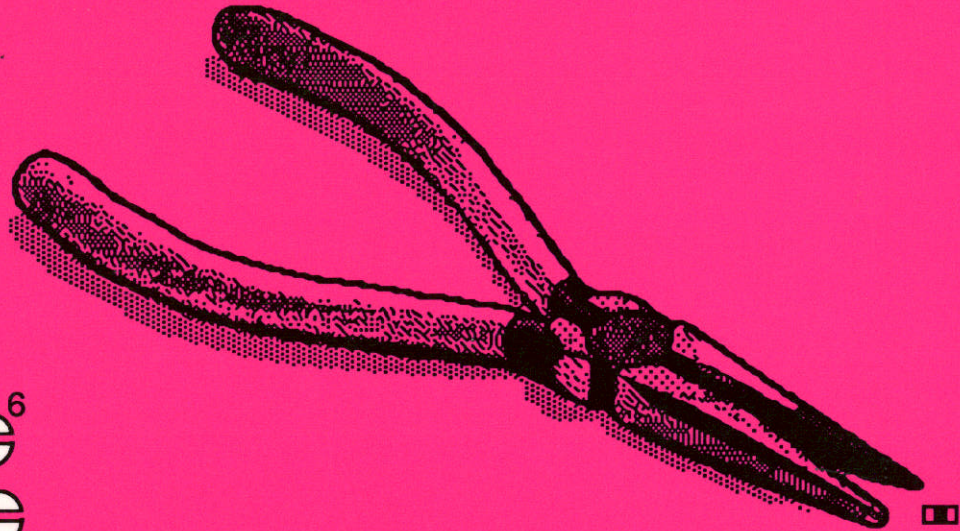
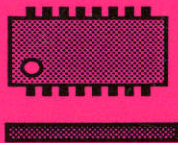
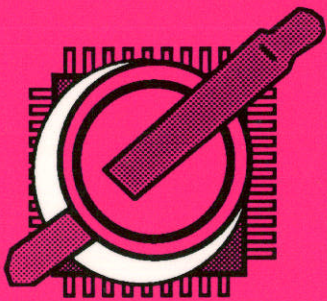
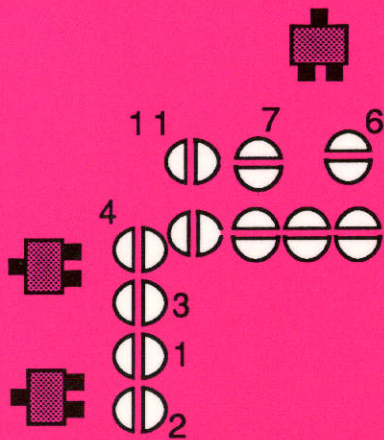


Radio / Tech Modifications



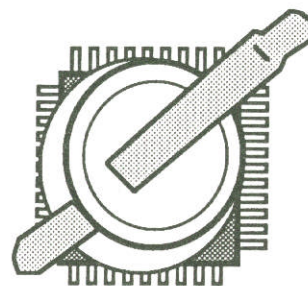
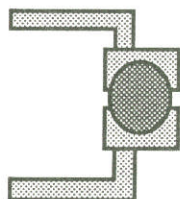
Modifications for:

Alinco
ICOM
Kenwood
Yaesu
Standard
CB's
Scanners
Others





Radio / Tech Modifications



artsci



Artsci, Inc.
P.O. Box 1848
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Radio / Tech Modifications

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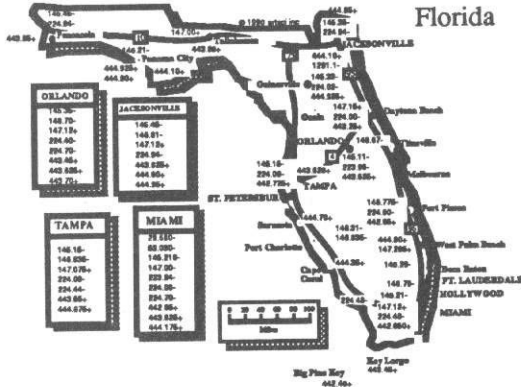
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U.S. REPEATER MAPBOOK #2

A repeater guide that shows where in each state principal open amateur repeaters are located. The Maps also show the important highways in each state. Tables showing the popular repeater in the states major cities are also presented. 2 meter, 200, 440 MHz and 1.2 GHz repeaters are shown. 144 pages, 6 x 9" format

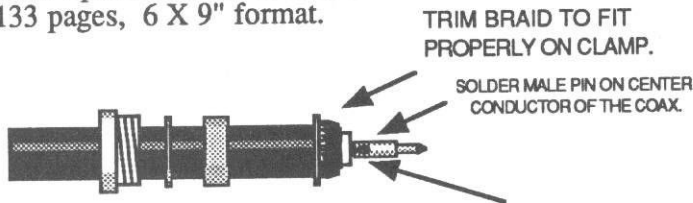


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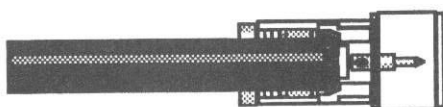
The Frequency assignment master file. The complete listing of all U.S. government used frequencies listed by agency and in frequency order. Frequencies for Departments of: Agriculture, Air Force, Army, Commerce, Defence, Energy, Health and Human Services, Housing and Urban Development, Interior, Justice, Labor, Navy, State, Treasury, Transportation and 29 Independent agencies & Commissions. 255 pages, 8 1/2 X 11" format

AMATEUR HAMBOOK

Equipment & Log Sheets, Charts, Tables showing: worldwide call signs, world times, shortwave listening frequencies, coax losses, CTCSS details, conversions, construction plans, emergency information, etc. This book contains all the useful information a amateur radio operator needs to reference. 133 pages, 6 X 9" format.



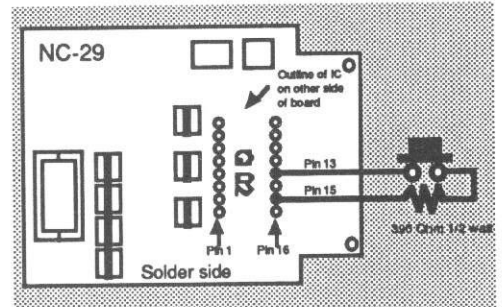
NOTE: USE A FINE FILE TO RUFF UP THE CENTER CONDUCTOR UNDER THE SOLDER HOLE TO IMPROVE THE SOLDER JOINT.



