cPCI-8168

Advanced 6U CompactPCI 8-axis Motion Control Card with One HSL Network Inside

Features

- *32-bit CompactPCI, PICMG 2.0 Rev 2.1*
- *6U ComactPCI Form factor*
- *Pulse output rate up to 6.5MHz*
- *Pulse output options: OUT/DIR, CW/CCW, AB Phase*
- *2~4 axes linear interpolation*
- *2 axes circular interpolation*
- *Multi-axis continuous interpolation*
- *Programmable acceleration and deceleration time*
- *Trapezoidal and S-curve velocity profiles*
- *Easy interface to any stepping motors, AC or DC servo, linear or rotary motors*
- *28-bit up/down counter for incremental encoder of each axis*
- *All digital input or output signals are 2500V$_{DC}$ isolated*
- *Change speed/position on-the-fly*
- *Simultaneously start/stop on multiple axes*
- *Supports up to 6 cards in one system (48 axes)*
- *High speed position compare and trigger output*
- *4 single-ended 16-bit DA outputs*
- *4 single-ended 12-bit AD inputs*
- *High speed remote I/O interface: scan 1000 points/ ms*
- *Programmable interrupt source*
- *13 home return modes including auto searching*
- *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*

Ordering Information

cPCI-8168	CompactPCI 8-axis motion control card
DIN-68S-01	Termination board with 68-pin SCSI-II connector with DIN socket
DIN-68M-J3A0	Termination board for Mitsubishi MR-J3-A
DIN-68M-J2A0	Termination board for Mitsubishi MR-J2S servo amplifier with 68-pin SCSI-II connector
DIN-68Y-SGII0	Termination board for Yaskawa Sigma II servo amplifier with 68-pin SCSI-II connector
DIN-68P-A40	Termination board for Panasonic MINAS A4 servo amplifier with 68-pin SCSI-II connector
Cable	ACL-10568-1

Introduction

6U CompactPCI Interface

The cPCI-8168 is an 8-axis motion control cards based on CompactPCI bus. The CompactPCI interface provides plug-and-play feature that is the key to easy maintenance. The maximum number of cards in one system is 6 cards with capability of controlling 48 motors.

Motion Control Principle

The cPCI-8168 can generate high frequency pulse train. The frequency of the pulse train controls the motor speed; the number of pulse controls the motor position. The differential input/output signals reduce noise interference. The command output options, including DIR/OUT mode and CW/CCW mode, provide an easy access to various stepper or servo motor drivers.

Support HSL network

One HSL network port is inside. It is easy for users to realize centralized motion control and distributed I/O control with one board.

Velocity Profile

The motion control ASIC performs versatile trajectory planning ability. The acceleration and deceleration time are programmable. The S-curve helps to avoid mechanism vibration. The hardware linear interpolation between two axes is powerful to reduce software computation effort.

Operation Modes

Various operation modes are available, such as continuous motion, absolute move, relative move, simultaneous move, change speed on the fly, linear interpolation, and home return.

Encoder Interface

Incremental encoder interface is used for position feedback. The encoder counters provides the position information to correct the position error generated by inaccurate mechanical transmissions. The differential-type encoder feedback avoids noise interference. The 28-bit counters cover the position range for most applications.

Mechanism Interface

The pre-defined limit switch sensors on table are widely used to protect the mechanism. The dedicated I/O interface for end-limit and origin is very useful for system integration.

Servo Drive Interface & GPIO

Some servo motor drivers provide interfacing signals such as in-position (INP), alarm (ALM), error counter clear (ERC), servo ready signals. These signal interfaces are supported. General-purposed digital input/output for each axis is provided.

Interrupt Events

Many hardware status can be used as interrupt events, such as limit switch, alarm, moving home ready, one movement finished, and so on.

Analog Inputs, Analog Outputs

Data Acquisition functions are widely used in system integration for machine automation. 4 analog inputs and 4 analog outputs channels are provided.

