PORT TO PORTAL --Editorial

The sun had begun to sink, the air was filled with a golden haze, and the long shadows of broken column and formless pedestal were thrown across the field of ruin. For a moment I stopped my aimless pacing. So far it had been a day haunted with questions. Questions I stood asking myself. Could I meet my own deadline? Do all the people out there who claim they have QUERY!2 or QUERY!3 use it as often as I do? How about **new software**, is there any? That last question is a good one, and it has a good answer; stick around a while.

I should explain that "the field of ruin" (above) was really not meant to depict my computer room — any resemblance is purely coincidental. In fact it can now be revealed that that atmospheric opening sentence was borrowed (how can I ever give it back?) from a very famous author (do you know who?) in an attempt to breathe some class into these paragraphs. But if you use QUERY!(2 or 3) there is **something else** classy I can tell you about.

As you QUERY!3 users know, you can convert a database to an "everyday" text file at will. But now you can go the other way as well: Kirk Thompson has created TXT2Q3, an MBASIC program (with versions for HDOS, CP/M-80, and even MS-DOS) capable of converting an ASCII text file into a QUERY13 ".DTB" database file! There are a number of great time-saving applications for this, though I'm not going to list them here. Thorough documentation for the software (twenty-odd pages worth!) is supplied as a disk file. TXT2Q3 can be downloaded from HUG's PBBS, (616) 982-3956, or ordered directly from Kirk. (For his address see his column). However, if you order directly from Kirk, the MS-DOS version cannot be supplied. Send him a formatted diskette (hard- or soft-sectored) along with a selfaddressed, stamped return mailer, and \$2.00. If you omit the mailer send \$4.00. If you also omit the formatted diskette send \$6.00. In the latter case, Kirk will furnish a hard-sectored disk unless you specifically request soft. I recommend clearly labeling any formatted disk you send, to indicate the type and format used.

Now it's time for me to clean up my field of ru- er, my office. May you enjoy Issue #3.

-Hank Lotz

THE EIGHT-BIT R/W -Letters

Interfacing the Most Accurate Clock

[From Carl Edwin Lovett Jr., 3107 Craiglawn Road, Calverton, MD 20705]... My equipment consists of a standard H8 chassis with a Trionyx Z80 2/4MHz CPU board, 64K RAM, H8-4 I/O board.... I also have a Heath GC-1000 Most Accurate Clock with the RS232 output accessory connected to an H8-4 port, but I have yet to get any intelligible data out of it. [Has anyone] done this successfully?

Feedback on Spike Problem

[From Peter Ruber, Oakdale, NY]... The spiking problem Phil McCrum describes on page 1 [of STAUNCH #2] may be connected to the power supply. The IGC goes inside the H-19 terminal when used with an H-8, with a special +5-volt power supply to handle the board. (The same goes into an H-89.) The braided chasis ground wire of the '19 or '89 is connected to the power supply (as I recall), and if it isn't shielded properly (either with the clear plastic tubing supplied by Heath or with electrical tape) and comes in contact with any of the exposed circuit traces on the board, you can create [or wreak?] havoc with your power supply.

[Regarding Mr. McCrum's other question] the SigmaSoft Disk System is first-rate. It doubles as a double-density controller and hard disk controller on one board. It interfaces to the '89 through an upgraded IGC interface card that plugs in on the left-hand side of the CPU board. There is a similar card available for the '89 [sic]. One other note, if Mr. McCrum is using an H-8 with an older motherboard, which is noted for signal problems, that may be compounding the problem.

Lonely 158's, Cheap Daisywheels, & Mute Hams

[From Ron Nelson (N9CFN), 1448 Garland St., Green Bay, WI 54301]... I'm a ham radio operator and picked the H-89 up 1-1/2 years ago to use as a terminal for a Heath HD-40-40 TNC, which is used for packet radio. After I had the H-89 for a while I found all sorts of things to use it for besides ham radio. It seems...the H-89 is very popular with hams and there is much software out there for that use. Hopefully there will be a few of your readers who are hams. Maybe you could ask. [Editor's Reply: Consider it hereby asked. But I **already know** there are **tons** of our STAUNCH readers who are ham radio operators! Unfortunately, I can't do much about it if they don't submit!]

In the past year I also bought an H-158. I have been able to run CP/M on it and transfer files from the H-89 using HUG software. The file transfers... take place using the serial ports on both machines. I do have a question for the readers. Has anyone out there used any software which will let me transfer files from the H-158 to the H-89 using a similar transfer method?

On page 4 in Issue #2, in the first column, you had a reader looking for a cheap daisywheel printer. In our area the TOYS'R'US store was selling the Smith-Corona TP-1 serial printer for \$149. This is the printer which I'm using for this letter and seems to work great if you don't need a lot of speed. In the Winter 1984 Issue #8 of the Sextant magazine, there is an article on how to hook the TP-1 up. The article is on page 15 and is almost a plug-and-go installation. One point of note, the [Sextant] article said \$599 was paid for it. The printer seems to be very well made, in fact you could say that it's built like a tank. I am using MAGIC WAND for a word processor, which seems to work well with the printer.

