INSTRUCTION MANUAL

WA6MAD
KØPKV

for the

GLOBE

"Globe Champion"

MODEL 350

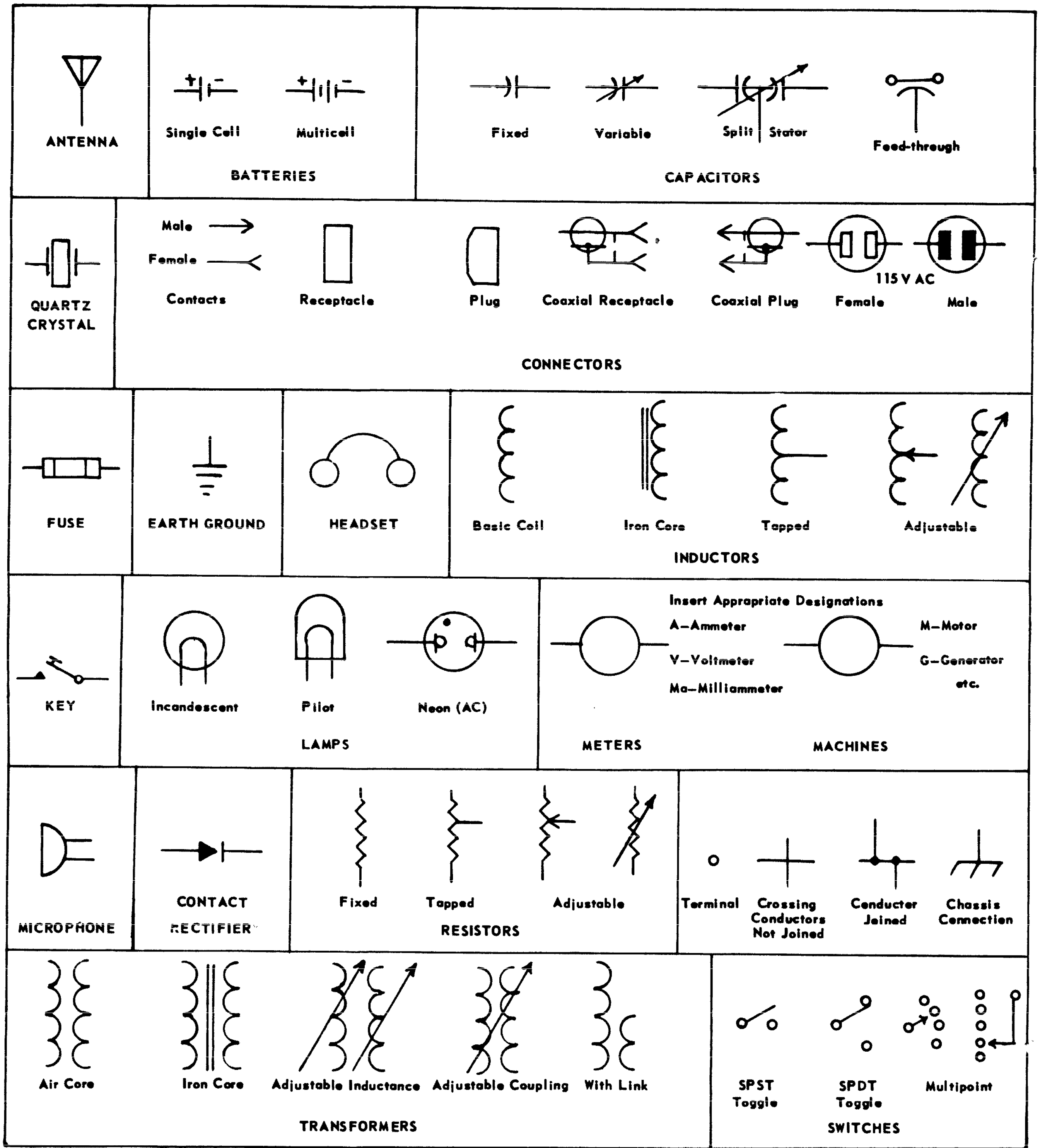
SER C11186W

Manufactured by
GLOBE ELECTRONICS, INC.
Council Bluffs, Iowa

MANUFACTURERS OF

World Famous Globe Transmitters

HELPFUL KIT BUILDING INFORMATION



GLOBE CHAMPION 350

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GENERAL SPECIFICATIONS

Max. Input Power: CW, 350 watts; AM, 275 watts; SB, 400 watts (PEP)

AC Line Power Consumption: CW/SB, 500 watts; AM, 700 watts; Standby, 150 watts
115V AC, 50/600 cycle
Single phase

Output Impedance: 50-300 ohms, resistive load

Frequency Control: External crystal or Internal VFO

Dimensions: 12 inches high, 17 inches deep, 21-1/4 inches wide
Shipping Weight: 120 pounds
Net Weight: 105 pounds

Total Frequency Coverage with Crystal Control: 1.700/2.6MC 3.275/5.300MC 10/23MC 5.400/8.100MC 27.8/31MC

Amateur Band VFO Coverage: 1.8-2MC 3.5-4MC 7.0-7.3MC 14.0-14.350MC 21.0-21.45MC 28-29.7MC


Globe Champion
GLOBE ELECTRONICS

GENERAL DESCRIPTION

SECTION I

1. The Globe Champion transmitter is manufactured by Globe Electronics, Inc. of Council Bluffs, Iowa. The transmitter is capable of operating at 275 watts input power to the final amplifier stage on Telephony (AM), 350 watts input power on Telegraphy (CW), or 400 watts peak input power (P.E.P.) operating single or double sideband (SB) suppressed carrier modes, SB operation requiring an external exciter capable of delivering at least 10 watts to the final amplifier in the Globe Champion.

2. Operation of the Globe Champion requires the operator to hold a valid radio amateur's license, and the operator shall be responsible for operation of the equipment in conformance with existing regulations.

3. The Globe Champion is self-contained (except for SB operation) in a steel, well ventilated cabinet of smart appearance. The cabinet itself, plus internal RF shielding and filtering provides excellent suppression of unwanted radiation. Adequate heat dissipation is provided by an internal air blower.

4. Tube complement: 6AU6 VFO; 6CL6 crystal oscillator/buffer; 2E26 driver; parallel AX-9909 final amplifier tubes; 6AU6 microphone amplifier; 6AQ5 driver; 6AL5 compression rectifier; push-pull 809 modulators; two OA2 voltage regulators; 5U4GB low voltage rectifiers;two 866A high voltage rectifiers.

5. THEORY OF OPERATION

   (a) A 6AU6 tube is employed in the VFO in a series tuned Colpitts or Clapp circuit. The components used throughout the VFO circuity are especially chosen for high frequency stability at normal operating temperatures. Further stability is obtained by complete shielding and isolation of the VFO components on a separate sub-assembly, plus the use of voltage regulation . The basic frequencies developed in the VFO are in the 160 and 40 meter bands, and additional frequency multiplication is utilized in later stages to arrive at the desired operating frequency. Two adjustable slug tuned coils are provided on the VFO sub-assembly to properly resonate the output circuits.

   (b) A 6CL6 tube functions as a Colpitts crystal oscillator or as a buffer/doubler when VFO operation is employed. Crystal or VFO operation is selected by a front panel control switch which connects the 6CL6 grid to either the crystal socket or VFO output circuit. The switch also controls voltage to the VFO stage.

   (c) A 12AU7 tube is used to provide a clean CW keying wave-form. The 12AU7 keyer stage directly controls operation of the 6AU6 VFO tube and 6CL6 crystal oscillator/buffer tube. The 12AU7 tube applies and removes bias voltages at the grids of the 6AU6 and 6CL6 in a sequence that prevents undesirable clicks from appearing in the transmitter output signal. Keying of any RF stage will develop clicks and undesirable spurious signals, however, by employing a sequential keying system and proper wave shaping as accomplished in the 12AU7, these undesirable wave-forms are cut off and do not appear in the output signal.

(d) A 2E26 tube serves as a buffer/doubler stage and drives the final amplifier stage. The screen grid of this tube is voltage regulated to provide very stable operation. In addition, the 2E26 screen voltage is adjustable over a wide range with a panel control to effectively control the grid driving power to the final amplifier stage. The plate tuned circuit of the 2E26 is shunt fed which removes high voltage from the tuned circuit. A capacitive voltage divider in the tuned circuit allows part of the amplifier output signal to be coupled back into the buffer plate and final grid tuned circuit which is common to both stages and, thereby, serves as an effective neutralizing circuit for the final amplifier. This tuned circuit is used to resonate the final grid in all modes of operation.

