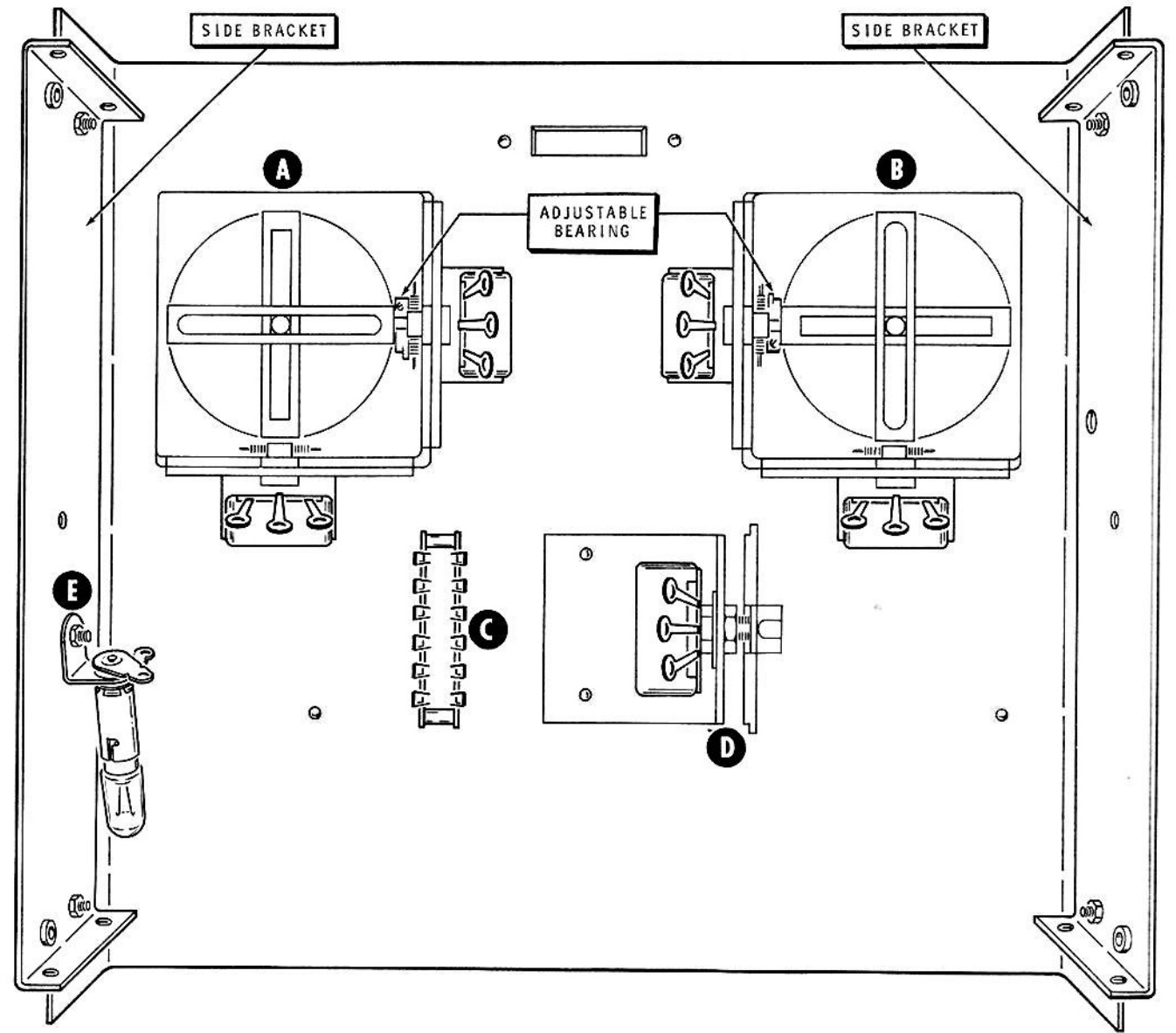


PICTORIAL 1-8



PICTORIAL 1-7

TRANSMITTER STEP-BY-STEP ASSEMBLY

ENCODER CIRCUIT BOARD ASSEMBLY

Before starting to assemble this kit, be sure you have read the wiring, soldering, and step-by-step assembly information in the Kit Builders Guide.

Since the circuit board and the components to be installed on it are quite small, it is suggested that you take your time while assembling the circuit board. Each component should be positioned carefully over its outline on the circuit board, as it is shown in the Pictorial.

Resistors will be called out by their resistance value (in Ω , or $k\Omega$) and color code. Resistors are 1/4 watt unless specified otherwise in a step. Capacitors will be called out by their capacitance value and type.

You may find it helpful to place the circuit board on a soft cloth to prevent it from sliding around when it is being soldered. Also, be very careful not to cover unused holes with solder.

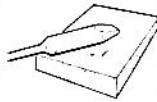
NOTE: It is recommended that you use a soldering iron that is rated at 15 to 25 watts. Its tip should be no wider than 1/8" at its widest dimension; pyramid or chisel-shaped tip is best. This type of soldering iron will make the kit easier to assemble, with less chance of solder bridges occurring between foils on the circuit board.

Complete the steps on Pictorial 1-1 through 1-4.

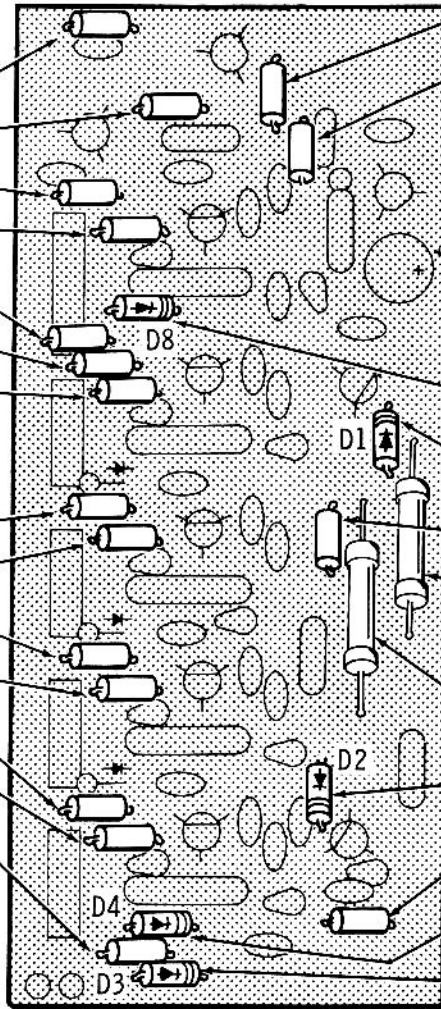
START



FOR GOOD SOLDERED CONNECTIONS, YOU MUST KEEP THE SOLDERING IRON TIP CLEAN... WIPE IT OFTEN WITH A DAMP SPONGE OR CLOTH.



- () Locate the encoder circuit board (#85-187-3) and position it lettered side up as shown.
- () 1000 Ω (brown-black-red).
- () 2200 Ω (red-red-red).
- () 47 k Ω (yellow-violet-orange).
- () 150 k Ω (brown-green-yellow).
- () 4700 Ω (yellow-violet-red).
- () 47 k Ω (yellow-violet-orange).
- () 150 k Ω (brown-green-yellow).
- () Solder all connections and cut off the excess lead lengths.
- () 47 k Ω (yellow-violet-orange).
- () 150 k Ω (brown-green-yellow).
- () 47 k Ω (yellow-violet-orange).
- () 150 k Ω (brown-green-yellow).
- () 47 k Ω (yellow-violet-orange).
- () 150 k Ω (brown-green-yellow).
- () 47 k Ω (yellow-violet-orange).
- () Solder all connections and cut off the excess lead lengths.



CONTINUE



- () 4700 (yellow-violet-red).
 - () 27 k Ω (red-violet-orange).
- NOTE: When installing silicon diodes, be sure to position the (banded) end as shown.
-
- BA NDED END
- () Silicon diode D8 (S160). Note position of banded end.
 - () Silicon diode D1 (S160). Note position of banded end.
 - () 4700 Ω (yellow-violet-red).
 - () 111 k Ω 1%, 1/2 watt.
 - () Solder all connections and cut off the excess lead lengths.
 - () 111 k Ω 1%, 1/2 watt.
 - () Silicon diode D2 (S160). Note position of banded end.
 - () 47 k Ω (yellow-violet-orange).
 - () Silicon diode D4 (S160). Note position of banded end.
 - () Silicon diode D3 (S160). Note position of banded end.
 - () Solder all connections and cut off the excess lead lengths.

PROCEED TO PICTORIAL 1-2.

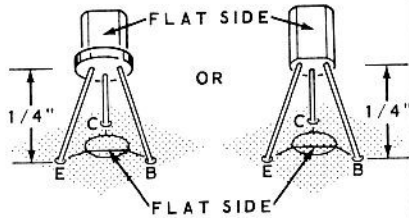
PICTORIAL 1-1

START



NOTE: When installing transistors, place the E, B, and C leads of the transistor in the corresponding holes of the circuit board. Position the transistor 1/4" above the circuit board. Solder all three connections of each transistor as it is installed. Cut off the excess lead lengths.

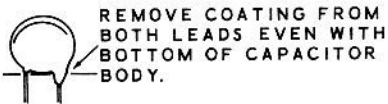
- () X29A829 transistor (#417-201) at Q8.



- () X29A829 transistor (#417-201) at Q9.

- () X29A829 transistor (#417-201) at Q10.

NOTE: When installing all capacitors onto this circuit board, remove any excess coating from the leads. Use long-nose pliers to remove this coating.

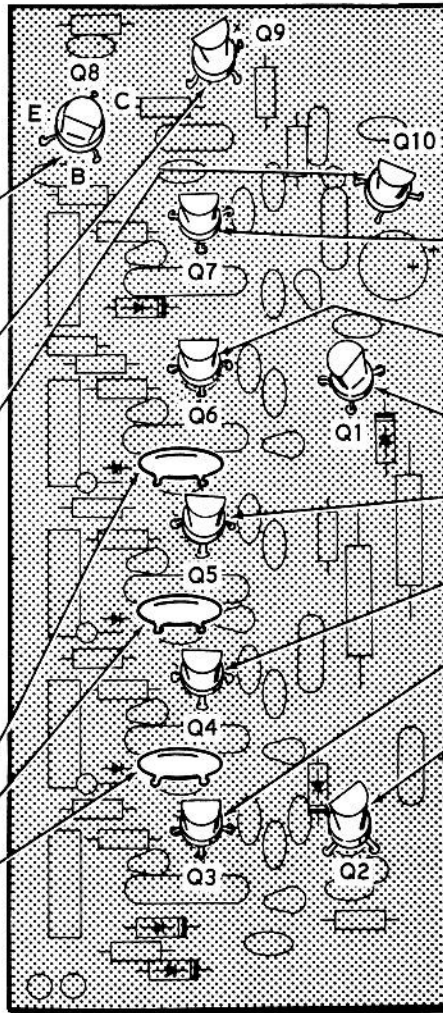


- () .005 μ F disc.

- () .005 μ F disc.

- () .005 μ F disc.

- () Solder all connections and cut off the excess lead lengths.



CONTINUE



- () 2N5232A/2N3391A transistor (#417-91) at Q7.

- () 2N5232A/2N3391A transistor (#417-91) at Q6.

- () 2N3393 transistor (#417-118) at Q1.

- () 2N5232A/2N3391A transistor (#417-91) at Q5.

