

DX-300

Amateur Bi Linear Amplifier



Operator's Manual

TABLE OF CONTENTS

SPECIFICATIONS	1,2
CIRCUIT DESCRIPTION	2
INSTALLATION INFORMATION	3,4
OPERATING INSTRUCTIONS	5-7
POWER SUPPLY DESCRIPTIONS	7
LOW VOLTAGE BOARD LAYOUT	8
HIGH VOLTAGE BOARD LAYOUT	9
POWER SUPPLY SCHEMATIC	10
MAIN RF BOARD DESCRIPTION	11
MAIN RF BOARD WIRE TABLE	12
WATTMETER PARTS LAYOUT	13
SAFETY INTERLOCK BOARD LAYOUT	13
MAIN RF BOARD LAYOUT	14
AC TERMINAL WIRE TABLE	15
MAIN RF BOARD PARTS TABLE	15
SERVICING INFORMATION	16-19
MAIN CHASSIS SCHEMATIC	20
PARTS LIST AND REF. DESIGNATORS	21-24
WARRANTY POLICY	REAR I.C.

The Pride DX-300 is a high frequency linear amplifier covering the Amateur bands from 3.5 to 30 MHz. It is designed to provide a medium power amplifier with high power gain and excellent linearity. It includes a receiver preamplifier, and automatic RF acuated switching. It will provide the operator of lower power equipment with an unquestionable increase in "punch" in a rugged, handsome package.

SPECIFICATIONS:

Power Ratings:

500 Watts PEP output in the SSB mode, with a maximum of 12 watts PEP drive required.

250 Watts continuous duty output modes, with a maximum of 5 watts drive required. This rating applies to modes such as SSTV, RTTY and CW. Maximum key down time is 5 minutes.

Frequency Coverage:

3.5 to 4.0 MHz
7.0 to 7.3 MHz
14.0 to 14.35 MHz
21.0 to 21.45 MHz
28.0 to 29.70 MHz

Device Complement:

1 4CX250B ceramic transmitting tetrode
1 2N2905 receiver preamp transistor
1 2N2905 RF switching transistor
16 Mallory M2.5A rectifier diodes
8 1N4007 rectifier diodes
5 1N4001 rectifier diodes
3 Ln914 small signal diodes

Metering Functions:

Meter reads RF power output. Amplifier tube screen current is monitored by an LED indicator. Receive amplifier and power amplifier status are also monitored by LED indicators.

Front Panel Functions:

Power On/Off switch
Receive preamp on/off switch
SSB delay on/off switch
Tune/Standby/Operate switch
Plate tuning control
Band selector switch
Plate Loading control

Other Functions:

Rear panel bias adjustment pot and input/output connections.

AC Power Requirements:

120VAC 60 Hz, 1000 watts absolute peak, 500 watts average.

Dimensions:

12" wide x 9" high x 12" deep.

Weight:

29 lbs.

Spectral Purity:

All harmonics are greater than 40 db below PEP at 500 watts peak output, two-tone test.

Intermodulation products are greater than 30 db below PEP, same conditions as above.

Purity measurements made with a Hewlett-Packard Model 8558B spectrum analyzer with a 182T mainframe.

Circuit Description:

The DX-300 power amplifier uses a 4CX-250B tetrode transmitting tube in a grounded cathode, driven grid configuration that provides very high power gain, high peak power output, and excellent linearity and harmonic suppression. This tube was chosen because of its superb record in military transmitters, broadcasting, and television equipment. Although small in size, it has a plate dissipation of 250 watts. This tube is of ceramic/metal construction, and utilizes forced air cooling. Use of tuned input circuits and broad band matching transformers permits low drive operation combined with additional rejection of exciter harmonics. Class AB operation of the tube permits high peak powers with low distortion products and harmonics. The tune function restricts the power gain of the amplifier for easy, safe tune ups. The use of a single tube in the design avoids the problem of matching tubes and it also simplifies repairs. RF actuated switching eliminates the need for switching contacts on the exciter, which are not found on some of the lower powered rigs on the market. An internal receiver preamp provides approximately ten db of gain on the higher frequencies.

INSTALLATION

WARNING

WARNING

WARNING

WARNING

WARNING

Lethally high voltages are present inside the amplifier unit. Never remove either top or bottom cover when power line is connected. DO NOT attempt to operate unit when covers are removed:

- 1) Lethal voltages would be open to contact.
- 2) Protective interlock on top cover will short circuit the high voltage power supply; attempting to operate under these conditions can cause damage to power supply, amplifier tube, or both.
- 3) Attempting to operate the unit with bottom cover removed causes loss of air pressure to the tube, and can cause rapid failure of the tube.
- 4) Attempting to operate the unit with top cover removed (with the interlock blocked) may make the amplifier erratic in tuning and performance due to the high level of R.F. on the top chassis coupling to the coaxial input cable at the rear of the chassis.

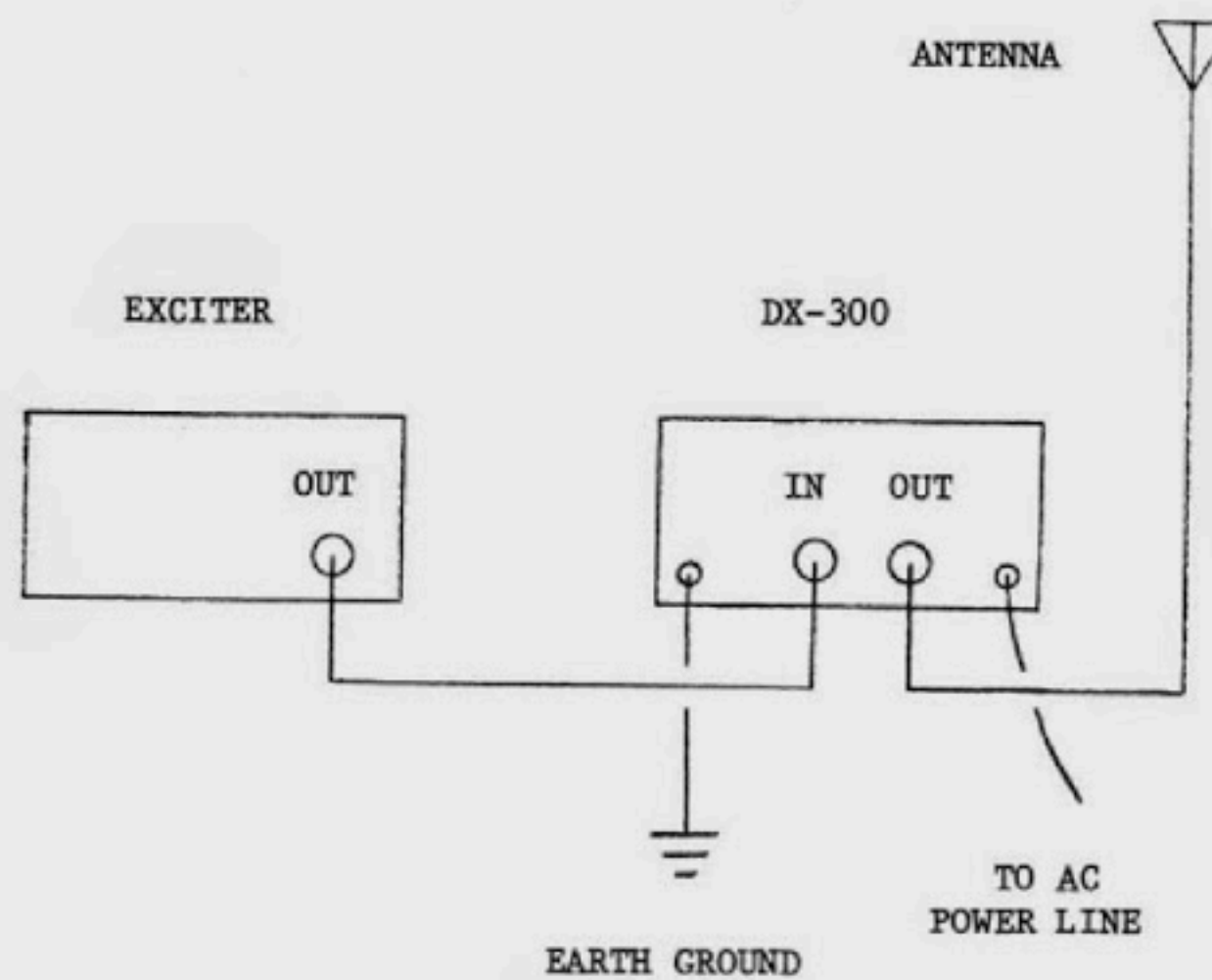
If repairs should be necessary, contact the factory, or a repair facility with proper equipment and technical experience for the servicing of high power amplifiers.

If covers need be removed, allow two minutes after turning the unit off and unplugging the line cord before removing covers.

General:

- 1) Connect a short length of coaxial cable from the exciter to the amplifier input connector. RG58/U or RG8/U may be used and a PL 259 connector is required at the amplifier end of the cable. This cable should be as short as is practical, preferable under five feet.
- 2) Connect antenna or suitable high power dummy load to the output connector of the amplifier using RG8/U coax. The smaller RG58/U coax may be used with matched antenna systems (better than 1.5 to 1 SWR) but will have somewhat higher loss. The amplifier will match most loads from 25 to 100 ohms.
- 3) Exciter power levels above 12 watts PEP or 5 watts carrier level should be avoided as over drive of the amplifier will occur.

- 4) The unit should be grounded for R.F. by attaching a ground strap of coaxial shield or 10-12 gauge wire to the ground post on the amplifier. This should be connected by a short run to a ground rod or cold water pipe. The idea is to have a short direct earth ground to keep the chassis at radio frequency ground. In many cases normal operation can be had without such a ground, but a good ground can help prevent television interference, and make tuning straightforward.
- 5) The A.C. line cord may be plugged into a three wire outlet. The electrical circuit should be capable of handling a 10 ampere load.



