have good taste!

There you have it, the true history of the ANAPRO Z-System. I do need to add that the complete Z-System is actually more than just a CPR and BIOS mod. It also includes a replacement for the BDOS. This item is known as ZRDOS+. There are several newer products that have been released since ZRDOS+ was around. ZRDOS+ is a copyrighted commercial product and is **not** in the public domain. You must pay for it if you want it. However, there are not very many features which require its presence. It is nice to have if you can have it, but most of the benefit of the Z-System is achieved through the CPR and BIOS mods. Incidentally, ZRDOS+ cannot be used with the C.D.R. SASISOFT hard disk package.

Next installment will hopefully come without such a long delay. I intend to stay put for a while (at least a year of two). But then I have said that before, haven't I?

=====

Modifications to QUERY!3's ADD Module
By Terry Hall

Previously in **STAUNCH** issue #2, page 4, there was an article [by Hank Lotz] on how to modify Query!3's ADD.COM to provide an automatic feature to allow continuously adding files without having to type "Y" after every "R." Since the program can be stopped at any time with an ESC command, all that is necessary is to preserve this function, and the program actually operates much faster. The patch, however, was for CP/M, but I run mine under HDOS. The idea was excellent, so here is how to do it for HDOS. In addition to the cookbook cure is a little insight into HDOS for those interested.

First PIP *.BAK=ADD.ABS to make a backup copy in case of disaster. Next load UDUMP and look at sector 0 of ADD.ABS. The first 8 bytes are FF 00 48 2A D6 12 48 2A. The FF tells HDOS that the file is not ASCII. (Have you tried to TYPE a non-ASCII file to the CRT and gotten that message and wondered how it knew? Now you know how it knew.) The second byte 00 means it's a regular program, not a device driver (01) or a task in HDOS 3.0 (02). The third and

fourth bytes tell HDOS where to start loading the file into memory. The fifth and sixth bytes tell how many bytes to load and the last two tell HDOS where to start running the program.

Since my patch requires extra code, you must change the file length by changing the D6 to FF. This is a little more than needed but does no harm. If you want to be a purist, change it to E1. However, if a modification should extend into another sector, then you would also have to modify the directory entry (byte 19) that tells HDOS how many sectors of that last group is included in the program.

Now go to the last sector (18) (12hex) and go to the bytes following the last usable code. The line labeled 3D10 should read 3C C3 F1 23 C3 D0 23 XX XX XX. (XX means doesn't matter.) Starting at XX, which would be byte 3D17 in the program relative mode or byte D712 (look familiar?) in the absolute count, add the following code: FE 02 C2 F5 2D CD 34 3C C3 C3 2D 00 00 00... to the end of the sector. I added the 00's so that if I ever added more code it would be easier to find. It's optional, and that's where the FF came from.

Up to this point you have not disturbed the original program code, so now you need to jump into this little addendum. Go to sector 3, line 9, which should be byte 2DC0 in the program. It should read: CD 34 3C. Just change them to read C3 17 3D. Now your patch is done. Exit and run QUERY!3 or ADD.ABS as a separate program. Run it through its paces, and if all goes well, just delete the ADD.BAK or archive it somewhere else, and you're on your way. Remember: to stop the program when you are finished ADDing records (or to safely abort at any point), just hit ESC (the ESCape key). This modification was made under HDOS 3.0, but should work equally well under HDOS 2.

=====

MISCELLANY

The Worn-Out Ribbon Blues. [From Bill Lindley, 4257 Berwick Place, Woodbridge, VA 22192] How annoying. You start a printout, only to realize that you can hardly see it. The ribbon has faded to a dull grayish blue. And to top it off, the company that made your printer went out of business in 1985. Sure, maybe you can still get replacement ribbons ... at $10.00 each or more. What to do?

Look! In the sky! It's a bird, it's a plane, it's ... WD-40 to the rescue! That favorite panacea of handymen everywhere, WD-40 spray, can rejuvenate your old ribbons for just pennies apiece.

Usually the faded ribbon still has plenty of ink left on it, but it has simply dried out; so when the pins of the printer hit the ribbon, the ink just stays in the ribbon. By spraying some WD-40 on the ribbon, we can get that ink flowing again. Here's my "recipe."

