

ZDAUTO®

ZDAUTO Automation
ZD-MIO-UNO-KIT
I/O Expansion Board
Extension Module Assembly
Product Manuals (V1.0)

www.zdauto.com
ZDAUTO Automation Technology Co.,LTD.
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1. Introduction

Arduino is an open-source hardware development platform originating from Italy, and Arduino UNO is the development board launched by Arduino UNO. With peripheral components (sensors, control switches, LED screens, etc.), anyone with a slight electronic circuit foundation can quickly build a practical electronic circuit with various interesting functions based on this platform. This paper mainly introduces the introduction and application of the corresponding extension board of Arduino UNO configuration combination.

ZD-MIO-UNO-KIT is an I/O expansion board compatible with Arduino UNO and Arduino Leonardo development board. The I/O port of the motherboard is led to the expansion board for unified layout and M5S conversion module is added. Switch quantity, pulse quantity, analog quantity and other input and output modules can be freely selected according to the characteristics of the development board for users to access/drive peripheral devices.

ZD-MIO-UNO-KIT expansion board is standard equipped with 4 M5S modules, and the remaining 4 blank bases allow users to purchase M5S modules with other functions to insert, so as to realize different functions.

2. Product feature

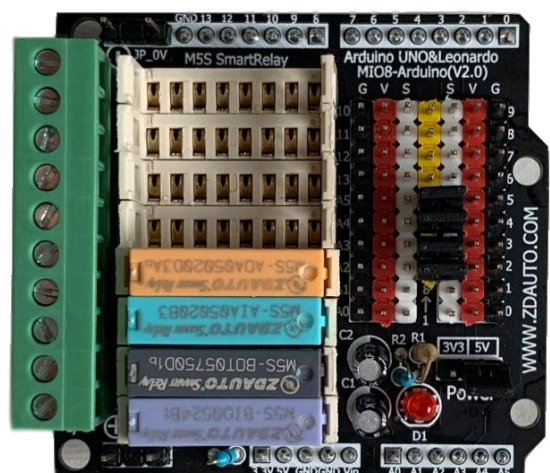
- The expansion board has eight M5S module bases, and customers can select modules according to their functional requirements to realize the designed functions.
- External circuit access and switching voltages can be higher than the rated voltage on the Raspberry PI;
- Select isolation module, realize circuit isolation, improve module security;

3. Extension board ZD-MIO-UNO-KIT combination configuration

-ZDAUTO-MIO-Ardunio Extension board*1

(It contains 8 M5S bases, and you can access 8 M5S modules)

- M5S-BID0524B1 *1
- M5S-BOT05750D1b *1
- M5S-AIA05020B3*1
- M5S-AOA05020D3Ab *1
- Original Jumper Cap *9
- Original Tweezers (for pulling out M5S parts) *1
- Original jumper *8



(If you need a blank expansion board, please contact customer service)

Type selection Tips:

1. The standard M5S-BID0524B1 module does not have the pull resistance function. If you want to have a strong driving ability, it is recommended to choose the module with the pull resistance internally, otherwise you must design the driver program in the chip.

2. When the source module is not switched on, it is low; when switched on, it is high. Therefore, it is recommended to select the source type module (such as BID.xx. yyy.B1) for external drive with high power.

Conversely, the leakage module is high when not switched on, and low when switched on. Therefore, it is recommended to choose leaky module (such as BID.xx. yyy.A1) for external drive with low power.

4. Pin description

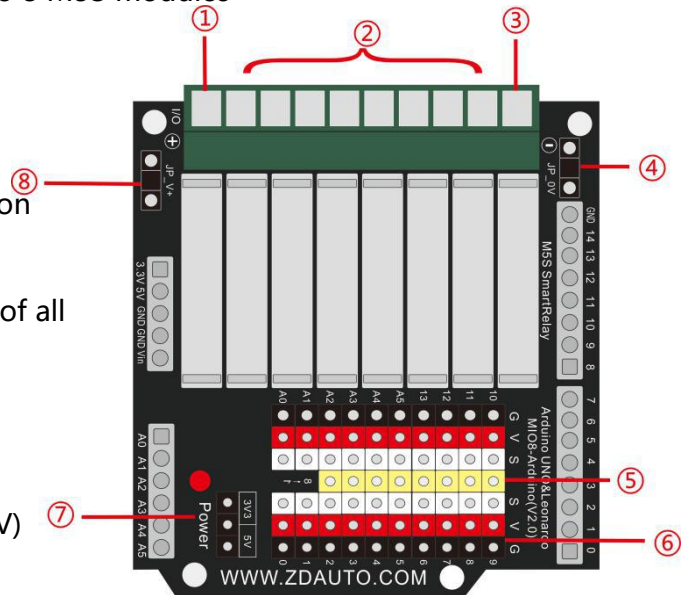
4.1 Expansion board

- ① : Internal/external supply M5S module 7 pin power (V+)
 - ② : Signal input/output outlets for external devices (pin 8 for each M5S)
 - ③ : Internal/external supply M5S module no. 6 pin power (V-)
 - ④ : Connect external circuit to internal power supply (0V common)
 - ⑤ : Pin 1 (access control signal) corresponding to 8 M5S modules
 - ⑥ : Connector field
- G : Internal power supply (public land V-)
V : Internal power supply (V+)
S : The corresponding Arduino UNO expansion

