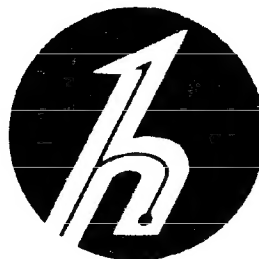


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## OPERATING AND SERVICE INSTRUCTIONS

**RF LINEAR  
POWER AMPLIFIER  
MODEL HT-45 MARK II A**

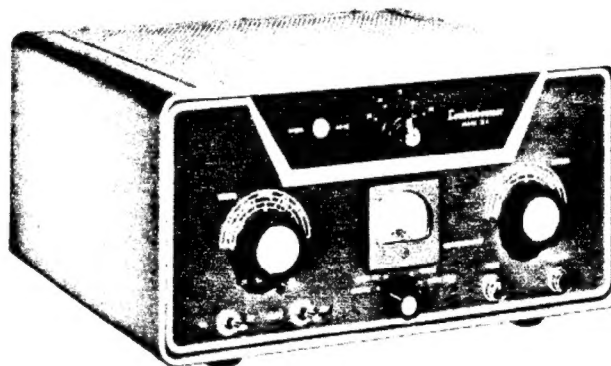


Figure 1. Hallicrafters' Model HT-45 Mark IIA RF Linear Amplifier.

## SECTION I GENERAL DESCRIPTION

### 1-1. INTRODUCTION.

Hallicrafters Model HT-45 Mark IIA RF Linear Amplifier provides amplification of RF signals in the 80-meter through 10-meter amateur bands. The amplifier uses an Eimac Type 3-400Z Zero Bias triode in a grounded-grid circuit and is designed for operation with any exciter having an output impedance of 50 ohms and capable of delivering approximately 45 watts of drive.

The linear amplifier incorporates the filament supply, a cooling blower, and control circuits. Switches on the front panel provide control of primary power to the blower motor, the filament transformer, and external power supply filament voltage and power to operate a plate-voltage relay in the Mark IIA Power Supply.

The RF input circuit of the linear amplifier utilizes a wide-band ferramic transformer which is broad-band tuned and essentially flat from 3.5 to 30 megacycles. The transformer elevates the tube filament in the grounded-grid circuit and provides an impedance-matching circuit. The input impedance is 50 ohms to match the output impedance center for most commercially available exciters.

Approximately 45 watts of driving power is required for 1,000 watts input to the 3-400Z tube.

By use of the grounded-grid circuitry, more than one-half of the driving power is fed through to the output and appears as useful power.

The RF output circuit is a Pi-network with an operating "Q" of 12 and an output impedance design center of 50 ohms. Taps on the coil are selected by the BAND SWITCH for the desired frequency and the lever switch under the tuning control is switched ON for the 3.5 to 4.0 megacycle range. The plate circuit is tuned to resonance by the TUNING control. The LOADING control permits matching to loads other than 50 ohms when required.

The HT-45 Mark IIA Linear Amplifier is designed for use with an external power supply. The Model Mark IIA, described in Section IX of this manual, has been designed specifically for use with this amplifier. When power supplies other than the Mark IIA are used, careful attention must be given to the interconnection of control and power lines.

The Model HT-45 Mark IIA RF Linear Amplifier and the Mark IIA Power Supply are manufactured at Radio Industries, Inc., a subsidiary of The Hallicrafters Co., and an outstanding leader in the design and manufacture of RF linear amplifiers and power equipment.

1-2. TVI (TELEVISION INTERFERENCE SUPPRESSION).

NOTE

With any high power installation, particularly in television fringe areas, TVI may be a problem. Should this occur, it is recommended that a high-quality, low-pass filter be used at the output of the linear amplifier.

Consideration has been given to minimizing possible local TVI problems in the design of the HT-45 Mark IIA Linear Amplifier. The unit is adequately shielded and bypassed at the RF frequencies encountered. However, it is recommended that all station equipments be bonded together with heavy copper wire or strap and be connected to an earthground. When bonding equipments together, care should be exercised that high-impedance grounds are not encountered.

To prevent high-impedance grounds, avoid wire lengths which are equal to multiples of odd one-quarter wave lengths at your favorite operating frequencies.

1-3. ADDITIONAL FEATURES.

The Model HT-45 Mark IIA Linear Amplifier incorporates many features for reliability and ease of operation. All important circuits are metered by a five-position switch and an easily-read, front-panel meter. The metering circuit indicates grid current, plate current, RF output voltage, and DC plate voltage. In the RF OUTPUT position, the plate TUNING control is adjusted for maximum indication of RF output voltage. A green lamp on the front panel indicates when power is applied to the filament and cooling blower. A red lamp on the front panel indicates when plate power is applied. The overall schematic diagram of the Hallicrafters' Model HT-45 Mark IIA RF Linear Amplifier is shown in figure 7.

## SECTION II SPECIFICATIONS

2-1. GENERAL.

Specifications for the Model HT-45 Mark IIA RF Linear Amplifier are presented below.

Mode of Operation . . . . .	Grounded-grid, class-B, linear power amplifier.
Power Requirements, AC . . . . .	155 watts, 115 volts, 60 cycles*.
Power Requirements, DC . . . . .	3,000 volts, 333 milliamperes**.
	2,500 volts, 400 milliamperes.
	2,000 volts, 400 milliamperes.
Input Impedance . . . . .	50 ohms (design center).
Output Impedance . . . . .	50 ohms (design center).
Driving Power for 1,000 watts input . . . . .	45 watts (approximately).
Overall Dimensions . . . . .	15 inches wide x 13 inches deep x 8 inches high.
Net weight . . . . .	25 pounds.
Shipping weight . . . . .	30 pounds.***

\*Blower and filament power only (see Power Supply Requirements).

\*\*Voltage obtainable from Mark IIA Power Supply.

\*\*\*Tube and chimney shipped in separate carton, total weight.

## SECTION III

### INSTALLATION

#### 3-1. UNPACKING.

After removing the amplifier from the carton, examine it for any damage which may have occurred in shipment. Should any sign of damage be apparent, immediately file a claim with the carrier stating the extent of damage. Check and retain all shipping tags and cartons for special instructions and possible re-use. The Type 3-400Z tube and chimney are shipped in a separate carton to reduce possibility of breakage in shipment.

#### NOTE

DO NOT REMOVE TUBE AND CHIMNEY FROM CARTON UNTIL READY TO INSTALL. The tube is installed by inserting it in the socket and exerting a gentle straight downward pressure on the tube. DO NOT FORCE TUBE INTO SOCKET.

Remove the top cover from the amplifier cabinet by turning the fasteners one-quarter turn counterclockwise. Install the 3-400Z tube in its socket and place the glass chimney over the tube. The glass chimney is aligned and held in place by three clips on the chassis. Identify the plate lead, attached to top of RF choke RFC1, and attach it to the heat-radiating plate cap on the 3-400Z tube. (See figure 5.) Secure the plate lead, using the brass screw in the center of plate cap. DO NOT TIGHTEN SCREW EXCESSIVELY, as high torque applied to the plate cap could result in tube damage. Replace the top cover, noting the alignment of the tab which engages the equipment interlock switch, and secure it in place by turning the fasteners one-quarter turn clockwise.

#### 3-2. LOCATION.

It is very important that the amplifier be placed in an operating position that enables unobstructed air circulation directly behind and at the top of the unit. The air intake for the cooling blower is located at the rear of cabinet and necessitates exhausting of the warm air out of the top of cabinet. UNDER NO CIRCUMSTANCES SHOULD ANY OBJECT BE PLACED ON TOP OF CABINET, PREVENTING EXHAUST OF WARM AIR.

