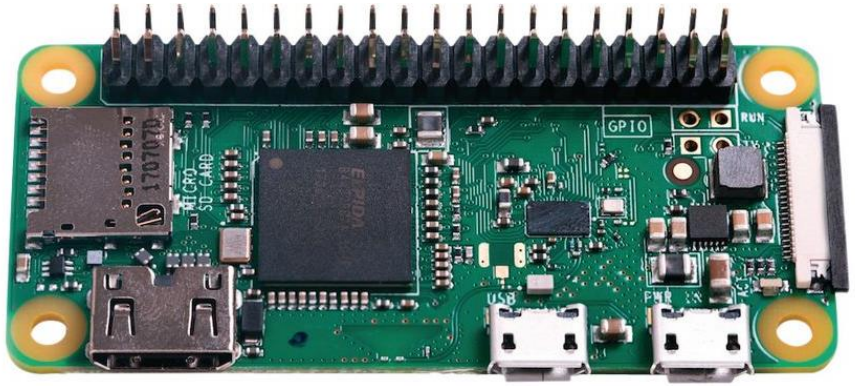
Raspberry Pi Internet Radio

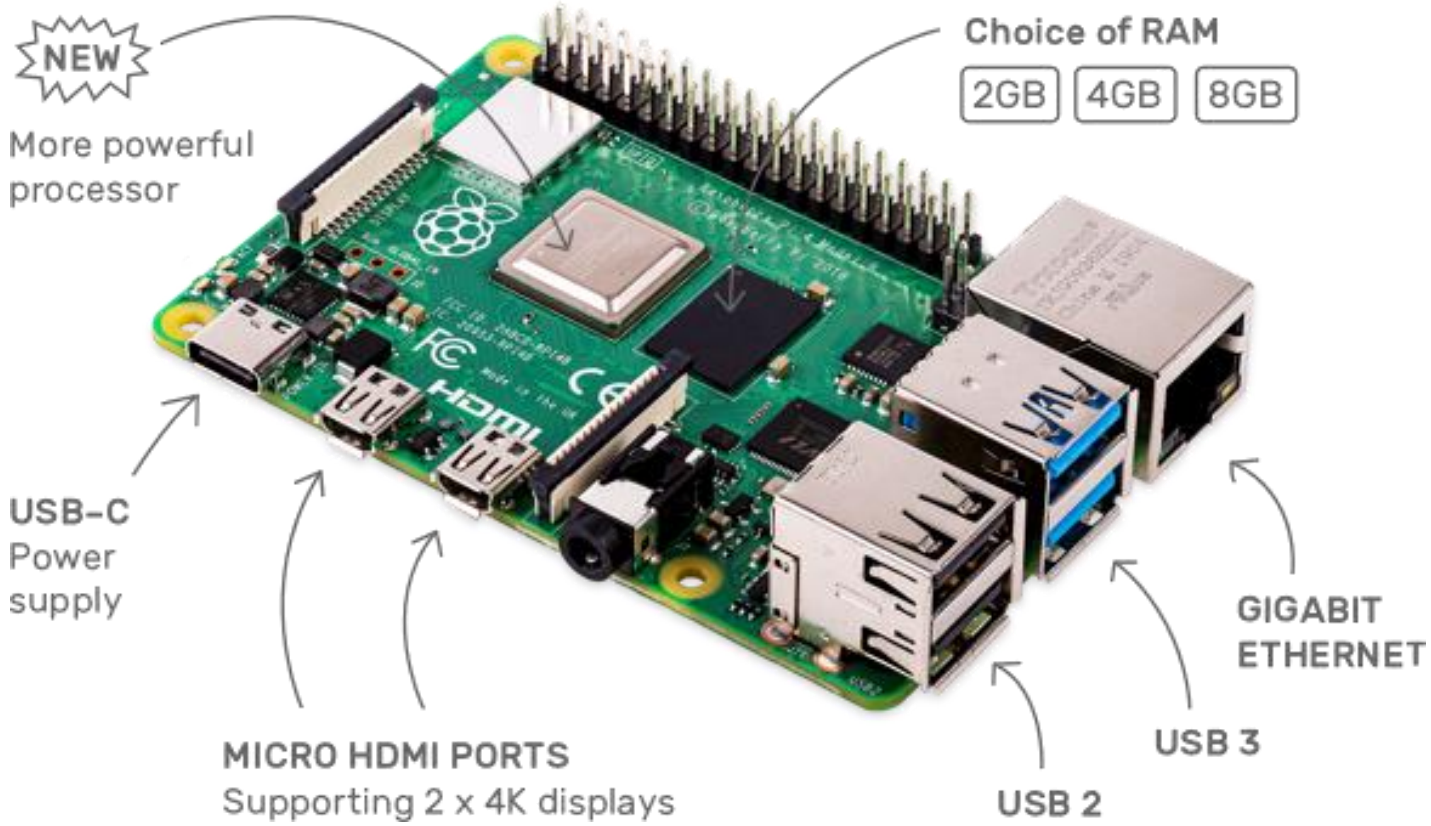
http://bobrathbone.com

Raspberry Pi is 10 years old

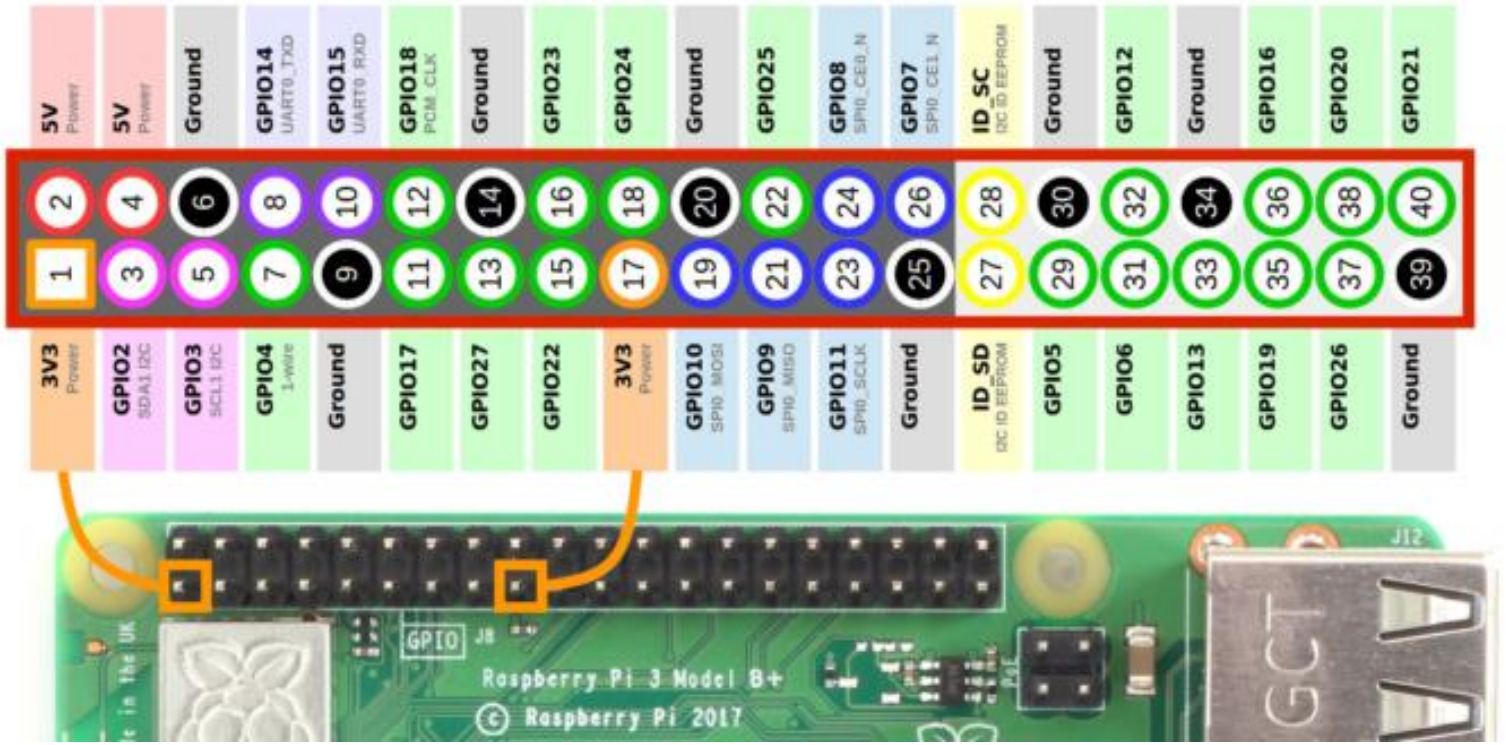
- Educational computer produced by the Raspberry Pi Foundation
- First produced in February 2012
- Over 45 million units sold (‘til March 2022)
- Currently 21 different models available



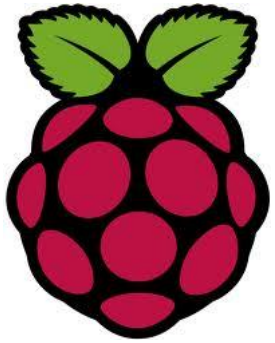
Raspberry Pi
Zero W (Wi-Fi)



