Motion Control Products

ADLINK offers a variety of control interfaces and cost-effective, easy-to-use function library motion control solutions for industrial application platforms such as semiconductor/LCD/solar equipment, electrical assembly equipment, and packaging applications. Machine manufacturers will benefit from the precise positioning and advanced motion trajectory control technology provided by ADLINK.
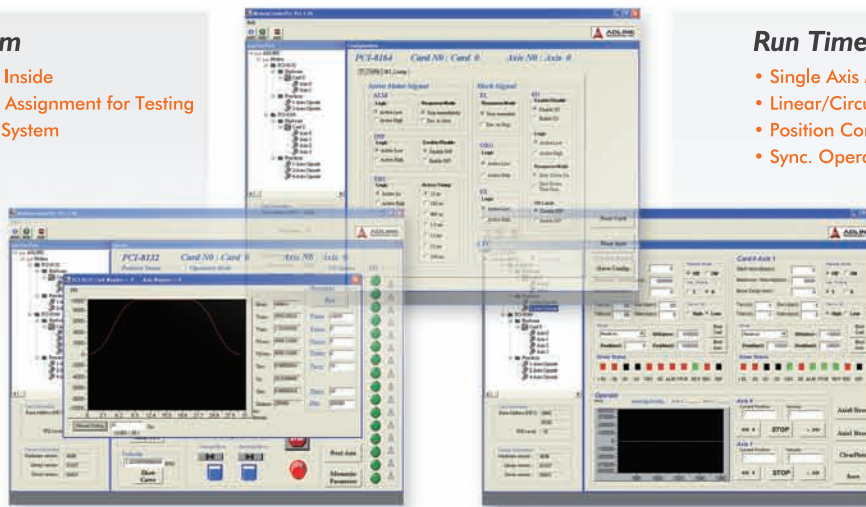
ADLINK's PC-based motion control solutions include pulse train motion controllers, DSP-based analog motion controllers, and the SSCNET (Servo System Control Network) series. ADLINK motion control solutions deliver accurate and high-performance motion trajectories for target objects. Position comparing and trigger output functions match the performance of high-end frame grabbers in carrying out on-the-fly image inspection with line scanning. SSCNET solutions can provide up to 18-bit high-resolution, high-speed movement and simultaneous absolute synchronization via a serial connection. ADLINK also provides distributed motion and I/O control solutions to further reduce wiring costs. The latest MotionCreatorPro and MotionCreatorPro 2 utilities from ADLINK are graphical user interfaces to provide an intuitive way to discover ADLINK motion control solutions. Windows Vista 32-bit drivers, multi-core CPU drivers, and RTX are also supported.

Develop System
- MotionCreatorPro Inside
- Motion Parameter Assignment for Testing
- Debugging of the System

Run Time Software Support
- Single Axis Motion
- Linear/Circular Interpolated Motion
- Position Compare & Trigger Output
- Sync. Operation, etc.

Hardware Platform
- Pulse Train Motion
- DSP-based Analog Motion
- Distributed Motion
- Multi-channel Encoder Boards
- CompactPCI Solution
- PXI Solution

ADLINK Motion Control Solutions:

Pulse Train Motion
Pulse train motion cards generate high-frequency digital signals to control servo motors and steppers, matching the performance and precise position of high-performance servo amplifiers.

DSP-based Analog Motion
Analog motion cards generate voltage commands to control servo motors or brushless DC motors to achieve higher performance, higher precision positioning, and higher response times.

Distributed Motion (SSCNET)
SSCNET (Servo System NETwork) is a serial connection protocol proposed by Mitsubishi. The SSCNET protocol has real-time response and absolute synchronization. With this technology, a single board can connect to up to 16 axes. The cycle time is 0.444 ms for 8 axes and 0.888 ms for 16 axes

Key Features

DSP
DSP, or Digital Signal Processing, allows for time-critical motion control, multiple axes synchronization, and standalone control in a variety of applications.

Closed-Loop Control
Motion control cards can accept feedback signals to perform closed-loop control. The control loop gain can be tuned for optimal positioning and velocity control.

PID Plus Feedforward Gain Control
All servo applications require specified safe and stable PID loop parameters in order to perform position control, ADLINK Softmotion provides a proportional-integral-derivative (PID) algorithm with adjustable velocity and feed-forward gain to simplify servo application development.

Speed Override
Change the rotation speed on-the-fly while the axis is running.

Position Override
After movement begins, the position target can be changed on-the-fly even if the motion speed goes into maximum velocity.

Card ID
Card identification to support multiple cards in one system.

Manual Pulser Input Interface
Some motion control solutions provide an interface that connects manual pulser input devices, which can be used to move the axes.

Digital I/O Capacity
Digital input and output channels are provided.

Analog Output / Analog Input Channels
Some products offer analog output/input channels for voltage signals.

Linear and Circular Interpolation
For interpolative operations, ADLINK provides linear interpolation by any 2, any 3, or even all 4 axes. Any 2 axes can perform circular interpolation. Linear or circular interpolated movements can be executed at the same time with advanced pulse train motion controllers.

Helical Interpolation
If the start point and destination of circular interpolation move does not lie in the same plane, ADLINK provides helical interpolation between any 3 of the 4 axes. Helical interpolated movements can be executed at same time on the PCI-8154/PCI-8158.

Home Return Modes
ADLINK's advanced pulse train motion controllers can provide up to 13 home modes for high-precision home position to meet the needs of various mechanical designs and operating restrictions.

T-Curve / S-Curve Velocity Profile
The acceleration and deceleration times are programmable. Acceleration and deceleration rates can be set individually and S-curve movement can compensate for mechanical vibration during movement.

Absolutely Synchronization
ADLINK motion controllers can perform simultaneously start/stop functions on multiple axes in one card or multiple axes across multiple cards by using software or external input signals. This is especially beneficial for complicated motion patterns requiring absolute synchronization of multiple axes. The simultaneous stop function is selectable to be active when certain axes are stopped abnormally.

Hardware Emergency Input
This function is a safety protection feature for system designers to provide emergency shut-down in case of malfunction.

Security
Hardware security prevents duplication of the software developed by the system designer.

HSL Network Support
HSL is a High Speed Link bus designed specifically for distributed real-time I/O control and motion systems. Functionality can be extended to one HSL network and control I/O in remote site.

Mechanism Interface
Pre-defined limit switch sensors are often used on a table are to protect the mechanism. ADLINK's motion control cards provide dedicated I/O which can be used end-limit and origin sensors which are very useful for the system integration of such applications.

Servo Drive Interface and GPIO
Most servo motor drivers provide interfacing signals such as in-position (INP), alarm (ALM), error counter clear (ERC), servo ready signals. These signal interfaces are supported. General-purpose digital input/output for each axis is also provided.

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

Automatic Backlash Compensation
Whenever direction change occurs, this function is to output backlash corrective pulses before sending commands. This function only supports single-axis movement.

Continuous Contouring
ADLINK motion controllers can provide hardware-based contouring control in order to provide a variety of trajectories controls for smooth motion. The pre-register architecture of the controllers offers the feature to build continuous interpolation functions so that the second motion may follow previous motion instantly without latency. Thus perfect velocity continuity can be established.

Hardware Position Compare and Trigger Output (TRO)
By sending several position compare points to the buffer, the triggering pulse will be triggered upon reaching each compare position at a high-speed rate (up 1 MHz for ADLINK products) without any loss. Comparison is performed via hardware. The on-board SDRAM can store large amounts of compare points. The high-frequency trigger pulse can also signal line scan frame grabbers.

1 DAQ
2 PXI
3 Modular Instruments
4 GPIB & Bus Expansion
5 PAC
6 Motion
7 Distributed I/O
8 Serial Comm
9 Vision
10 Software & Utilities
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12 Accessories

Selection Guide

Pulse Train Motion

Form Factor		PCI			
Model Name		PCI-8158	PCI-8154	PCI-8164	PCI-8102
Number of Axes		8	4	4	2
Support Motor		stepper / servo	stepper / servo	stepper / servo	stepper / servo
Encoder Input Frequency (Max)		6.55 MHz @ 1 M, under 4 x AB phase	6.55 MHz @ 1 M, under 4 x AB phase	6.55 MHz @ 1 M, under 4 x AB phase	6.55 MHz @ 1 M, under 4 x AB phase
Pulse Output Rate (Max)		6.55 Mpps	6.55 Mpps	6.55 Mpps	6.55 Mpps
Motion Features	Linear Interpolation	Any 2 to 4 of 4 axes	Any 2 to 4 of 4 axes	Any 2 to 4 of 4 axes	2 axes
	Circular Interpolation	Any 2 axes	Any 2 axes	Any 2 axes	2 axes
	Helical Interpolation	√	√	-	-
	Home Return Mode	13 (including auto homing)	13 (including auto homing)	13 (including auto homing)	13 (including auto homing)
	Continuous Contouring	by 3 command buffer	by 3 command buffer	by 3 command buffer	by 3 command buffer
Motion Profile		T/S curve (non-symmetric acceleration/deceleration settings are supported)			
Dedicated Moiton I/O		±EL/ORG/SVON/INP/ALM/RDY for each axis			
DI/O Channels		8DI / 8DO	4DI / 4DO	6 TTL DO	16DI / 16DO
Card Index Switch		√ (0 to 15)	√ (0 to 15)	-	√ (0 to 15)
Hardware Emergency Input		√	√	-	√
Advanced Motion Function	Position Compare & Triggering	√ (with DB-8150, up to 1 MHz)	√ (with DB-8150, up to 1 MHz)	√ (up to 15 kHz)	√ (up to 1 kHz by interrupt function)
	Backlash Compensation	√	√	√	√
	Simultanous Move	√	√	√	√
	Ring Counter Support	√	√	√	√
Page No.		6-5	6-5	6-9	6-10

Form Factor		PCI			PXI	cPCI
Model Name		PCI-8144	PCI-8132	PCI-8134	PXI-8164	cPCI-8168
Number of Axes		4	2	4	4	8
Support Motor		stepper / servo	stepper / servo	stepper / servo	stepper / servo	stepper / servo
Encoder Input Frequency (Max)		-	2.4 MHz @ 3 M	2.4 MHz @ 3 M	6.55 MHz @ 1 M	6.55 MHz @ 1 M
Pulse Output Rate (Max)		6.55 Mpps	2.4 Mpps	2.4 Mpps	6.55 Mpps	6.55 Mpps
Motion Features	Linear Interpolation	-	2 axes	2 axes	Any 2 to 4 of 4 axes	Any 2 to 4 of 4 axes
	Circular Interpolation	-	-	-	Any 2 axes	Any 2 axes
	Helical Interpolation	-	-	-	-	-
	Home Return Mode	1	3	8 auto homing by software	13 (including auto homing)	13 (including auto homing)
	Continuous Contouring	-	-	-	√	by 3 command buffer
Motion Profile		T/S curve (Non-symmetric acceleration/deceleration settings are supported)			T/S curve (Non-symmetric acceleration/deceleration settings are supported)	
Dedicated Moiton I/O		±EL/ORG/SVON/INP/ALM/RDY for each axis	±EL/ORG/SVON/INP/ALM/RDY/SD for each axis		±EL/ORG/SVON/INP/ALM/RDY for each axis	
DI/O Channels		8DI / 8DO	16DI / 16DO	-	4DI / 4DO	8DI / 8DO
Card Index Switch		-	-	-	-	-
Hardware Emergency Input		√	-	-	-	-
Advanced Motion Function	Position Compare & Triggering	-	√ (up to 1 kHz by interrupt function)	-	-	√
	Backlash Compensation	-	-	-	√	√
	Simultanous Move	-	√	√	√	-
	Ring Counter Support	-	-	-	√	√
Page No.		6-13	6-11	6-12	6-9	6-14

DSP-based Analog Motion

Form Factor		PCI	
Model Name		PCI-8253	PCI-8256
Number of Axes		3	6
Support Motor		servo / brushless DC	servo / brushless DC
Encoder Input Frequency (Max)		20 MHz, under 4 x AB phase	20 MHz, under 4 x AB phase
Servo Update Rate		150 µs / 3 axes	300 µs / 6 axes
Motion Features	Linear Interpolation	Any 2 to 3 of 3 axes	Any 2 to 4 of 6 axes
	Circular Interpolation	Any 2 axes	Any 2 axes
	Home Return	√	√
	Gearing	√	√
	Continuous Contouring	√	√
Motion Profile		T/S curve (Non-symmetric acceleration/deceleration settings are supported)	
Dedicated Moiton I/O		±EL/ORG/SVON/INP/ALM/RDY for each axis	
AI Channels		3 (14-bit garuantee)	6 (14-bit garuantee)
DI/O Channels		4DI / 4DO	8DI / 8DO
Card Index Switch		√ (4-bit)	√ (4-bit)
Hardware Emergency Input		√	√
Advanced Motion Function	Position Compare & Triggering	up to 1 MHz	up to 1 MHz
	Simultanous Move	√	√
	Ring Counter Support	√	√
	Gantry Function	√	√
	Software Limit	√	√
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SSCNET Distributed Motion

