PORTABLE TRANSISTOR RADIO

Model ES170 Instruction Manual

Fast, easy, uncomplicated assembly — GE does the hard work for you! An actual portable transistor radio for years of enjoyment.

PART 1

BEFORE YOU BEGIN

Transistors, printed circuit boards, miniature components and modules are key items in modern electronics and in your kit. Follow this book closely, and you will discover how these components operate, and how radio receivers work. You will learn construction techniques — and have fun besides.

Construction should take approximately one hour. Before you begin, leaf through the entire manual to familiarize yourself with what you will be doing.

PART 2

UNPACKING AND COMPONENT IDENTIFICATION

Check the parts in your kit against *Figure No. 1* before proceeding. In addition, you will need the following items to complete your radio:

A. Glue — very small amount necessary Use "Elmer's" or a similar household glue.
B. Soldering iron — Small pencil iron with chisel tip preferable. Do not use a soldering gun.
C. Solder — About 2 feet of rosin core solder.
D. Screwdriver — Flat blade type.
E. Pliers or 5/16 wrench.
F. Diagonal cutters or fingernail clippers.
G. Battery — Eveready No. 266, 9 Volt or equivalent.

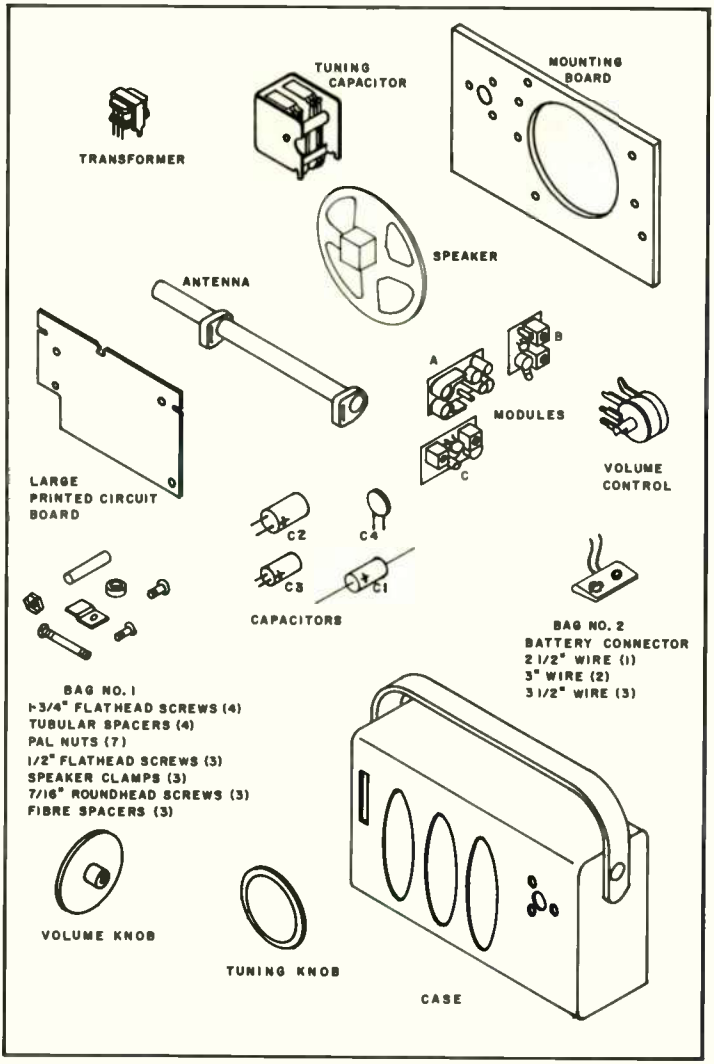


FIG. NO. 1

PART 3

ASSEMBLY

Mark (x) when step is completed

( ) 1. Select: 1—mounting board
4—1¾" long flat head screws
4—tubular spacers
4—pal nuts

( ) 2. Add glue under the head of each screw and push the screw through counter-sunk holes from rough side of mounting board. Slip a tubular spacer over each screw and tighten in place with a pal nut. This will hold screws in position until the glue dries. *See Fig. No. 2.*

