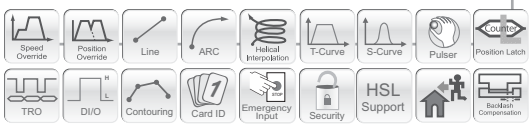
PCI-8158 / PCI-8154

Advanced 8/4-axis Stepper & Servo Motion Control Cards with Modular Design

PCI-8158

PCI-8154



Features

- 3 axes helical interpolation
- Hardware-controlled position compare and trigger (with DB-8150, up to 1 MHz)
- One HSL network support (with DB-8151)
- ECAM (Electronic CAM) control (with DB-8152)
- One Motionnet master support (with DB-8153)
- 32-bit PCI bus, Rev. 2.2, 33 MHz
- High density (200-pin) 8-axis motion controller
- Pulse output rate: up to 6.55 MHz
- Pulse output options: OUT/DIR, CW/CCW, AB Phase
- 2 to 4 axes linear interpolation
- 2 axes circular interpolation
- Helical interpolation
- Multi-axis continuous interpolation
- Position/Speed change override
- 13 home return modes and auto home search
- High speed position latch function
- Programmable acceleration and deceleration time
- Trapezoidal and S-curve velocity profiles
- 28-bit up/down counter for incremental encoder
- Multi-axis, simultaneous start/stop
- Programmable interrupt sources
- Hardware backlash compensator
- Manual pulser input interface
- Softwares limit function
- Hardware emergency input
- More than 100 thread safe API functions
- Security protection for user's program
- Easy interface to any stepping motors, AC or DC servo, linear or rotary motors
- All digital inputs and outputs are 2500 Vrms isolated
- Supports up to 12 cards in one system

Specifications

Pulse Type Motion Control	
Max. Number of Axes	8
Pulse Output Rate	0.01 pps to 6.5 Mpps
Max. Acceleration Rate	245 Mpps^2
Speed Resolution	16-bit
Encoder Input Rate	6.55 MHz under 4 x AB phase @ 1 M 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	
Position Latch Input Pin	LTC
Position Compare Output Pin	CMP
I/O Pin	Differential and 2500 Vrms optically isolated
Incremental Encoder Signals Input Pin	EA and EB
Encoder Index Signal Input	EZ
Mechanical Signal Input Pin	±EL, SD, and ORG
Servomotor Interface I/O Pin	INP, ALM, ERC, RDY, SVON
General DO Pin	DO x 8 for DO/CMP
General DI Pin	GDI x 8 for DI/LTC/PCS/SD/CLR/EMG
Pulser Signal Input	PA and PB
Simultaneous Start/Stop Signal I/O Pin	STA and STP

Software Support

Windows® Platform

- Available for Windows Vista (32-bit)/XP/2000
- Recommended programming environments: VB/VC++/BCB/Delphi/VB.NET
- Various sample programs with source codes
- Customized API functions are possible

RTX (Windows Real Time Extension)

- RTX 5.x/6.x/8.1a

Linux Platform

- Redhat 9, kernel 2.4.x
- Fedora Core 3, kernel 2.6.9
- Fedora Core 4, kernel 2.6.11
- Fedora Core 5, kernel 2.6.15

MotionCreatorPro 2™

MotionCreatorPro 2 is a user-friendly Windows-based application development software package included with all distributed motion and I/O control modules.

MotionCreatorPro 2 provides simple configuration and real-time statuses of modules, in addition to precise positioning control with no effort.

(See page 1-23 for more information on MotionCreatorPro 2.)

Ordering Information

- **PCI-8158**
  Advanced 8-axis stepping & servo motion control card
- **PCI-8154**
  Advanced 4-axis stepping & servo motion control card
- **DB-8150**
  High-speed triggering daughter board
- **DB-8151**
  Single HSL master controller daughter board
- **DB-8152**
  Electronic CAM slave motion solution daughter board
- **DB-8153**
  Single Motionnet master controller daughter board

Accessories

See section 14 for more information on Accessories.

