

INTRODUCTION TO
THE ASSEMBLY DETAILS FOR THE
JOHNSON VIKING I TRANSMITTER KIT

Success in assembling a piece of radio equipment, such as the Viking I, requires only that the instructions be followed implicitly, and that the work be divided into sections which may be easily checked for correctness and completeness. This instruction manual was written by assembling a transmitter from standard production material and each step in the exact order of assembly described fully. It is a good plan to read over each description of the operation, perform it, and using the schematic diagram, check to see if your interpretation agrees with the schematic. As you go along you will be surprised how very familiar with the transmitter you become. Even with this, it is inevitable that some small mistakes will be made; however, by the time the transmitter is finished, these mistakes can be found readily by following the test procedure.

Avoid "resin" or "cold" solder connections by using a clean, hot iron, by using good resin core solder, and by holding the iron against the connection long enough so that the solder flows freely around the wire or terminal. Make certain all screw and nut electrical connections are clean and tight. Use shakeproof washers whenever they are called for in the text.

Mounting the front panel is postponed until one of the last operations to avoid the possibility of scratching the panel. The parts which mount on the front of the chassis behind the front panel are equipped with two mounting nuts so that it is not necessary to remove them in order to mount the panel when that stage is reached.

The photographs, schematic diagram, and charts referred to in the following assembly details, or which may be useful in several phases of assembly, are in the rear of the Instruction Manual supplied with the Viking I. Study the Instruction Manual thoroughly, but in particular, read the warning on Page 1, the license notice of paragraph 41 on Page 3, The Theory of Operation, and Viking I Tuning Details, before testing or operating the Viking I.

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VIKING I ASSEMBLY DETAILS

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VIKING I TRANSMITTER KIT

Assembly Details

- 1 In order to be able to work on the transmitter in an inverted position without damaging the parts mounted above the chassis, four legs roughly $3/4"$ x $1-1/4"$ x $9"$ should be made of scrap wood. Four $7/32"$ diameter holes are provided in each end of the chassis for the $1"$ 10-32 machine screws and nuts supplied for bolting the legs to the chassis.
- 2 Mount all the tube sockets, the VFO power socket, and the crystal selector socket in the positions shown on Figure 1, according to the following directions (Figure 1 may be found in the Instruction Manual).
 - a Mount socket X5, 7 pin miniature with shield base, using $3/16"$ 4-40 machine screws, with nuts on top of the chassis, shakeproof washers and nuts. It is necessary to place the nuts on top of the chassis to avoid danger of short circuits between socket terminals. A #6 teardrop solder terminal should be fastened under the mounting screw nearest the outside edge of the chassis. X5 is for the 6AQ5 buffer/doubler. Pin 5 (plate) should be toward the front of the chassis.
 - b Mount miniature socket X6 in the same manner for the 6AU6 oscillator, with Pin 5 (plate) toward the front of the chassis and a #6 solder terminal under the mounting screw nearest the outside edge of the chassis.
 - c Mount miniature socket X1 the same way for the 6AU6 audio amplifier, with Pin 1 (control grid) toward the front of the chassis and a #6 solder terminal under the screw nearest the end of the chassis.
 - d Mount X2 for the 6AU6 audio driver in the same way as X1.
 - e Mount miniature socket X11 for the 6AL5 bias rectifier, with Pin 2 (plate 2) to the rear and a #6 solder terminal under the screw near Pin 3.
 - f Mount socket X4, 5 pin ceramic wafer for one of the 807 modulators, under the chassis, with Pin 4 (the cathode of the 807) to the front of the chassis. Use $1/2"$ 6-32 screws, shakeproof washers and nuts.
 - g Mount socket X3, 5 pin ceramic wafer for the other 807 modulator, in the same way, with Pin 2 (807 screen grid) toward the front of the chassis.
 - h Mount socket X8 and X9, octal ceramic wafer for the 5R4G rectifiers, under the chassis, with Pin 7 to the rear of the chassis in each case. Use $1/2"$ 6-32 screws, shakeproof washers and nuts.
 - i Mount X7, 7 pin large shielded wafer socket for the 4D32 amplifier, with Pin 6 (control grid) toward the chassis front. Terminals are marked on the bottom of the steatite body of the socket. Subpanel

Mount the socket by means of the 1/2" long 3/8" O.D. spacers, 3/4" 8-32 screws, lockwashers and nuts. Also use shakeproof washers under the heads of the mounting screws.

- j Mount socket X10, octal wafer for the 5Z4 low voltage rectifier, with pin 7 to the rear of the chassis. Mount with 1/2" 6-32 screws, shakeproof washers and nuts.
- k Mount X12, the octal ceramic wafer VFO power socket, on the rear edge of the chassis (on the right side with the chassis inverted) with the key slot away from the corner of the chassis. Use 1/2" 6-32 screws, shakeproof washers and nuts.
- l Mount X15, the crystal selector socket only, atop the chassis so that its numbers appear correctly from the front of the chassis. Use 1/2" 6-32 screws, shakeproof washers and nuts. The front screws need not be tightened as the nuts will have to be removed later.

3 Mount the six terminal strips shown in the photo Figure 2 as follows:

- a Mount terminal board X17, a 5 terminal strip, by means of 3/16" 4-40 machine screws, shakeproof washers and nuts, vertically on the chassis back, inside near the left edge of X10 with a #6 solder terminal under each mounting nut.
- b Mount terminal board X18 (also 5 terminal), in the same way parallel to the front of the chassis beside the sockets for the 807 modulators (X3, X4) with a #6 solder terminal under the nut nearest the center of the chassis.
- c Mount terminal board X19 (also 5 terminal) at right angles to the front of the chassis between and slightly to the rear of the 6AU6 audio amplifier sockets (X1, X2), with a #6 solder terminal under the nut nearest the rear of the chassis.
- d Mount terminal board X20, a 6 terminal strip, at right angles to the front of the chassis between the 4D32 socket (X7) and the 6AU6 oscillator socket (X6) with a #6 solder terminal under each nut.
- e Mount terminal board X21 in the same way at right angles to the front of the chassis beside pin 7 of the socket X7 with a #6 solder terminal under the nut nearest the front of the chassis.
- f Mount terminal board X22 the same way at right angles to the front of the chassis opposite pin 1 of the 5R4 socket X9 with a #6 solder terminal under the rear nut.

4 Make all the grounds to the chassis as follows using #20 tinned wire except where noted otherwise. The black #20 wire (W2) should have the insulation stripped off for the very short leads.

- a On socket X5, for the 6AQ5 buffer, ground the center shield and pin 3 to the solder terminal under the socket mounting nut and solder.

- ✓ b Ground the center shield and pins 2 and 3 of the 6AU6 oscillator socket X6 to the solder terminal under one of the mounting screws and solder.
- ✓ c Ground pins 2, 4 and the center shield of audio amplifier socket X1 to the solder terminal under the mounting screw and solder all except pin 2.
- ✓ d Do the same to audio driver socket X2 and solder all connections.
- ✓ e Ground pin 3 and the center shield of the bias rectifier socket X11 to the solder terminal under the mounting screw. Solder.
- ✓ f Connect pin 1 of 5Z4 socket X10 to pin 3 of socket X11 with a piece of W2 wire. Solder.
- ✓ g Ground pin 5 of the 807 socket X4 and pin 5 of the 807 socket X3 to the #6 solder terminal under one of the terminal board X18's mounting nuts and solder.
- ✓ h Run a 5/8" 4-40 screw thru the rivet hole in socket X7 between pins 4 and 5 and secure beneath the socket with a lockwasher and nut. Mount two #6 solder terminal on the screw using another shakeproof washer and nut. One terminal should be turned toward the solder terminal of pin 4, one toward the solder terminal of pin 5. Connect a piece of #14 tinned wire to pins 7 and 4 of socket X7 and leave 2-1/2" extending from pin 4. Solder to the socket pin terminals. Make certain that the lead clears all the other tube terminals.
- ✓ i Connect each end terminal of the terminal board X20 to the corresponding solder terminal under the mounting nuts. Do not solder.
- ✓ j Connect the 4th terminal from the rear of terminal board X22 to the solder terminal under mounting nut. Solder at the #6 solder terminal only.
- ✓ k Connect the rear terminal of X19 to the solder terminal under the mounting nut. Do not solder.
- ✓ l Using W2 wire, connect pins 1 and 2 of the VFO socket X12 together and to the solder terminal under the mounting nut of terminal board X17 on the rear bottom edge of the chassis and solder.
- ✓ m Using W2 hookup wire connect sockets X8 and X9 in parallel as follows:
 - Pin 6 of X8 to pin 6 of X9 and solder.
 - Pin 4 of X8 to pin 4 of X9 and solder.
 - Pin 2 of X8 to pin 2 of X9 and solder only at X9.
 - Pin 8 of X8 to pin 8 of X9 and solder only at X8.

- 5 a Mount bracket BKT4 for the 160 meter auxiliary switch SW6 atop the chassis in the position shown on Figure 1. The mounting holes are approximately 4-1/2" from the front of the chassis slightly to the right of the center. These holes are behind the pair of half-inch holes (spaced 2" apart) provided to permit the drive cable to pass thru the chassis. The horizontal edge through which the screws pass should be toward the chassis rear. Use 1/4" 6-32 binding head screws, shakeproof washers and nuts.
- b Mount bracket BKT5 in exactly the same manner under the chassis in the pair of holes in front of the 1/2" cable clearance holes. See Figure 2. The horizontal edge should be to the rear.
- c Mount the 160 meter auxiliary switch SW6 on the bracket BKT4 with the shaft toward the front of the chassis and indexing ball toward the left edge of the chassis. The SW6 assembly screws should be on a line perpendicular to the top of the chassis. Use a 3/8-32 nut and 3/8" shakeproof washer.
- d Install the drive pulley D3 on the shaft of SW6 with the hub side toward the front of the chassis. The opening in the rim should be downward (toward the chassis) with SW6 turned to its counter-clockwise position looking at the end of the shaft. The pulley should be centered over the half-inch holes provided for passing the drive cable thru the chassis.
- e Mount the 5-1/2" shaft and bearing assembly D15 in bracket BKT5 with the shaft extending through the front edge of the chassis as shown in Figure 2. Secure in place with two 3/8-32 nuts, the second nut locking the first. Obtain additional nuts from the hardware envelope.
- f Mount pulley D4 on the rear end of D15 the hub toward the front of the chassis and the rim of D4 centered over the 1/2" chassis holes.
- g Cut a 34" length of dial cord D7. Slip one of the dial cord tension springs D9 on the cord, tie it in the center of the cord with an overhand knot.
- h Hook the tension spring D9 on either of the ears of D3. Check SW6 to be sure it is still in the counter-clockwise position.
- i Fasten a knob on the shaft D15 so that in the process of stringing the dial cable you can keep the pulley D4 from turning.
- j Pass one end of the cable D7 thru the break in the rim of the pulley D3, around D3 in a counter-clockwise direction looking from the front of the chassis, and thru the corresponding 1/2" hole in the chassis.
- k While holding the end of the dial cable under the chassis, turn the knob on the shaft D15 so that the break in the rim of the pulley D4 is nearest the chassis. Holding the knob with the left hand,

string the cable around the pulley D4, thru the break in the rim and under the nearest ear on the pulley. Hold the pulley and dial cord with the right hand. Using a screwdriver, push the ear of D4 so that it grips the dial cord. Tension need not be kept since the critical dimensions are now set and if the cable falls off the pulleys, it can be readily re-strung. Tie an overhand knot in the clamped end of the cable, slide the knot down to where the cable is clamped, and draw the knot tight.

