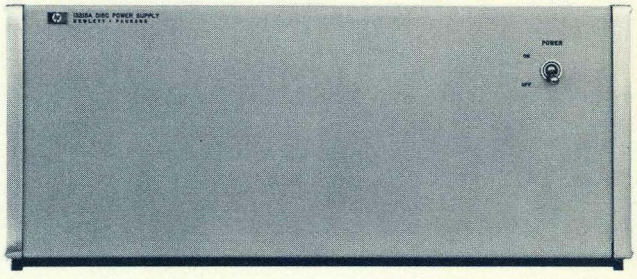
OPERATING AND SERVICE MANUAL

13215A

DISC POWER SUPPLY



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CERTIFICATION

Products, materials, parts, and services furnished on this order have been provided in accordance with all applicable Hewlett-Packard specifications. Actual inspection and test data pertaining to this order is on file and available for examination.

Hewlett-Packard's calibration measurements are traceable to the National Bureau of Standards to the extent allowed by the Bureau's calibration facilities.

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OPERATING AND SERVICE MANUAL

13215A

DISC POWER SUPPLY

(FOR THE 7900A DISC DRIVE)

Serial Numbers Prefixed: 1515

Note

This manual may be backdated to cover earlier versions of the Disc Power Supply by incorporating appropriate backdating information from Appendix A.

13215-90003

HEWLETT-PACKARD COMPANY
11000 WOLFE ROAD, CUPERTINO, CALIFORNIA, U.S.A.

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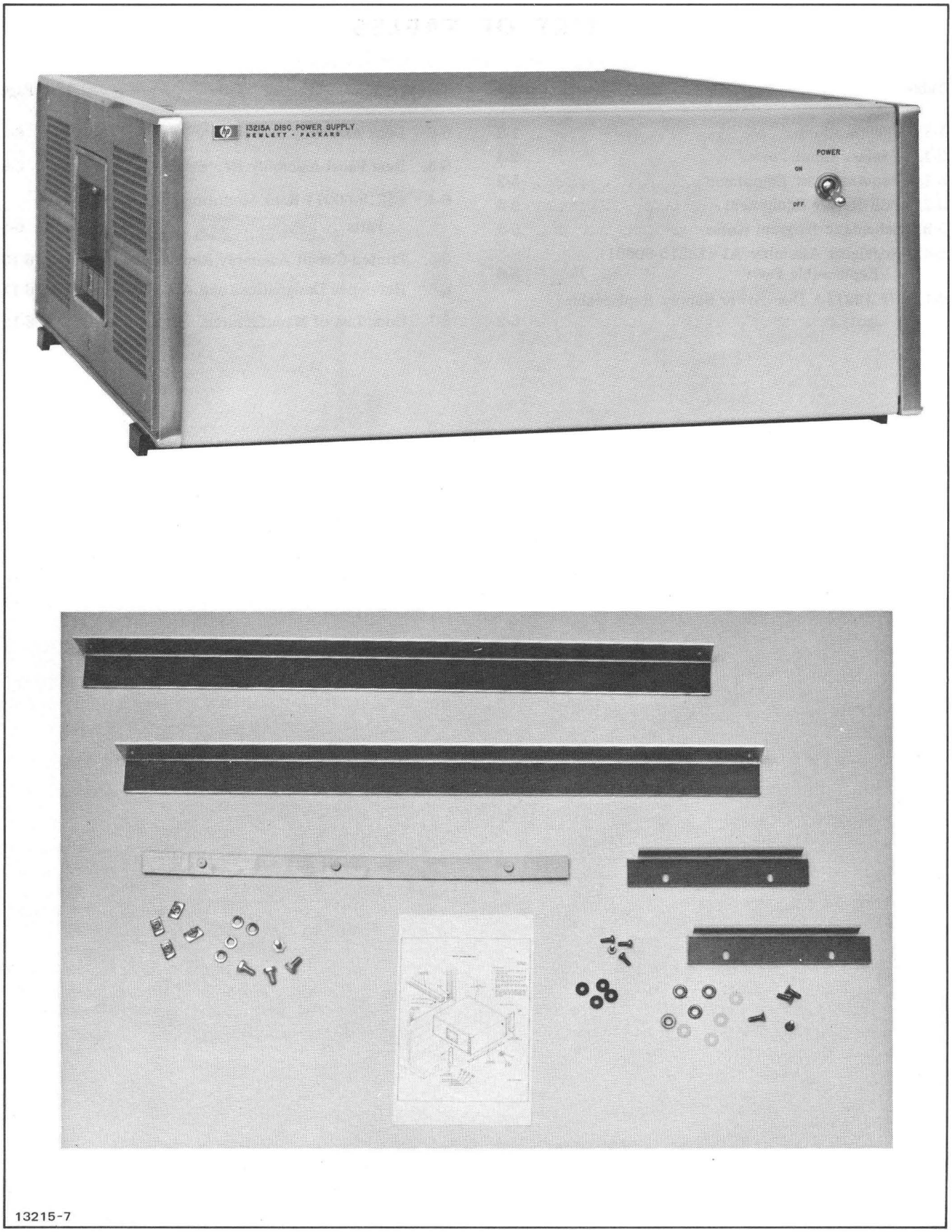

Figure 1-1. Hewlett-Packard 13215A Disc Power Supply and Accessories

SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This manual contains the information required to install, operate, test, adjust, and troubleshoot the Hewlett-Packard 13215A Disc Power Supply. This section covers a general description identification, specifications, options, accessories, related manuals and other basic information. Figure 1-1 shows the disc power supply.

1-3. The various sections in this manual provide information for the disc power supply as follows:

a. SECTION II, INSTALLATION. Provides information relative to unpacking and incoming inspection, power requirements, mounting, checkout, packing and shipping, etc.

b. SECTION III, OPERATION. Provides information relative to operating controls and indicators and the operating instructions for the disc power supply.

c. SECTION IV, THEORY OF OPERATION. Provides an overall functional description and an overall block diagram.

d. SECTION V, MAINTENANCE. Provides preventive maintenance information, maintenance precautions, repair information, a list of required test equipment, performance tests, adjustment procedures, troubleshooting, schematic diagram notes, and printed-circuit assembly schematic and parts location diagrams.

e. SECTION VI, REPLACEABLE PARTS. Provides ordering information for all replaceable parts and assemblies and parts location drawings and parts listings.

1-4. GENERAL DESCRIPTION.

1-5. The disc power supply provides operating power for the Hewlett-Packard 7900A Disc Drive. The disc power supply provides three regulated, constant dc voltage supplies, two unregulated dc voltage supplies (+24 and -24 volts), and ac voltage to operate the disc drive ac motors. The three regulated supplies (+5, +12, and -12 volts) use foldback current limiting for overload protection.

1-6. IDENTIFICATION.

1-7. Hewlett-Packard product identification can be made by reviewing the sticker on the rear panel (see figure 1-2). Hewlett-Packard products carry a model number, an option number listing, and a ten-digit serial number. The model number corresponds to the placarding on the front panel and the option number(s) indicate those options that the customer has specified.

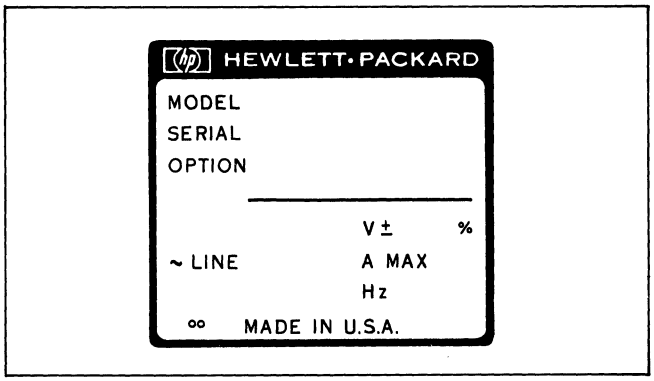

Figure 1-2. Product Identification Sticker

1-8. Hewlett-Packard identifies each unit with a two-section serial number (0000A-00000). The first four digits are a serial number prefix used to identify a particular unit configuration. The letter identifies the country in which the unit was manufactured. The last five digits identify each specific unit. If the serial number prefix on the unit does not agree with the prefix on the title page of this manual, there are differences between that unit and the unit described in this manual. These differences are described in manual supplements supplied with the manual or available at the nearest HP Sales and Service Office, or in the back-dating information in the back of this manual.

1-9. Printed-circuit assembly (PCA) revisions are identified by a letter, a series code, and a division code marked beneath the part number on the PCA. The letter identifies the revision of the etched trace pattern on the unloaded PCA. The four-digit series code pertains to the electrical characteristics of the loaded PCA and the positions of the components. The two-digit division code identifies the division of Hewlett-Packard that manufactured the PCA. If the series code number does not correspond exactly with the code number on the schematic diagram in this manual, the PCA differs from the one described in this manual. These differences are covered in manual supplements available at the nearest HP Sales and Service Office.

1-10. SPECIFICATIONS.

1-11. Specifications for the disc power supply are listed in table 1-1.

1-12. ACCESSORIES.

1-13. A 13215-60011 Rack Mounting Accessory Kit is available to mount the disc power supply in a standard (EIA) 19-inch rack.

Table 1-1. Specifications

INPUT CHARACTERISTICS

120 Vac ±10%, 60 Hz ±2% with 15A type plug

OUTPUT CHARACTERISTICS

+5 ±0.1 Vdc at 4.5A regulated
+12 ±0.3 Vdc at 1.3A regulated
-12 ±0.5 Vdc at 1A regulated
+24 Vdc ±20% at 4A unregulated
-24 Vdc ±20% at 4A unregulated

TEMPERATURE RANGES

Operating: 10° to 40°C (50° to 104°F), intake temperature

Storage: -20° to 65°C (-29° to 169°F)

HUMIDITY

8% to 95% Non condensing

GENERAL CHARACTERISTICS

Overload Protection:

All regulated voltages have a foldback current-limiting circuit protecting the supply from overloads, including a direct short-circuit across the output terminals. All unregulated supplies are fused.

Overvoltage Protection:

Overvoltage protection is provided in the disc drive for all regulated voltages.

Output Terminals:

Output terminals are located at the rear of the unit on a terminal barrier strip. Access to the barrier strip can be made by removal of the barrier cover.

Cooling:

Forced air is provided by an internal fan at the rear of the power supply.

GENERAL

Dimensions:

7 in. high by 16-3/4 in. wide by 19-3/4 in. deep (178 x 426 x 502 mm)

Weight:

Net: 55 lb (25,0 kg)

Shipping: 61 lb (28,0 kg)

Power Cable:

7-foot, 3-wire, detachable

1-14. OPTIONS.

1-15. Options are factory modifications of a standard disc power supply that are requested by the customer. Option 001 units are factory wired for 240 Vac 50/60 Hz input power. Section II of this manual provides information for restrapping these units for 100, 120, 200, and 220 Vac 50/60 Hz input power.

1-16. RELATED MANUALS.

1-17. The HP 13215A Disc Power Supply provides the +5, +12, -12, and ±24 Vdc and 120 Vac power for the HP 7900A Disc Drive. All the information relative to interconnection for these two units can be found in this operating and service manual. For information relative to the disc drive refer to the HP 7900A Disc Drive Operating and Service Manual, part number 07900-90002.

SECTION II
INSTALLATION

2-1. INTRODUCTION.

2-2. This section contains information on unpacking and incoming inspection, input power requirements, mounting, checkout, and shipping instructions for the disc power supply.

2-3. UNPACKING AND INSPECTION.

2-4. If the shipping carton is damaged upon receipt, request that the carrier's agent be present when the unit is unpacked. Inspect the unit for damage (scratches, dents, broken parts, etc). If the unit is damaged and fails to meet specifications, notify the carrier and the nearest HP Sales and Service Office immediately. (HP Sales and Service Offices are listed at the back of this manual.) Retain the shipping container and the packing material for the carrier's inspection. Hewlett-Packard will arrange for repair or replacement of the damaged unit without waiting for any claims against the carrier to be settled.

2-5. POWER REQUIREMENTS.

2-6. This power supply may be run continuously from the following power sources.

100 Vac ±10%, 50/60 Hz ±2%
120 Vac ±10%, 50/60 Hz ±2%
200 Vac ±10%, 50/60 Hz ±2%
220 Vac ±10%, 50/60 Hz ±2%
240 Vac ±10%, 50/60 Hz ±2%

Note

The unit is available from the factory in the standard 120 Vac 50/60 Hz and optional 240 Vac 50/60 Hz configurations described in table 1-1 and paragraph 1-14. However, the unit may be wired on-site for the above 50/60 Hz power sources by following the wiring diagrams in figures 2-1 thru 2-4.

2-7. Unless specified by an option number, the unit as shipped from the factory is wired for 120 Vac 50/60 Hz operation. The input current required when operated with a HP 7900A Disc Drive at 120 Vac is 4.1 amperes at full load. Connections for all input power combinations are described in table 2-1 and shown in figures 2-1 thru 2-4.

2-8. POWER CABLE.

2-9. To protect operating personnel, the National Electrical Manufacturers Association (NEMA) recommends that the unit panel and chassis be grounded. This unit is equipped with a three conductor power cable. The third conductor is the ground conductor and when the cable is plugged into an appropriate receptacle, the unit is grounded. The offset pin on the power cable three-prong connector is the ground connection.

2-10. Option 001 units are equipped with a three-conductor power cable for 200-, 220-, or 240-Vac operation. The power cable provided has a plug that maintains the grounding feature described in paragraph 2-9 and has an appropriate pin pattern for the ac receptacle to be used.

WARNING

A power cable that maintains the grounding feature described in paragraph 2-9 must be used or injury to operating personnel might result.

2-11. MOUNTING.

2-12. The power supply is shipped ready for operation. It is necessary only to connect the detachable power cable to the power supply and to the AC power source.

2-13. The unit is air cooled. Sufficient space should be allotted so that a free flow of cooling air can reach the rear of the unit when it is in operation. Intake air temperature at the fan must not exceed 40°C (104°F).

2-14. Accessory hardware for mounting the disc power supply in a standard (EIA) 19-inch rack cabinet is shown in figure 2-5. To install the rack mounting kit:

a. Remove feet by pushing foot release buttons.

b. Attach filler strip.

c. Attach right and left mounting ears to disc power supply using number 8-32, 7/16-inch screws (eight).

d. Attach support rails to rack cabinet using 1/4-inch screws, lockwashers, and nuts (four sets).

e. Attach right and left mounting ears to rack cabinet using number 10-32, 5/8-inch screws and washers (four sets).

f. Care must be taken that upper and lower panels or instrumentation do not contact the disc power supply and rack cabinet or the isolation feature of the rack mounting kit will be defeated.

Note

The mounting kit is designed to isolate the power-supply chassis from the cabinet-rack. The power-supply chassis is internally connected to the primary power distribution ground line (green wire). Isolating the chassis from the cabinet rack provides an extra measure of noise immunity in the disc system by providing a single point ground.

2-15. CHECKOUT.

2-16. Prior to connecting the HP 13215A Disc Power Supply to the HP 7900A Disc Drive, use an HP 427A Multi-Function Meter or equivalent to check the five drive supply voltages below:

TB2-1	Ground
TB2-2	Ground
TB2-3	+5 Vdc ±2%
TB2-4	-12 Vdc ±5%
TB2-5	+12 Vdc ±3%
TB2-6	Ground
TB2-7	+24 Vdc ±20%
TB2-8	-24 Vdc ±20%

2-17 If the electrical performance is not within specifications and a circuit malfunction is not suspected, refer to paragraph 5-12 for adjustment procedures.

2-18. If the electrical performance of the disc power supply is within specifications, attach HP 13215A Disc Power Supply dc cable W1 to the disc power supply as follows (see figure 2-6):

WIRE COLOR		TB2-	VOLTAGE
two shields	to	1	Ground
black	to	2	Ground
white-red-black	to	3	+5 Vdc
white-violet	to	4	-12 Vdc
white-red	to	5	+12 Vdc
black	to	6	Ground
red-black	to	7	+24 Vdc
violet-black	to	8	-24 Vdc

2-19. Attach HP 7900A Disc Drive ac cable W1 to the disc power supply as follows:

WIRE COLOR		TB1-
black	to	2
white-gray	to	6
green-yellow	to	9
shield	to	9

2-20. After the disc power supply and disc drive are completely installed, refer to paragraph 5-9 for performance tests.

2-21. SHIPPING INSTRUCTIONS.

2-22. USING ORIGINAL PACKAGING.

2-23. The same containers and materials used in factory packaging can be obtained through the Hewlett-Packard Sales and Service Offices listed at the rear of this manual. If the unit is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service or repair required, return address, model number, and full serial number. Also, mark the container FRAGILE to assure careful handling. In any correspondence, refer to the unit by model number, full serial number, and option numbers, if any.

2-24. USING OTHER PACKAGING.

2-25. The following general instructions should be used for repackaging with commercially-available materials:

a. Wrap the unit in heavy paper or plastic. (If shipping to a Hewlett-Packard Sales and Service Office, attach a tag indicating the type of service required, return address, model number, and full serial number.)

b. Use a strong shipping container. A double-wall carton made of 350 pound test material is adequate.

c. Use enough shock-absorbing material (3- to 4-inch layer) around all sides of the unit to provide firm cushioning and prevent movement inside the container. Protect the control panel with cardboard.

d. Seal the shipping container securely and mark it FRAGILE to assure careful handling.

e. In any correspondence, refer to the unit by model number, full serial number, and option numbers, if any.

Table 2-1. Primary Input Power

POWER SUPPLY WIRING FOR 100 Vac, 50/60 Hz (See figure 2-1.)		
TB1 PIN	**VOLTAGE**	**DESCRIPTION**
5 & 6	100 Vac ±10%, 50/60 Hz ±2%	Input power (Jumper 4 to 5, 6 to 7)
2 & 6	120 Vac ±10%, 50/60 Hz ±2%	Output power to motors in disc drive
1 & 7	120 Vac ±10%, 50/60 Hz ±2%	Output to fan in disc power supply
POWER SUPPLY WIRING FOR 120 Vac, 50/60 Hz (See figure 2-2.)		
TB1 PIN	**VOLTAGE**	**DESCRIPTION**
1 & 6	120 Vac ±10%, 50/60 Hz ±2%	Input power (Jumper 1 to 2, 6 to 7)
2 & 6	120 Vac ±10%, 50/60 Hz ±2%	Output power to motors in disc drive
1 & 7	120 Vac ±10%, 50/60 Hz ±2%	Output to fan in disc power supply
POWER SUPPLY WIRING FOR 200 Vac, 50/60 Hz, 1-PHASE (See figure 2-3.)		
TB1 PIN	**VOLTAGE**	**DESCRIPTION**
5 & 6	200 Vac ±10%, 50/60 Hz ±2%	Input Power (Jumper 7 to 8, 3 to 4)
2 & 6	120 Vac ±10%, 50/50 Hz ±2%	Output power to motors in disc drive
1 & 7	120 Vac ±10%, 50/60 Hz ±2%	Output to fan in disc power supply
POWER SUPPLY WIRING FOR 220 Vac, 50/60 Hz, 1-PHASE (See figure 2-3.)		
TB1 PIN	**VOLTAGE**	**DESCRIPTION**
5 & 6	220 Vac ±10%, 50/60 Hz ±2%	Input power (Jumper 7 to 8, 2 to 3)
2 & 6	120 Vac ±10%, 50/60 Hz ±2%	Output power to motors in disc drive
1 & 7	120 Vac ±10%, 50/60 Hz ±2%	Output to fan in disc power supply
POWER SUPPLY WIRING FOR 240 Vac, 50/60 Hz, 1-PHASE (See figure 2-4.)		
TB1 PIN	**VOLTAGE**	**DESCRIPTION**
1 & 6	240 Vac ±10%, 50/60 Hz ±2%	Input power (Jumper 7 to 8, 2 to 3)
2 & 6	120 Vac ±10%, 50/60 Hz ±2%	Output power to motors in disc drive
1 & 7	120 Vac ±10%, 50/60 Hz ±2%	Output to fan in disc power supply

