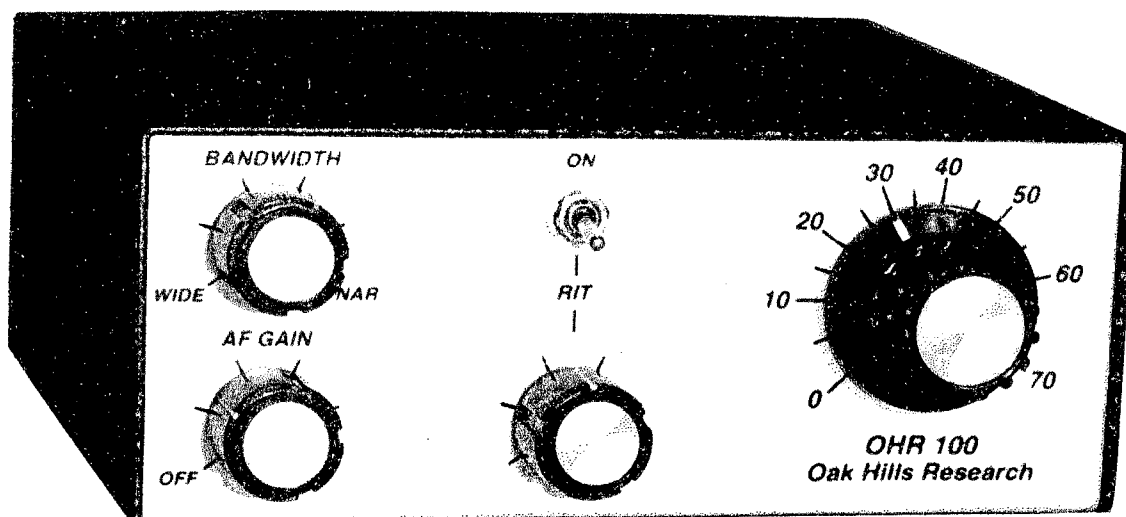


# ASSEMBLY INSTRUCTIONS

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OHR100  
15M



**Oak Hills Research**  
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# Introduction

Thank you for purchasing the OHR 100 transceiver kit. The OHR100 is a single band superhet transceiver offered for the 40, 30, 20, 17 & 15M bands. It features a very stable pre-mix VFO circuit providing 70 KHz of coverage and high side injection; RIT circuit providing 1 KHz of range; four pole crystal Cohn filter continuously variable from 1500 Hz to 350 Hz; HP AGC circuit; true sinewave sidetone oscillator with frequency & level adj; silky smooth QSK circuit; 4 - 5 watts of RF output on all bands adjustable from 0 - full output. The current drain on RX is 60mA and 750mA on TX. The transceiver is constructed on a single, double-sided PC board with plated-thru holes and component screen. All wire connections to the board are terminated with pre-assembled Molex 3 circuit connectors. The alignment is very easy to perform and requires a 30 MHz frequency counter with a 10:1 probe, oscilloscope, QRP wattmeter and 50 ohm dummy load and your main station transceiver.

You will need the following tools to assemble your kit: normal hand tools which include long-nose pliers; diagonal cutters; GOOD wire strippers; phillips screwdriver; small bladed regular screwdriver; .080" Allen wrench; pliers; 25-30 watt pencil type soldering iron; ruler; magnifying glass; supply of *ROSIN CORE* solder. A desoldering bulb and desoldering braid are also helpful to have. You should also have a piece of course sandpaper to remove paint on the inside of the chassis to provide a good ground.

Soldering is one of the most important operations you will perform while assembling your kit. About 95% of all kits returned to us for repair have problems caused by poor soldering. A good solder connection will form an electrical connection between two parts, such as a component lead and a circuit board foil. A bad solder connection will prevent an otherwise well assembled kit from operating properly. It is easy to make good solder connections if you follow a few simple rules. Use the correct type of soldering iron. A 25-30 watt pencil soldering iron with a 1/8 or 3/16 chisel tip works well. Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth; then apply solder to the tip to give the entire tip a wet look. This process is called tinning, and it will protect the tip and enable you to make good solder connections. When solder tends to "ball" or does not stick to the tip, the tip needs to be cleaned and retinned. **ALWAYS USE ROSIN CORE**, radio type solder (60:40 tin-lead content) for all the soldering in this kit. The warranty will be void and we will not service any kit in which acid core solder or paste has been used.

## ASSEMBLY NOTES

The parts list contains a PARTS ID # and DESIGNATOR #. Use the PARTS ID # to help identify parts. The DESIGNATOR # is used on the schematic diagram and PC board to identify individual parts. Some parts may be supplied on a tape. Use your cutters to cut the component leads from the tape. Never pull the components from the tape. All components are mounted on the component screen side of the board. All horizontal mounted components are positioned down against the board.

The PC board supplied with this kit is double-sided with plated thru holes. When you assemble the board, BE ABSOLUTELY SURE YOU HAVE THE CORRECT COMPONENT IN THE CORRECT LOCATION BEFORE SOLDERING IT IN PLACE! DOUBLE CHECK YOUR WORK BEFORE SOLDERING! With plated-thru holes, once you have soldered a component in place, and then want to remove it, it is more difficult. If you do make a mistake and want to remove a component, follow this simple procedure. Use your desoldering bulb and desoldering braid to remove ALL solder from the holes. Make sure the component leads are loose and free in the holes before removing the component. Use care when handling the cabinet parts. Some may have sharp edges. You should wear eye protection to prevent a cutoff lead clipping from flying up into your eye. As you cut component leads, hold on to the lead as you cut it.

The OHR100 is not difficult to build. Just take your time and use common sense. Don't work too long at one time. Take frequent breaks. Take the time now to read through all the steps in this booklet before beginning construction of your kit. This will help you become familiar with the kit and may help prevent mistakes.

## BOARD ASSEMBLY

- (✓) Install 14 pin IC sockets at U104 & U105. Solder all 14 pins.
- (✓) Install 15 $\mu$ H chokes (BRN-GRN-BLK) at L100 & L107. L100 mounts horizontally. L107 mounts vertically. See drawing below.



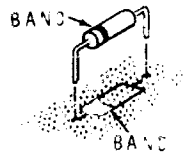
- (✓) Install 10 $\mu$ H chokes (BRN-BLK-BLK) at L108 & L109. Both chokes mount vertically.
- (✓) Refer to the parts list. Install all the resistors. Some of the resistors mount horizontally and some mount vertically. See drawing above for vertically mounted resistors. Install four or five resistors at a time, turn the board over and solder and trim each lead. **NOTE:** Resistor R134 is not used. It is not listed on the parts list, however it is shown on the board.
- (✓) Locate one of the cutoff leads from a resistor. Bend it into a 1/2" loop. Install this loop at R134. R134 is located near U104. Position the loop above the board. Do not push it down against the board. Solder and trim leads.
- (✓) Bend a second cutoff lead into a 1/4" loop. Install in the holes labeled "**TEST LOOP**". Position the loop about 1/4" above the board. Solder and trim leads.
- (✓) Install a 5K ohm white trim pot (502) at R152. Solder leads. It is not necessary to trim leads after soldering.
- (✓) Install a 100K ohm white trim pot (104) at R168. Solder leads.
- ( ) Install the 100 ohm pink trim pot with the white shaft at R104. The white shaft should extend over the edge of the board. Solder all three leads. Now hold the body of the pot firmly and pull the white shaft from the body. Set the shaft aside for now.
- (✓) In the following step you will install the two silver colored poly caps. These caps are extremely fragile. **DO NOT** twist the leads in the body of the caps. Also, when soldering the leads, do not use excessive heat by leaving the iron on the connection too long. This can cause the cap to start melting inside. Both of these caps have axial leads and are mounted horizontally.

## BOARD ASSEMBLY

- ( ) In the next step you will unpack the parts. Do not open the package labeled "*Band Pack*". Parts in the band pack will be installed later.
- ( ) Unpack the two large parts bags. Take inventory. Use the parts pictorial sheets and parts list to identify parts. As you check parts off, it is helpful to lay out the parts in groups, resistors in one group, caps in another group and so on. NOTE: When you remove the ICs from the plastic carrier tube, be sure that all of the ICs are accounted for. Occasionally, an IC will get stuck in the tube because of the tape on the ends. Also, set aside the 1N4007 (D113) diode for now. It is not board mounted. It will be installed later.
- ( ) Locate the PC board and position it in front you with the white component screen up and Y100 at the upper left corner. The REF DES #'s start at the left and generally run left to right. When you install components on the board, bend the leads as necessary and place in the correct holes. Then on the solder side of the board bend leads slightly to hold part in place. You may install four or five components at a time and solder and trim the leads. Resistors, caps and diodes are installed in this manner. Other parts are generally installed one at a time. Use the parts list and component screen diagram to identify the parts and their location on the board. Some resistors and chokes are mounted vertically and some are mounted horizontally. All diodes are mounted horizontally. All the caps are mounted vertically. In all the following steps, when you are instructed to install a component, this means install the part, solder and trim the leads.



- ( ) When you install diodes, be sure to position the banded end as shown on the board. All diodes are positioned down against the board.
- ( ) Install 1N4148 diodes at D100, D101, D105, D106, D108, D109, D110 & D114.
- ( ) Install 8 pin IC sockets at U100, U101, U102, U103, U107 & U108. It is best to install the sockets one at a time. Be sure to match the notched end with the half-moon end on the board. Solder all 8 pins on each socket.

