

CHAPTER

2

HARDWARE OVERVIEW

Motion Coordinator PCI 208 - Product Code P180

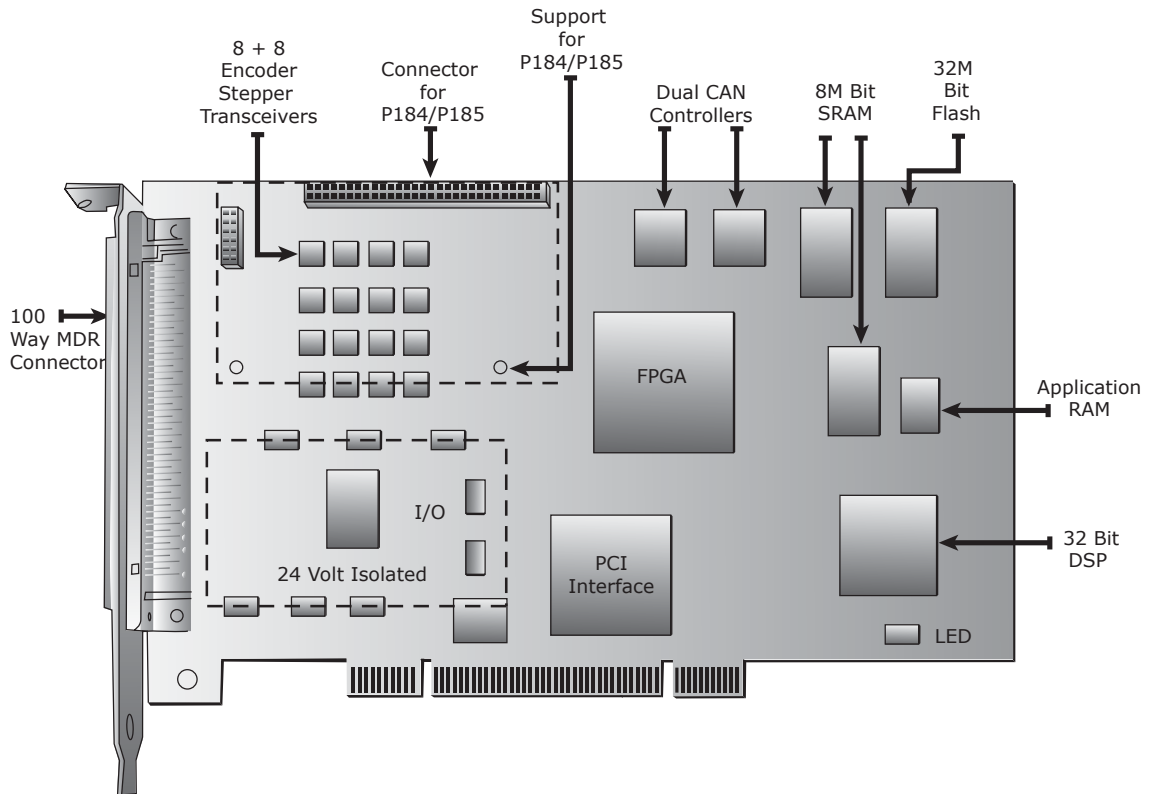
Overview The PCI 208 is a powerful *Motion Coordinator* designed to fit into the PCI slot of a PC. It can control up to 8 servo or stepper motors, has built-in opto-isolated I/O and has one or two CAN channels. An expansion connector allows for the addition of +/-10 volt outputs for the control of voltage output servos. The PCI 208 is designed to provide a powerful yet cost-effective control solution for OEM machine builders who are building machines centred around a PC.



Programming The PCI 208 can be programmed via an OCX software component from most PC programming languages. In addition it can be optionally programmed to execute programs on board using Multi-tasking Trio BASIC.

Breakout Options An optional “Breakout” board for the PCI 208 can be used to ease the task of making connections to the 100 way PCI 208 backplate connector. For some simple applications connections can be wired to a mating connector which plugs directly into the PCI 208. For serial production a customised connection PCB can provide the best solution. For many other applications the breakout board is the most convenient solution.