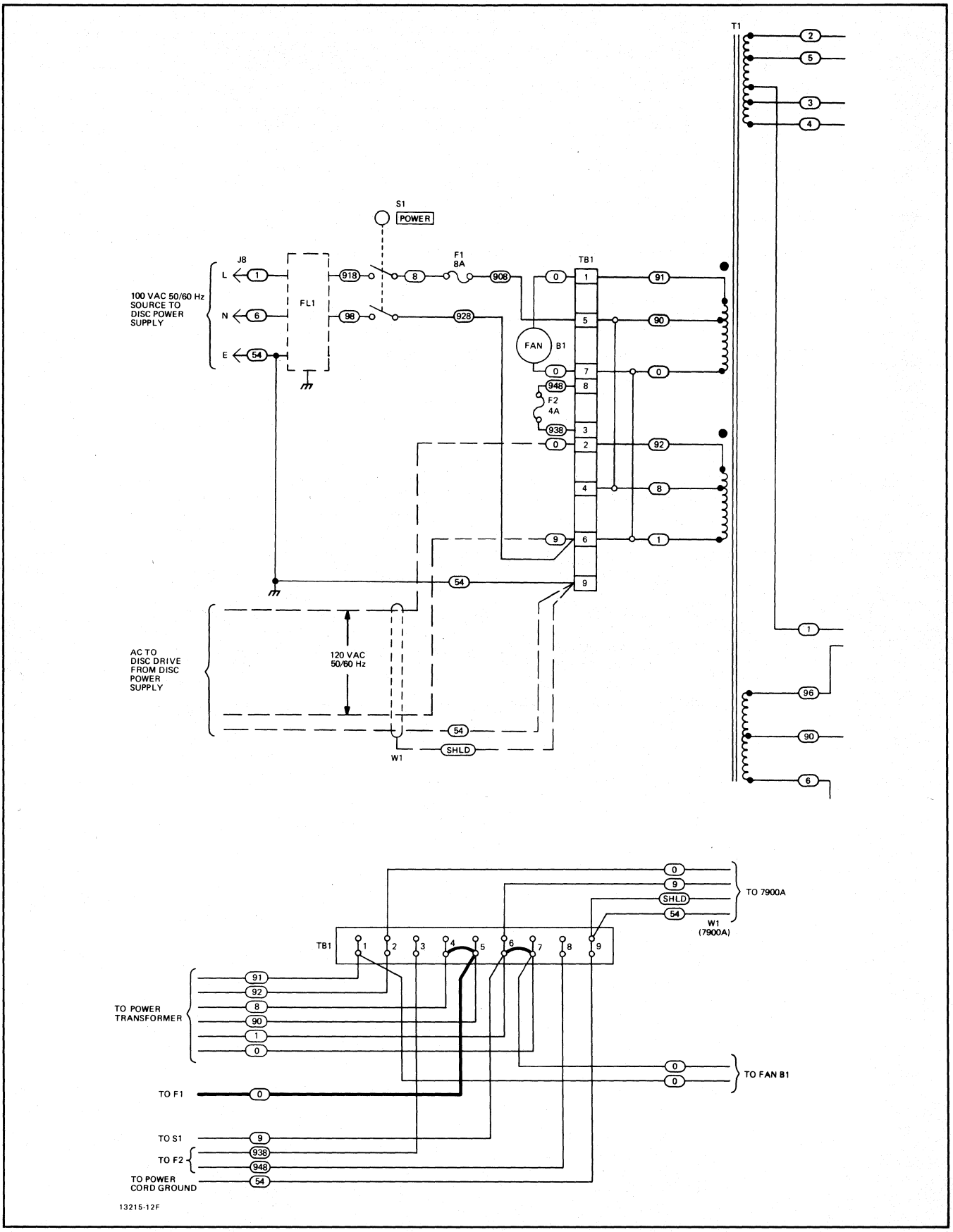

Figure 2-1. Power Supply Wiring for 100 Vac, 50/60 Hz

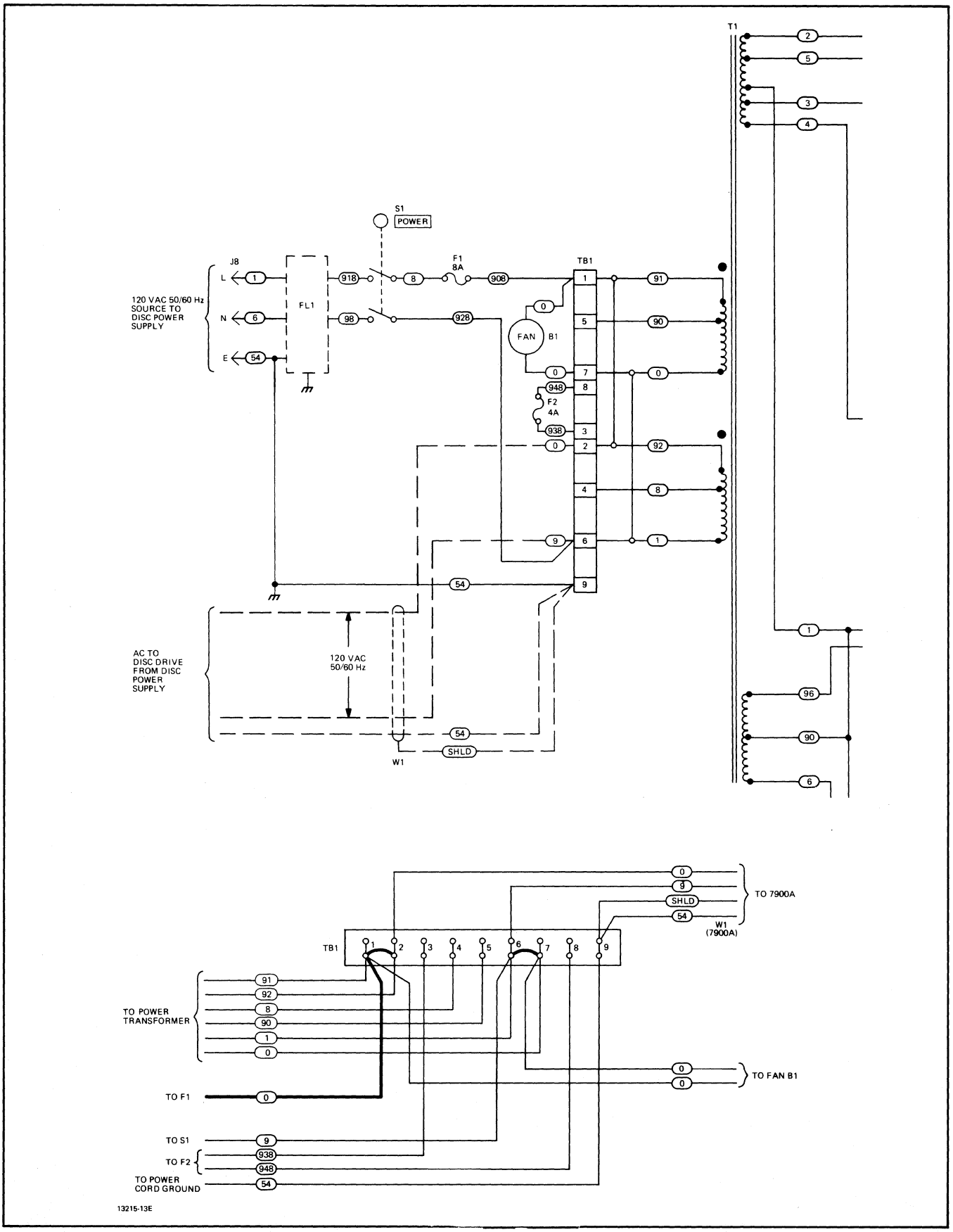

Figure 2-2. Power Supply Wiring for 120 Vac, 50/60 Hz

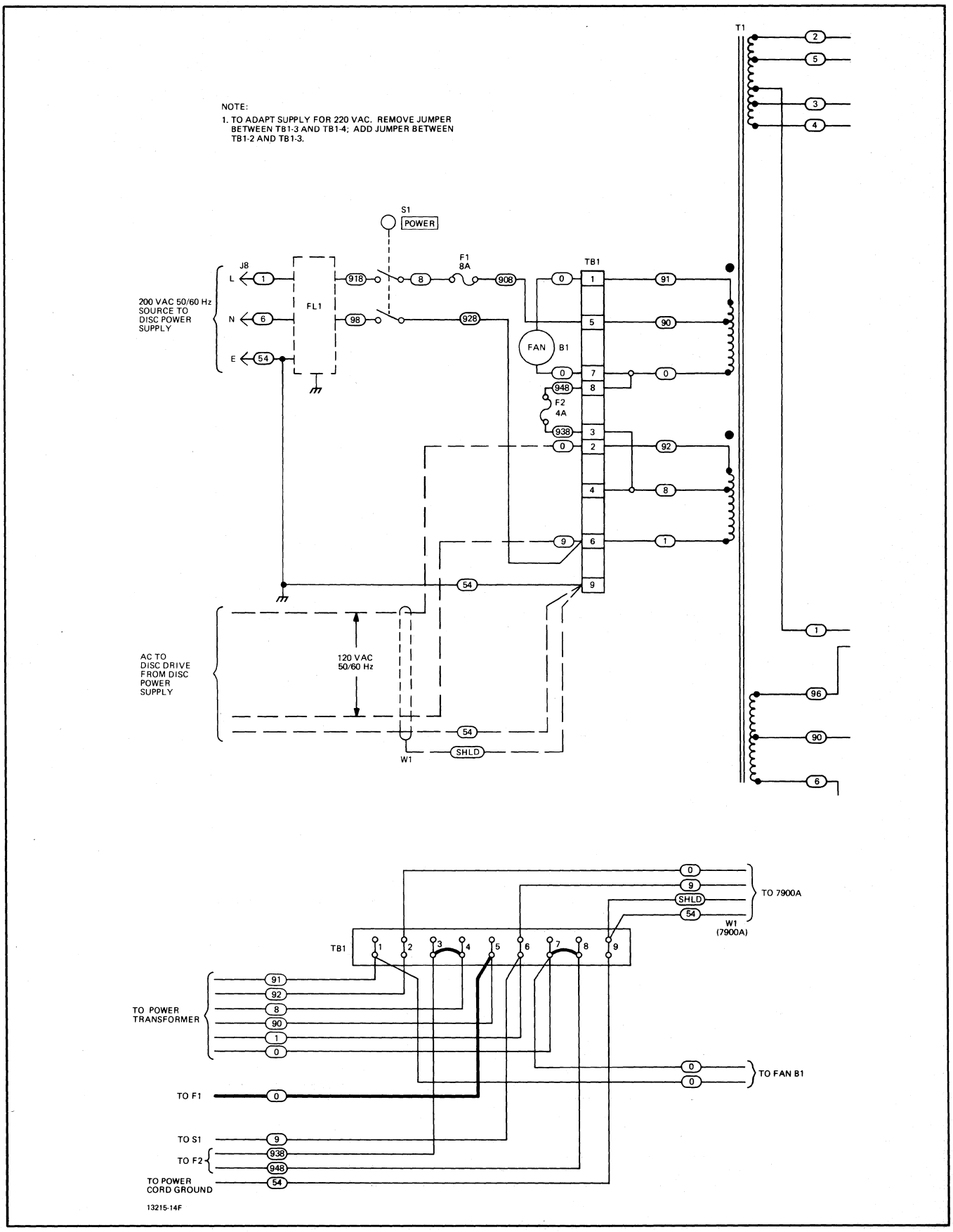

Figure 2-3. Power Supply Wiring for 200 Vac, 50/60 Hz

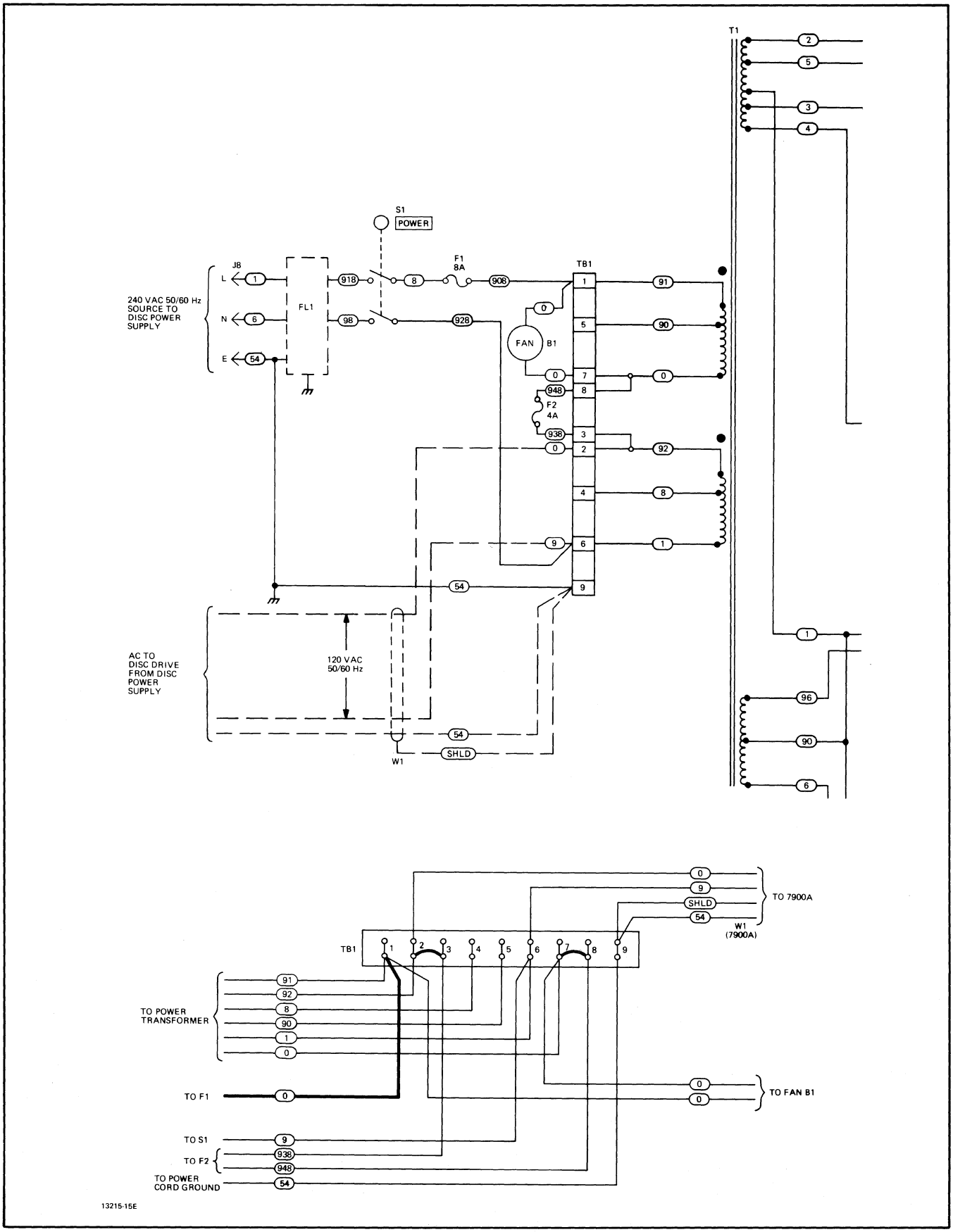

Figure 2-4. Power Supply Wiring for 240 Vac, 50/60 Hz

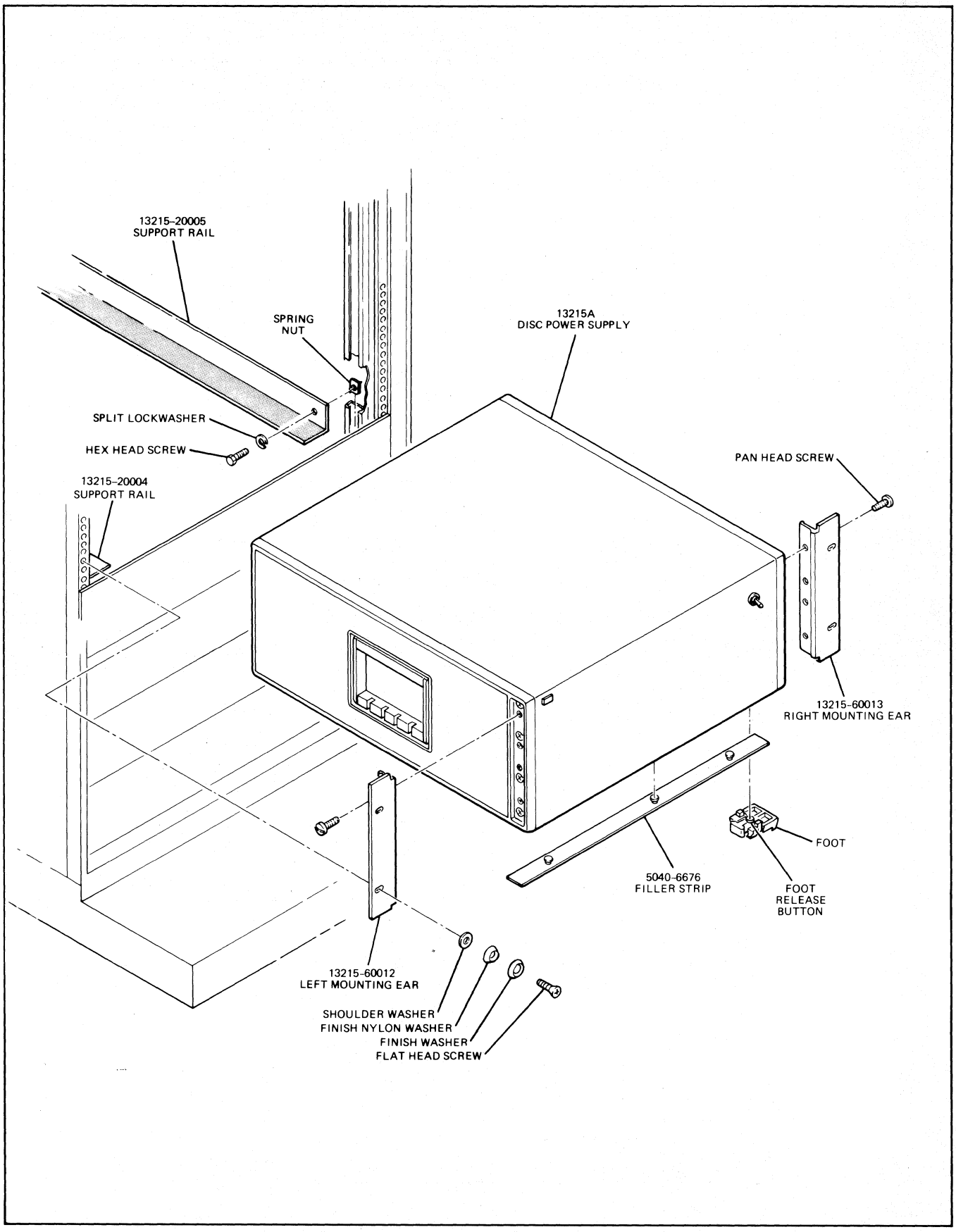

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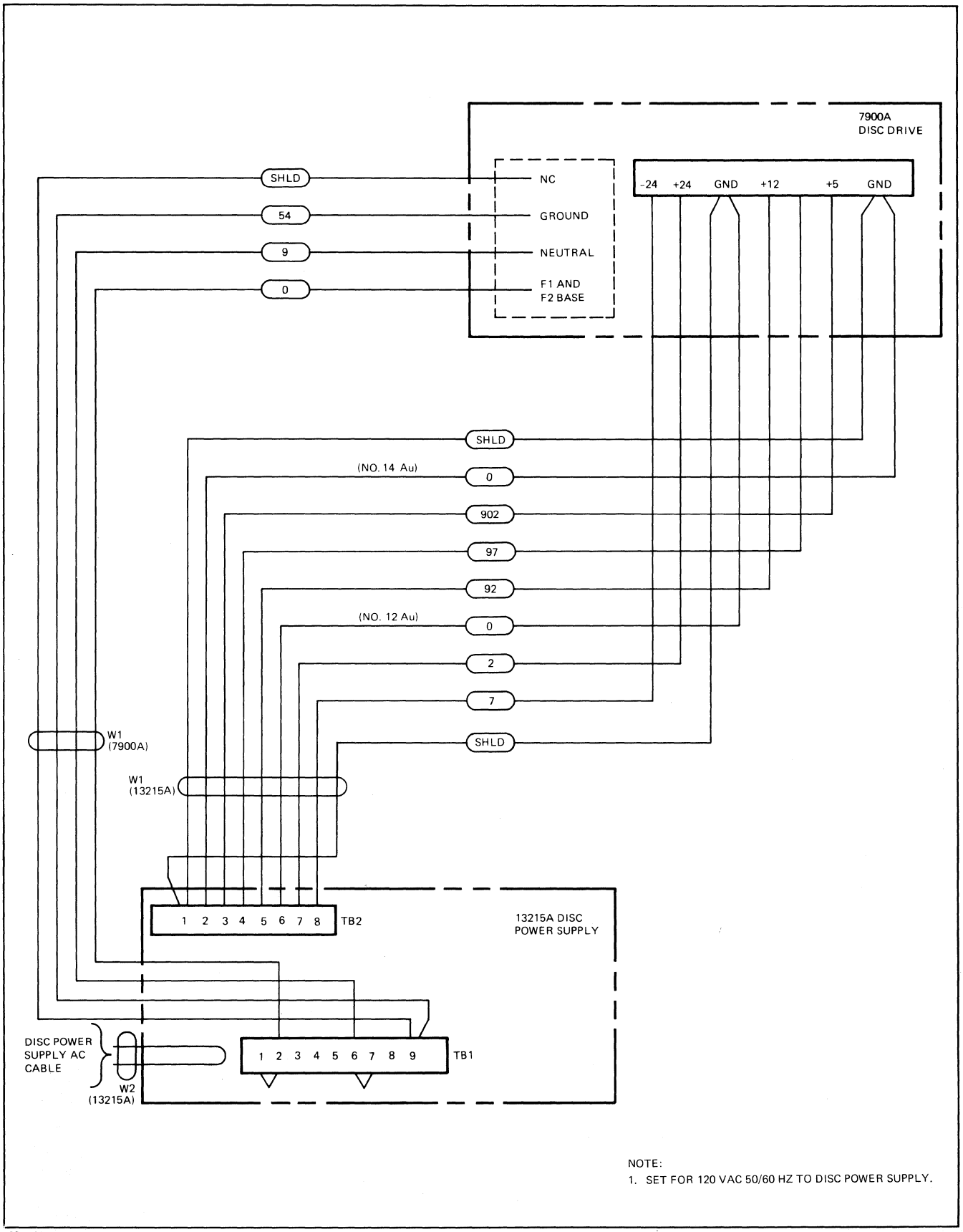
Figure 2-5. Conversion to Rack Mounting



13215-4D

Figure 2-6. Disc Drive/Disc Power Supply Connecting Diagram

SECTION III
OPERATION

3-1. INTRODUCTION.