RADIO/TECH MODIFICATIONS # 4

Modifications for all the popular amateur radios, including:

Allinco	ICOM	Kenwood	Others
ALD-24T	IC-02AT*	TH-21A*	
ALR-22T	IC-2GAT*	TH-25A*	
ALR-22T	IC-2SA*	TH-26A*	
DJ-100T	IC-2SAT*	TH-27A*	
DJ-160T*	IC-3SAT*	TH-45A*	
DJ-460T*	IC-04AT*	TH-55A*	BC-200*
DJ-500	IC-4GAT*	TH-75A*	BC-205
DJ-560*	IC-4SA*	TH-77A*	BC-760
DR-110T*	IC-12AT	TH-215*	BC-950
DR-510*	IC-2A*	TH-315*	
DR-570T*	IC-27*	TM-221*	R-4030*
DR-590T*	IC-28A/H	TM-231A*	R-1600*
	IC-32AT	TM-241A	
Yaesu	IC-228	TM-321*	PRO-2004
FL-7000*	IC-229*	TM-421*	PRO-2005
FT-23R*	IC-448	TM-621	PRO-2006
FT-26*	IC-575*	TM-701A*	PRO-2022
FT-33R*	IC-720	TM-721*	PRO-34
FT-73R*	IC-725	TM-731*	
FT-76*	IC-730	TM-2530*	HR-2510*
FT-209*	IC-735*	TM-2550*	148GTL*
FT-212*	IC-740	TM-2570*	
FT-227R	IC-745	TR-751*	Cobra
FT-290	IC-751	TR-2500*	Realistic
FT-311*	IC-761	TR-2600*	Others
FT-411*	IC-765	TS-140S*	
FT-470*	IC-781*	TS-430S	RCI 2950*
FT-709*	IC-900*	TS-440S	KDK FM-240
FT-711*	IC-901A	TS-680*	TEN TEC PARAGON
FT-712 RH*	IC-1200	TS-711	AZDEN PCS-6000
FT-727*	IC- 2400	TS-790A	
FT-736R	IC-2500E	TS-850S*	STANDARD C228A*
FT-747	IC-3210	TS-930S	STANDARD HW-24*
FT-757	IC-3220*	TS-940	
FT-767GX	IC-H16*	TS-960SD	
FT-811*	IC-U2AT*	TS-2400	
FT-900*	IC-U4AT*	TW-4100	
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FT-2311	IC-W2A*		
FT-2400	IC HT'S TO TNC		
FT-4700			
FT-5200*			
FT-ONE			
NC-29			



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Preface

WHO SHOULD PERFORM MODIFICATIONS

This book is intended to be used as a reference guide for licensed Technicians. The text for each modification has been written with belief that the performing technician has experience with servicing modern radio equipment.

Attempts to perform these modifications by an inexperienced person may cause serious damage to the radio. Damage can occur by simply opening the radio case incorrectly. With the average repair cost of a damaged radio exceeding \$150.00, it is a good investment paying a licensed technician to perform the modification.

Many of the new radio are constructed with components that are barely larger than the head of a pin. Many of these parts require precision soldering. Excessive heat can damage these parts. Caution and the proper tools should be used to avoid damage to the components.

Some of the modifications presented in this book have not been tested. However, most of the modifications have been, at one time or another, reviewed by the technicians at the radio manufacturing or distributing plants.

USE THE PROPER EQUIPMENT

Alignment controls have been shown on many of the radios presented here. Proper alignment of a radio require test equipment that is usually not available to the average operator. Exercise caution when changing the alignment controls. Improper settings can cause a radio to generate RF signals outside the desired frequency range. These undesired emissions will cause interference to others and may quite possibly be illegal.

Service manuals are valuable to any radio service technician. Service manuals will provide you with a list of components and detailed drawings of your radio. Our technical department is always looking to review the service manuals for the radios presented in this publication. If you have a service manual for a radio present here, we would like to review it.

MODIFICATIONS OF TYPE ACCEPTED EQUIPMENT

Some of the modifications presented in this publication may allow a radio to operate outside its design range. Using a radio outside of its designed range may cause radio interference, equipment damage or may simply be illegal. If you have any concerns about the validity of the modification, or the purpose for a modified radio, do not perform the modification. Use your best judgement.

HOW FAR 'OUT OF BAND' WILL MY RADIO OPERATE?

The exact Receive and Transmit Frequency range of a radio is almost impossible to predict. The technicians at the factory tune a radio to operate in the specified range. Most radios can be tuned to operate almost anywhere within a 50 MHz range.

Once a radio is tuned, it should operate anywhere within a 30 MHz window. That's 15 Mhz up and 15 MHz down from center. Most of the newer radio have been designed to allow a greatly increased range.

Your radio may operate better 'out of band' towards to bottom half of the workable range, and the next radio may operate better towards the top half.

The modifications presented here deal with opening up the microprocessors allowable frequency range. After a modification has been done, the microprocessor will tell the VCO/VXO circuitry what frequency to operate on. Can the current tuning of the RF coils and the circuitry operate at the desired frequency? That is the big question.

The tuning of the coils and VCO/VXO circuitry can be changed. These changes go well beyond the scope of this publication.

ACCURACY AND NEW MODIFICATIONS

The authors have made every attempt to present all the available modifications. As new radios and modifications become available, they will be added to the next publication. Outside contributions are accepted. A number of useful graphs, charts and tables are provided in the appendices.

Technicians are welcome to forward comments, suggestion and new modifications. Forward your modifications to our mailing address or FAX a copy to us.

Radio / Tech Modifications

Kenwood Radio Modifications

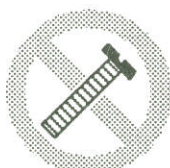
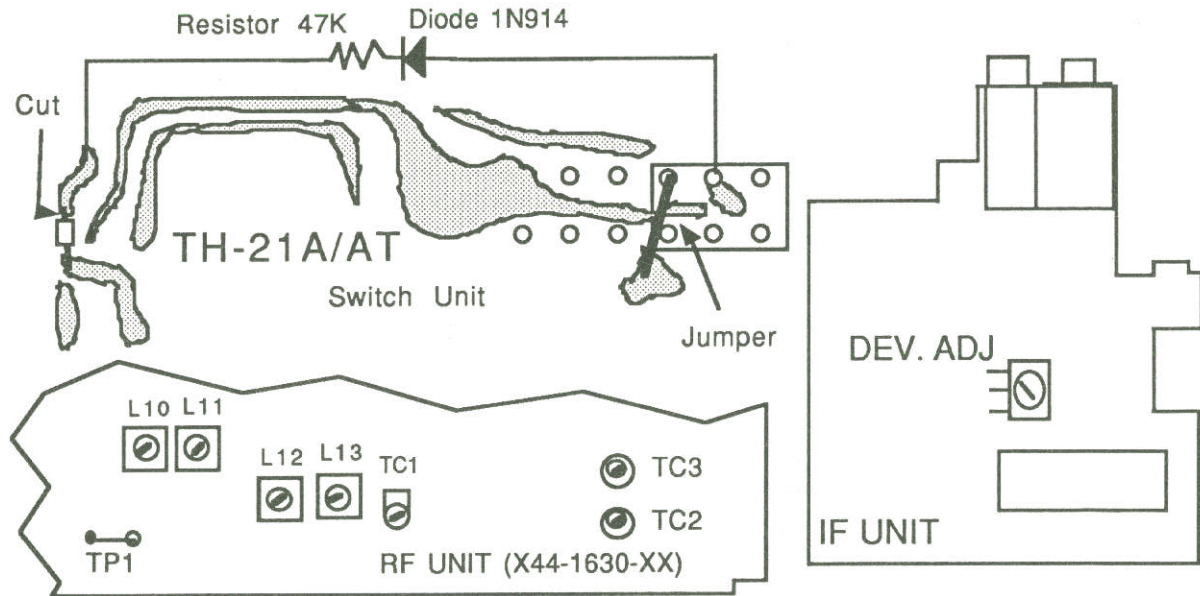
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KENWOOD TH-21A/AT

