Unit 4

Raspberry Pi

Your Tiny, Dual Display , Desktop PC Replacement

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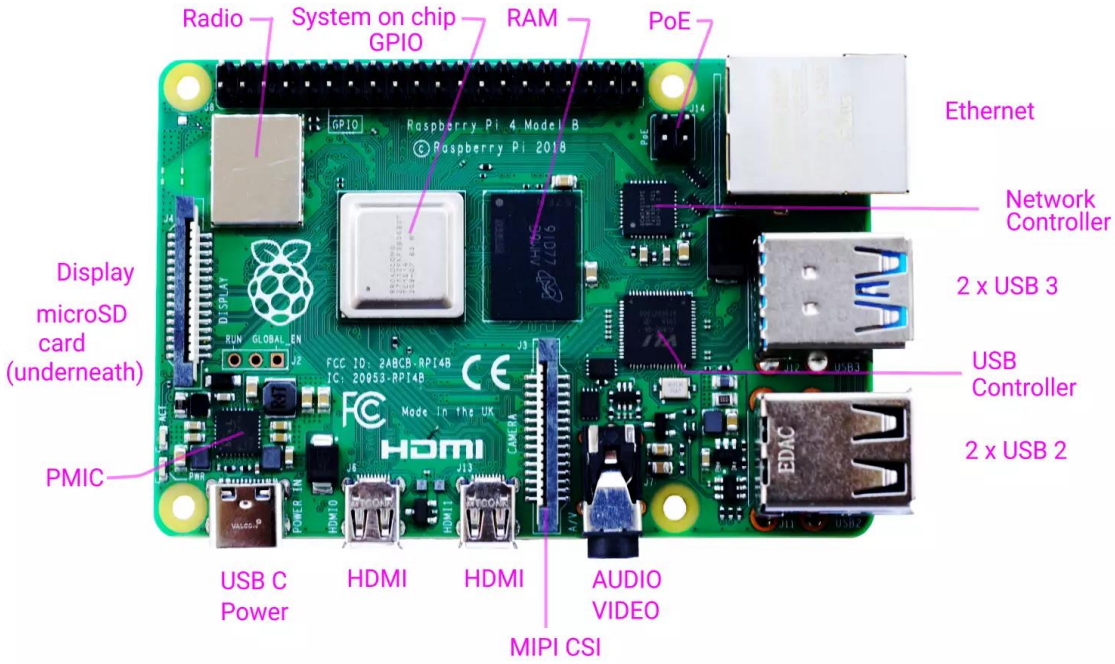
Source: https://youtu.be/sajBySPeYH0

Learning Objectives

- Introduction of Raspberry
- Requirements for Setup
- Raspberry Pi Setup

Introduction to Raspberry Pi

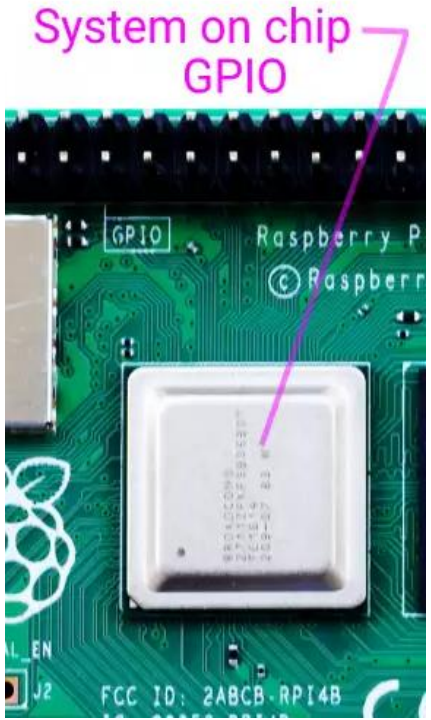
The Raspberry Pi is a low cost, **credit-card sized computer** that plugs into a computer monitor or TV, and uses a standard keyboard and mouse.
It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python.
It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games.



The Raspberry Pi 4 Model B

System-on-chip, (Soc).

- This is the Broadcom BCM2711 SoC, which uses the 64-bit ARM Cortex-A72 quad-core processor as the central processing unit (CPU).
- BCM2711 also has the 32-bit Video Core VI 3D multimedia processor, or the graphics processing unit (GPU).

