INSTRUCTIONS FOR AMECO TRANSMITTER KIT, MODELS AC-1 AND AC-1T

GENERAL INSTRUCTIONS

1. Check the parts in the kit with the Parts List. Should inspection reveal a missing part, notify the factory in writing. There should be no shortage of parts since all kits leaving the factory are thoroughly inspected. A slight difference in value between the actual part and the Parts List does not mean that you have the wrong part. For instance, the kit may have a 67,000 ohm resistor, while the Parts List calls for a 68,000 ohm resistor. Both parts will work equally well.

PARTS LIST FOR AMECO TRANSMITTER

Ameco No.	Parts Per Kit	Description
C-102	1	Chassis
T-141	1	Power Transformer
CH-101	1	Power Choke
C-133	2	Variable Condenser
C-144	1	8 x 8 mfd. Condenser
C-135	1	22 mmfd. Condenser
C-136	1	220 mmfd. Condenser
C-137	4	.001 mfd. Disc Condenser
R-126	1	0.1 megohm Resistor
R-127	1	15,000 ohm, 1 Watt Resistor
R-128	1	47,000 ohm Resistor
RFC-250	2	R.F. Choke
S-171	3	Octal Socket
S-172	1	5 Prong Socket
S-160	1	Slide Switch
I-191	1	Instruction Sheet

Ameco No.	Parts Per Kit	Description
H-152	1	Line Cord With Plug
F-1000	1	Coil Form
K-180	2	Knob
H-162	1	2-Screw Terminal Strip
H-151	1	2-Lug Terminal Strip
H-153	1	Rubber Grommet
H-163	4	Rubber Feet
H-154	16	6/32 x 1/4 Screws
H-164	2	4/40 x 3/8 Screws
H-156	12	6/32 Nuts
H-165	2	4/40 Nuts
H-157	18	#6 Lockwashers
H-166	2	#8 Lockwashers
W-100	1	Length of Coil Wire
H-161	1	Length of Insulated Sleeving
T-6V6-GT	1	6V6-GT Tube (in model AC-1T)
T-6X5-GT	1	6X5-GT Tube (in model AC-1T)

2. Follow the Step-By-Step instructions carefully. Double check frequently and do not attempt short cuts. The instructions have been written so as to complete the kit in the shortest time with the least difficulty.
3. USE A ROSIN CORE SOLDER TO SOLDER ALL CONNECTIONS. Make sure that the soldering iron is properly tinned, hot, and clean at all times.

STEP-BY-STEP ASSEMBLY

1. Scrape away about 1/8" paint around mounting holes of the transformer, the choke, the variable condensers and the tube sockets.
2. Mount X1, an 8 pin octal socket, in the position indicated in Fig. 1. Note the position of the key (slot) in the octal socket. Use a 6/32 x 1/4 screw, a #6 lockwasher and a 6/32 nut for each mounting hole of the socket. Insert the screw into the top of the chassis and the lockwasher between the socket and the nut.
3. Mount X2, an 8 pin octal socket, in the position shown in Fig. 1. Use the same hardware and mounting procedure as in Step 2. Note the position of the key of the socket.
4. Mount X3, an 8 pin octal socket, in the position indicated in Fig. 1. Use the same hardware and mounting procedure as in Step 2. Note the key position.
5. Mount X4, a 5 prong socket, in the position shown in Fig. 1. Use the same hardware and mounting procedure as in Step 2. Socket X4 does not have a key as in the octal sockets. However, socket X4 can be mounted correctly by observing the position of the five terminals in Fig. 1.
6. Mount H1, a 2-screw terminal strip, in the position shown in Fig. 1. H1 is mounted on top of the chassis. Use the same hardware as in Step 2. Place the lockwasher between the chassis and the nut. Note that the solder lugs of the terminal strip face the center of the chassis.
7. Mount CH-1, an 8 henry choke, in the position shown in Fig. 1. The choke should be mounted so that the two choke leads are closest to the top of the chassis.
8. Remove the four nuts from T1, the power transformer. Mount T1 in the position shown in Fig. 1. Note that the two black transformer leads are closest to the center of the chassis. Mount C1, the 8 x 8 mfd. electro-

