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Official magazine for users of  computer equipment.



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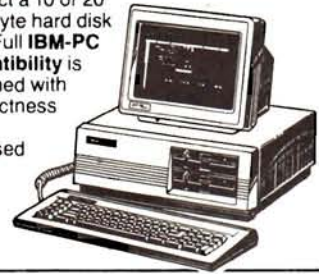


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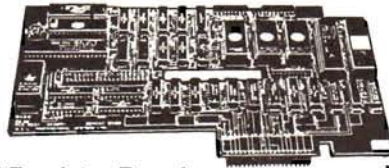
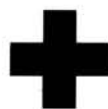
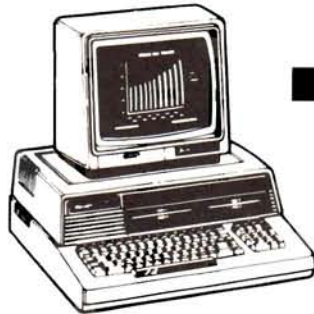
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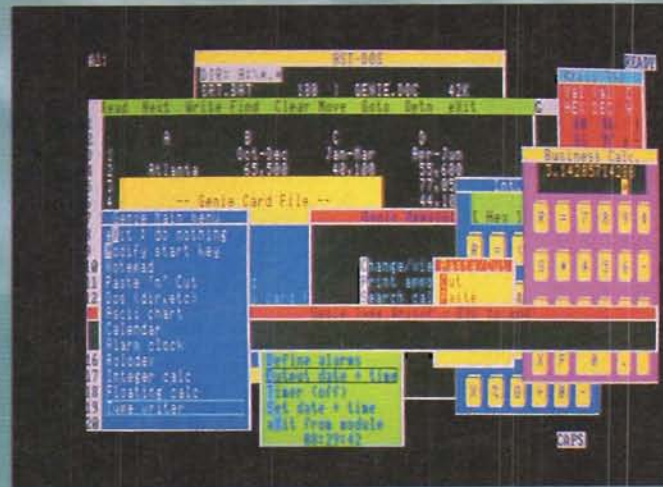
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(616) 982-3463

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Software Developer ... Jim Buszkiewicz
(616) 982-3463

Software Coordinator Nancy Strunk
(616) 982-3838

Secretary Margaret Bacon
(616) 982-3463

Editorial and Advertising
Assistant Lori Lerch
(616) 982-3794

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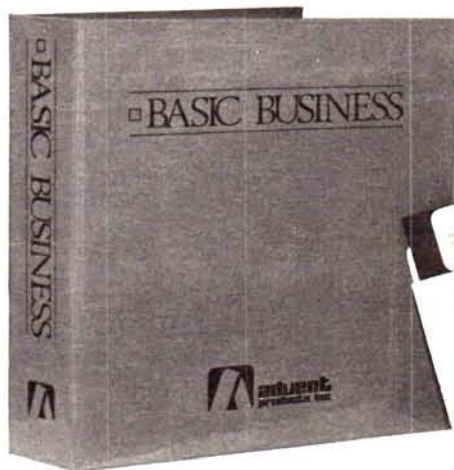
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BUGGIN' HUG



Sympathizes With Robert Owens

Dear HUG:

I really enjoyed Robert H. Owens article in the February 1985 REMark, entitled "High Resolution Graphics With CP/M-85." The routines worked as advertised the first time. I sympathize with Mr. Owens when it comes to typing a series of 'DATA' numbers into an MBASIC program in order to 'POKE' an assembly language routine into memory. I came up with yet another way to get those numbers into an MBASIC program, without all that tedious typing. I assembled his graphics driver with the time tested ASM assembler, producing an Intel format .HEX file. I then wrote a short MBASIC program which converted the opcodes from the ASCII .HEX file to decimal equivalents, and wrote a file of comma delimited ASCII integers. This file could then be included into the MBASIC source code with a text editor. The program also prints the number of opcodes converted on the screen, so you don't have to count them (for your FOR...NEXT loop).

Sincerely,

Jay K. Joiner
300 Luchana Drive
Litchfield Park, AZ 85340

Listing of 'HEX2DEC.BAS'

```
10 'HEX-TO-DECIMAL CONVERSION PROGRAM
20 'BY JAY K JOINER
30 '02-27-85
40 '
50 'INPUT FILE IS INTEL HEX FORMAT
60 'OUTPUT FILE IS COMMA DELIMITED ASCII INTEGERS
  (DECIMAL VALUE OF OPCODES)
70 'ALSO OUTPUTS A DECIMAL INTEGER EQUAL TO THE NUMBER
  OF OPCODES CONVERTED.
80 '
90 'USED TO POKE ASSEMBLY ROUTINE INTO MEMORY USE ANY
  EDITOR TO INCLUDE
100 'AS 'DATA' STATEMENTS INTO BASIC SOURCE CODE
110 '
120 'RENAME FILES AS NECESSARY
130 '
140 'OPEN"I",1,"PLOT.HEX"
150 'OPEN"O",2,"PLOT.TMP"
160 '
170 LET SUM% = 0: 'INITIALIZE COUNT OF OPCODES
180 IF EOF(1) THEN 310
190 INPUT #1,X$: 'INPUT ONE RECORD AT A TIME
200 LET A%=(LEN(X$)-9)/2-1:
  'COMPUTE THE NUMBER OF OPCODES ON THAT LINE
210 IF A% = 0 THEN 310
220 LET SUM% = SUM% + A%
230 PRINT#2,"DATA":;
  'ALL YOU HAVE TO DO IS INSERT LINE NUMBERS
240 FOR I%=0 TO A%-1
250 LET B$=MID$(X$,10+I%*2,2) 'PICK OFF A SINGLE OPCODE
260 GOSUB 350.
  'CONVERT HEX STRING (B$) TO DECIMAL INTEGER (B%)
270 PRINT#2,STR$(B%);",":;
  'RE-CONVERT INTEGER TO STRING FOR OUTPUT
```

```
280 NEXT
290 PRINT#2,""" 'SIGNAL END OF LINE
300 GOTO 180
310 PRINT "NUMBER OF OPCODES CONVERTED = ";SUM%
320 CLOSE#1
330 CLOSE#2
340 END
350 '
360 'CONVERT HEX STRING 'B$' TO DECIMAL INTEGER 'B%'
370 '
380 'RANGE OF B$ = 0 TO 0FFH
390 '
400 LET B0$ = RIGHT$(B$,1) 'CONVERT LEAST SIGNIFICANT DIGIT
410 LET B0% = VAL (B0$)
420 IF B0% <> 0 THEN 490.
  'IF ALREADY A NUMBER, NO NEED TO CONTINUE
430 IF B0$ = "A" THEN B0% = 10:GOTO 490
440 IF B0$ = "B" THEN B0% = 11:GOTO 490
450 IF B0$ = "C" THEN B0% = 12:GOTO 490
460 IF B0$ = "D" THEN B0% = 13:GOTO 490
470 IF B0$ = "E" THEN B0% = 14:GOTO 490
480 IF B0$ = "F" THEN B0% = 15
490 LET B1$ = LEFT$(B$,1) 'CONVERT MOST SIGNIFICANT DIGIT
500 LET B1% = VAL(B1$)
510 IF B1% <> 0 THEN 580
520 IF B1$ = "A" THEN B1% = 10:GOTO 580
530 IF B1$ = "B" THEN B1% = 11:GOTO 580
540 IF B1$ = "C" THEN B1% = 12:GOTO 580
550 IF B1$ = "D" THEN B1% = 13:GOTO 580
560 IF B1$ = "E" THEN B1% = 14:GOTO 580
570 IF B1$ = "F" THEN B1% = 15
580 LET B% = B1% * 16 + B0% 'DO THE FINAL CONVERSION
590 RETURN
```

Listing of 'PLOT.HEX'

```
10C35000E5D52A0100013F000922A0C3232323229F
:10C36000AEC3E15E2356010900CDC4C3E53E10CD46
:10C37000B0C3D119E5D13E80CDB0C3D1E5E5E238A
:10C3800056010800CDC4C3E5C1E119E579A73E8097
:10C39000CA98C31F0DC293C34FC5EB2100E0E5CD82
:10C3A0000000E1C1D1B14FDBD8E60FD3D8C3000004
:10C3B000210000B71FD2B9C319B7C8EB29EBD2B41B
:10C3C000C3C3B3C3782F47792F4F032100003E1119
:10C3D000E509D2D6C3E3E1F5187D176F7C1767F145
:07C3E0003DC2D0C3B710C934
:0000000000
```

Listing of 'PLOT.TMP'

```
DATA 229,213,42,1,0,1,63,0,9,34,160,195,35,35,35,34,
DATA 174,195,225,94,35,86,1,9,0,205,196,195,229,
62,16,205,
DATA 176,195,209,25,229,209,62,128,205,176,195,209,
229,235,94,35,
DATA 86,1,8,0,205,196,195,229,193,225,25,229,121,
167,62,128,
DATA 202,152,195,31,13,194,147,195,79,197,235,33,
0,224,229,205,
DATA 0,0,225,193,209,177,79,219,216,230,15,211,
216,195,0,0,
DATA 33,0,0,183,31,210,185,195,25,183,200,235,41,
235,210,180,
DATA 195,195,179,195,120,47,71,121,47,79,3,33,0,0,
62,17,
DATA 229,9,210,214,195,227,225,245,24,125,23,111,
124,23,103,241,
DATA 61,194,208,195,183,16,201,
```

Foreign Language And Mathematical Word Processing On The Z-100

Dear HUG:

One need that many people have is to be able to do word processing of scientific text, or of foreign languages like Greek or

Russian, which use a set of characters different from the Roman alphabet. The current generation of microcomputers have bit-mapped graphics that enable such characters to be displayed, and there are many printers that are able to print the characters, so it ought to be possible. However, the available software is rather limited.

As physicists in a university environment, we work with text that contains lots of weird characters, and we would like to describe our solution. We are using Z-100 computers, and we have found that the recently reviewed WatchWord word processor satisfies our needs very well. It can handle alternate character sets with ease — it even comes provided with a Greek font. We have modified this with software provided with WatchWord to include the many mathematical symbols that we use. WatchWord is easily tailored to satisfy many individual needs. Our complicated equations are displayed on the screen more-or-less as they will print. This is a feature missing from most word processors, such as WordStar. A second problem is that many word processors, including WatchWord, cannot take full advantage of the capabilities of a dot-matrix printer, such as the MPI that we use. So we have written a separate program to do the printout.

Of interest to less specialized users is the capability of our program to extend the range of what can be handled by such a printer. We implement the whole range of WordStar dot commands, and then some. Most notably, we can do multi-column printing.

Our program, WWP (for WatchWord Printer), will print files created under WatchWord (or under WordStar). It can vary the line-spacing and use any character pitch that the printer is capable of. It handles sub- and super-scripting, and use of an alternate font. All WordStar and the most important WatchWord dot commands are understood. A separate mode is provided for displayed equations.

At present, WWP is set up for the MPI Sprinter, but the source code is easily modified to work with other printers (e.g., Epson), and we are in the process of doing this. The speed of the compiled program is good enough to keep ahead of the printer. (This is not, for example, true for WordStar when running under MSDOS 2 on the Z-100.)

We are interested in having other people test WWP, and will send out copies on receipt of a blank floppy disk. We will send a copy of the executable program and its source (we are at present using compiled BASIC), plus documentation and a font generator program for the MPI printer. Note that the source code will run unmodified under the ZBASIC interpreter (but rather slowly).

Yours Sincerely,

John Collins and
Howard Rubin
Physics Department
Illinois Institute of Technology
Chicago, IL 60616

Not Expensive, Works Well, And Doesn't Require Some Arcane Language

Dear HUG:

In the latest issue of REMark, I read that many of your readers (of which I am certainly a faithful one) expressed an interest in

database programs which are not expensive, work well and don't require one to learn some arcane language. Might I suggest QUERY!3 published by Hoyle and Hoyle. For just under one hundred dollars, you get an extraordinarily well developed package of routines that easily matches the performance of the over-advertised, over-priced and underperformance "hot stuff" we always read about. The programs are available for both CP/M and MSDOS machines, are written in assembly language and will blow the doors off the "hot stuff" which is written in C or some other bog slow dialect. The documentation is clear and in plain English, but best of all is the rarely needed support that is but a phone call away! When I had questions on earlier versions, I invariably got clear and straight answers to whatever my question was on the first call. None of the usual, "I'll have someone get back to you on that" sort of nonsense one gets from the "hot stuff" people.

I operate a small winery which has a very large and extensively referenced mailing list of about 1750 names. We find that the list is easily managed even though our customers are quite mobile and there are lots of changes needed as time goes on. The standard mailing label print format is a wonder to use in it's normal form, and is easily changed to suit your special needs. The sort routines are the fastest I've seen (I use a Kres 4MHz H-89). Extensive anding and within range sort functions are included. For those who desire advanced report writing and the four basic math functions, there is QUERY!CALC 3 for under \$50 which really rounds out a neat package. I have not found any bugs in the whole package, which makes it an even bigger bargain.

Cheers,

Nat Sherrill
Sherrill Cellars
P.O. Box 620050
Woodside, CA 94062

Is It My Printer?

Dear HUG:

As a new owner of a computer system, I expect to have some problems which will require time to resolve. One problem of major importance to me, as a judge who needs to write with footnotes and with reference to changing laws, is the inability to obtain certain character formats. I have followed The Word's instructions:

1. Alt-+ for superscript;
2. Alt- - for subscript;
3. small capitals are created by Alt-k;
4. bold by ALT-b;
5. italics by Alt-i;
6. underline by Alt-u;
7. double-underline by Alt-d;
8. strikethrough by Alt-s;

All of the commands given above show on the computer screen as being performed as directed, but six (6) of the commands are not carried out by the printer: superscript and subscript are not offset; small capitals are regular size; italics become an underline; double-underlines become a single underline; the underlines are not solid lines.

Computer — Zenith ZFA-161-52 (serial #441DH0949C);

Continued on Page 82

MSWorks For The ZP-150

Briefcase Computers Come Of Age



Bill Gates
Microsoft Corporation

For the first time in history, technology allows us to put a full functional computer into a tiny lap size portable that costs less than \$1200. Microsoft was given the enviable assignment of designing a software for this hardware wonder. Our solution is a single integrated software package that gives you a full range of applications that work equally well together and independently.

Microsoft was in a good position to develop this package. With a broad range of software experience — from languages and operating systems to application software — we've looked at software issues from every angle. In fact, we helped define the standard for machines like the Zenith ZP-150 which run on the 8088 microprocessor.

The new Zenith ZP-150 is one of the most inexpensive lap portables on the market, yet one of the most powerful. It features a large 80 column by 16 line display that's as large as most desktop computers. Its built-in modem lets you easily transfer information by telephone. And the 32K bytes of memory give you enough room for the high-performance features you've grown to expect on your office or home PC. It makes an ideal productivity complement to a desktop computer. Although you'll need to offload files to another computer, the Zenith does the lion's share of the work all by itself.

In MSWorks, we've applied many of the same concepts that were used for the Microsoft family of desktop software, like Word for word processing, File for information management and Multiplan for calculation and numbers analysis.

A Package Of Powerful Application Software

The second common requirement is for a tool that can organize information, make calculations and analyze data. Multiplan's power stems from its ability to perform many calculations on large quantities of data quickly and easily. You'll find this version a very faithful implementation of our popular spreadsheet. You can answer the "what if?" questions that go along with budgets, projecting inventory and planning investments. With 255 rows and 63 columns, MSWorks Multiplan can handle almost any calculation, whether you're sitting on an airplane or at the kit-

chen table.

Use File to store, retrieve and process the information you enter. This program can handle something as simple as an address list or as complex as inventory, client billing and invoicing. Almost every busy person these days carries an appointment book.

With MSWorks' Calendar, your Zenith computer can record daily appointment and activities. It's ideal for accurate trip reports and it keeps you on schedule. You can set the alarm and, regardless of which program you're using at the moment, the computer will signal you by a display or a tone.

Telcom is your MSWorks link to the world. If you're searching for information, Telcom can use the built-in modem to call up mainframes, information services (like Dow Jones or CompuServe) or even your own PC back at the office. You can just as easily send information. Even when you're a thousand miles away from your desk, you can make a change to a contract draft and share them with your partner before the deal closes. It all happens in a matter of minutes — it's like being two places at once.

The MSWorks package also includes BASIC, a powerful, easy-to-use programming language, and a special system function key called CALC. It lets you suspend the program you're working in and use your computer as a calculator.

Integrated Software That Truly Complements Your Desktop Computer

A key element to make MSWorks truly functional is the System Manager. It lets you run each application program, exchange information between programs and manage the files you create. Integrating information between applications makes the individual programs even more useful. And when it is accomplished quickly and with little effort, the computer becomes a powerful productivity tool.

In developing MSWorks, we addressed three major areas of concern: interfacing, data movement and consistency.

Since portable computers complement desktop computers, MSWorks needed to be similar to desktop software. If you learn

Multiplan on your PC-Compatible, you can easily learn MSWorks Multiplan in a very short time. Likewise, the applications need to be simple enough and consistent enough so that you can learn how to use all the applications at once. Major concepts are learned once. Then, if you're in a meeting and want to find data in a file and analyze it in Multiplan, you can do it with minimum effort.

You must also be able to exchange information between your portable application and your desktop computer for the two to become true complements. Our goal was to allow you to generate information on your lap portable and then upload it to the desktop. For example, if you're a salesperson, you might generate a meeting report and financial figures during a customer visit. When you return to the office you can upload the information for formatting, printing and distributing. You could cable directly into your PC or use your Telcom program to upload.

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Setting Up Your System

William M. Adney

*P.O. Box 531655
Grand Prairie, TX 75053*

Even though most of you already have a computer system of one kind or another, I think that you will find a number of useful tidbits of information in this article. Although the documentation provided by Heath and Zenith for hardware and software is probably the best in the industry, it does not include some of the details of setting up your own personal computer center. For example, all manuals that I have seen contain very detailed instructions for creating backups and working copies of software to the point that almost anyone can follow them successfully. But it does not contain any information on how you can organize a disk library. How about creating a useful computer center? Dining room and typing tables do not provide the ideal personal computer working environment.

Many people entering the world of personal computing believe that the largest expense associated with a personal computer is the hardware . . . that is simply not true. Ask anyone who has owned a personal computer for a few years. They will tell you that the biggest expense is software. Sure, the major INITIAL expense is usually hardware, but in the long run you will find that you spend more on software than you ever thought possible.

You will also find that, as you travel down the path of personal computing, you'll "need" some additional accessories (usually hardware) that make your living with a personal computer much easier. And, of course, you will want to add some additional equipment to your system, most notably a printer, it helps to understand some of the technical terms (e.g. DCE versus DTE) associated with the serial interface. But before we get too involved with the technicalities, let's take a look at a good working environment.

Computer Furniture

Since I use my H-100 for all of my writing, a comfortable working environment is extremely important to me. I have been known to spend as much as 18 hours a day at my computer, so it's important to have a well organized and comfortable work station. Why is that also important to you? Consider the following scenario.

You have come home after a hard day at work with the intention of spending a "couple of hours" working on that new program or spreadsheet. After dinner, you sit down at your computer (sitting on a typing table) with a dining room chair. The next thing you know, it's after midnight . . . your neck and back ache, your eyes are bleary (and not just because of the late hour), and your arms hurt. What's wrong? The real problem is that you do not have a planned work station which is designed to be comfort-

able. That leads us into a look at one of the very popular buzzwords in computers — ergonomics. Ergonomics is concerned with the use of biological and engineering information relating to the mutual adjustment of man and machine — in this case the computer. It deals with such things as the comfortable chairs and the proper height for a typewriter or keyboard. We will leave such things to the appropriate scientists and engineers, but let's take a look at some furniture for our work station.

You will find some excellent computer furniture in the current Heathkit catalog. It's to their credit that they recognized the need for reasonably priced work stations and chairs. If you have about four feet of wall space, I recommend the large computer desk (PF-130) and the matching hutch (PF-131). A slightly smaller unit is also available (PF-125 and PF-126) which requires about three feet of wall space. Unless you are absolutely limited by space, I strongly recommend the larger unit. You will find that the size of your system will only be limited by the amount of space available. In addition to my regular computer work station for my H-100, I now have three of the large desks and hutches which goes to show how much a personal computer center can grow. By the way, I strongly recommend that you buy the hutch as an ideal place to store documentation within easy reach of your system.

One necessity for a computer is a printer. I have two — an H-25, which I use for high speed drafts and a DTC Style Writer (daisy wheel) that I bought at the Fort Worth Heathkit Store. Although you can set up a printer on the computer desk discussed above, I do not recommend it. You will very quickly find that you need that space for reference books, floppy disks, and other necessary items. Get a separate table for your printer. I use the listed printer stand (HCA-9) for the H-25. However, I recommend that you take a look at the roll-around printer stand (PF-120). Since it has dual-wheel casters that work well on carpet, it's much easier to move out of the way when you don't need it. It also has the advantage of matching the desk and hutch if you're interested in that.

Perhaps the most critical item, from a comfort point of view, is a chair. Dining room and kitchen chairs are okay for their intended purpose, but I really haven't found one that's comfortable for the number of hours that you can expect to use your computer. Even a lot of the so-called office chairs are not particularly suited to working at a computer terminal. A chair with an easily adjustable seat height and good back support, such as the PF-103, is a valuable addition to your work station at a very reasonable price.

Lighting is another critical factor in a good computer work station. There is nothing that causes eyestrain faster than poor lighting. In the case of a computer terminal, that usually takes the form of glare on the CRT. Overhead room lighting, particularly fluorescent lighting, is generally unsatisfactory for working at a computer terminal because of glare. Although you can buy "glare shields" that fit on the front of your CRT for about \$50, I haven't found them to be very satisfactory, aside from the expense involved.

The solution that works best for me is a simple and inexpensive flexible incandescent lamp, such as the GDP-202 for about \$20. You can turn off the normal room lights and adjust the lamp for just about any light (with no glare) that you will need.

Another annoying problem that I have had with glare is the window. Even with a mini-blind, there is enough light to create glare on my CRT. My inexpensive solution was to get a light blocking window shade for my study. You should be able to find one at just about any one of the home improvement centers for under \$20, if you need it.

A good work station, a comfortable chair, and proper lighting can determine how useful your computer really is. Although you may think that such "comfort" is a luxury, you will find that your computer is really more useful than you thought. That's only because you will comfortably be able to spend the time required to properly learn the system and its hardware without the annoying aches, pain, and eyestrain. It seems ridiculous to me that some people spend thousands of dollars on hardware and software, but haven't thought of spending a little more to set up a good working environment to use it. By the way, I trust that nobody told you that getting into the world of personal computing is cheap . . . it isn't.

Now that we have our work station established, it's time to take a look at some equipment for it.

The Computer

The core of your system is of course, the computer. One of the best features of Zenith equipment is that you can take it out of the box, read the instructions, plug it in, turn it on, and DO something. The Heathkits obviously must be assembled, but the same features are still there.

I have noticed that many people are using the term "Central Processing Unit" (CPU) to describe the "box" that contains the computer. In the mainframe world, we also use CPU to identify the box that contains the computer (and main memory), such as an IBM 4341, IBM 3084 or Amdahl V6. That can be confusing to a new user of microcomputers, since we also talk about the 8085 CPU (in the H-100) or the 8088 CPU (in the H-100, H-150 series, and the IBM PC). In the latter case, the CPU is actually the "computer chip" that provides the processing power for the system. You can usually tell what someone is talking about from the context of the discussion, but if in doubt, I always ask. But for purposes of this discussion, I will use the CPU as referring to the entire box. In some cases, such as the H-89 and the H-100 All-In-One computers, the CPU box also includes the CRT which we'll discuss later on in this article.

Fortunately for us, the Heath and Zenith manuals provide excellent detailed instructions and illustrations on the physical set up of the system, so I will not go into detail on that.

The CRT Display

There are many ways to display information on your computer.

More importantly, there are a number of terms that are used to describe the television-like display for a terminal. If the display is basically a slightly modified television, like the ZVM-122A that I use, it can be called any of the following: CRT (Cathode Ray Tube), monitor or display. Those terms can be combined in just about any order to describe the same thing. The latest Heathkit catalog uses the term "video monitors".

Another term frequently associated with a CRT is a Video Display Terminal or VDT. Aside from the fact that a VDT nearly always has a keyboard, it is usually identified as a "Smart Terminal" since it has a set of features which can be implemented independently of the CPU. Smart terminal features are usually implemented through the use of firmware and are generally very easy to set up from a user viewpoint. Various smart terminals are also available from Heathkit, such as the H-29, Z-39, and Z-49 among others. Take a look at some of the features of those terminals to get an idea how smart these terminals can be.

The CRT display is usually the next item to be installed in your system unless you happen to have an All-In-One or portable computer from Heath or Zenith. Most computers, with the exception of the IBM PC, include all of the necessary hardware to connect a monochrome (single color, usually green or amber) CRT to the CPU. The base price of the IBM PC does not include any kind of video display adapter, which is a required item that must be purchased separately. It's interesting to note that all Heath and Zenith computer systems provide the capability to connect monochrome CRTs as a standard feature.

If you decide on a monochrome CRT monitor because of price or other reasons, one of the choices that you will have to make concerns the color of the display — either green or amber. Green has been a standard for the IBM series 3270 display terminals, which are frequently used with mainframe computers. My personal experience is that green does not seem to be as susceptible to the glare caused by fluorescent lighting commonly found in the office environment. That was my choice for my old H-89. When I bought my H-100 Low-Profile computer, I chose an amber monitor (ZVM-122A). Why the amber instead of green? Well, I checked with a friend of mine who happens to be an ophthalmologist. He told me that the human eye is more sensitive to amber than it is to green. Because of that, the amber display doesn't have to be as "bright" as a green display to provide the equivalent level of readability. And that, in itself, can help reduce eyestrain. Considering the amount of time that I spend at the computer, that was a very important consideration for me.

On the other hand, you may decide that you need a color display. In addition to a color monitor, you will generally need to upgrade your system to handle the color CRT. The 5 megahertz H-100's require the addition of two sets (Z-219-1: 9 in each set) of video RAM (random access memory) for the red and blue color memory. The H-150 and the IBM PC require a special display adapter card for color, such as the Graphics Master Board (PC-185) available from Heath. I should note that you can easily spend more for the display adapter than the color CRT itself.

As you look at ads for color monitors, you will probably see that some have RGB (Red, Green, Blue) input, some have composite input, and some have both. The RGB output is basically three separate signals which are fed into the CRT and displayed as appropriate by one of the three electron guns (red, green or blue). In a composite video signal, the three color signals are basically combined (technically called multiplexing) into one signal which is then sent to the CRT. Monitors capable of proc-

essing a composite signal have a special circuit which separates the red, green, and blue components of the signal for the electron guns.

Why do you care about the difference between RGB and composite video for a color monitor? The primary reason is that RGB input generally provides better resolution so that the picture seems to be "clearer" — very important in graphics applications.

Another factor that is more important for resolution (picture clarity) than the signal type is the size of the picture element, which is commonly referred to as a PIXEL. A pixel (which is basically a "dot" of phosphor) is the smallest element on the CRT which can be independently assigned color and intensity. The smaller the pixel, the better the resolution and picture clarity. If you were talking about a ZVM-133 high resolution color monitor, you would be discussing the numbers "640 x 240". The 640 is the number of pixels in a line — the horizontal resolution — and 240 is the number of pixels in a column. Note that these numbers are not the same as the text display capability which is normally rated in terms of columns and rows (e.g. 80 x 25).

A related factor is that monitors with finer shadow masks — the metal grid through which the electron beams pass — display sharper images. The spacing between the grid slots — called the pitch — is usually on the order of 0.43mm or less for high resolution monitors. The ZVM-133, for example has a pitch of 0.41mm. The ZVM-135 has a pitch of 0.43 with a pixel resolution of 640 x 480. Although it may be nice to use numbers in a formal evaluation of a monitor, I suggest that you actually see the monitor perform and make your own judgment. In most cases, you can actually see the difference, so there isn't too much question about the numbers.

Setting Up A Disk Library

One of the more difficult chores in personal computing is that of setting up a disk library. If you don't spend the time to set up a good system, you are guaranteed a significant amount of future frustration. That will usually take the form of: "Where did I put that stupid file?". And you may end up trying to look through several hundred disks to find that one file. But before we do that, I want to revisit a subject that we discussed last month.

Setting Up The System Disks

One of the keys to setting up an effective disk library is the use of the system disk and data disk concept that I mentioned last month. You will recall that a system disk contains the boot loader, the Basic Input/Output System (BIOS), the System Kernel, and the Command Interpreter. A disk which contains those DOS components must be used to boot (start up) your system. In addition to those DOS components, we discussed the idea that the system disk also contains DOS commands such as FORMAT, DISKCOPY, etc. And finally a system disk also contains application software, such as your word processing or spreadsheet program. With few exceptions (experimenting with programming is one), you should never have any data on a system disk. The system disk should be strictly reserved for system and application software, plus the appropriate batch files.

From a procedural viewpoint, the system disk always runs in the system drive... typically drive A on a floppy disk system or drive E on a hard disk system. If you are able to have all your system and application software on one disk, great! But that won't last for long. You will find that, in the long run, it works much better to

have a word processing disk, a spreadsheet disk, a programming disk (which also may contain an editor), a communications disk, and so on.

Since that may get us a little ahead of where we want to be, let's back up a minute. Let's say that you just bought your computer, some system software (MS-DOS), and some application software (WordStar and Multiplan). The system has been set up, and now you are ready to begin. When in doubt, read the manual and follow directions.

The first thing you will do is to create a backup of the MS-DOS distribution disks following the documented procedure. These backups will be created using the DISKCOPY command which produces an identical copy of the distribution disks. My personal preference is to label these as "MS-DOS Duplicate Master Disk x" with the appropriate disk number. After you have created duplicate masters of all of the MS-DOS disks, the next step is to move the distribution disks away from your work station and reboot your system from distribution disk 1. This is extremely important, since it ensures that your duplicate master disk is readable to the extent that it is bootable.

The next step is to make a second duplicate master set using the same procedure which includes rebooting the system. Since this master will be used for our system configuration, the CONFIGUR command is now run with the results being written to both disk and memory. At this point, you now have a working system which is configured for your system. Since one of the key functions of CONFIGUR is to set up your system printer, you should test the printer. The easiest way to do that is to "echo" the CRT display on the printer using the DIR command. For the H-100, press CTRL-P to start the printing, enter the DIR command, and press CTRL-N to end the printing. For the H-150 and IBM PC, press CTRL-PRTS to start the printing and CTRL-P to end the printing. Aside from testing the printer, you also have a complete listing of all files on the disk. Some people like to store those directory listings inside the envelope with each disk. I prefer to keep them in a three ring notebook. Note that this applies to all disks, not just to system disks.

Since you now have two sets of backups from your distribution disk, I find it helpful to label the second one as "MS-DOS Duplicate Master Disk x (Configured)" so that I know that I have set it up for my printer.

Now, boot the system with the configured master disk. Remember that it is important to boot each new disk as it is created to ensure its readability. Although you may think that this process is too time consuming and is too cautious, it isn't. And this wasn't my idea either. All large computer centers use this same process to ensure readability of backup tapes. I learned about this years ago and applied the same idea to my own system.

Since it is unlikely that you will ever need all of the programs on both disks for various functions (e.g. word processing, spreadsheets, etc.), it is now easy to set up a working system master for each function. Functional categories of disks include word processing, spreadsheets, data base, programming, accounts payable, and so on. At this point, it is extremely helpful to begin assigning a label color to each function. For example, the green labels are used for the spreadsheet working system master, as well as the DATA disks. Blue might be used for word processing and so on.

If you started with a new box of floppy disks, you should have six left. Use the FORMAT /S command on the remaining six. While

you are waiting for the FORMAT, create the appropriate labels for word processing or whatever you have selected for your working master disk functions.

The big question is what system software to copy to each of the working system master disks. My personal policy is to copy the following programs to all working system masters: CHKDSK, DISKCOMP, DISKCOPY, FC, FORMAT, PRINT, PSC, RECOVER, and SEARCH. I may also copy the SORT, MORE, and RDCPM commands. The easiest way to do that is to create a batch file to copy those commands to each disk.

All that remains to be done is to follow the installation instructions for each of your application software packages. I recommend that you install one application per disk, since you will find that you may need the disk space for some very helpful HUG utilities. More on that in next month's column.

Before you go any further, I suggest that you also consider making a backup of each of your functional working system masters, particularly any of the ones that you use for programming. As a personal matter, I always backup working system masters "just in case". It is especially important to backup programming working masters — you never know what will happen. When I was creating the ERAFIX program for the CP/M-80/85 FlipFast book, I destroyed more than one disk directory because of a program bug during the testing process. Admittedly, I was working with the disk directory which is "dangerous" to begin with, but I always had plenty of backups, so that I could concentrate on the programming instead of worrying about the software. Once the program was assembled, I copied it to a special test disk for stress testing. If the program destroyed the disk directory, it was back to the drawing board, but I never lost any source code or master disks because of a program bug.

Although H-150 owners will not find any problems with this procedure, I have specifically avoided a discussion of the subdirectories, which are part of the MS-DOS version 2 distribution disks for the H-100, because that tends to complicate the process. Since I will talk about MS-DOS Directory Trees, I/O Redirection, and Command Pathing in a future column, I will not go into specific detail about those subdirectories now. Suffice it to say that the necessary information is available on page 4.7 of the MS-DOS documentation. I have assumed that all DOS commands will be copied to the ROOT directory in the H-100 system. In my opinion, the easiest way to do that is to create the "Configured MS-DOS System Master 1" with a ROOT directory only. I have found that it is easiest to do any copy so that the source disk (the one with the files I want to copy) is always in drive A and the destination disk (usually a formatted blank disk) is in drive B. In this case, the "MS-DOS Duplicate Master Disk 1 (NOT Configured)" is in drive A and a formatted blank system disk is in drive B. The command which will create that is as follows:

```
COPY A:\BIN\* * B:
```

You can use the same process on Distribution Disk 2, except that you will have to use four commands as follows:

```
COPY A:\CHR\* * B.  
COPY A:\DEV\* * B  
COPY A:\DEVEL\* * B  
COPY A:\PSC\* * B:
```

At this point, your system software is located in the ROOT directory in the Configured MS-DOS System Master Disks, so that it is easy to use a COPY command without having to add the subdirectory name.

Creating A Data Disk

All that remains to be done is to create a set of data disks for your system. Use the FORMAT command without the /S option. Remember to use the same color labels for the data disks, like green for spreadsheets or blue for word processing. Now you have organized your disks so that you should be able to find just about any file without too many problems. If you used the echoing feature to print each directory, you will also be able to quickly locate any file on any disk.

Setting Up A Useful AUTOEXEC.BAT File

Assuming that you have now set up your disk library with system disks and data disks, you can also begin to customize your system for your use. As a start, I suggest that you begin with the AUTOEXEC.BAT file with the commands shown in Figure 1. The DATE and TIME commands only prompt for the obvious values. The PATH command tells the system to look for all commands in the ROOT directory on drive A regardless of the disk drive shown on the command prompt (e.g. B>). That is one of the particular advantages of using the system disk and data disk concept. We will update this file next month to include some advanced features and improve the performance of our system. The commands shown in Figure 1 will work on ANY system which uses MS-DOS (or PC-DOS) version 2 or later.

