

Thunderbolt Versions

| Version | Bandwidth | Connector Type |
|---------|-----------|------------------|
| 1 | 10 Gbps | Mini Displayport |
| 2 | 20 Gbps | Mini Displayport |
| 3 | 40 Gbps | USB Type-C |
| 4 | 40 Gbps | USB Type-C |

USB Versions

| USB Version | Name | Transfer Rate |
|-------------|-------------|---------------|
| USB 1.0 | Low-Speed | 1.5 Mbps |
| USB 1.1 | Full-Speed | 12 Mbps |
| USB 2.0 | Hi-Speed | 480 Mbps |
| USB 3.0 | SuperSpeed | 5 Gbps |
| USB 3.1 | SuperSpeed+ | 10 Gbps |
| USB 3.2 | SuperSpeed+ | 10/20 Gbps |

Reserved IP Ranges

| Name | Start | End |
|--------------------|----------------|--------------------|
| RFC1918 (Private) | 10.0.0.0/8 | 10.255.255.255/8 |
| RFC1918 (Private) | 172.16.0.0/16 | 172.31.255.255/16 |
| RFC1918 (Private) | 192.168.0.0/24 | 192.168.255.255/24 |
| Localhost | 127.0.0.0/8 | 127.255.255.255/8 |
| APIPA (Link Local) | 164.254.0.0/16 | 169.254.255.255/16 |

Classful IP Ranges

| Class | Start | End |
|-------|-----------|-----------------|
| A | 0.0.0.0 | 127.255.255.255 |
| B | 128.0.0.0 | 191.255.255.255 |
| C | 192.0.0.0 | 223.255.255.255 |
| D | 224.0.0.0 | 239.255.255.255 |
| E | 240.0.0.0 | 255.255.255.255 |

Laser Printing Process

| Step | Name | Description |
|------|--------------|--------------------------------|
| 1 | Processing | Build image in memory |
| 2 | Charging | Negatively charge drum |
| 3 | Exposing | Write image on drum with laser |
| 4 | Developing | Apply toner to charged drum |
| 5 | Transferring | Move toner from drum to paper |
| 6 | Fusing | Heat and bake toner to page |
| 7 | Cleaning | Clean excess toner from drum |

Storage Interfaces

| Interface | Throughput |
|-----------|------------------|
| Sata 3 | 6 Gbps |
| NVME | 16 Gb/s PCIe 3x4 |
| NVME | 32 Gb/s PCIe 4x4 |
| SAS | 12-45 Gbps |

DDR Memory Pins

| Standard | DIMM Pin Count | SODIMM Pin Count |
|----------|----------------|------------------|
| DDR | 184 | 200 |
| DDR2 | 240 | 200 |
| DDR3 | 240 | 204 |
| DDR4 | 288 | 260 |
| DDR5 | 288 | 260 |

Common Resolution

| Common Name | Resolution | Aspect Ratio |
|----------------|------------------|--------------|
| SVGA | 800x600 Pixels | 4:3 |
| XGA | 1024x768 Pixels | 4:3 |
| Super XGA | 1280x960 Pixels | 4:3 |
| HD | 1280x720 Pixels | 16:9 |
| Full HD | 1920x1080 Pixels | 16:9 |
| 2K or 1440p | 2560x1440 Pixels | 16:9 |
| Ultra HD or 4K | 3840x2160 Pixels | 16:9 |



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Common RAID

| RAID # | Common Name | Minimum # of Disks | Fault Tolerance |
|---------|-----------------------------|--------------------|-----------------|
| RAID 0 | Disk Striping | 2 | None |
| RAID 1 | Disk Mirroring | 2 | 1 Drive |
| RAID 5 | Striping with Parity | 3 | 1 Drive |
| RAID 10 | Mirrored Stripe with Parity | 4 | 1 Per subsystem |

