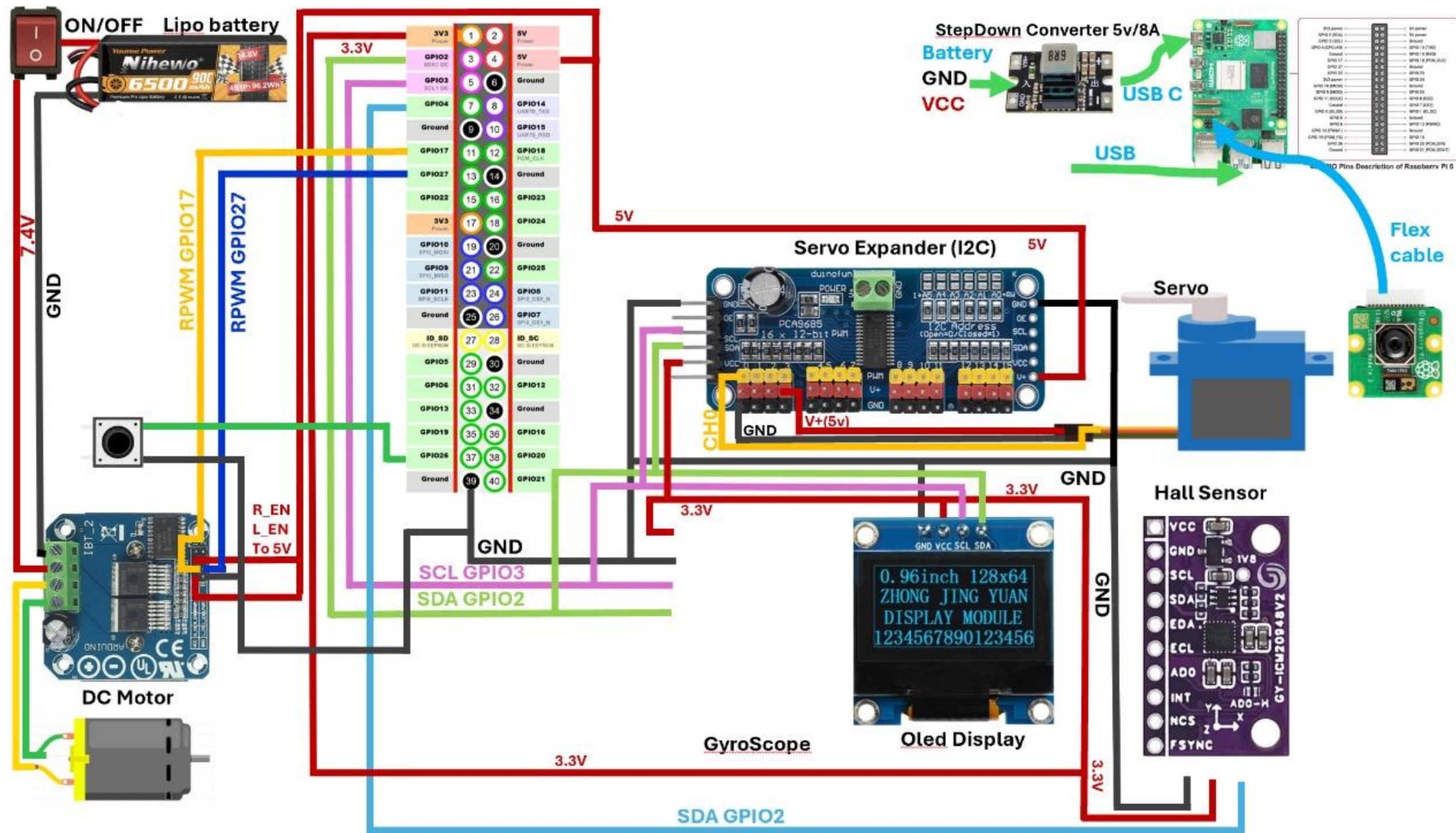


Components Datasheet Explanation:



Components Datasheet Explanation:

