Motor Master Development Board User Manual

0. Document Version Change Record

Version	Date	Change Log
V1.1	2024/08/15	Official Release

1. Introduction to the main control development board

1.1 Hardware Resource Introduction

interface	quantity
CAN 2.0	1
RS485	1
UART	1
OLED screen	1
KEY	4
LED	3 (RGB colors)
User SWD debug interface	1 (1.25 4pin non-locking terminal cable)

As shown in the figure below, the development board is mainly divided into Type-C power supply interface, SWD burning and debugging interface, screen display, buttons, And five areas of motor communication interface
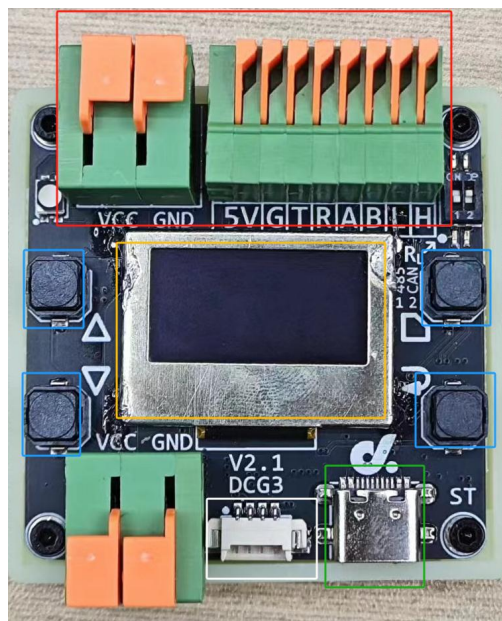
Physical diagram of the development board hardware partition

Functions and usage of each interface:

Hardware	Function usage
Communication interface area	Connect the motor communication interface （485/CAN/UART）
OLED	Display UI menu, human-computer interaction
KEY	There are 4 buttons, defined as page up, page down, confirm, and return
Type-C	Power supply and USB communication
SWD	User-programmed debugging interface, customizable development

Currently supported motor models:

| model	Communication method	Does the development board support
M0601C_111/411	RS485	Yes
M0602C_112	RS485	Yes
M0603C_111/211	UART	Yes
M1502E_111	CAN	Yes
M1502D_133/233	CAN	Yes
M1505A_222	CAN	Yes
P1010A/B	CAN	Yes
M0603A_111/411	LIN	Yes(UART to LIN conversion module is required)

2. Usage steps reference

2.1 Item Preparation

1. USB Type-C data cable
2. The motor to be controlled and the DC power supply
3. Various wires and connectors

2.2 Turn on the CAN terminal resistor

There are two sets of terminal resistor dip switches on the development board. The left switch controls RS485, and the right switch controls CAN.
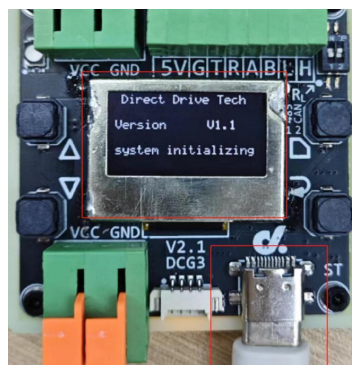
Before use, you need to turn the CAN terminal resistor dip switch to the ON direction, as shown in the figure below. Turn the right dip switch to the top (ON).
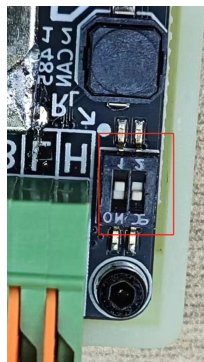
DIP switch diagram

2.3 Development board power up

First, use the USB Type-C data cable to power on the development board. The screen will display the initialization page, as shown below:

Initialization page diagram

After initialization is completed, enter the first level page, which is used to select the motor model to be controlled. By default, the first beginning

Initialization completion page diagram

2.4 Motor power up

Refer to the corresponding reference document of the motor to be controlled, power on and fix the motor, etc. The steps are as follows:

1. Fix the motor, power on the DC power supply, adjust the voltage to the rated voltage of the motor, and turn off the power after adjustment.

2. Connect the motor communication interface signal line to the corresponding terminal in the wiring area of the development board.

