K5EXA

INSTRUCTION MANUAL

50¢

for the

WRL

"Globe Champion"

TRANSMITTER MODEL 300

OPERATING INSTRUCTION MANUAL

Manufactured by WRL ELECTRONICS, INC.

Council Bluffs, Iowa

MANUFACTURERS OF

World Famous Globe Transmitters

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SPECIFICATIONS

FINAL POWER INPUT: 350 watts CW; 275 watts AM Phone; 300 watts SSB Peak Envelope Power (with external SSB exciter).

OUTPUT: Coaxial into 52-600 ohm antenna.

BAND COVERAGE (Crystal Control):	
160 Meters	1700-2600 Kc.
80 Meters	3275-5300 Kc.
40 Meters	5400-8100 Kc.
20 Meters	10-15 Mc.
15 Meters	14-23 Mc.
11 Meters	20-31 Mc.
10 Meters	20-31 Mc.

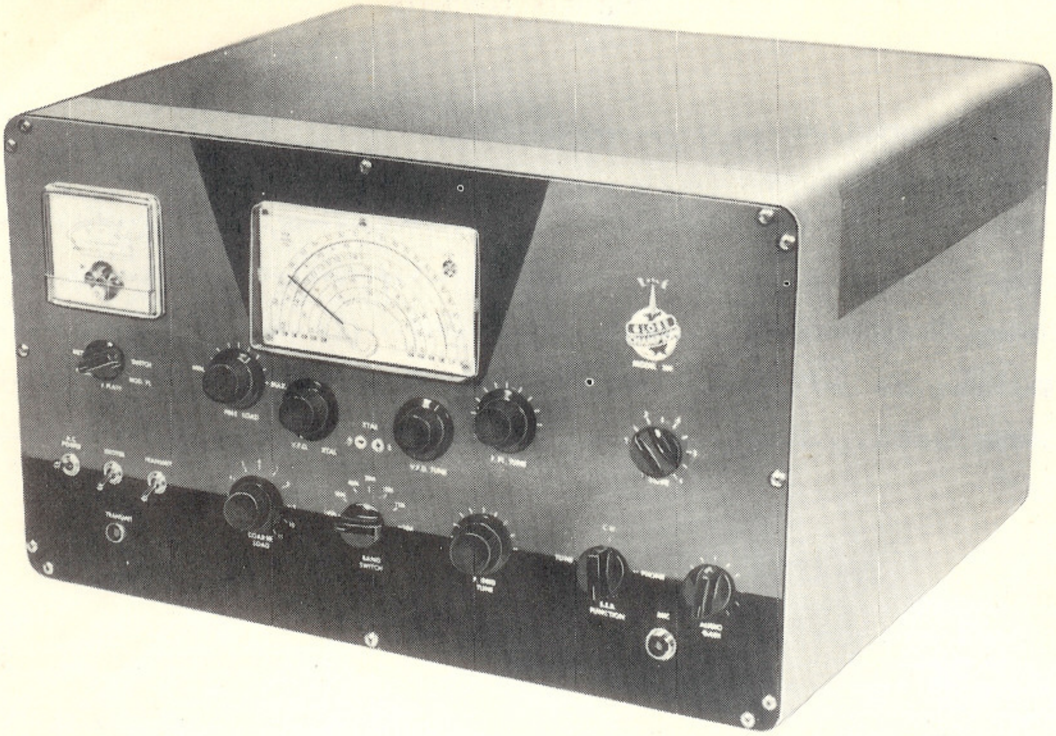
POWER REQUIREMENTS: 115V AC 50/60 cycles. 700 watts phone; 500 watts CW; 150 watts standby.

FREQUENCY CONTROL: Crystal or VFO.

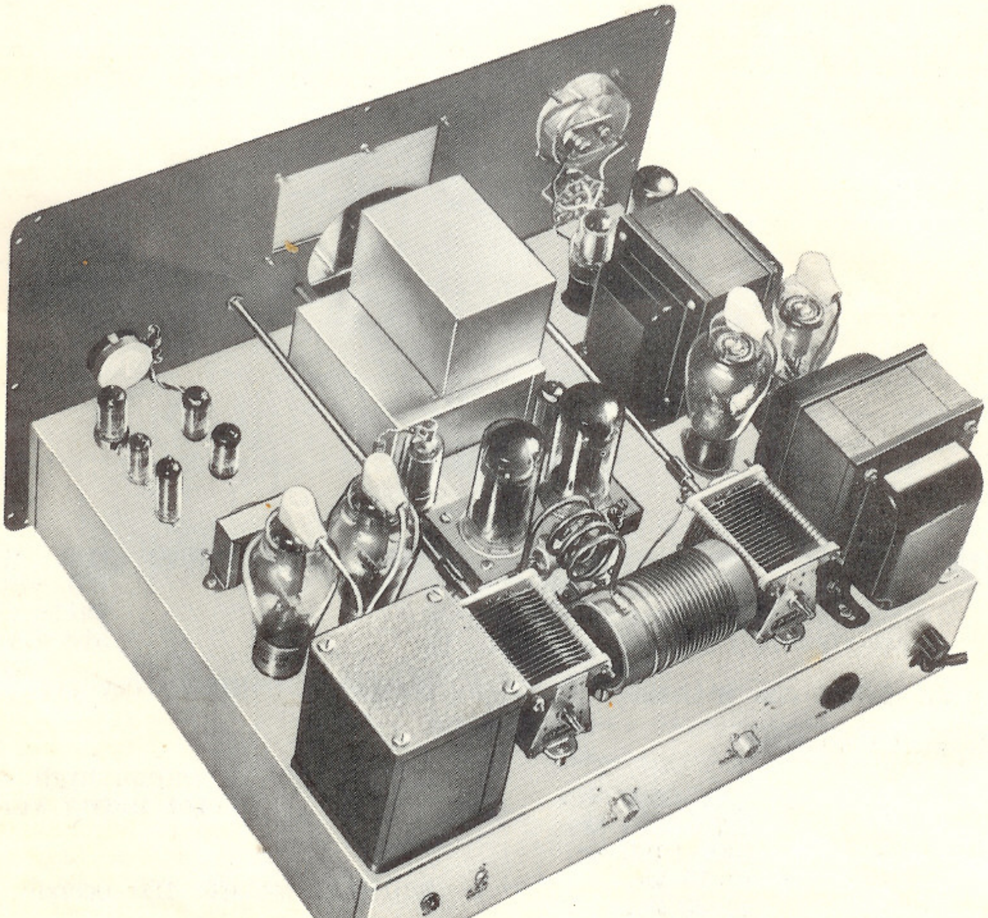
DIMENSIONS: 12 inches high, 17 inches deep, 21-1/4 inches wide.

SHIPPING WEIGHT: 120 pounds.

NET WEIGHT: 105 pounds.



Globe Champion Transmitter Model 300



Inside Top View Of Chassis (R.F. Shield Removed For Full View)

SECTION I

GENERAL DESCRIPTION

1-1. GENERAL.

1-2. The WRL Globe Champion Transmitter, Model 300, is made by WRL Electronics, Inc. of Council Bluffs, Iowa. The transmitter is rated at 350 watts DC plate input power to the R.F. Power Amplifier CW operation; 275 watts Radio Telephony (AM) operation; or 300 watts P-E-P Single Sideband operation (with external SSB exciter that will deliver 8 to 10 watts power at the final grid).

1-3. DESCRIPTION.

1-4. The Model 300 transmitter is completely self-contained in a metal cabinet. Dimensions are 12 inches high, 17 inches deep and 21-1/4 inches wide. The top portion of the cabinet is made of perforated steel material. The use of this material provides three distinct advantages: smart appearance, excellent RF shielding and adequate ventilation for heat dissipation. Complete TVI precautions have been taken. The meter and the VFO dial are fully shielded and external leads are adequately by-passed. The unit may be removed from the cabinet for servicing and inspection. Power requirements are 115 volts A.C., 50/60 cycles, single phase. Power consumption is 700 watts (AM) phone operation, 500 watts CW operation and 150 watts standby. Net weight is approximately 105 pounds. The tube complement is shown in Table I.

TABLE I. TUBE COMPLEMENT.

Quan.	Type	Function
2	AX9909	R.F. Power Amplifier
1	2E26	Buffer/Doubler
1	6CL6	Crystal Oscillator/VFO Buffer
1	12AU7	Keyer Tube
1	6AU6	Microphone Amplifier
1	12AX7	Speech Amplifier
1	6AQ5	Modulator Driver
2	809	Modulators
1	6AL5	Compression Rectifier
1	6AU6	VFO Oscillator
1	0A2	VFO Regulator
1	0A2	Buffer Screen Regulator
1	0A2	R.F. Amp. Screen Grid Regulator
1	0B2	R.F. Amp. Screen Grid Regulator
1	5U4GB	Low Voltage Rectifier
2	866A	High Voltage Rectifier

1-5. THEORY OF OPERATION.

