Saving Our CLASSIC Heath 8-Bit Machines!

# The SEBHC JOURNAL

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*See Inside of Last Page for Subscription Information & Order Blank*

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## The READER'S MAILBOX

Hi!

We haven't met, but I've read of you and your interest in the H89A in The Staunch 8/89er.

I've used my H89 since 1979--still use HDOS--but now I am replacing my TL8 with a Mac SE/30 motherboard....the H89's CPU board & interface cards will then act as a decidedly secondary "co-processor". I don't realistically expect to be using/running HDOS much more in this Grey Ghost, but it'll be there when I want it--and, this way I'm not leaving my H89 behind! (Lee Hart of TMSI is doing the [conversion] work, contact him if my approach interests you.)

The point is, I have a lot of stuff to unload. Discs, for example--I'll no longer be using hard-sector discs (actually, I'll be uisng Lee's H1000 board as the H89's 8/16-bit CPU board, and I'll be running soft-sector from it). So, I thought that I should return these [hardsector] discs to the [8-bit] community...perhaps you can use them, perhaps not--in which case, please pass them along! (Hardsector discs are not that easily found nowadays, and nobody is writing HDOS code!) [Oh, yes I am! I'll publish it Real Soon Now! -- ed]

Most of the stuff on the [accompanying discs I've sent you] is Public Domain. The small fraction which may not be PD you should try contacting the authors for their ok to use their software. Otherwise, just erase the discs and re-use them.

Now, on another note: I have an extra H67 [Heath 8-bit hard disc] which should work (it has a new H67 drive ini it), and another which is incomplete but still good for parts. I'll help with the shipping--folks, I just want to find a good home for some pretty-hard-to-find gear. (Note: The H67 which should work doesn't, and I just don't know why not!)

I also have an H77 with two eighty-track half-height drives plus various boards. Why not let me know what you need? Maybe I can help?! Again, I'll help with the shipping...just want to do the "right thing" by some pretty special hardware.

MARK HUNT, P O Box 280, Ray Brook, NY 12977; ph 518-523-1482

[Hey, Mark! Last we had heard from you was a couple years back when you'd gotten a job up in Alaska! And you're right, we haven't met, but you were a fairly loyal subscriber to this newsletter for about four years. From what I'm able to gather from your letter, you essentially decided to keep most of your H89's basic hardware virtuially intact, and replaced a few parts to make it a bit more "compatible" with other computers. Sort of having your cake, and eating it too, hmm? We went the other way, still using our H89 pretty much as it came from Heathkit but swapped the original CPU for D-G Electronics' Super89 CPU board. Gained a whole lot there! We also picked up a nearly-100% peesee compatible H120 and a Whole Bunch of peesee software with it which runs just fine under Pat Swayne's ZPC software emulator utility. Presently we have three computers running in one room, an H8 w/colour monitor & 4-part stereo sound, this H89A, and the H120 (w/hard disc). And thanks for the hardsector discs you sent; three were original release discs (one Adventure game, 2 Heath drive-system test discs) and four were HDOS INITed but otherwise blank. The blank discs must have been some you'd had since "day one" because they didn't have drive-hole reinforcement rings installed. But that's no problem, all half-height drives do a much better job of centering discs than the original single-sided 40-trackers...in any case, we'll still be able to use them, so thanks! -- ed]

Dear Mr Geisler,

As you can see I now have Calligraphy-II. I spoke with Mike Krivalavek and he not only apologised for the delay in its' shipment, but sent me a FREE DOS version to make up for my inconvenience. Nice!

I'm just now learning how to use the program's many features (as you can see from this letter). How about another [Calligraphy-II] tutorial? [OK, Really Soon Now! -- ed]

It was great talking with you as always. I learned a lot from our conversation about our old lamented friend, Heathkit. [And] I did order two of their remaining kits, but not the two I [really] wanted. I'll try to write more when I learn to use Calligraphy-II; in the meantime, keep up the good work!

HAROLD SEGAL, 3563 Aurora Circle, Memphis, TN 38111

[Hey, Harold! Thanks for your follow-up letter on our phone conversation last month. From the looks of your letter, you have grasped some of Calligraphy-II's command-structure fundementals. But one thing you seem to have missed was changing vertical line spaces when combining several parts of a graphics "font" set into a complete image (cf top of your letter's page). Check the instructions and examples again to see how that's done. Also, when combining different font sizes on one line, be sure to include a closing punctuation mark BEFORE the same-line-continuation "\" mark, otherwise sentences can be difficult to read and understand. -- ed]

Dear Lenny,

The story here is old news to your readers: we're once again moving. This time its to a new state and new weather. I've accepted a computer-science instructor position at Green River Community College in Auburn, WA., and I'm writing this while surrounded by many boxes, both packed, and empty. The empties are getting fewer, and familiar household items are becoming harder to locate every day. Move day is [scheduled for] July 31st.

