UNCLASSIFIED

TECHNICAL MANUAL

for

LINEAR POWER AMPLIFIER MODEL PAL-1K

(AMPLIFIER-POWER SUPPLY GROUP, AN/URA-36)

THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N. Y. OTTAWA, ONTARIO

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IN-216

Issue Date: 1 January 1961

A D D E N D U M

Adjustments

1. PA PLATE IDLING (No Drive) current - Approximately 200 ma. Set by adjusting PS-4's PA BIAS ADJ resistor R310.

2. PA PLATE CURRENT OVERLOAD Current - Approximately 600 ma. Set by adjusting PS-4's PA PLATE OVERLOAD ADJ resistor R303.

3. PA SCREEN CURRENT OVERLOAD SETTING
Fixed by screen grid overload breaker CB 303 in power supply PS-4. Set to open at 50 ma.

4. Typical PA PLATE and SCREEN CURRENT

OPERATION	PLATE	SCREEN	REMARKS
SSB	400-480	30 - 45	Values depend upon
CW/FS	550-600	35 - 50	age of tube.

5. Neutralization - see page 6-3, paragraph 6-5, g.
   a. Tune and load amplifier at 8 mc. Remove PL-172's B+. Connect a VTVM across PL-172's tank. Adjust RFD's NEUTRALIZING capacitor C255 to minimize VTVM's reading.

   b. Tune and load amplifier at 30 mc. Remove PL-172's B+. Connect a VTVM across PL-172's tank. Readjust RFD's NEUTRALIZING capacitor C255 to minimize VTVM's reading.

   c. If the setting in items a and b differ, use a compromise setting to keep VTVM's readings low at both the 8 and 30 mc points.

6. Errata
   Page 2-0, Paragraph 2-4, b: change C connector to HN connector
   Page 3-2, Paragraph 3-5, g: change 15 ma to 35-40 ma.
   Page 4-1 Table: change +400 to +575.

ADDENDUM

The following information outlines the differences between the PAL-1K and PAL-1KA.

PS-5: No changes in this unit.

RFD-1 vs. RFD-1A: The RFD-1 and RFD-1A are identical except for the ALDC circuit. The RFD-1A has the ALDC ADJUST potentiometer mounted on the front panel between the PA TUNE and PA LOADING knobs. The potentiometer is now knob adjusted. On the RFD-1, this potentiometer is mounted on the rear plate and is screwdriver adjusted. In addition, the RFD-1A has a SPDT toggle switch mounted on the rear plate in place of the ALDC ADJUST potentiometer. The switch is the INTERNAL or EXTERNAL ALDC selector switch. With the switch in the INTERNAL position, ALDC voltage is fed back to the 5763 tube in the RFD-1A. When the switch is in the EXTERNAL position, the ALDC voltage is fed thru the power cable to the PS-4.

PS-4 vs. PS-4A: The PS-4A supplies power to the RFD-1A as did the PS-4 to the RFD-1. The PS-4A, however, provides regulated PA screen voltage, 6146 (IPA) plate voltage, and increased bias voltage. The PS-4A also includes a more reliable time delay and control relay circuit. The PA screen and IPA plate voltages are regulated 500VDC; where in the PS-4 these voltages varied between 500 and 600 volts with load and line changes. The PS-4 PA bias supply could be varied between -100 and -150 volts. In the PS-4A the range has been extended to -100 and -200 volts $\pm$ 5%. A BNC jack is mounted on the rear of the PS-4A labeled EXT. ALDC. This jack enables ALDC voltage from the RFD-1A to be applied to the exciter unit thru a coaxial cable when the ALDC selector switch on the RFD-1A is in the EXT. position.

IF IT IS FOUND DESIRABLE TO CHANGE ANY TOLERANCE OR OTHER DETAIL SPECIFIED ON THIS DRAWING NOTIFY THE PURCHASER PROMPTLY.

MAXIMUM ALLOWABLE TOLERANCES HAVE BEEN DETERMINED AND DEVIATIONS WILL BE CAUSE FOR REJECTION. REMOVE ALL BURRS AND SHARP EDGES

DRIVER BANDSWITCH S201	
1	2-4 MC
2	4-8 MC
3	8-16 MC
4	16-22 MC
5	22-32 MC

PA BANDSWITCH S202	
1	2.0-2.5 MC
2	2.5-3 MC
3	3 - 4 MC
4	4 - 6 MC
5	6 - 8 MC
6	8 - 12 MC
7	12 - 16 MC
8	16 - 22 MC
9	22 - 32 MC

MULTIMETER S204	
1	PA BIAS x 10 VDC
2	PA E_{SG} x 10 VDC
3	PA E_P x 100 VDC
4	PA I_{SG} x1 MADC
5	1ST AMPL E_P x1 VRF
6	PA E_G x1 VRF
7	PA E_P x100 VRF
8	PA E_G x10 VRF

NOTES -

1- ALL CAPACITORS SPECIFIED IN DECIMALS ARE IN µf. ALL OTHERS ARE IN µµf.

2- ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED.

LAST SYMBOLS	MISSING SYMBOLS
B 201	C277
C290	E 201
CR 205	L 205
E 203	L 206
J 202	R230
L248	R231
M 202	L235
P 202	R216
PS 202	
R 233	
S 209	
V 203	
W 201	

CK-502

ISSUE	ITEM	CHANGED FROM	DATE	CN NO	DRAFTS	CHECKER	ENG APP.

TOLERANCES — SCALE:

ALL OTHERS: DEC. DIM ±, FRAC. DIM ±, ANGULAR DIM ±

DRILL PUNCH COMMERCIAL STOCK SIZES AND MANUFACTURERS TOLERANCES ARE NOT INCLUDED

REQ PER UNIT	MODEL	PROJECT NO	ASS'Y NO	DATE
1	RFD-1A			6-9-61

USED ON

REQ	ITEM	PART NO.	DESCRIPTION	SYMBOL

STOCK SIZE — MATERIAL — WEIGHT PER PC — TYPE & TEMPER — HEAT TREAT SPEC — FINISH & SPEC. NO.

THE TECHNICAL MATERIEL CORP.
MAMARONECK, NEW YORK

SCHEMATIC DIAGRAM
MODEL RFD-1A

DRAWN: W.D.S. — ENG. DES. APP. — MECH. DES. APP.
CHECKED: J.C.B. — FINAL APPROVAL: Ben Kahn

CK-502

FORM-111

SYM.	DESCRIPTION	FUNCTION	TMC DWG. OR PART NO.
C701	CAPACITOR, fixed: electrolytic 25 uf, 450V.	Filter Capacitor	CE51F250R
C702A, B	CAPACITOR, fixed: paper, .1 uf, 1KV.	A Section-Arc Suppressor; B Section-Bypass Capacitor	CP54B6FG104K
C703	CAPACITOR, fixed: paper, 2 uf, 1KV.	Filter Capacitor	CP40C2FG205K
C704,	CAPACITOR, fixed: paper, .1 uf, 600V.	Arc Suppressors	CP54B1EF104K
C705	CAPACITOR, fixed: paper, 4 uf, 600V.	Filter Capacitor	CP40C2FF405K
C706	CAPACITOR, fixed: paper, 4 uf, 600V.	Phase Shift Capacitor for RFD-1A Blower	CP41B1FF405K
C707	CAPACITOR, fixed: paper, .1 uf, 600V.	Arc Suppressors	CP54B1EF104K
C708	CAPACITOR, fixed: paper, .1 uf, 600V.	Arc Suppressors	CP54B1EF104K
CR701	DIODE, Zener, 200V, 50 watt Zener.	Bias Regulator	VR-100-200R5
E701	TERMINAL Strip: barrier type 4 terminals.	Internal Connections for Cable Interconnect	TM-100-11
E702	TERMINAL Strip: 11 terminals.	External Connections for Power and Control	TM-102-4
F701	FUSE, Cartridge: 5 Amp.	115V ADJ. FUSE	FU-100-5
F702	FUSE, Cartridge: 1/10 Amp.	B- FUSE	FU-102-.1
F703	FUSE, Cartridge: 2 Amp.	Blower FUSE	FU-100-2
F704	FUSE, Cartridge: 1/4 Amp.	B+ FUSE	FU-100-.250
I701	LAMP, Incandescent: 120V, 3W.	Main Power Indicator	BI-102-3
I702	LAMP, Incandescent: 120V, 3W.	Transmitter Voltages Indicator	BI-102-3
I703	LAMP, Incandescent: 120V, 3W.	Final Voltages Indicator	BI-102-3
J701	CONNECTOR, Receptacle: female.	Interconnecting Jack for RFD-1A	MS3102A32-7S
J702	CONNECTOR, Receptacle: female.	Interconnecting Jack for PS-5	MS3102A28-11S

SYM.	DESCRIPTION	FUNCTION	TMC DWG. OR PART NO.
J703	CONNECTOR, Receptacle: 3 prong.	AC Input Jack	PL-133NG
K701	RELAY, Thermostatic Delay.	180 sec. Time Delay Relay	RL-111-115-NO-180
K702	RELAY, Armature.	Control Relay	RL-116-DC-3C-120
K703	RELAY, Armature.	Transmitter Voltages Relay	RL-114
L701	REACTOR, Filter: 10HY.	Filter Choke	TF-5006
L702	REACTOR, Filter.	Filter Choke	TF-144
R701	RESISTOR, Fixed, Wirewound, 1.5K, 20W.	Series Dropping Resistor	RW-110-23
R702	RESISTOR, Fixed, Composition, 6.8K, 2W.	Series Dropping Resistor	RC42GF682J
R703	RESISTOR, Variable Composition, 10K, 2W pot.	PA Bias ADJ. potentiometer p/o Bleeder	RV4ATXA103K
R704	RESISTOR, Fixed, Composition 10K, 2W.	P/o Bleeder	RC42GF103J
R705	RESISTOR, Fixed, Composition, 27K, 1W.	Series Dropping Resistor	RC32GF273J
R706	RESISTOR, Fixed, Composition, 100 ohms, 2W.	Arc Suppressor	RC42GF101K
R707	RESISTOR, Fixed, Composition 150K, 1W.	Plate Load Resistor for V704	RC32GF154J
R708	RESISTOR, Fixed, Composition 150K, 1W.	Screen Grid Dropping Resistor for V704	RC32GF154J
R709	RESISTOR, Fixed, Composition, 1K ohms, ½W.	Parasitic Suppressor	RC20GF102K
R710	RESISTOR, Fixed, Composition, 1K ohms, ½W.	Parasitic Suppressor	RC20GF102K
R711	RESISTOR, Fixed, Composition, 1K ohms, ½W.	Parasitic Suppressor	RC20GF102K
R712	RESISTOR, Fixed, Composition, 100 ohms, 2W.	Cathode Bias Resistor for V703	RC42GF101K
R713 -	RESISTOR, Fixed, Composition, 100 ohms, 2W.	Cathode Bias Resistor for V703	RC42GF101K

SYM.	DESCRIPTION	FUNCTION	TMC DWG. OR PART NO.
R714	RESISTOR, Fixed, Wirewound, 8K, 20W.	Series Dropping Resistor for V705, V706	RW-110-46
R715	RESISTOR, Fixed, Composition, 33K, 2W.	P/o Bleeder Network	RC42GF333J
R716	RESISTOR, Variable, Composition, 25K, 2W, pot.	MID VOLTAGE ADJ potentiometer, p/o Bleeder Network	RV4ATXA253K
R718	RESISTOR, Fixed, Composition, 27K, 2W.	P/o Bleeder Network	RC42GF273J
R719	RESISTOR, Fixed, Wirewound, 100K, 20W.	Bleeder for B+	RW-110-43
R720	RESISTOR, Fixed, Composition 100 ohms, 2W.	Arc Suppressor	RC42GF101K
R721	RESISTOR, Fixed, Wirewound, 10 ohms, 10W.	Protection for Meter Burn-out	RW-109-4
R722	RESISTOR, Variable, Wirewound, 15 ohms, 12½W, pot.	PA OVERLOAD ADJ. Rheostat; P/o CB704 Shunt Network	RP-100XH150K
R723	RESISTOR, Fixed, Wirewound, 7.5 ohms, 10W.	P/o CB704 Shunt Network	RW-109-48
R724	RESISTOR, Fixed, Composition 100 ohms, 2W	Arc Suppressor	RC42GF101K
R725	RESISTOR, Shunt, Ass'y. .07 ohms.	CB701 Shunts	AR-111(1A-1738)
R726	RESISTOR, Shunt, Ass'y. .07 ohms.	CB701 Shunts	AR-111(1A-1738)
R727	RESISTOR, Fixed, Wirewound, 20K, 10W.	Series Dropping Resistor for I702	RW-109-37
R728	RESISTOR, Fixed, Wirewound, 15K, 10W.	Series Dropping Resistor for V707 and V708	RW-109-36
S701	SWITCH, Tap	PA FIL PRI ADJ Switch	SW-167-7
S702	SWITCH, Toggle D.P.D.T.	Transmitter Voltages Switch (Grounds Coil of K703)	ST-104
S703	SWITCH, Toggle D.P.D.T.	Final Voltages Switch	ST-104
T701	AUTOTRANSFORMER	Provides tapped Voltages for PA FIL ADJ	TF-164

SYM.	DESCRIPTION	FUNCTION	TMC DWG. OR PART NO.
T702	TRANSFORMER, Filament	Provides Filament Voltages to RFD-1A	TF-202
T703	TRANSFORMER, Power	Provides Filament and B- for PS-4A	TF-101
T704	TRANSFORMER, Plate	Provides Mid-voltage Rect Plate Voltage	TF-231
V701	TUBE, Electron, 6X4	Bias Rect.	6X4
V702	TUBE, Electron, 5R4GY	Mid-voltage Rect.	5R4GY
V703	TUBE, Electron, 6336A	Mid-voltage Series Regulator	6336A
V704	TUBE, Electron, 6AU6	Control Amplifier	6AU6
V705	TUBE, Electron, OA2	IPA Screen Grid Regulator	OA2
V706	TUBE, Electron, OB2	IPA Screen Grid Regulator	OB2
V707	TUBE, Electron, OA2	Regulator Voltage Reference	OA2
V708	TUBE, Electron, OB2	Regulator Voltage Reference	OB2
CB701	CIRCUIT BREAKER, Dual	MAIN POWER Circuit Breaker	SW-261
CB702	CIRCUIT BREAKER, 10 ma.	PA GRID OVERLOAD Circuit Breaker	SW-229
CB703	CIRCUIT BREAKER, 60 ma.	PA SCREEN OVERLOAD Circuit Breaker	SW-262
CB704	CIRCUIT BREAKER	PA PLATE OVERLOAD Circuit Breaker	SW-215

Changes in Parts Lists Necessary to Convert

RFD-1 to 1A

M202.....to MR-150

R224.....to RC20GF564J

R225.....to RC20GF515J

R232.....to RC20GF472J

R217.....to RC20GF124J

R209.....to RC20GF154J

R218.....to RC20GF754J

R215.....to RC32GF206J

R201.....to RV4ATRA503B

Add S209, ST22N

C288.....to CC-109-4

R216.....Deleted

C255.....to AC-113

L235.....Deleted

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SECTION 4—PRINCIPLES OF OPERATION (C nt.)

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SECTION 3—OPERATOR'S SECTION

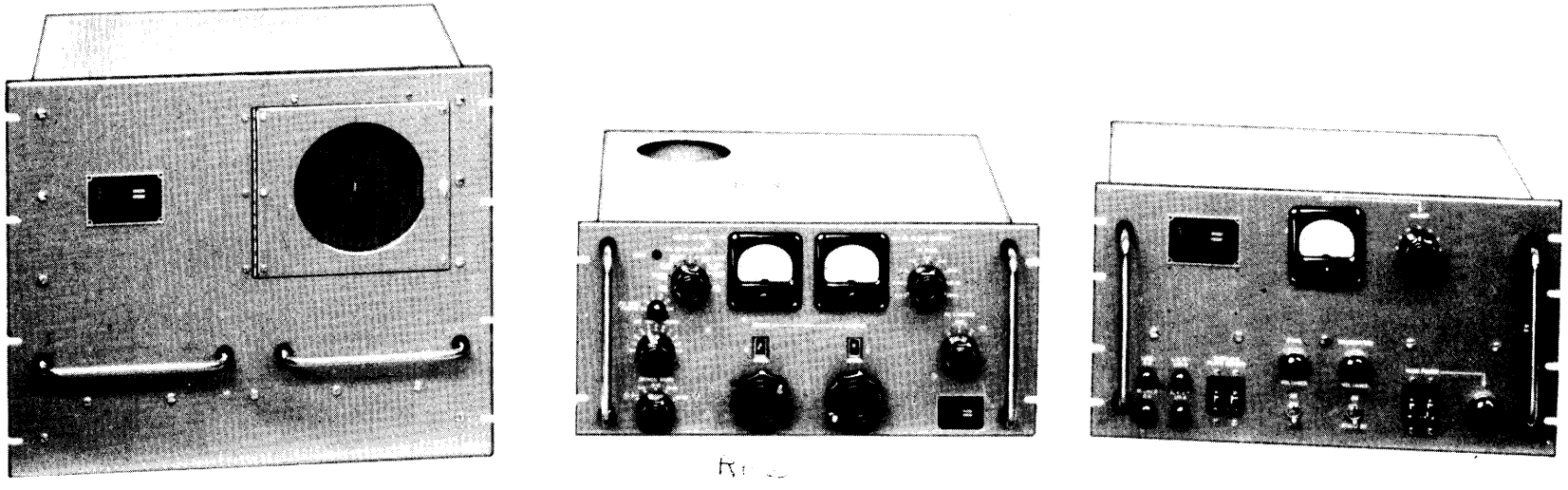


Figure 1-1. Front View, Linear Power Amplifier, PAL-1K

SECTION 1
GENERAL DESCRIPTION

1-1. EQUIPMENT ILLUSTRATION.

The TMC Model PAL-1K, figure 1-1, consists of three units: the RF amplifier, TMC Model RFD; the low voltage and bias supply, TMC Model PS-4; and a high voltage plate voltage supply, TMC Model PS-5. The total vertical rack space occupied by these units is 35 inches. Operational controls and metering are located on the front panels of the RFD and PS-4.

1-2. FUNCTIONAL DESCRIPTION.

The PAL-1K is a conservatively-rated, general purpose linear amplifier and power supply capable of providing 1000-watt peak envelope power (PEP) output throughout the frequency range of 2 to 32 mc. Although the PAL-1K is designed primarily for single sideband service, it may be used for many types of emission.

1-3. TECHNICAL SPECIFICATIONS.

