

# Expansion Cards

---

At the end of this episode, I will be able to:

1. Identify common expansion cards, their purpose and connections.

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

Description: In this episode, we discuss central processing units or CPUs, their characteristics, features and attributes.

---

- **Expansion Cards**
  - Sound card (Show)
  - Video card
  - Capture card (Show)
  - Storage cards (Show PCIe M.2/SATA card)
  - Network interface card (NIC) (Show)
- **Connection Types**
  - Peripheral Component Interconnect (**PCI**)
    - Local bus/shared bus
    - Bus mastering
    - Half duplex
    - 133 MBps

- 32-bit and rare 64-bit cards
- PCI Express (**PCIe**)
  - Serial communication
  - Utilizes single and multilane architecture
  - Multilane implementations are represented by a “x-lane” designation
  - Data is striped across multiple lanes, making the total bandwidth a multiplier of a single lane speed
  - Versions
    - Version 1.x
      - $\times 1 = 250 \text{ Mbps}$
      - $\times 16 = 4 \text{ GBps}$
    - Version 2.x
      - $\times 1 = 500 \text{ MBps}$
      - $\times 16 = 8 \text{ GBps}$
    - Version 3.x:
      - $\times 1 = 985 \text{ MBps}$
      - $\times 16 = 15.75 \text{ GBps}$
    - Version 4.x
      - $\times 1: 1.97 \text{ GBps}$
      - $\times 16: 31.5 \text{ GBps}$
    - Version 5.0
      - $\times 1: 3.94 \text{ GBps}$
      - $\times 16: 63 \text{ GBps}$
    - Version 6.0
      - $\times 1 = 7.56 \text{ GB/s}$

- $\times 16 = 121 \text{ GB/s}$
  - Accelerated Graphics Port (**AGP**)
    - Legacy bus architecture
    - Used for video graphics
    - Replaced by PCIe
  - Peripheral Component Interconnect eXtended (**PCI-X**)
    - Legacy bus architecture
    - 64-bit PCI implementation
    - Server technology
    - Not widely adopted
- 

- Additional Reference Materials
  - Not applicable if blank