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***leetro***

# MPC08D Motion Controller

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(version 1.1)

**乐创自动化技术有限公司**  
LEETRO AUTOMATION CO.,LTD.

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# preamble


Thank you for purchasing the MPC08D Motion Controller! The MPC08D is a cost-effective general-purpose controller developed from our company. This manual describes the specifications of the MPC08D and how to use it, so please fully understand the functions of the MPC08D before using it.

## safety warning

Observe the following warnings to avoid injury to the operator and others and to prevent damage to the machine.

- ◆ The "DANGER" and "WARNING" symbols below are labeled according to their degree of accident hazard.

 Dang erous s	Indicates a potentially dangerous situation that, if not avoided, will result in death or serious injury.
---	---

 Warn ings	Indicates a potentially dangerous situation that, if not avoided, will result in a minor or moderate injury, or material damage.
---	--

- ◆ The following symbols indicate what is prohibited or what must be observed.

	This symbol indicates that the operation is prohibited.
---	---

	This symbol indicates an operation that requires attention.
---	---

## **Summary of general security**

Please review the following safety precautions to avoid injury and to prevent damage to this product or any of its components.

The connected product causes damage. To avoid potential hazards, use the product according to the detailed instructions.

Use the correct power cord. Use a power cord that meets national standards.

Connect and disconnect correctly. Connect the control card output to the adapter board first, then connect the motor and driver to the adapter board, and finally turn on the power. When disconnecting, turn off the external power supply first, then disconnect the motor and driver from the adapter board, and finally disconnect the control card from the adapter board.

Do not operate when there is a suspected malfunction. If you suspect damage to this product, have it inspected by qualified service personnel.

Do not operate in a humid environment.

Do not operate in explosive atmospheres. Keep product surfaces clean and dry.

Prevent electrostatic damage. Electrostatic discharge (ESD) can cause damage to components in the motion controller and its accessories. To prevent ESD, handle the controller components carefully and do not touch the components on the controller. Do not place the controller on surfaces that may generate static electricity. Transport and store the controller in bags or containers that are protected from static electricity.

## **About guarantees**

### **Warranty Time**

The warranty period for products purchased at the specified location

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is 1 year.

## Warranty Coverage

If a failure occurs due to our responsibility during the above warranty period, we will provide a no-cost repair.

Reason.

The following coverage is not covered under warranty:

- For malfunctions caused by inappropriate environments or inappropriate use as documented in the instruction manual and other manuals.
- Accidental malfunction of this product caused by the user's device, control software, etc.

- Malfunctions caused by customer modifications to this product.
- Malfunctions caused by external major causes such as fire, earthquake and other natural disasters.

## Product Applications

This product is designed and manufactured for general industrial applications. Uses that are beyond what is expected and have a significant impact on human life or property are not within the scope of service of the product.

## Contact Information

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# 1 Overview narrate

## 1.1 summary

MPC08D Motion Controller is a **PC-based** motion controller developed and manufactured by Legrand Automation Technology Ltd. A single card can control 4-axis stepper motors or digital servo motors. A single card can control 4-axis stepper motors or digital servo motors. Multiple cards can be shared to support the development of motion control systems with more than 4 axes.

MPC08D Motion Controller takes **IBM-PC** and its compatibles as the host, and is based on the **PCI** bus as the upper control unit of stepping motor or digital servo motor. It forms a master-slave control structure with **PC**: **PC** is responsible for the management of human-computer interface and real-time monitoring of the control system (e.g. management of keyboard and mouse, display of system status, sending of control commands, monitoring of external signals, etc.) the motion controller completes all the details of the motion control (including straight-line interpolation, output of pulse and direction signals, processing of automatic speed increase and decrease, detection of home position and limit signals, etc.). (including linear interpolation, output of pulse and direction signals, processing of automatic speed increase and decrease, detection of origin and limit signals, etc.)

MPC08D motion controller is equipped with powerful and rich **Windows** dynamic link library, which can easily develop various motion control systems. For the current popular programming and development tools, such as **Visual Basic6.0**, **Visual C++6.0** provides development **Lib** libraries and header files and module name files, which can be easily linked to the dynamic link libraries, and other 32-bit **Windows** development tools, such as **Delphi**, **C++Builder** and so on, are also very easy to use the **MPC08D** libraries. Other 32-bit **Windows** development tools such as **Delphi**, **C++Builder**, etc. can also easily use the **MPC08D** library.

MPC08D motion controllers are widely used in: laser processing equipment; CNC machine tools, machining centers, robots, etc.; X-Y-Z consoles; plotters, engraving machines, printing machines;

feeding devices, heads, marking machines, wire-winding machines; medical equipment; packaging machinery, textile machinery, woodworking machinery; assembly lines.

## 1.2 Performance specifications

Table 1-1 MPC08D Motion Controller Performance Specifications

sports event	MPC08D
primary interface	PCI (3.3, 5V Dual Purpose)
Number of control axes	4
Universal Digital Inputs	DC24V Photocoupling 24 points
Universal Digital Output	26 points, 100mA max Open Collector

sports event	MPC08D
Dedicated input	4 points per axis (positive limit, negative limit, home, alarm) board alarms
Maximum pulse output frequency	4MHz
Pulse output minimum frequency	10Hz
Pulse output specifications	Symmetric and asymmetric trapezoidal acceleration and deceleration per axis, S-shaped acceleration and deceleration
Pulse output method	Pulse/Direction Output ( <b>Pulse/DIR</b> ) or Dual Pulse Output ( <b>CW/CCW</b> )
Pulse Output Counter	32bit symbols per axis $\pm 2147483647$
Z pulse captured at zero return Minimum effective width	0.5 $\mu$ s
user storage area	1M Byte Flash
multi-card sharing	6 Card Sharing
special function	Dynamic change of target position, backlash compensation function
operating system	WINDOWS XP, WINDOWS 7 (32/64 bit)

## 1.3 Typical control system components

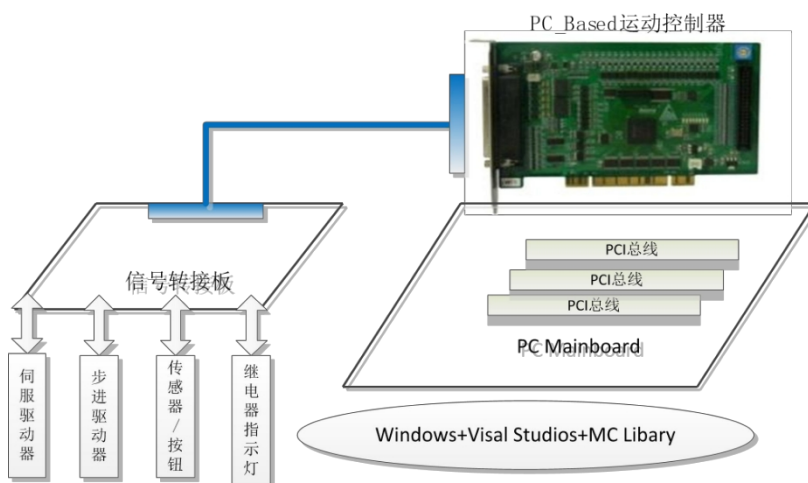


Figure 1-1 Schematic diagram of the control system using MPC08D motion controller.

A typical motion control system based on the **MPC08D** motion controller consists of the following components:

- (1) **MPC08D** Motion Controller, adapter board and its connecting cable;
- (2) **PCs** or industrial controllers with **PCI** slots and **Windows XP/7** operating system installed (the operating system supported by different controller models may vary);
- (3) Stepper motors or digital servo motors;
- (4) Motor Driver;
- (5) Various signal sensors;
- (6) Relays, indicator lights, etc.

## 2 Quick Installation

### 2.1 unpacking and inspection

After opening the package, please carefully check whether the product type is consistent with the ordered product, whether there is any mechanical damage on the surface of the controller, whether the components are detached, and whether the accessories are complete. If there is any damage on the surface of the controller, or if the product type does not match and the accessories are not available, please do not use it and contact your dealer immediately. Product list of MPC08D controller in standard configuration (MPC08D in standard configuration can control 8 universal inputs and 10 universal output ports)

- MPC08D Motion Control Card, 1 pc;
- P62-05 Adapter plate, 1 piece;
- 1 x 62-core shielded cable, 2m;
- 1 CD-ROM.