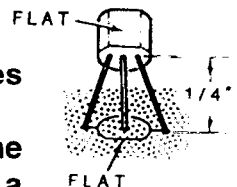


## BOARD ASSEMBLY

- (✓) Install the 1000pF poly cap (1000J) at C165. Carefully solder and trim leads. Install the 4700pF poly cap (4700J) at C168. Carefully solder and trim leads.
- (✓) In the following steps you will be installing the mono caps. These caps are small in size and have very small printing indicating the value. Use your magnifying glass to help with the small print. These caps are generally yellow or blue in color. Also, most of these caps will mount down against the board. Some will mount slightly above the board because of the bend in the leads.
- (✓) Install .01 $\mu$ F mono caps (103) at C101, C103, C105, C133, C134.
- (✓) Install the remaining .01 $\mu$ F caps at C149, C169, C171, C182, C183 & C186.
- (✓) Install .1 $\mu$ F mono caps (104) at C107, C111, C115, C125, C127, C138, C142 & C145.
- (✓) Install the remaining .1 $\mu$ F caps at C150, C151, C154, C155, C176, C177, C179 & C185.
- (✓) Install a 1 $\mu$ F mono cap (105) at C153.
- (✓) Install .047 $\mu$ F mono caps (473) at C161 & C180.
- (✓) Install 1000pF NP0 mono caps (102J) at C114, C124, C143, C164, C166 & C167.
- (✓) Install 33pF NP0 mono caps (33J) at C135 & C146.
- (✓) Install 47pF NP0 mono caps (47J) at C102 & C173.
- (✓) Install 68pF NP0 mono caps (68J) at C131 & C172.
- (✓) Install a 150pF NP0 mono cap (151J) at C100.
- (✓) Install .02 $\mu$ F polyester caps (203) at C162 & C163. These caps are green.

## BOARD ASSEMBLY

- (✓) Install a 10pF ceramic disc cap (10) at C188. This and all the ceramic disc caps are tan in color.
- (✓) Install a 22pF ceramic disc cap (22) at C118 and a 47pF ceramic disc cap (47) at C147.
- (✓) Install a 150pF ceramic disc cap (151J) at C189. Mount about 1/4" above the board.
- (✓) Install 270pF ceramic disc caps (270J) at C136 & C137.
- (✓) Install the 27pF air trim cap at C181. This cap is red in color and is the larger of the trim caps. It is not necessary to trim leads after soldering.
- (✓) Install the three yellow 40pF trim caps at C104, C116 & C132. It is best to install these caps one at a time. Be sure to match the flat side on the cap with the board outline.
- (✓) Install the six black 120pF trim caps at C119, C121, C129, C141, C157 & C175.
- (✓) In the following steps you will install the electrolytic caps. Be sure to install the long lead (+) in the the hole labeled "+". It is best to install these caps one at a time.
- (✓) Install a .47μF electrolytic cap at C106.
- (✓) Install a 1μF electrolytic cap at C144.
- (✓) Install a 10μF electrolytic cap at C126.
- (✓) Install 22μF electrolytic caps at C130, C152, C158 & C178.
- (✓) Install 220μF electrolytic caps at C159 & C160.
- (✓) Install 9 MHz crystals one at a time at Y100, Y101, Y102, Y103, Y104 & Y105.
- ( ) In the following steps you will install the transistors, varactor diodes and the 9V regulator. Be sure to match up the flat side of the part with the screened outline on the board. Mount about 1/4" above the board. See drawing at right. It is best to install these parts one at a time.



## BOARD ASSEMBLY

- (✓) Install the MVAM108 varactor diodes at D102, D103, D104 & D107.
- (✓) Install the 78L09 regulator at U106.
- (✓) Install the MPF102 transistor at Q107.
- (✓) Install 2N3904 transistors at Q104, Q105 & Q108.
- (✓) Install 2N5770 transistors at Q106 & Q109.
- (✓) Install the 2N5179 transistor at Q103. Be sure to match up the small tab on the transistor with the screened outline on the board. Mount about 1/4" above the board.
- (✓) Install the 2N2907A transistor at Q100. Again, be sure to match up the small tab on the part with the board. Mount about 1/4" above the board.
- (✓) Place a white spacer on the leads of the 2N3866 transistor. Install at Q101 making sure the small tab on the case matches the board outline. Hold the transistor and spacer down against the board and solder the leads. Trim leads. Install the small red heatsink on Q101.
- (✓) Locate the 2SC2078 transistor and the black heatsink. You will also need a 4-40 x 1/4" screw, #4 lockwasher and #4 hex nut. Place the flat side of the transistor against the flat portion of the heatsink. The pins on the transistor should be pointing in the same direction as the pins on the heatsink. Insert the 4-40 screw through the hole in the transistor and the top hole in the heatsink. Slip a #4 lockwasher on the screw and start a #4 hex nut. Do not tighten. Install at Q102. Match up the pins on the transistor and heatsink with the holes in the board. Push down on the heatsink until it is seated down against the board. Tighten the transistor mounting screw. Solder and trim all three transistor leads. It is not necessary to solder the heatsink pins. Also, heatsink compound is not necessary for this installation.
- ( ) Remove all the insulation from the large 1 1/2" length of red solid wire. Insert one end of the wire into the hole labeled "ANT" at the upper right corner of the board. Solder the connection. The other end will be connected later.

## BOARD ASSEMBLY

- (✓) Refer to assembly pictorial Fig 8. Prepare each IC for installation as shown.
- (✓) In the next step you will install the ICs in their sockets. Note that there is a half-moon index mark at one end of the IC. Be sure to match this index mark with the half-moon outline on the board. Some ICs may also have a dot over pin one. Also, when you install an IC, be sure it seats properly in the socket.
- (✓) Carefully install the ICs as follows:
  - NE602AN - U100, U102, U103 & U108
  - MC1350P - U101
  - LM380N-8 - U107
  - CD4066 - U104
  - LM324N - U105
- (✓) Refer to assembly pictorial Fig 3, Fig 4 & Fig 5 for the following step.
- (✓) Remove the two black cores and wire from the package labeled "T100,T101". Straighten the two wires. Be careful not to place any kinks in the wires. Cut two 8" lengths of red wire and green wire. Hold an 8" red & green wire parallel to each other. Place the first turn on the core with the leads about 1" from the core as shown. See Fig 3. Continue placing turns on the core until you have a total of 10 turns on the core. The turns should be fairly evenly spaced on the core. Cut the excess wire leads to 1" from the core as shown. The completed coil should look like Fig 4. Refer to Fig 5 and tin all four leads with your soldering iron as shown. You have just wound a bifilar coil. *Easy!* Now wind the other coil using the exact same procedure.
- (✓) Install one of the completed bifilar coils at T100. The coil mounts vertically. Insert the two red wires into the holes labeled "R" and the two green wires into the holes labeled "G". From the solder side of the board remove any slack in the leads. Solder and trim all four leads. Use the same procedure and install the second bifilar coil at T101.

## BOARD ASSEMBLY

- ( ) Locate the six pre-assembled Molex connectors with the attached red, white & blue wires attached. When you install these connectors on the board in the following step, be absolutely sure you install them correctly. Notice on the male part of the connector there is a small locking tab parallel to the three long pins. When you install the connector on the board, be sure this tab lines up with the double line on the board. The short pins go into the board and are soldered. It is best to install each connector one at a time.

This side lines up  
with double line  
on board



- ( ) If not already done, install a terminal housing with the red, white & blue on each of the three pin male connectors. There are small ears on each side of the housing that fit on each side of the small locking tab allowing the housing to be installed only one way.
- ( ) Install a male connector at P100. Hold the connector down against the board and solder all three pins. It is not necessary to trim the pins after soldering.
- ( ) Install the remaining five connectors at P101, P102, P103, P104 & P105.
- ( ) Remove the housing with the three wires from P100. On any side of the housing label it "P100". Use any kind of a permanent marker. Set the housing aside for now. Remove the housing from P101 and label it "P101". Set it aside for now. Remove and label the remaining four housings.
- ( ) Set the PC board aside for now.
- ( ) Refer to assembly pictorial Figs 1 & 2. Locate the chassis bottom. Use a small piece of sandpaper to remove any paint overspray on the INSIDE of the chassis around any of the holes. Place a #4 lockwasher on a 4-40 x 5/8" screw. From the bottom of the chassis, insert the screw through one of the four holes. Start a 1/4" hex spacer on the screw as shown in Fig 2. Turn the hex spacer as far as it will go leaving it finger tight. Repeat at the other three holes in the bottom of the chassis.
- ( ) From the outside of the rear panel, install the SO-239 at the holes labeled "ANTENNA". Secure with 4-40 x 5/16" hardware as shown in Fig 1. Tighten hardware.

## CHASSIS ASSEMBLY

- ( ) Install the phono jack in the hole labeled **"OSC OUT"**. This jack also mounts from the outside. Position the solder lug toward the center of the rear panel. Secure with the supplied hardware. Tighten nut.
- ( ) The remaining rear panel jacks mount from the inside. Install 1/4" standard phone jacks in the holes labeled **"KEY"** and **"PHONES"**. Use supplied hardware. Position the jacks as shown in Fig 1. Tighten the nuts.
- ( ) Install the coaxial power jack in the hole labeled **"13.6VDC"**. Position the jack as shown in Fig 1. Use supplied hardware. Tighten nut.
- ( ) Locate the large 100K ohm pot. Remove the nut and washer. Bend the small alignment tab on the front of the pot off to the side. From the inside of the front panel, install the pot in the hole with the numbers from 0 to 70 around it. Position the pot as shown in Fig 2. Use the supplied hardware. Tighten the nut.
- ( ) Locate the small panel pot labeled B5K. Remove the nut and washer. Bend the small alignment tab off to the side. Install the pot in the front hole labeled **"RIT"**. Position pot as shown in Fig 2. Use supplied hardware. Tighten nut.
- ( ) Use the same procedure to install the 10K pot with switch on the rear. This pot is labeled B10K. Install in the front panel hole labeled **"AF GAIN"**.
- ( ) Install the last 10K panel pot in the front panel hole labeled **"BANDWIDTH"**. This pot is also labeled B10K.
- ( ) Locate the toggle switch. Remove the first nut and washer. Turn the second nut about 3/4 of the way toward the switch body. Install in the remaining front panel hole labeled **"ON"**. Position switch as shown in Fig 2. Secure with the removed nut and washer.
- ( ) Set the chassis aside for now. Proceed to the next section which is **FINAL BOARD ASSEMBLY**.