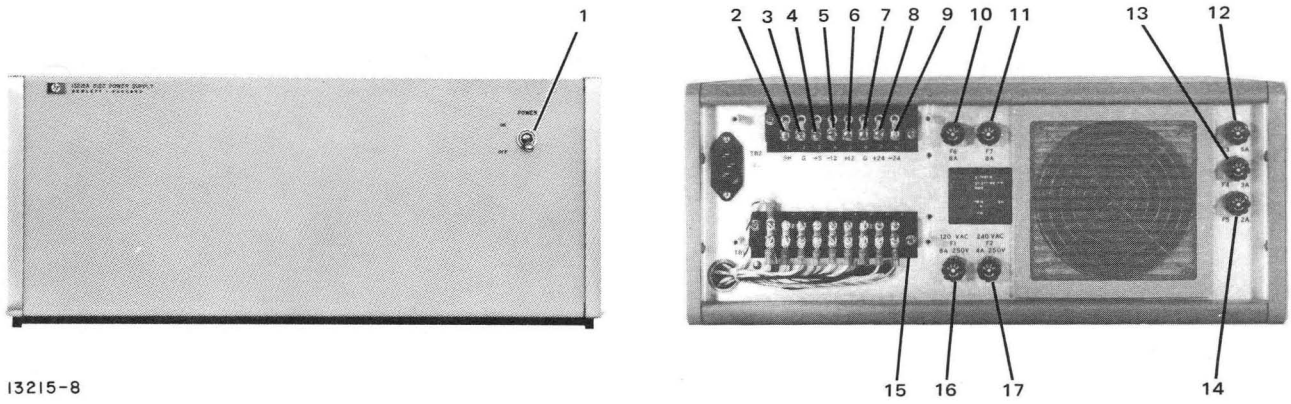
3-2. This section provides operating instructions for the disc power supply. Operating instructions for the HP 7900A Disc Drive, which must be interconnected with the disc power supply, are not included in this manual except as required in installation procedures. The operator should be thoroughly familiar with the disc drive and have the appropriate manual on hand.

3-3. OPERATING CONTROLS AND INDICATORS.

3-4. Front and rear panel controls, indicators, and terminals of the disc power supply are identified in figure 3-1.

3-5. OPERATING INSTRUCTIONS.

3-6. Set the power switch (on the front panel) to ON. The DRIVE POWER lamp on the front panel of the disc drive will light indicating that the disc power supply is operational.



1. POWER switch. Turns disc power supply on and off.
2. Terminal. Shield termination.
3. Terminal. Ground terminal board pin for regulated supply grounds.
4. Terminal. Terminal board pin for +5 Vdc supply.
5. Terminal. Terminal board pin for -12 Vdc supply.
6. Terminal. Terminal board pin for +12 Vdc supply.
7. Terminal. Ground terminal board pin for 24V grounds.
8. Terminal. Terminal board pin for +24 Vdc supply.
9. Terminal. Terminal board pin for -24 Vdc supply.
10. Fuse holder. Fuse protection for -24 Vdc supply.
11. Fuse holder. Fuse protection for +24 Vdc supply.
12. Fuse holder. Fuse protection for +5 Vdc supply.
13. Fuse holder. Fuse protection for +12 Vdc supply.
14. Fuse holder. Fuse protection for -12 Vdc supply.
15. Terminal board pins for the internal connections of the transformer primary windings, fan, line filter, POWER switch, and 8-ampere fuse F1. Refer to schematic diagram in section V for connection information. Terminal board rear panel location allows for re-strapping due to optional line voltages. (Refer to paragraph 2-7.)
16. Fuse holder. Fuse protection for 120-Vac line.
17. Fuse holder. Fuse protection for 240-Vac line.

Figure 3-1. Disc Power Supply Front and Rear Panel Features

SECTION IV
THEORY OF OPERATION

4-1. INTRODUCTION.

4-2. This section contains an overall functional description and an overall block diagram for the disc power supply regulators. Detailed theory for the unit regulator circuits appear in section V, adjacent to the schematic diagram.

4-3. OVERALL FUNCTIONAL DESCRIPTION.

4-4. An overall block diagram of the regulated supplies is shown in figure 4-1. During operation, the input line voltage passes through the power transformer to the rectifiers and filters. The rectifier-filters convert the ac input to unregulated +5, +12, -12, +24 and -24 volt dc supplies. The unregulated +5, +12, and -12 volt supplies are fed to the regulator board. The +5, +12 and -12 Vdc regulators alter conduction to maintain constant output voltage and provide foldback current limiting. The unregulated +24 and -24 volt supplies are used directly by the disc drive.

4-5. FOLDBACK CURRENT LIMITING.

4-6. Foldback current limiting is provided by sensing the voltage developed across the current sense resistors. The voltages sensed are used to control the output current of the regulator. The foldback current limiting circuit alters the series regulator conduction so that the power dissipated in the series regulator transistors remains within safe operating limits. The regulators can operate into a short circuit without damage. Short-circuit current is reduced to a value substantially below the full load capabilities of the regulators.

4-7. VOLTAGE REGULATION.

4-8. Voltage regulation is accomplished through the use of +5V, +12V, and -12V series regulators. Error amplifiers for the +5V, +12V, and -12V regulated supplies provide control over the conduction of the series regulator transistors.

4-9. The voltage from the +5V series regulator is applied to the +5V error amplifier. There it is compared to an established reference voltage. The +5V error amplifier controls the conduction of the +5V series regulator transistor to maintain a regulated output whenever comparison voltage differences are detected.

4-10. The voltage from the +12V series regulator is divided by resistors and applied to the +12V error amplifier. There it is compared to the +5V regulated output reference voltage. The +12V error amplifier controls the conduction of the +12V series regulator transistor to maintain a regulated output whenever comparison voltage differences are detected.

4-11. The voltage from the -12V series regulator is divided by resistors and applied to the -12V error amplifier. There it is compared to the +12V regulated output reference voltage. The -12V error amplifier controls the conduction of the -12V series regulator transistor to maintain a regulated output whenever comparison voltage differences are detected.

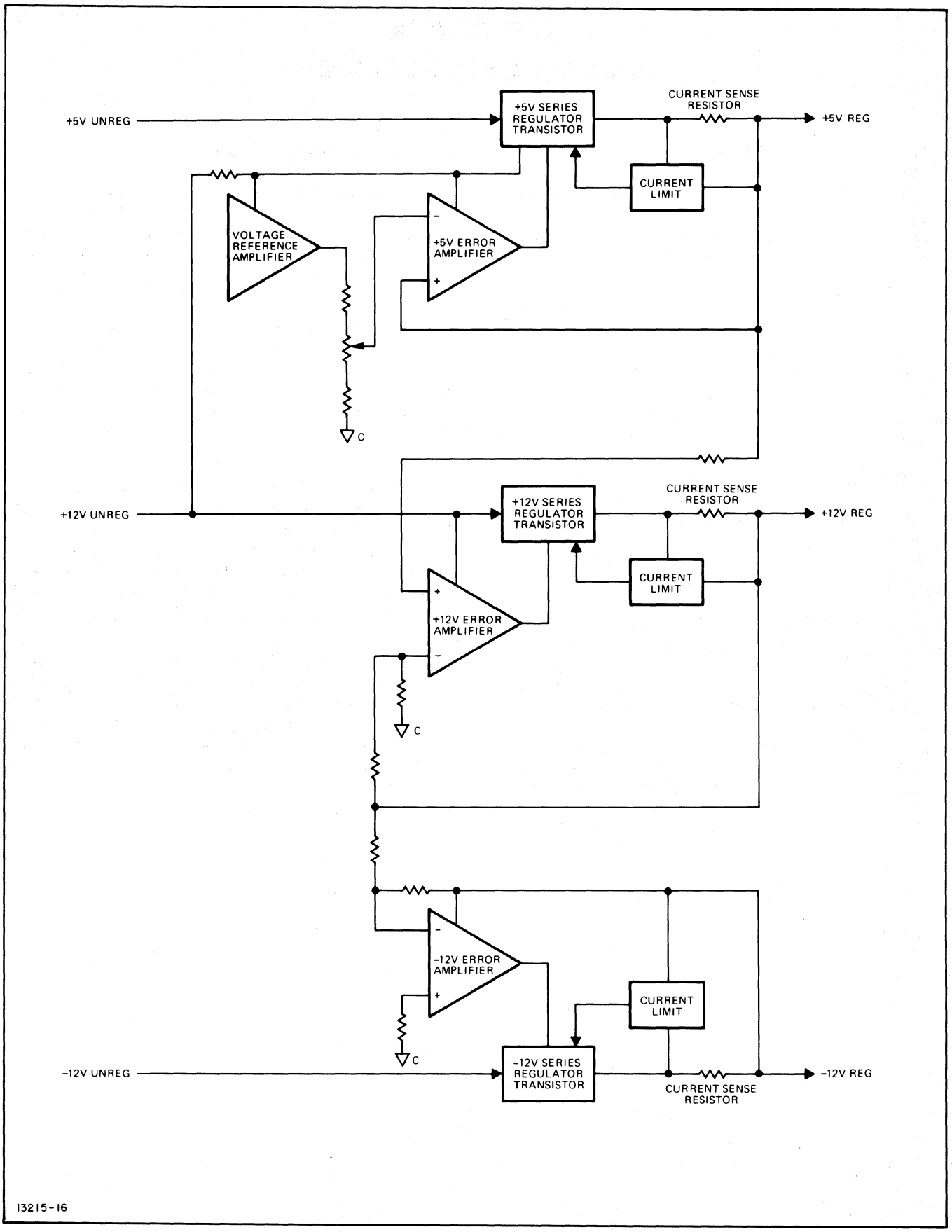


Figure 4-1. Overall Block Diagram

SECTION V
MAINTENANCE

5-1. INTRODUCTION.

5-2. This section contains preventive maintenance information, maintenance precautions, general repair information, required test equipment, performance tests, adjustment procedures, troubleshooting, printed-circuit assembly theory, and the schematic and parts location diagrams for the disc power supply.

5-3. PREVENTIVE MAINTENANCE.

5-4. The disc power supply is designed for a minimum of maintenance. The unit should be inspected for obvious defects and cleaned every six months as described in the following paragraph.

5-5. The disc power supply should be kept free of dust, moisture, grease, and foreign matter to ensure trouble-free operation. Remove fan screen at rear of unit by pressing inward from either side of the screen. Brush away any built-up dust particles. Using an air brush, blow through the screen any dust particles that have collected. Restore the cleaned fan screen on the rear of the disc power supply.

5-6. MAINTENANCE PRECAUTIONS.

WARNING

This unit has dangerous line voltages present at various points within the chassis. Use extreme caution when working on the unit with the cover removed, or serious injury or death to personnel may result.

5-7. REQUIRED TEST EQUIPMENT.

5-8. Table 5-1 lists test equipment and accessories recommended to service the disc power supply. Equivalent equipment may be substituted in each case.

5-9. PERFORMANCE TESTS.

5-10. The following performance tests should be made after the disc power supply and disc drive have been completely installed. (Refer to paragraph 2-7.)

a. Set the disc power supply POWER switch to ON.

b. Set the disc drive LOAD switch to LOAD. In this position, the heads are loaded, but not accessing.

c. Using an HP 427A Multi-Function Meter or equivalent, measure the following dc voltages on the dc terminal at the rear of the disc drive:

TB-1	Ground
TB-2	Ground
TB-3	+5 Vdc ±2%
TB-4	-12 Vdc ±5%
TB-5	+12 Vdc ±3%
TB-6	Ground
TB-7	+24 Vdc ±20%
TB-8	-24 Vdc ±20%

5-11. If the disc power supply fails to meet any of the performance test specifications and a circuit malfunction is not suspected, refer to paragraph 5-12 for adjustment procedures. If a circuit malfunction is suspected, refer to paragraph 5-17 for troubleshooting procedures.

5-12. ADJUSTMENTS.

5-13. TEST EQUIPMENT REQUIRED.

5-14. Test instruments required to perform the adjustments are listed in table 5-1. Instruments other than those listed may be used, provided the specifications equal or exceed the critical specifications.

5-15. POWER SUPPLY VOLTAGE ADJUSTMENTS.

5-16. There is one adjustable voltage: +5V. Adjust this voltage only if outside the tolerances specified above. Adjust the +5V supply as follows:

a. Remove top cover of the disc power supply. Locate +5 ADJ variable resistor.

b. Connect a variable voltage transformer to control the disc power supply line voltage.

c. Set the disc power supply POWER switch to ON.

d. Adjust the transformer for wall voltage.

e. Connect DVM to the +5V and ground terminals of TB2.

f. Adjust variable resistor R6 (see figure 5-2) for +5.1 volts.

g. Check the output voltage of the other regulators to ensure that the voltages are within specified tolerances. (Refer to paragraph 5-10.)

Table 5-1. Required Test Equipment

ITEM	CRITICAL SPECIFICATIONS	MODEL	USE*
Multi-Function Meter	DC Voltmeter Ranges: -24 Vdc to +12 Vdc Accuracy: ±2% of range Input resistance: 10 Megohms AC Voltmeter Ranges: 110 to 240 Vac Frequency range: 50 to 60 Hz Response: responds to average value, calibrated in rms.	HP 427A	P, A, T
10:1 Probes	10:1 divider attenuation; input 10 megohms, 10 picofarads	HP 10004 (two required)	T
Oscilloscope	Vertical sensitivity: 0.005V	HP 180A with HP 1801 Vertical Amplifier and HP 1821A Horizontal Amplifier	T
Variable Voltage Transformer	Range: 108 to 132 Vac and 198 to 264 Vac	General Radio W10MT3A	A
Digital Voltmeter	Voltage Range: 0 to 30 Vdc Voltage Accuracy: ±0.05%	HP 3440A with 3441A plug-in	A
*P = Performance Tests, A = Adjustments, T = Troubleshooting			

5-17. TROUBLESHOOTING.

5-18. Troubleshooting information for the disc power supply is described in the troubleshooting flow chart in figure 5-1.

5-19. REPAIR INFORMATION.

5-20. The etched printed-circuit boards (PCB's) used in Hewlett-Packard equipment are the plated-through type consisting of metal bonded to both sides of an insulating material. The metallic conductors are extended through the component holes by a plating process. Table 5-2 lists recommendations and precautions pertinent to PCB repair work.

a. Avoid unnecessary component substitution; it can result in damage to the PCB and/or adjacent components.

b. Do not use a high-power soldering iron on PCB's. Excessive heat may lift a conductor or damage the board.

c. Use a suction device (table 5-2) or wooden toothpick to remove solder from component mounting holes.

CAUTION

Do not use a sharp metal object such as an awl or twist drill for this purpose. Sharp objects may damage the plated-through conductor.

d. After soldering, remove excess flux from the solder areas and apply a protective coating to prevent contamination and corrosion.

5-21. The following procedures are recommended when component replacement is necessary:

a. Remove defective component from board.

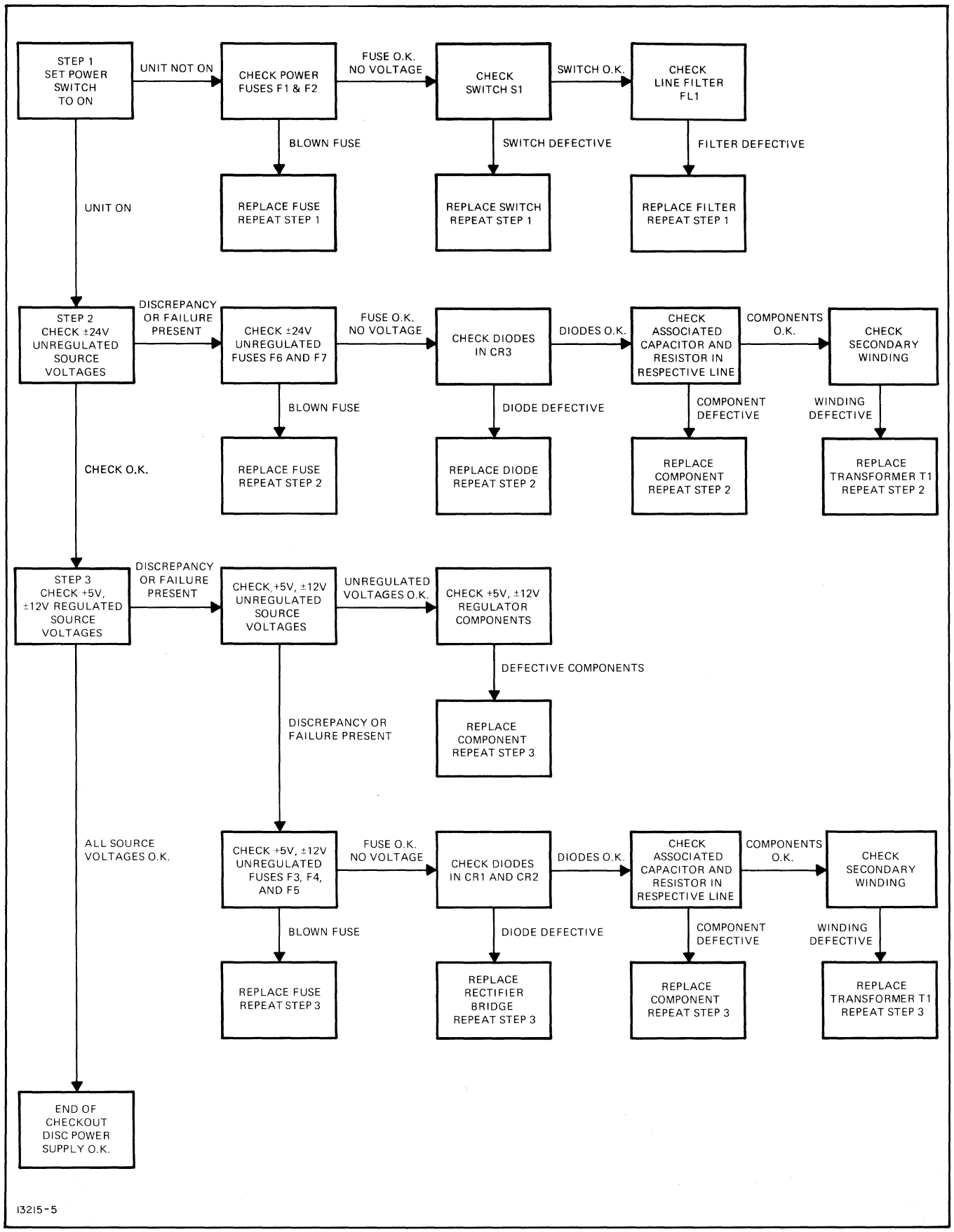


Figure 5-1. Troubleshooting Flow Chart

Table 5-2. PCB Repair Equipment

ITEM	USE	DESCRIPTION	RECOMMENDED MODEL
Soldering Tool	Soldering and unsoldering	Wattage rating: 47-1/2 to 56-1/2W Tip Temp: 850 to 900°F	Ungar #776 Handle with Ungar #4037 Heating Unit*
Soldering Tip*	Soldering and unsoldering	Shape: pointed	Ungar #PL111*
Suction Device	Removes molten solder from connection		Soldapullt by Edsyn Co., Arleta, California
Resin (Flux)	Removes excess flux from soldered area before application of protective coating	Must not dissolve etched circuit base board material or conductor bonding agent	Freon Aceton Lacquer thinner Isopropyl Alcohol (100% dry)
Solder	Component replacement, printed-circuit board repair, and wiring connections	Resin (flux) core, high tin content (60/40 tin/lead), 18 gauge (SWG) preferred	
Protective	Contamination and corrosion protection	Good electrical insulation, corrosion-prevention properties	Krylon R** #1302 Humiseal Protective Coating, Type 1B12 by Columbia Technical Corp., Woodside, New York

*For working on etched boards; for general purpose work, use Ungar #1237 Heating Unit (37.5W, tip temp of 750 – 800°F) and Ungar #PL113 1/8-inch chisel tip.

**Krylon, Inc., Norristown, Pennsylvania

b. If component was unsoldered, remove solder from mounting holes with a suction device (table 5-2) or a wooden toothpick.

c. Shape leads of replacement component to match mounting hole spacing.

d. Insert component leads into mounting holes and position component as original was positioned. Do not force leads into mounting holes; sharp lead ends may damage the plated-through conductor.

Note

Although not recommended when both sides of the PCB are accessible, axial lead components such as resistors and tubular capacitors can be replaced without unsoldering. Clip leads near body of defective component, remove component, and straighten leads left in board. Wrap leads of replacement component one turn around original leads. Solder wrapped connection and clip off excess lead.

Table 5-3. Schematic Diagram Notes

Reference designations within outlined (— - - —) assemblies are abbreviated. Full designation includes assembly number; e.g., R1 of assembly A1 is A1R1. Designations of other components are complete as shown.

Resistance is in ohms and capacitance is in microfarads unless otherwise noted.

Screwdriver adjustment.

Encloses front panel designations.

Assembly outline.

Subassembly or functional outline.

Wiper moves toward CW with clockwise rotation of control as viewed from shaft or knob.

Encloses wire color code. Code used (MIL-STD-681) is the same as the resistor color code. First number identifies the base color, second number the wider stripe, and the third number identifies the narrower stripe, e.g. (947) denotes white base, yellow wide stripe, violet narrow stripe.

