

## Raspberry Pi Audio Output Vsn 04 by David Cole on 2024EMay11

### Introduction

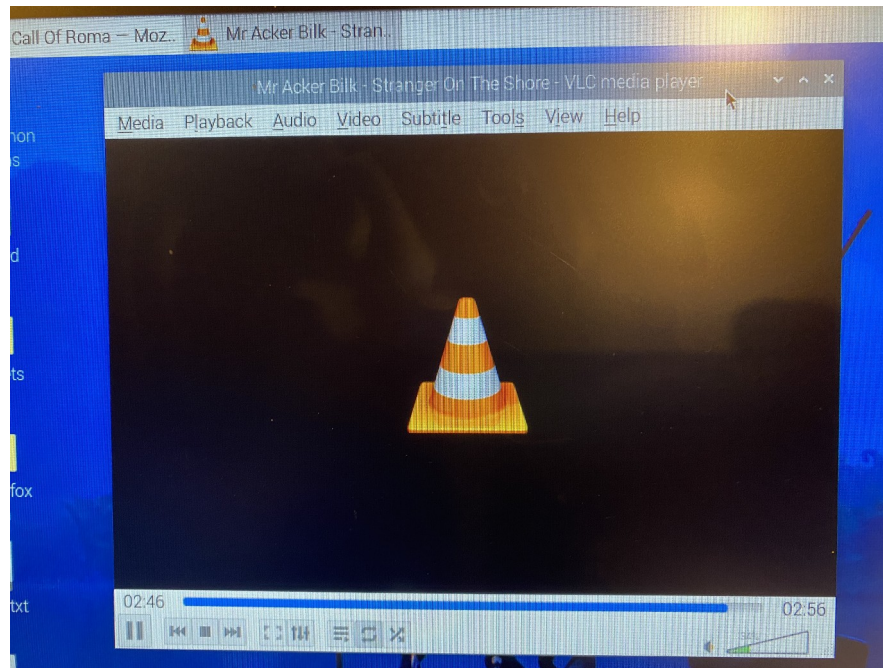
The Raspberry Pi 4 can output audio in many different ways. First we will describe the easiest and most useful way to output audio: using the HDMI speaker. Then we will describe how to select and control what is being output. Then we will describe the many different ways to hear the audio including: HDMI, headphones, BlueTooth, external speaker pairs (that include an amplifier) and finally how to use an external amplifier that can drive different output devices. Note that all Raspberry Pi computers (except the RP 5) have a female audio jack. In this article, we will continually be playing an mp3 audio recording. The author uses “Stranger On the Shore” in mp3 format stored in the home/pi/Desktop/d/audio folder. First we will introduce you to the different devices that can be used. You do not need to have **all** of these devices in order to follow the steps and understand this article:

- Raspberry Pi 4 [including Raspberry Linux OS and VLC Media Player software,
- power supply, keyboard, mouse, wifi]
- including: Bluetooth, female headset jack, USB-A connector, HDMI connector,
- HDMI cable to television set
- Headset with male jack
- Speakers combined with an internal amplifier and male jack
- USB-A to USB-C cable
- A male to male cable with a microphone jack on each end
- Speaker with wires (and a small phillips screwdriver)
- TV or monitor with internal speaker
- YS-Audio amplifier
- BlueTooth Speaker
- Google Home or Nest Player
- Local router (wifi)

If you have many of the above items, this article will teach you how to use them to produce audio from your “RPi 4”. Those readers who have a “RPi 5” will not have an output jack, preventing them from connecting a device to the output jack. Of course HDMI can be used. But the YS-Audio amplifier will accept either BlueTooth input or input from a USB-A connector. For the latter, a USB-A to USB-C cable will be necessary.

### Playing a song using the HDMI TV connection

To play a mp3 recording, start up the Raspberry Pi 4. On the top left corner of the Raspberry Pi 4 Desktop, select the menu, then select “Sound and Video”. then select the “media” then “Open File”. Then go to Desktop/d/ folder, then click on VLC to play music. You will see the following VLC window.



Select media/Open File. then select “Stranger On The Shore” or any other song. On the bottom line of the VLC window, click on the = (to the left of the “X”) so that the song will continue to play over and over again. On the main Desktop window right-click on Audio (in the top right hand corner) and select HDMI and raise the volume. The music should be audible through the TV or monitor, perhaps the TV volume will also need to be turned up. This is the simplest way to listen to music; it requires no wires nor any special audio equipment.

