

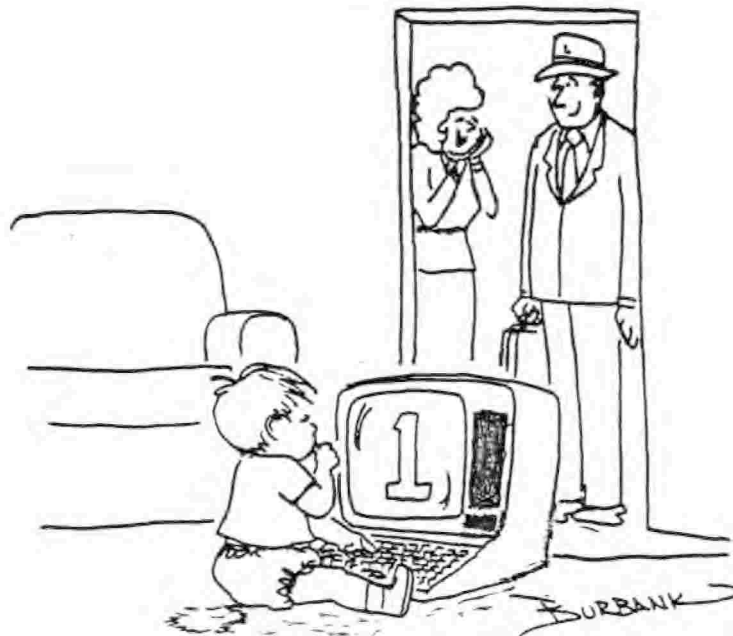
Saving Our HEATH Eight-Bit Machines!

SEBHO JOURNAL

Volume 1, Number 10

\$2.50 a copy, \$15.00 a year

June, 1987



"He said his first word today: 'data'!"

LETTERS, BOUQUETS, BRICKBATS, etc.

Dear Len,

I have enclosed a couple samples of a "generic" overlay which I have just finished developing for the H/Z-19/89 type keyboards. Please try them out and let me know what you think of them. If you have space please run the enclosed advertisement for my overlay in your next issue.

Kirk L. Thompson, West Branch, IA 52358

[Thanks for the samples, Kirk. They're something I've been needing and searching for these long years! Many programs, such as PIE and TERM.COM--for example--should have an overlay such as yours since they use up too much memory if they put anything on the 25th line. Keep up the good work, Kirk, you're a real 8-Bit supporter! P.S.: Your ad is in this edition on page 6. -- ed]

A SPECIAL NOTE FROM THE EDITOR TO RECENT SUBSCRIBERS

We're STILL receiving subscriptions at the 1986 rate of \$12.50! To make sure you folks who're trying to subscribe at last year's HUGCON-V introductory price know how we're handling this problem, I'll tell you THIS LAST TIME:

- * The \$15/year price is 50% off the \$2.50 single-issue price.
- * The \$12.50 you sent will bring only ten (that's 10) issues.

If you want a full year's worth (12 issues) of JOURNAL, put your cheque for \$2.50 in an envelope and send it to us. Also, be sure to include the number string following your name on the JOURNAL mailing label so we may properly credit/update your SEBHC database mailing-list entry so it shows that full year you thought you had ordered...

Dear Mr. Geisler:

Please enter my subscription for one year of your 8-bit newsletter. I am an '89 user for just about 7 years now, and see no reason to spend more money for speed and power--such as in the PC types of machines [sic]--when I have no need for it.

I have always believed in basics and tend to shy away from the "bells and whistles" embellishments of either hardware or software. I'm writing this via PIE, and use ZENCALC regularly for spreadsheet work. Both [Software Toolworks'] programs, in my opinion, are just great. What they lack in power, size and pizzazz (such things as menus and help screens) they make up for in simplicity and ease of learning and use.

I do not know of any of the many "pc compatibles" where I work which allow easy printing of special character fonts, mathematic or scientific notation. If they can do it, it

would take much more time and effort [than it does on my '89]. In any case, you can see that I am quite happy with my present machine and am now looking for a publication which will keep me informed about what's happening of importance to me in the eight-bit world.

I'm letting my BUSS and Sextant subscriptions run out since there's now very little of interest to me in them. They once were both great in the pre 16-bit days, but now they're almost completely dominated by those big machines. Hence my interest in your [8-bit-only] publication.

Long live the 8-bit machines.

John V. Wert, Levittown, PA 19056

[Thanks for your subscription. You're quite correct that it's easier to work with 8-bit software on H/Z-8s and '89s. The reason for this is their standard 64k memory size. The people who wrote (and I hope, still are writing) 8-bit software were constrained to writing the smallest-possible programs. There isn't any room for spectacular 'whiz-bangeries'--everything is aimed at making the computer work as economically as possible for you. On the 16-bit pcs with their 'megabobble' memories, programmers can get away with being terribly sloppy because they're not hardware bound to write tight, elegant programs. Please note that the original 16-bit "Chaplain" pc purportedly runs at an 'astounding' 5MegaFlops/second, YET IT IS MORE THAN TWICE AS SLOW AS YOUR 2MegaFlop Plain-Vanilla H/Z89 is if it's running the same program as the pc (see SEBHC JOURNAL Vol 1 #1 for details.) But I'd hang onto that BUSS subscription because of those numerous H/Z 8-bit un-classified ads. You can pick up some real bargains there; also, Sextant sometimes lets an important 8-bit article or news slip in by way of Walt Janowski's "Eight Bit World" column. -- ed]

Gentlemen:

We have a Z89 w/64k and WZ-87 disc unit which we purchased in 1981, plus a used 889 (bought in 1986) w/unidentified dual disc unit. The Z89 works with a Diablo 630 daisy-wheel printer. Both machines use 40trk hard-sector single-sided discs.

Software running on these machines are an outdated appraisal package and Zenith's CP/M Autoscribe. Additionally, we have HDOS 2.0, CP/M 2.203, Supercalc, Datastar, BASIC-80, Magic Wand and Jay Gold's Home Finance 2.0, but we've never learned how to use any of this except the appraisal forms and Autoscribe programs.

[Although] we are now using two Z-148s, we continue using our H/Z89 workhorses for many projects. Sextant articles have inspired us to upgrade the machines and try finding someone to hire to help us use them more efficiently.

[GOTO next page]

MORE Letters, Bouquets, etc.

These machines have been the most reliable equipment in our office--only two service calls in over six years--and we want to continue using them. We're now looking for a modem and a 4Megaflop [CPU] speed conversion, plus a few other bells and whistles. Any advice you can provide us shall be greatly appreciated.

Andy Borsen, Kankakee, IL 60901 -- 815-939-4930, 939-4965

[Andy, you've got a pair of winners in those two '89s. Adding Analytical Products' 4-meg CPU speed option is one thing you could do to make them work quicker. Something else which would be even better would be installing TMSI's H1000 H/Z89 upgrade. That would have several things going for you, such as one megabyte (maximum) memory, switchable CPU speeds from 2-MegF/s through 10, an internal RAM disc, and the ability to run about 90% of the IBM-type programs which you're presently running on the Z-148s without extensive operator re-training. As for modems, I've seen numerous "external HAYES compatible" 300 to 2400 baud intelligent modems advertised for as little as \$199 in such magazines as "Family Computing" and "Compute!". We use a similar bargain-basement unit, the Anchor Volksmodem 12, which works just fine.