OPERATION:

- 1) Check to see that the TUNE/STANDBY/OPERATE switch is in the center or STANDBY position. Apply power to the unit by switching the POWER switch to the ON position. You will hear the cooling blower come up to speed. Wait 60 seconds for the tube to come up to operating temperature.
- 2) During the time that the amplifier is warming up or at any time that the TUNE/STANDBY/OPERATE switch is in the STANDBY position, the exciter may be operated normally "straight through" the amplifier.
- 3) Set the band switch to the same band as that the exciter is tuned to.
- 4) After warm up, place the TUNE/STANDBY/OPERATE switch into the TUNE position. The OPERATE indicator will light up, indicating that the unit is ready for operation. If the RECEIVE switch is on, the RECEIVE indicator will light also, indicating operation of the receive preamplifier.
- 5) Rotate the PLATE LOADING control to the nine o'clock (counter clockwise) position.
- 6) Apply several watts of drive from the exciter and quickly peak the PLATE TUNE control for maximum output as indicated on the front panel wattmeter. The SCREEN overload indicator may glow at this time, and will peak in brilliance at approximately the same place of tuning that maximum output occurs.
- 7) The PLATE LOADING control is then turned clockwise 1/2 division or so, and the PLATE TUNING control is peaked again for maximum output. The brilliance of the SCREEN indicator will peak again, but not quite as brightly as before. This process is continued until a further increase in the PLATE LOADING control will give no further increase in power output. This will normally result in approximately 100 watts output for three to four watts of driving power.
- 8) Unkey the exciter, and place the TUNE/STANDBY/OPERATE switch in the OPERATE position. When the exciter is keyed again, the power output will be somewhat higher, and the SCREEN indicator may glow brightly again. Repeat the procedure as before, tuning the PLATE LOADING and PLATE TUNING controls alternately for maximum output. The PLATE TUNING control should always be the last control that is adjusted. Power output should be about 250 watts for five watts drive at this point in the tune up procedure. When proper loading is accomplished, the SCREEN indicator should glow only dimly. The plate current, as read on an external meter, should be in the neighborhood of 200-250MA.

9) For SSB operation, drive power should now be gradually increased to 10 or 12 watts, and the unit peaked for maximum output. This can be done using the carrier insertion control on some exciters, or if this is not available, a steady tone may be applied to the microphone input. When maximum power has been achieved, operation consists of simply keying the microphone and speaking. The SSB delay switch should be in the on position, which will give the R.F. actuated relays a time delay, so that they won't chatter during transmission. During the SSB transmission, power output peaks will occur so rapidly that the output meter will not be able to follow the signal. If a monitor scope is available, it can be seen that the peak power is considerably better than the 400 watts or so that was obtained during tune up. The SCREEN indicator will flicker with the transmission level, and will reach full brilliance at high peak power levels. This is a faster indicator of peak drive conditions than is the power output meter.

10) For CW operation, tune up as in step eight above. Power output will be nominal 250 watts for 5 watts of driving power. The SSB delay switch may be left in the on position to prevent relay chatter during keying.

11) Hints and Kinks (how to keep it amplifying a long, long time): The 4CX-250B transmitting tube has been proven in commercial and military uses where long life and reliability are major factors. Although it is designed to work a little harder in amateur service, it will still be extremely reliable if a few common sense rules are applied.

a) Make sure that the tube always receives a good air flow. Remember that a lot of watts are being packed into that rather small package, and that the only way to keep it cool is to get air through the tube fins. Do not block the top of the cabinet, or stack other equipment on the amplifier. Make sure that the rear of the chassis (where the blower gets its air) is open to cool room air. If the bottom cover of the unit has to be removed for service, see that it is replaced properly prior to plugging in the unit (for safety also). The bottom chassis must be pressurized in order to force air through the tube fins.

b) Wait 60 seconds before applying drive to the tube. Allowing the tube to properly warm up will help you get the longest service from it.

c) After a long period on the air, let the amplifier run in the STANDBY mode for a minute or so before turning off the power switch. This allows the blower to bring the tube down to a cooler temperature fairly rapidly.

d) Avoid excessive R.F. drive to the amplifier.

e) Use care in tuning -- most tube failures are the result of operator error, not equipment failure.

These transmitting tubes are used for thousands of hours in commercial service, and similar results should be yours with reasonable precautions.

PARTS LOCATIONS AND CIRCUIT OPERATION:

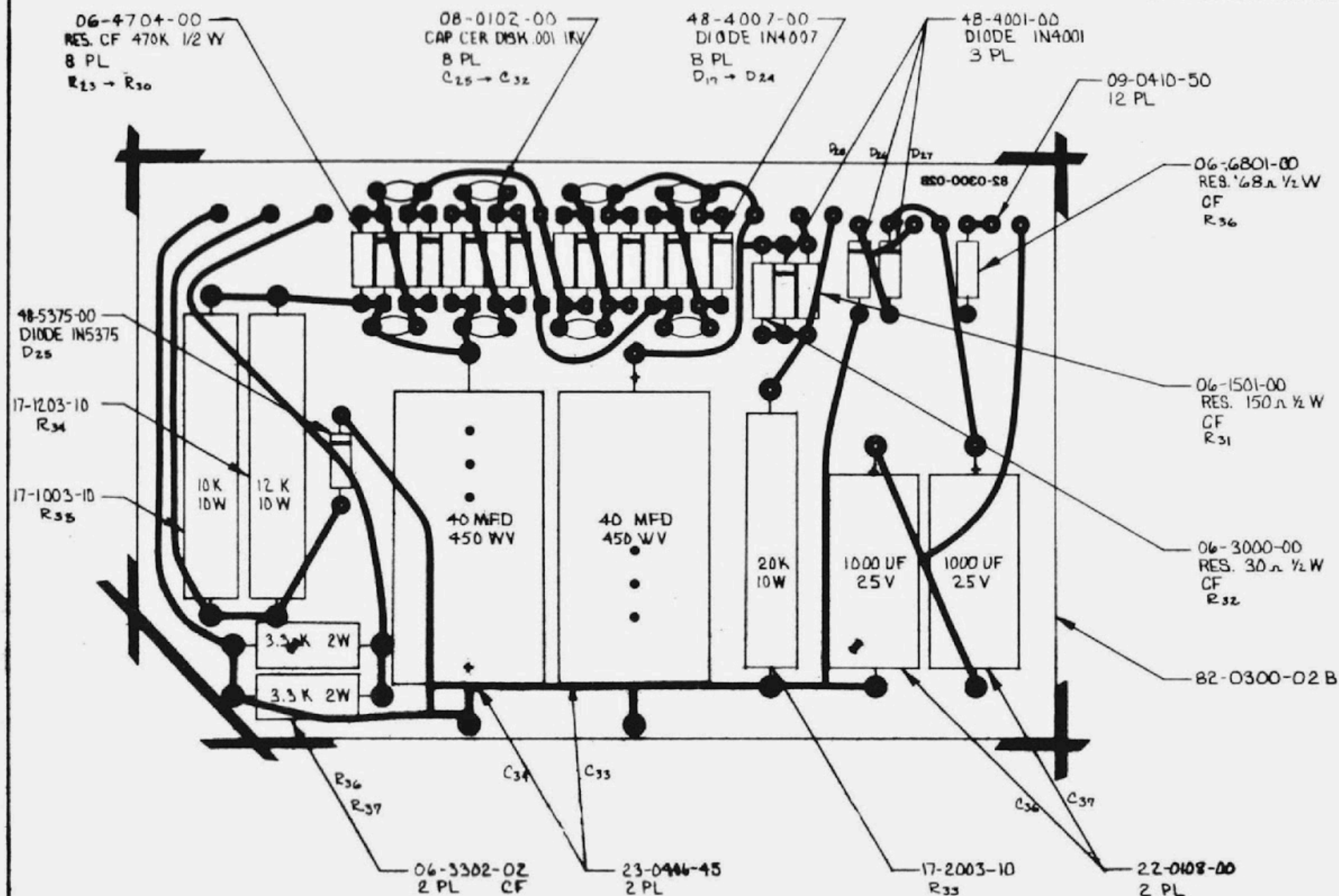
1) Power supplies:

a) High voltage supply: The high voltage supply consists of the plate supply transformer located on the top of the chassis, and the two rectifier-filter boards below chassis directly under the plate transformer. A bridge rectifier circuit is used, which allows good utilization of the transformer with less heating than voltage doubler circuits. Both circuit boards are the same, with the exception of the jumpers which determine whether the filter capacitors are on the high side of the series filter string, or on the low side. The low side board also contains two 6.8 ohm, 2 watt metering resistors. Each board contains one half of the bridge rectifier circuit, with appropriate jumpers between the boards. The filter string consists of six 100uf electrolytic capacitors in series, with voltage equalizing resistors across each one. The time constant of the filter when no current is being drawn is approximately 20 seconds, so that supply will be largely discharged 60 seconds after turn off (ALWAYS CHECK!). The high voltage developed by the supply is approximately 2200 VDC no load, and 1800 VDC at 500 mA.

b) Screen and Bias supplies: The screen and bias supply is also bridge rectified, but with a center tapped transformer and filter string that allows a split output voltage. Approximately 700 VDC is developed across the two 40uf filter caps, but due to the circuit configuration this shows up as +350 and -350 VDC. The +350 VDC is fed through a 30 ohm metering resistor to the screen current. The -350 VDC is fed through two power resistors to provide source current for an 82 volt Zener diode that provides a stable bias supply voltage. This -82 volt supply is dropped in a voltage divider consisting of the back panel bias pot and two 3300 ohm, 2 watt resistors to provide an adjustable, stable bias source for the tube control grid.