- ⑦ : Connect the voltage of Arduino to the 3 pin of all M5S modules (M5S power supply) :

- Pin 1~2: 3.3 v
- Pin 2~3: 5V

- ⑧ : Connect external circuit to internal power (5V)



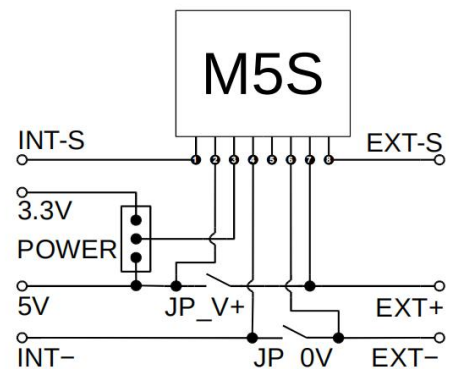
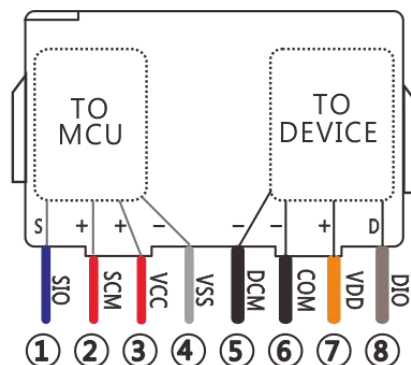
*Notice :

- ④⑧ : Not parallel

4.2 M5S Module pin description

Pins Define

Control Side	① SIO : Signal A
	② SCM:Signal B/V2+
	③ VCC:Power (L)
	④ VSS:Public land
Device Side	⑤ DCM:Signal B (NC)
	⑥ COM:Public land
	⑦ VDD:Power(H)
	⑧ DIO:Signal A



*There are hundreds of models of M5S module devices, please contact customer service for detailed information.

5. Wiring diagram of expansion board

<p>Detecting a voltage of 24 V DC. Input wiring diagram BID0524B1. M5S 1 connected to Arduino digital pin 2.</p>	<p>Switching a load with a maximum voltage of 24 V DC and a maximum current of 750 mA. Output wiring diagram BOT05750D1b. M5S 2 connected to Arduino digital pin 3.</p>
<p>Measuring an analogue current ranging from 0 to 20mA with voltage supply 24 V DC. Input wiring diagram AIA05020B3. M5S 3 connected to Arduino analogue pin A4.</p>	<p>Output of an analogue current ranging from 0 to 20mA with voltage supply 24 V DC. Output wiring diagram AOA05020D3Ab. M5S 4 connected to Arduino digital pin 5.</p>

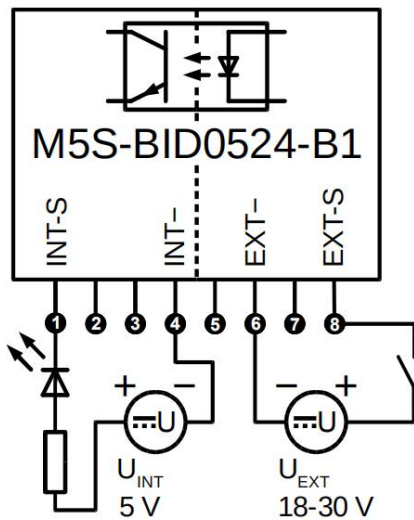
To secure isolation circuit : 1. The power supply on the equipment side is isolated from the power supply on the control side (MCU) and the power supply on the equipment side.
2.The selected M5S module should be fully isolated.