But you didn't say what you intend to use a modem for. If you want to have communications between any of your computers in the same office, just get some low-capacity shielded three-conductor cable with 3 different conductor colours, a pair of DB-25 male solder-type shielded (RS232) plugs and a few inches of shrink tubing. With this hardware you can make a null-modem cable (not over 50 feet long) and no modem black box is needed. Let's assume your cable's internal conductors are white, red, black and the shield's uninsulated "drain" wire. Hook up the DB-25 plugs as shown below (be careful when soldering the pins!):

| Plug #1 | Plug #2 |
|----------------------------|---------|
| Pin 1 -----drain wire----- | Pin 1 |
| Pin 2 <--red----- | >Pin 3 |
| Note crossed connections | |
| Pin 3 <-----black--> | Pin 2 |
| Pin 7 -----white----- | Pin 7 |

Note: Slip a piece of shrink tubing over the uninsulated drain wire to prevent it shorting out to the other DB-25 pins BEFORE you solder any conductors in place.

Plug one end of this cable into one of your '89s at DCE port 340, the other end into DCE 340 port on the other '89. Now the two computers can talk to each other with one of HUG's modem programs at baud rates between 300 to 9600. You can now

run HDOS on one computer and CP/M on the other as long as both modem programs are set for the same baud rate. I do this with HTERM.ABS (HDOS) and TERM.COM (CP/M). There are several other modem programs which might work even better than these, such as HUG's MAPLE, Hilgreave's ACCESS, etc., but I like these two because they're cheap and work pretty good. Good luck, and keep us informed. -- ed]

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MY LIFE WITH THE H-8
by William H DuBay

One reason I built my H-8 back in 1979 was to have a word processor. I'm a writer, and though I've been using the typewriter ever since I was in high school, my typing has always left something to be desired. My submissions usually appeared as though afflicted with a severe case of wood-pulp acne.

When I saw the new Commodore PET featured on the cover of "POPULAR SCIENCE" I knew I had to get a microcomputer to help me with my writing. Instinctively, I realised that it would be terrific to edit a text on screen and then print it out copy-perfect.

Even at that early date there were quite a few vendors offering computer systems. Confused, I asked a friend who was quite familiar with computers for advice. He recommended that I go with Heathkit. "They give good support; everything they sell is solid and conservatively designed," he said.

Not being familiar with electronics and worried about costs I first invested in Heath's ET-3400 Microprocessor Trainer and their instruction course for it. I raced through the course, hoping that I would be able to upgrade the ET into a word processor. I thoroughly enjoyed the course and trainer. Although it was tiny, I felt that its' Motorola 6800 CPU would take me to the moon. Getting intimate with that chip through the ET's front panel was a mystical experience. (Heathkit continues supporting the ET-3400 for good reason--it's a real WINNER.)

I got my ET-3400 before Heath had introduced the 4k memory-expansion kit for it. Also I didn't know how to connect my ET up with cassette recorder, and video monitor so I could use it for my writing jobs. So I began investing in an H-8, and soon found it was everything I had ever hoped for. Equipped with an H-9 terminal and a GE cassette recorder I commenced writing --using the HDOS TED-8 line editor as a word processor. I was then writing a book, and stored some 400 pages of outline and notes on tape cassettes. Eventually I got the H-14 printer and spent several days getting everything out onto paper.

The only unlovable thing for me about the H-8 system was that [CENSORED] H-9 terminal; a real test of one's stamina!

Life W/H-8 continued

Difficult to assemble, it kept blowing resistors on the video and keyboard circuit boards filled with hundreds of logic ICs. I don't know how much time, sweat and money I devoted to keeping that H-9 "thing" running. Sometimes I'd get desperate and send the blasted contraption down to the Seattle Heath Electronics Center, or I'd truck it to a local radio repair shop, begging the technicians for help. Eventually, I installed the lower-case, 80-column ICs in it--a real jimcrack arrangement. It barely helped me keep my head above water until the famous H-19 came along--and won my heart.

My H-8 and I have been busom buddies ever since I added the H-19 terminal (and junked that boat-anchor named "H-9"). I've added a Quikdata Xebec 15-meg hard disc, and C/NIX from Software Toolworks. I believe I have everything I'll ever need. My H-8 system currently supports some 122 different combinations of disc formats and operating systems. (Phylogeny repeats ontogeny!)

I work a lot with ibms and clones and am very impressed with with what they can do. I'm grateful that ibm imposed some standards on the computer industry, because--bless their greedy little hearts--they've enabled us to trade floppies with other offices without having to worry about compatibility.

But actually, Heath led the computer industry in adopting standards as soon as they became available. For example, Kansas City cassette tape standard, Microsoft BASIC, 5.25-inch floppies, CP/M (and for later machines, MS-DOS). This was the good business sense which kept Heathkit in the forefront when so many other firms were going belly up. Later, Heath/Zenith embracing ibms architecture came as no surprise to me. There's no doubt that both Heath and the H-8 played an important part in the architecture that ibm finally settled upon--open buss, separate keyboard and monitor, etc.

Despite ibm, I have not yet felt it necessary to abandon my H-8. The new (ibm) programs are just more of the same. The ultimate word-processing program for authors and writers has yet to be written--although Microsoft's Word is getting close. Word-processor program designers simply don't understand how a writer develops and organises materials.

I still find that Software Toolworks' PIE/TEXT/SPELL combination are still the fastest, simplest, most convenient programs around for putting words on paper. My H-8 is just fine for my purposes. A real work horse in every sense, it has enabled me to write several books, publish a magazine, and do most of my donkey work. I have programs for it which I've not yet begun to explore or develop. It'll take another twenty or so years for me to outgrow it, but until then, it does exactly what I need it to do. [Editor's note: Read another interesting article by member Bill DuBay in next month's JOURNAL.]

RECOVERING TEXT LOST IN MEMORY

A Nifty Trick You Can Pull By Off Using CP/M's DDT

or, WHY DIDN'T THEY TELL ME THIS IN THE MANUAL?!

How many times have you lost whatever you'd been working on, either by inadvertently hitting the BREAK key or via some other unintended mechanism? For me, my 'elderly' H19 terminal (fitted with a Northwest Digital's Graphics Plus card) randomly gets asphasia and loses all communications with my H-8. To this day I've yet to detect any real cause for this *annoying* characteristic. But, thanks to an article I found in a copy

of HUGNJ's Newsletter sent me by SEBHC Member Matt Baum, I've been able to recover from those nasty "terminal" crashes. The technique follows below:

1. DO NOT PANIC! Calm down. Reset computer (SHIFT-RESET on H/Z89 or 0 and ALTR/EST-0 on H8).

2. Reboot CP/M and load DDT.

3. Use DDT's display command (D1400) to show memory starting at address 1400. Repeat D command until you see your text pass by. (Word processor buffers are usually quite high memory.)

5. Note beginning and ending addresses of your text.

6. If text starts at 5609 and ends at 89AC, enter H89AC, 5609 to find difference of these addresses (here it's 33A3). Convert the difference to decimal; 33 is high byte, so address rounds up to 52 decimal. Note down this number as you'll use it in a later step.