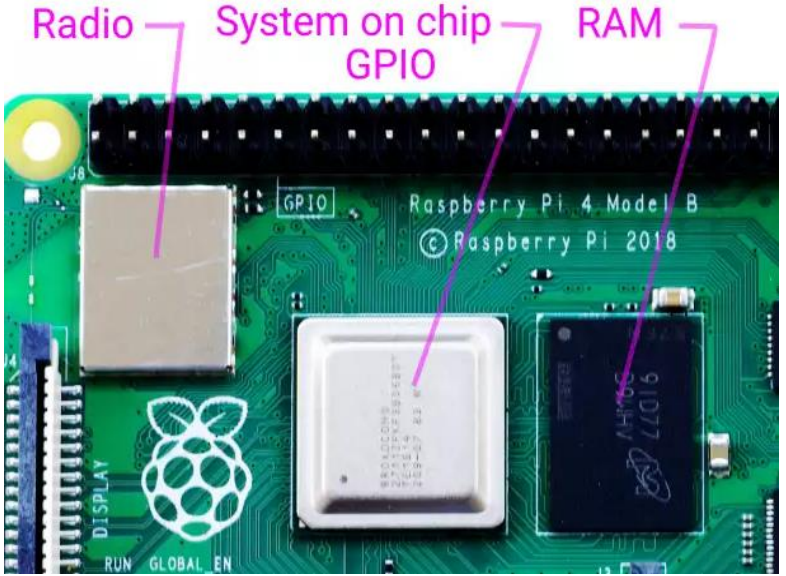


Random access memory (RAM)

- Pi4B has either 1GB or 2 GB or 4GB of LPDDR4 SDRAM.

Radio

- The radio component comprises of two technologies. It has WiFi (IEEE 802.11 b/g/n/ac) for connecting to local area networks. There is also Bluetooth 5.0 with BLE for connecting with peripherals



Power over Ethernet (PoE)

- The PoE hat is for getting power from the Ethernet connection instead of the USB-C type port.

Network controller

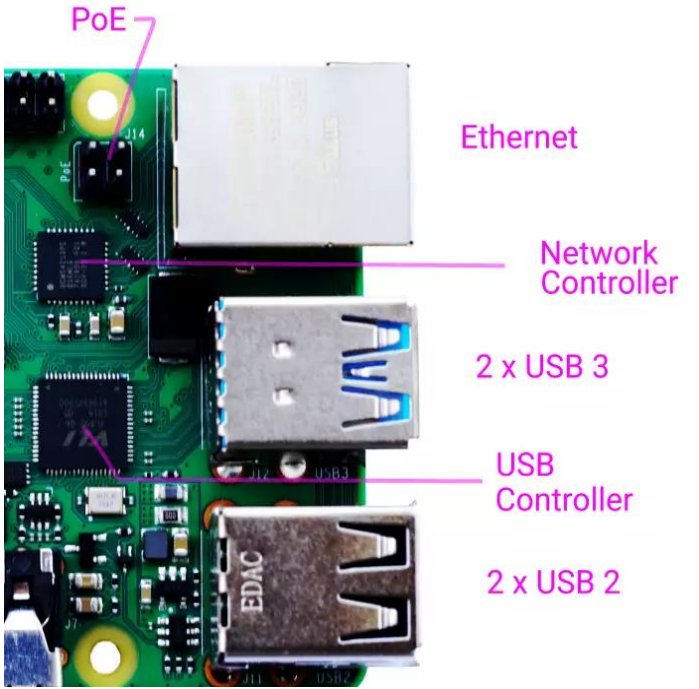
- The network controller is for running the Ethernet interface.

USB controller

- The USB controller is for managing the four USB ports.

Ethernet port

- There is an Ethernet port for linking Pi4B in a local area network



Power management integrated circuit (PMIC).

- The PMIC is for taking the power from the USB C port and providing it to Pi4B.

Camera serial interface (CSI).