Two Problems with an MPI Solved

[From Allie C. Lingo, Dierks, AR] ... I have a little information ... concerning problems I had with an MPI model 99G dot-matrix printer. I purchased this printer shortly after I put my H-89A together in late 1983 I believe. It worked fine until about six months ago when I noticed that every once in a while there was a dot missing from all printed characters. ... Finally the printer wouldn't print the dot any of the time I decided that I would try to locate the problem and make repairs myself. I live in a town of about 1200 people and [there is no] H/Z store and probably never will be. I checked the things that I could. I checked the coils in the print head and checked to see that the mechanics of the head were free. I then checked the driver transistors to the print head and all seemed OK. After reading the manual I deduced that the CPU controlled the print head and I decided I would try replacing the CPU chip. I called MPI and ordered both the CPU and I/O chips. I found out that MPI has a minimum order of \$40 and I had to order a ribbon to make the minimum. When the parts arrived I tried the CPU, which had little effect if any. I then tried the I/O chip and the mystery of the missing dot was solved.

The other problem I had was that of the print head hanging and nothing being printed until the head freed and moved again. I changed the whole printer system board and still had the problem. The operator's manual said this could be caused by a too-tight ribbon. It also mentioned that the head would print everything in the same place. I checked the head drive mechanics and did not find anything binding until I removed the head drive motor and belt. ... I found that a dot from a tractor feed paper hole had lodged in one of the grooves on the head drive motor pulley. This accounted for the fact that when fewer than 25 characters were sent to the printer it would work fine. After cleaning out this "trash" and reassembling, the printer has been working just fine. [Editor's comment: Every so often it's nice to hear a success story like this!]

THE 8-BIT IOWAN

Kirk L Thompson #6 West Branch Mob Hom Vil West Branch, IA 52358

Hello out there,

HDOS 3.0. Hank tells me there's a great deal of interest in the new version of HDOS. Although HUG has placed it in the public domain (and provided extremely poor means for downloading it from HUG's PBBS), I think some financial reward should go to the system's developer, Bill Parrott. I strongly recommend you order it directly from the source; send him \$25 or \$30 to demonstrate your appreciation. The address is:

> Mr. William G. Parrott, Jr. 7010 Caenen Avenue Shawnee, KS 66216

Be sure to specify whether you want it on hard- or soft-sector. Also mention this newsletter when you write! And I anticipate reviewing it late this year.

Request for Assistance. Hank also tells me there are many of you interested in CPU speedup mods. I plan on doing a column on them next. So could those who have any of the commercial products (Analytical Products, Kres Engineering, Micronics, or others) write, telling me your experiences with them? How well do they work? How easy was installation? How was reliability? Support? This will provide muchneeded "manure" for my discussion and your indirect assistance to others who have to decide which is best for them. We 8-bit'ers have to stick together and this is one way you can help others who are going through what you and I did! I don't anticipate the need to reply to each contribution, so don't include an SASE unless you want feedback.

Response. Speaking of feedback, my thanks to those who wrote. In most cases I've replied individually. But a five-pager from Lee Hart of Technical Micro Systems, Inc. (TMSI), prompted by my first column, contained information which should be passed along. (Thanks, Lee.) This concerned three subjects: TMSI's soft-sector controller for the H-89, Al Davis's liquidated parts, and differences between connectors for the H-89 and H-89A.

From Lee's discussion, there appear to be some design differences between Heath/Zenith's controller and TMSI's. The biggest of these is the use of low power consumption MOS semiconductors. This difference should reduce wear and tear on your power supply if you use TMSI's board. Another difference is a change in the onboard clock. The information I have about this is that Heath's discontinued board had a clock speed of 4 MHz. Lee remarked that the clock on his board is running at 1 MHz.

This difference will probably have no effect on performance! The reason, as Lee noted, is that the speed improvement you gain from soft-sector is partially attributable to the system software. Soft-sector interleaves the sectors on each track, so the read/write head doesn't have to wait for the diskette to make one full revolution before the next contiguous sector comes back around. Instead, the diskette only has to rotate one-third of a revolution for the next one, since sector layout runs something like: 1-4-7-2-5-8-3-6-9. A second reason for the speed improvement is that, very simply, the data is packed on the tracks twice as densely as it is for hard-sector. That's why it's called "double-density."

The second subject which Lee remarked on was Al Davis's parts. This was more cautionary than anything else. The reason is that Davis is selling Heath's rejects. [I have not verified this! -Ed.] Lee suggested that they be used as a source of spare parts, swapping from a number of boards till you find a part that works. Also look for "cosmetic" rather than functional defects, which means that you should probably attend a HUG conference to make your selection rather than order by mail. But if you can't do that, maybe ordering two or three boards might be the way to go since pricing can hardly be a problem!