I hope that readers from Washington can extend a welcome to me even though I come from California! When I get settled in the new location, I will try to get a BBS going. Meanwhile, I shall continue monitoring the BBS in Blythe [CA] on a weekly basis. A reminder for JOURNAL readers: There is a selection of CP/M software on the PVC BBS which I had been operating. It's number is 619-922-3104; thus far I've not

## more READER'S MAILBOX

seen any HUGgers log onto it. [We'll fix THAT Really Soon Now! -- ed]

Please write me at my new address [below] or, if in great need, phone me at 206-939-9705. That's it for now....

/s/PETE

PETER SHKABARA, 31624 121st Avenue SE, Auburn, WA 98002

Dear Lenny,

It's always nice to know that one has a "working vintage" machine (see attached clipping from the San Francisco Examiner).

SPRING SMITH, San Luis Obisco, CA

[Hey, Spring! You're playing OUR song! I've copied the item and included it below for the pleasure of our other readers. Thanks heaps, friend! -- ed]

"ASK DVORAK -- by John C Dvorak

"Where to start in collecting vintage PCs

"Q: A friend of mine was showing me his old computer, an Altair with an Owl Monitor. I thought it was neat that he still uses it. We were discussing the item as something that is collectible like an old Model T Ford. If you were going to collect old personal computers, which would you suggest?--B Bennett

"A: I wonder how long it will be before these old machines become valuable. The personal computer scene officially began in 1975. So we've been at it 17 years. It's not a long time, but much of its' history is already lost. By this, I mean that many of the collectible computers of yore are gone forever. This is our last chance to start a collection of early machines.

"The premier machine to collect is the old Apple-I which isn't really a computer, but a hokey card that the computer hobbyist/maniac pieced together and then regretted owning. It's worth about $2,000 or more already.

"We now have a last ditch opportunity to grab one or more of the old machines for a collection. Ideally, it should be in working condition. My pick to click is the old SOL-20 compter (circa 1977), a machine that should have knocked Apple off the block except for one or two things: one, it wasn't in color; two, the company was poorly managed.

"The best add-on for the SOL-20 was a Northstar 5-1/4-inch floppy. Northstar was the first company to use the 5-1/4-inch floppy for a small computer. The thing required hard-sectored diskettes that had ten holes in them. The storage capacity was 70 kilobytes. A double-density controller released a few years later provided 140 K!

"The real collectors item, though, to go with a SOL-20, is an old Helios 8-inch floppy add-on. I don't know if any ever worked. If you can't get a SOL, then look for the famous Exidy Sorcer (circa 1978). It was SOL compatible.

"Nobody should overlook a vintage Osborne-1, an Apple-III, a John Deere (yes, the tractor people), the old IMSAI VDP-80 and VDP-40s, the IBM 5100 (the world's slowest BASIC computer also ran APL from ROM), a Polymorphic (preferably with the three floppy drives), a Southwest Technical Products Computer, the original Heath [H-8] machine, or any other pre-1980 machine.

"Good luck and happy hunting."

[Readers, please send questions or comments to: JOHN C DVORAK, c/o SAN FRANCISCO EXAMINER, P O Box 7260, San Francisco, CA 94120. They might give our little "vintage newsletter" tons of good publicity. And, who knows, we might even pick up a few new subscribers. Thanks again, Spring! -- ed]

SOFTWARE FOR SALE... SOFTWARE FOR SALE... SOFTWARE FOR SA

CP/M HARD SECTOR

| | | |
|---|---|---|
| CP/M 2.2.04 Distribution discs | $3.00 | CP/M utilities |
| EASY APPOINTMENT w/MANUAL | 8.00 | Calender appointment procesor saves, prints daily appointments |
| DESPOOL w/MANUAL | 2.00 | printer command utils |
| BIOS-80 DISCS w/MANUAL | 5.00 | BIOS for double-sided hardsector drives |
| CPS w/MANUAL | 3.00 | Heath modem software |
| MAIL LIST w/MANUAL | 3.00 | mail-listing software |
| TEXT PROCESSOR w/MANUAL | 3.00 | modify programs & text |
| X-BAR PLOT w/MANUAL | 3.00 | creates graphs, charts |
| SNAP w/MANUAL | 3.00 | screen note & print |
| MYCHESS w/MANUAL | 3.00 | computer chess game |
| MBASIC-80 w/MANUAL | 8.00 | programming package |
| COMPUTER CHEF w/MANUAL | 3.00 | recipies database pgm |
| WHAT'S FOR DINNER? w/MANUAL | 5.00 | more "CHEF" recipies |
| SUPERSORT w/MANUAL | 15.00 | extensive sorting pgm |
| DATASTAR w/MANUAL | 15.00 | form generator program |
| SUPERCALC w/MANUAL | 15.00 | great spread-sheet pgm |
| JUPITER w/MANUAL | 15.00 | easy-to-use database |
| LOG BOOK | 3.00 | radio ham log book pgm |
| KEYMAP FOR WORDSTAR w/MANUAL | 2.00 | patch for Wordstar to use keypad arrow keys |
| CHEAPCALC | 2.00 | simple spread sheet |
| SETUP DISC (distribution disc) | 3.00 | sets up 89 for printer |
| BRAND-NAME HARD-SECTOR DISCS | 10.00 | factory-new 10 in box |
| MIXED NAMES HARD-SECTOR DISCS | 5.00 | for ten--minimum order |

--(oo)--

SOFTWARE FOR SALE... SOFTWARE FOR SALE... SOFTWARE FOR SA

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# READER'S MAILBOX & 4-SALE end

4-SALE, Continued....

