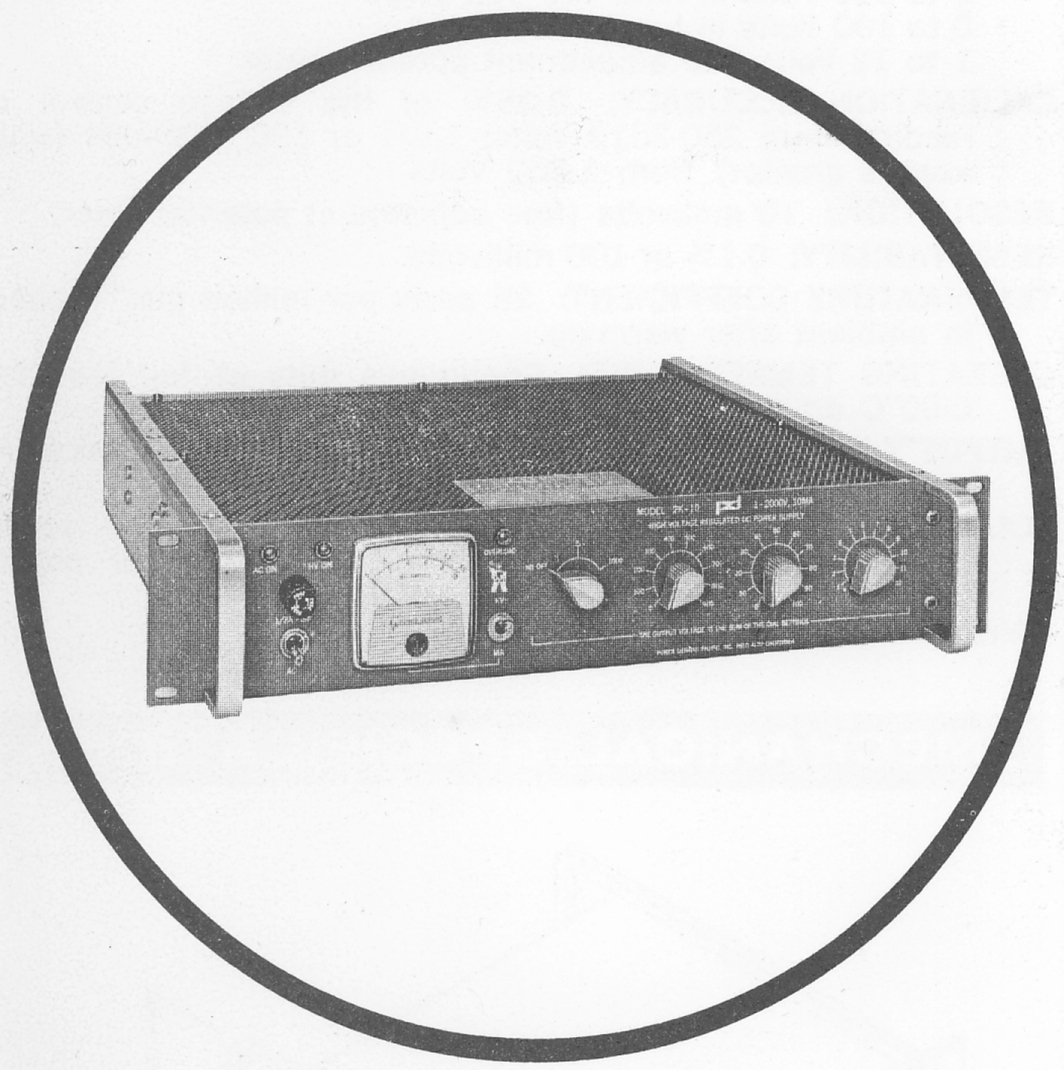
POWER DESIGNS

PHOTO MULTIPLIER AMPLIFIERS
RADIATION MONITORS
PARTICLE DETECTORS
ELECTRON OPTICS
MICROWAVE POWER

MODEL 2K-10

1-2012 V
0-10 MA

PRECISION DC HIGH VOLTAGE SOURCE

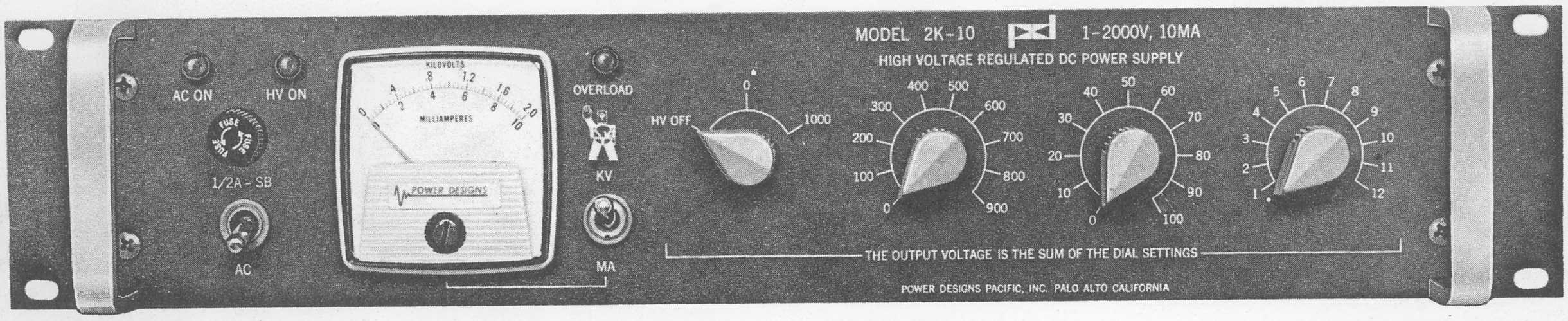


The exceptional performance of the Model 2K-10 is achieved through the combination of vacuum tube high voltage capability with sophisticated semiconductor techniques common in low voltage systems.

An order of magnitude improvement in operating parameters is achieved with the replacement of all vacuum tubes except for the "series regulator" by a temperature stabilized silicon transistor amplifier and solid state voltage references.

Fast acting electronic overload protection* permits continuous operation without damage into a short circuit. Function is automatically restored upon fault clearance.

