## Motion Control Solutions Overview

### Selection Guide

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Overview

Complete Application-Ready Platforms for General Motion Control Applications

Since the release of motion control cards in the 1990’s, Advantech has kept developing various types of motion control cards for users world-wide. Today, Advantech is still focused on providing the most robust, cost-effective and application-ready platform for General Motion Control (GMC).

Advantech offers application-ready platforms that range from industrial workstations and industrial-grade CPUs, to motion control, encoder input and isolated I/O cards for general motion control (GMC) applications such as SMT/PCB, semiconductor and LCD manufacturing machinery. Advantech provides a full-range of industrial computing platforms that include high-brightness LCD displays, keypads, up to 20-slot backplanes and redundant power supplies for machine builders.

Advantech motion control solutions have 3-axis, 4-axis and 6-axis inputs with pulse-type and voltage-pulse models and the AMONet series of distributed motion modules. Furthermore, these cards are supported by complete motion control libraries under DOS and Windows OS, which are widely applied in GMC applications.

AMONet™ - Advantech Distributed Motion Control Solutions

Motion control is growing in complexity as the number of axes in newly developed machines with motion control increases each year. Distance is also becoming an issue, as motors are located further and further away from the host computer. AMONet™ (Advantech Motion Network) was engineered to tackle the problems of increasing spending on wiring and maintenance of these complex motion control systems, and it also gets rid of distance limitations.

The first series of distributed motion control products from Advantech are called the AMONet RS-485 Series. AMONet RS-485 products are categorized as Master cards or Slave modules. While the Master card is kept in the host PC, the slave modules can be distributed so that they are next to motor drivers on the factory floor. The communication speed between the AMONet RS-485 slave modules can be up to 20 Mbps. This makes it possible to scan 2048 I/O points within 1.04 ms (or 1024 I/O points in 0.56 ms).

Furthermore, an AMONet RS-485 master will update the I/O status automatically, and map data into local memory. Software running on the host PC can then read the status by simply reading the onboard memory, so no polling of slave modules is necessary.

Each port of a master card can control up to 2048 I/O connections or 64 motion axes, so future extensions are easily implemented. The distance between a master card and its slave modules can be up to 100 meters, and this distance is covered with a low-cost Cat 5 network cable. In addition to saving wiring costs - debugging and maintenance is also simplified.

Another advantage of AMONet RS-485 is its compatibility with motor drivers from different vendors. Advantech provides specially designed wiring boards for popular motion drivers from vendors such as Panasonic®, Mitsubishi® and Yaskawa®. This makes configuration easier, as pin-to-pin cables can be used. Having a selection of motor vendors can also be an advantage when sourcing of a certain motor is difficult.

Motion control and I/O functions with AMONet RS-485 use the same library. This unique feature saves time, as programmers do not need to study both a motion library and an I/O library. You can also connect to a manual pulse generator directly to adjust and calibrate the system without having to write programs first.

AMONet™ makes machine building with motion control easier. The savings made on wiring and programming effort, as well as the compatibility with a wide range of popular motors have already led to many requests for AMONet products. Advantech is not content with the current selection though. There are already plans to release more AMONet products based on PCI, PC/104, and 1-axis motion slave modules as well as D/I/O slave modules.
A Broad Array of Products for Centralized Motion Control

Advantech’s full product offering can accommodate all your motion control needs. You can choose from 3-axis, 4-axis or 6-axis controllers, pulse-output or voltage-output, ISA-bus-based or PCI-bus-based, and standard PC-based or embedded in a system. The functions of the motion cards also vary, from high-end 3-axis circular interpolation cards to low-cost point-to-point motion devices. And if you cannot find a controller to meet your exact requirements for an embedded motion controller, then Advantech can design one to your specifications. We are ready to build cost-effective controllers to meet your criteria, whether it be adding digital I/O channels or changing connector styles, or perhaps changing CPU grade. With all the inherent costs, time and risks involved, there’s no reason why you should design your own controller when you can instead rely on the expertise, cost-efficiency, experience and proven reliability of Advantech.

Figure 3: Development Architecture
## Centralized Motion Cards

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<th>ISA</th>
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## AMONet™ Distributed Motion Control

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<td>1 x DB-15</td>
<td>2 x RJ45</td>
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<td>ADAM-3752F</td>
<td>ADAM-3756F</td>
<td>ADAM-3754F</td>
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<tr>
<td>Motion Slave Modules</td>
<td>ADAM-3210</td>
<td>ADAM-3211/PMA</td>
<td>ADAM-3213/YS2</td>
</tr>
</tbody>
</table>

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PCI-1247 Series

4-axis Motion Control Cards with AMONet™ RS-485 Master

Features

- Max. 6.5 MHz, 4-axis pulse output
- Linear, circular and continuous interpolation
- High speed position latch function
- Manual pulse generator input interface
- Simultaneously start/stop on multiple axes
- Programmable acceleration and deceleration time
- Programmable pulse output and interrupt
- Position compare and trigger output
- 1 Ring of AMONet™ RS-485 master
- Programmable baud-rate up to 20 Mbps transfer rate
- Max. 64 AMONet digital slave modules support
- Easy installation with RJ45 phone jack and LED diagnostic

Introduction

PCI-1247 is an ad

With its 4-axis motion control functions, PCI-1247 provides 4 axes of linear interpolation, 2 axes of circular interpolation and also continuous interpolation with velocity continuity. There are 13 homing modes for different machine designs, and position compare and trigger output functions are supported to interface with applications such as on-the-fly image acquisition. For applications like tool length measurement, it provides position latch and interrupt functions. PCI-1247 provides digital I/O interfaces that are dedicated to servo drivers/motors, (e.g. ALM, INP, ERC) and also digital I/O interfaces that are dedicated to machines (e.g. ORG, PEL, EMG). These dedicated I/O signals guarantees functionality via hardware and therefore reduces software loading.

AMONet™ RS-485 is a new series of products designed for versatile and distributed automation applications with special motion control requirements. PCI-1247 is equipped with 1 master, that can connect with up to 64 slave modules. There are 2 categories of slave modules, one for motion control, and one for digital I/O. For motion control slave modules, there are 4 types of 1-axis motion modules in the ADAM-3210 Series. For digital I/O slave modules, there are 4 types, 32-IN, 32-OUT, 16-IN & 16-OUT and 24-IN & 8-OUT.

Specifications

Pulse Type Motion Control

- Motor Driver Support: Pulse-type servo
- Number of Axes: 4
- Interpolation: Linear, circular, and continuous
- Max. Output Speed: 6.5 Mpps
- Step Count Range: ±134,217,728
- Pulse Output Type: ±OUT/DIR, ±CW/CCW
- Position Counter: ±134,217,728
- Home Modes: 13
- Velocity Profiles: T-curve, S-curve
- Local I/O
  - Machine Interfaces: PEL x 4, MEL x 4, ORG x 4, SLD x 4
  - Servo Driver Interfaces: ALM x 4, RDY x 4, SVON x 4, INP x 4, ERC x 4
  - Position Compare I/O: CMP x 4, LTC x 4
  - General Inputs: 3
  - General Outputs: 4

AMONet RS-485 Motion Control

- AMONet RS-485 Rings: 1
- Interface: Isolated half-duplex RS-485
- Cable Type: CAT5 UTP/STP Ethernet cable
- Surge Protection: 10 kV
- Transmission Speeds: 2.5, 5, 10, and 20 Mbps
- Data Flow Control: Automatic

Communication Distance: 100 m @ 20 Mbps w/32 slave modules

Slave Module Support: Digital I/O, motion control, analog I/O

Isolated Digital Input

- Input Voltage: Low: 3 V max.
  - High: 12 Vdc min. (30 Vdc max.)
- Isolation Protection: 2,500 Vdc

Isolated Digital Output

- Output Type: Open collector
- Isolation Protection: 2,500 Vdc
- Output Voltage: 5–30 Vdc
- Sink Current: 10 mA/ch, 50 mA max.

