Chapter 8: Multimedia Devices

Complete CompTIA A+ Guide to PCs, 6e
Chapter Objectives

- To compare optical drive and disc technologies
- To determine optical drive specifications and features from an advertisement or specification sheet
- To determine the best interfaces and ports used to connect optical drives
- How to install, configure, and troubleshoot optical drives, sound, scanners, and digital cameras
- How to use Windows to verify optical drive, audio ports, scanner, and digital camera installations
- How to provide support with a positive, proactive attitude
CompTIA A+ Exam Objectives Covered in This Chapter

801-1.1: Configure and apply BIOS settings.
801-1.4: Install and configure expansion cards.
801-1.5: Install and configure storage devices and use appropriate media.
801-1.12: Install and configure various peripheral devices.
801-3.1: Install and configure laptop hardware and components.
801-3.3: Compare and contrast laptop features.
802-1.4: Given a scenario, use appropriate operating system features and tools.
802-1.5: Given a scenario, use Control Panel utilities.
Optical Disk Drives

- CD (compact disc)
- DVD (digital versatile disc or digital video disc)
- Blu-ray
How Data Is Read and Written To Optical Discs

- Process of writing data
  - Data written using laser beam
  - Data burned (etched) with lands (1) and pits (0)
  - Acrylic surface added to protect the data

A CD is constructed of plastic, aluminum, and acrylic
How Data Is Read and Written To Optical Discs

• Process of reading data
  • Laser beam passed over pits and lands on surface
    • Distinguish between pit and land by amount of deflection or scattering when light beam hits surface
• CDs and DVDs use red laser beams
  • DVD laser beam wavelength is shorter than CD
  • Shorter wavelength allows a more accurate beam
    • More data can be stored on a DVD than on a CD
• Blu-ray uses blue laser beam
  • Shorter than any red beam
  • Blu-ray technology stores more data than a DVD
How Data Is Read and Written To Optical Discs

- CD: data written to one side
- DVD or Blu-ray disc: data written on one or both sides
- Optical disc data
  - One continuous spiral of equal length sectors
- Hard drives spin at a constant rate
- Optical drives use variable speeds
  - Reads each sector on the spiral at a constant linear velocity (CLV)
  - Disc spins faster when read-write head near disc center
## Optical Drive Writeable Media

<table>
<thead>
<tr>
<th>Media Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>CD</td>
<td>650 or 700MB</td>
</tr>
<tr>
<td>DVD-5</td>
<td>4.7GB single-sided single layer</td>
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<tr>
<td>DVD-9</td>
<td>8.5GB single-sided dual layer</td>
</tr>
<tr>
<td>DVD-10</td>
<td>9.4GB double-sided single layer</td>
</tr>
<tr>
<td>DVD-18</td>
<td>17.1GB double-sided dual layer</td>
</tr>
<tr>
<td>BD</td>
<td>25GB single layer</td>
</tr>
<tr>
<td>BD DL</td>
<td>50GB dual layer</td>
</tr>
<tr>
<td>Mini BD</td>
<td>7.8GB single layer</td>
</tr>
<tr>
<td>Mini BD DL</td>
<td>15.6GB dual layer</td>
</tr>
</tbody>
</table>
Optical Drive Interfaces and Connections

- PATA
- SATA
- USB
- IEEE 1394 (FireWire)
- eSATA
- eSATAp (Combo SATA/USB)
Sound Card Operation

- MIDI (Musical Instrument Digital Interface)
- Analog
- Digital
Scanner Types

- Flatbed Sheetfed
- Handheld
- Film (photographic)
- Barcode Reader
# Scanner Connectivity

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<table>
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<tbody>
<tr>
<td><strong>Parallel</strong></td>
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<tr>
<td><strong>USB</strong></td>
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<tr>
<td><strong>IEEE 1394 (FireWire)</strong></td>
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<tr>
<td><strong>RJ-45 Ethernet</strong></td>
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<tr>
<td><strong>Wireless</strong></td>
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Type A connector

Type B connector

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Scanner File Formats

JPEG (Joint Photographic Experts Group)
- “lossy” data compression
- digital photography

GIF (Graphic Interchange Format)
- data compression algorithm patented by Unisys Corp.
- 256 color limit

TIFF (Tag Image File Format)
- popular in publishing industry
- high color applications
- large files

PNG (Portable Network Graphics 1995)
- “lossless” data compression
- replacement for GIF