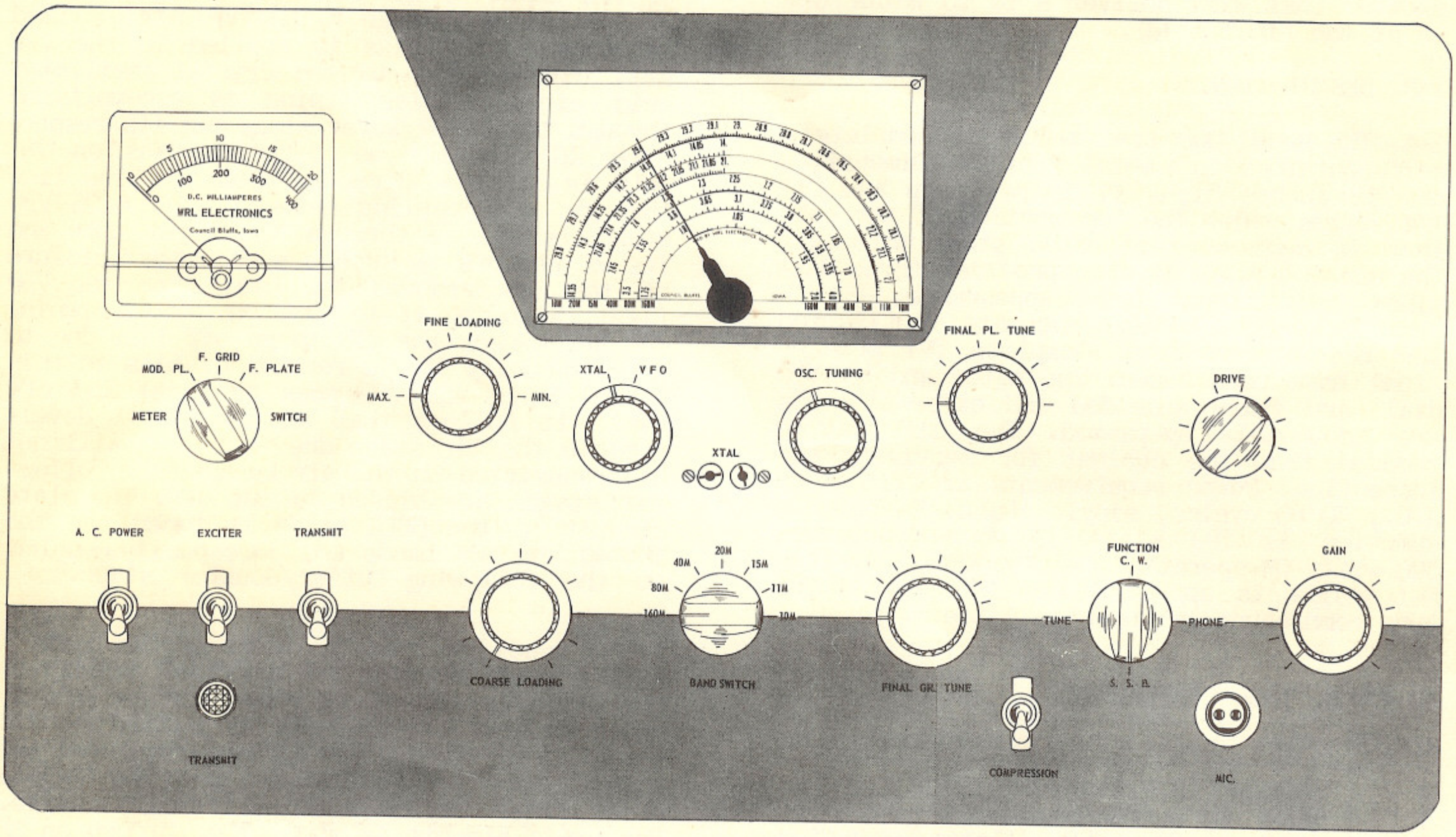
1-6. A 6AU6 tube is employed as the VFO oscillator tube in a series tuned clapp oscillator circuit. Complete coverage of the 160M and 40M bands is obtained. Maximum operating stability is governed by voltage regulation of the screen grid circuit, plus temperature compensation of the input grid tank circuit. Broad tuning of the plate circuit on the 160M and 40M bands allows maximum drive to the following stage. Capacity coupling is utilized between the VFO and the grid of the next stage. A 6CL6 tube operates as a regenerative crystal oscillator, or serves as a buffer/doubler stage for the VFO. The switching circuit in the grid of the 6CL6 serves two functions; selection of crystal or VFO input to the grid circuit and removes or applies B+ voltage to the VFO stage. Timed sequence keying bias is applied to the VFO grid circuit and to the crystal oscillator grid circuit. Bias timing is accomplished through the 12AU7 keyer stage and its respective RC circuits as follows: Bias on the 6CL6 is obtained directly from the bias line through a decoupling network. The 6AU6 VFO stage is biased through the keyer tube and its RC network in such a manner that closure of the key removes the bias from the VFO first, allowing it to come on first. Opening the key causes the VFO to go off last due to the time delay in the removal of bias to this stage. Since the VFO goes on first and off last, it follows that any transients developed in the VFO stage due to keying will not be transmitted on the air because the following stages are biased to cut off. The plate circuit of the 6CL6 stage is tuned to the 160-40 and 20M bands and is capacity coupled to the following buffer/doubler stage.

1-7. A type 2E26 tube functions as the buffer/doubler stage which drives the final amplifier. The stage is biased to very near cut-off in order to serve efficiently as a doubler. The screen grid circuit is voltage regulated and potentiometer controlled so that any degree of RF output may be obtained from this stage. The plate circuit is shunt fed through an RF choke and is capacity coupled to its tank circuit, which is in effect, the grid tank circuit of the final amplifier. This tank circuit tunes all the bands, 160 through 10 meters, and is used to resonate the buffer plate and final grid circuits to the desired operating frequency.

1-8. The power amplifier stage employs two type AX9909 tubes connected in parallel. Maximum efficiency is obtained on all bands by "straight through" operation. Fixed and excitation bias are utilized with the fixed bias being variable. This feature allows selection of either class B or class C type operation. Bridge type neutralization assures completely stable operation and is easily accomplished without any special equipment. Regulation of the final amplifier screen grid voltage prolongs tube life and materially contributes to stability of operation. The final amplifier plate circuit is shunt fed through an RF choke and is capacity coupled to the pi network tank circuit.

SECTION I

GENERAL DESCRIPTION



Globe Champion Model 300 Front Panel View

The pi network output circuit will match a wide range of resistive loads, from approximately 50 to 600 ohms. Proper tuning of this circuit provides a good harmonic rejection ratio. High level modulation of the final amplifier plates is employed and the screen grids are self modulated by means of a high inductance choke in series with them.

1-9. A 6AU6 speech input tube amplifies the microphone output to a pre-determined level. Except for an audio AVC feature (explained later) conventional circuitry is employed in this stage. A printed circuit couplate in the plate of the 6AU6 stage permits maximum stage gain and provides a restricted speech range. The 12AX7 speech amplifier stage is capacity coupled to the 6AU6 input stage through the volume control. The high side of the volume control is directly connected to the phone patch input jack so that high level, high impedance, audio may be fed from an external source to the input of the 12AX7 speech amplifier. A printed circuit couplate is used in this plate circuit also and adequate de-coupling between stages insures operating stability. The output of the speech stage is capacity coupled to a very efficient speech filter. The speech filter limits the audio range from 200 to 3500 cycles and provides rapid attenuation above and below these frequencies. the speech filter feeds directly into the grid circuit of the 6AQ5 modulator driver stage. The 6AQ5 driver tube is transformer coupled to the grids of the modulator tubes. The output of the 6AQ5 is also capacity coupled to a voltage doubler rectifier through a suitable filter network. The audio voltage is rectified in the 6AL5 compression rectifier, filtered through an RC network and then applied to the suppressor grid of the 6AU6 input stage as negative bias voltage. The compression on/off switch removes or applies the bias voltage. Thus, it can be seen that as microphone input level increases the driver output voltage increases; this in turn increases the bias voltage which causes a reduction of amplification in the speech input tube. Such action holds the overall audio stage gain to a near constant level regardless of microphone input level. Approximately 7 db of compression is allowed using fixed circuit constants and with the volume control at mid-range. Two 809 modulator tubes are operated class B with a fixed, regulated bias. The modulator bias is obtained from the main bias line through suitable dropping resistors. Regulation of bias is accomplished by back biasing two series connected selenium rectifiers and using the variable back resistance of the rectifiers. When the modulator grid voltage and current increase, such as during an audio peak, no action occurs until the additional voltage drop across the rectifiers exceeds the applied back bias. When the bias value is exceeded, the back resistance of the rectifiers diminish at a proportional rate so the total bias remains the same under all modulating conditions.

1-10. B+ voltage is supplied to the VFO, RF exciter, keyer, speech amplifier and modulator driver stages by a 5U4GB tube connected as a full wave rectifier circuit with choke input. Two 866A tubes connected as full wave rectifiers, with choke input filter, supply voltage to the RF power amplifiers and the modulator stages.

1-11. A terminal strip on the rear apron of the chassis provides 115V AC with the Transmit switch in the "on" position. This voltage may be used for the control of external equipment or accessories. The AC input line is safety fused with a 10 ampere fuse for protection of the equipment in case of a component failure. The push-to-talk circuit employs a half-wave selenium rectifier which rectifies 6.3V AC. The rectified voltage is applied to a condenser input RC filter which builds up, and smooths out the rectified voltage. The DC voltage is then applied to a sensitive relay, one side of which is grounded by the microphone switch. The relay contacts are in series with the main transmitter power relays and the 115V AC line. Depressing the microphone switch actuates the sensitive relay. Contact closure of this relay applies voltage to the main relay solenoids which in turn supply the complete transmitter with power.

1-12. The bias supply also incorporates a half-wave selenium rectifier for rectification of 115V AC to provide a negative voltage. The negative voltage is applied to a condenser input RC filter circuit. The output of the filter circuit is connected through suitable bleeder resistors to ground. The various bias voltages are obtained from appropriate junctions of the bleeder resistors.

SECTION II

OPERATING PROCEDURES

2-1. GENERAL.

2-2. The following paragraphs describe the various controls of the Globe Champion transmitter, Model 300. Tune up and operating procedures are outlined following the description of the controls. It is recommended that this section be studied thoroughly before any attempt is made to place the transmitter in operation.

2-3. DESCRIPTION OF CONTROLS.

2-4. METER SWITCH. Connects the panel meter to any one of the following three circuits: modulator cathode, final amplifier grid or final cathode.

2-5. A.C. POWER. Applies AC power to the entire transmitter.

2-6. EXCITER. Completes the low voltage B- circuit and supplies B+ voltage to the RF exciter section and the audio speech sections.

2-7. TRANSMIT. Duplicates the EXCITER switch function and also applies AC voltage to the high voltage plate transformer and 115V AC to accessory terminal strip TS-1.

2-8. FINE LOADING. Matches the final amplifier plate circuit to the antenna load accurately and to a fine degree.

2-9. COARSE LOADING. Matches the final amplifier plate circuit to the antenna by the addition of capacity in steps of 200 mmfd.

2-10. XTAL-VFO. Connects the crystal or VFO output to the 6CL6 grid circuit. Removes VFO B+ when in XTAL position.

2-11. BAND SWITCH. Selects the proper value of inductance for each band in the following stages: VFO grid and plate, 6CL6 plate circuit, final amplifier plate circuit.

2-12. OSC. TUNING. Varies the VFO tuning capacity for each band of operation.

2-13. FINAL GR. TUNE. Varies the buffer stage plate circuit tuning capacity for each band of operation.

2-14. FINAL PL. TUNE. Varies the final amplifier plate circuit tuning capacity for each band of operation.

