Assembly - #143D Regulated Power Supply

Construction

( ) Clean the copper side of the printed circuit board with a piece of steel wool if it appears dull or oxidized.

( ) Mount all of the parts on the printed circuit board using the parts list and the printing on the top side of the circuit board. Be sure to orientate all diodes and electrolytic capacitors properly. Mount the components flush with the top of the board. Bend the leads on the foil side of the board and trim so that 1/16" to 1/8" of wire remains. Transistor Q2 is mounted on the top side of the circuit board so the copper side of the transistor faces away from the board. After installing transistor Q2, coat the copper face with a small amount of the heat sink compound included with your kit; place the small heat sink over the transistor; and secure with a #4-40 x 3/8 screw, expandable washer and nut. Thus transistor Q2 is sandwiched between the small heat sink and the circuit board with the copper side of the transistor facing the heat sink.

( ) Solder all of the board connections with a 30 to 50 watt soldering iron. Use only the solder supplied or an equivalent 60/40 alloy resin core solder. Do not use acid core solder or any type of paste flux. We will not guarantee or repair any kit on which such a product has been used.

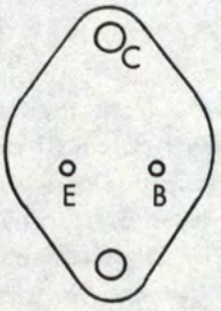
( ) Set the board aside and begin on the chassis assembly using the chassis pictorial as a reference. Attach the four angle brackets and rubber feet to the chassis in the four holes near the edge of the chassis. Slip the #6-32 x 3/8" screws through the feet, chassis and angle brackets and then secure with #6-32 lockwashers and nuts.

( ) Attach the following to the chassis ampmeter - M1, voltmeter-M2, switches-S1 and S2, jacks-J1, J2 and J3, potentiometers-R1 and R2. The finished front panel is sandwiched between the chassis hardware and the chassis itself. The meters are installed by removing the two nuts on the back of the meters, removing the metal shells, slipping the meters through the holes, replacing the shells and securing the nuts. Switches S1 and S2 are held by #4-40 x 1/4" screws, lockwashers and nuts. Potentiometer R1 and R2 are fastened by placing a 3/8" lockwasher between the potentiometers and the inside of the chassis and securing the controls with a 3/8" nut.

( ) Attach the four nylon mounting slips to the chassis at the location of the printed circuit board mounting holes.

( ) Attach the fuse holder F1.

( ) Attach the transistor Q1 to the heat sink after coating both sides of the included mica insulating washer with heat sink compound and placing the washer between the transistor Q1 and the heat sink. The transistor should be secured to the heat sink by two #6-32 x 1/2" screws, shoulder washers, locklug or lockwasher and nuts. The case of the transistor Q1 is electrically connected to the collector of the transistor and must be electrically isolated from the chassis.



Transistor Q1
bottom view

Use the diagram of the transistor Q1 to show the location of its emitter, base and collector terminals. Use the chassis layout diagram to show the proper set of holes in which Q1 should be mounted.

( ) Refer to the wiring chart and complete steps 1 thru 7. Cut each of the wires as near as possible to the indicated length and strip approximately 1/4" of insulation from each end. Solder only those connections indicated. The #18 guage wire is the wire with the larger diameter. Be sure to use the wire gauge specified in the table. Most of the longer wires should be routed from point to point by running the wires along the bend at the front of the chassis. This will give a neat wiring appearance and the lengths of wire specified will fit properly.

( ) Cut, strip and attach the wires in steps 8 thru 11 to the transistor Q1 only. Do not connect the other ends of the wires yet. This will be done in a later step.

( ) Bundle the wires attached to transistor Q1 and run them through the hole provided in the rear of the chassis. Turn the heat sink so the transistor is nearer the bottom of the chassis and attach the heat sink to the chassis using #4-40 x 1/4" screws, lockwashers and nuts. The wire bundle should be routed toward the front of the chassis while following the curvature of the inside of the chassis.

