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 semiconductors 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 those 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 arc 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:

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.

ADDENDA

POWER SUPPLY

MODEL 2005

The Schematic Diagram and Electrical Parts **List have been modified as follows:**

1. **Capacitor C21 has been added directly across CR9 on the auxiliary board. This capacitor is** tantalum, **10 uf, 35 vdc, part number CE-106—.35 (manufacturer 98095).**

2. **Capacitor C22 has been added across diode CR14. This is plastic film, 0.01 uf, 200 vdc, part number CP—16-2 (manufacturer 98095).**

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,1000 uf, 50 vdc	98095	CE-94-.5
C2,C3	Capacitor,electrolytic,100 uf, 80 vdc	98095	CE—91—.8
C4	Capacitor,electrolytic,8 uf,100 vdc	98095	CE—42—1
C5	Capacitor,electrolytic,400 uf, 85 vdc	98095	*CE—83—.85*
C6	Capacitor,ceramic disc,0.02 uf, 500 vdc	98095	CC-23-5
C7	Capacitor,electrolytic,100 uf,80 vdc	98095	CE-91-.8
C8	Capacitor,plastic film,0.1 uf, 200 vdc	98095	CP—17—2
C9	Capacitor,ceramic disc,0.05 uf, 600 vdc	98095	CC—34—6
C10,C11	Capacitor,plastic film,0.1 uf, 200 vdc	98095	CP—17—2
C12	Capacitor,ceramic disc,0.01 uf, 1 kvdc	98095	CC—13—10
C13	Capacitor,plastic film,680 pf, 200 vdc	98095	CP—27—2
C14	Capacitor,ceramic disc,O.O1 uf, 1 kvdc	98095	CC—13—10
C15	Capacitor,ceramic tubular,330 pf, 500 vdc	98095	CC—26—5
C16,C17	Capacitor,ceramic disc,1 uf, 3 vdc	98095	CC-100M3AD
C20,C21	Capacitor,tantalum,10 uf, **35** vdc	98095	CE-106-.35

CR1 thru CR7 Diode, silicon 98095 G144
CR8, CR9 Diode, silicon, zener 98095 UZ587
CR10, CR11 Diode, silicon, zener 98095 AC359C, D
CR12 Diode, silicon 98095 GI44
CR13 Diode, silicon, zener (See Note 1) 98095 AC359BT
CR14 thru CR21 Diode, silicon 98095 GI44
CR22 Diode, silicon, zener 98095 AC359C,D

Fl Fuse, “Slo—Blo,” 3/8 ampere 71400 MDL3/8
F2 Fuse, “Slo—Blo,” 1 ampere 71400 MDL 1

I1, 12 Lamp assembly, neon 98095 PLA—7
13 Lamp assembly, neon 98095 PLA—10

M1 Meter, volt—ammeter, 0—25 V, 0—500 MA 98095 MVA—109

Q1 Transistor, silicon, NPN 98095 RC1700
Q2 Transistor, silicon, PNP 98095 MS1028A
Q3 Transistor, silicon, NPN 98095 MS2270/U
Q4 Transistor, silicon, PNP 98095 MS1028L
Q5 Transistor,dual,silicon,NPN(See Note1)98095 AS2056
Q6 thru Q8 Transistor, silicon, NPN 98095 MS2270/U
Q9, Q10 Transistor, silicon, PNP 98095 MS1028A

R1 Resistor,wirewound,1 k ohm, 5%, 5 w 98095 RW—102—3DA
R2 Resistor,wirewound,800 ohms,5%, 5 w 98095 RW—801-3DA
R3 flesistor,composition,390 ohms,5%,1/2 w 01121 EB3915
R4 Resistor,precision,metal film,150 k ohms,1%,* w 98095 RD—154—1QA
R5 Resistor,composition,6.8 megohms,to 15 megohms, 01121 Type EB
10%,1/2 w (precise value selected on test)
R6 Resistor,precision,metal filrn,562 ohms,1%,* w 98095 RD—5620—1QA
R7 Resistor,composition,4.7 k ohms,10%,1/2 w 01121 E34721
R8 Resistor,precision,metal film,22.1 k ohms,1%,1/4 w 98095 RD—2212-1QA
R9 Resistor,precision,metal film,16.2 k ohms,1%,1/4 w 98095 RD—1622—1QA

