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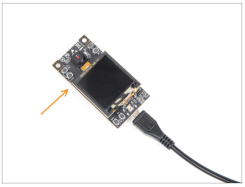
Cámara ESP para Prusa Connect

help.prusa3d.com/g390230

Escanea el código QR para ver la última versión de este capítulo.

PASO 1 Introduction



- In this guide, we will get an **ESP Camera (ESP32-S3-EYE)** running and connected to Prusa Connect.

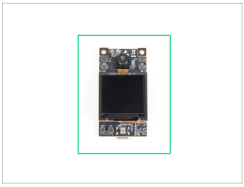
  This guide is intended for experienced users.

  This guide is suitable for Windows computer users only! If you use another operating system, please refer to the documentation on GitHub.

Firmware for the **ESP32 Cameras** has been developed **by Miroslav Pivovarsky**.

For general information about Prusa remote-control services, visit the Prusa Connect and PrusaLink explained article.

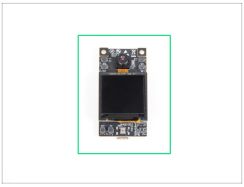
PASO 2 Hardware Compatibility



- There are countless ESP32 Cam modules available on the market. After you buy the Cam hardware, you have to flash the appropriate firmware into it. The firmware could work with multiple models of them.
  - This guide focuses on the **ESP32-S3-EYE** version. It has a valid *EU Radio Equipment Directive (RED)* certificate, enabling us to provide a guidance for its use.
  - Other modules vary in price, reliability, shape, and features. Some require a USB shield. Although the setup process is almost identical, we can't officially recommend their use due to legal reasons.
  - For more information on compatibility, refer to the GitHub documentation.

ⓘ The ESP32 Cameras connect over a 2.4GHz Wi-Fi network.

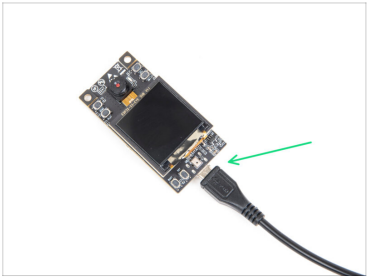
PASO 3 Hardware parts preparation

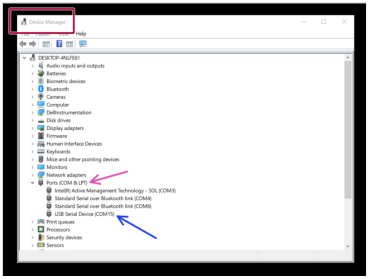


- **Para los siguientes pasos, por favor prepara:**
- Placa ESP32 Cam (Estamos usando la versión **ESP32-S3-EYE**)
- A compatible **USB power supply** capable of providing at least **2A current**.
- A compatible USB cable. In this case, it is a **Micro USB to USB-A**.

  ⓘ Make sure you are using a cable that provides a data connection. Some cables are designed for charging only and wouldn't do the job in this case.
- We suggest printing a cover for the camera. Covers for various ESP camera models can be found on Printables.com

PASO 4 Connecting the Cam to computer



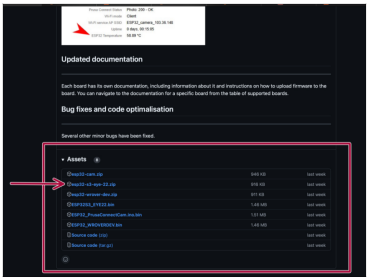


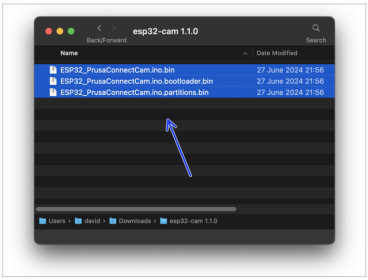
- Using the compatible USB cable, connect the camera into your computer.
- Now, we have to check if your computer detects the camera module properly.
- Open up **Device Manager** (press Windows key + X, then press **m**)
- Navigate to the **Ports (COM & LPT)** section.
  - The camera should appear as **USB Serial Device** and a corresponding **COM port number**.
  - Note down the **COM port number**. In our case, it is **COM15**.

