

Instructions

for the



ACCESSORY BAND PACK

Model HWA-9

INTRODUCTION

The Heathkit Model HWA-9 Accessory Band Pack will expand the transmission and reception capabilities of your Model HW-9 Transceiver from four to eight amateur bands. Thus, your Transceiver has 250 kHz CW coverage on all of the amateur bands from 80 through 10 meters. The following instructions will include only the information necessary to install these added parts on your circuit boards. Complete information on alignment, operation, a circuit description, and the schematic diagram are provided in your HW-9 Transceiver manual.

PARTS LIST

Unpack your kit and check each part against the following list. Do not remove components that are supplied on a tape from the tape until you use them in a step. Return any part that is packed in an individual envelope, with the part number on it, back to the envelope after you identify it until that part is called for in a step. Do not throw away any packing material until all of the parts are accounted for.

To order a replacement part, always include the PART NUMBER. Refer to "Replacement Parts" inside the rear cover of this Manual. For prices, refer to the separate "Heath Parts Price List."

TAPED COMPONENTS

NOTE: These parts are taped on a strip which was checked before shipment. Since these parts are taped in the order of assembly, you may not wish to check these parts against the following list.

HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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RESISTORS

NOTE: The following resistors are rated at 1/4-watt and have a tolerance of 5% (gold fourth color band).

6-222-12	4	2200 Ω (red-red-red)	R111, R115, R119, R121
6-103-12	3	10 kΩ (brn-blk-org)	R116, R120, R122
6-123-12	1	12 kΩ (brn-red-org)	R112

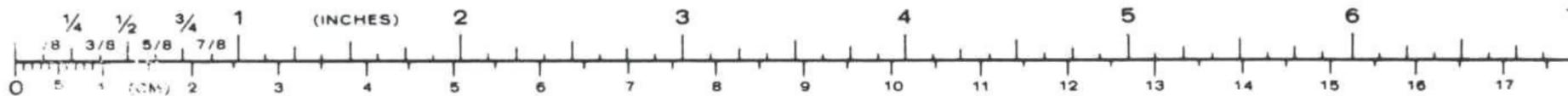
CAPACITORS

21-761	12	.01 μF (103) glass ceramic	C116, C125, C134, C138, C142, C144, C146, C147, C155, C159, C164, C166
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HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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DIODES

56-646	16	BA-244	D105, D106, D109, D111, D114, D115, D116, D117, D125, D126, D129, D131, D134, D135, D136, D137
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NON-TAPED PARTS

The following parts are not taped on strips. The key numbers correspond to the numbers on the "Parts Pictorial."

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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CAPACITORS

Mica

A1	20-78	2	56 pF	C136, C137
A1	20-76	2	68 pF	C132, C133
A1	20-119	2	90 pF	C565, C567
A1	20-104	2	130 pF	C123, C124
A1	20-105	2	180 pF	C114, C115
A1	20-714	1	185 pF	C566
A1	20-114	2	270 pF	C555, C557
A1	20-133	1	430 pF	C556

Ceramic

B1	21-149	2	2.7 pF	C131, C135
B2	21-701	1	Small 3.3 pF	C422
B1	21-33	1	Large 3.3 pF	C122
B1	21-169	1	6 pF	C113
B1	21-703	2	6.8 pF	C412, C418
B1	21-181	1	7.7 pF	C165
B1	21-115	1	9 pF	C405
B1	21-111	1	15 pF	C163
B2	21-709	1	36 pF	C158
B3	21-738	2	68 pF (680)	C420, C423
B1	21-148	1	75 pF	C154
B3	21-715	2	150 pF (151)	C413, C414
B3	21-746	4	180 pF (181)	C406, C407, C419, C421

INDUCTORS

C1	40-1785	6	.14 μ H coil (violet)	L109, L111, L114, L115, L116, L117
C2	40-2076	6	.3 μ H coil	L126, L128, L131, L132, L409, L411
C3	40-2078	2	.35 μ H coil	L416, L417
C4	40-1865	2	.44 μ H toroid coil	L443, L444
C2	40-2075	2	.44 μ H coil	L105, L106
C2	40-2074	2	.57 μ H coil	L414, L415
C5	40-2114	2	1.34 μ H toroid coil	L436, L437
C2	40-2071	2	1.5 μ H coil	L405, L406

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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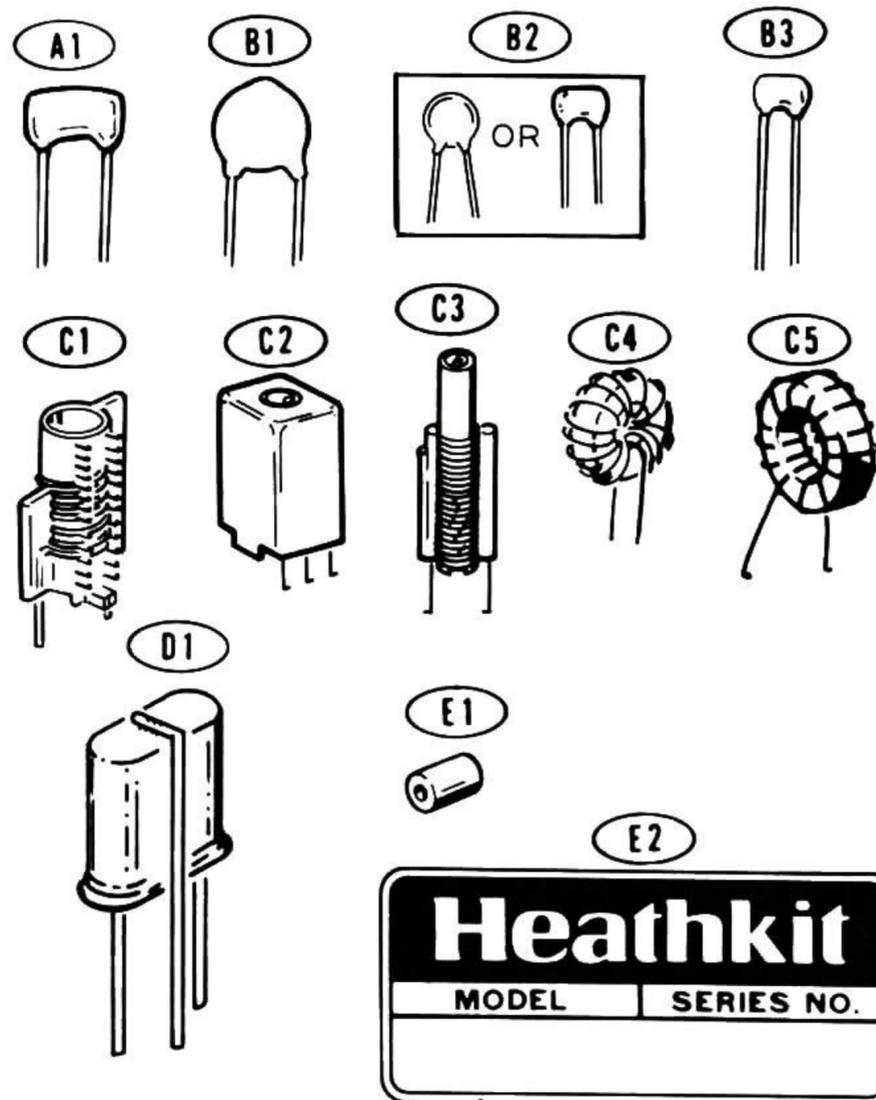
CRYSTALS

