REGULATED DC POWER SUPPLY
MODELS 6256B, 6263B, 6264B, 6265B, 6266B, 6267B, 6271B, AND 6274B

* OPERATING AND SERVICE MANUAL FOR
MODEL 6256B, SERIALS 1542A–01167 AND ABOVE
MODEL 6263B, SERIALS 1542A–01227 AND ABOVE
MODEL 6264B, SERIALS 1539A–01656 AND ABOVE
MODEL 6265B, SERIALS 1529A–01231 AND ABOVE
MODEL 6266B, SERIALS 1539A–01671 AND ABOVE
MODEL 6267B, SERIALS 1539A–02341 AND ABOVE
MODEL 6271B, SERIALS 1543A–00746 AND ABOVE
MODEL 6274B, SERIALS 1539A–01811 AND ABOVE

* For instruments with serial numbers above those listed, a change page may be included.

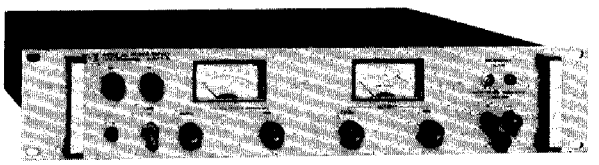
HP Part No. 5950-1765
Microfiche Part No. 5950-1766

Printed: January, 1976

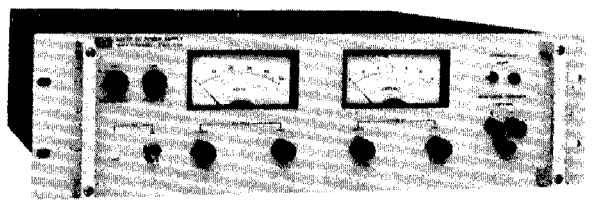
SECTION I
GENERAL INFORMATION

1-1 DESCRIPTION

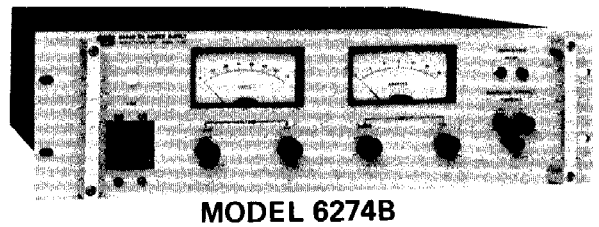
1-2 The eight constant-voltage/constant-current power supply models included in this manual use a transistor series-regulator combined with a triac preregulator for high efficiency, excellent regulation, and low ripple and noise. These supplies are suitably packaged for either bench or relay rack operation. The Models 6256B, 6264B, 6267B, and 6274B are housed in a 5 1/4-inch high full-rack-width cabinet, and the Models 6263B, 6265B, 6266B, and 6271B are housed in a similar 3 1/2-inch high cabinet.



MODELS 6263B, 6265B, 6266B, 6271B



MODELS 6256B, 6264B, 6267B



MODEL 6274B

1-3 The outputs of these supplies can be varied from zero to full rated voltage or current by setting coarse and fine voltage and current controls on the front panel or they can be programmed remotely by resistance or voltage inputs to rear panel terminals. When the voltage controls are used to establish a constant output voltage, the current controls establish a current limit that can protect the load from overcurrent; when the current controls are used to establish a constant output current, the voltage controls establish a voltage limit that can protect the load from excessive voltage. The crossover from constant-voltage to constant-current operation, or vice versa, occurs automatically when the load current reaches the value established by the current controls or the voltage reaches the value established by the voltage controls. The output voltage and current can both be monitored continuously on front panel meters.

1-4 Output loads are further protected by a built-in fast-acting overvoltage protection crowbar circuit that automatically shorts the supply's output terminals if a preset voltage limit is exceeded. A front panel control sets the voltage at which the crowbar trips and can be adjusted from approximately 10% to 110% of the supply's maximum rated voltage. When several supplies are installed in the same system, whether in series, parallel, or independently, their crowbar circuits can be interconnected so that all will trip simultaneously whenever any one of them does.

1-5 The Model 6274B supply is forced-air cooled; the other models covered by this manual are cooled by convection.

1-6 The ac input connections to the supplies in 5 1/4-inch cabinets are made at rear panel terminals; the 3 1/2-inch units are equipped with 3-wire line cords. All dc output, remote sensing, and remote programming connections are made at rear panel terminals. (The output terminals on the front panel are for monitoring purposes only and are rated at 3 amps maximum.) Either the positive or negative output terminal of a supply may be grounded or the supply's output may be floated at up to 300 volts above ground.

1-7 Remote programming, remote sensing, and several methods of operating supplies in combinations of two or three are made possible by rear panel terminals that allow access to control points within the regulator circuits. These capabilities are described below.

a. Remote Programming. The power supply's output voltage or current (or both) can be controlled from a remote location by varying a resistance or a voltage input signal to the supply's voltage or current regulator circuit.

b. Remote Sensing. Connecting the voltage regulator's feedback circuit to the load terminals rather than to the supply's output terminals prevents the voltage drop in the load leads from impairing voltage regulation at the load

terminals (see Figure 3-2), and turn it back on.

NOTE

The front panel MONITORING TERMINALS are intended only for monitoring the supply's output. They cannot be used for measuring the supply's performance specifications. These terminals have a 3-amp current limitation.

h. Adjust COARSE and FINE CURRENT controls ⑦ until ammeter ⑧ indicates desired output current or current limit. (The VOLTAGE controls must be set for a greater-than-zero output to obtain the output current programmed.)

i. Turn off the supply, remove the short from its output, and read the remainder of these operating instructions before connecting the supply to an actual load.

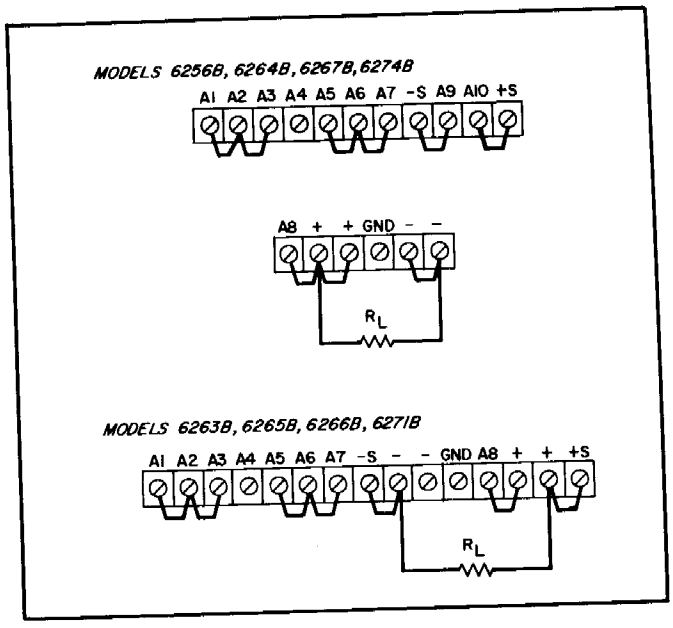


Figure 3-2. Normal Strapping Patterns

3-3 OPERATING MODES

3-4 This power supply is designed so that its mode of operation can be selected by making strapping connections between terminals on its rear panel. The following paragraphs first describe normal operation using the normal strapping pattern as it is connected at the factory. Later paragraphs cover some optional operating modes including remote voltage sensing, remote programming, and some methods of operating these power supplies in combinations of two or three.

