UMC4

User Manual

Version: 20150320

Table of Content

1. Introduction

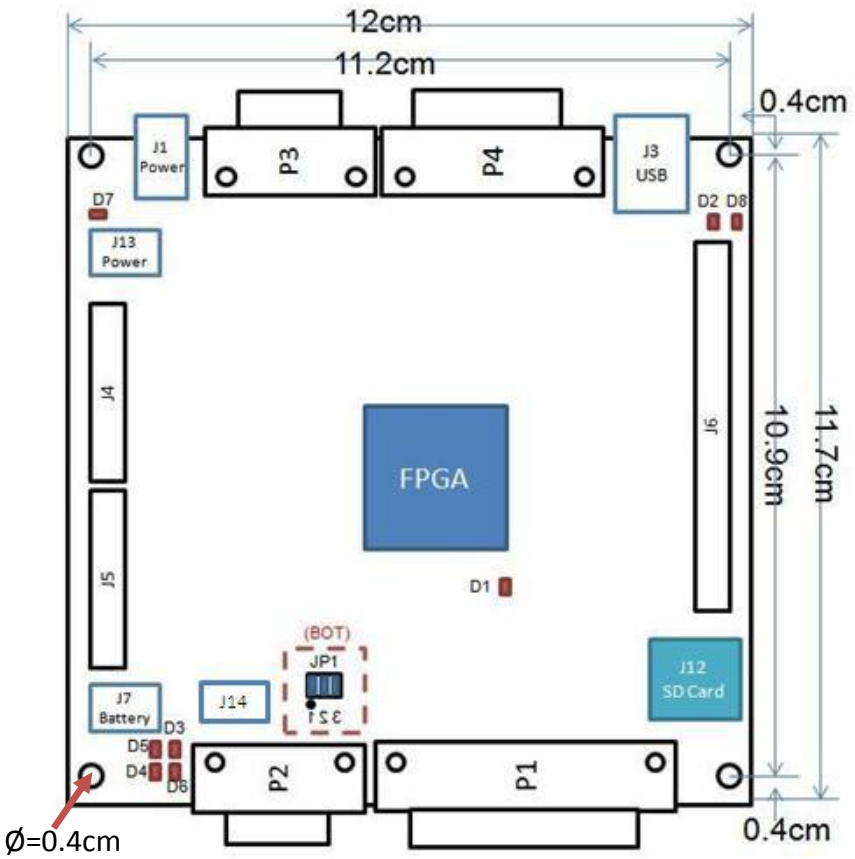
UMC4 is a high performance USB interface card designed for Laser Marking System. The card supports digital galvo motor, compatible with XY2-100 protocol, and through DA2-16 daughter board can control analog galvo motor precisely. UMC4 built-in full offline marking functions, could access up to 16 files, each file contains up to 8 sets auto-text and 8 kinds of fonts. Through I/O signal or PLC human-machine interface, users could easily choose the file and start marking. The card also features complete rotary and mark-on-fly functions. Besides, it provides a variety of expanded boards for all kinds of connection requirements.

1-1 Specification

- Built-in DSP, marking computing do not occupy computer CPU time.
- Support one XY2-100 digital control signal output, 10μs cycle update galvo motor position.
- FPK, PPK, R05 first pulse suppression.
- Two 10-bits analog control signals.
- PWM maximum output frequency is 10MHz, minimum pulse width is 0.08μs.
- Support offline marking, could access 16 files each contains 8 sets auto-text and 8 kinds of fonts.
- One RS232 Communication Port for PLC communication.
- Support one encoder input for mark-on-fly function.
- Support 1-way pulse/direction or CW/CCW step/servo motor control signals, the maximum output frequency is 2MHz.
- Contain expansion connectors for connecting with a variety of daughter boards.
- Support Windows XP/Vista/Windows 7.

1-2 Appearance

1-3 LAYOUT



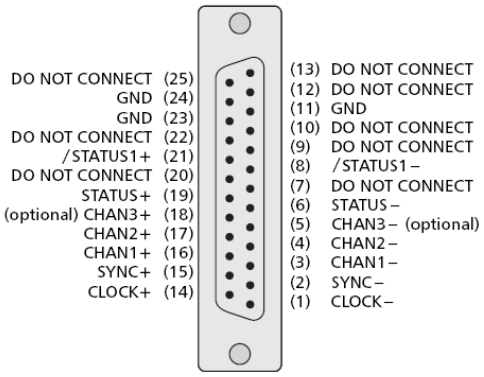
Name	Purpose	Descriptions	
P1	Scan head	Main marking port (D-SUB 25-Pin female connector)	
P2	Laser Connector	Laser control and analog output port (D-SUB 15-Pin 3 row female connector)	
P3	RS232	PLC control port (D-SUB 9-Pin female connector)	
P4	I/O Connector	Rotary, Encoder and I/O port.(D-SUB 15-Pin 2 row female connector)	
J1,13	Power	+5V 3A power	
J3	USB	USB port	
J4,5,6	Expansion Connector	Expansion Connector port[1]	
J7	Battery Connector	External battery port for timer (+1.5V~+5V)	
J12	SD Card	SD Card port	
J14	RS232	OMRON Laser RS232	
D1~D8	LED	Status lights	
JP1(BOT)	FPK / R0	1、2 Close : FPK	2、3Close : R05

※[1]Caution：DO NOT mistake connecting to J4, J5, and J6 Expansion Connector ports, for wrong connection may cause the board damaged.
※[2] Please refer to 8 OMRON Laser.

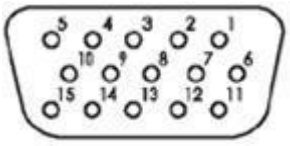
2. Pin Assignment

2-1 Laser Control Connector

2-1-1 P1 (SCANHEAD)：XY2-100 Interface Port

25-pin Female Connector	Pin	Descriptions
	1, 14	Differential Out (CLOCK)
	2, 15	Differential Out (SYNC)
	3, 16	Differential Out (CHAN1)
	4, 17	Differential Out (CHAN2)
	5, 18	Differential Out (CHAN3)
	6, 19	Differential In (STATUS)
	8, 21	Differential In (/STATUS)
	11, 23, 24	GND

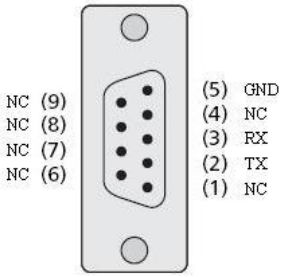
2-1-2 P2 (LASER CONNECTOR)：Laser Control Port

15-pin Female Connector	Pin	Descriptions		
			CO2	YAG
	1	Analog Out1	Power[2]	Current
	2	Analog Out2		Frequency [2]
	3	GND		
	4	Laser1 (PWM) [1]	Power[1]	Frequency [1]
	5	Laser2 (FPK) or R05 [1]		
	6	L0 (Laser On/Off)		
	7	L1 (Leading Light On/Off)		
	8	L2 (Shutter)		
	9	L3 (CW select)		
	10	L4 (Lamp On/Off)		
	11	L5 (Start power saving mode)		
	12	/START (Dry connect input) (Let Pin12 & Pin15 short-circuit will get START signal)		
	13	/STOP (Dry connect input) (Let Pin13 & Pin15 short-circuit will get STOP signal)		
	14	DC：+5V 1A		
	15	GND		

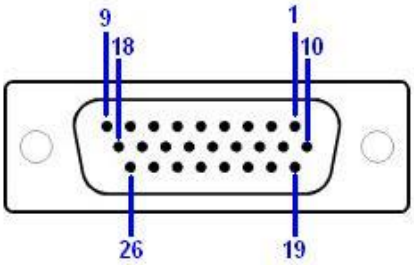
※[1] The output signal of Laser1 and Laser2 depend on the selected laser control mode.

	CO_2 Mode	YAG Mode	RO5
Laser1	Modulation Pulse 1	Q-Switch signal	Q-Switch signal
Laser2	Modulation Pulse 2	First Pulse Killer	Analog out R05

2-1-3 P3 (RS232)：PLC Communication Port

9-pin Connector	Pin	Descriptions
	2	TX
	3	RX
	5	GND

2-1-4 P4 (I/O CONNECTOR)：Rotary, Encoder and I/O Port

26-pin Connector	Pin		Descriptions	
	1	11	Encoder A+	Encoder A-
	2	12	Encoder B+	Encoder B-
	3	13	Pulse+ / CW+ [1]	Pulse- / CW- [1]
	4	14	Direction+ / CCW+ [1]	Direction- / CCW- [1]
	5	15	Home+	Home-
			Pre-View On+	Pre-View On-
	6、10		DC：+5V 1A	
	7		OPTO IN5：System On	
	8		/START(Dry connect input) (Let Pin8 & Pin18 short-circuit will get START signal)	
	9		/STOP(Dry connect input) (Let Pin9 & Pin18 short-circuit will get STOP signal)	
	16		OPTO IN1 Input of File Selection	
	17		OPTO IN2 Input of File Selection / InPosition	
	25		OPTO IN3 Input of File Selection / Limit-	
	26		OPTO IN4 Input of File Selection / Limit+	
	18		GND	
	19		OPTO V+：5 ~ 24V Input	
	20		OPTO OUT1：Program Ready	
	21		OPTO OUT2：Mark Ready	
	22		OPTO OUT3：Mark End	
	23		OPTO OUT4：Mark Busy / Busy [1]	
	24		OPTO GND：0V Input(Pin24 & Pin18 open circtui)	

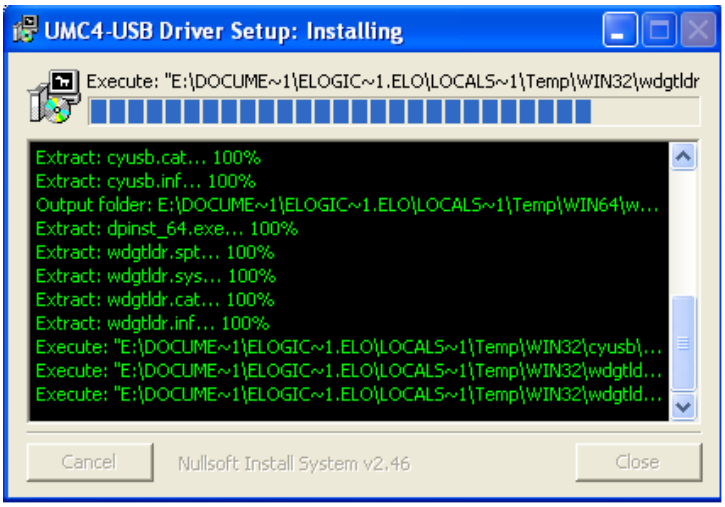
※[1] Please refer to 3-9 HWConfig Setting Description。

3. Installation and Cable Connection

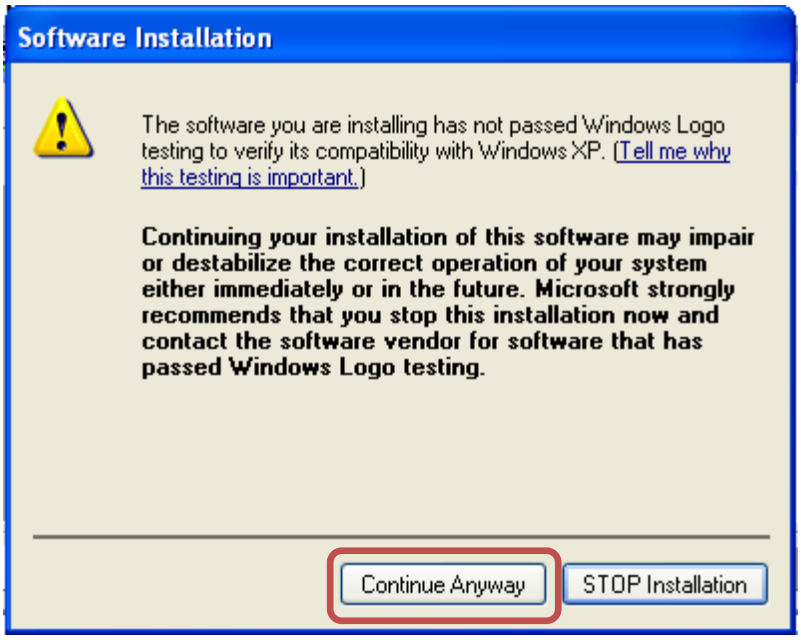
3-1 UMC4 Installation

If your computer is not installed MM-SA software yet, please install the MM-SA first.

During MM-SA installation, system will run "UMC4-USB Driver Setup" automatically.

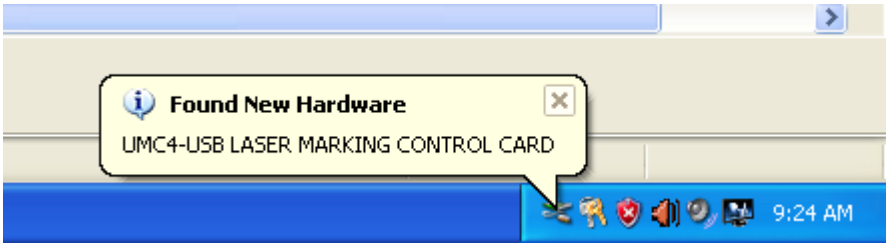


While "UMC4-USB Driver Setup" is executing, please press "Continue Anyway" button. This step may need to repeat 3 times.

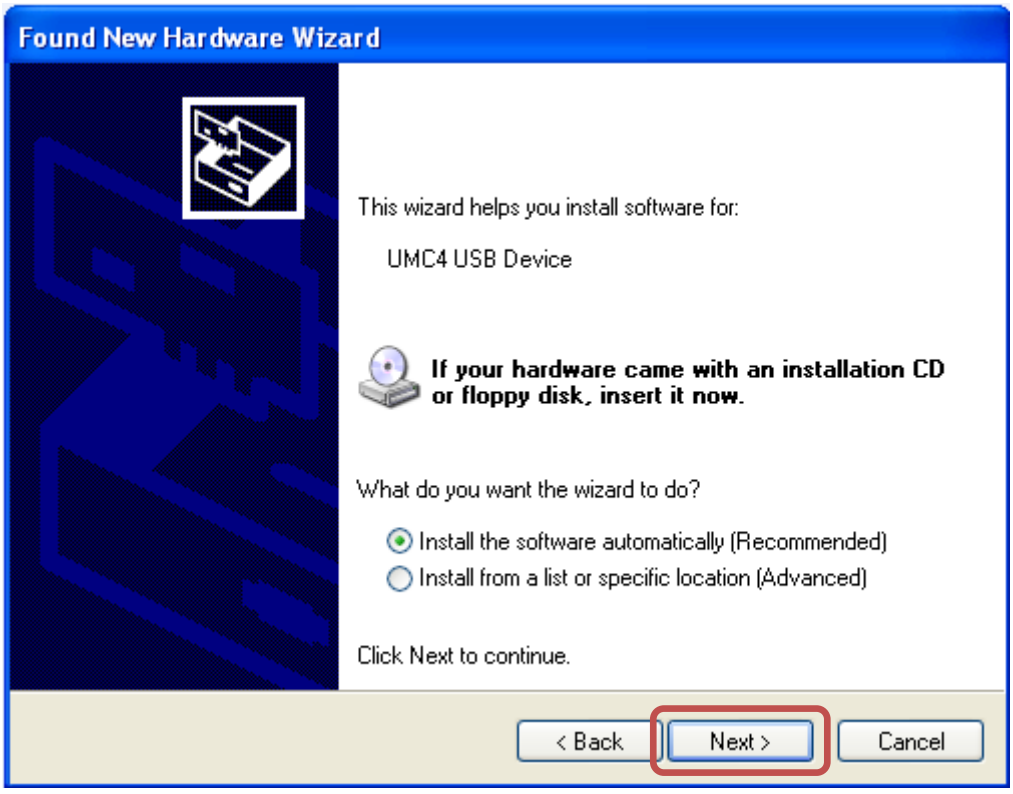


After the installation completed, you could plug-in power of UMC4 and connect to computer via USB cable.