Lee also observed that the holes drilled in the

boards are deliberately aimed at vital areas. Based on my experience at Midwest HUGCON last May, this is not the case. All the boards I saw had holes in nonfunctional areas. I still think Davis's boards are a good deal!

Finally, Lee noted that there are some cabling differences between old H-89 and newer H-89A boards. The principal of these are 1) the jumper between the CPU board (P515) and terminal board (P401) and 2) the connection to the video board (P514). Compared with the H-89, the H-89A includes a "nonexistent" pin at each of these locations for polarizing purposes, making each plug eleven (11) pins long, rather than 10.

I also noticed that the newer ('89A) terminal board has a right-angle header for the ribbon cable from the keyboard —certainly an improvement over the pins on the older ('89) board. They stick straight out, and the CPU board **always** hangs up on the keyboard cable socket when it's dropped into place!

For more information on this, if you have an old '89, the thing to do is order a manual for the '89A from Heath. (They're still available; I ordered a set last December for about \$17. I doubt whether manuals for the '89 are still around.) Then compare the pictorials between your old one and the new and make yourself a custom jumper between P401 and P515 for whichever spare board (CPU or TLB) you are trying. For the cable to P514, an **adapter** will probably be more appropriate since this cable solders directly to the video boards in both machines. [Editor's Note: Part Nos. of the H-89A manuals (from my copies) are: ASSEMBLY MNL: 595-2596-01; OPERATION MNL: 595-2766-01.]

If you have any comments or corrections, write, enclosing a self-addressed, stamped envelope if you want a reply.

Soft-Sector CP/M Postscript. I would like to thank Andrew Duli and James Frank (alphabetically) for the loan of their Zenith 2.2.04 hard-sector setup disks. (You may recall that mine won't boot because of hard errors.) If you are running this version, that disk is without any doubt the fastest way to set up a soft-sector system, to say nothing of being the only one!. Personally, I think the software wizards at Zenith should be heartily congratulated for the excellent job they did with it! Everything is menu-driven, with some pretty nifty graphics, considering what the '89 has to offer. And it works, to boot!

Soft-Sector HDOS. As I promised last time, I now turn my attention to bringing up bootable softsector HDOS. As background, I've been running that type of system on 40-track/double-sided drives for over 3-1/2 years. In fact, I did considerable research before I leapt into it and didn't even consider the driver on "HOS-5-UP" when it came.

But what is "HOS-5-UP?" Well, if you bought the Z89-37 controller board from Heath and they knew you were running HDOS, you automatically got this free hard-sector disk of HDOS software for the board. It included drivers for H37 and H47 drives and H25 and Epson MX80 printers, drive test programs for the '37 and '47, and a patch file for HDOS.SYS. Although I've used the '37 driver and TEST37 from it, it was only on my hardware test disk!

That was because I went immediately to a faster, more sophisticated driver from Extended Technology (now defunct). This driver provides higher capacity than **any** of the drivers available then or now and is decidedly faster than the one Heath supplied free. But as you well know, the HDOS-oriented market has all but dried up. So sources for soft-sector drivers are hard to come by, with two exceptions!

One of these is HUG. The national group still supplies its "HDOS Soft Sector Support Package" (885-1127[-37]) and it can be ordered from Heath's Parts Dept. for \$30, plus shipping. Besides the driver, it includes soft-sector versions of DUP, DUMP, TEST, and several other utilities, plus HUG's usual source code. I recommend it. But if you are just bringing up soft-sector, it will be easier if you get the hard-sector version.

A second source is me. If you don't want to pay the price for HUG's package, I would be happy to dig out a public domain driver I have in my library. Extended Technology's driver was presumably based on it, but I have **never** tried it. If you want to give it a shot, send me a formatted, standard hard-sector disk and a postage-prepaid return mailer; I'll transfer it for you free of charge. (I'll even endeavor to try it before the disks start rolling in, particularly to prepare some kind of documentation!) But I make no guarantees, nor can I provide any version of TEST37 since none are in the public domain to my knowledge.

How, you might ask, do these drivers compare? Well, here is a table of timings to give you some feel for speed:

Operation	HOS	HUG	ET	
Boot	30	13	23	
Load MBASIC	5	4	5	
Catalog disk	15	5	7	
Mount disk	9	4	6	

All of these were timed with a stopwatch between the carriage return which activates the command and the appearance of an appropriate prompt on a 2 MHz system. The boot-up was timed from the "ACTION <BOOT>" prompt (with a rapid <RETURN> for the date), the catalog was done on the **same** disk in SY1:, and the disk mount used the "mutually readable" disk format.

