"DATASPEED*" TAPE-TO-TAPE SYSTEM

POWER SUPPLY 1A FOR TYPE 2 TAPE SENDERS AND RECEIVERS

DESCRIPTION, TROUBLESHOOTING, AND WIRING DIAGRAMS

CONTENTS PAGE

1. INTRODUCTION

1.01 This section contains information regarding the power supply 1A module used in the high speed 1A and 2A Tape Senders and 1B and 2B Tape Receivers. No TCNs have been issued for or added to this section since its last issue. This section was formerly 592-805-402.

1.02 This section is reissued to include troubleshooting procedures and associated checkout and trouble analysis tables.

1.03 Since this is a general revision, marginal arrows used to indicate changes and additions are omitted.

2. GENERAL DESCRIPTION

2.01 Identical modular power supplies (TP177149) provide operating voltages for the electronic circuitry in both the tape sender and tape receiver. This supply consists of a rectifier mounted in a frame approximately 5 inches wide, 7 inches high and 15 inches deep.

2.02 The supply operates from a 120 v ac (103-127) 60 Hz primary power source and provides the following continuous dc voltages: -12 v, +1.5 v, +6 v, -6 rv (reference volts), and a "floating" 28 v. For complete electrical data, see Table A.

2.03 A three-pin input power connector and a multiple-pin output connector are mounted on a rear panel. The following components are on a front panel for easy access:

(a) A voltmeter and a rotary selector switch for selecting the voltages to be measured.

(b) An ON-OFF POWER switch.

(c) A convenience ac outlet.

(d) An amber POWER-ON lamp.

(e) Eight fuses for protecting the ac and dc circuits.

(f) A signal ground jack.

Five spare fuses and screwdriver adjustments for the -12, +6 and +1.5 voltages are on the top of the module.

3. CIRCUIT DESCRIPTION (See Fig. 1)

3.01 Primary 120 v ac power is brought into the unit through three-pin connector J901 on the rear panel. Pins B and C (common) provide the power, and Pin A is grounded to the frame. Three-prong convenience receptacle J900 on the front panel is connected directly to J901.

3.02 ON-OFF two-pole toggle POWER switch S900 on the front panel makes and breaks both sides of the power source. The power is brought to pins on the output connector to provide an ac supply. Amber POWER-ON indicator lamp DS900 is connected across the source through resistor R912.

3.03 After being fused on both sides (F900 and F901), the power is connected to the primary winding of ferroresonant transformer T900. A ferroresonant secondary winding connected across capacitor C900 maintains constant

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TABLE A

OUTPUT VOLTAGES AND DETAILED REQUIREMENTS

NOMINAL VOLTAGE*	MAX AVG LOAD 1	MAX SURGE LOAD 1	SURGE LOAD 1 MAX TIME DUR	REGULATION**			RIPPLE % RMS
				LOAD ENL-EFL	PRI POWER 103-127 V AC	PRI POWER FREQ 59.65-60.45 Hz	
-28 V ±5%	4.0 amp	12 amp	4 Millisec	20%	5%	±5%	2%
-12 V ±5%	1.6 amp	—	—	20%	5%	±5%	2%
-6 (5.6-6.2)	0.5 amp	1.1 amp	4 Millisec	10%	5%	±5%	2%
-6 (5.6-6.2)	-0.5 amp***	—	—	10%	5%	±5%	2%
+1.5	1.0 amp	—	—	—	5%	±5%	2%
+6	0.5 amp	—	—	—	5%	±5%	2%

*With 120 v ac, 60 Hz applied, and rated load.

**Each parameter (load, input volts and frequency) varied separately. Parameters otherwise maintained at 120 v ac, 60 Hz and rated load.

***Load supplied externally to -12 v.

output voltage in the event of fluctuations in the input voltage. In addition, the transformer has two secondary windings which supply the various dc voltages. Diodes CR900 through CR907 provide full-wave rectification. C902, C903, C904, C906, C907 and C908 are filter capacitors. R900, R905 and R906 are bleeder resistors. Each supply is protected by a fuse (F900 through F907).