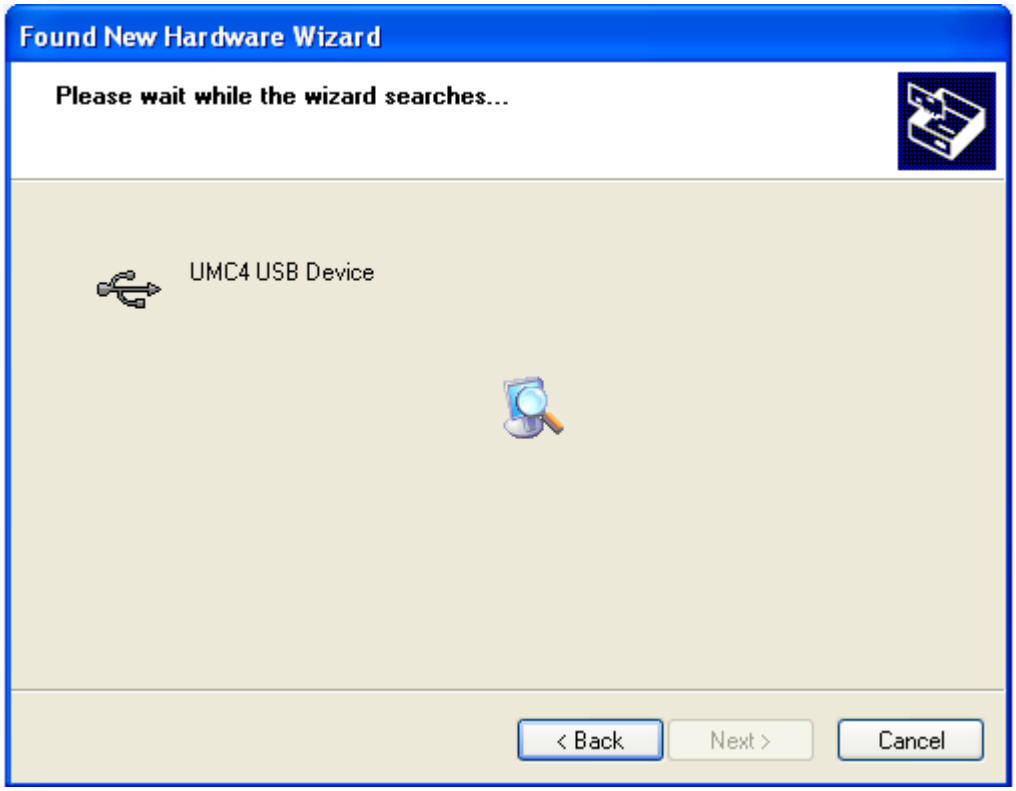
Normally, Windows system will appear a message " Found New Hardware UMC4-USB LASER MARKING CONTROL CARD".



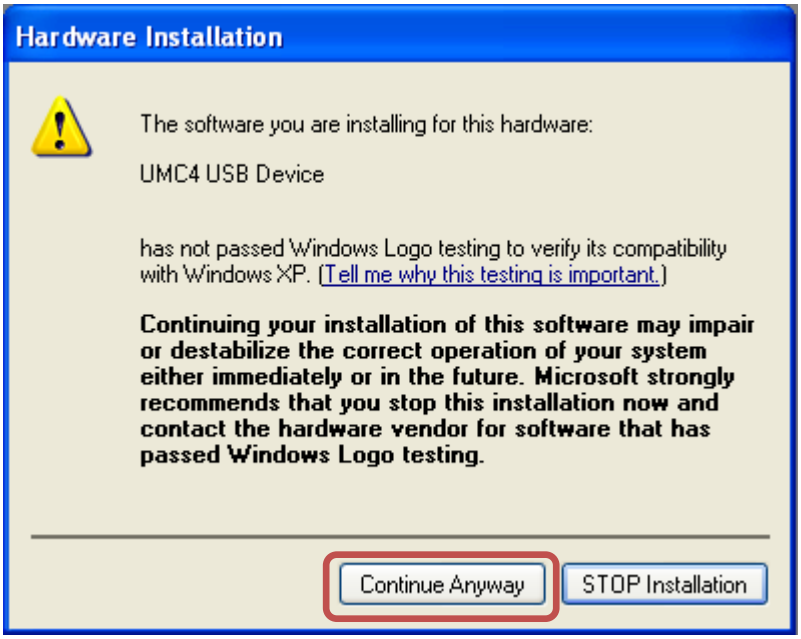
Please press "Next" under the recommended setting.



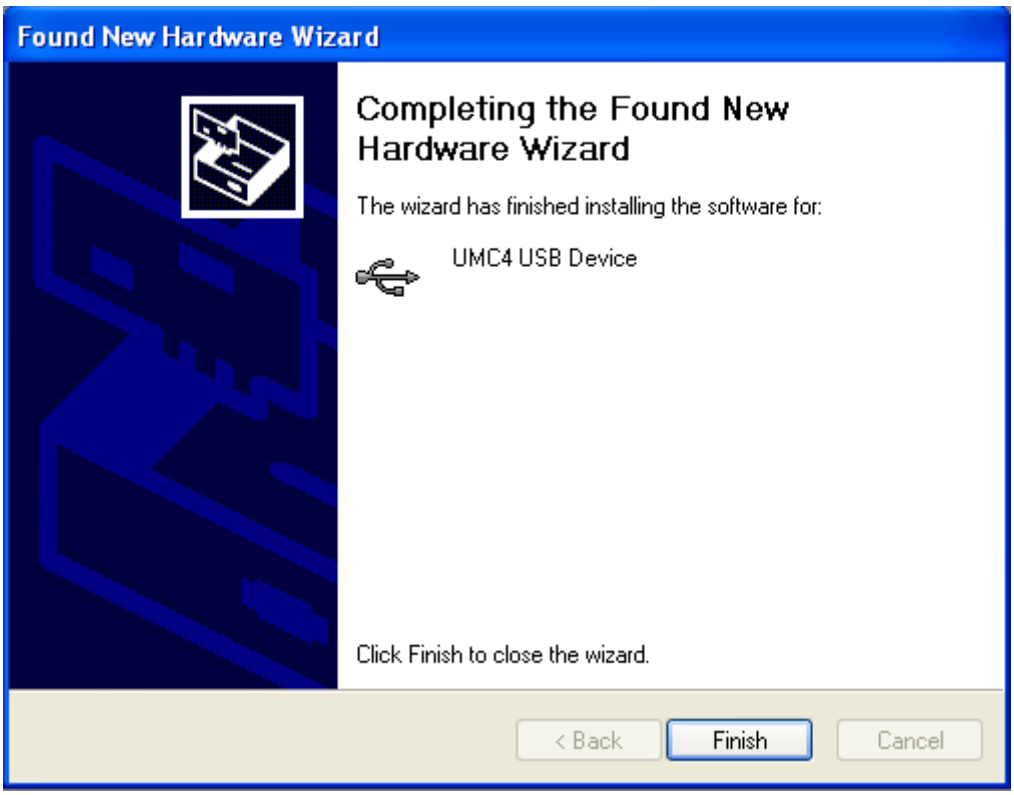
Wait for wizard searching the driver,



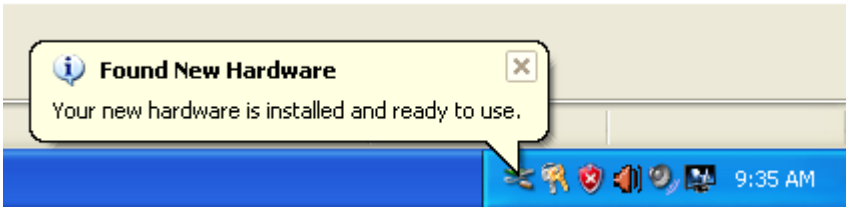
After system founded UMC4 Driver, please press "Continue Anyway".



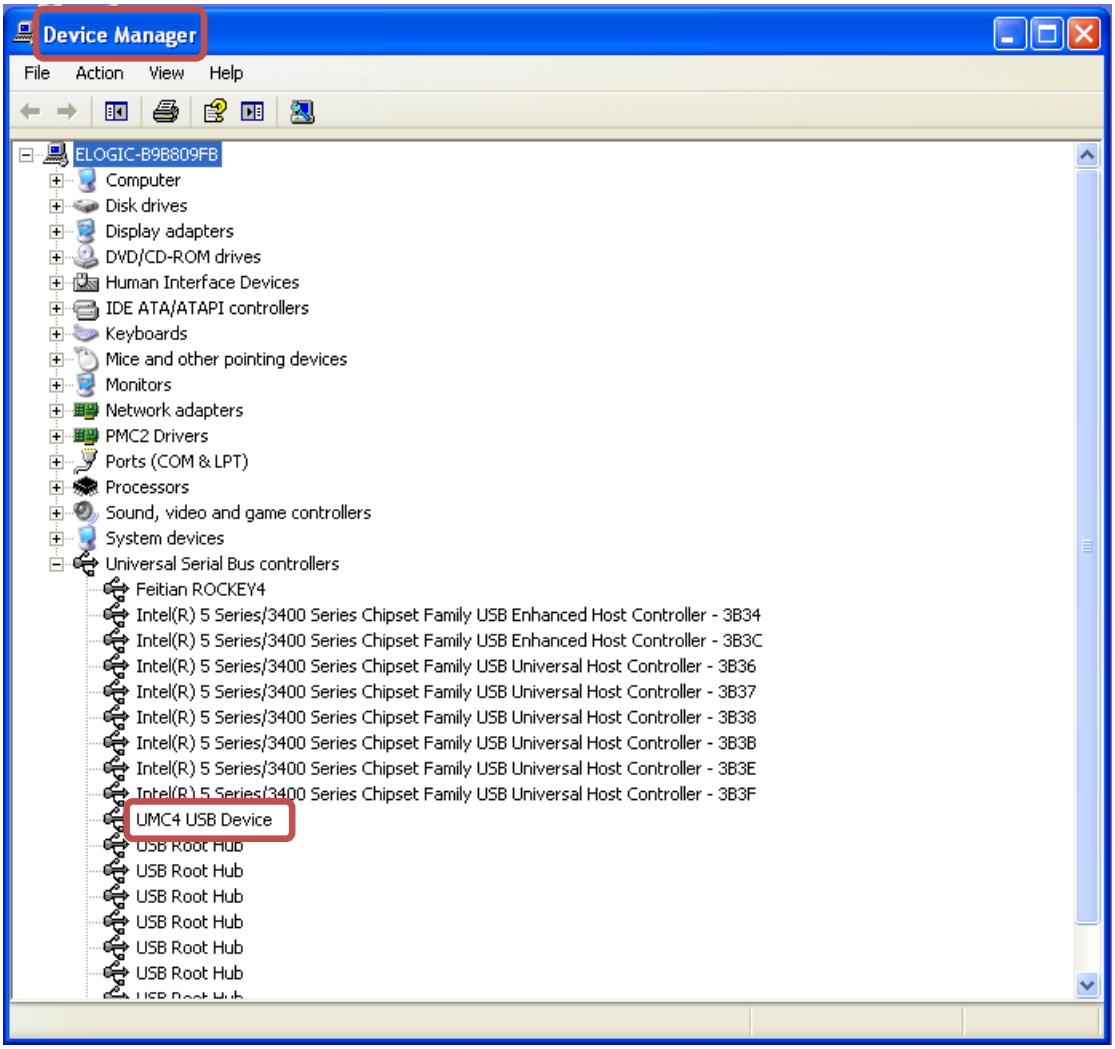
After driver installed, please press "Finish".



When the message "Your new hardware is installed and ready to use" appeared you could use UMC4 now.



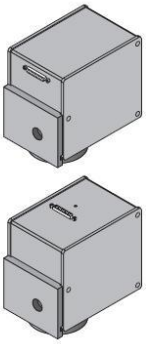
If UMC4 installed properly, you could see the UMC4 device information appeared in Device Manager, as below:

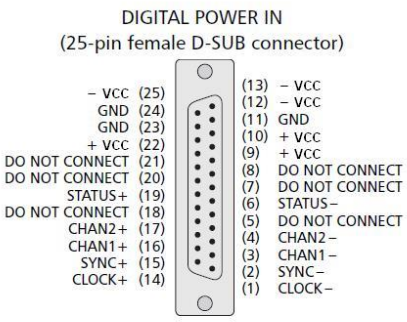

Device Manager
File Action View Help
ELOGIC-B9B809FB
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Monitors
Network adapters
PMC2 Drivers
Ports (COM & LPT)
Processors
Sound, video and game controllers
System devices
Universal Serial Bus controllers
Feitian ROCKEY4
Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B34
Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B3C
Intel(R) 5 Series/3400 Series Chipset Family USB Universal Host Controller - 3B36
Intel(R) 5 Series/3400 Series Chipset Family USB Universal Host Controller - 3B37
Intel(R) 5 Series/3400 Series Chipset Family USB Universal Host Controller - 3B38
Intel(R) 5 Series/3400 Series Chipset Family USB Universal Host Controller - 3B3B
Intel(R) 5 Series/3400 Series Chipset Family USB Universal Host Controller - 3B3E
Intel(R) 5 Series/3400 Series Chipset Family USB Universal Host Controller - 3B3F
UMC4 USB Device
USB Root Hub
USB Root Hub
USB Root Hub
USB Root Hub
USB Root Hub
USB Root Hub

3-2 XY2-100 Digital Scanner

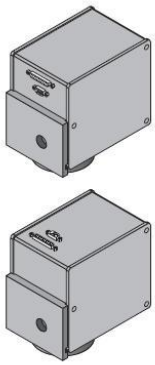
Currently common seen digital galvanometer could divide into the following 2 types:

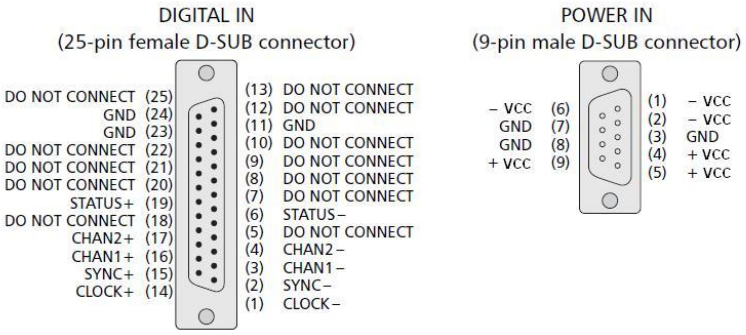
3-2-1 Type 1: With one D-SUB 25Pin connector ◦





3-2-2 Type 2: With D-SUB 25Pin connector + D-SUB 9Pin connector ◦





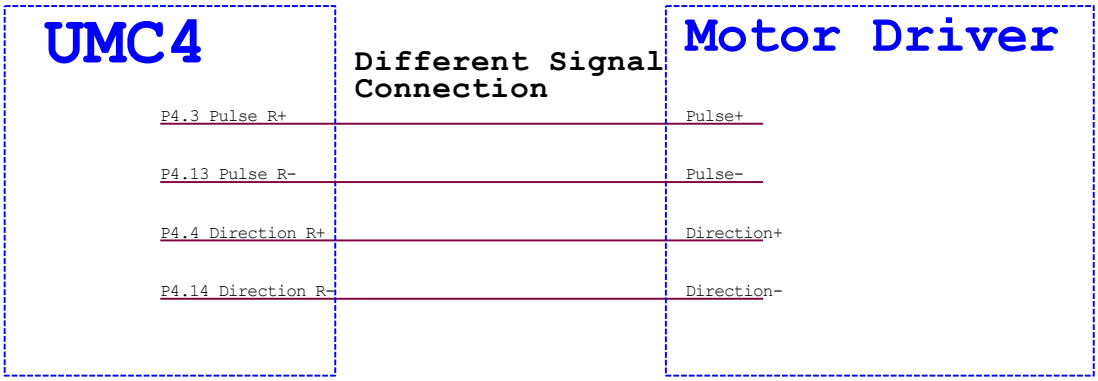
Notice:

- UMC4P1 is corresponding to digital galvanometer D-SUB25Pin. User could easily connect them by 25-pin 1 to 1 cable; however, if using type 1 galvanometer, user has to wire to power source from the cable.
- For the power source: User has to wire all pins of them, which means has to wire 3 pins of the +VCC, 3 pins of the –VCC, and 3 pins of the GND. **Only wire to 1 pin of +VCC, 1 pin of –VCC, or 1 pin of GND is forbidden.**

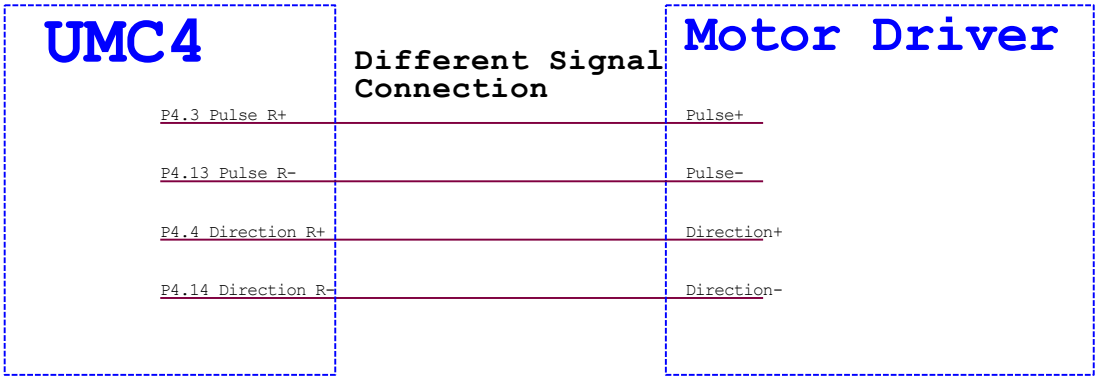
3-3 Pulse/Direction Signal Connection

According to the different types of Motor Driver, there are three ways of connection between Motor Driver and UMC4's P4 connectors.

