Models: 5A5 (Discontinued)
Suggested replacements: 10A8, Z6A6

FEATURES:

* Surface-mount technology

* Extremely small size

* Ease of use

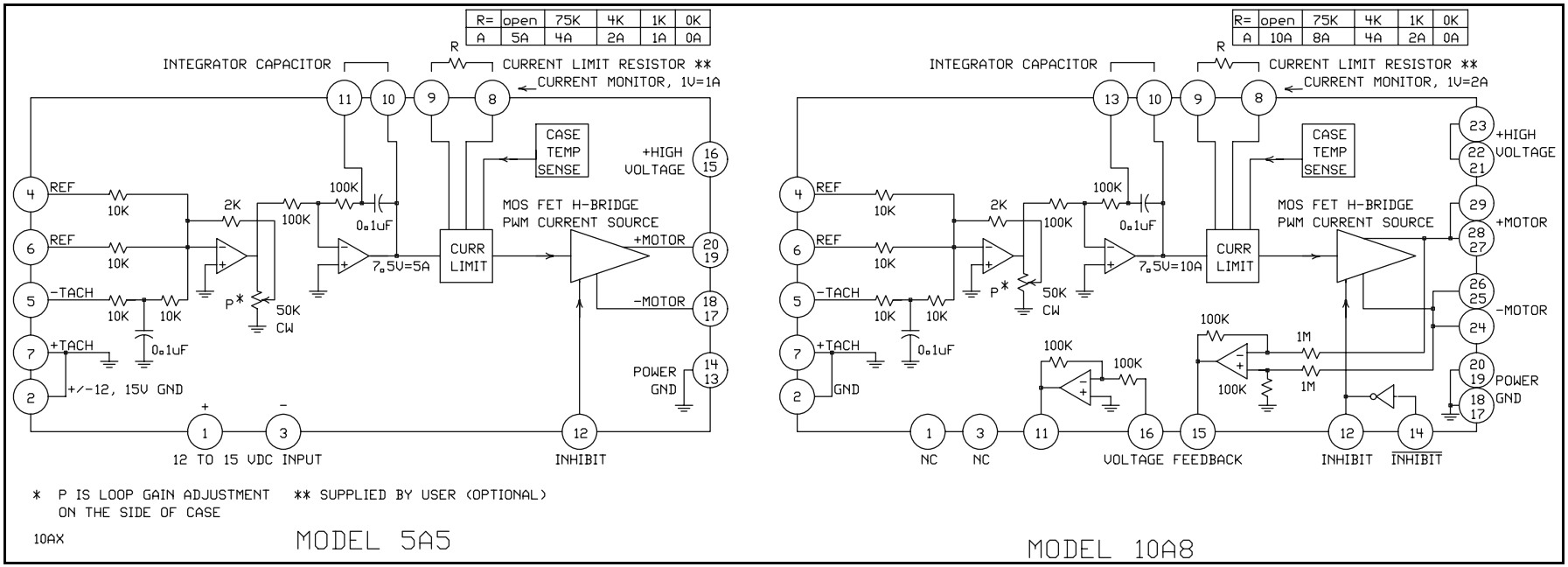
* Low cost

* Single supply operation (10A8 only)

* Four quadrant regenerative operation

5A5

DESCRIPTION: 10A Series PWM servo amplifiers are designed to drive brush type DC motors. There are two different models to the 10A Series: models 10A8 and model 5A5. Operating efficiency for 5A5 is 90%, and 95% for 10A8. Both models are fully protected against over-voltage, over-current, over-heating and short-circuits across motor, ground and power leads. These amplifiers interface with digital controllers or can be used as a stand-alone drive. Model 10A8 requires a single unregulated power supply only. Model 5A5 also requires an external ±12V to ±15V supply. A potentiometer is located on the side of both modules for loop gain adjustment.