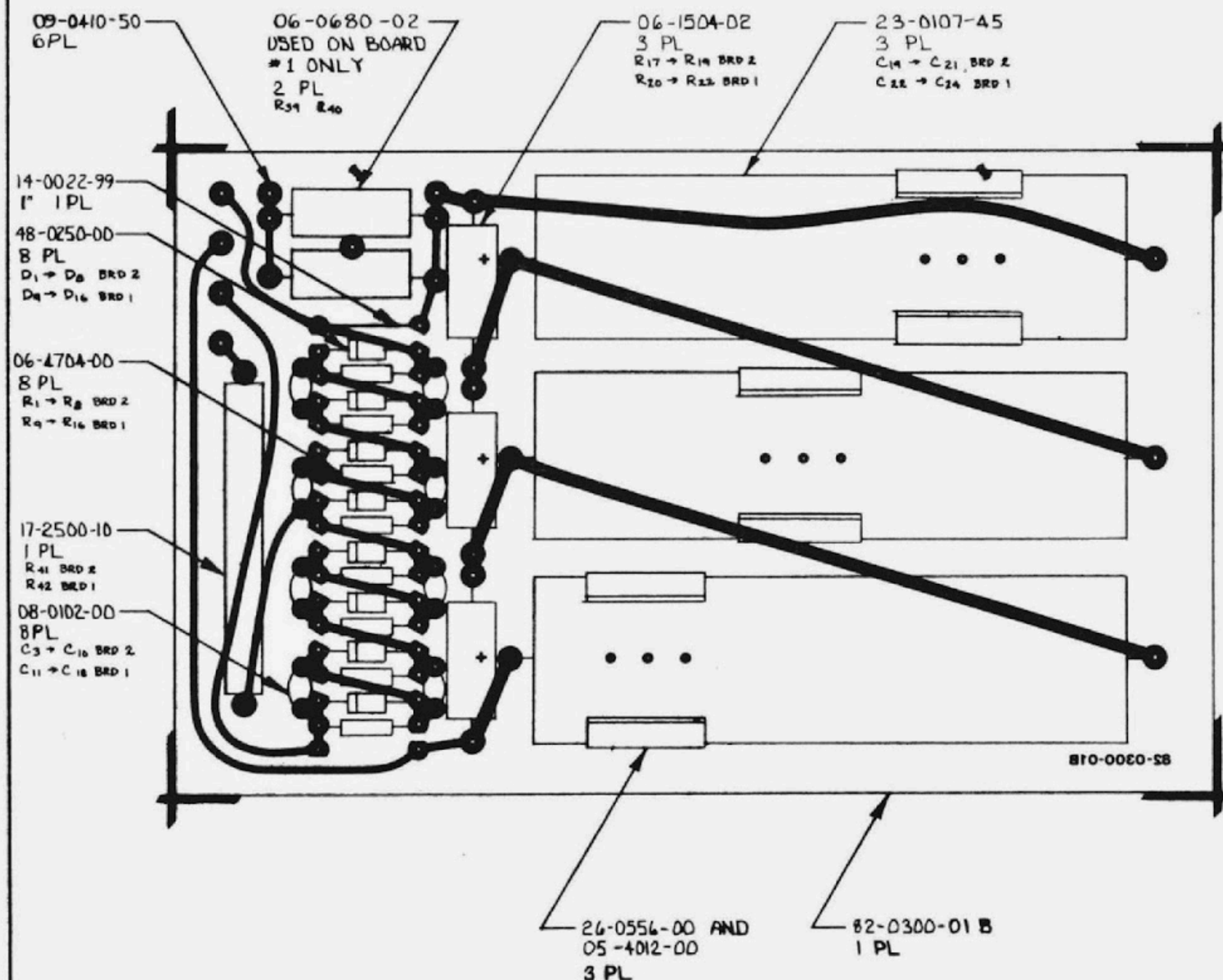
c) Low voltage supply: This supply consists of a full wave voltage doubler which is supplied from the 6.0 volt filament winding on the smaller transformer. 12 to 15 VDC is developed for use of the receive preamp, relays and indicators.

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	RELEASED FOR PRODUCTION		
B	REVISED PER ECN 1039		

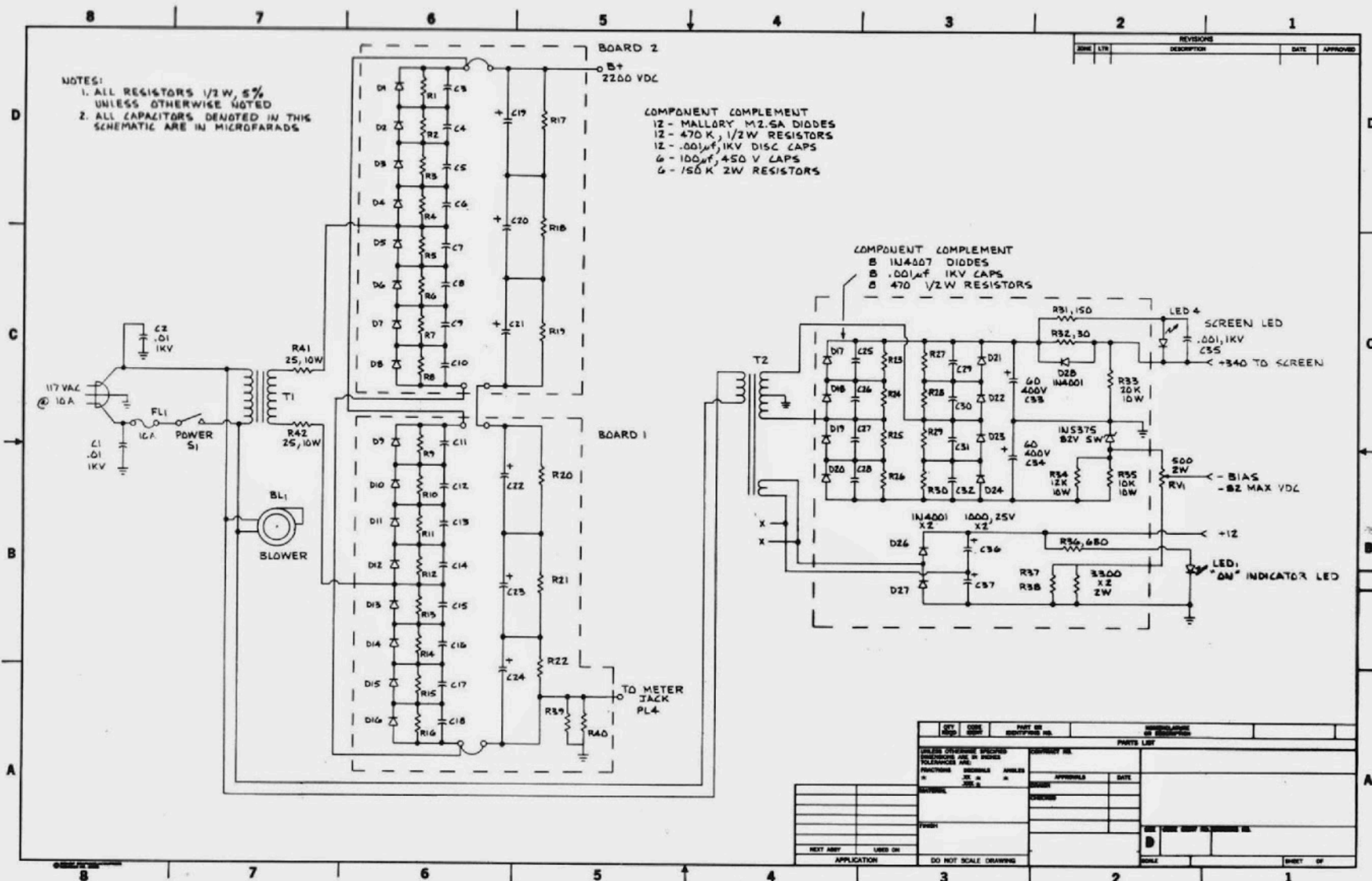


TOLERANCE UNLESS OTHERWISE SPECIFIED		PRIDE ELECTRONICS	
FRACTIONS DEC ANGLES		ASSY. LOW VOLT PWR SPLY	
APPROVALS DATE		DX-300	
TMN 2-25-77		SCALE	
CHOICE		NTS C 01-0300-02	
		DO NOT SCALE DRAWING	
		SHEET 1 OF 1	

REVISION			
LTB	DESCRIPTION	DATE	APPROVED
A	RELEASED FOR PRODUCTION	12-12-76	
B	REVISED PER ECN 1040	3-18-77	

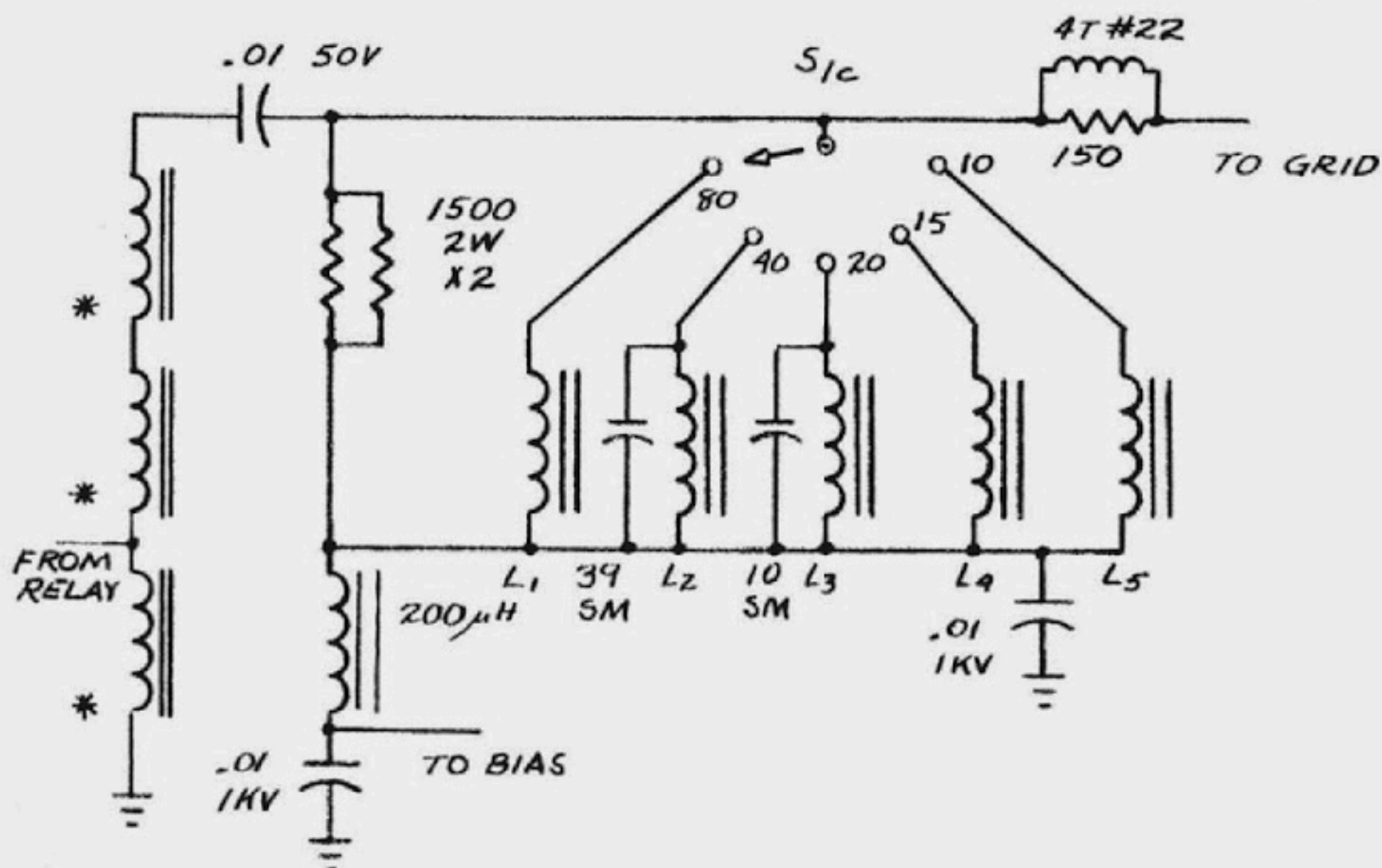


TOLERANCES UNLESS OTHERWISE SPECIFIED		PRIDE ELECTRONICS	
FRACTIONS DEC ANGLES		ASSY. HIGH VOLT PWRSPLY DX-300	
APPROVALS	DATE	SCALE	DRAWING NO.
CHECKED	12-12-76	NTS	C 01-0300-01
DO NOT SCALE DRAWING		SHEET 1 OF 1	