Sample AUTOEXEC.BAT file

```
DATE  
TIME  
PATH A:\
```

Figure 1

Disk Library Enhancements

Although you now have a well organized disk library, I don't like to keep often used disks in the original boxes. I prefer to use the floppy disk storage cabinets, like the PM-100, for most of my floppy disks. But I keep the original boxes for the floppy disks. Those are used for storage of ALL original distribution disks for system and application software, plus I also use them for archive storage. My archive storage contains all final disks that I used for the FlipFast books, articles, and any other information that I want to keep. I use the white Avery file folder labels to vertically label the edge of the box as Z-DOS Masters, MS-DOS Masters, CP/M-86 Masters, and so on. I use the same labels on the outside back of the box to record the CONTENTS of the box. Examples of labels include MS-DOS version 2.13, MS-DOS version 2.21 update, WordStar 3.3, etc. I also keep a notebook with all directory listings of each disk, so that I can quickly locate just about any file.

Another use for an empty box is to store blank disk labels. Keep them next to your system so they will be handy for immediate use. Nothing is more frustrating than to have a bunch of disks with no labels and then trying to determine if they contain valuable information. That's particularly difficult if you have a number of operating systems like I do.

Since your disk library is already fairly well organized, all you have to do is label the dividers for the floppy disk storage cabinet. That should be easy, since you have already determined the functional categories of the floppy disks. Creating labels for word processing, spreadsheets, and games is easy. My preference is to place the appropriate system disk in the front of each

group and the system backup disk follows the data disks. I also have a divider which is labeled as "Blanks", which means that the disks are formatted, but no data is recorded. I have also found it very useful to sequentially number each disk and include the date that the disk was first formatted. By now you are so well organized that you probably can't stand it. Or you may be wondering why you should spend the time to get that well organized when you only have a couple of programs and virtually no data.

For the most part, the organization process that I have described is not particularly unique. And it's only one way that it can be done — there are obviously many variations that may be better for you. The purpose of this description is to give you some ideas, and if you can't think of a better approach, perhaps this concept may also work well for you.

When you begin the planning for your system, it may be difficult for you to envision the day when you will have more than 20 or 30 data disks. I also thought the same thing when I bought my H-89 a few years ago, but I still took the time to organize a library system. It never occurred to me to do anything else because of my 20 years' experience in data processing. I just set up my disk library in much the same way as I had seen large data centers organize a tape library, which contains tens of thousands of reels. I had no idea that, within a few years, I would be writing a series of FlipFast books and numerous magazine articles. And the idea that I would become a freelance writer and computer consultant did not occur to me either.

Multiple Operating Systems

When I bought my H-100, the first thing I noticed was the expanded number of function keys in which the H-89 color codes were noticeably absent. That was important to me at the time since I used Magic Wand, and the documentation talked about the blue, red, and white function keys for the H-89. I was used to pressing the "blue" key for the "find" function, and I really missed that color code. It was difficult for me to remember that F6 was "blue", F7 was "red", and F8 was "white". My solution was to buy some Avery self-adhesive color coded "dots" — roughly a quarter inch in diameter — and place them on the front of those function keys. By now you are probably wondering what that has to do with operating systems.

Since each package contains about 450 of those dots, it seemed like there should be another use for them. After all, I only needed one from each box. To make a long story short, I began using those dots on the disk labels to indicate the operating system format. I currently have five different operating systems: CP/M-85, Z-DOS, MS-DOS, CP/M-86, and Concurrent CP/M-86. A blue dot indicates that the disk is CP/M-85 format, red is MS-DOS format, and so on. Using that technique, I can still use the color of the actual disk label to indicate the function (e.g. green for spreadsheets), but the color dot on the label tells me the operating system format.

The "Sometimes Things Change (FORMAT/CHKDSK)" Department

About the only thing you can depend on is the fact that software and other things change. And that happens to be true with some information that appeared in the March and July columns related to the difference between the information reported by FORMAT and CHKDSK on the "number of bytes in bad sectors". As it turns out, the number of bytes in bad sectors, reported by the latest version of the FORMAT program (version 2.2x) is now

the same as reported by the CHKDSK program. That is, the FORMAT program now reports the number of bytes in bad CLUSTERS just like the CHKDSK program does. A quick check with a reliable source at ZDS indicates that this change was made by MicroSoft, so that the numbers would be consistent between the two programs. As long as they were going to make that change, it seems ridiculous to me that they didn't also change the "error" message in both programs to read "clusters" instead of "sectors" so that the message would be technically accurate.

My thanks to Dr. Richard Mallin for bringing this to my attention. Although he wrote me about the same subject as a result of the March column, I didn't find any evidence that FORMAT and CHKDSK both reported bad clusters. I checked the bad sector log for my hard disk and found that I had different number of bytes in bad sectors reported by those two programs, which I thought were part of MS-DOS version 2.13. Because of the date, I know that I was finishing the MS-DOS (Z-DOS) FlipFast book at that time, and I did have a version 1 Z-DOS partition on my hard disk. Unfortunately, I did not record the version of FORMAT and CHKDSK which generated those reports. As a matter of fact, I originally began looking into the difference in bad sector reports as a direct result of those notes in my log. I also checked with my source at ZDS to verify that, and he confirmed the information in the July column.

Fortunately for us, Dr. Mallin was persistent enough to write me a second letter indicating that the information in the July column was not correct for the latest version of FORMAT. Although I have not had the time to unload a hard disk partition which I know contains a bad sector to verify that, my source at ZDS told me that the latest version of FORMAT included in the 2.2x release does indeed report bad CLUSTERS. He also confirmed that all releases of the Z-DOS version 1 FORMAT program did report bad sectors (instead of clusters), but he wasn't absolutely sure exactly when MicroSoft made that change. My own guess is that MicroSoft made the change for the initial release of MS-DOS version 2, and I missed that change since I had both Z-DOS and MS-DOS partitions at the time.

The easiest way for you to tell the difference is that, if your FORMAT/CHKDSK programs report different numbers, the numbers indicate sectors/clusters respectively. Unless you have used the special sector size override (not recommended) in the PREP program, a sector is normally 512 bytes. If the numbers are identical, both programs are reporting bad clusters, and the number of bad sectors can be determined by dividing the "number of bytes in bad sectors" value by the appropriate cluster size (Minimum File Allocation Size) as shown in Tables 2 and 3 in my July column. As stated in that column, the number of bad sectors resulting from that calculation is really an estimate, since it is based on the very reasonable assumption that there is only one bad sector in each cluster. My apologies to any of you who wondered if there was a problem on your system when you found the bad sector reports of the FORMAT and CHKDSK programs to be identical.

New Software

As I mentioned in the August column, one of the items for this series is a discussion of: "What is a Data Base?". In preparation for that article, I recently received a copy of Query!3 and Query! Calc which is a data base and optional report package available from Hoyle & Hoyle Software. It is a significant enhancement over all previous versions, and I have been very impressed with it. The price (about \$150 for both) and performance are excellent,

but I think that it is also very easy to use which is a definite plus for any data base software. I am currently using the CP/M-85 version, but both packages will probably be available for the Z-100 MS-DOS, and Z-150 MS-DOS (and IBM PC-DOS) by the time you read this.

Next Month

Part 2 of this article is on the agenda for next month. That will include a discussion of printers, modems, and some other accessories that you will find useful for your system. I will also suggest some very good HUG utility software that I have found particularly useful.

If you have any questions or comments about this series of columns, be sure to let me know. Even criticism is welcome, since it lets me know what YOU want to see. Although I take a lot of time to work out and verify technical details that appear here, there are occasions when things change (like the FORMAT program). Typographical errors on my part may lead to misleading or inaccurate technical information. My intention is to provide clear and technically accurate information in all my books and articles, so if you spot something that looks like a mistake, be sure to let me know . . . are you listening Rich? As always, be sure to enclose a stamped, self-addressed envelope when you write if you would like a personal reply.

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Double Format + Disk History + Disk/Drive Maintenance = Getting The Mo\$ From Di\$k Dollar\$

Wallace M. Theodore
PO Box 2488
Hammond, IN 46323-0488

I had encountered four disk "crashes" in as many months and was beginning to wonder if it really was the disk, the disk drive or some other factor causing the problems. I could understand one disk going down, even two, but when "BDOS Error: Bad Sector" began appearing regularly, it became a cause for concern. All four disks were marked "Test" and shelved until I could attempt to isolate and correct the problem.

I would have been very concerned over a problem of this nature had I not kept a running "history" of disk usage and performance. It may seem like a complex task, but it is easily accomplished and, in this case, indicated my problem was indeed with the disks and not in other areas as will be explained later.

Format Twice

Double formatting of double-density disks (i.e. formatting a disk two times instead of the normal one) is an idea recently suggested by my nephew, John Theodore, an employee at the Heathkit Electronics Center in Milwaukee, WI, on information received from Al Olander, Assistant Manager, Downers Grove, IL.

At first, double formatting appeared somewhat senseless since FORMAT destroys all information on the disk. I could only assume information acquired by the first FORMAT would be destroyed by the second thus, apparently, gaining nothing. On the other hand, for the few extra minutes it takes to double FORMAT, I felt I certainly had nothing to lose by the process and, possibly, a lot to gain.

At HUGCON, I decided to find out more about FORMAT and turned to the representative at the Dysan booth. He was extremely helpful.

While, as you know, FORMAT does destroy all disk data, it is also possible for a small portion of the process to not take as strongly as others. While this normally does not create a problem, there are those instances when it MIGHT. By performing a double FORMAT the weak spot, if one exists, is reinforced by the second FORMAT.

Difficulties of this type, I have found, do not usually appear immediately after FORMAT is performed, but rather after the disk has been in service for awhile and is filled with programs and data.

Reformatting

In addition, it was suggested that all disks be cleared and reformatted at six month intervals and that drive heads be cleaned on the same schedule.

Reformatting is easily accomplished: transfer the files from the disk to be reformatted to disk 2, reFORMAT the first disk and transfer the information from disk 2 back to disk 1: or put disk 1 to another use and label disk 2 accordingly.

Drive Head Cleaning

As with many facets of computing, I have heard or read conflicting reports of what should and should not be done to assure continued smooth performance of a computer. In one case, an author stated that drive heads should NEVER require cleaning. Of course, the Dysan representative presented a completely opposite view.

Disk drive head cleaning can present a number of problems. Heads are difficult to access since they are buried inside the drive unit, alignment MAY be disrupted during cleaning which can become expensive to correct, and much time can be consumed just getting to the heads and cleaning them.

Gaining access to the drive heads, incidentally, involves removing the drive from its housing, removing a circuit board, and then manually opening the heads and cleaning them with a cotton swab and isopropyl alcohol or other suitable liquid cleaner. The job involves a great deal of responsibility, patience, and for the average user, I would believe a great deal of risk.

One alternative is by means of a number of supposedly non-abrasive head cleaners on the market. Put to use in much the same manner as inserting a disk, the head cleaners wipe the

heads with a mild non-abrasive agent and render them clean.

I am in the audio recording business and regularly use both reel-to-reel and cassette recorders. Non-abrasive cleaners are also available for this equipment, but I do not use them since I am not at all convinced another's interpretation of "non-abrasive" is the same as mine.

Recording heads of any type are not indestructible: they DO wear, even from repeated use of something as 'smooth' as audio recording tape and they DO wear down and OUT over a period of time. Using anything even minutely more abrasive than what the head is designed for is bound to accelerate wear.

Replacement is expensive since new heads must be purchased, installed and exactly aligned. For the average home computer user, who is also dealing with magnetic 'recording and playback' heads, this must be accomplished by a trained technician.

The newest addition to head cleaning systems utilizes a chemical that is harmless to your drive unit, totally non-abrasive, and supposedly as simple to use as inserting a disk in your unit. Since, the product is new at the time of this writing, I have no detailed information, but am sure a complete description is or will be available at your local dealer.

Disk History

A disk history is invaluable. I began "tagging" disks with basic information in 1981, mainly out of curiosity about the life expectancy of any given disk and what I was sure would be a need, at some time, to know which disks are new and reliable — and which have been extensively used.

Through the years, the system has been expanded upon and now includes four labels containing information about almost every facet of the disk, including test and "crash" references.

The system is extremely flexible which allows you to choose only the information deemed most important to you. I have found, for my needs, that ALL records I keep have at some time or other been needed for decisions concerning future usage (or discarding) of an individual disk.

The history of a disk is easily maintained on unprinted self-adhesive labels. I have found Avery No. 620 (3/8" by 1-1/4") to be most suited for my needs. Available at about two dollars per thousand, they are the ideal size for many different facets of disk information.

Basic Information

I routinely replace existing factory labels with my own or those supplied with the diskettes. For this reason, I have found it advantageous to retain a reference record of the manufacturer and factory reorder number, as well as a statistical history of each disk.

Existing labels, by the way, may be easily lifted off when the disk is lying on a hard, flat surface. Small bits of glue residue remaining from the original label can be lifted off with a piece of package sealing, masking or other tape.

Assuming I am formatting a Dysan soft-sectored, double-sided, double-density disk, the first label would be applied on the upper left hand corner of the BACK of the disk and contain the manufacturer, disk order number, date of first use and date of current use.

Dysan 802067
First use: 2-5-81
Curr use: 8-15-84

All information is hand printed using an ultra-fine tip PERMANENT marker, since many ballpoint pens have difficulty marking on the labels and may smear or fade with time.

The label is replaced when a new use is found for the disk. All information is rewritten, as is, to the new label with the exception of the date of current use which is updated.

Disk Testing

User testing of new disks may appear unnecessary, since rigid factory quality controls do not usually allow shipment of sub-standard or defective disks. Even so, I test ALL disks for Rotational Speed (T), Seek Time (S) and the Media Check (M) before they are put into service. Results of the tests are also logged on labels for future reference.

Disk tests are time consuming so they are usually performed when other tasks (or a good TV program) keep me from using my H/Z-89 for programming or other purposes. Rotational Speed testing takes only a minute or two: the result is noted. Seek Time takes a little longer but the computer does all the work: all I need do is begin the test, go about other tasks and return to get the result. The Media Check (sector validity) can take in the vicinity of 45 minutes to perform, depending on the FORMAT of the disk in test. Again, the test is begun, I go about other business and return to get the results.

A second label containing test results is applied at the upper right hand corner of the BACK of the disk.

Tested: 2-3-81
T-1.001 S-6 M-0
SS-DS-DD 96/80

If at a future date the disk is retested, the retest date and new test results are shown on a replacement label. Original test information is not needed, since the first label still displays the very important date of first use.

SS-DS-DD and 96/80 indicates a soft-sectored double-sided double-density 96tpi disk formatted for 80 tracks. A listing of 48/40 would be shown for 48tpi disks formatted for 40 tracks.

And, yes, in at least one instance a brand new unused disk (from a manufacturer not mentioned in this text) was found to contain a bad sector. Formatting twice, at least in that case, eliminated the problem.

Additional Documentation

Following the suggestion to double FORMAT double-density disks, I have made it a regular practice to FORMAT ALL disks twice, both hard- and soft-sector and single- or double-density. Since I have a great many disks in service it is difficult, without documentation, to keep track of those which have been reformatted and double formatted.

I have also recently begun using a bad sector find-and-lockout program called FINDBAD (public domain, available through CompuServe on the Heath Net). The program does NOT destroy existing disk data which allows its use extensively in regular disk maintenance.

These two operations have created the need for a third label to be placed below the right hand corner label:

Format 2: 9-18-84
Findbad 0: 9-18-84

"Format 2" records the most recent date a double FORMAT was performed. "Findbad 0" indicates the date this particular program was run and the result (0). Had one or more bad sectors been found and locked out, this listing would be changed to "Findbad 1" or "Findbad 2" depending on the number of faulty sectors located.

Disk Crashes

Since it is apparent crashes of some disks may become more prevalent due to heavy use and age, I have also begun keeping a record of when such malfunctions occur and, if possible, in what section of the disk it occurred (this information is usually supplied by FINDBAD).

Assuming the disk failed due to a problem in the Directory Section, where I have found most read/write errors, information logged on a forth label would be:

Dir sec: 2-4-85
Dir sec: 3-18-85

Assuming the error was in the Data Area, a listing of

Data Area: 4-1-85

would be logged on a label. Through FINDBAD, I have been able to pinpoint more exactly the area of trouble and log

Data 0024: 4-1-85

the area, 0024, having been pointed out by FINDBAD and locked out of use. By logging the exact location I will be able to tell, if another Data Area error occurs, if it is the same area that previously went down or if another section is also breaking down.

In a recent case, FINDBAD located and displayed a problem in the Data Area of a disk. A double FORMAT corrected the problem and the next pass of FINDBAD indicated "no bad blocks". However, just to be on the safe side, the disk was retested. The Media Check (M) still listed a bad sector. The disk, while still in use, will be loaded with only non-essential data "just in case."

Getting Maximum Disk Usage

Many times, a reformatted disk will remain in use for many months. In other cases, I have encountered another failure within a month or so. When repeat errors begin plaguing a disk, there are several ways to safeguard against a "crash" and still keep the disk in use.

1. On the first error, try a double FORMAT and then return the disk to regular use.
2. If another crash occurs, double FORMAT double-density disks to SINGLE-density. You might, at this stage, consider using this disk for a backup rather than general use.
3. If still another error is found, double FORMAT the disk, double-density, for 48tpi at 30ms (rather than 6ms that is standard for 96tpi double-density disks).
4. Still another error would lead me to double FORMAT, 48tpi, 30ms, at SINGLE-density.
5. If, at this point, I still find errors, I simply discard the disk as totally unreliable or give it to a school to show computer students what the inside of a disk looks like.

By this process, I feel the disk has been utilized to the fullest and that every effort has been made to gain the most use of my investment. Use of the downgraded disks as backups frees my more reliable disks for heavy duty use.

When downgrading disks or making any changes that affect logged disk history information, be sure to alter existing labels and add any "problem" information you may need.

Drive Checkout

In addition to keeping close check on disks, I also run the General Drive Checkout (D) at intervals of six months to a year. This test, as with the Media Check and some other tests, is easily performed while you go about other business.

Results are kept on a label which contains the name of the test, a simple "OK" if no problems are found, and date of the test. In my case, I keep the label pasted to the heat sink of my external H37 drive, but the back of the computer or any other convenient out-of-the-way place may be used.

Other Safeguards

There are several other measures which may be taken to assure data and/or programs will not be destroyed through disk malfunctions.

1. Keep disks in dust and humidity free storage boxes. Many models in a wide price range are available or you may prefer, as I did, to design and build your own out of sheet plastic.
2. Be absolutely certain to make backup disks containing duplicate copies of at least your most important programs. The value of this can only be appreciated when many hours of careful programming or many months of data gathering are lost in a few seconds due to a disk crash, power failure or other problems which occur at the most unexpected times.

DO NOT keep your working program and a copy of it saved under the .BAK extension on the same disk. If the disk should fail, both your working program and its backup may be lost.

3. Disks are expensive, especially when you have many of them in continual use. I have found that disks which have been "worked" too long to assure reliability in regular use, when retested and reformatted, become valuable backup disks since they are rarely accessed.

Most major computer supply houses now stock what has been termed "the dollar-ninety-eight special" (when purchased in quantity). These disks, advertised as completely reliable in every way, are not designed for heavy use: they are intended to serve as backup disks, thus freeing up more expensive disks while providing additional backup space at a modest price.

4. When programming, disks are continually reading and writing for extended periods of time. This, of course, puts heavy usage on the section of disk containing the program on which you are working.

To balance sector usage, SAVE your program and change the name to PROGRAM.HLD, indicating a "hold" program. Reload PROGRAM.HLD and save it again under its original name. In this manner, you have effectively locked out the section of diskette where you have been working and moved your working program to a fresh, lesser used area. This process may be repeated whenever you feel an area of disk is

becoming overused.

5. Be sure disks you purchase are housed in strong, sturdily constructed envelopes which do not bend or twist when accidentally subjected to abnormal conditions. If you now have disks which appear to be somewhat flimsy, use them for backups.
6. Find a disk which you feel is completely reliable and then use it exclusively. While there is certainly no harm in using disks from many manufacturers, my feeling of security has increased since I began using only one brand. The selection of this particular brand was based, in part, on the results of records I have kept through the years.

Summary

The METHOD of record keeping is totally unimportant. What IS important is that records be kept, not only as a means of finding which disks are the most reliable, but also as a means of knowing which disks have been used for how long and which disks have given you problems.

Record keeping requires no more than putting dates on labels for things you normally do in disk maintenance anyway.

You may prefer to keep records in a book or in another form more suitable for you. I, for a number of reasons, prefer labels pasted directly on the back of the disks.

Through the use of labels, each disk carries an instantly accessible record of its own usage and age throughout its lifespan. Any other specific information the user may want to retain can also be noted on a label and affixed to the disk.

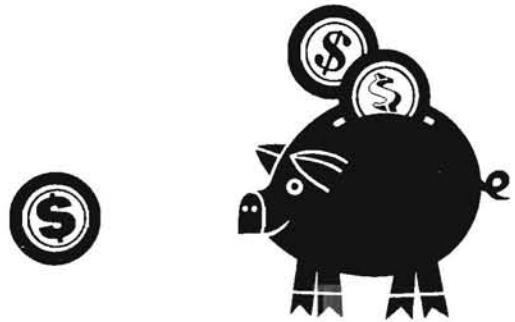
Double formatting takes only minutes and can assure greater reliability from your disks, especially those with very delicate double-density configurations.

FINDBAD was the positive confirmation that disk malfunction caused the four disk "crashes" mentioned earlier rather than other factors. It had indicated a bad sector in the directory section of each disk and suggested reformatting: a double FORMAT cured the problem on ALL disks.

Even before using FINDBAD though, I was reasonably sure extended use of the diskettes had caused the failure, since all four malfunctioning disks had been in continuous service for two to three years and had never been retested nor reformatted.

On each disk was a great deal of programming and data that, if not retrieved, would have caused the loss of hundreds of hours of work. Fortunately, in this case, I was able to copy all records to other disks.

Through double formatting, increased attention to recorded historical data, and a regular disk/drive maintenance schedule, I am confident most problems of this type will, in the future, be caught before they have the chance to destroy data. *



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Loading ASM Subroutines Using MBASIC The Ultimate Method?

M. D. Zapolski, Sr.
226 N. West Avenue
Bridgeton, NJ 08302

One of the most frustrating problems for a BASIC programmer to solve is how to efficiently load an assembly-language subroutine from within a BASIC program. And once loaded, coping with the inevitable program changes. Reworking and re-POKEing all those bytes — Yuk! But recently, an article by D. F. Yriart (BYTE, April 1985, p.429) discussed a method to accomplish this dreaded task that I found simple, and could easily accommodate program changes. The programs discussed below should function with any Microsoft BASIC-80, version 5.X for CP/M, and have the following advantages:

1. Automatic subroutine file loading from within the BASIC program with no DATA statements.
2. Memory is automatically reserved for the subroutine.
3. No need to modify the BASIC program when you change, add, or delete assembly-language statements.
4. Final load routine uses little memory (469 bytes).
5. Provides program statistics.

This technique initially uses two programs. The first, LOADHEX.BAS (Listing 1), is a stand-alone BASIC program that:

1. Calculates where to load the subroutine
2. Loads the HEX subroutine
3. And provides the program statistics

The second program, LOADHEX.MRG (Listing 2), is a BASIC program (saved in ASCII) which is MERGED into your target BASIC program and actually loads the subroutine when your program runs.

The .ASM Subroutine

Before going further into the details of these programs, I'll assume you have an assembly-language subroutine that has been converted to a HEX file using CP/M's ASM.COM. If not, then you should copy TREK.ASM (Listing 3) and create the test file TREK.HEX (produces an outline of the starship "Enterprise"). Regardless of the file you use, two points must be made about the subroutine you create:

1. The origin should be as high an address in memory as possible. This will afford you the maximum BASIC programming space.
2. The subroutine must exit via a RET instruction.

Main Program — LOADHEX.BAS

Referring to Listing 1, we'll look at what LOADHEX.BAS does, and in some cases, why. Lines 7 and 8 identify certain variables: F\$ — the HEX file's name, SADDR — the starting address of the loaded HEX file, and TOP — the address at the top of CP/M's CCP. Line 90 requests the name of the HEX file to be loaded (note the HEX ext. is assumed) and invokes an error trapping routine if the file is not found on the default disk. Line 100 calculates the top of your CCP and bears some explanation. CP/M, version 2.2, stores a BIOS jump vector in page 0 of memory (Figure 1). The MSB of this address is at 0002H. If you review Figure 1 and line 100 of Listing 1, you should see how the value of TOP is determined.

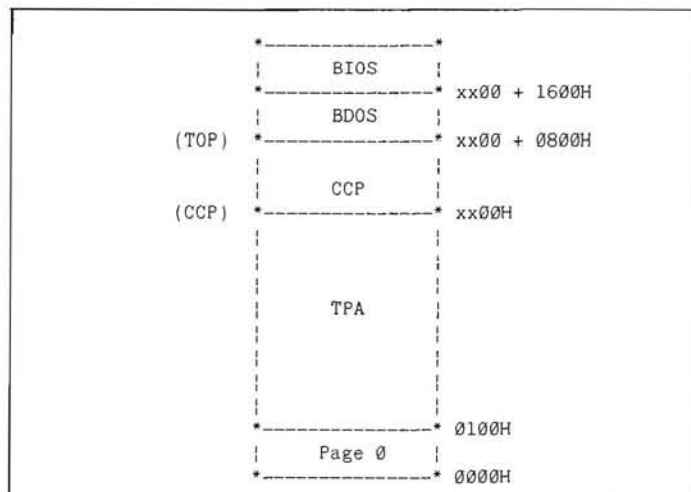


Figure 1 — Hexadecimal CP/M Memory Map (xx is a dummy argument)

First, the MSB of the BIOS start address is extracted, and from it, 16H is subtracted. This is the MSB of the CCP's starting address. Next, the HEX equivalent of this value is added to the address' LSB (i.e. 06H) to create a string variable. This string is numerically evaluated, and assigned to the variable TOP. Finally, the top of the CCP is found by adding 0800H to the value of TOP.

To digress for a moment, Mr. Yriart used 00H for the LSB, instead



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Groupil III CP/M (DSDD)	Insight Dev. IQ-120 (SSDD)
H/Z Z-100 CP/M (DSDD) - later	Kaypro II/2 (SSDD)
H/Z Z-100 CP/M (SSDD)	*Kaypro 4, 10 (DSDD)

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Lobo Max-80 (SSDD)	Superbrain (DSDD)
Lobo Max-80 512 (SSDD)	Superbrain Jr. (SSDD)
Micral 9050 CP/M-80 (DSDD)	Systel II (SSDD)
Morrow MD 11 (DSDD)	Systel III (DSDD)
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of 06H to determine the value of TOP. To be more accurate, I used the actual LSB value of the H/Z-100 BIOS start address. You may use either 00H or your actual LSB value. Lines 105-110 open the HEX file and extract the starting address (SADDR) used in the ORG instruction. The file name and values of TOP and SADDR are then stored in the string A\$. The ASCII values of A\$'s bytes are next stored in CP/M's DMA area starting at 0080H. Then, the CLEAR command is used to establish the highest memory address to be used by MBASIC. As you see, this address is just below the subroutine's starting address. You may have already realized that the use of A\$ and its storage into the DMA area was necessary prior to using the CLEAR command, so that program variable's values were not zeroed, strings set to null and thereby lost. Now that memory is reserved, lines 115-130 extract the stored values of F\$, TOP, and SADDR and causes the HEX file bytes to be automatically POKEd into memory, starting at the value of SADDR. The two WHILE/WEND loops read the HEX file records (outer loop), extract the data within each record and poke it into memory (inner loop) byte-by-byte. When the subroutine has been placed into memory — you may notice some time delay here depending upon the size of your routine — the screen is cleared and the program statistics are displayed:

1. Filename
2. HEX file bytes loaded
3. Highest MBASIC address allowed
4. Maximum MBASIC program size
5. Transfer Variable (TOP)
6. How to use program message.

The MBASIC program size calculation introduces some items which may need to be changed depending upon your hardware and software configuration. For my H-100 and MBASIC version 5.2, the values are:

1. 34059 . . . the # of bytes free after loading MBASIC (value is displayed on screen)
2. K=65536 . . . High memory addresses normally produce negative numbers. This value corrects for that, and is usually found in your BASIC-80 manual in the section that discusses the function VARPTR.
3. 469 . . . The # of bytes used by the subroutine LOADHEX.MRG.

The remainder of LOADHEX.BAS is left to the error trapping routines and program exit. Note that line 205 resets MBASIC programming space to its normal value.

Subroutine — LOADHEX.MRG

Essentially this is a stripped-down version of LOADHEX.BAS which is MERGEd into your target program. The line numbers are arbitrary and may be changed at will. If you do renumber them, you must reassign the line number argument in the GOSUB statement that calls the subroutine.

Using LOADHEX

The use of these programs is best shown by an example outline:

1. Develop your ASM subroutine
2. Create a HEX file using ASM.COM
3. Place the HEX file on the disk with LOADHEX.BAS
4. Run LOADHEX.BAS — Copy the program statistics
5. MERGE LOADHEX.MRG into your target MBASIC program
6. Add the "required line" (shown on the LOADHEX statistics

screen) to your target program: e.g. F\$="TREK.HEX":TOP=-5463:GOSUB 1000

7. Run your MBASIC program (invoke your subroutine using the statement CALL SADDR
8. To restore your full MBASIC programming area, insert CLEAR, TOP somewhere at the end of your program.

So, now you want to modify your ASM file? No problem! Just reassemble the ASM file to a HEX file and run your BASIC program. LOADHEX.MRG automatically readjusts the memory size and reloads the new HEX file.

During the development and testing of your target BASIC program, you may find it more convenient to MERGE LOADHEX.BAS into the target program because of the statistical information it provides. Just remember to change its END instructions to RETURNS and use it as a subroutine. When you are satisfied with your BASIC program, substitute the smaller program LOADHEX.MRG for LOADHEX.BAS and add the "required line."

Summary

Although somewhat simplified, this article describes a method, based on the insight provided by D. F. Yriart in his BYTE article, to automatically load an assembly-language subroutine into memory using a BASIC program.

This technique should be usable with any CP/M 2.X based computer using Microsoft BASIC-80, version 5.X. I hope you HUGGERS enjoy the use of this program as I have.

Listing 1

```

5 REM 6/28/85 ***> LOADHEX.BAS <*** BYTE, April 85
6 REM This program LOADS a HEX file into memory from within a BASIC
  program. The loaded file may then be CALLED from within the
  BASIC program.
7 REM VARIABLES... F$= the HEX file's name, e.g. F$="TREK.HEX"
  SADDR= the starting address of the HEX file
8 REM TOP= the address at the top of the CCP
90 PRINT CHR$(27);"E";TAB(31);"LOADHEX PROGRAM": PRINT:PRINT:LINE
  INPUT "Enter the .HEX file name to be loaded (HEX ext assumed)";
  F$:F$=F$+".HEX":ON ERROR GOTO 200
100 CCP=PEEK(2)-&H16:TOP=VAL("&H"+HEX$(CCP)+"06"):TOP=TOP+&H800
105 OPEN "I",1,F$:LINE INPUT #1,A$:CLOSE 1:SADDR=VAL
  ("&H"+MID$(A$,4,4)):A$=SPACE$(20):MID$(A$,1,12)=F$:
  MID$(A$,13,4)=HEX$(TOP):MID$(A$,17,4)=HEX$(SADDR)
110 FOR I%=1 TO 20:B=ASC(MID$(A$,I%,1)):POKE &H7F+I%,B:NEXT:
  CLEAR,(SADDR-1):A$=SPACE$(20)
115 FOR I%=1 TO 20:MID$(A$,I%,1)=CHR$(PEEK(&H7F+I%)):NEXT
120 F$=MID$(A$,1,12):TOP=VAL("&H"+MID$(A$,13,4)):SADDR=VAL("&H"+MID$
  (A$,17,4)):F$=LEFT$(F$, (INSTR(1,F$,CHR$(32))-1)):OPEN "I",1,F$:
  B=SADDR
125 WHILE NOT EOF(1):LINE INPUT #1,A$:A$=MID$(A$,10,LEN(A$)-11):C=1
130 WHILE C<LEN(A$):B$=MID$(A$,C,2):V=VAL("&H"+B$):POKE B,V:C=C+2:
  B=B+1:WEND:WEND:CLOSE 1
140 PRINT CHR$(27);"E":PRINT TAB(31);"LOADHEX STATISTICS":NB=B-SADDR:
  K=65536!
145 PRINT:PRINT:PRINT "Filename = ";F$:PRINT "HEX file Bytes loaded",
  NB:PRINT "Highest MBASIC address allowed = ";HEX$(SADDR-1);"H";
  " (";K+SADDR-1;")":PRINT "Max. MBASIC program size = ";
  (34059)-NB-469)
150 PRINT "Transfer Variable TOP = ";TOP:PRINT:PRINT "CALL the routine
  with the command.. CALL SADDR":PRINT:PRINT "To use this utility,
  MERGE the program LOADHEX.MRG. Then, at the start of your"
160 PRINT "program, insert the line >> TOP=";TOP;"F$="";
  F$;"":GOSUB 1000:GOTO 205
200 IF ERR<>53 GOTO 210 ELSE PRINT:F$, " is not on the logged
  drive. HEX files available are .":PRINT:FILES "*.HEX":PRINT:
  PRINT:PRINT "Try again (Y/N)...":R$=INPUT$(1):IF R$="Y" OR R$="y"
  THEN PRINT:RESUME 90
205 IF TOP=0 THEN END ELSE CLEAR, TOP:END
210 PRINT "Error #";ERR;"occurred in line";ERL:PRINT:PRINT
  "LOADHEX can't continue":GOTO 205

```

Listing 2

```

1000 OPEN "I",1,F$:LINE INPUT #1,A$:CLOSE 1
      SADDR=VAL("&H"+MID$(A$,4,4)):A$=SPACE$(20)
      MID$(A$,1,12)=F$:MID$(A$,13,4)=HEX$(TOP):
      MID$(A$,17,4)=HEX$(SADDR)
1005 FOR I%=1 TO 20:B=ASC(MID$(A$,I%,1)):POKE &H7F+I%,B:
      NEXT:CLEAR,(SADDR-1):A$=SPACE$(20):FOR I%=1 TO 20
      MID$(A$,I%,1)=CHR$(PEEK(&H7F+I%)):NEXT
1010 F$=MID$(A$,1,12):TOP=VAL("&H"+MID$(A$,13,4))
      SADDR=VAL("&H"+MID$(A$,17,4)):
      F$=LEFT$(F$,(INSTR(1,F$,CHR$(32))-1)):
      OPEN "I",1,F$:B=SADDR
1015 WHILE NOT EOF(1):LINE INPUT #1,A$:
      A$=MID$(A$,10,LEN(A$)-11):C=1:WHILE C<LEN(A$):
      B$=MID$(A$,C,2):V=VAL("&H"+B$):POKE B,V:C=C+2
      B=B+1:WEND:WEND:CLOSE 1:RETURN
  
```

Listing 3

```

;
;          TEST FILE FOR BASIC ASM
;          LOAD ROUTINE
;
;          (M.D Zapolski, Sr.)
;
ORG 53000D
PBUFF EQU 9
BDOS EQU 5
CR EQU 0DH
LF EQU 0AH
TAB EQU 9
;
START LXI D,DATA
CALL PRINT
RET
  
```

```

PRINT MVI C,PBUFF
      JMP BDOS
;
DATA DB CR,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF
      DB LF,LF,LF,LF
      DB TAB,TAB,'
      DB CR,LF
      DB TAB,TAB,'
      DB 39,CR,LF
      DB TAB,TAB,'
      DB CR,LF
      DB TAB,TAB,'
      DB CR,LF
      DB TAB,TAB,'
      DB CR,LF
      DB TAB,TAB,'
      DB TAB,TAB,'
      DB CR,LF,LF
      DB TAB,TAB,'
      DB CR,LF,LF,LF,LF,LF,LF,LF,'$'
END
  
```

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- This product is still in firmware development and is expected to ship in limited quantities toward the end of October or early November.