(e) Two type AX-9909 tubes are used in the final amplifier stage, operating in parallel. The stage operates "straight-through" on all frequencies to assure maximum efficiency and a minimum harmonic content. A shunt fed pi-network is used in the final amplifier stage. The use of a pi-network circuit allows easy bandswitching, matches a range of resistive impedances, cancels small amounts of antenna reactance and attenuates harmonics. High level plate modulation is used and the screen grids of the final amplifier tubes are self-modulated by a high inductance choke, assuring 100% modulation.

(f) A 6AU6 first speech stage is used to amplify the microphone output in normal operatio

When compression is introduced by a front panel switch, rectified and filtered, voltage is applied to an element of the 6AU6 to provide greater average output from this stage. Output is coupled through a printed circuit couplate, and then to the panel GAIN control which sets the proper driving level to the following speech amplifier stage, a 12AX7 tube. Output from the 12AX7 triode section is coupled through a printed circuit couplate and also an audio bandpass filter, the latter restricting the audio range to approximately 300-3000 cycles, eliminating excessive lows and highs which waste modulating power in frequencies that contribute little to intelligence and creates unnecessary bandwidth. Output from the filter is applied to the 6AQ5 driver stage, the output of which is transformer-coupled to the modulator (809's) grids. Some of the 6AQ5 output is returned to the 6AL5 compression rectifier where the DC output is filtered and applie to the first 6AU6 speech stage at the proper level to hold the overall modulation to a very high level. A pair of 809 tubes, operated push-pull, Class B, complete the audio system.

(g) Two 866A rectifier tubes, with choke input filter, supply high voltage to the AX-9909 and 809 tubes. A 5U4GB rectifier supplies voltage to all other stages. Selenium rectifiers furnish all required bias voltages. A special bias regulating system is used on the 809 modulators. Two series selenium rectifiers are reverse biased, and the variable resistance of these reverse biased rectifiers very effectively regulates the bias voltage of the 809 modulators which have a large value of grid current swing.

SECTION II

SHIPPING DAMAGE

1. Immediately on receipt of shipment, the carton should be checked for any visible signs of external damage. Should damage be evident, a notation to this effect should be made on the carrier's copy of the waybill. IMMEDIATELY request an inspection by the carrier's agent. Open the shipment and check carefully for concealed damage. Should concealed damage be evident, no matter how slight, a claim for concealed damage should be made to the carrier IMMEDIATELY. Arrangements for repair of any damage should be made with the CARRIER at once. Do not return the equipment to the Dealer from whom the equipment was purchased, or the factory, without first obtaining authorization. Any shipping and/or repair charges should be borne by the carrier. Neither Globe Electronics or their Dealers may be held liable for any unauthorized repair charges or shipping charges incurred due to damage in transit. Protect yourself and file a claim with the carrier for any damage suffered in transit.

2. NORMAL INSTALLATION

   The Globe Champion is shipped with the AX-9909, 809 and 866A tubes packed separately. To install these tubes, the unit must be removed from the cabinet. Remove the front panel screws and self-tapping screws at the rear and slide the unit out of the cabinet carefully. Remove the RF shield cage from the final amplifier by removing the self-tapping screws involved. Insert the AX-9909, 809 and 866A tubes in their proper sockets with a gentle downward rocking motion. Attach plate caps to the 809 and 866A tubes. Check all other tubes for proper seating in their sockets, using the same procedure. Give the unit a careful visual check to insure that no components are broken or abnormally disturbed.

3. Install the final RF shield cage and install all screws provided. Insert the transmitter in the cabinet and use all screws provided. Insert the shorted AC jumper plug provided in the ANT.RELAY receptacle on the rear. Attach a #10 ground wire to the GROUND post provided on the rear.

SECTION III

ANTENNA CONSIDERATIONS

1. The antenna is the most important part of the transmitting station, and if unsuitable for the frequencies or transmitter used, the resulting radiated signal can only be unsatisfactory. The results of an unsatisfactory antenna can be classed in these groups: (a) damage to the transmitter; (b) radiation of spurious signals; (c) poor radiation of the desired signal. As these classifications indicate, poor signal radiation may not be the least trouble encountered.

2. Damage to the transmitter, or feed-line, may result from operation of an antenna system

that has rather high SWR or large values of reactance (reactance can be high with relatively low SWR). In the case of a matched 52 ohm line and a transmitter at 1000 watts input, the RMS voltage across the line is about 180. At the power of the Globe Champion, this is reduced to about 95 volts RMS. The use of pi-network capacitors, rated at 2500 volts peak, insures a very adequate safety factor under any reasonable load condition within the range of the pi-network. The operator should take care to minimize reactance presented to the transmitter as reactance is the factor that damages equipment. Even at a low SWR there can be appreciable reactance, and as it is in series with the load and accepts no power, appreciable voltages can build up and cause damage to properly rated components. It is most important then that the operator tune out reactance from the antenna system to avoid damage to the equipment - such adjustments should be made BEFORE high power is applied.

3. The antenna controls transmitter performance to a great degree in the practical application, and thus must have suitable characteristics for the transmitter in use in order to achieve maximum efficiency. Present day amateur equipment must, for practical reasons, include many features and be designed to have great flexibility. Antenna characteristics must be held within a smaller tolerance with respect to specific impedance and reactance values, and the margin for error decreases with power increase. Failure to do this may not result in component failure, however, circuit constant values may be changed to the extent that they no longer provide the suppression of which they are capable, resulting in the radiation of undesirable signals. Such spurious signals are radiated by the transmitter, however, they are the result of the user not providing a suitable antenna system.

4. Last but certainly not least, use of an unsuitable antenna system can result in radiation of a desired signal which is of considerable less power than which the transmitter is capable of producing, even where there is no danger of break-down or radiation of spurious signals involved.

5. The Globe Champion uses a conventional pi-network in the final RF amplifier stage. Use of such circuity offers flexibility of bandswitching and the capability of matching a range of impedance values. The overall range of the Globe Champion pi-network is such that a satisfactory match can normally be obtained to RESISTIVE loads from 50 to 300 ohms on 10 through 80 meters and 70 to 300 ohms on 160 meters. The values used are optimum for loads of 50 to 75 ohms on 10 through 80 meters and 70 to 150 ohms on 160 meters. We recommend the operator use loads in the optimum matching range. The pi-network must compensate with equal and opposite reactance to reach resonance and achieve the proper match as the reactive component in the antenna/feedline system increases. As reactance increases, the overall range of resistive loads the pi-network will match necessarily decrease at the same time, and a point will be reached where the harmonic rejection characteristic will be inadequate and undesirably large amounts of harmonic signal will be radiated. Then the point will be reached where large values of RF voltages will build up and cause flash-over of components.

6. Recommended antennas are beams, dipoles and verticals that are properly tuned to closely match either a 52 or 72 ohm coaxial feedline. A very common mis-conception seems to be that merely attaching a 52 or 72 ohm coaxial feedline provides a proper match. The impedance value of a length of coaxial line is a value that can be roughly compared to the size of a length of pipe, though not a value of volume. A generalized comparison would be to use a piece of pipe having a diameter of one-half inch and attaching a water pump that delivers more water than the pipe will handle, a pump delivering less than the pump will handle, or a pump that delivers just the right amount of water for the pipe size. However, as stated, the comparison shall not refer to volume in the case of coaxial cable; the comparison is used only to indicate that the antenna impedance and the feedline impedance must be the same to deliver maximum efficiency just as the pipe and pump must have the same characteristics in order to delivery maximum efficiency.

7. Commercially built antennas normally are supplied with information to properly adjust them to match a 52 or 72 ohm coaxial feedline. The operator must recognize the fact that the antenna manufacturer cannot take into account all possible disturbing influences in each and every individual installation. Low SWR will result, in most cases, by following the manufacturer's specifications, however, there are exceptions that will result in undesirably high SWR even though the specifications are followed. The operator should provide himself with a reasonably accurate SWR bridge to see that the antenna actually is satisfactory.

8. The beam antenna should preferably be used on the 10-15-20 meter bands - either the single band or multi-band types as long as the latter is electrically one-half wave on each band and not operating on the principal of multi-wave length. The mini-beam, or shortened type beams, are normally satisfactory, however, where the mini-beam is employed for reasons of space due to close surrounding objects, a mis-match is likely to be encountered and the operator is cautioned to carefully check the antenna impedance with a measuring device.

