Computer Hardware - Output Devices Cheatsheet

A comprehensive cheat sheet detailing various computer output devices, their functionalities, key characteristics, and applications. This guide serves as a quick reference for students, IT professionals, and anyone interested in understanding how computers communicate information.

Display Devices

Monitors

CRT (Cathode Ray Tube)	Older technology, bulky, high power consumption, but good color reproduction. Becoming obsolete.
LCD (Liquid Crystal Display)	Flat panel, lower power consumption, sharper image, but contrast ratio may not be as good as CRT. Common in laptops and desktop monitors.
LED (Light Emitting Diode)	LCD monitors that use LED backlighting. Even lower power consumption, brighter images, and longer lifespan compared to standard LCDs.
OLED (Organic Light Emitting Diode)	No backlight needed, each pixel emits its own light, resulting in excellent contrast ratios and vibrant colors. Used in high-end TVs and smartphones.
Resolution	Number of pixels displayed on the screen (e.g., 1920x1080 - Full HD). Higher resolution means sharper images.
Refresh Rate	The number of times per second the image is refreshed (Hz). Higher refresh rates (e.g., 144Hz) reduce motion blur, important for gaming.

Projectors

DLP (Digital Light Processing)	Uses tiny mirrors to project images. Known for good contrast and fast response times.
LCD Projectors	Uses LCD panels to create images. Tend to be brighter and more energy-efficient, but may have lower contrast than DLP.
LED Projectors	Uses LEDs as a light source. Long lifespan and energy-efficient.
Throw Ratio	Distance required for the projector to display a certain image size. Short throw projectors can be placed closer to the screen.
Lumens	Measure of brightness. Higher lumens are better for well-lit environments.

Printers and Plotters

Printers

Inkjet Printers	Sprays tiny droplets of ink onto paper. Good for photos and documents with color. Can be slow and ink can be expensive.
Laser Printers	Uses a laser to create an electrostatic image on a drum, which then attracts toner. Fast and efficient for text documents. More expensive upfront but lower cost per page.
Thermal Printers	Uses heat to create images on special thermal paper. Common in point-of-sale systems and label printers.
Dot Matrix Printers	Impact printers that use pins to strike an ink ribbon. Noisy and low-resolution, but can print on multi-part forms.
Duplex Printing	Printing on both sides of the paper automatically. Saves paper and reduces costs.
PPM (Pages Per Minute)	A measure of printer speed. Higher PPM means faster printing.

Plotters

Pen Plotters	Uses pens to draw on paper. Capable of high-precision drawings.
Electrostatic Plotters	Uses electrostatic charge to create images. Faster than pen plotters.
Inkjet Plotters	Uses inkjet technology for large-format printing. Commonly used for posters and banners.
Applications	Used for creating technical drawings, architectural plans, and other large-format graphics.

Audio Output Devices

Speakers

Types	Internal speakers, external speakers, headphones, earbuds, soundbars.
Frequency Response	Range of frequencies a speaker can reproduce (Hz). Wider range means better sound quality.
Impedance	Measure of resistance to electrical current (Ohms). Must match the amplifier's output impedance.
Sensitivity	Measure of how loud a speaker will be at a given power level (dB). Higher sensitivity means louder sound.
Wattage	Power handling capability of the speaker. Higher wattage means the speaker can handle more power without distortion.

Sound Cards

Function	Converts digital audio data into analog signals that can be played through speakers or headphones.
Internal vs. External	Internal sound cards plug into the motherboard. External sound cards connect via USB or other ports.
DAC (Digital-to-Analog Converter)	Essential component of a sound card that converts digital signals to analog.
Sampling Rate	Number of samples taken per second (kHz). Higher sampling rates result in better audio quality.
Bit Depth	Number of bits used to represent each sample. Higher bit depth results in better dynamic range.

Other Output Devices

Force Feedback Devices

Joysticks and Steering Wheels	Provide tactile feedback to the user, simulating forces and vibrations in games and simulations.
Haptic Devices	Provide tactile sensations, used in medical training, virtual reality, and robotics.

GPS

Global Positioning System (GPS)	Receives signals from satellites to determine location and provide navigational information.
Applications	Navigation systems in cars, smartphones, and other devices.

Braille Display

Function	Displays text in Braille, allowing visually impaired users to read digital content.

3D Printers

Stereolithography (SLA)	Uses a UV laser to cure liquid resin layer by layer.
Fused Deposition Modeling (FDM)	Melts and extrudes plastic filament to build objects layer by layer.
Selective Laser Sintering (SLS)	Uses a laser to fuse powder materials together.
Applications	Prototyping, manufacturing, medical devices, and more.