

## PORT TO PORTAL -- Editorial

The best-laid plans of men (to say nothing of mice) can go terribly astray. For example, the **Staunch** database crash I experienced just before the last issue went to the post office!

As you're probably aware, I maintain the subscriber list with Hoyle and Hoyle's **QUERY!3** under HDOS 2.0, using C.D.R.'s SuperRAM89 RAMdrive reviewed in issue #6. The crash occurred during wrap-up of an update to the database. I have a batch file that first deletes the database files from the two floppies I have mounted--necessary because the size of the database file has grown to **over half** the disk capacity--before the copy operation (with T & E Associates' FM.ABS). Well, after the delete and **during** the copy process to the first on-line disk, the power glitched, locking up the system!

At this point, I **knew** I was in deep trouble. For one thing, the disk which the file was copying to would be next to useless for recovery. So I rebooted and went into the disk directory of the second disk with Mike Cogswell's UDUMP to "undelete" the file. But a subsequent directory listing showed the file had ballooned in size to occupy almost the **entire** disk. Then I looked at the file with **QUERY!3**'s VIEW and discovered garbage beyond the tenth record! Apparently, HDOS had altered the sector linkage table (group reservation table, GRT.SYS) during the delete. So I knew I was in deeper trouble than I expected.

Anyway, I put that aside for the moment and stuffed the envelopes I'd preprinted for the mailing to you. But as insurance, I keyed in your names and addresses right off the envelopes in case I wasn't able to recover the original. If you were wondering, that was one reason for the delivery delay you may have noticed last issue.

Since I knew file recovery would probably take some time, I reserved the following Sunday for the operation. And I dug out Grant Gustafson's CRASH.ABS recovery package (from Software Wizardry) and went through the detailed documentation that came with it. But Sunday, about an hour after I began using this software, I realized it wasn't going to aid me significantly. The principal reason was the **size** of the file (about 700 sectors, 175K) I had to recover.

So I was reduced to restoring the file the "hard" way: VIEW the file till I encountered garbage, locate the last good sector of that data on the disk with UDUMP, advance sector-by-sector through the disk until I found the adjacent sector of valid data, patch the required link into GRT.SYS, then resume VIEWing from that point to find more garbage. The operation took all afternoon and concluded with patching GRT.SYS to mark the end of the file. In all, I pieced together four sections the file was broken into. As you can imagine, I was relieved when the job was done!

As a consequence of this "episode," I've added one more step to my "security" for this vital link between you and me. That is a weekly backup to a **third**, independent disk. And I've finally broken down and put some money into repairing the Saft UPS (uninterruptable power supply) which has had a flat battery for some time.

But despite the aggravation, the exercise was useful. I learned a **lot** about HDOS's directory and filing structure. Much of that came from the documentation that accompanied CRASH; some of it came from the sweat of actually doing it. And based on this experience, I might suggest that you dig deeper into the directory structure and filing system of whatever o.s. you are using. I can **guarantee** the information will prove useful somewhere down the line when you, too, are faced with a major file recovery headache.

Kirk L. Thompson

## THE EIGHT-BIT R/W -- LETTERS

## CP/M Clone?

[From Pat Swayne, HUG Software Engineer, Benton Harbor, MI] Here is an idea for those of your readers who are assembly language programmers: why not produce a public domain clone of Zenith's CP/M 2.2.03 or 2.2.04. I'm sure that since HDOS 2.0 was released into the public domain, ZDS would be willing to release their portions of CP/M 2.2 also. Since you can use the old ZCPR version 1 as a direct replacement for the CCP portion of CP/M, that leaves only the BDOS as the portion of the actual operating system that belongs to Digital Research. So if a programmer could write a clone of the BDOS (using different code that performed the same functions), he could produce a CP/M 2.2 clone. The package could also include clones of the various utilities normally included with CP/M, such as SUBMIT, ASM, LOAD, etc. Public domain clones of most of the utilities already exist...

I realize that the "Z-System" operating system is available, but there are probably some users who would like the simplicity of the original CP/M. If I had the time, I would try this project myself.... [Thanks for the intriguing idea, Pat. There **are** people who like the "simplicity of the original," this newsletter's creator and contributing editor, Hank Lotz, and myself among them. And it looks like CP/M 2.2 will be with us for quite a while; see the "Miscellany" section later in this issue. But in the meantime, Magnolia Microsystems continues to sell the "simple" commercial standby. -Ed.]

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## CONTACTS

(A Wanted/For Sale/Swap Column)

**Jerry Pindus** (U.S. Energy Controls, Inc., Suite AA, 78-40 164th St., Flushing, NY 11366, phone: 718-380-1004, FAX 718-380-1432) -- "WANTED H8 COMPUTERS AND/OR PARTS: Will Pay Up To \$100 Depending Upon Condition; Call Jerry Pindus...."

**Dave Young** (402 Houghton St., Ontonagon, MI 49953) -- "1st) With my 'new' used H89 I got MAGIC WAND. I have a Star Powertype Daisywheel printer which emulates Qume. I see that MAGIC WAND has Diablo drivers, but no Qume. Is there a driver for Qume daisywheels or has anyone ever patched it to do so? I want to use proportional spacing. 2nd) Wanted: CDR RAM II board, the add-on board for SuperRAM89 which raises RAM from 512K to 1 Meg."

**Terry Hall** (Media Ministries, 516 East Wakeman, Wheaton, IL 60187, 312-665-4594) -- "TAX DEDUCTIONS FOR EXCESS EQUIPMENT: Media Ministries, Inc., a registered, non-profit corporation which uses modern media to promote creative Bible study and teaching, is seeking donation of an MSDOS computer (preferably Zenith but will consider any PC clone) and/or a laser printer. We'll pay shipping (or pick up within a reasonable distance of Chicago) and give you a tax receipt. If you can help us with these current needs, please contact Terry Hall...." [On a postcard, Terry added that he needs the PC because of its graphics capability and to run some new Bible search programs, not because he's defecting!]

"FOR SALE ... a Z-25 printer in good working condition, serial cable, all manuals, and several extra new ribbons. Asking \$200 plus shipping or best offer."

"Since installing a MAKO H89 buss expander, I need help in making a new BIOS for CP/M 2.2 to recognize my H47 at port 030. What I actually need are two BIOS's: one for H17/H47 drives with H47 at port 030 and another for H37/47 drives with H47 at port 030. I successfully changed the source code for HDOS 3.0 and assembled it, so I now have H17 (3 drives), H37 (2 drives currently; will be adding a 3rd), and H47 (2 drives) on line simultaneously. I renamed the H47 driver "DL.DVD." But when I tried changing the CP/M BIOS.ASM file and reassembling it, it didn't work on accessing the new port. Can anyone help me?"

**Tony Venticinque** (536 Redwood Road, Bollingbrook, IL 60439) -- Tony called about a week before this issue went to the printer. Amongst the information we exchanged was a "short-list" of hardware he has for sale. This includes: an H-37 controller (\$100), basic (1/2 Meg) C.D.R. SuperRam89 board with RAM (\$150), quad-density drives in enclosure (\$125), Z89-11 parallel interface board (\$40), and spare CPU and TLB boards (\$20 each). Apparently he's picking up a lot of stuff from a pack-rat friend, so if you are in need of something in particular, let him know.

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#### DISK EXPLORATION

The DS Kaypro Disk and the H-89

by Ludovic Van Hemelryck

In a shrinking 8-bit world, it is more than ever desirable to be able to exchange information between systems of different origins. At one point, this interchange was provided via a generic IBM 3740 format single-density 8" disk. None of the formats utilized with 5 1/4" disks ever became dominant and universally available, although more Kaypros and Osbornes seem to have survived the exodus toward Big Blue, and consequently more software is available in one of those formats.

Heath 8-bit systems themselves share a number of native formats, and some after-market controllers impose their own requirements on the recording process. The documentation Heath provided with each kit, together with the hackers spirit which made one buy such a system in the first place, allow one to extend the range of usable formats considerably. Fortunately, a large family of soft-sector drives

and controllers use non-conflicting protocols, and the differences in implementation between such systems are mostly software resident.