Encoder Interface

- Input Type: Quadrature(AB phase), Up/Down
- Counts per Enc. Cycle: x0, x1, x2, x4 (AB phase only)
- Input Range: Compatible with TIA/EIA-422 Differential Line Driver I=±20 mA, VOD=±2 V/min
- Isolation Protection: 2,500 Vrms
- Max. Input Frequency: 2 MHz

AMONet™ RS-485

10 kV @ 20 Mbps w/32 slave modules

Digital I/O, motion control, analog I/O

3 V max.

12 Vdc min. (30 Vdc max.)

2,500 Vdc

Open collector

2,500 Vdc

5–30 Vdc

10 mA/ch, 50 mA max.

Quadrature(AB phase), Up/Down

x0, x1, x2, x4 (AB phase only)

Compatible with TIA/EIA-422 Differential Line Driver I=±20 mA, VOD=±2 V/min

2,500 Vrms

2 MHz
PCI-1247

System Architecture

![Diagram of PCI-1247 system architecture]

- Slave can be Motion or Digital I/O modules
- **Last Slave module needs [Terminator] setting

**Software**

- **Windows® 2000/XP WDM Driver**
  Supports BCB/VB/VC++ programming on Windows® 2000/XP platforms with DLL
- **MotionNAVI**
  MotionNAVI is a Windows® utility for testing motion control functions
- **AMONet EzLink**
  AMONet EzLink is a Windows® utility for testing AMONet RS-485 configurations

**General**

- **Bus Type**: PCI V2.2
- **Certifications**: CE
- **Connectors**: SCSI-68P x 2, RJ45 x 1, SCSI-20P x 1
- **Dimensions**: 175 x 100 mm (6.9” x 3.9”)
- **Power Consumption**: +5 V, @ 0.5 A typical
- **Humidity**: 5 – 95% RH, non-condensing (IEC 68-2-3)
- **Operating Temperature**: 0 – 60° C (32 – 140° F)
- **Storing Temperature**: -20 – 85° C (-4 – 185° F)

**Ordering Information**

- **PCI-1247**: 4-axis Motion Control Card with AMONet Master
- **PCI-1247L**: 4-axis Motion Control Card
- **ADAM-3210**: 1-Axis Motion Slave Module
- **ADAM-3211/PMA**: 1-Axis Motion Slave for Panasonic® Minas A
- **ADAM-3212/J2S**: 1-Axis Motion Slave for Mitsubishi® MR-J2S
- **ADAM-3213/YS2**: 1-Axis Motion Slave for Yaskawa® Sigma-II
- **ADAM-3968M**: 68-pin Motor Wiring Board
- **ADAM-3968M/PMA**: Terminal Board for Panasonic® Minas A
- **ADAM-3968M/J2S**: Terminal Board for Mitsubishi® MR-J2S
- **ADAM-3968M/YS2**: Terminal Board for Yaskawa® Sigma-II
- **ADAM-3752FN**: 32-ch Digital Input Module
- **ADAM-3754FN**: 32-ch Digital Output Module
- **ADAM-3756FN**: 16-ch/16-ch Digital Input/Output Module
- **PCL-10168M-2**: 68-pin SCSI cable, 2m (One PCI-1247 works with two optional PCL-10168M-2)
- **PCL-10120M-2**: SCSI 20-pin cable, 2m (Optional for ADAM-3212/J2S)
- **PCL-10150M-2**: SCSI 50-pin cable, 2m (Optional for ADAM-3211/PMA and ADAM-3213/YS2)
- **ADAM-3934D**: Wiring Board for ADAM-3750F Series
- **PCL-10134**: 34 pin Flat cable, 1 M

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Introduction
PCM-3202 is a PC/104 interface card which supports two AMONet™ RS-485 master ports, and transfers data between host and slaves directly without any operations in between. Each port of the master can control up to 2048 I/O points, 64 axes, or a combination of I/O points and axes for motion control. The master ports support up to 20 Mbps transfer rate and a maximum communication distance of up to 100 meters. The communication between master and slave is time-deterministic features. The communication interface between master and host PC is accomplished by memory mapping. Various functions can be chosen on the slave modules, and standard industrial DIN rail mounting design makes it easy to distribute them in the field. The master collects information from slave modules and publishes the information to its host PC.

Specifications
**AMONet™ RS-485 Motion Control**
- **AMONet™ RS-485 Rings**
  - 2
- **Interface**
  - Isolated half-duplex RS-485
- **Cable Type**
  - CAT5 UTP/STP Ethernet cable
- **Surge Protection**
  - 10 kV
- **Transmission Speeds**
  - 2.5, 5, 10, and 20 Mbps
- **Data Flow Control**
  - Automatic
- **Communication Distance**
  - 100 m @ 20 Mbps w/32 slave modules
- **Slave Module Support**
  - Digital I/O, motion control, analog I/O

**General**
- **Bus Type**
  - PC/104
- **Certifications**
  - CE
- **Connectors**
  - RJ45 x 2
- **Dimensions**
  - 96 x 90 mm (3.8” x 3.5”)
- **Power Consumption**
  - +5 VDC, @ 0.5 A typical
- **Humidity**
  - 5 – 95% RH, non-condensing (IEC 68-2-3)
- **Operating Temperature**
  - 0 – 60°C (32 – 140°F)
- **Storing Temperature**
  - -20 – 85°C (-4 – 185°F)

Software
- **Windows® 2000/XP WDM driver**
  - Supports BCB/VB/VC++ programming on Windows® 2000/XP platform with DLL
- **AMONet EzLink**
  - AMONet EzLink is a Windows® diagnosis utility

Features
- Max. 20 Mbps transfer rate
- Supports 2 independent AMONet™ RS-485 rings
- Supports up to 128 AMONet™ RS-485 slave modules
- Easy installation with RJ45 phone jack and LED diagnostics
- Max. 100 m (20 Mbps / 32 slave modules) communication distance

Ordering Information
- **PCM-3202**
  - PC/104 AMONet™ RS-485 Master Card
- **ADAM-3210**
  - 1-Axis Motion Slave Module
- **ADAM-3211/PMA**
  - 1-Axis Motion Slave for Panasonic® Minas A
- **ADAM-3212/J2S**
  - 1-Axis Motion Slave for Mitsubishi® MR-J2S
- **ADAM-3213/YS2**
  - 1-Axis Motion Slave for Yaskawa® Sigma-II
- **ADAM-3752FN**
  - 32-CH Digital Input Module
- **ADAM-3754FN**
  - 32-CH Digital Output Module
- **ADAM-3756FN**
  - 16-CH/16-CH Digital Input/Output Module
- **ADAM-3934D**
  - Wiring board for Dual 34-pin flat cable
- **PCL-10120M-2**
  - SCSI 20-pin cable, 2m (Optional for ADAM-3212/J2S)
- **PCL-10150M-2**
  - SCSI 50-pin cable, 2m (Optional for ADAM-3211/PMA and ADAM-3213/YS2)
- **PCL-10134-1**
  - 34 Pin Flat cable, 1M

AMONet™ Slave Module Address Number Setting

[Diagram showing AMONet™ Slave Module Address Number Setting]
Introduction

PCI-1202 is a PCI interface card which supports two AMONet™ RS-485 master ports, and transfers data between host and slaves directly without any operations in between. Each port of the master can control up to 2048 I/O points, 64 axes, or a combination of I/O points and axes for motion control. The master ports support up to 20 Mbps transfer rate and a maximum communication distance of up to 100 meters.