Terminal Boards

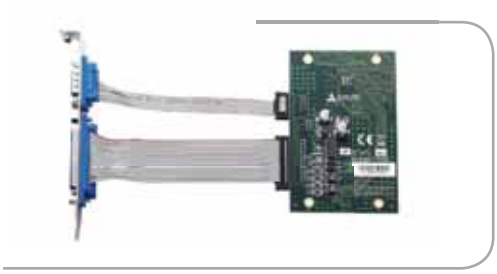
- DIN-100S-01
  Terminal board with one 100-pin SCSI-II connector and DIN-rail mounting
- DIN-814M0
  Terminal board for Mitsubishi MR-J2S-A servo amplifier
- DIN-814M -J3A0
  Terminal board for Mitsubishi MR-J3S-A amplifier
- DIN-814Y0
  Terminal board for Yaskawa Sigma II/III/V amplifier
- DIN-814P-A40
  Terminal board for Panasonic MINAS A4 amplifier
- DIN-814PA0
  Terminal board for Panasonic MINAS A servo amplifier

Cabling

- ACL-102100-1 (for PCI-8154)
  100-pin SCSI-II cable (mating with AMP-787082-9), 1 M
- SCSI-VHDCI 100P (for PCI-8158)
  100-pin SCSI-VHDCI cable, available for 2 M, 3 M

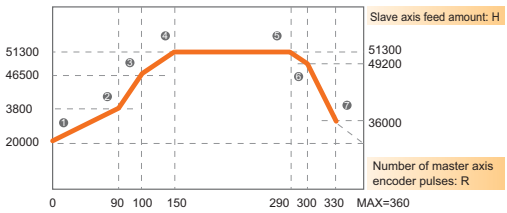
DB-8152

Electronic CAM Slave Motion Solution Daughter Board



Features

- Up to 1 MHz from encoder signals of the master axis
- Supports OUT/DIR and CW/CCW pulse output mode
- Supports 4 x AB phase and CW/CCW pulse input mode
- Programmable interrupt
- CAM table setting by API function

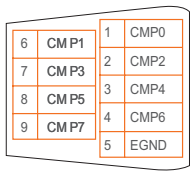


Specifications

ECAM Controller

D-Sub 9 and 25 bracket required when using the DB-8152	
D-Sub 25 for master encoder and slave encoder, pulse out and DIO with isolation	
D-Sub 9 for CMP output with 2 high speed and 6 general speed	
Dimension	96.42 (L) x 62 (W) mm
Operating Temperature	0°C to +60°C
Storage Temperature	-20°C to +80°C
Power Consumption	+3.3 V @ 200 mA typical, +5 V @ 100 mA typical

CN3 on DB-8152 Bracket



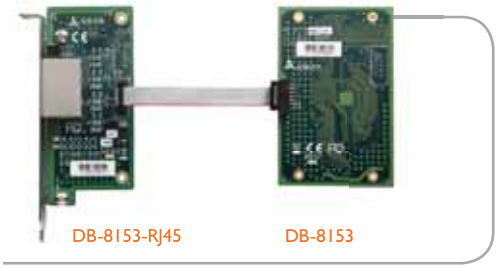
CN4 on DB-8152 Bracket

Ordering Information

DB-8152
Electronic CAM slave motion solution daughter board for PCI-8158/PCI-8154

DB-8153

Single Motionnet Master Controller Daughter Board



DB-8153-RJ45 DB-8153

Features

- RJ-45 jack for easy installation (with DB-8153-RJ45)
- Provides both distributed and on-board motion control does not occupy a PCI slot when attached to a PCI-815x
- Software selectable transmission speed

Specifications

Motionnet Master Controller

Half duplex, RS-485 with transformer isolation	
Transmission Speed	2.5/5/10/20 Mbps (Default: 20 Mbps)
Dimension	96.42 (L) x 62 (W) mm
Operating Temperature	0°C to +60°C
Storage Temperature	-20°C to +80°C
Power Consumption	+3.3 V @ 250 mA typical, +5 V @ 100 mA typical

Connections
CN3: Main DB-8153 connector

PIN NO.	PIN OUT
PIN 1	+5 V
PIN 2	FG
PIN 3	DG
PIN 4	LED Signal
PIN 5	RXD1
PIN 6	TXD
PIN 7	RXD2
PIN 8	TXE
PIN 9	DG
PIN 10	FG