A soft-sector drive-equipped H-89 can access a wide variety of alien formats under CP/M via the ANAPRO-provided EMULATE package. Soft-sector systems rely on information recorded on the disk during the formatting operation. All systems do not request nor interpret this information the same way. The format utility supplied with a system only concerns itself with the requirements of that particular system.

EMULATE includes an utility (EFORM), which allows an H-89 to format diskettes to the combined requirements of both the Heath and the other system. By using a disk formatted by EFORM, systems which do not format disks to a Heath-compatible format also become accessible. A case in point is the 40 track DSD format utilized by the Kaypro 4/2X systems; the H-89 is unable to access side 1 of a diskette formatted on a Kaypro. If however the disk is formatted to the combined Kaypro and Heath requirements via a recent update of EFORM, it will be accepted by both systems.

Trying to elucidate the Kaypro implementation led me to explore some of the details of floppy disk operation. The information I compiled in the process allows me to explore disks of unknown origin, not restricted to CP/M compatibility.

**Major Interfaces.** A floppy disk system may consist of one or more drives, integrated with one or two disk controllers. All access to the drive(s) occurs through the controllers which in turn communicate with the processor. Physical interfaces can be identified between the disk and drive, between the drives and controller, and between the controller and the system processor.

Diskette compatibility:

- Drives may be able to read both soft sector and hard sector diskettes.
- Drives may support either single density (FM), or both FM and double density (MFM) recording.
- Drives may be able to read only one or both sides of a disk.
- A drive may be able to resolve tracks spaced at 48 TPI or at 96 TPI. Drives capable of the higher resolution can read disks generated at both resolutions. A disk generated on a 96 TPI drive can not however be read reliably on a 48 TPI drive (probably because of the lower magnetic moment of the narrower trace).

The actual installed drive(s) characteristics obviously limit the type of diskettes and recording methods which can be accessed.

**Controller compatibility:** A number of Heath and after-market controllers are available for the H-89. Some may support only a subset of the type of disk and/or recording methods supported by the drive, further restricting the range of acceptable diskettes.

- The Z-89-37 controller utilizes a Western Digital WD1797-02 LSI device driven by a 1 MHz clock, thereby restricted to a 5 1/4" disk interface. This chip supports DS or SS, FM or MFM, but does not handle hard sectored disks.
- The WD1797 not only transmits processor

instructions to the drive, but verifies their execution and flags errors.

The disk must carry a number of index marks and side, track, and sector information, correctly positioned with respect to the index hole, in order to enable the controller to perform these verifications.

**Format compatibility:** The requirements imposed by the 1797 controller are a subset of the IBM 3740 standard in Single Density Mode, and of the IBM System 34 in Double Density Mode. The information recorded on a disk during format initialization consists of a number of fields and index marks. The marks are special patterns in which particular clock transitions are deleted. The fields include Data Blocks, Sector ID Labels, and 4 different type of Gaps.

- Gap I separates the initial Index Mark from the first Sector ID Label.
- Gap II separates each Sector ID Label from the Sector Data Field.
- Gap III separates the Sector Data Field from the next Sector ID Label.
- Gap IV fills the track segment remaining between the last Sector Data Field and the initial Index Mark.

Starting at the index hole, which lays within Gap IV, the content of the fields is defined as follows:

FM			
Field/Function	IBM 3740 format 128 bytes/rec.		1797 format
(End of gap IV)	40	FF*	16 FF*
	6	00	
Index Mark	1	(FC)	- --
Gap I	26	FF*	16 FF*
	6	00	
1st Sector ID:			
Preset CRC	1	(FE)	1 (FE)
Track #	1	xx	1 xx
Side #	1	xx	1 xx
Sector #	1	xx	1 xx
Sector Length	1	00	1 xx
ID Label CRC	2	xx	2 xx
Gap II	11	FF*	11 FF*
	6	00	6 00
1st Sector Data:			
Preset CRC, or delete Data Mark	1	(FB)	1 (FB) or (F8)
Data	128	xx	nnn xx
Data CRC	2	xx	2 xx
Gap III	27	FF*	10 FF*
	6	00	4 00
2nd Sector ID (as for 1st Sector)	.	..	.
Last Sector Data (as for 1st Sector)	.	..	.
	.	..	.
Gap IV	fff	FF*	- --

MFM			
Field/Function	IBM System 34 format 256 bytes/rec.		1797 format
(End of gap IV)	80	4E	32 4E
	12	00	
	3	(C2)	
Index Mark	1	FC	- --
Gap I	50	4E	24 4E
	12	00	8 00
Preset CRC	3	(A1)	3 (A1)
1st Sector ID:			
ID Address Mark	1	FE	1 FE
Track #	1	xx	1 xx
Side #	1	xx	1 xx
Sector #	1	xx	1 xx
Sector Length	1	01	1 xx
ID Label CRC	2	xx	2 xx
Gap II	22	4E	22 4E
	12	00	12 00
Preset CRC	3	(A1)	3 (A1)
1st Sector Data:			
Data Mark, or delete Data Mark	1	FB	1 FB or F8
Data	256	xx	nnn xx
Data CRC	2	xx	2 xx
Gap III	54	4E	24 4E
	12	00	8 00
Preset CRC	3	(A1)	3 (A1)
2nd Sector ID (as for 1st Sector)	.	..	.
Last Sector Data (as for 1st Sector)	.	..	.
	.	..	.
Gap IV	fff	4E	- --

Notes: \* 00 (Optional)

- The 1797 disregards the Index Mark.
- Gaps shown for 1797 are minimums, except where boldfaced (exact count required).
- Bytes shown in ( ) have a clock bit suppressed.
- nnn Data Bytes (as defined by Sector ID Field and Sector Length Flag).
- fff Bytes (to fill remainder of track).

**The Kaypro 4/2X Caper.** Within any sector read or write operation, the 1797 controller sets the side select line and scans the Sector ID Labels for a match between the track, side, and sector numbers, and those requested by the processor.

The Kaypro double sided controller protocol ignores the ID Label side information: the disk side select line is not driven by the controller but directly from the processor interface. When sectors 0 to 9 are requested this line is set to 0, and for sectors 10 to 19, the side select line is set to 1. Kaypro formats its disks with the side byte, in the Sector ID Label, set to 00 regardless of which side is actually addressed.

Because no side information is inserted in the Sector ID Labels on side 1, no match can be found on this side by the Heath Z-89-37 protocol. The Kaypro will, however, accept disks with the proper side identification. Ambivalent disks can be generated by a proper formatting routine.

**Diskette Formatting.** Formatting a disk requires the generation of special sequences with suppressed clocks (field ID marks), and CRCs. The controller Write Track command performs such functions. With the R/W head positioned over the desired track, when the 1797 has received a Write Track command, the controller will request a sequence of bytes to be written as soon as a hole index pulse is received, until the next pulse is encountered. Characters between F5 through FE are re-interpreted as follows:

(From Zenith Data Systems "Double-Density Disk Controller" Operation Manual - (595-2674-04))

Input	FM Interpretation
-----	
F5-F6	Not Allowed
F7	Generate 2 CRC bytes
F8-FB	F8-FB, CLK=C7, Preset CRC
FC	FC, CLK=D7
FD	FD
FE	FE, CLK=C7, Preset CRC
MFM Interpretation	
-----	
F5	Write A1* in MFM, Preset CRC
F6	Write C2** in MFM
F7	Generate 2 CRC bytes
F8-FE	F8-FE

\* Missing clock transition between bits 4 and 5

\*\* Missing clock transition between bits 3 and 4

In order to format a Heath/Kaypro compatible disk, the following sequence must be presented to the controller, after a Write Track command has been issued:

Number of bytes	Input Byte	Written to Disk
-----		
77	4E	4E
12	00	00
3	F6	(C2) CLK=F7 (Index Mark preamble)
1	FC	FC (Index Mark)
* 18	4E	4E
+-----		
12	00	00
3	F5	(A1) CLK=EF (Preset CRC)
1	FE	FE (ID Address Mark)
1	trk	trk 00-27 (Track Number)
1	side	side 00-01 (Side Number)
1	sect	sect 00-09 (Sector Number on Side 0)
		0A-13 ( " " on Side 1)
1	02	02 (Sector Length = 512 bytes)
1	F7	crc1,crc2 (2 CRCs written)
22	4E	4E
12	00	00

3	F5	(A1) CLK=EF (Preset CRC)
1	FB	FB (Data Address Mark)
512	data	data (Fill with E5 typical)
1	F7	crc1,crc2 (2 CRCs written)
22	4E	4E
-----		
179**	4E	4E (Approximate minimum)

\* Write bracketted field 10 times

\*\* Continue writing until 1797 interrupts out.

