

CompuPro®

COMPUTER ENCLOSURE & MOTHERBOARDS

TECHNICAL MANUAL

A205

\$20.00

WARNING

Your CompuPro Computer Enclosure is a Class A commercial digital device. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

WE STRONGLY RECOMMEND THAT YOU INSTALL SHIELDED EXTERNAL RS-232 CABLES WITH THIS SYSTEM TO REDUCE RADIO FREQUENCY INTERFERENCE (RFI).

DO NOT OPERATE THIS EQUIPMENT WITH THE COVER REMOVED.

COMPUTER ENCLOSURE AND MOTHERBOARDS TECHNICAL MANUAL
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Enclosed front panel design shown on cover is available from Full Service CompuPro System Centers only.

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COMPUTER ENCLOSURE

The **CompuPro System Enclosure** is one of the most versatile and reliable microcomputer enclosures on the market today. It provides a home for your computer now, and plenty of room to expand your system if your needs change. The enclosure is available either as rack mount for a standard 19" rack, or as a desk top model.

Major features include:

- Quiet ventilation fan.
- Three switched convenience outlets on rear.
- Lighted RESET button for "POWER" indication.
- Circuit breaker for safe operation.
- Punchouts for DB-25 connectors on rear.
- Provisions for other connectors.
- A.C. line filter for noise isolation.
- Fused D.C. power for motherboard.
- Constant voltage power supply which provides 8 Volts at 25 Amps and +16 and -16 Volts at 6 Amps total. This power will remain constant through most A.C. power dips or surges.

Follow the Steps Below Before Configuring Your System in this Enclosure

1. When you get your CompuPro Computer Enclosure, inspect inside and out for any shipping damage or things that may have come loose during transit. Check with your CompuPro System Center/Dealer if you have any questions.
2. Pick a home for your system that will provide adequate cooling for the system. Note that the air flow is into the fan, and out the left side of the enclosure. Both of these areas should have at least 3 inches free space for proper air circulation and system cooling.
3. Your system **MUST** be plugged into a grounded wall outlet. If you are not sure of the ground, have an electrician verify that the outlet has a proper ground. This is necessary for safety, and proper system operation.
4. There are outlets on the back of the enclosure. Any devices you plug in these outlets will be turned on and off at the same time as your system. They are intended for terminals, printers or disk drives only (NOT high current devices like broiler ovens). Each outlet is rated for a maximum of 120 Watts.
5. With the motherboard empty, turn the system on and make sure the outlets on the rear are switched on with the breaker/switch.
6. With the power **ON**, use an extender card and calibrated voltmeter to check the voltages on the edge connectors. The following voltages should be observed:

PIN	VOLTAGE
1 & 51	+8 to +10 Volts DC
2	+16 to +18 Volts DC
52	-16 to -18 Volts DC
20, 70 & 100	GND ref. (0 Volts)

All the other S-100 pins should have the proper termination voltage of 2.6-2.9 Volts. Checking one of these pins is sufficient.
7. After verifying power to the motherboard, turn the system **OFF**. The reset button will glow for some time due to the stored charge in the power supply, and you should wait for it to stop glowing before you proceed with your system bring-up.