Raspberry Pi 4B

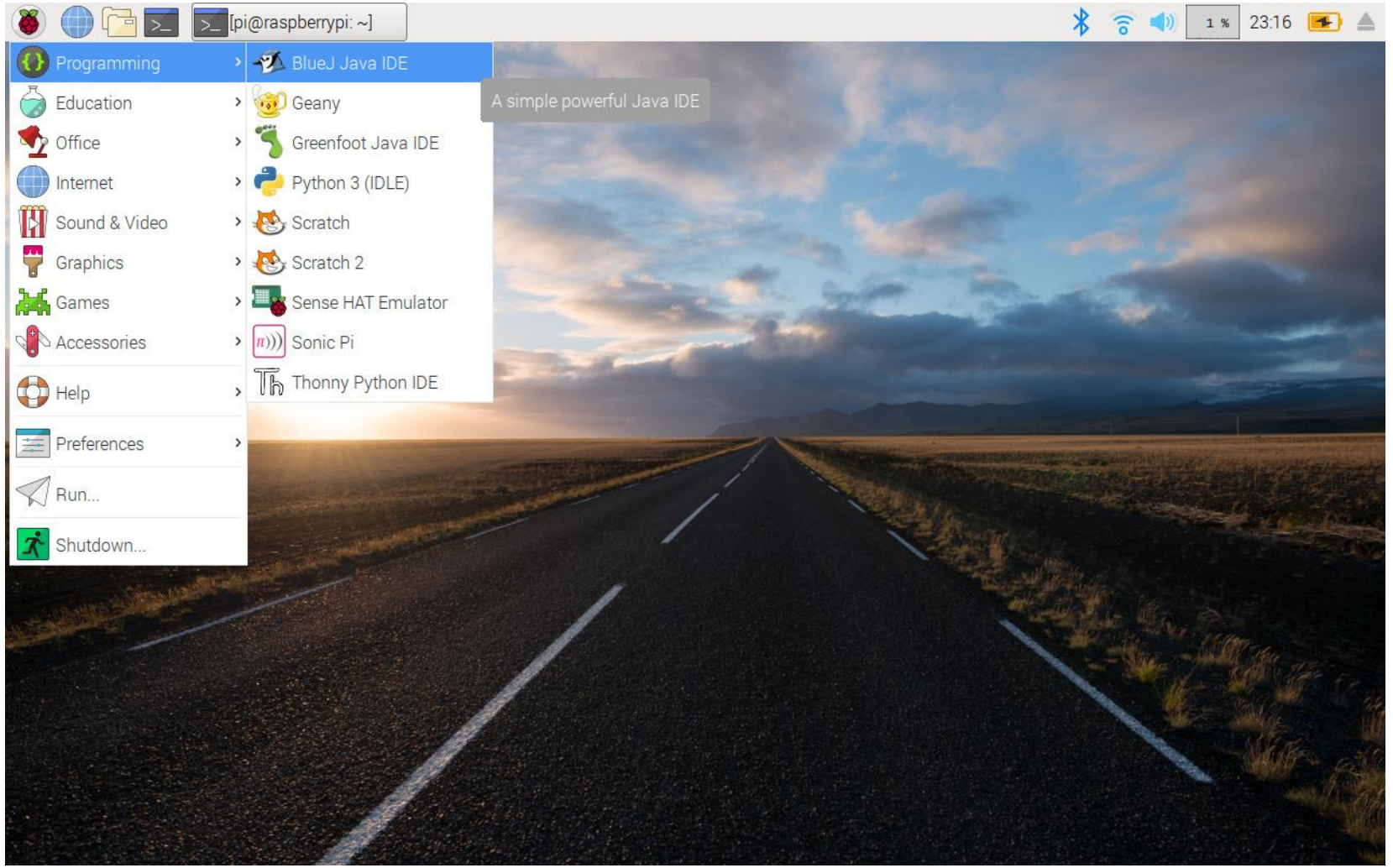


40-PIN GPIO HEADER



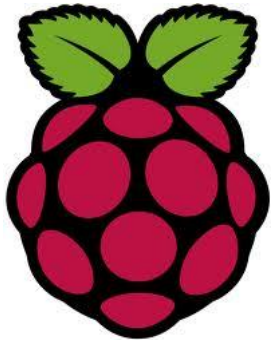
Interfaces

- Wi-Fi - 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless
- Bluetooth 5.0, BLE
- Gigabit Ethernet
- 2 x USB 3.0 ports; 2 x USB 2.0 ports.
- Raspberry Pi standard 40 pin GPIO header
- 2 × micro-HDMI ports
- 2-lane MIPI DSI display port
- 2-lane MIPI CSI Camera port
- 4-pole stereo audio and composite video port
- Micro-SD card slot for loading operating system and data storage
- I2C Philips two wire serial interface (via GPIO header)
- i2S Philips Inter-IC sound interface (via GPIO header)
- SPI Motorola Serial Peripheral Interface (via GPIO header)
- Legacy Serial Interface TX RX (via GPIO header)



Raspberry Pi OS (Linux) and others

Radio Features (1)



Raspberry Pi Internet Radio

Turn your Raspberry Pi into an Internet Radio using a variety of designs as shown in the constructors manual.

Media Player

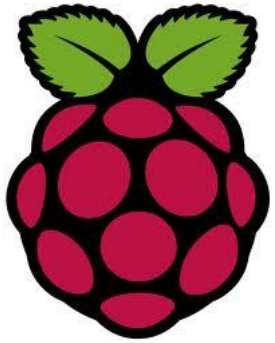
Play your favourite MP3 tracks from a USB stick, SD card or from a NAS (Network Attached Storage).

Airplay Receiver

This design allows the Raspberry Pi to act as an Airplay receiver. Music tracks can be played from your Apple or Android mobile phone or tablet.

Spotify Receiver

Turn your Raspberry Pi into a Spotify Receiver. This requires a Spotify Premium account.



Features (2)

RSS News Feed Reader

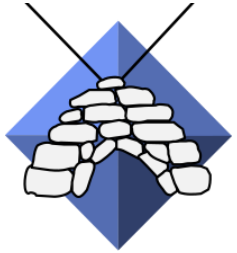
This software also allows you to read any configured RSS feed. For example, your favourite news feed.

Digital Clock

The Internet Radio software displays as standard a digital clock and date with alarm and snooze functions.

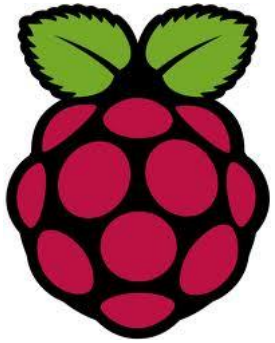
Shoutcast

Shoutcast radio is a streaming audio which is used by some 50,000 Internet Radio stations across the internet. The radio software allows you to create playlists by Artist or Music Genre.



Icecast

Icecast allows the currently playing station or track to be streamed around the local network or out to the Internet (Legal and Copyright issues apply).