Descriptions in parentheses refer to the preceding byte(s).

(Sectors are interleaved)

**Operating System Compatibility.** Once a formatted disk acceptable to both systems is available, information can be written to or read from such disk by either a Kaypro or an H-89. To properly interpret and link the individual sectors, both systems must use compatible disk operating systems and the operating system must be provided with the disk organization info.

The Kaypro 4/2X comes with a CP/M 2.2 BDOS and BIOS in ROM. The disk parameter block (DPB) shows 40 CP/M records/track (SPT), which are grouped into ten 512-byte physical sectors numbered 0 to 9 on side 0, and 10 to 19 on side 1. The block shift factor (BSH) is 04 and block mask (BLM) is 0F, indicating an allocation block size of 2k. The extent mask is 01 (< 256 blocks/disk and 16 blocks/extent). Each disk can accommodate 196 blocks (BLM = 00C3) and 64 directory entries (DRM = 003F). The allocation block bit map reserves 4 blocks for the directory (ALO, ALI = F000). The size of the changed disk check vector is 16 bytes (CKS = 0010). The number of tracks before the directory is 1 (OFF = 0001).

The disk parameter block (DPB) for the drive to be utilized must be updated accordingly. So must the Heath extensions to the disk parameter entry tables (DPE) reflect the number of CP/M records per physical sector (DPERPS = 4), and the number of CP/M records per allocation block (DPERPAB = 16). All of the above information is built into ANAPRO's EMULATE and its custom BIOS. When the KAYPRO 4/2X format is selected from the opening menu, these parameters can be associated with any of the available logical drives.

**Conclusion.** The ANAPRO EMULATE/EFORM formats a disk to both the Kaypro and the Heath protocols. Consistent with the fact that a 96-TPI-generated disk can not reliably be read by a 48 TPI drive, the formatting program requests a lower resolution, double-sided drive.

It is not uncommon that a 48 TPI drive recognizes a trace written on a 96 TPI drive. While the reliability of such transfers is unpredictable, it is possible to format a Kaypro compatible 48 TPI disk on an H-89 96 TPI drive. The H-89 will find and read whatever a 48 TPI equipped Kaypro has written on such a disk, but the reverse is not guaranteed. Success will depend on the sensitivity of the Kaypro drive the transfers will be attempted from. To format such a disk on a 96 TPI drive requires a



**HDOS OPERATING SYSTEMS****HDOS 2.0**

(Written by Heath Company)

The last commercial version of the original operating system for the H-8 and H/Z-89/90, based on the design of J. Gordon Letwin, now Chief Architect for OS/2 at Microsoft. On four (4) disks: OS distribution, device driver source, software tools, and HOS-5-UP (soft-sector floppy and printer driver update). Includes the drive testing software mentioned by Dan Jerome's article in the last issue. I will provide soft-sector systems using Heath's standard (though slow) floppy disk driver. See my discussion of floppy drivers in issue #3, pp. 3-5.

(This package is available on either standard hard-sector or single-sided, 40-track (48 tpi), soft-sector disks for \$15 postpaid. [This price is up because of the rising cost of hard-sector disks!] See issue #'s 9 and 11 for documentation. If you have no experience with HDOS, I recommend, at minimum, Chapters One and Two of the manual.)

**HDOS 3.0**

(By W. Parrott, R. Musgrave, etc.)

The seven-disk set formerly sold by Bill Parrot. Includes: OS distribution, executable device drivers and utilities, device driver source (4 disks), and common decks. The set includes updates to the OS, Benton Harbor BASIC, EDIT, etc., combining the best of HDOS 2.0, CP/M, and MSDOS. Many third-party printer device drivers will run under this system, as will most standard software written for HDOS 2.0, such as Lucidata Pascal (see issue #9). Exceptions include EDIT19, but see Rick Streeter's column in #9 for a patch and further below. For more information on this system, see Rick's introductory column in issue #8. The on-disk documentation is skimpy and presumes knowledge of HDOS 2.0. Assembly of the device driver source code **requires** the UltiMeth Assembler, available from Quikdata. An assembler for more conventional applications is included.

(This package is available on either standard hard-sector or single-sided, 40-track (48 tpi), soft-sector disks for \$25 postpaid. See issue #'s 9 and 11 for HDOS 2.0 documentation. If you have no experience with HDOS, I recommend, at minimum, Chapters One and Two of the manual.)

**HDOS 2.0 Source Code**

(Written by Heath Company)

(Keyed by members of CHUG)

(Provided by Terry Hall)

Source code based on the published listings Heath sold some years ago. Covers eight (8) standard hard-sector disks or three double-sided soft-. Available on either HDOS 2.0 or 3.0 media. Reputedly, assembly requires the UltiMeth assembler available from Quikdata.

(This package is available on either standard hard-sector or 40-track (48 tpi), soft-sector disks for \$15 postpaid. Please specify disk format and operating system.)

**TEXT EDITING SOFTWARE**For CP/M only**VDE**

(By Eric Meyer)

A WordStar work-alike editor. Features full-screen editing, word-wrap, formatting (margins, tabs, and

line spacing), printing, block operations, and macros. Reads and writes WordStar "document" (though WS's dot commands are ignored) and ASCII files, with margins active and tabs variable; and WS's "non-document" files, with margins disabled and hard tabbing. Recognizes hyphens (though it doesn't add them during reformatting) and disks can be easily swapped when you run out of space. File size is limited to roughly 50K, depending on your TPA. Can be configured for a large number of terminals; the normal installation program (VINST) sets up a WordStar-like environment, without the H/Z-19 keypad for cursor control. Hank Lotz supplies a custom utility to bring up the keypad for cursor movement. If you want a more sophisticated environment (with keypad and function keys), HUG's KEYMAP is an excellent alternative. VDE comes as a compressed file with a delibrary utility (UNARC10.COM) and Hank's utility and documentation. If running only hard-sector, you will have to delibrary to several disks since the fully extracted files take some 130K. Packed onto one hard-sector disk. Requires a Z80 CPU. (My thanks to Hank Lotz for his utility and Al Sophianopoulos for bringing VDE to my attention.)

For HDOS only**EDIT19**

(By S. and K. Robbins)

(From CHUG's Library)

The last version (3.01) produced by the Robbins'. Customized for the H/Z-19 terminal, it features formatting (margins, justification, word-wrap, and centering), macros, and can edit files larger than memory. Somewhat difficult to learn (but Dan Jerome has prepared some help that will appear in **Staunch** next issue) and occupies considerable disk space. Includes seven overlays, two on-line help files, and an extensive tutorial. Covers five hard-sector disks: editor, very large manual (cleaned up and formatted by Dan Jerome using EDIT19!), tutorial (squeezed), index (which CHUG didn't have room for), and a patched .ABS program (per Rick Streeter's instructions in **Staunch** #9) so you can use the package under HDOS 3.0.

**OTHER SOFTWARE**For HDOS only**From QUIKDATA COMPUTER SERVICES**

(Courtesy of Henry Fale)

General Utilities and Toys (HS-001)

(By various authors)

A collection of utilities and non-graphic games in machine code, BH BASIC, and MBASIC. Among other things, these let you change terminal baud rate, change volume numbers and labels on hard-sector disks, do memory and disk dumps, list files on a printer within MBASIC, and play games (Blackjack and Crazy-8's, by William Velten).