3-5 The DC Power Supply Handbook, Application Note 90A, is a useful source of additional information on using regulated power supplies effectively. This 138-page handbook includes chapters on operating principles, ac and load connections, optional operating modes, and performance measurements and is available at no charge from your local HP sales office. The address of your local sales office can be found in the back of this manual.

3-6 NORMAL OPERATING MODE

3-7 This power supply was shipped with the proper rear panel strapping connections made for constant-voltage/constant-current operation with local sensing and local programming. This strapping pattern is illustrated in Figure 3-2. By means of the front panel voltage and current controls, the operator selects either a constant-voltage or a constant-current output. Whether the supply functions in the constant-voltage or the constant-current mode depends on the settings of the voltage and current controls and on the resistance of the output load. For values of load resistance greater than a critical crossover value equal to the voltage setting divided by the current setting, the supply operates in the constant-voltage mode. With a load resistance smaller than this critical value, it operates in the constant-current mode. The transition occurs automatically; no switches need to be operated or connections changed.

3-8 Constant Voltage Operation

3-9 To adjust the supply for constant voltage operation:

a. Turn on supply and, with output terminals open, adjust the VOLTAGE controls for the desired output voltage.

b. Connect a short across the rear panel output terminals and adjust the CURRENT controls for the desired maximum output current. If a load change causes this current limit to be exceeded, the supply automatically crosses over to constant current operation at this preset current limit and the output voltage drops proportionately. In setting the current limit, make an adequate allowance for high peak currents that could cause unwanted crossover. (Refer to paragraph 3-69.)

3-10 Constant Current Operation

3-11 To adjust the supply for constant current operation:

a. Connect a short across the rear output terminals and adjust the CURRENT controls for the desired output current.

b. Open the output terminals and adjust the VOLTAGE controls for the desired maximum output voltage. If a load change causes this voltage limit to be exceeded, the supply automatically crosses over to constant voltage operation at this preset voltage limit and the output current drops

3-31 Another factor to be considered when making a remote sensing installation is the inductance of the long load leads. Although dc and low frequency performance are improved by remote sensing, the higher inductance of longer leads does impair transient response and could affect the stability of the feedback loop seriously enough to cause oscillation. Disconnecting the supply's output capacitor and connecting a similar capacitor directly across the load helps to overcome these problems. Disconnect output capacitor C20 by removing the rear panel jumper from between terminals (+) and (A8) and connect another capacitor having approximately the same capacitance, an equal or greater voltage rating, and good high frequency characteristics across the load using short leads. It may also be beneficial to readjust transient recovery control R30 located on the main circuit board.

3-32 Remote Programming

3-33 The output voltage or current of these power supplies can be remotely controlled by connecting an external resistor or applying an external voltage to rear panel terminals. If resistance programming is used, a variable resistor can control the output over its entire range, or, by being connected in series with a fixed resistor, can have its control restricted to a limited portion of the output range. Alternately, a switch can be used to select fixed values of programming resistance to obtain a set of discrete voltages or currents. (The switch must have make-before-break contacts to avoid producing the output voltage transients that momentarily opening the programming terminals would cause.) To maintain the temperature and stability specifications of the supply, programming resistors must be stable, low noise resistors with a temperature coefficient of less than 30ppm per °C and a power rating at least 30 times what they will actually dissipate.

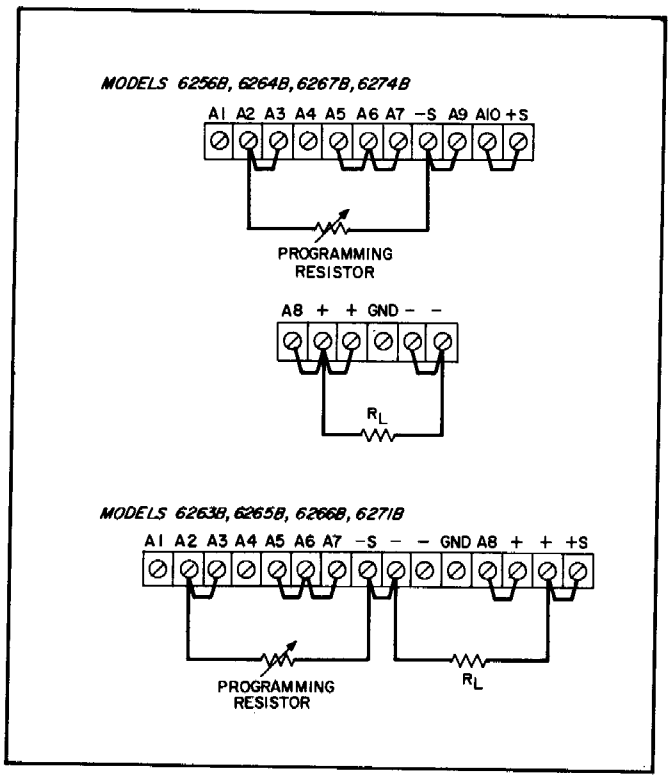


Figure 3-4. Resistance Programming of Output Voltage

3-34 Both voltage and current outputs can also be controlled through a voltage input. When voltage programming the output voltage, the choice can be made between using a connection that produces a unity gain relationship between input and output or another connection that produces variable voltage gains. (Only the unity gain connection is included in this manual, but methods of voltage programming that provide gains greater or less than unity are discussed in Application Note 90A, which is described in paragraph 3-5.)

3-35 Connecting a supply for remote voltage or current programming disables the corresponding front panel controls.

3-36 The following paragraphs discuss in greater detail the methods of remotely programming the output voltage or current using either a resistance or a voltage input.

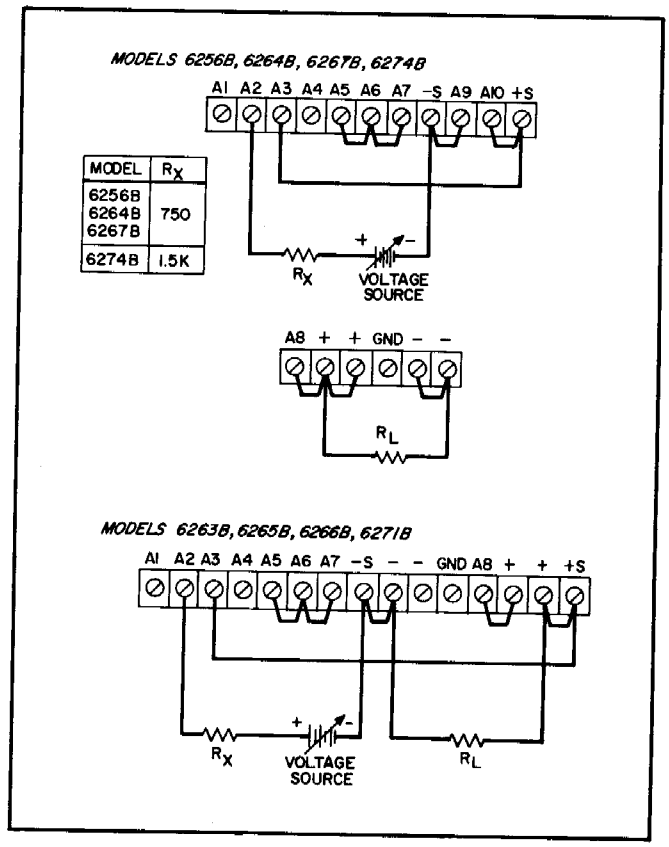


Figure 3-5. Voltage Programming of Output Voltage (Unity Gain)

Whichever method is used, the wires connecting the programming terminals of the supply to the remote programming device must be shielded to reduce noise pickup. The outer shield of the cable should not be used as a conductor but should be connected to ground at one end only.