- () 2N5232A/2N3391A transistor (#417-91) at Q4.

- () 2N5232A/2N3391A transistor (#417-91) at Q3.

- () 2N3393 transistor (#417-118) at Q2.

- () Check to see that all connections are soldered and the excess lead lengths are cut off.

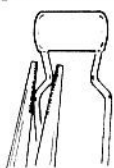
PROCEED TO PICTORIAL 1-3.

PICTORIAL 1-2

START

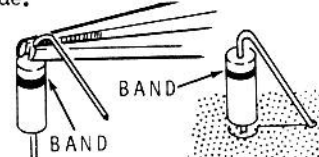
- () .022 μ F Mylar. (small).
- () .001 μ F disc.
- () .001 μ F disc.
- () .001 μ F disc.
- () .001 μ F disc.

NOTE: When installing .022 μ F Mylar (large) capacitors, use long-nose pliers and straighten the leads if necessary after removing the excess coating from the leads.

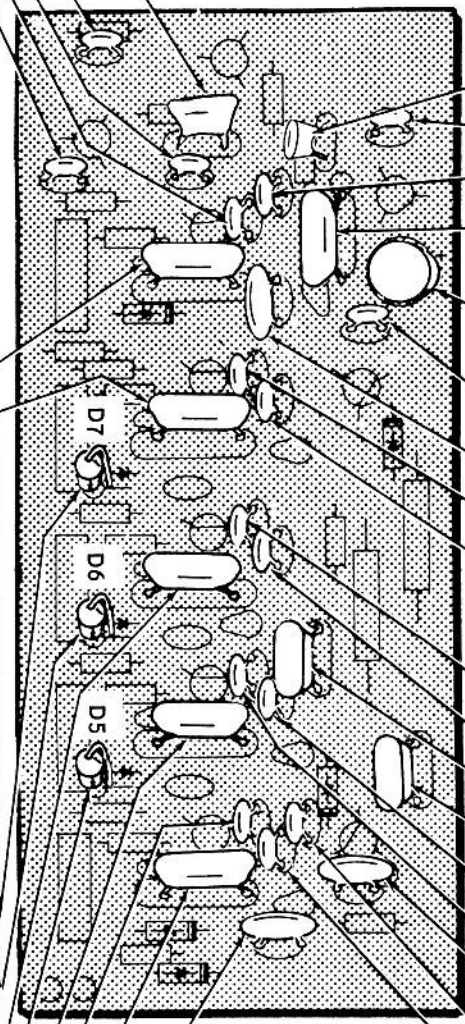


- () .022 μ F Mylar, (large).
- () .022 μ F Mylar, (large).
- () Solder all connections and cut off the excess lead lengths.

NOTE: When installing silicon diodes vertically, position the lead opposite the cathode (banded end) in the hole with the outline. Hold the diode lead with pliers so the diode is not broken when bending the lead. Bend the lead before installing the diode.



- () Silicon diode D7 (S160). Position banded end up.
- () Silicon diode D6 (S160). Position banded end up.
- () .022 μ F Mylar (large).
- () Silicon diode D5 (S160). Position banded end up.
- () .022 μ F Mylar (large).
- () .001 μ F disc.
- () .022 μ F Mylar (large).
- () .005 μ F disc.
- () Solder all connections and cut off the excess lead lengths.



CONTINUE

- () .01 μ F Mylar.
- () .001 μ F disc.
- () .001 μ F disc.
- () .1 μ F Mylar.
- () 50 μ F electrolytic. Position the positive (+) lead in the positive (+) marked hole in the circuit board.
- () .001 μ F disc.
- () .005 μ F disc.
- () .001 μ F disc.
- () .001 μ F disc.
- () Solder all connections and cut off the excess lead lengths.
- () .001 μ F disc.
- () .001 μ F disc.
- () .1 μ F Mylar.
- () .1 μ F Mylar.
- () .001 μ F disc.
- () .001 μ F disc.
- () .005 μ F disc.
- () .001 μ F disc.
- () .001 μ F disc.
- () Solder all connections and cut off the excess lead lengths.

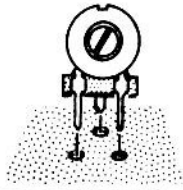
PROCEED TO PICTORIAL 1-4.

PICTORIAL 1-3

START



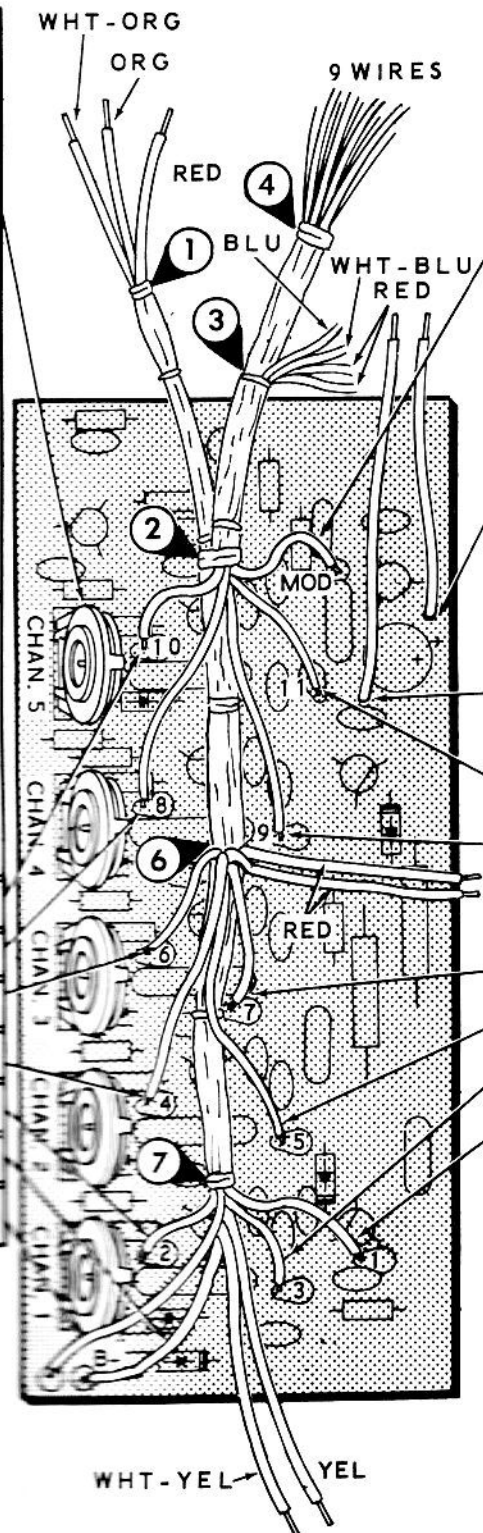
() Install 50 kΩ controls (#10-222) at the CHAN. 5, CHAN. 4, CHAN. 3, CHAN. 2, and CHAN. 1 locations. Solder all three connections of each control as it is installed.



NOTE: The cable assembly will be installed in the next step. Look at the end of each wire in the assembly before you install it. If the small strands have separated, twist them together again. Then apply a small amount of solder to the end of the wire to hold the strands together.

() Position the cable assembly over the circuit board with the breakouts as shown. (The term "breakout" refers to a place where a group of wires come from the cable assembly.) Solder each wire as it is installed. NOTE: Do not shorten any of the wires even though they may seem too long.

- () White-blue to 10.
- () White-green to 8.
- () White-yellow to 6.
- () White-orange to 4.
- () White-brown to 2.
- () Red to indicated B-.
- () White-red to other B-.



CONTINUE



() Violet to MOD.

NOTE: Be sure to use solid wire in all steps unless stranded wire is specified.

() Cut off a 2" length of red solid wire, remove 1/4" of insulation from each end, and solder one end in the indicated position. The other end will be connected later. NOTE: The hole is not marked.

() Cut off a 2-1/2" length of black solid wire, remove 1/4" of insulation from each end, and solder one end in the indicated position. The other end will be connected later. NOTE: The hole is not marked.

() Black to 11.

() Blue to 9.

NOTE: These two red wires will be connected later.

() Green to 7.

() Yellow to 5.

() Orange to 3.

() Brown to 1.

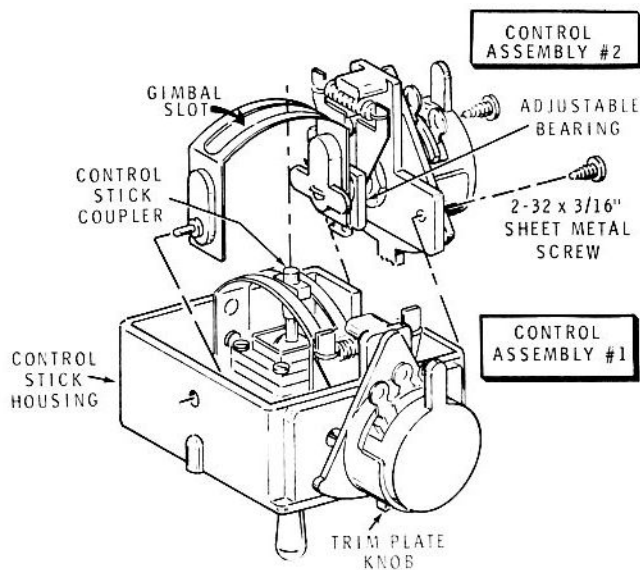
() Check all connections to see that they are soldered and cut off any excess lead lengths. Be sure there are no solder bridges between the foils. The remaining cable assembly wires will be connected later.

() Set the completed circuit board aside temporarily.

FINISH

PICTORIAL 1-4

CONTROL STICKS ASSEMBLY

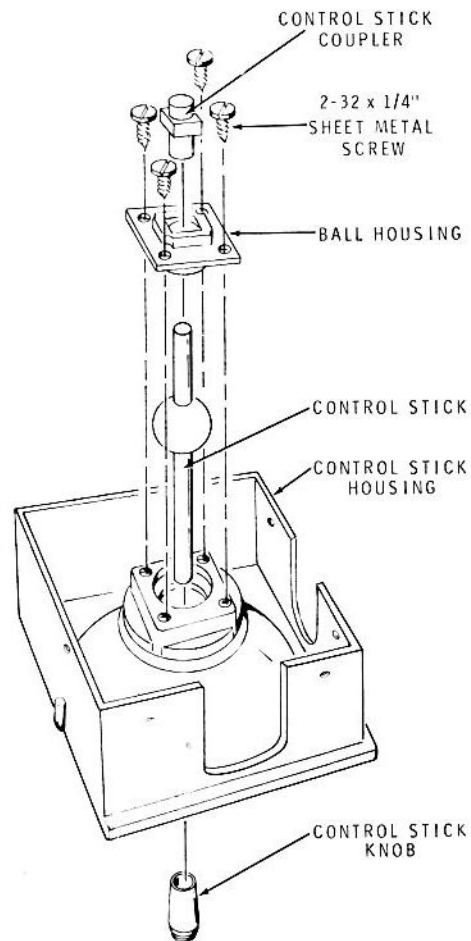


PICTORIAL 1-5

Refer to Pictorial 1-5 for an overall view of the control stick assemblies as you perform the following steps.

In the following steps you will put together both control stick assemblies. Carefully assemble the parts as shown in each of the Details: be sure each part is in its proper place, and that nuts and screws are properly tightened. Before you perform each step, locate the necessary parts for that step. **NOTE:** The nylon parts are precision molded and, in some cases, may require a force fit.

