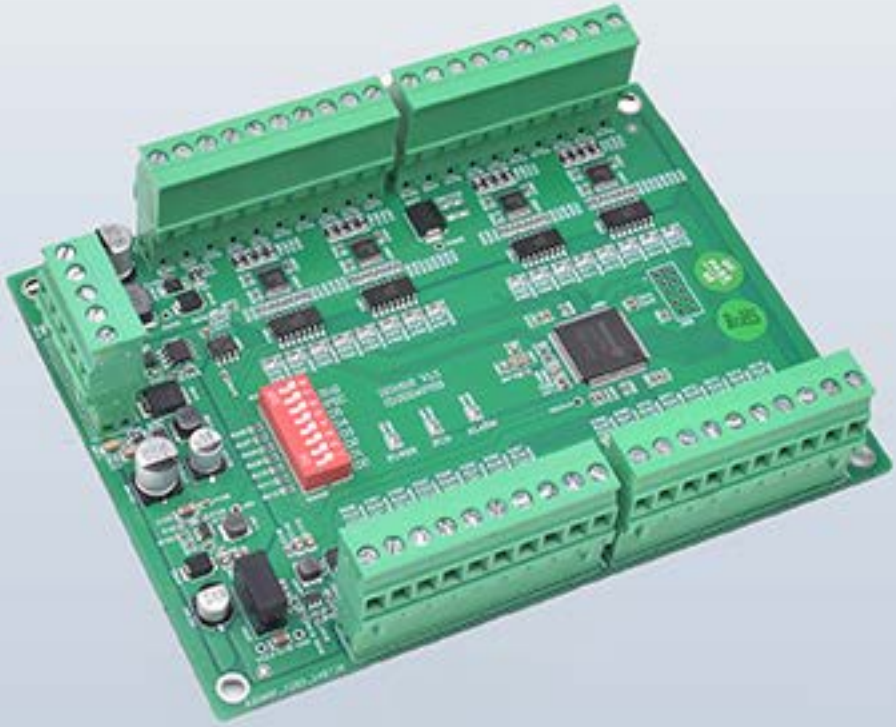
Zmotion
正运动技术

做更好用的运动控制，智造美好生活
Better Motion Control, Smarter Life

ZIO CAN IO Expansion Module

ZIO1616



This manual is for ZIO1616, ZIO1616M, ZIO1616MT.

Vision Motion Controller

Motion Controller

Motion Control Card

Expansion Module

HMI

Foreword

The motion controller provides rich interface, and it has excellent motion control performance, which can meet the expansion requirements of various projects.

For details about the ZMC controller software and the introduction and routine of each command, please refer to the ZBASIC software manual.

Information contained in this manual is only for reference. Due to improvements in design and functions and other aspects, Zmotion Technology reserves the final interpretation! Subject to change without notice!

Pay attention to safety when debugging the machine!

Please be sure to design an effective safety protection device in the machine, and add an error handling program in the software, otherwise Zmotion has no obligation or responsibility for the loss caused.

In order to ensure the safe, normal and effective use of the product, please be sure to read this product manual carefully before installing and using the product.

Safety Statement

- This chapter describes the safety precautions required for the correct use of this product. Before using this product, please read the instructions for use and correctly understand the relevant information on safety precautions.
- This product should be used in an environment that meets the design specifications, otherwise it may cause equipment damage or personal injury, and malfunctions or component damage caused by failure to comply with relevant regulations are not within the scope of product quality assurance.
- Zmotion will not take any legal responsibility for personal safety accidents and property losses caused by failure to comply with the contents of this manual or illegal operation of products.

Safety Level Definition

According to the level, it can be divided into " Danger " and " Caution ". Failure to operate as required may result in moderate injury, minor injury or equipment damage.

Please keep this guide in a safe place for reading when needed, and be sure to hand this manual to the end user.

Install	
 Danger	◆ When the controller is disassembled, all external power supplies used by the system should be disconnected before operation, otherwise it may cause misoperation or damage to the equipment. ◆ It is forbidden to use in the following places: places with dust, oil fume, conductive dust, corrosive gas and flammable gas; places exposed to high temperature, condensation, wind and rain; places with vibration and shock. Electric shock, fire and misuse can cause product damage and deterioration.
 Notice	◆ Avoid metal shavings and wire ends falling into the hardware circuit board during installation. ◆ After installation, ensure that there are no foreign objects on the hardware circuit board. ◆ When installing, make it tightly and firmly with the mounting frame.

	◆ Improper installation of the controller may result in misoperation, failure and fire.
Wiring	
 Danger	◆ The specifications and installation methods of the external wiring of the equipment shall comply with the requirements of local power distribution regulations. ◆ When wiring, all external power supplies used by the system should be disconnected before operation. ◆ When powering on and running after the wiring work is completed, the terminals attached to the product must be installed. ◆ Cable terminals should be well insulated to ensure that the insulation distance between cables will not be reduced after the cables are installed on the terminal block.
 Notice	◆ Avoid metal shavings and wire ends falling into the hardware circuit board during installation. ◆ The cable connection should be carried out correctly on the basis of confirming the type of the connected interface. ◆ It should be confirmed that the cables pressed into the terminals are in good contact. ◆ Do not bundle the control wires and communication cables with the main circuit or power supply wires, etc., and the distance between the wires should be more than 100 mm, otherwise noise may cause malfunction. ◆ If the controller is not installed properly, it may cause electric shock or equipment failure or malfunction.

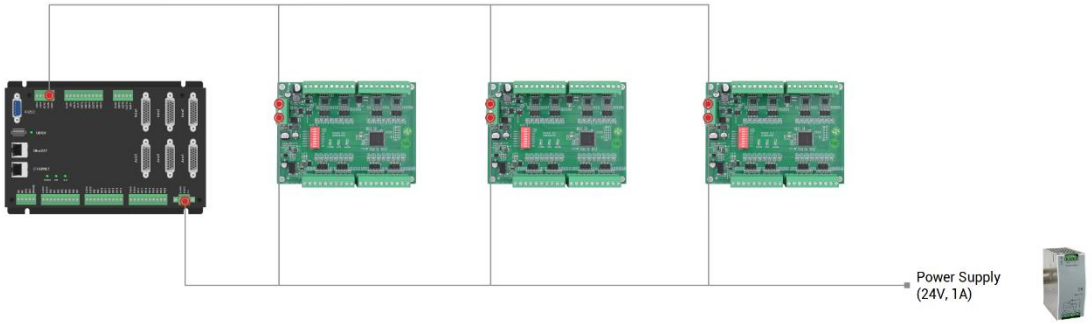
CONTENT

Chapter I Introduction

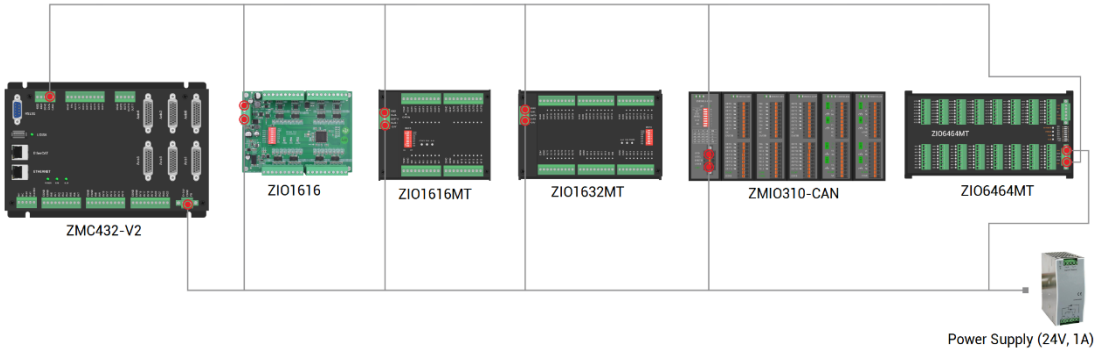
1.1. Product Introduction

When you need more IO resources, Zmotion provides "Expansion Modules", there are EtherCAT and CAN modules. Here, "ZIO Series Expansion Module" uses CAN protocol to achieve resources expansion. And multiple ZIO series expansion modules can be connected at the same time. Now, this is ZIO1616 user manual.