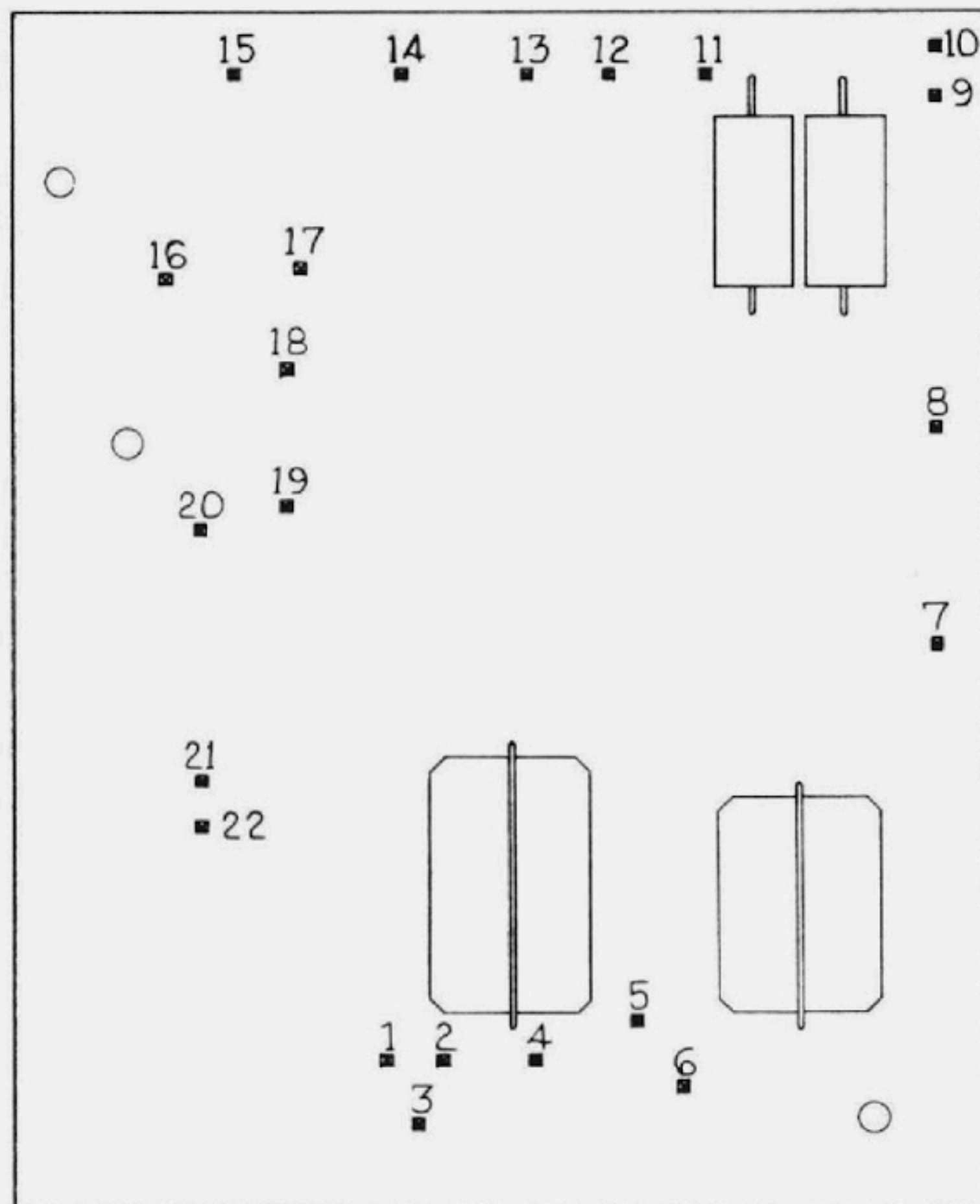


2) Main R.F. board: This board is located under chassis near the tube socket, and is mounted horizontally. It contains the R.F. switching circuitry, the receiver preamp, and some of the control circuitry. The input matching transformer and tuned toroidal input coils are located on this board.

Drive power from the exciter is fed to one set of contacts on the 4PDT relay and coupled also to the 2N2905 relay switching transistor. When the amplifier is in the standby mode, drive is fed through the relay to the output connector. In the operate or tune mode, drive is switched to the 9:1 input matching transformer, which steps the impedance up from 50 ohms to 450 ohms to feed the input circuitry. The rear deck of the bandswitch selects a tuned circuit for the appropriate band. Two 1500 ohm, 2 watt resistors are in parallel with the resonant input circuit to provide proper loading and bandwidth. Adjustable bias voltage is fed to the grid through a 200 uH choke, an input toroid, and the parasitic choke on the tube grid connection.



R.F. Input circuitry

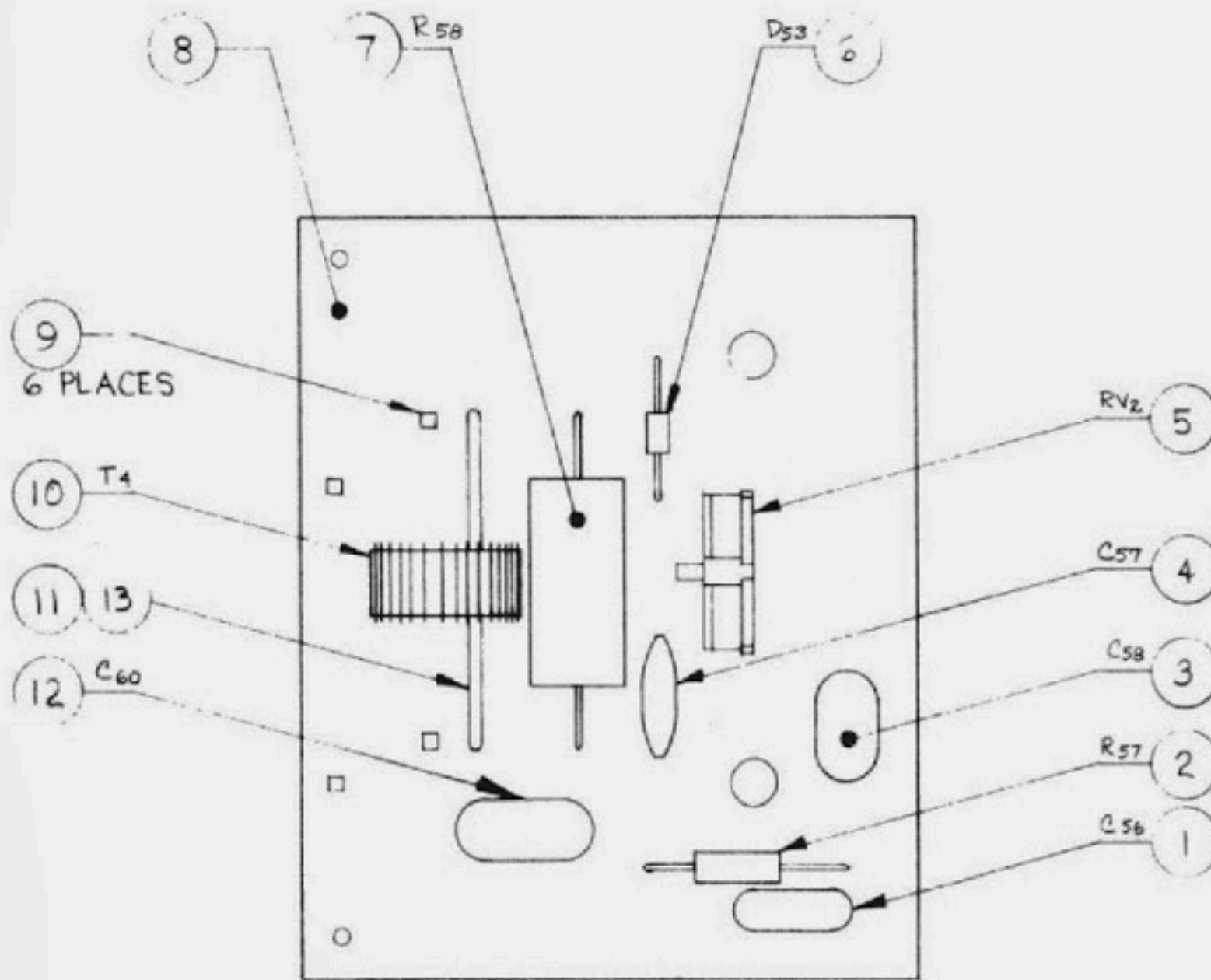


PIN NO.	WIRE	SOCKET	GOES TO
1	SHIELD, COAX	BOTH ENDS	PIN #4 ON 01-0300-09
2	BUSS #16 2"	THIS END	GND OF OUTPUT CONN
3	DIELECTRIC, COAX	BOTH ENDS	PIN #3 ON 01-0300-09
4	BUSS #16 2"	THIS END	CTR TAP OF OUTPUT CONN
5	BUSS #16 2"	THIS END	CTR TAP OF INPUT CONN
6	BUSS #16 2"	THIS END	GND OF INPUT CONN
7	BLUE WIRE	THIS END	FROM "RECIEVE" L.E.D.
8	RED WIRE	THIS END	FROM S 3-1
9	YELLOW WIRE	THIS END	FROM S 2-2
10	BLACK WIRE	THIS END	FROM S 2-1
11	GREEN WIRE	THIS END	TERM #6 BAND SWITCH
12	GREEN WIRE	THIS END	TERM #5 BAND SWITCH
13	GREEN WIRE	THIS END	TERM #4 BAND SWITCH
14	GREEN WIRE	THIS END	TERM #3 BAND SWITCH
15	GREEN WIRE	THIS END	TERM #2 BAND SWITCH
16	BLUE WIRE	THIS END	FROM BIAS ADJ PIN #2
17	GREEN WIRE	THIS END	TERM #1 BAND SWITCH
18	GREEN WIRE	THIS END	FROM "OPERATE" L.E.D.
19	VIOLET WIRE	THIS END	FROM BUSS ON S1
20	BROWN WIRE	THIS END	FROM S1-5
21	BROWN WIRE	THIS END	FROM S1-6
22	RED WIRE	THIS END	TERM #2 ON 85-0300-20