Word Processor and Editor (HS-002)

An easy-to-learn, easy-to-use page editor (by Ronald Baker) written in MBASIC and featuring command completion, editing, inserting, and printing. Files are limited to 60 lines for such things as letters. And a complex word processor (adapted by Rich Green) written in MBASIC and based on one by D.L. Fitchorn published in the August, '78, **Kilobaud**. Supports five open files at once, hyphenation, hyphen-dictionary lookup, justification, margins, macros, table of contents, and indexing. Text files are composed of REM'd lines in MBASIC and are created with a text entry program. But file editing is done

with the line editor of the interpreter. Additional documentation is provided over the original release to help you get the package running. The word processor **requires** a two-drive system and 48K.

H-19 Graphics/Printer Pictures I (HS-003)  
(By various authors)

Graphics programs and games in Benton Harbor BASIC and MBASIC, including DOGRACE, tic-tac-toe, maze generators, and PINBALL. Has machine language programs to test the screen and generate the H-19's graphics blocks. And pictures for display or printing composed of ASCII characters.

H-19 Graphics/Printer Pictures II (HS-004)  
(By various authors)

A continuation of the previous disk, containing BATTLESHIP, OTHELLO, several animation programs, a banner maker, and documentation about the H/Z-19 graphics set.

Miscellaneous BASIC Programs (HS-005)  
(By various authors)

This collection lets you let up a mailing label system, chart your biorythm, compute the unknown length of sides in right triangles, determine what plants to grow and where, and set up and maintain a random file system. Requires both BH BASIC and MBASIC.

Challenger (HS-006)

Two adventure games by Haywood Nichols: ATOM20 (survive a nuclear holocaust) and OREGON TRAIL (drive a covered wagon to Oregon). Require BH BASIC.

HDOS 2.0 Patches (HS-007)

Patches to HDOS, requiring PATCH.ABS or a dump program. Also patched versions of ASM, FLAGS, PATCH, SET, XREF, and ERRORMSG.SYS. Includes extensive documentation, ACM's, and additional utilities: DUMP, SUBMIT, R, and XSTAT.

Selectric and Misc. Drivers (HS-008)

Parallel and serial drivers to interface an IBM Selectric typewriter as printer. Also drivers for an Anderson-Jacobson terminal, (bi-directional) Diablo 630, and the H-25 printer.

Miscellaneous BASIC Programs (HS-009)

Includes SWARMS, a complicated (adventure?) game in BH BASIC by Hayward Nichols. The remaining MBASIC programs on this disk (from Bill Velten) include graphics versions of HANGMAN and SINK (a ship), a calorie counter, and three for op-amp design (high/low-pass filters, notch filters, and amps).

Multi-Key Sort Routines (HS-010)

A multiple-key sorting package by Fred Pospeschil, including the C source. Will sort on up to 25 fields, ascending or descending, and anywhere in a record. The size of the file to be sorted is limited by memory.

From the U. of Houston (HS-011)

MBASIC games from instructor Furman Smith and students at the U. of Houston, Victoria Campus. Many of these appeared in past issues of **RECREATIONAL COMPUTING**. Also includes a program to remove

comments and unnecessary blanks from MBASIC code and some additional mazes for Software Toolworks' MUNCHKIN.

Multipurpose DUP/DUMP/H-8 Routines (HS-13)  
(By Terry Smedley)

Hard-sector DKDUP whole-disk duplication utility is compatible with UltiMeth's driver (HUG #885-1121) as well as Heath's standard and allows up to 6 drives and DUP'ing a 40-track disk **in** an 80-track drive **to** a 40-track drive. DKDUMP is **only** for use with the UltiMeth hard-sector driver. Also has a utility and ACM library for the H-8's LED's. ASM source included.

MBASIC Utilities and Goodies (HS-014)  
(On **Three** hard-sector disks)

The ABS programs in this collection, by Jerry Seefield, include KOPY (to copy non-system files with the flags intact), PIP (displays the files copied), SYSGEN (selective copy of non-system files after a normal SYSGEN), INIT (select large or small directory), and FLAGS (deletes L flag). The MBASIC programs, mostly by Bill Velten, are principally a menu-driven set for office use. These include checkbook record keeping, multifunction calculator, and appointment/schedule/date tracking. Some graphics programs are also included as office diversions!

FHANDLR/RS232C/ALTER (HS-016)

Textfile utilities (provided by Al French and written in Tiny Pascal) to: break large files into smaller ones, number lines, filter out garbage (such as CTRL-characters), remove tabs, search and report on strings, sort small files, merge-sort small sorted files, and convert lower-case to upper and the reverse. The MBASIC material (written by Dean Gibson) gives you **direct** access to your serial ports for bit-twiddling or is a disk dump utility that includes the ability to **disassemble** bytes in the displayed sector somewhat like CP/M's DDT, but written in MBASIC.

Daisygraph (HS-017)  
(Provided by Al French)

A package to do graphics with your Diablo 630, DAISYWRITER, DTC-380Z, or compatible daisywheel printer. (Not for the HP 2601!) Includes device drivers; MBASIC software to prepare data for bar charts, linear least-squares regression plots, and pie charts; and the main graphics program (written in Pascal MT+).

MX-80 Support (HS-018)

A driver and utilities for the Epson MX-80 and compatible printers. Because this driver uses RAM in low memory, it is probably not useable with HDOS 3.0. The documentation shows how to embed printer control codes in text edited with EDIT.ABS and PIE.ABS, the driver's set options, and hardware configuration.

HDOS Utilities (HS-019)  
(By A. van Andel)

Three utilities: DISCOM for deleting unnecessary spaces, tabs, and comments from ASM and ACM files to reduce disk storage requirements and speed up assembly; SWTERM to run a second terminal from your system, for either the original or Watzman/HUG terminal ROMs, 8080 or Z80 CPUs, and off port 320; and TEST4MHZ, to check dynamic RAM, monitor ROM, and H-17 floppy RAM and ROM for functioning at 4 MHz.

## How to Order

**Except** where otherwise indicated above, your cost depends on what you supply:

Formatted disk(s) and self-addressed, stamped return mailer ..... \$2.00  
Formatted disk(s) without mailer ..... \$4.00  
No disk(s) or mailer ..... \$6.00

Disk formats available are standard (SS/SD) hard-sector and 40-track (48 tpi) soft-sector, single- or double-sided, for both HDOS and CP/M. Please clearly indicate the format you are supplying or require. If you desire soft-sector, I will pack multiple items as described above onto one disk for the **single-disk** charge. But I will not subdivide a disk. Send your order to:

Kirk L. Thompson / **The Staunch 8/89'er** / #6 West Branch Mob Hom Vil / Rte 1 / West Branch, IA 52358

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## Alternative Printers

Installing a new printer on that old H-8 or '89/90 can be something of a chore these days. The main reason, especially for HDOS, is because many of the old device drivers and utilities don't seem to apply to the newer models. But among the material I've received in the last few months was a chart of alternatives provided by MicroPro\* for WordStar\* Professional Release 4. Though not specific to our equipment, I think it can supply some guidance in connecting drivers, utilities, and handshaking with those new printers.

A word about the material in the chart. Many printers use DIP switches to select which "standard" model they emulate or a mode; this is indicated by the names in parentheses on the left, after the printer models. The abbreviations on the right mean the following: 630ECS is the Diablo 630 ECS, 630WP the Diablo 630 w/ WP Option, DIABLO a "generic" Diablo daisywheel, DRAFT a generic draft printer, FX80 the Epson FX80/100, FX85 the Epson FX85, GEM10X the Star Micronics Gemini 10X, HPLJET the HP LaserJet, IBMGR the IBM Graphics Printer, IBMPRO the IBM Proprinter, LQ1500 the Epson LQ1500, MX80 the Epson MX80/100, QUME the Qume Sprint Daisywheel, SPINWR the NEC Spinwriter, and TI855 the TI 855/856.