PDF (Portable Document Format)
- represents documents independent of hardware, software and operating system
- originally controlled by Adobe, Inc., now an open standard
Scanner Terms

- **Resolution**: dots per inch
- **Bit Depth**: # of bits for color, more bits, more color
- **Interpolation**:
  - SW process for greater resolution
  - Fills in pixels around scanned pixels
- **TWAIN**: App. Program Interface (API) and protocol for communication between software and digital imaging devices
- **OCR (Optical Character Recognition)**: software process to convert images of character to editable characters

1. A document is placed on the scanner’s glass plate. There is a lamp under the glass.
2. The lamp (fluorescent, CCFL [cold cathode fluorescent lamp], or Xenon) turns on. Light reflects from the document.
3. The scan head is used to capture the reflected light. It moves slowly down the document by way of a belt. The light reflects through a series of mirrors to the CCD (charge-coupled device) array.
4. The CCD array holds light sensitive diodes. The diodes convert light into varying voltage levels. The voltage levels are sent to an ADC (analog to digital converter).
5. The ADC converts the voltage levels to pixels. A pixel is a dot and is the smallest unit in a picture or document.
6. The pixels are sent through the scanner interface to the computer where the image is displayed.
## Digital Camera Data Storage

<table>
<thead>
<tr>
<th>Small Card Type</th>
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<tbody>
<tr>
<td>Compact Flash (CF)</td>
</tr>
<tr>
<td>SmartMedia</td>
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<tr>
<td>Memory Stick</td>
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<tr>
<td>Secure Digital</td>
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<tr>
<td>PC Card/ExpressBus Drives</td>
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<tr>
<td>MMC (Multimedia Card)</td>
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</tbody>
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Digital Camera File Formats

- RAW: unprocessed data, not ready for print
- JPEG: Joint Photography Experts Group standard is the most common file format for storing image data
- TIFF: **Tagged Image File Format** is a file format for storing images,
- WAV: **Waveform Audio File Format** (**WAVE**, or more commonly known as **WAV** due to its filename extension) is a Microsoft and IBM audio file format standard for storing an audio
- MOV: video (movie) files
## Soft Skills - Attitude

- Is proactive, not reactive.
- Seeks solutions instead of providing excuses.
- Accepts responsibility for actions taken.
- Deals with priority changes professionally.
- Cooperates and enjoys working with others.
- Maintains professionalism even when working with a coworker who is unethical, unprofessional, or uncooperative.
- Embraces problems as challenges to learn and develop skills.
Review the disc media types and capacities before the exam.

Ensure that you know how to install and configure an optical drive, a sound card, and a scanner.

Know common sound issues and the easy fixes for them.

Maintaining a positive attitude is the professionalism and communication skill that is part of the 220-801 exam.

Review the troubleshooting tips in each of the multimedia sections for help on the 220-802 exam.
Chapter Summary

• Install ODDs using the same rules of configuration as for SATA and PATA hard drives.
• Use the appropriate media for the type of drive installed.
• Don't multitask when writing data to an optical disc.
• Optical drives and discs have region codes that must match.
• When purchasing an optical drive, features to look for include ample buffer memory and reduced random access times, MTBFs, and MCBFs.
• For stuck optical discs, use the Eject option from Windows Explorer or the emergency eject hole.
• Keep the laser lens clean.
Chapter Summary

• Wipe dirty discs in an inward-to-outward (not circular) motion.
• It's important to ensure that device and video drivers are up to date.
• DirectX (dxdiag) is used to troubleshoot multimedia issues.
• A decoder must be installed for video to play from a disc correctly.
• A motherboard normally has a small speaker used for POST codes when sound does not work properly.
• If a sound card is installed, disable the motherboard sound ports.
• The higher the sampling rate, the better the audio quality.
• For sound issues, check muting, volume controls, cables, and device conflicts.
Chapter Summary

- Laptop speakers are commonly mounted on the side or back of the laptop case. The keyboard may have to be removed to replace the speakers.
- Microphones are used for VoIP and are tested/managed through the Recording tab of the Sound window.
- Scan documents at a resolution suited for the final output (print, web, display).
- Do not spray cleaner directly on the scanner glass, but do keep the glass clean.
- Digital cameras commonly have storage media that can be removed and attached directly to a PC using a memory card reader.
- Web cams can be integrated into a display or mobile device or an external unit that is used for conference calls or recording video.
- A technician should have a positive attitude, be proactive, and maintain professionalism when working with others.