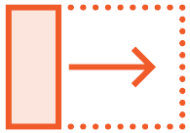
Internal PC Hardware Components

Overview

- Motherboards
- CPUs
- Add-on cards
- RAM

Motherboards

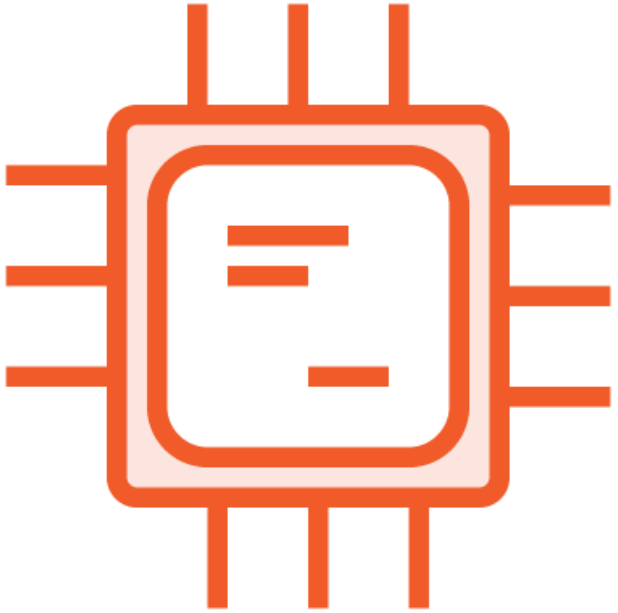
Motherboards



Also referred to as “mobos”