SSCNET (Servo System Control NETwork)	SSCNET III (Cycle Time: 0.888 ms for 16 axes; 0.444 ms for 8 axes)		SSCNET II (Cycle Time: 0.888 ms)		
Model Name	PCI-8392	PCI-8392H	PCI-8366+	PCI-8372+	cPCI-8312H
Number of Axes	16	16	6	12	12
Linear Interpolation	Any 2 to 4 axes	Any 2 to 4 axes	Any 2 to 3 axes	Any 2 to 3 axes	Any 2 to 3 axes
Circular Interpolation	Any 2 axes	-	Any 2 axes	Any 2 axes	Any 2 axes
Pulse Output Channel	-	-	-	-	2
Analog Input Channel	-	-	-	-	2
Analog Output Channel	-	-	2	2	2
DI/O Channels	-	via HSL bus, up to 2016 points	2DI / 2DO	2DI / 2DO	2DO
Programmable I/O	-	-	√	√	√
External Encoder Counter	-	-	3 (32-bit)	3 (32-bit)	2 (32-bit)
Speed Profile	T/S curve	T/S curve	T/S curve	T/S curve	T/S curve
Position Compare	-	-	2CH/axis	2CH/axis	2CH/axis
Trigger Output Channels	-	-	2 (via DO channel, up to 1 kHz)		
Continuous Triggering	-	-	√	√	√
Continuous Contouring	-	-	√	√	√
Continuous Interpolation	-	-	√	√	√
Dedicated Moiton I/O	PEL/MEL/ORG are on Mitsubishi J3B servos (CN3). All signal information will be monitored by SSCNET III protocol		PEL/MEL/ORG for each axis		
HSL Inside	-	√ (MKY36)	-	-	√ (MKY33)
HSL Network Port	-	1	-	-	2
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PCI-8158 / PCI-8154

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

PCI-8158

PCI-8154

Speed Override	Position Override	Line	ARC	Helical Interpolation	T-Curve	S-Curve	Pulser	Position Latch
TRO	DI/O	Contouring	Card ID	Emergency Input	Security	HSL Support		Backlash Compensation
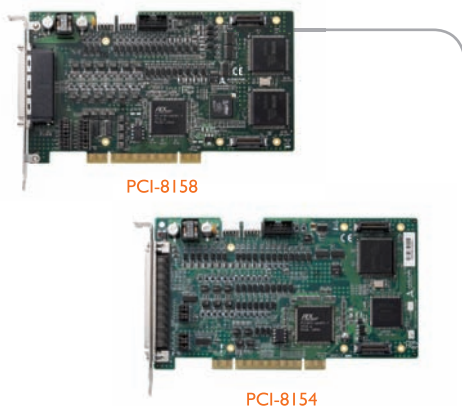
Features

- 3 axes helical interpolation
- Hardware-controlled position compare and trigger (with DB-8150, up to 1 MHz)
- One HSL network support (with DB-8151)
- ECAM (Electronic CAM) control (with DB-8152)
- One Motionnet master support (with DB-8153)
- 32-bit PCI bus, Rev. 2.2, 33 MHz
- High density (200-pin) 8-axis motion controller
- Pulse output rate: up to 6.55 MHz
- Pulse output options: OUT/DIR, CW/CCW, AB Phase
- 2 to 4 axes linear interpolation
- 2 axes circular interpolation
- Helical interpolation
- Multi-axis continuous interpolation
- Position/Speed change override
- 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
- Hardware backlash compensator
- Manual pulser input interface
- Softwares limit function
- Hardware emergency input
- More than 100 thread safe API functions
- 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 2500 VRMS isolated
- Supports up to 12 cards in one system

Applications

- Semiconductor front & back end equipment
- LED probe sort equipment
- TFT/LCD manufacturing equipment
- Solar cell manufacturing equipment
- Electronic assembly and testing equipment
- Automatic optical inspection equipment
- Flight/Vehicle simulation in military applications and video games
- Dispenser machinery
- Cutting or carving machinery
- Printing machine technology
- Packaging industry (with DB-8152)

Specifications

Pulse Type Motion Control	
Max. Number of Axes	8
Pulse Output Rate	0.01 pps to 6.5 Mpps
Max. Acceleration Rate	245 Mpps^2
Speed Resolution	16-bit
Encoder Input Rate	6.55 MHz under 4 x AB phase @ 1 M cable
Encoder Counter Resolution	28-bit
Positioning Range	-134,217,728 to +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
I/O Pin	Differential and 2500 VRMS optically isolated
Incremental Encoder Signals Input Pin	EA and EB
Encoder Index Signal Input	EZ
Mechanical Signal Input Pin	±EL, SD, and ORG
Servomotor Interface I/O Pin	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 Pin	STA and STP

Software Support

■ Windows® Platform
- Available for Windows Vista (32-bit)/XP/2000
- Recommended programming environments: VB/VC++/BCB/Delphi/VB.NET
- Various sample programs with source codes
- Customized API functions are possible

■ RTX (Windows Real Time Extension)
- RTX 5.x/6.x

■ Linux Platform
- Redhat 9, kernel 2.4.x
- Fedora Core 3, kernel 2.6.9
- Fedora Core 4, kernel 2.6.11
- Fedora Core 5, kernel 2.6.15

■ MotionCreatorPro™
MotionCreatorPro™ assists motion system developers in debugging any cabling problems and resolving complex system configuration before programming.

Ordering Information

- **PCI-8158**
  Advanced 8-axis stepping & servo motion control card
- **PCI-8154**
  Advanced 4-axis stepping & servo motion control card
- **DB-8150**
  High-speed triggering daughter board
- **DB-8151**
  Single HSL master controller daughter board
- **DB-8152**
  Electronic CAM slave motion solution daughter board
- **DB-8153**
  Single Motionnet master controller daughter board

Accessories

Terminal Boards

- **DIN-100S-01**
  Terminal board with one 100-pin SCSI-II connector and DIN-rail mounting
- **DIN-814M0**
  Terminal board for Mitsubishi MR-J2S-A servo amplifier
- **DIN-814M -J3A0**
  Terminal board for Mitsubishi MR-J3S-A amplifier
- **DIN-814Y0**
  Terminal board for Yaskawa Sigma II/III/V amplifier
- **DIN-814P-A40**
  Terminal board for Panasonic MINAS A4 amplifier
- **DIN-814PA0**
  Terminal board for Panasonic MINAS A servo amplifier

Cabling

- **ACL-102100**
  See Section 12, Accessories

Pin Assignment

PCI-8158/PCI-8154 100-pin Mini SCSI Connector Pin Assignment

Signal	Pin	Pin	Signal
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+
EB1-	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

A variety of extension boards to meet your needs...

(See page 6-7 for the details)
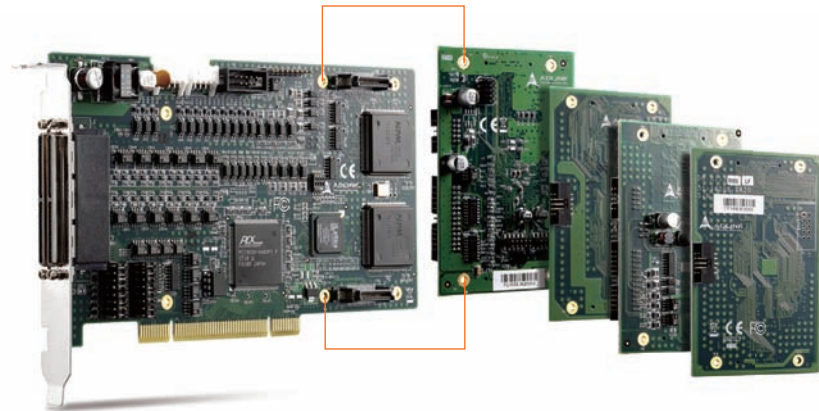
PCI-8158/PCI-8154

DB Series/Extension Modules

The PCI-8158/PCI-8154 supports these modules:

DB-8150
High-speed trigger

DB-8151
HSL bus distributed motion & I/O

DB-8152
ECAM slave motion control

DB-8153
Motionnet bus distributed motion

DB-8150

High-speed Triggering Daughter Board
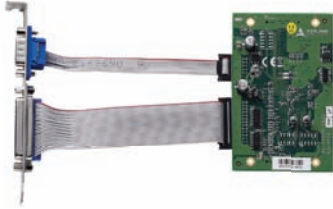
Features

- High performance FPGA inside
- On-board SDRAM for comparing point table (2 M points for one channel)
- Simultaneous 8 channel TTL compatible differential output
- One general-purpose digital output channel, current sink capacity up to 20 mA
- Two general-purpose digital input channels, 10 kHz response time
- Two high speed digital input channels
- Three 32-bit comparators for position comparing
- Trigger output pulse polarity and pulse width adjustable
- Two 32-bit position counters by two EA/EB encoder signals input from carrier board
- Two EA/EB encoder signals input from daughter board
- Counter clear signal via EZ input from carrier board
- Supports trigger output toggle modes
- Equal and window condition comparison available
- Linear function and point table mode for continuous trigger output
- Counter latched by digital input pins

Specifications

High-speed Trigger

■ FPGA on-board to process the trigger function without consuming CPU resources	
■ Max. Trigger Pulse Frequency	Up to 1 MHz
■ FIFO Capacity	2 M * 32-bit
■ Max. Encoder Input Frequency	6.5 MHz under 4xAB mode, 1.5 meter cable
■ Dimension	96.42 (L) x 62 (W) mm
■ Operating Temperature	0°C to +60°C
■ Storage Temperature	-20°C to +80°C
■ Power Consumption	+3.3 V @ 250 mA typical, +5 V @ 100 mA typical

Connections					
PIN No.	Name	Function (Axis)	PIN No.	Name	Function (Axis)
1	CMP0+	Compare output+	14	CMP0-	Compare output-
2	CMP1+	Compare output+	15	CMP1-	Compare output-
3	CMP2+	Compare output+	16	CMP2-	Compare output-
4	CMP3+	Compare output+	17	CMP3-	Compare output-
5	CMP4+	Compare output+	18	CMP4-	Compare output-
6	CMP5+	Compare output+	19	CMP5-	Compare output-
7	CMP6+	Compare output+	20	CMP6-	Compare output-
8	CMP7+	Compare output+	21	CMP7-	Compare output-
9	EGND	Ext. Ground	22	EGND	Ext. Ground
10	DO	Open collector output	23	DO_COM	Output COM
11	EXGND	Ext. Ground	24	EXGND	Ext. Ground
12	DI_0	Digital Input Ch_0	25	DI_1	Digital Input Ch_1
13	N/A	Empty	26	N/A	Empty

Ordering Information

■ **DB-8150**
High-speed triggering daughter board for PCI-8158/PCI-8154

DB-8151

Single HSL Master Controller Daughter Board
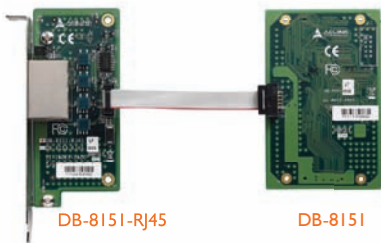
DB-8151-RJ45   DB-8151

Features

- Programmable timer interrupt
- RJ-45 jack for easy installation (with DB-8151-RJ45)
- Provides both 4 to 8-axis control and distributed I/O and does not occupy a PCI slot when attached to a PCI-815x
- Software selectable transmission speed and mode
- Supports HSL-HUB3/HSL-Repeater
- DI data transmission interrupt

Specifications

HSL Master Controller

■ Full duplex, RS-485 with transformer isolation	
■ Transmission Speed	3/6/12 Mbps
■ Dimension	96.42 (L) x 62 (W) mm
■ Operating Temperature	0°C to +60°C
■ Storage Temperature	-20°C to +80°C
■ Power Consumption	+3.3 V @ 250 mA, +5 V @ 100 mA typical

Connections	
PIN NO.	PIN OUT
PIN 1	+5V
PIN 2	FG
PIN 3	DG
PIN 4	LED Signal
PIN 5	RXD1
PIN 6	TXD
PIN 7	RXD2
PIN 8	TXE
PIN 9	DG
PIN 10	FG

CN3: Main DB-8151 connector

Connections	
PIN NO.	PIN OUT
PIN 1	NC
PIN 2	NC
PIN 3	RX+
PIN 4	TX-
PIN 5	TX+
PIN 6	RX-
PIN 7	NC
PIN 8	NC

RJ1: DB-8151-RJ45 RJ-45 connector

Ordering Information

■ **DB-8151**
Single HSL master controller daughter board for PCI-8158/PCI-8154

■ **DB-8151-RJ45**
Bracket with RJ-45 jack for DB-8151

DB-8152

Electronic CAM Slave Motion Solution Daughter Board

Features

- Up to 1 MHz from encoder signals of the master axis
- Supports OUT/DIR and CW/CCW pulse output mode
- Supports 4 x AB phase and CW/CCW pulse input mode
- Programmable interrupt
- CAM table setting by API function
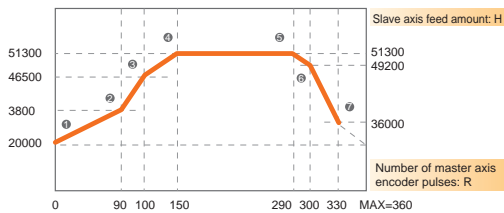
Specifications

ECAM Controller

- D-Sub 9 and 25 bracket required when using the DB-8152
- D-Sub 25 for master encoder and slave encoder, pulse out and DIO with isolation
- D-Sub 9 for CMP output with 2 high speed and 6 general speed
- Dimension   96.42 (L) x 62 (W) mm
- Operating Temperature   0˚C to +60˚C
- Storage Temperature   -20˚C to +80˚C
- Power Consumption   +3.3 V @ 200 mA typical, +5 V @ 100 mA typical

