

3mi-0x-BL



Product Description

The PCI-bus cards of the Millennium series are high performance feature-rich multi axis motion controllers. The 3mi-0x-BL model implements the Navigator MC23xx series chipsets - dedicated motion processors from PMD. It controls brushless servomotors with on-board phase commutation. These controllers harness the power of the Navigator high-speed DSP chip and incorporate ASIC and surface mount technologies. The Millennium controllers are available in configurations of 1, 2 or 4 axes.

The DSP unit provides S-curve, trapezoidal, velocity contouring and electronic gearing profiling modes for Analog or PWM signal output. Onboard memory allows designers to capture on-the-fly motion data for analyzing system performance, tuning servo filters and diagnostic purposes. Motion trajectory segments can be blended into continuous motion path in the velocity mode.

The boards interface to external components via a 100 pin high density connector providing motor outputs and reading pulsed encoder (incremental or absolute), limit switches and home indicator input signals. They are capable of handling eight analog inputs and eight user-defined discrete I/Os.

The card is supported by C-Motion™ - extensive C-language software libraries and Windows drivers, which allow development of any motion control application. EasyMotion™, a Windows application package with the industry's first ever MotionWizard, assists in a quick and easy way to set up and tune even complex electro-mechanical systems.

The boards can be used in a variety of industries, such as robotic, machine tool, semiconductor, medical, food processing, textile and many others.

Features:

- Uses DSP and ASIC high speed dedicated motion processors in 1, 2 or 4 axes configuration
- Supports 2 or 3-phase brushless motors
- 6-step (Hall based) or sinusoidal commutation
- Independent or synchronous axes programming
- Open or closed servo loop operating modes
- Advanced PID filter with velocity and acceleration feedforward, bias offset and 32-bit position error
- Axis settled indicator and tracking window in addition to automatic motion error detection
- Choice of S-curve, trapezoidal, velocity contouring or electronic gearing motion profiles
- Asymmetric acceleration and deceleration to custom program a trapezoidal motion profile
- Velocity and acceleration changes on-the-fly for trapezoidal and velocity contouring profiles
- Position range from $-2,147,483,648$ to $+2,147,483,647$ counts
- Velocity range from $-32,768$ to $+32,767$ counts/sample with a resolution of $1/65,536$ counts/sample in velocity contouring profile mode or from 0 to $32,767$ counts/sample with a resolution of $1/65,536$ counts/sample in all other modes
- Acceleration and deceleration range from $-32,768$ to $32,767$ counts/sample² with a resolution of $1/65,536$ counts/sample²
- Jerk range from 0 to 1 counts/sample³ with a resolution of $1/4,294,967,296$ counts/sample³
- Electronic gear ratio range from $-32,768$ to $32,767$ (negative and positive direction)
- Programmable sample rate from $150 \mu\text{sec}$ to 3355 msec per axis
- Single-ended or differential incremental encoder maximum rate up to 5.0 Mcounts/sec
- Maximum parallel feedback device rate up to $160.0 \text{ Mcounts/sec}$
- Parallel feedback device word size: 16 bits
- 3 Hall effect input signals per axis (TTL level)
- Commutation rate 10 kHz for 4 axes or 20 kHz for 1 and 2 axes
- $\pm 10\text{V}$ 16 -bit DAC output signal
- PWM motor output signal of 10 -bit resolution at 20 kHz (1 or 2 axes) or 10 -bit resolution at 10 kHz (4 axes) – $50/50$ PWM mode supports 2 or 3 phase motors, Sign/Magnitude PWM mode supports 2 phase motors only
- On-board 64 kByte dual-port memory buffer for data and parameters storage
- PCI-bus communication interface
- Opto-isolated dedicated inputs for two-directional travel limit switches, home indicator and fault signal operating at $+5\text{V}$, $+12\text{V}$, $+24\text{V}$ or $+48\text{V}$
- 8 general purpose discrete TTL level input lines
- 8 uncommitted discrete output lines operating at TTL level, expandable to 128 outputs or opto-isolated capable of sinking or sourcing maximum 350 mA at 50V
- 8 general purpose 10 -bit analog inputs in range of 0 to 5.0 V dc
- Automatic motor shutdown on motion error
- Programmable host interrupts
- Trace capabilities for system performance testing, servo-filter tuning and diagnostic purposes
- Software functions support coordinated linear and circular interpolation, point-to-point positioning and contouring, backlash compensation, jogging, homing, etc.
- Status reporting for position, speed and errors
- Infinite number of linear and arc segments for smooth motion
- Programmable event triggers for monitoring elapsed time, motion complete, position, motion error, limit switches and position wrap-around