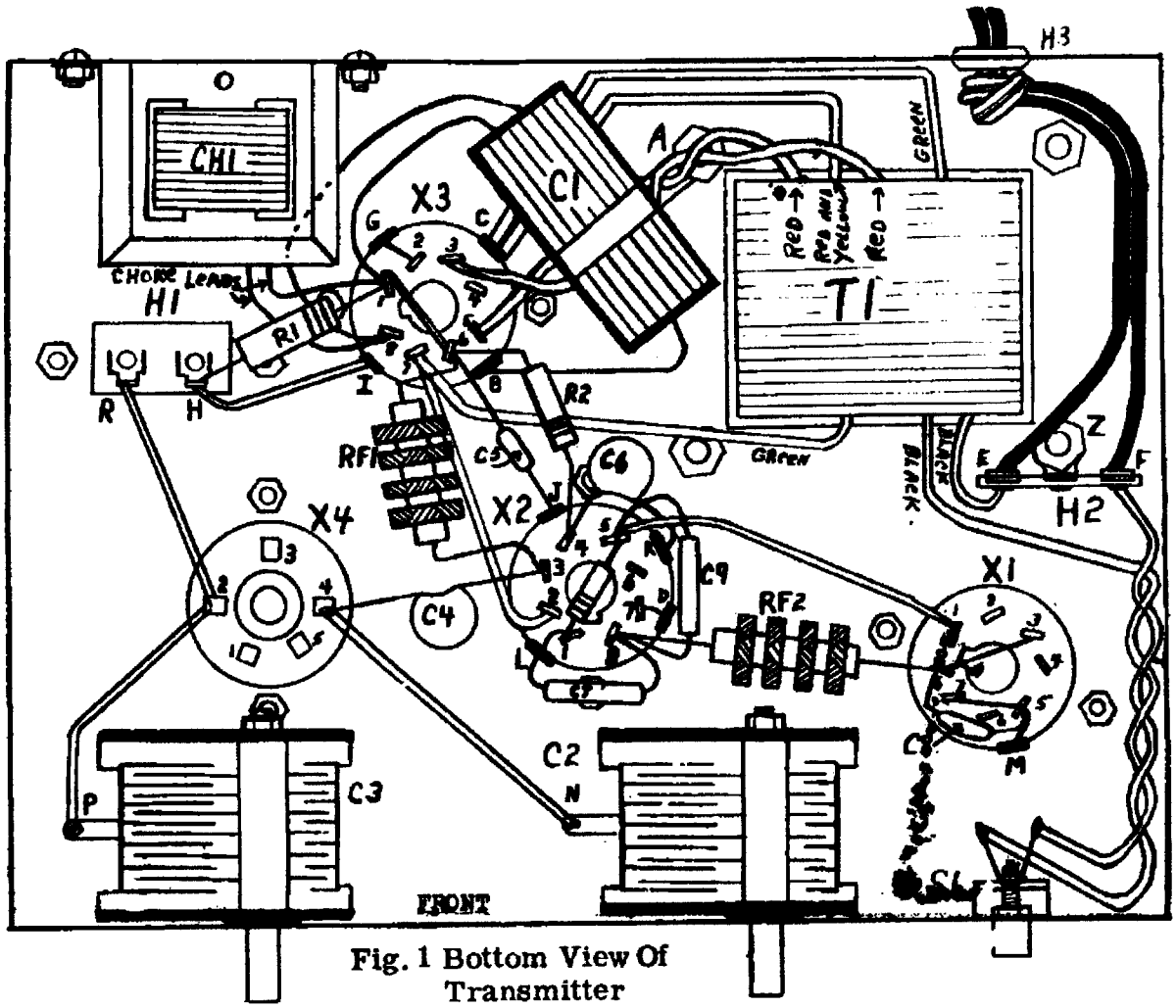
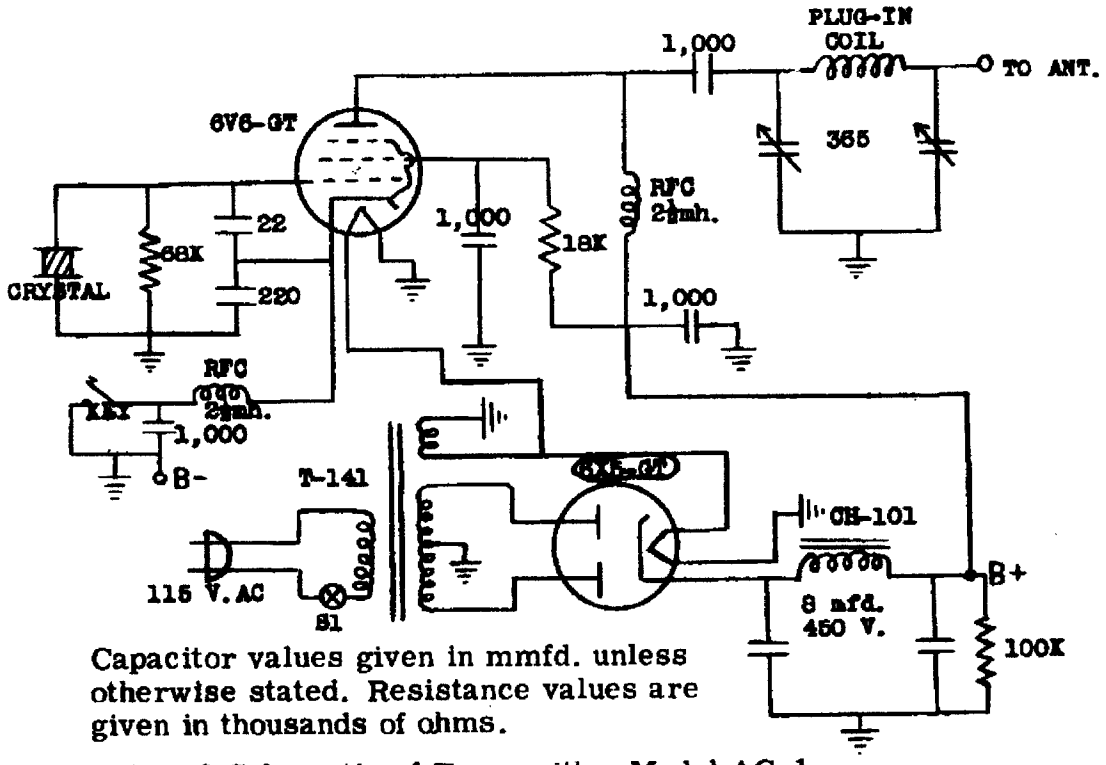


