Philmore TC-11 TC-612 Owner's Manual

Price $1.00

INSTRUCTION MANUAL

SECOND EDITION

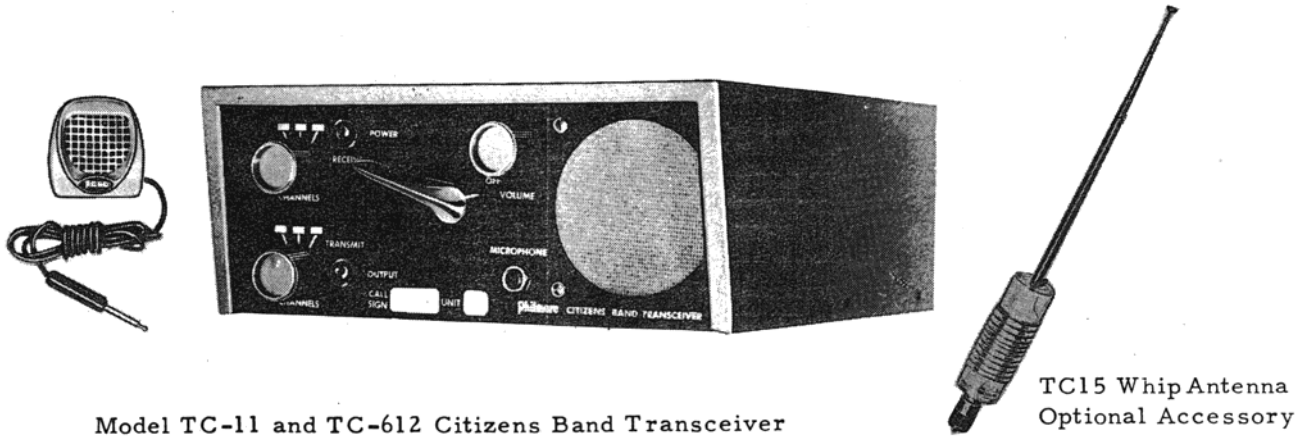
Philmore

MODEL TC-11 and TC-612

CITIZENS' BAND
TRANSCEIVER KIT

Like any other piece of electronic equipment, the ultimate performance of this kit depends upon three factors: the excellence of its initial engineering design, the quality of its components, and the care with which it is assembled. PHILMORE MANUFACTURING CO. is justly proud of the manner in which it has handled the first two; the remaining factor -- care in assembly -- is entirely in your hands. To insure the superb performance designed into the kit, PHILMORE provides you with one of the most comprehensive instruction manuals ever prepared for the kit builder. Each step has been tested thoroughly. For maximum ease of assembly and the final pleasurable thrill of building an instrument that works properly the first time it is powered, PHILMORE urges you to follow all instructions in the order given, without omissions or modifications.

PHILMORE MANUFACTURING CO., INC. • RICHMOND HILL 18 N. Y.



Model TC-11 and TC-612 Citizens Band Transceiver

TC15 Whip Antenna
Optional Accessory

SOLDERING

In virtually all electronic equipment, good solder joints are depended upon to insure proper electrical connections. The cultivation of a few relatively simple techniques will enable you to solder expertly almost at once. By following instructions exactly, not only will you find soldering easy, but you will also experience the gratification of seeing a professional-looking instrument when you are through.

The Solder - Purchase a good grade of rosin-core solder. Under no conditions should acid-core solder be used! When asking for solder, specify a 60:40 alloy (60% tin, 40% lead). If this is not available in your locality, 50:50 solder may be used but is not quite as satisfactory since more heat is required to melt it. Do not use solder with a lower tin content than 50%. We must strongly emphasize that separate paste fluxes or liquid soldering aids must not be used. ALL GUARANTEES AND WARRANTEES ARE VOIDED IF ANY PHILMORE KIT OR COMPONENT IS RETURNED TO THE FACTORY BEARING EVIDENCE OF THE USE OF PASTE FLUXES, SOLDERING LIQUIDS, OR ACID-CORE SOLDER.

The Soldering Iron - Almost any good commerical soldering iron or soldering gun can do a good job in competent hands. We recommend an iron of not less than 60 watts nor more than 100 watts in power rating; the same is true of soldering guns. In either case, the working tip must be coated with a thin layer of solder before any joints are attempted. If your iron has never been used before, it should be coated (this is called tinning) as follows: plug the iron into a convenient 120 volt a-c outlet and let it warm for a minute or two. As it heats, keep rubbing a piece of rosin-core solder along one of the tip faces until the solder begins to melt. Tin each face of the tip (or the tip of the gun) until it is uniformly shiny and bright. While the tip is still hot, wipe it briskly with a cloth to remove excess solder.

As the iron is used, its tip should be brightened occasionally by a few rapid strokes on a pad of fine steel wool. Once the tip becomes corroded, it should be filed bright again -- right down to the copper -- and re-tinned for further use. Never dip the tip in cold water to cool it; always permit it to come back to room temperature at its own rate once the plug is removed. YOU CANNOT SOLDER PROPERLY WITH A CORRODED, PITTED, OR DIRTY TIP.

Soldering Technique - Anyone who has had little experience with soldering will find this order of procedure to result in excellent solder joints.

1. Be sure the terminal and wire are bright and clean and free of strands of insulation or wax. Rubbing with steel wool will insure this condition if you are in doubt.

2. Wrap or crimp the wire around the terminal using your long-nose pliers to be certain of good mechanical joining. Never depend upon solder alone for mechanical strength.

3. Bring the hot iron to the terminal and wire(s), applying a clean, flat face to the joint. Leave it there for at least three seconds to heat the joint, then with the iron still in place, apply the solder to both the iron tip and the work. USE SOLDER SPARINGLY! More poor joints are the result of using excessive amounts of solder than from any other single cause.

4. Let the solder RUN AND FLOW in and around the terminal and wire(s). This will avoid a lumpy, unreliable "cold" solder joint. You will recognize the time for removal of the iron when the solder appears "glassy" and smooth.

5. Allow the joint to cool, then wipe it clean with gentle strokes of a small piece of cloth.

6. Examine the joint. If it shows any evidence of cracked or grainy texture it is probably an indication of movement of the wire(s) before the joint was fully cool. Merely flow the solder back into the joint by reheating. Be sure that the solder has not run where you don't want it; often, hidden solder flows cause short-circuits or other undesirable connections that prevent the equipment from functioning correctly.

Some Additional Tips

*When soldering crystal diodes, transistors, or small carbon resistors, the pigtail of the component should be gripped close to the body with your long-nose pliers to held conduct the heat away from the sensitive portion of the part. Overheating transistors or diodes while soldering my result in destruction of the component; resistors have been known to change value by as much as 25% as a result of overheating while soldering.

*Avoid undue mechanical stress on the pigtails of small parts, as well as on the terminal lugs of sockets, coils, and switches.

*When soldering stranded wire to a terminal, tin the strands together before crimping around the terminal. This prevents loose, unseen strands from "floating" around where they may touch other metallic parts.

*When soldering to tube sockets, it is often helpful to plug a discarded tube into the socket to avoid having solder run into the socket holes.

*Use just enough heating time when working on coil terminals to give you a good joint. Overheating here may damage the winding adjacent to the terminal lug.

SECTION I

SPECIFIC PRELIMINARY INFORMATION

Electrical and mechanical specifications of the
Model TC-11 and TC-612 Citizens Band Transceiver

TRANSMITTER:

Power Input	Maximum 5 watts total Anode (plate) circuit power input
Frequency Range	Any three of the 22 authorized frequencies in the 11 meter (27 megacycle) Citizens Band (from 26.965 MC to 27.225 MC).
Frequency Control	Operating frequencies crystal controlled within .005% of marked crystal frequencies over an ambient temperature range of -20° F to + 130° F.
Nominal Output Impedance	52 ohms at center-band frequency (27.105 MC).
Modulation	Combined plate and screen modulated, AM, with automatic limiting to maximum of 100%.

RECEIVER:

Type	Stage of R.F. gain feeding super-regenerative detector, tuned by three individual channel coils. Each coil tunes the entire Citizens Band.
Sensitivity	Signal levels as low as 1 microvolt provide sufficient quieting of receiver for clear reception.
Tuning Range	Each of the three tuning coils can be pre-tuned to any of the 22 Citizens Band channels, and then switch-selected from front panel.

POWER SUPPLIES:

Model TC-11	Power supply sub-chassis for operation on 110-120 volts, A.C. Provides 6.3 volts A.C. at 3 amperes for filaments, and 250 volts D.C. B+. Automatically connects filaments for 6 volt operation.
Model TC-612	Power supply sub-chassis for either 6 or 12 volt D.C. storage battery operation. Can be used interchangeably on either voltage by connecting power cord to proper input socket. Automatically selects proper filament connections for 6 or 12 volt operation. Provides 250 volts D.C., hash-filtered B+.
Interchangeability	Either power supply can be installed in Transceiver, and can be changed for the alternate type of power at any time.

ACCESSORIES:

Microphone	Hand-held or desk type ceramic element microphone, insensitive to temperature or humidity variations.
Antennas	Can be used with any commercially available Citizens Band antenna cut for 11 meters. Successfully powers either the Base-loaded, quarter-wave whip, conical (ground-plane), or beam type of antennas.
Antenna connections	Accepts UHF type PL-259 connector, attached to base-loaded antennas or RG-58/U cable. Base loaded antenna can be mounted on top of unit directly to utilize cabinet as ground plane, or cable can be plugged into side of unit for mobile or roof-top antenna.

