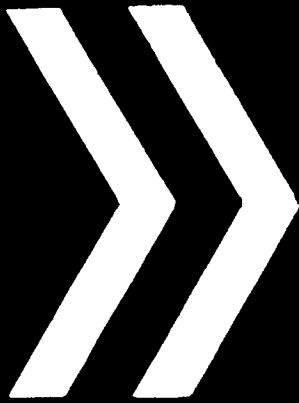


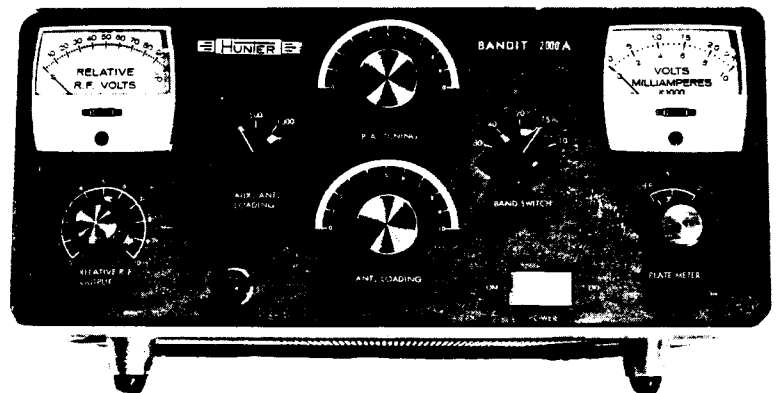
# HUNTER



## INSTRUCTION MANUAL

**BANDIT  
2000A**

**LINEAR  
AMPLIFIER**



*Hunter Manufacturing Company, Inc.*



## BANDIT 2000A LINEAR AMPLIFIER

February 1963 Edition

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*Hunter Manufacturing Company, Inc.*  
IOWA CITY, IOWA

## UNPACKING

Open the shipping carton very carefully, and lift the Bandit from the carton. Inspect the unit for visible damage which may have incurred during shipment. If damage can be detected, save all packing materials and contact the transportation company for damage claim instructions. Also notify your dealer in order that repair or replacement procedures may be activated.

Remove, fill in and mail the warranty card as soon as possible. The card must be returned within 10 days to qualify the unit for warranty service.

Check all controls and switches for freedom of operation. Open and unpack the shipping carton containing the tubes (if applicable).

## INSTALLATION OF TUBES

In most cases the tubes must be installed before operating the Bandit. In some instances the tubes will already be installed, and only the packing around them must be removed. In either case the high voltage cover must be removed in order to remove the packing or install the tubes.

### a. Removal of H.V. Shield.

To remove the cover please observe the following steps. Remove the two screws shown in figure 1 and slide the cover approximately  $\frac{1}{4}$  inch towards the middle of the unit, then raise the rear of the cover and pull backwards. This should disengage the front of the cover and it can be easily removed. Do not attempt to loosen the two front screws.

### b. Installation of Tubes.

Remove one tube from its carton and insert it into one of the lower sockets.

CAUTION: Do not excessively bend the plate caps. These caps are held on by means of the resistor leads and may break off in case of forceful bending.

Next insert the second tube into the other bottom socket. Finally insert both of the top tubes. Make certain that the tubes are seated properly and that the plate caps are properly attached. The tubes must have an air space between each other and the aluminum chassis.

Be sure to replace and fasten the H.V. Shield before the Bandit is operated.

NOTE: Check the cooling fans for freedom of operation.

## POWER REQUIREMENT

The Bandit 2000A may be operated on 110-120 or 220-240VAC, 60 cps. Due to the fact that the peak line current during modulation will

be in the order of 18 amperes on 120V operation, the operator should provide an excellent 115 volt power source (No. 10 or better copper wire service's desirable). To change from 115 volt to 230 volt operation the unit must be removed from its case and a set of jumper lugs must be changed, as shown in figure 2. Please keep in mind that low supply voltage will result in low filament voltage which in turn will shorten the tube life.

