PCI-8164

Advanced 4-axis Stepping & Servo Motion Control Card

Features

- 32-bit PCI bus, plug & play
- Pulse output rate up to 6.55 MHz
- Pulse output options: OUT/DIR, CW/CCW
- 2-4 axes linear interpolation
- 2 axes circular interpolation
- Multi-axis continuous interpolation
- Change position or speed on-the-fly
- 13 home return modes including auto searching
- Hardware position compare and trigger with auto-loading FIFO
- High speed position latch function
- Programmable acceleration and deceleration time
- Trapezoidal and S-curve velocity profiles
- 28-bit up/down counter for incremental encoder
- Simultaneously start/stop on multiple axes
- Programmable interrupt sources
- Supports up to 12 cards in one system
- Hardware backlash compensator
- Software limit function
- Easy interface to any stepping motors, AC or DC servo motors
- All digital input and output signals are 2500 Vrms isolated
- Manual pulser input interface

Introduction

Advanced 4 axes motion controller
The PCI-8164 is an advanced 4-axis motion control card. It contains all the functions provided by previous PCI-8134, such as linear, trapezoidal and S-curve velocity profile. Furthermore, many new features/functions are introduced.

Velocity or Position Override
The PCI-8164 provides powerful position or speed changing function while axis is moving. Changing speed/position on the fly means the target speed/position can be altered after the motion started.

Linear & Circular Interpolation
In multi-axis operation, the PCI-8164 provides linear interpolation by any 2, any 3, or even all-4 axes. Besides any 2 axes can perform circular interpolation.

Continuous Interpolation
The pre-register architecture of PCI-8164 helps to build the continuous interpolation function, i.e. the second motion may follow previous motion instantly without latency. Thus perfect velocity continuity can be established.

Hardware Position Compare and Trigger Output
The PCI-8164 provides position compare and trigger functions. The CMP channel will output a trigger pulse when encoder counter reached the compared value preset by user. Comparison is done by hardware, and an on-board FIFO is implemented to auto-reload comparing data. Thus, the trigger rate can be reach 30k, while almost no CPU time is needed. The trigger pulse width is about 33μsec.

Position Latch
The latch function is to capture the instant counter value of related axis when latch signal activate. LTC channel is used to receive that latch pulse. The latch function is done by hardware without any software delay.

Automatic Backlash Compensation
Whenever direction change is occurred, The PCI-8164 outputs backlash corrective pulses before sending commands. During interpolation mode, this function will be ineffective.

13 home Return Modes
To fit into various mechanical design and operating restrictions, PCI-8164 provides 13 home moving modes for users to choose as their best convenience.

Simultaneously Start/Stop
By using software program or external input signal, PCI-8164 can perform simultaneously Start/Stop function on multi-axis in one card or multi-axis in multi-card. And, the simultaneously stop function is selectable to be active when some axes is abnormally stopped.

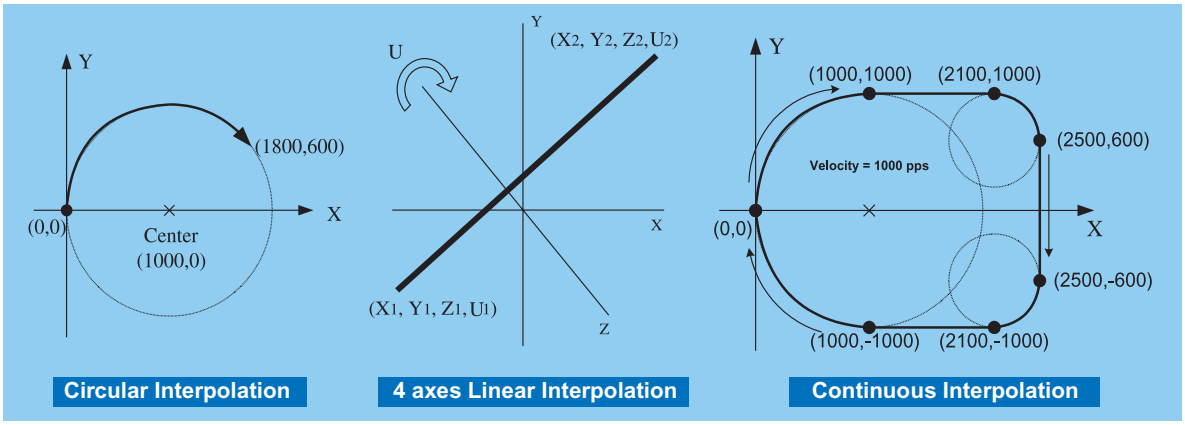
Application

- Electric Assembly
- Semiconductor, LCD Manufacturing and Measurement
- Laboratory Automation
- Vision & Photocomposition Automation
- Biotech Sampling and Handing
- Robotic
- CNC Machine

