

**Owner's
Manual**

Model 2501

Mother Board



**California
Computer
Systems**

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I FEATURES

- 12 Slot Capability
- All S-100 Connectors Included
- Low Inductance Interconnect to Reduce Signal Noise and Crosstalk
- Active Termination of All Bus Lines to Further Reduce Signal Noise and Line Reflections
- Distributed bypassing of All Power Lines
- Solder Mask on Both Sides of Board
- Silkscreen of Reference Designations
- Simple Strong Board Mounting
- Criss-Cross Bus Lines on Both Sides of Board
- All Holes Plated Through
- Solder Plated Circuit Area

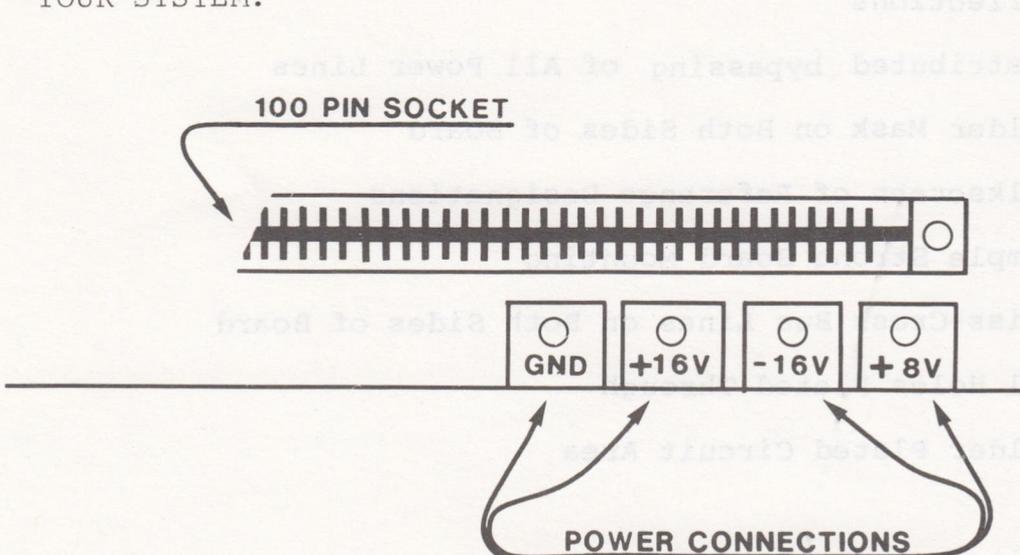
II OPERATING INSTRUCTIONS

- 2-1 The model 2501A is packaged and shipped in a standard cardboard container with styrofoam inserts to prevent damage. Upon receipt of the instrument, a thorough inspection should be made to reveal any possible shipping damage. If, for any reason, the instrument must be returned to the factory, the original shipping container should be used.
- 2-2 Before applying power to your motherboard, it must be securely fastened in place using 12 screws, six on each side. Care must be taken that none of the circuitry on the bottom of the board be allowed to contact ground. Next, power must be securely connected to the board using the connections supplied. It is vital that the correct voltages are applied to the correct points, or destruction to your computer system will result. See Fig A .

Marked on the circuit board are the nominal voltages to be applied at each point.

The +8 supply will normally be between +8 and +12 depending upon the current requirements. The +16 and -16 supplies will normally be between 16 and 25 volts depending upon the load.

DO NOT EVER APPLY REVERSED VOLTAGES OR EXCESSIVE VOLTAGES LEST IRREPARABLE DAMAGE MAY OCCUR TO YOUR SYSTEM.



III THEORY OF OPERATION

GENERAL

The model 2501 is a 12 slot motherboard for use in S-100 bus systems. It has several design features to optimize system operation.

- A) Distributed bypassing of all power lines to minimize crosstalk through the power lines.
- B) Active termination of all signal lines to minimize signal reflections.
- C) Newly developed trace pattern to minimize pulse ringing.

