Hardware & Peripherals — Complete End-User Guide

(laptops/desktops, docks, monitors, USB, audio, webcams, storage, power)

> This manual explains how to set up and use common hardware at work or home, with step-by-step playbooks for Windows and macOS, best-practice cabling, multi-monitor layouts, and a deep troubleshooting cookbook (docks not detecting, “USB device not recognized”, flicker, mic/cam not found, Ethernet slow, external drives not showing). Admin-only notes are marked *(Admin)*.

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0) Scope & Audience

- Employees/students on Windows 10/11 or current macOS, using corporate or personal devices.
- Covers: laptops/desktops, USB-C/Thunderbolt docks, monitors, keyboards/mice, headsets/speakers, webcams, external storage, Ethernet adapters, power/charging.

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1) Ports & Cables: Quick Primer (know these before you plug)

- **USB-C**: Reversible connector. May carry **USB data**, **DisplayPort Alt Mode (video)**, and **USB Power Delivery (PD)**. Not every USB-C port supports video or high-watt charging—check the tiny **display** or **bolt** icon near the port.
- **Thunderbolt** (TB): High-bandwidth superset using USB-C. TB docks drive more monitors at higher resolutions and charge laptops; cable matters (use active TB-rated cables for long runs).
- **DisplayPort (DP)** vs **HDMI**: Both carry video+audio. For high refresh/resolution, prefer recent DP or HDMI cables that match your monitor spec.

- **Ethernet (RJ-45)**: Wired network; most stable for calls. USB-C/TB docks often include an Ethernet jack.

- **Audio jacks**: TRRS (headset) vs TRS (headphones-only). USB headsets present as their own sound device.

Cable rules of thumb

- Keep cables short and known-good; avoid cheap adapters.

- For 4K monitors, use DP 1.4 or HDMI rated for 4K60; for 1440p/165 Hz gaming, use DP 1.4.

- If a dock includes a proprietary **230 W/180 W** power brick, you must use it for stable multi-monitor output.

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2) Docks & Hubs: What You Have Matters

- **USB-C "Alt-Mode" docks**: Use your laptop's GPU via DisplayPort Alt Mode. Stable, lower CPU use. Limited by the laptop's USB-C port capabilities.

- **Thunderbolt docks**: Highest bandwidth; best for dual/triple displays at high resolutions, charging, Ethernet, USB expansion.

- **DisplayLink docks**: Use a software driver to encode video over USB (works even on ports without video Alt Mode; good for extra displays). Slight CPU/GPU overhead; install the DisplayLink driver if required. *(Admin: standardize driver and firmware versions.)*

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3) Monitors: Single / Dual / Triple Setups

1. **Connect with the best port** each side supports (DP→DP, or USB-C/TB to the dock and dock→DP/HDMI to monitor).

2. **Power sequence**: Monitor(s) on → dock powered → laptop connected.

3. **Windows**: `Settings → System → Display` → **Identify** → **Multiple displays =** Extend → set **Scale**, **Resolution**, **Refresh rate** (Advanced display).
    - If text is blurry, avoid non-integer scaling (try 100/125/150%).
4. **macOS**: **System Settings** → **Displays** → **Arrange** (drag blue rectangles) → **Use as** (mirror/extend) → **Show all resolutions** (press **Option** while clicking “Scaled”).
5. **Daisy-chain (MST)**: If your DP monitors support **MST**, you can chain DisplayPort cables: Dock→Monitor1 (DP-in) → Monitor1 (DP-out) → Monitor2 (DP-in). Enable MST in Monitor1’s OSD. Not all Macs support MST daisy-chain—use dual-cable or a TB dock instead.

Reality check: Different laptops support different numbers of external displays. If a third monitor refuses to light, test two at a time and consult your model’s external-display limit; consider a TB or DisplayLink dock for more heads.

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4) Step-by-Step Setups

4.1 Dock + Dual Monitors (Windows)

1. Connect the dock’s **power brick** to AC and the dock.
2. Connect **DP/HDMI** from dock to each monitor (avoid adapters if possible).
3. Connect **dock→laptop** with the provided **USB-C/TB** cable (use the labeled host port).
4. Wait 10–20 s; then open **Settings** → **System** → **Display** → click **Identify** → set **Extend**, arrange and set **Resolution/Refresh**.
5. Install **dock driver/firmware** or **DisplayLink** if IT provides it (then reboot).

