

SDHC Cards vs Hard Drive vs SSD

Jerry Jackson

Almost every modern notebook has a built-in memory card reader, but not everyone uses these card readers for digital photography. Now that SDHC memory cards offer larger capacities at low prices, is this a good option as a second storage drive, or even your primary boot disk? We did some testing to find out just how useful a \$30-\$100 memory card is for laptop owners.

One of the harsh realities of modern life is that we constantly need more storage space. Between software files, digital images, digital audio, and now digital video we just can't get by on a single 40GB hard drive anymore. But what if you don't feel comfortable opening up your laptop and removing the old hard drive? What if you don't like constantly plugging and unplugging external hard drives and flash drives into your laptop USB ports? Another option is to use the built-in SDHC card reader as a second internal storage drive.



Our editorial staff first stumbled onto the idea of using an SDHC card as a "permanent" second drive during our review of the Asus Eee PC. That subnotebook only includes a 4GB SSD (or rather built-in flash drive) and it just isn't enough room for most storage needs. That's when we realized a SDHC card could serve as a second drive for everything from files and applications to even the operating system.

As we tested these low-cost storage drives on multiple laptops in our offices we discovered some great reasons why you might want to buy an SDHC card for your notebook ... and some reasons why you might want to consider more traditional storage options.

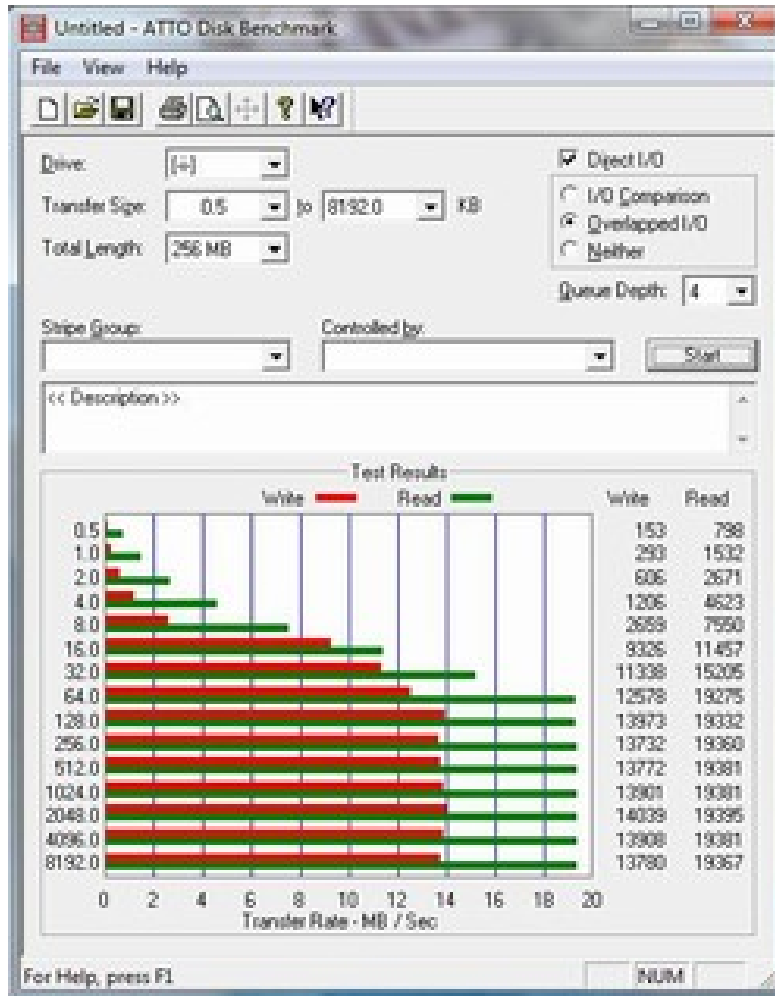
Performance

In this review we tested several storage options both in terms of SDHC cards and traditional storage like Hard Disk Drives (HDDs) and Solid State Drives (SSDs). The two primary SDHC cards we used for our benchmarks were the 8GB Transcend SDHC card and the 16GB A-DATA SDHC card. Both cards are labeled as "class 6" which means they offer the fastest read/write times currently available for SDHC cards.