Comparison of PCI-8132, PCI-8134 and PCI-8164

	8132	8134	8164
Number of Axes	2	4	4
Position Compare	Yes	No	Yes
FIFO Auto-reload	No	No	Yes
Position Latch	No	No	Yes
Linear Interpolation	2-axis	2-axis	4-axis
Circular Interpolation	No	No	Yes
Continuous Interpolation	No	No	Yes
Home Return Mod	3	3	13
General I/O	16DI/16DO	None	6TTL

Various Interpolation Modes of PCI-8164



Circular Interpolation | **4 axes Linear Interpolation** | **Continuous Interpolation**

Specifications

Motion

- Number of controllable axes: 4
- Max number of cards in one system: 12
- Up to 6.55 MHz pulse output
- Pulse output is programmable to be: OUT/DIR or CW/CCW
- 28-bit Up/Down counter for encoder feed-back signals
- Position range: (28-bit), -134217728 to +134217728 pulses

Motion Interface I/O Signals

- Position latch input pin: LTC
- Position compare output pin: CMP
- All I/O pins are differential and 2500 Vrms optically isolated
- Incremental encoder signals input pins: EA and EB
- Encoder index signal input: EZ
- Mechanical limit switch signal input pins: ±EL, SD and ORG
- Servomotor interface I/O pins: INP, ALM, ERC
- General DO pin: SVON
- General DI pin: RDY
- Pulser signal input: PA and PB
- Simultaneous Start/Stop Signal I/O Pins: STA and STP

General-Purpose I/O

- 6 TTL level Digital Output

Software Support

- Windows DLL
  The software drivers support VC++ /VB/C++ Builder/Delphi programming on Windows 95/98/NT/2000/XP platform with DLL.
- MotionCreator™
  MotionCreator™ (VB utility) assists the motion system developer to debug any cabling problem, and solve the difficulty of system configuration before programming.

Termination Board

- **DIN-100M15**
  Termination Board for General Purpose with 1.5M cable

DIN-100M15

- **DIN-814M**
  Termination Board for Mitsubishi Servo Driver with 1M Cable

DIN-814M

Ordering Information

- **PCI-8164**
  Advanced 4-Axis Motion Control Card

Note: The products are shipped with software development kits for DOS, Windows 95/98/NT/2000/XP.

PCI-8164 Pin Assignment of the 100-pin SCSI-type Connector

VPP	1	51	VPP
GND	2	52	GND
OUT1+	3	53	OUT3+
OUT1-	4	54	OUT3-
DIR1+	5	55	DIR3+
DIR1-	6	56	DIR3-
SVON1	7	57	SVON3
ERC1	8	58	ERC3
ALM1	9	59	ALM3
INP1	10	60	INP3
RDY1	11	61	RDY3
GND	12	62	GND
EA1+	13	63	EA3+
EA1-	14	64	EA3-
EB1+	15	65	EB3+
EB1-	16	66	EB3-
EZ1+	17	67	EZ3+
EZ1-	18	68	EZ3-
VPP	19	69	VPP
GND	20	70	GND
OUT2+	21	71	OUT4+
OUT2-	22	72	OUT4-
DIR2+	23	73	DIR4+
DIR2-	24	74	DIR4-
SVON2	25	75	SVON4
ERC2	26	76	ERC4
ALM2	27	77	ALM4
INP2	28	78	INP4
RDY2	29	79	RDY4
GND	30	80	GND
EA2+	31	81	EA4+
EA2-	32	82	EA4-
EB2+	33	83	EB4+
EB2-	34	84	EB4-
EZ2+	35	85	EZ4+
EZ2-	36	86	EZ4-
PEL1	37	87	PEL3
MEL1	38	88	MEL3
CMP1	39	89	CMP3
SD1	40	90	SD3
ORG1	41	91	ORG3
GND	42	92	GND
PEL2	43	93	PEL4
MEL2	44	94	MEL4
GMP2	45	95	GMP4
SD2	46	96	SD4
ORG2	47	97	ORG4
GND	48	98	GND
GND	49	99	E_24V
GND	50	100	E_24V