# PMC6

User Manual

Version: 20200703

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## **1. Introduction**

PMC6 is a high performance PCIe interface card designed for Laser Marking System. Support common used brands of 16'18'20-bits high resolution ScanHead, and is compatible to multiple communication protocol. It reserves plenty of I/O capacity for flexible connecting with automatic equipment or lasers requiring additional I/O. PMC6 features complete stepper and servo motor control function, and can control four axes simultaneously. Besides, it provides variety kinds of extending port for multiple types of connection requirements.

### **1-1 Specification**

- Support common used brands of 16'18'20-bits high resolution ScanHead.
- Support output up to 3 axes digital scanner signal \* 2.
- Build-in DSP. No occupation of PC CPU resource.
- Scanner digital signal refresh rate: 10 us/times.
- FPK, PPK, R05 first pulse suppression.
- Two 16-bits analog control signals.
- ♦ 3-way encoder inputs.
- PWM maximum output frequency is 10MHz, minimum pulse width is 0.05µs.
- 4-way digital step/servo motor control signals at the same time, the maximum output frequency is 10MHz.
- General 16-bits digital outputs, 16 bit digital inputs.
- Specific 16-bits laser control digital outputs.
- Support for Windows XP / 2000 / Vista / Windows 7 / 8 / 8.1/ Windows 10.

### **1-2** Appearance



## 1-3 Layout



名稱	用途	說明		
		SCANHEAD 1 Connec	tor. (D-SUB 25-Pin Female)	
P1	SCANHEAD1	Default: XY2-100 16-bits · a	daptable to :Raylase XY2-100-E	
		18-bits \ CTI XY2-100 20-bit	s `Canon 20-bits `Canon 64-bits.	
P2	LASER CONNECTOR	Laser control and analog ou	tput port (D-SUB 15-Pin female	
12	LASER_CONNECTOR	cor	nnector)	
		SCANHEAD 1 Conr	ector, independent to P1.	
IF1	SCANHEAD?	(26Pin bo	ox connector)	
J1 1	SCANIIEAD2	Default:XY2-100 16-bits · a	daptable to :Raylase XY2-100-E	
		18-bits CTI XY2-100 20-bit	s `Canon 20-bits `Canon 64-bits.	
IE2	LASED EXTENSION	Extension laser control and	16-bit digital output port (26-Pin	
JF2 LASEK_EXTENSION		box header connector)		
JF3	MOTOR_X_Y	XY Table port (26-Pin box header connector)		
JF4	MOTOR_Z_R	Z-axis and rotary port (2	6-Pin box header connector)	
JF5	ENCODER	XY encoder port (16-	Pin box header connector)	
JF6	INTPUT	16-bits digital input port (	20-Pin box header connector)	
1177	EVTENCION	Extension 16-bits digital of	output port (20-Pin box header	
JF /	EXTENSION	connector)		
JF8	OUTPUT	16-bits digital output port (20-Pin box header connector)		
JF9	ENCODER	Z encoder port (10-Pin box header connector)		
JF10	LED Signal Out	D2~D5 LED Signal Output.		
JF11	Power In	This is necessary. Otherwise there is no signal output.		
JP1(BOT)	FPK / R05	1 \ 2 Close : FPK 2 \ 3 Close : R05		

## 2. Pin Assignment

### 2-1 ScanHead Control

P1(ScanHead	l) : D-SUB 25F	JF1(ScanHead 2) : 26Pin Box
DO NOT CONNECT (25) GND (24) GND (23) DO NOT CONNECT (22) STATUS1+ (21) STATUS2+ (19) CHAN2+ (17) CHAN1+ (16) SYNC+ (15) CLOCK+ (14)       (13) DO NOT CONNECT (12) DO NOT CONNECT (12) DO NOT CONNECT (14) DO NOT CONNECT (9) DO NOT CONNECT (16) STATUS2- (5) CHAN3- (4) CHAN2- (16) CLOCK+ (17) CLOCK+		CLOCK- (1) <ul> <li>(2)</li> <li>CLOCK+</li> <li>SYNC- (3)</li> <li>(4)</li> <li>SYNC+</li> <li>(6)</li> <li>CHAN1+</li> <li>CHAN2- (7)</li> <li>(8)</li> <li>CHAN2+</li> <li>CHAN3- (9)</li> <li>(10)</li> <li>CHAN3+</li> <li>STATUS2- (11)</li> <li>(12)</li> <li>STATUS2+</li> <li>STATUS3- (13)</li> <li>(14)</li> <li>STATUS3+</li> <li>STATUS1- (15)</li> <li>(16)</li> <li>STATUS1+</li> <li>DO NOT CONNECT (17)</li> <li>(18)</li> <li>DO NOT CONNECT (19)</li> <li>(20)</li> <li>GND (21)</li> <li>(22)</li> <li>GND</li> <li>(22)</li> <li>GND</li> <li>(24)</li> <li>DO NOT CONNECT</li> <li>(25)</li> <li>(26)</li> <li>DO NOT CONNECT</li> </ul>
Descriptions	Signal Type	Remark
<b>Descriptions</b> CLOCK	Signal Type Differential Output	Remark V <sub>OH</sub> : +5V \ Iomax : 25mA
Descriptions CLOCK SYNC	Signal Type Differential Output Differential Output	Remark $V_{OH} : +5V \cdot Iomax : 25mA$ $V_{OH} : +5V \cdot Iomax : 25mA$
Descriptions CLOCK SYNC CHAN1	Signal Type Differential Output Differential Output Differential Output	Remark $V_{OH} : +5V \cdot Iomax : 25mA$ $V_{OH} : +5V \cdot Iomax : 25mA$ $V_{OH} : +5V \cdot Iomax : 25mA$
Descriptions CLOCK SYNC CHAN1 CHAN2	Signal Type Differential Output Differential Output Differential Output Differential Output	Remark $V_{OH} : +5V \cdot Iomax : 25mA$
Descriptions CLOCK SYNC CHAN1 CHAN2 CHAN3	Signal TypeDifferential OutputDifferential OutputDifferential OutputDifferential OutputDifferential OutputDifferential Output	Remark $V_{OH} : +5V \cdot Iomax : 25mA$
Descriptions CLOCK SYNC CHAN1 CHAN2 CHAN3 STATUS2	Signal Type Differential Output Differential Output Differential Output Differential Output Differential Output Differential Input	Remark $V_{OH}$ : +5V $\cdot$ Iomax : 25mA $+2V < V_{IH} < +5V$
Descriptions CLOCK SYNC CHAN1 CHAN2 CHAN3 STATUS2 STATUS3	Signal TypeDifferential OutputDifferential OutputDifferential OutputDifferential OutputDifferential OutputDifferential OutputDifferential InputDifferential Input	Remark $V_{OH}$ : +5V $\cdot$ Iomax : 25mA $+2V < V_{IH} < +5V$ $+2V < V_{IH} < +5V$
Descriptions CLOCK SYNC CHAN1 CHAN2 CHAN3 STATUS2 STATUS3 STATUS1	Signal TypeDifferential OutputDifferential OutputDifferential OutputDifferential OutputDifferential OutputDifferential OutputDifferential InputDifferential InputDifferential Input	Remark $V_{OH}$ : +5V $\cdot$ Iomax : 25mA $+2V < V_{IH} < +5V$