Circuit Number	Description	Mfr Code Number	Part Number
R10	Resistor,precision,metal film,35.7 k ohms,1%,1/4w	98095	RD—3572—1QA
R11	Resistor,precision,wirewound,5.2 k ohms,1%,1/4w	98095	RW—522—8QA
R12	Resistor,variable,wirewound,200 ohms,10%,3w	98095	RWV—201K4—.68
R13	Resistor,precision,metal film,8.25k ohms,1%,1/4w	98095	RD—8251-1QA
R15	Resistor,composition,1.8 k ohms,5%,1/2 w	01121	EB1825
R16	Resistor,composition,560 ohms,10%,1/2 w	01121	EB5611
R17	Resistor,composition,4.7 k ohms,10%,1/2 w	01121	EB4721
R18	Resistor,composition,i.8 k ohms,10%,1/2 w	01121	EB1821
R19	Resistor,composition,560 ohms,10%,1/2 w	01121	EB5611
R20	Resistor,composition,100 ohms,10%,1/2 w	01121	EB1011
R21	Resistor,wirewound,2 ohms,5%, **5 w**	**98095**	**RW—020—3DA**
R22	Resistor,precision,metal film,475 ohms,1%,1/4w	98095	RD—4750—1QA
R23	Resistor,precision,metal film,150 ohms,1%,1/4w	98095	RD—151—1QA
R24	Resistor,composition,5.6 k ohms,10%,1/2 w	01121	EB5621
R25	Resistor,variable,wirewound,1 k ohm,10%,2 w	98095	RWV—102C4—.78
R26	Resistor,composition,4.7 k ohms,10%,1/2 w	01121	EB4721
R27	Resistor,variable,wirewound,i k ohm, 10%,1 1/4w	98095	RWT—102—C4
R28	Resistor,composition,3.9 k ohms,10%,2 w	01121	HB3921
R29	**Resistor,composition,22 k ohms,5%,1/2 w**	**01121**	**EB2235**
R30	Resistor,composition,2.7 k ohms,10%,1/2 w	01121	EB2721
R31	Resistor,wirewound, 500 ohrns,5%,5 w	98095	RW—501—3DA
R32	Resistor,composition,560 ohms,10%,1/2 w	01121	EB5611
R33	Resistor,precision,wirewound,24.9k ohms,O.5%,*w	98095	RW—2492—6QA
R37,R38	Resistor,precision,metal film,221 ohms,1%,1/4w	98095	RD—2210-1QA
R39	Resistor,variable,wirewound,5 k ohms,10%,4 w	98095	RWV—502M4-.87
R40	Resistor,precision,metal film,4.32 k ohms,1%,1/4w	98095	RD-4321-1QA
R41	Resistor,precision,metal film,32.4 k ohms,1%,1/4w	98095	RD—3242—1QA
R42	Resistor,variable,wirewound,5O ohms,10%,1 1/4w	98095	RWT—500--C4
R43	Resistor,wirewound, 0.2 ohm shunt	98095	RW—FA—4A
R45	Resistor,precision,wirewound,10 k ohms,0.1%,0.4w	98095	RW—103—8UR
R46	•Resistor,variable,wirewound,1 ohm,10%,2 w	98095	RWV—010C4—.81
R47	Resistor, precision,wirewound, 1 k ohm, 0.1%, 0.4w	98095	RW—l02—8UR
R48,R49	Resistor,precision,wirewound,2 k ohms,0.1%,0.4w	98095	RW—202—8UR
R50	Resistor,precision,wirewound,5 k ohms,0.1%,0.4w	98095	RW—502—8UR
R51	Resistor,composition,4.7 k obms,10%,1/4 w	01121	CB4721
R52	Resistor,composition,6.8 k ohms,10%,1/4 w	01121	CB6821
R53	Resistor,composition,18 k ohms,10%,1/4 w	01121	CB1831
R54	Resistor,composition,27 k ohms,10%,1/4w	01121	CB2731
R55	Resistor,precision,wirewound,100 ohms,0.1%,0.4w	98095	RW—1O1—8UR
R56,R57	Resistor,precision,wirewound,200 ohms,0.1%,0.4w	98095	RW—201—8UR
R58	Resistor,precision,wirewound,500 ohms,0.1%,0.4w	98095	RW—501—8UR
R59	Resistor,composition,470 ohms,10%,1/4 w	01121	CB4711
R60	Resistor,composition,680 ohms,10%,1/4 w	01121	CB6811
R61	Resistor,composition,1.8 k ohms,10%,1/4, w	01121	CBi821
R62	Resistor,composition,2.7 k ohms,10%,1/4 w	01121	CB2721
R63	Resistor,precision,wirewound,1O ohms,1%,0.4 w	98095	RW—100--1UR
R64,R65	Resistor,precision,wirewound,20 ohms,0.5%,0.4 w	98095	RW—200—6UR
R66	Resistor,preeision,wirewound,50 ohms ,0. 5%,0. 4w	98095	RW—500—6UR
R67	Resistor,composition, 47 ohms,10%,1/4 w	01121	CB4701
R68	Resistor,composition, 68 ohms, 10%, w	01121	CB6801
R69	Resistor,composition,180 ohms, 10%, 1/4w	01121	CB1811
R70	Resistor,composition,270 ohms,10%, 1/4w	01121	CB2711
R71	Resistor,precision,wirewound,1 ohm, 3%, 0.4 w	98095	RW—O1O—7UR
R72,R73	Resistor,precision,wirewound,2 ohms,3%, 0.4 w	98095	RW—020—7UR
R74	Resistor,precision,wirewound,5 ohms,3%, 0.4 w	98095	RW—050—7UR
R75	Resistor,composition,4.7 ohms,10%,1/4 w	01121	CB47G1