Fig. 1 Bottom View Of Transmitter



Capacitor values given in mmfd. unless otherwise stated. Resistance values are given in thousands of ohms.

Fig 2 Schematic of Transmitter Model AC-1

lytic condenser on the transformer screw shown in Fig. 1 (point A). Place the condenser strap between the chassis and an 8/32 nut. The two red condenser leads should face the rear of the chassis. Mount H2, a two lug terminal strip, on the transformer screw shown in Fig. 1 (point Z). Place the terminal strip mounting bracket between the chassis and the nut. Place #8 lockwashers and 8/32 nuts on the other two screws that hold the transformer.

9. Place H3, a rubber grommet, in the 3/8 inch hole at the rear of the chassis.
10. Take the two variable condensers and turn their shafts so that their plates are meshed. Keep the plates meshed while constructing the transmitter. This will prevent damage to the plates. Mount the two variable condensers at the front of the chassis. Use two 6/32 x 1/4 screws and two #6 lockwashers for each condenser. Insert the screw into the top of the chassis and the lockwasher between the head of the screw and the chassis.
11. Mount S1, the slide switch, in the position indicated in Fig. 1. Position the slide switch so that the two solder lug terminals are closest to the top of the chassis. Use two 4/40 x 3/8 screws, two #6 lockwashers and two 4/40 nuts in the manner described in Step 2.