4.2 Dock + Dual Monitors (macOS)

1. Power the dock first; connect monitors to dock with **DP/HDMI**.
2. Connect **dock→Mac** via USB-C/TB.
3. **System Settings** → **Displays** → arrange → choose scaling.

4. If one display won't appear: try swapping ports/cables; for some Macs you need a **TB dock** or a **DisplayLink** dock with the driver installed.

4.3 Ethernet (best for calls)

- Plug Ethernet into the dock or a USB-C Ethernet adapter; verify link lights.
- **Windows**: `Settings → Network & Internet` should show **Ethernet** connected.
- **macOS**: **System Settings** → **Network** shows Ethernet with an IP.

4.4 Headset / Speakers

- **USB or 3.5 mm** into PC or dock.
- **Windows**: `Settings → System → Sound` → choose **Output/Input** device, test mic.
- **macOS**: **System Settings** → **Sound** → set **Output/Input** to your headset; test.

4.5 Webcam

- Plug USB webcam; don't face a bright window.
- In Teams/Zoom/etc., choose the correct camera and mic in **Settings** → **Devices**.

4.6 External Storage

- Prefer **USB-C SSDs** for speed; format **exFAT** for cross-platform read/write (unless your org requires BitLocker/FileVault).
- Always **Eject** before unplugging.

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5) Power & Charging

- **USB-C PD (Power Delivery)**: Your laptop may need **65–100 W** (or more) to charge while driving multiple monitors. Under-powered docks cause battery drain or flicker.

- If using the **manufacturer AC adapter**, plug it in for heavy workloads.
- Avoid daisy-chaining power through flimsy hubs.
- For travel, use a **GaN USB-C PD** charger that meets your laptop's wattage.

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6) Best-Practice Settings

Windows

- **Display**: Set native **resolution**; match **refresh rate** across monitors where possible.
- **Graphics**: For stutter in video calls with DisplayLink, set the app to **High performance GPU** in **Graphics settings**.
- **Power**: Disable USB selective suspend for critical USB audio if it clicks/pops.

macOS

- **Displays**: Use **Scaled** with "More Space" only if text remains legible; otherwise default.
- **Energy**: Prevent automatic sleep during long calls/demos.
- **Accessibility** → **Zoom**: useful for presenting on dense 4K monitors.

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7) Troubleshooting Cookbook (symptom → fix)

7.1 No display / "No signal" on external monitor

- **Cable/port sanity**: reseat both ends; try another cable (short, rated).
- **Power order**: monitors on → dock powered → then connect laptop.
- **Try direct**: connect monitor directly to laptop (bypass dock). If it works, the dock or its cable/firmware is suspect.

- **Windows**: `Win+P` then select **Extend**; in **Advanced display**, choose a supported **resolution/refresh**.
- **macOS**: **Displays** → **Detect Displays** (hold **Option**), toggle mirroring.
- **Dock type mismatch**: If laptop USB-C lacks video Alt Mode, you need **DisplayLink** or a **TB** dock.

7.2 One display works, second won't

- Check the dock's spec: some USB-C docks support only **one** external display without DisplayLink/TB.
- Swap ports/cables; some docks have a primary and secondary video port.
- For DP daisy-chain, enable **MST** on the first monitor and ensure your OS supports it.

7.3 Wrong resolution / 30 Hz cap / flicker

- Use **DP** instead of older HDMI if the monitor supports it.
- Replace passive adapters with **active** ones for long or conversion runs (e.g., DP-to-HDMI 2.0 active).
- Set the monitor's **Input** correctly in the OSD; disable **"eco"** modes that limit refresh.
- Update GPU and dock firmware; try a different USB-C/TB cable (active TB for >0.8 m).

7.4 Dock not charging the laptop

- Ensure the dock's **power brick** is connected (many are 130–230 W).
- Some ports on the dock are **data-only**; use the **host**/computer icon port.
- If your laptop needs 100 W but the dock supplies 65 W, expect slow charge or drain under load—use the laptop's AC adapter.

7.5 "USB device not recognized" / devices disconnect randomly

- Try another port on the dock or a **powered** USB hub for high-draw devices.
- Windows: **Device Manager** → **Universal Serial Bus controllers** → right-click **USB Root Hub** → **Properties** → **Power Management** → uncheck “Allow the computer to turn off this device to save power.”
- Replace poor-quality USB cables; avoid front case ports with low power.

