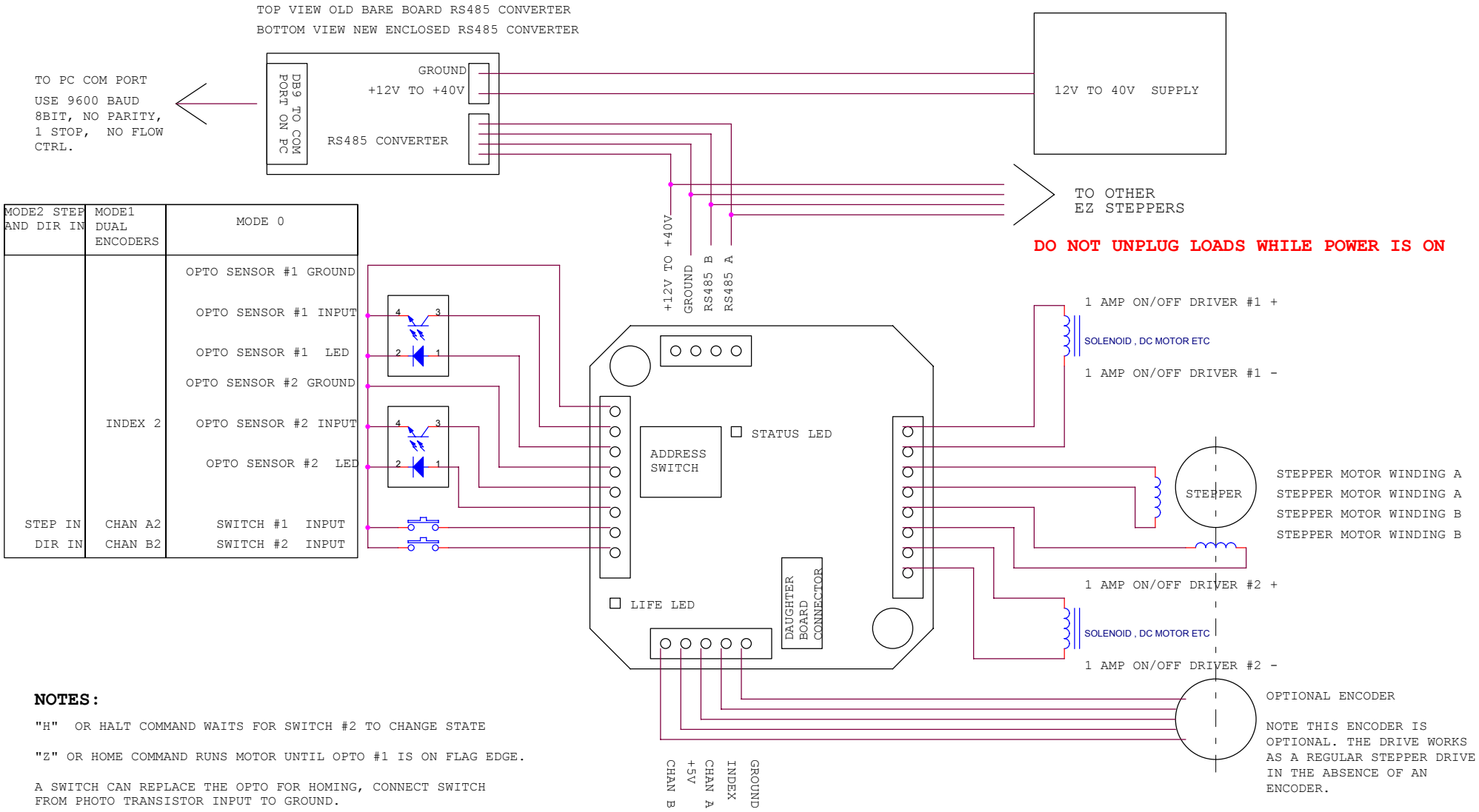

NOTES:

"H" OR HALT COMMAND WAITS FOR SWITCH #2 TO CHANGE STATE

"Z" OR HOME COMMAND RUNS MOTOR UNTIL OPTO #1 IS ON FLAG EDGE.

A SWITCH CAN REPLACE THE OPTO FOR HOMING, CONNECT SWITCH FROM PHOTO TRANSISTOR INPUT TO GROUND.

TOTAL CURRENT DRAW FROM ENCODERS + LEDS MUST BE < 200mA

DO NOT BUNDLE ENCODER OR SENSOR WIRES WITH THE MOTOR WIRES.