9. The simple one-half wave dipole is a good choice for the 40-80 meter bands. Important factors in the use of such an antenna are the height, type of feedline and carefully tuning the antenna to resonance. The antenna height above ground is important on these lower frequencies as the feed-point impedance decreases rapidly as they come closer to earth. For this reason, it is very important that the height above ground be at least one-quarter wave length. This amounts to about 35 feet on 40 meters, and 70 feet on 80 meters. The antenna impedance at resonance is generally about 65 ohms at these heights and a satisfactory match to 72 ohm coax can be obtained. The 40 meter height is practical, however, the 80 meter antenna height is usually impractical, and the average mounting height is normally 30 to 40 feet. At this height on 80 meters, the antenna impedance at the center of a one-half wave split dipole is usually close to 55 or 60 ohms, and for that reason, a better match is obtained by using coaxial line of 52 ohms. A 72 ohm coaxial cable should be used if the 80 meter antenna can be mounted over 60 feet high. On such an antenna with balanced radiation characteristics, the use of coaxial feedline which is unbalanced is not entirely proper, however, on 40 meters and lower, it is the lesser of several possible compromises and the use of coaxial feedline

is recommended in preference to twin lead where the operator desires to couple the feedline direct to the pi-network type transmitter. Important facts are: keep the feedline at right angles to the antenna; choose the proper feedline type for the height of the antenna in your installation; make certain the antenna is resonant at the desired frequency and limit operation to the resonant frequency as much as possible. Preferably use a feedline length that is electrically odd quarter-wave lengths long.

10. Operation on 160 meters may be the most difficult as far as antennas are concerned. A one-half wave antenna is about 264 feet long which is out of the question for the average location. The antenna will, therefore, be of the loaded type in most cases. We refer the operator to antenna handbooks that will show appropriate designs for shortened antennas. Arrange for a match of that antenna to a coaxial feedline of either 72 or 104 ohms (the latter obtained by parallel 52 ohm coaxial lines for double the normal impedance) regardless of the design involved.

11. Simple dipoles may be used for the 10-15-20 meter bands and 72 ohm coaxial feedline is the best choice for such antennas.

12. The vertical can be a very effective radiator, either when mounted with the base at ground level and actual earth serving as the counterpoise reference, or the vertical mounted at a height of varying amount with properly tuned radials to serve as an artificial counterpoise. Several commercial trap verticals are offered to the amateur and these, when properly tuned, will be capable of closely matching a 52 ohm coaxial line. The frequent comment that verticals are prone to cause TVI is, in general, quite untrue. In fact, this probably originated from the unfamiliarity of the requirements of a proper vertical installation. Excessive harmonics that may have resulted were not due to the polarization being vertical, but due to a very poor installation.

13. The use of trap doublet antennas covering 80 through 10 or 40 through 10, can be satisfactory under favorable condition. On most such antennas, a one-half wave exists only on the two lowest bands, and on higher bands, the antenna operates as three half-waves, five half-waves, etc. The feedline impedance match is bound to be poorer in such cases of harmonic operation, and in MANY cases, completely unsatisfactory. No difficulty should be encountered where operation is confined to those portions of the band where MEASURED SWR is low, but trying to cover whole bands presents difficulties due to points developing high SWR. We recommend the trap doublet antenna be fed with 72 ohm twin lead, and an antenna tuner be used to cancel reactance and transform the existing impedance to a resistive load in the 52/72 ohm range.

14. The use of balun coils is not generally understood. The commercial balun coil is a device that usually operates either on a single band or covers several bands, frequently 80 through 10 meters. In either case, the arrangement is normally one that provides a FIXED transformation ratio, usually 4:1. The most commonly used is 300 to 75 ohms. If the antenna load is a resistive 300 ohms, then the use of such a balun is quite satisfactory, however, keep in mind that the balun also gives a 4:1 transformation ratio to any reactance as well as the resistive component of the load. For this reason, baluns should only be used with antennas that are very close to a pure 300 ohm resistive load.

SECTION III
(Contd)

In practice, this usually eliminates the use of a balun with the harmonic type Windom antenna fed with 300 ohm line. The SWR and reactive component of this type antenna are appreciable, and the balun will simply transform the existing load to one which has a high reactive value. The Windom type antenna should be used with an antenna tuner in order to: (a) cancel the reactive component; (b) transform the antenna impedance to the desired level of 52 or 72 ohms. Naturally, the antenna tuner also has limitations, and its capability to cancel the antenna reactive component as well as its resistive matching capability without suffering break-down, must be taken into consideration. Most antenna tuners do have the capability of handling complex loads greatly in excess of the pi-network of the commercial amateur transmitter.

15. In conclusion, there is an endless variety of antenna configurations that are useable, and the important requirements are to resonate the antenna to the operating frequency and use suitable matching devices to transform the antenna impedance to 52 or 72 ohms in order to match standard coaxial cable. A complete technical understanding of electrical terms, such as reactance, impedance, etc., is not within the scope of this manual. The operator should refer to appropriate handbooks for this knowledge. The various antenna handbooks are excellent reference material, and it is suggested the amateur possesses and refers to such manuals, even when using commercial antennas, for better understanding of antenna operation and the knowledge to identify an antenna that is not performing as it should.

SECTION IV

GENERAL INFORMATION AND OPERATING HINTS

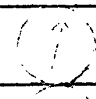
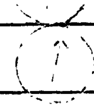
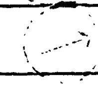
1. CRYSTAL CHART

BAND	HAM BAND LIMITS	EXTREME XTAL COVERAGE	NOTES
160	1800 - 2000 KC	1700 - 2600 KC	See FCC rules for area.
80	3500 - 4000 KC	3275 - 5300 KC	Use 80 meter crystals.
40	7000 - 7300 KC	5400 - 8100 KC	USE 80 METER CRYSTALS 1/2 FREQUENCY
20	14000 - 14350 KC	10 - 15 MC	USE 40 METER CRYSTALS 1/2 FREQUENCY
15	21000 - 21450 KC	14 - 23 MC	USE 40 METER CRYSTALS 1/3 FREQUENCY
10	28000 - 29700 KC	27.8 - 31 MC	USE 40 METER CRYSTALS 1/4 FREQUENCY

The internal VFO covers the amateur bands with slight overlap.

SECTION IV
(Contd)

2. TYPICAL KNOB SETTINGS (Center of ham bands) (52 ohm load) (300 ohm on 160)

CONTROL	160	80	40	20	15	10
FINAL GR. TUNE						
FINAL PLATE TUNE						

3. IMPORTANT! The BANDSWITCH, FUNCTION SWITCH OR COARSE LOAD SWITCH should not be rotated when either the EXCITER or TRANSMIT switches are in the ON position. Failure to observe this precaution will likely result in component break-down.

4. Should RF feed-back occur in the audio system, it may indicate the antenna impedance or reactance must be lowered or that the ground wire is resonating. In the case of the antenna, improved match to low impedance feedline is necessary. In the case of the ground wire, there may be a one-quarter wave resonance, and in such case, it would be desirable to use two separate ground points - one ground wire to be exactly twice the length of the other. Do not use plumbing pipes for grounds, unless the point of connection is close to the entrance into the house or is used in conjunction with other grounds. Use a metal rod that has been driven into the earth.

5. On the rear of the transmitter, there are two AC type receptacles. If the internal antenna relay does not function, check to be sure the jumper plug provided is making good contact in the lower receptacle to complete the relay circuit.

6. When making connections to the microphone jack, be sure the #1 pin is the audio lead, and the #2 pin is the push-to-talk lead.

7. High voltage is used in the equipment, and it is important the operator - UNPLUG - the AC line cord and short the high voltage circuit to the chassis before touching any wiring.

8. The neutralizing plates have been pre-set at the factory. The normal spacing is one-quarter inch and as this is not critical, no adjustment normally need be made in the field when changing final tubes.

9. DESCRIPTION OF CONTROLS

(a) METER SWITCH. Connects the panel meter into either the final grid circuit (read top scale 0-20 ma), the modulator circuit (read lower scale 0-400 ma) or the final circuit (read lower scale 0-400 ma).

(b) AC POWER. Supplies power to entire transmitter. In case of flash-over or other emergency, turn this switch OFF immediately.

(c) EXCITER. Operates high voltage supply feeding exciter and speech amplifier stages.

(d) TRANSMIT. Duplicates EXCITER switch functions, and applies high voltage to the final and modulator tubes. Also actuates internal antenna relay, and places 115V AC on the top AC receptacle on the rear of the transmitter.

(e) FINE LOADING. Matches the final to the antenna load to a fine degree.

(f) COARSE LOAD. A coarse adjustment of the above antenna matching circuit which introduces pi-network capacity in 200 mmfd steps.

(g) BANDSWITCH. Selects the proper tuned circuits constants for all RF circuits.

(h) XTAL-VFO. Connects either the crystal or VFO output circuit to the 6CL6 grid circuit. Removes VFO high voltage when in XTAL position.

(i) OSC. TUNING. Varies the VFO frequency for each band of operation.

(j) FINAL GR.TUNE. Resonates the buffer plate/final grid circuits which are common to each other.

