CONVEYOR
Hardware documentation

Description of the modules

we will use

Elouan Da Costa Peixoto

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Module documents

M5 Core S3:

The board we use is a M5 Core S3 from M5-Stack. It's based on ESP32. The purpose of the M5 board is to use specific modules from the M5-Stack and make Embedded software development easier. The M5Go board integrates an HD IPS display panel with various hardware peripherals, 16M FLAS and it's compatible with multiple development platforms, like:

UIFlow

Micropython

Arduino

.NET nanoFramework

Here are some features of the board:

- Low code development:
- Supports UIFlow graphical programming platform, scripting-free, cloud push
- Fully compatible with Arduino, ESP32-IDF, and other mainstream development platforms
- FreeRTOS support, with dual-core and multitasking mechanism, can perform the tasks efficiently, Program optimization.
- High integration.
- 2.0-inch IPS display panel, 6-axis IMU, programmable RGB lights x10, microphone, speaker, custom buttons x3
- Built-in Li-ion power supply, integrated power management chip, supports TypeC interface and POGO PIN interface power supply
- Finely tuned RF circuitry for stable and reliable wireless communication

- Strong expandability.
- GROVE expansion ports x3 (I2C, GPIO, UART)
- Easy access to M5Stack hardware and software system, stackable module design, plug-and-play sensor expansion

Module specifications:

Specifications	Parameters
ESP32-D0WDQ6-V3	240MHz dual core, 600 DMIPS, 520KB SRAM, Wi-Fi
Flash	16MB
Input Voltage	5V @ 500mA
Host Interface	TypeC x1, POGO PIN x1, I2C x1, GPIO x1, UART x1
IPS Screen	2 inch, 320x240 Colorful TFT LCD, ILI9342C, 853nit max brightness
Keys	Custom Keys x 3
Speaker	1W-0928
Microphone	Analog BSE3729 Microphone
IMU	6-axis MPU6886
USB Chip	CH9102F
LED	SK6812 RGB LED x 10
Antenna	2.4G 3D antenna
Battery	500 mAh @ 3.7V
Operating Temperature	0°C to 40°C
Net Weight	56.4g
Gross Weight	228g
Product Dimensions	54 x 54 x 21 mm
Package Size	147 x 90 x 40 mm
Cover Material	Plastic (PC)

GoPlus2:

The GoPlus2 module is a motor and servo-motor control module. The master control integrates the STM32F030C8T6 chipset. The module has a 2-way DC motor drive interface and a 4-way servo drive interface. Three PORT-B interfaces(Analog Input, Digital Output, Digital Input) can be expanded. Built-in 500mAh battery and support infrared (IR) transmission and receive. To meet the requirements of a multi-channel interface power supply at the same time, a DC power interface is provided for the external power supply, battery can be charged through the M5Core with USB-C.

Communication protocol: I2C(0x38)

Module features:

- 2x DC motor interface
- 4x Servo interface
- IR transmit & receive
- 3x expand PORT B
- STM32F030C8T6
- Built in 500mAh battery

Module specifications:

Resources	Parameter
Main control chip	STM32F030C8T6
Expand interface	DC Motor x 2,PORT-B x 3, Servo x 4
motor drive	DRV8833
IR	Transmit and Receive
Battery	500mAh
Communication protocol	I2C:0x38
Net Weight	38g
Gross Weight	58g
Product Size	54*54*13mm
Package Size	133*95*20mm

GRBL 13.2:

The GRBL 13.2 is a three-axis stepper motor driver module. It uses an ATmega328P-AU controller with three sets of DRV8825PWPR stepper motor driver chip control ways, which can drive three bipolar steppers at the same time. Using the I2C communication interface (default address:0x70) and integrated DIP switch for adjusting motor step subdivision (maximum support of 1/32 step subdivision) and I2C address adjustment (support dual address adjustment 0x70, 0x71), You can achieve six-axis control by stacking two GRBL 13.2 modules.

The power input interface is DC/9-24V, the motor drive current can reach 1.5A, and three sets of limit switch signal interfaces are open, which can be used to connect an external limit switch (active low) to realize the motor braking function. Suitable for a variety of stepping motor motion control scenarios, such as printers, robotic arms, etc.

Module features:

- ATmega328P-AU controller
- Three-axis DRV8825PWPR stepper motor driver
- Drive current up to 1.5A
- Drive bipolar stepper motor
- Maximum 1/32 mode STEP subdivision
- Limit switch interface (active low)

Module specifications:

Resources	Parameter
Motor driver chip	DRV8825PWPR
Controller chip	ATmega328P-AU
Maximum drive current of single channel	1.5A
Support maximum step subdivision	1/32
Interface	XT2.54-4P
Net weight	22.5g
Gross weight	42.3g
Product size	54.2*54.2*13.2mm
Package size	95*65*25mm

RFID:

The RFID module can realize the function of the card reading and writing device, to identify and record multiple card information, to encode and authority a RF card. RFID has an RFID MFRC522 chip inside.

The MFRC522 operates in the 13.56MHz frequency band and uses the modulation and demodulation principle to interact with the proximity RF

card. It can be used when you connect this Unit to GROVE PORTA on M5Core, I2C address is 0x28.

Module features:

- 13.56MHz Operation frequency
- I2C data rate: Fast mode: up to 400 Kbit/s; High-speed mode: up to 3400 Kbit/s
- RC522 Transceiver Buffer: 64 bytes
- Supported protocol: ISO14443A, MIFARE and NTAG
- Operate temperature: -20°C-85°C
- How long data be saved for: > 10 years
- Reading and writing distance: < 20 mm
- Program Platform: Arduino, UIFlow (Blockly, Python)
- Two Lego installation holes

Module specifications:

Resources	Parameter
Communication protocol	I2C: 0x28
Net weight	6g
Gross weight	21g
Product Size	48*24*8mm
Package Size	67*53*12mm

Tools

We use PlatormIO and the Arduino environment.

PlatformIO is a collaborative ecosystem. It’s an extension to the existing IDE and a CLI.