NOTE: Both control sticks will be assembled with all centering springs attached. Then, the proper spring will be removed later to establish the correct mode of operation for the throttle control. Please perform all of the steps as directed to obtain the correct results.

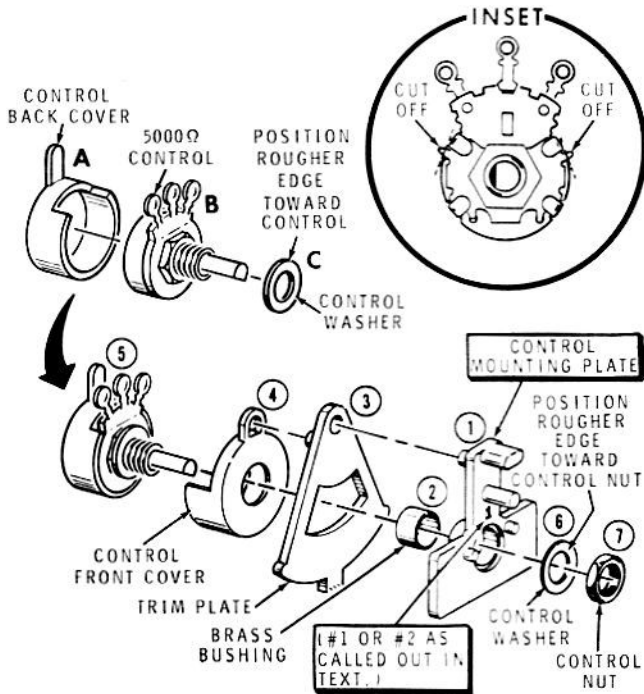


Detail 1-5A

- () Assemble a control stick housing as shown in Detail 1-5A.
- () Assemble the remaining control stick housing as shown.

NOTE: To operate properly, the control sticks must move freely. Move the control stick knobs in a circular motion and loosen the ball housing screws if necessary.

- () Set the two units aside until they are called for later.



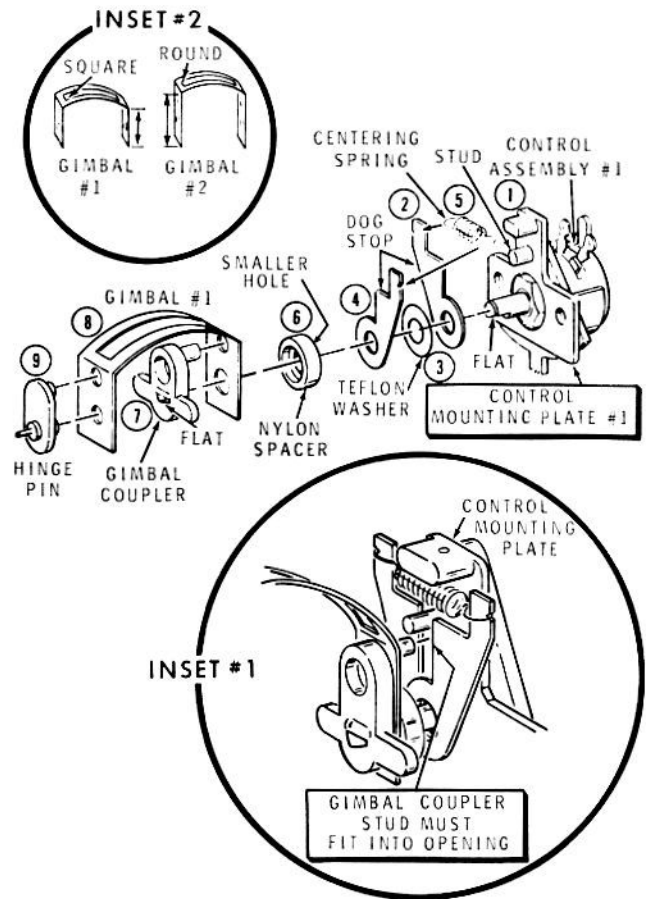
Detail 1-5B

CONTROLS

- () Refer to the inset drawing on Detail 1-5B and examine the four 5000 Ω controls. If small ears protrude past the control body, cut them off.
- () Refer to Detail 1-5B and carefully examine each of the control mounting plates to be used in the next step. Note a small #1 on two plates and a #2 on the other two plates (the numbers may be printed backwards). The #1 or #2 determines the number of the assembly. NOTE: Other parts may also have numbers on them, but these may be disregarded.

Refer to Detail 1-5B as you perform the following steps. Be sure to assemble the parts following the lettered sequence, A through C, and then the numbered sequence, 1 through 7, in the Detail. CAUTION: Do NOT over tighten the control nut; if the control nut is too tight, it can prevent the trim plate from adjusting the control.

- () Assemble a #1 control assembly.
- () Assemble the remaining #1 control assembly.



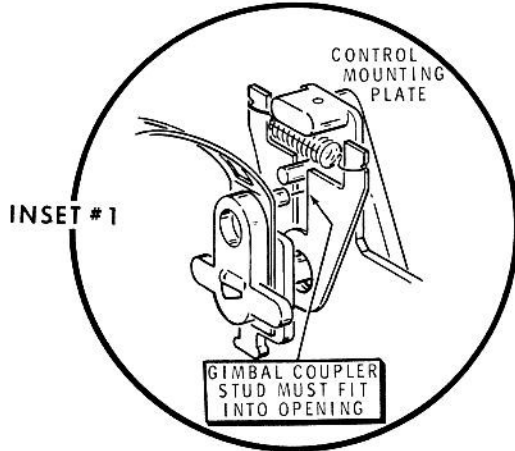
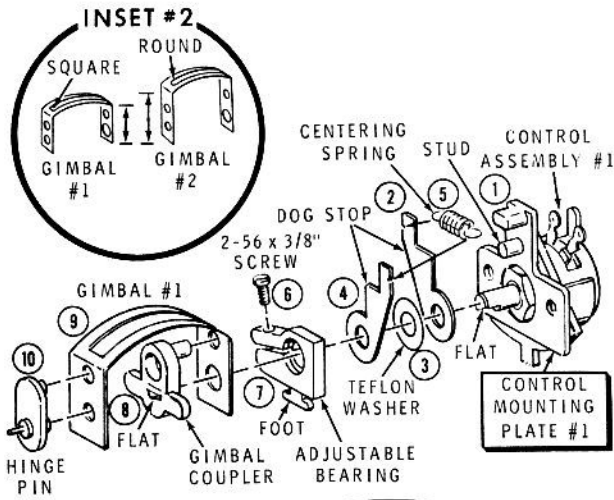
Detail 1-5C

- () Assemble a #2 control assembly.
- () Assemble the remaining #2 control assembly.

Refer to inset drawing #2 on Detail 1-5C and notice the difference between gimbals #1 and #2.

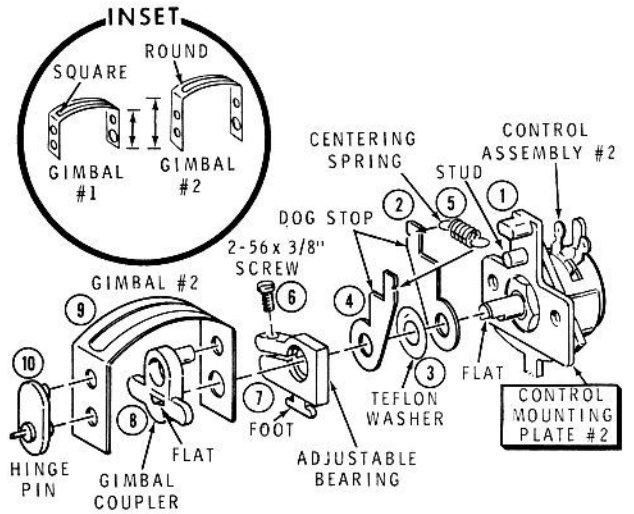
Locate all parts before you start each of the next four steps. Note that some different parts are used in each assembly.

- () Assemble a gimbal assembly #1 as shown in Detail 1-5C. It may be necessary to use some force to assemble the hinge pins and gimbal couplers to the gimbals in steps 7, 8, and 9.

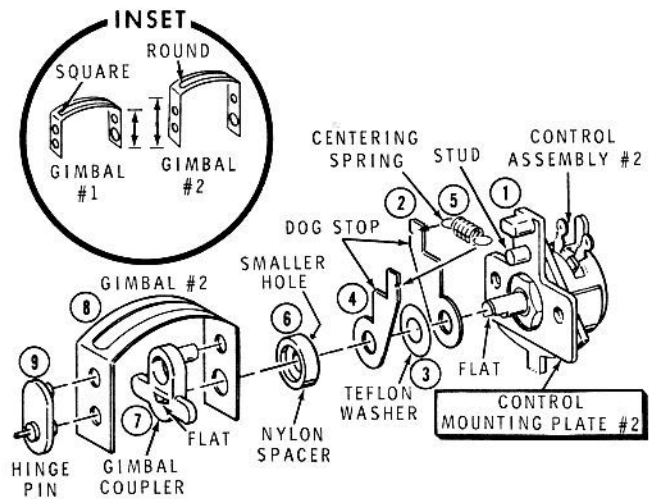


Detail 1-5D

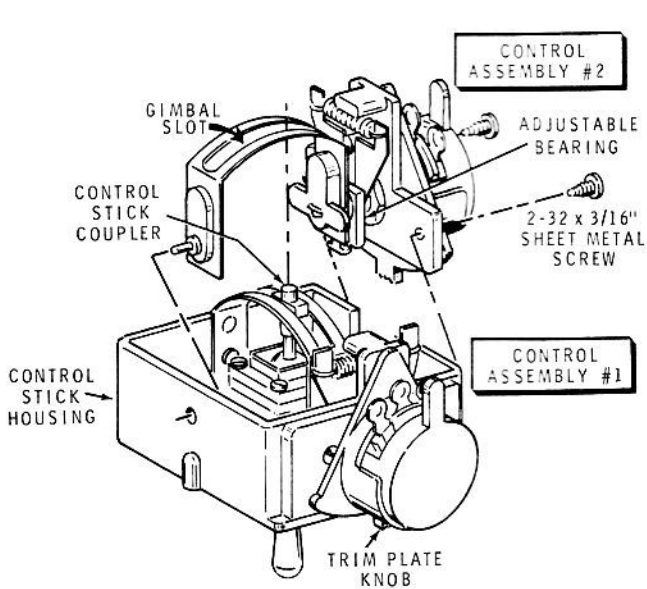
- () Assemble a gimbal assembly #1 as shown in Detail 1-5D.
- () Assemble a gimbal assembly #2 as shown in Detail 1-5E.
- () Assemble a gimbal assembly #2 as shown in Detail 1-5F.