2-15. FUNCTION. A four-position rotary switch. TUNE position: Places a high resistance in series with the final amplifier screen grid circuit to limit the final amplifier plate current. CW position: Shorts the screen grid modulating choke and the modulation transformer secondary. Also removes B+ voltage from the modulator plate circuit. PHONE position: Applies B+ voltage to the modulator tubes, removes the short from the screen grid modulating choke and modulation transformer secondary. SSB position: Changes the final amplifier grid bias voltage for Class B operation. Shorts the screen grid modulating choke and the modulation transformer secondary. Also removes B+ voltage from the modulation tube plates.

2-16. DRIVE. Controls screen grid B+ voltage of the buffer stage thereby controlling RF drive to the final amplifier grid.

2-17. GAIN. Controls the amount of audio drive to the speech amplifier stage thereby controlling the percentage of modulation of the RF carrier. Switch attached to this control supplies filament voltage to speech tubes.

2-18. COMPRESSION. Supplies negative AVC voltage to the supressor grid of the microphone amplifier stage when in the ON position. This controls the overall gain of the speech and driver stages and prevents overmodulation of the carrier when operated in accordance with procedures outlined in this manual.

2-19. EXTERNAL CONNECTIONS.

WARNING

Before making any external connections to the transmitter remove the AC power cord plug from the AC source receptacle. Also place the TRANSMIT switch in the OFF position. The first external connection should be a good ground to the GROUND terminal located on the rear of the transmitter. See paragraph 2-26. Do not make any external connections as yet.

2-20. XTAL. Crystal socket. Complete amateur band coverage, 160 through 10 meters, with 160 M and 40 M crystals. Located on front panel.

2-21. MIC. Microphone connector on front panel. Pin #1 connects the microphone to the grid of the 6AU6 input tube. Pin #2 connects the microphone switch to one side of the push-to-talk relay.

2-22. PATCH-IN. A phone jack located on rear of chassis. Permits insertion of an external high impedance audio signal to the high side of the audio gain control independently of the microphone input.

2-23. KEYER ADJ. Control located on the rear of the chassis. Regulates the amount of bias voltage to the keyer tube which in turn regulates the VFO keying characteristics.

2-24. SSB. A receptacle located on the rear of the transmitter. Permits the insertion of an external SSB generator signal direct to the final amplifier grids through an isolation condenser.

2-25. KEY. A jack located on the rear of the chassis. Connected to the bias line through an isolation resistor. Controls the operation of the keyer tube and the 6CL6 stage for CW operation.

2-26. GROUND. Terminal located on the rear of the chassis. Attach a good electrical ground to this terminal.

CAUTION

Read paragraph 2-19 before making any external connections.

A No. 10 copper wire connected to a cold water pipe, or to a 6 or 8 foot ground rod driven into the ground is usually satisfactory. Should difficulty be encountered in achieving a good ground on the higher frequency bands it may be that the length of the grounding wire is such that it acts like an antenna. The cure is to shorten or lengthen the wire a few feet. Do not make any external connections as yet. See also Section V, paragraph 5-•.

2-27. RCVR. ANT. Allows automatic antenna switching from receiver to transmitter when connected to the receiver antenna terminals.

2-28. ANTENNA. Allows automatic antenna switching from the transmitter output to the RCVR ANT coaxial receptacle when connected directly to the antenna feedline.

2-29. 115V AC. Terminal strip on rear of chassis. Supplies 115V AC to any external accessory when the TRANSMIT switch is in ON position, or with microphone switch depressed.

2-30. 10A FUSE. AC line fuse for the entire transmitter. Fuse post located on rear of chassis.

2-31. POWER CORD AND PLUG. Extends out from the rear of the transmitter. Supplies A.C. power to the transmitter when plugged into a 115 volt 50/60 cycle, single phase alternating current source.

2-32. PRELIMINARIES PRIOR TO INITIAL TUNE-UP.

2-33. Upon unpacking the transmitter, and the tubes packed separately, a visual inspection for any damage should be made. Should any damage be discovered a claim should be filed with the Carrier (Express Company or Motor Freight Line) immediately. Prior to the initial tune-up certain preliminary precautions and procedures must be observed.

WARNING

Operation of this equipment involves the use of high voltages which are dangerous to life. Observe all safety precautions! Do not attempt to make any adjustments inside the equipment or change any tubes with the power on. Disconnect-UNPLUG-the power cord before touching any high voltage points, antenna terminals, or any exposed wiring. Do not do any work on the inside of the transmitter without first unplugging the power cord. It is advisable to short the B+ to ground using a highly insulated screwdriver as a shorting bar before touching anything inside the transmitter.

(a) Make certain the AC power cord plug is removed from the AC power source receptacle.

(b) The six tubes shipped separately must be installed before operation of the transmitter is attempted. Remove the twelve panel mounting screws carefully in order to avoid marring the panel. Remove the three self-tapping screws from the rear apron of the cabinet. Slide the chassis out of the cabinet. Remove the tape securing the plate caps. Insert the following tubes into their respective sockets: two 809, two 866A and two AX9909. Attach the appropriate plate caps. Check the remaining tubes for proper positioning and seating. Slide the chassis back into the cabinet being careful to keep the AC line cord from being wedged between the cabinet and the rear apron of the chassis. Install the twelve panel mounting screws and the three self-tapping screws that were previously removed. Install the panel mounting screws carefully to avoid marring the panel.

(c) Make certain the AC power cord plug is removed from the AC power source receptacle.

(d) Make certain the TRANSMIT switch is in the OFF position.

(e) Attach a No. 10 grounding wire to the GROUND terminal of the transmitter.

(f) Connect the antenna feedline to the coaxial receptacle labeled ANTENNA.

(g) Connect the receiver antenna leads to the coaxial receptacle labeled RCVR. ANT.

2-34. Proper tune-up is necessary for optimum performance of the Globe Champion transmitter. Attempted operation of the transmitter without proper tune-up may result in damage to the equipment or spurious radiations outside the assigned amateur bands.

2-35. TUNE-UP PROCEDURE-CRYSTAL OPERATION.

1. Place the three toggle switches A.C. POWER, EXCITER and TRANSMIT in the down, or OFF, position.
2. Insert the A.C. power cord plug into a 115V AC, 60 cycle source receptacle.
3. Place the A.C. POWER switch in the up, or ON position. Allow a three minute warm-up period.
4. Place the BAND SWITCH to the desired band of operation.
5. Place the XTAL-VFO switch to the XTAL position.
6. Select the proper crystal for the frequency from the crystal chart, Table II. Insert the crystal into the XTAL socket on the front panel of the transmitter.

TABLE II. CRYSTAL CHART.

Band	Crystal, Frequency limits
160 Meters	1800-2000 KC.
80-75 Meters	3500-4000 KC.
40 Meters	7000-7300 KC.
20 Meters	7000-7175 KC.
15 Meters	7000-7150 KC.
11 Meters	6740-6807 KC.
10 Meters	7000-7425 KC.

7. Place the FUNCTION switch to the TUNE position.
8. Place the METER SWITCH to the F. GRID position.
9. Place the DRIVE control to the mid scale position. The white indicator line should point straight up.
10. Rotate the GAIN control to the extreme counter-clockwise position until a click is heard. This turns off the filament voltage to the speech tubes.
11. Rotate the COARSE LOADING control to the extreme counter-clockwise position.
12. Rotate the FINE LOADING control to the MIN. position.
13. Rotate the FINAL GR. TUNE control so the indicator points to the 9 o'clock position.
14. Rotate the FINAL PL. TUNE control so the indicator points to the 9 o'clock position.

TABLE III. TYPICAL KNOB SETTINGS FOR BAND OF OPERATION.

CONTROL	160 Meters	80 Meters	40 Meters	20 Meters	15 Meters	11 Meters	10 Meters
FINAL GR. TUNE							
FINAL PL. TUNE							

15. Place the EXCITER switch to the ON position.
16. Advance the FINAL GR. TUNE control slowly in a clockwise direction until the meter indicates maximum grid current.
17. Adjust the DRIVE control, either clockwise or counter-clockwise, in order to obtain a meter indication of 15 ma. grid current.
18. Place the EXCITER switch in the OFF position.
19. Place the METER SWITCH to the F. PLATE position.
20. Place the TRANSMIT switch to the ON position. The meter should now indicate approximately 110 ma.
21. Slowly advance the FINAL PL. TUNE control in a clockwise direction until a pronounced dip of at least 10 to 20 ma in plate current is indicated. In the event a pronounced dip in plate current cannot be obtained, overloading of the final amplifier plate circuit is indicated. Should overloading be indicated proceed as follows:

(a) Place the TRANSMIT switch to the OFF position.

CAUTION

Do not rotate the COARSE LOADING or the BAND SWITCH while the TRANSMIT switch is in the ON position. Severe damage to these switches will occur if this precaution is ignored.

(b) Advance the COARSE LOADING control one position in a clockwise direction.
(c) Repeat steps 20 and 21.

The above procedure must be repeated until the proper resonance dip of final amplifier plate current is obtained. With the TRANSMIT switch in the ON position and the final amplifier tuned to resonance at approximately 90-95 ma. The tune-up procedure may be continued.

22. Place the FUNCTION switch to the CW position. The final amplifier plate current should immediately rise to approximately 260 ma.
23. Retune the FINAL PL. TUNE control for minimum dip in plate current.
24. Slowly advance the FINE LOADING control in a counter-clockwise direction towards MAX. position until the final amplifier plate current rises to 330 ma. In the event the final amplifier plate current does not rise to the required value of current, place the TRANSMIT switch to the OFF position and proceed as follows:

(a) Reset the FINE LOADING control to the MIN. position.
(b) Advance the COARSE LOADING control one position counter-clockwise.
(c) Place the TRANSMIT switch to the ON position.
(d) Immediately tune the FINAL PL. TUNE control for minimum dip of plate current to prevent damage to the meter or final amplifier tubes.
(e) Advance the FINE LOADING control in a clockwise direction towards the MAX. position until the final amplifier plate current rises to 330 ma.

25. Retune the FINAL PL. TUNE control for minimum plate current.
26. Repeat steps 24 and 25 until the minimum plate current dip of the final amplifier is 330 ma. This is full load current for the final stage and should not be exceeded or an overloaded final amplifier with poor RF output will be the result.
27. Re-adjust the FINAL GR. TUNE control for maximum grid current.
28. Re-adjust the DRIVE control to indicate 10-12 ma. grid current.

2-36. The tune-up procedure is now completed. However, before the transmitter may be placed into initial operation the keyer control must be adjusted for the proper keying characteristics. Refer to paragraph 2-39, KEYER CONTROL ADJUSTMENT.

2-37. TUNE-UP PROCEDURE-VFO OPERATION.