The primary digital circuit board in a computer

Allows internal component and external peripheral connections



Motherboard form factor

- Size
- Orientation within the case

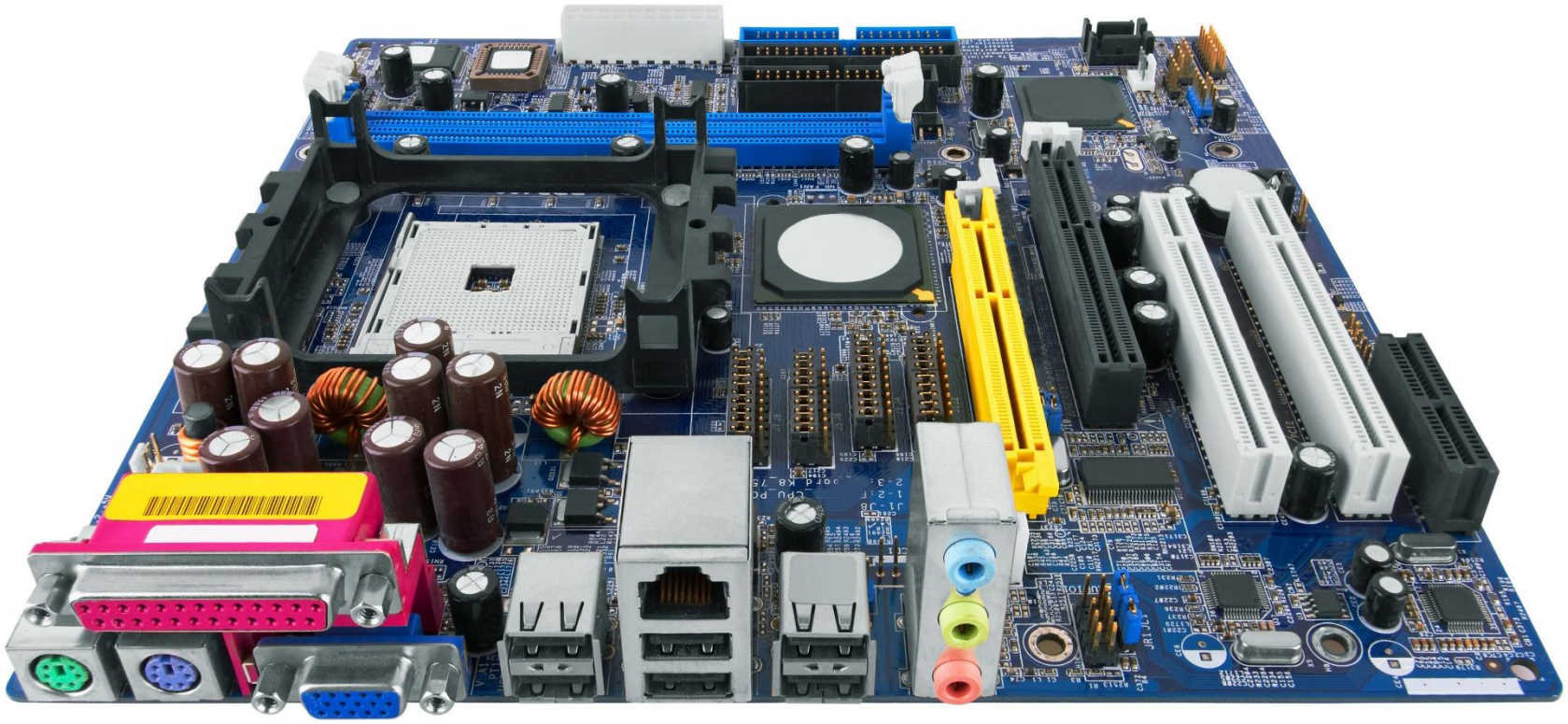
Common form factors

- ATX
- Micro ATX (mATX)
- ITX
- (Mini ITX) mITX

Connectors /slots

- Multiple CPUs
- PCI Express

Motherboard Connectors



BIOS and CMOS

BIOS/UEFI

Firmware can be updated

Firmware computer instructions

Power on password

Drive encryption

Secure boot

CMOS

BIOS/UEFIC configured settings

CMOS battery

Demo

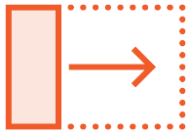
View motherboard details using the CPU-Z tool

