



SMC-32A

Serial Stepping Motor  
Driver/Controller



ADVANCED CONTROL SYSTEMS CORPORATION

[www.ACSMotion.com](http://www.ACSMotion.com)

Revision 1.5

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# 1. General Information

## 1.1 *Warranty*

ACS warrants its products to operate within specifications under normal use and services for a period of one year from the date of shipment. Component products, spares, replacement parts and repairs are warranted for 90 days. Software is thoroughly tested and thought to be functional, but is supplied "as is" with no warranty of any kind covering detailed performance. Accessory products not manufactured by ACS are covered by the original equipment manufacturers warranty only.

In exercising this warranty, ACS will repair or, at its option, replace, any product returned to the customer service department or an authorized service facility within the warranty period, provided that the warrantor's examination discloses that the product is defective due to workmanship or materials and has not been caused by misuse, neglect, accident, or abnormal conditions or operations.

The purchaser is responsible for the transportation and insurance charges arising from the return of products to the servicing facility. ACS will return all in-warranty products with transportation prepaid.

This warranty is in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability, fitness, or adequacy for any particular purpose or use. ACS shall not be liable for any special, incidental, or consequential damages, whether in contract, or otherwise.

## 1.2 *Assistance and Maintenance Agreements*

Answers to questions concerning installation, calibration, and use of ACS equipment are available from the customer service department, 35 Corporate Park Drive, Pembroke, MA 02359, (781)829-9228.

ACS offers a selection of customer support services.

For example, maintenance agreements provide extended warranty and allow the customer to budget maintenance costs after the initial one year warranty has expired. Other services requested by the customer, such as installation, training, on-site repair, and addition of engineering improvements, are made available through specific Supplemental Support Agreements.

### **1.3 Documentation Discrepancies**

ACS is committed to providing state-of-the-art products and is continually refining and improving the performance of its products. While physical modifications can be implemented quite rapidly, the corrected documentation frequently requires more time to produce. Consequently, this manual may not agree in every detail with the accompanying product. There may be small discrepancies in the values of components and, occasionally, minor logic changes. Where any such inconsistencies exist, please be assured that the unit is correct and incorporates the most up-to-date circuitry.

### **1.4 Service Procedure**

Products requiring maintenance should be returned to the customer service department or authorized service facility. If under warranty, ACS will repair and replace the part at no charge. The purchaser is only responsible for the transportation charges arising from the return of the goods to the service facility.

For all ACS products in need of repair after the warranty period, the customer must provide a Purchase Order Number before any inoperative equipment can be repaired or replaced. The customer will be billed for the parts and labor for the repair as well as for shipping.

## 2. SMC-32A DESCRIPTION

### 2.1 SMC-32A CONTROLLER FEATURES

This Advanced Control Systems Corp. stepping motor controller contains control and power drive circuitry to operate any two or four phase stepping motor with currents up to 3Amp per phase. Several controllers can be controlled by a single computer communication port.

The stepping motor driver is two phase bi-polar type, which is highly efficient, and results in cool operation of motors and drivers.

Motor winding current is trimpot adjustable in the range of .125 to 3.00Amps. Idle winding current is also trimpot adjustable.

Motors can operate in full step mode one-phase on, full step mode-two phases on, and ministep mode. Ministep modes are 2, 3, 4, 5, 6, or 8 motor ministeps per full motor step.

The SMC-32A generates constant stepping rates as well as trapezoidal type velocity profiles. Acceleration, deceleration and top speed are all programmable.

The SMC-32A supports two limit inputs and home position input. The SMC-32A is designed to operate reliably in adverse industrial environments.

All operational variables are retained in the EEPROM nonvolatile memory.

The SMC-32A understands high level instructions in the form of serial ASCII messages. The instruction set covers all aspects of computer controlled motion and is not dependent on the type of host computer or operating systems.

Communication driver/receiver on board is a standard RS-232C type. Internal communication bus facilitates interconnection for multiple axis operation.