The communication between master and slave is based on a customized RS-485 solution that saves wires, covers a long distance, supports high-speed communication and has time-deterministic features. The communication interface between master and host PC is accomplished by memory mapping. Various functions can be chosen on the slave modules, and standard industrial DIN rail mounting design makes it easy to distribute them in the field. The master collects information from slave modules and publishes the information to its host PC.

Specifications

AMONet RS-485 Motion Control
- AMONet RS-485 Rings: 2
- Interface: Isolated half-duplex RS-485
- Cable Type: CAT5 UTP/STP Ethernet cable
- Surge Protection: 10 kV
- Transmission Speeds: 2.5, 5, 10, and 20 Mbps
- Data Flow Control: Automatic
- Communication Distance: 100 m @ 20 Mbps w/32 slave modules
- Slave Module Support: Digital I/O, motion control, analog I/O

Isolated Digital Input
- Channels: 8
- Input Voltage: Logic 0: 3 V max., Logic 1: 12 V min. (30 V max.)
- Isolation Protection: 2,500 V
- Input Resistance: 2.4 kΩ @ 0.5 W

Isolated Digital Output
- Channels: 4
- Output Type: Open collector
- Isolation Protection: 2,500 V
- Output Voltage: 5–30 V
- Sink Current: 10 mA/ch, 50 mA max.

Features
- Max. 20 Mbps transfer rate
- 2 independent AMONet™ RS-485 Master Rings
- Max. 128 AMONet™ RS-485 slave modules supported
- Programmable digital input to notify events
- Easy installation with RJ45 phone jack and LED diagnostic

General
- Bus Type: PCI V2.2
- Certifications: CE
- Connectors: DB15 x 1, RJ45 x 2
- Dimensions: 175 x 100 mm (6.9" x 3.9")
- Power Consumption: +5 V DC @ 0.5 A typical
- Humidity: 5 ~ 95% RH, non-condensing (IEC 68-2-3)
- Operating Temperature: 0 ~ 60°C (32 ~ 140°F)
- Storing Temperature: -20 ~ 85°C (-4 ~ 185°F)

Ordering Information
- PCI-1202: 2 port AMONet™ RS-485 master card
- ADAM-3210: 1-axis AMONet™ RS-485 Motion Slave Module
- ADAM-3211/PMA: 1-axis AMONet™ RS-485 Motion Slave for Panasonic® Minas A
- ADAM-3212/J2S: 1 axis AMONet™ RS-485 slave for Mitsubishi® MR-J2S
- ADAM-3213/YS2: 1-axis AMONet™ RS-485 Slave for Yaskawa® Sigma-II
- ADAM-3752FN: 32-CH AMONet™ RS-485 Digital Input Module
- ADAM-3754FN: 32-CH AMONet™ RS-485 Digital Output Module
- ADAM-3756FN: 16-CH/16 CH AMONet™ RS-485 Digital Input/Output Module
- ADAM-3934D: Wiring board for Dual 34-pin flat cable
- ADAM-3915: Wiring board for D-sub 15-pin
- PCL-10120M-2: SCSI 20-pin cable, 2m (Optional for ADAM-3212/J2S)
- PCL-10150M-2: SCSI 50-pin cable, 2m (Optional for ADAM-3211/PMA and ADAM-3213/YS2)
- PCL-10134-1: 34 Pin Flat cable, 1M
- PCL-10115-1: D-sub 15-pin cable, 1M
Introduction

Products in the ADAM-3240 Series are used to increase the number of axes with interpolation for an AMONet™ RS-485 distributed motion control network. These extension slave modules connect serially by a simple and affordable Cat.5 LAN cable, reducing the wiring between driver and controller. This is very suitable to highly integrated machine automation applications. Please select the respective cable SCSI-20P or SCSI-50P and plug this cable into the motor driver and motion slave module. AMONet™ RS-485 also supports a general purpose motion slave module for general motor drivers, including step motor drivers. This general purpose motion slave module is designed with many screw terminals to support easy wiring. Please refer to the related installation guides.

Specifications

**Pulse Type Motion Control**
- **Motor Driver Support**: Pulse-type servo
- **Number of Axes**: 4
- **Interpolation**: Linear
- **Max. Output Speed**: 6.5 Mpps
- **Step Count Range**: ±134,217,728
- **Pulse Output Type**: ±OUT/DIR, ±CW/CCW, ±A/B phase
- **Position Counter**: ±134,217,728
- **Home Modes**: 13
- **Velocity Profiles**: T-curve, S-curve
- **Local I/O**:
  - Machine Interfaces: PEL x 4, MEL x 4, ORG x 4, SLD x 4
  - Servo Driver Interfaces: ALM x 4, RDY x 4, SVON x 4, INP x 4, ERC x 4
  - Position Compare I/O: LTC x 4, CMP x 4

**Encoder Interface**
- **Input Type**: AB phase, CW/CCW
- **Counts per Enc. Cycle**: 1x, 2x, 4x (AB phase only)
- **Input Range**: Compatible with TIA/EIA-422 Differential Line Driver I=±20mA, VOD=±2V/min
- **Isolation Protection**: 2,500 Vrms
- **Max. Input Frequency**: 2 MHz

**General**
- **Bus Type**: AMONet RS-485
- **Certifications**: CE
- **Connectors**: RJ45 x 2, DB15 x 4, SCSI-20P x 1, SCSI-50P x 4
- **Dimensions**: 210 x 150 x 60 mm (8.3” x 5.9” x 2.4”)
- **Power Consumption**: Typical: 3 W
- **Power Supply**: 18 ~ 30 VDC
- **Humidity**: 5 ~ 95% RH, non-condensing (IEC 68-2-3)
- **Operating Temperature**: 0 ~ 60°C (32 ~ 140°F)

Ordering Information

- **ADAM-3241-PMA**: 4-axis AMONet™ RS-485 Slave Module for Panasonic® Minas A Servo driver
- **ADAM-3915**: Wiring board for D-sub 15-pin
- **PCL-10120M-2**: SCSI 20-pin cable, 2m (Optional for ADAM-3242/J2S)
- **PCL-10150M-2**: SCSI 50-pin cable, 2m (Optional for ADAM-3241/PMA and ADAM-3243/YS2)
- **PCL-10115-1**: D-sub 15-pin cable, 1M
### ADAM-3210 Series

**Features**

- DIN rail mounting (L-124 x W-72 x H-53 mm)
- Max. 20 Mbps transfer rate
- Max. 6.5 MHz, 1-Axis pulse output
- 28 bits counter for incremental encoder
- Programmable acceleration and deceleration time
- T-curve and S-curve velocity profiles support
- Change speed on-the-fly
- Easy installation with RJ45 phone jack and LED diagnostic
- Easy installation for servo or stepping motor driver

**Introduction**

Products in the ADAM-3210 Series are used to increase the number of axes for an AMONet™ RS-485 distributed motion control network. These extension slave modules connect serially by a simple and affordable Cat.5 LAN cable, reducing the wiring between driver and controller. This is very suitable for highly integrated machine automation applications.

AMONet™ RS-485 has driver specific motion slave modules to support a range of common motor vendors such as: Mitsubishi® J2-Super series, Panasonic® Minas A type, and Yaskawa® Sigma II.

AMONet™ RS-485 also supports a general purpose motion slave module for general motor drivers, including step motor drivers. This general purpose motion slave module is designed with many screw terminals to support easy wiring. Please refer to the related installation guides.