7. Move text to start at 100. Enter M5609, 89AC, 100 to do that job.

8. Use CTRL-C (^C) to return to CP/M. Now from keyboard, enter SAVE 52 TEXT.REC and hit RETURN key. Note: The 52 came from step 6 above. If you get a disc-full error, change to another formatted disc or different drive such as B:, then repeat SAVE attempt. It should work this time. DO NOT USE ANY OTHER CP/M COMMAND; JUST 'SAVE nn fname.ext'!

9. If the SAVE was successful, re-enter your word processor and edit away any garbage that shows up at the end of the saved file.

That's all there is to it! Of course, if you had accidentally lost power to your computer, all bets are off. More CP/M DDT tricks in future issues of the JOURNAL, such as recovering text sitting in memory after an HDOS crash, etc. -- l.e.g.

MISCELLANY

* In our last issue (A New PORTABLE H89?! - 1:9) we carried an excellent hardware review of the Tandy/RS Model 100 truly-portable computer by Lee Hart of TMSI. Since then, we stumbled across CompuServe's Tandy Model 100 forum (similar to our HUGPBBS on the CIS net). This forum has a wealth of public-domain "shareware" and "freeware" programs you can easily download. An index helps you search these program files by subject to find programs for jobs you never thought could be done by your computer before. There's also downloading help, plus helpful hints from the forum administrator (sysop). You can find out more by ordering CompuServe's "The Best of Tandy Model 100 Forum Guide" at \$9.95+\$2 s&h; order it online via GO ORDER, or call 1-800-848-8199 (614-457-0802 in Ohio or outside the USA) to order by credit card (VISA, MC only).

* The latest General Electric Network for Information Exchange, "GEnie Live Wire" newsletter informs us that they have a Tandy Model 100 forum on their network, the connect charge for which is \$5/hr (300 AND 1200 baud!), much cheaper than CompuServe's! You can find out how to sign up with GEnie by calling (voice) 800-638-9636. Be aware that there also is a Heath User's Round Table on GEnie, similar to that on CompuServe.

* The Source (McLean, VA) also has special interest groups similar to those on CIS and GEnie. But I'm not very pleased with the Source--they charge \$10/month whether you use their service or not! Also, whenever I check out their H/Z BB I end up more frustrated than pleased; there never seems to be any activity there or even a backlog of stored software. Think I'll drop this expensive turkey, Real Soon Now...

* Here's some additional info on the RS Model 100 in reference to H/Z use: REMark ran an article in the September, 1985 issue (pp 44 - 47) entitled "B-89 HDOS/CPM Interface to TRS80/MODEL 100 Portable Computer", by V.N. Fritz of Winnipeg, Manitoba, Canada. If you're interested in a RS Model 100 portable, this article has a different approach than Lee Hart's story had in last month's JOURNAL. It has lots of "how-2" stuff about interconnecting the two computers, plus two program listings which might let you swap programs and files between the two machines. I highly recommend that you first read the REMark article, and then Lee's if you intend adding a Model 100 to your computer stable. Maybe you will come up with an entirely different way to accomplish the same job than either of them. And if you do, TELL US ABOUT IT!

* We've gotten a raft of new subscribers since V1:9 was mailed (and a new quasi-legitimate excuse for being late with this month's issue). We're desperately trying to get caught up so we can get our First Anniversary issue of the JOURNAL ready for distribution and sale from Your Editor's hotel room during HUGCON-VI. We're also planning on having ten dozen (240) complete sets of JOURNAL Volume 1 in hardcover loose-

leaf binders on sale for \$25 a set. And we'll have Master Discs of CP/M Game Disc #0, HDOS "Programmer's CARE Package Disc #0" and HDOS Game Disc #0 available if you want us to update your originals (at no cost). (Or, buy new copies and give your old ones to someone else.) More details in the next JOURNAL issue. Keep tuned!

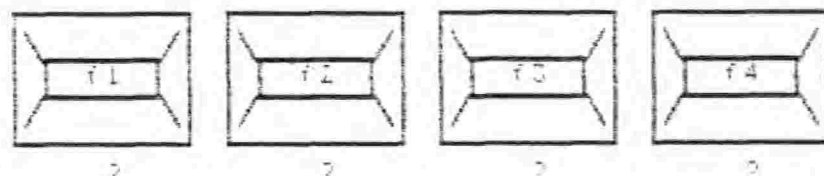
* Member Bill Underwood writes us asking about the H19/H89 ESC #--transmit page function. Unfortunately, I haven't done anything lately with it, but I did find something which may help Bill. See REMark, November, 1984 (pp 21-24). Jim Feasel gives a partial BASIC listing of how you'd enter data and then store it in a string array. From the array you'd process data, send it to disc or to printer, or whatever. His CP/M Transmit-Page MBASIC listing (Jim didn't know if it would work under HDOS) starts below:

```
10 DIM X$(24)
20 PRINT CHR$(27)"E":REM      Clear screen
30 :
40 REM (Input information & format screen as desired)
50 :
60 :
:
100 PRINT CHR$(27)"*":REM      Transmit page
110 FOR I=1 TO 24:REM      Xmit 24 80-character lines
120 X$(I)=INPUT$(79)
130 NEXT I
```

"Caution: Don't try to include graphics with text unless you're prepared to lose lines from the page bottom," Jim said, "Graphics escape sequences won't print but do take up space in the X\$(x) array. Also, clear up BASIC's memory by entering PRINT FRE("") before transmitting the page, else it will be garbled." [Editor's note: This works best if terminal is set to 300 baud because BASIC is too slow to read all those characters reliably at higher baud rates.]

Jim included a Cursor Position Report (ESC n) program listing example, and concluded with ED.BAS--a public-domain working BASIC language text editor example which demonstrates use of many H19/H89 escape codes. I remember loading it into HDOS MBASIC and successfully running it sometime in 1984 after changing only the printer output codes, but I can't find the original file on any of my HDOS MBASIC archival discs! It is a fairly simple program and uses the special function keys--marked by their functions on the screen's 25th line. The keypad keys are also used in their shifted modes. It's a pretty good information article, and you should look into it. We may have more on the ESC # function in our next edition.

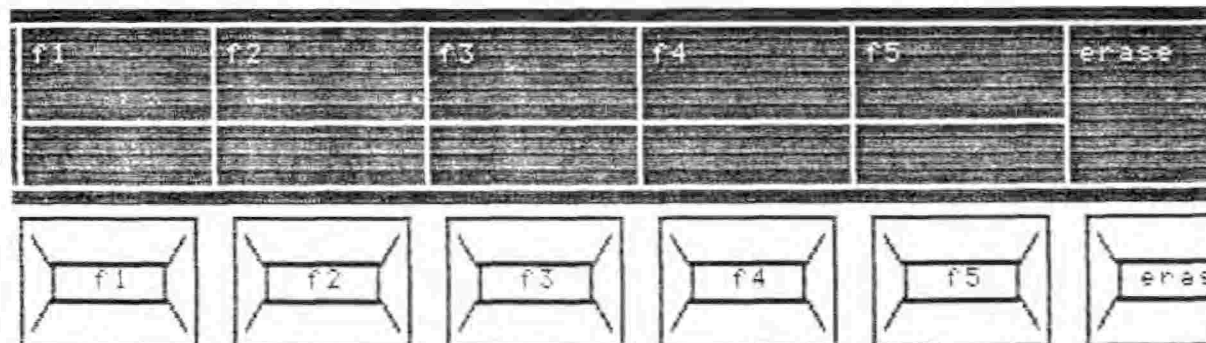
We've received several articles from William DuBay up there in Anchorage, AK. Read the first one of them in this issue. (Check the address label on this issue, Bill!)