## 2.2 SMC-32A BLOCK DIAGRAM DESCRIPTION

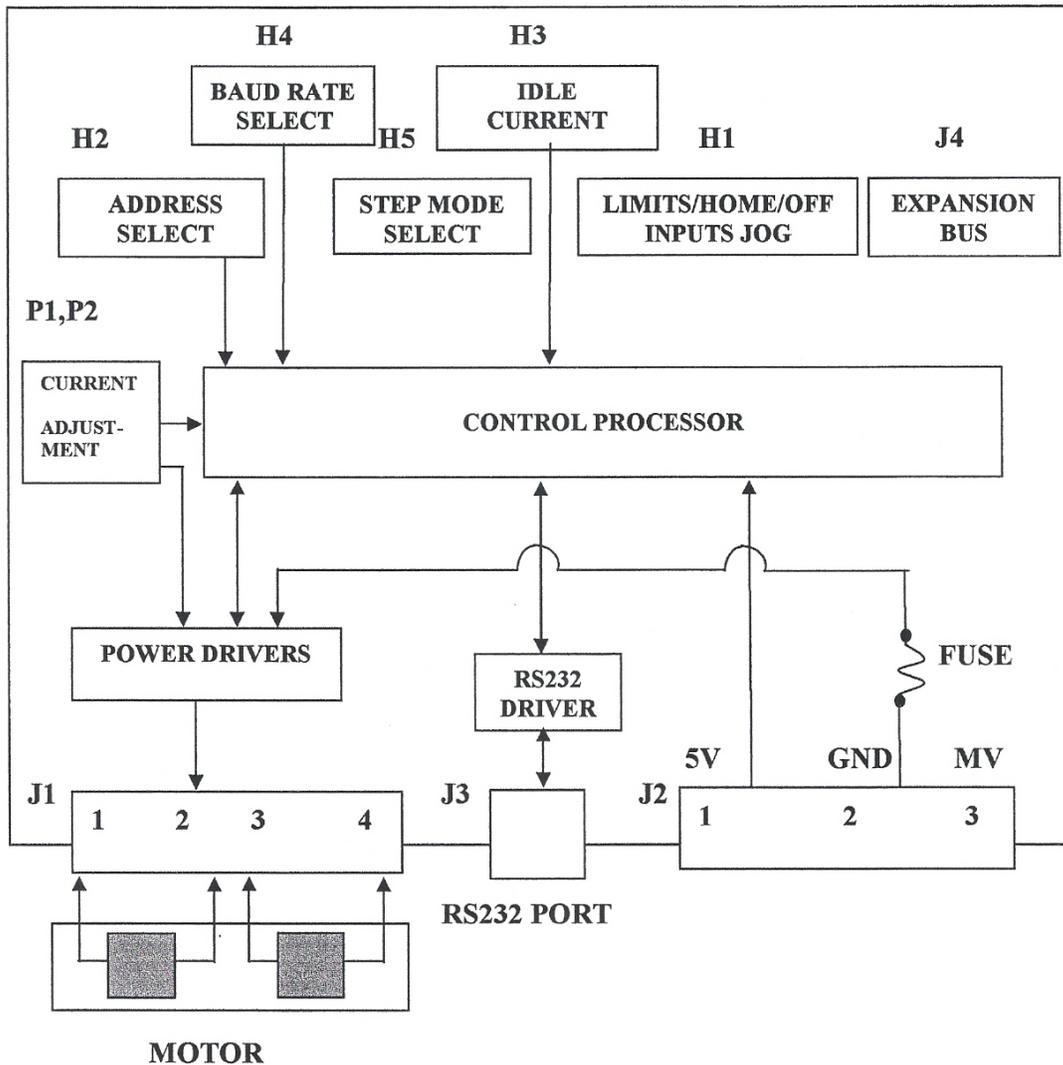


FIG. 1.1 SMC-32A BLOCK DIAGRAM

The imbedded control processor coordinates operation of the SMC-32A controller. It communicates via RS-232 communication interface with the host computer. The programs (firmware) which interprets host instructions are stored in flash memory. Operational variables, which can be changed, are stored in non-volatile memory (EEPROM).

The processor which is actually a single chip independent microcontroller generates stepping sequences to the power drivers.

Option jumpers on board are used for various configurations.

## 2.3 SPECIFICATIONS

### POWER REQUIREMENTS:

Logic Power Supply	5VDC $\pm$ 5% @50mA typical
Motor Power Supply	12 to 40 VDC @up to 2Amp

Motor supply voltages and currents depend on type of motors being connected.

### MOTOR REQUIREMENTS:

Type of Motors	Two phase bi-polar stepping motors or four phase motors connected as two phase
Number of Leads	Four, six or eight
Max Winding Current	3 Amp, adjustable down to .125Amp
Duty Cycle	100%

### MODE OF MOTOR OPERATION:

BiPolar Chopper Drive  
Full Step – One Phase On or Two Phases On  
Half Step with Torque Compensation  
Three, four, five, six or eight ministeps per full step

### MOTOR FUSE:

Four Amp, Fast blow

### PHYSICAL DIMENSIONS:

Length:	4"
Width:	3.65"
Max. Height:	1.50"

Motor Connectors:	Phoenix type; four terminals MSTB 2,5/5-ST-5,08 or equivalent.; or terminal block
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### COMMUNICATION PARAMETERS:

Baud Rates:	2400, 9600, 19200, 57600 baud
Byte Structure:	10 bit ASCII characters: Start bit, 8 data bits, stop bit; no parity

### ENVIRONMENT:

Operating Temperature:	-20°C to 50°C (-4°F to 140°F)
Storage Temperature:	-20°C to 70°C (-4°F to 160°F)
Humidity:	<95% non-condensing

### 3. INSTALLATION SET-UP

#### 3.1 CONNECTORS, JUMPERS, AND ADJUSTMENT IDENTIFICATION

Table 3.1 identifies important points of the SMC-32A board, Appendix A show their location on the printed circuit board.

Designation	Function
J1	CONNECTOR FOR MOTOR
J2	TERMINAL STRIP FOR POWER CONNECTION
J3	COMMUNICATIONS PORT CONNECTOR
J4	INTERNAL COMMUNICATIONS BUS
H1	HEADER CONNECTOR FOR LIMITS, HOME JOG, MOTOR OFF INPUTS
H2	MOTOR ADDRESS SELECT
H3	IDLE CURRENT REDUCTION ENABLE
H4	BAUD RATE SELECT
H5	STEPPING MODE SELECT

TABLE 3.1 CONNECTOR JUMPER AND ADJUSTMENT IDENTIFICATION

#### 3.2 MOTOR CONNECTION

The stepping motor is connected to SMC-32A controller via J1 connector at the edge of the board (see Appendix A). The connector accepts one four pin screw type plug. Two or four phase stepping motor can be operated by the SMC-32A controller board. Stepping motors equipped with four, six, or eight leads can be connected in several ways.