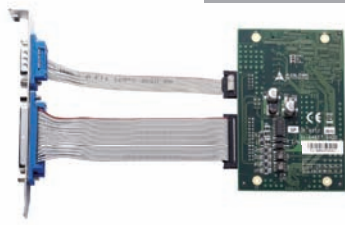CN3 on DB-8152 Bracket

CN4 on DB-8152 Bracket

Ordering Information

■ **DB-8152**
Electronic CAM slave motion solution daughter board for PCI-8158/PCI-8154

DB-8153

Single Motionnet Master Controller Daughter Board

DB-8153-RJ45   DB-8153

Features

- RJ-45 jack for easy installation (with DB-8153-RJ45)
- Provides both distributed and on-board motion control does not occupy a PCI slot when attached to a PCI-815x
- Software selectable transmission speed
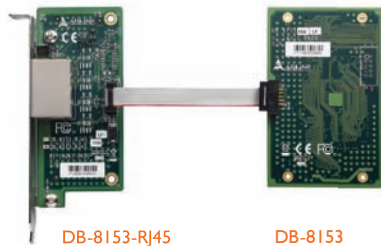
Specifications

Motionnet Master Controller

- Half duplex, RS-485 with transformer isolation
- Transmission Speed   2.5/5/10/20 Mbps (Default: 20 Mbps)
- Dimension   96.42 (L) x 62 (W) mm
- Operating Temperature   0˚C to +60˚C
- Storage Temperature   -20˚C to +80˚C
- Power Consumption   +3.3 V @ 250 mA typical, +5 V @ 100 mA typical

Connections		Connections	
CN3: Main DB-8153 connector		RJ1: DB-8151-RJ45 RJ-45 connector	
PIN NO.	PIN OUT	PIN NO.	PIN OUT
PIN 1	+5 V	PIN 1	NC
PIN 2	FG	PIN 2	NC
PIN 3	DG	PIN 3	NC
PIN 4	LED Signal	PIN 4	Data-
PIN 5	RXD1	PIN 5	Data+
PIN 6	TXD	PIN 6	NC
PIN 7	RXD2	PIN 7	NC
PIN 8	TXE	PIN 8	NC
PIN 9	DG		
PIN 10	FG		

Ordering Information

■ **DB-8153**
Single Motionnet master controller daughter board for PCI-8158/PCI-8154

■ **DB-8153-RJ45**
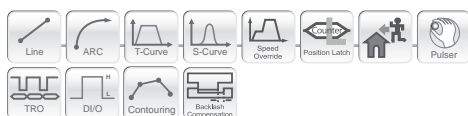Bracket with RJ-45 jack for DB-8153

1 DAQ

2 PXI

3 Modular Instruments

4 GPIB & Bus Expansion

5 PAC

6 Motion

7 Distributed I/O

8 Serial Comm

9 Vision

10 Software & Utilities

11 cPCI & Industrial Systems

12 Accessories

PCI-8164 / PXI-8164

Advanced 4-axis Stepper & Servo Motion Control Cards with High-Speed Triggering

PCI-8164

PXI-8164

| Line | ARC | T-Curve | S-Curve | Speed Override | Position Latch | | Pulser |

| TRO | DI/O | Contouring | Backlash Compensation |

Specifications

Pulse Type Motion Control

■	Number of Axes	4
■	Pulse Output Rate	0.01 pps to 6.5 Mpps
■	Max. Acceleration Rate	245 Mpps^2
■	Speed Resolution	16-bit
■	Encoder Input Rate	6.55 MHz under 4 x AB phase @ 1 M cable
■	Encoder Counter Resolution	28-bit
■	Positioning Range	-134,217,728 to +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 (15 kHz for continuous triggering)
■	I/O Pin	Differential and 2500 V$_{RMS}$ optically isolated
■	Incremental Encoder Signals Input Pin	EA and EB
■	Encoder Index Signal Input	EZ
■	Mechanical Limit Switch Signal Input Pin	±EL, SD, and ORG
■	Servomotor Interface I/O Pin	INP, ALM, ERC, RDY, SVON
■	General DO Pin	SVON
■	General DI Pin	RDY
■	Pulser Signal Input	PA and PB
■	Simultaneous Start/Stop Signal I/O Pin	STA and STP

Features

- ■ **32-bit PCI/PXI bus, Rev. 2.2, 33 MHz**
- ■ **Pulse output rates up to 6.55 MHz**
- ■ **Pulse output options: OUT/DIR, CW/CCW, AB Phase**
- ■ **2 to 4 axes linear interpolation**
- ■ **2 axes circular interpolation**
- ■ **Multi-axis continuous interpolation**
- ■ **Position/Speed change override**
- ■ **13 home return modes and auto home search**
- ■ **Hardware position compare and trigger with auto-loading FIFO as a buffer**
- ■ **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 2500 V$_{RMS}$ isolated**
- ■ **Manual pulser input interface**
- ■ **More than 250 thread safe API functions**

Applications

- ■ **Semiconductor front & back end equipment**
- ■ **TFT/LCD manufacturing equipment**
- ■ **Solar cell manufacturing equipment**
- ■ **Electronic assembly and testing equipment**
- ■ **Automatic optical inspection equipment**
- ■ **Flight/Vehicle simulation in military applications and video games**
- ■ **Dispenser machinery**
- ■ **Cutting or carving machinery**

Software Support

■ Windows® Platform

- • Available for Windows Vista (64-bit) (PCI-8164 only)
- • Available for Windows Vista (32-bit)/XP/2000
- • Recommended programming environments: VB/VC++/BCB/Delphi
- • Various sample programs with source codes
- • Customized API functions are possible

■ RTX (Windows Real Time Extension)

- • RTX 5.x/6.x

■ Linux Platform

- • Redhat 9, kernel 2.4.x
- • Fedora Core 3, kernel 2.6.9
- • Fedora Core 4, kernel 2.6.11
- • Fedora Core 5, kernel 2.6.15
- • FC 6, kernel 2.6.18

■ MotionCreatorPro™

MotionCreatorPro™ assists motion system developers in debugging any cabling problems and resolving complex system configuration before programming.

Ordering Information

- ■ **PCI-8164**
  Advanced PCI 4-axis stepping & servo motion control card with high-speed triggering

- ■ **PXI-8164**
  Advanced PXI 4-axis stepping & servo motion control card with high-speed triggering

Accessories

Terminal Boards

- ■ DIN-100S-01
  Terminal board with one 100-pin SCSI-II connector and DIN-rail mounting

- ■ DIN-814M0
  Terminal board for Mitsubishi MR-J2S-A servo amplifier

- ■ DIN-814M -J3A0
  Terminal board for Mitsubishi MR-J3S-A amplifier

- ■ DIN-814Y0
  Terminal board for Yaskawa Sigma II/III/V amplifiers

- ■ DIN-814P-A40
  Terminal board for Panasonic MINAS A4 amplifier

- ■ DIN-814PA0
  Terminal board for Panasonic MINAS A servo amplifier

Cabling

- ■ ACL-102100
  See Section 12, Accessories

Pulse Train Motion

1 DAQ
2 PXI
3 Modular Instruments
4 GPIB & Bus Expansion
5 PAC
6 Motion
7 Distributed I/O
8 Serial Comm
9 Vision
10 Software & Utilities
11 cPCI & Industrial Systems
12 Accessories

PCI-8102

Advanced 2-axis Stepper & Servo Motion Control Card

ADLINK GREEN RoHS Compliant

Specifications

Pulse Type Motion Control

■ Number of Axes	2
■ Pulse Output Rate	0.01 pps to 6.5 Mpps
■ Max. Acceleration Rate	245 Mpps^2
■ Speed Resolution	16-bit
■ Encoder Input Rate	6.55 MHz under 4 x AB phase @ 1 M cable
■ Encoder Counter Resolution	28-bit
■ Positioning Range	-134,217,728 to +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
■ I/O Pin	Differential and 2500 Vrms optically isolated
■ Incremental Encoder Signals Input Pin	EA and EB
■ Encoder Index Signal Input	EZ
■ Mechanical Limit Switch Signal Input Pin	±EL, SD, and ORG
■ Servomotor Interface I/O Pin	INP, ALM, ERC, RDY, SVON
■ General DO Pin	x 16 (P2 connector)
■ General DI Pin	x 16 (P2 connector)
■ Pulser Signal Input	PA and PB
■ Simultaneous Start/Stop Signal I/O Pin	STA and STP

Line / ARC / T-Curve / S-Curve / Pulser / Speed Override / Position Override / Position Latch

TRO / DI/O / Contouring / Backlash Compensation / Emergency Input / Security / Card ID

Features

- ■ 32-bit PCI bus, Rev. 2.2, 33 MHz
- ■ Pulse output rates up to 6.55 MHz
- ■ Pulse output options: OUT/DIR, CW/CCW
- ■ 2 axes linear/circular interpolation
- ■ Continuous interpolation
- ■ Position/Speed change override
- ■ 13 home return modes and auto home search
- ■ Hardware position compare
- ■ High-speed position latch function
- ■ Programmable acceleration and deceleration time
- ■ Trapezoidal and S-curve velocity profiles
- ■ Multi-axis, simultaneous start/stop
- ■ Programmable interrupt sources
- ■ Supports up to 12 cards in one system
- ■ Hardware backlash compensator
- ■ Softwares limit function
- ■ On-board GPIO: 16IN/16OUT (P2 connector)
- ■ Card index switch setting
- ■ Hardware emergency input
- ■ Security protection for user's program
- ■ Easy interface to any stepping motors, AC or DC servo, linear or rotary motors which have pulse train input mode
- ■ All digital inputs and outputs are 2500 Vrms isolated
- ■ Manual pulser input interface
- ■ More than 100 thread safe API functions

Applications

- ■ Semiconductor front & back end equipment
- ■ TFT/LCD manufacturing equipment
- ■ Solar cell manufacturing equipment
- ■ Electronic assembly and testing equipment
- ■ Automatic optical inspection equipment
- ■ Flight/Vehicle simulation in military applications and video games
- ■ Dispenser machinery
- ■ Cutting or carving machinery

Software Support

■ Windows® Platform
- • Available for Windows Vista (32-bit)/XP/2000
- • Recommended programming environments: VB/VC++/BCB/Delphi
- • Various sample programs with source codes
- • Customized API functions are possible

■ Linux Platform
- • Redhat 9, kernel 2.4.x
- • Fedora Core 5, kernel 2.6.15
- • Fedora Core 3, kernel 2.6.9
- • Fedora Core 4, kernel 2.6.11

■ MotionCreatorPro™

MotionCreatorPro™ assists motion system developers in debugging any cabling problems and resolving complex system configuration before programming.

Ordering Information

- ■ **PCI-8102**
  Advanced 2-axis stepping & servo motion control card

Accessories

Terminal Boards

- ■ **DIN-68S-01**
  Terminal board with 68-pin SCSI-II connector with DIN socket

- ■ **DIN-68M-J3A0**
  Terminal board for Mitsubishi MR-J3S-A servo amplifier with 68-pin SCSI-II connector

- ■ **DIN-68M-J2A0**
  Terminal board for Mitsubishi MR-J2S-A servo amplifier with 68-pin SCSI-II connector

- ■ **DIN-68Y-SGII0**
  Terminal board for Yaskawa Sigma II/III/V servo amplifiers with 68-pin SCSI-II connector

- ■ **DIN-68P-A40**
  Terminal board for Panasonic MINAS A4 servo amplifier with 68-pin SCSI-II connector

Cabling

- ■ **ACL-10568-1**
  See Section 12, Accessories

- ■ **ACL-10569-1**
  See Section 12, Accessories

PCI-8132

Entry-level 2-axis Stepper & Servo Motion Control Card with 32-CH GPIO

ADLINK
GREEN
RoHS Compliant

Line | T-Curve | S-Curve | Pulser | TRO | Servo Interface | Speed Override

DI/O | Mechanism Interface

Features

- **32-bit PCI bus, Rev2.2, 33 MHz**
- **Pulse output rate up to 2.4 MHz**
- **Pulse output options: OUT/DIR, CW/CCW**
- **Encoder input frequency up to 2.4 MHz under 4 x AB mode**
- **2 axes linear interpolation**
- **Programmable acceleration and deceleration time**
- **Trapezoidal and S-curve velocity profiles**
- **Easy interface to any stepping motors, AC or DC servo, linear or rotary motors which have pulse train input mode**
- **28-bit up/down counter for incremental encoder**
- **All digital inputs and outputs are 2500 VRMS isolated**
- **Change speed override**
- **Multi-axis, simultaneous start/stop**
- **Dedicated I/O interface for PEL, MEL, ORG, EZ, INP, ERC, ALM**
- **Programmable interrupt sources**
- **Manual pulser input interface**
- **Supports up to 12 cards in one system**
- **Hardware position compare and trigger pulse output**
- **16-CH general purpose input/16-CH general purpose output**
- **3 home return modes**
- **More than 100 thread safe API functions**

Applications

- **Semiconductor front & back end equipment**
- **TFT/LCD manufacturing equipment**
- **Solar cell manufacturing equipment**
- **Electronic assembly and testing equipment**
- **Automatic optical inspection equipment**
- **Flight/Vehicle simulation in military applications and video games**
- **Dispenser machinery**
- **Cutting or carving machinery**

Specifications

Pulse Type Motion Control	
Number of Axes	2
Pulse Output Rate	0.03 pps to 2.4 Mpps programmable
Pulse Command Output	DIR/OUT, CW/CCW
Max. Acceleration Rate	91 Mpps^2
Speed Resolution	16-bit
Encoder Input Rate	2.4 MHz @ 3 M cable
Encoder Counter Resolution	28-bit
Positioning Range	-134,217,728 to +134,217,727 pulses (28-bit)
Max. Number of Cards in One System	12
Motion Interface I/O Signals	
Position Latch Input Pin	LTC (1 kHz for continous triggering)
I/O Pin	Differential and 2500 VRMS optically isolated
Incremental Encoder Signals Input Pin	DIR/OUT, EA/EB
Encoder Index Signal Input	EZ
Mechanical Limit Switch Signal Input Pin	±EL, ±SD, and ORG
Servomotor Interface I/O Pin	INP, ALM, ERC
General DO Pin	SVON
General DI Pin	RDY
Pulser Signal Input	PA and PB
Simultaneous Start/Stop Signal I/O Pin	STA and STP
General-purpose I/O	
16-CH input & 16-CH output	

Software Support

- **Windows® Platform**
  - Available for Windows Vista (32-bit)/XP/2000
  - Recommended programming environments: VB/VC++/BCB/Delphi
  - Various sample programs with source codes
  - Customized API functions

- **LabVIEW® VIs**
  - Motion VIs of the PCI-8132 for LabVIEW are available.

