### Pulse Train Type Motion Control Solution Selection Guide

<table>
<thead>
<tr>
<th>Model Name</th>
<th>PCI-8174</th>
<th>PCI-8158</th>
<th>PCI-8154</th>
<th>PCI-8164</th>
<th>PCI-8102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controllable Axes</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Support Motor</td>
<td>Stepper / Servo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse Output Rate (Max)</td>
<td>6.55Mpps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encoder Input Frequency (Max)</td>
<td>6.55MHz@1M</td>
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<td></td>
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<tr>
<td>Encoder Counter (28-bit)</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Ring Counter Support</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed Profile</td>
<td>T/S curve (Non-symmetric acceleration/ deceleration setting are supported)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linear Interpolation</td>
<td>Any 2-4 of 4 Axes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circular Interpolation</td>
<td>Any 2 Axes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helical Interpolation</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position Compare &amp; Triggering</td>
<td>✓ (Controlled by DSP, up to 2MHz)</td>
<td>✓ (With DB-8150, up to 2MHz)</td>
<td>✓ (up to 15KHz)</td>
<td>✓ (up to 1KHz)</td>
<td></td>
</tr>
<tr>
<td>Home Mode</td>
<td>13 (Include Auto Homing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Contouring</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dedicated Motion I/O</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIO Channels</td>
<td>4DI / 4DO</td>
<td>8DI / 8DO</td>
<td>4DI / 4DO</td>
<td>6 TTL DO</td>
<td>16DI / 16DO</td>
</tr>
<tr>
<td>Card Index Switch</td>
<td>✓ (0 to 15)</td>
<td>-</td>
<td>-</td>
<td>✓ (0 to 15)</td>
<td></td>
</tr>
<tr>
<td>Hardware EMG Stop Input</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Backlash Compensation</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Synchronous Action(*)</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
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<td>4-7</td>
<td>4-7</td>
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<td>4-13</td>
</tr>
</tbody>
</table>

(*) Please refer to user manual.
### CompactPCI industrial computers

#### DPAC Motion Control

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPAC604</td>
<td></td>
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</tr>
</tbody>
</table>

### Software

- Controllable Axes: 8
- Support Motor: 4
- Pulse Motor: 1
- Encoder Counter: 1
- Encoder Input: 1
- Encoder Counter (28-bit): 1
- Ring Counter Support: 1
- Speed Profile: 1
- Linear Interpolation: 1
- Circular Interpolation: 1
- Helical Interpolation: 1
- Position Compare & Triggering: 1
- Home Mode: 1
- Continuous Contouring: 1
- Dedicated Motion I/O: 1
- DIO Channels: 1
- Card Index Switch: 1
- Hardware EMG Stop Input: 1
- Backlash Compensation: 1
- Synchronous Action(*) 1
- Page No.: 1

### System

- PCI-8132
- PCI-8134
- PCI-8144
- PXI-8164

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Model No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI-8132</td>
<td>PCI</td>
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</tr>
<tr>
<td>PCI-8134</td>
<td>PCI</td>
<td></td>
</tr>
<tr>
<td>PCI-8144</td>
<td>PCI</td>
<td></td>
</tr>
<tr>
<td>PXI-8164</td>
<td>PXI</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI-8132</td>
<td>8 DI / 8 DO</td>
</tr>
<tr>
<td>PCI-8134</td>
<td>4 DI / 4 DO</td>
</tr>
<tr>
<td>PCI-8144</td>
<td>4 DI / 4 DO</td>
</tr>
<tr>
<td>PXI-8164</td>
<td>8 DI / 8 DO</td>
</tr>
</tbody>
</table>

### Features

- Stepper / Servo: 2
- Stepper Only: 4
- Stepper / Servo: 4
- Support Motor: 4
- Encoder Counter (28-bit): 1
- Encoder Input: 1
- Encoder Counter: 1
- Ring Counter Support: 1
- Speed Profile: 1
- Linear Interpolation: 1
- Circular Interpolation: 1
- Helical Interpolation: 1
- Position Compare & Triggering: 1
- Home Mode: 1
- Continuous Contouring: 1
- Dedicated Motion I/O: 1
- DIO Channels: 1
- Card Index Switch: 1
- Hardware EMG Stop Input: 1
- Backlash Compensation: 1
- Synchronous Action(*) 1

### Specifications

- Controllable Axes: 8
- Support Motor: 4
- Encoder Counter: 1
- Encoder Input: 1
- Encoder Counter (28-bit): 1
- Ring Counter Support: 1
- Speed Profile: 1
- Linear Interpolation: 1
- Circular Interpolation: 1
- Helical Interpolation: 1
- Position Compare & Triggering: 1
- Home Mode: 1
- Continuous Contouring: 1
- Dedicated Motion I/O: 1
- DIO Channels: 1
- Card Index Switch: 1
- Hardware EMG Stop Input: 1
- Backlash Compensation: 1
- Synchronous Action(*) 1

### Website

www.adlinktech.com
Motion Control Products

Selection Guide - SSCNET Series Motion Control Solution

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<tr>
<th>Model Name</th>
<th>PCI-8392</th>
<th>PCI-8392H</th>
<th>PCI-8366+</th>
<th>PCI-8372+</th>
<th>cPCI-8312H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlable Axes</td>
<td>16</td>
<td>16</td>
<td>6</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Communication Protocol</td>
<td>SSCNET III (Cycle Time: 0.888 ms for 16 axes, 0.444 for 8 axes)</td>
<td>SSCNET II (Cycle Time: 0.888 ms)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed Profile</td>
<td>T/S Curve</td>
<td>T/S Curve</td>
<td>T/S Curve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2D Linear Interpolation</td>
<td>Any 2 Axes</td>
<td>Any 2 Axes</td>
<td>Any 2 Axes</td>
<td>Any 2 Axes</td>
<td></td>
</tr>
<tr>
<td>3D Linear Interpolation</td>
<td>Any 3 Axes</td>
<td>Any 3 Axes</td>
<td>Any 3 Axes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2D Circular Interpolation</td>
<td>Up to 40</td>
<td>-</td>
<td>Any 2 Axes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position Compare</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Trigger Output Channels</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2 (Via DO Channel, Up to 19kHz)</td>
<td></td>
</tr>
<tr>
<td>Continuous Triger</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Continuous Interpolation</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Contour Smoothing</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Dedicated Motion I/O</td>
<td>PEL/MEL/ORG are on Mitsubishi J3B servo (C3D)</td>
<td>PEL/MEL/ORG for every axis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dedicated Motion I/O:
- Via WRL bus, up to 2016 points
- 2 DI / 2 DO
- 2 D

Di/O Channels:
- 3 (32-bit)
- 3 (32-bit)
- 2 (32-bit)

Programmable I/O:
- 2 D
- 1 D

External Encoder Counter:
- 3 (32-bit)
- 3 (32-bit)
- 2 (32-bit)

Analog Input Channel:
- 3 (32-bit)
- 3 (32-bit)
- 2 (32-bit)

Analog Output Channel:
- 3 (32-bit)
- 3 (32-bit)
- 2 (32-bit)

Pulse Output Interface:
- 3 (32-bit)
- 3 (32-bit)
- 2 (32-bit)

Pulse Output Channel:
- 3 (32-bit)
- 3 (32-bit)
- 2 (32-bit)

HSL inside:
- 3 (MKY36)
- 3 (MKY36)
- 3 (MKY36)

HSL Network Port:
- 3 (MKY36)
- 3 (MKY36)
- 3 (MKY36)

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Note:
1. PCI-8366+ has two dedicated digital input channels. However, PEL/MEL/ORG of axis 7 to 12 can be also utilized as digital input channels, for a total of 20 digital input channels.
2. If PEL/MEL/ORG are not used in your application, they can be assigned as digital input channels by function call. For details, please refer to the SSCNET manual.

Selection Guide – Auxiliary Encoder Board Solution

<table>
<thead>
<tr>
<th>Form Factor</th>
<th>PCI-8136</th>
<th>PCI-8124</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model Name</td>
<td>PCI-8136</td>
<td>PCI-8124</td>
</tr>
<tr>
<td>Pulse Output Rate (Max.)</td>
<td>500 kHz</td>
<td>500 kHz</td>
</tr>
<tr>
<td>Position Compare</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Di/O Channels</td>
<td>19DI / 7DO</td>
<td>19DI / 7DO</td>
</tr>
<tr>
<td>Encoder Counter</td>
<td>6 (32-bit)</td>
<td>6 (32-bit)</td>
</tr>
<tr>
<td>Analog I/O</td>
<td>6AI / 6AO</td>
<td>6AI / 6AO</td>
</tr>
<tr>
<td>Cable</td>
<td>ACL-102100</td>
<td>ACL-50P</td>
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<tr>
<td>Terminal Board</td>
<td>DIN-1005-01</td>
<td>DIN-50S</td>
</tr>
<tr>
<td>Page No.</td>
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<td>4-31</td>
</tr>
</tbody>
</table>

Note: 1. PCI-8136 offers an interrupt signal to let users check the position compare event.
Motion Control Products

ADLINK offers a powerful, cost-effective, and easy-to-use motion control solution for customers with a platform ready for many industrial applications, such as semiconductor/LCD equipment manufacturers, electrical assembly manufacturers, or packaging applications. Machine manufacturers will benefit from precise positioning and advanced motion control technology. ADLINK PC-based motion control solutions provide, including pulse train, DSP-based analog, and the SSCNET (Servo System Control Network) series. Our motion control solutions deliver accurate and high performance motion for target objects. Our position comparing and trigger output capabilities match the performance of high-end frame grabbers in carrying out on-the-fly image inspection or line scanning. Distributed motion control solutions are also available. ADLINK motion control solutions provide user-friendly and ready-to-use function library for use under DOS, Windows®, and Linux. Our superior technical support team is always ready to assist you.