#### 3-3. POWER REQUIREMENTS.

The Model HT-45 Mark IIA RF Linear Amplifier requires an operating power of 155 watts (115 volts, 60 cycles AC) for the blower and filament circuits and a plate power supply of

3,000 volts DC at 350 milliamperes. Input connections for the power and control circuits are made through a multiple-conductor, number-coded cable. The cable is designed to terminate at a barrier-type terminal strip and a high-voltage type connector on the Mark IIA Power Supply. Connections are shown in figure 2. In the event another power supply is used, careful attention must be given to the interconnecting diagram, figure 2, and power supply schematic diagram, figure 8, to insure proper connection.

#### 3-4. INPUT AND OUTPUT CONNECTIONS.

a. RF Input. The input connection for the RF driving signal is located at the rear of the cabinet. A chassis-mounted, female, phono-type connector is provided for the input connection. The mating connector is supplied with the equipment and is used by connecting to a short length of RG-58/U coaxial cable terminated in a connector mating with the exciter output connector. Refer to figure 3 for location of the RF input connector and cabling diagram.

#### NOTE

For best performance, the input cable should be less than one-quarter wavelength at the highest operating frequency. When the amplifier is used with an exciter that will not deliver 45 watts or more of driving power, the amplifier cannot be driven to the rated 1,000 watts input. In certain cases it may be desirable to reduce the output of exciters, having output capabilities in excess of 45 watts, by inserting a 3-DB attenuating pad. For information covering the installation and construction of a suitable attenuator, see Section VII, Supplementary Data.

b. RF Output. The output connection for the RF output signal is located at the rear of the cabinet. The output connector is a chassis mounted, UHF Type coaxial connector (SO-239) and mates with a UHF Type coaxial connector (PL-259). The power output developed requires the use of RG-8/U coaxial antenna feed line. The linear amplifier performs best when the load impedance is as near to 50 ohms as is practical. A load impedance of 50 ohms reduces VSWR (voltage standing wave ratio) on the transmission line. Refer to figure 3 for location of the output connector and interconnecting data.

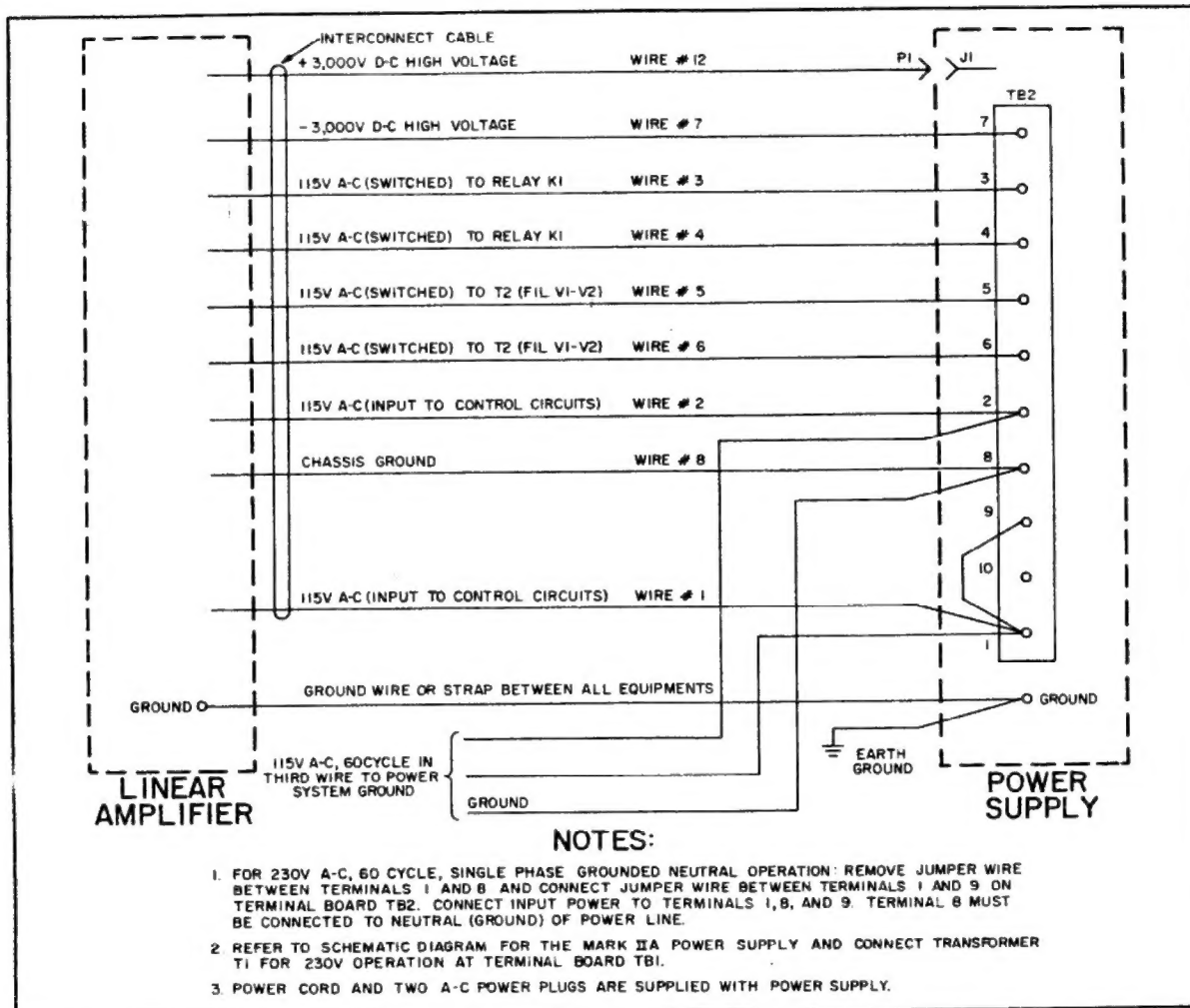


Figure 2. Interconnecting Cabling Diagram, HT-45 Mark IIA Amplifier and Mark IIA Power Supply.

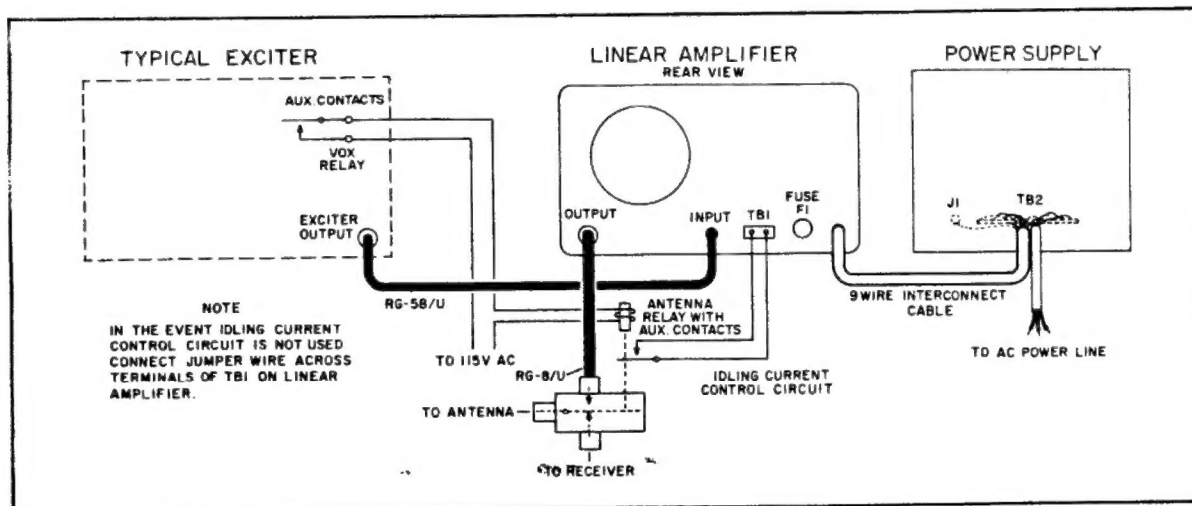


Figure 3. Suggested System Cabling Diagram, Linear Amplifier, Exciter, and Power Supply.