## **FINAL BOARD ASSEMBLY (15M)**

- (✓) **Open the band pack bag and take inventory of the parts.**
- (✓) **Take a cutoff lead from a resistor or cap and form it into a half-moon loop about 1/2" across. Install it at R105. Be sure it is not touching the top of the board.**
- (✓) **Install a 3.3 $\mu$ H choke (Org-Org-Gld) at L103.**
- (✓) **Install 2.2pF NP0 mono caps (229) at C120 & C140.**
- (✓) **Install 5pF ceramic disc caps (5) at C156, C174 & C184.**
- (✓) **Install 62pF ceramic disc caps (62) at C113 & C139.**
- (✓) **Install 68pF ceramic disc caps (68) at C112 & C148.**
- (✓) **Install 68pF ceramic disc caps (68) at C122 & C128.**
- (✓) **Install a 180pF ceramic disc cap (180) at C109.**
- (✓) **Install 82pF ceramic disc caps (82J) at C108 & C110.**
- (✓) **Install 680pF ceramic disc caps (680J) at C117 & C123.**
- (✓) **Install a 47pF NP0 mono cap (47J) at C187.**
- (✓) **Install the 25.000 MHz crystal at Y106.**
- (✓) **Locate the length of red #26 wire. Unroll it and straighten it out without putting any kinks in it. Cut a 13" length of this wire. Also, locate the T44-6 yellow core. This will be the largest of the yellow cores. Refer to assembly pictorial Fig 6. Wind 15T of wire on the core. This is the same procedure as before except this time there is only one wire to put on the core instead of two. After winding the coil, trim both leads to 1" from the core. Refer to Fig 5 and tin each lead as shown.**
- (✓) **Install the above wound coil at L113. This and all the coils are mounted vertically on the board. From the bottom solder side of the board, pull on the leads to remove any slack. Solder and trim both leads.**

## FINAL BOARD ASSEMBLY (15M)

- (✓) Cut two 10" lengths of the red #26 wire. Wind 12T of wire on two of the yellow cores. Trim and tin each lead. Use the same procedure as above.
- (✓) Install the two wound yellow coils at L111 & L112.
- (✓) Cut four 10" lengths of the red #26 wire. Wind 13T of wire on each of the remaining four yellow cores. Install the coils at L104, L105, L106 & L110.
- (✓) Cut two 10" lengths of the red #26 wire. Wind 12T of wire on each of the two red cores. Install the coils at L101 & L102.
- ( ) This completes assembly of the PC board. All components should be installed, soldered and trimmed. Take the time now to look the board over and check for unsoldered or improperly soldered connections. Also, check for solder bridges. **DO NOT** skip over this step as it may save you a lot of frustration and expense later. About 95% of all radios returned for repair and troubleshooting are found to have unsoldered or improperly soldered connections on the PC board. **NOTE:** You should have (1) 47pF ceramic disc cap and (1) 1N4007 diode left over from the chassis pack. They will be installed shortly.
- ( ) Place the chassis assembly in front of you so the front panel faces you. Position the PC board over the four board mounting screws with the red heatsink toward the rear. Engage the four mounting screws into the four board mounting holes. Hold the board down against the hex spacers. Turn the chassis over and tighten the four mounting screws. Turn the chassis upright and place a #4 lockwasher and #4 hex nut on each board mounting screw. Tighten the four nuts.
- ( ) Locate the power adjust pot white shaft. With one hand hold on to the pink power adjust pot (R104) located near the rear panel. With the other hand, insert the white shaft through the power adj hole in the rear panel and insert it into the pink pot. Push it in far enough so it cannot be easily removed. Its just a tight friction fit. If you don't hold on to the pot when you remove or install the shaft, the pot could be damaged. The white shaft will need to be removed each time you want to remove the board.

## **FINAL BOARD ASSEMBLY (15M)**

- ( ) The wires coming from the six Molex connector housings will be cut to the indicated lengths in this step. Simply measure from the top of the housing where the three wires exit. Double check to be sure you are on the correct connector before cutting the wires. Cut the red, white and blue wire on each connector as indicated below.

|                                   |               |
|-----------------------------------|---------------|
| P100 - 5" (do not cut white wire) | P103 - 4"     |
| P101 - 3 3/4"                     | P104 - 3 1/4" |
| P102 - 5"                         | P105 - 2 1/4" |

- ( ) In the following steps all the loose wire ends will be connected to the various components on the front and rear panel. All the wires coming from the Molex connectors are top coated. This means the stranded wire is pre-tinned the full length of the wire. This makes it very easy to both remove a small amount of insulation and to make a neat solder connection to a lug or terminal.

- ( ) Remove 1/4" of insulation from the free end of all the wires coming from the Molex connectors. In the following steps, the word "connect" means to connect the wire to the indicated terminal and solder it except where noted.

- (✓) Refer to assembly pictorial Fig 2 for the following steps. Connect the RED wire coming from P100 to SW101/4. SW101 is located on the rear of the AF GAIN pot. Connect the wires coming from P105 to the AF GAIN pot as follows: RED - 1; WHITE - 2; BLUE - 3.

- (✓) Connect the wires coming from P101 to the RIT pot as follows: WHITE - 2; RED - 3. Carefully cut off the BLUE wire coming from P101. Simply cut it off where it exits the top of the housing.

- (✓) Connect the wires coming from P103 to SW100 as follows: RED - 1; WHITE - 2. The BLUE wire will be connected shortly.

- (✓) Connect the wires coming from P102 to the BANDWIDTH pot as follows: RED - 1; WHITE - 2; BLUE - 3.

- (✓) Connect the wires coming from P104 to the MAIN TUNE pot as follows: BLUE - 1; WHITE - 2; RED - 3.

- (✓) Refer to assembly pictorial Fig 1 for the following steps. Connect the BLUE wire coming from P103 to J100/3. This is the phone jack. Remove the nut and washer from J100. Lay the jack aside for now.

## **FINAL BOARD ASSEMBLY (15M)**

- ( ) **Cut a 1" length of the blue scrap wire cut off in a previous step. Remove a 1/4" of insulation from each end. Connect one end to the solder lug on the small "OSC OUT" phono jack. Solder the connection. Connect but do not solder the other end to lug 2 of the coaxial power jack, J107.**
- ( ) **Connect the BLUE wire coming from P100 to J109/3. J109 is the KEY jack. Carefully cut off the WHITE wire from P100. Now measure and cut this white wire to a length of 9 1/4". Remove 1/4" of insulation from both ends.**
- ( ) **Connect one end of the prepared 9 1/4" WHITE wire to SW101/5. SW101 is the switch on the rear of the AF GAIN pot. Route the wire down along the chassis to the rear panel, around the corner and under the small phono jack with the solder lug. Connect but do not solder the free end to lug 1 of the coaxial power jack.**
- ( ) **Cut both leads of the 1N4007 diode to 1/2". Connect the BANDED end to lug 1 of the coaxial power connector, J107. Connect the other end to lug 2 of J107. Solder both lug connections.**
- ( ) **Place a bend in the large bare wire coming from the hole labeled "ANT". Insert the free end into the center pin of the SO-239 antenna connector, J108. Solder the connection.**
- ( ) **Locate the 47pF (47) ceramic disc cap. Bend each lead outward. From one of the cutoff wire leads, remove two pieces of insulation 3/4" long. Slip the insulation pieces onto the leads of the cap. Connect one end of the cap to the "TEST LOOP". When you solder this connection, be sure the end of the wire is not shorting to the top of the board. Place a gentle arc in the leads so the other lead just engages the center terminal of the "OSC OUT" phono jack. Solder the connection. Bend the cap down so it will not interfere with the phone jack, J100 when it is reinstalled. Reinstall J100. Tighten nut.**
- ( ) **Rotate the shafts of all four pots on the front panel fully counterclockwise. Install a small knob on the AF GAIN shaft. Turn the knob until the white indicator line is lined up with the OFF tick mark. Tighten the set screw.**
- ( ) **Install a small knob on the BANDWIDTH shaft. Set the white line to the WIDE tick mark and tighten the set screw.**

## **FINAL BOARD ASSEMBLY (15M)**

- ( ) Install a small knob on the RIT shaft. Set the white line on the left most tick mark and tighten the set screw.
- ( ) Be sure the main tuning shaft is turned all the way to the left. Install the large knob on the shaft. Turn the knob until the pointer or white indicator line is lined up with the "O" in OHR below the knob. Tighten the set screw.
- ( ) Turn the cabinet over. Remove the backing paper from the four cabinet feet. Install the four feet 1" in from each corner.
- ( ) This completes the assembly of the OHR100. The alignment will be performed next.

