

QUICK START GUIDE

MERUS™ audio amplifier piHAT ZW with moOde audio player

Infineon Technologies



Product overview and features

Overview

The MERUS™ audio amplifier is a hardware at the top (HAT) power amplifier board which brings the Infineon proprietary multilevel technology to Raspberry Pi users and makers. It is intended for loudspeaker building and wireless music streaming with minimum size and consumption along with state-of-the-art power efficiency and HD audio quality. It is equipped with the MERUS™ MA12070P class D audio amplifier. Key features include:

- > Compatible with Raspberry Pi Zero and Raspberry Pi Zero Wireless
- > Compatibility with major streaming applications for Raspberry Pi (Raspberry Pi OS, moOde Audio, Volumio)
- > No need for external or extra power supplies in addition to the 5 V USB supply
- > Full hardware control, customization, and error monitoring through Linux Alsamixer

General features and audio performance

Number of audio channels	2xBTL, 1xPBTL.
Audio input format	Digital (I2S)
Minimum power supply requirement (micro USB supply)	5 V@2.5A DC
Minimum power supply requirement (power bank)	5 V@2.1A DC 3000 mAH
Output Power/ch (instantaneous peak – measured with music)	20 W@4 ohm
THD+N	< 0.014% 1 W 1 KHz RL=4 ohm
Overall system efficiency	66% 1 W/ch 4 ohm