Item	Characteristic
FREQUENCY RANGE	2 to 32 mc continuous, bandswitched.
OUTPUT POWER	At least 1000 watts PEP; 1000 watts, CW or FSK.
OPERATING MODES	CW, MCW, SSB, DSB, ISB, FSK.
TUNING	All tuning and bandswitching controls are on front panel (no plug-in components).
OUTPUT IMPEDANCE	Matches any unbalanced load from 50 to 600 ohms at ±45 degrees.
OUTPUT CONNECTION	Type C coaxial.
INPUT REQUIREMENTS	100 mw produces full output.
INPUT CONNECTION	Type UHF coaxial.
SIGNAL TO DISTORTION RATIO	Better than 40 db down relative to PEP output.
HARMONIC SUPPRESSION	Second harmonic at least 40 db and all others at least 50 db down from PEP output.
ALDC	An automatic load and drive control is provided to limit distortion during high drive peaks or load changes.
PRIMARY POWER REQUIREMENTS	115- or 230-volt single-phase 50- or 60-cycle AC, approximately 1900 watts.
SAFETY	Full interlock protection. Full overload and fuse protection.
COOLING	High capacity, filtered, forced air cooling.
TEMPERATURE AND HUMIDITY	Designed to operate in any ambient temperature between the limits of 0°C and 50°C for any value of humidity up to 90%.
MOUNTING	Standard 19-inch panel width.
SIZE	RFD - 8-3/4 x 19 x 17-1/8 inches PS-4 - 10-1/2 x 19 x 12 PS-5 - 15-3/4 x 19 x 16-1/4 inches
APPROXIMATE WEIGHT	Unpacked / Packed RFD - 40 lb. / 80 lb. PS-4 - 60 lb. / 120 lb. PS-5 - 160 lb. / 300 lb.
COMPONENTS AND CONSTRUCTION	Equipment manufactured in accordance with JAN/MIL specifications wherever practicable. All parts and assemblies meet or exceed the highest quality standards.
TUBE COMPLEMENT	RFD - 1 PL-172, 1 5763, and 1 6146 PS-4 - 1 5R4GY, 1 0B2, 1 6X4, and 2 0A2 PS-5 - 2 872A

SECTION 2
INSTALLATION

2-1. UNPACKING AND HANDLING.

The PAL-1K has been designed for ease of installation and minimum effort in operation. The units are packed in individual shipping containers and should be carefully unpacked. Packing material should be examined for loose items before discarding. Make a close visual inspection to determine any physical damage due to rough handling during shipment. If damage is found, notify carrier immediately.

2-2. POWER REQUIREMENTS AND DISTRIBUTION.

The unit is designed for operation from a 115- or 230-volt, 50- or 60-cycle source. Unless specifically ordered for a 230-volt, 50- or 60-cycle source, the unit is shipped wired for 115-volt AC operation.

Wiring changes necessary to change the PAL-1K to 230-volt AC operation are shown in figures 8-2 and 8-3.

CAUTION

Do not change any fuse values, as all fuses are independent of the primary source voltage.

2-3. INSTALLATION LAYOUT.

The PAL-1K is generally used in combination with other equipments as the linear power amplifier of a 1000-watt single sideband transmitter. The PAL-1K's RFD, PS-4, and PS-5 units are provided with slides for convenient mounting in the transmitter's rack. The PAL-1K does not have a rack of its own.

2-4. INSTALLATION REQUIREMENTS.

a. Cables to interconnect the three individual units are provided as loose items. Connect them as shown in figure 2-1.

b. Connect a coaxial cable such as RG-8/U or RG-11/U, depending upon antenna or lead, to J202 through a type C connector. Connect the exciter output through a RG-59/U coaxial cable and a type UHF connector to J201.

c. Connect the power cable to J301.

d. Make all other external connections to terminal strip E302 as shown in figure 2-2. If an external interlock switch is not used, ensure that terminals 3 and 4 are jumpered.

2-5. INSPECTION AND ADJUSTMENTS.

a. Make certain that all connections are properly made.

b. Be especially sure that an antenna or load is connected to the output jack, J202.

c. Neutralization, bias, and overload circuit adjustments are made before the equipment leaves the factory. A check of these adjustments is recommended before placing the RFD in operation. (Refer to Section 6 for specific directions.)

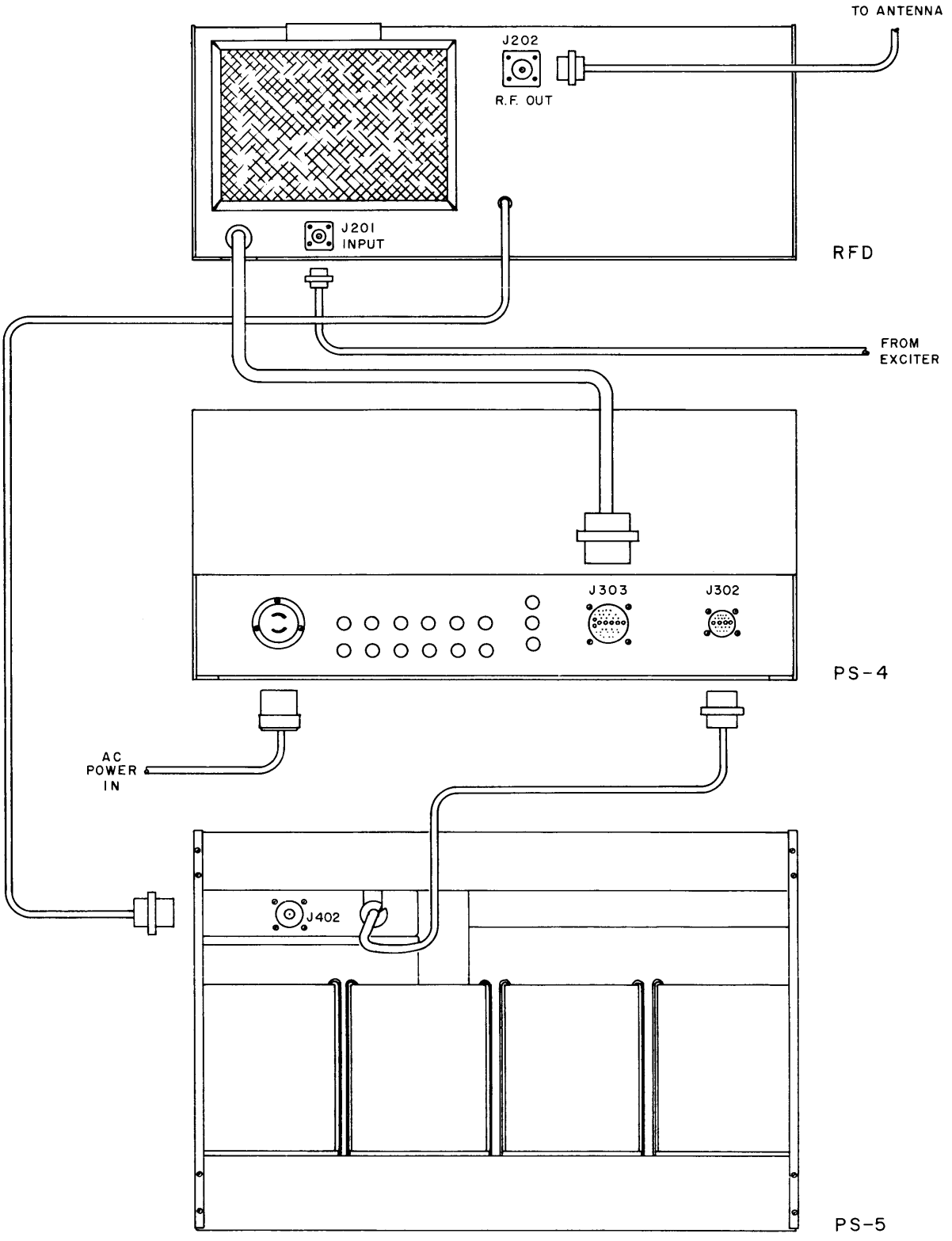


Figure 2-1. Pictorial Cabling Diagram, PAL-1K

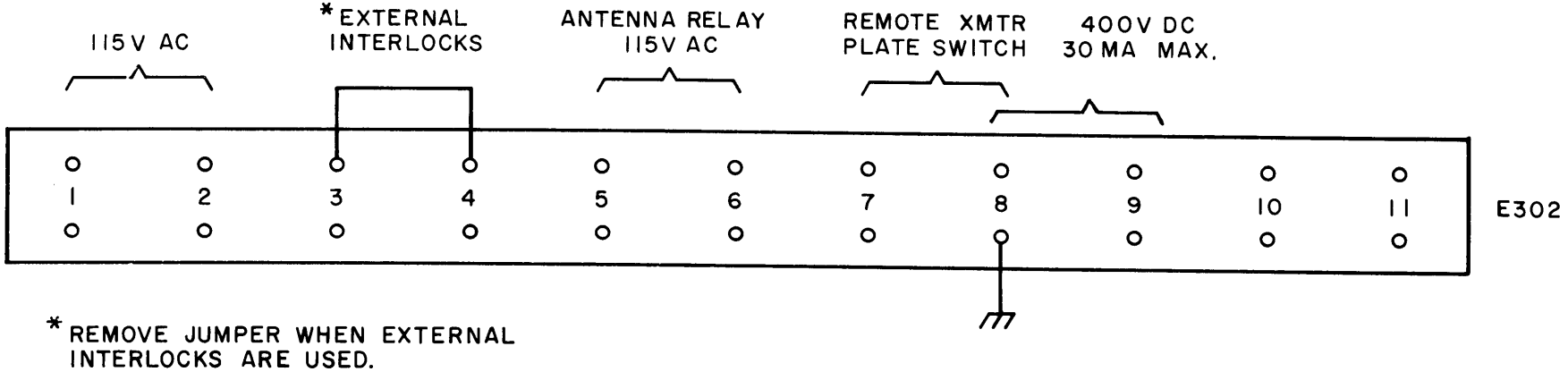


Figure 2-2. E302 Terminal Connections, PAL-1K

SECTION 3
OPERATOR'S SECTION

3-1. FUNCTIONAL OPERATION.

The PAL-1K accepts the output of an exciter and amplifies the signal to the 1-kw level for transmission.

3-2. DESCRIPTION OF CONTROLS.

(See figure 3-1.)

a. RFD.

Control	Function
MULTIMETER M202 meter	Measures meter points selected by associated switch.
MULTIMETER switch S204	Selects circuits for measurement by multimeter.
PA GRID TUNING control C231	In combination with C232 varies the tuned circuit at the grid of RFD's power amplifier stage.
1ST AMPL TUNING control C203	Varies the tuned circuit at the plate of RFD's first amplifier stage.
DRIVER BAND switch S201	Changes frequency range of RFD's driver stage.
PA PLATE CURRENT meter M201	Indicates plate current of RFD's power amplifier stage.
PA BAND switch S202	Changes frequency range of RFD's power amplifier stage.
PA LOADING switch S203	Selects various loading capacitors for loads of different impedances.
TUNING control C245	Varies the main tuning vacuum capacitor which is an integral part of the PA Pi tank.
LOADING control C269	Varies the variable vacuum capacitor which adjusts the degree of coupling to the load.

b. PS-4.

LINE meter M301	Indicates voltage at primary of filament transformer.
LINE ADJUST switch S301	Selects taps on the filament transformer to maintain desired 115 volts AC.
FINAL VOLTAGES switch S303	Applies high voltage to the PA stage when the TRANSMITTER VOLTAGES switch is ON.
TRANSMITTER VOLTAGES switch S302	Applies plate voltage to the low level stages and high voltage to the PA stage when the FINAL VOLTAGES switch is ON.
OVERLOAD PLATE SCREEN circuit breakers CB302 and CB303	Provides automatic protection and manual reset in the event excessive PA plate or screen grid currents are drawn.
MAIN POWER circuit breaker CB301	Applies AC voltage to the transmitter and provides automatic overload protection.
LINE 5A, LV B- 1/10A, BLOWER 2A, and LV B+ 1/4A fuses	These fuses protect their respective circuits.

3-3. PRELIMINARY POWER OFF ADJUSTMENTS.

Place the following controls in the positions indicated before applying AC power to the PAL-1K.

ASSOCIATED EXCITER

POWER ON/OFF	ON
OUTPUT	OFF or MINIMUM

(Permit the exciter to warm up for the proper length of time before applying power to the associated transmitter.)

NOTE

All frequency determining elements of the exciter units should be given their proper warm-up times before attempting to transmit. Single sideband suppressed carrier transmission requires a degree of high frequency stability for maximum effectiveness, and a 24-hour warm-up period is recommended.

PS-4

LINE ADJUST	Position 4 from fully ccw.
FINAL VOLTAGES	OFF

PS-4 (Cont.)

TRANSMITTER VOLTAGES	OFF
OVERLOAD PLATE SCREEN	OFF
MAIN POWER	OFF

3-4. PRELIMINARY POWER ON ADJUSTMENTS.

a. Tune the associated exciter for the desired output frequency. Return output to zero.

NOTE

No provision is made for a different output from input frequency in the RFD. The frequency of output is the same as that fed from the exciter. Since the RFD is a linear amplifier, attempts to multiply frequency in this unit prove unsuccessful.

b. Set MAIN POWER circuit breaker located on PS-4 to ON; the indicator should go on. If not, check to see that the previous steps have been performed properly, or refer to Section 6.

c. Check the filament LINE meter for a reading of 115 volts. Use LINE ADJUST switch for correction if necessary. Set OVERLOAD PLATE SCREEN circuit breaker to ON. Select the range to be used by turning the DRIVER BAND and PA BAND switches on RFD to position of selected frequency.

3-5. PAL-1K TUNING.

a. Turn the TRANSMITTER VOLTAGES switch to ON; the indicator goes on after the MAIN POWER circuit breaker has been ON for about 2 minutes. When the indicator does go on, the procedure may be continued.

b. Turn the MULTIMETER switch on the RFD to the 1ST AMPL E_p position.

c. Increase OUTPUT control of exciter until a usable reading is obtained on the MULTIMETER of the RFD.

d. Rotate the 1ST AMPL TUNING control, observing the MULTIMETER for a peak reading.

e. Turn the MULTIMETER switch to PA E_g position.

f. Rotate the PA GRID TUNING control, observing the MULTIMETER for a peak reading.

g. Rotate the OUTPUT control of the exciter fully ccw.

h. Turn the PA TUNING control to approximate setting as indicated in tuning chart, table 3-1.

i. Turn PA LOADING switch as indicated in tuning chart, table 3-1.

j. Turn PA LOADING control as indicated in tuning chart, table 3-1.

k. Turn the FINAL VOLTAGES switch to ON.

l. Increase the OUTPUT of the exciter until the PA PLATE CURRENT meter on the RFD indicates about 300 ma.

m. Adjust PA TUNING control, observing the PLATE CURRENT meter for a dip.

n. Increase the PA LOADING control until the plate current rises.

o. Readjust OUTPUT control on the exciter unit for a PA PLATE CURRENT of 300 ma.

p. Adjust PA TUNING control for a PA PLATE CURRENT dip.

q. Repeat PA TUNING and PA LOADING adjustments until the desired power output is reached with a minimum OUTPUT on the exciter as indicated on RFD MULTIMETER (PA E_g.). The screen current (PA I_{sg}.) is with a resistive load, usually under 15 ma. At no time should the screen current reading exceed full scale.

r. Turn the TRANSMITTER VOLTAGES switch to OFF.

3-6. PAL-1K OPERATION.

The transmitter may be operated by turning the TRANSMITTER VOLTAGES switch to ON or it may be operated remotely through the external interlock connection. (Refer to Section 2.)

3-7. SHUTDOWN PROCEDURE.

Turn the FINAL VOLTAGES and TRANSMITTER VOLTAGES to OFF. Wait 5 minutes before turning the MAIN POWER switch to OFF, thus permitting tube PL-172 to cool, prolonging its life.

3-8. OVERLOAD CIRCUIT BREAKERS.

If during tuning or operation, the transmitter should automatically be shut down (red indicators off) check the OVERLOAD PLATE SCREEN switch. If they are OFF reduce the exciter output before switching them to ON. Check the PA PLATE CURRENT and/or PA I_{sg}. to be sure there is no overload as indicated by very high or off scale readings.

3-9. OPERATOR'S MAINTENANCE.

a. Fuses should be replaced with fuses of the same value. If fuses continue to open, do not insert a larger fuse unless continued operation is more important than damage to the equipment. Refer to paragraph 3-2 for fuse values.

b. In order to prevent failure of the equipment due to corrosion, dust, and other destructive ambient conditions, thoroughly inspect the inside of the chassis for signs of dirt, dampness, molding, or corrosion. This should be done periodically depending upon the severity of the conditions. Clean the affected parts with a cleaning agent of proven quality.

TABLE 3-1. TUNING CHART

f	VMO Freq.	PA Band	1st AMPL RF Volts	PA E_g Volts	PA Tuning	PA Loading	PA Loading Pos.
2.0	2.500	2.0-2.5	10	21	020	105	1
2.5	3.000	2.0-2.5	10	20	054	118	2
2.5	3.000	2.5-3.0	10	24	040	002	2
3.0	3.500	2.5-3.0	11	20	062	005	3
3.0	3.500	3.0-4.0	11	20	053	069	2
4.0	2.250	3.0-4.0	11	20	079	089	3
4.0	2.250	4.0-6.0	11	20	074	058	2
6.0	3.250	4.0-6.0	10	20	196	067	3
6.0	3.250	6.0-8.0	9	23	141	058	2
8.0	2.125	6.0-8.0	9	22	184	040	3
8.0	2.125	8.0-12	10	20	142	050	2
12	3.125	8.0-12	10	19	197	041	3
12	3.125	12-16	8	20	172	008	3
16	2.062	12-16	9	18	205	060	3
16	2.062	16-22	8	20	170	009	3
22	2.812	16-22	11	18	205	081	3
22	2.812	22-32	12	20	170	039	3
32	2.031	22-32	12	22	147	097	3

NOTE

This tuning chart was obtained on an early model and is presented for illustrative purposes only. In each specific case, on initial setup the settings of PAL-1K's dials should conform with the tuning chart supplied with the equipment. This chart was obtained by factory checkout tests made under factory conditions. Subsequently, this chart, too, should be replaced by settings obtained under field usage conditions of the PAL-1K.