Features (3)

Web Interface

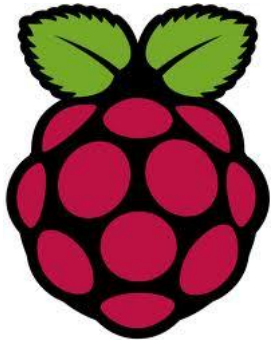
The radio software includes a web interface powered by Apache. This allows stations and playlists to be selected via web pages on your PC, mobile telephone or tablet.

User Interface and displays

This design caters for a number of user interfaces such as push-buttons, rotary encoders or touch screens. Also, a number of displays such as 2 and 4-line LCDs, OLED displays, TFT or full graphical displays such as HDMI and touch-screen are supported.

Espeak

The **eSpeak** engine is a small, lightweight Text-To-Speech (TTS) program which supports a large number of languages. It is used with the radio software to assist blind or visually impaired users by “speaking” the menus.



Music Player Daemon (MPD)

Radio software interfaces to MPD

The radio software uses the MPD client application interface (API) to access both Internet radio streams and audio media files. It is completely dependant upon MPD's features.

MPD features

Music Player Daemon (MPD) is a flexible, powerful, server-side application for playing music. Through plugins and libraries it can play a variety of sound files while being controlled by its network protocol.

Stream formats

MPD plays Ogg Vorbis, FLAC, Opus, WavPack, MP2, MP3, MP4/AAC, MOD, Musepack, wave files and any other files supported by Ffmpeg (Format converter).

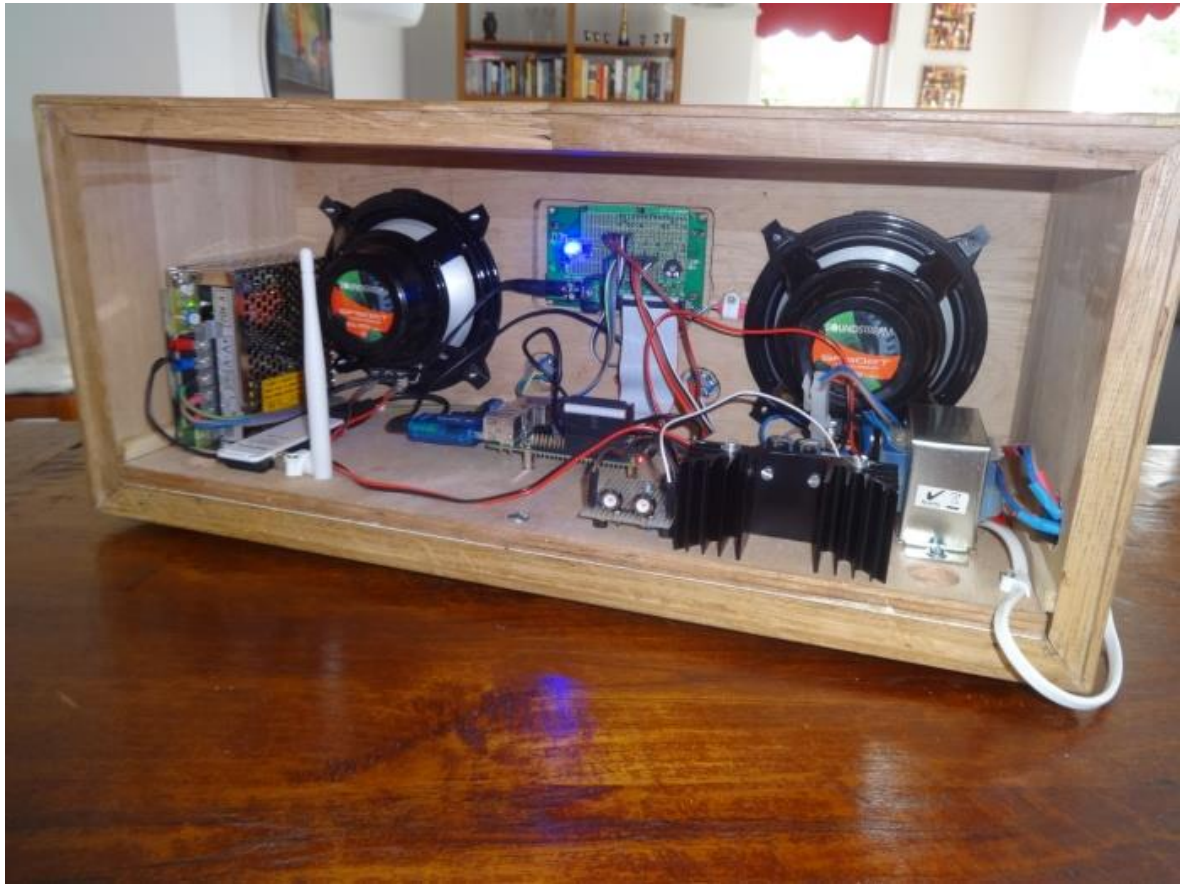
Radio example (1)

Push button radio with 4x20 character LCD (Mikes Electronics)

Radio example (2)

35W Pi Boombox with 4x20 character LCD and rotary encoders (Bob Rathbone)

Radio example (3)



35 Watt Pi Boombox with 4x20 character LCD and rotary encoders (Rear view)

Radio example (4)

Wine box radio with old PC speakers and amplifier (Bob Rathbone)

Radio example (5)

Cute radio using the IQaudIO Cosmic Controller (Bob Rathbone)

Radio example (6)

Raspberry Pi Radio with valve amplifier (Broesel)

Radio example (7)

Push-button Lego radio (Alan Broad)

Radio example (8)

Touch screen “vintage” radio with rotary encoders (Bob Rathbone)

Radio example (9)

Full feature graphical radio running on an Adafruit 3.5” TFT touch-screen.