Are you always wondering what the function and keypad keys do for some of your software? Even some popular pack-

kages, such as those from Software Toolworks, make extensive use of these special keys, but to discover their use, you have to keep referring to the manual. So why hasn't someone come up an alternative? Something you could mark the function of each of the keys on? Something you could drop over the keyboard of your H/Z-19, '88, '89, or '90 for each program you have which doesn't identify the function keys on the terminal's 25th line? And above all, something cheap?

Well, someone **finally** has! You can now purchase a keyboard overlay which wraps around the keypad and stretches across above the function keys. Included are areas for you to mark in usage, program name, and any other information you might deem worthwhile having at your fingertips, rather than buried in the manual.



Just imagine what you could put in those blanks for your favorite programs: PIE or ED-A-SKETCH or MAGIC WAND? The overlay, itself, is printed on card stock for reasonable durability versus cost. It includes a strip of double-faced tape above the f1 and f2 keys for more permanent attachment of the tail.

So what is the price? \$5.00, postpaid, for a set of half a dozen. (Iowa residents must include 4% sales tax.) That's enough to cover your present needs and maybe have a couple of spares left over!

To get your set, send a check, ordering item K0-19, to:

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

AUTO KEY REPEAT for the H19/89

by Jim Holt

With the supply of Add-On modifications drying up, the idea of producing your own improvements becomes more and more feasible for the H19/89 owner. With this in mind an auto key repeat for the keys on your 19/89 may be a good choice. Why not have all the luxuries of the more recently introduced machines? This circuit was designed and implemented some time ago, but for the inexperienced or curious, lets examine the design and implementation process as if design were in process.

ORIGINAL KEYBOARD CIRCUIT ANALYSIS: The design should be simple utilizing low cost, off the shelf components but reliable enough to match the hearty "industrial grade" H19/89.

1. The keys are arranged in 10 groups of 9 keys (all possible key combinations are not utilized).

2. Each of the 9 keys in a group receive a pulsed (multiplexed) signal at a rate determined by the keyboard decoder (NOTE: The pulse rate in the unmodified H89 is approximately 1 MHZ so it is not physically possible to press a key and release it between pulses).

3. When a key is depressed, the keyboard decoder receives a signal from one of the 10 key groups and determines (Demultiplexes) which of the 9 keys in that group was depressed by the pulse timing.

4. Four of the keys operate on a different principle. These keys (CNTL, SHIFT L, SHIFT R, & REPEAT) sink (ground) a 4 volt signal provided by a pull-up resistor. These signals are individually monitored by various circuits to determine what key was depressed.

CIRCUIT DESIGN FEATURES:

1. There must be some time interval between the time a key is depressed and repeat operation begins in order to

allow single character input. A simple RC timing loop (instead of a clock and counter) would be the simplest and easiest method to accomplish this feature.

2. All 10 keyboard groups must be monitored but must be isolated to prevent feedback between groups. The high frequency multiplexed signals from each group indicate the need for switching diodes for this purpose.

3. For keyboard repeat, a circuit parallel to the REPEAT key four volt logic would be the simplest method. Inverting logic could be used to sink the REPEAT circuit on a positive four volt input.

4. The "Repeat" sensing logic would require a continuous DC logic signal to prevent reset of the timing circuit between pulses. This could be accomplished by applying the pulses to a capacitor downstream of the diodes. The capacitor would be sized such that there would be insufficient time for it to discharge between pulses but it would easily be discharged between keystrokes of the fastest typist.

5. Because two pull-up resistors are utilized in the key REPEAT key circuit, an off-the-shelf IC would be marginal in sinking the circuit. A transistor would be necessary to provide reliable sinking of the REPEAT circuit.

6. For signal accessibility, the best location for the new circuit board would be under the keyboard.

7. Since the new circuit would be designed for very low power consumption and there is no reason for simultaneous operation of the CNTL key and repeat operation, a good source to power the circuit would be the four volt logic to that key.

DESIGN AND CONSTRUCTION: The components utilized are not critical and substitutions can be freely implemented to make use of available spare parts. With this in mind, the author examined his spare parts boxes

for equipment to be utilized in the project. Two packs of switching diodes, a variable resistor, a 4 gate NAND IC, a NPN transistor, a 2"X3" perforated circuit board, and hook-up wire were found. The only equipment purchased was the capacitors. If all items were purchased, the price should be less than \$15. The circuit was designed as indicated by FIGURE 1 utilizing the components as specified on TABLE 1. The component layout is indicated by FIGURE 2.

One area which couldn't be designed utilizing component specifications was the value of capacitor C-2. Because of the many variables involved, the IC-1/C-1 combination was breadboarded and a 1 MHZ square wave signal applied through one of the signal diodes. Several 4.7 pico-farad disk capacitors were utilized for C-2 beginning with one and adding additional ones until a minimum value of 2.2 volts was observed downstream of the diode. Utilizing an oscilloscope, it was observed that 4 capacitors were necessary providing an approximate value of 19 or 20 pico-farads. Utilizing this value, the keyboard was removed from the H89 (keyboard cable still connected) and hook-up wire used to verify operation with a signal from the keyboard replacing the square wave signal. The circuit functioned flawlessly and should be sufficient for projects utilizing the same IC without further testing.

The components were laid out on the circuit board as indicated by FIGURE 2 and hook-up wire utilized to complete the on-board circuits per FIGURE 1. Hook-up wire for connection to the keyboard traces were soldered to the 2"X3" board and left hanging for later attachment. From the bottom of the keyboard, the two screws nearest the keyboard connector were removed (after removal of the keyboard ribbon cable). After lining up one of the existing

holes in the 2"X3" board with the holes where the screws were removed from the keyboard, the small board was rotated to prevent interference. A hole was drilled to line up with the second hole in the keyboard. The 2"X3" board was then attached to the keyboard utilizing 1/8" stand-off insulators. Finally, the hook-up wires were cut to size and soldered to the appropriate traces on the keyboard.

FINAL TESTING AND VERIFICATION: The keyboard connector was reconnected and normal keyboard operation verified. Next, a character key was maintained depressed and R-1 adjusted to obtain repeat operation. The adjustment of R-1 was in a very narrow portion of the adjustable range but since it performed properly no substitution was made. All character keys were then tested for proper time delay before key repeat commenced and to verify repeat operation. Some minor readjustment of R-1 was required. Finally, the keyboard was reinstalled in the H89. After more than a year of heavy use, no problems or indications of difficulty have surfaced as a result of the modification and the repeat option has evolved from a convenience to a necessity.

