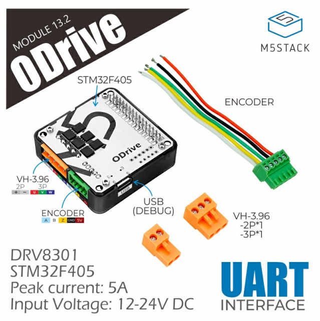
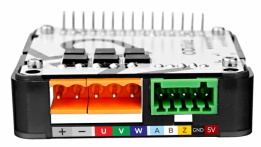
ODrive

SKU:M036





Description

ODrive is a high-performance servo motor drive module launched by M5Stack, based on the open source motion control solution ODrive. Supports the control of a single three-phase servo motor, the peak drive current can reach 5A. It has high-speed motor control capability while providing encoder signal interface, which can realize high-precision motion control positioning. The module uses UART communication interface and is compatible with the official ODrive configuration tool and protocol (you can also configure different motor motion modes through the host computer tool to make the motor work more smoothly and stably).

- Configure the motor parameters through the PC upper computer, and send commands to control the motor displacement through UART.

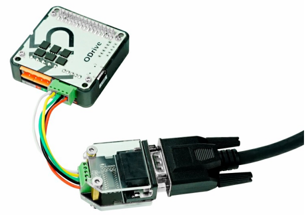
Product Features

- Single three-phase servo motor drive
- Peak drive current 5A
- 12-24V DC power input interface (requires adapter output current up to 5A)
- Communication interface: UART
- Single channel servo motor drive/with encoder interface

Include

- Single module version
  - 1x ODrive Module
  - 1x 3.96-3P terminal
  - 1x 3.96-2P terminal
  - 1x 2.54-5P terminal

- Matching motor version
  - 1x ODrive Module
  - 1x 3.96-3P terminal
  - 1x 3.96-2P terminal
  - 1x 2.54-5P terminal
  - 1x servo motor (see the specification table below for detailed parameters)
  - 1x Encoder adapter board



Applications

- High precision motion control
- Servo motor drive

Specification

Resources	Parameter
Optional servo motor specifications	phases: 3, Voltage: 24V-DC, Rated current: 4A, Rated power: 62W, Rated speed: 3000rpm
Motor driver chip	DRV8301
Maximum drive current	5A
Interface Type	3.96-2P (power supply), 3.96-3P (motor), 2.54-5P (encoder)
Input power	12-24V DC
Net weight	22.5g