(k) FINAL PL.TUNE. Resonates the final amplifier plate circuit.

(l) FUNCTION. In TUNE position, places a high resistance in series with the final amplifier screen circuit to limit final current while tuning. In CW position, shorts the choke that is in series with the final screen grid, shorts the modulation transformer secondary winding, removes high voltage from the modulator tubes. In PHONE position, removes the screen choke short, removes the modulation transformer short, applies modulator high voltage. In SSB position, removes modulator high voltage, shorts the modulation transformer secondary, shorts the final screen choke and changes the final amplifier bias to operate the final amplifier in class B mode.

(m) DRIVE. Controls the drive to the final grids by regulating the 2E26 screen voltage which necessarily regulates the power output of the 2E26 driver stage.

(n) GAIN. Controls modulation level by regulating speech amplifiers. A switch attached to this control removes filament voltage from the speech amplifier stages when the control is turned maximum counter-clockwise.

(o) COMPRESSION. Supplies negative polarity - rectified audio voltage to the suppressor grid of the first speech stage when in the ON position. This gives a higher average level of modulation.

(p) BIAS. A potentiometer on the rear of the chassis which is used to set the final amplifier idling current on SB mode.

10. EXTERNAL CONNECTIONS

(a) Before making any external connections, remove the AC line cord from the power source and check to make sure the AC POWER switch, EXCITER switch and TRANSMIT switch are in the OFF position.

(b) GROUND. A terminal (bolt) located on the rear of the unit. Attach a wire, at least #10, to appropriate ground.

(c) XTAL. A panel mounted crystal socket for external crystal control. Use 160, 80 and 40 meter crystals. NOTE: 80 meter crystals must be used to operate in the 40 meter range.

(d) MIC. A two pin shielded socket. Use mating plug, Amphenol type 80MC2M. Shield or common is the shell. Pin 1 connects to the microphone element wire, pin 2 to the microphone push-to-talk lead if used.

(e) PATCH IN. A jack located on the rear of the transmitter to attach an external audio input, normally a phone patch. In some instances, you may find you will not have enough audio for 100% modulation. In this case, connect the phone patch directly to MIC. connector.

(f) KEYER ADJ. A control on the rear which regulates the CW keying characteristics.

(g) SB. A receptacle to attach an external sideband exciter to drive the final amplifier stage in linear operation.

(h) KEY. A jack on the rear to attach a telegraph key for CW operation.

(i) RCVR.ANT. A coax connector on the rear to which the receiver antenna terminal is connected.

(j) ANTENNA. A coax connector on the rear to which the antenna lead (coax) is connected.

(k) 115V AC. A standard AC type receptacle on the rear.- 115 volts AC is applied to this receptacle when the TRANSMIT switch is in the ON position, and this voltage source may be used to operate several relays which the operator may require in his installation to operate external accessories.

(l) ANT.RELAY. A standard AC type receptacle on the rear just under the above receptacle. A shorted jumper plug is normally inserted in this receptacle to provide continuity for the internal antenna relay voltage, however, on sideband operation, the best method of operation requires the TRANSMIT switch be left in the ON position which would keep the antenna relay on TRANSMIT. In this case, the shorted plug is removed, and contacts from an external relay that is operated from the SB exciter are used to control the antenna relay.

(m) 10A FUSE. On rear of chassis. A 10 ampere fuse is used.

(n) LINE CORD. Supplies power to the transmitter when plugged into a 115V AC/60 cycle single phase source. The power source should be capable of 15 amperes for good regulation.

1. CW TUNE-UP PROCEDURE - CRYSTAL OPERATION

(a) Place the three panel toggle switches, AC POWER, EXCITER, TRANSMIT in the down or OFF position.

(b) Attach a proper ground wire.

(c) Insert the power cord plug into a suitable 115V AC source receptacle.

(d) Place the AC POWER switch in the ON position. Allow a 3 minute warm-up period. (One-half hour for initial operation or when unit has been off more than 10 days)

(e) Place the BANDSWITCH to the desired band of operation.

(f) Select a crystal of suitable frequency, and insert into the XTAL socket on the front panel. See the Crystal Chart, Section IV, Part One.

(g) Set the XTAL-VFO switch to XTAL position.

(h) Place the FUNCTION switch to the TUNE position.

(i) Place the METER switch to F. GRID position.

(j) Place the DRIVE control to mid-scale position.

(k) Rotate the GAIN control maximum counter-clockwise until a click is heard. This turns off the speech tube filaments.

(l) Set the COARSE LOAD control in the maximum counter-clockwise position.

(m) Set the FINE LOAD control to the MIN. position.

(n) Set the FINAL GR. TUNE control knob pointer at 9 o'clock position.

(o) Set the FINAL PL. TUNE control knob pointer at 9 o'clock position.

(p) See Section IV, Part Two, for typical knob settings.

(q) Place the EXCITER switch to the ON position.

(r) Advance the FINAL GR. TUNE control slowly in a clockwise direction until the meter indicates maximum grid current at the proper position.

(s) Adjust the DRIVE control, either clockwise or counter-clockwise, in order to obtain a meter indication of 15 ma grid current.

(t) Place the EXCITER switch in the OFF position.

(u) Place the METER switch to the F. PLATE position.

(v) Place the TRANSMIT switch to the ON position. The meter should now rise to approximately 110 ma.

(w) Advance the FINAL PL. TUNE control in a clockwise direction until a pronounced dip of at least 10 ma in plate current is indicated. In the event a pronounced dip in plate current cannot be obtained, over-loading of the final amplifier plate circuit is indicated. Momentarily, turn the TRANSMIT switch OFF and advance the COARSE LOADING control one position in a clockwise direction. Repeat steps (v) and (w) as many times as necessary to obtain a dip.

2. NOVICE OPERATION

Tune the transmitter as described in steps 1(a) through 1(w).

(a) Adjust the DRIVE control for a final plate current reading of 85 ma.

(b) Insert key plug into KEY jack on rear of transmitter and operate hand key. (Do not switch FUNCTION switch to the CW position for novice operation. FUNCTION switch remains in TUNE position)

3. COMPLETION OF TUNING PROCEDURE - CRYSTAL CONTROL OPERATION

(a) Place the FUNCTION switch to the CW position. The final amplifier plate current should immediately rise to approximately 160-260 ma.

(b) Re-tune the FINAL PL. TUNE control for minimum dip in plate current.

(c) Slowly advance the FINE LOADING control in a counter-clockwise direction toward 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:

(d) Reset the FINE LOADING control to the MIN. position.

(e) Rotate the COARSE LOADING control one position either direction to satisfy loading.

(f) Place the TRANSMIT switch to the ON position.

(g) Immediately tune the FINAL PL. TUNE control for minimum dip of plate current to prevent damage to the meter or final amplifier tubes.

(h) Advance the FINE LOADING control in a clockwise direction toward the MAX. position until the final amplifier plate current rises to 330 ma.

(i) Re-tune the FINAL PL. TUNE control for minimum plate current.

(j) Repeat steps 3(h) and 3(g) 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 over-loaded final amplifier with poor RF output will be the result.

(k) Re-adjust the FINAL GR. TUNE control for maximum grid current.

(l) Re-adjust the DRIVE control to indicate 12-15 ma grid current.

4. MAXIMUM EFFICIENCY TUNING

It is desirable to insert an SWR bridge or a 2 ampere RF ammeter in series with the transmitter and antenna feedline and adjust the DRIVE control for maximum output indication of the RF ammeter or SWR bridge indicator. (Under these conditions, the RF 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 Procedure.This isthe accepted and most accurate method of tuning up a pentode or tetrode final amplifier for maximum operating efficiency). Plate current of the final amplifier stage must 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 flash-over 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 RF output will range from 12 ma to 15 ma.

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 Section VIII, Step One, Keyer Control Adjustment.

5. TUNE-UP PROCEDURE - VFO OPERATION

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

(a) Remove the crystal from the XTAL socket.

(b) Place the XTAL-VFO switch to the VFO position.

(c) Tune the VFO to the desired operating frequency.

(d) Proceed with the tune-up procedure as outlined under Tune-Up Procedure - Crystal Operation, steps 1(h) through 4 inclusive.

SECTION VI

1. AM OPERATION

(a) When the transmitter is properly tuned up for CW operation, it may be placed in AM operation as follows:

(b) Remove the key plug from the KEY jack, or make certain the key contacts are closed.

(c) Place the TRANSMIT and EXCITER switches to the OFF position. 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.

(d) Place the FUNCTION switch to the PHONE position.

(e) 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 are as follows: Pin 1 to the microphone element; pin 2 to press-to-talk switch; braided shield to metal shell of connector.

(f) Place the COMPRESSION switch to the OFF position.