EXPANDED RF 140-159 MHz

1. Disconnect the battery and antenna.
2. Remove knobs, antenna nut ring and plastic top
3. Remove front panel.
4. Locate switch unit. (PCB X41-1590-00) This unit has the Vol, Squ etc.
5. Cut trace between R1 and D4,D5
6. Install a jumper from the common point of R11, R5 & 5C to the corner of the tone switch.
7. Install a 1N914 diode and 48K resistor from the center top pin of the tone switch to the end of resistor R1. (R1 was cut in step 5).
Note: Cathode end of the diode goes to the tone switch top center pin.
Cathode end of a diode has the line.
8. Adjust L10,L11,L12,L13,TC1,TC2 & TC3 for maximum upper frequency range.
9. Reassemble the radio.

Depress the tone switch to receive from 140 to 149 MHz
Tone switch off for 150 -159 MHz.



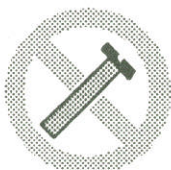
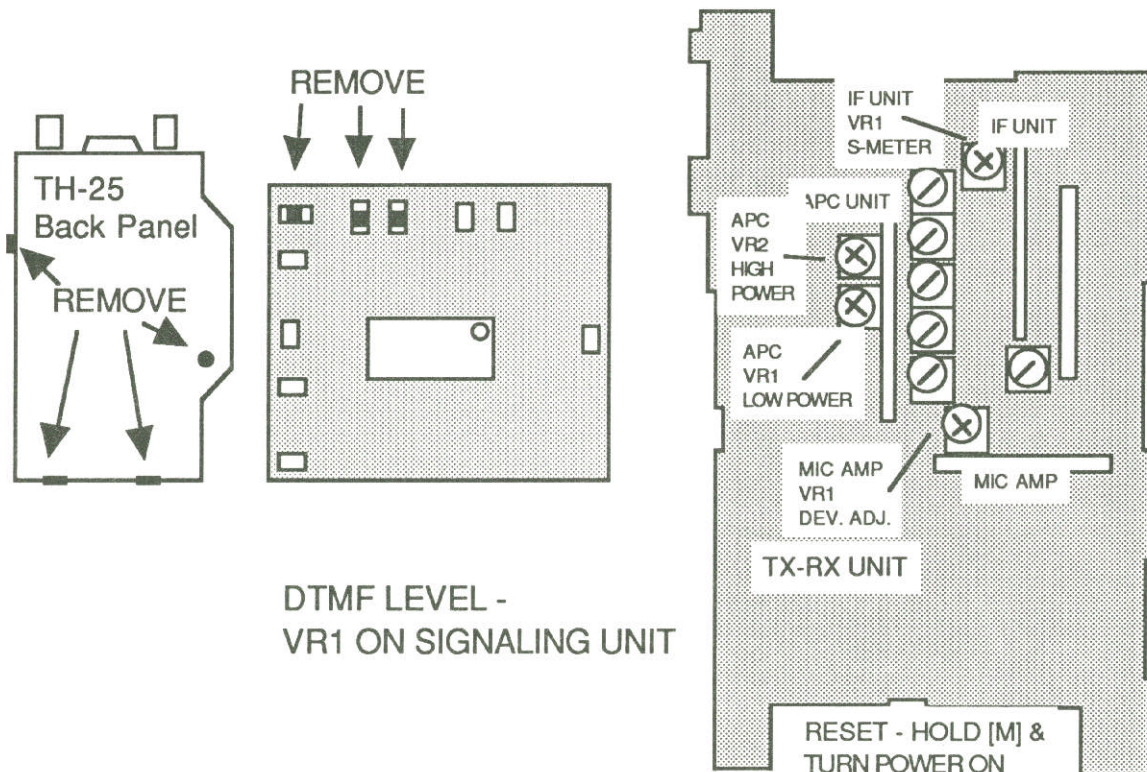
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KENWOOD TH-25AT

EXPANDED RF

1. Disconnect the power and antenna.
2. Remove the volume, squelch and tuning control knobs
3. Remove the nuts from the volume control and tuning controls.
4. Remove screw located by the PTT switch.
5. Remove screw by the speaker jack
6. Remove two screws from the battery plate.
7. Carefully pull the front panel from the radio. Do not break any wires.
8. Gently lift the top panel from the radio by pulling it forward and then upwards. The O ring on the BNC connector will cause some tension.
9. Rotate the top panel towards the front of the radio to expose the .75" X .75" board.
10. Remove chip resistors R19, R20 & R21.
11. Reassemble the radio.
12. RESET the CPU. Hold down [M] and turn power on.



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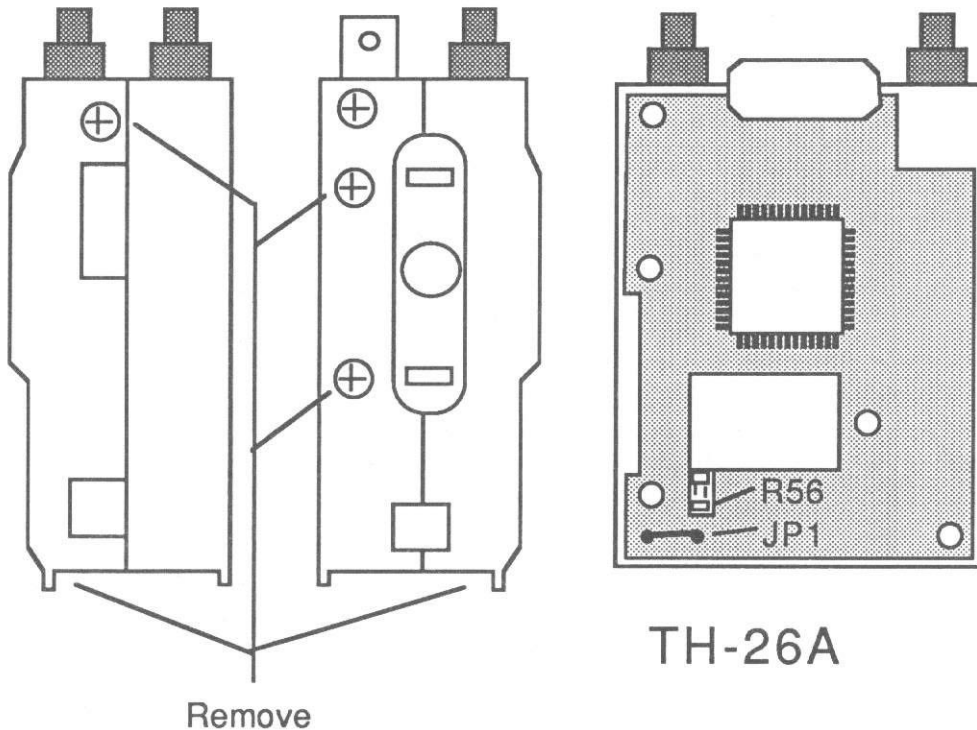
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KENWOOD TH-26A

EXPANDED RF

1. Disconnect the power and antenna.
2. Remove 3 screws from the case and 2 from the battery plate.
3. Open the radio.
4. Remove jumper JP1. Use a soldering iron the remove the jumper. Do not pull the jumper or overheat the board.
5. Unsolder and remove chip resistor R56.
6. Reassemble the radio. Carefully re-seat the O-Ring on the BNC connector.
7. Reset the microprocessor. (Press and hold the [F] key and turn the power on.)