Component	Weight (g)	Details	Model
1) Raspberry Pi 5	47	<ul style="list-style-type: none">- 8GB RAM- Raspbian os 64bit full of Desktop.- SD Card 128GB (SandDisc)	Raspberry Pi 5
2) Step-Down Converter	7	<ul style="list-style-type: none">- Output 3.3V 5V 9V 12V 8A mini560 Step Down DC-DC Converter Voltage Regulator Buck Stabilized	DC-DC Step Down
3) Raspberry Pi Active Cooler	23	<ul style="list-style-type: none">- A cooler designed for the Raspberry Pi to prevent overheating.	Raspberry Pi Official
4) Gyroscope	2.2	<ul style="list-style-type: none">- A sensor that detects angular velocity and orientation.	BNO085
5) OLED Display	3.2	<ul style="list-style-type: none">- A small OLED display used for showing information or output.	Generic
6) Push Button	2	<ul style="list-style-type: none">- A switch that is pressed to send a signal, commonly used for interaction.	Momentary Switch
7) Buzzer	4	<ul style="list-style-type: none">- An electronic device that emits sound signals, typically used for notifications.	Generic
8) Raspberry Pi Camera Module 3 Wide	5	<ul style="list-style-type: none">- A high-quality camera module for the Raspberry Pi with improved features.	Raspberry Pi Camera Module 3 Wide
9) Step-Up Converter XL6019	11	<ul style="list-style-type: none">- A step-up converter used to increase the voltage from lower to higher levels.	XL6019
10)RGB LED	2.2	<ul style="list-style-type: none">- An RGB LED used for displaying multiple colors.	RGB LED
11)Battery Nihewo 6500 mAh, 90C	304	<ul style="list-style-type: none">- A high-capacity battery designed for demanding applications like drones.	Nihewo 6500mAh
12)Motors Details	None	<ul style="list-style-type: none">- Contains the details of motors and their specifications.	
13)Servo Motor max 40kg max torque	65	<ul style="list-style-type: none">- High-torque servo motor suitable for heavy-duty tasks.	Servo Motor
14)Servo Motor Driver PCA9685PW	11	<ul style="list-style-type: none">- A motor driver used to control multiple servo motors.	PCA9685PW
15)DC Motor with Encoder 620 RPM	75	<ul style="list-style-type: none">- DC motor with encoder, used for precise control of rotational speed.	DC Motor with Encoder
16)IBT-4 Arduino DC Motor Driver	25	<ul style="list-style-type: none">- A motor driver designed for controlling DC motors, offering robust performance.	IBT-4

Components Datasheet Explanation:

1. Raspberry Pi 5

Overview

The Raspberry Pi 5 is the latest iteration in the Raspberry Pi family, offering significant performance upgrades and enhanced features for developers, educators, and hobbyists. Its 8GB RAM configuration, 64-bit Raspbian OS, and ample 128GB SD card storage make it an ideal choice for resource-intensive applications.

Key Specifications and Features

1. Processor and Performance:

- **CPU:** Powered by a quad-core **ARM Cortex-A76** processor running at a clock speed of up to 2.4 GHz.
- **GPU:** Advanced VideoCore VII GPU for improved graphics performance.
- **Performance:** Enhanced computational capability compared to previous versions, enabling smooth multitasking, real-time data processing, and high-speed applications.

2. Memory (RAM):

- **8GB LPDDR4X:** This configuration provides substantial memory for running multiple processes, handling large datasets, and performing complex computations, such as AI/ML workloads and image processing.

3. Operating System:

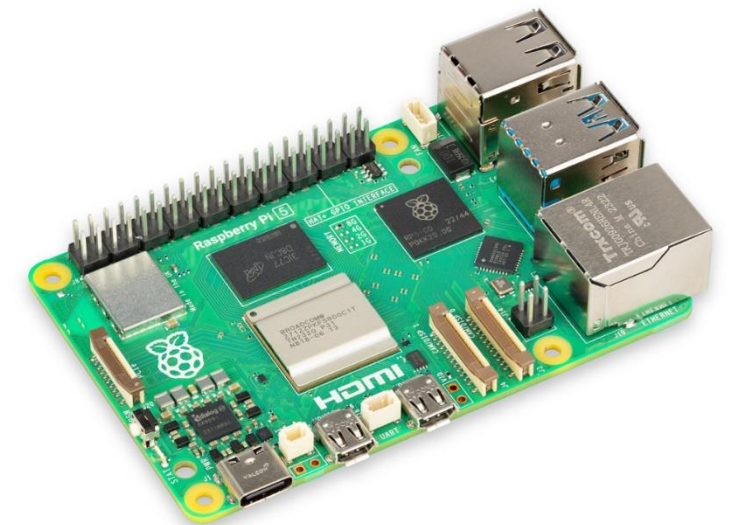
- **Raspbian OS 64-bit (Full with Desktop):**
 - A Debian-based Linux distribution optimized for Raspberry Pi devices.
 - Includes a desktop interface for user-friendly navigation and application management.
 - Ideal for coding, software development, and general computing tasks.