Table 5-4. Regulator Assembly A1 (13215-60001), Replaceable Parts

REFERENCE DESIGNATION	HP PART NO.	DESCRIPTION	MFR CODE	MFR PART NO.
C1, 3	0160-2055	CAPACITOR, fxd, cer, 0.01 μF, +80 -20%, 100 Vdcw	56289	C023F101F103ZS22-CDH
C2	0160-2199	CAPACITOR, fxd, mica, 30 pF, 5%, 300 Vdcw	28480	0160-2199
C4	0160-0134	CAPACITOR, fxd, mica, 220 pF, 5%, 300 Vdcw	28480	0160-0134
C5	0160-0153	CAPACITOR, fxd, My, 0.001 μF, 10%, 200 Vdcw	56289	192P10292-PTS
C6	0160-3460	CAPACITOR, fxd, cer, 0.05 μF, +80 -20%, 100 Vdcw	56289	C023E101L503ZS22-CDM
C7, 8, 9	0180-0104	CAPACITOR, fxd, elect, 200 μF, +75 -10%, 15 Vdcw	56289	30D207G0150DF4-DSM
C10	0150-0121	CAPACITOR, fxd, cer, 0.1 μF, +80 -20%, 50 Vdcw	56289	5C50BIS-CML
CR1	1902-3193	DIODE, breakdown, 13.3V, 5%	28480	1902-3193
Q1	1854-0045	TRANSISTOR, Si, NPN	04713	2N956
Q2	1853-0013	TRANSISTOR, Si, PNP	80131	2N2904
Q3, 4	1854-0072	TRANSISTOR, Si, NPN	80131	2N3054
Q5	1853-0303	TRANSISTOR, Si, PNP	80131	2N5956
Q6, 7, 8	1854-0063	TRANSISTOR, Si, NPN	80131	2N3055
R1	0761-0052	RESISTOR, fxd, met. ox., 270 ohms, 5%, 1W	28480	0761-0052
R2	0698-3476	RESISTOR, fxd, flm, 6k, 1%, 1/8W	28480	0698-3476
R3, 4	0698-5088	RESISTOR, fxd, flm, 12k, 1%, 1/8W	28480	0698-5088
R5	0757-0420	RESISTOR, fxd, met. flm, 750 ohms, 1%, 1/8W	28480	0757-0420
R6	0757-0430	RESISTOR, fxd, met. flm, 2.21k, 1%, 1/8W	28480	0757-0430
R7	2100-1772	RESISTOR, Var, ww, 500 ohms, 5%, type H, 1W	28480	2100-1772
R8	0757-0438	RESISTOR, fxd, flm, 5.11k, 1%, 1/8W	28480	0757-0438
R9	0698-3151	RESISTOR, fxd, met. flm, 2.87k, 1%, 1/8W	28480	0698-3151
R10	0698-3700	RESISTOR, fxd, flm, 715 ohms, 1%, 1/8W	28480	0698-3700
R11	0698-4470	RESISTOR, fxd, flm, 6.98k, 1%, 1/8W	28480	0698-4470
R12	0686-8205	RESISTOR, fxd, flm, 82 ohms, 5%, 1/2W	28480	0686-8205
R13	0698-4465	RESISTOR, fxd, flm, 931 ohms, 1%, 1/8W	28480	0698-4465
R14	0811-0003	RESISTOR, fxd, ww, 390 ohms, 1%, 5W	38480	0811-0003
R15, 16, 17	0811-3046	RESISTOR, fxd, ww, 100 ohms, 3%, 10W	28480	0811-3046
R18	0683-3005	RESISTOR, fxd, met. flm, 30 ohms, 5%, 1/4W	28480	0683-3005
R19, 22	0757-0402	RESISTOR, fxd, met. flm, 110 ohms, 1%, 1/8W	28480	0757-0402
R20	0811-3049	RESISTOR, fxd, ww, 2.75 ohms, 3%, 10W	38480	0811-3049
R21	0683-5605	RESISTOR, fxd, comp, 56 ohms, 5%, 1/4W	01121	CB5605
R23, 24	0811-3047	RESISTOR, fxd, ww, 1.0 ohm, 3%, 10W	28480	0811-3047
R25	0811-3045	RESISTOR, fxd, ww, 1.2 ohms, 3%, 10W	28480	0811-3045
R26	0811-3048	RESISTOR, fxd, ww, 1.5 ohms, 3%, 5W	28480	0811-3048
R27	0698-4469	RESISTOR, fxd, flm, 1.15k, 1%, 1/8W	28480	0698-4469
R28	0683-2225	RESISTOR, fxd, comp, 2.2k, 5%, 1/4W	28480	0683-2225
U1, 2	1820-0439	INTEGRATED CIRCUIT	07263	U6E7723393
U3	1820-0477	INTEGRATED CIRCUIT	28480	1820-0477

REGULATOR ASSEMBLY A1 THEORY OF OPERATION

FEEDBACK LOOP

The feedback loop functions continuously to keep the output voltage constant during constant voltage operation and the output current at a safe limit during operation.

OPERATION OF THE +5V REGULATOR

Assume that the output voltage instantaneously rises (goes positive) due to a variation in the external load circuit. A rise in the output voltage will cause the inverting (—) input to rise at the error amplifier. This imbalance between the inverting and non-inverting input (the desired output voltage) will cause the output of the error amplifier to go negative, decreasing the conduction of Q3 and Q6. With less current available at the output, the voltage across the load will decrease. The error amplifier will continue to decrease conduction until the difference between the two input voltages is reduced to zero. The above operation maintains the output voltage constant. When the external load resistance decreases, the output current increases until the "current limit" is reached. The positive voltage developed at the node (U2, pin 2) of R18 and R12 causes the current limit transistor to conduct. The conduction of Q3 and Q6 is then controlled by the current limit transistor. Any further decrease in the load resistance reduces the voltage at the base of Q3, which decreases the conduction of Q6. Thus, through feedback action the maximum output current is limited.

OPERATION OF THE +12V REGULATOR

A rise in output voltage will cause the inverting (—) input to rise at the error amplifier. This imbalance between the inverting and non-inverting input will cause the output of the error amplifier to go negative, decreasing the conduction of Q4 and Q7. With less current available at the output, the voltage across the load will decrease. The error amplifier will continue to decrease conduction until the difference between the two input voltages is reduced to zero. Since the error amplifier reference is +5V, the output of +12V will vary directly as a function of +5V. If +5V is not present, no +12V output will be present. When the external load resistance decreases, the output current will be allowed to increase until the "current limit" is reached. The positive voltage level developed at (U1, pin 2) the terminal of R19 and R13 causes the current limit transistor to conduct. Conduction of Q4 and Q7 is then controlled by the current limit transistor. Any further decrease in the load resistance reduces the voltage at the base of Q4, which decreases the conduction of Q7.

OPERATION OF THE -12V REGULATOR

An increase in the load resistance will cause the inverting input (—) (U3, pin 2) to go more negative (away from ground) at the error amplifier. This imbalance between the inverting and the non-inverting input will cause the output of the error amplifier to go positive (towards ground), increasing the voltage at the emitter of Q1. As the voltage at the emitter of Q1 goes positive, conduction of Q5 and Q8 is decreased. With less current at the output, the voltage across the load will decrease. The error amplifier will continue to decrease conduction at the output until the difference between the two input voltages is reduced to zero. Because R3 in the output voltage feedback circuit is returned to +12V, the -12V output will vary as a function of the +12V output. When the external load resistance decreases, the output current will be allowed to increase until the "current limit" is reached. The negative voltage level developed at the base of Q2 causes current limit transistor Q2 to conduct. Transistors Q5 and Q8 are then controlled by current limit transistor Q2. Any further decrease in the load resistance reduces the voltage at the base of Q2, which reduces the conduction of Q5 and Q8.

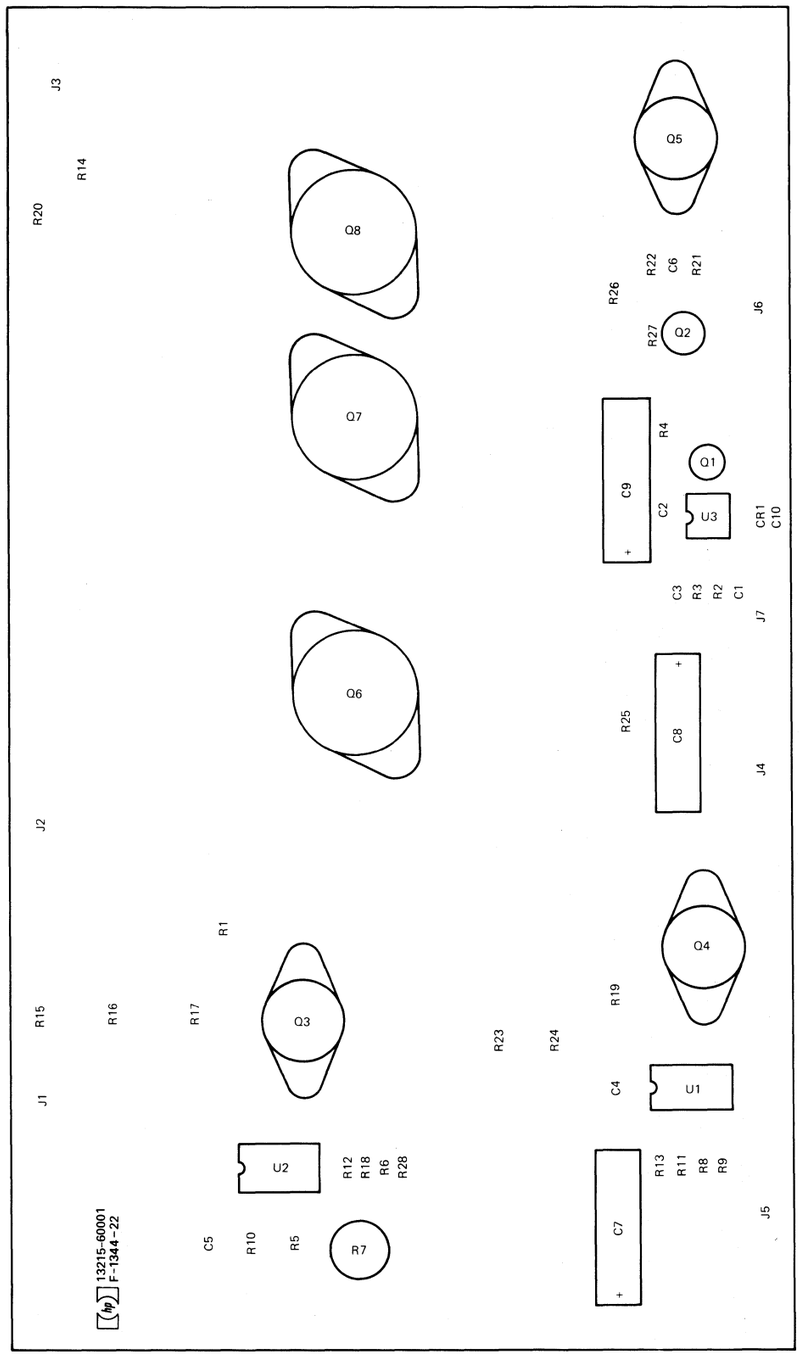


Figure 5-2. Regulator Assembly A1 Parts Location Diagram

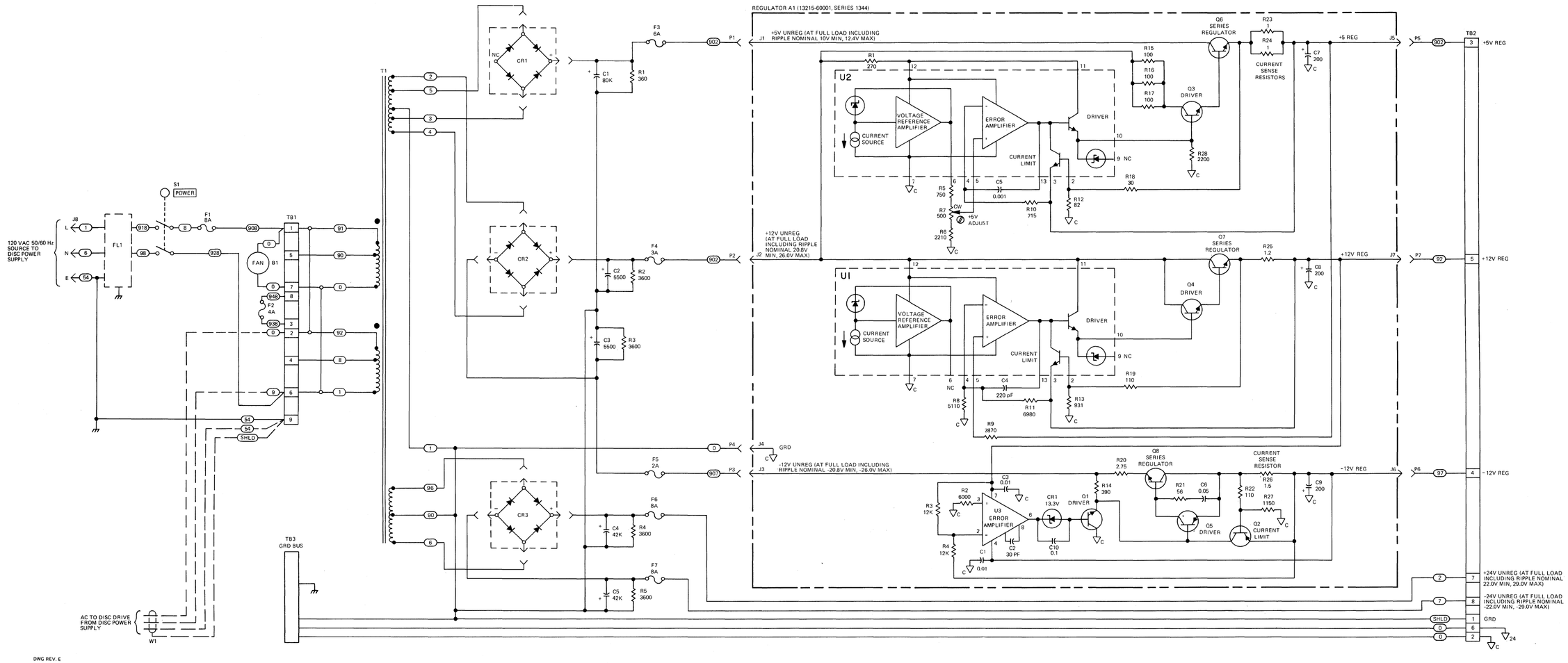


Figure 5-3. Disc Power Supply Schematic Diagram

SECTION VI
REPLACEABLE PARTS

6-1. INTRODUCTION.

6-2. This section contains information for ordering replacement parts for the disc power supply. Figure 6-1 is an exploded view of the disc power supply. Table 6-1 is the parts list for the parts called out in figure 6-1. Index numbers for the parts in the figure and table correspond to disassembly sequence for the unit. Assembly order is the reverse of the disassembly order.

6-3. A separate parts list and parts location diagram is provided for regulator printed-circuit assembly A1. These are located in section V of this manual, adjacent to the respective schematic diagram for the assembly. Parts are listed in this table in alphanumeric order by reference designation. Table 6-5 is a total quantity listing of the parts for the printed-circuit assembly only.

6-4. Tables 6-1 through 6-5 list the following information for each part:

a. Hewlett-Packard part number.

Note

When "Coml" appears in the HP PART NO. column for a particular part, that part is available from normal commercial sources.

b. Description of the part. (Refer to table 6-6 for an explanation of abbreviations used in the DESCRIPTION column.)

c. Typical manufacturer of the part as a five digit code. (Refer to table 6-7 for a listing of the manufacturers that correspond to the codes.)

d. Manufacturer's part number.

e. Total quantity of each part used in the unit.

Note

When the total quantity (TQ) column in the parts list indicates "REF" for a given part, the part has been listed previously in the table and the initial listing for the part should be referenced to determine the total quantity for that part.

6-5. Items in the DESCRIPTION column of the replaceable parts lists are indented to indicate item relationships, as follows:

DESCRIPTION

*Subassembly

*Attaching Parts for Subassembly

**Subassembly Parts

**Attaching Parts for Subassembly Parts

6-6. ORDERING INFORMATION.

6-7. To order replacement parts, address order or inquiry to the local Hewlett-Packard Field Office. (Refer to list at the rear of this manual for addresses.) Specify the following information for each part ordered:

a. Unit model and serial number.

b. Hewlett-Packard stock number for each part.

c. Description of each part.

d. Circuit reference designation (if applicable).

Table 6-1. HP 13215A Disc Power Supply Replaceable Parts

FIG. & INDEX NO.	HP PART NUMBER	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY	TQ
6-1-		13215A DISC POWER SUPPLY				
1	5060-8506	* TOP COVER	28480	5060-8506	1	1
		(Attaching Parts)				
	Coml	* SCREW, no. 6-32, 0.500 in., flat head			4	8
	Coml	* NUT, no. 6-32, sheet metal			4	8
		– – – x – – –				
2	5060-8514	* BOTTOM COVER	28480	5060-8514	1	1
		(Attaching Parts)				
	Coml	* SCREW, no. 6-32, 0.500 in., flat head			4	REF
	Coml	* NUT, no. 6-32, sheet metal			4	REF
3	5060-0767	* FOOT ASSY	28480	5060-0767	4	4
		– – – x – – –				
4	5000-8550	* SIDE COVER	28480	5000-8550	2	2
		(Attaching Parts)				
	Coml	* SCREW, no. 6-32, 0.250 in., flat head			6	12
		– – – x – – –				
5	5060-8736	* HANDLE RETAINER	28480	5060-8736	2	2
		(Attaching Parts)				
	Coml	* SCREW, no. 8-32, 0.312 in., pan head			4	8
	Coml	* WASHER, no. 8, split lock			4	8
		– – – x – – –				
6	5060-0222	* HANDLE ASSY, side	28480	5060-0222	2	2
7	13215-20002	* SIDE FRAME	28480	13215-20002	2	2
		(Attaching Parts)				
	Coml	* SCREW, no. 8-32, 0.312 in.			4	8
	Coml	* WASHER, no. 8, split lock w/ext tooth			4	
		– – – x – – –				
8	13215-00010	* FRONT PANEL	28480	13215-00010	1	1
9	3101-1233	* TOGGLE SWITCH (S1)	27191	732OK2	1	1
		(Attaching Parts)				
	Coml	* WASHER, int tooth			1	1
	Coml	* NUT, hex			1	1
	Coml	* NUT, knurled, 0.600 O.D.			1	1
		– – – x – – –				
10	No Number	* DECK ASSEMBLY (See fig. 6-2.)				1
11	No Number	* REAR PANEL ASSY (See fig. 6-3.)			1	1
		ACCESSORIES (not shown in fig. 6-1)			1	1
	8120-1378	* POWER CORD ASSY (W2) (Std units only)	28480	8120-1378	1	1
	8120-1752	* POWER CORD ASSY (W2) (Opt 001 units only)	28480	8120-1752	1	1
	0360-1712	* BAR BLOCK JUMPER	28480	0360-1712	2	2
	7120-0134	* INFORMATION LABEL	28480	7120-0134	1	1
	5000-0052	* FLAT ALUMINUM PLATE (for non-rack mounting only)	28480	5000-0052	2	2
	13215-60011	* RACK MOUNTING KIT (See fig. 6-4.)	28480	13215-60011	1	1
	13215-60015	* LOGIC CABLE (W1)	28480	13215-60015	1	1
	13215-60016	* SERVO POWER CABLE (W3)	28480	13215-60016	1	1
	13215-90003	* OPERATING AND SERVICE MANUAL	28480	13215-90003	1	1