Note1 : JF1 connect with 25 to 26convertor has the same interface with P1 port.

Note2 :  $V_{OH}$  : High Level Output Voltage (No Resistive load)

Iomax : Maximum Output Current

 $V_{I\!H}$  : High Level Input Voltage.

## 2-2 Laser Control

	P2: HD-SUB 15F					
$\begin{array}{c} 5\\10\\15\end{array}$						
Pin	PinDescriptionsSignal TypeRemark					
1	Analog Out1	0V ~ 11V Output	Default 0V ~ +10V ( <u>HWConfig Setting</u> )			
2	Analog Out2	0V ~ 11V Output	Default 0V ~ +10V ( <u>HWConfig Setting</u> )			
3	Analog GND	Analog GND	Isolated			
4	PWM	TTL Output	V <sub>OH</sub> : +5V 、 Iomax : 25mA			
_	FPK or R05	TTL Output or Analog	Jumper JP1 select FPK or R05			
5		$0\mathrm{V}\sim5\mathrm{V}$	mode. Default is FPK.(JP1 Setting)			
6	Laser On/Off	TTL Output	$V_{OH}$ : +5V $\cdot$ Iomax : 25mA			
7	Leading Light On/Off	TTL Output	$V_{OH}$ : +5V $\cdot$ Iomax : 25mA			
8	Shutter	TTL Output	$V_{OH}$ : +5V $\cdot$ Iomax : 25mA			
9	CW select	TTL Output	$V_{OH}$ : +5V $\cdot$ Iomax : 25mA			
10	Lamp On/Off	TTL Output	$V_{OH}$ : +5V $\cdot$ Iomax : 25mA			
11	Start power saving mode	TTL Output	$V_{OH}$ : +5V $\cdot$ Iomax : 25mA			
12 /START		Dry Contact or Optical coupling Input	Default Dry Contact ( <u>HWConfig Setting</u> )			
13	/STOP	Dry Contact or Optical coupling Input	Default Dry Contact ( <u>HWConfig Setting</u> )			
14	Vout_5V	PC Power +5V Output				
15	Digit GND	PC Power 0V				

Note : V<sub>OH</sub> : High Level Output Voltage (No Resistive load) Iomax : Maximum Output Current

 $V_{IH}$ : High Level Input Voltage.

#### PMC6

JF2 : 26F	Pin Box	26 to 25 Line : D-SUB 25F
Analog1 (1) Analog2 (3) PWM (5) FPL / R05 (7) Laser On / Off (9) Leading Light On / Off (11) Shutter (13) CW Select (15) Lamp On / Off (17) Power Saving Mode (19) IPG MO (21) Reserved Output (23) GND (25)	<ul> <li>(2) GND</li> <li>(4) GND</li> <li>(6) /START</li> <li>(8) GND</li> <li>(10) /STOP</li> <li>(12) GND</li> <li>(14) Program Ready+</li> <li>(16) Program Ready-</li> <li>(18) Marking Ready+</li> <li>(20) Marking Ready-</li> <li>(22) Marking End+</li> <li>(24) Marking End-</li> <li>(26) NC</li> </ul>	Analog1 (1) Analog2 (2) PWM (3) FPL / R05 (4) Laser On / Off (5) Shutter (7) CW Select (8) Lamp On / Off (9) Power Saving Mode (10) IPG MO (11) Reserved Output (12) GND (13) (14) GND (14) GND (15) /START (17) GND (18) /STOP (19) GND (20) Program Ready+ (21) Program Ready+ (23) Marking Ready+ (24) Marking End+ (25) Marking End-
Descriptions	Signal Type	Remark
Analog1	$0V \sim +11V$ Output	Default $0V \sim +10V$ ( <u>HWConfig Setting</u> )
Analog2	$0V \sim \pm 11V$ Output	Default 0V ~ +10V ( <u>HWConfig Setting</u> )
PWM	TTL Output	$V_{OH}$ : +5V $\cdot$ Iomax : 30mA
FPK or R05	TTL Output or Analog $0V \sim 5V$	Jumper JP1 select FPK or R05 mode. Default is FPK.(JP1 Setting)
Laser On/Off	TTL Output	$V_{OH}: +5V \cdot Iomax: 25mA$
Leading Light On/Off	TTL Output	$V_{OH}:+5V \cdot Iomax:25mA$
Shutter	TTL Output	$V_{OH}:+5V \cdot Iomax:25mA$
CW select	TTL Output	$V_{OH}$ : +5V $\cdot$ Iomax : 25mA
Lamp On/Off	TTL Output	$V_{OH}$ : +5V \ Iomax : 25mA
Start power saving mode	TTL Output	$V_{OH}$ : +5V > Iomax : 25mA
IPG MO	TTL Output	$V_{OH}$ : +5V $\cdot$ Iomax : 25mA
Reserved	TTL Output	$V_{OH}:+5V \cdot Iomax:25mA$
/START	Dry Contact or Optical coupling Input	Default Dry Contact ( <u>HWConfig Setting</u> )
/STOP	Dry Contact or Optical coupling Input	Default Dry Contact ( <u>HWConfig Setting</u> )
Program Ready	Optical coupling Outpu	t Icmax : 100mA
Marking Ready	Optical coupling Output	t Icmax : 100mA
Marking End	Optical coupling Output	t Icmax : 100mA
GND	PC Power 0V	