3-37 Constant Voltage Output, Resistance Input. The rear panel connections shown in Figure 3-4 allow the output voltage to be varied by using an external resistor to program the supply. The supply's constant voltage programming current determines its programming coefficient. In the Models 6256B, 6263B, 6264B, 6265B, 6266B, and 6267B, this programming current is factory adjusted to within 1% of 5mA, resulting in a programming coefficient of 200 ohms per volt. In the Models 6271B and 6274B, a programming current of 3.33mA ±1% produces a programming coefficient of 300 ohms per volt. If a greater programming accuracy is required, it can be obtained either by changing resistor R13 as discussed in paragraph 5-74 or, if the instrument is equipped with Options 020 or 022, by adjusting potentiometer R122 as discussed in paragraph 5-75.

3-38 With the programming terminals shorted (terminals A2 to –S), the no-load output voltage of the supply should be –10mV ±5mV. If a minimum output voltage is required that is closer to zero than this, it can be obtained either by changing resistor R6 or R8 as discussed in paragraph 5-71 or, if the instrument is equipped with Option 020 or 022, by adjusting potentiometer R124 as discussed in paragraph 5-72.

——CAUTION——

Do not allow programming terminals (A2) and (–S) to become open circuited while resistance programming the output voltage. If they do become open circuited, the supply's output voltage tends to rise beyond its rated maximum. If the supply's current controls and overvoltage crowbar trip point are properly adjusted, however, no damage to the power supply or load should result.

3-39 Constant Voltage Output, Voltage Input. The rear panel connections shown in Figure 3-5 allow the output voltage to be varied by using an external voltage source to program the supply. In this mode, the output voltage varies in a 1 to 1 ratio with the programming voltage. The load on the programming voltage source is less than 20 microamperes. Impedance matching resistor R_X is required to maintain the temperature coefficient and stability specifications of the supply.

3-40 Constant Current Output, Resistance Input. The rear panel connections shown in Figure 3-6 allow the output current to be varied by using an external resistor to program the supply. The supply's constant current programming current, which is factory adjusted to 0.5mA ±10%, determine the exact value of its programming coefficient. The programming coefficients for the supplies included in this manual are as follows:

Models	6256B, 6264B	10 ohms/ampere
	6263B, 6267B	100 ohms/ampere
	6265B, 6271B	300 ohms/ampere
	6266B	200 ohms/ampere
	6274B	67 ohms/ampere

If the ±10% accuracy of these coefficients is not adequate, they may be adjusted either by changing resistor R19 as discussed in paragraph 5-80 or, if the instrument is equipped with Option 021 or 022, by adjusting potentiometer R126 as discussed in paragraph 5-81.

3-41 With zero ohms placed across the programming terminals, the output current of the supply may be set to exactly zero either by changing resistors R25 and R28 as described in paragraph 5-78 or, if the insturment is equipped with Option 021 or 022, by adjusting potentiometer R128 as discussed in paragraph 5-79.

——CAUTION——

Do not allow programming terminals (A4) and (A6) to become open-circuited while resistance programming the output current. If they do open, the supply's output current rises to a value thay may damage the supply or the load. If in the particular programming configuration used there is a chance that the terminals might open, we suggest that a resistor of the following value be connected across the programming terminals:

Models	*6256B, 6264B*	*200 ohms*
	6263B, 6266B	*1000 ohms*
	6267B, 6274B	*1000 ohms*
	6265B, 6271B	*900 ohms*

Of course, when this resistor is used, the resistance value actually programming the supply is the parallel combination of the remote programming resistance and the resistor across the programming terminals. Like the programming resistor, this resistor should be a low noise, low temperature coefficient type.

3-42 Constant Current Output, Voltage Input. The rear panel connections shown in Figure 3-7 allow the output current to be varied by using an external voltage source to program the supply. The constant current programming

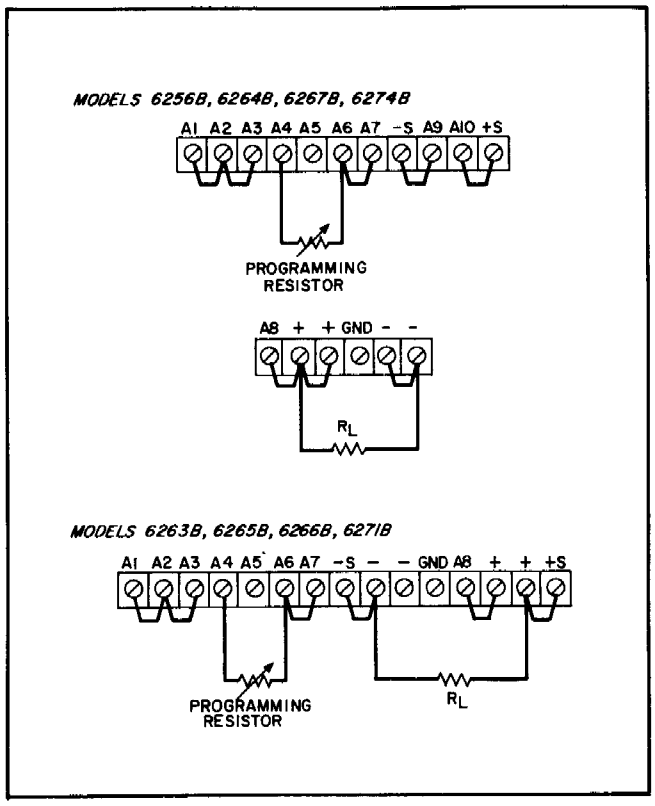


Figure 3-6. Resistance Programming of Output Current

coefficients for the supplies included in this manual are as follows (±10%):

Models	6256B, 6264B	25mV/ampere
	6263B, 6267B	50mV/ampere
	6265B, 6271B	167mV/ampere
	6266B	100mV/ampere
	6274B	33.3mV/ampere

The load on the programming voltage source is less than 20 microamperes. The programming voltage required to obtain maximum rated current from these supplies is about 500 millivolts. An input greater than 600mV may damage the instrument through excessive power dissipation. Impedance matching resistor R_X is required to maintain the temperature coefficient and stability specifications of the supply.

3-43 Auto-Parallel Operation

3-44 Use the rear panel and circuit board interconnections shown in Figure 3-8 or 3-9 to auto-parallel two or three supplies. This mode of operation provides a greater current capacity than can be obtained from a single supply while maintaining nearly equal load sharing among the paralleled supplies under all load conditions.
Supplies having the same model number make the most practical auto-parallel combinations, but any of the supplies included in this manual that have equal current ratings may be used.

