



The need for SSD speed: How to find the perfect SSD

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Installing an SSD is a sure-fire way of reviving an old and slow computer or adding warp-speed performance to your beloved system. It is a much faster, power-efficient and robust storage device than traditional spinning hard drives. But there are SSDs of various sizes, bus interfaces and technologies out there such as 2.5-inch drives and different sizes of M.2 drives, SATA and PCIe interfaces, TLC and QLC technologies and so on. As a result, it is really easy to buy the wrong one that your computer would not support. We will arm you with the right questions to ask and enable you to apprehend the specifications when buying a shiny new SSD.

Dealing with SSD form factors might seem like a simple process, but there is more to it than meets the eye. Generally, you have two options: getting a 2.5-inch SSD or an M.2 SSD. 2.5-inch SSDs are similar in size to 2.5-inch hard drives. M.2 SSDs on the other hand, are far smaller in size and connect directly to the motherboard without any wiring. Firstly, you have to know if your computer's

motherboard has an M.2 slot or not. It should be written on the product specification page. If yes, you need to find out what size of M.2 drive it takes as there are several sizes available. The most commonly used size nowadays is 2280, which is 22 mm wide and 80 mm tall, though, modern motherboards can accommodate several sizes of M.2 SSDs. Some other common form factors are 1630, 2230, 3030, 2242, 22110. There are also Add-In Cards or AIC and M.2 adapters for desktop computers that can be connected through a PCIe slot which can take several SSDs.

After resolving the form factor dilemma, you should turn your head to the bus interface problem. In simple words, interfaces are the connectors at the end of SSDs that connect to the motherboard. There are two generally used interfaces known as, SATA (Serial Advanced Technology Attachment) and PCIe NVMe. The SATA interface delivers a maximum data transfer speed of 550 MB/s, while NVMe, a standard for connecting SSDs

using a PCIe interface can deliver up to 7,000 MB/s of data transfer speed.

2.5-inch SSDs generally use a SATA interface, NVMe being very rare and expensive for this form factor. You will therefore not face any problem buying a 2.5-inch SSD. M.2 SSDs however, can use SATA as well as PCIe NVMe interfaces. Although most modern motherboards support both SATA and NVMe M.2 SSDs, it is important to know which kind of M.2 SSD your motherboard supports as many old motherboards do not support both.

One very critical thing to keep in mind is that M.2 SSDs have cutouts or notches to prevent them from being inserted into the wrong slots. Modern NVMe SSDs have one cutout and SATA SSDs have two cutouts. You can determine which one you need by looking at the M.2 slot on your motherboard.

Lastly, there is one technical issue that concerns the monetary aspect. Consumer SSDs use TLC and QLC cell technologies to offer more storage and cut down prices. TLC or Triple Level Cell SSDs store 3 bits

of data per memory cell and QLC or Quad Level Cell SSDs store 4 bits of data per memory cell. The more you divide a cell, the lower the P/E cycle becomes of an SSD which determines its life expectancy. Therefore, TLC drives have a longer life expectancy than QLC drives and are technically faster. However, you do not need to be afraid of getting a QLC drive as it will last a great many years anyway.

It must be clear to you that TLC drives are costlier than QLC drives. For your convenience, Samsung EVO series drives are TLC SSDs and QVO series drives are QLC SSDs. If money is burning a hole in your pocket, you might even go for an MLC or Multi-Level Cell drive such as, Samsung Pro series, which stores 2 bits of data per cell and offers a much higher P/E cycle.

In the end, you have all the information to make a sensible purchase. Mind the size, find the bus and cut your technology according to your pocket. See you on the highway of supersonic computing.