Feature Overview

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

- **SSCNET III**
  - SSCNET is a serial connection protocol proposed by Mitsubishi. The SSCNET III 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 0.444ms.

- **SSCNET II**
  - SSCNET is a serial connection protocol proposed by Mitsubishi. The SSCNET II protocol has real-time response and absolute synchronization. With this technology, a single board can connect to up to 12 axes. The cycle time is 0.888ms.

- **PTP Motion**
  - PTP motion move one axis from position A to position B (Point-to-point motion).

- **Linear Interpolation**
  - Move two or multiple coordinated axes to perform line piece motion.

- **Circular Interpolation**
  - Move two coordinated axes to perform arc and circular piece motion.

- **T-Curve/S-Curve Velocity Profile**
  - Users can use T-curve or S-curve for speed profiles. S-curve velocity typically has smoother performance.

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

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

- **Contouring**
  - Some motion controllers can provide hardware-based contouring control in order to provide a variety of trajectories controls for smooth motion.

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

- **Manual Pulse Input Interface**
  - Some motion control solutions provide the interface that connects manual pulse input devices, which can be used to move the axis.

- **Position Compare & Trigger Output (TRO)**
  - By sending several position compare points to the buffer with this feature, the digital signal would be triggered upon reaching each compare position. The high frequency trigger pulse can signal line scan frame grabbers.

- **Closed-Loop Control**
  - Motion control cards can accept feedback signals to perform closed-loop control. Users can tune the control loop gain to get the better positioning or velocity control.

- **Absolute Synchronization**
  - Most of the time a pulse train type motion control solution does not provide this feature. However, SSCNet motion controllers entitle users to enjoy this feature, which is especially vital for complicated motion patterns requiring absolute synchronization of multiple axes.

- **Digital I/O Capabilities**
  - Digital input and output channels are provided for users.

- **Analog Output Channel**
  - Some products offer analog output channels for voltage signal.

- **Analog Input**
  - Some boards offer analog input channels for voltage signals.

- **HSL**
  - HSL is a High Speed Link bus designed specifically for distributed real-time I/O control and motion systems.

- **Emergency Input**
  - Emergency Input is typically used to immediately stop a moving stage when an emergency occurs. This is typically implemented by an external button to open the circuit and stop the controller from sending commands to servo/stepper motors.

- **Security**
  - This function offers hardware security protection for software developed by the system integrator.

www.adlinktech.com
**PCI-8174**

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

**Introduction**

**Advanced DSP-based 4-axis Motion Controller**

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

**Motion Control Feature**

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

**Linear & Circular Interpolation**

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

**Continuous Contouring**

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

**Hardware Position Compare and Trigger Output**

The PCI-8174 provides position compare and trigger functions. The CMP channel will output a trigger pulse when encoder counter reached the compared value preset by user. Comparison is done by hardware without time delay problem.

**Position Latch**

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

**Automatic Backlash Compensation**

Whenever direction change is occurred, the PCI-8174 outputs backlash corrective pulses before sending commands. During interpolation mode, this function will be ineffective.

**13 Home Return Modes**

To fit into various mechanical design and operating restrictions, the PCI-8174 provides 13 home moving modes for users to choose as their best convenience.

**Simultaneously Start/Stop**

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

**Applications**

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

Motion

- Number of controllable axes: 4
- Pulse output rate: 0.01 pps to 6.5 Mpps
- Max. Acceleration rate: 245 Mpps²
- Speed resolution: 16-bit
- Encoder input rate: 6.55 MHz under 4 x AB phase @ 1m cable
- Encoder counter resolution: 28-bit
- Positioning range: -134, 217, 727 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
- Position clear input pin: CLR
- Position change input pin: PCS
- Emergency Stop input pin: EMG
- All I/O pins are differential and 2500VRMS optically isolated
- Incremental encoder signals input pins: EA and EB
- Encoder index signal input: EZ
- Mechanical Limit switch signal input pins: ±EL, SD and ORG
- Servomotor Interface I/O pins: INP, ALM, ERC, RDY, SVON
- Pulser signal input: PA and PB
- Simultaneous Start/Stop Signal I/O pins: STA and STP

General-Purposed I/O

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

Ordering Information

- PCI-8174: Advanced DSP-based 4-axis stepper & servo motion control card
- DIN-100S-01: Termination board for general purpose
- DIN-814M: Termination board for Mitsubishi MR-J2S-A servo amplifier
- DIN-814P-A040: Termination board for Panasonic MINAS A4 amplifier
- DIN-814V: Termination board for Yaskawa Sigma II amplifier
- DIN-814PA0: For Mitsubishi MR-J3-A Amplifier
- DIN-814PA0: For Panasonic MINAS A Servo amplifier
- DIN-814PA0: For Mitsubishi MR-J2S-A Servo Amplifier
- DIN-814PA0: For Yaskawa Sigma II Amplifier
- DIN-814PA0: For Mitsubishi MR-J3-A Amplifier
- DIN-814PA0: For Panasonic MINAS A4 Amplifier

Termination Board

- DIN-100S-01: General Purpose
- DIN-814M: For Mitsubishi MR-J2S-A Servo Amplifier
- DIN-814M-J3A0: For Mitsubishi MR-J3-A Amplifier
- DIN-814PA0: For Panasonic MINAS A Servo amplifier
- DIN-814PA0: For Yaskawa Sigma II Amplifier
- DIN-814PA0: For Panasonic MINAS A4 Amplifier

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## 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/circular 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.
### Ordering Information

<table>
<thead>
<tr>
<th>Ordering Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI-8158</td>
<td>Advanced 8-axis stepping &amp; servo motion control card</td>
</tr>
<tr>
<td>PCI-8154</td>
<td>Advanced 4-axis stepping &amp; servo motion control card</td>
</tr>
<tr>
<td>DIN-1005-01</td>
<td>Termination board for general purpose</td>
</tr>
<tr>
<td>DIN-814M-J3A0</td>
<td>Termination board for Mitsubishi MR-J2S-A Servo Amplifier</td>
</tr>
<tr>
<td>DIN-814PA0</td>
<td>Termination board for Panasonic MINAS A Servo Amplifier</td>
</tr>
<tr>
<td>DIN-814Y0</td>
<td>Termination board for Yaskawa Sigma II Amplifier</td>
</tr>
<tr>
<td>DIN-814P-A40</td>
<td>Termination board for Panasonic MINAS A4 Servo Amplifier</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIN-814M0</td>
<td>DIN-814M0: For Mitsubishi MR-J3A Servo Amplifier</td>
</tr>
<tr>
<td>DIN-814M-J3A0</td>
<td>DIN-814M-J3A0: For Mitsubishi MR-J3-A Servo Amplifier</td>
</tr>
<tr>
<td>DIN-814PA0</td>
<td>DIN-814PA0: For Panasonic MINAS A Servo Amplifier</td>
</tr>
<tr>
<td>DIN-814Y0</td>
<td>DIN-814Y0: For Yaskawa Sigma II Amplifier</td>
</tr>
<tr>
<td>DIN-814P-A40</td>
<td>DIN-814P-A40: For Panasonic MINAS A4 Amplifier</td>
</tr>
</tbody>
</table>

### Software Support

**Windows® Platform**
- Various sample programs with source codes
- Customized API functions are possible

RTX (Windows Real Time Extension)
- RTX 1.5/6.x

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

**Linux® Platform**
- Red Hat 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

### Motion Specifications

- **Number of controllable axes:** 8
- **Pulse output rate:** 0.01pps to 6.595pps
- **Max. acceleration rate:** 2450pps²
- **Encoder input rate:** 6.55MHz under 4xAB phase @ 1M cable
- **Encoder counter resolution:** 28-bit
- **Positioning range:** ±3.4, 217, 227 = ±134, 217, 227 pulses (28-bit)
- **Comparators:** x 4 for each axis

### Termination Board

- **DIN-1005-01:** General Purpose
- **DIN-814M-J3A0:** For Mitsubishi MR-J3A Servo Amplifier
- **DIN-814PA0:** For Panasonic MINAS A Servo Amplifier
- **DIN-814Y0:** For Yaskawa Sigma II Amplifier

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

**Pin Assignments:**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDD</td>
<td>1 51 VDD</td>
</tr>
<tr>
<td>EXGND</td>
<td>2 52 EXGND</td>
</tr>
<tr>
<td>OUT0+</td>
<td>3 53 OUT0+</td>
</tr>
<tr>
<td>OUT0-</td>
<td>4 54 OUT0-</td>
</tr>
<tr>
<td>DIR0+</td>
<td>5 55 DIR0+</td>
</tr>
<tr>
<td>DIR0-</td>
<td>6 56 DIR0-</td>
</tr>
<tr>
<td>SV0N0</td>
<td>7 57 SV0N0</td>
</tr>
<tr>
<td>ERC0</td>
<td>8 58 ERC0</td>
</tr>
<tr>
<td>ALM0</td>
<td>9 59 ALM0</td>
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<tr>
<td>INP0</td>
<td>10 60 INP0</td>
</tr>
<tr>
<td>RDY0</td>
<td>11 61 RDY0</td>
</tr>
<tr>
<td>EXGND</td>
<td>12 62 EXGND</td>
</tr>
<tr>
<td>EA0+</td>
<td>13 63 EA0+</td>
</tr>
<tr>
<td>EA0-</td>
<td>14 64 EA0-</td>
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<tr>
<td>EB0+</td>
<td>15 65 EB0+</td>
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<td>EB0-</td>
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<td>17 67 EZ0+</td>
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<tr>
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<td>18 68 EZ0-</td>
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<tr>
<td>VDD</td>
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<tr>
<td>EXGND</td>
<td>20 70 EXGND</td>
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<tr>
<td>OUT1+</td>
<td>21 71 OUT1+</td>
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<tr>
<td>OUT1-</td>
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<td>49 99 E-24V</td>
</tr>
<tr>
<td>EXGND</td>
<td>50 100 E-24V</td>
</tr>
</tbody>
</table>