TABLE 1
MATERIAL LIST

| | |
|-----------------|---------------------------|
| IC-1 | 4011 Quad NAND Gate |
| | Radio Shack # 276-2411 |
| D1-->11 | IN4138 Small Signal Diode |
| | Radio Shack # 276-1620 |
| C-1 | 10 Microfarad Capacitor |
| | Radio Shack # 272-1013 |
| C-2 | 20 Picofarad Capacitor |
| | Radio Shack # 272-120 (4) |
| R-1 | 100K Potentiometer |
| | Radio Shack # 271-338 |
| Q-1 | 2N3904 NPN Transistor |
| | Radio Shack # 276-2009 |
| 2"X3" | Circuit Board |
| | Radio Shack # 276-150 |
| Single Stranded | Hook-up |
| wire | (18 gage) |

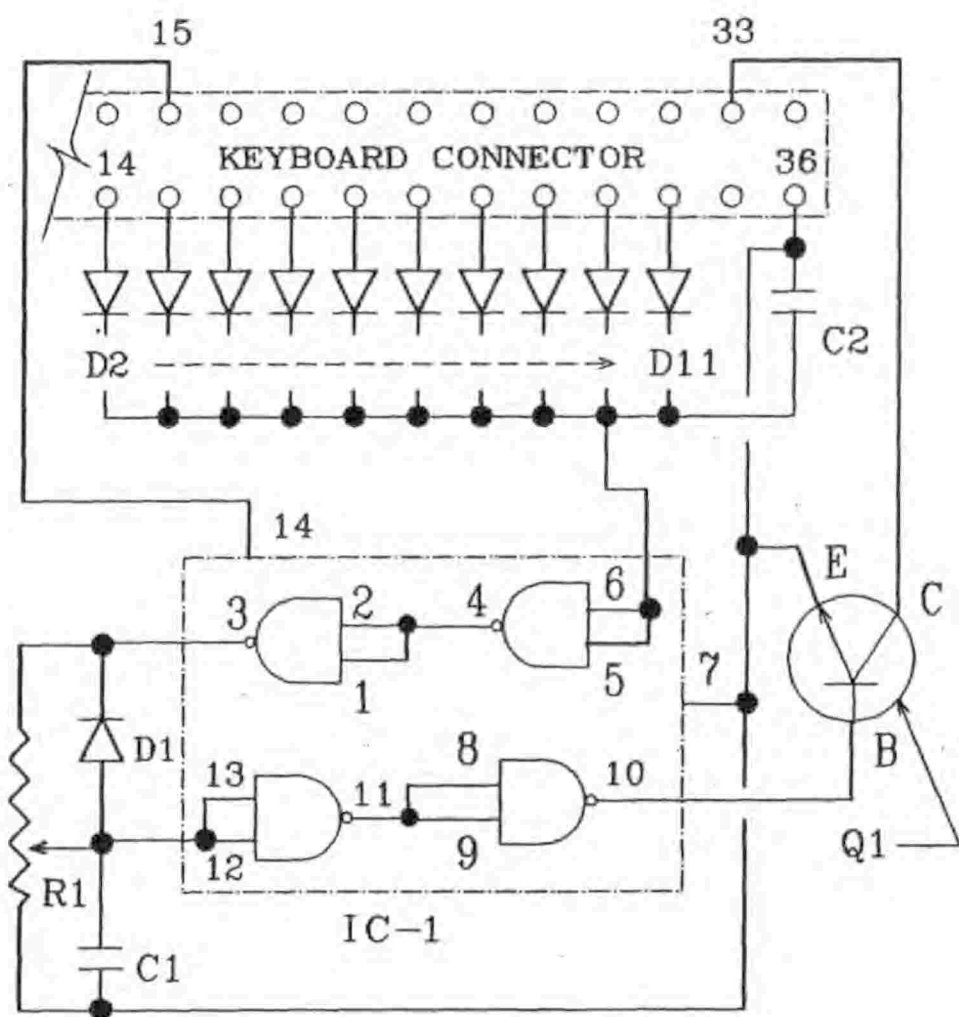


FIGURE 1
SCHEMATIC

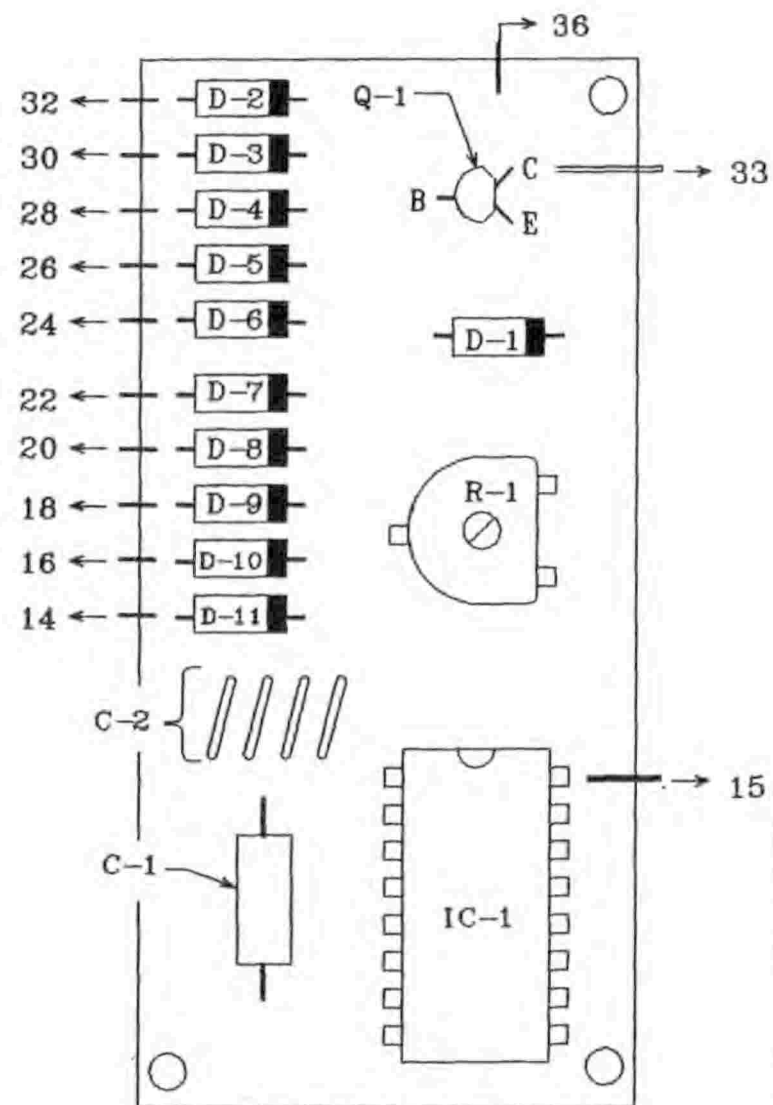


FIGURE 2
LAYOUT

NO SQUARE PEGS FOR ROUND HOLES FILEBASE Available at Three Levels to Better Fit Needs

EWDP Software's FILEBASE is now available in three functional levels. This data manager stores records in the comma delimited format compatible with letter-merge functions of Displaywrite, WordStar/MailMerge, Multimate, Word, Xy-Write and others.

The complete FILEBASE manual is supplied for all three levels as is the entire main menu when running the program. With Levels I and II not all menu options are fully operational because not all program modules are supplied. Users can move to higher levels at the price differential.