D1	404-666	1	24.830 MHz	Y103
D1	404-668	1	32.830 MHz	Y105
D1	404-670	1	39.580 MHz	Y107
D1	404-671	1	42.830 MHz	Y108

MISCELLANEOUS

	340-8	5"	Bare wire	
	344-163	9-1/2"	Black wire	
E1	475-10	4	Ferrite bead	
E2		1	Blue and white label	
		1	Taped Component Chart	
		1	Instructions (See Page 1 for part number.)	

Solder



PARTS PICTORIAL

STEP-BY-STEP ASSEMBLY

OSCILLATOR CIRCUIT BOARD

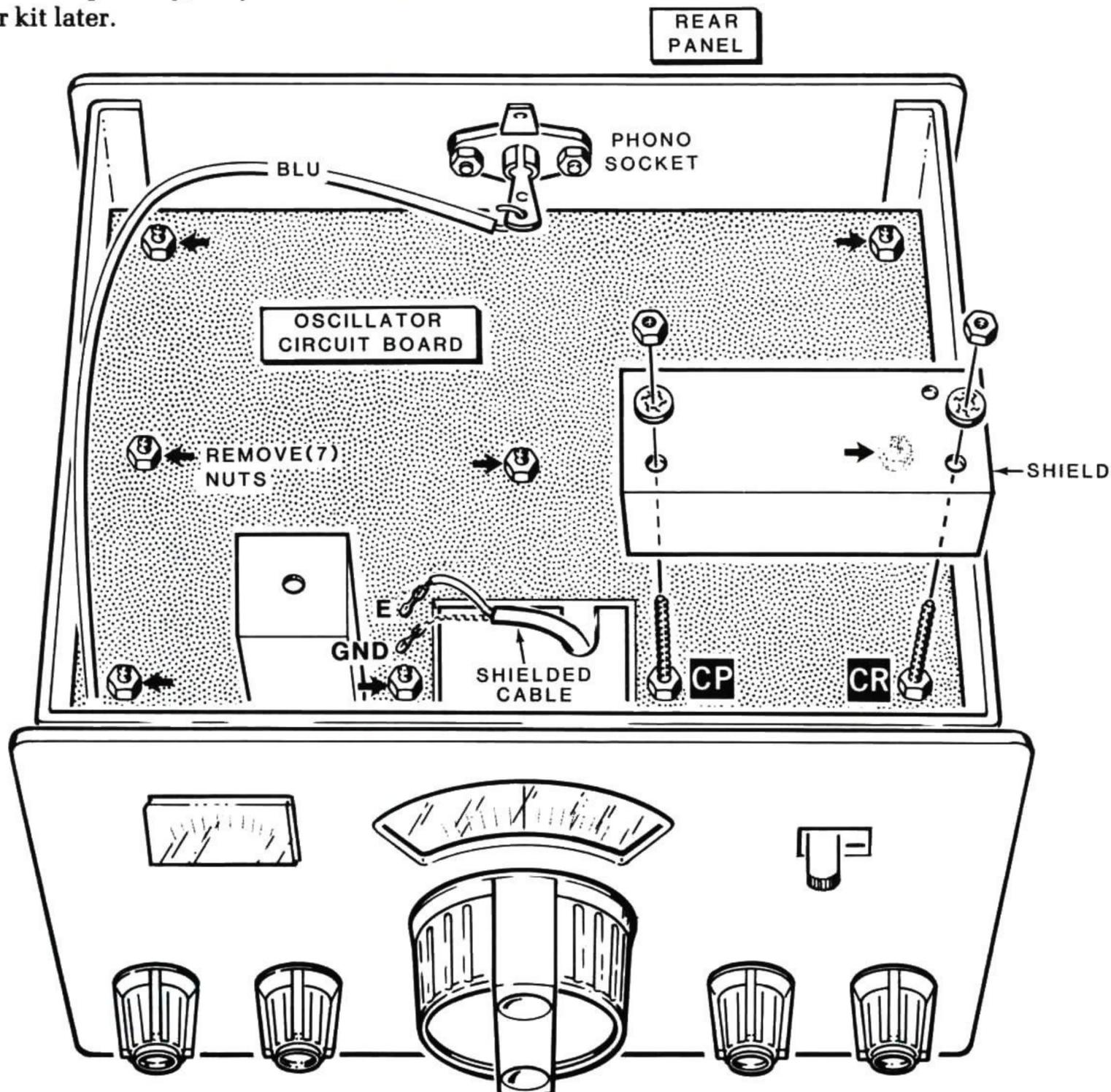
NOTE: Perform the following "Disassembly" steps only if you are modifying your previously-assembled Model HW-9 Transceiver kit; otherwise, proceed directly to "Parts Installation."

Disassembly

Refer to Pictorial 1-1 for the following steps.

NOTE: In the following steps, when you remove any components and hardware from your Transceiver, set them aside temporarily; they will be used to reassemble your kit later.

- () Remove the top and bottom halves of the Transceiver cabinet.
- () Set the Transceiver upright on your work area as shown.
- () Remove the nuts and lockwashers holding the shield at CP and CR. Lift the shield from the mounting studs and set it aside.
- () Remove and set aside the nine 6-32 nuts holding the oscillator circuit board into the chassis. Be sure to remove the two nuts from studs CP and CR.



PICTORIAL 1-1

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- () Unsolder the blue wire from the rear panel phono socket. Position the wire to one side, out of the way.
- () Unsolder the end of the shielded cable from pins E and GND on the oscillator circuit board.