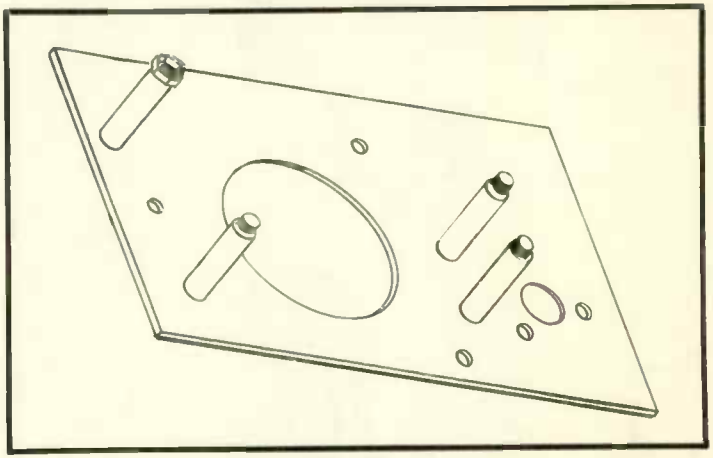


FIG. NO. 2

( ) 3. Select: 3—½" long flat head screws
3—clamps
3—pal nuts
1—speaker (handle speaker carefully)

( ) 4. Add glue under head of each screw and push through counter-sunk holes from rough side of mounting board.

Place speaker in its position, add the 3 clamps and tighten in place with pal nuts. *See Fig. No. 3*

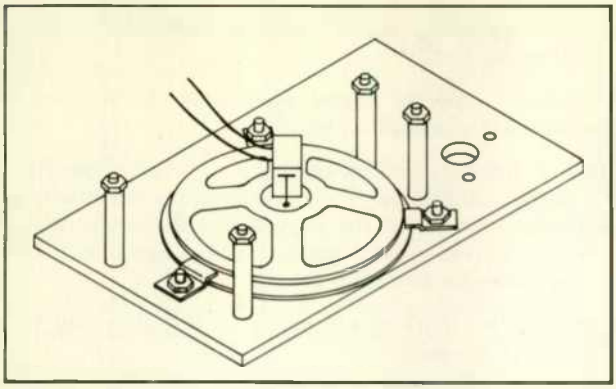


FIG. NO. 3

( ) 5. Select: 1—tuning capacitor
3—7/16" long round head screws
3—fibre spacers

( ) 6. Push screws through holes from rough side of mounting board. Place fibre spacers over screws. Mount tuning capacitor over fibre spacers and tighten screws. Rotate shaft to close plates to avoid damage. *See Fig. No. 4.* The mounting board assembly is now complete.

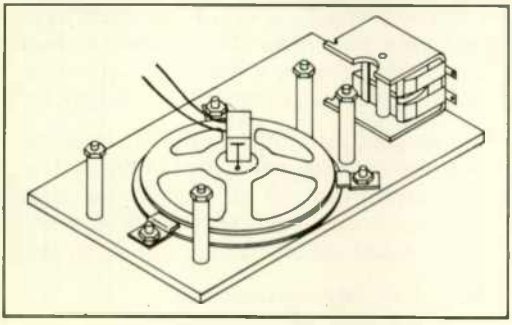


FIG. NO. 4

HOW TO SOLDER

The first step in soldering is to "tin" the hot iron. Unfold a few inches of solder. Touch the pointed end of the iron to the end of the solder briefly.

The iron is properly tinned when only the pointed end is covered with a thin coat of solder.

A major trouble spot in electronic devices is poorly made (cold) solder connections. "Cold" solder joints are usually caused by insufficient heating of the joint before the solder is applied. Be sure solder flows around wires at all connections. Follow the steps listed below for best results:

a. Position the work, if possible, so that gravity will keep the solder on the joint.

b. Place a flat side of the soldering iron tip against the joint to be soldered until it is heated sufficiently to melt the solder.

c. Then place the solder against the heated terminal, not the iron, and it will immediately flow over the joint. Use only enough solder to thoroughly wet the junction or cover a hole in the printed board.

d. Remove the solder and then the iron from the junction. Do not move the leads until the solder has solidified. If you do, and the solder cracks or crumbles, reheat the junction. A cold solder joint usually looks grainy or crystalline, or the solder will stand up in a blob. Such joints should be reheated until the solder flows smoothly over the entire junction. In some cases, it may be necessary to add a little more solder to achieve a smooth, bright appearance.