Demo

Configure BIOS settings

CPUs

CPUs

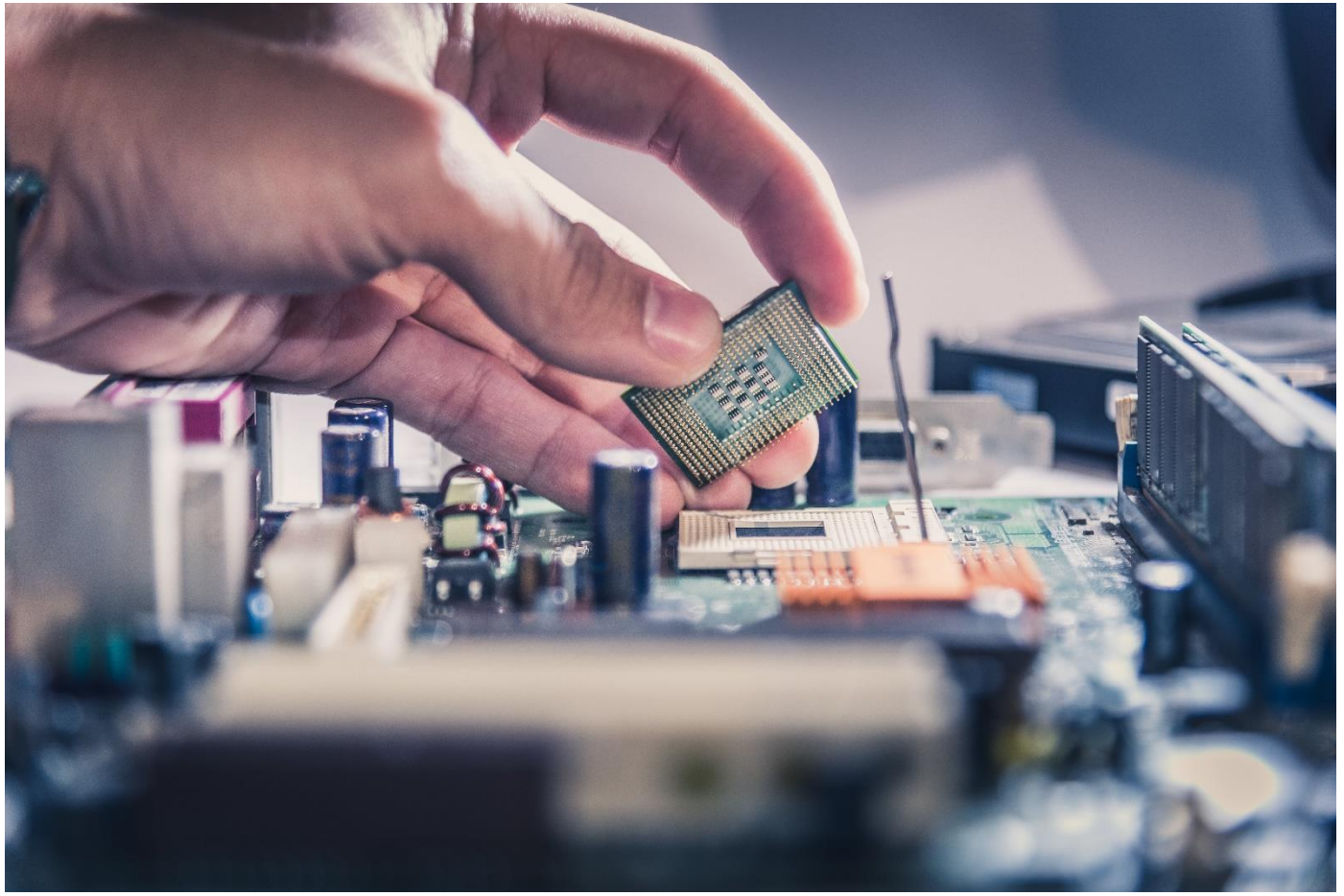


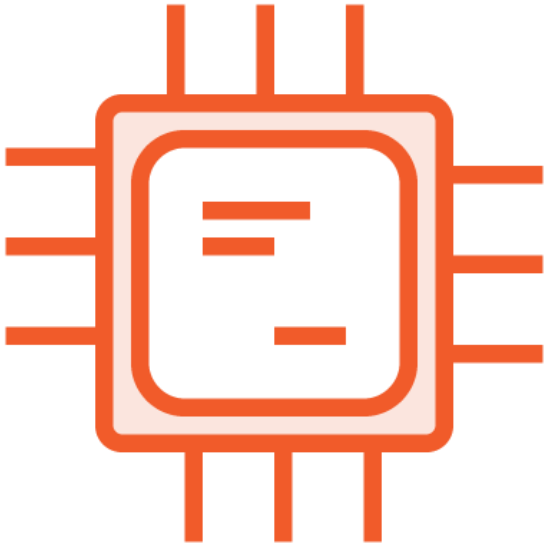
Central Processing Unit; the “brain” of the computer

Multi-core: Multiple CPUs within a single physical chip

CPU speed is measured in Gigahertz (GHz)

Central Processing Unit (CPU)