- 1 Twist the knob on shaft D-15 in a counter-clockwise direction so that the dial cord is now under tension. String the thus far unused end of the dial cord around the pulley D3 in a clockwise direction, thru the corresponding 1/2" hole in the chassis, around pulley D4 in a clockwise direction. Now holding D4 and the cable in the right hand, clamp down the other ear of D4 over the cable. Tie an overhand knot in the end of the cable and slide it down tight against the ear and draw tight. Check the cable to make sure that there is no backlash in the switch operation and that the cable does not cross on the pulleys causing them to bind. Trim off excess length of cable, leaving about 1/2 inch.
- 6 a Mount bracket BKT8 atop the chassis just to the right of the socket X5 by means of a 3/8" 10-32 machine screw, shakeproof washer and nut. The bend in the bracket should be toward the front of the chassis. This is the bracket holding switch SW4 in Figure 3.
 - b Locate the exciter bandswitch SW4. Looking at the rear deck of the switch from the rear and with the blank section of the switch to the left call the topmost terminal #1 and the next one 2 and so on around the switch deck in a clockwise direction, the last one being terminal 7. Connect R21 (4700 ohms 1 watt) between terminals 1 and 4 of the rear deck, jumper terminal 4 to terminal 3, solder at terminal 3. Connect R22 (22 ohm 1/2 watt resistor) between terminals 4 and 5, do not solder. Bend R22 back toward switch.
 - c Mount SW4 in bracket BKT8 using the 3/8-32 nut and shakeproof washer. Looking from the front of the chassis, the switch should be turned so that the terminals of the rear deck are toward the left end of the chassis and the switch assembly screws on a line perpendicular to the top of the chassis.
 - d Connect a jumper of SW2 wire between terminals 1 and 7 of the rear deck of SW4. Do not solder.
 - e Insert one of the small grommets in the chassis hole under terminal 7.
 - f Slip 3/4" of spaghetti over one of the leads of R20 (100 ohms 1/2 watt), pass this lead and spaghetti thru the grommet hole from underneath the chassis and connect it to terminal 7 of the switch. Do not solder.

g Considering now the front deck of SW4 looking at it from the front of the chassis, call the topmost terminal #1 the next one in a clockwise direction 2 and so on around, the bottom terminal being 7.

h Connect a jumper of SW2 wire from terminal #1 to terminal 7 of the front deck. Do not solder.

i Place a grommet in the hole under terminal 7 and install R26 (100 ohms 1/2 watt) following the same procedure as in (f) above. Also slip one spaghetti covered lead of C23 (.005 mica) into the grommet from under the chassis and solder all leads on terminal 7.

7 a Mount the buffer/doubler coil L5A just to the right (looking from the front of the chassis) of the rear deck of the bandswitch SW4 and directly in front of the 4D32 socket, using shakeproof washers and 6-32 nuts. The coil terminals will be toward the left end and slightly toward the front of the chassis. See Figure 4. Coils L4, the oscillator coil, and L5A, the buffer coil, are quite similar, the difference being that the bottom 5 turns of L4 are space wound.

b Strip off insulation and connect the top lead of the coil L5A to terminal #1 on the front deck of SW4 and solder both leads on terminal #1.

c Connect the tap of coil L5A (approximately 50 turns from the top) to terminal 2 on the front deck of SW4 and solder. Use #24 tinned bare wire for connections to the taps of L5A, keeping the leads as short as possible without applying any strain on the taps.

d Connect the next lower tap on coil L5A to terminal 3 of the front deck of SW4 and solder.

e Connect the next lower tap on coil L5A to terminal 4 of the front deck of SW4 and solder.

f Strip off insulation and connect the bottom lead of coil L5A to terminal 5 of the front deck of SW4. Do not solder.

8 a Mount the oscillator coil L4 atop the chassis by means of shakeproof washers and 6-32 nuts behind and slightly to the left of SW4 looking from the front of the chassis. Refer to Figure 5. The coil terminals will be toward the left end of the chassis looking from the front.

b Strip off insulation and connect the top lead of coil L4 to terminal #1 of the rear deck of SW4 (refer to Section 6b) and solder both leads on terminal #1.

c Connect the tap (approximately 50 turns from the top) of coil L4 to terminal 6 on the rear deck of switch SW4 and solder. Wire all the taps of L4 with #24 tinned bare wire, keeping leads as short as possible without applying any strain at the taps.

d Connect the next lower tap of L4 to terminal 3 of the rear deck of SW4 and solder.

- ✓ e Connect the tap nearest the bottom of L4 to terminal 2 of the rear deck of SW4. Strip off 1" of insulation starting 3/4" away from the coil and leave the bottom lead of coil L4 hanging for the time being.
 - ✓ f Solder terminals 4 and 5 on the rear deck of SW4.
 - ✓ g Insulate one lead of C19 (.005 mica) with a 1" piece of spaghetti. Pass it between the decks of SW4 from the left end of the chassis and connect it to terminal 7 on the rear deck of SW4. Solder all leads on terminal 7. The lead should be between the shaft and the bottom spacer of SW4. C19 will be connected later to the oscillator tuning condenser.
- 9 a Mount the high frequency buffer coil L5B in front of the buffer coil L5A, its axis parallel to the front of the chassis and the tap to the rear, as per Figure 4. The #14 lead of L5B passes thru the hole in the chassis. Shape the straps mentioned in the following steps 9b and 9c for easy connection to the front deck terminals 5 and 6 before securing L5B. Use 3/8" 6-32 screws and shakeproof washers furnished on L5B's insulators and at the same time mount the bracket BKT6 under the chassis, the edge through which the mounting screws pass toward the rear of the chassis. This bracket is for the buffer tuning condenser C22. See Figure 10.
- b Connect the strap on the left end of the coil L5B, looking from the front of the chassis, to terminal 5 on the front deck of the band-switch SW4 and solder both leads on terminal 5.
 - ✓ c Connect the tap of L5B to terminal 6 on SW4 and solder.
 - d Loosely fasten the drive control R25 (25,000 ohm 4 watt potentiometer) to the bracket BKT9 by means of a 3/8-32 mounting nut. Mount bracket BKT9 on the chassis flush with the front edge directly in front of the coil L5B, shaft of R25 to the front with a 3/8" 10-32 screw, shakeproof washer and nut. Rotate R25 so that the terminals point toward the left edge of the chassis looking from the front, as seen in Figure 4. Tighten the nut on R25.
 - e Check to make sure all leads and terminals in the buffer compartment are soldered.
- 10 a Using 1/4" 6-32 binding head screws, shakeproof washers and nuts, fasten shield S4B to shield S4A. In order to see the positions of these shields slip the smaller of the shields between the decks of SW4. The slot in the small shield will clear the switch. Place the larger of the shields atop the chassis, the edge having punched holes down. The shield will fit between the 4D32 socket and the oscillator coil L4; also between the buffer coil L5A and the 4D32 socket. The front edge of the shield will be beside the potentiometer R25. After screwing the shields together put them back in the position just described and note the locations of the mounting holes for the shields which coincide with the holes punched in the lower edge of the shields. Using 1/4" 6-32 binding head screws, shakeproof washers, and nuts,

fasten the 6-32 spade lugs to the shields being careful to get the spade lugs on the correct side of the shields. This can be seen by referring to Figures 4, 5, 6, and 7. The shields will fit nicely into the 7 holes provided without the necessity of distorting the shape of the shields. Secure the shields under the chassis with 6-32 nuts and shakeproof washers. The job is simplified if the spade lugs are not particularly tight. The spade lugs can then be moved slightly in order to get them into their respective holes. The screw holding the spade lug near the buffer coil L5A must be inserted in the shield, screwhead toward L5A, otherwise the coil will be scraped in assembly. Mount one #6 solder terminal under the spade lug nut nearest pin 4 of socket X7, one #6 solder terminal under the rearmost spade lug nut, and another #6 solder terminal under the spade lug nut by the edge of the chassis near X5.

- b Mount the oscillator tuning condenser C18 (75L15 JOHNSON), the small variable with the short shaft, in the hole on the shield next to the switch SW4, with the stator section toward the chassis as shown in Figures 4 and 5. Secure with a 3/8-32 nut and a 3/8" shakeproof washer which may be taken from the 2 pole 6 position single wafer motor switch. The contact of C18 should be toward the center of the chassis.
 - ✓ c Connect the .005 mica condenser C19, previously connected to terminal 7 of the rear deck of SW4, to the rotor terminal of C18 and solder.
 - d Install a grommet in the hole beside the 6AU6 oscillator tube socket X6.
 - ✓ e Connect the bottom lead of the oscillator coil L4 and a 2" length of wire W2 to the nearest stator terminal of C18 and solder. Run the wire W2 thru the grommet just installed in (d).
- 11 a Mount the final inductor L9 atop the chassis directly over the six ventilation holes near the front edge. The front of the inductor is the end where the spacing between turns is least and should be toward the front edge of the chassis. Use 3/8" 8-32 screws, shakeproof washers and nuts. Place a flat #10 teardrop solder terminal under the front mounting nut.
- b Connect a piece of #14 tinned wire between the solder terminal on the front end frame of L9 and the 8-32 screw terminal on the same end of the inductor. Form an eye on the #14 wire and tighten between the nuts of L9's 8-32 terminal.
 - c For convenience in shipping the tuning mechanism BKT1, the gear which will be later used to drive the condenser C29, may have been fastened to the inductor drive shaft and pinion. This gear should be removed so that the drive shaft is free to slide back and forth in its bearing. Mount the flexible coupler D16 on the drive shaft on the end next to the small gear.
 - d Loosen the other pair of set screws in the flexible coupler D16,

mount the tuning mechanism BKT1, the outside of the bend in the bracket to the front of the chassis. BKT1 mounts directly in front of the final inductor L9 with the rear end of the flexible coupler D16 over the shaft of L9. Use 3/8" 10-32 screws, shakeproof washers and nuts.

- e Loosen set screws in the flexible coupler D16 and adjust its position on the shafts so that it can move freely and take care of any slight misalignment of the shafts. Tighten all four set screws in D16.
- f Mount BKT2 behind the final tuning inductor L9, with the outside of the bend in the bracket toward the right edge of the chassis, looking from the front. Refer to Figure 6. Use 3/8" 10-32 screws, shakeproof washers and nuts.
- g Mount bracket BKT3 between brackets BKT1 and BKT2 using 5/16" 10-32 screws and shakeproof washers at the front, and 3/8" 10-32 screws, shakeproof washers and nuts at the rear. Loosen the top bearing in BKT1 but do not remove.
- h Take the gear removed from the drive shaft of BKT1 and hold it behind the top bearing in BKT1, with hub side to the chassis rear, set screws up, and with the gear teeth in mesh with the small gear near the center of BKT1. Pass the shaft of variable condenser C29, the large 350 mmf. with the longer shaft, thru the hub of the gear and the bearing in BKT1. Permit C29 to rest on the final inductor L9.
- i Fasten the mounting feet provided in the hardware envelope (23.08-1) on the other large 350 mmf. variable condenser C30.
- j Pass 1/2" 6-32 screws thru the mounting feet on C29, thru the holes in brackets BKT3 and thru the mounting brackets of C30. Fasten with shakeproof washers and nuts. The long shaft of C30 should be toward the front edge of the chassis.
- k With the roller of the inductor L9 at the front stop and with C29 fully meshed, adjust the position of the gear on the shaft of C29 so that the groove in the gear's hub clears the gear below, and tighten set screws.
- l Tighten the top bearing in BKT1. Attach a knob temporarily to the final tuning shaft and check to see whether or not this tuning assembly turns freely. If not, loosen the mounting screws of various components and realign. A drop of oil on the bearings of BKT1 on the outside ends of the bearings of L9 and the variable condenser C29 will aid in making the tuning smooth. Do not lubricate the roller and trolley of L9.
- 12 a Using bracket BKT10, a 3/8" 10-32 screw, nut and shakeproof washer, mount the coupling switch SW5, as shown on Figure 3, directly under the front shaft of the output coupling condenser C30. The assembly screws should lie on a line perpendicular to the top of the chassis, the blank side of the switch to the left of the chassis looking from the front.

- b Attach two #6 solder terminals to the front of the frame of the output tuning condenser C30, as seen in Figure 6, one under the screw in the condenser mounting bracket nearest the condenser shaft, the other under the screw nearest the chassis on the right (lower frame rod). Connect a piece of #14 wire between these terminals and solder.
- c Starting with the first terminal to the right of the top screw in the switch SW5 (looking from the front), connect the small 300 mmf. 500 volt mica condensers C33, C34, C35, each to one of the switch terminals around the switch in a clockwise direction (from the front). Using #14 or double #20 wires at the condenser lugs, connect C38 (150 mmf. 1200V large mica) to the last clockwise switch terminal. In the same manner, connect C36 and C37, each 600VV large mica, to the two switch lugs still open. Connect the other leads of all the condensers to the #14 wire on condenser C30 covered in operation 12-b. Solder all connections.
- d Fasten a #6 solder terminal under the nut of the bottom, front stator terminal of the output tuning condenser C30. Between this terminal and the two lugs on the top of SW5 (to the left of the top screw) connect a piece of #14 wire and solder.
- 13 a Under convenient screws in the rear of the frames of condensers C29 and C30, connect a #10 solder lug on each condenser. Connect two parallel #14 wires as short as possible between these lugs and solder. This is to provide a good low resistance bond between the two condensers.
- 14 a Looking at the 160 meter switch SW6 from the rear of the chassis, as in Figure 6, call the first terminal to the right of the top nut (used in assembling the switch) terminal #1. Call the others in order in a clockwise direction 2, 3, etc., around to the one just to the left of #1 which will be 12.
- b Fasten a flat #10 solder terminal under the 8-32 screw terminal on the rear of the final inductor L9 and connect a piece of #14 wire between this terminal and terminals 2 and 3 on the 160 meter switch SW6 and solder.
- c Connect a flat #10 solder terminal on the bottom rear stator terminal of the coupling condenser C30. Solder a piece of #14 wire between this terminal and terminals 11 and 12 of the 160 meter switch SW6.
- d Mount the 160 meter auxiliary inductor L10 atop the chassis directly behind switch SW6, as shown in Figure 7, and with the leads toward SW6. Secure with shakeproof washers and 6-32 nuts.
- e Strip and solder the top lead of L10 to terminals 5 and 6 of the switch SW6.
- f Strip and solder the bottom lead of L10 to terminals 8 and 9 of SW6. Terminals #1, 4, 7 and 10 will be left blank.