A high-grade, coaxial-type antenna change-over relay is recommended for use in the installation of the linear amplifier. When selecting the antenna changeover relay, a relay with auxiliary contacts should be used if the idling current control provision is to be utilized. The antenna relay is normally operated by contacts of the VOX (voice operated) relay in the exciter unit. Figure 3 illustrates a typical interconnection of the antenna relay and the wiring to auxiliary contacts to provide idling current control.

### 3-5. IDLING CURRENT CONTROL CIRCUIT.

The type 3-400Z tube, a zero-bias triode with operating voltages up to 3,000 volts DC, does not require the application of bias voltage, either for normal operation or in the standby condition. However, in the standby condition with no driving signal applied, the presence of plate voltage and the heated filament permits an idling current to flow through the tube. The amount of idling current flowing in the standby condition is controlled by the resistance of the ground-return circuit of the filament. Therefore, the amount of idling bias can be reduced by insertion of a resistance in the ground-return circuit during standby. The resistance, which is inserted during standby, must be removed during the transmit condition. The two-connector terminal board (TB1) at the rear of the cabinet serves this purpose, see figure 3. The two leads terminated at TB1 provide a low resistance path and effectively remove the resistor from the circuit when auxiliary contacts of the antenna relay close in the transmit condition or when a permanent jumper is placed across the two terminals. Idling current during standby, when the two terminals are jumpered together, is approximately 120 milliamperes compared with 40 milliamperes when the jumper is removed.

## CAUTION

THE RESISTOR IN THE GROUND-RETURN CIRCUIT MUST BE JUMPERED OR SHORTED OUT THROUGH A LOW RESISTANCE PATH DURING TRANSMIT CONDITION. FAILURE TO OBSERVE THIS CAUTION WILL RESULT IN DESTRUCTION OF THE SERIES RESISTOR.

Operation of the linear amplifier with idling current control circuit is optional and entirely up to the owner's discretion. Normal idling current of approximately 120 milliamperes is not detrimental to the tube or circuit and provides a bleeder current for the Mark IIA Power Supply. The reduced idling current of approximately 40 milliamperes still provides the bleeder current for the Mark IIA Power Supply but results in reduced heat dissipation of the tube during standby condition.

If the idling current control circuit is not used, a jumper must be installed permanently across the two terminals. If the user elects to utilize the idling current control circuit, connection to the auxiliary contacts of an antenna change-over relay and the terminal strip should be made as shown in figure 3. The two leads must be connected to the auxiliary relay contacts in such a manner that when the antenna changeover relay is de-energized (standby condition), contacts are open, placing the resistor in the ground return circuit; when the antenna changeover relay is energized (transmit condition), contacts close to short the resistor out.

## SECTION IV

### FUNCTIONS OF OPERATING CONTROLS

#### 4-1. GENERAL.

Operating controls for the HT-45 Mark IIA Linear Amplifier and remote operation of the Mark IIA Power Supply are all located on the front panel. (See figure 1.)

#### 4-2. PLATE VOLTAGE SWITCH.

The PLATE voltage switch, a two position (on-off) toggle switch, applies plate voltage to the Linear Amplifier through relay control circuits incorporated in the Mark IIA Power Supply or other similar power supply. The red lamp indicates when the plate switch is in the ON position and primary power is applied to the plate transformer in the power supply.

#### 4-3. FILAMENT SWITCH.

The FILAMENT switch, a two-position (on-off) toggle switch, applies power to the filament and blower in the amplifier and AC power to the filament transformer for the rectifier tubes in the power supply when placed in the ON position. The green lamp indicates when this switch is in the ON position and voltage is applied.

#### 4-4. METER SWITCH.

The Meter Switch, a five-position rotary switch, selects the desired circuit to be metered. The operator may select GRID MA (current), PLATE MA, RF OUTPUT voltage or PLATE VX10 (voltage). The center position (not marked) removes the meter from the transmitter circuitry, providing an OFF position.

#### 4-5. BAND SWITCH — MEGACYCLES.

The BAND SWITCH, a five-position rotary switch, selects the desired amateur band, indicated in megacycles. This switch selects the proper taps on the coil and additional tuning capacitance for band changes. The 3.5-4.0 MC ON-OFF switch, located under the TUNING control, must be in the ON position for 3.5-4.0 MC (80-meter band) operation only. This switch places additional padder capacitance in the plate tuning circuit. The 3.5-4.0 MC ON-OFF switch must be in the OFF position for all other operating frequencies.

#### 4-6. PLATE TUNING.

The plate TUNING control, a variable capacitor, resonates the plate circuit at the desired frequency.

#### 4-7. PLATE LOADING.

The plate LOADING control, a variable capacitor, adjusts the transformer ratio of the Pi-network to reflect the desired load to the tube.

#### 4-8. METER.

The meter provides an indicator for tuning the amplifier. The meter indicates grid current (0 to 500 MA), plate current (0 to 500 MA), RF output voltage (arbitrary scale), and plate voltage (0 to 500 volts x 10).

