Unique Industrial Design Extremely Compact myCobot is an integrated modular design and only weighs 850g which is very easy to carry. Its overall body structure is compact with less spare parts and can be quickly disassembled and replaced to realize plug and play. High configuration Equipped with 2 Screens myCobot contains 6 high-performance servo motors with fast response, small inertia and smooth rotation, and carries 2 screens supporting fastLED library to show the expanded application scene more easily and clearly. Lego Connector Thousands of M5STACK Ecological Application The base and end of myCobot are equipped with Lego Connector, which is suitable for the development of various miniature embedded equipment. Its base is controlled by M5STACK Basic, and thousands of application cases can be use directly. Bloky Programming Supporting Industrial ROS Using UIFlow visual programming software, programming myCobot is simple and easy for everyone. You can also Arduino, ROS, or other multiple functional modules of open source system, even RoboFlow, software of industrial robots from Elephant Robotics. Track Recording Learn by hand Get rid of the traditional point saving mode, myCobot supports drag teaching to record the saved track and can save up to 60mins different tracks making it easy and fun for new players to learn. The User Interface (UI) Flow for myCobot has been carefully designed to ensure a seamless and intuitive experience for users, aligning with the core philosophy of accessibility and education. Here's an overview of the UI Flow for myCobot:

Initialization and Connection:

When a user starts with myCobot, they typically begin by initializing the system. This involves turning on the robot and connecting it to a computer or a mobile device. The UI provides clear instructions and options for establishing a connection, such as via USB, Wi-Fi, or Bluetooth. Dashboard:

Once connected, users are greeted by a user-friendly dashboard. This dashboard provides an overview of the robot's current state, including its position, status, and power level. Users can also access key features like movement control, programming, and settings from the dashboard. Control and Movement:

MyCobot's UI offers various options for controlling the robot's movements. Users can choose to control each joint individually or use predefined motion patterns. The UI includes sliders, buttons, or a 3D model representation of the robot to enable users to visualize and command its movements. Teaching and Programming:

MyCobot is designed for educational purposes, and its UI allows users to teach the robot by demonstrating specific movements. Users can guide the robot through a sequence of motions and save these movements for future reference. For more advanced users, the UI may also include a programming interface. Users can create custom scripts or sequences to automate tasks and experiment with robotic capabilities. Settings and Configuration:

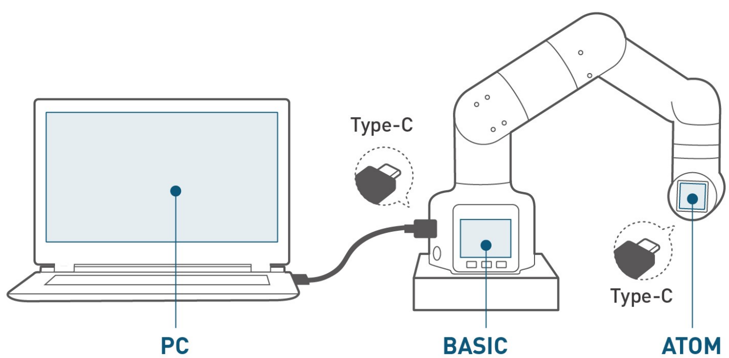
The UI provides a settings menu where users can customize various aspects of myCobot, such as motion speed, precision, and safety settings. It also includes options for calibrating the robot, ensuring accurate and reliable performance. Tutorials and Documentation:

To support the learning process, myCobot's UI includes a dedicated section for tutorials and documentation. Users can access step-by-step guides, video tutorials, and relevant resources to enhance their understanding of robotics and myCobot's capabilities. Community and Support:

MyCobot's UI may feature a community forum or support center, allowing users to connect with other enthusiasts, share their experiences, and seek assistance when needed. Updates and Notifications:

The UI can notify users about software updates, ensuring that their myCobot always operates with the latest features and security enhancements. Safety Features:

Safety is a paramount concern, and the UI incorporates safety features like emergency stop buttons and position monitoring to prevent accidents and protect users. The UI Flow for myCobot emphasizes ease of use, educational value, and flexibility, making it suitable for a wide range of users, from beginners looking to explore robotics to experts aiming to develop intricate robotic applications. It provides an environment that encourages experimentation, learning, and creativity while maintaining a strong focus on safety and user support.