NOTE

Use wires of equal length and gauge to connect each auto-paralleled supply to the load. Load sharing accuracy is affected unless the positive leads connecting each supply to the load are all equal in resistance.

3-45 Setting the Voltage and Current Controls. The auto-parallel combination of two or three supplies behaves as if it were a single constant-voltage/constant-current supply controlled by the voltage and current controls of the master supply. The voltage controls of the slave(s) are disabled, but their current controls remain operative and must be set to maximum to prevent a slave supply from independently reverting to constant current operation as would occur if the output current setting of the master supply exceeded that of a slave.

3-46 Overvoltage Protection in Auto-Parallel. The interconnections shown in Figures 3-8 and 3-9 between transformer T4 in the master and T4 in the slave(s) must be made to permit the overvoltage crowbar in the master to fire the SCRs in the master and the slave(s) if an overvoltage condition occurs. The circuit board pads to be interconnected are marked "EXT TRIG" and their locations are indicated on the component location diagrams

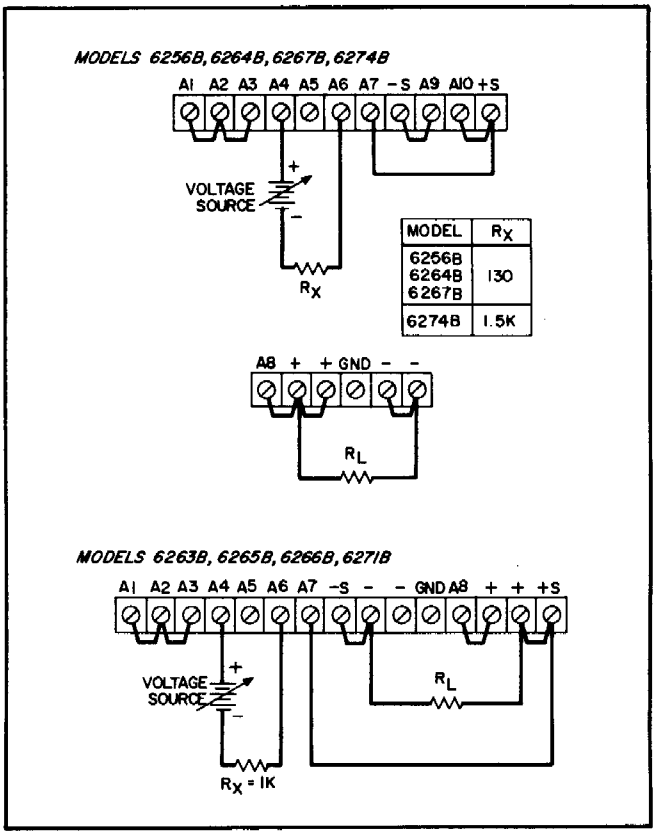


Figure 3-7. Voltage Programming of Output Current

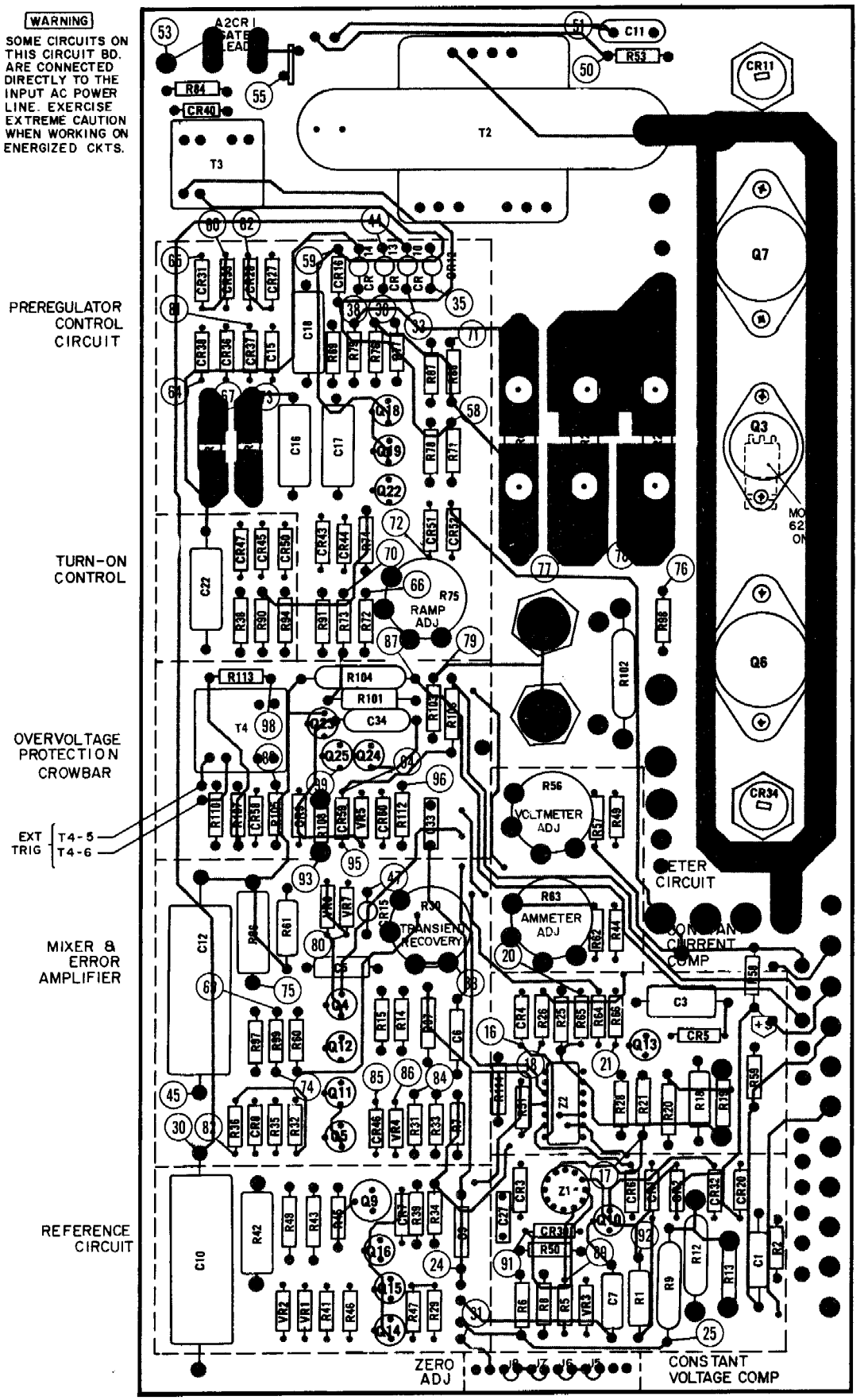


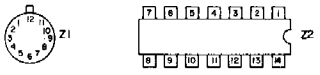
Figure 7-3. A1 Board Component Locations for Models 6256B, 6264B, 6267B, and 6274B