A. Connect several expansion modules that are same models to controller:

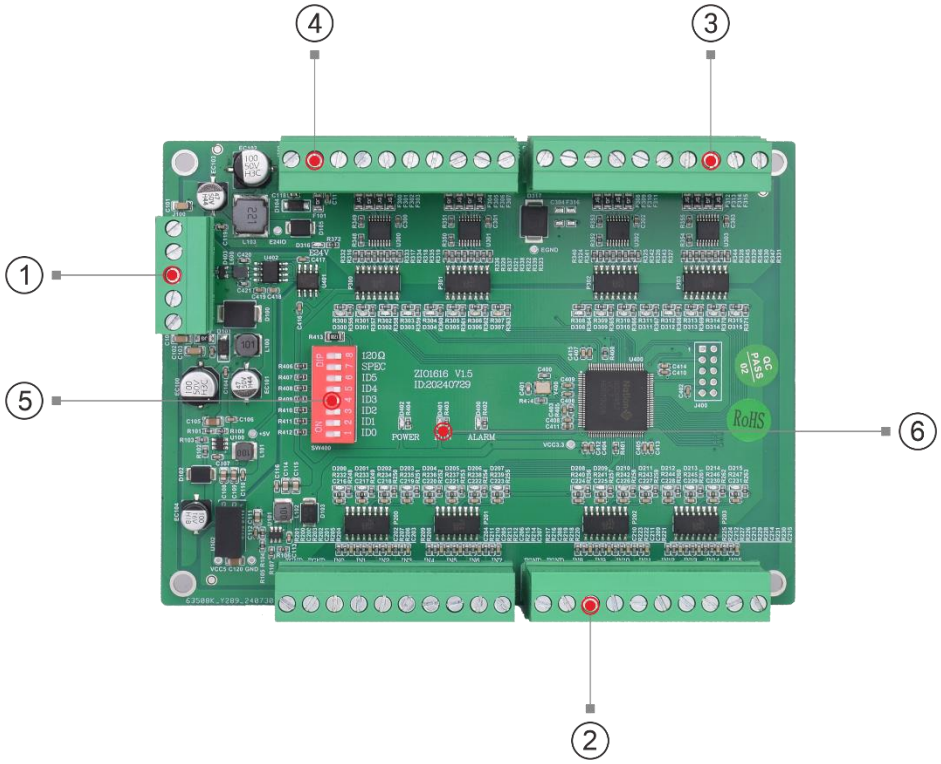


B. Connect several expansion modules that are different models to controller:



- ZIO1616: it can expand 16 digital inputs and 16 digital outputs (there are PCB model, module model, and cover (shell) model).
- It has one CAN bus interface that is connected to master motion controller.
- This module has IO state indication led, which can be use to watch IO state.

1.2. ZIO1616 Interfaces



No.	Interface	Description
①	Main Power	24V DC power supplies power for expansion module to control communication circuit.
	CAN Bus	Connect to CAN expansion module or main controller
②	General Digital IN	NPN type, IN 0-15.
③	General Digital OUT	NPN type, OUT 0-15.
④	IO Power	24V DC power for IO
⑤	DIP Switch	8-digit dial code, used to define CAN communication address and velocity.
⑥	State Indication Led	IO POWER/E24V: it is ON when IO power is conducted.
		POWER main power indicator: it is ON when the power is conducted.
		Run indicator: it is ON when runs normally
		ALARM indicator: it is ON when runs abnormally

1.3. ZIO Specification & Models

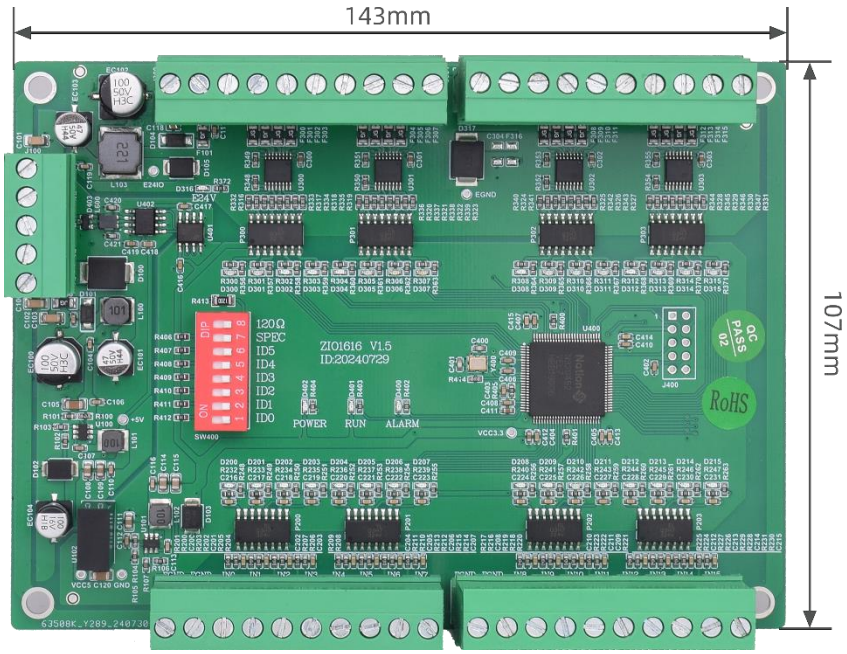
Model	ZIO1616	ZIO1616M	ZIO1616MT
IO Type	NPN		
Digital IN	16 (general)		
Digital OUT	16 (general)		
CAN	1		
DIP Switch	8-digit dial code switch		
Axis	-	-	-
AD/DA	-	-	-
Function Description	PCB Board Type	Module Type	Module with cover (shell) Type
Size	143*107*31.5	147*123*55	147*123*55

1.4. Usage Environment

Item		Parameters
Work Temperature		-10℃-55℃
Work relative Humidity		10%-95% non-condensing
Storage Temperature		-40℃ ~ 80℃ (not frozen)
Storage Humidity		Below 90%RH (no frost)
vibration	Frequency	5-150Hz
	Displacement	3.5mm(directly install)(<9Hz)
	Acceleration	1g(directly install)(>9Hz)
	Direction	3 axial direction
Shock (collide)		15g, 11ms, half sinusoid, 3 axial direction
Degree of Protection		IP20

1.5. ZIO1616 Hardware Installation

ZIO1616 expansion module adopts the horizontal installation method of screw fixing, and each expansion module should be installed with 4 screws for fastening.



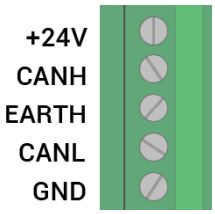
→ Unit: mm →Installment Hole Diameter: 4.3mm

Chapter II ZIO1616 Hardware Interfaces

2.1. Power IN / CAN Communication

This terminal is used for module's main power and CAN communication.

IO power input locates in “OUT” terminal, 24V DC power.

Main Power	Name	Type	Function
	+24V	Input	Main power 24V IN
	CANH	Input / Output	CAN differential data +
	EARTH	Earthing (Grounding)	Shield layer / Protection
	CANL	Input / Output	CAN differential data -
	GND	Input	Main power ground
Note: please supply +24V and E24V power separately, not recommend to use same one power supply, therefore, please use 2 24V output power supplies or the power that can support 2 isolated 24V power supplies.			

IO Power	Name	Type	Function
	EGND	Input	IO power ground
	E24V	Input	IO power 24V input
Note: please supply +24V and E24V power separately, not recommend to use same one power supply, therefore, please use 2 24V output power supplies or the power that can support 2 isolated 24V power supplies.			

→ Power Supply Specification

Item	Description
Voltage	DC24V±5%
The current to open	≤0.2A

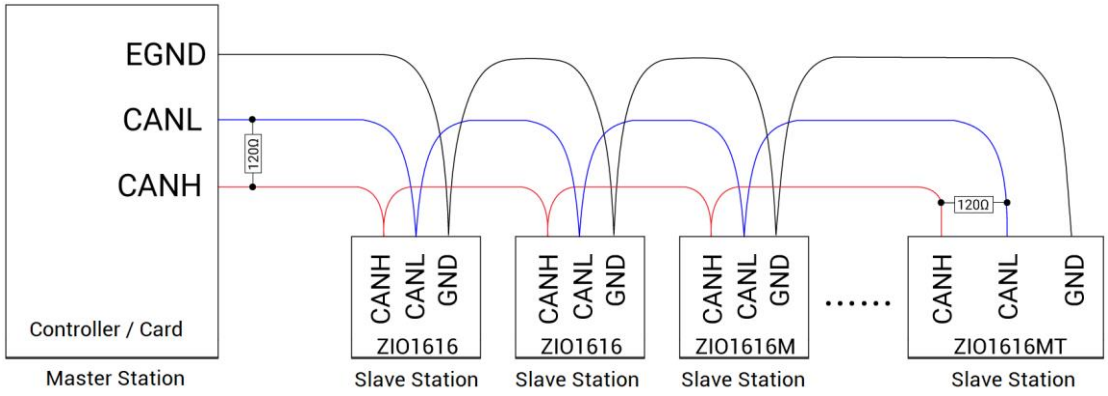
The current to work	≤0.1A
Anti-reverse connection	YES
Overcurrent Protection	YES

Item	IO Power Description
Voltage	DC24V±5%
The current to work	≤5A
Anti-reverse connection	YES
Overcurrent Protection	YES

→ CAN Communication Specification

CAN	Description
Maximum Communication Rate	1Mbps
Terminal Resistor	120Ω
Topological Structure	Daisy Chain Topology
The number of nodes can be extended	Up to 16
Wiring length	Recommend: <30m (500kbps)
Communication Isolation	YES

→ Wiring



➢ Wiring Notes

- As above, the daisy chain topology is used for wiring (the star topology structure cannot be used). And shorter distance between nodes, the better.
- Please connect a 120Ω terminal resistor in parallel to each end of the CAN bus for matching the circuit impedance and ensuring communication stability.
- Please be sure to connect the public ends of each node on the CAN bus to prevent the CAN chip from burning out.
- Please use STP (Shielded Twisted Pair), especially in bad environments, and make sure the shielding layer is fully grounded.
- When on-site wiring, pay attention to make the distance between strong current and weak current, it is recommended for the distance to be more than 30cm.
- It should be noted that the equipment grounding (chassis) on the entire line must be good, and the grounding of the chassis should be connected to the standard factory ground pile.