Circuit Number	Description	Mfr Code Number	Part Number
R76	Resistor,composition,6.8 ohms,10%,1/4 w	01121	CB68G1
R77	Resistor,composition,18 ohms,10%,1/4 w	01121	CB1801
R78	Resistor,composition,27 ohms,10%,1/4 w	01121	CB2701
R79	Resistor,composition,200 ohms,5%,1/2 w	01121	EB2015
R80	Resistor, precision,metal film (See Note 1)		
R81	Resistor,composition,l.5 k ohms,5%,1/2 w	01121	EB1525
R82	Resistor,compositicn,47 k ohms,10%,1/2 w	01121	EB4731
R83	Resistor,precision,metal film, (See Note 1)		
RT1	Disc thermistor, 1000 ohms, 10%, at 25°C	73168	KA31L1
S1	Switch, toggle, SPST	98095	ST—S
S2	Switch, toggle, DPDT	98095	ST—16
S3	Switch, pushbutton, SPST	98095	ST—19
S4	Switch, toggle, DPDT	98095	ST—16
S5	Switch, rotary	98095	PS—2005—7—3
S6	Switch, rotary	98095	PS—2005—7—4
T1	Transformer, power	98095	TTM—56
Z1	Oven Assembly	98095	PS—2005—1

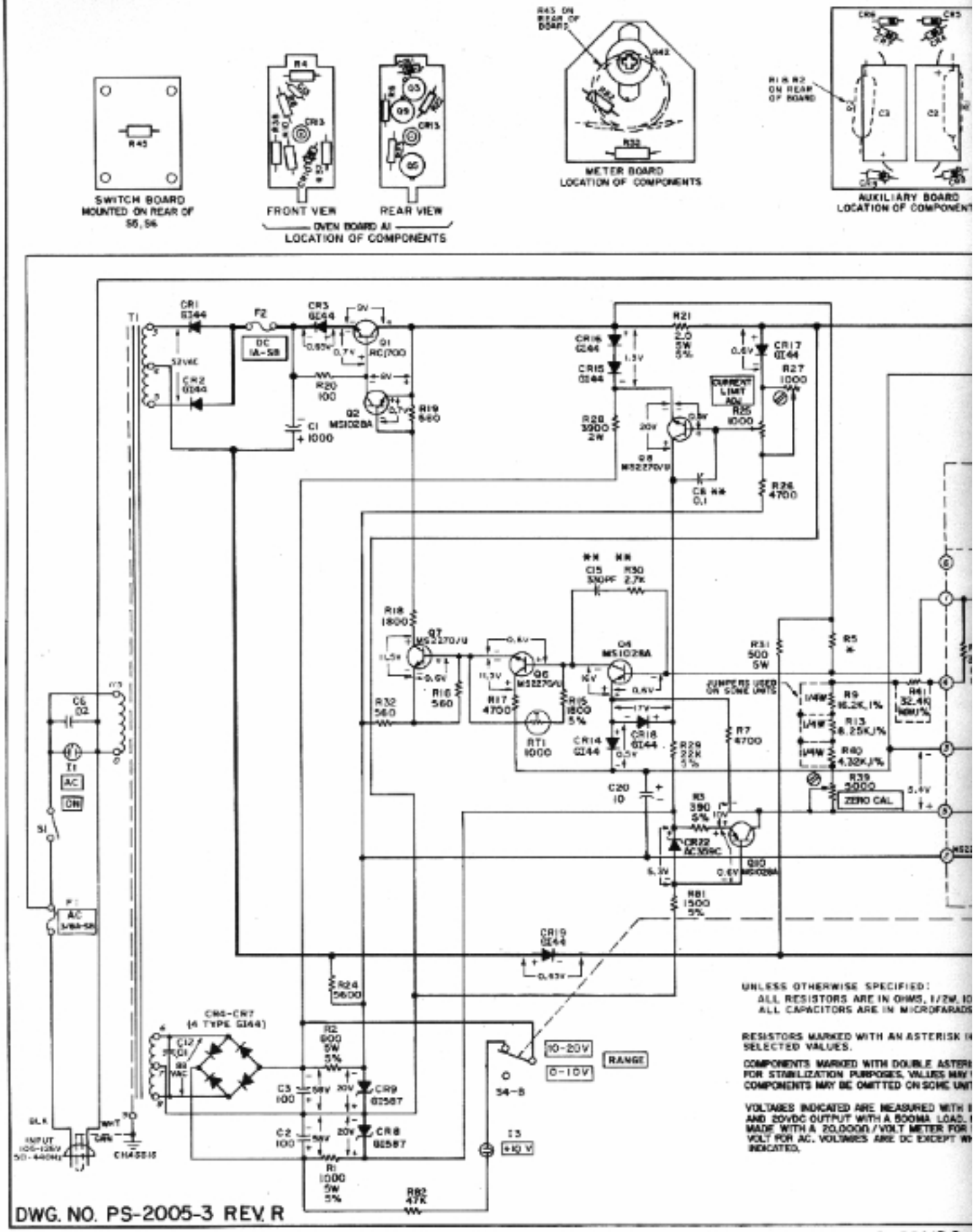
NOTE 1

This item is a matched component. If it requires replacement, the complete oven board should be sent back to the factory for repair and recalibration. When the repaired and recalibrated board is returned by the factory, the procedure described in paragraph 4—2b of the manual should be followed. It may also be necessary to retrim resistor R11 and/or adjust the value of R80. To do this, set potentiometer R12 approximately 2/3 clockwise and, using a high precision voltmeter, measure the voltage across R45 (located on board at rear of decade switch assembly) with switch S4 in "10V-20V" position. Trim R11 and/or adjust the value of R80 (using type RN60 precision resistors) until the voltage across R45 reads close to 10.00 volts.

(An alternative to the foregoing procedure is to return the entire unit to the factory for repair and recalibration).