CP/M SOFT-SECTOR SOFTWARE

| | | |
|---|---|---|
| INSTRUMENT FLIGHT w/MANUAL | $10.00 | pilot-trainer simulator |
| LONG & LOUD w/MANUAL | 15.00 | banner & sideways dot-matrix printing utility |
| DATEMATE w/MANUAL | 15.00 | calendar appointment processor--save & print personalised calendars |
| REMBRANDT w/MANUAL | 15.00 | fancy grafix pkg for 89 |
| WORDSTAR 2.26 w/MANUAL (includes MAILMERGE manual) | 6.00 | word-processing package |

HDOS HARD-SECTOR SOFTWARE

| | | |
|---|---|---|
| HDOS 2.0 DISTRIBUTION DISCS | $ 6.00 | set of 3 original discs |
| "PIE" FS EDITOR w/MANUAL | 3.00 | word & text editor |
| TEXT w/MANUAL | 3.00 | document formatter pgm |
| INTRO--BASIC PROGRAMMING w/MAN | 3.00 | CA programming course |
| GENERAL LEDGER w/MANUAL | 3.00 | 8-bit accounting pkg |
| CPM-HDOS/HDOS-CPM CONVERTER | 3.00 | converts ASCII files |
| UD.DVD w/MANUAL | 3.00 | universal device driver |
| TOUCH-TYPING TUTOR w/MANUAL | 3.00 | CA typing course |
| COMP-CHEF CHOCOLATE BYTES w/MAN | 3.00 | recipies database |
| "DISC XIV" | 3.00 | misc HDOS HUG software |

NOTE: $25 buys above HDOS software plus "SIX DRIVES" floppy expansion package for H8 or H89 hard-sector interface card, and five additional discs of mystery HDOS software--shipping is included.

HARDWARE

| qty | description | price |
|---|---|---|
| 1 | Full ht 96tpi "80trk" drive | $45.00 |
| 1 | 1/2ht 96tpi w/full face drive | 55.00 |
| 2 | 1/2ht 96tpi w/1/2ht w/ff " | 60.00 ea |
| 2 | 1/2ht 48tpi "40trk" drives | 45.00 ea |
| 1 | H77 Dual Drive cabinet | 15.00 |
| 1 | H77 cabinet slightly damaged | 8.00 |

SHIPPING AND HANDLING

| | |
|---|---|
| SOFTWARE (PROGRAMMES) DISCS, 1 to 3, 4-up, free | $1.50 total |
| DISC DRIVES | $5.00 1, up |
| H77 Cabinet | $7.00 1, up |

CONTACT: TOM SLAVIK, 5205 Links Drive, Waco, TX 76708; phone 817-754-5164

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Dear Lenny,

Here's my cheque for renewal. Sorry for the lateness but it was due to my trying to get my modified H89A back in business!

I finally installed the two thin drives, soft-sector controller, 4MHz [clock] modification and 512k CDR RAM expansion board. Now to put it all together again!

/s/JOE

JOSEPH GONZALEZ, Box 414426, Miami Beach, FL 33141

[Hey there, Jose! Glad to hear that you're getting your machine back in operating order. How about letting us know how it works out for you with all that speed and extra memory. Here we have our D-G Super89 CPU card running at 4-meg clock speed, and its' RAM-disc feature helps us load and unload programs "in the twinkling of an eye"--or maybe faster! Also, when we run CP/M, the S-89 has a RAM printer buffer which automatically engages, and that lets us do other jobs without having to wait for the printer to finish--it just chugs along in the background. Actually, this setup is somewhat faster (and a whole lot easier to use) than how our H120 printer output works under CP/M-85 or MS-DOS 3.1. (I'll someday eventually learn all that machine's ins & outs.....) But do keep in touch! -- ed]

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ANOTHER COLOSSAL COMPUTER SALE IN OCTOBER...ARE YOU READY?!

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The Jewish Community Center of Washtenaw County is holding another "Colossal Computer Sale" on 4-Oct-92 for the benifit of their preschoolers. All proceeds will be used to purchase necessary instructional items for use by little kids in pre- and grade-school classes at the Center.

This charitible event is repeated three time a year, and really does help lots in replacing "consumables" such as crayons, paper, chalk, pencils, modelling clay and the like which are used by the kids in their classes.

So here's a chance for you to help some little kid get a good start in life by your either attending the Sale, or donating useable computer books, parts, etc. Even better, you could rent a table and sell off some of that surplus "stuff" you have been accumulating for the past decade or two! Just think of all the space you'd gain, not to mention the fun you certainly will have!