WIRING

For best results, refer frequently to Fig. 1 for placement of parts and leads. In some cases, more than one wire or part will go to the same terminal. This situation will be indicated in the instructions by the abbreviation "NS". This will mean that the connection SHOULD NOT be soldered until other leads have been connected to the terminal. Whenever only one lead is connected to a terminal or where the last lead has been connected, the joint should be soldered and this will be indicated by the abbreviation "S".

The leads on some of the parts may be longer than necessary. When wiring these parts, cut the leads to their proper lengths. In cutting these leads or removing insulation from them, be extremely careful not to nick or cut the copper wire that remains with the part.

The instructions will refer to pin numbers of the sockets. These numbers are actually printed on the socket and are also shown in Fig. 1. In counting the pins of an octal socket, we view the socket from the bottom and count in a clockwise direction, starting at the key.

Use #20 gauge insulated hookup wire. Use either solid or stranded wire. If stranded wire is used, make certain that there are no loose strands of wire that may touch parts or terminals that they are not supposed to touch.

12. Run the black lead of C1 to the ground lug on the saddle of socket X3, point B (S).
13. Run the green lead of T1 that is closest to the rear of the chassis along the rear corner of the chassis to the ground lug, point C, of socket X3 (NS).
14. Run the other green lead of T1 to pin 7 of socket X3 (NS).
15. Run a length of hookup wire from pin 7 of X3 (S) to pin 2 of socket X2 (S).
16. Run a small length of hookup wire from pin 7 of X2 (S) to the ground lug, point D, of X2 (S).
17. Run the short black lead of transformer T1 to lug E of the two-lug terminal strip, H2 (NS).
18. Connect a six inch piece of hookup wire to point F of the two-lug terminal strip, H2 (NS). Twist this piece of hookup wire together with the remaining black lead of T1 and run this twisted pair along the corner of the chassis to the slide switch, S1. Solder one of the two wires to a slide switch terminal (S) and solder the other wire to the remaining slide switch terminal (S).
19. Run the red and yellow striped lead of T1 to point C of X3 (S).
20. Twist together the two red leads of T1 and run one of them to pin 3 of X3 (S). Run the other red lead to pin 5 of X3 (S).
21. Run a lead from pin 2 of X3 (S) to ground lug, point G, of X3 (S).
22. Run any one of the two red leads of the electrolytic condenser, C1, to pin 8 of X3 (NS).
23. Run any one of the two leads of choke CH1 to pin 8 of X3 (S).
24. Run the remaining lead of condenser C1 to pin 1 of X3 (NS).
25. Run the remaining lead of CH1 to pin 1 of X3 (NS).
26. Run a lead from pin 1 of X3 (NS) to pin 6 of X3 (NS).
27. Connect R1, a 100,000 ohm resistor (color coded brown, black, yellow) from pin 1 of X3 (S) to terminal H of H1 (NS).
28. Run a lead from terminal H of H1 (S) to the ground lug, point I of X3 (S).
29. Connect one of the two identical RF chokes, RF1, from pin 6 of X3 (NS) to pin 3 of X2 (NS).
30. Connect C4, a .001 mfd. disc condenser, from pin 3 of X2 (S) to pin 4 of the 5 prong socket, S4 (NS).
31. Connect C5, a .001 mfd. disc condenser, from pin 6 of X3 (NS) to ground lug, point J, of X2 (S).