(g) Place the METER switch to the MOD. PL. position.

(h) 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 50-70 ma.

(i) 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.

(j) 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 over-modulate.

SECTION VII

1. SIDEBAND OPERATION

(a) Remove the crystal from the XTAL socket.

(b) Place the XTAL-VFO switch in the XTAL position.

(c) Attach a piece of coax that is as short as practical from RF output on the sideband exciter to the SB input connector on the rear of the Champion.

(d) Connect SPST contacts (normally open) of a relay controlled by the SB exciter to the ANT. RELAY socket on the rear of the Champion after removing the shorting plug.

(e) Place the Champion FUNCTION switch to SB position, the METER switch to FINAL GRID, the BANDSWITCH to the desired band, the GAIN control to maximum counter-clockwise, the COARSE LOAD control to maximum counter-clockwise, the FINE LOADING control to MIN., the FINAL PL. TUNE to a 9 o'clock position.

(f) Tune up the SB exciter according to its manual, adjusting it for NO carrier or sideband output.

(g) Turn on the Champion EXCITER switch and then adjust the SB exciter to deliver a VERY small amount of either carrier or sideband power (on sideband output, use a constant tone of about 1,000 cycles into the SB exciter), and adjust the Champion FINAL GR. TUNE for maximum grid current reading. Now adjust the SB exciter output to obtain a grid current reading of 1/2 to 1 ma on the Champion. Now turn OFF the SB exciter and Champion EXCITER switch, set the Champion METER switch to FINAL PLATE position.

(h) Turn ON the Champion TRANSMIT switch only and note the value of idling plate current. Now turn on the SB exciter and it should cause the plate current of the Champion to increase from 50 to 100ma.

(i) QUICKLY turn the Champion FINAL PLATE TUNE control in a clockwise direction throughout its range. A dip in plate current should be found. If NOT, QUICKLY turn OFF the Champion TRANSMIT switch.

(j) Adjust the Champion COARSE LOAD switch one position clockwise, reset the FINAL PLATE TUNE control to a 9 o'clock position.

(k) Repeat steps (i) and (j) until a dip is obtained.

(l) Now, alternately, advance the FINE LOADING control two dial divisions, then re-tune the FINAL PLATE control for a dip in plate current and continue this procedure until there is less than a 5 ma dip obtained.

(m) Increase the SB exciter output so as to cause the Champion plate current to increase to 280 ma and then repeat step (l). (Above step)

(n) If, in step (m), the adjustment of the FINE LOADING control will not load the final enough to produce a dip of only 5 ma, then turn off the TRANSMIT switch and the SB exciter a moment, and set the COARSE LOAD control one position clockwise and reset the FINE LOAD control to MIN. load position.

(o) Turn on the equipment again, and repeat step (l) to obtain a dip of less than 5 ma.

(p) Repeat steps (n) and (l) until less than 5 ma dip is obtained at a plate current of about 280 ma, then turn exciter off.

(q) Adjust the SB exciter for NO carrier. Attach microphone to exciter. Set SB exciter audio at minimum. Turn on the SB exciter and slowly advance the exciter audio gain control while speaking into the microphone. Adjust the exciter audio control to the place where speaking into the microphone causes the Champion plate current to swing up to peaks NOT EXCEEDING 300 ma.

2. USING THE DSB-100 AS AN EXCITER

(a) For those who wish to operate sideband with a minimum investment, as compared with the usual SSB exciter, the DSB-100 will make an excellent sideband exciter. At the same time, the DSB-100 will allow the operator to have a complete second station that will give excellent results by itself, and is very convenient for portable operation on AM, CW and SB.

(b) For a complete exciter for the Globe Champion, the operator should have the DSB-100, VOX-10, QT-10, VFO-755A and a 115V AC relay with at least SPST contacts.

(c) The VOX/QT are attached to the receiver and DSB-100 as shown in the VOX manual, Figure 1, with the exception of the 115V AC relay, shown as an antenna relay (Figure 1), which in this case, is used to close the Globe Champion internal antenna relay at the ANT. RELAY receptacle on the rear of the transmitter.

(d) The DSB-100 is tuned in accordance with the procedure in the DSB-100 manual, and the unit loaded to full input power, then using the sideband output control on the DSB-100 to control drive to the Globe Champion.

(e) The Globe Champion is tuned according to Section VII, Step One of this manual.

SECTION VIII

ALIGNMENT

1. KEYER CONTROL ADJUSTMENT

(a) The keying system employed in the Globe Champion model 350 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 pre-determined 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 de-coupling 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. Inasmuch 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 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 on one's own frequency, it is necessary that the VFO be completely cut off to eliminate interference with the received signal.

(b) Rotate the KEY ADJ. control shaft to its extreme clockwise position.

(c) Complete the tune-up procedure, VFO OPERATION, on the 20 meter band. It is important that the VFO OPERATION be employed, not CRYSTAL OPERATION.

(d) Upon completion of the tune-up procedure, place the TRANSMIT switch to the OFF position, or release the press-to-talk switch on the microphone.

(e) Leave the key plug in the KEY jack, close the key contacts.

(f) Place the EXCITER switch to the ON position.

(g) Tune in the transmitter signal on your receiver.

(h) Open the key contacts and advance the receiver gain control until the VFO signal is heard on the receiver.

(i) 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.

(j) The keyer adjustment is now completed. No further adjustment need be made unless the 12AU7 tube is replaced.

2. BIAS ADJUSTMENT OF FINAL LINEAR OPERATION

(a) The BIAS control on the rear corner of the transmitter is used to set the correct operating point of the final amplifier stage when operating as a linear. This control is set at the factory for the tubes supplied, and it will not normally be necessary for the operator to adjust this control except when the final tubes have had considerable operating time or when the final tubes are being changed.

(b) The normal SB idling current is 80 to 90 ma, and 85 ma is average. When viewing the unit from the rear, turning the BIAS control clockwise will LOWER the idling current, and turning the BIAS control counter-clockwise will INCREASE the current.

(c) When necessary to re-adjust the idling current of the final: set the FUNCTION switch to SB mode; set the XTAL-VFO switch to XTAL; remove any crystal from the socket; remove any external SB exciter cables; set the METER switch to FINAL PLATE. The setting of other tuning controls is not important.

(d) Turn on the AC POWER switch, and allow a one minute warm-up, then turn ON the TRANSMIT switch. The final current should be in the range of 50-100 ma. If the current is not in this range, immediately adjust the BIAS control in the proper direction to bring the current to about 85 ma. Leave the final idle at least ten minutes to "settle down", and all components are stabilized. The current may drift up to 20 ma. After ten minutes of operation, adjust the BIAS control to bring the idling current to 85 ma, and this will complete the adjustment.

3. VFO FREQUENCY ALIGNMENT

(a) Should the need arise to realign the VFO, the operator should check to determine that all switches and drive mechanism are properly set. This involves removing the cover from the VFO sub-assembly covering the VFO tuning capacitor. When the VFO FREQUENCY knob on the front panel is rotated counter-clockwise until the drive wheel stop is engaged, the VFO tuning capacitor should be exactly fully meshed on the large capacity side. If the capacitor is not at this position, the coupling on the capacitor shaft should be loosened, the capacitor properly set and the coupling tightened. Now replace the VFO sub-assembly cover and put in all the screws. Set the VFO pointer at 7.0 MC on the dial scale.

(b) Set the BANDSWITCH to the 40 meter band. Set the receiver to 7.0 MC. (It is assumed the receiver is accurately calibrated or a standard is also used to ascertain the frequency the receiver is tuned to). Refer to Figure 1 for the proper alignment points. Turn ON the transmitter EXCITER switch.

(c) Adjust the L-12 until the signal is heard. Set the VFO pointer and receiver to 7.4 MC, and adjust C-10 until the signal is heard. Repeat this procedure as many times as necessary for the VFO frequency to appear accurately at 7.0 and 7.4 MC according to the VFO dial. Turn the EXCITER switch OFF.

(d) Set the receiver to 28.0 MC, the VFO pointer to 28.0 MC and the transmitter BANDSWITCH to 10 meters. Turn ON the EXCITER switch. Adjust the L-13 until the signal is heard. Set the VFO and receiver to 29.7 MC, and adjust C-15 until the signal is heard. Repeat this sequence until the VFO pointer reads accurately at bot 28.0 MC and 29.7 MC. Turn OFF the EXCITER switch.