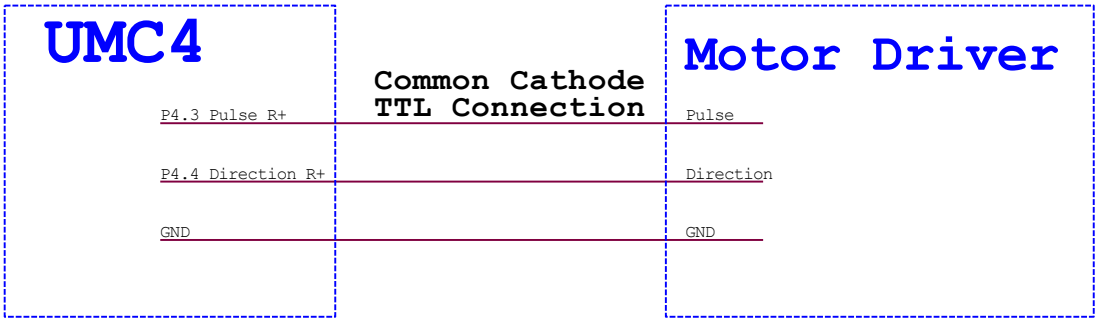
3-3-1 Differential Signal



3-3-2 Common Anode TTL

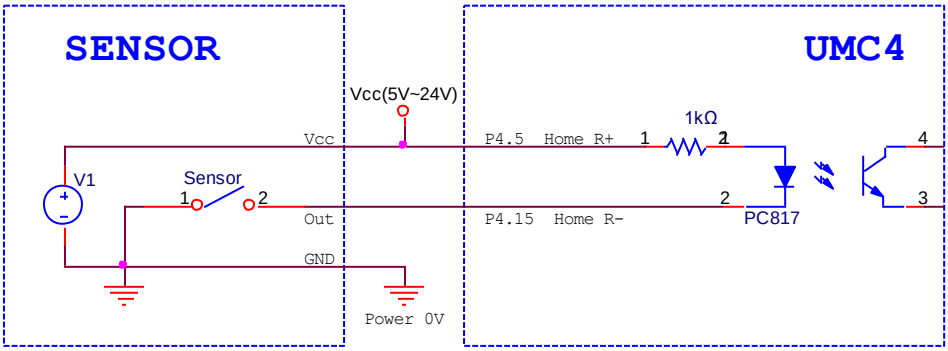


3-3-3 Common Cathode TTL

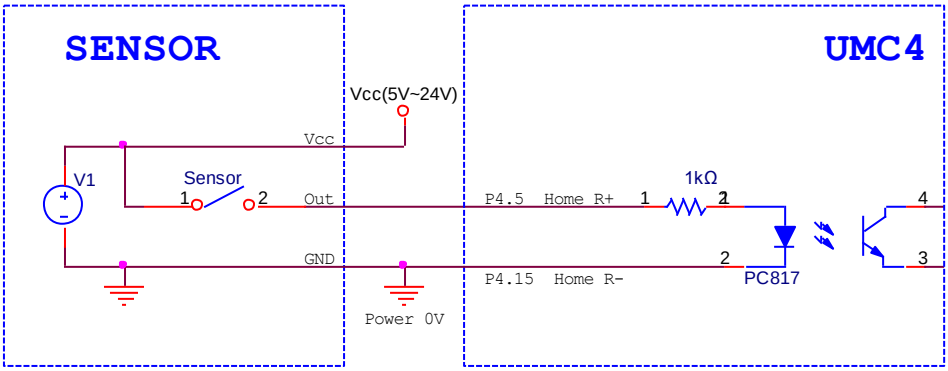


3-4 Axis Control Signal Connection

3-4-1 Common Cathode Sensor(NPN)

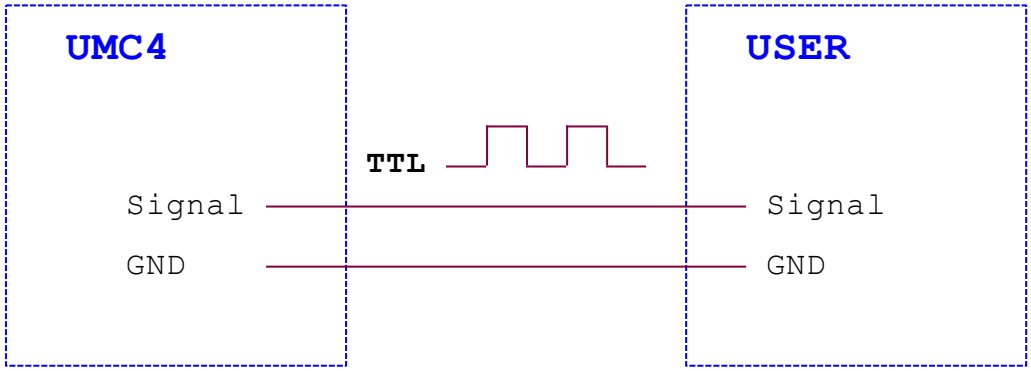


3-4-2 Common Anode Sensor(PNP)

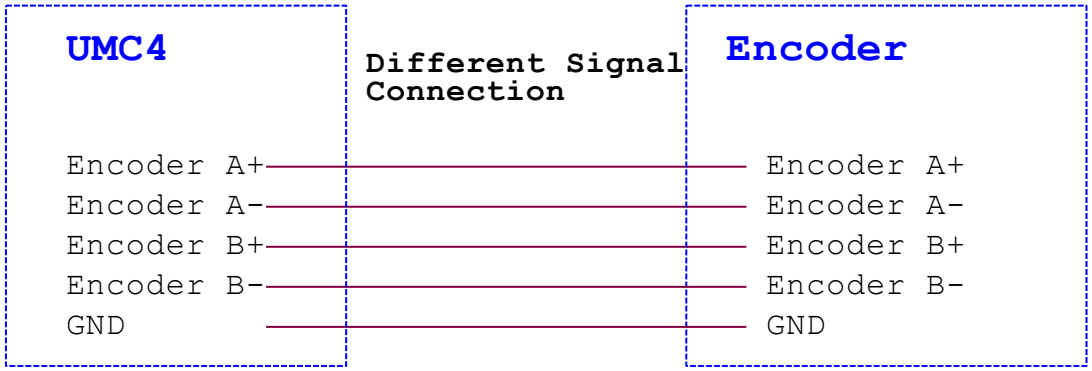


3-5 TTL Signal Connection

TTL signal is connected by one to one as below.

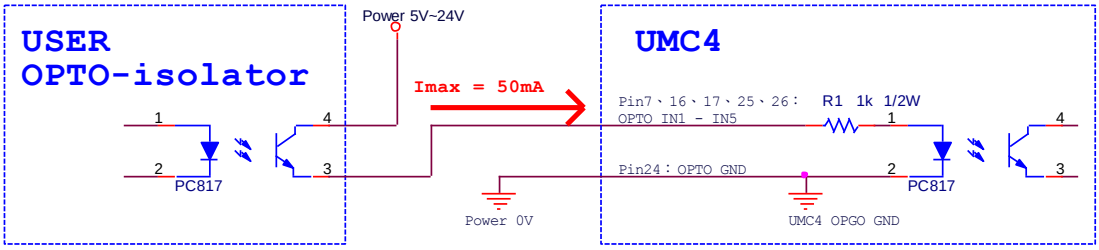


3-6 Encoder Signal Connection

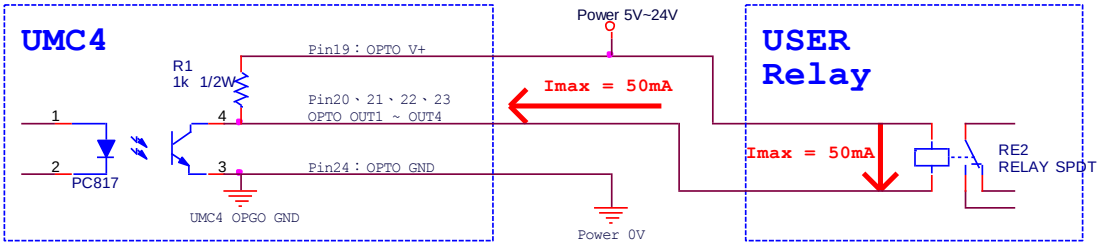


3-7 Photo Couple Signal Connection

3-7-1 OPTO IN Connection



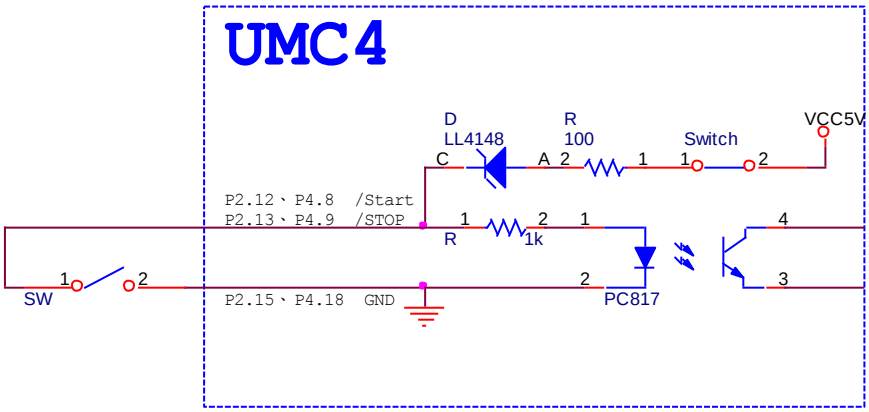
3-7-2 OPTO Out Connection



PS: The Max. current for Relay is 50 mA

3-8 START & STOP Signal Connection

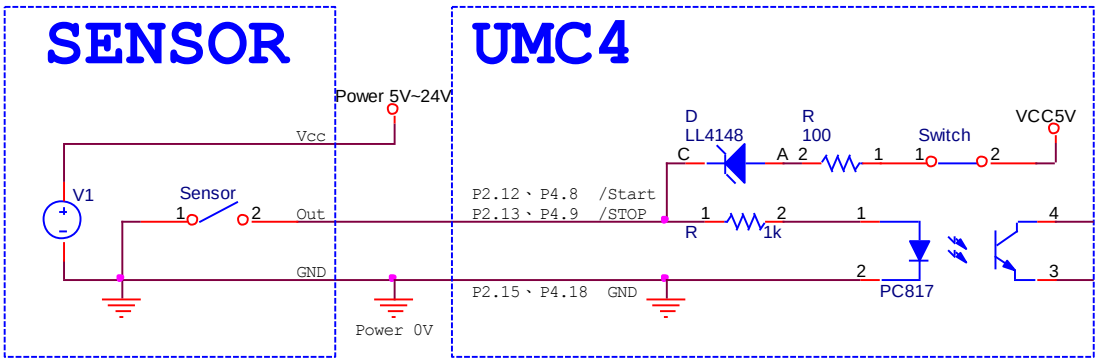
3-8-1 Connect with general buttons



Note： Please set Common Cathode for HWConfig, Please refer to 3-8 HWConfig Setting Description.

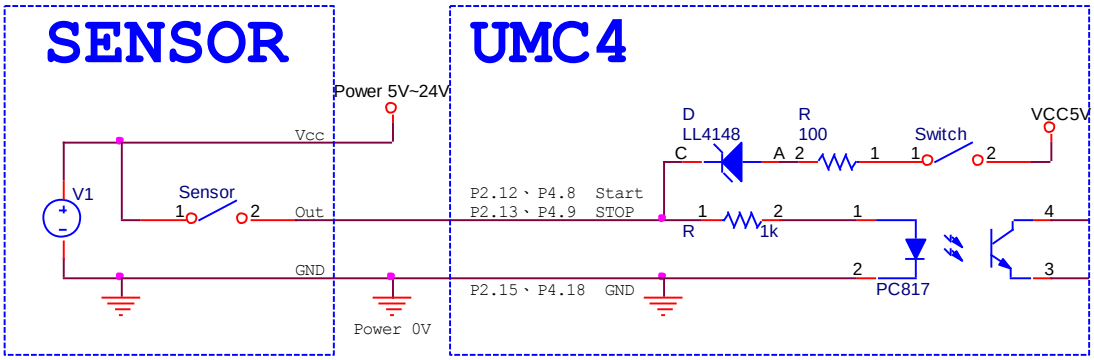
3-8-2 Connect with sensors

a. For Common Cathode Sensor(NPN), short circuit the sensor output with GND.



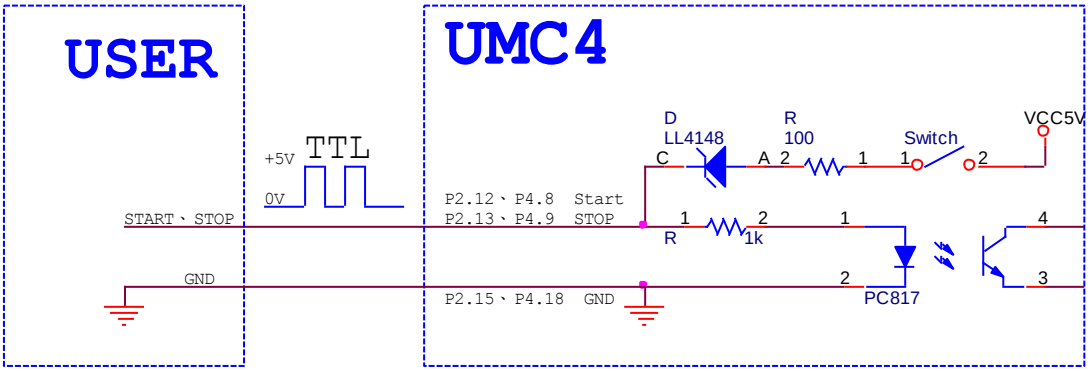
Note： Please set Common Cathode for HWConfig, Please refer to 3-8 HWConfig Setting Description.

b. For Common Anode Sensor(PNP), short circuit the sensor output with Vcc.



Note： Please set Common Cathode for HWConfig, Please refer to 3-8 HWConfig Setting Description.

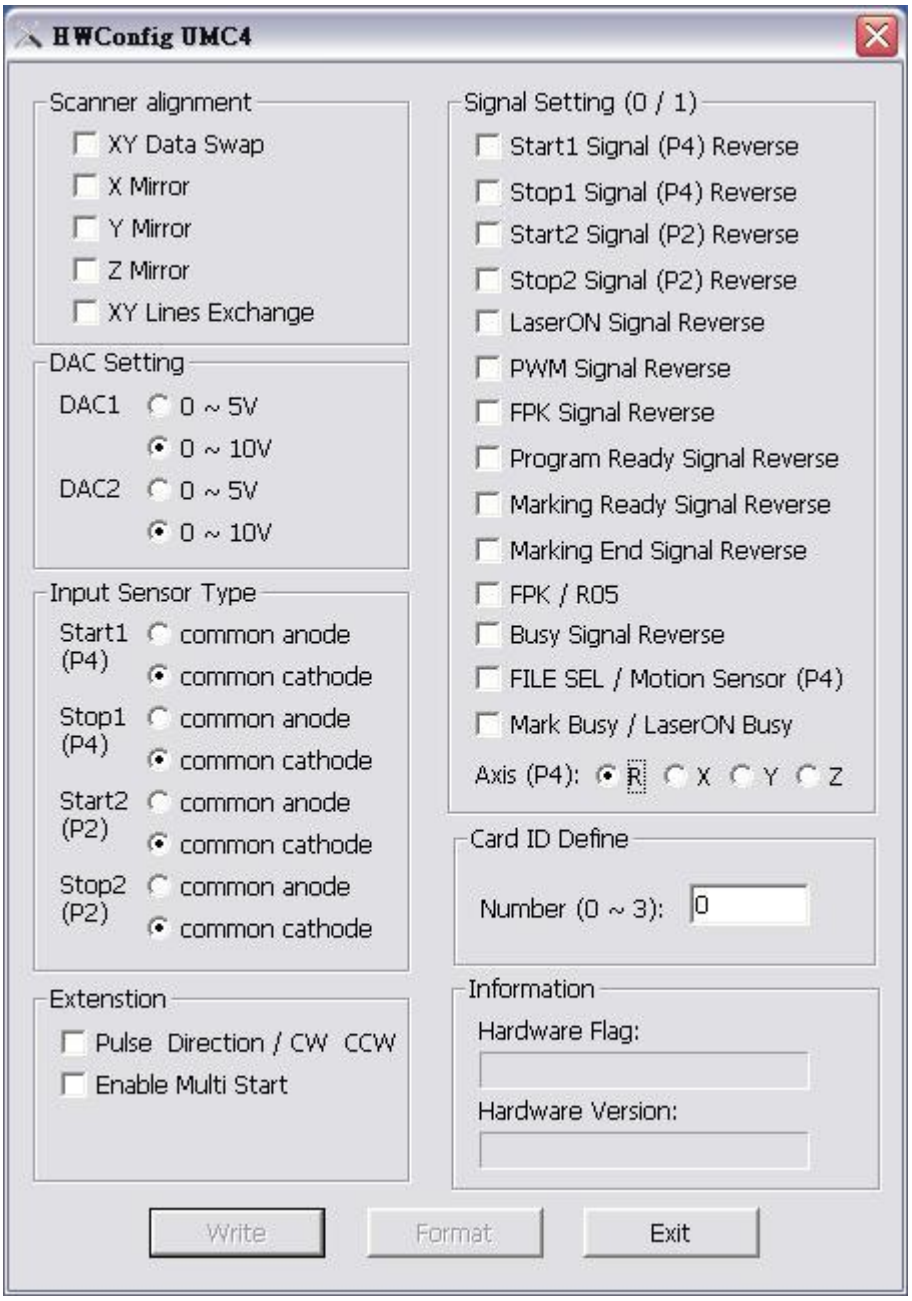
3-8-3 Input TTL signal



Note： Please set Common Cathode for HWConfig, Please refer to 3-8 HWConfig Setting Description.