GENERAL SPECIFICATIONS:

Tube Compliment	6AN8 - R.F. amplifier and detector 6AU8 - Third overtone oscillator driver and R.F. power amplifier. 12AX7 - Microphone pre-amplifier and audio driver. 6AQ5 - Audio output and modulator. 6X4 - Rectifier (in power supplies)
Dimensions	4-1/8 inches high 10 inches wide 10-7/8 inches deep
Net Weight	11 lbs. (TC-11 assembled) 11 lbs. (TC612 assembled)

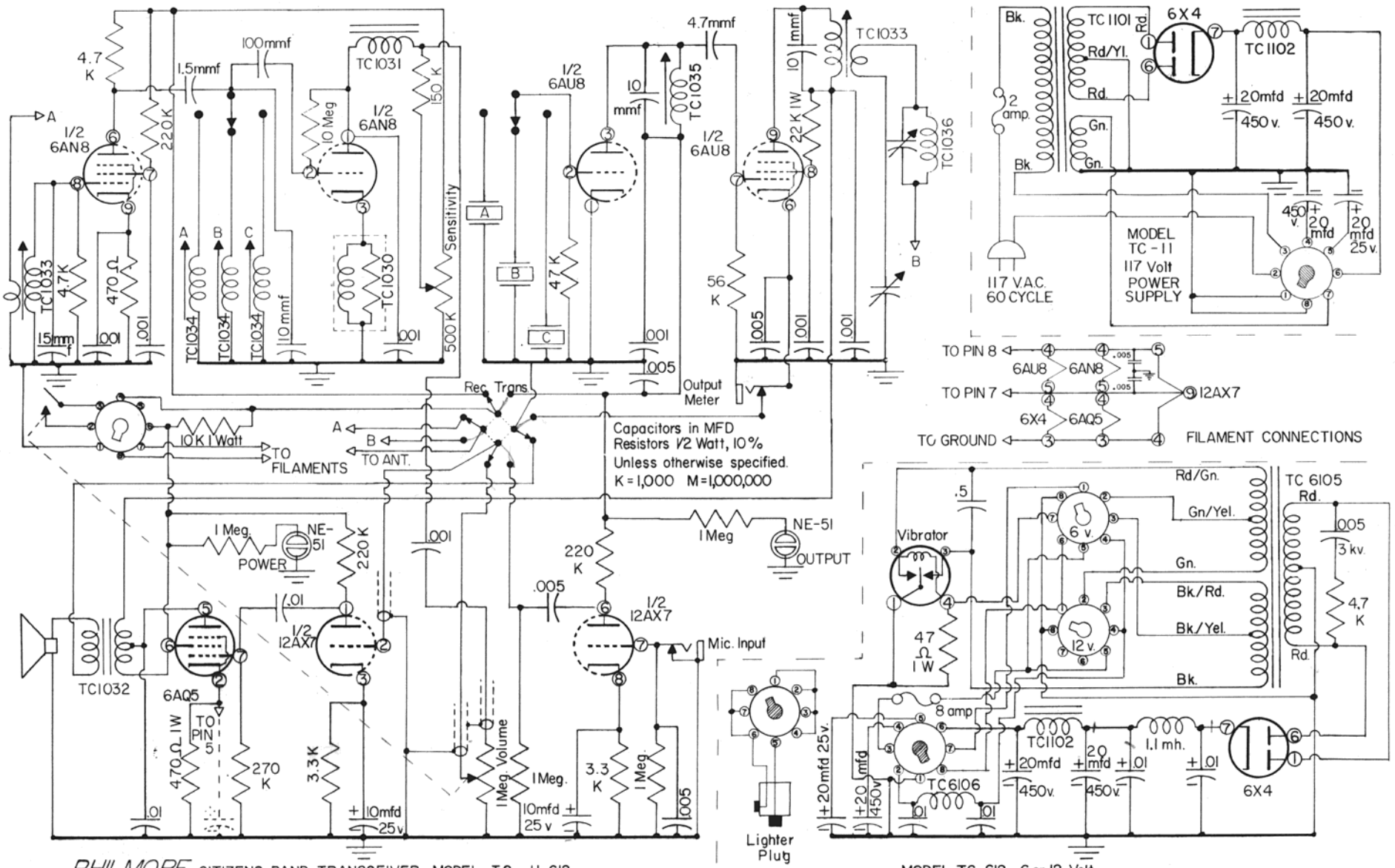
CIRCUIT FEATURES AND OPERATION: (see schematic diagram on Page 5)

RECEIVER: The incoming signal on any of the Citizens Band frequencies is inductively coupled into the grid of the 6AN8 R.F. amplifier section, which is broadly tuned to cover the entire band, but to exclude signals outside the band. The amplified signal is next fed into the super-regenerative detector section of the 6AN8. The grid of this tube is tuned to any one of the 22 available frequencies by one of the three switch-selected tuning coils, which have been pre-set to different specific frequencies. The detector is going in and out of oscillation at an audio frequency rate (approximately 20,000 cycles) and the signal is detected with high efficiency just prior to each time the tube breaks into oscillation. The oscillation point of the detector is set by adjusting the plate voltage on the tube appearing across the 500 K ohm potentiometer. The detected audio signal is fed through a filter consisting of the 75 millihenry choke and the .001 mfd. capacitors to filter out unwanted R.F., and is coupled through the TRANSMIT-RECEIVE switch to the grid of the 12AX7 audio driver tube. This signal is amplified, and then sent to the 6AQ5 power output tube, which amplifies its power sufficiently to drive the speaker through the combination modulation/output transformer, which converts this signal into sound energy. When the unit is switched to the TRANSMIT position, the antenna connection is removed from the input coil; B plus voltage is removed from both stages of the 6AN8 tube; the detector output is removed from the grid of the audio driver stage and volume control; and the speaker is switched off ground, thus unloading the secondary of the modulation/output transformer.

TRANSMIT: Oscillation of the 6AU8 triode section is caused by the internal plate-to-grid capacity of the tube. The rate of oscillation is governed by the crystal in the grid circuit, and the plate tank circuit consisting of the oscillator coil and a fixed capacitor. Since the tube can oscillate on any harmonic (or overtone) of the basic frequency for which the crystal was cut, this plate tank is tuned to select the third harmonic of the crystal, which lies in the 11 meter Citizens Band. Any other harmonic frequency lies outside the tuning range of this tank circuit, thus excluding any transmitting frequency other than those within the Citizens Band. This Radio Frequency (R.F.) oscillation is fed into the grid of the pentode section of the 6AU8 tube, where it is amplified in terms of power, and coupled to the antenna through the plate tank circuit of the amplifier and the secondary winding on the coil in this tank. This secondary circuit is series-tuned to match the antenna at the Citizens Band frequency by means of a variable padder capacitor in the ground leg. Since any second harmonic of the transmitting frequency appearing at the output lies within the lower of the Television channels, a series R.F. trap is introduced in the antenna line to filter out this undesired frequency, but to present a low impedance to the desired 11 meter fundamental frequency.

Audio signals from the microphone are amplified in the first triode stage of the 12AX7 tube, coupled through the TRANSMIT-RECEIVE switch to the audio driver, and thence to the 6AQ5 tube, now functioning as a modulator tube. The signal from this tube is coupled through the modulation/output transformer, which has its output tap so positioned so that automatic limiting to 100%, or less, modulation is assured. This audio signal is fed into the plate and screen circuits of the 6AU8 R.F. amplifier tube, thus amplitude modulating (A.M.) the R.F. carrier already present.

When the TRANSMIT-RECEIVE switch is in the TRANSMIT position, B plus voltage is fed to the plate circuit of the 6AU8 triode oscillator. A portion of this voltage is used to light the NE-51 indicator lamp, showing that R.F. carrier is being fed to the antenna. In the RECEIVE position of this switch, B plus voltage is removed from the oscillator; the ground circuit to the cathode of the R.F. amplifier is broken; the microphone pre-amplifier output is removed from the audio driver stage; the antenna is removed from the secondary network of the transmitter; and the speaker is attached to the secondary of the output/modulation transformer.



PHILMORE CITIZENS BAND TRANSCEIVER MODEL TC—11-612

12/21/59 F.M.KAUFMAN Chief Engineer

MODEL TC-612 6 or 12 Volt DC MOBILE POWER SUPPLY

POWER SUPPLIES: Two types of power supplies are available for the Transceiver. They are completely interchangeable at any time, since they are assembled as separate kits on complete sub-chassis, which attach to the main chassis of the Transceiver, and within the cabinet of the unit.

The Model TC-11 power supply derives its operating power from the 117 volt A.C. wall outlets in the home or office. Its internal transformer provides 6.3 volts of A.C. to heat the tube filaments of the main unit. It also provides high voltage to the 6X4 rectifier tube, which converts this to 250 volt D.C. B+ voltage to power the plate circuits of the Transceiver. This high voltage is filtered, and fed to the main chassis through the connecting power cable. Also in this cable are switch lines so that the power supply may be controlled from the front panel, and filament lines which properly connect the filament of the tubes for 6.3 volt operation.

The Model TC-612 power supply derives its power from the storage battery of a car, boat, or other vehicle. The power line cable is terminated on one end with a cigarette lighter plug, so that power can be fed directly from the dashboard of the vehicle. The other end of this cable terminates in a jumper-wired plug, which properly connects the vibrator, primary winding of the transformer, and the filament lines of the main chassis and power supply for either 6 or 12 volt battery operation. Two sockets, one for 6 and the other for 12 volt batteries, appear on the rear of this power supply. Switching of the above circuits is automatically accomplished when the cable is plugged into the proper socket.