SHIELD MOTOR WIRES WITH A GROUNDED BRAID TO REDUCE EMI

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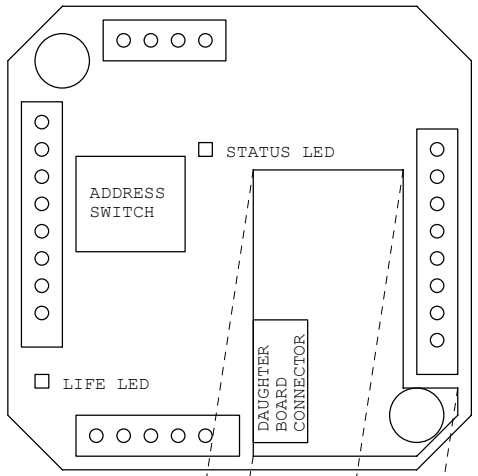
MODE2 STEP AND DIR IN	MODE1 DUAL ENCODERS	MODE 0 STANDARD MODE
		DIGITAL I/O CONNECTOR
		OPTO SENSOR #1 GROUND / SW CLOSURE GND
		INPUT3 OPTO SENSOR #1 PHOTO TRANSISTOR
		OPTO SENSOR #1 LED
	INDEX 2	OPTO SENSOR #2 GROUND / SW CLOSURE GND
		INPUT4 OPTO SENSOR #2 PHOTO TRANSISTOR
		OPTO SENSOR #2 LED
STEP IN	CHAN A2	**INPUT1** SWITCH CLOSURE TO GROUND INPUT
DIR IN	CHAN B2	**INPUT2** SWITCH CLOSURE TO GROUND INPUT

4 SWITCH CLOSURE, OR 2 OPTO AND 2 SWITCH CLOSURE INPUTS

POWER INPUT AND COMMUNICATION

+10V TO +40V
GROUND
RS485 B
RS485 A

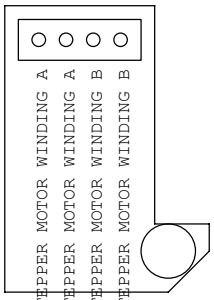


POWER OUTPUT DRIVERS

1 AMP ON/OFF DRIVER #1 +
1 AMP ON/OFF DRIVER #1 -
STEPPER MOTOR WINDING A
STEPPER MOTOR WINDING A
STEPPER MOTOR WINDING B
STEPPER MOTOR WINDING B
1 AMP ON/OFF DRIVER #2 +
1 AMP ON/OFF DRIVER #2 -

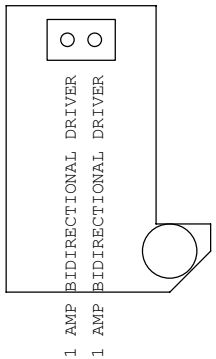
2 AMP PEAK BIPOLAR STEPPER DRIVE, AND 2 AMP PEAK ON/OFF DRIVERS FOR RELAYS, DC MOTORS, SOLENOIDS ETC.

NOTE: MAX 30V SUPPLY WHEN USING STEPPER DAUGHTER



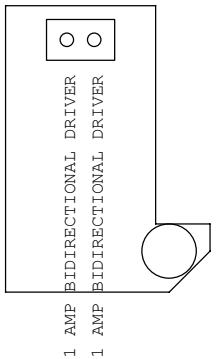
DAUGHTER BOARD OPTION1

SECOND STEPPER DRIVE



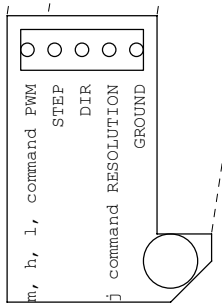
DAUGHTER BOARD OPTION2

BIDIRECTIONAL CURRENT DRIVER



DAUGHTER BOARD OPTION3

BIDIRECTIONAL PWM VOLTAGE DRIVER



DAUGHTER BOARD OPTION 4

STEP AND DIR PULSE OUTPUT

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EZHR17 AND EZHR23ENHC ACESSORIES AND OTHER ELECTRICAL NOTES

MATING CONNECTORS:

AMP MTA 100 SERIES

4PIN 22 GA DIGIKEY P/N A31108 (INPUT CONNECTOR)

8PIN 22 GA DIGIKEY P/N A31111 (NEMA23 MOTOR)

8PIN 24 GA DIGIKEY P/N A31023 (NEMA17 MOTOR)

8PIN 26 GA DIGIKEY P/N A31030 (FOR OPTOS)

5PIN 26 GA DIGIKEY P/N A31027 (FOR ENCODER)

T HANDLE CRIMP TOOL DIGIKEY P/N A9982

PISTOL GRIP TOOL DIGIKEY P/N A1998 + A2031

OPTIONAL CRIMP STYLE CONTACTS AND HOUSINGS
770602-8 AND 770666-1

MOTORS:

1) THE EZ STEPPER WILL DRIVE MOST STEPPER MOTORS

2) FOR BEST PERFORMANCE SELECT A MOTOR THAT IS RATED AT ABOUT 1/4 OF THE SUPPLY VOLTAGE. (Eg USE A 6V MOTOR WITH A 24V SUPPLY).