32. Connect R2, a 15,000 ohm resistor (color coded brown, green, orange) from pin 6 of X3 (S) to pin 4 of X2 (NS).
33. Connect C6, a .001 mfd. disc condenser, from pin 4 of X2 (S) to ground lug point K of X2 (S).
34. Run a lead from pin 5 of X2 (NS) to pin 1 of X1 (S).
35. Connect R3, a 47,000 ohm resistor (color coded yellow, violet, orange), from pin 5 of X2 (NS) to pin 1 of X2- Run the resistor lead THROUGH pin 1 of X2 (S) to the ground lug, point L, of X2 (NS).
36. Connect C7, a 220 mmfd. condenser (this may be a rectangular shaped mica condenser or a disc type condenser) from pin 8 of X2 (NS) to the ground lug, point L, of X2 (S).
37. Connect RF2, the remaining RF Choke, from pin 8 of X2 (put a small piece of insulated sleeving over the bare r.f. choke lead going to pin 8 of X2) (NS) to pin 8 of X1 -- run the lead THROUGH pin 8 of X1 (NS) to pin 3 of X1 (S).
38. Connect C8, a .001 mfd. disc condenser, from pin 8 of X1 (S) to pin 5 of X1 (NS).
39. Run a lead from pin 7 of X1 (S) THROUGH pin 5 of X1 (S) to the ground lug, point M of X1 (S).
40. Connect C9, the 22 mmfd. disc condenser, from pin 5 of X2 (S) to pin 8 of X2 (S).
41. Connect a lead between terminal N of the variable condenser, C2 (S) and pin 4 of X4 (S).
42. Connect a lead between terminal P of the variable condenser, C3 (S) and pin 2 of X4 (NS).
43. Connect a lead between pin 2 of X4 (S) and terminal R of H1 (S).
44. Put the line cord through the grommet at the rear of the chassis and tie a knot in the line cord on the inside of the chassis.
45. Connect one end of the line cord to terminal E of H2 (S). Connect the other end of the line cord to terminal F of H2 (S).

The chassis itself is now completely wired. Go over the wiring again and check it carefully against the instructions and diagrams to make certain that everything is correct. Also check to see that adjacent wires or terminals do not touch each other (assuming, of course, that they are not supposed to touch each other).

COIL CONSTRUCTION

Take one end of the coil wire and scrape off about 3/4 of an inch of insulation. Use a knife, razor blade or emery cloth to do this. Be extremely careful not to nick or weaken the wire. Pass the cleaned end of the wire through the hole in the coil form closest to the prongs. Then pass the wire into the inside of the prong directly beneath the hole (prong 2 of the coil form). Allow 3/8 of an inch of the cleaned wire to protrude from the bottom of the prong. Bend this 3/8" piece of wire up against the prong so that the wire doesn't slip out of the prong. Using a clean, well tinned soldering iron, solder the wire to the prong. Do not keep the iron on the prong too long. The heat will tend to soften the polystyrene coil form. One way to prevent the heat from getting to the coil form is to touch the prong midway between the soldering point and the polystyrene base of the coil with a pair of long nose pliers. The pliers will conduct the heat away from the coil base. Do not allow the solder to remain on the outside of the prong as this will make it difficult to plug the coil into the coil socket.

After the end of the wire has been carefully soldered to the coil prong, the coil is ready to be wound. The coil is carefully close-wound toward the top of the coil form. The turns of the coil touch each other. If the coil is to be used for the 40 meter band, wind 15-1/2 turns. If the coil is for the 80 meter band, wind 32-1/2 turns. Keep track of the turns as the coil is being wound. The 40 meter coil should end up at the middle hole of the coil form and the 80 meter coil should terminate at the top hole of the coil form. After the correct number of turns have been wound, cut the coil wire, allowing enough wire to be passed through the hole in the coil form and into the prong nearest the hole (prong 4). Also allow for an extra 1/2" of wire to protrude out of the bottom of the prong. Scrape the end of the wire clean and solder it to the prong, using the same procedure that was previously used.