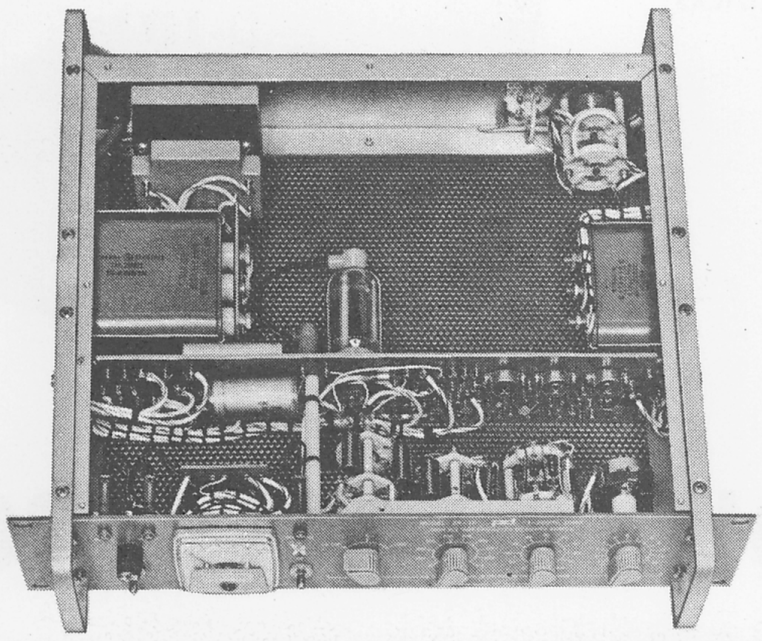
*ROBOTEC® Patent No. 3,083,330



SERIAL NUMBER _____

MODEL **2K-10** 1-2012 V • 0-10 MA

PRECISION DC HIGH VOLTAGE SOURCE



DESIGN FEATURES

- Vacuum tube/semiconductor regulator system prevents voltage overshoot on turn-on or turn-off and eliminates time delay relay circuits.
- Silicon semiconductor amplifier with low noise differential amplifier input stage, and better than 50 microsecond response time.
- *Fast, self-indicating electronic overload and short circuit protection permitting continuous operation into a short circuit with automatic restoration upon fault clearance. Fault indicator lamp signals overload.
- Corona free epoxy encapsulated transformers with multiple electrostatic shielding.
- Prestabilized solid state voltage reference with .001%/°C temperature coefficient and 15 microvolt noise level.
- Precision 4-dial voltage control calibrated to better than 0.25% utilizing low leakage ceramic and delrin switches and 5 PPM sealed wirewound resistors. Resettable to 0.1%.
- High resolution voltage output vernier potentiometer with precious metal wiper arm and resistance card with soldered end contacts.
- Glow discharge tubes protect transistors and precision divider resistors against high voltage transients.
- Lifetime silicon high voltage rectifier employing one ampere diodes in a multiple series configuration with built-in switching transient suppression. Voltage derated to 50% of maximum operating potentials.
- Electronic current limiter holds output to 125% of rating protecting loads such as sensitive photomultiplier tubes and permitting use as a capacitor charging source.
- BNC "safety" high voltage output receptacles safeguard against accidental insertion of low voltage coaxial leads and connectors.
- Dual volt-ammeter for output voltage or current monitoring.
- Low leakage plastic dielectric output and feedback capacitors in high voltage circuits. Computer grade electrolytic capacitors in low voltage circuits.
- Polarity reversing switch permits supply operation with either positive or negative output terminal at ground potential.
- Line and load circuits separately fused. Accessible at front panel. Separate HV on-off switch.
- Front and rear handle/rail construction provides ease in bench handling or relay rack installation.
- Fifty hour pre-aging of power supply prior to final test insures field service reliability.

*ROBOTEC® Patent No. 3,083,330

ELECTRICAL SPECIFICATIONS

OUTPUT: 1 Volt to 2012 Volts D-C, 0-10 milliamperes, continuously adjustable.

INPUT: 105-125 Volts, 50-440 Cycles, *55 Watts.

REGULATION: 0.002% plus 2 millivolts for line or load variations over the operating range.

RIPPLE: 1 millivolt peak to peak, maximum.

RESPONSE TIME: Less than 50 microseconds to return to within regulation limits for 100% step change in rated load.

STABILITY: Less than .005% drift in output voltage per hour; less than 0.02% drift per 24 hour period at constant ambient temperature after warm-up.

VOLTAGE CONTROLS: Precision calibrated voltage divider:
High voltage off —0-1000 volts.
0 to 900 Volts in nine 100 Volt steps
0 to 100 Volts in ten 10 Volt steps
1 to 12 Volts fine adjustment potentiometer

CALIBRATION ACCURACY: 0.25% of the voltage control dial reading from 250-2012 Volts; 1.0% or 100 millivolts (whichever is greater) from 1-250 Volts.

RESOLUTION: 10 millivolts (fine adjustment potentiometer)

RESETTABILITY: 0.1% or 100 millivolts.

TEMPERATURE COEFFICIENT: 25 parts per million per °C change in ambient after warm-up.

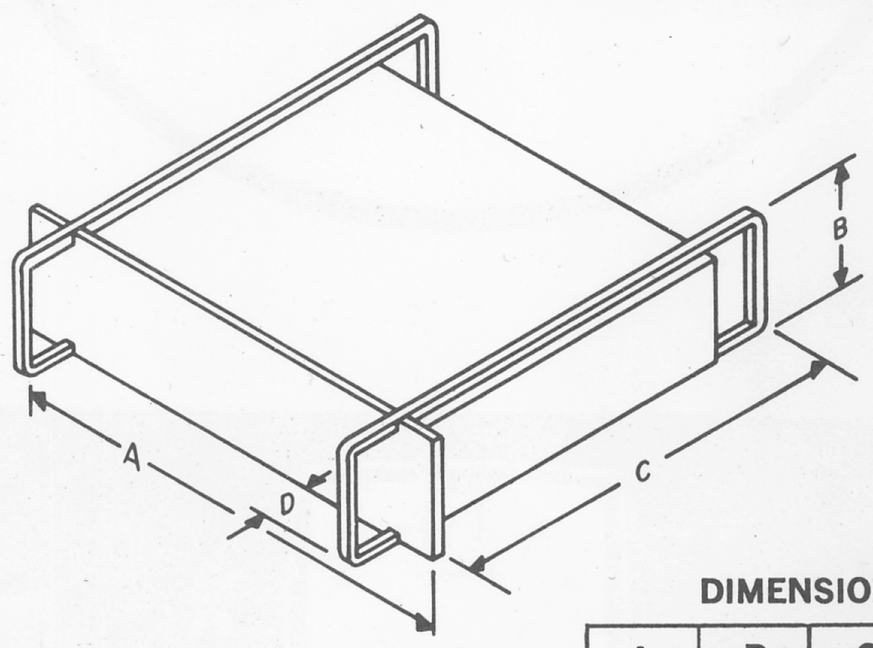
OPERATING TEMPERATURE: Continuous duty at full load from 0-50°C ambient.

OUTPUT TERMINALS: Two BNC "safety" high voltage receptacles on rear chassis surface.

POLARITY REVERSING SWITCH: Reversing switch on rear of chassis permits operation with either positive or negative output terminal at ground potential.

*At nominal line voltage.

MECHANICAL SPECIFICATIONS



DIMENSIONS:

A	B	C	D
19"	3½"	16"	1½"

WEIGHT: 20 lbs.

FINISH: Smooth blue epoxy synthetic enamel panel with white nomenclature. Golden alodine chassis. Grey epoxy enamel perforated metal dust covers. Brushed anodized natural aluminum handles and rails.

MODEL 2K-10 ---------- $299.00 F.O.B. WESTBURY

POWER DESIGNS INC.
1700 SHAMES DRIVE • WESTBURY, N. Y.
516 EDgewood 3-6200 TWX: 510-222-6561

POWER DESIGNS PACIFIC, INC.
3381 JUNIPERO SERRA • PALO ALTO, CALIFORNIA
415-321-6111 TWX: 910-373-1251

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HIGH-VOLTAGE POWER SUPPLY MODEL 2K10

SECTION 1
GENERAL DESCRIPTION

1-1. DESCRIPTION

The Model 2K10 is a well-regulated, high-voltage DC power source designed to operate devices requiring exceptionally stable voltages with unusually low noise and ripple content.

The regulator circuits use a series regulator tube driven by an all-silicon transistorized control amplifier. This amplifier provides a power source having excellent operating characteristics, stability, and response time. The power source also includes electronic overload protection circuits which protect semiconductor circuits from damage caused by voltage transients, arcing in the series regulator tube, or short-circuits suddenly applied to the output terminals.

The unusual stability of the output voltage is due to the use of a temperature compensated zener diode as a reference element, to the use of precision, wirewound, low-temperature-coefficient resistors in all voltage dividers, and to the use of an all-silicon control amplifier, fully compensated for temperature effects.

1-2. ELECTRICAL SPECIFICATIONS

Refer to Table 1 for a complete list of the electrical specifications.

1-3. MECHANICAL SPECIFICATIONS

The over-all dimensions and weight of the power supply are as follows:

Width: 19 inches (for mounting in standard 19-inch rack)
Height: 3-1/2 inches
Depth: 16 inches behind front panel (including handles)

Weight: 20 pounds

The high voltage output is available from two paralleled 5134 connectors on the rear panel. The mating connector 5135 may be used with RG-59A/U cable.

TABLE 1. ELECTRICAL SPECIFICATIONS

Parameter	Value
Input	105 to 125 volts, 50 to 440 Hz, single phase, 55 watts at nominal line.
Output	1 to 2012 volts DC, 0 to 10 milliamperes, continuously adjustable.
Regulation	Better than 0.002% +2 mV for line variations of ±10% or 100% changes in rated load
Ripple and Noise	Less than 1 mV peak-to-peak
Response Time	Less than 50 microseconds to return to within regulation limits for 100% step change in rated load (1 microsecond rise time).
Stability	Better than 0.005% per hour or 0.02% per 24 hours (after warm-up) at constant ambient temperature, line voltage and load
Output Voltage Control	Output voltage equals the sum of the settings of the three rotary switches and an interpolation potentiometer
Calibration Accuracy	0.25% of the voltage control dial reading from 250-2012 volts; 1% or 100 mV (whichever is greater) from 1-250 volts.
Resolution	10 mV (fine adjustment potentiometer)
Resettability	0.1% or 100 mV
Temperature Coefficient	25 parts per million per ^{o}C change in ambient after warm-up
Operating Temperature	Continuous duty at full load from 0 to 50^{o}C ambient
Polarity	Either positive or negative output may be grounded

SECTION 2

PREPARATION FOR USE, STORAGE AND RESHIPMENT

2-1. PREPARATION FOR USE

Do not operate the power source until the following is completed:

a. Disassemble top and bottom dust covers and carefully remove the packing material which protects the series regulator vacuum tube.

b. Be sure tube is firmly seated in its socket.

c. Remove all traces of dust accumulation on high voltage insulation surfaces.

d. Reassemble both dust covers.

e. Keep the original carton, protective wrap and cushioning for future usc.

