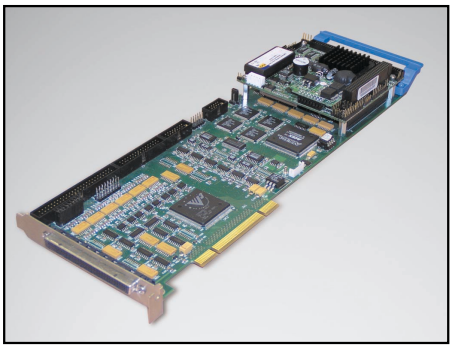


SPiiPlus PCI

Advanced 2, 4, 6, 8 Axes Motion Controller

The SPiiPlus PCI meets the motion control requirements of the utmost demanding applications such as semiconductors manufacturing, wafers inspection and Flat Panel Display assembly and testing. The SPiiPlus PCI provides sub-nanometer resolution and high speed without compromising accuracy and throughput, outstanding smooth motion, programmability and ease of use. SPiiPlus PCI meticulous and accurate motion control is obtained with 20kHz sampling rate, customized control algorithms, Gantry control, Sin-Cos encoder interpolation, real-time registration and position compare outputs, software commutation 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: programmable 0.5, 1 (default) or 2kHz.

Position Range: $\pm 4x10^{15}$ counts.

Velocity: $160x10^{9}$ counts/second.

Acceleration: up to $4x10^{15}$ counts/second^2.

Control

Position (P) loop + velocity loop (PI, 2'nd order low-pass and Notch filters).

Sampling Rate: 20 kHz.

Accuracy: ±1 count.

Dual Loop: see table below.

Note: each Dual Loop consumes another axis, which should be defined as a dummy.

Feedback

Feedback types: incremental digital encoders, Sin-Cos encoders (optional), analog inputs or user defined devices via HSSI channels.

Note: encoders require external supply.

Incremental Digital Encoder:
One per axis, A&B,I; UP/DN,I; CLK/DIR,I. Type: RS-422.
Max. rate: 30 million encoder counts/sec.

Sin-Cos Analog Encoder (optional): one per axis. Type: three-channel, 1Vptp, differential. Programmable multiplication factor: x4 – x65,536.
Rate: up to 250,000 sine periods/second.
Maximum acceleration with Sin-Cos encoder: 10^{8} sine periods/second^2.

Drive Interface

Analog commands:
one (torque command) or two (commutation commands). Type: ±10V, differential, 16-bit DAC res. Offset compensation: programmable, 0.3mV res.

Pulse-Direction Commands:
Type: RS-422. up to 4 million pulse/sec.

Drive enable output: one per axis.
Type: two-terminal, source or sink.
Collector emitter voltage: 5Vdc to 30Vdc.
Output current: 50mA.

Drive Fault Input: one per axis.
Type: two-terminal, source/sink. External input voltage: 5Vdc (±10%) / 24Vdc (±20%).

Digital I/O

Safety Inputs: one . Left and Right limit per axis.
Type: two-terminal, source or sink, opto-isolated. Voltage: 5Vdc (±10%) or 24Vdc (±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: <0.1µsec.

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 µsec. PEG pulse width: 25nsec to 1.6msec.
PEG position accuracy: ±1 count at up to 5,000,000 counts/sec.
PEG random events: up to 30,000.

HSSI Expansion Channels: see table below. Each channel provides 64 input bits and 64 output bits per channel, sampled and updated at a 20kHz rate.
Type: RS-422 . Up to additional 64/63 I/Os via each HSSI channel.

Analog I/O

Analog Inputs: see table below.
Type: ±0.5V, differential, 14-bit resolution.

Note: analog inputs also serve as Sin-Cos encoder inputs. Each Sin-Cos encoder consumes two analog inputs.

Analog Outputs: see table below.
Type: ±10V, differential, 16-bit resolution.