Note: Automatic offset selection will be disabled when this mod is performed.



Caution

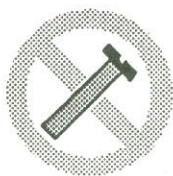
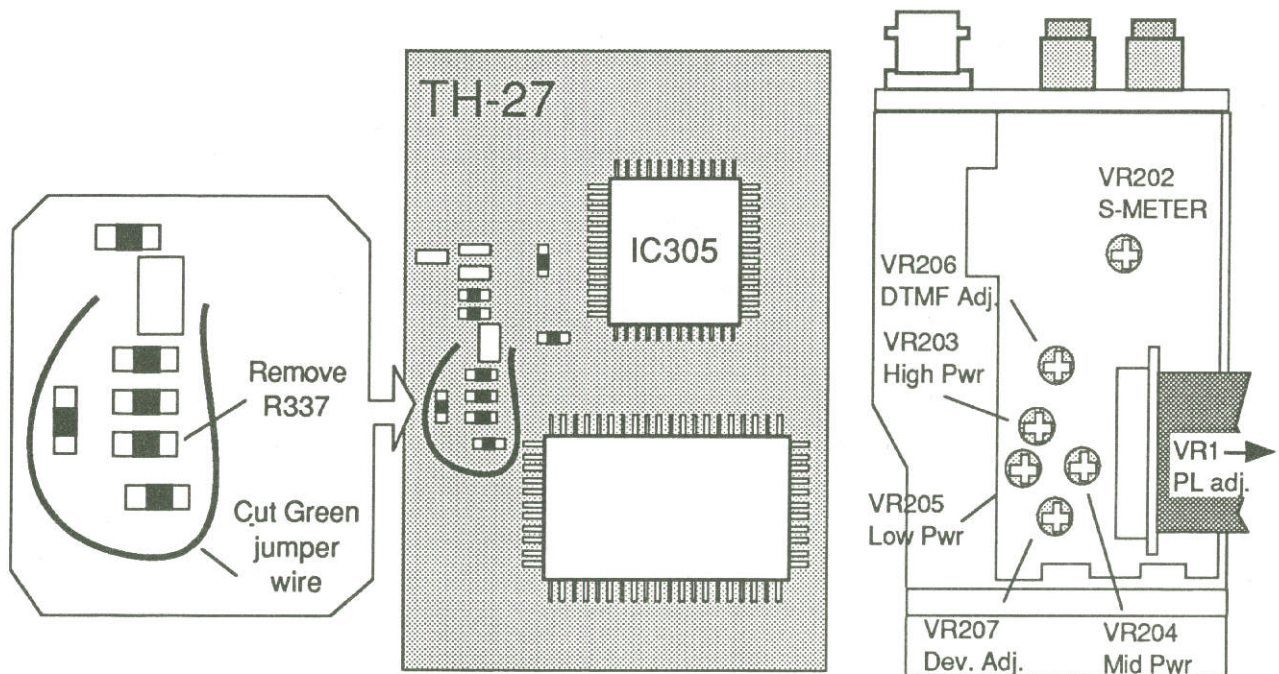
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KENWOOD TH-27A

EXPANDED RF

1. Disconnect the Power and antenna.
2. Remove 4 screws from the back panel.
3. Open the bottom of the front panel first and slide the panel downward.
4. Open the radio being careful not to break the flex cable.
5. Move the tone board out of the way to expose the green jumper wire located inside the front panel assembly.
6. Cut the GREEN Jumper wire.
7. Remove chip resistor R337. (Disables AM receive & auto offset)
8. Reassemble the radio. Carefully re-seat the O-Ring on the BNC connector.
9. Reset the Microprocessor. (Press and hold the [M] key and turn the power on.)



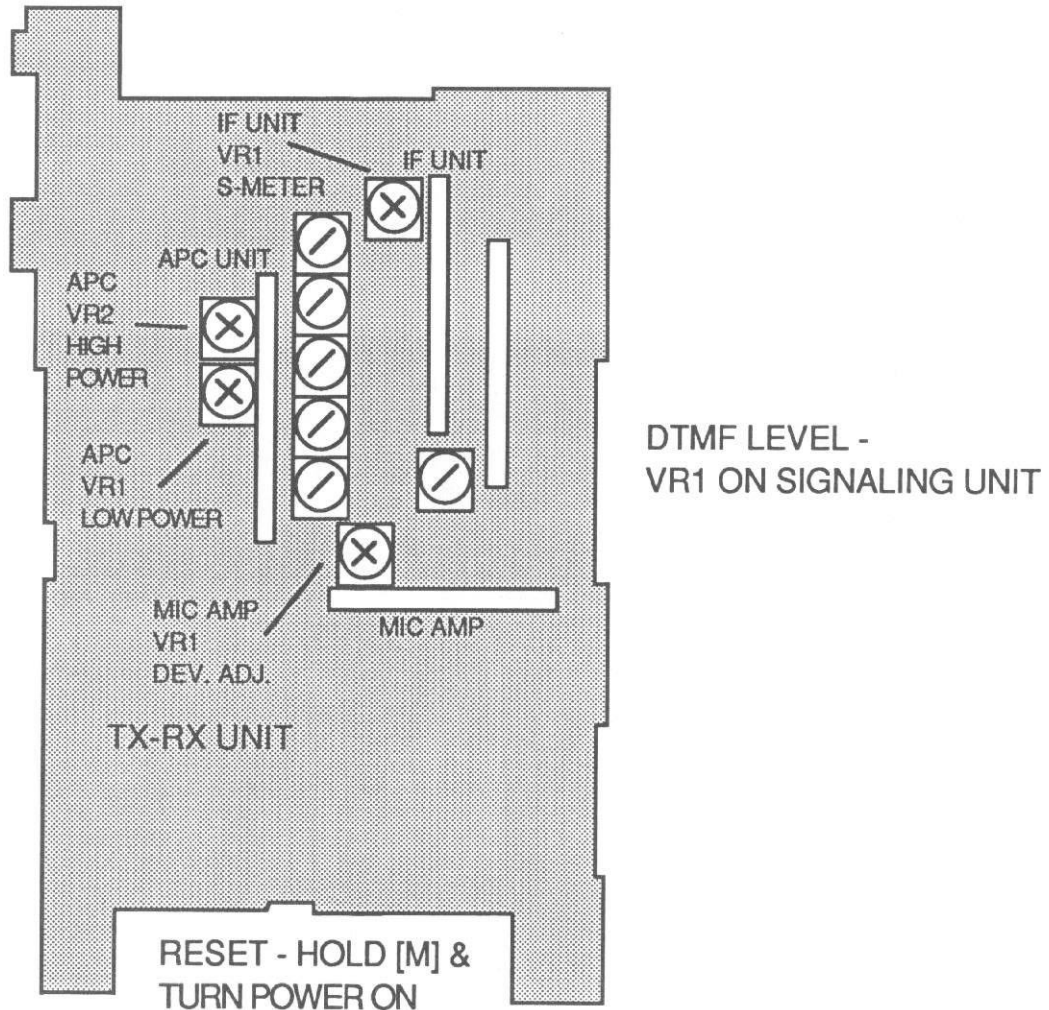
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KENWOOD TH-45A/AT