1.IMG

Here's how IEEE protocols are used in today's industrial robotics:

IEEE 802.11 (Wi-Fi) Wireless Connectivity: IEEE 802.11 standards enable wireless communication within industrial robot systems. Robots can connect to central control systems or other robots, allowing for flexible deployment and reconfiguration in manufacturing environments.

IEEE 802.3 (Ethernet) Wired Networking: Industrial robots often use Ethernet (IEEE 802.3) for wired communication. This provides high-speed, reliable connections for real-time control, data exchange, and remote monitoring of robots and robotic cells.

IEEE 1588 (Precision Time Protocol) Synchronization: IEEE 1588 is used for precise time synchronization among devices in robotic systems. It ensures coordinated actions in multi-robot setups and is vital for applications like coordinated motion control or collaborative robotics.

IEEE 802.15 (Wireless Personal Area Network - WPAN) Wireless Sensor Networks: WPAN standards, such as IEEE 802.15.4 (Zigbee), are used for low-power wireless sensor networks in industrial robotics. These networks support *data collection, monitoring, and control in robotic applications.*

IEEE 1451 (Smart Transducer Interface Standards) Sensor Interoperability: IEEE 1451 standards define a framework for sensor and actuator interfaces. This ensures that sensors from different manufacturers can be integrated into robotic systems seamlessly.

IEEE 11073 (Health Informatics - Medical Device Communication) Medical Robotics: In medical robotics, IEEE 11073 standards enable communication between robotic surgical systems and medical devices. This is critical for ensuring the safety and effectiveness of surgical procedures.

IEEE 802.1 (Time-Sensitive Networking - TSN)Real-Time Communication: TSN standards provide deterministic and real-time communication capabilities, which are essential in industrial robotics for applications like motion control and human-robot collaboration.

IEEE 2030 (Smart Grid) Energy Management: In robotics for automated manufacturing, IEEE 2030 standards can be applied to manage energy consumption. Robots can be integrated into smart grids to optimize power usage during peak and off-peak hours.

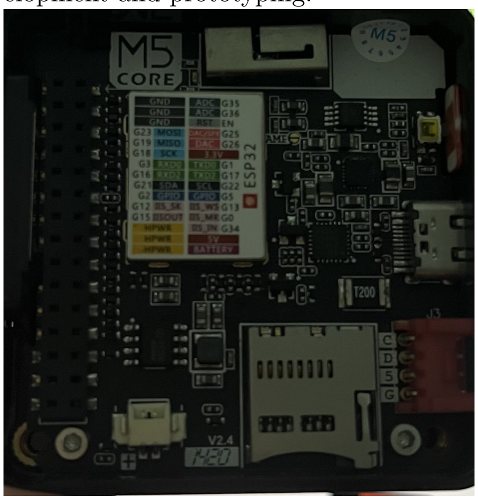
IEEE 802.11p (Wireless Access in Vehicular Environments) Robotics in Autonomous Vehicles: IEEE 802.11p can be applied in industrial applications where robots are used in autonomous vehicles, providing vehicle-to-vehicle and vehicle-to-infrastructure communication.

IEEE 1851 (Test Procedures for Measuring the Performance of Servo Drives) Quality Assurance is standard can be used for testing and verifying the performance of servo drives in robotic systems, ensuring they meet specified requirements.

IEEE 1149 (Boundary-Scan) Testing and Debugging: Boundary-scan standards are employed for testing and debugging electronic components and connections in robotic control systems.

In industrial robotics, IEEE protocols and standards contribute to the reliability, safety, and interoperability of robotic systems. These standards ensure that robots can communicate effectively, integrate with other equipment, and meet the stringent requirements of modern manufacturing environments. The adoption of IEEE protocols in industrial robotics is expected to continue growing as the industry advances and embraces new technologies like Industry 4.0 and the Industrial Internet of Things (IIoT).

As shown in 1.IMG M5Stack Basic is one of the popular variants of the M5Stack series, known for its compact size, ease of use, and versatility in IoT and embedded systems development. Here are the key mechanical aspects of M5Stack Basic is designed to be compact and portable. It is a self-contained unit that can easily fit in the palm of your hand, making it ideal for on-the-go development and prototyping.