## **ALIGNMENT (15M)**

- ( ) The alignment of the OHR100 is not difficult to perform. If you do not have the necessary equipment, Oak Hills Research will align and return the radio to you for a fee of \$45.00. This alignment service is for properly assembled units only. We will not accept incomplete kits for alignment. The \$45.00 fee must accompany unit to be aligned. We accept check, money order, Visa or MasterCard for payment. This fee is for U.S. customers only. Canadian customers add an additional \$7.00. All other customers add an additional \$20.00. If you are going to perform your own alignment, continue on to the next step.
- ( ) The alignment is easy to perform and will require the following items: A well regulated and filtered power supply capable of supplying 13.6VDC @ 1A; frequency counter with a 10:1 probe; 30 MHz oscilloscope; ohm meter; QRP dummy load; QRP wattmeter; your main station transceiver; a small screwdriver alignment tool to adjust the trim caps; and some Q-dope or clear finger nail polish to hold the turns on the VFO inductor. *NOTE:* You cannot align this radio without an oscilloscope.
- ( ) Locate the molded power cable assembly. The *POSITIVE* lead is connected to the center pin of the molded plug. Use your ohmmeter to identify the *POSITIVE* lead. Be sure this *POSITIVE* lead connects to the *POSITIVE* terminal of your power supply. If the positive terminal of your power supply is not fused, you should add an in-line fuse holder with a 1A fuse in the positive supply line.

## ALIGNMENT (15M)

- ( ) Attach the power plug to the 13.6VDC coaxial power jack on the rear panel. Attach your frequency counter probe to the lead on C189 that is closest to C188. These caps are located at the lower right corner of the board. Rotate the AF GAIN control until it clicks. Turn the power supply on. Turn on your frequency counter. Allow everything to warm up for 30 minutes. The radio should be drawing about 60mA of current on receive.
- ( ) In this and the following steps, frequencies listed in ( ) are for the Novice portion of the band. Set the main tuning dial to "0". Adjust trim cap C181 for a frequency of 5000 (5100) KHz. If you are unable to adjust the frequency down to 5000 (5100) KHz, you will need to spread or compress the wire turns on coil L113 slightly and then readjust C181. After you have obtained the 5000 (5100) KHz reading with the dial pointer set at "0", check to be sure there is at least 10 KHz of adjustment left in trim cap C181. That is, see if you can adjust C181 to obtain a frequency of at least 5 KHz above and below 5000 (5100) KHz. If you cannot, continue adjusting turns on L113. When you are finished, make sure the frequency is 5000 (5100) KHz with the main tuning dial set at "0".
- ( ) Attach your oscilloscope and frequency counter with 10:1 probe to the test loop. Adjust trim caps C157 & C175 for maximum signal at the frequency of 30.000 (30.100) MHz. You may have to adjust C181 to get the frequency set at 30.000 (30.100) MHz. It may be off several KHz because of crystal Y106. If you are getting a peak signal at a frequency other than 30.000 (30.100) MHz, continue adjusting C157 & C175 until you do get a peak maximum signal at the correct 30.000 (30.100) MHz frequency. The peak signal will be about 300mV P-P. When you have the maximum signal at the correct frequency, turn the main tuning dial through its full range. The signal at the test point should go from 30.000 - 30.070 (30.100 - 30.170) MHz and have about the same amplitude across the entire tuning range. If the amplitude is uneven across the tuning range, alternately adjust C157 & C175 until it is fairly even. After you have the correct frequency at the test loop, carefully apply a coat of Q-dope or clear fingernail polish to the VFO coil, L113. The frequency may shift because of the Q-dope coating. This is normal. The frequency should return to its original value or at least very close. If it is still off a bit after the Q-dope dries, simply readjust C181.

## **ALIGNMENT (15M)**

- ( ) Set the main tuning dial to the center of its range. Attach a pair of 8 ohm headphones to the headphone jack on the rear panel. Set the bandwidth control to mid-range. Turn the RIT switch to the off position. You should be hearing some background noise in the headphones.
- ( ) Terminate your main station transceiver into 50 ohm dummy load. Set it up for operation on 21.030 (21.130) MHz with a few watts of output power. Key the radio and attempt to find the signal on the OHR100. Don't leave the radio keyed for more than 60 seconds at a time. You may have to attach a test lead or piece of wire to the bare wire connected to the SO-239 on the OHR100 to increase the signal level. Once you can hear the signal from the station transceiver, adjust the yellow trim cap, C132 for a nice mellow sounding 700 Hz tone. *SLOWLY* turn the main tuning dial on the OHR100 toward "70". The tone should get lower and lower in frequency. If it goes higher and higher in frequency, you have the BFO adjusted on the wrong side of zero beat. In this case, simply readjust C132 to move the signal to the other side of zero beat. Also, as you turn the bandwidth control fully clockwise (narrow), the received signal will be attenuated slightly. If this attenuation is much higher or if the signal disappears completely, then touch up the adjustment of C132 slightly. Adjust yellow trim cap C116, and black trim caps C129 & C141 for maximum signal level. Unkey the main station transceiver. Remove the test lead or wire connected to the SO-239.
- ( ) Attach a QRP wattmeter terminated in a 50 ohm dummy load to the antenna connector on the OHR100. Attach a key to the key jack.
- ( ) Set the power adjust control on the rear panel to mid-range. Set the main tuning dial to about "30". Key the OHR100. Don't leave the radio keyed for more than 60 seconds at a time. Adjust trim caps C119 & C121 for maximum power output. Adjust the power adjust control for maximum power output. Readjust C119 & C121 for maximum power. Turn the main tuning dial from 0 to 70 while watching output power. The power out should be about 5 watts and should be fairly constant throughout the tuning range. If it is not, continue adjusting C119 & C121. Unkey the radio. *NOTE:* The radio will draw about 700 - 800mA with 5 watts output.

## **ALIGNMENT (15M)**

- ( ) To adjust the transmit offset, follow this procedure. Set your main station transceiver to transmit on 21.030 (21.130) MHz into its dummy load. Key the radio. On the OHR100, carefully tune this signal in for a 700 Hz tone. Unkey the main station transceiver. Do not move the tuning dial on either radio. Attach a 50 ohm dummy load to the OHR100. Key the radio. Adjust yellow trim cap C104 until you hear a nice mellow sounding 700 Hz tone in the main station transceiver. Unkey the OHR100. After a few minutes of cool down, again key the radio and adjust trim pot R152 for the sidetone frequency you want. Adjust trim pot R168 for a comfortable sidetone level. Unkey the radio.**
- ( ) Attach a good 50 ohm antenna to the antenna connector on the OHR100. Tune in a weak signal near the center of the dial. Carefully repeak trim caps C116, C129 & C141 for maximum received signal.**
- ( ) This completes the alignment. Bundle up the wires going to the RIT pot, RIT on/off switch, bandwidth pot and the red wire going to the on/off switch on the AF gain pot. Place a plastic tie around the wires just above pot R152. Be sure there are no wires anywhere near the VFO coil L113 or cap C181.**
- ( ) Place the black cabinet cover in place and secure with the four black 1/4" sheet screws.**
- ( ) The radio is now set up for operation from 21.000 - 21.070 (21.100 - 21.170) MHz in the 15M band. This completes the assembly and alignment of the radio.**

## OPERATION

The operation of the OHR100 is easy and straightforward. Simply attach a power supply, your favorite key, a good 50 ohm antenna and your 8 ohm headphones and start enjoying yourself.

The variable bandwidth control is used to vary the bandwidth of the four pole crystal filter from about 1500 Hz to 350 Hz. It is best to set the bandwidth control to a wider setting while tuning around the band and then adjust it to a narrower setting once a signal is tuned in.

The RIT is used to vary the receive frequency approximately 1 KHz. It is active only on receive and defaults to the receive frequency on transmit. It is best to leave the RIT on/off switch in the off position when not in use. **NOTE:** The RIT will have less range when the main tuning dial is near the low end.

The power adjust control on the rear panel is used to adjust transmitter power output from 0 to full output.

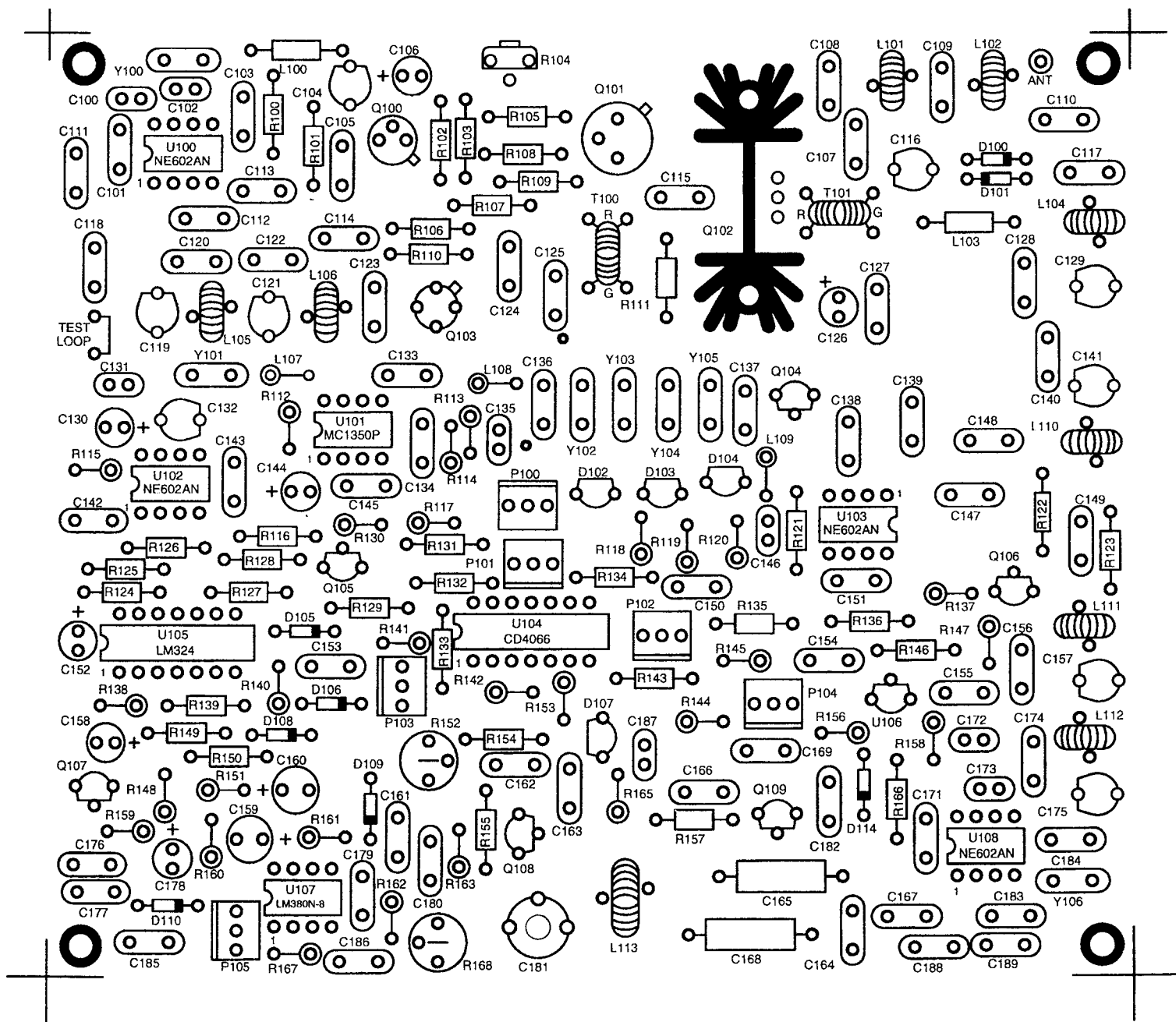
The "OSC OUT" jack on the rear panel provides the LO signal for use with a dial display unit such as the DD-1.