If you need to use more general-purpose inputs and outputs, you need to add the following additional configuration:

- Universal IO Expansion Cable C40-0.2M, 1 pc;
- P37-05 Adapter plate, 1 sheet;
- 37-core shielded cable 1pc, 2m.

### 2.2 Control card form factor

#### 2.2.1 MPC08D Motion Control Card Structure

##### Diagram

Eight of the motion indicators are located on the front of the card. J3 is a 62-conductor shielded cable connector, and J4 is a 40-conductor flat cable connector for general purpose IO expansion cards.

The rotary switch is used to set the card's local ID (i.e., card number) when sharing multiple cards.

This product is designed based on FPGA, and functions such as motion control, digital IO, PCI, etc. are written into FPGA by VHDL hardware description language. Therefore, it is possible to meet the requirements of different specifications of customers and OEM products in a short time by changing the internal composition.



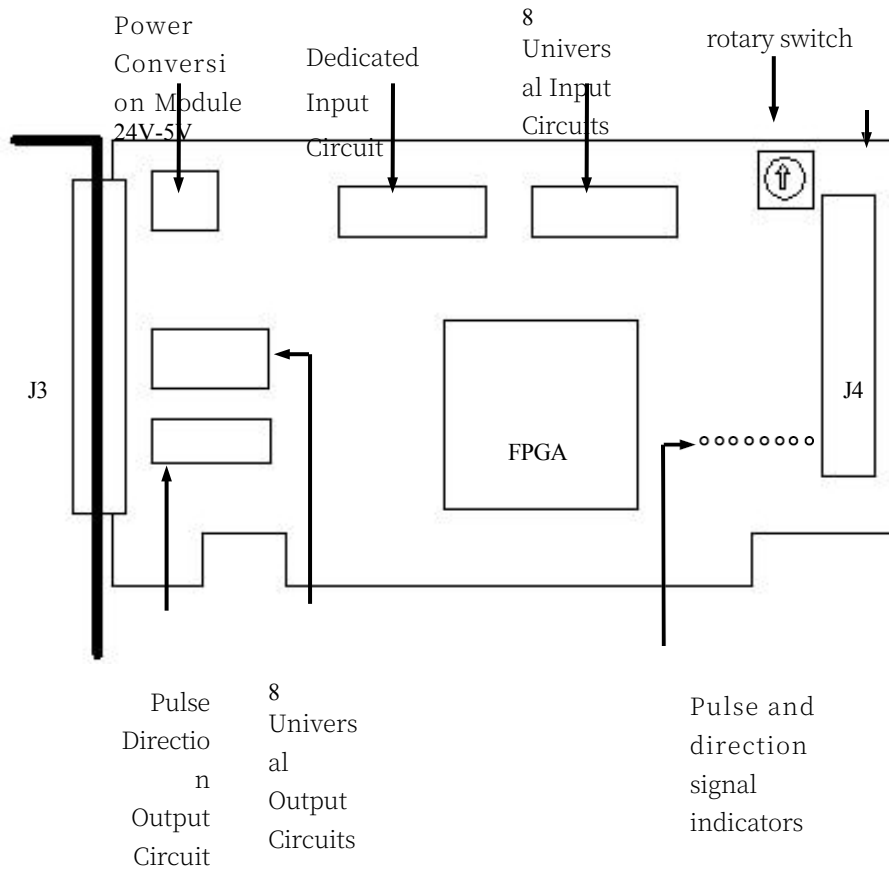
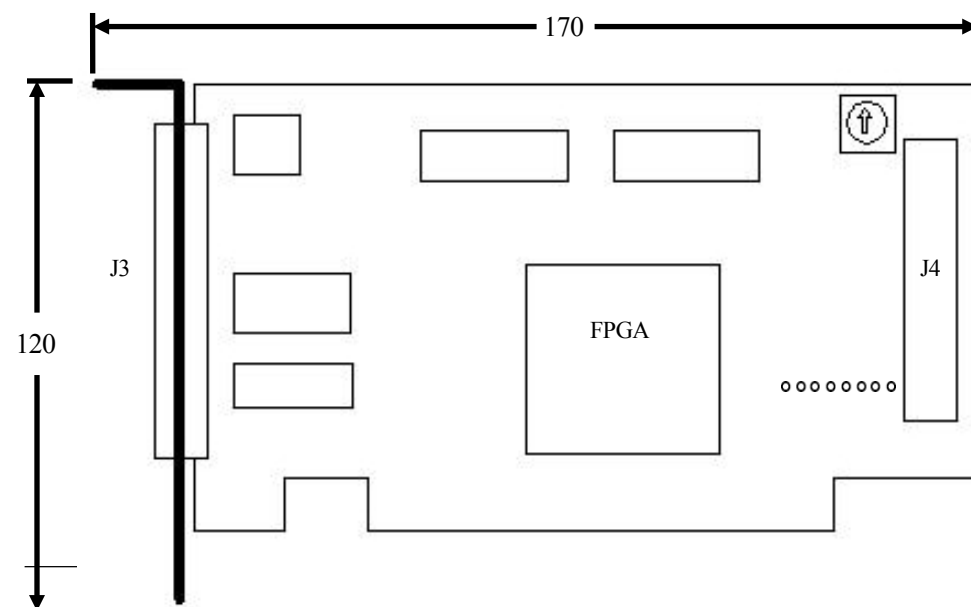


Figure 2-1 MPC08D Board Diagram

MPC08D control card size specification: (mm × mm)





## 2.2.2 MPC08D Adapter Board Pin Definitions

The MPC08D is supplied with a standard adapter board, P62-05, which is designed to connect to the MPC08D's main motion control signals and some of the IOs. If more general purpose IO signals are required, a P37-05 adapter board must be added. For more general-purpose IO signals, the P37-05 adapter board must be added. The port definitions of the signal adapter board are shown in the silkscreen on the adapter board.

P62-05 Adapter plate size specification: (mm × mm)

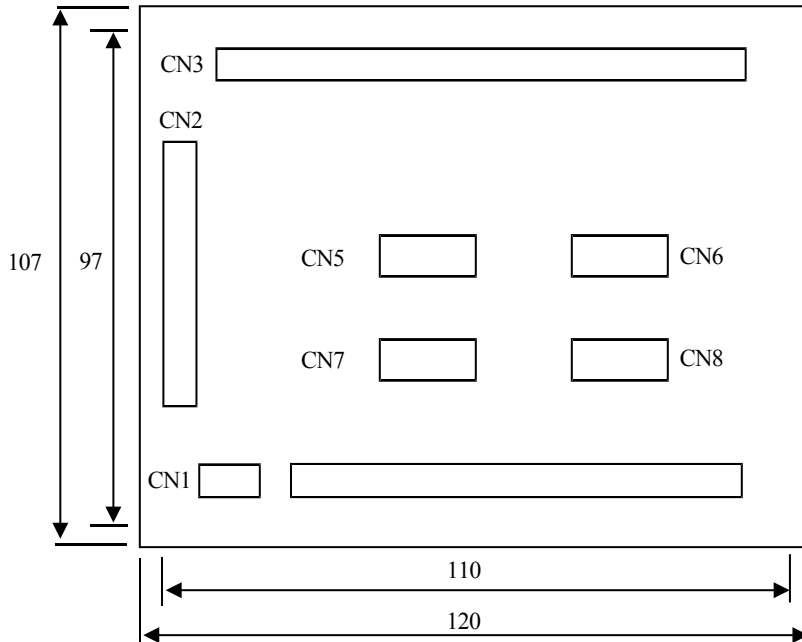


Fig.2-3 P62-05Adapter plate  
external dimensions where mounting hole  
diameter:  $\phi 3$  mm.