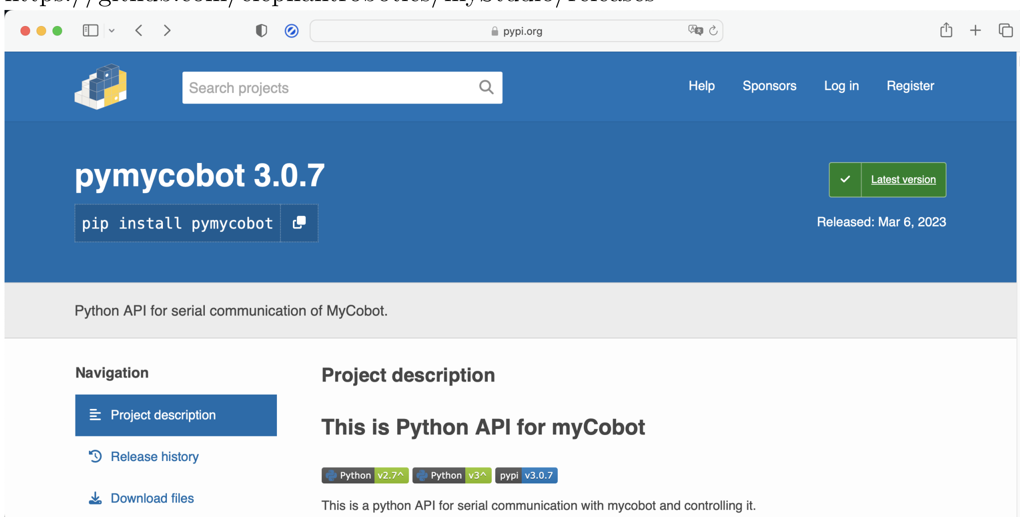
2.IMG

Like other M5Stack variants, the M5Stack Basic features a core unit that houses the main microcontroller, power management, and a display shown in 2.IMG. The core unit is typically equipped with an ESP32 microcontroller, which provides Wi-Fi and Bluetooth connectivity. M5Stack Basic incorporates a color touchscreen display that acts as both an output interface and an input method. The display is used to show data, user interfaces, and real-time information. The M5Stack Basic unit is enclosed within a durable and protective case. This case not only safeguards the internal components but also offers mounting points for additional modules and accessories. Physical buttons are integrated into the case for user interaction. These buttons allow users to navigate through menus, control applications, and trigger specific actions. The number and arrangement of buttons may vary among different M5Stack Basic versions. M5Stack Basic provides various input/output (I/O) ports and connectors, including GPIO pins, I2C interfaces, UART communication, and a USB-C port for power and programming. These I/O options allow you to connect external sensors, devices, or peripherals. A rechargeable battery is typically included in the M5Stack Basic unit. This battery can be charged via the USB-C port, enabling standalone operation without the need for an external power source. M5Stack Basic units often include mounting holes, allowing you to secure the device to other surfaces or objects. This is useful for applications where the device needs to be stationary or attached to a specific location. Some M5Stack Basic units offer extension interfaces for more advanced use cases. These interfaces may include Grove-compatible connectors, allowing you to connect various

Grove sensors and actuators for expanded functionality. M5Stack Basic units are designed to be durable and resilient. The cases are constructed from quality materials, and the connectors are built to withstand typical handling and environmental conditions.Make sure that you flash Atom to the top Atomflash Transponder to the Basic. Firmware Atom and Transponder Download link

