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HOWGOZIT

This issue we get to complete our Z-100's 40th birthday challenge with all the answers to our Z-100 LifeLine Challenge. I am sorry to report that I received only two responses to the Word Search and one response to the Crossword. While I am disappointed, with all that is going on in the world and especially here in the States, I can not say that I am surprised. Time is critical for all of us. In any case, I thoroughly enjoyed putting the puzzles together.

If you had started the challenges, but felt that you could not get a satisfactory answer, I am publishing the answers in this issue.

I found two more finished articles that never got published. So...

One of this issue's Inserts discusses **Z-100 Interlaced Video**. Never heard of it? Well, here is the scoop.

As you know, the H/Z-100 video screen is normally composed of 25 rows by 80 columns. The scan lines are drawn on the screen one at a time at a very high rate of speed, controlled by a device called a CRT-C (CRT Controller). The entire screen is drawn 60 times per second.

If you look very closely at the Z-100 screen with writing on it, you can see a small gap between every scan line. What the CRT-C can do is to shift the screen of information every other time it is refreshed (redisplayed on the screen) so that the space between the scan lines is filled in.

This procedure of placing every other screen with the scan lines woven together is called Interlacing.

While it appeared that Interlaced Video never really caught on, you may be surprised to know what products were created to enable use of this capability. The article also introduces us to several hardware offerings that gave us high density video in the Z-100.

Finally, the last Insert article, **Seagate ST-251 Hard Drive, Stiction Revisited** describes my continuing effort to resolve the Seagate ST-251 'Stiction' issues.

I had accumulated quite a number of these drives over the years, nearly all of which had some problem or another and taking up shelf space. Unfortunately, most had spinning problems, while others were just no longer recognized and could not be PREPped. This is a shame considering the shortage of large working MFM hard drives still available to us.

So, for some months I attempted, again, to figure out what was happening. Seagate was one of the most commonly used hard drives of the time. It did not make sense that so many of these drives failed, and most that did were having 'no spin' issues.

However, **IF** these drives were so stable and reliable, why were there **SO MANY** drive/controller board combinations? If something was found to work, there would not have been a need to continue trying so many combinations.

So this article documents my last effort to solve the mystery. My conclusion continues to be that it is a controller problem and positively not 'stiction', which was the popular opinion of the period. I will be clearing my shelves of this hard drive variety.

Z-100 LifeLine Trivia Answers!!

While most of the Z-100 series computers that I have found were from the mid-80's, I believe that I have seen at least one dating back to 1982, surely one of the earliest. Do you know what that means?

The Z-100 series computer is celebrating 40 years young! Did you ever imagine that it would still be operational, in some form, 40 years later? I doubt that Heathkit or even Zenith ever even contemplated the thought...

So, as a form of celebration, I created a new challenge.

It has been many years since we have last had a contest. In fact, the last word find game was in December 1995, issue #42! So, I thought of a three-phase contest open to anyone for a chance to win $20.00 off their next Z-100 LifeLine purchase.

The first phase was probably the most time con- suming as it required you to research the Z-100 LifeLine website to answer several trivia questions. It was meant to remind you of many, probably long forgotten, aspects of Zenith and Heathkit computing and was to provide you a ready reference to assist in the other two phases of the challenge.

Phase two was to complete a word search chal- lenge. Unlike most word search puzzles, there was **no** list of words provided to search for, and alphanumeric characters were permitted, but the words to be found were from the trivia that you compiled in the first phase.

The owner of the word list that most closely matched ours, would receive a discount of $10.00 towards their next purchase at "*Z-100 LifeLine*".

The last LifeLine contained the phase three challenge, which asked you to complete a cross- word puzzle. This puzzle also included important numbers and names associated with Heathkit Computers and Z-100 LifeLine Trivia.

Obviously, since it was created by me, it was not like the usual crossword. It would again contain alphanumeric characters, and some of the answers would need to be answered **reversed** (I have not seen that before). The clues were simple, but for those who failed to complete phase one, could be a bit more challenging.

All you had to do was mail or email a copy of this back to me before the end of the contest.