**www.adlinktech.com**
**DB-8150**

**High-speed Trigger Board**

**Features**
- High performance 125MHz FPGA inside
- On-board SDRAM for comparing point table (1M points for each channel)
- Simultaneously 8 channel TTL compatible differential output
- One general-purpose digital output channel, up to 20mA
- Two general-purpose digital input channel, 100MHz response time
- Two high speed digital input channel
- One 32-bit comparator for position comparing
- Trigger output pulse polarity and pulse width adjustable
- Two 32-bit position counters by two encoder signals EA/EB input from carrier board
- Two encoder signals EA/EB input from daughter board
- Counter clear signal from by EZ input from carrier board
- Support trigger output toggle mode
- Equal and window condition comparison available
- Linear function and point table mode for continuous trigger output
- Counter latched by digital input pins

**Specifications**

<table>
<thead>
<tr>
<th>Counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPGA on-board to process the trigger function without consuming CPU</td>
</tr>
<tr>
<td>Trigger Speed</td>
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<tr>
<td>Trigger Points</td>
</tr>
<tr>
<td>Dimension</td>
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<tr>
<td>Operating Temperature</td>
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<tr>
<td>Storage Temperature</td>
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<tr>
<td>Power Consumption</td>
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</table>

<table>
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<td>12</td>
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<tr>
<td>13</td>
</tr>
</tbody>
</table>

**Ordering Information**

DB-8150 High-speed trigger board

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**DB-8151**

**Single HSL Master Controller Daughter Board**

**Features**
- Programmable timer interrupt
- RJ-45 phone jack for easy installation (with DB-8151-RJ45)
- Attached with PCI-815x can save PCI slots and take advantage of 4 to 8-axis control and distributed I/O together
- Software selectable transmission speed and mode
- Supports HSL-HUB3/ HSL-Repeater
- DI data transmission interrupt

**Specifications**

<table>
<thead>
<tr>
<th>Counter</th>
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<tbody>
<tr>
<td>Master controller ASIC</td>
</tr>
<tr>
<td>Build-in 32KB RAM</td>
</tr>
<tr>
<td>Full duplex, RS-485 with transformer isolation</td>
</tr>
<tr>
<td>Transmission speed</td>
</tr>
<tr>
<td>Dimension</td>
</tr>
<tr>
<td>Operating Temperature</td>
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<tr>
<td>Storage Temperature</td>
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<td>9</td>
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<td>10</td>
</tr>
</tbody>
</table>

**Ordering Information**

DB-8151 Single HSL master controller daughter board

DB-8151-RJ45 Bracket with RJ-45 phone jack for DB-8151

---

DB-8151-RJ45 is the main connector of DB-8151.
### DB-8152

**Electronic CAM Slave Motion Solution Daughter Board**

**Features**
- Up to 1MHz from encoder signals of the master axis
- Support OUT/DIR and CW/CCW pulse output mode
- Support 4 x A/B phase and CW/CCW pulse input mode
- Programmable Interrupt
- CAM table setting by API function

**Specifications**
- **Counter**
  - D-Sub 9 and 25 bracket required when using the DB-8152
  - Support OUT/DIR and CW/CCW pulse output mode
  - D-Sub 9 for master encoder and slave encoder, pulse out and DIO with isolation
  - Support 4 x AB phase and CW/CCW pulse input mode
  - Programmable Interrupt
  - CAM table setting by API function

**Ordering Information**
- DB-8152: Electronic CAM slave motion solution daughter board

---

### DB-8153

**Single Motionnet Master Controller Daughter Board**

**Features**
- RJ-45 phone jack for easy installation (with DB-8153-RJ45)
- Attached with PCI-815x can save PCI slots and take advantage of distributed motion controller and on-board motion controller together
- Software selectable transmission speed

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

**Connections**

<table>
<thead>
<tr>
<th>PIN NO.</th>
<th>PIN OUT</th>
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<tbody>
<tr>
<td>PIN 1</td>
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<tr>
<td>PIN 2</td>
<td>FG</td>
</tr>
<tr>
<td>PIN 3</td>
<td>DG</td>
</tr>
<tr>
<td>PIN 4</td>
<td>LED Signal</td>
</tr>
<tr>
<td>PIN 5</td>
<td>RXD1</td>
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<td>PIN 6</td>
<td>TXD</td>
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<td>PIN 7</td>
<td>RXD2</td>
</tr>
<tr>
<td>PIN 8</td>
<td>TXE</td>
</tr>
<tr>
<td>PIN 9</td>
<td>DG</td>
</tr>
<tr>
<td>PIN 10</td>
<td>FG</td>
</tr>
</tbody>
</table>

**Ordering Information**
- DB-8151: Single HSL master controller daughter board
- DB-8151-RJ45: Bracket with RJ-45 phone jack for DB-8151
PCI-8164/PXI-8164

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

Introduction

Advanced 4-axis Motion Controller

ADLINK PCI-8164/PXI-8164 is an advanced 4-axis motion control card. Compared with the PCI-8132/PCI-8134 series, PCI-8164/PXI-8164 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.

Velocity or Position Override

The PCI-8164/PXI-8164 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-8164/PXI-8164 provides linear interpolation by any 2, any 3, or even all-4 axes. Besides any 2 axes can perform circular interpolation.

Continuous Contouring

The pre-register architecture of PCI-8164/PXI-8164 offers the feature to build the continuous interpolation function, ie, the 2nd motion may follow previous motion instantly without latency. Thus perfect velocity continuity can be established.

Hardware Position Compare and Trigger Output

The PCI-8164/PXI-8164 provides position compare and trigger functions. The CMP channel will output a trigger pulse when encoder counter reached the compared value preset by user. Comparison is done by hardware, and an on-board FIFO is implemented to automatically reload the comparing data. Thus, the trigger rate can reach 15KHz, while almost no CPU resource is needed.

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-8164/PXI-8164 outputs backlash corrective pulses before sending commands. During interpolation mode, this function will be ineffective.

13 Home Return Modes

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

Simultaneously Start/Stop

By using software program or external input signal, the PCI-8164/PXI-8164 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.

Software Support

Windows® Platform


VB/VCL/C#/.Net are recommended programming environment.

Customized API functions are possible

RTX (Windows Real Time Extension)

RTX 5.x/s.x

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 2.6.8

Fedora Core 5, kernel 2.6.15

Fedora Core 4, kernel 2.6.11

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
Various Interpolation Modes of PCI-8164/PXI-8164

Specifications

Motion
- Number of controllable axes: 4
- Pulse output rate: 0.01 pps to 6.5pps
- Max. Acceleration rate 245Mpps²
- Speed resolution: 16-bit
- Encoder index signal 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 (10kHz for continuou triggering)
- All I/O pins are differential and 2500VRMS optically isolated
- Incremental encoder signals input pins: EA and EB
- Encoder index signal input: EZ
- Mechanical limit switch signals input pins: ±EL, SD and ORG
- Servo motor interface I/O pins: INP, ALM, ERC
- General DO pin: SVON
- General DI pin: RDY
- Pulse input pin: PA and PB
- Simultaneous Start/Stop Signal I/O Pins: STA and STP

General-Purposed I/O
- 6 TTL level digital output (PCI-8164 only)
- 4D/HDC (PXI-8164 only)

Ordering Information
- PCI-8164: Advanced PCI 4-axis stepper & servo motion control card with high-speed triggering
- PXI-8164: Advanced PXI 4-axis stepper & servo motion control card with high-speed triggering
- DIN-0100S-01: Termination board for general purpose
- DIN-0140: Termination board for Mitsubishi MR-J2S-A servo amplifier
- DIN-814M0: Termination board for Mitsubishi MR-J2S-A Servo amplifier
- DIN-814M-J3A0: Termination board for Mitsubishi MR-J3-A Amplifier
- DIN-814PAO: Termination board for Panasonic MINAS A Servo amplifier
- DIN-814PAO: Termination board for Yaskawa Sigma II Amplifier
- DIN-814Y0: Termination card for high-speed triggering
- DIN-814P-A40: Termination card for Panasonic MINAS A4 Amplifier

Termination Board
- DIN-0100S-01: General Purpose
- DIN-814M0: For Mitsubishi MR-J2S-A Servo amplifier
- DIN-814M-J3A0: For Mitsubishi MR-J3-A Amplifier
- DIN-814PAO: For Panasonic MINAS A Servo amplifier
- DIN-814PAO: For Yaskawa Sigma II Amplifier

Pulse Train Type

Circular Interpolation

4 axes Linear Interpolation

Continuous Interpolation

MotionCreatorPro

RTX (Windows Real Time Extension)

Linux Platform

Windows® Platform
Introduction

Advanced 2-axis Motion Controller
ADLINK PCI-8102 is an advanced 2-axis motion control card. Compared with the PCI-8132/PCI-8134 series, PCI-8102 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.

Velocity or Position Override
The PCI-8102 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 program.

Linear & Circular Interpolation
The PCI-8102 provides 2-axis linear/circular interpolation.

Continuous Contouring
The pre-register architecture of PCI-8102 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.