2-38. Tune-up procedure for VFO operation varies only slightly from the crystal operation tune-up. Proper procedure is as follows:

1. Release the press-to-talk switch on the microphone.
2. Make certain the EXCITER and TRANSMIT switches are in the OFF position.
3. Remove the crystal from the XTAL socket.
4. Place the XTAL-VFO switch to the VFO position.
5. Tune the VFO to the desired operating frequency.
6. Proceed with the tune-up procedure as outlined under TUNE-UP PROCEDURE-CRYSTAL OPERATION, steps 7 through 28.

2-39. KEYER CONTROL ADJUSTMENT.

2-40. The keying system employed in the Globe Champion, Model 300 is fundamentally grid block keying. However several refinements have been incorporated into the basic circuit. The keyer stage utilizes a 12AU7 tube connected as a cathode follower in series with the bias voltage and provides a predetermined time lag in the application of bias voltage to the VFO tube. The 6CL6 crystal stage is biased directly from the bias source through a suitable R/C decoupling network. The 6AU6 VFO stage is biased through one-half of the keyer tube. The circuit constants in the keyer stage are such that key closure turns on the VFO first and the crystal stage last. Opening the key disables the VFO stage last and the crystal stage first. In as much as the VFO goes on first and off last, it eliminates the possibility of any keying chirp generated in the VFO stage to be transmitted on the air. The keyer circuit need be adjusted for the desired keying characteristics only when the transmitter is placed into initial operation. The KEY ADJ. control determines the desired keying characteristics. When this control is in the extreme clockwise position, softest keying is obtained; with the control in the extreme counter-clockwise position, sharper keying with a very slight click is obtained. Optimum operation, with the most pleasant keying, is at the point where the VFO is just cut off. For break-in operation

OPERATING PROCEDURES

on ones own frequency, it is necessary that the VFO be completely cut off to eliminate interference with the received signal. Proper adjustment is as follows:

1. Rotate the KEY ADJ. control shaft to its extreme clockwise position.
2. Complete the tune-up procedure, VFO OPERATION, on the 40 meter band. It is important that the VFO tune-up procedure be followed, not crystal tune-up.

3. Upon completion of the tune-up prodedure, place the TRANSMIT switch to the OFF position, or release the press-to-talk switch on the microphone.

4. Leave the key plug in the KEY jack, close the key contacts.
5. Place the EXCITER switch to the ON position.
6. Tune in the transmitter signal on your receiver.
7. Open the key contacts and advance the receiver gain control until the VFO signal is heard on the receiver.
8. Slowly rotate the KEY ADJ. control in a counter-clockwise direction until the VFO signal is just cut off. Then rotate the control an additional 1/8 turn counter-clockwise to assure complete VFO cut off.

2-41. The keyer adjustment is now completed. No further adjustment need be made unless the 12AU7 tube is replaced.

2-42. VFO ALIGNMENT.

2-43. In the event it should be necessary for any reason, to re-align the VFO; the following procedure should be followed to assure correct alignment.

1. Place all switches in the OFF position.
2. Disconnect all cables and plugs from the rear apron of the transmitter.
3. Remove the 12 panel mounting screws and the 3 self-tapping screws on the rear apron of the cabinet. Slide the chassis out of the cabinet.

4. Place the chassis with its heavier side (T1 and T2) down. Identify the five holes directly under the VFO as shown in Fig.

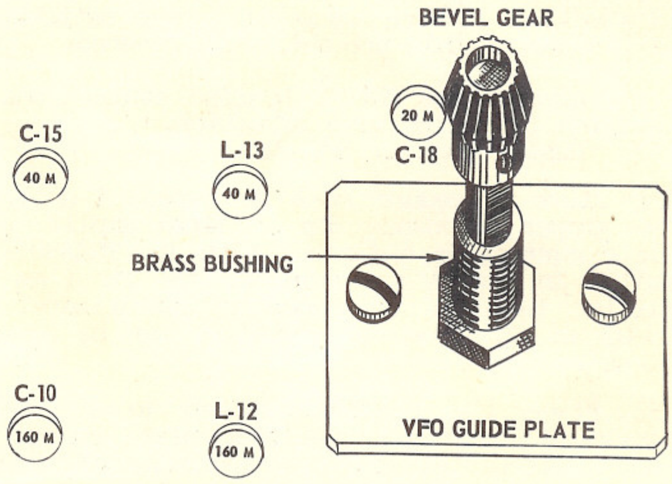


Fig. 1. VFO Alignment Hole Locations.

WARNING

Operation of this equipment involves the use of high voltages which are dangerous to life. Observe all safety precautions!

5. Insert the AC power cord plug into a 115V AC source receptacle. Place the AC POWER switch to the ON position. Allow a five minute warm up period.
6. Place the XTAL-VFO switch to the VFO position.
7. Place the BAND SWITCH to the 160 M position.
8. Use a pre-adjusted 100 KC crystal calibrator standard and tune your receiver to 1800 KC.

9. Place the EXCITER switch to the ON position.
10. Set the VFO pointer to 1800 KC.
11. Adjust the slug-in coil L-12 for zero beat with the calibrator.
12. Tune the receiver to 2.0 mc by listening for the calibrator beat then set the VFO pointer to 2.0 mc.
13. Adjust trimmer condenser C-10 for zero beat with the calibrator.
14. Repeat steps 8, 9, 10, 11, 12 and 13 as many times as necessary until the 1800 and 2000 Kc points on the VFO dial correspond with these same points on the receiver.
15. Place the transmitter BAND SWITCH to the 40 M position.
16. Tune the receiver to 7.0 mc then set the VFO pointer to 7.0 mc.
17. Adjust the slug in coil L-13 to zero beat with the receiver.
18. Tune the receiver to 7.4 mc and set the VFO pointer to 7.4 mc.
19. Adjust trimmer condenser C-15 to zero beat with the receiver.
20. Repeat steps 17, 18, and 19 as many times as necessary until the 7.0 and 7.4 mc points on the VFO correspond to these same points on the receiver.
21. Place the transmitter BAND SWITCH to the 20 M position.
22. Tune the receiver to 7.1 mc and the VFO to 14.2 mc.
23. Adjust trimmer condenser C-18 to zero beat with the receiver.

2-44. The VFO alignment is now completed. The VFO output coils L-1 and L-2 on top of the VFO chassis should be peaked for maximum drive to the final grid circuit. Coil L-1, the 40 meter output coil, is the coil nearest the rear of the VFO chassis. This coil should be peaked for maximum drive to the final grid on 15 meters. Coil L-2 (160 meter output) should be peaked at 3800 Kc in the 80 meter band. Coil L-2 will peak very broadly and is not critical.

2-45. VFO alignment and peaking is now complete. The transmitter may be installed in the cabinet for normal operation.

SECTION III

RADIO TELEPHONY OPERATION

3-1. RADIO TELEPHONY (AM) OPERATION.

3-2. Once the transmitter has been properly tuned up for CW operation, it may be placed in AM operation as follows:

1. Remove the key plug from the KEY jack, or make certain the key contacts are closed.
2. Place the TRANSMIT and EXCITER switches to the OFF position.
3. Advance the GAIN control in a clockwise direction until the switch click is heard. Closure of this switch applies filament voltage to the speech tubes.
4. Place the FUNCTION switch to the PHONE position.
5. Connect the microphone to the MIC. connector on the front panel of the transmitter. Make certain the connector on the microphone cable is properly wired. Correct connections for use with the Globe Champion transmitter, Model 300, are as follows: Pin 1 to the microphone element; Pin 2 to press-to-talk switch; braided shield to metal shell of connector.
6. Place the COMPRESSION switch to the OFF position.
7. Place the METER SWITCH to the MOD. PL. position.
8. Depress the press-to-talk switch. This action should energize the transmitter and the modulator plate current should rise to a static value of approximately 50 ma.
9. Speak into the microphone in a normal tone of voice and slowly advance the GAIN control in a clockwise direction until the modulator plate current rises from its static value and swings up to 200 ma on voice peaks. This corresponds to 100% modulation. Excessive splatter and distortion will result if this is exceeded.
10. The compression feature may now be utilized by placing the COMPRESSION switch to the ON position. This action will reduce the modulator current peak swing by approximately 15% indicating that a limiting action is taking place. To compensate for the slight reduction in audio output merely advance the GAIN control in a clockwise direction just enough to bring the peak modulator current swing back up to 200 ma. The compression feature holds the modulation percentage nearly constant regardless of whether you shout or speak normally into the microphone reducing any tendency to overmodulate.

3-3. The transmitter may now be placed into (AM)PHONE operation.

SECTION IV

SINGLE SIDE BAND OPERATION (SSB)

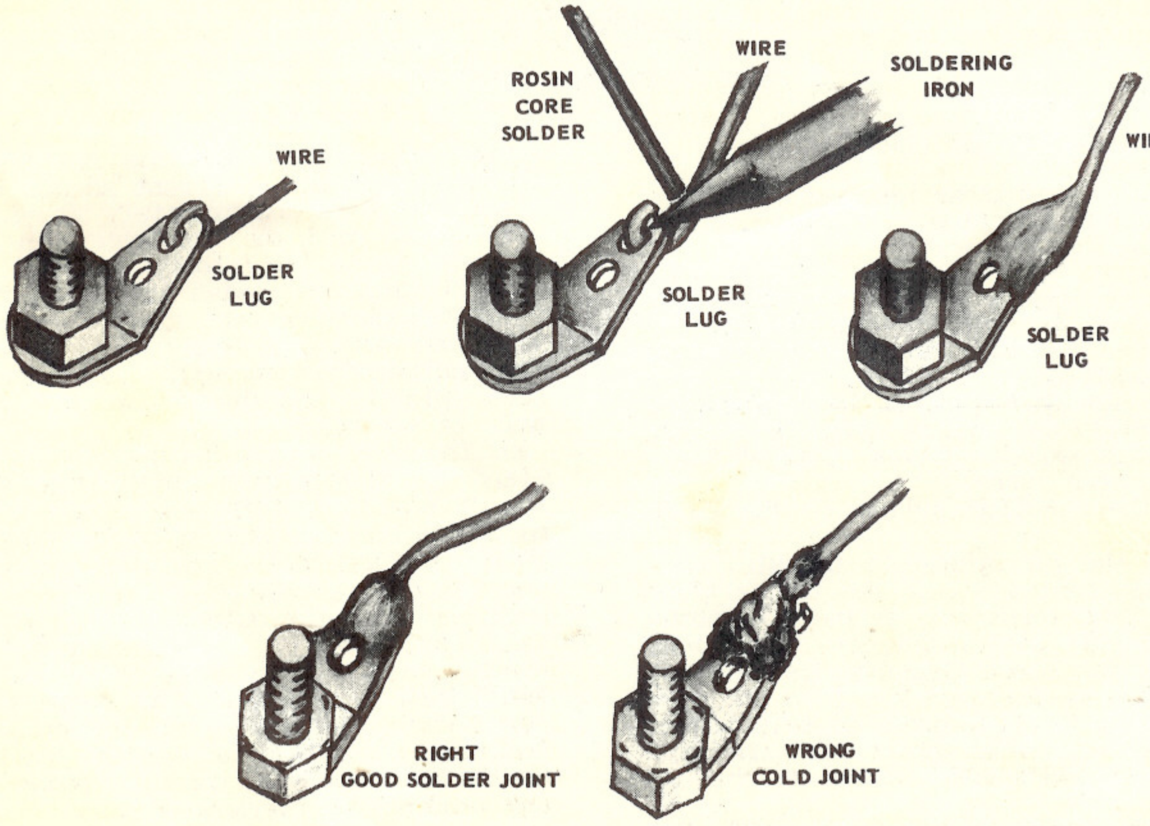
4-1. SINGLE SIDEBAND OPERATION.