#### VENTILATION

Locate the Bandit in such a position that there is room for sufficient air circulation around the Bandit. Several inches of room must be left between the tube side of the Bandit and other objects. In case your operating quarters are confined so that air cannot freely circulate, you should consider a small external fan to circulate the air around your equipment.

The top and tube side of the Bandit will become quite warm. Under continuous operation the top and tube side will become uncomfortably hot to the hand.

**CAUTION:** Do not place other equipment, books or papers on top of the Bandit Case.

#### CONNECTING THE LINEAR

**a. For Transceiver Operation:**

All connections are made at the rear of your Bandit. A binding post is provided for connection of chassis to ground. Be sure to make this connection before power is applied to the Bandit.

Two concentric 50 or 52 ohm lines are required to connect the Bandit to a transceiver-exciter unit. One line connects the antenna relay, connect this line from the exciter relay connection to the Bandits "Relay" jack.

The second line attaches the exciter RF output to the "R F Input" jack. The RG 8/U line output connector marked "Antenna" goes to the 52 ohm antenna installation.

Operation of the transceiver will be as though the linear were not connected after the tune up procedure has been properly followed. (See Below)

**b. For Transmitter-Receiver Operation:**

The Internal Antenna relay will accomplish the necessary switching operations. However, you should be certain that during receiving, your exciter is inoperative. Please study the switching circuit before operating. Almost all modern exciters have built-in methods which will prevent any RF from entering the receiver. In all such cases it will not be necessary to have external switching relays.

Connect the exciter to the "RF Input" jack. Connect the receiver to the Bandit "Receiver" jack. The antenna relay of the linear must be energized for transmitting. The receiver receives

its input from the antenna during the time the vox circuit is not being operated, and the antenna relay is deenergized. When the voice operated relay is activated by the exciter the receiver input is shorted to ground,

#### ANTENNA IMPEDANCE

The Bandit should be used on antenna impedances of 50-72 ohms. Antenna installation with impedances in the 50 ohm region will perform most satisfactory.

#### TUNING PROCEDURE

Observe the following steps, do not attempt to tune the Bandit any other way unless you are completely familiar with this unit.

1. Place the plate voltage switch (inside the unit - S4) to the high position. This position is marked with an "H".
2. Set the band switch to the desired position.
3. When working into a 50 ohm antenna installation: Initially set the "Ant. Loading" control and the "Aux. Loading" switch as follows:

For 80 and 40 meters, set "Aux. Load" to 1000 and "Ant. Loading" to 0.

For 20 meters, set "Aux. Load" to 0 and "Ant. Loading" to 10.

For 15 and 10 meters, set "Aux. Load" to 0 and "Ant. Loading" to 5.

4. Place the "Relative R. F. Voltage" control to approximately 5.
5. Set the plate meter switch to Ip.
6. At this point tune your exciter, and return the excitation at zero.
7. Flip the Bandit power switch to "ON".
8. Carefully lift the case top and observe whether both cooling fans are operating.
9. Increase the excitation to obtain approximately 400 mA plate current reading on the Bandit plate meter. (May be less than 400 mA. 300 mA will give you a good indication on the lower bands.)  
CAUTION: Do not increase Ip to more than 415 mA. FCC regulations limit the input power in this mode of operation to 100cwatts.
10. Now turn the "P. A. Control" until a peak on the relative R. F. meter is obtained. This will also be an approximate indication of the plate current dip. In order to increase the relative R. F. voltage, slowly turn the Loading capacitor through its range, while observing the R. F. meter for a rise. Then change the "Aux. Loading" as a further attempt to obtain higher R. F. indication, on 10, 15, and 20 meters. Aux. loading must not be set to 1000.