ADJUSTMENT CONTROLS



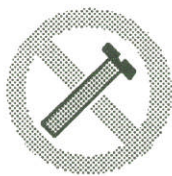
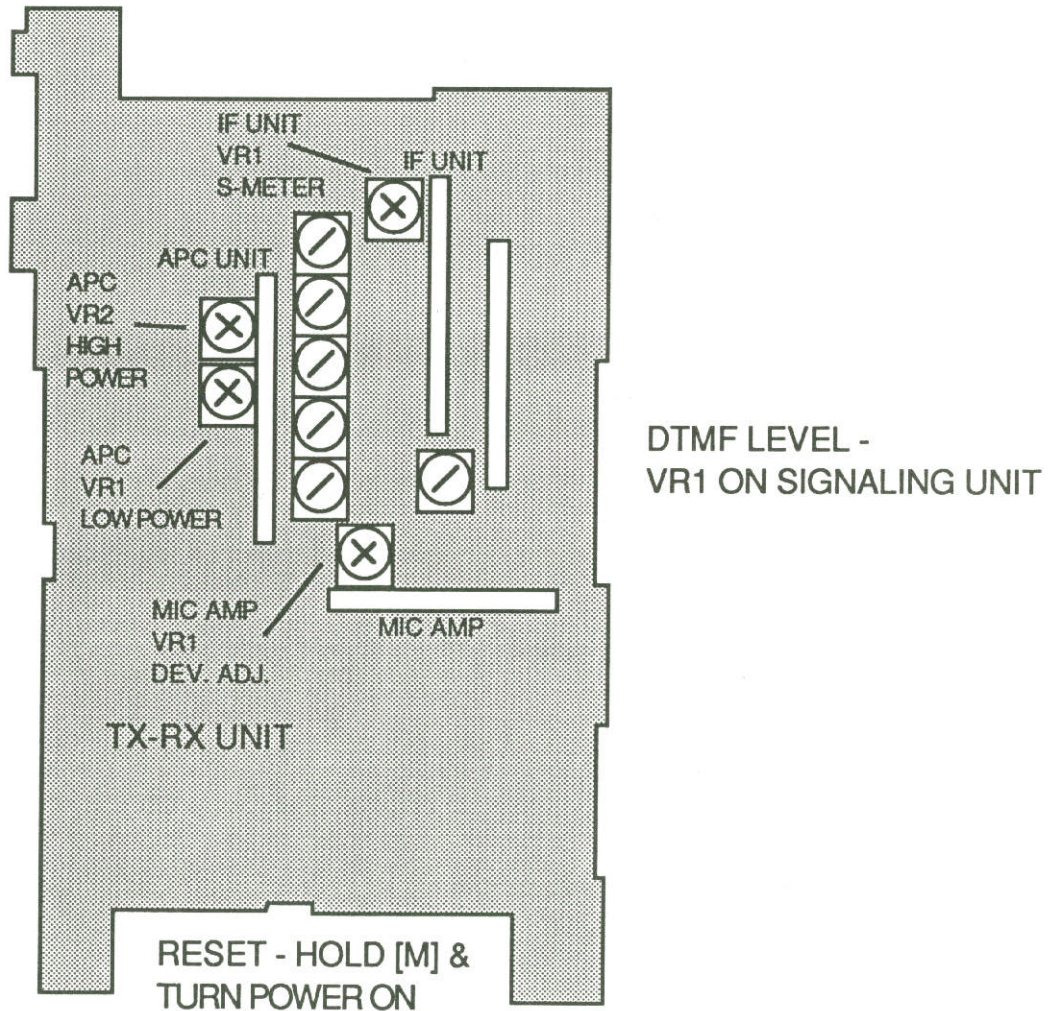
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KENWOOD TH-55A/AT

ADJUSTMENT CONTROLS



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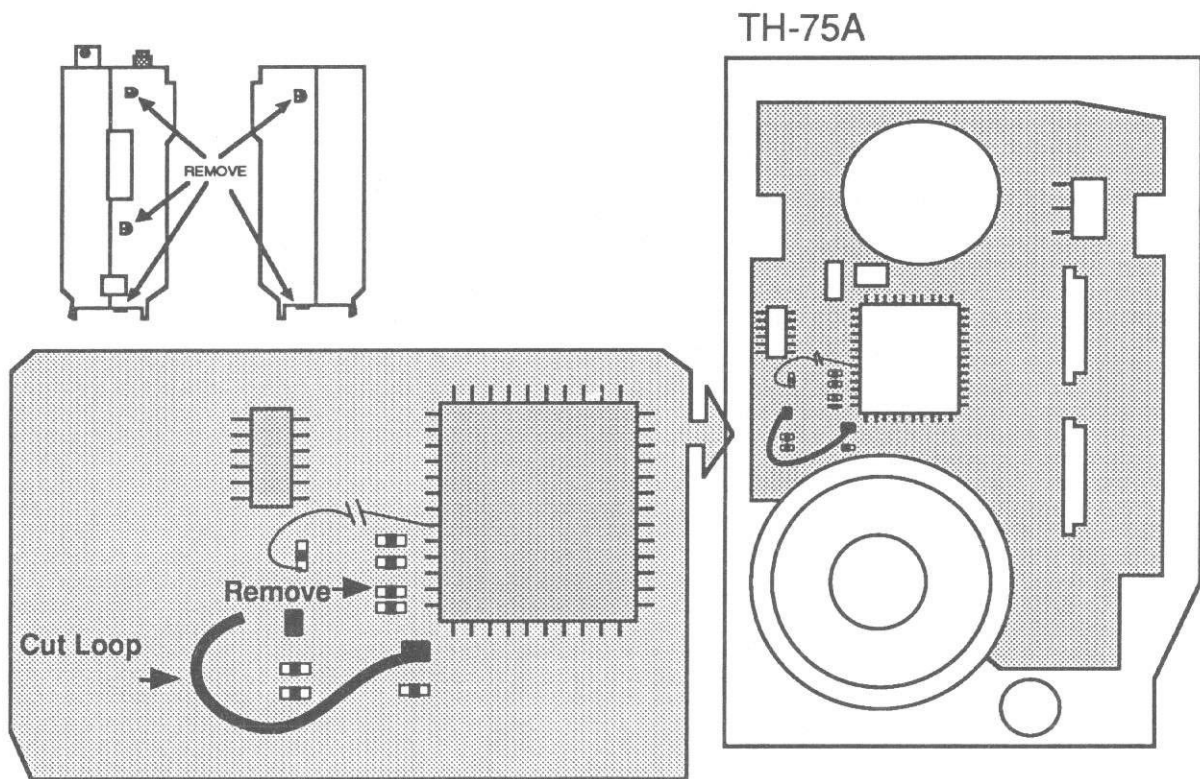
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KENWOOD TH-75A