3) FOR (UNIPOLAR) STEPPER MOTORS WITH CENTER TAPPED WINDINGS , TYPICALLY LEAVE THE CENTER TAP UNCONNECTED, OR WIRE PER MANUFACTURERS RECOMMENDATIONS.

SUITABLE POWER SUPPLIES:

1) FOR FIRST TIME USERS, TO GUARD AGAINST A POSSIBLE MISWIRE, A CURRENT LIMITED LAB SUPPLY SET TO 12V AND 0.5A IS RECOMMENDED.

2) A SUPPLY OF 24V AND 2A CAPABILITY IS GOOD FOR MOST PURPOSES. POSSIBLE CHOICES ARE:

DIGIKEY P/N 237-1296

DIGIKEY P/N 237-1395

3) INPUT CURRENT IS MUCH LESS THAN MOTOR CURRENT DUE TO THE SWITCHING (PWM). IT CAN BE CALULATED BY CONSIDERING CONSERVATION OF POWER. HOWEVER IT IS IMPORTANT TO MAKE SURE THAT THE SUPPLY WILL NOT FOLD BACK AS IT IS COMING UP SINCE THE EZ STEPPER WILL DRAW MORE CURRENT AT LOWER VOLTAGES.

OPTO HOME SWITCH:

1) "Z" OR HOME COMMAND RUNS MOTOR UNTIL OPTO #1 IS ON FLAG EDGE.

2) AN OPTO SWITCH PROVIDED WITH EACH STARTER KIT

3) USE TRANSISTOR OPTO THAT HAS Ic > 1mA @ IF = 20mA.

4) EXAMPLES OF ACCEPTABLE OPTOS ARE:

DIGIKEY P/N QVA11134

DIGIKEY P/N H21A1

HONEYWELL HOA1887-012 (IS PREWIRED)

HONEYWELL HOA1870-33 (IS PREWIRED)

OPTEK OPB830W11 (IS PREWIRED)

5) THE OPTO COUPLER LED PIN HAS 200 OHM TO 5V IN SERIES ON THE BOARD. THE 200 OHM CAN BE REMOVED IF DESIRED FOR RUNNING SENSORS THAT REQUIRE DIRECT ACESS TO 5V. THE COLLECTOR OF THE TRANSISTOR HAS A 10K PULLUP TO 5V.

6) ALL INPUTS WORK ON TTL LEVEL SIGNALS

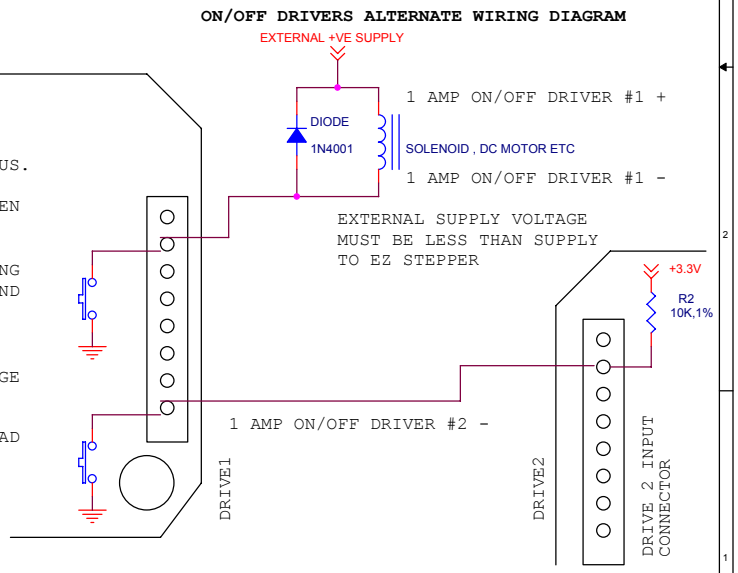
ON/OFF DRIVERS ALTERNATE WIRING DIAGRAM

1) ON/OFF DRIVERS RATED AT 2 AMPS PEAK, 1 AMP CONTINUOUS.

2) THE NEGATIVE PIN OF THESE DRIVERS IS ACTUALLY AN OPEN COLLECTOR TYPE OUTPUT THAT IS ESSENTIALLY A SWITCH TO GROUND. IT IS POSSIBLE TO DRIVE LOADS THAT ARE OF A DIFFERENT VOLTAGE THAN THE SUPPLY VOLTAGE, BY CONNECTING THE POSITIVE SIDE OF THE LOAD TO AN EXTERNAL SUPPLY, AND THE NEGATIVE SIDE TO THE -VE OUTPUT PIN. HOWEVER, IN CASE THIS IS DONE IT IS NECESSARY TO PLACE AN EXTERNAL "FREE WHEELING" DIODE ACROSS ANY INDUCTIVE LOADS. EXTERNAL SUPPLY VOLTAGE MUST BE LESS THAN SUPPLY VOLTAGE TO EZ STEPPER

3) EXTERNAL DIODE IS NOT NECESSARY IF BOTH SIDES OF LOAD ARE WIRED BACK TO THE EZ STEPPER.