4. Storage:

- **128GB SD Card (SanDisk):**
 - High-capacity storage for installing the operating system, software libraries, and storing project files.
 - Sufficient space for resource-intensive applications, such as media servers, databases, or large-scale coding projects.

5. Connectivity:

- **USB Ports:** Multiple USB 3.0 and USB 2.0 ports for peripherals like keyboards, mice, and external drives.



Components Datasheet Explanation:

- **Networking:** Gigabit Ethernet and Wi-Fi 6 for high-speed internet connectivity.
- **Bluetooth:** Latest Bluetooth version for low-latency wireless communication.

6. IO Interfaces:

- **GPIO:** 40-pin GPIO header for connecting sensors, actuators, and other peripherals, ideal for robotics and IoT projects.
- **Display Output:** Dual micro-HDMI ports supporting resolutions up to 4K at 60fps.

7. Power Supply:

- **USB-C Power Input:** Requires a high-quality 5V/5A power adapter for optimal performance.
- **Efficiency:** Improved power management ensures stable operation even under heavy loads.

Applications

- **Educational Tools:** Perfect for learning programming, electronics, and IoT concepts.
- **Development Platform:** Suitable for software development, AI/ML projects, and prototyping.
- **Media Center:** Can be configured as a 4K media server or entertainment hub.
- **IoT Hub:** Acts as a reliable base for Internet of Things projects due to its GPIO capabilities and wireless connectivity.

Advantages

- Powerful CPU and GPU for demanding tasks.
- Ample 8GB RAM for seamless multitasking and handling of large datasets.
- Pre-installed Raspbian OS ensures quick setup and a robust development environment.
- Generous 128GB SD card provides plenty of storage for data-heavy projects.
- Extensive connectivity options support a wide range of peripherals and use cases.

Our selective Raspberry Pi 5 with 8GB RAM, Raspbian OS, and 128GB SD card offers a balanced blend of performance, versatility, and ease of use, making it a standout choice for both beginners and professionals in the tech community.

Components Datasheet Explanation:

2. DC-DC Step Down Converter

The DC-DC Step Down Converter is a critical power management component in our robot, ensuring stable voltage regulation for various subsystems. Below is the detailed component information:

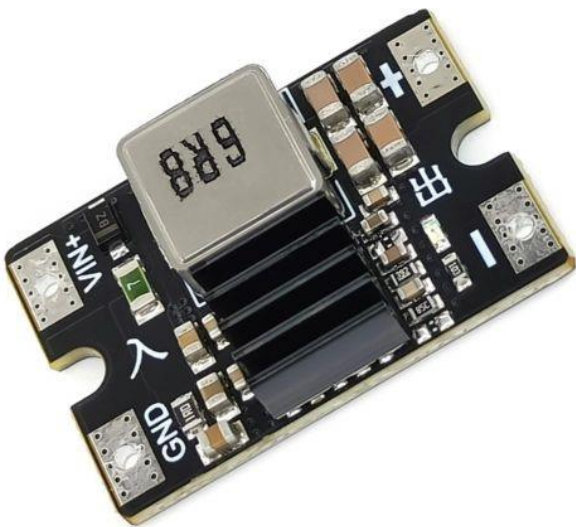
Model: Mini560 DC-DC Step Down Converter

Details:

- **Output Voltage Options:** Configurable output of 3.3V, 5V, 9V, and 12V to accommodate diverse power requirements of connected components.
- **Current Capacity:** Supports up to 8A, providing sufficient power for high-demand devices.
- **Voltage Regulation:** Designed to step down higher input voltages to stable, lower levels, ensuring consistent performance for sensitive electronics.
- **Compact Design:** Miniature size allows for easy integration into tight spaces, maintaining the robot's compact structure.
- **Efficiency:** High-efficiency design minimizes power loss, reducing heat generation and improving overall energy management.