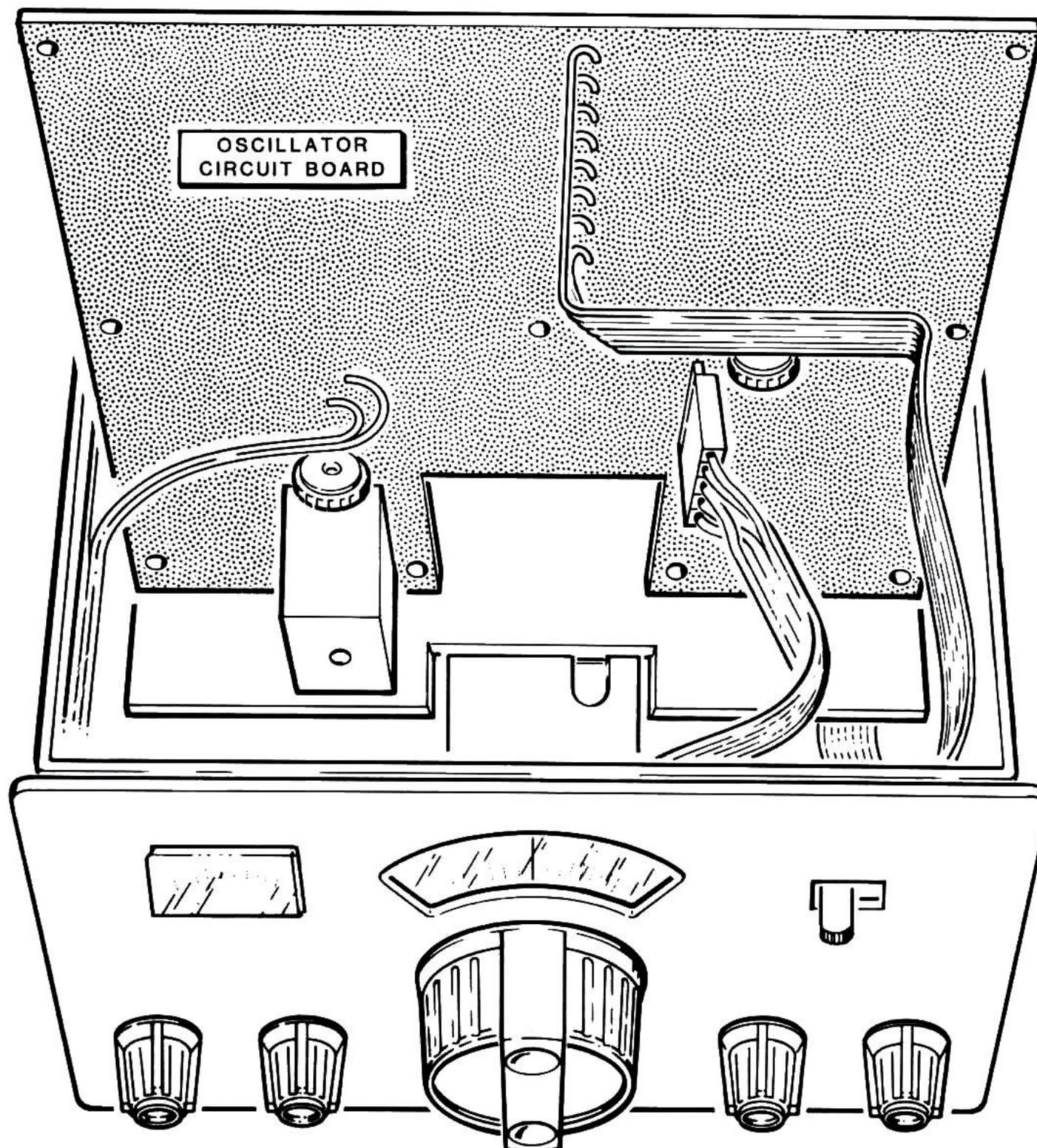
NOTE: Perform the next step carefully to avoid damage to the circuit board and wiring.

- () Lift the circuit board straight up and off the seven short mounting studs, then work the front right corner off the long studs at CP and CR.

Refer to Pictorial 1-2 for the next step.

- () Once the circuit board is free of all nine mounting studs, carefully lift the rear edge of the circuit board forward as you position the wiring down along the sides of the board. When you are done, the board should stand almost vertically on its front edge, near the center of the chassis.

This completes the disassembly of the oscillator circuit board.



PICTORIAL 1-2

Parts Installation

NOTE: In the following steps, you will be instructed to install the parts on the oscillator circuit board. Perform these steps in the same manner as you have already done on the Transceiver. Use the parts from the "Taped Component Chart" first.

Refer to Pictorial 1-3 (Illustration Booklet, Page 1) for the following steps.

Section 1

NOTE: In the following steps, be sure to position the banded end of each diode to match the banded diode end printed on the circuit board.



- D105: BA-244 diode (#56-646).
- D109: BA-244 diode (#56-646).
- D114: BA-244 diode (#56-646).
- D116: BA-244 diode (#56-646).
- C116: .01 μ F (103) glass ceramic.
- C125: .01 μ F (103) glass ceramic.
- C134: .01 μ F (103) glass ceramic.
- C138: .01 μ F (103) glass ceramic.
- Solder the leads to the foil and cut off the excess lead lengths.

Section 2

- D106: BA-244 diode (#56-646).
- C142: .01 μ F (103) glass ceramic.
- C144: .01 μ F (103) glass ceramic.
- D111: BA-244 diode (#56-646).
- C146: .01 μ F (103) glass ceramic.
- D115: BA-244 diode (#56-646).
- C147: .01 μ F (103) glass ceramic.
- D117: BA-244 diode (#56-646).
- Solder the leads to the foil and cut off the excess lead lengths.

Section 3

- R111: 2200 Ω (red-red-red) resistor.
- D125: BA-244 diode (#56-646).
- R115: 2200 Ω (red-red-red) resistor.
- D129: BA-244 diode (#56-646).
- R119: 2200 Ω (red-red-red) resistor.
- D134: BA-244 diode (#56-646).
- R121: 2200 Ω (red-red-red) resistor.
- D136: BA-244 diode (#56-646).
- C155: .01 μ F (103) glass ceramic.
- C159: .01 μ F (103) glass ceramic.
- C164: .01 μ F (103) glass ceramic.
- Solder the leads to the foil and cut off the excess lead lengths.

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Section 4

- () R112: 12 k Ω (brn-red-org) resistor.
- () R116: 10 k Ω (brn-blk-org) resistor.
- () R120: 10 k Ω (brn-blk-org) resistor.
- () C166: .01 μ F (103) glass ceramic.
- () R122: 10 k Ω (brn-blk-org) resistor.
- () D126: BA-244 diode (#56-646).
- () D131: BA-244 diode (#56-646).
- () D135: BA-244 diode (#56-646).
- () D137: BA-244 diode (#56-646).
- () Solder the leads to the foil and cut off the excess lead lengths.

NOTE: This completes the installation of the "Taped Component Chart" parts.

Refer to Pictorial 1-4 (Illustration Booklet, Page 2) for the following steps.

Section 1

- () C114: 180 pF mica.
- () C123: 130 pF mica.
- () C132: 68 pF mica.
- () C136: 56 pF mica.
- () C113: 6 pF ceramic.
- () C122: Large 3.3 pF ceramic.
- () C131: 2.7 pF ceramic.
- () C135: 2.7 pF ceramic.
- () C115: 180 pF mica.
- () C124: 130 pF mica.
- () C133: 68 pF mica.

- () C137: 56 pF mica.

