

## A Short History of the Floppy Disk

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*Editor's Notes: Once in a while, some of the history of computing strikes our fancy. The Computing Center's early days centers squarely around the floppy disk. We worked with nearly every type of floppy disk from the 8" variety all the way down to the 3.5" and some exotic floppys such as the SyQuest and Bernoulli cartridges. You can see some examples of floppy disk drives and media preserved at our office. Come visit.*

We had floppy disks long before we had CDs, DVDs, or USB thumb drives. Here's the evolution of the portable media that changed everything about personal computing.

In the fall of 1977, I experimented with a newfangled PC: a Radio Shack TRS-80. For data storage, it used—I kid you not—a cassette tape player. Tape had a long history with computing; I had used the IBM 2420 9-track tape system on IBM 360/370 mainframes to load software and back up data. Magnetic tape was common for storage in pre-personal computing days, but it had two main annoyances: It held only tiny amounts of data, and it was slower than a slug on a cold spring morning. For those of us excited about technology, there had to be something better. And there was: the floppy disk.

In the mid-70s I heard about floppy drives, but they were expensive, exotic equipment. I didn't know that IBM had decided as early as 1967 that tape drives, while fine for backups, simply weren't good enough to load software on mainframes. So it was that Alan Shugart assigned David L. Noble to lead the development of "a reliable and inexpensive system for loading microcode into IBM System/370 mainframes" using a process called Initial Control Program Load (ICPL). From this project came **the first 8-inch floppy disk**.

Oh, yes, before the 5.25-inch drives many of you remember was the 8-inch floppy. By 1978, I was using those on mainframes. Later I would use them on dedicated cataloging PCs at the Online Computer Library Center.

## How big was yours?

The 8-inch drive **began to show up in 1971**. They let everyone

stop using the dreaded paper tape, which was easy to fold, spindle, and mutilate—not to mention pirate. And it meant the demise of the loathed IBM 5081 punch card. Everyone who ever twisted some tape or—the horror!—dropped a deck of Hollerith punch cards was happy to adopt 8-inch drives.



Besides, the early single-sided 8-inch floppy could hold the data of up to 3,000 punch cards, or 80K to you. I know that's nothing today—the text of this article uses up 66K alone—but then it was a big deal.

Some early microcomputers, such as the Xerox 820 and Xerox Alto, used 8-inch drives, but these first-generation floppies never broke through to the larger consumer market. That honor would go to the next generation of the floppy: the 5.25-inch model.

By 1972, Shugart had left IBM and founded his own company, Shugart Associates. In 1975, **Wang**, which at the time owned the then big-time dedicated word processor market, approached Shugart about creating a computer that would fit on top of a desk. To do that, Wang needed a smaller, cheaper floppy disk.

According to Don Massaro, another IBMer who had followed Shugart to the new business, Charles Wang, the founder of Wang, told him, “I want to come out with a much lower end word processor. It has to be much lower cost, and I can't afford to pay you \$200 for your 8-inch floppy; I need **a \$100 floppy**.” This was just as people were starting to talk about PCs. They didn't quite know what it was.



So, Shugart and company started working on the project. According to Massaro, “We designed the 5.25-inch floppy drive in terms of the overall design—what it should look like—in a car driving up to Herkimer, New York, to visit Mohawk Data Systems.” The design team stopped at a stationery store to buy cardboard while trying to figure out what size the diskette should be. “It's real simple the reason why it was 5.25 inches,” he says. “5 1/4 was the smallest diskette that you could make that would not fit in your pocket. We didn't want to put it in a pocket because we didn't want it bent, OK?”