Gross weight	42.3g
Product Size	54.2*54.2*13.2mm
Package Size	95*65*25mm

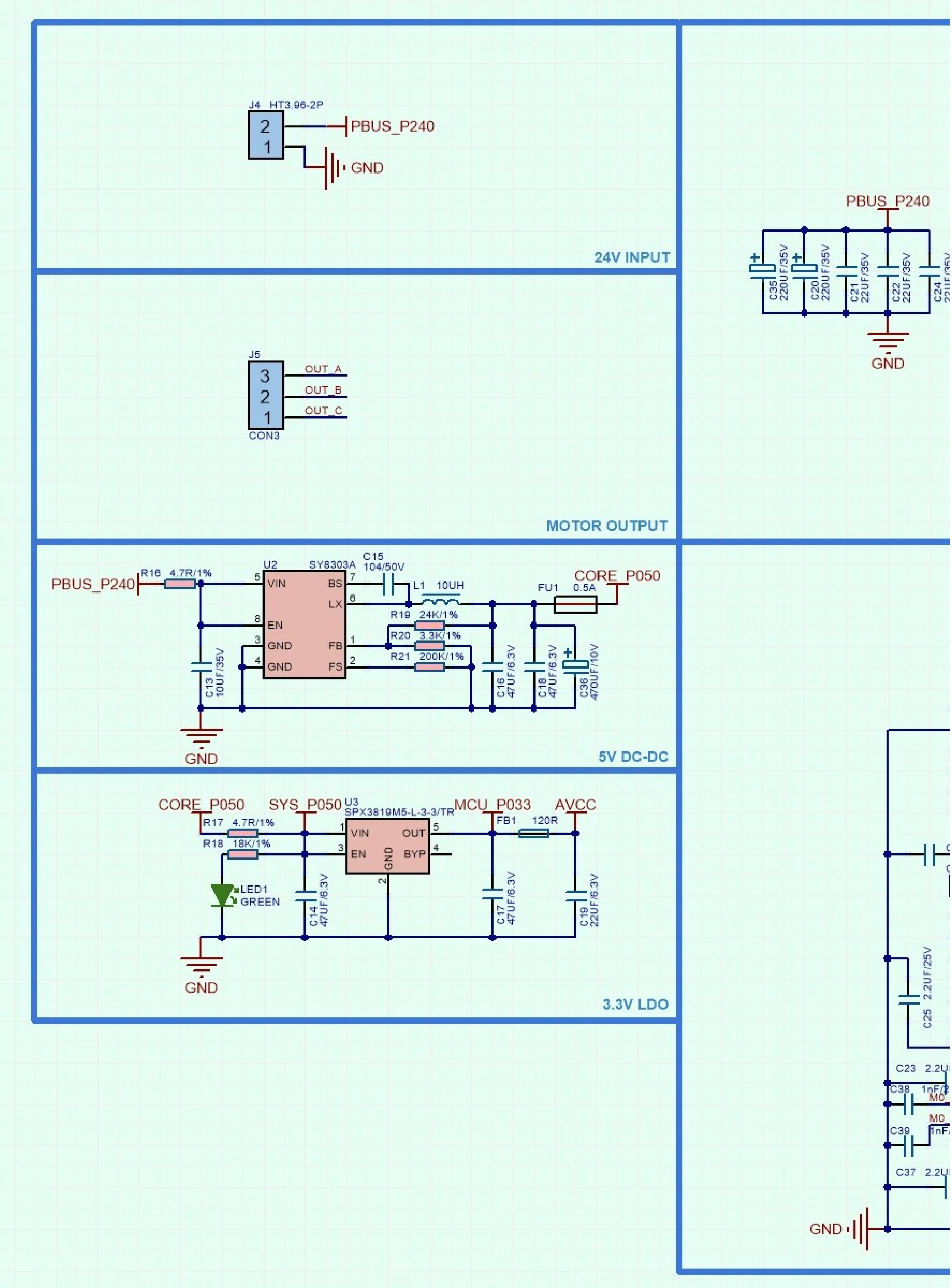
Related Link

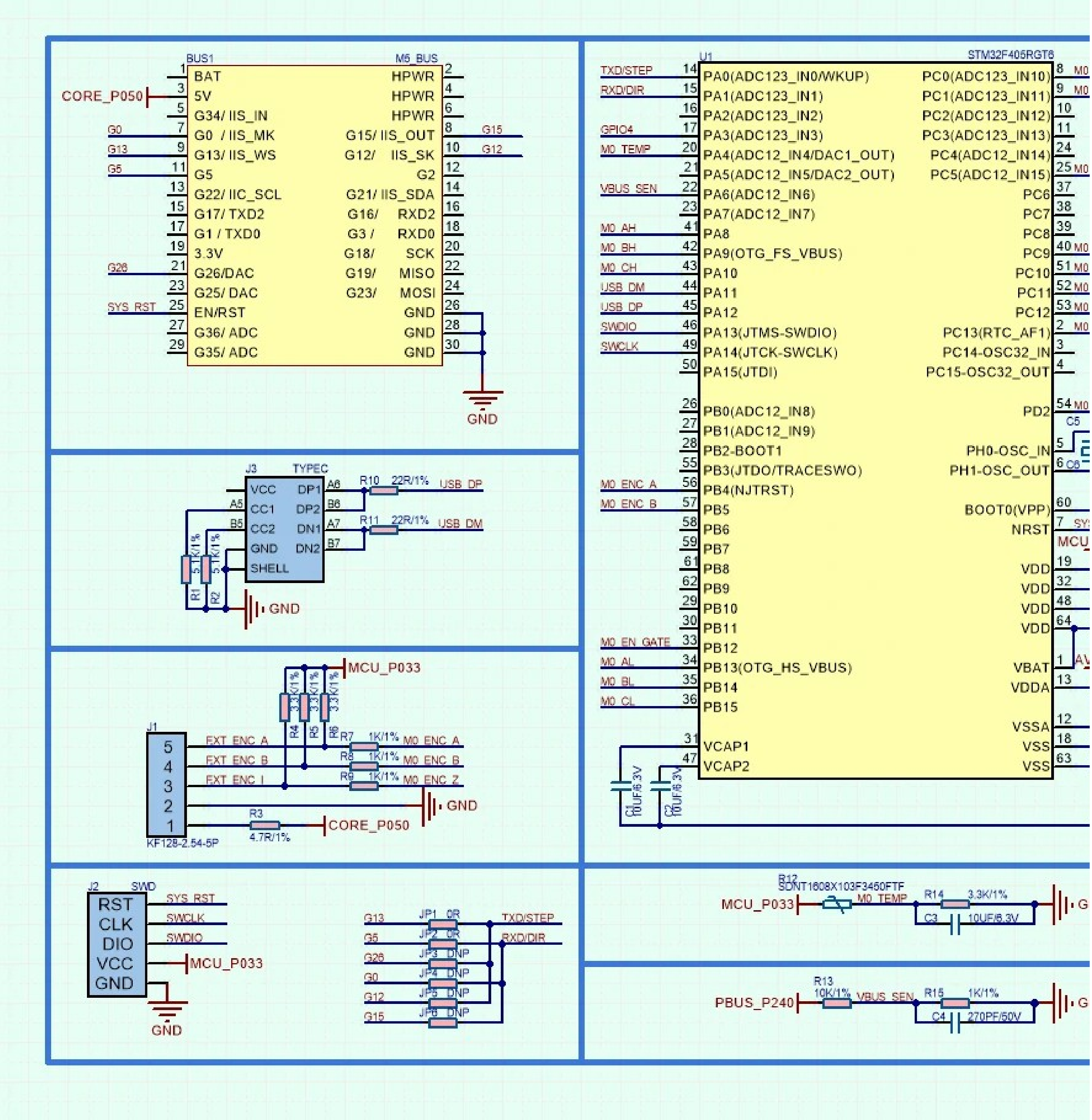
- DRV8301 Datasheet
- NTC Thermistor- SDNT1608X103F3450FTF
- Power MOSFET NTMFS5C430NLT1G