6. Introduction of M5S module functions

6.1 M5S-BID0524B1

Optical Isolated,DC Digital Sourcing Input(Input:DC,PNP,6-8 pin; Output: without pull-up resistor,NPN,OC Output, 1-4 pin)

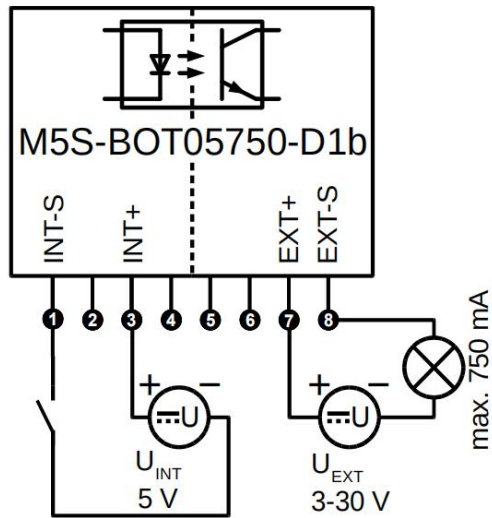
Model	Control Side (Output)				Frequency	Isolation	Device Side (Input)				Circuit index
	Voltage(1)	Current(1)	Power(3)	Polarity			Voltage(8)	Current(8)	Power(7)	Polarity	
M5S-BID0524B1	H:5V L:0V	Max 8mA	x	N OC	0 ~ 5KH	•	24VDC	L:7mA H:1mA	x	P	B1



6.2 M5S-BOT05750D1b

Optical Isolated, Transistor Digital Sourcing Output (Input : 1, 3 pin N signal, 7-8 pin Transistor-OC-P, Transistor header electrode open circuit output)

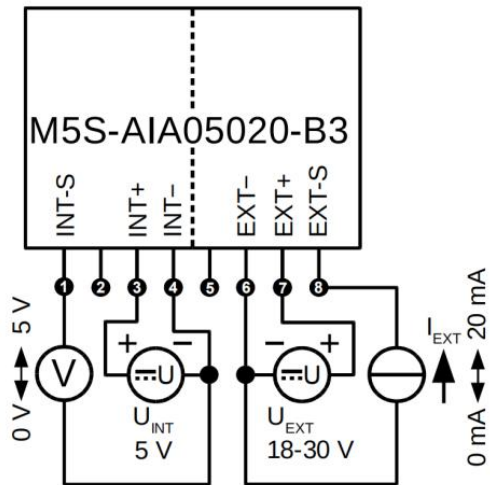
Model	Control Side (Input)				Frequency	Isolation	Device Side (Output)				Circuit index
	Voltage(1)	Current(1)	Power	Polarity			Voltage(8)	Current(8)	Power	Polarity	
M5S-BOT05750D1b	ON:0V OFF:5V	Max 7mA	5V	N	0 ~ 20KHz	●	DC 24V	Max 750mA	x	P TOC	D1



6.3 M5S-AIA05020B3

Optical Isolated, Current analog Input(Input:DC current, 6-7-8 PIN), Output (0~ 3.3V/5V, 1-3-4 PIN)

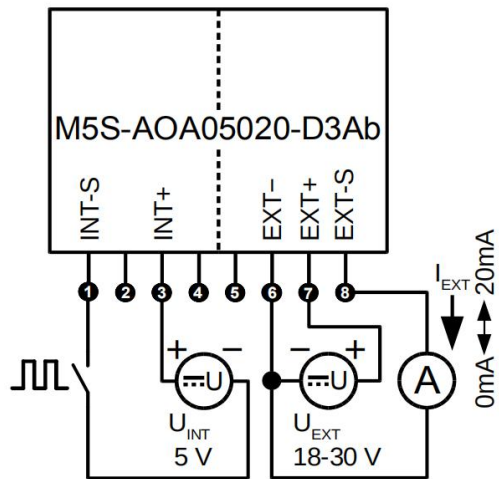
Model	Control Side (Output)				Frequency	Isolation	Device Side (Input)				Circuit index
	Voltage(1)	Current(1)	Power	Polarity			Voltage(8)	Current(8)	Power	Frequency response	
M5S-AIA05020B3	0~5V	<5mA	5V	5%	linear	●		0~20mA	24V	1KHz	B3



6.4 M5S-AOA05020D3Ab

Optical Isolated, PWM type current analog Output (Input, 1, 3 TTL level PWM signal, Output: voltage signal, 6-7-8pin)

Model	Control Side (Input)				Frequency	Isolation	Device Side (Input)				Circuit index
	Voltage(1)	Current(1)	Power	Voltage(8)			Voltage(8)	Current(8)	Power	Frequency response	
M5S-AOA05020D3Ab	PWM	<5mA	5V	3%	linear	●		0~20mA	24V	1KHz	D3A

