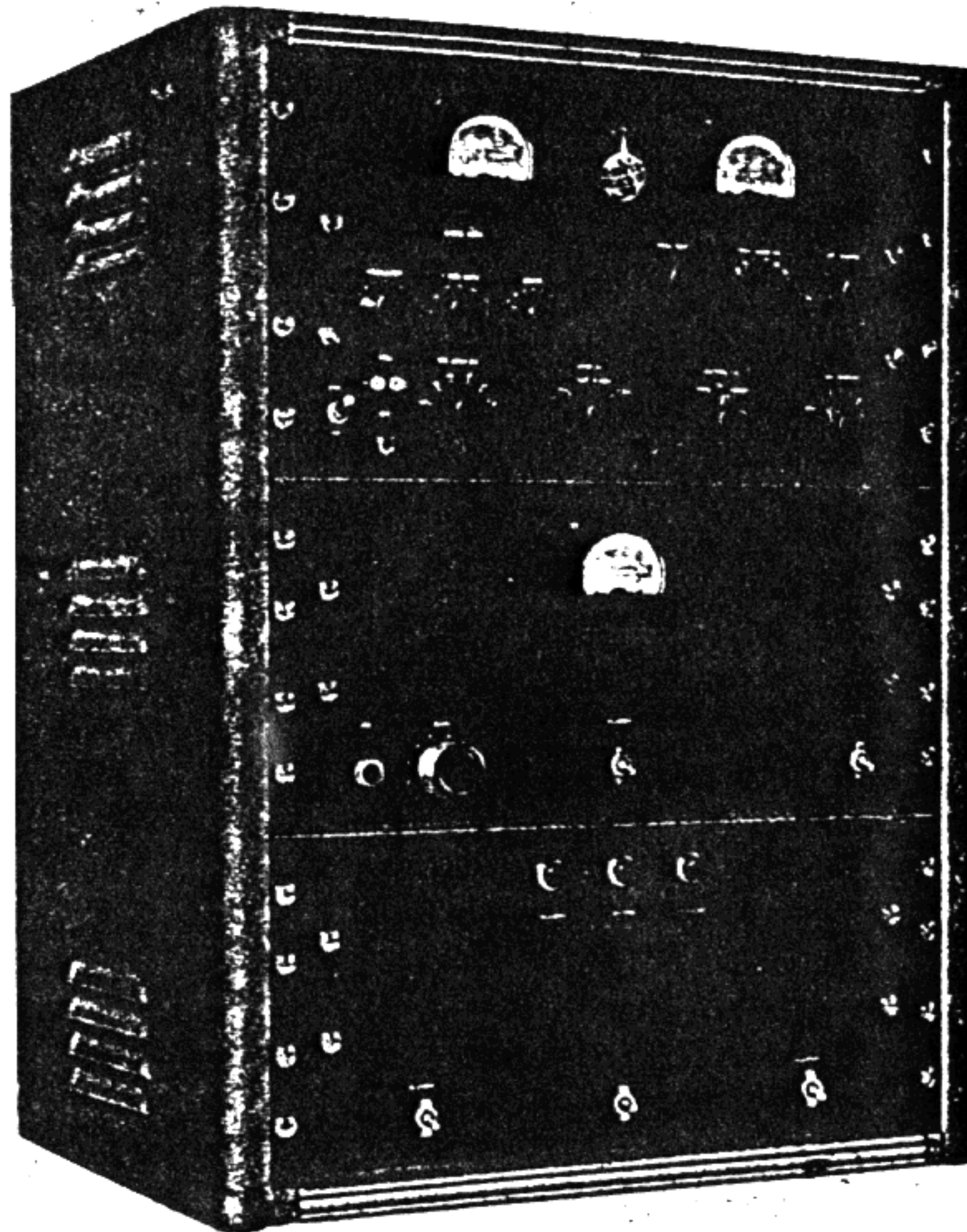


INSTRUCTION MANUAL

GLOBE KING TRANSMITTER

MODEL 500 A



Manufactured By WRL ELECTRONICS, INC.
Council Bluffs, Iowa

FOR

WORLD RADIO LABORATORIES, INC.

SECTION I

GENERAL DESCRIPTION

1-1. GENERAL.

1-2. The WRL Globe King Transmitter Model 500A is made by World Radio Laboratories of Council Bluffs, Iowa. This transmitter is rated at 500 Watts input power to the R.F. Power Amplifier, either Radio Telegraphy (CW), Radio Telephony (AM) operation or 400 watts Single Sideband, peak D.C. plate input.