By leaving the excitation and "Relative R.F. Voltage" controls constant a maximum indication on the R.F. meter will coincide with the maximum power at your antenna. (Also see output check)

NOTE: It is recommended that the  $I_p$  be retained at 415mA for periods of only 15 sec. In case it takes you longer to tune up the Bandit, return the excitation to zero, wait 15 sec. and then start where you left off. Tune up periods of over 30 seconds may damage the unit. Do not increase  $I_p$  to maximum possible for more than 1 sec. at any time. Attempting to tune the Bandit at higher plate currents (even with lower plate voltages) will not gain any additional power.

The best tuning procedure is described above.

#### MODULATION

It is recommended that the plate milliammeter reading be limited to 415mA or less, when the unit has been tuned as described above. An indication of about 400mA has proven to deliver excellent talk power.

The relative RF output voltage reading makes an excellent audio output indicator during modulation.

#### CW OPERATION

It is important that the input power be limited to 1000 watts when operating C.W. This can be done by reducing the High Voltage by means of switch S-4 (set to medium or low) or by simply decreasing the excitation.

#### IDLING CURRENT

Without excitation the normal plate idling current should be approximately 100mA, (with the High Voltage switch set to "High"). The Bandit can be operated with idling currents up to 200mA without incurring damage, however, high idling current is usually an indication that the bias voltage has been lost.

#### REMOVAL OF THE CHASSIS

CAUTION: Do not attempt to remove the case as long as an  $E_p$  is indicated on the plate meter. Wait 30 sec. or so, unplug the unit and discharge the H.V. (short circuit the tube caps to chassis by means of a suitable insulated tool).

Place the Bandit upright so that it will rest on the front panel knobs. Use a soft pad in order to avoid scratching the knobs. Remove the hold down screw at the rear bottom edge of the case and lift the case from the chassis. The case fits rather tightly and it may require several trials, before the operator will find the

removal of the case a simple matter. Use a "tilting action" after the case is almost completely off. Keeping the lid open will aid in the removal and replacement of the case.

#### OUTPUT CHECK

In case you get reports that your Bandit seems to have improper output, you may want to try the following test.

Connect a 50-52 ohm, 1000 watt Dummy Load to the Bandit "Antenna" jack. Tune up as described previously. Then momentarily increase the excitation to 160 watts P.E.P. The Ip meter should kick up to 600 - 850 mA. The increase of excitation should take only one or two seconds. In case the Ip did not reach 650mA, change the loading settings and repeat step 10 of the Tuning Procedure. Whenever, step 10, is combined with approximately 600 - 850 mA Ip into a 50 ohm antenna load, you can be sure that the Bandit is operating properly.

#### MAINTENANCE

Special maintenance is not required to keep the Bandit operating properly. Perform all ordinary maintenance at frequent intervals paying particular attention to the following points:

**Cooling Fans:** Whenever the fan blades appear to have dirt on them, use a cloth and solvent for cleaning.

**Relay:** The relay contacts should be cleaned with a contact burnishing tool. Do not use liquid contact preserves or anti-corrosion compounds, most such liquids will shorten the relays life expectancy.

**Switches:** The switch contacts must be cleaned by use of very small amounts of liquid switch contact cleaners.

**Tubes:** The tube compartment and the case surrounding the tube compartment must be kept clean and shiny at all times. This is necessary to insure sufficient cooling of the tubes.

#### REPAIR

Do not attempt to perform repairs unless you are completely familiar with circuits utilizing very high voltages and currents. For parts replacement use only specified components. Do Not substitute without consulting your authorized dealer or representative.

Unauthorized substitution will void the warranty.

**High Idling Current:** This condition indicates loss of bias supplied by the Zener diode Z. Check voltage at the Zener diode pin. It should be about 8 volts.

**No Plate Voltage:** Inspect resistor R-8, and check its resistance, this resistor also serves as an overload protector. A plate current of Approx. 850-1000 mA for a duration of about 10 seconds will open this resistor.

**Pilot Lamp:** To replace pilot lamp simply unscrew the red front panel jewel and replace the lamp. In case more brightness is desired, replace existing lamp with a No. 47.

**Power Switch:** The Power switch may be removed by taking off the two 6-32 nuts. It is possible to take the switch apart for point burnishing. DO NOT remove and clean this switch unless it fails to operate. DO NOT replace with any substitutes.