4-2. Once the transmitter has been properly tuned up for CW operation, it may be placed into SSB operation as follows:

1. Place the TRANSMIT switch in the OFF position.
2. Remove the crystal from the XTAL socket.
3. Place the XTAL-VFO switch to the XTAL position.
4. Connect a SSB signal source to the SSB connection on the rear of the chassis. The SSB driver unit must deliver 5-10 watts power to the final amplifier grid.
5. Place the FUNCTION switch to the SSB position.
6. Place the TRANSMIT switch to the ON position.
7. Inject a steady tone, in the range of 1000 to 1500 cycles, into the audio input of the SSB exciter. An audio signal generator is excellent for this purpose. Should no signal generator be available, the operator may whistle into the microphone, holding the tone as steady as possible. The final amplifier grid current SHOULD NOT exceed 5 Ma. (A grid current of about 1 Ma. on peaks is excellent).
8. The final amplifier plate current swing for full input should not exceed 300 Ma. peak. The resting current will be approximately 60 Ma. in SSB operation. The power amplifier grid and plate current swings are entirely controlled by the amount of excitation from the SSB exciter.
9. Settings of the tuning controls will hold over a slight frequency shift. The transmitter should be re-tuned for large frequency excursions.

4-3. The most satisfactory method of tuning any SSB amplifier for maximum efficiency is to use a R.F. current indicating device in the antenna system, along with a scope to monitor linearity. Using the two tone test, adjust drive to the final amplifier for about 1 ma. Load the final amplifier for maximum RF output, as indicated by the RF indicator, so long as the waveshape stays linear.

HOW TO MAKE A GOOD SOLDER JOINT



SECTION V

ANTENNA CONSIDERATIONS

5-1. ANTENNA CONSIDERATIONS.

5-2. The output circuit of the Globe Champion transmitter, Model 300, utilizes a pi network which has the capability of matching a considerable range of non-reactive load impedances. As the reactive component increases in the antenna and feedline, the matching range is reduced as the pi network must compensate with an equal and opposite reactance for proper matching. In some cases, where the reactive component is large in comparison to the resistive component of the load, the matching range of the network may be reduced to as low as 50-100 ohms. Properly, the operator should accurately measure the antenna impedance at the transmitter end of the feedline and correct any large amount of reactance at the antenna rather than trying to tune it out with the pi network.

5-3. The Windom antenna, when properly constructed, will come closest to supplying a reasonable impedance match on all bands without the use of an antenna tuner. The greatest disadvantage of this type of antenna is since it is fundamentally a harmonic type of antenna it will not provide any great degree of attenuation to undesirable harmonics. Careful tuning of the transmitter and pi network will help considerably to overcome the attenuation deficiency of the antenna and satisfactory results may be obtained.

5-4. There are numerous antenna configurations that will give good all band results. However, in many cases the impedance presented to the transmitter on one or more bands will not be within the capabilities of the pi network; in these instances an antenna tuner will be required. The standard dipole and folded dipole antennas are the easiest to match. While the free space center impedance of the dipole is considered to be 72 ohms, in practice it is usually nearer to 50-60 ohms. This is due to the proximity of the antenna to ground; if the antenna is one-half wave or more above ground, it may be considered to be a 72 ohm free space antenna and may be fed with 72 ohm line. A 52 ohm feedline would be more suitable if the antenna were between one-quarter and one-half wave above ground. The folded dipole is not so greatly affected as to impedance and will generally show a center impedance of close to 270 ohms. A 300 ohm feedline is most suitable for that type antenna. A height of at least one-half wave above ground is highly desirable for any type of antenna.

5-5. One of the most commonly encountered troubles is a feedline that acts as a transformer. Proper loading to the transmitter cannot be obtained in many antenna installations where the measured SWR at the transmitter indicates 1.1:1. This is due to the above mentioned transformer action of the feedline. As an example: A 52 ohm feedline attached to an improperly adjusted beam indicates an SWR of 1.5:1. Due to mismatch at the antenna, the impedance at the transmitter end of the feedline may be 50 to 60 ohms but up to at least 2/3 of this impedance may be reactive. The pi network must then be adjusted to compensate for the high reactive component and in so doing may lose it's capability to match the resistive component of the total load. Here the operator probably shortened or lengthened his feedline to obtain the low SWR, which in turn disguised the original defect of an improperly adjusted antenna.

5-6. All pi networks may normally have the capability of matching a particular range of resistive impedances but due to compensation for excessive reactances may not be able to match the resistive component properly. A resistive antenna having an impedance the same as the characteristic impedance of the feedline should give no difficulty as the line is flat. Changing the length will not change the feed point impedance. Where the antenna does not have an impedance the same as the feedline, or where the antenna is reactive (off resonance), the feedline should preferably be cut to odd multiples of one-half wave (1/2, 1-1/2, 2-1/2, etc.) taking into account the feedline velocity factor. A close reproduction of the center impedance of the antenna will thus be presented to the transmitter. A feedline cut to one-eighth or one-quarter wave may present a very complex impedance at the transmitter end of the feedline. Such an antenna system, while showing a relatively low SWR, may be virtually impossible to load in many cases.

5-7. On all bands, except 160 meters, the Globe Champion transmitter output circuit can match in excess of 50-600 ohms where a small amount of reactance is present. On 160 meters the lowest impedance that may be matched is 300 ohms. A one-half wave off-center fed antenna using single wire feed is satisfactory on this band. A very good ground system is imperative with this type of antenna. The exact feed point may be determined experimentally starting at a point approximately 1/3 from either end. The 400 ohm point will probably be the most satisfactory as it allows some leeway for reactance.

5-8. Beam type antennas usually have a very low impedance, often as low as 15 ohms for a close spaced 3-element array. The feed point impedance of such an antenna may be increased to a high enough value for use with standard feedlines through the use of a folded dipole driven element, a "T" match, a Gamma match, etc. Even so, a very little reactance may present a complex impedance below 50 ohms which may be impossible for the pi network to match. The best solution is to try to make the impedance presented to the transmitter about 70 ohms as slightly more reactance can be tuned out and still maintain a match.

5-9. The most reliable way to adjust any antenna is by the use of a good SWR bridge. Most bridges cover the range of 50-72 ohms. The bridge should be excited by a low power signal on the operating frequency (power to be determined by the manufactures specifications) and the ANTENNA adjusted for the lowest possible SWR. An SWR of 1.5:1 is good. The antenna section of the ARRL Handbook gives many suggestions for antennas, feedlines, etc.

5-10. Keep in mind the fact that many antenna formulas refer only to free space, or theoretical dimensions and impedances which will seldom hold true in practical application. An antenna which may present a certain impedance at one location may be considerably different at another location, even at the same height above ground. Surrounding objects, soil conductivity, etc. will all affect the antenna impedance. Therefore, specified dimensions may have to be corrected for each particular location and the only sure way that an antenna impedance can be determined is to measure it properly.

5-11. ANTENNA FORMULAS.

5-12. All formula answers are in feet. One wavelength in free space $= \frac{300}{\text{Freq. Mc.}}$

$$\text{One-half wave dipole} = \frac{468}{\text{Freq. Mc.}}$$

$$\text{One-half wave folded dipole} = \frac{462}{\text{Freq. Mc.}}$$

TABLE VI. RECOMMENDED ANTENNAS.

Band	Type Of Antenna				
11-10 Meters	Doublet	F. Dipole	1/4 wave vert.	52 ohm beam	* * * * * *
15 Meters	Doublet	F. Dipole	1/4 wave vert.	52 ohm beam	* * * * * *
20 Meters	Doublet	F. Dipole	1/4 wave vert.	52 ohm beam	* * * * * *
40 Meters	Doublet	F. Dipole	1/4 wave vert.	52 ohm beam	* * * * * *
80 Meters	Doublet	F. Dipole	1/4 wave vert.	* * * * * *	Long wire w/ant. Tuner
160 Meters	Doublet	* * * * *	1/4 wave vert.	* * * * * *	* * * * * *

SECTION VI

MALFUNCTIONS AND PROBABLE CAUSE-VOLTAGE CHART

6-1. GENERAL.

6-2. This section deals with various malfunctions the operator may encounter. The most likely causes for each type of malfunction are given. The operator should be able to ascertain the nature of the malfunction from this chart and thus, easily repair the equipment. A voltage chart is also given as an aid to determining the nature of various malfunctions.

WARNING

Operation of this equipment involves the use of high voltages which are dangerous to life. Observe all safety precautions. Do not attempt to make adjustments inside the equipment or change tubes with any power on. Disconnect-UNPLUG-the A.C. power cord and short out the filter condensers with a highly insulated shorting bar before touching any high voltage components.

6-3. MALFUNCTIONS AND PROBABLE CAUSE.