4) NOTE OUTPUT IS A SWITCH TO GROUND, DRIVES CAN BE SYNCHRONISED BY CONNECTING THE OUTPUT OF ONE DRIVE TO THE INPUT OF ANOTHER AS SHOWN. THE 10K PULLUP IS INTERNAL TO THE DRIVE.



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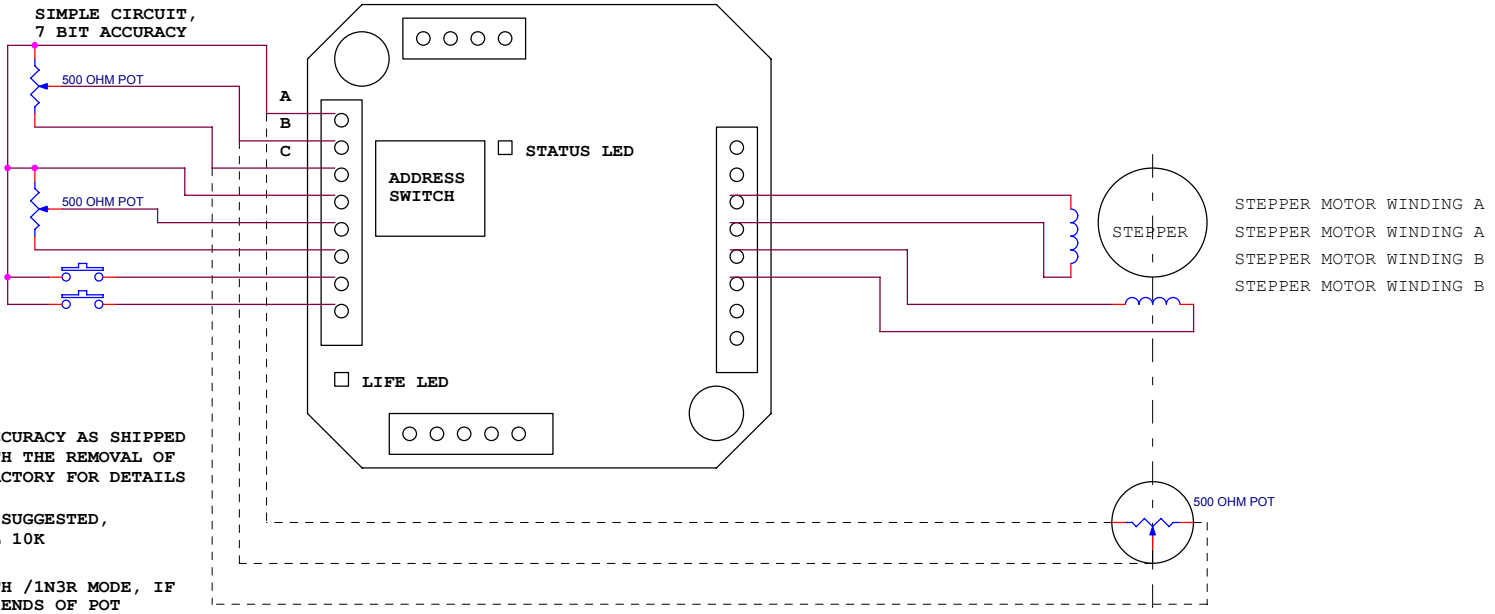


NOTES:

