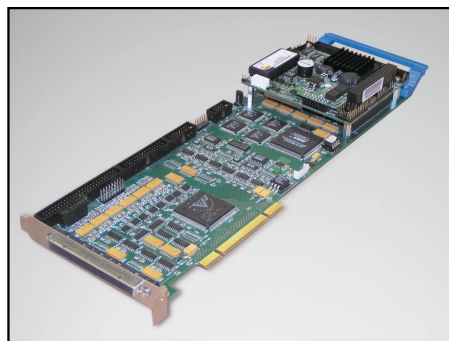


# SPiiPlus Econo Series

## Economical Motion Controllers



### SPiiPlus PCI-LT

#### Economical 2, 4, 6, 8 Axes Motion Controller

The SPiiPlus PCI-LT is especially designed for enhancing the performance of OEM machinery that requires multi-axis synchronization and low price. With its versatility, the SPiiPlus PCI-LT controls systems with both servo and step motors. It provides smooth motion, high resolution and high speed without compromising accuracy and throughput.

The SPiiPlus PCI-LT precise motion control is obtained by 20 kHz sampling rate, real-time registration inputs and position compare outputs and ACSPL+ multi-tasking application language. A powerful suite of software tools provides high speed host communication via multiple channels and a quick application development, system setup and analysis.

## Specifications

### Axes

See table below.

### Profile Generation

Trajectory Calculation Rate: 1kHz  
 Position Range:  $\pm 4 \times 10^{15}$  counts.  
 Velocity: up to  $160 \times 10^9$  counts/second.  
 Acceleration: no practical limitation.

### Control

Position (P) loop + velocity loop (PI, 2<sup>nd</sup> order low-pass and Notch filters).  
 Sampling Rate: 20 kHz.  
 Accuracy:  $\pm 1$  count.  
 Dual Loop: see table below.  
 Note: each Dual Loop consumes another axis, which should be defined as a dummy.

### Feedback

One incremental digital encoder per axis, A&B,I; UP/DN,I; CLK/DIR,I.  
 Type: RS-422. Maximum rate: 30 million encoder counts/second.  
 Note: encoders require external supply.

### Drive Interface

**Analog command:** One torque command. Type:  $\pm 10V$  differential, 16-bit DAC res. Offset compensation: programmable, 0.3mV res.  
**Pulse-Direction Commands:** Two commands per half of the axes. Type: RS-422. Up to 4 million pulse/sec.

**Drive Enable Output:** One per axis. Type: two-terminal, opto-isolated, source or sink. Collector emitter voltage: 5Vdc to 30Vdc. Output current: 50mA.

**Drive Fault Input:** One per axis. Type: two-terminal, opto-isolated, source or sink. Input voltage: 5Vdc ( $\pm 10\%$ ), or 24Vdc ( $\pm 20\%$ ), requires an external supply.

### Digital I/O

**Safety Inputs:** One E-stop. Left and Right limit per axis. Type: two-terminal, source or sink, opto-isolated. Voltage: 5Vdc ( $\pm 10\%$ ) or 24Vdc ( $\pm 20\%$ ), requires an external supply.

**Digital Inputs:** See table below. Can be used as general purpose or as registration mark (position capture) inputs. Type: RS-422. Propagation delay:  $< 0.1 \mu\text{sec}$ .

**Digital Outputs:** See table below. Can be used as general purpose, or as Position Event Generator (PEG) outputs, or as mechanical brake control. Type: RS-422. Propagation delay:  $< 0.1 \mu\text{sec}$ . PEG pulse width: 25nsec to 1.6msec. PEG position accuracy:  $\pm 1$  count at up to 5,000,000 counts/sec. PEG random events: up to 30,000.

**HSSI Expansion Channels:** One channel, providing 64 input bits and 64 output bits, sampled and updated at a 20kHz rate. Type: RS-422. Up to additional 64/63 I/Os via a single HSSI channel.

### Analog I/O

**Analog Inputs:** Four, for general purpose. Type:  $\pm 0.5V$ , differential, 14-bit resolution.

**Analog Outputs:** Two, for general purpose.

Note: in addition, one dedicated analog output drive command is provided per axis (can not be used for general purpose).

Type:  $\pm 10V$ , differential, 16-bit resolution.

### Communication Channels

PCI Bus: 33MHz, 32-bit. Bi-directional FIFO: 512x8 in each direction.

RS-232/422: two ports (one can be also RS-422). Up to 115,200bps.

Ethernet: TCP/IP, 10/100 Mbits/sec. Simultaneous communication through all channels is fully supported. Modbus protocol as master or slave is supported via Ethernet or Serial channels.

### Controller

User Memory:  
 RAM: 13Mb. Flash: 13Mb.  
 Powerup Time: 25sec.  
 Power Supply Voltage/Current:  
 $+5Vdc (-2\%/+5\%) / 3.5A, \pm 12Vdc (\pm 5\%) / 0.25A$ .

Note: when used outside the PC, the 5V and  $\pm 12V$  must be supplied through a dedicated power connector.