( ) Cut, strip and attach the wires in steps 12 thru 20 to the printed circuit board PC1 only Do not connect the other ends of the wires yet This will be done in a later step. All of the wires should be attached from

the copper side of circuit board and the remaining lengths of the wires should be routed toward the capacitor C4 side of the board.

( ) Without snapping the board into place , set the circuit board on the nylon standoffs. One by one attach the wires from the printed circuit board to the terminals given in steps 12 thru 20. Here again route the wires to the front of the chassis and then along the bend line to the proper terminal. Secure the wires in steps 12 thru 20 at the circuit board near capacitor C4 with the nylon wire tie

( ) Now attach the wires from the heat sink to their appropiate terminals as given in steps 8 thru 11

( ) Attach the capacitor clamp to the chassis using a #6-32 x 1/4" screw lockwasher and nut. Snap the capacitor C1 into place while using the chassis layout diagram to show proper orientation Be sure to note that C1 is a polarized capacitor and must not be connected backwards

( ) Attach the transformer T1 and the terminal strip TB1 to the chassis. The transformer is held to the chassis using #6-32 x 3/8" screws, lockwashers, and nuts. The terminal strip TB1 is held by the transformer mounting screw nearer the front of the chassis Orientate the transformer so the wires come out of the transformer on the printed circuit board side of the chassis.

( ) Cut , strip and attach the wires in steps 21 thru 23

( ) Attach the transformer leads to points given in steps 24 thru 30. All of the leads except for the black primary leads should be routed toward the rear of the chassis, along the bend line and under the circuit board where they should be attached

( ) Pull the two wires apart from the stripped and tinned end of the line cord for a lengthe of 7". Cut off 4" of wire from one of the ends and strip and tin the remaining length of wire Place the strain relief on the line cord at the point to which it was pulled back and crimp it with a pair of pliers. While crimping the strain relief, insert the wire and strain relief into the hole provided at the rear of the chassis. Push the line cord and strain relief far enough into the hole so that the strain relief locks in

( ) Attach the line cord wires as given in steps 31 and 32 of the wiring table.

( ) Check over all connections to be sure they have been soldered Snap the circuit board into place

( ) Insert the fuse into the fuse holder

( ) Attach the knobs to the potentiometers R1 and R2

Calibration

Check over all wiring carefully. The circuit is short proof for external loads, but a wiring error can destroy many of the components if it occurs in the wrong place.

Set the trimmer potentiometer R3 so the tab on the knurl of the control faces the transformer T1. Flip the voltage switch to the 32V position. Turn both the voltage and current controls fully clockwise (maximum voltage and minimum current). Plug the line cord into a 117 VAC wall outlet and turn the unit on. Slowly advance the control R3 until the voltage indication goes off scale above 35 Volts.

If your unit does not seem to be operating properly, unplug it and check all wiring. With the unit calibrated as it is, the output current can be limited from approximately 300 ma to 2 amps. Install the cover using #6-32 x 3/8" screws.

Operation

Turn the voltage control fully counterclockwise and the current control to mid range. Turn the power on. Set the voltage range switch to the range which covers the particular output voltage desired. With nothing connected to the output jacks, set the voltage control to the desired voltage. Short the output jacks of the supply with #18 gauge or heavier wire and advance the current control until the maximum amount of current desired is shown on the ampmeter. Remove the shorting wire. The power supply is now ready for operation. Although the current control can be adjusted for currents greater than 2 amps, continuous operation exceeds the design limits of the power supply and will cause the fuse F1 to blow out.

The current limiting circuit is for protection only. The supply should not be allowed to operate with a shorted output for an extended period of time. Doing so could overheat the power transistor and cause circuit failure. The current limiting circuit is a safety feature only and is not meant to be used for a constant current source.