1) ALL 4 INPUTS ARE ANALOG INPUTS

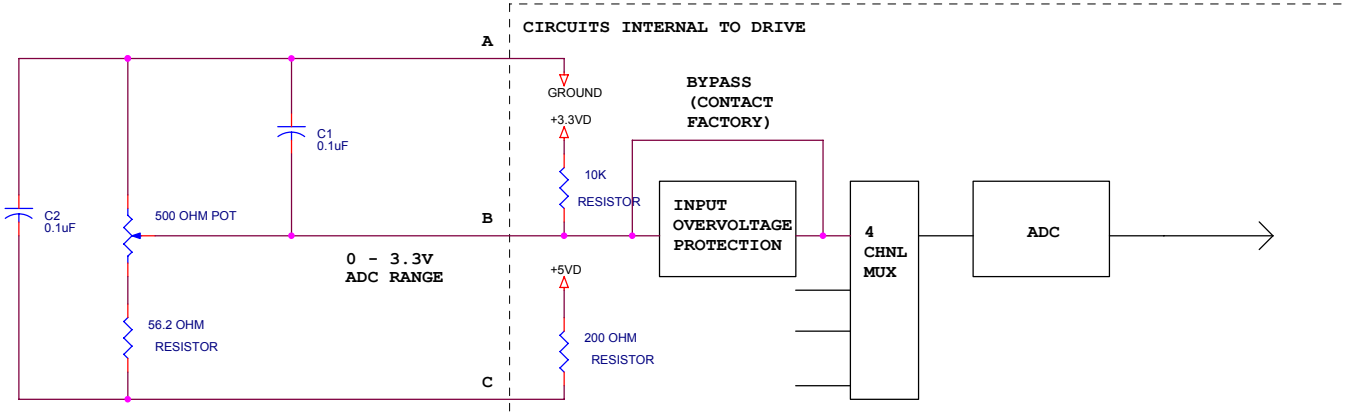
2) ADC's VALUES RANGE FROM 0-16368. THE ACCURACY AS SHIPPED IS 7 BIT BUT CAN BE IMPROVED TO >10BIT WITH THE REMOVAL OF THE INPUT PROTECTION CIRCUITRY, CONTACT FACTORY FOR DETAILS

3) POTS IN THE RANGE OF 500 OHM - 10K ARE SUGGESTED, LOWER VALUES ARE LESS AFFECTED BY INTERNAL 10K PULLUP. 500 OHM RECOMMENDED.

4) IF USING POT FOR POSITION FEED BACK WITH /1N3R MODE, IF MOTOR EXHIBITS POSITIVE FEEDBACK, SWITCH ENDS OF POT

5) 10K INTERNAL PULLUP WILL INTERFERE WITH LINEARITY OF POT VOLTAGE, AND MAY NEED TO BE REMOVED - CONTACT FACTORY.

6) INPUT OVERVOLTAGE PROTECTION CIRCUITRY MAY NEED TO BE REMOVED FOR >7BIT ACCURACY - CONTACT FACTORY.



ENHANCED EXTERNAL CIRCUIT FOR > 10BIT ACCURACY

WIRING DIAGRAM ANALOG INPUT OR POTENTIOMETER FEEDBACK

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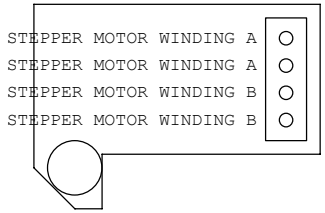
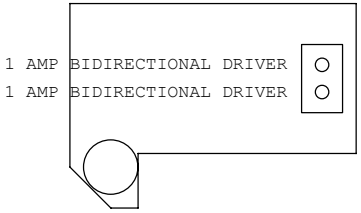
DAUGHTER CARD DETAIL

DAUGHTER BOARD OPTION 1
SECOND STEPPER DRIVE -ST



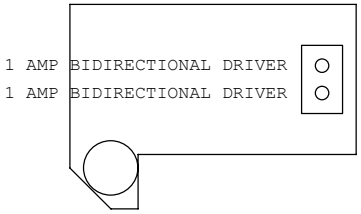
THE STEPPER DAUGHTER CARD DRIVES A SECOND STEPPER MOTOR AT 1Amp 1/8th STEP , (1/16th OPTION AVAILABLE)
THE SECOND AXIS USES THE SWITCH INPUTS FOR LIMITS/HOME
USE COMMANDS TO SECOND AXIS Eg /1aM2A1000A0R
THE MAX SUPPLY VOLTAGE IS 30V WITH THIS DAUGHTER CARD

DAUGHTER BOARD OPTION 2
BIDIRECTIONAL CURRENT MODE PWM DRIVER -BD



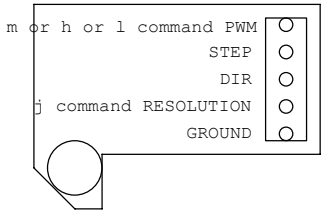
THE BIDIRECTIONAL DAUGHTER CARD ALLOWS A BIDIRECTIONAL CURRENT TO BE OUTPUT
USE THE l (lower case L) COMMAND TO SET CURRENT (remain in aM1 mode).
/1l80R SETS THE CURRENT TO 80%
USE THE O AND I COMMANDS TO SET THE DIRCTION OF THE CURRENT
/1O1R SETS THE CURRENT ONE WAY, /1I1R SETS THE CURRENT THE OTHER WAY
USE WITH INDUCTIVE LOADS SUCH AS SOLENOIDS, CAN BE USED TO CONTROL A DC BRUSH MOTOR AS A POSITION SERVO.
THE MAX SUPPLY VOLTAGE IS 40V WITH THIS DAUGHTER CARD

