TITLE PAGE

PROJECT TITLE

SUBTITLE

AUTHOR

DATE

1. PROJECT BACKGROUND
2. PURPOSE OF DOCUMENTATION
3. OBJECTIVE

1.RASPBERRY PI 5 MODEL B

DESCRIPTION: The Raspberry Pi 5 is a small, affordable computer that's even more powerful than the Raspberry Pi 4. It's great for hobby projects, learning to code, or building custom gadgets.

SPECIFICATIONS:

Processor

- CPU: Quad-core Arm Cortex-A76 64-bit SoC
- Clock Speed: 1.8 GHz, offering a substantial performance boost over the Raspberry Pi 4

Memory

- RAM Options: Available in 4GB and 8GB LPDDR4 configurations

Graphics

- GPU: VideoCore VII GPU
- Support for OpenGL ES 3.1, Vulkan 1.1

Connectivity

- USB Ports: 2x USB 3.0 ports, 2x USB 2.0 ports
- Ethernet: Gigabit Ethernet
- Wireless: Dual-band 2.4/5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE

Storage

- MicroSD Slot: For OS and data storage
- PCIe Interface: Allows for additional storage and expansion options

Display and Audio

- Dual Micro-HDMI Ports: Supporting up to 4Kp60
- Camera Interface (CSI): 2x MIPI CSI-2 lanes

Display Interface (DSI): 2x MIPI DSI lanes

Audio: 3.5mm audio-video jack, HDMI audio output

Power

Power Supply: USB-C with a minimum of 5V 3A required

Power-over-Ethernet (PoE) Support: Via PoE HAT

Expansion

40-pin GPIO Header: Backward-compatible with previous Raspberry Pi boards

HAT Compatibility: Supports a wide range of HATs (Hardware Attached on Top)

Operating System

Official OS: Raspberry Pi OS (formerly Raspbian), with support for other OSes like Ubuntu, Windows IoT, and various Linux distributions

Other Features

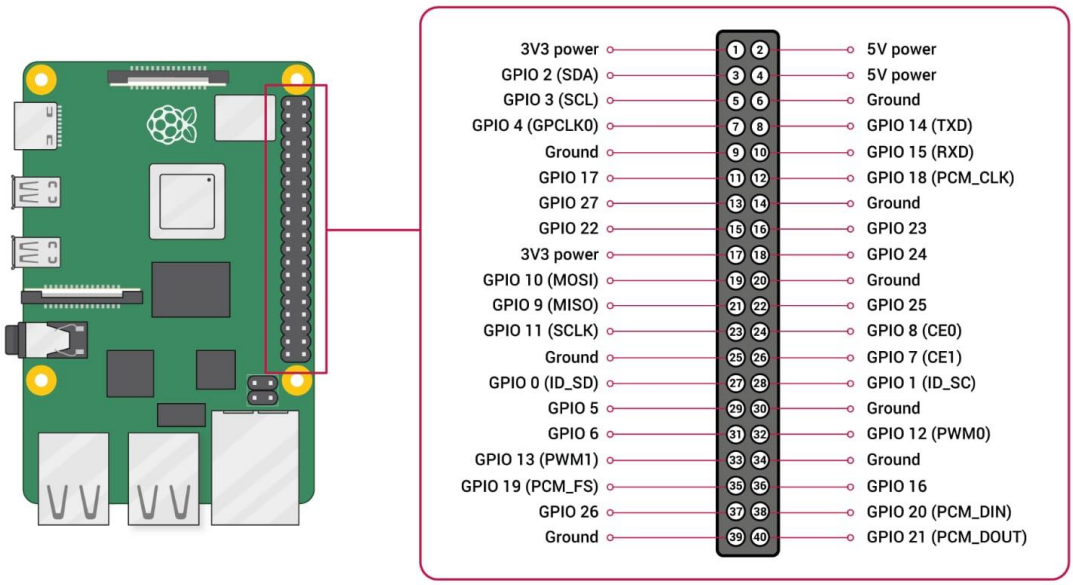
Real-Time Clock (RTC): Included on the board for timekeeping

Hardware Video Decode/Encode: Supports H.265 (4Kp60 decode), H.264 (1080p60 decode, 1080p30 encode)

Enhanced Thermal Management: Improved cooling solutions.

DATA SHEET: https://datasheets.raspberrypi.com/rpi5/raspberry-pi-5-product-brief.pdf

PIN DIAGRAM:



CONNECTIVITY:

1. Power Supply:

- USB-C Power Input: Connect a USB-C power adapter (5V, 3A recommended) to the power port.

2. HDMI Output:
   - HDMI Ports: Connect to monitors or TVs using micro-HDMI to HDMI cables. The Raspberry Pi 5 typically has two micro-HDMI ports for dual monitor support.
3. USB Ports:
   - USB 3.0 Ports: Connect peripherals like keyboards, mice, and external storage devices. The Raspberry Pi 5 usually has two USB 3.0 ports.
   - USB 2.0 Ports: Additional USB peripherals can be connected here. The Raspberry Pi 5 typically includes two USB 2.0 ports.
4. Ethernet:
   - Gigabit Ethernet Port: Connect to a network for internet access or network communication.
5. GPIO (General Purpose Input/Output):
   - 40-pin GPIO Header: Connect various sensors, modules, and electronic components. The GPIO header provides power, ground, and data connections.
6. Audio Output:
   - 3.5mm Audio Jack: Connect headphones or speakers for audio output.

7. Camera and Display Interfaces:
   - Camera Connector (CSI): Attach a Raspberry Pi camera module using the CSI ribbon cable.
   - Display Connector (DSI): Attach an official Raspberry Pi display using the DSI ribbon cable.
8. MicroSD Card Slot:
   - MicroSD Card: Insert a microSD card with the Raspberry Pi OS or another compatible operating system for booting and storage.
9. Wi-Fi and Bluetooth:
   - Built-in wireless communication modules for Wi-Fi and Bluetooth connectivity.

TESTING AND CALIBRATION:

Testing Procedure:

- Verify that the Raspberry Pi boots and displays output on the monitor.
- Run a simple GPIO script to ensure GPIO pins are functioning.

Calibration Guide:

- No specific calibration is required for the Raspberry Pi itself, but ensure any connected sensors or actuators are calibrated as per their respective guides.

TROUBLESHOOTING:

Common Issues:

Issue: Raspberry Pi does not boot.

Solution: Check the power supply connection and ensure the MicroSD card is properly inserted.

Issue: No display output.

Solution: Verify the HDMI connection and check the monitor input settings.

Error Codes: N/A for hardware, refer to software-specific documentation for error handling.

MAINTENANCE:

Maintenance Schedule: General inspection every 6 months.

Maintenance Procedures:

- Keep the Raspberry Pi in a cool, dust-free environment.
- Regularly check the connections and cables for wear and tear.
- Update the Raspberry Pi OS and installed packages periodically to ensure security and performance.