Weight (g): 7g

Component Role: Voltage Regulator for stabilized power delivery to various electronic subsystems.



This entry ensures the DC-DC Step Down Converter is documented clearly, emphasizing its role and contribution to the robot's power management system

Components Datasheet Explanation:

3. Raspberry Pi Active Cooler

Overview:

The Raspberry Pi Active Cooler is designed to prevent overheating of the Raspberry Pi 5. It ensures that the CPU and GPU run optimally during extended operation, especially when performing intensive tasks such as image processing or running AI models.

Key Specifications and Features:

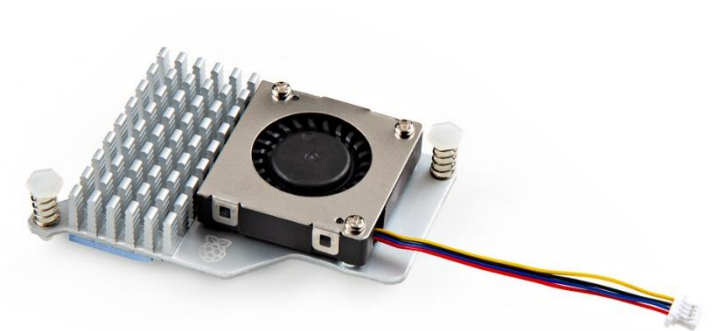
- **Cooling Type:** Active (fan-based cooling)
- **Compatibility:** Designed specifically for Raspberry Pi models, including Raspberry Pi 5
- **Size:** Compact and fits on top of the Raspberry Pi without interfering with GPIO pins.
- **Power Supply:** Powered by the Raspberry Pi itself via GPIO pins.

Advantages:

- Prevents overheating, maintaining system stability.
- Compact design makes it easy to install.
- Ideal for long-running tasks, ensuring the Raspberry Pi operates at peak performance.

Disadvantages:

- Requires GPIO pins for power, reducing the number of available pins for other peripherals.
- Might increase overall system noise due to fan operation.



Components Datasheet Explanation:

4. Gyroscope (BNO085)

Overview:

The BNO085 is a high-performance 9-axis sensor that combines an accelerometer, gyroscope, and magnetometer into a single unit, offering precise motion tracking and orientation detection. It's ideal for applications like robotics, motion capture, and navigation systems.

Key Specifications and Features:

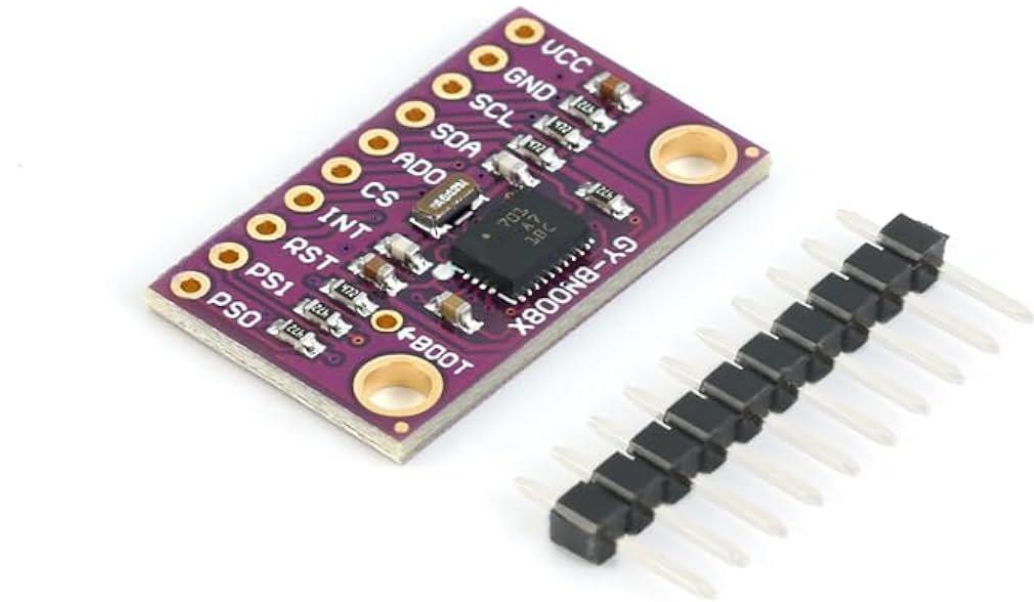
- **Sensor Type:** 9-axis (3-axis accelerometer, 3-axis gyroscope, 3-axis magnetometer)
- **Communication Interface:** I2C, SPI
- **Output:** Provides data on angular velocity, acceleration, and magnetic field
- **Power Supply:** 3.3V to 5V