SCHEMATIC TABLE

	6256B	6264B	6267B	6274B
C1	5μF, 50V	5μF, 50V	5μF, 50V	5μF, 65V
C5	1000pF, 200V	1000pF, 200V	1000pF, 200V	2200pF, 200V
C13	34000μF, 30V	34000μF, 50V	40000μF, 50V	22000μF, 75V
C14	34000μF, 30V	34000μF, 30V	NOT USED	22000μF, 75V
C19	22μF, 35V	22μF, 35V	15μF, 50V	10μF, 100V
C20	8600μF, 25V	8600μF, 25V	5000μF, 45V	1600μF, 85V
F1	8A	10A	10A	NOT USED
R1	1K, 5%, 3W	1K, 5%, 3W	1K, 5%, 3W	2K, 5%, 3W
R2	43, 5%, 1/2W	82, 5%, 1/2W	160, 5%, 1/2W	240, 5%, 1/2W
R9	600, 5%, 5W	600, 5%, 5W	600, 5%, 5W	1K, 5%, 5W
R10	2.5K	5K	10K	20K
R11	50	50	50	1K
R12	680, 5%, 5W	680, 5%, 5W	680, 5%, 5W	1K, 5%, 5W
R15	750K, 5%, 1/2W	1.5M, 5%, 1/2W	1.5M, 5%, 1/2W	3.3M, 5%, 1/2W
R16	200	200	1K	1K
R17	10	10	100	100
R18	3K, 5%, 3W	3K, 5%, 3W	14K, 5%, 2W	14K, 5%, 2W
R33	330, 5%, 1/2W	330, 5%, 1/2W	330, 5%, 1/2W	24, 5%, 1/2W
R49	6K, 1%, 1/8W	12K, 1%, 1/8W	27.4K, 1%, 1/8W	39K, 1%, 1/8W
R54	.025	.025	.050	.0333
R57	471, 1%, 1/8W	471, 1%, 1/8W	600, 1%, 1/8W	600, 1%, 1/8W
R64	7.5K, 1%, 1/8W	7.5K, 1%, 1/8W	7.5K, 1%, 1/8W	160K, 1%, 1/8W
R65	5.49K, 1%, 1/8W	5.49K, 1%, 1/8W	5.49K, 1%, 1/8W	91K, 1%, 1/8W
R66	21.5, 1%, 1/8W	21.5, 1%, 1/8W	100, 1%, 1/8W	100, 1%, 1/8W
R67	150, 5%, 10W	150, 5%, 10W	400, 5%, 10W	800, 5%, 10W
R74	4.3K, 5%, 1/2W	4.3K, 5%, 1/2W	4.3K, 5%, 1/2W	10K, 5%, 1/2W
R76	75K, 5%, 1/2W	100K, 5%, 1/2W	390K, 5%, 1/2W	300K, 5%, 1/2W
R79	2.4K, 5%, 1/2W	2.4K, 5%, 1/2W	2.4K, 5%, 1/2W	5.1K, 5%, 1/2W
R86	51K, 5%, 1/2W	100K, 5%, 1/2W	200K, 5%, 1/2W	360K, 5%, 1/2W
R87	3.3K, 5%, 1/2W	3.3K, 5%, 1/2W	3.3K, 5%, 1/2W	6.2K, 5%, 1/2W
R96	270, 5%, 2W	270, 5%, 2W	560, 5%, 2W	270, 5%, 2W
R106	470, 1%, 1/4W	470, 1%, 1/4W	470, 1%, 1/4W	1.33K, 1%, 1/4W
R109	2.5K	5K	10K	20K

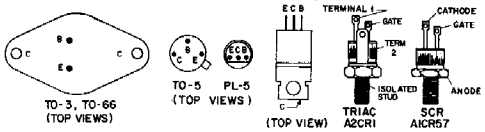
SCHEMATIC NOTES

1. ALL RESISTORS ARE IN OHMS, 1/2W ±5%, UNLESS OTHERWISE NOTED
2. ALL 1/8W AND 1/4W RESISTORS ARE ±1%, UNLESS OTHERWISE NOTED.
3. ALL CAPACITORS ARE IN MICROFARADS, UNLESS OTHERWISE NOTED.
4. REAR TERMINALS ARE SHOWN IN NORMAL STRAPPING FOR USE OF FRONT PANEL CONTROLS
5. ▭ DENOTES FRONT PANEL MARKING.
6. ——— DENOTES VOLTAGE FEEDBACK PATH.
7. ——— DENOTES CURRENT FEEDBACK PATH.
8. TRANSFORMERS AND RFI CHOKE SHOWN STRAPPED FOR 115VAC OPERATION.
9. DC VOLTAGES WERE MEASURED UNDER THE FOLLOWING CONDITIONS.
   A. HEWLETT-PACKARD MODEL 427A OR EQUIVALENT.
   B. 115VAC INPUT
   C. VOLTAGES REFERENCED +S, UNLESS OTHERWISE NOTED.
   D. VOLTAGES ARE TYPICAL ±10%, UNLESS OTHERWISE NOTED.
   E. ALL READINGS TAKEN IN CONSTANT VOLTAGE OPERATION AT MAXIMUM RATED OUTPUT WITH NO LOAD CONNECTED AND CURRENT CONTROLS TURNED FULLY CLOCKWISE.
10. ALL COMPONENTS LOCATED ON MAIN PRINTED CIRCUIT BOARD, UNLESS OTHERWISE INDICATED.
11. + DENOTES CHASSIS-MOUNTED COMPONENTS
12. PIN LOCATIONS FOR INTEGRATED CIRCUITS ARE AS FOLLOWS:



(TOP VIEWS)