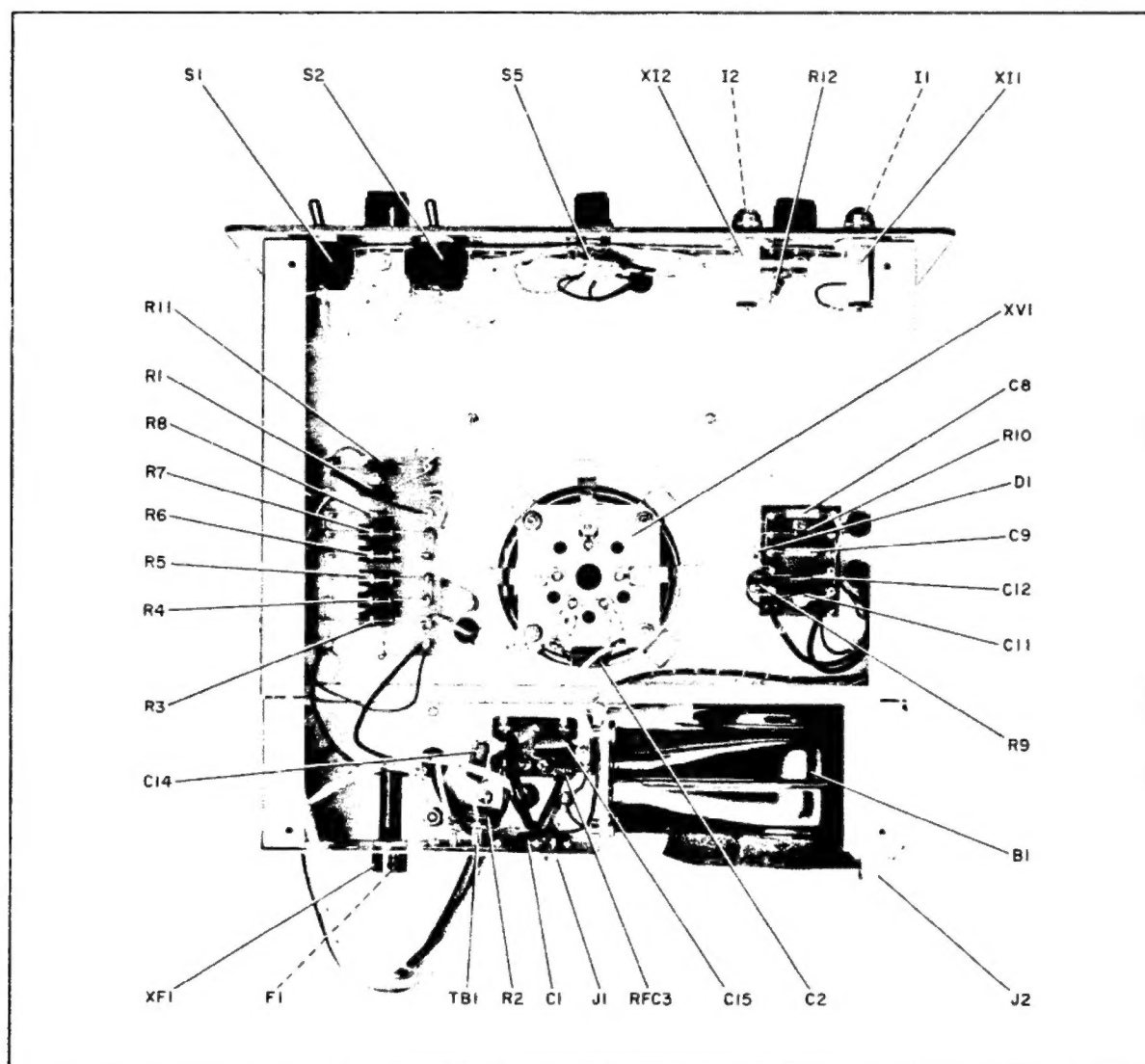


Figure 4. Bottom View of Linear Amplifier, Showing Component Locations.



## SECTION V

### OPERATING PROCEDURE

#### 5-1. GENERAL.

Operating procedures for the Model HT-45 Mark IIA RF Linear Amplifier are covered in the following paragraphs. Careful attention should be directed to the tuning procedure variations required for the mode of operation desired. During the tune-up procedures, continuous reference should be made to the meter and operation should be checked on the meter. A monitor oscilloscope, although not required, is extremely useful in tuning a linear amplifier for all modes of operation. Refer to the latest ARRL Handbook for detailed instructions covering the use of a monitor oscilloscope. The oscilloscope permits accu-

ate determination of output power in any mode. The metering circuit will establish the DC input power during tune-up procedures and the average power when transmitting in the single sideband (SSB) or AM (amplitude modulated) voice modes. There are many factors which influence the ability of a meter to indicate the power input in voice modes of operation. Some of these are the degree of damping in the meter, individual voice characteristics, microphone frequency response, exciter audio bandwidth, etc. A typical meter reading in normal SSB operation will be approximately 175 milliamperes on voice peaks when the switch is set to the PLATE MA (current) position.

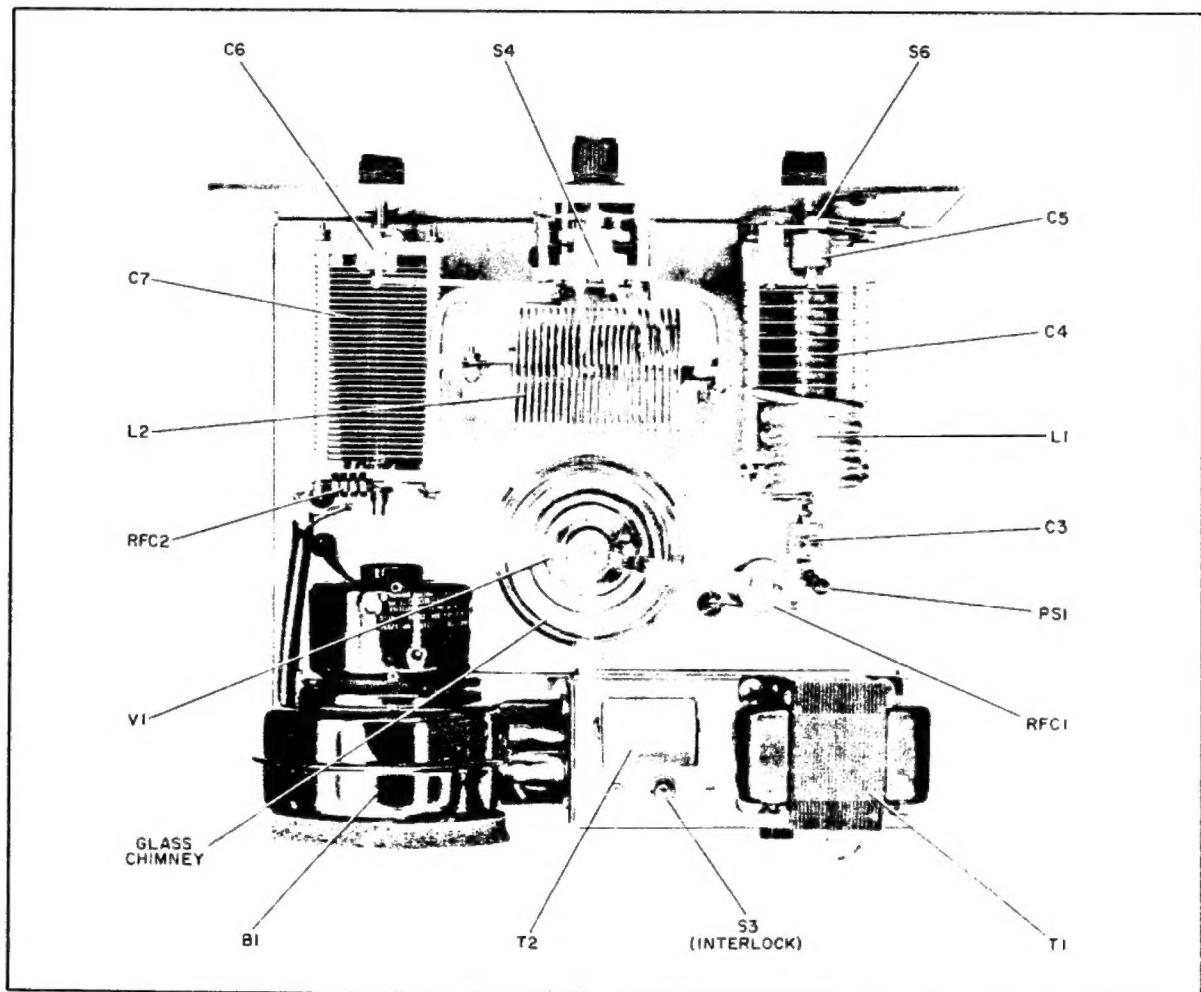


Figure 5. Top View of Linear Amplifier, Showing Component Locations.



## 5-2. PRELIMINARY PROCEDURES.

Before operation or tune-up is attempted, the following must be checked and completed:

1. All power connections and control lines to the external power supply must be made in accordance with information contained in Section III.

2. All station equipments should be bonded together and connected to an earth ground.

3. The output of the linear amplifier must be connected to a 50-ohm antenna load or to a dummy load capable of dissipating the output power. Connection to the antenna should be made using Type RG-8/U coaxial cable. **DO NOT ATTEMPT TO OPERATE OR TUNE THE LINEAR AMPLIFIER WITHOUT A SUITABLE LOAD CONNECTED TO THE OUTPUT.**

4. A source of RF driving power must be connected to the RF input connector through a length of coaxial cable.

5. The antenna changeover relay should be in the antenna transmission line and the idling current control circuits should be connected to the changeover relay or be shorted out permanently by a jumper, as covered in Section III.

6. The FILAMENT and PLATE switches must be in the OFF position. The topcover of the amplifier must be in place and secured to complete the interlock circuit.

7. The power connection to the power supply should be connected to the AC power line.

### CAUTION

Never connect equipment to the AC power line with the power switches in the ON position.

## 5-3. TUNING.

Tuning of the linear amplifier necessitates observing the relative output at a meter or other indicating device. This is characteristic of all linear amplifiers because they do not exhibit as pronounced a dip at resonance as a class C amplifier. The power input at resonance is dependent upon the RF driving power applied and upon the loading. After the linear amplifier is properly resonated and loaded, output power may be reduced by decreasing the exciter output.