Symptom	Probable Cause
1. Transmitter will not energize.	1-1. Defective fuse FS-1. 1-2. Defective switch SW-1.
2. Meter indicates backward when AC on.	2-1. Internal short in V4 or V5.
3. VFO note rough or chirpy.	3-1. Defective V1. 3-2. Poor VFO shield or chassis bonding.
4. VFO instability.	4-1. Defective V1 or V15. 4-2. Defective C-11, C-12, C-13, C-14. 4-3. Internal transmitter heat excessive.
5. VFO calibration inaccurate.	5-1. Loose or moved VFO dial pointer. 5-2. Loose VFO coil slug screws. 5-3. Contacts of switch SW-4 intermittent.
6. Lack of final amplifier grid current.	6-1. Defective VFO. 6-2. Defective V2 or V3. 6-3. Bandswitch ganging defective. 6-4. Open key contacts or key jack.
7. Insufficient final amplifier grid current.	7-1. Low AC line voltage. 7-2. Weak or defective V3, V4 or V5. 7-3. Improper tuning procedure. 7-4. Improper adjustment of neutralizing discs.
8. Insufficient final amplifier plate current.	8-1. Low AC line voltage. 8-2. Defective V4 or V5. 8-3. Insufficient grid drive and current. 8-4. Defective meter shunt MS-2.
9. Inadequate final amplifier plate loading.	9-1. Defective relay RLY-4. 9-2. Defective C-43, C-44, C-45 or C-46. 9-3. Defective antenna system. 9-4. Defective V4, V5, V18 or V19. 9-5. Defective switch SW-12.
10. Insufficient or low percentage of modulation.	10-1. Defective tube V7, V8, V9, V10 or V11. 10-2. Defective switch SW-7. 10-3. Defective transformer T-3. 10-4. Open choke CH-3. 10-5. Defective couplate PC-81 or PC-91. 10-6. Shorted jack J-3.
11. Inoperative compression circuit.	11-1. Defective tube V7 or V12. 11-2. Shorted capacitor C-54, C-55 or C-60. 11-3. Defective switch SW-8.

6-3. MALFUNCTIONS AND PROBABLE CAUSE.

Symptom	Probable Cause
12. Inoperative press-to-talk circuit.	12-1. Defective relay RLY-2. 12-2. Shorted capacitor C-65. 12-3. Defective selenium rectifier SR-4. 12-4. Defective microphone switch.
13. Insufficient or no low B+ voltage.	13-1. Defective tube V17. 13-2. Defective switch SW-2. 13-3. Open choke CH-1. 13-4. Shorted capacitor C-66.
14. Insufficient or no high B+ voltage.	14-1. Defective tube V18 or V19. 14-2. Open transformer T-2. 14-3. Shorting QQ winding in transformer T-1. 14-4. Open chokes CH-2 and CH-2A. 14.5. Shorted capacitor C-68.
15. Inoperative bias supply.	15-1. Defective winding in transformer T-1. 15-2. Defective selenium rectifier SR-3. 15-3. Open resistor R-17 or R-18. 15-4. Shorted capacitor C-27 or C-28.
16. Fuse blows when transmit switch placed in "ON" position.	16-1. Defective QQ winding in transformer T-1. 16-2. Shorted tube V10, V11, V18, or V19. 16-3. Shorted capacitor C-40 or C-68.
17. No final amplifier plate current.	17-1. Defective tube V4, V5, V18 or V19. 17-2. Open chokes CH-2 and CH-2A. 17-3. Open secondary on transformer T-3. 17-4. Open RF choke RFC-6. 17-5. Open meter shunt MS-2. 17-6. Open relay RLY-1. 17-7. Lack of RF excitation to tubes V4 and V5.
18. No modulator plate current.	18-1. Defective tube V10 or V11. 18-2. Open primary of transformer T-3. 18-3. Defective switch SW-7. 18-4. Excessive grid bias. 18-5. Open secondary of transformer T-4.

6-4. TYPICAL VOLTAGE READINGS.

6-5. The voltage readings given in Table V are typical for the conditions as set forth. Some allowance must be made if the test meter used is not a 20,000 ohm per volt meter.

WARNING

Use extreme caution when taking voltage readings. High voltages, dangerous to life, are involved.

CONDITIONS: AC line voltage 115 volts; Test meter 20,000 ohms per volt; FUNCTION switch placed in PHONE position; Transmitter tuned on 40 meter band, loaded to 320 ma; Grid current 12 ma; No modulation applied; Meter connected from specified point to chassis ground except where otherwise noted.

TABLE V. TYPICAL VOLTAGE READINGS.

Tube Type	Symb.	Tube Pin Number 1	2	3	4	5	6	7	8	9	Plate Cap
AX-9909	V4 V5	6.3 AC	Below RFC-5 -105 DC	+255 DC	Below RFC-6 +950 DC	0	0	6.3 AC	———	———	———
2E26	V3	0	6.3 AC	+25 DC	0	Below RFC-3 -110 DC	0	0	0	———	Below RFC-4 +320 DC
6CL6	V2	+2 DC	0	+120 DC	0	6.3 AC	+225 DC	0	+120 DC	0	———
12AU7	V6	0 -10 DC‡	0 -25 DC‡	+12 DC -28 DC‡	0 0‡	0 0‡	+225 DC +280 DC‡	0 -90 DC‡	+12 DC -28 DC‡	6.3 AC	———
6AU6	V1	0	0	0	6.3 AC	+225 DC	+150 DC	0	———	———	———
12AX7	V8	0	0	0	0	0	+200 DC	0	+2 DC	6.3 AC	———
6AQ5	V9	0	+14 DC	0	6.3 AC	+225 DC	+230 DC	0	———	———	———
809	V10 V11	3.2 AC	0	-8 DC	3.2 AC	———	———	———	———	———	+920DC
6AL5	V12	75 AC*	75 AC*	6.3 AC	0	0	0	-160 DC	———	———	———
6AU6	V7	0	-60 DC	0	6.3 AC	+80 DC	+20 DC	+.75 DC	———	———	———
0A2	V15 V16 V17	0	0	0	0	+150 DC	0	0	———	———	———
0B2	V13	0	0	0	0	+255 DC	0	+150 DC	———	———	———
5U4GB	V17	+350 DC	+350 DC	———	+440 AC	0	440 AC	———	5V AC To Pin 2	———	———
866A	V18 V19	2.5V AC To Pin 4	0	0	+980 DC	———	———	———	———	———	1000 AC

‡ FUNCTION switch at CW position. Key contacts open. Switch attached to GAIN control in OFF position.

* Modulation swing of 180 ma peak. COMPRESSION switch in ON position. Measured with audio output meter.

SECTION VII

PARTS LIST

Quan.	Description	Circuit Designa-tion	WRL Part No.
1	*Capacitor, TCZ 82 mmf ceramic tubular	C-1	1101-012
1	*Capacitor, 500 mmf Silver mica	C-2	1102-007
1	*Capacitor, 500 mmf Silver mica	C-3	1102-007
1	*Capacitor, .005 mf ceramic disc	C-4	1101-003
1	*Capacitor, .005 mf ceramic disc	C-5	1101-003
1	*Capacitor, TCZ 130 mmf ceramic tubular	C-6	1101-013
1	*Capacitor, .005 mf ceramic disc	C-7	1101-003
1	*Capacitor, 200 mmf mica	C-8	1102-001
1	*Capacitor, TCZ 1 mmf ceramic tubular	C-9	1101-021
1	*Capacitor, 15 mmf variable	C-10	1105-008
1	*Capacitor, TCN 120 mmf ceramic tubular	C-11	1101-016
1	*Capacitor, TCZ 18 mmf ceramic tubular	C-12	1101-017
1	*Capacitor, TCZ 39 mmf ceramic tubular	C-13	1101-006
1	*Capacitor, TCN 15 mmf ceramic tubular	C-14	1101-008
1	*Capacitor, 9 mmf variable	C-15	1105-010
1	*Capacitor, variable, Special Dual VFO	C-16	1105-007
1	*Tab. 1/4 mmf	C-17	on SW 4B
1	*Capacitor, 9 mmf variable	C-18	1105-010
1	Capacitor, 25 mmf ceramic disc	C-19	1101-001
1	Capacitor, .002 mf ceramic disc	C-20	1101-009
1	Capacitor, 250 mmf ceramic tubular	C-21	1101-007
1	Capacitor, .005 mf ceramic disc	C-22	1101-003
1	Capacitor, 25 mf-25 volt electrolytic	C-23	1106-003
1	Capacitor, 70 mmf mica	C-24	1101-018
1	Capacitor, .005 mf ceramic disc	C-25	1101-003
1	Capacitor, .005 mf ceramic disc	C-26	1101-003
1	Capacitor, 20 mf-150 volt electrolytic	C-27	1106-006
1	Capacitor, 20 mf-150 volt electrolytic	C-28	1106-006
1	Capacitor, .005 mf ceramic disc	C-29	1101-003
1	Capacitor, .001 mf-6000 volts, ceramic	C-30	1101-027
1	Capacitor, 140 mmf variable	C-31	1105-001
1	Capacitor, .005 mf ceramic disc	C-32	1101-003
1	Capacitor, .005 mf ceramic disc	C-33	1101-003
1	Capacitor, 200 mmf mica	C-34	1102-001
1	Capacitor, .005 mf ceramic disc	C-35	1101-003
1	Capacitor, .005 mf ceramic disc	C-36	1101-003
1	Capacitor, .002 mf ceramic disc	C-37	1102-001
1	Capacitor, .002 mf ceramic disc	C-38	1102-001
1	Door Knob, 500 mmf 20 KV	C-39	1107-002
1	Capacitor, 500 mmf 10 KV ceramic	C-40	1101-010
1	Capacitor, 250 mmf variable	C-41	1105-003
1	Capacitor, 350 mmf variable	C-42	1105-004
1	Capacitor, .0002mf-2500 Volt, mica	C-43	1102-004
1	Capacitor, .0004mf-2500 volt, mica	C-44	1102-008
1	Capacitor, .0006mf-2500 volt, mica	C-45	1102-009
1	Capacitor, .0008 mf-2500 volt, mica	C-46	1102-010
1 1	Capacitor, .1 mf-200 volt, paper	C-49	1100-001
1	Capacitor, 25 mf-25 volt, electrolytic	C-50	1106-003
1	Capacitor, 10 mf-500 volt, can. electrolytic	C-51	1106-002
1	Capacitor, 10 mf-500 volt, can. electrolytic	C-52	1106-002
1	Capacitor, 25 mf-25 volt, electrolytic	C-53	1106-003
1	Capacitor, .1 mf-200 volt, paper	C-54	1100-001
1	Capacitor, .002 mf ceramic disc	C-55	1101-009
1	Capacitor, 500mmf ceramic disc	C-56	1101-005
1	Capacitor, 500 mmf ceramic disc	C-57	1101-005
1	Capacitor, 500mmf ceramic disc	C-58	1101-005
1	Capacitor, 25 mf-25 volt, electrolytic	C-59	1106-003
1	Capacitor, .005 mf ceramic disc	C-60	1101-003
1	Capacitor, 10 mf-500 volt, electrolytic	C-61	1106-002
1	Capacitor, .005 mfd ceramic disc	C-62	1101-003