13. PIN LOCATIONS FOR SEMICONDUCTORS ARE AS FOLLOWS:

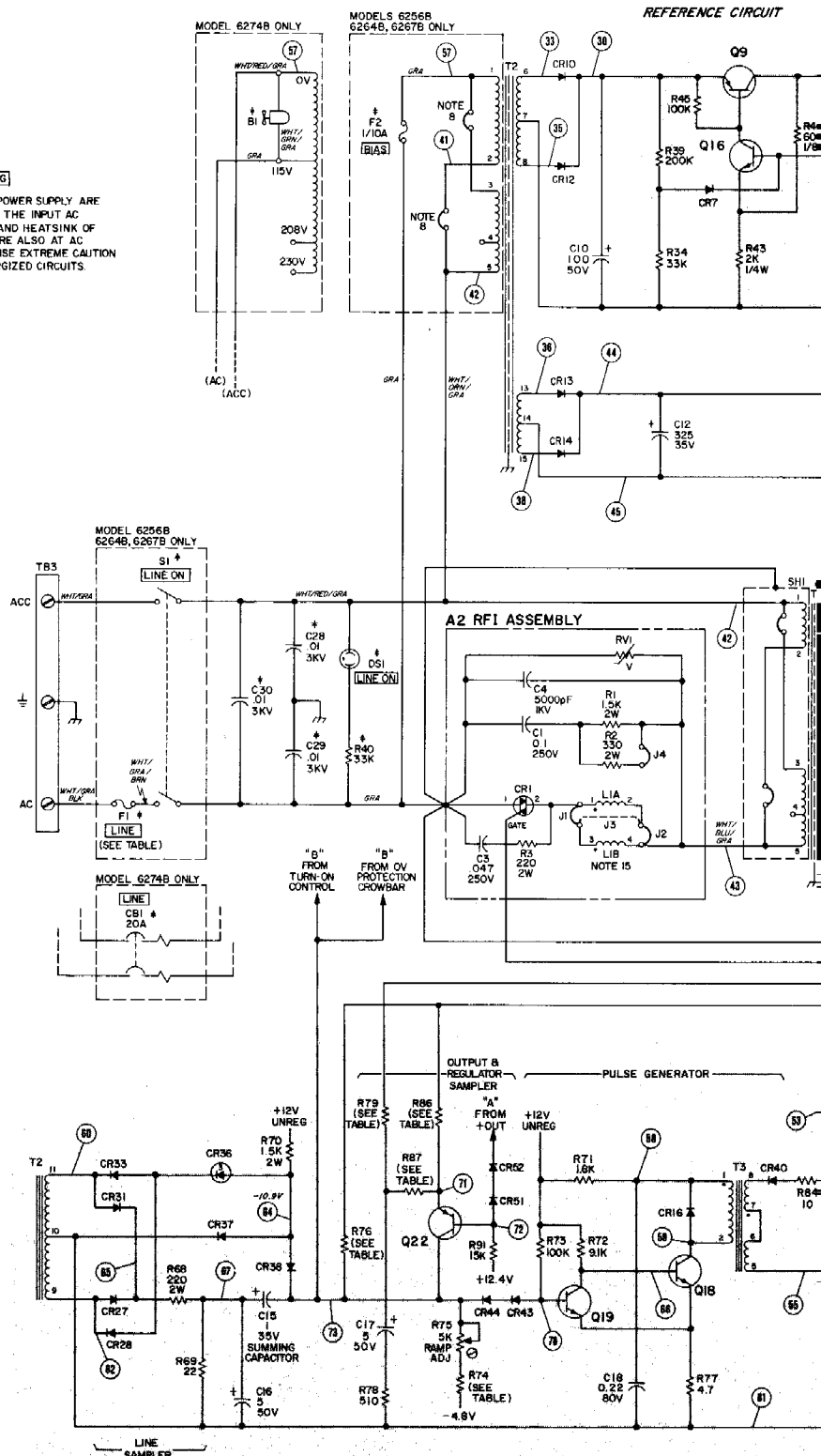


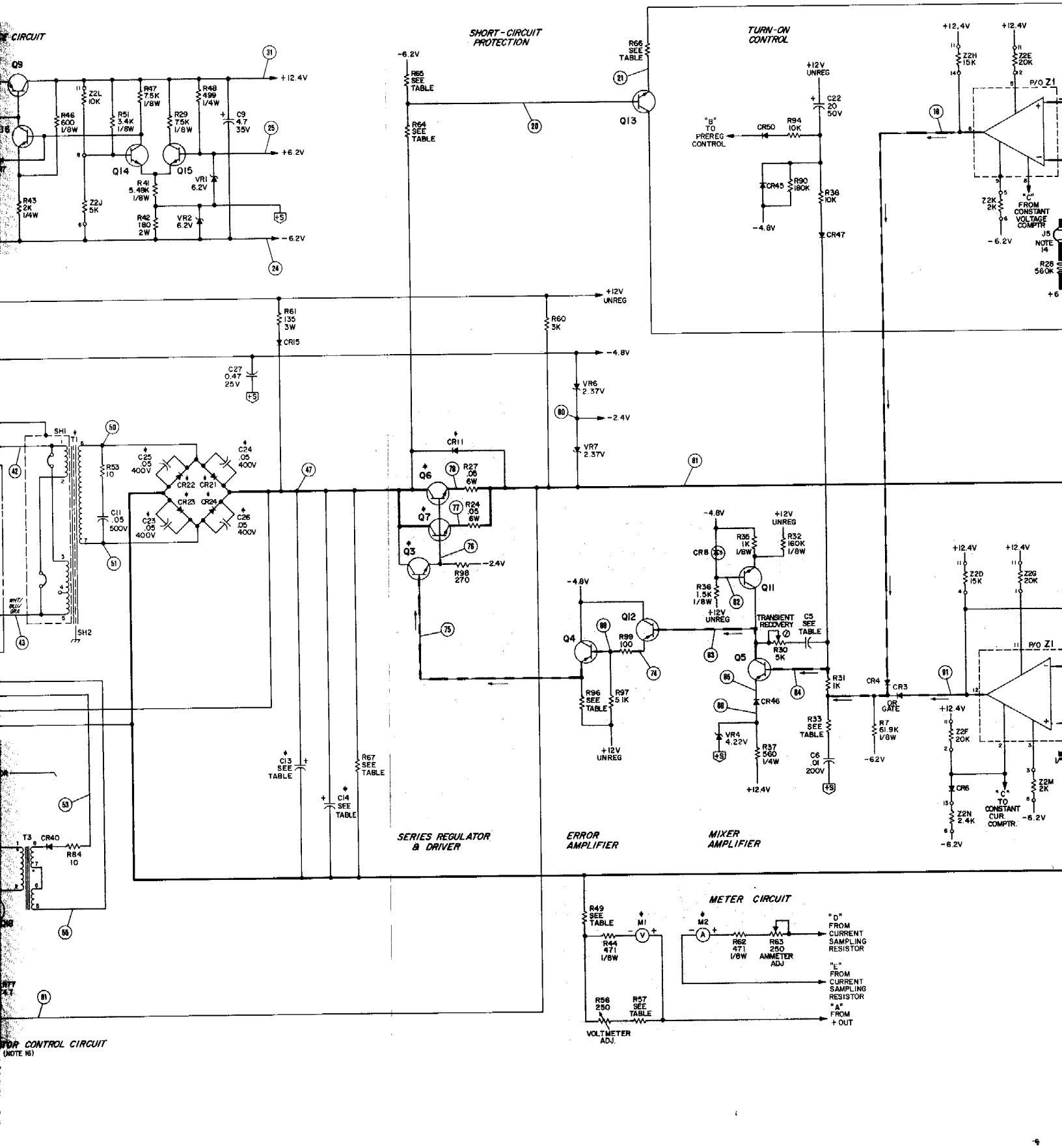
14. JUMPERS J7 & J8 REMOVED WHEN SUPPLY IS EQUIPPED WITH OPTION 020, 022, OR 040. JUMPERS J5 & J6 REMOVED WHEN SUPPLY IS EQUIPPED WITH OPTION 021, 022, OR 040.
15. FOR 115VAC INPUT, CONNECT JUMPERS J1, J2, AND J4, AND DISCONNECT J3. FOR 208 OR 230VAC INPUT, CONNECT J3 AND DISCONNECT J1, J2, AND J4.
16. SEE FIGURE 4-4 FOR PREREGULATOR CONTROL CIRCUIT WAVEFORMS.