Having full Level III documentation and a complete main menu enables purchasers to better evaluate the upgrade potential. Not only can they become familiar with the scheme of operation (look and feel) but will understand exactly what is included in the stepwise additions.

LEVEL I (FBSORT) at \$29.95 provides for sorting, sort/merging, and for extracting records by testing field contents or searching for words or by record number techniques. This may satisfy the needs of those with MailMerge or BASIC files, those who can output comma delimited records from fixed-length field data managers or have downloaded mainframe files. These users have no intent to enter data or generate reports but wish to use the program as a sorting, merging, splitting utility.

LEVEL II (FBFILE) at \$69.95 adds capabilities to create files, enter records, update information, generate reports, print labels, and access records by in-RAM indexing on any field. This level is excellent for producing and managing data files when initially designed file structures (number of fields) are unchanging (i.e. mailing lists, article references), or where computations beyond numeric totals and subtotals are not required. In this group are MailMerge users who wish to employ formatted entry to replace keying within the non-document mode, and other letter-mergers needing an easy way to generate compatible data files with no formatting errors.

LEVEL III, the full featured FILEBASE at \$99.95 includes file restructure, addition of new fields, inter-field computations, running totals, indexing to disk rather than only in RAM, and other file manipulations. Also supplied with the complete package is PROF/LOSS, a program to produce a 14-column profit and loss statement from a check register file when "checkbook accounting" suffices.

Reprints of reviews and further information can be obtained by writing to EWDP Software, Inc., P.O. Box 40283, Indianapolis, IN 46240, Phone 317-872-8799 or by a CompuServe message to 73210,3516.

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SOFT-SECTOR DISK CONTROLLERS FOR THE H-89

by

George M. Ewing

One of the pet peeves of a lot of Heath/Zenith H-89/Z89 computer users has been the high cost of a soft-sector disk controller card. It was bad enough that the H-89 family required a separate card instead of including it on the main board in the first place; the high price just added to the nuisance. When Heath introduced the controller as a replacement for the H17 hard-sector card, it cost \$300. But at the time, this was only 20% of the cost of an H89; not too far out of line, though it did pinch the pocketbook a bit. You could also choose a soft-sector card from Magnolia or CDR, though they cost even more.

Now Heath is no longer selling the H89, and used machines are going for a few hundred dollars. Yet soft-sector cards are STILL over \$250, when you can get a similar board for a PC-clone for under \$50. What gives?

For one, it's the old law of supply and demand. The more they sell, the lower the price. PC clones sell by the thousands, so it keeps the price down. For another, controllers for the H89 are a higher class act; they have more bells and whistles, and come with more advanced software and better documentation. Finally, you're paying for support; the Heath vendors actually developed the boards, and are intimately familiar with them. If you have questions or need service, there's someone to call for help.

So maybe it's worth a few hundred dollars to add a soft-sector controller to your H89. In this report we'll take a look at the boards available, and compare them. Then you can decide for yourself!

The H17 - More Than Meets the Eye

Standard equipment for many H89s was the H88-1 hard-sector controller, usually referred to as an "H17". This board can control from one to three 5-1/4" drives. Heath normally supplied either a Wangco or Siemens 40-track single-sided disk drive. When used with 10-sector disks, this combination could store up to 100K on each disk.

At the time, this was pretty good. The H89 was one of the first micros to include a disk at all, and 100K compared very favorably with the Apple II, Atari, and Commodore 8-bit machines. But the H89 was no toy; nobody would dream of editing a 100K file on a Commodore 64, but Heath owners found

their machines eager and willing, if it wasn't for those darned dinky disks.

Ray Livingston of Livingston Logic Labs provided an answer. By replacing the single-sided drive with a double-sided unit, you can put twice as much on a disk, or 200K. Since the drives still have 40 tracks, disks are completely interchangeable. Going to an 80-track double-sided drive doubled storage again to 400K. The 80-track drives can read the older 40-track disks, too, but they can't write to them, so you should plan to keep at least one 40-track drive connected, or convert all your disks to 80 tracks.

The H17 controller had all the hardware needed; the bigger drives just plugged right in. But the standard Heath software would just ignore these extra sides and tracks. So Ray wrote a software product called BIOS-80. It modified the Heath CP/M BIOS to use the extra tracks and sides with an H17 controller. BIOS-80 sells for \$40 from Quikdata.

Now 400K per disk is already more than any of the competition, including the IBM PC, Apple, Atari, or Commodore. But blank hard-sector disks cost more, and are harder to find. It's also harder to find vendors who still offer software on the hard-sector disks.

Getting Soft (-Sectored, that is)

The classic solution is to get a soft-sectored controller board. Soft-sector disks are cheap and easy to buy, because they are used by nearly every microcomputer on the market. Soft-sector disks are normally run in double-density mode, which puts twice as much data on a disk and reads and writes data twice as fast.

There are three soft-sector boards available for the H89. The original Heath Z89-37 is now being produced by Technical Micro Systems; CDR offers their FDC-880H; and Magnolia has the XM-316.

The similarities between them are greater than the differences. All are normal-sized I/O cards that install in one of the right-hand I/O slots on your H89 motherboard. They all include new ROMs for U518 and U550, so you can boot from any of your new soft-sector disks as well as your old disks.

You can keep your present hard-sector controller as well, so the computer can read/write to both hard- and soft-sector disks, and copy data between them. Copying files from hard- to soft-sector is as easy as "PIP A:=D:FILENAME". The CP/M and HDOS operating systems automatically handle all the format conversions necessary.

The biggest problem for a novice soft-sector user is getting used to the jungle of disk formats.

Life is simple when you only have one disk format. "One size fits all"; you can shove any disk in any drive and read/write it with impunity. But as soon as you have more than one kind of drive, or more than one disk controller, life gets complicated.

The fun begins when you format a disk. A unformatted disk right out of the box is literally blank; like a blank sheet of paper. "Formatting" is the process of dividing a disk into sides, tracks, and sectors. It's like drawing lines on a sheet of paper to divide it into little boxes for writing data into.

With a soft-sector board, you suddenly have dozens of formats. The trouble is, not every format can be used for every drive. You can't read a double-side disk in a single-side disk drive for example. The software for each controller board tries to detect the disk's format, and keep you from doing something stupid. It therefore is very important to mark each disk as you format it: hard/soft sector, single/double side, single/double/extended density, 40/80 track, Heath/CDR/Magnolia format.

TMSI Z89-37

The standard of comparison for soft-sector boards is the Heath Z89-37, commonly referred to as the "H37". It supports from one to four 5-1/4" drives, and any combination of single/double sided, 40/80 track, and single/double/extended density. This is by far the most common soft-sector controller, and the one most vendors assume when you buy software.

Heath discontinued the Z89-37 about 2 years ago, when they dropped the rest of the H89 line. The board is now produced by Technical Micro Systems Inc. and sold through them as well as Quikdata and some Heath stores. Though a completely new layout, the TMSI board is strictly compatible with the original Heath/Zenith Z89-37. The new design improves performance and takes about half the power of the original (from 400 mA to 200 mA). This cuts heat build-up, and is accomplished by using low-power CMOS parts for many of the conventional chips in the old design. TMSI also uses hi-rel gold-plated IC sockets and connectors instead of economy TI-style sockets.