### **Playing a song using a BlueTooth speaker**

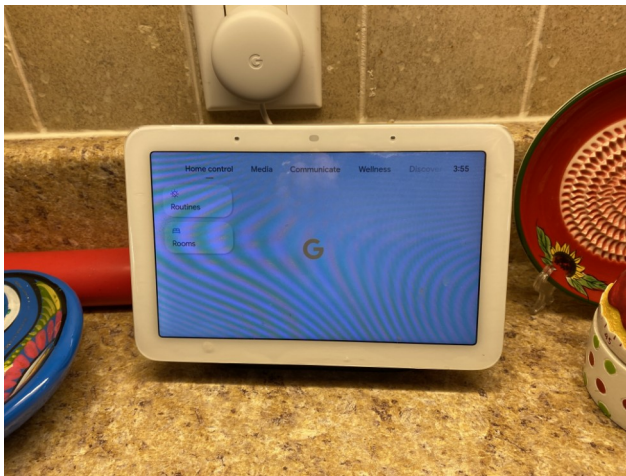


Power up the BlueTooth speaker (the blue cylinder in the center of the above photo) and turn it on. To cause the BlueTooth speaker to go into Pairing mode, do the following:

Click on the “B” in the top right corner of the “RPi 4” monitor then select Add Device to tell the Raspberry Pi 4 to add a BlueTooth device. It will open a window titled “Searching for BlueTooth

devices”. Then wait for the name of the BlueTooth speaker to appear in the list of BlueTooth devices. It may take over 100 seconds on the “RPi 4” for the name of the device to appear. Mine is called “BT speaker”. Select the “BT speaker”. Click on the “Pair” button. It will begin pairing and should say “Pairing Successful...”. Then select Audio in the top right corner of the Desktop and right click on it. Then select the name of the desired device, in this case “BT speaker”. Then select “Connect”. The music should now be playing through the BlueTooth device. It may be necessary to adjust the volume on the BlueTooth Device. It may be necessary to select the output devices on the VLC, then “Audio Devices” then “BT Speaker”. Do not be surprised if the BT Speaker does not connect immediately. Try various combinations of BT Connect, Audio Device and VLC Audio/Audio Device until it works.

### Playing a song on a Google Nest or Google Audio Hub.



**Google Nest**



**Google Hub**

Audio can be also be played on a Google Nest (in the above photo on the left) or Google Hub (the grey “ball” in the center of the above photo on the right). This connection mode is called “rendering”. Be sure that the “RPi 4” is connected to the local router. Be sure that the Google device has already been set up using Home Assistant on your cell phone. Test the Google device by asking it something like the time to ensure that it is functioning. Each such Google device will have been assigned a name. Mine is named “Cellar Display”. The VLC Media Player can be told to use a Google device as output. To do this, on the VLC Media player menu click on “Play Back”, then on “renderers”. A list of available renderer devices (on the same router as the “RPi 4” will be displayed). My current list is:

- Cellar Display
- Kitchen Display
- Kitchen Speaker.

Simply select “Cellar Display”. The music should be heard from the Cellar Display. To adjust the volume say “Hey Google Volume 5” for mid-volume. To stop using a renderer, select a different Audio Device in the Top Right Hand corner. Sometimes it is necessary to select a different device in “VLC/Audio/Audio Output”.

## Using Wired Output Devices.

### Wired Headset

The simplest wired device to use is a headset (shown below) that has a male audio jack on the end of its cable. This should be a simple headset, not one that uses BlueTooth. Just plug the male audio jack into the jack on the “RPi 4”. Then return to the top right corner of the Desktop and right-click on the Audio icon. The “AV Jack” should be listed. Click on “AV Jack” to select the “headset”. Put on the headset to listen to the music.

When done unplug the male jack from the “RPi 4”. It may be necessary to restart the VLC Media Player by “VLC/Audio/Built-In Audio Stereo.