As you can see, in terms of raw speed, HUG's driver, written of course by Pat Swayne (but based on the "HOS-5-UP" driver), runs away with the gold. Although only qualifying for silver, Extended Technology's driver still isn't too bad and I suspect that the public domain driver on which it's based will be similar. But "HOS-5-UP" takes the bronze only by default!

Now I mentioned "higher capacity" and "mutually readable" disk format, above. The one advantage which Extended Technology's (and **maybe** the public domain) driver has over the other two is higher capacity. The other two drivers only recognize a format of 16 sectors per track. This yields a capacity of 160K per 40-track disk side. (Multiply by two or four, depending on your particular hardware, to determine what you might actually get.) ET's driver can format at 18 per track, for 180K per 40-track side, as well as the former. The latter driver can also switch between the two during mounting, but this takes additional seconds. Interestingly, the DUP program on HUG's disk will recognize 18-sector/track format on the source, but locks the system up when it tries to duplicate it!

Implementing System Software. Preparing bootable soft-sector HDOS 2.0 from hard-sector is actually easier than CP/M. There is no "MAKEBIOS" procedure to suffer through, but you **must** have a soft-sector driver installed on a bootable disk. So lay out two (2) disks as follows:

A. a normally (not minimum) SYSGEN'd bootable disk containing INIT, SYSGEN, SET, the soft-sector driver named DK.DVD, whatever printer drivers you have, and any other files you can squeeze on for transfer later; and

B. a double-density-quality disk, to be initialized shortly.

Neither of these should be write-protected. I'm also presuming that you have the new controller board installed and checked out. And my remarks, last time, about the MIR-90 ROM chips and the primary boot-system DIP switch apply here, too.

1. SET. Hard reset your system, put disk A in your usual drive, and boot. The next thing to do is to set the DK: driver to conform to your particular hardware. If you don't have documentation for the driver, type:

SET DK: HELP

to see what options you have. For example HUG's driver lets you specify head unload delay, motor idle, number of retries before hard error, the number of drives supported (to conserve memory), and the step rate. If you have different types of drives running from the soft-sector board, you may be able to set the last for **each** drive with:

SET DKO: STEP XX

and so on. But bear in mind that step rate is hardware-dependent. Tandon and newer-make double-tracked and/or double-sided drives will usually step at 6 milliseconds. The old Siemens's (hard-sector-type) are doing very well if you get below 20.

2. INIT. With the driver set, you can now initialize from it. To identify the first soft-sector drive, type:

MOUNT DKO:

One drive light will come on; press **control-C** to abort the mount and insert disk B into this drive. (If more than one light comes on, shut down the system and check your hardware installation!) Now type:

INIT DKO:

The prompts you get during this operation will depend on your driver. At minimum, you will be asked whether to initialize for double-density, doublesided, and double-tracked; which boot step rate to use (set this the same as your drive); and whether to do a media check. And as I discussed last time, these should correspond to your **actual** hardware; the system might go off into never-never land if you don't. So use caution first time through; the default answers to these questions might **not** be appropriate to your hardware! 3. SYSGEN. Now you can convert the just-initialized disk into a bootable one. Type: SYSGEN *.*

When prompted for the destination device, enter "DKO:". This command will transfer all system files to the new disk and any other files, such as printer drivers and utilities, you might have on the source disk.

One other thing which SYSGEN does is to rename the disk drive device drivers automatically! If it didn't, you would have to manually rename the drivers so that the soft-sector driver (DK.DVD under hard-sector) is the default SY.DVD on the new softsector bootable disk. But, fortunately, SYSGEN takes care of that for you. (In fact, I discovered this while preparing this column; I wondered why I had so many problems when I did this, way back when! So thanks, Hank, for letting me write for you; I probably wouldn't have found this out for some time yet.)

4. **REBOOT.** When SYSGEN finishes copying the files, reset the system and boot from the soft-sector controller. (Don't forget that how you do that depends on how you've set the boot section of that DIP switch on the CPU board.) And don't forget to press the space bar until you get the "ACTION <BOOT>" prompt.

So there you have it -you now have HDOS up and running on soft-sector. So you can begin reorganizing your disk library and moving its contents over to your new, higher-capacity drives. As under CP/M, you have direct access to your old drives, but named DKO:, DKL:, and so on. When I did this in the summer of '83, I was able to reduce the number of disks in my library by half! And, with very few exceptions, my old hard-sector disks were put aside for software exchange with my "local" HOG and correspondents.

Software Exchange With Soft-Sector. One thing you have to be careful about when you exchange software on disk is formatting. Soft-sector gives you so many options, but some of these aren't readable by others in the H/Z 8-bit community. To make disk exchange as versatile as possible, the best format to use is single-sided, 40-track, single- or double-density. This is readable by everybody, no matter what their hardware or system software. But if you only have 80-track drives, you also can't write this format. Hence, it's probably worthwhile to either hold onto at least one hard-sector drive (which is still a "universal" format) or have one 40-track drive running off your soft-sector controller.