In the Heathkit tradition, the manual is quite thorough and installation is almost idiot-proof. TMSI has completely redone the manuals to focus more on the practical side; the computer jargonese and IC data sheets of the Heath manual have been replaced by information on how to use the board. There's a whole chapter on choosing disk drives and disks, and on disk formats and compatibility.

Installation is straightforward, with no soldering or traces to cut, etc. New ICs are supplied for U516, U518, and U550 on the CPU board. In addition

U557 and U558 are replaced by a jumper and a cable that connects to the controller board itself.

There are two ribbon cable connectors; one for internal drives, and one for external. Having two connectors prevents accidental erasure of disks if the power supply for any external drives is turned off when the main computer is on.

No software comes with the Z89-37; it is covered automatically by Heath's CP/M and HDOS. For CP/M 2.204, simply run the SETUP disk to automatically build a new BIOS that includes the H37 format. For the older CP/M 2.203, you have to run the tedious MAKEBIOS program. For HDOS, you install the DK.DVD device driver. If you have an early version of HDOS, the H37 update is available from Heath free of charge; order HOS-5-UP.

Operationally, the Z89-37 is simple and straightforward. If you're already familiar with Heath's CONFIGUR, MOVCPM, and SYSGEN utilities, you'll be right at home; they all work exactly the same. Though the board can address 4 drives, Heath software only uses 3, for a maximum of 6 drives (3 hard + 3 soft). The CONFIGUR program lets you specify track density (40/80) and stepping rate (6-30 mSec) for each drive. The FORMAT program offers a choice of single/double sided, and single/double density (CP/M version 2.203 also supports an undocumented "Extended" density, which puts about 25% more data on a disk).

The Z89-37 only supports Heath soft-sector formats, but format selection is automatic and flawless. No condition of the wrong disk format in a drive will crash the system, or cause faulty data to be written to the disk; the worst you'll get a "BDOS" error. "Phantom" drives are supported ("put disk C in drive A", etc.). If you need to read soft-sector disks produced by another computer, Anapro (formerly Analytical Products) offers the EMULATE program to read/write disks for the Osborne, Kaypro, and many other formats.

Any disk can be made bootable, regardless of format. Since some formats don't have enough room to put the entire CP/M system in the boot tracks, a bootable soft-sector disk has a file called BIOS.SYS that contains the portion of the BIOS that didn't fit in the boot tracks. The BIOS.SYS file typically takes 6K of disk space.

The TMSI Z89-37 is sold 3 ways. For \$249 you get the assembled board with all the parts needed to upgrade even the oldest H89; external and internal drive cables, 16-pin interrupt cable, 3 new ROMs including the MTR-90 monitor, manuals, etc. If you already have MTR-90 and the disk drive cables, you can get the Z89-37, 16-pin interrupt cable, and manual for \$195. Finally, the hacker's special; \$50 for the bare board, custom PALs, and manual so you can "roll your own".

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Factory support is good. The person to talk to at TMSI is Lee Hart; he's knowledgeable and very helpful. But expect 8-10 weeks delivery from TMSI; they build to order, rather than delivering from stock. If you need one in a hurry, Quikdata sells the same board, but without the low-power features or TMSI's manual; they just send a photocopy of about 1/4 of the Heath manual.

CDR FDC-880H

CDR (Controlled Data Recordings Inc.) is a long-time supporter of the H89 and H8. Their FDC-880H soft-sector controller is very similar to the 289-37, but supports 8" drives as well as 5-1/4". The advantage of 8" drives is storage capacity; a double-sided extended-density 8" disk will hold over 1.2 megabytes of data. Data transfers are also twice as fast as 5-1/4". But 8" drives are big, heavy, and expensive, and have fallen out of favor lately. 8" controllers may be destined for a comeback however, because the IBM AT uses a 5-1/4" drive that behaves electrically like an 8".

The FDC-880H is the easiest board to install. It simply plugs into either right-hand I/O slot; there is no dangling cable to the CPU board. Two new ROMs are supplied for U518 and U550.

The documentation is thorough, but designed for the technically inclined. Installation instructions are very brief, but adequate if you know your way around in an H89. The only trouble I had was in sorting out the jumpers for disk drive selection; it's different from Heath and not very well explained. A schematic and parts list are supplied, and a theory of operation section is included. The software manual is simply a printout of the BIOS listing. BIOS source code is included on disk, though it requires Microsoft's M80 to assemble it, not CP/M's ASM.

There are two ribbon cable connectors; one for 5-1/4" drives and one for 8" drives. No cables are supplied, though they are available from CDR and others. One interesting trick; you can crimp an extra 34-pin connector onto your existing cable to the hard-sector controller, and plug the drives onto BOTH the CDR and H17 controllers at the same time. The CDR software can then allow the same physical drive to have two names; one for reading hard-sector disks, and one for soft-sector.

Another nice feature is that you can reformat your old hard-sector disks as soft-sector; the FDC-880H has circuitry to ignore the extra holes in the disk. (Don't send such a disk to your friends however; it will drive them crazy trying to read it!)

The CDR card requires a whole new version of CP/M. You give them your CP/M serial number or send them a bootable disk and they send back a bootable copy

for the CDR board. SYSGEN, MOVCPM, CONFIGUR, and FORMAT are all replaced with CDR equivalents. In addition, they include a number of useful bells and whistles, like ZCPR and a fancy DIRECTORY listing program.

CDR uses its own unique disk format, unreadable by non-CDR systems. The format is similar to Heath's extended density, and is the only format you can make bootable. But you can also format, read, and write all standard Heath format disks for exchange purposes. CDR also includes MODIFY, a program to read and write (but not format) disks from other computers like the Osborne, Kaypro, and Z-100.

By making their own format, the boot tracks are big enough to hold the entire CP/M system (BIOS, BDOS, and CCP). Thus CDR disks don't have a BIOS.SYS file, giving you an extra 6K per disk. A disk is made bootable with the PUTSYSnn program, where "nn" is the desired memory size (48K, 64K etc.). The procedure works well, and is easier to use than Heath's MOVCPM and SYSGEN.

Configuring CDR CP/M is not as simple as Heath, but there are more options. I/OMOD is CDR's equivalent of CONFIGUR. It lets you to set terminal and printer characteristics but not disk configuration or step rates. These changes are made via a DRIVES program. There are also separate programs for switching between serial and parallel printers.

CDR doesn't support "phantom" drives, so operation on a 1-drive system is difficult. They do supply a 1-drive COPY program so you can backup a disk even if you only have one drive of a particular type.

In general, CDR's CP/M is highly compatible with H89 software. In 3 years of use I have only run across a few programs that work with Heath CP/M but not CDR. But the CDR BIOS is less forgiving of disk handling errors. It does not like reading a 40-track disk in an 80-track drive, and you can "hang" the system if you fail to close the disk door before reading, or try to read an impossible disk. Some of the error timeouts are so long that I give up and reset the system.

Support for CDR products has been quite good. Mark and Herm Brooks have always been willing and helpful in getting the most out of the product. The FDC-880H sells fully assembled for \$395, which includes two ROMs and manuals. An HDOS driver is available for an additional \$50. Order from CDR Systems, 7210 Clairemont Mesa Blvd, San Diego CA 92111, (619) 560-1272.