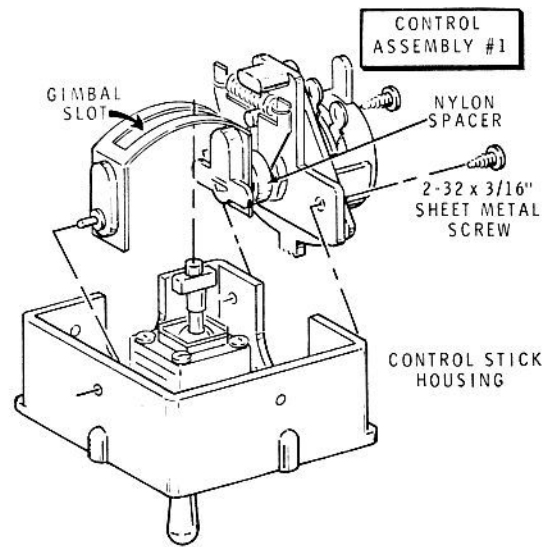
Detail 1-5E



Detail 1-5F

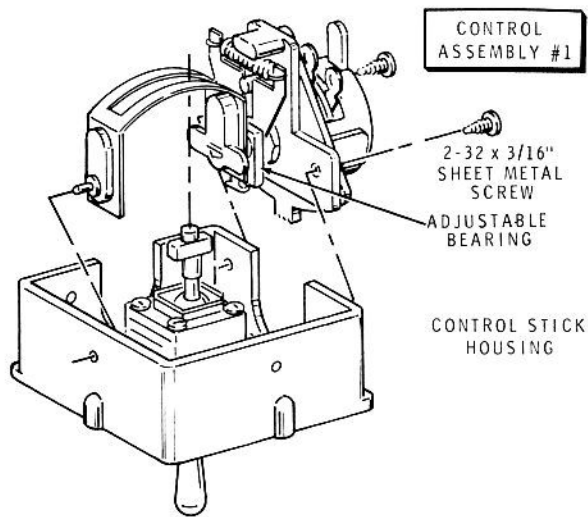


PICTORIAL 1-5
(Repeat)



Detail 1-5G

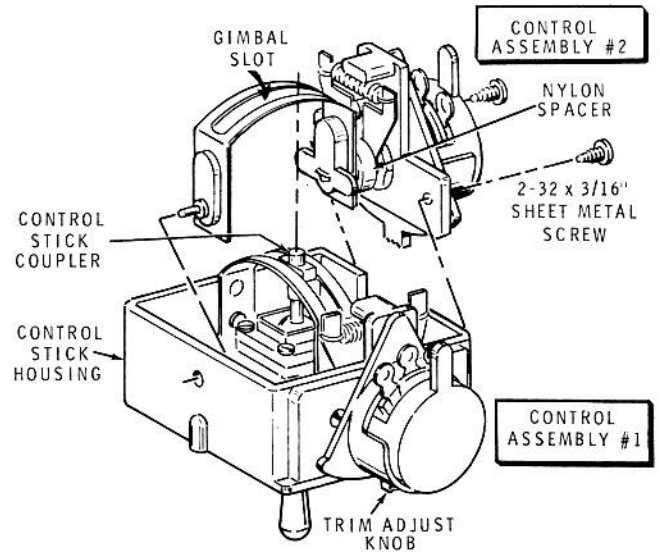
- () Refer to Detail 1-5G and mount the completed control assembly #1 with the nylon spacer (assembled in Detail 1-5C) in the following manner: Hook the hinge pin into its hole, position the rectangular portion of the control stick coupler into the gimbal slot, and fasten the control assembly with two 2-32 x 3/16" screws. The control mounting plate screw holes are made accessible by moving the trim plate knob one way or the other.
- () Refer to Pictorial 1-5 and locate the control assembly #2 with an adjustable bearing (assembled in Detail 1-5E). Position the adjustable bearing so its foot is pointing straight down, as shown, and tighten the adjustable bearing screw. The gimbal must now point straight up when the adjustable bearing foot points down as shown.
- () Mount the control assembly #2 from the previous step into the remaining control stick housing position (#2). Position the remaining portion of the control stick coupler into the gimbal slot, and fasten the control assembly with two 2-32 x 3/16" screws.
- () Loosen the adjustable bearing screw three complete turns.



Detail 1-6A

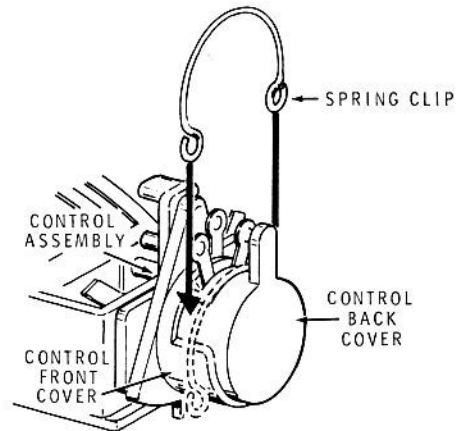
Refer to Pictorial 1-6 for an overall view of the control stick assemblies as you perform the following steps.

- () Refer to Detail 1-6A and locate the control assembly #1 with an adjustable bearing (assembled in Detail 1-5D). Position the adjustable bearing so its foot is pointing straight down, as shown, and tighten the adjustable bearing screw. The gimbal must now point straight up when the adjustable bearing foot points down as shown.
- () Mount the control assembly #1 from the previous step as shown. Position the rectangular portion of the control stick coupler into the gimbal slot and fasten the assembly with two 2-32 x 3/16" screws.
- () Loosen the adjustable bearing screw three complete turns.
- () Refer to Pictorial 1-6 and mount the remaining control assembly (assembly #2 with a nylon spacer, assembled in Detail 1-5F) into the remaining control stick housing position (#2). Position the remaining portion of the control stick coupler into the gimbal slot and fasten the assembly with two 2-32 x 3/16" screws.



PICTORIAL 1-6

- () Refer to Detail 1-6B and push a spring clip onto each of the control assemblies. The three control lugs may have to be bent out of the way to do this.



Detail 1-6B

This completes the assembly of the control sticks. When the control stick is moved to any position other than center and released, it should freely return to center. However, if the control stick binds or does not return to center, try loosening the four ball-housing screws shown in Detail 1-5A. If this does not remedy the situation, make sure that #1 or #2 parts were used when they were called for. Also be sure the control stick coupler fits into the gimbal track properly as shown in Pictorials 1-5 and 1-6.

CHASSIS ASSEMBLY

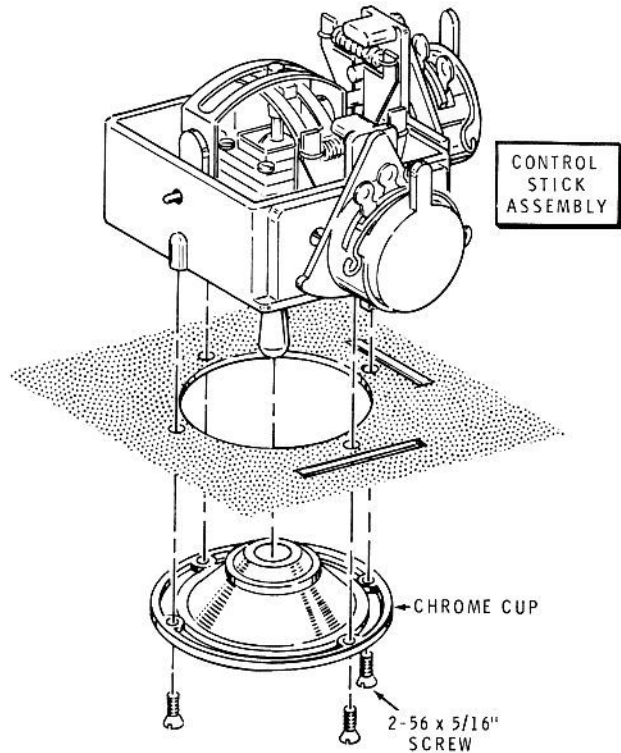
CABINET PARTS MOUNTING

Refer to Pictorial 1-7 (fold-out from Page 10) for the following steps.

- () Place a soft cloth on your work area to prevent the cabinet from being scratched.
- () Locate the cabinet front and position it on your work area as shown.

NOTE: Use the plastic nut starter to hold and start 6-32 and 4-40 nuts on screws. Refer to Page 3 of the Kit Builders Guide.

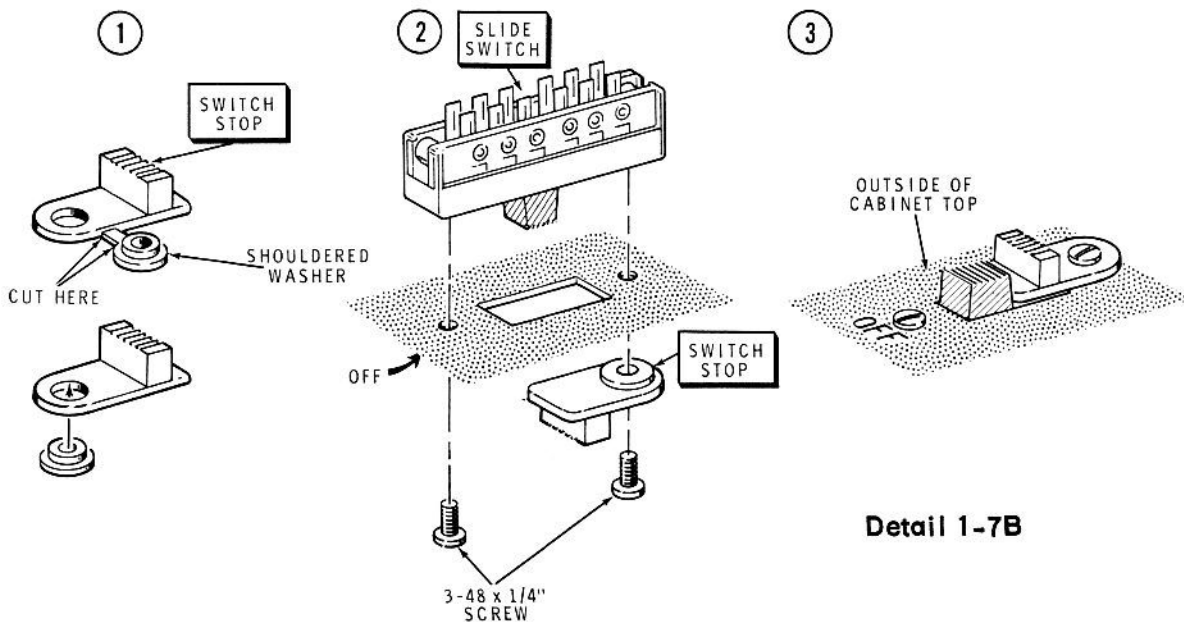
- () Locate the control stick assemblies, chrome cups, and eight 2-56 x 5/16" screws.
- () Mount the control stick assemblies as shown in Detail 1-7A with the adjustable bearings positioned as shown in Pictorial 1-7.



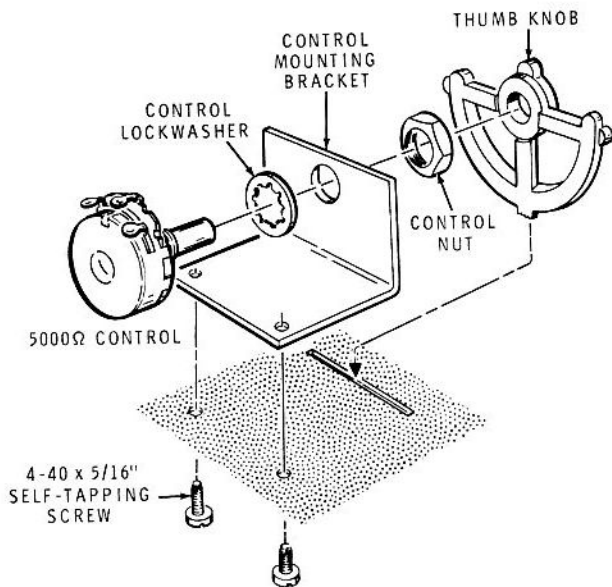
Detail 1-7A

Refer to Detail 1-7B for the following steps.

