Computer and Software Requirements

All our cameras are supplied with 10+m USB cables and free software that will run on even the smallest Windows, Macintosh or Linux PCs, but a larger choice of software is available for Windows. A Windows-11 Pro mini-PC for ~$200 is more than adequate.

Otherwise you can use an inexpensive “headless computer” to control the camera, and connect to it over WiFi or Ethernet with another **Windows, Macintosh or Linux PC, or even a phone or tablet**.
WiFi: The camera’s computer and your remote control device must be on the same WiFi network
Ethernet: Connect the mini-PC directly to your lab's wired Ethernet port (or directly to your workstation via an Ethernet switch) and configure a Static IP / DHCP reservation with your lab IT team.

The ToupTek StellaVita is a linux headless controller, but a mini-PC is about the same price. The best choice is a modern fanless low power computer such as the MINIX, but if you don’t need to run continuously, you can use any modern mini-PC such as the MAGICNUC AS1 or BOSGAME-E2.



You will need a wireless keyboard and mouse, and initially a local screen to set up your camera's mini-PC, which you later replace with a Dummy HDMI plug, controlling it instead via **Remote Desktop**.

Simple Google Chrome Remote Desktop

If you can run **Google Chrome** on both devices (check your lab’s security policy), a simple Remote Desktop can be run as a plug-in, even with a Windows Home mini-PC. This is the simplest solution, especially for tablets. It allows you to simply press the power button to boot the camera's mini-PC and then connect with **Chrome Remote Desktop**, all without any dialogue or physical mini-PC screen.

- **On your camera's mini-PC,** go to https://remotedesktop.google.com/access, download and execute the plugin to set up remote access, name your computer, and create a 6-digit access PIN.

Controlling the camera’s mini-PC with a PC & Chrome Remote Desktop

- Make sure you are signed into the same Google account used on the camera’s mini-PC.
- On your PC, open Google Chrome and go to https://remotedesktop.google.com/access.
- Or just click on the Remote Desktop icon beside the extensions icon, since you already installed it.
- Click on your camera’s mini-PC name; enter the same 6-digit access PIN, saving it for next time.
- You can hide the local taskbar and “Open in App” (beside the search bar) to maximise the display.

Controlling the camera’s mini-PC with a Mac & Chrome Remote Desktop

- Follow the steps above as for a Windows PC

Controlling the camera's mini-PC with Linux & Chrome Remote Desktop

- **Zero Client Setup on Linux.** Open a Chromium-based browser on your Linux machine, sign into the same Google account at google.com, click your camera's mini-PC, and enter your PIN.
- **Best Display Settings in the Chrome Remote Desktop Sidebar.** Click the small blue arrow tab (<) on the right edge of the browser window once connected:
- **Check Scale to fit** (and Resize to fit if you want the camera's mini-PC resolution to match your Linux monitor automatically, provided your HDMI dummy plug supports it).
- **Set Video codec to VP9 or AV1** giving you sharp text and smooth live video with low latency.
- **Full-Screen Keyboard Shortcuts.** Toggle Full screen in the right-hand sidebar so Alt + Tab and Windows shortcuts pass straight instead of switching windows on your Linux desktop.
- **Accessing Saved Captures.** Since your camera's mini-PC is on the same local Wi-Fi, you can mount its shared SMB folder directly inside your Linux file manager.

Controlling the camera's mini-PC with a Tablet & Chrome Remote Desktop

- **Download the Chrome Remote Desktop app** from the device Store, sign in with the same Google account, select your computer, and enter your PIN. Select "Save your Pin" to connect automatically.
- **Use Trackpad Mode for Fine Controls**. Or use a wireless keyboard and mouse on your mini-PC.
- **Match Resolution to Your Tablet**. Set Windows Display scaling to 125% or 150% (at 1080p) so the camera's menus and exposure controls are comfortably readable on a smaller tablet screen.
- **Accessing Saved Captures on a Tablet**. Either install a free SMB file manager app (FE File Explorer on iPad or Cx File Explorer on Android), or simply save captures onto a Google Drive.

Controlling the camera's mini-PC with a Phone & Chrome Remote Desktop

Use the same method as for a tablet, but adjust the resolution and magnification carefully.

Windows RDP and Third Party Remote Desktop Solutions

If you can't run **Google Chrome** on both devices (perhaps for lab. Security reasons), use Windows or other Remote Desktop solutions on your camera's mini-PC running **Windows-11 Pro**.