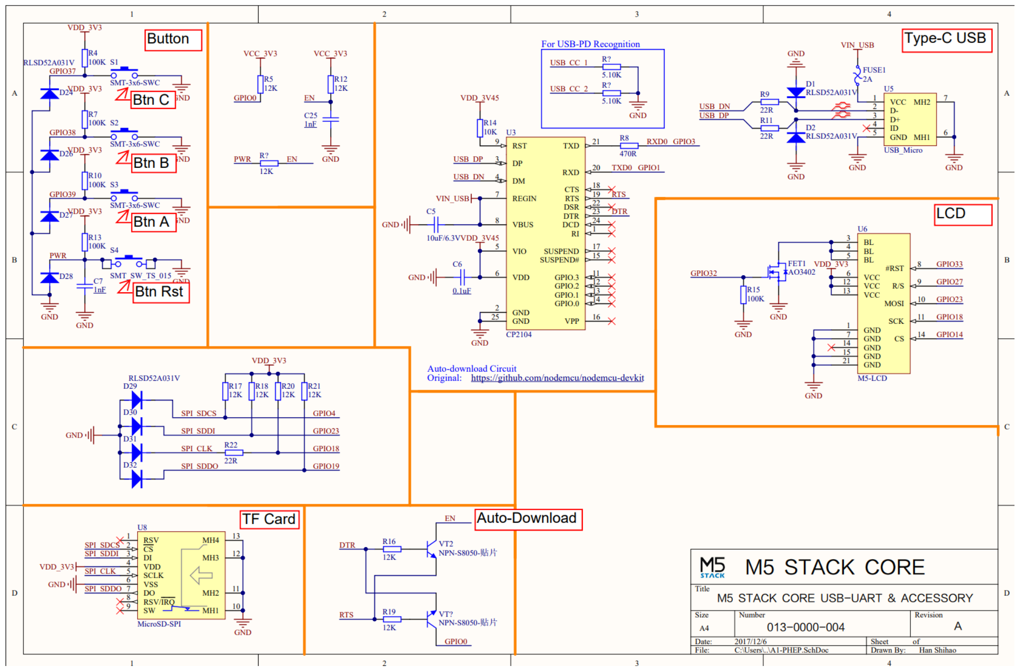
https://github.com/elephantrobotics/myCobot/tree/main/Software You can also usemyStudio to updatedownload link of myStudio

https://github.com/elephantrobotics/myStudio/releases



Source code:

```
git clone
https://github.com/elephantrobotics/pymycobot.git <your-path>
cd <your-path>/pymycobot
 Install
[sudo] python2 setup.py install
 or
[sudo] python3 setup.py install
```



S.1

The M5Stack Basic's mechanical design mirrors the core features of the M5Stack series, providing a user-friendly platform for IoT and embedded systems development. Its compact size, integrated display, input controls, I/O options, and rechargeable battery make it a versatile tool for rapid prototyping, experimenting with sensors, and creating IoT applications without the need for extensive hardware design show in *S*.1. EUI-48 (Extended Unique Identifier-48) is a term related to MAC addresses (Media Access Control addresses), which are widely used in computer and network communications. However, it is not directly related to terms from robotics. In the context of robotics, there are specific terms and concepts that are relevant, such as: Robotic Operating System (ROS): ROS is an open-source robotics framework that simplifies the development of robotic applications. It is a software platform used to facilitate the control, sensor integration and data processing of robots. End-effector: This refers to the end of a robotic arm or manipulator that is used to perform physical tasks. It can include various tools such as grippers, lasers, etc.

Artificial Intelligence (AI): AI is becoming increasingly important in robotics. It includes technologies such as machine learning, computer vision and natural language processing, which enable robots to make autonomous decisions and communicate with humans.

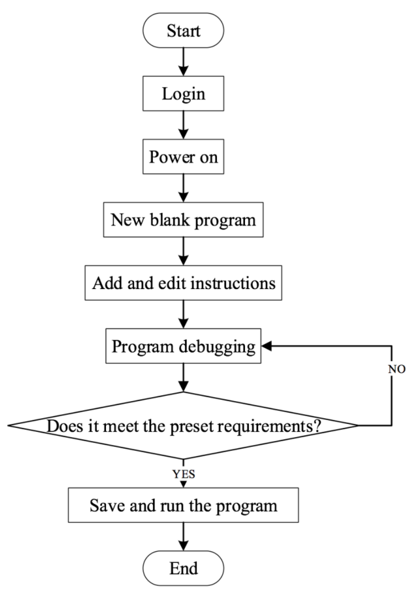
Kinematics and Dynamics: These are terms that relate to the movement of robot arms and bodies. Kinematics deals with the position and speed of robot parts, while dynamics deals with the forces and movements that occur.

Sensors: Robots use various sensors, such as lidar, cameras, ultrasonic sensors and touch sensors, to collect data about their environment and respond to changes.