Quan.	Description	Circuit Designation	WRL Part No.
1	Capacitor, Dual .0008 mf-1600 volt, ceramic disc	C-63	1104-002
1	Capacitor, 15 mmf tube	C-64	1101-008
1	Capacitor, 50 mf-25 volt, electrolytic	C-65	1106-005
1	Capacitor, 8 mf-450 volt, electrolytic	C-66	1106-013
1	Capacitor, 6 mf-1000 volt, oil filled	C-68	1103-004
1	Capacitor, .005 mf ceramic disc	C-71	1101-003
1	Capacitor, .005 mf ceramic disc	C-72	1101-003
1	Capacitor, .005 mf ceramic disc	C-73	1101-003
1	Capacitor, .005 mf ceramic disc	C-74	1101-003
1	Choke, 7H. 250 ma	CH-1	1300-008
1	Choke, 7H. 250 ma	CH-2	1300-008
1	Choke, 7H. 250 ma	CH-2A	1300-008
1	Choke, 4H. 50 ma	CH-3	1300-007
1	Choke, 7H· 50 ma	CH-5	1300-001
1	Connecter, coaxial 831R	CX-1	2000-004
1	Connector, coaxial 831R	CX-2	2000-004
1	Fuse, 10 ampere	FS-1	1500-004
1	Jack, key, closed circuit	J-1	2004-001
1	Jack, microphone 2 circuit	J-2	2000-001
1	Jack, key, open circuit	J-3	2004-002
1	Jack, key, phono tip	J-4	2000-002
1	*Coil, plate, 40M VFO	L-1	1400-024
1	*Coil, plate, 160M VFO	L-2	1400-121A
1	Coil, plate, orange dot, 20/11M 6CL6	L-3	1400-022B
1	Coil, plate, yellow dot, 40M 6CL6	L-4	1400-023A
1	Coil, plate, green dot, 160/80M 6CL6	L-5	1400-021A
1	Coil, final grid, 160/40M	L-6	1400-018A
1	Coil, final grid, 20/10M	L-7	1400-019A
1	Coil, final plate, 10M	L-8	1400-029
1	Coil, plate, 80/15M	L-9	1400-027A
1	Coil, plate, 160M	L-10	1400-028A
1	Coil, plate, white dot, 15M 6CL6	L-11	1400-038
1	*Coil, grid, VFO 160/80	L-12	1400-025
1			

Quan.	Description	Circuit Designation	WRL Part No.
1	*Coil, grid, VFO 40/10M	L-13	1400-026
1	Coil, plate, blue dot, 11M 6CL6	L-14	1400-040
1	Coil, 3M, 0-20-400Ma	M	2500-009
1	Couplate, PC81	PC81	1109-001
1	Couplate, PC91	PC91	1109-002
1	Choke, parasitic, final plate	PS-1	1301-010
1	Choke, parasitic, final plate	PS-2	1301-010
1	Choke, parasitic, buffer plate	PS-3	1301-008
1	*Resistor, 56 ohms, 1/2 watt	R-1	1000-010
1	*Resistor, 100K ohms, 1/2 watt	R-2	1000-004
1	Resistor, 15K ohms, 1/2 watt	R-3	1000-013
1	*Resistor, 4700 ohms, 2 watt	R-4	1002-012
1	Resistor, 1 meg 1/2 watt	R-5	1000-023
1	Resistor, 500K ohms, potentiometer	R-6	2300-001
1	Resistor, 47K ohms, 1 watt	R-7	1001-009
1	Resistor, 100K ohms, 1/2 watt	R-8	1000-004
1	Resistor, 47K ohms, 1/2 watt	R-9	1000-002
1	Resistor, 120 ohms, 1/2 watt	R-10	1000-003
1	Resistor, 22K ohms, 1 watt	R-13	1001-010
1	Resistor, 120 ohms, 2 watt	R-14	1002-007
1	Resistor, 390 ohms, 2 watt	R-15	1002-005
1	Resistor, 4700 ohms, 2 watt	R-16	1002-012
1	Resistor, 56 ohms, 1 watt	R-17	1001-003
1	Resistor, 560 ohms, 2 watt	R-18	1002-008
1	Resistor, 8200 ohms, 1 watt	R-19	1001-012
1	Resistor, 2200 ohms, 2 watt	R-20	1002-010
1	Resistor, 1500 ohms, 1 watt	R-21	1001-007
1	Potentiometer, 25K ohms, 5 watt, wire wound	R-22	2300-003
1	Resistor, 8200 ohms, 2 watt	R-23	1002-011
1	Resistor, 120 ohms, 1/2 watt	R-24	1000-003

PARTS LIST

Quan.	Description	Circuit Designation	WRL Part No.
1	Resistor, 2000 ohms, 7 watt	R-25	1003-008
1	Resistor, 25K ohms, 10 watt	R-26	1003-001
1	Resistor, 100K ohms, 1/2 watt	R-27	1000-004
1	Resistor, 2.2 meg 1/2 watt	R-28	1000-005
1	Resistor, 560K ohms, 1/2 watt	R-29	1000-022
1	Resistor, 2200 ohms, 1/2 watt	R-30	1000-012
1	Resistor, 1 meg 1/2 watt	R-31	1000-023
1	Resistor, 1 meg 1/2 watt	R-32	1000-023
1	Resistor, 22K ohms, 1/2 watt	R-33	1000-008
1	Resistor, 4700 ohms, 1/2 watt	R-34	1000-018
1	Resistor, 220K ohms, 1/2 watt	R-35	1000-019
1	Resistor, 22K ohms, 1/2 watt	R-36	1000-008
1	Resistor, 2000 ohms, 5 watt	R-37	1003-008
1	Resistor, 47K ohms, 1/2 watt	R-38	1000-002
1	Resistor, 390K ohms, 1/2 watt	R-39	1000-015
1	Resistor, 390 ohms, 2 watt	R-40	1002-005
1	Resistor, 47K ohms, 1/2 watt	R-41	1000-002
1	Resistor, 500K potentiometer w/switch	R-42	2300-002
1	Resistor, 47K ohms, 1/2 watt	R-43	1000-002
1	Resistor, 50K ohms, 10 watt	R-44	1003-009
1	Resistor, 50K ohms, 50 watt	R-45	1006-002
1	Resistor, 68K ohms, 2 watt	R-47	1002-006
1	Resistor, 2000 ohms, 5 watt	R-49	1003-008
1	Choke, RF, 2.4 mh-125 ma	RFC-1	1301-001
1	Choke, RF, 750 uh-50 ma	RFC-2	1301-005
1	Choke, RF, 750 uh-50 ma	RFC-3	1301-005
1	Choke, RF, 2.4 mh-125 ma	RFC-4	1301-001
1	Choke, RF, 750 uh-50 ma	RFC-5	1301-005
1	Choke, RF, 1 mh-600 ma	RFC-6	1301-004
1	Choke, RF, AC line	RFC-7	1301-011
1	Choke, RF, AC line	RFC-8	1301-011
1	Relay, SPDT, 115V AC	RLY-1	3500-007
1	Relay, SPDT, 6V DC	RLY-2	3500-006
1	Relay, DPST, 115V AC	RLY-3	3500-005
1	Relay, DPDT, 115V AC	RLY-4	3500-004

Quan.	Description	Circuit Designation	WRL Part No.
1	Rectifier, selenium, 65 ma	SR-1	3700-001
1	Rectifier, selenium, 65 ma	SR-2	3700-001
1	Rectifier, selenium, 65 ma	SR-3	3700-001
1	Rectifier, selenium, 25 ma	SR-4	3700-003
1	Switch, toggle, DPST	SW-1	2101-002
1	Switch, toggle, DPST	SW-2	2101-002
1	Switch, toggle, DPST	SW-3	2101-002
1	*Switch, rotary, VFO band switch	SW-4	2100-010A
1	*Switch, rotary, xtal-VFO	SW-5	2100-012
1	Switch, rotary, exciter band switch	SW-6	2100-009C
1	Switch, rotary, function	SW-7	2100-008
1	Switch, toggle, DPDT	SW-8	2101-001
1	Switch, rotary, DPDT final pl. band	SW-9	2100-007
1	Switch, rotary, meter	SW-10	2100-005
1	Switch cover-integral with R-42	SW-11	* * * *
1	Switch, rotary, coarse load	SW-12	2100-011
1	Transformer, low voltage power	T-1	1201-008
1	Transformer, high voltage plate	T-2	1201-001
1	Transformer, modulation	T-3	1203-005
1	Transformer, driver	T-4	1203-006
1	Lamp, type #47	I-1	3800-002
1	Lamp, type 6S6	I-2	3800-003
1	Lamp, type T6-1/2	I-3	3800-001
1	Shunt, meter, .25 ohm	MS-1	1010-003
1	Shunt, meter, .25 ohm	MS-2	1010-003

Quan.	Description	WRL Part No.
7	Bearing, panel	3300-019
1	Bearing, panel w/shaft	3300-018
1	Bracket, coil mounting	1901-014
1	Bracket, condenser mounting 1/2" hole	1901-012A
2	▲Bracket, oil condenser mounting	* * * *
2	**Bracket, resistor mounting	* * * *
3	Bracket, switch mtg.	1901-012
1	Cabinet	1700-010A
1	Cable, power, AC	2700-043
1	Chass-sub, tube mounting	1901-013
1	Chassis	1900-003
1	Clamp, cable	3300-030
5	Coupling, shaft, flexible	3300-021
2	Coupling, shaft, rigid	3300-024
1	Dial assembly, VFO	3300-005A 3300-006
1	Dial pointer, VFO.	3300-007
1	Fuse retainer	1500-006
2	Gear, bevel	3300-032
12	Grommet, 3/8"	3200-001
2	Grommet, 1/2"	3200-002
2	Insulator, cone, 5/8"	2201-001
4	Insulator, feed-through, 1"	2200-001
5	Knob, bar	2600-008
6	Knob, round	2600-009
8	Lug, solder, #4	2006-005
35	Lug, solder, #6	2006-004
3	Lug, solder, #6 double	2006-006
1	Lug, solder, #6 tear-drop	2006-008
4	Lug, solder, #10	2006-009
2	Neutralizing capacitor plates	1901-017
23	Nut, hex, 2-56 X 3/16	2901-007
6	Nut, hex, 4-40 X 3/16	2901-001
110	Nut, hex, 6-32 X 1/4	2901-003
7	Nut, hex, 8-32 X 5/16	2901-004
14	Nut, hex, 10-32 X 5/16	2901-005
5	Nut, hex, 3/8"	2901-006
4	† Nut, ring	* * * *
1	Pad, foam	3300-041
1	Panel	1800-007
1	Pilot lamp assembly, red jewel	2400-002
[1	Pilot lamp assembly, meter	2400-007 2400-008]