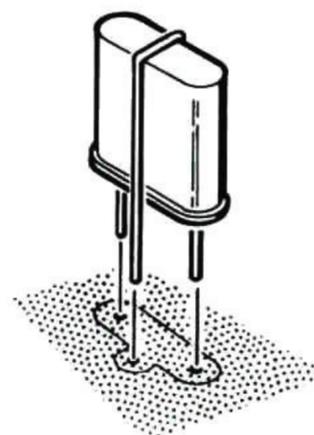
NOTE: When you are instructed to install ferrite beads, cut and use 1" lengths of bare wire (supplied with your kit).

- () Install ferrite beads at the four indicated locations (labeled FB).
- () Solder the leads to the foil and cut off the excess lead lengths.

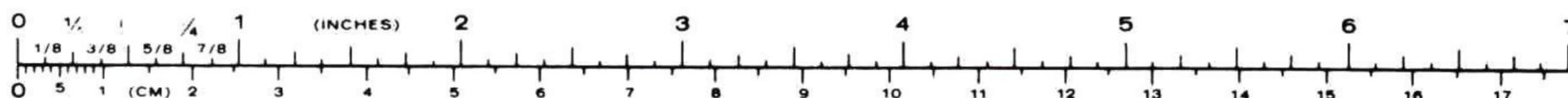
Section 2

- () C154: 75 pF ceramic.
- () C158: 36 pF ceramic.
- () C163: 15 pF ceramic.
- () C165: 7.7 pF ceramic.

NOTE: When you install the crystals in the next four steps, be sure to install all three leads of each crystal through the circuit board holes as shown. Then, holding the crystal snug against the board, bend its leads to hold it firmly in place.

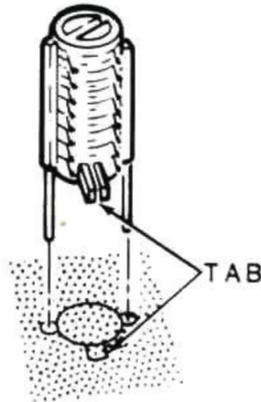


- () Y103: 24.830 MHz crystal (#404-666).
- () Y105: 32.830 MHz crystal (#404-668).
- () Y107: 39.580 MHz crystal (#404-670).
- () Y108: 42.830 MHz crystal (#404-671).
- () Solder the leads to the foil and cut off the excess lead lengths.



Refer to Pictorial 1-5 (Illustration Booklet, Page 3) for the following steps.

NOTE: In the following steps, as you install each coil, make sure it is snug against the surface of the board, solder its leads to the foil and cut off the excess lead lengths. Also make sure the tabs (on the coils that have a tab) are positioned toward the outline of the tab on the circuit board.



- L105: .44 μ H coil (#40-2075).
- L109: .14 μ H (violet) coil (#40-1785).
- L114: .14 μ H (violet) coil (#40-1785).
- L116: .14 μ H (violet) coil (#40-1785).
- L106: .44 μ H coil (#40-2075).
- L111: .14 μ H (violet) coil (#40-1785).
- L115: .14 μ H (violet) coil (#40-1785).
- L117: .14 μ H (violet) coil (#40-1785).
- L126: .3 μ H coil (#40-2076).
- L128: .3 μ H coil (#40-2076).
- L131: .3 μ H coil (#40-2076).
- L132: .3 μ H coil (#40-2076).

Circuit Board Checkout

Check the oscillator circuit board for the following conditions:

- Unsoldered connections.
- Poor solder connections.
- Solder bridges between foil patterns.
- Protruding leads which could touch together.
- Diodes for the correct positions of the banded ends.

This completes the step-by-step assembly of your oscillator circuit board. If you are presently assembling the HW-9 Transceiver, set this board aside until it is called for in your HW-9 Assembly Manual. If you are installing these parts in a previously-assembled Transceiver, proceed with the following "Reassembly" steps.

Reassembly

NOTE: You may wish to temporarily refer to disassembly Pictorial 1-1 on Page 4 as you reinstall the oscillator circuit board in the following steps.

- Carefully lower the oscillator circuit board into the chassis, making sure all the wires are routed onto and across the top of the board. Slide the back edge of the board under the rear panel phono socket; then make sure you position the right front of the board down over studs CP and CR.
- Lower the circuit board down over all seven short studs (as well as long studs CP and CR). Then secure all nine studs with the 6-32 nuts you previously removed.
- Position the shield down onto studs CP and CR and secure the shield with two #6 lockwashers and two 6-32 nuts previously removed. NOTE: Do not overtighten these two nuts and damage the shield.
- Solder the inner lead at the free end of the shielded cable coming from the VFO assembly to PCB pin E on the oscillator circuit board.
- Similarly, solder the shield wires of the shielded cable to wire socket GND.

NOTE: The blue wire will be connected later.

Proceed to "T/R Circuit Board."

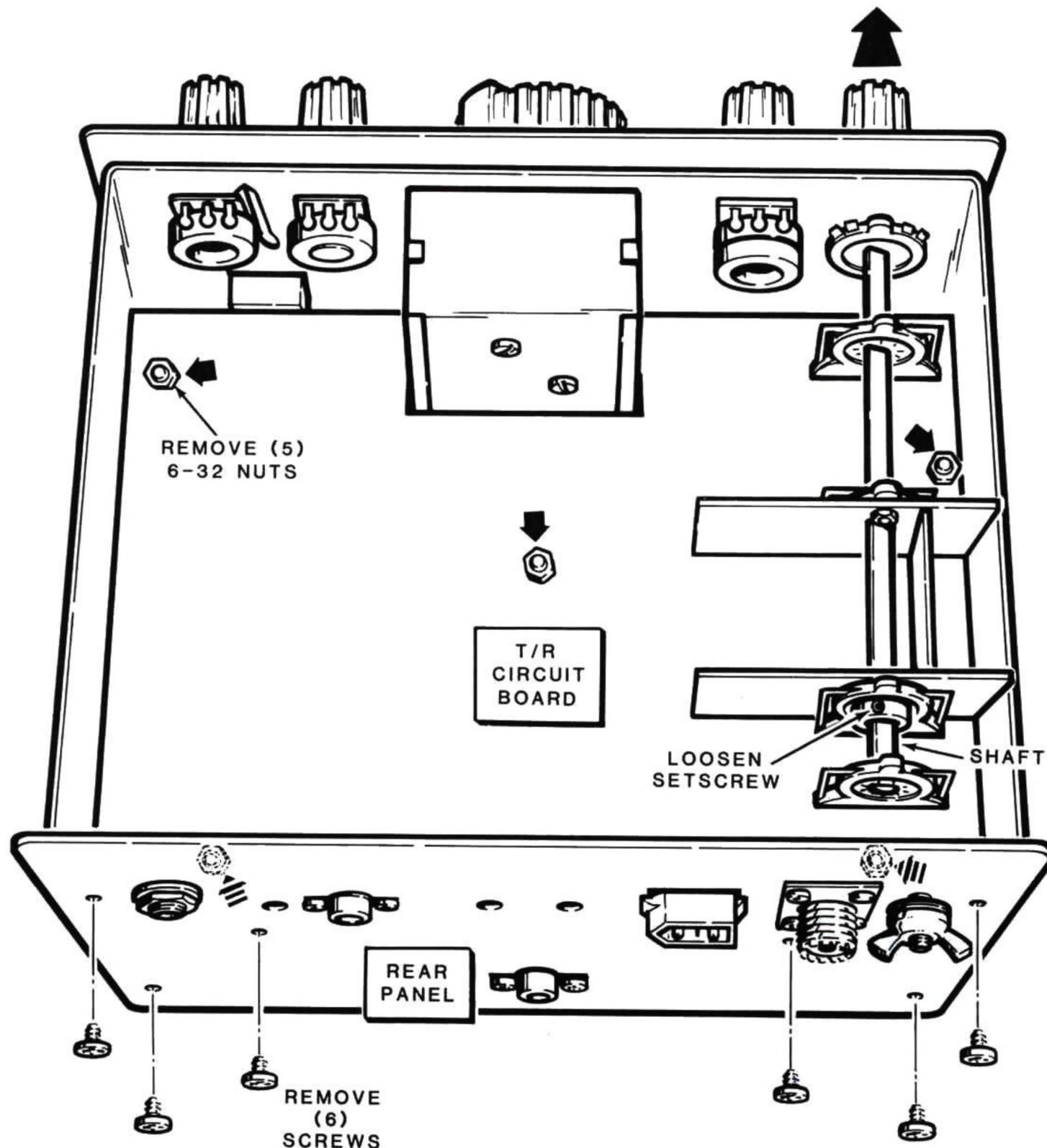
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T/R CIRCUIT BOARD