Autonomous navigation: This is a robot's ability to move independently and avoid obstacles, often with the help of sensors and path planning algorithms.

Human-Robot Interaction (HRI): HRI involves the study and development of interfaces and interaction methods that allow humans and robots to communicate and collaborate effectively.

While EUI-48 specifically addresses network identification, these terms are more focused on the physical and control aspects of robotics. The MAC address (Media Access Control address) may be relevant for the installation of robots. Although a MAC address is typically associated with network communications and not directly related to a robot's physical setup, it can still be important in certain contexts: Robot network communications: Robots that communicate with other devices over a network, such as Ethernet or Wi-Fi, often have a network interface card (NIC) with a MAC address. This address is used to identify the robot and exchange data with other devices on the same network. Network Configuration: When installing robots in a network environment, it is important to know the MAC addresses of the robot so that they can be configured correctly on the network. This can be used, among other things, to assign IP addresses to the robot. Network management and security: Managing robots on a network often requires identifying devices based on their MAC addresses. This can be used for network security, monitoring and managing access control. Interaction with external systems: Robots can be integrated with other computer systems and devices on a network. Using MAC addresses can help identify and route data between the robot and other devices. In general, the MAC address is important for robots' network communications and can affect the installation and configuration of robots in a network environment.



See S.2 *S.2*

In the context of the M5Stack Basic and similar embedded systems, the DC-DC buck inductor plays a critical role in power management and voltage regulation. The M5Stack Basic typically includes a DC-DC buck converter as part of its power circuitry. Here's an explanation of the role and importance of the DC-DC buck inductor:

1. Voltage Conversion: The primary function of the DC-DC buck inductor is to convert an input voltage, often provided by a battery or an external power source, to a lower and more stable output voltage. This is essential because many components, including the microcontroller, display, and sensors, require a specific and consistent voltage level to operate correctly.

2. Efficiency: The buck inductor helps improve the energy efficiency of the system. It achieves this by reducing the voltage from the input source to a level that closely matches the voltage requirements of the device's components. When voltage conversion is done with minimal energy loss, it maximizes the utilization of the available power source, such as a battery, thus extending the device's operating time.

3. Voltage Stabilization: The DC-DC buck inductor helps maintain a stable output voltage even as the input voltage varies. This is crucial to prevent damage to sensitive electronic components and ensure consistent performance in a range of operating conditions.

4. Noise Reduction: It filters out high-frequency noise from the input voltage, ensuring that the output voltage is clean and free from voltage spikes or interference that could disrupt the operation of the device.

5. Heat Management: By reducing the voltage with minimal energy loss, the buck inductor generates less heat compared to other voltage regulation methods, such as linear regulators. This contributes to better thermal management within the device.

6. Longer Battery Life: In battery-powered devices like the M5Stack Basic, the buck inductor plays a pivotal role in extending the device's battery life. By efficiently converting the battery voltage to the required lower voltage, it ensures that the battery's capacity is used optimally.

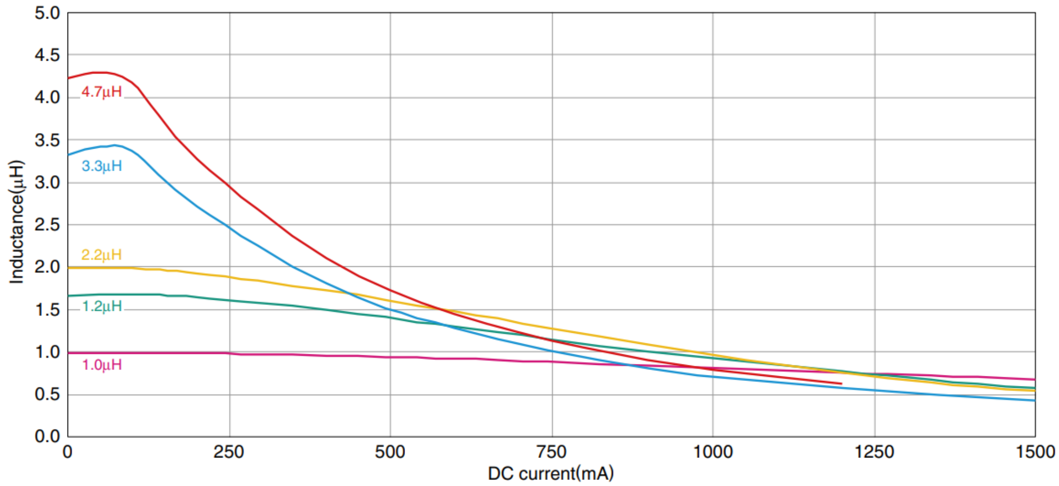
In summary, the DC-DC buck inductor in the M5Stack Basic is a fundamental component of the device's power management system. It regulates the voltage supplied to the device's components, ensuring that they receive the appropriate voltage for operation. This contributes to the efficiency, stability, and longevity of the device, making it suitable for portable and low-power applications, such as IoT development and embedded systems.