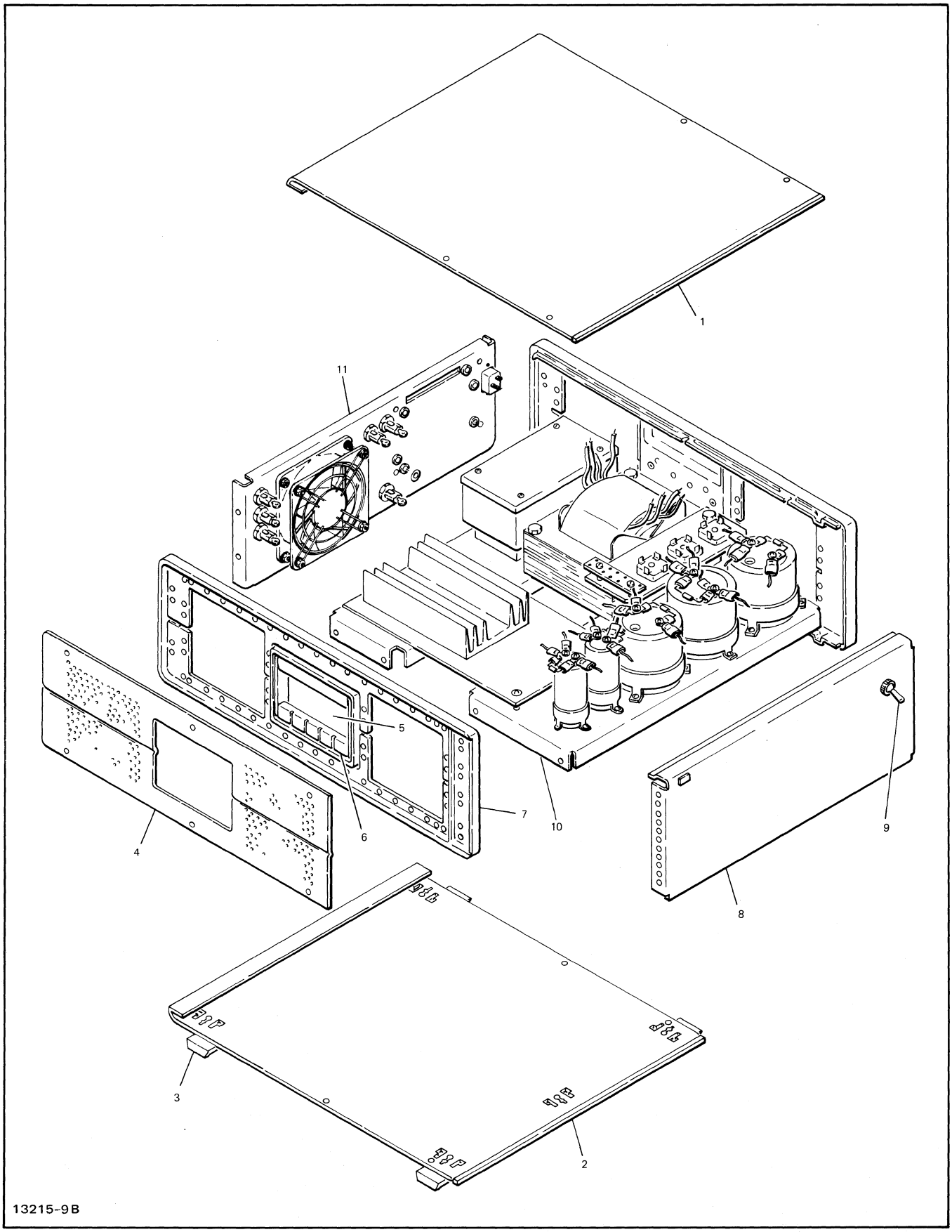


Figure 6-1. HP 13215A Disc Power Supply Parts Location Diagram

Table 6-2. Deck Assembly Replaceable Parts

FIG. & INDEX NO.	HP PART NUMBER	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY	TQ
6-2-	No Number	DECK ASSEMBLY (10, fig. 6-1)				
1	9100-3303	* LINE FILTER (FL1)	28480	9100-3303	1	1
		(Attaching Parts)				
	13215-40039	* INSULATING SPACERS	28480	07900-40039	2	2
	Coml	* SCREW, no. 1/4-20, 0.500 in.			4	4
	Coml	* WASHER, split, lock, 1/4 in.			4	4
	Coml	* WASHER, flat, 1/4 in.			4	4
	Coml	* NUT, no. 1/4-20, square			4	4
		– – – x – – –				
2	9100-3398	* TRANSFORMER (T1)	28480	9100-3398	1	1
		(Attaching Parts)				
	Coml	* SCREW, no. 1/4-20, 0.3 in.			4	4
	Coml	* WASHER, split, lock, 1/4 in.			4	4
	Coml	* NUT, no. 1/4-20			4	4
		– – – x – – –				
3	13215-00005	* LINE FILTER CHASSIS	28480	13215-00005	1	1
4	13215-00001	* CAPACITOR SUPPORT CHASSIS	28480	13215-00001	1	1
5	1906-0017	* RECTIFIER BRIDGE (CR1)	28480	1906-0017	1	1
6	1906-0032	* RECTIFIER BRIDGE (CR2)	28480	1906-0032	1	2
7	1906-0032	* RECTIFIER BRIDGE (CR3)	28480	1906-0032	1	REF
		(Attaching Parts)				
	13215-00007	* RECTIFIER BRACKET	28480	13215-00007	1	1
	Coml	* SCREW, no. 6-32, 0.625 in.			3	3
	Coml	* NUT, no. 6-32, ext. tooth			3	3
		– – – x – – –				
8	0180-2391	* CAPACITOR, fxd, elctlt, 42 mF, 30 Vdcw (C4)	56289	36D423G030DD2A	1	2
9	0180-2391	* CAPACITOR, fxd, elctlt, 42 mF, 30 Vdcw (C5)	56289	36D423G030DD2A	1	REF
10	0180-2393	* CAPACITOR, fxd, elctlt, 80 mF, 15 Vdcw (C1)	56289	36D803G015DC2A	1	1
11	0180-2392	* CAPACITOR, fxd, elctlt, 5.5 mF, 30 Vdcw (C2)	56289	36D552G025AB2A	1	2
12	0180-2392	* CAPACITOR, fxd, elctlt, 5.5 mF, 30 Vdcw (C3)	56289	36D552G035AB2A	1	REF
		(Attaching Parts)				
	0160-2149	* CAPACITOR CLAMPS, small			2	2
	Coml	* SCREW, no. 6-32, 0.375 in.			2	2
	Coml	* NUT, no. 6-32, ext tooth			2	2
	0180-1958	* CAPACITOR CLAMPS, large			3	3
	Coml	* SCREW, no. 8-32, 0.312 in.			3	3
	Coml	* NUT, no. 8-32, ext tooth			3	3
	Coml	* NUT, no. 6-32, 0.312 in., ext tooth			13	13
	Coml	* WASHER, no. 6, flat			13	13
		– – – x – – –				
13	13215-20001	* GROUND BLOCK (TB3)	28480	13215-20001	1	1
		(Attaching Parts)				
	Coml	* WASHER, no. 6, ext tooth			1	1
	Coml	* WASHER, no. 6, 0.312 in., ext tooth			1	1
	13215-00014	* GROUND STRAP	28480	13215-00014	1	1
		– – – x – – –				
14	13215-60001	* REGULATOR ASSEMBLY (A1)	28480	13215-60001	1	1
		(Attaching Parts)				
	Coml	* WASHER, no. 6, 0.312 in., ext tooth			7	7
15	07900-20040	* HEAT SINK TO-3	28480	07900-20040	1	1
16	1205-0085	* HEAT SINK TO-66	13103	6166B Base Only	3	3
		– – – x – – –				
17	0686-3625	* RESISTOR, fxd, flm, 3.6k, 5%, 1/2W (R4)	01121	EB 3625	1	4
18	0686-3625	* RESISTOR, fxd, flm, 3.6k, 5%, 1/2W (R5)	01121	EB 3625	1	REF
19	0761-0055	* RESISTOR, fxd, flm, 360 ohms, 5%, 1W (R1)	28480	0761-0055	1	1
20	0686-3625	* RESISTOR, fxd, flm, 3.6k, 5%, 1/2W (R2)	01121	EB 3625	1	REF
21	0686-3625	* RESISTOR, fxd, flm, 3.6k, 5%, 1/2W (R3)	01121	EB 3625	1	REF
		– – – x – – –				

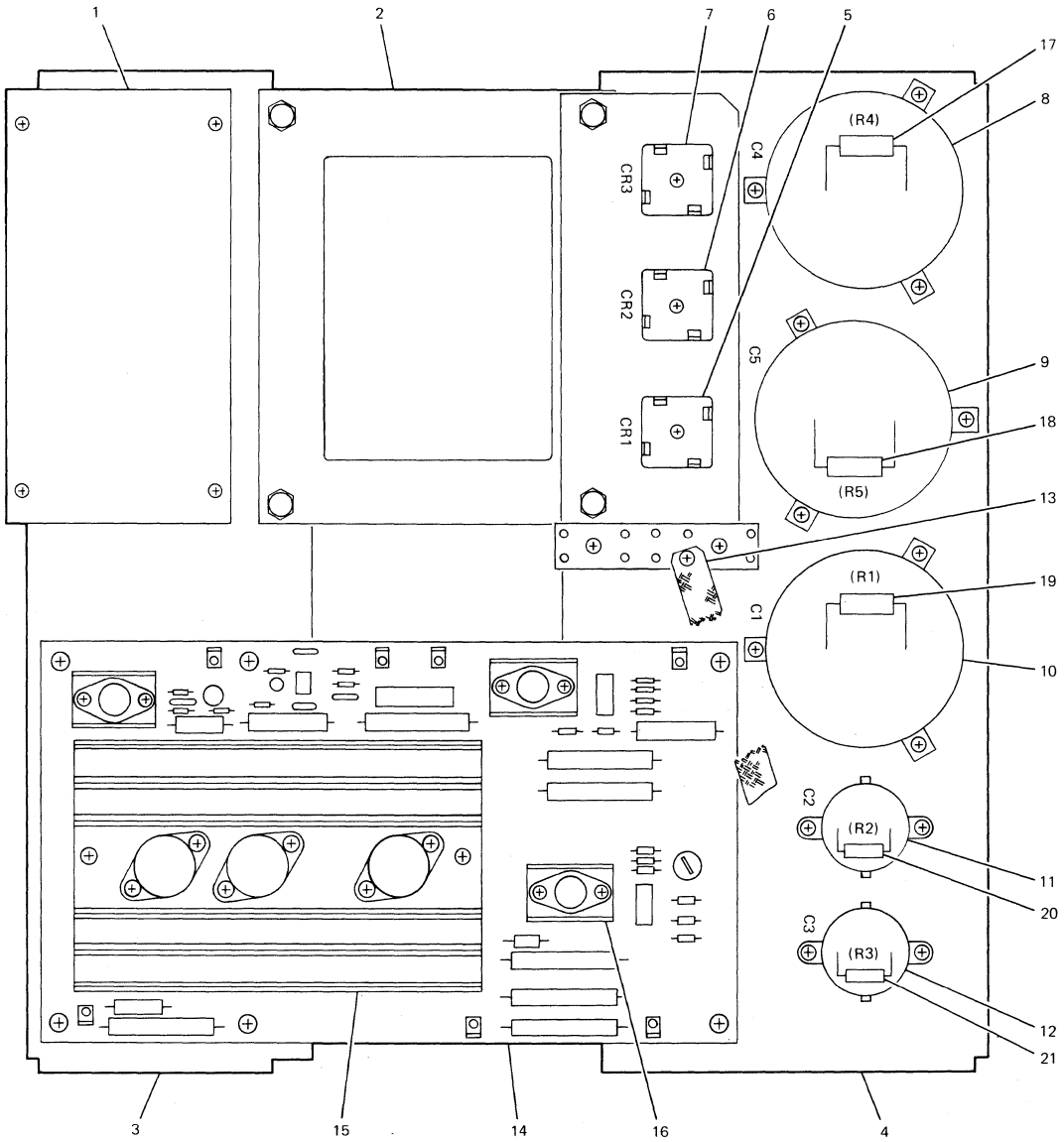


Figure 6-2. Deck Assembly Parts Location Diagram

Table 6-3. Rear Panel Assembly Replaceable Parts

FIG. & INDEX NO.	HP PART NUMBER	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY	TQ
6-3-	No Number	REAR PANEL ASSEMBLY (11, fig. 6-1)				
1	13215-00002	* CABLE COVER	28480	13215-00002	1	1
		(Attaching Parts)				
	13215-00012	* COVER INSULATOR	28480	13215-00012	1	1
	Coml	* SCREW, no. 6-32, 0.375 in., pan head			4	4
	Coml	* WASHER, no. 6, split lock			4	4
		– – – x – – –				
2	0360-1689	* BARRIER BLOCK, nine-pos (TB1)	71785	354-11-09-001	1	1
		(Attaching Parts)				
	0360-1688	* MARKER STRIP, nine-pos	71785	364-11-09-010	1	1
	Coml	* SCREW, no. 6-32, 0.625 in., pan head			2	4
	Coml	* WASHER, no. 6, ext tooth			2	4
	Coml	* WASHER, no. 6, flat			2	16
		– – – x – – –				
3	0360-0017	* BARRIER BLOCK, eight-pos (TB2)	71785	354-18-08-001	1	1
		(Attaching Parts)				
	0360-1687	* MARKED STRIP, eight-pos	71785	364-12-08-010	1	1
	Coml	* SCREW, no. 6-32, 0.625 in., pan head			2	REF
	Coml	* WASHER, no. 6, ext tooth			2	REF
	Coml	* WASHER, no. 6, flat			2	REF
		– – – x – – –				
4	2110-0342	* FUSE, 8A, 250 Vac (F1)	28480	2110-0342	1	3
5	2110-0342	* FUSE, 8A, 250 Vac (F6)	28480	2110-0342	1	REF
6	2110-0342	* FUSE, 8A, 250 Vac (F7)	28480	2110-0342	1	REF
7	2110-0365	* FUSE, 4A (F2)	28480	2110-0365	1	1
		(Attaching Parts)				
	1400-0084	* FUSE HOLDER (XF1, XF2, XF6, XF7)	75915	342014	4	7
		(Attaching Parts)				
	Coml	* RUBBER WASHER			1	7
	Coml	* WASHER, int tooth			1	7
	Coml	* NUT, fuseholder			1	7
		– – – x – – –				
8	5000-8015	* FAN SHIELD	28480	5000-8015	1	1
		(Attaching Parts)				
	Coml	* NUT, no. 6-32, ext tooth			4	8
	Coml	* WASHER, no. 6, flat			4	REF
	Coml	* SCREW, no. 6-32, 0.750 in., pan head			4	8
		– – – x – – –				
9	3160-0099	* GRILLE, fan	28480	3160-0099	1	1
		(Attaching Parts)				
	Coml	* NUT, no. 6-32, ext tooth			4	REF
	Coml	* WASHER, no. 6, flat			8	REF
	Coml	* SCREW, no. 6-32, 0.750 in., pan head			4	REF
		– – – x – – –				
10	3160-0056	* FAN	99743	WS2107FL-55	1	1
11	5060-0428	* REAR FILTER	28480	5060-0428	1	1
		– – – x – – –				
12	2110-0056	* FUSE, 6A, 250 Vac (F3)	28480	2110-0056	1	REF
13	2110-0003	* FUSE, 3A, 250 Vac (NOR) (F4)	28480	2110-0003	1	REF
14	2110-0002	* FUSE, 2A, 250 Vac (NB) (F5)	28480	2110-0002	1	REF
		(Attaching Parts)				
	1400-0084	* FUSE HOLDER (XF3, XF4, XF5)	75915	342014	3	REF
	Coml	* RUBBER WASHER			1	REF
	Coml	* WASHER, int tooth			1	REF
	Coml	* NUT, fuseholder			1	REF
		– – – x – – –				
15	1251-2357	* CONNECTOR, receptacle, electrical (J8)	28480	1251-2357	1	1
		(Attaching Parts)				
	0361-0146	* RIVET, 0.123 in. dia., 0.22 in. long	00000	OBD	2	2
		– – – x – – –				
16	13215-00017	* REAR PANEL	28480	13215-00017	1	1
		(Attaching Parts)				
		* SCREW, no. 8-32, 0.312 in., pan head with one ext tooth			4	4
		– – – x – – –				

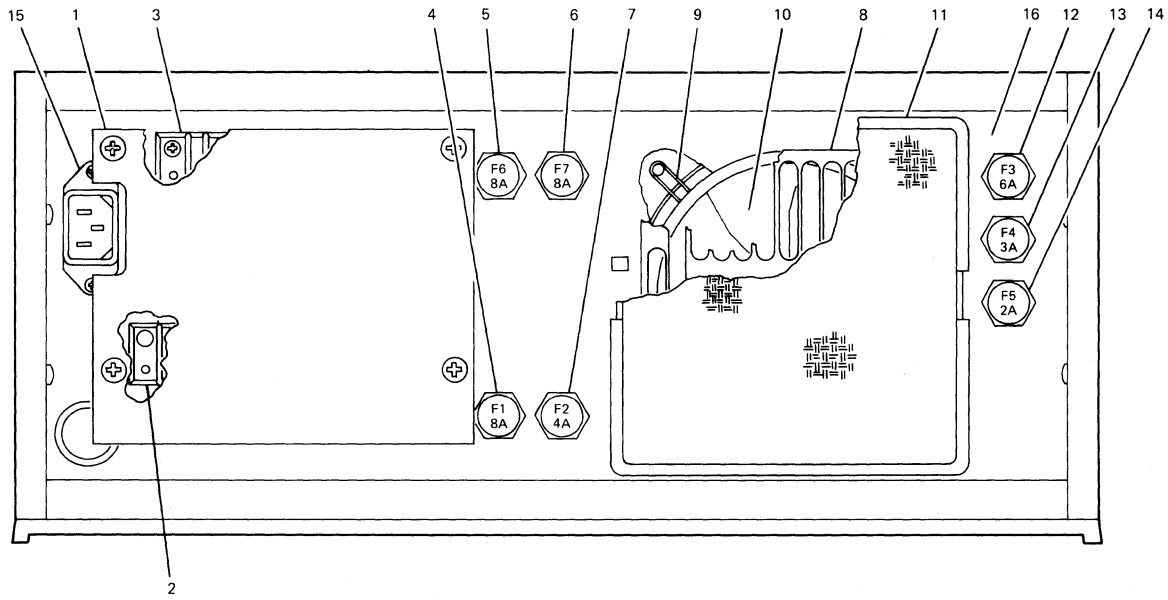
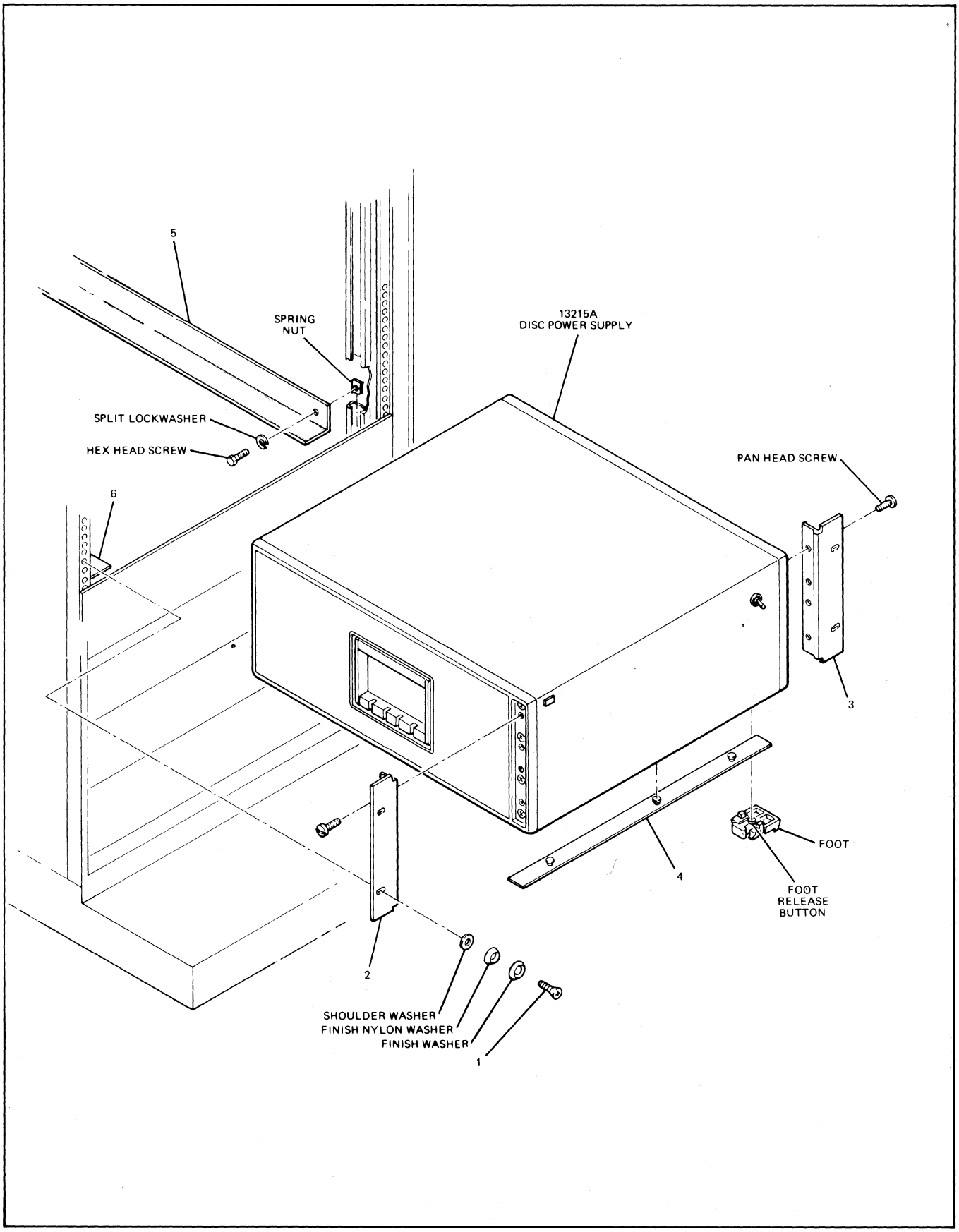


Figure 6-3. Rear Panel Assembly Parts Location Diagram

Table 6-4. 13215-60011 Rack Mounting Kit Replaceable Parts

FIG. & INDEX NO.	HP PART NUMBER	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY	TQ
6-4-	13215-60011	RACK MOUNTING KIT				
1	2680-0119	SCREW, machine, flat hd			4	4
		(Attaching Parts)				
	3050-0007	* WASHER, cup, no. 10			4	4
	3050-0248	* WASHER, cup, no. 10			4	4
	3050-0006	* WASHER, extruded, no. 10			4	4
		– – – x – – –				
2	13215-60012	LEFT MOUNTING EAR			1	1
		(Attaching Parts)				
	2510-0105	* SCREW, 8-32 x 0.438			4	8
		– – – x – – –				
3	13215-60013	RIGHT MOUNTING EAR			1	1
		(Attaching Parts)				
	2510-0105	* SCREW, 8-32 x 0.438			4	REF
		– – – x – – –				
4	5040-6676	LARGE FILLER STRIP			1	1
5	13215-20005	SUPPORT RAIL, right-hand			1	1
		(Attaching Parts)				
	2940-0103	* SCREW, 1/4-20, 1/2 in., hex head			2	4
	2190-0032	* WASHER, lock, 1/4 in.			2	4
	0590-0789	* NUT, channel			2	4
		– – – x – – –				
6	13215-20004	SUPPORT RAIL, left-hand			1	1
		(Attaching Parts)				
	2940-0103	* SCREW, 1/4-20, 1/2 in., hex head			2	REF
	2190-0032	* WASHER, lock, 1/4 in.			2	REF
	0590-0789	* NUT, channel			2	REF
		– – – x – – –				