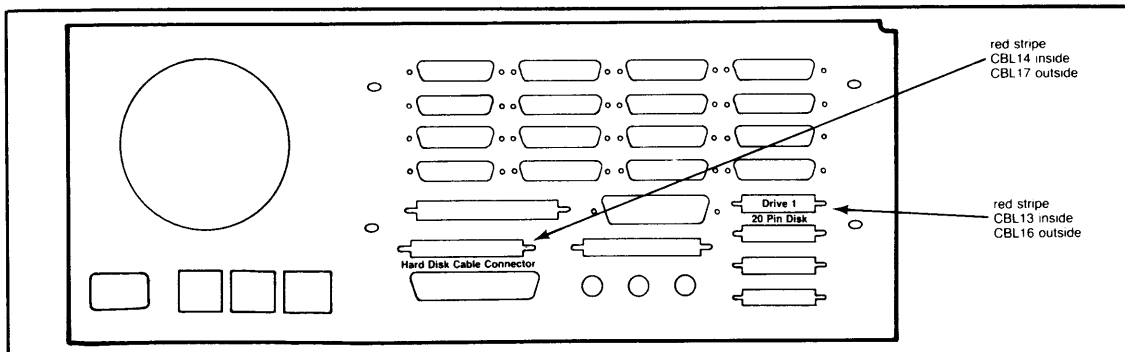
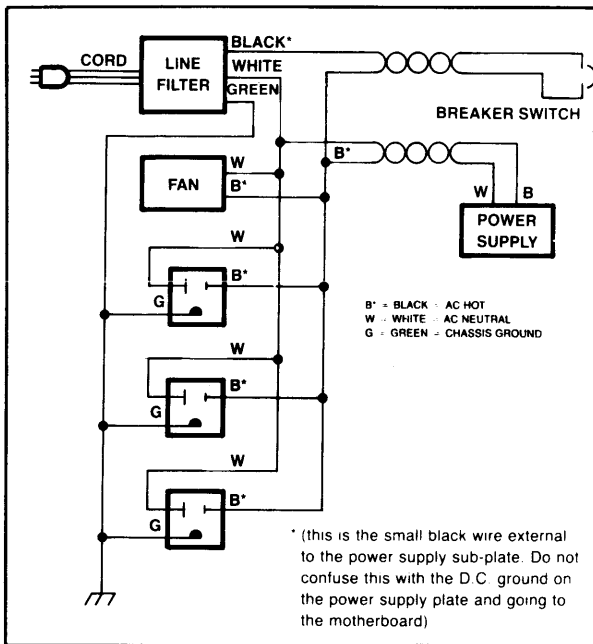


Figure 1: Computer Enclosure Back Panel

AC POWER DISTRIBUTION

The Computer Enclosure wiring is color coded to provide easy identification of voltages. The following drawing and schematic can be used to identify any system power problems.



CAUTION: As with any electrical device which plugs into the wall, there are voltages present that can cause a bad shock or possible death. The power supply should be serviced only by qualified service personnel. The oval capacitor near the transformer has very high voltage on it and should be avoided at all times.

Before working in the power supply area, make sure the system is off, and unplugged from the wall for at least 5 minutes to let the stored charge bleed off. Remove any rings, watches or other metal objects before reaching carefully into the power supply area.

NOTE: For best system cooling, always have a board in the rearmost slot, and keep the cover on.