REF: 01-0300-03

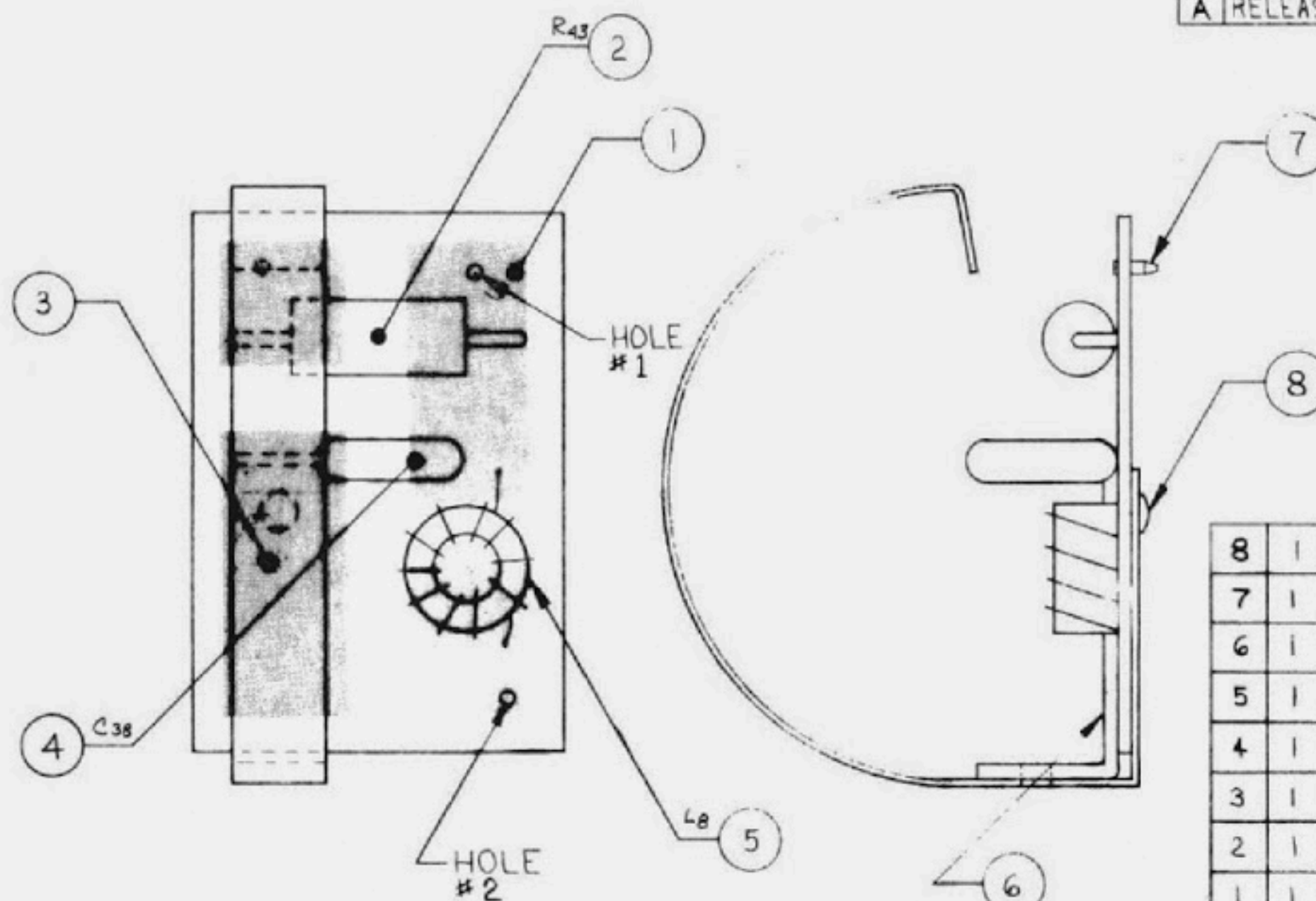
TELEPHONE UNLESS OTHERWISE SPECIFIED		PRIDE ELECTRONICS	
FRACTIONS DEC ANGLES		RELAY & INPUT BOARD	
= ± ±		WIRE CHART, DX-300	
APPROVALS	DATE	SCALE	SHEET NO.
J. M. RY	11-30-76	2/1	C 88-0300-03
CHECKED		DO NOT SCALE DRAWING	SHEET 1 OF 1

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED FOR PRODUCTION		



13	1	16-0017-00	TUBING, TEFLON
12	1	21-1330-00	CAP. DM 33PF 1KV 5%
11	1	14-0018-99	#18 AWG BUSS BULK
10	1	01-0300-27	ASSY TOROID COIL METERING NO 17 WINDS
9	6	09-0410-50	TERMINAL, PIN TIN PLTD
8	1	82-0300-06	PCB PC BOARD, DX 300 MTC
7	1	06-6800-02	RES, CARBON FILM 68 OHM
6	1	48-0914-00	DIODE, SIGNAL 1N914
5	1	19-5003-00	POTENTIOMETER, TRIMPOT 50K OHM
4	1	08-0102-00	CAP, CER DISK .001MF 1KV
3	1	08-0104-02	CAP, MYLAR .1MFD 100V
2	1	06-1503-00	RES, CARBON FILM 15K OHM
1	1	21-1331-00	CAP, DIPPED MICA 330 PF

ITEM	QTY	PART NUMBER	DESCRIPTION
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC. ANGLES			
PRIDE ELECTRONICS			
ASSY, DX 300 METERING BOARD			
APPROVALS	DATE	SCALE	SIZE
DRAWN J MAY 12-13-76		2/1	B
CHECKED		DRAWING NO.	
		01-0300-09	
DO NOT SCALE DRAWING			SHEET 1 OF 1



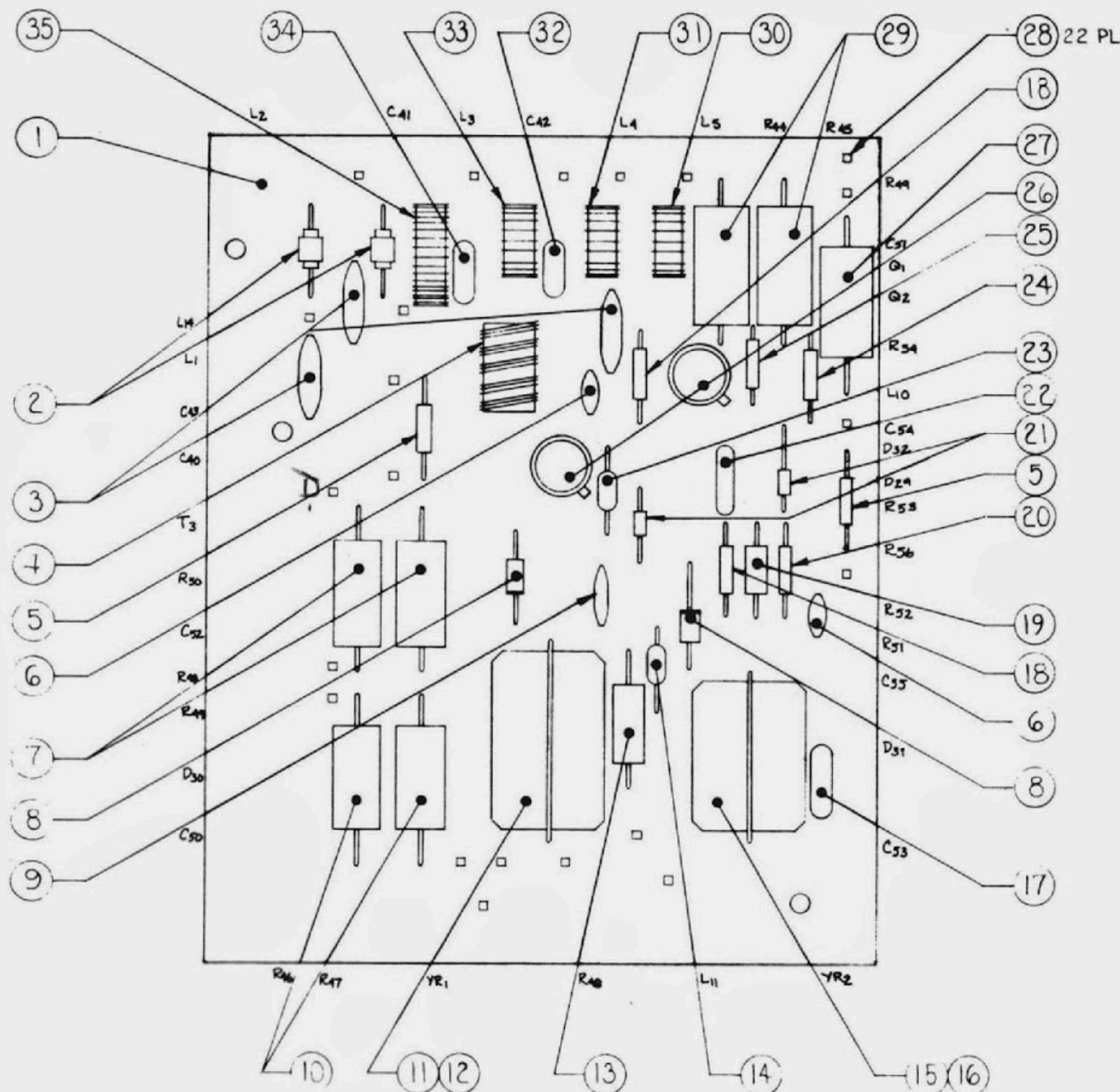
HOLE NO.	WIRE	GOES TO
1	RED HIGH VOLTAGE # 8899-00 14"	SOCKET ONE END PIN #6 ON 01-0300-01 BOARD NO. 2
2	BUSS #18 AWG 2"	PLATE CHOKE (BOTTOM)

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED FOR PRODUCTION		

8	1	05-4012-00	RIVET, ALUMINUM 3/16
7	1	09-0410-50	TERMINAL, PIN TIN PLATED
6	1	85-0300-18	BRACKET, GROUND STRAP
5	1	01-0300-28	ASSY. TOROID INDUCTOR 0μH
4	1	08-0502-00	CAP, CER DISK .005MFD 3KV
3	1	85-0300-15	GROUND STRAP
2	1	06-1504-02	RES, CARBON 150K 2W 10%
1	1	52-0300-04	PCB, RELAY OLD-TYPE
ITEM	QTY	PART NUMBER	DESCRIPTION