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-8102 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-8102 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-8102 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-8102 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
PCI-8102 offers hardware security protection for system designers’ software.
## Specifications

### Motion
- Number of controllable axes: 2
- Pulse output rate: 0.01pps to 6.5Mpps
- Max. Acceleration rate: 24500000°/sec²
- Speed resolution: 16-bit
- Encoder input rate: 6.95MHz under 4 x AB phase @ 1M cable
- Encoder counter resolution: 28-bit
- Positioning Range: -134, 217, 728 ~ +134, 217, 727 pulses (28-bit)
- Counters x 4 for each axis
- Comparators x 5 for each axis

### Motion Interface I/O Signals
- Position latch input pin: LTC
- Position compare output pin: CMP
- All I/O pins are differential and 2500Vmos 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
- Servo motor interface I/O pins: INP, ALM, ERC, SVON, RDY
- General DI pin: DI x 16 (P2 Connector)
- General DO pin: DO x 16 (P2 Connector)
- Pulse signal input: PA and PB
- Simultaneous Start/Stop Signal I/O Pins: STA and STP

## Software Support

### Windows Platform
VB/VC++, C/C++, Delphi/VB.NET are recommended programming environment.
Various sample programs with source codes
Customized API functions are possible

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

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

### Pin Assignment of 68-pin SCSI type Connector

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
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<tbody>
<tr>
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www.adlinktech.com
ADLINK PCI-8132 is a 2-axis motion control card based on PCI bus. The PCI interface provides plug-and-play feature that is the key to easy maintenance. The maximum number of cards in one system is 12 cards with capability of controlling 24 motors.

**Motion Control Principle**

The PCI-8132 can generate high frequency pulse train. The frequency of the pulse train controls the motor speed; the number of pulse controls the motor position. The differential input/output signals reduce noise interference. The command output options, including DIR/OUT mode and CW/CCW mode, provide an easy access to various stepper or servo amplifier.

**Velocity Profile**

The PCI-8132 offers versatile trajectory planning ability. The acceleration and deceleration time are programmable. The S-curve helps to avoid mechanism vibration. The hardware linear interpolation between two axes is powerful to reduce software computation effort.

**Operation Modes**

Various operation modes are available, such as continuous velocity motion, absolute move, relative move, manual pulser mode, simultaneous move, change speed on the fly, linear interpolation, and home return.

**Encoder Interface**

Incremental encoder interface is used for position feedback. The encoder counters provides the position information to correct the position error generated by inaccurate mechanical transmissions. The differential-type encoder feedback avoids noise interference. The 28-bit counters cover the position range for most applications.

**Mechanism Interface**

The pre-defined limit switch sensors on table are widely used to protect the mechanism. The dedicated I/O interface for end-limit, slow-down point, and origin is very useful for system integration.

**Servo Amplifier Interface & GPIO**

Some 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.

**Pulser Interface**

The handle-wheel pulser is widely used in machine applications, such as NC machine. Four pulser interfaces are available through the CN3 connector (10-pin).

**Interrupt Events**

Many hardware status can be used as interrupt events, such as limit switch, alarm, moving home ready, one movement finished, and so on.

**Applications**

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

Motion

Number of controllable axes: 2
Max. number of cards in one system: 12
0.03pps to 2.4Mpps programmable DIR/OUT, CW/CCW pulse command output
Max. acceleration rate: 91Mpps²
Speed resolution: 16-bit
One 28-bit counter for encoder input of each axis
Positioning range: -134,217,728 to +134,217,727 (28-bit)
Encoder input frequency: 2.4MHz @ 3M cable

Motion Interface I/O Signals

All I/O pins are 2500VRMS optically isolated
Incremental encoder signals input pins: D/R, E/A, EB
Encoder index signal input: EZ
Mechanical Limit/Switch signal input pins: ±EL, ±SD and ORG
Servomotor Interface I/O pins: INP, ALM, ERC
General DO pin: SVON
General DI pin: RDY
Pulser signal input: PA and PB
Simultaneous signal I/O pins: STA and STP
Position compare output pin: CMP (1 KHz for continuous triggering)

General-Purposed I/O

16-CH input & 16-CH output

Termination Board

• DIN-100S-01: General Purpose

DIN-100S-01

• DIN-812M0: For Mitsubishi MR-J2S-A Servo Amplifier

DIN-812M0

Ordering Information

PCI-8132 | Entry-level 2-axis stepper & servo motion control card with GPIO
DIN-812M0 | Termination board for Mitsubishi MR-J2S-A servo amplifier
DIN-100S-01 | Termination board for general purpose

Cable: ACL-102100

PCL-8137 Pin Assignment of the 100-pin SCSI-type Connector

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**PCI-8134**

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

---

**Introduction**

**PCI Interface**

ADLINK PCI-8134 is a 4-axis motion control card based on PCI bus. The PCI interface provides plug-and-play feature that is the key to easy maintenance. The maximum number of cards in one system is 12 cards with capability of controlling 48 motors.

**Motion Control Principle**

The PCI-8134 can generate high frequency pulse train. The frequency of the pulse train controls the motor speed; the number of pulse controls the motor position. The differential input/output signals reduce noise interference. The command output options, including DIR/OUT mode and CW/CCW mode, provide an easy access to various stepper or servo motor drivers.

**Velocity Profile**

The PCI-8134 offers versatile trajectory planning ability. The acceleration and deceleration time are programmable. The S-curve helps to avoid mechanism vibration. The hardware linear interpolation between two axes is powerful to reduce software computation effort.

**Operation Modes**

Various operation modes are available, such as continuous velocity motion, absolute move, relative move, manual pulser mode, simultaneous move, change speed on the fly, linear interpolation, and home return.

**Encoder Interface**

Incremental encoder interface is used for position feedback. The encoder counters provides the position information to correct the position error generated by inaccurate mechanical transmissions. The differential-type encoder feedback avoids noise interference. The 28-bit counters cover the position range for most applications.

**Mechanism Interface**

The pre-defined limit switch sensors on table are widely used to protect the mechanism. The dedicated I/O interface for end-limit, slow-down point, and origin is very useful for system integration.

**Servo Drive Interface & GPIO**

Some 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.

**Pulser Interface**

The handle-wheel pulser is widely used in machine applications, such as NC machine. Four pulser interfaces are available through the CN3 connector (10-pin).

**Interrupt Events**

Many hardware status can be used as interrupt events, such as limit switch, alarm, moving home ready, one movement finished, and so on.

---

**Features**

- 32-bit PCI bus, Rev. 2.2, 33MHz
- Pulse output rate up to 2.4MHz
- Pulse output options: OUT/DIR, CW/CCW
- 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 2500VRMS isolated
- Change speed on-the-fly
- 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 ASCII-based home return modes and 9 software-based home return modes
- More than 75 thread safe API functions

---

**Software Support**

**Windows® Platform**

Available for Windows Vista/XP/2000

Various sample programs with source codes

Customized API functions are possible

**LabVIEW® VIs**

The motion VIs of PCI-8134 for LabVIEW is available.

**MotionCreatorPro**

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

**Linux Platform**

RHEL 9, kernel 2.4.x
Fedora Core 3, kernel 2.6.6
Fedora Core 5, kernel 2.6.15
Fedora Core 4, kernel 2.6.11

---

**Applications**

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

#### Motion
- Number of controllable axes: 4
- Max. number of cards in one system: 12
- 0.03 pps to 2.4 Mpps programmable DIR/OUT, CW/CCW pulse command output
- Max. acceleration rate: 91 MPPS²
- Speed resolution: 16-bit
- One 28-bit counter for encoder input of each axis
- Encoder input frequency: 2 MHz (6 MHz for Mitsubishi MR-J2S-A)

#### Motion Interface I/O Signals
- All I/O pins are 2500VRMS optically isolated
- Incremental encoder signals input pins: DIR/OUT, EA/EB
- Encoder index signal input: EZ
- Mechanical Limit/Switch signal input pins: ±EL, ±SD and ORG
- Servo motor interface I/O pins: INP, ALM, ERC
- General DO pin: SVON
- General DI pin: RDY
- Pulser signal input: PA and PB
- Simultaneous signal I/O pins: STA and STP

#### Ordering Information

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<thead>
<tr>
<th>Product Code</th>
<th>Description</th>
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<td>PCI-8134</td>
<td>Entry-level 4-axis stepper &amp; servo motion control card</td>
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<tr>
<td>DIN-100S-01</td>
<td>For Mitsubishi MR-J2S-A Servo Amplifier</td>
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<tr>
<td>DIN-814Y0</td>
<td>For Yaskawa Sigma II Amplifier</td>
</tr>
<tr>
<td>DIN-814P-A40</td>
<td>For Panasonic MINAS A4 Amplifier</td>
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</tbody>
</table>

### Termination Board

- **DIN-100S-01**: General Purpose
- **DIN-814M0**: For Mitsubishi MR-J2S-A Servo Amplifier
- **DIN-814M-J3A0**: For Mitsubishi MR-J3-A Amplifier
- **DIN-814PA0**: For Panasonic MINAS A Servo amplifier
- **DIN-814Y0**: For Yaskawa Sigma II Amplifier
- **DIN-814P-A40**: For Panasonic MINAS A4 Amplifier

#### PCI-8134 Pin Assignment of the 100-pin SCSI-type Connector

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```

### Controls

- **MotionCreatorPro™**
- **Speed Profile Preview**
- **Multiple Axes Access within One Window**

---

www.adlinktech.com 4-18
**cPCI-8168**

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

---

**Introduction**

**6U CompactPCI Interface**

The cPCI-8168 is an 8-axis motion control cards based on CompactPCI bus. The CompactPCI interface provides plug-and-play feature that is the key to easy maintenance. The maximum number of cards in one system is 6 cards with capability of controlling 48 motors.