For more information, watch for a big announcement to run in this space Real Soon Now! Or, call the Jewish Community Center at 313-971-0990, M-F, 9am - 4pm. Tell 'em Lenny sent you and get special service! You can't imagine what a good time you'll be missing if you don't get in on this Colossal Sale! Admission is just $3 for the entire day (9am - 4pm).

# The CONTINUING STORY of The +55+ GANG

## RUNNING EXTENDED BENTON-HARBOR BASIC
## or
## How to Use and Learn to Love This Venerable Language

by
Leonard E Geisler

So I'm old fashioned--SO WHAT! I learned to get along in "BH BASIC" long before I could afford to buy MICROSOFT BASIC, and didn't have many problems with it. Probably because I'd learned how to run Tiny BASIC on my Heathkit ET3400 microprocessor trainer (it came on a chip within the ET3400 4000k memory expansion unit). BH BASIC works much faster at many tasks than MBASIC does, even though it only has two-place computational (math) accuracy. My copy ran just fine as received, but Pat Swayne (and others) wrote several neat patches and published them in REMark, so I just had to try them all out. Whaddayano?! They all worked just fine, and I was able to edit programs and do other neat stuff, such as LOAD a program instead of OLDing it. I'll reproduce Pat's BH patches in future editions so that you may have as much fun as I had putting them into use.

Now as to BH BASIC's command structure, I've prepared a series of major BH commands we'll use this month for writing a few simple example programs. They should give you a good "feel" for programming in a "high-level language". Also they may make you feel pretty good if any of your programs runs properly right away.

But first, dig out that BH BASIC SYSTEM DISC you made a while back, boot it up and check the directory. Make sure it has BASIC.ABS on it as well as LP.DVD. (You'll need LP.DVD in order to print out a listing of your program to compare with ours later.)

Load BASIC by entering:

```
RUN BASIC<cr>          (We're assuming you've only
                        one drive here.)
```

BASIC should sign on with this message:

```
EXTENDED BENTON HARBOR BASIC #11.00.00
*_
```

Note: BASIC uses the asterisk (*) as its' prompt. Don't worry if your BASIC has a different serial number, it'll run.

To begin our exercise, let's try a few commands and see if BASIC likes 'em. Enter (after the asterisk):

```
*PRINT 3<CR>    (DON'T ENTER "*" OR "<CR>"; HIT RETURN KEY)
3
*_

*PRINT 3+5<CR>
8
*_
```

You should see the answers "3" and "8" printed out as shown. This tells you BASIC and HDOS are working ok. Now let's try subtraction. Enter:

```
*PRINT 10-3<CR>
7
*_
```

See, the answer came out correctly as "7" (unless you didn't enter the problem properly).

Now enter:

```
*PRINT "HEATH" + " " + "COMPUTER"<CR>
HEATH COMPUTER
*_
```

This shows that you can add two ASCII (letter) strings the same as if they are digits (but they must be enclosed in quotes). This comes in handy where you need word and number combinations, as in a game or financial program for example.

Thus far we've been working in COMMAND MODE. Whatever you tell BASIC to do it does it and goes back to sleep until you give it another job to do. Well, let's do that. Enter this command string and see what happens:

```
*FOR I = 1 TO 3;PRINT "HI, THERE!";NEXT I<CR>
HI, THERE!
HI, THERE!
HI, THERE!
*_
```

Wasn't that fun?!

BASIC is very handy to use in the COMMAND MODE. You don't need to write programs to solve problems because it can do it for you pretty much the same as a digital calculator. Here's an example of an algebra-type problem you can try:

```
*PRINT 12/6*4=<CR>     (Note: "*" means "multiply")
8
*_
```

And another, more complex one:

```
*PRINT 6+4*3^2=<CR>   (Note: "^" means "exponentiation")
42
*_
```

Now try the same problem but enclose the parts in parenthethes, thus: (6+4)*(3^2) and run it. What was your answer? It should have come out as 42, the same as the first example. Parenthethes are handy in math work because they compartmentalise problem elements and eliminate confusion.

# MORE "+55+" GANG

Summing up what we've learned thus far, we've found that BASIC performs arithmetic operations in this sequential order:

1- Parentheses have top priority in any calculation; that is, any expression in parentheses is evaluated before any expression not in parentheses.

2- Without parentheses, the order of priority is:

a. "Unary minus" and NOT have equal priority

b. Exponentiation proceeds from left to right

c. Multiplication and division have equal priority and proceed from left to right

d. Additon and subtraction have equal priority and proceed from left to right

3- If rules in either 1 or 2 do not clearly designate order of priority, evaluation of expresion proceeds from left to right.