Note: Due to the increased interest in PC emulation, the above information is intended to let you know how close to actual delivery these two important products are. Since the information is compiled approximately 30 days before you see REMark, it would be a good idea to check with your local Heath/Zenith Computers and Electronics Centers or check with Heath Mail Order (616-982-3285) to determine availability. In the future, we are requesting that users report on products that do or do not work with these two boards, so that we may publish your findings here.

one at row 2 using `\~`. GOTO A16 and for appearance add a divider line by typing `\=` (not `\~`) and pressing the Return key. With the cursor at Cell A16, type `/C` and at "Enter range to copy FROM: A16..A16", press the Return key and at the "Enter range to copy TO: A16", press the Right Arrow key once, Anchor (type a period), press the Right Arrow key twice to Cell D16 and press the Return key. How do you readers like the "pointer" method so far? It is too soon to decide, so we will keep on with more applications. Save the current file by typing `/FS` and at the response to "Enter save filename:", type BUDGET1 and press the Return key.

I want to review the Global Currency Format. GOTO Cell A1 (F5 and A1) and type `/WGFC` (`/Worksheet Global Format Currency`) and at "Enter number of decimal places (0..15): 2", press the Return key. Save again by typing `/FS` and naming the file BUDGET2 and press the Return key.

Fifth, let us make up a formula using the "pointer" method (add Cells B5..B15). GOTO B17 (F5 and B17) and type the following list of commands:

```
type +, press Up Arrow 2 times to B15
type +, press Up Arrow 3 times to B14
type +, press Up Arrow 4 times to B13
type +, press Up Arrow 5 times to B12
type +, press Up Arrow 6 times to B11
type +, press Up Arrow 7 times to B10
type +, press Up Arrow 8 times to B9
type +, press Up Arrow 9 times to B8
type +, press Up Arrow 10 times to B7
type +, press Up Arrow 11 times to B6
type +, press Up Arrow 12 times to B5, press the Return key.
```

I can hear some of the readers saying, why didn't he just use the formula `@SUM(B5..B15)`. I usually would, but I want to show alternate ways of making formulas. Now we will copy the formula. GOTO Cell B17 and type `/C` and at the "Enter range to copy FROM: B17..B17", press the Return key and at the "Enter range to copy TO: B17", press the Right Arrow once to Cell C17 and press the Return key.

Seventh, GOTO Cell D17 and press the Return key. Type `@SUM(`, press the Up Arrow twice, Anchor (type a period), press the Up Arrow 10 times, type `)`, and press the Return key (you should be at Cell D5, are you?). Again, I would rather type the formula `@SUM(D5..D15)`, but we will find many where the pointer method will be as good or better than typing in formulas, as we proceed! Save the current worksheet again using the name BUDGET2 and R for replace.

Eighth, how would you copy the current worksheet to a place directly below where we have been working? GOTO to Cell A1 and type `/C` and at the "Enter range to copy FROM: A1..A1", Anchor (remember what we do), and "paint" the active current worksheet range by pressing the END key, press the HOME key, and press the Return key. At the "Enter range to copy TO: A1", press Down Arrow to move the cursor to Cell A20 and press the Return key. Make sure that the copy of the worksheet exists at rows 20 thru 36 by pressing the PGDN key! Did you find it? I like this method because it provides a visual check of the "active worksheet" that we are copying. Do you agree? Save again and call it BUDGET3.

Ninth, we want to erase all of the numeric data from the lower (new) worksheet. How would you do this? I would GOTO Cell B24 with the cursor and type `/RE` (`/Range Erase`) and at the "Enter range to erase: B24..B24", "paint" the range using the Right Arrow to get to Cell D24 and the Down Arrow to get to Cell D34,

YOUR NAME -- TOTAL FAMILY BUDGET 1985 (3 PERSONS) AMOUNT			
ITEM	LOWER	AVERAGE	HIGHER
FOOD	\$4,950.00	\$5,940.00	\$7,500.00
HOUSING	\$2,880.00	\$5,550.00	\$8,550.00
TRANSPORTATION	\$1,310.00	\$2,400.00	\$3,000.00
CLOTHING	\$960.00	\$1,400.00	\$2,000.00
PERSONAL CARE	\$360.00	\$480.00	\$720.00
MEDICAL CARE	\$1,440.00	\$1,440.00	\$1,500.00
OTHER CONSUMPTION	\$600.00	\$1,200.00	\$1,800.00
OTHER ITEMS	\$600.00	\$1,200.00	\$1,800.00
INCOME TAXES	\$1,500.00	\$4,800.00	\$9,600.00
SOCIAL SECURITY	\$1,080.00	\$1,800.00	\$2,040.00
	\$15,680.00	\$26,210.00	\$38,510.00

YOUR NAME -- TOTAL FAMILY BUDGET 1985 (3 PERSONS) PERCENT			
ITEM	LOWER	AVERAGE	HIGHER
FOOD	31.6%	22.7%	19.5%
HOUSING	18.4%	21.2%	22.2%
TRANSPORTATION	8.4%	9.2%	7.8%
CLOTHING	6.1%	5.3%	5.2%
PERSONAL CARE	2.3%	1.8%	1.9%
MEDICAL CARE	9.2%	5.5%	3.9%
OTHER CONSUMPTION	3.8%	4.6%	4.7%
OTHER ITEMS	3.8%	4.6%	4.7%
INCOME TAXES	9.6%	18.3%	24.9%
SOCIAL SECURITY	6.9%	6.9%	5.3%
TOTAL	100.0%	100.0%	100.0%

Figure 2

and press the Return key. Did it work? How do you like the "paint" method? It provides a visual check of what range you are working with! To finish the worksheet, GOTO Cell A36 and type TOTAL and press the Return key. Again, save the current worksheet and name it BUDGET4.

Next, we will format the cells in the worksheet. GOTO Cell B24 with the cursor and type `/RFP` (`/Range Format Percentage`) and at "Enter number of decimal places (0..15): 2", type 1 and press the Return key. At the "Enter range to format: B24..B24", "paint" the range by using the Right Arrow to move the cursor to Cell D24, and the Down Arrow to Cell D36, and press the Return key. Enter the Percent Formula in Cell B24. Would you know how to do this? GOTO Cell B24 with the cursor and type `+B5/B$17`, and press the Return key.

Note: I have discussed the relative vs absolute addressing in earlier articles. For a review, I will briefly go over it again. A coordinate address is relative unless it is converted to an absolute by having a dollar sign (\$) precede the column and/or row designation. Look at the `B$17` I have used. When the formula is copied, column B will be relative to its new location and row 17 will remain absolute (with no change). Use your Manual and the Help Screens for more information, but learn this NOW as it will be used many times in your projects!

Next, copy the Percent Formula in Cell B24 to the range of B25 thru B34. GOTO Cell B24 and type `/C`. At "Range to copy FROM: B24..B24", press the Return key. At the "Range to copy TO: B24", press the Down Arrow once, Anchor, press the Down Arrow to Cell B34, and press the Return key. Save your work up to this point and name it BUDGET5. Copy the Formulas in the range painted B24..B34 to the ranges C24..C34 and D24..D34. Do you

A1: 'YOUR NAME -- TOTAL FAMILY BUDGET 1985 (3 PERSONS) AMOUNT
 A2: \~
 B2: \~
 C2: \~
 D2: \~
 A3: ^ITEM
 B3: ^LOWER
 C3: ^AVERAGE
 D3: ^HIGHER
 A4: \~
 B4: \~
 C4: \~
 D4: \~
 A5: 'FOOD
 B5: 4950
 C5: 5940
 D5: 7500
 A6: 'HOUSING
 B6: 2880
 C6: 5550
 D6: 8550
 A7: 'TRANSPORTATION
 B7: 1310
 C7: 2400
 D7: 3000
 A8: 'CLOTHING
 B8: 960
 C8: 1400
 D8: 2000
 A9: 'PERSONAL CARE
 B9: 360
 C9: 480
 D9: 720
 A10: 'MEDICAL CARE
 B10: 1440
 C10: 1440
 D10: 1500
 A11: 'OTHER CONSUMPTION
 B11: 600
 C11: 1200
 D11: 1800
 A13: 'OTHER ITEMS
 B13: 600
 C13: 1200
 D13: 1800
 A14: 'INCOME TAXES
 B14: 1500
 C14: 4800
 D14: 9600
 A15: 'SOCIAL SECURITY
 B15: 1080
 C15: 1800
 D15: 2040
 A16: \=
 B16: \=
 C16: \=
 D16: \=
 B17: +B15+B14+B13+B11+B10+B9+B8+B7+B6+B5
 C17: +C15+C14+C13+C11+C10+C9+C8+C7+C6+C5
 D17: @SUM(D15..D5)
 A20: 'YOUR NAME -- TOTAL FAMILY BUDGET 1985 (3 PERSONS) PERCENT
 A21: \~
 B21: \~
 C21: \~
 D21: \~
 A22: ^ITEM
 B22: ^LOWER
 C22: ^AVERAGE
 D22: ^HIGHER
 A23: \~
 B23: \~
 C23: \~
 D23: \~
 A24: 'FOOD
 B24: (P1) +B5/B\$17
 C24: (P1) +C5/C\$17

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D24: (P1) +D5/D\$17
 A25: 'HOUSING
 B25: (P1) +B6/B\$17
 C25: (P1) +C6/C\$17
 D25: (P1) +D6/D\$17
 A26: 'TRANSPORTATION
 B26: (P1) +B7/B\$17
 C26: (P1) +C7/C\$17
 D26: (P1) +D7/D\$17
 A27: 'CLOTHING
 B27: (P1) +B8/B\$17
 C27: (P1) +C8/C\$17
 D27: (P1) +D8/D\$17
 A28: 'PERSONAL CARE
 B28: (P1) +B9/B\$17
 C28: (P1) +C9/C\$17
 D28: (P1) +D9/D\$17
 A29: 'MEDICAL CARE
 B29: (P1) +B10/B\$17
 C29: (P1) +C10/C\$17
 D29: (P1) +D10/D\$17
 A30: 'OTHER CONSUMPTION
 B30: (P1) +B11/B\$17
 C30: (P1) +C11/C\$17
 D30: (P1) +D11/D\$17
 A32: 'OTHER ITEMS
 B32: (P1) +B13/B\$17
 C32: (P1) +C13/C\$17
 D32: (P1) +D13/D\$17
 A33: 'INCOME TAXES
 B33: (P1) +B14/B\$17
 C33: (P1) +C14/C\$17
 D33: (P1) +D14/D\$17
 A34: 'SOCIAL SECURITY
 B34: (P1) +B15/B\$17
 C34: (P1) +C15/C\$17
 D34: (P1) +D15/D\$17
 A35: \=
 B35: (P1) \=
 C35: (P1) \=
 D35: (P1) \=
 A36: 'TOTAL
 B36: (P1) +B34+B33+B32+B30+B29+B28+B27+B26+B25+B24
 C36: (P1) +C34+C33+C32+C30+C29+C28+C27+C26+C25+C24
 D36: (P1) @SUM(D34..D24)
 C37: 'FIGURE_2

Figure 3

NOW know how to do this? Try it before you read on! GOTO Cell B24 with the cursor. Did you use the F5 key? Type /C and at the "Enter range to copy FROM: B24..B24", press the Down Arrow to Cell B34, and press the Return key. At "Enter range to copy TO: B24", press the Right Arrow to Cell C24, Anchor (you remember this?), press the Right Arrow to Cell D24, and press the Return key. Save your work again using the /FS and name the file BUDGET6.

It is a good time to clean up a few things on the lower portion of the current worksheet. First, EDIT the row 20 Title. GOTO Cell A20 with the cursor and press F2 — the EDIT function key. Press the Left Arrow 6 times so that the cursor will be under the A in the word AMOUNT. Type PERCENT and then press the DEL key 6 times to delete the word AMOUNT. Second, we will erase the 0.0% values from row 31. GOTO Cell B31 with the cursor and type /RE (/ Range Erase). In response to "Enter range to be erased: B31..B31", press the Right Arrow twice to Cell D31, and press the Return key. Third, save the work, again, using the file name BUDGET7.

Have you noticed that we have collected a large number of files? Display a listing of these saved files. Type /FLW (/File List Worksheet) to list the saved .WKS files on the screen. Do you find them? Press any key to return to the current worksheet. Type /FEW (/File Erase Worksheet) and in response to "Enter name of file to erase:", type BUDGET5 and press the Return key, and in response to the "No Yes", type Y. Now, do the same thing to erase BUDGET6. List the saved files on the screen using the same things we did to erase BUDGET5 above. Verify that the files have been deleted.

So far, in "SPREADSHEET Corner" we have not used the Window command very much and it can be very handy. So, we will do some Windows:

First, press the HOME key and then GOTO Cell A10 and type /WWH (/ Worksheet Window Horizontal), press the Down Arrow once (rows 2 thru 10 should be displayed in the upper window), to move the cursor to the lower window press F6 (the Window key), press the Down Arrow 20 times (rows 21 thru 30 should now be displayed in the bottom window. Do you find this to be true?)

Do a Screen Print! Do you know what that is and how to do one? With the printer turned ON and the Paper Aligned to the top of the page, hold down the Shift key and press the PrtSc key at the same time. Did it work? This is for an H/Z-150/160 PC type computer. Also, every type of printer requires its own Configuration, so I would not have enough room to cover this subject. Look up these commands in your computer and printer manual or ask the organization that sold you the equipment how to do this. There are some utilities available to do this also. Save your current worksheet and name the file BUDGETH. To return to the normal screen without the Horizontal Window, type /WWC (/ Worksheet Window Clear).

How about trying a Vertical Window? Can you do it without reading ahead? First, press the HOME key and then GOTO Cell B12, type /WWV (/ Worksheet Window Vertical). Do you find rows 1 thru 20 displayed? Press F6 (remember, the Window key) to move the cursor over to the right side window. Press the Right Arrow 4 times so that only columns A and D are displayed. Any trouble? Do another Screen Print using the same things we did above. Move the paper alignment down about one inch below the previous printing, so that we will have both Screen Prints on

the same page. Did you get the Vertical Printout? Save your current worksheet naming the file BUDGETV. Return to the normal worksheet by typing /WWC.

Now, I would like to start discussing Printing Spreadsheets. I will use the Epson F80 because that is the printer that most readers indicated they had on the Questionnaire we had in "SPREADSHEET Corner — Part 7" a few months back. I do not recommend this printer over any other one. I normally use an IDS-132C which can print wide paper, print in color, and has very nice Graphics. Every dot matrix printer uses similar Escape Codes, but few are exactly the same. Thus, the reader will be expected to refer to their printer manual for the necessary codes! I could not cover all the various printers in this article. If necessary, go back to where you purchased the printer for instructions.

Let's try an easy printout to start. Turn your printer ON and align the paper to the top of the page. Type /PPR (select Print, Printer, and Range Options). At the "Enter print range:", press the HOME key, type a period to Anchor the top of the left-hand corner of the range, press the END key, press the HOME key, and press the Return key. Have you "painted" the desired range? Check it to see if it includes the complete current worksheet. Type O (selects Options which allow page formatting). Type H (selects HEADER which allows the entry of a page header). At the "Enter header line:", type — @ | YOUR NAME — SPREADSHEET Corner | Page # — and press Return key.

Note: The @ sign causes the date to be printed on the left end of the header line, the | (be sure not to use : instead) causes the heading to be centered, and the # causes the page number to be printed on the right end of the header line.

Type Q (selects Quit) to return to the printer Menu. Type A (selects Align) to reset the line counter to 1. Type G (selects GO) to print the selected range from above painted area. Note —To abort the printing at any time, press CTRL SCROLL keys. Type Q (selects Quit) to return to the Ready Mode after the printing has been completed. Did you get the desired printout of the AMOUNT and PERCENT current worksheet? If not, work with your printer manual and the DOS configure file. Save this file and call it BUDGET8. This will save both the selected Range and Header Settings. We will call this type of Printout "Print Spreadsheet As Displayed"!

We will now print the Cell Formulas and call this one BUD2CELL. With the printer ON and the paper aligned to the top of the page, type /PPR (selects Print, Printing, and Range Options). We have previously defined the Range for the current worksheet, so press the Return key. Type O (selects Options) and type H (selects Header). Edit the current Header Line. The cursor will be at the right end of the Heading, so press the Left Arrow 6 times, type BUD2CELL, press the space bar, and press the Return key. You should now have a revised — @ | YOUR NAME — SPREADSHEET Corner | BUD2CELL Page #. Type S (selects Setup). This is where you enter the Escape codes to vary the print type, margins, and clear the printer Escape codes that might have been entered previously. When a list of cell formulas are printed, it can take several pages; therefore, to save printing space we will use ELITE (compressed) print type. With the Epson printer, enter the Escape code — \027\064 — to clear the possible printer codes. Enter the Escape code — \027\077 — to select ELITE type and enter this Escape Code — \027\048 — to select 8 lines per inch line spacing. The command line should look like this for an Epson printer (remember that your printer may require you to choose different codes):

\027\064\027\077\027\048 & press Return key

Next, type P (selects Page Length). The 1-2-3 default value is 66, but we have chosen 8 lines per inch in place of 6 lines per inch, so we will specify 88 line page length. It will look like this:

Enter Lines per Page (20..100): 66 (Type 88 to replace 66 & press Return).

Now, type M (selects Margins) and type R (selects Right Margin). The command will look like this:

Enter Right Margin (0..240): 76 (Type 96 & press Return)

Note: ELITE type allows 96 characters across the normal width paper.

Also, type O (selects Other). This provides a selection of — As-Displayed, Cell-Formulas, Formatted, and Unformatted. We want Cell-Formulas for this printout, so press the Right Arrow once and Cell-Formulas will be highlighted, and press Return key. Type Q (selects Quit) and return to the printer menu. Type A (selects Align). This resets the line counter to 1 and type G (selects GO). This should printout the current worksheet cell contents using a couple of pages with the correct heading and page number on each. Did you get the right result? Lastly, type Q (selects Quit) and you are back to the Ready Mode. At this point, we will save the file naming it BUD2CELL.

I will explain how to print Format Text next. First, retrieve the BUDGET7 "For file to retrieve:" and press Return. (We cannot use the BUD2CELL file, because it has different printer setting saved.) Second, we will format the desired range. Press the HOME key and type /RFT (/ Range Format Text). At "Enter range to format: A1..A1", Anchor (remember to type a period), press the END key, press the HOME key, and press the Return key. The worksheet will now be displayed in Text Format with the formulas (cell width permitting) shown.

Third, we must change the width of columns with long formulas:

GOTO Cell B17 & type /WCS (Worksheet Column-Width Set) at "Enter column width (1 72): 18, press Right Arrow 22 times (need a column width of 40) and press Return key. GOTO Cell C17 and adjust the column width to 40. GOTO Cell B36 and adjust the column width to 45. GOTO Cell C36 and adjust the column width to 45.

Fourth, we want to print this worksheet. Turn the printer ON. Align the paper to the top of the page. Type /PPR. Remember the Range was previously defined so press the Return key. Type O to provide the page formatting. Type H, and edit the Header we previously used. The cursor will be at the right end of the heading line, so press the Left Arrow 6 times and type BUD2TEXT, press the DEL key 6 times, and press the Return key. Your resulting Header should look like this:

@|YOUR NAME -- SPREADSHEET Corner|BUD2TEXT

Type S to select SETUP and enter the following Escape Codes (or the correct ones for your printer) to set the printer for Condensed Type:

\027\064\015 and press Return key.

Note: Some printers may require the \027 preceding each and every code. Try this and see which works for you!

Reset the right margin by typing M and then R and at the "Enter Right Margin (0..240): 76, type 132 and press the Return key. The condensed type will allow 132 characters per line on our 8.5" paper. Select Quit by typing Q and select Align by typing A. Start

YOUR NAME -- TOTAL FAMILY BUDGET 1985 (3 PERSONS) AMOUNT

ITEM	LOWER	
FOOD		4950
HOUSING		2880
TRANSPORTATION		1310
CLOTHING		960
PERSONAL CARE		360
MEDICAL CARE		1440
OTHER CONSUMPTION		600
OTHER ITEMS		600
INCOME TAXES		1500
SOCIAL SECURITY		1080
=====		
		+B15+B14+B13+B11+B10+B9+B8+B7+B6+B5

YOUR NAME -- TOTAL FAMILY BUDGET 1985 (3 PERSONS) PERCENT

ITEM	LOWER	
FOOD	+B5/B\$17	
HOUSING	+B6/B\$17	
TRANSPORTATION	+B7/B\$17	
CLOTHING	+B8/B\$17	
PERSONAL CARE	+B9/B\$17	
MEDICAL CARE	+B10/B\$17	
OTHER CONSUMPTION	+B11/B\$17	
OTHER ITEMS	+B13/B\$17	
INCOME TAXES	+B14/B\$17	
SOCIAL SECURITY	+B15/B\$17	
=====		
TOTAL	+B34+B33+B32+B30+B29+B28+B27+B26+B25+B24	

AVERAGE	HIGHER
5940	7500
5550	8550
2400	3000
1400	2000
480	720
1440	1500
1200	1800
1200	1800
4800	9600
1800	2040

+C15+C14+C13+C11+C10+C9+C8+C7+C6+C5 @SUM(D15..D5)

AVERAGE	HIGHER
+C5/C\$17	+D5/D\$17
+C6/C\$17	+D6/D\$17
+C7/C\$17	+D7/D\$17
+C8/C\$17	+D8/D\$17
+C9/C\$17	+D9/D\$17
+C10/C\$17	+D10/D\$17
+C11/C\$17	+D11/D\$17
+C13/C\$17	+D13/D\$17
+C14/C\$17	+D14/D\$17
+C15/C\$17	+D15/D\$17
=====	
+C34+C33+C32+C30+C29+C28+C27+C26+C25+C24	@SUM(D34..D24)

Figure 4

the printing by typing G. How did your printout work? Finally, type Q to select the Ready Mode. Save the BUD2TEXT file to disk.

Note: To Clear the current worksheet from working memory prior to starting a new worksheet/program, type /WEY (/Worksheet Erase Yes). I have supplied the critical figures with this article, so that you can compare your printouts with the ones that I have. I have supplied detailed instructions with this program because we were covering a lot of new ground and to help new readers. Besides the best learning tool is "REPEAT, REPEAT,

REPEAT"!

The next "SPREADSHEET Corner" will take a simple budget worksheet to use with creating graphs, starting the use of Macros, and learning how to print graphs. (You will need a printer with graph abilities.) If you have a color monitor, the graphs will be in color on the screen. The 1-2-3 Manual does not cover the important Macro subject that we will be spending many months on. It would help if you review your manual about Graphs and Macros!!



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885-1079-[37]	HDOS Page Editor	25.00	15	885-3020-378§	MSDOS HUG Menu System	20.00	62	Continued on Page 83			
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885-1082	Programs for Printers H8/H89	20.00		885-3024-378§	ZDOS/MSDOS 8080 To 8088 Trans	20.00	64				
885-1083-[37]	Disk XVI Misc H8/H89	20.00	11	885-3025-378§	ZDOS/MSDOS Misc. Utilities	20.00	64				
885-1089-[37]	Disk XVIII Misc H8/H89	20.00	20	885-3029-378§	ZDOS/MSDOS HUG Bg. Print Spool	20.00	66				

§ All program files run on both
§§ Program files run partially on both



HUG NEW PRODUCTS

Disk D

ARITHMAG .BAS	HBRZC	.COM
ARITHMAG .DOC	HBR8C	.COM
COPTER .BAS	INSTR	.HBR

Authors:

- Cribbage — Richard Marks
- Bzerk — Iraj Aidun
- Monopoly — M.D. Zapolski
- Krypto — Steven W. Vagts
- Xword — Steven W. Vagts
- Arithmag — Eric E. Bruder
- Copter — Rob Ford
- HBridge — Robert F. Hassard

Game Descriptions: **Cribbage** can be found occupying all of disk 'A'. This program plays a two-handed form of the card game cribbage. The computer plays one hand, and the player at the keyboard plays the other. Standard rules for two-handed cribbage are applied, adapted slightly for computer play. A listing of these rules is included.

BZERK.COM, BZERK.DOC, and BZERK.SCR can be found on disk 'B'. This is a real-time fast action game. The object of the game is to pass as many mazes as you can, while you battle the evil 'Bzerks' who come after you. At first it seems simple, but as the game progresses you will encounter some surprises which make the game more and more difficult until only the superhuman can survive.

MONOPOLY.BAS, MONOPOLY.DOC, MBOARD.DAT, MNSETUP.PGM, and CLRPGM.PGM make up a set of files which are used to play a full version of the ever-popular board game, Monopoly. This game allows for any number of players, uses H-19 type graphics for its display, keeps track of all the money and paperwork (acts as banker so no one cheats!) and rolls the dice. If that isn't enough, you can also save the game and come back to exactly where you left off at a later date!

KRYPTO.INT, KRYPTO.RUL, KRYPTO.BAS, and LETTE\$.DAT make up the game called Krypto, and can be found on Disk 'C'. Krypto is a word-search style game for 2, 3, or 4 players. Each player searches for, and identifies words from the playing board composed of a computer generated pattern of random letters and question marks. The question marks represent any letter chosen by the player. The score depends upon the length of the word found, the letters used, and their position in relation to previously identified words. This program is written in BASIC-E and RUN.COM, the runtime interpreter, is included on this disk. This program makes use of the H-19 graphics characters and cursor addressing.

XWORD.INT, XWORD.BAS, XWORD.RUL, LTR\$.DAT, CROSS.DAT, CRYSTO.DAT, DELTA.DAT, DIAMON.DAT, EXRAY.DAT, FREE.DAT, MODSQR.DAT, TEE.DAT, and SQUARE.DAT, are files that make up a game called Xword. These files can also be found on Disk 'C'. Xword is a crossword style game for 2, 3, or 4 players. Each player uses his letters to form

**HUG P/N 885-1248-[37] CP/M
Fun Disk II \$35.00**

Introduction: This second in a series of CP/M fun disks contain eight games on a set of four disks. Included are two card games, two real-time action type games, two word puzzle games, a computer version of a very popular board game, and an arithmetic flash card type program for grade school students.

Requirements: This package requires the CP/M operating system on either an H8 (with an H/Z-19 terminal), or H/Z-89/90. 64k of RAM is also needed. MBASIC 5.2X is required for the programs COPTER and MONOPOLY. These programs will also run on an H/Z-100 (not PC) system running CP/M-85 or CP/M-86.

The following files are included on the HUG P/N 885-1248-[37] CP/M Fun Disk II set:

Disk A

CRIB	.COM	NAMES	.DAT
CRIBBAGE	.DOC	README	.DOC
CRIBB	.COM	SCRATCH	.DAT
RULES	.SCR		

Disk B

BZERK	.COM	MONOPOLY	.DOC
BZERK	.DOC	CLRPGM	.PGM
BZERK	.SCR	MNSETUP	.PGM
MONOPOLY	.BAS	MBOARD	.DAT

Disk C

KRYPTO	.INT	CRYSTO	.DAT
KRYPTO	.RUL	DELTA	.DAT
KRYPTO	.BAS	DIAMON	.DAT
LETTER\$.DAT	EXRAY	.DAT
XWORD	.INT	FREE	.DAT
XWORD	.RUL	MODSQR	.DAT
XWORD	.BAS	TEE	.DAT
LTR\$.DAT	SQUARE	.DAT
CROSS	.DAT	RUN	.COM

words on the playing board, building on words of the previous plays. The score depends upon the letters used and their resultant position on the board. This program is also written in BASIC-E, and RUN.COM, the runtime interpreter, is included on this disk. This program makes use of the H-19 graphics characters and direct cursor addressing.

ARITHMAG.BAS, and ARITHMAG.DOC make up a flashcard style arithmetic practice program designed for young people in elementary school. This program, found on Disk 'D', is completely menu driven, and the program can display addition, subtraction, multiplication, or division problems. The user can select these types of problems exclusively, or a mixture of addition/subtraction or multiplication/division. When addition or subtraction is chosen, carrying and borrowing may be suppressed, if desired. There are 9 skill levels in the program. Problems in level 1 have answers not greater than 10. As the skill level increases, the problems get progressively more difficult. A tally of right and wrong answers appears on the 25th line, as well as the percentage of correct answers. Also, a portion of the screen contains a "PAC-MAN" like display which is used to graphically depict the progress in solving the problems.

COPTER.BAS, found on Disk 'D', is a real-time action game using the H-19 style graphics set for its' display. A mountain is displayed in the center of the screen with the player's status shown inside. The rest of the screen is left clear for playing. The object is to fly a helicopter over the mountain, as many times as possible. There are many things flying through the air to stop you, however. You must keep track of your fuel, for refueling is important.

HBR8C.COM, HBRZC.COM, and INSTR.HBR are files found on Disk 'D'. These files are for playing the popular card game Bridge. It is suitable for the novice bridge player. The computer plays three hands (or two if North or South are the Declarer) and the human player plays one (or two). HBridge (as it is called by the author) bids using fundamental conventions, plays following the simplest of rules, and then scores each hand when finished. The score is recorded on a disk file bearing the human player's name. After playing a hand, a display of all four hands may be obtained, or the North-South hand may be switched with East-West and replayed, or a new deal may be called for. According to the author, this program plays a fair quality of Bridge. It makes mis-

takes just as humans do. In this respect, it is humanlike. For a person who also makes mistakes, this can be an enjoyable program. HBRZC.COM is a version of HBridge for a system using a Z80 processor (like the H89). HBR8C.COM is a version of HBridge for the 8080, or 8085 processor.

Comments: Several of these programs are of a quality worth putting on a separate product disk. I believe, however, in giving HUGgies their money's worth . . . plus!

TABLE C Rating: (0), (1), (2), (3), (10)

**HUG P/N 885-3031-37 Z-DOS/MS-DOS
Graphics \$20.00**

Introduction: Graphics is a Z-BASIC application program used to create drawings by allowing the user complete "keyboard" control of the Z-BASIC advanced color graphic capabilities. The function and numeric keypad keys are used to control the drawing process, and the two top text lines of the screen are used for parameter display. The program is completely Menu driven from the function key line and is partitioned into separate "Specialty" routines (Trace, Line, Circle, Figures, etc.), each with it's appropriate menu and parameter display. The screen drawing position is referenced by a "cross-hair" type graphic cursor, controlled from the numeric keypad keys. The drawing (and the parameters for up to twenty each), circles and figures can be saved and/or loaded from disk at any time. This software comes with an extensive users manual.

Requirements: The H/Z-100 series computer (not PC) with one disk drive is a minimum requirement. Z-DOS or MS-DOS with ZBASIC is also needed. To take full advantage of the program capabilities, color memory and a color display are very highly recommended.

The following files are included on the HUG P/N 885-3032-37 ZDOS/MS-DOS Graphics Disk:

README .DOC	SNOOPY .GRN
GRAPHICS .BAS	SNOOPY .RED
STAR .GRN	SNOOPY .BLU
STAR .CIR	CIRCUIT .FIG
STAR .FIG	

TABLE C
Product Rating

- 10 - Very Good
- 9 - Good
- 8 - Average

Rating values 8-10 are based on the ease of use, the programming technique used, and the efficiency of the product.

- 7 - Has hardware limitations (memory, disk storage, etc.)
- 6 - Requires special programming technique
- 5 - Requires additional or special hardware
- 4 - Requires a printer
- 3 - Uses the Special Function Keys (F1,F2,F3,etc.)
- 2 - Program runs in Real Time*
- 1 - Single-keystroke input
- 0 - Uses the H19 (H/Z89) escape codes (graphics, reverse video)

Real Time — a program that does not require interactivity with the user. This term usually refers to games that continue to execute with or without the input of the player, e.g. p/n 885-1103 or 885-1211[-37] SEA BATTLE.

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NOTE

The [-37] means the product is available in hard-sector or soft-sector. Remember, when ordering the soft-sectored format, you must include the "-37" after the part number; e.g. 885-1223-37.

Author: Jon R. Rehage

Program Content: When Graphics first signs on, a main menu appears on the 25th line. From this menu, the following commands are available:

F1 — TRACE: This routine is used to draw lines and/or paint with a defined rectangular area called the "paint brush". The process occurs as you move the graphic cursor by depressing the key-pad keys.

F2 — LINE: The line routine is used to draw lines and boxes in a "from/to" manner, by drawing on command from the function keys after the graphic cursor is exactly positioned.

F3 — CIRCL: The circle routine is used to draw circles, ellipses, arcs, single dots, horizontal and vertical lines, and lines at any defined angle. To accomplish this, the circle routine allows control of all the Z-BASIC "Circle" statement arguments from the keyboard. Twenty circles can be defined and used at a time. These twenty circles can be saved on disk for future use.

F4 — FIGRS: The figure routine is used to define and draw figures using the capabilities of the Z-BASIC "Draw" statement. Twenty figures can be defined and used at a time. The figures are created by defining a "string expression" for each desired figure, using the "movement commands" defined for the Z-BASIC "Draw" statement. As in the circle routine, the twenty defined figures can be saved on disk for future use.

F5 — IMAGE: The image routine is used to "capture the image" of a desired rectangular area of the screen, and then transfer that image to other areas of the screen. The Image routine uses all the capabilities of the Z-BASIC "Get/Put" statements. Control of the "Put" statement's action verbs (PSET, PRESET, AND, OR, and XOR) allow the creation of some very unusual drawings.

F6 — PAINT: The paint routine is used to fill "bounded" areas of the screen with any of the eight colors defined for the Z-BASIC "Paint" statement.

F7 — TEXT: The Text routine is used to type on the screen with alpha/numeric or graphic characters with complete control of the typing direction, location and foreground/background colors. The Text routine is especially useful for "framing the drawing" using the graphics characters.

F8 — CLEAR: This routine simply clears the drawing area of the screen.

F9 — Z-DOS: Exits the program and returns to the operating system. Any command that affects the drawing's existence, such as the CLEAR, Z-DOS, etc. always requires a confirming Yes/No answer.

F10 — FILE: The File routine is used to show, save, load, and kill disk files created by this program.

F11 — GRID: The F11 key puts a grid reference on the screen by placing cursor images "+" at equally spaced positions. The F11 key is a toggle operation to display the grid, if not on the screen, or to remove the grid if on the screen.

F12 — EXIT: The F12 key exits the current routine and returns you to the previous routine (in most cases, the main graphics menu). The function of keys F11 and F12 are always used as defined above and are not displayed on the 25th menu line.