The power supply has been adjusted at the factory and is ready fo use. The three-conductor, molded line cord, provided with the power supply, grounds the chassis and front panel when plugged into a mating outlet. If a two-conductor outlet must be used, connect through an adapter. Wire the ground lead of the adapter to ground on the outlet.

NOTE

The maximum operating temperature of the power source is 50°C (122°F). In rack installations be sure that the circulation of air within the cabinet, or the total heat dissipation of other equipment, does not result in too high an ambient temperature. If the unit is operated on a bench, provide sufficient space for free circulation of air.

2-2. PREPARATION FOR STORAGE AND RESHIPMENT

When necessary to store or reship the power source, use the following as a guide:

a. Protect the series regulator tube with foam cushioning material.

b. Wrap the power supply in heavy paper or plastic. Protect the meter face from scratches if paper is used. Do not tape over the meter face.

c. Pack the power supply in heavy corrugated cardboard carton and use heavy tape or metal bands to seal the carton.

NOTE

If the power supply is to be returned to the factory for service or repair, attach a tag identifying the owner and indicating the repair or service needed. In any correspondence identify the power supply by model number and serial number.

SECTION 3
OPERATION

3-1. PROCEDURES

a. Connect the line cord to a source of AC power. Set the AC toggle switch to the on position. This will energize the auxiliary power supplies and the heater of the series regulator tube. the AC ON lamp will light.

b. Set the POLARITY switch for the desired output polarity.

c. Set the output voltage to the desired level, using the front panel switches. The HV ON lamp will light and the high voltage circuits will be energized. The output voltage is the sum of the settings of these switches. The interpolation potentiometer permits precise output voltage adjustment.

3-2. OPERATING NOTES

a. No time delay is included in the high-voltage circuits. The HV on switch may be operated simultaneously with the AC on switch without damaging the unit and without any output voltage overshoot. The output voltage will rise more slowly than normal when the AC on and HV on switches are operated simultaneously, as the series regulator tube will pass no current until its filaments have warmed up. If the switches are operated simultaneously, the output voltage cannot overshoot because the transistorized control amplifier operates as soon as the unit is turned on.

b. Do not operate the POLARITY switch with the high voltage on. To reverse polarity, set the HV switch to off. Operate the OUTPUT POLARITY switch only when the output voltage has fallen to zero. Failure to observe this procedure will cause arcing in the switch, which may damage the power source.

c. The panel meter normally reads output voltage. By holding the meter switch in the MA position, the meter will read the output current. The meter is outside the regulating loop, thus introducing a voltage drop when in the MA position. To prevent poor load regulation due to this voltage drop, the meter switch is spring-loaded in the KV position.

d. The power source is factory adjusted to limit the output current to 11 milliamperes. The overload system will protect the load from long term thermal damage due to a continued short-circuit. The circuit is not a crowbar type, which is necessary to protect loads such as arcing traveling wave tubes, etc.

SECTION 4
THEORY OF OPERATION

4-1. GENERAL

The basic subassemblies making up the Model 2K10 are the unregulated DC source, series pass element, control amplifier and auxiliary power source.

4-2. UNREGULATED DC SOURCE

This is a voltage doubler circuit using silicon rectifiers.

4-3. SERIES PASS ELEMENT

A tetrode is used as a series regulator in the positive leg of the unregulated supply. The tube acts as a series resistance connected between the unregulated source and the load.

4-4. CONTROL AMPLIFIER

This transistor amplifier senses a fraction of the output voltage obtained from a switched resistance divider and compares it to a fixed zener diode voltage. Any error signal is then amplified and applied to the control grid of the regulator tube.

4-5. AUXILIARY POWER SOURCES

The control amplifier, regulator tube and zener diode reference circuit derive their operating potentials from the following auxiliary power sources:

(1) The +80 volt supply provides bias for V1 and the control amplifier.

(2) The -100 volt supply provides operating voltage for the control amplifier.

(3) The regulated +10 volt supply provides stable zener voltage references for the control amplifier.

SECTION 5
MAINTENANCE

5-1. GENERAL

Make the following adjustments whenever a component is replaced or whenever periodic calibration is scheduled:

WARNING

LETHAL VOLTAGES MAY BE PRESENT WHEN THE POWER SOURCE IS TURNED OFF. DISCHARGE ALL HIGH-VOLTAGE CAPACITORS BEFORE SERVICING THE SUPPLY. WHENEVER POSSIBLE, SERVICE THE UNIT WITH THE OUTPUT POLARITY SWITCH SET TO NEGATIVE. ALWAYS USE AN INSULATED SCREWDRIVER WHEN MAKING ADJUSTMENTS.

5-2. OUTPUT VOLTAGE CALIBRATION

Check the calibration of the unit at regular intervals. Adjust potentiometer R17, if necessary, to bring the unit back within specifications. This adjustment may also be necessary when any component in the regulator section is replaced. If the zener reference diode is replaced, calibration may be necessary. Proceed as follows:

a. Set the selector switches for an output of 2001 volts.

b. Set the AC switch to on and allow the unit to stabilize for at least five minutes. Adjust potentiometer R17 (using an insulated screwdriver) until the output voltage shown on the external voltmeter agrees with the selector switch settings.

NOTE

It may be necessary to connect a jumper across R15 and/or R16 in some combination to set this voltage with R17. Jumpers which may already be present on the board should be removed before these jumpers are installed.

5-4. LOAD REGULATION

a. The regulation of the supply has been set before leaving the factory, but the circumstances of some experiments may require a change in regulation setting; the use of a long cable between supply and load, for instance, will introduce regulation at the load which may be compensated by adjusting R40 for negative load regulation.

b. Regulation settings should not be made at output voltages less than 1500 volts. If the regulation is set at low output voltage, the unit may be out of specification at high output voltages.

5-6. CURRENT LIMITING

The power supplies are adjusted at the factory to current limit at 11 milliamperes. Adjust R12 to limit the output to a lower current when desired. Settings higher than 11 milliamperes are not recommended, as they may lead to overheating of the series regulator tube under some conditions of line voltage and output voltage settings.

5-7. METER CALIBRATION

a. Potentiometer R28 adjusts the calibration of the kilovolt scale. Set the unit to an output above 1500 volts (read either on the selector switches or on an external voltmeter). Then, adjust R28 until the meter reading corresponds to the actual output voltage.

b. Potentiometer R63 adjusts the calibration of the milliampere scale. Connect an external load and an external meter to measure the current supplied to this load. Turn on the power source and adjust the output voltage until the load current exceeds 10 milliamperes. Then, adjust R63 until the front panel meter reading agrees with that of the external current meter.

APPENDIX

1. INTRODUCTION

This appendix contains an electrical parts list, schematic diagram, parts location diagram and equipment warranty.

2. ELECTRICAL PARTS LIST

All electrical and electronic parts are listed in the sequence of their circuit numbers as shown on the schematic diagram. A brief description of each part is given, followed by the code number of the manufacturer and his part number. All manufacturers' code numbers are taken from Cataloging Handbooks H4-1 and H4-2, Federal Supply Code for Manufacturers. These handbooks are available through Federal Agencies. They may also be ordered directly from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

We recommend that all parts having the code number 98095 be ordered directly from Power Designs Inc. The commercial equivalents of these parts have either wide parameter tolerances or require special factory inspection or modification before they are suitable for use in the power supply.

All components used in the power supply or supplied as replacements are carefully inspected at the factory. Inspections are performed on a 100% basis or at AQL levels in accordance with Military Specification MIL-Q-9858 under which Power Designs Inc. has been qualified.

All semicorductors are inspected on a 100% basis. They are inspected not only for operating parameters, but also for critical characteristics related to reliability and predictable life expectancy. Some of these characteristics are observed when the device is taken beyond its normal operating regions. These test techniques have been developed under a "predictable-reliability" program in operation at Power Designs Inc. for the past ten years. Under this program, quality-control procedures are constantly revaluated and updated as new advances are made in solid-state technology and additional experience is gleaned from field history.