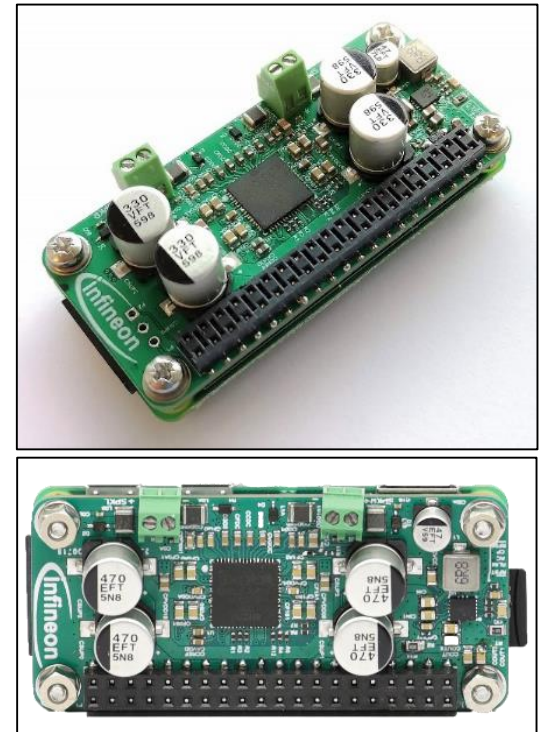


Figure 1. Overview of the MERUS™ Audio amplifier HAT ZW

Product overview and features

System diagram

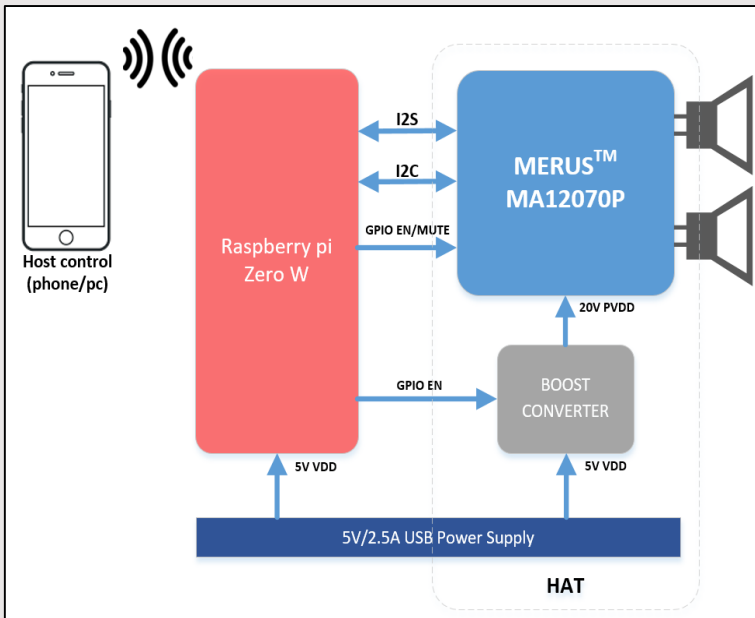


Figure 2. MERUS™ audio amplifier piHAT ZW system diagram

MERUS™ audio amplifier piHAT board

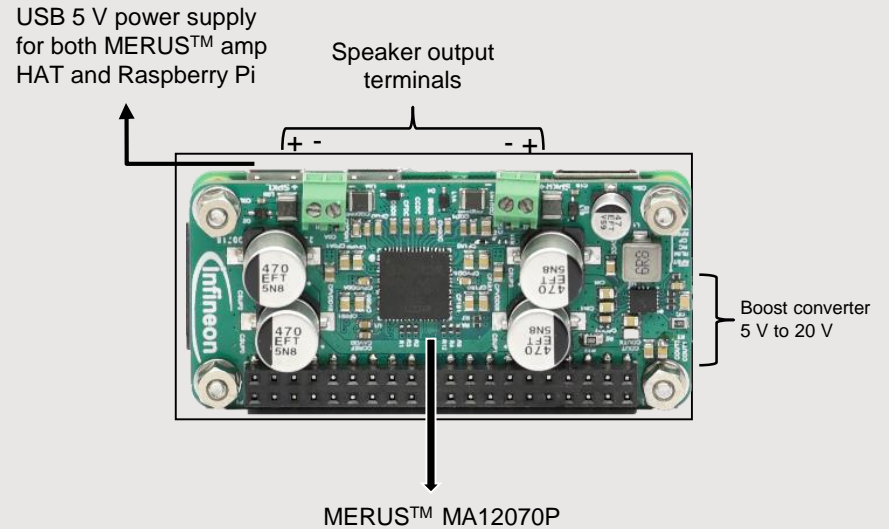


Figure 3. Top board view of MERUS™ audio amplifier piHAT ZW

Hardware setup

Attach boards

- > Attach the MERUS™ HAT to the Raspberry Pi using 2.5M screws and 2.5M 4mm length spacers.

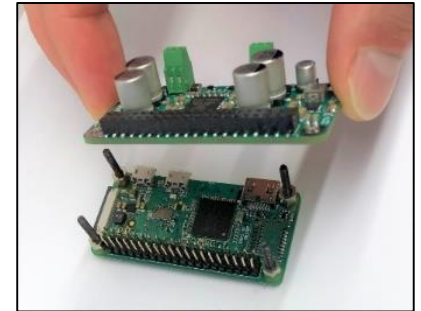


Figure 4. Assembly procedure of the Raspberry Pi + piHAT

Secure assembly

- > Secure both boards assembly with 2.5M spacers or nuts.

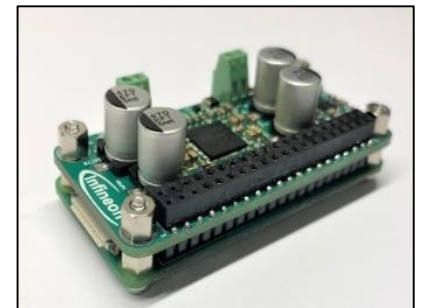


Figure 5. Completed assembly of the Raspberry Pi + piHAT.

Hold

- > Do not connect the power supply. Continue with the software setup.

Software setup

1 – moOde audio player image

- › Download the moOde audio image file from the [official site](#).

2 – Balena etcher

- › Download balena etcher (or any other SD card image burner) from this [link](#) and open it.

3 – Burn the image to the SD card

- › Insert your SD card in the windows, linux or macOS host machine and flash the downloaded moOde audio image file into the card.

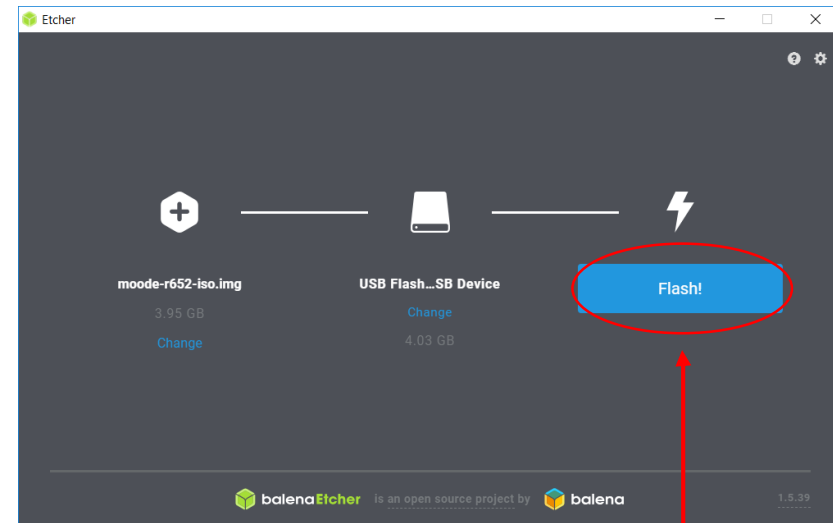


Figure 6. Using balena etcher to burn the SD card

Software setup

4 – Insert SD card in the Pi

- › After the flash process insert the SD card in the Raspberry Pi and turn it on. Wait about 2 minutes.