**Specifications**

**Pulse Type Motion Control**

- **Motor Driver Support**: Pulse-type servo
- **Number of Axes**: 1
- **Interpolation**: None
- **Max. Output Speed**: 6.5 Mpps
- **Step Count Range**: ±134,217,728
- **Pulse Output Type**: ±OUT/DIR, ±CW/CCW, ±A/B phase
- **Position Counter**: ±134,217,728
- **Home Modes**: 13
- **Velocity Profiles**: T-curve, S-curve
- **Local I/O**
  - **Machine Interfaces**: PEL x 1, MEL x 1, ORG x 1, SLD x 1
  - **Servo Driver Interfaces**: ALM x 1, RDY x 1, SVON x 1, INP x 1, ERC x 1
  - **Position Compare I/O**: LTC x 1, CMP x 1
  - **General Inputs**: 2
  - **General Outputs**: 2

**Encoder Interface**

- **Input Type**: Quadrature (AB phase), Up/Down
- **Counts per Enc. Cycle**: x0, x1, x2, x4 (AB phase only)
- **Input Range**: Compatible with TIA/EIA-422 Differential Line Driver I=±20 mA, VOD=±2 V/min
- **Isolation Protection**: 2,500 Vrms
- **Max. Input Frequency**: 2 MHz

**General**

- **Bus Type**: AMONet RS-485
- **Certifications**: CE
- **Connectors**: RJ45 x2
  - SCSI-20P x 2 (ADAM-3210/J2S)
  - SCSI-50P x 1 (ADAM-3210/YS2/PMA)
- **Dimensions (LxWxH)**: 124 x 72 x 53 mm (4.9” x 2.8” x 2.1”)
- **LED Indicators**: PWR, RUN, ERR, PEL, MEL, ORG, SLD
- **Power Consumption**: 3 W @ 24 V typical
- **Power Supply**: 18 ~ 30 Vdc
- **Humidity**: 5 ~ 95% RH, non-condensing (IEC 68-2-3)
- **Operating Temperature**: 0 ~ 60° C (32 ~ 140° F)

**Ordering Information**

- **ADAM-3210**: 1-Axis General Purpose AMONet™ RS-485 Slave Module
- **ADAM-3211/PMA**: 1-Axis AMONet™ RS-485 Slave Module for Panasonic® Minas A Servo driver
- **ADAM-3212/J2S**: 1-Axis AMONet™ RS-485 Slave Module for Mitsubishi® MR-J2S Servo driver
- **ADAM-3213/YS2**: 1-Axis AMONet™ RS-485 Slave Module for Yaskawa® Sigma-II Servo driver
- **PCL-10120M-2**: SCSI-20-pin cable, 2m (Optional for ADAM-3212/J2S)
- **PCL-10150M-2**: SCSI-50-pin cable, 2m (Optional for ADAM-3211/PMA and ADAM-3213/YS2)
Introduction

The ADAM-3750F Series consists of digital slave modules for AMONet™ RS-485 that extend the digital I/O capacity. All the DIO slave extension modules are connected serially with a simple Cat.5 cable. This reduces wiring between driver and controller and is very suitable for highly integrated machine automation applications. High speed, scalability and cost-effectiveness ensures a solid solution for machine builders.

There are 3 main types of DIO slave modules, 32in, 32out, and 16in/16out. With these slave modules, you can connect actuators/sensors directly with minimum hassle. You can access I/O points nearby or 100 meters aw

Specifications

Isolated Digital Input
- Channels: ADAM-3752F/2N: 32, ADAM-3756FNN: 16
- Input Voltage: Logic 0: 3 V max.
  Logic 1: 12 V (30 V max.)
- Isolation Protection: 2,500 Vrms
- Opto-Isolator Response: On to Off, about 180 μs; Off to On, about 1.2μs
- Input Resistance: 2.4 kΩ @ 0.5 W

Isolated Digital Output
- Channels: ADAM-3754FN: 32, ADAM-3756FNN: 16
- Output Type: Sink (NPN) (open collector Darlington transistors)
- Isolation Protection: 2,500 Vrms
- Output Voltage: 5–30 VDC
- Sink Current: 60 mA @ 24 VDC

General
- Bus Type: AMONet RS-485
- Certifications: CE
- Connectors: 2 x RJ45, 2 x 34-pin flat cable
- Dimensions (LxWxH): 124 x 72 x 53 mm (4.9" x 2.8" x 2.1")
- Power Consumption: Typical: 3 W
- Power Supply: 18 – 30 VDC
- Humidity: 5 – 95% RH, non-condensing (IEC 68-2-3)
- Operating Temperature: 0 – 60°C (32 – 140°F)

Ordering Information
- ADAM-3752FN: Flat-cable type 32-CH Digital NPN Input Module
- ADAM-3754FN: Flat cable type 32-CH Digital NPN Output Module
- ADAM-3756FNN: Flat cable, 16/16CH Digital NPN In/Output Module
- ADAM-3934D: Dual 34-pin wiring terminal with DIN-rail
- PCL-10134-1: 34-pin IDC flat cable, 1M

Features
- DIN rail mounting (L-124 x W-72 x H-53 mm)
- Max. 20 Mbps transfer rate
- Flat-Cable Connection
- Easy installation with RJ45 phone jack and LED diagnostic
- 3-wire terminal board for sensor
- LED indicator for each I/O channel
- Selection of I/O-channel configuration (32 DI, 32 DO or 16/16 DI/O)
- 2500 Vrms Isolation voltage

Pin Assignments
ADAM-3750

Screw-Terminal Type 8/8-ch Digital NPN Input/Output Module

Introduction
ADAM-3750 is a digital slave module for AMONet™ RS-485 that extend the digital I/O capacity by 16 channels (8 input, 8 output). All digital I/O slave modules are connected serially with a simple cat.5 cable. This reduces wiring between driver and controller and is very suitable for highly integrated machine automation applications. High speed, scalability and cost-effectiveness ensure a solid solution for machine builders.

ADAM-3750 is designed for the applications which with limited installation space. It integrates 8 DI, 8 DO, and wiring screw terminals in a compact module. With it, you can connect actuators/sensors directly with minimum hassle. You can access I/O points nearby or 100 meters away using simple and low-cost wiring.

Specifications

Isolated Digital Input
- Channels: 8
- Input Voltage:
  - Logic 0: 2 V
  - Logic 1: 5 V (30 V max.)
- Isolation Protection: 2,500 V
- Opto-Isolator Response: 18 µs max.
- Input Resistance: 2.4 kΩ

Isolated Digital Output
- Channels: 8
- Output Type: Sink (NPN) (open collector Darlington transistors)
- Isolation Protection: 2,500 V
- Output Voltage: 5–30 V
- Sink Current: 60 mA @ 24 V

General
- Bus Type: AMONet RS-485
- Certifications: CE
- Connectors: 2 x RJ45, screw-terminals
- Dimensions (L x W x H): 124 x 72 x 53 mm (4.9” x 2.8” x 2.1”)
- LED Indicators: I/O, power, error, run
- Power Consumption: Typical, 3 W
- Power Supply: 18 – 36 V
- Humidity: 5 – 95% RH, non-condensing (IEC 68-2-3)
- Operating Temperature: 0 – 60°C (32 – 140°F)

Features
- DIN rail mounting (L=124 x W=72 x H=53 mm)
- Max. 20 Mbps transfer rate
- On-board screw terminal
- Easy installation with RJ45 phone jack and LED indicators
- LED indicator for each I/O channel
- Highly integrated and compact size
- 2500 Vrms isolation voltage

Ordering Information
- ADAM-3750
  Screw-Terminal Type 8/8-Ch Digital NPN Input/Output Module

Courtesy of Steven Engineering, Inc. ● 230 Ryan Way, South San Francisco, CA 94080-6370 ● General Inquiries: (800) 670-4183 ● www.stevenengineering.com
ADAM-3710

Features
- DIN rail mounting (L-124 x W-72 x H-53 mm)
- Max. 20 Mbps transfer rate
- 16-Ch single-ended or 8-CH differential analog input
- 2-Ch Analog Output
- Resolution: 12-bit
- Unipolar: 0–10 V, 0–1 V, 0–0.1 V, 0–0.01 V
- Maximum Sampling rate: 100 kS/s
- Easy installation with RJ45 phone jack

Introduction
ADAM-3710 is an analog input/output slave module for AMONet™ RS-485 that adds analog I/O points to your system. Like other AMONet modules, these analog I/O slave modules are connected serially with a simple Cat.5 cable. This reduces wiring between driver and controller and is very suitable for highly integrated machine automation applications. High speed, scalability and cost-effectiveness ensure a solid solution for machine builders.