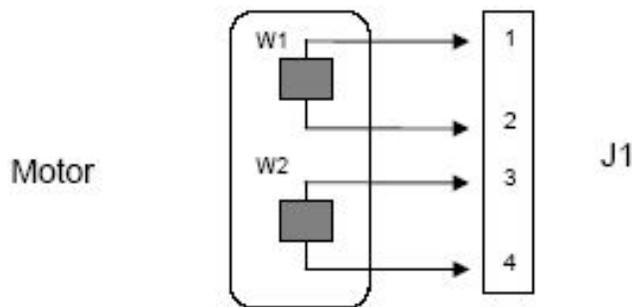
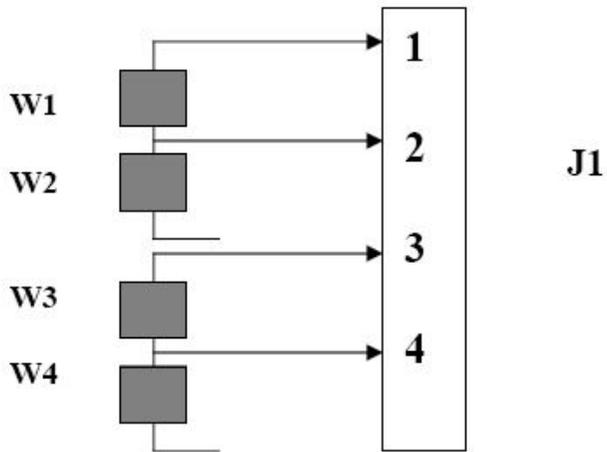
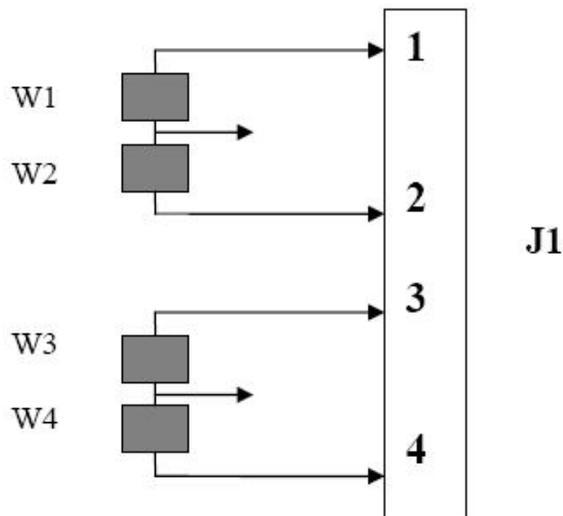


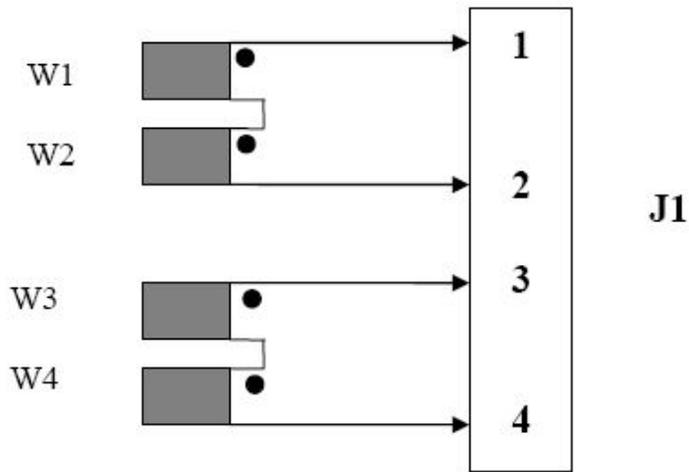
FIGURE 2.2 FOUR LEAD MOTOR CONNECTIONS TO SMC-32A UNIT



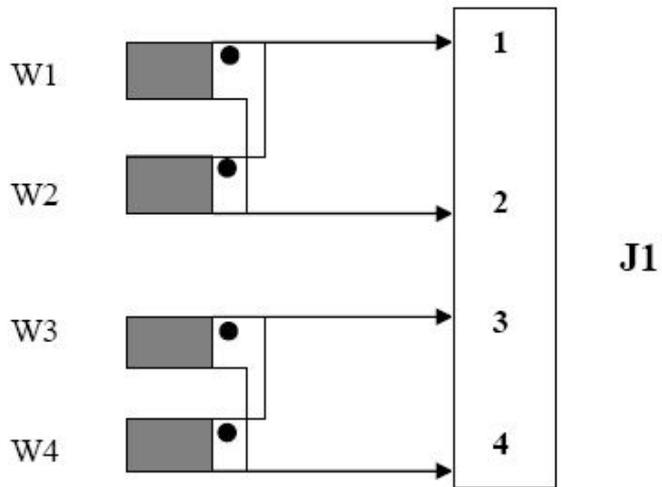
**FIGURE 2.3 SIX LEAD MOTOR – HALF WINDING CONNECTIONS**



**FIGURE 2.4 SIX LEAD MOTOR – FULL WINDINGS CONNECTIONS**



**FIGURE 2.5 EIGHT LEAD MOTOR – SERIAL CONNECTIONS**



**FIGURE 2.6 EIGHT LEAD MOTOR – PARALLEL CONNECTIONS**

### **3.3 LIMIT INPUTS, HOME INPUT, JOG INPUTS, CURRENT OFF INPUT, PROGAM RUN INPUT**

The inputs are connected to SMC-32A via a 10 pin header H1. Limit and Home inputs are normally closed. Jog and Current Off inputs are normally open. Refer to Appendix A for H1 location on the board.

<b>PIN</b>	<b>INPUT</b>	<b>PIN</b>	<b>INPUT</b>
1	JOG –	2	I OFF
3	JOG +	4	RUN/BUSY
5	HOME	6	GND
7	LIM –	8	GND
9	LIM +	10	GND

**TABLE 2.3 SMC-32A CONTROL INPUTS**

### **3.4 COMMUNICATION SPEED**

Header H4 (See Appendix A for location) is to be jumped for required communication baud rate. Selections are no parity and four baud rates.

<b>HEADER H4</b>		
<b>1</b>	<b>2</b>	<b>BAUD RATE</b>
OUT	OUT	57600 BAUD
OUT	IN	19200 BAUD
IN	OUT	9600 BAUD
IN	IN	2400 BAUD

**TABLE 2.4 SMC-32A BAUD RATE SELECTION**

### 3.5 MOTOR ADDRESS SELECTION

The SMC-32A driven motors can be addressed for up to 32 different addresses. Header H2 selects the binary address of the motor. See table 2.5 for some examples. See Appendix A for header locations.

