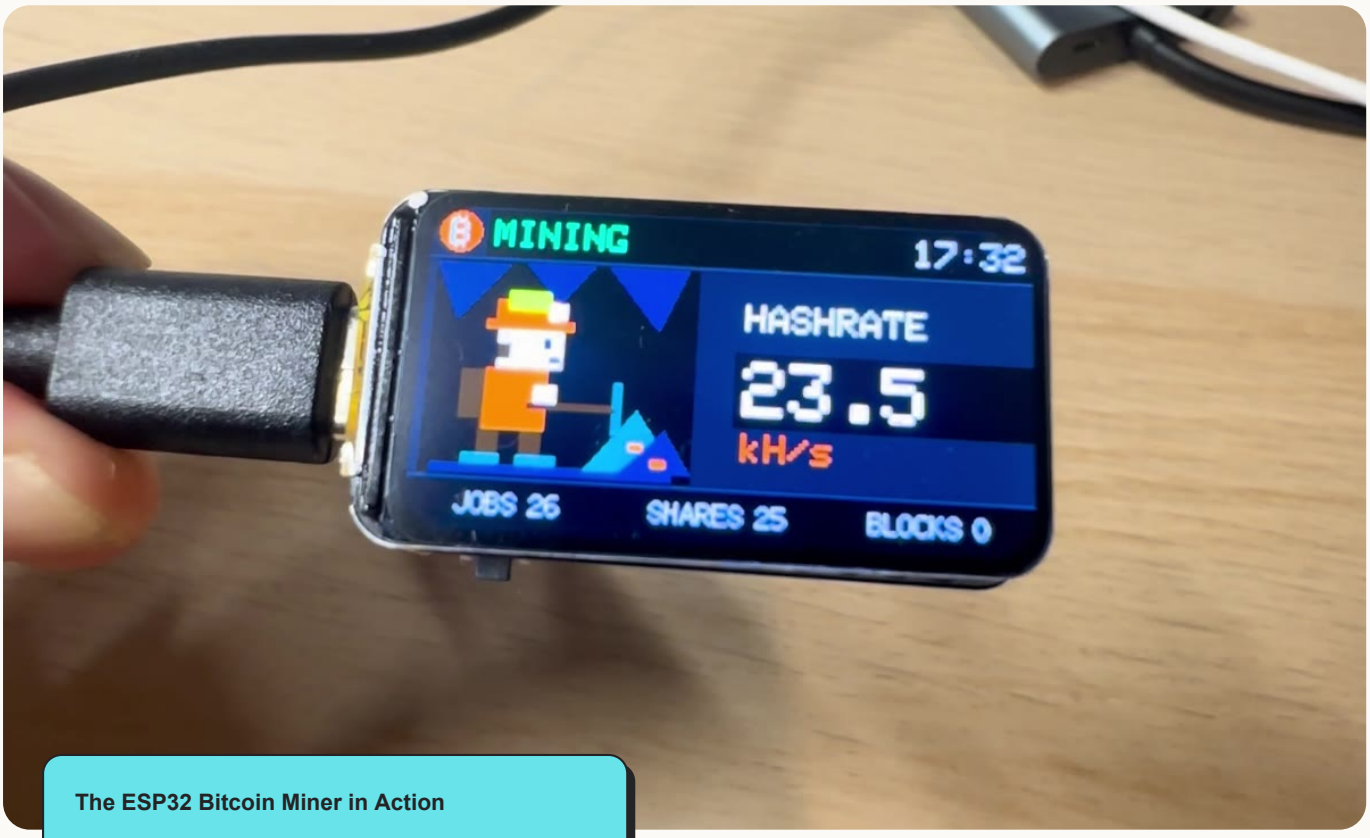
A BEGINNER-FRIENDLY DESK PROJECT

ESP32 Bitcoin Miner Build Guide

Your board. My animated miner. Ready to upload with Arduino IDE.



The ESP32 Bitcoin Miner in Action

MADE FOR THIS BOARD

Waveshare ESP32-C6-LCD-1.47

4 MB flash / 1.47-inch ST7789 screen / USB-C

Includes the supplied code, illustrated setup steps and help with your first upload. No soldering needed for this board.

BEFORE YOU START

A small kit. A clear path.

You do not need to write code. The supplied files already include the animated screen and the settings for this exact board.