ADVANCED MOTION CONTROLS
3805 Calle Tecate, Camarillo, CA 93012 Tel: (805) 389-1935, Fax: (805) 389-1165

	MODELS	
POWER STAGE SPECIFICATIONS	**10A8**	**5A5**
DC SUPPLY VOLTAGE	** 20-80V	** 20-50V
LOW VOLTAGE POWER SUPPLY	Not required	±11V to ±16V @±5mA
PEAK CURRENT (internally limited)	±10A	±5A
MAXIMUM CONTINUOUS CURRENT	±6A	±3A
MINIMUM LOAD INDUCTANCE*	200uH	
SWITCHING FREQUENCY	33KHZ	
HEATSINK (BASE) TEMPERATURE RANGE	-25^{o} to +65^{o}C, output current limit internally reduced if above +65^{o}C	
POWER DISSIPATION AT CONT. CURRENT	20W @ 6A	12W @ 3A
OVER-VOLTAGE SHUT-DOWN (self-reset)	86V	52V
BANDWIDTH	2.5KHz	

MECHANICAL SPECIFICATIONS		
CONNECTOR	Molex connector	
SIZE (inches)	4.00 x 2.00 x .60	2.82 x 1.62 x .60
WEIGHT	5.1 oz.	3.5 oz.

* Low inductance motors ("pancake" and "basket-wound") require external inductors.
** Modification for 12V battery operation is available. Specify when placing order.

CAUTION: WHEN NOT MOUNTED DIRECTLY ON FACTORY SUPPLIED MATING MOUNTING CARDS, POWER LEADS LONGER THAN ONE FOOT REQUIRE EXTERNAL BY-PASS CAPACITORS (MIN. 1000 uF) FOR HIGH VOLTAGE. PLEASE CONTACT FACTORY FOR ADDITIONAL INFORMATION.

PIN FUNCTIONS

CONNECTOR	**PIN**	**NAME**	**DESCRIPTION / NOTES**	**I/O**
P1	1	+15V	±12 to ±15V inputs for model 5A5. Pins 1 & 3 are not connected for model 10A8. Pin P1- 2 is signal ground.	I
	2	GND		
	3	-15V		

CONNECTOR	PIN	NAME	DESCRIPTION / NOTES	I/O
	4	REF	Maximum ±15V, 10K input resistance	I
	6			
	5	TACH	Maximum ±60V analog, 20K input resistance	I
	7			
	8	CURRENT MONITOR	Current monitor. This DC signal is proportional to the actual current in the motor leads: 1V = 2A for 10A8, and 1V = 1A for 5A5 (also see pin P1- 9 description)	O
	9	CURRENT LIMIT	The external current limiting resistor connects between P1-8 and 9. See block diagram on data sheet (page A-35) for values	
	10	CURRENT REF	Command signal to the internal current-loop. The maximum peak current rating of the amplifier always equals 7.5V at this pin. Also see following pin descriptions: P1-13 for 10A8 and P1-11 for 5A5	
	11	INTEGRATOR	For 5A5, shorting this pin to P1-10 eliminates the velocity/voltage loop integrator. This provides direct access to the internal current loop (current mode). The potentiometer on the side of the case can be used to adjust the input-voltage to output-current ratio in current mode. For	

CONNECTOR	**PIN**	**NAME**	**DESCRIPTION / NOTES**	**I/O**
			10A8, this is the output of the internal unity-gain inverting amplifier	
	12	INHIBIT	Apply +3V to +15V @3mA to inhibit drive	I
	13	INTEGRATOR	Applicable for 10A8 only. Shorting this pin to P1-10 eliminates the velocity/voltage loop integrator. This provides direct access to the internal current loop (current mode). The potentiometer on the side of the case can be used to adjust the input-voltage to output-current ratio in current mode	O
	14	INHIBIT	Applicable for 10A8 only. Inhibit. It turns off all four mosfets of the "H" bridge drive when pulled to ground. Leaving this pin open or connecting it to +15V enables the amplifier module	I
	15	VOLTS OUT	Applicable for 10A8 only. Output of the internal differential amplifier. This signal is proportional to the output voltage	O
	16	INV. IN	Applicable for 10A8 only. Input of the internal unity-gain inverting amplifier	I

OPERATING MODE SELECTION

10A Series amplifiers operate in the following modes:

* Voltage Mode (10A8 only)
* Velocity Mode
* Current (Torque) Mode

Use of mating mounting card is required for the following modes:

* Analog Position Loop mode
* Voltage Mode (5A5 only)

Voltage mode can be selected for model 10A8 by shorting pins P1-15 and P1-5. Use of mating mounting cards is required for 5A5. Current (Torque) mode can be selected for model 10A8 by shorting pin P1-10 to P1-13. This mode can be selected for model 5A5 by shorting pin P1-10 to P1-11.