### Environment

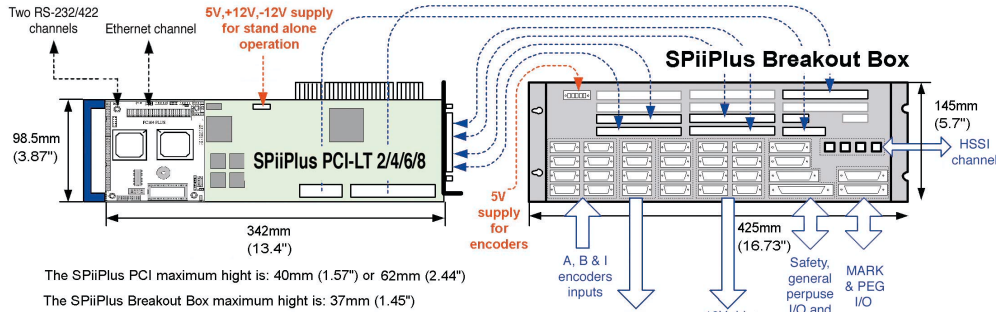
Operating Temperature:  $0^\circ\text{C}$  to  $60^\circ\text{C}$ .  
 Storage Temperature:  $-40^\circ\text{C}$  to  $85^\circ\text{C}$ .  
 Humidity: 90%RH, non-condensing.

## Axes and I/O Functionality

Product	Axes and Supported Features			I/O			
	Axes with $\pm 10V$ Drive Command	Axes with P-D Drive Commands	Axes Supporting Dual Loop	Digital I/O	Axes with PEG Pulse Output	Position Registration MARK Inputs	Analog I/O
SPiiPlus PCI-LT-2	2 (XA)	1 (X)	1 (X)	6/5	1 (X)	2 per axis (X)	4/2
SPiiPlus PCI-LT-4	4 (XAYB)	2 (XY)	2 (XY)	8/10	2 (XY)	2 per axes (X,Y)	4/2
SPiiPlus PCI-LT-6	6 (XAYBZC)	3 (XYZ)	3 (XYZ)	8/11	3 (XYZ)	2 per axes (X,Y,Z)	4/2
SPiiPlus PCI-LT-8	8 (XAYBZCTD)	4 (XYZT)	4 (XYZT)	8/12	4 (XYZT)	2 per axes (X,Y,Z,T)	4/2



# Layout & Dimensions



## How To Order

### SPiiPlus PCI-LT Controller and Software

- **SPiiPlus PCI-LT Controller**

Example: **SPiiPlus PCI-LT - 4**

- 2 - Two axes controller
- 4 - Four axes controller
- 6 - Six axes controller
- 8 - Eight axes controller

Each SPiiPlus PCI-LT controller is provided with:

- One communication cable (37cm/14.1") provides an RS-232 and an RS-232/422 channels via two D-sub, male, 9-pin connectors.
- One CD with SPiiPlus ADK (Advanced Development Kit) for programmers who develop ACSPL+ based applications and host based programs. The SPiiPlus ADK is free to download from our website |Download & Support | SPiiPlus Downloads | Software Installation section. The SPiiPlus ADK includes:
  - **SPiiPlus MMI** - for axis configuration, programming and for viewing parameters
  - **SPiiPlus Library** - for host programming in C/C++ or Visual Basic
  - **SPiiPlus Utilities** - for upgrading firmware and for error recovering
  - **SPiiPlus Simulator** - for fast application development and debugging
  - **SPiiPlus FRF** - for analyzing motion frequency response
  - Hardware & setup, software and programming guides in PDF format
  - ACSPL+ ,C / C++ and COM training files and programming examples

Supported Motors:	
+10V Command	AC Servo/DC Brushless (commutation by drive)
	DC Brush
P-D Commands	Nanomotion Piezo-ceramic
	Step motor
	Servo motor

### Additional Products

- **FC-52050-420**: Flat cable (20cm/7.8") - 200 pins header to four 50 pins headers
- **FC-52050-440**: Flat cable (40cm/15.7") - 200 pins header to four 50 pins headers
- **FC-52050-493**: Flat cable (95cm/37.4") - 200 pins header to four 50 pins headers
- **FC-52050-4150**: Flat cable (141cm/55.5") - 200 pins header to four 50 pins headers
- **CB-RS422-040**: RS-422 communication flat cable (36cm/14.1") - D type connector, 9 pins, male

- **SPiiPlus PCI-INT Kit**

Interface kit for easy connection of controller to system using standard D-type connectors and provided cables. Kit includes:

- One SPiiPlus breakout box.
  - Dimensions: 35mm (1.37") x 425mm (16.73") x 145mm (5.70") [H x W x D]
- One flat cable (95cm/37.4") - 200-pin header to four 50 pins headers
- One flat cable (95cm/37.4") - 50-pin headers
- One flat cable (95cm/37.4") - 30-pin headers
- One power male connector and cable (150cm/59") – for standalone operation

- **SPiiPlus PCI-BRACKET**

Mounting bracket for stand-alone controller operation.

Dimensions: 175mm (6.88") x 345mm (13.58") x 40mm (1.57") [H x W x D]

### For prototyping, the following products are recommended:

- SPiiPlus PCI-LT controller
- SPiiPlus PCI-INT
- SPiiPlus PCI-BRACKET (for stand-alone operation)

## Warranty

The warranty of this product is according to the Terms and Conditions of Sale and is effective for one year from date of shipment from ACS Motion Control. Copyright© August 2006 ACS Motion Control. All rights reserved. Version 1.5.



**SPiiPlus Breakout Box for easy integration and cables connection**

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For the most updated information please refer to [www.acsmotioncontrol.com](http://www.acsmotioncontrol.com)