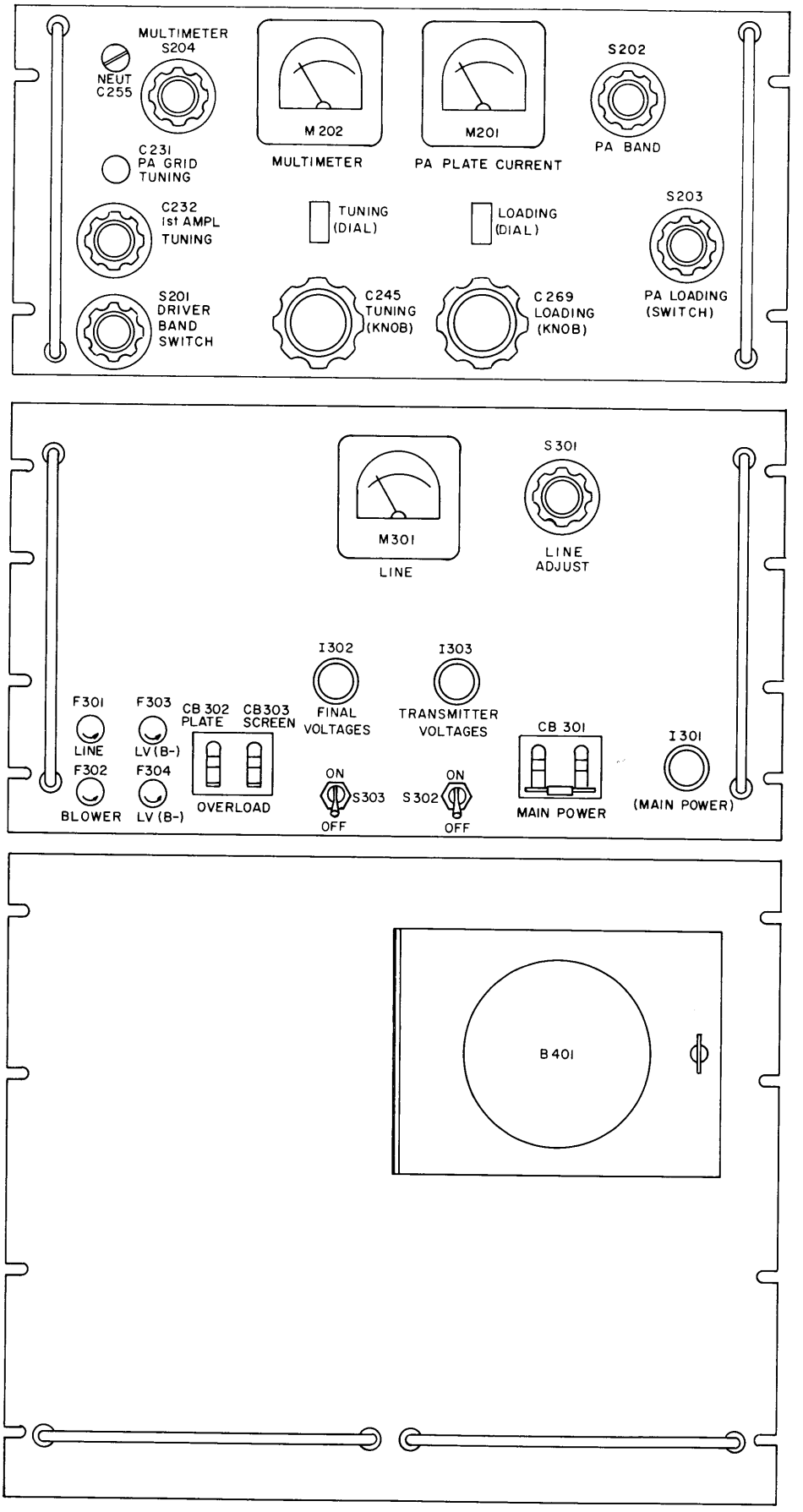


Figure 3-1. Operating Controls, PAL-1K

SECTION 4
PRINCIPLES OF OPERATION

4-1. FUNCTIONAL DESCRIPTION.

The RFD consists of three cascade linear amplifier stages. Figure 4-1 shows the arrangement.

4-2. AMPLIFIER CIRCUIT DESCRIPTION.

a. 1ST AMPLIFIER, V201. (See figure 4-2.) - Tube 5763 is operated as a class A amplifier. The tuned plate circuit of V201 is varied by the front panel control, 1ST AMPL TUNING. This stage requires an input power of approximately 100 mw to drive stages V202 and V203 to full power output.

b. DRIVER STAGE, V202. (See figure 4-3.) - Tube 6146 is operated as a class AB_1 amplifier which drives the final stage to full output. PA GRID TUNING is the front panel control for the tuned plate circuit of V202.

c. POWER AMPLIFIER, V203. (See figure 4-4.) - The class AB_1 amplifier utilizes a PL172 air-cooled tube to provide 1-kw output.

d. NEGATIVE FEEDBACK. - Negative feedback from V203 to the cathode of V202 decreases distortion to a low level.

e. ALDC FEEDBACK. - An ALDC (automatic load and drive control) feedback system limits high drive peaks or load changes. Some of the RF output is rectified by crystal diode CR204. The voltage produced is used to bias the grid of V201, providing a control similar to AGC.

f. METERS M201 AND M202. (See figure 4-5.) - Meter M201 measures DC plate supply to PL-172. The meter deflection should be less than 250 ma with no RF drive and to avoid excessive expenditure of power in PA tube, the deflection should not exceed approximately 600 ma with full RF output.

Eight-position MULTIMETER selector switch S204 "inserts" MULTIMETER M202 in one of eight circuits as follows:

Position	Switch Desig.	Indication	Nominal Value
1	PA Bias	DC grid-cathode bias on PL-172	-130
2	PA E_{sg}	DC screen voltage on PL-172	+400
3	PA E_p	DC plate voltage on PL-172	+3000
4	PA I_{sg}	DC screen current (mils) on PL-172	Less than 50 ma
5	1st AMPL E_p	RF output of V201	-
6	PA E_g	RF at grid of PL-172	-
7	PA E_p	RF output of PL-172	-
8	PA E out	RF output from RFD	-

4-3. POWER SUPPLY DESCRIPTION.

a. PS-4 utilizes a full-wave rectifier to provide the low B+ and a half-wave rectifier for bias requirements of the RFD. The voltages are well filtered by choke-capacitor circuits. All voltage ON/OFF controls including MAIN POWER are operated from the front panel of this unit.

b. PS-5 provides the plate supply voltage of stage V203. The rectifier uses a full-wave circuit with two type 872A mercury vapor tubes and a swinging choke in the negative lead of the filter.

4-4. INTERLOCK CIRCUIT. (See figure 4-6.)

The TRANSMITTER PLATES relay K303, is connected in series with resistor R314 and various interlock switches across the 150-volt bias regulator. Opening of any of the interlocks removes all high voltages by opening relay K303.