Figure 2: AC Power Distribution

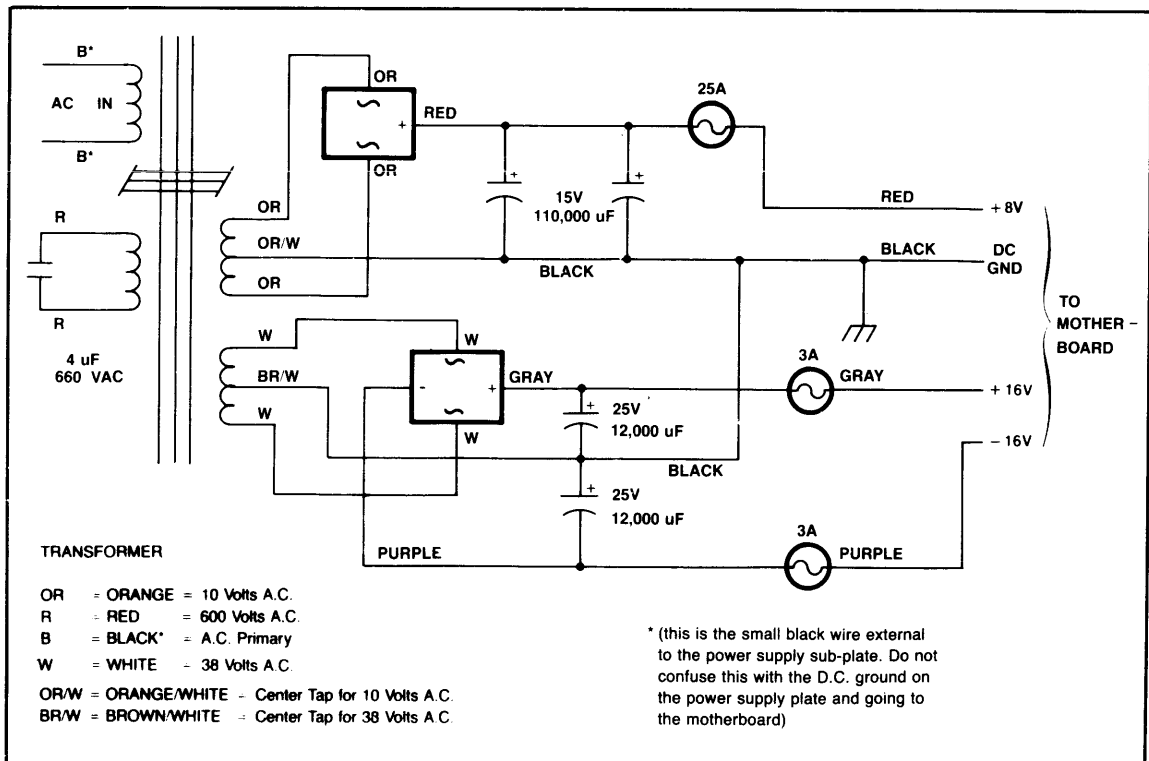


Figure 3: Power Supply Schematic

MOTHERBOARDS (6, 12, & 21-SLOT)

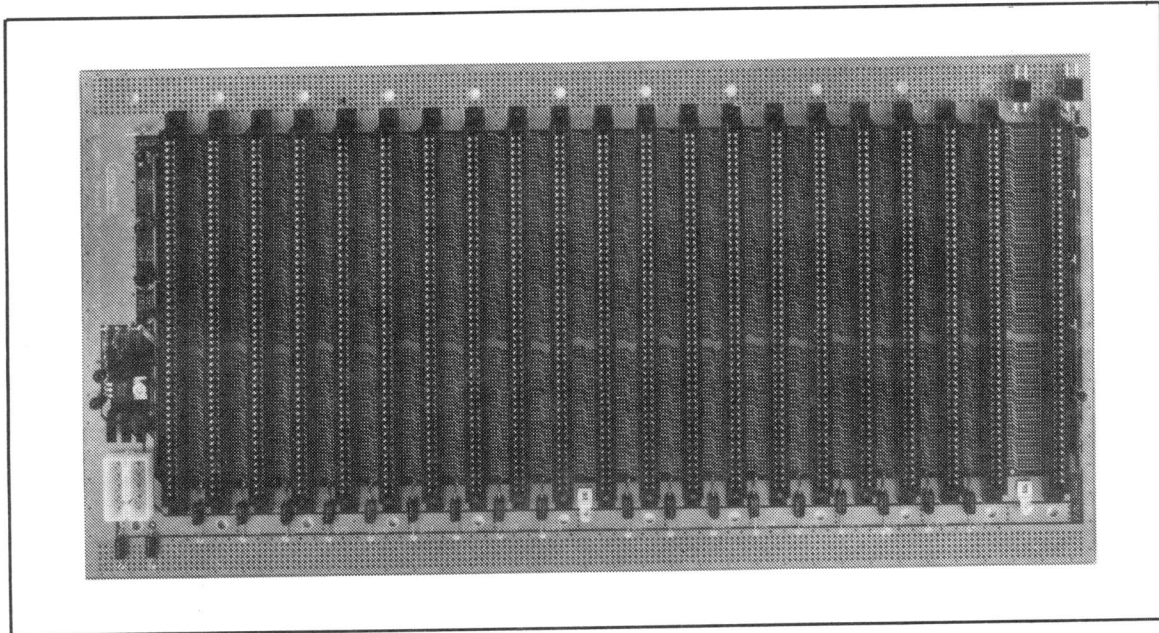


Figure 4: 21-Slot Motherboard

Termination Circuitry

The termination circuitry has evolved over the last few years and is a tried and proven method of reducing noise in your system. The voltage is fixed by precision resistors. You do not need to make any adjustments on new boards.