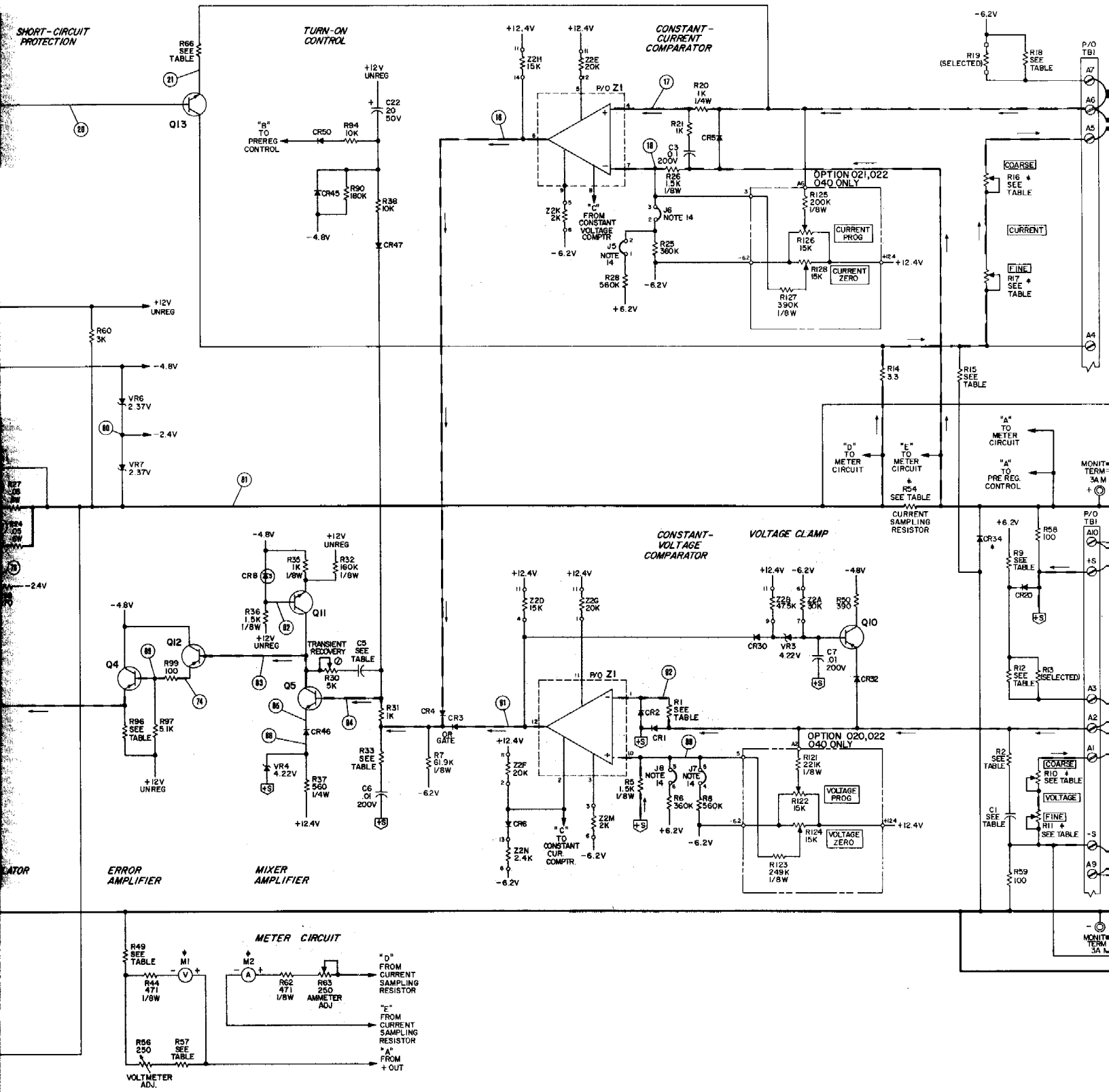
WARNING

SOME CIRCUITS IN THIS POWER SUPPLY ARE CONNECTED DIRECTLY TO THE INPUT AC POWER LINE. THE CASE AND HEATSINK OF THE A2 RFI ASSEMBLY ARE ALSO AT AC LINE POTENTIAL. EXERCISE EXTREME CAUTION WHEN WORKING ON ENERGIZED CIRCUITS.