3. For example: the motor wiring of the CAN interface is shown in the figure. For more motor wiring references, please refer to Chapter 3

CAN Wiring Diagram

2.5 Level 1 page: Select motor model

After completing the above power supply operation and waiting for initialization to complete, enter the first-level page, as shown below:

First-level page diagram

The first-level page shows the selected motor model to be controlled. You can see that the currently selected motor model is clearly.

It is larger than the two motor models to be switched, and there is an arrow on the right side of the text.

On the first-level page, the operations of each button are:

KEY	Corresponding functions
Previous page	Select motor model
Next page	Select motor model
Back	none
Confirm	Enter the secondary page (display motor information, select control speed)

To select the motor model you want to control, follow these steps:

1. Use the up and down buttons to switch motor models, and observe the screen display area at the same time.

2. After confirming that the motor model to be controlled is selected, press the OK button to enter the secondary page and adjust the control speed.

2.6 Secondary page: Adjust control speed

After completing the above motor selection operation and pressing the OK button, you can successfully enter the secondary page, as shown below:
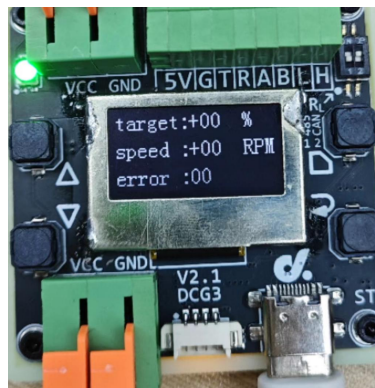
Second level page diagram

The second level page is to control the motor speed and can also provide feedback on the real-time motor speed, which is displayed on the screen area.

The machine information mainly consists of 3 lines:

	Display information
First row	Target speed (motor speed in percentage)
Second row	Motor real-time feedback speed (in RPM)
Third row	Display different information according to different motor models
Line 3: Motor error information	Motor error message
Line 3: Motor temperature	Motor temperature, in degrees Celsius

Operation of each button on the secondary page:

key	Corresponding functions
Previous page	Select the motor speed percentage (motor will start turning without pressing the OK button)
Next page	Select the motor speed percentage (motor will start turning without pressing the OK button)
Back	Return to the first level page (reselect the motor model)
Confirm	none

The specific steps are as follows:

1. Use the Up and Down buttons to select the motor speed percentage (currently supports plus or minus 10 percentage gear speeds)

2. The motor starts to rotate (no need to press the OK button)

3. The screen displays the selected motor speed percentage and the real-time RPM speed of the motor, as shown in the figure below (taking M1502D as an example)
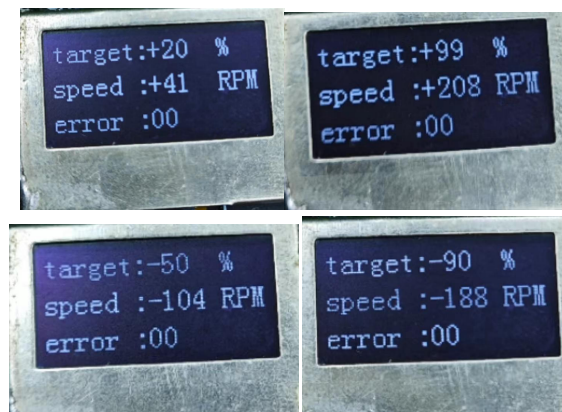

Speed diagram for each gear

Note: If the motor drive fails, you can check the motor error information (decimal) on the third line. Zero means the motor Normal status, non-zero value, see the motor specification for detailed description.

As shown in the figure below, the motor model is M0602C.The motor speed is

expected to be 20%, but the actual motor speed is 0, and the speed displayed in the second line is 553RPM, which is obviously wrong.
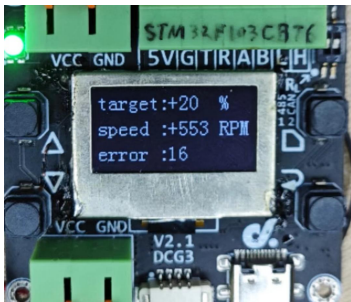
Motor abnormality diagram

The third line shows 16, which is 0x10 in decimal. According to the motor specification, the error code is: the motor is overheated.