CODE LIST OF MANUFACTURERS

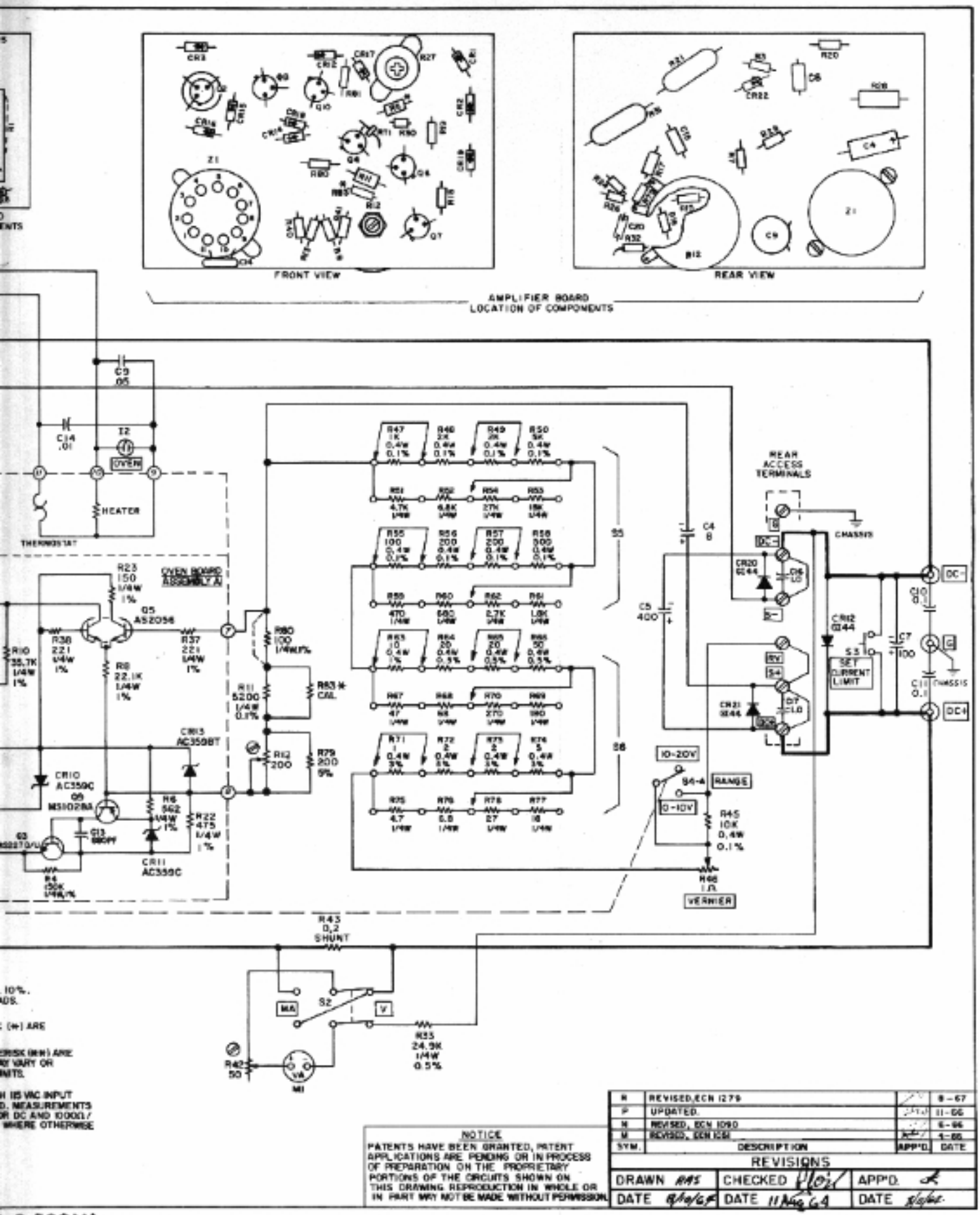
Code Number	Manufacturer	Address
01121	Allen—Bradley Company	Milwaukee, Wisconsin
71400	Bussman Manufacturing Div.	St. Louis, Missouri
73168	Fenwal, Inc.	Ashland, Massachusetts
98095	Power Designs Inc.	Westbury, New York



MODEL 2005
TRANSISTORIZED POWER SUPPLY

0-20VDC,

AMPLIFIER BOARD
LOCATION OF COMPONENTS



NOTICE

PATENTS HAVE BEEN GRANTED, PATENT APPLICATIONS ARE PENDING OR IN PROCESS OF PREPARATION ON THE PROPRIETARY PORTIONS OF THE CIRCUITS SHOWN ON THIS DRAWING. REPRODUCTION IN WHOLE OR IN PART MAY NOT BE MADE WITHOUT PERMISSION.

SYM.	DESCRIPTION	APP'D.	DATE
R	REVISED, ECN 1279		8-67
P	UPDATED.		11-66
N	REVISED, ECN 1080		6-66
M	REVISED, ECN 1061		1-66

REVISIONS

DRAWN	CHECKED	APP'D.
DATE 8/16/64	DATE 11 Aug 64	DATE 8/16/64

, 0-500MA

POWER DESIGNS INC.
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.

POWER DESIGNS INC.

Westbury, L I., New York

POWER DESIGNS PACIFIC, INC.

Palo Alto, California