Heathkit of the Month #48:
by Bob Eckweiler, AF6C

Another April Heathkit Article:

Introduction:
It's April again and time to find another of the more esoteric Heathkit models to write about in honor of April Fool's Day. Unfortunately, two Aprils ago when I wrote on the Heathkit GU-1810 Gasoline Powered Log Splitter, **I challenged my readers to name some of the other Heathkits that run on gasoline;** nobody took up the challenge at all. So last April I wrote on the Heathkit Candlestick (no kidding - #39), and again challenged you, the reader, to see how many Heathkits you can think of that run on gasoline; again no response. I can think of at least four other kits and a lot more if you consider fuels other than gasoline; but alas no one seems to care about those Heathkits, so I won't bother with one of them this April. Actually, right now as I'm writing this, I have no idea what I should write on. Let me think…, let me review my catalogs.

Oh! I found one! I found one! I found one!

Wow, here is one of the more expensive kits Heath produced. It is from the Fall 1989 Factory Catalog #217. And from everything I see about it, it is worthy of an April HOM article.

The Heathkit HS-3860-M Laptop Computer Kit:
The Heathkit catalog page states: *Enjoy the power of building our most powerful laptop computer kit.* And powerful it is - but not by 2013 standards. It is Intel 80386 processor based, comes with 2 MB of RAM, a 3.5" 1.4 MB floppy drive, a 40 MB hard drive and a 2,400

baud modem. The processor runs at a blazing 12 MHz (with no wait states.) And NO I didn't get mega mixed up with giga! What is impressive is the factory catalog price: $5,249.00. If you didn't want to spend that much in the fall of 1989, you could get the less expensive non-modem HD-2860 (without the -M) for $4,999. If $5k+ meant little to you in the fall of 1989 you could add an additional one MB of RAM memory for a mere $799; just order the Assembled ZA-3034-ME Memory upgrade - *[Heathkit] recommend[s] you install extra memory when first assembling your kit….*

The Heathkit HS-3860 Laptop computer is shown in Figure 1. It is a kit equivalent of the Zenith Turbosport 386. I have seen the computer name also spelled TurbosPORT and TurboSport on various advertising and review articles. The specifications for the HS-3860-M are given in table I. One specification that seems confusing is the weight of the HS-3860-M laptop. The shipping weight is 38 lbs., but one Heathkit blurb states: *Take along the HS-3860 at less than 15 lbs.* There must be a lot of packing material, or maybe it is the weight of many 3.5" floppy disks? Looking at reviews of the Zenith version of this computer, the weight with battery and AC adapter is over to 21 lbs. (26 lbs in one review), and just under 15 lbs. less AC adapter and battery. But why would you *[t]ake along* the computer without its battery or AC adapter?

The accessories you can purchase for the HS-3860 are listed in Table II along with their prices. The numeric keypad is detachable and features 24 keys. The expansion box has slots to hold up to three PC/XT cards. It includes an AC power supply and weighs in around 10 lbs depending on what is installed in it. Since it requires AC power and adds considerably to the system's weight, it is not something that would likely travel with the laptop.

The screen used on this computer is a backlit monochrome liquid crystal display measuring just over 6" x 8" with a 640 x 400 pixel resolu-

SPECIFICATIONS:	HS-3860
Microprocessor:	Intel 80386
Clock Speed:	12 MHz
Memory	
Standard:	2 MB
Optional:	3 MB
EMS Memory:	Yes
Floppy Disk Drive:	1.4 MB - 3.5"
Hard Disk Drive:	40 MB
Display:	Page White 640 x 400px
Ports:	
Display:	640 x 400 CGA video
Serial:	1 RS-232C, 9-pin
Parallel:	1 25-pin
External Floppy Drive:	No Provision
Keyboard:	Full-size, detachable, 79 keys
Co-processor slot:	Yes
Clock/Calendar:	Yes
Operating System:	MS-DOS 3.3+
Power Supply/Charger:	120 VAC 60 Hz
Dimensions:	4-3/4 H x 13-1/4 W x 14-7/8 D
Weight:	See text

Table I

tion. The graphic standard used is double-scan CGA. The fluorescent back light results in a high contrast screen with "page-white" whites. The cost of the then new LCD technology probably accounts for a substantial part of the high cost of this early laptop.

