RSI ROBOTIC SYSTEMS
I N T E G R A T I O N

PCI Bus Replacement for the LC/DSP
DL-PCI

The DL-PCI is RSI's price and performance leader, combining an Analog Devices DSP with extensive C function libraries. This controller has the same connector and identical pinouts as the LC/DSP controller manufactured by MEI. The DL-PCI can easily replace the LC/DSP.

FEATURES

- 1 to 4 axis support
- C-programmable using RSI Standard C function libraries (over 250 functions)
- Fast host communication across PCI bus
- Supports both servos and steppers
- 20 user I/O lines
- 16-bit servo output resolution
- 550 kHz step/direction output
- Point-to-point and coordinated motion
- Supports Windows NT/2000/XP, Windows95/98/ME, DOS, VxWorks, Linux, and QNX
- Flexible DSP architecture allows on the-fly changes to many motion parameters

The DL-PCI offers excellent price and performance in a single-board motion controller. A powerful Analog Devices DSP provides up to 4 axes of servo or stepper control in a single PCI bus slot. Hardware features include 16-bit servo outputs, encoder inputs to 5 MHz, and 20 lines of user I/O.

You program the DL-PCI using RSI's flexible C function libraries with over 250 motion control functions. This library is fully compatible with existing code developed by Motion Engineering. Combining RSI C libraries with compilers from Microsoft, Borland, GNU and others speeds development of complex motion applications.

The DL-PCI provides a rich set of software algorithms, including a sophisticated second-order PID control algorithm with velocity, acceleration, and friction feed-forward.

Advanced features include electronic gearing and camming, dual-loop control, circular and linear interpolation, and trapezoidal, S-curve, parabolic, and custom motion profiles.

The DL-PCI allows motion control programs to share execution between the on-board DSP and the host . This results in an ideal division of labor with minimal host intervention.

Processor
- Analog Devices, 20 MHz DSP

Computer Interface
- Standard PCI Bus Interface
- Address and Interrupt set and configured by BOIS and Operating System
- Fast binary communication through the PCI bus at speeds of 33 MHz
- Host CPU interrupts

Software Development Tools
- RSI standard C function libraries (over 250 functions)
- Compilers: Microsoft, Borland, GNU
- Operating system support: Windows NT/2000/XP, Windows95/98/ME, DOS, VxWorks, Linux, and QNX

Servo Loop Update Rate
- User-programmable rate
- Maximum: 8 kHz (1 axis), 3.0 kHz (4 axes)
- Default: 1.25 kHz

Servo Output
- ±10V DC at 16-bit resolution
- ±18 mA current
- 100 ppm long-term velocity accuracy

Step Output
- Pulse rate ranges (16-bit resolution):
   0 to 550 kHz; 0 to 93.75 kHz; 0 to 23 kHz
- RS-422 line driver outputs
- ±20 mA current
- Step/direction or clock up/clock down*
- Pulse width: 50% duty cycle

Position Feedback
- Incremental encoder: 5 MHz, single-ended or differential
- RS-422 line receivers/digital filtering
- Encoder checking: broken wire and illegal state detection

Dedicated I/O (per axis)
- TTL compatible, 4.0 mA drive
- Inputs: positive and negative limits, home, amp-fault (SCR clamp protected)
- Outputs: in-position, amp-enable

User I/O (per board)
- 20 lines, user programmed mode: input or output
- TTL compatible, 4.0 mA drive
- Direct access from host CPU
- Opto-isolation connectors available

Kinematic Ranges
- Position: 32-bit ±2.15 billion counts
- Velocity: 48-bit ±65 million counts/sec at 2 kHz sampling
- Acceleration: 48-bit ±131 billion counts/sec 2 at 2 kHz sampling
- Jerk: 48-bit ±262 trillion counts/sec 3 at 2 kHz sampling

Motion Control Features
- Point-to-point motion
- Coordinated motion
- Cubic spline motion
- Electronic gearing and camming
- Feed speed override
- Dual-loop control
- High inertia compensation
- High-speed registration

Motion Profiles
- Trapezoidal profile
- S-curve profile
- Parabolic profile
- Custom (user-defined)

Power Requirements
- +5 V Icc = 0.8 A max
- +12V Icc = 10 mA max
- -12V Icc = 20 mA max

Robotic Systems Integration, Inc.
1050 Broadway
Suite 3
Chesterton, IN 46304
ph. 219.926.3630
fax 219.926.5870
sales@roboticsys.com
tech@roboticsys.com