→ How to Use:

(1) Please follow the above wiring instructions to wiring correctly.

(2) After powered on, please use any one interface among the three interfaces (ETHERNET, RS232, RS485) to connect to ZDevelop / RTSys.

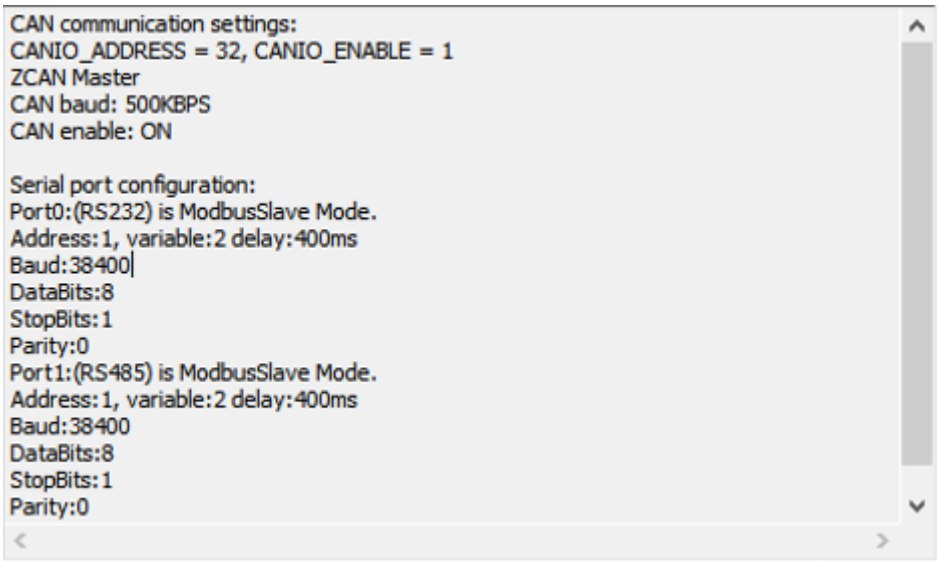
(3) Configure controller CAN master station:

a. use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs.

b. use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

c. you can view parameters through "RTSys/Controller/State the Controller/Communication Info" intuitively.

d. You can view bus nodes parameter through "RTSys/Controller/State the Controller/ZCan Node" intuitively



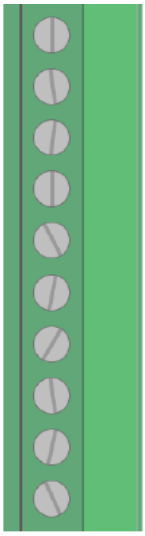
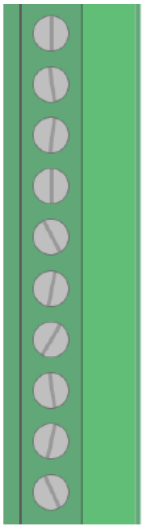
(4) Correctly set the "address" and "speed" of the slave station expansion module according to the manual of the slave station, and do mapping (refer to “3.2 Resources Mapping").

(5) After all the settings are completed, restart the power supply of all stations to establish communication (success: there will be module information in “controller state – CAN node", failure: slave module ALM will be ON).

(6) Note that the "speed" settings of each node on the CAN bus must be consistent, and the "address" settings cannot cause conflicts, otherwise the "ALM" alarm light will be on, and the communication establishment will fail or the communication will be disordered.

(7) Above commands details and others, please refer to the “ZBasic Programming Manual".

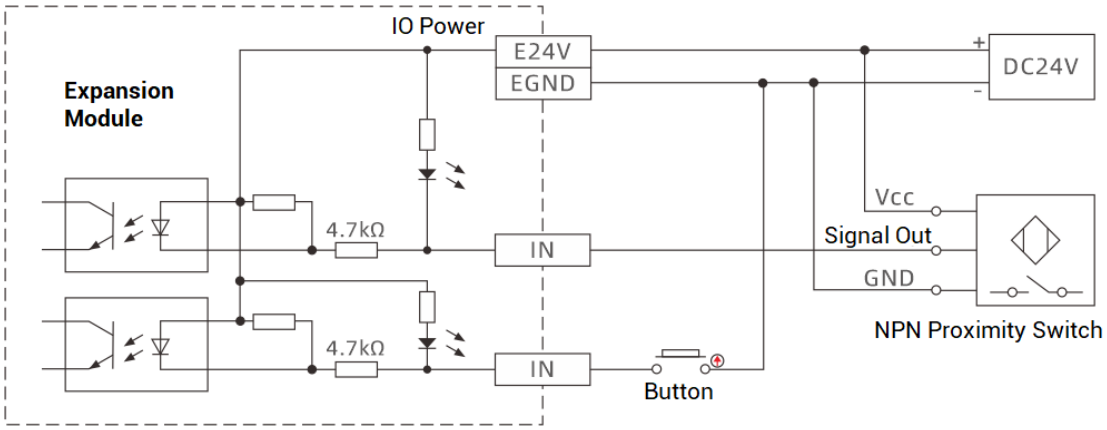
2.2. IN Digital Input

Terminal	Name	Type	Function 1
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN0	NPN type, digital input	Input 0
	IN1		Input 1
	IN2		Input 2
	IN3		Input 3
	IN4		Input 4
	IN5		Input 5
	IN6		Input 6
	IN7		Input 7
	EGND	/	IO power ground
	EGND	/	IO power ground
	IN8	NPN type, digital input	Input 8
	IN9		Input 9
	IN10		Input 10
	IN11		Input 11
	IN12		Input 12
	IN13		Input 13
	IN14		Input 14
	IN15		Input 15

→ Specification

Item	Digital Input (IN0-15)
Input mode	NPN type, triggered by low level
Frequency	< 5kHz
Impedance	4.7KΩ
Voltage	≤24V
Communication Distance	√

→ Wiring Reference



➢ **Wiring Note:**

- The wiring principle of digital input IN (0-15) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on the IO power supply to the "COM" terminal of the external input device. If the signal area power supply of the external device and the power supply of the controller are in the same power supply system, this connection also can be omitted.

→ How to Use

(1) Please follow the above wiring instructions to wiring correctly.

(2) DIP assigns IP address and communication velocity, please refer to “3.2 resources mapping".

(3) After that, and power on, connect controller to RTSys through ethernet or serial port.

(4) Use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs. And use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

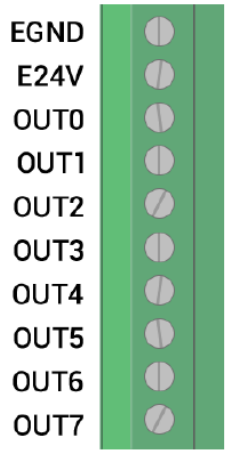
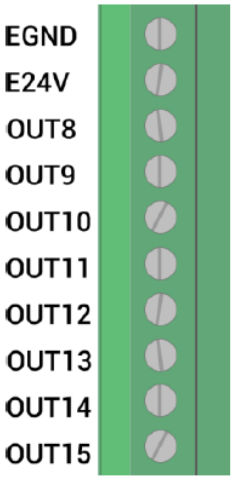
(5) Establish the communication: when built, corresponding information will be shown

in “controller state” – “CAN Node”.

(6) State values of relative input ports can be read directly through “IN” command, also, it can be read through “RTSys>Tool>In”.

(7) Above commands details and others, please refer to the “ZBasic Programming Manual”.

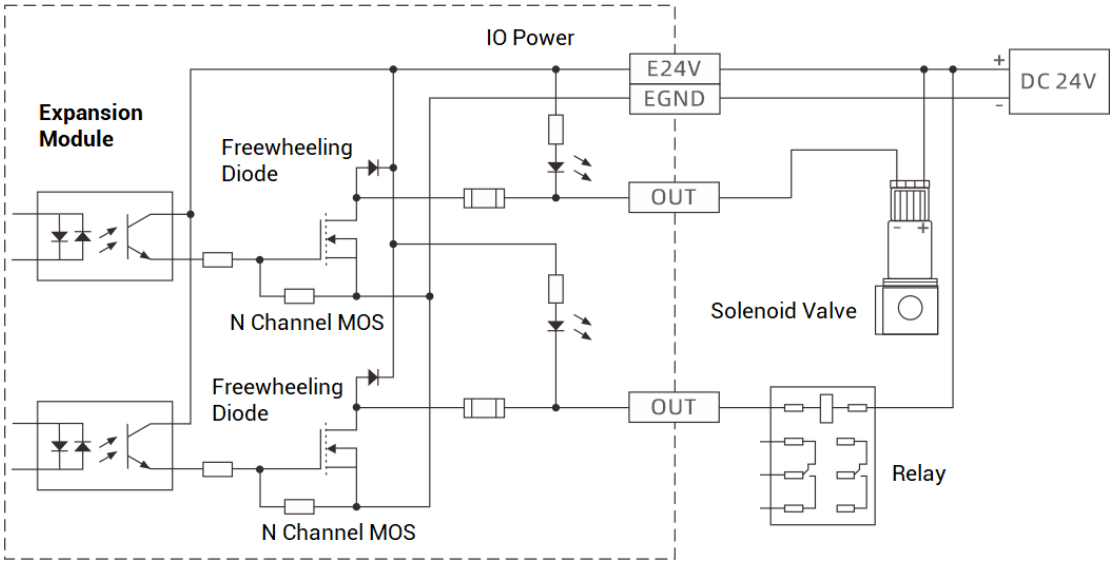
2.3. OUT Digital Output

Terminal	Name	Type	Function 1
	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT0	NPN leakage type, digital output	Output 0
	OUT1		Output 1
	OUT2		Output 2
	OUT3		Output 3
	OUT4		Output 4
	OUT5		Output 5
	OUT6		Output 6
	OUT7		Output 7
	EGND	/	IO power ground / IO Public End
	E24V	/	IO power input DC24V
	OUT8	NPN leakage type, digital output	Output 8
	OUT9		Output 9
	OUT10		Output 10
	OUT11		Output 11
	OUT12		Output 12
	OUT13		Output 13
	OUT14		Output 14
	OUT15		Output 15