3-9 HWConfig Setting Description

File Address：C:\Program Files\MM-SA\Drivers\UMC4\HWConfig.exe.



3-9-1 Scanner alignment：Set P1 (XY2-100).

XY Data Swap：Exchanging X and Y coordinate will not affect correction file.

X Mirror、Y Mirror、Z Mirror：X and Y and Z Mirror。

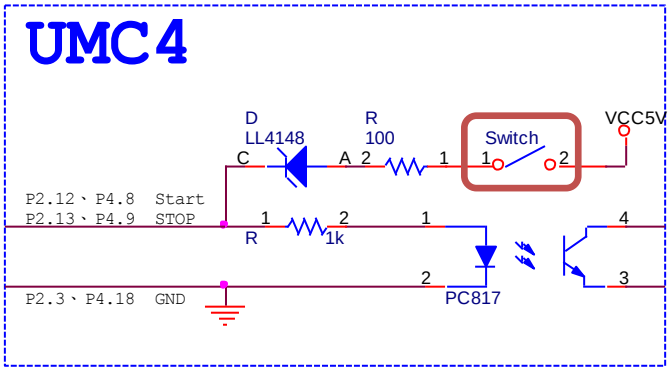
XY Lines Exchange：X and Y output exchange。

3-9-2 DAC Setting：Set P2 (Analog Out Voltage).

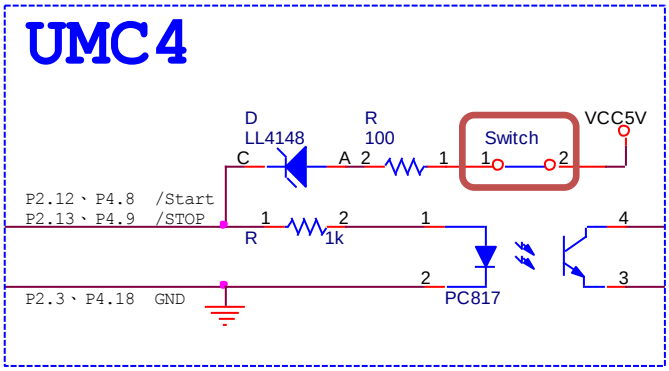
Select DAC1& DAC2 as 0~5V or 0~10V。

3-9-3 Input Sensor Type：Set P2、P4(Start、Stop).

Common Anode：Figure Switch Close, /Start、/Stop LOW action.



Commoun Cathode：Figure Switch Open, Start、Stop High action.



3-9-4 Extenstion

Pulse Direction / CW CCW：Select Motion output Pulse/Dir or CW/CCW。
Enable Multi Start: While in automation mode, multiple start marking signal trigger is allowed.

3-9-5 Signal Polarity (Enable Active Low)

Setting Start、Stop drive phase with P2、P4, Check for reverse.
Setting TTL signal with P2, Check for reverse.
Setting photo couple phase with P4, Check for reverse.
Selecting FPK or R05 Out(Applies Old Card IP1.2.1),The new card changed JP1setting.
Setting Limit + - with P4 IN3、IN4, Check for Limit+ -、InPosition with P4 IN2.
Setting motion with P4, Selecting X、Y、Z、R axis, By default the R axis.

4. Others

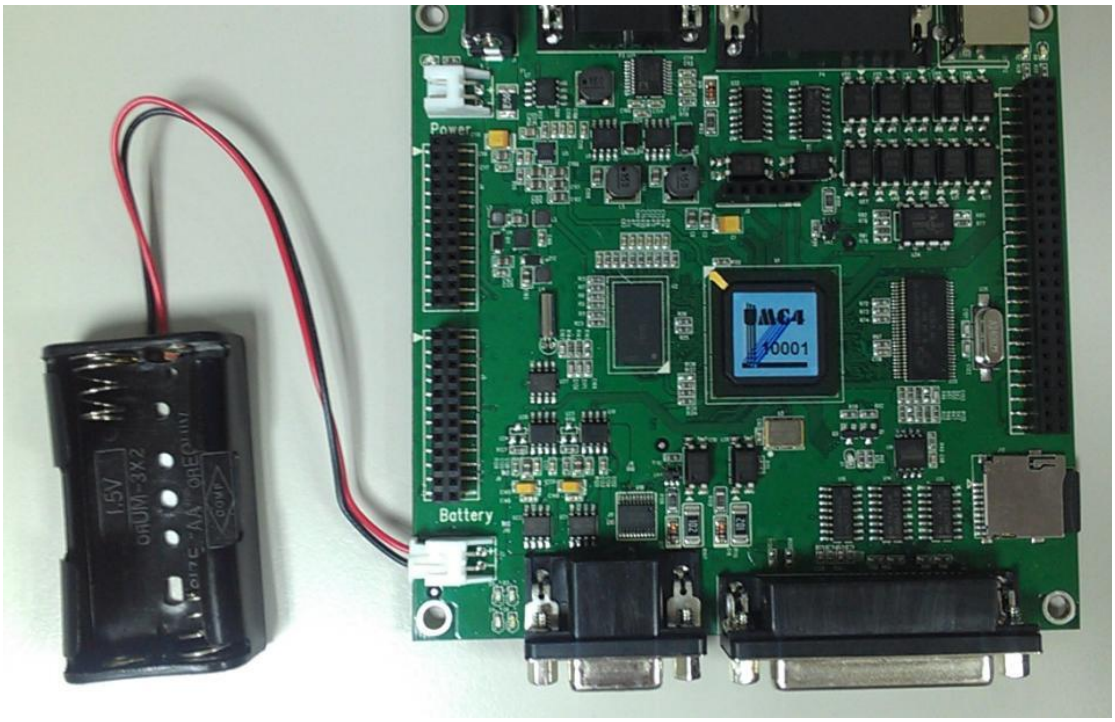
4-1 Clock

UMC4 is equipped with clock counter, capable to mark current date and time.

4-1-1 Hardware Configuration

a. **J7 is needed to connect with +1.5V~+5V battery. Without battery, the current date and time will be erased as long as UMC4 been cut-off power.**

b. **Lifetime of Carbon-zinc battery is approximated 3 years.**
Note: Even UMC4 is plug in the power, the battery is still consumed by minimum current.

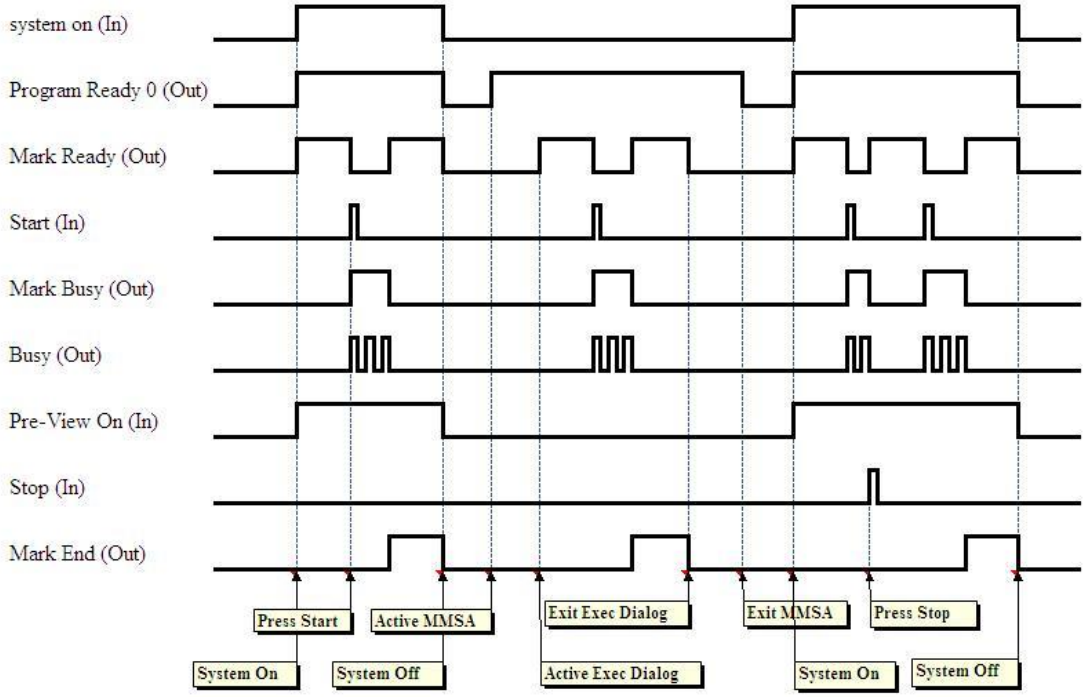


4-1-2 Software Configuration (Time Reflash)

a. **Date and time will be updated to computer's current time when MM-SA is executing.**

b. **Could be configured through PLC human-machine interface.**

4-2Offline Marking Signal Time Series



Name	IN/OUT	Pin	Definition
System On	IN	P4.7	Stand-alone marking standby
Program Ready	OUT	P4.20	System standby
Mark Ready	OUT	P4.21	Mark standby
Mark End	OUT	P4.22	Mark complete
Busy	OUT	P4.23	Laser busy
Mark Busy	OUT	P4.23	System busy
Start	IN	P4.8	External trigger start
Stop	IN	P4.9	External trigger stop
Pre-View On	IN	P4.5 P4.15	External trigger mark preview

4-3 File Selection for Off-line Marking

4-3-1 Through PLC Human-Machine Interface

Using the human-machine interface of PLC, users could select file and set basic marking parameters.

4-3-2 Through External I/O

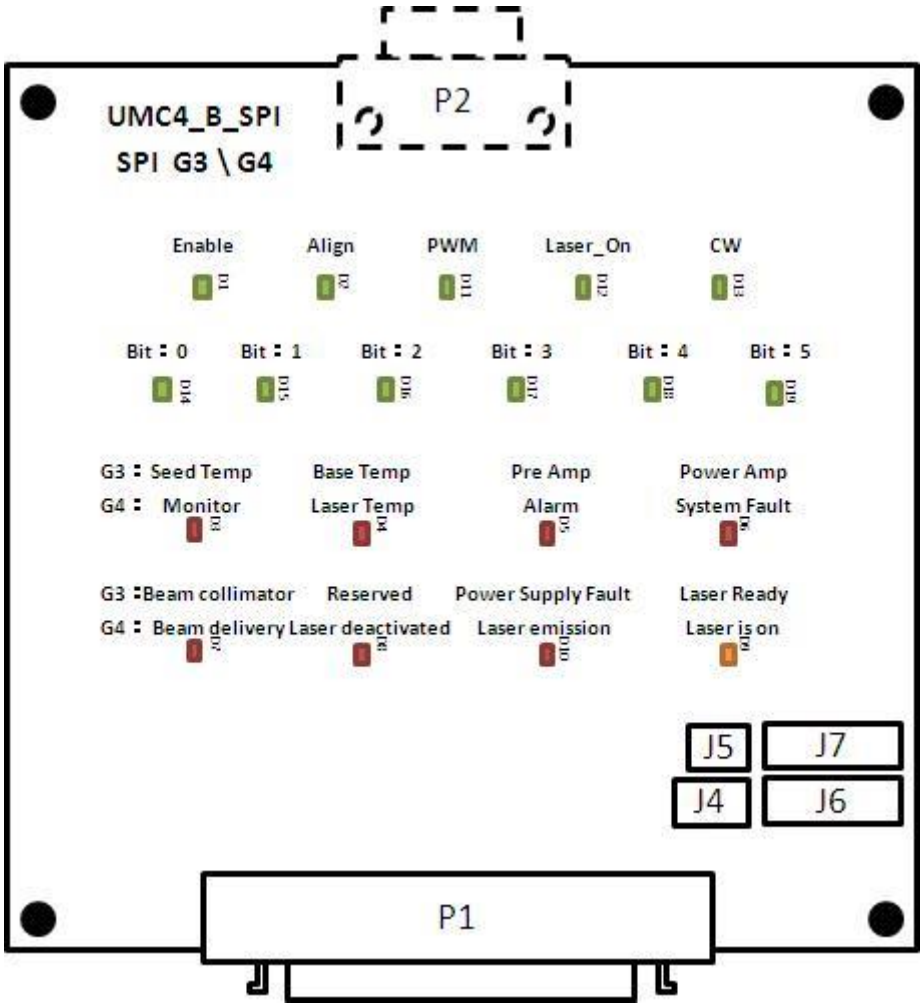
IN4	IN3	IN2	IN1	File Name	IN4	IN3	IN2	IN1	File Name
0	0	0	0	#01	1	0	0	0	#09
0	0	0	1	#02	1	0	0	1	#10
0	0	1	0	#03	1	0	1	0	#11
0	0	1	1	#04	1	0	1	1	#12
0	1	0	0	#05	1	1	0	0	#13
0	1	0	1	#06	1	1	0	1	#14
0	1	1	0	#07	1	1	1	0	#15
0	1	1	1	#08	1	1	1	1	#16

4-4 LED Status (D1 ~ D8)

Name	Color	Descriptions
D1	Red	Executing status. Keep light while function is normal.
D2	Red	Light flashing while data is transferring.
D3	Red	UMC4 is initializing, please wait.
D4	Yellow	Reserved.
D5	Red	Reserved.
D6	Green	Ready to use.
D7	Red	Power in.
D8	Green	USB connected with computer.

5. UMC4_B_SPI Board(SPI G3 / G4)

5-1 Appearance



Name	Descriptions
P1	SPI Laser port, connect with SPI laser one on one with SCSI 68Pin cable.
P2	RS232 port, connect with computer RS232 (Serial) port for SPI laser software mode control.(Default not available)
J4	SPI RS232
J5	SPI Estop
J6、J7	SPI Status

5-2 Pin Assignment

5-2-1 J4~J7 (Laser extend connector)

Connector	PIN	Descriptions
J4 	J4.1	GND
	J4.2	SPI_RS232_RX
	J4.3	SPI_RS232_TX
J5 	J5.1	/Estop Dry connect input(Let GND short-circuit will get Estop signal)
	J5.2	GND
J6、J7 	J6.1	Seed laser temperature fault
	J6.2	Base plate temperature fault
	J6.3	Pre-amplifier current fault
	J6.4	Power-amplifier current fault
	J6.5	GND
	J6.6	5V
	J7.1	Beam collimator fault
	J7.2	Reserved fault indicator
	J7.3	Laser Ready (no fault)
	J7.4	Power Supply Fault
	J7.5	GND
	J7.6	5V

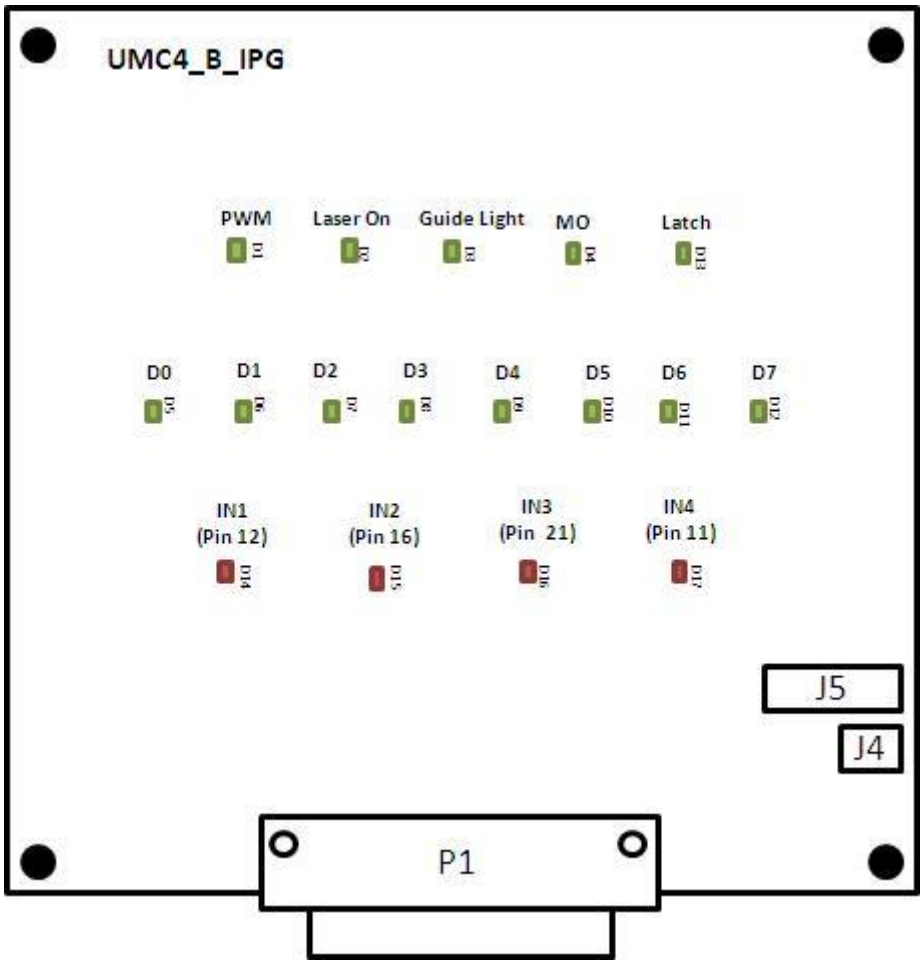
5-3 LED Status

Name	SPI Pin	Descriptions	
LED	SCSI 68Pin	**SPI G3**	**SPI G4**
D1	7	Global Enable	Laser enable
D2	6	Alignment laser enable	Pilot laser enable
D3	3	Seed laser temperature fault	Monitor
D4	8	Base plate temperature fault	Laser temperature
D5	9	Pre-amplifier current fault	Alarm
D6	10	Power-amplifier current fault	System fault
D7	11	Beam collimator fault	Beam delivery
D8	12	Reserved fault indicator	Laser deactivated
D9	14	Laser Ready (no fault)	Laser is on
D10	16	Power Supply Fault	Laser emission warning