ACTIVE TERMINATION

Active termination is achieved by returning all 94 signal lines through separate 330 ohm resistors to a regulated +2.4 volts DC (See Fig B)

This means that all signal lines are HIGH unless deliberately pulled LOW, and that all lines see the same load rather than being left in an indeterminate state.

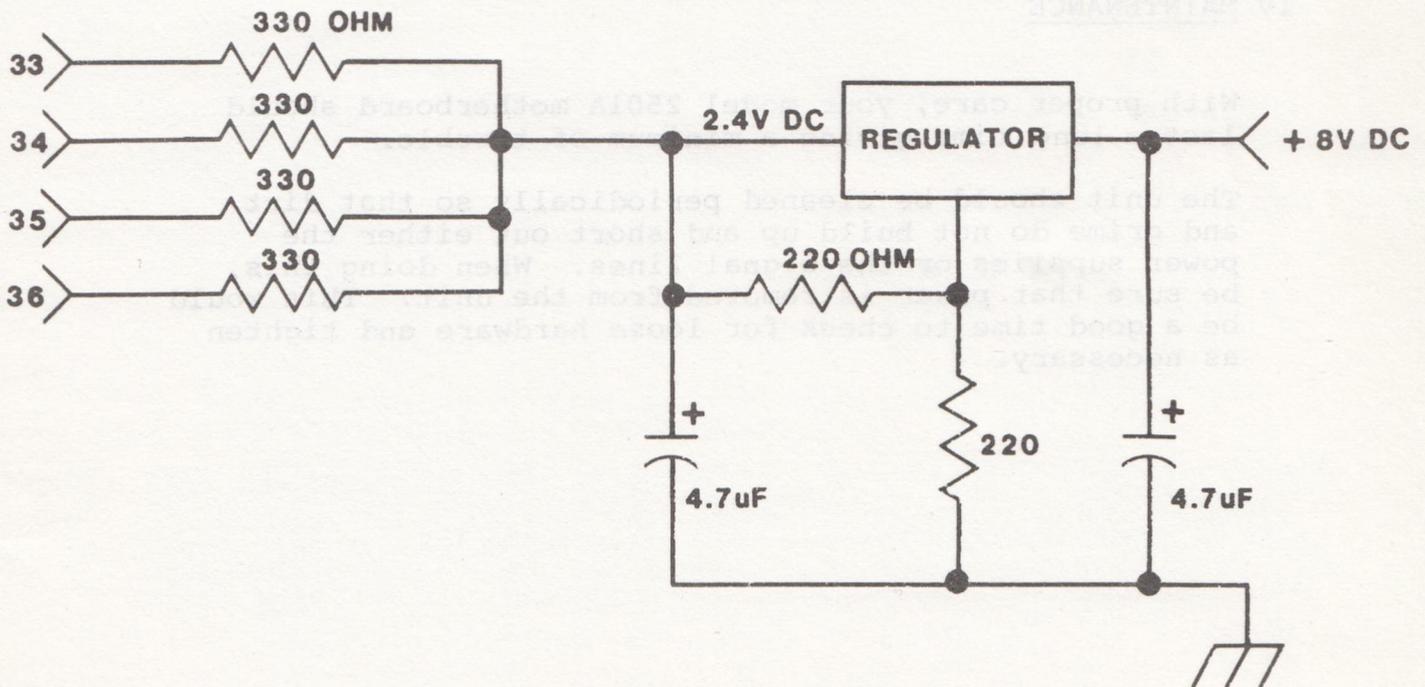


FIG B

TRACE PATTERN

If you examine the trace pattern carefully, you will notice several features. First, all pins are connected on each side of the board. ie-pin 33 of every socket is connected together on the top of the board and on the bottom of the board. This "double-path" effectively halves the line inductance.

Second, each trace is maintained as wide as practicable further reducing line inductance. Minimizing line inductance is important as inductance causes ringing on signal pulses, creating system errors.