⚠ We will need the number later on. Note that your number might differ!

ⓘ Different versions of the ESP Cam might identify as USB-SERIAL CH340G.

PASO 5 Downloading the firmware files

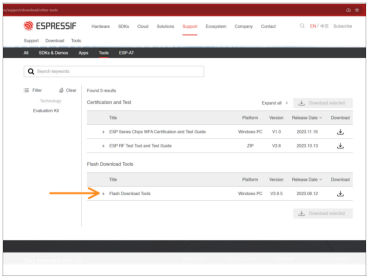


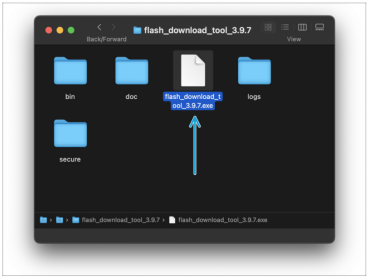


- Download the **ESP32 Prusa Connect Cam firmware** files
  - Find the latest version in the Releases page of the GitHub repository.
  - **Download the .zip file** with the pre-compiled firmware images from the **Assets** column.

  ⚠ Make sure you're downloading the correct package for your ESP32 camera type!
- Unzip all the files from the downloaded package. We will need these image files in the upcoming steps.

PASO 6 Downloading the Flashing tool

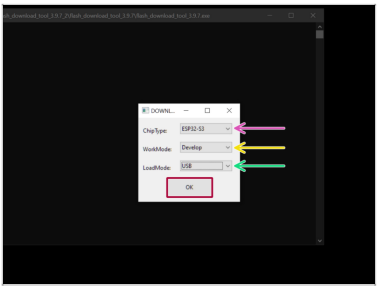




- Download the EXPRESSIF ESP32 **Flash Download Tools**
  - https://www.espressif.com/en/support/download/other-tools
- **Extract the whole zip** file.
- Run the **flash_download_tool_x.*x*.x.*exe***

  If you encounter issues, try running the app as an administrator.

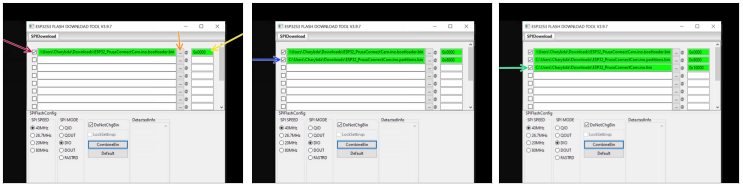
PASO 7 Opening the flashing tool



- On the first screen:
  - Set **ChipType:** as **ESP32-S3**
  - Set **WorkMode:** as **Develop**
  - Set **LoadMode:** as **USB**
  - Hit **OK** to continue

⚠ These settings are suitable for the **ESP32-S3-EYE** version only. Other ESP Cam models might require different settings, such as *Chip Type: ESP32* and *Load Mode: UART*.

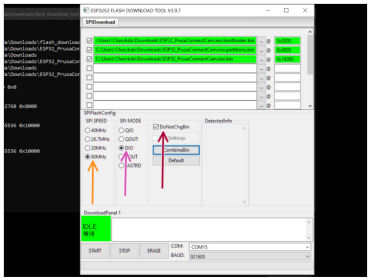
PASO 8 Flashing tool Setup (part 1)

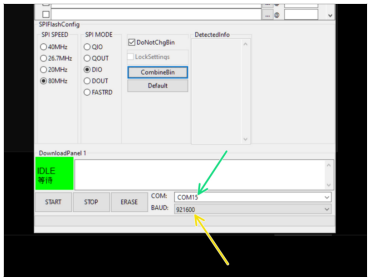


- **Tick the first checkbox.** The first line will become red temporarily.
  - Click the three dots button and select the following file from the firmware images we have downloaded earlier:
    - **ESP32_PrusaConnectCam.ino.bootloader.bin**
  - At the end of the line, set the address to:
    - **0x0000**