3.04 One of the secondary windings (pin 3 to pin 9) provides power for the -12, +1.5, +6 and two -6 volt supplies. Pin 6 serves as the common side of each of these supplies. The two -6 volt supplies are developed by zener diodes (CR908 and CR909) and current-limiting resistors (R902 and R904) connected across the -12 volt supply. One -6 volt supply is capable of generating high peak currents over a short duration; the other is a reference voltage which provides a reference clamp for external circuitry. Variable resistors R907, R908 and R909 provide adjustments for the -12, +6 and +1.5 volt supplies respectively.

3.05 The other secondary winding (pin 0 to 12) provides power for a 28-volt supply which "floats" with respect to the other voltages.

3.06 Wafer switch S901 is connected so that any of the supply voltages can be applied to voltmeter M900 on the front panel. Current limiting resistors R910 and R911 act as voltage dividers for the meter.

3.07 Each supply voltage terminates in parallel at four pins of the output connector. The frame ground is also connected to pins on this connector.

3.08 Ground jack J1 on the front panel provides a signal ground connection.

4. TROUBLESHOOTING PROCEDURES

GENERAL

4.01 Tools required for troubleshooting are listed in Sections 570-005-800 and 582-100-717. A volt-ohm-milliammeter is also required.

4.02 Field troubleshooting is intended to locate a trouble area, by use of check-out procedures, as quickly as possible. The repair should be limited to adjustments, lubrication,

spare parts replacement, and other minor routines as stated in the troubleshooting table. For major repairs, the failing component is usually replaced to restore operation, then repaired in the service shop or returned to a service center with suitable facilities. For troubles not covered in the trouble-shooting table, consider the following:

(a) Exercise locally established routines (contact supervisor, contact service center, etc).

(b) If extensive repair is required, replace the entire unit to restore operation until repairs are made.

4.03 Troubles can be caused by malfunction of one or more of several elements in the system. The first step in troubleshooting is to isolate the trouble to one or more of its sources by use of Table B — Checkout Procedure with cross-reference to Table C — Power Supply Trouble Analysis.

TABLE B

CHECKOUT PROCEDURE

STEP	OPERATION	RESPONSE	TROUBLE NUMBER
1	Connect power cord to 120 v ac receptacle and move ON-OFF switch to ON.	POWER lamp lights.	1,2
2	Turn voltmeter switch to: +1.5 +6 -12 -6 -6R -28	Meter Reading: 1.35 to 1.65 5.4 to 6.6 10.8 to 13.2 5.3 to 6.5 5.3 to 6.5 25.3 to 30.9	3,4
3	Power supply output check procedure: Disconnect plug J902 from connector J903 at rear of power supply. With ON-OFF switch at ON and using a VOM, check reading at connector J903. Each output should be present at four pins. J903 Connector Pin A8, B2, C3, D2 B4, C4, D4, E4 B7, C7, D7, E7 A1, A2, A3, A4 A5, B1, C1, D1 B6, C6, D6, E6 B5, C5, D5, E5 B8, C8, D8, E8 B3, C3, D3, E3 A9, B9, C9, D9 A10, B10, C10, D10	 Voltage Present -28 Return -28 -12 -6 -6R (Voltage Ref) Circuit Gnd Frame Gnd +1.5 +6 120 v ac (103-127) 120 v ac Common (103-127)	5

TABLE C

POWER SUPPLY TROUBLE ANALYSIS

<table>
<tr><th>NO.</th><th>SYMPTOM</th><th>ANALYSIS AND CORRECTIVE PROCEDURES</th></tr>
<tr><td>1</td><td>No power (power supply switch ON).</td><td>Examine power input connections and connector at rear of power supply (see Fig. 1).

Pin — Description
A — Frame Gnd
B — 120 v ac Common (103-127)
C — 120 v ac (103-127)

Examine terminal 10 amp SL-BL fuse TP120165 in bottom front of cabinet. Replace if blown.

Examine terminal power cord TP165239. Replace if defective.

Examine POWER switch TP105803 and its wiring. Replace if defective.</td></tr>
<tr><td>2</td><td>POWER ON lamp at power supply does not light.</td><td>Replace bulb TP171624.