HEADER H2					MOTOR ADDRESS
16	8	4	2	1	
OUT	OUT	OUT	OUT	OUT	0
OUT	IN	OUT	OUT	OUT	8
OUT	IN	IN	OUT	OUT	12
IN	IN	IN	IN	IN	31

**TABLE 2.5 SMC-32A ADDRESS SELECTION**

### 3.6 FUSING

The SMC-32A motor control module has an on board fuse. The fuse is to be rated accordingly to protect the motor; 4 Amp fast blow maximum.

### 3.7 STEPPING MODE SELECT

There are eight selections for stepping mode. Refer to Table 3.7 for jumper options.

HEADER H5			
4	2	1	MODE
OUT	OUT	OUT	FULL STEP, 2 PHASES ON
OUT	OUT	IN	FULL STEP, 1 PHASE ON
OUT	IN	OUT	HALF STEP (TWO MINISTEPS/STEP)
OUT	IN	IN	THREE MINISTEPS/STEP
IN	OUT	OUT	FOUR MINISTEPS/STEP
IN	OUT	IN	FIVE MINISTEPS/STEP
IN	IN	OUT	SIX MINISTEPS/STEP
IN	IN	IN	EIGHT MINISTEPS/STEP

**TABLE 2.7 SMC-32A STEPPING MODE SELECTION**

### **3.8 MOTOR WINDING CURRENT ADJUSTMENT; P1, P2**

P1 – Run trimpot controls motor running current.

P2 – Idle trimpot controls motor idle current.

Turning trimpot clockwise, the current will increase.

Motor Current Adjustment Procedure:

1. Insert DC Ampmeter into one of the motor windings.
2. Remove Jumper on H3 if installed.
3. Turn the Power On.
4. Single step motor until you get maximum current.
5. Adjust trimpot P1 – run for required current.
6. Insert Jumper on H3.
7. Adjust trimpot P2 – idle for required idle current.
8. Disconnect power and remove the meter.

## 4. INSTRUCTION SET

### 4.1 INSTRUCTION SET SUMMARY

Each instruction message is constructed from ASCII characters. Alphabetic characters can be upper or lower case.

1. # Start Character (Hex 23).
2. aa Board Address Numeric Characters; 00-31 range.
3. \* Character “ \* “ acts as an all numeric character (Hex 2A).
4. I Instruction Alphabetic Characters (upper or lower case).
5. +1000 Data Characters.
6. ↵ Termination Character: Carriage Return (Hex 0D).
7. = Equal Sign Indicates Data to be Entered (Hex 3D).
8. En E followed by a number indicates Error in Instruction, but correct address.

Example: #12I+1000↵ Motor with address 12 is instructed to index 1000 steps in positive direction immediately.

Response: #12R↵ Instruction Executed!

Example: #12G5000↵ Motor with address 12 is instructed to goto absolute position 5000.

Response: #12E5↵ Error response, bad instruction structure, direction sign is missing.

Each instruction with Start Character correct address and termination character generates a response message from the SMC-32A controller.

## **4.2 SINGLE CHARACTER INSTRUCTION SUMMARY**

- J Examine or set jog rate index (2-65535 range).
- C Examine or set constant speed index (2-65535 range).
- V Examine or set high speed index (2-255 range).
- R Examine or set acceleration/deceleration index (1-255 range).
- M Move number of steps at constant speed using C index ( $\pm 8,388,607$  steps range).
- G Go to absolute position using V and R indexes ( $\pm 8,388,607$  steps range).
- I Index number of steps using V and R indexes ( $\pm 8,388,607$  steps range).
- F Decelerate and stop motion (Soft Stop).
- H Seek home position.
- Q Immediate stop of motion (Hard Stop).
- X Examine motor status.
- E Examine limits and home inputs.
- L Examine or enable/disable limit interrupts.
- W Examine or turn on/turn off motor winding current
- P Examine or set absolute position ( $\pm 8,388,607$  range).
- S Save motion indexes.
- D Load motion parameters defaults.
- T Test unit.

### 4.3 ERROR RESPONSES

An error response in form #aaEn.↓ is generated for various reasons. Instruction itself is ignored.

1. Instruction structure following #aa is not recognizable or data is out of range.
2. A motion instruction is executed while motor is already stepping.
3. A motion instruction is executed but motor current is shut off by manual input W=0 instruction.
4. A motion instruction is executed but limit in that particular direction is activated.
5. Quit or finish instruction is executed but motor is already stopped.

The following table describes error responses.

E1	Wrong instruction character
E2	Motor is stepping
E3	Wrong data
E4	Motor is stopped
E5	Bad instruction structure
E6	Current turned off
E7	Limits activated or current Off

### 4.4 STEPPING RATE INDEXES

Stepping rate indexes define stepping rate for jog, move, index, and go motion control instructions. Actual stepping rate in steps/sec is calculated by formula:

$$\text{Step Rate} = 115200/\text{Rate Index (Steps/Sec)}$$

Jog and move are constant rate instructions (no acceleration) and should be set below start/stop rate of the motor load combination. Table 4.1 shows some stepping rate calculations.

Step Rate Index	Step Rate (Steps/Sec)	Step Rate Index	Step Rate (Steps/Sec)
2	57600	60	1920
3	38400	80	1440
4	28800	100	1152
5	23040	150	768
6	19200	200	576
7	16457	250	460
8	14400	300	384
9	12800	400	288
10	11520	600	192
11	10473	800	144
12	9600	1000	115.2
13	8861	1152	100.0
14	8228	2000	57.6
15	7680	4000	28.8
17	6776	8000	14.4
20	5760	10000	11.52
25	4680	11500	10.00
30	3840	20000	5.76
35	3291	40000	2.88
40	2880	57600	2.00
50	2304	60000	1.92
		65000	1.77

**TABLE 3.1 STEP RATE TABLE**

**4.5 JOG RATE INDEX: J**

Instruction: #aaJ=500.↓ Set Jog Rate Index to 500; aa = 00 to 50  
 Response: #aaR.↓ Instruction accepted

Instruction: #aaJ.↓ Examine Jog Rate Index; aa = 00 only  
 Response: #aaJ=500.↓ Jog Rate Index is set to 500 which is 230 steps per second

Notes: Jog Rate Index range is 2 to 65535. Jog Rate Index controls stepping rate when operating manual jog toggle switches which are connected to Header H1, Pins 1 and 3. Jog Rate should be set below start/stop stepping rate of motor/load combination. Jog Rate Index can be changed any time. It takes effect on the next jog motion.