ADAM-3710 is designed for analog sensor applications like thermocouple, pressure sensors, or flow sensors. It integrates 16-ch AI, 2 –ch AO, and wiring screw terminals in a module. With this slave module, you can connect actuators/sensors directly with minimum hassle. You can access I/O points nearby or 100 meters away using simple and low-cost wiring.

Specifications

Analog Input
- Channels: 16 single-ended, or 8 differential
- Resolution: 12 bits
- Max. Sampling Rate: 100 KS/s
- Overvoltage Protection: 30 Vdc
- Sampling Modes: SW
- Input Range: (V, software programmable)

<table>
<thead>
<tr>
<th>Bipolar</th>
<th>±10</th>
<th>±1</th>
<th>±0.1</th>
<th>±0.01</th>
</tr>
</thead>
</table>

Analog Output
- Channels: 2
- Resolution: 12 bits
- Output Rate: Static update
- Output Range: +/- 10V

General
- Bus Type: AMONet RS-485
- Certifications: CE
- Connectors: 2 x RJ45 and on-board screw terminal
- Dimensions: 124 x 72 x 53 mm (4.9” x 2.8” x 2.1”)
- Power Consumption: Typical: 3 W
- Power Supply: 18 – 30 Vdc
- Humidity: 5 – 95% RH, non-condensing (IEC 68-2-3)
- Operating Temperature: 0 – 60° C (32 – 140° F)

Ordering Information
- ADAM-3710-A: AMONet 16-ch analog input, 2-ch analog output slave module
**PCI-1241**

4-axis Voltage-type Servo Motor Control Card

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**Introduction**

PCI-1241 uses an ASIC for 4-axis servo positioning and synchronized control with a DDA (Digital Differential Analyzer) to evenly move each axis. Closed-Loop control is implemented with P control, and -10 to +10 V signals are used for outputs to the speed type servo motor driver. It can be applied to multi-axis precision servo control, and it can also read back motor encoder values via its encoder input port to allow stepping motor control. In the control of each axis, there is a set of sensor input points, including: home points, plus limit points and minus limit points. Furthermore, there are inhibit signal output points, position ready output points and an emergency stop input point. It can be expanded up to 128 points input and 128 points output. Additionally, the board reserves a set of 6-channel A/D conversion.

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**Specifications**

**V-Command Motion Control**

- **Motor Driver Support**: Voltage-type servo
- **Number of Axes**: 4
- **Interpolation**: 3-axis linear, 2-axis circular, helical
- **Voltage Output Range**: ±10 V
- **Resolution**: 16 bits
- **Channels**: 4
- **Position Counter**: ±2,146,483,647
- **Home Modes**: 14
- **Velocity Profiles**: T-curve, S-curve
- **Local I/O**
  - Machine Interfaces: PEL x 4, MEL x 1, ORG x 4, EMG x 1
  - Servo Driver Interfaces: SVON x 4, PRDY x 1
  - Manual Pulse Generator Input: 1 set
  - Remote I/O Port: 2

**Isolated Digital Input**

- **Input Voltage**: Logic 0: 1 V max.  
  Logic 1: 18 V (30 V max.)
- **Isolation Protection**: 2,500 V<sub>rms</sub>
- **Opto-isolator Response**: 50 ms
- **Input Resistance**: 5.4 kΩ @ 18 V

**Isolated Digital Output**

- **Output Type**: Sink (NPN) (open collector Darlington transistors)
- **Isolation Protection**: 2,500 V<sub>rms</sub>
- **Output Voltage**: 5 – 40 V<sub>dc</sub>
- **Sink Current**: 100 mA max./channel; 500 mA max.

**Encoder Interface**

- **Input Type**: Quadrature (A/B phase) or Up/Down
- **Counts per Enc. Cycle**: 0x, 1x, 2x, 4x  
  (AB phase only)
- **Input Range**: 10–30 V<sub>dc</sub>
- **Isolation Protection**: No isolation
- **Max. Input Frequency**: 2 MHz

**General**

- **Bus Type**: PCI V2.2
- **Certifications**: CE, FCC class A
- **Connectors**: 3 x 10-pin box head, 1 x 16-pin box head, 1 x SCSI 68-pin female
- **Dimensions**: 174 x 107 mm (6.85” x 4.2”)
- **Power Consumption**: Typical: 5 V @ 850 mA  
  Max: 5 V @ 1 A
- **Humidity**: 5 – 95% RH, non-condensing (IEC 68-2-3)
- **Operating Temperature**: 0 – 60°C (32 – 140°F)

**Ordering Information**

- **PCI-1241**: 4-axis Voltage-type Servo Motor Control Card
- **PCL-10168**: 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2m
- **ADAM-3968**: 68-pin SCSI-II Wiring Terminal Board for DIN-rail mounting
- **ADAM-3941**: Wiring terminal for PCI-1241/1242 with LEDs
- **PCLD-8241**: 64 DI/64 DO Remote IO Board
Introduction

PCM-3240 is a 4-axis stepping/pulse-type servo motor control card designed for general-purpose motion applications. PCM-3240 is a high-speed 4-axis motion control card for the PC/104 bus that simplifies stepping and pulse-type servo motor control, giving you added performance from your motors. The card’s intelligent NOVA® MCX314-motion ASIC builds in a variety of motion control functions, such as 2/3-axis linear interpolation, 2-axis circular interpolation, T/S-curve acceleration/deceleration rate and more. In addition, the PCM-3240 performs these motion control functions without processor loading during driving. For advanced applications, we supply Windows® DLL drivers and user-friendly examples to decrease your programming load. Moreover, with a free bundled PCM-3240 motion utility, you can easily complete configuration and diagnosis.

Specifications

Pulse Type Motion Control
- Motor Driver Support: Pulse-type servo/stepping
- Number of Axes: 4
- Interpolation: 2-axis linear, 3-axis linear, 2-axis circular
- Max. Output Speed: 4 Mpps
- Step Count Range: ±2,147,483,646
- Pulse Output Type: Pulse/Direction (1-pulse, 1-direction type), or CW/CCW (2-pulse type)
- Position Counters: Range of Command, Range of Actual Position
- Velocity Profiles: T-Curve, S-Curve
- Local I/O: Machine Interfaces: PEL x 4, MEL x 4, ORG x 4
  Servo Driver Interfaces: ALM x 4, RDY x 4, SVON x 4, INP x 4
  Position Compare I/O: CMP x 4
  General Outputs: 4

Encoder Interface
- Input Type: Quadrature (A/B phase or Up/Down)
- Counts per Enc. Cycle: x1, x2, x4 (A/B phase only)
- Input Range: 5 – 25 V
- Isolation Protection: 2,500 V
- Max. Input Frequency: 1 MHz

General
- Bus Type: PC/104
- Certifications: CE
- Connectors: 2 x IDC 50-pin male
- Dimensions: 96 x 91 mm
- Power Consumption: Typical: 5 V @ 850 mA
  Max: 5 V @ 1 A
- Humidity: 5 – 95% RH, non-condensing (IEC 68-2-3)
- Operating Temperature: 0 – 60° C (32 – 140° F)
- Storing Temperature: -20 – 85° C (-4 – 185° F)