See section "G" for more information.

CURRENT LIMIT ADJUSTMENTS

These amplifiers feature a single current limit adjustment. If due to extremely harsh operating conditions over-heating occurs, the internal analog temperature sensor automatically reduces the current limit to a safe level without interrupting operation or damaging the amplifier. The current limit can be reduced by connecting an external resistor between pins P1- 8 and 9. See chart on the data sheet (page A-35) for values.

See section "G" for more information.

RECOMMENDED MOUNTING CARDS

Mounting cards: MF3X510, MF2X510, MF1X510

MC1X510, MC2X510, MC3X510

TYPICAL SYSTEM WIRING: See section "G" (G-7).

ORDERING INFORMATION

Models: 5A5X, 10A8X

X indicates the current revision number.

MOUNTING DIMENSIONS: See section "E" fig. 5 (E-7).

SERIES MC3X MOUNTING CARDS
Models:
MF3X510, MF2X510, MF1X510A, MC1X510, MC2X510, MC3X510

FEATURES:
* Differential or single-ended inputs

* Potentiometer adjustments
  for offset/test, input gain,
  tach, IR compensation, current limit

* Current, voltage, tachometer,
  and IR compensation modes

DESCRIPTION: Advanced Motion Controls MC3X Series mounting card product line is designed to host three Model 10A8 or Model 5A5 servo amplifiers. On-card DC-to-DC converter generates the ±15V from the high voltage supply. Customer is provided ±10V at ±5mA for customer use at the screw terminals. Part NO's beginning with "MC" can host both 5A5's and 10A8's. Part NO's beginning with "MF" can host either 5A5's or 10A8's and feature an on board filter in the motor lines. The schematic on the reverse side of this data sheet describes all combinations of 5A5 and/or 10A8 for 1-, 2-, and 3-axes cards. The cards measure: 4.98" x 8.00" (3-axes), 4.98" x 6.02" (2-axes), 3.80" x 4.98" (1-axis). The highest point on the cards is 1.10"

POTENTIOMETER FUNCTIONS:

POTENTIOMETER	DESCRIPTION	TURNING CW
Pot 5, 10, 15	Tachometer gain adjustment (normally not necessary and not factory installed)	Increase
Pot 4, 9, 14	Adjustment of IR compensation feed back amount	Increase
Pot 3, 8, 13	Current limit adjustment	Increase
Pot 2, 7, 12	Input gain adjustment	Increase
Pot 1, 6, 11	Adjustment of any offset or imbalance in the amplifier/card assembly or in the input signal	N/A

Servo Amplifier/Card Configurations: The operating modes are selected by DIP switches according to the table on the block diagram. When SW 1, 5, 9 are in "test mode", the sensitivity of the offset pots is increased so they can be used as an "on-board reference signal".

Current Mode Reference-Gain Adjustments: Connect "+C" to "+10V" on screw terminal and adjust Pot 2, 7, 12 (for channels #1, 2, 3) to obtain -5V at the test point located between Pot 2, 7, 12 and edge of card (wiper of Pot 2, 7, 12). Adjust the potentiometer located on the side of the amplifier module to obtain 7.5V at left contacts of C 3, 43, 63 (which are connected to pin 10 of module). C 3, 43, 63 are not factory installed.

Amplifier Loop-Compensation: In **Voltage and Tachometer Mode** rotate potentiometer located on the side of the amplifier module clockwise until oscillation occurs, and then turn counter-clockwise until oscillation stops.

IR Compensation Configuration: Rotate potentiometer located on the side of the amplifier module clockwise until oscillation occurs, and then turn counter-clockwise until oscillation stops. Repeat this procedure for Pot 4.
See section "G".