Example: The expression 2^3^2 evaluates from left to right:

Step 1. 2^3 = 8 (leftmost exptn has highest priority)

Step 2. 8^2 = 64 (answer)

Check the above out by entering:

```
*PRINT 2^3= <CR>
8           (answer)
*_
*PRINT 8^2= <CR>
64          (answer)
*PRINT 2^3^2= <CR>
64          (answer)
*_                                  (By golly, it worked!)
```

Now we'll check out division. This expression--12/6*4--evaluates from left to right since multiplicaton and division have equal priority. Check it out by entering:

```
*PRINT 12/6= <CR>     (division is left-most operator)
2
*_
PRINT 2*4= <CR>
8           (answer)
*_
*PRINT 12/6*4 <CR>
8           (answer)
*_                                        (This worked too!)
```

Parentheses may be nested (sets of parentheses enclosing other sets). Expression in the innermost set is evaluated first, the next innermost left-justified set is second, and so on until all parenthetical expressions are evaluated. In this example:

```
*PRINT 6 * ((2^3+4)/3)
```

evaluates thusly (you won't see it on the terminal, but it does):

Step 1. 2^3=8

Step 2. 8+4=12

Step 3. 12/3=4

Step 4. 4*6=24

Break the problem down then try it yourself to see that it works.

Parentheses also can prevent confusion or doubt when you are evaluating expressions (or trying to explain something abstruse) because they compartmentalise a problem's elements. Which of these two identical expressions are more quickly grasped?

1. D*E^2/4+E/C*A^2
2. ((D*(E^2))/4)+((E/C)*(A^2))

(Don't try this in BH BASIC unless you substitute numbers for the algebra because you'll get a SYNTAX ERROR message!)

Note: You may also separate parts of expressions with blanks to make them easier to read; BH BASIC ignores them except when they're part of a quotation-mark enclosed string.

Let's see; we've discussed addition, subtraction, multiplication, and expontentiation in a rather sketchy manner. Also, we've rather sneakily shown you some examples of COMMAND MODE. But the main idea is to give you enough illustrative examples of BH BASIC programming techniques that you should be able to work out simple programs for yourself. So, we'll now proceed to give you a few more. Here's a list of BH BASIC Relational Operators:

| ALGEBRAIC SYMBOL | BASIC SYMBOL | EXAMPLE | MEANING |
|---|---|---|---|
| = | = | A = B | A is equal to B |
| < | < | A < B | A is less than B |
| ≤ | < = | A < = B | A is less than or equal to B |
| > | > | A > B | A is greater than B |
| ≥ | > = | A > = B | A is greater than or equals B |
| ≠ | < > | A < > B | A is not equal to B |

Note: Symbols =<, =>, and >< are not accepted and BASIC generates a "syntax error" message if they are used.

Here's how we use relational operators:

```
*PRINT 3<4 <CR>       (true)
65535                 (indicating maximum computation)
*_

*PRINT 4<3 <CR>       (false)
0                     (does not compute)
*_
```

The Boolean Operators (invented by a drunken Irish mathematician):

OR

The OR operator performs a Boolean OR on the two integer operands (which must lie in the range of zero to 65535) and converts them to 16-bit binary numbers. The 16-bit OR is applied and the computational result is returned to the equivalent interger representation. (Pretty hairy isn't it?! But let's plow onward, there's more!) As the Boolean value chosen to represent true (65535) and false (zero--or 0), the OR operator impements a standard truth table OR function.

# Still more +55+ GANG!

For example:

```
*PRINT 132 OR 255 <CR>          00000000  10000100  132
255                             00000000  11111111  255
                                --------  --------
                                00000000  11111111  255
```

and

```
*PRINT (3>2) OR (4>9) <CR>
65535
```

## AND

This arithmetic command performs what is termed a "logical Boolean AND" operation on two integer operands which must lie in the range of zero to 65535. The two integers are converted into 16-bit binary numbers, then they are ANDed. The result of this operation is then returned to the equivalent integer digits. Note: The AND operator tests the operands against a standard AND truth table on the values true (65535) AND false (zero); see example below:

```
*PRINT 132 AND 255 <CR>             00000000  10000100  132
 132                                00000000  11111111  255
*_                                  --------  --------  ---
                                    00000000  10000100  132
*PRINT (3>2) AND (9<7) <CR>
 65535
*_
```

## NOT

This is the Boolean negation operator. It converts the numeric value of a variable into a 16-bit Boolean data value, each bit is inverted, and the 16-bit binary number is restored to numeric data. Here's an example "from the book":

```
*PRINT NOT 0 <CR>            0 = 00000000  00000000  and
 65535                   65535 = 11111111  11111111
*_
```

This is pretty confusing stuff to lots of ordinary folk but we're asking you to stick with us for a bit longer. We'll give you a few short BH BASIC programs which you may copy and run to see what all this math jargon is really trying to tell us in PLAIN ENGLISH! Really, BASIC is a very handy item to have in your software tools box and know how to use. It won't hurt you to understand it, that knowledge can help you be a better computerist. Honest!

## STRING MANIPULATION

Here's where we get into the fun part of BH BASIC! BASIC is capable of manipulating string information to let you achieve many interesting and valuable affects which will help non-computer types better appreciate what you're doing. We have several short routines lurking in the background which you may copy and run, but to know what you're doing, you MUST continue reading this text!