13215-18A

Figure 6-4. 13215-60011 Rack Mounting Kit Parts Location Diagram

Table 6-5. Printed-Circuit Assembly Replaceable Parts

HP PART NUMBER	DESCRIPTION	MFR CODE	MFR PART NO.	TQ
0150-0121	CAPACITOR, fxd, cer, 0.1 μF, +80 -20%, 50 Vdcw	56289	5C50BIS-CML	1
0160-0134	CAPACITOR, fxd, mica, 220 pF, 5%, 300 Vdcw	28480	0160-0134	1
0160-0153	CAPACITOR, fxd, My, 0.001 μF, 10%, 200 Vdcw	56289	192P10292-PTS	1
0160-2055	CAPACITOR, fxd, cer, 0.01 μF, +80 -20%, 1000 Vdcw	56289	C023F101F103ZS22-CDH	2
0160-2199	CAPACITOR, fxd, mica, 30 pF, 5%, 300 Vdcw	28480	0160-2199	1
0160-3460	CAPACITOR, fxd, cer, 0.05 μF, +80 -20%, 100 Vdcw	56289	C023E101L503ZS22-CDM	1
0180-0104	CAPACITOR, fxd, elctlt, 200 μF, +75 -10%, 15 Vdcw	56289	30D207G0150DF4-DSM	3
0683-2225	RESISTOR, fxd, comp, 2.2k, 5%, 1/4W	28480	0683-2225	1
0683-3005	RESISTOR, fxd, met flm, 30 ohms, 5%, 1/4W	01121	CB 3005	1
0683-5605	RESISTOR, fxd, comp, 56 ohms, 5%, 1/4W	01121	CB 5605	1
0686-8205	RESISTOR, fxd, flm, 82 ohms, 5%, 1/2W	01121	EB 8205	1
0698-3151	RESISTOR, fxd, met flm, 2.87k, 1%, 1/8W	28480	0698-3151	1
0698-3476	RESISTOR, fxd, flm, 6k, 1%, 1/8W	28480	0698-3476	1
0698-3515	RESISTOR, fxd, flm, 5.9k, 1%, 1/8W	28480	0698-3515	1
0698-3700	RESISTOR, fxd, flm, 715 ohms, 1%, 1/8W	28480	0698-3700	1
0698-4465	RESISTOR, fxd, flm, 931 ohms, 1%, 1/8W	28480	0698-4465	1
0698-4469	RESISTOR, fxd, flm, 1.15k, 1%, 1/8W	28480	0698-4469	1
0698-4470	RESISTOR, fxd, flm, 6.98k, 1%, 1/8W	28480	0698-4470	1
0698-5088	RESISTOR, fxd, flm, 12k, 1%, 1/8W	28480	0698-5088	2
0757-0283	RESISTOR, fxd, met flm, 2k, 1%, 1/8W	28480	0757-0283	1
0757-0402	RESISTOR, fxd, met flm, 110 ohms, 1%, 1/8W	28480	0757-0402	2
0757-0420	RESISTOR, fxd, met flm, 750 ohms, 1%, 1/8W	28480	0757-0420	1
0757-0430	RESISTOR, fxd, met flm, 2.21k, 1%, 1/8W	28480	0757-0430	1
0757-0438	RESISTOR, fxd, flm, 5.11k, 1%, 1/8W	28480	0757-0438	1
0761-0052	RESISTOR, fxd, met. ox., 270 ohms, 5%, 1W	28480	0761-0052	1
0811-0003	RESISTOR, fxd, ww, 390 ohms, 1%, 1/4W	28480	0811-0003	1
0811-3045	RESISTOR, fxd, ww, 1.2 ohms, 3%, 10W	28480	0811-3045	1
0811-3046	RESISTOR, fxd, ww, 100 ohms, 3%, 10W	28480	0811-3046	3
0811-3047	RESISTOR, fxd, ww, 1.0 ohm, 3%, 10W	28480	0811-3047	2
0811-3048	RESISTOR, fxd, ww, 1.5 ohms, 3%, 5W	28480	0811-3048	1
0811-3049	RESISTOR, fxd, ww, 2.75 ohms, 3%, 10W	28480	0811-3049	1
1820-0439	INTEGRATED CIRCUIT	07263	U6E7723393	2
1820-0477	INTEGRATED CIRCUIT	28480	1820-0477	1
1853-0013	TRANSISTOR, Si, PNP	80131	2N2904	1
1853-0303	TRANSISTOR, Si, PNP	80131	2N5956	1
1854-0045	TRANSISTOR, Si, NPN	04713	2N956	1
2854-0063	TRANSISTOR, Si, NPN	80131	2N3055	3
2854-0072	TRANSISTOR, Si, NPN	80131	2N3054	2
1902-3193	DIODE, breakdown, 13.3V, 5%	28480	1902-3193	1
2100-1772	RESISTOR, var, ww, 500 ohms, 5%, type H, 1W	28480	2100-1772	1

Table 6-6. Reference Designations and Abbreviations

REFERENCE DESIGNATIONS

A	= assembly	K	= relay	TB	= terminal board
B	= motor, synchro	L	= inductor	TP	= test point
BT	= battery	M	= meter	U	= integrated circuit, non-repairable assembly
C	= capacitor	P	= plug connector	V	= vacuum tube, photocell, etc.
CB	= circuit breaker	Q	= semiconductor device other than diode or integrated circuit	VR	= voltage regulator
CR	= diode	R	= resistor	W	= jumper wire
DL	= delay line	RT	= thermistor	X	= socket
DS	= indicator	S	= switch	Y	= crystal
E	= Misc electrical parts	T	= transformer	Z	= tuned cavity, network
F	= fuse				
FL	= filter				
J	= receptacle connector				

ABBREVIATIONS

A	= amperes	gra	= gray	PCA	= printed-circuit assembly
ac	= alternating current	grn	= green	PWB	= printed-wiring board
Ag	= silver			phh	= phillips head
Al	= aluminum	H	= henries	pk	= peak
ar	= as required	Hg	= mercury	p-p	= peak-to-peak
adj	= adjust	hr	= hour(s)	pt	= point
assy	= assembly	Hz	= hertz	prv	= peak inverse voltage
		hdw	= hardware	PNP	= positive-negative-positive
b	= base	hex	= hexagon, hexagonal	pwv	= peak working voltage
bp	= bandpass			porc	= porcelain
bpi	= bits per inch	ID	= inside diameter	posn	= position(s)
blk	= black	IF	= intermediate frequency	pozi	= pozidrive
blu	= blue	in.	= inch, inches		
brn	= brown	I/O	= input/output	rf	= radio frequency
brs	= brass	int	= internal	rdh	= round head
Btu	= British thermal unit	incl	= include(s)	rms	= root-mean-square
Be Cu	= beryllium copper	insul	= insulation, insulated	rwv	= reverse working voltage
		impgrg	= impregnated	rect	= rectifier
cpi	= characters per inch	incand	= incandescent	r/min	= revolutions per minute
coll	= collector	ips	= inches per second	RTL	= resistor-transistor logic
cw	= clockwise				
ccw	= counterclockwise	k	= kilo (10^3), kilohm	s	= second
cer	= ceramic			SB, TT	= slow blow
com	= common	lp	= low pass	Se	= selenium
crt	= cathode-ray tube			Si	= silicon
CTL	= complementary-transistor logic	m	= milli (10^{-3})	scr	= silicon controlled rectifier
		M	= mega (10^6), megohm	sst	= stainless steel
cath	= cathode	My	= Mylar	stl	= steel
Cd pl	= cadmium plate	mfr	= manufacturer	spcl	= special
comp	= composition	mom	= momentary	spdt	= single-pole, double-throw
conn	= connector	mtg	= mounting	spst	= single-pole, single-throw
compl	= complete	misc	= miscellaneous		
		met. ox.	= metal oxide	Ta	= tantalum
dc	= direct current	mintr	= miniature	td	= time delay
dr	= drive			Ti	= titanium
DTL	= diode-transistor logic	n	= nano (10^{-9})	tgl	= toggle
depc	= deposited carbon	nc	= normally closed or no connection	thd	= thread
dpdt	= double-pole, double-throw			tol	= tolerance
dpst	= double-pole, single-throw	Ne	= neon	TTL	= transistor transistor logic
		no.	= number		
em	= emitter	n.o.	= normally open	U(μ)	= micro (10^{-6})
ECL	= emitter-coupled logic	np	= nickel plated		
ext	= external	NPN	= negative-positive-negative	V	= volt(s)
encap	= encapsulated	NPO	= negative-positive zero (zero temperature coefficient)	var	= variable
elctlt	= electrolytic			vio	= violet
		NSR	= not separately replaceable	Vdcw	= direct current working volts
F	= farads	NRFR	= not recommended for field replacement		
FF	= flip-flop			W	= watts
flh	= flat head	OD	= outside diameter	ww	= wirewound
flm	= film	OBD	= order by description	wht	= white
fxd	= fixed	orn	= orange	WIV	= working inverse voltage
filh	= fillister head	ovh	= oval head		
		oxd	= oxide	yel	= yellow
G	= giga (10^9)				
Ge	= germanium	p	= pico (10^{-12})		
gl	= glass	PC	= printed circuit		
gnd	= ground(ed)				

Table 6-7. Code List of Manufacturers

CODE NO.	MANUFACTURER	ADDRESS
00779	Amp., Inc. (Aircraft Marine Prod.)	Harrisburg, Pennsylvania
01121	Allen Bradley Company	Milwaukee, Wisconsin
04713	Motorola Semiconductor Prod. Inc.	Phoenix, Arizona
04870	PM Motor Company	Westchester, Illinois
07263	Fairchild Camera & Inst. Corp., Semiconductor Division	Mountain View, Calif.
13103	Thermalloy Company	Dallas, Texas
27191	Cutler-Hammer, Inc., Power Dist. & Control Division	Milwaukee, Wisconsin
28480	Hewlett-Packard Company	Palo Alto, California
56289	Sprague Electric Company	N. Adams, Mass.
71400	Bussman Mfg. Div. McGraw-Edison Company	St. Louis, Missouri
71785	Cinch Mfg. Co. Div. TRW, Inc.	Elk Grove Village, Ill.
75915	Littelfuse, Inc.	Des Plaines, Illinois
80131	Electronic Industries Association	Washington, D.C.
99743	IMC Magnetics Corp., Western Division	Maywood, Calif.

APPENDIX A
BACKDATING INFORMATION

This backdating appendix provides information for making this manual applicable to earlier configurations of HP 13215A Disc Drive Power Supplies. Changes are identified numerically in this appendix. Refer to the following table to determine which changes are associated with particular series-numbered printed-circuit assemblies or power supply serial number prefix:

Description	Part Number	Series/Serial No. Prefix	Changes
A1 Regulator Board	13215-60001	1115	1 thru 40
A1 Regulator Board	13215-60001	1122	4 thru 40
Disc Drive Power Supply	13215A	1138	7 thru 40
Disc Drive Power Supply	13215A	1141	8 thru 40
Disc Drive Power Supply	13215A	1144	9 thru 40
Disc Drive Power Supply	13215A	1232	10 thru 40
Disc Drive Power Supply	13215A	1235	13 thru 40
Disc Drive Power Supply	13215A	1244	21 thru 40
Disc Drive Power Supply	13215A	1336	24 thru 40
Disc Drive Power Supply	13215A	1420	27 thru 40
Disc Drive Power Supply	13215A	1435	30 thru 40

CHANGE **DESCRIPTION**

1 Page 5-6, table 5-4. Delete C10.

2 Page 5-7/5-8, figure 5-2. On parts location diagram change HP series code to A-1115-42.

3 Page 5-7/5-8, figure 5-3.

a. On schematic diagram change HP series code to 1115.

b. Delete A1C10.

4 Page 5-6, table 5-4.

a. Change C4 to HP Part No. 0160-0153; CAPACITOR, fxd, My 0.001 μF, 10%, 200 WVDC; 56289; 192P10292-PTS.

b. Change R8 to HP Part No. 0698-4002; RESISTOR, fxd, met flm, 5k, 1%, 1/8W; 28480; 0698-4002.

5 Page 5-7/5-8, figure 5-2. On parts location diagram change HP series code to B-1122-42.

6 Page 5-7/5-8, figure 5-3.

a. On schematic diagram change HP series code to: 1122.

b. Change A1C4 to 0.001 μF.

c. Change A1R8 to 5k.

7 Change 39 of this appendix, table 6-3. Change F2, figure and index no. 7, from HP Part No. 2110-0365 to 2110-0014.

8 Changes 34 and 36 of this appendix, figures 2-1, 2-2, 2-3, 2-4, and 5-3, respectively. Reconnect green yellow wire from TB1-9 to output side of FL1.

9 Change 37 of this appendix, table 6-1, under accessories.

a. Delete Logic Cable, HP Part No. 13215-60015.

b. Delete Servo Power Cable, HP Part No. 13215-60016.

c. Add DC Interconnect Cable, HP Part No. 13215-60009.

10 Change 39 of this appendix, table 6-3. Delete index no. 8 and add:

FIG. & INDEX NO.	HP PART NUMBER	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY	TQ
8	3140-0052	* FAN MOTOR (B1)	16228	M14L1-4R3	1	1
		(Attaching Parts)				
	5243A-20A	* FAN MOTOR HOUSING	28480	5243A-20A	1	1
	3160-0034	* FAN BLADE	28480	3160-0034	1	1

CHANGE	DESCRIPTION
11	Page 5-7, figure 5-3. Add a no. 7 wire connected between TB1 pin 9 and TB3.
12	Page 6-4, table 6-2. Change CR3 listing to read "CR1". Change CR1 and CR2 listings to read "CR2" and "CR3", respectively.
13	Change 31 of this appendix, paragraph 1-15. Change last sentence to read: . . . for 110 and 220 Vac . . .
14	Page 2-1, paragraph 2-6. Change the 100 Vac entry to read 110 Vac. Delete between the 120 Vac and 220 Vac entries: 200 Vac ± 10%, 50/60 Hz ± 2%.
15	Page 2-2, table 2-1. Change "POWER SUPPLY WIRING FOR 100 Vac . . . " to read "POWER SUPPLY WIRING FOR 110 Vac . . ." Change 100 Vac entry to 110 Vac. Change description entry of power supply wiring for 220 Vac to read: Input power (Jumper 7 to 8, 3 to 4). Delete the following entries:

POWER SUPPLY WIRING FOR 200 Vac, 50/60 Hz, 1-PHASE

TB1 PIN	VOLTAGE	DESCRIPTION
5-6	200 Vac ± 10%, 50/60 Hz ± 2%	Input Power (Jumper 7 to 8, 3 to 4)
1-7	120 Vac ± 10%, 50/50 Hz ± 2%	Output power to motors in disc drive
2-6	120 Vac ± 10%, 50/60 Hz ± 2%	Output to fan in disc power supply

16	Change 34 in this appendix, figure 2-1. Change all references to 100 Vac to read 110 Vac.
17	Change 34 in this appendix, figure 2-3. a. Change all references to 200 Vac to read 220 Vac. b. To adapt figure 2-3 to indicate wiring for 220 Vac; delete the jumper between TB1 pins 3 and 4 and add jumper between pins 2 and 3; delete the wire between TB1 pins 3 and 4 in the schematic and show the no. 6 wire connected to TB1 pins 2 and 3.
18	Page 6-4, table 6-2. Change part number of transformer T1 (index no. 2) to 9100-3304.
19	Page 2-1, paragraph 2-10. Change paragraph 2-10 to read: Option 001 units are equipped with an IEC power cord; however, no power plug is provided. A power plug suitable for the particular site must be installed prior to connecting the power supply to the line power.
20	Page 6-6, table 6-3. Change FAN SHIELD, index no. 9, from the HP Part No. 5000-8015 to 13215-00013.
21	Page 5-6, table 5-4. a. Change R12 to HP Part No. 0698-3515; 5.9k, 1%, 1/8W; 28480; 0698-3515. b. Change R18 to HP Part No. 0757-0283; 2k, 1%, 1/8W; 28480; 0757-0283.

CHANGE	DESCRIPTION
22	Page 5-7, figure 5-2. Change series code to F-1336-22.
23	Page 5-7, figure 5-3. Change value of R12 to 5.9k and R18 to 2k. Change series to 1336.
24	Page 2-2, paragraph 2-19. Change destination of black wire from TB1-2 to TB1-1 and destination of white-gray wire from TB1-6 to TB1-7.
25	Page 2-3, table 2-1. Change entries for TB1 pin 2 & 6 to pin 1 & 7. Change entries for TB1 pin 1 & 7 to pin 2 & 6.
26	Page 2-9, figure 2-6. Change connection of W1 (7900A) cable wire 0 from TB1-2 to TB1-1 and wire 9 from TB1-6 to TB1-7.
27	Page 5-6, table 5-4. Delete R28.
28	Page 5-7, figure 5-2. Delete R28 and change series code to E-1336-22.
29	Page 5-7, figure 5-3. Delete R28 and change series code to 1336.
30	Page 1-2, table 1-1. Change Power Cable information to 15 foot, 3-wire, shielded, UL approved.
31	Page 1-2, paragraph 1-15. Change to read: Options are factory modifications of a standard disc power supply that are requested by the customer. Option 001 units are equipped with an IEC power cord (without plug) and are factory wired for 240 Vac 50/60 Hz input power. Section II of this manual provides information for restrapping these units for 100, 120, 200, and 220 Vac 50/60 Hz input power.
32	Page 2-1, paragraph 2-10. Change to read: Option 001 units are equipped with a three-conductor, UL-approved power cable for 200-, 220-, or 240-Vac operation; however, no power plug is provided. A power plug that maintains the grounding feature described in paragraph 2-9 and has an appropriate pin pattern for the ac receptacle to be used *must* be attached to the supply cable before connecting the power supply to an ac outlet. **WARNING** *A power plug that maintains the grounding feature described in paragraph 2-9 must be used or injury to operating personnel might result.*
33	Page 2-1, paragraph 2-12. Change to read: The standard unit is shipped ready for operation. It is necessary only to connect the unit to a source of power. Option 001 units must first be fitted with a suitable power plug.
34	Pages 2-4 thru 2-7, figures 2-1 thru 2-4. Replace with figures 2-1 thru 2-4 of this appendix.

CHANGE	DESCRIPTION
35	Page 3-1, figure 3-1. Show power cord exiting rear panel instead of receptacle connector for removable power cable.
36	Page 5-7, figure 5-3. Replace input power circuits with the circuit shown in figure 5-3 of this appendix.
37	Page 6-2, table 6-1. Replace table 6-1 with table 6-1 of this appendix.
38	Page 6-3, figure 6-1. Replace figure 6-1 with figure 6-1 of this appendix.
39	Page 6-6, table 6-3. Replace table 6-3 with table 6-3 of this appendix.
40	Page 6-7, figure 6-3. Replace figure 6-3 with figure 6-3 of this appendix.