(e) Set the BANDSWITCH to 20 meters, the receiver and VFO pointer to 14.2MC. Turn ON the EXCITER switch. Adjust C-18 until the signal is heard. There is no further adjustment on this range (20-15 meters), and the tracking on 20-15 will depend upon how well tracking was accomplished in step (d). Turn OFF EXCITER switcl

4. VFO OUTPUT ALIGNMENT

(a) There are two slug tuned coils on the VFO sub-assembly chassis as indicated in Figure 2, coil L-1 for controlling drive on 20-15-10 meters, and coil L-2 controlling drive on 160-80-40 meters. The following procedure is used in the alignment of these coils.

(b) Set the BANDSWITCH to 40 meters, the VFO frequency to 7.0 MC, the DRIVE control to mid-scale, the FINAL GR. TUNING control to one o'clock positinn, and the METER switch to FINAL GR. TUNE. Turn ON the EXCITER power switch and resonate the FINAL GR. TUNE control for maximum meter reading. Adjust the DRIVE control as necessary to keep the meter about mid-scale. Adjust coil L-2 for maximum meter reading. Turn OFF the EXCITER power switch.

(c) Set the BANDSWITCH to 10 meters, the VFO frequency to 28.8 MC, the DRIVE control to full clockwise, the FINAL GR. TUNING control to 2 o'clock position, then turn ON the EXCITER power switch. Adjust the FINAL GR. TUNING control for maximum meter reading. Adjust the DRIVE control as necessary for about 1/2 scale reading. Now adjust the coil L-1 for a maximum meter reading. Turn OFF the EXCITER power switch. Relatively little grid current may have been obtained with the above adjustment, but adequate drive will be obtainable when the 6CL6 coil L-3 is peaked, and the drive obtainable at this step depends upon how close L-3 may have been to the proper setting.

(d) Without disturbing L-1 and L-2 settings, tighten the lock nuts on these adjustments.

5. BUFFER (6CL6) STAGE ALIGNMENT

(a) Alignment of the 6CL6 stage involves peaking three ceramic slug tuned coils under the main chassis. These coils are mounted in line on a bracket near the EXCITER bandswitch, the coil nearest the chassis being 10-20 meters, the middle coil 15 meters and the coil at the top of the bracket 160-80-40 meters. Refer to Figure 3. Set the VFO pointer to 7.0 MC.

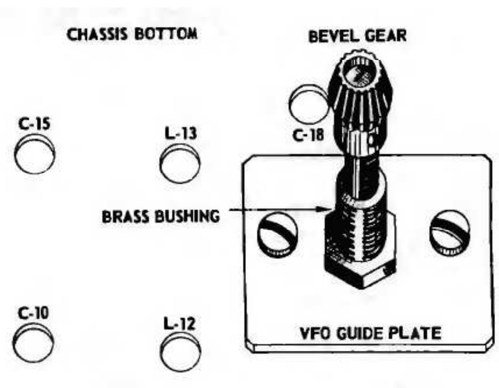
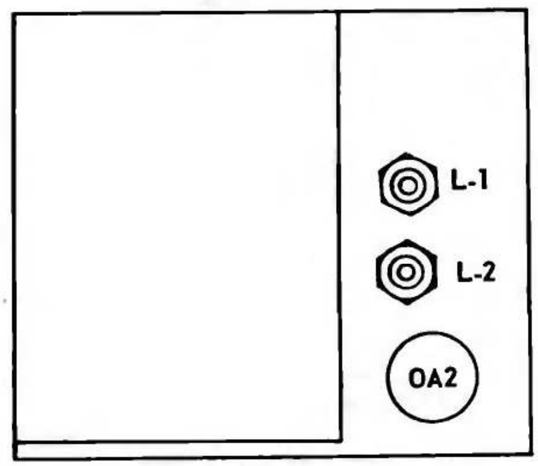


FIG. 1



CHASSIS TOP

FIG. 2

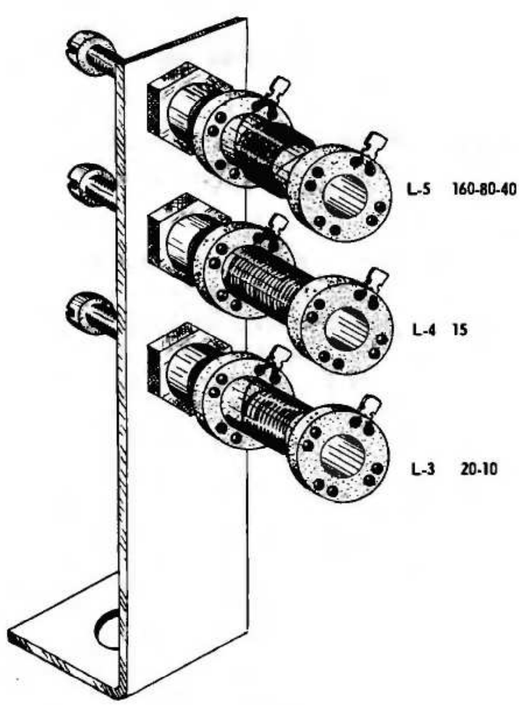


FIG. 3

(b) Set the BANDSWITCH to 40 meters, the METER switch to F. GRID, the DRIVE control to mid-scale and the FINAL GR. TUNE control to about the one o'clock position. Turn ON the EXCITER power switch and resonate the FINAL GR. TUNE control so as to produce maximum final grid current. If the meter reading is over 10 ma, turn the DRIVE control slightly counter-clockwise to reduce grid current to 10 ma. Adjust coil L-5 to produce maximum meter reading, adjusting the DRIVE control as necessary to keep the meter on scale. This coil normally peaks with the slug near all the way out of the coil form. Turn OFF the EXCITER power switch.

(c) Set the BANDSWITCH to 10 meters, the FINAL GR. TUNE control to 2 o'clock position, the VFO frequency to 29.3 MC and the DRIVE control to mid-scale. Turn ON the EXCITER power switch and resonate the FINAL GR. TUNE control for maximum meter reading. Adjust the DRIVE control as necessary to keep the reading about 10 ma. Adjust coil L-4 for maximum grid current reading, adjusting the DRIVE control as necessary to keep the meter on scale. Turn OFF the EXCITER power switch.

(d) Set the BANDSWITCH to 15 meters, the FINAL GR. TUNE control to one o'clock position, the VFO frequency to 21.3 MC, the DRIVE control to mid-scale. Turn ON the EXCITER power switch and resonate the FINAL GR. TUNE control for maximum meter reading, adjusting the DRIVE control as necessary to obtain about 10 ma reading. Adjust coil L-5 for maximum meter reading, adjusting the DRIVE control as necessary to keep the reading on scale. Turn OFF the EXCITER power switch.

(e) Alignment of the exciter section is now complete and ample drive should exist for all amateur bands. Should you wish to operate crystal control on special frequencies outside the amateur bands, the 6CL6 coils may be re-peaked for drive on the desired frequency, but at a loss of drive in the amateur bands which may necessitate re-peaking to work amateur frequencies again. To favor frequencies on 160-80-40 meters, re-peak coil L-5. On 10-20 meters, peak coil L-4 and on around the 15 meter range, re-peak coil L-5 .

SECTION IX

MALFUNCTIONS AND PROBABLE CAUSES

1. Transmitter will not energize.	1-1. Defective fuse FS-1. 1-2. Defective switch SW-1.
2. Meter reads backward when AC turned on.	2-1. Short in V4 or V5 tubes.
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.
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. Defective bandswitch ganging. 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.
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.
12. Inoperative press-to-talk circuit.	12-1. Shorted capacitor C-65. 12-2. Defective selenium rectifier SR-4. 12-3. Defective microphone switch.
13. Insufficient or no low B plus 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 plus 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.
19. Feedback and squeal.	19-1. If mechanical, may be the top cover of the modulation transformer vibrating as an earphone diaphragm does Remove top cover and pad with cardboard 19-2. If RF, usually excessive antenna reactance or too high impedance. Also check mike cord and connections. Try ground wires of different lengths and use several to different ground points.