What's a "string"? It's a sequence of characters treated as a single unit of an expression. It may be composed of alphanumeric and other printing characters. An alphanumeric string contains letters, numbers, blanks, or any combination of the same, but it may not exceed 255 characters! The blank, bell, form-feed, and TAB are considered to be printing characters.

## String Variables

The dollar ($) sign, following a variable name indicates a string variable. For example, B$ and L6$ are string variables. Here's an example of how the variable B$ is used:

```
*B$ = "HI!": PRINT B$ <CR>
 HI!
*_
```

Note: Don't confuse a letter variable with a string variable such as B$. They're quite different critters!

An array name followed by a dollar sign ($) indicates that the dimensioned variable is a string. Example:

```
L$(n)     A2$(n)     are single-dimensioned variables
D$(m,n)   H1$(m,n)   are multiple-dimensioned variables
```

Numbers within the parentheses are called subscripts and indicate locations within the array. (More on that later.)

The same variable can be used as a numeric variable and as a string variable in one program. For example, each of these is a different variable:

```
B       B(n)    B$      B$(m,n)
```

But these below are illegal because they're double declarations of the same variable:

```
A$(n)   A$(n,m)       (can't have TWO "n" values!)
```

String arrays are defined with a dimension (DIM) statement in the same manner that numerical arrays are defined:

```
00020 DIM A$(4)
00030 A$(0)="SY1:PAYROL1.BAS"
00040 A$(1)="SY1:PAYROL2.BAS"   etc.
```

## String Operators

Extended BH BASIC gives you the ability to manipulate strings. Back at the start of this edition we showed you how to Concantenate (a fancy word meaning "add", or "connect") a string using "+". You can also use relational mathematical operators for strings to indicate alphabetic sequence where each character's ASCII value determines it's worth when compared with other ASCII characters in any combination. This is best shown by a couple examples:

```
*PRINT "ABC" < "DEF" <CR>
 65536                        (Relation shown is true)
```

# HANG ON; HERE'S MORE "+55+"
(We'll be done for this edition Real Soon Now...)

```
*PRINT "ABC" > "ABCD" <CR>
 0                          (Relation is false--"ABC" is
                             less than "ABCD")
```

Note: Trailing blanks in any string comparison are NOT ignored. Example:

```
*PRINT "CDE" = "CDE " <CR>
 0                          (Statement is false because
                             blank after 2nd E is a null
                             character)
```

This table indicates how relational operators are used with string variables in Extended 8H BASIC.

| OPERATOR | EXAMPLE | MEANING |
|---|---|---|
| = | A$ = B$ | A$ and B$ are alphabetically equal |
| < | A$ < B$ | A$ is alphabetically less than B$ |
| > | A$ > B$ | A$ is greater than B$ |
| <= | A$ < = B$ | A$ equals or is less than B$ |
| >= | A$ > = B$ | A$ equals or greater than B$ |
| < > | A$ < > B$ | A$ and B$ are not equal |

## COMMAND MODE

### Using the Command Mode for Statement Execution

Early on in this installment we gave a couple examples of Command Mode which makes BASIC an extremely powerful (desktop) calculator. In many applications this is more than adequate, but if you must do the same type of mathematical manipulations a number of times on different values, a program is much better. It reduces the number of repetitive keystrokes and thereby tends to help avoid operator's errors.

In Command Mode BASIC immediately executes statements, but in a program, line numbers are required so that BASIC will go through each command in strict sequence. To illustrate:

```
 10 PRINT "THIS IS A COMPUTER" <CR>
```

is NOT executed when entered at the keyboard. Can you guess why not? But the statement:

```
*PRINT "THIS IS A HEATH COMPUTER" <CR>
```

is immediately printed onscreen as soon as the RETURN key is pressed. Why is that?

Furthermore, the Command Mode of operation is useful in program debugging and performing simple calculations which do not justify writing a complete program.

For example, to make program de-bugging easier, you may place STOP statements anywhere you desire within the program. When you RUN the program, BASIC will STOP and print an error message onscreen. This is perfectly normal and you may then work on whatever bug the program has while execution is held back by the STOP. Then you can tell BASIC CONTINUE <CR>, and it does so until it hits the next STOP.

You may also use a GOSUB or IF command to direct BASIC to a STOP. In such cases, any variables assigned earlier in the program remain intact. If you want to reset any values, you can use SCRATCH, CLEAR, or another RUN command.

While in Command Mode you may place multiple statements on a single line. Here's an example:

```
*B = 2:PRINT B:PRINT B + 1 <CR>
 2
 3
*_
```

You may also use program loops in Command Mode. For example, suppose you need to produce a table of squares; here is how you'd do it:

```
*FOR A = 1 TO 10:PRINT A,A * A:NEXT A <CR>
 1             1
 2             4
 3             9
 4            16
 5            25
 6            36
 7            49
 8            64
 9            81
 10           100
*_
```

Some statements cannot be used in Command Mode. For example, INPUT isn't available and if used makes BASIC rebuke you sharply by printing "Illegal Usage" onscreen. (I have had my share of those....)