OPERATION OF THE TRANSMITTER

1. Place the two tubes and the correct coil into their respective sockets as shown in Figs. 1 and 2.
2. Place the knobs on the variable condensers in such a way that the knobs point to the switch when the condenser plates are completely meshed.
3. Insert the proper crystal into pins 1 and 7 of socket X1. If 40 meter operation is desired, use a 40 meter crystal. The 40 meter Novice band is from 7150 kc. to 7200 kc. The General class operators may operate their transmitters between 7000 kc. and 7300 kc. If 80 meter operation is desired, use an 80 meter crystal. The 80 meter Novice band is from 3700 kc. to 3750 kc. General class operators may operate their transmitters between 3500 kc. and 4000 kc.
4. Using a Mosely 301 jack or a Millen 37412 plug, insert the key leads into pins 3 and 5 of X1.

O= Wound

5. Obtain a 115 volt, low wattage bulb (7-1/2 to 15 watts) and connect it between the Antenna and Ground terminals of the transmitter (terminals R and H of terminal strip H1). To make it easy to connect the bulb to the Antenna and Ground terminals, solder a piece of wire to the center terminal in the base of the bulb and another piece of wire to the screw shell portion of the bulb. Connect the other ends to terminal strip H1. The bulb is called the dummy load, and it takes the place of the antenna during testing periods.

   WARNING - There are high voltages present in the transmitter and they can cause injury. Therefore, the transmitter should be turned off before adjusting or touching anything on the inside of the transmitter. Also, discharge the filter condensers after the transmitter has been turned off by shorting B+ to ground with a screwdriver that has an insulated handle.

6. GROUNDING: Before proceeding further, it is important to ground the transmitter chassis. This is not only a safety precaution, but it helps minimize television interference and it makes for efficient antenna loading. The chassis is grounded by connecting the ground terminal to a cold water pipe or to a radiator. The connecting wire should be a heavy gauge copper or aluminum ground wire. It should be as short as possible. Make certain that a good electrical contact is made between the wire and the water pipe or radiator.
7. Connect the power cord plug to a 115 volt A.C. source and turn the power switch on. After a few seconds, the tubes will warm up and glow.
8. Completely mesh both variable condensers (the knobs should be pointing toward the switch).
9. Close the telegraph key and turn the PLATE TUNING control slowly until the dummy load bulb lights up. Adjust the PLATE TUNING control for maximum brilliance of the bulb. Turn the ANTENNA LOADING control slightly clockwise. Then readjust the PLATE TUNING control for maximum brilliance of the bulb. Again turn the ANTENNA TUNING control slightly clockwise and readjust the PLATE TUNING control for maximum brilliance. Continue this procedure until the point of maximum brilliance is reached. At this point, the dummy load is drawing maximum r.f. power from the transmitter, If a receiver is tuned to the frequency of the transmitter, the signal of the transmitter will be picked up by the receiver. The signal in the receiver will be loudest when the bulb shows maximum brilliance.
10. Another way to tune up the transmitter is to use a 0-100 ma. d-c meter. The milliammeter is inserted in series with the key. After both tuning condensers have been meshed completely, we rotate the PLATE TUNING control until we get a "dip" or minimum reading of the meter. The ANTENNA LOADING control is then rotated slightly clockwise. There will be a slight increase in the meter reading. This indicates that the bulb is loading up, thus drawing more power from the transmitter. Readjust the PLATE TUNING control for a dip in the meter reading. Again adjust the ANTENNA LOADING control slightly clockwise and note the increase in plate current. Readjust the PLATE TUNING control for a dip in the meter. Continue this procedure until the dip reading is maximum - that is, the meter shows the highest current and yet increases when the PLATE TUNING control is rotated slightly in either direction. Note that the dip is sharpest when the ANTENNA LOADING condenser is fully meshed. As we open this condenser, we load the transmitter, (more power is being drawn from the transmitter) and the dip becomes shallower. In tuning up the transmitter with either of the above methods, dipping with the PLATE TUNING control should be the last adjustment before operating.