1-3. DESCRIPTION.

1-4. The Model 500A transmitter is completely self-contained in a metal relay rack cabinet. Dimensions are 31 inches high, 15 inches deep, and 22 inches wide. Weight is approximately 60 pounds. Ventilating louvers are provided in the cabinet to assure adequate ventilation and heat dissipation. Complete TVI precautions have been taken. The R.F. section of the transmitter is completely shielded, meter leads have been by-passed and all AC leads have been by-passed.

1-5. The components of the transmitter are so arranged that semi-unit construction is employed and are broken down into three units as follows;

- Exciter, Buffer and Power Amplifier.
- Modulator with Integral Power Supply.
- Main Power Supply.

Each unit may be removed from the cabinet independently for inspection and servicing. Power requirements are 115 volts, 50/60 cycles single phase alternating current. Tube complement is shown in Table I. The rear and top doors of the cabinet may be opened for additional ventilation in very hot climates. This will not affect TVI or BCI, as the R.F. section is individually shielded.

TABLE I. TUBE COMPLEMENT.

Quan	Type	Function
	4-250A	RF Power Amplifier
	6146	Buffer-Doubler
1	6V6	Crystal Oscillator 6AG7
1	6SJ7	Microphone Amplifier
2	6C5	Speech Amplifiers
1	6L6G	Audio Driver
2	811A	Modulators
1	6X5	Bias Rectifier
1	5Y3GT	P.A. Screen Grid Rectifier
2	816	Modulator High Voltage Rectifiers
	5Y3GT	Modulator Low Voltage Rectifier
	866A	P.A. High Voltage Rectifiers
1	5U4G	Exciter Voltage Rectifier

1-6 THEORY OF OPERATION.

1-7. A 6V6 tube is employed in a regenerative crystal oscillator circuit. The oscillator has a substantial harmonic output and works very

well as a doubler or tripler with a minimum of crystal current; this allows the use of 160-80 and 40 meter crystals to cover all amateur bands up to 10 meters. A VFO with approximately 10 volts RF output will drive the oscillator stage easily, with cathode choke RFC-1 shorted. A switch on the panel selects crystal or VFO operation, and with this switch in the correct position either VFO or crystal may be used in the oscillator stage.

1-8. A type 6146 tube functions as a buffer or doubler stage. This stage is capacity coupled to the oscillator. A combination of fixed and excitation bias is applied to the buffer stage; this allows class "C" operation and also assures complete cut-off of buffer plate current when the oscillator is keyed, or in the event of excitation failure. R.F. drive to the power amplifier is controlled by a potentiometer in the buffer screen grid circuit. Bandswitching of the entire exciter section is simplified by a ganged switch. DC voltages are kept off the coil (L3) and the bandswitch by shunt feeding of the plate of the buffer tube. A SSB RF signal may be inserted by means of a link in the plate coil (L3). This same link may be used for VFO control and drive of the power amplifier stage. 10-15 watts drive are required for this method of operation. SSB operation requires the removal of low B plus voltages from the exciter section. A switch located on the rear of the RF section is provided for this purpose.

1-9. The power amplifier employs a type 4-250A tube which operates as a straight through class "C" AM, or class "B" SSB amplifier. Fixed and excitation bias are used in the power amplifier stage. Class of operation is determined by the switch on the rear of the RF chassis, which selects the proper fixed bias voltage. The plate circuit is tuned by a Pi network and an additional "L" section is used on 160 meters. It will match resistive loads of 50-600 ohms except on 160 meters where an external matching device may be used to match below 300 ohms. On 80 through 10 meters additional capacity (where needed) will match 50-600 ohms resistive, and reasonable reactive loads. When properly tuned, harmonic output of the power amplifier is reduced considerably. The plate of the power amplifier is high level modulated directly while the screen grid is self-modulated by means of a high inductance choke in series with the screen lead. The power amplifier is unique in that the screen grid voltage is self regulating. A rise of screen grid current automatically reduces voltage, and vice-versa. By this means the screen grid power rating is not exceeded, giving excellent tube protection, and tube life is extended. A 5Y3GT tube is employed as the low voltage rectifier for the power amplifier