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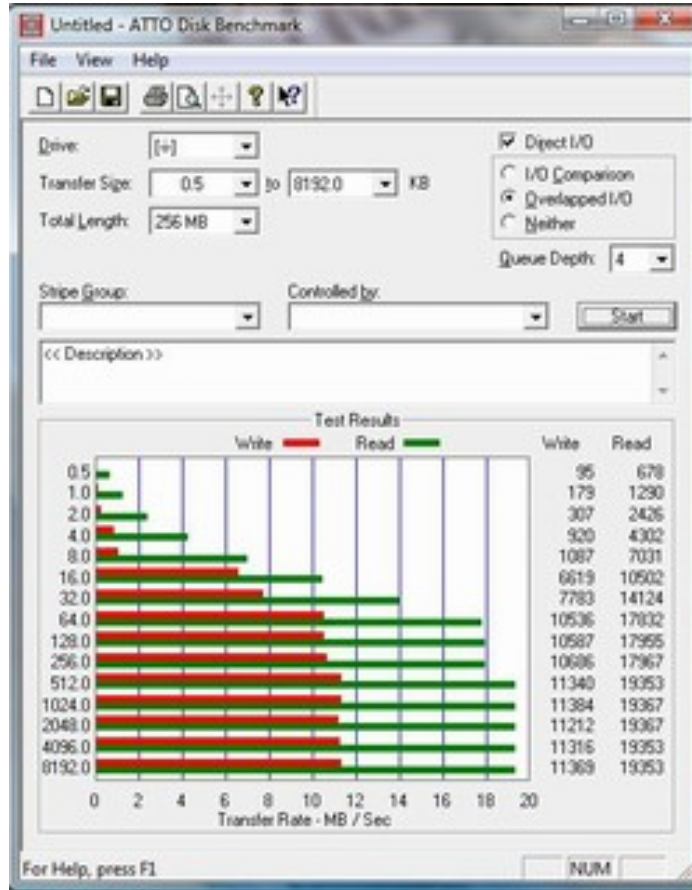
Below are standard ATTO disk performance benchmarks used to test the maximum read and write speeds for storage drives. We compared the 8GB Transcend SDHC (\$31.99) and 16GB A-DATA SDHC (\$64.99) against a 128GB Memoright SSD (\$3,399) from DVNation. Granted, this is hardly a fair comparison, but it demonstrates the difference between using an SDHC card and a genuine SSD. 8GB Transcend SDHC:



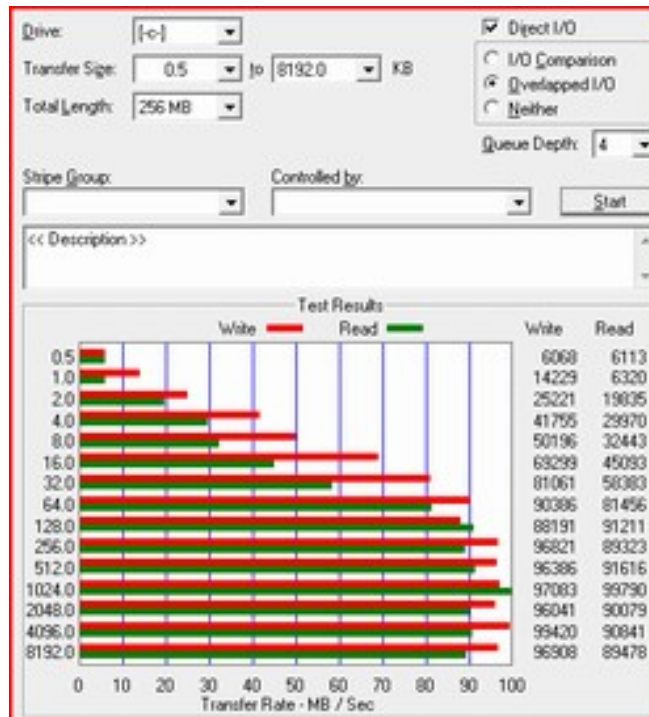
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16GB A-DATA SDHC:



128GB Memoright SSD:



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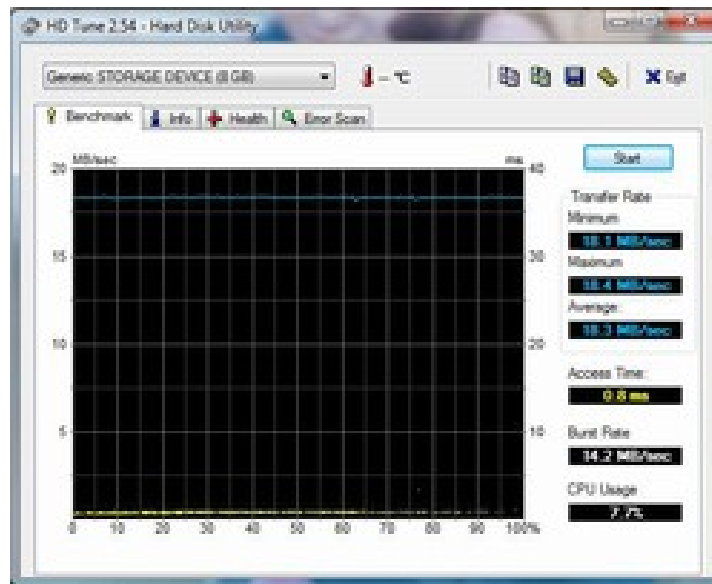
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The main point here is that both of the class 6 cards offer similar performance but the genuine SSD is so much faster they aren't even in the same league. Of course, what did you expect from a SDHC card when it's only a small fraction of the cost of a true SSD?

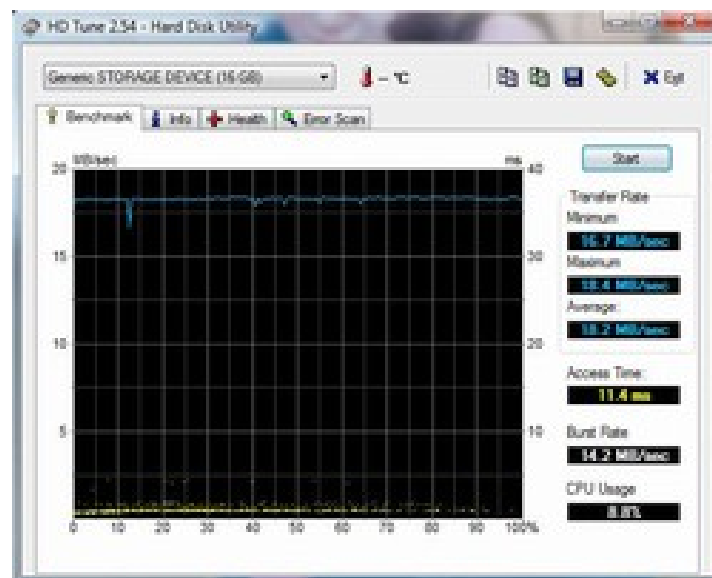
Next, we benchmarked the SDHC cards in both a Dell Inspiron notebook and an Asus Eee PC using HDTune. HDTune is the gold standard for drive benchmarking because it measures the consistency of the transfer rate (basically the read rate) and provides the access time (the delay between when the computer tries to read data and when the data is available).

We also benchmarked a traditional 2.5" SATA 60GB hard drive (5,400 rpm) and a 32GB Memorigt SSD (\$999) from DVNation for comparison purposes.

8GB Transcend SDHC in Dell:



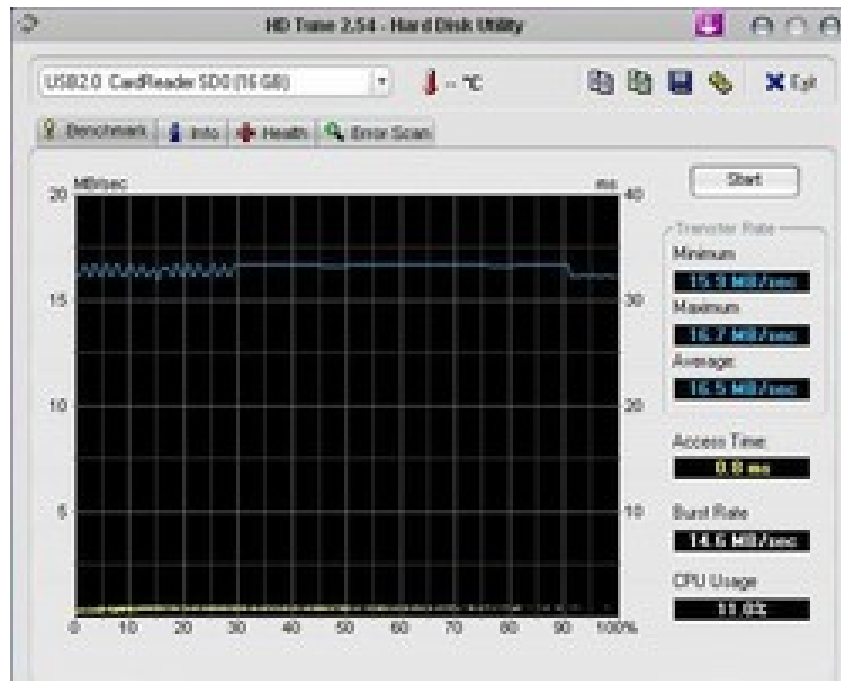
16GB A-DATA SDHC in Dell:



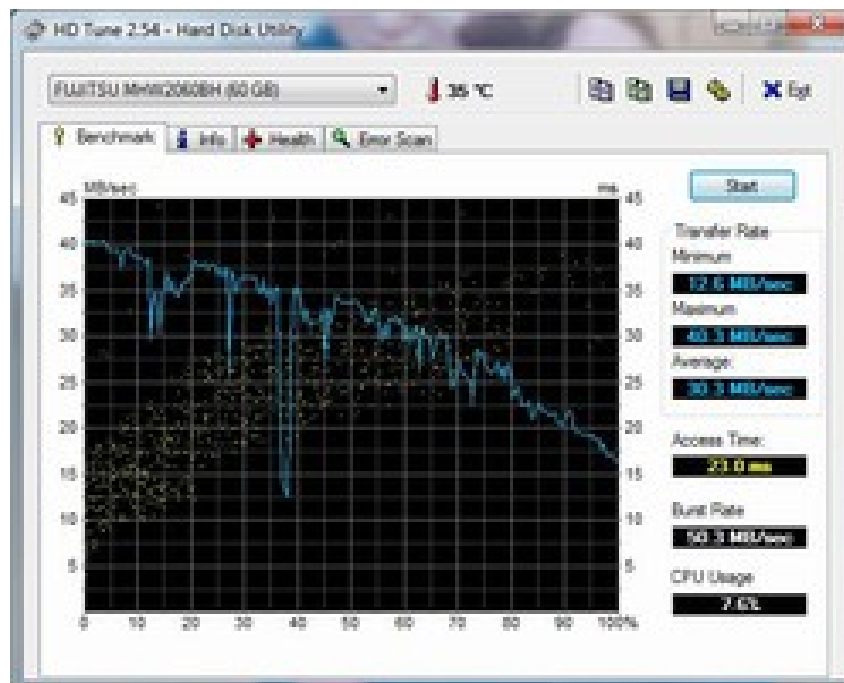
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16GB A-DATA SDHC in Asus Eee PC:



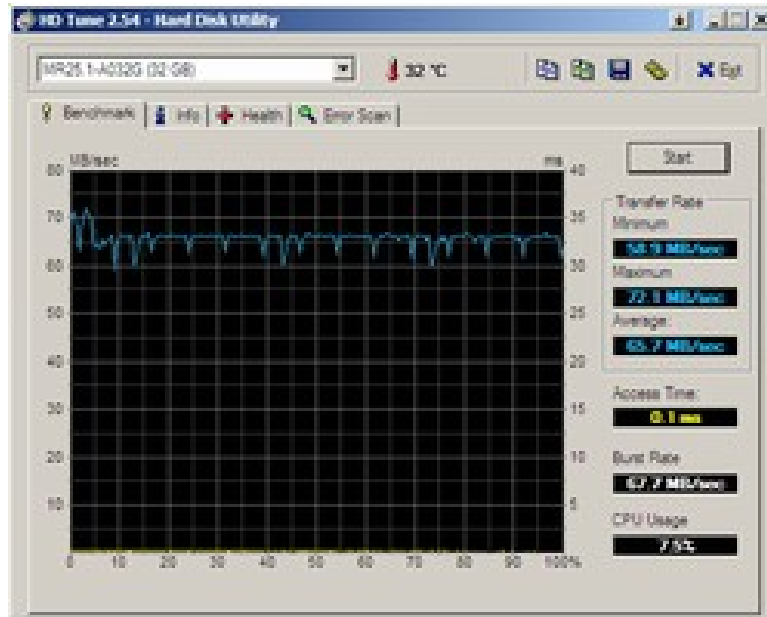
60GB SATA (5,400 rpm) hard drive:



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32GB Memoright SSD:

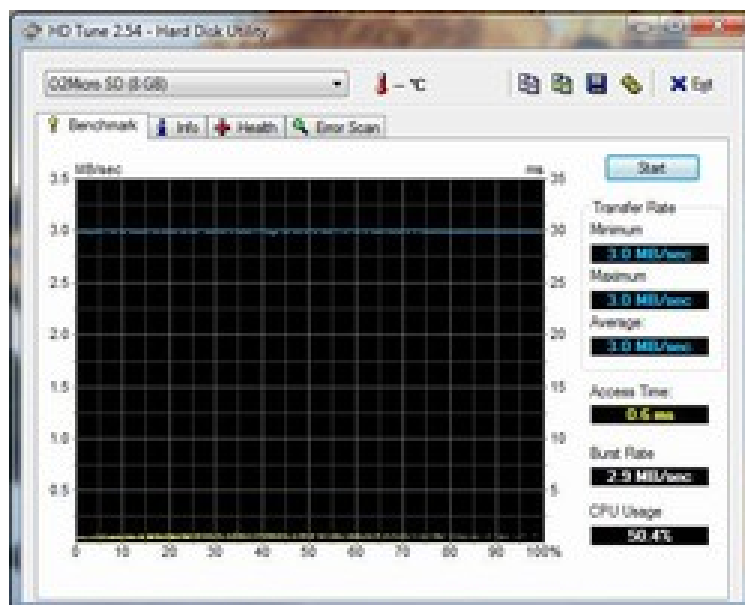


The most interesting item of note in these benchmarks is that the SDHC cards managed to deliver access times similar to that of a genuine SSD. This means the instant your computer needs to find data it is there.

The Limitations

One of the first clear limitations we encountered during our testing on multiple notebooks is that some laptops use slow built-in card readers. If your laptop isn't equipped with a high-speed built-in card reader then any SDHC card you use will run too slowly to be of any practical use as a second drive.

Below is an HDTune screenshot showing just how slow a typical SDHC card is when used inside the built-in card reader on a Fujitsu LifeBook E8410. Keep in mind the card being used in this test is a class 6 SDHC card ... one of the fastest cards available:



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As you can see from the image above, the speed of the built-in card reader can be a serious bottleneck in the performance of the card.

Another common criticism of flash-based storage like SDHC cards is the lack of "wear leveling." Wear leveling is a technique used in SSDs for prolonging the lifespan of flash memory. Flash memory is limited by the number of times data can be written and erased to the medium. Wear-leveling works around this limitation by arranging data so that erasures and re-writes are distributed evenly across the medium. In this way, no single sector of the flash prematurely fails due to a high number of write cycles.

That sounds like an absolutely mandatory thing to have in flash storage ... and luckily "high-performance" SDHC cards such as the 16GB A-DATA SDHC card and many other class 6 cards from other manufacturers incorporate wear-leveling.

For example, the 16GB A-DATA SDHC card has an estimated endurance or lifetime of 1,000,000 write cycles. What does that mean in "real world" terms? You would have to constantly write, erase and re-write data non-stop for several years before you need to be concerned about failure.

If your SDHC is 4GB with a formatted capacity of 3900MB, and you do nothing but write to it as fast as you can - at, say, 30MB/s - you'll still only be able to replace its entire contents every 130 seconds. At that rate, it'll take you 1,500 days (4.1 years) to hit 1,000,000 cycles.

In short, by the time you need to worry about SDHC failure we'll probably have 320GB SDHC cards or the computer industry will start using another type of storage medium. That said, every electronic device ever created can fail. We've had brand new hard drives and brand new SSDs fail in our office after less than a week of use. Bottom line, in most cases we don't believe using an SDHC card is any less safe than any other storage methods.