- 15 a Using a 1/4" 6-32 binding head screw and shakeproof washer, fasten bracket BKE13 to the plate coupling condenser C31 (.002 mfd. 1200WV mica) so that the bend in the bracket is parallel to the long axis of the condensers. See C31 in Figure 7.
- b Mount the bracket BKE13 on the bottom rear stator terminal of the tuning condenser C29 so that the condenser C31 projects upward. To this same terminal on C29 and at the same time, mount the residual high frequency coil L8 as shown in Figure 7, by means of its attached solder lug. Solder the plain wire end of L8 to the rear solder terminal of the final inductor L9.
- c Mount the rf choke L7 behind the 4D32 socket X7, using 1/4" 6-32 binding head screws, shakeproof washers and nuts. The bottom terminal of choke L7 should be to the rear of the chassis.
- d Fasten two #6 solder terminals to the top end of the coupling condenser C31 by means of a 1/4" 6-32 screw and shakeproof washer. To one of the terminals solder a piece of #14 wire, the other end of the wire to the top terminal of the choke L7. To the other solder terminal of C31, solder the parasitic suppressor L11. The suppressor lead to the C31 terminal should be as short as possible.
- e To the other end of L11 solder the 4D32 plate connector T01.
- f Mount the plate by-pass condenser C32 (.01 mfd. 1200 WV mica) atop the chassis behind the final inductor L9 in the position shown in Figure 7, the center line between the tapped holes of the condenser parallel to the front edge of the chassis. Before proceeding, remove a mounting bracket from one end of the High Voltage Divider R13 (a 20,000 ohm, 50W adjustable resistor), mount the bracket below the chassis under the head of the screw used to mount C32, orienting the bracket to support R13 later, as shown in Figure 10. Mount the condenser and R13's bracket by means of a 1/2" 6-32 screw run thru a shakeproof washer, up thru the chassis and thru a 10-32 nut used for a spacer between the condenser and chassis.
- g Fasten, by means of a 1/4" 6-32 binding head screw, a #6 solder terminal to the end of C32 nearest the rf choke L7 and solder a piece of #14 wire between this terminal and the bottom terminal of L7.
- h Install a grommet in the hole directly behind L7.
- 16 a Lay the wiring harness W1 in the chassis as shown in the Figure #8. Some of the leads in the harness will prove to be slightly long and may be trimmed to fit. For this reason the leads are not stripped. The plastic covering of the wire may be readily stripped using diagonal cutters, a knife, or a good wire stripper. An iron applied directly to the insulation will cause it to melt but the iron can be left on joints long enough for the solder to flow without effecting the insulation. Numbers of the leads of the wiring harness are given in the drawing Figure 11; however, most leads can be readily identified by their proximity to the connecting terminals.

- ✓ b Connect leads 13A and 14A (green) to pin #1 of the 4D32 socket X7 and solder lightly to hold in position. Do not fill terminal holes.
- ✓ c Connect lead 5B (orange) to the lug of the terminal strip X21 nearest the front of the chassis. Do not solder.
- d Connect the leads 6B and 21B (white) to the fourth terminal from the front of the chassis on terminal board X21. Do not solder.
- ✓ e Connect lead 22A (black) to the third terminal from the front of terminal board X21. Do not solder.
- ✓ f Connect the lead 23A (black-brown) to the second terminal from the front of terminal board X21. Do not solder.
- ✓ g Solder the black wire, which comes out of the harness very close to the front mounting nut of the variable inductor L9, to the solder terminal under the nut.
- ✓ h Connect lead 47B (gray) to pin 2 of the 4D32 socket X7. Do not solder.
- ✓ i Run lead 49B (green-white) thru the grommet beside the rf choke L7 and solder it to the bottom terminal of the choke L7.
- ✓ j Connect 39B and 40A, both violet, to pin 4 (cathode) of the 807 socket X3 and solder.
- ✓ k Solder leads 14B and 15A, both green, to pin #1 (filament) of the 807 socket X3.
- ✓ l Solder leads 45B and 46A, both yellow-blue, to pin 2 (screen) of the 807 socket X3.
- ✓ m Solder lead 15B (green) to pin #1 (filament) of the 307 socket X4.
- ✓ n Solder lead 40B (the longest violet lead) to pin 4 (cathode) of the 807 socket X4.
- ✓ o Solder lead 46B (yellow-blue) to pin 2 (screen) of the 807 socket X4.
- ✓ p Connect lead 22B (black) to the fourth terminal from the edge of the chassis on terminal board X18. Do not solder.
- ✓ q Connect lead 43B (violet) to the terminal of the terminal board X18 nearest the edge of the chassis. Do not solder.
- ✓ r Connect leads 48B and 49A (both green-white) to the second terminal from the edge of the chassis on terminal board X18. Do not solder.
- ✓ s Connect leads 7B and 38A (both yellow) to the fifth terminal from the rear of the chassis on terminal board X22. Do not solder.

- ✓ t Connect leads 8B and 39A (both violet) to the terminal of terminal board X22 nearest the center of the chassis. Do not solder.
- ✓ u Connect leads 27B and 28A (both black-brown) to the rear terminal of the terminal board X22. Do not solder.
- ✓ v Connect lead 32B (gray-red) to the second terminal from the rear of terminal board X22. Do not solder.
- ✓ w Connect lead 42A (violet) to pin #1 of the forward 5W4 socket X9. Do not solder.
- ✓ x Connect lead 20B (green) to pin 3 of the 6AU6 audio amplifier socket, X1, nearest the corner of the chassis and solder.
- ✓ y Connect lead 9A (red) to the center terminal of terminal board X19. Do not solder.
- ✓ z Solder leads 19B and 20A (both green) to pin 3 of the 6AU6 socket X2.
- ✓ aa Install a grommet G4 in the 13/32" hole between and in front of sockets X1 and X2. Run leads 1A, 2A, 3A, 4A, 5A, 6A, 7A and 8A for connection later to the meter switch SW7.
- ✓ bb Solder lead 4B (black) to the terminal under mounting nut of socket X2.
- ✓ 17 a Connect lead 25B (white) to pin 6 (screen) of the 6AQ5 socket X5 and solder.
- ✓ b Connect lead 3B (gray) to pin 2 (cathode) of socket X5. Do not solder.
- ✓ c Connect leads 17B and 18A (both green) to Pin 4 (filament) of socket X5. Do not solder.
- ✓ d Connect leads 16B and 17A (both green) to Pin 4 (filament) of the 6AU6 oscillator socket X6. Do not solder.
- ✓ e Train the harness leads near the VFO socket X12 so they can be brought to the socket terminals neatly and solder lead 10B and 12A (both red) to pin 3 of the octal VFO power socket X12.
- ✓ f Connect leads 13B and 16A (both green) to pin 7 of socket X12. Do not solder.
- ✓ g Solder a piece of W2 wire between pin 7 of VFO socket X12 and pin 4 of 6AL5 socket X11.
- ✓ h Solder leads 23B and 24A (both black-brown) to pin 5 of socket X12.
- ✓ i Solder lead 30B (brown) to pin 8 of socket X12.

- ✓ j Connect lead 12B (red) to pin 3 of the 5Z4 rectifier socket X10. Do not solder.
 - ✓ k Connect lead 29A (white) to the 4th terminal from the bottom edge of the chassis on terminal board X17. Do not solder.
 - ✓ l Connect lead 31B (blue-orange) to the terminal of terminal board X17 nearest the edge of the chassis. Do not solder.
 - ✓ m Connect lead 27A (black-brown) to the center terminal of the terminal board X17. Do not solder.
 - ✓ n Connect lead 1B (blue) to pin 7 (cathode) of the 6AU6 oscillator socket X6 and solder.
 - ✓ o Connect lead 9B, 10A and 11A (all red) to the 3rd and 4th terminals from the front of the chassis on terminal board X20 and solder. Jumper terminals 3 and 4 with the excess of one of the leads. Make certain the jumper is well soldered without filling the terminal eye.
 - ✓ p Connect lead 24B (black-brown) to the second terminal from the front of the chassis on terminal board X20. Do not solder.
 - X q Connect lead 34A (brown) and 50A (brown) to the 5th terminal from the front of the chassis on terminal board X20. Do not solder.
 - ✓ r Install a grommet G5 in the 13/32" hole directly under the drive control R25 and bring up the leads for the drive control to the top of the chassis.
- 18 a Using a bracket BKT11, a 3/8" 10-32 screw, shakeproof washer and nut, mount the motor switch SW7 atop the chassis on the extreme right hand end looking from the front. Secure the motor switch to the bracket with a 3/32" 3/8-32 nut only. Mount the switch so that the center line thru the switch assembly screws is perpendicular to the top of the chassis. The switch is symmetrical and may be turned so that either screw is toward the top. Looking at the switch SW7 from the rear, call the first terminal to the right of the top screw terminal #1, the next in a clockwise direction 2 and so on around the switch, the last one being terminal 12.
- ✓ b Solder the brown lead to terminal 6.
 - ✓ c Strip 1-1/2" of insulation off the black lead, connect it to terminal 5, slip a piece of spaghetti over the exposed lead and connect to terminal 9 also. Solder terminals 5 and 9.
 - ✓ d Solder the orange lead to terminal 4.
 - ✓ e Solder the yellow lead to terminal 3, also to terminal 2.
 - ✓ f Solder the violet lead to terminal 8.
 - ✓ g Solder the white lead to terminal 10.

- ✓ h Solder the gray lead to terminal 11.
- ✓ i Solder the blue lead to terminal 12.
- ✓ j Solder a 4" length of the hookup wire W2 to terminal 7. This will later connect to the negative terminal of the meter.
- ✓ k Solder a 3" length of the wire W2 to terminal #1, tag it in some manner so you can remember it connects to the positive terminal of the meter.

19 Wire the drive control R25 as follows:

- ✓ a Connect the white wire to the center terminal. Solder.
 - ✓ b Looking from the front of the chassis, solder the black wire to the terminal next to the center in a clockwise direction (top terminal).
 - ✓ c Solder the red wire to the terminal next to the center in a counter-clockwise direction.
- 20
- ✓ a Mount bracket BKT12 atop the chassis, outside of the bend to the front, between the switch SW7 (meter switch) and switch SW5 (output coupling switch) using a 3/8" 10-32 screw, shakeproof washer and nut.
 - ✓ b Slip pulley D5 on the long end of the 1-5/8" shaft and bearing assembly D14, hub side of D7 toward the bearing.
 - ✓ c Slip D14 into the hole in BKT12 and secure with the 3/32" 3/8-32 mounting nuts on the assembly.
 - ✓ d Adjust the position of the pulley D5 on the shaft of D14 so that it clears the shield base of the socket X2 by 1/4".
 - ✓ e Slip pulley D6 on the front shaft of the output coupling condenser C30, the hub to the rear. Adjust the position of the pulley so that it lines up with the pulley D5, the opening in the rim toward the pulley D5, and condenser C30 at full capacity.
 - ✓ f With the pulley D5 turned so that the opening in its rim is away from SW5, run a 1" 8-32 screw thru the topmost outside hole stamped in the pulley. Pass the screw thru the pulley from rear to front. Secure with a shakeproof washer and nut. This is the stop for the drive assembly.
 - ✓ g Readjust the position of D5 on the shaft D14 so that the end of the screw installed in 20-f is exactly flush with the front edge of bracket BKT12.
 - ✓ h Now making use of the stop just provided, install the drive cable in exactly the same manner as the drive cable for the 160 meter switch SW6 described in part 5-h; thru 5-1. The tension spring should be fastened to pulley D5 on shaft assembly D14.