Note : V<sub>OH</sub> : High Level Output Voltage (No Resistive load) Iomax : Maximum Output Current

Icmax : Maximum Collector Current.

### 2-3 Motor Servo Control

JF3 : 2	26Pin Box	26 to 25 Line : D-SUB 25F	
Pulse / CW X+ (1) Direction / CCW X+ (3) InPosition X+ (5) Home X+ (7) Limit XP+ (9) Limit XN+ (11) +5V (13) Pulse / CW Y+ (15) Direction / CCW Y+ (17) InPosition Y+ (19) Home Y+ (21) Limit YP+ (23) Limit YN+ (25)	<ul> <li>(2) Pulse / CW X-</li> <li>(4) Direction / CCW X-</li> <li>(6) InPosition X-</li> <li>(8) Home X-</li> <li>(10) Limit XP-</li> <li>(12) Limit XN-</li> <li>(12) Limit XN-</li> <li>(14) Pulse / CW Y-</li> <li>(16) Direction / CCW Y-</li> <li>(18) InPosition Y-</li> <li>(20) Home Y-</li> <li>(22) Limit YP-</li> <li>(24) Limit YN-</li> <li>(26) GND</li> </ul>	Pulse / CW X+ (1) Direction / CCW X+ (2) InPosition X+ (3) Home X+ (4) Limit XP+ (5) Limit XN+ (6) +5V (7) Pulse / CW Y+ (8) Direction / CCW Y+ (9) InPosition Y+ (10) Home Y+ (11) Limit YP+ (12) Limit YN+ (13) (14) Pulse / CW X- (15) Direction / CCW X- (16) InPosition X- (17) Home X- (18) Limit XP- (19) Limit XN- (20) Pulse / CW Y- (21) Direction / CCW Y- (22) InPosition Y- (23) Home Y- (24) Limit YP- (25) Limit YN-	
JF4 : 2	26Pin Box	26 to 25 Line : D-SUB 25F	
Pulse / CW Z+       (1)       •       (2)       Pulse / CW Z-         Direction / CCW Z+       (3)       •       (4)       Direction / CCW Z-         InPosition Z+       (5)       •       (6)       InPosition Z-         Home Z+       (7)       •       (8)       Home Z-         Limit ZP+       (9)       •       (10)       Limit ZP-         Limit ZN+       (11)       •       (12)       Limit ZN-         +5V       (13)       •       (14)       Pulse / CW R-         Pulse / CW R+       (15)       •       (16)       Direction / CCW R-         Direction / CCW R+       (17)       •       (18)       InPosition R-         InPosition R+       (19)       •       (20)       Home R-         Home R+       (21)       •       (22)       Limit RP-         Limit RP+       (23)       •       (24)       Limit RN-         Limit RN+       (25)       •       (26)       GND		Pulse / CW Z+ (1) Direction / CCW Z+ (2) InPosition Z+ (3) Home Z+ (4) Limit ZP+ (5) Limit ZN+ (6) +5V (7) Pulse / CW R+ (8) Direction / CCW R+ (9) InPosition R+ (10) Home R+ (11) Limit RP+ (12) Limit RN+ (13) (14) Pulse Z- (15) Direction Z- (16) InPosition Z- (17) Home Z- (18) Limit ZP- (19) Limit ZN- (20) Pulse R- (21) Direction R- (23) Home R- (24) Limit RP- (25) Limit RN-	
Descriptions	Signal Type	Remark	
Pulse / CW	Differential Output	V <sub>OH</sub> : +5V \ Iomax : 25mA ( <u>HWConfig Setting</u> )	
Direction / CCW	Differential Output	$V_{OH}$ : +5V $\cdot$ Iomax : 25mA ( <u>HWConfig Setting</u> )	
InPosition	Optical coupling Input	$V_{Imax}$ : +24V	
Home	Optical coupling Input	$V_{Imax}$ : +24V	
Limit+	Optical coupling Input	$V_{Imax}$ : +24V	
Limit-	Optical coupling Input	$V_{Imax}$ : +24V	
Vout_5V	PC Power +5V Output		
GND	GND		

Note :  $V_{\rm OH}$  : High Level Output Voltage (No Resistive load)

Iomax : Maximum Output Current

V<sub>Imax</sub> : Maximum Iutput Voltage

### 2-4 Others Control

JF5 : 16	Pin Box	JF9 : 10Pin Box
ENCODER XA-(1) $\bullet$ (2)ENCODER XA+ENCODER XB-(3) $\bullet$ (4)ENCODER XB+ENCODER XZ-(5) $\bullet$ (6)ENCODER XZ+ENCODER YA-(7) $\bullet$ (8)ENCODER YA +ENCODER YB-(9) $\bullet$ (10)ENCODER YB+ENCODER YZ-(11) $\bullet$ (12)ENCODER YZ+GND(13) $\bullet$ (14)GNDVout(15) $\bullet$ (16)+12V		ENCODER ZA- (1) ENCODER ZB- (3) ENCODER ZB- (3) ENCODER ZZ- (5) GND (7) Vout (9) $\bullet \bullet$ $\bullet \bullet$ $\bullet$ $\bullet \bullet$ $\bullet \bullet$ $\bullet$ $\bullet$ $\bullet$ $\bullet$ $\bullet$ $\bullet$ $\bullet$
Descriptions	Signal Type	Remark
Encoder $A \cdot B \cdot Z(Index)$	Differential Input	$+2V < V_{IH} < +5V \cdot V_{IL} < +0.8V$
Vout_5V	PC Power +5V Output	
Vout_12V	PC Power +12V Output	
GND	PC Power 0V	