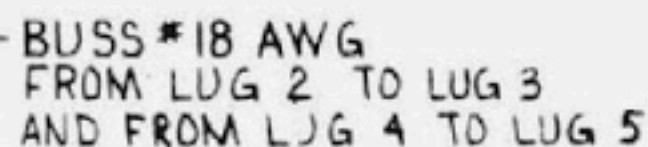
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC. ANGLES			
PRIDE ELECTRONICS			
ASSY B+ CIRCUITRY DX-300			
APPROVALS	DATE	SCALE	SIZE
DRAWN J MAY 12-13-76		2/1	B
CHECKED		DRAWING NO.	
		01-0300-16	
DO NOT SCALE DRAWING			SHEET 1 OF 1

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	RELEASED FOR PRODUCTION		
B	REVISED PER ECN 1044		



SEE SEPARATE PARTS LIST

TOLERANCES UNLESS OTHERWISE SPECIFIED		FRACTIONS DEC ANGLES	
APPROVALS	DATE	PRIDE ELECTRONICS	
DRAWN	DATE	ASSY. RELAY & INPUT BOARD DX-300	
CHECKED	DATE	SCALE	SIZE DRAWING NO.
		N/A	C 1-0503-03
DO NOT SCALE DRAWING		SHEET 1	



LUG NO.	WIRE	GOES TO
1	BLACK 4" SOCKET ONE END	PIN #13 ON 01-0300-02
	BLACK WIRE 5"	LUGS 2 & 3 ON 09-7135-00
2	BLACK WIRE	S4-1 ON 01-300-10
	BLACK WIRE	FROM BLOWER 87-1250-00
3	BLACK WIRE	FROM LOW POWER TRANSFORMER
	BLACK WIRE	FROM HIGH POWER TRANSFORMER
4	BLACK WIRE	FROM LOW POWER TRANSFORMER
	BLACK WIRE	FROM HIGH POWER TRANSFORMER
5	BLACK WIRE	FROM BLOWER 87-1250-00
	WHITE WIRE	LINE CORD
6	RED / YELLOW WIRE	FROM LOW POWER TRANSFORMER
	GREEN WIRE	LINE CORD

TOLERANCES UNLESS OTHERWISE SPECIFIED		PRIDE ELECTRONICS	
FRACTIONS DEC. ANGLES		ASSY. TERMINAL, SOLDER	
APPROVALS DATE DRAWN 1 MAY 1977 CHECKED		POST, WIRE CHART, DX-300	
		SCALE 2/1	SIZE B
		DRAWING NO. 88-0300-08	
		DO NOT SCALE DRAWING	
		SHEET	

APPLICATION			REVISION		
NEXT ASSY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
ITEM	QTY	PRICE P/M	DESCRIPTION		
1	1	82-0300-03	PCB Relay & Input Circuit		
2	2	24-2000-00	Choke, Sub Min 2000RMIN Q 47		
3	3	08-0103-02	Capacitor, Ceramic Disk, .01 MFD 1KV		
4	1	01-0300-22	Assy, Input transformer DX-300		
5	2	06-4801-00	Resistor, Carbon Film, 680 Ohm		
6	2	08-0102-00	Capacitor, Ceramic Disk, .001 MF 1KV		
7	2	06-2701-02	Resistor, Carbon 270 Ohm 2W 10%		
8	2	48-4001-00	Diode, Rect 1A 100V		
9	1	08-0103-00	Capacitor, .01 100V		
10	2	08-1003-02	Resistor, Carbon 18K 5W 10%		
11	1	09-1030-00	Socket, Relay for		
12	1	91-1024-00	Relay, 4 PDT (BX-300)		
13	1	96-1002-01	Resistor, Carbon Film 1K 1W 5%		
14	1	24-0820-00	Choke, Ferrite Bead		
15	1	09-1022-00	Socket, Relay for R10E272		
16	1	41-1022-01	Relay		
17	1	21-1121-00	Capacitor, Dipped MICA 120 PF 5% 0mL5		
18	2	06-4701-00	Resistor, Carbon Film, 470 Ohm 1/2W 5%		
19	1	06-4803-00	Resistor, Carbon Film, 68K 1/2W 5%		
20	1	06-1002-00	Resistor, Carbon Film, 1 K 1/2W 5%		
21	2	48-0914-00	Diode, Signal 1N 914		
22	1	21-1500-00	Capacitor, Dipped MICA 50 PF 5% 1mL5		
23	1	24-2200-00	Choke, RF 22 UBY		
24	1	06-1003-00	Resistor, Carbon Film 10K 1/2W 5%		
25	1	06-2701-00	Resistor, Carbon Film, 270 Ohm 1/2W 5%		
26	2	48-2905-00	Transistor, PNP Si Switching		
27	1	22-0356-00	Capacitor, Electrolytic 35 MF 25V Axial		
28	22	09-0410-50	Terminal, Pin Tin Plated		
29	2	06-1502-02	Resistor, Carbon 1.5K 2W 10%		
30	1	01-0300-23	Assy, Coil Input Toroid 10 Meters		
31	1	01-0300-24	Assy, Coil Input Toroid 15 Meters		
32	1	21-1100-00	Capacitor, Dipped MICA 10PF 5% 1mL5		
33	1	01-0300-25	Assy, Coil Input Toroid 20 Meters		
34	1	21-1390-00	Capacitor, Dipped MICA 39PF 5% 1m-15		
35	1	01-0300-26	Assy, Coil Input Toroid 40 Meters		

CONTRACT NO

APPROVALS

DRAWN J. May

CHECKED

DATE

12-23/76

PRIME ELECTRONICS

PARTS LIST

ASSY, RELAY & INPUT BOARD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:

FRACTIONS DECIMALS ANGLES

± .XX ± ±

MATERIAL

SCALE

CODE IDENT NO.

DRAWING NO.

01-0300-03

SHEET 1

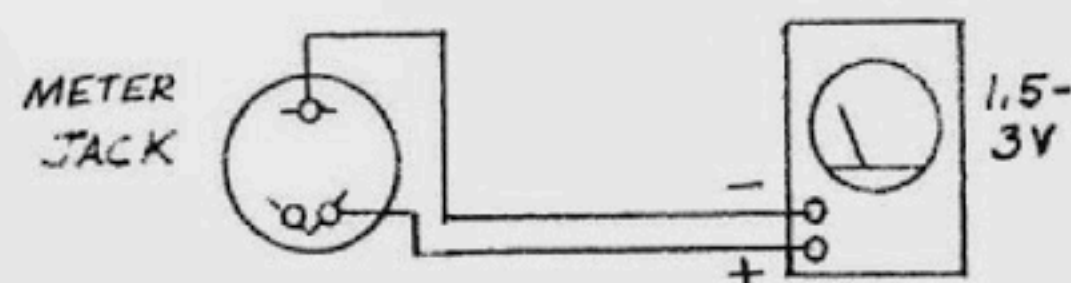
OF 1

DO NOT SCALE DRAWING

The following information is presented so that the competent service technician should have no trouble in performing routine service on the DX-300

Plate current measurement

Plate current can be monitored by means of an external meter plugged into the METERING jack on the back panel. The voltmeter should be connected as below:



The following chart converts voltage as read at the metering jack to actual plate current.

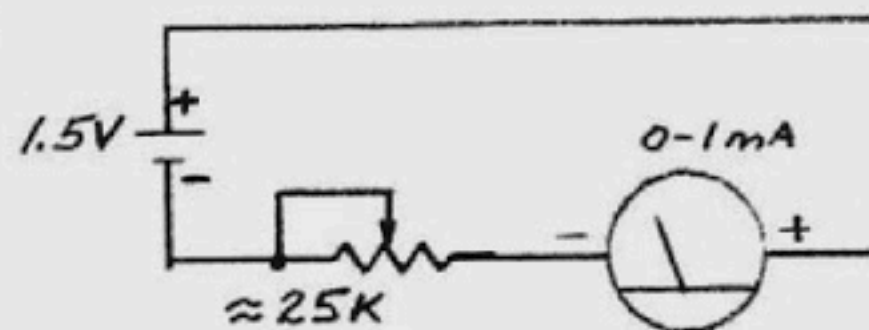
.17V = 50mA	1.02V = 300mA
.34V = 100mA	1.19V = 350mA
.51V = 150mA	1.36V = 400mA
.68V = 200mA	1.53V = 450mA
.85V = 250mA	1.70V = 500mA

Another method is to use a 0-1 mA meter movement as a voltmeter. To do this, a resistor must be added in series with the meter. The value of the resistor can be determined by the following formula:

$$1700 \text{ ohms} - R_{\text{meter}} = R_{\text{series}}$$

where R_{meter} is the meter movement resistance and R_{series} is the value of the series resistor.

The resistance of the meter movement can be determined by the following method:



Hook up the meter as shown above. Adjust the potentiometer so that the meter reads 1mA. Remove the potentiometer from the circuit and measure its value with an ohmmeter. Use this value with the equation on the next page to determine R_{meter} .

$$1500 \text{ ohms} - R_{\text{pot.}} = R_{\text{meter}}$$

This value can now be substituted into the first equation to find the value of the series resistor.

Bias voltage adjustment

The bias voltage is preset at the factory and should rarely need attention. If, however, the tube is changed or the adjustment is otherwise disturbed, the following procedure should be adhered to.

- 1) Be sure the amplifier has been off for several minutes to allow enough time to discharge the power supplies. Remove the bottom cover.
- 2) Place a jumper wire or cliplead from point (A) on the main circuit board to ground. Refer to pictorial for specific placement of the jumper.
- 3) Replace bottom cover.
- 4) Place a 50 ohm dummy load on the output connector of the amplifier.
- 5) Turn the unit on and allow it to warm for 60 seconds.
- 6) Place the TUNE/STANDBY/OPERATE switch into the OPERATE position and adjust bias control for a reading of 35mA or .12V as read at the metering jack.
- 7) Turn off unit and allow it to discharge for several minutes before restoring it to normal configuration.

This completes the bias adjustment.

Voltage measurement

As the voltages present on the DX-300 chassis are potentially lethal, the procedure below must be followed when checking voltages.

- 1) Make sure that the unit is unplugged and has been off for several minutes to allow all voltages to bleed to zero.
- 2) Remove the top cover. Doing so will engage the safety interlock so never apply A.C. power when this cover is removed.