- 21 a ✓ Mount the voltage divider R13 directly behind the 4D32 socket parallel to the front of the chassis, as shown in Figure 10. One of the resistor's mounting feet has been mounted under the screw for the plate by-pass condenser C32 which is on top of the chassis. Place the open end of R13 over the bracket "V" and mount the other foot with a 1/4" 6-32 binding head screw, shakeproof washer and nut.
- b When the resistor was shipped from the factory, the shape of the tap may have been deliberately distorted so that it does not make contact with the resistance. This tap then must be taken off the resistor, re-shaped and put back on the resistor in a position shown in Figure 10. Tighten the tap carefully so as not to damage the fine wire with which the resistor is wound. Do not attempt to move the slider without first loosening it!
- c ✓ Connect the three violet wires 42B, 43A and 44A to the voltage divider R13 terminal nearest the center of the chassis. Solder.
- d ✓ Solder wire 41A (gray-red) to the tap on R13.
- e ✓ Solder wire 38B (yellow) to the end of the voltage divider nearest the edge of the chassis.
- 22 a ✓ Mount the phono/CW switch SW3 in the center of the front edge of the chassis with the center line between the two screws used in the assembly of the switch perpendicular to the top of the chassis. Do not use the shakeproof washer supplied but save it for future use. Note that the switch SW3 is symmetrical and that all the terminals are in groups of three. In order that you may stay properly oriented in wiring the switch, number any one of the center terminals of one of the groups of three terminals, #1. Looking at the switch from the rear call the next terminal in a clockwise direction 2 and so on, the last terminal being 9.
- b ✓ Solder leads 2B and 34B (brown) to the #1 terminal of the phono/CW switch SW3.
- c ✓ Solder lead 36A (blue) to terminal 2.
- d ✓ Solder lead 45A (Yellow-blue) to terminal 3.
- e ✓ Solder lead 41B (gray-red) to terminal 4.
- f ✓ Connect lead 47A (gray) to terminal 5. Do not solder.
- g ✓ Connect the screen dropping resistor R28 (10,000 ohms 20 watts) between terminals 5 and 6 of switch SW3. Use one of the resistor lugs to support the resistor and a piece of #14 wire to complete the connection to the other resistor lug.
- h ✓ Solder lead 48A (green-white) to terminal 7 of switch SW3.
- i ✓ Solder lead 44B (violet) to terminal 8.
- j ✓ Solder lead 35A (orange) to terminal 9.

- 23 a Mount the high voltage indicator socket X13A, the larger of two sockets supplied, on the front edge of the chassis directly beneath the shaft which drives the 160 meter switch SW6, using a 1/4" 6-32 binding head screw, shakeproof washer and nut. Screw the 120 volt pilot lamp in the socket.
- b Connect lead 28B (black-brown) to one of X13's lugs and 33B (gray-red) to the other terminal and solder. Polarity need not be observed.
- 24 a Mount the low voltage indicator socket X14A on the front edge of the chassis beneath the drive control R25 using a 1/4" 6-32 binding head screw, shakeproof washer and nut. Screw the 6 volt, #40, lamp in the socket.
- b Solder leads 18B and 19A (both green) to one of X14A's lugs.
- c Solder a piece of wire W2 to the other lug of X14A, run it to the terminal under the front mounting nut of terminal board X21. Do not solder at the ground terminal.
- 25 a Mount the keying jack J2 in the front edge of the chassis directly under the bandswitch SW4 with the solder terminals of J2 toward the right edge of the chassis, as in Figure 10. Use a 3/32" 3/8-32 nut, discarding any washers which may be on J2.
- b Solder the black lead 26B to the terminal of J2 nearest the front edge of the chassis and also to the heavy terminal which is part of the frame of the jack.
- c Solder the blue lead 36B to the terminal of J2 nearest the top of the chassis.
- 26 a Mount the low voltage switch SW1 (SPST toggle switch) in the hole on the front of the chassis nearest the bottom of the chassis and between the phone/CW switch SW3 and the indicator socket X14A, using one of the hexagonal nuts on the switch. The lugs should be toward the top of the chassis and the bushing keyway toward the bottom of the chassis.
- b Solder the white lead 29B to one of the switch terminals and the blue-orange lead 30A to the other switch terminal.
- 27 a Mount the high voltage switch SW2 (DPST toggle) perpendicular to the top of the chassis using one of the hexagonal nuts on the switch, in the hole nearest the top of the chassis, between SW3 and the high voltage indicator socket X13A. The bushing keyway should be toward the bottom edge of the chassis.
- b Connect leads 30B and 31A (both blue and orange) to one of the terminals of SW2 nearest the top of the chassis.
- c To the terminal of SW2 vertically in line with the terminal previously connected, solder leads 32A and 33A (both gray and red).

- ✓ d Solder the black lead 37A to the other terminal of SW2 nearest the top of the chassis.
- ✓ e Solder the orange lead 35B to the terminal of SW2 vertically in line with the terminal connected to the black lead previously.

✓ 28 Mount the buffer tuning condenser C22, the small variable with the long shaft, on the bracket located under the chassis beneath the drive control R25, shown in Figure 10, as follows:

- ✓ a Slip the shaft of C22 thru the hole in the bracket toward the front of the chassis. Slide two of the 3/32" 3/8-32 nuts over the shaft.
- ✓ b Tighten one nut on C22 and lock it with the second 3/8-32 nut. The rotor terminal of C22 should point toward the right end of the inverted chassis.

✓ 29 a Solder the .005 mica condenser C23 to the rotor terminal of C22.

✓ b Solder the coupling condenser C25, 50 mmf. mica (consists of two 25 mmf. silver micas in parallel) between the left hand stator terminal of C22 and terminal 6 of the 4D32 socket.

✓ c Solder the #14 lead of the auxiliary coil L5B which comes from the top of the chassis and a 4-1/2" piece of W2 wire to the right hand stator terminal of C22. Be sure the #14 coil lead does not touch the chassis.

✓ d Trim and solder the W2 wire to pin 5 of the buffer socket X5. Since this is an RF lead, keep it short and clear of other objects.

✓ e Connect the 100 ohm 1/2 watt resistors R26 and R20 to the third and fourth terminals from the front of the chassis on terminal board X20.

30 Operations 30, a thru n, can be seen on Figure 10.

✓ a Connect the W2 wire from the stator terminal of the oscillator tuning condenser C18 and the 50 mmf. silver mica condenser C20 to pin 5 of the oscillator socket X6 and solder.

✓ b Connect the other end of C20 and one end of R23, 47,000 ohm 1/2 watt resistor, to the grid terminal of the 6AQ5, pin 1 of socket X5. Jumper pins 1 and 7 of X5 with the excess lead of R23 and solder at both pins.

✓ c Connect the other end of R23 to the second terminal from the front of the chassis on terminal board X20. Do not solder.

✓ d Between the #6 solder terminal, near the edge of the chassis by X5, and pin 2 of the 6AQ5 socket X5, solder C27, .005 mica condenser, and SH5, 2.2 ohms 1/2 watt resistor.

- ✓ e Beside the left side of the terminal board X20 connect the .005, mica condenser C24 between the second terminal from the front on X20 and the ground terminal under the front mounting nut of X20. Solder all leads on the second terminal from the front.
- ✓ f Connect the .005 mica condenser C26 between pin 4 (filament) of socket X5 and the ground terminal under the front mounting nut of terminal board X20. Solder all leads on pin 4 and the ground terminal.
- ✓ g Solder the .005 mica condenser C21 between pin 6 of socket X5 and the front terminal of terminal board X20.
- ✓ h Connect the .005 mfd. mica condenser C17 between the fourth terminal from the front of the chassis on terminal board X20 and the ground terminal under the rear mounting nut of X20. Solder all leads on both terminals.
- ✓ i Connect C15, .005 mfd. mica condenser between pin 7 of socket X6 and the ground terminal on the rear of X20. Solder all leads on pin 7.
- ✓ j Connect C16, .005 mfd. mica condenser between pin 4 of socket X6 and the rear ground terminal at the rear of X20. Solder all leads on pin 4 and the ground terminal of X20.
- ✓ k Solder one end of C14 and one end of the 1 watt 68,000 ohm resistor R19 to pin 6 of the 6Au6 socket X6.
- ✓ l Connect the other end of R19 to the fourth terminal from the front of the chassis on X20. Do not solder.
- ✓ m Solder R18, 470,000 ohm 1/2 watt resistor, and 3-1/2" of W2 wire to pin 1 of socket X6. Connect the other end of R18 and another 3-1/2" length of W2 wire to pin 2 of socket X6. Leave the other ends of the W2 leads unconnected until later.
- ✓ n Connect shunt SH5, 5.1 ohm 1/2 watt resistor, between pin 7 of X6 and the 5th terminal from the front of X20. Solder both terminals.
- ✓ 31 a Mount the bracket BKT7 under the chassis on the front screws of the crystal selector socket X15 with the outside of the folded edge to the front of the chassis.
- ✓ b Using #24 tinned wire, connect the inside terminals of crystal positions 1, 2, 3, 4 and 5 on socket X15 all in parallel. This is done by running the wire parallel to the edge of the chassis thru each of the terminals and soldering.
- ✓ c In the same way connect the inside terminals of crystal positions 6, 7, 8, 9 and 10 in parallel.
- ✓ d Connect these two wires together using a piece of #24 wire running from terminal 5 to terminal 6.

- ✓ e Bring the unconnected end of the 50 mmf. condenser C14 around the bracket to the crystal board terminal 6. Connect and solder.
- ✓ f Mount the crystal selector switch SW8 on the bracket BKT7, the shaft toward the front edge of the chassis. Secure with two 3/8-32 nuts. The switch should be turned so that the rotor terminal of the switch is up when the chassis is in an inverted position. Terminals 1 and 7 (see next step) should be in a vertical line.
- ✓ g Looking at the switch from the rear, call the rotor terminal #1 and the next terminal in a clockwise direction 2 and so on around the switch, the last terminal being #12.
- ✓ h Using #24 wire connect and solder switch terminal 6 to the terminal of crystal position 6 on the outside edge of the crystal board.
- ✓ i In the same way connect and solder terminal 7 of the switch to the terminal of crystal position 5 on the outside of the crystal board.
- ✓ j Connect switch terminal 5 to crystal position 7.
- ✓ k Connect switch terminal 8 to crystal position 4.
- ✓ l Connect switch terminal 4 to crystal position 8.
- ✓ m Connect switch terminal 9 to crystal position 3.
- ✓ n Connect switch terminal 3 to crystal position 9.
- ✓ o Connect switch terminal 10 to crystal position 2.
- ✓ p Connect switch terminal 2 to crystal position 10.
- ✓ q Connect switch terminal 11 to crystal position 1. Terminal 12 on the switch is left unconnected for the time being.
- ✓ r Connect the wire W2, already connected to pin 1 of the oscillator socket X6 to switch terminal #1. Keep this lead clear so that it does not touch other objects.
- ✓ s Install one of the 3/8-32 panel bearings D17 in the hole in front of the chassis in line with the socket X5. The threaded portion of the bearing should extend thru the chassis to the front. Secure with one of the 3/32" 3/8-32 nuts. If the bushing does not tighten against the chassis completely, no harm will be done by leaving it loose at this time.
- ✓ t Slip one of the split sleeve couplings D19 on the shaft of the crystal selector switch SW8.
- ✓ u Slip the 1/4" x 5-1/2" shaft extension D11 into the coupling D19, on the crystal selector switch SW8. Center the ends of the shafts in the coupling D18 and secure.