## BASIC STATEMENTS

A program is composed of one or more lines or "statements" instructing BASIC to carry out some function, such as solve a problem. Each program line begins with a line number identifying the line and its' statement. Line numbers indicate the order in which statements are to be executed. Each statement starts with an English word specifying the operation to be performed. Single statements are terminated with the RETURN key, while multiple statements are separated by a colon (:), with the last statement ending with the RETURN key. A DATA statement is not allowed to share a line with other program statements.

### Line Numbers

An integer (or whole decimal) number begins each line in a BASIC program. BASIC executes the program statements in numerical sequence regardless of the input order. Statement numbers must lie in the range of one to 65,534. It is

# INSTALLMENT END, "+55+ GANG"

customary (and good programming practice) to number lines in increments of five or ten to allow insertion of forgotten or additional statements when de-bugging the program.

The length of a BH BASIC statement must not exceed one line since there is no established way to continue a statement on a following line. But multiple statements may be written on a single line as long as they are separated by colons (:) as in the second example below:

```
10 PRINT "VALUES", A, A+1
                          is a single line print statement
                                    whereas
20 LET A=12: PRINT A,A+1,A+2
                          is a line with two statements--
                                LET and PRINT
```

Virtually all statements can be used anywhere in a multiple statement line. But there are a few exceptions which we shall discuss later. Note: Only the first statement on a line can have a line number, and program control cannot be transferred to a statement WITHIN a line, only to the line's beginning.

Every time you type a statement with a line number, BASIC performs some simple syntactical checks before inserting the line into your program. BASIC checks all keywords for correct spelling and translates them to capital letters (if you have forgotton to press the CAPS LOCK key down). It also makes sure that all function calls are immediately followed by an open or left parenthesis "(", and makes several other checks of the line for simple syntax errors. If the line is incorrect, the "SYNTAX ERROR" message will appear onscreen and the line will be ignored. Do not think BASIC will catch every error as you type it, but it will detect an error later when you execute the program. Then it's up to you to fix it.

Note: You can catch errors early while writing a program by inserting STOP statements every so often in the program listing such as this example:

```
*PRINT "ERROR-STOP #xx":STOP<CR>  (xx may be any number of
                                   choice to help identify a
                                   particulary sticky area)
```

## STATEMENT TYPES

BENTON HARBOR BASIC supports three different types of statements: 1- Command Mode statements, used for loading programs, erasing memory, and other functions directing BASIC's activities; 2- Statements valid as both commands or within a program; 3- Statements valid only within a program. These last may not be used in the command mode. Most statements fall into the 2nd category which means they may appear within a progam or be typed directly in command mode for immediate execution. But some statements valid in both modes may not work in both modes.

BASIC was designed to allow maximum versatility in its' structure. Thus, almost everywhere BASIC requires a number or a string it allows a numeric or string expression. For example, you could cause the SIN of 3 to be printed by entering:

```
*PRINT SIN(6/2)<CR>
```

and so on....

## COMMAND MODE STATEMENTS

Command Mode statements can't be used within a program. For example, RUN cannot be used to make a program self-starting. If you tried to enter in into a program, you'd immediately get an "Illegal Usage" error message!

BUILD is used to insert or replace program lines. Try out this example:

```
*BUILD 100,10 <CR>
 100 PRINT "LINE 100" <CR>
 110 PRINT "LINE 110" <CR>
 120 PRINT "LINE 120" <CR>
 130 <^C>                    (Hold down CTRL and press C
                              key to exit BUILD)
*LIST <CR>
 100 PRINT "LINE 100"
 110 PRINT "LINE 110"
 120 PRINT "LINE 120"
*_
```

You can now enter RUN and see BASIC print out:

```
LINE 100
LINE 110
LINE 120
*_
```

Note that BASIC ends this program run at a very high line number which you didn't enter.

Let's suppose you have just finished writing and checking out a program and want to wrap up things for the night. It is quite important that you first save all your work and THEN exit by entering BYE, otherwise your labor will vanish into digital eternity! Also, it's important to place a REM statement at the head of your program so that you know what it's supposed to do later. Here's an example to enter:

```
*01 REM ... TEST.BAS<CR>
*LIST 1,10<CR>
 00001 REM ... TEST.BAS
 00010 PRINT "TEST.BAS TESTS A NUMBER OF COMMAND EXAMPLES"
*_            (If satisfied with the program, send it to
               disc with this command:)

*SAVE "TEST"<CR>      (or SAVE "SY1:TEST"<CR> if 2 drives)
```

Enter BYE<CR>, answer YES<CR> to BASIC's SURE?, and you are back in HDOS. [More in our next exciting edition...!]

# VENDORS & MISC NOTES

==> EIGHT-BIT SOURCES, SERVICES, and VENDOR DIRECTORY <==

-> Listing last updated on 4 July, 1992 <-

CDR SYSTEMS, Inc., 7171 Ronson Road, San Diego, CA 92111; ph: 619-560-1272, 9a-5p Pacific Time Zone--ask for Herman....