- **Linux Platform**
  - Redhat 9, kernel 2.4.x
  - Fedora Core 3, kernel 2.6.9
  - Fedora Core 4, kernel 2.6.11
  - Fedora Core 5, kernel 2.6.15

- **MotionCreatorPro™**
  MotionCreatorPro™ assists motion system developers in debugging any cabling problems and resolving complex system configuration before programming.

Ordering Information

- **PCI-8132**
  Entry-level 2-axis stepper & servo motion control card with 32-CH GPIO
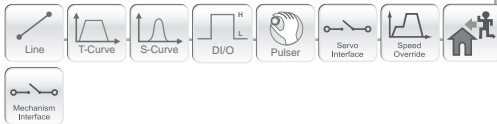
Accessories

Terminal Boards

- **DIN-812M0**
  Terminal board for Mitsubishi MR-J2S-A servo amplifier

- **DIN-100S-01**
  Terminal board with one 100-pin SCSI-II connector and DIN-rail mounting

Cabling

- **ACL-102100**
  See Section 12, Accessories

PCI-8134

Entry-level 4-axis Stepper & Servo Motion Control Card

ADLINK
GREEN
RoHS Compliant

Specifications

Pulse Type Motion Control

■ Number of Axes	4
■ Pulse Output Rate	0.03 pps to 2.4 Mpps programmable
■ Pulse Command Output	DIR/OUT, CW/CCW
■ Max. Acceleration Rate	91 Mpps^2
■ Speed Resolution	16-bit
■ Encoder Input Rate	2.4 MHz @ 3 M cable
■ Encoder Counter Resolution	28-bit
■ Positioning Range	-134,217,728 to +134,217,727 pulses (28-bit)
■ Max. Number of Cards in One System	12

Motion Interface I/O Signals

■ I/O Pin	Differential and 2500 VRMS optically isolated
■ Incremental Encoder Signals Input Pin	DIR/OUT, EA/EB
■ Encoder Index Signal Input	EZ
■ Mechanical Limit Switch Signal Input Pin	±EL, ±SD, and ORG
■ Servomotor Interface I/O Pin	INP, ALM, ERC
■ General DO Pin	SVON
■ General DI Pin	RDY
■ Pulser Signal Input	PA and PB
■ Simultaneous Start/Stop Signal I/O Pin	STA and STP

Line T-Curve S-Curve DI/O Pulser Servo Interface Speed Override

Mechanism Interface

Features

- **32-bit PCI bus, Rev. 2.2, 33 MHz**
- **Pulse output rates up to 2.4 MHz**
- **Pulse output options: OUT/DIR, CW/CCW**
- **Encoder input frequency up to 2.4 MHz under 4 x AB mode**
- **2 axes linear interpolation**
- **Programmable acceleration and deceleration time**
- **Trapezoidal and S-curve velocity profiles**
- **Easy interface to any stepping motors, AC or DC servo, linear or rotary motors**
- **28-bit up/down counter for incremental encoder**
- **All digital inputs and outputs are 2500 VRMS isolated**
- **Change speed override**
- **Multi-axis, simultaneous start/stop**
- **Dedicated I/O interface for PEL, MEL, ORG, EZ, INP, ERC, ALM**
- **Programmable interrupt sources**
- **Manual pulser input interface**
- **Supports up to 12 cards in one system**
- **3 ASIC-based home return modes and 9 software-based home return modes**

Applications

- **Semiconductor front & back end equipment**
- **TFT/LCD manufacturing equipment**
- **Solar cell manufacturing equipment**
- **Electronic assembly and testing equipment**
- **Automatic optical inspection equipment**
- **Flight/Vehicle simulation in military applications and video games**
- **Dispenser machinery**
- **Cutting or carving machinery**

Software Support

■ **Windows® Platform**
- Available for Windows Vista (32-bit)/XP/2000
- Recommended programming environments: VB/VC++/BCB/Delphi
- Various sample programs with source codes
- Customized API functions are possible

■ **LabVIEW® VIs**
- Motion VIs of the PCI-8134 for LabVIEW are available.

■ **Linux Platform**
- Redhat 9, kernel 2.4.x
- Fedora Core 3, kernel 2.6.9
- Fedora Core 4, kernel 2.6.11
- Fedora Core 5, kernel 2.6.15

■ **MotionCreatorPro™**
MotionCreatorPro™ assists motion system developers in debugging any cabling problems and resolving complex system configuration before programming

Ordering Information

■ **PCI-8134**
  Entry-level 4-axis stepper & servo motion control card

Accessories

Terminal Boards

■ **DIN-100S-01**
  Terminal board with one 100-pin SCSI-II connector and DIN-rail mounting

■ **DIN-814M0**
  Terminal board for Mitsubishi MR-J2S-A servo amplifier

■ **DIN-814M-J3A0**
  Terminal board for Mitsubishi MR-J3S-A amplifier

■ **DIN-814Y0**
  Terminal board for Yaskawa Sigma II/III/V amplifiers

■ **DIN-814P-A40**
  Terminal board for Panasonic MINAS A4 amplifier

■ **DIN-814PA0**
  Terminal board for Panasonic MINAS A servo amplifier

Cabling

■ **ACL-102100**
  See Section 12, Accessories

1 DAQ
2 PXI
3 Modular Instruments
4 GPIB & Bus Expansion
5 PAC
6 Motion
7 Distributed I/O
8 Serial Comm
9 Vision
10 Software & Utilities
11 cPCI & Industrial Systems
12 Accessories

PCI-8144

4-axis Stepper Motion Control Card

ADLINK GREEN RoHS Compliant

Specifications

Pulse Type Motion Control

■ Number of Axes	4
■ Pulse Output Rate	0.5 pps to 2.4 Mpps
■ Max. Acceleration Rate	737 Mpps^2
■ Speed Resolution	16-bit

Motion Interface I/O Signals

■ I/O Pin	Differential and 2500 V$_{RMS}$ optically isolated
■ End Limit Signal Pin	PEL and MEL
■ Slow Down Signal Pin	PSD and MSD
■ Home Sensor	ORG
■ GPIO	8 DI and 8 DO

General Specifications

■ Connector	68-pin SCSI-type connector
■ Operating Temperature	0°C to +50°C
■ Storage Temperature	-20°C to +80°C
■ Humidity	5% to 85%, non-condensing

Power Consumption

■ Power Supply (Input)	+24 V$_{DC}$ ±5%
■ External Power Supply (Output)	+5 V$_{DC}$ ±5%, 100 mA (max.)

Features

- **32-bit PCI bus, Rev. 2.2, 33 MHz**
- **Card index switch selection**
- **Pulse output rates up 2.4 Mpps for stepper motor control**
- **Pulse output options: CW/CCW**
- **Speed change on-the-fly**
- **3 home return modes**
- **Programmable acceleration and deceleration time**
- **Trapezoidal and S-curve velocity profile**
- **Simultaneously start/stop with external signal control (STA/STP)**
- **Programmable interrupt control**
- **Supports up to 12 cards in one system**
- **Security protection for user's program**
- **General purpose isolated I/O: 8 DI and 8 DO**
- **Emergency stop input via STP pin**
- **All digital I/O are 2500 V$_{RMS}$ isolated**
- **More than 30 thread safe API functions**
- **2-phase stepping motor excitation optional**

Icons: T-Curve, S-Curve, DI/O, Card ID 7, Emergency Input, Security, Speed Override

Software Support

■ Windows® Platform

- Available for Windows Vista (32-bit)/XP/2000
- Recommended programming environments: VB/VC++/BCB/Delphi
- Various sample programs with source code
- Customized API functions

■ MotionCreatorPro™

MotionCreatorPro™ assists motion system developers in debugging any cabling problems and resolving complex system configuration before programming.

Ordering Information

■ PCI-8144

4-axis stepper motion control card

Accessories

Terminal Board

■ DIN-68S-01

Terminal board with 68-pin SCSI-II connector with DIN socket

Cabling

■ ACL-10569-1

See Section 12, Accessories

Pin Assignment

Signal	Pin	Pin	Signal
VDD	1	35	VDD
EGND	2	36	EGND
CW+	3	37	CW+
CWCCW+	4	38	CWCCW+
CCWPEL0	5	39	CCWPEL2
MEL0	6	40	MEL2
PSD0	7	41	PSD2
MSD0	8	42	MSD2
ORG0	9	43	ORG2
EGND	10	44	ORG2
CW+	11	45	EGND
CWCCW+	12	46	CW+
CCWPEL1	13	47	CWCCW+
MEL1	14	48	CCWPEL3
PSD1	15	49	MEL3
MSD1	16	50	MEL3
ORG1	17	51	PSD3
STP/EMG	18	52	MSD3
DIN0	19	53	ORG3
DIN1	20	54	STA
DIN2	21	55	DOUT0
DIN3	22	56	DOUT1
DIN4	23	57	DOUT2
DIN5	24	58	DOUT3
DIN6	25	59	DOUT4
DIN7	26	60	DOUT4
VDD	27	61	DOUT5
VDD	28	62	DOUT6
EGND	29	63	DOUT7
EX +24V	30	64	DO_COM
	31	65	DO_COM
	32	66	DO_COM
	33	67	EGND
	34	68	EX +24V

cPCI-8168

Advanced 6U CompactPCI 8-axis Motion Control Card with One HSL Network

ADLINK
GREEN
RoHS Compliant

Line | ARC | T-Curve | S-Curve | Mechanism Interface | Servo Interface | Speed Override

TRO | DI/O | Contouring | HSL Support | AO | AI |
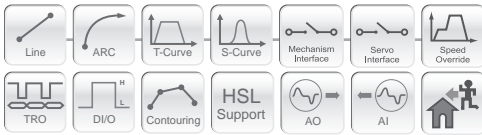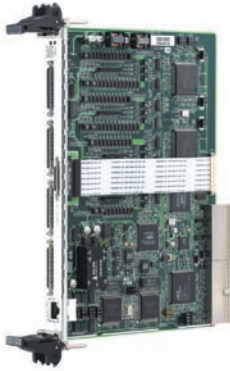
Features

- **32-bit CompactPCI, PICMG 2.0 Rev 2.1**
- **6U ComactPCI Form factor**
- **Pulse output rates up to 6.55 MHz**
- **Pulse output options: OUT/DIR, CW/CCW, AB Phase**
- **2 to 4 axes linear interpolation**
- **2 axes circular interpolation**
- **Multi-axis continuous interpolation**
- **Programmable acceleration and deceleration time**
- **Trapezoidal and S-curve velocity profiles**
- **Easily interface to any stepping motors, AC or DC servo, linear or rotary motors**
- **28-bit up/down counter for incremental encoder of each axis**
- **All digital input or output signals are 2500 VDC, isolated**
- **Change speed/position on-the-fly**
- **Simultaneously start/stop on multiple axes**
- **Supports up to 6 cards in one system (48 axes)**
- **High speed position compare and trigger output**
- **4 single-ended 16-bit DA outputs**
- **4 single-ended 12-bit AD inputs**
- **High speed remote I/O interface: scan 1000 points/ms**
- **Programmable interrupt source**
- **13 home return modes including auto searching**
- **More than 400 thread safe API functions**

Applications

- **Semiconductor front & back end equipment**
- **TFT/LCD manufacturing equipment**
- **Solar cell manufacturing equipment**
- **Electronic assembly and testing equipment**
- **Automatic optical inspection equipment**
- **Flight/Vehicle simulation in military applications and video games**
- **Dispenser machinery**

Specifications

Pulse Type Motion Control

Number of Axes	8
Pulse Output Rate	0.01 pps to 6.5 Mpps
Max. Acceleration Rate	245 Mpps^2
Speed Resolution	16-bit
Encoder Input Rate	6.55 MHz under 4 x AB phase @ 1 M cable
Encoder Counter Resolution	28-bit
Positioning Range	-134,217,728 to +134,217,727 pulses (28-bit)
Counters	x 4 for each axis
Comparators	x 5 for each axis

Motion Interface I/O Signals

I/O Pin	Differential and 2500 V$_{RMS}$ optically isolated
Incremental Encoder Signals Input Pin	EA and EB
Encoder Index Signal Input	EZ
Mechanical Limit Switch Signal Input Pin	±EL and ORG
Servomotor Interface I/O Pin	INP, ALM, ERC, SVON, RDY
Position Compare Output Pin	CMP

General Purpose I/O

Digital Input	8-CH isolated digital input
Input Voltage	0 to 24 V
Input Resistance	2.4 KΩ @ 0.5 W
Digital Output	8-CH isolated digital output
Output Voltage	5 V (min.); 35 V (max.)
Output Type	NPN open collector Darlington transistors
Current Sink	90 mA

Analog Input (A/D)

Resolution	12-bit
Input Channel	4 single-ended
Input Range	±10 V; bipolar
Conversion Time	8 μs
Sampling Rate	110 K samples/sec (max.)
Accuracy	0.01% of FSR ±1 LSB

Analog Output (D/A)

Converter and Resolution	16-bit; AD1866R
Output Channel	4 single-ended
Output Range	±10 V; bipolar
Setting Time	2 μs (-10 V to +10 V)
Sampling Rate	110 K samples/sec (max.)