- ✓ 32 a Trim and solder the #14 lead extending from pin 4 of the 4D32 socket X7 to the solder terminal on the chassis under the buffer shield mounting nut (on the chassis below pin 4).
- b Connect C40, .005 mfd. mica condenser between pin 1 and pin 5 of the 4D32 socket X7. Run the lead at pin 5 also thru one of the solder terminals mounted there and solder at the terminal and pin 5 only. Do not solder at pin 1 as yet.
- ✓ c Using 1/4" 6-32 binding head screws, fasten double 1" leads (of the W2 hookup wire, stripped) on the ends of condenser C28 (.002, 1200 WV mica). With the wire leads toward the chassis, run these leads thru the lugs on pin 2 of X7, pin 4 of X7 and thru the solder terminal beside pin 4. Draw the condenser down tightly and solder at all points.
- ✓ 33 a Place resistor R27, 2000 or 2200 ohms 1 watt, and R24, 2700 ohms 1 watt, on the chassis beside terminal board X21 and connect both between each of the end terminals of X21. Do not solder.
- b Connect shunt SH4, 1/2 watt 5.1 ohms, between the front terminal of X21 and the fifth terminal from the front of the chassis on X21. SH4 should be on the same side of X21 as R27. Use the excess length of SH4 lead to jumper terminal 5 to terminal 4 of X21. Do not solder.
- ✓ c On the same side of X21, connect R17, 2700 ohms 1 watt resistor, between the third and fifth terminals from the front of the chassis on terminal board X21. Do not solder.
- d On the other side of X21, connect R15, 1500 ohms, 1 watt resistor, between the second terminal from the front of the chassis on X21 and the ground soldering terminal under the mounting nut of X21 toward the front of the chassis. Solder the ground terminal.
- ✓ e On the same side of X21, between the second and third terminals from the front of the chassis on X21, connect R16, 820 ohms 1 watt. Do not solder.
- ✓ f Between the terminal of terminal board X21 nearest the front of the chassis and pin 7 of the 4D32 socket X7 connect C39, .005 mfd. mica condenser and solder.
- ✓ g Between the rearmost terminal of X21 and pin 6 of the 4D32 socket X7 solder the RF choke L6. It will be necessary to attach a short length of #14 tinned wire to make the choke reach between these terminals and support it.
- h Solder all connections on terminal board X21.
- 34 a Using the shielded wire, W5, temporarily connect the microphone input connector J1.

- b Solder the center conductor to the center contact of J1, wrap a short piece of W2 wire, stripped, around the shielding of the wire W5 and solder. Solder the other end of the wire to the ground lug on the connector. Cut 1" off the other end of W5 for use in 34d. Strip the outer shield braid back 1/4" and the insulation back 3/16" on the unconnected end of W5.
 - c Wrap another short piece of stripped W2 wire around the shield braid of the unconnected end of the shielded wire and connect to pin 2 of socket X1.
 - d Slip a half-inch piece of spaghetti over one lead of the resistor R1, 1 meg. 1/2 watt. Slip a one inch length of shield braid only over the entire resistor for shielding. Tin the ends of the braid at the end of the resistor where it is insulated with spaghetti. Solder the braid to the other lead of the resistor.
 - e Solder the center conductor of the shielded wire and the insulated end of the resistor R1, 1 meg. 1/2 watt to pin 1 of socket X1.
 - f Connect the other end of R1 to pin 2 of socket X1. Solder all leads.
- 35
- a Mount the audio gain control R6 (1/2 meg. volume control) on the front edge of the chassis under the meter switch. Secure with a 3/32" 3/8-32 nut.
 - b Using W2 wire solder the center lug of R6 to pin #1 of the 6AU6 socket X2, keeping the lead short but not taut.
 - c Looking at the back of R6, the lug in a counter-clockwise direction from the center lug should be connected to pin 2 of X2 with W2 wire, spiraling the lead once around the lead previously connected. Solder at control only.
 - d Solder R7, 220 ohms 1/2 watt, to pin 2 of X2, connect other end of R7 to pin 7. Do not solder.
 - e Connect C1, 10 mfd. 25V. tubular electrolytic between pin 7 of socket X1 and the soldering terminal under the rear nut of X19. The end marked with a plus sign should be connected to pin 7.
 - f Connect C4 .1 mfd. tubular condenser between the end terminals of terminal board X19. The outside foil end (indicated by a black band) should be grounded. Do not solder.
 - g Solder the ground leads at the rear nut of terminal board X19.
 - h Connect R5, 22,000 ohms 1/2 watt resistor, between the center terminal and the front terminal of terminal board X19. Do not solder.
 - i Connect R4, 220,000 ohms 1 watt, between the front terminal of X19 and pin 5 of socket X1. Do not solder.

- ✓ j Connect R3, 470,000 ohms 1/2 watt, between the front terminal of X19 and pin 6 of socket X1. Solder at X19 only.
 - ✓ k Connect R8, 47,000 ohms, 1 watt, between pin 6 of socket X2 and the center terminal of terminal board X19. Do not solder.
 - ✓ l Solder the modulator screen by-pass condenser C8, .5 mfd. 600 volts between pin 5 of socket X3 and pin 2 of either socket X4 or X3. C8 may be placed parallel to the rear of the chassis and behind sockets X3 and X4, instead of the position shown in figures 8 and 10. The outside foil of C8 should be connected to pin 5.
 - ✓ m Solder C3, .02 mfd. 400 V tubular to pin 6 of socket X1. Connect the other end to the rear terminal on X19, with outer foil grounded. Do not solder.
 - ✓ n Connect C6, .02 mfd. 400 V tubular between pin 6 of socket X2 and the rear terminal of X19, with the outer foil grounded. Solder at pin 6 and all leads at the rear terminal of X19.
 - ✓ o Solder R2, 1800 or 2000 ohms 1/2 watt, between pins 4 and 7 of socket X1.
 - ✓ p Looking at the rear of the volume control R6 solder to the first terminal clockwise from the center terminal C2, .003 mfd. 600 V tubular condenser. Solder the other lead of C2 to pin 5 of socket X1.
 - ✓ q Connect one end of C5, .01 mfd. 1000 volts tubular condenser to pin 7 of socket X2. Connect the other end to the right hand terminal of terminal board X18. The outer foil should be connected to pin 7. Solder all leads on pin 7 only.
 - ✓ r Solder R9, 1 watt 220,000 ohm resistor between the right hand terminal of X18 and the X18 terminal second from the left. If the modulator is to be used to drive a larger stage, suggestions for wiring can be found on pages 8 through 9 of the Operating Instruction Manual.
 - s Check to make sure all the terminals and leads are soldered in the audio section with the exceptions of the middle terminal of X19 and the two left terminals of X18.
- 36 The modulation transformer has dual secondary windings, normally series connected by instructions b, c, and d immediately following. If the Viking I modulator is to be used for driving a larger stage, suggestions for wiring can be found on pages 8 through 9 of the Operating Instruction Manual.
- a Mount the modulation transformer T4 (SNC P1992) atop the chassis between the meter switch SW7 and the 807 sockets X3 and X4, as shown in Figure 9, with 3/8" 8-32 screws, shakeproof washers and nuts. Use shakeproof washers under the screw heads as well as under the nuts.
 - b Cut both the green/yellow and the red wire to length and connect to the left hand terminal of X18. Solder all leads on the terminal.

- ✓ c Trim the yellow wire of T4 to length and connect to the second terminal from the left on X18. Solder all leads on the terminal.
- ✓ d Cut to length both the red/yellow and green wires of T4 and solder to the center terminal of X18.
- ✓ e Install a 9/16" O.D. grommet in the hole between the 807 sockets X3 and X4. Run the brown and blue transformer leads thru the grommet to the top of the chassis.
- ✓ f Solder plate caps TC 2 and TC3, one on each of the modulation transformer leads previously run thru a grommet to the top of the chassis.
- ✓ 37 a Mount the audio transformer T3 (SNC P1503) underneath the chassis on the left end above the terminal board X18, with the red and blue leads up. Use 1/4" 6-32 binding head screws, shakeproof washers and nuts.
- ✓ b Solder the yellow lead of T3 to pin 3 of socket X3.
- ✓ c Solder the green wire of T3 to pin 3 of socket X4.
- ✓ d Connect the black lead of T3 to the 4th terminal from the left end of terminal board X18. Solder all leads on the terminal.
- ✓ e Connect the red lead of T3 to the center terminal of terminal board X19. Solder all leads on the terminal.
- ✓ f Solder the blue lead of T3 to the plate pin 5 of socket X2.
- ✓ 38 a Mount the high voltage transformer T1 (SNC P1781) in the corner of the chassis between the 807 sockets and the 5R4 sockets X8 and X9 using 3/8" 8-32 screws with shakeproof washers under both the screw heads and nuts.
- ✓ b Trim the black leads of T1 to length and connect one lead to each of the two rearmost terminals of terminal board X22. Solder all leads on the two terminals.
- ✓ c Solder the red-yellow lead of T1 to the second terminal from the front of the chassis on terminal board X22.
- ✓ d Solder one of the red leads of T1 to pin 4 of the 5R4 socket X8.
- ✓ e Solder one of the red leads of T1 to pin #6 of the 5R4 socket X9.
- ✓ To make a neat job, the leads of T1 may be now laced up with lock-stitch (waxed linen string).
- ✓ 39 Before mounting the choke L1 (SNC P1783) between the 5R4 sockets X8 and X9 and the 5Z4 socket X10, note that there is a small hole in the chassis inside the square formed by the mounting holes of the choke. Insert a 1/4" 6-32 screw into this hole from the top of the chassis and fasten loosely with a nut.
- ✓ a Mount the choke L1 atop the chassis using 3/8" 8-32 screws, with shakeproof washers under both the screw heads and nuts. See Figure 9.

- ✓ b Connect one of the leads of the choke to pin #1 of socket X9. Do not solder.
- c Connect the other choke lead to pin 8 of socket X9.
- ✓ 40 a Mount the filter choke L3 (SNC P1784) under the chassis to the rear of the crystal selector board, the choke parallel to the rear edge of the chassis. Secure only the end of the choke nearest the right end of the chassis using a 1/4" 6-32 binding head screw, shakeproof washer and nut. The other end will be secured with a mounting screw in step 41a.
- ✓ b Connect one of the leads of choke L3 to pin 7 of socket X11. Jumper pin 2 to pin 7 with a piece of W2 wire. Solder at pin 2 only. Connect the other lead of L3 to pin 6 of X11. Do not solder.
- ✓ 41 a Mount the transformer T2 (SNC P1883) atop the chassis on the rear right hand corner as seen in Figure 9, using 3/8" 8-32 screws, with shakeproof washers under both the screw heads and nuts. Secure the loose end of L3 at the same time. The red leads of the transformer should project thru the 5/8" hole in the chassis nearest the corner. Allow some slack in all the leads of T2 so that they may be later cabled.
- ✓ b Solder one red lead of T2 to pin 4 of the 5Z4 socket X10.
- ✓ c Solder the other red lead of T2 to pin 6 of X10.
- ✓ d Solder one of the brown leads of T2 to pin 2 of X10.
- ✓ e Connect the other brown lead of T2 to pin 8 of X10.
- ✓ f Leave the green leads of T2 full length and solder one to pin 1 of the 4D32 socket X7, the other to pin 7.
- ✓ g Solder one of the blue leads of T2 to pin 1 of the 6AL5 socket X11.
- ✓ h Solder the other blue lead of T2 to pin 5 of X11.
- ✓ i Connect one of the yellow wires of T2 to pin 8 of the 5R4 socket X8. Solder all leads on pin 8.
- ✓ j Solder the other yellow wire of T2 to pin 2 of X8.
- ✓ k For the sake of neatness lace these transformer leads to the main wiring harness from T2 to the 5R4 sockets X8, X9 leaving the black wires and the red-yellow wire out of the cable opposite terminal board X17, and the green wires out opposite pin 1 of socket X7.
- ✓ l Solder the red-yellow lead of T2 to the ground lug under the mounting nut of X17 nearest the top of the chassis.
- ✓ m Connect one of the black leads of T2 to the center terminal of terminal board X17. Do not solder.
- ✓ n Connect the other black lead of T2 to the terminal of X17 to which a blue-orange lead was previously connected. Solder all leads on the terminal.

✓ 42 a Mount the dual capacitor C10-C11 (dual 16 mfd. 450 volts) parallel to the rear edge of the chassis on the screw located beneath the choke L1, the negative (black) lead toward terminal board X22.

✓ b Connect the negative (black) lead to the fourth terminal from the rear of terminal board X22. Do not solder.

✓ c Mount choke L2 (SNC F1501) on the rear edge of the chassis with the leads down, directly under L1 using 3/8" 8-32 screws, shakeproof washers and nuts.

✓ d Connect one of the positive leads of C10-C11 and one of the leads of choke L2 to pin 3 of socket X10. Solder all leads on pin 3.

✓ e Connect the other lead of L2 and the other positive lead of C10-C11 to pin 8 of socket X10. Solder all leads on pin 8.

43 a Mount the bias supply filter condenser C12 and C13 (dual, 16 mfd. 150-volt electrolytic) parallel to the rear edge of the chassis between socket X11 and resistor R13, with the red and green leads to the right.

✓ b Solder the positive leads of C12 and C13, red and green, to the ground terminal under the nut of the rearmost buffer shield spade lug.