- () Locate the switch stop and cut off the shouldered washer as shown in part 1 of the Detail. Then push the shouldered portion of the washer into the hole of the switch stop.
- () Mount the slide switch and switch stop at C with two 3-48 x 1/4" screws as shown in parts 2 and 3 of the Detail. The switch is symmetrical and can be positioned either way.



Detail 1-7B



Detail 1-7C

Refer to Detail 1-7C for the following steps.

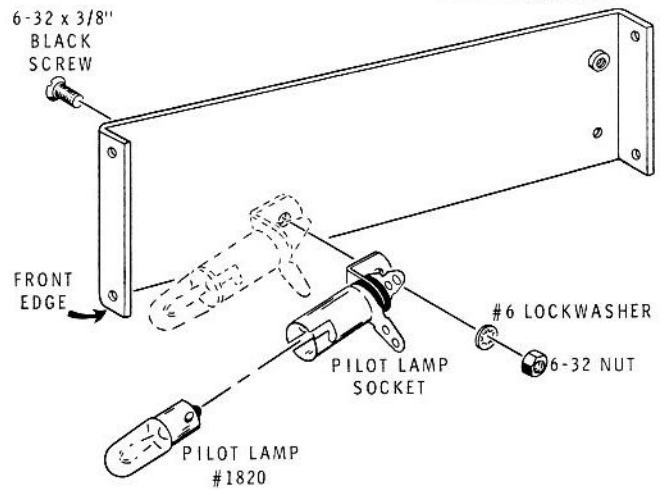
- () Install the 5000 Ω control (#10-273) on the control mounting bracket as shown with a control lockwasher and a control nut.
- () Rotate the control shaft back one-quarter turn from the full clockwise position.
- () Push the thumb knob onto the control shaft so the thumb knob points down with the control at its preset position.
- () Mount the control mounting bracket at D with two 4-40 x 5/16" self-tapping screws.
- () Rotate the knob to make sure it moves freely. If it does not, reposition the control mounting bracket or knob.

Refer to Detail 1-7D for the following steps.

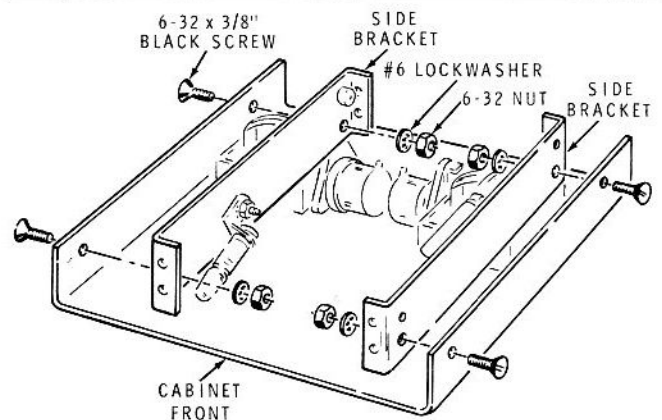
- () Insert the pilot lamp into the pilot lamp socket.
- () Mount the pilot lamp socket to either side bracket at E with a 6-32 x 3/8" black screw, #6 lockwasher, and 6-32 nut. Position the pilot lamp socket so the lamp is near the bottom of the front edge as shown.

Refer to Detail 1-7E for the following steps.

- () Mount the side bracket, with the pilot lamp, to the cabinet front as shown. Use two 6-32 x 3/8" black screws, #6 lockwashers, and 6-32 nuts.



Detail 1-7D

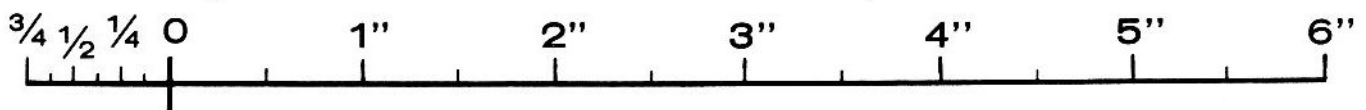


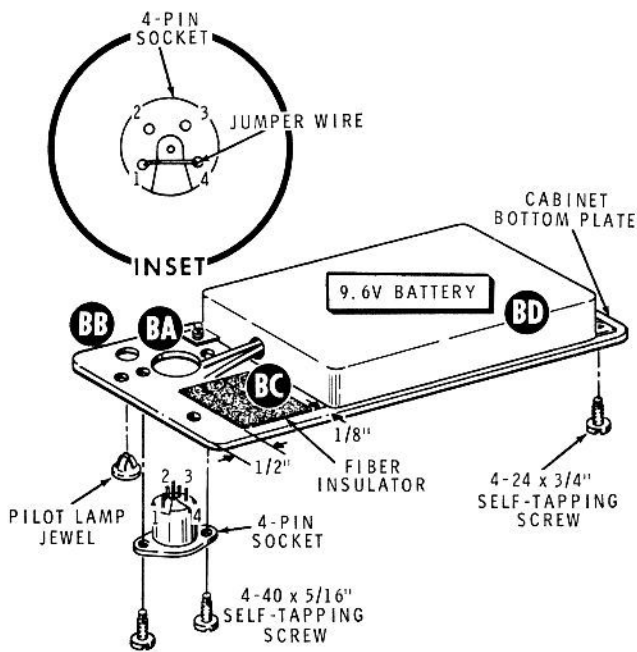
Detail 1-7E

- () Mount the remaining side bracket with two 6-32 x 3/8" black screws, #6 lockwashers, and 6-32 nuts.

Refer to Pictorial 1-8 (fold-out from Page 10) and Detail 1-8A for the following steps.

- () Position the cabinet bottom plate as shown in Detail 1-8A.
- () Mount the 4-pin socket at BA with two 4-40 x 5/16" self-tapping screws. Position the socket as shown.
- () Locate a length of excess resistor lead or solid wire with its insulation removed and cut it to a length of 1/2".
- () Refer to the inset drawing and connect this wire from lug 1 (S-1) to lug 4 (S-1) of the socket BA. NOTE: Do not allow the wire to touch any other metal parts on the socket.



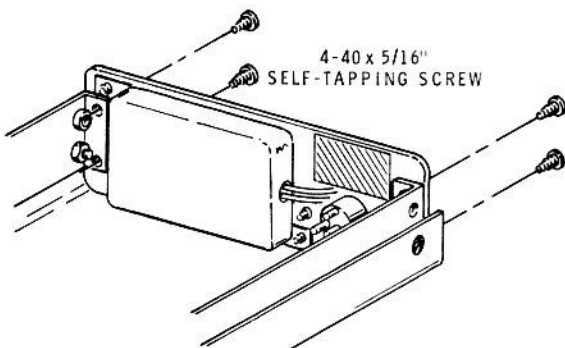


Detail 1-8A

- () Install the pilot lamp jewel at BB. Push on the jewel until it snaps into place.
- () Clean the area on the bottom plate at BC of any grease where the fiber insulator is to be installed.

NOTE: In the following steps, note the dimensions on Detail 1-8A for correct positioning of the fiber insulator.

- () Peel off the protective backing and press the fiber insulator in place at BC.
- () Mount the battery at BD with two 4-24 x 3/4" self-tapping screws. CAUTION: Do not overtighten these screws.
- () Refer to Detail 1-8B and mount the cabinet bottom plate with four 4-40 x 5/16" self-tapping screws.



Detail 1-8B

- () Make sure switch C, the ON-OFF switch, is in the OFF position.

CAUTION: Do not turn the Transmitter on until instructed to do so. This could damage the battery.

- () Cut each battery lead to a length of 3". NOTE: Cut only ONE lead at a time.

CAUTION: In the following steps do not let the bare battery lead ends touch each other. Where a wire passes through a connection and then goes to another point as in the following steps, it will count as two wires in the solder instructions (S-2), one entering and one leaving the connection.

NOTE: If your transmitter is on the 53 MHz band, do not perform the next two steps only. (The battery will be connected later for the 53 MHz band).

FOR 27 AND 72 MHz BAND TRANSMITTERS ONLY

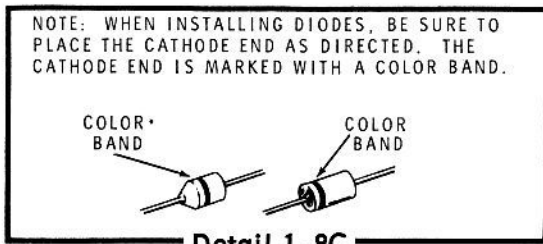
- () Remove 1/4" of insulation from the black battery lead. Then connect this lead through lug 11 (S-2) to lug 5 (S-1) of switch C.
- () Remove 1/4" of insulation from the red battery lead. Then connect this lead through lug 8 (S-2) to lug 2 (S-1) of switch C.

NOTE: When wiring this kit, you will be instructed to prepare lengths of hookup wire. To prepare wire, cut it to the indicated length and remove 1/4" of insulation from each end. Scales are provided on a number of pages throughout the Manual for measuring wires.

Always use solid wire unless stranded is specified in a step. When stranded wire is called for, twist the strands together and melt a small amount of solder on the bare wire ends to hold the separate strands together.

- () Prepare a 2-1/2" length of black wire.
- () Connect one end of this wire through lug 10 (S-2) to lug 4 (S-1) of switch C. Connect the other end of the wire to lug 1 of socket E as shown (S-1).

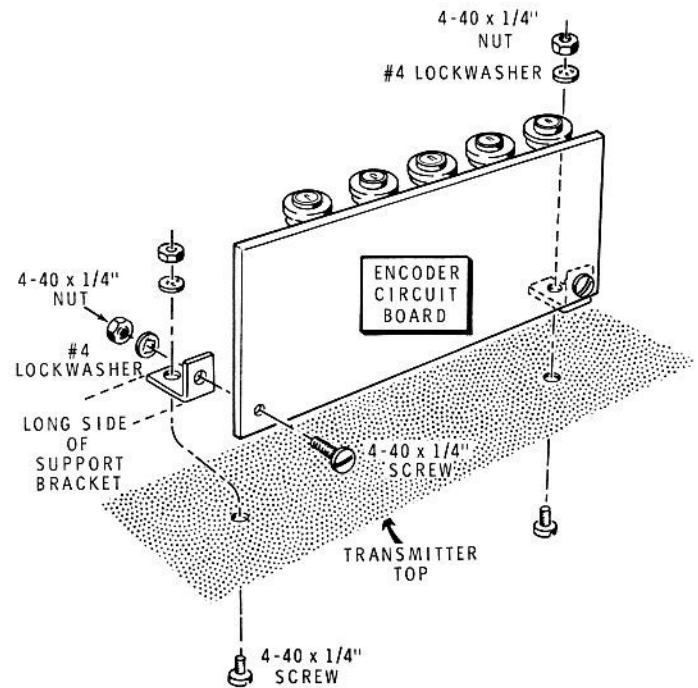
- () Cut one lead of the 1000 Ω 7 watt resistor to a length of 1".
- () Connect the long lead of the 1000 Ω 7 watt resistor through lug 7 (S-2) to lug 1 (S-1) of switch C.
- () Connect the other lead of the 1000 Ω 7 watt resistor to lug 3 of socket BA (S-1). Push the resistor down against the cabinet as shown.
- () Locate the 1N2079 (#57-27) silicon diode and cut each lead to a length of 3/4".
- () Refer to Detail 1-8C and connect the cathode end of this silicon diode to lug 2 of socket BA (S-1).