7.6 Headset/microphone not detected or low volume

- Select the correct **Input/Output** device in OS and in the app (Teams/Zoom).
- Disable **audio enhancements** in Windows if the mic sounds hollow.
- If using a 3.5 mm combo jack, ensure your headset plug is **TRRS** (4-pole) or use a **USB** audio adapter.

7.7 Webcam black screen / “in use by another app”

- Close other apps that can seize the camera (Teams, Zoom, privacy tools).
- Check **privacy permissions** (Windows: App permissions → Camera/Microphone; macOS: Privacy & Security → Camera/Microphone).
- Try a different USB port; avoid unpowered hubs.

7.8 Ethernet slow or flapping

- Replace the cable; use a **Cat5e/6** cable and known-good switch port.
- Set NIC to **Auto-negotiation**; mismatched speed/duplex causes errors.
- Update NIC driver/firmware; disable “Energy-Efficient Ethernet” if link drops.

7.9 External drive not showing / write-protected

- Try another port/cable; avoid sharing the same bus with a hungry webcam.

- **Disk format**: If it's NTFS on Mac (read-only) or APFS on Windows (unknown), move data and reformat to **exFAT** for cross-platform.
- Check **BitLocker/FileVault** prompts; unlock to access.
- For spinning HDDs, use a **Y-cable** or powered hub to supply enough current.

7.10 Random reboots when using a dock

- Update **BIOS/UEFI**, **GPU**, **dock firmware**, and **Thunderbolt drivers** (Windows).
- Use the **original dock power adapter**; under-power can brown-out the dock under load.

7.11 Coil whine / buzzing from speakers when docked

- Use **grounded** power strips/UPS; try a different outlet.
- Switch to a **USB** headset or an **isolated** audio interface.

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8) Preventive Care & Longevity

- Keep vents clear; don't block laptop exhaust—heat kills performance.
- Dust monitors and fan intakes with a soft brush or compressed air (device off).
- Avoid liquid cleaners on screens; use microfiber + a screen-safe solution.
- Battery health: keep between **20–80%** when plugged long-term if your OEM utility supports battery care mode.
- Use **surge protection**; for critical desktops, add a **UPS**.

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9) Security & Policy Basics

- Only use **approved USB devices**; unknown USB can carry malware.
- Encrypt external drives if policy requires (BitLocker/FileVault).
- Don’t leave laptops or docks unattended in public spaces; lock the screen and use a **lock slot** where available.
- *(Admin)* Consider USB device control and driver whitelisting on managed PCs.

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10) Escalation Checklist (what IT needs)

- **Who/where**: Your name, location, time zone, callback.
- **Device**: Laptop/desktop model, Windows/macOS version, GPU (if known).
- **Dock**: Brand/model, firmware (if visible), dock power brick wattage.
- **Monitors**: Make/model, resolution/refresh, cable types (DP/HDMI/USB-C) and lengths.
- **Peripherals**: Headset/webcam/drive models.
- **Symptoms**: Exact error messages, when it started, frequency.
- **Tried**: Cable swaps, different ports, direct-connect test, driver/firmware updates, OS display resets.
- **Screenshots/photos**: Display arrangement, cable routing, OSD inputs, error dialogs.

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11) Paste-able Quick Replies (no links)

- **Windows: show all displays & set extend**: *Settings → System → Display → Identify → Multiple displays = Extend → Advanced display = set Resolution/Refresh.*
- **macOS: arrange displays**: *System Settings → Displays → Arrange → drag monitors; hold Option on “Scaled” to show all resolutions.*

- **USB power saving off (Windows)**: *Device Manager → USB Root Hub → Power Management → uncheck allow to turn off.*

- **Spool of fixes for docks**: *Power cycle monitors → power dock → connect laptop; swap DP ports; try another USB-C/TB cable; install dock firmware; if USB-C Alt Mode fails, use DisplayLink dock.*

- **Ethernet basics**: *Use Cat5e/6, set NIC to Auto, try a new switch port; if slow, replace cable and disable Energy-Efficient Ethernet.*

- **External drive cross-platform**: *Format exFAT (after backing up), always Eject before unplugging.*

Final Notes

- The vast majority of “dock/monitor” issues are **cable/port/power** related. Start there.

- Keep one **known-good DP cable** and one **active TB-rated USB-C cable** at your desk for A/B testing.

- If you routinely need **3+ external displays**, standardize on a **Thunderbolt** or **DisplayLink** dock per your device’s capabilities.