Chalfant, Rick, 100 Bayberry Drive, Springboro, OH 45066; ph 513-748-1344. H/Z89s, misc parts. Usually RECORD-A-FONE

D-G ELECTRONIC DEVELOPMENTS Co., 700 S Armstrong, Denison, TX 75020; phone 903-465-7805 (Central Time). Bruce Denton, pres. Service & advice available, also H8 and H/Z89 hardware at clearance prices; call for details. --> Bruce is A * Certified * YOU-BETCHA GOOD GUY! <--

DISK MOVERS, 8534 McCormick Blvd, Skokie, IL 60076; phone 708-679-3727 (Central Time)--ask for Miriam. Fair priced bulk HARD & Soft-sector discs for our H/Z 8-Bit machines. "VERY NICE, VERY HELPFUL PEOPLE."

GOLDSMITH SURPLUS, 2107 N Adams/PO Box 18676, Indianapolis, IN 46218; 317-545-4747, ask for Phil or Eric. Dealers in "Almost Any Surplus Material You Have (or Need)"!

HOYLE & HOYLE SOFTWARE, 111 Sparrow Drive, Isle of Palms, SC 29451. No longer in business, but SEBHC JOURNAL shall be carrying HDOS, CP/M & MS-DOS versions of QUERY!2 & 3, Real Soon Now. WATCH THIS SPACE FOR ANNOUNCEMENTS!

LINDLEY SYSTEMS, 8139 E Mawson, Mesa, AZ 85207 -- phone: 602-380-9175. Scads of neat 8-bit software. Ask Bob or Bill Lindley for a catalogue. "REALLY FINE FELLOWS!"

MAGNOLIA MICROSYSTEMS, 2818 Thorndyke Avenue West, Seattle, WA 98199; phone 206-285-7266 (Pacific Time). Special memory upgrades and op-systems for H/Z89s & 90s. Quite trustworthy people (but somewhat slow, we've heard).

MICRO COMPUTER REPAIR SERVICE, 2308 Industrial Highway, Ste C Ann Arbor, MI 48104; ph 313-663-3646. FLOPPY DISC DRIVE REPAIRS & SALES. Ask for Mike Morris, "A SUPER GUY"!

MICRONICS TECHNOLOGY, Suite 159, 54 Dalrada Road, Montgomery, AL 36109; phone 205-244-1597 voice, 205-244-0192 bbs CTZ Darrell C Pelan, pres. Soft & Hardware, '89 hardiscs Catalogue & 8-bit help available. A REALLY GOOD GUY!

New Orleans Data General Services, 7230 Chadbourne Drive, New Orleans, LA 70126; phone 504-241-9388-- "Dave" gives H/Z8/89 colour, sound & music board tech advice only.

QUIKDATA COMPUTER SERVICES, Inc., 2618 Penn Circle, Sheboygan WI 53081; 414-452-4172; Henry Fale "Folley", mfgr, sales and H/Z computer parts, support, publishes "H-SCOOP" newsletter, runs 24-hr BBS--HANK'S A REALLY GOOD GUY!

SIGMASOFT & SYSTEMS, 2433 Winterstone Drive, Dallas TX 75023-7818; 214-596-0116 (Central Time Zone)--Clay Montgomery--hardware/peripherals mfgr, software publisher, hardware & tech support, RAM drives, Hi-Res grafix addons for H/Z89s. Catalog & help; A *FANTASTIC* GOOD GUY!

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TMSI/LEE HART, 323 West 19th Street, Holland, MI 49423; phone 616-396-5085 (evenings, weekends--usually). Misc. 8-bit hardware items, hardware/software support for '89/90 users. "LEE'S A NICE GUY & TOP-NOTCH ENGINEER!"

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ICE... SPECIAL NOTICE... SPECIAL NOTICE... SPECIAL NOTI

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Publication of the JOURNAL has unfortunately been held up by two root canal procedures and a very painful back injury experienced by your editor. He expects to be back in nearly-new operating condition Real Soon Now, and will strive to get the JOURNAL back on schedule before the end of September (we hope!).

Other news:

With the demise of REMark, all that news-letter's staff has been dispersed to the four winds. To make the transition to a new position easier, Pat Swayne has donated all his 8-bit software master discs to The SEBHC JOURNAL and STAUNCH 8/89er newsletters. Pat told us that we may consider these HUG programs public domain for all intents and purposes and to dispose of them as we see fit. Kirk Thompson and your editor will set up a full catalogue of all the discs donated by Pat and we shall publish it in both our newsletters As Soon As Possible for benifit of all our subscriber!

Note: Sale proceeds of the above-mentioned former HUG software items will be shared with Pat Swayne to help in relocating his family upon news of his securing that new position...

A personal note: Pat, thanks for all that nifty stuff you so generously made available to us die-hard 8-BITers! And we do hope you get the best possible job in the world, Really, REALLY SOON Now! -- ed

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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 ONLY, Monday thru Friday. Other times (EMERGENCIES ONLY): 313-769-6052 (residence).

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