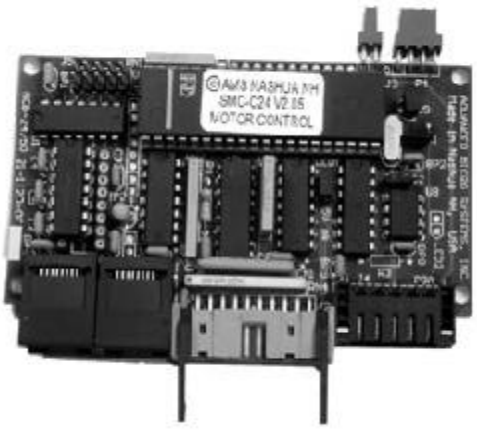
MCB
INTELLIGENT MOTOR CONTROL BOARD



OVERVIEW

The MCB-24 (23k SPS) and MCB-50 (50k SPS) are low-cost OEM motor control boards that integrate quickly into new or retrofit product designs. On-board non-volatile memory allows application sequences of high level hardware, or keyboard "Go" commands. Commands issued via the line editor permit precise control with position trigger, loop on ports or count delays, 5 separate user ports and home routines.

The MCB combines AMS' high performance "SMC" microprocessor with all required components on a small (2" x 3.9") circuit board to form a complete, single axis, intelligent motor control subassembly. The MCB provides extensive buffering, optical isolation and differential serial interface for high reliability in industrial environments.

- ***Stand-alone or host operation***
- ***Optically isolated home and limits***
- ***2k non-volatile program storage***
- ***Five user definable I/O ports***
- ***Buffered inputs and outputs***
- ***Modular connectors***
- ***Dual speed Jog inputs***
- ***Go and Soft Stop inputs***
- ***RS-232 or RS-422 Party Line***
- ***5 Volt operation***

AUXILIARY I/0 (J2)

A twenty contact header connectors provide auxiliary inputs and outputs. Buffered signals use optical isolation or TTL buffers.

Signals

Pin	Signal	Type	Pin	Signal	Type
1	Port 2	Input	2	+5v	Logic
3	Port 4	Output	4	Home	Input*
5	Moving	Output	6	Limit A	Input*
7	Port 5	Output	8	Limit B	Input*
9	Port 3	Input	10	Jog -	Input
11	Port 1	Input	12	Jog +	Input
13	Jog Spd	Input	14	Trip	Output
15	GND	Logic	16	Soft Stp	Input
17	Go	Input	18	Opto com	Pwr In
19	+5V		20	Opto com	

*Optically isolated inputs with series resistor.

Inputs are TTL with pull up resistors. Outputs are open collector (7407) with pull up resistors. The opto common supplies optical isolator power for limits, home and remote Party Line select (on J1).

SERIAL INTERFACE (J1)

The MCB has full duplex, RS-422 party line communications. The 4 wire interface implements a differential transmission and receiver pair. This type of operation provides a high degree of reliability in noisy environments. Each MCB connects to the host (terminal or computer) and acts as a "listener," awaiting a single character representing it's unique "name." On receipt of the "name," the addressed axis starts the tri-state differential transmitter.

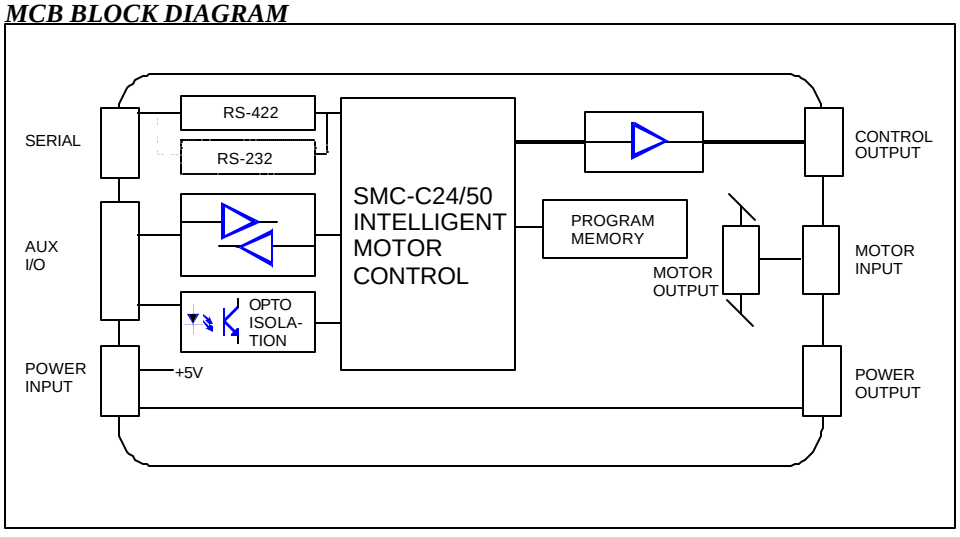
RS-232 protocol is also available for simple single axis or daisy chain applications. The serial connector will accept either a 6 or 8 contact modular (telephone style) plug. The six contact signal arrangement allows direct connection of a hand held terminal.