Ordering Information
- PCM-3240: 4-axis stepping/pulse-type servo motor control card
- PCL-10150-1.2: 50-pin flat cable, 1.2 m
- ADAM-3950: 50-pin flat cable wiring terminal for DIN-rail mounting
- PCL-12250-1: Two 50-pin flat cable to 100-pin SCSI connector, 1 m
- ADAM-3952-J2S: 4-axis wiring terminal for Mitsubishi® J2S series driver
- ADAM-39100: SCSI-100 wiring terminal for DIN-rail mounting
- ADAM-3952: Wiring Terminal for DIN-rail mounting
Feature Details

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

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

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

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

Pin Assignments

Block Diagram
**Introduction**

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

**Specifications**

**Pulse Type Motion Control**
- **Motor Driver Support**: Pulse-type servo/stepping
- **Number of Axes**: 4
- **Interpolation**: 2-axis linear, 3-axis linear, 2-axis circular
- **Max. Output Speed**: 4 Mpps
- **Step Count Range**: ±2,147,483,646
- **Pulse Output Type**: Pulse/Direction (1-pulse, 1-direction type), or CW/CCW (2-pulse type)
- **Position Counters**: Range of Command, Range of Actual Position
- **Velocity Profiles**: T-Curve, S-Curve
- **Local I/O**: Machine Interfaces: PEL x 4, MEL x 4, ORG x 4
  Servo Driver Interfaces: ALM x 4, RDY x 4, SVON x 4, INP x 4
  Position Compare I/O: CMP x 4
  General Outputs: 4
- **Encoder Interface**: Input Type: Quadrature (A/B phase or Up/Down)
  Counts per Enc. Cycle: x1, x2, x4 (A/B phase only)
  Input Range: 5 – 25 V
  Isolation Protection: 2.500 V
  Max. Input Frequency: 1 MHz

**General**
- **Bus Type**: Universal PCI V2.2
- **Certifications**: CE
- **Connectors**: 1 x 100-pin SCSI-II female
- **Dimensions**: 175 x 100 mm (6.9” x 3.9”)
- **Power Consumption**: Typical: 5 V @ 850 mA
  Max: 5 V @ 1 A
- **Humidity**: 5 – 95% RH, non-condensing (IEC 68-2-3)
- **Operating Temperature**: 0 ~ 60° C (32 ~ 140° F)
- **Storing Temperature**: -20 ~ 85° C (-4 ~ 185° F)

**Ordering Information**
- **PCI-1240U**: 4-axis universal PCI stepping/pulse-type servo motor control card
- **ADAM-3952**: 50-pin SCSI-II wiring terminal for DIN-rail mounting
- **ADAM-39100**: 100pin SCSI-II wiring terminal, DIN-rail mounting
- **ADAM-3952-J2S**: PCI-1240 Wiring Board for Mitsubishi J2S series
- **PCL-10251-1**: 100-pin SCSI to two 50-pin SCSI cable for PCI-1240U, 1m
- **PCL-10251-3**: 100-pin SCSI to two 50-pin SCSI cable for PCI-1240U, 3m
Feature Details

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

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

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

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

Pin Assignments

Block Diagram

![Block Diagram](image-url)
## Introduction

The PCI-1242/PCI-1261 realizes 4-axis/6-axis asynchronous/synchronous control with a DDA (Digital Differential Analyzer) that ensures even movement of each axis. At pulse output control, it can also read back motor encoder values via its encoder input port. In the control of each axis, there is a set of sensor input points, including home points, plus limit points and minus limit points. Further, there are servo-on signal output points, position ready output point and an emergency stop input point. For advanced applications, we supply Windows® DLL drivers and user-friendly examples to decrease your programming load. Moreover, through a free bundled PCI-1242/PCI-1261 motion utility, you can complete configuration and diagnosis easily.

## Specifications

### Pulse Type Motion Control

- **Motor Driver Support**: Pulse-type servo/stepping
- **Number of Axes**: PCI-1242: 4 axes; PCI-1261: 6 axes
- **Interpolation**: 3-axis linear, 2-axis circular, Helical
- **Max. Output Speed**: 4 Mpps
- **Step Count Range**: ± 8,388,608
- **Pulse Output Type**: Pulse/Direction, CW/CCW, A/B Phase
- **Position Counters**: ± 2,147,483,647
- **Home Modes**: 14
- **Velocity Profiles**: T/S-Curve, Acceleration/Deceleration
- **Local I/O**
  - **Machine Interfaces**: PCI-1242: PEL x 4, MEL x 4, ORG x 4, EMG x 1
    - PCI-1261: PEL x 6, MEL x 6, ORG x 6, EMG x 1
  - **Servo Driver Interfaces**: PCI-1242: SVON x 4, PRDY x 1
    - PCI-1261: SVON x 6, PRDY x 1

### Encoder Interface

- **Input Type**: Quadrature (AB phase), or Up/Down
- **Counts per Enc. Cycle**: x0, x1, x2, x4 (A/B phase only)
- **Input Range**: 10–30 V
- **Isolation Protection**: 2,500 V DC
- **Max. Input Frequency**: 2 MHz

### General

- **Bus Type**: PCI V2.2
- **Certifications**: CE, FCC class A
- **Connectors**: 1 x 100-pin SCSI-II female
  - 1 x 10-pin block head
- **Dimensions**: 175 x 107 mm (6.85” x 4.2”)
- **Power Consumption**:
  - Typical: 5 V @ 850 mA, 12 V @ 600 mA
  - Max: 5 V @ 1 A, 12 V @ 700 mA
- **Storing Humidity**: 5 ~ 95% RH, non-condensing (IEC 68-2-3)
- **Operating Temperature**: 0 ~ 60° C (32 ~ 140° F)
- **Storing Temperature**: -20 ~ 85° C (-4 ~ 185° F)

## Ordering Information

- **PCI-1242**: 4-axis Pulse-type Servo Motor Control Card
- **PCL-10168**: 68-pin SCSI-II cable with male connectors on both ends and special shielding for noise reduction, 1 and 2 m
- **ADAM-3968**: 68-pin SCSI-II Wiring Terminal Board for DIN-rail mounting
- **ADAM-3941**: Wiring terminal for PCI-1241/1242 with LEDs
- **PCI-1261**: 6-axis Pulse-type Stepping Motion Control Card
- **ADAM-39100**: 100-pin SCSI-II Wiring Terminal for DIN-rail Mounting
- **PCL-101100M-1**: 100-pin SCSI cable, 1m
- **PCL-101100M-3**: 100-pin SCSI cable, 3m
- **ADAM-3961**: Wiring terminal for PCI-1261 with LED
- **PCLD-8241**: 64 DI / 64 DO Remote IO Board

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** Courtesy of Steven Engineering, Inc. ● 230 Ryan Way, South San Francisco, CA 94080-6370 ● General Inquiries: (800) 670-4183 ● www.stevenengineering.com **
## PCI-1784

**4-axis Quadrature Encoder and Counter Card**

### Introduction

PCI-1784 is a 4-axis quadrature encoder and counter add-on card for PCI bus. The card includes four 32-bit quadruple AB phase encoder counters, 8-bit timer with multi range time-base selector and 4 isolated digital input.

### Specifications

#### Encoder Input
- **Number of Axes**: 4 (independent)
- **Resolution**: 32-bit
- **Max. Quadrature Input**: 1.0 MHz with digital filter, 2.0 MHz without digital filter
- **Digital Filter**: 4 stage
- **Drive Type**: Single-ended or differential
- **Counter Modes**: Quadrature, Up/Down, Count/Direction
- **Isolation Protection**: 2,500 V<sub>DC</sub>
- **Max. Input Pulse Freq.**: x 1, x 2, x 4
- **Sample Clock Freq.**: 8, 4, 2, or 1 MHz

#### Input Range
- **Single Ended Configuration**:
  - Logic 0: 0.8 V max.
  - Logic 1: 2.8 V min. (12 V max.)
- **Differential Configuration**:
  - Logic 0: -0.2 V max.
  - Logic 1: 0.2 V min. (±12 V max.)