Check resistor R912 at DS900A.

Check socket DS900 and wiring connections.

Check ON-OFF switch S900 wiring at terminals 3 and 4.</td></tr>
<tr><td>3</td><td>Voltmeter does not show a reading (when a voltage is checked, with POWER ON lamp ON).</td><td>If all voltages are missing, check both 1.6 amp ac fuses TP171642. Replace if blown.

Examine fuse at missing voltage.

Voltage — Amps — Part No.
-6 v — 1 — TP120139
+6 v — 1 — TP120139
+1.5 v — 2 — TP120166
-6R v — 1 — TP120139
-12 v — 3 — TP171658
-28 v — 6 — TP171641

Replace if blown.

Check output voltage at fuse holder (using a VOM, set to X1 scale).

(1) If voltage is present, replace rotary switch TP171447.

(2) If voltage is missing, see Trouble 5.</td></tr>
</table>

TABLE C

POWER SUPPLY TROUBLE ANALYSIS (Continued)

NO.	SYMPTOM	ANALYSIS AND CORRECTIVE PROCEDURES
4	Power supply voltmeter reading is outside of limits.	Verify output voltage at fuse holder for incorrect voltage, using a VOM. If voltage is within limits replace meter TP171449 and retest. If either +1.5 v, +6 v or -12 v is outside of its limits an adjustment may be made varing the vernier rheostat located on the top of the power supply. Voltage — Resistor +1.5 — R909 +6 — R908 -12 — R907 Procedure: Loosen locknut at the rheostat. Turn left or right until reading is nominal on VOM. Tighten locknut (while holding setting with a screw-driver). Recheck voltage reading of voltmeter and output voltages at J903. If either -6 v, -6R v or -28 v is outside of its limits, see Trouble 5.
5	Voltage is missing or outside of limits at J903.	Examine circuit path (base of fuse holder to terminal output at J903) wiring and connections, using Fig. 1, 2, and 3. Replace or repair any defective wiring or connections. With power removed, test components of the circuit individually for continuity, resistance or capacitance. WARNING: BE EXTREMELY CAREFUL WHEN HANDLING CHARGED CAPACITORS. A SEVERE ELECTRICAL SHOCK MAY BE RECEIVED, EVEN AFTER SET POWER HAS BEEN REMOVED. Replace any defective parts and retest.

4.04 Troubles isolated to the power supply may be corrected by adjustment, cleaning, or replacement of mechanical components; replacement of fuses, capacitors, resistors, or other electrical components; repair or replacement of set wiring. Most electrical troubles are found at contact points in the set, such as switch contacts, plug-in connector contacts, wiring field terminals, wire straps, soldered connections, spliced wires, and chassis ground connections. Localizing these may require checking for continuity, resistance, or capacitance. REMOVE POWER BEFORE MAKING ANY OF THESE CHECKS.

(a) Continuity — The continuity check is used to locate open circuits. Connect the test leads on a volt-ohm-milliammeter so that current can flow only through the suspected circuit or component. Be sure no other part of the circuit is in parallel with the circuit being checked. If necessary, disconnect some leads but DO NOT DISTURB THE WIRING MORE THAN NECESSARY. Check all components which are likely to have caused the open circuit. If the trouble source is not found, open the circuit at a convenient point and check continuity from one side of the open point to a point near the middle of the complete circuit. If continuity is indicated, check again from the other side of the open point to the same point near the middle. Continue dividing the circuit until the open circuit fault is located.

(b) Resistance — The resistance check is used to locate open or shorted coil windings, transformer windings, resistors, and inductors. Follow the same procedures as for continuity check.

(c) Capacitance — The capacitance check is used to locate shorted or leaking capacitors. Discharge the capacitor to be tested with an insulated jumper. Disconnect one lead and connect the capacitor to an ohmmeter. Use the highest scale. If the capacitor is good, the needle will move up the scale rapidly, then return more slowly to the infinity mark. If the capacitor is open, the needle will not move off infinity. If the capacitor is shorted, the needle will remain at a constant value between zero and infinity, depending on the resistance of the short.