Axes Control Signals Connector (J4)

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
01	QuadA1+	26	QuadA2+	51	QuadA3+	76	QuadA4+
02	QuadA1-	27	QuadA2-	52	QuadA3-	77	QuadA4-
03	QuadB1+	28	QuadB2+	53	QuadB3+	78	QuadB4+
04	QuadB1-	29	QuadB2-	54	QuadB3-	79	QuadB4-
05	Index1+	30	Index2+	55	Index3+	80	Index4+
06	Index1-	31	Index2-	56	Index3-	81	Index4-
07	Vcc (encoder)	32	Vcc (encoder)	57	Vcc (encoder)	82	Vcc (encoder)
08	GND (encoder)	33	GND (encoder)	58	GND (encoder)	83	GND (encoder)
09	Hall1A	34	Hall2A	59	Hall3A	84	Hall4A
10	Hall1B	35	Hall2B	60	Hall3B	85	Hall4B
11	Hall1C	36	Hall2C	61	Hall3C	86	Hall4C
12	GND (Hall)	37	GND (Hall)	62	GND (Hall)	87	GND (Hall)
13	PosLim1	38	PosLim2	63	PosLim3	88	PosLim4
14	NegLim1	39	NegLim2	64	NegLim3	89	NegLim4
15	Home1	40	Home2	65	Home3	90	Home4
16	AxisIn1	41	AxisIn2	66	AxisIn3	91	AxisIn4
17	AxisOut1	42	AxisOut2	67	AxisOut3	92	AxisOut4
18	PWMMagA1	43	PWMMagA2	68	PWMMagA3	93	PWMMagA4
19	PWMMagB1	44	PWMMagB2	69	PWMMagB3	94	PWMMagB4
20	PWMMagC1	45	PWMMagC2	70	PWMMagC3	95	PWMMagC4
21	Not used	46	Not used	71	Not used	99	Not used
22	DACA1	47	DACA2	72	DACA3	97	DACA4
23	DACB1	48	DACB2	73	DACB3	98	DACB4
24	GND (DAC)	49	GND (DAC)	74	GND (DAC)	99	GND (DAC)
25	Opto GND	50	Opto GND	75	Opto GND	100	Opto GND

User-defined Digital I/O Connector (J5)

Pin	Signal Name	Pin	Signal Name
01	PrIn0	11	PrIn5
02	PrOut0	12	PrOut5
03	PrIn1	13	PrIn6
04	PrOut1	14	PrOut6
05	PrIn2	15	PrIn7
06	PrOut2	16	PrOut7
07	PrIn3	17	GND
08	PrOut3	18	Vcc
09	PrIn4	19	GND
10	PrOut4	20	Vcc

Serial Channel Connector (J2)

Pin	Signal Name
01	SrIXmt
02	SrIRcv
03	Synch
04	GND
05	Vcc

Analog Input Connector (J1)

Pin	Signal Name	Pin	Signal Name
01	Analog1	09	AnalogRefHigh
02	Analog2	10	AnalogRefLow
03	Analog3	11	AnalogVcc
04	Analog4	12	AnalogGND
05	Analog5	13	Vcc
06	Analog6	14	GND
07	Analog7	15	Synch
08	Analog8	16	~HostIntrpt

High Power I/O Connector (J7)

Pin	Signal Name	Pin	Signal Name
01	High PrOut0	09	High PrOut4
02	+VS	10	Pwr GND
03	High PrOut1	11	High PrOut5
04	+VS	12	Pwr GND
05	High PrOut2	13	High PrOut6
06	+VS	14	Pwr GND
07	High PrOut3	15	High PrOut7
08	+VS	16	Pwr GND

Environmental and Electrical Ratings

Dimensions	4.00" x 8.25"
Storage Temperature	-40 °C to 125 °C
Operating Temperature	0 °C to 70 °C (an industrial version with an operating range of -40 °C to 85 °C is also available)
Power Consumption	1A @ 5V; 83mA @ +/-12V
Supply Voltage Limits	-0.3V to +7.0V
Supply Voltage Operating Range	4.75V to 5.25V
Analog Output Range	-10.0V to 10.0V
Analog Input Range	0.0V to 5.0V

Ordering information