**4.6 CONSTANT RATE INDEX: C**

Instruction: #aaC=400.↓ Set Constant Rate Index to 400; aa = 00 to 50  
 Response: #aaR.↓ Instruction accepted

Instruction: #aaC.↓ Examine Constant Rate Index; aa = 00 only

Response: #aaC=400.␣ Constant Rate Index is set to 400 which is 288 steps per second.

Notes: Constant Rate Index is 2 to 65535 Constant Rate Index controls stepping rate when M motion is executed. Constant Rate Index can be changed any time. It takes effect immediately.

#### **4.7 VELOCITY RATE INDEX: V**

Instruction: #aaV=20.␣ Set Velocity Rate Index to 20; aa = 00 to 50  
Response: #aaR.␣ Instruction accepted

Instruction: #aaV.␣ Examine Velocity Rate Index; aa = 00 only  
Response: #aaV=20.␣ Velocity Rate Index is set to 20 which is 5760 steps per second.

Notes: Velocity Rate Index controls top stepping rate while executing G or I motion instruction. Velocity Rate Index range is 2 to 255. Velocity index can be changed any time. It takes effect on the next high speed motion.

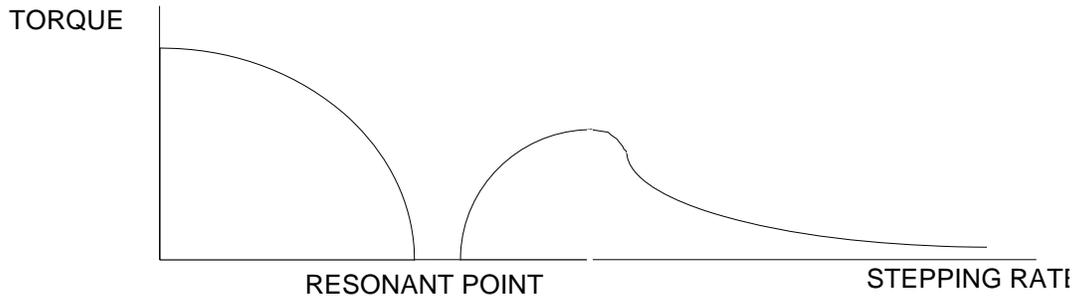
#### **4.8 RAMP INDEX: R**

Instruction: #aaR=150.␣ Set Ramp Index to 150; aa = 00 to 50  
Response: #aaR.␣ Instruction accepted

Instruction: #aaR.␣ Examine Ramp Index; aa = 00 only  
Response: #aaR=150.␣ Ramp Index is set to 150

Note: Ramp Index range is 1 to 255. Ramp index controls acceleration/deceleration. ramp while executing Go or Index instruction. Index 1 sets the slowest ramp, index 255 is the fastest ramp. It can be changed any time and it takes effect on the next high speed motion.

Some motors have a resonant point where there is no torque at certain frequencies. In such cases, the motor has to be started at a lower speed than the resonant point in order to fly into a higher speed area. To minimize the time to stay on the resonant point, higher ramp index for acc/dec must be applied. It is recommended that a damper should be used to increase the inertia moment if the motor goes in the resonant point with a small load.



Actual ramping rate in step/sec/sec is calculated by formula:

$$\text{Ramp Rate} = 720,000 / (256 - \text{Ramp Index})$$

Table 4.2 Shows some ramp rate calculations.

<b>RAMP INDEX</b>	<b>RAMP RATE (STEPS/SEC/SEC)</b>
2	2835
10	2927
50	3495
100	4615
150	6792
200	12857
220	20000
230	27692
240	45000
245	65455
250	120000
252	180000
253	240000
254	360000
255	720000

TABLE 4.2 RAMP RATE TABLE

#### 4.9 MOVE NUMBER OF STEPS AT CONSTANT RATE: M

Instruction: #aaM+2000␣ Move 2000 steps in positive direction; aa = 00 to 50

Response: #aaR␣ Move instruction accepted

Instruction: #aaM-500␣ Move 500 steps in negative direction; aa = 00 to 50

Response: #aaR␣ Move instruction accepted

Instruction: ##aaM+␣ Move in positive direction until Quit instruction is executed Or + Limit is activated.

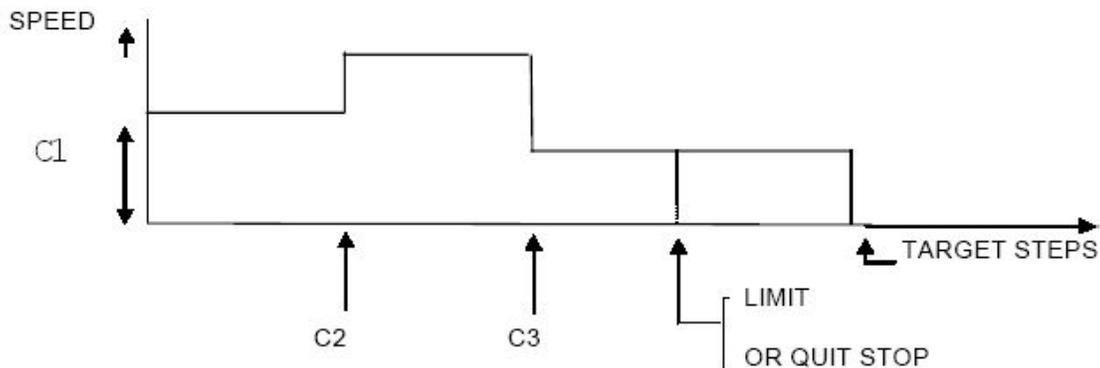
Response: #aaR␣ Move instruction accepted.

