

# “DCB” SERIES

## PROGRAMMABLE STEP MOTOR DRIVERS



### OVERVIEW

The “DCB” series driver/controller boards offer a low cost solution for operating small to midsize stepping motors. They combine programmable control, including over 30 sophisticated motion commands, with efficient bipolar chopper drive output for high performance operation. All that is required for a complete system is a single, unregulated power supply and a motor.

Peak output current ratings range from 1.0 to 4.0 amps/phase. Motor shaft resolution varies from full step to 1/8 step at speeds up to 40k SPS, depending on model.

Automatic slow and fast decay is available to optimize motor performance. Encoder input for “shuttle control” applications is also offered on selected models.

### STANDARD FEATURES

- Small size and low O.E.M. price
- Efficient bipolar chopper drive output
- Powerful “SMC” intelligent controller
- Single 24 - 40 volt power supply input
- 2k bytes of non-volatile memory
- Limit, Home, Go and Stop inputs
- Adjustable current
- Serial communication (1-32 axes)
- Programmable accel / decel ramping
- Constant velocity commands
- Heat-sink mounted
- Mating connectors included

### DRIVER

A bipolar chopper drive circuit with a 20kHz chopping rate is utilized for maximum performance. The input voltage range is from 24 to 40Vdc. The run current is adjustable via a potentiometer or software, depending on model. The hold current is automatically setback at the completion of a move to eliminate excess heat generated by the motor.

### CONTROLLER

The on-board controller provides powerful step and direction output signals to the driver. A 24 bit position register tracks steps within a  $\pm 8,388,607$  step range. An instruction set of over 30 commands, including: loop on port, count delays, set/clear ports, limit and home sensor inputs, provides flexibility and programming ease

### POWER SUPPLY

A single, unregulated +24 to 40Vdc power supply input is provided. The on-board 5 volt logic power is derived from the motor power supply.

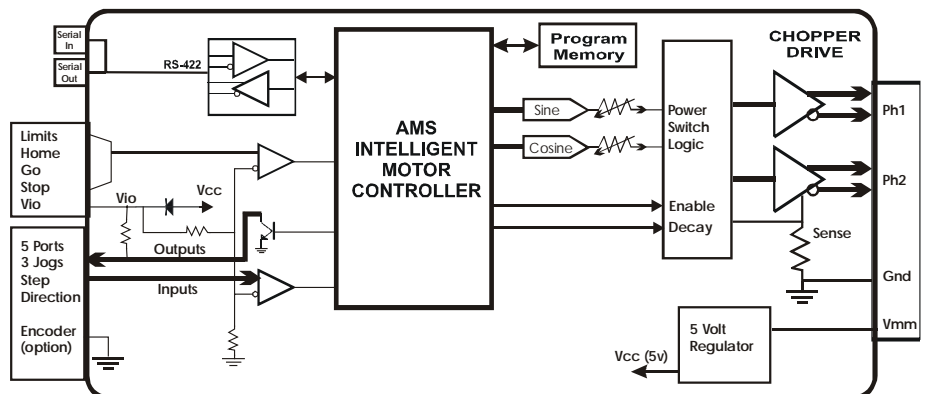
### SERIAL INTERFACE

Full duplex serial communications, with an RS-422/485 “Party Line” interface, helps to ensure reliable communication in harsh industrial environments. This protocol also permits simultaneous communication (to 32 axes) with minimum command processing latency.

### PROGRAMS

Using a host computer or dumb terminal, programs can be stored in non-volatile memory (2k bytes) and initiated via the serial communication port, the “GO” input or auto power-up.

### BLOCK DIAGRAM.



### INPUT SIGNALS

Available input signals include: Home, Limit A, Limit B, Go, Soft Stop, Step, Direction, Jog 1, Jog 2, Jog Speed and Ground. All signals have a 5 volt range.

### USER I.O.

Three input ports are available that can test and branch to multiple motion subroutines. Two programmable outputs are also available to drive solid state relays and other devices. A separate "TRIP" function provides automatic program branching when a specified position is passed.

### COMMANDS (Refer to specific Users Manuals for available commands)

ASCII	Description
ESC	Abort/Terminate
@	Soft Stop
^C	Reset
+	Index in Plus Direction
-	Index in Minus Direction
[	Read NV Memory
]	Read Limits, Hardware
\	Write to NV Memory
I	Selective Termination
^	Read Moving Status
A	Port Read/Write
B	Set Jog Speeds
b	Slow and Fast Decay
C	Restore/Initialize
D	Divide Step Rates
E	Enable Auto Power Down
F	Find Home (SPS)
G	GO from Address
H	Resolution Mode
I	Initial Velocity (SPS)
i	Restart Special Trip
J	Jump to Address
K	Ramp Slope
k	Special Trip
L	Loop on Port
l	Invert Limits/Step - Dir. Output
M	Move at a Constant Speed
O	Set Origin
P	Program Mode
Q	Query Program
R	Index to Target Position
S	Store Parameters
T	Set Trip Point
V	Slew Velocity (SPS)
W	Wait "N" Milliseconds
w	Pre-energize Motor
Y	Set Hold Current
X	Examine Parameters
Z	Display Position