Semiconductor manufacturers are constantly modifying their products. Complete lines are frequently discontinued to be replaced by devices having improved gain, operating voltage levels and frequency response. The high-gain, closed-loop DC amplifiers used in regulator circuits are particularly sensitive to slight changes in these parameters. Commercial or military "equivalent" transistors used as replacements may affect the power supply performance. Compliance with the original specifications can be assured if replacement semiconductors are ordered from the factory.

All replacement semiconductors are processed and stocked at the factory to insure complete interchangeability with the devices in the original equipment. To insure that proper replacements are provided, the original devices are coded with a Power Designs Inc. part number as follows:

MS	1028	A
Semiconductor Manufacturer's Code	Power Designs Inc. Type	Suffix Identifying Special Parameters

When ordering replacements, please identify the device as completely as possible, listing the model and serial number if available.

In some cases the replacement part received may have a different part number from that given in the electrical parts list. This can be due to several factors:

a. A different prefix indicates that Power Designs Inc. is using a different vendor source. The operating characteristics of the devices are identical.

b. A completely different part number indicates:

1. The original vendor discontinued manufacture of the item or could no longer manufacture it to the original specifications.

2. A better device for use in the particular circuit has been substituted.

3. Tighter controls for interchangeability have provided greater assurance of improved reliability with the new replacement.

ELECTRICAL PARTS LIST

NOTE: When replacing semiconductors or investigating their part numbers, note the information in paragraph 2 above.

	Circuit Number	Description	Mfr Code Number	Part Number
	C1	Capacitor, electrolytic, 400 uf, 85 vdc	98095	CE-83-.85
	C2	Capacitor, electrolytic, 50 uf, 150 vdc	98095	CE-86-1.5
	C3	Capacitor, plastic film, 0.1 uf, 200 vdc	98095	CP-17-2
**	C4 thru C7	Capacitor, ceramic disc, 0.005 uf, 3 kvdc	98095	CC-29-30
	C8	Capacitor,dual,oil filled, 2 uf, 2 kvdc each section	98095	CO-22-20
	C9	Capacitor, ceramic disc, 0.0022 uf, 6 kvdc	98095	CP-27-60
	C10,C11	Capacitor, plastic film, 0.01 uf, 200 vdc	98095	CP-16-2
	C12	Capacitor, plastic film, 0.1 uf, 200 vdc	98095	CP-17-2
	C13	Capacitor, plastic film, 0.01 uf, 200 vdc	98095	CP-16-2
	C14	Capacitor, dual, oil filled, 1 uf, 2 kvdc each section	98095	CO-21-20
	C15	Capacitor, ceramic disc, 0.05 uf, 600 vdc	98095	CC-34-6
	CR1 thru CR4	Diode, silicon	98095	SS843S,R
	CR5	Diode, silicon, zener	98095	UZ567
	CR6	Diode, silicon, zener	98095	AC359D,E
	CR7	Diode, silicon	98095	GI44
*	CR8	Diode, silicon, zener	98095	AC1948
	CR9	Diode, silicon	98095	GI44
**	CR10 thru CR21	Diode, silicon	98095	UT843AS,AR
	CR22	Diode, silicon, zener	98095	AC359B,C
	CR23 thru CR28	Diode, silicon	98095	GI44
	DS1,DS2	Lamp assembly, neon	98095	PLA-7
	DS3	Lamp assembly, neon	98095	PLA-8
	F1	Fuse, "Slo-Blo," ½ ampere	71400	MDL½
	I1	Lamp, neon	98095	GD-10
	I2,I3	Lamp, neon	98095	GD-11
	I4 thru I6	Lamp, neon	98095	GD-10
	J1, J2	Connector, HV coaxial	09408	5134
	M1	Meter, dual scale, 0-2 KV, 0-10 MA	98095	MVA-111
	Q1 thru Q4	Transistor, silicon, PNP	98095	MS1028A
	Q5	Transistor, silicon, PNP	98095	FS1027
	Q6	Transistor, dual silicon, NPN	98095	AS2056, FS2063
	R1	Resistor, composition, 120 ohms, 10%, ½ w	01121	EB1211
	R2	Resistor, wirewound, 1750 ohms, 5%, 5 w	98095	RW-1751-3DA
*	R3	Resistor,precision,metal film,562 ohms,1%,¼ w	98095	RD-5620-1QA
	R4	Resistor, composition, 27 k ohms,10%,½ w	01121	EB2731
	R5	Resistor,composition,1.5 k ohms,5%,½ w	01121	EB1525
	R6	Resistor, composition,1 megohm, 10%, ½ w	01121	EB1051
	R7	Resistor, composition, 56 k ohms, 10%, ½ w	01121	EB5631

*Part number determines value of R3
** Part of ADR-2

Circuit Number	Description	Mfr Code Number	Part Number
R8	Resistor, composition, 180 k ohms, 10%, ½ w	01121	EB1841
R9	Resistor, composition, 82 k ohms, 10%, ½ w	01121	EB8231
R10	Resistor, composition, 3.3 k ohms, 10%, ½ w	01121	EB3321
R11	Resistor, composition, 15 k ohms, 10%, ½ w	01121	EB1531
R12	Resistor, wirewound, variable, 1 k ohm, 10%, 1½ w	98095	RWT-102-C4
R13	Resistor, composition, 1.2 k ohms, 10%, ½ w	01121	EB1221
R14	Resistor, precision, wirewound, 10k ohm, 0.5%, 1/3w	98095	RW-103-6S1
R15	Resistor, precision, metal film, 158 ohms, 1%, ¼ w	98095	RD-1580-1[illegible]A
R16	Resistor, precision, metal film, 301 ohms, 1%, ¼ w	98095	RD-3010-8[illegible]A
R17	Resistor, wirewound, variable, 200 ohms, 10%, 1½ w	98095	RWT-201-C4
R18	Resistor, composition, 10 megohms, 10%, 2 w	01121	HB1061
R19	Resistor, carbon film, 10 megohms, 15%, 3 w	98095	RD-106-10K
R24	Resistor, composition, 18 k ohms, 10%, ½ w	01121	EB1831
R25 thru R27	Resistor, composition, 2.2 megohms, 10%, 2 w	01121	HB2251
R28	Resistor, wirewound, variable, 5 k ohms, 10%, 1½w	98095	RWT-502-C4
R29	Resistor, wirewound, 8 k ohms, 5%, 20 w	98095	RW-802-3FF
R30	Resistor, composition, 220 ohms, 5%, ½ w	01121	EB2215
R31	Resistor, composition, 5.6 k ohms, 10%, ½ w	01121	EB5621
R32	Resistor, composition, 120 k ohms, 10%, ½ w	01121	EB1241
R33	Resistor, composition, 2.2 k ohms, 10%, ½ w	01121	EB2221
R34	Resistor, composition, 82 k ohms, 10%, ½ w	01121	EB8231
R35	Resistor, composition, 470 k ohms, 10%, ½ w	01121	EB4741
R36	Resistor, composition, 18 k ohms, 10%, 2 w	01121	HB1831
R37	Resistor, composition, 270 k ohms, 10%, ½ w	01121	EB2741
R38	Resistor, composition, 2.2 k ohms, 10%, ½ w	01121	EB2221
R39	Resistor, composition, 10 k ohms, 10%, ½ w	01121	EB1031
R40	Resistor, wirewound, variable, 1 k ohm, 10%, 1½w	98095	RWT-102-C4
R41	Resistor, composition, 100 k ohms, 10%, ½ w	01121	EB1041
R42	Resistor, composition, 680 ohms, 10%, ½ w	01121	EB6811
R43	Resistor, composition, 68 k ohms, 10%, ½ w	01121	EB6831
R44	Resistor, composition, 20 k ohms, 5%, ½ w	01121	EB2035
R45	Resistor, composition, 470 ohms, 10%, ½ w	01121	EB4711
R46	Resistor, composition, 220 ohms, 10%, 1 w	01121	GB2211
R47, R48	Resistor, precision, wirewound, 400 k ohms, 0.1%, 1½ w	98095	RW-404-8T[illegible]
R49, R50	Resistor, composition, 1.8 megohms, 10%, ½ w	01121	EB1851
R51	Resistor, composition, 820 k ohms, 10%, ½ w	01121	EB8241
R52	Resistor, composition, 270 k ohms, 10%, ½ w	01121	EB2741
R53	Resistor, precision, wirewound, 80 k ohm, 0.1%, 1½w	98095	RW-803-8TA
R54	Resistor precision, wirewound, 400k ohm, 0.1%, 1½w	98095	RW-404-8TA
R55, R56	Resistor, precision, wirewound, 160k ohm, 0.1%, 1½w	98095	RW-164-8TA
R57	Resistor, precision, wirewound, 24 k ohm, 0.5%, 1 w	98095	RW-243-6B[illegible]
R58	Resistor, precision, wirewound, 16 k ohm, 0.5%, 1 w	98095	RW-163-6BA
R59	Resistor, precision, wirewound, 8 k ohms, 0.5%, 1 w	98095	RW-802-6B[illegible]
R60	Resistor, precision, wirewound, 32 k ohm, 0.5%, 1 w	98095	RW-323-6BA
R61	Resistor, wirewound, 800 ohms, 5%, 5 w	98095	RW-801-3DA
R62	Resistor, wirewound, variable, 10 k ohms, 10%, 4 w	98095	RWV-103M4-2.12
R63	Resistor, wirewound, variable, 1 k ohm, 10%, 1½w	98095	RWT-102-C4
R64	Resistor, composition, 18 ohms, 5%, 1 w	01121	GB1805
R65	Resistor, composition, 10 megohms, 10%, ½ w	01121	EB1061
R66	Resistor, composition, 1 megohm, 10%, ½ w	01121	EB1051
R67	Resistor, composition, 820 ohms, 10%, ½ w	01121	EB8211
R68	Resistor, precision, metal film, 301 ohms, 1%, ¼ w	98095	RD-3010-1[illegible]A