Instruction: #aaM-␣ Move in negative direction (same as positive).

Response: #aaR␣ Move instruction accepted.

The preset constant rate "C" can be changed at any time (changing stepping rate on the fly). See 4.7 Constant Rate Index.

Note: Motion Execute Instruction. Motor steps at constant rate C; no acceleration or deceleration. Constant stepping rate is to be set lower than start/stop rate of the motor load combination. Move commands are used when coordinated motion is required. Stepping rate is precisely controlled.



#### 4.10 GO TO ABSOLUTE POSITION: G

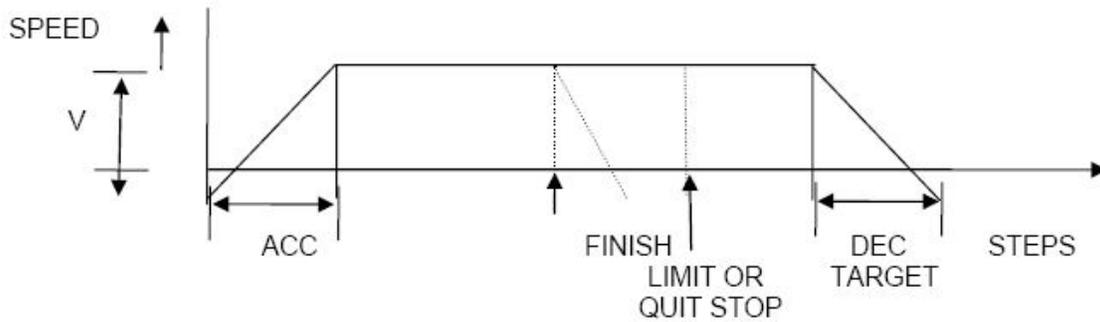
Instruction: #aaG+12345␣ Go to absolute position +12345; aa = 00 to 50

Response: #aaR␣ Instruction accepted

Instruction: #aaG+0␣ Go to zero position; aa = 00 to 50

Response: #aaR␣ Instruction accepted

Notes: G Instruction is used when rapid motion is required. Motor accelerates to high speed executing trapezoidal or triangular velocity profile. Motion indexes R and V control the shape of velocity profile.



#### 4.11 INDEX TO RELATIVE POSITION: I

Instruction: #aaI-6000.↓ Step 6000 steps from current position in negative direction; aa = 00 to 50

Response: #aaR.↓ Instruction accepted.

Instruction: #aaI+1.↓ Execute single step in positive direction; aa = 00 to 50

Response: #aaR.↓ Instruction accepted

Notes: I Instruction is similar to G instruction. Motor accelerates to high speed defined by R and V indexes. Runs at high speed, then decelerates and stops, completing the instructed number of steps.

#### 4.12 FINISH, DECELERATING STOP: F

Instruction: #aaF.↓ Decelerate and stop motor; aa = 00 to 50

Response: #aaR.↓ Instruction accepted

Notes: Finish instruction works only when G or I type of motion is being executed. Motor decelerates to base speed and stops. No steps are lost and position counter stays accurate.

#### 4.13 QUIT, IMMEDIATE STOP: Q

Instruction: #aaQ.↓ Motor stop immediately; aa = 00 to 50

Response: #aaR.↓ Instruction accepted

Notes: Quit instruction, works whenever motor is stepping instructed by G, I, M, H instructions.

#### **4.14 SEEK HOME POSITION: H**

Instruction: #aaH+↵                      Seek Home in positive direction; aa = 00 to 50  
Response: #aaR↵                      Instruction accepted

Notes: Motor moves at constant rate (C) in positive direction until Home position is found (Home Switch activated). Motor will stop if it hits active Limit switch or Quit instruction is received.

Instruction: #aaH-↵                      Seek Home in negative direction; aa = 00 to 50  
Response: #aaR↵                      Instruction accepted

Notes: Same as for positive direction.

#### **4.15 EXAMINE MOTOR STATUS: X**

Instruction: #aaX↵                      Examine if motor is stepping; aa = 00 to 50  
Response: #aaX=0↵                      Motor stopped.  
                    Or  
Response: #aaX=1↵                      Motor is stepping

Notes: Numeric character zero or one represents motor status.

#### **4.16 EXAMINE LIMITS AND HOME INPUTS: E**

Instruction: #aaE↵                      Examine Status of Limit and home inputs; aa = 00 only.  
Response: #aaE=000↵                      All three inputs are Low  
                    Or  
Response: #aaE=001↵                      Limits are Low, home input is HI

Note: Numeric character zero or one represent Low or High level respectively on time inputs.

First character is L+ (Limit in Positive direction).  
Second character is L- (Limit in Negative direction).  
Third character is for H (Home input).

#### **4.17 ENABLE, DISABLE, EXAMINE LIMIT INTERRUPTS: L**

Instruction: #aaL=1↓ Enable Limits interrupts; aa = 00 to 50

Response: #aaR↓ Instruction executed

Instruction: #aaL↓ Examine Limit interrupts; aa = 00 only

Response: #aaL=1↓ Interrupts are enabled

Note: Numeric character one represents enabled limits, zero represents disabled limits. The same characters are used to enable or disable limits. When limits are enabled, limit inputs must be connected to limit switches which present normally Low status. Limits can also be jumped on the controller board.

#### **4.18 TURN ON/OFF MOTOR WINDING CURRENT OR EXAMINE IT: W**

Instruction: #aaW=0↓ Turn Motor Current Off; aa = 00 to 50

Response: #aaR↓ Instruction executed

Instruction: #aaW=1↓ Turn Motor Current On; aa = 00 to 50

Response: #aaR↓ Instruction executed

Instruction: #aaW↓ Examine Motor Current; aa = 00 only

Response: #aaW=1↓ Motor Current is On

Note: This is remote (host) control of motor current. Position is not affected by this instruction. Motor current can be turned On/Off manually with on-board toggle switch SW-0. Manual control has higher priority than remote control.