→ Specification

Item	Digital Output (OUT0-15)
Output mode	NPN type
Frequency	< 8kHz
Voltage	≤24V
Max output current	+300mA
Overcurrent protection	Support
Communication Isolation	Support

→ Wiring Reference



➢ **Wiring Note:**

- The wiring principle of digital output OUT (0-15) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device. If the DC power supply of the external device and the controller power supply are in the same power supply system, this connection can also be omitted.

→ How to Use

(1) Please follow the above wiring instructions to wiring correctly.

(2) DIP assigns IP address and communication velocity, please refer to “3.2 resources mapping".

(3) After that, and power on, connect controller to RTSys through ethernet or serial port.

(4) Use the "CANIO_ADDRESS" command to set the master's "address" and "speed" according to the needs. And use the "CANIO_ENABLE" command to enable or disable the internal CAN master function.

(5) Establish the communication: when built, corresponding information will be shown in “controller state" – “CAN Node".

(6) State values of relative input ports can be read directly through “OP" command, also, it can be read through “RTSys>Tool>Op".

(7) Above commands details and others, please refer to the “ZBasic Programming Manual".

Chapter III CAN Resources Expansion

When controller doesn't have enough IO, axis, AIO, they can be expanded by CAN or EtherCAT expansion modules. Here, mainly CAN.

There are 3 kinds CAN expansion modules, ZIO, ZAIO, ZMIO310-CAN. For axis, 2 can be expanded at mots.

Please select the expansion module according to the requirements, and select IO mapping or axis mapping according to the resources of the expansion module.

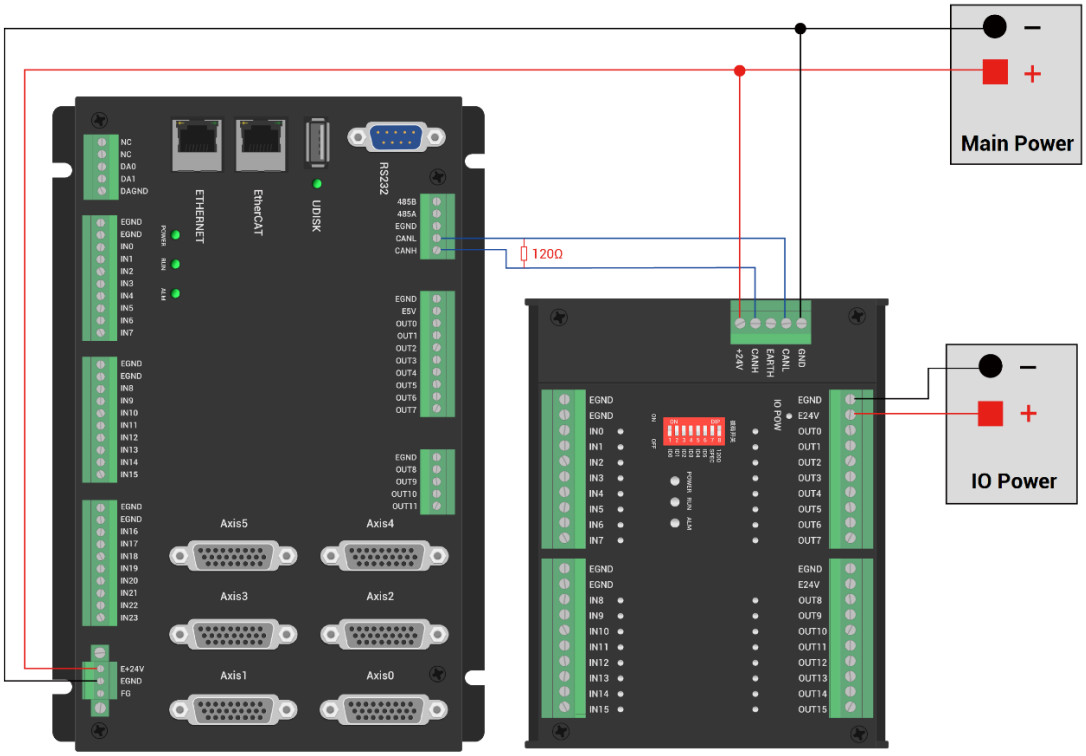
3.1. Expansion Module Wiring

The ZIO expansion module is powered by the dual power supply. Except the main power supply, an additional IO power supply is required to supply independent power for IO. Both the main power supply and the IO power supply use 24V DC power supply. For ZAIO, it only needs to connect to the main power supply.

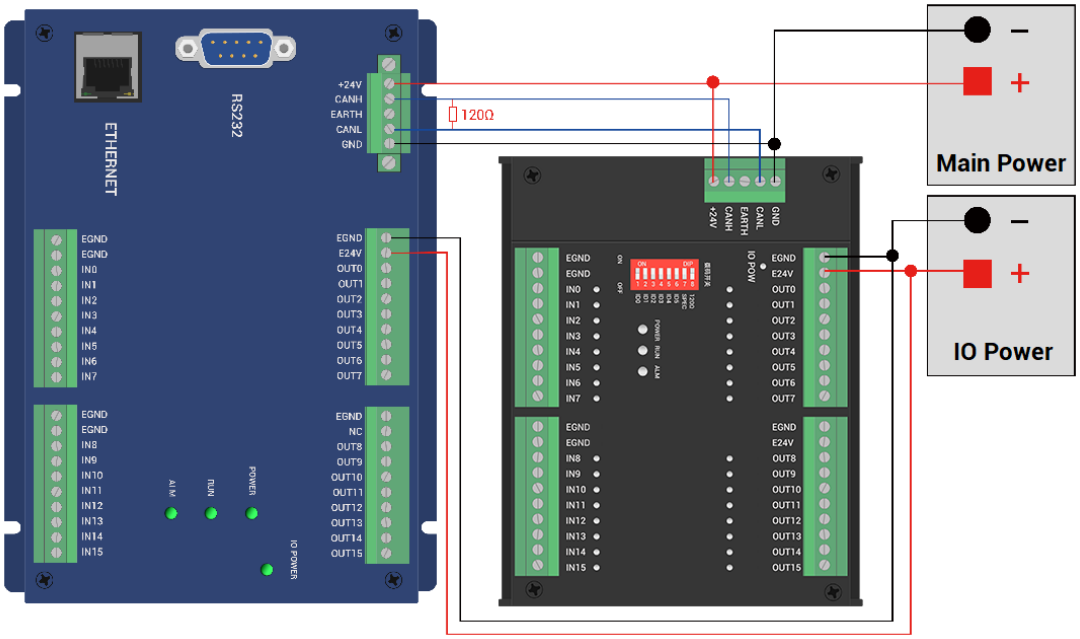
To prevent interference, separate the IO power supply from the main power supply.

Please select the expansion module according to the requirements, and select IO mapping or axis mapping according to the resources of the expansion module. Attention the No. must be different while mapping.

A. Single-Power Controller & Module Wiring



B. Dual-Power Controller & Module Wiring



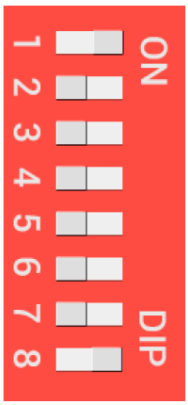
➢ **Wiring Note:**

✧ The controller and the expansion module need to share the main power supply, IO power of ZIO and ZMIO310-CAN need to be powered independently for isolation.

- ✧ When connecting multiple expansion modules on the CAN bus, a 120-ohm resistor needs to be connected in parallel between the CANL and CANH terminals, for the expansion module that is with 8-digit dialing codes, the terminal resistor can be realized by dialing the code (DIP).
- ✧ The maximum output current of output can reach 300mA, when the load exceeds the power, it is necessary to add relay.
- ✧ It is recommended that the internal power supply 24V and the external digital IO power supply 24V should be separately powered, and two 24V power supplies can be used, or a power supply that can provide two isolated 24V outputs.
- ✧ When the controller and the expansion module are powered by different power supplies, the ground of the main control power supply of the controller should be connected to the GND of the power supply of the expansion module, otherwise the CAN may be burned.