EXPANDED RF

1. Disconnect the battery and antenna.
2. Remove the three case screws and two battery plate screws.
3. Lift front panel from radio. Do not disconnect flex cables.
4. Cut the GREEN JUMPER WIRE, located on left side of the CPU.
5. Remove the diode. (see drawing)
6. Reassemble the radio.
7. RESET the CPU. Press and hold the M Key while turning on the radio.



Caution

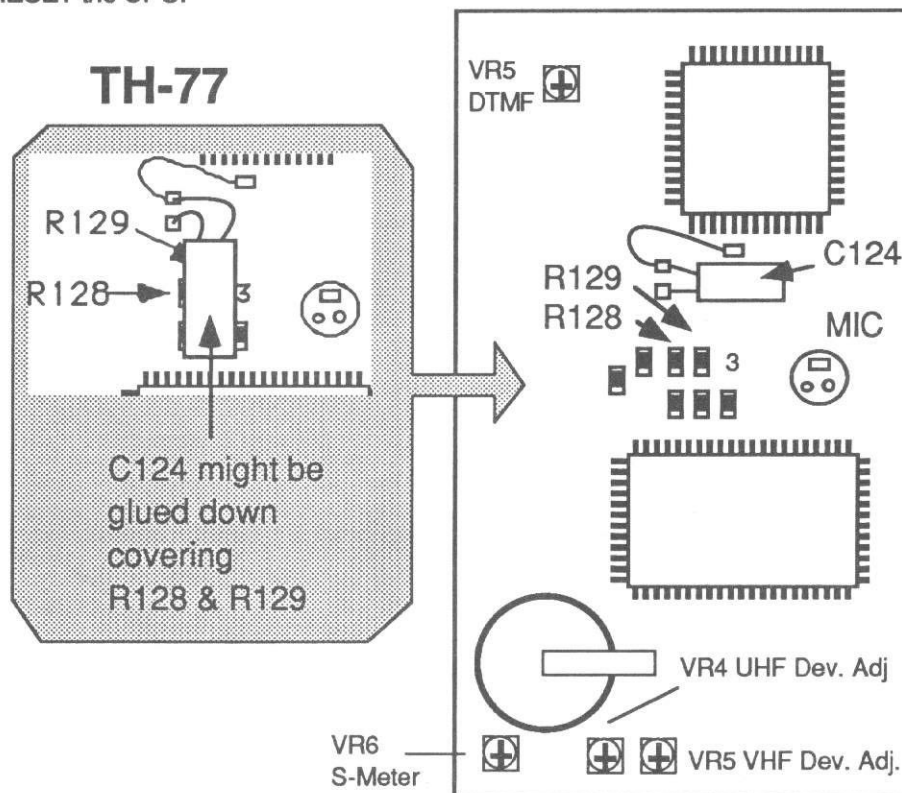
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KENWOOD TH-77A

EXPANDED RF CROSS BAND REPEATER AM RECEIVE ON 118-136 MHz

1. Disconnect the battery and antenna.
2. Remove the three case screws and two battery plate screws.
3. Lift front panel from radio. Do not disconnect flex cables.
4. Remove chip resistor R128 and R129. Capacitor C124 may be glued down over these Resistors. You may wish to unsolder the capacitor to avoid tearing the flex board foil traces.
5. Reassemble the radio.
6. RESET the CPU.



AM sensitivity is typically less than 1uV for 10db S+N/N.

CROSS BAND OPERATING PROCEDURES

Turn on /off the Repeater mode : Press and hold the [SUB UP] key and turn the power on.



Caution

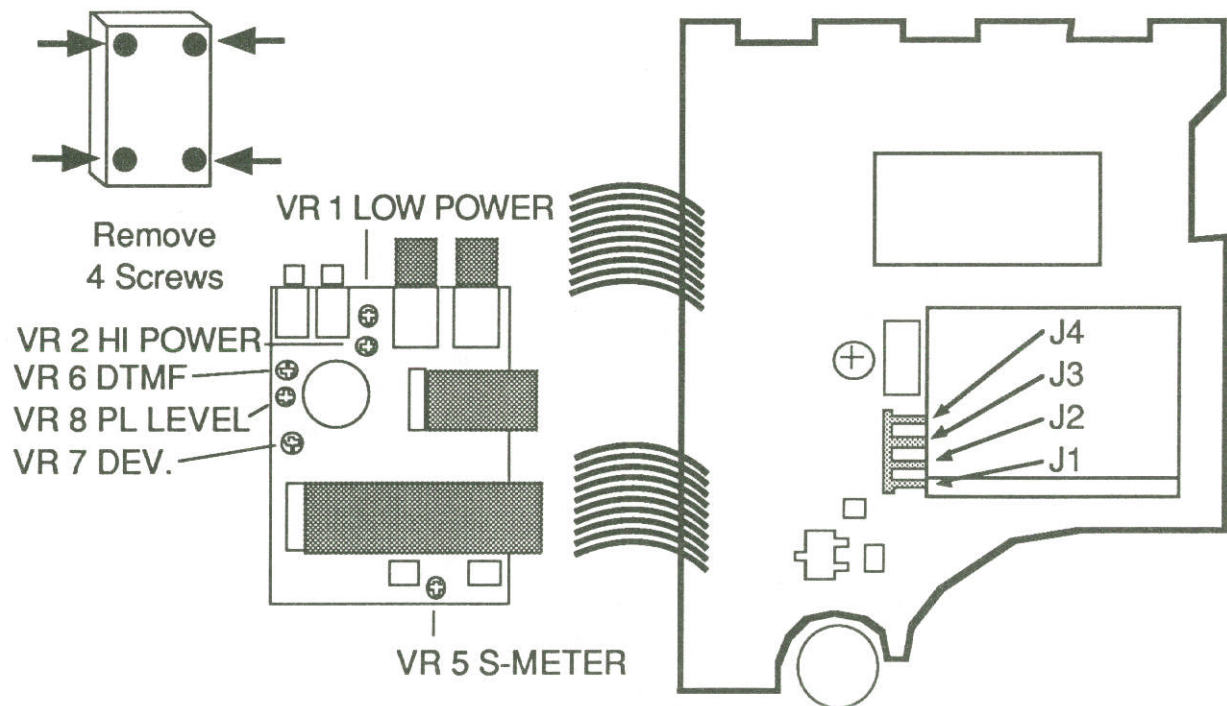
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KENWOOD TH-215