**Variable Capacitors:** The Two variable capacitors must be kept dirt and dust free at all times.

#### The Power Transformer

The primary connections of the Transformer can be easily changed for 115 or 230 volt operation.

The schematic diagram shows the change over links (see Figure 2) in the 115 volt position. For 230 volt operation the primary windings must be wired in series. Changing the links (see figure 2) to the 230 volt position, will disconnect point 1 from 3 and point 2 from 4, while connecting point 2 to 3.



SCHEMATIC IDENTIFICATION NUMBER	<u>PARTS LIST</u>		MANUFACTURER, TYPE OR EQUIVALENT
	HUNTER PART NO.	DESCRIPTION	
B1, B2	23A-18	Cooling Fan Motor 115 VAC	Barber-Coleman DYAB
C1, 2	7-11	Capacitor, .02mfd Disc Ceramic	CRL
C3, 4, 13 C14, 15, 16	7-7	Capacitor, .01 mfd Disc Ceramic	CRL
C5, 6, 10	7A-205	Capacitor, 1000 mmfd 2500 V, 5000V test	Transmitting Mica
C9	7A-203	Capacitor, 330 mmf 2500 V, 5000 V test	Transmitting Mica
C7	7A-209	Capacitor, variable 19-488 mmfd	E. F. Johnson 154-3-9
C8	7A-207	Capacitor, variable 15-353 mmfd	E. F. Johnson 154-2-9
C11A, 11B, 11C C12A, 12B, 12C	7-211	Capacitor, 140 mfd 475 VDC, Aluminum can type	Sprague TVL
F		Fuse, 20 amp, 250V; for 115V operation 10-12 amp, 250V; for 230V operation	
D	32-51	Rectifier, Silicon 4000 VDC, 1.0 amp per leg	Solitron
L1, 2, 3, 4	37A-72	Parasitic Suppressor 6 turns, No. 16 wire on 47 ohm 2W resistor	Hunter
L7, 8		Filament choke, No. 12 or 13 wire on 3/4" core	Hunter
L5	37A-76	Tank coil, 16 turns, No. 10 wire, 1" diam. tapped at 9 and 4 turns	Hunter
L9	37A63A	RF choke, 1.0 mH	National R-154-U mod.
L10	37A-60	RF choke, 2.5 mH	National R-100-U Modified

SCHEMATIC IDENTIFICATION NUMBER	HUNTER PART NO.	DESCRIPTION	MANUFACTURER TYPE OR EQUIVALENT
G	32-2	Diode IN48	
M-1	19A-20	Panel meter "Relative RF output" 0-1 mA movement	Ammon AM-2 (special)
M-2	19A-21	Panel meter; Ip, Ep 0-1 mA movement	Ammon AM-2 (special)
P		Pilot lamp 6 volt for high, 12 volt for moderate brightness	
R1, 2, 3, 4	31-287	Resistor 37.5 ohm 10 watt non-inductive Made up of 2 - 75 ohm, 5 watt 5% non- inductive wire wound	Sprague "Koolohm" NIT
R5	31-377	Resistor, carbon 10 Kohm, 1 watt 10%	A-B
R6	37-375	Resistor, carbon 1.2 Kohm, 1 watt 10%	A-B
R7	31A-250	Potentiometer, 50 Kohm, 1 watt Linear taper	CRL
R8	31A-287	Resistor, 5 ohm, 5 watt, wire wound	Sprague "Koolohm"
R9A, 9B, 9C R10A, 10B, 10C	31-285	Resistor, carbon 82 Kohm, 2 watt, 10%	A-B
R11		Resistor, carbon, 1 watt, approx. 620 Kohm selected in manufacture	A-B
R12		Resistor, wire, approx. .1 ohm selected in manufacture	Hunter
R13		Resistor, carbon, 300 ohm 10 watt, 10%, non-inductive	"Koolohm" NIT Sprague
RY-1	29A-40	Relay, 3 PDT, 6.3 VAC coil, 10 amp. contacts	Advance
S-1	35A-66	Band switch, 5 pos., 4500 R. F.volt, 25 amp rating	Radio Switch Corp.