Reliability. I should note one further thing before I move on to other topics. This applies to CP/M as well. It's the question of the reliability of soft-sector. I rate it as very high. One reason for this is the drives I chose when I set up the hardware. As I mentioned in STAUNCH #1, the 80-track Tandon drives Heath was selling at that time for the 237 system were exhibiting a lot of problems. In fact, after I ordered (and during a sizable delay while I waited), Heath changed their drive supplier to Control Data. In the confusion, I opted for the 40-track Tandons Heath was providing with the

H/Z100.

I haven't regretted that decision. But if I were to go through the same thing today, I wouldn't hesitate to select 80-track drives.

In a word, I'm satisfied with the soft-sectored system. And, with Heath no longer in the game, third-party vendor support for the system has been tremendous!

In the Queue. As mentioned above, I next turn my attention to commercial CPU speedup modules. For this, I need your input to present a balanced survey. Include an SASE in your letter only if you want a reply.

So see you next time, Kirk

MISCELLANY

Composite Generator. [From Kirk Thompson] There are also a lot of new hardware and software items for 8-bit systems going for a pittance these days. One is a composite video generator (model 77319) for the H/Z19/89/90 terminal from Magnolia Microsystems, Inc., 2820 Thorndyke Ave. West, Seattle, WA 98199, (206) 285-7266. This is a small board with a BNC connector on it which mounts on the back panel of your equipment. A ribbon cable connects it to the terminal board. It provides composite output for a monochrome monitor or the video input to a VCR. When I first read Peter Ruber's short article on it in the August Computer Shopper, the VCR application is what appealed to me in particular. Here was one way of putting the terminal's output on video tape for instructional or other purposes. But it's also one way of backing up the video board(s) of the system. After I installed it, I ran a preliminary test on the generator - by stringing together video co-ax cable across my living room between my H89 and the VCR. While I didn't tape anything, I brought up the '89's working screen on my color TV. (The latter is certainly not a high-resolution device!) I've also tried it on a composite monitor at a demonstration I presented for OMAHUG in late October; very nice. The generator opens up a number of possibilities!

But according to Magnolia, the quantity is limited. Originally selling for around \$80, they are presently asking \$30 apiece. I'd go for it if I were you! Who knows...?

MORE new software: A Condensed CPM/DOS Package (The Derby CP/M Utilities) (c) 1987 William S. Derby, Livermore, Calif.

This CPM/DOS package provides some of the capabilities of the MS-DOS (Microsoft Trademark) operating system that are needed to enrich a conventional CP/M (Digital Research Trademark) environment in a simple and straightforward way without any modifications to the original system. The package is written in assembly language in order to keep the programs small and compact (6K bytes on disk). It was programmed and tested on an H-89 computer, but it adheres completely to CPM/8080 (Intel Trademark) conventions, so the condensed

CPM/DOS programs should run in any CP/M environment compatible with Version 2.2 of CP/M.

The package consists of the four programs: SUB, SD, CMP, and COPY. Each provides a distinct capability in a form appropriate for but not limited to small machines with limited disk capacity; and all execute at speeds very close to the optimum.

SUB replaces the SUBMIT facility. It emulates SUBMIT for SUB files, but it also allows several SUB files to be packed into and invoked directly or listed from a single master file named SUB.BAT. In the interactive mode SUB behaves much like the DOS command structure since it accepts CCP, COM, SUBMIT, or SUB.BAT commands without any qualification. SUB normally accepts multiple commands per line, but this and other environment features such as allowing lower case files can be enabled and disabled with special configuration commands.

SD replaces the STAT utility. It produces a list of the files, or of a subset of the files on a disk. For each file listed, it tells its size and the number of unused sectors at the end of the file. A summary of the space used by the files follows the list. Directives allow listing four or fewer files per line in alphabetic or directory order by name or by extension. A user summary directive, as well as directives for changing the status of a file are also provided.

CMP compares the respective bytes of two indicated files up to the end of the shorter of the files. It lists the first 30 (or more if indicated) differences in ASCII or hexadecimal. Directives allow comparisons in a binary mode, and the specification of a pattern byte to search for in the file (or in a file compared to itself). The number of bytes compared, differences found, and the line number of the first difference are reported when the comparison is finished.

COPY converts a DOS copy command line to a PIP command line and transfers control to PIP. It does not really provide any capability beyond the normal PIP command, but it accepts the more natural DOS copy command sequence. A directive exists to tell COPY to delete a file with the same name as the destination file to make more disk space available before copying the file.

The program package and documentation is available from its author for \$12.00 (including postage in U.S.) in any standard H-89 hard- or soft-sectored 48-TPI CP/M format. It is also available in the standard 48-TPI CP/M formats of most other CP/M machines. Orders, indicating the disk format preferred, should be sent to W. S. Derby, P.O. Box 2041, Livermore, CA 94550.