OPERATION WITH AN ANTENNA

11. The simplest type of antenna to use with this transmitter for both 40 and 80 meters, is a random length of wire. Although the transmitter will load into almost any length of wire, it will load best into 67 feet of wire (as measured from the antenna terminal of the transmitter to the end of the wire). Size #14 copper wire is ideal for antenna use. The antenna SHOULD BE AS HIGH AS POSSIBLE and should be kept clear of trees, power lines, buildings, etc. One end of the antenna should be connected to the antenna terminal of the transmitter and the other end should be suspended from some high object with an insulator.
12. The transmitter with the random length of antenna wire can be tuned up with a 0 to 100 ma. d-c milliammeter. using the procedure given above. If a meter is not available, the following tuning method may be used:

    Obtain a 2 volt, .06 ampere flashlight bulb (either #48 or #49) and two pieces of wire, each one about two feet long. Connect the bulb between the two pieces of wire, one lead to the tip of the bulb base and the other lead to the shell of the bulb base. We now have a four foot length of wire with the bulb in the center. Connect one end of the wire to the output (Antenna) terminal of the transmitter. The other end is clipped to the antenna about three or four feet up from the Antenna terminal. If the antenna wire is insulated at this point, clean off the insulation before clipping the indicator wire to it. Turn the transmitter on and tune both tuning condensers for maximum brilliance of the bulb. Use the same procedure that was used in tuning the transmitter with the dummy load lamp. This tuning system is ideal since it is an indication of what is actually going into the antenna. The bulb and four foot length of wire can be left on while operating the transmitter. It is a simple form of monitor and it will indicate that the transmitter is operating properly.

13. Another type of antenna that can be used with this transmitter is the Half-Wave dipole antenna. This is shown in Fig. 3. The transmission line can be #RG-59U and it can be of any length. The inner conductor of the transmission line is connected to the Antenna terminal of the transmitter and the metal braid of the transmission line is connected to the Ground terminal. At the antenna, the inner conductor is connected to one side of the antenna and the braid is connected to the other side. The total length of the antenna (not including the transmission line) should be 65 feet for 40 meters and 125 feet for 80 meters. The center insulator should be exactly in the middle of the antenna. While the random length wire antenna can operate properly for both 40 and 80 meters, we must use separate antennas for the two bands when using the dipole type of antenna of Fig. 3. In either case, the antenna should be as high as possible.

See Antenna Handbook or ARRL Handbook for other suitable antenna systems.

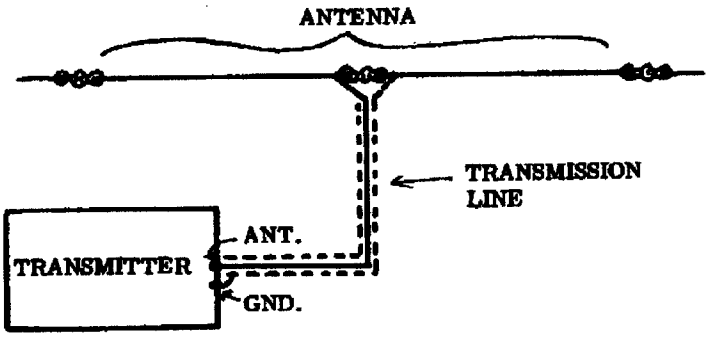


Fig. 3. Half-Wave Dipole Antenna.

WARRANTY

The Ameco Equipment Corp. limits its warranty of parts supplied with any kit (except tubes where the original manufacturer's guarantee applies) to a period of three (3) months from the date of purchase. Replacement will be made only when said part is returned postpaid, with prior permission, and in the judgment of the Ameco Equipment Corp., was defective at the time of sale. This warranty does not extend to any kits which have been subjected to misuse, neglect, accident or improper installation or application. This warranty is not transferable and applies only to the original purchaser. This warranty is in lieu of all other warranties and the Ameco Equipment Corp. neither assumes or authorizes any other person to assume for them any other liability in connection with the sale of AMECO kits.

The Ameco Equipment Corp. assumes no responsibility or liability for any damages or injuries sustained in the assembly of the kit or in the operation of the completed unit.