## PARTS LIST

SCHEMATIC IDENTIFICATION NUMBER	HUNTER PART NO.	DESCRIPTION	MANUFACTURER TYPE OR EQUIVALENT
S2	35A-62	Switch, "Aux. loading" 1 pole, 3 pos.	CRL
S3	35A-61	Switch, "Plate Meter" 2 pole, 3 pos.	CRL
S4	25A-60	Switch, High-Med.-Low voltage. 1 pole, 3 pos.	CRL
V1, 2, 3, 4		Tube, 572A	United Electronics
Z	32A-54	Zener Diode, 8.2V 50 watt	Motorola 1N2806
T-1	T-2001	Power Transformer Primary: 115-230 volt 60 cps Sec. I High Voltage Sec. II 6.8V, 1 amp Sec. III 7 volt, 16 amp	



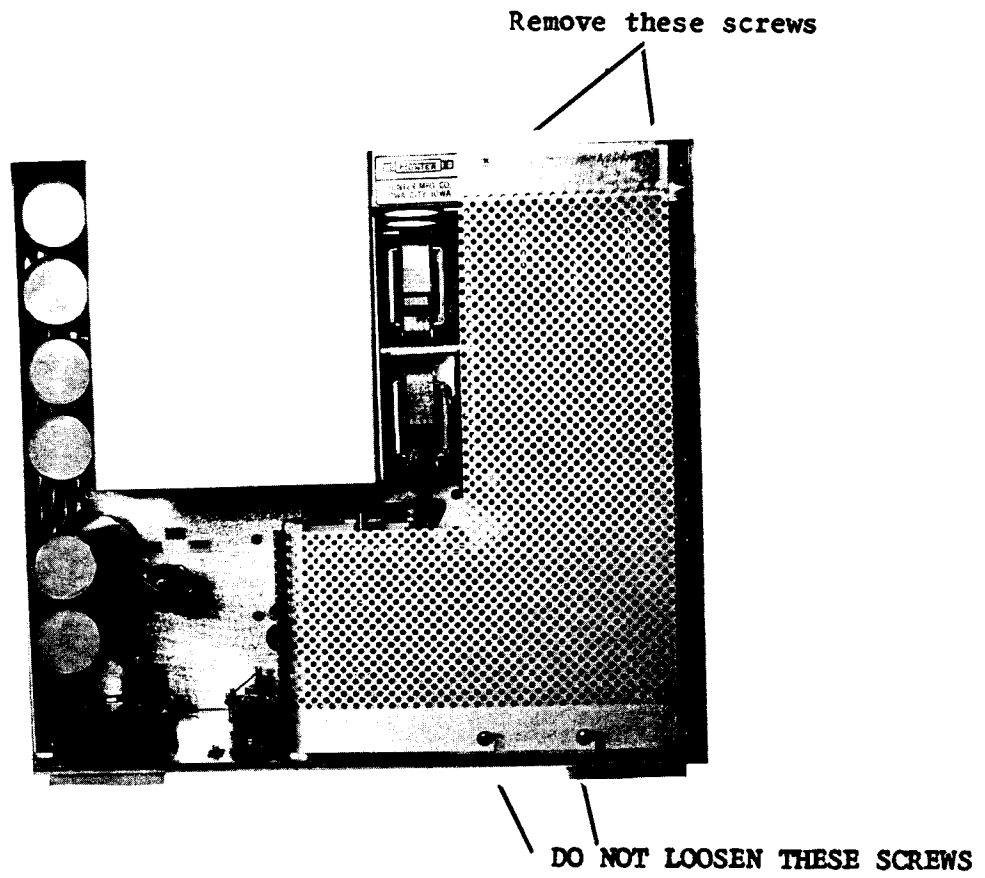


Figure 1.

