

# Chapter 17

## Display Technologies



## Episode: **Monitor Technologies**

Objective(s): Core 1: 1.2 Compare and contrast the display components of mobile devices.



## Episode Description

A+

There's more than one way to make a monitor, but they all share one very important common feature: the pixel. Once we understand that all monitors have pixels, it's easier to understand the different technologies you might find in a modern monitor.

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## Key Terms

A+

- 0:45 - Pixel (picture element)
- 0:58 - Objective term - Liquid Crystal Display (LCD)
- 1:36 - RGB
- 2:07 - Cold cathode fluorescent lamp (CCFL)
- 2:14 - Light-emitting diodes (LEDs)
- 3:07 - Objective term - Twisted nematic (TN)
- 3:15 - Objective term - In-place switching (IPS)
- 3:36 - Resolution

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## Key Terms

A+

- 4:10 - Brightness
- 4:16 - Nit (nt)
- 4:21 - Panels generally run from 200-500 nits
- 4:26 - Response time
- 4:56 - Panel response times run from about 1ms - 4 ms
- 5:49 - Objective term - Organic LED (OLED)
- 6:25 - Digital Light Processing (DLP)

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# Quick Review

- A monitor is composed of a mosaic of individual picture elements (pixels); the total pixels across and down is the resolution
- Liquid Crystal Display (LCD) monitors use liquid crystals to allow light to pass or not pass for each color in a pixel
- LCD backlights are fluorescent or LED lights and shine through the liquid crystals
- Organic LED (OLED) doesn't use a backlight, as the pixels make their own light
- Digital Light Processing (DLP) uses a grid of tiny mirrors that shine through a color wheel to create an image



## Episode: **LCD Breakdown**

Objective(s): Core 1: 1.2 Compare and contrast the display components of mobile devices.



## Episode Description

A+

The Liquid Crystal Display (LCD) is the dominant technology for today's monitors. A good tech should possess a deep understand of how LCDs work and how to open and repair an LCD monitor.

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## Key Terms

A+

- 1:29 - CCFL tubes
- 2:57 - Objective term - Inverters
- 3:03 - Only CCFL screens need inverters
- 3:25 - 1. Panel
- 3:27 - 2. Backlight unit
- 3:46 - 3. Connectors
- 3:46 - 4. Input from data
- 3:46 - 5. Power connection

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# Quick Review

- An LCD panel has a preset resolution
- The back panel (backlight unit) distributes the light emanating from the CCFL or LED backlights
- Inverters convert DC power back into AC power for fluorescent lights; LEDS don't need inverters



## Episode: **Graphics Cards and Connections**

### Objective(s):

Core 1: 3.1 Explain basic cable types and their connectors, features, and purposes.

Core 2: 1.7 Given a scenario, apply application installation and configuration concepts.

Core 2: 4.6 Explain the importance of prohibited content/activity and privacy, licensing, and policy concepts.



## Episode Description

A+

Monitors don't create the images they display; that's the graphics card's job. Graphics cards come with different features and capabilities that a good tech understands very well.

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## Key Terms

A+

- 0:26 - Graphics processing units (GPU) AKA - video card
- 0:55 - Frame buffering
- 2:34 - Nvidia
- 2:38 - ATI/AMD
- 2:45 - Intel
- 3:12 - Objective term - Integrated (built-in) GPU

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## Key Terms

A+

- 3:23 - CPU + GPU = APU!
- 4:46 - Objective term - VGA (Video Graphics Array)
- 5:44 - Objective term - Digital Visual Interface (DVI)
- 6:44 - DVI to VGA
- 7:10 - DVI-I (digital and analog)
- 7:19 - DVI-D (digital only)

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## Key Terms

A+

- 7:43 - Single-link DVI
- 7:43 - Dual-link DVI
- 8:54 - Objective term - Digital Rights Management (DRM)
- 9:02 - Objective term - HDMI (High-Definition Multimedia Interface)
- 9:42 - Mini-HDMI
- 10:20 - Objective term - DisplayPort
- 11:03 - DisplayPort and Mini DisplayPort