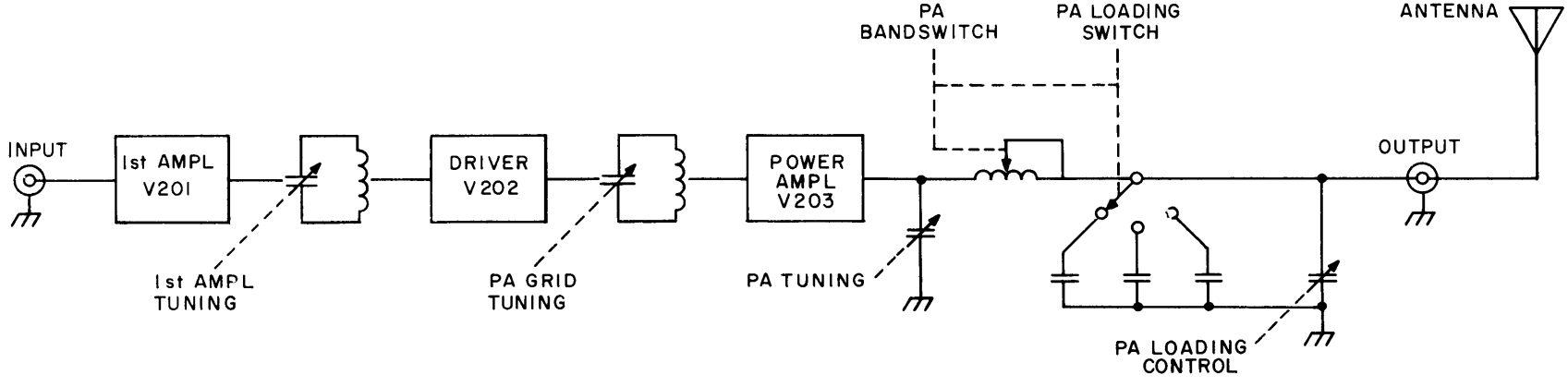


Figure 4-1. Block Diagram, RFD

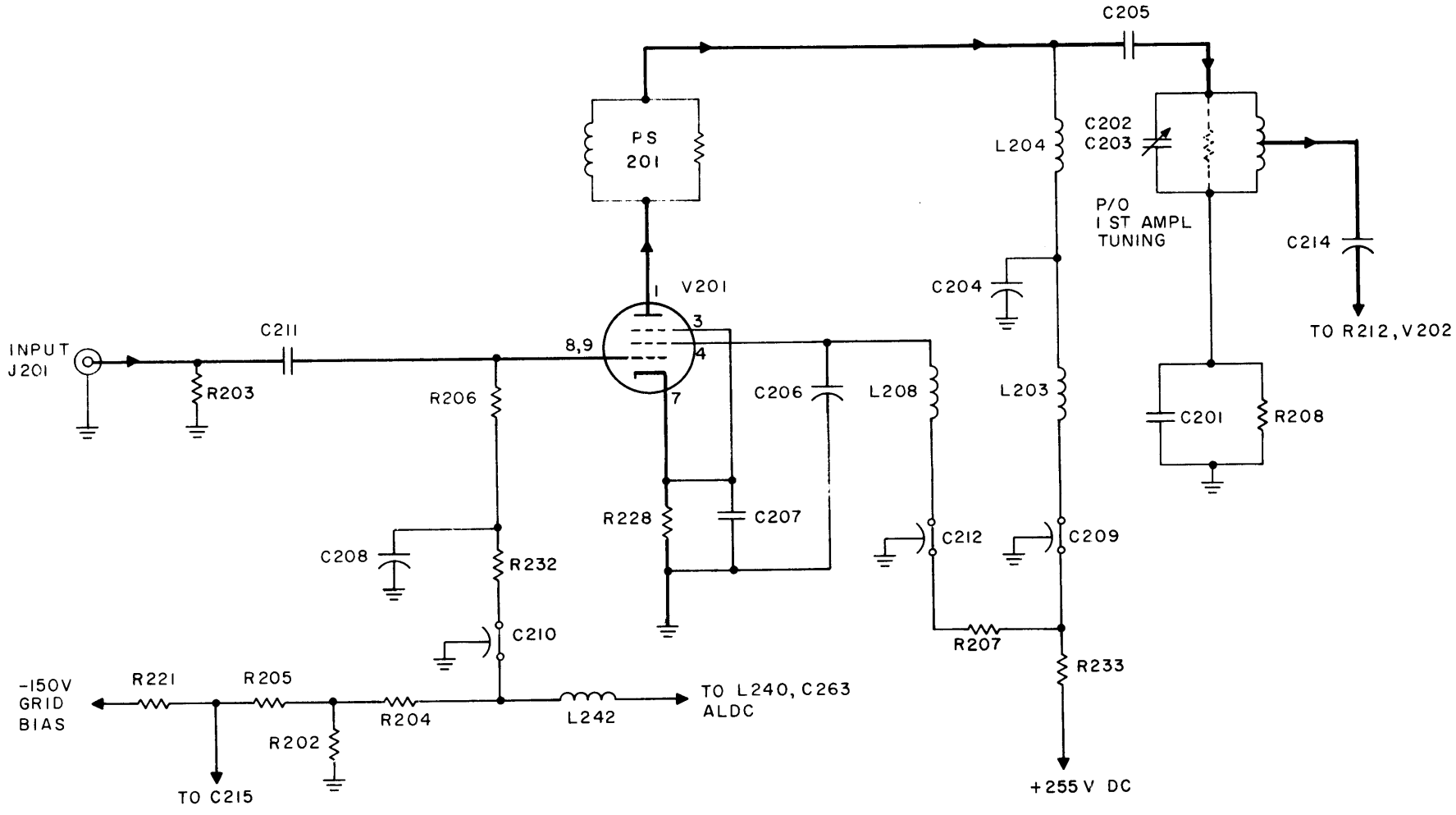


Figure 4-2. Simplified Schematic, 1st Amplifier Stage V201, RFD

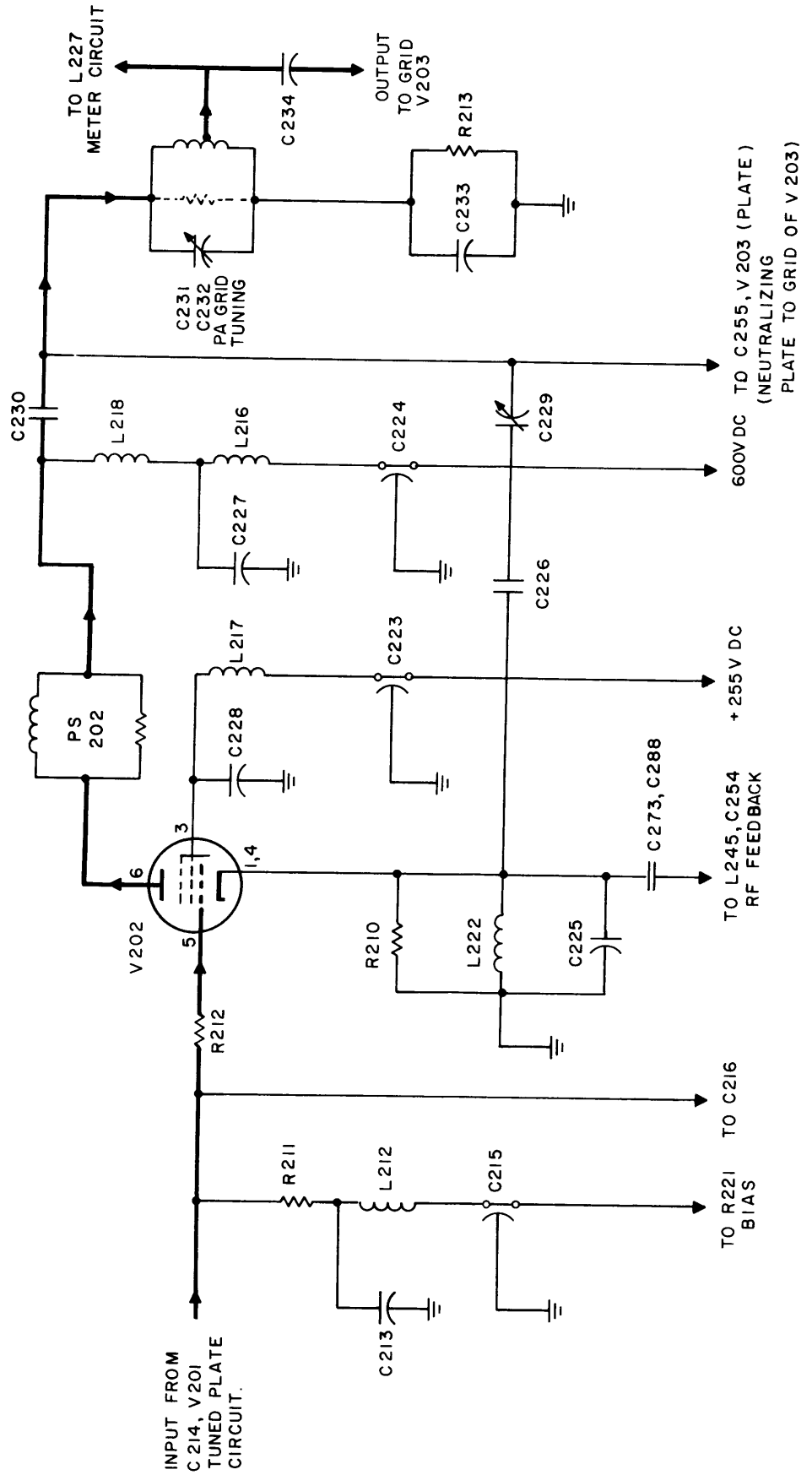


Figure 4-3. Simplified Schematic, Driver Stage V202, RFD

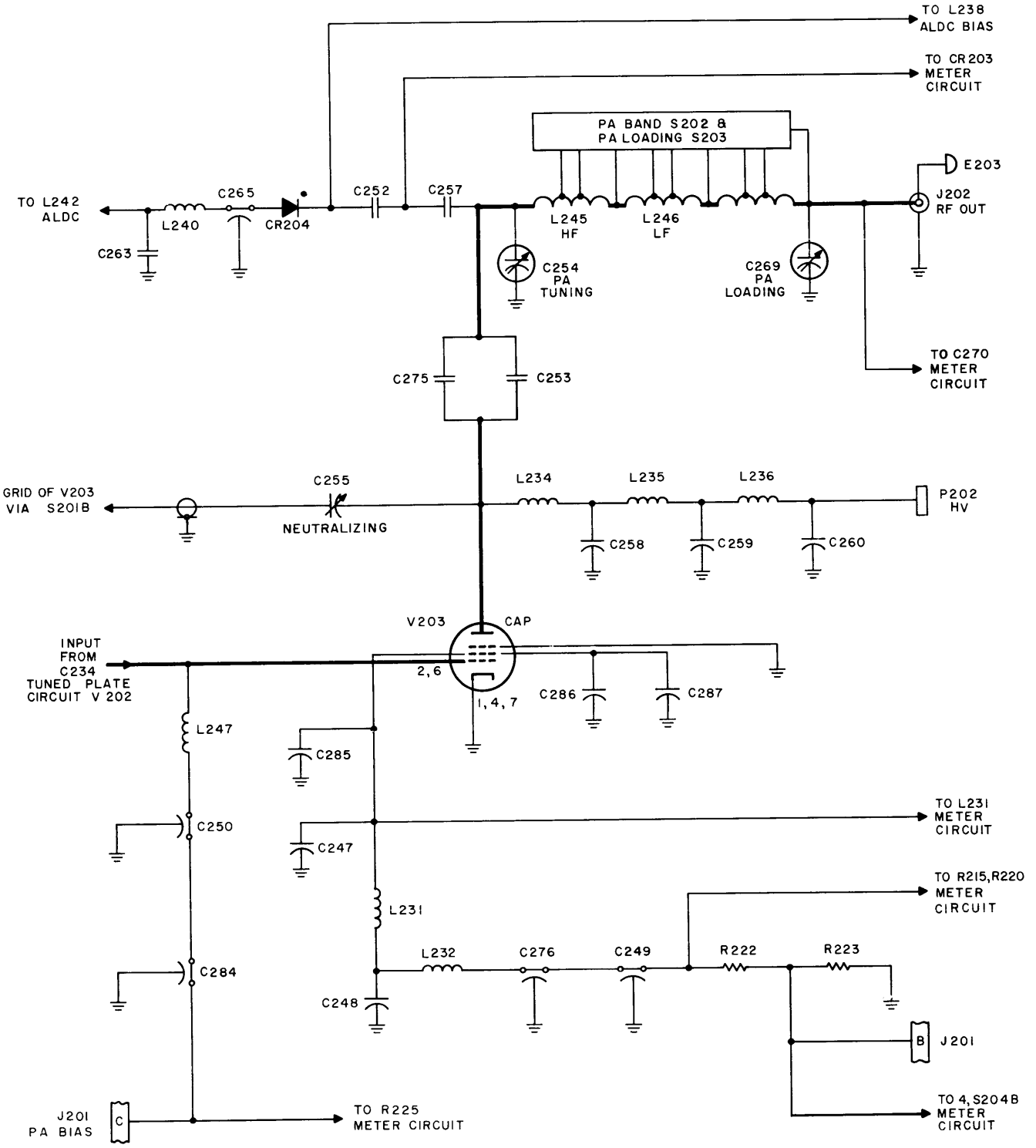


Figure 4-4. Simplified Schematic, Power Amplifier Stage V203, RFD

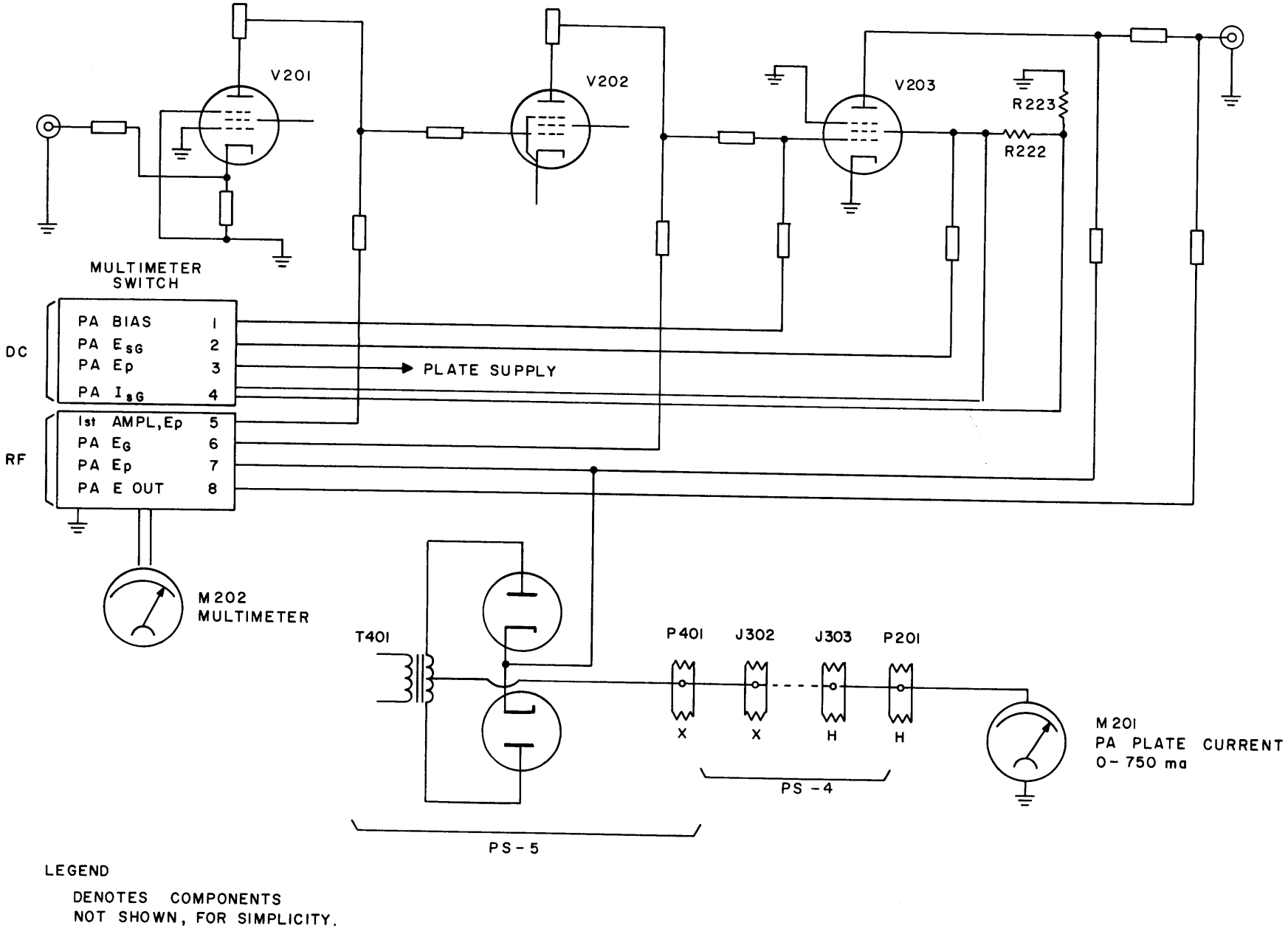


Figure 4-5. Simplified Schematic, Metering Circuits, RFD

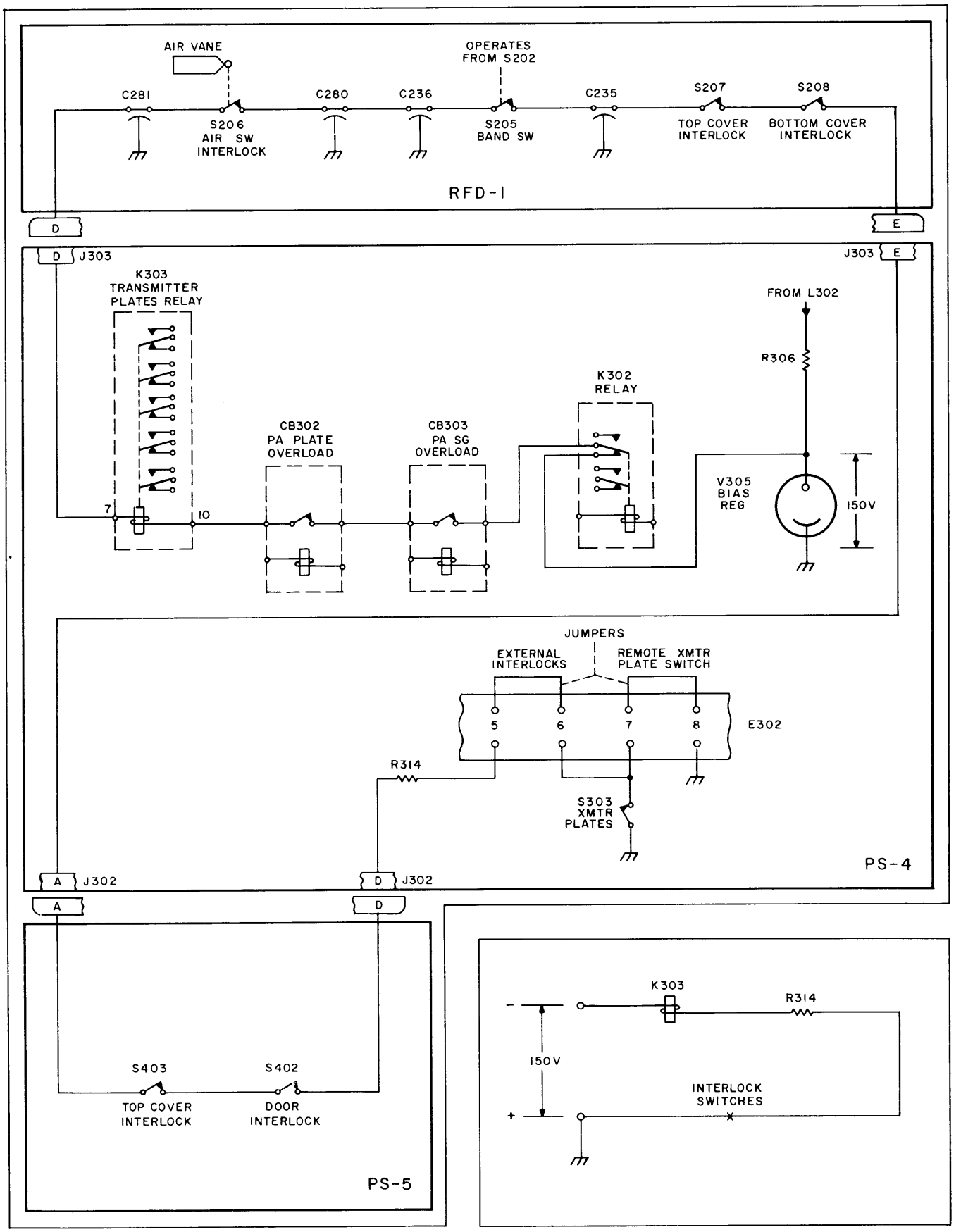


Figure 4-6. Simplified Schematic, Interlock Circuits, PAL-1K

SECTION 5
TROUBLE-SHOOTING

WARNING

Operation of this equipment involves the use of high voltages which are dangerous to life. Observe safety precautions at all times. Do not change tubes or make adjustments inside the equipment with final voltages ON. Do not depend on interlock switch for protection but always throw MAIN POWER current breaker to OFF position. Under no circumstances should interlocks be removed or tampered with except by authorized maintenance personnel. To avoid injury always ground B+ lines before touching them.

5-1. GENERAL.

a. The PAL-1K has been designed for long term trouble free duty. Little attention beyond normal maintenance is required. Any corrective maintenance to the equipment should be performed by a competent technician familiar with this type equipment.

b. In case trouble does develop, trouble-shooting may be expedited by following a logical testing routine. The procedure in such corrective maintenance is, first, the localization of the faulty circuit or stage and, second, the location of the faulty component or components. In order to determine the trouble as quickly and as accurately as possible, the maintenance technician should familiarize himself with operation and theory of operation of the equipment.

c. Before proceeding with any extensive repairs, ensure that the corrections to be made eliminate the trouble which exists. Do not waste time in needless testing or replacement of parts.

d. In all repairs involving replacement, every attempt should be made to duplicate the original condition of the equipment. Exact replacement parts, such as supplied in the spare parts accompanying this equipment or obtained from TMC, should be used. Care should be taken to run any replacement wiring in the same position and manner as the original wiring. Solder with rosin-core solder only.

e. In case of emergency repairs, where it is impossible to make exact replacement of parts, the temporarily repaired equipment should be conspicuously marked or tagged to indicate the temporary nature and location of the repair. Restore the equipment to its original condition at the first opportunity.

5-2. TEST EQUIPMENT.

A minimum of test equipment is required for servicing the PAL-1K. The built-in multimeter provides checks of all stages of the RFD and voltages supplied to these stages.

a. TEST EQUIPMENT REQUIRED FOR BASIC TROUBLE-SHOOTING.

Equipment	Typical Unit
VTVM	Hewlett-Packard Model 410B

b. TEST EQUIPMENT RECOMMENDED FOR MAXIMUM PERFORMANCE.

Equipment	Typical Unit
Distortion analyzer designed for sideband equipment.	TMC Model PTE-1 Single Sideband Analyzer.

5-3. VOLTAGE AND RESISTANCE CHARTS.

Figure 5-1 shows voltage and resistance at vacuum tube in terminals.

5-4. LOCATION DATA.

Figures 5-2 through 5-10 show location of major components composing the PAL-1K.

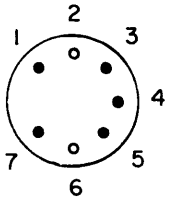
VOLTAGE CHART RFD			
PIN NO.	V201	V202	V203
1	+225	NC	0
2	NG	6.3 AC	-100 TO-130
3	5.5	+255	0
4	0	+.35	0
5	6.3AC	- 60	6.3 AC
6	+180	+ 600	-100TO-130
7	+ 5.5	0	0
8	0	NC	
9	0		
SCREEN			+600
PLATE CAP			+3000

VOLTAGE CHART PS-4				
V301	V302	V303	V304	V305
		+150	+255	0
+600	+350	0	0	-150
	AC			
AC	AC	0	0	-150
		+150	+255	
AC	-350			
	AC	0	0	-150
+600				

RESISTANCE CHART RFD			
1	450 K	16	0
2	NC	0+	∞
3	180	450K	0
4	0	16	0
5	0+	94K	0
6	470 K	∞	∞
7	180	0	0
8	47K/32K*	0	
9	47K/32K*		
SCREEN			
PLATE CAP			∞

RESISTANCE CHART PS-4				
	∞ / 19K*	∞	∞	0
20 K		∞		∞ / 19K*
	0+			
0+	0+	∞	0	∞ / 19K*
		∞	∞	0
0+	∞ / 19K*			
	0+	∞	0	∞ / 19K*
20 K				

DIAGRAM SHOWING PIN POSITION
ON PL-172 (BOTTOM VIEW OF TUBE)



PINS 2, 6 CONNECTED INTERNALLY

* VALUE DEPENDS ON WHICH METER LEAD IS GROUNDED

NOTE:

RESISTANCE OBTAINED WITH 1000 OHMS-PER VOLT SIMPSON METER.

ALL THREE UNITS DISCONNECTED FROM ONE ANOTHER DURING MEASUREMENTS.