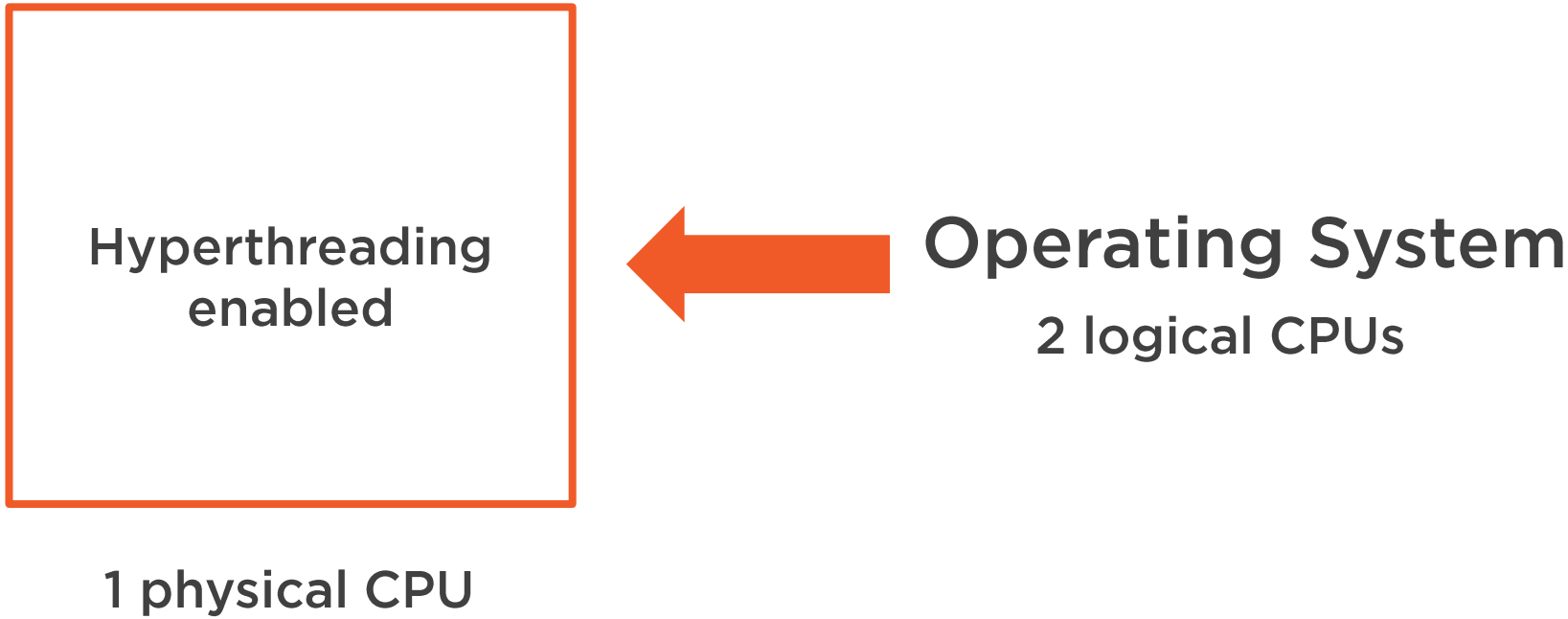
Common CPU manufacturers

- AMD
- Intel

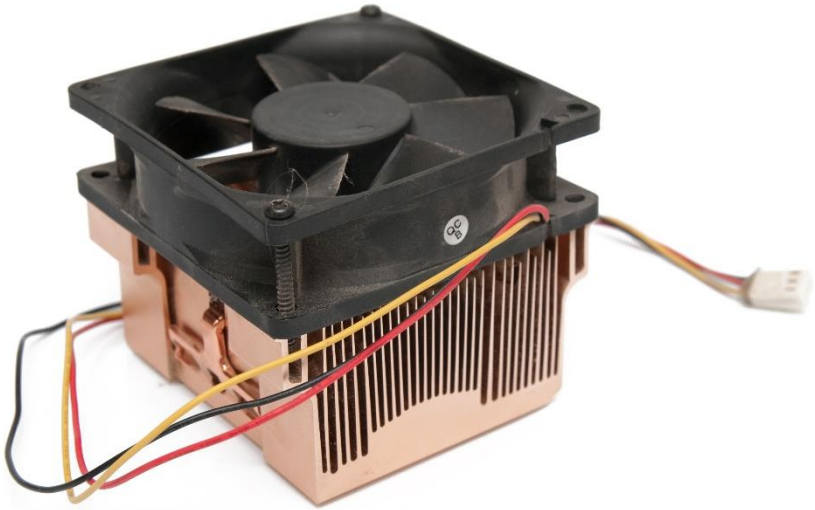
CPU characteristics and options

- L1, L2, L3 cache
- 32-bit vs 64-bit
- Virtualization extensions
- Overclocking
- Integrated GPU

CPU Hyperthreading



CPU Cooling

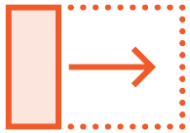


Demo

View processor details using the CPU-Z tool

Add-on Cards

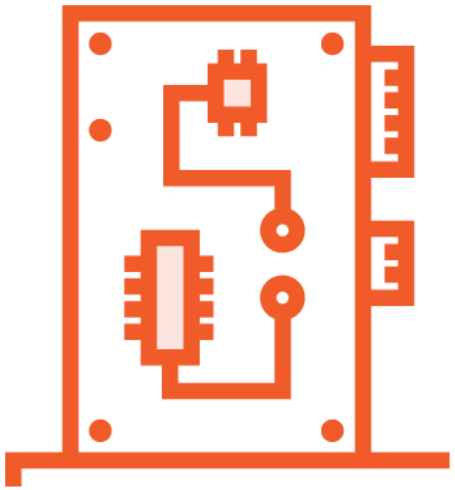
Add-on Cards



Also called “expansion cards” or simply “adapters”

Provide additional functionality to the PC

Card form factors (size, orientation)