### Wired Speaker Pair

A pair of wired speakers usually has a 110v cord & plug and a male jack on the end of a cable. Plug in the 110 plug, plug the male jack into the “RPi 4” female jack, turn on the speakers, turn up the volume and the music should start playing. The “RPi 4” does not know whether you are using the “headset” or the “wired speakers”. It just sends the audio signal to the “AV Jack”. To stop the Wired Speaker Pair, turn it off and disconnect the jack from the “RPi 4”.

### Using an Audio Amplifier

The audio signal coming from the “RPi 4” is not strong enough to connect directly to a speaker unless it is a pair of wired speakers that includes an amplifier (as above). To send audio output to an unamplified speaker, a large or small amplifier is necessary. The cheapest amplifiers can be used, but the quality of the sound will be poor because it is distorted. The author paid \$15.00 to buy a small

amplifier named YS-Audio Amplifier from TEMU on the internet. There were no shipping charges. It is described after the photo of it (shown below):



The BlueTooth antenna appears along the bottom right hand edge. Continuing clockwise, just above the bottom left corner is the black DC voltage connector. The similar product at Source 1 (at end of article) shows that the center pin of the DC voltage connector is positive. The YS-Audio Amplifier comes with a DC Adapter that has two screw terminals to receive power. Above that is the white USB-C female audio input connector. A pair of speaker wires can be seen in the top left corner. Just below the top right corner is the Headphone (output) jack. Below that is the Microphone (input) Jack. The on/off volume knob is in the middle of the device.

There is a cell phone APP that is described for the YS-Audio Amplifier at some web sites. But no known source exists for this app.

### **YS-Audio Amplifier**

The Source 2 at the end, Sinilink, mentions an APP that can be downloaded to an iPhone.

The YS-Audio Amplifier (shown above) needs an external power supply (not included) that provides 12v to 24v DC. The polarity is unimportant. The YS-Audio Amplifier has the following inputs:

BlueTooth input  
 female jack accepting audio input  
 USB-C female connector accepting audio input

It also has the following outputs:

female jack providing audio output  
 2 pairs of terminals (each pair is to be connected to a speaker)  
 Only 1 speaker is necessary for this article.

A USB cable is necessary. To connect the “RPi 4” USB-A female connector to the USB-C connector on the YS-Audio Amplifier, a male to male USB-A to USB-C cable is needed. The main component of the YS-Audio Amplifier is the stereo audio amplifier. The audio signal provided to any of the 3 inputs is amplified and sent to the outputs. External DC power is required. Power is NOT used from the USB-C connector. The DC power is protected against being plugged in backwards. It is important to supply sufficient input power to drive the speaker(s) or the quality of the audio will be distorted.

### **Initial Test of the YS-Audio Amplifier**

Plug in the DC power into the YS-Audio Amplifier. A small blue LED should turn on. Sometimes the blue LED blinks, but the meaning of this is not known. If the blue LED does not turn on, it may be necessary to push down on the volume control (on the YS-Audio Amplifier) to switch it on. Connect the headphones to the female audio jack nearest to the corner of the YS-Audio Amplifier. Disconnect any speaker wires that are connected to the YS-Audio Amplifier for the moment. Use the cable with the two male jacks to connect the “RPi 4” female jack to the female microphone input jack on the YS-Audio Amplifier. On the “RPi 4” desktop, in the top right corner, select the “AV jack” so that the “RPi 4” will send its audio signal to the female “AV jack” on the “RPi 4”. Put on the headset to hear the music. It may be necessary to turn up the volume (clockwise) on the YS-Audio Amplifier. If the music can be heard, the YS-Audio Amplifier is working correctly. If not, check your connections. If there is no music, unplug the headset and plug it directly into the “RPi 4” as you did previously. This is to verify that the “RPi 4” is connected properly. Do not proceed with the next steps unless this initial test works satisfactorily.

### **Verify all three volume controls**

At this stage, three volume controls can be used to control the output. There is a horizontal slide volume control at the bottom of the VLC control panel window. There is also a vertical slide volume control in the Audio Control on the top right corner of the desktop of the “RPi 4”. The third volume control is the round knob on the YS-Audio Amplifier. Practice turning the volume up and down using each of the three. The YS-Audio Amplifier can also be powered off by pressing down on the volume control for a few seconds and then releasing it. Double Click the volume knob on the YS-Audio Amplifier to start or restart the playing of a song on the VLC control panel. Holding the volume knob down for a few seconds will power off the YS-Audio Amplifier.