Now, examine both sides of the printed circuit board. Notice that one side is printed with component outlines. The component leads will be mounted through the holes in the board from this side. Turn the board over and examine the copper pattern. On this side you will solder the leads that protrude through the holes.

( ) 7. Select: 1—large circuit board
3—modules (A, B & C)

4—capacitors (C1, C2, C3, C4)
1—volume control
1—antenna
1—battery connector
6—wires (1-2½", 2-3", 3-3½")
1—transformer

( ) 8. Insert the 3 modules in the large circuit board as shown in *Fig. No. 5* and solder the leads to the copper pattern.

( ) 9. Insert the volume control as shown in *Fig. No. 5* and solder. (Make sure that volume control is seated firmly and square).

( ) 10. Insert the transformer as shown in *Fig. No. 5* and solder. (Make sure that the dot on the transformer is in the same position as indicated on the circuit board).

( ) 11. Insert capacitor C1 as shown in *Fig. No. 5* and solder. (Make sure that the lead marked (+) on the capacitor is in the hole marked (+) on the circuit board.

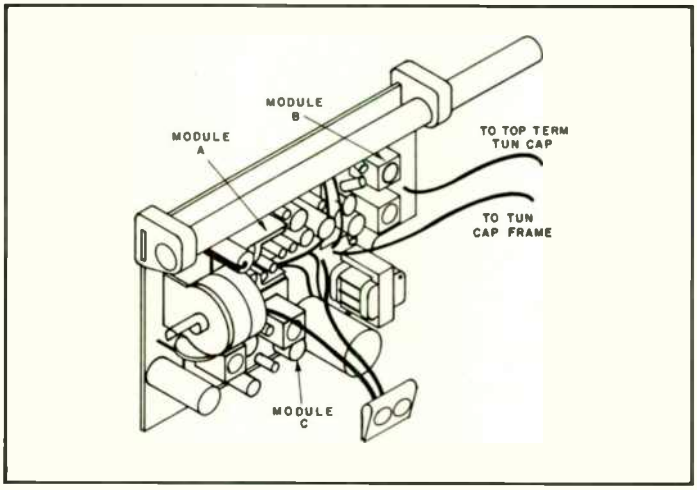


FIG. NO. 5

( ) 12. Insert capacitor C4 as shown in *Fig. No. 5* and solder.

( ) 13. Insert capacitor C2 as shown in *Fig. No. 5* and solder. (Make sure that the lead marked plus (+) on the capacitor is in the hole marked (+) on the circuit board).

( ) 14. Insert capacitor C3 as shown in *Fig. No. 5* and solder. (Make sure that the lead marked plus (+) on the capacitor is in the hole marked (+) on the circuit board).

( ) 15. Insert battery connector *red* lead in hole marked (Bat Red) and solder.

( ) 16. Insert battery connector *black* lead in hole marked (Bat Blk) and solder.

( ) 17. Select a 2½" wire. Insert the leads in the 2 holes marked (J1) and solder.

( ) 18. Select a 3" wire. Insert the leads in the 2 holes marked (J2) and solder.

( ) 19. Select a 3½" wire. Insert the leads in the 2 holes marked (J3) and solder.

( ) 20. Select a 3" wire. Insert the leads in the 2 holes marked (J4) and solder.

( ) 21. Mount the antenna to the circuit board as shown in *Fig. No. 5.*

( ) 22. Use caution when handling the fine antenna wires. Solder the double wire in the hole marked (Ant. (2)).

( ) 23. Solder the single wire (from the center of the antenna) in the hole marked (Ant.).

( ) 24. Solder the 2 wires from the speaker in the 2 holes marked (Spkr.) as shown in *Fig. No. 6.*

( ) 25. Select a 3½" wire. Solder one end to the corner of the tuning capacitor frame and solder the other end in the hole marked (Gang) as shown in *Fig. No. 6.*

( ) 26. Select a 3½" wire. Solder one end to the *top terminal* on the side of the tuning capacitor (furtherest from the mounting board) and solder the other end in the hole marked (Osc.) as shown in *Fig. No. 6.*

( ) 27. Remove the 4 nuts from the long screws and mount the circuit board over the screws. Rotate speaker if necessary to allow circuit board to position itself. Replace the nuts and tighten. *See Fig. No. 7*