#### Isolated Digital Input
- **Channels**: 4
- **Input Voltage**:
  - Logic 0: 3 V max.
  - Logic 1: 10 V min. (30 V max.)
- **Interrupt Capable Ch.**: DIO-D13
- **Isolation Protection**: 2,500 V<sub>DC</sub>
- **Opto-Isolator Response**: 25 ms
- **Overvoltage Protection**: 70 V<sub>DC</sub>

### Isolated Digital Output
- **Channels**: 4
- **Compatibility**: 5 V/TTL
- **Isolation Protection**: 2,500 V<sub>DC</sub>
- **Output Voltage**:
  - Logic 0: 0.8 V min.
  - Logic 1: 2.0 max.
- **Sink/Source Current**: 50 mA max./channel
- **Opto-Isolator Response**: 20 ms

#### Counter/Timer
- **Channels**: 4
- **Resolution**: 32 bits
- **Compatibility**: 5 V/TTL
- **Max. Input Frequency**: 8 MHz
- **Counter Modes**: Quadrature, 2-pulse, Pulse/Direction
- **Interrupt Capable Ch.**: Counter0 ~ Counter3
- **Digital Noise Filter**: 4 stage

#### General
- **Bus Type**: PCI V2.2
- **Connectors**: 37-pin D-sub female
- **Dimensions (L x H)**: 175 x 100 mm (6.9” x 3.9”)
- **Power Consumption**:
  - Typical: +5 V @ 200 mA
  - Max: +5 V @ 450 mA
- **Operating Temperature**: 0 ~ 60° C (32 ~ 140° F)
- **Storage Temperature**: -20 ~ 70° C (-4 ~ 158° F)
- **Storing Humidity**: 5~95% RH, non-condensing (refer to IEC 68-2-3)
- **Certifications**: CE certified

### Ordering Information
- **PCI-1784**: 4-axis Quadrature Encoder and Counter Card
- **PCL-10137H-1**: High-speed DB-37 cable assembly, 1m
- **PCL-10137H-3**: High-speed DB-37 cable assembly, 3m
- **ADAM-3937**: DB-37 Wiring Terminal Board for DIN-rail mounting
Introduction

PCL-839+ chips can execute a v

Programming PCL-839+

You can control each axis directly through the card’s I/O registers, but use of the card’s high-level interpreter is recommended. This interpreter reads high-level commands from a text file to perform specific tasks. We also supply function libraries which you can call from your C program. The libraries come with ‘Turbo C’ source code which you can recompile if you want to access the libraries from other C compilers.

Specifications

Pulse Type Motion Control
- Motor Driver Support: Stepping
- Number of Axes: 3
- Max. Output Speed: 200 kpps
- Step Count Range: 0 – 16,777,215
- Pulse Output Type: Pulse/Direction, CW/CCW
- Velocity Profiles: T-Curve
- Local I/O
  - Machine Interfaces: PEL x 3, MEL x 3, ORG x 3, SLD x 3
  - General Inputs: 16 (5 V/TTL)
  - General Outputs: 16 (5 V/TTL)

General
- Bus Type: ISA
- Certifications: CE
- Connectors: 1 x DB-37 (limit switches and pulse output)
  - 1 x 20-pin flat cable (DIO)
- Dimensions: 185 x 100 mm (7.3” x 3.9”)
- Power Consumption: Max: 5 V @ 390 mA
- Storing Humidity: 5 – 95% RH, non-condensing (IEC 68-2-3)
- Operating Temperature: 0 – 60° C (32 – 140° F)
- Storing Temperature: -20 – 70° C (-4 – 158° F)

Features
- Independent, simultaneous control of three stepping motors
- Optically-isolated outputs
- Five isolated digital inputs per axis for limit switches
- Half-size PC add-on card
- Up to 200 kpps step rate
- 16 DI and 16 DO

Ordering Information
- PCL-839+: Intelligent 3-axis stepping motor control card, user manual and driver CD-ROM (cable not included)
- PCL-10137-1: DB-37 cable assembly, 1 m
- PCL-10137-2: DB-37 cable assembly, 2 m
- PCL-10137-3: DB-37 cable assembly, 3 m
- ADAM-3937: DB-37 wiring terminal for DIN-rail mounting

Applications
- X-Y table control
- Rotary machine control
- Robotics control
- Precision position control using stepping motors

3-axis Stepping Motor Control Card

PCL-839+
Introduction

PCL-833 is a 3-axis quadrature encoder and counter add-on card for the IBM PC/AT and compatibles (ISA bus). This card lets your PC perform position monitoring for motion control systems.

Each input includes a decoding circuit for incremental quadrature encoding. Inputs accept either single-ended or differential signals. Quadrature input works with or without an index, allowing linear or rotary encoder feedback.

PCL-833 has three independent 24-bit counters. The maximum quadrature input rate is 1.0 MHz, and the maximum input rate in counter mode is 2.4 MHz. You can individually configure each counter for quadrature decoding, pulse/direction counting or up/down counting.

PCL-833 provides five digital input channels. Each channel accepts digital input as an index input for a rotary encoder or as a home sensor input for a linear encoder. The card can generate an interrupt to the system based on a signal from its digital inputs, overflow/underflow of its counters, or on a programmed time interval. It can repeatedly generate interrupts at any time interval you specify, from 0.1 msec. to 255 sec. These interrupts let you precisely monitor the speed of a control system.

Specifications

Encoder Interface
- Input Type: Single-ended or differential
- Counts per Encoder Cycle: x1, x2, x4 (SW selectable)
- Input Range: 12 V max.
- Isolation Protection: 2,500 Vrms (optical)
- Max. Input Frequency: 2.4 MHz

Counter/Timer
- Channels: 3
- Resolution: 24 bits
- Compatibility: 5 V/TTL
- Max. Input Frequency: 2.4 MHz
- Counter Modes: 3 (quadrature, up/down, pulse/direction)
- Interrupt Capable Ch.: Counter 0~3
- Digital Noise Filter: 4 stage

Isolated Digital Input
- Channels: 5 (Zin*3 + DI0 + DI1)
- Input Voltage: Logic 0: 1 V max.
- Logic 1: 5 V min. (12 V max.)
- Interrupt Capable Ch.: DI0, DI1
- Isolation Protection: 2,500 Vrms (optical)

General
- Bus Type: ISA
- Certifications: CE
- Connectors: 1 x DB-25 female
- Dimensions: 185 x 100 mm (7.3" x 3.9")
- Power Consumption: Typical: 5 V @ 700 mA, 12 V @ 15 mA
- Storing Humidity: 5 ~ 95% RH, non-condensing (IEC 68-2-3)
- Operating Temperature: 0 ~ 60°C (32 ~ 140°F)
- Storing Temperature: -20 ~ 70°C (-4 ~ 158°F)

Ordering Information
- PCL-833: 3-axis quadrature encoder and counter card, user's manual and driver CD-ROM (cable not included)
- ADAM-3925: DB-25 wiring terminal for DIN-rail mounting
- PCL-10125-1: DB-25 cable assembly, 1m
- PCL-10125-3: DB-25 cable assembly, 3m

Features
- 1.0 MHz max. quadrature input rate
- Three 24-bit counters (can cascade up to 48 bits)
- Optically isolated up to 2,500 Vrms
- 4-stage digital filter
- 2.4 MHz max. input pulse rate
- Pulse/direction and up/down counting
- Digital input with interrupt for each axis
- Programmable time-interval interrupt
- Half-size AT bus card
PCI-1243U

4-axis Low Cost Stepping Motor Control Card

Features
- 4 axis stepping motor control
- PCI universal bus
- Up to 400 k pulse output rate
- T-curve acc/dec
- Pulse/Dir and CW/CCW pulse output mode
- Up 24-bit step count
- Opto-Isolated Digital input and output
- Up to 1,500 Vrms system isolation
- BoardID™ switch

Introduction
PCI-1243U is a 4-axis intelligent stepping motor control card with universal PCI interface. The card's PCD-4541 motion controller can execute a variety of motion-control commands.

