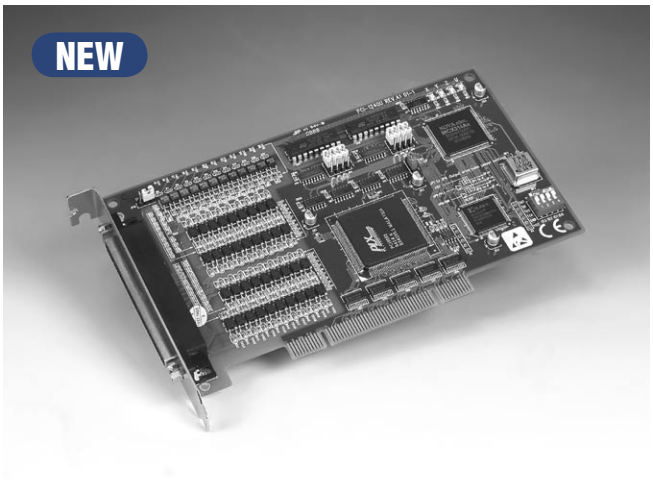
PCI-1240U

4-Axis Universal PCI Stepping/Pulse-type Servo Motor Control Card



Features

- Independent 4-axis motion control
- Hand wheel and jog function
- 2/3-axis linear interpolation function
- 2-axis circular interpolation function
- Continuous interpolation function
- Programmable T/S-curve acceleration/deceleration rate
- Up to 4 MPPS pulse output for each axis
- Two pulse output types: Up/Down or Pulse/Direction
- Up to 1 MHz encoder input for each axis
- Two encoder pulse input types: A/B phase or Up/Down
- Constant speed control
- Position management and software limit switch function
- BoardID™ switch

CE

Introduction

Advantech introduces the PCI-1240U 4-axis Universal PCI (supports both 3.3V and 5V signal slot) stepping/pulse-type servo motor control card designed for general-purpose extreme motion applications. The PCI-1240U is a high-speed 4-axis motion control card for the PCI bus that simplifies stepping and pulse-type servo motor control, giving you added performance from your motors. The card's intelligent NOVA® MCX314-motion ASIC builds in a variety of motion control functions, such as 2/3-axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration rate and more. In addition, the PCI-1240U performs these motion control functions without processor loading during driving. For advanced applications, Advantech supplies Windows® DLL drivers and user-friendly examples to decrease your programming load. Moreover, through a free bundled PCI-1240U motion utility, you can complete configuration and diagnosis easily.

Specifications

Motion Axis

Nunber of Axes	4 Axes	
2/3 -axis Linear Interpolation	Range	+/- 2,147,483,646 for each axis
	Speed	1 PPS ~ 4 MPPS
	Precision	± 0.5 LSB
2-axis Circular Interpolation	Range	+/- 2,147,483,646 for each axis
	Speed	1 PPS ~ 4 MPPS
	Precision	± 1 LSB
Continuous Interpolation	Speed	1 PPS ~ 2 MPPS
Drive Output Pulses	Range	1 PPS ~ 4 MPPS
	Precision	1 LSB
	Change of Acceleration for S Curve	954 ~ 31.25 x 10^9 PPS/sec^2
	Acceleration/Deceleration	125 ~ 500 x 10^9 PPS/sec^2
	Initial Velocity	1 PPS ~ 4 MPPS
	Drive Speed	1 PPS ~ 4 MPPS (Can be changed during driving)
	Number of Output Pulses	0 ~ 4,294,967,295 (fixed pulse driving)
	Pulse Output Type	Pulse/Direction (1-pulse, 1-direction type) or Up/Down (2-pulse type)
	Output Signal Modes	Differential Line driving output/Single-ended output
	Speed Curve	T/S-curve Acceleration/Deceleration
Input Pulse for Encoder Interface	Encoder Pulse Input Type	Quadrature (A/B phase or Up/Down)
	Counts per Encoder Cycle	x1, x2, x4 (A/B phase only)
	Protection	2,500 V_{DC} isolation
	Input Range	+5V ~ +30V
Position Counter (read/write at any time)	Range of Command Position Counter (for output pulse)	-2,147,438,648 ~ +2,147,483,647
	Range of Actual Position Counter (for output pulse)	-2,147,438,648 ~ +2,147,483,647
Comparison Register	COMP+ Register Range	-2,147,438,648 ~ +2,147,483,647
	COMP- Register Range	-2,147,438,648 ~ +2,147,483,647
	Can be used for software over traveling limit	
Interrupt Functions (excluding Interpolation)	Interrupt CONDITION (All conditions could be enable individually)	Position Counter ≥ COMP-
		Position Counter < COMP-
		Position Counter ≥ COMP+
		Position Counter < COMP+
		Constant speed begin or end during acceleration/deceleration driving pulse finished
External Signals Driving	Input Signal*	nEXOP+ and nEXOP
	Max. Input Frequency	100 Hz
	Driving Mode	Fixed pulse driving or continuous driving Supports Hand wheel/Jog
	Protection	2,500 V_{DC} Photo coupler isolation; accept mechanical connection point.
External Deceleration/ Instantaneous Stop Signal	Input Signal*	nINI ~ 3
	Max. Input Frequency	4 KHz
	Protection	2,500 V_{DC} Photo coupler isolation and RC filtering
Input Signal for Servo Motor Drivers	Input Signal*	nALArm (servo alarm) nINPOS (position command coompleted)
General Purpose Output Signal	Output Signal*	nOUT4 ~ 7
Over Traveling Limit Switch Input	Input Signal*	nLMT+ and nLMT-
	Protection	2,500 V_{DC} Photo coupler isolation and RC filtering; accept mechanical connection point.
Emergency Stop	Input Signal*	EMG- one emergency stop input for PCI-1240
	Protection	2,500 V_{DC} Photo coupler isolation and RC filtering; accept mechanical connection point.