**Motion Control Principle**

The cPCI-8168 can generate high frequency pulse train. The frequency of the pulse train controls the motor speed; the number of pulse controls the motor position. The differential input/output signals reduce noise interference. The command output options, including DIR/OUT mode and CW/CCW mode, provide an easy access to various stepper or servo motor drivers.

**Support HSL network**

One HSL network port is inside. It is easy for users to realize centralized motion control and distributed I/O control with one board.

**Velocity Profile**

The motion control ASIC performs versatile trajectory planning ability. The acceleration and deceleration time are programmable. The S-curve helps to avoid mechanism vibration. The hardware linear interpolation between two axes is powerful to reduce software computation effort.

**Operation Modes**

Various operation modes are available, such as continuous motion, absolute move, relative move, simultaneous move, change speed on-the-fly, linear interpolation, and home return.

**Encoder Interface**

Incremental encoder interface is used for position feedback. The encoder counters provides the position information to correct the position error generated by inaccurate mechanical transmissions. The differential-type encoder feedback avoids noise interference. The 28-bit counters cover the position range for most applications.

**Mechanism Interface**

The pre-defined limit switch sensors on table are widely used to protect the mechanism. The dedicated I/O interface for end-limit and origin is very useful for system integration.

**Servo Drive Interface & GPIO**

Some 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-purposed digital input/output for each axis is provided.

**Interrupt Events**

Many hardware status can be used as interrupt events, such as limit switch, alarm, moving home ready, one movement finished, and so on.

**Analog Inputs, Analog Outputs**

Data Acquisition functions are widely used in system integration for machine automation. 4 analog inputs and 4 analog outputs channels are provided.

---

**Software Support**

**MotionCreator™**

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

Motion
Number of axes: 8 axes
Pulse output rate: 0.01pps to 6.5Mpps
Max. Acceleration rate: 245Mpps²
Encoder input rate: 6.55MHz under 4 x AB phase @ 1M cable
Max. Positioning range: -134,217,728 to +134,217,727 pulses (28-bit)

High Speed Link (HSL) Port
Connector: RJ45
Cable: Shield 100Base/TX Ethernet cable
Wiring Distance: 200 meters
Transmission Speed: 6Mbps
I/O Refreshing Rate: 30.4 µs sec per slave ID

General Purpose I/O
Digital Input: 8 channel isolated digital input
Input Voltage: 0 to 24V
Input Resistance: 2.4KΩ @ 0.5W

Analog Input (A/D)
Converter and Resolution: 12-bit LTC1402
Input Channels: 4 Single-Ended
Input Range: ±10V Bipolar
Conversion Time: 4µs
Sampling Rate: Max. 110K samples/sec
Output Voltage: Min. 5 V
Max. 35 V
Over Voltage Protection: Continuous ±35 V
Accuracy: 0.01% of FSR ±1LSB

Analog Output (D/A)
Converter and Resolution: 16-bit, AD1866R
Output Channels: 4 Single-Ended
Output Range: ±10V Bipolar
Setting Time: 2µs (-10 V to + 10 V)

LED display
Motion chipset busy display
HSL communications error

cPCI-8168 Pin Assignment of the 68-pin VHDCI Connector

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<thead>
<tr>
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<th>Pin Assignment</th>
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www.adlinktech.com
### Introduction

**4-axis Stepper Motion Controller**

The ADLINK PCI-8144 is a pulse train motion controller ideal for stepper motor control. This controller provides T/S curve control, on-the-fly speed change, non-symmetric acceleration and deceleration control, and simultaneous start/stop functions. This controller also offers card index settings for multiple cards in one IPC system and a hardware security function to prevent unauthorized use of in-house developed applications.

**Velocity Override**

The PCI-8144 offers powerful speed change functions that can be executed while the axis is moving. After motion begins, the target speed can be changed as needed according to the application.

**Simultaneously Start/Stop**

By using either a software function or external input signal, the PCI-8144 can perform simultaneously starts and stops on multiple axes in a one-card configuration, or multiple axes in a multiple-card application. The simultaneously stop function can be selectively active when an axis (or axes) stops abnormally.

**Hardware Emergency Input**

The PCI-8144 provides hardware emergency control via the wiring. When the hardware button is pressed, a hardware emergency function is triggered and the motion controller will cease sending pulses.

**Application Security**

PCI-8144 offers hardware security protection for in-house developed applications to prevent unauthorized use and copying.

### Specifications

**Motion**

- Number of channels: 4
- Pulse output rate: 0.5pps to 2.4Mpps
- Max. acceleration rate: 737Mpps²
- Speed resolution: 16-bit

**I/O Signals**

- I/O signals are optically isolated with 2500VRMS isolation voltage
- 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**

- Connections: 68-pin SCSI-type connector
- Operating temperature: 0°C to 50°C
- Storage temperature: -20°C to +80°C
- Humidity: 5% - 85%, non-condensing

**Power Consumption**

- Power supply (input): +24 VDC ±5%
- External power supply (output): +5VDC ±5%, 100mA (max)

### Pin Assignment

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</table>
MotionCreatorPro™

Universal User Interface Utility for ADLINK Pulse Train Motion Controller™

ADLINK MotionCreatorPro is a new utility that can graphically display the speed profile to familiarize users with motion control manipulation. This universal user interface for all ADLINK pulse train motion controllers provides single axis, multiplaxes, and interpolation simulation. By previewing the speed profile, users can check and adjust the speed profile setting simultaneously.

Universal User Interface for ADLINK Pulse Train Motion Controllers

All ADLINK pulse train motion controllers and simulation functions are shown here.

Easy to understand hardware & software version

Multiple Axes Simulation within One Window

Up to 4 axes can be simulated at once

Running speed profile can be monitored instantaneously

Universal User Interface for ADLINK Pulse Train Motion Controllers

Speed profile can be previewed. Users can check and adjust the speed parameters simultaneously

Motion Parameters Settings can be Saved and Reused in Users’ Program

Press "Save Config" button to save the configuration setting of the motion control parameters.

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**PCI-8392/PCI-8392H**

SSCNET III 16-axis Motion Controller

**Introduction**

ADLINK PCI-8392/PCI-8392H is an advanced SSCNET III 16-axis motion controller based on PCI bus. The PCI bus features plug-and-play function and maximum installation is up to 12 cards in one system. PCI-8392 and PCI-8392H offer the following advantages:

- **Advantages**
  - Easy wiring and time-deterministic servo update
  - Command synchronization
  - Easy maintenance
  - Meet maximum motor speed and maximum encoder resolution (18-bit) simultaneously
  - Parameter setting and tuning by software
  - Absolute encoder support

**Extra advantages for PCI-8392H users**

- One card to simultaneously meet the servo network and distributed I/O configuration
- High cost/performance: Users can benefit from combining SSCNET III and HSL into one card and save the PCI slot, PC system size and cost.
- Distributed I/Os are up to 2016 points and refreshed within 1ms
- Reduce controller size. (No more need large backplane to install multiple cards)

**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
  - PCI-8392/PCI-8392H stops motion control if the EMG1 signal is activated.
- **LED Indicator (LED1)**
  - Red & green light to indicate the communication status of SSCNET III and HSL bus
- **Board ID Selection**
  - DP switch selection
  - ID is available from 0 to 15
- **HSL bus**
  - Only available for PCI-8392H version
  - For HSL bus, please refer to chapter 6 High Speed Link
- **General Specifications**
  - Operating temperature: 0°C to 50°C
  - Storage temperature: -20°C to +80°C
  - Humidity: 5% - 85%, non-condensing

**Board Features**

- 32-bit PCI bus, Rev 2.2, 33MHz
- Servo Interface: SSCNET 3 protocol
- Controllable axes up to 16 axes
- High speed network communication bus up to 50Mbps
- Servo update rate: 0.444ms for 8 axes, 0.888ms for 16 axes
- On-board DSP: TI TMS320C6711 250MHz to process the synchronization (RTOS is not needed)
- Fiber cable connection ensures the best communication quality
- Easy and reduced wiring up to 20/50 meters between servo drivers (POF/HPCF fiber cable)
- 32-bit position command resolution

**Function Features**

- Function Features
  - No command frequency limitation
  - Runtime data logging for debug and machine monitoring
  - On-line servo tuning and full servo parameter management
  - High speed servo information sampling
  - Excellent performance in axis synchronous control
  - Programmable acceleration rate for T/S-curve profile
  - Up to 4 axes linear interpolation positioning
  - Up to 3 axes circular interpolation positioning
  - Velocity moving function
  - Jogging function
  - Absolute positioning system
  - Speed override and position override function
  - Auto home returning function
  - Programmable interrupt events
  - Security protection for user’s program
  - Board ID switch selection from 0 to 15
  - Watch dog timer for safety
  - External emergency input pin (Jumper selection)
  - One HSL bus is available for PCI-8392H
  - Supports up to 16 boards in one system
  - Free MotionCreator software for system setup and servo parameters management
New Version, Faster Processing Speed

Mitsubishi J3-B Servo Features
- High resolution encoder of Mitsubishi J3 servo motor up to 18-bit (262,144 pulse/rev)
- PEL-MEL/ORG on Mitsubishi J3-B servo drive to save the wiring from motion controller

Software Support
Windows® Platform
VB/VC+/BCB/Delphi are recommended programming environment.

Ordering Information
<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI-8392</td>
<td>SSCNET III Motion Controller</td>
</tr>
<tr>
<td>PCI-8392H</td>
<td>SSCNET III Motion Controller with one HSL bus</td>
</tr>
</tbody>
</table>

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 (Support 3.3V & 5V)
- Board ID selection (0 to 15)

MotionCreator™
- Single Axis Operation
- Servo Driver Parameters
- Servo Tuning
- XY Move Operation

Source: Mitsubishi Electric Corporation

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Introduction

Serial-Connection Multi-Axis Motion Controller
ADLINK cPCI-8312H is a 12-axis motion control card based on CompactPCI bus. They contain two main features: SSCNET II motion control and HSL network control. SSCNET II motion control allows users to connect Mitsubishi servo motors to realize high performance and to benefit from absolute synchronization mechanism.