A low-loss magnetic material is used so that a low-loss inductor for the power supply circuit can be achieved. In addition to the inductance value, product types with various features are available so that they can be compatible with different usages. H type: this product uses a low-loss material and has low DC resistance.

* Optimal for when heavy load power efficiency is important. V type: as with the H type, this product with a low-loss magnetic material and that has good DC superimposition type characteristics.

* Optimal for when light load power efficiency is important. S type: STD

product lineup that includes a wide L value and various sizes.See Table.1 for the Charateristics Specification Table. Operating temperature range: –40 to +125°C (including self-temperature rise) see Graph.1 for INDUCTANCE VS. DC BIAS CHARACTERISTICS



Graph.1 (Product No.1 4285A+42841A+42842C+42851-61100 by Keysight Technologies)

NO.	Patent Name	Patent No.
1	Collaborative robotic arm	2020030683471.3
2	Mechanical arm linkage and mechanical arm	CN 208196791 U
3	Mechanical arm joint connector and mechanical arm	CN 208196840 U
4	Method and system for robot posture maintaining, dragging and teaching	ZL 2018 11634649.3
5	A robot online collision detection method and system based on momentum model	ZL 2019 10030748.9
6	A Kind of Robot Dynamic Parameter Identification Method Independent of Joint Angular Acceleration	ZL 2019 10773865.4

Table 1: Vertical Characteristics Specification Table

Part No.	Type	Thickness (T) (mm) Max	Inductance (µH)	Tolerance	Measuring Frequency (MHz)	DC Resistance(Ω)	Rated Current (mA)
MLP2016HR47MT0S1 1700	Low core loss	1.0	0.47	±20%	2	0.055	±25%
MLP2016H1R0MT0S1 1300	Low resistance	1.0	1.0	±20%	2	0.09	±25%
MLP2016H1R5MT0S1 1200	Low resistance	1.0	1.5	±20%	2	0.11	±25%
MLP2016H2R2MT0S1 1200	Low resistance	1.0	2.2	±20%	2	0.11	±25%
MLP2016H3R3MT0S1 1200	Low resistance	1.0	3.3	±20%	2	0.12	±25%
MLP2016H4R7MT0S1 1100	Low resistance	1.0	4.7	±20%	2	0.16	±25%
MLP2016VR47MT0S1 1500	Emphasized DC Bias Characteristics	1.0	0.47	±20%	2	0.07	±25%
MLP2016V1R0MT0S1 1200	Emphasized DC Bias Characteristics	1.0	1.0	±20%	2	0.12	±25%
MLP2016V1R5MT0S1 1150	Emphasized DC Bias Characteristics	1.0	1.5	±20%	2	0.14	±25%
MLP2016V2R2MT0S1 1000	Emphasized DC Bias Characteristics	1.0	2.2	±20%	2	0.17	±25%
MLP2016SR47MT0S1 1600	STD Product	1.0	0.47	±20%	2	0.05	±30%
MLP2016S1R0MT0S1 1400	STD Product	1.0	1.0	±20%	2	0.09	±30%
MLP2016S1R5MT0S1 1200	STD Product	1.0	1.5	±20%	2	0.09	±30%
MLP2016S2R2MT0S1 1200	STD Product	1.0	2.2	±20%	2	0.11	±30%
MLP2016S4R7MT0S1 800	STD Product	1.0	4.7	±20%	2	0.27	±30%