Disassembly

Refer to Pictorial 2-1 for the following steps.

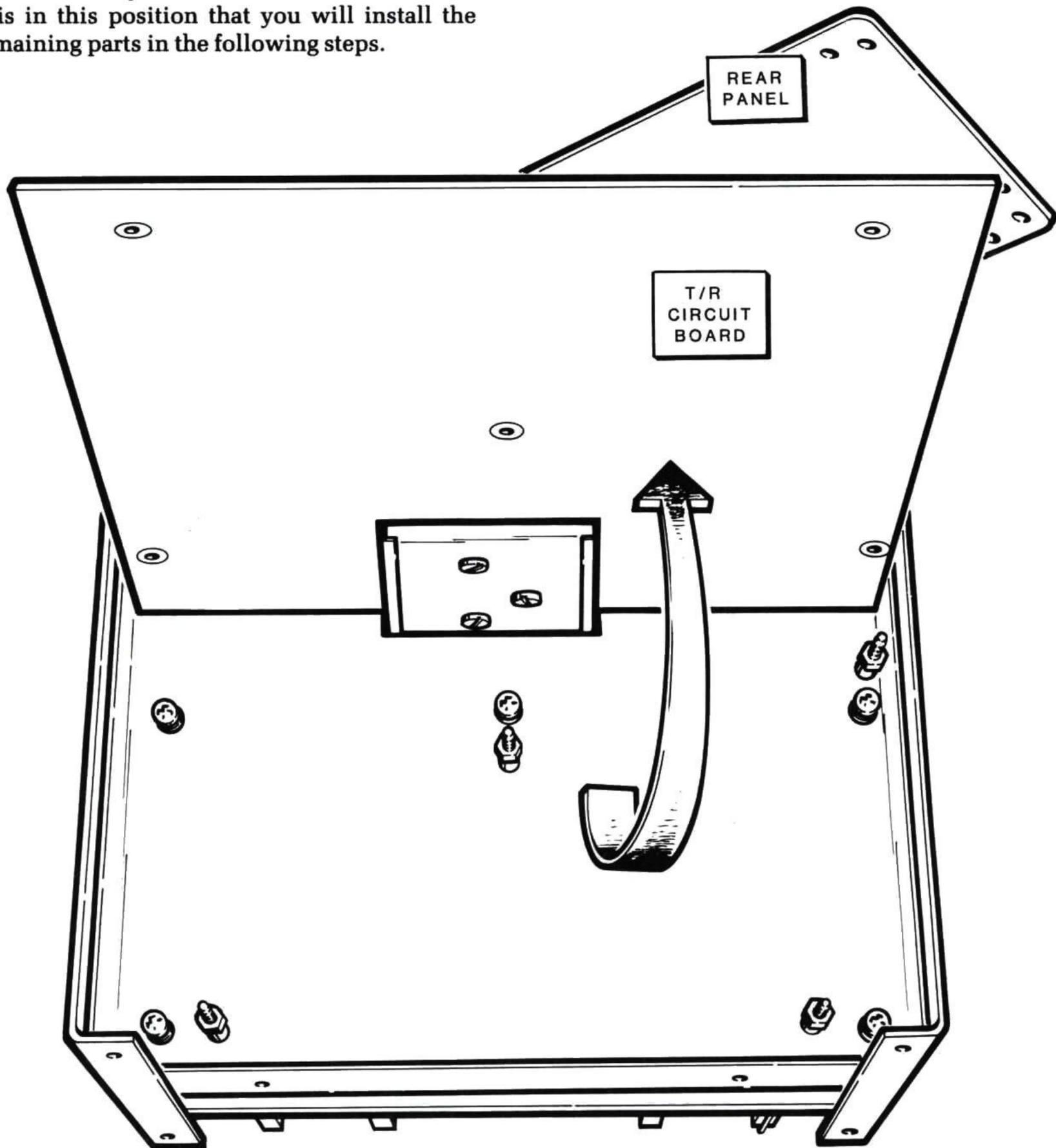
- () Position the Transceiver on your work area as shown.
- () Turn the BAND switch to 20. Do not change the setting of this switch until you complete these instructions.
- () Using a small screwdriver, loosen the small screw that secures the collar on the bandswitch shaft. Then slide the shaft all the way out of the Transceiver and set it and the collar aside temporarily.
- () On the rear panel, remove the six screws holding the panel to the chassis and set them aside temporarily.
- () On the T/R circuit board, remove the five 6-32 nuts holding the board to the chassis.



PICTORIAL 2-1

Refer to Pictorial 2-2 for the next step.

- () Carefully lift the T/R circuit board up and off the mounting studs. Pull the board rearward toward the rear panel, then push down on the front edge of the board as you lift the rear edge and rear panel together; the circuit board will stand vertically near the center of the chassis. It is in this position that you will install the remaining parts in the following steps.



PICTORIAL 2-2

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Parts Installation.

Refer to Pictorial 2-3 (Illustration Booklet, Page 4) for the following steps.

- () Cut and prepare the following small black wires:

1-5/8"	1-3/8"
1-1/4"	1-5/8"

NOTE: In the following steps, you will install these prepared wires as shown in Pictorial 2-3, Section 2. As you install each wire, solder it to the circuit board foils and cut off the excess wire ends. Perform these steps carefully and avoid any unnecessary bending and stress on the preassembled board and wiring.