3.2. Resources Mapping

→ DIP Switch

DIP Switch	DIP Code	Name	Description
	1	ID0	CAN address dial code
	2	ID1	CAN address dial code
	3	ID2	CAN address dial code
	4	ID3	CAN address dial code
	5	ID4	CAN speed dial code
	6	ID5	CAN speed dial code
	7	SPEC	Special function reserved
	8	120Ω	CAN 120Ω resistor dial code

Generally, one CAN expansion board has one 8-code DIP switch used for communication configuration & resources mapping, dial it as ON to take effect:

- 1-4: CAN module address ID, combination value is 0-15 (from 4-digit binary into decimal system) – controller will automatically map module's IO number range according to this address ID, for axis No., please map manually.
- 5-6: CAN communication speed, corresponding value is 0-3 (from 4-digit binary into

decimal system), four different speeds are optional.

DIP 5-6 combination value	CAN communication speed
0	500KBPS (default value)
1	250KBPS
2	125KBPS
3	1MBPS

- 7: special functions reserved.
- 8: 120 ohm resistor, dial ON that means a 120 ohm resistor is connected between CANL and CANH.

➢ **Wiring Note:**

✧ For "how to do communication configuration for master station controller", please check "2.1 Power IN / CAN Communication Configuration" – "How to Use".

✧ Each node's on the bus communication speed ratio must be configured as the same, mapped IO No. and axis No. can't be the same.

→ IO Mapping

CAN expansion module's IO mapping is determined by code switch 1-4, below shows the mapping relation:

Code 4	Code 3	Code 2	Code 1	Address ID	Starting IO No.	End IO No.
0	0	0	0	0	16	31
0	0	0	1	1	32	47
0	0	1	0	2	48	63
0	0	1	1	3	64	79
0	1	0	0	4	80	95
0	1	0	1	5	96	111
0	1	1	0	6	112	127
0	1	1	1	7	128	143
1	0	0	0	8	144	159
1	0	0	1	9	160	175
1	0	1	0	10	176	191

1	0	1	1	11	192	207
1	1	0	0	12	208	223
1	1	0	1	13	224	239
1	1	1	0	14	240	255
1	1	1	1	15	256	271

Analog IO mapping form (for 1-4 code state and corresponding ID, please refer to above form):

Address ID	Starting AD No.	End AD No.	Starting DA No.	End DA No.
0	8	15	4	7
1	16	23	8	11
2	24	31	12	15
3	32	39	16	19
4	40	47	20	23
5	48	55	24	27
6	56	63	28	31
7	64	71	32	35
8	72	79	36	39
9	80	87	40	43
10	88	95	44	47
11	96	103	48	51
12	104	111	52	55
13	112	119	56	59
14	120	127	60	63
15	128	135	64	67

→ How to Check Expanded Resources

Please connect controller to RTSys at first, then enter “controller – controller state – ZcanNode", you can view expansion module's ID and corresponding resource mapping No.

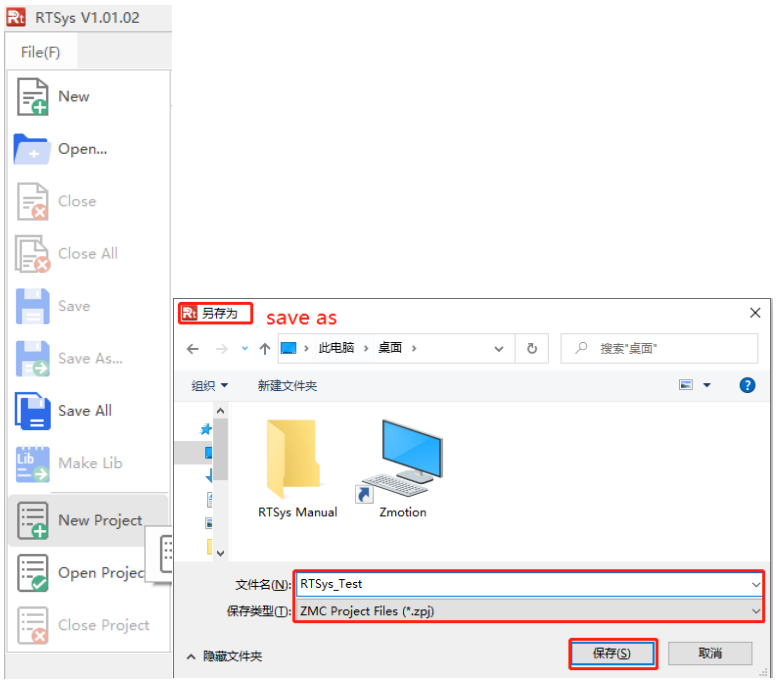
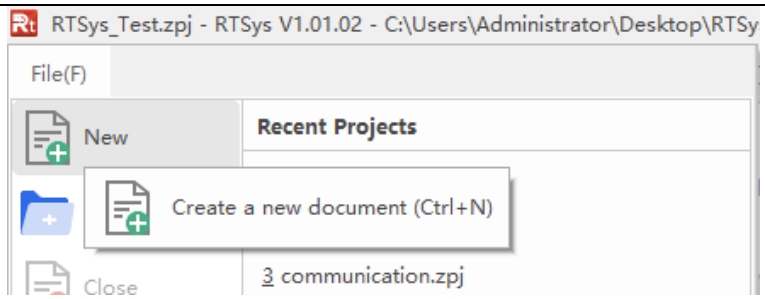
Chapter VI Programming

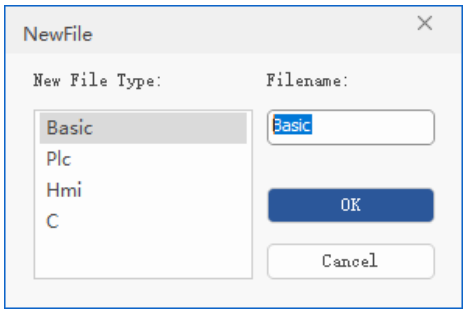
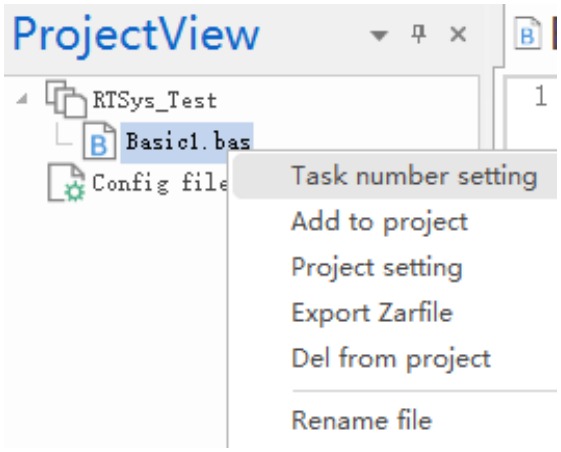
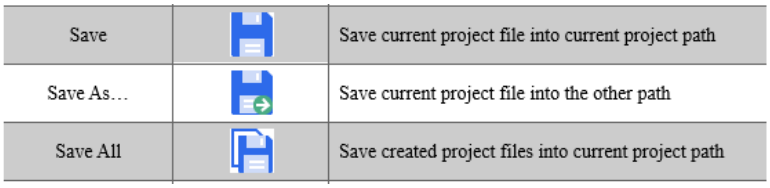
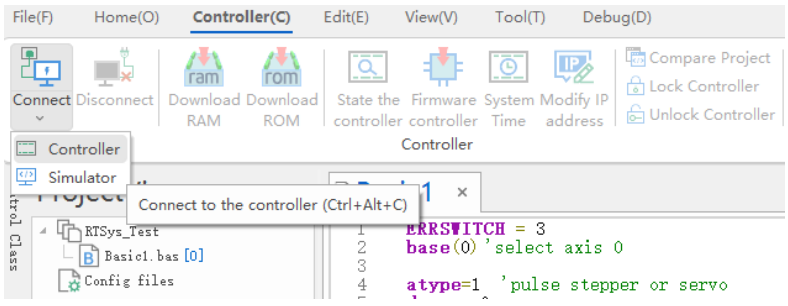
4.1. Program in RTSys