- 3) Loosen and remove the anode clamp from the 4CX-250B tube. Remove the tube, the ceramic chimney, and the anode clamp from the chassis. Make sure the parasitic suppressor is suspended away from any chassis parts.
- 4) Replace the top cover on the amplifier.
- 5) Lay the amplifier on its side or top and remove the bottom cover. Remember-- the tube must be removed or it will be damaged by the loss of cooling air when the unit is powered without the bottom cover.
- 6) Apply A.C. power to the unit. WARNING: Extreme caution must be used when working with voltages of this level. Always be cautious and alert while working on the live chassis.
- 7) Refer to the individual circuit board pictorials for voltage readings and locations. Voltages on the tube socket are as follows:

pin 1 - +350 VDC, $\pm 10\%$
pins 3 and 7 - 6.3 VAC, $\pm 10\%$
grid connection - -82 to -64 VDC, depending on
the setting of bias control.

Caution: When measuring the B+ supply (+2400 VDC), use only a meter which is designed for safety during operation at high voltage levels.

- 8) Restore the unit to its original condition.

Tube replacement

Because of the high reliability of the 4CX-250B transmitting tetrode, the tube should rarely need replacement. If a tube failure does occur, however, a likely reason for this would be a loss of one or more of the required operating voltages at the tube socket. Thus, before a tube is replaced, the voltage measurement procedure should be followed to determine if further repairs are necessary. If all required voltages are present, the tube can then be replaced safely.

Wattmeter calibration

The wattmeter has been adjusted at the factory and should require no further attention. If adjustment becomes necessary, it should be performed only if the following equipment is available:

Exciter: 100 to 200 watts output at 28 MHz
Dummy load: 50 ohms with an accurately calibrated wattmeter. (B&W 334A)

Calibration procedure:

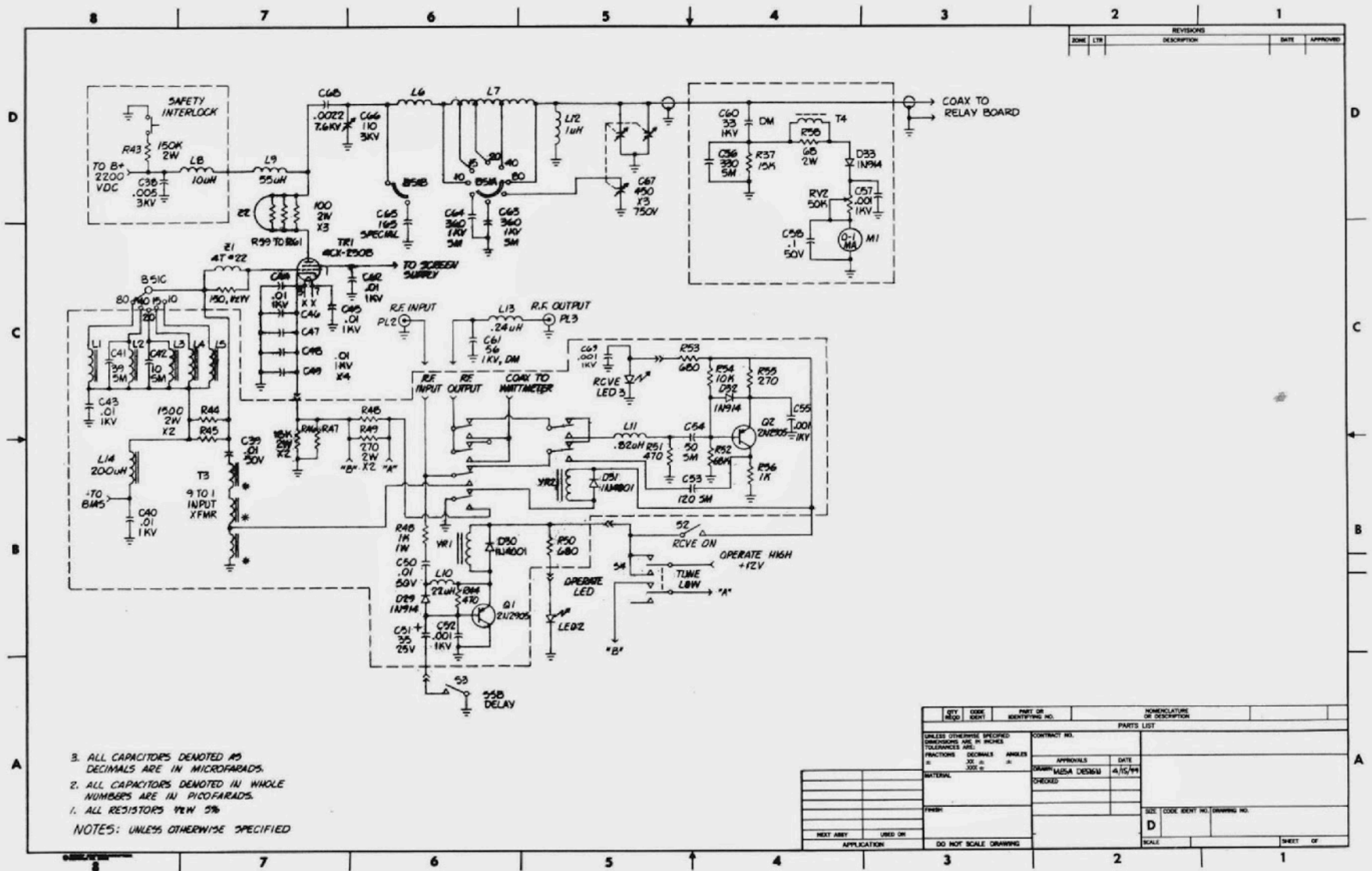
- 1) Remove the top cover after allowing several minutes for the unit to discharge to a safe level.
- 2) Disconnect the right hand (as viewed from the front of the unit) coax cable at the wattmeter board and attach a short length of RG58/U coax cable from the wattmeter board to the output of your exciter.
- 3) Disconnect the left hand coax cable and attach a short length of RG58/U from the wattmeter board to the input of the dummy load/wattmeter.
- 4) Apply power and adjust the exciter for an output of 100 to 200 watts as read on the dummy load/wattmeter.
- 5) Set the potentiometer on the wattmeter board for the same reading.

This now completes the calibration of the wattmeter. Restore the unit to its original configuration.

Input SWR adjustment

If the input SWR should require adjustment on any particular band, the following procedure should be used:

- 1) Remove the bottom cover after allowing sufficient time for the power supply to discharge to a safe level.
- 2) Apply +12 VDC to point (B) as identified on the pictorial of the main circuit board.
- 3) Place the TUNE/STANDBY/OPERATE switch into the operate position.
- 4) Apply approximately three watts of drive to the input of the amplifier (with bandswitch set to the appropriate band).
- 5) Spread or compress the turns of the toroid for the band in use to obtain the lowest SWR reading possible.
- 6) Restore the unit to its original configuration.



DX-300 REPLACEMENT PARTS LIST

REFERENCE DESIGNATOR

1	01-0300-00	1	ASSY.HIGH VOLT PWR SUPPLY DX-300 #2	
2	06-1504-02	3	RESISTOR, CARBON FILM 150K 2W 10%	R17 - R19
2	06-4704-00	8	RESISTOR, CARBON FILM 470K 1/2W	R1 - R8
2	08-0102-00	8	CAPACITOR, CER DISK .001 MF 1KV	C3 - C10
2	17-2500-10	1	RESISTOR, WIREWOUND 25 OHM 10W 10%	R41
2	23-0107-45	3	CAPACITOR, ELECT 100MF 450 V CAN	C19 - C21
2	48-0250-00	8	DIODE, M2 5A MALLORY	D1 - D8
2	82-0300-01	1	PCB DX-300 HIGH VOLTAGE PWR SUPPLY	NA
1	01-0300-01	1	ASSY DX-300 HIGH VOLTAGE PWR SUPPLY #1	
2	06-0680-02	2	RESISTOR, CARBON FILM 6.8 OHM 2W 5%	R39 - R40
2	06-1504-02	3	RESISTOR, CARBON FILM 150K 2W 10%	R20 - R22
2	06-4704-00	8	RESISTOR, CARBON FILM 470K 1/2W	R9 - R16
2	08-0102-00	8	CAPACITOR, CER DISK .001 MF 1 KV	C11 - C18
2	17-2500-10	1	RESISTOR, WIREWOUND 25 OHM 10W 10%	R42
2	23-0107-45	3	CAPACITOR, ELECT 100 MF 450 V CAN	C22 - C24
2	48-0250-00	8	DIODE, M2 5A MALLORY	D9 - D16
2	82-0300-01	1	PCB, DX-300 HIGH VOLTAGE PWR SUPPLY	NA
1	01-0300-02	1	ASSY. DX-300 LOW VOLTAGE PWR SUPPLY	
2	06-0301-00	1	RESISTOR, CARBON 30 OHM 1/2W 5%	R32
2	06-1501-00	1	RESISTOR, CARBON FILM 150 OHM 1/2W 10%	R31
2	06-3302-02	2	RESISTOR, CARBON 3.3K 2 W 5%	R36, R37
2	06-4704-00	8	RESISTOR, CARBON FILM 470K 1/2W	R23 - R30
2	06-6801-00	1	RESISTOR, CARBON FILM 680 OHM 1/2W 5%	R36
2	08-0102-00	8	CAPACITOR, CER DISK .001 MF 1 KV	C25 - C32
2	17-1003-10	1	RESISTOR, WIREWOUND 10K 10W 10%	R35
2	17-1203-10	1	RESISTOR, WIREWOUND 12K 10W 10%	R34
2	17-2003-10	1	RESISTOR, WIREWOUND 20K 10W	R33
2	22-0108-00	2	CAPACITOR, ELECTROLYTIC, 1000 MF 25V	C36, C37
2	23-0406-45	2	CAPACITOR, ELECTROLYTIC 40MFD 450WV	C34, C33
2	48-4001-00	3	DIODE, RECT 1A 50V PLASTIC	D26 - D28
2	48-4007-00	8	DIODE, RECTIFIER 1 AMP 1000PIV	D17 - D24
2	48-5375-00	1	DIODE, ZENER 82V 5W 1N5375	D25
2	82-0300-02	1	PCB DX-300 LOW VOLTAGE PWR SUPPLY	NA
1	01-0300-03	1	ASSY. RELAY & INPUT BOARD	
2	01-0300-22	1	ASSY. INPUT TRNSFMR 3 WIRES 10 WINDINGS	T3
2	01-0300-23	1	ASSY. COIL INPUT TORIOD 10 METERS	L5
2	01-0200-24	1	ASSY. COIL INPUT TORIOD 15 METERS	L4
2	01-0300-25	1	ASSY COIL INPUT TORIOD 20 METERS	L3
2	01-0300-26	1	ASSY. COIL INPUT TORIOD 40 METERS	L2
2	06-1002-00	1	RESISTOR, CARBON FILM 1K 1/2W 5%	R56
2	06-1002-01	1	RESISTOR, CARBON FILM 1K 1W	R48
2	06-1003-00	1	RESISTOR, CARBON FILM, 10K 1/2W 5%	R54
2	06-1502-02	2	RESISTOR, CARBON 1.5K 2W 10%	R44, R45
2	06-1803-02	2	RESISTOR, CARBON 18K 2W 10%	R46, R47
2	06-2701-00	1	RESISTOR, CARBON FILM 270 OHM 1/2W 5%	R55
2	06-2701-02	2	RESISTOR, CARBON 270 OHM 2W 10%	R48, R49
2	06-4701-00	2	RESISTOR, CARBON FILM, 470 OHM 1/2W 5%	R59