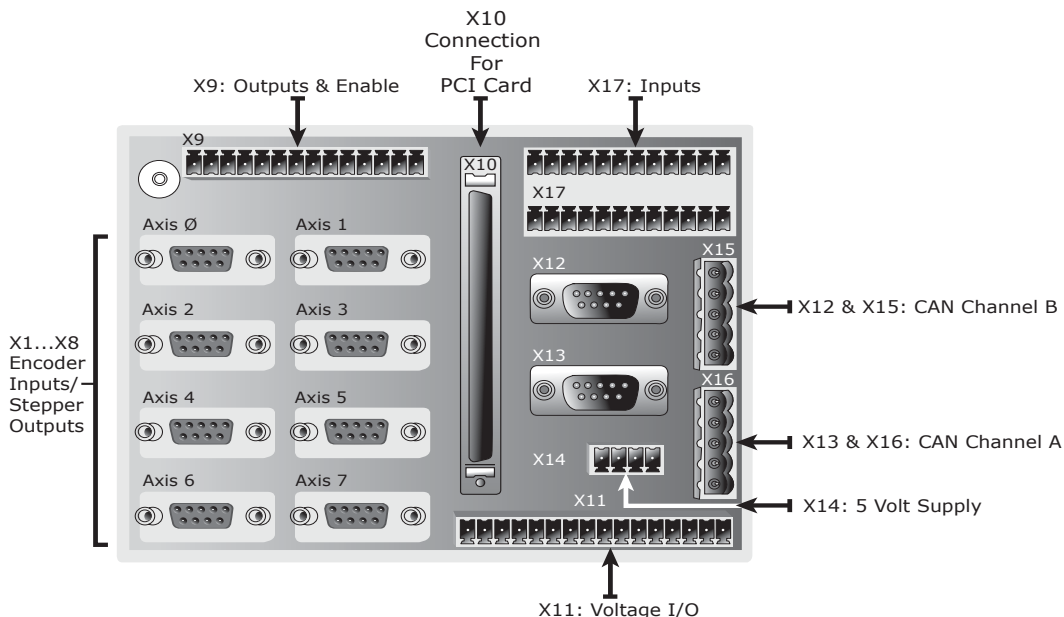
PCI 208 Block Diagram



Connectors **100-Way MDR Connector**

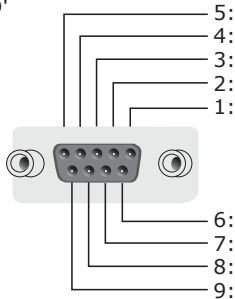
All connections to the real world are provided via a 100 way MDR connector. The pinout is given in the table on page 2-11.

Connectors Breakout Board



Encoder/Stepper Connectors:

Axis 0...Axis 7
Female 'D'

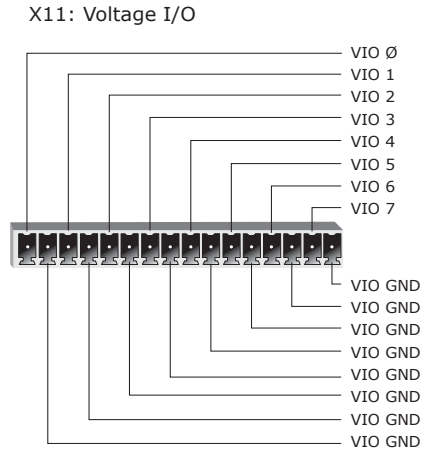


Pin	Servo Axis	Stepper Axis
1	Enc. A	Step +
2	Enc. /A	Step -
3	Enc. B	Direction +
4	Enc. /B	Direction -
5	GND	GND
6	Enc. Z	Boost +
7	Enc. /Z	Boost -
8	5v	5v
9	Not Connected	Not Connected
shell	Screen	Screen

Each of the axes 0 to 7 has its encoder or stepper connections brought out to a separate female D connector. Each axis can be switched to have either an encoder input or differential stepper outputs provided the necessary Feature Enable Codes have been installed.