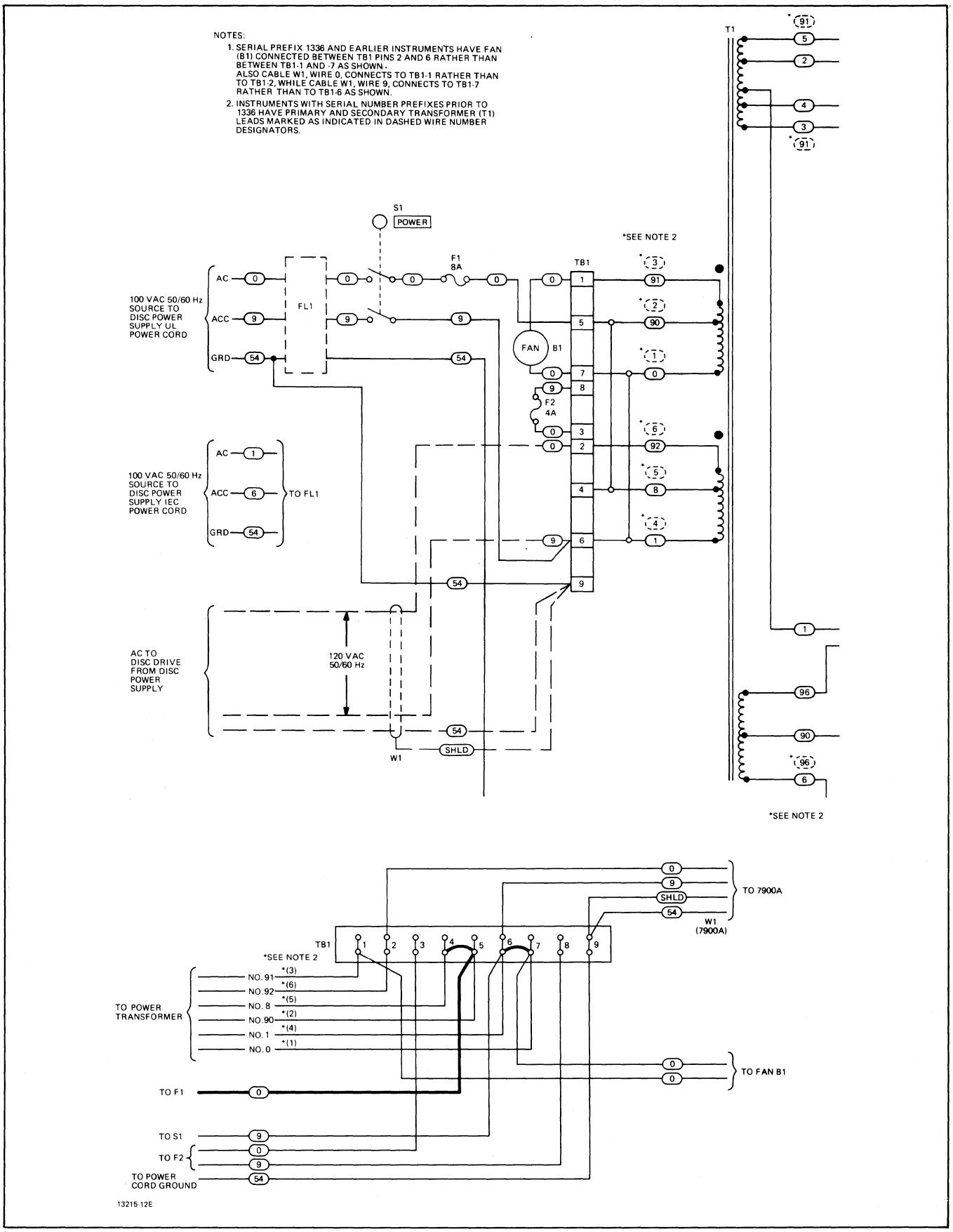


Figure 2-1. Power Supply Wiring for 100 Vac, 50/60 Hz

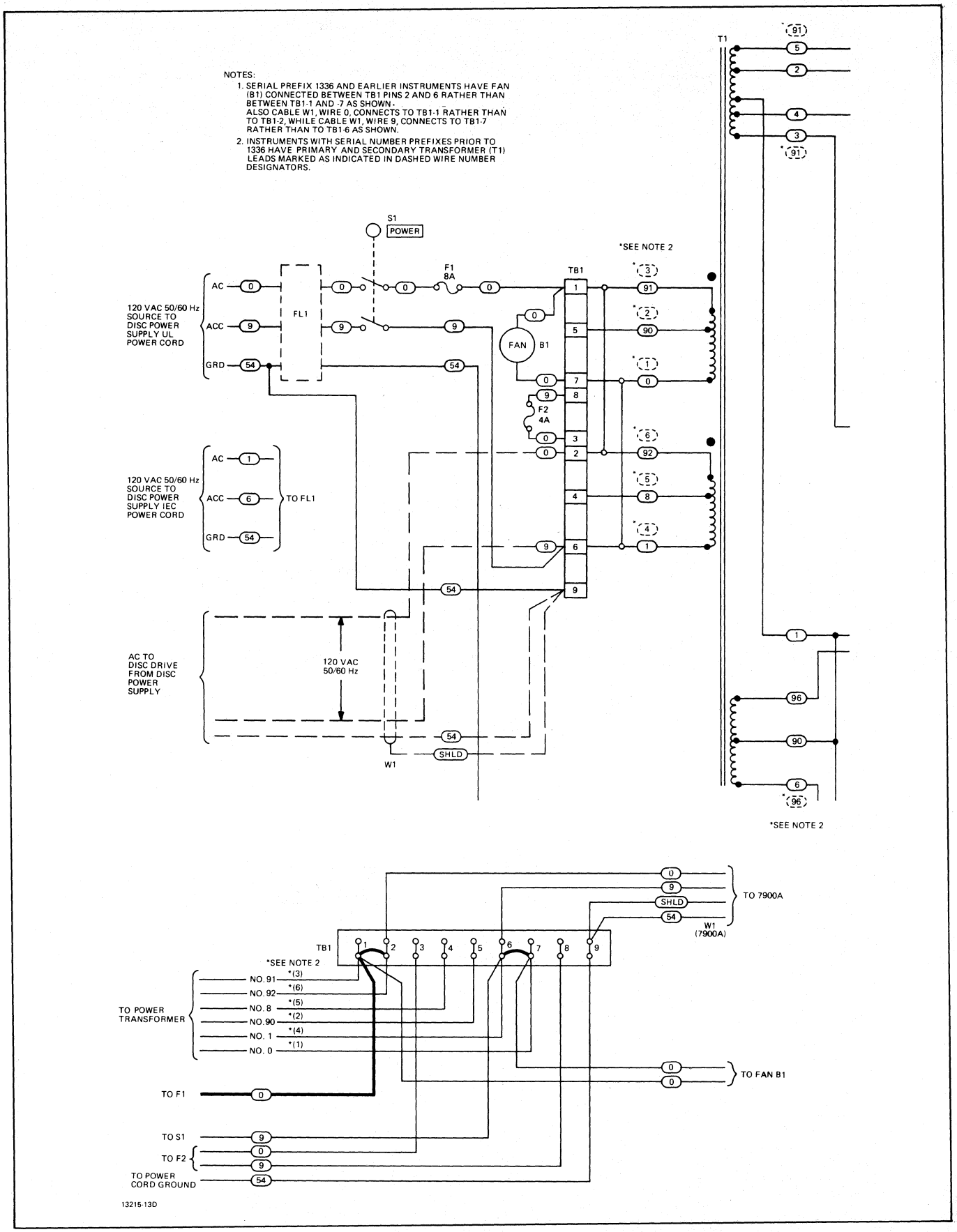


Figure 2-2. Power Supply Wiring for 120 Vac, 50/60 Hz

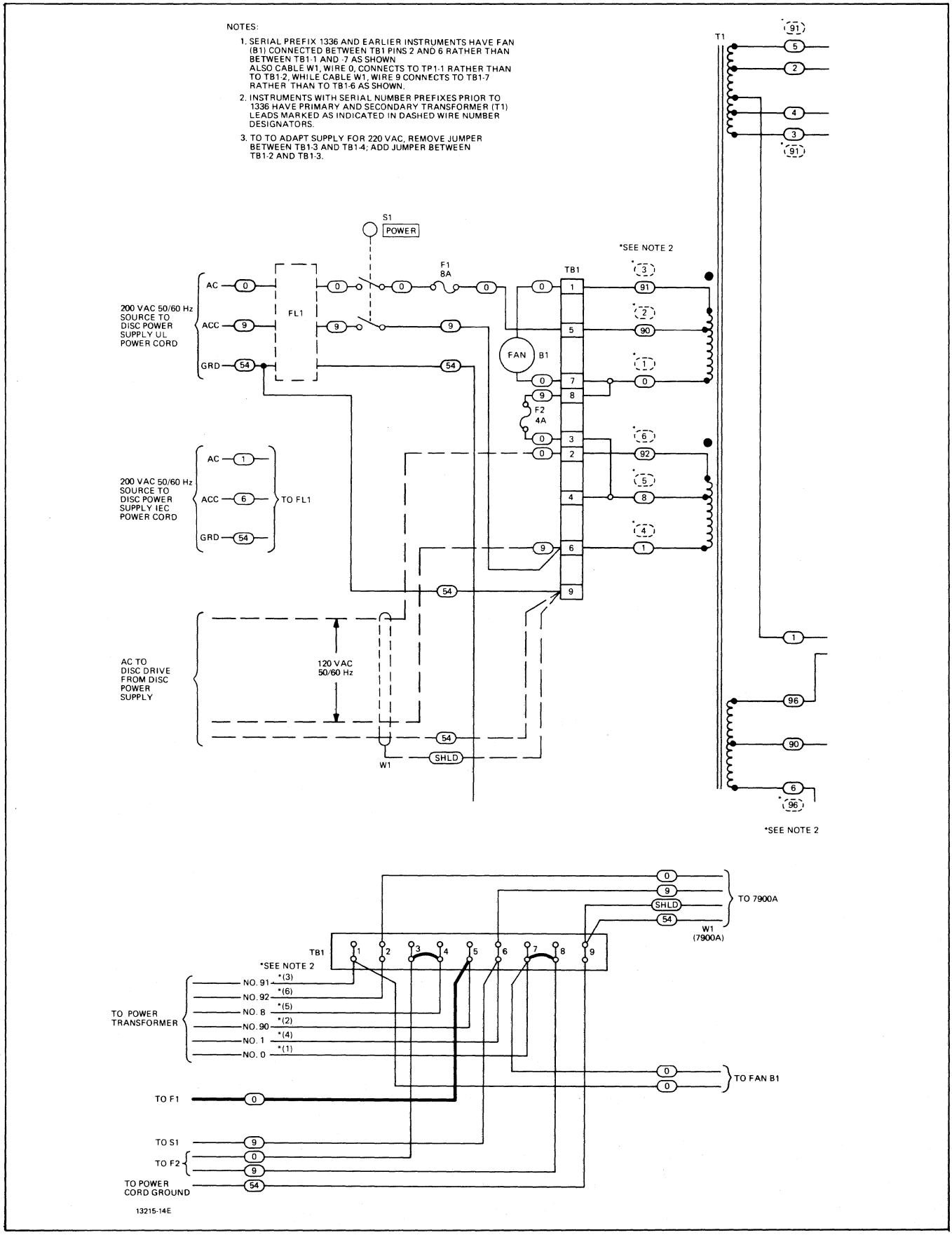


Figure 2-3. Power Supply Wiring for 200 Vac, 50/60 Hz

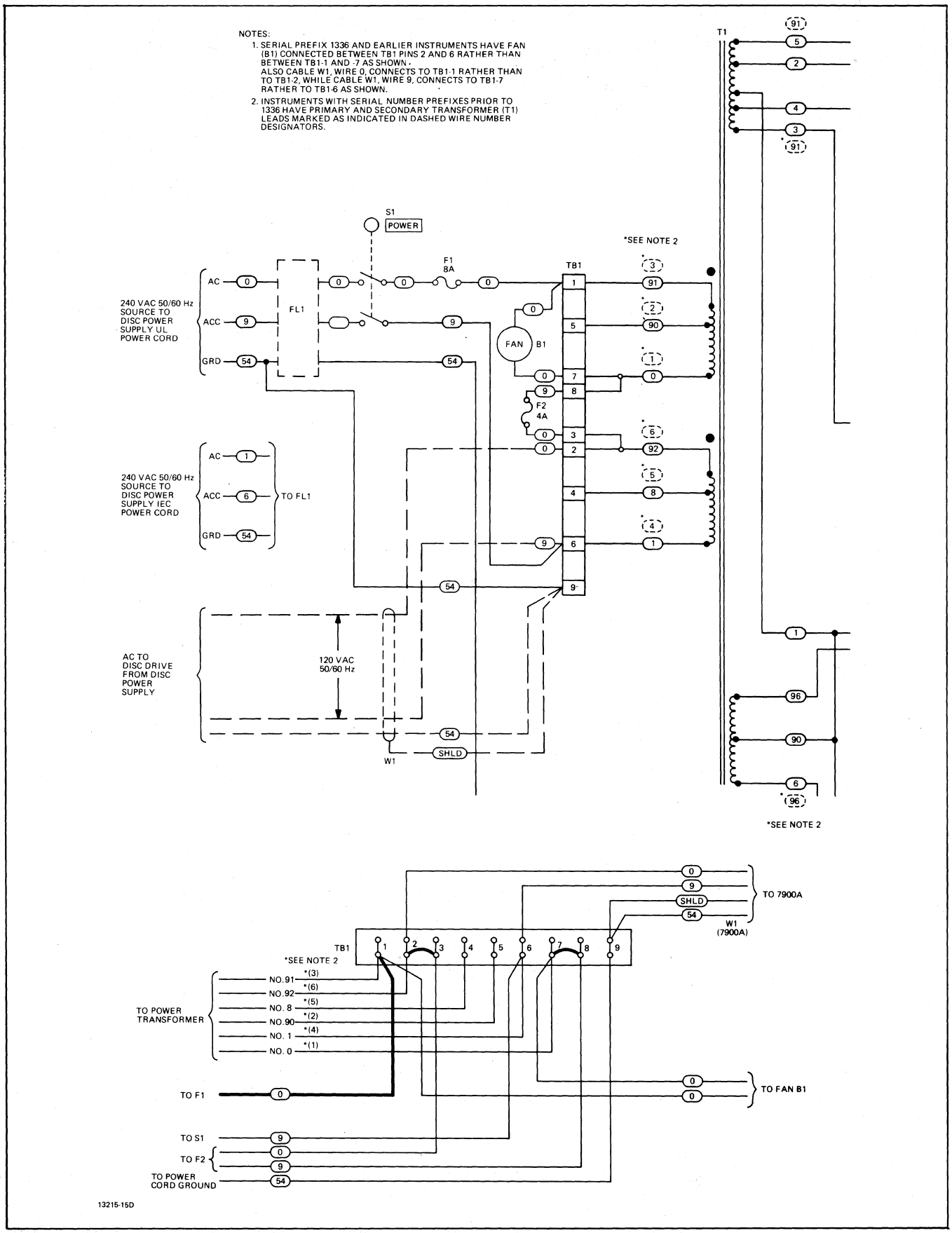


Figure 2-4. Power Supply Wiring for 240 Vac, 50/60 Hz

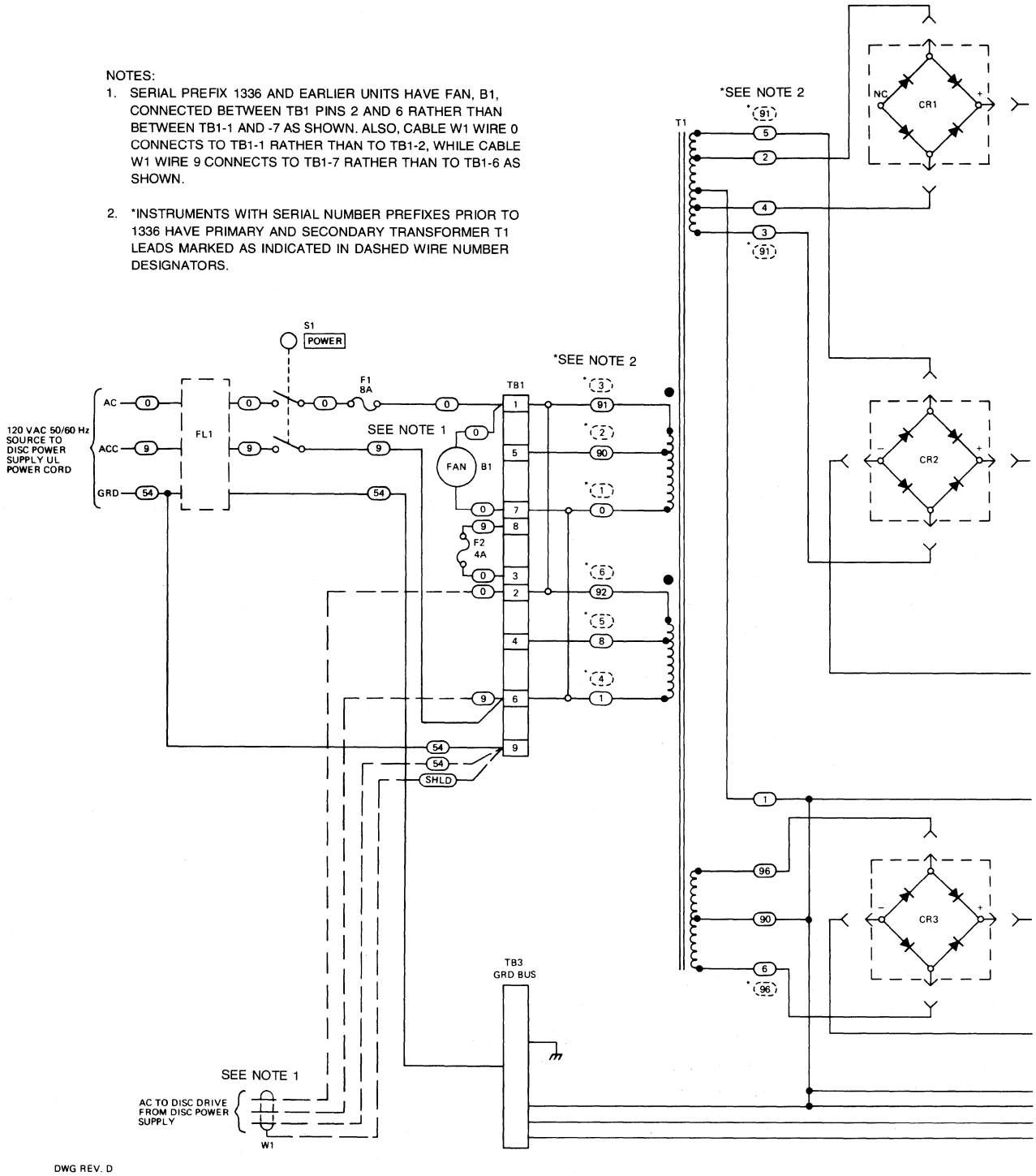


Figure 5-3. Disc Power Supply Schematic Diagram

Table 6-1. HP 13215A Disc Power Supply Replaceable Parts

FIG. & INDEX NO.	HP PART NUMBER	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY	TQ
6-1-		13215A DISC POWER SUPPLY				
1	5060-8506	* TOP COVER	28480	5060-8506	1	1
		(Attaching Parts)				
	Coml	* SCREW, no. 6-32, 0.500 in., flat head			4	8
	Coml	* NUT, no. 6-32, sheet metal			4	8
		– – – x – – –				
2	5060-8514	* BOTTOM COVER	28480	5060-8514	1	1
		(Attaching Parts)				
	Coml	* SCREW, no. 6-32, 0.500 in., flat head			4	REF
	Coml	* NUT, no. 6-32, sheet metal			4	REF
3	5060-0767	* FOOT ASSY	28480	5060-0767	4	4
		– – – x – – –				
4	5000-8550	* SIDE COVER	28480	5000-8550	1	2
		(Attaching Parts)				
	Coml	* SCREW, no. 6-32, 0.250 in., flat head			6	12
		– – – x – – –				
5	5060-8736	* HANDLE RETAINER	28480	5060-8736	1	2
		(Attaching Parts)				
	Coml	* SCREW, no. 8-32, 0.312 in., pan head			4	8
	Coml	* WASHER, no. 8, split lock			4	8
		– – – x – – –				
6	5060-0222	* HANDLE ASSY, side	28480	5060-0222	1	2
7	13215-20002	* SIDE FRAME	28480	13215-20002	1	2
		(Attaching Parts)				
	Coml	* SCREW, no. 8-32, 0.312 in.			4	8
	Coml	* WASHER, no. 8, split lock w/ext tooth			4	
		– – – x – – –				
8	13215-00010	* FRONT PANEL	28480	13215-00010	1	1
9	3101-1233	* TOGGLE SWITCH (S1)	27191	732OK2	1	1
		(Attaching Parts)				
	Coml	* WASHER, int tooth			1	1
	Coml	* NUT, hex			1	1
	Coml	* NUT, knurled, 0.600 O.D.			1	1
		– – – x – – –				
10	No Number	* DECK ASSEMBLY (See fig. 6-2.)				1
11	13215-00009	* REAR PANEL ASSY (See fig. 6-3.)	28480	13215-00009	1	1
12	13215-60008	* POWER CORD ASSY (W2) (Std units only)	28480	13215-60008	1	1
	13215-60010	* POWER CORD ASSY (W2) (Opt 001 units only)	28480	13215-60010	1	1
13	1251-0313	* POWER PLUG (P1) (Not used with opt 001)	74545	5266	1	1
		ACCESSORIES (not shown in fig. 6-1)				
	0360-1712	* BAR BLOCK JUMPER	28480	0360-1712	2	2
	7120-0134	* INFORMATION LABEL	28480	7120-0134	1	1
	5000-0052	* FLAT ALUMINUM PLATE (for non-rack mounting only)	28480	5000-0052	2	2
	13215-60011	* RACK MOUNTING KIT (See fig. 6-4.)	28480	13215-60011	1	1
	13215-60015	* LOGIC CABLE (W1)	28480	13215-60015	1	1
	13215-60016	* SERVO POWER CABLE (W3)	28480	13215-60016	1	1
	13215-90003	* OPERATING AND SERVICE MANUAL	28480	13215-90003	1	1

