cPCI-8312H

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

Features

SSCNET II Part
- 32-bit CompactPCI, PICMG 2.0 Rev. 2.1
- Servo Interface: *SSCNET II protocol
- On-board DSP: TI TMS320C5571 200 MHz
- Maximum control axes: 12
- 32-bit position command resolution
- On-line servo tuning and data monitoring
- Easy wiring up to 30 meters
- 2 isolated DI channels
- 2 Analog input and 2 analog output channels
- 2 pulse train output channels, supporting pulse train type servo amplifiers
- 2 external encoder/linear scale interface
- Multiple axes linear interpolation
- Any 2 axes circular interpolation
- Contour following motion
- On-the-fly velocity change
- Programmable interrupt sources
- Easy-to-use function library
- MotionCreatorPro utility for machine setup
- Sequence Motion Control for speed profile timing chart between axes
- Absolute encoder access

HSL Part
- Dual independent network operation
- One network port with 2 separate connectors
- Max. 300m/2 communication distance at 3 Mbps
- Jumper selectable transmission rate: 3/6/12 Mbps
- Jumper selectable transmission mode: full/half duplex
- On-board memory
- Programmable timer interrupt
- RJ45 phone jack for easy installation
- More than 400 thread safe API functions

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

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’ requirements 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 transmitted to the DSP via DDRAM. According to these frames, DSP calculates the absolute position of all axes in one control cycle and sends 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

Two 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 application 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 available for this board.

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.
**MotionCreator™**

- **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 signal input pins: EA and EB
  - Encoder index signal input: EZ
  - Mechanical limit switch and origin signal input pins: ±EL and ORG
- **Analog Input (AI):**
  - 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: 500VRMS

**Specifications**

**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.

**Ordering Information**

- **SP1 Pin assignment**
  - PCI-8312H 6U CompactPCI SSCNETII 12-axis motion control card with HSL network
  - DIN485-01 Termination Board for CNS

**Motion Creator**

- Single Axis Operation
- Servo Driver Parameters
- Servo Tuning
- XY Move Operation
- HSL Master Utility
- HSL Module Utility

**Software Support**

- **Available for Windows Vista32/XP/2000**
- **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.

**Ordering Information**

- **SP1 Pin assignment**
  - PCI-8312H 6U CompactPCI SSCNETII 12-axis motion control card with HSL network
  - DIN485-01 Termination Board for CNS