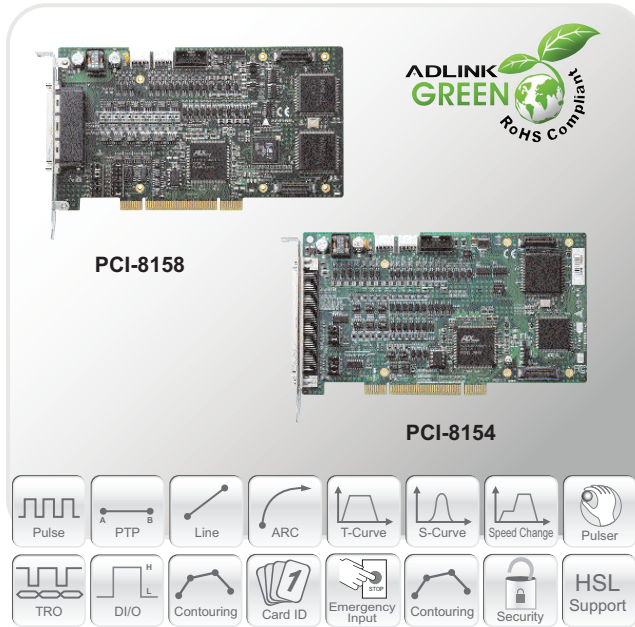


# PCI-8158/PCI-8154



Advanced 8/4 -axis Stepper & Servo Motion Control Card with Modular Design



## Introduction

### Advanced 8-axis Motion Controller

ADLINK PCI-8158 is an advanced 8-axis motion control card. Compared with the PCI-8132/PCI-8134 series, PCI-8158 offers better linear and circular interpolated move and continuous contouring performance-ideal for advanced pulse train motion control solutions and complicated motion and pick-and-place applications. With DB accessories, users can extend the functionality to high-speed triggering, distributed I/O control or ECAM control.

### Velocity or Position Override

The PCI-8158/PCI-8154 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-8158/PCI-8154 provides linear interpolation by any 2, any 3, or even all-4 axes. Any 2 axes can perform circular interpolation. Besides, linear/linear or circular/circular interpolated moves can be executed at the same time.

### Continuous Contouring

The pre-register architecture of PCI-8158/PCI-8154 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 (with DB-8150)

The PCI-8158/PCI-8154 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 SDRAM can store amount of comparing point (2 million points, up to 1MHz).

### One HSL Network Support (with DB-8151)

With DB-8151 accessories, users can extend the functionality to one HSL network and control I/O from remote site. Details please refer to Chapter 6.

### 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-8158/PCI-8154 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-8158/PCI-8154 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-8158/PCI-8154 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.

### Hardware Emergency Input

The PCI-8158/PCI-8154 provides hardware emergency control with the cable wiring. When the emergency button is pressed, it triggers this function and the motion controller will cease sending pulses. This function is ideal protection for system designers.

### Security Protection

The PCI-8158/PCI-8154 offers hardware security protection for system designers' software.

## Features

- 3 axes helical interpolation
- Hardware-controlled position compare and trigger (with DB-8150, up to 1MHz)
- ECAM (Electronic CAM) Control (with DB-8152)
- One HSL network support (with DB-8151)
- One Motionnet master support (with DB-8153)
- 32-bit PCI bus, Rev. 2.2, 33MHz
- High density (200-pin) 8-axis motion controller
- 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
- 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
- Hardware emergency input
- Security protection for user's program
- Easy interface to any stepping motors, AC or DC servo, linear or rotary motors
- All digital inputs and outputs are 2500V<sub>rms</sub> isolated
- Manual pulser input interface
- More than 100 thread safe API functions

## 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
- Packaging industry (with DB-8152)
- Timber industry (with DB-8152)
- Materials Handling technology (with DB-8152)
- Printing machine technology (with DB-8152)

## Specifications

### Motion

Number of controllable axes: 8
Pulse output rate: 0.01pps to 6.5Mpps
Max. acceleration rate 245Mpps <sup>2</sup>
Speed resolution: 16-bit
Encoder input rate: 6.55MHz under 4xAB 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
All I/O pins are differential and 2500V <sub>RMS</sub> 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
General DO pin: DO x 8 for DO/CMP
General DI pin: GDI x 8 for DI/LTC/PCS/SD/CLR/EMG
Pulser signal input: PA and PB
Simultaneous Start/Stop Signal I/O Pins: STA and STP