- () Connect the other lead of the silicon diode to lug 2 of socket E (S-1).

Refer to Pictorial 1-9 (fold-out from Page 25) for the following steps.

- () Refer to Detail 1-9A and mount the two support brackets to the component side of the encoder circuit board. Use two 4-40 x 1/4" screws, #4 lockwashers, and 4-40 nuts. Position the brackets with the long side as shown.
- () Place the encoder circuit board into the cabinet and secure it with two 4-40 x 1/4" screws, #4 lockwashers, and 4-40 nuts. Make sure no wires are pinched between the circuit board and the front panel.



PRELIMINARY WIRING

Refer to Pictorial 1-9 for the following steps.

- () Connect the solid red wire coming from the encoder circuit board through lug 3 (S-2) to lug 9 (S-1) of switch C.
- () Connect the solid black wire coming from the encoder circuit board through lug 6 (S-2) to lug 12 (S-1) of switch C.

NOTE TO EXPERIENCED MODELERS: Do not change any of the following steps. It is not necessary for you to choose a particular mode of operation at this time, since the Transmitter controls will be wired to operate in any mode. (Modes of operation are explained in detail during the Receiver wiring, on Page 49, where you must choose the mode you intend to use.)

The wires from the wire harness will be connected to the controls and RF circuit board in the following steps. The term "breakout", and its abbreviation - BO, refers to a place where a group of wires come out of the harness.

NOTE: Do not cut any of the harness leads, even though they may appear to be too long.

WARNING: Be careful not to melt any of the nylon on the control sticks while soldering.

() Connect the two red wires from BO#6 (breakout #6) to lug 1 of the channel 3 control (S-2).

() Connect the white-yellow wire from BO#7 to lug 2 of the channel 3 control (S-1).

NOTE: If your transmitter will operate in the 27 MHz or 72 MHz bands, solder the connections in the next two steps. The connections on the 53 MHz band transmitter will be soldered later.

() Connect the yellow wire from BO#7 to lug 3 of the channel 3 control (S-1). (NS) on 53 MHz band transmitters.

() Connect the white-brown wire from BO#4 to lug 2 of the channel 1 control (S-1). (NS) on 53 MHz band transmitters.

() Connect the two red wires from BO#4 to lug 1 of the channel 1 control (NS).

() Connect the brown wire from BO#4 to lug 3 of the channel 1 control (S-1).

() Connect the two red wires from BO#3 to lug 1 of the channel 5 control (S-2).

() Connect the white-blue wire from BO#3 to lug 2 of the channel 5 control (S-1).

() Connect the blue wire from BO#3 to lug 3 of the channel 5 control (S-1).

() Connect the red wire from BO#1 to lug 1 of the channel 2 control (S-1).

() Connect the white-orange wire from BO#1 to lug 2 of the channel 2 control (S-1).

() Connect the orange wire from BO#1 to lug 3 of the channel 2 control (S-1).

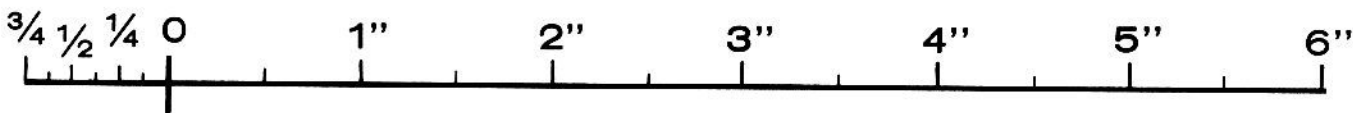
() Connect the green wire from BO#4 to lug 3 of the channel 4 control (S-1).

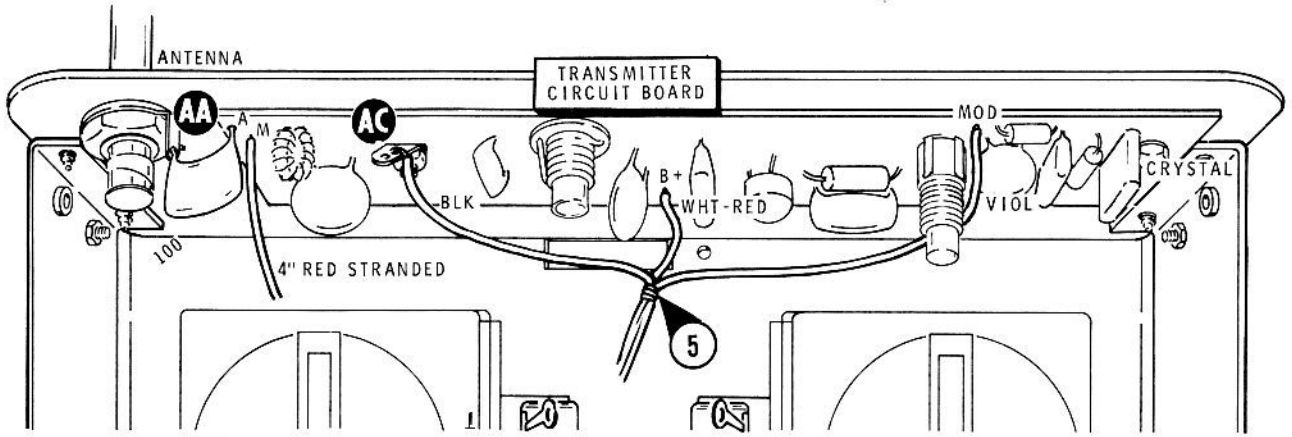
() Connect the white-green wire from BO#4 to lug 2 of the channel 4 control (S-1).

() Prepare a 2-1/2" length of red stranded wire.

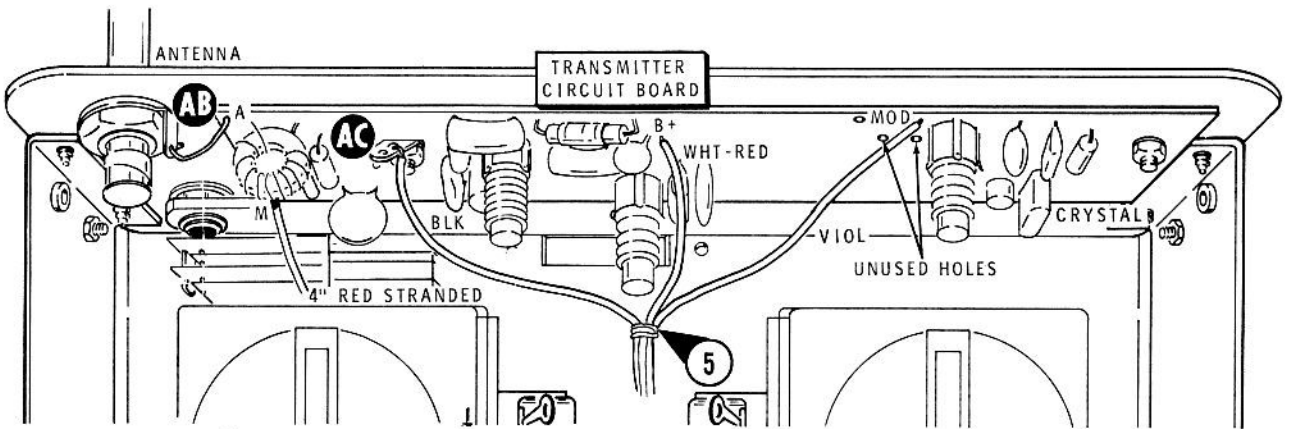
() Connect this wire from lug 1 of the channel 4 control (S-1) to lug 1 of the channel 1 control (S-3).

() Position the harness wires around the control housing levers as shown in the Pictorial.

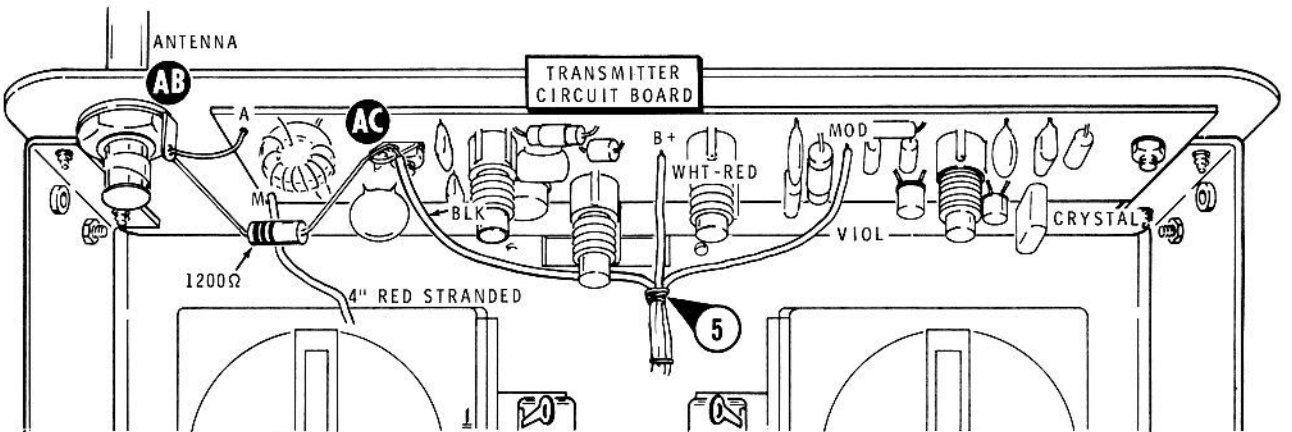




(A) WIRING FOR 27MHz TRANSMITTER CIRCUIT BOARD



(B) WIRING FOR 53MHz TRANSMITTER CIRCUIT BOARD



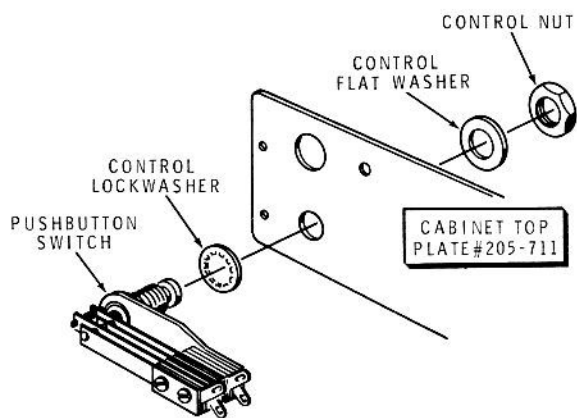
(C) WIRING FOR 72MHz TRANSMITTER CIRCUIT BOARD

PICTORIAL 1-11

NOTE: The following steps are for 53 MHz band transmitters only. For 27 MHz and 72 MHz band transmitters, proceed to ALL BANDS on Page 28.

Refer to Pictorial 1-10 for the following steps.

Refer to Detail 1-10A and remove the control nut and control flat washer from the pushbutton switch assembly. Using a control lockwasher and the hardware just removed, mount the pushbutton switch assembly on the cabinet top plate as shown.