PinMap

M5Stack	GPIO16	GPIO17	5V	GND
ODrive	RX	TX	5V	GND

Schematic


J4 HT3.96-2P
2
1
PBUS_P240
GND
24V INPUT
J5
3
2
1
OUT_A
OUT_B
OUT_C
CON3
MOTOR OUTPUT
PBUS_P240
R16 4.7R/1%
U2 SY8303A
5 VIN
8 EN
3 GND
4 GND
BS 7
LX 6
FB 1
FS 2
C15 104/50V
L1 10UH
FU1 0.5A
CORE_P050
R19 24K/1%
R20 3.3K/1%
R21 200K/1%
C13 10UF/35V
C16 47UF/6.3V
C18 47UF/6.3V
C36 470UF/10V
GND
5V DC-DC
CORE_P050
SYS_P050
U3 SPX3819M5-L-3-3/TR
MCU_P033
AVCC
R17 4.7R/1%
R18 18K/1%
1 VIN
3 EN
2 GND
OUT 5
BYP 4
FB1 120R
LED1 GREEN
C14 47UF/6.3V
C17 47UF/6.3V
C19 22UF/6.3V
GND
3.3V LDO
PBUS_P240
C35 220UF/35V
C20 220UF/35V
C21 22UF/35V
C22 22UF/35V
C24 22UF/35V
GND
C25 2.2UF/25V
C23 2.2U
C38 1nF/2
M0
M0
C39 1nF/
C37 2.2U
GND



Example

> Remark: In this case, the ODrive module is used to control the high-speed and precise rotation of the servo motor. Press button C to calibrate (do not touch the motor shaft during this period), long press and short press button A to control the motor rotation. Note: The motor parameter configuration in this case is only applicable to the motor model matched with the M5 Odrive kit. When driving other types of motors, please configure the parameters according to the motor used.

- Arduino Example

Video

Arduino-API

```
//Create an instance, specify the serial port used
```

```
ODrive odrive(Serial1);


// Commands
void setPosition(float position);
void setPosition(float position, float velocity_feedforward);
void setPosition(float position, float velocity_feedforward, float current_feedforward);
void setVelocity(float velocity);
void setVelocity(float velocity, float current_feedforward);
void setCurrent(float current);
void setGain(float pos, float vel, float vel_integrator);
void setControlMode(int32_t mode);
void setControlInputPos(float pos);
void trapezoidalMove(float position);
// Getters
float getVelocity();
float getVbusVoltage();
int32_t getEncoderShadowCount();
float getEncoderPosEstimate();
float getMotorTemp();
float getPhaseCurrent();
float getBusCurrent();
bool checkError(int32_t* axis=NULL, int32_t* motor_thermistor=NULL, int32_t* encoder=NULL, int32_t* controller=NULL);
// General params


// State helper
bool runState(int32_t requested_state, uint32_t timeout);


// device will reboot
void eraseConfig();
void reboot();

void saveConfig();

void setDefaultConfig();



float readFloat();

int32_t readInt();

void writeToDeive(const char* data);

void writeConfig(const char* config, float_t value);

void writeConfig(const char* config, int32_t value);

int32_t readConfigInt(const char*config);

float readConfigFloat(const char*config);
```

ODriveTool

> odrivetool is the configuration and debugging software for ODrive, through which the motor parameters can be configured. This tutorial will demonstrate the installation and basic use of odrivetool under the `Linux` platform.

- Use the following command to install odrivetool v0.5.1, environment requirement: `python3`.

```
pip3 install odrive==0.5.1.post0
```

- Add `~/.local/bin` to the system environment variable, execute the following command, and insert `export PATH=$PATH:~/.local/bin` to the end of the text.

```
vim~/.bashrc
```

- Execute `odrivetool` from the command line to run the tool. Connect the ODrive module to the computer and wait for odrivetool to recognize it. After successful connection, enter `odrv0.vbus_voltage` to test and obtain the power supply voltage of the drive board.

```
$odrivertool



ODrive control utility v0.5.1.post0

Website: https://odriverobotics.com/

Docs: https://docs.odriverobotics.com/

Forums: https://discourse.odriverobotics.com/

Discord: https://discord.gg/k3ZZ3mS

Github: https://github.com/madcowswe/ODrive/



Please connect your ODrive.
```

```
You can also type help() or quit().

Connected to ODrive 306A396A3235 as odrv0

In [1]: odrv0.vbus_voltage
```

- Commonly used configuration commands.

```
//配置电机电流限制

odrv0.axis0.motor.config.current_lim[A].

//配置电机转速限制值

odrv0.axis0.controller.config.vel_limit

//配置功率耗散电阻的电阻值

odrv0.config.brake_resistance

//保存配置

odrv0.save_configuration()
```

For more details, Please click here to view Odrive official documents.