## BlueTooth Input to the YS-Audio Amplifier

Disconnect the input cable from the male jack on the YS-Audio Amplifier as this automatically takes precedence over the BlueTooth input on the YS-Audio Amplifier. The BlueTooth name of the YS-Audio Amplifier input is “YS-Audio”. Simply follow the steps listed earlier to connect the YS-Audio Amplifier. The music will be heard via the headphones that should still be connected to the YS-Audio Amplifier output jack. When done, connect the cable with 2 male jacks. This will stop the input from being sent by BlueTooth to the YS-Audio Amplifier. When done, be sure to disconnect the YS-Audio Amplifier from BlueTooth using the top-right BlueTooth and/or Audio submenus.

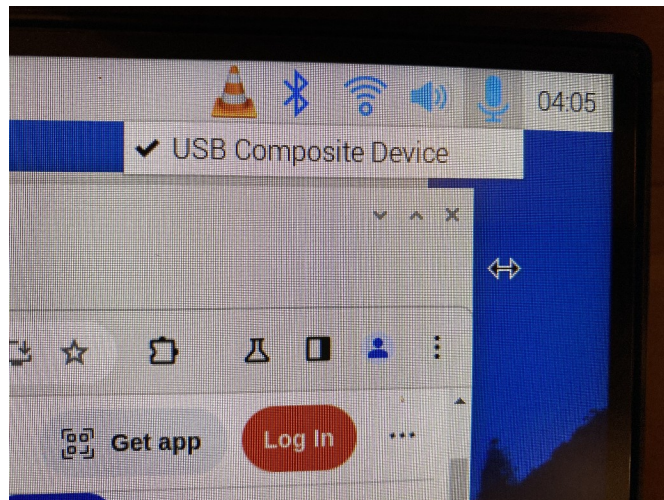
## USB-C Input to the YS-Audio Amplifier

It takes a special sequence of steps to use the USB-C input. If the following steps do not work, use the exact steps in the following section titled “**FoolProof Steps to use the USB Composite Device**”. Sometimes the USB-C input might be difficult to see at the right-hand end of the top menu line on the “RPi 4”. It is recommended that the “RPi 4” and the YS-Audio Amplifier be powered off first. Remove the AV audio jack from the “Microphone Input” on the YS-Audio Amplifier. Now power on the “RPi 4”. The “RPi 4” should power up normally. Now power up the YS-Audio Amplifier. The blue LED of the YS-Audio Amplifier should turn back on.

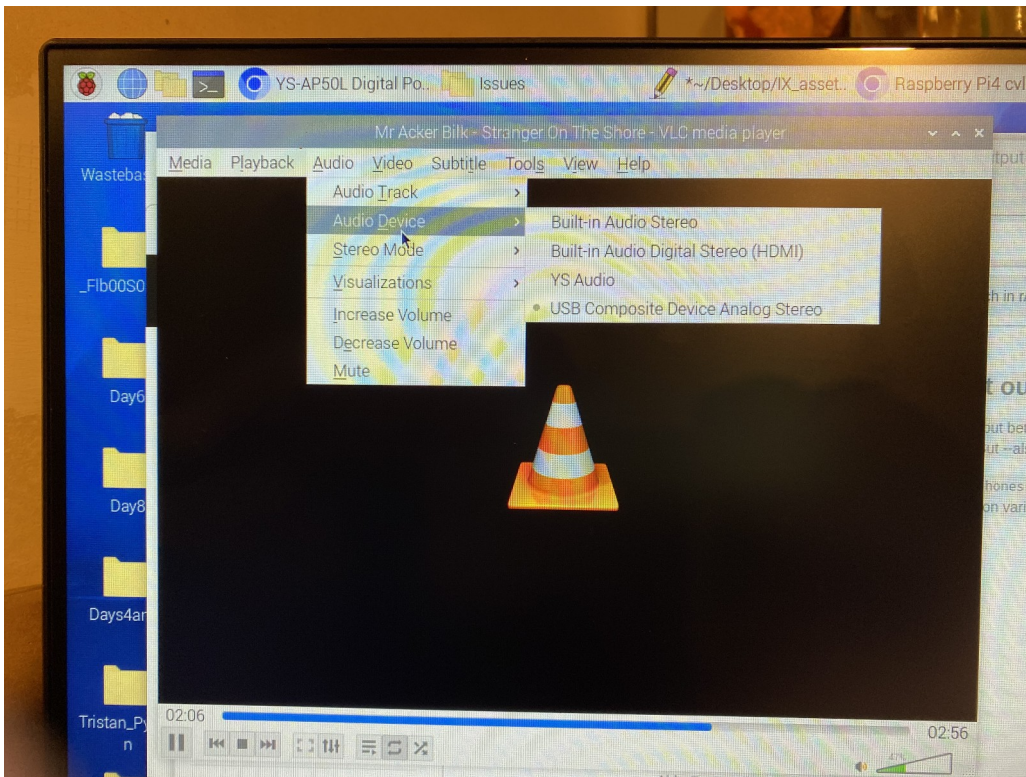
Use the USB-A male to USB-C male cable to connect the female USB-A connector on the “RPi 4” to the female USB-C connector on the YS-Audio Amplifier. A microphone icon should appear in the top right corner of the “RPi 4” (as seen in the image below).