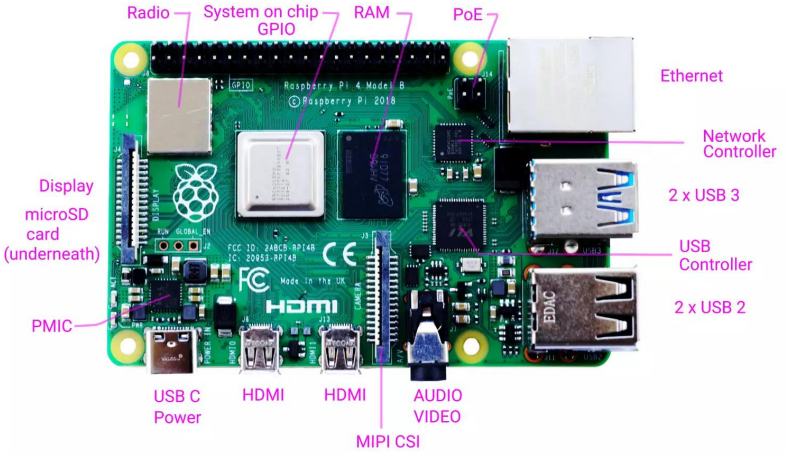
- Pi4B has a MIPI Camera Serial Interface (CSI) connector. A Raspberry Pi camera module can be connected to this.

HDMI ports.

- There are two micro–High-Definition Multimedia
- Interface (micro-HDMI) ports.

USB Type - C power port.

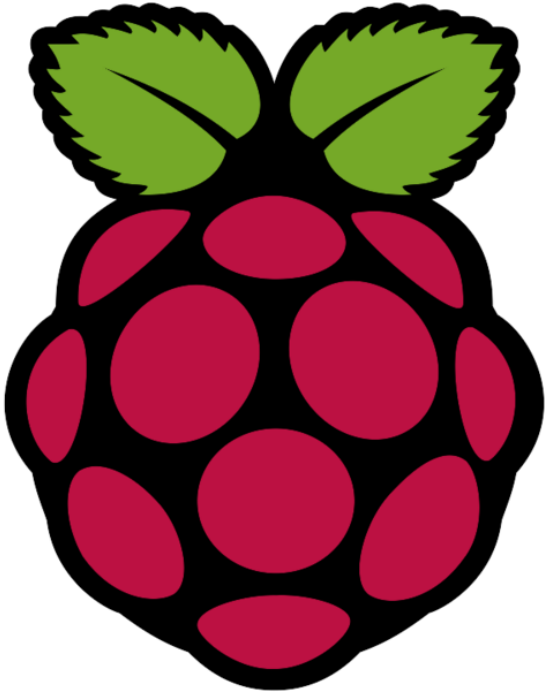
- The USB Type C port is for supplying power to Pi4B.

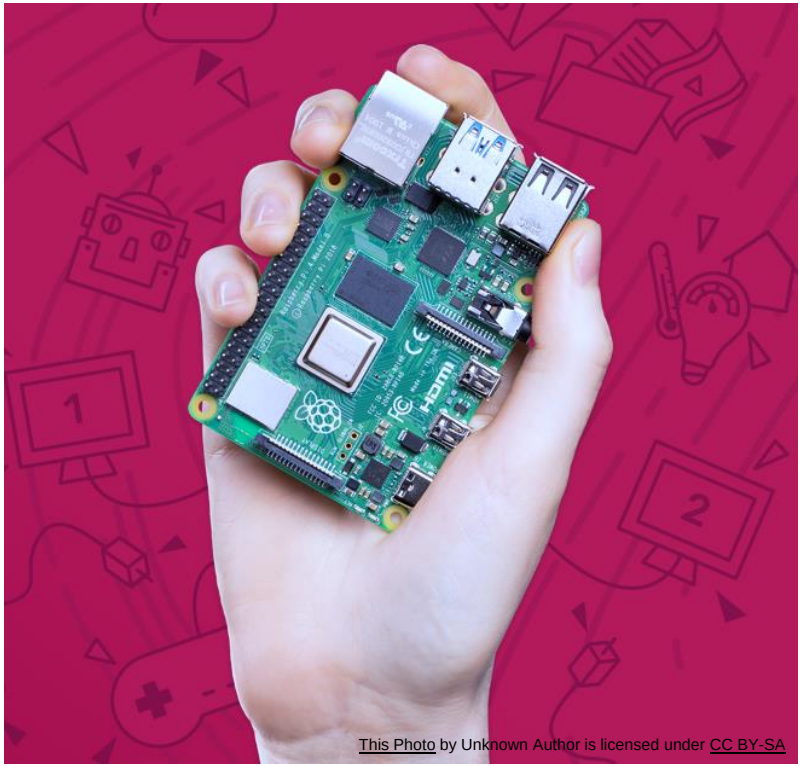


The Raspberry Pi 4 Model B

Lab 1: Installation of Raspberry Pi OS .