The audio circuit in the OHR100 is designed for 8 ohm headphone operation. To obtain the best possible receiver audio performance, a good quality pair of 8 ohm communication headphones must be used. **DO NOT** use stereo or high impedance type headphones as this will significantly degrade the audio quality.

I hope you have enjoyed building the OHR100 and that it provides many years of reliable service.

Dick Witzke, KE8KL

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OHR100  
PARTS OVERLAY

**Oak Hills Research  
OHR 100 Parts List  
40-210 PC Board**

| QTY | OHR P/N  | DESCRIPTION               | REF DES                                         | MARKINGS        | PART ID |
|-----|----------|---------------------------|-------------------------------------------------|-----------------|---------|
| 1   | 6-279-14 | 2.7 Ohm 1/4W 5% Resistor  | R161                                            | Red-Vio-Gld-Gld |         |
| 1   | 6-339-14 | 3.3 Ohm 1/4W 5% Resistor  | R107                                            | Org-Org-Gld-Gld |         |
| 1   | 6-100-14 | 10 Ohm 1/4W 5% Resistor   | R123                                            | Brn-Blk-Blk-Gld |         |
| 3   | 6-470-14 | 47 Ohm 1/4W 5% Resistor   | R111,R117,R148                                  | Yel-Vio-Blk-Gld |         |
| 1   | 6-680-14 | 68 Ohm 1/4W 5% Resistor   | R122                                            | Blu-Gry-Blk-Gld |         |
| 1   | 6-271-14 | 270 Ohm 1/4W 5% Resistor  | R137                                            | Red-Vio-Brn-Gld |         |
| 1   | 6-431-14 | 430 Ohm 1/4W 5% Resistor  | R131                                            | Yel-Org-Brn-Gld |         |
| 6   | 6-471-14 | 470 Ohm 1/4W 5% Resistor  | R101,R103,R106,<br>R112,R136,R158               | Yel-Vio-Brn-Gld |         |
| 3   | 6-102-14 | 1K Ohm 1/4W 5% Resistor   | R108,R127,R147                                  | Brn-Blk-Red-Gld |         |
| 5   | 6-222-14 | 2.2K Ohm 1/4W 5% Resistor | R100,R115,R116,<br>R154,R157                    | Red-Red-Red-Gld |         |
| 1   | 6-242-14 | 2.4K Ohm 1/4W 5% Resistor | R142                                            | Red-Yel-Red-Gld |         |
| 1   | 6-332-14 | 3.3K Ohm 1/4W 5% Resistor | R133                                            | Org-Org-Red-Gld |         |
| 1   | 6-362-14 | 3.6K Ohm 1/4W 5% Resistor | R143                                            | Org-Blu-Red-Gld |         |
| 3   | 6-472-14 | 4.7K Ohm 1/4W 5% Resistor | R102,R110,R121                                  | Yel-Vio-Red-Gld |         |
| 1   | 6-562-14 | 5.6K Ohm 1/4W 5% Resistor | R135                                            | Grn-Blu-Red-Gld |         |
| 1   | 6-622-14 | 6.2K Ohm 1/4W 5% Resistor | R145                                            | Blu-Red-Red-Gld |         |
| 1   | 6-682-14 | 6.8K Ohm 1/4W 5% Resistor | R146                                            | Blu-Gry-Red-Gld |         |
| 1   | 6-752-14 | 7.5K Ohm 1/4W 5% Resistor | R151                                            | Vio-Grn-Red-Gld |         |
| 8   | 6-103-14 | 10K Ohm 1/4W 5% Resistor  | R109,R129,R130,<br>R140,R149,R150,<br>R160,R167 | Brn-Blk-Org-Gld |         |
| 1   | 6-153-14 | 15K Ohm 1/4W 5% Resistor  | R125                                            | Brn-Grn-Org-Gld |         |
| 2   | 6-183-14 | 18K Ohm 1/4W 5% Resistor  | R155,R163                                       | Brn-Gry-Org-Gld |         |
| 4   | 6-223-14 | 22K Ohm 1/4W 5% Resistor  | R124,R156,R165,<br>R126                         | Red-Red-Org-Gld |         |

**Oak Hills Research  
OHR 100 Parts List  
40-210 PC Board**

| QTY | OHR P/N  | DESCRIPTION                | REF DES                      | MARKINGS        | PART ID |
|-----|----------|----------------------------|------------------------------|-----------------|---------|
| 1   | 6-273-14 | 27K Ohm 1/4W 5% Resistor   | R113                         | Red-Vio-Org-Gld |         |
| 2   | 6-473-14 | 47K Ohm 1/4W 5% Resistor   | R141,R166                    | Yel-Vio-Org-Gld |         |
| 1   | 6-753-14 | 75K Ohm 1/4W 5% Resistor   | R138                         | Vio-Grn-Org-Gld |         |
| 5   | 6-104-14 | 100K Ohm 1/4W 5% Resistor  | R114,R118,R119,<br>R120,R139 | Brn-Blk-Yel-Gld |         |
| 5   | 6-105-14 | 1M Ohm 1/4W 5% Resistor    | R132,R144,R153,<br>R159,R162 | Brn-Blk-Grn-Gld |         |
| 1   | 6-155-14 | 1.5M Ohm 1/4W 5% Resistor  | R128                         | Brn-Grn-Grn-Gld |         |
| 1   | K228     | 100 Ohm PC mount trim pot  | R104                         | Pink Body       | 34      |
| 1   | POT6     | 5K Ohm PC mount trim pot   | R152                         | 502             | 1       |
| 1   | POT10    | 100K Ohm PC mount trim pot | R168                         | 104             | 1       |
| 1   | K269     | 10pF 5% Disc Cap           | C188                         | 10              | 3       |
| 1   | K271     | 22pF 5% Disc Cap           | C118                         | 22              | 3       |
| 2   | MC16     | 33pF NP0 Mono Cap          | C135,C146                    | 33J             | 2       |
| 2   | K270     | 47pF 5% Disc Cap           | C147,C190                    | 47              | 3       |
| 2   | MC18     | 47pF NP0 Mono Cap          | C102,C173                    | 47J             | 2       |
| 2   | MC20     | 68pF NP0 Mono Cap          | C131,C172                    | 68J             | 2       |
| 1   | MC24     | 150pF NP0 Mono Cap         | C100                         | 151J            | 2       |
| 1   | K272     | 150pF 5% Disc Cap          | C189                         | 151J            | 3       |
| 2   | K283     | 270pF 5% Disc Cap          | C136,C137                    | 270J            | 3       |

**Oak Hills Research  
OHR 100 Parts List  
40-210 PC Board**

| QTY | OHR P/N | DESCRIPTION                  | REF DES                                                                                             | MARKINGS         | PART ID |
|-----|---------|------------------------------|-----------------------------------------------------------------------------------------------------|------------------|---------|
| 6   | MC34    | 1000pF NP0 Mono Cap          | C114,C124,C143,<br>C164,C166,C167                                                                   | 102J             | 2       |
| 1   | K326    | 1000pF Poly Cap (Axial)      | C165                                                                                                | 1000J            | 36      |
| 11  | MC101   | .01 $\mu$ F Mono Cap         | C101,C103,C105,<br>C133,C134,C149,<br>C169,C171,C182,<br>C183,186                                   | 103              | 2       |
| 16  | MC102   | .1 $\mu$ F Mono Cap          | C107,C111,C115,<br>C125,C127,C138,<br>C142,C145,C150,<br>C151,C154,C155,<br>C176,C177,C179,<br>C185 | 104              | 2       |
| 2   | K111    | .02 $\mu$ F Poly Cap         | C162,C163                                                                                           | 203 (Green Body) | 9       |
| 2   | MC104   | .047 $\mu$ F Mono Cap        | C161,C180                                                                                           | 473              | 2       |
| 1   | K327    | 4700pF Poly Cap (Axial)      | C168                                                                                                | 4700J            | 36      |
| 1   | MC106   | 1 $\mu$ F Mono Cap           | C153                                                                                                | 105              | 9       |
| 1   | CE01    | .47 $\mu$ F Electrolytic Cap | C106                                                                                                |                  | 10      |
| 1   | CE02    | 1 $\mu$ F Electrolytic Cap   | C144                                                                                                |                  | 10      |
| 1   | CE06    | 10 $\mu$ F Electrolytic Cap  | C126                                                                                                |                  | 10      |
| 4   | CE07    | 22 $\mu$ F Electrolytic Cap  | C130,C152,C158,<br>C178                                                                             |                  | 10      |
| 2   | CE11    | 220 $\mu$ F Electrolytic Cap | C159,C160                                                                                           |                  | 10      |
| 1   | TC08    | 27pF Air Trim Cap            | C181                                                                                                | Red Body         | 33      |
| 3   | TC09    | 40pF Trim Cap                | C104,C116,C132                                                                                      | Yellow Body      | 4       |