6. UMC4_B_IPG Board(Type D / D1)

(Also apply for Raycus and JPT Laser)

6-1 Appearance



Name	Descriptions
P1	IPG Laser port, connect with IPG laser one on one with D-sub 25Pin cable.
J4	IPG E-Stop：(Dry connect input)
J5	IPG Status：(TTL Output)

6-2 Pin Assignment

6-2-1 J4~J5 (Laser extend connector)

Connector	PIN	Description
J4 	J4.1	/Estop (Dry connect input)(Short with GND to trigger)
	J4.2	GND
J5 	J5.1	GND
	J5.2	IPG Pin 11
	J5.3	IPG Pin 12
	J5.4	IPG Pin 16
	J5.5	IPG Pin 21
	J5.6	GND

6-3 LED Status

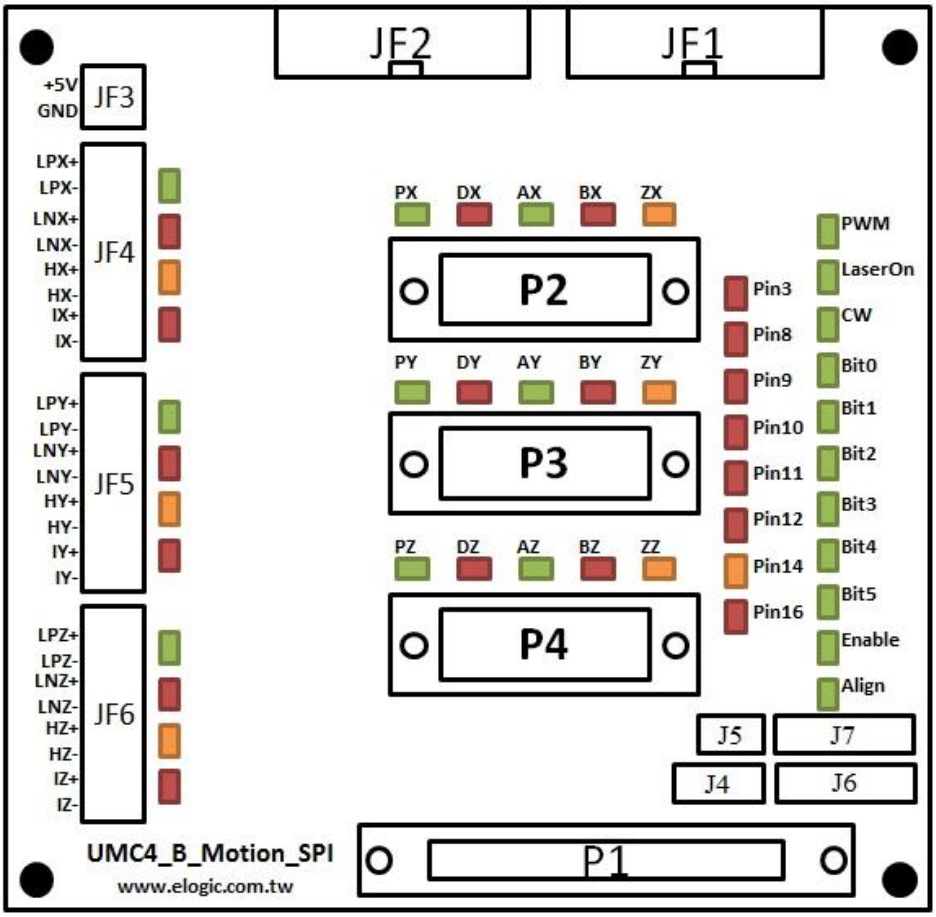
Name	IPG Pin (D-SUB 25-pin)	Descriptions
D1	20	PWM
D2	19	Laser On
D3	22	Guide Light
D4	18	MO
D5	1	Power Bit0
D6	2	Power Bit1
D7	3	Power Bit2
D8	4	Power Bit3
D9	5	Power Bit4
D10	6	Power Bit5
D11	7	Power Bit6
D12	8	Power Bit7
D13	9	Latch
D14	12	INPUT1
D15	16	INPUT2
D16	21	INPUT3
D17	11	INPUT4

IPG_Fiber.cfg	For IPG Laser
IPG_Fiber_RS232.cfg	For RS232 control IPG Laser
IPG_GLPM.cfg	For IPG GLPM Laser
IPG_YLP_B.cfg	For IPG YLP-B Laser
IPG_YLPM.cfg	For IPG YLPM Laser
raycus.cfg	For Raycus Laser
JPT_YDFLP_10_20.cfg	For JPT YDFLP 10-20 Laser
JPT_YDFLP_20_DP1_S.cfg	For JPT YDFLP 20-DP1 Laser
JPT_YDFLP_20_DP1_S_L.cfg	For JPT YDFLP 20-DP1-S Laser
JPT_YDFLP_20_PRO_S_L.cfg	For JPT YDFLP 20-PRO-S Laser

7. UMC4_B_Motion

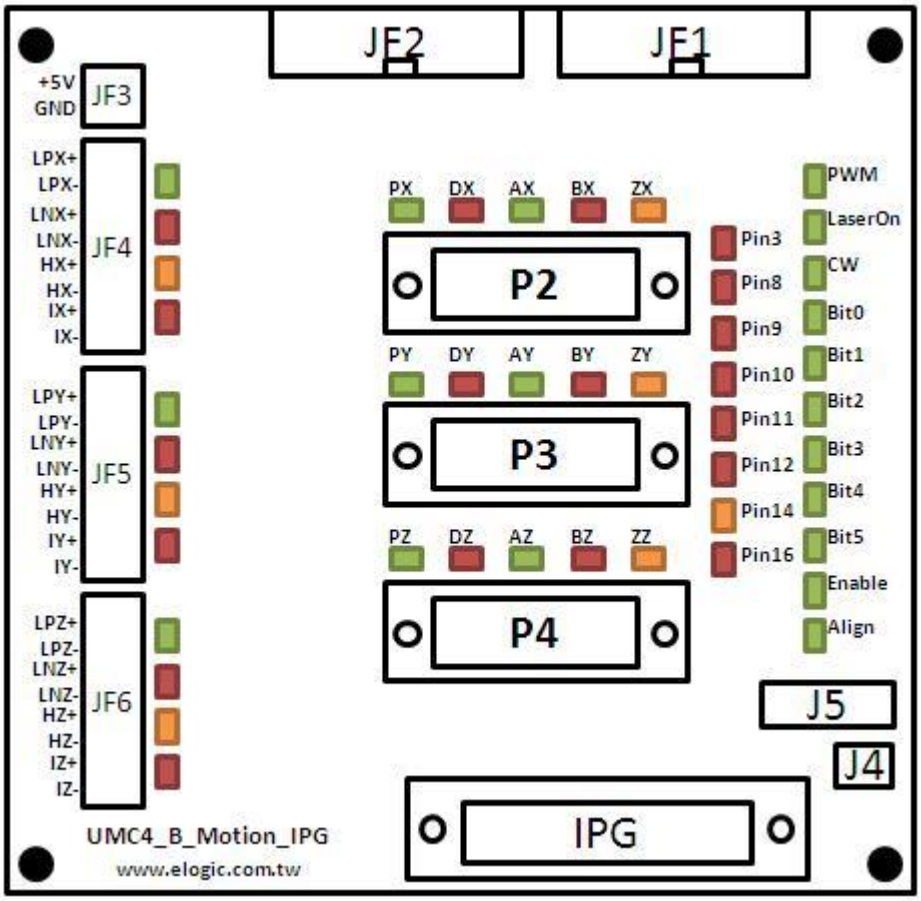
7-1 Appearance

7-1-1 UMC4_B_Motion_SPI：(SPI G3 / G4)



Name	Descriptions
P1	SPI Laser port, connect with SPI laser one on one with SCSI 68Pin cable.
P2、P3、P4	D-SUB 15F：X、Y、Z Motion、Encoder connector.
JF3	Terminal Block 2Pin：+5V and 0V.
JF4、JF5、JF6	Terminal Block 8Pin：Sensor Input.
J4	SPI RS232
J5	SPI Estop
J6、J7	SPI Status

7-1-2 UMC4_B_Motion_IPG：(IPG Type D / D1)



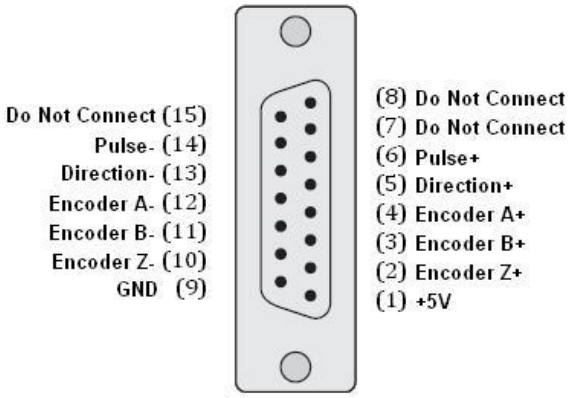
Name	Descriptions
P1	IPG Laser port, connect with IPG laser one on one with D-sub 25Pin cable.
P2、P3、P4	D-SUB 15F：X、Y、Z Motion、Encoder connector.
JF3	Terminal Block 2Pin：+5V and 0V.
JF4、JF5、JF6	Terminal Block 8Pin：Sensor Input.
J4	IPG E-Stop：(Dry connect input)
J5	IPG Status：(TTL Output)

7-2 Pin Assignment

7-2-1 P1 Laser Control Connector

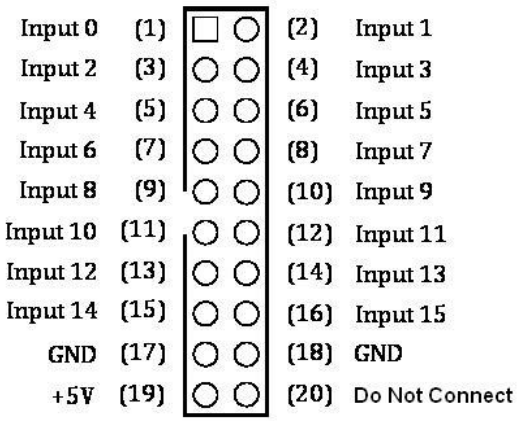
Reference SPI G3 / G4 User Manual or IPG Type D / D1 User Manual.Connect with laser one on one with cable.

7-2-2 P2~P4 Control Port

15-pin Female Connector	Pin	Descriptions
	1	+5V
	2、10	Encoder Z+、Encoder Z-
	3、11	Encoder B+、Encoder B-
	4、12	Encoder A+、Encoder A-
	5、13	Direction+、Direction-
	6、14	Pulse+、Pulse-
	7、8、15	Undefined
	9	GND

7-2-3 JF1 (INPUT): TTL Input Port

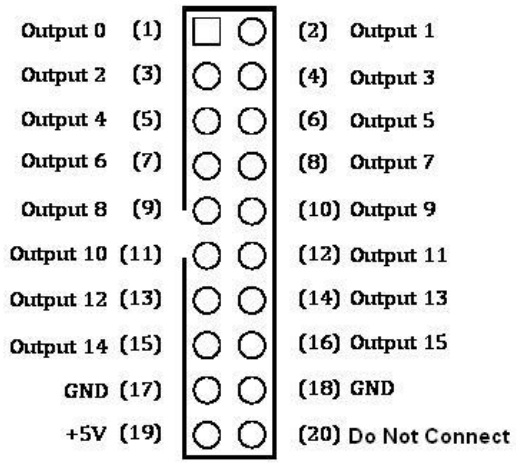
When there is no any connection to TTL input, the program receives 0 value; while if input 0V, the program will read 0, if input 5V, the program will read 1. You must consider about the noise issue. The pin assignment of JF1 connector is compatible to the general purpose input daughter boards such as PCLD-782 of Advantech Co., Ltd. or the DB-16P of ICPDAS Co., Ltd. Using these kinds of daughter boards can isolate power source while provide protection and easy cable connections.

Pin	Name	Descriptions	20-pin Connector
1	General Digital Input 0		
2	General Digital Input 1		
3	General Digital Input 2		
4	General Digital Input 3		
5	General Digital Input 4		
6	General Digital Input 5		
7	General Digital Input 6		
8	General Digital Input 7		
9	General Digital Input 8		
10	General Digital Input 9		
11	General Digital Input 10		
12	General Digital Input 11		
13	General Digital Input 12		
14	General Digital Input 13		
15	General Digital Input 14	Start	
16	General Digital Input 15	E. Stop	
17	GND		
18	GND		
19	+5V		
20	Do Not Connect		

7-2-4 JF2(OUTPUT): TTL Output Port

As for the output of TTL, when an output is set as inactive in the software; the output voltage is 0V. When an output is set as active in the software; the output voltage is 5V. The pin assignment of JF2 connector is compatible to the general purpose relay output boards such as PCLD-885 of Advantech Co., Ltd. or the DB-16R of ICPDAS Co., Ltd. Using these kinds of daughter boards can isolate external power and drive the peripheral devices more powerfully, it provides benefits of protection and easy cable connections.

Pin	Name	Descriptions	20-pin Connector
1	General Digital Output 0		
2	General Digital Output 1		
3	General Digital Output 2		
4	General Digital Output 3		
5	General Digital Output 4		
6	General Digital Output 5		
7	General Digital Output 6		
8	General Digital Output 7		
9	General Digital Output 8		
10	General Digital Output 9		
11	General Digital Output 10		
12	General Digital Output 11		
13	General Digital Output 12		
14	General Digital Output 13	Marking Ready	
15	General Digital Output 14	Program Ready	
16	General Digital Output 15	Marking End	
17	GND		
18	GND		
19	+5V		
20	Do Not Connect (Undefined)		



7-2-5 J4~J7 (Laser extend connector)

7-2-5-1 UMC4-B-Motion-SPI

Connector	PIN	Descriptions
J4 	J4.1	GND
	J4.2	SPI_RS232_RX
	J4.3	SPI_RS232_TX
J5 	J5.1	/Estop Dry connect input(Let GND short-circuit will get Estop signal)
	J5.2	GND
J6、J7 	J6.1	Seed laser temperature fault
	J6.2	Base plate temperature fault
	J6.3	Pre-amplifier current fault
	J6.4	Power-amplifier current fault
	J6.5	GND
	J6.6	5V
	J7.1	Beam collimator fault
	J7.2	Reserved fault indicator
	J7.3	Laser Ready (no fault)
	J7.4	Power Supply Fault
	J7.5	GND
	J7.6	5V

7-2-5-2 UMC4-B-Motion-IPG

Connector	PIN	Description
J4 	J4.1	/Estop (Dry connect input)(Short with GND to trigger)
	J4.2	GND
J5 	J5.1	GND
	J5.2	IPG Pin 11
	J5.3	IPG Pin 12
	J5.4	IPG Pin 16
	J5.5	IPG Pin 21
	J5.6	GND

7-2-6 JF4~JF6 Sensor Control Port：(Terminal Block)

Name	Descriptions
LPX+、LPY+、LPZ+	Positive Limit + (X、Y、Z)
LPX-、LPY-、LPZ-	Positive Limit - (X、Y、Z)
LNX+、LNY+、LNZ+	Negative Limit + (X、Y、Z)
LNX-、LNY-、LNZ-	Negative Limit - (X、Y、Z)
HX+、HY+、HZ+	Home + (X、Y、Z)
HX-、HY-、HZ-	Home -(X、Y、Z)
IX+、IY+、IZ+	InPosition + (X、Y、Z)
IX-、IY-、IZ-	InPosition - (X、Y、Z)

7-2-7 D1~D19 Laser LED Status Descriptions

7-2-7-1 UMC4_B_Motion_SPI

Name	Pin	Descriptions	
LED	SCSI68Pin	**SPI G3**	**SPI G4**
D1	13	External Pulse Trigger	Pulse_trigger_h
D2	5	Laser Emission Gate	Laser_emission_gate_h
D3	21	Pulsed/CW Mode select	Laser_Pulse_CW_h
D4	17	State Select: bit 0	DI_0
D5	18	State Select: bit 1	DI_1
D6	19	State Select: bit 2	DI_2
D7	20	State Select: bit 3	DI_3
D8	51	State Select: bit 4	DI_4
D9	52	State Select: bit 5	DI_5
D10	7	Global Enable	Laser_enable_h
D11	6	Alignment laser enable	Pilot_laser_enable_h
D12	3	Seed laser temperature fault	Monitor
D13	8	Base plate temperature fault	Laser temperature
D14	9	Pre-amplifier current fault	Alarm
D15	10	Power-amplifier current fault	System fault
D16	11	Beam collimator fault	Beam delivery
D17	12	Reserved fault indicator	Laser deactivated
D18	14	Laser Ready (no fault)	Laser is on
D19	16	Power Supply Fault	Laser emission warning