Magnolia XM-316

Magnolia is one of the earliest supporters of the H89, and continues to this day. Their 77316 soft-sector controller board also handles up to 4

drives, in any combination of 5-1/4" and 8". It installs much like the Z89-37, with a trailing ribbon cable to U553. New ROMs are supplied for U518 and U550. The Magnolia board appears to be the oldest design; it has the most ICs and takes the most power (about 500 mA).

Support has always been a problem with Magnolia. They pretend that all their customers are "system integrators", technically sophisticated enough to install their products without thorough manuals or factory support. Their manual was certainly the skimpiest, and included no circuit description, schematic, parts list, or software listing. The only way I got the Magnolia board going was by looking at a friend's installation, and copying it. He then had to show me how to use it.

Like CDR, the Magnolia board requires a new version of CP/M. But it comes with the board, so you don't have to send away any disks or serial numbers. If you don't already own a copy of CP/M, this is the way to go.

Installing the Magnolia board essentially transforms your H89 into another computer that is only vaguely H89-like. The "H:" prompt becomes "MMS:", and the boot commands are different. Once CP/M is booted, everything is subtly changed. You're better off if you don't know Heath CP/M, and are starting fresh.

Magnolia CP/M is competently designed, and runs smoothly. It boots quickly, and disk accesses are a bit faster. Their SETUP program is menu driven, and you use the keypad arrow keys to position the cursor over the desired option. The functions of BIOS-80 (ability to read/write double-sided and 80-track hard-sector disks) are built right into the BIOS, and need not be purchased separately.

Like CDR, Magnolia uses their own disk format, unreadable by other systems, though they support the standard Heath formats as well.

Once I got used to the differences, I liked Magnolia CP/M. There were only two real problems. First, the Magnolia BIOS is bigger than Heath's or CDR's, so you have less memory for your programs. For text editors or word processors, this is no big deal - you just can't edit quite as large a file. But for programs that need the whole 64K, you're out of luck. I couldn't run Ashton-Tate's "Friday!" database and a few other large MBASIC programs for lack of memory.

Second, I found a significant number of programs were incompatible with Magnolia CP/M. Patches are provided for some of these, like Microsoft BASIC; for others I had to depend on my friend, who has been collecting patches from Remark, Buss, etc. And some programs just won't work at all.

Magnolia's solution is to buy their XM-318 128K

RAM expansion. The extra memory restores your TPA to 56-57K. It also comes with Digital Research's latest (last?) version, called CP/M-Plus. It has a significant number of improvements in speed and efficiency. I haven't tried this product, but understand it works pretty much as advertised.

The XM-316 has been recently reduced in price to \$295, and includes the assembled board, ROMs, 5-1/4" and 8" drive cables, and CP/M on a bootable disk. Magnolia Microsystems, 2820 Thorndyke Ave. West, Seattle WA 98199, (206) 285-7266. If you need support, buy through a dealer.

Conclusions

Each board has its own strengths and weaknesses. The TMSI board is the "Volkswagen" of the lot. It's the cheapest, most compatible, and has the best manual. For hardware hacks, it's the only one available as a bare board. But it doesn't support 8" drives, and limits you to 3 soft-sector drives.

The CDR board is more like a "Porsche", a high-performance sports version for the enthusiast. It supports 4 drives in any combination of 5-1/4" or 8", and puts the most on a disk with its extended density formats. It comes with lots of special utilities, and complete technical info to let you get "under the hood" and tinker to your heart's content. But it's the most expensive, and requires more technical savvy to get the most out of it.

The Magnolia is the "Chevy" of the group; simple, solid, and dependable. It should suit a business user perfectly, who only runs a few dedicated programs and doesn't particularly care about compatibility. The price is reasonable, and it comes with CP/M. But it steers you off into Magnolia's own little world, and is a pain to setup if you don't buy through a competent dealer.

Well, that's about it. Now you can judge whether your H89 should get "soft" in its old age, or stay "hard" for the rest of its life!

George M. Ewing
1524 Brightwaters NE
St. Petersburg, FL 33704



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[Please tell Jim you saw it in the SEBHC JOURNAL. This's a very real bargain; wish I had bucks enough to grab it myself! -- ed]

FORTRAN HELP NEEDED:

I have a Heath GCA-1000 Most Accurate Clock, the output of which I have not been able to access. I've attempted to program something in Fortran (without any luck) which would let me take information from the clock and print date and time on documents, computer files, and programs. I've called Heath many times with ZERO SUCCESS. If any of the SEBHC's members has accomplished the simple task outlined here, I shall be most grateful if they will share their knowledge with me. Also, if anyone knows of a Fortran User's Group which I might join I'd like to hear about it. You can reach me at either of these numbers (24hrs/day): 803-881-8576 (voice/modem) or 803-881-1218 (voice). Thanks!

Joseph Caruana

[OK you Fortran-o-philic SEBHC members, get in touch with Joe Right Away; He Needs Help! -- ed]

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AUTOFILE AND HDOS 3.0 "HELP!" RESPONSE:

In reference to Terry Hall's letter in JOURNAL V1:9, page 5 about HDOS 3.0: I have been using HUG's Autofile, p/n 885-1110 with HDOS 3 for some time now and I haven't had any problems. (Autofile was originally intended for use with HDOS 2.0.) The only problem I have experienced with HDOS 3.0 is that Lindley System's printer driver doesn't let me select desired printer modes, such as setting or changing chars/line, fonts, or c.p.i. Some head scratching is needed here. I remember seeing HDOS 3.0 patches in BUSS #137, p3, but since I didn't have the problems those patches were for, I just passed over them. Terry might look them up to see if they help. And thanks Len, for a great magazine.

Allie Lingo, P.O. Box 118, Dierks, AR 71633-0118

[And thank YOU Allie, for so kindly responding to your fellow member's cry for help! Here are some more requests. -- ed]

MORE HDOS 3.0 HELP WANTED:

1. These back-issues of Micro Media Magazine on disc for HDOS 2.0, in MBASIC: Volume I, numbers 1 thru 6; Volume II, numbers 1 thru 4; Volume III, numbers 5 and 6. Any HDOS disc format ok.
2. An HDOS program (.abs or .msb, doesn't matter) which will alphabetically sort files larger than memory.
3. Source code on disc for EDIT-19 (created by S & K Robbins, but now in public domain). Disc format doesn't matter.
4. CP/M copy of Software Toolworks' PIE Ver. 1.5 in which the DELETE key works properly. On mine, pressing the keypad DL key just rings the bell, but SHIFT-DELETE works!
5. My favorite editor--EDIT-19--won't run under HDOS 3.0. My experience with EDIT-19 seems to indicate it must overlay part of the operating system because I can call up EDIT-19 but then it crashes the system. Has anyone been successful in getting HDOS 3.0 and EDIT-19 to live harmoniously together in an H/Z-8-bit computer?

Terry Hall, 516 E. Wakeman, Wheaton, IL 60187
312-885-4594

[Please contact Terry directly. -- ed]



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The SEBHC JOURNAL's Back Page

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* The SEBHC JOURNAL is composed, edited and published by L.E. Geisler at 895 Starwick Drive, Ann Arbor, MI 48105. Phone 313-662-0750, 9am - 6pm Eastern Time, Monday thru Friday. Off hours, try 313-769-6052 (home).

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