THE ENHANCED H-89

by Mick Topping

Do you have a faithful computer that does a great job on many of your computing tasks, but is just a little restrictive in its works? If it is an H-89 then this story is for you. I had that problem, and as I had started with microcomputers with an objective of learning about them, rather than simply owning the most expensive, flashiest machine in town, I decided to make my Gray Ghost more competitive. Not a trivial task as I have developed expensive tastes, driven by my place of employment, which started filling up with "PC's". I started to like some of the features, as I had really not seen too much of my H-89's true capacity. The tons of very expensive software started to look good. But did I want to spend the best part of \$2k on a machine that comes with BASIC, and find that a spreadsheet was another \$300-\$600?

About this time, CHUG (The Capital Heath Users' Group, P.O. Box 16406, Arlington, VA, 22215-1406) had an amazing group purchase of "obsolete" software. I was lucky enough to get Wordstar and Supercalc. Both very low version numbers, not state-of-the-art, but nice little packages. I was now locked in. I am not cheap, at least I don't call myself cheap, just frugal. (Some of my friends have expressed other opinions, based perhaps on my habit of stretching printer ribbons 2+ years by application of WD-40.) [Ed Note: On this WD-40 practice, see Q/A col., p8.] But I couldn't let that nice H-89 and software just sit while I spent more money on prett? electronic coloring books. I resolved to keep the old friend I had assembled with my own hands, and to make it competitive, if not "compatible". An additional condition was to keep cost to an absolute minimm.

Through no original thought, but by talking to the old guard who really knew the guts of these machines, I've compiled a short list of enhancements that can make Old Reliable very competitive for a truly reasonable price.

DISK CAPACITY. H/Z-90 owners and those who have upgraded to Magnolia and CDR double-density drive controllers may disregard this section. These folks have already cured the disk-drive limitations, but at what is usually a substantial price. Insufficient disk space is the first thing most users find impossible to live with. The standard single-drive H-89 has available 90k of disk storage, reduced to about 20k on any disk that has the minimum necessities. The cheapest way to increase disk space is to add an 80-track, double-sided drive with about 400k bytes of usable space. This won't give the flexibility of soft-sectored controllers, but for upping storage it's the cheap way to go. Under \$120 for drive and new BIOS (from Livingston Logic Labs), plus some change for cables, etc. Note that a system with one large and one small drive has its own challenges; the major one being that disk copy is not possible, making disk backup of the larger disk a chore. (More on this later.) This may encourage the less frugal to think in terms of two larger-capacity drives. The minor challenge to this setup (minor at least for those who belong to an active users' group like CHUG) is that there are very few sources of software in compatible format. Keep that low cost criterion in mind, and see your local users' group for software and software conversions.

SPEED. Compared with my old 1.2 MHz 8080 system, the H-89 is pretty fast. However, after using the office machine, I was often frustrated by response times from my H-89. Many factors, some subjective, determine a computer's speed. The first, because it is so obvious, is processor speed. This is controlled by the speed of the clock signal supplied to your Z80. All processor operation occurs at a speed proportional to this clock. Also easy to get a feel for is the disk drive access speed. This causes the delay for loading programs or the help/menu functions of a program which keeps its programs in an overlay, like Wordstar or Supercalc. Finally, there's the speed of output at the terminal. This speed is the rate at which the main processor and the terminal logic board exchange information. The limitations resulting from this rate are very hard to separate from the CPU speed in the normal operation of a program. For example, it is hard to tell if the "page-up" speed of Wordstar is due to "thinking" or "painting-the-screen" limitations.

Normally, disk-access and terminal-speed limitations are referred to by the term "I/O-bound", meaning that the input/output process is the limiting factor for a given operation. The CPU speed limit is called "processor-bound". These terms refer to a specific configuration, usually while running a given operation. An H-89 is usually I/O-bound while making output to the screen or to a disk, and processor-bound while doing computation. At least logically this is how it should be. Obviously, the operation of Wordstar would be enhanced by speeding the terminal communication rate. One of the easiest upgrades to make is this software change. November '83 >CHUG gave some detail on this procedure. (>CHUG PLUG: If you have an H8/89/90/88 etc., spring for all the older issues of >CHUG. These booklets are filled with hot tips. Bargain-table creme de la creme is the "BEST OF >CHUG".) This was the first upgrade I made to my system (it's free). My dabbling indicates the H-89 is a very balanced machine, and all performance upgrades should be across the board to be satisfactory. Anyway, when I upped the terminal speed, much of Wordstar and Supercalc became processorbound and disk-bound, so my terminal-speed change didn't show much improvement.