Getting Started with Raspberry Pi





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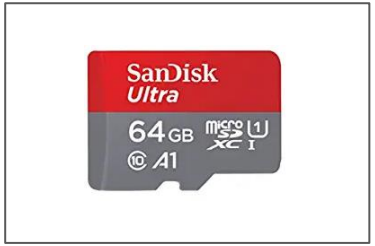
Requirements – (Hardware Components)

- Raspberry Pi 4B
- 32 GB microSD memory card
- SD Card reader (preferred USB card reader)
- Micro HDMI to HDMI cable*
- GrovePi+ kit*
- HDMI supported TV or Monitor for Display
- USB Type C power Adaptor



Install Raspberry Pi OS using Raspberry Pi Imager

- Raspberry Pi Imager is the quick and easy way to install Raspberry Pi OS and other operating systems to a microSD card, ready to use with your Raspberry Pi.

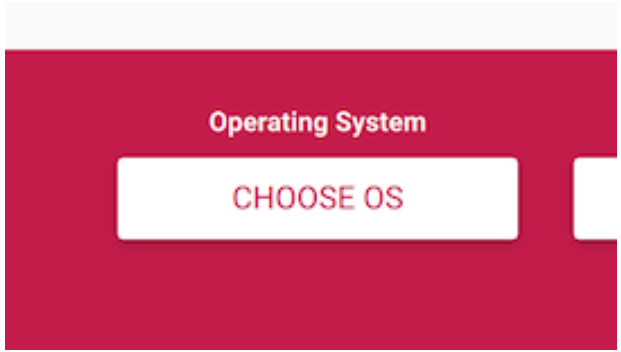
- Download and install Raspberry Pi Imager to a computer with an SD card reader. Put the SD card you'll use with your Raspberry Pi into the reader and run Raspberry Pi Imager.

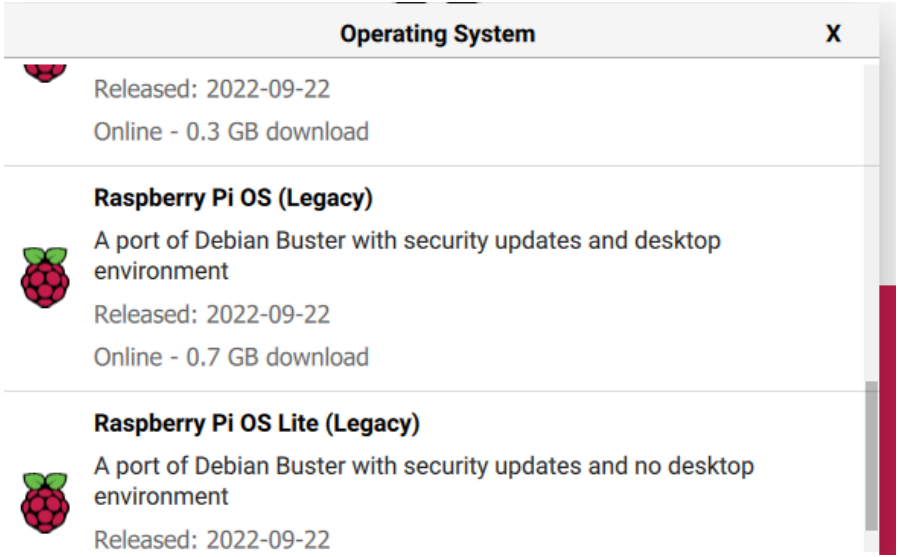
Click here

Reference link

Install Raspberry Pi OS using Raspberry Pi Imager

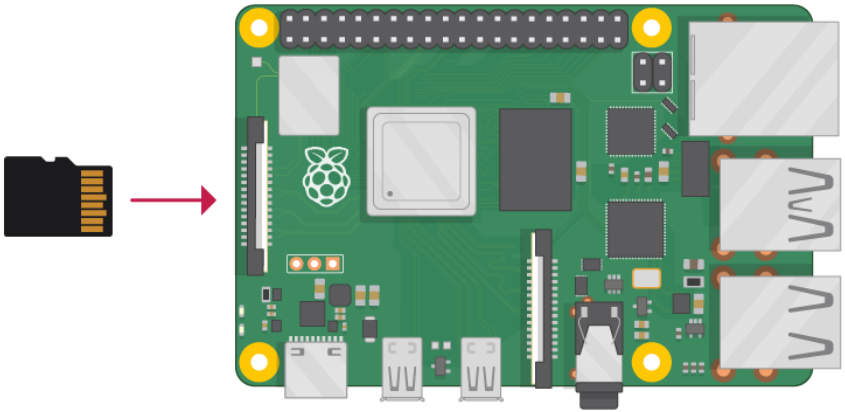
- Open Raspberry Pi Imager and select OS – Raspberry Pi OS (Legacy)