7-2-7-2 UMC4_B_Motion_IPG

Name	IPG Pin (D-SUB 25-pin)	Descriptions
D1	20	Sync
D2	19	Modulation
D3	22	Guide
D4	18	EE
D5	1	Power Setting D0
D6	2	Power Setting D1
D7	3	Power Setting D2
D8	4	Power Setting D3
D9	5	Power Setting D4
D10	6	Power Setting D5
D11	7	Power Setting D6
D12	8	Power Setting D7
D13	9	Latch
D14	12	Laser alarms status
D15	16	Laser alarms status
D16	21	Laser alarms status
D17	11	Laser alarms status

7-2-8 D20~D46 Motion LED Status

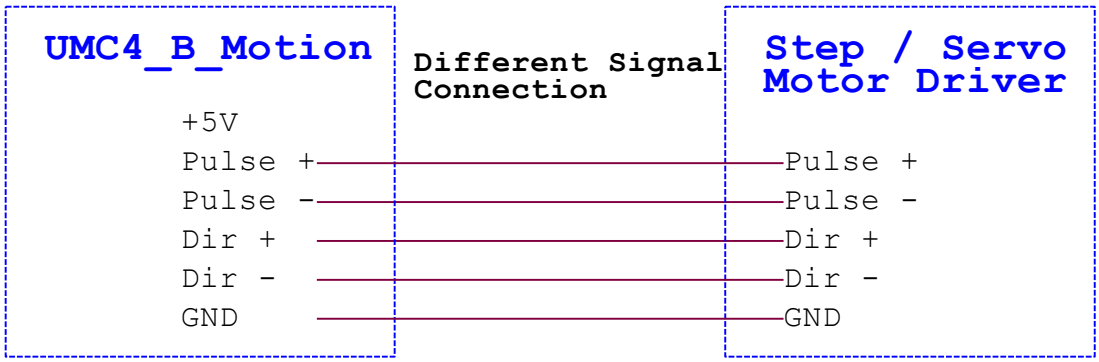
Name	Descriptions	Name	Descriptions
D20	Pulse X	D34	Positive Limit Z
D21	Direction X	D35	Negative Limit Z
D22	Pulse Y	D36	Home Z
D23	Direction Y	D37	InPosition Z
D24	Pulse Z	D38	Encoder AX
D25	Direction Z	D39	Encoder BX
D26	Positive Limit X	D40	Encoder ZX
D27	Negative Limit X	D41	Encoder AY
D28	Home X	D42	Encoder BY
D29	InPosition X	D43	Encoder ZY
D30	Positive Limit Y	D44	Encoder AZ
D31	Negative Limit Y	D45	Encoder BZ
D32	Home Y	D46	Encoder ZZ
D33	InPosition Y		

7-3 Cable Connection

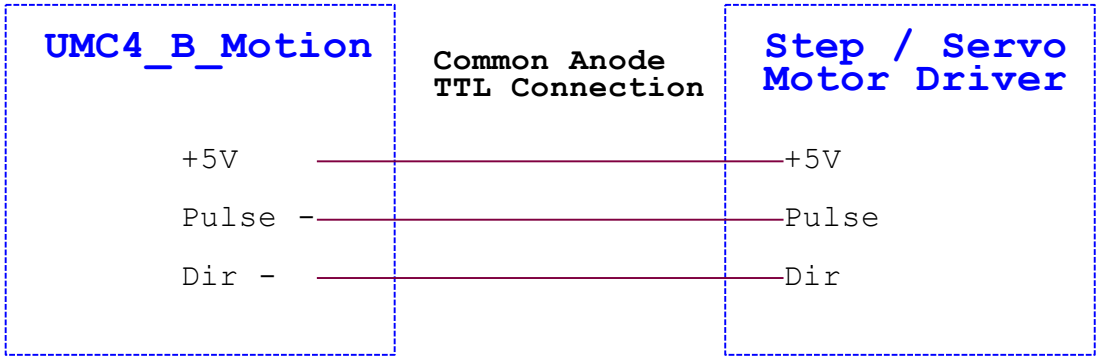
7-3-1 Pulse/Direction Signal Connection

According to the different types of Motor Driver, there are three ways of connection between Motor Driver and UMC4_B_Motion's P2 ~ P4 connectors.

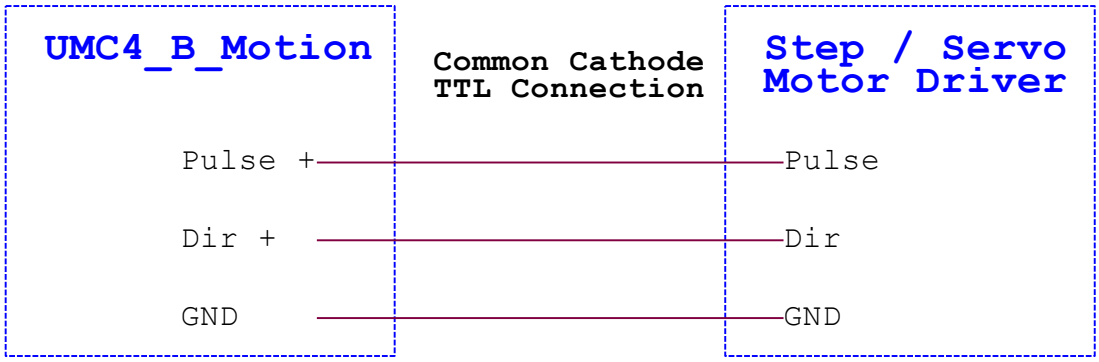
7-3-1-1 Different Signal



7-3-1-2 Common Anode TTL

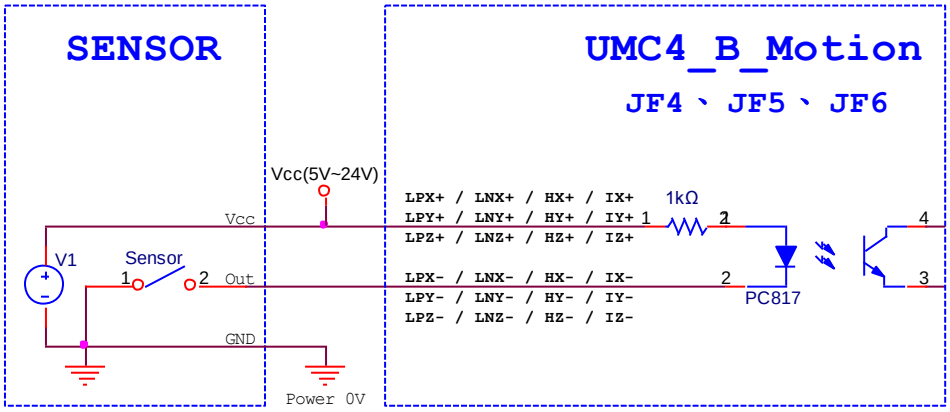


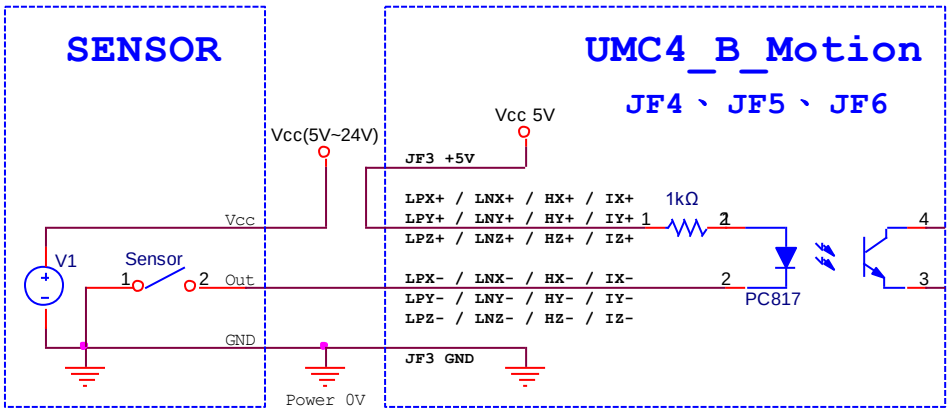
7-3-1-3 Common Cathode TTL



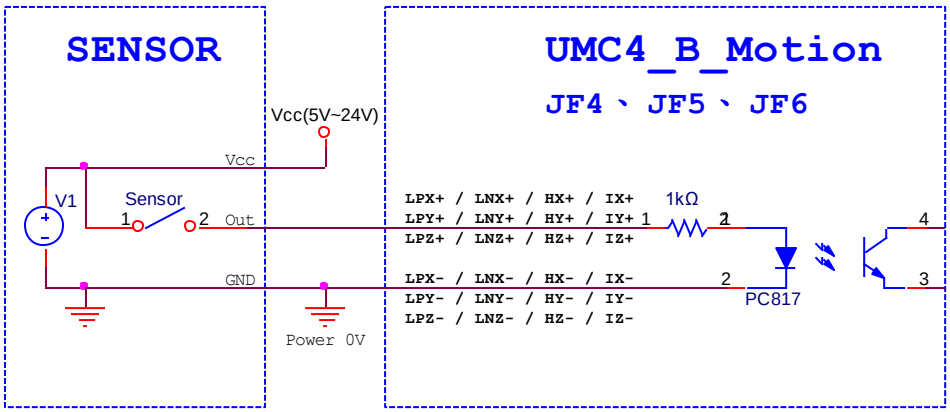
7-3-2 Connect with sensors

7-3-2-1 Common Cathode Sensor (NPN)

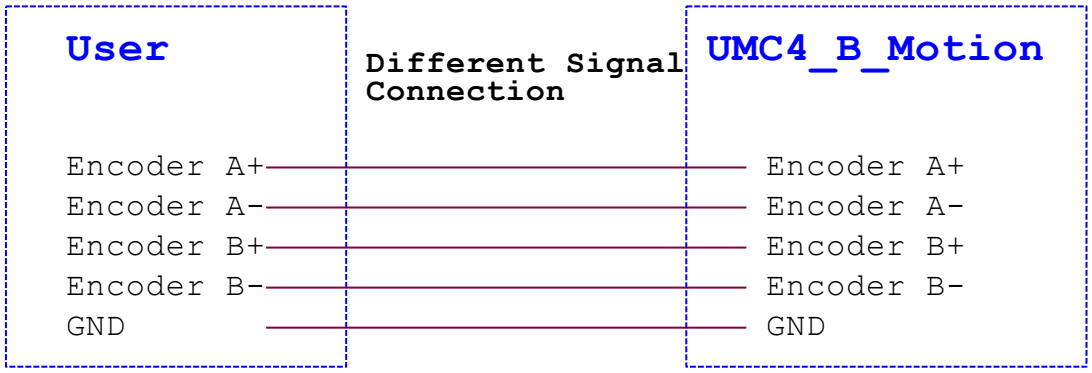




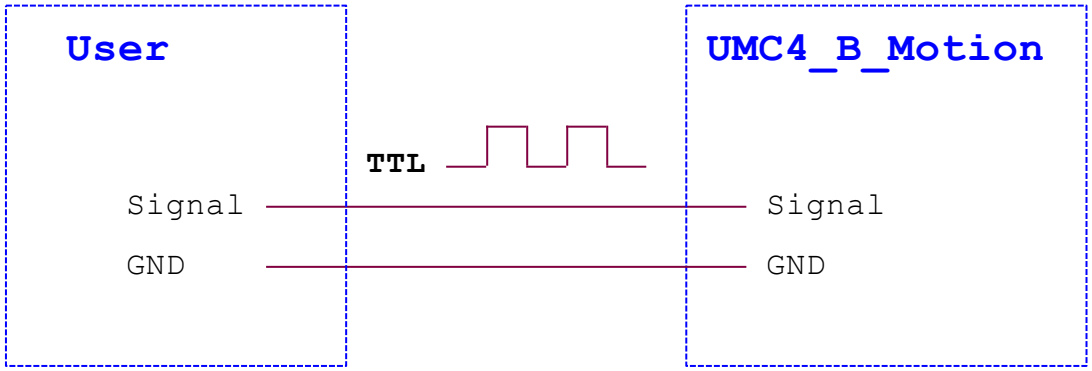
7-3-2-2 Common Anode Sensor (PNP)



7-3-3 Encoder Signal Connection

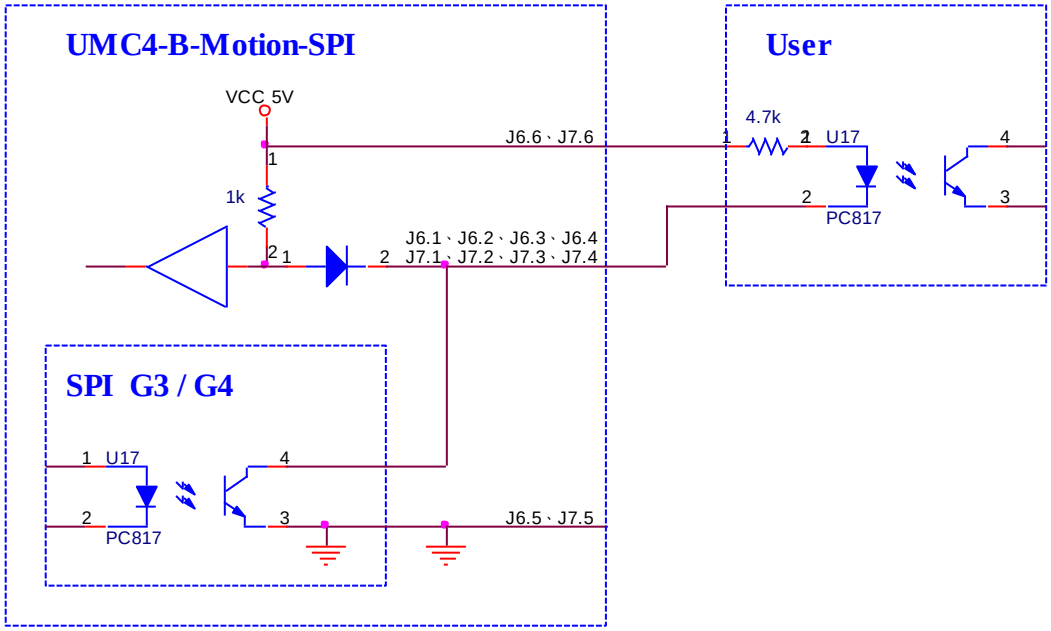


7-3-4 TTL Signal Connection (JF1、JF2)

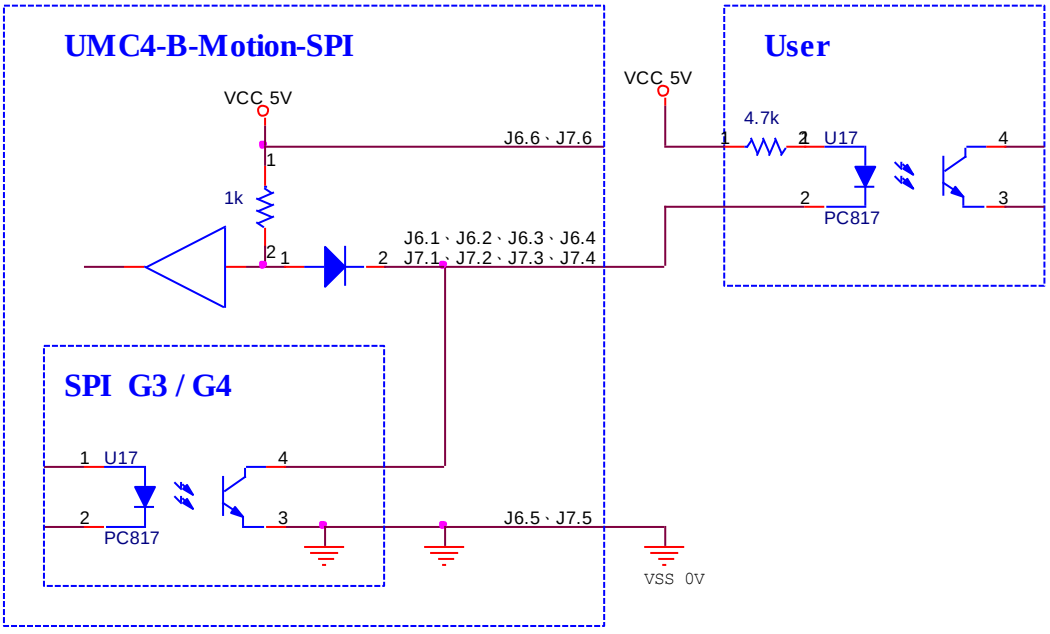


7-3-5 SPI STATUS Signal Connection (J6、J7)

7-3-5-1 Use internal power



7-3-5-2 Use external power



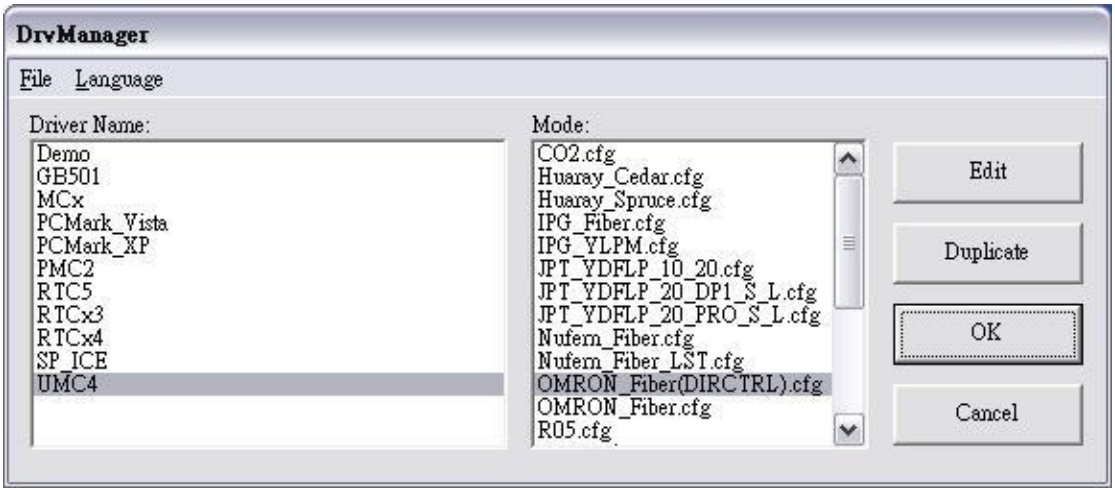
PS：SPI suggest external power is +5V, and series connect to 4.7kΩ. Please refer to SPI User`s manual.

