CHEAT HERO

Raspberry Pi Cheat Sheet

A quick reference guide to Raspberry Pi, covering setup, common commands, GPIO pins, and troubleshooting tips. This cheat sheet is designed to help both beginners and experienced users get the most out of their Raspberry Pi.



Getting Started

Initial Setup

1. Download Raspberry Pi Imager: Download the official Raspberry Pi Imager from the Raspberry Pi website for your operating

system (Windows, macOS, Ubuntu).

Raspberry Pi Imager Download

2. Install the Imager:

Run the downloaded installer and follow the onscreen instructions.

3. Prepare SD Card:

Insert an SD card (at least 8GB recommended) into your computer.

4. Choose OS and SD Card:

Open Raspberry Pi Imager, select the desired OS (e.g., Raspberry Pi OS), and choose the connected SD card.

5. Write to SD Card:

Click 'Write' to flash the OS onto the SD card. This process will erase all existing data on the card.

6. Boot Raspberry Pi:

Insert the SD card into your Raspberry Pi, connect peripherals (keyboard, mouse, display), and power it on.

7. Initial Configuration:

Follow the on-screen prompts to set up your Raspberry Pi (e.g., set the country, language, keyboard layout, and Wi-Fi).

8. Update the System:

Open a terminal and run the following commands to update the package lists and upgrade installed packages:

sudo apt update

sudo apt upgrade

GPIO Programming

GPIO Pinout

Refer to the official Raspberry Pi documentation for the specific GPIO pinout of your model.

<u>Raspberry Pi Pinout</u>

Key considerations:

- Power Pins: 3.3V, 5V, and Ground (GND).
 GPIO Pins: General Purpose Input/Output pins.
- I2C Pins: SDA (Data) and SCL (Clock).
- SPI Pins: MOSI, MISO, SCLK, CEO, CE1.
- UART Pins: TXD and RXD.

Basic Commands

File Management

`ls`	List files and directories in the current directory.
`cd`	Change the current directory.
`mkdir `	Create a new directory.
`rm`	Remove a file.
`rmdir`	Remove an empty directory.
`cp`	Copy a file.
`mv `	Move or rename a file.
`nano`	Open a file in the Nano text editor.

RPI.GPIO Library (Python)

Example: Blinking LED

mport RPi.GPIO as GPIO`	Import the RPi.GPIO library.	import RPi.GPIO as GPIO	
GPIO.setmode(GPIO.BCM)`	Set the GPIO numbering mode to BCM (Broadcom SOC channel) or GPI0.BOARD (physical pin numbering).	<pre>import time GPI0.setmode(GPI0.BCM) GPI0.setup(18, GPI0.OUT) try: while True: GPI0.output(18, GPI0.HIGH) time.sleep(0.5)</pre>	
GPIO.setup(pin, GPIO.IN)`	Set a GPIO pin as an input.		
GPIO.setup(pin, GPIO.OUT)`	Set a GPIO pin as an output.	S GPI0.output(18, GPI0.LOW time.sleep(0.5)	
GPIO.output(pin, GPIO.HIGH)`	Set a GPIO pin HIGH (3.3V).	<pre>except KeyboardInterrupt: GPIO.cleanup()</pre>	
GPIO.output(pin, GPIO.LOW)`	Set a GPIO pin LOW (0V).		
`GPIO.input(pin)`	Read the state of a GPIO pin (returns GPIO.HIGH or GPIO.LOW).		
GPIO.cleanup()`	Clean up GPIO resources when the script ends.		

Networking

Network Configuration	SSH Ac	ccess	VNC Access
`ìfconfig` `ìwconfig`	Display Enable network By defa interface sudo configura Ciptis n Display create	le SSH: ifault, SSH is disabled. To enable it, use raspi-config and navigate to 'Interface ons' -> 'SSH' and enable it. Alternatively, e an empty file named ssh in the boot ion of the SD card. ect via SSH: m SSH client (e.g., PuTTY on Windows, inal on macOS/Linux) to connect to the	Install VNC Server: Install a VNC server on the Raspberry Pi. sudo apt update sudo apt install tightvncserver
`ping`	wireless partition network Conner configurations an Test network		Start VNC Server: Start the VNC server and set a password. vncserver :1
	connective Network Pills of the second state o	erry Piusing its IP address. pi@ <raspberry_pi_ip_address></raspberry_pi_ip_address>	Connect via VNC Client: Use a VNC client on your computer to connect to the Raspberry Pi using its IP address and the display number (e.g.,
`hostname -I`	Display the IP passwo address of the Raspberry Pi.	fault username is p1 and the default ord is raspberry (change this iately after initial setup).	<raspberry_pi_ip_address>:1).</raspberry_pi_ip_address>
`sudo nano /etc/network/interfaces`	Edit network interface configurations (use with caution).		
`sudo nano /etc/wpa_supplicant/wpa_supplicant.conf`	Edit Wi-Fi configuration (SSID and password).		

Troubleshooting

power adapter).

2. Network Connectivity Issues: Verify Wi-Fi credentials in

address using ifconfig.

Common Issues

1. No Boot:

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Log Files

`/var/log/syslog`	System log file containing general system messages.
`/var/log/auth.log`	Authentication log file recording login attempts and authorization events.
`/var/log/daemon.log`	Daemon log file containing messages from various system services.
`/var/log/kern.log`	Kernel log file recording kernel-related messages.

Useful Commands for Troubleshooting

`dmesg`	Display kernel messages, useful for identifying hardware-related issues.
`vcgencmd get_throttled`	Check for CPU throttling due to overheating or insufficient power.
`top`	Display real-time system resource usage (CPU, memory).
`journalctl`	Query the systemd journal for logs.

Check file permissions using 1s -1 and . modify them using chmod if necessary.

elevated privileges.

3. Permission Errors:

4. Package Installation Errors: Run sudo apt update to update the package lists before installing new packages.

• Use sudo to run commands that require

• Ensure the SD card is properly inserted and

Check the power supply (use a 5V 2.5A

Check the activity LED (green) for blinking patterns indicating boot progress.

/etc/wpa_supplicant/wpa_supplicant.con

Check if the Raspberry Pi is obtaining an IP

Ensure the network is functioning correctly.

flashed with a valid OS image.

Ensure there is enough disk space available. .

5. GPIO Issues:

- Double-check the wiring and pin connections.
- Ensure the correct GPIO numbering mode is . used (GPI0.BCM or GPI0.BOARD).
- Verify that GPIO pins are properly configured . as inputs or outputs.