

### 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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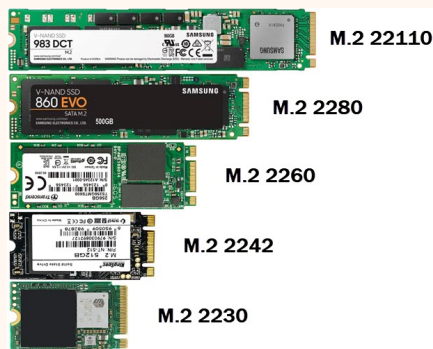
### Intel Core CPU Code Names (cont)

|      |             |          |
|------|-------------|----------|
| 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         |

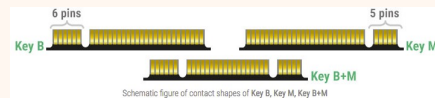
### M.2 Sizes



### 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         |



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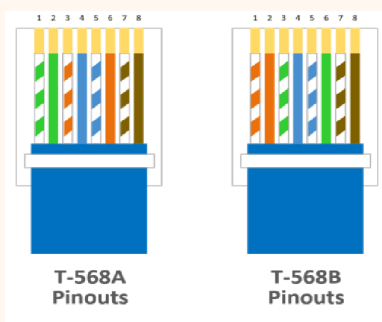
### UPT Categories and Speeds

| 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  |

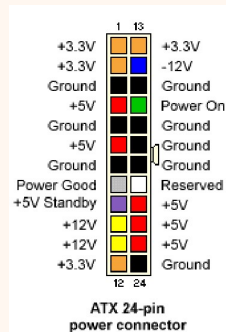
### Ethernet Wiring Guide

| 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        |

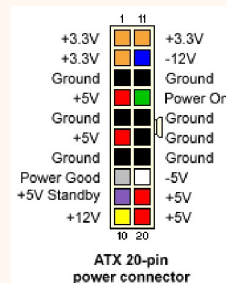
### Ethernet Wiring Diagram



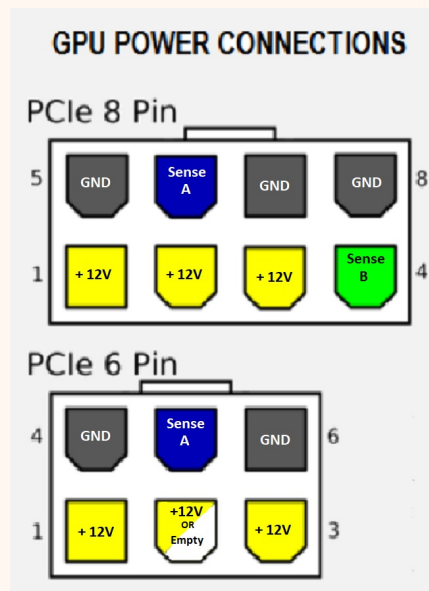
### 24 Pin ATX Power



### 20 Pin ATX Power



### PCIe Power Pinout



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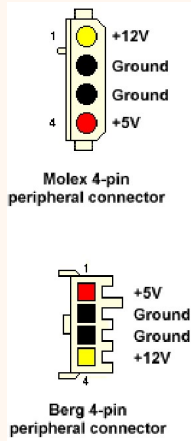
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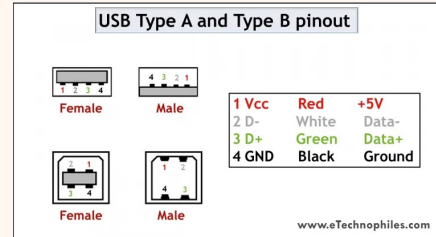
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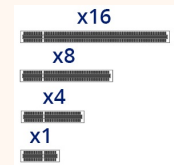
### Peripheral Power



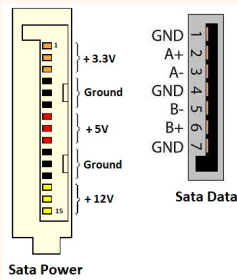
### More USB Pinouts



### PCIe Slot Size



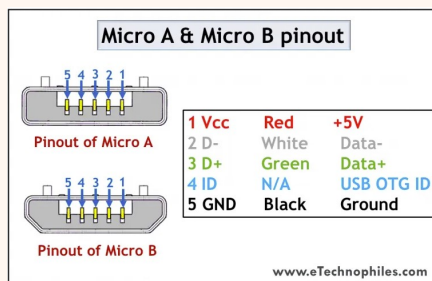
### SATA Pinout



### 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         |

### 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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