In operation, D.C. voltage from the battery is fed through a hash choke to eliminate unwanted ignition pulses, into the coil and interrupter contacts of the vibrator. The vibrator converts this current into a pulsating, interrupted D.C., which is needed in order to operate the transformer. High voltage from the secondary of this transformer feeds the 6X4 rectifier, which converts it to B+ voltage. This rectified voltage is fed through a network which filters out any higher frequency pulses from the vibrator, and into a filter for smoothing of the low-frequency ripple, and thence into the power cable. As before, control of the power supply is accomplished from the front panel thru leads in the power cable.

ANTENNA MOUNTING ALTERNATIVES: The chassis layout of the Transceiver is so designed that either one or two alternatives is available for mounting of the antenna socket.

If the Transceiver is to be used for shorter-range communications (one to three miles under normal conditions), the use of the shorter, self-contained Base-Loaded whip type of antenna is recommended. In order for this type of antenna to operate most efficiently, and in order to make the entire Transceiver self-contained and portable, it is advisable to mount the antenna directly on TOP of the Transceiver cabinet. For this purpose, a top-mounting position is provided on the main chassis, with a mating knock-out hole in the top of the cabinet.

If the Transceiver is to be used in the home or office with a roof-mounted antenna, for longer transmission and reception; or it is to be used in a car, boat, or other vehicle with the antenna mounted outside or away from the mounting position of the Transceiver, the antenna must be fed with a length of co-axial cable. In order that the top surface of the cabinet can be kept free for under-dash mounting of the unit, an alternate antenna socket mounting position is provided at the SIDE of the main chassis, with a mating knock-out slot in the cabinet.

Decide at this time which alternative mounting position is to be used for the antenna jack, with regard to the ultimate type of antenna to be used and the mounting position of the Transceiver if used in a car or boat. This is necessary so that the proper instructions may be followed for internal wiring and mounting of the socket, and so that the proper hole may be knocked-out in the cabinet.

THIS PHILMORE MODEL TC-11 OR TC-612 TRANSCEIVER HAS BEEN DESIGNED FOR USE IN CLASS "D" OPERATION IN THE 11 METER CITIZENS RADIO SERVICE. IT IS DESIGNED TO MEET THE FEDERAL COMMUNICATIONS COMMISSION REQUIREMENTS APPLICABLE TO EQUIPMENT OPERATING IN THIS SERVICE UNDER CLASS "D" EMISSION, AND NOT TO BE USED FOR ANY OTHER PURPOSE. PART 19 OF THE F.C.C. REGULATIONS DEFINE OPERATION IN THIS SERVICE, AND YOU ARE REQUIRED TO READ AND UNDERSTAND THESE REGULATIONS PRIOR TO OPERATING THIS EQUIPMENT. COPIES OF PART 19 OF THE REGULATIONS ARE AVAILABLE FOR 10 CENTS FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, 25, D. C. YOU ARE ALSO REQUIRED TO SUBMIT A COMPLETED COPY OF F.C.C. FORM 505 PRIOR TO OPERATING THIS EQUIPMENT ON THE AIR. NOTICE THAT YOU WILL BE IN VIOLATION OF PART 19 OF THE REGULATIONS IF YOU OPERATE THIS EQUIPMENT ON THE AIR PRIOR TO RECEIVING YOUR LICENSE AND CALL SIGN.

SECTION II

PREPARING TO BUILD THE KIT

Unpacking and Checking

Veteran kit-builders work with the firm conviction that every step in kit assembly is as important as every other step. This manual has been prepared to permit you to realize the greatest pleasure from the completed instrument with the fewest possible annoyances in the construction process.

Your first vitally important step is to unpack the kit carefully and then check the components against the list of parts. Clear a generous portion of your workbench or table, and unpack each of the component boxes piece by piece. Handle delicate parts such as coils, variable capacitors, speaker, etc. gently.

Check each part for type and number against the parts list, referring to the drawings of components given in this book when in doubt as to the name of a given part. Prepare Mason Jar lids or any other compartmentalized container so that the hardware can be placed in separate "bins" as you check it off. If you discover a shortage, advise us promptly, including with your letter a full description of the missing part. Your work will be expedited immeasurably if you will group the components in useful categories for quick selection as you need them during assembly. Resistors, capacitors, coils, wire, hardware, etc., should be kept separated but within easy reach.

Fold-in Drawings

You will find the large fold-in drawings extremely handy. Tape the fold-ins on the wall above your workbench. This should be done, in particular, with the pictorial mounting and wiring diagrams. Since you will be referring to these constantly, you can avoid much page-turning and eyestrain by placing them where they will be in clear view at all times.

Soldering

If you are a novice at soldering, you will want to study the soldering instructions to be found inside the front cover of this book. If you are a veteran at kit-building, you may not need the instructions in detail but you must give careful attention to the special warnings given in the soldering instructions concerning the use of solder paste or flux.

WARNING!

ANY PHILMORE INSTRUMENT THAT HAS BEEN ASSEMBLED USING ACID CORE SOLDER OR PASTE FLUX WILL NOT BE SERVICED AT ANY TIME, NOR WILL SUCH EQUIPMENT BE CONSIDERED TO BE COVERED BY ANY WARRANTY OR GUARANTEE ISSUED BY THE COMPANY.

Component Tolerances

Your kit has been carefully engineered so that relatively large variations in component value will not affect the performance of the instrument. This applies to components such as resistors and potentiometers in which variations of ± 20% are common; capacitors in which variations may be as high as ± 50% (ceramic and mica); and electrolytic capacitors where the tolerance may exceed ± 75 %. In any case, the components that appear in your kit have been factory-tested for acceptable tolerances so that there is no need for you to measure their values individually.

Interpretation of Wiring Instructions

To make your work proceed along smoothly, and to give you a check as to the progress of your wiring, you will find each step terminated by a notation in parenthesis. For example, in the step that reads:

"Connect the shorter green power transformer lead to lug NN. (crimp)."
we mean that the connection to lug NN on the pictorial should not be soldered at this time, but should merely be crimped around the lug. This keeps the lead open for a later connection where the soldering is accomplished all at one time.

Or in the step that reads:

"Connect the longer red lead to E1 (solder 1)" we mean that the red lead that goes to lug number one on component E should be soldered at this time and that there will be only one soldered connection to this lug even after the instrument is completed."

Finally, in the step that reads:

"Connect B4 (solder 2) to F8 (crimp)."
we mean that point 4 on component B will now have two connections going to it and that both connections should now be soldered. This indicates that no further connections will be made to this terminal. On the other hand, we are not finished with connections to point 8 on component F, hence the wire going here is to be crimped, not soldered, at this time.

One more point. It sometimes happens that there are two resistors of the same type that have identical values but different power dissipations. Unless stated otherwise, a resistor connection refers to the 1/2 watt size. If a larger resistor is to be used, the power rating will be given.

SECTION III

MAJOR MOUNTING AND SUB-ASSEMBLIES

Mounting of Major Components

Your attention is called to the special preliminary procedures presented in detail in Section II. Work should not be started before this section has been carefully read. We will assume that the kit has been carefully unpacked and checked against the parts list so that all components have been identified. The various items of hardware should be laid out as suggested for ready availability, and should be further identified against the list below. In general, lockwashers are used under most of the nuts except where otherwise noted. All tube sockets are mounted with their metal portions inside the chassis; only the phenolic extrusions with the tube pin holes appear above the chassis. All screws are fastened so that their heads are above the chassis with the nuts and lockwashers below.

MOUNTING PROCEDURE

(As step is completed, check it off by putting an "X" in the circle for that step.)

◯ Lay the chassis bottom up on the work bench with the projecting tab to your left. Refer to Pictorial "A" bottom view. All instructions involving rear, front, left, and right will apply to the chassis in this position unless instructed otherwise.

◯ Referring to the pictorial diagram, mark all chassis openings to correspond with the diagram. A wax or grease pencil is excellent for this purpose. All markings are to be on the underside, or wiring side, of the chassis.

○ Position "A". Using 4-36 screws, nuts, and lockwashers, mount a 9-pin miniature bakelite socket at this position with the opening between lugs 1 and 9 to your right as shown in Pictorial Diagram "A". Make sure to mount a ground lug at position "AG".

○ Position "B". Using 4-36 screws, nuts, and lockwashers, mount a 9-pin miniature bakelite socket at position "B" (orient as shown in Pictorial "A"), making sure to put a ground lug under each nut at positions "BG1" and "BG2".

○ Position "C". Using 4-36 screws, nuts, and lockwashers, mount the 9-pin miniature SHIELD BASE tube socket at position C, on the TOP side of the chassis. Place it so that the lugs are on the wiring side of the chassis, and orient it so that the opening between lugs 1 and 9 is pointing away from you. Make sure to mount a ground lug at position "CG".

○ Position "D". Mount a 7-pin miniature bakelite socket at this position, using 4-36 screws, nuts, and lockwashers. Mount this socket so that the opening between lugs 1 and 7 is facing towards you. Make sure to mount a ground lug under the nut at position "DG".

○ Position "E". Mount a large octal socket at this position using 6-32 screws, nuts, and lockwashers. Orient the socket so that the keyway slot is facing towards you. Make sure to use a 3 terminal strip under the nut at position "F".

○ Position "G". Mount a large rubber grommet in the hole at this position. Do not force the grommet with a sharp metal instrument as it will tear. Try to use your fingers to insert it and seat it properly in the hole.