Voltage I/O:

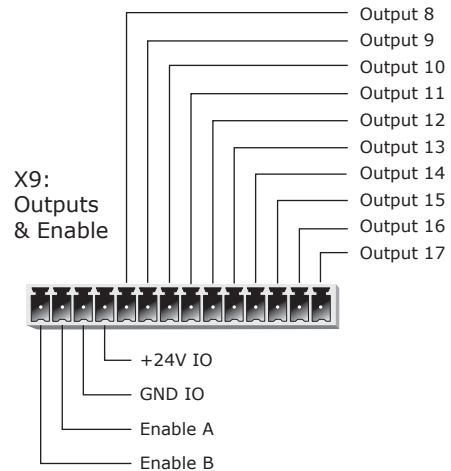
X11 is used to provide isolated voltage I/O when the P184 or P185 DAC modules have been fitted to the PCI208. When the P184 module has been fitted VIO0 to VIO3 provide 4 x +/-10 volt voltage outputs and VIO4 to VIO7 provide 4 x 0..10 volt analog inputs. When the P185 module has been fitted VIO0 to VIO7 provide 8 x +/-10 volt voltage outputs. The analog outputs have 16 bit resolution and are normally used for controlling analog servo drives. Each analog input/output pin has a GND connection alongside to ease connections. If neither a P184 nor P185 are fitted X11 has no function.



24volt Outputs and Enable

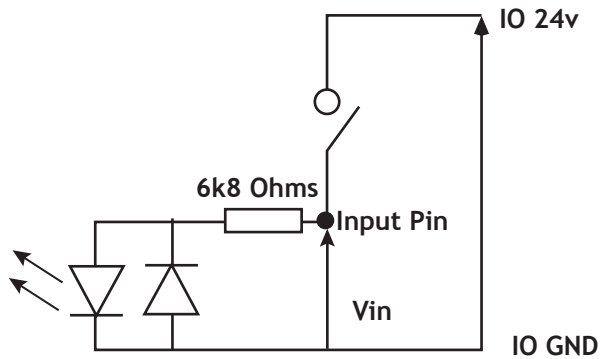
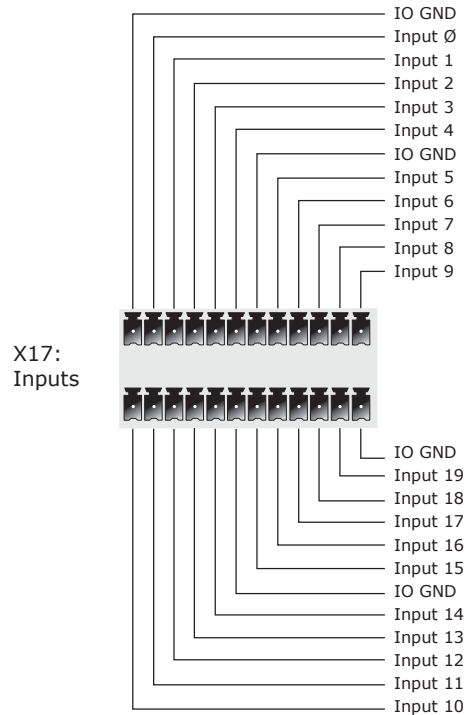
X9 provides 10 x 24 V sourcing opto-isolated output channels. The outputs are current limited and are rated at 250mA. In addition there is a 1 amp rating for all channels combined. The IO GND is common with the isolated input channels.

The +24 V IO connection is used to provide power to the isolated 24 volt outputs ONLY



24 volt Inputs

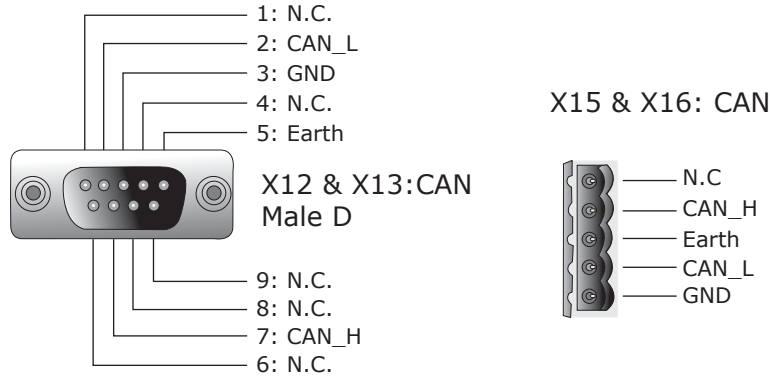
X17 provides 20 x 24 V opto-isolated input channels. The IO GND is common with the isolated output channels.