DAUGHTER BOARD OPTION 3
BIDIRECTIONAL VOLTAGE MODE PWM DRIVER -PW



THE BIDIRECTIONAL DAUGHTER CARD ALLOWS A BIDIRECTIONAL PWM VOLTAGE TO BE OUTPUT
USE THE l (lower case L) COMMAND TO SET THE PWM ON OFF DUTY. THIS SETS THE AVERAGE VOLTAGE AS A FRACTION OF THE SUPPLY VOLTAGE.
/1l80R SETS THE VOLTAGE TO 80%
USE THE O AND I COMMANDS TO SET THE DIRCTION OF THE CURRENT
/1O1R SETS THE CURRENT ONE WAY, /1I1R SETS THE CURRENT THE OTHER WAY
BOARD CAN BE USED FOR DC MOTOR OPEN LOOP SPEED CONTROL, RESISTIVE HEATER ETC.
THE MAX SUPPLY VOLTAGE IS 40V WITH THIS DAUGHTER CARD

DAUGHTER BOARD OPTION 4
LOGIC LEVEL OUTPUT OF STEP/DIR/PWM -LO



LOGIC LEVEL OUTPUT DAUGHTER CARD OUTPUTS STEP AND DIRECTION PULSES TO AN EXTERNAL DRIVER.
THE OUTPUTS ARE 4V, 24mA CAPABLE DRIVERS IN SERIES WITH 100 OHM RESISTORS.
THE PWM OUTPUT SETS THE CURRENT LEVEL IN THE DRIVE AND VARIES WITH THE m OR h or l (lower case L) VALUES
C4 ON THE PCB CAN BE POPULATED TO SMOOTH OUT THE PWM OUTPUT AND YEILD A DC VOLTAGE
THE RESOLUTION OUTPUT CAN BE USED AS AN ENABLE LINE AND CHANGE VIA THE j2 AND j16 COMMANDS
USE COMMANDS TO SECOND AXIS EG /1aM2A1000A0R
SECOND AXIS HOMES TO SWITCH INPUTS
THE MAX SUPPLY VOLTAGE IS 40V WITH THIS DAUGHTER CARD

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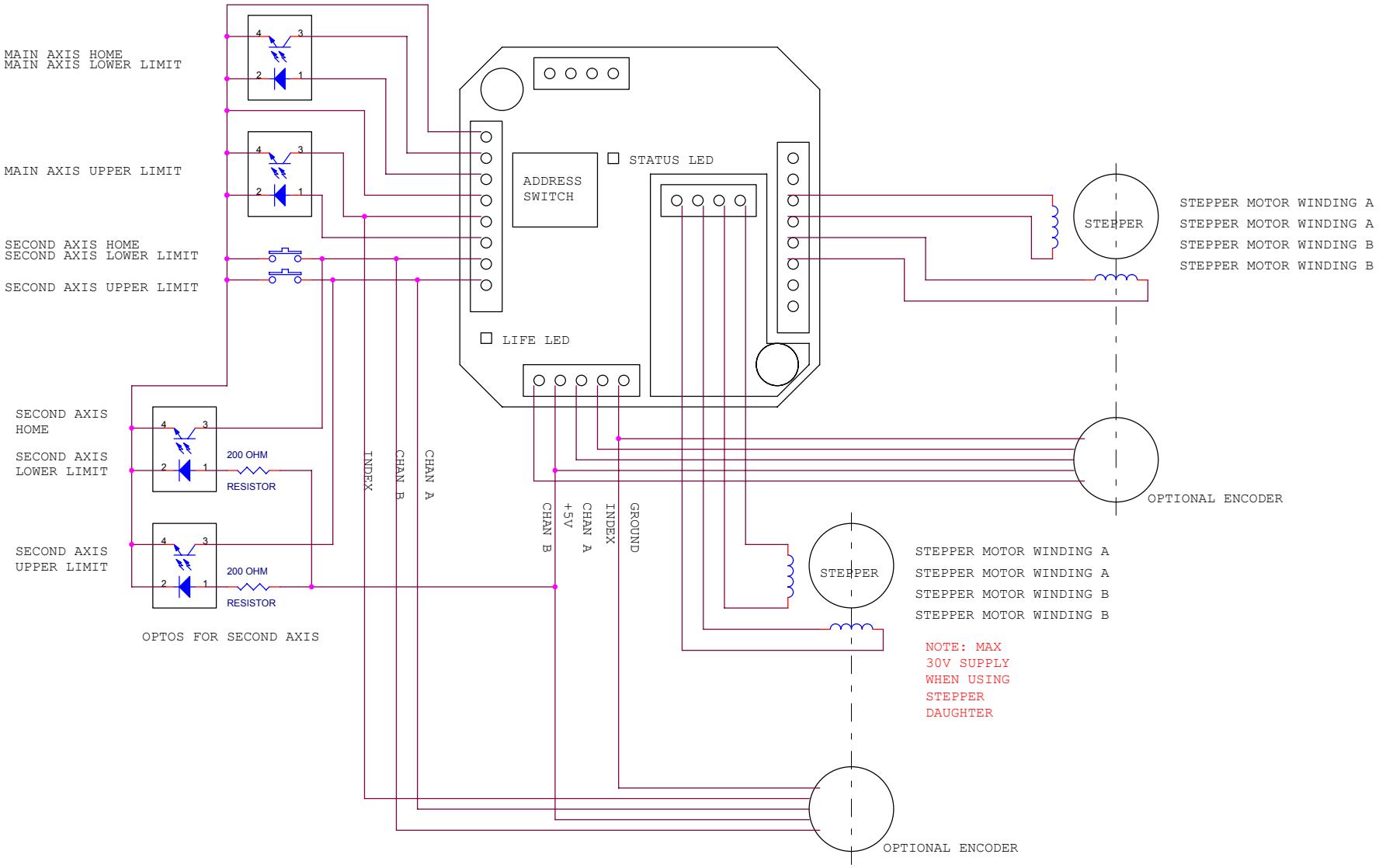