# Oak Hills Research

## OHR 100 Parts List

### 40-210 PC Board

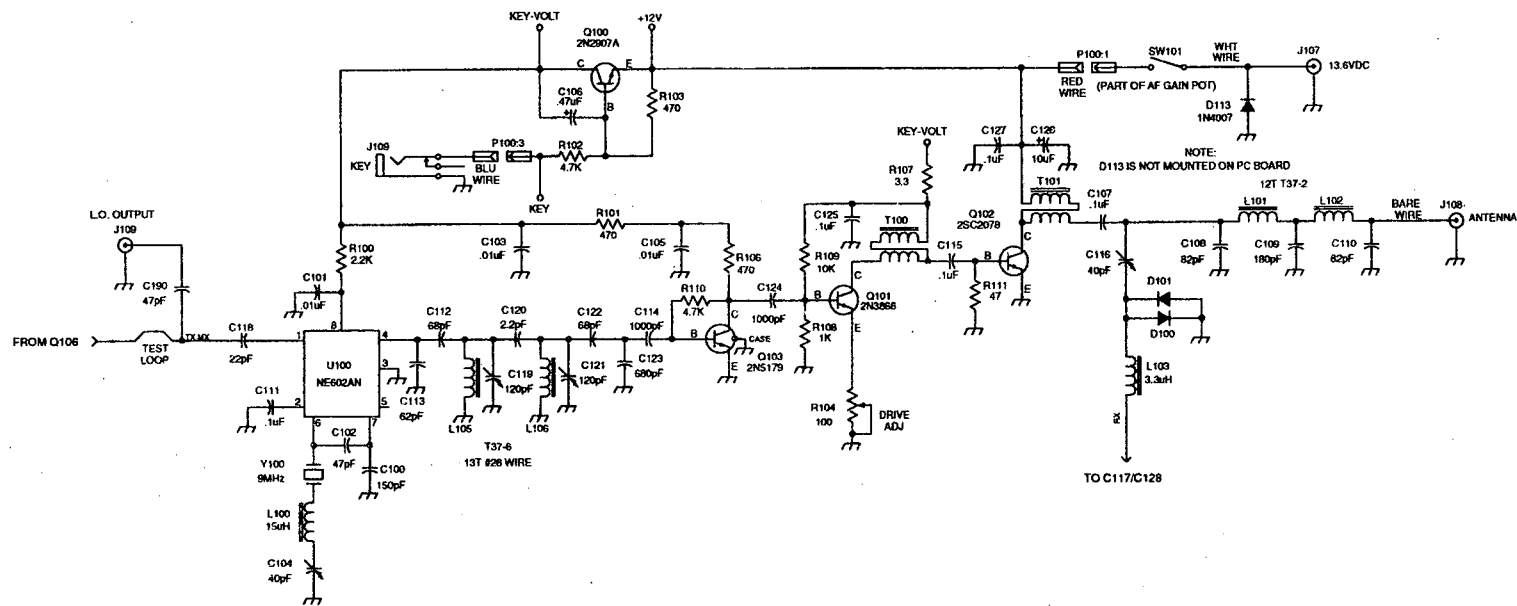
| QTY | OHR P/N  | DESCRIPTION           | REF DES                                         | MARKINGS         | PART ID |
|-----|----------|-----------------------|-------------------------------------------------|------------------|---------|
| 6   | TC13     | 120pF Trim Cap        | C119,C121,C129,<br>C141,C157,C175               | Black Body       | 4       |
| 2   | CH14     | 10μH Choke            | L108,L109                                       | Brn-Blk-Blk      | 5       |
| 2   | CH16     | 15μH Choke            | L100,L107                                       | Brn-Grn-Blk      | 5       |
| 2   | FT37-43  | Black Ferrite Core    | T100,T101                                       | 10 Bifilar Turns | 37      |
| 6   | K032     | 9MHz Crystal          | Y100,Y101,Y102,<br>Y103,Y104,Y105               | 9.000 MHz        | 8       |
| 8   | 1N4148   | Diode                 | D100,D101,D105,<br>D106,D108,D109,<br>D110,D114 | 1N4148           | 6       |
| 4   | MVAM108  | Varactor Diode        | D102,D103,D104<br>D107                          | MVAM108          | 17      |
| 1   | 78L09    | 9V Regulator          | U106                                            | 78L09            | 38      |
| 1   | MPF102   | JFET                  | Q107                                            | MPF102           | 38      |
| 1   | 2N2907A  | PNP Transistor        | Q100                                            | 2N2907A          | 7       |
| 3   | 2N3904   | NPN Transistor        | Q104,Q105,Q108                                  | 2N3904           | 38      |
| 1   | 2N3866   | NPN Transistor        | Q101                                            | 2N3866           | 11      |
| 1   | 2N5179   | NPN Transistor        | Q103                                            | 2N5179           | 42      |
| 2   | 2N5770   | NPN Transistor        | Q106,Q109                                       | 2N5770           | 38      |
| 1   | 2SC2078  | NPN Transistor        | Q102                                            | C2078            | 18      |
| 1   | LM324N   | Quad Op-Amp 14 Pin IC | U105                                            | LM324N           | 40      |
| 1   | LM380N-8 | Audio Amp 8 Pin IC    | U107                                            | LM380N-8         | 41      |
| 1   | MC1350P  | IF Amp 8 Pin IC       | U101                                            | MC1350P          | 41      |
| 4   | NE602AN  | Mixer/Osc 8 Pin IC    | U100,U102,U103,<br>U108                         | NE602AN          | 41      |
| 1   | CD4066   | Quad Switch 14 Pin IC | U104                                            | CD4066           | 40      |
| 6   | ICS01    | 8 Pin IC Socket       |                                                 |                  | 39      |
| 2   | ICS02    | 14 Pin IC Socket      |                                                 |                  | 39      |

## Oak Hills Research OHR 100 Chassis Parts List

| QTY | OHR P/N  | DESCRIPTION                                          | REF DES             | MARKINGS | PART ID |
|-----|----------|------------------------------------------------------|---------------------|----------|---------|
| 1   | 40-210   | PC Board                                             |                     |          |         |
| 1   | 10-110-A | Chassis Bottom                                       |                     |          |         |
| 1   | 10-110-B | Cabinet Cover                                        |                     |          |         |
| 1   | K318     | 100K Precision Pot (Large)                           | Main Tune           | 100K     | 27      |
| 1   | MP04     | 10K Pot                                              | Bandwidth Adj       | B10K     | 20      |
| 1   | MP03     | 5K Pot                                               | RIT                 | B5K      | 20      |
| 1   | MP08     | 10K Pot W/Switch                                     | Audio Gain - On/Off | B10K     | 20      |
| 1   | K095     | Toggle Switch                                        | SW100               |          | 26      |
| 1   | K302     | Panel Phono Jack                                     | Osc Out             |          | 24      |
| 1   | K293     | Coaxial DC Power Jack                                | J107                |          | 29      |
| 1   | K234     | Molded Power Cable                                   |                     |          | 35      |
| 2   | K090     | Standard 1/4" Phone Jack                             | J100,J109           |          | 19      |
| 1   | K092     | SO-239 Ant Connector                                 | J108                |          | 28      |
| 6   | K319     | Preassembled 3 Ckt Molex<br>Conn w/Red-Wht-Blu wires |                     |          | 44      |
| 1   | HS04     | Large Heatsink                                       |                     |          | 25      |
| 1   | HS03     | Small Red Heatsink                                   |                     |          | 13      |
| 1   | K027     | TO-39 Transistor Spacer                              |                     |          | 12      |
| 4   | K239     | 1/4" Hex Alum Spacer                                 |                     |          | 30      |
| 4   | K238     | 4-40 x 5/8" Machine Screw                            |                     |          | 43      |
| 5   | K056     | 4-40 x 5/16" Machine Screw                           |                     |          | 21      |
| 9   | K059     | #4 Hex Nut                                           |                     |          | 15      |
| 13  | K058     | #4 Lockwasher                                        |                     |          | 23      |
| 4   | K129     | #6 x 1/4" Black Sheet Screw                          |                     |          | 45      |
| 4   | K132     | Rubber Feet                                          |                     |          | 22      |
| 1   | 1 1/2"   | Large Solid Red Wire                                 |                     |          |         |
| 3   | K296     | Small Knob                                           |                     |          | 31      |
| 1   | K321     | Large Knob                                           |                     |          | 32      |
| 4   | K145     | Plastic Tie                                          |                     |          | 16      |
| 1   | 1N4007   | Silicon Diode                                        | D113                | 1N4007   | 14      |