There are two connectors on the left edge of the board. J2 is for the RESET and J1 is for the power on indicator. J2 can be used for connecting a RESET pushbutton to a system which has no other means of generating RESET. J3 is the power socket. The power connector provides a convenient method of delivering the system power to the motherboard. There are four pins for ground, four pins for +8 volts, and one each for the +16 and -16 volts. The connector is keyed to prevent connecting errors. The power cables is color coded as follows.

COLOR	VOLTAGE
Black	GND
Red	+8V
Gray	+16V
Purple	-15V

		TOP VIEW				
J3		GND	GND	+8	+8	-16
		GND	GND	+8	+8	+16

NOTE: On all but the 6 slot motherboard there are provisions for using a fast-tab connector to distribute the +8 volts to the bus with very little loss due to board trace resistance. These fast-tabs should be connected to a +8 volt distribution lead from the power supply.

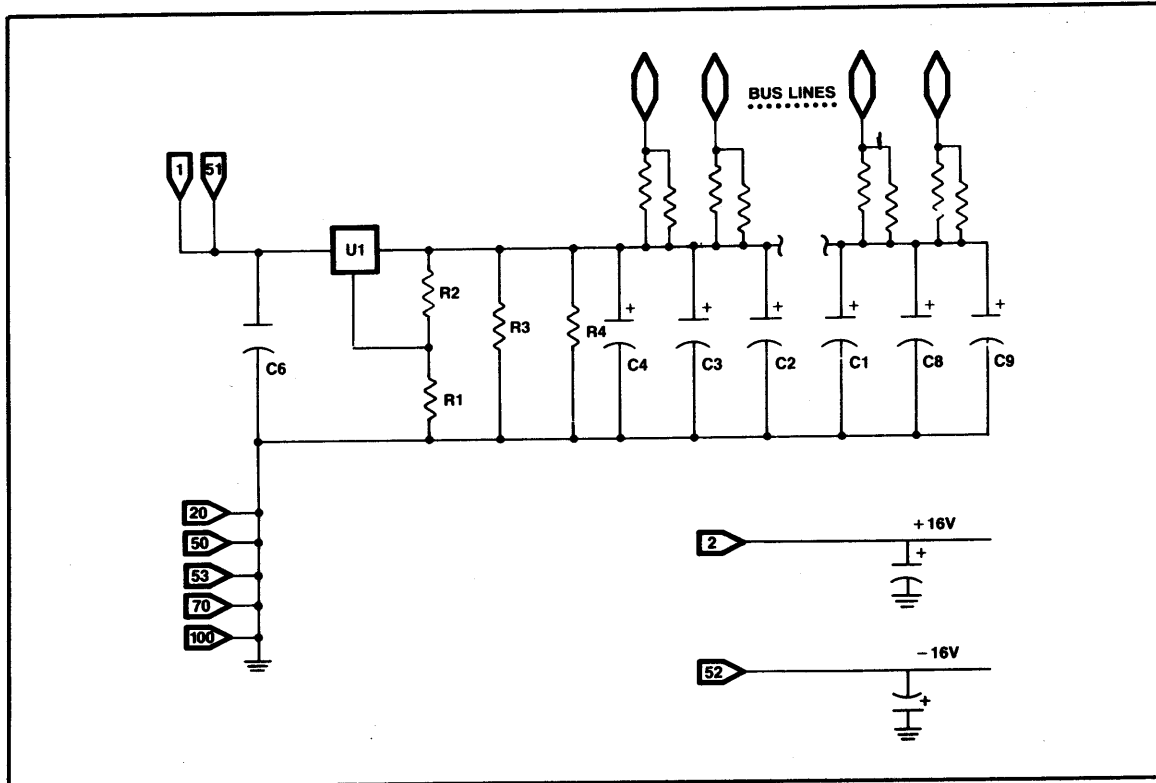


Figure 5: Motherboard Schematic

Active Termination Theory

The standard TTL termination is a 2.7V reference, comprising a 360 ohm resistor and a 390 ohm resistor in series across a 5V power supply; the TTL line terminates at the junction of these two resistors. This type of passive termination allows for proper sourcing and sinking of the TTL line, and keeps the impedance of the line to a minimum to reduce pickup of noise and crosstalk. Each one of these terminations, however, also draws about 6.7 mA from the power supply. Terminating 92 lines in this manner means a standby current drain of well over half an Amp! These passive terminations don't just put a strain on your power supply, they waste energy and create heat inside your computer's cabinet. We don't have to go much further to realize that passive termination is not such a good way to do things, although it's better than no termination at all.

The active termination in the CompuPro MotherBoard takes advantage of the fact that there is an equivalent *ACTIVE* structure, based around a voltage source and isolating resistor, that can accomplish the same results (see schematic). Current can either source or sink through the 750 ohm resistance (two 1.5K ohm resistors in parallel), either dumping into or drawing from the voltage source. Terminating more lines simply means adding more series resistors between the line and voltage source. As a result, the standby current is slashed to the standby current of the voltage source circuitry . . . about 15 or 20 mA, which is quite a savings in energy.