HS-3860 Accessories	
1 MB Memory Upgrade: (Assembled ZA-3034-ME)	$799.00
Numeric Keypad: (Assembled ZA-3034-NP)	$129.00
Expansion Box: (Assembled ZA-3034-ME)	$449.00
Carrying Case: (Assembled ZA3034-CS)	$79.00

Table II
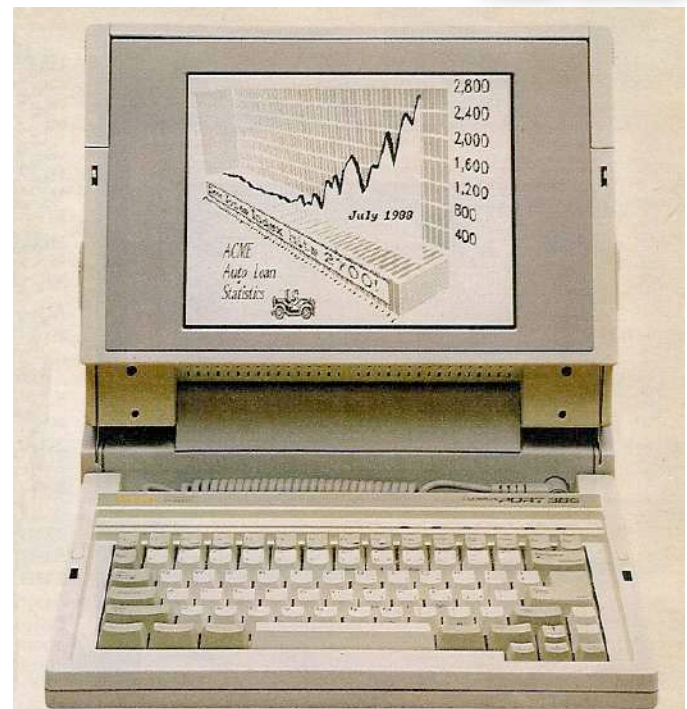
Figure 1: Heathkit HS-3860-M Laptop Computer

The battery used in the HS-3860 is nickel-cadmium. It is designed for fast charging - about two hours to full charge with supplied charger. Battery life, according to a review in Info-World, is about two and a quarter hours under normal operation with moderate hard-drive access. While short by today's standards, This amount of operating time got kudos as being above average by reviews of the time.

Building the Heathkit HS-3860 Laptop:
The kit is easy to assemble. Heathkit gives it a Skill Level one rating. Heath describes level 1 kits as: *Kits [that] include relatively few components and require simple, if any, soldering. A few ordinary household tools such as pliers, blade and Phillips screwdrivers, wire strippers and a pencil soldering iron are all you need.*

Heathkit classified the HS-3860 as a one evening kit. The motherboard comes pre-assembled and construction involves mostly installing and plugging the various assemblies together. Of course, the kit comes with a set of easy to read manuals and pictorials that made Heathkit famous.

Figure 2: An ad from the February 1990 issue of Popular Science by Under-Ware Electronics featuring the non-modem HS-3860 Heath Zenith computer at a 45% discount.

Included Software:

The Heathkit HS-3860 and 3860-M models came with MS-DOS. The early Zenith units shipped with version 3.21. which was soon replaced with version 3.3 that solved a partitioning problem encountered by many users when setting up their hard drive. Also shipped with the computer is Diagnostix, Integrated 7, and MS Windows (evidently a pre-mouse version of Windows!) Integrated 7 is a relational database, spreadsheet, mail-merge, business graphics, word processor, terminal emulation and communications package. It was a $795 list price program by Mosaic Software.