2	06-6801-00	2	RESISTOR, CARBON FILM 680 OHM 1/2W 5%	R50,R53
2	06-6803-00	1	RESISTOR, CARBON FILM 68K 1/2W 5%	R52
2	08-0102-00	2	CAPACITOR, CER DISK .001 MF 1KV	C52,C55
2	08-0103-00	1	CAPACITOR,CERAMIC DISC, .01MF,50V	C50
2	08-0103-02	3	CAPACITOR, CERAMIC DISK .01 MFD 1KV	C39,C40,C43
2	21-1100-00	1	CAPACITOR, DIPPED MICA 10PF 5% DM15	C42
2	21-1121-00	1	CAPACITOR, DIPPED MICA 120PF5% DM15	C53
2	21-1390-00	1	CAPACITOR, DIPPED MICA 39 PF 5% DM-15	C41
2	21-1500-00	1	CAPACITOR, DIPPED MICA 50 PF5% DM15	C54
2	22-0356-00	1	CAPACITOR, ELECTROLYTIC 35MF 25V AXIAL	C51
2	24-0820-00	1	CHOKE, RF .82 UHY	L11
2	24-2000-00	2	CHOKE, SUB MIN 200UHMIN Q 47	L1,L14
2	24-2200-00	1	CHOKE, RF 22 UHY	L10
2	41-1022-01	1	RELAY	YR2
2	41-1024-00	1	RELAY, 4PDT (DX300)	YR1
2	48-0914-00	2	DIODE, SIGNAL 1N914	D29,D32
2	48-2905-00	2	TRANSISTOR, PNP SI SWITCHING	Q1,Q2
2	48-4001-00	2	DIODE, RECT 1A 50V PLASTIC	D30,D31
2	82-0300-03	1	PCB, RELAY & INPUT CIRCUIT	NA
1	01-0300-04	1	ASSY.PLATE CLAMP	
1	01-0300-08	1	ASSY. PLATE CHOKE DX-300	
2	01-0300-05	1	ASSY. PARASITIC SUPPRESSOR	Z1
2	24-0014-00	1	CHOKE, RF PLATE 55UH	L9
1	01-0300-10	1	ASSY. DX-300 FRONT PANEL	
2	01-0300-06	1	ASSY. DX-300 CAPACITOR	
3	15-0058-07	1	CABLE, COAX, RG58CU 7 1/2"	
3	20-2450-00	1	CAPACITOR, VARIABLE,PANEL 1350 RF 750V	C67
3	24-1006-00	1	CHOKE, RF 1MHY 160 MA	L12
2	01-0300-09	1	ASSY. METERING BD DX-300	
3	01-0300-27	1	ASSY. TORIOD COIL METERING BD 17 WINDINGS	T4
3	06-1503-00	1	RESISTOR, CARBON FILM 15K OHM 1/2W 5%	R57
3	06-6800-02	1	RESISTOR, CARBON FILM 68 OHM 2W 5%	R58
3	08-0102-00	1	CAPACITOR, CER DISK .001 MF 1KV	C57
3	08-0104-02	1	CAPACITOR CERAMIC .1MFD 100V	C58
3	19-5003-00	1	POTENTIOMETER, TRIMPOT 50K OHM 1/4 W	RV2
3	21-1330-00	1	CAPACITOR, DIPPED MICA 33PF 1KV 5%	C60
3	21-1331-00	1	CAPACITOR, DIPPED MICA 330 PF 5% DM-15	C56
3	48-0914-00	1	DIODE, SIGNAL 1N914	D33
3	82-0300-06	1	PCB PC BOARD DX-300 METERING CIRCUITRY	NA
2	01-0300-12	1	ASSY. BAND SWITCH PORCELAIN 15-18 MET.	
3	21-1361-01	2	CAPACITOR, DIPPED MICA 360 PF 1 KV	C63,C64
3	40-9002-00	1	SWITCH, BAND CERAMIC 2 WAFER	B51
2	01-0300-13	1	ASSY. CAPACITOR 165 PFTEFLON DIELECTRIC	C65
3	85-0300-04	1	TEFLON SHT. 4.50 X 3.50	
3	85-0300-05	1	TEFLON PLUG 1.0 DIA	
3	85-0300-06	1	BRASS SHT. 4.00 X 3.00	
3	85-0300-07	2	TEFLON SHT. 2.00 X 2.00	
3	85-0300-08	1	BRASS SHT. 1.40 X 1.40	

2	01-0300-15	1	ASSY. TANK COIL 15 - 80 METERS	L7
2	01-0300-18	1	CAPACITOR PLATE TUNING	
3	08-0222-07	1	CAP. CERAMIC DISC. 0022 MF 7.5 KV	C68
3	20-1101-03	1	CAPACITOR, VARIABLE, PANEL 110PF 3KV	C66
3	85-0300-17	1	CAPACITOR STRAP	NA
2	05-5024-00	4	CLIP & RING, LED PANEL MOUNTING	NA
2	08-0102-00	2	CAPACITOR, CER DISK .001 MF 1KV	NA
2	32-0299-00	3	DIAL, FIGURE BLACK DX-300	NA
2	32-2912-00	2	KNOB, BLACK DX-300	NA
2	32-2912-01	1	KNOB, BLACK DX-300	NA
2	40-1606-00	2	SWITCH, 3A SPST	S2,S3
2	40-8006-00	1	SWITCH, SPST, 10A	S1
2	40-8706-00	1	SWITCH, DPOT, C.O. 10A	S4
2	42-0290-00	3	CAP. KNOB DX-300	NA
2	49-0300-00	1	METER, 1MA F.S. WITH SPECIAL SCALE	M1
2	49-5024-00	4	L.E.D. RED DIFFUSED	LED1 - LED4
2	84-0300-00	1	PANEL, DRESS DX-300	NA
2	85-0300-01	1	CHASSIS, FRONT	NA
2	85-0300-02	1	SUPPORT BRACKET	NA
2	85-0300-03	1	SUPPORT BRACKET	NA
2	85-0300-16	2	BRACKET, COVER MOUNT	NA
1	01-0300-11	1	ASSY. CHASSIS POWER DX-300	
2	01-0300-07	1	PARASITIC SUPPRESSOR, GRID	Z2
2	01-0300-19	1	ASSY. TERMINAL SOLDER POST DX-300	
3	08-0103-02	2	CAPACITOR, CERAMIC DISK .01 MFD 1KV	
3	31-0854-00	1	TERMINAL, SOLDER POST 6 2 GROUND	NA
2	01-0300-20	1	ASSY. TUBE SOCKET	
3	08-0103-02	7	CAPACITOR, CERAMIC DISK .01 MFD 1KV	C44 -C49,C62
3	09-0250-00	1	SOCKET, ELECTRON TUBE 4CX250B	
2	25-0300-01	1	TRANSFORMER, DX-300 HIGH VOLTAGE	T1
2	25-0300-02	1	TRANSFORMER, DX-300 LOW VOLTAGE	T2
2	85-0300-12	1	POWER CHASSIS	NA
2	87-1250-00	1	BLOWER, HIGH OUTPUT MODIFIED	BL1
2	87-1250-01	1	FLANGE, OUTLET FOR BLOWER PN 87-1250-00	NA
1	01-0300-16	1	ASSY. B + CIRCUITRY	
2	01-0300-28	1	ASSY. TOROID INDUCTOR 10UH 10 WINDINGS	L8
2	06-1504-02	1	RESISTOR, CARBON FILM 150K 2W 10%	R43
2	08-0502-00	1	CAPACITOR, CERAMIC DISK .005 MFD 3 KV	C38
2	82-0300-04	1	PCB, B+ CIRCUITRY	NA
2	85-0300-15	1	GROUND STRAP, SAFETY INTERLOCK	NA
2	85-0300-18	1	BRACKET, B+ CIRCUITRY	NA
1	01-0300-17	1	ASSY. CHASSIS REAR DX-300	
2	09-7135-00	1	RECEPT 3-COND ROUND	PL-4
2	18-5001-02	1	POT.500 OHM 2.25W 10% SCR. ADJ. .625 SHFT	RV1
2	28-3186-00	1	LINE CORD. 3 WIRE #18 W MOLDED PLUG	PL1
2	65-0010-00	1	FUSE, AGC 10 AMP	F1
2	67-1200-00	1	FUSE EXTRACTOR POST	NA
2	85-0300-13	1	CHASSIS, REAR DX-300	NA

1	01-0300-99	1	DX-300 MISCELLANEOUS	
2	09-0250-01	1	TUBE SOCKET CHIMNEY, 4CX250B	NA
2	26-0138-00	1	COUPLER, SHAFT	
2	40-3000-00	1	SWITCH, PHENOLIC 1 POLE 5 POSITION	
2	54-0300-03	1	INSTRUCTION MANUAL DX-300	NA
2	65-0250-00	1	TUBE, 4CX250B	TRI
2	75-2135-00	4	FOOT, RUBBER 31/32"	NA
2	85-0300-11	1	COVER	NA
2	85-0300-14	1	BOTTOM PLATE	NA

LIMITED WARRANTY POLICY

Pride Electronics warrants this equipment against defects in material or workmanship, when used in normal service, for a period of ninety (90) days from date of original purchase. This warranty is valid only if the enclosed card is properly filled in and mailed to the factory within ten (10) days of purchase. Do not ship unit to the factory without prior authorization. This warranty is limited to repairing or replacing only the defective parts, and is not valid if the unit has been tampered with, misused, or otherwise damaged.

This warranty is in lieu of all other warranties, expressed or implied.

Specifications and policies outlined in this manual are subject to be changed by Pride Electronics without prior notice or responsibility to effect retroactive changes on units in the field.