The current requirement goes up as lines require more sourcing or sinking, but here we also are somewhat fortunate. At any given moment, on 92 lines there will be a fairly random mix of 1's and 0's from instant to instant . . . these tend to cancel out and thus reduce the current drive requirements of the voltage source. Nonetheless, although this keeps average current consumption down, there are instances when you might have an extreme momentary need for current. As a result, the voltage source has enough capacity built-in to take care of the most adverse cases.

PARTS LIST

CAPACITORS

C1-29

RESISTORS

R1	154 Ohms
R2	120 Ohms
R3,4	56 Ohms
R5,6	1.5K Ohms
R7	270 Ohms

SIP RESISTORS

SR1-SR20	1.5K Ohm
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LIMITED WARRANTY

COMPUPRO warrants this computer product to be in good working order for a period of one (1) year, (two [2] years CSC and six [6] months for disk drives) from the date of purchase by the original end user. Should this product fail to be in good working order at any time during this warranty period, COMPUPRO will, at its option, repair or replace the product at no additional charge except as set forth below. Repair parts and replacement products will be furnished on an exchange basis and will be either reconditioned or new. All replaced parts and products become the property of COMPUPRO. This limited warranty does not include service to repair damage to the product resulting from accident, disaster, misuse, abuse, or unauthorized modification of the product.

If you need assistance, or suspect an equipment failure, always contact your COMPUPRO System Center or dealer first. COMPUPRO System Center technicians are factory trained to provide prompt diagnosis and repair of equipment failures. If you prefer, or if you are not satisfied by the actions taken by your System Center/dealer, you may return the product to COMPUPRO for warranty service. Please call COMPUPRO at (415) 786-0909 to obtain a Return Material Authorization (RMA) number, or, write to COMPUPRO at 3481 Arden Road, Hayward, California 94545, Attn.: RMA. Be sure to include a copy of the original bill of sale to establish purchase date. If the product is delivered by mail or common carrier, you agree to insure the product or assume the risk of loss or damage in transit, to prepay shipping charges to the warranty service location (System Center or COMPUPRO) and to use the original shipping container or equivalent. Contact your COMPUPRO System Center/dealer or write to COMPUPRO at the above address for further information.

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Note: This warranty supersedes all previous warranties, and all other warranties are now obsolete.