Again, the puzzle that most closely matched ours would receive a discount of $10.00 towards their next purchase at "*Z-100 LifeLine*". Even if you could not complete the puzzle, it may have still won.

So, **Phase One**... Here is the series of questions that would review important facts and events that have happened over the years in the Heathkit and Zenith community, but more speci- fically, to the users of the Z-100 computer community... this time with the answers:

1. The Z-100 was first introduced in the early to mid 1980s.
   - When was the Z-100 LifeLine first published? It's on the letterhead - **1989**.

   - And by whom? **Paul Herman**

   - Who assumed publishing duties with issue #31 in 1994? **Steven W. Vagts**

2. In addition to several newsletters that were being published in the 80s, there were two fine magazines specifically for Heath/Zenith (H/Z) computers.
   - What were they? *REMark* and *Sextant*

   - What H/Z newsletter was published by Henry Fale?
     H8Scoop Newsletter, later HScoop, 80-95

   - What H/Z newsletter was published by Charles Floto? **BUSS Newsletter, 77-89**

   - Who were the two publishers of *"The Staunch8/89'er"*?
     The Staunch 8/89'er was a newsletter for the H-8/H-89 by Hank Lotz, Dec86-Sep87 and by Kirk Thompson, Dec87-Oct92.

3. "ADVENTURE" was an early game developed around 1979. Do you recall the special magic word used to help move through one or more of the chambers? (Hint: See LifeLine issue #64.)
     XYZZY was in a picture in that issue.

4. There were several PC Emulators developed for the Z-100 to run PC-DOS:
   - One consisted of a set of several boards, including a new floppy controller board. What was the name of this set of boards from UCI? **EasyPC PC Emulator**

   - The other consisted of one board that mounted to the top of the Z-100 mother- board. What was the name of this PC Emulator board? **Gemini PC Emulator**

   - There was another PC-emulator board that started as just a software utility. What was the name of that utility? **ZPC**

   - What REMark Engineer was responsible for the ZHS hardware circuit to support this first PC-emulation software?
     Patrick Swayne

     He also ran a column for years patching applications and describing the continuing developments in PC-emulation.

- What was the name of the S-100 board that was developed by Mike Zinkow (Parts-is-Parts) to enhance that PC-emulation software by providing hardware resolution to some remaining glitches? **Scottie Board**

   Note: Each of these PC-emulators now have articles on the "*Z-100 LifeLine*" Website.

5. There have also been several real time clocks developed for the Z-100. The most popular one was installed under the ROM chip on the Z-100 motherboard.
   - What was the name of this clock module, sold by Zenith? **SmartWatch**

   - Another clock was available at the time, developed by FBE Research Company, Inc, and was mounted on a board that replaced the 68A21 Peripheral Interface Adapter (PIA) at the U114 socket. What was this clock's name? **ZCLOCK** or **ZCLK**

   An updated version of this last real time clock board is still available from *Z-100 LifeLine*. **Note:** The Z-100 LifeLine IDE Controller Board had its own RTC.

6. The Z-100 was unique in that it could run 8-bit software using an 8085 CPU and 16-bit software using the 8088 CPU. This enabled the Z-100 to run the earlier Heathkit H/Z-89/90 software.
   - Which Operating System used the 8085 CPU? **CP/M, CP/M-85**

   - Which Operating System used the 8088 CPU? **Z-DOS, MS-DOS (now also called Z-DOS)**

   Actually, the Z-100 could run numerous versions of CP/M (Control Program/Monitor and later Control Program for Microcomputers) from Digital Research. However, CP/M version 3, aka CP/M Plus, for the Z-100 was attributed to Barry A. Watzman.

7. There were several popular Z-100 Spreadsheet Software in the 1980's:
   - The most popular spreadsheet program, aka 1-2-3, was from what company? **LOTUS**

   - Another popular Microsoft spreadsheet, marketed by Zenith was? **MULTIPLAN**

   - And yet another from PeachTree Software was? **PEACHCALC** or **SUPERCALC**

8. There were several choices for Z-100 word processing applications. Two lesser known packages were Galahad from Golden Knight Software and WatchWord from S & K Technology. Can you name these?