HSL network control also allows users to take advantage of the high-speed, real-time, and distributed connection while building up the entire application. These two main features can meet users’ requirement in motion and distributed I/O control simultaneously. The CompactPCI interface offers plug-and-play feature that is key to easy maintenance. The maximum number of cards in one system is 12 cards, offering users the following advantages:

Advantages of SSCNET II
• Easy-wiring and real-time motion control
• Command synchronization
• Easy maintenance
• High-resolution/High Speed
• 32-bit command resolution
• Up to 30 meters control distance
• Parameter setting and tuning by software
• Absolute position command control

Advantage of HSL
• High-Speed communication and remote data exchange
• Real-time scanning
• Easy wiring
• Huge Number of I/O points
• Easy and flexible I/O expansion
• Remote motion control available, connecting up to 60 axes in one HSL network port

Motion Control Principle
The motion command is accomplished by the host PC and the DSP on cPCI-8312H. DSP accomplished the synchronization between users’ program control and SSCNET update cycle. Motion profiles are split into several frames and transferred to the DSP via DPRAM. According to these frames, DSP calculates the absolute position of all axes in one control cycle and send each position to the individual driver via the *SSCNET II at the same cycle. The cPCI-8312H can also collect data from the servo driver via the SSCNET II at the same cycle including servo parameter, position, speed, torque etc. The cycle time is 0.888ms which is defined in *SSCNET II protocol.

Operation Modes
Single axis motion; Linear interpolation; Circular interpolation mode; multi-axis simultaneous start motion; contour motion; change speed/position on-the-fly; and home return modes.

Mechanism Interface
Dedicated limit switch and origin input points for each axis.

General Purpose I/O
2 isolated digital output channels.

Pulse Train Interface
This board offers users 2 pulse train output channels for users to connect pulse train type servomotors. The maximum frequency is 4.16MHz.

Interrupt Events
The hardware interrupts are transformed into software events or signals. An event driven applications under multi-tasking OS can be realized by this way.

Analog Inputs and Outputs
These are two modes for analog: Direct +/-10 volts output with 16-bit resolution and velocity command monitoring. 2 analog inputs are also realized by this way.

Servo Amplifier/Motor Support
ADLINK cPCI-8312H is designed for SSCNET II series servo amplifier/motor including MR-J2S-B and MR-J2M-B.

*For HSL introduction, please refer to chapter 6.
*SSCNET II: Servo System Control Network defined by Mitsubishi Electric Co.
Motion Control

Motion Interface I/O Signals

Analog Output (D/A):
- Resolution: 16-bit
- Programmable input range: ±10V, ±5V, ±2.5V
- Auto calibration
- Sampling rate: 250ks/sec

Analog Input (A/I):
- Resolution: 16-bit
- Auto calibration
- Sampling rate: 250ks/sec

Pulse Train Output:
- OUT/DIR, CW/CCW AB phase selectable
- Max. output frequency: 4.16 MHz
- Isolated voltage: 500V

General-Purposed I/O:
- 2 channels open collector output
- Sink current: 4mA
- Bandwidth 10KHz

Motion Interface I/O Signals

Single Axis Operation

Servo Driver Parameters

Servo Tuning

XY Move Operation

HSL Master Utility

HSL Module Utility

MotionCreator™

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

Specifications

Motion Control
- Cycle time: 0.888ms
- Number of controllable axes: 12
- Max. number of cards in one system: 12
- Encoder feedback: 3-CH, 32-bit, Up/Down counter up to 5MHz

Motion Interface I/O Signals
- External encoder signals input pins: EA and EB
- Encoder index signal input: EZ
- Mechanical limit switch and origin signal input pins: ±EL and ORG

General-Purposed I/O
- 2 channels open collector output
- Sink current: 4mA
- Bandwidth 10KHz

Analog Input (A/I)
- Resolution: 16-bit
- Programmable input range: ±10V, ±5V, ±2.5V
- Auto calibration
- Sampling rate: 250ks/sec

Analog Output (D/A)
- Resolution: 16-bit
- Output channels: 2 single-ended channels
- Output range: ±10V, Bipolar
- Setting time: 10µs
- Output driving ±5mA

Pulse Train Output
- OUT/DIR, CW/CCW AB phase selectable
- Max. output frequency: 4.16 MHz
- Isolated voltage: 500V

Software Support

Windows® Platform
- VB/V++/BCB/Delphi are recommended programming environment.

MotionCreator™

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

Ordering Information

CPCI-8312H 6U CompactPCI SSCNETII 12-axis motion control card with HSL network
DIN-68S-01 Termination Board for CNS

SP1 Pin assignment

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<th>DO2</th>
<th>PE2</th>
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</table>

www.adlinktech.com
PCI-8372+/PCI-8366+

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

Introduction

Serial-connection Multi-Axis Motion Controller
ADLINK PCI-8372+/PCI-8366+ is a 12/6-axis motion control cards based on PCI bus. The PCI interface provides plug-and-play feature that is the key to easy maintenance. The maximum number of cards in one system is up to 12 cards, offering users the following advantages.

Advantages
• Easy-wiring and time-deterministic
• Command synchronization
• Easy-maintenance
• Maximum motor speed can be achieved under maximum motor resolution (17-bit)
• 32-bit command resolution
• Connecting distance up to 30 meters
• Parameter setting and tuning by software
• Absolute encoder control (ABS position) control

Motion Control Principle
The motion command is accomplished by the host PC and the DSP on PCI-8372+/PCI-8366+. DSP accomplished the synchronization between users' program control and SSCNET update cycle. Motion profiles are split into several frames and trans-ferred to the DSP via DPRAM. According to these frames, DSP calculates the absolute position of all axes in one control cycle and send each position to the individual driver via the *SSCNET II at the same cycle. The PCI-8372+/8366+ can also collect data from the servo driver via the *SSCNET II at the same cycle including servo parameter, position, speed, torque etc. The cycle time is 0.888ms which is defined in *SSCNET II protocol.

Operation Modes
Single axis motion; Linear interpolation; Circular interpolation mode; multi-axis simulta-neous start motion; contour motion; change speed on the fly; and home return modes.

Mechanism Interface
Dedicated limit switch and origin input points for each axis.

General Purpose I/O
2 Isolated DI, 2 open collector output DO are included to provide general purpose I/O.

Interrupt Events
The hardware interrupts are transformed into softrware events or signals. An event driven applications under multi-tasking OS can be realized by this way.

Analog outputs
These are two modes for analog: Direct 16 bits +/-10 volts output, velocity command monitoring.

Hardware Synchronization
The PCI-8372+/PCI-8366+ can be synchronized via the CN4 connector between every card.

Servo Amplifier/Motor Support
ADLINK PCI-8372+/PCI-8366+ is designed for *SSCNET II series servo amplifier/motor including MR-J2S-B and MR-J2M-B.

*SSCNET II
Servo System Control Network proposed by Mitsubishi Electric Co.
MotionCreator™

Specifications

Motion Control
- Cycle time: 0.888ms
- Number of controllable axes: 12/6 axes for PCI-8372+/PCI-8366+
- Max. number of cards in one system: 12
- Encoder feedback: 3-CH, 32-bit, up/down counter up to 5MHz

Motion Interface I/O Signals
- External encoder signals input pins: EA and EB
- Encoder index signal input: EZ
- Mechanical limit switch and origin signal input pins: ±EL and ORG

General-Purposed I/O
- 2 channels isolated digital inputs
  - Input voltage: 0 to 24 V
  - Input resistance: 2.4KΩ @0.5W
  - 2 channel open collector output
  - Sink current: 4mA
  - Bandwidth 10KHz

Analog Output (D/A):
- Resolution: 16 bits
- Output channels: 2 Single-Ended channels
- Output range: ±10V, Bipolar
- Setting Time: 10µs
- Output driving: ±5mA

Software Support

Windows® Platform
- VB/VC++/BCB/Delphi are recommended programming environment.

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

Termination Board
- Termination board for CN5

Ordering Information

CN5 Pin Assignment

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
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<tbody>
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Ordering Information

PC-8372+ PCI Bus SSCNETII 12 axes motion control card
PC-8366+ PCI Bus SSCNETII 6 axes motion control card
DIN688-01 Termination board for CN5

DIN-68S-01
The PCI-8136 is a high performance industrial counter and Multi-I/O card. What makes it special is the ADPIO function, which is the abbreviation of Analog/Digital/Pulse Input/Output.

**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 500KHz
- 6-CH 32-bit position compare with interrupt function
- 6-CH 16-bit +/-10V analog output
- 6-CH 12-bit 133KHz analog single-ended input
- 15-CH opto-isolated DI, 7-CH open collector DO
- Digital I/Os and counters are 2500Vdc opto-isolated
- One 24-bit programmable timer with interrupt
- Auto-calibration for analog I/O
- More than 50 thread safe API functions

**Introduction**
The PCI-8136 is a high performance industrial counter and Multi-I/O card. What makes it special is the ADPIO function, which is the abbreviation of Analog/Digital/Pulse Input/Output.

- Analog Input: 6 channels
- Analog Output: 6 channels
- Digital Input: 19 channels
- Digital Output: 7 channels
- Pulse Input (Industrial Counter): 6 channels
- Pulse Output (Pulse Generator): 6 channels

Besides, the PCI-8136 provides some useful functions for industrial applications.