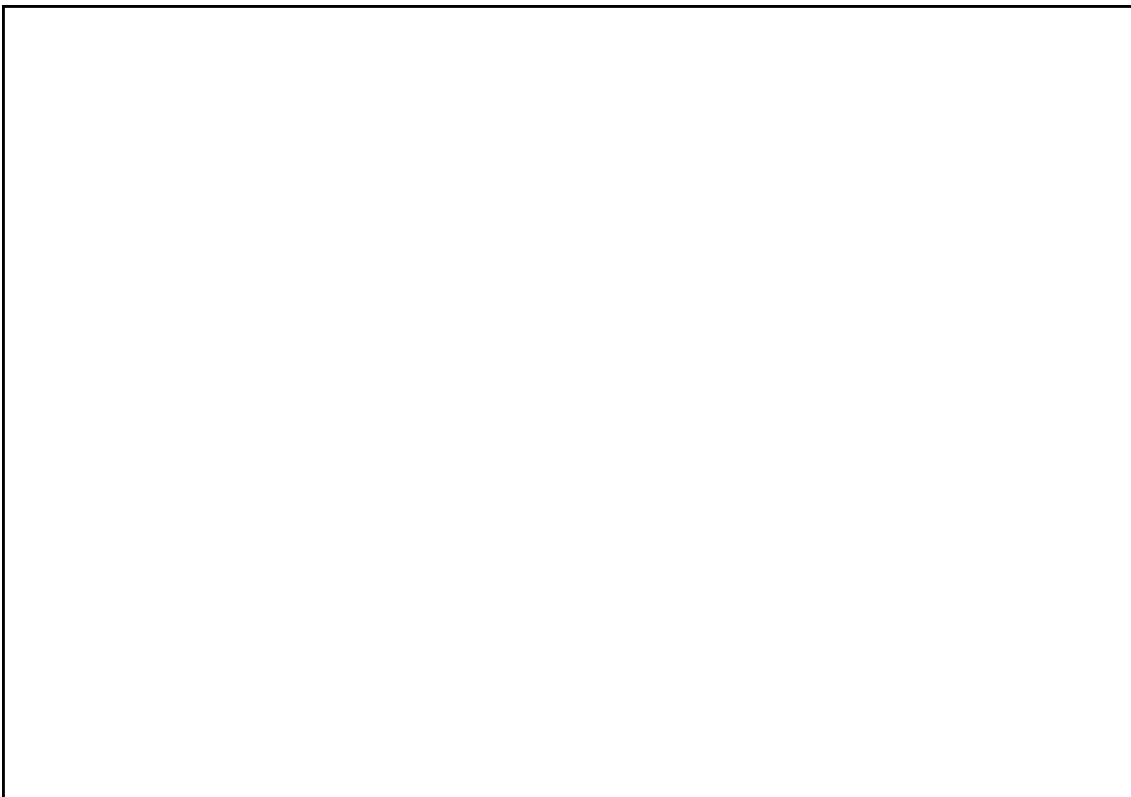
Shugart also designed the diskette to be that size because an analysis of the cassette tape drives and their bays in microcomputers showed that a 5.25-inch drive was as big as you could fit into the PCs of the day.