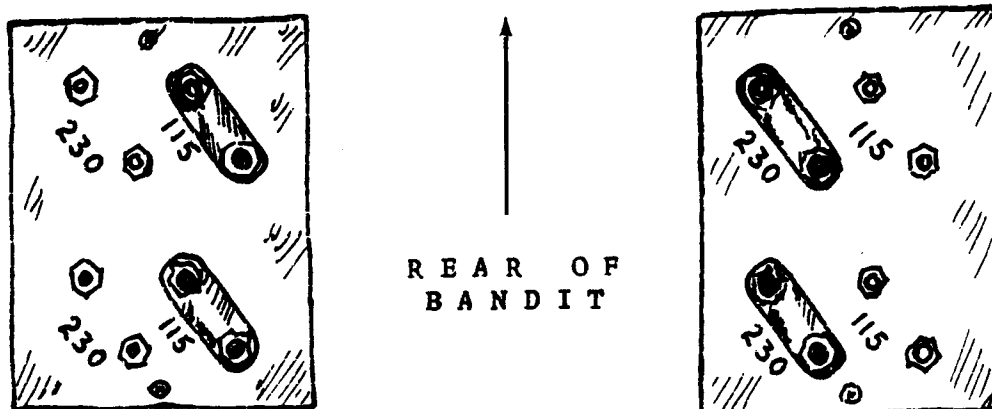


Figure 2. 115-230 VAC Board

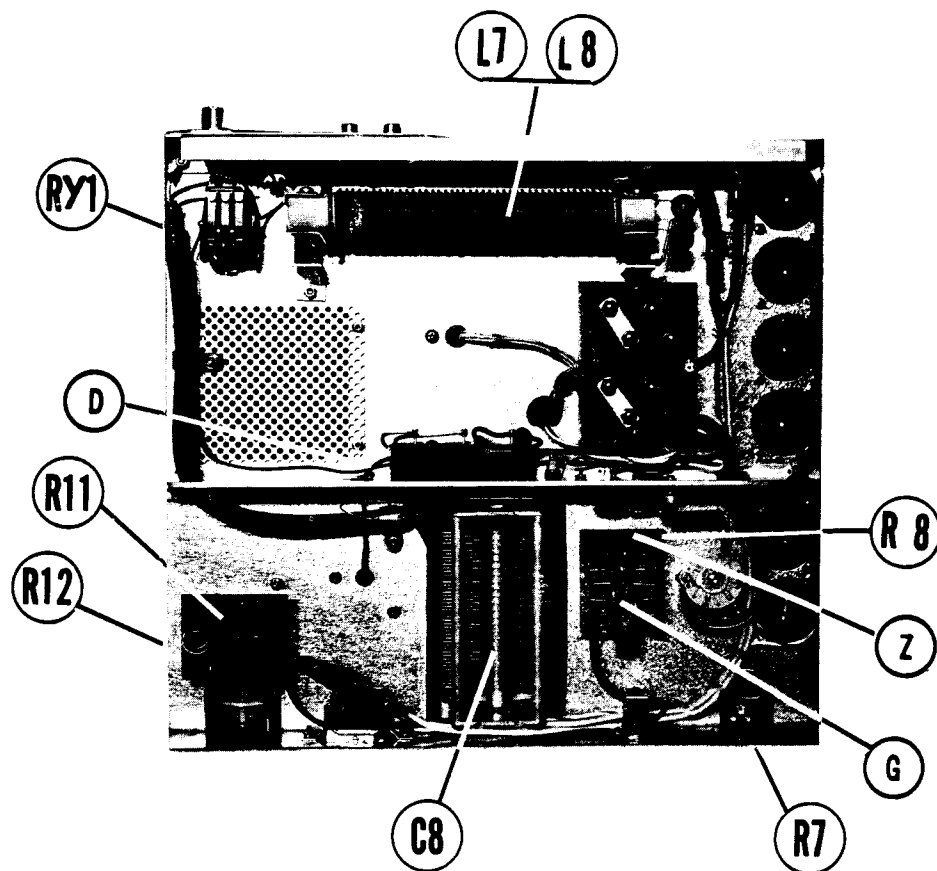