✓ c Connect one of the negative leads (blue) of this dual condenser to pin 7 of socket X11 and solder all leads on this terminal.

✓ d Connect the white lead 21A and the other negative lead (black) of the dual condenser to pin 6 of socket X11 and solder the three leads on this terminal.

44 ✓ a Connect shunt SH2 between the front terminal and the second terminal from the front on terminal board X22, as seen in Figure 10. Do not cut shunts.

✓ b Connect shunt SH1 between the second and third terminals from the front of terminal board X22. Solder all connections on the first and third terminals from the front.

✓ c Mount the high voltage filter condenser, C9, 8 mfd. oil-filled, on the rear edge of the chassis below the H.V. transformer, T1. Refer to Figure 8. Use 3/4" 8-32 screws, shakeproof washers and nuts. Mount the brackets so that there is as much clearance as possible between the condenser and the wiring below. The screw nearest the middle of the chassis should have the nut outside the chassis so it can be used for a ground terminal. Place an additional nut and lock-washer on the ground stud thus formed for future ground lead connections.

✓ d Using W2 wire, solder a lead from one terminal of C9 to the #1 pin of socket X9. Solder all leads on pin #1.

✓ e Using W2 wire, connect a lead between the other terminal of C9 and

✓ the second terminal from the front of terminal board X22. Solder all connections on the second terminal from the front.

✓ 45 a Strip 2" of the outside vinylite covering from item G2 RG59U cable used for VFO input lead. Cut the shield braid back 1/2" exposing the polyethylene insulated center conductor. Strip the insulation back 1/4" on the center conductor and tin with solder. Fill the solder terminal of J4 (one of the 83-1R receptacles) with solder. Slit the extruded end of the hood H2 at the holes so that it can be crimped down to a smaller diameter later and slide the hood on the cable, the extruded end of the hood over the shield braid. Place the receptacle J4 in the hole near the bottom edge on the rear of the chassis, to the left of X12 as shown in Figure 12, the threaded end inserted through the hole from the inside of the chassis. If necessary, secure the receptacle temporarily using 3/8" 4-40 screws. Heat the solder lug of J4 to melt the solder, push the tinned end of the cable G2 into the lug and remove the iron immediately. Slide the hood down the cable to the chassis, fasten hood and receptacle with two 3/8" 4-40 screws, shakeproof washers and nuts. Crimp the hood end around the shield and solder.

✓ b Strip three inches of the vinylite covering from the free end of cable G2. Cut the now exposed shield back 3/4" from the end being careful not to damage the insulation underneath. Connect and solder the piece of W2 hookup wire already connected to pin 2 of X2, to the shield braid after the cable G2 has been laid along the edge of the chassis near the crystal socket X15 and looped back toward the top of the crystal selector switch. Strip the insulation on the center conductor of G2 back about a quarter inch and solder to terminal 12 of the crystal selector switch SW8. Looking at the switch from the rear and calling the rotor terminal #1, this is the 12th terminal in a clockwise direction. Carefully tin the end of the shield with solder to keep it from fraying, being careful not to melt the insulation.

✓ 46 a Trim the RG8U lead G1 to exactly 11 inches long. Strip the insulation off the outside of one end for two inches. Trim 1-1/4" of insulation off the other end, unbraided the shield on this end.

✓ b Cut the center insulation back to 1/4" from the point where the outside insulation was cut on the 1-1/4" length:

✓ c Fasten a flat #10 solder terminal under the rear bottom stator connection on the output coupling condenser C30.

✓ d Fasten another #10 solder lug (with wings) under the screw on C30 under which was previously fastened a soldering lug for connecting together the rotors of C30 and C29.

✓ e Fit the center conductor of the RG8U in the lug on C30 stator and solder.

✓ f Comb the strands of the outer braid, gather on the proper side of the cable, twist them together into a lead, and solder to the solder lug on the rotor of C30.

- g At the other end of the RG8U cable, **slide** the braid back on the cable, trim the insulation of the center conductor back about 1/4", tin the end of the wire.
 - h Slide the hood H1 (83-1H) on the RGSU cable.
 - i Force the receptacle J3 (83-1R) into the hole on the rear edge of the chassis under I1 from inside the chassis, the solder terminal extending into the chassis.
 - j Fill the solder terminal with solder.
 - k Pushing the hood back out of the way, solder the center conductor of the RG8U to the solder terminal of J3.
 - l Fasten the receptacle and hood to the chassis using 3/8" 4-40 screws, shakeproof washers and nuts.
 - m Slip the braid of the RG8U down over the hood, solder carefully and trim off the excess braid. Be sure to check that none of the braid wires are left inside the hood.
- 47
- a Mount the fuse post X16 on the rear edge of the chassis in the top hole beside the VFC socket X12. The body terminal should be accessible for wiring later.
 - b Using a short piece of insulated hookup wire W2 connect lead 29A (white) on the terminal board X17 to the end lug of the fuse post X16. Solder. Check to make certain that there is a 5 ampere fuse in the fuse post.
 - c Install a grommet G6 in the hole beside the terminal board X17, insert the power cord leads, tie an overhand knot in the cord inside the chassis and solder the leads, one to the center terminal of X17, the other to the body terminal of the fuse post.
- 48
- a Slip the split sleeve coupling D18 on the shaft of C18. Slide the 1/4" x 2-1/4" shaft extension D13 into the coupling from the front. Center the ends of the shafts in the coupling D18 and tighten.
 - b Connect the meter M1 to the meter leads on the meter switch temporarily for testing. Care must be exercised to keep from subjecting the meter to jarring during testing. One method of temporary mounting is to tape the meter securely on the inside of the chassis leg near the meter switch. Another method of using the meter is to attach long leads so that the chassis can be moved readily or the meter can be easily disconnected during chassis inspection. The plus meter switch lead is on top.
 - c Attach knobs temporarily for testing (without the panel) according to paragraph A5, page 3, of the Instruction Manual. Refer to the photo of the Viking I on the front page of the brochure at the front of the Instruction Manual for panel designations of the knobs. Be careful not to apply side force to the "oscillator" shaft extension - the shaft bearing may be loosened. All index marks will have to be "assumed" to be directly above the dial in the absence of the panel.

- d Slip the final tuning dial D1 on the shaft of the condenser C29, the hub toward the rear of the transmitter. D1 should be as far back as possible. Tighten the hub temporarily in position where the zero is straight down when the tuning condenser is fully engaged.
- 49 a We are now at the stage where the testing should be done. Read the Instruction Manual warnings and notices on the first three pages, Theory of Operation, and Tuning Details before testing. The following instructions are fairly complete in themselves, but familiarity with operating procedure is very helpful. The panel should not be mounted nor the transmitter placed in the cabinet until after testing thoroughly. First look over the wiring carefully for unsoldered connections, accidental grounds, and other mechanical difficulties. A half hour spent now may save hours later.
- b Loosen the tap on the high voltage divider R13 and adjust the position to approximately 1/3 of the distance from the end nearest the center of the chassis.
- c Next, with all the tubes out of their sockets, plug in the power cord, throw the low voltage switch and check to determine that line voltage is applied to the primary (black) leads of the low voltage transformer T2. The small pilot lamp should light.
- d If no trouble is encountered at this stage, throw the high voltage switch, leaving the low voltage switch on, and check to see if line voltage is applied to the high voltage transformer T1. The large pilot lamp should light. Lighting of the large lamp does not always conclude that line voltage is applied to T1, but it is a fairly dependable indication.
- ✓ e Turn off the H.V. switch and plug in the 5Z4 rectifier in socket X10, check the voltage between ground and the fourth terminal from the front of the chassis on terminal board X20. This voltage should be approximately 380 volts positive to ground, with the line voltage approximately 120 volts.
- f Plug the 6AL5 in the socket X11. This should produce a voltage approximately 80 volts negative with respect to the chassis on the front terminal of terminal board X21. Voltage at the second terminal from the front of the terminal board X21 should be approximately 25 volts. Voltage at the third terminal from the front should be around 40 volts. These readings taken with a 20,000 ohms per volt meter may be less on a 1,000 ohms per volt meter.
- ✓ g Set the phone/CW switch on CW. Next plug in the 6AU6 oscillator tube into socket X6 and switch the meter to the "osc" position. Oscillator current without a crystal will run approximately 14 ma. With an active 160, 80 or 40 meter crystal plugged into the crystal socket, this current will drop to around 7 ma. The meter reads 25 ma. full scale on the oscillator position.

- h Next plug the 6AQ5 buffer into socket X5, set the bandswitch to correspond with the output frequency desired. Turn the drive control R25 up about half way. With the meter switch in the "bfr" position, tune the oscillator condenser C18 to the position where the 6AQ5 buffer plate current rises. Tune C18 for maximum buffer plate current. This rise in plate current indicates that the 6AQ5 is receiving excitation.
- i Do not yet apply high voltage. Next plug in the 4D32 amplifier and connect the plate cap.
- j Turn the meter switch to the "grid" position. The meter may now show some deflection indicating grid current flowing in the 4D32. The meter reads 25 ma. at full scale in the "grid" position and the maximum permissible grid current on the 4D32 is 15 ma. or 60% of full scale. Avoid exceeding this value. The amount of excitation which can be obtained will vary over the various bands. However, enough excitation to drive the amplifier to full output over its entire range can be obtained even though the maximum of 15 ma. is not necessarily available. Although the loading of the final amplifier will cause the grid current to decrease, in general the following is the amount of excitation available under different operating conditions with reasonably active crystals.

<u>Xtal Freq.</u>	<u>Output Freq.</u>	<u>Grid Current</u>
1800-2000	1800-2000	15 ma. plus
1800-2000	3600-4000	15 ma. plus
1800-1825	7000-7300	13 ma. - note 1
1750-1800	14000-14400	13 ma. - note 2
3500-4000	3500-4000	15 ma. plus
3500-3650	7000-7300	15 ma. plus
3500-3600	14000-14400	15 ma. - note 2
3500-3712.5	28000-29700	8 ma. - note 3
7000-7300	7000-7300	15 ma. plus
7000-7200	14000-14400	15 ma. plus
7000-7425	28000-29700	13 to 15 ma.
7000	21000	15 ma. plus
4666-4800 (14 mc)	14000-14400	15 ma.
4866-4950(crystal)	28000-29700	10 ma.

Note 1: This type operation is not recommended as it is possible to obtain output also from 5400 kcs. to 5475 kcs.

Note 2: It is possible to accidentally get output around 11 mcs.

Note 3: It is possible to get output around 24.5 mcs.

- k Re-tune the oscillator and buffer tuning condensers for maximum 4D32 grid current keeping this value to 15 ma. or below by adjusting the drive control.

- l Next, plug the 5R4 rectifiers into sockets X8 and X9 and with the drive control turned to zero, throw the high voltage switch on. The voltage from the lug of the voltage divider nearest to the center of the chassis should be approximately 700 volts positive above the chassis. Keep the 807 plate caps away from ground. Don't touch them! They have full plate voltage on them.
- m Turn the drive control up until the 4D32 draws about 150 ma. plate current (read on the "plt" position of the meter switch).
- n Tune the final amplifier to resonance starting with the tuning condenser C29 at maximum capacity. This precludes the possibility of tuning the final amplifier to a harmonic. Resonance is the point where the current dips sharply.
- o Attach the antenna to the output terminal and re-tune the amplifier to resonance. Minimum coupling is with C30 turned counterclockwise to full capacity and the coarse coupling switch set counterclockwise with all the capacitors in the circuit. The amplifier should be tuned to resonance with minimum coupling and then loaded by adjusting the coarse coupling switch and C30 bringing the amplifier back to resonance each time with C29. The antenna should be loaded until the final amplifier plate current dips only about 20 ma. as the amplifier is tuned thru resonance. The grid current should now be brought up to its normal value (9 to 12 ma.) and the plate current should be between 250-275 ma. Turn off the high voltage! Antennas requiring balanced transmission line currents may be loaded by means of an external balanced tank circuit link coupled to the transmitter.
- p Next, turn off both power switches and plug in the 6AU6 amplifier tubes into sockets X1 and X2. Plug the 807's into sockets X3 and X4 and attach plate caps. Turn on L.V. switch.
- q With the audio gain control turned to the "0" position and the phone/CW switch in the "phone" position, throw the high voltage on. If a whistle is heard from the modulation transformer, turn the high voltage off, discharge the H.V. supply at the 807 plates, reverse the 807 plate caps.
- r The tap on the voltage divider R13 should now be adjusted in the "phone" position, with the final drawing normal plate current, the voltage at the tap should be between 280 and 320 volts. Adjust the tap so that the no signal modulator plate current reads between 60 and 80 ma. Don't try to adjust the tap with the plate voltage on! Loosen the tap sufficiently so that the resistance wire is not damaged as the tap is moved.
- s Attach the microphone to the mike input connector and adjust the audio gain control for 100% modulation (approximately 175 ma "Mod" current peak swing).
- t While the transmitter is still out of its cabinet and the front panel is still unattached, it is a good plan to check the operation of the

transmitter on all bands to be certain that oscillator and buffer stages are wired correctly.