Software Support

Windows® Platform

- Available for Windows Vista32/XP/2000
- VB/VC++/BCB/Delphi are recommended programming environment.
- Various sample programs with source codes
- Customized API functions are possible

MotionCreator ™

MotionCreator™ assists the motion system developer to debug any cabling problem, and solve the difficulty of system configuration before programming.

Specifications

Motion

Number of axes: 8 axes	
Pulse output rate: 0.01pps to 6.5Mpps	
Max. Acceleration rate: 245Mpps^2	
Speed resolution: 16-bit	
Encoder input rate: 6.55MHz under 4 x AB phase @ 1M cable	
Encoder counter resolution: 28-bit	
Positioning range: -134, 217, 728 to +134, 217, 727 pulses (28-bit)	
Counters x 4 for each axis	
Comparators x 5 for each axis	

Motion Interface I/O Signals

Isolation Protection	All I/O pins are differential and 2500VRMS optically isolated
Incremental Encoder Signals Input Pins	EA and EB
Encoder Index Signal Input	EZ
Mechanica Limit Switch Signal Input Pins	±EL and ORG
Servomotor Interface I/O Pins	INP, ALM, ERC, SVON, RDY
Position Compare Output Pin	CMP

General Purpose I/O

Digital Input	8 channel isolated digital input
Input Voltage	0 to 24V
Input Resistance	2.4KΩ @ 0.5W
Digital Output	8 channel isolated Digital outputs
Output Voltage	Min. 5V
	Max. 35V
Output Types	NPN open collector Darlington transistors
Current Sink	90mA

Analog Input (A/D)

Converter and Resolution	12-bit LTC1402
Input Channels	4 Single-Ended
Input Range	±10V; Bipolar
Conversion Time	8μs
Sampling Rate	Max. 110K samples/ sec
Output Voltage	Min. 5 V
	Max. 35 V
Over Voltage Protection	Continuous ±35V
Accuracy	0.01% of FSR ±1 LSB

Analog Output (D/A)

Converter and Resolution	16-bit; AD1866R
Output Channels	4 Single-Ended
Output Range	±10V; Bipolar
Settling Time	2μs (-10 V to + 10 V)

High Speed Link (HSL) Port

Connector	RJ45
Cable	Shield 100 Base/TX Ethernet cable
Wiring Distance	200 meters
	Multi-drop full duplex RS-485 with transformer isolation scheme
Transmission Speed	6Mbps
I/O Refreshing Rate	30.4 μs sec per slave ID
Maximum Slave Index	Control maximum 63 slave I/O index

LED display

Motion chipset busy display
HSL communications error

cPCI-8168 Pin Assignment of the 68-pin VHDCI Connector

VPP	1	35	VPP
IGND	2	36	IGND
OUT1+	3	37	OUT2+
OUT1-	4	38	OUT2-
DIR1+	5	39	DIR2+
DIR1-	6	40	DIR2-
SVON1	7	41	SVON2
ERC1	8	42	ERC2
ALM1	9	43	ALM2
INP1	10	44	INP2
RDY1	11	45	RDY2
EA1+	12	46	EA2+
EA1-	13	47	EA2-
EB1+	14	48	EB2+
EB1-	15	49	EB2-
EZ1+	16	50	EZ2+
EZ1-	17	51	EZ2-
VPP	18	52	VPP
IGND	19	53	IGND
PEL1	20	54	PEL2
MEL1	21	55	MEL2
IGND	22	56	IGND
IGND	23	57	IGND
ORG1	24	58	ORG2
AGND	25	59	AGND
AIN1	26	60	AIN2
AGND	27	61	AGND
AOUT1	28	62	AOUT2
DI_COM	29	63	DI_COM
DIN1	30	64	DIN2
DOUT1	31	65	DOUT2
IGND	32	66	IGND
IGND	33	67	IGND
E_24V	34	68	E_24V