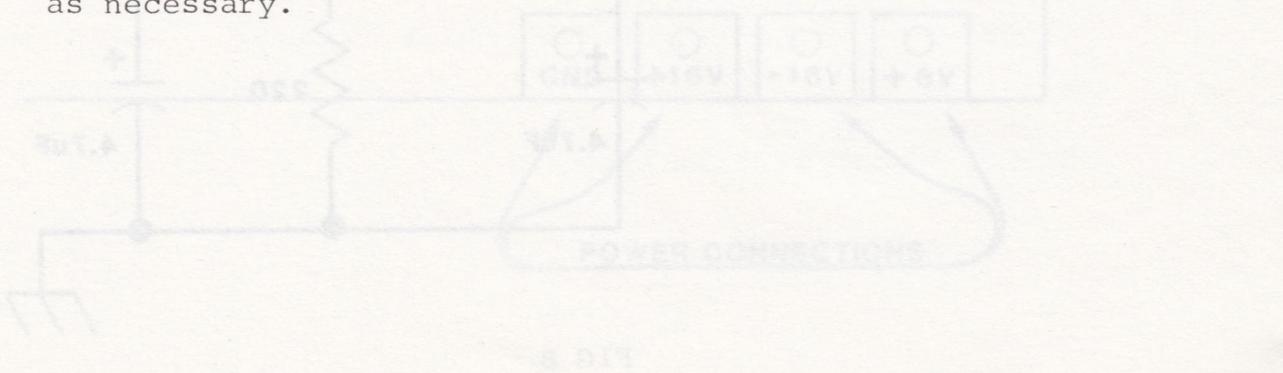
Third, the traces on the top and bottom of the board are in a criss-cross pattern resulting in a quasi-twisted pair for each signal line, minimizing noise pickup and crosstalk with other lines.

All of this effort in designing the trace pattern in conjunction with the active terminations results in signals with low noise, minimal ringing, and low line reflections along with its concomitant improved system operation.

IV MAINTENANCE

With proper care, your model 2501A motherboard should last a long time giving a minimum of trouble.