Figure 5-1. Voltage and Resistance Charts, PAL-1K

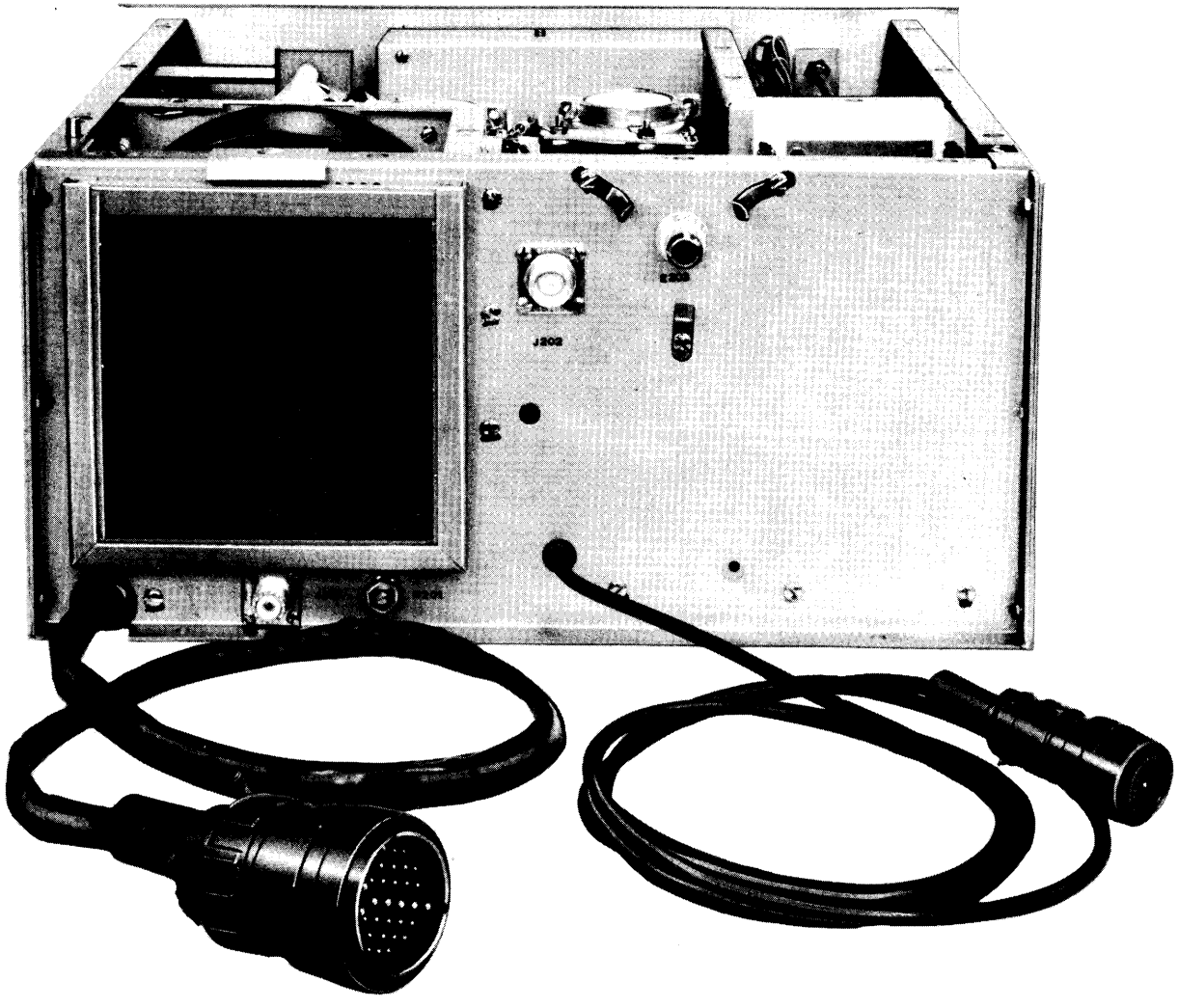


Figure 5-2. Rear View, RFD

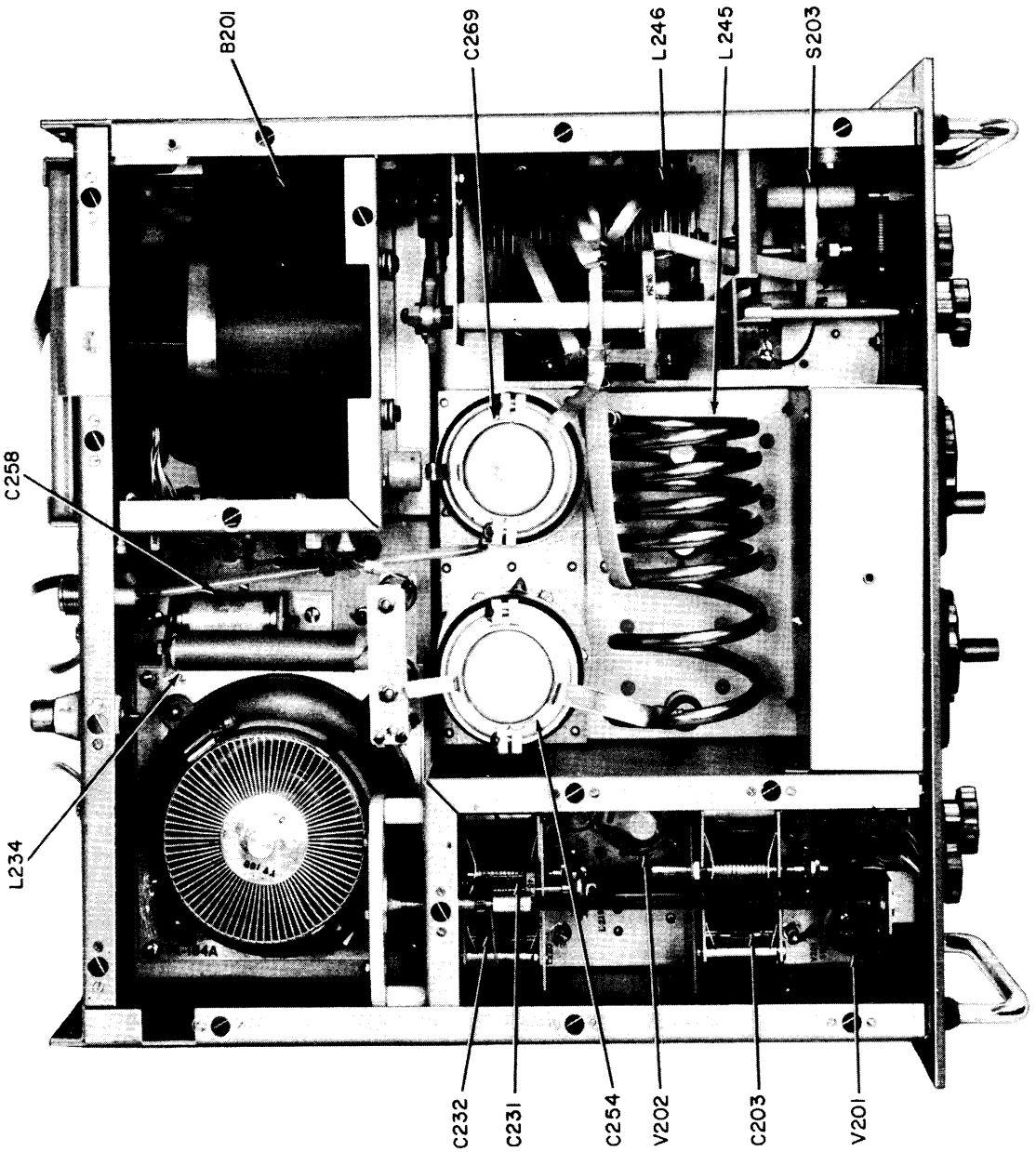


Figure 5-3. Top View, RFD

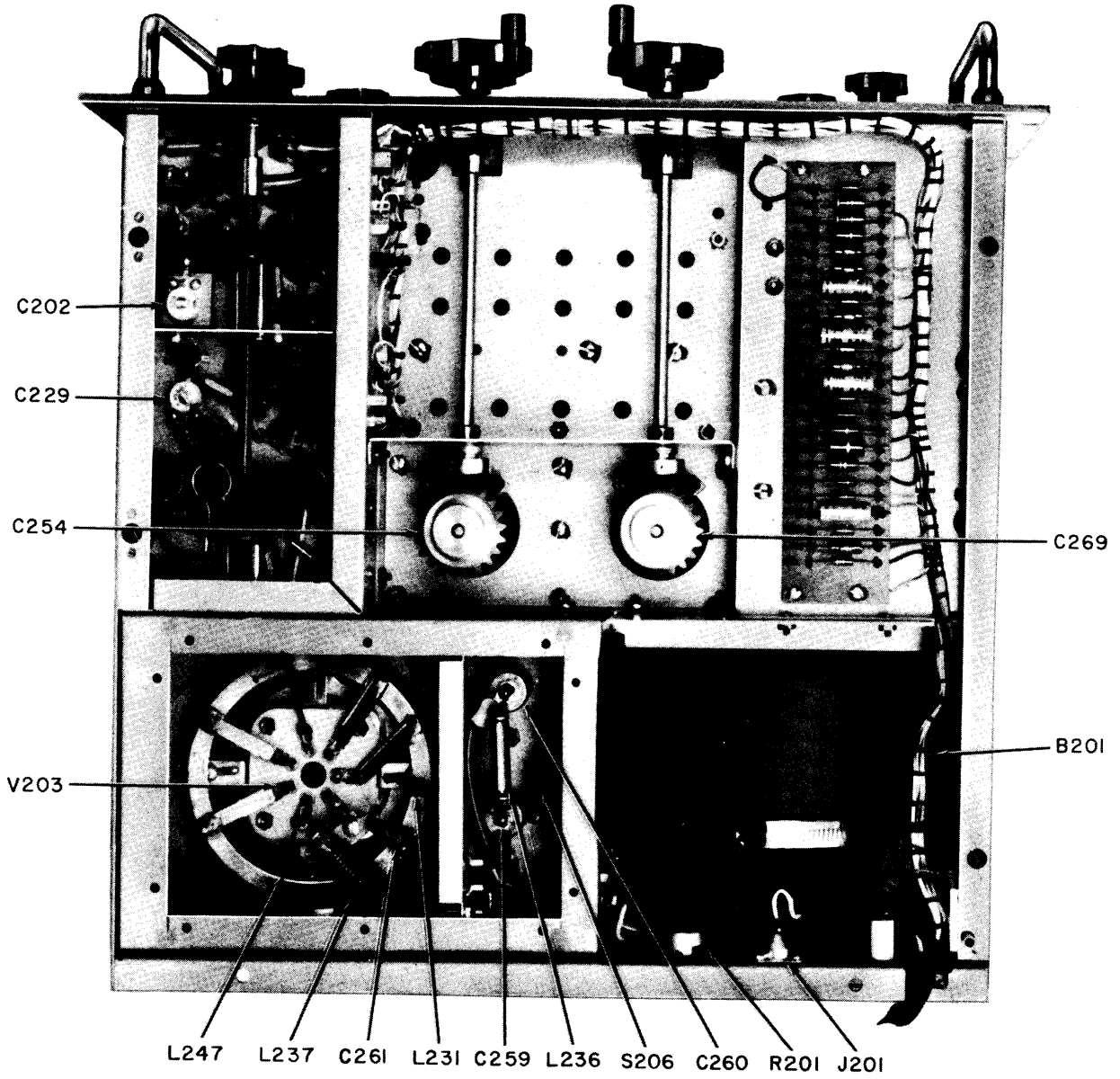


Figure 5-4. Bottom View, RFD

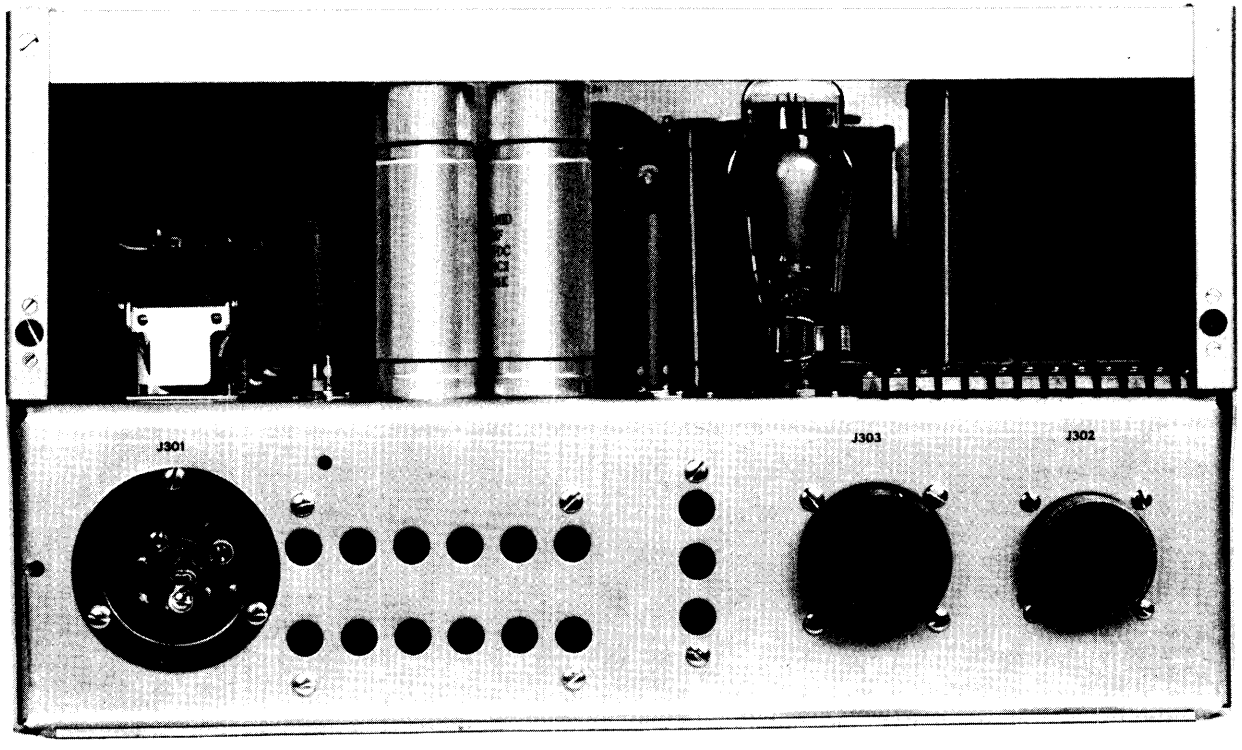


Figure 5-5. Rear View, PS-4

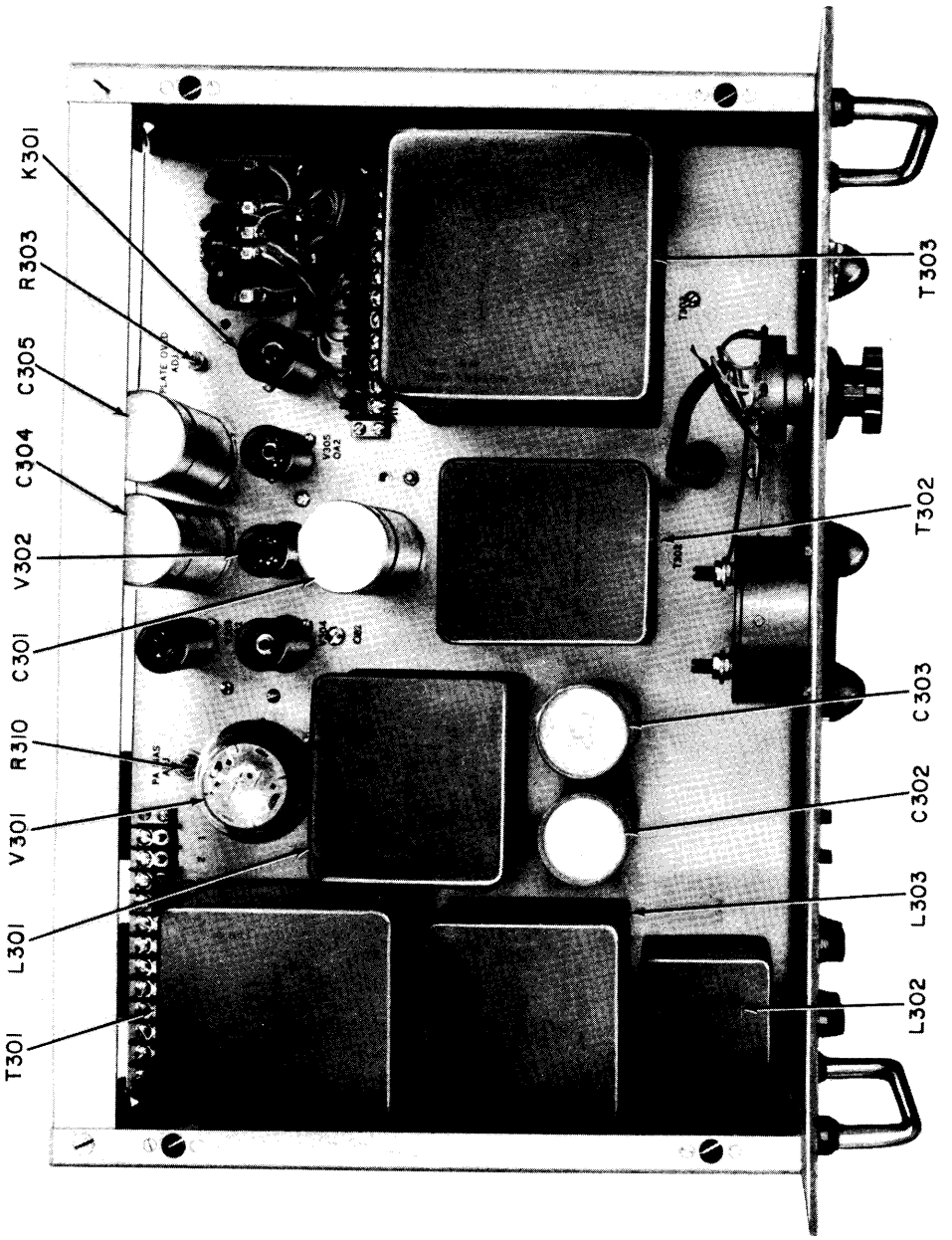


Figure 5-6. Top View, PS-4

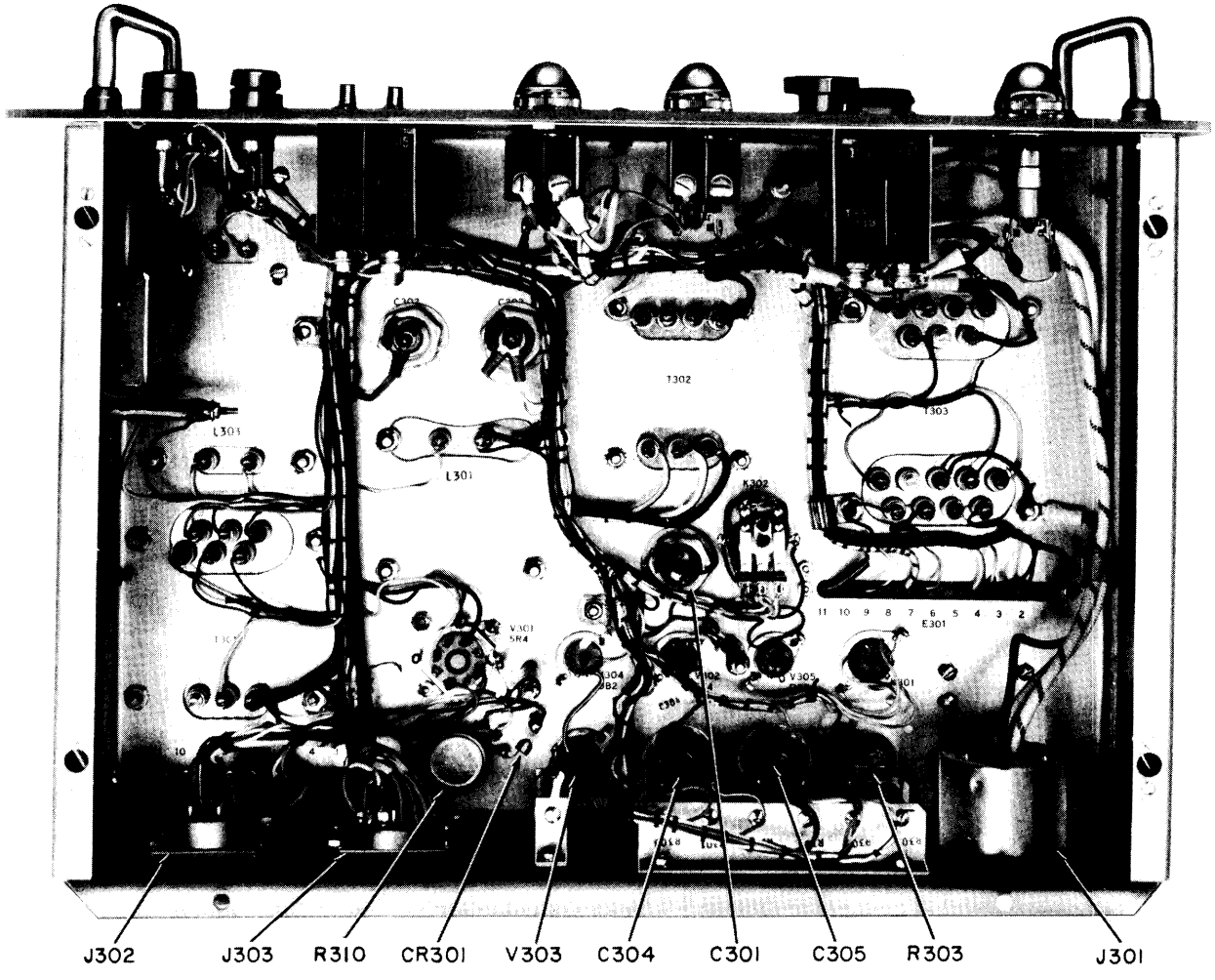


Figure 5-7. Bottom View, PS-4

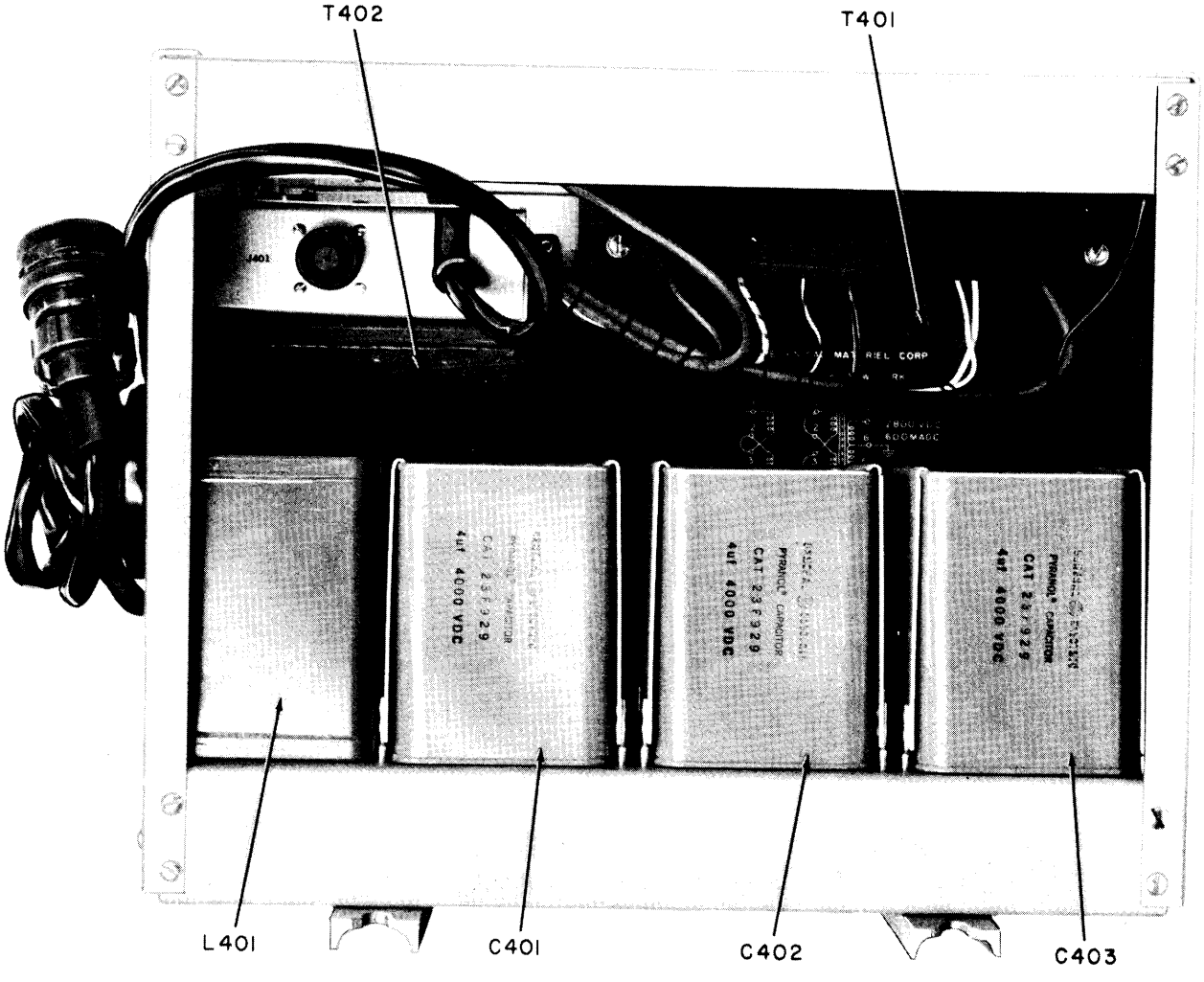


Figure 5-8. Rear View, PS-5

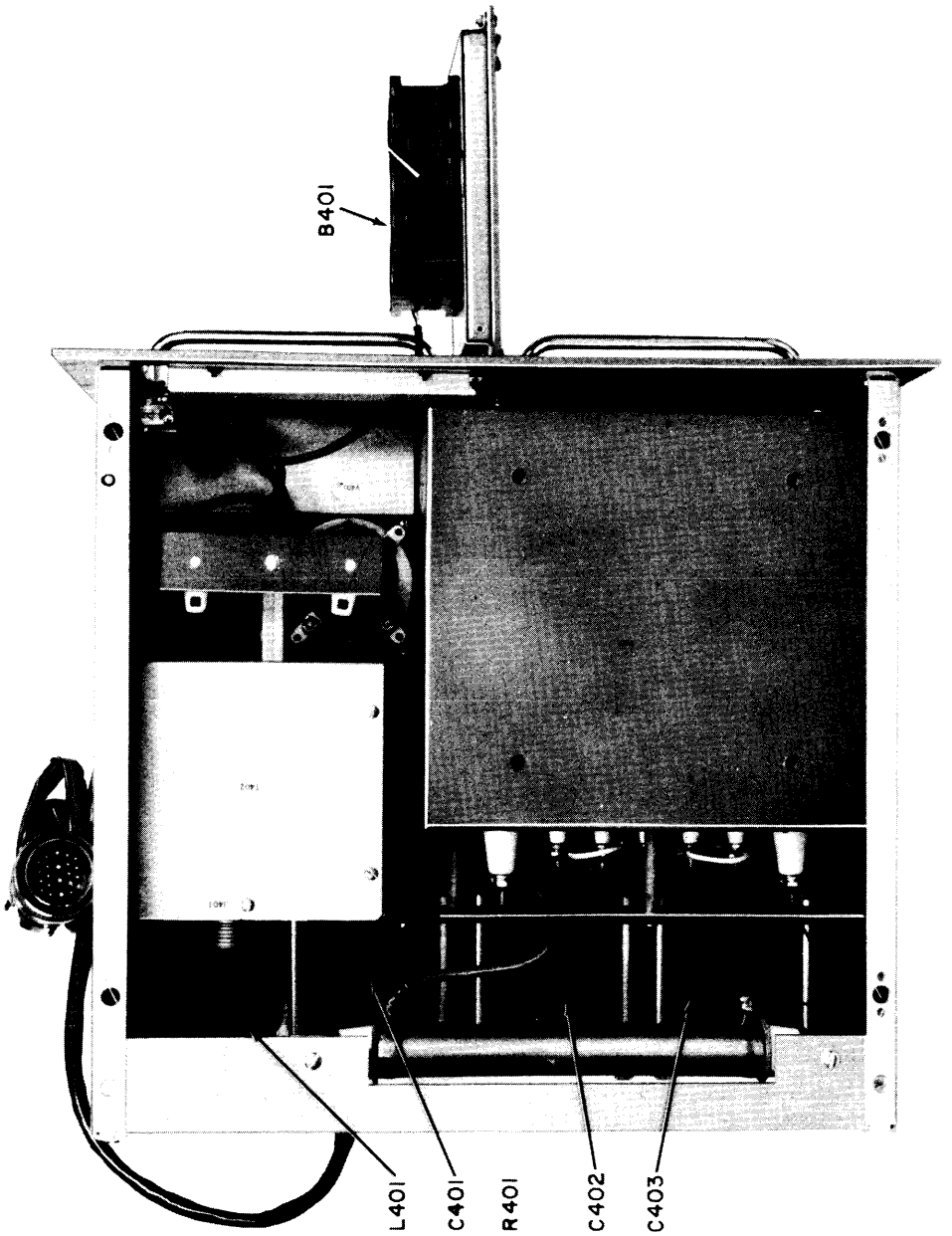


Figure 5-9. Top View, PS-5

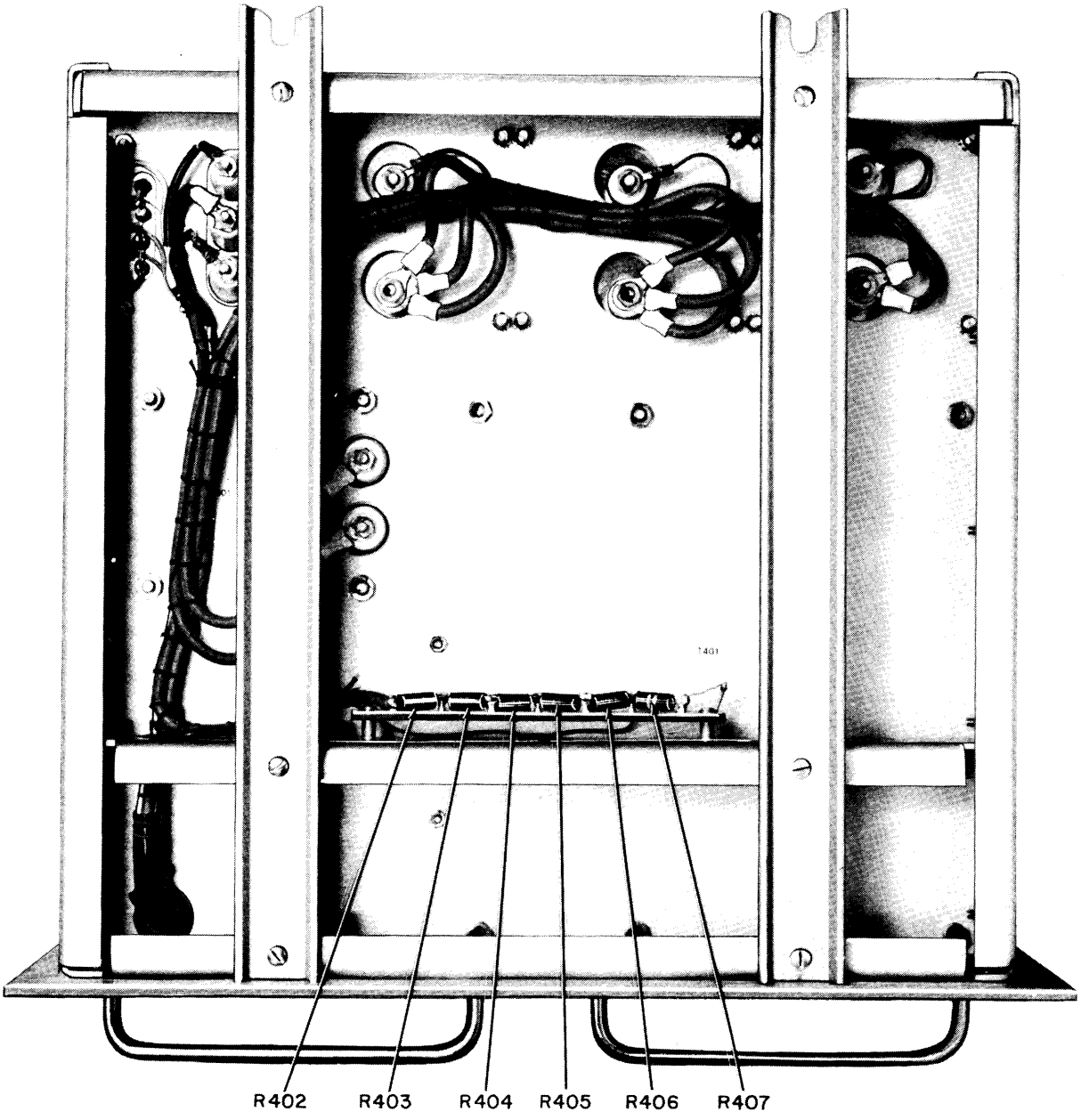


Figure 5-10. Bottom View, PS-5

SECTION 6
MAINTENANCE

6–1. GENERAL.

The PAL-1K is an assembly of many electrical and mechanical parts which may be maintained adequately by conventional preventive and corrective maintenance techniques as outlined in the following paragraphs. Long life and continual reliable operation of moving parts require especially good maintenance. When a complicated mechanical assembly fails, fabrication of parts peculiar without suitable tools makes the replacement of the entire assembly more practical than disassembly, fabrication, and reassembly. Pieces of PAL-1K equipment that fall into this category are band and load switches, blowers, contactors, relays, etc. For reasons stated above, this section is limited to maintenance.

6–2. OPERATOR'S MAINTENANCE.

The following is a list of maintenance duties normally performed by the operator of the PAL-1K. These procedures do not require special tools on test equipment.

a. Replacement of defective tubes, fuses, and pilot lights.

b. Checking cable connections, overheating, loose parts.

c. Checking condition of PAL-1K as regards dirt and grime.

Operator's maintenance consists in not only maintaining optimum PAL-1K performance at all times but also keeping a detailed record of the PAL-1K readings specified in the tuning chart, table 3-1, as well as a log of events and happenings pertinent to PAL-1K operation.

6–3. PREVENTIVE MAINTENANCE.

Preventive maintenance is maintenance that detects and corrects trouble-producing items before they become serious enough to affect equipment operation adversely. Some trouble-producing items are dirt and grime, contact erosion, improper contact pressure, lack of proper lubrication, improper relay adjustment, dirty air filters, overheating, unstable power supplies, vacuum tubes with poor emission, loose parts (due to vibration), etc.

It may appear contradictory to state that good preventive maintenance means that one should not constantly poke around and tinker with an equipment that is performing excellently. Overzealous maintenance can readily cause more, rather than less, potential trouble. Good preventive maintenance requires constant vigilance and good judgment of when, what, and how to apply remedial measures.

a. ONCE EACH SHIFT DURING AN "ON THE AIR" PERIOD. - Check the operator's PAL-1K performance record for irregularities and possible sources of future trouble. Make minor adjustments of tuning controls to verify proper tuning. Observe all electrical quantities measurable with built-in meters and compare observations with established standards for irregularities. Observe indicator lights and rectifier tubes for abnormal color and signs of internal flashing.

b. DAILY DURING AN "OFF THE AIR" PERIOD. - Visually and manually inspect all parts in the PAL-1K for overheating and damage. Inspect all sliding or moving coil contacts. Feel blower motors for overheating and observe rotating parts for wear. Note deposits of dust and dirt. Inspect condition of relay contacts. Check operation of all door interlocks.

c. MONTHLY DURING "OFF THE AIR" PERIODS. - Recondition rotary and switch contacts as necessary. Use crocus cloth and trichlorethylene or ethylene-dichloride for cleaning. Inspect and rid the PAL-1K of dust and dirt. Check the condition of the air filters; replace or clean dirty filters. Inspect the PAL-1K for loose solder connections or screws especially in those cases experiencing appreciable vibration in service. Note the condition of gear trains; those showing signs of becoming dry should be lubricated with a drop or two of any high quality, light machine lubricant. Check the condition of all tubes.

6–4. CORRECTIVE MAINTENANCE.

Corrective maintenance is an aftermath of trouble-shooting as discussed in Section 5, or preventive maintenance as discussed in the preceding paragraph. With the exception of those cases when components suddenly fail for no apparent good reason or under extenuating circumstances, an intelligent program of preventive maintenance should produce minimum PAL-1K outage.

After a defective part has been localized and isolated by the trouble-shooting technique presented in Section 5, replacement generally presents no major problem, particularly in the case of failure of non-complex electrical and mechanical components.

6–5. ALIGNMENT.

Alignment should only be attempted if there is definite indication that it is required. Such indications are inability to get peaks within the correct range of 1ST AMPL TUNING and PA GRID TUNING controls.

a. PRELIMINARY.

WARNING

The final voltages switch must be in the OFF position throughout this procedure. Servicing personnel are warned, however, that dangerously high voltages exist in the area of operation.