HSL Speed Link (HSL) Port

Connector	RJ-45
Cable	CAT5 / CAT5E
Wiring Distance	200 M; multi-drop full duplex RS-485 with transformer isolation scheme
Transmission Speed	6 Mbps
I/O Refreshing Rate	30.4 μs second per slave ID
Max Slave Index	Control maximum 63 slave I/O index

LED Display

Motion chipset busy display	
HSL communications error	

Software Support

■ Windows® Platform

- Available for Windows Vista (32-bit)/XP/2000
- Recommended programming environments: VB/VC++/BCB/Delphi
- Various sample programs with source codes
- Customized API functions are possible

■ MotionCreatorPro™

MotionCreatorPro™ assists motion system developers in debugging any cabling problems and resolving complex system configuration before programming.

Ordering Information

■ cPCI-8168

Advanced 6U CompactPCI 8-axis motion control card with one HSL network

Accessories

Terminal Boards

- **DIN-68S-01**
  Terminal board with 68-pin SCSI-II connector with DIN socket
- **DIN-68M-J2A0**
  Terminal board for Mitsubishi MR-J2S-A servo amplifier with 68-pin SCSI-II connector
- **DIN-68M-J3A0**
  Terminal board for Mitsubishi MR-J3S-A
- **DIN-68Y-SGII0**
  Terminal board for Yaskawa Sigma II/III/V servo amplifier with 68-pin SCSI-II connector
- **DIN-68P-A40**
  Terminal board for Panasonic MINAS A4 servo amplifier with 68-pin SCSI-II connector

Cabling

- **ACL-10568-1**
  See Section 12, Accessories
- **ACL-10569-1**
  See Section 12, Accessories

1 DAQ
2 PXI
3 Modular Instruments
4 GPIB & Bus Expansion
5 PAC
6 Motion
7 Distributed I/O
8 Serial Comm
9 Vision
10 Software & Utilities
11 cPCI & Industrial Systems
12 Accessories

PCI-8253 / PCI-8256

DSP-based 3/6-axis Analog Motion Control Cards

PCI-8253

PCI-8256
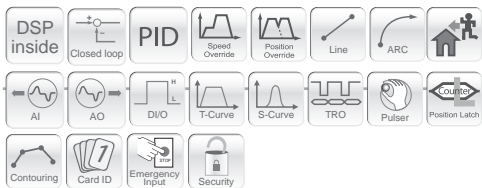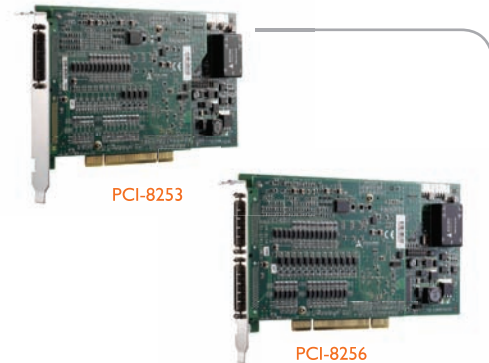
Features

- **32-bit PCI bus, Rev. 2.2, 33 MHz**
- **On-board 250 MHz DSP**
- **3/6 axes of ±10 volts analog command for controlling servo motors by differential command signal**
- **Maximum servo update rate is less than 300 μs for 6 axes**
- **Built-in PID with feed-forward gain closed loop control algorithm – reducing the following error**
- **Available with 3/6 encoders – providing up to 6 axes of closed-loop control, support EA/EB and index interface**
- **Encoder feedback frequency up to 20 MHz**
- **Digital filter for encoder input to reduce noise disturbance**
- **1/2 channel up to 1 MHz high speed trigger pulse output for PCI-8253/PCI-8256**
- **A/D inputs (3/6 channels, 14-bit, ±10 V)**
- **Manual pulse generator inteface**
- **4-bit board ID for multiple boards indexing**
- **One dedicated emergency input pin**
- **High speed position latch function via ORG and Index signals**
- **On-board 512 kb flash ROM for motion kernel and non-volatile data – PID parameters**
- **Programmable interrupt source control to host PC**
- **Dedicated motion I/O for per axis**
- **General purpose I/O: 4DI/4DO for PCI-8253 and 8DI/8DO for PCI-8256**
- **Watch dog timer for safety control**
- **Support for up to 16 cards in one system**
- **ADLINK Softmotion DSP provides comprehensive trajectory control functions:**
  - **Jogging mode**
  - **Any 2-4 axes linear interpolation**
  - **Any 2 axes circular interpolation**
  - **Multi-axis synchronized motion**
  - **Trapezoidal, S-curve velocity profile**
  - **Position override & speed override in anytime**
  - **Programmable acceleration/deceleration**
  - **Variety of homing modes via ORG and index signals**
  - **Linear and FIFO position comparison method for high speed trigger output**
  - **E-gear (Electronic gear) and ECAM (Electronic CAM)**
  - **Contouring function by point table description**
  - **Gantry mode**
  - **Ring counter (32-bit) for rotatory encoder input**
  - **Motion trajectory & PID parameters can be changed on-the-fly**

Specifications

Analog Input / Output Channels	
Number of Channels	3 for PCI-8253; 6 for PCI-8256
Analog Output	±10 Volt with 16-bit D/A Converter
Analog Input	±10 Volt with 14-bit A/D Converter

Encoder Input Channels	
Number of Channels	3 for PCI-8253; 6 for PCI-8256
Max. Encoder Input Frequency	20 MHz under 4 x AB mode
Encoder Counter	6, 32-bit
Pulse Command Type	AB phase and CW/CCW modes

Trigger Channels	
Number of High speed Channels	1 for PCI-8253; 2 for PCI-8256
Number of Low Speed Channels	1 for PCI-8253; 2 for PCI-8256
Maximum Trigger Pulse Frequency	1 MHz for high speed trigger; 25 KHz for low speed trigger
Trigger Pulse Width	0.3 μs to 300 ms

Motion I/O Interface Signals	
I/O Pins	Differential and 2500 V$_{RMS}$, optically isolated
Incremental Encoder Signals Input Pin	EA and EB
Encoder Index Signal Input	EZ
Mechanical Limit Switch Signal Input Pins	±EL and ORG
Servomotor Interface I/O Pin	INP, ALM, ERC, SVON, RDY
Position Compare Output Pin	CMP

General Purpose I/O	
Digital Input	8-CH isolated digital input
Input Voltage	0 to 24 V
Input Resistance	2.4 KΩ @ 0.5 W
Digital Output	8-CH isolated digital output
Output Voltage	5 V (min.); 35 V (max.)
Output Type	NPN open collector Darlington transistors
Current Sink	90 mA

Analog Input (A/D)	
Resolution	12-bit
Input Channel	4 single-ended
Input Range	±10 V, bipolar
Conversion Time	8 μs
Sampling Rate	110 K samples/sec (Max.)
Accuracy	0.01% of FSR, ±1 LSB

General Specifications	
Connectors	68-pin SCSI-type connector
Operating Temperature	0˚C to +55˚C
Storage Temperature	+20˚C to +80˚C
Humidity	5% to 95%, non-condensing

Software Support

Windows® Platform

- Available for Windows Vista (32-bit)/XP/2000
- Recommended programming environments:
  Visual Basic, Visual C++, Borland C++ Builder, and Delphi

MotionCreatorPro 2™

MotionCreatorPro 2™ is a Windows-based application development software package included with the PCI-8253/PCI-8256. MotionCreatorPro 2™ is useful for debugging a motion control system during the design phase of a project. An on-screen display lists all installed axes information and I/O signal status of the PCI-8253/PCI-8256. By using this utility, you can easy tune the axis parameter servo gain (PID plus feed forward gain) reducing the efforts on gain tuning. Furthermore, the sampling windows makes more accurate in motion data analysis, moreover, integrates with axis parameter and PID gain on-the-fly change, thus, the PCI-8253/PCI-8256 provides precise positioning control with less effort.

Analog Motion

1 DAQ
2 PXI
3 Modular Instruments
4 GPIB & Bus Expansion
5 PAC
6 Motion
7 Distributed I/O
8 Serial Comm
9 Vision
10 Software & Utilities
11 cPCI & Industrial Systems
12 Accessories

ADLINK GREEN RoHS Compliant

Ordering Information

■ **PCI-8253**
DSP-based 3-axis analog motion control card

■ **PCI-8256**
DSP-based 6-axis analog motion control card

Accessories

Terminal Board

■ DIN-825-J3A0
Terminal board for Mitsubishi MR-J3S-A servo amplifiers

■ DIN-68S-01
Terminal board with 68-pin SCSI-II connector with DIN socket

Cabling

■ ACL-10568-1
See Section 12, Accessories

Introduction

DSP-based Analog Motion Controller

The PCI-8253/PCI-8256 controllers combine a 250 MHz 32-bit MIPS processor, 12,000 logic element FPGA (Field Programmable Gate Array), I/O buffering circuitry, ADLINK softmotion, and motion control characterization software to control the position/velocity of as many as six ±10 V analog command servo axes.

ADLINK Softmotion

PCI-8253/PCI-8256 leverages ADLINK softmotion technology, 250 MHz DSP and 20 MHz encoder rate to meet faster servo update rate up to 50 µs/axis and control requirement in real application. PCI-8253/PCI-8256 not only realizes the gantry control with closed-loop and error handling, but also adopts the feed-forward gain to reduce speed profile following error to meet precise velocity and position control.

PID Control Plus Feed Forward G
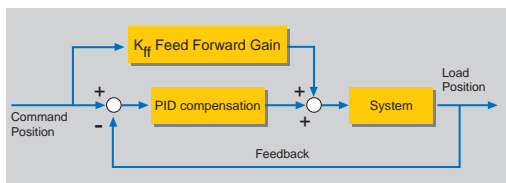
Pin Assignment

SP1 (PCI-8253 & PCI-8256)

No.	Name	I/O	Function of Axis	No.	Name	I/O	Function of Axis
1	AOUT1+	O	Analog output (+),(1)	35	AOUT1-	O	Analog output (-),(1)
2	AOUT2+	O	Analog output (+),(2)	36	AOUT2-	O	Analog output (-),(2)
3	AOUT3+	O	Analog output (+),(3)	37	AOUT3-	O	Analog output (-),(3)
4	AGND	SG	Analog ground	38	AGND	SG	Analog ground
5	AIN1	I	Analog input, (1)	39	AGND	SG	Analog ground
6	AIN2	I	Analog input, (2)	40	Rsv.	-	Reserved
7	AIN3	I	Analog input, (3)	41	Rsv.	-	Reserved
8	EA1+	I	Encoder A-phase (+),(1)	42	EA1-	I	Encoder A-phase (-),(1)
9	EB1+	I	Encoder B-phase (+),(1)	43	EB1-	I	Encoder B-phase (-),(1)
10	EZ1+	I	Encoder Z-phase (+),(1)	44	EZ1-	I	Encoder Z-phase (-),(1)
11	ALM1	I	Servo alarm,(1)	45	ORG1	I	Home limit, (1)
12	SVON1	O	Servo-ON, (1)	46	PEL1	I	Positive limit, (1)
13	ZSP1	I	ZeroSpeed 1	47	MEL1	I	Negative limit, (1)
14	TRG1+	O	Trigger Output, (+)(1)	48	TRG1-	O	Trigger Output, (-)(1)
15	TRG2+	O	Trigger Output, (+)(2)	49	TRG2-	O	Trigger Output, (-)(2)
16	EA2+	I	Encoder A-phase (+),(2)	50	EA2-	I	Encoder A-phase (-),(2)
17	EB2+	I	Encoder B-phase (+),(2)	51	EB2-	I	Encoder B-phase (-),(2)
18	EZ2+	I	Encoder Z-phase (+),(2)	52	EZ2-	I	Encoder Z-phase (-),(2)
19	DOCOM	-	Digital output common	53	DICOM	-	Digital input common
20	ALM2	I	Servo alarm, (2)	54	ORG2	I	Home limit, (2)
21	SVON2	O	Servo-ON, (2)	55	PEL2	I	Positive limit, (2)
22	ZSP2	I	ZeroSpeed 2	56	MEL2	I	Negative limit, (2)
23	EA3+	I	Encoder A-phase (+),(3)	57	EA3-	I	Encoder A-phase (-),(3)
24	EB3+	I	Encoder B-phase (+),(3)	58	EB3-	I	Encoder B-phase (-),(3)
25	EZ3+	I	Encoder Z-phase (+),(3)	59	EZ3-	I	Encoder Z-phase (-),(3)
26	ALM3	I	Servo alarm,(3)	60	ORG3	I	Home limit, (3)
27	SVON3	O	Servo-ON, (3)	61	PEL3	I	Positive limit, (3)
28	ZSP3	I	ZeroSpeed 3	62	MEL3	I	Negative limit, (3)
29	DOCOM	-	Digital output common	63	IEMG	I	Emergency Stop
30	DOCOM	-	Digital output common	64	DICOM	-	Digital input common
31	EDO1	O	Digital Output, (1)	65	EDI1	I	Digital Input, (1)
32	EDO2	O	Digital Output, (2)	66	EDI2	I	Digital Input, (2)
33	EDO3	O	Digital Output, (3)	67	EDI3	I	Digital Input, (3)
34	EDO4	O	Digital Output, (4)	68	EDI4	I	Digital Input, (4)