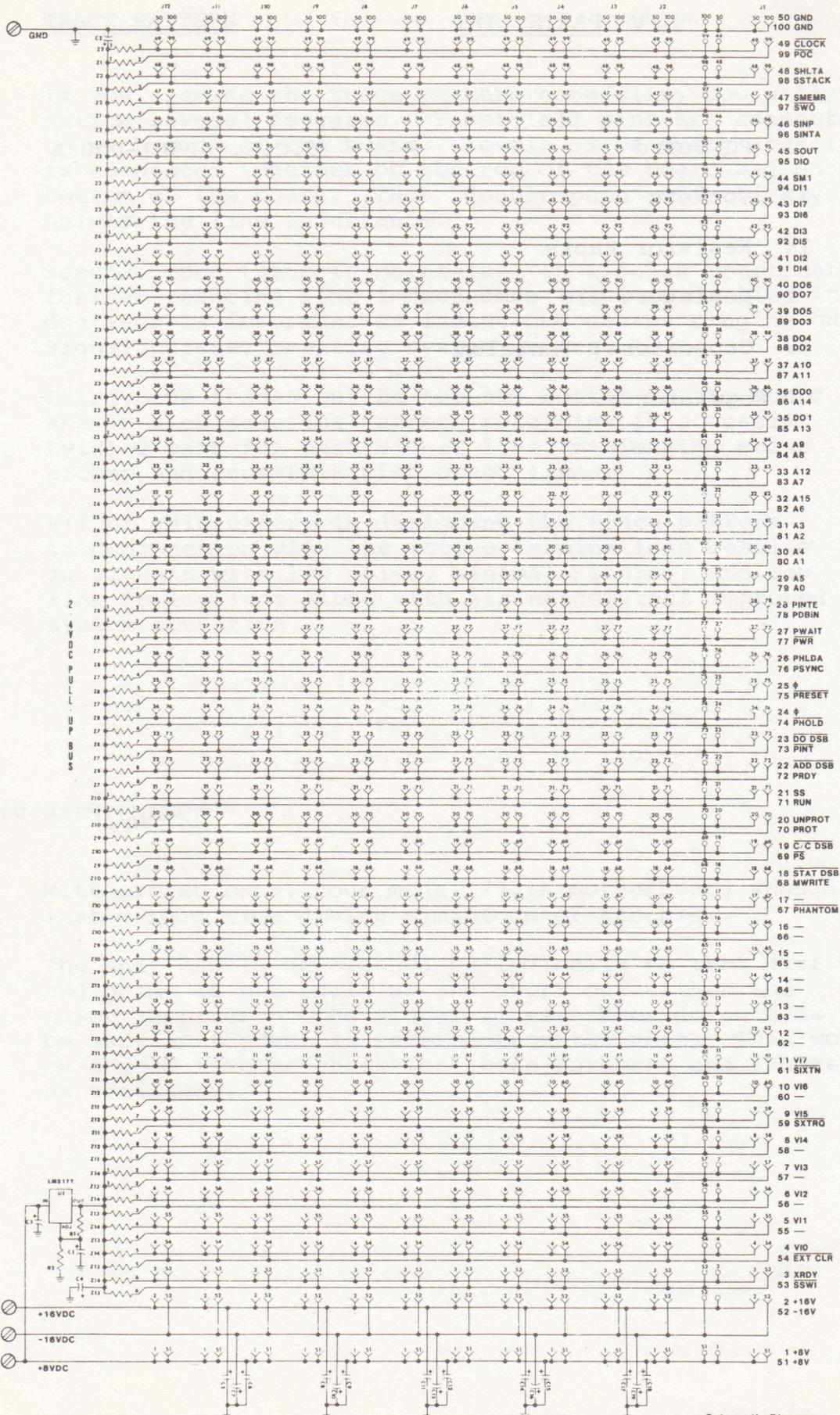
The unit should be cleaned periodically so that dirt and grime do not build up and short out either the power supplies or the signal lines. When doing this, be sure that power is removed from the unit. This would be a good time to check for loose hardware and tighten as necessary.



V PARTS LIST

1. 1 PC Board C.C.S. 02501-0002A
2. 12 Sockets
3. 14 Resistor Packs
4. 2 Resistors 220 ohms $\frac{1}{4}$ w
5. 19 Capacitors, Tantalum
6. 1 Regulator

VI SCHEMATIC



Schematic Diagram

LIMITED WARRANTY

California Computer Systems (CCS) warrants to the original purchaser of its products that

- (1) its CCS assembled and tested products will be free from materials defects for a period of one (1) year, and be free from defects of workmanship for a period of ninety (90) days; and
- (2) its kit products will be free from materials defects for a period of ninety (90) days.

The responsibility of CCS hereunder, and the sole and exclusive remedy of the original purchaser for a breach of any warranty hereunder, is limited to the correction or replacement by CCS at CCS's option, at CCS's service facility, of any product or part which has been returned to CCS and in which there is a defect covered by this warranty; provided, however, that in the case of CCS assembled and tested products, CCS will correct any defect in materials and workmanship free of charge if the product is returned to CCS within ninety (90) days of original purchase from CCS; and CCS will correct defects in materials in its products and restore the product to an operational status for a labor charge of \$25.00, provided that the product is returned to CCS within ninety (90) days in the case of kit products, or one (1) year in the case of CCS assembled and tested products. All such returned products shall be shipped prepaid and insured by original purchaser to:

Warranty Service Department
California Computer Systems
250 Caribbean Drive
Sunnyvale, California
94086

CCS shall have the right of final determination as to the existence and cause of a defect, and CCS shall have the sole right to decide whether the product should be repaired or replaced.

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- (3) any alteration, modification, or repair by anyone other than CCS or its authorized representative.

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