How big is a 300 GB hard disk

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I recently acquired a 300 GB hard disk for $110 after rebates. When I look at that 3.5 inch hard drive that is one inch high and easily held in my hand, trying to put those 300 Giga bytes of storage in perspective is a little tough. I thought about the first Z80 CPM system I built in 1977 from a Cromemco kit that I had to solder together. It used 8 inch floppy disks that held 128,000 Bytes.

The diskettes were easy to damage and it was a good idea to keep them in storage boxes. I made some good money selling the SRW Computer Products plastic storage boxes at a great ACP Swap Meet discounted price of $2.00 each. They were designed to hold 10, but you could get 2 or 3 more in if you were careful! I wondered how many floppies that would be, so I punched the numbers into the calculator. $300,000,000,000B/128,000B = 2,343,750$ diskettes. I don't know how to visualize that, but I did calculate that it would take $468,750.00 worth of those boxes to store them all. I then remembered that the average price at that time was about $3.50 a diskette. Again the calculator, 2,343,750 diskettes x $3.50 = $8,203,125.00. Wow! That is a number that I don't want to think about if I am talking about a hobby.

Another way to wrap your mind around huge numbers is to start small, with something that you can relate to, and work your way up. Now we know that one byte equals one character of the alphabet. The common 10 point type has 10 characters per inch. So, if we have 120 characters/bytes in a row, we have one foot. There are 5,280 feet in a mile. So 5,280 x 120 gives the number of character or bytes that would be on a mile long ticket tape that was being printed with 10 point type, an answer of 633,000 bytes. Compared to the 300 Giga bytes on the hard disk, 633,600 bytes is not much. To find out how much, we need to take the 300,000,000,000 byte capacity of the hard disk and divide it by 633,600 bytes in a mile. The answer to that math problem is the equivalent of 473,485 miles of ticker tape.

To put that into perspective, let's take the circumference of the earth (nominally 25,000 miles) and divide that into our answer. So, 473,485 / 25,000 = 18.93. If we could find a big enough roll of ticker tape, printing all the information on that hard disk would wrap around the equator of the earth 18.93 times. That sounds impressive, but how many people can really visualize that. Besides, I don't know anyone who has a big enough ticker tape printer. Another thought, that ticker tape would be 3,000 miles short of stretching from the Earth to the Moon and back.

But let's try it with regular 8.5 inch x 11 inch paper. Again, standard printing would be 10 point type, 10 bytes per inch, and 6 lines per inch. Most people leave at least a half inch margin all the way around the page. So that means each line will be 7.5 inches, or 75 bytes, and there will be 60 lines per page. So each page will use 75 bytes x 60 lines, or 4,500 bytes. First, let's take 1 of the 300,000 megabytes on the disk and see how many pages that represents. 1,000,000 / 4,500 = 222.2 pages. We still have 299,999 megabytes left and, using them, the total number of pages comes out to 66,660,000 pages.

That is also a little hard to imagine, so let's see how many reams of paper that is. Take 66,660,000 pages, divided by 500 sheets per ream = 133,320 reams of paper. Again, a little hard to visualize.

A lot of things have their volume given in cubic feet. That's 12 inches x 12 inches x 12 inches or 1,728 cubic inches, or 1 cubic foot. I measured one case of paper at 11.25x9x17.5 inches, or 1,771 cubic inches. Let's be generous and round that off to one cubic foot. So at 5,000 sheets, or ten reams per case, we divide the 133,320 reams that we came up with by 10 to get 13,332 cases, or that many cubic feet of space.

Stipulating that an average house is 1,400 square feet with eight foot high ceilings, then the average house has 11,200 cubic feet of space, ignoring the walls. If you filled up your house, wall-to-wall, floor-to-ceiling, with cases of printed paper, you would still have 2,132 cases left over. If you are in better shape than I am, there is still room to get one car in that two car garage. That's 10'x20'x9' = 1,800 cubic feet, so that still leaves us with 332 cases of paper. We could take all of the junk out of the other half of the garage, lay down a two foot thick layer of paper and put all the junk back in on top of it. That's how much the 300 Giga byte disk holds! So, unless you are planning on taking out a home improvement loan, don't buy that 400 Giga byte disk.