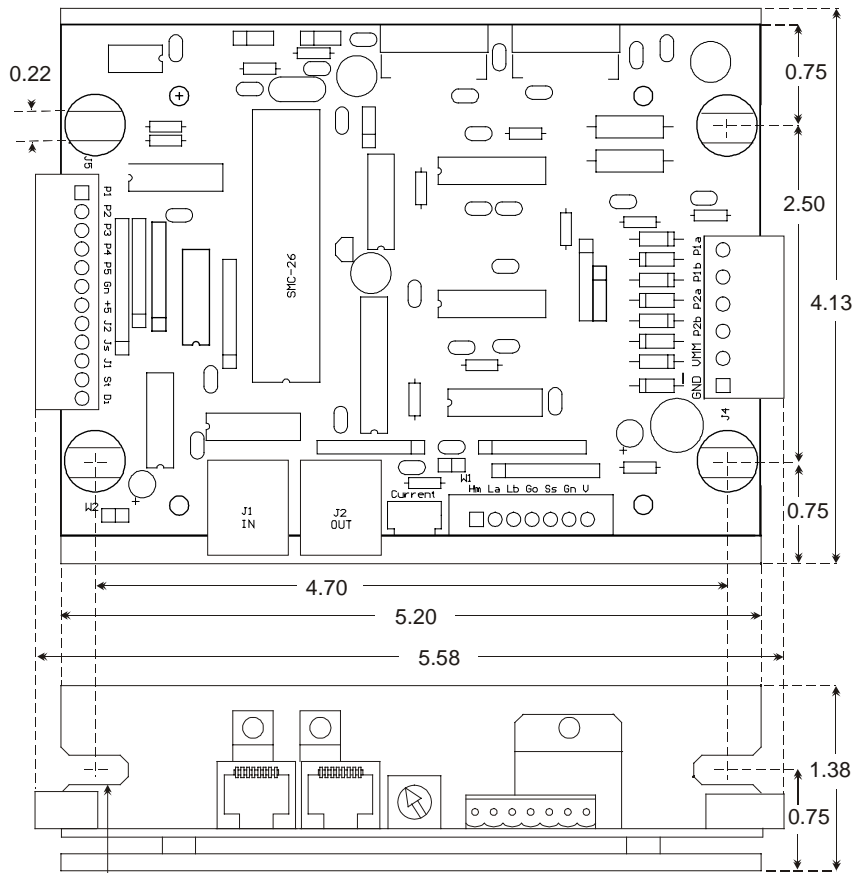
### SLOW / FAST DECAY

The slow / fast decay option optimizes motor performance. When there is no motion (stopped), the decay will always be slow. The threshold defines a motor speed where slow decay changes to fast decay during acceleration and switches back to slow decay during deceleration. The threshold will occur at an RPM where step resolution is taken into account.

### SHUTTLE CONTROL

With optional encoder circuitry the step input pins change to quadrature A and B inputs. The quadrature clocks, when applied to the A and B inputs, are converted to step and direction signals. The number of steps per encoder revolution are equal to four times the number of "slots" on the encoder. The motor will follow exactly any changes in the encoder position.

### MOUNTING DIMENSION (Refer to specific Users Manuals for actual dimensions)



NOTE: ALLOW 0.5 INCH CLEARANCE ON ALL CONNECTORS FOR EXTERNAL WIRING

### STEP AND DIRECTION OUTPUTS

This option converts port 4 to a step output and port 5 to a direction output. These signals can be directed to stand-alone drivers to control additional motors if required. The step outputs are short, negative going pulses.

### PLC MODE

This option allows for direct connection to any PLC by telling the controller that all inputs are inverted, and to compensate accordingly. A jumper re-configures the input hardware with pull-down rather than pull-up resistors.

### PHYSICAL SPECIFICATIONS

Operating Temperature... 0 to +50<sup>0</sup> C  
 Storage Temperature... -40 to +125<sup>0</sup> C  
 Plate Temperature (max)... +70<sup>0</sup> C  
 Size.....4.13 x 5.58 x 1.38 in.  
 Weight.....8.0 oz.

Feature	DCB-241	DCB-242	DCB-261	DCB-264	DCB-274
Amps/Phase	1.0	2.0	1.0	4.0	
Speed (SPS)	23,000			40,000	
Resolution (Steps)	1/2		Full, 1/2, 1/4, 1/8		
Baude Rate	9600 to 470k				
Current Adjust	Manual (Pot)			Manual (2 Pots)	Programmable
Decay Mode	Fast			Auto Slow/Fast	
I/O Inputs:					
Step/Direction	No		Yes		
Jog	No		Yes		
General Purpose	3 (option)		3		
Encoder Shuttle	No			Yes (option)	
I/O Outputs:					
Step/Direction	No			Yes	
General Pupose	2 (option)		2		
PLC Mode	No				Yes
Voltage Specifications:					
VIO	5 Volts		5 - 28 Volts		
Limit/Home Input	5 Volts		5 - 28 Volts		
Jog Input	5 Volts		5 - 28 Volts		
Step/Dir. Input	N/A		5 - 28 Volts		
Step/Dir. Output	N/A			28 Volts @ 0.5A	
Gen. Purpose Input	5 Volts		28 Volts		