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MC 186/40

Four Axis Position Control Module For Multibus I™ Applications

The MC 186/40 motion control module is an intelligent linear motion control sub-system for use with Multibus I applications. The module provides a highly integrated solution to control the position of four servo axes. The MC 186/40 senses position using magnetostrictive linear displacement transducers (Temposonics™) and controls the associated output based on programmable parameters. Drive outputs can be configured to work with hydraulic valves and servo drives.

Features

- Four axes of independent or coordinated control
- Optically isolated inputs and outputs
- Direct connection to Magnetostrictive (Temposonics™) sensing devices
- Motion profiles can be changed on the fly using dual port RAM
- Full PID loop control
- One millisecond control loop
- Axis status indicators
- Optional RS-232 diagnostic port for tuning parameters and graphic display of motion

Applications

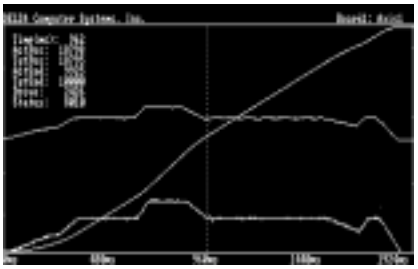
- Headrigs, carriages, and other forest industry machinery
- Hydraulic actuators
- Scanning
- Palletizers/Stackers
- Laser positioning
- Robotics
- Tube forging machines
- Pinch roller positioning

Magnetostrictive Inputs

- Resolution to 0.0005 inches
- Direct connection to magnetostrictive transducers (Temposonics)
- 1,2 or 4 recirculations
- Positive or negative interrogation pulses
- Maximum speeds up to 60 inches per second (0.001" resolution)
- Transducer lengths up to 144 inches

Diagnostic Program - MB1MON (Requires SBX-351MU option and external PC)

- Provides graphic display of previous motion profile



- Provides utilities to calculate motion parameters SCALE, OFFSET & DIRECTION
- Provides access to auto tuning function
- Allows user to activate simple motion profiles
- Permits user to change control parameters
- Displays parameter and status information for multiple axes
- Saves and retrieves graphic diagnostic information to and from disk
- Provides a mode to display previously saved diagnostic graphic information using a PC

DELTA
Computer Systems, Inc.

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MC 186/40

Hardware Information

Magnetostrictive Interface	Interface Type	Start/Stop digital pulse
	Temposonics I and II	Direct connection
	Temposonics II & RPM module	One differential driver board per axis (AMP 10)
	Santest	Direct connection
	Balluff	Direct connection (BTL-2-N2-XXXX-Z-S50)
	T&R Electronics	One recirculation only (Consult Delta before using)
	Sample Rate	Maximum of 4 kHz
	Input Isolation	2500 VAC optically isolated
	Recirculations	Provided by module: 1, 2 or 4 (positive or negative pulse)
	Counters	50.0 MHz
	Position update rate	One millisecond
	Sensor protection	4.7 and 15 ohm resistors for sensor power
Drive Outputs	Output Isolation	2500 VAC optically isolated
	Current Mode	±100 milliamps
	Voltage Mode (external resistors)	±10 Volts
	Resolution	12 bit
Multibus Interface	Memory Requirements	512 bytes - 128 allocated for each axis
	Addressing	20 bit (24 bit if P2 used)
	Interrupt Support	Single interrupt for four axes using one of seven interrupt lines (INT 0 through INT 7)
Power Requirements	Multibus I	+ 5 VDC @ 2.5 amps maximum
	External Magnetostrictive Sensor	±15 VDC @ 500 mA, +5 VDC @ 500 mA
	External Drive	±15 VDC @ 500 mA
Mechanical Specifications	Backplane	P1 connector, P2 for 24 bit addressing
	Sensor	DB-25S for sensors
	Drive	DB-15S for drives
Environment	Operating Temperature	+32 to +140 F (0 to +60C)
	Non-Operating Temperature	-40 to +185 F (-40 to +85C)
	Storage Temperature	-40 to +185 F (-40 to +85C)
	Humidity	0 to 93% non-condensing
Optional RS-232 Diagnostic Port	Interface with Delta's MB1MON setup and diagnostic software	Requires SBX-351-MU option and external IBM PC or compatible (two slots required)

