

# How to Set Up LCC on Raspberry Pi for Home Theater Entertainment

## Materials

- Raspberry Pi 4 Model B/4GB
  - <https://www.pishop.us/product/raspberry-pi-4-model-b-4gb/>
- USB-C Power Supply, 5.1V 3.0A, Black, UL Listed
  - <https://www.pishop.us/product/usb-c-power-supply-5-1v-3-0a-black-ul-listed/>
- Micro HDMI Male to HDMI Female Adapter Cable
- HighPi Raspberry Pi Case for Pi4, Black
  - <https://www.pishop.us/product/highpi-raspberry-pi-case-for-pi4/>
- Samsung 32GB Evo Plus Class 10 Micro SDHC card
  - <https://www.amazon.com/Samsung-Class-Micro-Adapter-MB-MC32DA/dp/B00WR4IJBE>
- USB keyboard
- USB mouse
- HDMI Audio Extractor with SPDIF output
  - <https://www.amazon.com/avedio-links-Extractor-Splitter-Converter/dp/B07H94D77V>
- 2x HDMI cable
- 1x optical Toslink cable (for audio receiver or sound bar)

# Steps

## Pre-setup

1. Gather all materials in the materials section.
2. Download ubuntu server image for raspberry pi
3. Plug in sd card to computer via sd card slot or usb sd card reader.
4. Flash ubuntu server image to sd card using whatever tool you are most comfortable with e.g. balena etcher, ubuntu disk image writer, rufus, dd, etc.
5. optional, skip if planning to use ethernet) Remove sd card and insert it again.
6. (optional, skip if planning to use ethernet) Edit 50-cloud-init.yaml and only replace MYSSID with ssid and MYPASSWORD with ssid password. Keep quotes.
7. (optional, skip if planning to use ethernet) In the linux partition which contains etc folder, replace file /etc/netplan/50-cloud-init.yaml with the file of the same name that you edited with your ssid and password.

## Assembly

8. Assemble the Raspberry Pi device components and connect it to the TV.
  - a. Place the raspberry pi device inside the case. Make sure the device is firmly locked into the case.
  - b. Plug in the usb mouse and the usb keyboard into black USB 2.0 ports of the raspberry pi device.
  - c. Plug in the micro hdmi adapter to the micro hdmi port of the raspberry pi device.
  - d. Plug in an hdmi cable from female hdmi end of micro-hdmi adapter to hdmi input of avedo links hdmi audio converter.
  - e. Plug in hdmi cable from hdmi output to hdmi input of the television set or hdmi input of audio-video receiver.
  - f. Plug in the usb connector of USB-C 5V DC adapter to the raspberry pi device.
  - g. Insert sd card into the sd card input of the raspberry pi device. It should fit in smoothly with little physical pushback.
  - h. (optional) Plug in optical Toslink cable from avedo links hdmi audio extractor optical output to optical input of audio-video receiver or soundbar.

## Software Configuration

9. Turn on the television set and set it to display the input that the raspberry pi device is connected to.
10. Plug in the USB-C power supply into an outlet. You should see text displayed in the television set.
11. At the login, wait until a message appears about cloud-init initializing ubuntu user, then, login with user ubuntu and password ubuntu.
12. Change password as prompted.
13. (optional, skip if planning to use ethernet)
  - a. `$ cd /etc/netplan`
  - b. `$ sudo netplan generate`
  - c. Edit file 50-cloud-init.yaml if errors are found.
  - d. `$ sudo netplan apply`
14. `$ sudo apt update`
15. `$ sudo apt upgrade`
16. (optional, do this step to install a graphical desktop environment)  
`$ sudo apt install ubuntu-mate-desktop`
17. `$ git clone https://github.com/MeteorStudioASU/lcc.git`
18. `$ cd lcc`
19. `$ mkdir build`
20. `$ cd build`
21. `$ sudo apt-get install git cmake g++ pulseaudio pavucontrol libpulse-dev libasound2-dev`
22. `$ cmake .. && make && sudo make install`

23. \$ cd /usr/local/bin

24. \$ chmod +x lcc\_audio

## **Running the Program**

25. Make a virtual audio device i.e. pulse audio sink

\$ pacmd load-module module-null-sink sink\_name="Game"

26. \$ pavucontrol &

27. \$ lcc\_audio

28. Chose monitor of Null Output for input device and built-in audio for output device

29. Use pulseaudio volume control to set audio stream to output on null output