    ⚠ These are settings for ESP32-S3-EYE. Other ESP Cam versions might require a bootloader to be flashed onto 0x1000 address!
- Proceed to **the second line**. Tick the checkbox, set the firmware image and an address to:
  - **ESP32_PrusaConnectCam.ino.partitions.bin**
  - **0x8000**
- Proceed to **the third line**. Tick the checkbox, set the firmware image and an address to:
  - **ESP32_PrusaConnectCam.ino.bin**
  - **0x10000**

PASO 9 Flashing tool Setup (part 2)



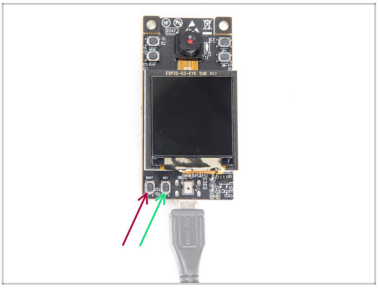


- Set the **SPI SPEED** to: **80MHz**
- Set the **SPI MODE** to: **DIO**
- Leave the **DoNotChgBin** option **checked**.
- Set the **COM**: port to the corresponding Com port number for your camera.
- Set the **BAUD**: rate to **921600**.

ⓘ These are settings for ESP32-S3-EYE. Other ESP Cam versions might require a different Baud rate, such as 460800.

⚠ **Verify** once more, that **everything has been set correctly**, as seen in the pictures.

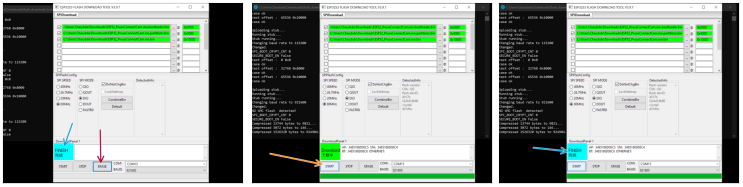
PASO 10 Accessing the BOOT MODE



- Before proceeding to access the Cam's memory, it is necessary to switch the board into a **BOOT mode**.
  - Press the **BOOT** button and **keep it held.**
  - While you still hold the BOOT button, Press the **RST** button.
  - Wait for 1 second. Then, release the BOOT button.

ⓘ ESP32-S3-EYE requires this boot mode trick. Other ESP Cam versions might not.

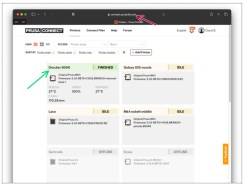
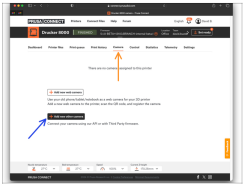
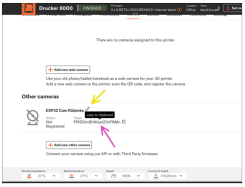
PASO 11 Erasing and Flashing



- First, we will have to clear the Cam's memory.
  - Click the **ERASE** button.
  - A finished operation will be indicated by the **FINISH完成 FINISH** sign.
- Now, we can flash the firmware files into the Cam.
  - Click the **START** button.

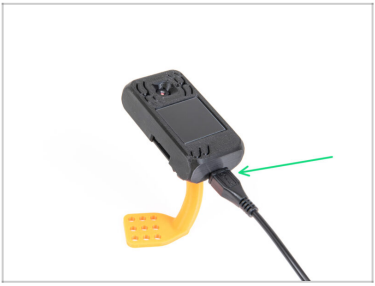
    ⚠ Now, the flashing will begin. Do not touch, move or click anything while the process goes on. **Wait until it finishes up! Otherwise, you can damage the camera module!**
  - After the **FINISH完成 FINISH** sign appears again. Now, you can disconnect the camera from the computer.