What you need

1. Waveshare ESP32-C6-LCD-1.47
2. USB-C **data** cable
3. Windows PC or Mac + internet
4. A 2.4 GHz Wi-Fi network

THE WHOLE PROCESS

1

Prepare

Install Arduino IDE, board support and the two included libraries.

2

Upload

Open the supplied sketch, choose the board and click Upload.

3

Connect

Enter your own Wi-Fi details on the miner setup page.

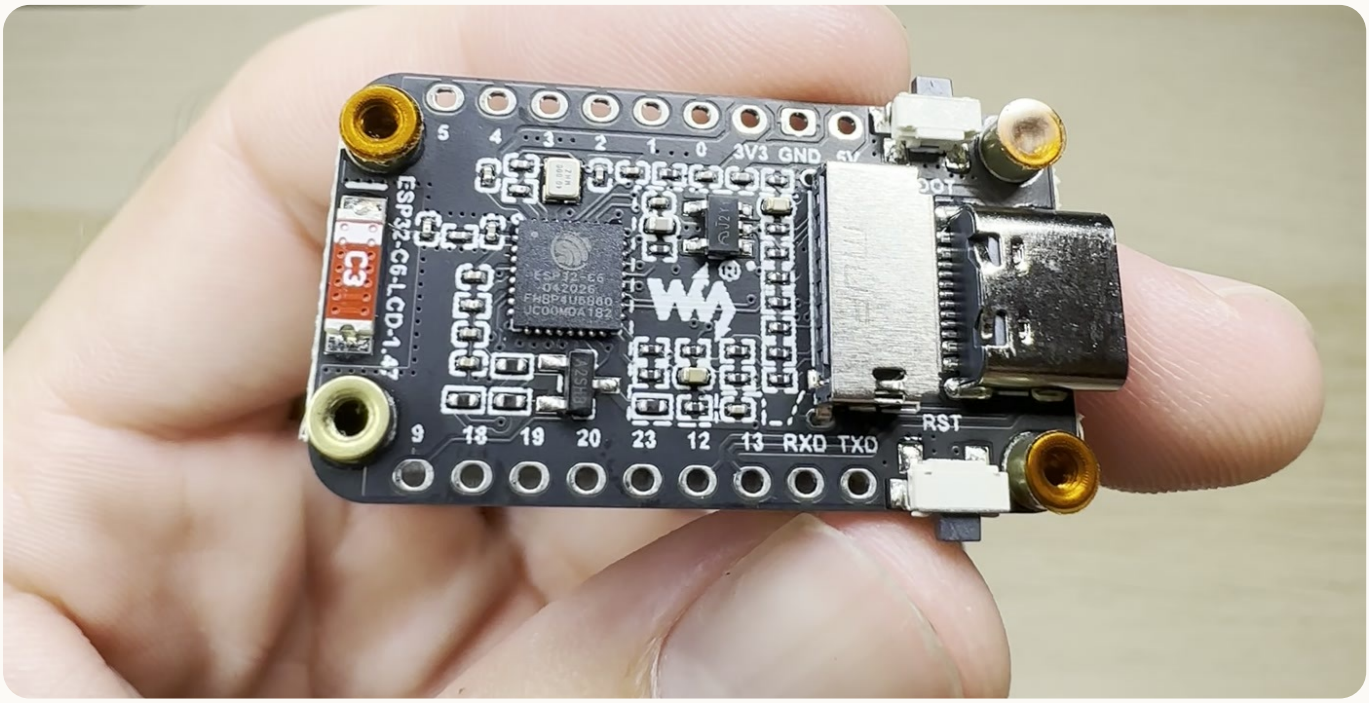
A learning project with a lottery-sized chance

This is a real hashing experiment and a fun desk display. An ESP32 has an extremely small chance of finding a Bitcoin block. Do not expect an income from it.

A QUICK HARDWARE TOUR

Find these three things.

Turn the board over to see its USB-C port and the two small buttons. The front is the screen; no extra screen wiring is needed.



STILL FROM THE ORIGINAL SOURCE FOOTAGE

USB-C	The metal socket on the right in the photo. Connect it to your computer with a data cable to upload; it also powers the board.
BOOT	The upper white button in this photo, labelled BOOT. Hold for 2 seconds during normal operation to reopen miner setup.
RESET / RST	The lower white button, labelled RST. Press once to restart. BOOT and RESET together can put the board into upload mode.