Note :  $V_{IH}$  : High Level Input Voltage  $V_{IL}$  : Low Level Input Voltage

JF6: 20Pin Box					
	Input 1 Input 3 Input 5 Input 7 Input 9 Input 11 Input 13 Input 15 GND +5V	<ol> <li>(1)</li> <li>(3)</li> <li>(5)</li> <li>(7)</li> <li>(9)</li> <li>(11)</li> <li>(13)</li> <li>(15)</li> <li>(17)</li> <li>(19)</li> </ol>		<ul> <li>(2)</li> <li>(4)</li> <li>(6)</li> <li>(10)</li> <li>(12)</li> <li>(14)</li> <li>(16)</li> <li>(18)</li> <li>(20)</li> </ul>	Input 2 Input 4 Input 6 Input 8 Input 10 Input 12 Input 14 Input 16 GND +12V
Descriptions	Sig	gnal T	уре		Remark
Input 1 ~ 16	[	ГТL Inp	out		$+2V < V_{IH} < +5V \cdot V_{IL} < +0.8V$
+5V PC Po		wer +5V	V Output		
+12V	PC Power +12V Output		t		
GND	PC	C Power	: 0V		

Note :  $V_{IH}$  : High Level Input Voltage  $V_{IL}$  : Low Level Input Voltage

PMC6

JF8 : 20	Pin Box	JF7 : 20Pin Box
Output 1       (1)         Output 3       (3)         Output 5       (5)         Output 7       (7)         Output 9       (9)         Output 11       (11)         Output 13       (13)         Output 15       (15)         GND       (17)         +5V       (19)	<ul> <li>(2) Output 2</li> <li>(4) Output 4</li> <li>(6) Output 6</li> <li>(8) Output 8</li> <li>(10) Output 10</li> <li>(12) Output 12</li> <li>(14) Output 14</li> <li>(16) Output 16</li> <li>(18) GND</li> <li>(20) +12V</li> </ul>	Output 17       (1) <ul> <li>(2)</li> <li>Output 18</li> <li>Output 19</li> <li>(3)</li> <li>(4)</li> <li>Output 20</li> </ul> Output 21       (5)       (6)       Output 22         Output 23       (7)       (6)       Output 24         Output 25       (9)       (10)       Output 26         Output 27       (11)       (12)       Output 28         Output 29       (13)       (14)       Output 30         Output 31       (15)       (16)       Output 32         GND       (17)       (18)       GND         +5V       (19)       (20)       +12V
Descriptions Signal Type		Remark
Output 1 ~ 32	TTL Output	V <sub>OH</sub> : 5V × Iomax : 25mA
Vout_5V	PC Power +5V Output	
Vout_12V	PC Power +12V Output	
GND	PC Power 0V	

Note : V<sub>OH</sub> : High Level Output Voltage (No Resistive load) Iomax : Maximum Output Current

JF10: 20Pin Box						
Pin	Descriptions	Signal Type	Remark			
1	GND	PC Power 0V				
2~5	D2 ~ D5	TTL Output	V <sub>OH</sub> : 5V × Iomax : 25mA			
6	GND	PC Power 0V				

Note : ( <u>Appendix2 : LED Status</u>)

JF11 : Wafer 4Pin				
JE11	Pin	Descriptions		
	1	Input +5V		
	4	Input +12V		
	2 ` 3	0V		

## 3. Installation and Cable Connection

### **3-1 PMC6 Installation**

Before install PMC6 board to computer, must make sure PC power has been cut off. It is safer to cut off PC power supply by turnning switch to OFF, or remove power cable temporarily. After confirm there is no power on motherboard, then insert PMC6 into suitable PCIe slot (All of PCIe 1X, 4X, 8X, 16X are compatible), and wire J11 extension power port from an usable USB3.0 port, then start up the computer.

P.S.: If lack of wiring JF11, although marking software can execute normally, there is no signal output from port, and user will get "Stop signal is activated" message when marking dialog is opened.



• If PMC6 is installed normal, as the picture below, the device "PMC6 Drivers" will appear within WINDOWS Device Manager.

👱 System	
← → · · ↑ 🗹 > Control Panel	I > System and Security > System
Control Panel Home	Device Manager
Device Manager	File Action View Help
Remote settings	
System protection	
Advanced system settings	Snawn_PC Audio inputs and outputs
• · · · · · · · · · · · · · · · · · · ·	Computer
	> Disk drives
	> 🔙 Display adapters
	> PVD/CD-ROM drives
	> 🐺 Human Interface Devices
	> 📷 IDE ATA/ATAPI controllers
	> 🚽 Jungo
	Keyboards
	Mice and other pointing devices
	> Monitors
	Network adapters
	PMC6 Drivers
	PMC0: PCIe Marking Controller
	Point (COM & EPT)
	Software devices
	Sound, video and game controllers
	> 🍇 Storage controllers
	> 🏣 System devices
See also	> 🏺 Universal Serial Bus controllers
Security and Maintenance	
	1

 If PMC6 is installed abnormal, as the picture below, PMC6 will be shown as "Other devices".
 In this case, user has to execute C:\Program Files (x86)\Marking Mate\Drivers\PMC6\ Setup.exe to install proper driver.