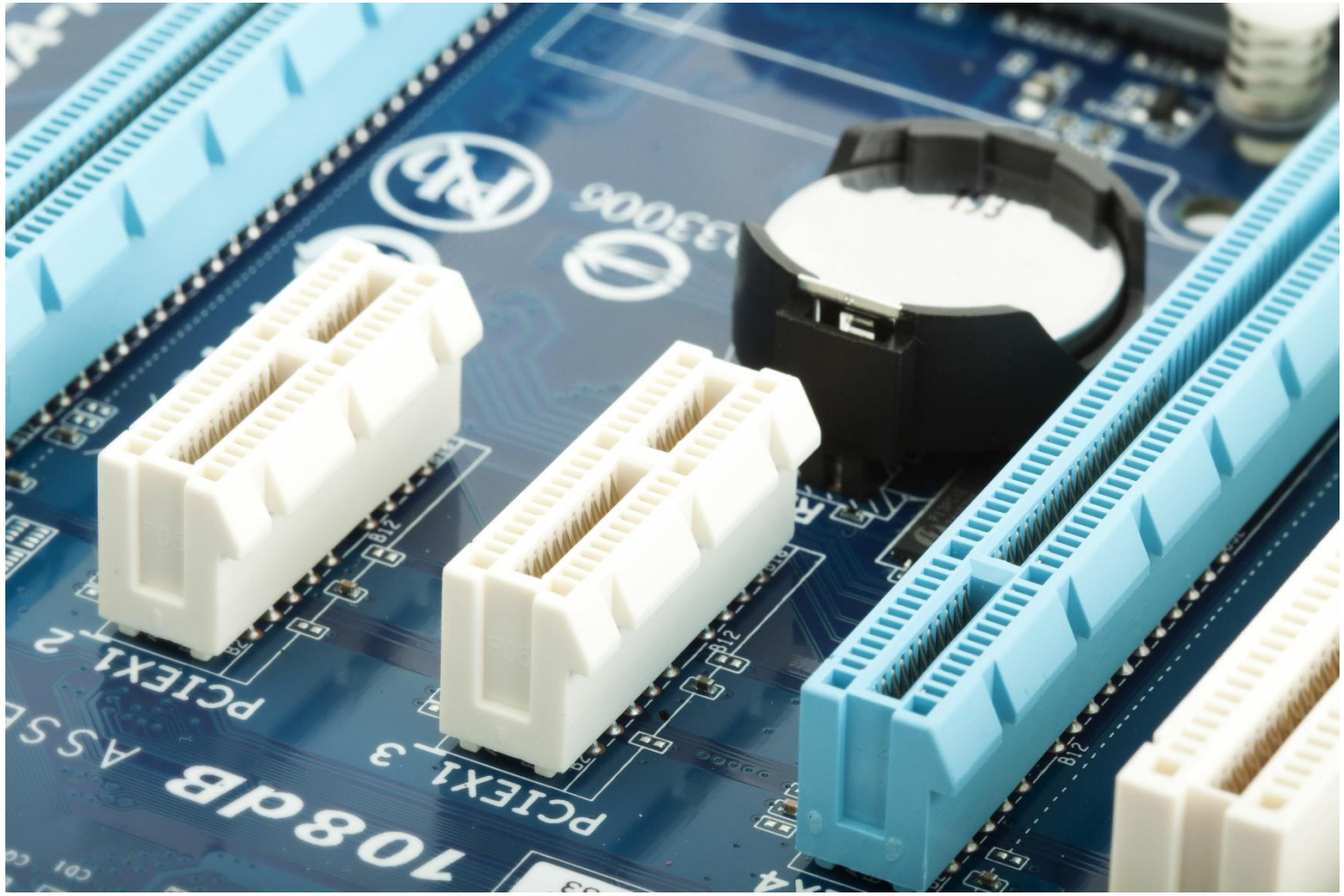
Expansion card socket types

- PCI
- PCI Express (PCIe)
- Riser card

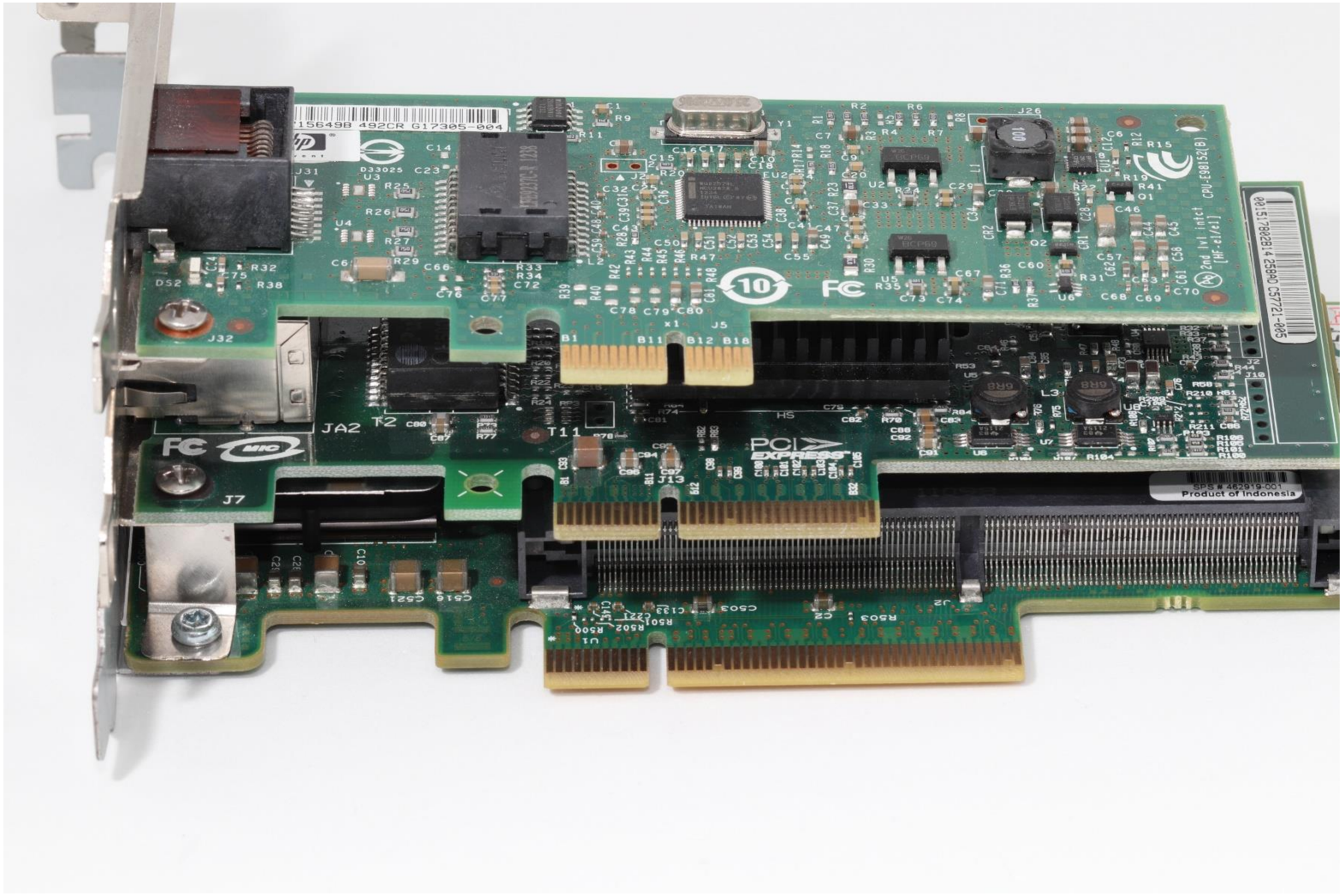
PCIe 3.0

- x1 means 1,000MBps bi-directionally
- x2, x4, x8, x16

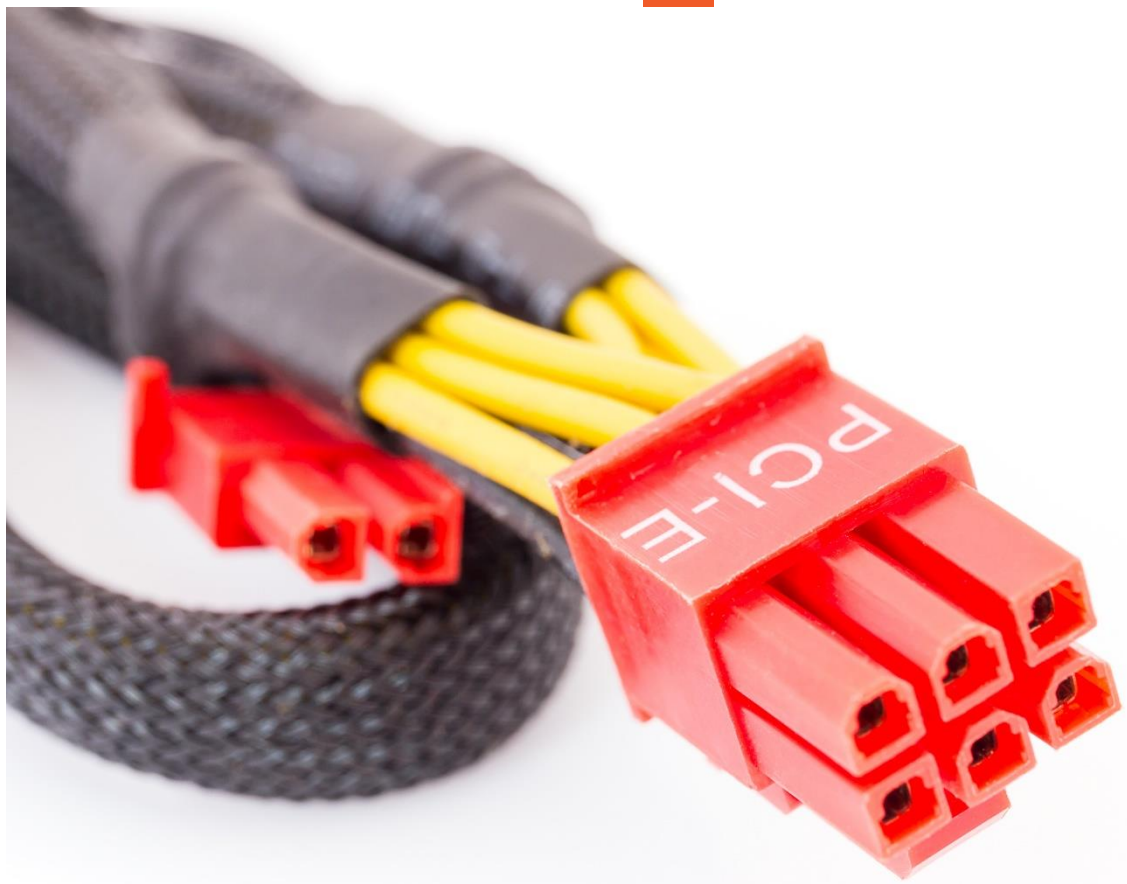
PCI Express Slots

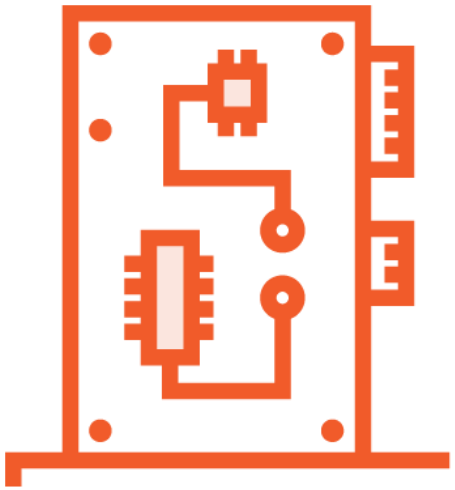


PCI Express Cards



PCI Express Power



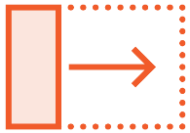


Onboard or add-on cards

- Network interface card (NIC)
- Sound card
- Video card
- USB card
- eSATA card
- RAID controller

RAM

RAM



Random Access Memory

Volatile storage; relies on electricity

Motherboards determine the maximum possible amount of RAM

Parity

- Uses a 9th error checking bit for every byte of memory

Non-parity

- No 9th parity bit

Error correcting code

- ECC
- Not only detects but also corrects common memory corruption issues
- Often supported on non-ECC motherboards