Last summer I found another leg of the performance stool - for my money still the best investment in performance - A RAM Disk. As I mentioned, the different disk sizes of my system makes copying the large disk a chore. However, if I had a RAM Disk, I could copy to RAM Disk, then back. This disk-copying problem made at least 400k of RAM a requirement for me. The CDR Super RAM 89 met that requirement for under \$240 (lower now with memory prices down). Now I can copy a 400k floppy into RAM and back to a new floppy in just over the time it would take to copy disk-to-disk. Installation is a whiz. I am amazed at the number of small hardware suppliers for the H-89 that are so easy to work with. But on to performance - \$250 is not trivial, but this really makes the H-89 go. My decision to make RAM Drive the A: drive has not been regretted; the CONTROL-C when changing disks is just a wink. Wordstar and Supercalc overlays load in two winks. Assemblers work in one-third the normal time. There were some new-product bugs, but CDR kept working at it and finally hand-delivered (during CHUGCON 85) the right software to allow a SUBMIT program to keep running

during the RAM-disk initialization process. It now takes me about two minutes to power up, cold-boot, and fill the RAM Disk. And when I do a hard reset, the data is still in RAM Disk. To warn that RAM Disks are volatile is probably not necessary or sufficient, as most people know this fact intellectually, but have to turn a full one off once to make that fact stick; but you have been warned. Still, when I was working with Wordstar and Supercalc, and particularly with the assembler, some reactions were a little slow. Processor-bound — or Westward Ho!

Actually Florida Ho, for the Micronics Technology H-89 Speed Mod. [Micronics Technology, 449 Barbados Way, Niceville, FL 32578] This is a nice, reasonable package for pushing (gently) the outer edge of the performance envelope in the H-89. It features a Z-80A, a tiny circuit board, no trace-cutting, to achieve a software-selectable 2/4-MHz capability, and a disk of software for making the change. Price is \$30-\$40. The included software readily installs in the Heath or LLL BIOS. The Micronics Technology package took about 15 minutes to install. There are no noticeable problems after 6 months of doodling (except for DDT and other programs which alter the BIOS and tend to fight for priority). Note - I suggest that EX.COM, the public-domain SUBMIT substitute, be used with caution in conjunction with the Micronics software. The Micronics software alters the BIOS to change the CPU clock back to 2 MHz on each disk access. Without this, my drive controller refuses to go. I tried it inadvertently, as I was satisfying my curiosity as to whether the RAM Disk is accessed at 2 or 4 MHz. With the standard software, it is 2. I tried speed comparisons in

ORG 100H LDA ØDH ORI Ø10H OUT ØF2H STA ØDH JMP Ø	FIND OUT WHAT IS IN THE GP PORT ;SET BIT 4 HIGH FOR 4MHZ ;RELOAD THE GP PORT ;AND THE PORT COPY ADDRESS
CAUTION:	"SLOW.ASM" must be run after this program, before any real-disk operation.

"SLOW.ASM"

This program must be run to slow down the CPU after "FAST" has changed the CPU clock to 4 MHz, or disk operations will fail. System control port bit 4 low makes the CPU run at 2 MHz.

ORG	1ØØH	
LDA	ØDH	FIND OUT WHAT IS IN THE GP PORT
ANI	ØEFH	SET BIT 4 LOW FOR SLOW
OUT	ØF2H	RELOAD THE GP PORT
STA	ØDH	AND THE PORT COPY ADDRESS
JMP	ø	

I'd like to install this code in the RAM-disk driver, but for the time savings, it isn't likely I'll get to it soon. To emphasize, the provided software works fine, I am just a tinkerer at heart.

The results of all this are documented in Table 1. All times are minutes and seconds, terminal speed is 19200 baud, for all tests. (As I am not sure how to change it back to 9600 this particular speedup has been running so long.) LFCB is an assembly language program I am working on, about 16K which results in about 600 bytes of COM program.

Table 1 - Speed Tests

TEST	FLOPPY	DISK	RAM	DISK	FAST RAM	DISK
	2MHz	4MHz	2MHz	4MHz	4MHz	
MAC LFCB	1:20	1:10	:30	:17	:15	
WORDSTAR FIND	:12	:Ø9	:Ø6	:Ø3	:Ø2	
WORDSTAR PG DN			:Ø2.4	:Ø1.4		
COPY 218K IN 16 FILES			:24	:23	:12	
(RAM-DSK to RAM-DSK)						

various configurations and wrote a couple small programs to set the speed manually:

"FAST.ASM"