Detail 1-10A

() Prepare the following lengths of stranded wire:

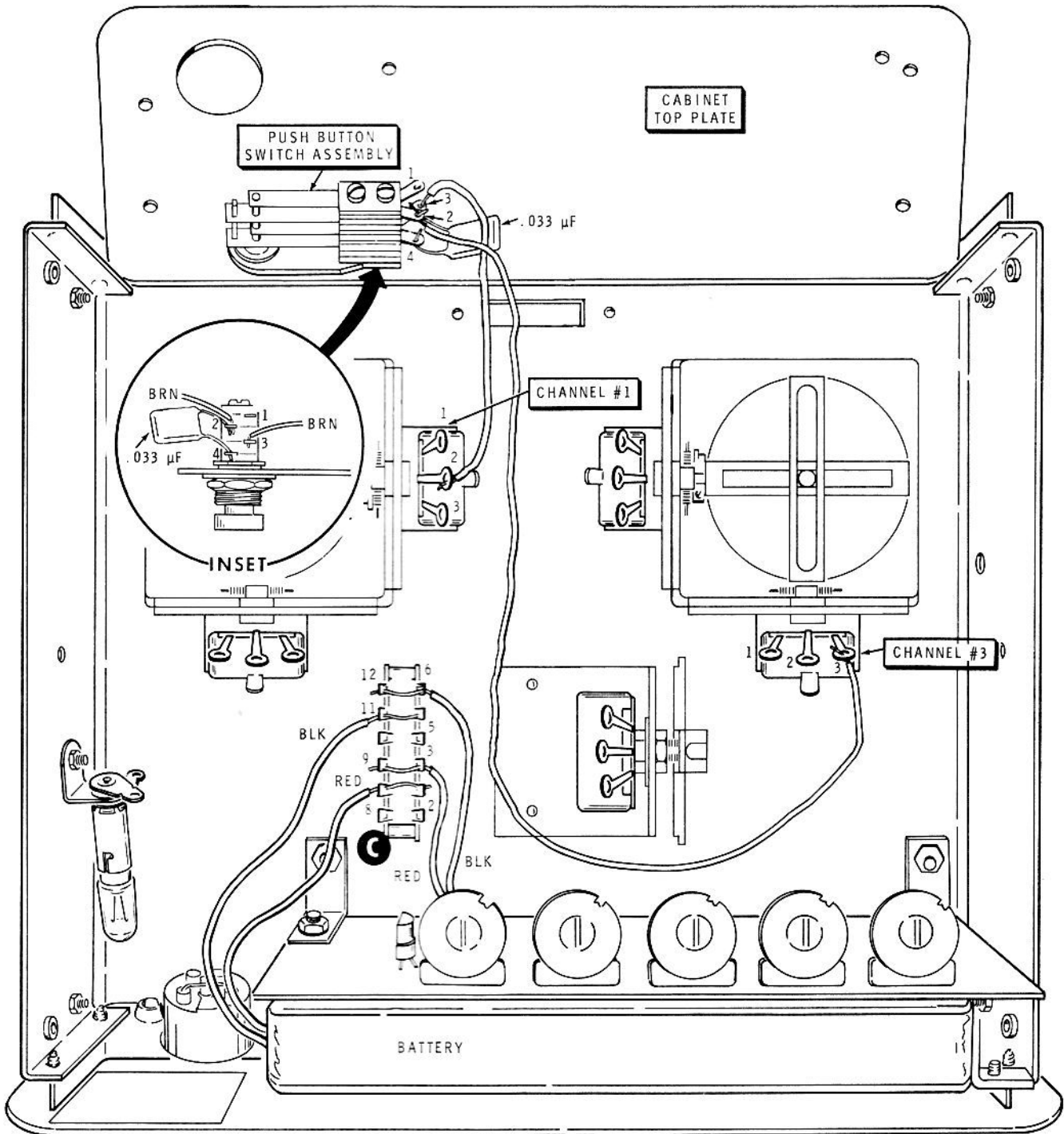
LENGTH	COLOR
3"	brown
9"	brown

- () Connect one end of the 3" brown stranded wire to lug 3 of the pushbutton switch (S-1). See the inset drawing in Pictorial 1-10.
- () Connect the other end of this wire to lug 2 of the channel 1 control (S-2).
- () Connect a .033 μ F Mylar capacitor from lug 2 (NS) to lug 4 (S-1) of the pushbutton switch (S-2). See the inset drawing in Pictorial 1-10.
- () Connect one end of the 9" brown stranded wire to lug 2 of the pushbutton switch (S-2). See the inset drawing in Pictorial 1-10.
- () Connect the other end of this wire to lug 3 of the channel 3 control (S-2).

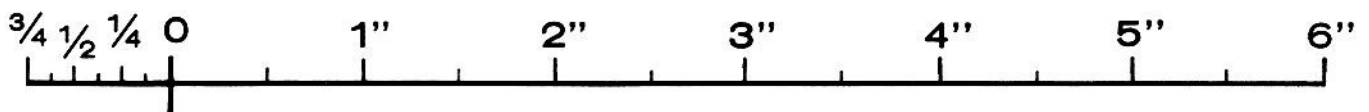
CAUTION: In the following steps, do NOT let the bare battery lead ends touch each other.

- () Make sure switch C, the ON-OFF switch, is in the OFF position.
- () Remove 1/4" of insulation from the black battery lead. Then connect this lead through lug 11 (S-2) to lug 5 (S-1) of switch C.
- () Remove 1/4" of insulation from the red battery lead. Then connect this lead through lug 8 (S-2) to lug 2 (S-1) of switch C.

NOTE: For the following steps, you will be referred to details that do not show the pushbutton switch assembly. Do not be alarmed by this and perform each step as instructed.



PICTORIAL 1-10



ALL BANDS

NOTE: Since there are three transmitting bands for this kit and each band's transmitter is different, your transmitter circuit board may or may not look like the one in Detail 1-11B. Nevertheless, even though the board may look different, it will be mounted with the crystal (X-tal) on the right-hand end of the circuit board.

Refer to Pictorial 1-11 (fold-out from Page 26) for the following steps. For 27 MHz band Transmitters refer to part A, for 53 MHz band Transmitters refer to part B, and for 72 MHz band Transmitters refer to part C.

CAUTION: The transmitter circuit board assembly has been prealigned at the factory; therefore, do not change the setting of any coil or slug.

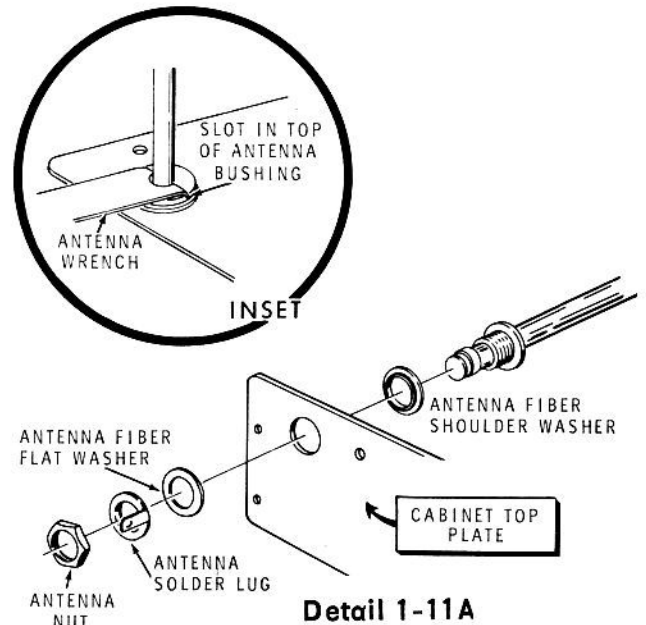
- () Position the transmitter circuit board above the control stick assemblies.

Connect the wires from BO#5 of the wiring harness to the transmitter circuit board as follows.

- () Violet to the hole marked MOD (S-1).
- () White-red to the hole marked B+ (S-1).
- () Prepare a 4" length of red stranded wire.

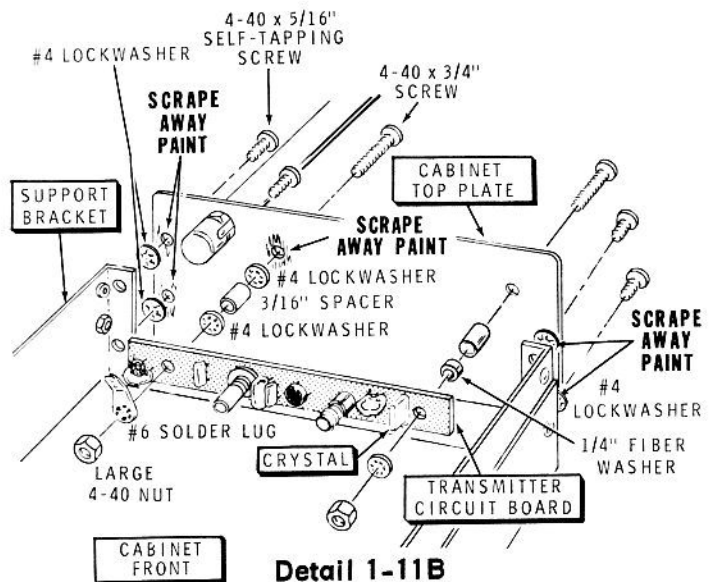
- () Connect one end of this wire into the hole marked M on the transmitter RF circuit board. The other end will be connected later.

- () Refer to Detail 1-11A and mount the antenna on the cabinet top plate. Use the nut and solder lug furnished with the antenna, the antenna fiber flat washer, and the antenna fiber shoulder washer. Position the lug as shown in Pictorial 1-11, parts A, B, and C. Use the small end of the antenna wrench as shown in the inset drawing. Hold the antenna nut with a pair of pliers to keep it from turning.



Refer to Detail 1-11B for the following steps.

- () On the inside of the cabinet top plate scrape away all paint around the five holes indicated. These bare spots, which should be about the size of a #4 lockwasher, are critical because they will be the "ground contact" points, without which the transmitter circuit board will not function.
- () Mount the cabinet top plate into place with four #4 lockwashers and 4-40 x 5/16" self-tapping screws. Be sure to position the lockwashers between the cabinet top plate and the support brackets.





- () Mount the transmitter circuit board on the cabinet top plate with two 4-40 x 3/4" screws, three #4 lockwashers, two 3/16" spacers, one 1/4" fiber washer, and two 4-40 nuts, with a #6 solder lug at AC. Position the solder lug as shown.

RF WIRING

Complete only the following steps that refer to the transmitter RF circuit board you have purchased.

For 27 MHz Band RF Circuit Boards

Refer to part A of Pictorial 1-11 for the following steps.

- () Cut one lead of a 100 pF mica capacitor to 1/4". Connect this lead to hole A in the transmitter circuit board (S-1).
- () Connect the other capacitor lead to antenna lug AA (S-1), and remove the excess lead. Position the capacitor leads so they do not touch the cabinet or any other leads on the circuit board.

Proceed to Final Wiring.

For 53 MHz Band RF Circuit Boards

Refer to part B of Pictorial 1-11 for the following steps.

NOTE: Use a discarded length of resistor lead or a piece of solid wire with its insulation removed for the jumper wire in the next step.

- () Connect a 3/4" jumper wire from antenna lug AB (S-1) to hole A on the transmitter circuit board (S-1). Position the wire so it does not touch the cabinet or any other leads on the circuit board.

Proceed to Final Wiring.

For 72 MHz Band RF Circuit Boards

Refer to part C of Pictorial 1-11 for the following steps.