#### **4.19 EXAMINE OR SET ABSOLUTE POSITION: P**

Instruction: #aaP=+0↓ Set Position counter to zero; aa = 00 to 50

Response: #aaR↓ Instruction executed

Instruction: #aaP↓ Examine Position; aa = 00 only

Response: #aaP=+0↓ Position is zero

Note: Position can be examined at all times. Direction sign + or – is always required. Position cannot be changed when motor is stepping.

#### **4.20 SAVE MOTION INDEXES: S**

Instruction: #aaS␣ Save motion indexes; aa = 00 only  
Response: #aaR␣ Instruction executed

Note: Motion Indexes J, C, V, R are saved to nonvolatile memory (EEPROM) and are reloaded on the next power-up.

#### **4.21 LOAD MOTION PARAMETER DEFAULTS: D**

Instruction: #aaD␣ Load defaults; aa = 00 only  
Response: #aaR␣ Instruction executed

Note: Default indexes are set as follows:

V – Top rate index to 15 (7680 steps/sec)  
C - Constant rate index to 300 (384 steps/sec)  
J – Jog rate index to 300 (384 steps/sec)  
R – Ramp index to 100

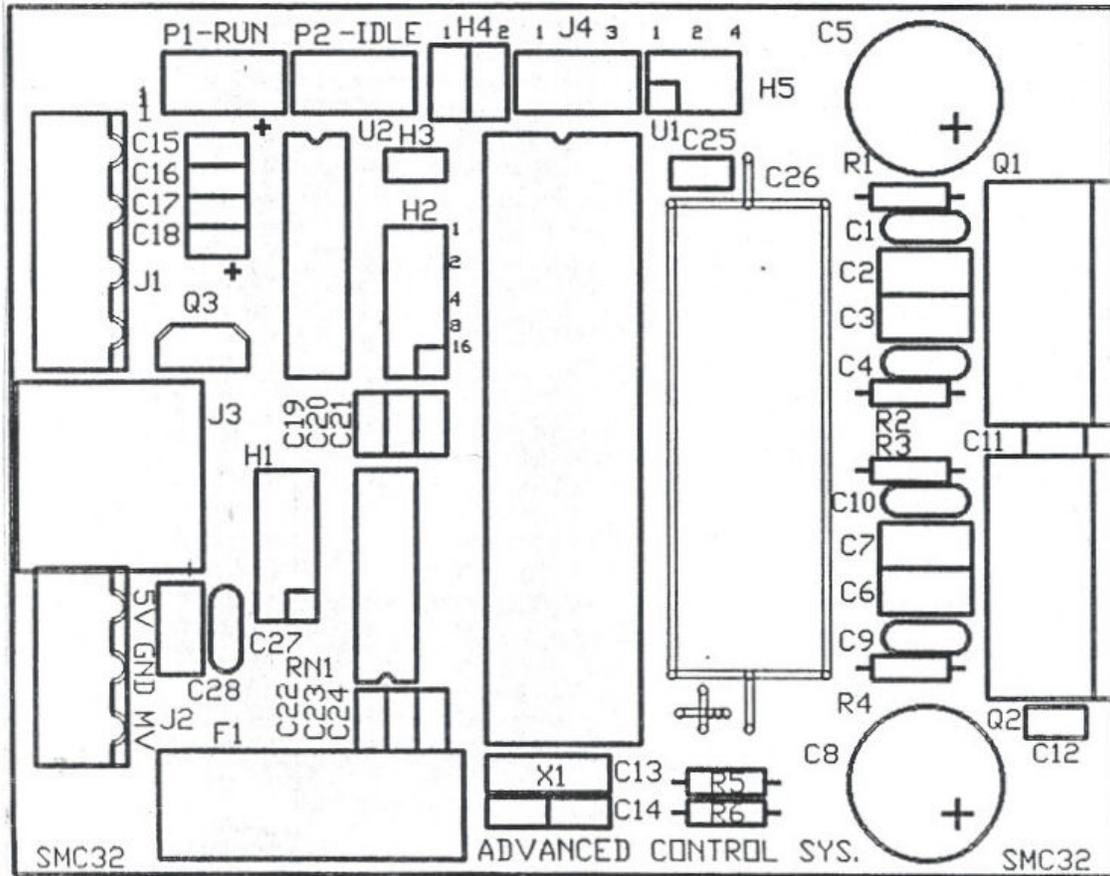
#### **4.22 TEST UNIT: T**

Instruction: #aaT␣ Test the Unit; aa = 00 only  
Response: #aaSMC32B-R0␣

Note: aa – register address  
SMC32B – controller model  
R0 – firmware revision number