Never use this instrument as a battery charger or for similiar service. This is a laboratory power supply and it should be treated accordingly if you expect it to continue to operate properly and reliably.

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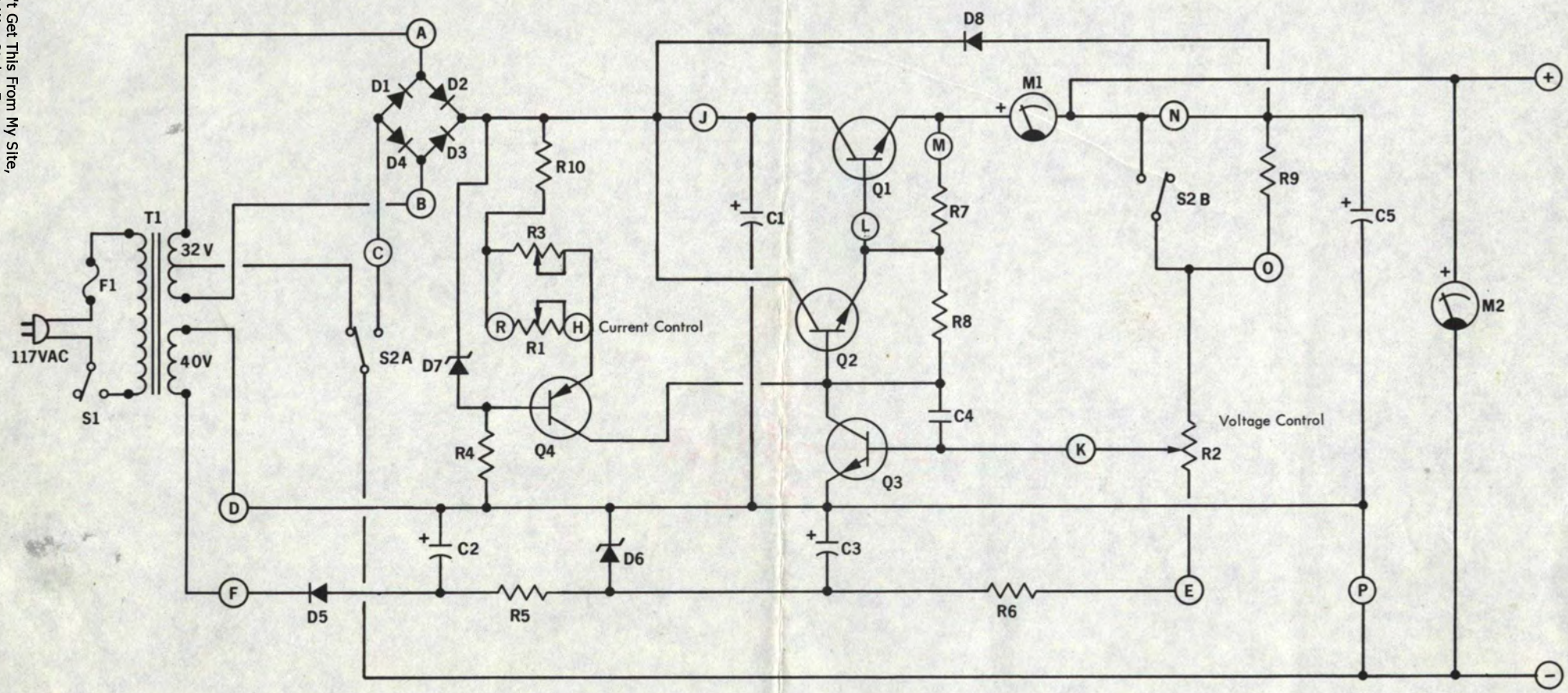