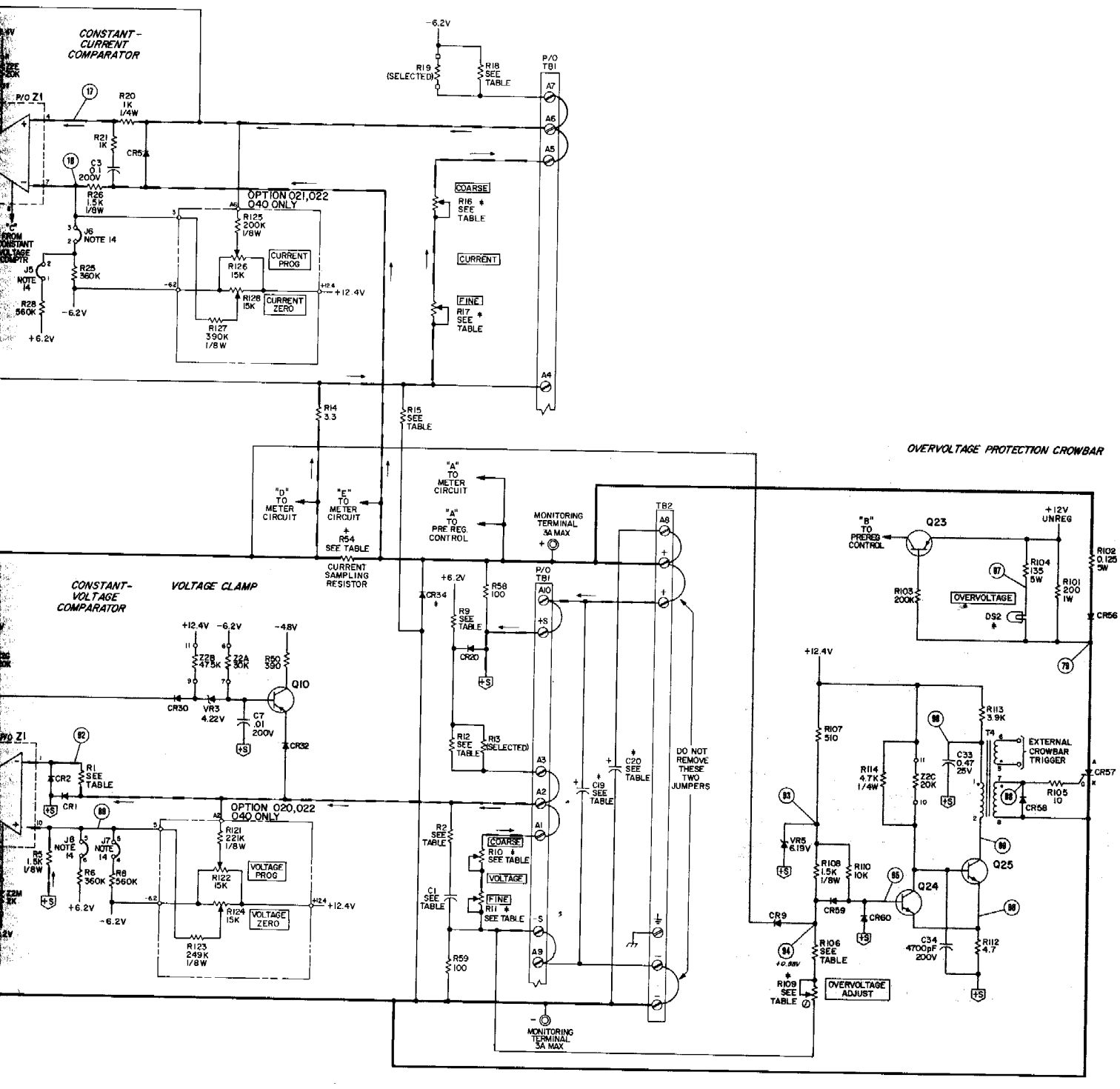
REFERENCE CIRCUIT




SHORT-CIRCUIT PROTECTION
TURN-ON CONTROL
SERIES REGULATOR & DRIVER
ERROR AMPLIFIER
MIXER AMPLIFIER
METER CIRCUIT
+12.4V
+6.2V
-6.2V
+12V UNREG
-4.8V
-2.4V
Q9
Q13
Q14
Q15
Q6
Q7
Q3
Q4
Q12
Q11
Q5
R66 SEE TABLE
R65 SEE TABLE
R64 SEE TABLE
R61 135 3W
R60 3K
C22 20 50V
R94 10K
R90 180K
R36 10K
CR50
CR45
CR47
"B" TO PREREG CONTROL
R46 600 1/8W
R51 3.4K 1/8W
R29 7.5K 1/8W
R48 499 1/4W
C9 4.7 35V
R47 7.5K 1/8W
Z2L 10K
Z2J 5K
R43 2K 1/4W
R41 5.49K 1/8W
R42 180 2W
VR1 6.2V
VR2 6.2V
C27 0.47 25V
VR6 2.37V
VR7 2.37V
CR15
CR11
R27 .06 6W
R24 .05 6W
R98 270
R53 10
C11 .05 500V
C25 .05 400V
C24 .05 400V
C23 .05 400V
C26 .05 400V
CR22 CR21 CR23 CR24
SH1 SH2 T1
C13 SEE TABLE
C14 SEE TABLE
R67 SEE TABLE
T3 CR40 R64 10
R96 SEE TABLE
R97 5.1K
R99 100
R35 1K 1/8W
R32 160K 1/8W
R36 1.5K 1/8W
CR8
TRANSIENT RECOVERY
C5 SEE TABLE
R30 5K
R31 1K
R33 SEE TABLE
C6 .01 200V
CR46
VR4 4.22V
R37 560 1/4W
CR4 CR3 OR GATE
R7 61.9K 1/8W
Z2H 15K
Z2E 20K
Z2D 15K
Z2G 20K
Z2F 20K
Z2N 2.4K
Z2M 2K
Z2K 2K
P/O Z1
"C" FROM CONSTANT VOLTAGE COMPTR
"C" TO CONSTANT CUR COMPTR.
J5
NOTE 14
R49 SEE TABLE
R44 471 1/8W
M1
M2
R62 471 1/8W
R63 250 AMMETER ADJ
R56 250 VOLTMETER ADJ.
R57 SEE TABLE
"D" FROM CURRENT SAMPLING RESISTOR
"E" FROM CURRENT SAMPLING RESISTOR
"A" FROM + OUT
ERROR CONTROL CIRCUIT
(NOTE 16)


SHORT-CIRCUIT PROTECTION
TURN-ON CONTROL
CONSTANT-CURRENT COMPARATOR
CONSTANT-VOLTAGE COMPARATOR
VOLTAGE CLAMP
ERROR AMPLIFIER
MIXER AMPLIFIER
METER CIRCUIT
OPTION 021,022 040 ONLY
OPTION 020,022 040 ONLY
Q13
Q12
Q11
Q10
Q5
Q4
P/O Z1
CURRENT SAMPLING RESISTOR
"A" TO METER CIRCUIT
"A" TO PRE REG. CONTROL
"D" TO METER CIRCUIT
"E" TO METER CIRCUIT
"B" TO PREREG CONTROL
"C" FROM CONSTANT VOLTAGE COMPTR
"C" TO CONSTANT CUR. COMPTR.
CURRENT PROG
CURRENT ZERO
VOLTAGE PROG
VOLTAGE ZERO
COARSE
CURRENT
FINE
VOLTAGE
TRANSIENT RECOVERY
OR GATE
VOLTMETER ADJ.
AMMETER ADJ
+12V UNREG
-4.8V
-2.4V
-6.2V
+6.2V
+12.4V
-12.4V
VR6 2.37V
VR7 2.37V
VR4 4.22V
VR3 4.22V
"D" FROM CURRENT SAMPLING RESISTOR
"E" FROM CURRENT SAMPLING RESISTOR
"A" FROM + OUT

Figu


CONSTANT-CURRENT COMPARATOR
CONSTANT-VOLTAGE COMPARATOR
VOLTAGE CLAMP
OVERVOLTAGE PROTECTION CROWBAR
OPTION 021,022 040 ONLY
OPTION 020,022 040 ONLY
-6.2V
+6.2V
+12.4V
-48V
+12V UNREG
R19 (SELECTED)
R18 SEE TABLE
P/O T81
R20 1K 1/4W
R21 1K
CR54
C3 0.1 200V
R26 1.5K 1/8W
R125 200K 1/8W
R126 15K
CURRENT PROG
R128 15K
CURRENT ZERO
R127 390K 1/8W
R28 560K
R25 560K
J6 NOTE 14
J5 NOTE 14
COARSE
R16 * SEE TABLE
CURRENT
FINE
R17 * SEE TABLE
R14 3.3
R15 SEE TABLE
"D" TO METER CIRCUIT
"E" TO METER CIRCUIT
R54 SEE TABLE
CURRENT SAMPLING RESISTOR
"A" TO METER CIRCUIT
"A" TO PRE REG. CONTROL
MONITORING TERMINAL 3A MAX
TB2
R58 100
CR34
R9 SEE TABLE
CR20
Z2B 475K
Z2A 30K
R50 390
Q10
CR30
VR3 4.22V
C7 .01 200V
CR32
R12 SEE TABLE
R13 (SELECTED)
C20 SEE TABLE
C19 SEE TABLE
DO NOT REMOVE THESE TWO JUMPERS
R1 SEE TABLE
CR2
CR1
R121 221K 1/8W
R122 15K
VOLTAGE PROG
R124 15K
VOLTAGE ZERO
R123 249K 1/8W
R5 1.5K 1/8W
J8 NOTE 14
J7 NOTE 14
R6 360K
R8 560K
R2 SEE TABLE
R10 * SEE TABLE
VOLTAGE
R11 * SEE TABLE
C1 SEE TABLE
R59 100
"B" TO PREREG CONTROL
Q23
R104 135 5W
R101 200 1W
R103 200K
OVERVOLTAGE
DS2 *
CR56
R102 0.125 3W
R107 510
R113 3.9K
T4
EXTERNAL CROWBAR TRIGGER
CR57
R105 10
CR58
R114 4.7K 1/4W
Z2C 20K
C33 0.47 25V
VR5 6.19V
R108 1.5K 1/8W
R110 10K
Q25
Q24
CR59
CR60
CR9
R106 SEE TABLE
C34 4700pF 200V
R112 4.7
R109 * SEE TABLE
OVERVOLTAGE ADJUST
MONITORING TERMINAL 3A MAX