Radio example (10)

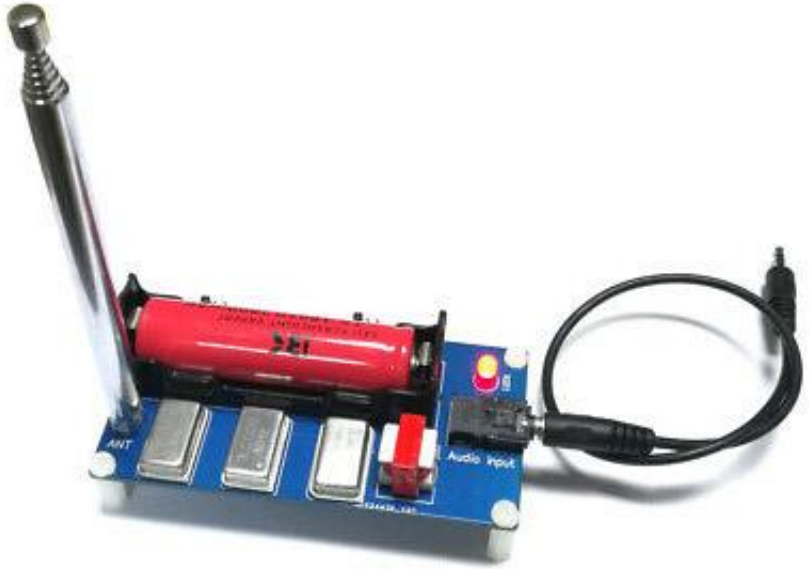
Fully converted vintage radio to an Internet radio (Front view)

Radio example (11)

Fully converted vintage radio to an Internet radio (Rear view)

Radio example (12)

Vintage Bush AM radio tuned to 300M with Internet Radio to AM converter



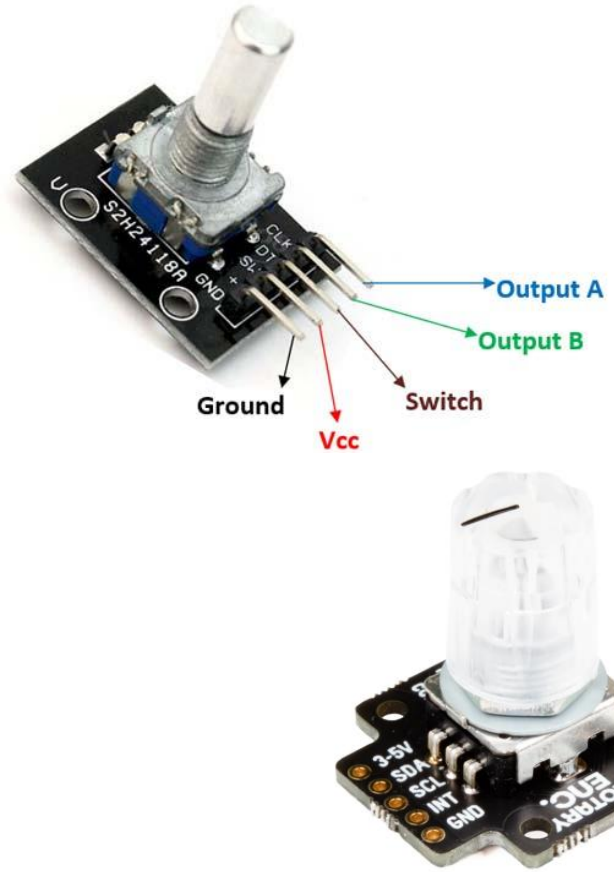
Lusya DIY 3-channel AM transmitter (Connects to RPi)

Radio example (13)

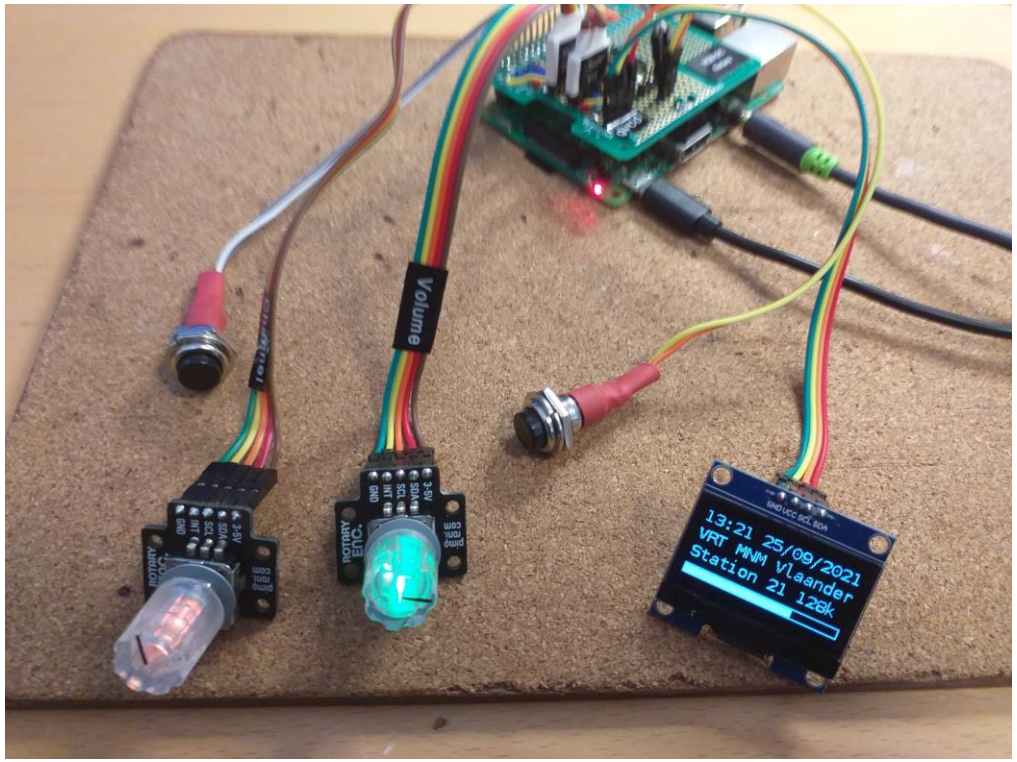
Pimoroni Pirate Radio – 3W mono output – No display