- One 24-bit programmable interrupt timer with 33MHz base clock
- Position compare: 6 channels

**Analog Output**
The PCI-8136 provides 6 16-bit digital-to-analog converter channels. The output voltage ranged from -10V to +10V. The Analog outputs are all single ended with common ground "AGND".

**Digital Input**
The PCI-8136 provides 19 digital inputs with 2500 Vrms isolation. The system recognizes a logical "1" when no current goes from COM+ to DIO and, Logical "0" is returned when current goes from COM+ to DIO. The max current passing through DIO must be less than 20mA.

**Digital Output**
The PCI-8136 provides 7 open collector outputs with 2500 Vrms isolation. The maximum output switching frequency is 10KHz, and the continuous output supply current is subject to 500mA/ (total), 100mA/CH (typical), and 268mA/CH (max).

**Pulse Input (Industrial Counter)**
The PCI-8136 provides 6 differential pulse inputs with 2500 Vrms isolation. The pulse mode is software programmable to be AB-phase, CW/CCW, or Pulse/Direction, and the counter speed goes up to 2MHz.
**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): ±5%, 900 mA (max.)
  - External power supply (input): +5V, ±5%, 500mA (max.)
  - External power supply (output): +5V, ±5%, 500mA (max.)
- Dimension: 164mm (L) x 98.4mm (H)

**Pulse Input (Industrial Counter)**

- 6 differential input channels
- 32-bit counter for AB-phase, CW/CCW, Pulse/Direction
- 2500VDC optical isolation
- Max. counter speed: 3MHz

**Pulse Output (Pulse Generator)**

- 6 output channels with differential Drivers
- Pulse command type: CW/CCW, Pulse/Direction, A/B Phase
- Max. pulse rate: 500KHz

**Analog Input**

- Channel Numbers: 6 differential/single-end input channels
- Input Range: ±10V
- Current: 0-20mA
- Input Impedance: 40KΩ (Voltage)
- Approx: 120Ω (Current)
- Sampling Rate: 133KHz multiplexing

**Analog Output**

- Channel Numbers: 6 output channels
- Output Range: ±10V
- 16-bit DAC resolution, 14-bit accuracy guarantee
- Setting Time: 2µs

**Digital Output**

- Channel Numbers: 7 output channels
- Output Type: open collector
- Sink Current: 100mA (typical)
- Isolated Voltage: 2500VDC
- Throughput: 100KHz (0.1ms)

**Timer**

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

**Software Support**

**Windows® Platform**


VB/VBC/VC/BDE/Dephi are recommended programming environment.

**Linux Platform**

- Fedora Core 3, kernel 2.6.9
- Fedora Core 4, kernel 2.6.11

**Termination Board**

- Termination board for general purpose

**Ordering Information**

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

DIN-100S-01 Termination board for general purpose
PCI-8124

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

Features
- 32-bit PCI bus, Rev. 2.2, 33MHz
- Support both PCI-X (3.3V) and PCI (5V) slot
- Card index switch selection
- Four 32-bit quadrature encoder input and trigger output channels
- Trigger output up to 5MHz
- Encoder input up to 10MHz
- Trigger pulse width up to 3.7ms
- Encoder input frequency: Up to 5MHz
- Trigger output frequency: Up to 1MHz
- Encoder input interface: OUT/DIR, CW/CCW, and 1x, 2x, 4x A/B phase
- Input / Output circuit source can be selectable: TTL/ Open Collector (with isolation)
- Four 32-bit comparators where source can be configurable
- Internal high-speed FIFO for 4 32-bit comparators as data reload buffer
- Each channel can store 5023M points (32-bit)
- Trigger pulse width is software programmable from 0.1 µs to 3.2765ms
- Each trigger output channel is selected from all comparators, manual trigger commands, EZ signal and timers by demands
- 4 comparators for comparing encoder counter and FIFO data
- 10 comparators for comparing encoder counter and linear data
- Each encoder counter source is selected from encoder input pins or timers
- Comparator data is updated by next FIFO data or linear data when encoder counter is compared and trigger is outputted
- 14 comparators can select one of 4 trigger output channels individually
- 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 input pin can be used for general purpose input
- Latch input logic is selectable by rising or falling edge
- Encoder counter can be cleared via EZ input pin as zero operation by rising or falling edge
- Programmable interrupt sources from linear data finished, triggered, FIFO empty/full, latched, TTL input on.
- Switch setting for trigger output default level while power on
- Trigger output pin logic programmable

Software Support
Windows® Platform
VB/V/BCB/Delphi are recommended programming environment.

Ordering Information
PCI-8124 Advanced 4-CH encoder card with high-speed triggering function
DIN-505 Termination board with 50-pin SCSI-II connector with DIN socket

Specifications

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<th>Counter</th>
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<tr>
<td>Number of Channels</td>
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<td>Maximum Trigger</td>
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<td>Pulse Frequency</td>
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<tr>
<td>Encoder Counter</td>
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<td>Comparator</td>
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<td>FIFO Capacity</td>
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<tr>
<td>Maximum Encoder</td>
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<tr>
<td>Input Frequency</td>
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<tr>
<td>Trigger Pulse width</td>
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<tr>
<th>I/O Signals</th>
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<tr>
<td>Partial I/O Signals</td>
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<tr>
<td>Partial I/O Signals</td>
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<tr>
<td>Encoder Signals Input Pins</td>
</tr>
<tr>
<td>Encoder Index Signal</td>
</tr>
<tr>
<td>Input Pin</td>
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<tr>
<td>Position latch Input Pin</td>
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<tr>
<td>Trigger Pulse Output Pin</td>
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<th>General Specifications</th>
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<tr>
<th>Power Consumption</th>
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<td>External Power Supply (output)</td>
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<tr>
<th>Pin Assignment</th>
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<tr>
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</table>
**MNET-J3/MNET-S23/MNET-MIA**

Motionnet Distributed Single-axis Motion Control Module

### Features
- Compact & single-axis connection
- One Motionnet master can connect up to 64 axes
- Support Mitsubishi J3, Panasonic MINAS A, and Yaskawa Sigma II and V series
- The distributed distance up to 100m with CAT-5 cable
- The scanning cycle time up to 0.97 ms when 64 axes are connected at 20 Mbps
- Point-to-point application can be easily completed with multiple single-axis modules
- Supports linear/S-curve acceleration and deceleration

### Specifications

#### Counter
- **Required Power**: 24 V ±10%, 110 mA (Typ.)
- **Power Indicator**: Displays the status of the 3.3 Vdc internal control power using a red LED.
- **Operating Temperature Range**: 0 to 40 °C
- **Operating Ambient Humidity**: 80% RH or less (Non-condensing through the 10 °C to 40 °C range)
- **Measures for Environmental Problem**: Complies with the EU RoHS requirement
- **Vibration Proof**: Complies with JIS C0040
- **Weight Approximately**: 50 g
- **Dimensions**: 52.4 x 16.3 x 69.5 mm (W x H x D)

#### Connection

**CN1/CN2 Pin Assignment**

<table>
<thead>
<tr>
<th>No.</th>
<th>Signal name</th>
<th>Function</th>
<th>Signal direction</th>
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<tbody>
<tr>
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<td>PEL</td>
<td>Positive and limit</td>
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<tr>
<td>2</td>
<td>MEL</td>
<td>Negative end limit</td>
<td>I</td>
</tr>
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<td>3</td>
<td>SD/OPP</td>
<td>Shaded input / comparator output (+/-)</td>
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<td>4</td>
<td>ORG</td>
<td>Zero position input</td>
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<td>EMG</td>
<td>Emergency stop input</td>
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<td>6</td>
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<td>Comparator output (–)</td>
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<tr>
<td>7</td>
<td>24V</td>
<td>24Vdc Power source</td>
<td>I</td>
</tr>
<tr>
<td>8</td>
<td>GND</td>
<td>Ground</td>
<td>I</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
<td>Ground</td>
<td>I</td>
</tr>
<tr>
<td>10</td>
<td>FG</td>
<td>Frame ground</td>
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</table>

#### LED Indicator

**CN3 Pin Assignment**

<table>
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<tr>
<th>No.</th>
<th>Signal name</th>
<th>Function</th>
<th>Signal direction</th>
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<tbody>
<tr>
<td>1</td>
<td>PEL</td>
<td>Positive end limit</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>MEL</td>
<td>Negative end limit</td>
<td>I</td>
</tr>
<tr>
<td>3</td>
<td>FG</td>
<td>Frame ground</td>
<td>-</td>
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</tbody>
</table>

**Power indicators LED (3.3V)**

**Communication status RUN LED**

**Communication status ERR LED**

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

### Ordering Information

- **MNET-J3**: Motionnet Distributed Single-Axis Motion Control Module for Mitsubishi J3-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

www.adlinktech.com
HSL-4XMO-CG-N/-P, HSL-4XMO-CD-N/-P

4-axis Pulse Train Motion Control Module

General Features
- HSL communication protocol
- Transmission speed selectable: 3/6/12Mbps
- Support for Half / Full Duplex Mode
- On-board DSP
- 4-axis pulse train Output channels
- Up to 60 axes on a single HSL Network
- Motion point table management
- Motion script download (G-Code-Like Language)

Motion Control Features
- Pulse train frequency up to 6.55MHz
- Point-to-point motion
- On-the-fly speed/position change
- 13 home return modes
- 4 axes high-speed position counter latches
- Dedicated motion I/O: EL, ORG, INP, RDY, SVON, ERC, and ALM
- Pulse output options: OUT/DIR or CW/CCW
- 2~4 axes linear interpolation
- 2 axes circular interpolation
- Continuous Contouring
- Hardware position compare and trigger
- Automatic Backlash Compensation
- 13 Home Return Modes

Notes:
1. HSL-4XMO-CG-N/-P provides general-purpose interface for connection. Users can easily connect steppers, linear motors, and other pulse train type amplifiers.
2. HSL-4XMO-CD-N/-P provides D-sun interface for connection. Users can easily connect servo motors with a transfer cable.