### NOTE

When tuning the HT-45 Mark IIA RF Linear Amplifier, it is important that the plate TUNING and LOADING controls be preset to the panel markings of the controls for the frequency of operation desired. Subsequent adjustments are made with the TUNING control set for maximum RF power as indicated by the meter with meter switch set to the OUTPUT position. The plate LOADING control is adjusted for proper loading in accordance with Table I.

TABLE I  
OPTIMUM VOLTAGE AND CURRENT RATIOS

Plate Voltage PLATE VX10	Plate Current PLATE MA	Grid Current GRID MA
300	333	150
250	400	165
200	400	168

## 5-4. PROCEDURE.

The following steps apply to all modes of operation and should be completed before tune-up for a specific mode is attempted:

1. Place the FILAMENT switch in the ON position to apply voltage to the blower and filament circuits of the linear amplifier and to the power supply rectifier filament transformer when using the Mark IIA Power Supply. The green lamp indicates application of power to the above circuits.

### NOTE

Allow a minimum of four minutes for filament warmup before applying plate voltage. When using the Mark IIA Power Supply, the delay permits the mercury vapor rectifier tubes to reach proper operating temperature. If a prolonged period of time has elapsed between operation, a fifteen-minute delay may be desirable upon initial starting of the equipment to permit mercury vapor tubes to reach proper operating temperature.

2. Set the BAND SWITCH to the desired frequency range, and the TUNING and LOADING controls to the center of the corresponding frequency on the front panel markings. These markings are approximate and serve as a starting point in tuning.

**TABLE II**  
**AM MODE PLATE VOLTAGE AND**  
**PLATE CURRENT RATIO**

Plate Voltage PLATE VX10	Plate Current PLATE MA
300	200
250	240
200	300

**NOTE**

The 3.5-4.0 MC ON-OFF switch, located under the TUNING control, must be in the OFF position for all frequencies other than 3.5-4.0 MC (80-meter band) operation.

3. Set the meter switch to PLATE MA.
4. Check that the RF output control on the exciter is in the OFF position; no RF driving power applied to the input.
5. Place the PLATE voltage switch in the ON position.
6. Observe the meter for indication of idling current, (meter switch in PLATE MA position). When utilizing the idling current control circuit to reduce idling current, the auxiliary contacts on antenna changeover should be open (de-energized) and the idling current as indicated by meter will be approximately 40 milliamperes. If the idling current control circuit is not used, a permanent jumper wire must be in place across the two screw terminals on the rear of the cabinet and the meter will indicate approximately 120 milliamperes of idling current.
7. Set the meter switch to PLATE VX10 position and note indication on meter (paragraph 5-5 and Tables I and II).

**5-5. CW OPERATION.**

1. Apply the filament and plate voltages by completing steps 1 through 7 of paragraph 5-4, set the meter to PLATE MA, and increase the RF output of the exciter in the CW mode (continuous carrier) until the meter on the linear amplifier indicates approximately 200 milliamperes.
2. Set the meter switch to the OUTPUT position and adjust the plate TUNING control for resonance (upward deflection of the meter).

3. Increase excitation (check resonance each time the drive is changed) until either the plate or grid current shown in Table I is reached.

4. Set the meter switch to GRID MA position and observe the grid current for comparison with Table I.

5. In the event the plate current is less than listed for the corresponding grid current obtained during tuning, the amplifier is not loaded to its optimum condition. Increase loading by rotating the plate LOADING control counterclockwise in small increments. It may be necessary to increase the exciter output to obtain optimum conditions.

If the plate current is more than listed for the corresponding grid current, the amplifier is loaded too heavy. Decrease loading by rotating the plate LOADING control clockwise in small increments. It may be necessary to reduce the exciter output to obtain optimum conditions.

6. Repeat steps 3 through 5 alternately, gradually increasing the exciter output in increments until the optimum conditions, specified in Table I, are reached for the plate operating voltage.

**5-6. SSB OPERATION.**

1. Follow steps 1 through 7 of paragraph 5-4 and steps 1 through 6 of paragraph 5-5.
2. Set the meter switch to the PLATE MA position.
3. Switch the exciter to the SSB position and adjust the audio gain control until the linear amplifier plate current peaks at 170 to 200 milliamperes while speaking in a normal tone of voice.

**CAUTION**

Do not apply excitation to the linear amplifier without plate voltage applied to the 3-400Z.

**5-7. AM OPERATION.**

1. Follow and complete steps 1 through 7 of paragraph 5-4 and steps 1 through 6 in paragraph 5-5.
2. Set the meter switch to the PLATE MA position.

3. Switch the exciter to the AM (DSB) position and adjust the exciter output until the plate current meter indicates the plate voltage and current ratio shown in Table II.

#### 5-8. VOICE OPERATED BREAK-IN (VOX).

When the exciter utilizes voice operated break-in (VOX) the PLATE switch is left in the ON position. The antenna relay is actuated by the VOX relay to transfer the antenna and close the auxiliary contacts on the antenna relay.

#### 5-9. CALCULATING POWER INPUT.

To determine the average DC plate power input, multiply the plate current by the voltage indicated on the meter in the PLATE VX10 position ( $333 \text{ MA} \times 300 \times 10 = 999 \text{ watts}$ ).

Meter readings will be accurate only when a steady CW input is being measured. As previously mentioned, many factors influence the indicated plate current on SSB.

## SECTION VI

### SERVICE DATA

#### WARNING

#### HIGH VOLTAGE PRESENT

DC voltages in excess of 3,000 volts are present in the linear amplifier and power supply. DO NOT attempt to measure voltages with hand-held test leads or to service this amplifier with the high voltage supply on. In addition to the danger of serious injury or death from the high voltage supply, serious radio frequency burns can result from coming in contact with or in close proximity to the plate and output circuits.

#### 6-1. CLEANING.

Equipment utilizing forced-air cooling will collect dust within the unit, depending on the dust content of the circulated air.

All components should be kept clean, as any accumulation of dust in the high voltage or RF areas may cause arcing and consequent damage.

#### CAUTION

When cleaning the variable capacitors, use care so as not to nick or bend capacitor plates. Never use solvents for cleaning any component or area of the unit. The preferred method of cleaning is the use of a vacuum cleaner while dusting with a clean, flexible-bristle brush.

#### 6-2. LUBRICATION.

Lubricate the blower every six months with a few drops of SAE No. 10 oil at the front and rear oil retainers. Do not over lubricate.

#### 6-3. OPERATING AND SERVICE QUESTIONS.

For further information regarding operation or servicing of this equipment, contact the dealer from whom the unit was purchased. The Hallicrafters Company maintains an extensive system of Authorized Service Centers where any required service will be performed promptly and efficiently at no charge if this equipment is delivered to the service center within 90 days from date of purchase by the original buyer and the defect falls within the terms of the warranty. It is necessary to present the Bill-of-Sale in order to establish warranty status. After the expiration of the warranty, repairs will be made for a nominal charge. All Hallicrafters Authorized Service Centers display the sign shown below. For the location of the one nearest you, consult your dealer or your local telephone directory.

Make no service shipments to the factory unless instructed to do so by letter, as The Hallicrafters Company will not accept responsibility for unauthorized shipments.

The Hallicrafters Company reserves the privilege of making revisions in current production of equipment and assumes no obligation to incorporate such revisions in earlier models.



## SECTION VII

### SUPPLEMENTARY DATA

#### 7-1. NEUTRALIZATION.

Neutralization of the triode stage is not necessary. Grounded-grid operation, low-impedance input, and excellent shielding and bypassing assure complete stability at all times.