故障码:

故障值	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
内容	保留	保留	保留	过温故障	堵转故障	相电流过流	过流故障	传感器故障

例如故障码为：0x02 即为 0b00000010　表示发生过流故障

Motor Specifications Schematic

3. Wiring reference for various motors

3.1 CAN

The motor uses CAN communication, and the motor's CAN_H / CAN_L is connected to the H / L interface of the wiring area of the accessory board

Motor	Development board side
CAN_H	H
CAN_L	L

For example: The following figure is the wiring diagram of the P1010A motor CAN signal line
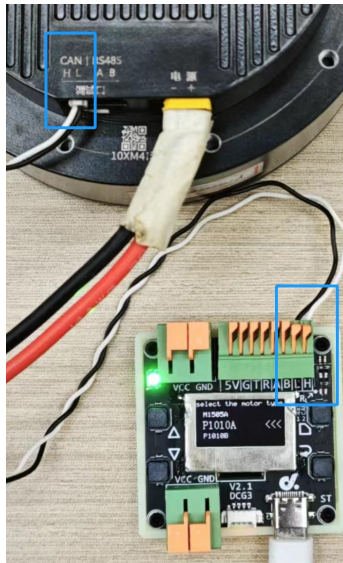
CAN Wiring Diagram

## 3.2 RS485

The motor uses RS485 communication. The motor's RS485_A / RS485_B is connected to the A / B interface of the wiring area of the accessory board.

Motor	Development board side
RS485_A	A
RS485_B	B

The motor uses RS485 communication. The motor's RS485_A / RS485_B is connected to the A / B interface of the wiring area of the accessory board.

For example: The following figure is the wiring diagram of the RS485 signal line of the M0601C motor
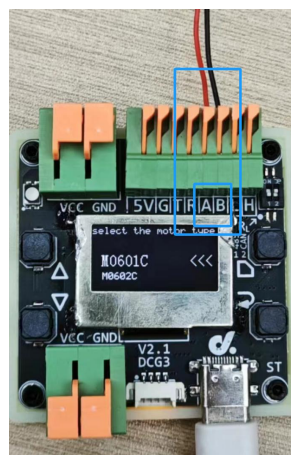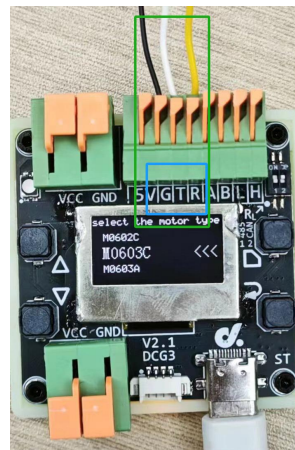

485 Wiring Diagram

3.3 UART

The motor uses UART communication, and the motor's communication interface is connected to the development board's interface:

Motor	Development board side
UART_TX	R
UART_RX	T
Motor power supply GND	G

UART communication GND must be connected, otherwise there is no common ground and communication is impossible

UART Wiring Diagram

3.4 LIN

A LIN to TTL module is required (for details on this module, see the M0603A motor reference manual). The motor harness interface is directly

connected to the corresponding female connector of the LIN to TTL module. The positive and negative poles of the power supply are connected to the positive and negative poles of the LIN to TTL module respectively.

LIN to TTL	Development board side
TXD	T
RXD	R
Motor power supply GND	G

GND must be connected, otherwise there will be no common ground and communication will fail.

4. Notes

1. When using RS485 and CAN bus communication to control the motor, GND does not need to be connected

2. When using UART (including LIN to TTL module) to control the motor, GND must be connected. The GND of the development board and the motor power supply share the same ground, otherwise it will affect UART communication and fail to control

3. Power-on sequence: In principle, there is no requirement for the power-on sequence of the development board and the motor. It is recommended to connect the lines first, power on the motor, and then use the Type-C data cable to power on the development board, and then select the model and other operations

4. The motor must be powered on on the first-level page. The following situation will cause the motor control to fail: After entering the second-level page, the motor is powered on again. At this time, because the motor ID setting, mode, etc. are unsuccessful, the drive command cannot match the motor's internal command, and the drive fails. At this time, you can return to the first-level page, select the motor model, and re-enter the second-level page

Tips：In order to support all motor models in the list, the development board sets the motor ID to 1 and sets the mode to speed loop.

F: Why can't I control the speed after connecting the motor and selecting the speed?

Q: First check the connection. Some motor models need to be connected to GND. Then check whether the motor model is selected correctly. If it is a CANcommunication motor, check whether the DIP switch is operated correctly.

F: Why can't I see the temperature of some motors on the secondary page?

Q: Depending on the motor model, the secondary page displays fault codes and motor temperature.

F: How to program the main control board, sample code?

Q: https://github.com/DDTMotor/Debug_Card