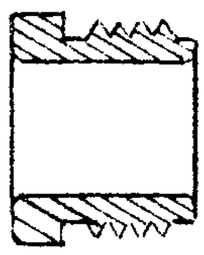
Circuit Number	Description	Mfr Code Number	Part Number
S1	Switch, rotary	98095	PS-2K10-17
S2	Switch, rotary	98095	PS-2K10-15
S3	Switch, rotary	98095	PS-2K10-14
S4	Switch, rotary	98095	PS-1565-30
S5	Switch, toggle, DPDT, spring return	98095	ST-17
S6	Switch, toggle, DPST	98095	ST-3
T1	Transformer, power	98095	PDP666
V1	Tube, electron	33173	8068
	Accessory		
P1	Connector (mates with J1 and J2)	09408	5135

CODE LIST OF MANUFACTURERS

Code Number	Manufacturer	Address
01121	Allen-Bradley Company	Milwaukee, Wisconsin
09408	Star-tronics, Inc.	Georgetown, Massachusetts
33173	General Electric Company	Owensboro, Kentucky
71400	Bussman Manufacturing Div.	St. Louis, Missouri
98095	Power Designs Inc.	Westbury, New York

STAR-TRONICS 5135
CABLE ASSEMBLY INSTRUCTIONS

FOR USE WITH STAR-TRONICS NO 5134 & 7758 CONNECTORS

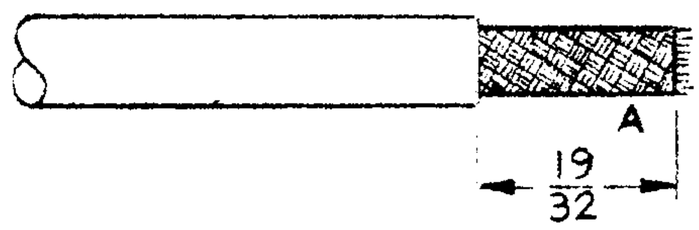


CLAMP NUT

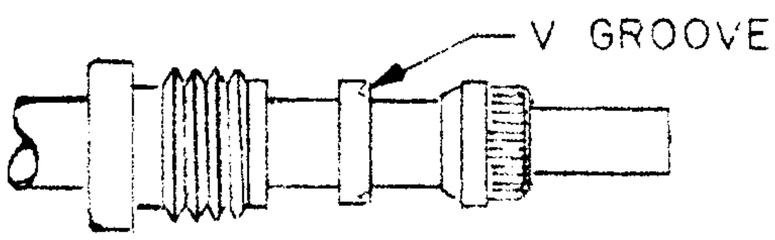
GASKET

BRAID CLAMP

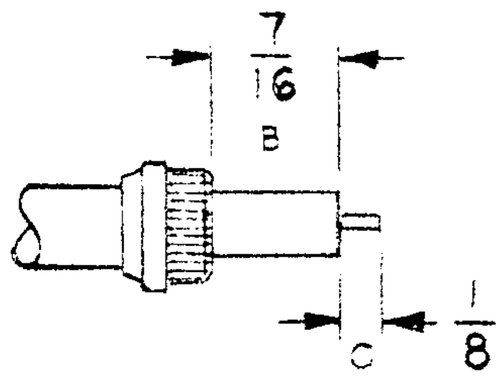
FEMALE CONTACT



1. Cut cable jacket square to dimension A. Unbraid and comb out braid wires, and taper inward toward conductor.

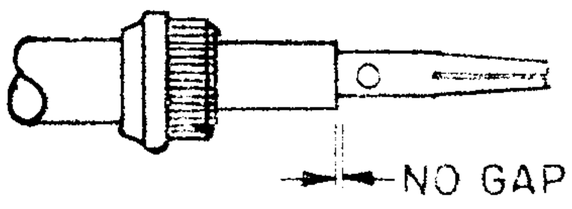


2. Insert clamp nut, gasket (V-groove toward braid clamp) and braid clamp over cable. Inside shoulder of braid clamp must seat against end of cable jacket. Fan out braid wires, trim to length, and form back over braid clamp. Ends of braid wires must not extend over shoulder.



3. Cut cable dielectric to dimension B and conductor to dimension C. Tin exposed conductor with a thin coating of solder. Some connectors that are used with low capacitance cable have an insulating bushing that is placed over the conductor prior to soldering the contact.

4. Solder the contact to the conductor by sweating together or applying solder through the side hole. Most plugs use a male contact and jacks use a female contact. The outside surface must be free of excess solder. High voltage connectors (2 kv or higher) should have a thin layer of Dow-Corning DC-4 applied to the exposed cable dielectric.



5. Place the grooved gasket in back of the braid clamp with the sharp edge in line with the V-groove of the gasket. Insert the assembly less the clamp nut into the connector body. Rotate slightly to make sure that the contact has entered the insulator and that the braid clamp is properly sealed. Thread clamp nut into body and tighten securely with a wrench.