Comments: This drawing program just about has it all!!!

TABLE C Rating: (1), (3), (10)

HUG P/N 885-6006-37 MS-DOS
Cardcat (PC Version) \$20.00

Introduction: Cardcat is a program which permits the user to organize information in a manner similar to a library's card catalog. The entries are stored on disk and can be edited and searched using the program's routines. This version of Cardcat is for the H/Z-150 PC, and has a number of enhancements as compared to the version for the H/Z-100: Detailed help screens are incorporated into the program, file disk capacity is increased, a faster routine is used for alphabetizing the lists of entries, and several versions of the program are included to take advantage of larger amounts of RAM.

Requirements: This program requires MS-DOS 2.11 or greater on the H/Z-150 PC computer. One 5" disk drive is required, however, two are recommended. The computer should have at least 192k of RAM, and a line printer is also recommended.

The following files are included on this disk:

README .DOC	GOODIES .ASM
CARDCAT .192	CONVERT .EXE
CARDCAT .320	CONVERT .FOR
CARDCAT .640	STUFF .ASM
CARDCAT .FOR	

Author: Dr. Mark Dershwitz

CARDCAT.192 is the compiled version of the card catalog program. For each "card" entry, the program will accept a title, up to three authors, up to two subjects, and a "location", a reference to an alphanumeric code relating to the entry. The entries are stored on disk, with each disk having a capacity of 2800 entries. Each entry can be examined for correctness and edited, if necessary. There is no limit to the number of disks that can be used to store data. The disks can be searched for all entries containing a specific title, author, subject, or location, and the output list can be alphabetized and displayed on the screen, sent to a line printer or saved on disk. The output list is limited to 500 entries. Help screens are available from almost everywhere within the program without interrupting data already entered. For use with systems having 192k or 256k of RAM.

CARDCAT.320 is an alternate version of Cardcat for systems having 320k to 576k of RAM. The output list is limited to 1500 lines.

CARDCAT.640 is an alternate version of Cardcat for systems having 640k to 704k of RAM. The output list is limited to 4100 lines.

CARDCAT.FOR is the FORTRAN source code for CARDCAT .640.

GOODIES.ASM is the assembly language source code for the assembly language portion of CARDCAT.640

CONVERT.EXE is a utility program that allows file disks made with the H/Z-100 version of Cardcat to be converted so that they may be used with the H/Z-150 PC version of Cardcat.

CONVERT.FOR is the FORTRAN source code for CONVERT .EXE.

STUFF.ASM is the assembly language source code for the assem-

bly language portion of CONVERT.EXE

Comments: Cardcat is an inexpensive alternative to the commercially available filing programs, and permits the user to keep track of collections of books, records, journal articles, etc. The searching routines are particularly useful for readily locating information.

TABLE C Rating: (1), (3), (10)

HUG P/N 885-8034-37 MS-DOS
DBZ (A Database For The Z-100) \$25.00

Introduction: DBZ is a sophisticated, menu-driven Database Management System (DBMS) designed to be quick, easy to use, flexible, and user interactive. It is ideal for personal use in the home and powerful enough for a small business office environment with the capability to handle up to 500 records, up to 26 categories per record, and up to 1199 characters per record. DBZ stores all database information in memory while executing, which results in minimal disk drive access with almost instantaneous response to any user command. DBZ was designed with the user in mind; therefore, it can be up and running with minimal set-up time (on the order of minutes). DBZ makes extensive use of linked menus, the HELP key, single function keys, visual/audible prompts and numerous safety checks which allow the user to spend time manipulating the data rather than manipulating the software.

Requirements: DBZ requires MS-DOS or Z-DOS (any versions) and will run on any H/Z-100 (not PC) system. DBZ also requires a minimum of 128k of RAM, a monochrome monitor (a color monitor is optional) and one single- or double-sided disk drive. A daisy wheel or dot matrix printer is optional to produce hard copy reports.

The following files are included in this package:

DBZ Disk I

README .DOC	ZAPPER .COM
DBZ .EXE	DBZM .EXE
DCONFIG .SYS	DB .BAT
SCHEDULE .COM	DINSTALL .EXE
DBZE .EXE	DBZL
SAMPLE .DAT	DBZ-DBII .COM
RESET .DAT	

DBZ Disk II

DBZ .DOC	ZAPPER .DOC
DBZ .BAS	ZAPPER .PAS
DBZ-DBII .BAS	DBZM .BAS
DBZE .BAS	TUTOR .TXT
SCHEDULE .DOC	DINSTALL .BAS
SCHEDULE .PAS	

Authors: Edward A. Mahoney and Richard J. Komar

DBZ.EXE — This is the central control program for DBZ. It contains the opening menu which is the user's link to other menus. The opening menu contains the following commands:

- * Create a database
- * Edit a database
- * Modify a database

- * Directory
- * HELP to display help menu
- * HOME to exit DBZ

DBZE.EXE — This is the information editor overlay for DBZ. DBZ automatically calls up this overlay when the user presses the highlighted 'E' key from the opening menu. The following commands are then available:

- * Display records
- * Add records
- * Order of records
- * Report
- * Save the database
- * Forms
- * HOME to exit this database

DBZM.EXE — This is the database modifier overlay for DBZ. The configuration of any database can be changed at any time through the use of this menu driven modifier. The following commands are then available:

- * Add a new category
- * Delete a category
- * Move a category
- * Rename a category description
- * Save the database
- * Change a category width
- * HOME to return to opening menu

DINSTALL.EXE — This is the program which customizes DBZ for a particular monitor and printer configuration. The user can install printer codes, screen color codes and a warning beep option for his system. Data entry can be in the form of decimal, hexadecimal or alphanumeric codes. The installation procedure is completely menu driven and can be done in a matter of minutes.

DBZ.DOC — This is a detailed user's manual for DBZ which contains easy to follow, step-by-step instructions and multiple examples. Designed for the user, not the programmer.

SAMPLE.DAT — This is a sample database of computer vendors and products.

DBZ-DBII.COM — This program transfers DBZ files to dBase II.

ZAPPER.COM — This is a program which can be used to examine, and/or modify the contents of any MS-DOS or Z-DOS file.

SCHEDULE.COM — This is an electronic "appointment book and calendar".

DCONFIG.SYS — This is a file created by DBZ during the installation process. This file contains the screen and printer codes.

DB.BAT — This is a batch file to start up DBZ.

DBZL — This is the DBZ logo.

RESET.BAT — This batch file resets the Z-100 to its pre-DBZ configuration upon exiting DBZ.


TUTOR.TXT — This is a sample session for the first time user.

DBZ.BAS, DBZE.BAS, DBZM.BAS, DINSTALL.BAS, DBZ-DBII.BAS, ZAPPER.PAS, and SCHEDULE.PAS are the complete source codes for DBZ!!

Comments: DBZ is extremely flexible. At all times, the user knows what options are available. DBZ will even anticipate a

user's next request and suggest an action. The HELP key is always active to remind the user of special DBZ functions and commands. DBZ employs several safety checks which remind the user to routinely save his databases. This feature also prevents the accidental erasure of valuable data. Any command given DBZ can be aborted at any time by pressing the HOME key with no adverse effects on the data.

TABLE C Rating: (10)



CHECKZ

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The Past Revisited

Paul W. Simmons

6409 Glenbard Road
Burke, VA 22015

I think I've been here before. It looks so very familiar. Haven't we learned anything from our past? Is that really the same bottleneck up ahead we ran into in '73, when we went to time-sharing on the mainframe?

Before time-sharing, things were fairly simple, but painfully slow. Data processing consisted of finding a key punch (port contention), punching a program and/or data (word processing), giving the assembled deck to the computer operator (task initiation), and going bowling or some other trivial pursuit while you waited (multi-tasking). Some time in the dead of night your job would attempt to run. This, of course, was solely dependent on the whim of the computer operator and the quality of the late night TV programming. Early the next morning, after you had bolstered your spirits with several cups of coffee and a doughnut or two, off you would go to the computer room to pick up your listing. The listing, of course, was a memory dump, not at all what you expected (typical mainframe friendliness). Something went wrong. Oh well, back to the key punch and start again.

In its infancy, time-sharing sure looked good and oh, so fast. Gone were the cards and the key punch. Instead, we had terminals and on-line storage at the computer center. When we initiated a job, it would run, or shall I say, attempt to run, right before our eyes. We had instant memory dumps, rather than belated dumps. What an improvement! Of course, the phone system was, and still is, a problem. We had a good healthy case of line interference, so disconnects in the midst of our dumps were commonplace. Also, we were plagued with computer down time. That was tolerable, since a two or three hour wait was still better than overnight. Soon, though, we began running out of disk space at the center, so in the wee hours of the morning all our files would be copied to tape. No problem. After the first job in the morning failed, we'd call the center and in a few hours the files would be restored. Of course, as they were activating our files, they were purging the next guy's files. But it was still better than overnight processing. Then there were days when more than 100 users tried to use the system simultaneously, and response was then measured in minutes rather than seconds. The final blow was when I had to drop out of the bowling league, so I could watch my nonresponsive terminal.

Then came microcomputers. These little beauties are a godsend. Mine sits where the dumb terminal was. It has never broken. It has never had a disconnect (no modem). It has never run out of disk storage (purchase diskettes as needed). It has never timed-out. I don't even share it. If it's busy, it's because I'm making it busy, not because some joker in Philadelphia is modeling the universe. This thing is a real workhorse, a time saver, a tool. They even let me back in the bowling league, although I did have to re-establish my average.

But what's happening now? Networks, multi-user micros, shared hard disks, shared printers, shared software: it all spells DISASTER. That's what it is, a disaster. The industry that brought us the micro is transforming that useful tool into a mainframe.

We're going backwards fast, and the ADP managers, who see control coming back into their hands, are loving it. Managers toot, "Hook those micros together and toss out the ones you have. We all need the same micro; they're a lot easier to hook together that way. So we're all going to have a Shazam 300. It's a hummer, even if it is a little short on software. But that's ok, because the folks over in coding are bored. Besides, when they're all hooked together, we can talk to one another rather than hollering over the partitions or using the phone. No one likes the phone company, right?"

So much for networks. Now what about the powerful multi-user systems? Well, multi-user means add terminals until the micro (or mainframe, for that matter) can't cope. It always works that way. Why? Because the hardware is cheaper per workstation. AS for sharing, shared disks mean lost files. They can be lost due to system failure, a blip in the network or your best friend's blunder. Shared printers means your boss has the printer tied up all day, but it will be available at 5:00.

On the other hand, shared software does mean a savings in software licensing agreements, one bright spot in an otherwise bleak outlook.

What it all really means is I'll have to drop bowling again. ✱



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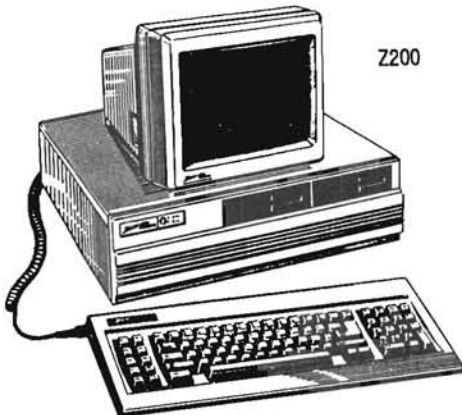
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
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*Lead Computer Publications Writer
Heath Company*

A touch of class . . . a touch of magic . . . and a lot more marked this year's International HUG Conference. From the time the lines formed at the registration windows to the final closing moments, you could feel the joy of a great time at a great conference. Perhaps it was the accommodations, made possible by the highly qualified staff of the Hyatt Regency O'Hare Hotel and Convention Center. Perhaps it was the spaciousness of the rooms for the speakers, gala Grand Opening on Friday night, and Dinner and Awards Banquet Saturday night. Perhaps it was the showing of Zenith Data Systems new computers and the face lifts (or interior redecoration?) of two old friends. Perhaps it was the announcement of not one, but two ways to make the Z-100 compatible with many PC programs. Perhaps it was the magic and joy experienced by a thirteen-year-old boy who came to the conference wanting a Hero Jr. more than anything else in the world, and within two hours walked away with one as a surprise gift at the Grand Opening.

On Friday, August the 9th, just before the 2:00 p.m. opening of registration, the long lines were forming for the preregistered anxious to get into the exhibition area when it opened — then only an hour away. On the other side of the hotel's main lobby, the sightseeing information, for those less anxious to check out the bits and bytes, was being readied. The vendors, in the meantime were saying, "Is it already 2 o'clock?" They were in the last stages of frantically setting up their booths, testing their equipment, and diagnosing which cable or what software they forgot to bring. And so on this note of anticipation, the 4th Annual and now truly International Heath User's Group Conference was ready to open.

Chicago's Hyatt Regency O'Hare, after a one-year hiatus, had

once again opened its doors to the many huggers and huggies for the third time in four years.

This year could easily be called the Year of Hardware. From the mountains of hardware for sale at a number of the vendors' booths, to the live entertainment in the room reserved by DEL to announce the Gemini board, to the Zenith Data Systems display showing four new computers and two old friends with new features, you could sense the feeling of well-being by three companies (and their supporting cast) in an industry wracked by Chapter 11 filings and reorganization.

At the Grand Opening event, Bob Ellerton shared his "I have a dream . . ." with all of us. It was a recording of a news announcement that "today, IBM and Apple Computer jointly announced reorganization under Chapter 11 . . . Heath/Zenith was being credited with 'bringing them to their knees . . .' IBM was going to try to get back into selling typewriters . . . Apple was abandoning the computer market altogether and going into raising MacIntosh apples . . ." Ah yes, what a dream to share . . .

One of the utmost questions on a lot of attendees' minds was directed to Bill Parrott . . . "Where is HDOS 3.0?" More on that in a moment.

During the traditional introduction of independent user's groups, organizations were represented from around the globe including Germany, Okinawa, and Puerto Rico. In the United States, clubs from Buffalo and North White Plains, New York; Austin, Texas; Miami, Florida; and California were represented, as well as many, many clubs in between, including one with just one member! Well, if there isn't an independent User's Group near you, why not form one yourself?

Then followed the introductions of the HUG staff and their helpers: Nancy Strunk (HUG Software Coordinator), Deb Watkins (Heath Computer Sales), and Jim Buszkiewicz (HUG Software Developer) at the HUG booth; Walt Gillespie (REMark Editor), who served as MC and general troubleshooter for the exhibit area; Herb Friedman, President of the Pomona HUG and West Coast Heath User's Group Conference, who was helping everywhere he could, especially in the exhibit area as Walt's very able assistant; Margaret "Ma HUG" Bacon (HUG Secretary), who thanks John Guldán (Summer Student), Al Heigl (HUG Member), Connie Huber (Author's Wife), Jim Jones (HUG Member), and Lori Lerch (Editorial and Advertising Assistant) for helping her in the registration booth; and David and Anita Kimery, who spent untold hours gathering information for sightseeing in the local area. Bob Ellerton, Manager of HUG, who was serving as MC for the Grand Opening forgot to introduce himself, but made up for it the next night at the Banquet. Missing most of the conference this year was one HUG staff member, who in past years, has always been ready to answer numerous software questions: Pat Swayne (HUG Software Engineer) was home tending to his wife and a brand new 8-pound, 1-ounce baby boy.

The award this year for outstanding club went to Herb Friedman and the Pomona Heath User's Group for sponsoring the first ever West Coast Heath User's Group Conference in Anaheim late last year.

Dave Troendle and New Orleans General Data was named as the outstanding vendor this year for all the support given to the computers.

Mike Cogswell, the man responsible for the 8 MHz/256K modification for older H/Z-100 computers, was named as User of the Year.

And finally, but not at all least of all, Bruce Denton, of D-G Electronics, was presented the Lifetime Membership Award by Larry Sites, the first lifetime member and a kit builder since the early days in 1949. Bruce was the first advertiser to sign up with REMark when we started accepting competitive advertising.

Mr. Chas Gilmore, one of the team that developed and marketed Heath's first digital computer, the H-8, and now Vice-President in charge of New Product Development at Heath Company, was the keynote speaker. His topic was "Back To The Future" with a look back at the beginnings of Heath Company as we know it today up through tomorrow's exciting new products.

His presentation included slides from yesteryears' catalog pages and a glimpse into the future pages, yet to be published.

In 1947, the O-1 and V-1 Oscilloscope and Voltmeter kits were being advertised for \$39.50 and \$24.50. These kits were assembled from surplus parts and as those parts ran out, others were substituted. This resulted in a change of model number and by the mid-1950's the V-1 had advanced to become the V-7 Voltmeter, selling for \$27.95. That model is still on our price lists and can be repaired for a fee of \$27.00. Those figures provide a statement about our dollar, as well as a statement about Heath's continuing commitment to its products.

But even more important, the features of the 1940s are not much different than those of today. We are still committed to quality products and technical advancement. Mr. Gilmore brought us up to the future through other pages from past, current, and future catalogs as he announced the various lines of ham equip-

ment, instrumentations, televisions, high-fidelity amplifiers and receivers, and computers, including the analog computer kit Heath sold in the mid 1950s. Current products include educational products for amateur radio, and AutoCAD, the EPROM programmer and eraser, the LORAN-C receiver and computer, the TL-400 telescope and software (in the September issue of REMark). He introduced the HA-108 upgrade for H/Z-100 computers to 8 MHz and potential for 768K of on-board RAM.

Mr. Gilmore provided a rundown on the new ZP-150 Laptop Computer and Works software from Microsoft; the ZFL-171 full MS-DOS compatible portable computer with a 25-line x 80-column flat display screen and two disk drives; the ZF-138, 7-inch, flat-screen portable with two drives; the HF-148 Desktop Computer that is a one-evening solderless kit and has the option for adding memory to 640K and one PC-compatible card; the HF-158, the big brother to the HF-148, but fully expandable; and the HF-241 kit version of the new ZF-241 computer.

He announced the future availability of not one, but two PC emulator kits for the H/Z-100 computer; an 8-channel logic probe that may be stacked for 8, 16, 24, or even 32-bit resolution; a digital line voltage monitor and indicator that tells you when a glitch has occurred that could affect disk or data integrity; and a new 25 MHz oscilloscope.

On into 1986, Mr. Gilmore sees more support of computer products that will connect to, monitor, and control the environment in our homes.

After his address, Mr. Gilmore opened the session to questions from the audience.

An 8 MHz modification for the Z-150 and Z-160 computers? Mr. Gilmore expressed serious doubts because he said it would cost about \$1500 and be, essentially, a new computer.

What will the HF-241 sell for? It isn't priced yet, but it will be "very competitive."

Is there going to be a next robot and what will it be? We are definitely in robotics — keep an eye on the catalog.

Any chance of getting away from the Intel architecture in CPUs in the next couple of years? Nothing in the short term.

A member of the audience provided a list of a number of products that required software and then asked, "Are there any plans to offer appropriate software to load and run without problems [on various computers and in different operating systems]? Perhaps by rejuvenating SoftStuff?" This issue will be addressed. For right now, HUG has some solutions to some of the problems.

Where is HDOS 3.0? It will probably come through HUG.

At the conclusion of the question and answer session, Bob Ellerton did a "man on the street" interview with a young man selected at random out of the audience. The interview went something like this:

"Do you like science fiction?"

"Yes."

"Do you like horror movies?"

"No."

"But you like science fiction... Would you like a robot?"

"Oh, yes."

"Well, you got one now!"

Charlie Powers, age thirteen, of Beavercreek, Ohio, became the

proud owner of a brand new, fully assembled Hero Jr. I was there when Charlie's dad registered him at the conference. He told my wife and I that he would rather go swimming or play the video games than spend all his time at the show. But there was one thing that Charlie wanted more than anything else . . . and that was a robot. Two and a half hours later he had one. And that little touch of magic made this conference one of the best ever, especially for Charlie.

As I talked with various people at the show, it became apparent that a number of you may be confused by who the players are in the Heath/Zenith organization. For your information, there are three separate, but related companies. First, there is Heath Company, the design team, publications group, and manufacturing arm of Heathkits and educational products. Included at Heath is the catalog sales and service group, along with the HUG organization and the hardware computer publications group for the ZDS products. They also are responsible for publishing, but not writing, the software publications for ZDS. Secondly, there is Veritechnology, Inc. They are the marketing arm of the Heath Company, and own and operate the Heath/Zenith Computers and Electronic stores throughout the United States. Until late last year, you knew those stores as the Heathkit Electronic Centers. Finally, there is Zenith Data Systems Corporation, the design team behind Zenith Data Systems computers, software, and service. Each of these separate companies is a wholly-owned subsidiary of Zenith Electronics Corporation, one of the pioneers in the radio and television industry and one of the last television companies to still manufacture color television sets in the United States. You probably know them better as Zenith Radio Corporation. The decision to rename the corporation was made by the stockholders late last year as a result of the company's diversification into computers and other electronic products that continue to mold and shape the corporation's future.

Like last year's conference, I once again found it impossible to attend all the discussion groups. Attendance ranged from small groups of fifteen, upward. For those who attended last year, you may have remembered that most sessions were held in rooms that were inadequate. With the exception of one session, Walt Bilofsky's "Introduction to C," the hotel's facilities handled the groups very nicely. We simply underestimated the interest in this powerful computer language and the room was filled to standing room only and on out into the foyer. Fortunately, Pat Swayne's Sunday morning session was open (he was home with his new baby) and so Walt kindly provided another session.

In Bruce Denton's hardware workshops, he fielded a variety of questions. Interestingly enough, these sessions were well received and the questions asked varied from session to session. For instance, in the Saturday morning session, Bruce answered questions about how memory is addressed and how it works, while in the Saturday afternoon session, the questions turned more philosophical with a good discussion about the myth of "home" computers.

In the software workshops, Bill Parrott and Richard Mueller fielded the questions. As you may remember from last year, Bill Parrott described HDOS 3.0 in detail, so where is it? Is it dead? What happened. Here is his response: HDOS 3.0 is not dead, but it will be supplied only for the H-8 and H-89. It is now done and working and he is now working out the details of how it will be sold (distributed). Right now, it appears that HUG will be the vendor, so watch for the announcement in these pages. There will not be support for the Z-100 or PC families. He had been

promised help to do that code, but it never materialized. Bill mentioned that source code will be available and probably will be on disk. The selling price has not been determined, but he said he will probably throw in a bunch of stuff, such as a driver similar to that needed for the Z-67.

Other questions of general interest covered the way Perks and other "windowing"-type programs stay resident in memory. The 8088 allows two types of exits from programs, including one that keeps a program in memory. To get back into the program, you set up an interrupt vector and execute it when you want to get back into the program.

MS-DOS 3.0 is in final testing for the Z-100, but the actual release date is not known for sure. Some of the changes are to handle file protection in networking applications and others are additions that allow you to do things like rename the volume label on disks, prefix commands with pathnames, and support the newer 1.2 megabyte floppy disk drives. Those that have tested it have seen no noticeable speed differences. Later in the session, the speed tradeoffs were mentioned in regard to Z-DOS versus MS-DOS version 2. Bill noted that version 2 was not ideally optimized, but most people would probably get better performance if the number of buffers were set to ten.

Updates were mentioned, particularly with regard to the fact that Zenith uplevels firmware and software almost daily, in some instances. Since not everybody has modems and a lot of people do not want to call long distance on a continuing basis, it was suggested that maybe REMark could be used to note those new versions, as well as the changes and fixes implemented in addition to software consultations bulletin board.

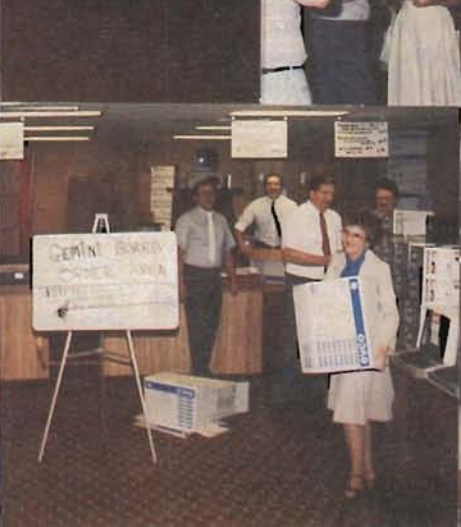
An interesting question arose that dealt with reading soft-sectored disks on hard-sectored drives. The H-17 controller is little more than a glorified serial port and so software can be written to read almost any format from it. However, the software to read soft-sectored disks would probably be slower, since all the timing would have to be handled by the routine. Furthermore, the drives are only single-sided, single-density, so the disks could not be double-sided or double-density.

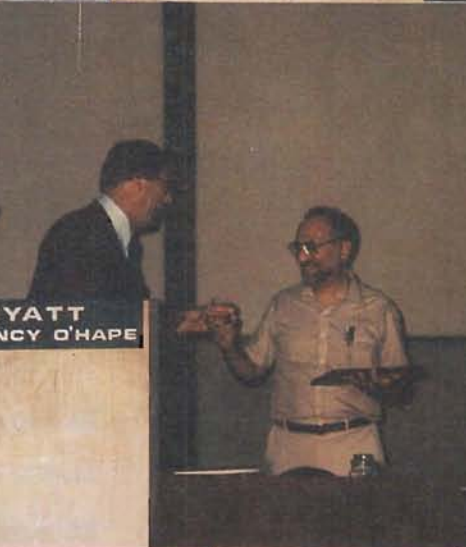
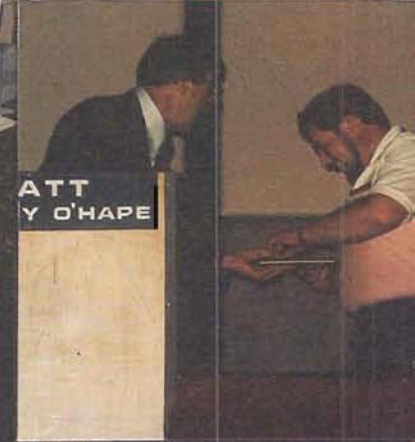
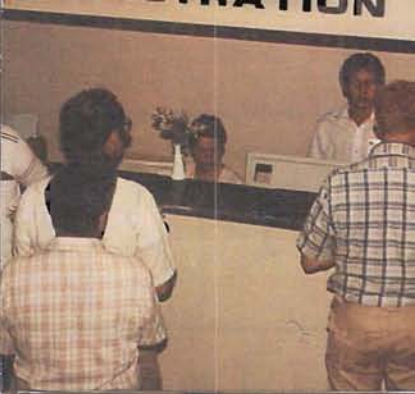
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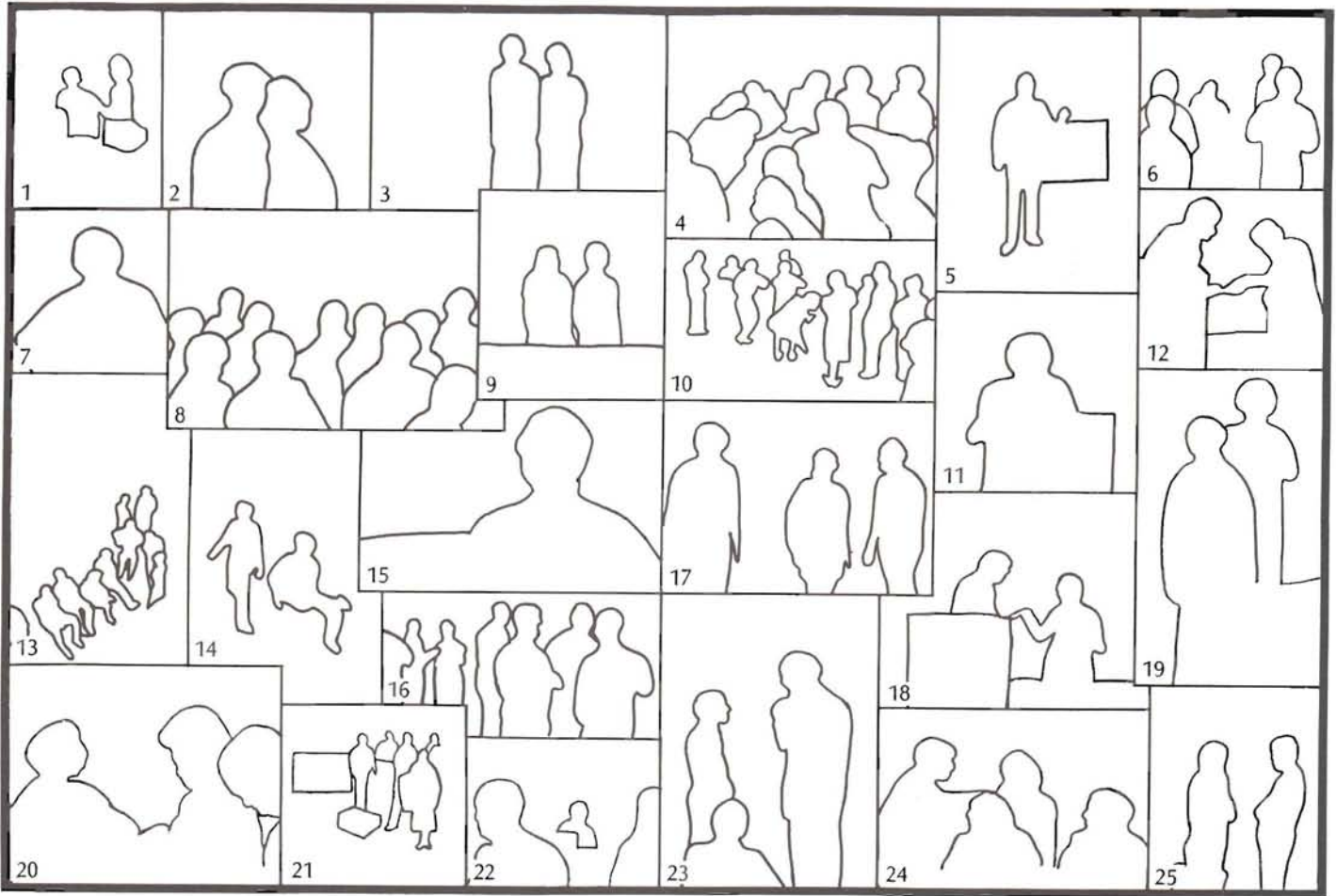
I toured the exhibit area several times during the conference and I was always pleased to find it busy, even up to the closing moments on Sunday. As I visited the various booths, a number of items caught my eye. This year there were not as many vendors pushing graphics packages, although there were still many to be found. I saw more CAD applications, including WINCAD and jr-CAD from Redwood Development. jr-CAD is a small CAD system for PC machines and aimed particularly at those other guy's jr. WINCAD is available for both the Z-100 and PC-compatible systems.

Old favorites, including the Software Toolworks, Generic Software, and Newline Software were there with their booths full of not only the latest offerings, but many of the old favorites. Software Wizardry occupied a number of booths and offered a full range of products, including inexpensive 256K upgrades for Z-100 and PC computers. Of course, there were a number of '89 boards, and in chatting with one of the fellows from C.D.R. Systems, he said they did very well this year with an expansion system that put the boot disk in RAM and renamed the boot disk drive so it could be used as drive 1 under HDOS.

Hardware wasn't limited to Z-100's. I saw a sprinkling of non-







1. . . . and this ticket entitles you to a free night at the . . .
2. How many HUG BB users remember <TLJ>?
3. Bruce Denton (with his wife Jane) was named as HUG's third Life Member.
4. I can't hear it! Can you?
5. Joe's Bargain Barn!
6. Say what?
7. Where's the beef!!!!
8. This isn't too boring. My eyes are open!
9. . . . with Double-Mint, Double-Mint . . .
10. Where can I find the HUG Registration Booth?
11. They went that-a-way!
12. Got ya! Mike Cogswell earns the User of the Year Award.
13. Come on! Let's get this show on the road!
14. Are you happy? I'm happy!
15. Bob Dilworth, ZDS President, fields user questions.
16. . . . Sample Software. Call BR-549!
17. No! They went that-a-way!
18. . . . this Bud's for you!
19. The huggables, Judy and Barb, from the HUG Factory.
20. Opposites attract!
21. Ya, I know! I just dropped that other one!
22. And, heeere's Herbie!
23. . . . and you're sure you like science fiction?
24. Bill Johnson, Heath President, congratulates the Hero Jr. winner.
25. You spent how much?!

Heath/ZDS machines, though they were in the obvious minority. Some of the most amazing products were truly innovative. For instance, did you ever want your PC-compatible computer to run regular old CP/M-80 software? It can be done now with a replacement CPU system from Weitzman and Wood Associates. It is available in 5 or 8 MHz versions of either the 8088 or 8086, so this product isn't limited to just ZDS machines. The CPU, from NEC, is a processor that accepts both the 8086/8 code and 8080 code. Any CP/M software that isn't dependent upon hardware or a Z-80 processor should run with the modification.

Diverse Systems was offering a product that caught my eye. It was a small board and disk drives that allowed a Z-100 to create 1.25 megabyte 5.25-inch disks. Basically, it allows the quad density drives to appear to be drives C and D in the MS-DOS Z-100 environment. Those are the drive designators for the 8-inch disk drives. You use the same Z-207 controller as always, but convert the 50-pin connector/cable to the standard 34-pin cable needed by 5.25-inch drives.

Database programs were also in evidence with Zeducomp showing Dataflex for CP/M (Z-89's), and MS-DOS (both Z-100 and PC machines). They were also showing their DeZign software for not only the Z-100, but this year for the PC machines.

Local area networks (LANs) were also in evidence with Automatic Office Systems showing a system in use, centered around a Z-150 and two terminals (Z-29s work fine). Zeducomp was showing a VCR presentation of Novell's NewWare program.

Lots of disks were available with Dysan back again this year, along with a number of independent vendors selling bulk disks (DSDD) for less than \$1.00 each.

The Zenith Data Systems booth was showing off all the new products. The following is a run-down on those of which you may not be aware.

The Z-130 PC Series Computer is the new 25-pound portable that features two disk drives, up to 640K memory and a built-in flat, 7-inch amber CRT. Personally, I like this new portable. It far outclasses the old hernia-pack (the 42-pound Z-160 PC series) and features the 4.77 to 8 MHz CPU speed switch on the front panel. With the addition of the optional interface card you can even add a PC-compatible card of your choice internally.

The Z-140 PC Series Computer is the desk-bound twin to the Z-130 that has the same internal arrangement, but fits in a remarkably small enclosure that isn't much taller than the width of a full-size floppy disk drive or wider than two set edge to edge. Like its portable brother, the Z-140 features the 4.77 to 8 MHz CPU clock switch and expandable memory (up to the PC-addressable limit of 640K). Both feature a detached keyboard.

If twenty-five pounds is too much to lug around and you don't mind an attached keyboard, the Z-170 PC Series Computer just may fill the bill for those of you that want true portability. The built-in battery pack is said to run up to four hours on a single-charge, if you don't perform disk I/O. I wouldn't want to do a lot of disk operations on the two built-in third-height floppy disks while running on the battery pack, but still this new little light portable sure looks like a real winner for the ZDS team. It is PC-compatible, but cannot be expanded with PC-compatible cards. Instead, you can buy a modem or the RGB/monochrome composite video options. Like the Z-130 PC and Z-140 PC, its memory can also be expanded to 640K internally.