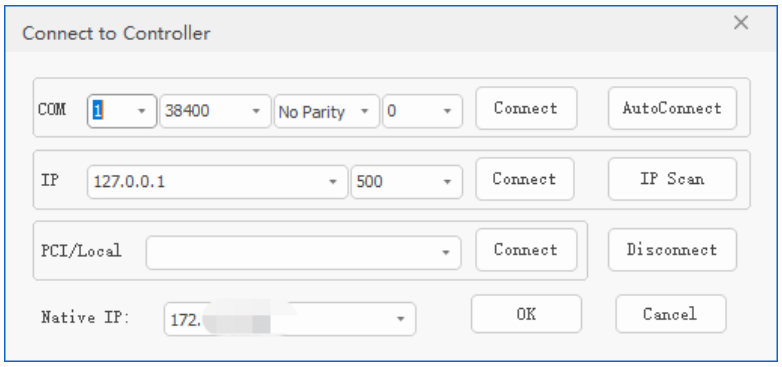
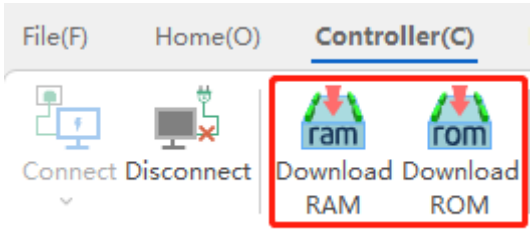
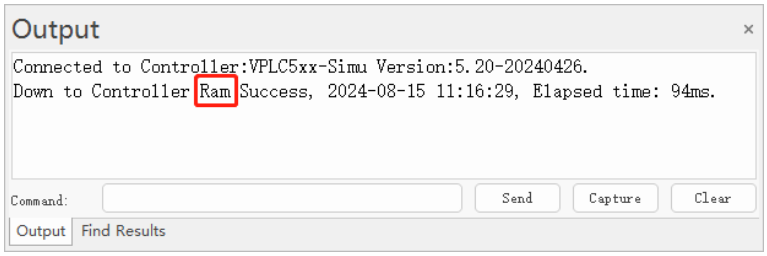
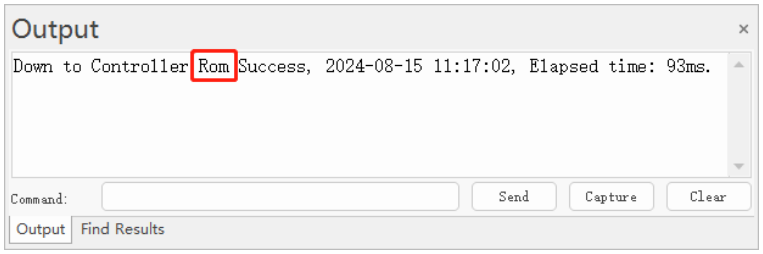
RTSys / ZDevelop (RTSys is new one, ZDevelop is old one) is a PC-side program development, debugging and diagnostic software for the Zmotion series motion controllers. Through it, you can easily edit and configure the controller program, quickly develop applications, diagnose system operating parameters in real time, and watch the motion controller. It supports Chinese and English, or you add your own language.

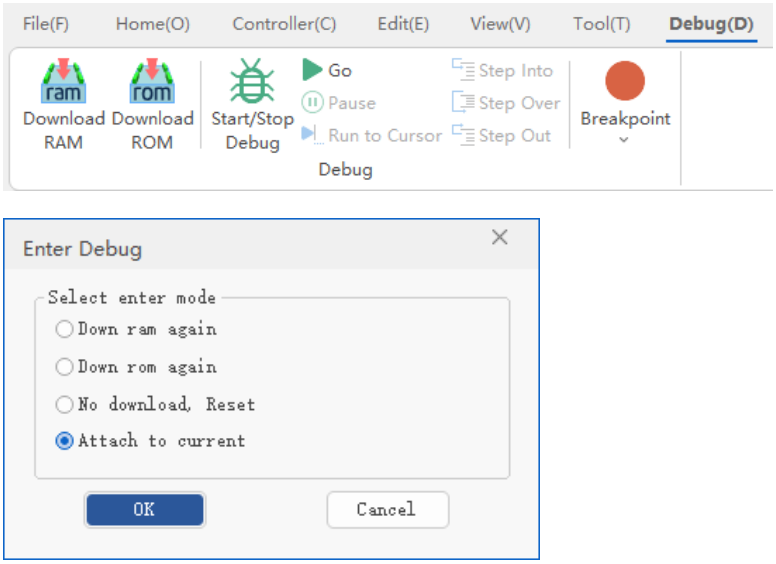
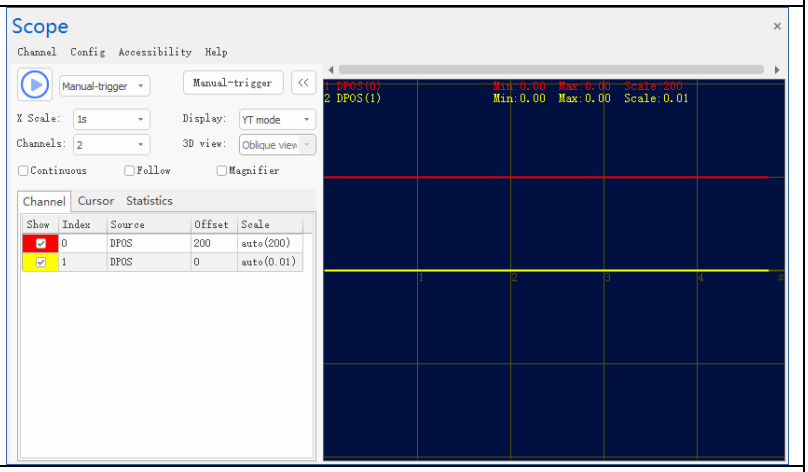
In RTSys, you can program by our languages: Basic, PLC, HMI, they can be programmed and run at the same time. (it can be downloaded from website)

--How to Use-- (for more, please refer to RTSys User Manual)

Step	Operations	Display Interface
1	Open RTSys, click "File" – "New Project", Save as window will pop up, then enter file name, save the project file with suffix "zpj.".	
2	Click "File" – "New File", select file type to build, here select Basic, click "OK".	

		
3	Right click the file, select “task number setting”, then enter 0 (can be any one, only it is less than max valid task, and no priority)	
4	Edit the program, click “save”, new built basic file will be saved under “zpj.” project. “Save all” means all files under this project will be saved.	
5	Click “controller – connect”, if no controller, select connect to simulator.	

	Then, “connect to controller” window will pop up, you can select serial port or net port, and enter related information, click “connect”.	
6	Click “Ram/Rom” – “download RAM / download ROM”, if it is successful, there is print indication, at the same time, program is downloaded into controller and runs automatically. RAM: it will not save when power off. ROM: it will save data when power off,	  

	and when the program is connected to controller again, running according to task number.	
7	Click “Debug” – “Start/Stop Debug”, Task and “Watch” window will open.	
8	Click “View” – “Scope” to open oscilloscope.	

Note:

- When opening an project, choose to open the zpj file of the project. If only the Bas file is opened, the program cannot be downloaded to the controller.
- When the project is not created, only the Bas file cannot be downloaded to the controller.
- The number 0 in automatic operation represents the task number, and the program runs with task 0, and the task number has no priority.
- If no task number is set for the files in the entire project, when downloading

to the controller, the system prompts the following message WARN: no program set autorun

4.2. How to Upgrade Firmware

The controller supports development under various operating systems such as windows, linux, Mac, Android, and wince, and provides dll libraries in various environments such as vc, c#, vb.net, and labview, as shown in the figure below. PC software programming refers to "ZMotion PC Function Library Programming Manual".

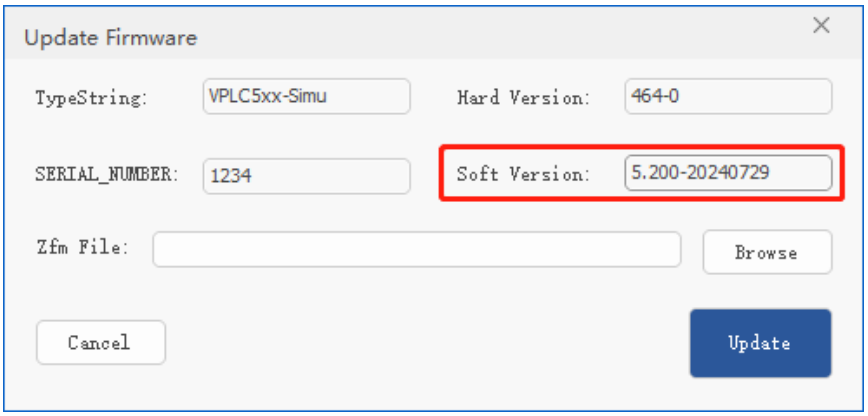
For some functions, you need to upgrade your controller's firmware. You can upgrade it in RTSys or using zfm firmware package downloaded from “zfirmdown" tool software. “zfm" file is the controller firmware upgrade package, different controller models have corresponding firmware, please choose correct one, better to contact with us.

Next, let's see how to upgrade the firmware through these methods one by one:

A. Upgrade the Firmware in RTSys

Step 1: download the new version firmware, and save it in your PC

Step 2: open RTSys, connect to controller, and click “controller” – “Firmware controller”, then one window appears, current controller firmware version can be checked, then you can check the version.



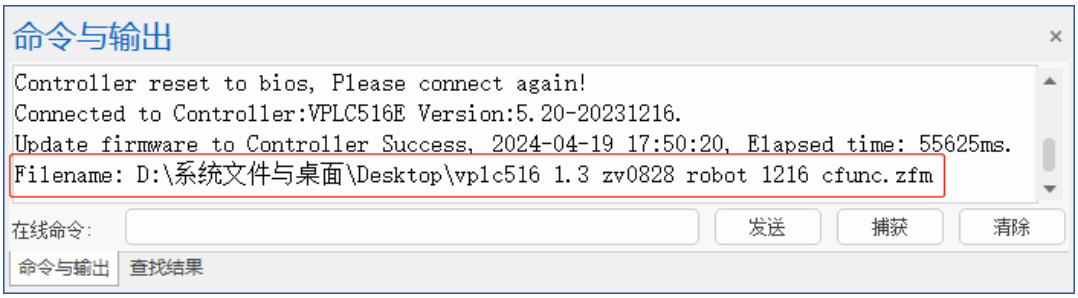
Step 3: click “Browse”, then open the file you saved of step 1.