(1) Inspect entire PAL-1K for bad solder connections and loose hardware.

(2) Check counters and see that variable capacitors are fully meshed when counter indicates 000.

(3) Turn internal voltmeter switch to IPA BIAS position and adjust bias control for -100-volt indication.

(4) Connect RF signal generator to input jack J201.

(5) Turn MAIN POWER circuit breaker to ON.

(6) Turn TRANSMITTER VOLTAGES to ON.

b. 2- TO 4-MC BAND.

(1) Set RF generator to 2.0 mc and adjust for 1.0-volt RF across R203.

(2) Turn DRIVER BAND switch on RFD to 2-4 (mc) position.

(3) Adjust trimmer capacitor C202 to approximately half capacity.

(4) Turn 1ST AMPL TUNING to 0.5 on front panel. Tune L201 for maximum meter deflection.

(5) Turn MULTIMETER switch to PA E_g position. Turn PA GRID TUNING control to number 1. Tune L219 for maximum meter deflection.

(6) Set RF generator to 4.0 mc. Turn MULTIMETER switch to 1ST AMPL E_p position. Rotate the 1ST AMPL TUNING control to number 9. Adjust C202 for maximum meter deflection.

(7) Turn MULTIMETER switch to PA E_g position and turn PA GRID TUNING control to the point of maximum meter deflection.

(8) The control pointer should read number 9. If this reading does not occur, repeat the procedure, selecting a slightly different position of the 1ST AMPL TUNING control in step d.

c. 4- TO 8-MC BAND.

(1) Turn DRIVER BAND switch to 4-8 mc position. Turn the 1ST AMPL TUNING and the PA GRID TUNING controls to 0.5.

(2) Turn MULTIMETER to 1ST AMPL E_p position and tune L202 for maximum deflection.

(3) Turn MULTIMETER to PA E_g position and tune L220 for maximum deflection.

(4) Set RF generator to 8 mc. Tune PA GRID TUNING and 1ST AMPL TUNING controls for maximum deflection.

(5) Both controls should indicate number 9. If not, the procedure should be repeated using slightly different positions from those indicated in step 1.

d. 8- TO 16-MC BAND.

(1) Turn DRIVER BAND switch to 8-16 mc position. Turn the 1ST AMPL TUNING and the PA GRID TUNING controls to 0.5.

(2) Turn MULTIMETER to 1ST AMPL E_g position and tune L209 for maximum deflection.

(3) Turn MULTIMETER to PA E_g position and tune L223 for maximum deflection.

(4) Set RF generator to 16 mc. Tune PA GRID TUNING and 1ST AMPL TUNING controls for maximum deflection.

(5) Both controls should indicate number 9. If not, the procedure should be repeated using slightly different positions from those indicated in step 1.

e. 16- TO 22-MC BAND.

(1) Turn DRIVER BAND switch to 16-22 mc position. Turn the 1ST AMPL TUNING and the PA GRID TUNING controls to 0.5.

(2) Turn MULTIMETER to 1ST AMPL E_p position and tune L210 for maximum deflection.

(3) Turn MULTIMETER to PA E_g position and tune L224 for maximum deflection.

(4) Set RF generator to 22 mc. Tune PA GRID TUNING and 1ST AMPL TUNING controls for maximum deflection.

(5) Both controls should indicate number 9. If not, the procedure should be repeated using slightly different positions from those indicated in step 1.

f. 22- TO 32-MC BAND.

(1) Turn DRIVER BAND switch to 22-32 mc position. Tune the 1ST AMPL TUNING and the PA GRID TUNING controls to 0.5.

(2) Turn MULTIMETER to 1ST AMPL E_p position and tune L211 for maximum deflection.

(3) Turn MULTIMETER to PA E_g position and tune L225 for maximum deflection.

(4) Set RF generator to 32 mc. Tune PA GRID TUNING and 1ST AMPL TUNING controls for maximum deflection.

(5) Both controls should indicate number 9. If not, the procedure should be repeated using slightly different positions from those indicated in step 1.

g. NEUTRALIZATION.

WARNING

The FINAL VOLTAGES switch must be in OFF position throughout this procedure. Servicing personnel are warned, however, that dangerously high voltages exist in the area of operation.

SECTION 7
PARTS LIST

INTRODUCTION

Reference designations have been assigned to identify all maintenance parts of the equipment. They are used for marking the equipment (adjacent to the part they identify) and are included on drawings, diagrams, and the parts list. The letters of a reference designation indicate the kind of part (generic group), such as resistor, amplifier, electron tubes, etc. The number differentiates between parts of the same generic group. Parts of the same first major unit are numbered from 1 to 199; parts of the second, 201 to 299, etc. Two consecutive series of numbers have been assigned to major units in which there are more than 100 parts of the same generic group. Sockets associated with a particular plug-in device, such as an electron tube or fuse, are identified by a reference designation which includes the reference designation of the plug-in device. For example, the socket for fuse F7 is designated XF7. The parts for each major unit are grouped together. Column 1 lists the reference series of each major unit, followed by the reference designations of the various parts in alphabetical and numerical order. Column 2 gives the name and describes the various parts. Major part assemblies are listed in their entirety; subparts of a major assembly are listed in alphabetical and numerical order with reference to its major assembly. Column 3 indicates how the part is used within a major component. Column 4 lists each Technical Materiel Corporation part number.