Now if speed is your real need, then Zenith's answer to those

other guys' AT is a treat to see and use. The machine is a monster compared to the smaller PC series, but that case holds a lot of horsepower. The 80286 CPU, 6 MHz clock, and no-wait state technology spell just one thing: speed. I have never experienced this much difference in operating speed since the days of playing with those other guys' floppy disk computer and the Z-100 running at 8 MHz with a Winchester. There is just that much difference. You can put not one, but two Winchester systems in this cabinet, along with two floppy disk drives. The floppies don't have to be limited to the PC-standard of 360K, but can now be the high-density 1.2 Megabyte versions. I saw one of these babies running AutoCAD. If you have run AutoCAD on an 8 MHz Z-100 Winchester (without the 8087) and then come over and run it on the Z-241, Wow! What a difference!

A couple of old friends graced the Zenith booth. One was a new version of the Z-150 PC Series, this time with two boards replacing the four-board design and a further bonus of being able to run at either 4.77 MHz or 8 MHz CPU clock speed. Oh yes, if you want 640K, you don't have to buy extra memory cards. Like the Z-130, Z-140, and Z-170, the Z-158 PC series will use the new 256K chips and expand out to the full addressable PC limit.

But an even fonder friend sits in the ZDS booth this year. It is the Z-100 with a new 8 MHz 8088 CPU (remember last year's speed-up kits?) and on-board memory expansion to 3/4 megabyte. Who says the '100 is dead?

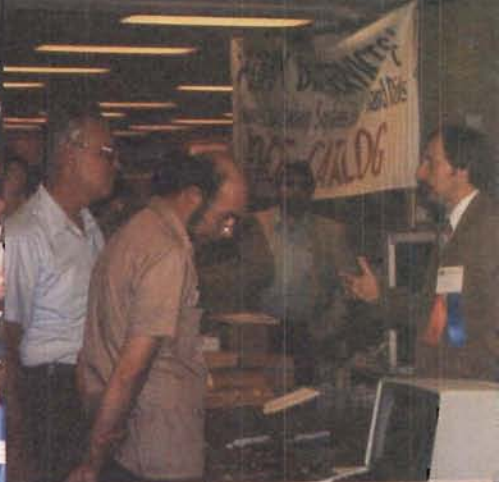
If you think the PC is dominating the software end of things, but want the better graphics of the Z-100, then you just might want to try one of three PC emulators. One of them is a software-only showing from HUG's own Pat Swayne, and is available in the September issue of REMark.

The other two are available and look like gang-busters. One is DEL's Gemini board; the other is UCI's three-board computer to-be-placed-inside-a-computer. Heath will be supporting and selling both versions. The DEL version is heavily software-dependent and so has some limitations, primarily in speed over the standard Z-150. The UCI version has three boards that replace the CPU, floppy disk controller, and video in the '100. However, that replacement is only while running in the PC mode. The DEL version is less money — it will list for \$599, while the UCI is said to list for an amazing \$699. In the words of Bruce Denton, that is a remarkable achievement in cost. When you consider the alternative of buying a new computer, even the "entry-level" ZF-148, the cost is considerably less than half.

Speaking of PC machines, what do you think about almost 5 megabytes as a RAM-based disk? Next to the UCI booth was a booth occupied by KCI and they were offering 1.25 Megabyte memory boards for the PC. RDisk is the daughter board that fits on the 5-bank, 256K-device memory board. It allows the disk software to look at up to four boards for 4.375 megabytes of contiguous RAM. By using BACKUP and RESTORE, databases larger than one floppy disk can be loaded into the RDisk, used, updated, or whatever, and then downloaded when finished.

What good is all that memory if the power goes out in the middle of your work you ask? Well, needless-to-say, I also saw power backup systems in evidence this year.

Word processors were not as much in evidence this year, but I did stop by S & K Technology's booth to look at their new stand alone speller. It operates much like MicroPro's CorrectStar, but avoids those areas that I consider pitfalls. I sat through a demonstration on part of this article and was very impressed by its





action. But what makes this speller truly unique is that it can be coresident with other software. Therefore, if you are programming in BASIC, you can use it to make a quick syntax check on your code. Unlike CorrectStar, you can build your own dictionaries. Furthermore, you can, right in the middle of some action in another program, pull up the speller to check one word, a paragraph, or the whole document, then drop back out and continue where you left off. S & K has also upgraded WatchWord to support the Hewlett-Packard LaserJet printer. If you haven't used WatchWord, spend the three dollars to get the demo disk. It will be well worth your time. Unfortunately, WatchWord is only for the Z-100 (sorry PC owners, but you will have to wait for the PC version), so I can't start talking my boss into a new word processing system . . . yet.

Removable media rigid disk drives (that's another way of saying removable Winchester disk drives) were also in evidence with more than one booth showing various versions. Computer Consultants to Business told me they would have one for the Z-100 in a couple of months. There were several tape spooling backup systems, along with fixed Winchester drives and controllers. Like I said earlier, this was the year for hardware and there was a lot of it. The only thing I missed seeing, if there was one there, was a low-cost mouse for my Z-100 and the support software to go along with it. They were there for the PC, but not the Z-100. Anybody know of one?

I hope you have received the feeling that this conference covered a lot of territory. As I said at the start of this report, there was a touch of class and a touch of magic in the air. The crowds did not exceed the room in the exhibit area and were allowed to move freely, even when they were weighed down with an armload or two of new hardware and software. Unfortunately, like the talks, I simply couldn't cover everything and all the booths as much as I would have liked, so if I left somebody out, please accept my apology. However, I am sure there are a number of you that would have found even those things in which you might have an interest. For instance, my wife came home with huggie-type t-shirts for her, DELT-shirts for the kids, and bumper stickers ("Have you hugged your kids today?") for the car. In case you missed them, there were even overlays for various programs.

Which brings me to the next subject. What to do with spouses who have no interest in the conference, but still would like to come and have a good time. If you look back at the July issue of REMark and the registration form, you will notice a small area to indicate your preference for other activities. A number responded and we tried to accommodate most of their desires. But, like most humans, we didn't quite do it all. So next year, if you would like, we will try even harder and this time make it a vacation for the entire family. But, in order to do so, we actually have to start now so we want to hear from you now. And spouses, please be patience with your other half, all they want to do is have a good time too. After all, you might end up like thirteen-year-old Charlie Powers and take home your heart's content.

At The Banquet

Once again the Hyatt Regency staff added a touch of class and served up a surprisingly good meal for close to 1200 banquet attendees. Not only did they carry it off with a professionalism I have not seen before, but the food was actually very good.

After all were fed and comfortable, Bob Ellerton played his "dream" tape (the news broadcast of the joint Apple/IBM Chapter 11 filing) again. Then he announced that there were atten-

dees from the Fiji Islands, New Guinea, Okinawa, and Venezuela. The Heath/Zenith dignitaries at the head table were also introduced: Mr. Bill Johnson, President of Heath Company, and his wife, Pat; Mr. Joe Schulte, President of Veritechnology, and his wife, Sue; Mr. Bob Dilworth, President of Zenith Data Systems; Mr. Chas Gilmore, Vice President of Product Development for Heath Company, and his wife, Polly; and Mr. Phil Cole, Director of Product Planning at Heath Company, and his wife, Maria.

Mr. Bob Dilworth, who just three weeks previously joined Zenith Data Systems after a long tenure at Morrow Design (formerly Thinker Toys), spoke to the assembled group. He introduced his talk with the three questions he is most often asked: why he came to Zenith Data Systems, where is he going to take Zenith in the future, and how is Zenith Data Systems going to respond to the Japanese challenge.

He said that he had been frustrated by the size of Morrow Design even though they produced good products. He said that because venture capital and financial companies are not providing any money to the computer industry, that the future growth into a leadership position seemed uncertain for Morrow. Of all the computer companies, Zenith Data Systems is in the best position to grow — they have a lot going for them. He stated that he wanted to be a part and participate in that growth.

As to where Zenith Data Systems is going, Mr. Dilworth indicated that he felt he was yet too new in the organization to really tell. However, he did respond by what he thought needed to be done to meet the Japanese challenge.

The answer lies in the changing technology. The Japanese have trouble competing on a world-wide basis as long as the technology is changing. It takes time for the Japanese to gear up their factories to produce competitive products. As an example, the floppy disks, which now are being sold at low prices by the Japanese manufacturers are having to compete with the higher storage capabilities of the hard disks, which are continuing to evolve and drop in price.

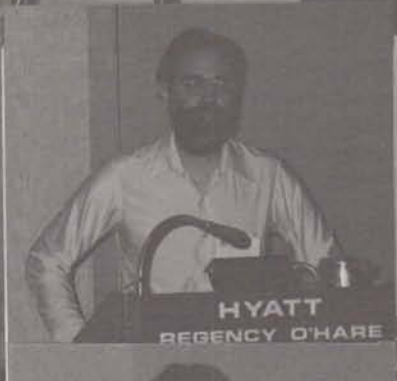
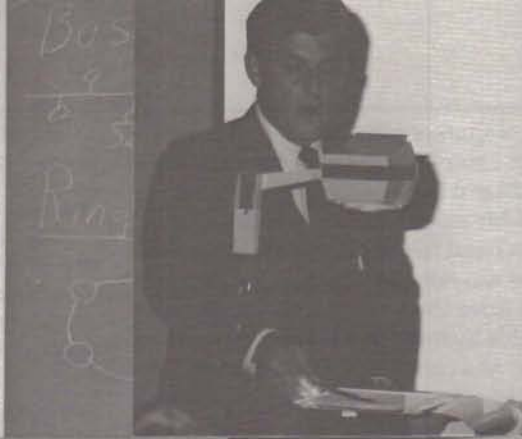
He mentioned that flat screen displays are going to have a major effect on packaging of future computer products. The trend is toward much smaller units; units that take less desk space. Today's computer takes a lot of room on a 30 X 60-inch desk and with the emphasis toward more efficient use of desktop space, smaller computers are going to be important.

Other areas are in the price of memory and mass storage. One of the most exciting technologies is the optical disk with the capability of containing 400 to 500 megabytes of information on an optical disk the size of those used for music.

Today's user has a tendency to be technically-minded, but the next group to purchase computers are going to be less tolerant. The industry will have to look toward software packages that do not need manuals. The extra memory of the optical disk will make this possible. However, he warned, don't expect this to happen overnight. It is a long-term trend and they don't happen quickly.

Mr. Dilworth told us to expect the electronics to take up less space — we are not far from putting the electronics on a flexible board, roll it up, and tuck it somewhere in a much smaller cabinet.

He went on to say that hardware doesn't sell hardware; software sells hardware. Many of today's leaders are where they are be-



cause of software. Apple computers were VisiCalc drivers — electronic spreadsheets that couldn't be found anyplace else. CP/M machines were WordStar drivers and IBM and Compaq, the move from 8-bit to 16-bit machines, were Lotus drivers, which was created to fill the need for larger spreadsheets. Mr. Dilworth commented that he was not sure what kind of software was going to come about to drive the 32-bit machines, but that wider data paths made possible by these machines were needed for more and more memory. As a conclusion, Mr. Dilworth said that Zenith Data Systems will be out front with memory and other storage — storage capabilities that boggles the mind — when the need is there.

Mr. Dilworth then opened the floor to questions from the audience.

In response to a question concerning advertising, Mr. Dilworth related his experience at Morrow. Morrow is well-respected in California, but basically lacked user recognition because of Osborne (Adam Osborne's flamboyant style) and Eagle (the president drove his car off a cliff). Since he didn't want to follow the Eagle president's lead, they targeted the Northern California area for an advertising blitz on television and in major magazines. After spending between 1/2 and 3/4 of a million dollars, the measurement of name recognition showed a gain from 1 percent (before the advertising campaign) to 1.5 percent (after the campaign) of the purchasers of new computers. All the owners called to say they saw the advertising; it felt good to him to be recognized. However, good feelings do not sell computers. He cited Apple's experience with the Macintosh advertising blitz and DEC's 10.5 million dollar media effort with the Butterfly, neither of which was considered successful. However, he did say that we could expect more advertising, but not at the level that has been done by other vendors in the past; nor, for that matter, should we expect to see the other manufacturers equal those previous efforts.

In response to a question about carrying forth the image of Heath, he said that we would continue to do so as long as possible. However, there are problems with surface-mount technology in the home.

As far as a commitment toward Unix or Xenix is concerned, Mr. Dilworth said he felt Unix (or Xenix) may have a strong enough push to survive. There were times in the past when the jury was out on the future of this type of operating system, but now he is interested in supporting it when the time comes.

When asked what kind of computer he has, he said he owns a fairly large S-100 system running Unix, but that his son has networked RS-232 wires through the trees to six neighbors. He said he has a '150 at home for DOS and a Morrow for CP/M. His wife is not a real computer nut, he said, and warns that if you have two computers in one home, they end up having babies.

Is there a future for voice operated computers? Mr. Dilworth stated that he doesn't really know yet. Sound is certainly the nicest part of Commodore's new computer, but whether it is the time for it now . . . he simply didn't know. He did say that robotics was one area where voice recognition had a place. He then cited an experience recently in Japan with a computer that had been developed to recognize and displace English as it was spoken. He, along with a Japanese that he didn't know was speaking English, and an [east] Indian with a heavy accent all spoke into it and it amazed him at the capabilities of the computer to recognize the correct words even through the vast differences of the

sound of the same language. From the audience, it was commented that there was the 32-bit software driver. Perhaps so.

The vendor-supplied prizes this year were awarded through regular drawings in the exhibit area. They are published at the end of this article. At the dinner, the Heath/Zenith organizations gave away several prizes, including the new ZF-241-81 from Zenith Data Systems, and a fully-loaded H-100 kit with 768K RAM, a Winchester, and 8 MHz clock speeds from Heath Company. Three ZP-150 laptop computers were awarded by Veri-technology.

Bill Johnson, President of Heath Company spoke briefly in response to some of the questions asked Mr. Dilworth. He mentioned that CP/M and the S-100 buss lives on at Heath company. Heath will continue to support the H-89 for seven years after the last one is sold and it hasn't been sold yet.

On an availability issue that came about with slow delivery of Z-150's to Heath stores, it by policy, won't happen again. We will do all in our power to ensure that products reach both Heath/Zenith Computers and Electronics stores at the same time they reach Zenith Data Systems dealers.

We do understand artificial intelligence and voice recognition, but cost drives the computer. We could give you that technology today if you were willing to pay \$30,000 for the computer. Price will one day come down and when it becomes practical Heath and Zenith Data Systems will have it.

After the prizes were awarded, Bob Ellerton announced some of the statistics from the conference. 1,344 had registered and of those, 2 owned robots, 7 didn't know what they had, 3 were H-11 owners, there were 110 H-8 owners, 402 had H-89's, 268 owned 150's, and a whopping 627 were H/Z-100 owners. He further announced that Heath and ZDS will back both the UCI and DEL PC emulator boards with warranty and service. By the time Sunday closed the doors on the Fourth Annual Heath/Zenith Users' Group Conference, over 1400 people had passed through the workshops, talks, and exhibit area.

Then came the close with some final surprises. To the son of the father-son team from the farthest away, George Sellers of Cumberland, Maryland, took home a ZP-150. Bill Johnson wouldn't let that pass and to the daughter of the father- or mother-daughter combination from the farthest away, Susan Widener of Portales, NM, took Hero home with her. Then Mr. Johnson had Bob Ellerton pull five more names out of the barrel and gave each a \$100 gift certificate to spend in the catalog or in one of the 70

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Heath/Zenith Computers and Electronics stores. Finally, Mr. Johnson had his wife, Pat, pull the name of an individual to receive a \$1,000 gift certificate. (The winners of all the prizes are listed below.)

Then, on Sunday, August 11th, with the final two sessions for speakers and five hours of exhibition hall time, the 4th Annual Heath/Zenith User's Group International Conference came to a close. Of those I spoke with, all felt this was the best ever conference.

Grand Opening Awards

Outstanding Club

Herb Friedman, Pomona [CA] HUG

Vendor Of The Year

Dave Troendle, New Orleans General Data

User Of The Year

Mike Cogswell

Lifetime Membership

Bruce Denton, D-G Electronics

HERO Jr

Charlie Powers, Beaver Creek, OH

Banquet Award Winners

ZF-241-81 Computer

William S. Hall, Ann Arbor, MI

H-100 Winchester, 768K 8 MHz Kit

Richard J. Galler, Raleigh, NC

ZP-150 Computers

Alan Gregalot, Gainesville, FL

Lyn Durant, Marquette, MI

Charles Hillman, Brownsburg, IN

George Sellers, Cumberland, MD

\$100 Heath Gift Certificates

Richard Allen, North Little Rock, AR

Col. Jim Crossman, Alexandria, VA

Herbert A. Friedman, Upland, CA

Ralph Sprandel, Oak Park, IL

Richard H. Holbert, New Hope, MN

\$1,000 Heath Gift Certificate

Hans Wakiw, Chicago, IL

HERO Jr

Susan Widener, Portales, NM

Exhibit Hall Door Prize Winners

Alex M. Law	1 Box/Microperfed Paper	Access, Norristown, PA
Barbara D. Sellers	Perks Desktop Utility	Barry A. Watzman, Benton Harbor, MI
Leslie Friesen	Perks Desktop Utility	Barry A. Watzman, Benton Harbor, MI
Steven Robbins	Perks Desktop Utility	Barry A. Watzman, Benton Harbor, MI
Gary Hansen	ZS-100 Speed Module	C.D.R. Systems, Inc., San Diego, CA
Neal VanEck	ZS-100 Speed Module	C.D.R. Systems, Inc., San Diego, CA
David Yankowitz	ZS-100 Speed Module	C.D.R. Systems, Inc., San Diego, CA
Cyrus B. Rowe	ZS-100 Speed Module	C.D.R. Systems, Inc., San Diego, CA
Ralph G. Munroe, Jr.	ZS-100 Speed Module	C.D.R. Systems, Inc., San Diego, CA
Brad Pulaski	Super RAM 89 Board W/256K	C.D.R. Systems, Inc., San Diego, CA
Ryck Zarick	The Source Subscription	Computer Consultants To Business, Cumberland, MD
Peg Winninghoff	Textra Jr For The Z-150	Computer Consultants To Business, Cumberland, MD
Twila Y. Frieders	A Program From Software Toolworks	Computer Consultants To Business, Cumberland, MD
Bruce M. Carskadon	Designer 3D	Computer Graphics Center, Palo Alto, CA
Carl H. Eaton	2+2 Accessory Board W/8087 Chip	D.E.L. Professional Systems Ltd., Richmond, Canada
Carl H. Eaton	Gemini Emulator Board	D.E.L. Professional Systems Ltd., Richmond, Canada
Dale L. Ellard, Sr.	PAC 50 5-1/4" Storage Case	Disk Movers, Skokie, IL
Glenn Watt	PAC 50 5-1/4" Storage Case	Disk Movers, Skokie, IL
Kathleen Wesolowski	FILEBASE(TM) For CP/M or MSDOS	EWDP Software, Inc., Indianapolis, IN
John Hamelink	FILEBASE(TM) For CP/M or MSDOS	EWDP Software, Inc., Indianapolis, IN
David E. Mongold	C-RAM Card W/256K RAM	First Capitol Computer, St. Charles, MO
A. Robert Hamel	\$50.00 Gift Certificate	First Capitol Computer, St. Charles, MO
Jodi Kae Kore	768K Z-100 RAMPAL & Chips OR 640K Z-150 RAMPAL & Chips	First Capitol Computer, St. Charles, MO
William Moss	Pascal For H-89/Z-90 CP/M Soft-Sector	Generic Computer Products, Inc., Marquette, MI
Florence Kerns	Pascal For H-89/Z-90 CP/M Soft-Sector	Generic Computer Products, Inc., Marquette, MI
Joyce Wilusz	Condor FMS For Z-100	Generic Computer Products, Inc., Marquette, MI
Ed Kerr	CP/M-86 For Z-150/Z-160	Generic Computer Products, Inc., Marquette, MI
Greg Ramsdell	Genesis Menu Shell Z-150 PC W/Hard Disk	Domino Computer, Arlington Heights, IL
Linda Gambill	GNS 64 MB 1.20 MB on 305 Card	GraphNet Systems, Bensalem, PA
Tom Marley	V-20 W/Software CP/M Applied on H/Z-150	GraphNet Systems, Bensalem, PA
Carroll Fetter	Z-Max Z-100 Motherboard Memory Maximizer Kit	Graymatter Application Software, Norristown, PA
Frank Cepulkowski	Search and Print	H/Z Ware, Rochester, NY
Sue Awe	UV-DVD	H/Z Ware, Rochester, NY
E.G. Kiehl	UV-DVD	H/Z Ware, Rochester, NY
Peter T. Demetrios	Spool-N-Go	H/Z Ware, Rochester, NY
Mark V. Tollefson	User	H/Z Ware, Rochester, NY
Gordon Rossow	MX.DVD	H/Z Ware, Rochester, NY
Liz Elzerman	MX.DVD	H/Z Ware, Rochester, NY

David Hanus	Dynamic Disk Partitioner HDOS	H/Z Ware, Rochester, NY
Mike Murphy	Gravitron II	H/Z Ware, Rochester, NY
Harry Cole	Gravitron II	H/Z Ware, Rochester, NY
George A. Hardenbergh	Computer Chef	H/Z Ware, Rochester, NY
H. N. Hodges	Text 40	H/Z Ware, Rochester, NY
Arthur Goldsmith	HyperACCESS For Z-100 or Z-100 PC	Hilgraeve, Inc., Monroe, MI
Maurice Lacey	HyperACCESS For Z-100 or Z-100 PC	Hilgraeve, Inc., Monroe, MI
James A. DeBruycker	Word Won — Text Print Processor	Maximum Performance Software, Bryan, TX
Mark Grothe	Z-GRAPH-100 Software Package	Micro-Doc, San Antonio, TX
Tim Payne	Z-GRAPH-100 Software Package	New Orleans General Data, New Orleans, LA
Janice Kerr	Professional Text Processor (Z-150)	Newline Software, Tiverton, RI
Walt Hess	Professional Text Processor (Z-100 MSDOS)	Newline Software, Tiverton, RI
Jane Hesterman	Touch Typist (Z-150)	Newline Software, Tiverton, RI
Fred J. Foster	SR-25A Memory Board For Z-100	Piiceon, Inc., San Jose, CA
Tee H. Hiett	SR-25A Memory Board For Z-100	Piiceon, Inc., San Jose, CA
Charles Bernhardt	1 Year Subscription to H-Scoop	Quikdata, Inc., Sheboygan, WI
Baron J. Bieber	\$50.00 Gift Certificate	Quikdata, Inc., Sheboygan, WI
Karen Bakos	\$25.00 Gift Certificate	Quikdata, Inc., Sheboygan, WI
Clyde Anderson	JS-100 Joystick Controller	Red E Products, Kenner, LA
Larry Sites	DOS Utilities	Red E Products, Kenner, LA
James Truc	DOS Utilities	Red E Products, Kenner, LA
Donald K. Lauer	Right Hand Man	Red E Products, Kenner, LA
Alberta D. Anthony	Right Hand Man	Red E Products, Kenner, LA
Darrell Pelan	WINCAD Z-100 or Z-100 PC	Redwood Development, Butte, MT
B. Reinemer	jr-CAD	Redwood Development, Butte, MT
Linda Gambill	Z-DRAW Z-100 or Z-100 PC	Redwood Development, Butte, MT
Philip B. Samsey	WatchWord	S&K Technology, San Antonio, TX
Dolly Sellers	20 Issues of Buss	Sextant Publishing Company, Washington, D.C.
Mary Burks	12 Issues of Sextant Magazine	Sextant Publishing Company, Washington, D.C.
Ted Pervin	Parallel Interface Board For H-89 W/Cable & Software	SigmaSoft and Systems, Dallas, TX
Michael E. Warren	Two Pieces of Software	The Software Toolworks, Sherman Oaks, CA
Kurt R. Zimmerman	Two Pieces of Software	The Software Toolworks, Sherman Oaks, CA
Robert B. Edgerton	One Piece of Software	The Software Toolworks, Sherman Oaks, CA
Jima Widener	The Informer	Sunflower Software, Inc., Shawnee, KS
Jo Anne Nelson	The Informer	Sunflower Software, Inc., Shawnee, KS
Rodney L. Layer	5 MHz 8088 Version of UN/Emulator	Weitzman and Wood Associates, Pembroke Pines, FL
Walter B. Currier	5-1/4" Disk Drive Cleaning Kit	Weitzman and Wood Associates, Pembroke Pines, FL
Larry Miner	Illustrator Version 2 & MK Font	Wizard Software House, Providence, RI
Mike Nicol	Illustrator Version 2 & MK Font	Wizard Software House, Providence, RI
Trudy Formella	Illustrator Version 2 & MK Font	Wizard Software House, Providence, RI
Richard C. Myers	Program — Market Analysis	Young Investment Research, Glen Ellyn, IL
James L. Johnson	Program — Stock Analysis	Young Investment Research, Glen Ellyn, IL
Jan Schmidt	DEZIGN	Zeducorp, Stirling, NJ
Robert Brunner	DEZIGN	Zeducorp, Stirling, NJ
Eric Larson	DEZIGN	Zeducorp, Stirling, NJ



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A Farewell To The H-89

I wondered if Heath was perpetrating a monstrous joke on me when my copy of the Spring/Summer 1985 Catalog arrived on April 1st. Being a strong believer in coincidences, I quickly thumbed through the computer section to the pages on the H-89 and discovered that my suspicions were justified.

"LAST CALL!" declared the bold headline — the Heath euphemism that the H-89 was being consigned to the computer graveyard after a six year reign. It was a long time-span in the evolution of a computer system — almost double the industry standard. As such, it had outlived more systems than I can count on my fingers and toes. But I can name them, if you like, because I used to wait in avid anticipation for each issue of the more than 20 computer magazines I used to subscribe just to read about the new product announcements in this rapidly developing field. The aspirations and promises dissipated as rapidly as they materialized. Each new Computer Faire seemed like the Clash of the Titans. Everyone claimed to have the better mousetrap. It was quite bewildering.

The media hype was simply incredible. The PR and Marketing boys were really working overtime creating vaporware and smokescreens on products that were never destined to reach the market-place. I often wonder if most of the brouhaha was designed to scare away the competition rather than whetting the public's appetite.

Everybody had their own standard. Some manufacturers touted the S-100 Bus (or their version of it). It seemed to take years for them to arrive at the IEEE-696 standard with the Z80 CPU. The SS-50 Bus from Southwest Technical Systems had a loyal following among manufacturers of 6800 and 6809 systems. But mostly, we had proprietary expansion systems from Atari, Apple, Radio Shack, Ohio Scientific and Commodore. Even Heath's old H-8 had what the industry came to call the Benton Harbor Bus.

It was sometime in 1980 that I first became aware of the computer revolution, and I set out to learn what I could. I didn't really know what you could do with them or what arcane benefits I would derive from possessing one, but I knew I had to have one. I loved electronic gadgetry, and a computer seemed to be the ultimate gadget to end all gadgets.

Acquaintances advised me to buy something called an Apple. I could almost buy a new station wagon for the price they were

being hawked. Others said Radio Shack was the way to go. But the guy at the local store said that if I pressed the RETURN key the little blinking cursor moved to the beginning of the next line. The poor cretin knew less than I did.

So, I attacked the magazines. But it was in POPULAR ELECTRONICS where I read the tantalizing ads from Ohio Scientific about the revolutionary "Superboard II" and the "Elf" system from Netronics Research Ltd. (A couple of years ago when OSI was on its way out, the factory sponsored a mail order rummage sale and I purchased a Superboard II. For a hundred bucks I got a bare board, all the parts, a layout of sorts, an armful of manuals and tons of software on a tape. I assembled it in due course, and after it checked out OK, I hung it on my wall as a souvenir.) Then I saw the Heath ad and I quickly ordered a catalog.

I hadn't seen a Heath catalog in a couple of years. I had moved and didn't have much time to build up my library of junk mail. In the late 1960's I had built a host of Heath products ranging from Shortwave Radios to Stereo systems — all of which still worked as well as the first day.

As soon as I opened the catalog and saw the H-89, I knew that it was the computer I wanted. The \$1995 price was the hard part. Oh, what the hell! Money wasn't the object. The computer was more important. My wife, inordinately suspicious by nature when I appeared to be involved in cultivating another hobby, told me that after we rebuild the kitchen I could get a computer.

That seemed fair, except not in that order. I secretly saved and ordered an H-89 and had it sent to my office. It took months to arrive because Heath was embroiled in a struggle over RFI emission standards with the FCC. I nearly had a stroke when the mailroom flipped it off the handtruck with a careless thud. I locked the door, tore open the massive carton, and started spreading all the smaller boxes, circuit boards and other components on the floor.

It was beautiful. Thousands of parts to solder. Miles of wire to fashion into neat little cables and harnesses. This would keep a solder-bug in ecstasy for months. It was then that the scheme hatched in all its evil shrewdness. I couldn't take the whole kit home with me. I'd be hung the moment my foot stepped over the threshold. I studied the assembly manual over the next few days and broke the kit down into its basic elements. Video board

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and parts, power supply board and related components, etc. How crafty! I stayed awake nights planning the logistics.

It took quite a few weeks, I tell you. I often had to wait until 1 am to do my soldering and assembly work, and I dragged my tail around the office like a lethargic slug. Nothing mattered except the H-89, which grew larger every day and soon outgrew every typewriter cover I possessed in an effort to disguise it as it sat on my desk in my basement office.

The final day arrived. The mysterious H-89 was complete. All I had to do was plug it in and push the switch. It beeped. The fan started rumbling, and in the upper left-hand of the screen, an H: blossomed into brightness, followed by the blinking cursor.

I loved the line in the operating manual that said striking the keys will not damage the computer electronically. I tapped the keys cautiously. I had cut my wings in advertising and publishing typing on old Royals like a charing rhinoceros, that even when I switched to the relatively light touch of the H-89, I continued to pound the keys with a vengeance. You can't teach an old clod new tricks. None of the keys ever popped off.

Suddenly there were footsteps on the basement stairs, and my wife shouted down: "Well, sneak, does it work?"

It was hard to hide my guilty look. "Now that you sweated over your nocturnal adventure, what are you going to do with it?", she asked.

"Damned if I know," I said. The computer stared at me forbiddingly. I thought it loomed like a TV without the live-action stuff.

"You have no idea what fun I've been having with the kids watching you creep down to the basement to work on your computer. We even had a lottery going about the day you would finish it. I really don't mind, you know, except that you'll have no peace until the kitchen is torn out."

I was like a demon possessed. I began to acquire peripherals and components of every description. My software library grew and grew. I also began to buy other computers and some for the kids. I had three desks arranged in a make-shift manner supporting all my equipment, and two walls stocked with books, magazines and Heath educational courses.

I grew remote. I looked upon every hour away from my H-89 as a personal intrusion. I avoided the PTA, the Cub Scout meetings, the Saturday afternoon soccer league games, the beach, the pool, the movies. Mundane activities at best. Nothing would deter me from my computer.

One night, when my wife was putting the kids to bed, the youngest one asked her: "Why does daddy spend so much time in his office downstairs?"

My wife thought a moment, and then replied: "He's going through a difficult period in his life."

"What's that?"

"Well — he's experiencing a middle-age identity crisis."

"What does that mean?"

"Daddy thinks he's a computer!"

As the years passed, my system grew more complex. I had more circuit boards, drives, monitors and printers than I could use at any one time. A lot of them were good products, but you only got

to know about them through the ads in REMark and SEXTANT. How well they performed and what they did was a matter of speculation. I was more than curious that other H-89 owners did not seem to be interested in writing about them. There were occasional reviews, of course, but not about the really unique peripherals that I had. I swore I would scream if I saw another piece about a parallel printer card.

One Sunday afternoon, in the summer of 1984, when I was talking long distance with Kan Cheng of Microflash Co., I learned about some of the problems small entrepreneurial firms had in the Heath/Zenith marketplace. He and some others felt betrayed that Heath didn't do more to promote the H-89 — that too much hoopla was going into the new Z100 and Z150 series, and how the whole atmosphere seemed to be away from the hobbyist and builder who had supported Heath during its climb to success.

I could also sympathize with Heath's position. The computer revolution caused a blood bath in the marketplace. Even well-endowed firms were dropping like flies. It was survival time. I didn't really like it from a nostalgic point of view. The H-89 (and even its predecessor, the H-8) had become a cult object among its fanatically loyal band of users. It was well made and solid as a rock. The computer students at M.I.T. said it was a "Rolls Royce". But the manual was a mish-mash — full of futuristic jargon about ASCII, ANSI, BAUDOT and I/O Ports in Octal. It required the user to possess a photographic memory and the patience of a Saint.

I once saw it described as a "plain vanilla" machine that could be altered to do almost anything you wanted it to do by changing the ROM. Despite its restrictive I/O port scheme, what other machines grew from a lowly 16K cassette unit running HDOS, to a full-fledged workhorse capable of running CP/M, quad density disk drives, Winchester drives, color boards, high-resolution graphic cards without having undergone major design changes like the Apple? It was all in the clever use of the ROM, and the engineers who designed it there are probably still patting themselves on the back.

Partly in appreciation for the fun I've had with the old H-89, and because I knew its demise was imminent, I decided to write about some of my favorite hardware enhancements that had somehow escaped mention. The fun began after I had finished my phone conversation with Kan Cheng and I knew that his Microflash M-89 Expansion Box would be the first of many pieces.

Some of the reviewing projects had their odd moments. I recall that in January of 1985, I had installed in a two-week period SPOOLDISK 89 from FBE Research Co. (a true printer-spooler with 128K RAM on a plug-in card), the INTERACTIVE GRAPHICS CONTROLLER from SigmaSoft & Systems (interlaced graphics capabilities and 256K RAM), and the CO-16 from Hallock Systems Co. (which provided MSDOS compatibility, an 8086 CPU co-processor and 768K RAM).

It was a sight to behold — trying to fuse three different computer systems into one: a Z80, an 8031 and an 8086. I had to tear apart the H-89 right down to the bottom of the case, put in supplemental power supplies, replace chips, and patch in snake-like wire harnesses. It got so crowded as the day progressed that I had to remove my internal drive to make room for just the extra cables.

When I was done, I really went berserk and took my 1/4" drill out

of the workroom and drilled two holes right through the front of my cabinet while my son — playing with his Commodore-64 — looked at me speechlessly. "Don't worry," I said. "I'm only getting even." In point of fact, however, I needed to mount an LED activity indicator and a separate Reset switch for FBE's SPOOLDISK 89, and wire them to the card.

Rather than give up my hard-sector controller card in order to make room for SPOOLDISK 89, I decided to install FBE's nifty slot-expander called SLOT 4. This meant I could keep the hard-sector disk controller card, as well as the soft-sector controller, SPOOLDISK 89 and the Microflash Interface Card for the M-89. My H-88-3 Serial Card, New Orleans General Data Systems Color Card and other peripherals were all in the M-89.

On a temporary basis, I had to remove the Microflash Decoder Card which provided me with 8 additional ports. It plugged into the U550 socket and interfered with the mounting of SLOT 4. Not wanting to disassemble much of the work I had just completed, I just unplugged the cards and wormed my hand down toward the bottom of the CPU Logic Board in order to extract the Decoder Card. I removed the 444-61 Decoder Rom from the card, grasped it firmly between my thumb and forefinger and groped around trying to find the U550 socket. My hand slipped and scraped against the sharp component leads on one of the dangling circuit cards and blood spurted all over the Logic Board. I wondered if this was a sacrificial omen of things to come.