WARNING: BE EXTREMELY CAREFUL WHEN HANDLING CHARGED CAPACITORS. A SEVERE ELECTRICAL SHOCK MAY BE RECEIVED, EVEN AFTER SET POWER HAS BEEN REMOVED.

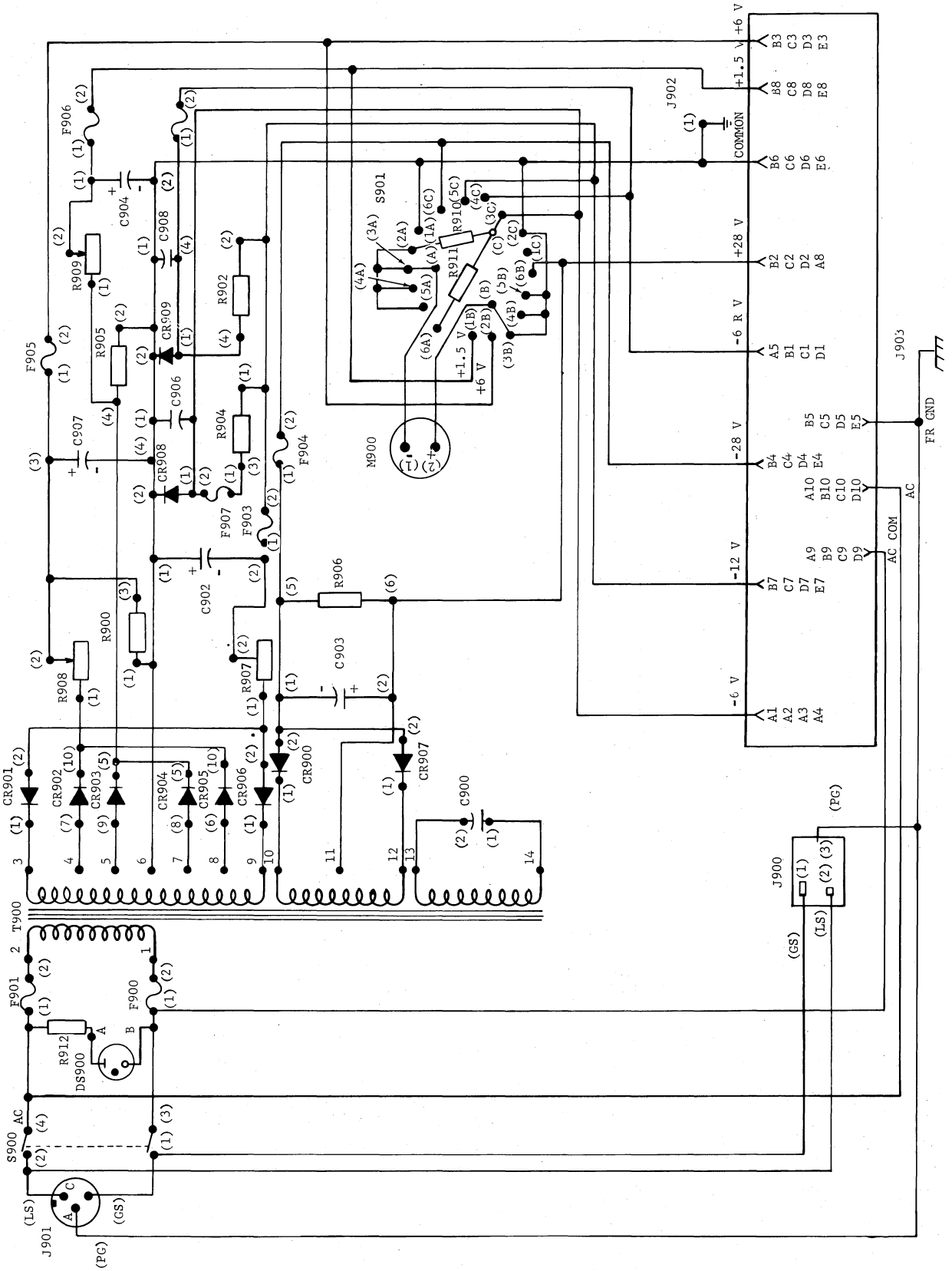

Fig. 1—Schematic Wiring Diagram for Rectifier

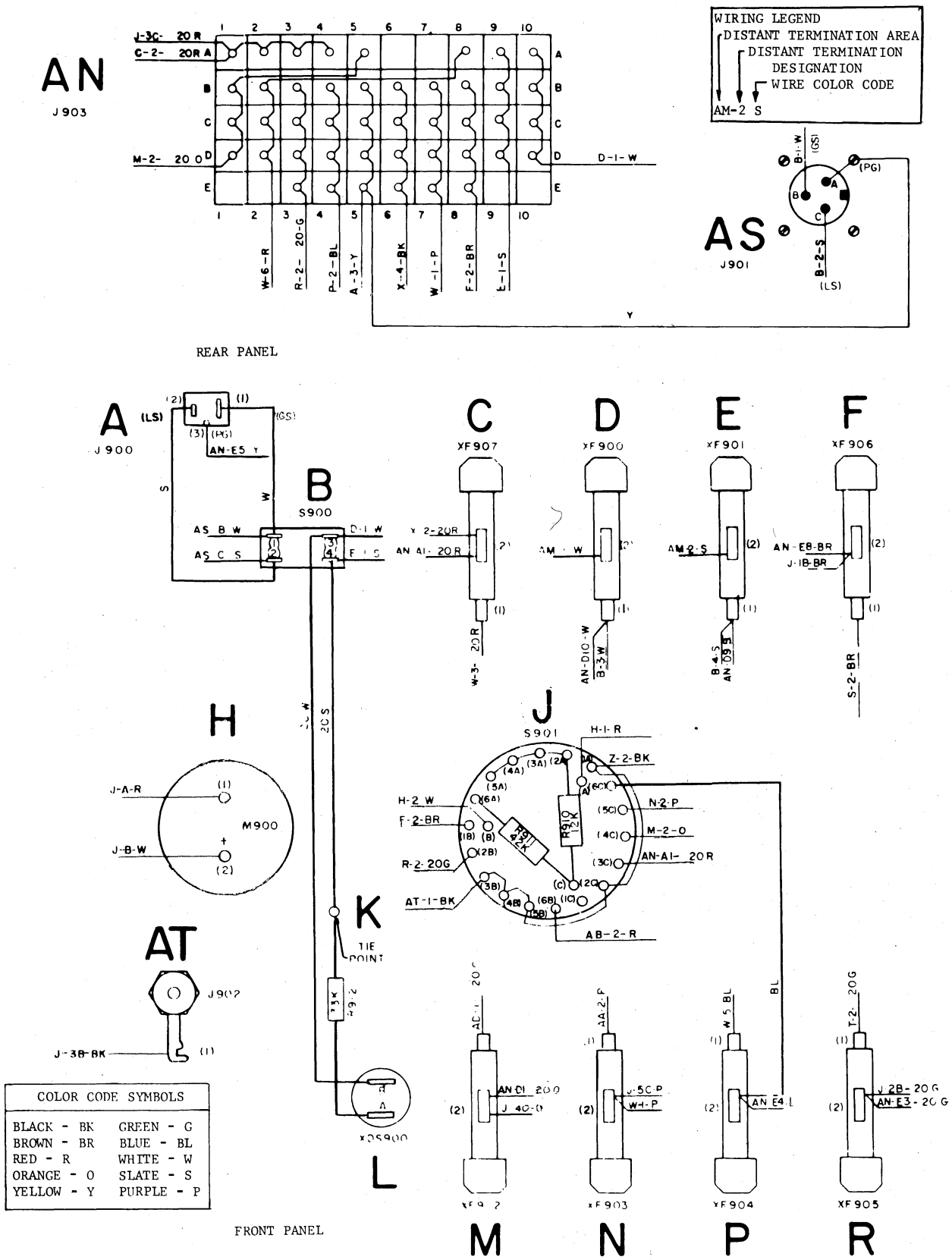