👱 System	
← → · · ↑ 🗹 > Control Pane	I > System and Security > System
Control Panel Home	Device Manager
🗣 Device Manager	File Action View Help
Remote settings	
System protection	
• system protection	V 📇 Shawn_PC
Advanced system settings	> 4 Audio inputs and outputs
	Computer
	Disk drives
	DVD/CD-ROM drives
	> 🔤 Human Interface Devices
	> 📹 IDE ATA/ATAPI controllers
	> 📮 Jungo
	Keyboards
	> 🕖 Mice and other pointing devices
	> 🦲 Monitors
	🚅 Network adapters
	V V Other devices
	PCI Device
	Ports (COM & LPT)
	> 🖻 Print queues
	> Processors
	> Software devices
	Sound, video and game controllers
	> X Storage controllers
	Iniversal Serial Rus controllers
See also	
Security and Maintenance	

### 3-2 Cable

#### **3-2-1 Differential**

The differential signal should use a shielded twisted pair cable to wire. Positive signal and Negative signal should use the same pair.



#### 3-2-2 Others

The cable should choose a shielded wire, and there should be tinned copper braid between insulator and inner cores.



### **3-3 D-SUB welding**

While welding D-SUB connector, should take care the protection of core, and the earth GND wiring.



The cover of D-SUB is recommended in metal material.



### **3-4 Adaptor cable**

For JF1~JF9 connector could use dual row box header inter-wire to D-SUB connector by a ribbon cable. The D-SUB connector should be fixed on the rear PC case panel by a screw.

#### Note:

• Do not extend the ribbon cable to exceed outside the PC case. This will cause receiving the noise signal easily.



### **3-5 Scanner Cable Connection**

#### 3-5-1 XY2-100 16Bit Scanner

• Type 1 XY2-100 16Bit : With one D-SUB 25Pin



• Type 2 XY2-100 16Bit : With D-SUB 25Pin and D-SUB 9Pin



Notice:

- PMC6 P1 is corresponding to digital ScanHead D-SUB25Pin. User could easily connect them by 25-pin pin to pin cable; however, if using type 1 ScanHead, 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.
- Power GND should short to PMC6 GND.
- Max cable length is 5M. Cable should cover with shield and isolated.

#### 3-5-2 Raylase XY2-100-E 18Bit Scanner

Wire is similar to XY2-100 16Bit scanner, except add additional 2 Status signal.



#### 3-5-3 CTI XY2-100 20Bit Scanner

Wire is same to XY2-100 16Bit scanner.



#### 3-5-4 CANON 20Bit / 64Bit Scanner

Wire is same to XY2-100 16Bit scanner.



Notice :

- **2**0Bit Scanner setting : Parameter ID = 67 (20) > Parameter ID = 68 (0)
- 64Bit Scanner setting : Parameter ID = 65 (5) Parameter ID = 66 (5) Parameter ID = 67 (20) Parameter ID = 68 (0)

#### 3-5-5 ME-Link Scanner



#### 3-5-6 SL2-100 20Bit Scanner



SL2-100 D-	SUB 9F	PMC6 P1 D	-SUB 25F
Description Pin		Description	Pin
DATA IN+	1	DO (XY) + / DO (Z) +	14 / 15
DATA IN-	6	DO (XY) - / DO (Z) -	1 / 2
DATA OUT+	5	DI (XY) + / DI (Z) +	19 / 20
DATA OUT-	9	DI (XY) - / DI (Z) -	6 / 7

Notice :

Scanner GNDshould not short to PMC6 GND. Otherwise scanner will keep stasis.

### 3-6 Stepper / Servo Motor Servo Cable Connection

According to the Differential types of Motor Driver, there are three ways of connection between Motor Driver and PMC6's JF3 and JF4 connectors.

#### **3-6-1 Differential Signal**



Note : Motor Servo GND should short to PMC6 GND.

### 3-6-2 Common Anode



#### 3-6-3 Common Cathode



### **3-7 Sensor Connection**

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



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



### **3-8 Optical coupler Connection**



### **3-9 START and STOP Connection**

#### **3-9-1 Button**



Note : Please set Common Cathode, Please refer to <u>3-11 HWConfig Setting Description</u>.

#### 3-9-2 Sensor



Note : Please set Common Cathode, Please refer to 3-11 HWConfig Setting Description.



Note : Please set Common Anode, Please refer to <u>3-11 HWConfig Setting Description</u>.

#### 3-9-3 TTL Signal



### **3-10 Encoder Signal**



Note : Encoder GND should short to PMC6 GND.

### **3-11 HWConfig Setting Description**

Scanner Type	Analog Test		Signal Setting (0 / 1)
XY2-100 16Bit 🔹	DAC1: 100	%	Start Signal Reverse
	DAC2: 100	%	🗖 Stop Signal Reverse
Scanner alignment	5/1021 [100		LaserON Signal Reverse
🗖 XY1 Lines Exchange	Test		PWM Signal Reverse
🗖 XY2 Lines Exchange	- Analog Scale Table (	0 655251	FPK Signal Reverse
	DAC1	DAC2	Program Ready Signal Reverse
1000000000	0 % 0	0	Marking Ready Signal Reverse
Start / Stop Type	10.%	-	Marking End Signal Reverse
Start © common cathode	10 % 595/	5957	
Stop	20 % 11915	11915	Extenstion
C common anode	30 % 17873	17873	🔲 Enable Multi Start
contribut director	40 % 22920	22820	
Analog Setting	10 10 23830	23630	
AOUT1 @ 0 ~ 10V	50 % 29788	29788	
C 0 ~ 5V	60 % 35746	35746	Card ID Define
AOUT2	70 % 41704	41704	Number $(0 \sim 3)$ : 0
C 0 ~ 5V	10 10 41704	41/04	
Motion Setting	80 % 47661	47661	
R	90 % 53619	53619	Hardware Flag:
X @ P/D C CW/CCW	100 % 59577	59577	
Y @ P/D @ CW/CCW	105077	100077	Hardware Version:
Z @ P/D @ CW/CCW			00020103

 $File \ Address \ : \ C:\ Program \ Files \ Marking \ Mate \ Drivers \ PMC6 \ HWC on fig. exe$ 

### 3-11-1 Scanner Type

Set P1 \ JF1 Scanner Type

- XY2-100 16Bit : Typical digital signal for most of scanner on market.
- Raylase XY2-100-E 18Bit : Raylase SS-III Communication specifications.
- **CTI XY2-100 20Bit** : CTI XY2-100 Protocol 20Bit Communication specifications.
- **Canon 20Bit** : Canon scanner setting : Parameter ID = 67 (20) Parameter ID = 68 (0)
- Canon 64Bit : Canon scanner setting : Parameter ID = 65 (5) > Parameter ID = 66 (5) > Parameter ID = 67 (20) > Parameter ID = 68 (0).
- **ME-Link** : Need to unlock the function.
- **SL2-100 20Bit** : Need to unlock the function.