Given the 53 printer variations listed below, you can see that there are only 15 "standards" which they emulate. So if I were in the market for a new one, I would first check out what utilities and drivers are already available for one or more of those standards and use this to narrow my choices. But, of course, I can't guarantee the matchups. This material serves only as a guide; more specific information in the printer manuals may override this. And I would like to thank MicroPro\* for giving permission to reproduce the chart.

Printer Name	Install As
AT&T 473	FX80
Brother HR-15/25	DIABLO
Brother 1709 (IBM)	IBMGR
Brother 1709 (Epson)	FX80
Brother 2024L (DP)	FX80
Brother 2024L (WP)	DIABLO
Brother Twinriter (DP)	FX80
Brother Twinriter (WP)	DIABLO
C. Itoh F-10	DIABLO
Comrex CR-II/III	DIABLO
Dataproducts DP5582	DIABLO
Diablo D801F	DIABLO
Diablo 620	DIABLO
Diablo 630 w/SPI	DIABLO
Diablo 635	630ECS

Printer Name	Install As
Dynax-Fortis 15/25/35	DIABLO
Epson DX20	DIABLO
Epson EX800 (Epson)	FX85
Epson EX800 (IBM)	IBMPRO
Epson (Lettertype)	FX85
Epson LQ2500	LQ1500
Epson JX80	FX85
Epson MX w/Graftrax+	MX80
Genicom 3320 (Diablo)	630WP
Genicom 3320 (IBM)	IBMGR
HP 2603A	DIABLO
IBM Page Printer	IBMGR
JDL 750e (LQ)	DIABLO
JDL 750e (DQ)	DRAFT
Juki 6100	DIABLO
Kyocera Laser	HPLJET
Mannesmann Tally 85	FX85
Mannesmann Tally 490	FX85
NEC Elf 360 (Diablo)	DIABLO
NEC Elf 360 (ISO)	SPINWR
Nissho NP-910	FX80
Nissho 2410	FX85
Olympia ESW 2000C	DIABLO
Primage 90	DIABLO
Panasonic 1091 (Epson)	FX80
Panasonic 1091 (IBM)	FX85
Panasonic 1092 (Epson)	FX85
Panasonic 1092 (IBM)	IBMGR
Panasonic 1093 (IBM)	IBMGR
Panasonic 1093 (Epson)	FX80
Panasonic 3151	DIABLO
QMS Kiss	DIABLO
Qume Letterpro Plus	QUME
Smith-Corona D200	FX80
Star NL-10	FX85
Star Radix 15	GEM10X
TI 850	MX80
TI 857	TI855

\*MicroPro and WordStar are trademarks of and copyrighted by MicroPro, 33 San Pablo Ave., San Rafael, CA 94903.

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## Fractals on the MPI 99 Printer

Lee Hart's fractal article in the last issue prompted input from Thomas Szebenyi. Tom has an MPI 99G printer and rewrote the print routine in the program for it. I reproduce it below. This is now included on the free disk of MBASIC source code. And if anyone has modified Lee's program for other printers, send your code to me and I'll include it there as well.

The section below only shows those changes Tom made for the printer. It's set up as a MERGEable file. You could key this in, save it in ASCII, then LOAD Lee's original program and combine the two with the command, MERGE "fname". The new lines will overwrite the old starting at 530. Or you could simply use the AUTO command to overwrite the existing code.

```

530 REM      --- INITIALIZE PRINTER GRAY-SCALE ---
540 REM      (for MPI 99G printer)
550 REM
560 GRAYP=12: REM subscript of last entry in printer
    array
570 DIM P$(GRAYP+1)
580 P$(0)="@@@H@@@"
590 P$(1)="H@R@I@"
600 P$(2)="Q@bHQB"
610 P$(3)="IRdIRd"
620 P$(4)="UJjEUj"
630 P$(5)="UjUjUj"
640 P$(6)="JWJjJ"
650 P$(7)="]n]n]n"
660 P$(8)=CHR$(95)+"mwm]m"

```

```

670 P$(9)=CHR$(95)+"ow{}"+CHR$(126)
680 P$(10)=CHR$(127)+CHR$(95)+CHR$(127)+"w"+
CHR$(127)+CHR$(126)
690 P$(11)=CHR$(127)+CHR$(127)+CHR$(127)+
CHR$(127)+CHR$(127)+CHR$(127)
700 P$(12)="@@@@@"
710 RETURN
720 REM
730 REM      ----- PRINT MANDELBROT SET -----
740 REM
750 WIDTH LPRINT 255
755 PT$=CHR$(54): PS$=E$+CHR$(23)
760 HORIZ=101-1: REM horizontal resolution at 12.5
characters/inch
770 VERT=120-1: REM vertical resolution at 12
graphic lines/inch
780 LPRINT E$+CHR$(30): REM select SERIF font
790 REM
800 FOR CR=RIGHT TO LEFT STEP (LEFT-RIGHT)/VERT
810 LPRINT PS$;
820 FOR CI=TOP TO BOTTOM STEP (BOTTOM-TOP)/HORIZ
830 I=0: ZI=CI: ZR=CR: ZI2=0: ZR2=0
840 WHILE I<IMAX AND ZR2<ZI2<4
850 ZI2=ZI*ZI: ZR2=ZR*ZR: ZI=2*ZR*ZI+CI:
ZR=ZR2-ZI2+CR: I=I+1: WEND
860 IF I<IMIN THEN IMIN=I: RANGE=GRAYP/(IMAX-IMIN)
870 LPRINT P$((I-IMIN)*RANGE);
880 NEXT CI
890 LPRINT PT$;
900 NEXT CR: LPRINT CHR$(12): LPRINT E$+CHR$(29)
910 GOTO 70

```

=====

#### VENDOR.UPDATE

**News from ANAPRO CORP.** [From Peter Shkabara] To those that have been long time followers of ANAPRO, an announcement of yet another address change will not come as a surprise. Well, such an announcement is in fact here. Retail sales did not agree with my family, and we ended up selling the Radio Shack store (at the new location to which we had just moved)! As a result, I have returned to UCSB in order to continue my studies in Computer Engineering. For now, ANAPRO will be operated out of the house with use of the family telephone and address. Keep in mind that this is now a family activity with no set hours of operation but usually there is someone in during the day. At other times, an answering machine will be on. The address and phone info is as follows: **ANAPRO** / 8895 Pino Solo Ave / Atascadero, CA 93422 / (805)466-4284.

Now for some news and views. We have not been advertising for nearly a year. Yet every day we get requests for CP/M stuff! As I have been saying, CP/M is NOT dead - but because owners of the older machines are reluctant to spend money, accessories and software are hard to find now. **FORM GROUPS!!!** There is a tremendous amount of good public domain software out there for all to find and use. Also, if hardware orders come in sufficient quantity, a vendor can supply your needs.

The CDR RAM board is no longer available. There was another limited production made due to customer demand, but that is now gone. Our own REP3 keyboard repeat is also gone. We can't justify another run of PCBs. If a group order for 50 or so were to come in, then it could be worthwhile. There is strength in numbers. Support your local group if you have one. If you do not have a local group, try keeping in touch with **The Staunch 89'er** or write to **H-Scoop**. Let your views be known. Sitting quietly lamenting will get you nowhere fast.

A few days ago (mid April) I talked with Bridger Mitchell of Plu\*Perfect Systems. They are the Date-Stamper people. The address in Idylwild, CA is no longer in effect and should not be used. Correct address and phone: Plu\*Perfect, 410 23rd St, Santa Monica, CA 90402, (213) 393-6105.

Following is a list of some items we have for sale:

Limited quantity of software at \$10 each: Sunflower Software - HDOS: SEARCH PRINT [finds strings in text, variables in MBASIC], NAMELIST [mailing list program], DISK SORT, DUAL PORT [run two terminals]; CP/M: EASY [electronic appointment book]. Software Toolworks - HDOS: SPOOL N GO [print spooler]. HUG: WATZMAN ROM source code for H19.

