5.2.3 SATA Installation Facts

Serial ATA (SATA) is computer bus technology primarily designed for the transfer of data from a hard disk. SATA:

- Uses serial communication (meaning each device is on its own channel).
- Provides built-in support for disk protection methods.
- Provides for easy configuration. Just connect the device to the SATA port.
- Has an L-shaped connector.
- Supports external devices through the external SATA (also called eSATA) standard. eSATA is faster than USB.

SATA is the latest generation of standards for hard disk and other storage devices. You should be familiar with the following SATA standards:

Standard	Description
SATA1	SATA1 is the original SATA standard. It provided for 1.5 Gbps (150 MBps) data transfer.
SATA2	The second generation of SATA devices support up to 3 Gbps (300 MBps). SATA2 includes the following enhancements: ▪ Xbox360 hard disk interface (called xSATA) ▪ Hot pluggable support, allowing drives to be added and removed while the system is running ▪ Improved connectors to reduce ESD, improved usability, and extended life when used with external devices ▪ Native Command Queuing (NCQ) for increased performance ▪ Port multiplier support, allowing multiple devices to be connected to a single SATA port
SATA3	The third generation of SATA devices support up to 6 Gbps (600 MBps). ▪ This standard mainly addresses solid state drives with SATA (hard disk drives are not capable with sending data at this rate). ▪ The standard includes new connectors for solid state devices and thin optical drives.
eSATA	The eSATA (external SATA) standards are a subset of other standards specifically for externally connected devices. ▪ eSATA devices use a special SATA data cable with a locking clip to prevent the cable from being accidently disconnected. ▪ Because power is not supplied through the SATA data cable, eSATA devices require an external power connector or power source. ▪ eSATA is typically faster than USB. ▪ eSATA has a rectangular connector.
eSATAp	The eSATAp (Power over eSATA or Power eSATA) standards are meant to replace eSATA. ▪ eSATAp combines the functionality of an eSATA and a USB port with a source of power in a single connector. ▪ Both SATA data and device power are integrated in a single cable. ▪ The eSATAp connector and port are neither an L-shaped or rectangular.

You should know the following facts about SATA:

- Each SATA drive has its own channel, with a single drive connected to each cable and port.
- The cable length can be up to one meter (up to 2 meters for eSATA).
- SATA devices use a special 15-pin power connector that supplies 3.3, 5, and 12 volts. You can use an adapter cable to convert a 4-pin Molex connector to a SATA power connector, but if you do, the resulting cable will not have 3.3 volts (3.3 volts are typically not used in most SATA devices).
- Devices you can connect using SATA include:
  - Hard disk drives (HDD)
  - Optical drives (CD/DVD/Blu-ray)
  - Solid state drives (SSD)
- All new motherboards include support for multiple SATA devices.
  - Some motherboards include eSATA connectors, or you can use a port connector device to add external ports using the internal SATA connections.
  - You can also install an adapter card in an available bus slot to increase the number of SATA ports.
- Removable storage devices are typically connected through eSATA or USB. A hard drive enclosure allows you to connect a SATA hard drive to the USB port of your computer, making the hard drive a form of portable storage.
- Connect the boot drive to the lowest SATA channel number of the installed devices. The boot sequence will normally follow the channel order unless a boot priority is specified in the BIOS/UEFI.
- When installing a newer SATA2 drive into a system that supports only SATA1, you might need to:
  - Configure the drive to operate in SATA1 mode. This is typically done by setting a jumper.
  - Update the BIOS/UEFI to recognize the new drive.

  Even with these steps, some SATA2 drives will not work in a motherboard that supports only SATA1. In that case, install a SATA2 controller card.
- eSATA cards offer simple connectivity between a host computer and eSATA devices. And remember that you also have the option to use expansion cards as needed.