○ Position "H". Mount a 7 lug terminal strip at this position using 6-32 screws, nuts, and lockwashers. Make sure that the lugs face to the right of the holes as shown in Pictorial "A".

○ Position "M". Mount another 7 lug terminal strip at position "M" as previously directed. Make sure that the lugs face to the left of the mounting holes as shown in Pictorial Diagram "A".

○ Position "R". Mount a ceramic trimmer condenser at position "R". Orient it so that the lug with the wide metal band is away from you. After the mounting ears of the condenser are inserted and seated in the mounting holes, turn the chassis over, and slip a screwdriver blade into the slots which protrude. Move the screwdriver blade to each side to spread the ears of the mounting lug so that it is securely and firmly seated on the chassis.

○ Position "S". Similarly, mount another ceramic trimmer condenser at position "S" in the same manner as in the previous step.

○ Position "P". Mount a closed circuit phone jack at this position, using a washer and a nut over the bushing which protrudes on the other side of the chassis. Orient this as shown in Pictorial A so that the lugs of the jack are towards you.

○ Position "N". Mount a potentiometer (the one with no switch on the back) at this position, using a nut and flat washer over the shaft which protrudes on the other side of the chassis. Make sure that the key-way slot is engaged in the hole provided for this purpose.

○ Position "XA". A ceramic crystal socket is mounted at this position. Feed the socket lugs thru the two mounting holes from the other side of the chassis. Slip a LONG 4-36 screw thru the center hole in the socket from this rear side, thru the chassis mounting hole, and secure on the wiring side with a 4-36 lockwasher and nut. DO NOT OVERTIGHTEN THE NUT. The metal connecting lugs should now protrude on the wiring side of the chassis as do all connecting lugs on components previously mounted.

○ Position "XB". Similarly, mount another ceramic crystal socket at this position as in the previous step. DO NOT OVERTIGHTEN THE NUT, or the ceramic will crack.

○ Position "XC". Similarly, mount the third ceramic crystal socket at this position. DO NOT OVERTIGHTEN THE NUT.

○ Position "TA". Inspect one of the coils marked with the part number "TC-1034". You will notice that there is a little projecting tab on the flat metal base plate of this coil. This tab engages a small hole along-side each of the coil mounting positions. Insert the metal-capped end of the coil (with the protruding screw) into the coil mounting hole at position "TA", FROM THE WIRING SIDE of the chassis, rotate the coil so that the small tab is aligned with the hole next to the mounting position, and GENTLY press the coil down to the chassis until the coil snaps into place with an audible click. Be certain that each coil is properly seated before going on to the next step.

○ Position "TB". Similarly, mount another coil with the same part number "TC-1034" at position "TB". Make sure that it is properly seated in its mounting hole.

○ Position "TC". In a like manner, mount the third coil with part number "TC-1034" at this position. Make sure that all three coils are firmly seated in their mounting holes.

○ Position "J". Select one of the coils marked with the part number "TC-1033". This is one of the coils with a layer of heavy wire over a layer of finer wire. Mount this coil in the hole at position "J" as in the previous steps, and make sure it is firmly seated.

○ Position "K". Mount the second coil with the part number "TC-1033" at this position as in the previous steps.

○ Position "L". Mount the remaining slug-tuned coil at this position, the one with the part number "TC-1035", as in the previous steps. Make sure that this and all coils are firmly seated. You will notice that this coil has a capacitor wired to it, and the slug sealed with paint. DO NOT DISTURB THE POSITION OF THE CAPACITOR, NOR ATTEMPT TO TURN THE SLUG AND BREAK THIS PAINT SEAL.

○ On the other side of the chassis, place the modulation/output transformer (part no. TC-1032) over its mounting holes at positions "U" and "V". Orient the transformer so that the leads are towards the grommet at hole "G". Secure the transformer with 6-32 screws, nuts and lockwashers. Heads of the screws should be on the transformer side of the chassis. Feed all the leads down through the grommet at "G".

SECTION IV

NOTE: In the following wire instructions, the importance of careful, direct wiring cannot be overly emphasized. Due to the high frequencies with which this unit operates, any extra wiring length, excess stray capacitance, or partial shorts, will result in inferior performance of this kit, and quite probably, non-operation.

You are therefore urged to follow the pictorial diagram most carefully in regard to lead dress and placement of components. Run resistors and capacitors directly between the two points indicated, and do not leave excess wire. Pigtail leads on resistors, capacitors, and coils are NOT intended to be used full length except in certain specific cases which are so noted in the instructions. Note especially the instructions regarding those components which are to be "dressed close to chassis". These are to be pushed flat to chassis, and leads drawn up taut to their connecting lugs. If the possibility of a short circuit of the leads of these components exists, cover them with sleeving.

The use of a good pair of needle-nose pliers and diagonal wire cutters will aid immeasurably in neat, accurate wiring. Good solder connections, as outlined inside the front cover of this manual, are absolutely necessary for proper performance. Slow, careful, and neat work at this point of construction may save many hours of trouble shooting when the kit is completed.

CORRECT WIRING PROCEDURE

Regardless of your wiring ability or your knowledge of electronics, you will find it easier and more gratifying to wire the Transceiver in accordance with the step-by-step instructions that follow. The sequence of steps has been selected to make the job easier. Small parts and components otherwise difficult to wire in place are handled first, before the accumulation of leads and parts makes it awkward to reach them. The wiring pictorial diagram should be mounted on the wall above the workbench for ready reference, the instruction book with its small diagrammatic inserts would be at your left and the soldering iron plus the necessary tools at your right. Many kit builders enjoy following the schematic diagram as they wire. If you are in this class, go over each line on the schematic as you make your connections, using a soft pencil to show that that particular component or wire has been added. Check off each completed step by placing an "x" in the circle to the left.

(REFER TO PICTORIAL "B") WIRING THE KIT

○ Cut the yellow transformer lead appearing thru grommet "G" to length sufficient to reach Socket D, lug 5. Allow 1/4" and connect to Socket D, lug 5 (crimp).

○ Cut the red transformer lead to length sufficient to reach Socket D, lug 6. Strip and tin this lead back 1/4". Connect to D-6 (crimp).

○ Cut the brown transformer lead to length sufficient to reach terminal strip F, lug 1. Strip and tin this lead and connect to F-1 (crimp).

- [ ] Connect one end of a piece of brown wire to Socket D, lug 4 (crimp). Run this wire under the red and yellow leads previously installed, and to the left of grommet "G", and connect the other end to Socket C, lug 9 (crimp). Dress wire flat to chassis.

- [ ] Connect one end of a brown lead to socket D, lug 4 (solder 2). Route this wire along the fold in the back chassis edge, to the right of Socket E, and connect the other end to Socket E, lug 7 (solder 1).

- [ ] Connect one end of a piece of brown wire to Socket C, lug 5 (crimp). Route this wire along the fold on the inside front edge, and right edge of the chassis and connect the other end to terminal 8 on socket E (solder 1).

- [ ] Cut two pieces of brown wire to a length of 3" each. Connect one brown wire to socket A, lug 4 (crimp). Connect the other brown wire to Socket A, lug 5 (crimp). Twist both wires together for a length of about 2 inches. Strip about 1/4" of insulation from the other ends of both wires.

- [ ] Connect one of these wires to Socket B, lug 4 (crimp). Connect the other wire to Socket B, lug 5 (crimp).

- [ ] Cut a piece of brown wire to a length of 5 inches. Cut another wire to a length of 6 inches. Strip both ends of each wire back 1/4".

- [ ] Connect one end of the shorter wire to Socket B, lug 4 (solder 2).

- [ ] Connect one end of the longer wire to Socket B, lug 5 (solder 2).

- [ ] Twist both wires together for a length of about 4 inches. Lay the wires close to chassis, and route below coil K and just below terminal strip H.

- [ ] Connect the shorter wire to Socket C, lug 5 (solder 2).

- [ ] Connect the longer wire to Socket C, lug 9 (solder 2).

- [ ] Run a piece of bare wire thru ground lug DG, through the center post of Socket D, and crimp the other end to Socket D, lug 3. Cut off excess, and crimp over ground lug DG. Now solder D-3 and the center post, but do NOT solder DG.

- [ ] Run another piece of bare wire through the center post of Socket C, through Socket C, lug 4, and then to ground lug CG (crimp). Solder the center post and lug C-4. Do not solder ground lug CG at this time.

- [ ] Connect a short length of bare wire from Socket E, lug 1 (solder 1), to terminal strip F, lug 2 (crimp). (Lug 2 is the center ground lug on strip F).

- [ ] Run a length of bare wire through coil J, lug 1, down through ground lug AG, and over to the center post of Socket A. Now solder the center post of Socket A. Do not solder the other two connections at this time.

- [ ] Now run a length of bare wire through coil K, lug 2 (crimp). Cover with a 1-1/2" length of sleeving, and connect the other end to Socket B, lug 9 (solder 1).

- [ ] With a pair of pliers, twist lug #1 of each of the crystal holders XA, XB, and XC to the right about 1/2 turn. Run a length of bare wire through each pin #1 of the crystal sockets and crimp to XC-1. Connect the other end to terminal strip M, lug 7 (crimp). Now solder XA-1, XB-1, and XC-1.

- [ ] Run a length of wire through Socket B center post, through Socket B, lug 1, and through the hole in ground lug BG-2. Cut off excess and crimp to BG-2. Solder B-1 and the center post.

- [ ] Run a length of bare wire through coil lugs TA-1, TB-1, and TC-1. Crimp one end to TC-1. Now connect the other end to terminal strip M, lug 1. Solder TA-1, TB-1, and TC-1. Do not solder M-1 at this time.