Hardware: TigerTronics serial/parallel converter (connect a parallel printer to your H89 serial port), used \$49. Heath external drive cabinets - \$75 w/o drives. 8-inch Siemens SSDD drive in external cabinet/PS - used \$120. H89 and H89A, 64K, 4MHz, H17/H37 controllers, green or amber screen - \$225 ea.

To get some interest going in our 4MHz mods for the H89, we have reduced the price to \$29 assembled, \$19 for a kit, and \$6 for the PCB w/o instructions or software. Specify format for software.

Add \$5 per order shipping handling / CA residents add 6% tax.

[Pete also noted that the price of his EMULATE package (recommended!) for the H37, Magnolia, and C.D.R. controllers is reduced to only \$39. -Ed.]

**FILEBASE.** And speaking of price reductions, Tom Markowitz of **EWDP Software** is offering **20% off** the normal \$99 price of his easy-to-use FILEBASE database manager for CP/M as a special for **Staunch** subscribers! This package is menu- and prompt-driven, requires no installation, and features variable-length fields, sorting and record selection, and compatibility with WordStar, InfoStar, MailMerge, dBase, BASIC, etc. Each field in a record may contain up to 255 characters, each record in a file can have up to 40 fields and a maximum length of 4096 characters, and maximum file size is in excess of 240K.

Record updates are by random access; you can modify the files with WordStar. FILEBASE is fast in sorting and general operation. It can also access two files simultaneously. But output automatically goes to a new file, so you need free disk space. And though the report generator requires no programming, it also is not particularly sophisticated. For elaborate output you can use BASIC or other languages to **directly** read the comma-delimited database files.

Finally, EWDP encloses some utilities with the package. These are: FB/ACCESS (for creating disk-based indices and even faster searches), FB/LABELS (for printing labels 3 or 4 across), SETPRINT (to set printer options in common models), PROFLOSS (generates a profit and loss statement from a check register under FILEBASE), and UTL (a CP/M front-end utility).

For more information or ordering, contact:

Tom Markowitz / EWDP Software, Inc. / P.O. Box 40283 / Indianapolis, IN 46240 / 317-872-8799

To get the discount, **be sure to mention Staunch!** And I would be interested in a review of this package for **Staunch**.

**More on Alpha.** Last issue I mentioned here that Borland's Turbo Pascal is now being handled by **Alpha Systems**. Well, I received a January catalog from them a month ago. The price for the compiler is \$60, plus \$4 shipping. But Alpha **also** is a supplier of Z-System software and downloadable fonts for the HP LaserJet. Besides Turbo, the catalog listed NZ-COM, ZCPR 3.4, Z3Plus, a number of utilities for Z-System, ZCPR3 manual and libraries, a CP/M/-Z-System newsletter, and eight typefaces (with many permutations) for the laser printer fonts. Check the address in the previous issue.



custom-made routine, writing to each track the sequences provided above.

The CP/M disk operating system isolates the user from direct access to the disk controller. While a disk operating system is required to make sense out of the information extracted from a disk, a "raw" exploration of diskettes of unknown origin may sometimes be useful. Once the disk structure is defined, further access can be attempted via the higher level EMULATE and DU3, or the appropriate DPB and Heath Extension can be set up.

Source for "EMULATE": ANAPRO Corporation  
8895 Pino Solo Ave.  
Atascadero, CA 93422  
805-466-4284  
=====

#### VENDOR UPDATE

(For more vendor info, see the insert!)

**Software Toolworks Discontinues HDOS Line!** I mentioned last issue that the news from this vendor wasn't good. I received official word **after** that issue went to the printer that it has discontinued selling HDOS software. You may still be able to get a few packages at third-party vendor close-outs, such as ANAPRO's (see this issue's insert), but that will be it. As I also wrote last issue, there is quite a bit in the public domain which can fill the large void created by Software Toolworks' departure on the HDOS side.

But there is **no** replacement in the immediate future for one item, MYCALC. If you need an electronic spreadsheet, you will have to purchase one that runs under CP/M. As for other applications and utilities, I expect to list alternatives (such as EDIT19 in this issue's insert) as time goes on. If you have special needs, let me know and I'll try to hunt something up for you.

**Thomas Bohon.** And though some are dropping the ball (or letting it slip through their fingers!), others are running with it. **Tom Bohon** (P.O. Box 293, Olympia, WA 98507) sent material on a pair of utility packages he has written. These are **KEYWORD**, "a free-form database retrieval program" to be used with a word processor (\$10), and **TextTools**, a collection to

- "restructure your text lines for length
- "clear your CRT screen...
- "remove trailing blanks and tabs from text
- "locate the difference between two files
- "add line numbers to a file during copy operations
- "convert a text file to all upper or all lower case characters
- "send a form feed (page eject) to your printer"

and composed of 12 programs (\$10). Tom added that **both** can be had for \$15 when ordered together. They require CP/M 2.2 or later and the H-8/19, H/Z-89/90, or -100 and can be obtained on either hard- or soft-sector.

In his cover letter, Tom also added: "The enclosed offers are just the beginning. I am in the process of forming a partnership with several other experienced programmers, each of whom has a wealth of experience to bring to our new venture--providing

you with usable, dependable, reasonably priced software ... In addition ... we are beta-testing a statistical analysis package, a financial package (with annuities, loans, amortization tables, etc.) and several other programs. We are also in the process of building a public domain library which will be made available in the \$2 to \$3 per volume price range. Finally, we are gearing up for custom software projects--if you need something written for your system, please drop us a note with the details.

"As you can see, our 'orphan' computers are far from being sent to the scrap heap .. I urge you to continue supporting those publishers, such as Len Geisler of **The SEBHC Journal** and Kirk Thompson of **The Staunch 8/89'er** who support us so well. And I urge you to search out those firms and individual programmers who still provide us with usable, useful software for our systems...."

=====

#### Two Bad Problems with TABs in MBASIC by Hank Lotz / 2024 Sampson St. / Pgh, PA 15221

Well it's great to be back with you after a hiatus of two issues! This article applies to (at least) MBASIC version 5.21 for CP/M. A CP/M-oriented solution is given for the first of the two problems discussed.

Late in 1988 I wrote a program to print **The STAUNCH 8/89'er** in 2 columns from Kirk's PeachText files (or my MAGIC WAND) **without** reversing the paper feed. (We used to do a "printer rewind" to get col 2 -- see **STAUNCH** #1, p.5.) The new program prints each line all the way across the page, thus doing both columns in **one** vertical pass. I wrote it in MBASIC.

**The First Problem.** Well, that MBASIC program needs to send control codes to the printer, and I discovered that when a sequence includes the value 9 (which happens to be the ASCII code for a TAB char), **MBASIC won't send the binary value of 9 (i.e., 00001001) to the printer.** Instead, MBASIC's LPRINT assumes you are "tabbing over" in a text, so it **always** expands TABs into spaces, and sends those spaces whether you like it or not! (The number of spaces sent **varies**, based on print head position relative to the next standard TAB stop.) I could in fact **not** send a "binary" 9 to the printer from MBASIC in **any** "friendly" way. (Direct-port I/O is not that "friendly" in my book.)

MBASIC will write a binary 9 to a **disk file**, but that was no direct help. I decided to employ a tiny assembly-language subroutine because that will transmit **any binary byte**, including the value 9, over to the printer, "as is". The subroutine uses CP/M's BDOS function 5, thus letting the op system send the byte to the printer. Here is the listing so you can see what the routine looks like, but you won't need to type it in this form if you use it with the interpreter. Read on and you'll see why.

```
;SUBROUTINE LP -- SENDS 1 BYTE TO PRINTER FROM MAIN
;SAMPLE MBASIC CALL: "CALL LP(1%)"
      MOV     A,M      ; Put passed byte into A
      PUSH    PSW      ; Save registers
      PUSH    B
      PUSH    D
      PUSH    H
```

```

ANI    07FH    ; Strip high bit if set
; To send a byte > 127 (for graphics or whatever),
; omit the ANI 07FH (or else substitute ANI 0FFH)
MOV    E,A     ; Put byte in register E
MVI    C,5     ; Put print function into C
CALL   5       ; Address 5 has JMP to BDOS
POP    H       ; Retrieve registers
POP    D
POP    B
POP    PSW
RET                     ; Return to calling program
END

```

; (For M80 use, add label LP: to first instruction,  
; "MOV A,M", and precede THAT line with "ENTRY LP")

It may seem unfortunate we must resort to a special routine, but it does work beautifully!