Pimoroni Pirate Audio Radio – 3W mono output – 128x128 TFT

User Input Devices



Rotary encoders



Push buttons & Rotary Encoders

Displays (1)

LCD/OLED character displays

OLED graphical displays

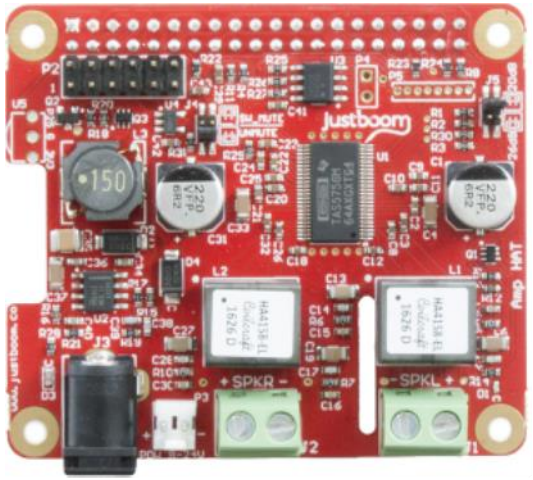
Displays (2) X Windows

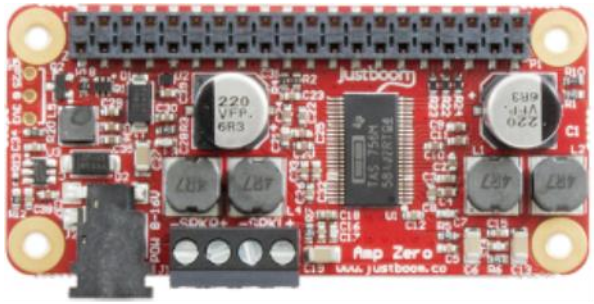
A range of 2.8”, 3.5” and 7” inch touch screens available

Displays (3) HDMI

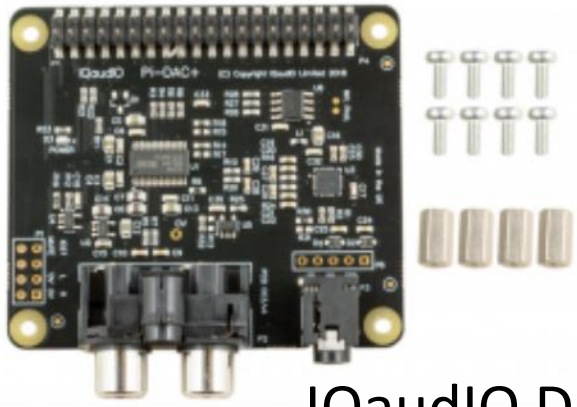
Any HDMI monitor or TV can be used
The above shows a Pi 400 radio with HDMI monitor

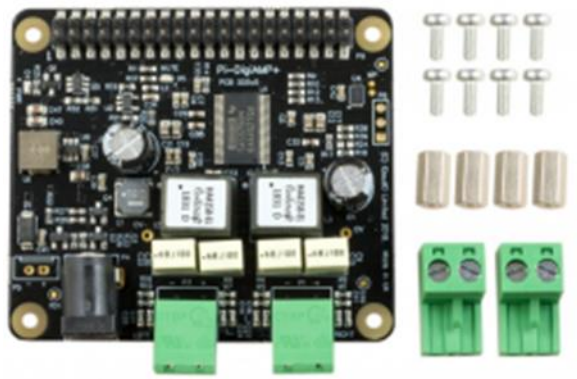
Sound cards (DACs)