Specifications
- Slave ID consumption: 4
- Number of controllable axes: 4
- Maximum number of HSL-4XMO in single HSL network: 15
- Position range (28 bit): Pulse output is programmable to be OUT/DIR or CW/CCW
- 28-bit up/down counter for encoder feedback signal -134217728 to +134217728 pulse
- General-purpose input type: NPN/PNP jumper selectable
- General-purpose input voltage: ON: 6.5V to 24V
- OFF: 0 to 3V
- General-purpose output: N for NPN sinking type output
- P for PNP sourcing type output
- General-purpose output current: ±90mA (Max.)
- Power Supply: 22Vdc to 26Vdc
- Power Consumption: 8W
- CE Certification: Ready

Introduction
4-Axis Pulse Train Control Module
ADLINK HSL-4XMO-CG-N and HSL-4XMO-CD-N are 4-axis pulse train motion control modules based on HSL bus. Compared with traditional PCI boards, distribution solution can let users benefit from wire-saving, space-saving, and cost-effective advantages. One HSL bus can support up to 60 axes pulse train motion control. Besides, HSL-4XMO offers point table management which can save the moving points into the module and make movement without consuming CPU resource.

Velocity or Position Override
The HSL-4XMO 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 HSL-4XMO provides linear interpolation by any 2, any 3, or even all-4 axes. Besides any 2 axes can perform circular interpolation.

Continuous Contouring
The pre-register architecture of HSL-4XMO offers the feature to build the continuous interpolation function, ie, the 2nd motion may follow previous motion instantly without latency. Thus perfect velocity continuity can be established.

Hardware Position Compare and Trigger Output
The HSL-4XMO 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 while almost no CPU resource is needed.

Automatic Backlash Compensation
Whenever direction change is occurred, the HSL-4XMO 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 HSL-4XMO provides 13 home moving modes for users to choose as their best convenience.

*For HSL introduction, please refer to chapter 6.
Cable Accessories

**MR-J2HBUS M**
- Controller to amp. bus cable
- Available for 2M, 5M

**MR-J2HBUS M(CAN)**
- Controller to amp. bus cable
- Available for 2M, 5M

**MR-JCCBCL M**
- Encoder cable (for KFS series)
- Available for 2M, 5M

**MR-JHSCBCL M**
- Encoder cable (for SFS series)
- Available for 2M, 5M

**SSCNET Y Cable**
- Controller to amplifier bus cable, 50pin to open wire
- Suitable for Panasonic A4 servo and Yaskawa Sigma II, III and V servo

**ACL-50P M**
- Controller to amplifier bus cable, 50-pin to 50-pin
- Available for 1M, 2M, 3M
- Suitable for Panasonic A4 servo and Yaskawa Sigma II, III and V servo

**ACL-50P M-OPEN**
- Controller to amplifier bus cable, 50-pin to open wire
- Available for 2M, 3M
- Suitable for Panasonic A4 servo and Yaskawa Sigma II, III and V servo

**HSL-4XMO-DM Cable**
- For HSL-4XMO-CD-N/-P
- For Mitsubishi MR-J2S-A servo amplifiers

**HSL-4XMO-DP Cable**
- For Panasonic MNAS A4 servo amplifier with brake control
- For HSL-4XMO-CD-N/-P

**ACL-10568-1**
- 68-pin SCSI-I cable
- Available for 1M, 2M, 1.5M, 3M, 5M

**ACL-102100**
- 68-pin SCSI-II cable
- Available for 0.5M to 10M

**ACL-10250**
- 50-pin SCSI-II cable
- Available for 1M, 2M, 1.5M, 4M, 6M

**ACL-10232**
- DB-9 RS-232 male-female cable
- Available for 5M

**ACL-10337**
- Two 20-pin header to DB-37 PC back panel

**ASS PCI-8134**
- +24V power core for motion card

**RJ45-DB9M**
- Flat cable connection between DB-8151 and DB-8151-RJ45
- Flat cable connection between DB-8153 and DB-8153-RJ45

**CB-MLPT-S1M**
- Mini LPT to single open cable
- Available for 5M

**MA-J3BUS M**
- Mini LPT to single open cable, SSCNET III fiber cable
- Available for 0.15M, 0.3M, 0.5M, 3M, 5M

www.adlinktech.com
DIN Rail Screw Termination Boards

Compatible Termination Boards for Motion Control Cards

<table>
<thead>
<tr>
<th>Product Name</th>
<th>DIN-100S-01</th>
<th>DIN-68S-01</th>
<th>DIN-68M-J2A0</th>
<th>DIN-68M-J3A0</th>
<th>DIN-68Y-SG50</th>
<th>DIN-68P-J40</th>
<th>DIN-812M0</th>
<th>DIN-814M0</th>
<th>DIN-814M-J3A0</th>
<th>DIN-814Y0</th>
<th>DIN-814PA0</th>
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For Mitsubishi Servo Terminal Boards

**DIN-812M0**
- Termination Board for Mitsubishi MR-J2S-A servo amplifiers with 100-pin SCSI connector
- Dimensions: 123 x 107 x 44 mm (W x L x H)
- Mating cables:
  - ACL-102100
  - SCSI-VHDCI 100P Cable

**DIN-814M0**
- Termination board for Mitsubishi MR-J2S-A servo amplifiers
- Dimensions: 123 x 107 x 44 mm (W x L x H)
- Mating cables:
  - ACL-102100
  - SCSI-VHDCI 100P Cable

**DIN-68M-J2A0**
- Termination board for Mitsubishi MR-J2A servo amplifiers
- Dimensions: 103 x 83 x 43 mm (W x L x H)
- Mating cables:
  - ACL-10568-1
  - ACL-10569-1

**DIN-814M-J3A0**
- Termination board for Mitsubishi MR-J3-A servo amplifiers
- Dimensions: 123 x 107 x 44 mm (W x L x H)
- Mating cables:
  - ACL-102100
  - SCSI-VHDCI 100P Cable

**DIN-68M-J3A0**
- Termination board for Mitsubishi MR-J3-A servo amplifiers
- Dimensions: 103 x 83 x 43 mm (W x L x H)
- Mating cables:
  - ACL-10568-1
  - ACL-10569-1
**DIN Rail Screw Termination Boards**

### For Yaskawa Servo Terminal Boards

**DIN-814Y0**
- Termination board for Yaskawa Sigma-II servo amplifiers
- Compatible with Yaskawa Sigma-II servo amplifiers
- Dimensions: 123 x 107 x 44 mm (W x L x H)
- Mating cables:
  - ACL-102100
  - SCSI-VHDCI 100P Cable

**DIN-68Y-SG10**
- Termination board for Yaskawa SIGMA-II servo amplifiers
- Compatible with Yaskawa SIGMA-II servo amplifiers
- Dimensions: 93 x 83 x 43 mm (W x L x H)
- Mating cables:
  - ACL-10658-1
  - ACL-10659-1

### For Panasonic Servo Terminal Boards

**DIN-814P-A40**
- Termination board for Panasonic MINAS A4 servo amplifiers
- Compatible with Panasonic MINAS A4 servo amplifiers
- Dimensions: 123 x 107 x 44 mm (W x L x H)
- Mating cables:
  - ACL-102100
  - SCSI-VHDCI 100P Cable

**DIN-68P-A40**
- Termination board for Panasonic MINAS A4 servo amplifiers
- Supports 100k & 2Mpps pulse frequency input options
- Dimensions: 93 x 83 x 43 mm (W x L x H)
- Mating cables:
  - ACL-10658-1
  - ACL-10659-1

**DIN-814PA0**
- Termination board for Panasonic MINAS A servo amplifiers
- Compatible with Panasonic MINAS A servo amplifiers
- Dimensions: 123 x 107 x 44 mm (W x L x H)
- Mating cables:
  - ACL-102100
  - SCSI-VHDCI 100P Cable

### For General Wiring Terminal Boards

**DIN-100S-01**
- Termination board with 100-pin SCSI-connector with DIN socket
- General purpose termination board for 100-pin SCSI-II cable
- On-board connector type: female 100-pin
- Dimensions: 157 x 112 x 51 mm (W x L x H)

**DIN-68S-01**
- Termination board with 68-pin SCSI-II connector with DIN socket
- General purpose termination board for 68-pin SCSI-II cable
- Dimensions: 103 x 83 x 43 mm (W x L x H)
- Mating cables:
  - ACL-10658-1
  - ACL-10659-1

### Others

**DIN-50S-01**
- Termination board with 50-pin SCSI-II connector with DIN socket
- General purpose termination board for 50-pin SCSI-II cable
- On-board connector type: female 50-pin
- Plastic cover for protection of wiring
- Dimensions: 124 x 77 x 50 mm (W x L x H)

**DIN-37D-01**
- Termination board with one 37-pin D-sub connector and DIN-rail mounting
- General purpose termination board for 37-pin D-sub cable
- On-board connector type: 37-pin D-sub female
- Dimensions: 113 x 85 x 52 mm (W x L x H)

**DIN-20P-01**
- Termination board with one 20-pin ribbon connector and DIN-rail mounting
- DIN-rail mounting General purpose termination board for 20-pin ribbon cable
- Dimensions: 68 x 84 x 55 mm (W x L x H)

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ACL-102100
SCSI-VHDCI 100P Cable

ACL-10568-1
ACL-10569-1

ACL-102100
SCSI-VHDCI 100P Cable

ACL-102100
SCSI-VHDCI 100P Cable

ACL-102100
SCSI-VHDCI 100P Cable

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