Use the printed labels to identify the buttons if you are holding the board in another orientation. Avoid touching exposed contacts while it is powered.

ONE-TIME COMPUTER SETUP

Meet Arduino IDE.

Arduino IDE is the free app that turns the supplied code into firmware and sends it to your board. The upload process is the same on Windows and macOS.

1 Install Arduino IDE 2

Go to arduino.cc/en/software and choose your operating system. Windows: run the installer. Mac: open the download and move Arduino IDE to Applications. Launch the app.

2 Add Espressif board support

Open Preferences (Windows: File > Preferences; macOS: Arduino IDE > Settings/Preferences). Add the address below to **Additional boards manager URLs**, then click OK.

COPY THE WHOLE ADDRESS

https://espressif.github.io/arduino-esp32/package_esp32_index.json

3 Install the correct esp32 package

Open **Tools > Board > Boards Manager**. Search for **esp32**. Choose **esp32 by Espressif Systems**, select version **3.3.12** and click Install. Wait for all downloads to finish.

BOARDS MANAGER / ILLUSTRATED

esp32

by Espressif Systems

3.3.12 INSTALL

Use Espressif Systems, rather than the separate Arduino ESP32 Boards package. Use this version with the supplied project files.

NO PIN EDITING REQUIRED

Open. Add. Keep together.

All the code files and both library ZIPs have been provided with this guide. Extract the main download first. Windows: right-click > Extract All. Mac: double-click the ZIP. Leave the two library ZIPs inside it compressed.

YOUR EXTRACTED FOLDER

```
ESP32_Bitcoin_Miner/
  ESP32_Bitcoin_Miner.ino   <-- open this
  main.cpp + display.cpp + pool.cpp + bitcoin_hash.cpp
  the matching .h files
TFT_eSPI-Waveshare-C6.zip
ArduinoJson-6.21.6.zip
```

1 Add the two included libraries

In Arduino IDE choose **Sketch > Include Library > Add .ZIP Library**. Select **TFT_eSPI-Waveshare-C6.zip**. Repeat for **ArduinoJson-6.21.6.zip**.

TFT_eSPI lets the miner code draw text, numbers and animation on the screen. The supplied copy is already configured for this board.

2 Open the miner sketch

Choose **File > Open** and open **ESP32_Bitcoin_Miner.ino** inside its matching folder. The .cpp and .h tabs belong to the same sketch. Keep every supplied code file together.

Already have TFT_eSPI installed?

Back up your existing library before replacing it. This supplied copy is configured specifically for the Waveshare C6 screen and can affect other TFT projects. Do not replace it with a generic TFT_eSPI update for this guide.

MATCH THESE SETTINGS

Tell Arduino what is connected.

Plug the board into your computer using a USB data cable. In Tools, select the ESP32C6 Dev Module board and match these options.

Board	ESP32C6 Dev Module
Flash Size	4MB (32Mb)
Partition Scheme	Huge APP (3MB No OTA/1MB SPIFFS)
USB CDC On Boot	Enabled
Upload Speed	115200
Other board options	Leave at their defaults

Windows port

Tools > Port: choose the new COM port, for example COM5. The number varies.

macOS port

Tools > Port: choose the new /dev/cu.usbmodem... entry. The suffix varies.

If you are unsure which port is yours, unplug the board, check the list, then reconnect it. Choose the entry that appears. Port names here are examples.

YOUR FIRST FLASH

Two buttons. One new miner.

Uploading replaces the program already on the board. Keep the USB cable connected until the upload completes.

ARDUINO IDE TOOLBAR / ILLUSTRATED



Select board: ESP32C6 Dev Module / Your USB port

1 Click Verify (the tick)

The first compile can take a few minutes. Wait for it to finish with no errors. If a library is missing, return to page 5.

2 Click Upload (the right arrow)

Arduino compiles again and writes the program. Wait for the upload to finish. The board may reset automatically; if it does not start, press RESET once.

If it stays on "Connecting..."

Hold BOOT, press and release RESET, then release BOOT. Reselect the board's port if it changed and try Upload again. After upload, press RESET to start the miner.

Success check: on a new or unconfigured board, the screen shows BITCOIN MINER SETUP and a setup Wi-Fi network. A board with saved settings may connect straight away. Hold BOOT for 2 seconds to reopen setup.

USE YOUR PHONE OR COMPUTER

Give it a Wi-Fi connection.