Fig. 2—Actual Wiring Diagram — Rear and Front Panels

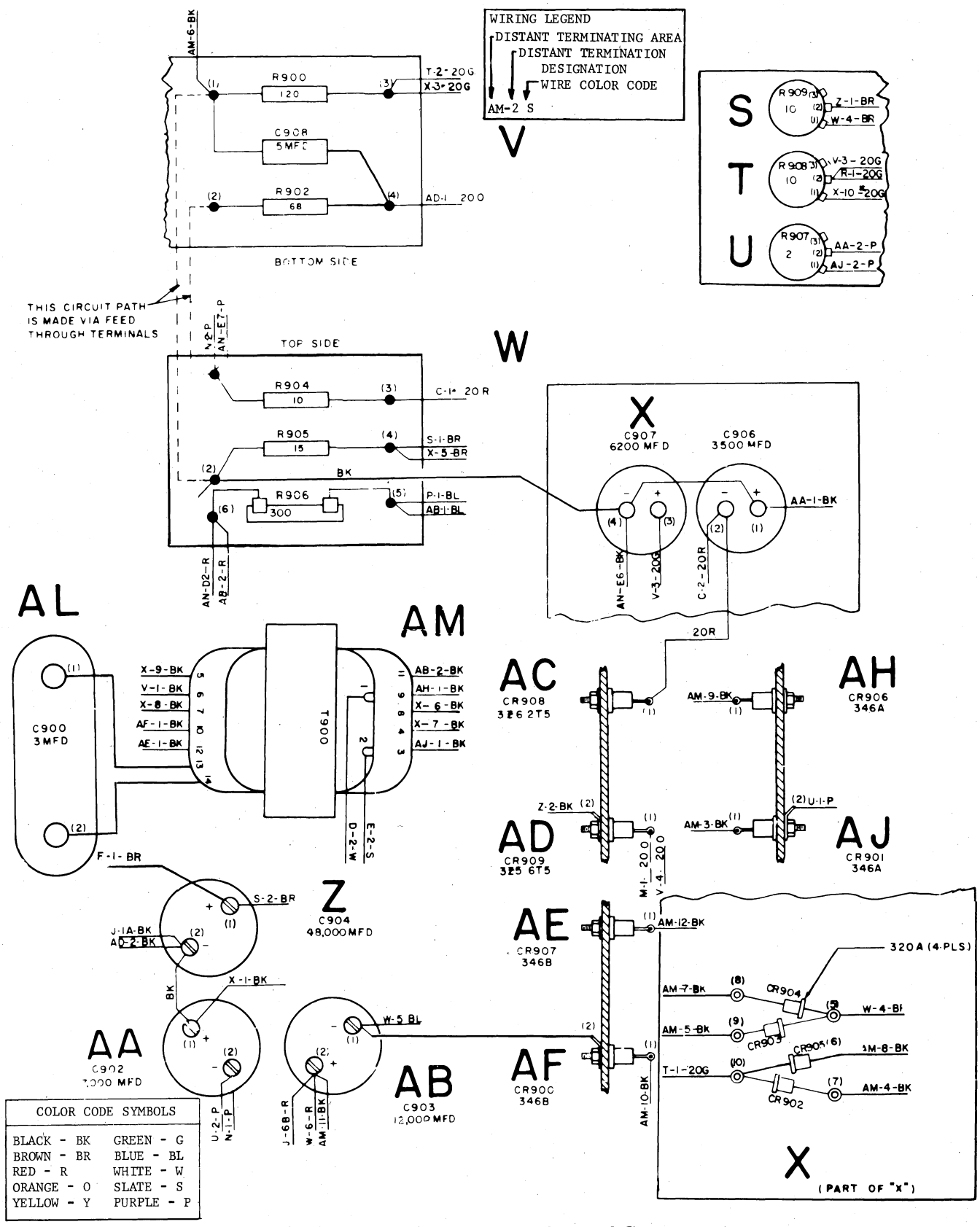

Fig. 3—Actual Wiring Diagram — Internal Components