CONTENTS

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
B201	BLOWER, motor and fan: 115/230 V, 50/60 cps, single phase; 3200 rpm, 4 uf capacitance; clockwise rotation from shaft end of motor.	Final Cooling	BL-103
C201	CAPACITOR, fixed: mica; button type; 1000 uuf, ±10%, 300.	Tank Elevating	CB21QW102K
C202	CAPACITOR, variable: ceramic; 7-45 uuf, char. C; 500 wvdc.	Tuning Trimmer	CB11C450
C203	CAPACITOR, variable: air dielectric; 12.5 to 270 uuf; single section.	Main Tuning	CB-139-1
C204	Same as C201.	Plate Bypass	
C205	CAPACITOR, fixed: mica; 2000 uuf, ±5%, char. C, 500 wvdc.	Coupling Plate	CM20C202J
C206	Same as C201.	Screen Bypass	
C207	Same as C205.	Bias Filter	
C208	Same as C201.	Bias Filter	
C209	CAPACITOR, fixed: ceramic; feed-thru type; 2000 uuf,	Plate Bypass	CK70A202M
C210	Same as C209.	Bias Bypass	
C211	CAPACITOR, fixed: mica; 1600 uuf, ±5%, char. C, 500 wvdc.	Input Coupling	CM20C162J
C212	Same as C209.	Screen Bypass	
C213	Same as C201.	Bias Filter	
C214	Same as C205.	Coupling	
C215	Same as C209.	Bias Filter	
C216	CAPACITOR, fixed: mica; 5 uuf; ±5%, char. C, 300 wvdc.	Metering Divider	CM15C050J
C217	CAPACITOR, fixed: mica; 47 uuf, ±5%, 300 wvdc, char. C.	Metering Divider	CM15C470K
C218	Same as C201.	Metering Divider	
C219	Same as C209.	Metering Divider	
C220	CAPACITOR, fixed: mylar; .1 uf, ±5%, 200 wvdc, char. C.	Metering Divider	CN108C1003J
C221	CAPACITOR, fixed: mica; .01 uf, ±10%, char. B; 300 wvdc.	Filament Filter	CM35B103K
C222	Same as C221.	Meter Bypass	

RF AMPLIFIER MODEL RFD (SYMBOL SERIES 200)

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
C223	Same as C209.	Screen Bypass	
C224	Same as C209.	Plate Bypass	
C225	Same as C201.	Cathode Bypass	
C226	CAPACITOR, fixed: mica; 100 uuf, ±10%, char. C, 500 wvdc.	Neutralizing	CM20C101K
C227	Same as C201.	Plate Bypass	
C228	Same as C201.	Screen Bypass	
C229	CAPACITOR, variable: ceramic; 1.5-7 uuf, 500 wvdc.	Neutralizing	CV11A070
C230	Same as C205.	Coupling	
C231	CAPACITOR, variable: air dielectric; 1 section, 19 plates; 3.2-50 uuf, 500 wvdc.	Tuning Trimmer	CT-104-1
C232	CAPACITOR, variable: air dielectric; 12.5 to 270 uuf, single section.	Main Tuning	CB-139-3
C233	Same as C201.	Tank Elevating	
C234	CAPACITOR, fixed: mica; .001 uf, ±10%, char. B, 500 wvdc.	Coupling	CM20B102K
C235	Same as C209.	Interlock Bypass	
C236	Same as C209.	Interlock Bypass	
C237	Same as C221.	Meter Bypass	
C238	Same as C220.	Meter Filter	
C239	Same as C209.	Meter Filter	
C240	Same as C201.	Meter Filter	
C241	CAPACITOR, fixed: mica; button type; 150 uuf, ±10%, 300 wvdc, char. W.	Meter Divider	CB21QW151K
C242	CAPACITOR, fixed: ceramic dielectric; 3 uuf: char. SL.	Meter Divider	CC21SL030C
C243	Same as C209.	Meter Filter	
C244	CAPACITOR, fixed: ceramic; 1000 uuf, ±20%, 5000 wvdc.	Interlock Filter	CC-109-38
C245	Same as C220.	Meter Filter	
C246	Same as C201.	Meter Filter	

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
C247	CAPACITOR, fixed: ceramic; 500 uuf, ±20%, 5000 wvdc, 6-32 tapped studs each end, 13/16" dia x 7/8" lg o/a. Not a replaceable item, part of XV203.	Screen Bypass	CC-109-36
C248	Same as C201.	Screen Bypass	
C249	Same as C209.	Screen Bypass	
C250	Same as C209.	Bias Filtering	
C251	CAPACITOR, fixed: mica; button type; 270 uuf, ±10%, char. W. 300 wvdc.	Meter Divider	CB21QW271K
C252	Same as C205.	Meter Coupling	
C253	CAPACITOR, fixed: trylar; 5000 uuf, ±10%, 8000 wvdc.	Coupling	CX102K501P
C254	CAPACITOR ASSEMBLY, variable: vacuum; capacity 5-750 uuf, 42 amps RMS, with gear.	Tuning	CB-150
C255	KIT, capacitor, replacement: consisting of 1 each: A-1845 - Neutralizer Plate Assembly MS-1667 - Plate, Neutralizing Capacitor PX-465 - Insulator, Plate, Neutralizing Capacitor	Neutralizing	AC-113
C256	CAPACITOR, fixed: ceramic; 100 uuf, ±10%, 5000 wvdc, temp. coef - N750.	Interlock Filter	CC-109-28
C257	CAPACITOR, fixed: ceramic; 3 uuf, ±10%, 5000 wvdc.	Meter Divider	CC-109-1
C258	CAPACITOR, fixed: trylar; .01 uf, ±10%, 8000 wvdc.	Plate Bypass	CX102J103M
C259	CAPACITOR, fixed: trylar; 2000 uuf,±10%, 4000 wvdc.	Plate Bypass	CX102K202M
C260	Same as C259.	Plate Bypass	
C261	CAPACITOR, fixed: mica; 500 uuf, ±5%, char. C, 500 wvdc.	Filament Filter	CM30B501J
C262	Same as C201.	ALDC Filtering	
C263	Same as C201.	ALDC Filtering	
C264	Same as C209.	ALDC Bias Filtering	
C265	Same as C209.	ALDC Filtering	
C266	Same as C209.	Meter Filter	
C267	Same as C220.	Meter Filter	

RF AMPLIFIER MODEL RFD (SYMBOL SERIES 200)

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
C268	Same as C201.	Meter Filter	
C269	CAPACITOR, variable: vacuum; 7-1000 uuf, 42 amps RMS; with locking shaft.	Loading	CB-144
C270	Same as C257.	Meter Divider	
C271	Same as C241.	Meter Divider	
C272	Same as C244.	Loading	
C273	CAPACITOR, fixed: ceramic; 10 uuf, ±10%, 5000 wvdc.	Feedback	CC-109-8
C274	Same as C244.	Loading	
C275	Same as C253.	Coupling	
C276	Same as C209.	Bypass	
C277	NOT USED.		
C278	Same as C209.	Filament Bypass, V203	
C279	Same as C209.	Filament Bypass, V203	
C280	Same as C209.	Bypass, S206	
C281	Same as C209.	Bypass, S206	
C282	Same as C209.	Filament Bypass, V203	
C283	Same as C209.	Filament Bypass, V203	
C284	Same as C209.	Grid Bypass, V203	
C285	Same as C247. Not a replaceable item, part of XV203.	Screen Bypass, V203	
C286	Same as C247. Not a replaceable item, part of XV203.	Screen Bypass, V203	
C287	Same as C247. Not a replaceable item, part of XV203.	Screen Bypass, V203	
C288	CAPACITOR, fixed: ceramic; H.V., 5 uuf, ±10%, 500 wvdc.	Feedback	CC-109-3
C289	CAPACITOR, fixed: mica; 10 uuf, ±10%, char. B, 500 wvdc.	p/o Parallel Tank Ckt.	CM15B100K
C290	Same as C289.	p/o Parallel Tank Ckt.	
CR201	DIODE, germanium: .140 dia. x .350 lg; 1 in. lg wire leads.	Grid Metering, V202	1N67
CR202	Same as CR201.	Grid Metering, V203	

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
CR203	DIODE, bonded silicon: .265 x .155 x .255 o/a; 1 in. lg wire leads.	Plate Metering, V203	1N303
CR204	Same as CR203.	ALDC	
CR205	Same as CR203.	Output Metering	
E201	NOT USED.		
E202	TERMINAL BOARD, barrier type: plastic; 4 terminals, screw w/feed thru solder lug type.	Blower Term. Bd.	TM-100-4
E203	CONTACT, electrical: consists of one brass, nickel plated button contact with 10-32 threaded rod; two ceramic insulators; one teflon gland; two fiber washers; one neoprene washer; one flat washer; one lockwasher; and one hex nut.	Feed-thru	AX-241
J201	JACK, connector: series UHF, teflon dielectric.	Input Jack	SO-239A
J202	CONNECTOR, receptacle: female; teflon insulated; mtg dim. four 1/8 in. holes on 29/32 in. mtg. center.	Output	UG-560/U
L201	COIL, R.F.: tuned; 2-4 mc; Q = 50 at 2.5 mc.	2-4 Mc Tuning	CL-181
L202	COIL, R.F.: tuned; 4-8 mc; 4.5 to 7.5 uhy.	4-8 Mc Tuning	CL-150
L203	COIL, R.F.: 10 millihenries; 100 ma max. current; DC resistance approximately 30 ohms, bakelite body.	Plate Filter	CL-101-4
L204	COIL, R.F.: 128 microhenries, ±10%, Q = 100.	Plate Filter	CL-177
L205	NOT USED.		
L206	NOT USED.		
L207	COIL, R.F.: fixed; 4.5 uhy.	Filament Filter	CL-134-1
L208	Same as L204.	Screen Filter	
L209	COIL, R.F.: tuned; 8-16 mc; 1.3 to 1.6 uhy.	8-16 Mc Tuning	CL-175
L210	COIL, R.F.: tuned; 16-22 mc; minimum value = .47 uhy, maximum value = .82 uhy; Q-150 or greater.	16-22 Mc Tuning	CL-258
L211	COIL, R.F.: tuned; 22-32 mc; .20 to .28 uhy; Q=135 or greater.	22-32 Mc Tuning	CL-257

RF AMPLIFIER MODEL RFD (SYMBOL SERIES 200)

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
L212	Same as L204.	Bias Filter	
L213	COIL, R.F.: 750 microhenries, ±20%; 100 ma max. current; DC resistance approximately 17 ohms; bakelite body.	Meter Compensation	CL-100-5
L214	Same as L204.	Meter Filter	
L215	COIL, R.F.: fixed; 26.4 microhenries, ±5%; Q = 110.	Meter Filter	CL-180
L216	Same as L204.	Plate Filter	
L217	Same as L204.	Screen Filter	
L218	Same as L204.	Plate Filter	
L219	COIL, R.F.: tuned; 2-4 mc; L = 10 uhy; Q = 40.	2-4 Mc Tuning	CL-173
L220	COIL, R.F.: tuned; 4-8 mc; L = 3.7 uhy to 4.7 uhy.	4-8 Mc Tuning	CL-256
L221	Same as L207.	Filament Filter	
L222	Same as L213.	Cathode RF	
L223	COIL, R.F.: tuned; 8-16 Mc.	8-16 Mc Tuning	CL-146
L224	COIL, R.F.: tuned; 16-22 mc; L = .55 to .85 uhy.	16-22 Mc Tuning	CL-259
L225	COIL, R.F.: tuned; 22-32 mc.	22-32 Mc Tuning	CL-260
L226	Same as L204.	Meter Filter	
L227	COIL, R.F.: fixed; 1.1 uhy.	Meter Compensator	CL-139
L228	Same as L204.	Meter Filter	
L229	Same as L215.	Meter Filter	
L230	Same as L215.	Meter Filter	
L231	Same as L204.	Screen Filter	
L232	Same as L204.	Screen Filter	
L233	Same as L213.	Meter Compensator	
L234	COIL, R.F.: fixed; 36 uhy.	Plate Filter	CL-152
L235	COIL, R.F.: fixed; 185 microhenries, ±15 microhenries; Q = 50.	Plate Filter	CL-178
L236	Same as L235.	Plate Filter	
L237	COIL, filament: fixed; L - nom. 3.0; Q = 35; F-2 Mc.	Filament Filter	CL-171

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
L238	Same as L213.	ALDC Bias Filter	
L239	Same as L204.	ALDC Bias Filter	
L240	Same as L204.	ALDC Filter	
L241	Same as L204.	Meter Filter	
L242	Same as L215.		
L243	Same as L215.	Meter Filter	
L244	Same as L213.	Meter Compensator	
L245	COIL, R.F.: 12-28 mc.	HF Tuning	CL-143
L246	COIL, R.F.: single layer wound type; 23 turns CW.	LF Tuning	CL-174
L247	Same as L204.	IPA Grid Choke	
L248	Same as L213.	Meter Compensator	
M201	METER, D.C.: 0-750 milliamps.	PA Plate Current	MR-110-750-S
M202	METER, D.C.: micro amp; 0-50.	Multimeter	MR-127
P201	CONNECTOR, receptacle: male; pin type.	Power Plug	MS3106B-32-7P
P202	CONNECTOR, plug: AN pin type; 1 contact; 35 amps; 3000 vdc, 210 vac (rms).	RV Cap	MS3106B-18-16P
PS201	SUPPRESSOR, parasitic.	Plate Parasitic Suppressor	AX-163
PS202	SUPPRESSOR, parasitic.	Plate Parasitic Suppressor	AX-164
R201	RESISTOR, variable: composition; 50,000 ohms, 2 watts, linear taper.	ALDC Bias Adj.	RV4ATXA503B
R202	RESISTOR, fixed: composition; 10 ohms, ±10%, 1/2 watt.	Bias Divider	RC20GF100K
R203	RESISTOR, fixed: composition; 270 ohms, ±10%, 1/2 watt.	Input	RC20GF271K
R204	RESISTOR, fixed: composition; 47,000 ohms, ±10%, 1 watt.	Bias Divider	RC32GF473K
R205	Same as R204.	Bias Divider	
R206	RESISTOR, fixed: composition; 100 ohms ±10%, 1/2 watt.	Input Divider	RC20GF101K
R207	RESISTOR, fixed: composition; 22,000 ohms, ±10%, 1/2 watt.	Voltage Dropping	RC20GF223K
R208	RESISTOR, fixed: composition; 680 ohms, ±10%, 1/2 watt.	Tank Elevating	RC20GF681K

RF AMPLIFIER MODEL RFD (SYMBOL SERIES 200)

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
R209	RESISTOR, fixed: composition; 82, 000 ohms, ±5%, 1/2 watt.	Meter Calibration	RC20GF823J
R210	RESISTOR, fixed: composition; 220 ohms, ±10%, 1/2 watt.	Cathode Bias, V202	RC20GF221K
R211	RESISTOR, fixed: composition; 47, 000 ohms, ±10%, 1/2 watt.	Bias	RC20GF473K
R212	RESISTOR, fixed: composition; 12 ohms, ±10%, 1/2 watt.	Bias Filter	RC20GF120K
R213	Same as R208.	Tank Elevating	
R214	RESISTOR, fixed: composition; 3300 ohms, ±10%, 1/2 watt.	Meter Compensator	RC20GF332K
R215	RESISTOR, fixed: composition; 15 meg-ohms, ±10%, 1/2 watt.	Screen Metering	RC20GF156K
R216	RESISTOR, fixed: composition; 100, 000 ohms, ±10%, 1/2 watt.	Meter Load	RC20GF104K
R217	RESISTOR, fixed: composition; 68, 000 ohms, ±5%, 1/2 watt.	Meter Calibration	RC20GF683J
R218	RESISTOR, fixed: composition; 470, 000 ohms, ±5%, 1/2 watt.	Meter Calibration	RC20GF474J
R219	Same as R207.	Meter Compensator	
R220	RESISTOR, fixed: composition; 8200 ohms, ±10%, 1 watt.	Screen Current Meter	RC32GF822K
R221	RESISTOR, fixed: composition; 68, 000 ohms, ±10%, 1 watt.	Bias Divider	RC32GF683K
R222	RESISTOR, fixed: composition; 12 ohms, ±10%, 2 watts.	Screen Current Meter	RC42GF120K
R223	RESISTOR, fixed: composition; 180, 000 ohms, ±10%, 1 watt.	Screen Load	RC32GF184K
R224	RESISTOR, fixed: composition; 270, 000 ohms, ±10%, 1/2 watt.	Meter Calibration	RC20GF274K
R225	RESISTOR, fixed: composition; 3 meg-ohms, ±5%, 1/2 watt.	Bias Meter	RC20GF305J
R226	RESISTOR, fixed: composition; 12, 000 ohms, ±10%, 1/2 watt.	ALDC Bias Divider	RC20GF123K
R227	RESISTOR, fixed: composition; 390, 000 ohms, ±10%, 1/2 watt.	ALDC Bias Divider	RC20GF394K
R229	RESISTOR, fixed: composition; 10, 000 ohms, ± 5%, 1 watt.	ALDC Bias Divider	RC32GF103J

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
R230	NOT USED.		
R231	NOT USED.		
R232	RESISTOR, Fixed: composition; 47,000 ohms, ±5%, 2 watts.	Bias Divider	RC42GF473J
R233	Same as R228.	Voltage Dropping	
S201A, B, C, D	SWITCH, rotary: shorting; 2 sections, 5 positions; 30° angle of throw; silver plated brass, mycalex insulation.	Drive Band	SW-258
S202	SWITCH ASSEMBLY, rotary: dual section 9 positions, 1 pole each section, steatite insulation, nickel silver shaft.	PA Loading	AS-118
S203	SWITCH, rotary: 8 contacts, 30° angle of throw, steatite insulation, nickel silver shaft.	PA Loading	AS-101
S204 A, B	SWITCH, rotary: 2 sections; 8 positions, 30° angle of throw; micalex insulation, silver plated contacts.	Meter Select	SW-245
S205	SWITCH, push button: momentary contact; normally closed; SPST, 15 amp at 125, 250 or 460 VAC, 1/2 amp at 125 VDC, 1/4 amp at 250 VDC.	Bandswitch Interlock	SW-169
S206	SWITCH, rotary: low torque micro switch counter-clockwise direction of rotation; SPDT, 5 amps, 125 or 250 VAC.	Air Interlock	SW-252
S207	SWITCH, interlock: push to operate; total travel app. 0.312 in.; 15 amp, 120, 250 VAC; 2 amps resistive at 250 VDC.	Top Cover Interlock	SW-230
S208	Same as S207.	Bottom Cover Interlock	
V201	TUBE, electron: power pentode; wide band amp., 9 pin miniature.	1st Amplifier	6CL6
V202	TUBE, electron: beam power; large wafer octal base with sleeve, duo triode; 9 pin miniature.	Driver	6146
V203	TUBE, electron: power tetrode.	Power Amplifier	TV-100
XV201	SOCKET, electron tube: 9 pin miniature.	V201 Socket	TS103P01
XV202	SOCKET, electron tube: octal.	V202 Socket	TS101P01
XV203	SOCKET, tube.	V203 Socket	TS-142

LOW VOLTAGE AND BIAS SUPPLY
MODEL PS-4 (SYMBOL SERIES 300)