Simplified Input Schematic

CAN connections

Each of the two CAN channels A and B is provided with 2 connectors. This is to suit either DeviceNet or CANopen style connections.

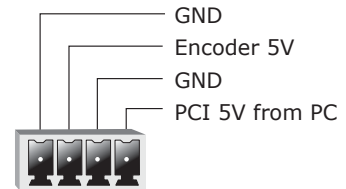


CAN Channels	CANopen Style	DeviceNet Style	Description
CAN Channel A	X13	X16	Used for connection of Trio IO modules if used. Addressed from CAN command as channel -1 E.G CAN(-1,2,1)
CAN Channel B	X12	X15	Auxiliary CAN channel. Addressed from CAN command as channel 0 E.G CAN(0,2,1)

5 Volt Supply

The PCI 208 can provide up to 200mA for powering external encoders, from the PC power supply. This is limited by an electronic circuit. The X14 connector allows an external 5 volt power supply to be easily connected if this is insufficient to power the any connected encoders.

The PCI 5 V and Encoder 5 V pins **MUST** be wired together to power the encoders from the PCI card.

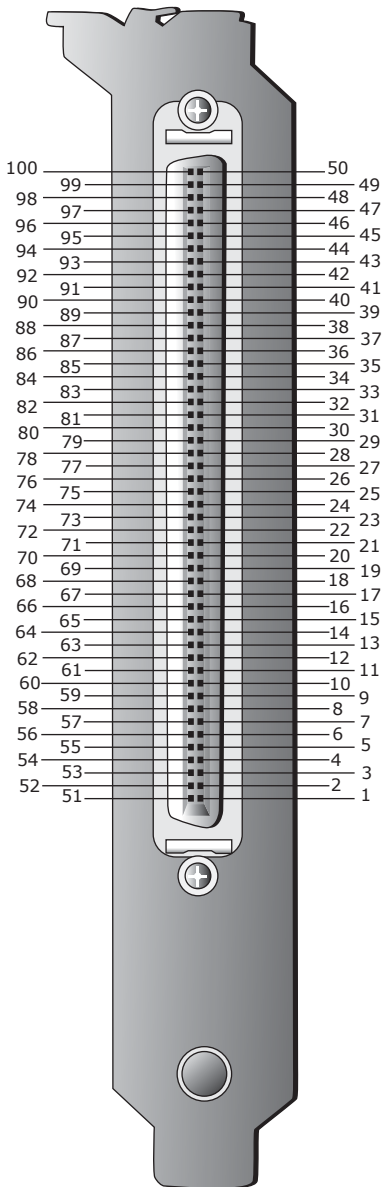


X14: 5 Volt Jumper

PCI 208 - Feature Summary

Size	175mm x 106mm x 18mm PCB overall (excludes PC bracket)
Weight	150g
Operating Temperature	0 - 45 degrees C
Control Inputs	Forward Limit, Reverse Limit, Datum Input, Feedhold Input, Software assignable for each axis. Registration Input
PCI Port	PCI v 2.2 32bit 33Mhz 32bit x 4096 memory locations
Position Resolution	32 bit position count
Interpolation modes	Linear 1-8 axes, circular, helical, CAM Profiles, speed control, electronic gearboxes.
Programming	Via PC OCX component from PC programs. Additionally Multi-tasking Trio BASIC system may be used, maximum 7 simultaneous Trio BASIC programs.
Speed Resolution	32 bit. Speed may be changed at any time. Moves may be merged.
Servo Cycle	1000, 500, or 250 usec for all 8 axes
Memory	32 Mbits Flash, 9 Mbits system RAM, 2 Mbits application RAM, 128kBits PCI dual port RAM
Power Input	Powered via PC. Isolated 24 volt outputs require external power
Drive Enable Output	Solid state relay 24 volt normally open contacts
+/-10 volt DAC Output	4 or 8 with 16 bit resolution optionally provided by P184 or P185 options
Encoder Inputs	Up to 8 axes, differential 5 V inputs, 6Mhz maximum edge rate
Stepper Outputs	Up to 8 axes, step and direction. 2Mhz maximum step rate
24 volt Inputs	20 Opto-isolated 24 volt inputs. 8 may be used as hardware registration inputs
24 volt Outputs	10 Opto-isolated 24 volt outputs, 250 mA /channel rating + 1 Amp all channels limit