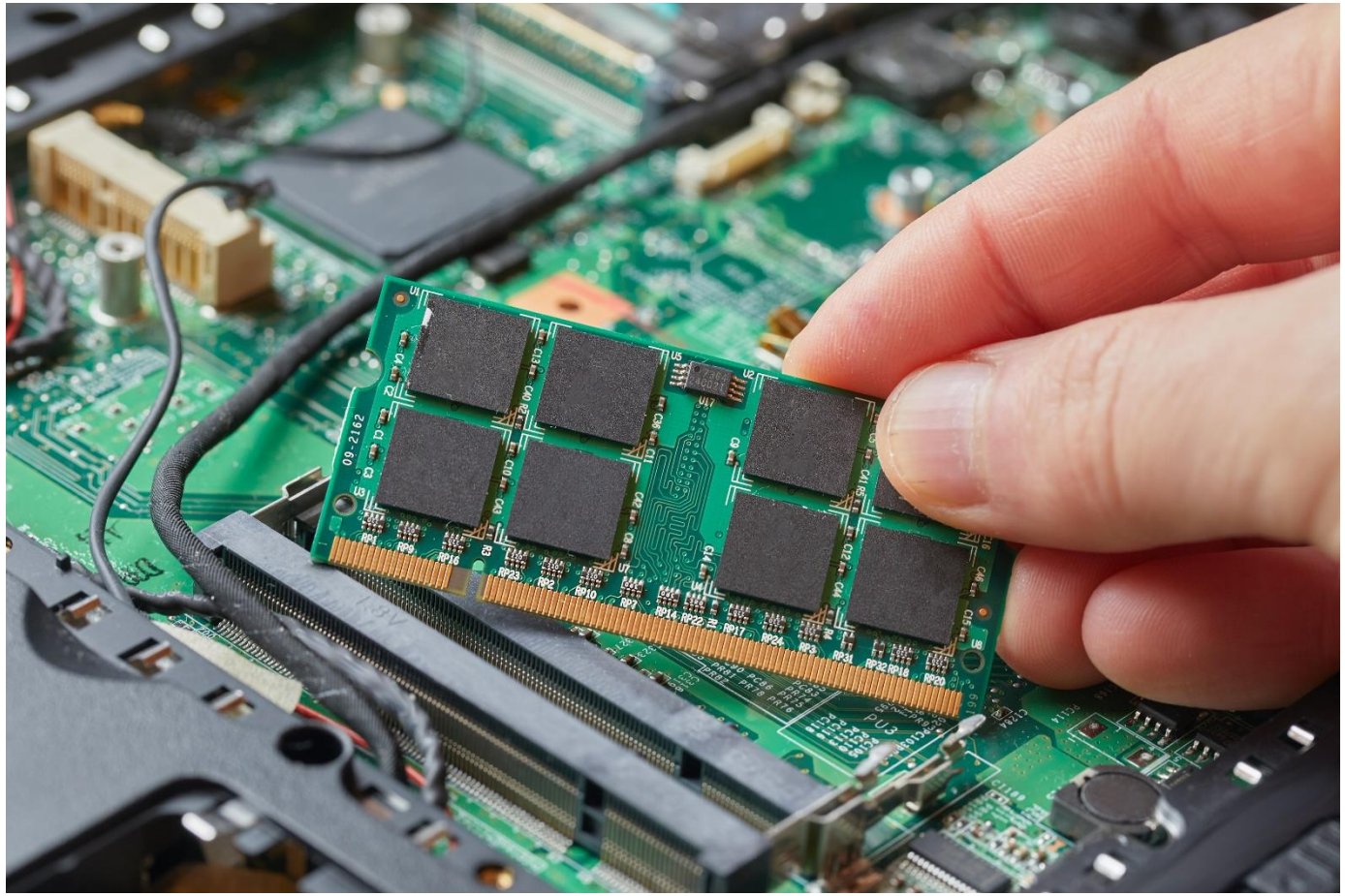
SODIMM

- Smaller chips used in laptops

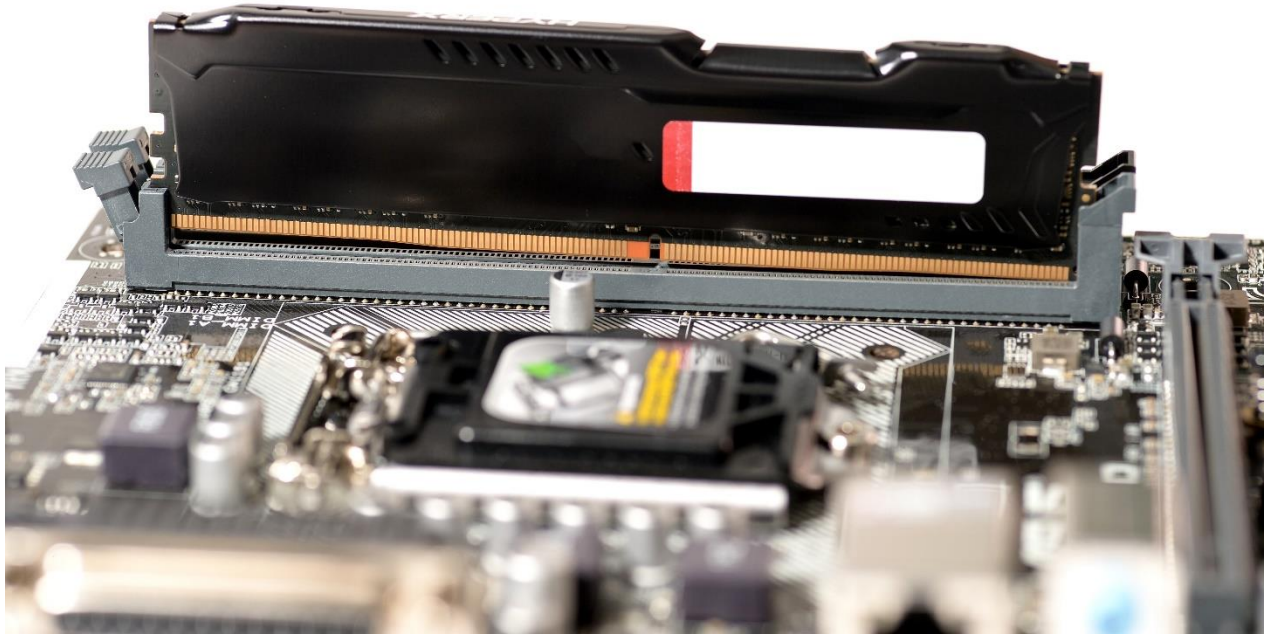
DDR RAM

- Double data rate
- Determined by the motherboard
- Does *not* have to be installed in pairs
- Many variations
- DDR2
- DDR3
- DDR4

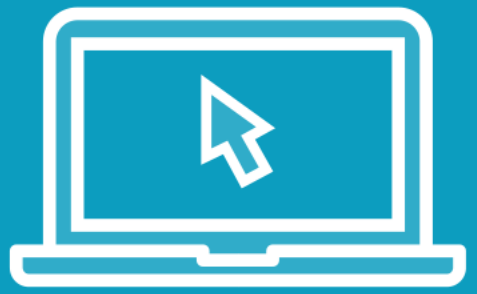
SODIMM RAM Installation



DDR4 RAM Installation



Demo



View RAM details using the CPU-Z tool

Summary

- Motherboards
- CPUs
- Add-on Cards
- RAM