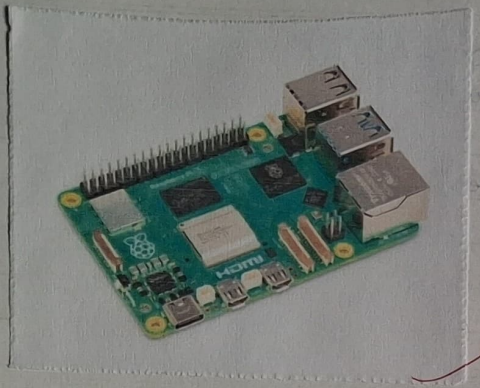
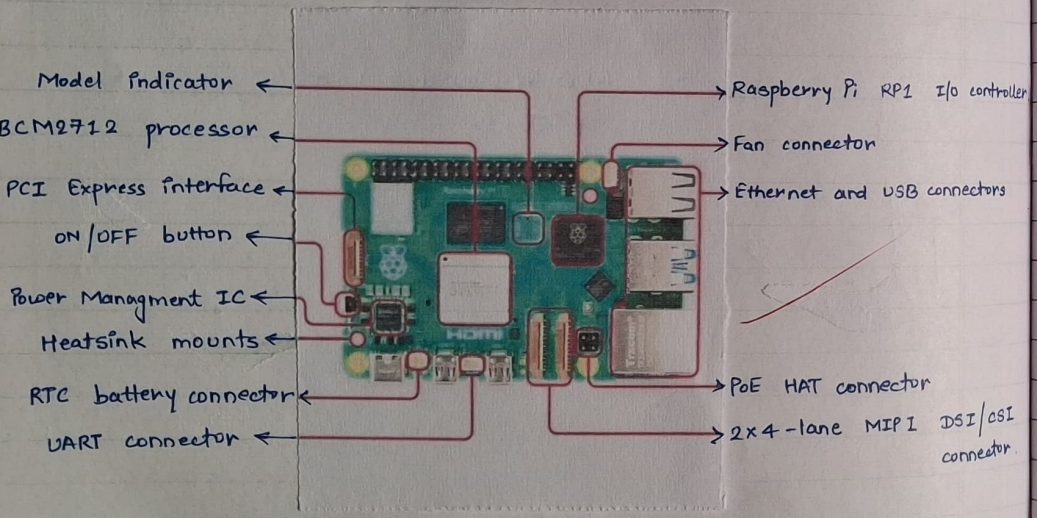
⇒ Raspberry Pi 5 Model-B



⇒ Raspberry Pi 5 Model B -Diagram.



PRACTICAL - 1

Date : 21-01-2025
Page : 03

Aim : Introduction to Raspberry Pi 5 Model B and its components.

Raspberry Pi 5 Model B is engineered by the Raspberry Pi Foundation, this innovation have set new standards for performance & versatility in the single-board computer arena.
↳ ability to adapt many different functions

Purpose :
It was designed for hobbyists, professionals, educators, etc to use in projects such as programming (of personal sys), robotics, IoT devices, home appliances and many more.

Model → Model A : for general-purpose use & most versatile.
→ Model B : flagship version, featuring the full set of hardware features (USB ports, GPIO pins, Ethernet, etc).

Feature	Model A	Model B
USB ports	Fewer (1)	More (2-4 ports).
Ethernet	No	Yes
RAM	less	More.
Size	Smaller	Larger
Power Consumption	Low	High
Cost	Not expensive	Expensive
Use cases	IoT projects. (minimal tasks)	Computing, neural networks, NLP, etc.

Teacher's Signature & Date : .....

Date : 21-01-2025
Page : 05

⇒ COMPONENTS OF "RASPBERRY PI 5 MODEL-B"

I]. Core components ~~of~~ are : (CPU)

1). Processor (CPU) :→ Broadcom BCM2712 ~~CPU~~ quad-core Arm Cortex-A76
- → Clock speed : 2.4 GHz
- → Performance : 3 x (Raspberry Pi 4 version)

2) Graphics Processor (GPU) :→ VideoCore VII GPU, supports OpenGL ES 3.1 and Vulkan 1.2 (enhanced graphics & multimedi

3). RAM :→ LPDDR4X SDRAM (4GB, 8GB or 16 GB config.)