#### **3-11-2 Scanner alignment**

Exchanging X and Y line will affect correction file.

### 3-11-3 Start / Stop Type

• Common Anode : Figure Switch Close, /Start \ /Stop Active Low.



• Commoun Cathode : Figure Switch Open, Start 
Stop Active High.



#### 3-11-4 Extenstion

• Enable Multi Start: While in automation mode, multiple starting marking signal trigger is allowed.

#### 3-11-5 Motion Setting

• Pulse Direction / CW CCW : Select Motion output Pulse/Dir or CW/CCW.

#### 3-11-6 DAC Setting

Select DAC1& DAC2 as 0~5V or 0~10V.

#### 3-11-7 DAC Scale Table

Fine tune Analog1 and Analog2 output voltage. $(0 \sim 65535 \approx 0V \sim 11V)$ 

#When press Format, the value will be set as default.

#### 3-11-8 DAC Test

Make test Analog1 and Analog2 easier when adjust Analog Scale Table. When pressing Test, Analog1 and Analog2 will change to corresponding voltage.

#### 3-11-9 Signal Setting

Enable Active Low.

#### **3-11-10 Card ID Define**

Setting card ID (For multi-card use).

#### 3-11-11 Information

PMC6 related information.

#### 3-11-12 Button

- Write : Click to reply any setting change.
- **Format :** Return every setting to default.
- **Exit** : Exit HWConfig.

## 4. SPI Laser Settings

### **4-1 Program Settings**

If you want to use MarkingMate software to control SPI Laser, you have two ways to make it.

#### 4-1-1 Software control interface

We recommend user to use software control mode to control SPI fiber laser by PMC6. By this mode user only have to connect to laser Break Out Board(BOB) by RS-232 cable and Gate signal.

The RS-232 port located on BOB which is needed to connect to COM port located on PC. If there is no such a COM port on PC, user could use a "USB to COM port convertor" to help. #Wiring please refer to (4-2 Pin Assignment).

After wiring is completed, user have to set cfg file to SPI\_Fiberg by \markingmate\DM.exe and edit "COMPORT = (the current COM port you are using)" within SPI Fiber.cfg by any text editor.



Please refer to the following picture and cfg list:

#### 4-1-2 Hardware control interface

If user has to pursue highest performance for laser control, definitely have to use hardware control mode. Please refer to the following (<u>4-2 Pin Assignment</u>) for wiring.

After wiring is completed, user have to set cfg file to SPI\_Fiber\_HWI.cfg or other suitable cfg by \markingmate\DM.exe.

)rvManager			
<u>File</u> anguage			
Driver Name:	Mode:		
Demo GB501 MCx	SPI_Fiber_HWI SPI_Fiber_HWI2 SPI_Fiber_HWI_G4	^	Edit
PCMark_Vista PCMark_XP PMC2	SPI_Fiber_HWI_G4_Alpha SPI_Fiber_HWI_G4_EP SPI_Fiber_HWI_G4_HS		Duplicate
RTC5 RTCx3 RTCx4	SPI_Fiber_HWI_G4_RM SPI_fiber_RS232_G4_EP SPI_fiber_RS232_G4_HS SPI_fiber_RS232_G4_RM		OK
SLM SP_ICE UMC4	SPI_fiber_TCP_G4_HS SPI_fiber_TCP_G4_RM SPI_Green_DPSS	~	Cancel

Please refer to the following picture and cfg list:

### 4-2 Pin Assignment

#### 4-2-1 Software control interface (RS232)

When you choose the driver of "SPI\_Fiber.cfg", the pin assignments of PMC6 and SPI G3 Laser are as below :

PMC6 - P2 : HD-SUB 15F		SPI G3 / G4 (SCSI 68-pin)		SPI break-out board		
Pin	Descriptions		Signal name Pin		Board description	Pin
6	Lagor On/Off	G3	Laser Emission Gate	5	LISED LASED OUT EN LL	17 Din 1
0	6 Laser On/OII	G4	Laser_emission_gate_h	3	USEK_LASEK_OUT_EN_H	J/ P1111
15	CND	G3	Laser emission gate low input	20	LISED LASED OUT EN L	17 Din 2
13	15 GND		Laser_emission_gate_l	39	USER_LASER_OUT_EN_L	J/Pln2

PC-RS D-S	232 Port: UB 9M	SPI G3 / G4 (SCSI 68-pin)		SPI break-out board	
Pin	Descriptions	Signal name	Pin	<b>Board description</b>	Pin
2	RX	RS-232_TX	25	User RX RS232	J3 Pin2
3	TX	RS-232_RX	26	User TX RS232	J3 Pin3
5	GND	Ground RS	59、60	0V RS232	J3 Pin5

### 4-2-2 Hardware control interface (HWI)

When you choose the driver of "SPI\_Fiber\_HWI", the pin assignments of PMC6 and SPI G3 laser will be as below:

PN J 26P	PMC6 - JF2 : 26Pin Box		SPI G3 / G4 (SCSI 68Pi	SPI break-out board		
Pin	Descri ptions		Signal name	Pin	Board description	Pin
1	Analog	G3	Power amplifier active-state current set point	65	USER PWR MOD IN	J6 Pin7
	Out1	<b>G4</b>	Al_1 – ext power control			
3	Analog	G3	Power-amplifier simmer current set point	64	USER PWR BIAS IN	J6 Pin6
_	Out2	<b>G4</b>	Al_2 – ext simmer control	-		
5	DW/M	G3	External Pulse Trigger	13	USER EXT TRIG H	I7 Pin7
5	1 1 1 1 1 1	<b>G4</b>	Pulse_trigger_h	15	USER_EAT_IRIO_II	J/ 1 111/
9	Laser	G3	Laser Emission Gate	5	USER LASER OUT EN H	I7 Pin1
	On/Off	<b>G4</b>	Laser_emission_gate_h	5	USER_EASER_OUT_EN_II	5/1111
		G3	GND_AN	$28 \cdot 29 \cdot 30 \cdot 31 \cdot 30 \cdot 31 \cdot 31 \cdot 31 \cdot 31 \cdot 31$		
		<b>G4</b>	GND_A	$32 \cdot 33$	0V Analogue	J6 Pin1
	2 • 4 • 25 GND	<b>G3</b>	Unused	27	0 ·	JO I III
2 • 4 •		<b>G4</b>	GND_A	27		
25		<b>G3</b>	External Pulse Trigger low input	17	LICED EVT TDIC I	17 Din9
		<b>G4</b>	Pulse_trigger_ext_l	4/	USER_EAT_INU_L	J/ F1110
		G3	Laser emission gate low input	30	USER LASER OUT EN L	17 Pin?
		<b>G4</b>	Laser_emission_gate_l	57	USEK_LASEK_OUT_EN_L	J7 Pin2

PN 2	1C6 - JF7 : 0Pin Box	SPI G3 / G4 (SCSI 68Pin)		n)	SPI break-out board		
Pin	Descriptions		Signal name	Pin	Board description	Pin	
6	Output 22	G3	Pulsed / CW Mode select	21	LISER DUISE N.CW H	I7 Din11	
0		G4	Laser_Pulse_CW_h	21	USEK_I UESE_N_CW_II	5/11111	
7	Output 23	G3	Globle Enable	7	USER GLOBAL EN H	I7 Pin5	
,	oupu 25	G4	Laser_enable_h	,		571115	
8	Output 24	G3	Alignment laser enable	6	USER PT LASER EN H	I7 Pin3	
	Output 24	G4	Pilot_laser_enable_h			<b>3</b> 7 T III3	
9	Output 25	G3	State Select: bit 0	17	USER CEG 0	I2 Pin1	
Ĺ	oupu 25	G4	DI_0	17		521111	
10	Output 26	G3	State Select: bit 1	18	USER CEG 1	I2 Pin2	
10	Output 20	G4	DI_1	10		JZ I 1112	
11	Output 27	G3	State Select: bit 2	19	USER CEG 2	I2 Pin3	
11	Output 27	G4	DI_2	15		52 T III5	
12	Output 28	G3	State Select: bit 3	20	USER CFG 3	J2 Pin4	
12	Output 20	G4	DI_3	20		J2 1 1114	
13	13 Output 29		State Select: bit 4	51	LISER CEG 4	J2 Pin5	
15	Output 2)	G4	DI_4			52.1 115	
14	Output 30	G3	State Select: bit 5	52	USER CEG 5	I2 Pin6	
14	Output 50	G4	DI_5	52		J2 T 1110	
		G3	Pulsed / CW Mode select low	55	LISER PULSE N CW I	J7 Pin12	
		G4	Laser_Pulse_CW_1	55	USER_FULSE_N_CW_L		
		G3	Global enable low input	41	USER GLOBAL EN L	17 Pin6	
		G4	Laser_enable_1	71	USEK_OLOBAL_EN_L	J/Pin6	
	17, 19, OVD	G3	Alignment laser enable low input	40	USER PT LASER EN L	J7 Pin4	
17 10		G4	Pilot_laser_enable_l			0,1111	
1/ 18	GND	G3	GND_ISOD 36 \cdot 37 \cdot 42	×43 ×			
		G4	GND_D 44 \ 43 \ 46 50 \ 56	· 48 ·			
		G3	0V Supply for fast output opto-couplers	58	0V_ISO_D	J11 Pin1	
		G4	GND_D				
		G3	GND_RS	59 . 60			
		<b>G4</b>	GND	00 י פכן			

PMC6 - JF6 : 20Pin Box		SPI G3 / G4 (SCSI 68Pin)		SPI break-out board			
Pin	Descriptions	Signal name Pin		Board description	Pin		
0	Lagut 0	G3	Seed laser fire indicator	2	Lizza good fine	111 Dim2	
9	Input 9	<b>G4</b>	Monitor	5	User_seed_life	JII PIIIZ	
10	Innut 10	G3	Pre-amplifier current fault	0	Lizza and other other of	111 Din 5	
10	Input 10	<b>G4</b>	Alarm	9	User_pre_amp_over_cur_n	JIIPino	
11	Input 11	<b>G3</b>	Base plate temperature fault	0	Ugar haga tamp fault p	I11 Dim 4	
11	input 11	<b>G4</b>	Laser_temperature	0	Oser_base_temp_taut_n	JII F 1114	
12	Innut 12	G3	Beam collimator fault	11	User hde fault r	J11 Pin7	
12	input 12	<b>G4</b>	Beam_delivery	11			
12	Innut 12	<b>G3</b>	Power-amplifier current fault	10	I loon day any agon a	111 Din 10	
15	input 15	<b>G4</b>	System_fault	10		JII PIIII0	
14	Input 14	<b>G3</b>	Reserved fault indicator	12	User good terms fault n	I11 Din2	
14	input 14	<b>G4</b>	Laser_deactivated	12	User_seed_temp_tauit_n	JII Pin3	
15	Innut 15	<b>G3</b>	Power Supply Fault	16	Lizer pur oppo over our p	III Din6	
15	input 15	<b>G4</b>	Laser_emission_warning	10	Oser_pwr_amp_over_cur_n	J11 F 1110	
16	Innut 16	<b>G3</b>	Laser Ready (no fault)		Ugar lagar randu	III Dim	
10	input 10	<b>G4</b>	Laser_is_on	14		JIIPIN9	
17,10	CND	G3	Unused	24	OV ISO D	III Dir 1	
1/ 18	UND	G4	GND	34	0120_0	JII FINI	

## 5. IPG Laser Settings

### 5-1 Program Settings (Also apply for Raycus and JPT

### Laser)

If you want to use MarkingMate software to control IPG Laser, you have to do the right program settings first, please follow the below steps.