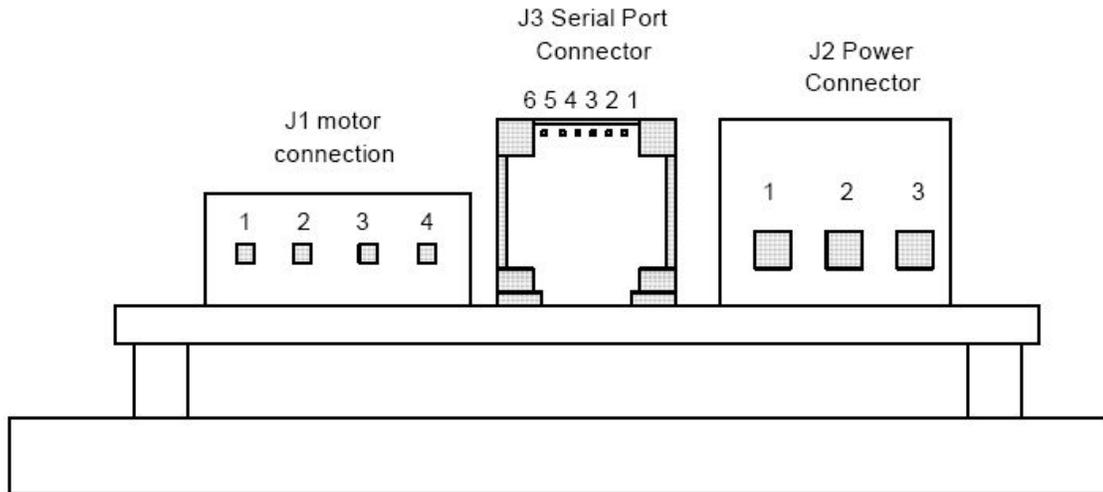
## 5. Appendices

### A. SMC-32A ON-BOARD JUMPER AND SETTING LOCATIONS



### C. SMC-32A PINOUT DIAGRAM

## SMC-32 Connector Pinout



#### J1 Motor Connection

pin 1 = winding A  
pin 2 = winding A  
pin 3 = winding B  
pin 4 = winding B

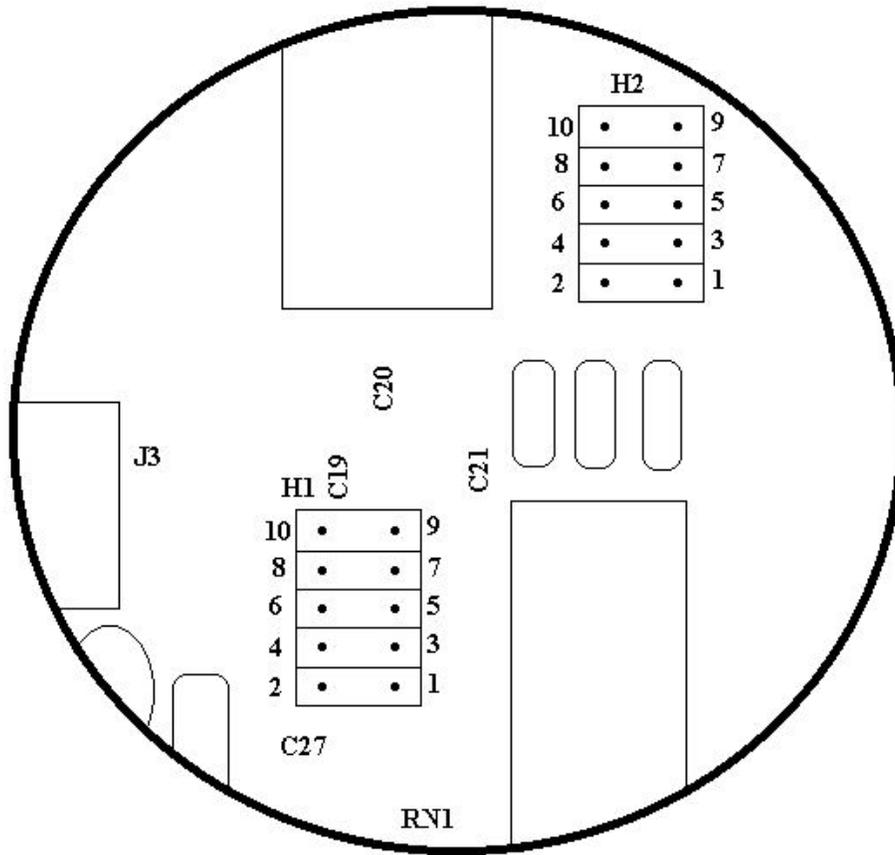
#### J3 Serial Port Connections:

pin 1 = not connected  
pin 2 = TX (data into SMC)  
pin 3 = RX (data out of SMC)  
pin 4 = must be left open  
pin 5 = GND (signal reference)  
pin 6 = not connected

#### J2 Power Connector

pin 1 = +5V Logic Supply  
pin 2 = Ground  
pin 3 = MV Motor Voltage

D. SMC-32A H1 & H2 PIN DETAIL



## **E. RoHS COMPLIANCE AND CE CONFORMITY**

Advanced Control Systems Corporation motor drivers and controllers are designed for world wide installation and use and designed to comply with requirements of certain governmental regulating agencies. Although ACS drivers and controllers are technically considered motion control components and may not be within the scope of the European Union's CE (Conformité Européenne) directives, ACS looks to provide its customers with solutions that meet world acceptance.

The following guidelines provide advice as to additional elements required to install an ACS driver/controller into a CE compliant system. Additional installation measures may be required at some locations. The ultimate responsibility for the design, fabrication and installation of a CE compliant machine resides with the builder.

### Low Voltage Directive (LVD) Installation Requirements:

- Mains power supply to be fused.
- Driver/Controller safety earth to be grounded.
- Stepping motor safety earth to be grounded.
- Installation such that the live terminals (terminal block) are not accessible under normal operation.

### Electromagnetic Compatibility (EMC) Installation Requirements:

- Mains power supply to be filtered.
- Varistors or other voltage surge limiting devices to be installed in order to meet the requirements of EN61000-4-5.
- Transient suppression to be installed.
- 360° EMC shielded motor cabling to be used (limit switches included).
- EMC compliant stepping motors to be used.
- Clip on ferrite absorbers to be installed on all cables.

The SMC-32 Series Driver/Controllers are available in RoHS Compliant models confirming to the Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment 2002/95/EC. RoHS compliant part numbers for the SMC Series are;

SMC-32 A+  
SMC-32 B+



## 6. Manual Revision History

### SMC-32A User's Manual Revision History

Revision	Date of Issue	Section	
1.0			Original Release
1.1	7-11-05	4.7	Changes to section
1.2	7-11-05	4.10	Changes to section
1.3	4-13-06	5.3	Added Pinout diagram
1.4	5-3-06	App. D	Added H1, H2 Pin detail
1.5	5-1-07	App. E	Added RoHS and CE Marking