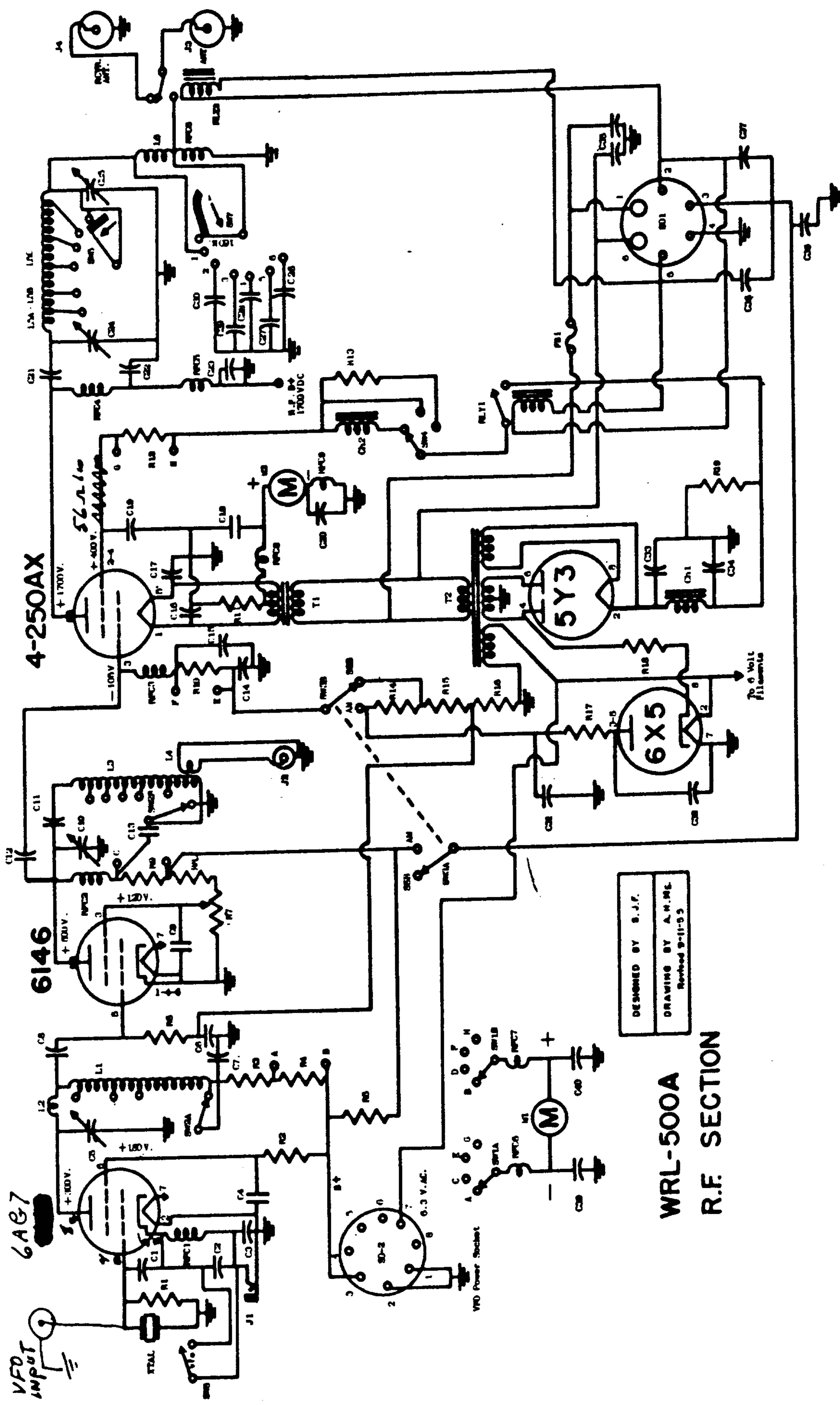
SECTION 1
GENERAL DESCRIPTION

screen grid supply. A 6X50T tube, operating as a half-wave rectifier, supplies all bias voltages to the power amplifier and buffer stages.

1-10. The microphone amplifier tube consists of a 6SJ7 tube which is capacity coupled to the following speech amplifier stage. Two 6C5 tubes are utilized as speech amplifiers, these being capacity coupled into a 6L6G driver stage. "Couplers" are used for coupling the aforementioned audio stages. They have a restricted audio range and allow full use of usable audio power, also, they discriminate against power wasting high and low audio frequencies. The 6L6G driver stage is transformer coupled to the modulator stage. All speech and driver stages are thoroughly decoupled, and all DC voltages applied to them are thoroughly filtered. Two 811A tubes, with zero bias, operate as push-pull, class B modulators. Modulator plate current is indicated at all times, by a meter in the plate circuit. High voltage for the modulator is supplied

by a pair of 816 rectifier tubes in a full wave rectification circuit. A 5Y30T tube, in a full wave rectification circuit, supplies plate voltage for the speech and driver stages.