Power Supply 143D - Schematic

Parts List - #143D Power Supply

Resistors

R1	50K ohm special log carbon potentiometer
R2	5K ohm linear taper potentiometer
R3	250K ohm trimmer resistor
R4	10 K Ohm 1/2 watt 10% resistor
R5	1.5K ohm 1/2 watt 10% resistor
R6	5.6K ohm 1/2 watt 10% resistor
R7	100 ohm 1/2 watt 10% resistor
R8	22K ohm 1/2 watt 10% resistor
R9	3.3K ohm 1/2 watt 10% resistor
R10	2.2K ohm 1/2 watt 10% resistor

Capacitors

C1	4000 mfd @50V electrolytic capacitor
C2, C3	100 mfd electrolytic capacitor
C4	0.047 mfd mylar capacitor
C5	2.2 mfd electrolytic capacitor

Diodes

D1 - D5, D8	Silicon Rectifier
D6	36 volt zener diode 1N4753 or 1N5258
D7	4.7 volt zener diode 1N4732 or 1N5230

Transistors

Q1	2N3055 power transistor
Q2	MJE3055 power transistor
Q3	SS1123 transistor
Q4	SS1122 transistor

Misc.

F1	1 amp standard fuse
M1	0-2A DC ampmeter
M2	0-35V DC voltmeter
S1	SPST slide switch
S2	DPDT slide switch
T1	117 VAC primary, 32 VAC @2 amps C. T. and 40 VAC @20 ma secondary #36P12B
	Instructions

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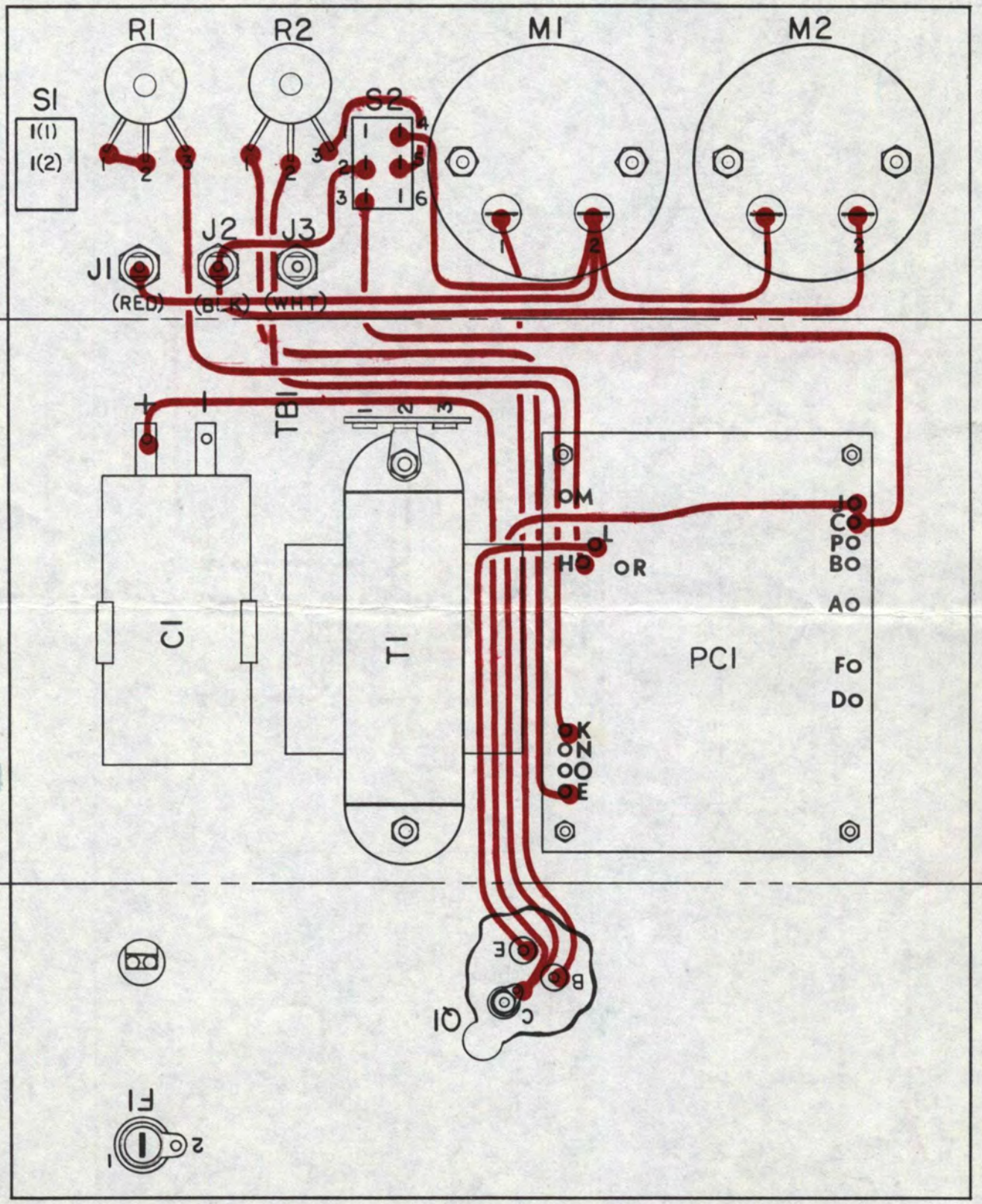
Front Panel