I squeezed SLOT 4 onto the right hand expansion slots, plugged all the board into place, and reconnected umpteen cables. I turned the computer back on and felt a tremor of anxiety when I didn't hear the beeps. The fan started up and then died a few moments later. I knew I had blown a fuse. I removed the fuse, a half-amp quick blow that I put in there some years earlier in order to get a faster power cut-off in case of problems. I double-checked my installation and everything was fine. In fact, I knew it was fine because I knew the H-89 better than the back of my hand. I could strip it down blindfolded and put it back together the same way.

I put another half-amp fuse in and the same thing happened again. I assumed SLOT 4 was creating some resistance and that I probably needed a fuse with Heath's recommended 2A rating. I found a slow-blow version of a 2A fuse and put it in. Still no beeps when I turned on the computer, but at least the fan didn't die. OK! So I screwed up part of reassembly. Over-confident buffoon!

I lifted up the cover just in time to get a whiff of something burning. I dropped the cover and yanked out the A.C. line cord. I angled my work lamp inside the case and saw smoke billowing from the 444-61 Decoder Rom. I looked closer and saw why. In my haste I had installed the ROM upside down. The computer had sensed a short in the circuit by tripping fuse, and instead of pursuing the problem logically, I had aggravated the situation by forcing voltage into the wrong pins on the chip.

The 444-61 was crispy brown and hotter than hell. I calmed myself with a variety of expletives and tried to think rationally. Well, I still had the old 444-43 Decoder Rom somewhere and put it in. Twenty minutes later we were up and running. Although I couldn't use my soft-sector controller and my disk files, at least I had use of the hard-sector controller and my single-sided drives until I got a replacement.

I thought about mentioning this bit of fun in my SPOOLDISK 89 review, but I didn't think the amiable Dave Brockman would

have appreciated it.

And so, my dear old friend, Heath tells us you're almost extinct. You probably won't appear in the next quarterly catalog. No doubt that pseudo-Zenith lapsize portable produced by Mitsui will occupy your old space. Maybe that new portable, which is really a Morrow MD-11, will be there. I'm rather glad you won't have to glance over the top of the page and see the young super-charged studs taking your place.

I'll tell you what. Your price has come down so low that I'm going to order a companion for you tomorrow. I know you're already expecting the arrival of the H-120, but you and I can still get along on all 8 cylinders for a few more years. I'm not as spry as I once was either. Just remember that age and cunning will always overcome youth and inexperience.

After we put him together, I think I'll hook up a null-modem cable between the two of you, so that you can talk to each other when I'm not around. You can tell your friend some of the dumb adventures we've had together. Yes, even my worst human blunders.

Like the time I put back the Z80 chip with pin #3 bent under. Remember how the Epson went nuts trying to print out those letters? And the time I . . .



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Using The PeachText 5000 List Manager To Track Your Projects

Arnold R. Madeira
22 Locust Glen Drive
Cranston, RI 02920

Let me begin by explaining that this is not a dissertation on project management. I use the word "project" here to describe the various tasks that are your current responsibilities in your work.

When I bought my new H100 a year ago, I only got two pieces of software to run on it. One was the Microsoft Pascal compiler and the other was Peachtext 5000. MS-Pascal is tough on a beginner like me, but the Peachtext 5000 package gets my enthusiastic endorsement. I will not go into detail on all its capabilities, you can get that from the two-part article by H. W. Bauman in the November and December 1983 issues of REMark. When I'm not teaching myself Pascal, I'm most often using Peachtext. I heartily agree with those who have said that you can't buy a more reasonably priced package with this much capability. State-of-the-art, perhaps not; but day-in and day-out useful, definitely Yes! It occurred to me that one of the things I use Peachtext for may be useful to others of you who read REMark.

After being transferred to a new department several months ago, I was quickly confronted with a number of new responsibilities, several unfamiliar product lines, and a limitless number of chores. Attempting to continue the use of several project lists my predecessor had initiated, I soon found myself spending more time updating and rewriting these lists than seemed prudent. Relying on memory to keep some items off the lists resulted in forgotten tasks. It reached the point where one of the people needing my services began routinely assuming that I had forgotten his latest project if a prompt response was not forthcoming.

Unable to find a more efficient way to maintain the project lists manually, the thought finally occurred to me that the Peachtext List Manager may be able to help. I brought the lists home and worked out a file structure for the lists. Next, the items were all entered into the List Manager file. The first attempts to extract reports were a little ragged, but it was immediately obvious that I could maintain the status of all items in the file with much less effort than before. In addition, I learned to use the Peachtext word processor to quickly add headings and page numbers to make the reports more presentable. Copies of the lists were made for my lead draftsman so he would know what the job priorities were, and for my supervisor so he could keep abreast of my work load.

It now takes me about twenty minutes once a week to update and print the project list. For those of you with access to a personal computer at work, the updating can be squeezed into your weekly work schedule, or if a clerk is available, you can have it done for you. I have neither, so I take the list home on weekends and do it there. The project list has been averaging about 45 items in length. Longer lists would probably not require a proportionally longer time, because more of the items on the list would not currently be in process. Items which are targeted two or more months down the road require no weekly updating. Most of the list maintenance time occurs on the items actively in process or just completed.

To get started, you will need to select a file name for your List Manager file. I have used "PROJECTS" for mine. Begin by selecting "df" (define file) from the List Manager menu. The List Manager will ask for a file name. Enter the one you have selected. Next, the List Manager goes to the field entry screen. Enter the field descriptions for your file records. Mine looked like this:

Item	Length
1: identifier	6
2: product	8
3: item number	2
4: due date	8
5: last update	8
6: description	40
7:	40
8:	40

Figure 1

If you haven't had much experience with the Peachtext List Manager, you may want to copy my field descriptions. Otherwise, feel free to change them to suit your needs. I have used the "identifier" field for sorting purposes. I want the records to be filed first by product type and second by item number within that product type. The identifier field combines an abbreviation of a product type with the item number. Filing systems work best when there is a unique field in each record to sort by. None of the other fields provides this property, except the description fields which are useless for sorting purposes. This identifier provides the unique field for each record which will simplify the updating

procedure later. The two items with no name (lines 7 & 8 in Figure 1) are interpreted by the List Manager as continuations of the last-named field ("description").

The rest of the fields should be self-explanatory. When you are finished entering the field descriptions, the List Manager gives you the option of selecting up to three fields for cross-indexing the file. I selected fields 1, 4, and 5 initially. Experience has shown that there is no occasion to search the file by the "last update" field so no third cross-index is needed. The last step in defining the file is to specify the maximum number of records you will need. I entered 150 which I now know is more than I need. If you are using a floppy disk to store the file, be aware that for my 150 record file, the List Manager created a 24K data file, three 4K cross-index key files and one additional 8K file with an unknown (by me) function.

You are now ready to enter your list. Select "uf" (update file) from the List Manager menu. The default sort key is the identifier (field 1); enter carriage return to accept it. For my purposes, I created the following abbreviations for my identifiers:

Product	Abbr
AC 1000	ac1
AC 2000	ac2
AC 3000	ac3
Min-Stat 1	ms1
Min-Stat 2	ms2
Miscellaneous	mis
R V S	rvs
Speed-Stat VI A	ss6

Figure 2

You will have to generate your own abbreviations for your products or whatever you want to file your items by. One note of caution, Peachtext's List Manager does not provide numeric field types. That means you will have to see to right-justifying the item number portion of the identifier yourself. You can enter the numbers 1 through 9 as either [space][number] or [zero][number]. If you don't do either, a 5 will sort as if it were something close to 50. In order to get the date entries to sort properly by year, enter the year first. In other words, the date "11/06/84" should be entered as "84/11/06". Again, enter all single digit numbers as two-digit numbers ("06" instead of "6").

At the prompt, enter your identifier. The entry/update screen will look something like this after entering the data:

```

identifier :[ss6- 8]
product   : SS VI A
item number: 8
due date.. 85/02/15
last update 84/12/19
description. develop hand-held tester
            .pcb circuit submitted by lab 11/30
            :

```

Figure 3

The square brackets surrounding the identifier are provided by the List Manager to indicate the size of the field. They move with you as you proceed from one field to the next. The three "description" lines may be used any way you see fit to carry appropriate information. I try to keep my item description to the first of the three lines and use the other two for in-process notes. Another of my idiosyncrasies is that I don't immediately remove an item from the list as soon as it is completed. I note it as being com-

plete and leave it on the list for one week. That way other users of the list can easily see what's being finished as we go.

Once all the data is in the file, the next step is to produce a report. Initially, two steps of preparation will be required. The first step formats the individual records in the report. Select "dp" (define print) from the List Manager menu. You will have to select a format name. I used "report". The format definition screen looks like this when filled in:

```

FORMAT: REPORT
Print 1 record(s) across
With each record 70 characters wide by 4 lines long
Skip 1 line(s) between records
If more than one across, put 0 characters between records
Optional
Skip 4 extra lines every 8 record(s)

```

Figure 4

This format will be used to produce a listing sorted by due date. I have elected to print eight records on each page. The above format will insert four extra lines after each eighth record. Later, these wide spaces will act as markers to set up the paging in the report. Again, you may wish to modify the definition to suit your own requirements. Next, we go to the horizontal positioning screen. This is the format I used:

```

product*      3*          5*          due date
description*****
description/2*****
description/3*****

```

Figure 5

During this stage, the List Manager will insert the name of the field if the field is long enough, otherwise, it inserts the field number. In either case, it will fill the unused spaces with asterisks. The second step for preparing the report sets up the page format, the number of copies, directs the output, and permits selection of records which satisfy selected criteria. Select "pr" (produce report) program from the List Manager menu. You will be asked for a report name; I called this one "bydue" since it is sorted by due date. This is what the completed screen looks like:

```

Report: BYDUE
Use print format: REPORT
Sort records by item number: 4
(opt) then by: 1
(opt) then by: 0
Ascending or Descending (A/D) A
Send data to
(P-Printer,D-Disk file,C-Crt): D
(if disk) File name: BYDUE
Continuous forms (Y/N) Y
Compress blank lines(Y/N): Y
Compress blank spaces(Y/N) N
Reverse halves at comma for
item number (0 if not used): 0
Number of copies per record: 1

```

Figure 6

The "REPORT" format is the one we created in the previous screen. Field 4 is the due date so the primary sort will be by that field. Selecting disk output causes the List Manager to create a text file which I have also named "BYDUE". There will be no conflict of filenames, since the List Manager format names are internal to the List Manager system and do not get into the disk directory. The "Reverse halves..." entry is intended for use with name-and-address files where names are entered as [last name],

[first name]. When used, it causes the names to print first name first. After accepting the report format, the List Manager asks for selection criteria for the records. The default is to include all records in the file, which is what we want. The screen looks like this:

```

Report: BYDUE
Profile Include all records

Accept (Y/N)?[Y]

```

Figure 7

Pressing carriage return accepts the screen and starts report generation. Since this report needs to be sorted, the List Manager announces that it is now sorting. When finished, it announces that it is writing the text file. After completion of the report, the List Manager menu is displayed. After producing the first week's reports, subsequent runs will produce a warning that a text file by the selected name already exists (last week's report), and that it will be overwritten. Normally, you approve that action with a carriage return. You now have one of the two reports generated. The next thing to do is format and generate the second report. The procedure is similar to what we just did except that the page formatting is slightly different.

Select "pr" again and this time, name the report "bytype". This screen will look similar to Figure 6. Reuse the "report" record format. Sort only by field 1 (leave zeros in the second and third optional sorts). Where the previous text file was named "bydue", this one will be named "bytype". In the second screen (Figure 7), accept the inclusion of all records. No sorting is involved in this report, since the records are being output in the same order as they occur in the List Manager file. The process goes immediately to text file generation. When the List Manager menu returns, enter "en" to exit the list manager.

Up to this point, we have defined a List Manager file and data has been entered into it. Two report formats have been created and a text file from each of them has been generated. Now we will use the Peachtext word processor to create header files for the two reports. At the Peachtext menu, type "ed" to enter the editor. I named the first header file "byheddue". This is what it looks like:

```

\setup~
\tm5,lm5,rm80~
\foot1~
\ctr\-- \%page\ ---
\hy ,un ,ssa ,ssb ~
\head12~
~
~
~
\ctr\PROJECT STATUS REPORT~
~
\ctr\listed by due date~
~
PRODUCT      #                UPDATED          DUE~
-----
~
~
\text~
\np~

```

Figure 8

The backslash is Peachtext's command marker. Anything within backslashes is not text, but a Peachtext command. The tilde characters at the end of each line are Peachtext's representations

for carriage returns. The second line in the file sets the top margin on the page to five lines, the left margin to five columns, and the right margin to eighty columns. The "foot1" command and the subsequent line, cause page numbers to be added at the bottom of each page. Peachtext keeps track of page numbers automatically and stores them in a system variable called "%page". The next line disables five of Peachtext's default commands. This is done because these command markers are characters which we may want to print such as "&", "@", "_", "<", and ">". The rest of the file is the actual page heading. The new-page command at the end initializes the system page counter to "1".

You will have to create another header file for the second report listed by type. I called mine "byhedtyp". Use the copy command to create this file, since it will be exactly like the first one except for two words. After making the copy, bring the new file up in the editor and change the words "due date" to "product type". That completes the preparation of the header files. These two files will be used as "include" files; that is, they will be included with the reports each time we generate new ones. You are now ready to put the finishing touches on the two reports.

Call up the "bydue" file in the editor. At the status screen backslash prompt, enter the command "ibyheddue". The initial "i" signals Peachtext to open the file name following the "i" in preparation for inclusion. After the status screen is updated, enter the command "i". This is the include command which causes Peachtext to display the contents of the include file. At the "Press RETURN to continue, Y to Accept" prompt, enter "Y". Since you have not yet displayed the report text, the editor's cursor is at the beginning of the file. The included material is inserted beginning at the present cursor location. This puts the header file ahead of the report which is exactly what is wanted.

In this report, all items are listed in order of the due date. There is no inherent part of the data which tells us where to start a new page. It is for this reason that we had the "bydue" List Manager format insert four extra blank lines after every eight records. Those wide spaces in the file are our markers for locating the new-page commands. Use the page-down key to find the first new-page marker. Set the cursor to the beginning of the first blank line of the marker. Type in the command "\np~". Use the line delete key to delete all the remaining blank lines in the marker. Proceed through the file and repeat the procedure at each page marker. When you are finished, file the report, it is ready for printing.

Call up the "bytype" file in the editor. Include the "byhedtyp" header file. In this file, paging is inherently indicated by changes from one product type to the next. New-line commands can be inserted at those points. There are two exceptions that I make when preparing this file. First, if header file. In this file, paging is inherently indicated by changes from one product type to the next. New-line comma header file. In this file, paging is inherently indicated by changes from one product type to the next. New-line commands can be inserted at those points. There are two exceptions that I make when preparing this file. First, if there are two successive short type-groups which together would fit on one page, I will skip the new page command between them and add eight to ten blank lines between the groups to emphasize the change in types. Second, if a group is more than eight items long, it must be broken up into two pages. To do this, locate the cursor at the beginning of the blank line following the eighth record. Type in a new page command. If you found more than

sixteen items in one type-group, another page feed would be required. My lists haven't gotten that long yet.

The last step in the process is printing the reports. Since all printing controls are already embedded in the files, no special instructions are required. Simply type "pr" at the Peachtext menu to call the printing program. Enter the filename when prompted. At the print status screen, press carriage return. When the first report is done, form-feed the printer and repeat the sequence for the second report. I use the photocopier at work to make the copies I distribute. You could enter the number of copies you want into the "bydue" and "bytype" print formats if you prefer. That would give everyone an original.

After the first reports are completed, subsequent reports will require updating the List Manager file. This will include adding or changing progress notes, deleting completed items, and entering new ones. I mark up my working copies during the week, then use them as source documents for updating during the weekend. When I have to delete one record and add a new one in the same type-group, I usually enter the new one in the slot being deleted. That saves renumbering the items. When the updating is finished, I usually pull up the first record in the file and enter "f" (forward) at the prompt. Then you can carriage return your way through the whole file, watching to see that the item numbers are in proper order and that you haven't accidentally created any spurious records.

After updating is done, produce new reports as outlined previously. This system works well for me. It is flexible enough to easily be modified to cover many variations. I don't put a print date on my reports, but if you want one, you can write "get date" and "rf;date" commands into the header files. The first command will cause the print program to prompt you for a date at print time. The second command will print the entered date flush with the right margin (rf). If your projects are not related to products or other useful categories, you may simply want one continuous list for everything. In that case, you could eliminate the "bytype" report and header file completely.

I have presented this procedure within the Peachtext 5000 environment. There is nothing in the idea that confines it to Peachtext. All you need is some kind of List Manager or database manager and some kind of word processor. The principle will work with any of them. If you do not have any of these software packages yet, Peachtext is probably the cheapest way to get both. In addition, Peachtext comes with a spreadsheet, a spelling checker, and a thesaurus. This procedure, in its present form, didn't occur to me all at once. It has evolved over time. It will probably continue to change as time passes. You may find better ways to handle some of the details. I would be happy to hear from you if you would like to share your thoughts.

Figures 9 and 10 show what one page from each of the completed reports looks like.



PROJECT STATUS REPORT			
listed by due date			
PRODUCT	#	UPDATED	DUE
AC 3000	1	84/12/09	84/12/07
test set for isolation amp PCB completed 12/10			
MISC	2	84/12/09	84/12/14
document R.L's new contactors in process			
M-S2/R	3	84/12/09	84/12/14
develop PCB test set in process			
M-S2/R	5	84/12/09	84/12/14
document M-S2R reversing option			
M-S2/R	11	84/12/09	84/12/14
generate voltage follower option kit add WK-square control in process			
SS VI A	2	84/12/09	84/12/14
generate artwork for snubber/iso board in process			
AC 3000	2	84/12/02	84/12/21
hand-held tester option in process			
AC 3000	3	84/11/18	84/12/21
redesign DB driver card for Matt' chgs completed 12/7			

Figure 9

PROJECT STATUS REPORT			
listed by product type			
PRODUCT	#	UPDATED	DUE
M-S2/R	1	84/10/20	n/s
adapt SSVIA meter circuits to M-S2			
M-S2/R	2	84/12/02	85/02/08
generate process follower option kit			
M-S2/R	3	84/12/09	84/12/14
develop PCB test set in process			
M-S2/R	4	84/12/09	85/01/18
artwork for taper tension option still in circuit lab			
M-S2/R	5	84/12/09	84/12/14
document M-S2R reversing option			
M-S2/R	6	84/12/09	84/12/21
test set for EOL option card			
M-S2/R	7	84/12/02	85/02/08
test set for dancer option card			
M-S2/R	8	84/10/06	n/s
revise driver card to elim unijunctions			

Figure 10

Search For A Language — Why I Chose IBM Pascal

Leo R. Hansen
6771 East 4th Street
Tucson, AZ 85710

Background

When the Z-120 computer came on the scene, it seemed to be the ideal machine. It had both 8 bit (8085) and 16 bit (8088) processors, great graphics capability with 640 X 225 resolution, and the option of doubling that using interlace (what ever that was) up to a megabyte of memory. It also looked like what I thought a desktop computer should look like, nice and neat, all in one package, attractive design with a lot of function keys and a numeric keypad.

Having both 8 bit and 16 bit processors appealed to me since your options are wider, all that 8 bit CPM software is available, and as the new 16 bit software becomes available, you could use that too.

The 640 X 225 resolution graphics looked great, especially since I had been using a system with 320 X 240 resolution, and it was quite acceptable as a professional stand alone system. The thoughts of doubling the vertical resolution really sounded good. The megabyte of memory looked like a good idea, although I argued that 64K was all anyone would ever need on a 8 bit machine. Why would you need a megabyte of memory on a 16 bit machine? Nevertheless, if I found a reason to need a lot of memory, the Z-120 would support it.

I like a single package for two reasons, one strictly personal: computers that use TV's for a monitor look like toys, and it is harder to drop the keyboard on the floor with a single package than with a detachable one.

The color capability of the Z-120 and Z-110 did not interest me at the time since color printers were out of my price range. I didn't feel I could justify a color system just to play games or make color charts I couldn't get off the machine.

At any rate, the Z-120 offered a lot of things I liked except for one thing, the price. The machine was tops and so was the price. So that was the end of the dream for a first class personal computer.

Then the H-120 (Heathkit version of the Z-120) came out. I checked it out to assure myself that this really was a Z-120 in sheep's clothing and bought one. Not being an "experienced or even a serious amateur" kit builder, I coughed up \$200 for a professional assembly job and I had my dream machine. Claims that

electronic kits can be built by non-kit builders have always left me with the same feeling that "the check is in the mail", "my dog doesn't bite", and "I'm from the government; I'm here to help you" have. One additional benefit of the H-120 over the Z-120 is the lack of the warning label that this equipment is not intended for use in a residential area and may cause interference with you or your neighbor's TV's and radios.

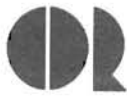
The Selection Process

Now I have this great machine, and it is time to use some great software on it. At the time the H-120 was introduced, Zenith did not have many languages available for the 16 bit side of the house. Since this was my first computer, I did not have a huge or even small library of software to salvage. Since I wanted to take advantage of the more powerful 16 bit side, I really had no incentive to even get any 8 bit software. Initially the operating systems available were CPM-85 for the 8 bit side, and Z-DOS for the 16 bit side. Naturally I chose Z-DOS.

BASIC and assembly language were the only two languages available from Zenith, and I didn't know 8088 assembly then. More languages were coming, and according to one rumor, IBM Pascal would run on the H-120 without modification. Also since Z-DOS was a MS-DOS derivative, other MS-DOS software should run on it.

At this time I decided it was time to enter the requirements phase of the language acquisition business. What did I want/need in the way of a language? Since I intended to write large programs which take full advantage of the machine, there were certain capabilities that I wanted that were not be required for smaller packages (less than 750 lines of code for me). The following list of capabilities is what I finally came up with:

- A. Separate compilation of modules – for modularity and compile speed.
- B. Assembly language interface (either in line or module linking) – for flexibility.
- C. Ability to use more than 128K bytes of memory – take advantage of Z-100.
- D. Cost – intuitive to the most casual observer.
- E. Native code generation – for execution speed.
- F. High level – ease of using structured program development techniques.



Controlled Data Recording Systems Inc.

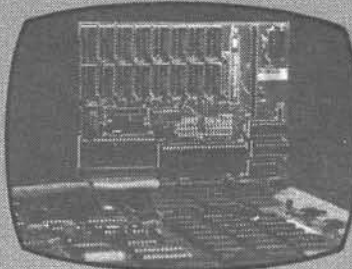
Quality Products and Support for the Heath/Zenith Community

New for the H/Z89-90 Computer Users: The Super RAM 89 Package

Heath/Zenith 89 and 90 computer users can now get the speed and power of a high capacity Ram Drive System at a reasonable price.

Using the Ram 89 package, standard software shows an immense improvement in speed. Depending on the software being run, programs may execute 10 times faster than when run through standard floppies.

Ram 89 comes as a two card set that plugs into the left hand (16k expansion) side of the computer. No computer modifications required.



Board 1 has two banks of 256k chips possible for a total of 512k. Either or both banks are able to use 64k chips instead. Board 1 can be used by itself, with board 2 added at a later date.

Board 2 has an additional 512k, plus it has a real time clock capability, and a SASI interface hardware capability. Board 2 piggybacks onto board 1.

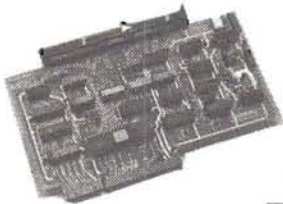
The Ram Drive Software (SRAM) allows one or two logical ram drives. The ram drive(s) can be located starting anywhere from logical A: to Q: (standard drives get relocated). SRAM can be set to start at logical A: and warm boot with ram (no floppy disk accesses needed). Ram drive attaches to any of the versions of CP/M 2.2 bios used in the H/Z89-90.

GET A FULL MAGABYTE OF RAM FOR YOUR H/Z89-90

Board 1 includes hardware manual and ram drive software with no ram: \$190.00. Each 256k bank, add \$56.00. Board 2 (must have board 1). With no ram, no clock, no SASI \$90.00. Each 256k bank, add \$56.00. Ask about clock, SASI pricing.

FOR THE H/Z89-90 COMPUTERS

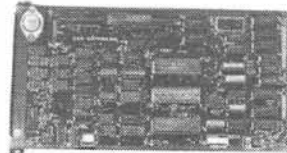
**THE ONE CONTROLLER
FOR 8"
& 5.25"
DRIVES
THE
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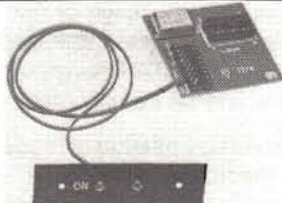
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Separate compilation of modules was an absolute requirement, since programs larger than my arbitrary 750 limit are hard to develop on a micro-computer, especially with mini-floppy disks. The reason is that the disk files generated during compilation will exceed the size of a normal floppy disk. Also, it is much faster if you only have to compile a few small modules when you are making changes to your programs. Normally, only one or two modules at a time are being modified when you are debugging a program.

Since separate compilation implies an ability to link the separate module together, these modules can be written in any source language as long as the object modules are all compatible. Thus, assembly language modules can be linked into your programs. The significance of using assembly language modules is that if the high level language doesn't support your needs, anything the computer can do can be controlled with an assembly language module. If the assembly language won't support the function you would like, no high level language will either. However, the reverse is not true. There are things you can do in assembly language that you can't do in some high level languages, such as bit manipulation and multi-precision mathematics. An alternative to separate compilation is in-line assembly which is supported by some high level languages. This capability allows you to embed assembly language statements in your high level language programs. Special compiler directives mark the beginning and end of the assembly language, or in some cases, machine language portions of the program. Most of these, however, do not offer the full assembly language capability, only a subset of it. As a follower of Murphy, believing that the needed capability will be included in the portion not supported, I prefer separate compilation to in-line assembly language support.

Another feature that I wanted to be able to take advantage of is the full memory space available on the Z-120. As many of you are aware, ZBASIC does not require more than 128K bytes of memory, in fact, if you expand to 192K bytes, it will not use more than the original 128K. Some high level languages are also like this, so this was a feature to watch out for. Most language descriptions, however, do not discuss the maximum or minimum amount of memory supported in the general sales literature.

Cost was an important consideration, which I decided would be capped at approximately \$300, but lower if most of the requirements could be met.

After performing a personal bench-mark test (counting down from 1000 using subtraction instead of a DO loop) on every personal computer I could get my hands on and also every language I could try, the speed advantage of native code programs became obvious. Native code programs execute directly without being processed by another program, such as BASIC or a Pseudo code interpreter. The speed improvement is on the order of 50 to 1, depending on the program structure and types of variables used.

Also, I have become convinced of the advantages of the block structured high level languages such as Pascal, Ada, PL1 and Modula. Program development is easier when you use the indented block construction for modules, and the indenting permits the rapid identification of incomplete blocks and improper nesting of loops. In fact, there are programs available that reformat your programs in accordance with indenting rules to specifically aid in error detection, and they work very well. However, even more important than the program development phase is the maintenance or modification phase that always comes later.

The modern high level languages tend to be some what self documenting. This means that you can read the program almost like story and understand what is supposed to happen without having to refer to or remember that the print device is number 6 or 8 and that the console is number 5 or 1. This readability is achieved by the liberal use of variable definitions that indicate the name or function of the action being performed. All of this is important because six months after you have written your program and you discover a need to use one of the routines from that program, the reasons that you did things the way you did are cold now. In fact, it's hard to remember exactly what you did, let alone why. Reutilization of code is the fastest way to develop new programs, rather than reinventing the wheel each time.

The Candidates

Janus ADA – Most modern of the high level languages.

The ADA language is appealing because it incorporates many of the modern programming facilities, such as multi-tasking, two or more programs apparently running at the same time (like a printer program running while you are editing), block structured and other theoretically useful capabilities. Janus ADA is subset of the Department of Defense sponsored ADA, but is very useful especially if your primary objective is to learn ADA. It, Janus ADA, had several of the features that I desired, i.e. separate compilation and assembly language support. The version available at the time did not support memory in excess of 128K, and since I was working on a program that would probably require more than 128K, this effectively eliminated Janus ADA. Another factor that helped eliminate it was the price, which then was approximately \$480.

C – Fanatical supporters, deserves a look.

This language is the darling of the UNIX operating system supporters and is a very powerful language. It is powerful in the same way that assembly language is powerful, you can directly make the machine do about anything you want it to do. But for me that was the problem, it is too cryptic, not self documenting. True you can define things and use structures like Pascal or ADA, but if I am going to remake the language into another, why not use the other language in the first place? This is the same reason I didn't even consider Forth.

Fortran – Most popular scientific language deserves a look.

This language is very popular in the scientific community and performs very well. However, the applications that I would be developing only needed adequate mathematical support and needed easier string handling support than is offered by Fortran. Even the updated Fortran-77 is not as self documenting as Pascal or ADA. Also, the cost of the Fortran compiler available then was \$500.

UCSD Pascal – great system support (editor and utilities).

In my work, I use this system every day and love it for the most part. The only thing that it lacks is a native code compiler. The UCSD Pascal compiler generates a Pseudo code called P-code, which is then interpreted at run time. The system is very efficient, with the run time modules being relatively small and executing very quickly compared to an interpreter like BASIC, but not as fast as a native code compiler like Fortran. The graphics support is great, and the editor that comes with the UCSD system is very good for program development and as a word processor. The compiler interaction with the editor is really nice. If an error is detected during compilation, the system gives you the option of

directly calling up the editor and fixing the error right then, or continuing the compilation and identifying the remaining errors before returning to the editor. This system also has a native code compiler option available for the 8088 processor. This was my first choice for a language and operating system. The price took care of my first choice, at the time it was approximately \$1100, including the native code compiler. So much for UCSD. If the price doesn't bother you, I recommend the system to you.

IBM Pascal – MicroSoft derivative for IBM PC.

This version of Pascal seems to offer all of the features that I wanted. It also had some features that were nice but not absolutely required, such as support for real numbers, not just integers. I would also like multiple precision math support, but this version did not have it. Calls to the operating system functions can be made directly from the Pascal procedures, also nice but not required. There is also a large library of system support procedures and functions available. For compatibility considerations, the extensions beyond Standard Pascal are clearly identified, so that if I want to write programs that will run on any compiler that supports Standard Pascal, they will run. Every Pascal compiler I am familiar with supports Standard Pascal and has varying numbers of extensions. Many of the extensions that MicroSoft built into the language are system oriented, very powerful, and useful to system level programming. At any rate, the language appeared to have had a lot of thought put into what features should or should not be included. These decisions appear to have been made by programmers or people very familiar with programming. This is especially evident in the options available for the compiling of the programs. One criticism of Pascal and Ada is that both include code that provides functions and features that you may not want in the final code. This is primarily due to speed considerations. If speed is not a critical part of your program, these features do not have any impact other than memory utilization. However, both IBM Pascal and Ada have the ability to turn off most of this "overhead" software and compile without it. The Ada purists maintain that if you do that you should not use Ada, but should switch to some language like C. Overall, IBM Pascal had many more advantages than disadvantages and appeared very suited to the programming that I had in mind, i.e. highly interactive large programs, like automated drafting and some interactive games.

Pascal MT+ – Popular CPM Pascal version.

This language is also very good, and if you like CPM is probably a good choice. I personally prefer MS-DOS to CPM, and since CPM wasn't available for the Z-120 when I was ready for a language, I dropped Pascal MT+ from consideration.

"Miss IBM Pascal"

After much deliberation, contemplation, and good old intuition, I chose IBM Pascal. It offered the best combination of price, run time options, compile time options, and memory utilization. But there was one nagging question. Would this compiler and linker really run on a Z-120? Since it seemed such a good match to what I wanted I finally decided to try it and see, although I had been told both that it would and wouldn't work on the Z-120. The price was the next question, but at the time it was just below my limit at \$280. So I took the bait and bought it. With much fear and trembling, I tried each feature and capability, and after two years, I have not discovered anything that will not perform properly.

Honeymoon Phase

Benchmark performance – One of the first things that I wanted to

do was run some benchmark tests and see how the Z-120 compared to other machines. You hate to think that you have bought a dog. Years ago I dreamed up a very simple benchmark that I could enter quickly and still get a rough idea of the relative performance of a language on a particular machine. The program counts down from 1000 by subtracting 1 and checking to see if the result is less than 1. The program looks like this in ZBASIC:

```
10 X = 1000
20 INPUT "HIT ANY KEY WHEN READY",A
30 X = X - 1
40 IF X > 1 GOTO 30
50 PRINT "DONE"
60 END
```

This program requires about 5 seconds to execute on most of the current micros running a non-compiled BASIC. When I ran this on the Z-120 (under ZBASIC), it also took about 5 seconds. I was a little disappointed that it wasn't faster, but at least it wasn't slower than the average micro. However, I wasn't interested in BASIC as a fast language anyway. Since I didn't include a system time read on the program, in order to make it very general and useful on any machine I might try, the time is determined by using my wrist watch. When I ran the following Pascal equivalent:

```
PROGRAM BENCH(INPUT,OUTPUT),
VAR
  X .INTEGER,
  ANS CHAR,
BEGIN
  WRITELN('HIT ANY KEY WHEN READY');
  X:= 1000;
  READ(ANS);
  REPEAT
    X:= X -1,
  UNTIL X < 1;
  WRITELN('DONE'),
END
```

"DONE" appeared on the screen instantly. So I changed the count to 2000 and tried it again. "DONE" appeared instantly. I decided that the best way to handle this was to read in the count value, and therefore replaced the x:= 1000 with "READLN(X)". Now I tried 10000, "DONE" appeared in less than a second. The maximum n count value I could use is 65534 (maximum positive integer) so I tried that, and this time it took approximately 1 second. This was not accurate enough for me, so I nested the basic decrement statement inside another loop. The program now looked like this:

```
PROGRAM TEST,
VAR X:WORD;
    Z,N: INTEGER;
    DONE: BOOLEAN,
BEGIN
  WRITELN ('INPUT THE NUMBER OF LOOPS');
  READLN(N);
  REPEAT
    X:= 1000;
    DONE:= FALSE;
    REPEAT
      X:= X - 1;
      IF X < 1 THEN DONE:= TRUE,
    UNTIL DONE;
    N:= N - 1;
  UNTIL N < 1,
  WRITELN('DONE'),
END.
```

I now used a count value of 1,000,000, the time to complete this

was 26 seconds for a benchmark value of .026 seconds/1000. Now this is more like it, and this is why you spend \$300 dollars for a compiler. But this value was with the "automatic overhead" code that the compiler included. Most of this can be turned off with the "\$DEBUG-" compiler option. When I did this, the benchmark time dropped to 23 seconds. This value is for the 8mz kit, which I installed to replace the 5mz clock that the Z-120 comes with.