Useful Shortcuts

| Shortcut | Description |
|--------------------|-------------------------------|
| Ctrl + [C, V, X] | Copy, Paste, Cut |
| Win + V | Paste Using Clipboard History |
| Win + Tab | Cycle Between Windows |
| Ctrl + Shift + Esc | Open Task Manager |
| Ctrl + Win + Q | Open Quick Assist |
| Win + P | Multi-Display Options |
| Win + E | Open File Explorer |

Logging Levels

| Level | Name | Description |
|-------|---------------|----------------------|
| 0 | Emergencies | Device Unusable |
| 1 | Alerts | Immediate Action |
| 2 | Critical | Critical Conditions |
| 3 | Errors | Error Condition |
| 4 | Warnings | Warning Condition |
| 5 | Notification | Normal but Important |
| 6 | Informational | Info Message |
| 7 | Debugging | Debug Message |

Intel Processor Suffixes

| Suffix | Meaning |
|--------|------------------------------------|
| K | Unlocked Frequency |
| S | Special Edition |
| T | Power-Optimized |
| F | No Integrated Graphics |
| U | Mobile Power Efficient |
| HK | High Performance Mobile, Unlocked |
| HQ | High Performance Mobile, Quad Core |
| X/XE | High Performance, Unlocked |
| E | Embedded |

AMD CPU Suffixes

| Suffix | Meaning |
|--------|---------------------------------|
| X | High Performance |
| G | Standard Desktop with Graphics |
| T | Low Power Desktop |
| S | Low Power Desktop with Graphics |
| H | High Performance Mobile |
| U | Standard Mobile |
| M | Low Performance Mobile |
| None | Standard Desktop |

Intel Core CPU Code Names

| Generation | Codename | Socket |
|------------|-------------------------|-----------------|
| 1st | Nehalem | LGA 1156 / 1366 |
| 2nd | Sandy Bridge | LGA 1155 / 2011 |
| 3rd | Ivy Bridge | LGA 1155 / 2011 |
| 4th | Haswell | LGA 1150 / 2011 |
| 5th | Broadwell | LGA 1150 / 2011 |
| 6th | Skylake | LGA 1151 / 2066 |
| 7th | Kaby Lake | LGA 1151 / 2066 |
| 8th & 9th | Coffee Lake | LGA 1151 |
| 10th | Comet Lake, Ice Lake | LGA 1200 |
| 11th | Rocket Lake, Tiger Lake | LGA 1200 |



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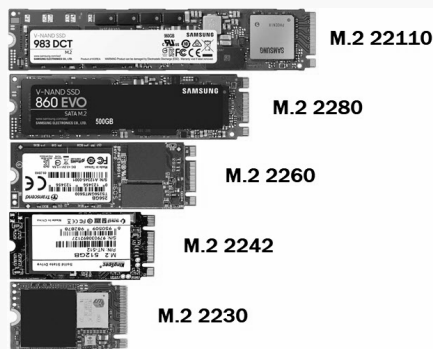
Intel Core CPU Code Names (cont)

| | | |
|------|-------------|----------|
| 12th | Alder Lake | LGA 1700 |
| 13th | Raptor Lake | LGA 1700 |

MacOS Release Names

| Release | Name | Release Year |
|---------|---------------|--------------|
| 10 | Cheetah | 2001 |
| 10.1 | Puma | 2001 |
| 10.2 | Jaguar | 2002 |
| 10.3 | Panther | 2003 |
| 10.4 | Tiger | 2005 |
| 10.5 | Leopard | 2007 |
| 10.6 | Snow Leopard | 2009 |
| 10.7 | Lion | 2011 |
| 10.8 | Mountain Lion | 2012 |
| 10.9 | Mavericks | 2013 |
| 10.10 | Yosemite | 2014 |
| 10.11 | El Capitan | 2015 |
| 10.12 | Sierra | 2016 |
| 10.13 | High Sierra | 2017 |
| 10.14 | Mojave | 2018 |
| 10.15 | Catalina | 2019 |
| 11 | Big Sur | 2020 |
| 12 | Monteray | 2021 |
| 13 | Ventura | 2022 |