Advantages:

- Combines three sensors (accelerometer, gyroscope, magnetometer) into one module for accurate 3D motion tracking.
- Offers high precision and low drift for reliable orientation data.
- Small form factor, easy to integrate into various projects.

Disadvantages:

- Requires proper calibration to ensure accuracy.
- May require additional processing power to handle data from multiple sensors.



Components Datasheet Explanation:

5. OLED Display

Overview:

The OLED display is a small and high-quality screen used for displaying information or output. It is commonly used in various DIY electronics projects and offers vibrant colors and high contrast.

Key Specifications and Features:

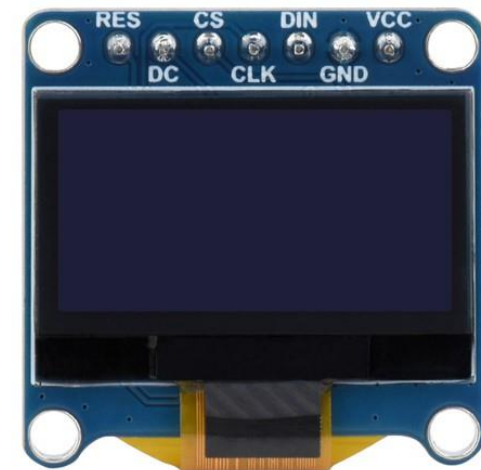
- **Size:** Typically 0.96 inches
- **Resolution:** 128x64 pixels
- **Interface:** I2C or SPI
- **Power Supply:** 3.3V or 5V

Advantages:

- High contrast, making it readable in various lighting conditions.
- Low power consumption, ideal for portable projects.
- Simple interface for easy integration with microcontrollers like Raspberry Pi.

Disadvantages:

- Limited display area (small size).
- May have limited viewing angles compared to other displays.



Components Datasheet Explanation:

6. Push Button

Overview:

A momentary switch that sends a signal when pressed, often used for user interaction in various embedded systems or IoT projects.

Key Specifications and Features:

- **Type:** Normally open
- **Actuation:** Push to make
- **Size:** Compact design
- **Durability:** Long lifespan with millions of presses

Advantages:

- Simple, reliable interface for user input.
- Easy to integrate into projects.

Disadvantages:

- Limited functionality; typically used for simple on/off signals.
- Mechanical wear over time can degrade performance.



Components Datasheet Explanation:

7. Buzzer

Overview:

The buzzer emits sound signals, commonly used for notifications, alerts, or audible feedback in electronic circuits.

Key Specifications and Features:

- **Type:** Active
- **Operating Voltage:** 3V to 5V
- **Sound Output:** Audible tones

Advantages:

- Simple to use and integrate into projects.
- Provides immediate auditory feedback.

Disadvantages:

- Can be loud or intrusive depending on the application.
- Limited in functionality (sound only).



Components Datasheet Explanation:

8. Raspberry Pi Camera Module 3 Wide

Overview:

The Raspberry Pi Camera Module 3 Wide is an upgraded camera module designed for the Raspberry Pi platform, offering a wider field of view and improved image quality. It's perfect for applications requiring broad coverage, such as surveillance, drones, and outdoor robotics.