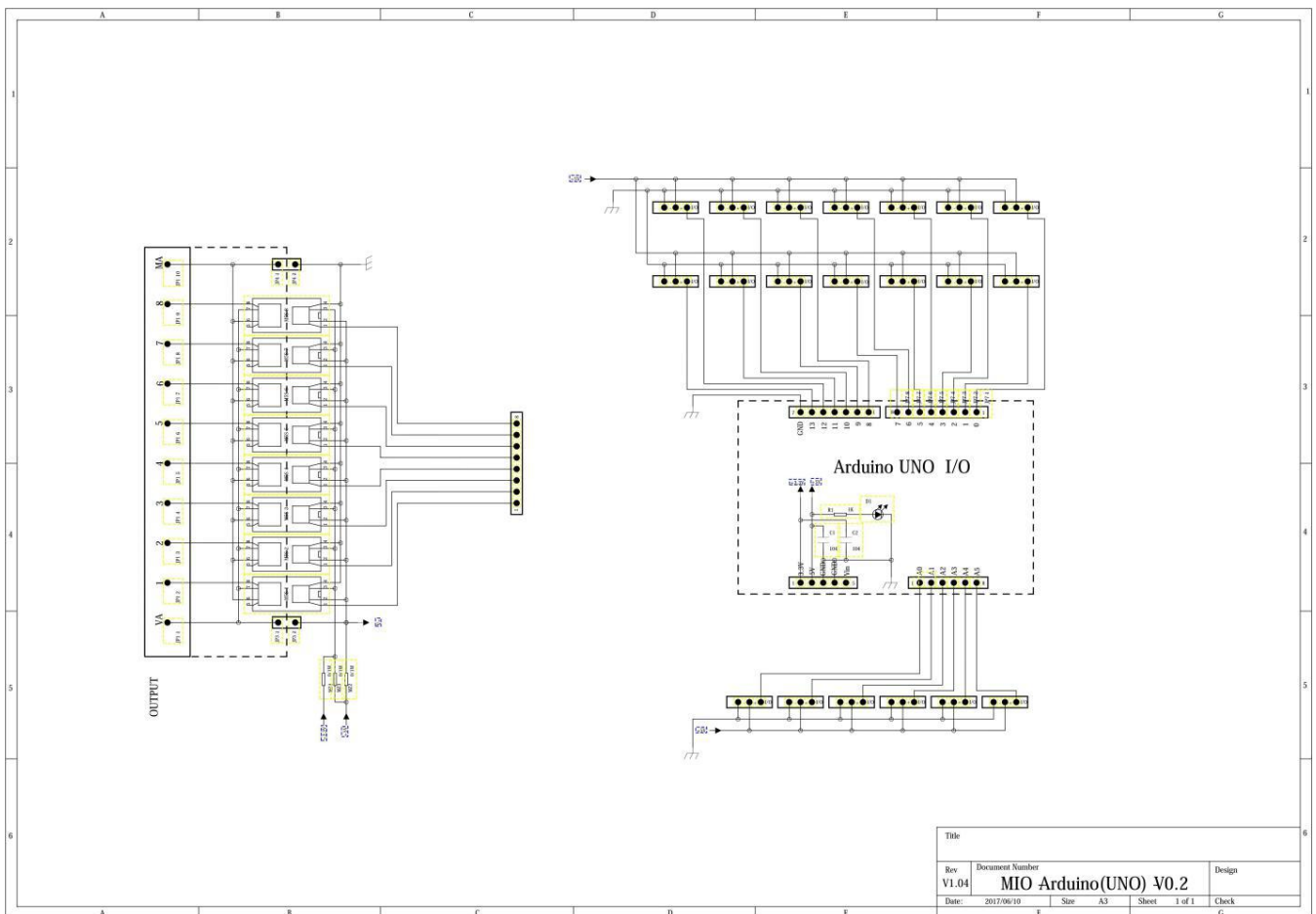


7. Practical application of Arduino UNO expansion board :

The GPIO point in the Arduino platform is connected with the signal pin of the corresponding M5S module in the expansion board to drive/receive signals from external devices.

I/O expansion boards with 2-way BI switch input, and 4-way BO switch output, 2-way AO analog module, switch input (access switch, button switch, limit switch, level switches, key signal, etc.), switch output (control relay, contactor, solenoid valves, electric wire, lights, buzzer, motor, etc.), the analog output (e.g., control motor speed, adjusting the furnace temperature, tension control, etc.).

8. Wiring diagram of Arduino UNO I/O expansion board (see attachment for the clear version)



9. Arduino expansion board case

This routine uses 5 M5S to realize the function of analog output, input and switching output and input. AOV05010C3 first generates 0~10V of analog quantity (analog quantity output), and then AIV05010A3 collects it (analog quantity input). The results of analog quantity output and input can be seen in the serial port monitor. When KEY1 is pressed down (switching quantity input), analog quantity output and input value increase (the maximum is 10V); when KEY2 is pressed down, analog quantity output and input value decrease (the minimum is 0V); and each time the key is pressed, LED lamp state is flipped once (switching quantity output). The serial port monitor displays the following.