( ) 28. Solder the wire from the end of the antenna to the *bottom terminal* of the tuning capacitor. *See Fig. No. 7.*

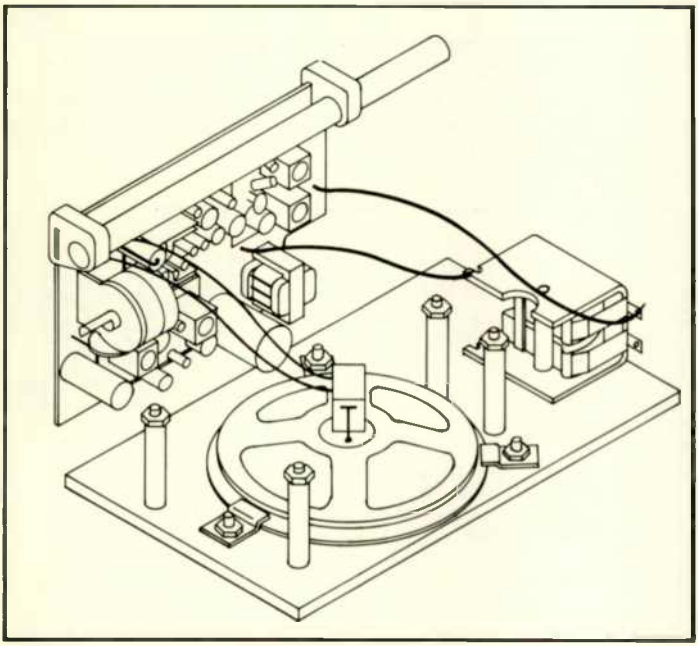


FIG. NO. 6

( ) 29. The circuit board assembly is now completed. Check all soldered connections to see that you do not have any "cold" solder joints.

(Recheck instruction under "How to Solder.")

( ) 30. Trim off excess length of soldered wire ends from circuit board using diagonal cutters or finger nail clippers.

( ) 31. Select: Volume knob (plain knob)
Tuning knob (marked with broadcast frequencies)

( ) 32. Carefully push volume knob on volume control shaft and tuning knob on tuning capacitor shaft.

( ) 33. At this point, let's check your radio to be sure it is hooked up properly and operating. Plug your battery into the battery connector from your radio. Turn on the volume knob and rotate the tuning knob. You should hear stations. If your radio does not work, consult the troubleshooting hints on page 14 before proceeding to step 34.

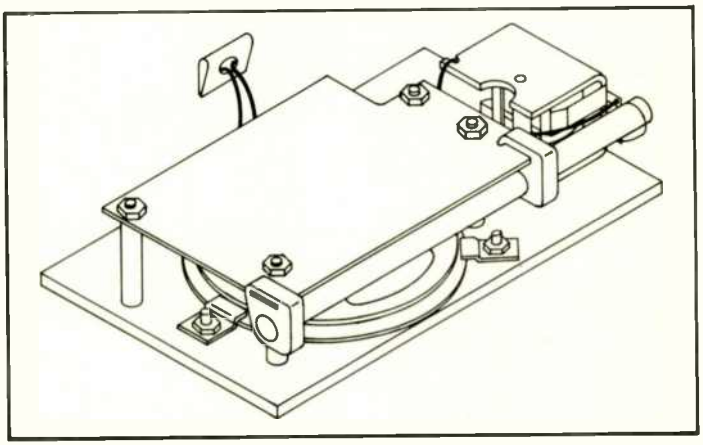


FIG. NO. 7

( ) 34. Remove the tuning knob and apply a generous amount of glue (such as Elmer's glue) to rough side of masonite mounting board and place in cabinet. Make sure that volume knob lines up with slot in cabinet and tuning capacitor shaft lines up with holes in cabinet. *See Fig. No. 8.* Allow glue to dry thoroughly, then push tuning knob on tuning capacitor shaft.

( ) 35. Connect battery leads to battery and insert battery into cabinet. Radio is now ready for alignment.