SP2 (PCI-8256 only)

No.	Name	I/O	Function of Axis	No.	Name	I/O	Function of Axis
1	AOUT4+	O	Analog output (+),(4)	35	AOUT4-	O	Analog output (-),(4)
2	AOUT5+	O	Analog output (+),(5)	36	AOUT5-	O	Analog output (-),(5)
3	AOUT6+	O	Analog output (+),(6)	37	AOUT6-	O	Analog output (-),(6)
4	AGND	SG	Analog ground	38	AGND	SG	Analog ground
5	AIN4	I	Analog input, (4)	39	AGND	SG	Analog ground
6	AIN5	I	Analog input, (5)	40	Rsv.	-	Reserved
7	AIN6	I	Analog input, (6)	41	Rsv.	-	Reserved
8	EA4+	I	Encoder A-phase (+),(4)	42	EA4-	I	Encoder A-phase (-),(4)
9	EB4+	I	Encoder B-phase (+),(4)	43	EB4-	I	Encoder B-phase (-),(4)
10	EZ4+	I	Encoder Z-phase (+),(4)	44	EZ4-	I	Encoder Z-phase (-),(4)
11	ALM4	I	Servo alarm, (4)	45	ORG4	I	Home limit, (4)
12	SVON4	O	Servo-ON, (4)	46	PEL4	I	Positive limit, (4)
13	ZSP4	I	ZeroSpeed 4	47	MEL4	I	Negative limit, (4)
14	TRG3+	O	Trigger Output, (+)(3)	48	TRG3-	O	Trigger Output, (-)(3)
15	TRG4+	O	Trigger Output, (+)(4)	49	TRG4-	O	Trigger Output, (-)(4)
16	EA5+	I	Encoder A-phase (+),(5)	50	EA5-	I	Encoder A-phase (-),(5)
17	EB5+	I	Encoder B-phase (+),(5)	51	EB5-	I	Encoder B-phase (-),(5)
18	EZ5+	I	Encoder Z-phase (+),(5)	52	EZ5	I	Encoder Z-phase (-),(5)
19	DOCOM	-	Digital output common	53	DICOM	-	Digital input common
20	ALM5	I	Servo alarm,(5)	54	ORG5	I	Home limit, (5)
21	SVON5	O	Servo-ON, (5)	55	PEL5	I	Positive limit, (5)
22	ZSP5	I	ZeroSpeed 5	56	MEL5	I	Negative limit, (5)
23	EA6+	I	Encoder A-phase (+),(6)	57	EA6-	I	Encoder A-phase (-),(6)
24	EB6+	I	Encoder B-phase (+),(6)	58	EB6-	I	Encoder B-phase (-),(6)
25	EZ6+	I	Encoder Z-phase (+),(6)	59	EZ6-	I	Encoder Z-phase (-),(6)
26	ALM6	I	Servo alarm,(6)	60	ORG6	I	Home limit, (6)
27	SVON6	O	Servo-ON, (6)	61	PEL6	I	Positive limit, (6)
28	ZSP6	I	ZeroSpeed 6	62	MEL6	I	Negative limit, (6)
29	DOCOM	-	Digital output common	63	Rsv.	-	Reserved
30	DOCOM	-	Digital output common	64	DICOM	-	Digital input common
31	EDO5	O	Digital Output, (5)	65	EDI5	I	Digital Input, (5)
32	EDO6	O	Digital Output, (6)	66	EDI6	I	Digital Input, (6)
33	EDO7	O	Digital Output, (7)	67	EDI7	I	Digital Input, (7)
34	EDO8	O	Digital Output, (8)	68	EDI8	I	Digital Input, (8)

PCI-8392 / PCI-8392H

DSP-based 16-axis SSCNET III Motion Control Cards

PCI-8392

PCI-8392H

| DSP inside | Card ID | Position Override | Emergency Input | Speed Override | Contouring | Line | ARC |
| Sync | T-Curve | S-Curve | | HSL Support | | | |
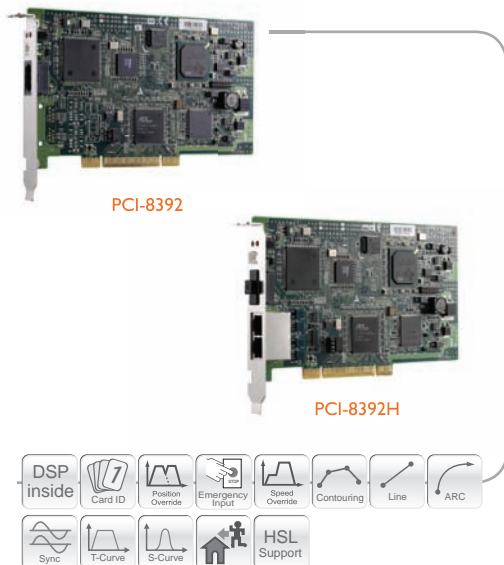
Introduction

ADLINK's PCI-8392/PCI-8392H are advanced 16-axis motion controller based on the PCI bus which features plug-and-play function and supports a maximum installation of up to 12 cards in one system. The PCI-8392 and PCI-8392H offer the following advantages:

- Easy wiring and time-deterministic servo updates
- Command synchronization
- Easy maintenance
- Meets maximum motor speed and maximum resolution (20-bit) simultaneously
- Parameter setting and tuning via software
- Absolute encoder control

■ Additional advantages for PCI-8392H users

- One card to simultaneously meet the servo network and distributed I/O configuration
- High cost/performance
- Distributed I/Os are up to 2016 points and refreshed within 1 ms
- Reduced controller size. (large backplane to install multiple cards no longer required)

Board Features

- **32-bit PCI bus, Rev 2.2, 33 MHz**
- **Servo Interface: SSCNET 3 protocol**
- **Controllable axes up to 16 axes**
- **High speed network communication bus up to 50 Mbps**
- **Servo update rate: 0.444 ms for 8 axes, 0.888 ms for 16 axes**
- **On-board DSP: TI TMS320C6711 250 MHz to process the synchronization**
- **Fiber cable connection ensure the best communication quality**
- **Easy wiring up to 50 meters between servo drivers (POF/HPCF fiber cable)**
- **32-bit position command resolution**

Function Features

- **No command frequency limitation**
- **Runtime data sampling for motion analysis**
- **On-line servo tuning and full servo parameter management**
- **High speed servo information logging**
- **Excellent performance in axis synchronous control**
- **Programmable acceleration rate for T/S-curve profile**
- **Any 4 axes linear interpolation positioning**
- **Any 2 axes circular interpolation positioning velocity moving function**
- **Jogging function**
- **Absolute positioning system**
- **Speed override and position override function**
- **Programmable interrupt events**
- **Board ID switch selection from 0 to 15**
- **Watch dog timer for safety**
- **External emergency input pin (jumper selected)**
- **One HSL bus is available for PCI-8392H**
- **Supports up to 16 boards in one system**

Specifications

■ Motion Control	Cycle time: 0.888 ms for 16 axes; 0.444 ms for 8 axes	
	Maximum number of controllable axes: Up to 16	
	Maximum number of cards in one system: 12	
	Connection: Via FB1 with fiber	
■ Emergency Control (EMG1)	Normal close	
	Stop controlling once the EMG to be open	
■ LED Indicator (LED)	Red & green light to indicate the communication status of SSCNET III and HSL bus	
■ Board ID Selection	DIP switch selection	
	ID is available from 0 to 15	
■ HSL bus	Only available for PCI-8392H version	
	For HSL bus, please refer to Chapter 7, Distributed I/O Section	
■ General Specifications	Operating Temperature: 0°C to +50°C	
	Storage Temperature: -20°C to +80°C	
	Humidity: 5% to 85%, non-condensing	

Software Support

■ MotionCreatorPro 2™

MotionCreatorPro 2™ is a Windows-based application development software package that included with the PCI-8392/PCI-8392H. MotionCreatorPro 2™ is useful for debugging a motion control system during the design phase of a project. An on-screen display lists all installed axes information and I/O signal status of the PCI-8392/PCI-8392H. By using this utility, you can easy tune the axis parameter and servo gain. Furthermore, the sampling windows makes more accurate in motion data analysis, moreover, integrates with axis parameter, thus, the PCI-8392/PCI-8392H provides precise positioning control with less effort.

■ Windows® Platform

- Available for Windows Vista (32-bit)/XP/2000
- Recommended programming environments: VB/VC++/BCB/Delphi

Ordering Information

- **■ PCI-8392**
  DSP-based 16-axis SSCNET III motion control card
- **■ PCI-8392H**
  DSP-based 16-axis SSCNET III motion control card with HSL

Accessories

Terminal Board

- **■ DIN-839-J3B**
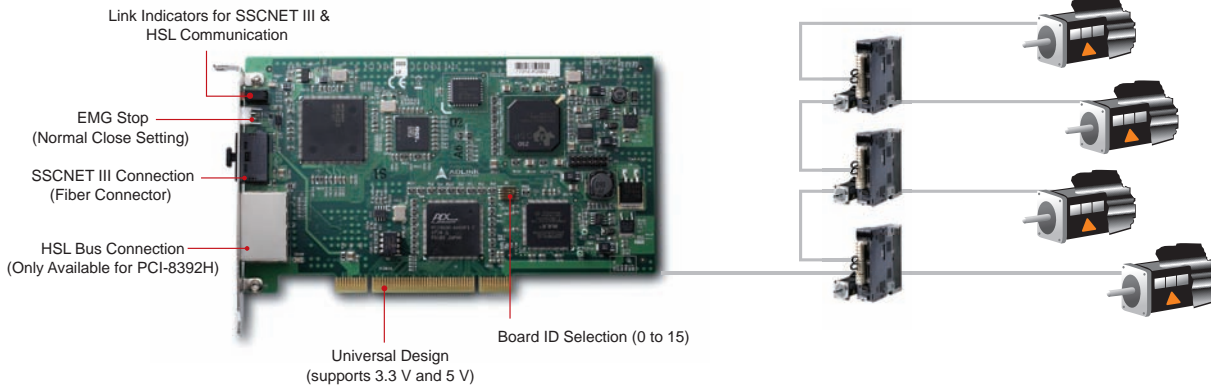 Terminal board for Mitsubishi MR-J3S-B servo amplifier

Cable

- **■ MR-J3BUS M**
  See Section 12, Accessories

PCI-8392/PCI-8392H Profile

Link Indicators for SSCNET III & HSL Communication

EMG Stop (Normal Close Setting)

SSCNET III Connection (Fiber Connector)

HSL Bus Connection (Only Available for PCI-8392H)

Universal Design (supports 3.3 V and 5 V)

Board ID Selection (0 to 15)

SSCNET III

SSCNET II

0.88 ms

20   80   100

100
80

20

0.88 ms

Improve Precision

SSCNET III

0.44 ms

6   6   6   6   6   6

100
96
80

20
6

0.44 ms
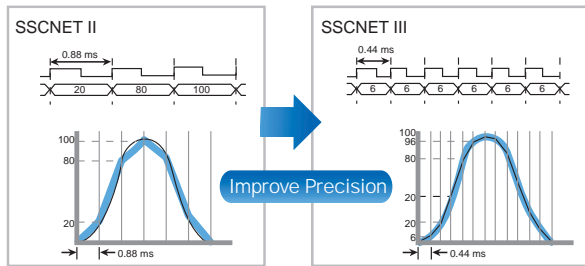
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MotionCreatorPro 2™

Single Axis Operations

Servo Driver Parameters
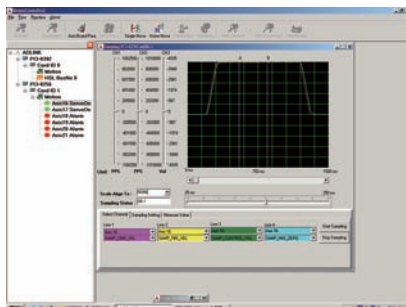
Servo Tuning

XY Move Operations
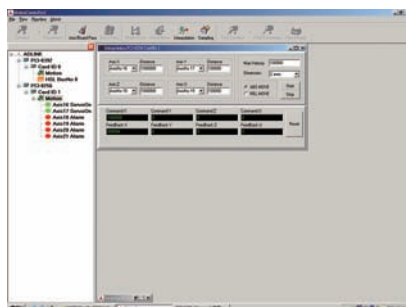
Sidebar:
1 DAQ
2 PXI
3 Modular Instruments
4 GPIB & Bus Expansion
5 PAC
6 Motion
7 Distributed I/O
8 Serial Comm
9 Vision
10 Software & Utilities
11 cPCI & Industrial Systems
12 Accessories