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the 4 screws from the back panel.
3. Carefully lift the front panel from the radio. Do not disconnect the flex cables.
4. CUT Jumpers J1 and J2.
5. Reassemble the radio.
6. RESET the CPU. (Press and hold [F] & [ENTER] and turn power on)



Caution

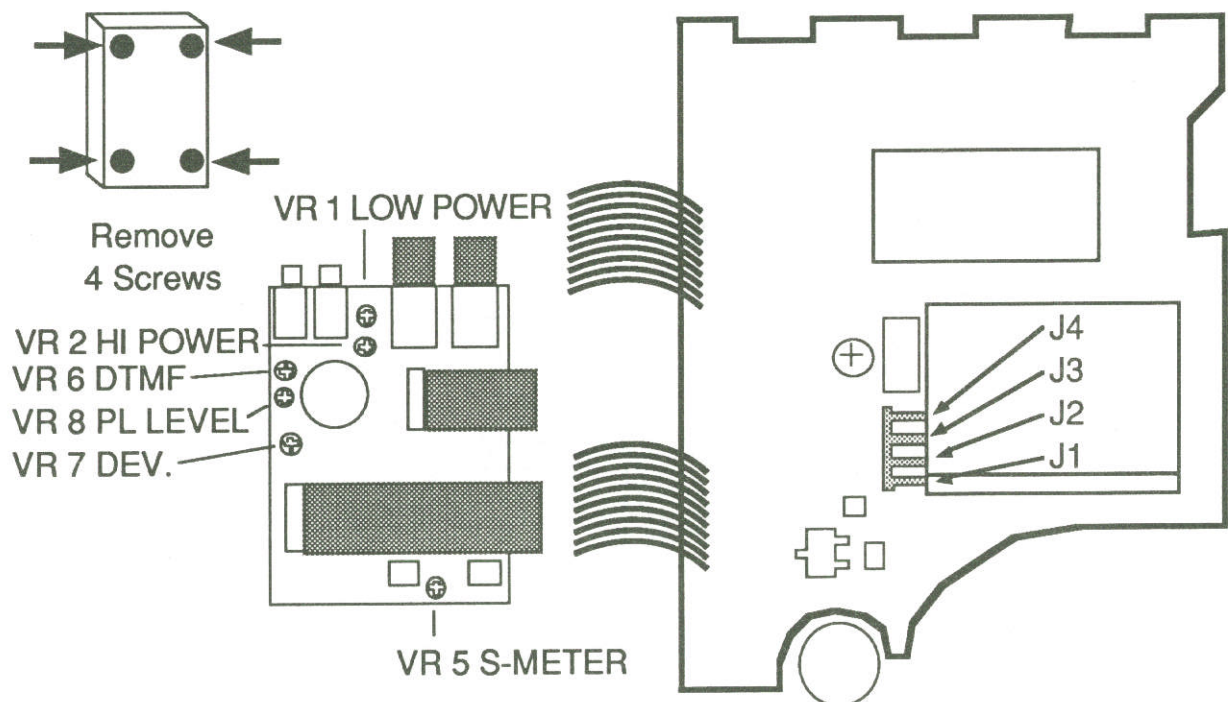
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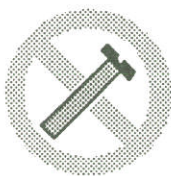
KENWOOD TH-315

EXTENDED RF

1. Remove battery and antenna.
2. Remove the screws holding the radio together.
3. Locate the Digital Circuit board (A02-076X-05)
4. Cut Jumpers 1, 3 and 4
5. Reassemble the radio.
6. Reset the microprocessor.(Press and hold [F] & [ENTER] and turn power on)



Range : 215.000 - 229.995 MHz



Caution

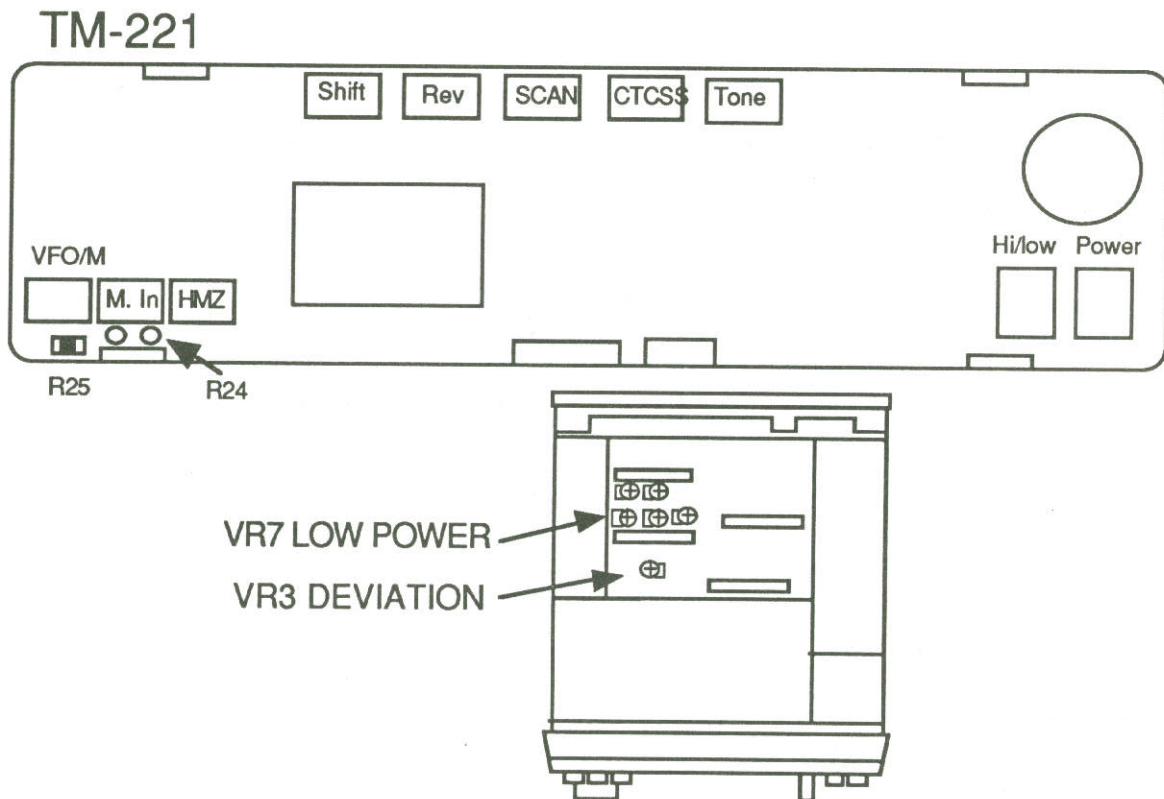
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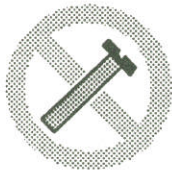
KENWOOD TM-221