Your home Wi-Fi details are entered on the miner itself. They are not included in the shared code or this guide.



1 Join the setup network

In your phone or computer Wi-Fi settings, join **ESP32-Miner**. The setup password is **12345678**. This is the supplied firmware's default, not your home Wi-Fi password.

2 Stay connected even without internet

Your device may say this network has no internet. Choose to stay connected. If it switches away automatically, temporarily turn off mobile data or automatic network switching.

3 Open the setup page

If it does not open automatically, type **http://192.168.4.1** into the browser address bar. Use http, and enter it as an address rather than a search.

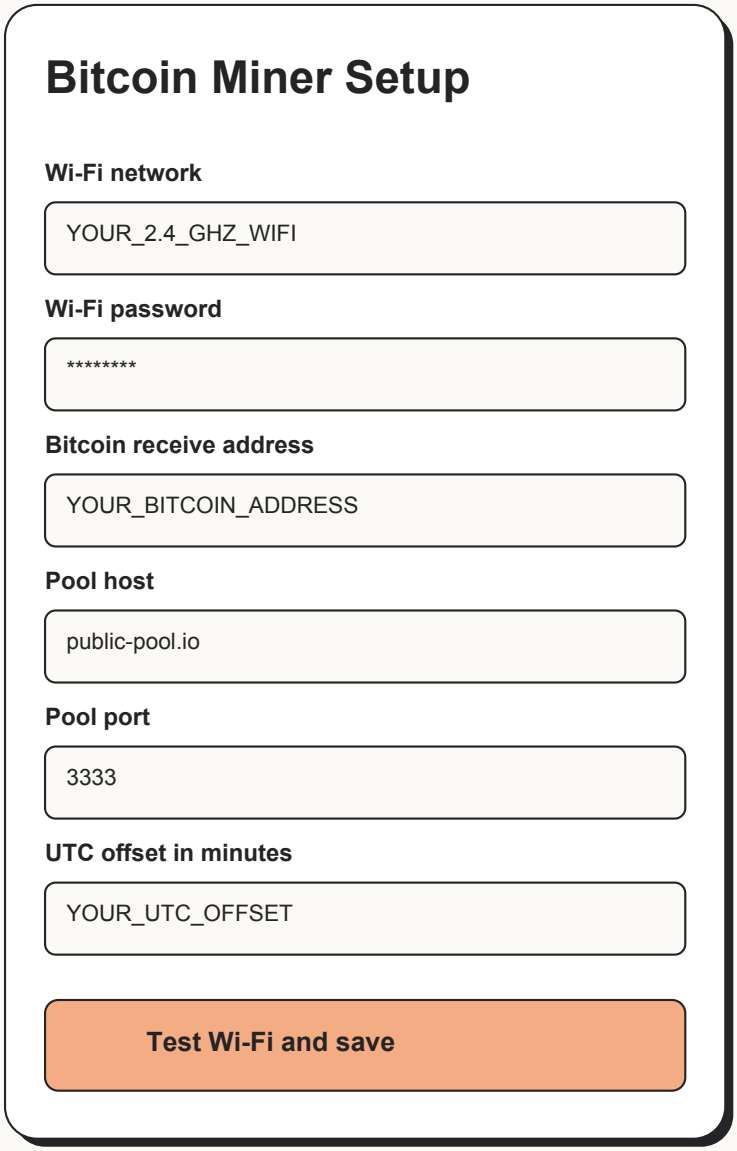
Need to bring setup back?

Hold the board's BOOT button for 2 seconds while the miner is running. Mining pauses while setup is open. An idle setup session closes after about 5 minutes; you can reopen it with BOOT.

SETUP PAGE / ANNOTATED

A few fields. Then save.

This is an illustrated version of the setup form. All Wi-Fi and address entries shown here are neutral placeholders.



Wi-Fi

Use a 2.4 GHz network and its normal password. Leave the open-network checkbox off for a secured network.

Receive address

Use your own Bitcoin on-chain receive address. Never enter a seed phrase or private key. Verify the whole address.

Pool

The supplied default is public-pool.io, port 3333. Use a pool that supports tiny NerdMiner-style devices.

Local time

Enter UTC offset in minutes. UTC = 0; UTC+10 = 600; UTC-5 = -300. Adjust manually for daylight saving.