To use more IO ports, you need to use the Adapter Board for IO Expansion - P37-05, whose schematic diagram and dimensions are shown below (mm × mm)

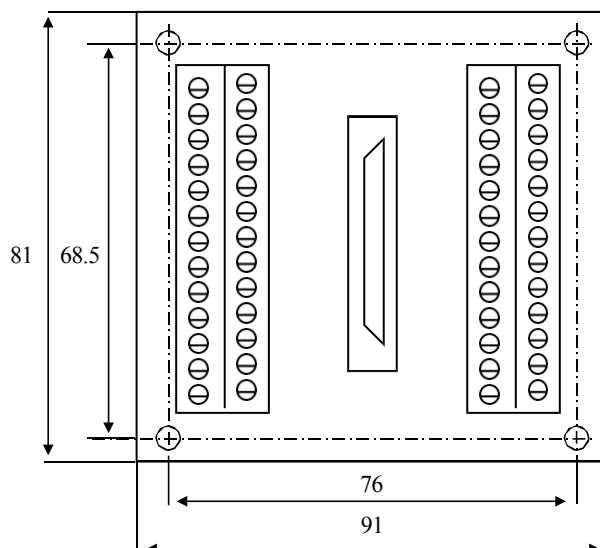


Figure 2-4 P37-05 Adapter Board Schematic

Of which, mounting hole diameter:  $\phi 3.5\text{mm}$ .


## 2.3 MPC08D Hardware Installation

MPC08D controller hardware requirements for PCs:


X86 compatible machine with PCI slot, PII or above CPU, 256M or above RAM.

The hardware installation procedure for the MPC08D control card is as follows:

- (1) Turn off the PC and all devices connected to the PC, insert the control card into the PCI slot of the PC, and fasten the motion control card with screws.

 Warn ings	To prevent static electricity from damaging the motion controller, contact the controller circuitry before or touch a valid grounded metal object to release the body before plugging/unplugging the controller. The electrostatic charge carried by the body.
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- (2) Connect the motion control card and the adapter board.
- (3) Connect the motor and drive.
- (4) Connect the adapter board, driver.

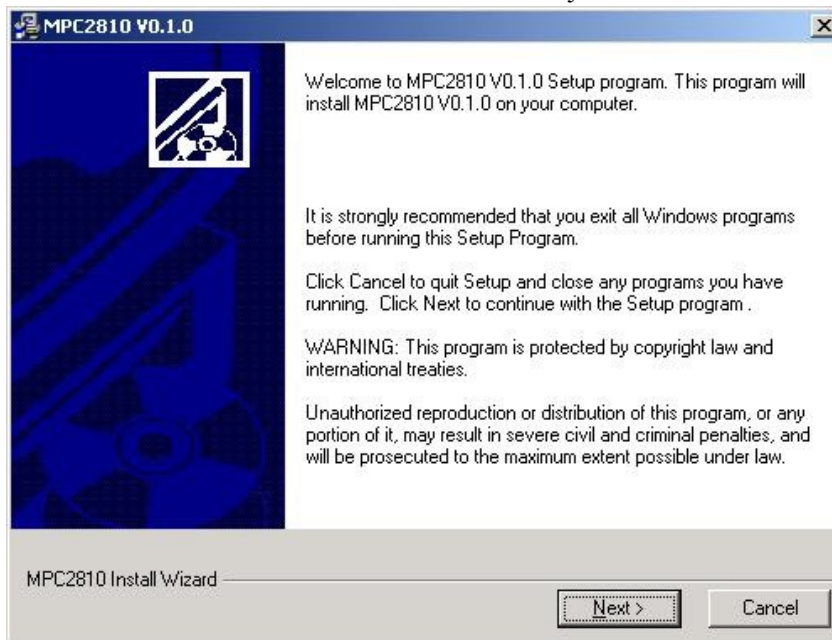
 Dan gero us	For safety reasons, it is recommended that when using the board for the first time, the user must make sure to set the motor controlled before connecting the system, otherwise serious consequences may result. Disconnect from the lead, pending adjustment of the board and drive parameters to make the motor
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## 2.4 MPC08D Software Installation

Under Windows 2000 and XP, since the operating system supports Plug and Play, when the card is correctly inserted into the PCI slot, the operating system will automatically detect the PCI card after startup, and then you can follow the steps below to complete the installation of the driver, function library and sample program.

(1) When the system detects the MPC08D, it will prompt to find "Unknown PCI Device", then click "Cancel".

(2) Run the installer in the root directory of the line installation disk



to display the welcome screen:

Figure 2-5 Software  
installation "Welcome" interface click  
"Next"(Next) button to enter step (3)

(3) Select the components to install. Users can choose to install  
drivers (Drivers) and applications  
(Application), all of which are installed by default.

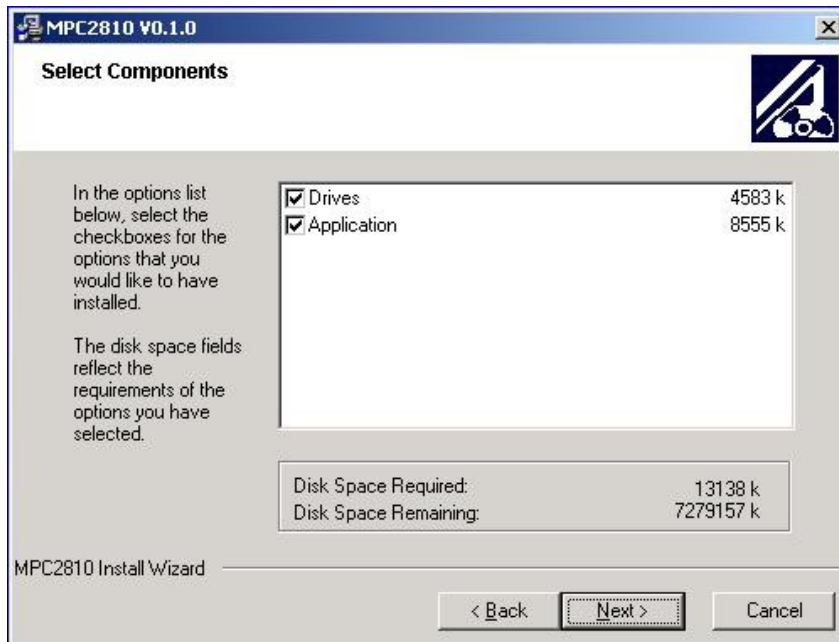
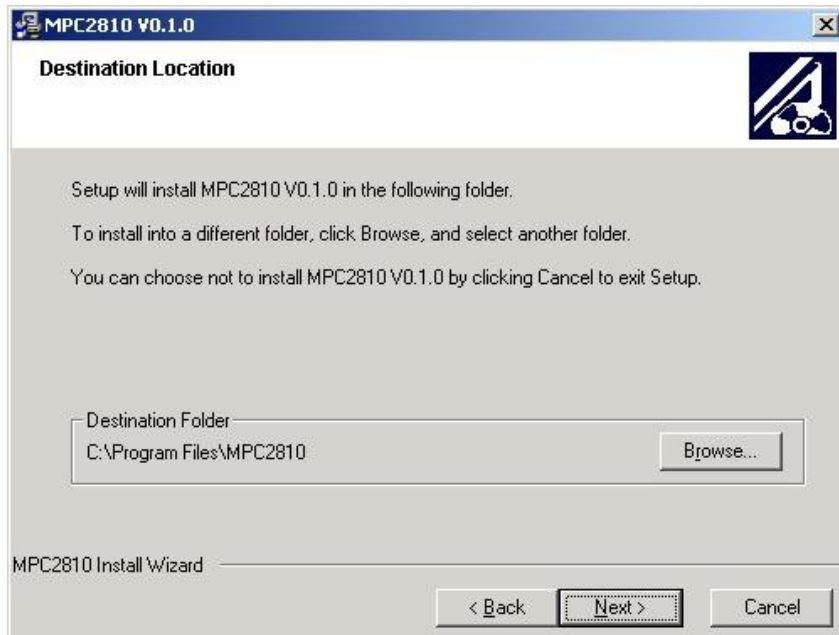