General

I/O Connector Type	100-pin SCSI-II female	
Dimensions	175 x 100 mm (6.9" x 3.9")	
Power Consumption	Typical	+5 V @ 850 mA
	Max.	+5 V @ 1 A
External Power Voltage	DC +12 ~ 24 V	
Temperature	Operating	0 ~ 60° C (32 ~ 140° F) (refer to IEC 68-2-1, 2)
	Storage	-20 ~ 85° C (-4 ~ 185° F)
Relative Humidity	5 ~95% RH non-condensing (refer to IEC 68-2-3)	
Certification	CE certified	

Note: *: "n" represents the axis (X, Y, Z or U) that is concerned.

Ordering Information

- **PCI-1240U** 4-axis universal PCI stepping/pulse-type servo motor control card
- **ADAM-3952** 50-pin SCSI-II wiring terminal for DIN-rail mounting
- **PCL-10251-1** 100-pin SCSI to two 50-pin SCSI cable for PCI-1240U, 1m
- **PCL-10251-3** 100-pin SCSI to two 50-pin SCSI cable for PCI-1240U, 3m

Feature Details

Programmable T/S-curve Acceleration and Deceleration

Each of four axes can be preset individually with S-curve or trapezoidal acceleration/deceleration rates. When using S-curve acceleration to control driving speed, output pulse is generated in parabolic-shaped acceleration or deceleration curves, and the triangular curve phenomenon will not occur through the NOVA® MCX314-motion ASIC design concept.

Linear and Circular Interpolation

Any two or three axes can be selected to execute linear interpolation driving and any two axes can be selected to execute circular arc interpolation control. The interpolation speed range is from 1 PPS to 4 MPPS.

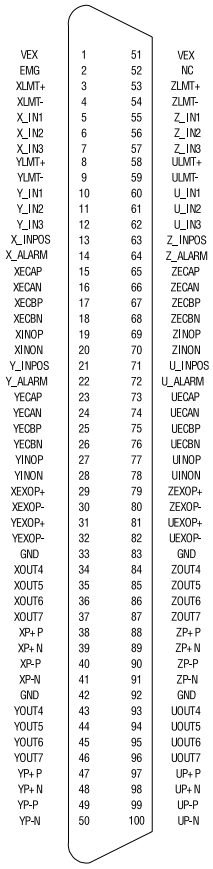
Powerful Position Management Function

Each axis is equipped with a 32-bit logical position counter and a 32- bit real position counter. The logical position counter counts the axis' pulse output number and the real position counter is recorded with the feedback pulse from the outside encoder or linear scale.

Applications

- General motion control (GMC)
- Packaging and assembly machinery
- Robotics and semiconductor manufacturing and measurement
- Precise X-Y-Z position and rotation control

Pin Assignments



VEX	1	51	VEX
EMG	2	52	NC
XLMT+	3	53	ZLMT+
XLMT-	4	54	ZLMT-
X_IN1	5	55	Z_IN1
X_IN2	6	56	Z_IN2
X_IN3	7	57	Z_IN3
YLMT+	8	58	ULMT+
YLMT-	9	59	ULMT-
Y_IN1	10	60	U_IN1
Y_IN2	11	61	U_IN2
Y_IN3	12	62	U_IN3
X_INPOS	13	63	Z_INPOS
X_ALARM	14	64	Z_ALARM
XECAP	15	65	ZECAP
XECAN	16	66	ZECAN
XECBP	17	67	ZECBP
XECBN	18	68	ZECBN
XINOP	19	69	ZINOP
XINON	20	70	ZINON
Y_INPOS	21	71	U_INPOS
Y_ALARM	22	72	U_ALARM
YECAP	23	73	UECAP
YECAN	24	74	UECAN
YECBP	25	75	UECBP
YECBN	26	76	UECBN
YINOP	27	77	UINOP
YINON	28	78	UINON
XEXOP+	29	79	ZEXOP+
XEXOP-	30	80	ZEXOP-
YEXOP+	31	81	UEXOP+
YEXOP-	32	82	UEXOP-
GND	33	83	GND
XOUT4	34	84	ZOUT4
XOUT5	35	85	ZOUT5
XOUT6	36	86	ZOUT6
XOUT7	37	87	ZOUT7
XP+ P	38	88	ZP+ P
XP+ N	39	89	ZP+ N
XP-P	40	90	ZP-P
XP-N	41	91	ZP-N
GND	42	92	GND
YOUT4	43	93	UOUT4
YOUT5	44	94	UOUT5
YOUT6	45	95	UOUT6
YOUT7	46	96	UOUT7
YP+ P	47	97	UP+ P
YP+ N	48	98	UP+ N
YP-P	49	99	UP-P
YP-N	50	100	UP-N

Block Diagram