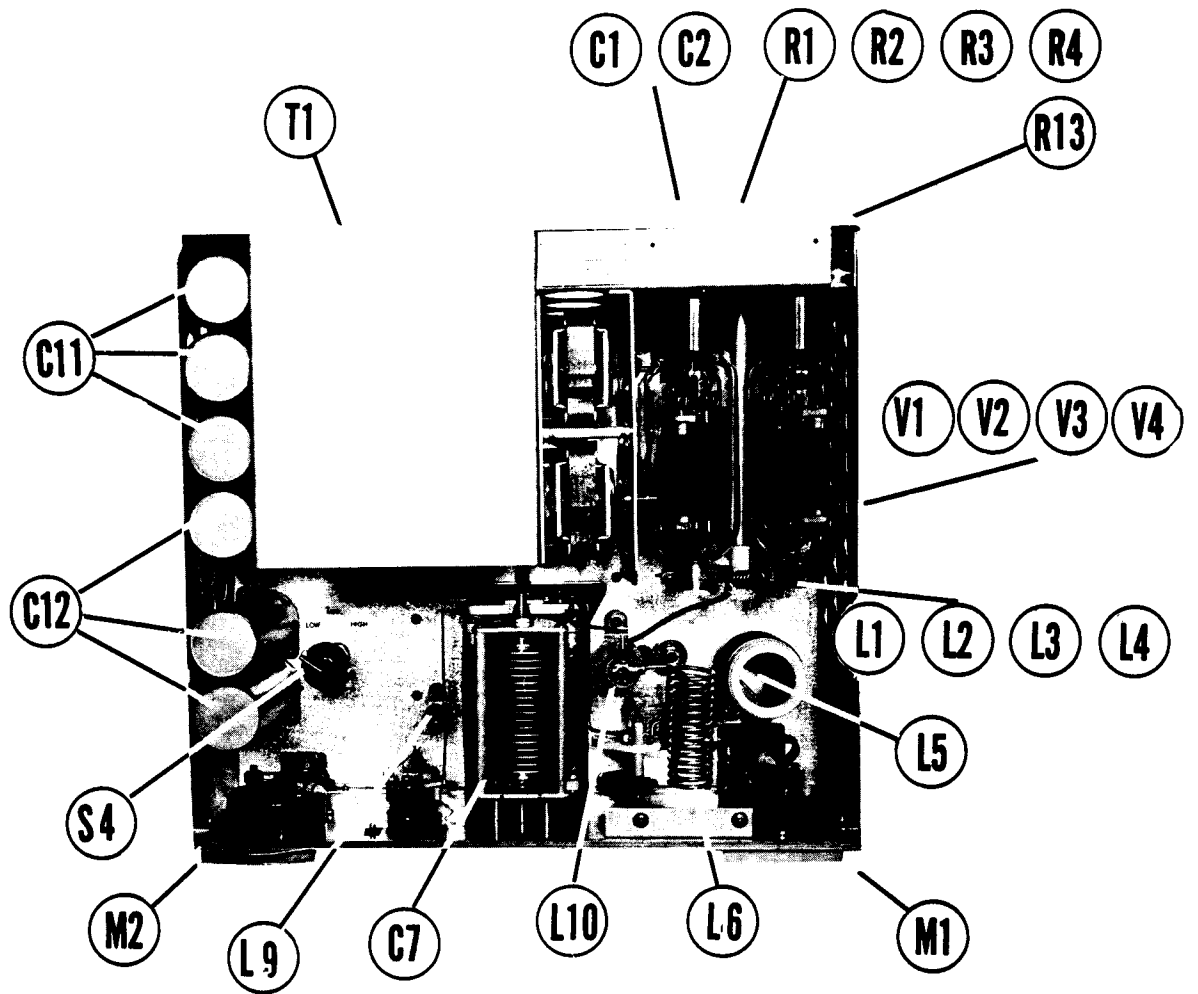


Figure 3, 4. Parts Location.