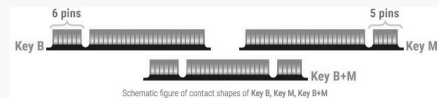
M.2 Sizes



Windows Versions

| Major Windows Versions | Release Year | Windows Server Versions |
|---------------------------|--------------|-------------------------|
| Windows 1.0 | 1985 | Windows Server 2000 |
| Windows 2.0 | 1987 | Windows Server 2003 |
| Windows 3.0 | 1990 | Windows Server 2008 |
| Windows 95 | 1995 | Windows Server 2012 |
| Windows 98 | 1998 | Windows Server 2016 |
| Windows 2000 | 2000 | Windows Server 2019 |
| Windows ME | 2000 | Windows Server 2022 |
| Windows XP / Professional | 2001 / 2005 | |
| Windows Vista | 2007 | |
| Windows 7 | 2009 | |
| Windows 8 / 8.1 | 2012 / 2013 | |
| Windows 10 | 2015 | |
| Windows 11 | 2021 | |

M.2 Connectors



PCIe Details

| PCIe Slot Width | Number of Pins | Version | X16 Transfer Rate |
|-----------------|----------------|----------|-------------------|
| X1 | 18 | PCIe 1.0 | 250 MB/s |
| x4 | 21 | PCIe 2.0 | 500 MB/s |
| x8 | 49 | PCIe 3.0 | 984 MB/s |
| x16 | 82 | PCIe 4.0 | 1969 MB/s |
| | | PCIe 5.0 | 3938 MB/s |

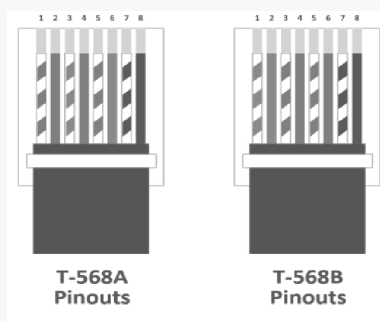
UPT Categories and Speeds

| Category | Speed | Bandwidth |
|----------|-----------------|-----------|
| Cat 5 | 100 Mbps @ 100m | 100 MHz |
| Cat 5e | 100 Mbps @ 100m | 100 MHz |
| Cat 5e | 1 Gbps @ 100m | 350 MHz |
| Cat 6 | 1 Gbps @ 100m | 250 MHz |
| Cat 6 | 10 Gbps @ 37m | 250 MHz |
| Cat 6a | 10 Gbps @ 100m | 500 MHz |
| Cat 7 | 10 Gbps @ 100m | 600 MHz |
| Cat 7a | 10 Gbps @ 100m | 1000 MHz |
| Cat 7a | 40 Gbps @ 50m | 1000 MHz |
| Cat 8.1 | 25 Gbps @ 30m | 2000 MHz |
| Cat 8.2 | 40 Gbps @ 30m | 2000 MHz |

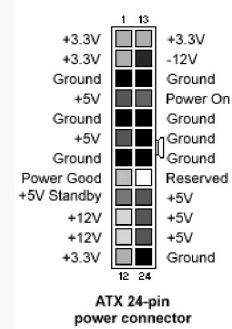
Ethernet Wiring Guide

| Pin | Signal | T568A | T568B |
|-----|--------|--------------|--------------|
| 1 | TX+ | White/Green | White/Orange |
| 2 | TX- | Green | Orange |
| 3 | RX+ | White/Orange | White/Green |
| 4 | TRD2+ | Blue | Blue |
| 5 | TRD2- | White/Blue | White/Blue |
| 6 | RX- | Orange | Green |
| 7 | TRS3+ | White/Brown | White/Brown |
| 8 | TRS3- | Brown | Brown |