**Oak Hills Research**  
**OHR 100 Parts List**  
**Band Pack (15M)**

| QTY | OHR P/N | DESCRIPTION        | REF DES                 | MARKINGS     | PART ID |
|-----|---------|--------------------|-------------------------|--------------|---------|
| 2   | MC03    | 2.2pF NP0 Mono Cap | C120,C140               | 229          | 2       |
| 3   | NP02    | 5pF 5% Disc Cap    | C156,C174,C184          | 5            | 3       |
| 1   | MC18    | 47pF NP0 Mono Cap  | C187                    | 47J          | 2       |
| 4   | K301    | 68pF 5% Disc Cap   | C112,C122,C128,         | 68           | 3       |
|     |         |                    | C148                    |              |         |
| 2   | K254    | 62pF 5% Disc Cap   | C113,C139               | 62           | 3       |
| 2   | K285    | 82pF 5% Disc Cap   | C108,C110               | 82J          | 3       |
| 1   | K284    | 180pF 5% Disc Cap  | C109                    | 180          | 3       |
| 2   | K282    | 680pF 5% Disc Cap  | C117,C123               | 680J         | 3       |
| 1   | K328    | 25.000 MHz Crystal | Y106                    | 25.000 MHz   | 8       |
| 1   | T44-6   | Yellow Toroid Core | L113                    | 13T #26 Wire | 37      |
| 2   | T37-6   | Yellow Toroid Core | L111,L112               | 12T #26 Wire | 37      |
| 4   | T37-6   | Yellow Toroid Core | L104,L105,L106,<br>L110 | 13T #26 Wire | 37      |
| 2   | T37-2   | Red Toroid Core    | L101,L102               | 12T #26 Wire | 37      |
| 1   | CH10    | 3.3uH Choke        | L103                    | Org-Org-Gld  | 5       |

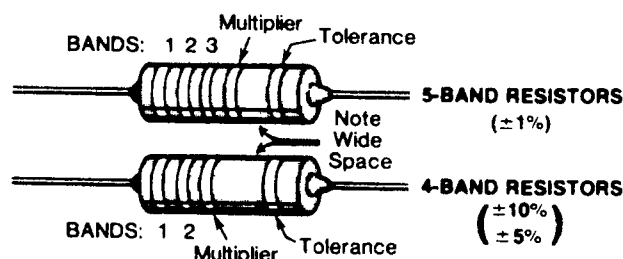


|                                         |            |                  |        |
|-----------------------------------------|------------|------------------|--------|
| Title COPYRIGHT 1996 OAK HILLS RESEARCH |            |                  |        |
| OHR100                                  |            |                  |        |
| Size                                    | Number     | TRANSMIT SECTION | Rev    |
| C                                       |            | 15M              | A      |
| Date                                    | 6/96       | Drawn by         | DW     |
| Filename                                | 40-210.S02 | Sheet            | 2 of 2 |



## RESISTORS

Resistors are identified in Parts Lists and steps by their resistance value in  $\Omega$  (ohms),  $k\Omega$  (kilohms), or  $M\Omega$  (megohms). They are usually identified by a color code of four or five color bands, where each color represents a number. See the "Resistor Color Code" chart. These colors are given in the steps in their proper order (except for the last band, which indicates a resistor's "tolerance"; see the "Resistor Tolerance Chart"). You do not need to memorize the color codes.



Occasionally, a "precision" or "power" resistor may have the value stamped on it. The letter R, K, or M may also be used at times to signify a decimal point, as in:

$$\begin{aligned} 2R2 &= 2.2 \Omega \\ 2K2 &= 2.2 k\Omega, \text{ or } 2200 \Omega \\ 2M2 &= 2.2 M\Omega \end{aligned}$$

Precision resistors may also be marked as shown in the following examples. The values of the multipliers are shown in the "Multiplier Chart," and the tolerance values are shown in the "Resistor Tolerance" chart.

Resistor Value Multiplier Tolerance

EXAMPLES:  $1009C = 100 \times 0.1 = 10 \Omega, \pm 0.25\%$   
 $1001D = 100 \times 10 = 1000 \Omega, \pm 0.5\%$

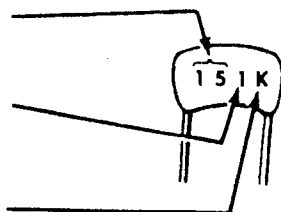
## CAPACITORS

Capacitors will be called out by their capacitance value in  $\mu F$  (microfarads) or pF (picofarads) and type: ceramic, Mylar<sup>®</sup>, electrolytic, etc. Some capacitors may have their value printed in the following manner:

First and second digits of capacitor's value: 15

Multiplier: Multiply the first & second digits by the proper value from the "Multiplier Chart."

To find the tolerance of the capacitor, look up this letter in the capacitor Tolerance chart.



## RESISTOR COLOR CODE CHART

|        | Band 1    | Band 2    | Band 3<br>(if used) | Multiplier  |
|--------|-----------|-----------|---------------------|-------------|
| Color  | 1st Digit | 2nd Digit | 3rd Digit           |             |
| Black  | 0         | 0         | 0                   | 1           |
| Brown  | 1         | 1         | 1                   | 10          |
| Red    | 2         | 2         | 2                   | 100         |
| Orange | 3         | 3         | 3                   | 1,000       |
| Yellow | 4         | 4         | 4                   | 10,000      |
| Green  | 5         | 5         | 5                   | 100,000     |
| Blue   | 6         | 6         | 6                   | 1,000,000   |
| Violet | 7         | 7         | 7                   | 10,000,000  |
| Gray   | 8         | 8         | 8                   | 100,000,000 |
| White  | 9         | 9         | 9                   | —           |
| Silver | —         | —         | —                   | .01         |
| Gold   | —         | —         | —                   | .1          |

## RESISTOR TOLERANCE CHART

|              | COLOR OR LETTER |   |
|--------------|-----------------|---|
| $\pm 10\%$   | SILVER          |   |
| $\pm 5\%$    | GOLD            | J |
| $\pm 2\%$    | RED             | G |
| $\pm 1\%$    | BROWN           | F |
| $\pm 0.5\%$  | GREEN           | D |
| $\pm 0.25\%$ | BLUE            | C |
| $\pm 0.1\%$  | VIOLET          | B |
| $\pm 0.05\%$ | GRAY            |   |

## MULTIPLIER CHART

| FOR THE NUMBER: | MULTIPLY BY: | FOR THE NUMBER: | MULTIPLY BY: |
|-----------------|--------------|-----------------|--------------|
| 0               | 1            | 4               | 10,000       |
| 1               | 10           | 5               | 100,000      |
| 2               | 100          | 8               | 0.01         |
| 3               | 1000         | 9               | 0.1          |

## CAPACITOR TOLERANCE CHART

| LETTER | 10 pF OR LESS | OVER 10 pF |
|--------|---------------|------------|
| B      | $\pm 0.1 pF$  |            |
| C      | $\pm 0.25 pF$ |            |
| D      | $\pm 0.5 pF$  |            |
| F      | $\pm 1.0 pF$  | $\pm 1\%$  |
| G      | $\pm 2.0 pF$  | $\pm 2\%$  |
| H      |               | $\pm 3\%$  |
| J      |               | $\pm 5\%$  |
| K      |               | $\pm 10\%$ |
| M      |               | $\pm 20\%$ |

EXAMPLES:  $151K = 15 \times 10 = 150 pF$   
 $759 = 75 \times 0.1 = 7.5 pF$

NOTE: The letter "R" may be used at times to signify a decimal point, as in:  $2R2 = 2.2 (pF \text{ or } \mu F)$ .

# PARTS PICTORIAL

1



2



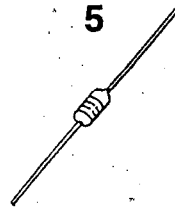
3



4



5



6



7



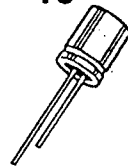
8



9



10



11



12



13



14



15



16



17



18



19



20



21



22



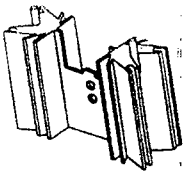
23



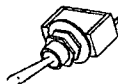
24



25



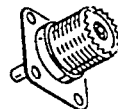
26



27



28



29



30



31



32



33



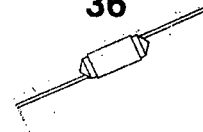
34



35



36



## PARTS PICTORIAL

37



38



39



40



41



42

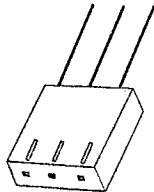


Always count the number  
of pins on the socket.

43



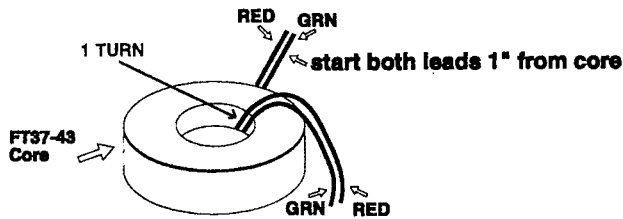
44



45

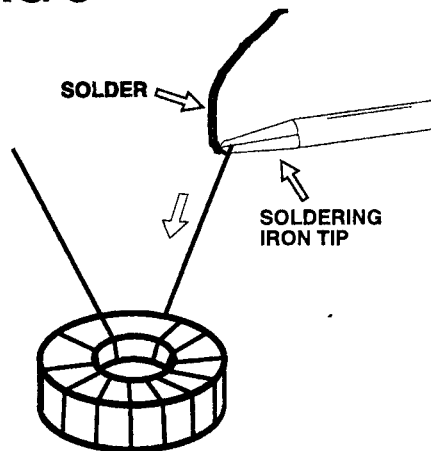


# ASSEMBLY PICTORIAL



Everytime the wires pass through the center of the core, you count that as one turn. Turns are always counted on the inside of the core.