1-11. The high voltage supply for the R.F. uses two 805A tubes in a full wave rectification circuit. The filter section utilizes choke input. The R.F. driver power supply uses a 504G rectifier tube in a full wave rectification circuit, with single section choke input filter. Reduced screen voltage on the final amplifier tube is obtained by placing the function switch in tune position. This will prevent the final amplifier tube from drawing excessive plate current during tune-up and testing. A terminal strip on the rear of the main power supply chassis provides 115 vac when the TRANSMIT switch is in ON position. This is to operate external relays used to silence the receiver, etc. The AC input circuit is fused with a 20 amp. fuse to protect the equipment in the event of component failure.



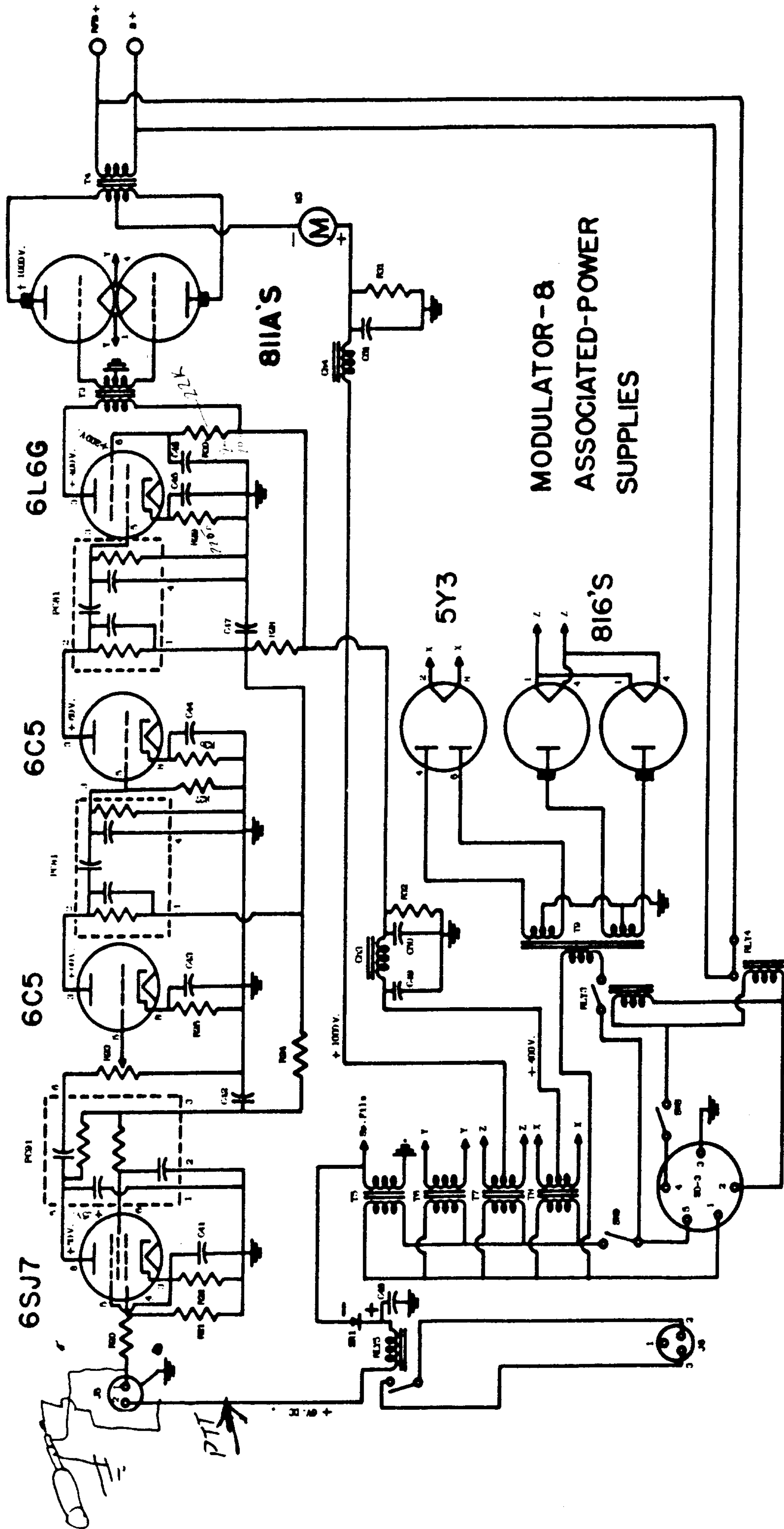
DESIGNED BY B.J.F.
DRAWING BY A.M.M.
Revised 9-11-53