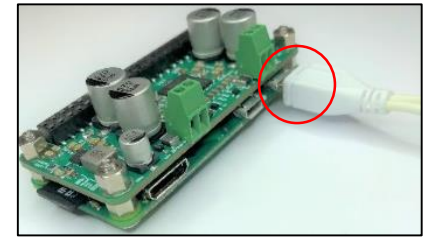
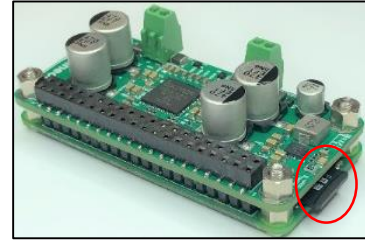


Figure 7. Assembly procedure of the Raspberry Pi + HAT

5 – Connect to moode.local/

- › Connect your host machine or mobile phone to the “Moode” network and then type `http://moode.local/` into your web browser to access the configuration GUI. The password is “moodeaudio”.

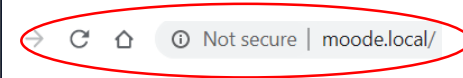
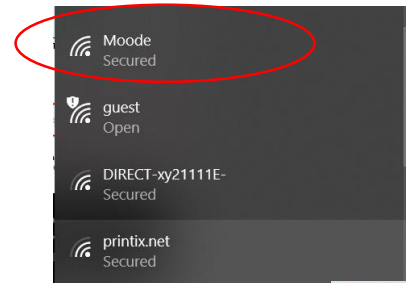


Figure 8. Connecting to moode.local

6 – Configuration menu

- › Press on the “m” local menu at the top right corner menu, and then go to “configure”.

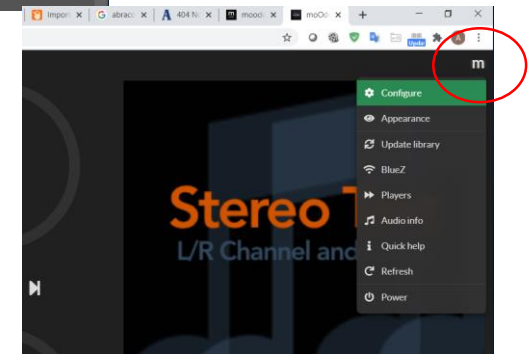


Figure 9. Press on the “m” logo and then go to “configuration”

Software setup

7 – Go to “audio” configuration

- › On the configuration menu press the “audio” configuration button.

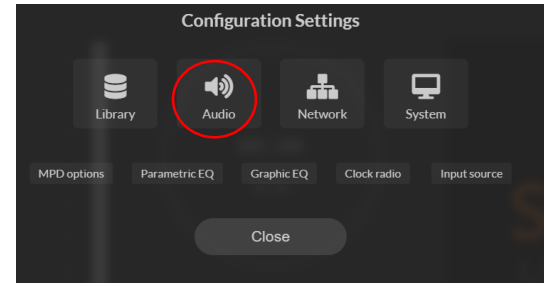


Figure 10. Moode configuration menu

8 – Configure I2S audio device

- › Under the “I2S audio device” select “MERUS Amp HAT ZW” and then press “set”. Do not reboot yet.

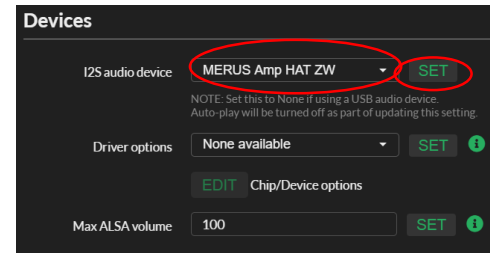


Figure 11. Moode initial configuration: Output device

9 – Configure Bluetooth and airplay

- › Scroll down and under “Renderers” turn the Bluetooth and pairing agent options “on” and press “set” in both. Then turn-on the “Airplay” option and also press “set”. Finally, press “EDIT” under Airplay and configure it for 44.1 KHz and 32-bit playback. Don’t forget to press save!