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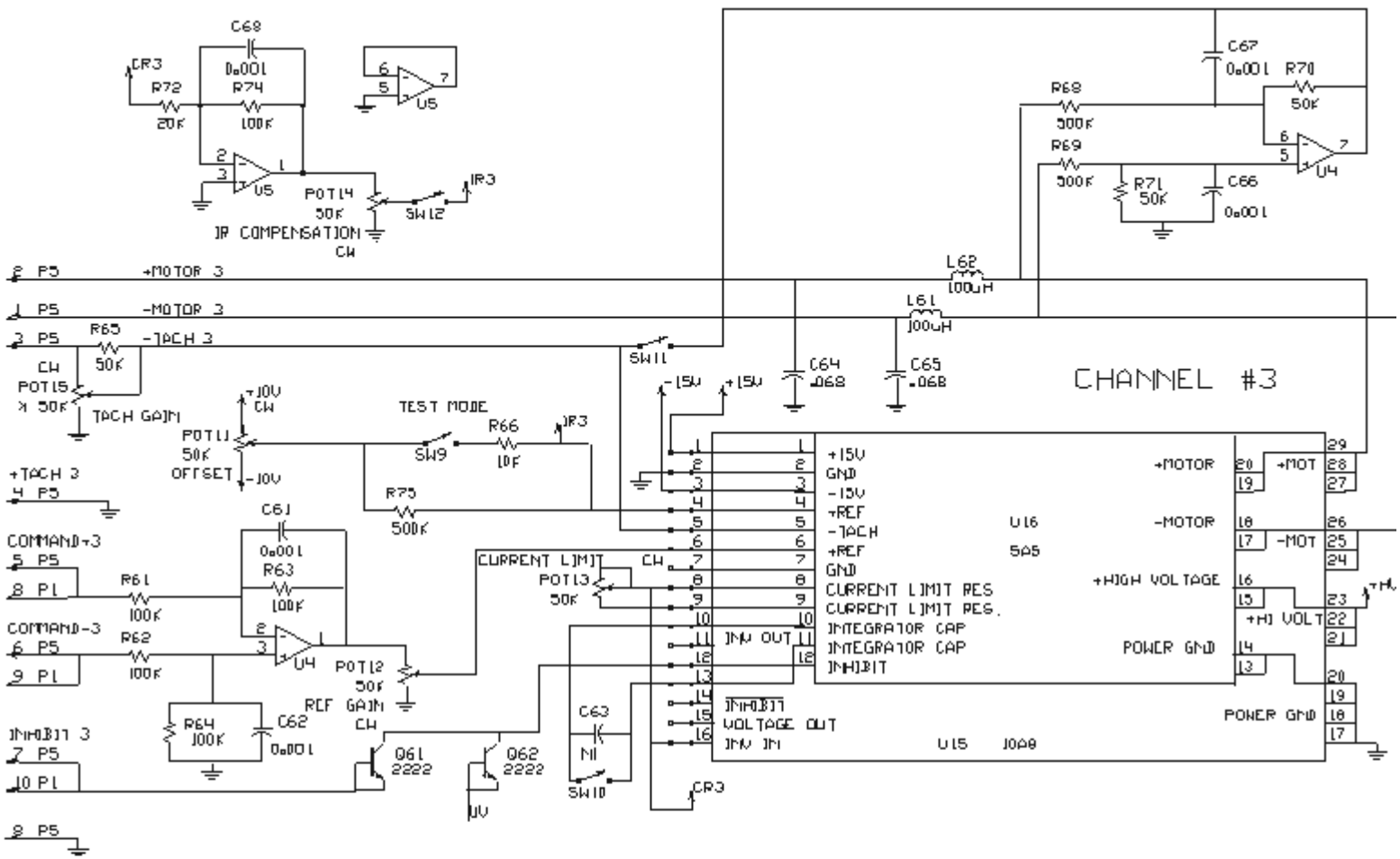
ANALOG POSITION LOOP MODE

