Cito
Systems

PC/104-bus Millennium Series
Motion Controller Board
For Microstepping Motors

3mc-0x-MS

Product Description

The PC/104-bus cards of the Millennium series are high performance feature-rich multi axis motion controllers, ideal for embedded system applications. The 3mc-0x-MS model implements the Navigator MC24xx series chipsets - dedicated motion processors to control microstepping motors. 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 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) for on-the-fly motor stall detection, limit switches and home indicator input signals. They are capable of handling eight analog inputs and eight user-defined discrete I/Os.

The cards are supported by C-MotionPlus™ and CyberMotion™ - extensive C-language software libraries and Windows and Linux drivers, which allow development of any motion control application. EasyMotion™, a GUI 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 stepping motors
- Programmable microstepping rate from 1 to 256 counts per full step
- Independent or synchronous axes programming
- Open loop operating mode
- 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/sample^2 with a resolution of 1/65,536 counts/sample^2
- Jerk range from 0 to 1/2 counts/sample^3 with a resolution of 1/4,294,967,296 counts/sample^3
- Electronic gear ratio range from –32,768 to 32,767 (negative and positive direction)
- Programmable sample rate from 150 µsec to 3355 msec per axis
- Single-ended or differential incremental encoder maximum rate up to 5.0 Mcounts/sec
- Maximum parallel encoder rate up to 160.0 Mcounts/sec
- Parallel encoder word size: 16 bits
- Parallel encoder read rate: 20kHz (every 50 µsec)
- Commutation rate 10 kHz for 4 axes or 20 kHz for 1 and 2 axes
- +/-10V 16-bit DAC output signal
- PWM motor output signal of 8-bit resolution at 80 kHz or 10-bit resolution at 20 kHz
- On-board 64 kByte dual-port memory buffer for data and parameters storage
- PC/104-bus communication interface
- Programmable watchdog timer
- Programmable software reset
- Power supply voltage monitor circuit to reset the board
- External reset circuit
- Opto-isolated dedicated outputs for amplifier enable signals
- Opto-isolated dedicated inputs for two-directional travel limit switches, home indicator and fault signal operating at +5V, +12V, +24V or +48V
- 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 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	N.C.	34	N.C.	59	N.C.	84	N.C.
10	N.C.	35	N.C.	60	N.C.	85	N.C.
11	N.C.	36	N.C.	61	N.C.	86	N.C.
12	GND	37	GND	62	GND	87	GND
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	PWMSignA1	45	PWMSignA2	70	PWMSignA3	95	PWMSignA4
21	PWMSignB1	46	PWMSignB2	71	PWMSignB3	99	PWMSignB4
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

Miscellaneous I/O Connector (J12)

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
01	PrlIn0	12	PrlOut3	23	High PrlOut6	34	AnalogRefLow
02	PrlIn1	13	PrlOut4	24	High PrlOut7	35	AnalogVcc
03	PrlIn2	14	PrlOut5	25	AnalogIn0	36	AnalogGND
04	PrlIn3	15	PrlOut6	26	AnalogIn1	37	Amp Enable0
05	PrlIn4	16	PrlOut7	27	AnalogIn2	38	Amp Enable1
06	PrlIn5PrlOut2	17	High PrlOut0	28	AnalogIn3	39	Amp Enable2
07	PrlIn6	18	High PrlOut1	29	AnalogIn4	40	Amp Enable3
08	PrlIn7PrlOut3	19	High PrlOut2	30	AnalogIn5	41	Amp +VS
09	PrlOut0	20	High PrlOut3	31	AnalogIn6	42	Amp GND
10	PrlOut1	21	High PrlOut4	32	AnalogIn7	43	Reset Out
11	PrlOut2	22	High PrlOut5	33	AnalogRefHigh	44	Hstrdy

Serial Channel (J2)

Pin	Signal Name
01	SrlXmt
02	SrlRcv
03	Synch
04	RDSSN
05	Vcc
06	GND

SYNCH Sig. (J1)

Pin	Signal Name
01	SYNCH
02	GND

HSTINT Sig. (J3)

Pin	Signal Name
01	HSTINT~
02	GND

Power Connector (J9)

Pin	Signal Name
01	+VS
02	Pwr GND
03	VCC
04	GND

Environmental and Electrical Ratings

Dimensions	3.5” x 3.8” (90mm x 96mm), max 4.2” x 3.8” (107mm x 96mm)
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	0.5A @ 5V; 40mA @ +/-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