TYPICAL VOLTAGE READINGS

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

TYPICAL VOLTAGE READINGS

Tube Type	Symb	Tube Pin Number 1	2	3	4	5	6	7	8	9	Plate Caps
AX-9909	V4 V5	6.3VAC	minus 105VDC (below RFC5)	plus 255VDC	plus 950VDC (below RFC6)	0	0	6.3VAC	- -	- -	- - -
2E26	V3	0	6.3VAC	plus 150VDC	0	minus 120VDC (below RFC3)	0	0	0	- -	Plus 320VDC (below RFC4)
6CL6	V2	plus 2VDC	minus 18VDC	plus 150VDC	0	6.3VAC	plus 250VDC	0	plus 155VDC	minus 32VDC	- - -
12AU7	V6	*minus 1VDC **0	*0 **plus 28VDC	*plus 16VDC **—55VDC	*0 **0	*0 **0	*plus 255VDC **+300VDC	*0 *minus 105VDC	*minus 1/2VDC **minus 55VDC	6.3VAC	- - -
6AU6	V1	0	0	0	6.3VAC	plus 255VDC	plus 150VDC	0	- -	- -	- - -
12AX7	V8	0	0	0	0	0	plus 200VDC	0	plus 2VDC	6.3 VAC	- - -
6AQ5	V9	0	plus 14VDC	0	6.3 VAC	plus 225VDC	plus 250VDC	0	- -	- -	- - -
809	V10 V11	6.3 VAC	0	minus 8VDC	6.3 VAC	- -	- -	- -	- -	- -	plus 920VDC
6AL5	V12	*75VAC	*75VAC	6.3VAC	0	0	0	minus 160VDC	- -	- -	- - -
6AU6	V7	0	minus 60VDC	0	6.3VAC	plus 80VDC	plus 20VDC	0	- -	- -	- - -
OA2	V15 V16	0	0	0	0	plus 150VDC	0	0	- -	- -	- - -
5U4GB	V17	plus 350VDC	plus 350VDC	- -	440VAC	0	440VAC	- -	5VAC (to pin 2)	- -	- - -
866A	V18 V19	2.5VAC (to pin 4)	0	0	plus 980VDC	- -	- -	- -	- -	- -	1000 VAC

EXCEPTIONS: A single asterisk* in measurements require modulation applied to produce 180 ma peak meter swing (modulation metering) and compression ON; a double asterisk**indicates FUNCTION switch at CW position, key contacts OPEN, audio GAIN switch turned OFF.

SECTION X

PARTS LIST

Circuit Design.	Description	Globe Part No.
C-19	Capacitor, 25 mmf ceramic disc	1101-001
C-20	Capacitor, .002 mfd ceramic disc	1101-009
C-21	Capacitor, 250 mmf silver mica	1102-013
C-22	Capacitor, .005 mfd ceramic disc	1101-003
C-23	Capacitor, 25 mfd 25V electrolytic	1106-003
C-24	Capacitor, 70 mmf mica	1102-002
C-25**	Capacitor, .005 mfd ceramic disc	1101-003
C-26**	Capacitor, .005 mfd ceramic disc	1101-003
C-27	Capacitor, 20 mfd 150V electrolytic	1106-006
C-28	Capacitor, 20 mfd 150V electrolytic	1106-006
C-29	Capacitor, .005 mfd ceramic disc	1101-003
C-30	Capacitor, .001 mfd 3000V ceramic disc	1101-028
C-31	Capacitor, 140 mmf variable	1105-001
C-32	Capacitor, .005 mfd ceramic disc	1101-003
C-33	Capacitor, .005 mfd ceramic disc	1101-003
C-34	Capacitor, 200 mmf mica	1102-001
C-35	Capacitor, .005 mfd ceramic disc	1101-003
C-36	Capacitor, .005 mfd ceramic disc	1101-003
C-37	Capacitor, .002 mfd ceramic disc	1101-009
C-38	Capacitor, .002 mfd ceramic disc	1101-009
C-39	Capacitor, 500 mmf-20KV, door-knob	1107-002
C-40	Capacitor, 500 mmf 7.5KV ceramic	1101-010
C-41	Capacitor, 250 mmf variable	1105-013
C-42	Capacitor, 350 mmf variable	1105-004
C-43	Capacitor, .0002 mfd 2500V mica	1102-004
C-44	Capacitor, .0004 mfd-2500V mica	1102-008
C-45	Capacitor, .0006 mfd 1200V mica.	1102-009
C-46	Capacitor, .0008 mfd 1200V mica	1102-010
C-49	Capacitor, .1 mfd 200V paper	1100-001
C-51***	Capacitor, 10 mfd 500V can. electrolytic	1106-002
C-52***	Capacitor, 10 mfd 500V can. electrolytic	1106-002
C-53	Capacitor, 25 mfd 25V electrolytic	1106-003
C-54	Capacitor, .1 mfd 200V paper	1100-001
C-55	Capacitor, .002 mfd ceramic disc	1101-009
C-56	Capacitor, 500 mmf ceramic disc	1101-005
C-57	Capacitor, 500 mmf ceramic disc	1101-005
C-58	Capacitor, 500 mmf ceramic disc	1101-005
C-59	Capacitor, 25 mfd 25V electrolytic	1106-003
C-60	Capacitor, .005 mfd ceramic disc	1101-003
C-61***	Capacitor, 10 mfd 500V electrolytic	1106-002
C-62	Capacitor, .005 mfd ceramic disc	1101-003
C-63	Capacitor, dual, .0008 mfd 1600V ceramic disc	1104-002
C-64	Capacitor, 15 mmf tubular	1101-008

*** All in one can

** Dual capacitor

C-65	Capacitor, 500 mfd 6V, electrolytic	1106-015
C-66	Capacitor, 8 mfd 450V electrolytic	1106-013
C-68	Capacitor, 6 mfd 1000V oil filled	1103-004
C-71	Capacitor, .005 mfd ceramic disc	1101-003
	Cond. 500 mmf disc (Quan. 2)	1101-005
C-72	Capacitor, .005 mfd ceramic disc	1101-003
C-73	Capacitor, .005 mfd ceramic disc	1101-003
C-74	Capacitor, .005 mfd ceramic disc	1101-003
C-75	Capacitor, .005 mfd disc	1101-003
C-76	Capacitor, .1 mfd 200V paper	1101-001
C-77	Capacitor, .005 mfd ceramic disc	1101-003
C-78	Capacitor, 250mmfd ceramic tubular	1101-007
C-79	Capacitor, .005 mfd ceramic disc	1101-003
C-80	Capacitor, 500 mmfd disc	1101-005
C-81	Capacitor, 500 mmfd disc	1101-005
C-82	Capacitor, 70 mmfd silver mica	1102-002
NC-1	Neutralizing cond. plates	1901-017
CH-1	Choke, 7h-250 ma	1300-008
CH-2	Choke, 7h-250 ma	1300-008
CH-2A	Choke, 7h-250 ma	1300-008
CH-3	Choke, 4h-50 ma	1300-007
CH-5	Choke, 7h-50 ma	1300-001
CX-1	Connector, coaxial 831R	2000-004
CX-2	Connector, coaxial 831R	2000-004
FS-1	Fuse, 10 ampere	1500-004
J-1	Jack, key, closed circuit	2004-001
J-2	Jack, microphone, 2 circuit	2000-001
J-3	Jack, key, open circuit	2004-002
J-4	Jack, phono tip	2000-002
L-3	Coil, plate, orange dot, 20/11M 6CL6	1400-022B
L-4	Coil, plate, white dot, 15M 6CL6	1400-081
L-5	Coil, plate, green dot, 160/80M 6CL6	1400-021A
L-6	Coil, final grid, 160/40M	1400-018A
L-7	Coil, final grid, 20/10M	1400-019A
L-8	Coil, final plate, 10M	1400-049
L-9	Coil, final plate, 80/15M	1400-027B
L-10	Coil, final plate, 160M	1400-028A
M	Meter, 0-20-400 ma	2500-009
PC-81	Couplate, PC-81	1109-001
PC-91	Couplate, PC-91	1109-002

PS-1	Choke, parasitic, final plate	1301-010
PS-2	Choke, parasitic, final plate	1301-010
PS-3	Choke, parasitic, buffer plate	1301-009
R-5	Resistor, 1 meg-1/2 watt	1000-023
R-6	Resistor, 500K ohms, potentiometer	2300-001
R-7	Resistor, 220,000 ohms-1/2 watt	1000-019
R-8	Resistor, 100K ohms-1/2 watt	1000-009
R-9	Resistor, 47K ohms-1/2 watt	1000-002
R-10	Resistor, 120 ohms-1/2 watt	1000-003
R-13	Resistor, 22K ohms-1 watt	1001-010
R-14	Resistor, 120 ohms-2 watts	1002-007
R-15	Resistor, 390 ohms-2 watt	1002-005
R-16	Resistor, 4700 ohms-2 watt	1002-012
R-17	Resistor, 56 ohms-1 watt	1001-003
R-18	Resistor, 560 ohms-2 watt	1002-008
R-19	Resistor, 8200 ohms-1 watt	1001-012
R-20	Resistor, 4000 ohms-5 watt potentiometer	2300-014
R-22	Resistor, pot., 25K ohms-4 watt, wire wound	2300-003
R-23	Resistor, 8200 ohms-2 watt	1002-011
R-24	Resistor, 120 ohms-1/2 watt	1000-003
R-25	Resistor, 2000 ohms-7 watt	1003-008B
R-26	Resistor, 25K ohms-10 watt	1003-001
R-27	Resistor, 100K ohms-1/2 watt	1000-009
R-28	Resistor, 2.2 meg-1/2 watt	1000-005
R-29	Resistor, 560K ohms-1/2 watt	1000-022
R-31	Resistor, 1 meg-1/2 watt	1000-023
R-32	Resistor, 1 meg-1/2 watt	1000-023
R-33	Resistor, 22K ohms-1/2 watt	1000-008
R-34	Resistor, 4700 ohms-1/2 watt	1000-018
R-35	Resistor, 220K ohms-1/2 watt	1000-019
R-36	Resistor, 22K ohms-1/2 watt	1000-008
R-37	Resistor, 2000 ohms-7 watt	1003-008B
R-38	Resistor, 47K ohms-1/2 watt	1000-002
R-39	Resistor, 390K ohms-1/2 watt	1000-015
R-40	Resistor, 390 ohms-2 watt	1002-005
R-41	Resistor, 47K ohms-1/2 watt	1000-002
R-42	Resistor, 500K potentiometer w/switch	2300-002
R-43	Resistor, 47K ohms-1/2 watt	1000-002
R-44	Resistor, 50K ohms-10 watt	1003-009
R-45	Resistor, 50K ohms-50 watt	1006-002
R-47	Resistor, 68K ohms-2 watt	1002-006
R-49	Resistor, 5000 ohms-10 watt	1003-002
R-50	Resistor, 20K ohms-20 watt	1004-001
R-51	Resistor, 47K ohms-1/2 watt	1000-002