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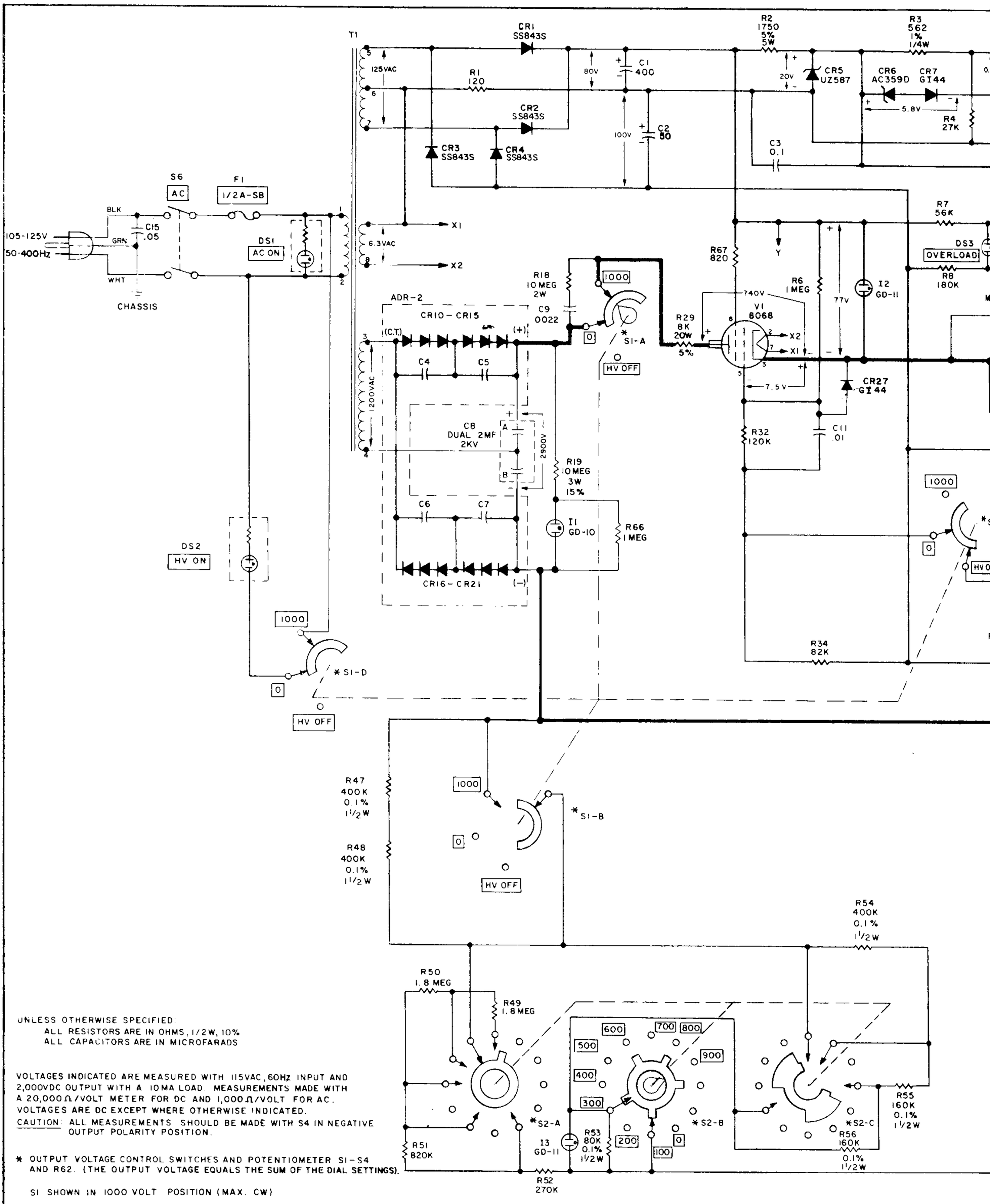
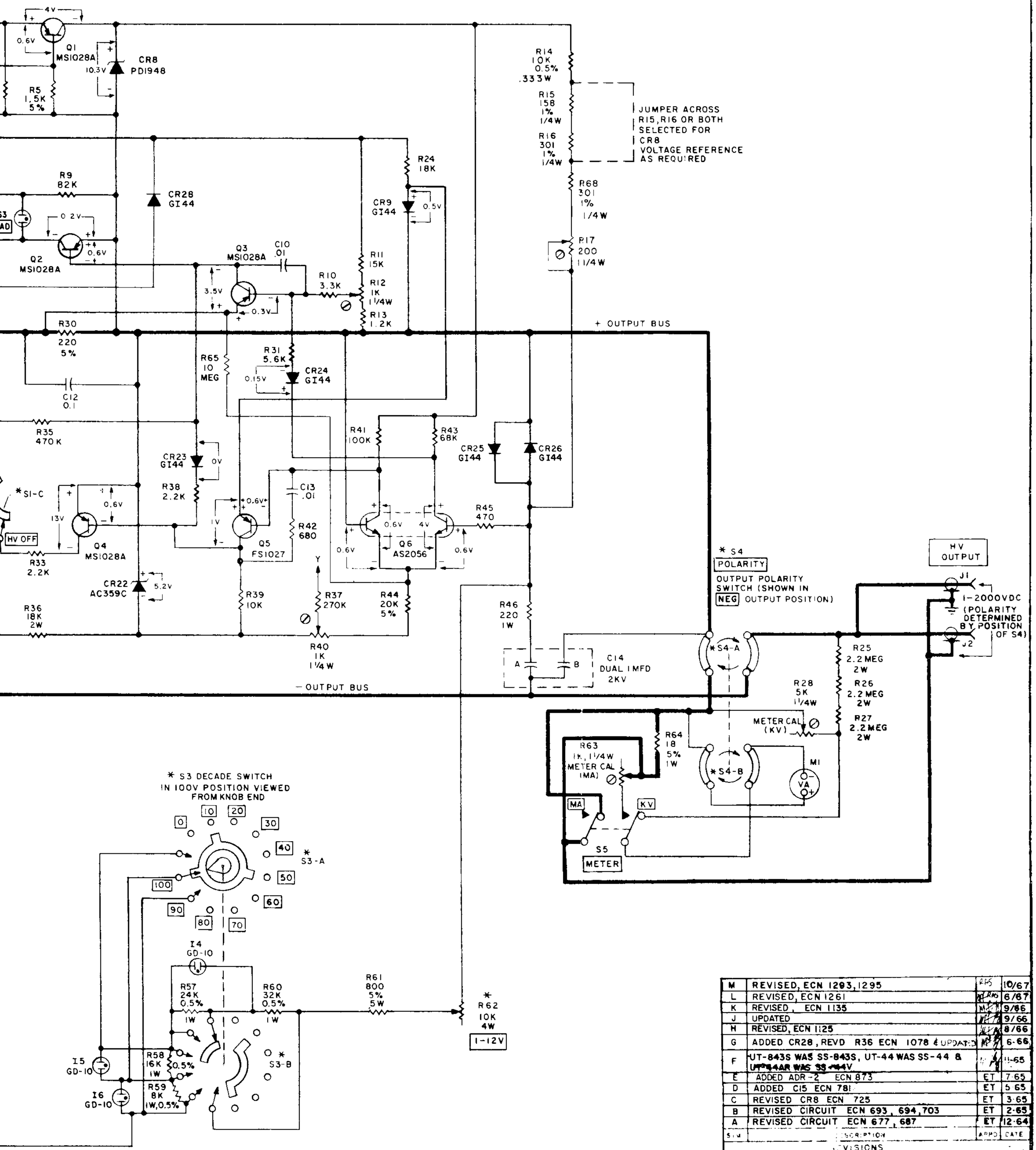


UNLESS OTHERWISE SPECIFIED:
ALL RESISTORS ARE IN OHMS, 1/2W, 10%
ALL CAPACITORS ARE IN MICROFARADS

VOLTAGES INDICATED ARE MEASURED WITH 115VAC, 60Hz INPUT AND 2,000VDC OUTPUT WITH A 10MA LOAD. MEASUREMENTS MADE WITH A 20,000Ω/VOLT METER FOR DC AND 1,000Ω/VOLT FOR AC. VOLTAGES ARE DC EXCEPT WHERE OTHERWISE INDICATED.
CAUTION: ALL MEASUREMENTS SHOULD BE MADE WITH S4 IN NEGATIVE OUTPUT POLARITY POSITION.

* OUTPUT VOLTAGE CONTROL SWITCHES AND POTENTIOMETER S1–S4 AND R62. (THE OUTPUT VOLTAGE EQUALS THE SUM OF THE DIAL SETTINGS).

S1 SHOWN IN 1000 VOLT POSITION (MAX. CW)



NOTICE

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SYM	DESCRIPTION	APPD	DATE
	REVISIONS		
M	REVISED, ECN 1293, 1295	RAS	10/67
L	REVISED, ECN 1261	RAS	6/67
K	REVISED, ECN 1135	MK	9/66
J	UPDATED	MK	9/66
H	REVISED, ECN 1125	MK	8/66
G	ADDED CR28, REVD R36 ECN 1078 & UPDATED	MK	6-66
F	UT-843S WAS SS-843S, UT-44 WAS SS-44 & UT-44AR WAS SS-44V	MK	11-65
E	ADDED ADR-2 ECN 873	ET	7-65
D	ADDED C15 ECN 781	ET	5-65
C	REVISED CR8 ECN 725	ET	3-65
B	REVISED CIRCUIT ECN 693, 694, 703	ET	2-65
A	REVISED CIRCUIT ECN 677, 687	ET	12-64