WRL-500A
R.F. SECTION

Schematic of R.F. Section

Parts List for R.F. Section

C1-25 mmf 600 V. Cer.	M1-0-150 MA meter
C2-120 mmf 600 V. Cer.	M2-0-400 MA meter
C3, 4, 6, 7, 9, 13, 14, 15, 16, 17-.005 mf 600 V.	RFC1-Osc. cathode choke-2.5 MH
C5-75 mmf variable	RFC2-Buff. plate choke-2.5 MH
C8-25 mmf 600 V.	RFC3-P.A. grid choke-2.5 MH
C10-140 mmf variable	RFC4-P.A. plate choke-1 MH
C11-.001 mf 1500 V.	RFC5-Protective output choke
C12-70 mmf 1000 V.	RFC6, 7, 8, 9-Meter TVI chokes
C18, 20, 36, 37, 38, 39, 40-500 mf 600 V.	RLY1-P.A. screen B+ relay
C19-.002 mf 600 V.	RLY2-Antenna changeover relay
C21-500 mmf 10 KV.	R1, 2, 6-47,000 ohms $\frac{1}{2}$ W.
C22, 23-500 mmf 20 KV.	R3-120 ohms $\frac{1}{2}$ W.
C24-250 mmf variable	R4-22 ohms $\frac{1}{2}$ W.
C25-350 mmf variable	R5-6000 ohms 10 W.
C26-.001 mf 2500 V.	R7-25,000 ohms WW. Pot.
C27-.001 mf 2500 V.	R8-25,000 ohms 10 W.
C28-.002 mf 2500 V.	R9, 10, 12-22 ohms 1 W.
C29-.002 mf 2500 V.	R11-22 ohms 2 W.
C30-.004 mf 2500 V.	R13-20,000 ohms 20 W.
C31, 32-12 mf 250 V. Elect.	R14-3000 ohms 10 W.
C33, 34-10 mf 450 V. Elect.	R15-1000 ohms 10 W.
C35-2x.0008 mf 1600 V.	R16-2500 ohms 10 W.
CH1-Screen B+ Filter Choke	R17-560 ohms 1 W.
CH2-Screen Modulation Choke	R18-5000 ohms 10 W.
FS1-3 Amp Fuse	R19-50K. ohms 10 W.
J1-Key Jack	S01-RF section power input
J2-SSB/VFO Input	S02-External VFO power output
J3-Antenna Input	SW1-Metering switch
J4-Receiver Antenna Input	SW2-Exciter bandchange sw.
L1-Osc plate coil	SW3-SSB/AM bias sw.
L2-Osc plate coil	SW4-Function sw.
L3-Buffer plate coil	SW5-P.A. bandchange sw.
L4-SSB/VFO Input link	SW6-Xtal/VFO sw.
L5A, B, C-Final P1 coils	SW7-Antenna loading sw.
L6-160M "L" matching coil	T1-4/250A P11 xfmr.
	T2-Screen and Bias xfmr.



Schematic of Modulator Section



Schematic of Power Supply Section

Parts List for Power Supply Section

C52-8 mf 600 V.	R33-50K-20 W.
C53-3 mf 3000 V.	R34-75K-100 W.
C54, 55-.1 mf 250 V.A.C.	S04-Power output socket
CH5, 7H-150 MA. choke	SW10-AC switch
CH6, 7H-350 MA. choke	SW11-Exciter B+ Sw.
FS2, 20A-AB fuse	SW12-Transmit Sw.
J7-Push to talk socket	T10-5V-3A xfmr.
PL1-Filament pilot light	T11-Lo B+ plate xfmr.
PL2-Exciter pilot light	T12-2.5 V.-10A xfmr.
PL3-Transmit pilot light	T13-Hi B+ plate xfmr.
RLX6-Control Relay	TS1-External relay control