#### 7-2. GRID CURRENT.

Grid current will be approximately 0 to 75 milliamperes on SSB voice peaks. Under no circumstances should the grid current be allowed to exceed 200 milliamperes.

#### NOTE

Excitation should always be removed from the amplifier before the PLATE voltage switch is placed in the OFF position.

#### 7-3. RF OUTPUT VOLTMETER.

The RF output voltmeter is connected across the RF output connector and indicates output voltage. This meter is not calibrated to read actual power but is merely a tuning indicator. Always tune for maximum voltage reading for a given plate current with proper grid current. As this is

not a peak reading voltmeter, voice peaks will deflect the meter approximately one-third of the equivalent CW output.

#### 7-4. CONSTRUCTION AND USE OF AN INPUT ATTENUATOR PAD.

If the exciter used to drive the HT-45 Mark IIA RF Linear Amplifier has an output of 100 watts, the use of a 50-ohm 3-DB attenuator pad between the output of the exciter and the input of the linear amplifier will simplify the tune-up and operation of both equipments.

Construction details and the input and output connections of a suitable 50-ohm 3-DB attenuator pad are given in figure 6. Care should be taken in construction, if other values are used to obtain the required resistances, that the power ratings of selected resistors are not exceeded.

#### 7-5. TUBE COOLING.

A fifty cubic foot per minute blower pressurizes the bottom of the chassis. The air flow is directed around the 3-400Z tube, through the chimney, and out through the top of the unit. Never operate the amplifier with the blower inoperative, or with the chimney removed.

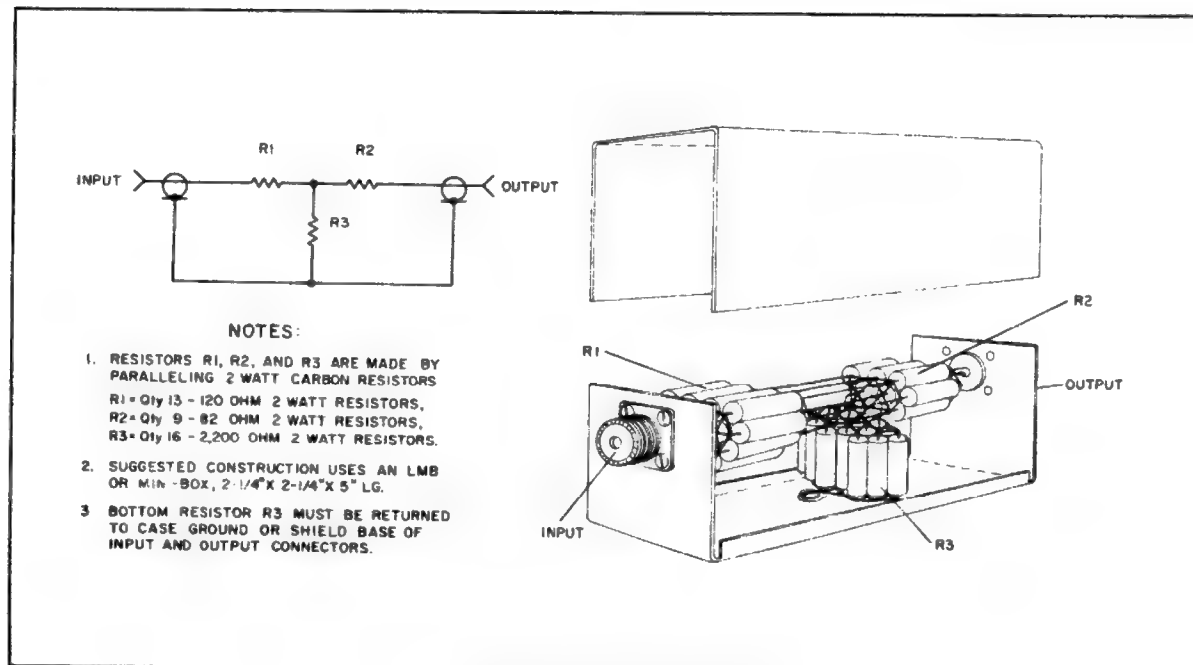
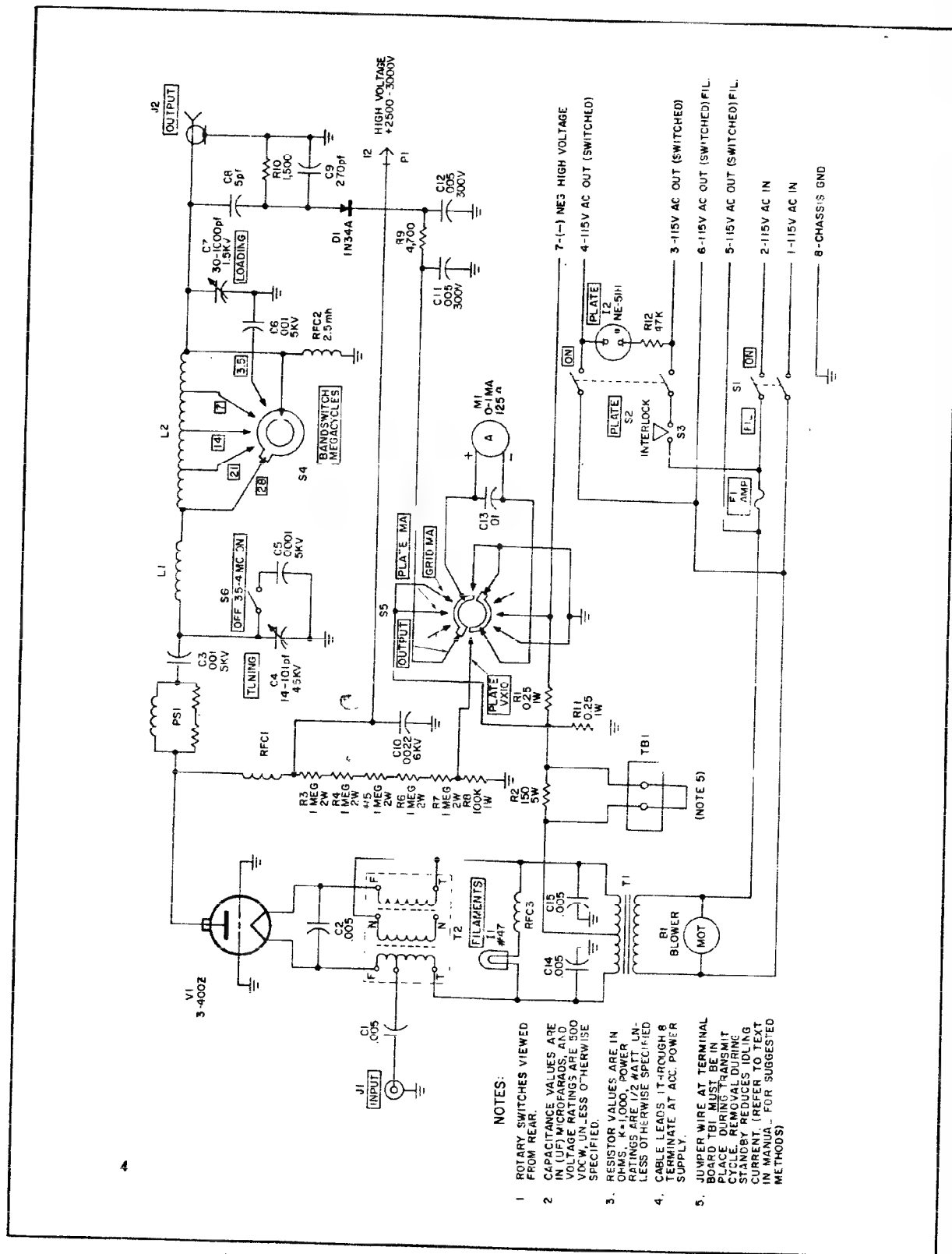


Figure 6. Suggested 50-Ohm 3-DB Attenuator Pad.