Execute the program DM.exe under the directory of C:\Program Files\MarkingMate, a dialogue box will be displayed as below. Choose the PMC6 of Driver Name and choose the suitable cfg according to the following table, and then click "OK" button.

rvManager			
ile <u>L</u> anguage			
Driver Name:	Mode:		
Demo GB501	IPG_EG_Fiber IPG_Fiber	^	Edit
MCx PCMark_Vista PCMark_XP PMC2	IPG_Fiber_RS232 IPG_Fiber_YLP_E_RS232 IPG_GLPM IPG_TYPE_B		Duplicate
PMC6 RTC5 RTC3 RTCx3	IPG_YLM_AC IPG_YLM_QCW IPG_YLPM	[	ОК
SLM SP_ICE UMC4	ITRI_fiber ITRI_IPG ITRI_I_Fiber	<b>v</b>	Cancel

### 5-2 Pin Assignment

РМС	6 - JF2 : 26Pin Box	IPG : D-SUB 25Pin			
Pin	Descriptions	Signal name	Pin		
5	PWM Output	Pulse Repetition Rate Input	20		
9	Laser On/off	Laser Modulation Input	19		
11	Leading Light On/Off	[Note 1]Guide Light On/Off	22		
21	МО	[Note 2] MO On/Off	18		

PMC6 - JF7 : 20Pin Box		IPG: D-SUB 25Pin		
Pin	Descriptions	Signal name	Pin	
3	Output 19	[Note 1] Guide Light On/Off	22	
4	Output 20	[Note 2] MO On/Off	18	
5	Output 21	D0	1	
6	Output 22	D1	2	
7	Output 23	D2	3	
8	Output 24	D3	4	
9	Output 25	D4	5	
10	Output 26	D5	6	
11	Output 27	D6	7	
12	Output 28	D7	8	
13	Output 29	Latch	9	
17 • 18	GND	Ground	10, 14	
19	+5V	EMStop	[Note 3]17, 23	

Note 1 : You can select either JF2 pin 11 or JF7 pin 4 to connect with.

Note 2: You can select either JF2 pin 6 or JF7 pin 3 to connect with.

Note 3 : In IPG EG Type Pin 17 should open to +5V.

PMC6 - JF6 : 20Pin Box		IPG : D-SUB 25Pin		
Pin	Descriptions	Signal name	Pin	
11	Input 11	Refer to IPG Manual	12	
12	Input 12	Refer to IPG Manual	16	
13	Input 13	Refer to IPG Manual	21	
14	Input 14	Refer to IPG Manual	11	

## 6. OMRON Laser Settings

### **6-1 Program Settings**

If you want to use MarkingMate software to control IPG Laser, you have to do the right program settings first, please follow the below steps.

Execute the program DM.exe under the directory of C:\Program Files\MarkingMate, a dialogue box will be displayed as below. Choose the PMC6 of Driver Name and choose the suitable cfg according to the following table, and then click "OK" button.

Driver Name:	Mode:		
Demo GB501	Nufern_Fiber_LST Nufern_Fiber_RS232	^	Edit
MCx DCM-sta Materia	OMRON Fiber	-	
PCMark_Vista PCMark_XP PMC2	Optowave PL 50W		Duplicate
PMC6	Prisma_Laser		
RTC5 RTCx3	PS_Laser Pulseo_Laser		ОК
RTCx4	Quantronix_254		
SP ICF	B05b		Canaal
UMC4	R05bb	v	Cancer

### 6-2 Pin Assignment

When you choose the driver of "OMRON\_Fiber", the pin assignments of PMC6 and OMRON laser will be as below :

PMC6-P2 : HD-SUB 15M		OMRON I/O Port : D-SUB 15M		
Pin	Descriptions	Pin	Descriptions	
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	

Note: OMRON RS-232 Serial Port has to connect to RS-232 Port on PC.

## 7 Using RS-232

### 7-1 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.

### 7-2 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 PMC6 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\PMC6\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.

SPI_fiber_RS232_G4_HS.cfg - Notepad	8	×	
<u>F</u> ile <u>E</u> dit F <u>o</u> rmat <u>V</u> iew <u>H</u> elp			
[ENV]			^
Correction File=correct.cor			
SUPPORI_CW=I			
RS232=1			
SPI Fiber Laser=1			
			×
<		>	

## **Appendix1 : Various Laser Setting Modes**

### TYPE 1 : CO2 Mode



### TYPE 2 : YAG 1-3 Mode



### TYPE 3 : R05 Mode



## **Appendix2 : LED Status**

D1: Boot success is bright, boot fail is dark. (Note 1)

D9:Power status. Power level normal is bright.

 $D2 \sim D5: \, STATUS$ 

Status	Descript	Note	
D2D3 and D4D5 flickering	Boot success but not execute software	Normal	
D2 flickering, others darkness	Software opened	Normal	
Flickering at the same time	Boot error and enter backup session.	Failure(Note2)	
Keep bright or darkness	Boot error.	Failure(Note3)	
Shimmer	JF11(4 pin) power supply error	Failure(Note4)	

Note1: If D1 is darkness, please contact the product supplier for help.

Note2: Please confirm if device manager has found the control card. If yes, please execute

HWUpdate.exe to update. If no, please reboot PC without cutting off power and check again if it is found.

Note3:Please shut down PC first then boot again to confirm if the card goes to normal. If not, please contact the product supplier for help.

Note4: Check if JF11 power supply is normal.