DUAL AXIS STEPPER DRIVE WITH DUAL ENCODERS (ENCODERS ARE OPTIONAL)

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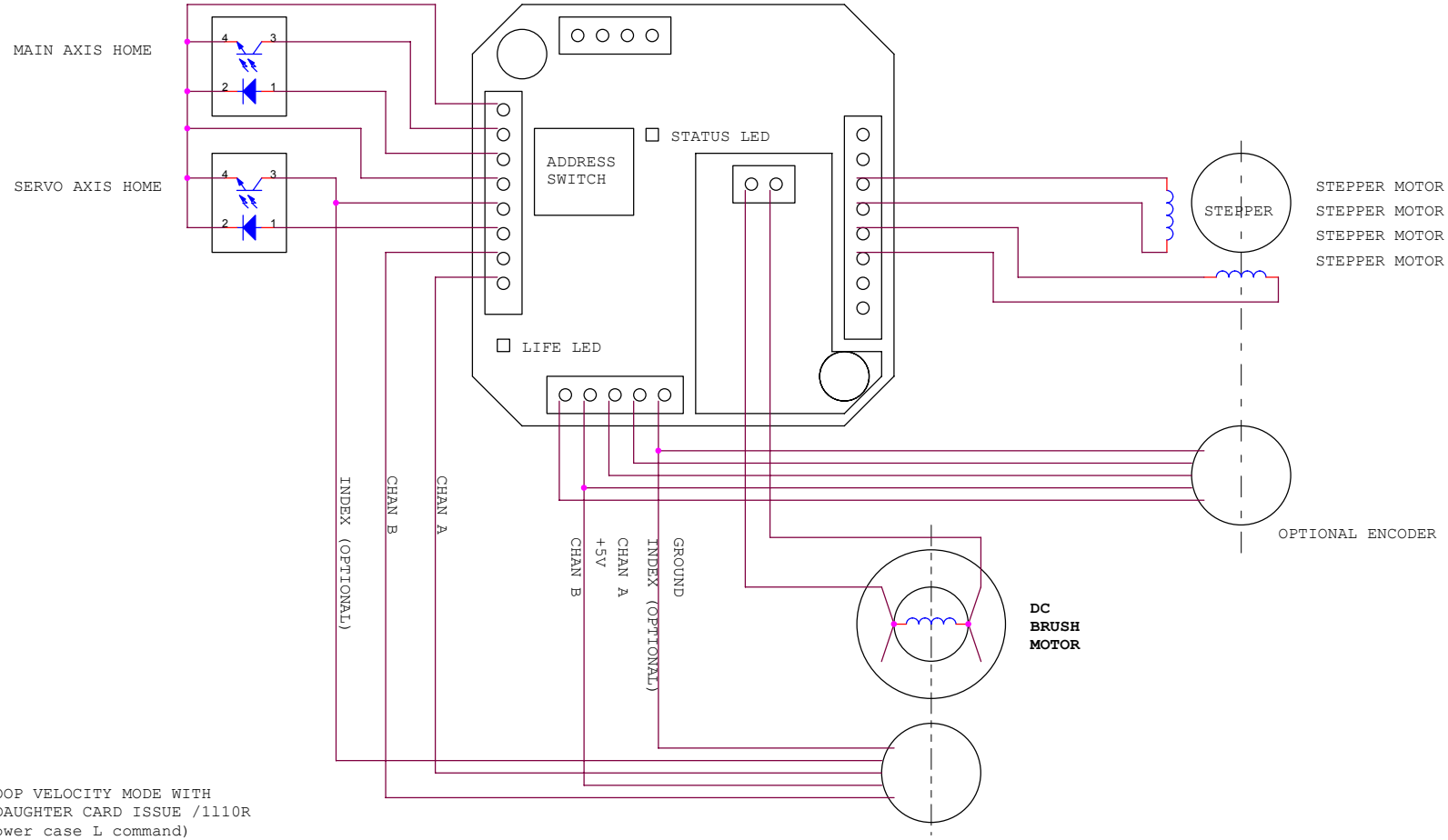