Figure 2-6 Software Installation "Component Selection" Interface

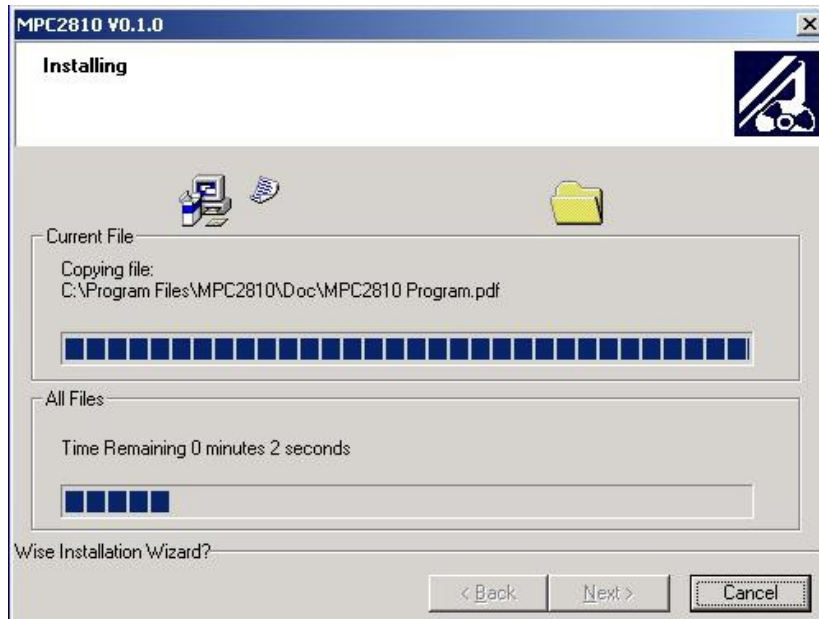
(4) Select the installation path. Set the location of the installation files on the user's computer, the default installation directory is "C:\Program Files\MPC08D". The default installation directory



is "C:\Program Files\MPC08D". The path can be reset using the

Figure 2-7 Software Installation "Path Selection"  
Interface

(4) After selecting the installation path, click the "Next" button to



automatically complete the installation.

Figure 2-8 File Copy Process Interface

(5) End of installation.

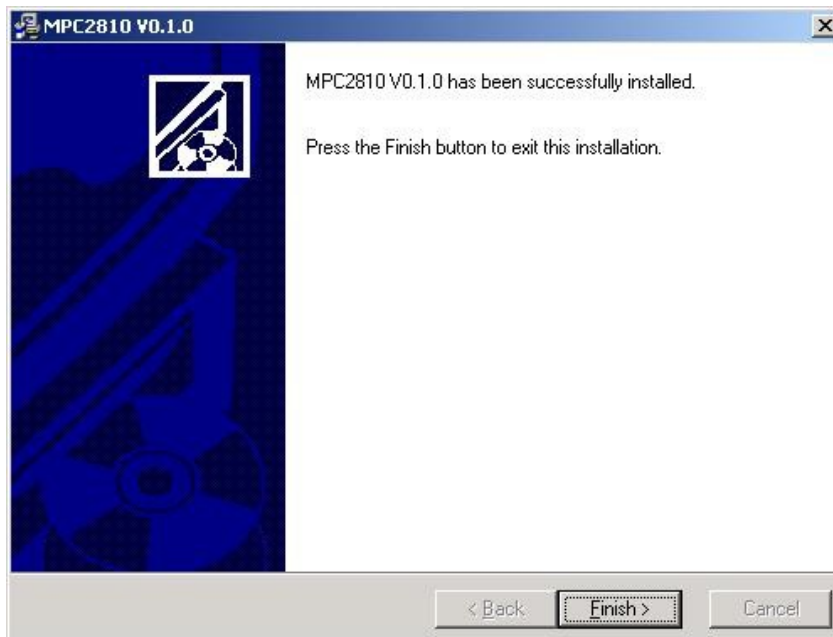


Figure 2-9 Software



installation "end" interface after the installation is complete, the system will prompt a restart, as shown in Figure:



Figure 2-10 Reboot System Screen

Click the "OK" button to restart the Windows operating system. Clicking the "Cancel" button does not restart the operating system. To use the controller, it must be restarted once.

After the installation is completed, the "MPC08D" folder will be automatically created under the installation directory (the default installation directory is \Program Files), and its directory tree is shown below:

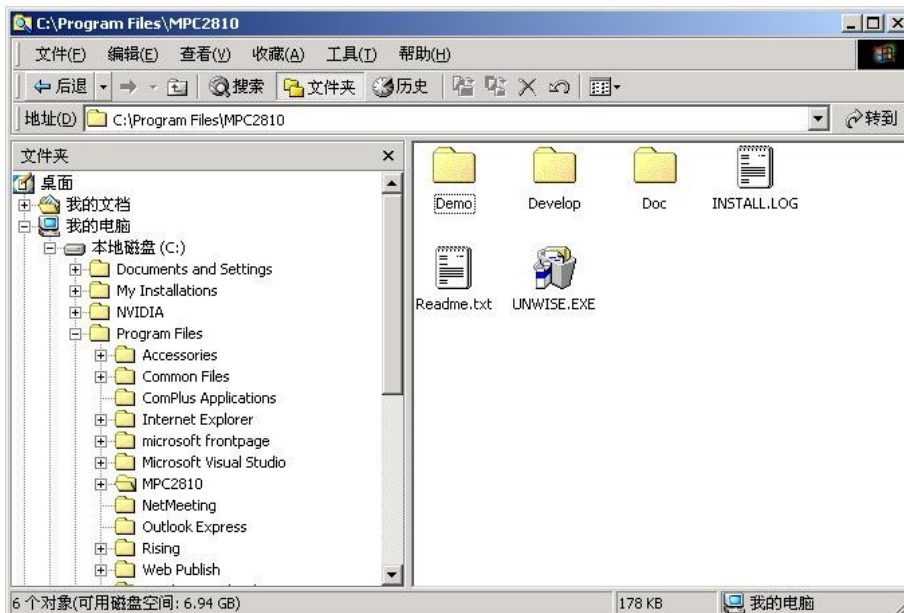


Figure 2-11 MPC08D Catalog Structure

Y The "Demo" directory contains sample programs, where:

- The "VBDemo" directory contains "Demo1" and "Demo2" are two VB examples, the source code is provided;

Run the "VBDemo1.exe" file in the Demo1 directory, the running interface is shown in the figure:



Figure 2-12 VBDemo1 Interface Schematic

With the VBDemo1 sample program, you can quickly understand how to develop the MPC08D application in VB environment and do a simple test on the control system. The "Board Information" button in the "About" menu displays the number of boards in the system and the version numbers of the hardware and software used.

VBDemo2 program provides a more powerful demonstration of motion control functions, running interface as shown in Figure:

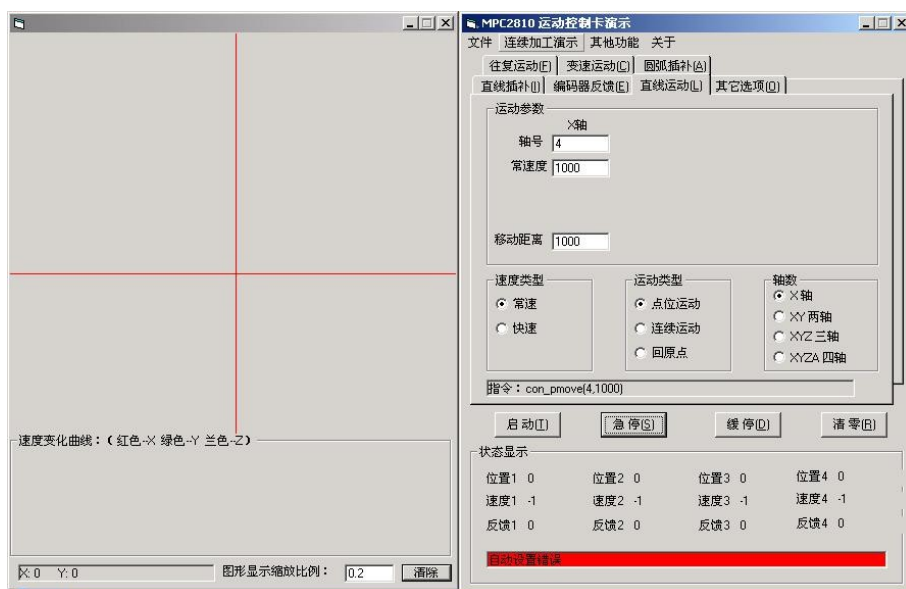


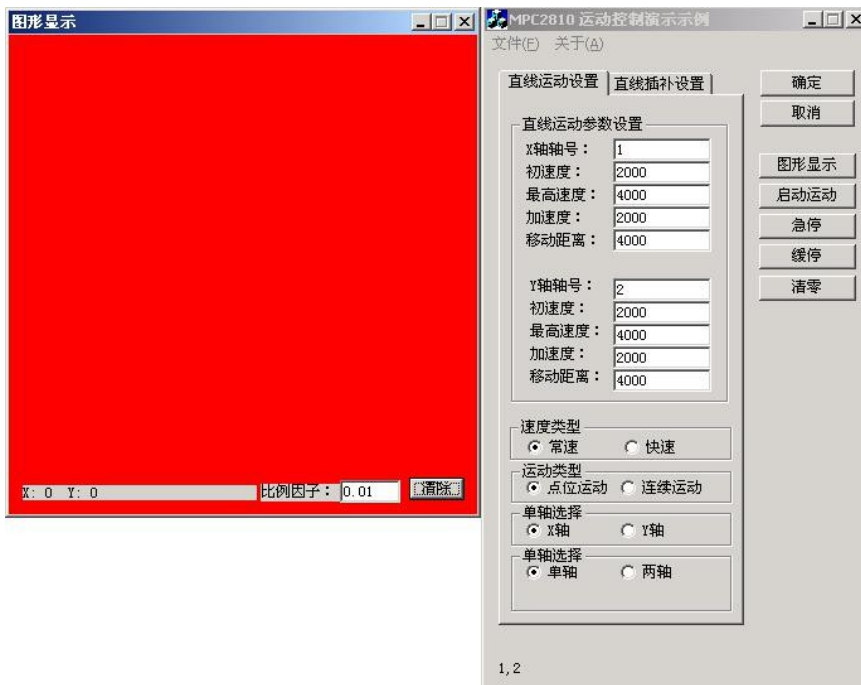
Figure 2-13 VBDemo2 Interface Schematic

The interface on the left side of the figure shows the motion trajectory and velocity profile. The right side shows linear interpolation and reciprocating motion,

Parameter settings such as linear motion. In the "Other Functions" menu item, you can test general-purpose input/output and special-purpose input signals.

- The "VCDemo" directory contains 5 sample programs, of which "Demo1" and "Demo2" provide the source code, "Demo1" is a VC static load dynamic link library example, "Demo2" is a VC dynamic load dynamic link library example. Demo1 is an example of VC static loading dynamic link library, "Demo2" is an example of VC dynamic loading dynamic link library. "Demo3" does not provide source code, with function testing. "Demo4" does not provide source code, with function libraries, drivers and firmware version reading function of each board.

Running VCDemo1 and VCDemo2 displays exactly the same interface, as shown in the figure:



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Figure 2-14 VCDemo1 Interface Schematic

The left area of the figure shows the motion trajectory display area, and the right side is the motion parameter setting interface.

IO DEMO is the main tool for debugging the MPC08D and has the following debugging functions:

- ◇ Send pulses to drive the motor in both forward and reverse directions
- ◇ Detection of external sensor signal (input)
- ◇ Controls external relay action (output)
- ◇ View hardware, library, and driver version numbers

### ◆ Motion Control Interface

Double-click to run IO DEMO, and the motion control interface opens by default, as shown below:




### Step

#### one:

- Select one or more of the **four** text boxes after "X" "Y" "Z" "A" to enter the axis number of the test. The unused textboxes can **be entered as 0**. Once Up to **4** axes can be tested.
- After filling in the axis number, check the boxes for "Negative" and "Double Pulse" **at the** back if necessary. Checking the "Negative" box indicates that the corresponding axis is moving in the negative direction, while the opposite indicates that it is moving in the positive direction. Checking the "Double Pulse" box indicates that the corresponding axis pulse output mode is **double pulse mode**.  
(CW/CCW) and vice versa for **pulse/direction mode (PUL+DIR)**

### Step

#### two:

- Select the speed type in the first drop-down box:  
 "constant speed" indicates

c User's Manual

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"fast speed" indicates rapid movement

- Select the type of movement in the second drop-down box:



"pmove" for point movement



"vmove" for continuous mo



The two together represent the entire movement type, e.g. "fast speed" + "pmove" means fast point movement.

### Step Three:

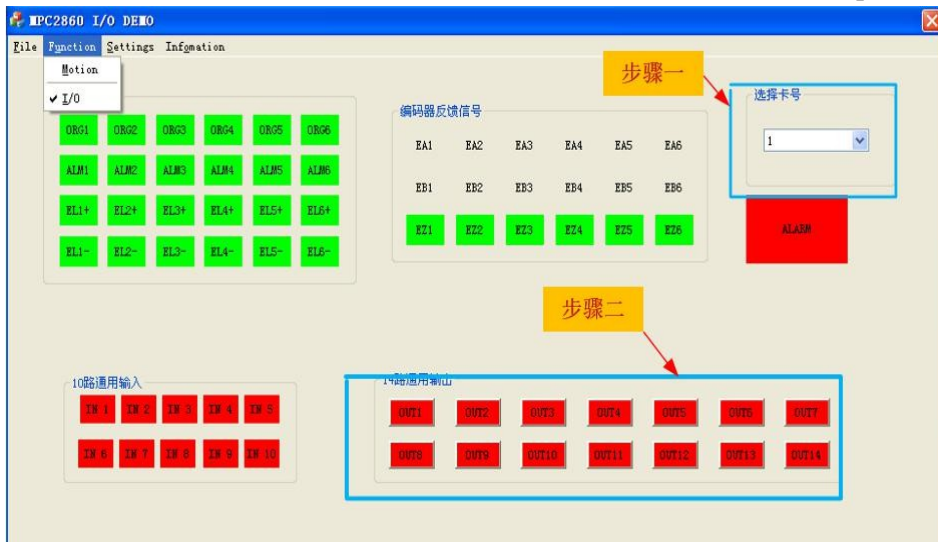
Set the speed parameter and distance of movement during operation according to whether normal speed movement or fast movement is selected in step 2.

### Step Four:

Click on the "Start" button to start the motion. During the motion, you can click the "Emergency Stop" or "Slow Stop" button to stop the motion of the current axis.

## ◆ IO Test Interface

Click the "I/O" submenu under the "Function" menu to open the



IO test interface.

### Step one:

Select the card number,  
the default is card number

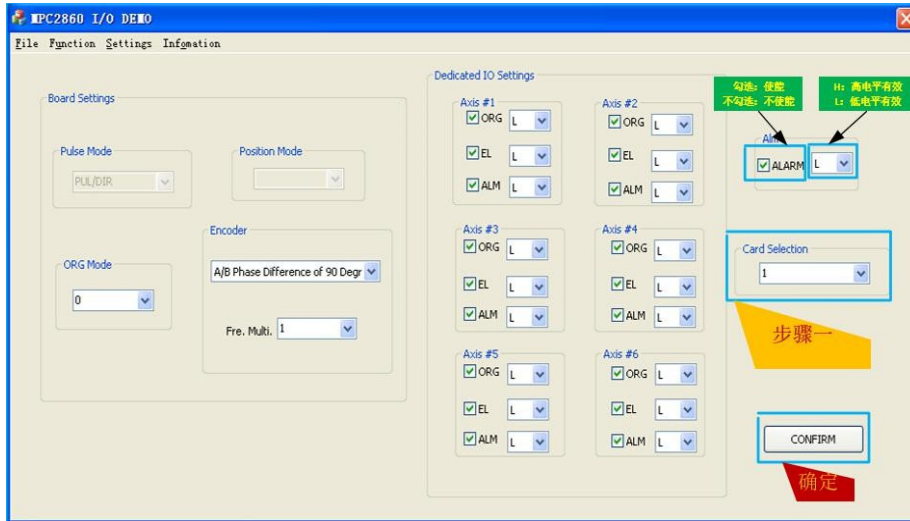
### 1. Step 2:

The MPC08D provides 26 general-purpose outputs and 24 general-purpose inputs per card (via the

- ①. Clicking the General Output Port button switches the General Output Port output between high and low;
- ②. The general-purpose output port is detected automatically by the program with a cycle time of about **20ms**.

### ◆ System Settings screen

Click the "board" submenu under the "Settings" menu to open the system settings interface.



#### Step one:

When there are multiple cards in the system, you need to select the card number first, and then complete the setting of the dedicated input signal validity (enable) and effective level for an axis on that card.