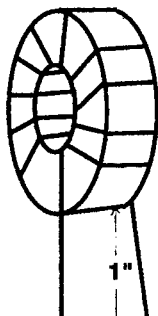
**FIG 3**



To tin the lead, place the soldering iron tip and solder on the lead near the end and feed a small amount of solder to the tip and lead. Move the tip back and forth a small amount. Keep feeding more solder to the tip and lead. The lead will start to tin. As it does, slowly move the tip and solder up the lead toward the core. As you do, the lead will become tinned. Continue until the entire lead is tinned. Repeat with the other lead or leads.

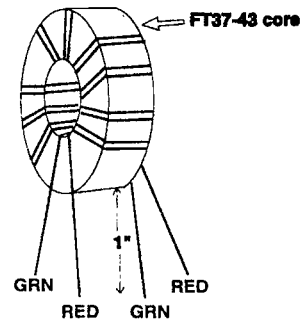
**FIG 5**

For illustration purposes only. Actual number of turns on core varies from coil to coil.



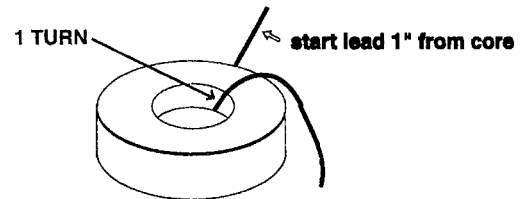
After winding, trim both leads to 1" from core. Tin each lead to the core.

**FIG 7**



After winding, trim all four leads to 1" from core. Tin each lead to the core.

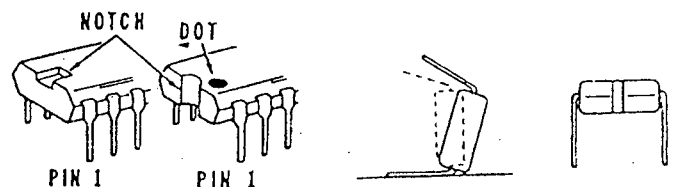
**FIG 4**



Everytime the wire passes through the center of the core, you count that as one turn. Turns are always counted on the inside of the core.

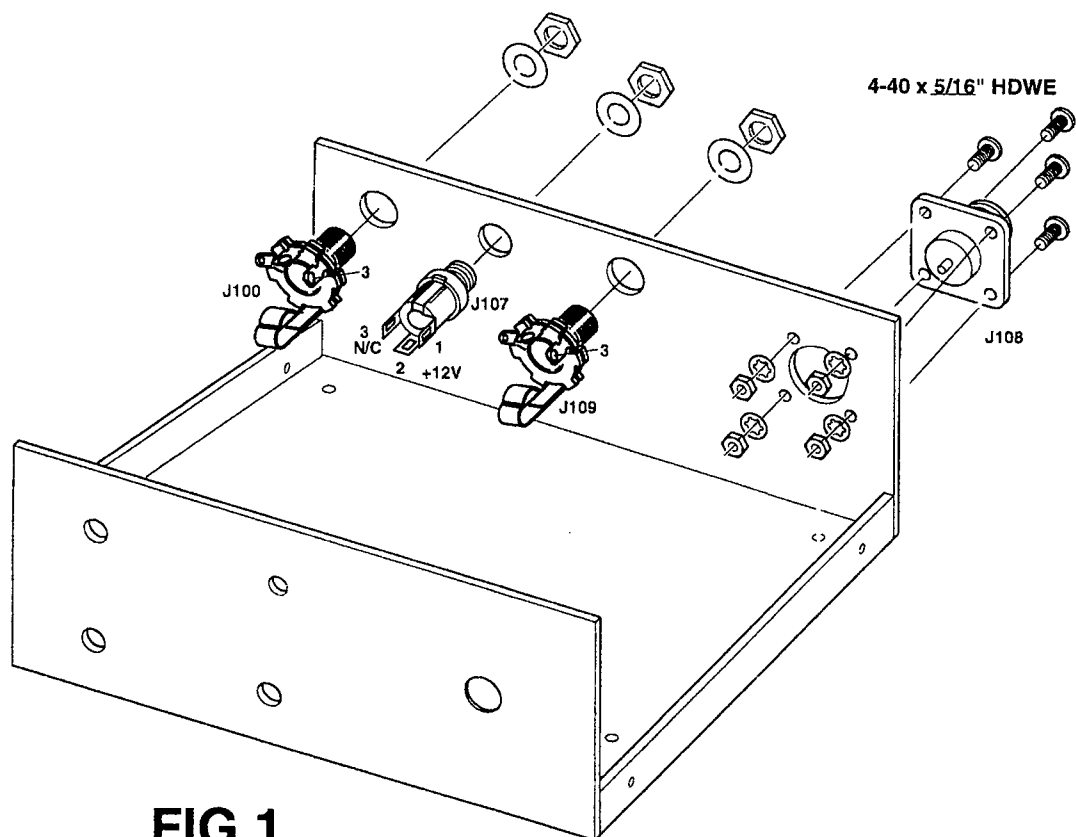
**FIG 6**

Before you install an IC, lay it down on its side as shown below and very carefully roll it toward the pins to bend the lower pins into line. Then turn the IC over and bend the pins on the other side in the same manner.

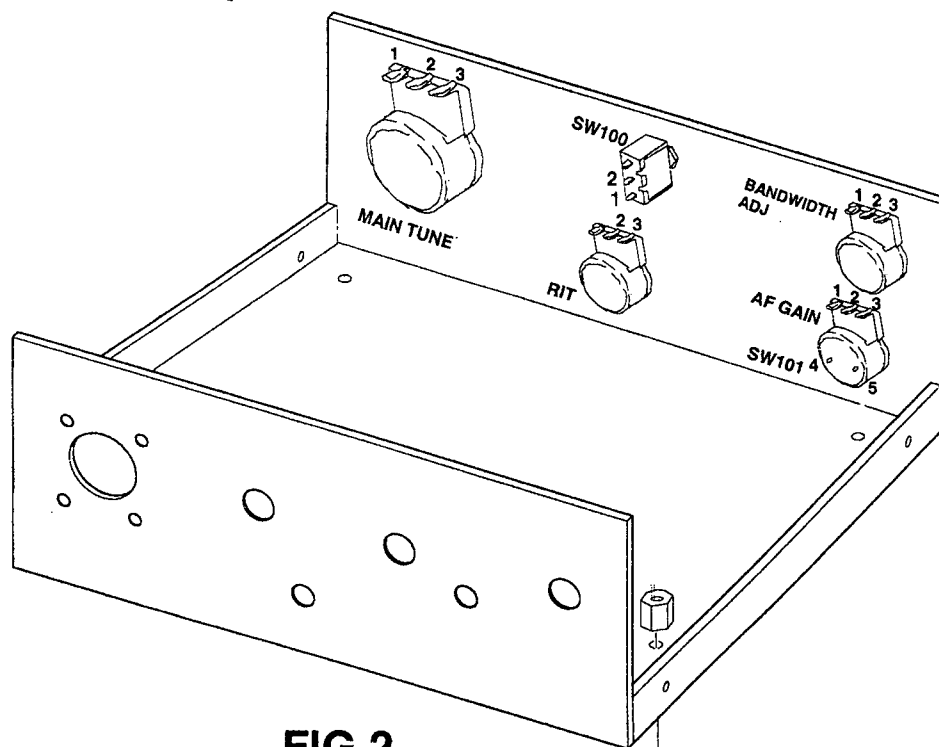


**FIG 8**

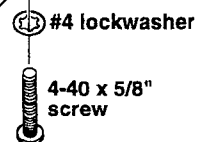
# ASSEMBLY PICTORIAL



**FIG 1**



**FIG 2**



## **CORRECTION**

### **OHR 100 INSTRUCTION MANUAL**

**Before starting construction of your kit, please make the following corrections.**

**The two 10uH (Brn-Blk-Blk) chokes L108 and L109 and the two 33pF (33J) NP0 mono caps C146 and C135 are now located in the band pack.**

**Electrolytic cap C106 is now a bipolar unit. The value remains at .47μF. The cap may be installed with the long lead in either hole.**

**Thank you**

**Oak Hills Research**

## **1 YEAR LIMITED WARRANTY**

**PARTS** - Replacements for defective parts will be supplied free of charge for a period of one year from the date of purchase. Replacement parts are warranted for the remaining portion of the original warranty period. If you have a defective part, you may obtain a replacement by calling us at (616) 796-0920. We will pay the shipping charges on these parts.

**SERVICE LABOR** - For a period of one year from date of purchase, any malfunction caused by defective parts will be corrected at no charge to you. You must deliver the unit at your expense to us. This warranty does not cover the correction of assembly errors or damage incurred during assembly of the kit.

**TECHNICAL CONSULTATION** - You will receive free consultation on any problem you may encounter in the assembly or use of our product. Just give us a call at (616) 796-0920, we will be glad to assist you.

**NOT COVERED** - The correction of assembly errors, adjustments, calibration, damage due to misuse, abuse or negligence are not covered by this warranty. Use of corrosive solder will void this warranty in its entirety. This warranty does not include reimbursement for inconvenience, loss of use or customer assembly.

This warranty covers only Oak Hills Research products and is not extended to other equipment or components that a customer uses in conjunction with our products.

**EFFECTIVE WARRANTY DATE** - Warranty begins on the date of first consumers purchase. Please supply a copy of your invoice when you request warranty service or parts.

**SHIPPING UNITS** - When shipping a unit back to us for repair, use adequate packing material. Damage due to inadequate packing cannot be repaired under this warranty.

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