NOTES:

1) FOR OPEN LOOP VELOCITY MODE WITH VOLTAGE MODE DAUGHTER CARD ISSUE /1l10R /1l60R etc (lower case L command)

2) FOR DC SERVO MODE WITH CURRENT MODE DRIVER CARD ISSUE /1N8aM2A10000A0R SEE COMMAND SET FOR MORE DETAILS.

3) RESISTIVE HEATERS ETC CAN BE RUN WITH THE VOLTAGE MODE PWM CARD

ENCODER REQUIRED FOR POSITION MODE WITH CURRENT MODE BI DIRECTIONAL DAUGHTER CARD.

ENCODER NOT REQUIRED FOR OPEN LOOP VELOCITY MODE WITH BI DIRECTIOANL VOLTAGE PWM MODE DAUGHTER CARD.

DUAL AXIS: STEPPER DRIVE + DC SERVO

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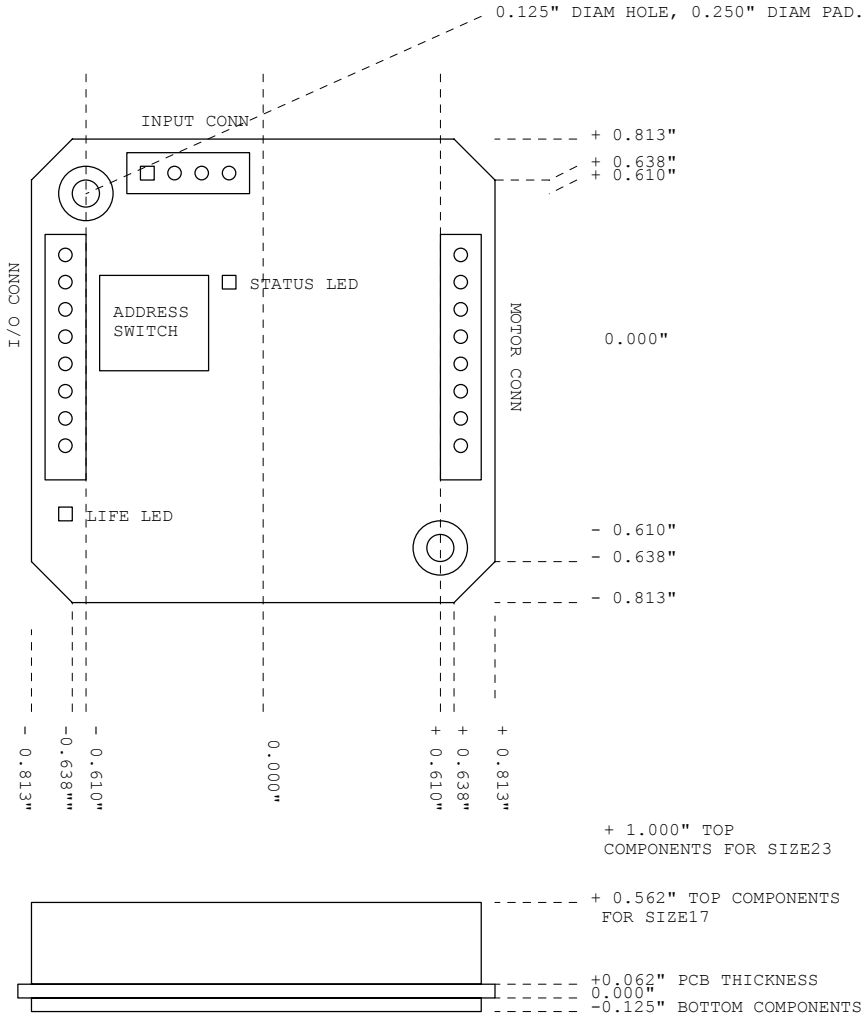

ENVELOPE IS MAINTAINED WITH DAUGHTER CARDS INSTALLED

DESIGN USES THE NEMA 17 SIZE
STANDARD 1.22" SQUARE BOLT PATTERN

EZHR17EN DIMENSIONAL INFORMATION

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