Tap Test Wi-Fi and save. The miner tests the connection before keeping the new settings. On success it closes setup after about 30 seconds. Rejoin your usual Wi-Fi. If it fails, correct the details and try again; previous saved settings are kept.

YOUR LITTLE DESK MINER

What the screen is telling you.

These are photos of the animated miner running. Displayed rates and counts are examples, not a speed or reward guarantee.



Status + clock	MINING appears while hashing. Local time needs an internet time sync and the correct UTC offset.
Hashrate (kH/s)	Thousands of hash attempts per second. It varies during operation and between devices.
Jobs / Shares / Blocks	Jobs are pool work; shares are accepted pool submissions. Shares are not Bitcoin block rewards.

Zero shares for a while can be normal: pool difficulty controls how often a tiny miner can submit one. An animation alone does not prove it is mining; check that status, hashrate and jobs are active.

SAME IDEA. DIFFERENT HARDWARE.

Can I use another ESP32?

Yes, other ESP32 devices with screens can be adapted. This supplied sketch and display library are prepared specifically for the Waveshare ESP32-C6-LCD-1.47.

The beginner route: use the matching board.

A different ESP32 screen is an adaptation project. Its board name alone does not tell the code how the display is wired.

Chip + USB	Select its exact Arduino board, flash size, partitions and USB settings. C3, C6 and S3 targets are different.
Display driver + pins	Match the vendor schematic: display controller, MOSI, SCLK, CS, DC, RESET and backlight. Some screens need a different library.
Size + orientation	Update pixel dimensions, offsets, colour order and rotation. The animated layout currently assumes a 320 x 172 landscape area.
Buttons + power	The supplied setup button is GPIO9. Check the new board's BOOT pin, backlight polarity and any power-enable pins.

Where the changes live: display wiring is in the supplied TFT_eSPI library's User_Setup.h; layout is in display.cpp; the setup-button pin is in main.cpp. Check the new board's official schematic and examples first. Do not reuse a pin map blindly.

IF SOMETHING STOPS YOU

Check the simple things first.

Work through one symptom at a time. Return to the matching setup page after making a change.

No USB port	Try a known data cable and another USB socket. Enter BOOT/RESET upload mode as on page 7, then recheck Tools > Port.
Library / compile errors	Confirm esp32 3.3.12 and both supplied library ZIPs. Keep every .cpp/.h file beside the .ino. Use the configured display ZIP.
Upload will not connect	Close Serial Monitor or other apps using the port. Use 115200 upload speed. Try BOOT/RESET, reselect the port and upload again.
Blank or odd screen	Confirm the exact Waveshare model and supplied TFT_eSPI ZIP. Check board settings, then upload again and press RESET.
Wi-Fi will not connect	Use 2.4 GHz, check spelling and password, and move closer to the router. Captive-portal/enterprise networks are outside this guide.
Connected, no pool work	Check the internet connection, Bitcoin address and pool host/port. Use a tiny-miner-compatible pool; reopen setup with BOOT to change it.

For more detail: Tools > Serial Monitor, 115200 baud. The firmware supports "s" for diagnostics and "?" for setup information. Check logs for personal details before sharing them.

PRIVACY, CARE + NEXT STEPS

Built for your desk.

The shared code starts without your Wi-Fi credentials or Bitcoin address. Each reader supplies their own details during device setup.

1

Keep credentials out of shared files

Wi-Fi settings and the receive address are stored on the board. Do not distribute flash-memory dumps or screenshots of your configured setup page. Check any serial logs before posting them.

2

Handle the little board carefully

Waveshare recommends screen brightness at 50% or lower. The supplied Arduino version sets the backlight to about 50%. Keep the board ventilated and unplug it if it becomes unusually hot.

3

Keep a copy of your starting files

Use the versions in this guide when reproducing the build. Automatic library or board-package upgrades can change compatibility. Recheck the upload after changing hardware or software versions.

Your supplied project files

The project ZIP contains the miner code and both required libraries. Open the supplied sketch in Arduino IDE and follow the settings in this guide. The PDF is provided separately so you can view it on your phone while using your computer.

OFFICIAL HELP + CODE REFERENCES

Arduino IDE download

Espressif board installation

Arduino ZIP library installation

Waveshare board documentation + brightness guidance

Library source and licence notices are retained inside the supplied ZIP files. Interface drawings in this guide are labelled illustrations; menu appearance can vary by operating system and IDE version.