Step 4: then click “update". After that, it will open one window that indicates the controller needs to be restarted to ZBIOS, then, please click OK to do reconnection (note: updated firmware version should be consistent with controller hardware model, otherwise, it will

report errors).

Step 5: after connect again, “update firmware” window will pop up again, now, system enters ZBIOS state, the current model will show as “VPLC516E-ZBIOS”, please click “Update” again. Then, it will download, don't close it while downloading.

Step 6: when downloaded, “update firmware” interface will disappear, and in “output”, success information will be shown.



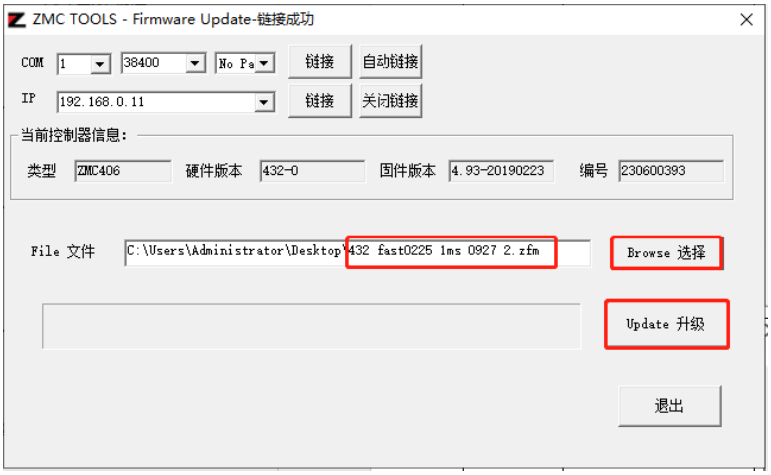
Step 7: connect to controller again, and check controller state to check firmware.

B. Upgrade the Firmware in zfirmdown Tool

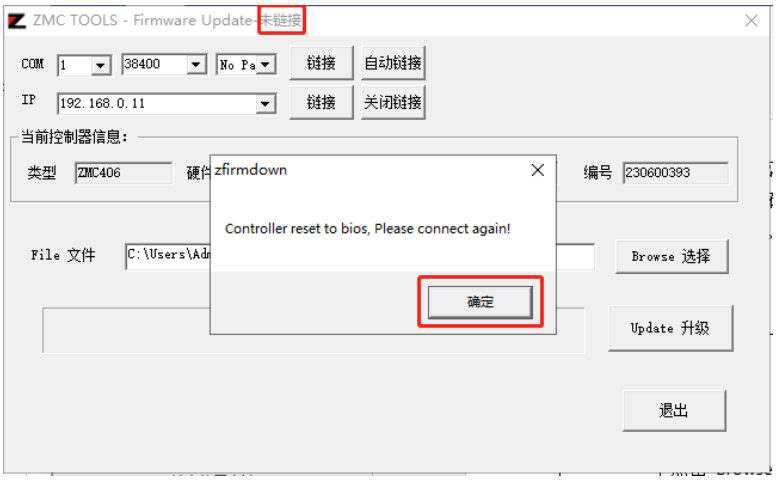
Step 1: download the new version firmware, and save it in your PC

Step 2: open zfirmdown software, and connect to controller through serial or ethernet. when it shows “connected”, you can view current hardware version and firmware version.

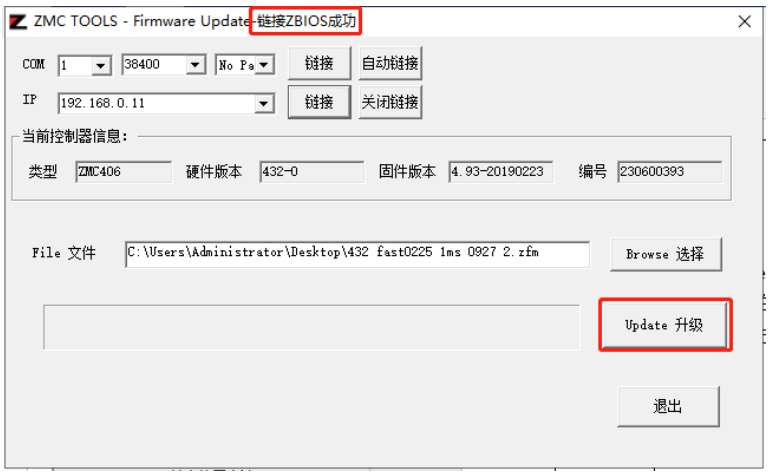
Step 3: click “Browse”, then open the file you saved of step 1, and click “Update”.



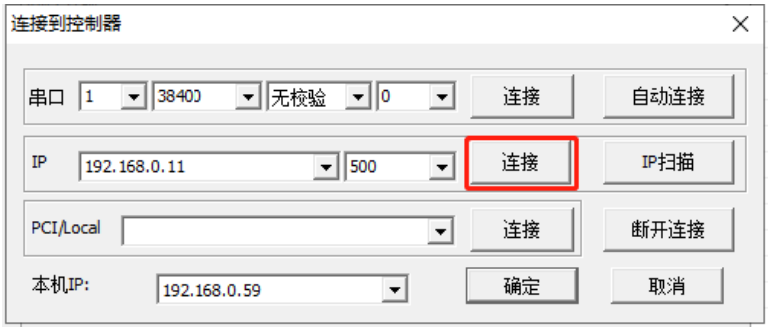
Step 4: the connection breaks, controller will enter ZBIOS state, please reconnect, and click OK.



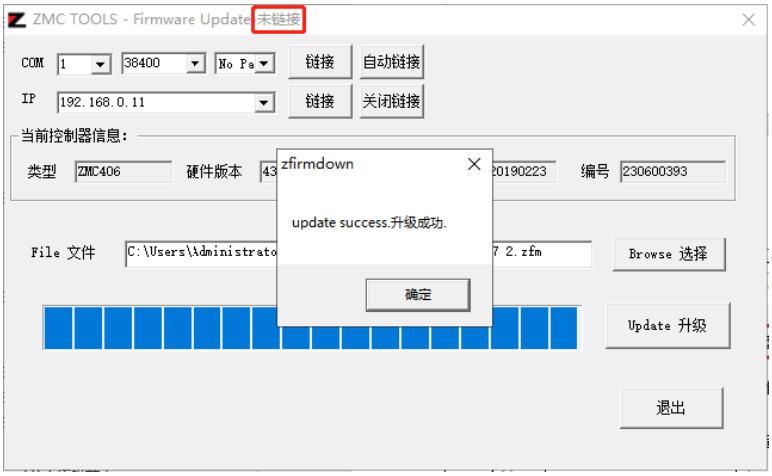
Step 5: when it shows “succeed to link ZBIOS", click “Update" again.

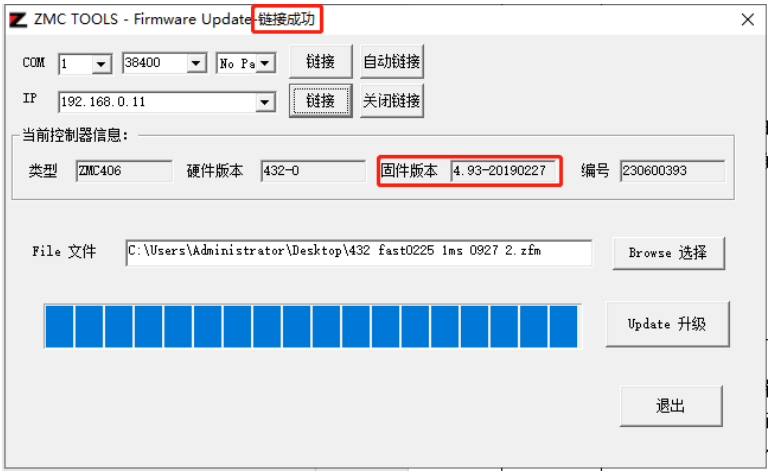


Step 6: at this time, “connect to controller” interface pops up again, please select correct IP address, and click OK.



Step 7: after updated, click OK, the connection breaks again, please reconnect, now latest version will be shown.