## SECTION VIII

### PARTS LIST

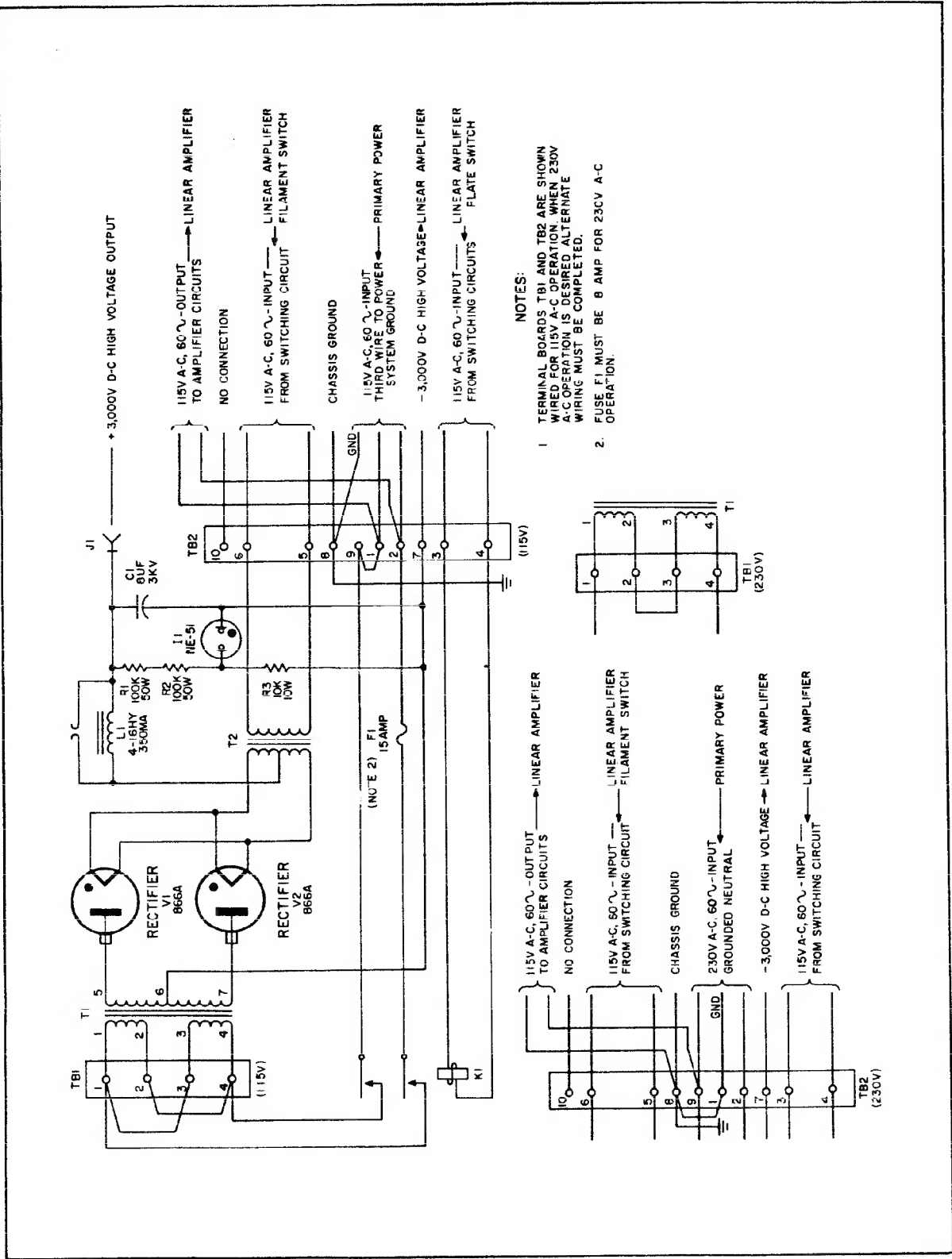
#### 8-1. GENERAL.

In the event repair or replacement parts are required for the Model HT-45 Mark II A RF Linear Amplifier, refer to the schematic diagram, figure 7, and the parts list to determine the exact re-

placement. Parts orders must provide the following information: Model (HT-45 Mark II A); Reference Designation (e.g. R1); Description (e.g. RESISTOR, Fixed, comp, 100K ohms, 1W, 10%); Part Number; and Serial Number.

#### PARTS LIST, LINEAR AMPLIFIER

Schematic Symbol	Description	Hallicrafters Part Number	Schematic Symbol	Description	Hallicrafters Part Number
CAPACITORS			COILS AND TRANSFORMERS (CONT)		
C1,2	0.005 $\mu$ F, 20%, 500V, Mica	120-001454	RFC2	Choke, RF, 2.5 MH	120-001478
14,15			RFC3	Choke, RF	120-001479
C3	0.001 $\mu$ F, 500V, Ceramic	120-001455	T1	Transformer, Power	120-001494
C4	Variable, TUNING, 16 to 101 PF, 4500V	120-001456	T2	Transformer, RF Input	120-001495
C5	100 PF, 5000V, Ceramic	120-001457	SWITCHES		
C6	0.001 $\mu$ F, 5000V, Ceramic	120-001458	S1,2	Toggle, DPST	120-001486
C7	Variable, LOADING, 30 to 1000 PF, 1500V	120-001459	S3	Interlock, Push type	120-001487
C8	5.0 PF, 20%, 500V, Mica	120-001460	S4	Rotary, Ceramic	120-001488
C9	270 PF, 20%, 500V, Mica	120-001461	S5	Rotary, Nylon	120-001489
C10	2200 PF, 20%, 6000V, Ceramic	120-001462	S6	Special, three part, lever type mechanical linkage	A 120-001490 B 120-001491 C 120-001492
C11,12	0.005 $\mu$ F, 20%, 300V, Ceramic	120-001463	MISCELLANEOUS		
C13	0.01 $\mu$ F, 300V, Ceramic	120-001464	B1	Blower, Centrifugal	120-001453
*RESISTORS				Chimney, Tube Pyrex	120-001500
R1,11	0.25 Ohm, 1%, 1 watt, wire wound	120-001480	J1	Connector, Phono Type	120-001469
R2	150 Ohm, 5%, 5 watt, wire wound	120-001481	J2	Connector, Coaxial Type	120-001470
R3,4,5,6,7	1 Megohm, 2 watt	120-001482	D1	Diode, Germanium, 1N34A	120-001465
R8	100K Ohm, 1 watt	120-001483	F1	Fuse, Cartridge, 3 ampere, 3AG	120-001466
R9	4700 Ohm, 5%	120-001484	XF1	Fuse Holder	120-001451
R10	1500 Ohm, 10%	120-001485	XI1	Indicator, w/green jewel	120-001497
*All RESISTORS are 10%, 1/2 watt carbon type unless otherwise stated.			XI2	Indicator, w/red jewel	120-001498
COILS AND TRANSFORMERS			I1	Lamp, Incandescent, Type 47	120-001467
L1	Coil, RF	120-001471	I2	Lamp, Neon, Type NE-51H	120-001468
L2	Coil, RF	120-001472	M1	Meter, 0 to 1 MA	120-001473
PS1	Suppressor, Parasitic	120-001474	P1	Plug, Phono Type	120-001475
RFC1	Choke, RF	120-001477	P2	Plug, Single Pin, Red	120-001476
			XV1	Socket, Electron Tube	120-001499
			TB1	Terminal Board, Two-Screw	120-001493
			V1	Tube, Electron, Type 3-400Z	120-001496





## SECTION IX

### MODEL MARK IIA POWER SUPPLY

#### 9-1. SPECIFICATIONS.

Type of Circuit . . . . .	Full-wave center tapped rectifier circuit.
Power Requirements, AC. . .	1200 watts, 115 volts or 230 volt 60 cycles.*
Power Output . . . . .	3,000 volts DC at 350 milliamperes.
Overall Dimensions . . . . .	14 inches wide x 10 inches high x 12 inches deep.
Net Weight . . . . .	58 pounds.
Shipping Weight . . . . .	75 pounds.**

\* Input circuit may be connected for either 115 volt AC, 60 cycle or 230 volt AC, 60 cycle, grounded neutral operation.