SECTION X
(Contd)

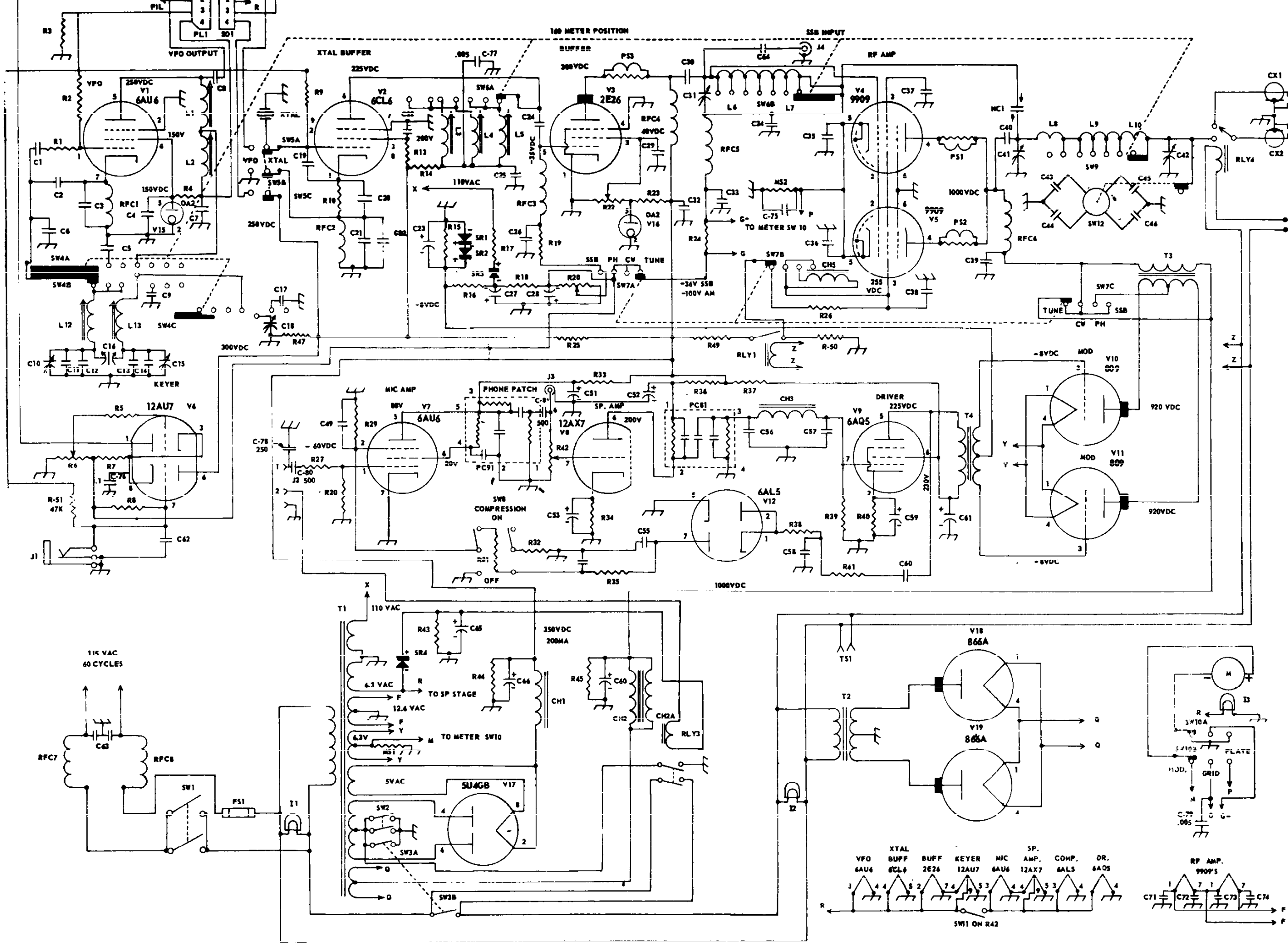
Quan		Description	Globe Part No.
1		Cabinet	1700-014
1		Cord, power, AC	2700-043
1		Dial assembly, VFO	3300-005A 3300-096
1		Dial pointer, VFO	3300-073
1		Fuse retainer	1500-006
2		Gear, bevel	3300-032
2		Insulator, cone, 5/8"	2201-001
4		Insulator, feed-through, 1"	2200-001
1		Panel	1800-014
1		Pilot lamp assembly, red jewel	2400-002
1		Pilot lamp assembly, meter	2400-007 2400-008
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 mounting	1901-021
1		Plate,switch, ON/OFF	2103-001
1		Plate, VFO switch guide	1901-018
1		Receptacle, VFO power	2000-006
1		Shield, RF, final plate	1902-008M
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
1		115V AC motor	3400-004
1		Cooling fan	3400-006
2		Tube, AX-9909	
1		Tube, 2E26	
1		Tube, 6CL6	
1		Tube, 12AU7	
1		Tube, 6AU6	
1		Tube, 12AX7	
1		Tube, 6AQ5	
2		Tube, 809	
1		Tube, 6AL5	
1		Tube, OA2	
1		Tube, 5U4GB	
2		Tube, 866A	

SECTION X
(Contd)
VFO PARTS LIST

Circuit Design.	Description	Globe Part No.
C-1	Capacitor, TCZ 82 mmf ceramic tubular	1101-012
C-2	Capacitor, 500 mmf silver mica	1102-007
C-3	Capacitor, 500 mmf silver mica	1102-007
C-4	Capacitor, .005 mmf ceramic disc	1101-003
C-5	Capacitor, .005 mmf ceramic disc	1101-003
C-6	Capacitor, TCZ 130 mmf ceramic tubular	1101-013
C-7	Capacitor, .005 mf ceramic disc	1101-003
C-8	Capacitor, 700 mmf mica	1102-002
C-9	Capacitor, TCZ 1 mmf ceramic tubular	1101-021
C-10	Capacitor, 15 mmf variable	1105-008
C-11	Capacitor, TCN 120 mmf ceramic tubular	1101-016
C-12	Capacitor, TCZ 18 mmf ceramic tubular	1101-017
C-13	Capacitor, TCZ 39 mmf ceramic tubular	1101-006
C-14	Capacitor, TCN 15 mmf ceramic tubular	1101-008
C-15	Capacitor, 9 mmf variable	1105-010
C-16	Capacitor, variable, special dual VFO	1105-007
C-17	Tab. 1/4 mmf	on SW-4B
C-18	Capacitor, 9 mmf variable	1105-010
L-1	Coil, plate, 40M	1400-024
L-2	Coil, plate, 160M	1400-121A
L-12	Coil, grid, 160/80M	1400-025
L-13	Coil, grid, 40/10M	1400-026
R-1	Resistor, 56 ohms, 1/2 watt	1000-010
R-2	Resistor, 100K ohms-1/2 watt	1000-004
R-3	Resistor, 15K ohms-1/2 watt	1000-013
R-4	Resistor, 4700 ohms-2 watt	1002-012
RFC-1	Choke, RF, 2.4 mh-125 ma	1301-001
SW-4	Switch, rotary, BANDSWITCH	2100-010A
SW-5	Switch, rotary, XTAL-VFO	2100-012

R27 - 100K
R28 - 2.2M
R29 - 560K

GLOBE CHAMPION Model 350



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