Note — This program is to be used only with the Micronics Technology speedup. Speedup kits are to be used with care. The hard-sector controllers are clock-rate-sensitive, but RAM-disk operations should take place at full speed. This short program can be patched into the RAM-disk software or used as a SUEMIT program to speed up operations in a pure RAM-disk environment. It uses the system port to control a switch which applies either 2 or 4 MHz to the CPU. Bit 4 high makes the clock run at 4 MHz, bit 4 low makes the CPU run at 2 MHz. Haphazard writes to the port can make the system crash hard. Find out what is in the port and alter just bit 4 for speed control. Location 000DH contains a copy of the contents of the system control port. SOFTWARE. To be fair, there is another leg of the performance stool that needs to be addressed: Software. It is extremely unlikely that Lotus 1-2-3 will be available on the H-89, ever, or any other program of that ilk. This is unfortunate. On the other hand, there is almost no \$600 software of any kind for it - truly a benefit. And there is lots available for \$2 to \$50 that offers tremendous value. More "obsolete" packages will become available as time goes on. One of the best examples of the kind of bargains to be had for the H-89 is Wordstar. Bill Parke (a CHUG member) has written a nice little public-domain program that attaches itself to Wordstar and makes the H-89 keypad and function keys work. And the CHUG bulletin board has a file that lists hundreds of patches for Wordstar that make it customizable. This makes a package that blows away all but the most current and expensive wordprocessing products. Add the public-domain Spell

software, and it is highly competitive with any word processor, regardless of price.

In more conventional implementations, where the software comes in a box, with no assembly required, I notice in the ads a recent product that is a Sidekick work-alike (Write-Hand-Man, a sort of resident notepad, calculator, etc. from Technical Micro Systems Inc., 366 Cloverdale, P.O. Box 7227, Ann Arbor, MI 48107), and a Modula II compiler, each under 50 dollars, as well as a short list of small hardware enhancements like auto-repeat keys. So far the hard disks are expensive, and the soft-sectored, double-density controllers are holding price pretty well, but that can't last.

The system I have now runs at 4 MHz most of the time, with a software selection of 19200 baud terminal (terminal clock 3 Mhz), a 90K internal drive, and 400K external drive (both hard-sectored), 512K RAM Disk, and substantial list of public-domain software or very cheap early-version software. A SUBMIT program that autoexecutes and loads most of the inserted disk into RAM Disk at powerup, takes about the same time as the office's IBM takes to check its parity. My system's Wordstar will stomp Displaywriter on a standard PC; my Supercalc is only about 1/3 as fast as Lotus 1-2-3, but also cost 2% of 1-2-3. And my machine is documented. I really don't enjoy having my H-89 do things; that's work. I mostly enjoy making it do things; that is a kick. And for a real high, I learn how to make it do things. And it is the right size for this. CP/M is built for hobbyists, and there is so much to improve and so many new tricks to explore.

As I see it, the major cause for [future] failure of the H-89 is likely to be its abandonment by innovators who supported it and overcame its original limitations. There are some superb exceptions, but I really fear for Old Paint because so many of the real wizards have refocused their attention on bigger and faster toys. If this is not to be Taps, some of us not-so-wizards best start filling the gaps with a little effort. Group effort is the only way. I didn't intend this to be a commercial for CHUG, that's just the users' group I happen to belong to. Any club will work. Without the club, my H-89 would be gathering dust with my Atari and my Polymorphic. You can't do it alone. Computers are tools that allow unlimited duplication of information and processes. No matter how good you are, you can't beat those thousands of guys hammering out stuff for Big Blue. But you can give them a good race if you participate in a club. Enough sermonizing - get those new soup-up designs coming in. I don't want to have to do this kind of article in Displaywriter, because it will be version seven before it equals my crusty old Wordstar. [Editor's Note: In a future issue Kirk Thompson plans a further look at speedup modules, and CDR's RAMdrive.]

QUESTIONS and ANSWERS

Q - Where can I buy ED-A-SKETCH?

A — ED-A-SKETCH is still available from The Software Toolworks, at \$29.95 plus shipping. Their brand new address is: The Software Toolworks / One Toolworks Plaza / 13557 Ventura Blvd. / Sherman Oaks, CA 91423 / (818) 907-6789.

Q - What software will connect ED-A-SKETCH to the H25 printer or to an Epson MX80?

A - The H25 should be able to take an ED-A-SKETCH file directly. For an Epson, special drivers are available for both HDOS and CP/M from Lindley Systems (21 Hancock St., Bedford, MA 01730). Although the drivers are a bit slow, they do a very nice job. A half dozen printers are supported, including the C.Itoh.

Q — Has anyone ever had any <u>real</u> problems in using WD-40 to rejuvenate ink ribbons? I have read some speculation about that but how about actual results?

A — We received the following note from reader Daniel Gilbertson: "I wore out one print head on the printer. I accelerated this by following a magazine article's advice to spray WD-40 on ribbons to get more life out of them. Don't. WD-40 is a solvent which softened the printer pin supports. Solution: New printer head, $$100.^{11}$

Q — How do I know if I have an H-89 or an H-89A?

A - Ideally, it will be on the front cover of your Operation Manual, if you have one. If you bought your machine new in 1982 it could be an H-89A. But there are other ways to tell; scan carefully through Kirk Thompson's 8-Bit Iowan column in this issue. He tells some of the differences.

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