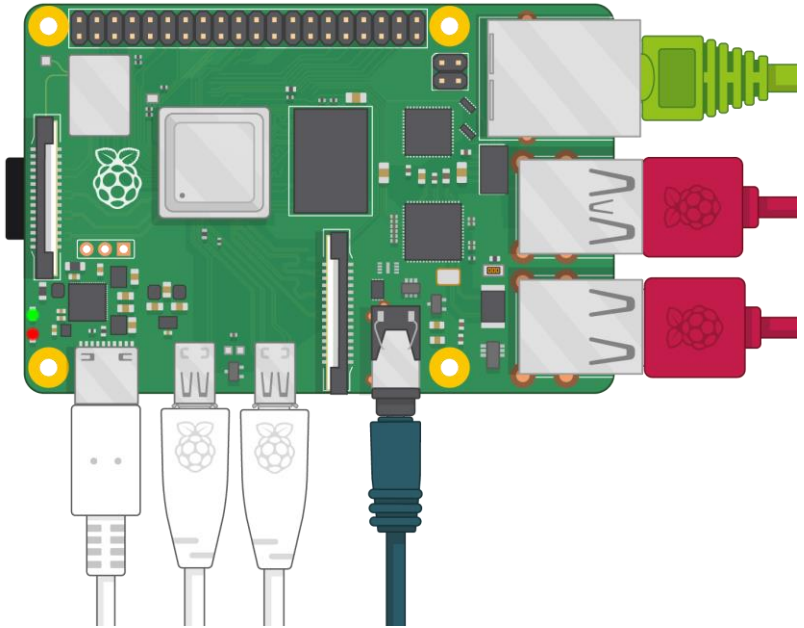
Insert SDCard

- After select OS, Select Storage device as SDCard.
- click on Write start writing OS to SDCard.
- Remove SDCard from Card Reader and insert into Raspberry Pi



Complete Setup

- Connect all necessary hardware to raspberry Pi as Shown in Fig.
- Connect Mouse, Keyboard to USB port
- Connect LAN cable to Ethernet port (Optional)
- Connect Display using HDMI cable
- Connect Power Supply Using Type C power Adaptor



Display Raspberry Pi OS

- After Successfully connection check out Raspberry OS on Display

Welcome to Raspberry Pi
Let’s Explore the world of IoT

Summary

In this session we have learnt:

- Raspberry Pi 4 Hardware features.
- Various ports and connectivity features for Raspberry Pi 4
- Hardware Components and their connections.
- Installation of Raspberry Pi OS using Raspberry Pi Imager tool.

Quiz

Question 1: What is the purpose of the HDMI port on Raspberry Pi 4?

a) To connect external hard drives

b) To interface with GPIO devices

c) To provide audio output

d) To connect to a monitor or TV for video output

Answer: d) To connect to a monitor or TV for video output

Quiz

Question 2: Which of the following is a wireless connectivity feature of Raspberry Pi 4?

a) VGA port

b) Ethernet port

c) USB 3.0 port

d) Wi-Fi and Bluetooth capabilities

Answer: d) Wi-Fi and Bluetooth capabilities

Quiz

Question 3: What is the primary storage medium for the operating system and user data on Raspberry Pi?

a) CD-ROM

b) USB flash drive

c) MicroSD card

d) External hard drive

Answer: c) MicroSD card

Quiz

Question 4: What do GPIO pins on Raspberry Pi allow you to do?

a) Connect to the internet

b) Charge external devices

c) Interface with external hardware

d) Connect to a printer

Answer: c) Interface with external hardware

Quiz

Question 5: Which tool is used to install the Raspberry Pi operating system (Raspberry Pi OS)?

a) Raspberry Pi Manager

b) Raspberry Pi Installer

c) Raspberry Pi Imager

d) Raspberry Pi Connector

Answer: c) Raspberry Pi Imager

Reference

- https://www.raspberrypi.org/help/what-%20is-a-raspberry-pi/
- https://www.raspberrypi.org/learn/

Thank you...!