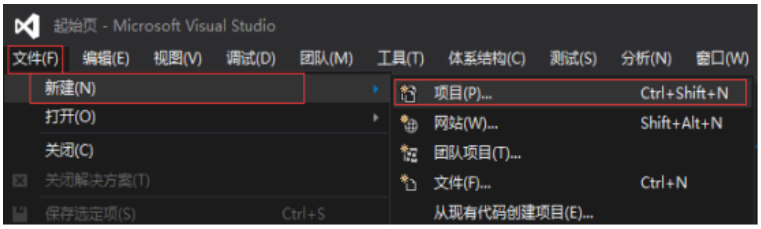
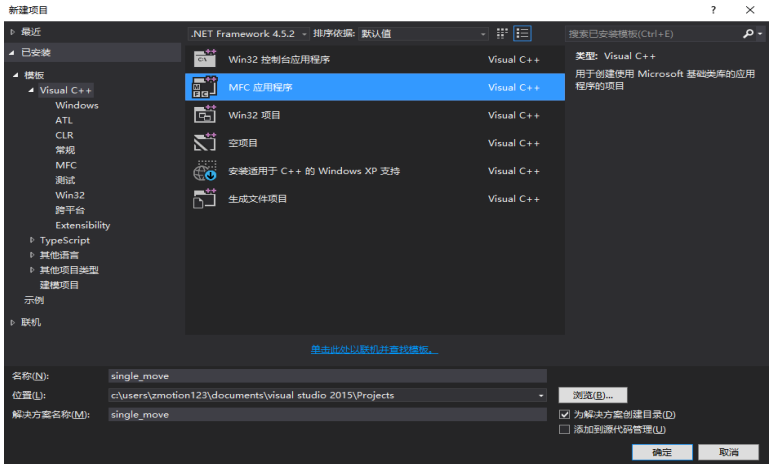
4.3. Program by PC Languages

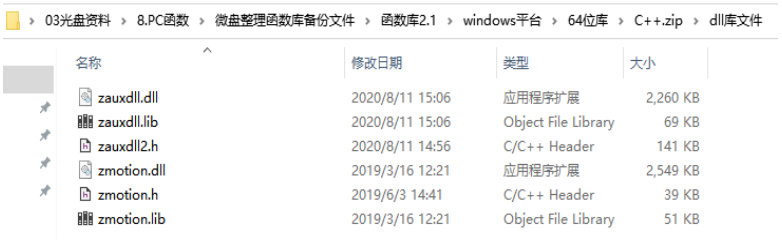
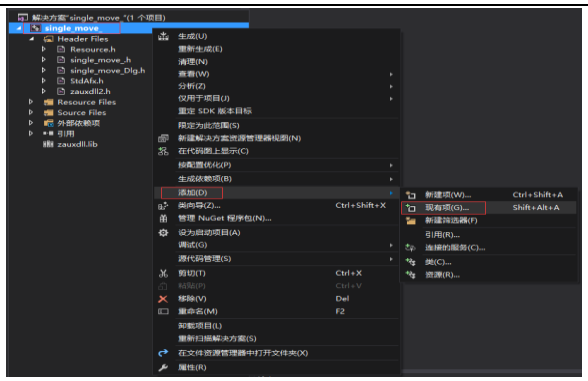
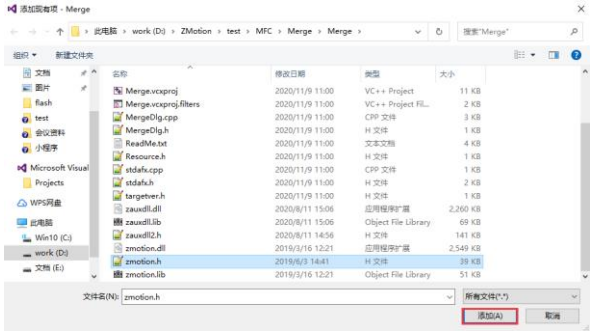
The controller supports development under various operating systems such as windows, linux, Mac, Android, and wince, and provides dll libraries in various environments such as

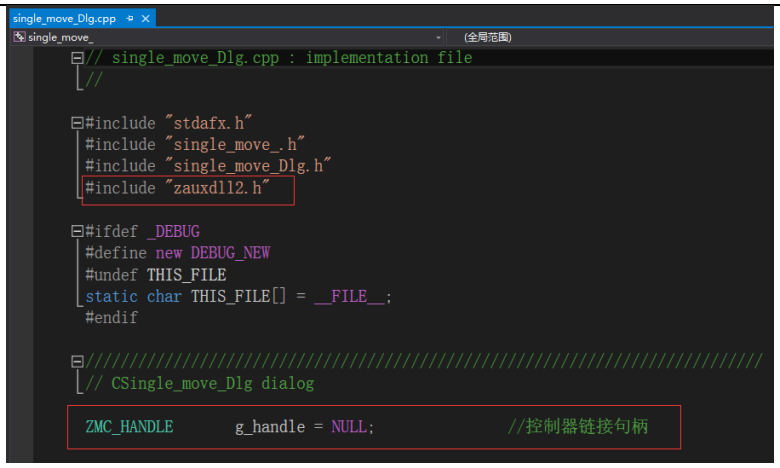
vc, c#, vb.net, and labview, as shown in the figure below. PC software programming refers to "Zmotion PC Function Library Programming Manual".

The program developed using the PC software cannot be downloaded to the controller, and it is connected to the controller through the dll dynamic library. The dll library needs to be added to the header file and declared during development.

The c++ project development process in VS is as follows:

Step	Operations	Display Interface
1	Open VS, click “File” – “New” – “Project".	
2	Select development language as “Visual C++” and the select program type as “MFC application type".	

<table>
<tr><td>3</td><td>Select “Based on basic box”, click “next” or “finish”</td><td colspan="2"> 
</td></tr>
<tr><td>4</td><td>Find C++ function library provided by manufacturer. Routine is below (64-bit library)</td><td colspan="2"> 
</td></tr>
<tr><td>5</td><td colspan="3">Copy all DLL related library files under the above path to the newly created project.</td></tr>
<tr><td rowspan="2">6</td><td rowspan="2">Add a static library and related header files to the project. Static library: zauxdll.lib, zmotion.lib
Related header files: zauxdll2.h, zmotion.h</td><td>1) Right-click the header file first, and then select: "Add" → "Existing Item".</td><td>  </td></tr>
<tr><td>2) Add static libraries and related header files in sequence in the pop-up window.</td><td>  </td></tr>
</table>

7	Declare the relevant header files and define the controller connection handle, so far the project is newly created.	

```cpp
// single_move_Dlg.cpp : implementation file
//

#include "stdafx.h"
#include "single_move_.h"
#include "single_move_Dlg.h"
#include "zauxdll2.h"

#ifdef _DEBUG
#define new DEBUG_NEW
#undef THIS_FILE
static char THIS_FILE[] = __FILE__;
#endif

/////////////////////////////////////////////////////////////////////////////
// CSingle_move_Dlg dialog

ZMC_HANDLE      g_handle = NULL;            //控制器链接句柄
```

Chapter V Maintain

The correct operation and maintenance of the device can not only guarantee and extend the life cycle of the equipment itself, but also take technical management measures according to the pre-specified plan or the corresponding technical conditions to prevent equipment performance degradation or reduce the probability of equipment failure.

5.1. Regular Inspection and Maintenance

The working environment has an impact on the device. Therefore, it is usually inspected regularly based on the inspection cycle of 6 months to 1 year. The inspection cycle of the device can be appropriately adjusted according to the surrounding environment to make it work within the specified standard environment.

Check item	Check content	Inspection standards
power supply	Check whether the voltage is rated	DC 24V (-5%~5%)
surroundings	Whether the ambient temperature is within the specified range (when installed in the cabinet, the temperature inside the cabinet is the ambient temperature)	-10°C - 55°C
	Whether the ambient humidity is within the specified range (when installed in the cabinet, the humidity in the cabinet is the ambient humidity)	10%-95% non-condensing
	Is there direct sunlight	No
	With or without droplets of water, oil, chemicals, etc.	No
	Whether there is dust, salt, iron filings, dirt	No
	Whether there is corrosive gas	No
	Whether there are flammable and explosive gases or articles	No
	Whether the device is subjected to	Should be within the range of

	vibration or shock	vibration resistance and impact resistance
	Is the heat dissipation good	Keep good ventilation and heat dissipation
Installation and Wiring Status	Whether the basic unit and the expansion unit are installed firmly	The mounting screws should be tightened without loosening
	Whether the connecting cables of the basic unit and the expansion unit are fully inserted	The connection cable cannot be loosened
	Are the screws of the external wiring loose	Screws should be tightened without loosening
	Whether the cable is damaged, aged, cracked	The cable must not have any abnormal appearance

5.2. Common Problems

Problems	Suggestions
No signal comes to the input.	1. Check whether the limit sensor is working normally, and whether the "input" view can watch the signal change of the limit sensor. 2. Check whether the mapping of the limit switch is correct. 3. Check whether the limit sensor is connected to the common terminal of the controller.
The output does not work.	1. Check whether IO power is needed. 2. Check whether the output number matches the ID of the IO board.
IN doesn't have voltage and current signals.	
POWER led is ON, RUN led is OFF.	1. Check whether the power of the power supply is sufficient. At this time, it is best to supply power to the controller alone, and restart the controller after adjustment. 2. Check whether the ALM light flickers regularly (hardware problem).

RUN led is ON, ALM led is ON.	1. Program running error, please check ZDevelop error code, and check application program.
CAN expansion module cannot be connected.	1. Check the CAN wiring and power supply circuit, whether the 120 ohm resistor is installed at both ends. 2. Check the master-slave configuration, communication speed configuration, etc. 3. Check the DIP switch to see if there are multiple expansion modules with the same ID. 4. Use twisted-pair cables, ground the shielding layer, and use dual power supplies for severe interference (the main power supply of the expansion module and the IO power supply are separately powered)