8 OMRON Laser

8-1 Drivers Setting

OMRON_Fiber.cfg：OMRON RS232 connect to computer COM port.

OMRON_Fiber(DIRCTRL).cfg：OMRON RS232 connect to UMC4 Port J14.



8-2 Cable Connection

UMC4 P2 (D-SUB 15M HIGH DENSITY)		OMRON I/O Port (D-SUB 15M)	
6	LASER ON	5	LASER ON H
15	GND	6	LASER ON L
10	LAMP	7	LD ON H
15	GND	8	LD ON L

While use “OMRON_Fiber.cfg”, connection is according to following definition:

PC RS232 (D-SUB 9M)		OMRON (D-SUB 9F)	
2	RX (Receive)	3	TX (Transmit)
3	TX (Transmit)	2	RX (Receive)
5	GND	5	GND

While use “OMRON_Fiber(DIRCTRL).cfg”, connection is according to following definition:

UMC4 J14 (Wafer 3Pin)			OMRON (D-SUB 9F)	
	1	TX (Transmit)	2	RX (Receive)
	2	RX (Receive)	3	TX (Transmit)
	3	GND	5	GND

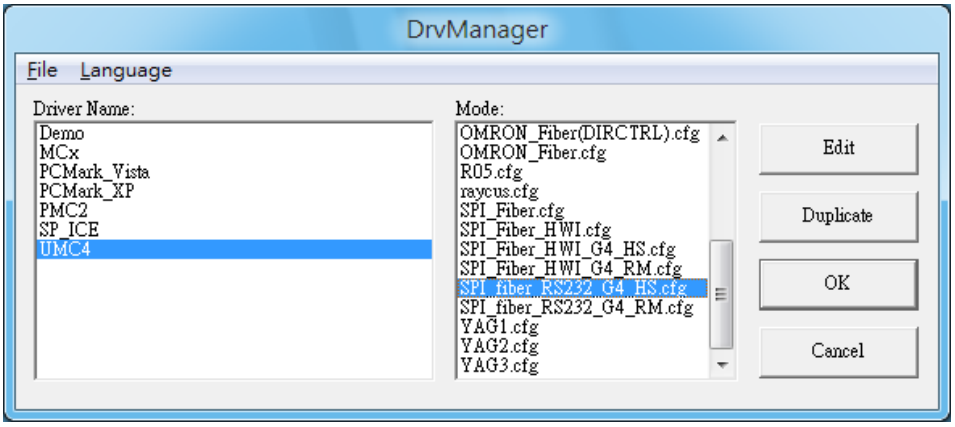
9 Using RS-232

9-1 What is RS-232

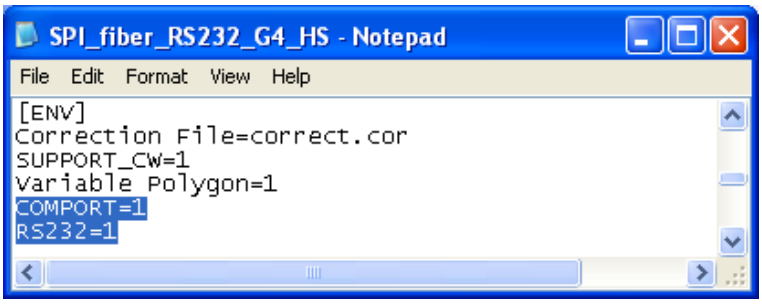
RS-232 is a kind of serial port. Common type of RS-232 connector is 9 pin D-Sub.
Some kinds of laser types needed to control by RS-232 port for tuning laser parameter, such as power percentage, frequency…etc.

9-2 Setting to use RS-232 to control laser

Take SPI G4 HS laser controlled by RS-232 as example. After user has executed \MarkingMate\DM.exe , chosen UMC4 at Driver Name column, and picked SPI_fiber_RS232_G4_HS.cfg at Mode column, to apply the setting by clicking OK. The location of cfg file is \MarkingMate\Drivers\UMC4\cfg\. Refer to the following picture:

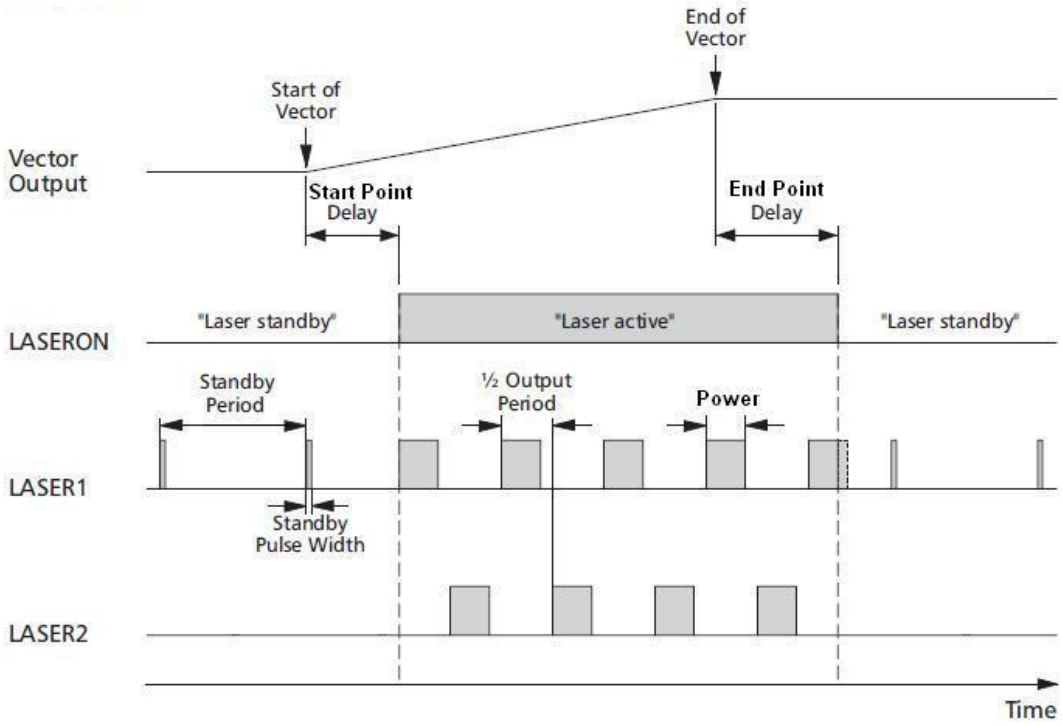


Open the given file by favorite text editor. There should be two instructions under [ENV] sector, such as RS232=1 and COMPORT=XXX. RS232=1 means control laser by RS-232. XXX within COMPORT=XXX means the using Com Port number. Default value is 1 which means using COM port 1 to control laser. Manually change this value to assign other port if necessary.

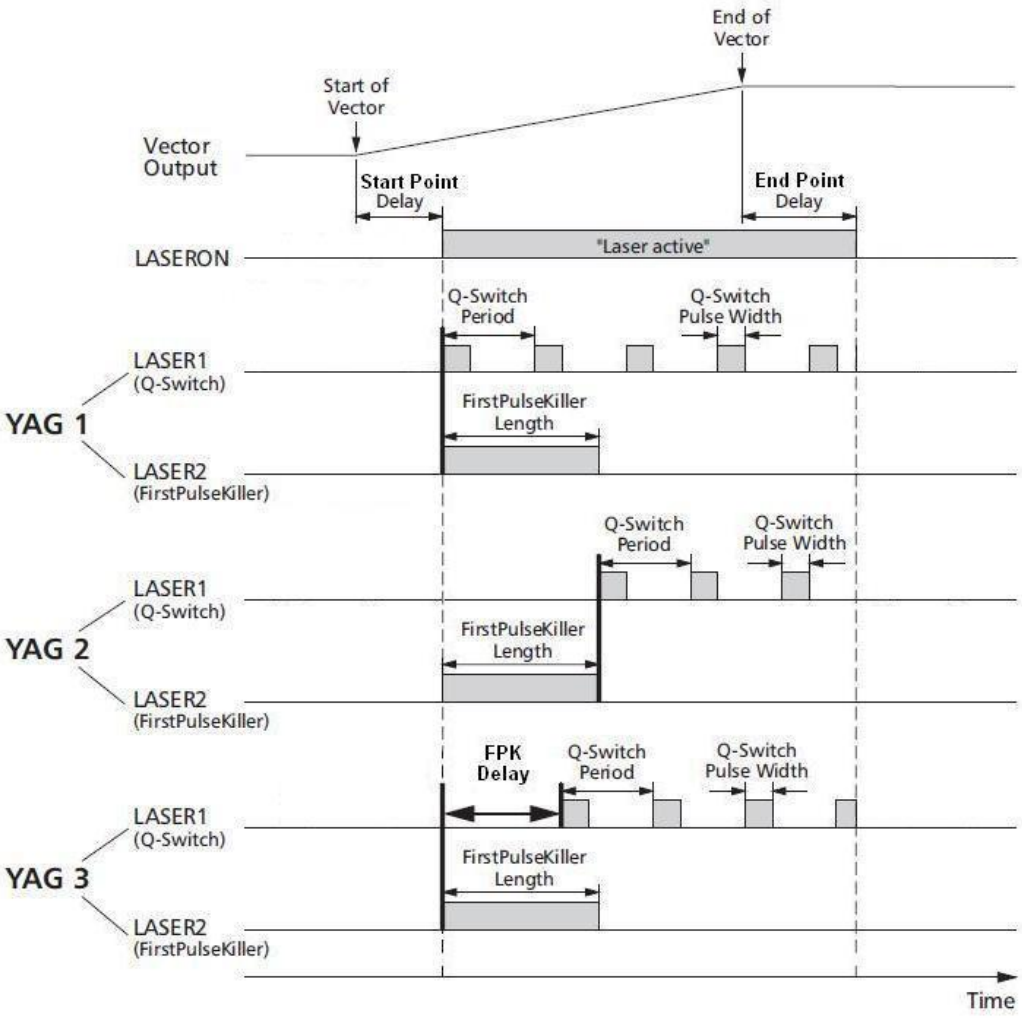


Appendix1: Various Laser Setting Modes

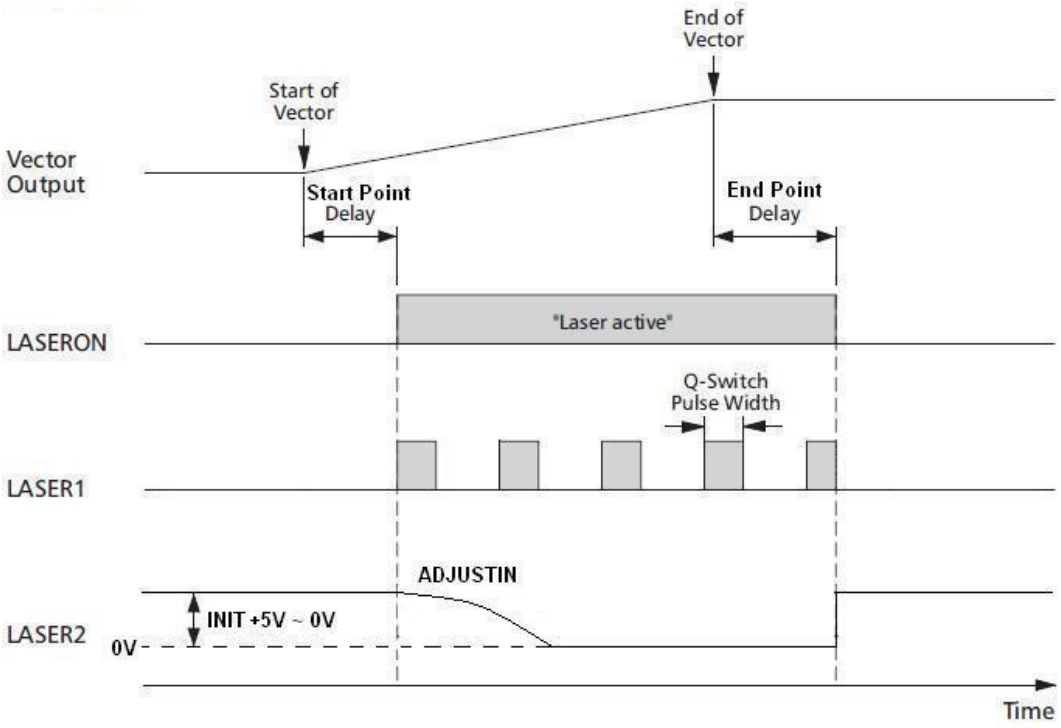
TYPE 1：CO2 Mode



TYPE2：YAG 1、2、3 Mode



TYPE 3：R05 Mode



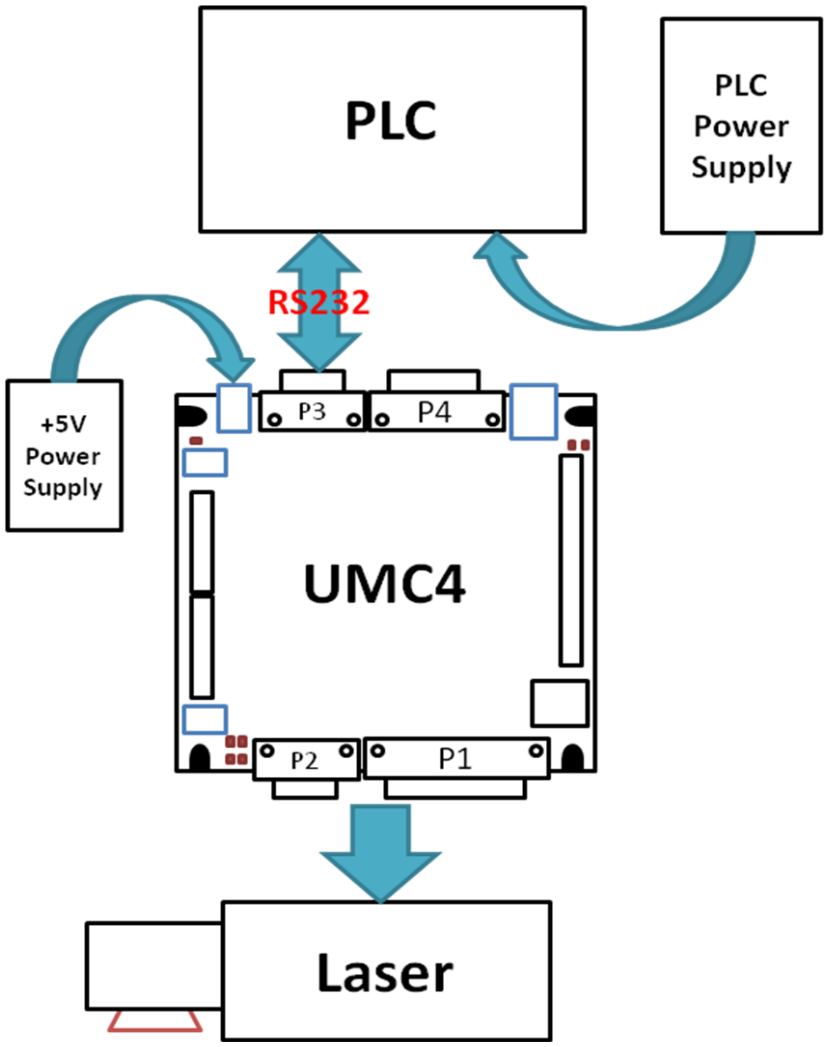
Appendix2：How to Connect with PLC

UMC4 provides a RS232 (P3) port for PLC connection. PLC communication protocol is Mitsubishi FX series.