- [ ] Run a length of bare wire from coil K, lug 4, down to ceramic capacitor S, lug 2. Solder both connections.

- [ ] Run a length of bare wire from coil J, lug 2 (crimp) to ceramic capacitor S, lug 1 (solder 1).

- [ ] Slip a piece of bare wire through terminal strip M, lug 1; slip a 1 inch length of sleeving over this wire, and connect the other end to control N, lug 1 (solder 1). Now cut off the excess at M-1, and crimp around this lug.

- [ ] Connect a piece of red wire from terminal strip M, lug 2 (crimp) to control N, lug 3 (crimp).

- [ ] Cut a piece of green wire to a length of 2-1/2 inches. Strip both ends back 1/4". Connect one end to Socket A, lug 8 (solder 1).

- [ ] Make a right angle bend upwards in this wire about 1 inch from this terminal and connect the other end to coil J, lug 4 (crimp).

- [ ] Connect a piece of red wire from coil L, lug 2 (crimp) to terminal strip H, lug 5 (crimp). Dress this wire straight down, flat against chassis, below socket B and strip H, and then against the chassis, and to terminal strip H, lug 5.

- [ ] Connect a short piece of bare wire from Socket B, lug 3 (solder 1) to coil L, lug 1 (crimp).

- [ ] Connect one end of a black wire to Socket B, lug 6 (crimp). Run this wire down to chassis, along chassis edge, as shown in Pictorial B, over to the left side, and up to Jack P. Connect the other end to jack P, lug 3 (solder 1).

- [ ] Run a length of brown wire from coil K, lug 3 (crimp), down to chassis along front chassis edge inside the fold, and up to terminal strip F, lug 1 (solder 2).

- [ ] Connect one end of a piece of bare wire to coil K, lug 1 (crimp).

- [ ] Slip a 1 inch length of sleeving over this wire, and connect the other end to ceramic capacitor R, lug 2 (crimp).

- [ ] Run a piece of yellow wire from Socket D, lug 2 (crimp) to Socket E, lug 5 (solder 1).

- [ ] Connect a piece of red wire from Socket D, lug 6 (solder 2), to terminal strip H, lug 2 (crimp).

- [ ] Connect another piece of red wire from terminal strip H, lug 2 (crimp) to Socket E, lug 6 (crimp).

- [ ] Run a short piece of green wire from terminal strip H, lug 3 (crimp) to Socket C, lug 7 (solder 1).

- [ ] Connect a piece of blue wire from terminal strip H, lug 4 (crimp) to Socket E, lug 4 (solder 1). Dress wire as shown in Pictorial "B".

This completes the preliminary wiring of this section of the transceiver. For wiring of the next section, refer to Figure 1. Some of the wires just installed have been omitted from the socket and terminal strip lugs in the sectional figures to follow, in order to avoid confusion. However, as each connection is soldered, the proper number of wires connected to the terminal at that point will be given as a check on your work.

- [ ] Connect a .001 mfd disc capacitor from Socket A, lug 7 (crimp) to ground lug AG (crimp).

- [ ] Connect another .001 mfd disc capacitor from Socket A, lug 9 (crimp) to ground lug AG (crimp).

- [ ] Connect a 470 ohm resistor (yellow-violet-brown) from Socket A, lug 9 (solder 2) to ground lug AG (crimp).

- [ ] Connect a .001 mfd disc capacitor from Socket A, lug 1 (crimp) to ground lug AG (solder 5).

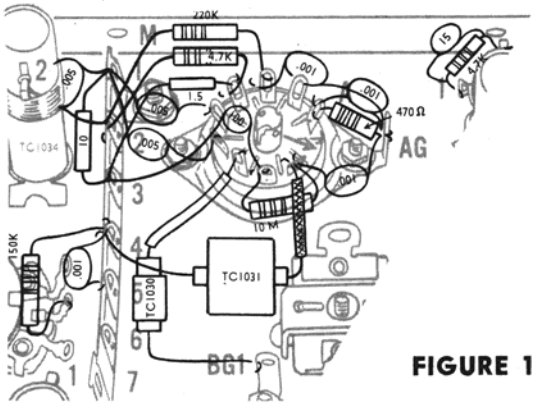


FIGURE 1.

- Connect a 10 megohm (brown-black-blue) resistor from Socket A, lug 2 (crimp) to Socket A, lug 1 "(crimp)". Keep the resistor dressed tight to chassis, and the leads as short as possible and close to the socket.

- Connect the RF choke, part #TC1030 (this is a large resistor with wire wrapped around it) from socket A, lug 3 (use sleeving) (solder 1) to ground lug BG-1 (crimp). Dress as shown in Figure 1. Make sure that this coil lies flat to chassis, and keep close to strip M.

- Connect a .005 mfd disc capacitor from Socket A, lug 5 (solder 2) to terminal strip M, lug 1 (crimp). Keep leads short and direct.

- Connect another .005 mfd disc capacitor from socket A, lug 4 (solder 2) to terminal strip M, lug 1 (crimp). Keep leads short and direct.

- Cut one lead of a 1.5 mmf disc or tubular capacitor (1.5 or brown-green-white) to a length of 1", and connect to Socket A, lug 6 (crimp).

- Slip a 1/2" length of sleeving over the other lead of this capacitor and connect to terminal strip M, lug 3 (crimp). Square leads with pliers so that capacitor is up away from socket lugs.

- Cut one end of a 4.7 K ohm resistor (yellow-violet-red) to a length of 1" and connect to Socket A, lug 6 (solder 2). Place a 3/4" piece of sleeving over the other resistor lead and connect to terminal strip M, lug 2 (crimp). Dress away from socket lugs and next to 1.5 mmf capacitor previously installed.

- Place a short (3/4") piece of sleeving over each lead of a 220 K ohm resistor (red-red-yellow) and connect one end of this resistor to Socket A, lug 7 (solder 2). Connect the other end to terminal strip M, lug 2 (crimp). Dress up away from socket lugs and next to 1.5 mmf capacitor and 4.7 K ohm resistor previously installed.

- Cut one lead of a 10 mmf disc or tubular capacitor (10 or brown-black-black) to a length of 1/2". Connect this lead to terminal strip M, lug 1 (crimp).

- Connect the other lead to terminal strip M, lug 3 (crimp). Keep body of capacitor close to, but not touching, terminal strip M.

- Connect a .005 mfd disc capacitor from terminal strip M, lug 2 (solder 4) to strip M, lug 1 (solder 6). Make sure that the solder flows and covers all the leads connected to M-1.

- Connect a 100 mmf disc or tubular capacitor (100 or brown-black-brown) (do not confuse a '100 MMF" capacitor for a ".001 MFD" capacitor. Watch the numbers or color code very carefully) from terminal strip M, lug 3 (crimp) to Socket A, lug 2 (solder 2).
  Keep the body of the capacitor away from socket lugs, and next to the 1.5 mmf capacitor previously installed.

- Connect one lead of the RF choke, part number TC1031 (this is the coil with the large winding, and the pigtail leads) to terminal strip M, lug 4 (crimp). Keep the body of this coil close to ceramic capacitor R. Dress the coil as shown in Fig. 1. Connect the other lead to Socket A, lug 1 (solder 3) after first slipping a 3/4" length of sleeving over this lead.

- Connect a 150 K ohm resistor (brown-GREEN-yellow) from control N, lug 2 (solder 1) to terminal strip M, lug 4 (crimp). Dress as shown in Fig. 1.

- Connect a .001 mfd disc capacitor from terminal strip M, lug 4 (solder 3) to strip M, lug 5 (crimp). Keep body of capacitor close to terminal strip M.

- Prepare a 4.7 K ohm resistor (yellow-violet-red) with a 15 mmf disc or tubular capacitor (15 or brown-green-black) as shown in Fig. 2A.

- Connect this assembly to coil J, lug 4 (solder 2) and the other end to coil J, lug 1 (solder 2). Dress the assembly close to the coil lugs and next to the body of the coil as shown in Fig. 1.

This completes the wiring of the receiver portion of the Transceiver. Carefully go over your work, and make sure that all solder joints are properly made, and that no shorts exist between leads and between socket lugs. At this point, only M-3, M-5, M-6, M-7, BG-1, N-3, J-2, and J-3 should remain unsoldered of the components which have been attached to in this section. All lugs of tube Socket A should be soldered.

TRANSMITTER WIRING (Refer to Fig. #2)

○ Connect a .001 mfd disc capacitor from Socket B lug 8 (crimp) to ground lug BG2 (crimp). Dress body close to chassis as shown in Figure #2.

○ Connect a 56 K Ohm resistor (green-blue-orange) from Socket B, lug 7 to Ground lug BG1 (crimp). Dress as shown close to chassis.

○ Connect a .005 mfd disc capacitor from Socket B lug 6 (solder 2) to ground lug BG1 (crimp). Dress as shown in the pictorial.

○ Connect a 47 K Ohm resistor (yellow-violet-orange) from Socket B lug 2 (crimp) to ground lug BG2 (crimp). Keep the body of this resistor close and flat to the chassis.