#### Remarks:

If you want to set the **ORG** home signal of the **7th** axis to be active high, since the **6th** axis is the **3rd** axis on the second control card (single card 4-axis) first select the card number as "2", then select the drop-down box in the "Axis #3" combobox as "H", and click "CONFIRM" button to confirm the operation. Then select "H" in the "Axis #3" combobox, check the upper checkbox, and click the "CONFIRM" button to confirm the operation.

### ◆ System version view screen

Click the "System" submenu under the "Information" menu to open the system version information interface. The

interface displays the hardware version number, library version number and driver version number. The following figure shows the system version information:



- ✎ The "Develop" directory contains the drivers and libraries for the MPC08D:
- The "Common" folder contains the drivers, libraries, etc. for the MPC08D;
- The "VB" folder contains the module file "'MPC08D.bas'" that needs to be added when developing VB applications;
- In the "VC" folder are the files needed to load the dynamic link library dynamically: "LoadDll.cpp" and "LoadDll.h", and the files needed to load the dynamic link library statically: "MPC08D.h" and "MPC08D.lib". Dynamic link library need to use the file "MPC08D.h" and "'MPC08D.lib'".
- ✎ The "Doc" directory contains the User's Manual and Programming Manual for the MPC08D.

## 2.5 MPC08D Software Uninstallation

There are two ways to uninstall the installer:

- (1) In the "MPC08D" installation directory, run the "UNWISE.exe" file.
- (2) In the Control Panel, run the uninstaller for the MPC08D in Add/Remove Programs.

## 2.6 MPC08D Software Upgrade

Please visit our website (<http://www.leetro.com>) frequently to download the latest version of the driver and function library. The new version of the function library will keep the compatibility with the existing functions of the old version of the function library and add new functions as needed. Please consult your dealer or technical support department before upgrading. If you get a set of the latest installation program, you can follow the following method to upgrade your old library.

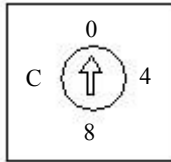
Row upgrades:

- (1) Close all running programs associated with the MPC08D;
- (2) Uninstall the original installer;
- (3) Run the new installer;
- (4) If Visual Basic 6.0 is used for development, copy the installed dynamic link library "MPC08D.dll" and the function declaration file "MPC08D.bas" to the project file, and then recompile it to generate the .EXE file. EXE file.
- (5) If Visual C++6.0 is used for development, the installed dynamic link libraries "MPC08D.dll" and "MPC08D.lib" and the function declaration file "MPC08D.h" are copied into the project file to generate the .EXE file by implicitly calling. MPC08D.h" are copied into the project file and recompiled to generate the .EXE file. When calling explicitly, copy the installed dynamic link libraries "MPC08D.dll", "MPC08D.lib" and function declaration files "LoadMPC08D.h", "LoadMPC08D.cpp" and the function declaration files "LoadMPC08D.h" are copied into the project file and recompiled to generate the .EXE file.

## 3 Quick access

### 3.1 Board Settings

Turn the knob switch (U35) mounted on the board to set the local ID of each board when it is shared by multiple boards. The range of the knob switch is from 0x0H to 0xFH, and the corresponding



relationship between the knob position and the local ID of the board is shown in Table 3-1.

Figure 3-1 U35 Rotary Switch Schematic

Table 3-1 Correspondence between Knob Positions and Card Local IDs

Rotary switch readout	Card Local ID Number (Card Number)
0x0H	1
0x1H	2
0x2H	3
0x3H	4
0x4H	5
0x5H	6

Currently the board only allows 6 cards to be shared, so the local ID setting range is the maximum number of settings allowed.

0x5H, can support 6 boards sharing at the same time.

If only one motion control card is used, the Local ID should be set to 0x0H. factory setting is 0x0H.

If there are multiple boards shared, e.g. 4 cards shared, the first card should be set to 0x0H, the second card should be set to 0x1H, the third card should be set to 0x2H, and the fourth card should be



When MPC08D is used with multiple cards,  
the correspondence between card number  
and axis number: Card 1: Axis 1 ~ 4;

Card 2: Axis 5 ~ 8;

...

Card N: Axis  $4 \times (N-1) + 1 \sim 4N$ .

## 3.2 Signal Interface Definition

### 3.2.1 P62-05 Adapter Board Pin Definitions

The P62-05 adapter board integrates the external pins for all dedicated and some general-purpose input and output signals of the MPC08D. The components are shown below in mm, including the mounting aperture:  $\phi 3\text{mm}$ .

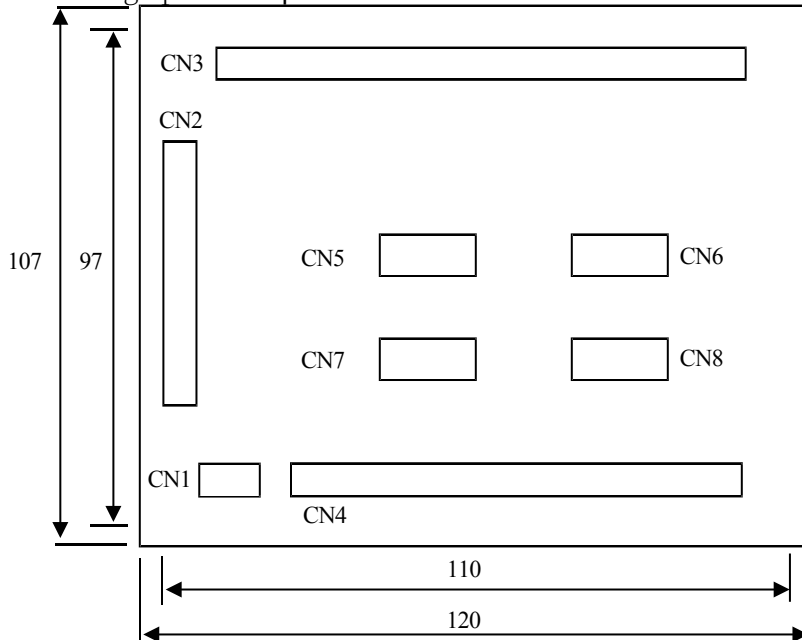


Figure 3-2 P62-05

Schematic Table 3-2

interface connector	functionality
CN1	24V switching power supply interface
CN2	DB62 interface to the motion controller
CN3	Limit, home, board alarm and 8 universal inputs (note: terminal +24V) and GND are board output 24 power supplies that can power sensors with dedicated input signals.)
CN4	10 Universal Outputs
CN5	Axis 1 Pulse, Direction and Axis Alarm, Z Pulse Signal Interface
CN6	Axis 2 Pulse, Direction and Axis Alarm, Z Pulse Signal Interface
CN7	Axis 3 Pulse, Direction and Axis Alarm, Z Pulse Signal Interface
CN8	Axis 4 Pulse, Direction and Axis Alarm, Z Pulse Signal Interface

## 3.2 .2 P37-05 Adapter Board Pin Definitions

When using the MPC08D Motion Controller with the P62-05 Adapter Board, more general purpose IO is required.  
For the interface, the signal expansion board P37-05 and the signal adapter C40-0.2M are used. The P37-05 pinout is defined below.

Table 3-3P37-05 Pin Definitions

P37-05 Turn Board Pinout	37 Coretro nic cable pin	name (of a thing)	Explanation
P19	19	IN9	Universal Input 9
P37	37	IN10	Universal Input 10
P18	18	IN11	General purpose input 11
P36	36	IN12	Universal Input 12
P17	17	IN13	General purpose inputs 13
P35	35	IN14	General purpose inputs 14
P16	16	IN15	Universal Input 15
P34	34	IN16	Universal Input 16
P15	15	IN17	General Purpose Inputs 17
P33	33	IN18	Universal Input 18
P14	14	IN19	Universal Input 19
P32	32	IN20	Universal input 20
P13	13	IN21	Universal Input 21
P31	31	IN22	Universal Input 22
P12	12	IN23	Universal input 23
P30	30	IN24	Universal Input 24
P11	11	OUT11	Universal output 11
P29	29	OUT12	Universal Output 12
P10	10	OUT13	General purpose outputs 13
P28	28	OUT14	General-purpose outputs 14
P9	9	OUT15	Universal Output 15
P27	27	OUT16	Universal Output 16
P8	8	OUT17	Universal Output 17

# MPC08D Motion Controller

P26	26	OUT18	Universal Output 18
P7	7	DCV24	Input +24V (7, 25, 2, and 20 can be connected to any one of them.)
P25	25	DCV24	Input +24V