RS232 communication parameters:

Baud	115200 BPS
Parity Check	Even
Data Bit	8
Stop Bit	1
Flow Control	none

The connection diagram of UMC4, PLC, and Laser is as below:



Appendix3：PLC Address definition table

System Reg		D0 – D255 (0x1000 – 0x11ff)	
Addr	**Name**	**Name**	**Type**
0x5800	PWM Mode	D0	Unsigned Short
0x5802	Laser Mode	D1	Unsigned Short
0x5804	Test Execute	D2	Unsigned Short
0x5806	FLASH Update	D3	Unsigned Short
0x5808	Standby Half Period	D4	Unsigned Long
0x580c	Standby Width	D6	Unsigned Long
0x5810	CorTable	D8	Unsigned Short
0x5812	FLY_MODE_X	D9	Unsigned Short
0x5814	FLY_MODE_Y	D10	Unsigned Short
0x5816	FLY_MODE_Z	D11	Unsigned Short
0x5818	FLY_VALUE_X	D12	Long
0x581c	FLY_VALUE_Y	D14	Long
0x5820	FLY_VALUE_Z	D16	Long
0x5824	FLY_DELAY_X	D18	Unsigned Long
0x5828	FLY_DELAY_Y	D20	Unsigned Long
0x582c	FLY_DELAY_Z	D22	Unsigned Long
0x5830	Laser Test : HPeriod	D24	Unsigned Long
0x5834	Laser Test : PWidth	D26	Unsigned Long
0x5838	Laser Test: Power	D28	Unsigned Short
0x583a	Preview File	D29	Unsigned Short
0x583c	Preview Speed	D30	Unsigned Long
0x5840	Preview Offset X	D32	Short
0x5842	Preview Offset Y	D33	Short
0x5844	Preview Matrix 0	D34	Long
0x5848	Preview Matrix 1	D36	Long
0x584c	Preview Matrix 2	D38	Long
0x5850	Preview Matrix 3	D40	Long
0x5854	PreLoadFile	D42	Unsigned Long
0x5858	Device Name	D44	Char (16)

Laser Reg		D256 – D511 (0x1200 – 0x13ff)	
Addr	**Name**	**Name**	**Type**
0x5870	SPI_ENABLE_OUT	D256	Unsigned Short
0x5872	SPI_CW_OUT	D257	Unsigned Short
0x5874	SPI_ALIGN_OUT	D258	Unsigned Short
0x5876	SPI_WAVEFORM_OUT0	D259	Unsigned Short
0x5878	SPI_WAVEFORM_OUT1	D260	Unsigned Short
0x587a	SPI_WAVEFORM_OUT2	D261	Unsigned Short
0x587c	SPI_WAVEFORM_OUT3	D262	Unsigned Short
0x587e	SPI_WAVEFORM_OUT4	D263	Unsigned Short
0x5880	SPI_WAVEFORM_OUT5	D264	Unsigned Short
0x5882	IPG_POWER_OUT0	D265	Unsigned Short
0x5884	IPG_POWER_OUT1	D266	Unsigned Short
0x5886	IPG_POWER_OUT2	D267	Unsigned Short
0x5888	IPG_POWER_OUT3	D268	Unsigned Short
0x588a	IPG_POWER_OUT4	D269	Unsigned Short
0x588c	IPG_POWER_OUT5	D270	Unsigned Short
0x588e	IPG_POWER_OUT6	D271	Unsigned Short
0x5890	IPG_POWER_OUT7	D272	Unsigned Short
0x5892	IPG_LATCH_OUT	D273	Unsigned Short
0x5894	IPG_MO_OUT	D274	Unsigned Short
0x5896	IPG_GUIDE_OUT	D275	Unsigned Short
0x5898	IPG_LATCH_TIME	D276	Unsigned Long
0x589c	IPG_MO_DELAY	D278	Unsigned Long
0x58a0	SoftStartMode	D280	Unsigned Short
0x58a2	SoftStartNum	D281	Unsigned Short
0x58a4	SoftStartLevel0	D282	Unsigned Short
0x58a6	SoftStartLevel1	D283	Unsigned Short
0x58a8	SoftStartLevel2	D284	Unsigned Short
0x58aa	SoftStartLevel3	D285	Unsigned Short
0x58ac	SoftStartLevel4	D286	Unsigned Short
0x58ae	SoftStartLevel5	D287	Unsigned Short
0x58b0	SoftStartLevel6	D288	Unsigned Short
0x58b2	SoftStartLevel7	D289	Unsigned Short
0x58b4	SoftStartLevel8	D290	Unsigned Short
0x58b6	SoftStartLevel9	D291	Unsigned Short

0x58b8	SoftStartLevel10	D292	Unsigned Short
0x58ba	SoftStartLevel11	D293	Unsigned Short
0x58bc	SoftStartLevel12	D294	Unsigned Short
0x58be	SoftStartLevel13	D295	Unsigned Short
0x58c0	SoftStartLevel14	D296	Unsigned Short
0x58c2	SoftStartLevel15	D297	Unsigned Short
0x58c4	R05Init	D298	Unsigned Long
0x58c8	R05Interval	D300	Unsigned Long
0x58cc	R05Level0	D302	Unsigned Short
0x58ce	R05Level1	D303	Unsigned Short
0x58d0	R05Level2	D304	Unsigned Short
0x58d2	R05Level3	D305	Unsigned Short
0x58d4	R05Level4	D306	Unsigned Short
0x58d6	R05Level5	D307	Unsigned Short
0x58d8	R05Level6	D308	Unsigned Short
0x58da	R05Level7	D309	Unsigned Short
0x58dc	R05Level8	D310	Unsigned Short
0x58de	R05Level9	D311	Unsigned Short
0x58e0	R05Level10	D312	Unsigned Short
0x58e2	R05Level11	D313	Unsigned Short
0x58e4	R05Level12	D314	Unsigned Short
0x58e6	R05Level13	D315	Unsigned Short
0x58e8	R05Level14	D316	Unsigned Short
0x58ea	R05Level15	D317	Unsigned Short
0x58ec	IPG Setting	D318	Unsigned Short
0x58ee	CO2 Setting	D319	Unsigned Short
0x58f0	YAG Setting	D320	Unsigned Short
0x58f2	SPI Setting	D321	Unsigned Short
0x58f4	SPI Align Off Delay	D322	Unsigned Long
0x58f8	SPI Enable Delay	D324	Unsigned Long

Layer Reg		D8000 – D8255 (0x0e00 – 0x0fff)	
Addr	**Name**	**Name**	**Type**
0x0X00	Power	D8000	Unsigned Short
0x0X02	Simmer Current	D8001	Unsigned Short
0x0X04	HalfPeriod	D8002	Unsigned Long
0x0X08	Duty width	D8004	Unsigned Long
0x0X0c	FPK	D8006	Unsigned Long
0x0X10	FPKLeadTime	D8008	Unsigned Long
0x0X14	Jump Speed	D8010	Unsigned Long
0x0X18	Mark Speed	D8012	Unsigned Long
0x0X1c	LaserON Delay	D8014	Long
0x0X20	LaserOFF Delay	D8016	Unsigned Long
0x0X24	Jump Delay	D8018	Unsigned Long
0x0X28	Poly Delay	D8020	Unsigned Long
0x0X2c	Mark Delay	D8022	Unsigned Long
0x0X30	OffsetX	D8024	Short
0x0X32	OffsetY	D8025	Short
0x0X34	Matrix 0	D8026	Long
0x0X38	Matrix 1	D8028	Long
0x0X3c	Matrix 2	D8030	Long
0x0X40	Matrix 3	D8032	Long
0x0X44	Waveform	D8034	Unsigned Short
0x0X46	CW Mode	D8035	Unsigned Short
0x0x48	Wobble Frequency	D8036	Unsigned Long
0x0x4c	Wobble Amp	D8038	Unsigned Long
0x0x50	Spot Time	D8040	Unsigned Long

AutoTxt Reg		T0 – T255 (0x0800 – 0x09ff)	
Addr	**Name**	**Addr**	**Name**
0x1X00	Map Table	T0	Unsigned Short
0x1X02	Digital	T1	Unsigned Short
0x1X04	Carry	T2	Unsigned Short
0x1X06	Increase	T3	Short
0x1X08	Repeat	T4	Unsigned Long
0x1X0c	Interval_x	T6	Unsigned Short
0x1X0e	Interval_y	T7	Unsigned Short
0x1X10	TxtDirType	T8	Unsigned Short
0x1X12	BasedZero	T9	Unsigned Short
0x1X14	Padding	T10	Unsigned Short
0x1X16	TimeType	T11	Unsigned Short
0x1X18	Separate	T12	Unsigned Short
0x1X1a	Year character	T13	Unsigned Short
0x1X1c	Month character	T14	Unsigned Short
0x1X1e	Week Day character	T15	Unsigned Short
0x1X20	InitValue_Digital0	T16	Unsigned Short
0x1X22	InitValue_Digital1	T17	Unsigned Short
0x1X24	InitValue_Digital2	T18	Unsigned Short
0x1X26	InitValue_Digital3	T19	Unsigned Short
0x1X28	InitValue_Digital4	T20	Unsigned Short
0x1X2a	InitValue_Digital5	T21	Unsigned Short
0x1X2c	InitValue_Digital6	T22	Unsigned Short
0x1X2e	InitValue_Digital7	T23	Unsigned Short
0x1X30	InitValue_Digital8	T24	Unsigned Short
0x1X32	InitValue_Digital9	T25	Unsigned Short
0x1X34	InitValue_Digital10	T26	Unsigned Short
0x1X36	InitValue_Digital11	T27	Unsigned Short
0x1X38	InitValue_Digital12	T28	Unsigned Short
0x1X3a	InitValue_Digital13	T29	Unsigned Short
0x1X3c	InitValue_Digital14	T30	Unsigned Short
0x1X3e	InitValue_Digital15	T31	Unsigned Short
0x1X40	MaxValue_Digital0	T32	Unsigned Short
0x1X42	MaxValue_Digital1	T33	Unsigned Short
0x1X44	MaxValue_Digital2	T34	Unsigned Short

0x1X46	MaxValue_Digital3	T35	Unsigned Short
0x1X48	MaxValue_Digital4	T36	Unsigned Short
0x1X4a	MaxValue_Digital5	T37	Unsigned Short
0x1X4c	MaxValue_Digital6	T38	Unsigned Short
0x1X4e	MaxValue_Digital7	T39	Unsigned Short
0x1X50	MaxValue_Digital8	T40	Unsigned Short
0x1X52	MaxValue_Digital9	T41	Unsigned Short
0x1X54	MaxValue_Digital10	T42	Unsigned Short
0x1X56	MaxValue_Digital11	T43	Unsigned Short
0x1X58	MaxValue_Digital12	T44	Unsigned Short
0x1X5a	MaxValue_Digital13	T45	Unsigned Short
0x1X5c	MaxValue_Digital14	T46	Unsigned Short
0x1X5e	MaxValue_Digital15	T47	Unsigned Short
0x1X60	CurValue_Digital0	T48	Unsigned Short
0x1X62	CurValue_Digital1	T49	Unsigned Short
0x1X64	CurValue_Digital2	T50	Unsigned Short
0x1X66	CurValue_Digital3	T51	Unsigned Short
0x1X68	CurValue_Digital4	T52	Unsigned Short
0x1X6a	CurValue_Digital5	T53	Unsigned Short
0x1X6c	CurValue_Digital6	T54	Unsigned Short
0x1X6e	CurValue_Digital7	T55	Unsigned Short
0x1X70	CurValue_Digital8	T56	Unsigned Short
0x1X72	CurValue_Digital9	T57	Unsigned Short
0x1X74	CurValue_Digital10	T58	Unsigned Short
0x1X76	CurValue_Digital11	T59	Unsigned Short
0x1X78	CurValue_Digital12	T60	Unsigned Short
0x1X7a	CurValue_Digital13	T61	Unsigned Short
0x1X7c	CurValue_Digital14	T62	Unsigned Short
0x1X7e	CurValue_Digital15	T63	Unsigned Short
0x1X80	First Padding 0	T64	Unsigned Short
0x1X82	First Padding 1	T65	Unsigned Short
0x1X84	First Padding 2	T66	Unsigned Short
0x1X86	First Padding 3	T67	Unsigned Short
0x1X88	First Padding 4	T68	Unsigned Short
0x1X8a	First Padding 5	T69	Unsigned Short
0x1X8c	First Padding 6	T70	Unsigned Short
0x1X8e	First Padding 7	T71	Unsigned Short

0x1X90	Last Padding 0	T72	Unsigned Short
0x1X92	Last Padding 1	T73	Unsigned Short
0x1X94	Last Padding 2	T74	Unsigned Short
0x1X96	Last Padding 3	T75	Unsigned Short
0x1X98	Last Padding 4	T76	Unsigned Short
0x1X9a	Last Padding 5	T77	Unsigned Short
0x1X9c	Last Padding 6	T78	Unsigned Short
0x1X9e	Last Padding 7	T79	Unsigned Short
0x1Xa0	Size Scale X	T80	Unsigned Long
0x1Xa4	Size Scale Y	T82	Unsigned Long
0x1Xa8	SpacingMode	T84	Unsigned Short
0x1Xaa	TxtMode	T85	Unsigned Short
0x1Xac	First Padding Num	T86	Unsigned Short
0x1Xae	Last Padding Num	T87	Unsigned Short
0x1Xb0	RECT_SHOW	T88	Unsigned Short
0x1Xb2	RECT_Width	T89	Unsigned Short
0x1Xb4	RECT_Height	T90	Unsigned Short
0x1Xb6	RECT_UpSpace	T91	Unsigned Short
0x1Xb8	RECT_DownSpace	T92	Unsigned Short
0x1Xba	RECT_LeftSpace	T93	Unsigned Short
0x1Xbc	RECT_RightSpace	T94	Unsigned Short
0x1Xbe	ARC_SHOW	T95	Unsigned Short
0x1Xc0	ARC_DISTYPE	T96	Unsigned Long
0x1Xc4	ARC_LINESPACE	T98	Long
0x1Xc8	ARC_DISVALUE	T100	Long
0x1Xcc	ARC_BASEANGLE	T102	Long
0x1Xd0	ARC_BLTYPE	T104	Unsigned Short
0x1Xd2	ARC_NEGARRAY	T105	Unsigned Short
0x1Xd4	ARC_CENTERX	T106	Unsigned Short
0x1Xd6	ARC_CENTERY	T107	Unsigned Short
0x1Xd8	ARC_RADIUS	T108	Unsigned Long

File Reg (AA = 0x59 – 0x68)		C0 – C199 (0x0a00 – 0x0b8f)	
Addr	**Name**	**Name**	**Type**
0xAA00	File Addr	C0	Unsigned Long
0xAA04	File Name	C2	Char(16)
0xAA14	File Length	C10	Unsigned Long
0xAA18	CharTb Addr	C12	Unsigned Long
0xAA1c	CharTb Length	C14	Unsigned Long
0xAA20	MarkData Addr	C16	Unsigned Long
0xAA24	MarkData Length	C18	Unsigned Long
0xAA28	Layer Param Num	C20	Unsigned Short
0xAA2a	AutoTxt Param Num	C21	Unsigned Short
0xAA2c	CharTb Num	C22	Unsigned Short
0xAA2e	TempData	C23	Unsigned Short
0xAA30	MaxWorkCnt	C24	Unsigned Long
0xAA34	WorkCnt	C26	Unsigned Long
0xAA38	MarkTime	C28	Unsigned Long
0xAA3c	comment	C30	Char(64)

Special Reg		C160 – C199 (0x0b40 – 0x0b8f)	
Addr	**Name**	**Name**	**Type**
0xf000	Hardware Config	C160	Unsigned Long
0xf004	Program Config	C162	Unsigned Long
0xf008	IP Version	C164	Unsigned Long
0xf00c	Execute Register	C166	Unsigned Long
0xf010	Current File	C168	Unsigned Short
0xf012	DataTime Status	C169	Unsigned Short
0xf014	DataTime (Sec)	C170	Unsigned Short
0xf016	DataTime(Min)	C171	Unsigned Short
0xf018	DataTime(Hour)	C172	Unsigned Short
0xf01a	DataTime(day)	C173	Unsigned Short
0xf01c	DataTime(Week Day)	C174	Unsigned Short
0xf01e	DataTime(Month)	C175	Unsigned Short
0xf020	DataTime(Year)	C176	Unsigned Short
0xf022	TempData	C177	Unsigned Short
0xf024	PLC File Sel	C178	Unsigned Long
0xf028	PLC Layer Sel	C180	Unsigned Long
0xf02c	PLC Autotxt Sel	C182	Unsigned Long
0xf030	Cor Offset X 1	C200	
0xf034	Cor Offset X 2	C201	
0xf038	Cor Offset Y 1	C202	
0xf03c	Cor Offset Y 2	C203	
0xf040	Cor Scale X 1	C204	
0xf044	Cor Scale X 2	C205	
0xf048	Cor Scale Y 1	C206	
0xf04c	Cor Scale Y 2	C207	
0xf050	Cor Matrix 0 1	C208	
0xf054	Cor Matrix 0 2	C209	
0xf058	Cor Matrix 1 1	C210	
0xf05c	Cor Matrix 2 2	C211	
0xf060	Cor Matrix 3 1	C212	
0xf064	Cor Matrix 3 2	C213	
0xf068	Cor Matrix 4 1	C214	
0xf06c	Cor Matrix 4 2	C215	