\*\*Shipping weight is total for both cartons; cover is shipped in separate fiberboard carton.

#### 9-2. MARK IIA POWER SUPPLY.

The Hallicrafters' Mark IIA Power Supply, shown in figures 8 and 9, is designed as a companion unit for the HT-45 Mark IIA RF Linear Power Amplifier. The power supply is sold as an accessory item to permit the purchaser of a Hallicrafters' HT-45 Mark IIA RF Linear Amplifier to choose either a matching power supply or utilize a home constructed supply, capable of delivering the required current and voltage.

#### WARNING

High voltages are present at all points in the power supply. Observe all safety procedures afforded to high-voltage components. Before touching any terminals in the supply, check the input power for proper disconnection and discharge the filter capacitor with a wooden stick having a metal extension capable of shorting the filter to ground.

The Mark IIA Power Supply is designed for remote operation from controls located on the front panel of the linear amplifier. The power and control lines are terminated at a ten-connector barrier-type terminal strip for ease of connection. The primary input power is terminated at these terminals and is routed to and through control circuits in the linear amplifier. The overall schematic diagram of the Model Mark IIA Power Supply is shown in figure 8.

The power supply utilizes, two type 866A, mercury vapor rectifiers in a full-wave, center-tapped circuit. The rectified output is smoothed and filtered by a wide-range swinging choke and a large value of filter capacitance. This configuration provides the static and dynamic regulation characteristic necessary. Application of primary power to the power supply is controlled by two switches on the linear amplifier and a controlled relay in the power supply.

Connections to the Mark IIA Power Supply are shown in figures 2 and 8, the interconnection diagram and the overall schematic diagram respectively. In the event an existing supply or home constructed supply is used, careful attention must be given to the interconnection of control and power lines.

The Mark IIA Power Supply may be shipped from the factory connected either for 115 volt AC or 230 volt AC, 60 cycle, single-phase, neutral-ground operation. In either event, connections for desired input source may be made by referring to figures 2 and 8 and making the alternate connections at terminal boards TB1 and TB2 of the Power Supply.

#### 9-3. MARK IIA POWER SUPPLY, PARTS LIST.

In the event repair or replacement parts are required for the Mark IIA Power Supply, refer to the schematic diagram, figure 8, and the parts list to determine the exact replacements. In the event replacement parts are required and requests are directed to the factory, the following information must be furnished.

Model (Mark IIA, Power Supply); Serial Number; Reference Designation (e.g. R1) Description (e.g. RESISTOR, Fixed, wire wound, 100K ohms, 50W, etc.); and Part Number.

## PARTS LIST, POWER SUPPLY

Schematic Symbol	Description	Hallicrafters Part Number
C1	Capacitor, 8 $\mu$ F, 3000V, Oil-Filled Paper	120-001502
L1	Choke, Power, Swinging 4 to 16 H	120-001508
J1	Connector, Single Pin, Red	120-001476
E1	Cord, Power, Three-Conductor	120-001503
F1	Fuse, Cartridge, 8 ampere, 3AG	120-001504
F1	Fuse, Cartridge, 15 ampere, 3AG (alternate)	120-001505
XF1	Fuse Holder	120-001451
I1	Lamp, Neon, Type NE-51	120-001506
P1	Plug, 3-wire AC (115 Volt)	120-001509
P1	Plug, 3-wire AC (230 Volt)	120-001510
R1,2	Resistor, 100K Ohm, 5%, 50 watt, wire wound	120-001445
R3	Resistor, 10K Ohm, 5%, 10 watt, wire wound	120-001446
XV1,2	Socket, Electron Tube, Four-Pin Ceramic	120-001452
TB1	Terminal Board, Four double-screw type	120-001447
TB2	Terminal Board, Ten double-screw type	120-001448
T1	Transformer, Power	120-001449
T2	Transformer, Power	120-001450
V1,2	Tube, Electron, Type 866A	090-90866A

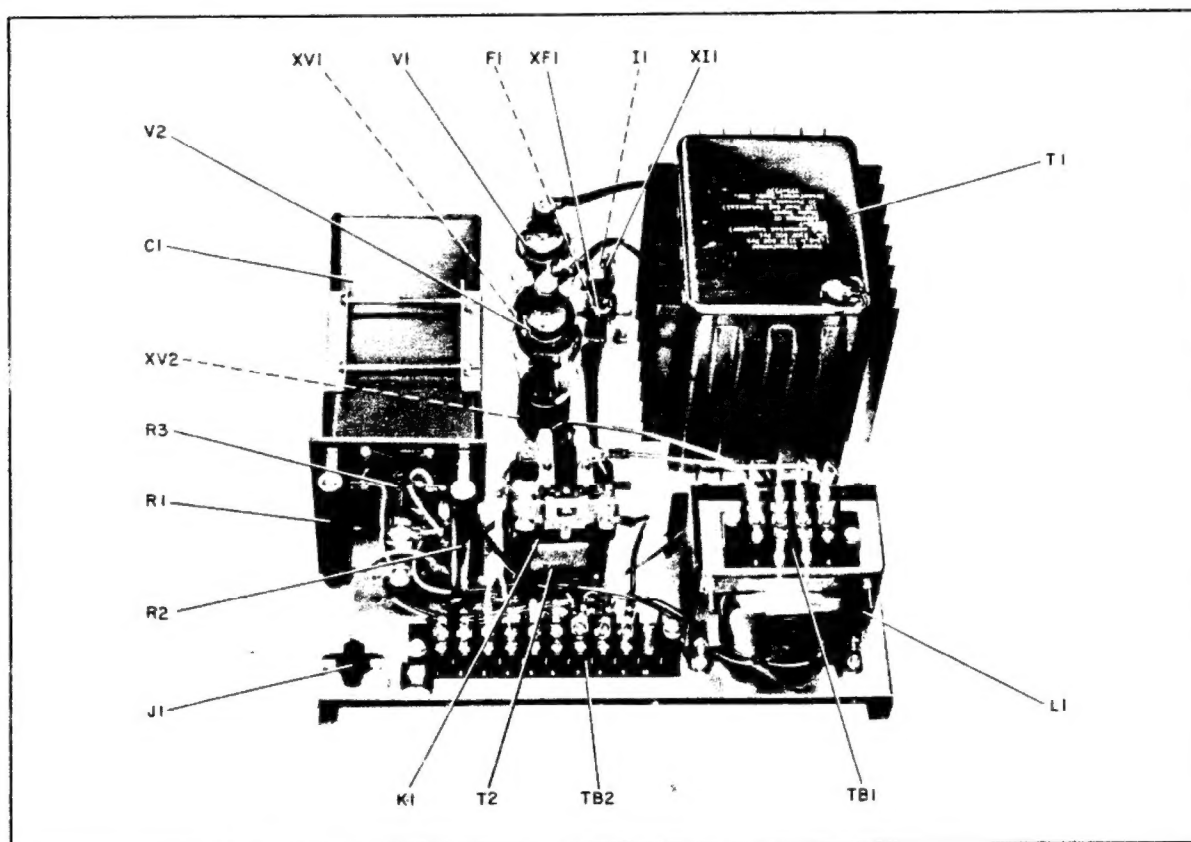


Figure 9. Model Mark IIA Power Supply, Cover Removed, Showing Components.