And because this happened I was able to answer John Clement, who wrote to **SEBHC Journal** with the same problem (Nov. 1988, p.4). He wanted to know how to send his printer the sequence ESC+"A"+9 (which, in decimal, is 27,65,9). I credit John's **SEBHC J.** letter for leading me to the further task of adapting the routine into a more convenient form, namely, MBASIC DATA statements. This MBASIC solution is **self-contained** and I mailed it to John. When this MBASIC program is RUN, it READs the subroutine from the DATA, POKEs it into memory, and CALLs it when needed. I put a CR/LF pair at the end for those printers that need it to make them print, because John wrote back that he realized he "needed a CR" (which I hadn't included). Here's one version of the listing:

```

100 REM  COMMAND LINE = MBASIC /M:&HCBFF
110 REM  ...OR,          MBASIC PROGNAM /M:&HCBFF
120 DATA &H7E,&HF5,&HC5,&HD5,&HE5,&HE6,&H7F,&H5F
130 DATA &H0E,&H05,&HCD,&H05,&H00,&HE1,&HD1,&HC1
140 DATA &HF1,&HC9
150 LP=&HCC00
160 FOR I=0 TO 17
170 READ BYTE : POKE LP+I,BYTE
180 NEXT I
190 REM  A SAMPLE CALLING SEQUENCE IS:
200 REM      CHAR%=&HOD : CALL LP(CHAR%)
210 REM      ...OR, IF YOU PREFER DECIMAL,
220 REM      CHAR%=13 : CALL LP(CHAR%)
230 REM  TO SEND THE 27,65,9 CODE (TEXT EXAMPLE):
240 REM      CHAR%=27 : CALL LP(CHAR%)
250 REM      CHAR%=65 : CALL LP(CHAR%)
260 REM      CHAR%=9 : CALL LP(CHAR%)
270 REM  BUT DO NOT EVER SAY "CALL LP(9)", BECAUSE
280 REM  "CALL LP(CHAR%)" PASSES THE ADDRESS OF
290 REM  CHAR%, AND 9 IS NOT THAT ADDRESS.
300 REM  THE FOLLOWING PRINTS "TEST" ON PRINTER:
310 CHAR%=84 : CALL LP(CHAR%)
320 CHAR%=69 : CALL LP(CHAR%)
330 CHAR%=83 : CALL LP(CHAR%)
340 CHAR%=84 : CALL LP(CHAR%)
350 CR%=13 : LF%=10 : CALL LP(CR%) : CALL LP(LF%)
360 END

```

My &HCC00 address (see "LP" in line 150) is sort of arbitrary. If you ever change it, change also your M: switch address when invoking MBASIC (see lines 100 and 110). The switch value should be **one less** than the "LP" address you use.

Notice in DATA lines 120, 130, and 140, which embody the assembly subroutine, there is a total of 18 values. Yet in the subroutine as listed earlier, you'll count only 14 instructions. (Don't count END; it's not a CPU opcode.) This is because CALL takes 3 bytes, and ANI and MVI require 2 bytes **each**. So the use of 7 bytes by 3 opcodes accounts for the 4 extra bytes in the DATA statements. By the way, we could've used **decimal** values in the DATA lines, but hexadecimal is easier to copy from (and compare with) HEX files, DDT memory scans, disk dumps, and standard opcode tables.

Also notice, **integer** variable names like CHAR% (not CHAR) are used for the CALL LP() argument. Don't forget the % sign or you'll likely be in trouble. (But DEFINIT CHAR would be another valid way to specify it as integer.)

**A By-product of the Solution.** Besides letting us output our 9's in binary, this whole example provides a nice way to load assembly-language code **in general** for use with interpreted MBASIC programs, especially when the code is brief as it is here. But in a future article, I'll show you another **easy** way to do the **same thing** using Microsoft's M80 assembler and L80 loader, if you have those beasts. And, no, I'm not talking about **compiled** MBASIC applications where those utilities are probably **more often** employed.

But in the meantime, if you do want to use the above assembly subroutine with M80, for a callable **relocatable** module, honor the last two comment lines in the assembly source.

**The Second Problem.** The title of this piece says "two" problems; so, now for the other one! This time I don't have a solution, but a patch to MBASIC just might be possible. The main thing is that you're informed, so you won't wonder what's wrong with your system, or go looking for a nonexistent bug in your program.

In handling **long strings** I learned of the terrible thing that can happen when a TAB char occurs beyond a certain position within a string! Unlike our first problem, this can crop up during **desired** tab expansion.

Concisely stated: When MBASIC generates spaces to expand TABs, and **those** spaces start to penetrate the area beyond 255 **output** columns, it **doesn't quit** generating them!

MBASIC's algorithm for generating the spaces breaks down if "WIDTH" (or "WIDTH LPRINT") is set to 255 **and** a TAB byte within the string calls for tabbing past column 255 **of the output**. MBASIC then enters a loop, generating spaces endlessly, and you **cannot** stop the output, unless you hit the RESET button!

A picture is worth a thousand words. Try this little program now. It's safe:

```

10 WIDTH 80 'Do not omit this line.
20 PRINT CHR$(27)+CHR$(118) '(Turns on wraparound)
30 A$=STRING$(245,"X")
40 PRINT : PRINT "A$ IS NOW";LEN(A$);"BYTES LONG:"
50 PRINT A$
60 INPUT "HIT RETURN TO CONTINUE",DM%
70 A$=CHR$(9)+A$
80 GOTO 40

```

To see everything, you need line 20 unless you already have terminal wraparound enabled.

A\$ lengthens by 1 at each iteration because 1 TAB char is added to the start of A\$ each time (line 70). The screen display, however, soon increases well beyond 255 chars.

It is important to realize that the max length of an MBASIC string is 255 chars, **but the output of that string can be much longer** if the string contains TAB chars. Thus **the characters on the paper (or screen) will not always appear in the same columns as in the string variable.**

When A\$, above, accumulates 10 TAB chars it is 255 bytes long (no matter how long it **expands** to on the screen). Please hit one more RETURN and notice the "String too long" error, which is normal.

Now change line 10 to WIDTH 255 (MBASIC's "infinite" width) and do another RUN. The display looks different since MBASIC doesn't generate CR's as it did for WIDTH 80. Notice you still get "String too long" at the same point as before. This is because we added TABs at the **beginning** of the string.

A TAB causes the **next** char in the string to print in column 9, 17, 25, 33, ..., 241, or 249 of the output. The next col would be 257 (if that worked). If, **in the output**, a TAB itself would end up in one of those positions (or beyond), it tabs the **next** char to the **following** tab position. Therefore, if a string has a **lone** TAB char at position 249 (or beyond), it will initiate tabbing action to 257. Since this exceeds 255, MBASIC starts spewing runaway spaces; but **output** strings are **not** limited to 255 so it **should** work right (or at least not lock up the computer).

So, with this bug, the last position a lone TAB char can **safely** occupy in a string is 248 and still work with WIDTH 255. Why do I say "lone"? Well consider the extreme opposite: If a string had **nothing but** TABs in it, it could be quite short and still bomb, for in that case each TAB would generate 8 spaces. For example, in the statement, PRINT STRING\$(N,9), N need be only 32 to trigger the bug, because  $8 \times 31 = 248$  and 32 is one too many. (If you want to test that, don't forget the WIDTH 255.)