Key Specifications and Features:

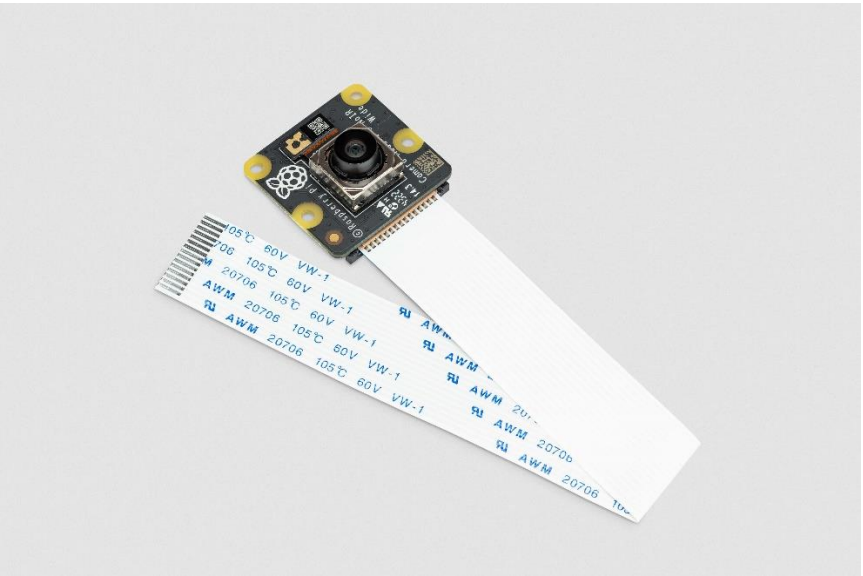
- Resolution: 12 MP
- Field of View: Wide-angle lens (ideal for broader coverage)
- Video Capture: Up to 60 fps at 1080p
- Interface: CSI (Camera Serial Interface)
- Lens Type: Wide-angle lens with fixed focus

Advantages:

- Wider field of view provides better coverage for applications like security cameras or environmental monitoring.
- High-resolution imaging captures more details.
- Supports up to 60 fps video capture for smooth video performance.

Disadvantages:

- Fixed-focus lens limits depth-of-field adjustment for some close-up applications.
- Requires proper lighting for optimal image clarity in low-light conditions.



Components Datasheet Explanation:

9. Step-Up Converter XL6019

Overview:

The XL6019 is a step-up converter that increases lower input voltages to higher output voltages, providing stable power for systems that require more voltage than the source can supply.

Key Specifications and Features:

- Input Voltage Range: 5V to 32V
- Output Voltage: 5V to 35V (adjustable)
- Current Capacity: Up to 4A
- Efficiency: Up to 90%

Advantages:

- Provides efficient voltage conversion for various power-hungry components.
- Adjustable output allows for versatile usage.

Disadvantages:

- Requires careful design to ensure stable power delivery at high currents.
- Can generate heat under high load.



Components Datasheet Explanation:

10. RGB LED

Overview:

An RGB LED allows for displaying multiple colors by mixing red, green, and blue light. It's used in various electronics projects where color indication or display is needed.

Key Specifications and Features:

- Size: Standard 5mm
- Voltage: Typically 3.2V to 3.4V per color
- Control: PWM (Pulse Width Modulation) for color mixing

Advantages:

- Capable of displaying a wide range of colors.
- Small and easy to integrate into projects.
- Power-efficient when using low current.

Disadvantages:

- Limited color resolution compared to full displays.
- Requires careful control for accurate color mixing.



Components Datasheet Explanation:

11. Battery Nihewo 6500 mAh, 90C

Overview:

The Nihewo 6500 mAh, 90C battery is a high-capacity LiPo battery designed for high-demand applications like drones, robotics, and other power-hungry devices.

Key Specifications and Features:

- Capacity: 6500 mAh
- Voltage: 7.4V
- Discharge Rate: 90C (high current output)

Advantages:

- High discharge rate supports power-hungry applications.
- Large capacity ensures longer run times.

Disadvantages:

- LiPo batteries can be sensitive to overcharging and overheating.
- Requires proper care and maintenance to ensure longevity.



Components Datasheet Explanation:

12. Motors Details

Overview:

The motors are critical components in any robotic or automated system, providing movement and control. These motors may include servo motors, DC motors with encoders, and other types of actuators that enable precise movement and positioning.