PCI-8372+ / PCI-8366+

DSP-based SSCNET II 12/6-axis Motion Control Cards

ADLINK
GREEN
RoHS Compliant

PCI-8372+/PCI-8366+

DSP inside | Line | ARC | T-Curve | S-Curve | TRO | DI/O | AO

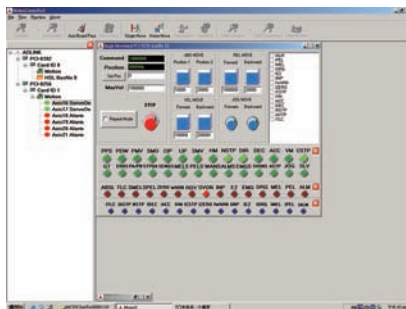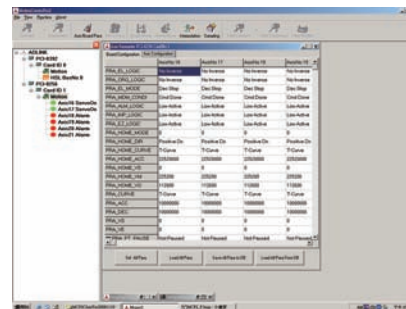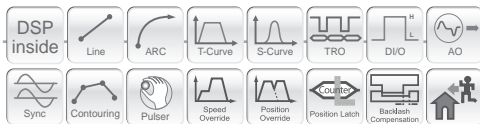Sync | Contouring | Pulser | Speed Override | Position Override | Position Latch | Backlash Compensation

Features

- **32-bit PCI bus, Rev 2.2, 33 MHz**
- **Servo Interface: SSCNET II protocol**
- **On-board DSP: TI TMS320C6711 200 MHz**
- **Maximum controllable axes: 12/6 for PCI-8372+/PCI-8366+**
- **32-bit position command resolution**
- **On-line servo tuning and data monitoring**
- **Easy wiring up to 30 meters for servo drivers connection**
- **2 isolated DI/DO**
- **3 external encoder/linear scale interface**
- **Multiple axes linear interpolation**
- **Any 2 axes circular interpolation**
- **Contour following motion with smoothing function**
- **On-the-fly velocity change**
- **Programmable interrupt sources**
- **Hardware synchronization between multiple cards**
- **Easy-to-use function library**
- **More than 250 thread safe API functions**
- **Sequence motion control for speed profile timing chart between axes**
- **Absolute encoder access**
- **2-CH 16-bit analog output**

Applications

- **Semiconductor front & back end equipment**
- **TFT/LCD manufacturing equipment**
- **Solar cell manufacturing equipment**
- **Electronic assembly and testing equipment**
- **Automatic optical inspection equipment**
- **Flight/Vehicle simulation in military applications and video games**
- **Dispenser machinery**
- **Cutting or carving machinery**

Specifications

SSCNET Distributed Motion Control	
Cycle Time	0.888 ms
Number of Controllable Axes	12 axes for PCI-8372+; 6 axes for PCI-8366+
Max. Number of Cards in One System	12
Encoder Feedback	3-CH, 32-bit, up/down counter up to 5 MHz
Motion Interface I/O Signals	
External Encoder Signals Input Pin	EA and EB
Encoder Index Signal Input	EZ
Mechanical Limit Seitch and Origin Signal Input Pin	±EL and ORG
General-purpose I/O	
2 channels isolated digital inputs; 2 channal open collector output	
Input Volotage	0 to 24 V
Input Resistance	2.4 KΩ @ 0.5 W
Sink Current	4 mA
Bandwidth	10 kHz
Analog Output (D/A)	
Resolution	16-bit
Output Channel	2 single-ended channels
Output Range	±10 V, bipolar
Setting Time	10 μs
Output Driving	±5 mA

Software Support

■ Windows® Platform
- Available for Windows Vista (32-bit)/XP/2000
- Recommended programming environments: VB/VC++/ BCB/Delphi

■ MotionCreatorPro™

MotionCreatorPro™ assists motion system developers in debugging any cabling problems and resolving complex system configuration before programming

Ordering Information

■ **PCI-8372+**
DSP-based 12-axis SSCNET II motion control card

■ **PCI-8366+**
DSP-based 6-axis SSCNET II motion control card

Accessories

Terminal Board

■ **DIN-68S-01**
Terminal board with 68-pin SCSI-II connector with DIN socket

Cabling

■ **ACL-10568-1**
See Section 12, Accessories

Pin Assignment

Signal	Pin	Pin	Signal
A.COM	1	35	DA1
PEL1	2	36	DA2
MEL1	3	37	PEL2
ORG1	4	38	MEL2
PEL3	5	39	ORG2
MEL3	6	40	PEL4
ORG3	7	41	MEL4
PEL5	8	42	ORG4
MEL5	9	43	PEL6
ORG5	10	44	MEL6
IPT_COM	11	45	ORG6
EA1+	12	46	EA2+
EA1-	13	47	EA2-
EB1+	14	48	EB2+
EB1-	15	49	EB2-
EZ1+	16	50	EZ2+
EZ1-	17	51	EZ2-
PEL7	18	52	PEL8
MEL7	19	53	MEL8
ORG7	20	54	ORG8
PEL9	21	55	PEL10
MEL9	22	56	MEL10
ORG9	23	57	ORG10
PEL11	24	58	PEL12
MEL11	25	59	MEL12
ORG11	26	60	ORG12
IPT_COM	27	61	IPT_COM
DO_COM	28	62	D11
EA3+	29	63	D12
EA3-	30	64	EMG
EB3+	31	65	EMG_COM
EB3-	32	66	DO1
EX3+	33	67	DO2
EZ3-	34	68	DO_COM

cPCI-8312H

Advanced 6U CompactPCI SSCNET II 12-axis Motion Control Card with HSL Network

SSCNET II Interface

HSL Interface

DSP inside | Sync | Speed Override | Position Override | Mechanism Interface | Line | ARC

HSL Support | T-Curve | S-Curve | TRO | Contouring | DI/O | AO | AI

Features

- **SSCNET II Part**
  - **32-bit CompactPCI, PICMG 2.0 Rev. 2.1**
  - **Servo interface: SSCNET II protocol**
  - **On-board DSP: TI TMS320C6711 200 MHz**
  - **Maximum controllable axes: 12**
  - **32-bit position command resolution**
  - **On-line servo tuning and data monitoring**
  - **Easy wiring up to 30 meters**
  - **2 isolated DO channels**
  - **2 analog input and 2 analog output channels**
  - **2 pulse train output channels support, connecting pulse train type servo amplifiers**
  - **2 external encoder/linear scale interface**
  - **Multiple axes linear interpolation**
  - **Any 2 axes circular interpolation**
  - **Contour following motion**
  - **On-the-fly velocity change**
  - **Programmable interrupt sources**
  - **Easy-to-use function library**
  - **Sequence Motion Control for speed profile timing chart between axes**
  - **Absolute encoder access**
- **HSL Part**
  - **Dual independent network operation**
  - **One network port with 2 separate connectors**
  - **Max. 300 m x 2 communication distance at 3 Mbps**
  - **Jumper selectable transmission rate: 3/6/12 Mbps**
  - **Jumper selectable transmission mode: full/half duplex on-board memory**
  - **Programmable timer interrupt**
  - **RJ45 phone jack for easy installation**
  - **More than 400 thread safe API functions**

Applications

- **Semiconductor front & back end equipment**
- **TFT/LCD manufacturing equipment**
- **Solar cell manufacturing equipment**
- **Electronic assembly and testing equipment**
- **Automatic optical inspection equipment**
- **Flight/Vehicle simulation in military applications and video games**
- **Dispenser machinery**

Specifications

SSCNET Distributed Motion Control	
■ Cycle Time	0.888 ms
■ Number of Controllable Axes	12
■ Max. Number of Cards in One System	12
■ Encoder Feedback	3-CH, 32-bit, up/down counter up to 5 MHz
Motion Interface I/O Signals	
■ External Encoder Signals Input Pin	EA and EB
■ Encoder Index Signal Input	EZ
■ Mechanical Limit Seitch and Origin Signal Input Pin	±EL and ORG
General-purpose I/O	
■ 2 channels isolated digital inputs	
■ Sink Current	4 mA
■ Bandwidth	10 kHz
Analog Input (AI)	
■ Auto-calibration	
■ Resolution	16-bit
■ Programmable Input Range	±10 V, ±5 V, ±2.5 V
■ Sampling Rate	250 ks/sec
Analog Output (D/A)	
■ Resolution	16-bit
■ Output Channel	2 single-ended channels
■ Output Range	±10 V, bipolar
■ Setting Time	10 μs
■ Output Driving	±5 mA
Pulse Train Output	
■ Pulse Command Type	OUT/DIR, CW/CCW AB phase selectable
■ Max. Output Frequency	4.16 MHz
■ Isolated Voltage	500 V$_{RMS}$

Software Support

- **Windows® Platform**
  - Available for Windows Vista (32-bit)/XP/2000
  - Recommended programming environments: VB/VC++/BCB/Delphi

- **MotionCreatorPro™**
  MotionCreatorPro™ assists motion system developers in debugging any cabling problems and resolving complex system configuration before programming.

Ordering Information

- **cPCI-8312H**
  Advanced 6U CompactPCI SSCNET II 12-axis motion control card with HSL network

Accessories

Terminal Board

- **DIN-68S-01**
  Terminal board with 68-pin SCSI-II connector with DIN socket
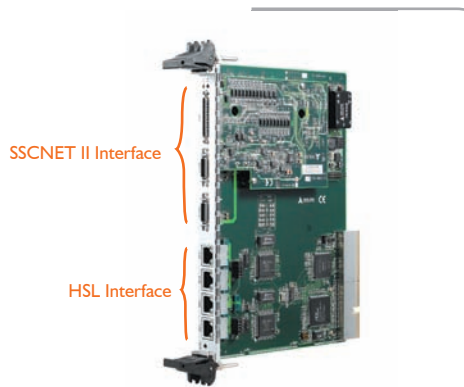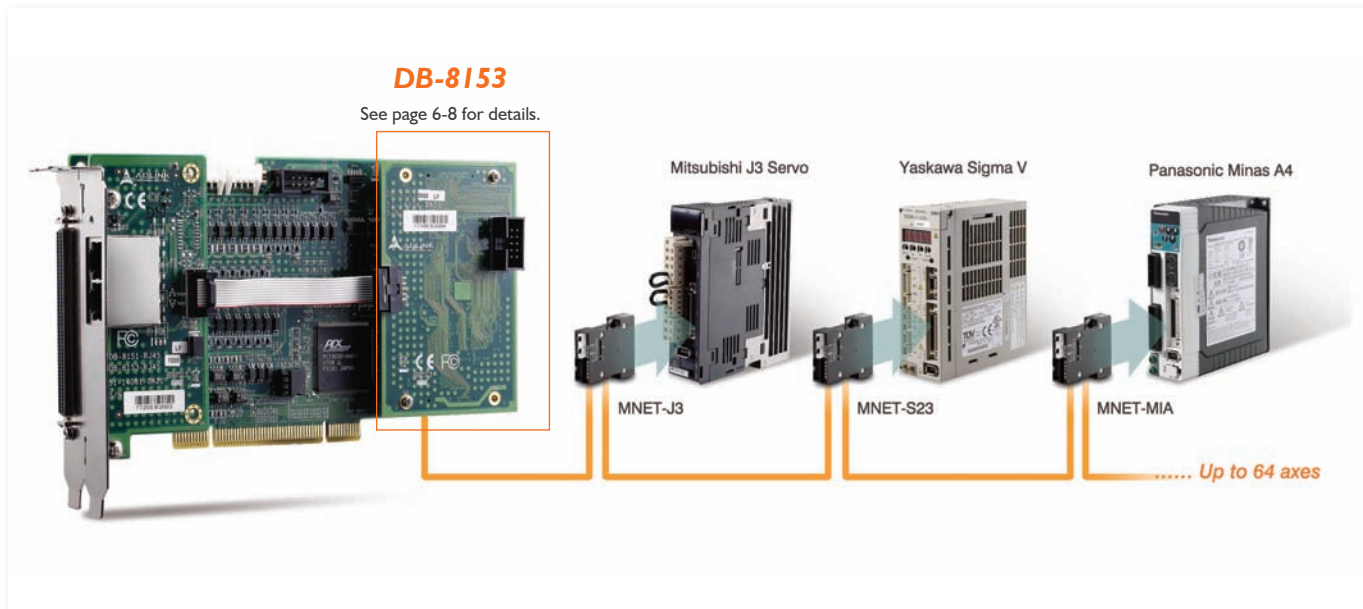
Cabling

- **ACL-10568-1**
  See Section 12, Accessories

Pin Assignment

Signal	Pin	Pin	Signal
DO_COM	1	35	DO1
PEL1	2	36	DO2
MEL1	3	37	PEL2
ORG1	4	38	MEL2
PEL3	5	39	ORG2
MEL3	6	40	PEL4
ORG3	7	41	MEL4
PEL5	8	42	ORG4
MEL5	9	43	PEL6
ORG5	10	44	MEL6
IPT_COM/EMG_COM	11	45	ORG6
EA1+	12	46	EA2+
EA1 -	13	47	EA2-
EB1+	14	48	EB2+
EB1 -	15	49	EB2-
EZ1+	16	50	EZ2+
EZ1 -	17	51	EZ2-
PEL7	18	52	PEL8
MEL7	19	53	MEL8
ORG7	20	54	ORG8
PEL9	21	55	PEL10
MEL9	22	56	MEL10
ORG9	23	57	ORG10
PEL11	24	58	PEL12
MEL11	25	59	MEL12
ORG11	26	60	ORG12
IPT_COM/EMG_COM	27	61	EMG
P_GND	28	62	AD1
OUT1+	29	63	DIR1+
OUT1 -	30	64	AD2
OUT2+	31	65	DIR1-
OUT2 -	32	66	DA1
DIR2+	33	67	DA2
DIR2 -	34	68	A_COM

1 DAQ
2 PXI
3 Modular Instruments
4 GPIB & Bus Expansion
5 PAC
6 Motion
7 Distributed I/O
8 Serial Comm
9 Vision
10 Software & Utilities
11 cPCI & Industrial Systems
12 Accessories

Motionnet Bus

Distributed Single-axis Motion Control Module

DB-8153

See page 6-8 for details.