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
C301	CAPACITOR, fixed: paper; 4 uf, ±10%, char. F; 600 wvdc, oil filled and impregnated, hermetically sealed cylindrical metal case.	Filter	CP41B1FF 405K
C302	CAPACITOR, fixed: paper; 4 uf, ±10%, char. F; 600 wvdc, oil filled and impregnated hermetically sealed cylindrical metal case.	Ripple Filter	CP40C1FF 405K
C303	Same as C302.	Ripple Filter	
C304	Same as C302.	Ripple Filter	
C305	Same as C302.	Filter	
C306	CAPACITOR, fixed: paper dielectric; 2 uf, ±10%, 600 wvdc, oil filled and impregnated; hermetically sealed bathtub case.	Ripple Filter	CP53B1FF 205K
CB301	CIRCUIT BREAKER, dual: companion trip; 15 amp, curve 5, 230 VAC operation.	Main Power Overload	SW-261
CB302	CIRCUIT BREAKER, final plate overload reset: toggle lever type; 250 VAC, 15A; 1% ripple; .1 ADC manual reset, armature trip release.	PA Plate Overload	SW-215
CB303	CIRCUIT BREAKER, screen grid overload reset: toggle lever type; 250 VAC, 15 amps; 1% ripple; .06 ADC manual reset; armature trip release.	PA SG Overload	SW-262
CR301	DIODE, germanium.	Bias Regulator Overload Protect Gate	DD-101-1
E301	BOARD, terminal: barrier type; 11 brass nickel plated 6-32 binding head machine screws; 600 vdc, 30 ma max.	Relay Transmitter Term. Bd.	TM-100-11
E302	Same as E301.	Main Power Term. Bd.	
F301	FUSE, cartridge: 5 amp; 250 V, instantaneous.	Main Line	FU-100-5
F302	FUSE, cartridge: 2 amp.	Main Line Bus	FU-100-2
F303	FUSE, cartridge: 1/10 amp, time lage.	L.V. B-	FU-102-.1
F304	FUSE, cartridge: 1/4 amp, 250 V, instantaneous.	L.V. B+	FU-100-.250
I301	LAMP, incandescent: double contact; 120 volts, 3 watts; S-6 clear bulb; bayonet base.	Main Power Indicator	BI-102-3
I302	Same as I301.	Final Voltage Indicator	

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
I303	Same as I301.	Transmitter Voltage Indicator	
J301	CONNECTOR, receptacle: male; recessed; locking type; polarized; 3 contacts; 20 amps; mtg. dim. 2.093 in. dia. cutout with three 3/16" holes on 1.250" radius 120° apart.	Power Input Jack	PL-133-NG
J302	CONNECTOR, receptacle: AN socket; 4 contacts.	Aux. Power Output Jack	MS3102A-28-11S
J303	CONNECTOR, receptacle: female; 35 contacts.	Regulated Voltage Output	MS3102A-32-7S
K301	RELAY, thermal: delay; 180 seconds; ±12 seconds, 115 V, 2 amp, 220 V, 1 amp; SPST; normally open voltage breakdown contact to contact 1000 V, heater to contact 1500 V; heater voltage 6.3 V; heater wattage 2.5 W; miniature 9 pin.	Time Delay	RL-111-6N 0180T
K302	RELAY ASSEMBLY, solenoid: with associated wiring; operating voltage 115 VAC; 3 PDT; contacts 5 amps at 115 volts non-inductive.	B+ Relay	RL-116-AC3C-115
K303	RELAY ASSEMBLY, solenoid: min. opr. amps .015A, min. opr. voltages 115 V; DC contacts 115 V AC non-inductive 10 amps.	Transmitter Plate Relay	RL-114
L301	REACTOR, filter: 10 henries; DC resistance approximately 85 ohms; 200 ma DC; insulated for 1500 V; in accordance with MIL-T-27, GR. 1, CL. A, FAM. 04.	Filter Choke	TF-144
L302	REACTOR, filter: 50 henries; DC resistance less than 800 ohms, 30 ma DC; insulated for 1500 V; in accordance with MIL-T-27, GR. 1, CL. A, FAM. 04.	Filter Choke	TF-166
L303	Same as L301.	Filter Choke	
M301	METER, volts AC: 0-150; mtg. dim. hole with four 9/64" dim. holes one 2-1/4" mtg. centers.	Power Line Meter	MR-108-150
R301	RESISTOR, fixed: wire wound; 5000 ohms, ±10%, 10 watts.	Voltage Dropping	RW-109-32
R302	RESISTOR, fixed: composition; 10 ohms, ±10%, 10 watts.	Meter Shunt	RW-109-4
R303	RESISTOR, variable: wire wound; 15 ohms, ±10%, 12.5 watts, linear taper.	PA Plate Overload Adj.	RP100XH150K

LOW VOLTAGE AND BIAS SUPPLY
MODEL PS-4 (SYMBOL SERIES 300)

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
R304	RESISTOR, fixed: wire wound; 7.5 ohms, ±10%, 10 watts.	Voltage Dropping	RW-109-48
R305	Same as R301.	Voltage Dropping	
R306	RESISTOR, fixed: wire wound; 4000 ohms, ±5%, 10 watts.	Voltage Dropping	RW-109-31
R307	RESISTOR, fixed: wire wound; 20,000 ohms, ±5%, 20 watts.	Bleeder	RW-110-44
R308	RESISTOR, fixed: wire wound; 6000 ohms, ±5%, 25 watts.	Plate Load	RW-109-30
R309	NOT USED.		
R310	RESISTOR, variable: composition; 5000 ohms, ±20%, 2 watts.	Bias Adj.	RV4ATSA502B
R311	RESISTOR, fixed: wire wound; 10K ohms, 10 watts.	Plate Load	RW-109-34
R312	NOT USED.		
R313	RESISTOR, fixed: wire wound; 500 ohms, ±5%, 10 watts.	Voltage Dropping	RW-109-19
R314	RESISTOR, fixed: composition; 2200 ohms, ±10%, 2 watts.	Voltage Dropping	RC42GF222K
R315	RESISTOR, shunt assembly: .009 ohms, ±.001 ohms, 10 watts.	Shunt	AR-111
R316	Same as R315.	Shunt	
S301	SWITCH, rotary: 1 section, 7 position; insulation ceramic; contacts and wipers silver plated; 1/4" drive shaft 15/16" lg flatted 3/8".	Line Adj.	SW-167-7
S302	SWITCH, toggle: DPST; 250 V at 20 amps, 1-1/2 horsepower 250 V.	Transmitter Plates	ST-104
S303	Same as S302.	Final Voltage	
T301	TRANSFORMER, line adjust: 115/230 VAC, 50/60 cycles; output 100 to 130 in seven steps of 5 V each; any one tap .3 amps to load in accordance with MIL-T-27, GR. 1, CL. A, FAM. 01.	Autotransformer	TF-164
T302	TRANSFORMER, power step down: primary - 115/230 VAC; 50/60 cps, single phase; secondary - 6.3 V at 2 amps and 6 V at 14 amps; hermetically sealed rectangular steel case.	Power Step-down	TF-202

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
T303	TRANSFORMER, power: 115/230 VAC, 50/60 cycles; term. 12 and 16 500 VDC, 13 and 15 270 VDC term. 14 CT; at 200 ma; term. 10 and 11 5.0 VAC at 2 amps; 8 and 9 6.3 VAC at 1.2 amps; 5.7, 6.3 VAC at 3 amps; CT insulated for 3000 volts in accordance with MIL-T-27, GR. 1, CL. A, FAM. 03.	Main Power	TF-161
V301	TUBE, electron: duo diode; rectifier.	Mid-Voltage Rectifier	5R4
V302	TUBE, electron: full wave rectifier, 7 pin miniature.	Bias Rectifier	6X4
V303	TUBE, electron: voltage regulator; 7 pin miniature.	Driver S.G. Regulator	0A2
V304	TUBE, electron: voltage regulator; 7 pin miniature.	Driver S.G. Regulator	0B2
V305	Same as V303.	Bias Regulator	
XI301	SOCKET, lens: green; for bayonet base using S6 bulb.	I301 Socket	TS-124-2
XI302	SOCKET, lens: red; for bayonet base using S6 bulb.	I302 Socket	TS-124-1
XI303	Same as XI302.	I303 Socket	
XK301	SOCKET, electron tube: 9 pin miniature.	K301 Socket	TS103P01
XV301	SOCKET, electron tube: octal.	V301 Socket	TS101P01
XV302	SOCKET, electron tube: 7 pin miniature.	V302 Socket	TS102P01
XV303	Same as XV302.	V303 Socket	
XV304	Same as XV302.	V304 Socket	
XV305	Same as XV302.	V305 Socket	

HIGH VOLTAGE PLATE VOLTAGE SUPPLY
MODEL PS–5 (SYMBOL SERIES 400)

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
B401	FAN, centrifugal: 100 cfm; CW rotation; 1-1/2" x 4-11/16" x 4-11/16" o/a.	Main Blower	BL-106-2
C401	CAPACITOR, fixed: paper dielectric; 4 mfd., ±10%; 4000 wvdc; w/mtg. brackets.	Filter	CN-109
C402	Same as C401.	Filter	
C403	Same as C401.	Filter	
J401	CONNECTOR, receptacle: AN socket type; one contact; 35 amps, 3000 VDC, 2100 VAC (rms); mtg. dim. 1.156" dim. cutout with four 3/16" holes on 1-1/16" mtg. centers.	Output Voltage Jack	MS3102A-18-16S
L401	REACTOR, filter: 10 hy at 600 ma; 25 hy at 100 ma; DC resistance less than 60 ohms; insulated for 4000 V; in accordance with MIL-T-27; GR. 1, CL. A, FAM. 04.	Filter Choke	TF-5012
P401	CONNECTOR, plug: AN pin type; 4 contacts; 35 amps, 18 contacts, 20 amps; 200 VDC, 150 VAC (rms).	Power Input Plug	MS3106B-28-11P
R401	RESISTOR, fixed: wire wound; 90,000 ohms, ±5%, 160 watts, 42 ma.	Bleeder	RW-117-39
R402	RESISTOR, fixed: composition; 20 megohms, ±5%, 2 watts.	p/o Voltage Divider	RC42GF206J
R403	Same as R402.	p/o Voltage Divider	
R404	Same as R402.	p/o Voltage Divider	
R405	Same as R402.	p/o Voltage Divider	
R406	Same as R402.	p/o Voltage Divider	
R407	RESISTOR, fixed: composition; 220,000 ohms, ±10%; 2 watts.	p/o Voltage Divider	RC42GF224K
S401	SWITCH, micro: push; 10 amps at 125/250 VAC; 1/2 amp at 125 VDC.	Door Interlock	SW-189
S402	Same as S401.	Door Interlock	
S403	SWITCH, interlock: push to operate; total travel approx. .156; SPDT; 5 amps 250 VAC; 4 amps resistance at 30 VDC.	Top Cover Interlock	SW-219

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
T401	TRANSFORMER, power: step up; primary 115/230 VAC, 50/60 cps, single phase; secondary - to deliver 2800 V at 680 ma into load of 4120 ohms. Hermetically sealed rectangular steel case; four 1/4-20 thd. mtg. inserts on 6" x 6" mtg. centers.	Main Power	TF-193
T402	TRANSFORMER, power: filament; 115/230 VAC; 50/60 cycles 5 VAC at 15A CT insulated for 7000 V in accordance with MIL-T-27 GR. 1, CL. A, FAM. 01.	Filament	TF-147
V401	TUBE, electron: mercury vapor half wave rectifier; 4 pin base.	Rectifier	872A
V402	Same as V401.	Rectifier	
XV401	SOCKET, tube: jumper; twist lock; 4 pin base.	V401 Socket	TS-123-211-1
XV402	Same as XV401.	V402 Socket	

SECTION 8
SCHEMATIC DIAGRAMS

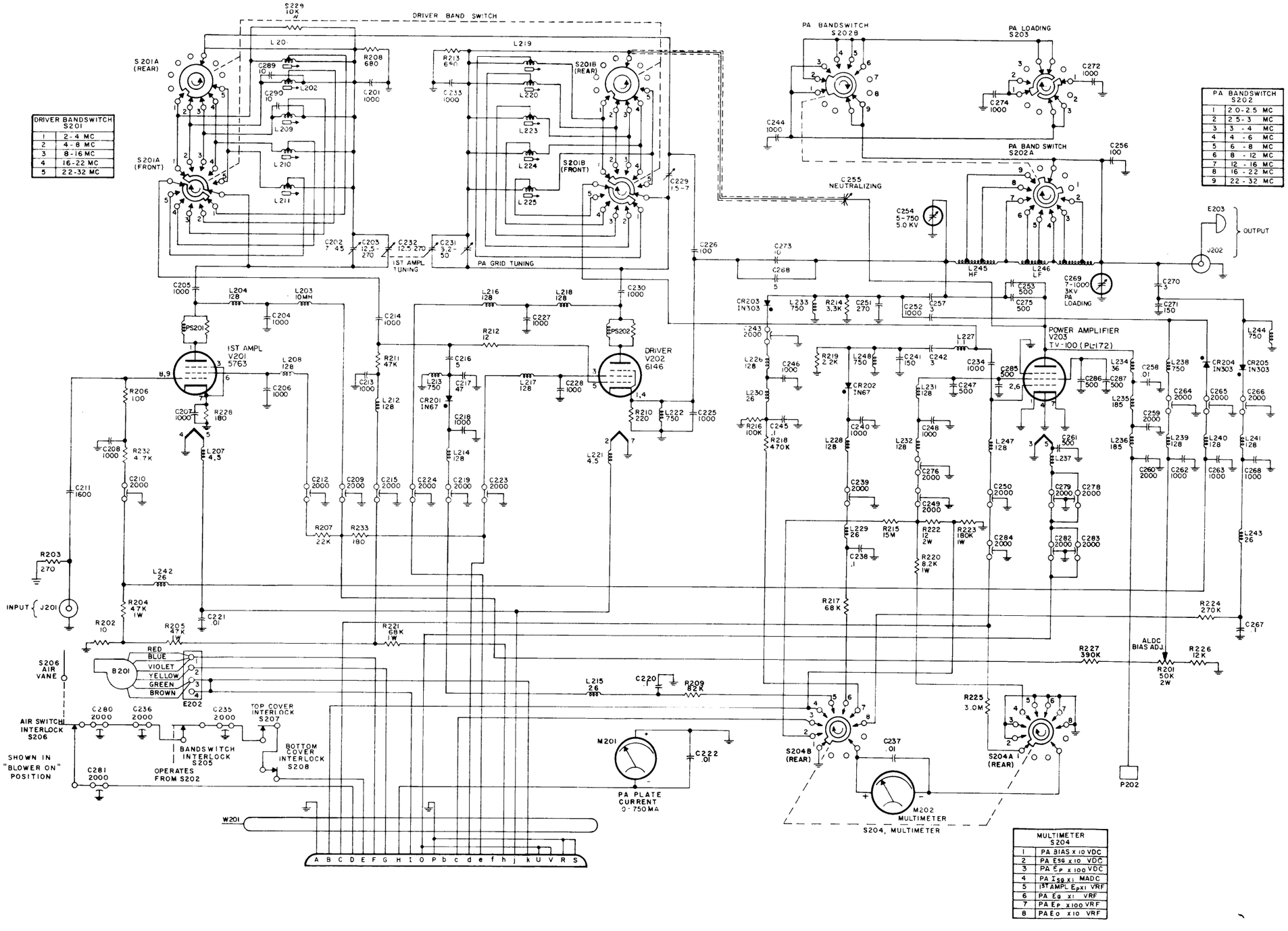


Figure 8-1. Schematic Diagram, RFD

NOTES- UNLESS OTHERWISE SPECIFIED
1- ALL CAPACITORS ARE IN MICROFARADS.
2- ALL RESISTORS ARE IN OHMS, 1/2 WATT.
3- ALL COILS ARE IN MICROHENRIES.

LAST SYMBOLS	MISSING SYMBOLS
C306	R309
CB303	R312
E302	
F304	
I303	
J303	
K303	
L303	
M301	
R316	
S303	
T303	
V305	
CR301	

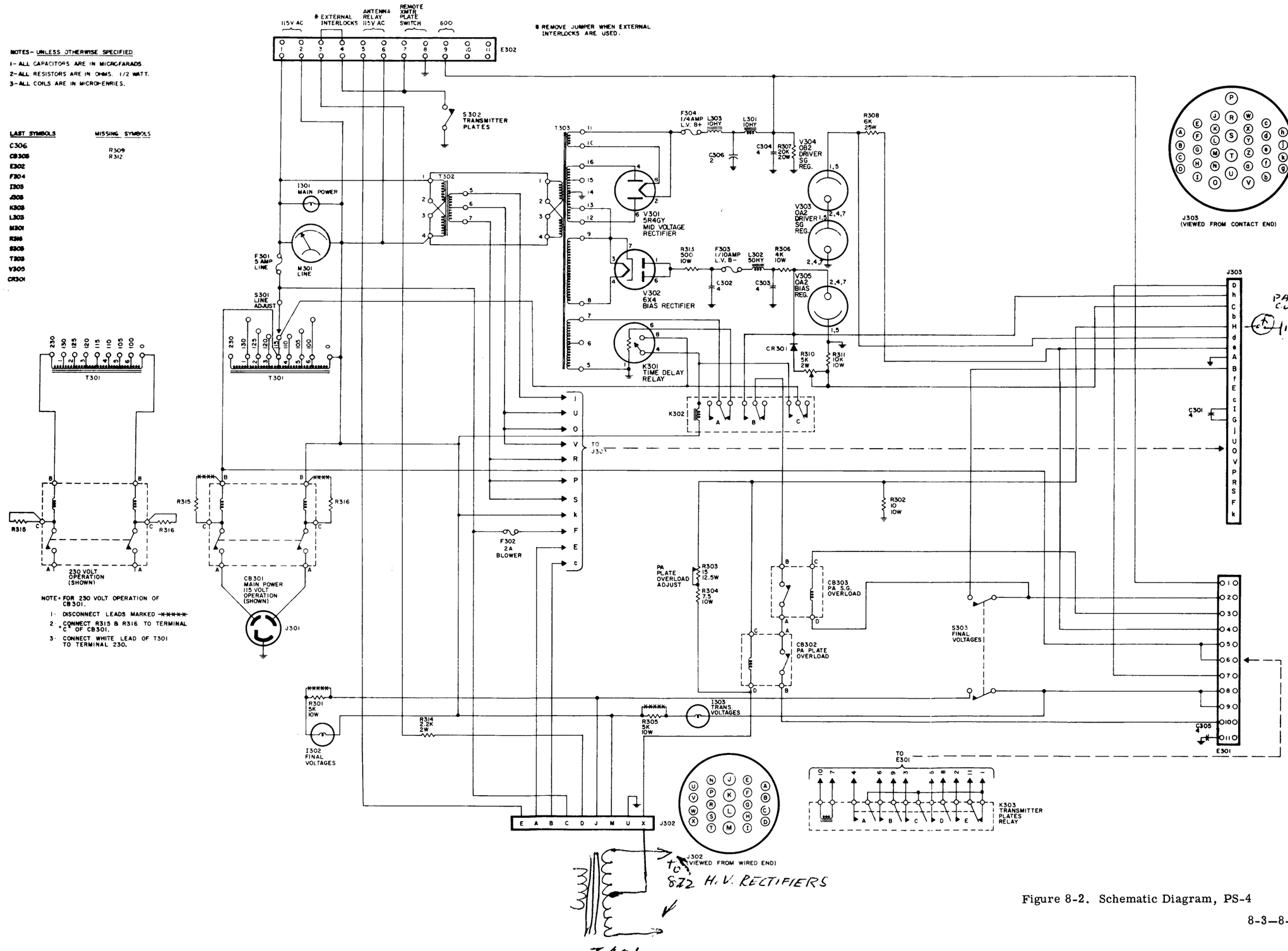


Figure 8-2. Schematic Diagram, PS-4