Key Specifications and Features:

- **Servo Motor:** Typically used in applications requiring precise angle adjustments and torque.
- **DC Motor with Encoder:** Used for precise rotational control, often used in wheels or gears.
- **Motor Driver:** Controls the power sent to motors, ensuring smooth operation and control.

Advantages:

- Provide precise control over mechanical movement.
- Can be easily integrated with microcontrollers and drivers for automation tasks.

Disadvantages:

- Motors can draw significant current, affecting power consumption and system performance.
- Motors with encoders require proper calibration to ensure accurate readings.

Components Datasheet Explanation:

13. Servo Motor max 40kg max torque

Overview:

This high-torque servo motor is designed for heavy-duty tasks, providing a maximum torque of 40kg. It is suitable for robotic arms, large-scale automation, and other applications that demand powerful actuation.

Key Specifications and Features:

- Torque: 40 kg-cm
- Power Supply: Typically 6V to 12V
- Rotation Range: 180°
- Applications: Robotics, mechanical systems requiring precise and powerful movement.

Advantages:

- Capable of handling heavy loads with high precision.
- Ideal for tasks such as robotic arms and larger robotic systems.

Disadvantages:

- Larger and heavier than standard servo motors.
- Consumes more power due to the high torque.



Components Datasheet Explanation:

14. Servo Motor Driver PCA9685PW

Overview:

The PCA9685PW is a motor driver used to control multiple servo motors, allowing precise control for up to 16 servos simultaneously. This driver is often used in robotics, automation, and other projects requiring multiple actuators.

Key Specifications and Features:

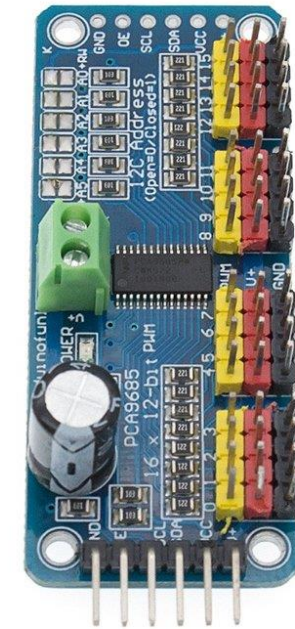
- Number of Channels: 16
- Interface: I2C communication
- Control: PWM (Pulse Width Modulation) for precise motor control
- Voltage: Typically operates with 5V power supply.

Advantages:

- Allows for the control of multiple servos with minimal wiring.
- I2C interface enables easy communication with microcontrollers like Raspberry Pi.

Disadvantages:

- Limited by the number of channels (up to 16).
- May require additional power regulation for larger systems with many motors.



Components Datasheet Explanation:

15. DC Motor with Encoder 620 RPM

Overview:

This DC motor with encoder provides precise control of rotational speed and direction, making it ideal for applications like robotics, conveyor systems, or any system requiring accurate movement feedback.

Key Specifications and Features:

- **Speed:** 500 RPM
- **Voltage:** Typically 12V
- **Encoder:** Provides feedback for position and speed control
- **Applications:** Robotics, industrial automation, CNC machines.

Advantages:

- Encoder feedback allows for precise control over motor speed and direction.
- Reliable and efficient for various automation tasks.

Disadvantages:

- Requires additional circuitry to process encoder signals and control the motor.
- Higher current draw may result in power supply demands.



Components Datasheet Explanation:

16. IBT-4 Arduino DC Motor Driver

Overview:

The IBT-4 is a motor driver used to control high-power DC motors, offering robust performance in driving large motors that require higher voltages and currents, suitable for robotics and vehicle applications.

Key Specifications and Features:

- Motor Voltage Range: 5V to 36V
- Current: Up to 43A peak
- Interface: Typically used with Arduino or other microcontrollers.
- Control Type: PWM for speed and direction control.

Advantages:

- Can control large motors, ideal for high-torque applications.
- Easy to integrate with Arduino and other microcontroller platforms.

Disadvantages:

- Can generate heat under heavy load, requiring adequate cooling.
- Requires careful handling due to high current capabilities.