   - One from Microsoft? **MS WORD**

   - One from PeachTree? **PEACHTEXT** or **PT5000**

   - One had a celestial body in the name? **WORDSTAR**

9. What were the set of Zenith Disk-based diagnostics utilities called? **DIAG**

10. Paul Herman developed a Floppy Disk software driver that could allow the Z-100 to use several additional disk formats and more drive sizes than the Z-207 Floppy Controller could normally use. Do you remember the name of this popular package? **DISKPACK**

   Paul Herman developed several other software enhancements for the Z-100, including a set of diagnostics utilities, The Herman Utilities (similar to The Norton Utilities for the PC of the period).

11. Barry Watzman also developed a background Desktop Utility Program for the Z-100, similar to Borland International's "Sidekick" program (for the PC) that combined a Calculator, Calender, Notepad, Rolodex, and Typewriter functions.
   - What was the name of this Desktop Utility? **PERKS**

12. The last official Zenith Monitor ROM (MTR-ROM or ZROM) chip (U149 on the motherboard) was v2.9.
   - Can you name the developer that was chiefly responsible for version 3.x? **Bob Donohue**

   - ZROM version 4 provided a much greater capability. In addition to the normal ROM diagnostics, it provided a means of changing nearly every conceivable Z-100 function setting imaginable. For example: The normal keyboard type was QWERTY. What was the name of an alternative keyboard? **DVORAK**

   - Three character sets were also placed in the ROM.
     O - The OLD or normal, single-dot character set.
     S - The SINGLE-DOT (but included the graphics characters).
     D - The DOUBLE-DOT to represent the IBM character set.
   - Where can you set the character set? **Press {F10} repeatedly in DRIVECFG**

   An alternative is to use the MTR vers 4.3 ESCape sequence (displayed as the second bootup or help {**SHIFT**}-{**HELP**} screen). Select {**f**} (font) to set the character map and {**g**} will display it.

   - This latest ROM (v4) was primarily the work of one person. Who was this chief developer? **John Beyers**

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13. The first DOS operating system that ran on the Z-100 series computer was called Z-DOS (versions 1.0 or 1.1). The last official version of MS-DOS developed by Zenith for the Z-100 series computer was version 3.10. And the last version of PC-DOS developed by Zenith for the Z-100 using a PC-Emulator (it was actually marketed for the Zenith PC clones) was version 3.21. ZDOS v4 was a complete deviation from the normal "look" of previous DOS versions, and with ZROM v4, gave us many new built-in capabilities:
- The normal display on the Z-100, including the 25th line for comments, showed 25 lines. What new command could provide up to double that number? **SETLPS**

- ZDOS version 4 was developed from Microsoft DOS versions 4 through 6, then completely modified to operate on the Z-100. What two individuals were most responsible for this ZDOS v4 development?
  John Beyers and **Mike Zinkow**

14. Who was the famous comic character that Zenith once used in an advertising campaign?
  "Ziggy" of **"Ziggy for Zenith"** campaign.

15. CDR Systems developed the first SCSI hard drive controller for the Z-100 to replace the aging Z-100 "Winchester" MFM hard drives. But when these boards also became scarce, the Z-100 LifeLine SCSI Controller Board was the first board developed by a team of LifeLine volunteers.
- However, who were the three volunteers that developed the Z-100 LifeLine IDE Controller Board?
  John Beyers, Charles Hett, and Steve Vagts

- While the SCSI board used an EEPROM to provide programming and boot capability, what provides that capability on the IDE Controller? **NVsRAM**

  No, it is not the Altera chip, which is a programmable chip that is the brains that controls all the IDE control functions.