## Software Support

### Windows® Platform

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

### RTX ( Windows Real Time Extension)

RTX 5.x/ 6.x

### MotionCreatorPro™

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

### Linux Platform

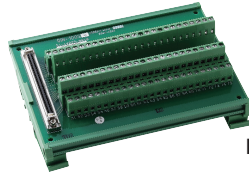
Redhat 9, kernel 2.4.x	SUSE 10, kernel 2.6.13
Fedora Core 3, kernel 2.6.9	Fedora Core 5, kernel 2.6.15
Fedora Core 4, kernel 2.6.11	

## Ordering Information

PCI-8158	Advanced 8-axis stepping & servo motion control card
PCI-8154	Advanced 4-axis stepping & 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 Panasonic MINAS A servo amplifier
DIN-814Y0	Termination board for Yaskawa Sigma II amplifier
DIN-814P-A40	Termination board for Panasonic MINAS A4 amplifier
Cable	ACL-102100

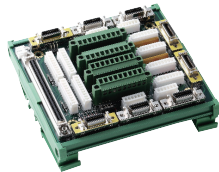
## Termination Board

- DIN-100S-01: General Purpose



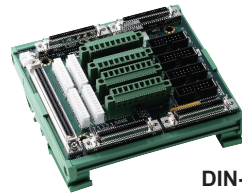
DIN-100S-01

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



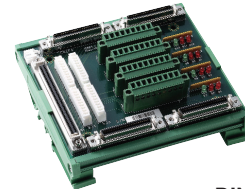
DIN-814M0

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



DIN-814M-J3A0

- DIN-814PA0: For Panasonic MINAS A Servo Amplifier



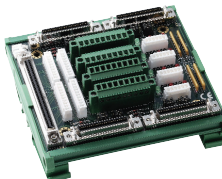
DIN-814PA0

- DIN-814Y0: For Yaskawa Sigma II Amplifier



DIN-814Y0

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



DIN-814P-A40

## PCI-8158/PCI-8154 Pin Assignment of 100-pin mini SCSI type Connector

VDD	1	51	VDD
EXGND	2	52	EXGND
OUT0+	3	53	OUT2+
OUT0-	4	54	OUT2-
DIR0+	5	55	DIR2+
DIR0-	6	56	DIR2-
SVON0	7	57	SVON2
ERC0	8	58	ERC2
ALM0	9	59	ALM2
INP0	10	60	INP2
RDY0	11	61	RDY2
EXGND	12	62	EXGND
EA0+	13	63	EA2+
EA0-	14	64	EA2-
EB0+	15	65	EB2+
EB0-	16	66	EB2-
EZ0+	17	67	EZ2+
EZ0-	18	68	EZ2-
VDD	19	69	VDD
EXGND	20	70	EXGND
OUT1+	21	71	OUT3+
OUT1-	22	72	OUT3-
DIR1+	23	73	DIR3+
DIR1-	24	74	DIR3-
SVON1	25	75	SVON3
ERC1	26	76	ERC3
ALM1	27	77	ALM3
INP1	28	78	INP3
RDY1	29	79	RDY3
EXGND	30	80	EXGND
EA1+	31	81	EA3+
EA1-	32	82	EA3-
EB1+	33	83	EB3+
EB1-	34	84	EB3-
EZ1+	35	85	EZ3+
EZ1-	36	86	EZ3-
PEL0	37	87	PEL2
MEL0	38	88	MEL2
GDI0	39	89	GDI2
DO0	40	90	DO2
ORG0	41	91	ORG2
EXGND	42	92	EXGND
PEL1	43	93	PEL3
MEL1	44	94	MEL3
GDI1	45	95	GDI3
DO1	46	96	DO3
ORG1	47	97	ORG3
EXGND	48	98	EXGND
EXGND	49	99	E_24V
EXGND	50	100	E_24V

1 Software

2 GEME Series

3 DPAC

4 Motion Control

5 Vision

6 HSL

7 Industrial Communication

8 CompactPCI system & Industrial Computers

9 NuDAM