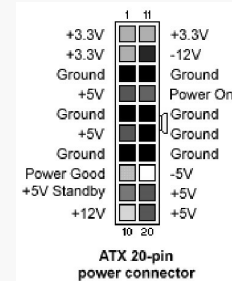
Ethernet Wiring Diagram



24 Pin ATX Power



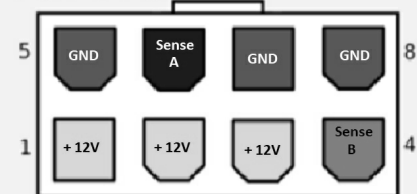
20 Pin ATX Power



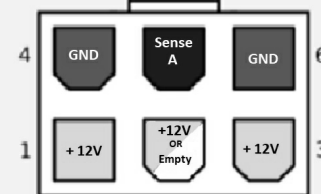
PCIe Power Pinout

GPU POWER CONNECTIONS

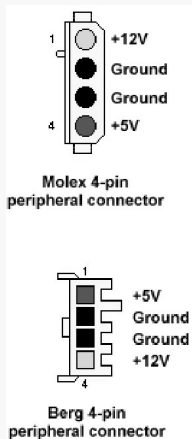
PCIe 8 Pin



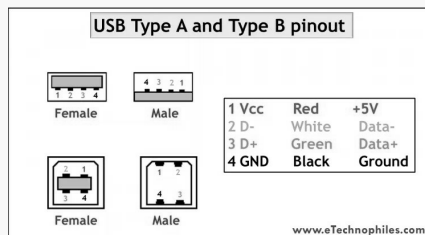
PCIe 6 Pin



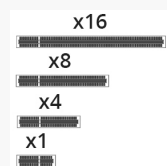
Peripheral Power



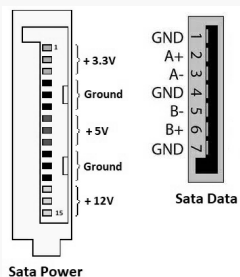
More USB Pinouts



PCIe Slot Size



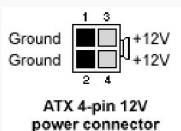
SATA Pinout



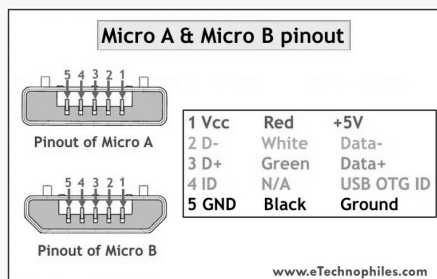
NVIDIA GPUs

| Series | Popular Models | Release Year |
|------------|---------------------------------------|--------------|
| 400 Series | GTX 470, 480 | 2010/2011 |
| 600 Series | GTX 650, 670, 680 | 2012/2013 |
| 700 Series | GT 710, GTX 750, 780, TITAN | 2013/2014 |
| 900 Series | GTX 960, 970, 980, TITAN X | 2014/2015 |
| 10 Series | GTX 1050ti, 1060, 1070, 1080, TITAN V | 2016/2017 |
| 16 Series | GTX 1650, 1660 / Super | 2019 |
| 20 Series | RTX 2060, 2070, 2080, TITAN RTX | 2018/2019 |
| 30 Series | RTX 3060/TI, 3070, 3080, 3090 | 2020/2021 |
| 40 Series | RTX 4080, RTX 4090 | 2022 |

4 Pin CPU Power



USB Pinouts



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| AMD GPUs | | |
|----------------|--------------------------------|--------------|
| Series | Popular Models | Release Year |
| Radeon 400 | R5/7 430, RX 470, 480 | 2016 |
| Radeon 500 | RX 570, 580, 590 | 2017 |
| RX Vega Series | Vega 56, 64 | 2017 |
| Radeon VII | Radeon VII | 2019 |
| RX 5000 | RX 5500, 5700, 5700XT | 2019 |
| RX 6000 | RX 6600/6650, 6800/XT, 6900/XT | 2021/2022 |
| RX 7000 | RX 7900 XT, 7900 XTX | 2022 |



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