However, this benchmark was not widely used by other people, so comparisons to benchmarks that are published are not possible. Therefore I have prepared the semi-standard, Sieve of Eratosthenes, which has been published in Byte magazine a couple of times over the years. This program finds the prime numbers in the range of 1 to 8190. This is the version as normally used:

```
PROGRAM SIEVE(INPUT,OUTPUT);
  CONST SIZE = 8190;

  VAR FLAGS: ARRAY [0..SIZE] OF BOOLEAN,
      I,PRIME,K,COUNT,ITER: INTEGER,
      ANS: LSTRING(2);

BEGIN
  WRITE('HIT ANY KEY TO START '); READLN(ANS);
  FOR ITER := 1 TO 10 DO
    BEGIN
      COUNT:= 0;
      FOR I:= 0 TO SIZE DO FLAGS[I]:= TRUE;
      FOR I:= 0 TO SIZE DO
        IF FLAGS[I] THEN
          BEGIN
            PRIME:= I + I + 3;
            K:= I + PRIME;
            WHILE K <= SIZE DO
              BEGIN
                FLAGS[K]:= FALSE;
                K:= K + PRIME;
              END;
            COUNT:= COUNT + 1;
          END;
        END;
      WRITELN(COUNT,' PRIMES' );
    END
  END
```

The sieve benchmark time on my 8mz Z-120 is 7.9 seconds. This is quite respectable for a desktop computer, and I am satisfied with performance of the language/machine combination of IBM Pascal and a Z-120.

Separate compilation of Pascal modules - The ability to write small modules or recompile one module at a time is very desirable. It is time consuming to make one or two corrections in a single module and then have to recompile the whole thing. Most of the books and articles that I had read on Pascal treated the subject of separate compilation very lightly if at all, usually not at all. The IBM manual has eight pages written on "UNITS", the term they use for separate compilation modules. Included are three examples with very little explanation of what is going on in the examples, as they are primarily templates for you to follow. My problems were mostly related to passing parameters between UNITS, which is addressed only in the Pascal Manual. I haven't seen it mentioned in any articles or books on Pascal. At any rate, after several trial and error runs, I finally succeeded in learning how to utilize the "UNIT" facility of IBM Pascal. It works pretty much as advertised, and I am well satisfied with the capability.

Assembly language modules linked - The last remaining major capability to be verified was the ability to link in assembly language modules. This was important because if this could be done, virtually any extension to the language could be accommodated, since assembly language gives you absolute control over the computer. After reading up on all the required para-

eters and the proper sequence of instructions, I tried linking one assembly language module into a single Pascal program. It worked like a champ. Next, multiple assembly modules and multiple Pascal modules into a large Pascal program. Again it worked without a hitch. I have not yet tried linking assembly modules and Pascal modules into an assembly language program, but I have seen nothing that would indicate that this is a problem. This last capability, linking modules into an assembly program, is important for large programs, because the IBM Pascal compiler does not provide the option of controlling the "model" that the compiler generates. The "model" is in reference to small, compact, medium, and large models of computation used by the 8088 microprocessor. The "COM" files on your system disks are "small model", which means that the program is limited to a maximum of 64K bytes in length. The "EXE" files are files that are greater than 64K bytes. The only information that I have seen on this aspect of assembly language used together with Pascal is in Intel documentation, which is very good. At any rate, the door appears open to create assembly/Pascal programs of any size. Well, almost any size. The ZDOS linker is limited to a maximum program size of 384K bytes, which will probably handle most of my programs.

Overall I am very well satisfied with IBM Pascal running on my 8mz H-120. It meets all of my hard requirements and fulfills some requirements that I wanted, but could have done without. Now I have essentially all the capability I need and want. However, everything is not well in River City. Some of this capability has a price (everyone keeps saying there is no free lunch and it's true in programming too). In the next installment, I'll discuss some of the things you don't find out about until you try it for yourself, such as: size of the compiler, linker/library files, and compile time surprises. I'll also give my list of good books related to all this neat capability, and the good news is that the book bill is very low cost.



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A Winchester For The '89

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Part One

Introduction

The most striking difference between an 8-bit computer and a 16-bit upstart is the speed with which the 16-bit computer can manipulate data. Having a lot of extra available memory helps, but it is the overall increase in user productivity that counts in any kind of comparison.

In the last two years, a number of important enhancements have appeared on the market that have eliminated the 64k memory restrictions of the H/Z-89. There is the 128k Silent Disk and Printer Spooler from FBE Research Co.; SPOOLDISK 89, the 256k Hi-Res Interactive Graphics Controller from SigmaSoft & Systems; the new 1MB SUPER RAM 89 from C.D.R. Systems; and the 768k-8086 CPU coprocessor from Hallock Systems Co. In combination with the '89s own memory, I now have 2MB of RAM available on this old war horse. By using these various devices as separate units, I can have MS-DOS, CP/M and HDOS files on line at any given time. The chief benefit is that I can load a large number of files into SPOOLDISK 89 and the Interactive Graphics Controller, instruct each to output data to their respective printers, reset the computer and go to work on other things.

My '89 is primarily used for word processing, and I frequently have several articles in various stages of completion, resident in the memory banks of my several peripheral boards. When I seem to run out of steam on one piece, or encounter a technical point that requires referencing, I can toggle back and forth between the articles in progress without switching disks, until it is time to call it a day and save the files.

But after watching the rapid on-screen text manipulation with one of my "silent ram disks" occur faster than the blinking of an eye, the interminable length of time it took to save a 30k byte article to my floppy disks made me impatient. The solution appeared to lie in the acquisition of a Winchester hard disk subsystem to give old Harold (my '89) a helpful boost.

Not too many years ago, the cost of a Winchester was equivalent to a King's Ransom from the viewpoint of many of us dyed-in-the-wool computer hobbyists. But the prices have been dropping steadily to a point where a hard disk subsystem has become an affordable acquisition. A 10MB subsystem can be purchased for around \$1,000; a 15MB for under \$1,500; and a whopping

33MB unit for \$2,000.

Was it worth plunking down another \$1,000 to keep old Harold zipping along like his 16-bit cousins? Or was it time to go for broke and buy a new system, tons of software and spend non-productive months relearning the basics without any guarantee that I could transfer years of accumulated files? I wasn't really convinced that I had to trade up to a faster, sleeker machine every couple of years. Besides, I hadn't even gotten around to giving a lot of my expensive software a decent workout.

When contemplating a major computer purchase, follow Rule #1 — Ask the man who owns one. Then proceed to Rule #2 — Read every critical review you can find about the equipment.

I was able to test out Rule #1 at the college where I work. The Winchesters installed on several IBM-XT's were like whirling dervishes in a desert sandstorm. But locating product evaluations on any H/Z-89 Winchester subsystem in either REMark or SEX-TANT was a futile endeavor. In fact, very little has been written about Winchester systems, in general, in any computer magazine, and I plow through at least two dozen every month.

In an attempt to correct this void, I would like to welcome all readers to the start of a new series in REMark called WINCHESTER/'89, in which I hope to enlighten you (and me) about a fascinating segment of computer technology. Having achieved a small measure of credibility with my occasional articles in REMark, I succeeded in persuading several major Heath/Zenith support firms to provide me with a desktop full of equipment and software to play with. In a spirit of cooperation, none made me swear that I would not abscond with the goods on a midnight plane to Tangiers, or imposed any conditions about how I should write about their hardware.

This introductory article will present an overview of Winchester technology and how floppy disks and hard disks compare to one another. The confusing mumbo-jumbo about the technology will be incorporated into future articles.

The second article in this series will be devoted to a discussion of the SASI and CORVUS interface cards designed by Magnolia Microsystems of Seattle, WA. Magnolia was one of the earliest manufacturers of Heath/Zenith related hardware, most of which

is quite unique, but usable for the most part only with their implementation of CP/M. Their Winchester host adaptor cards have become an industry standard, and as of this writing, every hard disk system available for the '89 uses a Magnolia interface card, because Heath's Z-89-67 was discontinued quite some time ago.

In article number three, we will evaluate the "Quikstor" subsystem developed by Quikdata, Inc. Most of you probably know that Quikdata is the parent company of H-SCOOP, a monthly newsletter devoted to Heath/Zenith computer systems, edited by the iconoclastic Henry E. Fale. The Quikstor represents a new standard by making available specially written CP/M and HDOS software created by Ray Livingston of Livingston Logic Labs and Dean Gibson of Ultimeth.

The fourth article, will be devoted to the new internally-mounted 10MB Winchester subsystem offered by Floppy Disk Services, one of the first independent suppliers of disk systems for H/Z computers. I will photograph the installation and capsule the software documentation, and comment on the system, as well.

The primary advantage in purchasing a complete hard disk subsystem from a reputable vendor boils down to one word: SUPPORT! A malfunction on a floppy disk system is relatively easy to isolate. If you are unable to Boot a disk in drive A: (SY0:), but have no problems with drive B: (SY1:), then chances are that you have an alignment problem, which is easily remedied at any drive repair center. If the system won't Boot from any drive, then a bad IC on your controller card is suspect.

There are four main elements to contend with on a Winchester subsystem: the host-adaptor interface card, the disk controller card, the hard disk drive, and an adequate power supply and case. Because the cost of each component is high, it isn't likely that you would have spare cards and drives lying about in order to isolate the faulty piece. When the Winchester system is down, it has to go en-masse to the dealer for testing.

However, if you're a confirmed do-it-yourselfer, who casts to the winds and isn't inclined to worry about something going wrong — until it actually does — then article #5 will be just your cup of tea. I will discuss how to integrate your own hard disk subsystem; what components to buy and where to buy them; how to make your own cables; cable connection pin-outs; how to buy a hard disk drive for \$100 or less; which drives are compatible with which controllers; and what to look for in power supplies.

As we get into the nuts-and-bolts of this series, I would appreciate hearing from anyone who has already built their own hard disk subsystem from scratch; what problems they may have had in getting their system up and running; or if they had conflicts with any other installed boards in their computer.

By the same token, feedback from owners of any Magnolia Microsystems, Quikdata or Floppy Disk Services hard disk subsystems would also be appreciated. If you have developed any special applications or special uses, this information would certainly be welcomed. If I receive a significant amount of pertinent data, it might be incorporated into a 6th article.

While it goes without saying that I appreciate the cooperation of Brad & Kay Gjerding of Magnolia Microsystems, Henry Fale of Quikdata, and David Hair of Floppy Disk Services, I would also like to thank the marketing staffs at Xebec Systems and Micro-science International for providing me with manuals and techni-

cal data on their respective controller and drive systems.

Floppies And Hard Disks Compared

In terms of raw power and speed, a hard disk will read and write data to and from a computer's memory 10 times faster than a floppy disk. The reason is that a floppy disk rotates at 360 rpm, while a hard disk spins at 3600 rpm. The faster the disk passes under the read/write head, the faster the I/O access time. Subjecting a floppy to such rotational extremes would probably disintegrate it in short order.

Both types of disks use a magnetically coated media, much on the same principle as recorder tape. Floppies are constructed of Mylar with an Oxide coating. Early hard disks used a similar formula on their aluminum platters. Newer technology now fuses a sensitized Cobalt and Nickel coating onto hard disks, which allows for extremely dense data storage capabilities.

While floppy disks are encased in a Tyvek paper-like jacket to make them safe for handling, hard disks are hermitally sealed inside an air-tight chamber. Except for some high-end business systems with removable hard disk cartridges, the aluminum hard disk platters are mounted to a spindle which is controlled by a small precision motor.

The physical read/write format of a floppy surface in double-density format is either 8 or 9 512-byte sectors per track, with 40 tracks per side. 80-track drives use a method called half-tracking in order to achieve 320k bytes of storage per side, instead of 160k bytes of 40-track drives. Hard disks, although capable of a 512 byte sector size, are generally set up for 256 bytes. A 19.14MB Tandon TM503 5.25" hard disk drive uses 3 platters to provide 6 active data surfaces. The number of cylinders (tracks) per surface is 306 (with a track density of 345 tpi) or 1836 total cylinders on all 6 surfaces. In relation to a quad-density 96 tpi disk, the storage density is 4 times as great on a hard disk surface — or 8 times that of a 48 tpi disk.

When you close the door or latch the lever on a floppy drive, you physically bring the read/write head in contact with the exposed surface of the disk. The floppy head or heads are mounted on a geared shaft that slides back and forth as it travels from track to track. Hard disk drives, in contrast, have lever arms mounted in tandem that have the heads positioned just microns above the surface of the platter. The front of the heads are aerodynamically chamfered, so that they literally fly above the surface of the spinning disk. Since even two platters inside a hard disk means four flying heads, a Winchester subsystem is especially vulnerable to movement and vibration when operating.

Some of the new 5.25" and 3.5" hard disk drives becoming available have succeeded in overcoming the problem of crashing by incorporating into the firmware code a routine that automatically parks the heads in a neutral zone (or locks the arms) when you power down. Other head systems contain a spring mechanism that is released when the power is turned off and forces the heads toward the center of the disk.

As Winchester technology becomes smaller and more sophisticated, a few 3.5" drives from manufacturers, such as Tandon will automatically lock the drive heads for transport in a laptop computer. Carrying the technology even further, a joint venture between Plus Development and Matsushita Kotobuki Electronics has produced a 3.5" 10MB drive that is mounted on a hard disk controller card, so that it plugs directly into any PC-compatible computer, thereby eliminating the need for cables entirely,

or having to give up a floppy disk. I suspect that by the time this product is available in full production runs, someone else will have devised a similar contraption with still higher storage capabilities.

The one thing almost all 5.25" hard disk drives have in common is the controller interface. The current standard is referred to as the ST506, which references the Seagate Technology ST506 drive that sold in such high numbers that every other drive manufacturer began to adopt this interface for their own drives. While system designers admit this is a low-level of interface intelligence, allowing only a 5M-bits/sec. data transfer rate (computers are capable of a data transfer rate three times as fast), they are hard-pressed to deviate from this standard in order to provide some continuity and compatibility between manufacturers of drives and interfaces.

The ST506 standard also requires that the surface media of the drive be formatted by the end user. Thus when you see drives rated by storage capacity it is wise to determine whether the capacity is formatted or unformatted. The difference in storage capacity between the two is generally anywhere from 20–25%. A hard disk drive rated at 12.7MB unformatted will actually yield only 10MB of usable storage space. Similarly, a 19.5MB will format to 15MB, and a 40MB drive will format down to 33MB.

Part of the difference is the way the software allocates cylinders and partitions. Also, sectors within a cylinder must be encoded with information that identifies how files and data are stored on the disk and how the head will know where to position itself next when it writes or reads data from the user's input. A typical 256 byte sector will allow for a 2 byte ID field header, an ID area (physical sector address plus cylinder and head information), a 2

byte data field header, followed by the actual data. There is also a 32 byte intersector gap between sectors for servo information and time delays.

Because of the high rate of disk revolutions, sectors on a cylinder are not consecutive. They are arranged in what is called an interleave factor of six or eight. This means six or eight sectors separate logically contiguous sectors. IBM uses a 17-sector track arrangement with an interleave factor of eight to produce a track loop with this sequence:

1:16:14:12:10:8:6:4:2:17:15:13:11:9:7:5:3:

In contrast to the IBM standard, the Xebec S1410 drive controller, which has become one of the most widely used controllers for ST506 compatible drive systems, uses an interleave factor of five. [See Figure 1. for the Logical and Physical Sector mapping illustration of a track format example of 32 sectors-per-track with an interleave factor of 5.]

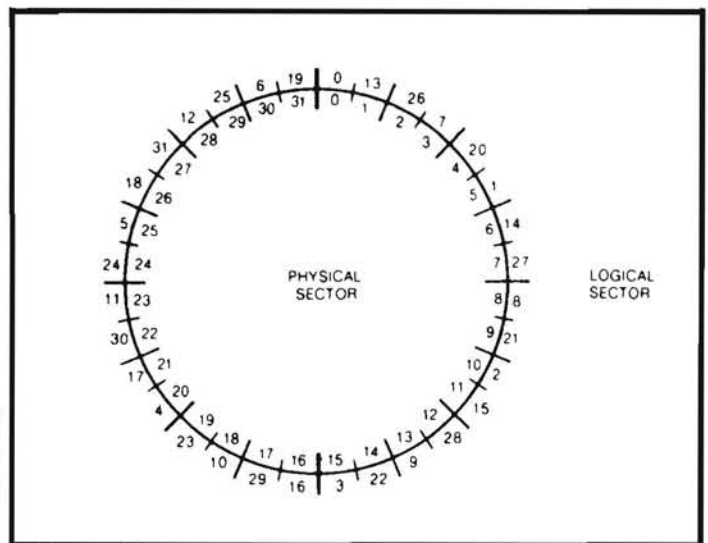


Figure 1 — Track format example of 32 sectors-per-track with an interleave factor of 5.

The Xebec S1410 is also capable of variable interleaving, which is described on page 33 of the manual as follows:

“Variable sector interleaving is supported by the S1410 disk controller. When any format command is issued, any interleave value up to the number of sectors-per-track minus one, may be passed in the Device Control Block (DCB byte 4). The interleave factor may be adjusted for maximum system performance. Interleaving allows logical contiguous sectors or data on a given track to be mapped onto non-adjacent physical sectors. An interleave factor of five, for instance, means that every fifth physical sector is transferred as the next contiguous logical sector of data. It does not mean that five sectors of data are transferred in one revolution. If the operation is read and the interleave factor is five, then a sector of data is read into the sector buffer, and during the time that the heads are passing over the next four physical sectors of the disk, the data is being transferred to the host. If the host cannot transfer the full sector of data during the four sector times available, then the controller has to wait a full revolution before the next logical sector can be read from the disk. If this happens, the interleave factor is too low and should be increased until an increase in operating system speed is noticed. In order to take full advantage of the interleaving feature of the controller, the operating system should perform multiple sector data transfers. If single sector transfers are employed, the difference in speed

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with various interleave factors may not be dramatic.”

Floppy disks can only be formatted for a single operating system, because the track and sector initialization is specific to that DOS. On the other hand, hard disk drives are capable of containing more than one Operating System through a unique feature called Partitioning. Partitioning allows the user to physically map the size of each partition during the set-up procedure, so that he can allocate the vast storage capabilities of the drive in a manner best suited for his own purposes.

All hard drives must be partitioned in one way or another, because the software does have limits on the number of directory entries it will handle. If your operating system allows you to have 256 directory entries on a 640k quad-density floppy disk, you certainly would not want to be limited to that on a 10MB Winchester. Once the 256 entries have been recorded on the hard disk, you would be informed that there is no more free space on the media, even if your entries consume less than 1MB of storage space.

You, therefore, allocate manageable chunks of space (partitions) within the boundaries and limitations of your operating system and hard disk driver software. The maximum number of partitions available will, again, depend on the software, which in relation to the drive's capacity, can be from 4 to 15 partitions. We will cover specific details on how to allocate partitions in a later article.

H/Z-89 owners, depending on the hard disk driver software they use, can have both CP/M and HDOS partitions resident on the same drive. Each partition is then Formatted (or Initialized) and Sysgened to make each Partition a separately allocated device on the drive. Depending on what your needs are, you can then select each partition for a specific work area: word processing, database management, modem communication, programming languages, spreadsheets, billing, etc. — all of which are now “on-line” and ready to be accessed through a Boot menu without having to constantly change floppy disks and rebooting the system.

However, a hard disk is not an island onto itself. Without the support of floppy disks to back up the data you so prodigiously worked to accrue, you simply can't take a hard disk out of service once all the partitions are full and plug in another hard disk. The cost is too high. Accepted procedure recommends that you periodically back up your data in the event of a system failure. Waiting until the hard disk is full is not a wise course either. Even a modest 10MB hard disk can hold the equivalent amount of data on 15 quad-density (640k) disks or 30 (320k) disks. Backing up this large volume of data would probably require several evenings of lost computer time.

Hard disk subsystems for 16-bit computers range from cheap to pricey. IBM-PC and compatible computers have a variety of combination host adaptor/controller cards available that are produced in such quantity that the competition has lowered their price to around \$200. Other 16-bit computers, such as the Z-100 series require a host adaptor and controller card set that cost around \$1000 to which you must still add the price of the drive.

By comparison, host adaptor and controller cards for the H-89 will cost only about \$550. And this would include the CP/M software by Magnolia Microsystems. For another \$195 you can purchase the Quikstor software from Quikdata Computer Services, which is compatible with all versions of the Heath imple-

mentation of CP/M, plus HDOS software, as well. It is also faster than the Magnolia software and allows for a greater number of partitions to be allocated on the disk.

The host adaptor card that mounts in the computer has what is referred to as an SASI interface. This design concept provides for an uncomplicated method of data transfer to and from the computer, and was the brainchild of the Shugart Drive Division of the Xerox Corporation. The letters stand for Shugart Associates System Interface, and it is easily adapted to almost any computer bus structure by means of a few ICs. (It is ironic to note that Shugart, responsible for so many innovations and standards, was recently sold to the Japanese manufacturing giant, Matsushita.)

To give you some idea of how the host adaptor, controller card and hard disk drive interact with one another, see Figure 2 for a simplified block diagram of the functional organization of the controller. The main elements are:

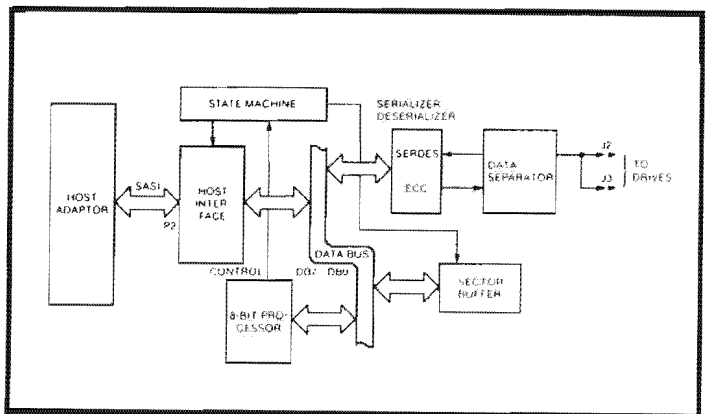


Figure 2 — S1410 Controller, Functional Organization

Host Interface. The host interface connects the internal data bus of the host adaptor. The state machine controls the movement of data and commands through the host interface.

Processor. The eight-bit processor is the intelligence of the controller. It monitors and controls the operation of the controller.

State Machine. The state machine controls and synchronizes the operation of the host adaptor, SERDES, and sector buffer.

SERDES. The serializer/deserializer (SERDES) converts parallel data from the internal data bus to serial data for transfer to a selected disk drive. It converts serial data from the selected disk drive to parallel data which it places on the internal data bus.

Data Separator. The data separator converts serial NRZ data to MFM for transfer to the selected disk drive. It converts MFM data coming from the selected disk drive to serial NRZ data for the SERDES.

Sector Buffer. The sector buffer stages data transfers between the disk and host adaptor to prevent data overruns.

* * *

When Heath/Zenith finally got around to producing a double-density disk controller card for the H-8 (which had already been taken out of production), they included an SASI interface to enable owners to connect a hard disk controller card and a Winchester drive. For the H/Z-89, which lacked the expansion card capabilities of the H-8, owners had to be content with a separate card called the Z-89-67.

According to Bob Harris, Senior Consultant at Heath's Technical Consultation Department: "This system consisted of an interface card that installed inside the H-89 Computer and communicated with the controller board inside the Z-67 Cabinet. This controller board was manufactured by Data Technology Corporation and was their model number MRX-101. This board is designed exclusively for controlling the Memorex 101 8-inch Winchester Drive."

In a subsequent letter, Mr. Harris informed me that the CP/M support package for the Z-67 Winchester subsystem was specifically written for this controller/drive combination and that he did not feel it would be transportable to other equipment. When Heath/Zenith phased out the Z-67, most of the H/Z retail centers began to offer pre-packaged subsystems from Magnolia, or put together their own subsystems using the host adaptor cards and software from Magnolia.

The significant point here is that the Z-67, although it used an SASI Interface, was part of the 8" Winchester drive era when controller cards were specifically designed to handle certain drives. There were numerous standards: the Corvus, which was actually designed by IMI, the Shugart SA1000 and SA4000, and others that faded as quickly as they appeared.

But none of these standards became as universally adopted as the emerging ST506 interface for 5.25 hard disk drives. What made the ST506 interface so popular and cost effective was partly the result of the development of the Xebec S1410 Winchester drive controller cards that could be integrated with many different drives and computer systems because the on-board firmware and the microprocessors could be programmed to talk to the drive: i.e., how many heads, cylinders, etc. Eight-inch Winchester controller cards weren't programmable in the same respect. They used only discrete components and firmware in ROM that relayed information on a particular drive to the computer. This did change slightly when drive manufacturers, such as Quantum finally adopted the Shugart SA1000 standard suitable for 5MB and 10MB drives, and SA4000 standard for 20MB and 40MB drives. These subsystems were massive and reposed on a desktop like a steamer trunk. In terms of reliability, they were solid performers that seemed to last forever.

Most 8" drives, like the Shugart SA1002 5MB (which used the Western Digital WD1001-85 hard disk controller, were ultimately dumped to electronic wholesalers and computer dealers at prices far below their original manufacturing cost. Many can still be obtained in original factory sealed cartons. Others were snapped up by system integrators and are now peddled at very attractive prices.

The quest for the maximum amount of storage in the smallest package possible still continues. Drive manufacturing firms like Siemens are already boasting 5.25" 7-platter drives holding 300MB, with 500MB systems in final stages of development. Already 20MB 3.5" drives for portables are available for OEM use. Most of us don't have the need to store the entire Encyclopedia Britannica on a hard disk, but the reality of owning a 5, 10 or 20MB unit is with us now — at a price the hobbyist can afford.

Put one in your H/Z-89 and you will be hard put to describe the blinding speed with which database programs are sorted and programs compiled. They can make a computer operating at 2 MHz as fast as any 16-bit upstart on the market. And possibly even faster, because 8-bit code is much more efficient. Perhaps not in relation to a true 16-bit CPU like the Intel 8086 or 80286, but

certainly in relation to the hybrid 8088 which uses 16-bit address lines with an 8-bit data path. In this context an H/Z-89 with a Winchester becomes a very capable and formidable contender.

Although I have occasionally been accused of sneering at 16-bit computers, I don't deny that the production volume of these units has directly influenced the lower prices we now see on hard disk components. The PC-compatible market uses the same ST506 standard drives that are used on the H-89 and other 8-bit computer systems.

Having now used several Winchester hard disk systems on my H-89, these past few months, has convinced me that they're not only a cost-effective storage media, but they provide a significant improvement in the overall operating speed and productivity of my computer. *

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Computer Aided Dialing With A Z100

Rich Hirsch

470 Belleview

Webster Groves, MO 63119

Are you disturbed that your favorite terminal program doesn't have a dialing directory? I use CPS and Kermit on my Z100, and although both programs allow programming the function keys to dial telephone numbers by sending commands to a smart modem, one has to remember which function key calls which number. This is especially difficult for me, because there are about eight computers I regularly contact. Now, with the DIAL program presented here and shown in Listing 1, those days are gone.

Using DIAL is simple, install DIAL by typing DIAL RETURN and then boot your terminal program. When you're ready to dial a number, hit SHIFT-F12 and a dialing directory will appear. Simply type in the item number of the computer, person, or business you wish to phone and hit RETURN (the program contains examples of how to enter the names and numbers). Next, the number will be dialed and then, you will be given the opportunity to hang up or exit the DIAL program. If you want to exit the program, hit RETURN and you'll be back in your terminal program for logging in, etc. If you want to hang up (if the number is busy, for example), hit "H" and when the dialing sequence is finished, the phone line will disconnect. Again, you will end up back in your terminal program.

Using DIAL does not require that you be in a terminal program. You can simply be in DOS. This is useful if you want to use the computer to dial someone for voice communication. It is especially useful if you have a long distance service, since in many instances this requires dialing a sequence of twenty-three digits to complete a call!

DIAL is to be used with modems that are software compatible with the D. C. Hayes Smartmodem (I use a POPCOM X100) and connect to serial port B (J2). Assemble to DIAL.COM by typing:

```
MASM B:DIAL; RETURN
LINK B:DIAL, RETURN
EXE2BIN B:DIAL.EXE.COM RETURN
DELETE B:DIAL.EXE RETURN
DELETE B:DIAL.OBJ RETURN
```

This sequence assumes that MASM, LINK, and EXE2BIN are on the default disk drive A and that DIAL.ASM is on disk drive B.

DIAL is an example of a program that is run by hitting the SHIFT-F12 keys. Other examples of such programs are PSC, a Zenith Data Systems product that comes with the Z100, and GPRINT, a screen print program written by J. Spalding. The beauty of this type of program is that once it is loaded, it remains in computer memory until the system is rebooted. When you want to run it, you hit SHIFT-F12. This means that if you run program "XYZ", you can do something in the middle of "XYZ" and then return to "XYZ", instead of having to exit "XYZ", run the program that

does the "something", exit that program, and then re-enter "XYZ".

Programs run by hitting the SHIFT-F12 keys generally work as follows. When SHIFT-F12 is struck, an interrupt 5 is generated. The microprocessor responds by stopping what it's doing and going to memory locations 20 through 23 to get the offset and segment of the next instruction the processor is to execute. The last portion of the DIAL program starting with INIT installs the segment and offset of DIAL into those memory locations. Once installed, this portion of the program is no longer necessary, so it is not stored in memory. In practice, after installation, when SHIFT-F12 is hit, the processor starts executing instructions at INT5 in the DIAL program. Upon exiting DIAL, the processor returns to what it had been doing before it was interrupted.

Other notes about the program:

1. I tried to use the ZDOS DOSF__AUXOUT function call to send data to the modem via the serial port, but it did not work. The BIOS routine BIOS__AUXOUT worked, so I used it. Writing data directly to the serial port also worked, but it was simpler just to use the BIOS routine.
2. Since I was using BIOS__AUXOUT anyway, I decided to use the BIOS__CONOUT routine to write data to the screen, rather than use a ZDOS function call.
3. I tried to use the BIOS__CONIN routine to input data from the keyboard, but this resulted in the program "hanging". I obtained the same result when I tried to use a ZDOS function call. The solution was to get key information directly from the keyboard data port. The routine that does this is called GET__KEY in the DIAL program. This produces some interesting effects, such as entered values showing up on the screen nowhere near the flashing cursor. But otherwise, it works fine.

I hope you find DIAL to be an enjoyable and useful program.