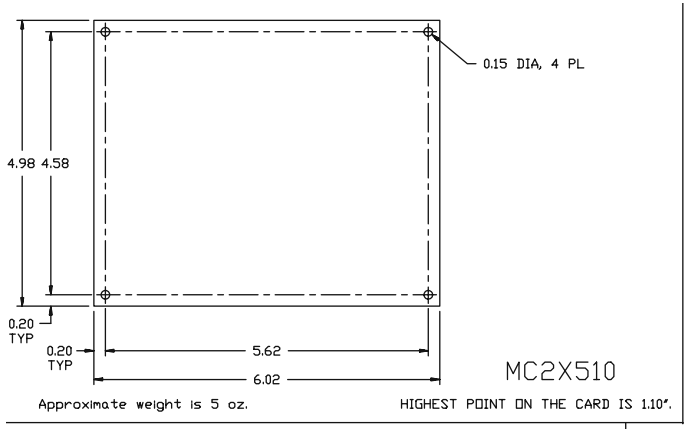
In this mode the feedback device is an analog potentiometer mechanically tied to the positioned object. This potentiometer can be powered by the card (+/-10V). The command is an analog signal which can be supplied by the user, or a potentiometer supplied by the card (+/-10V) (see analog position mode block diagram page G-15). Tune amplifier in voltage mode (or in IR compensation mode for best results), then connect the analog position feedback and turn Pot 2 clockwise until oscillation occurs. Finally, rotate Pot 2 counter-clockwise to stop oscillation. (Oscillation may not occur).



MODE SELECTION TABLE

	AMP #1				AMP #2				AMP #3		
OPERATING MODES	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10	SW11
CURRENT MODE	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
VOLTAGE MODE	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
IR COMPENSATION	OFF	OFF	ON	ON	OFF	OFF	ON	ON	OFF	OFF	ON
TACHOMETER MODE	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
TEST MODE	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON
POSITION MODE	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON

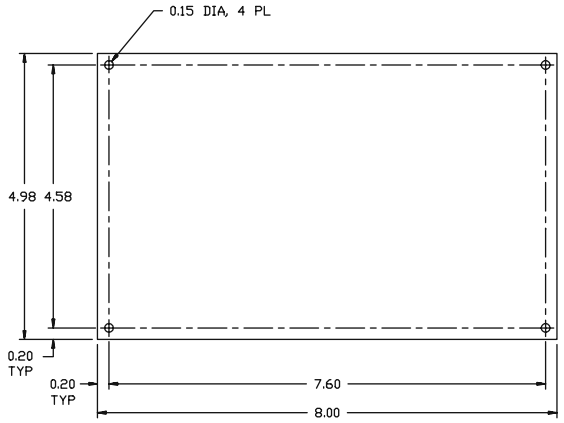
MOUNTING DIMENSIONS:



MC2X510

Approximate weight is 5 oz.

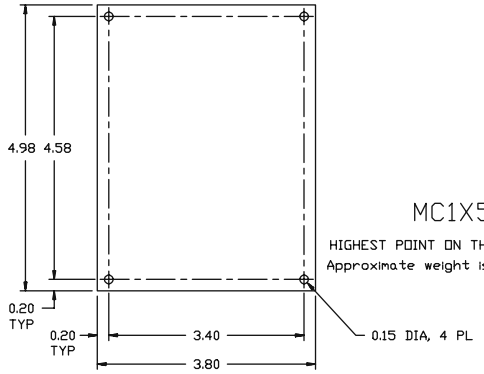
HIGHEST POINT ON THE CARD IS 1.10".



MC3X510

HIGHEST POINT ON THE CARD IS 1.10".

Approximate weight is 7 oz.



MC1X510

HIGHEST POINT ON THE CARD IS 1.10".

Approximate weight is 4 oz.

	advanced motion controls 3629 Vista Mercado, Camarillo, CA 93012 * (805) 389-1935			
TOLERANCES	TITLE	MOUNTING DIMENSIONS		
.XX - ±.01	MODEL(S)	MC1,2,3X510 MOUNTING CARDS		
.XXX - ±.005	DRAWN BY	AIDA	DATE	08/25/92
SCALE: 1 : 1	DWG NO	MMC123	REV	-