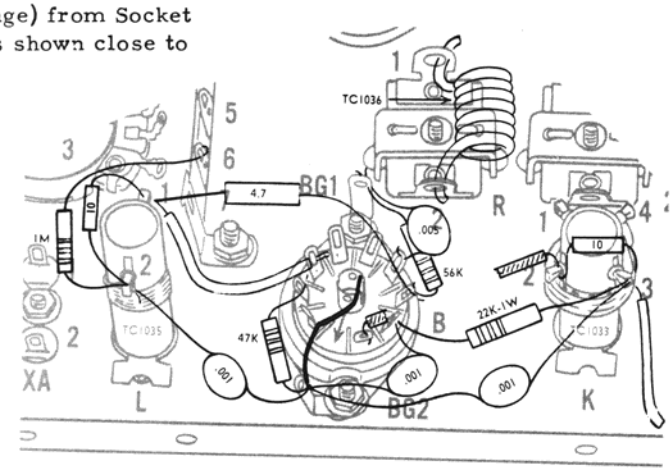


FIGURE 2.

○ Connect a .001 mfd disc capacitor from coil L, lug 2 (crimp) to ground lug BG2 (crimp).

○ Connect a 4.7 mmf disc or tubular capacitor (4.7 or yellow-violet-white) from coil L, lug 1 (solder 3) to Socket B, lug 7 (solder 2). Dress this capacitor exactly as shown in Figure #2.

○ Connect a 1 Megohm (brown-black-green) resistor from coil L, lug 2 (solder 4) to terminal strip M, lug 6 (crimp). Use care in attaching lead to L2 so as not to damage the coil form.

○ Cut 1 lead of a 22K Ohm, 1 watt resistor (large body, red-red-orange) to a length of 1-1/4 inches. Slip a 3/4 inch piece of sleeving over this lead, and connect this lead to Socket B, lug 8 (solder 2). Dress the resistor as shown in the pictorial, and connect the other end to coil K, lug 3. Slip this lead into the lug hole, but do not crimp, as the heavy wire might damage the lug.

○ Connect a 10 mmf disc or tubular capacitor (10 or brown-black-black) from coil K, lug 2 to coil K, lug 3. Wind lead one turn around back of lugs near coil body. Dress body of capacitor directly on top of coil body as shown in Figure #1. Solder K-2 only (2 wires).

○ Connect a .001 mfd disc capacitor, from ground lug BG2 (solder 5) to coil K, lug 3 (solder 4). Use care in making connection to K-3 so as not to damage lug or coil body.

○ Select the RF trap coil part #TC1036 (this is the coil wound with heavy wire with no coil form, and is self-supporting). Attach inside ceramic trimmer capacitor R, one lead through R1 and one through R2, crimping the leads at lugs 1 and 2 so that coil stands straight up from the ceramic capacitor. Solder R2 (2). Do not solder R1.

This completes the wiring of the transmitter portion of the Transceiver. Carefully go over your work, and make sure that no shorts exist between leads and between socket lugs. Also make sure that all solder joints are properly made. At this point, only M3, M5, M6, M7, BG1, B2 and R1 should remain unsoldered of the components which have been attached to in this section.

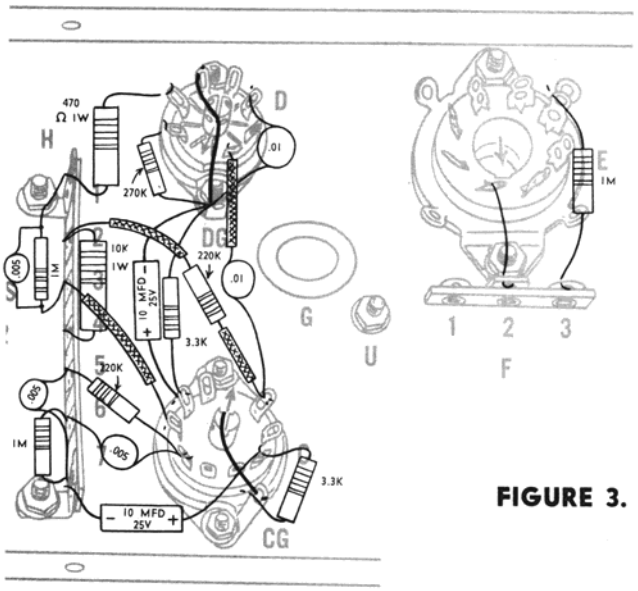


FIGURE 3.

WIRING OF AUDIO SECTION (Refer to Fig. 3)

Connect a 470 Ohm 1 watt resistor (large body, yellow-violet-brown) from Socket D, lug 2 (solder 2) to terminal strip H, lug 1 (crimp). Dress the body of this resistor close to chassis.

Connect a 270 K ohm resistor (red-violet-yellow) from Socket D, lug 1 (solder 1) to ground lug DG (crimp). Dress the body of this resistor close to chassis as shown in pictorial.

Connect a .01 mfd disc capacitor from Socket D, lug 5 (solder 2) to ground lug DG (crimp). Dress the body of this capacitor flat to the chassis on top of wires previously installed.

Cut one lead of a .01 mfd disc capacitor to a length of 1-1/4 inches. Slip a 1 inch piece of sleeving over this lead and connect the lead to Socket D, lug 7 (solder 1). Connect the other lead to Socket C, lug 1 (crimp). Dress the body of this capacitor close to chassis.

Prepare a 1 megohm (brown-black-green) resistor and a .005 mfd disc capacitor as shown in Figure #2A.

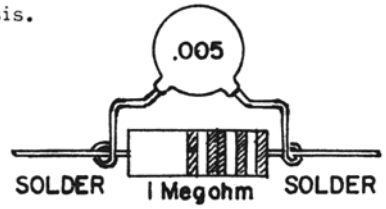


FIG. 2-A

Connect this assembly of resistor and capacitor from terminal strip H, lug 1 (solder 2) to terminal strip H, lug 3 (crimp). Dress the body of this assembly close to, but not touching, the strip on the left side, as shown in Figure #3.

Connect a 1 megohm resistor (brown-black-green) from terminal strip H, lug 6 (crimp) to strip H, lug 7 (crimp). Dress the body of this resistor close to terminal strip H as shown in Figure #3.

Install a 10 K ohm, 1 watt resistor (large body, brown-black-orange) from H2 (crimp) to H4 (crimp). Keep body of resistor close to chassis.

Connect a .005 mfd disc capacitor from terminal strip H, lug 5 (crimp) to terminal strip H, lug 7 (crimp). Make sure lead does not short to H6.

Connect a .005 mfd disc capacitor from Socket C, lug 6 (crimp) to terminal strip H, lug 6 (crimp). Keep leads short.

Connect a 3.3 K ohm resistor (orange-orange-red) from Socket C, lug 3 (crimp) to ground lug CG (solder 2). Dress body of resistor close to chassis and keep leads short.

Inspect the 10 mfd, 25 volt electrolytic capacitor. Notice that the positive end is marked with a plus (+) sign, and the negative end is marked with a minus (-) sign. Slip a 1/2 inch piece of tubing over the positive (+) end, and connect this end to Socket C, lug 3 (solder 2). Connect the minus (-) end to terminal strip H, lug 7 (crimp). Make sure that the polarity is correctly observed, as indicated.

Connect the positive (+) end of the second 10 mfd, 25 volt electrolytic capacitor to socket C, lug 8 (crimp). Lay the body of the capacitor against the chassis, and connect the minus (-) end to ground lug DG (crimp). Make sure the correct polarity is observed.

○ Connect a 220 K ohm resistor (red-red-yellow) from Socket C, lug 6 (solder 2) to terminal strip H, lug 5 (crimp).

○ Connect a 3.3 K ohm (orange-orange-red) resistor from Socket C, lug 8 (solder 2) to ground lug DG (solder 5). Dress body of this resistor close to chassis, over wires previously installed.

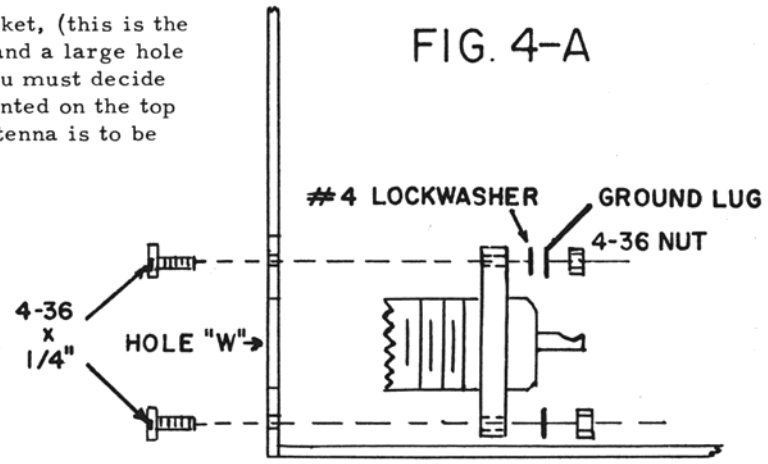
○ Cut 1 lead of 220 K ohm resistor (red-red-yellow) to a length of 1 inch, and slip a 3/4 inch piece of sleeving over this lead. Connect this lead to Socket C, lug 1 (solder 2). Slip a 1 inch piece of sleeving over the other lead and connect to terminal strip H, lug 2 (solder 4).

○ Connect a 1 megohm resistor (brown-black-green) from Socket E, lug 6 (solder 2) to terminal strip F, lug 3 (crimp). Dress as shown in Figure #3.

This completes the wiring of the audio portion of the Transceiver. Carefully go over your work, and make sure that no shorts exist between leads and between socket and terminal strip lugs. Also make sure that all solder joints are properly made. At this point only H3, H4, H5, H6, H7, C2, F2 and F3 should remain unsoldered of the components which have been attached to in this section. Shake loose all excess solder blobs and wire clippings. Set aside this chassis for now, and continue with steps below.