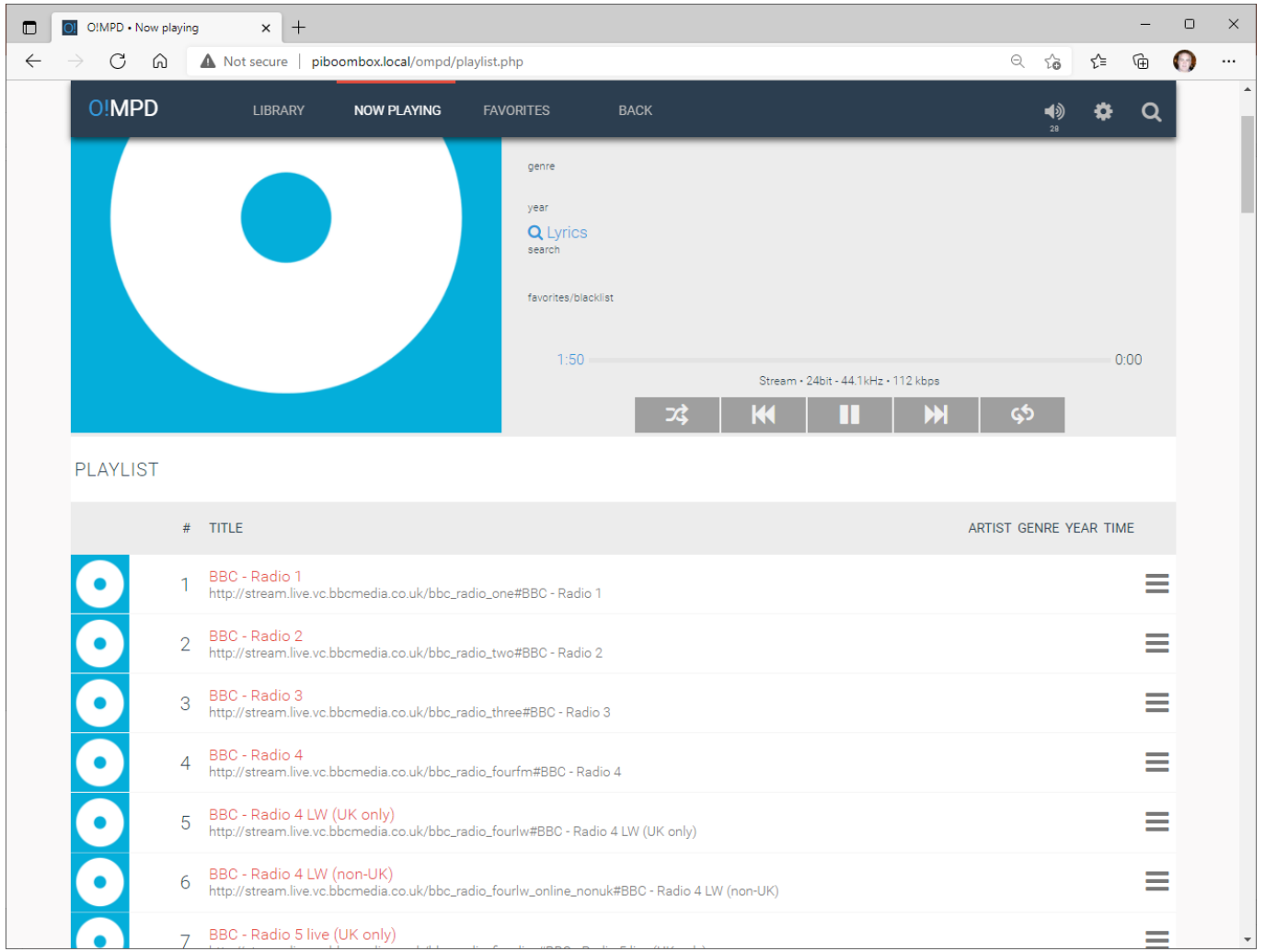
Justboom Amps



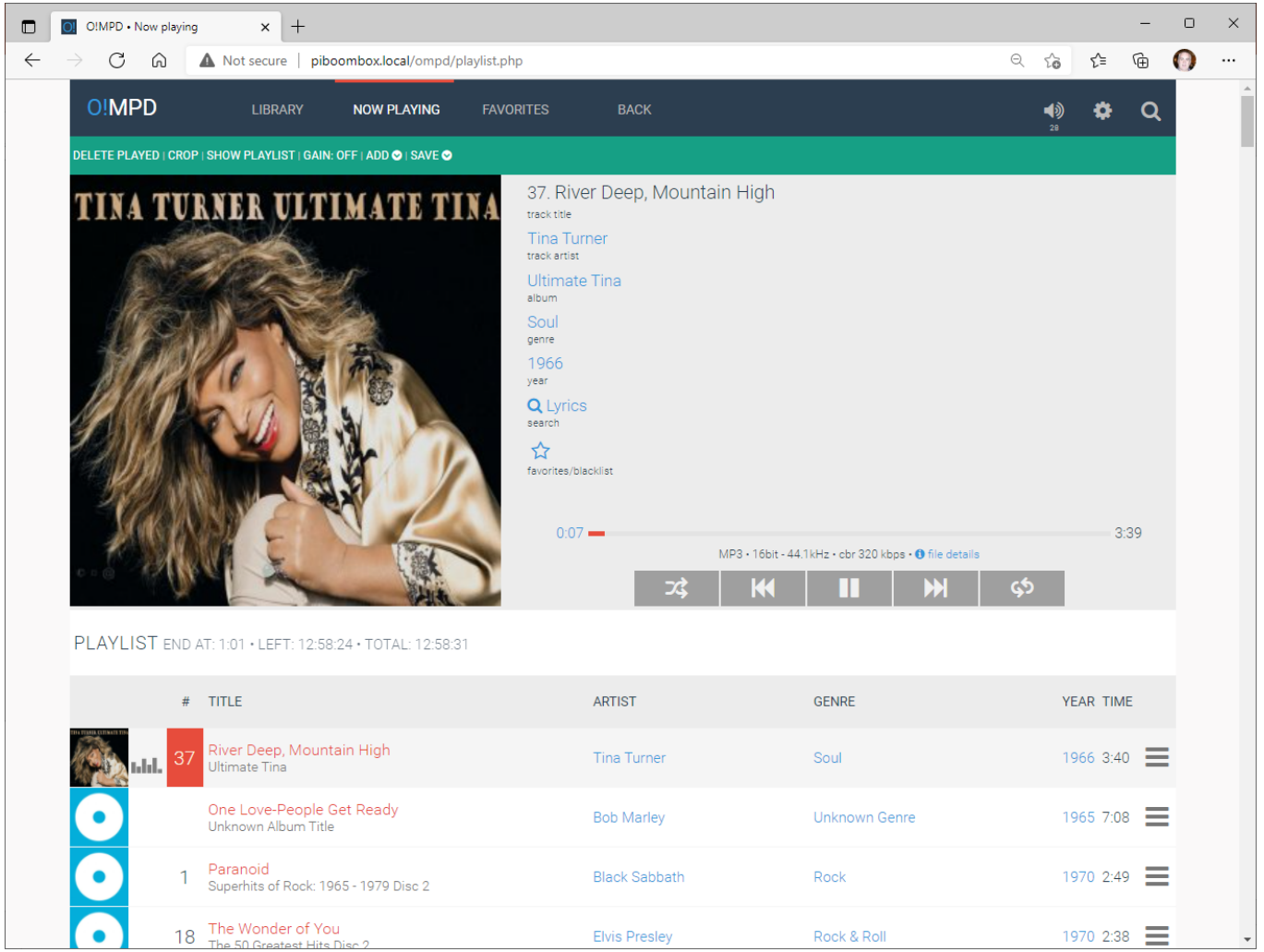


IQaudIO DAC and Amp

Web Interface (1)



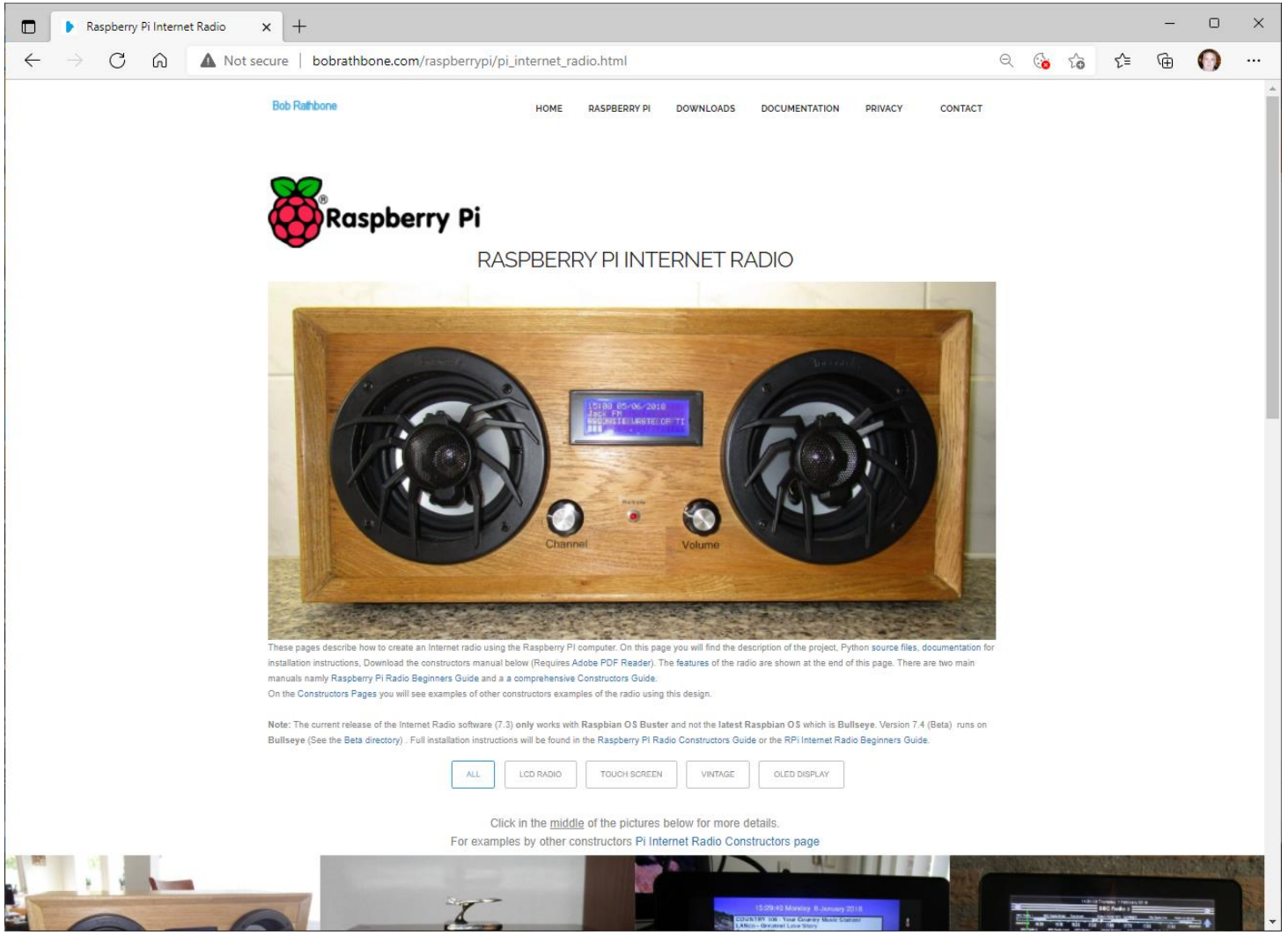
Web Interface (2)



Remember to have fun!

Fun radio using an old toaster (Courtesy Robert Knight)

More information from the Bob Rathbone website



https://bobrathbone.com/raspberrypi/pi_internet_radio.html

Questions ?

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