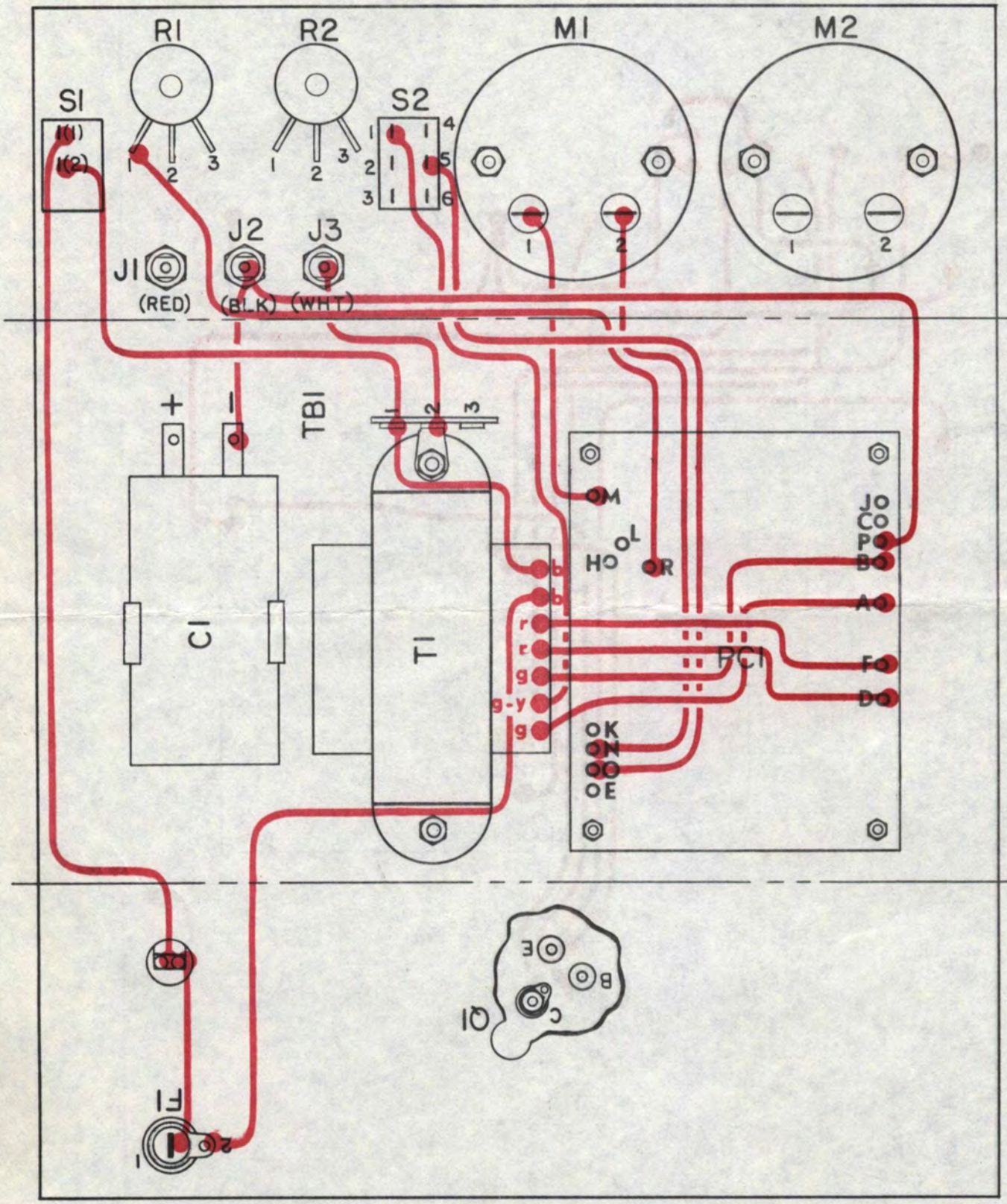


Power Supply #143 - Inside View of Chassis

Rear Panel

Wiring Pictorial - No. 143D Power Supply - Steps 1 - 15

Front Panel



Power Supply #143 - Inside View of Chassis

Rear Panel

Wiring Pictorial - No. 143D Power Supply - Steps 16 - 32

WIRE			FROM			TO		
STEP	LENGTH	GAUGE	PART	TERMINAL	SOLDER	PART	TERMINAL	SOLDER
1	7"	18	J1	-	YES	M1	2	NO
2	4"	18	S2	2	YES	J2	-	NO
3	6"	22	S2	4	YES	M1	2	NO
4	2"	22	M1	2	NO	M2	1	YES
5	9 1/2"	22	J2	-	NO	M2	2	YES
6	2"	22	R2	3	YES	S2	5	NO
7	1/2"	22	R1	2	YES	R1	1	NO
8	9 1/2"	18	Q1	E	YES	M1	1	YES
9	6 1/4"	22	Q1	B	YES	PC1	L	YES
10	8 1/2"	18	Q1	C	NO	PC1	J	YES
11	12"	22	Q1	[illegible]	YES	C1	(+)	YES
12	9 1/4"	18	PC1	C	YES	S2	3	YES