DRAWING NO. PS-2K10-5 REV M

TITLE SCHEMATIC, MODEL 2K-10
1-2000V, 10MA
HIGH VOLTAGE REGULATED DC PWR SUP

DRAWN	CHECKED	APPROVED
RAS	R.D.	
DATE 12/2/64	DATE 12/18/64	DATE 12/18/64

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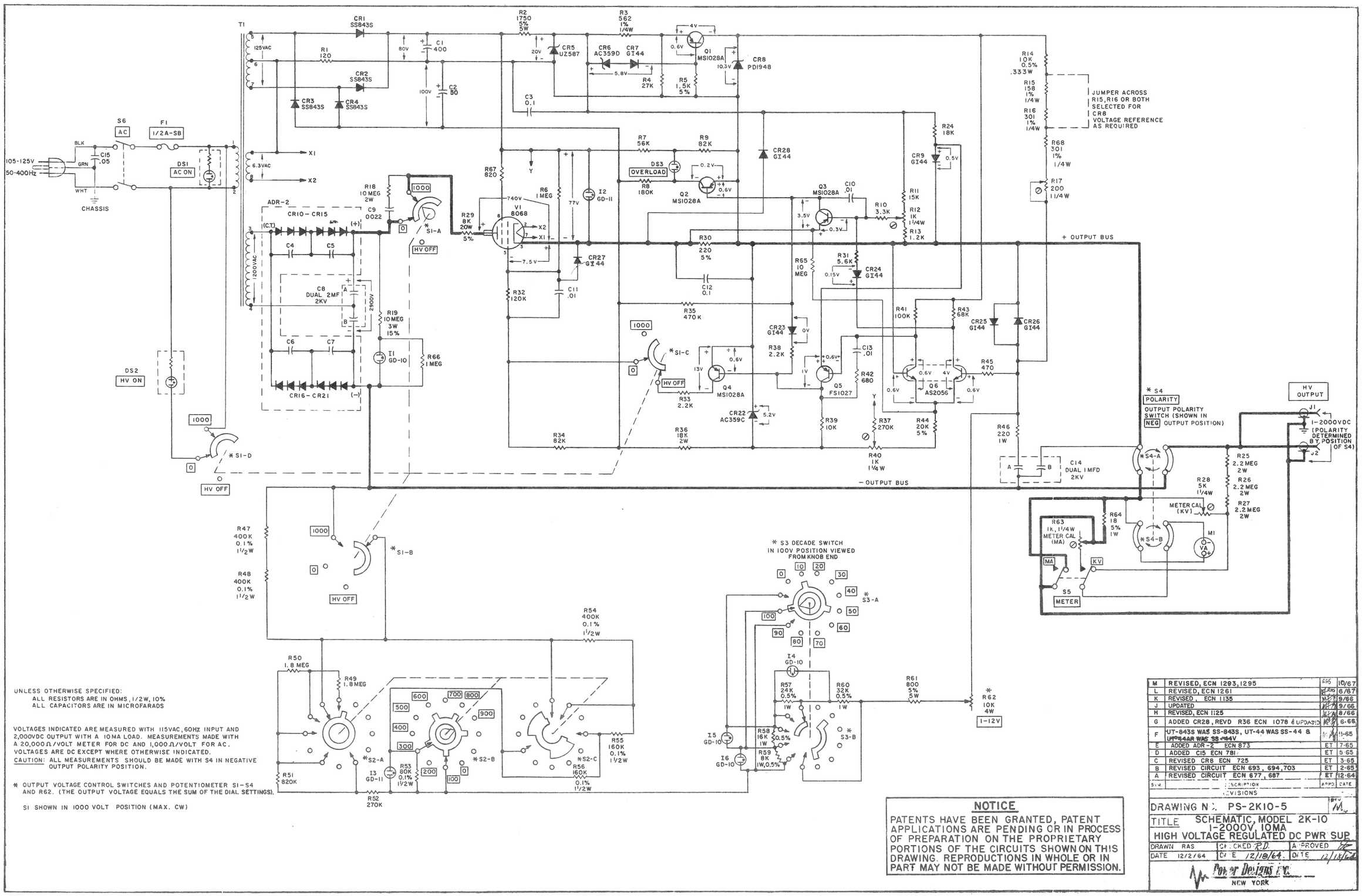

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* OUTPUT VOLTAGE CONTROL SWITCHES AND POTENTIOMETER SI-S4 AND R62. (THE OUTPUT VOLTAGE EQUALS THE SUM OF THE DIAL SETTINGS).

SI SHOWN IN 1000 VOLT POSITION (MAX. CW)

SYM.	DESCRIPTION	APPD	DATE
	REVISIONS		
M	REVISED, ECN 1293, 1295	RAS	10/67
L	REVISED, ECN 1261	RAS	6/67
K	REVISED, ECN 1135	RAS	9/66
J	UPDATED	RAS	9/66
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G	ADDED CR28, REVD R36 ECN 1078 & UPDATED	RAS	6-66
F	UT-843S WAS SS-843S, UT-44 WAS SS-44 & UT-44R WAS SS-44V	RAS	11-65
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DRAWING NO. PS-2K10-5 REV M

TITLE SCHEMATIC, MODEL 2K-10
1-2000V, 10MA
HIGH VOLTAGE REGULATED DC PWR SUP

DRAWN	CHECKED	APPROVED
RAS	RD	
DATE 12/2/64	DATE 12/18/64	DATE 12/18/64

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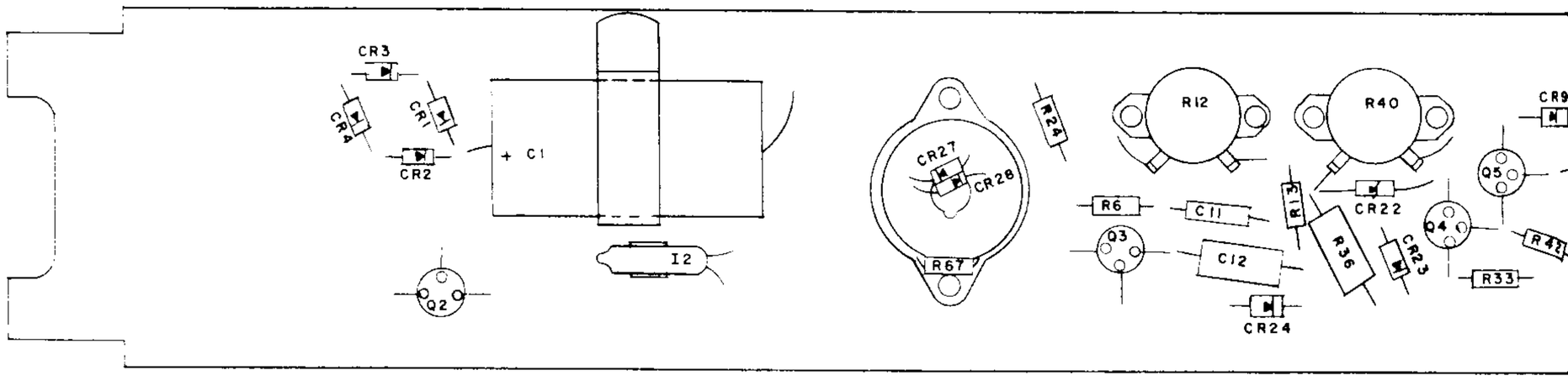
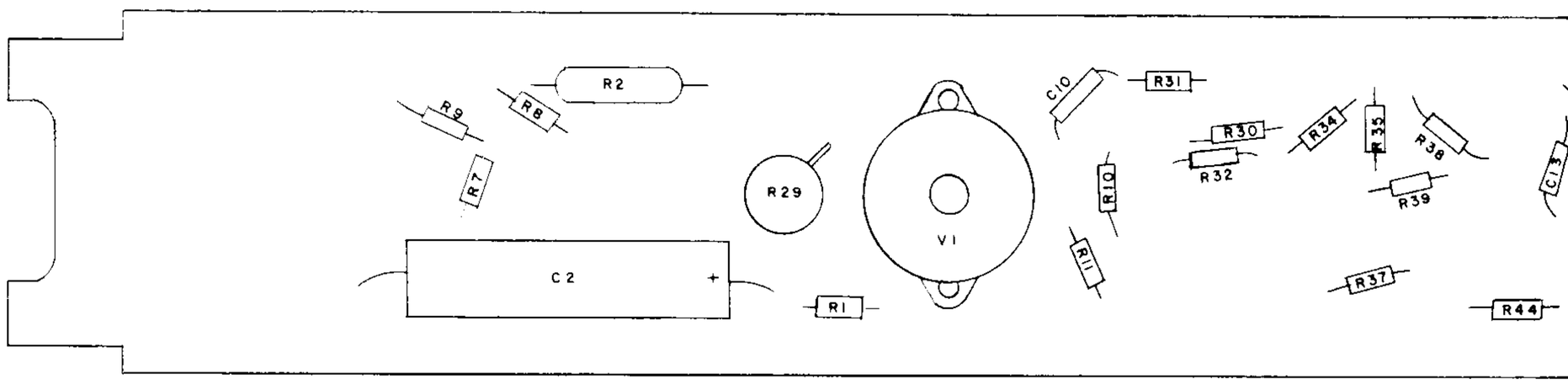
NEW YORK