P6	6	OUT19	Universal Output 19
P24	24	OUT20	Universal output 20
P5	5	OUT21	Universal Output 21
P23	23	OUT22	Universal Output 22
P4	4	OUT23	General purpose output 23
P22	22	OUT24	Universal Output 24
P3	3	OUT25	Universal Output 25
P21	21	OUT26	General-purpose outputs 26
P2	2	DCV24	Input +24V
P20	20	DCV24	Input +24V
P1	1	OGND	24V Power Ground

### 3.3 Wiring Method

#### 3.3.1 Connection of Motion Controller and Adapter Board

Turn off the power of the computer, insert the motion controller into the PCI slot of the computer, and connect the J3 connector of the controller and the CN2 connector of the adapter board with a 62-core shielded cable. As shown in the following figure:

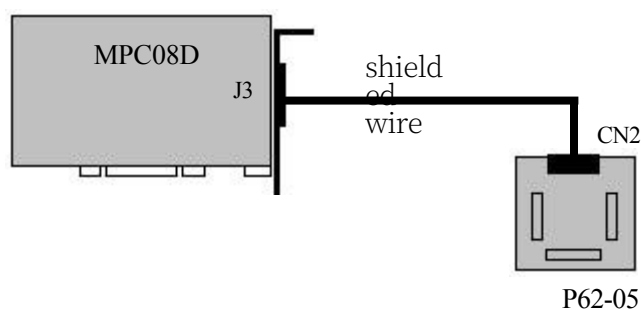


Figure 3-3 Motion Control Card and Adapter Board Connection Diagram

#### 3.3.2 Connection of adapter plate and drive

### 3.3.2.1 Control signal output connection method

The MPC08D has two types of pulse output methods: pulse/direction mode and double pulse mode. By default, each control axis is output in pulse/direction mode. The user can use the interface function "set\_outmode" to output pulses in the pulse/direction mode. (see "MPC08D Program.pdf") to set the output of an axis to one of the two.

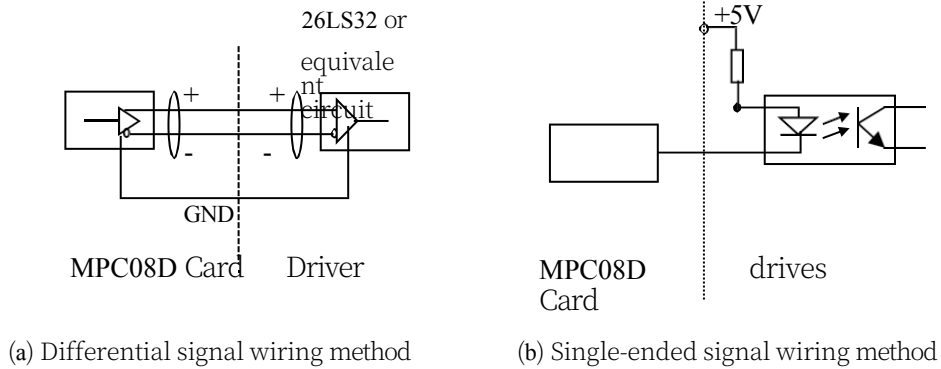


Figure 3-4 Differential and Single-Ended Output Circuit Schematic for Control Signals

(1) Pulse Direction Mode

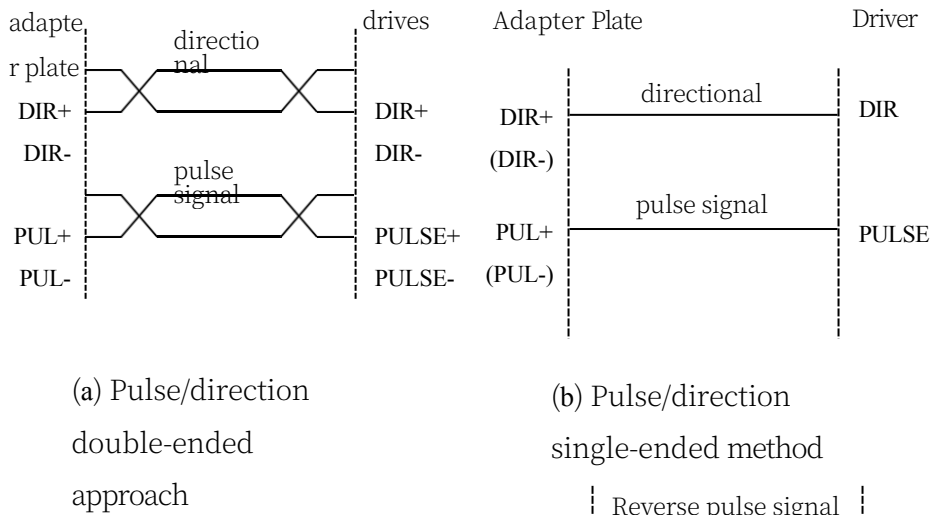
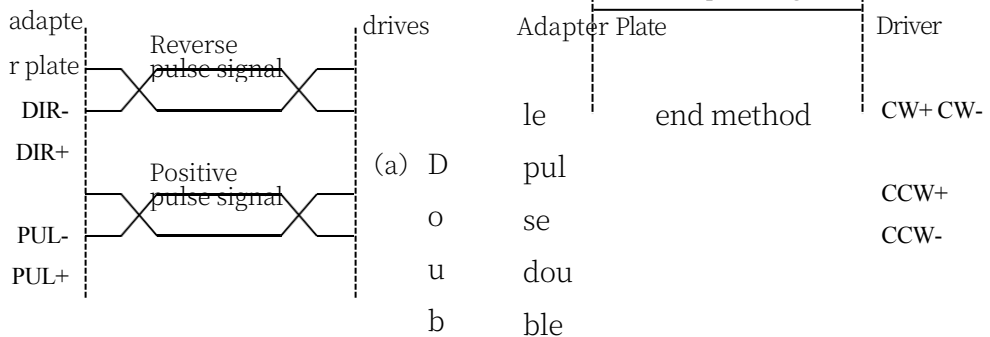


Figure 3-5 Pulse/Direction Control Output Schematic

(2) Double Pulse Mode



DIR-  
(DIR+)

CW

PUL-  
(PUL+)

CCW

(b) Double pulse  
single-ended  
method

Fig. 3-6 Schematic diagram of double-pulse control output



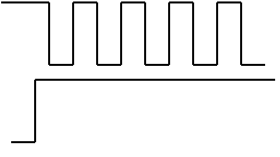
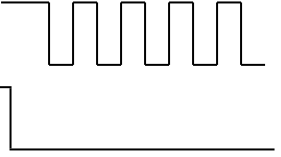
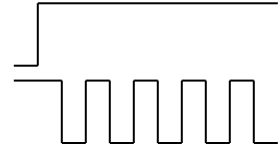
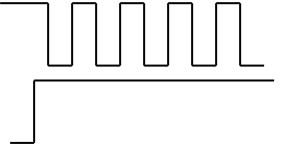

output method	pinout	forward motion (mechanics)	invert (upside-down, inside-out, back-to-front, white to black etc)
impulse + orientations	D46 to D61		
negative pulse + positive pulse	D46 to D61		

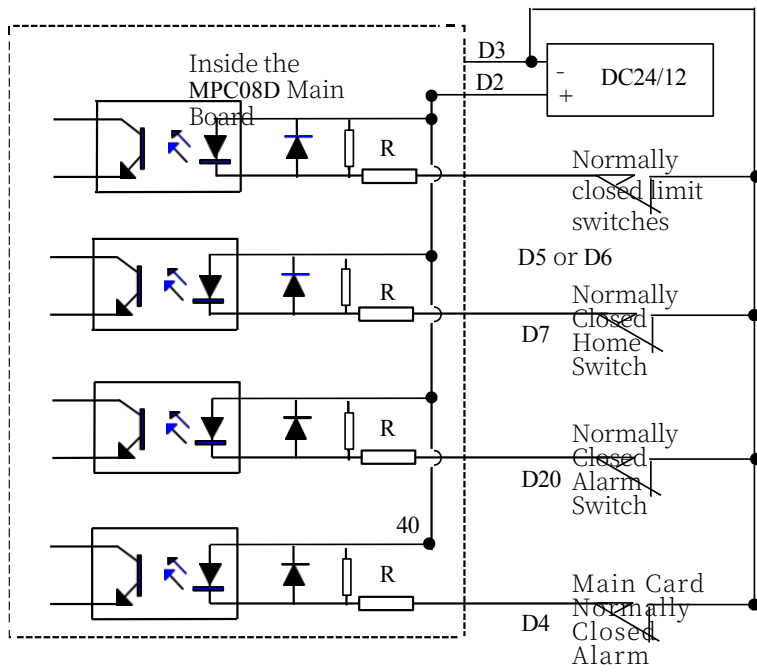
Figure 3-7 Pulse Output Waveform

### 3.3.2.2 Connection method for dedicated input



Controller alarm inputs, axis limit switch inputs, home inputs, and alarm signal lamps are initialized to a normally closed state (when not used by the user, short them to DC24 ground)