- 50 After thoroughly testing the transmitter, mount the panel on the chassis as follows:
- a Unsolder the microphone connector J1 at the connector.
 - b Mount the meter M1 in the panel using the screws and washers furnished with it.
 - c Mount the final tuning index plate and escutcheon assembly D2. The maroon escutcheon goes over the rectangular hole in the center of the panel, the index plate behind the panel with the indicating mark up. The spacers should be between the panel and the plate. Mount with the screws, washers and nuts furnished.
 - d Mount the microphone connector on the panel. Discard the insulating washers. Secure to the panel with a 3/8-32 nut.
 - e Solder one of the flat #10 solder terminals to each of the meter leads.
 - f Mount the jewels X13B and X14B in their proper places on the panel, with the green jewel toward the left of the panel, and secure with the nuts furnished.
 - g Mount a panel bearing D17 on the front panel in the hole corresponding to the drive shaft of the final amplifier tuning dial. The threaded portion of the panel bearing should be toward the chassis. Use a 3/8" shakeproof washer (saved from 22a) between the 3/8-32 mounting nut and the rear surface of this panel.
 - h Remove the knobs and check the front of the chassis to make sure that all the bearings required are properly installed and that all shafts and shaft couplers are in their correct positions and tight.
 - i Tentatively, place the panel over the shafts of the transmitter, shifting shafts as necessary to get them to pass thru the panel holes.
 - j Note which, if any, of the panel bearings or mounted bushings of switches or other components keep the panel from slipping down over the threads. If necessary, loosen the nuts of the bearings which are causing the trouble and shift the positions of the components slightly.
 - k Make a very careful check to see that all the jobs which cannot be done after the panel is in place are taken care of. Put the panel in position and fasten by means of the 3/32" 3/8-32 nuts with the exception of the toggle switches. Be most careful not to mar the panel with pliers.
 - l Fasten the knurled nuts on the toggle switches with your fingers. By grasping the knurled nut of the switch and at the same time the body of the switch and moving both the nut and switch slightly, the nut may be tightened without tools.

- m Mount the ground lug on J1 using one of the 3/8-32 nuts. Tighten this nut securely but not excessively since the threads may strip.
- n Re-solder the input leads to J1.
- o Connect the meter leads by means of the nuts on the meter terminal studs, being careful to observe correct polarity.
- p Set the main dial to zero and line it up with the index plate, while the condenser C29 is at full capacity, and tighten.
- q Attach the knobs according to the Instruction Manual, paragraph A5, on page 3.
- r Slide the transmitter into the cabinet being careful to support the chassis at the rear to avoid scratching the bottom of the cabinet. Lift the front panel slightly to keep it from marring the front bottom edge of the cabinet. Secure the chassis by means of the 3/8" #10 self-tapping screws run through the bottom of the cabinet.
- s Secure the panel to the cabinet using cup washers and oval head 10-32 screws.

VIKING I TRANSMITTER

Changes required for use of 829B final amplifier.

- 1 Turn coupling capacitor C31 down toward chassis to keep plate leads short.
- 2 Connect another parasitic choke (L11) to C31 by means of a solder terminal.
- 3 Connect a plate terminal (Johnson 119-848) to each of the parasitic chokes L11.
- 4 Leave pins 4 and 5 of socket X7 grounded to the chassis, but remove the ground lead from pin 7.
- 5 Remove filament wire from pin 7 and connect filament lead to chassis by means of a solder terminal under a convenient screw.
- 6 Connect pins 1 and 7 together with #20 wire.
- 7 Remove the ground lead of the filament bypass condenser C40 and re-connect to ground on the socket mounting screw near pin 1.
- 8 Remove C28 lead together with the gray screen grid lead from pin 2 and connect to pin 3.
- 9 Either change screen dropping resistor R28 to 12,500 ohms 20 watts, or connect a 3,000 ohm 10 watt resistor in series with R28.
- 10 Remove condenser C25 and choke L6 from pin 6.
- 11 Connect a jumper of #14 wire between pins 2 and 6 allowing it to bow upwards 1/2".
- 12 Re-connect C25 and L6 to the center of the jumper to provide balanced drive to the grids.

Adjustment: With the final amplifier loaded to approximately 230 ma. the voltage divider tap should be adjusted so that screen voltage is approximately 225 volts. This screen voltage setting should provide about 80 ma. no audio signal cathode current in the 807 modulators on the "phone" position.

Viking I Transmitter

Typical operation using 829B final
within ICAS tube ratings

CW operation with 115 V 60 cycle ac input:

FREQUENCY	28 mc.
P. A. CATHODE CURRENT	230 ma.
SCREEN GRID VOLTAGE	225 volts (loaded)
P. A. PLATE VOLTAGE	660 volts (loaded)
P. A. GRID CURRENT	12 ma.
P. A. GRID BIAS	-97 volts
POWER OUTPUT	95 watts

Phone operation with 115 V 60 cycle ac input:

FREQUENCY	28 mc.
P. A. CATHODE CURRENT	230 ma.
SCREEN GRID VOLTAGE *	225 volts (loaded)
P. A. PLATE VOLTAGE	620 volts (loaded)
P. A. GRID CURRENT	12 ma.
P. A. BIAS VOLTAGE	-97 volts
POWER OUTPUT	87 watts
MODULATOR CATHODE CURRENT	80 ma. (no signal)

* - 13,000 ohm screen dropping resistor used.