For advanced applications, we supply a DLL so that programs can be created for the Microsoft® Windows® environment.

PCI-1243U is a cost-effective solution for PCI based motion control. Each axis can be controlled directly through the card's I/O registers. However, use of the card's high-level DLL driver is recommended. With the DLL driver, you can easily link to VC++, Visual Basic® or BCB.

Specifications

Pulse Type Motion Control
- Motor Driver Support: Stepping
- Number of Axes: 4
- Max. Output Speed: 400 kpps
- Step Count Range: 0 – 16,777,215
- Pulse Output Type: Pulse/Direction, CW/CCW
- Position Counters: ±16,777,215
- Home Modes: 4
- Velocity Profiles: T or S-curve acceleration/deceleration
- Local I/O
  - Machine Interfaces: PEL x 4, NEL x 4, ORG x 4, SLD x 4, EMG x 1
  - General Inputs: 8
  - General Outputs: 8

Isolated Digital Input
- Channels: 8
- Input Voltage
  - Logic 0: 1 V
  - Logic 1: 12 V (24 V max.)
- Isolation Protection: 3,750 V<sub>im</sub>
- Opto-Isolator Response: 25 ms
- Input Resistance: 4.7 kΩ

Isolated Digital Output
- Channels: 8
- Output Type: Sink (NPN)
- Isolation Protection: 3,750 V<sub>im</sub>
- Output Voltage: 5–30 V<sub>dc</sub>
- Sink Current: 200 mA max./channel; 1.1 A max. total
- Opto-Isolator Response: 25 ms

General
- Bus Type: PCI V2.2
- Certifications: CE
- Connectors: 1 x DB-62 female
- Dimensions: 175 x 100 mm (6.9” x 3.9”)
- Power Consumption
  - Typical: 5 V @ 340 mA
  - Max: 5 V @ 500 mA
- Storing Humidity: 5 – 95% RH, non-condensing (IEC 68-2-3)
- Operating Temperature: 0 – 60°C (32 – 140°F)
- Storing Temperature: -20 – 80°C (-4 – 170°F)

Ordering Information
- PCI-1243U: 4-Axis Stepping Motor Control card
- PCL-10162-1: DB-62 Cable Assembly, 1M
- PCL-10162-3: DB-62 Cable Assembly, 3M
- ADAM-3962: DB-62 wiring terminal with DIN-rail mounting

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ADAM-3900 Series

Wiring Terminals for DIN-Rail Mounting

ADAM-3952
PCI-1240 50-Pin SCSI-II Wiring Terminal for DIN-rail Mounting

Features
- DIN-rail mounting wiring terminal for PCI-1240 applications
- Case dimensions (W x L x H): 77.5 x 179.5 x 41.5mm (3.1” x 7.1” x 1.6”)
- SCSI 50-pin connector
  To be used with PCI-1240U and PCM-3240

ADAM-3952/J2S
PCI-1240 Wiring terminal for Mitsubishi® MR-J2S

Features
- DIN-rail mounting wiring terminal for PCI-1240 connecting with Mitsubishi® MR-J2S servo motor driver
- Case dimensions (W x L x H): 121 x 202 x 45mm (4.76” x 7.95” x 1.77”)
- One SCSI-100-pin connector to connect with PCI-1240, PCI-1240UU
- Eight SCSI 20-pin connector to connect with Mitsubishi motor driver
- Optional cable PCL-101100M-1 and PCL-10120M-2
  To be used with PCI-1240U/PCM-3240

ADAM-3968M
PCI-1247 Wiring terminal

Features
- General purpose wiring terminal for PCI-1247 applications with DIN-rail mounting
- Case dimensions (W x L x H): 72 x 124 x 53 mm (2.83” x 4.88” x 2.09”)
- One SCSI-68-pin connector to connect with PCI-1247
- Optional cable PCL-10168M-2

ADAM-3968M-PMA
PCI-1247 Wiring terminal for Panasonic® Minas A Series

Features
- PCI-1247 wiring terminal for Panasonic® Minas A series driver with DIN-rail mounting
- Case dimensions (W x L x H): 72 x 124 x 53 mm (2.83” x 4.88” x 2.09”)
- One SCSI-68-pin connector to connect with PCI-1247
- Two SCSI 50-pin connector to connect with Panasonic motor driver
- Optional cable PCL-10168M-2 and PCL-10150M-2

ADAM-3968M-J2S
PCI-1247 wiring terminal for Mitsubishi MR-J2S series driver

Features
- PCI-1247 wiring terminal for Mitsubishi® MR-J2S series driver with DIN-rail mounting
- Case dimensions (W x L x H): 72 x 124 x 53 mm (2.83” x 4.88” x 2.09”)
- One SCSI-68-pin connector to connect with PCI-1247
- Four SCSI 20-pin connector to connect with Mitsubishi motor driver
- Optional cable PCL-10168M-2 and PCL-10120M-2

ADAM-3968M-YS2
PCI-1247 wiring terminal for Yaskawa Sigma-II series driver

Features
- PCI-1247 wiring terminal for Yaskawa® Sigma-II series driver with DIN-rail mounting
- Case dimensions (W x L x H): 72 x 124 x 53 mm (2.83” x 4.88” x 2.09”)
- One SCSI-68-pin connector to connect with PCI-1247
- Two SCSI 50-pin connector to connect with Yaskawa motor driver
- Optional cable PCL-10168M-2 and PCL-10150M-2
ADAM-3900 Series

Wiring Terminals for DIN-Rail Mounting

**ADAM-3941**
PCI-1241/1242 Wiring Board with LED

- DIN-rail mounting wiring terminal for PCI-1241 and PCI-1242 applications
- Case dimensions (W x L x H): 169 x 112 x 51mm (6.7” x 4.4” x 2.0”)
- SCSI 68-pin connector
- LED indicator

**ADAM-3943**
PCLD-8241 64 DI/64 DO Remote IO Board

- DIN-rail mounting wiring terminal for PCI-1243U applications
- Case dimensions (W x L x H): 123 x 85 x 56mm (4.8” x 3.3” x 2.2”)
- DB 62-pin female connector
- Tree-wire wiring for each channel

**ADAM-3961**
PCLD-8241 64 DI/64 DO Remote IO Board

- DIN-rail mounting wiring terminal for PCI-1261 applications
- Case dimensions (W x L x H): 169 x 112 x 51mm (6.7” x 4.4” x 2.0”)
- SCSI 100-pin connector
- LED indicator

**ADAM-3934D**
PCLD-8241 64 DI/64 DO Remote IO Board

- DIN-rail mounting wiring terminal for ADAM-3750F series applications
- Case dimensions (W x L x H): 123 x 85 x 56mm (4.8” x 3.3” x 2.2”)
- 2 x 34-pin IDC male connector
- Tree-wire wiring for each channel

**NEW**

**ADAM-3941**
PCLD-8241 64 DI/64 DO Remote IO Board

- DIN-rail mounting wiring terminal for PCI-1241/1242/1261 applications
- Case dimensions (W x L x H): 292 x 112 x 56mm (11.5” x 4.4” x 2.2”)
- D-sub 9-pin connector
- LED indicator