PCI 208 Backplate Connector :

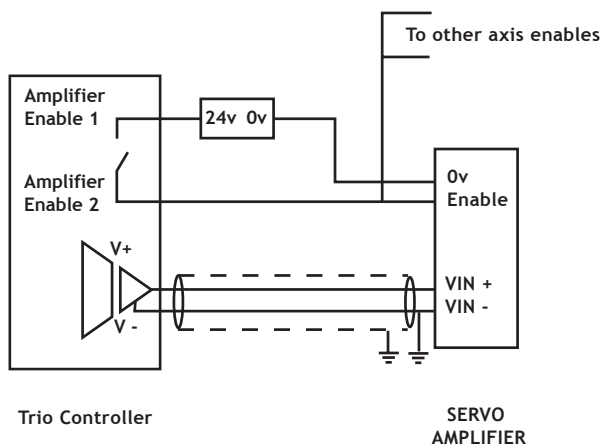


100	VOUT 1	VOUT 0	50
99	VOUT 3	VOUT 2	49
98	VIO 5	VIO 4	48
97	VIO 7	VIO 6	47
96	VIO GND	+5 V ENC	46
95	ENC GND	ENC GND	45
94	ENABLE A	/ENC Z7	44
93	ENABLE B	ENC Z7	43
92	/ENC B7	/ENC A7	42
91	ENC B7	ENC A7	41
90	/ENC Z6	/ENC B6	40
89	ENC Z6	ENC B6	39
88	/ENC A6	/ENC Z5	38
87	ENC A6	ENC Z5	37
86	/ENC B5	/ENC A5	36
85	ENC B5	ENC A5	35
84	/ENC Z4	/ENC B4	34
83	ENC Z4	ENC B4	33
82	/ENC A4	/ENC Z3	32
81	ENC A4	ENC Z3	31
80	/ENC B3	/ENC A3	30
79	ENC B3	ENC A3	29
78	/ENC Z2	/ENC B2	28
77	ENC Z2	ENC B2	27
76	/ENC A2	/ENC Z1	26
75	ENC A2	ENC Z1	25
74	/ENC B1	/ENC A1	24
73	ENC B1	ENC A1	23
72	/ENC Z0	/ENC B0	22
71	ENC Z0	ENC B0	21
70	/ENC A0	CAN BL	20
69	ENC A0	CAN BH	19
68	CAN AL	+24 V IO	18
67	CAN AH	0V IO	17
66	IN 0	OUT 8	16
65	IN 1	OUT 9	15
64	IN 2	OUT 10	14
63	IN 3	OUT 11	13
62	IN 4	OUT 12	12
61	IN 5	OUT 13	11
60	IN 6	OUT 14	10
59	IN 7	OUT 15	9
58	IN 8	OUT 16	8
57	IN 9	OUT 17	7
56	IN 10	IN 11	6
55	IN 12	IN 13	5
54	IN 14	IN 15	4
53	IN 16	IN 17	3
51	IN 18	IN 19	2
51	+24 V IO	0V IO	1

Drive Enable (Watchdog) Relay Output

An internal relay contact is used to enable external drives when the controller has powered up correctly and the system and application software is ready. The drive enable is a single pole relay with a set of normally open contacts. The enable relay contact will be open circuit if there is no power on the controller OR a following error exists on a servo axis OR the user program sets it open with the WDOG=OFF command.

The drive enable relay may, for example, be incorporated within a hold-up circuit or chain that must be intact before a 3-phase power input is made live.



drive Enable Output

Note: *ALL STEPPER AND SERVO DRIVES MUST BE INHIBITED WHEN THE DRIVE ENABLE OUTPUT IS OPEN CIRCUIT*