13	9 1/2"	22	PC1	E	YES	R2	1	YES
14	9 1/2"	22	PC1	H	YES	R1	3	YES
15	7 3/4"	22	PC1	K	YES	R2	2	YES
16	7"	22	PC1	M	YES	M1	1	NO
17	7 1/4"	18	PC1	N	YES	M1	2	YES
18	7 1/2"	22	PC1	O	YES	S2	5	YES
19	9 3/4"	18	PC1	P	YES	J2	-	NO
20	10"	22	PC1	R	YES	R1	1	YES
21	2"	22	C1	(-)	YES	J2	-	YES
22	2 1/2"	18	TB1	2	YES	J3	-	YES
23	6"	18	S1	2	YES	TB1	1	NO
24	FULL	18	T1	BLACK	-	F1	2	YES
25	FULL	18	T1	BLACK	-	TB1	1	YES
26	FULL	18	T1	GRN. YEL	-	S2	1	YES
27	FULL	18	T1	GREEN	-	PC1	A	YES
28	FULL	18	T1	GREEN	-	PC1	B	YES
29	FULL	18	T1	RED	-	PC1	D	YES
30	FULL	18	T1	RED	-	PC1	F	YES
31	3"	18	LINE CORD	-	-	F1	1	YES
32	7"	18	LINE CORD	-	-	S1	1	YES

Wiring Chart - #143D Power Supply

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