○ Select the U shaped antenna bracket, (this is the bracket with the 3 small holes, and a large hole on the top leg). At this time, you must decide whether the antenna is to be mounted on the top or the side of the unit. If the antenna is to be mounted on top of the unit, mount the UHF socket on top of this bracket as shown in Fig. #4. If the antenna is to be mounted on the side of the unit, mount the UHF socket on the main chassis lip on the left side marked as position "M". Carefully follow Fig. #4A which pertains to the placement of this socket. In either case, use 4-36 screws, nuts and lockwashers, plus one ground lug as shown in the Figure.

FIG. 4-A



○ Mark all holes on angle bracket to correspond with Fig. #4.

○ Mount the remaining volume control (the control with two switch lugs on the back face) at position AB. Make sure the projecting tab engages the hole provided. Temporarily fasten with a nut, adjusted finger tight, to hold control in place. This nut and others mounted on this subassembly will later be removed to enable unit to be mounted in chassis.

○ Mount 2 position switch, part #TC1040, at hole AC. (Notice that this switch has four groups of 3 lugs each, with open spaces between lug groups. Make sure that the proper switch is mounted at this position.) Engage the small tab in the keyhole provided, and temporarily fasten with a control nut.

○ Mount the remaining phone jack at position AD. Position as shown in Figure #4 and fasten temporarily with a control nut.

○ Connect a short piece of green wire from volume control AB, lug 2 (solder 1) to switch AC, lug 6, (solder 1). Note: It is imperative that connections to swith AC be made to the proper lugs, and with the proper color wire as identified in the instructions. Connections of this sub-assembly to main chassis depend upon color coding of wires, and therefore if improper color is used, misconnections will result.

○ Connect a short length of bare wire from jack AD, lug 1 (crimp) to AD, lug 2 (solder 1).

○ If antenna is to be mounted at top of unit, and UHF socket has been mounted on this bracket, connect a 4 inch piece of white wire from switch AC, lug 1 (solder 1) to Socket AA, center lug, (solder 1). Dress wire exactly as shown in Figure #4.

○ If antenna is to be mounted at side of unit, connect a 7 inch length of white wire to switch AC, lug 1 (solder 1) and leave the other end hanging free.

Strip both ends of a 2 inch length of white wire and connect one end to switch AC, lug 3, (solder 1). Use care in connecting wires to lugs of switch AC, so that no shorts exist and that lug is not damaged. Leaver other end free.

Strip both ends of a 4 inch length of yellow wire and connect one end to switch AC, lug 2, (solder 1). Leave other end free.

Strip both ends of a 3 inch piece of black wire. Connect one end of this wire to switch AC, lug 7 (solder 1). Leave the other end free.

Strip both ends of a 5 inch piece of brown wire. Connect one end of this wire to switch AC, lug 8, (solder 1). Leave the other end free.

Strip both ends of a 3 inch piece of red wire. Connect one end to switch AC, lug 10, (solder 1). Leave the other end free.

Strip both ends of a 3 inch piece of blue wire. Connect one end to switch AC, lug 11, (solder 1). Leave the other end free.

Strip both ends of a 4 inch piece of orange wire. Connect one end to switch AC, lug 12, (solder 1). Leave the other end free.

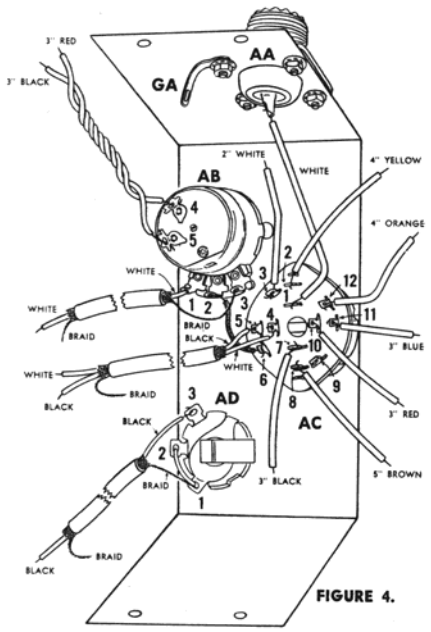


FIGURE 4.

FIGURE 4.

Cut off a 4 inch length of the gray, two conductor shielded wire. At one end, strip back carefully, approximately 3/4 of an inch, taking care not to cut the inner conductors. Untwist and cut off the braid at this end, strip the black and white wires back approximately 1/4 of an inch, carefully and tin both these leads. Connect the black lead to switch AC, lug 5 (solder 1) and connect the white lead to switch AC, lug 4 (solder 1).

At the other end of this cable, strip carefully back approximately 1-1/2 inch, untwist the braid, and retwist to form a third lead. Strip and tin the black and white wires approximately 1/4 inch, and tin the braid lead at the end. Leave this cable hanging free.

Cut off a 5 inch length of the two conductor shielded wire. At each end, strip the outer jacket back approximately 3/4 inch. Unwind the twisted braid, rewind to form a third lead, and cut off the black lead at each end of the wire. Carefully strip 1/4 inch of insulation off the white lead at each end, and tin. Now tin the twisted braid lead. This cable should now have 2 leads at each end, a braid and white lead.

At one end of this cable, connect the white lead to control AB, lug 1, (solder 1). Connect the braid to control AB, lug 3 (solder 1).

In a similar manner, strip back both ends of the remaining 3 inch piece of two conductor shielded cable for a length of approximately 3/4 inch. At each end, cut off the white wire and twist the braid so that the second lead is formed. Strip and tin the black lead on each end back approximately 1/4 inch. Tin the braid on each end. At one end of the cable connect the black lead to jack AD, lug 3 (solder 1). Connect the braid to jack AD, lug 1 (solder 2).

Cut a 4 inch length of black wire, strip both ends, and connect one end to control AB, lug 5 (solder 1). Leave the other end free.

Cut a 3 inch length of red wire, strip both ends, and connect one end to control AB, lug 4 (solder 1). Twist this wire together with the black wire previously installed and leave the twisted pair hanging free.

Bend the twisted pair of red and black leads on control AB to the left. Bend the shielded cable connected to control AB, down to the right, flat against the chassis, and just below switch AC. Dress the shielded lead connected to socket AD to the left. On switch AC, bend the yellow and white lead to the left, the black and brown leads to the right, and the shielded cable to the left.

If the antenna is to be mounted at the top of the unit, connect a 2 inch piece of bare wire to coil J, lug 2 (solder 2). Leave the other end free.

If the antenna is to be mounted at the side of the unit, connect a 9 inch black lead to coil J, lug 2 (solder 2).

Dress this black lead from coil J, lug 2 down flat to chassis, straight down between terminal strip H and ceramic capacitor S to bottom fold of chassis, across to the left inside the chassis fold, over to the UHF connector at hole W and connect to the ground lug at this point (solder 1).

On the main chassis, cut the green transformer lead appearing through grommet G to a length of 5 inches as measured from the grommet, strip the end back about 1/4 inch and tin. Connect this lead to switch AC, lug 9 on the antenna bracket (solder 1).

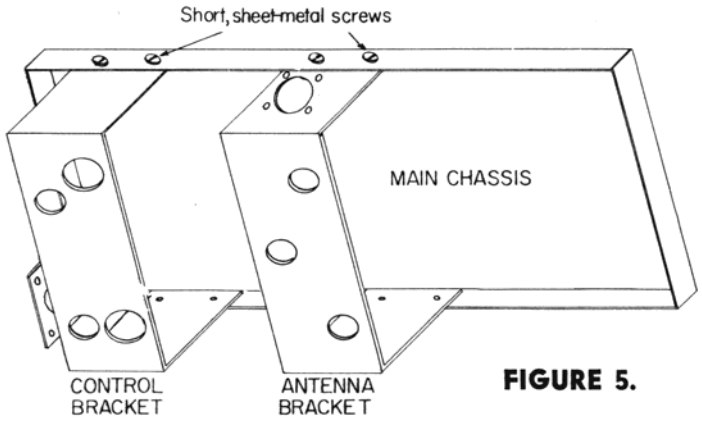


FIGURE 5.

Carefully place the completed antenna bracket assembly on the main chassis (see figure #5), so that the ears of the bracket are inside the bends of the chassis edges, and make sure that no wires are caught between the lips of the chassis and the antenna bracket at the bottom or top edge. Temporarily fasten two short, sheet-metal screws in the holes at the bottom edge of the chassis which mate with holes in the antenna bracket. Fasten at top in two mating holes with short, sheet-metal screws.

Connect the white wire (short, 2 inches) from switch AC, lug 3 to coil J, lug 3 (solder 1).

If antenna socket is mounted on the antenna bracket, connect the short bare lead from coil J, lug 2 to the ground lug at the antenna bracket GA (solder 1).

If the antenna socket has been mounted at position W, connect the long white lead from switch AC, lug 1 straight over, away from the chassis, to this socket at position W, and connect to the center lug at this socket (solder 1). Keep this lead fairly taut, and away from coil L.

Connect the free red lead from switch AC, to terminal strip H, lug 4, (solder 3).

Connect the free blue lead from switch AC, to terminal strip H, lug 5 (solder 4).

Connect the free yellow lead from switch AC to ceramic variable condenser R, lug 1 (solder 2).

Connect the red wire in the twisted pair from control AB to Socket E, lug 2 (solder 1). Connect the black wire in this pair to Socket E, lug 3 (solder 1).

Connect the black lead of the shielded cable from jack AD to terminal strip H, lug 3 (solder 3). (Note that shield braid should be cut off at this end).

Identify the shielded cable coming from switch AC. Connect the white wire in this cable to socket C, lug 2 (solder 1).