FRONT VIEW

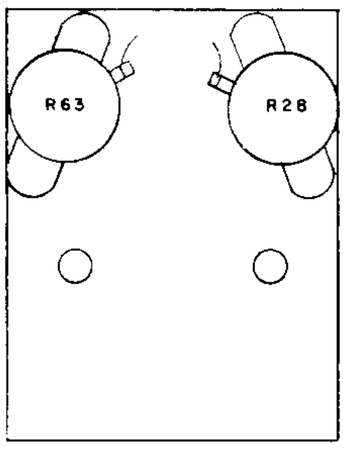


AMPLIFIER BOARD ASSEMBLY
PS-2K10-9

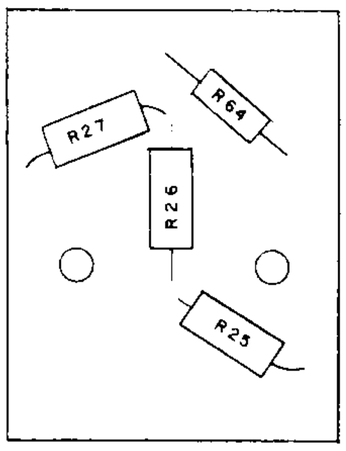


REAR VIEW

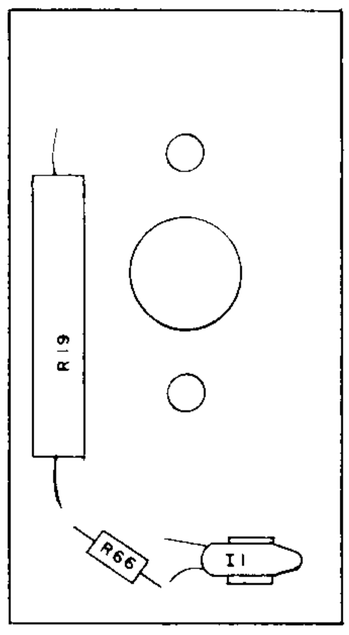
FRONT VIEW



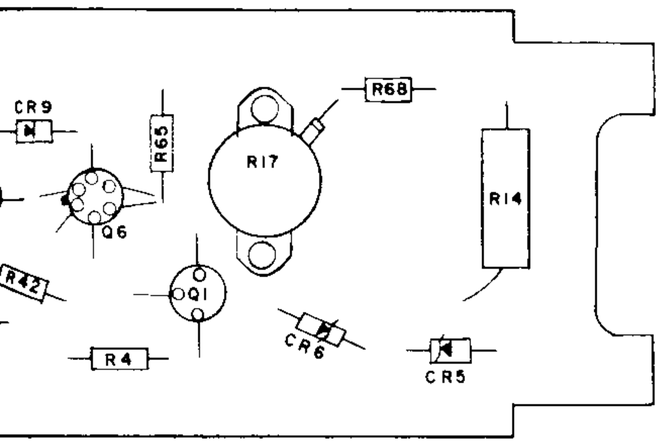
REAR VIEW

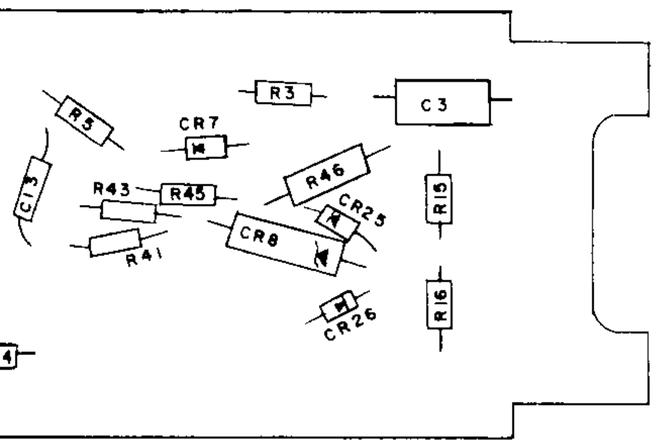


METER BOARD ASSEMBLY
PS-2K10-12



CAPACITOR BOARD ASSEMBLY
PS-2K10-27





A	RELEASED		7/18/67
SYM.	DESCRIPTION	APPD.	DATE

REVISIONS

DRAWING NO. PS-2K10-29 REV. A

TITLE LOCATION OF COMPONENTS
MODEL 2K-10

DRAWN J.R.	CHECKED	APPROVED
DATE 7-17-67	DATE 7-18-67	DATE 7-18-67

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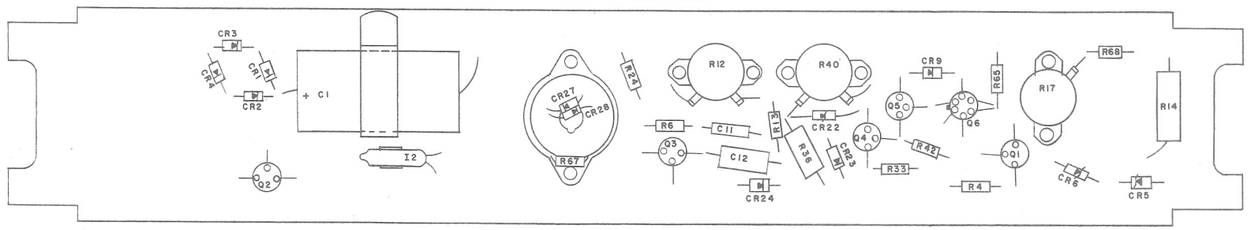
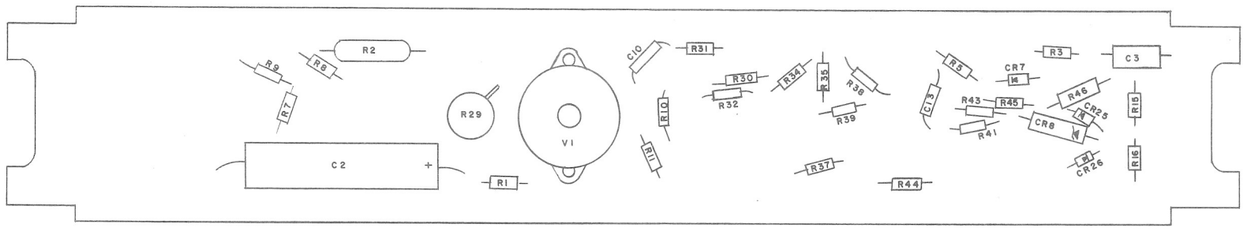
FRONT VIEW

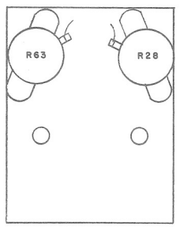


AMPLIFIER BOARD ASSEMBLY
PS-2K10-9



REAR VIEW

FRONT VIEW



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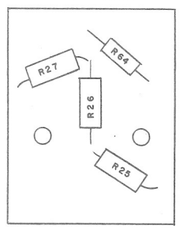
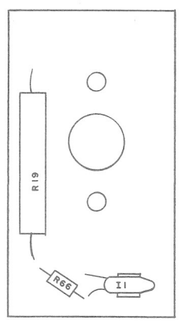


METER BOARD ASSEMBLY
PS-2K10-12



CAPACITOR BOARD ASSEMBLY
PS-2K10-27

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REVISIONS			

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DATE 7-17-67	DATE 7-18-67	DATE 7-18-67

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NEW YORK

WARRANTY

POWER DESIGNS INC., warrants to the original purchaser, each instrument sold by us, or our authorized agents, and all the parts thereof, to be free from defects in material or workmanship under normal use and service within the specified ratings and operating conditions.

Its obligation under this warranty is hereby limited to the repair or replacement of any instrument, or part thereof, which is returned to us within one year after delivery, and which shall prove, after our examination, to be thus defective.

This warranty does not include the cost of transportation charges to and from the factory and/or the cost of packaging or crating of instruments for return to the factory, unless such instrument is returned within thirty (30) days from the date of original shipment as shown on the packing list or shipping documents, and prior written authorization for such costs is obtained from the factory.

The repair or replacement of an instrument, or any part thereof, does not void or extend the original warranty.

POWER DESIGNS INC., reserves the right to discontinue any instrument without notice, or to make modifications in design at any time, without incurring any obligation to make these modifications in instruments previously sold.

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