Rich Hirsch
SMART GRAPHICS
470 Belleview
Webster Groves, MO 63119

Listing 1

```
TITLE - DIAL - Dialing Directory to dial phone nos via
      POPCOM modem
; C.A.D (Computer Aided Dialing) Prog by R Hirsch, 5-19-85
VER 1.1
;Prog is invoked with SHIFT-F12 key after installation.
;
BIOS SEGMENT AT 40H
      ORG 9 ;DISPLAY CHAR IN AL
BIOS_CONOUT LABEL FAR ; ON CONSOLE - SEE BCONIO.ASM
```

```

ORG 18 ;OUTPUT CHAR IN AL
BIOS_AUXOUT LABEL FAR ; TO AUX DEVICE - SEE BAUXIO.ASM
BIOS ENDS

;DEFINITIONS
ESC EQU 27
CR EQU 13
LF EQU 10
TAB EQU 9
DEN EQU 21 ;NO OF ENTRIES IN DIRECTORY
KBDD EQU 0F4H ;KEYBOARD DATA PORT
KBDS EQU 0F5H ;KEYBOARD STATUS PORT. BIT 0, 1=> CHAR TO READ
; BIT 1, 0=>KBD PROCESSOR READY

;CODE
SEGMENT PARA PUBLIC 'CODE'
ASSUME CS:CODE, DS:CODE, SS:CODE
ORG 100H

START JMP INIT ;INIT INSTALLS INT SERV ROUT ADDR INTO VECTOR TABLE

;VARIABLES
BUFF DB 3 DUP (?) ;KEYBOARD INPUT BUFFER
CHRS DB 37 ;CHARS IN DIALING STRING
INVMMSG DB CR,ESC,'K','INVALID ENTRY! ENTER A NUMBER.',0

OPTIONS DB ESC,'m70',ESC,'E',CR,LF
DB ESC,'m50',TAB,TAB,TAB,'MODEM DIALER',ESC,'m70',CR,LF,CR,LF
DB ESC,'m40',COMPUTERS',ESC,'m70'
DB ,0 VAX, Node A 6 Another Computer BES',CR,LF
DB TAB, 1 VAX, Node B 7 .Byte BBS',CR,LF
DB TAB, 2 VAX, Node C 8 .CompaServe',CR,LF
DB TAB, 3 VAX, Node D 9 ',CR,LF
DB TAB, 4 DEC10 10 ',CR,LF
DB TAB, 5 Zenith BBS 11 ',CR,LF,CR,LF
DB ESC,'m20',HUMANS',ESC,'m70'
DB , 12 .Blaze Pascal, Joliet, IL',CR,LF
DB TAB, 13 Connie Cobol, Chgo, IL',CR,LF
DB TAB, 14 .Frank Fortran, Tampa, FL',CR,LF
DB TAB, 15 ',CR,LF
DB TAB, 16 Weather',CR,LF
DB TAB, 17 .Smart Graphics, StL, MO',CR,LF
DB TAB, 18 .Heath Soft Consult, OS and Langs',CR,LF
DB TAB, 19 .Heath Soft Consult, Appl Pgms',CR,LF
DB TAB, 20 ',CR,LF
DB TAB, 21 EXIT DIAL',CR,LF,CR,LF

DB ESC,'m60',Enter the number of the device or person you want to call
and hit RETURN: ',ESC,'m71',0
HGMC DB CR,ESC,'K','Hit "H" to hang up or RETURN to exit DIAL program',0

;ENTER NUMBERS AND SPECIAL CHARACTERS HERE (comma = 2 second pause)
MSG0 DB 'ATD 123-4567,,,,,890123-111',CR ;Node A
DB 'ATD 123-4567,,,,,890123-222',CR ;Node B
DB 'ATD 123-4567,,,,,890123-333',CR ;Node C
DB 'ATD 123-4567,,,,,890123-444',CR ;Node D
DB 'ATD 123-4567,,,,,890123-555',CR ;DEC10 4
DB 'ATD 616-982-3503',CR ;ZEN 5
DB 'ATD',CR ;Node 6
DB 'ATD 603-924-9820',CR ;BYTE 7

ORG 241-3101
DB 'ATD',CR ;COMS 8
DB 'ATD',CR ;9
DB 'ATD',CR ;10
DB 'ATD',CR ;11
DB 'ATD',CR ;12
DB 'ATD',CR ;13
DB 'ATD',CR ;14
DB 'ATD',CR ;15
DB 'ATD 321-2222',CR ;WEA 16
DB 'ATD 314-962-7833',CR ;SG 17
DB 'ATD 616-982-3860',CR ;ZEN OS 18
DB 'ATD 616-982-3884',CR ;ZEN PG 19
DB 'ATD',CR ;20
DB 'ATD',CR ;EXIT 21

HGUP DB 'ATH0',CR ;HANG UP

;INT 5 SERVICE ROUTINE
INT5 PUSH DS
PUSH ES
PUSH SI
PUSH DI
PUSH BP
PUSH DX
PUSH CX
PUSH BX
PUSH AX
PUSH CS
POP DS
CALL MAIN
POP AX
POP BX
POP CX
POP DX
POP BP
POP DI
POP SI
POP ES
POP DS
IRET

;MAIN PROGRAM
MAIN PROC NEAR
MOV SI,OFFSET OPTIONS ;LIST THE DIRECTORY NUMBERS
CALL DISPLAY
;CALL READKEYS
;CALL ASCII_BIN
;JNC VALID
;MOV SI,OFFSET INVMMSG
;CALL DISPLAY
;JMP GET_NUM
;CMP AL,DEN
;JNB THRU
;MOV BX, OFFSET MSG0 ;POINT TO MSG0
;READ IN THE CHARS
;CONVERT TO BINARY (NO IN AX)
;IS THE ENTRY VALID?
;NO, DISPLAY ERROR MSG
;AND TRY AGAIN
;EXIT IF "DEN" OR GREATER IS CHOSEN

```

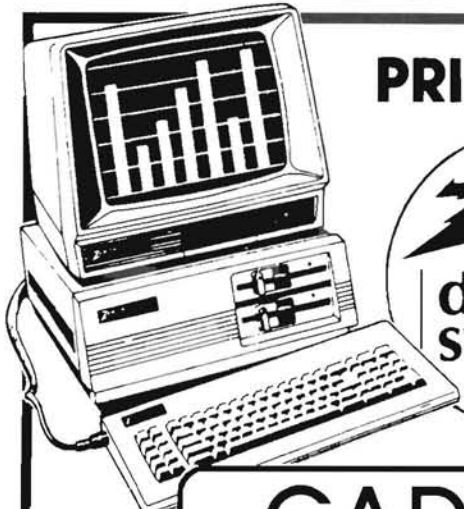
```

MUL CHRS          ;AX=AX*37
ADD BX,AX        ;POINT TO DESIRED MSG
MOV CX,37        ;GET SET TO SEND 37 CHARS
CALL AUX_IT      ;SEND STRING OUT AUX PORT
MOV SI,OFFSET HGMG ;GIVE OPTION OF HANGING UP
CALL DISPLAY
CALL GET_KEY
CMP AL,'H'
JNE THRU
MOV BX, OFFSET HGUP ; YES, HANG UP
MOV CX,5         ;GET SET TO SEND 5 CHARS
CALL AUX_IT      ;SEND STRING OUT AUX PORT
THRU            ;EXIT DIAL PROG
MAIN            ENDP
;PROC READS KEYS INTO BUFF UNTIL RETURN IS HIT.  ALLOWS THREE KEYS MAX.
READKEYS PROC NEAR
MOV DI,0
MOV CX,3
GETKEY: CALL GET_KEY ;READ A KEY, PUT CHAR IN AL
CMP AL,0DH
JE SAV_CNT
MOV BUFF[DI],AL ;LOCATION BUFF+DI (DI IS KEY COUNT)
INC DI
LOOP GETKEY
MOV CX,DI
MOV BX,OFFSET BUFF ;AND LEAVE ADDRESS OF BUFF IN BX
RET
READKEYS ENDP
;UPON ENTRY, STARTING ADDR OF STRING SHOULD BE IN BX AND
;NO. OF CHARS IN CX. UPON RET, BIN NO. IS IN AX
;IF NO. TYPED IS NON VALID CHAR, CARRY FLAG IS SET TO SIGNAL ERROR.
ASCII_BIN PROC NEAR
XOR AX,AX
;CONVERT THE STRING
RANGE: CMP BYTE PTR [BX],0' ;IS CHAR A NUMBER?
JB NON_DIG ;NO, JMP TO NON_DIG (ASCII CODE<30)
CMP BYTE PTR [BX],9' ;IS CHAR A NUMBER?
JBE DIGIT ;YES, JMP TO DIGIT (ASCII CODE<=39)
NON_DIG: STC ;IF NOT A DIGIT, SET CF FOR ERROR MARKING
;AND EXIT
DIGIT: MOV SI,10 ;THE CHAR IS A NUMBER
PUSH DX ;SO MULTIPLY AX BY 10
MUL SI
POP DX
MOV DL,[BX] ;FETCH CHAR AND PUT IT IN DL (6 IN ASCII IS 36)
AND DX,0FH ;SAVE ONLY LOW BITS (36H --> 06H)
ADD AX,DX ;UPDATE PARTIAL RESULTS
JC END_CONV ;EXIT IF RESULT IS TOO BIG (IF CF SET)
;AX=AX*37
;POINT TO DESIRED MSG
;GET SET TO SEND 37 CHARS
;SEND STRING OUT AUX PORT
;GIVE OPTION OF HANGING UP
CALL DISPLAY
CALL GET_KEY
CMP AL,'H'
JNE THRU
MOV BX, OFFSET HGUP ; YES, HANG UP
MOV CX,5
CALL AUX_IT ;SEND STRING OUT AUX PORT
;EXIT DIAL PROG
MAIN ENDP
;PROC READS KEYS INTO BUFF UNTIL RETURN IS HIT.  ALLOWS THREE KEYS MAX.
;ON RETURN, BUFF'S STARTING ADDRESS IS IN BX AND
;CHAR COUNT IS IN CX. - FROM LJ SCANLON, P.236.
;DI IS KEY COUNT
;GET READY FOR 3 KEYSTROKES MAX
;READ A KEY, PUT CHAR IN AL
;IS IT A RETURN?
;IF SO, EXIT VIA SAV_CNT
;LOCATION BUFF+DI (DI IS KEY COUNT)
;AND UPDATE THE KEY COUNT
;GET NEXT KEY
;FINAL KEY COUNT IS PUT INTO CX
;AND LEAVE ADDRESS OF BUFF IN BX
;EXIT DIAL PROG
MAIN ENDP
;OTHERWISE, INC BX AND CONTINUE
;WHEN DONE, CLEAR CF
END_CONV: RET
ASCII_BIN ENDP
;DISPLAY STRING AT SI ON CONSOLE
DISPLAY PROC NEAR
MOV AL,BYTE PTR [SI]
OR AL,AL
JNZ DISCALL ;DISPLAY IT UNTIL A '0' IS FOUND
RET
DISCALL: CALL BIOS_CONOUT ;DISPLAY CHAR IN AL
INC SI
JMP SHORT DISPLAY
DISPLAY ENDP
;PROC WAITS FOR A KEY TO BE HIT AND RETURN WITH CHAR IN AL
GET_KEY PROC NEAR
WAIT: IN AL,KBDS ;CHECK STATUS PORT
AND AL,1 ;IF AL=1, CHAR TO READ
JZ WAIT
IN AL,KBDD ;READ CHAR
RET
GET_KEY ENDP
;PROC SEND A STRING OUT THE AUX PORT. ENTER WITH NO. OF CHARS TO SEND IN CX
;AND BX-->STARTING ADDR OF STRING
AUX_IT PROC NEAR
LOOP1: MOV AL,[BX] ;PUT CHAR IN AL
CALL BIOS_AUXOUT ;OUTPUT CHAR TO MODEM PORT
INC BX
LOOP LOOP1 ;OUTPUT ALL THE CHARS
RET
AUX_IT ENDP
;PGM_END LABEL NEAR ;*CODE BEYOND THIS POINT IS LOST AFTER INSTALLATION
;INSTALL INTERRUPT SERVICE ROUTINE ADDRESS IN JUMP TABLE
INIT: PUSH DS
XOR AX,AX
MOV DS,AX ;DS=SEGMENT OF INT SERV RT JMP TABLE (=0)
MOV SI,5*4 ;OFFSET OF INT 5
CLI ;INTS OFF
MOV WORD PTR [SI],OFFSET INT5 ;INSTALL OFFSET OF ROUT
MOV WORD PTR [SI+2],CS ;INSTALL SEGMENT OF ROUT
STI ;START INTS
POP DS
MOV SI,OFFSET MG ;PRINT INSTALLATION MESSAGE ON CRT
CALL DISPLAY
MOV DX,OFFSET PGM_END ;TERMINATE AND STAY RESIDENT
INT 27H
MG DB ESC,'m20','DIAL Software Installed!',ESC,'m40','CR,LF
DB 'Hit SHIFT-F12 when ready to dial',ESC,'m70','CR,LF,0
;
; CODE ENDS
; END START

```

*

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Omnitrend's UNIVERSE

Haywood N. Nichols, Jr.
10900 S.W. 104th Street, Apt. #414
Miami, FL 33176

Stardate: 102 Day: 01 Time: 0078

Captain Haywood Nichols of the starship NICHOLAS V reporting.

Having left drydock around the planet Axia in the starsystem Hope, we are on our way under sub-light drive to the planet Philos in the same starsystem. The NICHOLAS V is a stripped down ZM-110 class ship outfitted for mining operations on the planet's surface. I have cut every corner to get this mission under way, and still only have a marginal chance of success.

Stardate: 102 Date: 02 Time: 0264

Now orbiting the planet Philos. An airless planet rich in ore, but very hostile. The ship is in the lowest possible orbit of 8200km as we prepare our only ore processor for launch. It's not a very good processor, but it's the best I could afford.

Stardate: 102 Date: 02 Time: 0270

First ore processor landing had to be aborted, sensors indicated possible sand drifts at the landing site. The processor was damaged slightly in the attempt. Second attempt was a successful landing on solid rock. On this landing, we'll be mining ORE IV; that's the type of ore needed to power the ship and get us back to Axia. Successfully launched processor and docked with the ship. Lost 4 crewmen and the processor was badly damaged, only 4 damage points remaining. Third landing also successful. We landed on an ancient seabed. We'll be mining for ORE I, the most valuable mineral in the galaxy. Had to lift off early when damage points to the ore processor reached 1, lost five crewmen. We were able to mine enough ORE I to give us a good grub stake, providing we make it back to Axia.

Stardate: 102 Date: 03 Time: 3201

Successfully navigated back to Axia and have taken an orbital shuttle down to the planet to sell our Ore I. We got a really good price, almost 300,000 credits. Now it's back to the orbital drydock to refit and repair. I figure one more mining trip, this time outfitted with two ore processors, and I'll be able to outfit my ship properly and begin my quest.

Welcome to Omnitrend's epic space simulation UNIVERSE. You will notice I said simulation and not game. It's much more than a mere game. If you're looking to buy a mindless shoot'em up arcade style game, don't buy Universe. If, on the other hand, you're looking for an excellent simulation with good playability, this is it. My Captain's log excerpts were just a small sample of what you can expect. In addition to mining operations, you will trade goods on many different planets and starsystems, fight off space pirates and even try a little piracy yourself, launch armed assault capsules to the surface of planets and much much more.

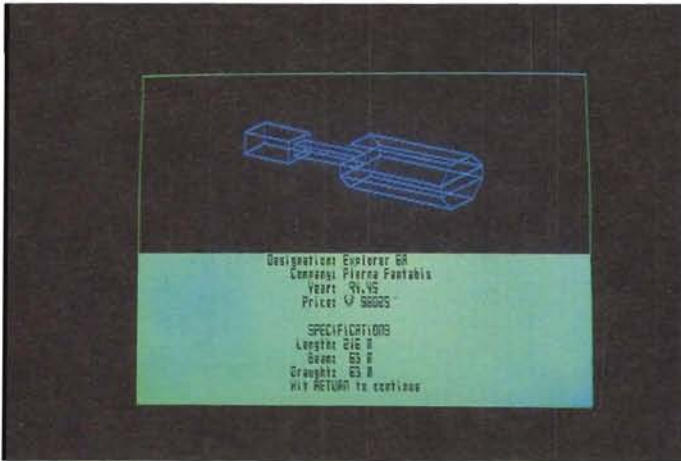
Universe runs on either the H/Z-100 or the H/Z-150/160 computers. On the Z-100 it requires 192k of memory, all three banks of video chips installed, jumpered for 64k and a color monitor. On the Z-150/160 it requires 192k of memory and a color monitor. MS-DOS version 2.0 or higher is required on both computers. One nice feature for owners of the H/Z-100 machine is the provision in the program for better graphics; eat your hearts out PC compatibles. Universe comes in a beautiful black three hole binder with over a hundred pages of documentation and two copy protected disks.

The primary object of Universe is to locate a lost hyperspace booster left by some ancient civilization that has long since vanished. The part of the galaxy you're located in is called the Local Group, thousands of light years from Earth. It is comprised of 20 starsystems, 46 planets, 19 starports, and 8 starship drydocks. Current technology doesn't provide the means for you to travel or communicate with Earth. If you don't find the lost booster, your race is doomed.

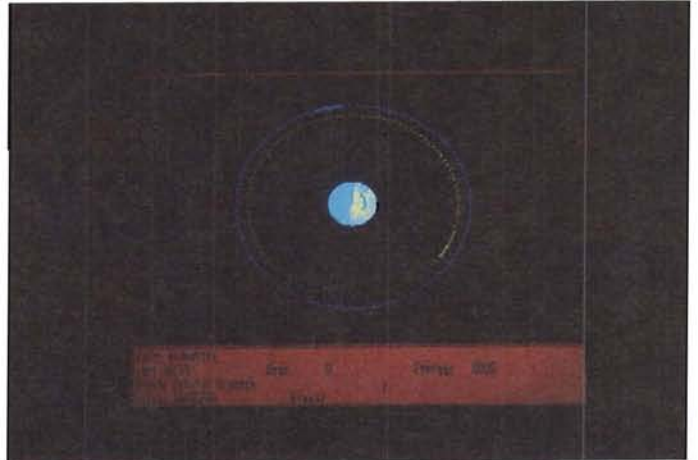
Universe is a 'menu driven' simulation. Three special function keys and your up and down arrow keys are used to move you around the program and select certain options:

f1 = Start
f2 = Select
f3 = Option

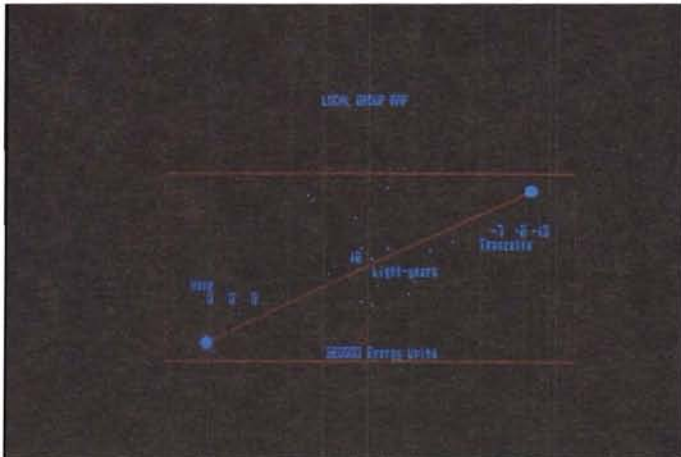
Universe also has a 'save game' feature. From the main menu, a



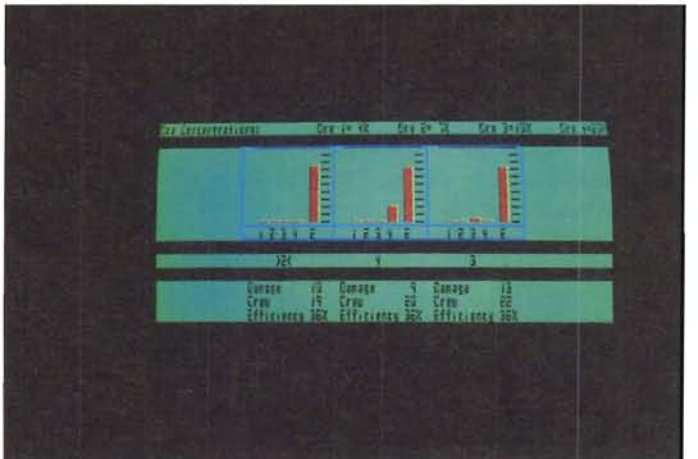
A 3D view of one of the ships for sale at the Axia shipyards.



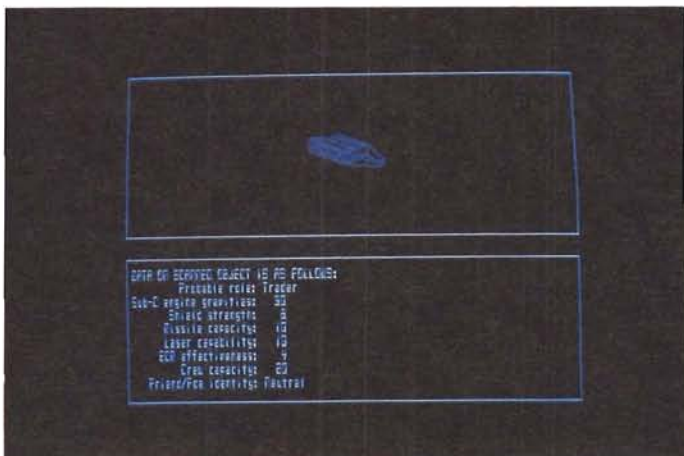
NICHOLAS V attempting orbital docking with the Axia drydock.



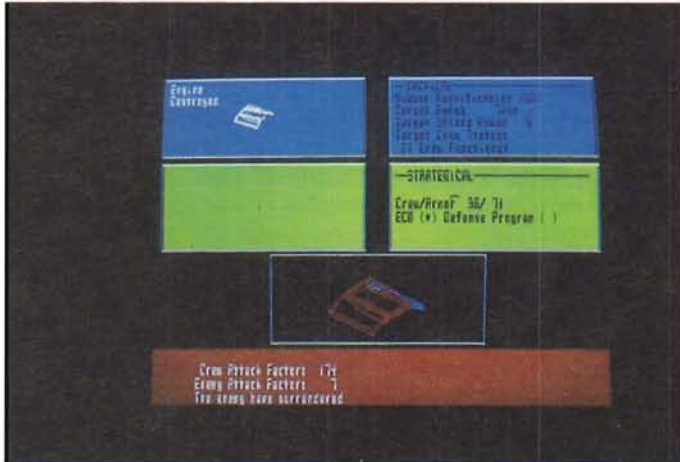
Ore processors falling through the atmosphere as they attempt to land on the planet's surface.



Ore processors in operation on the planet of Philos.



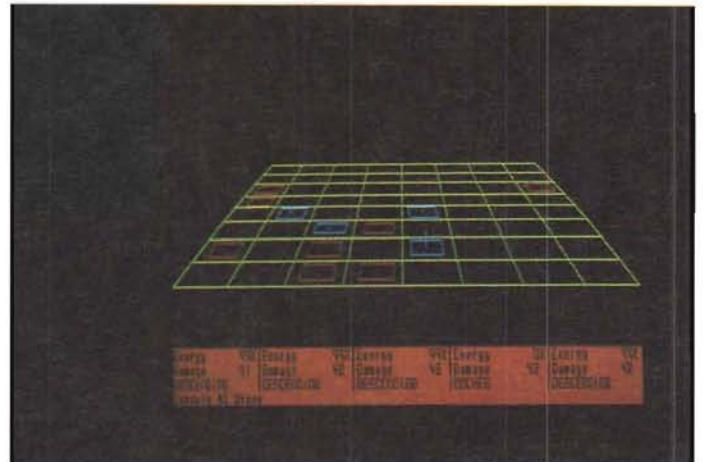
My high definition scanner in operation.



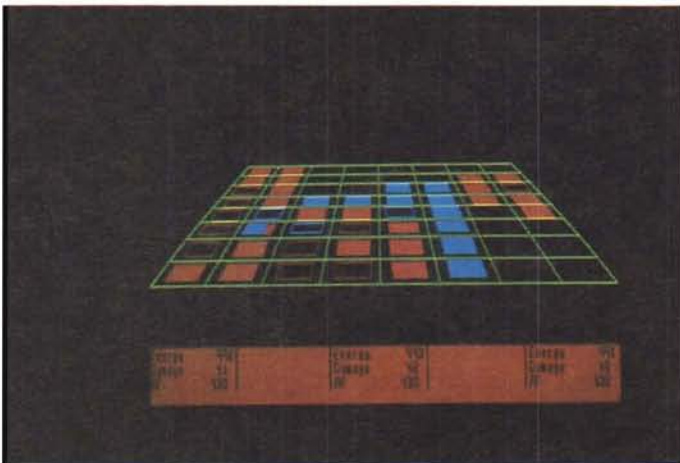
The Nicholas V attempting to board a trading vessel. Crewmen are making their way through the docking adapter.



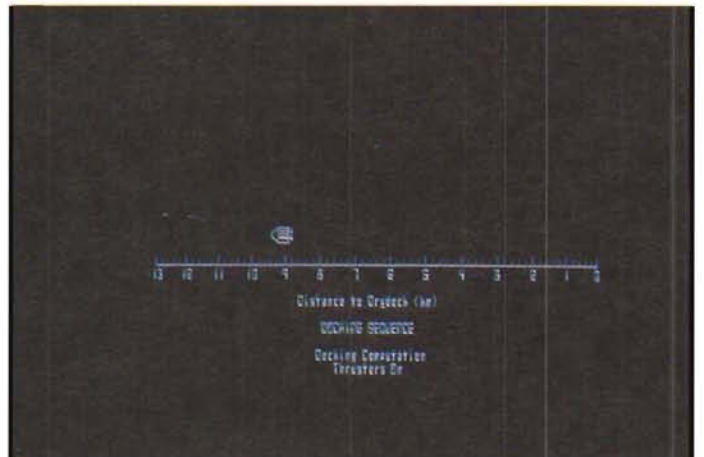
The weapons computer has just been activated as I prepare to do battle. I've fired a salvo of 8 Proton missiles.



Assault capsules landing on the planet's surface.



Assault capsules attempting to secure landing zones for the ore processors.



At the Axia drydocks again to repair and refit.

game can be saved so you may restart it at the same place at a later date.

The hardest part of Universe is getting started. It took me many hours just to figure out how to properly outfit a ship. If you don't properly outfit your ship, it will be a very short game. The first thing you must do to start the game is borrow money to purchase a ship. You are given a fixed interest rate and have the option of paying the money back within a 5–16 year period of time. The longer the period of time, the more money in interest you have to pay. If you don't pay back the loan on time, you are given a year's grace period (with penalties of course). If you're still in default, certain people might try to fit you with cement filled space boots. Next, you are taken to Axia's shipyards to purchase your ship. There are 10 different ships to choose from. Each one varies in size, price, durability, number of hulls (how much equipment and cargo you can carry) and visibility (how easy it is for an enemy ship's weapons computers to see you). You are given a 3-D display of the ship with all pertinent information. If you are using a H/Z-100, this is a rotating 360 degree animated view of the ship. If you have a H/Z-150/160, the view doesn't rotate. After you have your ship you must move it into an orbital drydock around Axia, where you will outfit yourself with what's contained in the 'Merchants Loan Package'. This package contains things such as hyperdrive, sub-light drive, crew's quarters, fuel, etc. You will have a small amount of money left over to purchase any other equipment you think you'll need.

This other equipment is very important. You will have to spend your money wisely or you'll end up lost in space forever (happened to me more than once). Now you must decide how you will initially make your living in space to keep your ship running as you search for the booster. There are four basic ways to earn a living in Universe:

Trading

You buy goods on one planet or starsystem and try to sell them for a profit on another. This is more complicated than it sounds, and I could almost write an entire review on this aspect of the game alone. You try to identify goods that are readily available and inexpensive on one planet and transport them to another planet where they are scarce. When you land at a planet's spaceport, you can go to the Seller's and Buyer's Board (an auction house of sorts), where items are put up for bid. With a carefully planned trade route, you can make a real good living.

At each spaceport there is also a 'CONTRACT HOUSE'. They represent the planet's Business Cooperative. It's here that orders are placed for specific off-planet products and supplies. If you enter into a contract to supply these products, they must be returned to the origin of the contract by a specified date. Since you are providing a special service, your profit is higher.

Transporting Passengers

There are many star systems and planets that need and will pay for immigrants. Others who have an excess population will pay you to take people off-planet. Passengers are placed in cryogenic vaults aboard your spaceship. They spend the trip in suspended animation to conserve food and oxygen. Even the best made vaults have a certain percentage of failure, so be prepared to lose a few passengers during revival attempts. You can't make a living (a decent one, that is) doing just this, but it does a nice job supplementing your income.

Mining

This is my favorite. It is also how I raise my initial grub stake to outfit my ship properly. The drawback to this method is the expense involved in purchasing the necessary equipment and extra crew needed to man the ore processor(s). It is also quite dangerous for the crewmen operating these rigs. I feel it's worth the risk because you can make a lot of money fast and keep your ship fueled (ORE IV is used to power your ship).

To begin mining operations, you first activate your resource scanner. This tells you where the ore is, how much there is of it and how dangerous the terrain is. If the planet has intelligent life on it, you may be required to send down armed assault pods to secure whatever area you wish to mine. Once mining areas have been secured you can load your processor(s) with fuel and crew. Your screen will show the processor(s) as they approach the planet's surface. Your fuel and damage status are updated continuously. When the damage points of your processor reach zero, it is destroyed. If the atmospheric radio interference isn't too great, you can request reports on the planet's surface. If it looks too dangerous, you can abort your landing and return to the ship.

Once you have landed on the surface, you tell your processor(s) which type of ore to mine. If the damage points reach zero during mining operations, the ore processor and crew are lost. When the energy level reaches a certain level, the processor automatically lifts off. You also have the option of manually lifting off at anytime.

Piracy

This one appeals to the buccaneer in all of us. The payback on this is only good if you select your targets carefully. Well armed warships and pirates usually have large amounts of credits (money) and many crewman that can be taken prisoner and sold. Traders, on the other hand, usually only have goods and supplies. When you defeat another ship in combat, you have the option of taking all of the captured vessels cargo (providing you have the necessary equipment for docking). While the profits are high, so are the risks. I've been blasted into space dust on more than one occasion when I got a little too greedy. Even with the best manned and equipped ship money can buy, it's very easy to get yourself into trouble.

When you engage in combat with another ship, you have a vast array of weapons and options to choose from. To locate other spaceships in orbit around a planet, you must first do an orbital scan. Other ships are identified as 'HRS' contacts. You must then position your ship using sub-light drive close enough to use your High Definition Scanners. This scan will tell you many important things about a possible foe, such as type of ship, shield strength, armament, number of crewman, probable role, etc. Remember, these ships are intelligent and they will also be scanning you at the same time.

After a High Definition Scan, you call up your Weapons Computer. When you are ready to engage the enemy, you have several different types of weapons to choose from; lasers, missiles (ten different types), tractor beams, etc. Missiles can be launched in salvos and their trajectory is shown on your scanner screen, as are laser blasts. Incoming enemy fire is also plotted. When hits are scored, (either to you or the enemy) damage reports are issued. You can board an enemy craft if your sub-light engines are more powerful or the enemy's engines are destroyed. You tell your Weapons Computer how many armed

crewman you want to attempt the boarding with. Then you watch as the fight takes place aboard the enemy spacecraft. A 3-D view of the enemy is provided showing the sections that fall under your control. If the battle isn't going well, you can retreat. Once the enemy has surrendered, all cargo, fuel, credits (money), and prisoners are transferred to your ship. The enemy ship is then vaporized.

Hints

I usually don't like to offer hints, but I'll give you two that will help get you started. Remember the 'Merchants Loan Package' I mentioned earlier. These are the various pieces of equipment included in the loan you received. Not all of that equipment is needed initially. Some things can be sold back to the drydock to give you extra cash.

Buy a High Definition Scanner as soon as possible. The scanner is also used to receive space radio transmissions. Around certain planets and starsystems, you will receive messages that include clues that will help you locate the booster.

Bugs

After about 25 hours of play I encountered a bug that would lock up the game. I called Omnitrend the next day, and was able to get one of the author's of the program, Tom Carbone, on the phone. He was extremely helpful and I had a replacement disk within the week. Since then, I have logged over 60 hours playing and haven't had a lick of trouble. About the only complaint I have is the program won't lock out a 'cntrl c' most of the time, which will abort the program and give you the 'A' prompt. Other than that, the program seems bullet proof, which is pretty remarkable considering the 'FLIGHT.EXE' program alone is over 300k long. Omnitrend also has a Bulletin Board for all registered owners of Universe. After you mail your registration card in you can gain access to the Universe Board by using your serial number as your password. If you have any problems or questions, you can call them Monday, Wednesday, or Friday between 4 and 5 pm, or call the Universe Bulletin Board Monday thru Friday: 7pm to 9am, Saturday 3pm to midnight, Sunday all day. After Scanning through the messages left on their board, it looks like they have a lot of satisfied customers.

COBOL Corner SPECIAL ANNOUNCEMENT

Due to circumstances beyond our control, the COBOL Corner Disk II mentioned in the September Issue of REMark, will not be available until at least February 1986. Mr. Bauman will try to get a revised version of the disk to the Heath/Zenith Users' Group by that time. The series written by Mr. Bauman will continue in future issues of REMark.

Conclusion

I really like Universe. It seems to be one of the few simulations around that uses the full capacity of a computer to help transport you into another world. The price tag on Universe is high (\$98.50 + \$4 postage & handling), in fact, it might well be the highest priced game on the market, but I'm glad I took the chance and bought it. I've received 10 times more enjoyment out of playing this simulation than from any other games that are priced in the \$50-\$60 range.

Like I said at the beginning of this review, it's a little rough going when you first start playing with all the information you have to digest, but the manual is well laid out. If you stick to it, you'll really enjoy the experience of zipping around the Universe creating all sorts of havoc.

Ordering Information:

Omnitrend Software
P.O. Box 3
West Simsbury, Ct. 06092

Business and Bulletin Board phone: (203) 658-6917

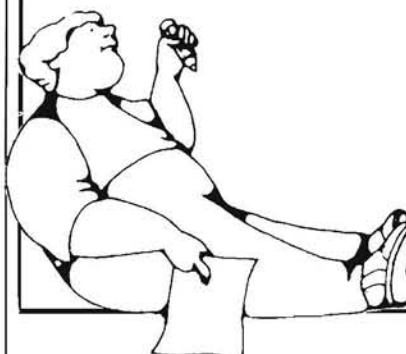
Price: \$98.50 plus \$4.00 postage and handling

I access the HUG SIG (special interest group) on Compuserve. If anyone has a question, feel free to drop me a line. My I.D. #[70020,164].



Have You Ever Asked?

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Continued from Page 8

Word Processor — Microsoft's The Word, version 1.10 (serial #000-00040928-6-04) using MS-DOS version 2.11 by Microsoft;

Printer — Okidata 92, IBM-compatible (serial #223408).

I purchased this IBM compatible system in the belief that it would be compatible with equipment designed to run with IBM PC equipment. Your help would be appreciated to enable me to use the full potential of the system.

I have called both Zenith and Okidata about the problem with superscript and I have not received a solution. Okidata has indicated that it would be sending some written material which might help. Zenith indicated that if I had a BASIC program (which I do not) that I could run some tests to see if the printer is malfunctioning.

I have taken a disk to a local dealer of both Zenith and Okidata 92 (without IBM graphics) and ran the program with no problem in obtaining the superscript. Because of this, I believe the problem is not with the computer or the word processing program. I went to a local dealer of IBMs and Okidata 92 — IBM Graphics — and was told that they have no problem with the printers reproducing all of the character formats available in The Word, by Microsoft.

Once again, your help would be appreciated.

Thank you,

Lloyd Tunik
East 742 Highland Boulevard
Spokane, WA 99203

GATO: Some New Information

Dear HUG:

Ralph Rumpf did an exceptional review of the GATO (REMark, September 1984), and there is some new information available of this challenging WWII naval submarine game.

Spectrum-Holobyte tells me that Version 1.2, now on the market, is OK for H/Z-151 with floppy, but NOT usable for H/Z-151 with hard disk. By 1 August 1985, Version 1.3 should be available for direct sale by Spectrum-Holobyte. This version, which dealers should have several months later, will be OK for the H/Z-151 with BOTH floppy and hard disks.

S-H tells me you can boot one working copy from your master, however, a copy of the master can be ordered from S-H for \$7.50, for those wanting the original to remain in the vault.

New address: Spectrum-Holobyte, Inc.
1050 Walnut, Suite 325
Boulder, CO 80302

John R. Miller
401 Tiffany Drive
Anderson, SC 29621

How Should They Be Used!?

Dear HUG:

Has any H-100 user out there had success in using a TI-855 (Omni 800 series) printer with either The Illustrator (Wizard Software

House/Newline Software) or Doodler (Paul F. Herman)? The technical manual doesn't seem to provide me much description in the way of how the graphics ESCape codes should be used and how to implement them into any hi-res graphics programs. I would greatly appreciate any help in understanding the way the instructions work.

Sincerely,

James Low
2063 N. Palm Avenue
Upland, CA 91786

Please Inform The Heath/Zenith Community

Dear HUG:

The purpose of my writing to you is in regard to Heath/Zenith hardware accessories. I have been reading computer supply catalogs and telephoning suppliers and manufacturers and Heath/Zenith stores with the intent of purchasing a CRT anti-glare screen, filter, or nylon mesh for attaching to my Heath/Zenith ZVM-122 monochrome monitor. If such a product exists or a manufacturer begins to produce an anti-glare screen, filter, or nylon mesh, consider informing the Heath/Zenith computer community through REMark.

I recently purchased a Heath/Zenith ZVM-122A monitor. However, additional filtering screen is still desirable.

Also, a number of computer supply catalogs indicate that they carry anti-glare screens for the Zenith ZVM-122 monitor. However, all four anti-glare screens that I purchased, I had to return by mail, as the screens were either 1 to 2 inches too short or too long.

Sincerely,

Stephen S. Israel
2725 N. Howard Street
Baltimore, MD 21218

Forgot To Turn Computer Off

Dear HUG:

After a recent session with my H-89, I was called away from my desk and since it was late, I decided to call it a day. Unfortunately, I failed to turn it off. Five days later, I decided to continue where I had left off, and as I approached the desk I could feel the heat coming off of the computer.

You guessed it — I had left it turned on all this time and to top it off the dust cover was also in place. Since it was too hot to touch, I left it to cool off for a few hours.

My first thought was that many of the circuits would certainly have shorted out from all this heat. I was really surprised to find that all operations performed without a fault and has since been working without any problems.

I wonder how many present day computers would have held up under this heat.

Very truly yours,

Bernard White, President
Bernard White and Company, Inc.
7 Church Lane
Baltimore, MD 21208

Continued from Page 31

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HDOS			
885-1122-[37]	HDOS MicroNET Connection	16.00	37

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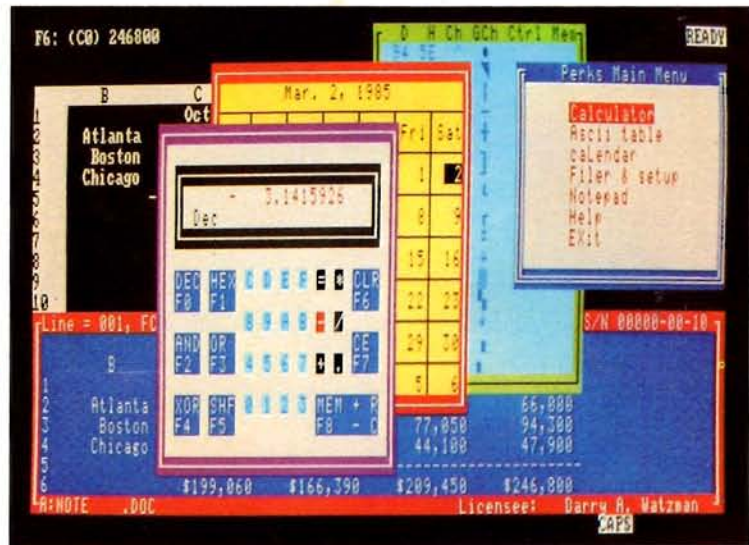
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