- **Enable Remote Desktop** by going to Settings > System > Remote Desktop and toggling it **On**. Find your remote PC name or IPv4 address by opening the Command Prompt and typing ***ipconfig***.
- **Third-Party Software**: You can also use popular remote desktop or screen-sharing tools like Splashtop, TeamViewer, or RustDesk, which also work on Windows Home editions of a mini-PC.

Windows Remote Desktop Control Devices

- **Windows local PC:** Open Remote Desktop Connection (**mstsc.exe**). Then enter the name or IP address of the remote PC.
- **Mac or iPad local device:** Download and install the Windows App from the Mac App Store, open it, click the add button, and select Add PC. Then enter the name or IP address of the remote PC.
- **Linux local device:** Download a linux RDP client like **Remmina**, open it and select RDP. Then enter the name or IP address of the remote PC.
- **Android local device:** Download the Microsoft Windows App from the Google Play Store, open it and tap the + icon to add a PC. Then enter the name or IP address of the remote PC.

Set the screen resolution of your camera's mini-PC to be the same as the screen resolution of your control device, even though you will no longer need a physical screen on your remote mini-PC.

Setup and Optimise the camera's mini-PC (All optimisations aren't needed)

- **Open Task Manager** (Ctrl + Shift + Esc → Performance tab) to confirm the hardware, Go to Settings > System > Activation to check Windows 11 Pro is activated, then run Windows Security.
- **Open Settings > Accounts > Your info** and click Sign in with a local account instead of a Microsoft account, entering a local password.
- **Set up Auto-Login.** Press Win+R, type ***netplwiz***, uncheck "*Users must enter a user name and password to use this computer*", and enter your password once, so the PC boots unattended.
- **Run Windows Update.** Go to **Settings > Windows Update** and install all pending OS and Intel graphics driver updates, then restart so background update processes finish.
- **Keep 15–20% Free Space on the SSD.** Enable **Storage Sense** under **Settings > System > Storage** to automatically clear temporary files and keep SSD read/write speeds fast.
- **Reduce Visual Clutter**. Open Settings > Accessibility > Visual effects and turn off Transparency effects (and Animation effects if you want snappier window transitions).
- **Keep Virtual Memory Automatic**. Press Win + R, type ***sysdm.cpl,*** go to Advanced > Performance > Settings > Advanced > Virtual memory, and verify **Automatically manage paging file size**.
- **Enable Auto Power-On in BIOS**. Delete or F7 during boot to enter BIOS, navigate to Chipset / Power Management, and set Restore AC Power Loss to Power On so it recovers if unplugged.
- **To Boot into BIOS:** As Administrator, run ***shutdown.exe /r /fw /t 1*** (Thanks Robin)
- **Select Best Performance Power Mode**. Go to Settings > System > Power & battery (or Power), lock Power mode to Best performance, and set Sleep to "Never".
- **Disable Sleep & Hibernation**. Go to Settings >System >Power & battery >Screen and set Screen and Sleep to Never; as Admin, run command ***powercfg -h off*** to disable hibernation.
- **Pause Automatic Restarts**. Go to Settings > Windows Update > Advanced options, turn off Restart this device as soon as possible, and configure Active Hours.
- **Disable USB Selective Suspend**. Press Win+R, type ***powercfg.cpl,*** click Change plan settings > Change advanced power settings, expand USB settings >USB selective suspend setting >Disabled.
- **Prevent Wi-Fi Power Saving**: Open Control Panel, Device Manager, Network adapters, right-click your Wi-Fi adapter, Properties. If Power Management is proposed (on older PCs) uncheck "*Allow the computer to turn off this device*".
- **Turn Off Root Hub Power Saving**. Open Control Panel, Device Manager, Universal Serial Bus controllers, right-click every USB Root Hub entry, Properties > Power Management, and uncheck "*Allow the computer to turn off this device*".
- **Turn Off Windows Widgets & Copilot**. Right-click the taskbar, select **Taskbar settings**, and toggle off Widgets and Copilot if listed, to save roughly 300–500 MB of idle RAM.
- **Disable Unnecessary Startup Programs**. Press Ctrl + Shift + Esc to open Task Manager, click Startup apps, and disable anything you do not need, e.g. Copilot to save 300-500 MB of RAM.
- **Uninstall Bloatware.** Remove other unused preinstalled apps under Settings > Apps > Installed apps to free up both RAM and SSD space.
- **Stop Background App Activity**. Go to Settings > Apps > Installed apps, click the three dots next to Microsoft Store apps, choose Advanced options, and set Background app permissions to Never.
- **Enable Memory Saver in Your Browser**. In Chrome or Edge, open Settings > Performance (or System and performance) and turn on Memory Saver (or Sleeping tabs).
- **Use the Blue USB 3.2 Ports** using the short USB-3 cable.
- **Save Captures Directly to the Local SSD**. Record images to the mini-PC's internal SSD rather than a network share, and mount that as a network drive on your control device (if possible).
- **Enable High-Speed Transfer in Camera Software**. In ToupView, SharpCap, or ASCOM, set the camera's USB traffic/bandwidth slider to 80–90%.
- **Adjust Preview Frame Rate / Bit Depth**. Use 8-bit RGB/RAW for high-FPS live focusing and framing, and switch to 12-bit / 14-bit / 16-bit only when capturing final high-dynamic-range stills.