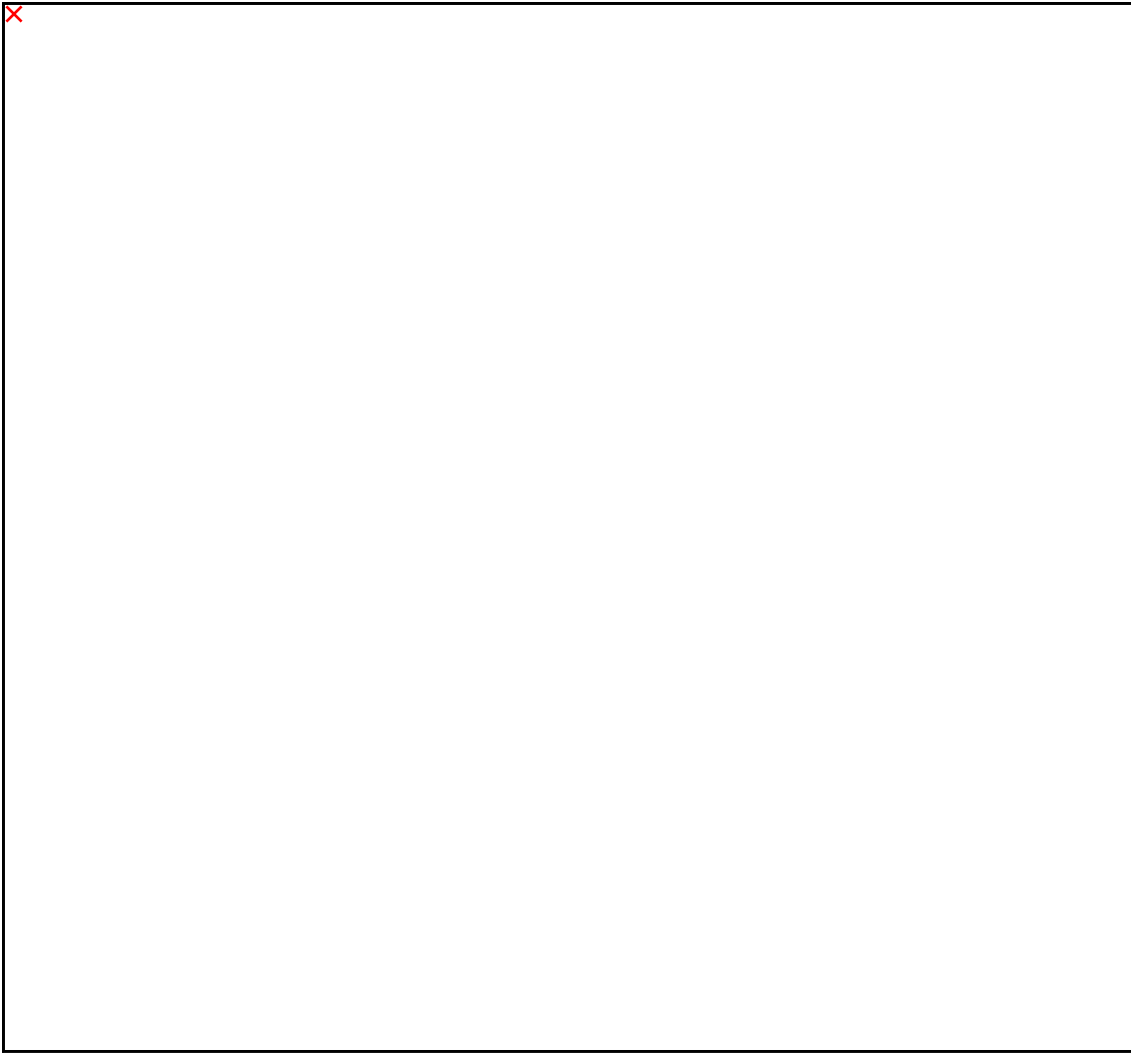
According to another story, **Jimmy Adkisson, a Shugart engineer**, and Massaro "were discussing the proposed drive's size with Wang. The trio just happened to be doing their discussing at a bar, and Wang motioned to a **drink napkin and stated, 'about that size,' which happened to be 5.25-inches wide.**"

## The bum in the lobby

Wang wasn't the most important element in the success of the 5.25-inch floppy. George Sollman, another Shugart engineer, **took an early model of the 5.25-inch drive** to a Silicon Valley **Home Brew Computer Club**. One guy who attended was very impressed and came to Sollman's office. Sollman recalls, "Don came to my office and said, 'Would you get the bum out of the lobby?' So I went out to the lobby and this guy is sitting there with holes in both knees. He really needed a shower in a bad way, but he had the most dark, intense eyes, and he said, 'I've got this thing we can build.'"

The bum's name was Steve Jobs, and the "thing" was the Apple II.





Apple had also used cassette drives for its first computers. Jobs knew his computers also needed a smaller, cheaper, and better portable data storage system. In late 1977, the Apple II was made available with optional 5.25-inch floppy drives, which were manufactured by Shugart. One drive ordinarily could be used to hold programs, while the other used to hold data (otherwise, to swap floppies back and forth when you needed to save a file).

## The beginning of personal computing

The floppy disk seems so simple now, but it changed everything. As IBM's history of the floppy disk states, this was a big advance in user-friendliness. "But perhaps the greatest impact of the floppy wasn't on individuals, but on the nature and structure of the IT industry. Up until the late 1970s, most software applications for tasks such as word processing and accounting were written by the personal computer owners themselves.

But thanks to the floppy, companies could write programs, put them on the disks, and sell them through the mail or in stores. "It made it possible to have a software industry," says Lee Felsenstein, a pioneer of the PC industry who designed the Osborne 1, the first mass-produced portable computer. Before networks became widely available for PCs, people used floppies to share programs and data with each other—calling it the 'sneakernet.' "

In short, it was the floppy disk that turned microcomputers into personal computers.