RIBBON A' LA WD-40. After removing the ribbon cartridge from your printer, gently pry it apart. Usually there are two halves held together by a few snaps or pressure points. Be careful not to spill the ribbon on the floor or dislocate any parts. If you make a little mistake, you might be able to stuff it back together. If you make a big mistake, you had to buy a new cartridge anyway.

Put the opened cartridge on your workbench, preferably on some old newspapers. This is not as messy as fingerpainting, but almost as fun. (You might try singing "Ink ... a dinka doo" to get in the mood.)

Spray some WD-40 on the ribbon, being sure to coat the whole ribbon. Don't use too much, or the ribbon will take a long time to dry.

Leave the ribbon cartridge open overnight to dry. When the ribbon seems dry, snap the top of the cartridge back on. Put the cartridge back in your printer, and try the printer's self-test mode for a sample. It it seems smudgy or too dark, let the ribbon dry some more and try it again.

Square-Pinned Power Connectors. I received a letter requesting assistance in locating connectors with square pins from one of you, but (unfortunately) I miss-laid it, so couldn't run it in the letters column. This reader was interested in replacing connectors such as P514, P515, and P516 on the '89's CPU board after reading Dan Jerome's discussion in #6 (p. 5). But he wasn't able to find a source for the headers (the circuit-board-mounting part with the pins). Not surprisingly, I recently ran into problems at P516 myself.

High current flow through one of the pins had caused burning of the nylon housing of the female receptacle. It had also annealed (softened) the brass spring contact inside the housing enough that much of its springiness was lost and contact between the spring and the round pin in the header became intermittent. So I hunted up a local electronics parts supplier for suitable replacements. Of the parts it sold, GC Electronics markets a line of products that fit the bill. Note that these products have .045" square pins on .156" centers and they mate nicely with the existing connectors in the '89. The specifics given below for the relevant connectors in the '89 (except for the prices) are from GC's catalog:

Cat. #	Pins	Type	Price
41-244	4	header	.53
41-334	4	receptacle	.85
41-250	10	header	.83
41-340	10	receptacle	1.32

Other manufacturers, such as Molex, make similar products. You could undoubtedly use the numbers above to cross-reference to those if your local supplier doesn't handle the GC Electronics line.

If you have an '89A, the connectors at P514 and P515 are **11**-pin models and these are **not** standard parts! However, pin 11 on both is not used for anything. Hence, you could replace them with stock 10-pin headers and receptacles.

I ended up replacing **both** the header and receptacle at P516. Doing the latter is no particular problem since you can easily cut the old receptacle off the wires, strip the insulation, and crimp and solder on the spring contacts before inserting them into the new housing. The header was a bit more of a job and I recommend using solder braid to suck up as much as possible of the old solder when you remove the old header. Once the holes in the PC board are clear, inserting and soldering the new header in place is no trouble if you have a stock '89.

However, if you've replaced any of the IC's with CMOS types, these could be too sensitive to the static charge on your soldering pencil. I recommend **removing** and storing them in anti-static foam while you replace the header.

If your machine is an '89A, don't forget to clip off or remove pin 5 from **both** P514 and P515. The receptacles for these headers has a polarizing key pushed into position 5 to help locate them on their respective headers.

While you've got the CPU board out of your machine, take a look at P401 on the TLB. You may **not** have to do anything with this header. On all of my terminal boards, this header **already** has square pins; check yours out, too. This might be just as well. This right-angle header, like the 11-pin headers on the '89A's CPU board, does not appear to be a stock item. Further, this may be a part where Heath **bent** extra long pins before installation to **make** the angle. One of those on a TLB of mine uses double-faced foam tape as a mount to the board. Further, this type of header comes with two different pin lengths, 3/4" (which are the ones I've specified above) and 1-1/4". If you need to replace P401, look for GC Electronics #41-280 or equivalent and make your own 90-degree bend.

There's one more thing I might add. If you are **unable** to locate these connectors, I would be happy to supply them to you. Individual part prices are given above (as quoted by my supplier); please include an additional $1 per order to cover shipper and postage. If you order a replacement for the TLB's P401 from me, the price for it is the same as that for the 10-pin header above.