Costing the Heathkit HS-3860 Laptop:

Zenith began shipping the Turbosport laptop in April of 1988. I was not able to find out exactly when it first came out as a Heathkit. My first catalog that shows it is the Fall 1989 catalog. It was also featured on the cover of the August 1989 issue of REMark magazine, with the headline : *Heathkit's version of the Zenith Turbosport*.

At this time the computer industry was in a heavy growth mode. The RAM industry was in a turmoil and RAM was just beginning to become readily available after being in short supply. In the Fall 89 catalog

Heathkit announced in numerous places that they were again shipping RAM memory with their computers, so evidently for a period Heathkit was selling computers without including any, or minimal, RAM. This also possibly accounts for the seemingly high price for RAM, even in the late eighties.

Figure 3: Damark ad in the same February 1990 Popular Science featuring the assembled Heath Zenith computer with modem at almost 65% off.

Looking at the high price of the HS-3860-M, one would believe that not many were sold to hobbyists. Businesses that purchased the computer would likely opt for the assembled Zenith units. Sure enough, a Google search showed up very little on "Heathkit" and "HS3680". I was able to find more by googling "Zenith" and "Turbosport 386". While the prices were given in the Fall catalog, the later Winter 1990 catalog had no prices, just a notice to *"Call for new low pricing!"*. In my searching for more on the HS-3860 I found two interesting ads. The first (See Figure 2) is selling the HS-3860 kit for a 45% discount (non-modem version). The second (See Figure 3) is selling the assembled Zenith model for a 65% savings over the stated $8,499.00 MSP. Info World lists the MSP as $7,999.00 but without the 2400 baud modem.

The HS-2860 Laptop Computer:
Heathkit also made a 286 based laptop that had a factory price of $2,799.00 dropping to $2,599 when the 386 model was introduced. The hard drive for this model was extra; you could get a 20MB drive for $697.00 or a 40 MB drive for $120.00 more.

Later Laptop Model:
Heath Zenith replaced the HS-3860 TurbosPORT Laptop with the SupersPORT HS-3286-A in mid-1991. This computer is based on the Intel 80386SX processor running at 16 MHz and capable of up to 8 MB of RAM. The disk drive, 20 or 40 MB was extra cost. No price was given for this machine; the *"Call for new low pricing!"* was shown instead. Interestingly, MS DOS 3.3 was included but not any Windows software. Integrated 7 was replaced by MS Works and Lap_Link.

The HS-3860 and Retro Computing:
If you are into retro computing, there are a few things you need to consider before you choose the HS-3860 or its Zenith twin. Batteries are still available by secondary battery companies; the batteries go for around $130 to $160. However hard drive replacement may present a more difficult situation. The drives are low

power 40-pin IDE units. However the setup program allows you to select between a limited number of different drive configurations, none of which are manufactured anymore. The drive table is hard coded into the **SETUP** program with no user defined configuration capability. Thus you are limited to finding an old hard drive, one that may be on its last legs even if it is still working. The CMOS battery is built into a Dallas 1260 IC, which must be replaced. They are still readily available.

Conclusion:
When I started writing these Heathkit columns, I had planned to not feature any of their computer products, instead focusing on ham and test equipment, occasionally tossing in Hi-Fi and household products. However, this computer kit gives reflection to the fast moving computer technology that we have been living with for the past few decades. Since the HD-3860 was introduced we've seen hard disk storage go up by 50,000 to 100,000 times. Processor speeds go up by 200 fold and RAM memory prices drop from $800 per MB down to 1.5¢ MB, and even less.

Thus ends another April Heathkit article. Once more I put out the challenge. Email me with a Heathkit that runs on gasoline, or another fuel. If you have one you really would like to see in print, send me as much information as you can! I have a Heathkit flashlight I plan to feature next April if I don't get any responses.

73, **from AF6C**

Remember, if you are getting rid of any old Heathkit Manuals or Catalogs, please pass them along to me for my research.
Thanks - AF6C

This article originally appeared in the April 2013 issue of RF, the newsletter of the Orange County Amateur Radio Club - W6ZE.