PASO 12 Prusa Connect camera setup

- Now, we will have to set up the camera in Prusa Connect.
  - Open up the **Prusa Connect** (connect.prusa3D.com)
  - Log in.
  - Select a printer you wish to use the camera for.
  - Navigate to the **Camera** tab.
  - Click **Add new other camera**
  - **A new camera will appear** in the list. Here, you can give the camera a name.
- **This is the most important part:** Copy the **TOKEN** for the given camera and save it for later use.

PASO 13 Cam Hardware setup

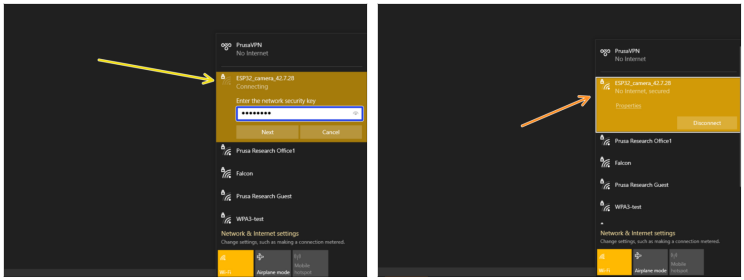


- Now, we have to set up the Cam itself.
- Connect the Cam to the **USB Power supply**.
- Install the camera next to the printer, where you wish to use it.

  We recommend using it in a well-ventilated space as the camera's electronics might emit heat and might require a sufficient airflow for its cooling.

  When placing the camera into a printed cover, make sure it allows for some **camera cooling** so that it doesn't overheat over time.
- An LED light will light up and start blinking on the camera module.

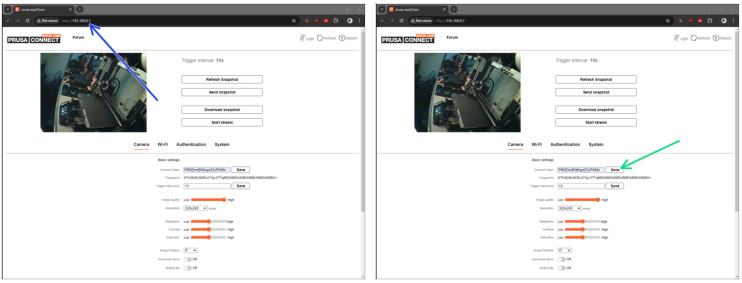
PASO 14 Connecting to Cam Wi-Fi



- After a brief moment, the camera will start in a **Wi-Fi AP mode.** Essentially, it starts it's own Wi-Fi network.
- Find the camera in the Wi-Fi list on your computer.
- Enter the default password: **12345678** and connect to it.
  - After establishing a successful connection, your computer might complain about having "No Internet" on the given network. That is OK.

  ⓘ When copy-pasting the password, ensure there are no additional characters, such as a space, included.

PASO 15 Cam Software: Token setup



- Open up a new web browser window.
  - Open up the **192.168.0.1** IP Address as a webpage.

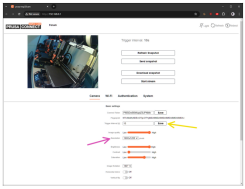
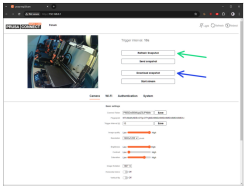
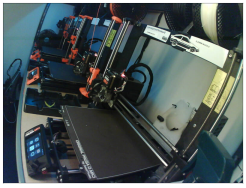
    Alternatively, you can also use the http://prusa-esp32cam.local hostname (mDNS) instead of the IP Address.

    If you're experiencing difficulties viewing the webpage on a specific device, such as an iPhone, consider trying a different platform.

    Keep in mind that you need to be connected to the ESP Cam's Wi-Fi network, as indicated in the previous step.
- The **camera's configuration interface** should appear.
- Insert the **Connect Token** into the marked field. Click **Save** and wait for confirmation.

  This is the **Prusa Connect camera token** we have obtained in an earlier step.