Start playing the music again using the VCM player through the HDMI to the speakers on the Television. Be sure that the music is being heard before continuing. Now, click on the microphone icon to the right of the audio icon in the top right corner of the Desktop (as seen in the image below).

v  
v



A list of devices should appear. One of the devices listed should be “USB Composite Device Analog Stereo” as shown in the following image.



Click on this device. The “USB Composite Device Analog Output” device group might not appear immediately. The “USB Composite Device” should appear. Sometimes it appears, sometimes not.

But once it appears, then the “RPi 4” will send the music out through the USB-A port via the white USB cable to the USB-C port on the YS-Audio Amplifier. If the headphones are connected to the YS-Audio Amplifier they should be playing music now.

It may take some patience to make this happen. As with all electronic devices, sometimes the easiest solution is to power **everything** off, disconnect all the wires and cables, then start everything up again.

However, the following exact steps should work.



## **FoolProof Steps to use the USB Composite Device**

- 1 Turn off the YS Audio Amplifier
- 2 Start by sending music to the HDMI speakers
- 3 Turn on the YS Audio Amplifier  
the blue LED should turn on.
- 4 Plug in and put on the headphones  
the music can be heard on the headphones only  
if the YS-Audio Bluetooth is on in 2 places.
- 5 Plug in the white USB cable  
if the microphone icon appears go to step 15
- 6 Unplug the white USB cable
- 7 Reboot the “Rpi 4” to power it off and on again
- 8 Start the VLC Media Player and select Media
- 9 Select to play the most recent tune
- 10 Select the “repeat over and over again” option
- 11 Select Audio Source on the VLC Media Player
- 12 Select the VS Audio Source (Using BlueTooth)
- 13 Select the VS Audio Source (on the top right audio),  
if necessary  
the music should now be playing in the headset.
- 14 Plug in the white USB cable  
the Microphone icon should appear.
- 15 Right Click on the Microphone icon  
the USB Composite Device should be selected.
- 16 On the VLC Media Player,  
Click on the Audio then select Audio Device
- 17 Select the USB Composite Device Audio Stereo  
the music should be heard on the Headphones.
- 18 Unplug the headphone jack  
(the music can be heard on the External Speakers after  
they are connected according to the following steps.)

## **Driving a Speaker**

To drive an external speaker using the YS-Audio Amplifier, a pair of wires must be attached to the speaker and to the pair of screw terminals closest to the edge of the YS-Audio Amplifier. The cables to be used should be the RCA plugs sometimes called bayonet plugs. This wiring should be done while the YS-Audio Amplifier is powered off. When it is powered on again, sound should be heard from both the headphones and the external speaker. It may be necessary to follow the steps in the previous section.

## Conclusion

The steps previously listed, demonstrate all of the ways that sound can be produced from a “RPI 4”. All of the inputs and all of the outputs from the YS-Audio Amplifier were demonstrated. The first source listed below is a link to detailed specifications for a very similar product at ELECbEE.com . Source 03 is an on-line copy of this article available on the web.

## Web Sources

Source 01: [XY-AP50L](#)

Source 02: [sinilink \(pdf\)](#)

Source 03: [Article 219 by David Cole](#)

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