Connect the black wire in this cable to terminal strip H, lug 6 (solder 3).

Connect the shield braid to terminal strip H, lug 7 (solder 4).

At the free end of the shielded cable coming from control AB, connect the white lead to terminal strip M, lug 5 (solder 2).

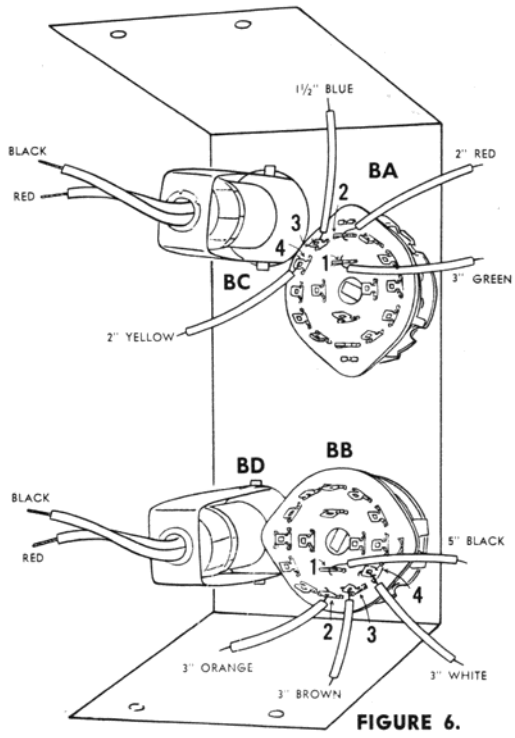


FIGURE 6.

- ◯ Connect the shield braid to terminal strip M, lug 7 (crimp).
- ◯ Connect the black wire from switch AC to ground lug BG (solder 4).
- ◯ Connect the orange wire from switch AC to control N, lug 3 (solder 2).
- ◯ Connect the brown wire from switch AC to jack P, lug 2 (solder 1).

At this point, all the leads from antenna bracket previously installed should now be connected to their various jacks and sockets. If any free wires exist, or no connection has been made to the lugs indicated, go back and carefully check your work.

Make sure, at this time, that all wires just installed cause no shorts, and are neatly and freely dressed to their respective tie points. Be especially careful that the shield braid of the various shielded wires do not short any other terminals than those to which they are soldered.

- ◯ Examine the U shaped control bracket. Position so that the two legs of the U are up towards you, and that two large hole cut-outs are to your left, as shown in Figure #6.
- ◯ Install one of the switches marked part number TC1041, at position BA and the other at position BB. Engaged the key tabs in the holes provided, and temporarily fasten with control nuts on the other side. (These nuts are shipped threaded on the shafts of the controls).
- ◯ Snap one of the pilot light sockets into each of the two large holes, positioning as shown in Figure #6.
- ◯ Mark the bracket with a grease pencil to correspond to Figure #6. Notice that only 4 lugs on each of the switches are used. It is suggested that the unused lugs be bent out of the way, or cut off entirely with a pair of diagonal wire cutters, so that they will not cause confusion. Study the pictorial carefully so as to properly identify the lugs used.
- ◯ Strip both ends of a 3 inch piece of green wire, and connect one end to switch BA, lug 1 (solder 1). Leave the other end free.
- ◯ Strip both ends of a 2 inch piece of red wire, and connect one end to switch BA, lug 2 (solder 1). Leave the other end free.
- ◯ Strip both ends of a 1-1/2 inch piece of blue wire, and connect one end to switch BA, lug 3 (solder 1). Leave the other end free.
- ◯ Strip both ends of a 2 inch piece of yellow wire, and connect one end to switch BA, lug 4 (solder 1). Leave the other end free.
- ◯ Strip both ends of a 5 inch piece of black wire, and connect one end to switch BB, lug 1 (solder 1). Leave the other end free.
- ◯ Strip both ends of a 3 inch piece of orange wire, and connect one end to switch BB, lug 2 (solder 1). Leave the other end free.
- ◯ Strip both ends of a 3 inch piece of brown wire, and connect one end to switch BB, lug 3 (solder 1). Leave the other end free.
- ◯ Strip both ends of a 3 inch piece of white wire, and connect one end to switch BB, lug 4 (solder 1). Leave the other end free.
- ◯ At switch BA, bend the blue lead to the right, the green lead to the left and the red lead to the left. At switch BB, bend the white and brown leads to the right, and the black and orange leads to the left. Bend the leads coming from each of the pilot light sockets to the left.
- ◯ Carefully install the control bracket to the main chassis, as previously done with the antenna bracket. Fasten at top and bottom with short, sheet metal screws. Make sure that no wires are pinched between the bracket legs and the main chassis edge.
- ◯ Connect the green wire from switch BA to terminal strip M, lug 3 (solder 4).
- ◯ Connect the red wire from switch BA to coil TA, lug 2 (solder 1).

- [ ] Connect the blue wire from switch BA to coil TB, lug 2 (solder 1).
- [ ] Connect the yellow wire from switch BA to coil TC, lug 2 (solder 1).
- [ ] Connect the black wire from switch BB to tube socket B, lug 2 (solder 2). Route this wire down to chassis, and then over to Socket B, below coil L.
- [ ] Connect the orange wire from switch BB to crystal socket XA, lug 2 (solder 1).
- [ ] Connect the brown wire from switch BB to crystal socket XB, lug 2 (solder 1).
- [ ] Connect the white wire from switch BB to crystal socket XC, lug 2 (solder 1).
- [ ] Run the black and red wires from pilot light socket BC across and under the fold of antenna bracket, and over to terminal strip F. Connect the red wire to strip F, lug 3 (solder 2). Connect the black wire to strip F, lug 2 (crimp).
- [ ] Cut the black wire from pilot light socket BD to length sufficient to reach terminal strip M, lug 7. Strip back 1/4 inch, tin the wire, and connect to strip M, lug 7 (solder 3).
- [ ] Cut the red wire from pilot light socket BD to length sufficient to reach terminal strip M, lug 6. Strip back 1/4 inch, tin the wire, and connect to strip M, lug 6 (solder 2).

At this point, all the wiring of the Transceiver has been completed, except for the black wire appearing through grommet G, and the unsoldered lug at strip F, lug 2. Carefully go over your work and make sure that all connections are soldered, and that no short-circuits exist. Shake loose all solder blobs and wire clippings, and put the chassis aside for now.

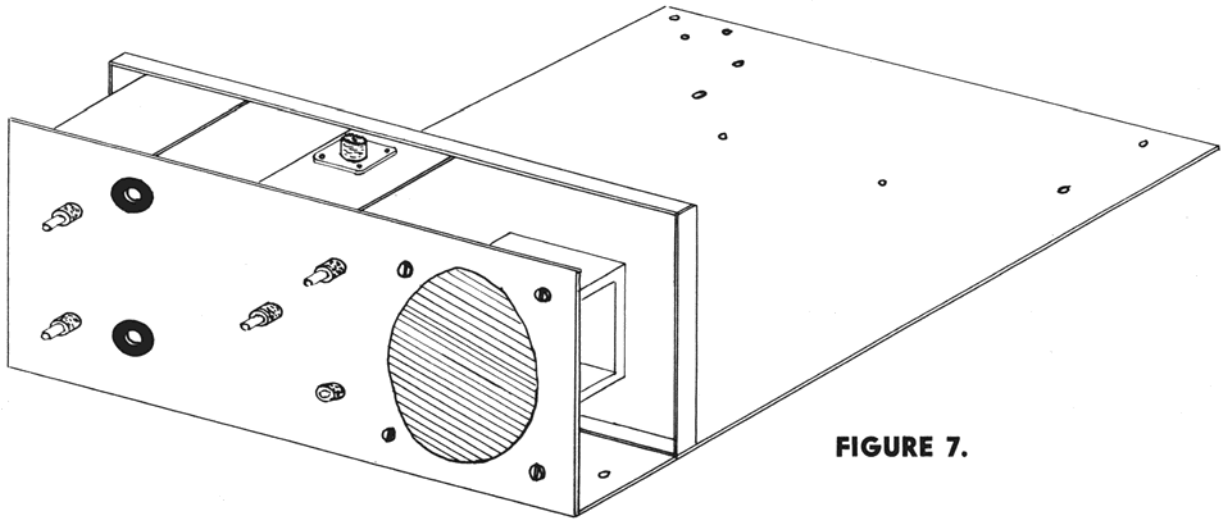


FIGURE 7.

INSTALLATION OF CHASSIS (See Figure #7)

- [ ] Examine the front panel of the Transceiver. You will notice two large holes next to the word "Power" and "Output". Install a large rubber grommet in each of these holes. Do not use a sharp metal instrument to insert these grommets, as you will probably tear them and scratch the panel.
- [ ] At the very large circular hole to the right of the panel, place the flocked speaker grille behind the panel, and align the corner holes with those in the panel. Place the speaker carefully behind this grille, so that the terminal strip mounted on the speaker is facing upwards. Holding the speaker and grille to the panel with one hand, insert a 6-32 screw through the panel (screw head on the front panel side), and place a lockwasher and nut over the screw and tighten with your fingers. Insert a 6-32 screw into the three remaining holes in a similar manner, and using #6 lockwashers and nuts, tighten the whole assembly to the panel.
- [ ] Now pick up the main chassis. Install an NE-51 pilot bulb in each of the pilot light sockets.
- [ ] Remove the sheet metal screws that hold the brackets to the bottom edge of the chassis. Do NOT remove the screws at the top of the brackets.