16. There were several modifications developed over the years to enable the Z-207 Floppy Controller to use dual-density (3.5" 1.44Mb/720Kb or 5.25" 1.2Mb/360Kb) drives. The first was suggested by Jim Hughes in 1991 and was described in LifeLine issue #13. The development of ZDOS v4, permitted a better modification. Who proposed and developed this better modification?
  Travis Barfield

17. What is the connector, J4, on the Z-100 back panel used for? It resembles a phone jack, but it is NOT used for a modem connection.
  Light Pen

18. The Z-100 is capable of several RAM capacities:
- Before the upgrade to 256K chips, each bank of RAM (3 total) on the motherboard contained? **64 Kb**

- After the upgrade to 256K chips, each bank of RAM (3 total) on the motherboard contained? **256 Kb**

- Each S-100 Bus Z-205 RAM Card could add how much RAM? **256 Kb (using 64k chips)**

19. What is the Z-100's standard CPU speed; 4MHz, 5MHz, or 8MHz? **5 MHz**

- After the Zenith HA-8 upgrade, it could run at what speed? **8 MHz**
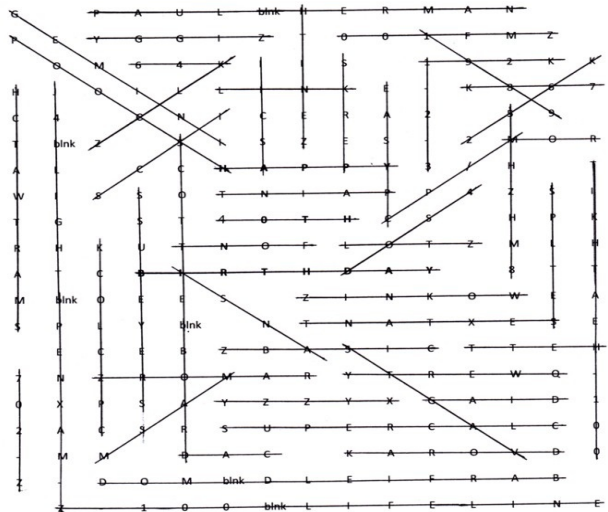
  There were also a few 3rd party speed/RAM upgrades: Z-MAX from Graymatter Application Software and from FBE Research Company that worked quite well. FBE also had one, the "ZMF100" that upgraded the RAM on our "old" motherboard.
  CDR Systems created a speed module for the Z-100 that allowed switching speeds. Steven Vagts created and still sells a similar, but not switchable, speed module.

20. The Z-100 uses ASCII (American Standard Code for Information Interchange) characters and codes. But it may also use standard American National Standard Institute code, if the appropriate driver is installed. What is the name of this code? **ANSI**

The completed Word Find Puzzle was:

Z-100 Word Find Puzzle for 2022

My list of words for the Word Find Puzzle:

1-2-3	5MHZ	8MHZ	64K	192K
256K	768K	1989		
ANSI	ASCII	BARFIELD	MOD	BEYERS
BUSS (Newsletter)	CAD		CP/M	DIAG

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DVORAK    EASYPC    FONT      GEMINI
HAPPY 40TH BIRTHDAY (on 3 lines)
HEATHKIT  HETT    HSCOOP    H-89      H-100
J4 LIGHT PEN      LINK      LOTZ      MASM
PAINT     PAUL HERMAN       PERKS     QWERTY
ROM       RAM       SCOTTIE BOARD     SCSI
SETLPS    SEXTANT   SMARTWATCH
SUPERCALC           VAGTS     XYZZY   ZBASIC
ZCLK      ZCLOCK    ZDOS4     ZENITH  ZHS
ZIGGY     ZINKOW    ZMF100    ZPC     ZROM
Z-100 LIFELINE      Z-207     Z-MAX
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The completed Crossword was:

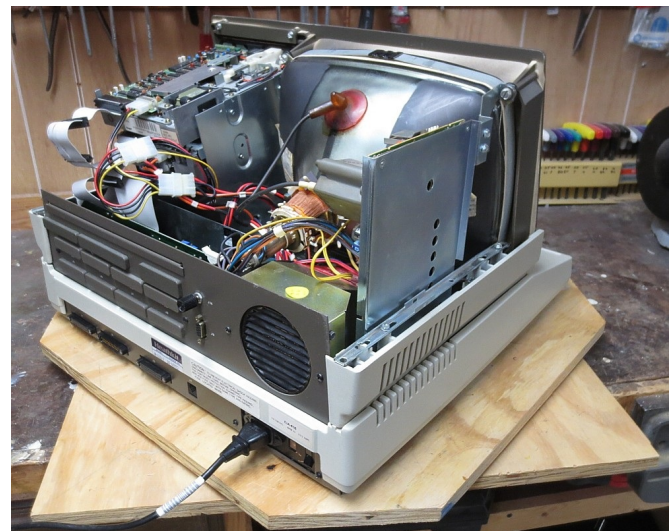| R | | Z | | D | I | A | G | | | Z | | |
E		C	L	A	M		E	A	S	Y	P	C
M		L		C	P	/	M			C	A	D
A	N	K	L	E	S		I	N	C	H		N
R					N			E	P	O	H	
K		Z	1	0	0	L	I	F	E	L	I	N	E
	H	-	8	9					P			A
		M		L		A		Z	I	T		
	B	A	R	F	I	E	L	D	M	O	D		H
S	E	X	Y		G		E	V	E		O	A	K
	Y		E		H			O			S		I
R	E	T	S	E	T		Z	R	O	M	4		T
	R		P			A		I				
S	P	L	T	E	S	K		C	H	I	P	
V		E		N			I		E		C	
A	E	R	O		H	E	A	D		R	A	M
G		K		R		E		E		M		O
T		S	C	O	T	T	I	E	B	O	A	R	D
S			M	I	T	T		D		N		E

Well, these were certainly not easy, but as a challenge, they were not meant to be. Nevertheless, I hope that you tried. The winner to both challenges was Charles Hett, who only missed a few words in each. He declined the monetary prizes. Thank you Charles.

As I had only one additional response to the Word Find puzzle, I awarded the $10.00 prize to Glenn Buchanan. Thank you Glenn.

And speaking of Charles, he sent me some photos of his Z-100 servicing platform that I thought was clever enough to present next...

A Z-100 Servicing Turntable

As I just mentioned, Charles Hett sent me a few photos showing his rotating workstation that permits easy access for servicing his Z-100 from any direction.

The boards are plywood, about 3/4" thick and 2' x 2' square. The turntable, available from Lowe's, is a 12" size swivel, with a 1000 pound capacity for about $16.00. The screw visible at the right front locks the turntable in position.

Nicely done, Charles. Thanks for the idea.

Closing

As reported in the last few LifeLines, I am out of spare Z-100 LifeLine IDE Controller boards! I have received zero comments or thoughts so far, so I have left the situation in limbo. If there is anyone who still desires obtaining an IDE Controller, please let me know.

For the past two months, I have updated a growing number of articles for the "*Z-100 LifeLine*" Website. I have also added several covering each of the Z-100 PC emulators. All of these have been updated with more recent information and many additional photographs that were not possible when I first published them.

I hope that you find these helpful and very useful.

However, what I found I liked best is that now they can be updated easily, as new information comes available, without having to worry about publishing them in a LifeLine issue! I just need to change the date, as necessary.

So, this issue will probably have the last inserts. As articles are updated, I'll continue to list them on the Website. They no longer need to be associated with any particular issue.

That also means that LifeLine issues will become less frequent. I'll use Email to bring up brief problems or topics that require more immediate attention, and only publish an issue when we have a subject that requires a more in-depth discussion.

This also gives me the opportunity to research and create a website article on topics of more interest to you. So, if you have an issue that you require more information on or that you feel would make a great addition to the Website, please feel free to let me know.

If you have just visited this website and have not given me an email address, please provide one to me so that I may advise you of when the next LifeLine is published, or when something new is happening. I promise - no SPAM.

Covid restrictions have finally been lifted, but as I said last time, I felt that this was a bit premature and case numbers are increasing again. Please stay safe & take no unnecessary chances. Keep your families safe and get vaccinated as soon as you can.

We hope you found the puzzles challenging and fun. We enjoyed putting them together.

Have a great summer.

'Til next time,
happy computing!

Cheers!!!

Z-100 LIFELINE
Supporting the H/Z-100 Community Since 1989

Steven W. Vagts
211 Sean Way
Hendersonville, NC 28792
(828) 685-8924
e-mail: z100lifeline@swvagts.com

Don't forget our Z-100 LifeLine Website:
https://z100lifeline.swvagts.com