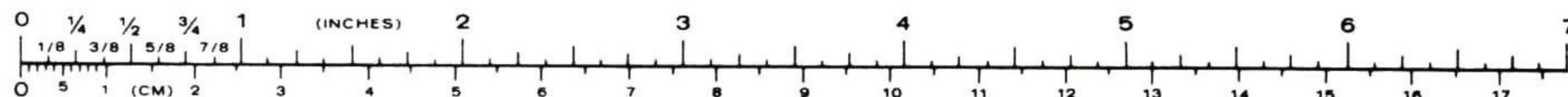
- () 1-5/8" wire at W408.
- () 1-1/4" wire at W407.
- () 1-3/8" wire W405.
- () 1-5/8" wire at W403.

Section 1

- () C567: 90 pF mica.
- () C566: 185 pF mica.
- () C565: 90 pF mica.
- () C557: 270 pF mica.
- () C556: 430 pF mica.
- () C555: 270 pF mica.
- () Solder the leads to the foil and cut off the excess lead lengths.

Section 2

- () C423: 68 pF (680) ceramic.
- () C422: Small 3.3 pF ceramic.
- () C420: 68 pF (680) ceramic.
- () C421: 180 pF (181) ceramic.
- () C418: 6.8 pF ceramic.
- () C419: 180 pF (181) ceramic.
- () C413: 150 pF (151) ceramic.
- () C412: 6.8 pF ceramic.
- () C414: 150 pF (151) ceramic.
- () C406: 180 pF (181) ceramic.
- () C405: 9 pF ceramic.
- () C407: 180 pF (181) ceramic.
- () Solder the leads to the foil and cut off the excess lead lengths.



Refer to Pictorial 2-4 (Illustration Booklet, Page 5) for the following steps.

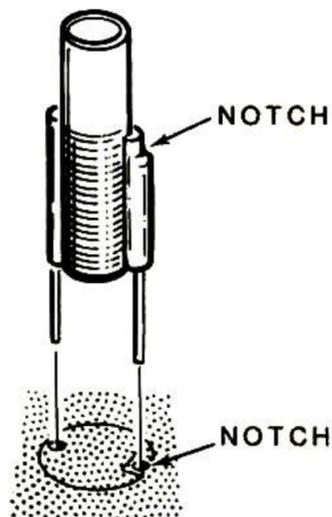
NOTE: As you install each coil in the following steps, solder its leads to the foil and cut off the excess lead lengths.

Section 1

- () L444: .44 μ H toroid coil (#40-1865).
- () L443: .44 μ H toroid coil (#40-1865).
- () L437: 1.34 μ H toroid coil (#40-2114).
- () L436: 1.34 μ H toroid coil (#40-2114).

Section 2

NOTE: When you install the next two coils, be sure to line up the notch in one side of each coil with the outline of the notch on the circuit board.



- () L417: .35 μ H coil (#40-2078).
- () L416: .35 μ H coil (#40-2078).
- () L415: .57 μ H coil (#40-2074).
- () L414: .57 μ H coil (#40-2074).
- () L411: .3 μ H coil (#40-2076).
- () L409: .3 μ H coil (#40-2076).
- () L406: 1.5 μ H coil (#40-2071).
- () L405: 1.5 μ H coil (#40-2071).

This completes the installation of your Accessory Band Pack. If you are presently assembling your HW-9 Transceiver, return to its Assembly Manual

and proceed with its assembly as directed. If you have installed these parts in your previously-assembled Transceiver, proceed with the following "Reassembly" instructions.

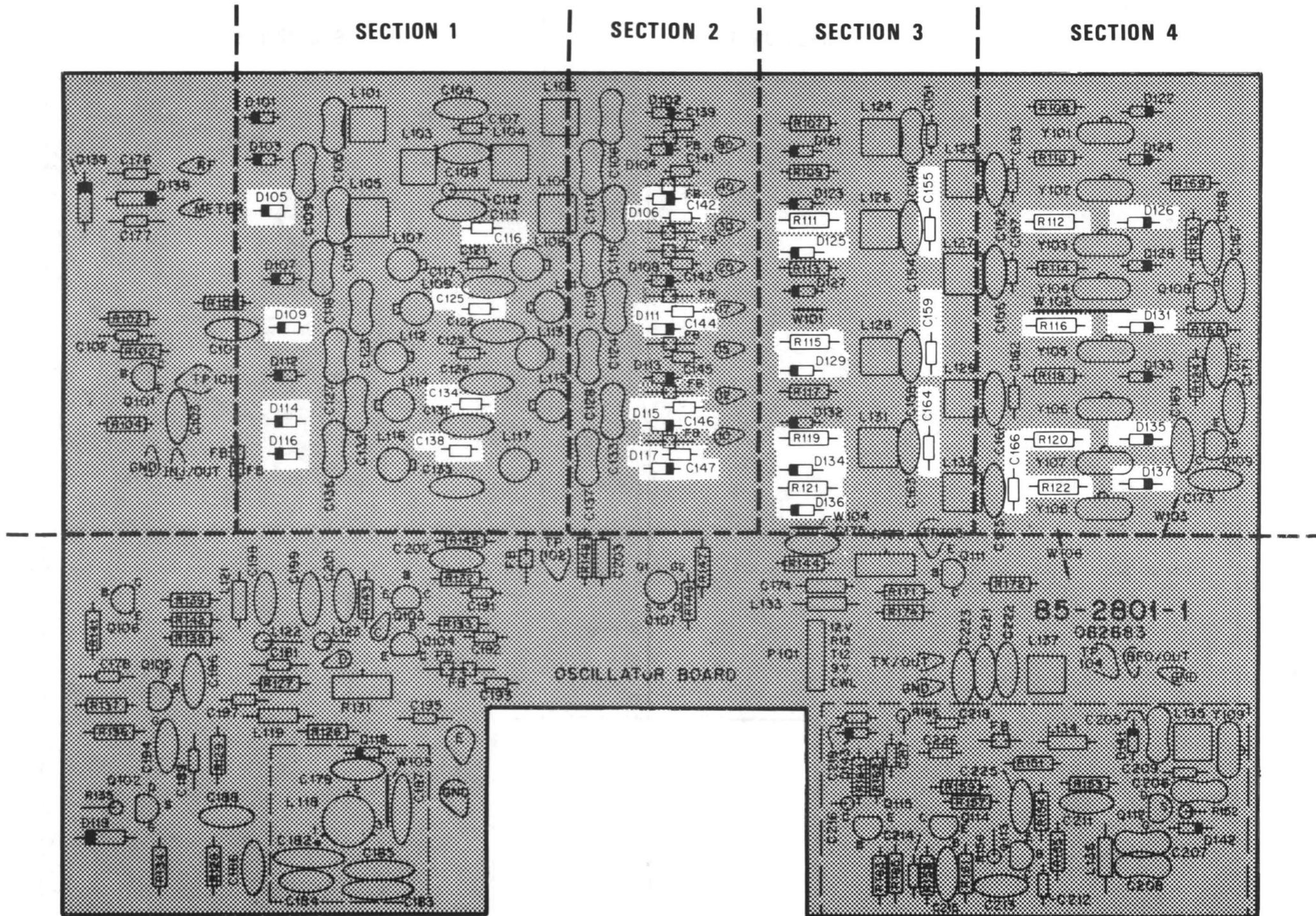
Reassembly

If necessary, refer back to Pictorial 2-1 on Page 9 as you perform the following steps.