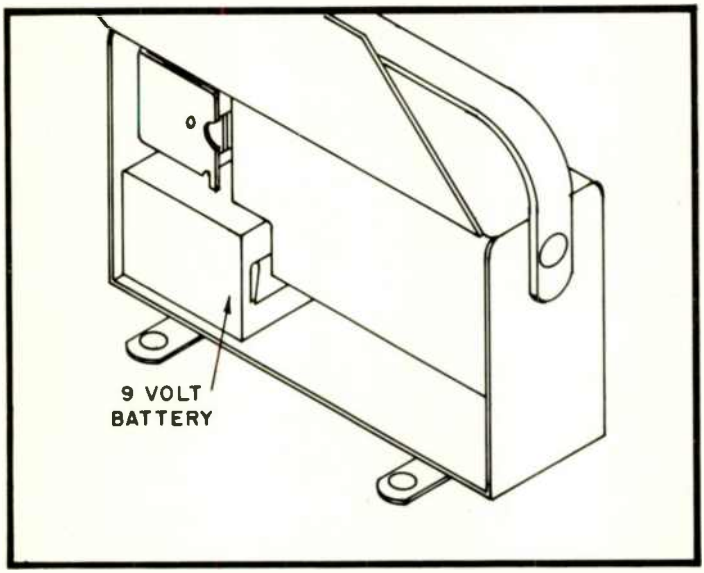


FIG. NO. 8

PART 4

ALIGNMENT

( ) 36. Turn on the radio and turn the volume control about one-quarter of the way. Set the tuning control to the place where you would normally find the strongest station in your area.

( ) 37. After referring to *Fig. No. 9*, bend handle toward back of cabinet, then carefully screw the oscillator trimmer until the station is best received. (If you find two places where the station is received, select the one where the screw is farthest out).

CAUTION: Trimmer screws will fall out if screwed out too far!

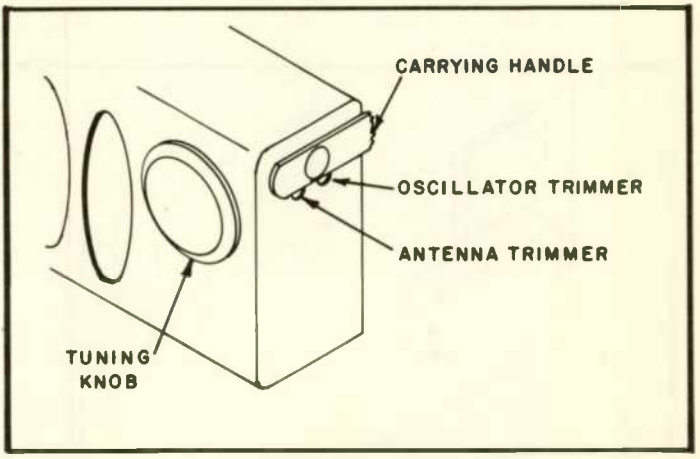


FIG. NO. 9

( ) 38. Adjust the antenna trimmer for loudest reception.

( ) 39. For best alignment, now tune a station close to 8 on the tuning dial. Readjust the antenna trimmer for best reception.

( ) 40. Glue label inside back cover flap.