- () Cut one lead of the 1200 Ω resistor (brown-red-red) to a length of 3/4". Connect this lead to solder lug AC (NS). Use the hole that is nearest the circuit board.
- () Insert the other lead of the 1200 Ω resistor through antenna lug AB (S-2) to hole A (S-1) on the transmitter circuit board and cut off any excess resistor lead. Position the resistor as shown, making sure that the resistor leads do not touch the donut-shaped coil.

FINAL WIRING

- () Refer to Pictorial 1-11 and connect the black wire from BO#5 to solder lug AC (S-1 for 27 MHz band; S-1 for 53 MHz band; S-2 for 72 MHz band). NOTE: Use the hole in the solder lug that is nearest the circuit board. Do not allow solder to run into the other hole of the solder lug, as a connection will be made here later.

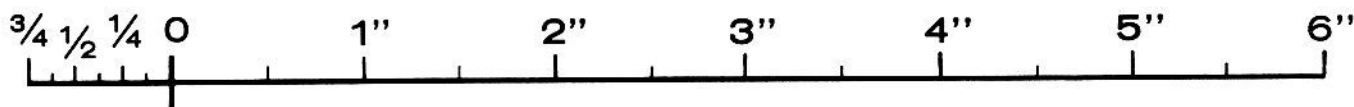
This completes the wiring of the Transmitter, except for the meter which will be connected to the Transmitter later. Check to see that all connections are soldered and shake out any wire clippings or solder splashes. The free end of the red wire coming from the transmitter circuit board will be connected later.

- () Set the Transmitter aside temporarily.

Prepare the meter as follows:

- () Prepare the following lengths of stranded wire:

<u>LENGTH</u>	<u>COLOR</u>
7"	black
7"	red



Refer to Pictorial 1-12 for the following steps.

- () Remove the shorting wire or strap from between the meter lugs.
- () Connect one end of the 7" black stranded wire to the negative (-) lug of the meter (S-1). Solder the wire flat on the lug. Do not use the hole in the lug of the meter.
- () Connect the other end of this wire to an alligator clip. Bend the tabs over the wire and solder (S-1).
- () Connect one end of the 7" red stranded wire to the positive (+) lug of the meter (S-1). Solder the wire flat on the lug.
- () Connect the other end of this wire to an alligator clip. Bend the tabs over the wire and solder the connection (S-1).
- () Set the meter aside temporarily.

CHARGING CABLE ASSEMBLY

Refer to Detail 1-13A for the following steps.

- () Locate the line cord and cut off the bare wires at the exposed end.
- () Locate the 4-pin plug with cap. Remove the cap from the plug if this is not already done. If a metal bushing is supplied with your cap and plug, it may be discarded.

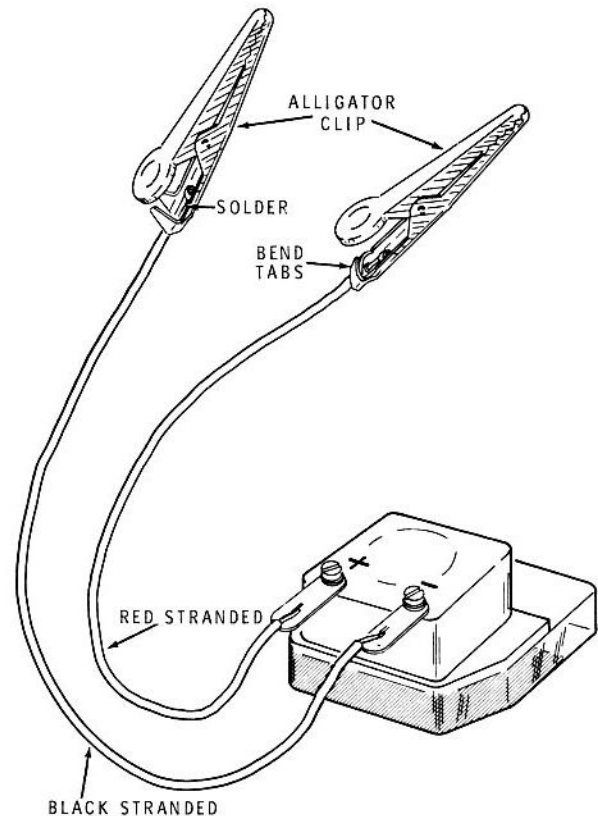
NOTE: The line cord has a silver wire (with ribbed insulation) and a copper wire (with smooth insulation). The proper positioning of the line cord will be important in the following steps.

Refer to Detail 1-13A for the following steps.

- () Position the line cord 2-prong plug to your left-hand side as shown.
- () With the ribbed insulation UP, fold the line cord five feet from the 2-prong plug. Then push the folded end through the hole in the small end of the 4-pin plug cap for a length of several inches.

Refer to Pictorial 1-13 (fold-out from Page 31) for the following steps.

- () Cut the line cord at the fold.
- () Split these two cord ends 1" and remove 1/4" of insulation from each of the four wires.



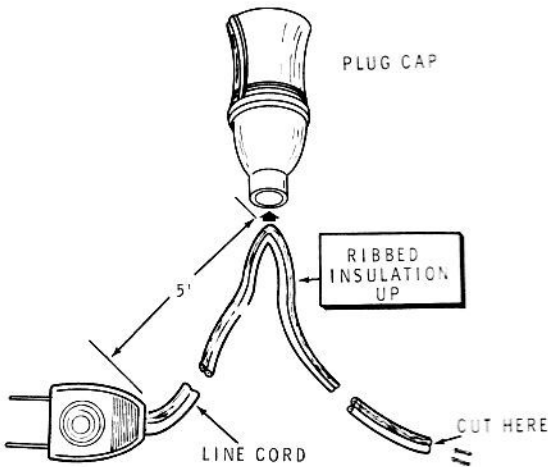
PICTORIAL 1-12

- () Place a 1/2" length of small black sleeving over each of the four wire ends.

CAUTION: Be sure to push the sleeving as far back as possible on the leads before soldering.

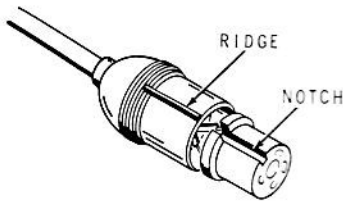
NOTE: In the following steps, you will be instructed to connect the silver (ribbed) and copper (smooth) wires of one line cord and then the silver (ribbed) and copper (smooth) wires of the other line cord to the 4-pin plug. Twist the small wire strands together at the end of each lead before inserting the leads into the connector pins.

- () Connect the silver (ribbed) wire of the longer line cord to pin 1 (S-1).
- () Connect the copper (smooth) wire of the longer line cord to pin 2 (S-1).
- () Connect the copper (smooth) wire of the shorter line cord to pin 3 (S-1).
- () Connect the silver (ribbed) wire of the shorter line cord to pin 4 (S-1).



Detail 1-13A

- () Push the sleeving over each of the four connections.
- () Hold each section of sleeving near a hot 100 watt light bulb so the sleeving will shrink around the connection. NOTE: A match may be used if extreme care is taken.
- () Push the plug cap over the plug. Be sure to align the ridge of the cap with the notch in the plug. See Detail 1-13B.

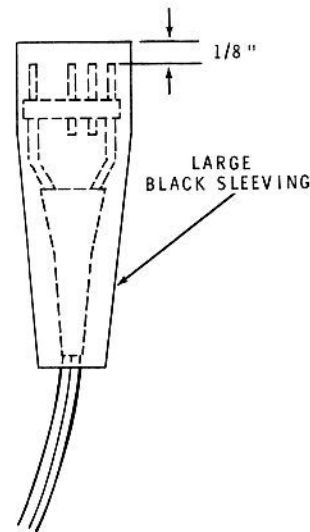


Detail 1-13B

The remaining end of the shorter line cord will now be connected.

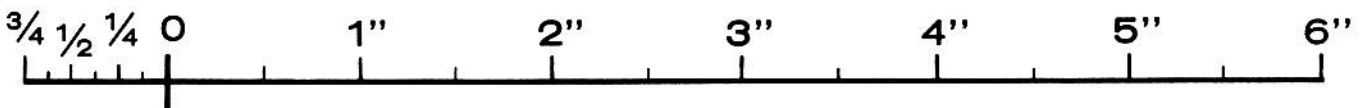
- () Slip the medium-size and large lengths of black sleeving over the unconnected line cord end. Position them several inches from the cord end.
- () Split the line cord end 1-1/4", and remove 1/4" of insulation from each of the two wires.
- () Slip a 3/4" length of small black sleeving over each wire.

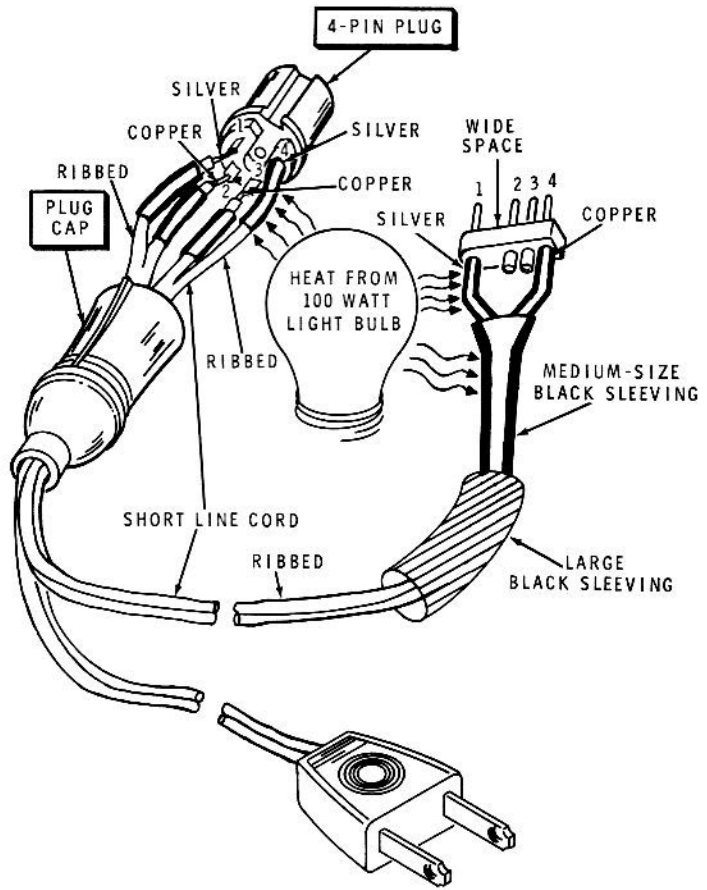
- () Position the 4-pin flat connector as shown, taking note of the larger space between pins 1 and 2.
- () Connect the silver (ribbed) wire of the line cord to pin 1 of the 4-pin flat connector (S-1).
- () Connect the copper wire to pin 4 of the connector (S-1).
- () Slide the small lengths of sleeving over each of these connections. Then hold each section of sleeving close to a hot 100 watt light bulb so the sleeving will shrink around the connection.
- () Refer to Pictorial 1-13 and slide the medium-size black sleeving over a portion of the two smaller sleeveings as shown.
- () Apply heat, as before, to the medium-size black sleeving until it shrinks around the line cord and two other sections of sleeving.
- () Refer to Detail 1-13C and slide the large black sleeving over the plug assembly until the plug pins are recessed approximately 1/8" into the large sleeving.



Detail 1-13C

Temporarily set the transmitter charging cable aside and proceed to the Receiver portion of the Manual. NOTE: You should have some components and hardware left over. They will be used later.





PICTORIAL 1-13