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# Quick Review

- NVIDIA, AMD (ATI), and Intel make the majority of GPUs
- All graphics cards have RAM to help resolve the screen
- Many CPUs come with built-in GPUs
- VGA uses an analog signal; DVI uses a digital signal





## Episode: **Resolutions and Aspect Ratios**

Objective(s): No exam-specific objectives



## Episode Description

A+

More resolution means a more detailed picture. Monitor resolutions have increased for decades, and a good tech understands common resolutions and aspect ratios.

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## Key Terms

A+

- 2:05 - 16:10 – golden ratio
- 3:18 - 720p
- 4:36 - 1080p

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# Quick Review

- All monitors have a resolution and an aspect ratio
- Take time to memorize all the resolutions defined in this episode
- It helps to memorize the resolutions by organizing them by aspect ratios



## Episode: **Installing a Graphics Card**

Objective(s): Core 1: 3.4 Given a scenario, install and configure motherboards, central processing units (CPUs), and add-on cards.



## Episode Description

A+

Graphics cards often require special treatment when installing them in terms of power and cooling. In addition, systems need special drivers to take full advantage of the power of most graphics cards.

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## Key Terms

A+

- 3:42 - Riser card

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# Quick Review

- Almost all graphics cards use 16-lane PCIe slots and one or two PCIe power connectors
- With multiple graphics cards, define the primary card in system setup
- Some systems provide riser cards for extra graphics cards
- Always run the system at your monitor's native resolution





## Episode: **Multiple Monitors**

Objective(s): No exam-specific objectives



## Episode Description

A+

The CompTIA A+ concentrates on Windows, but every operating system gives you the ability to use more than one monitor. Make sure you understand the power of multiple monitors as well as how to install and configure them.

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## Key Terms

A+

- None

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# Quick Review

- Windows multi-monitor support is not dependent on a single graphics card or even the same resolution
- Make sure you recognize your primary (number 1) monitor, since it's your main display by default
- Second monitors can duplicate or extend the desktop



## Episode: **Projectors**

Objective(s): Core 1: 5.4 Given a scenario, troubleshoot video, projector, and display issues.



## Episode Description

A+

It's easy to think of projectors as nothing more than monitors that project on a wall but that's a bit short-sighted. Projectors come with their own technologies and configurations that a good tech understands.

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## Key Terms

A+

- 0:35 - DLP
- 0:42 - Objective term - LCD
- 1:02 - Lumens
- 1:50 - Throw
- 2:59 - Pincushion
- 3:17 - Keystone
- 3:40 - Skew

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# Quick Review

- Projectors have resolutions and aspect ratios just like monitors
- Projectors usually have either DLP or LCD technology
- Lumens define the brightness of the projector
- Make sure you understand throw, pincushion, keystone, and skew





Episode: **Troubleshooting Display Technologies**

Objective(s): Core 1: 5.4 Given a scenario, troubleshoot video, projector, and display issues.



## Episode Description

A+

The CompTIA A+ exams will challenge you on monitor troubleshooting. Whether it's simply changing the input or replacing a burned-out bulb, troubleshooting displays is critical for techs.

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## Key Terms

A+

- 0:47 - Objective term - Intermittent projector shutdown
- 1:03 - Objective term - Burned-out bulb
- 1:28 - Objective term - Incorrect data source
- 2:54 - Objective term - Cabling issues
- 3:16 - Objective term - Bent pins
- 3:31 - Objective term - Image/display burn-in

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## Key Terms

A+

- 3:58 - Objective term - Dead pixels
- 4:11 - Objective term - Incorrect color display or dim image
- 4:23 - Objective term - Flashing screen

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# Quick Review

- Projectors need regular cleaning and bulb replacements from time to time
- You may need to swap from an incorrect data source to the correct one to get an output
- Always double check cabling when troubleshooting displays