PASO 16 Cam Software: Cam config

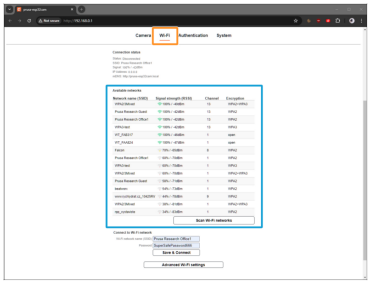
- Since we're in the camera configuration tab already, we can set up the image options:
- Set up the **Trigger interval** and click Save.
- Set up the **Resolution**.

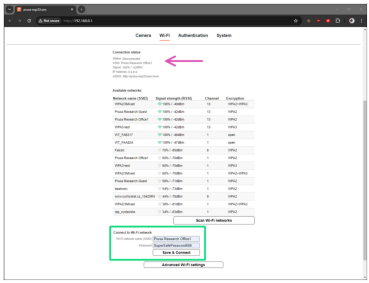
  This will improve the image quality significantly, as the resolution is set to the lowest possible by default.

  If you have connectivity issues due to bad Wi-Fi signal, decreasing the image quality and resolution might help.
- Clicking **Capture snapshot** will refresh the image you see on the page.
- Click Download snapshot or Start Stream to view the image in full scale.

  The third image is an example snapshot captured by the ESP Cam with a 170° wide-angle lens.

PASO 17 Cam software: Wi-Fi config

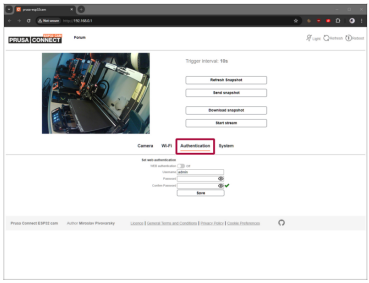


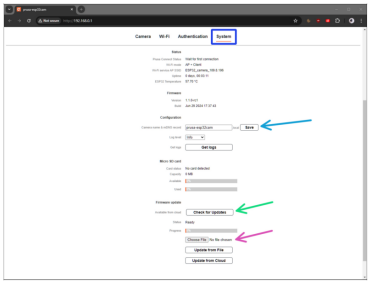


- Head into the **Wi-Fi** configuration tab.
- A list of networks will appear. Make sure the network you intend to connect to is listed and has a strong signal.
- Enter the SSID (network name) and password for the chosen network into the dedicated fields, then click 'Save & Connect'.
- Shortly after, it should connect to the specified Wi-Fi network, indicated in the Connection Status column.

  If the camera fails to connect on the first attempt, you can restart it using the Reboot button in the top right corner.

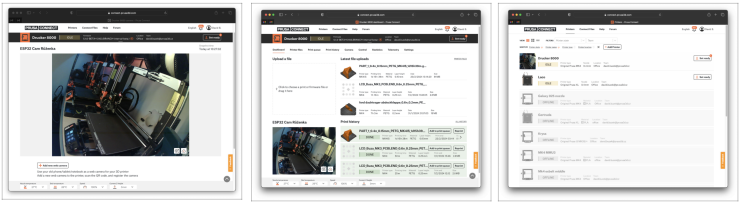
PASO 18 Cam software: Optional items





- **We should now have completed setting up the camera.**
- While we are on the ESP camera's configuration page, let's take a quick look at the other options it offers.
  - On the **Authentication** tab, you can set a password to access the configuration page.
  - The **System** tab provides several advanced options such as:
    - Setting a **Hostname** (mDNS record) for easier future access to the configuration page over the local network.
    - To check for OTA firmware updates, click **Check for Updates**. If a newer version is available, click 'Update from cloud'. Note that the camera has to be connected to the Internet, before using this function.
    - For a **manual firmware update**, select a firmware file on your computer (ESP32_PrusaConnectCam.ino.bin) and click 'Update from File'. Then, reboot the camera.

PASO 19 Cam in Prusa Connect



- Disconnect your computer from the ESP32 Cam Wi-Fi network and reconnect it to your usual network.
- Head back to **Prusa Connect**.
- After a short wait, the camera image will be displayed in Connect. You can find it under the 'Camera' tab, within the printer details, and also on the printers list pages.

Let us know how the ESP camera works for you! ;)

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