Mitsubishi J3 Servo   Yaskawa Sigma V   Panasonic Minas A4

MNET-J3   MNET-S23   MNET-MIA

...... Up to 64 axes

Introduction

ADLINK's Motionnet products provide system integrators with a simple configuration and reduced wiring method for a cost-effective solution for motion applications utilizing
multiple single axes. With this new concept of direct plug-in modules, the amount of space used and the amount of wiring required is greatly reduced from traditional terminal board connections.

After the module is plugged into the servo driver, all that is needed is a LAN cable to make the serial connection between the modules. Different servo drivers can be lined up on the Motionnet bus, making motion control configuration much simpler than PCI board solutions. The Motionnet bus can support up to 64 single-axis modules. Each module can execute continuous operations at constant speed, perform linear acceleration/deceleration, perform S-curve acceleration/deceleration, carry out preset positioning operations, and zero return operations. Data transfer for each node is time-deterministic (15.1 μs at 20 Mbps). The fastest cyclic time is up to 0.97 ms with 64 modules connected. As the fewer the number of devices connected, the proportionally greater the data transfer speed increases.

Features

- No command frequency limitation
- Available for Mitsubishi J3S, Panasonic MINAS A4, and Yaskawa Sigma II, III, V
- Up to 64 axes, serially connected
- No need for terminal boards – reduces space
- The scanning cycle time up to 0.97 ms at 20 Mbps when 64 axes are connected
- Point-to-point application can be easily completed with multiple single-axis modules
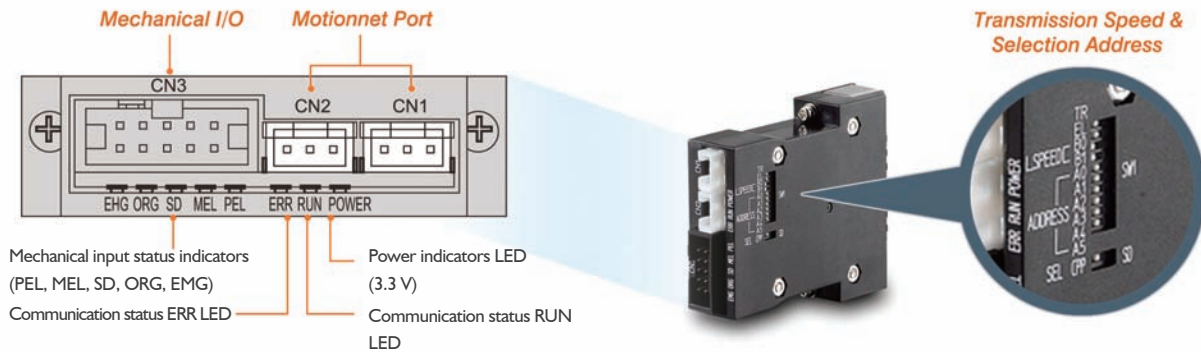- Supports linear/s-curve acceleration and deceleration

Specifications

▪ Power Indicator	Displays the status of the 3.3 V$_{DC}$ internal control power (red LED)
▪ Operating Temperature	0˚C to +40˚C
▪ Operating Ambient Humidity	80% RH or less (non-condensing within the 10˚C to 40˚C range)
▪ Environmental	RoHS compliant
▪ Vibration	JIS C0040 compliant
▪ Weight	Approximately 50 g
▪ Dimensions	52.4 x 16.3 x 69.5 mm (W x H x D)

Applications

- Convey machines
- Long distance semiconductor machines
- Long distance solar cell machines without any interpolation or simultaneous motion
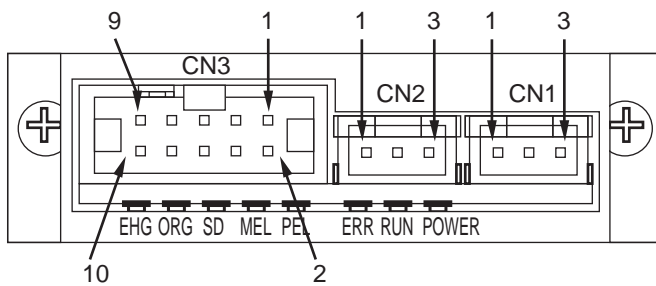- Simple motion configurations

LED Indicator

Mechanical input status indicators
(PEL, MEL, SD, ORG, EMG)

Communication status ERR LED

Power indicators LED
(3.3 V)

Communication status RUN
LED

Pin Assignment

CN1/CN2 Pin Assignment

No	Name	Function	Signal Direction
1	RS485+	Serial communicationdata+	I/O
2	RS485-	Communication data+	I/O
3	FG	Frame ground	-

CN3 Pin Assignment

No	Name	Function	Signal Direction
1	PEL	Positive end limit	I
2	MEL	Negative end limit	I
3	SD/CPP	Slowdown input / comparator output (+)	I/O
4	ORG	Zero position input	I
5	EMGI	Emergency stop input	I
6	CPN	Comparator output (-)	O
7	24V	24 V_{DC} Power source	I
8	GND	Ground	I
9	GND	Ground	I
10	FG	Frame ground	-

Ordering Information

■ **MNET-J3**

Motionnet distributed single-axis motion control module for
Mitsubishi J3S-A

■ **MNET-S23**

Motionnet distributed single-axis motion control module for
Yaskawa Sigma II, III, and V

■ **MNET-MIA**

Motionnet distributed single-axis motion control module for
Panasonic MINAS A4

PCI-8124-C

Advanced 4-CH Encoder Card with High-speed Triggering Function

TRO | DI/O | Card ID

Features

- **32-bit PCI bus, Rev. 2.2, 33 MHz**
- **Card index switch selection**
- **Four 32-bit quadrature encoder input and trigger output channels**
- **Encoder input interface: OUT/DIR, CW/CCW, and 1x, 2x, 4x A/B phase**
- **Trigger output up to 5 MHz**
- **Encoder input up to 20 MHz**
- **Programmable trigger pulse width: 0.2 us to 6.5 ms**
- **Input/Output circuit source can be selectable: TTL/Open collector (with isolation)**
- **Switch setting for trigger output default level while power on**
- **Trigger output pin logic programmable**
- **Digital filter for individual encoder input channel**
- **Internal high-speed FIFO for four 32-bit comparators as data reload buffer**
- **Each channel can store 1024 points (32-bit)**
- **Each trigger output channel is selected from all comparators, and manual trigger commands**
- **Each encoder counter source is selected from comparators and manual trigger commands**
- **14 comparators can select one of 4 trigger output channels individually**
- **4 comparators for comparing encoder counter and FIFO data**
- **10 comparators for comparing encoder counter and linear data**
- **4 channel TTL output pins for general purpose output or trigger output**
- **4 channel TTL input pins for general purpose or timer start signal**
- **4 channel high speed latch input pins for counters**
- **EZ and Latch input pins can be used for general purpose input**
- **Encoder counter clear via EZ input pin as zero operation by rising or falling edge**
- **Programmable interrupt sources from linear data finished, triggered, FIFO empty/full/low, latched, and TTL input on**

Specifications

Counter

■	Number of Channels	100-pin SCSI-type connector
■	Trigger Pulse Frequency	5 MHz (max.)
■	Encoder Counter	4, 32-bit
■	Comparator	11, 32-bit
■	FIFO Capacity	1023 points/channel
■	Encoder Input Frequency	20 MHz (max.) @ 4 x AB mode
■	Trigger Pulse Width	0.2 us to 6.55 ms

I/O Signals

■	Partial I/O Signals	Optically isolated with 2500 V$_{RMS}$ isolation voltage
■	Partial I/O Signals	TTL type
■	Encoder Signals Input Pins	EA and EB
■	Encoder Index Signal Input Pin	EZ
■	Position latch Input Pin	LTC
■	Trigger Pulse Output Pin	TRG, 5 V pulse output reference to ground

General Specifications

■	Connectors	50-pin SCSI-type connector
■	Operating Temperature	0°C to +50°C
■	Storage Temperature	-20°C to +80°C
■	Humidity	5% to 85%, non-condensing

Power Consumption

■	Slot Power Supply (input)	900 mA (Max.) ±5%, 900 mA (Max.)
■	External Power Supply (output)	+5 V$_{DC}$ ±5%, 500 mA (Max.)

Ordering Information

- **PCI-8124**
  Advanced 4-CH encoder card with high-speed triggering function

Accessories

Terminal Board

- **DIN-50S-01**
  Terminal board with one 50-pin SCSI-II connector and DIN-rail mounting

Cabling

- **ACL-10250-1**
  See Section 12, Accessories

Software Support

- **Windows® Platform**
  - Available for Windows Vista (32-bit)/XP/2000
  - Recommended programming environments: VB/VC++/BCB/Delphi
- **MotionCreatorPro 2™**

PCI-8136

6-CH Quadrature Encoder and Multi-Function I/O Card

1 DAQ
2 PXI
3 Modular Instruments
4 GPIB & Bus Expansion
5 PAC
6 Motion
7 Distributed I/O
8 Serial Comm
9 Vision
10 Software & Utilities
11 cPCI & Industrial Systems
12 Accessories

Features

- **32-bit PCI bus, plug & play**
- **6-CH 32-bit industrial counter for 3 kinds of differential pulse trains:**
  - **A/B phase**
  - **CW/CCW**
  - **Pulse/Direction**
- **6-CH differential pulse generators up to 500 kHz**
- **6-CH 32-bit position compare with interrupt function**
- **6-CH 16-bit ±10 V analog output**
- **6-CH 12-bit 133 kHz analog single-ended input**
- **19-CH opto-isolated DI, 7-CH open collector DO**
- **Digital I/Os and counters are 2500 VDC opto-isolated**
- **One 24-bit programmable timer with interrupt**
- **Auto-calibration for analog I/O**
- **More than 50 thread safe API functions**

Software Support

■ Windows® Platform
- Available for Windows Vista (32-bit)/XP/2000
- Recommended programming environments: VB/VC++/BCB/Delphi

■ Linux Platform
- Redhat 9, kernel 2.4.x
- Fedora Core 3, kernel 2.6.9
- Fedora Core 4, kernel 2.6.11
- Fedora Core 5, kernel 2.6.15

Ordering Information

- **PCI-8136**
  6-CH quadrature encoder and multi-function I/O card

Accessories

Terminal Board

■ DIN-100S-01
Terminal board with one 100-pin SCSI-II connector and DIN-rail mounting

Cable

■ ACL-102100
See Section12, Accessories

Specifications

General Specifications	
■ Connectors	100-pin SCSI-type connector
	DB25 female connector
	DB9 male connector
■ Operating Temperature	0˚C to +50˚C
■ Storage Temperature	-20˚C to +80˚C
■ Humidity	5% to 85%, non-condensing
■ Power Consumption	Slot power supply (input): to ±5%, 900 mA (max.)
	External power supply (input): +5 VDC ±5%, 500 mA (max.)
	External power supply (output): +5 VDC ±5%, 500 mA (max.)
■ Dimension	164 x 98.4 mm (L x H)

Pulse Input (Industrial Counter)	
■ Number of Input Channel	6, differential type
■ Pulse Command Type	32-bit counter for AB-phase, CW/CCW, Pulse/Direction
■ Max. Counter Speed	3 MHz, 2500 VDC optical isolation

Pulse Output (Industrial Generator)	
■ Number of Output Channel	6, differential type
■ Pulse Command Type	CW/CCW, Puls /Direction, A/B Phase
■ Max. Pulse Rate	500 kHz

Analog Input	
■ Number of Channels	6 differential/single-end input channels
■ Input Range	Voltage: ±10 V
■ Sink Current Capability	0 to 20 mA
■ Resolution	12-bit ADC with 1-bit non-linearity
■ Input Impedance	Approximately 440 KΩ (Voltage), 120 Ω (Current)
■ Sampling Rate	133 kHz multiplexing

Analog Output	
■ Number of Channels	6 output channels
■ Output Range	±10 V; bipolar
■ Sink Current Capability	0 to 20 mA
■ Resolution	16-bit DAC resolution, 14-bit accuracy guarantee
■ Setting Time	2 μs

Digital Output	
■ Number of Channels	7 output channels
■ Output Type	Open collector
■ Sink Current	100 mA/CH (typical); 268 mA/CH (max.); 500 mA/total
■ Isolated Voltage	2500 VRMS
■ Throughput	10 kHz (0.1 ms)

Timer	
■ One programmable timer interrupt	
■ Base Clock	33 MHz by PCI bus
■ Timer Range	24-bit