Quan.	Description	WRL Part No.
1	Pilot lamp assembly, VFO dial	2400-005
1	Plate cap, #24	2005-003
4	Plate cap, 9/16"	2005-002
1	Plate, electrolytic capacitor mtg.	* * * *
4	Plate, switch On-Off	2103-001
1	Plate, VFO switch guide	1901-018
1	Plug, VFO power (4-prong)	2001-011
1	Receptacle, VFO power	2000-006
23	Screw, 2-56 X 5/16, BH	2900-021
2	Screw, 4-40 X 3/8, special head	2900-001M
4	Screw, 4-40 X 3/8, BH	2900-001
1	Screw, 6-32 X 3/16, BH	2900-018
16	Screw, 6-32 X 1/4, BH	2900-003
63	Screw, 6-32 X 5/16, BH	2900-004
12	Screw, 6-32 X 1/2, BH	2900-005
1	Screw, 6-32 X 7/8, BH	2900-006
1	Screw, 6-32 X 1-3/4, RH	2900-008
6	Screw, 8-32 X 1/2, BH	2900-025
28	Screw, #6 X 1/4, self-tapping	2900-017
5	Screw, 10-32 X 1/2, TH	2900-024
5	Screw, 10-32 X 1/2, BH	2900-009
10	Screw, 10-32 X 1/2, Phillips Head	2900-023
1	Shaft, flatted, 5-3/4 in.	3300-047
1	Shaft, full round, 6 in.	3300-042
1	Shaft, full round, 6-1/4 in.	3300-043
1	Shaft, full round, 8-1/4 in.	3300-044
1	Shaft, full round, 10-1/2 in.	3300-046
1	Shaft, full round, 11-3/4 in.	3300-045
1	Shield, RF, final plate	1902-008
1	Shield, RF, final grid	1902-009
1	Shield, miniature tube, short	1600-021
1	Shield, miniature tube, medium	1600-020
1	Shield, miniature tube, long	1600-016
2	Socket, 4-pin, bakelite	1600-005
2	Socket, 4-pin, ceramic	1600-006
1	Socket, octal, mica filled	1600-004
2	Socket, 9-pin, miniature shielded base	1600-015

SECTION VII

PARTS LIST

Quan.	Description	WRL Part No.
1	Socket, 7-pin miniature, sheilded base	1600-019
1	Socket 9-pin miniature	1600-014
5	Socket, 7-pin miniature, wafer	1600-011
2	Socket, ceramic AX9909	1600-010
1	Socket, crystal	1602-002
5	†† Socket, retainer ring	* * * *
7	Spacer, brass, 1/2" internal thread	3300-020
10"	Spaghetti, #20, black	2800-008
6"	Spaghetti, #12, yellow	2800-002
2"	Spaghetti, #2, yellow	2800-006
4"	Spaghetti, large, clear	2800-005
1	Terminal strip, 2-screw	2003-002
8	Tie strip, 1-lug	2002-006
7	Tie strip, 2-lug	2002-002
2	Tie strip, 3-lug	2002-003
6	Tie strip, 5-lug	2002-004
1	Tie strip, 1-lug, 3/16" mtg. hole	2002-006S
1	VFO, assembled	3900-001
90	Washer, lock, #6	3101-002
6	Washer, lock, #8	3101-003
10	Washer, lock, #10	3101-004
3	Washer, lock, 3/8"	3101-005
1	Washer, flat, fiber, 3/8"	3100-004
1	Washer, extruded fiber, 3/8"	3100-003
1	Wheel, friction drive	3300-011

* In VFO
** Supplied with resistor R-45
*** Supplied with triple section capacitor C-51, C-52, C-61
† Supplied with toggle switches
†† Supplied with sockets
▲ Supplied with capacitor C-68

Quan.	Tube Type Description
2	Tube, AX9909
1	Tube, 2E26
1	Tube, 6CL6
1	Tube, 12AU7
2	Tube, 6AU6
1	Tube, 12AX7
1	Tube, 6AQ5
2	Tube, 809
1	Tube, 6AL5
3	Tube, OA2
1	Tube, OB2
1	Tube, 5U4GB
2	Tube, 866A

WIRE-KIT ASSEMBLY ONLY		
1	Harness, assembly	2703-003
35"	#14 bus wire	2700-040
55"	#16 bus wire	2700-004
65"	#20 bus wire	2700-005
60"	#20 hook-up wire, white, stranded	2700-016
35"	#20 hook-up wire, yellow, solid	2700-001
16"	#16 hook-up wire, yellow, stranded	2700-014
6"	#20 hook-up wire, red, stranded	2700-014
8"	#20 hook-up wire, black, stranded	2700-015
15"	#20 hook-up wire, blue, stranded	2700-013

GLOBE CHAMPION Model 300

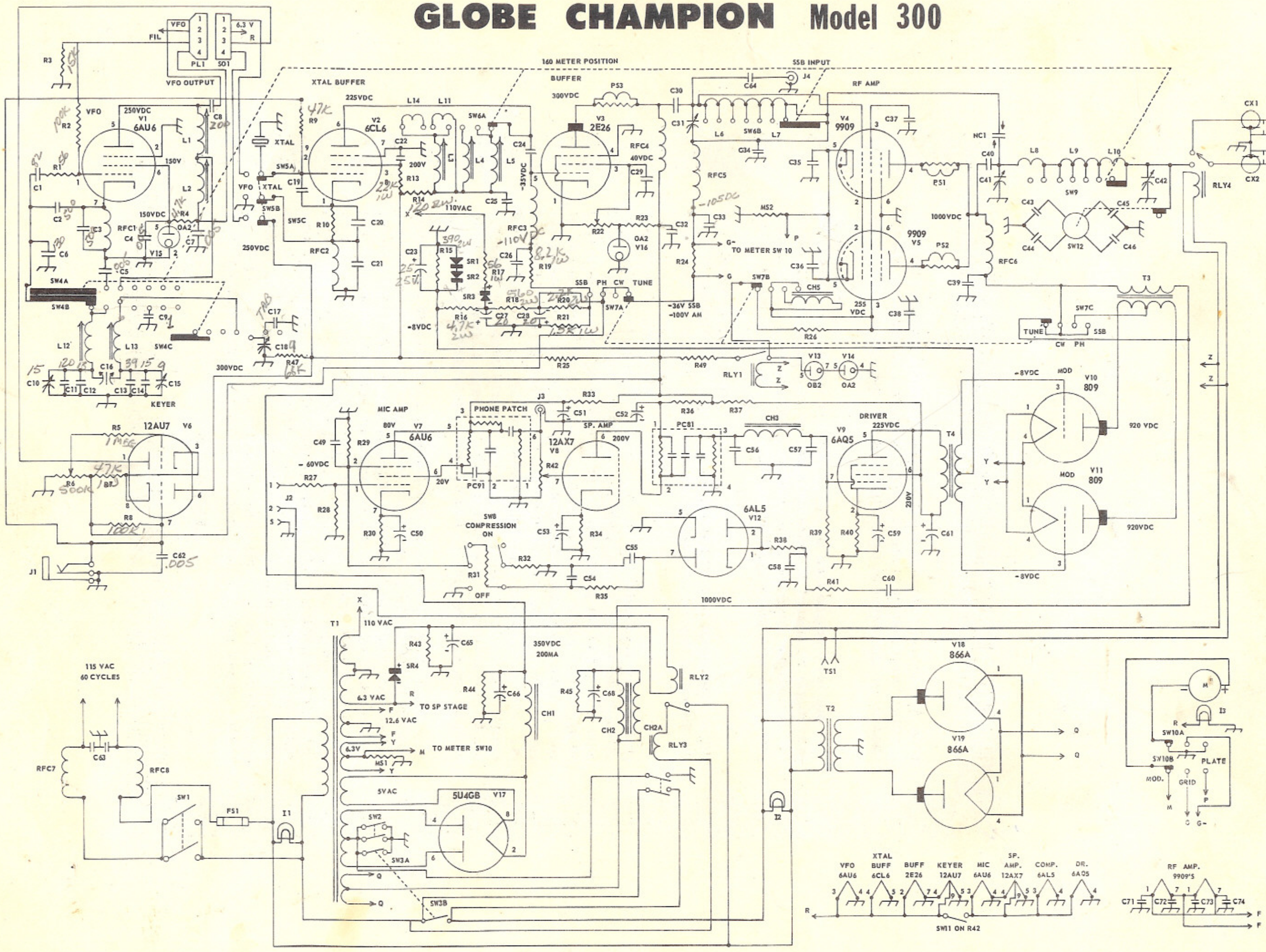


Figure 2. Schematic Drawing Of Globe Champion Model 300

ENGINEERING BULLITEN OCT. 7, 1957

Subject: Additional Tuneup instructions for The Globe Champ 300
These are to follow paragraph 2-36 of section II Opr. Procedures.

1. Insert an SWR Bridge, or a 2 ampere R. F. Ammeter, in series with the transmitter and antenna feed line.

2. Adjust the Drive control for Max. output indication of the R.F. ammeter or SWR Bridge indicator. (Under these conditions the R. F. output of the transmitter is at maximum even though the Final grid and plate current indications are somewhat removed from the typical values given previously in the tune-up porcedure. This is the accepted and most accurate method of tuning up a pentode or tetrode final amplifier for maximum operating efficiency).

Plate current of the Final Amplifier stagemust not be allowed to drop below 275 Ma. or the modulator tubes will not have the proper reflected load applied to them. Such a condition would result in possible flashover of some components and would also appreciably change the audio response.

The recommended Final plate currents are as follows;

AM Telephony:	Min. 275 Ma.,	Max. 300 Ma.
CW:	Min. 275 Ma.,	Max. 350 Ma.

The Final grid current for normal operation with maximum R. F. output will range from 5 Ma. to 12 Ma. A satisfactory compromise grid current would be 8 Ma. for CW and 10-12 Ma. for AM Telephony.

7.125 #5 Pos.