HARDWARE REVIEW

Semidisk

Eliminate those disk access delays with a virtual disk system

by Bill Machrone

Semidisk is an S-100 card with 512K of dynamic RAM, specifically designed to emulate a CP/M disk drive. It comes with support software, including a self-installing driver that relocates itself under the CCP. The driver software can also be built into your current BIOS, which offers several advantages.

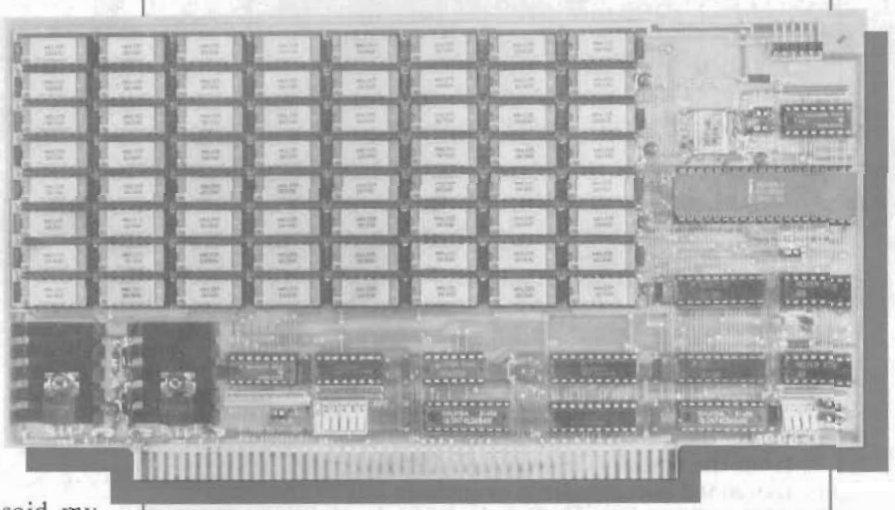
Experience may not be such a good teacher, for when I received the Semidisk I immediately plugged the card into my system, put the software disk into my B drive, and looked at the directory. I found a file called "SEMIDISK.COM" and executed it. The program announced that it was clearing memory and that I had a new drive E. I did a STAT on it and found that I had 504Kbytes free. Nothing could have been easier. By all past experience, plugging in a foreign card and running unknown software should have crashed the machine, wiped out the system tracks on my A drive, and run the head into the stops for good measure. So much for past experience. Sometimes it pays to live dangerously.

I then PIPed a few files to the Semidisk and got my kicks watching them execute instantly. Next, I popped Semidisk's floppy out of my B drive and put in one of my double-density disks with a big file on it that I would try sorting in Semidisk for a speed comparison. I typed ^C and went to read the directory. "BDOS ERR ON B: BAD SECTOR," said my system. I stopped to look at the manual.

It turned out that the Semidisk software running at the top of my TPA was blocking the warm boot action so that it would not be overwritten and disconnected from my BIOS. In my reading, I also found that I could disable this feature and enable the Semidisk software to reread itself from my A drive each time I warm-booted. For that matter, I could also set a whole host of options that I didn't understand, considering that I hadn't read the manual thoroughly.

As I read more about it, I was at first disappointed to learn that the Semidisk's 512K is not in the processor's memory map and that data to be stored or retrieved are passed through a port. I had been running the CompuPro/G&G Engineering Warp Drive whenever I had a few spare 64K boards sitting around, and the drivers were already in my BIOS. The Semidisk, I thought, would make a nice addition to what I already had. As it turns out, there is no need for the 512K to be memory resident and, indeed, the port-addressed design is a wiser choice. It robbed me, however, of the ability to brag that I had a half-megabyte system on my desk.

As I continued to read, I found all manner of nice surprises. The software drivers are utterly configurable, so that they can be located above CP/M or integrated into the BIOS. All source



S-100 Semidisk 512K dynamic RAM card, serving as a virtual disk. (Photo courtesy of Semidisk.)

code is provided on the disk that comes with Semidisk. There are suggestions on how to make it faster(!) using Z80 block I/O instructions. There is also a nice discussion of why the design choice was made to access the memory through I/O ports rather than extended addressing. After comparing the Semidisk with the extended-address based Warp Drive, I agree with their choice. Port I/O is just plain faster than selecting alternate pages of memory and flipping bytes back and forth through the processor's registers. It is also easier to implement on most machines. Finally, the dynamic RAM chips that make up the 512K are much more compact and cheaper than the equivalent static chips that would be necessary for a Warp Drive implementation. Just in case you were going

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to put an airline reservations system on your micro, you'll be pleased to know that 16 of these boards will work together to give you 8 megabytes, the CP/M limit for disk size.

You don't realize, though, just how fast a Z80 can move data around until you PIP a big file from one virtual disk to another. In this case, I went from the Warp Drive (CompuPro calls it M-Drive) to the Semidisk and back again. Both appeared as fast to the naked eye, but the Semidisk won out in objective, timed comparison tests. Also, normally disk-intensive operations like full file sorts become trivial, dropping from minutes to mere seconds in execution time. Even if you count the time it takes to load and unload the Semidisk and store things permanently on a floppy, you are still miles ahead. Even hard disk cannot match it in speed. It was a joy to do binary searches in Basic and indexed searches as with dBASE II: the results were instantaneous. Similarly, having WordStar's overlay and message files on the Semidisk made it seem as though all of WordStar was memory resident. (I guess it was.)

You may have noticed that there were only 504K free of the 512K on the card. In addition to the reserved "tracks" for the directory (128 entries) there is a reserved area for checksum bytes, one per "sector." The checksums work exactly the same way they would on a disk and offer the same protection against soft errors and, in this case, failing memory chips. One of the software utilities supplied with the Semidisk is a memory test, again, with source code. The Semidisk I used remained solid throughout the test period. There is also a battery backup connector on the board, with provisions to trickle-charge a nicad or gel cell battery whenever the system is on.

The Semidisk memory board also has a lot of potential that is unrealized at this point. It would be a good track-buffering host for TurboDos or one of the other "high speed" CP/M lookalikes. MP/M could also benefit from its speed, but the routines would have to be incorporated into the system's XIOS, unless some software wizard can figure a way to put its driver software into an RSP.

In summary, there was nothing I didn't like about the Semidisk except, perhaps, the price. Not that $1,995 is too much for a 512K disk that does everything instantly, but I hope that falling component prices and free market competition bring the price down so that it will be in reach of more people. This kind of performance is addictive.

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