Pin Out

45	RJ47	Signal	Type
1		Moving	Output
2	1	GND	Logic
3	2	RXD	Input
4	3	TXD	Output
5	4	TXD+	Output
6	5	RXD+	Input
7	6	+5v	
8		Party Enable	Input*

* Optically isolated, led power supplied via J2

MCB BLOCK DIAGRAM



2 Townsend West
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(603) 882-1447

POWER INPUT/OUTPUT (J3)

J3 is a power supply input connector. The MCB requires a 5 volt regulated power supply. Connectors J1, J2, and J5 may be used as alternate means to supply power to the board. The MCB uses no motor power Vmm, it is fed across to the opposite edge to mate with companion drivers.

Pin	Signal	Type
1	+5v	Logic power supply (+5v)
2	GND	Common/logic
3	Vmm	Motor Power (10-42 volts)

MOTOR (J4, P4)

The MCB does not contain motor driver circuits, and allows the companion driver to be mounted at the side opposite the connector edge. The motor connector allows the motor power drive outputs to be feed across, physically locating all wiring along the rear edge.

Pin	Type
1	Phase 1-A
2	Phase 1-B
3	Phase 2-A
4	Phase 2-B

CONTROL SIGNALS (J5)

Ten pin headers provide interface to motor power drivers. Buffered outputs have open collector (7407) circuits. Signals are easily interfaced to power drivers.

Pin	Signal	Type	Pin	Signal	Type
1	+5v	Logic	2	Step	Output
3	Direction	Output	4	Full/half	Output
5	Quarter	Output	6	Enable	Output
7		Reserved	8	Gnd	Logic
9		Reserved	10	Reserved	

COMMAND SUMMARY

ASCII	DESCRIPTION
ESC	ABORT/TERMINATE
@	SOFT STOP
^C	RESET
A	PORT READ/WRITE
B	JOG SPEED; SLOW, FAST
C	RESTORE/INITIALIZE
D	DIVIDE STEP RATES
E	ENABLE AUTO PWR DOWN
F	FIND HOME (SPS)
G	GO FROM ADDRESS
H	STEP RESOLUTION
I	INITIAL VELOCITY (SPS)
J	JUMP TO ADDRESS N + 1 (X)
K	RAMP SLOPE
L	LOOP ON PORT
M	MOVE AT CONSTANT SPEED
O	SET ORIGIN
P	PROGRAM MODE
Q	QUERY (LIST) PROGRAM
R	INDEX TO TARGET POS.
S	STORE PARAMETERS
T	TRIP POINT SET
+	+ INDEX COMMAND
-	-INDEX COMMAND
V	SLEW VELOCITY (SPS)
W	WAIT N MILLISECONDS
X	EXAMINE PARAMETERS
Y	HOLD/RUN CURRENT
Z	DISPLAY POSITION

D.C. Characteristics

Parameter	Min	Typ	Max	Units
Logic Power (VCC)	4.5	+5	5.5	Volts
Current (ICC)	300			Ma.
Output Signals				
High Level (Voh)		5	15*	Volts
Low Level (Vol)			0.3	Volts
Low Current (Iil)			30	Ma.
Input Signals				
High Level (Vih)	3.6		5.2	Volts
Low Level (Vil)			0.8	Volts
Low Current (Iil)			2	Ma.
Optical Inputs				
LED Current			5	Ma.
LED Drop			1.5	Volts
Internal Series Resistor			1k	Ohm
RS-232 Input Level		5	25	Volts
RS-232 Outputs		9	12	Volts
RS-422 Input Level		5	25	Volts
RS-422 Outputs		5	25	Volts
RS-232/422 Loads	1		32	Axis

* Open collector with internal pull-up to Vcc, over driven.

Note: The RS-422 implements drivers rated for EIA RS-485 transmission and limits receiver count to 32 with a maximum cable length of 4,000 feet. RS-232 units are rated for 1 receiver and a maximum cable length of 50 feet.

A.C. Characteristics

Parameter	Description	Min	Typ	Max	Units
Swl	Limit & home switch response	1	2		Step Clock

Non-Volatile Memory

Instruction	Condition	Min	Typ	Max	Units
Fetch and execute cycle	Loop		1.7		Ms
Save parameters	Store		63		Ms

Step Clock	Min	Typ	Max	Units
MCB-24	18		23K	SPS
Clock Period (Low Active)		5	7	us
System Clock			14.745	MHz
MCB-50	36		50K	SPS
Clock Period (Low Active)		5	7	us
Systems Clock			29.491	MHz

Physical Size (inches)

2.15 x 3.85