PART 5

TROUBLE SHOOTING HINTS

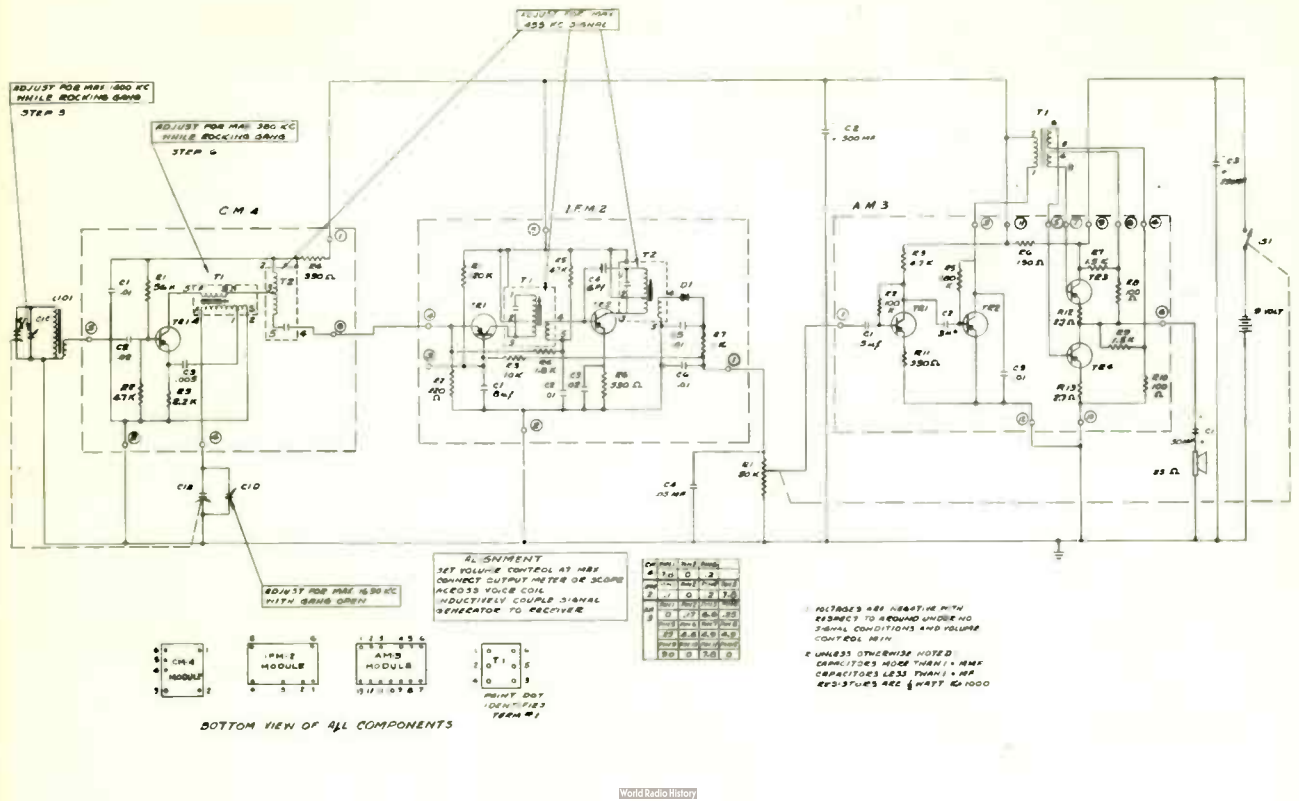
1. Battery should be fresh.
2. Make sure proper components are in proper locations.
3. Check all wiring and solder joints. Points of special concern should be:
   a. Battery connection and correct polarity.
   b. Module connections.
   c. Tuning capacitor connections.
   d. Volume control connections and power switch.
4. Check for shorts caused by solder between copper strips on the printed circuit board or bare wires touching each other.
5. If no signal or noise can be heard, check the antenna connections.
6. Repeat alignment procedure.

WARRANTY

General Electric Company warrants to the purchaser of this new General Electric Radio that if any part thereof proves to be defective in material or workmanship within 90 days from the date of original purchase for use, such defective part will be repaired or replaced free of charge. The Company has no other obligation or liability in connection with said Radio.

This warranty is void if said Radio has been subject to misuse or abuse.

This warranty applies only to products purchased for use within, and retained within, the continental limits of the United States, Alaska and Hawaii. The Company makes no warranty, expressed or implied, to purchasers located elsewhere.



Inquiries about General Electric Radio service may be addressed to: Education Recreation Products Section, General Electric Company, 1001 Broad Street, Utica, New York.

SPECIAL FACTORY SERVICE

Should your *Radio* require service, return it, carefully packed and insured to: *General Electric Co., Radio Receiver Department, Consumer Service Lab, 1001 Broad Street, Utica, New York.*

If returned during the 90-day warranty period, your Radio will be repaired without charge for labor, material and return transportation under terms of the warranty. If the warranty period has expired, enclose a check or money order in the amount of $6.00.*

Be sure to fill in the information requested on the coupon below. The coupon should be returned along with the *Radio.*

*Damaged or abused *Radio* excluded from flat-rate charge. Flat-rate subject to change without notice.

Detach and return with your Radio

PLEASE PRINT

What difficulties have you experienced with your ES 170 *Radio?*

.....

Date Radio Kit was purchased .....

(or received as a gift)

Owner's legal signature .....

Name .....

Street .....City and State .....

☐ I am enclosing a check or money order payable to the General Electric Company for $6 to cover the cost of out-of-warranty service.

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Radio Receiver Dept.
1001 Broad St.
Utica, N.Y.

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