Direct Isolated Ethernet Configuration & Windows Remote Desktop (RDP)

- **Configure Mini-PC IP**: Press Win + R > type *ncpa.cpl* > right-click Ethernet > Properties > IPv4 > Properties > select Use the following IP address:
  - IP address: 192.168.50.2
  - Subnet mask: 255.255.255.0 (leave Gateway and DNS blank).
- **Configure Workstation IP**: Repeat on your workstation's dedicated Ethernet adapter using:
  - IP address: 192.168.50.1
  - Subnet mask: 255.255.255.0 (leave Gateway and DNS blank).
- **Enable RDP on Mini-PC**: Go to Settings > System > Remote Desktop > toggle **On**.
- **Connect from Windows, Mac or Linux Workstation**:
  - **Windows**: Open mstsc.exe, enter 192.168.50.2, and log in with the mini-PC's local account.
  - **MacOS / Linux**: Open Windows App (MacOS) or Remmina (Linux), add PC 192.168.50.2.

Local Data Capture & Automatic SMB File Sharing

- **Capture Locally:** Save directly to C:\Captures on the mini-PC's internal SSD
- **Share Folder on Mini-PC:**
  - Right-click C:\Captures > Properties > Sharing > Advanced Sharing > check *Share this folder* > *Permissions* > *grant Everyone Full Control (or Read).*
  - Open PowerShell (Admin) and run:
    Get-NetConnectionProfile | Set-NetConnectionProfile -NetworkCategory Private
  - Open Settings > Network & internet > Advanced network settings > Advanced sharing settings and turn On Network discovery and File and printer sharing under Private.
- **Map Drive on Main Workstation**:
  Open File Explorer (Win + E) > This PC > Map network drive > select drive Z: >
  enter \\192.168.50.2\Captures > check Reconnect at sign-in and Connect using different credentials > save the mini-PC's login.

Google AI Summarised Checklist for Setting Up the mini-PC

- **Local Account & Boot: Settings > Accounts > Your info** > switch to a **Local account**.
  To auto-login (if permitted): **Settings > Accounts > Sign-in options** > turn **Off** *"only allow Windows Hello sign-in"*, then run *netplwiz* and uncheck *"Users must enter a user name and password"*.
- **BIOS Auto Power-On:** Press *Delete or F7* at boot > **Chipset / Power Management** > set **Restore AC Power Loss** to **Power On**.
- **Zero Sleep / Hibernation: Settings > System > Power & battery** > set Power mode to **Best performance**, and **Screen** / **Sleep** to **Never**. Run *powercfg -h off* in Command Prompt (Admin).
- **Disable USB & NIC Power Saving:**
  - Run *powercfg.cpl* > **Change plan settings > Change advanced power settings** > **USB settings** > disable **USB selective suspend**.
  - Open **Device Manager** > **Universal Serial Bus controllers** > right-click every **USB Root Hub** > **Properties > Power Management** > uncheck *"Allow the computer to turn off this device"*. Repeat for your Ethernet adapter under **Network adapters**.
- **Prevent Forced Reboots: Settings > Windows Update > Advanced options** >
  Turn **Off** *"Restart this device as soon as possible"* and set **Active Hours**
- **System & Camera Settings:** Keep **15–20% free SSD space**; disable unnecessary **Startup apps** in Task Manager (*Ctrl + Shift + Esc*); set camera **USB Traffic / Bandwidth** to **80–85%**; use **8-bit** mode for focusing and **12/14/16-bit uncompressed RAW (TIFF/FITS)** for acquisition.

Ask Google AI, I**s https://neutronoptics.com/computers.pdf advice good for...** your application