II]. CONNECTIVITY :

4). USB ports :→ 2 x USB 3.0 and 2 x USB 2.0

5). Networking :→ Gigabit Ethernet for wired networking.
- → Dual band WiFi 5 (802.11ac) for wireless.
- → Bluetooth 5.0 for wireless peripherals.

III]. Display & AUDIO :

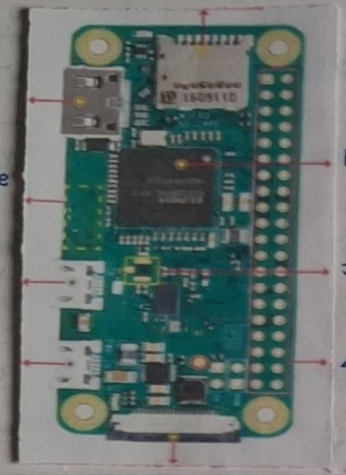
6). Micro-HDMI Port :→ 2 x micro-HDMI ports & each supports 4Kp60 resolution & allows 4K dual displays.

7). Camera Interfaces :→ 2 x MIPI CSI camera connector (for Rasp. cameras).

8). Audio :→ integrated 3.5mm audio/video jack.
(HDMI provides audio o/p as well)

Teacher's Signature & Date : .....

⇒ Raspberry Pi Zero-W - Diagram



⇒ Difference between Raspberry Pi 5 Model B vs Raspberry Pi Zero W

Feature	Raspberry Pi 5 Model B	Raspberry Pi Zero W
Processor (CPU)	Broadcom BCM2712, Quad-Core ARM Cortex-A76 @ 2.4GHz	Broadcom BCM2835, Single-Core ARM11 @ 1GHz
Graphics (GPU)	VideoCore VII	VideoCore IV
RAM	4GB, 8GB, or 16GB LPDDR4X	512MB LPDDR2
Wireless Connectivity	Wi-Fi 5 (802.11ac) and Bluetooth 5.0	Wi-Fi 4 (802.11n) and Bluetooth 4.1 (BLE)
Wired Networking	Gigabit Ethernet	Not available
USB Ports	2 x USB 3.0, 2 x USB 2.0	1 x Micro USB (for data, OTG)
HDMI Ports	2 x micro-HDMI (dual 4K @ 60Hz)	1 x Mini HDMI (1080p @ 60Hz)
GPIO Header	40-pin GPIO (populated)	40-pin GPIO (unpopulated)
Storage	MicroSD + PCIe interface for M.2 SSD	MicroSD card slot
Camera Interface	2 x MIPI CSI connectors	1 x CSI (requires adapter cable)
Power Input	USB-C (5V, 5A recommended)	Micro USB (5V, 1A recommended)
Cooling	Supports active cooling (fan and heat sink ready)	Passive cooling (no fan support)
Performance	High (Desktop-class performance)	Low (Suitable for lightweight tasks)
Weight	~40g	~9g
Power Consumption	Higher (due to performance)	Lower (ideal for battery-powered projects)
Price	Higher (starting ~$60+)	Lower (starting ~$10)
Use Cases	Desktop PC, media center, robotics, IoT, gaming	IoT devices, small robotics, lightweight tasks

Date: 21-01-2025
Page: 07

IV] Storage & EXPANSION:

9). Micro SD card slot :→ for OS installation & additional storage. (upto 2 TB)

10). PCIe Interface : → PCIe Gen 2 x1 lane for high speed peripherals. (with Hat)

11). GPIO Header :→ 40 Pin GPIO for hardware prototyping & expansion (General Purpose Input/output)

V] POWER:

12). Power Input: → USB-C power input (5V 5A recommended)
↳ Improverd power management for better efficiency

13). PMIC (Power Management IC) → enhanced power delivery for peripherals & components.

VI] COOLING:

14). Active Cooling Support: → optional fan + heat sink (for better thermal management).

VII] OTHER FEATURES:

15). RTC (Real time clock) :→ req. battery backup for operation

16). OS support :→ Runs Raspberry Pi OS + other Linux-based distributions.

CONCLUSION: After attending the lab we & exploring + researching for the Raspberry Pi we got indepth information about the boards & its real-world applications along with its key features.

Teacher's Signature & Date : .....