The success of the Apple II made the 5.25-inch drive the industry standard. The vast majority of CP/M-80 PCs, from the late 70s to early 80s, used this size floppy drive. When the first IBM PC arrived in 1981, you had your choice of one or two 160 kilobyte (K—yes, just one K) floppy drives.

Throughout the early 80s, the floppy drive became the portable storage format. (Tape quickly was relegated to business backups.) At first, the floppy disk drives were built with only one read/write head, but another set of heads were quickly incorporated. This meant that when the IBM XT PC arrived in 1983, double-sided floppies could hold up to 360 K of data.

There were some bumps along the road to PC floppy drive compatibility. Some companies, such as Digital Equipment Corp. with its **DEC Rainbow**, introduced their own noncompatible 5.25-inch floppy drives. They were single-sided but with twice the density, and in 1983, a single box of 10 disks cost \$45. [*This editor remembers paying that price. Retail. It was painful. —Ed.*]

In the end, though, market forces kept the various noncompatible disk formats from ever splitting the PC market into separate blocks. (How the data was stored was another issue, however. Data stored on a CP/M system was unreadable on a PC-DOS drive, for example, so dedicated applications like **Media Master** promised to convert data from one format to another.)

That left lots of room for innovation within the floppy drive mainstream. In 1984, IBM introduced the IBM Advanced Technology (AT) computer. This model came with a high-density 5.25-inch drive, which could handle disks that could up hold up to 1.2 MB.

By this time, a variety of **other floppy drives and disk formats** were tried. These included 2-, 2.5-, 2.8-, 3-, 3.25-, and 4-inch formats. Most quickly died off, but one, the 3.5-inch size introduced by Sony in 1980, proved to be a winner.

The 3.5-inch disk didn't really take off until 1982. Then, the **Microfloppy Industry Committee** approved a variation of the Sony design and the "new" 3.5-inch drive was quickly adopted by Apple for the Macintosh, by Commodore for the Amiga, and by Atari for its Atari ST PC. The mainstream PC market soon followed, and by 1988, the more durable 3.5-inch disks outsold the 5.25-inch floppy disks.

The first 3.5-inch disks could hold only 720 K. But they soon became popular because of the more convenient pocket-size format and their somewhat sturdier construction (if you rolled an office chair over one of these, you had a chance that the data might survive). Another variation of the drive, using Modified Frequency Modulation (MFM) encoding, pushed 3.5-inch diskette storage up to 1.44MBs in IBM's PS/2 and Apple's Mac Ix computers in the mid-to-late 1980s.

By then, though floppy drives would continue to evolve, other portable technologies began to surpass it.

In 1991, Jobs introduced the extended-density (ED) 3.5-inch floppy on his NeXT computer line. These could hold up to 2.8 MB. But it wasn't enough. A variety of other portable formats that could store more data came along, such as magneto-optical drives and Iomega's Zip drive, and they started pushing floppies out of business.

## **Don't copy that floppy**

The real floppy killers, though, were read-writable CDs, DVDs, and, the final nail in the coffin, USB flash drives. Today, a 64 GB flash drive can hold more data than every floppy disk I've ever owned all rolled together.

Apple prospered the most from the floppy drive but ironically was the first to abandon it as read-writable CDs and DVDs took over. The 1998 iMac was **the first consumer computer to ship without any**

## floppy drive.

However, the floppy drive took more than a decade to die. Sony, which at the end owned 70 percent of what was left of the market, announced in 2010 that **it was stopping the manufacture of 3.5-inch diskettes.**

Today, you can still buy **new 1.44 MB floppy drives** and **floppy disks**, but for the other formats, you're going to need to look to eBay or yard sales. If you really want a new 3.5-inch drive or disks, I'd get them sooner rather than later. Their day is almost done.

But, as they disappear even from memory, we should strive to remember just how vitally important floppy disks were in their day. Without them, our current computer world simply would not exist. Before the Internet was open to the public, it was floppy disks that let us create and trade programs and files. They really were what put the "personal" in personal computing.

*For more on floppy disks, HP Enterprise and the author, visit: [insights.hpe.com/articles/the-history-of-the-floppy-disk-1703.html](https://insights.hpe.com/articles/the-history-of-the-floppy-disk-1703.html)*