Note: analog outputs also serve as drive command outputs. Each servo axis consumes one (torque command) or two (commutation command) analog outputs.

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, ±12Vdc (±5%) /0.25A.

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

Environment

Operating Temperature: 0°C to 60°C.

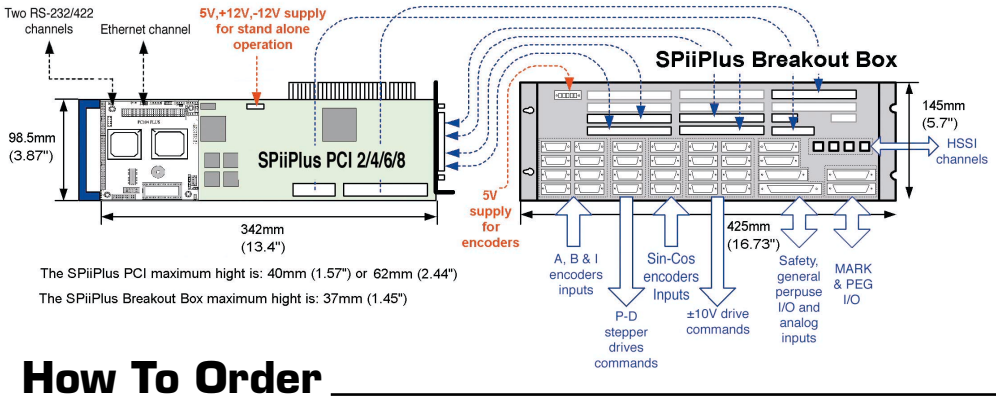
Storage Temperature: - 40°C to 85°C.

Humidity: 90%RH, non-condensing.

Axes and I/O Functionality

	Axes and Supported Features			*I/O*				
Product	*Axes with ±10V Drive Command/s*	*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*	*HSSI Channels*
SPiiPlus PCI-2…	2 (XA)	1 (X)	1 (X)	6/5	1 (X)	2 per axis (X)	4/4	1
SPiiPlus PCI-4…	4 (XAYB)	2 (XY)	2 (XY)	8/10	2 (XY)	2 per axes (X,Y)	8/8	2
SPiiPlus PCI-6…	6 (XAYBZC)	3 (XYZ)	3 (XYZ)	8/11	3 (XYZ)	2 per axes (X,Y,Z)	12/12	3
SPiiPlus PCI-8…	8 (XAYBZCTD)	4 (XYZT)	4 (XYZT)	8/12	4 (XYZT)	2 per axes (X,Y,Z,T)	16/16	4

Layout & Dimensions



Supported Motors:

±10V Commands	AC Servo/DC Brushless
	DC Brush
	Nanomotion Piezo-ceramic
P-D Commands	Step motor
	Servo motor

How To Order

SPiiPlus PCI Controller and Software

- ***SPiiPlus PCI Controller*** **Example: SPiiPlus PCI - 4 - E - 2 - I**

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

E -One RS-232, one RS-232/422 and one Ethernet 10/100 Mbits/sec.

0-8 - Number of Sin-Cos encoder multipliers.

I - Optional field - Convolve Input Shaping ® algorithm to reduce vibration and settling time

Each SPiiPlus PCI 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, servo tunning, programming and viewing parameters
  - ***SPiiPlus Library*** - or host programming in C/C++ or Visual Basic™
  - ***SPiiPlus Utilities*** - for upgrading firmware and recovering from errors
  - ***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
  - MATLAB™/Simulink servo algorithms models

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***
  Interface kit for easy connection of controller to system using standard D-type connectors and provided cables. Kit includes:
  - One SPiiPlus PCI breakout box Dim.: 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 stand-alone operation

SPiiPlus Breakout Box for easy integration and cables connection

- ***SPiiPlus PCI-BRACKET***
  Mounting bracket and screws for standalone operation. Dim.: 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 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. Version 4.4.

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For the most updated information please refer to www.acsMotionControl.com