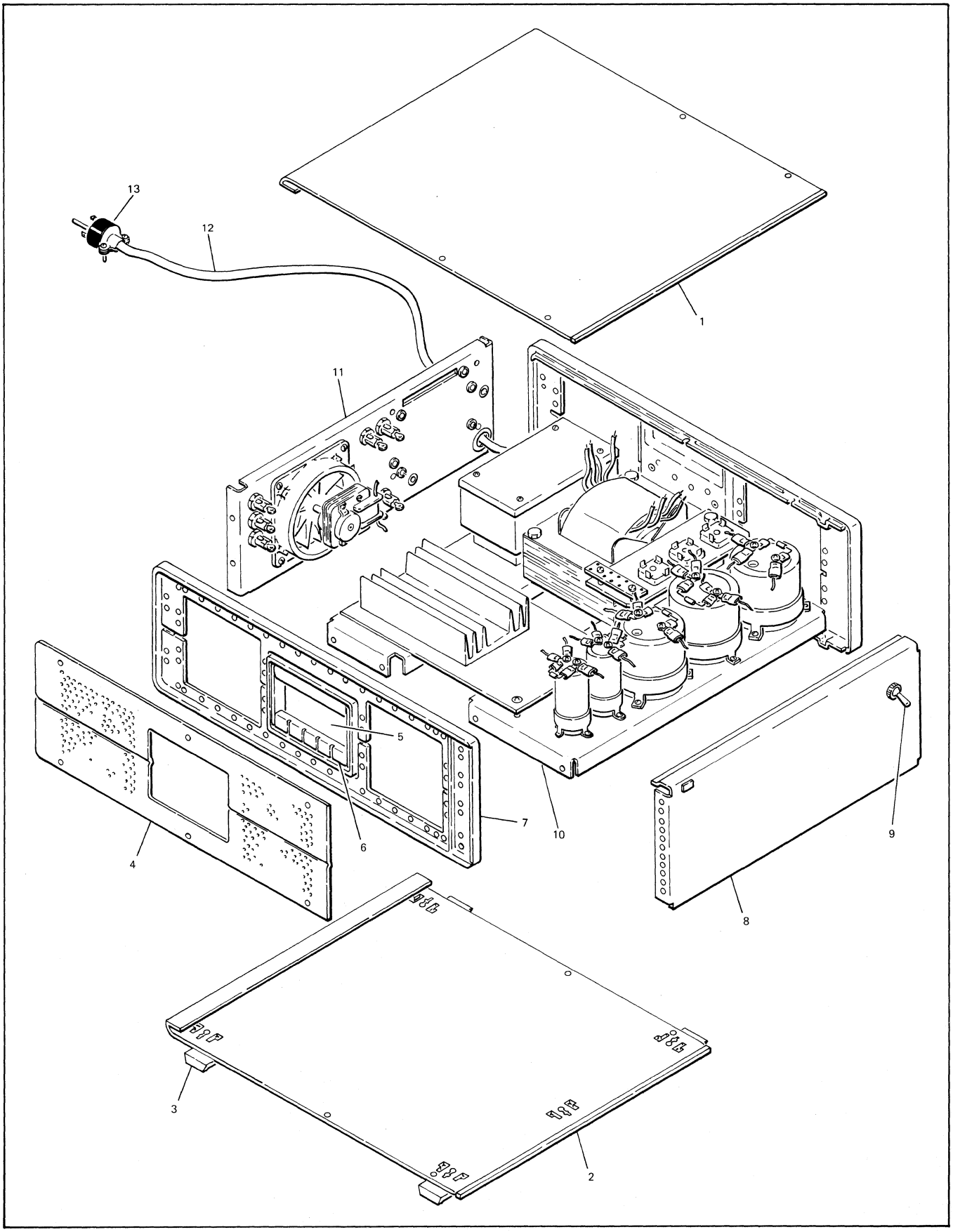


Figure 6-1. HP 13215A Disc Power Supply Parts Location Diagram

Table 6-3. Rear Panel Assembly Replaceable Parts

FIG. & INDEX NO.	HP PART NUMBER	DESCRIPTION	MFR CODE	MFR PART NO.	UNITS PER ASSY	TQ
6-3-	No Number	REAR PANEL ASSEMBLY (11, fig. 6-1)				
1	13215-00002	* CABLE COVER	28480	13215-00002	1	1
		(Attaching Parts)				
	13215-00012	* COVER INSULATOR	28480	13215-00012	1	1
	Coml	* SCREW, no. 6-32, 0.375 in., pan head			4	4
	Coml	* WASHER, no. 6, split lock			4	4
		– – – x – – –				
2	0360-1689	* BARRIER BLOCK, nine-pos (TB1)	71785	354-11-09-001	1	1
		(Attaching Parts)				
	0360-1688	* MARKER STRIP, nine-pos	71785	364-11-09-010	1	1
	Coml	* SCREW, no. 6-32, 0.625 in., pan head			2	4
	Coml	* WASHER, no. 6, ext tooth			2	4
	Coml	* WASHER, no. 6, flat			2	4
		– – – x – – –				
3	0360-0017	* BARRIER BLOCK, eight-pos (TB2)	71785	354-18-08-001	1	1
		(Attaching Parts)				
	0360-1687	* MARKED STRIP, eight-pos	71785	364-12-08-010	1	1
		* SCREW, no. 6-32, 0.625 in., pan head			2	REF
		* WASHER, no. 6, ext tooth			2	REF
		* WASHER, no. 6, flat			2	REF
		– – – x – – –				
4	2110-0342	* FUSE, 8A, 250 Vac (F1)	28480	2110-0342	1	3
5	2110-0342	* FUSE, 8A, 250 Vac (F6)	28480	2110-0342	1	REF
6	2110-0342	* FUSE, 8A, 250 Vac (F7)	28480	2110-0342	1	REF
7	2110-0365	* FUSE, 4A (F2)	28480	2110-0365	1	1
		(Attaching Parts)				
	1400-0084	* FUSE HOLDER (XF1, XF2, XF6, XF7)	75915	342014	1	7
		(Attaching Parts)				
	Coml	* RUBBER WASHER			1	7
	Coml	* WASHER, int tooth			1	7
	Coml	* NUT, fuseholder			1	7
		– – – x – – –				
8	3160-0056	* FAN	99743	WS2107FL-55	1	1
9	5000-8015	* FAN SHIELD	28480	5000-8015	1	1
	Coml	* WASHER, no. 6, split lock			1	1
	Coml	* SCREW, no. 6-32, 1.125 in., pan head			1	4
		– – – x – – –				
10	5060-0428	* REAR FILTER	28480	5060-0428	1	1
		– – – x – – –				
11	2110-0056	* FUSE, 6A, 250 Vac (F3)	28480	2110-0056	1	REF
12	2110-0003	* FUSE, 3A, 250 Vac (NOR) (F4)	28480	2110-0003	1	REF
13	2110-0002	* FUSE, 2A, 250 Vac (NB) (F5)	28480	2110-0002	1	REF
		(Attaching Parts)				
	1400-0084	* FUSE HOLDER (XF3, XF4, XF5)	75915	342014	1	REF
	Coml	* RUBBER WASHER			1	REF
	Coml	* WASHER, int tooth			1	REF
	Coml	* NUT, fuseholder			1	REF
		– – – x – – –				
14	13215-00009	* REAR PANEL	28480	13215-00009	1	1
		(Attaching Parts)				
		* SCREW, no. 8-32, 0.312 in., pan head with one ext tooth			4	4
		– – – x – – –				

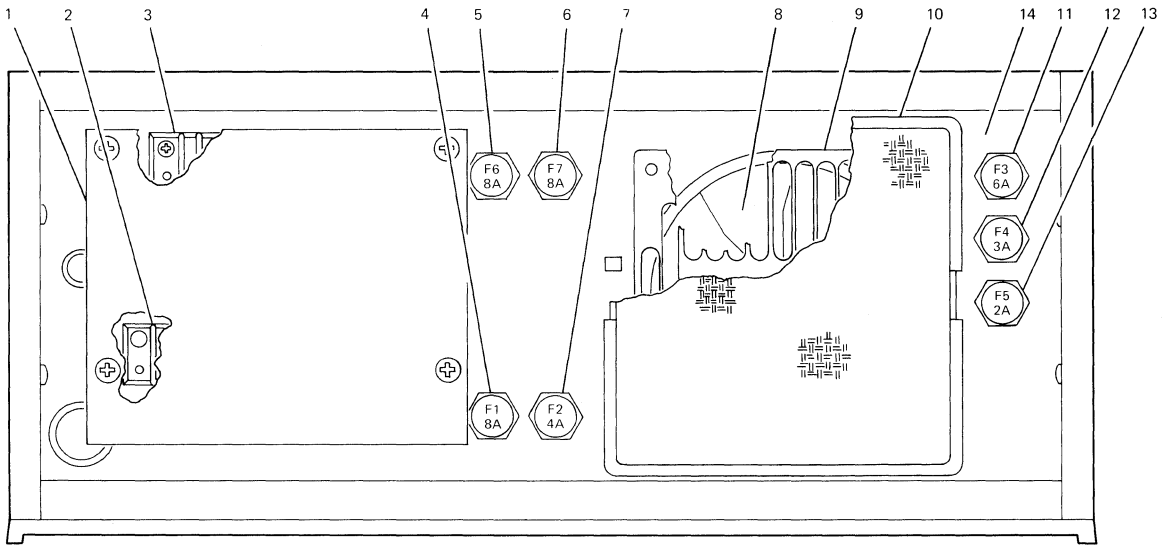


Figure 6-3. Rear Panel Assembly Parts Location Diagram

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Quito
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Instrumentacion y Procesamiento Electronico de el Salvador
Bulevar de los Heroes II-48
San Salvador
Tel: 252787

GUATEMALA
IPESA
Avenida La Reforma 3-48, Zona 9
Guatemala City
Tel: 63627, 64786
Telex: 4192 Teletro.Gu

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Hewlett-Packard Mexicana, S.A. de C.V.
Torres Adalid No. 21, 11° Piso
Col. del Valle
Mexico 12, D.F.
Tel: (905) 543-42-32
Telex: 017-74-507

Hewlett-Packard Mexicana, S.A. de C.V.
Ave. Constitución No. 2184
Monterrey, N.L.
Tel: 48-71-32, 48-71-84
Telex: 038-843

NICARAGUA
Roberto Terán G.
Apartado Postal 689
Edificio Terán
Managua
Tel: 25114, 23412,23454
Cable: ROTERAN Managua

PANAMA
Electrónico Balboa, S.A.
P.O. Box 4929
Calle Samuel Lewis
Cuidad de Panama
Tel: 64-2700
Telex: 3431103 Curunda, Canal Zone
Cable: ELECTRON Panama

PARAGUAY
Z.J. Melamed S.R.L.
División: Aparatos y Equipos Médicos
División: Aparatos y Equipos Científicos y de Investigación
P.O. Box 676
Chile-482, Edificio Victoria
Asunción
Tel: 4-5069, 4-6272
Cable: RAMEL

PERU
Compañía Electro Médica S.A.
Los Flamencos 145
San Isidro Casilla 1030
Lima 1
Tel: 41-4325
Cable: ELMED Lima

PUERTO RICO
Hewlett-Packard Inter-Americas
Puerto Rico Branch Office
Calle 272, Urb. Country Club
Carolina 00639
Tel: (809) 762-7355/7455/7655
Telex: HPIC-PR 3450514

URUGUAY
Pablo Ferrando S.A.
Comercial e Industrial
Avenida Italia 2877
Casilla de Correo 370
Montevideo
Tel: 40-3102
Cable: RADIUM Montevideo

VENEZUELA
Hewlett-Packard de Venezuela C.A.
Apartado 50933, Caracas 105
Edificio Segre
Tercera Transversal
Los Ruices Norte
Caracas 107
Tel: 35-01-07, 35-00-84, 35-00-65, 35-00-31
Telex: 25146 HEWPACK
Cable: HEWPACK Caracas

FOR AREAS NOT LISTED, CONTACT:
Hewlett-Packard
Inter-Americas
3200 Hillview Ave.
Palo Alto, California 94304
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TWX: 910-373-1260
Cable: HEWPACK Palo Alto
Telex: 034-8300, 034-8493

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Hewlett-Packard Ges.m.b.H.
Handelskai 52
P.O. box 7
A-1205 **Vienna**
Tel: (0222) 35 16 21 to 27
cable: HEWPAK Vienna
Telex: 75923 hewpak a

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Hewlett-Packard Benelux
S.A./N.V.
Avenue de Col-Vert, 1,
(Groenkraaglaan)
B-1170 **Brussels**
Tel: (02) 672 22 40
Cable: PALOBEN Brussels
Telex: 23 494 paloben bru

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P.O. Box 1152
CY-**Nicosia**
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Vyzkumnych Ustavu v Bechovicich
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Bechovice u Prahy
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Telex: 121333

DDR
Entwicklungslabor der TU Dresden
Forschungsinstitut Meinsberg
DDR-7305
Waldheim/Meinsberg
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Telex: 518741

Firma Forgber
Schlegelstrasse 15
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Tel: 28 27 411
Telex: 112889

DENMARK
Hewlett-packard A/S
Datavej 52
DK-3460 **Birkerød**
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Cable: HEWPACK AS
Telex: 166 40 hpas

Hewlett-Packard A/S
Navervej 1
DK-8600 **Silkeborg**
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Telex: 166 40 hpas
Cable: HEWPACK AS

FINLAND
Hewlett-Packard OY
Nahkahousuntie 5
P.O. Box 6
SF-00211 **Helsinki** 21
Tel: 6923031
Cable: HEWPACKOY Helsinki
Telex: 12-1563

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Bôite Postale
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Centre Vauban
201, rue Colbert
Entrée A2
F-59000 **Lille**
Tel: (20) 51 44 14
Telex: 820744

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Hewlett-Packard GmbH
Vertriebszentrale Frankfurt
Bernerstrasse 117
Postfach 560 140
D-6000 **Frankfurt** 56
Tel: (0611) 50 04-1
Cable: HEWPACKSA Frankfurt
Telex: 04 13249 hpftmd

Hewlett-Packard GmbH
Technisches Buero Böblingen
Herrenbergerstrasse 110
D-7030 **Böblingen**, Württemberg
Tel: (07031) 667-1
Cable: HEPAK Böblingen
Telex: 07265739 bbn

Hewlett-Packard GmbH
Technisches Buero Düsseldorf
Emanuel-Leutze-Str.1 (Seestern)
D-4000 **Düsseldorf**
Tel: (0211) 59 71-1
Telex: 085/86 533 hpdd d

Hewlett-Packard GmbH
Technisches Buero Hamburg
Wendenstrasse 23
D-2000 **Hamburg** 1
Tel: (040) 24 13 93
Cable: HEWPACKSA Hamburg
Telex: 21 63 032 hphh d

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Technisches Buero Hannover
Am Grossmarkt 6
D-3000 **Hannover 91**
Tel: (0511) 46 60 01
Telex: 092 3259

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Neumeyer Str. 90
D-8500 **Nuremberg**
Tel: (0911) 56 30 83/85
Telex: 0623 860

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Technisches Buero München
Unterhachinger Strasse 28
ISAR-Center
D-8012 **Ottobrunn**
Tel: (089) 601 30 61/7
Cable: HEWPACKSA München
Telex: 0524985

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Technisches Buero Berlin
Keith Strasse 2-4
D-1000 **Berlin** 30
Tel: (030) 24 90 86
Telex: 18 3405 hpbln d

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GR-**Athens** 126
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Miremad Avenue
P.O. Box 41/2419
IR-**Tehran**
Tel: 851082-7
Telex: 213405 HEWP IR

IRELAND
Hewlett-Packard Ltd.
King Street Lane
GB-**Winnersh**,Wokingham
Berks, RG11 5AR
Tel: (0734) 78 47 74
Telex: 847178

ITALY
Hewlett-Packard Italiana S.p.A.
Casella postale 3645
I-20100 **Milano**
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I-00143 **Roma**
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I-95126 **Catania**
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Tel: (081) 33 77 11

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Via E. Masi, 9/B
I-40137 **Bologna**
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Hewlett-Packard Benelux
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Avenue du Col-Vert, 1,
(Groenkraaglaan)
B-1170 **Brussels**
Tel: (02) 672 22 40
Cable: PALOBEN Brussels
Telex: 23 494

MOROCCO
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190, Blvd. Brahim Roudani
Casablanca
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Cable: Gerep-Casa
Telex: 23739

NETHERLANDS
Hewlett-Packard Benelux N.V.
Van Heuven Goedhartlaan 121
P.O. Box 667
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Tel: (020) 47 20 21
Cable: PALOBEN Amsterdam
Telex: 13 216 hepa nl

NORWAY
Hewlett-Packard Norge A/S
Nesveien 13
Box 149
N-1344 **Haslum**
Tel: (02) 53 83 60
Telex: 16621 hpnas n

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Biuro Informacji Technicznej
Hewlett-Packard
U1 Stawki 2 6P
00-950**Warsaw**
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Telex: 81 24 53 hepa pl

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Telex: 10440

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Milanesado 21-23
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Gran Via Fernando El Católico, 67
E-**Valencia**-8
Tel: 326 67 28/326 85 55

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Enighetsvägen 3
Fack
S-161 20 **Bromma** 20
Tel: (08) 730 05 50
Cable: MEASUREMENTS
Stockholm
Telex: 10721

Hewlett-Packard Sverige AB
Frötallsgatan 30
S-421 32 **Västra Frölunda**
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Telex: 10721 Via Bromma Office

SWITZERLAND
Hewlett-Packard (Schweiz) AG
Zürcherstrasse 20
P.O. Box 307
CH-8952 **Schlieren-Zurich**
Tel: (01) 730 52 40
Cable: HPAG CH
Telex: 53933 hpag ch

Hewlett-Packard (Schweiz) AG
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Telex: 27 333 hpag ch

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Beyoglu
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Cable: TELEMATION Istanbul
Telex: 23609

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Muhendislik Kollektif Sirketi
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TR-**Ankara**
Tel: 175622

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Yilmaz Ozyurek
Milli Mudafaa Cad No. 16/6
Kizilay
TR-**Ankara**
Tel: 25 03 09
Telex: 42576 Ozek tr

UNITED KINGDOM
Hewlett-Packard Ltd.
King Street Lane
GB-**Winnersh**, Wokingham
Berks. RG11 5AR
Tel: (0734) 78 47 74
Cable: Hewpie London
Telex:847178/9

Hewlett-Packard Ltd.
"The Grafftons"
Stamford New Road
GB-**Altrincham**
Cheshire WA14 1DQ
Tel: (061) 9289021
Cable: Hewpie Manchester
Telex: 668068

Hewlett-Packard Ltd.
Lygon Court
Dudley Road
GB-**Halesowen**, Worcs
Tel: (021) 550 9911
Telex: 339105

Hewlett-Packard Ltd.
Wedge House
799, London Road
GB-**Thornton Heath**
Surrey CR4 6XL
Tel: (01) 6640103
Telex: 946825

Hewlett-Packard Ltd.
c/o Makro
South Service Wholesale Centre
Wear Industrial Estate
Washington
GB-**New Town**, County Durham
Tel: Washington 464001 ext. 57/58

Hewlett-Packard Ltd
10, Wesley St.
GB-**Castleford**
West Yorkshire WF10 1AE
Tel: (09775) 50402
Telex: 557355

Hewlett-Packard Ltd
1, Wallace Way
GB-**Hitchin**
Herts
Tel: (0462) 52824/56704
Telex: 825981

USSR
Hewlett-Packard
Representative Office USSR
Pokrovsky Boulevard 4/17-KV 12
Moscow 101000
Tel:294-2024
Telex: 7825 hewpak su

YUGOSLAVIA
Iskra-standard/Hewlett-Packard
Miklosiceva 38/VII
61000 **Ljubljana**
Tel: 31 58 79/32 16 74
Telex: 31300

SOCIALIST COUNTRIES NOT SHOWN PLEASE CONTACT:
Hewlett-Packard Ges.m.b.H
P.O. Box 7
A-1205 **Vienna**, Austria
Tel: (0222) 35 16 21 to 27
Cable: HEWPAK Vienna
Telex: 75923 hewpak a

MEDITERRANEAN AND MIDDLE EAST COUNTRIES NOT SHOWN PLEASE CONTACT:
Hewlett-Packard S.A.
Mediterranean and Middle
East Operations
35, Kolokotroni Street
Platia Kefallariou
GR-Kifissia-**Athens**, Greece
Tel: 8080337/359/429
8081741/742/743/744
Telex: 21-6588
Cable: HEWPACKSA Athens

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7, rue du Bois-du-Lan
P.O. Box
CH-1217 Meyrin 2 - **Geneva**
Switzerland
Tel: (022) 41 54 00

UNITED STATES

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P.O. Box 4207
Huntsville 35802
Tel: (205) 881-4591

Medical Only
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Room 220
Birmingham 35209
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6305 Arizona Place
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***Ridgecrest**
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Sacramento 95834
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COLORADO
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CONNECTICUT
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Ft. Lauderdale 33307
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Honolulu 96814
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Rolling Meadows 60008
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TWX: 910-687-2260

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Indianapolis46250
Tel: (317)842-1000
TWX: 810-260-1797

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1902 Broadway
Iowa City 52240
Tel: (319) 338-9466
Night: (319) 338-9467

KENTUCKY
Medical Only
Atkinson Square
3901 Atkinson Dr.
Suite 207
Louisville 40218
Tel: (502) 456-1573

LOUISIANA
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3239 Williams Boulevard
Kenner 70062
Tel: (504) 721-6201

MARYLAND
6707 Whitestone Road
Baltimore 21207
Tel: (301) 944-5400
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2 Choke Cherry Road
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MASSACHUSETTS
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MICHIGAN
23855 Research Drive
Farmington Hills 48024
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TWX: 810-242-2900

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TWX: 910-764-0830

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TWX: 910-989-1185

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Tel: (716) 473-9500
TWX: 510-253-5981

5858 East Molloy Road
Syracuse 13211
Tel: (315) 454-2486

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Woodbury 11797
Tel: (516) 921-0300
TWX: 710-990-4951

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1923 North Main Street
High Point 27262
Tel: (919) 885-8101

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Cleveland 44130
Tel: (216) 243-7300
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330 Progress Rd.
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TWX: 810-474-2818

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Oklahoma City 73132
Tel: (405) 721-0200

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Tel: (503) 620-3350

PENNSYLVANIA
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Tel: (412) 782-0400
TWX: 710-795-3124

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King of Prussia 19406
Tel: (215) 265-7000
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