# REPLACEMENT PARTS PRICE SHEET

Parts No.	Descrip.	Unit Price	Parts No.	Descrip.	Unit Price
19A-20	Meter, R.F. Scale	\$12.00	32-51	Rectifier H.V.	\$24.00
19A-21	Meter, I.E. Scale	\$12.00	37A-74	Tank Coil Air Core	\$3.00
29A-40	Relay 3PDT	\$4.70	37A-76	Tank Coil Air Core	\$3.00
31A-250	Pot, 50K	\$1.35	37A-60	R.F. Choke 2.5 mH.	\$2.60
31-287	Res. set 2.75 5 W., N.I.	\$1.00	37A-63A	R.F. Choke 1.0 mH.	\$ .80
31A-287	Res. 5 ohm, 5 W	\$ .37		Carbon Resistors 2 Watt	\$ .25
32-2	Diode IN 48	\$ .38		Carbon Resistors 1 Watt	\$ .25
32A-54	Zener Diode IN 2806	\$6.70		Tube Socket for 572A	\$ .50
35A-60	Switch 1 Pole, 3 pos.	\$2.20		572A Tube	\$13.50
35A-61	Switch 2 Pole, 3 pos.	\$2.20		Disc. ceramic Capacitors	\$ .26
35A-62	Switch 1 Pole, 3 Pos.	\$2.20		Fuses	\$ .12
35A-66	Switch 1 Pole, 5 pos.	\$10.00		AC Power Switch	\$2.40
T-2001	Power Trans.	\$45.00		Case, complete	\$32.50
23A-18	Motor and Fan	\$4.60		Filament Choke	\$7.50
7A-203	Capacitor 500 mmf	\$2.60		Front Panel	\$8.50
7A-205	Capacitor 1000mmf	\$2.60		Set of Knobs	\$5.00
7A-209	Capacitor 19-488mmf	\$9.50			
7A-207	Capacitor 15-353mmf	\$8.00			
7-211	Capacitor 140 mfd 475 VDC	\$2.41			

The above parts can be sold only to owners of Hunter Linear Amplifiers. Please indicate the serial No. of your unit when ordering. Please include postage with the payment for parts. Please inquire in regard to parts not listed.

## WARRANTY

1. This unit is warranted to be free of defects in material or workmanship for a period of 180 days.
2. The tubes are warranted for a period of 90 days.
3. These warranties are limited to repair or replacement of any units or items found defective.
4. In all cases, the manufacturer or an authorized representative of the manufacturer has the right to final determination as to cause of the defect.
5. In no event does the warranty extend beyond the repair or replacement of the items in question.
6. In case there is evidence of any alteration or modification the warranty becomes void.
7. Always contact the manufacturer for authorization to return defective parts.
8. All defective parts or units must be returned to the manufacturer before replacement parts can be issued.
9. Returned parts or units will not be accepted if improperly packed. The manufacturer's shipping instructions must be followed.
10. The warranty card must be returned to the manufacturer within the specified time limit. All warranty terms are void in case the card has not been returned to the manufacturer.
11. Permission for warranty procedures other than described in 4-10 may be obtained from the company, if it deems necessary.
12. Always contact the manufacturer for instructions or in case of questions regarding this warranty. Write to the attention of Mr. M. Kattchee, Chief Engineer.



ERRATA SHEET FOR 2000A INSTRUCTION MANUAL FEBRUARY, 1963 EDITION

Page 7: Delete Hunter Part 37A63A  
Add Hunter Part 37-65A  
RF choke, solenoid wound (Antron)

Page 12: Interchange L-9 and L-10

Replacement Parts Price Sheet:  
Interchange 37A-60 and 37A63A  
Add: Solenoid wound choke (Antron) \$2.00

Note: Bluish florescence in the tubes does not necessarily indicate gas. Extremely high vacuum frequently causes florescence.