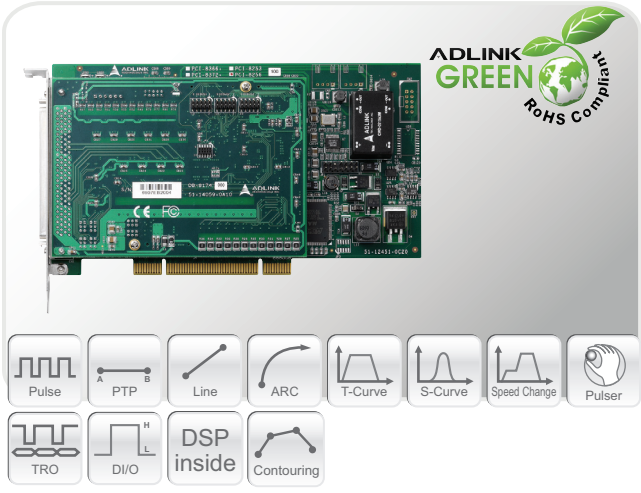
PCI-8174

DSP Firmware ODM by ADLINK is possible

Advanced DSP-based 4-axis Stepper & Servo Motion Control Card



Features

- *TI TMS320C6711 200MHz DSP on-board*
- *DSP firmware customizable*
- *Time-critical motion and standalone control*
- *32-bit PCI bus, Rev. 2.2, 33MHz*
- *Pulse output rate up to 6.55MHz*
- *Pulse output options: OUT/DIR, CW/CCW, AB Phase*
- *2~4 axes linear interpolation*
- *2 axes circular interpolation*
- *Multi-axis continuous interpolation*
- *Position/Speed change on-the-fly*
- *13 home return modes and auto home search*
- *Hardware position compare and trigger*
- *High speed position latch function*
- *Programmable acceleration and deceleration time*
- *Trapezoidal and S-curve velocity profiles*
- *28-bit up/down counter for incremental encoder*
- *Multi-axis, simultaneous start/stop*
- *Programmable interrupt sources*
- *Supports up to 12 cards in one system*
- *Hardware backlash compensator*
- *Softwares limit function*
- *Easy interface to any stepping motors, AC or DC servo, linear or rotary motors*
- *All digital inputs and outputs are 2500V$_{RMS}$ isolated*
- *Security protection for user's program*
- *Manual pulser input interface*

Software Support

Windows® Platform

Available for Windows Vista32/XP/2000
VB/VC++/BCB/Delphi are recommended programming environment.
Various sample programs with source codes
Customized API functions are possible

MotionCreatorPro ™

MotionCreatorPro™ assists the motion system developer to debug any cabling problem, and solve the difficulty of system configuration before programming.

Linux Platform

Redhat 9, kernel 2.4.x	SUSE 10, kernel 2.6.13
Fedora Core 3, kernel 2.6.9	Fedora Core 5, kernel 2.6.15
Fedora Core 4, kernel 2.6.11	

Introduction

Advanced DSP-based 4-axis Motion Controller

The ADLINK PCI-8174 offers an on-board DSP with motion ASIC to easily allow implementation of time-critical motion sequences. The DSP will execute the sequence via the motion ASIC without consuming CPU resources, making it ideal for interrupt control and synchronization among multiple axes. All processes are executed in the hardware layer, so the PCI-8174 operates as a standalone controller.

Motion Control Feature

The PCI-8174 provides powerful position or speed changing function while axis is moving. After motion begins, target of speed or position can be changed on the fly at the user's discretion.

Linear & Circular Interpolation

In multi-axis operation, the PCI-8174 provides linear interpolation by any 2, any 3, or even all-4 axes. Besides any 2 axes can perform circular interpolation.

Continuous Contouring

The pre-register architecture of PCI-8174 offers the feature to build the continuous interpolation function, ie, the 2nd motion may follow previous motion instantly without latency. Thus perfect velocity continuity can be established.

Hardware Position Compare and Trigger Output

The PCI-8174 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 without time delay problem.

Position Latch

The latch function is to capture the instant counter value of one certain axis when the latch signal activates. The LTC channel is used to receive the latch pulse. The latch function is implemented with hardware.

Automatic Backlash Compensation

Whenever direction change is occurred, the PCI-8174 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, the PCI-8174 provides 13 home moving modes for users to choose as their best convenience.