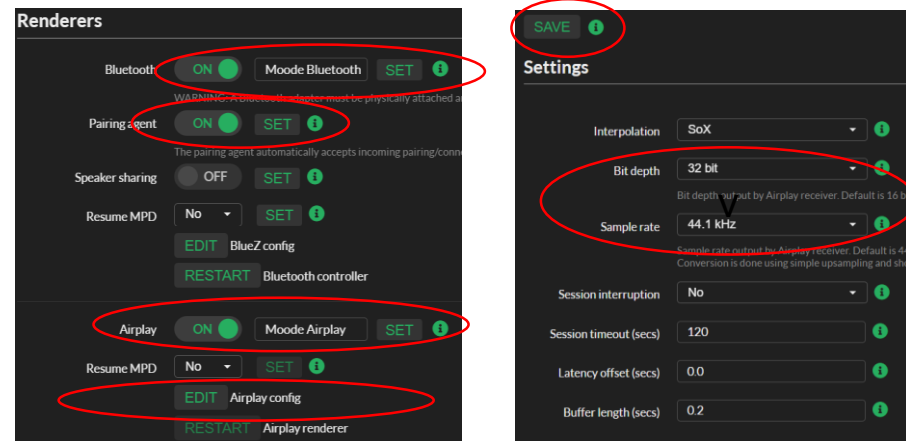


Figure 12: Moode initial configuration: Bluetooth and airplay

Software setup

10 – Configure Spotify

- › Turn the “Spotify” option on and press “set”. Next, go to “EDIT Spotify config” and configure it with 320 K of bitrate and 20 percent of initial volume (to be safe). Finally, press “save”.

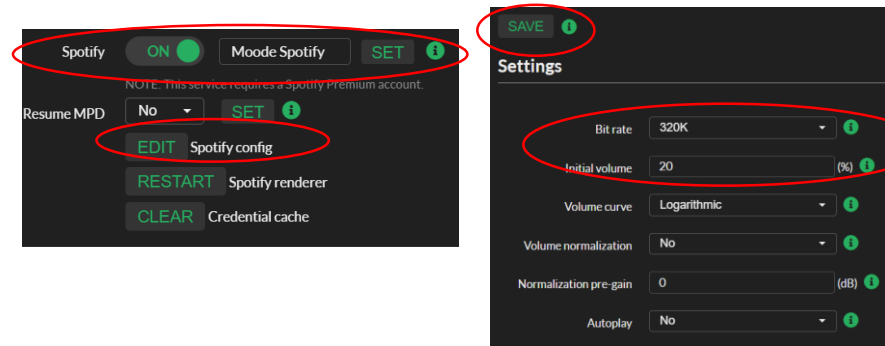


Figure 13. Moode Spotify configuration menu.

11 – Configure the pi Network

- › Go to the “Configure” menu again (step 6) and select “Network” in order to set your network configuration. Press the “SCAN” button next to “SSID” and then select the network you want to connect the board to. Then, press “SAVE”.

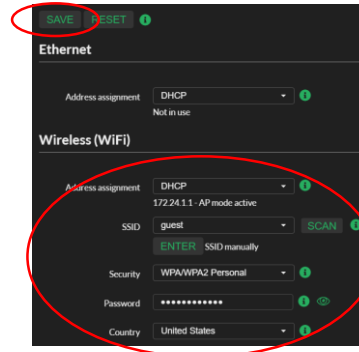


Figure 14. Moode network configuration

Important: Use an open network to properly communicate with the Raspberry Pi. An enterprise or office network will not work due to security restrictions. A temporal and fast solution may consists in using the hotspot network of your cellphone in case there is no other available open networks.

12 – Reboot

- › Go to the configuration menu again and press “Power”. Next, press “RESTART” in order to reboot the Raspberry Pi. It can take up to two minutes to restart.

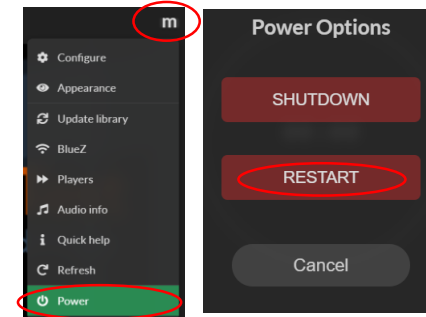


Figure 15. Moode power menu

Software setup

13 – Connect trough SSH

- > Download [putty](#) and login trough ssh into the Raspberry Pi. In host name type “moode.local”. Click “open” and then press “yes”. Then login with “pi” as user and “moodeaudio” as password.