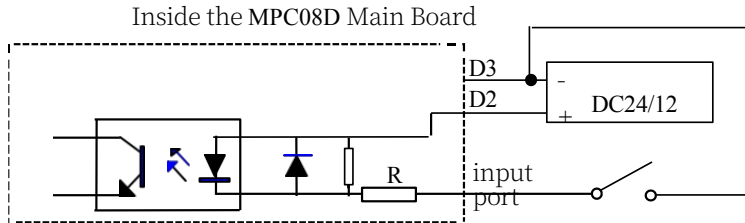
The MPC08D Motion Controller's dedicated switching input signals include: limit, alarm, home, and board alarm signals. They can be contact-type switches, sensor proximity switches with NPN outputs, and so on. The wiring method is shown below.





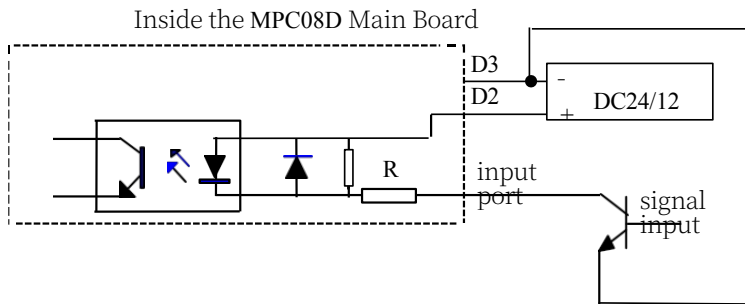
### 3.3.3.4 Connection method for general-purpose inputs and outputs

#### (1) Universal Input Circuit Connection Method



(a) Contact type switch

Figure 3-9 General Purpose Input Signal Wiring Diagram



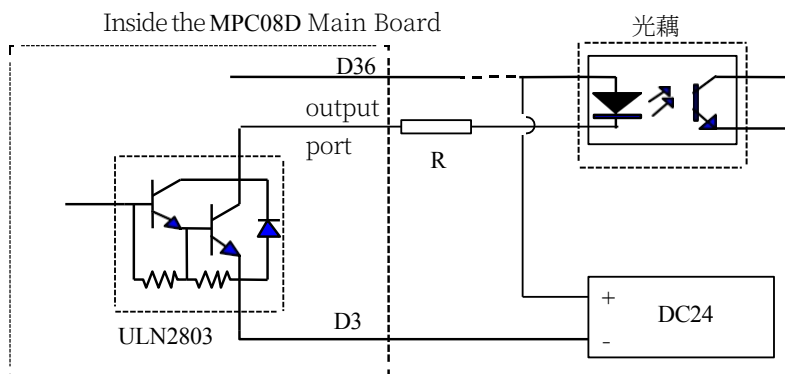
(b) NPN Switch

Figure 3-10 General Purpose Input Signal Wiring Diagram

#### (2) Universal Output Circuit

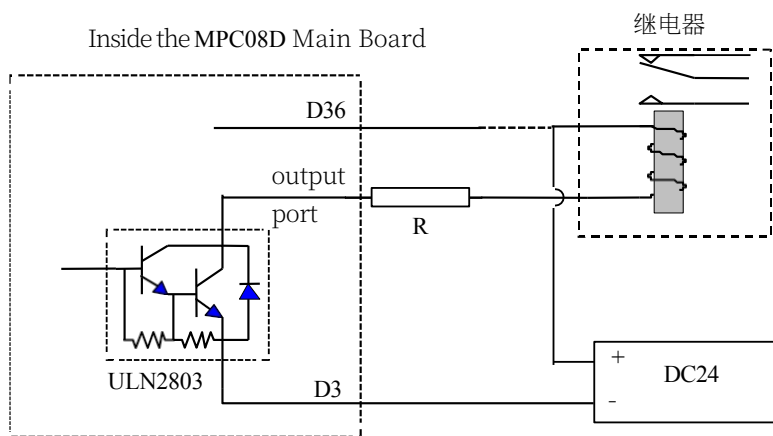
The switching general-purpose output circuit of the MPC08D motion controller is an open collector output, which can be connected to relays, opto-couplers, etc. The maximum current of a single circuit is 100mA, and the voltage is 24 V. It can be used as an input switching signal for servo system (servo-ON, zeroing of the deviation counter), or to drive an intermediate relay or opto-coupler of 24DCV. To prevent the driver chip ULN2803 from burning out, it must be ensured that the pass current of 2803 in Fig. 3-11 is less than 100mA, therefore, a suitable resistor R should be selected.

**NOTE: When using the general purpose output port to control an intermediate relay or opto-coupler, the 24DCV power supply as shown in Figure 3-11 below must be the same 24V power supply as that of the board, otherwise relay malfunction will occur.**



(a) Driving Optocoupler Circuits

Figure 3-11 General Output Signal Wiring Diagram

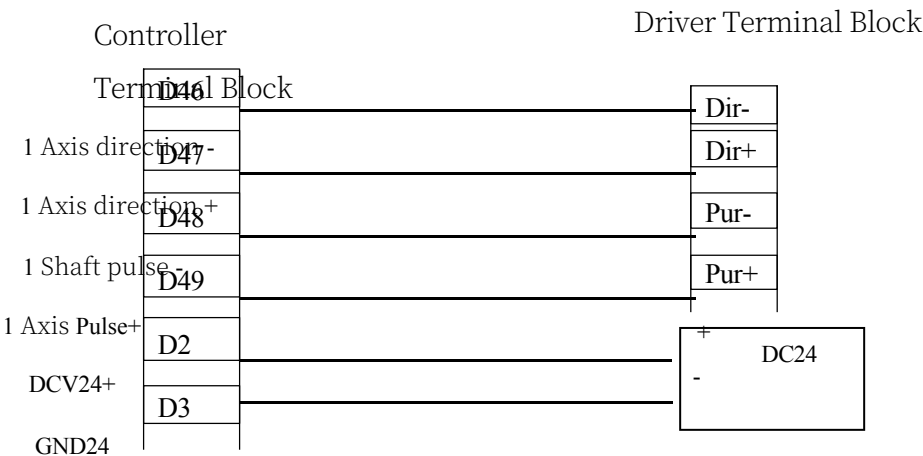


(b) Driver Relay Circuit

Figure 3-11 General Output Signal Wiring Diagram

# 4 Typical Wiring

## 4.1 MPC08D Controller Wired to DMD808 Driver



## 5 Technical Parameters

### Pulse output signal quality:

Frequency 10 - 4M  
pps Duty Cycle 50%  
of the time +-3%  
Drive Current  
20ma  
differential output

### Universal Input Port Specification:

Isolation Voltage	2500V RMS
Input Current	2-7.6ma
Input Voltage	+24VDC

### Dedicated input port (home, limit, alarm) specifications:

Isolation Voltage	2500V RMS
Input Current	2-7.6ma
Input Voltage	+24VDC

System response time for dedicated input signals during  
emergency stops 11 $\mu$ s

### Dedicated input port (Z pulse) specification:

Isolation Voltage	2500V RMS
Input Voltage	+5VDC.

System Response Time for Z Pulse Signal at Zero Return  
3 $\mu$ s

Minimum Z pulse width for return-to-zero motion	0.5us
---	-------

### Output port specification:

Isolation Voltage 2500V RMS

Average output delay 8 $\mu$ s

Maximum drive  
current 100ma

operating voltage  
range 5-30V with

overcurrent short  
circuit protection

function