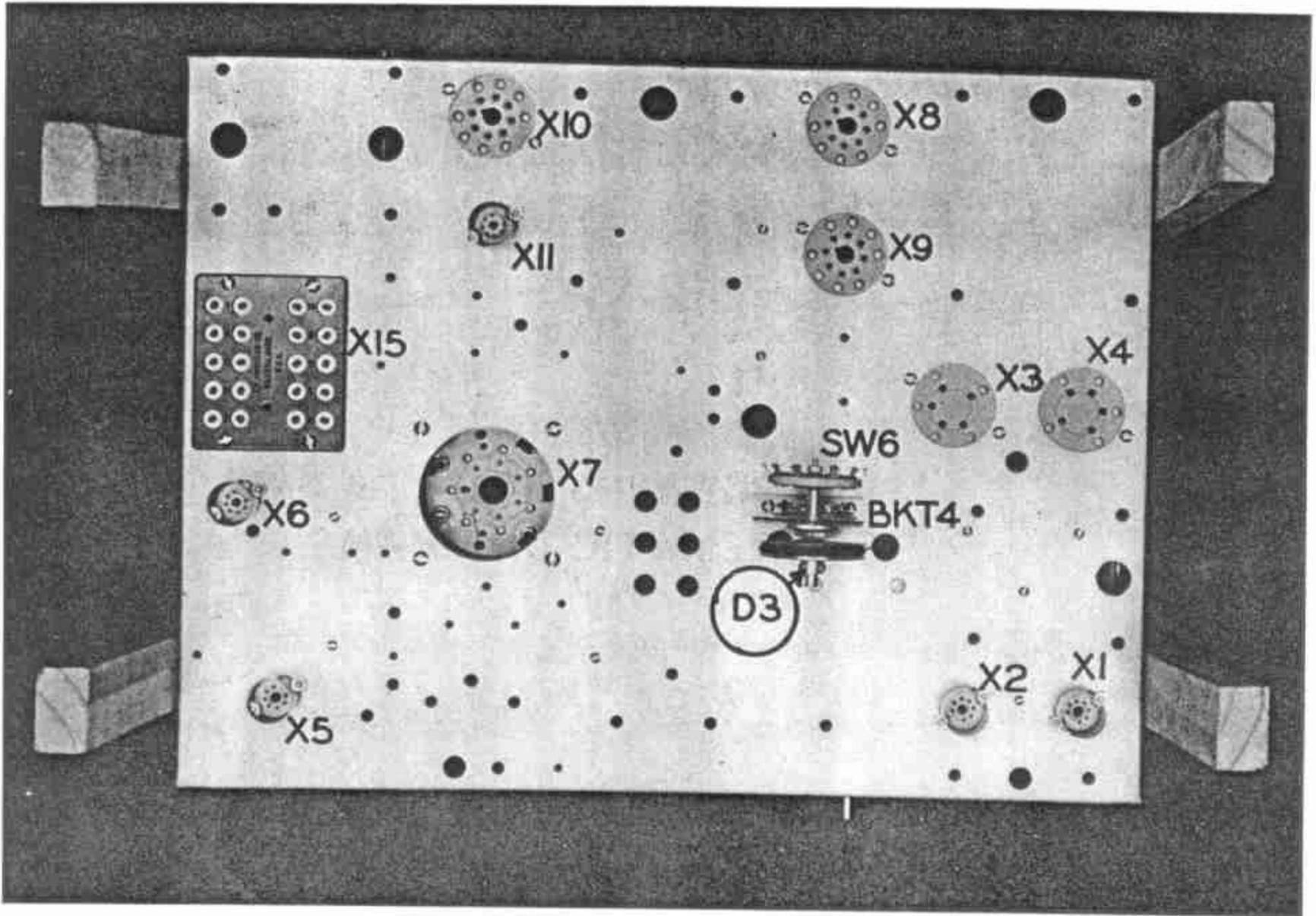


Figure 1

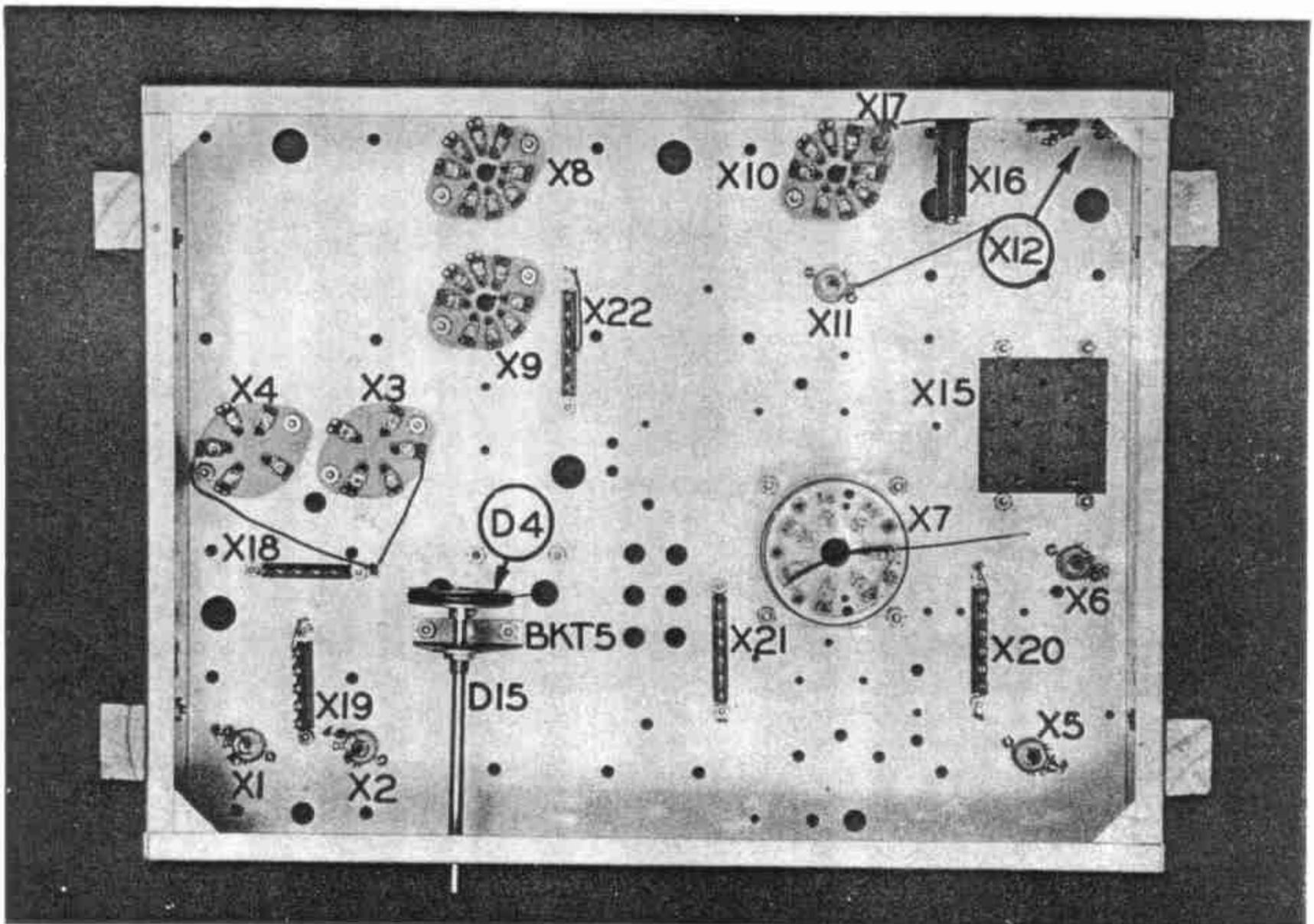


Figure 2

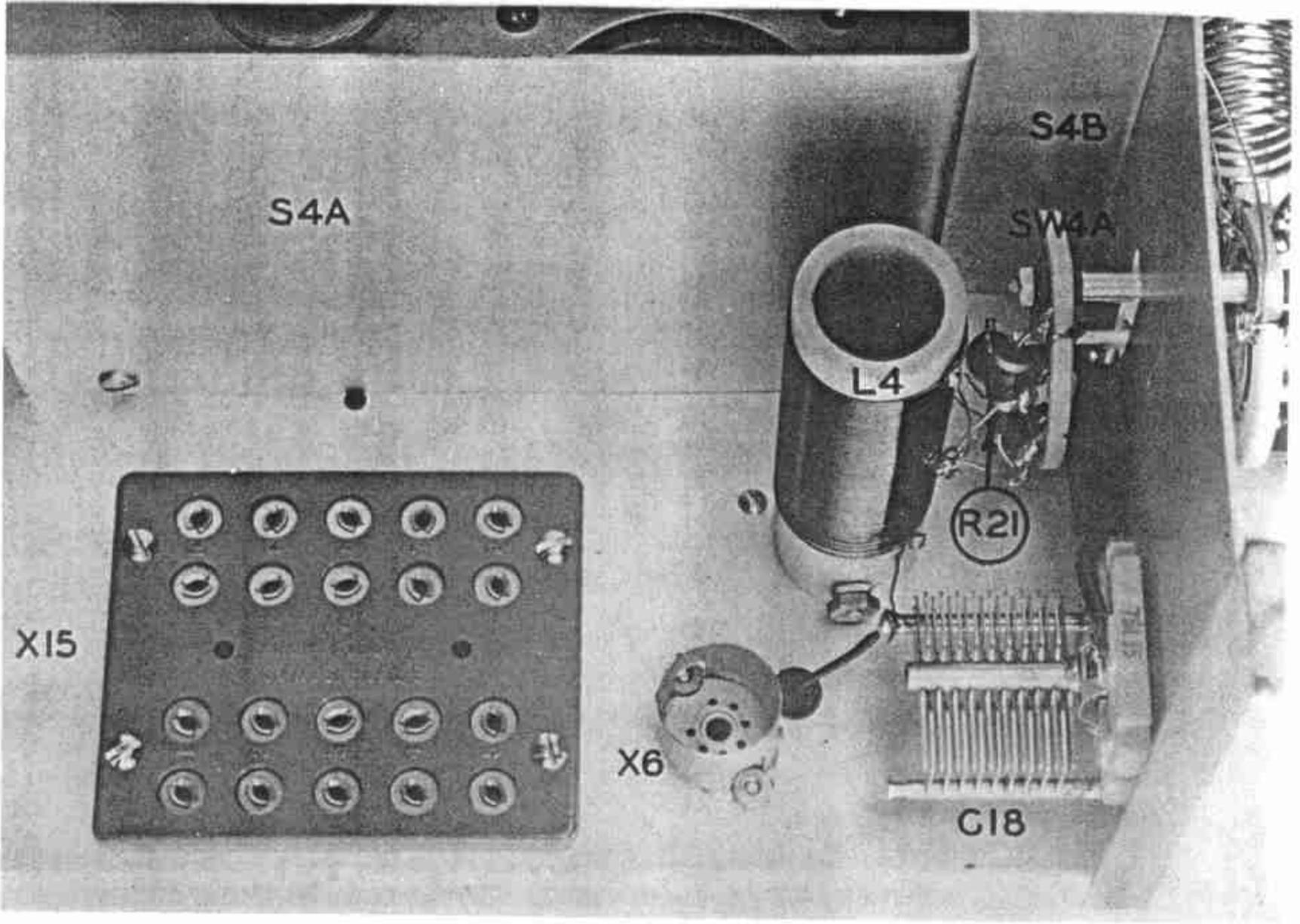


Figure 5

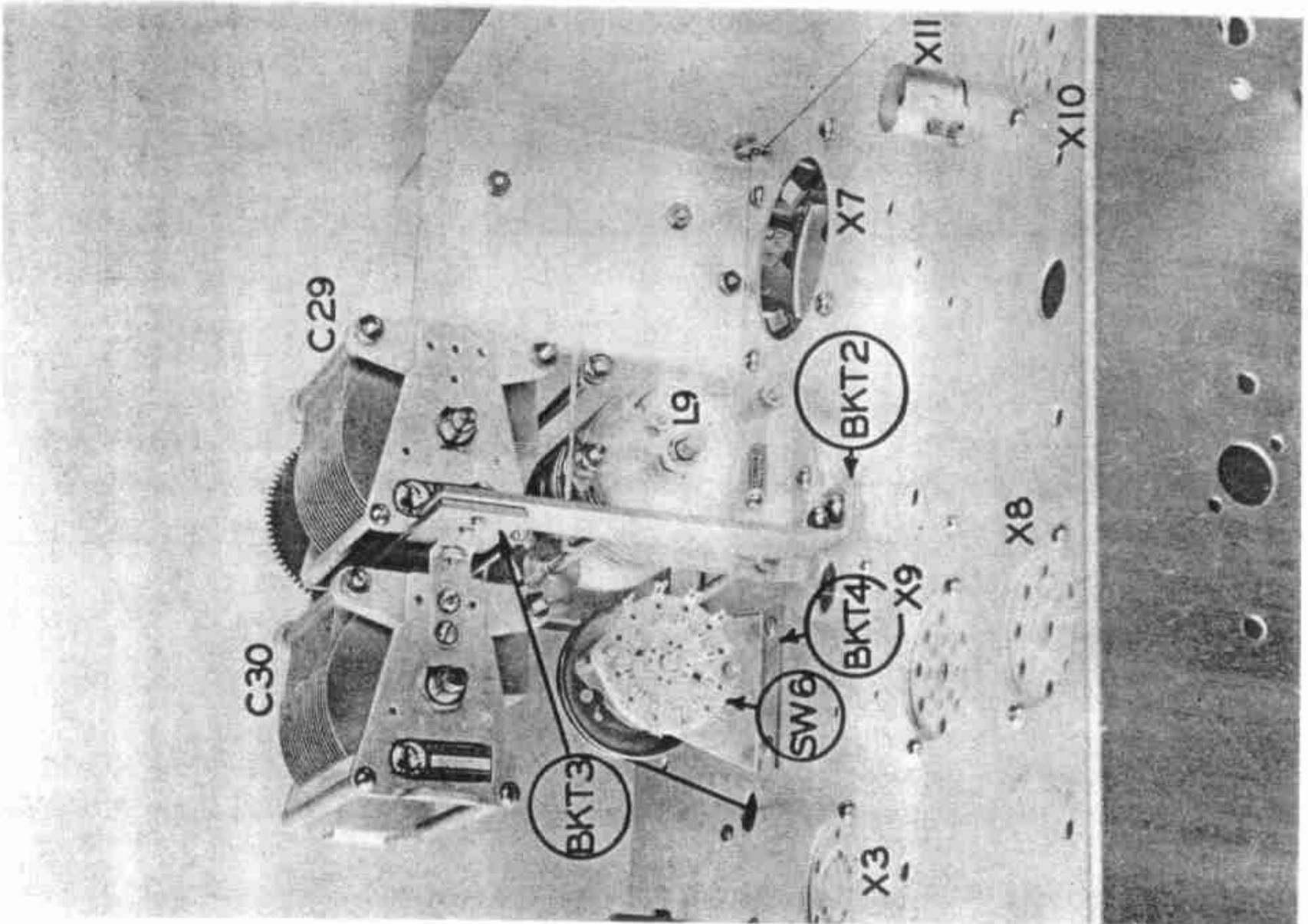


Figure 6

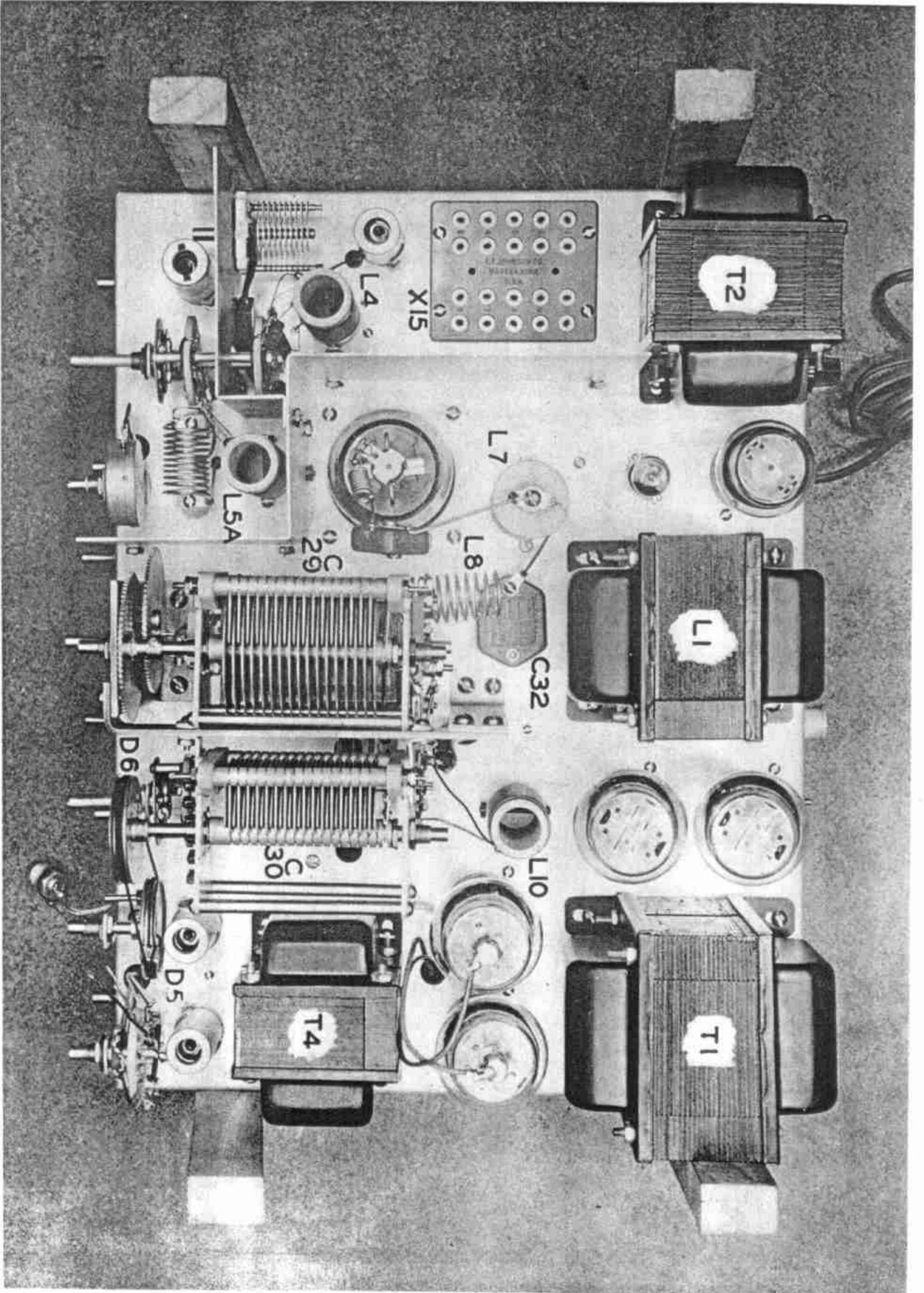


Figure 9