Programming Parameters

Hex Offset	Parameter Name	Default Value	Descriptions
00H	Command Position	Read Only	Requested Position with limits checked
02H	Target Position	Read Only	Calculated position of axis
04H	Actual Position	Read Only	Scaled position measurement
06H	Transducer Counts	Read Only	Raw transducer counts
08H	Status Word	Read Only	Axis error and status Bit 15 - Parameters initialized Bit 14 - Lag error Bit 13 - Lead error Bit 12 - Overdrive error Bit 11 - Valve out of null Bit 10 - Transducer not responding Bit 09 - Position overflow Bit 08 - Parameter error Bit 07 - Active (Axis one only) Bit 06 - Stopped Bit 05 - Decelerating Bit 04 - At Requested Speed Bit 03 - Accelerating Bit 02 - Halted Bit 01 - Near Command Position Bit 00 - At Command Position
0AH	Drive	Read Only	Output drive in raw A/D counts (12 bit)
0CH	Target Speed	Read Only	Calculated speed
0EH	Null Drive	Read Only	Current value for null drive
10H-3FH	24 Reserved words		
40H	Axis 1 Free Running Clock	Read Only	Free running 16 bit counter using millisecond clock
	Axis 2 Active Bit Interval	256	Active Bit toggle interval in milliseconds (Status Word axis 1)
	Axis 3 Graph Interval	2	Data capture interval (two millisecond increments)
	Axis 4 Reserved		
42H	Reserved	N/A	
44H	New Null	2048 (Write Only)	Entry for preset drive offset
46H	Estop Mask	FFFFH	Enables emergency stop on errors (Bit = 0 = Enabled)
48H	Halt Mask	0000H	Enables ramped stop on errors (Bit = 0 = Enabled)
4AH	Interrupt Mask	FFFFH	Enables Multibus interrupts on Status Word bits (0 = Enabled)
4CH	Feed Forward Advance	0	Time shift in milliseconds for Feed Forward term
4EH	Null Update	500	Null calculation interval in milliseconds
50H	Minimum Update Time (Axis one only)	1000	Minimum time in microseconds between sensor readings
52H	Dither	0	Static friction drive in percent of full drive
54H	Hysteresis	0	Deadband compensation
56H	Static Gain	50	Proportional gain at rest
58H	Extend Gain	50	Proportional gain when extending
5AH	Retract Gain	50	Proportional gain when retracting
5CH	Integral Gain	0	Integral gain while in motion
5EH	Differential Gain	0	Differential gain
60H	Extend Feed Forward	100	Feed-forward drive when extending
62H	Retract Feed Forward	100	Feed forward drive when retracting
64H	Scale	32768	Measured position conversation number
66H	Position Offset	0	Fixed position offset
68H	Direction	0	Sign of position units with respect to Transducer Counts
6AH	Maximum Position Error	250	Set point for position error indication
6CH	At Command Position	50	Window around requested position for status bit
6EH	Near Command Position	0	Window around requested position for status bit
70H	Extend Limit	Position on power-up	Maximum length allowed
72H	Retract Limit	Position on power-up	Minimum length allowed
74H	Mode	0	Function selection bits
76H	Acceleration	1000	Acceleration rate or distance
78H	Deceleration	1000	Deceleration rate or distance
7AH	Requested Speed	1000	Maximum speed during a move
7CH	Requested Position	N/A	Destination position in position units
7EH	Command	N/A	Command to be executed (F, G, H, P, O, R, S)

Wiring Information

DB-15P to pigtail cable (6 feet) for Drive outputs. Cable uses Alpha 1181/15 or equiv.

Pin	Function	Wire Color
1	+15 input	RED
2	Power Supply Common	BLACK
3	-15 input	WHITE
4	Common	GREEN
5	Drive Out 1	ORANGE
6	Common	BLUE
7	Common	BROWN
8	Drive Out 2	YELLOW
9	Common	RED/BLACK
10	Drive Out 4	RED/YELLOW
11	Common	RED/GREEN
12	Common	TAN
13	Drive Out 3	PINK
14	Common	GRAY
15	Common	VIOLET

DB-25P to pigtail cable (6 feet) for magnetostrictive sensor inputs. Cable uses Alpha 1181/25 or equiv.

Pin	Function	Wire Color
1	+15 input	RED
2	Power supply common	BLACK
3	-15 input	WHITE
4	+5 input	GREEN
5	+12 output	ORANGE
6	Common	GRAY
7	Interrogation pulse 1	BROWN
8	+15v axis 1	PINK
9	Return pulse 1	YELLOW
10	-15v axis 1	VIOLET
11	Common	TAN
12	Interrogation pulse 2	BLUE
13	+15v axis 2	RED/BLACK
14	Return pulse 2	RED/YELLOW
15	-15v axis 2	RED/GREEN
16	Common	WHITE/BLACK
17	Interrogation pulse 3	WHITE/BLUE
18	+15v axis 3	WHITE/RED
19	Return pulse 3	WHITE/YELLOW
20	-15v axis 3	WHITE/GREEN
21	Common	WHITE/GRAY
22	Interrogation pulse 4	WHITE/BROWN
23	+15v axis 4	WHITE/ORANGE
24	Return pulse 4	WHITE/BLACK/RED
25	-15v axis 4	WHITE/VIOLET

Ordering Information

Part Number: MC 186/40 - Provided with each MC 186/40: Reference manual, DB15P and DB25P 6' pigtail cable, MB1MON software and manual.

Additional Products, Options and Accessories

Part Number	Description
MC 186/40-TQ	Additional quadrature encoder interface
MC 186/40-TA	Additional analog sensor interface
SBX-351-MU	RS-232 interface for MB1MON
SSS/10	1 axis Servo System Simulator
AMP 10	1 axis RS 422 converter(two required)
MCCBS-01	6 ft DB-15P cable with pigtails
MCCBS-02	6 ft DB-25P cable with pigtails

Company Profile

Delta Computer Systems, Inc. manufactures motion controllers and other industrial controls providing high performance automation solutions to a wide range of industries.

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Mulibus I is a trademark of Intel Corporation

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