Now change line 10 back to WIDTH 80 and change line 70 to A\$=A\$+CHR\$(9) so TABs now get added **at the end**. RUN the program and you'll still get "String too long", a normal error rather than the bug: The trouble does not occur with WIDTH 80 because MBASIC inserts CR-type stuff after about every 80 chars, thus periodically resetting the output algorithm to column 1, even in the middle of a string. Finally, change line 10 to WIDTH 255. Be sure you don't have anything in memory that you want to save (as in a RAM drive, etc.) because **this time** you're going to have to hit the RESET button! Now RUN the program! (Some MBASICs lack this bug.)

Using the printer doesn't avoid this bug either. If line 10 is changed to WIDTH LPRINT 255 and line 50 to LPRINT A\$, then the system will hang while printing to the printer. (Patch, anyone?)

=====

#### COMPACTA for HDOS 3.0

By Bernard L. Waltuck

I have been an H-8 owner since the late '70's and I have vacillated between CP/M and HDOS 2.0

"forever". Since I have been using HDOS 3.0, I have been converting virtually everything I have to run on '3.0' whenever possible. The /Q [query] switch that runs in PIP also works with ERA, FLAGS/SET or CLR and even with "SYSGEN \*.\*" to allow me to be sure I copy onto my next disk the .TAS files, for example, without having to delete unwanted files later. So when I received COMPACTA [by Bill Moss and listed in *Staunch* #8] I was thrilled that it worked with '3.0', but it failed to recognize the added 4 flags: A, B, D, and U. The following is submitted on how (easy it is) to modify both PACK and UNPACK for this.

Read PACK.ASM into any text editor; I used PIE. Either go to line 335 or search for "EXCLUDE WHICH FLAGS" and find "MVI B,5". **Change the 5 to 9.** This permits entry of all 8 flags allowed by '3.0'. Next go forward slowly because you will see the flag-table which you must expand:

```
Find line 351 - FLGTAB  DB      'S',200Q
                      DB      'L',100Q
                      DB      'W',40Q
                      DB      'C',20Q
```

```
Insert 4 new lines in  DB      'A',10Q
the table for the new  DB      'B',4Q
flags -                DB      'D',2Q
                      DB      'U',1Q
```

```
Remember to leave the - DB      0
```

Finally you must go to near the end of the program now, lines 802 and 803, labelled EXFMSG.

Insert the added flags into the prompt message: "(e.g. SLWC)?" to read: "(e.g. SLWCABDU)?" And on the next line, "DS 5" should be expanded to 9, again to allow room. Save the new listing under a new name. I used NUPACK.ASM. Don't use the old name or you could lose it if you make a mistake.

Now for a simple change in UNPACK.ASM. Load it in a text editor as above and insert eight new lines at line 205, just four lines above the label CC3. The new listing should be as follows:

```
MVI      C,'W'
CALL     PRTFLG      'W'
MVI      C,'C'
CALL     PRTFLG      'C'
MVI      C,'A'
CALL     PRTFLG      'A'
MVI      C,'B'
CALL     PRTFLG      'B'
MVI      C,'D'
CALL     PRTFLG      'D'
MVI      C,'U'
CALL     PRTFLG      'U'
MVI      A,NL
CALL     CHAROUT
JMP      CC2

*
CC3      MVI      A,NL
```

Now save this to a new file (e.g., NUUNPACK.ASM).

To assemble the new programs, put UNPACK.ASM, NUUNPACK.ASM, and HDOS.ACM (supplied with COMPACTA) on a disk with sufficient room and mount it on drive SY0:. ASM.ABS supplied with HDOS 3.0 works very well

and fast. Now type ASM (or 1:ASM if it is on SY1:) and you will be prompted with "\*". Enter: NUPACK, =NUPACK<RETURN>. Repeat this with NUUNPACK and the rest, as they say, is history. NUPACK and NUUNPACK are ready to go.

One final comment. I find it easier to set the user flags like A, B, and U for my packing because I have greater control in selecting which files to pack. See the following commands:

```
FL *.ACM/SET:U      Get ready to pack all .ACM's
FL *.* /NOFLAG:U/SET:A Set all other flags to 'A'
NUPACK              Run program
P                   Pack "all" files
A                   Except 'A' files when it asks
FL *.* /CLR:AU       Restore flags as before
=====
```

### MISCELLANY

**CP/M Forever!** [Copyrighted by Robert H. Todd, SIG/M Coordinator] [ACGNJ] ...contacted Digital Research to ascertain if we could purchase the rights to CP/M 2.2 and put it in the public domain. They demurred stating: "Why should we? We are still selling a million copies a year!" We remarked that they meant CP/M Plus on the Commodore, but they said no, they meant CP/M 2.2.

It seems that the Z-80 is still widely used for industrial applications and CP/M is used as a development system. For example, every MS [MX?] missile produced has a CP/M development system included as a part of its support equipment. Apparently there are a number of militarized 8080's and Z-80's used both in the missile and its support equipment. There are still probably as many CP/M users as there were five years ago, but they have been swamped by the sheer numbers of users of MS-DOS computers in the business area.

So all you MS-DOS users watch out! Sic transit gloria mundi, but CP/M lives forever. (Gloria was sick on the bus, Monday, but ... ah, you get the rest). [Reprinted by permission from the **ACGNJ News**. My thanks to Al Bjorling for sending this item. But are those "militarized 8080's and Z-80's" also ruggedized? -Ed.]

**Embedding Printer Codes.** While going through the material from Quikdata listed on this issue's insert, I stumbled across some information well worth passing along. (Even this old "hacker" continues to learn!) Did you know you can handily embed printer escape codes with many editors by simply pressing a function or keypad key? Yes, siree! But first the easy part.

Embedding control-codes is pretty straightforward. To refresh your memory, some editors use a key sequence to do so. In PIE, this is CTRL-K; in TXTPRO, it's <OTHER><SPCINS>. If you're using WordStar or a clone like VDE (see this issue's insert), you press CTRL-P before the character. You've probably already inserted single-character codes, such as ESCape (CTRL-[]) and formfeed (CTRL-L), this way.

On the other hand, there are editors like MAGIC WAND or PeachText that **don't** permit this. If you want embedded codes, you must use a special command. For example, in these particular editors, ESCape is OUT 27 and formfeed is OUT 12. There are also

editors, like HDOS's EDIT or CP/M's ED that don't let you insert control-codes at all. This discussion doesn't apply to any of these.

Now that we know which editors we're talking about, on to the more difficult part. In PIE, TXTPRO, WordStar, VDE, and their ilk, when the key-entry sequence is active, the special function keys (f1 through white) and keypad keys are **no longer** defined by the software! So, for example, in PIE, when you hit the sequence <CTRL-K><f1>, the text on the screen **doesn't** flow up one page. Rather, you get "[S" with the open-bracket in reverse video to signify that it's a control character.

The keypad characters are even more interesting. In TXTPRO, press <OTHER><SPCINS>, then hold the shift key down and press <HOME> on the keypad. This will produce "[?u" (with the open-bracket again highlighted), which is the alternate code for that key. Bear in mind that what you get from the keypad will depend on the state (shifted or alternate) that the software or you put it in.

There is one **caveat**, however. If you are using a key remapper like HUG's KEYMAP (885-1230) with, say, WordStar, you will get what the key mapper defines as the "meaning" of the keys. If you press <CTRL-P><f1> in this situation, you'll get something like "CTRL-K" rather than the ESCape sequence that the key actually sends to the operating system. (And which is intercepted by the key mapper and transformed).

But what, you are asking, does this have to do with embedding printer codes? Simply that you can reduce your key strokes by matching the codes required by your printer with the codes produced by the function and keypad keys. For instance, my C. Itoh Prowriter uses ESC Q to shift it into condensed print. This same code is transmitted by the red function key. And the printer needs ESC N to shift it back to normal (pica) mode, which is the same code sent by the (shifted) "delete character" (DC or 9) key on the keypad. So in TXTPRO, if I want a line of condensed print, all I need do is press <OTHER><SPCINS><red> at the beginning of the line and <OTHER><SPCINS><DC> at the end. As easy as pie (if you'll forgive the pun) in TXTPRO! Or anywhere else where applicable.

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