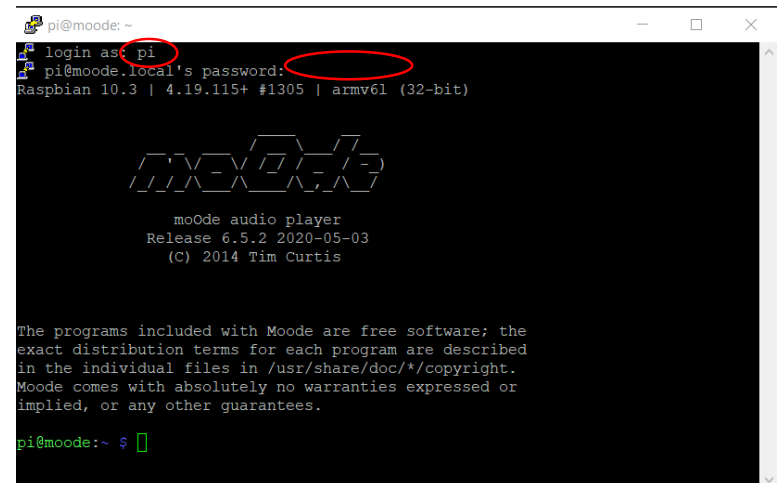
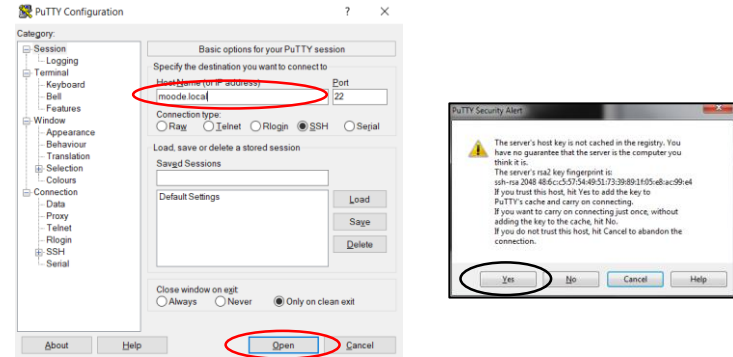


Figure 16. Connecting trough SSH in putty

Software setup

14 – Alsamixer and limiter settings

- > Type alsamixer on the command line and access the MA12070P control mixer to set the protection limiter level of the device. Usually a -15 dB setting will be a good starting point for 4 ohm nominal impedance speakers. It is strongly recommended to go through the user’s guide section, where this topic is covered, to correctly configure the limiter threshold level. Press escape to exit the mixer.

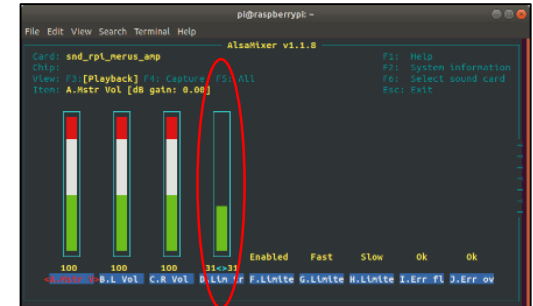


Figure 17. MERUS™ piHAT Alsamixer

15 – Turn-off and reboot

- > Turn-off the Raspberry Pi by disconnecting the power supply. Connect the loudspeakers to the terminal blocks and turn-on the Raspberry Pi again.

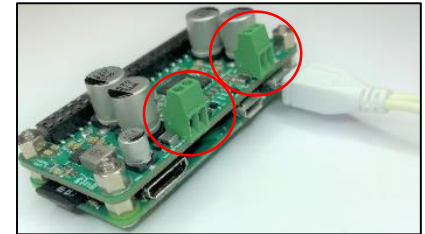


Figure 19. MERUS™ piHAT terminal blocks for loudspeaker connection

16 – Playing via Airplay or Bluetooth

- > Open any Airplay compatible device/app such as Spotify and select your device from the list to play music from the piHAT. Or select “Moode Bluetooth” to play via Bluetooth from the piHAT

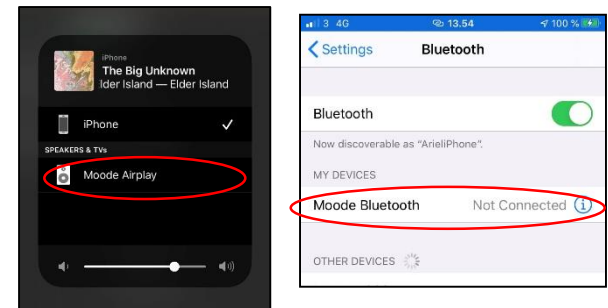


Figure 20. Selecting Moode as Airplay or Bluetooth device on Spotify.



Part of your life. Part of tomorrow.