- () Carefully reposition the T/R circuit board back down into the chassis and down onto its five mounting studs. Be sure there is a #6 lockwasher on each stud.
- () Secure the circuit board to the chassis with the five 6-32 nuts previously removed.
- () Position the rear panel back onto the chassis and resecure it with the six 6-32 \times 1/4" screws previously removed.
- () Position the bandswitch shaft through its front panel hole and through the first four switch sections on the T/R board. Make sure the knob pointer lines up with 20 on the front panel. Place the shaft collar onto the shaft, and then slide the shaft through the fifth switch section.
- () Push the shaft collar forward until it is against the back side of the fourth section; then tighten its setscrew.
- () Turn the Transceiver upright.
- () Reconnect and solder the end of the blue wire to the rear panel phono socket (see Pictorial 1-1 on Page 4).
- () Peel away the backing paper from the blue and white label. Then press the label onto the inside of one of the cabinet halves. Be sure to refer to the numbers on this label in any communications you may have with the Heath Company about your kit.

This completes the assembly of your Accessory Band Pack. Refer to the instructions in your Model HW-9 Manual for alignment, operation, circuit description, etc. Your newly-installed components are shown in the X-Ray Views in that Manual as well as on the Transceiver Schematic Diagram.

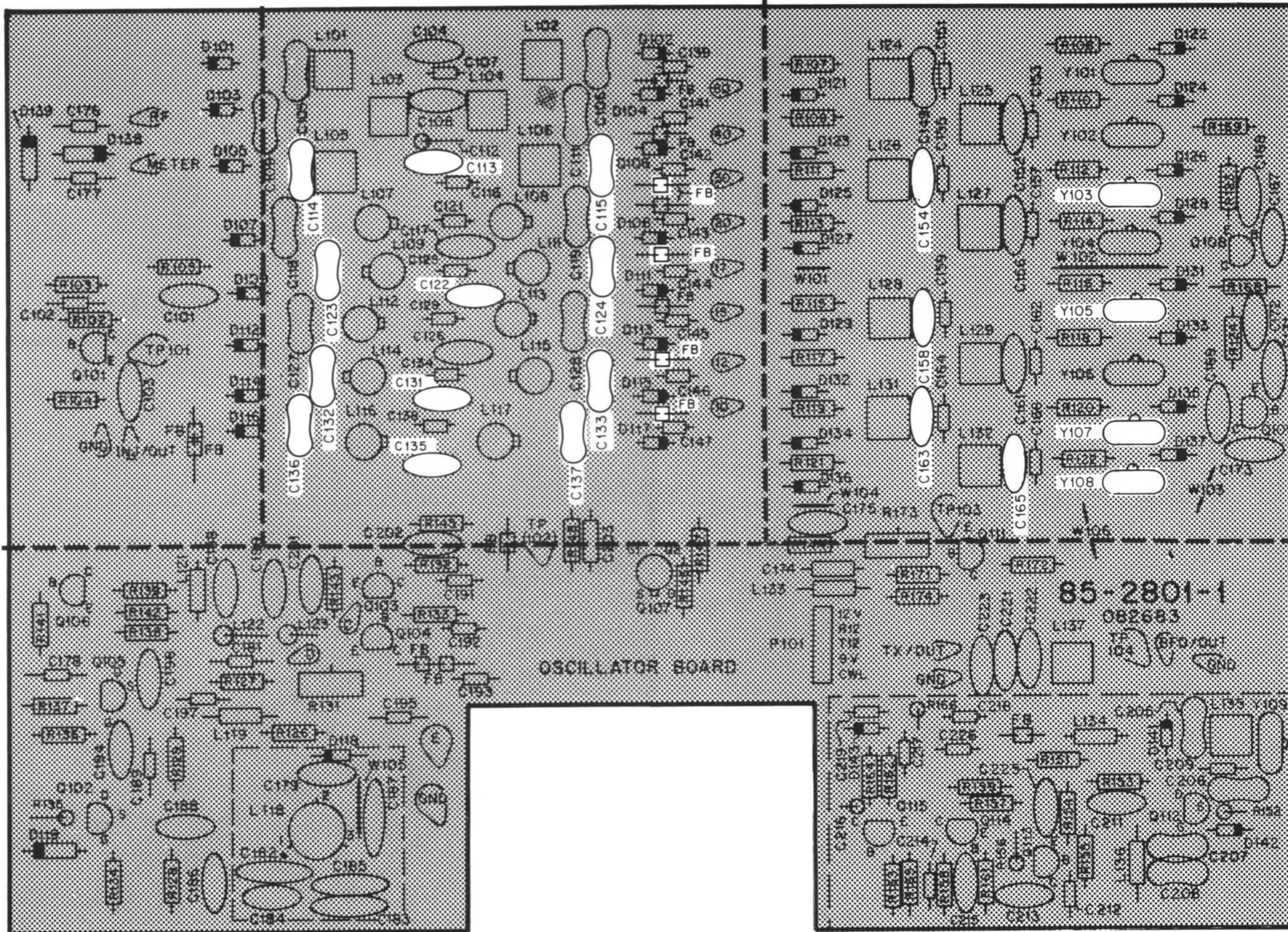
ILLUSTRATION BOOKLET



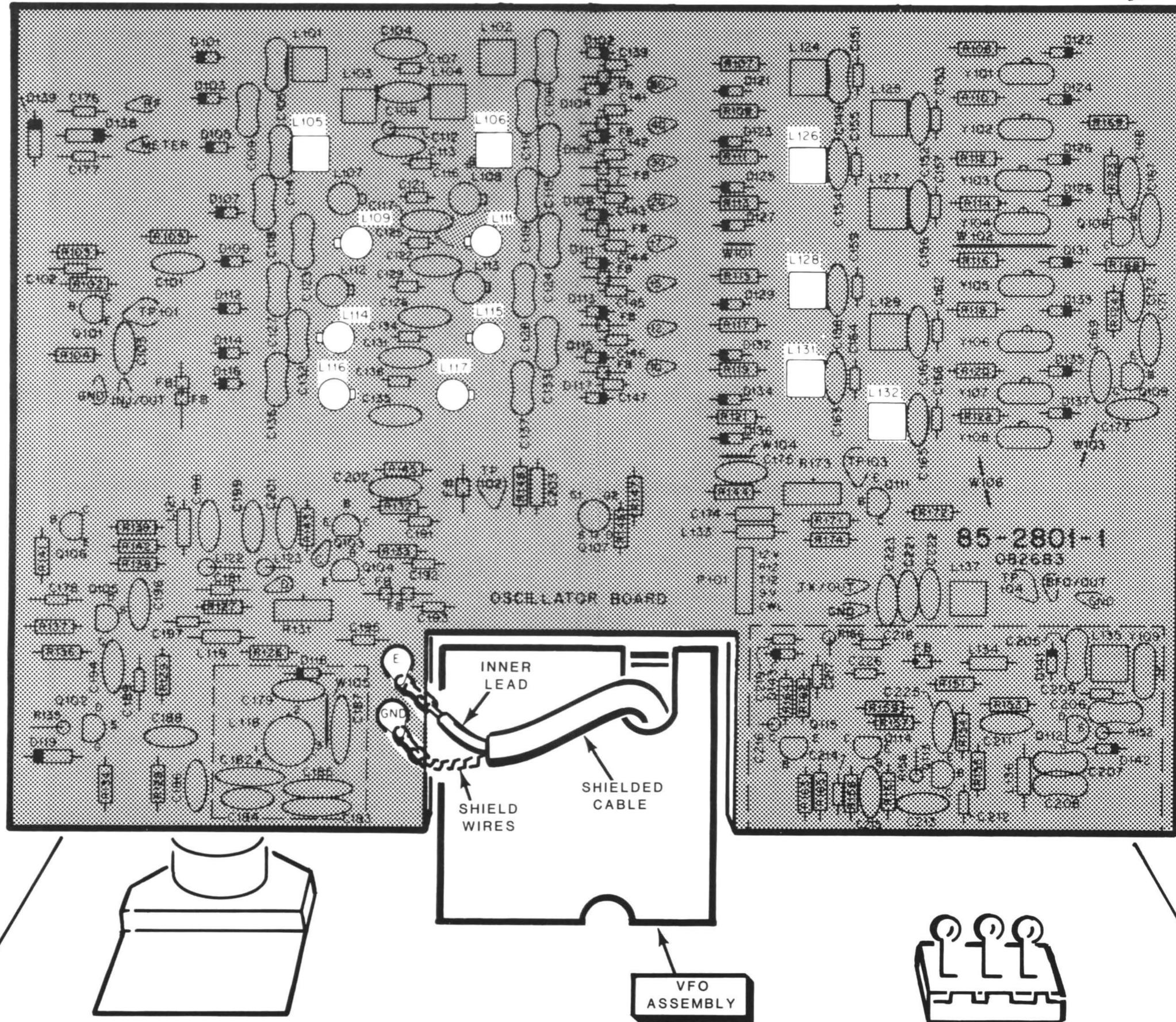
PICTORIAL 1-3

SECTION 1

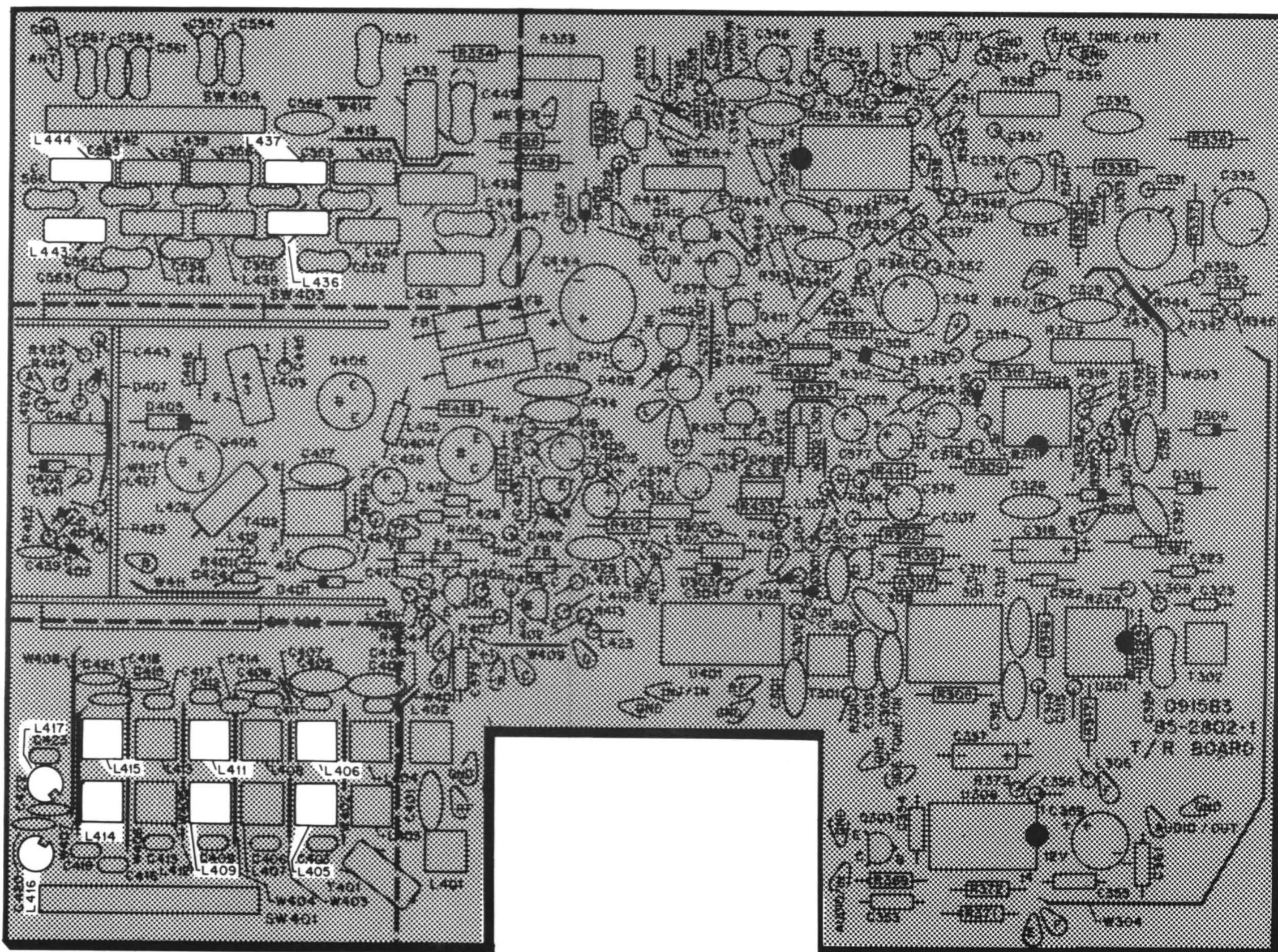
SECTION 2



PICTORIAL 1-4



SECTION 1



SECTION 2

PICTORIAL 2-4

Free Manual

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