Connections
RJ1: DB-8153-RJ45 RJ-45 connector

PIN NO.	PIN OUT
PIN 1	NC
PIN 2	NC
PIN 3	NC
PIN 4	Data-
PIN 5	Data+
PIN 6	NC
PIN 7	NC
PIN 8	NC

Ordering Information

DB-8153
Single Motionnet master controller daughter board for PCI-8158/PCI-8154

DB-8153-RJ45
Bracket with RJ-45 jack for DB-8153

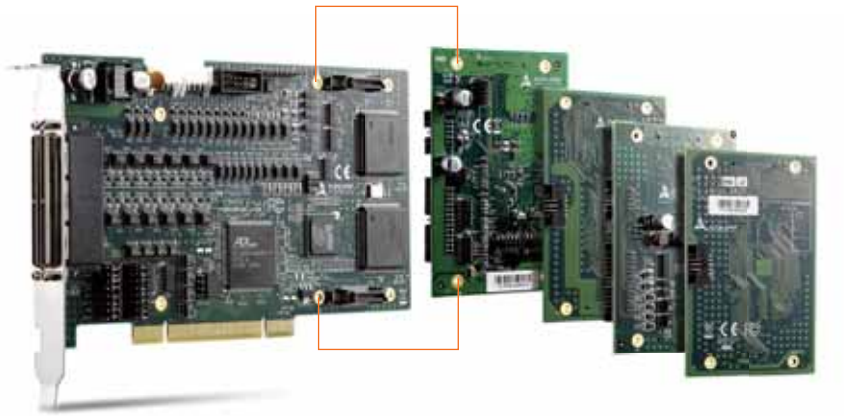
Pin Assignment

PCI-8158/PCI-8154 100-pin Mini SCSI Connector Pin Assignment

VDD	1	51	VDD
EXGND	2	52	EXGND
OUT0+	3	53	OUT2+
OUT0-	4	54	OUT2-
DIR0+	5	55	DIR2+
DIR0-	6	56	DIR2-
SVON0	7	57	SVON2
ERC0	8	58	ERC2
ALM0	9	59	ALM2
INP0	10	60	INP2
RDY0	11	61	RDY2
EXGND	12	62	EXGND
EA0+	13	63	EA2+
EA0-	14	64	EA2-
EB0+	15	65	EB2+
EB0-	16	66	EB2-
EZ0+	17	67	EZ2+
EZ0-	18	68	EZ2-
VDD	19	69	VDD
EXGND	20	70	EXGND
OUT1+	21	71	OUT3+
OUT1-	22	72	OUT3-
DIR1+	23	73	DIR3+
DIR1-	24	74	DIR3-
SVON1	25	75	SVON3
ERC1	26	76	ERC3
ALM1	27	77	ALM3
INP1	28	78	INP3
RDY1	29	79	RDY3
EXGND	30	80	EXGND
EA1+	31	81	EA3+
EB1-	32	82	EA3-
EB1+	33	83	EB3+
EB1-	34	84	EB3-
EZ1+	35	85	EZ3+
EZ1-	36	86	EZ3-
PEL0	37	87	PEL2
MEL0	38	88	MEL2
GDI0	39	89	GDI2
DO0	40	90	DO2
ORG0	41	91	ORG2
EXGND	42	92	EXGND
PEL1	43	93	PEL3
MEL1	44	94	MEL3
GDI1	45	95	GDI3
DO1	46	96	DO3
ORG1	47	97	ORG3
EXGND	48	98	EXGND
EXGND	49	99	E_24V
EXGND	50	100	E_24V

A variety of extension boards to meet your needs…

(See page 7-11 for the details)



PCI-8158/PCI-8154 DB Series/Extension Modules

The PCI-8158/PCI-8154 supports these modules:

DB-8150
High-speed trigger

DB-8151
HSL bus distributed motion & I/O

DB-8152
ECAM slave motion control

DB-8153
Motionnet bus distributed motion

DB-8150

High-speed Triggering Daughter Board

Features

- High performance FPGA inside
- On-board SDRAM for comparing point table (2 M points for one channel)
- Simultaneous 8 channel TTL compatible differential output
- One general-purpose digital output channel, current sink capacity up to 20 mA
- Two general-purpose digital input channels, 10 kHz response time
- Two high speed digital input channels
- Three 32-bit comparators for position comparing
- Trigger output pulse polarity and pulse width adjustable
- Two 32-bit position counters by two EA/EB encoder signals input from carrier board
- Two EA/EB encoder signals input from daughter board
- Counter clear signal via EZ input from carrier board
- Supports trigger output toggle modes
- Equal and window condition comparison available
- Linear function and point table mode for continuous trigger output
- Counter latched by digital input pins

Specifications

High-speed Trigger

FPGA on-board to process the trigger function without consuming CPU resources	
Max. Trigger Pulse Frequency	Up to 1 MHz
FIFO Capacity	2 M x 32-bit
Max. Encoder Input Frequency	6.5 MHz under 4xAB mode, 1.5 meter cable
Dimension	96.42 (L) x 62 (W) mm
Operating Temperature	0°C to +60°C
Storage Temperature	-20°C to +80°C
Power Consumption	+3.3 V @ 250 mA typical, +5 V @ 100 mA typical

Connections

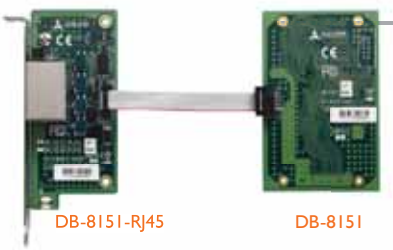
PIN No.	Name	Function (Axis)	PIN No.	Name	Function (Axis)
1	CMP0+	Compare output+	14	CMP0-	Compare output-
2	CMP1+	Compare output+	15	CMP1-	Compare output-
3	CMP2+	Compare output+	16	CMP2-	Compare output-
4	CMP3+	Compare output+	17	CMP3-	Compare output-
5	CMP4+	Compare output+	18	CMP4-	Compare output-
6	CMP5+	Compare output+	19	CMP5-	Compare output-
7	CMP6+	Compare output+	20	CMP6-	Compare output-
8	CMP7+	Compare output+	21	CMP7-	Compare output-
9	EGND	Ext. Ground	22	EGND	Ext. Ground
10	DO	Open collectoroutput	23	DO_COM	Output COM
11	EXGND	Ext. Ground	24	EXGND	Ext. Ground
12	DI_0	Digital Input Ch_0	25	DI_1	Digital Input Ch_1
13	N/A	Empty	26	N/A	Empty

Ordering Information

- **DB-8150**
  High-speed triggering daughter board for PCI-8158/PCI-8154

DB-8151

Single HSL Master Controller Daughter Board



DB-8151-RJ45 DB-8151

Features

- Programmable timer interrupt
- RJ-45 jack for easy installation (with DB-8151-RJ45)
- Provides both 4 to 8-axis control and distributed I/O and does not occupy a PCI slot when attached to a PCI-815x
- Software selectable transmission speed and mode
- Supports HSL-HUB3/HSL-Repeater
- DI data transmission interrupt

Specifications

HSL Master Controller

Full duplex, RS-485 with transformer isolation	
Transmission Speed	3/6/12 Mbps
Dimension	96.42 (L) x 62 (W) mm
Operating Temperature	0°C to +60°C
Storage Temperature	-20°C to +80°C
Power Consumption	+3.3 V @ 250 mA, +5 V @ 100 mA typical

Connections

PIN NO.	PIN OUT
PIN 1	+5V
PIN 2	FG
PIN 3	DG
PIN 4	LED Signal
PIN 5	RXD1
PIN 6	TXD
PIN 7	RXD2
PIN 8	TXE
PIN 9	DG
PIN 10	FG

CN3: Main DB-8151 connector

Connections

PIN NO.	PIN OUT
PIN 1	NC
PIN 2	NC
PIN 3	RX+
PIN 4	TX-
PIN 5	TX+
PIN 6	RX-
PIN 7	NC
PIN 8	NC

RJ1: DB-8151-RJ45 RJ-45 connector

Ordering Information

- **DB-8151**
  Single HSL master controller daughter board for PCI-8158/PCI-8154
- **DB-8151-RJ45**
  Bracket with RJ-45 jack for DB-8151