Simultaneously Start/Stop

By using software program or external input signal, the PCI-8174 can perform simultaneously start/stop function on multi-axis in one card or multi-axis in multi-card. Also, the simultaneously stop function is selectable to be active when some axes are abnormally stopped.

Applications

- *Semiconductor front & back end equipment*
- *TFT/LCD manufacturing equipment*
- *Electronic Assembly and Testing equipment*
- *Automatic Optical Inspection Equipment*
- *Flight/Vehicle Simulator in military and video game*
- *Dispenser Machinery*
- *Cutting or Carving Machinery*

Specifications

Motion

- Number of controllable axes: 4
- Pulse output rate: 0.01pps to 6.5 Mpps
- Max. Acceleration rate 245 $Mpps^2$
- Speed resolution: 16-bit
- Encoder input rate: 6.55MHz under 4 x AB phase @ 1M cable
- Encoder counter resolution: 28-bit
- Positioning range:
  -134, 217, 728 ~ +134, 217, 727 pulses (28-bit)
- Counters x 4 for each axis
- Comparators x 5 for each axis

Motion Interface I/O Signals

- Position latch input pin: LTC
- Position compare output pin: CMP
- Position clear input pin: CLR
- Position change input pin: PCS
- Emergency Stop input pin : EMG
- All I/O pins are differential and 2500V_{RMS} 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, RDY, SVON
- Pulser signal input: PA and PB
- Simultaneous Start/Stop Signal I/O Pins: STA and STP

General-Purposed I/O

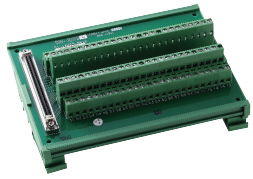
- 4 channel open collector DO
- 4 channel Isolated DI (LTC/CLR/PCS/SD/EMG)

Ordering Information

PCI-8174	Advanced DSP-based 4-axis stepper & servo motion control card
DIN-100S-01	Termination board for general purpose
DIN-814M0	Termination board for Mitsubishi MR-J2S-A servo amplifier
DIN-814M -J3A0	Termination board for Mitsubishi MR-J3-A amplifier
DIN-814PA0	Termination board for for Panasonic MINAS A servo amplifier
DIN-814Y0	Termination board for Yaskawa Sigma II amplifier
DIN-814P -A40	Termination board for Panasonic MINAS A4 amplifier

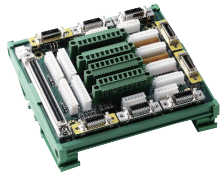
Termination Board

• *DIN-100S-01: General Purpose*



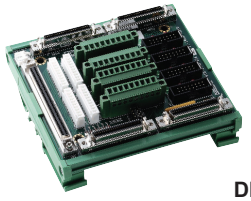
DIN-100S-01

• *DIN-814M0: For Mitsubishi MR-J2S-A Servo Amplifier*



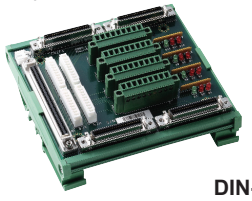
DIN-814M0

• *DIN-814M-J3A0: For Mitsubishi MR-J3-A Amplifier*



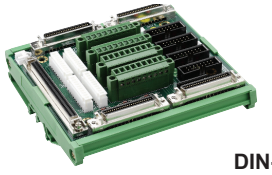
DIN-814M-J3A0

• *DIN-814PA0: For for Panasonic MINAS A Servo amplifier*



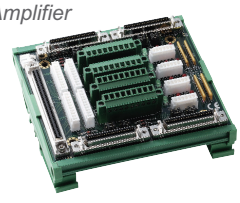
DIN-814PA0

• *DIN-814Y0: For Yaskawa Sigma II Amplifier*



DIN-814Y0

• *DIN-814P-A40: For Panasonic MINAS A4 Amplifier*



DIN-814P-A40

PCI-8174 Pin Assignment of the 100-pin SCSI-type Connector

VPP	1	51	VPP
EGND	2	52	EGND
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
EGND	12	62	EGND
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	EGND
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
EGND	30	80	EGND
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
GDI0	39	89	GDI2
DO0	40	90	DO3
ORG1	41	91	ORG3
GND	42	92	EGND
PEL2	43	93	PEL4
MEL2	44	94	MEL4
GDI1	45	95	GDI3
DO1	46	96	DO4
ORG2	47	97	ORG4
EGND	48	98	GND
EGND	49	99	E_24V
EGND	50	100	E_24V