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom covers.
3. Locate the control unit (X53-3040-XX). It is the board closest to the front.
4. Remove R25 and Place it in the position of R24.
5. Reassemble the radio.
6. RESET the CPU. (Press and hold [VFO/M] & [M.IN] and turn power on)



TX Range 142 MHz - 154 MHz



Caution

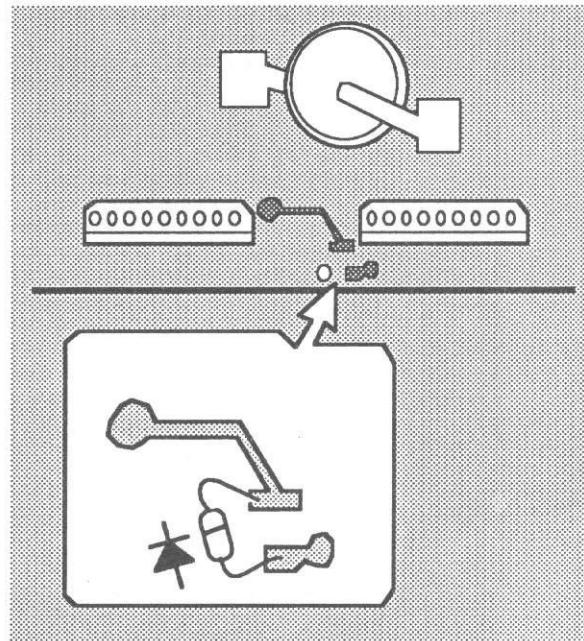
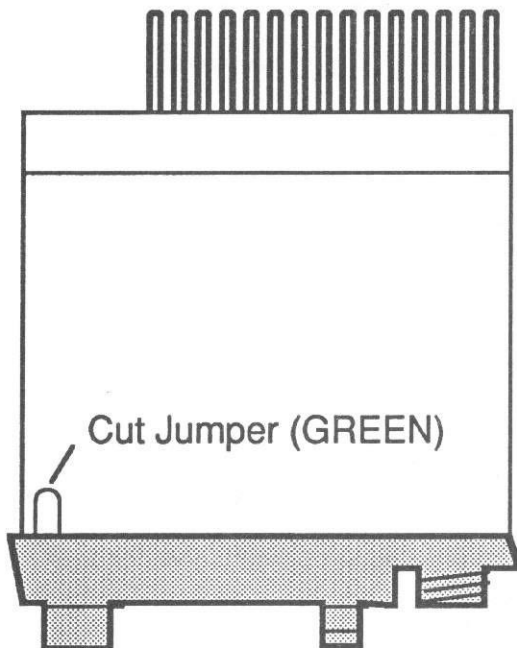
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KENWOOD TM-231A

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove all knobs from the front panel.
4. Remove the nut from the mic jack and the nut from the channel switch.
5. Remove four screws holding the front panel.
6. Remove the three screws from the control board.
7. Locate the green jumper wire sticking out the front panel, behind the VFO button
8. Cut the green jumper and tape the edges to prevent them from shorting.
9. Install diode D209 Part # MA141A on control board X57-3310-11.
10. Reassemble the radio
11. Reset the microprocessor. (Press and hold [MR] while turning on the power)



Caution

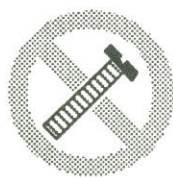
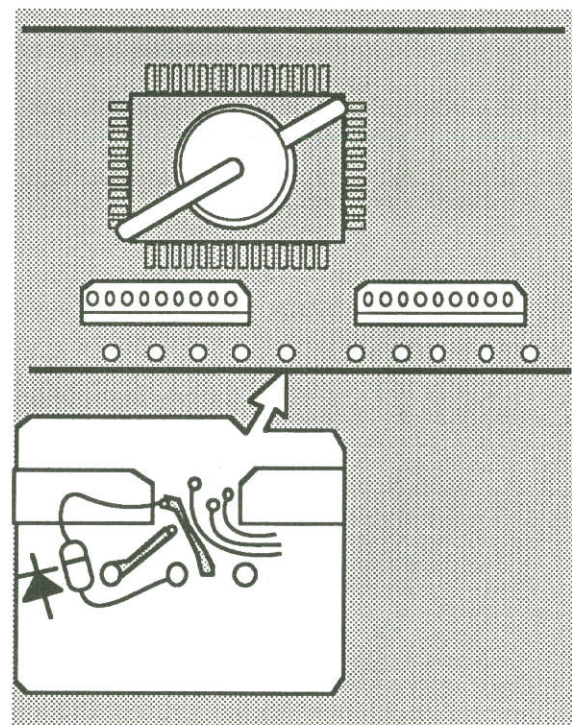
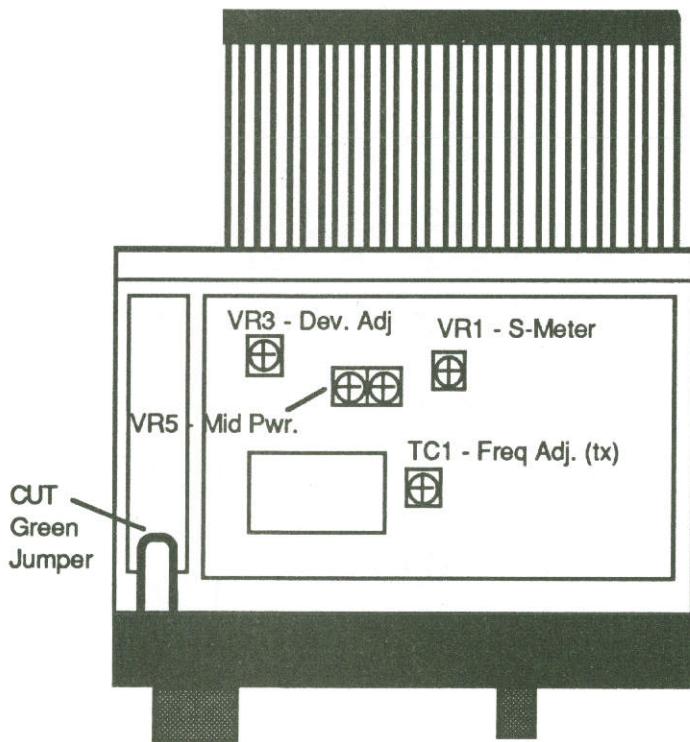
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KENWOOD TM-241A

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove all knobs from the front panel.
4. Remove the nut from the mic jack and the nut from the channel switch.
5. Remove four screws holding the front panel.
6. Remove the three screws from the control board.
7. Locate the green jumper wire on the control board.
8. Cut the green jumper and tape the edges to prevent them from shorting.
9. Install chip diode D209 on control board Part # MA141A
The control board is located on the front panel (Control knobs must be removed.)
10. Reassemble the radio
11. Reset the microprocessor (Press and hold [MR] while turning on the power)



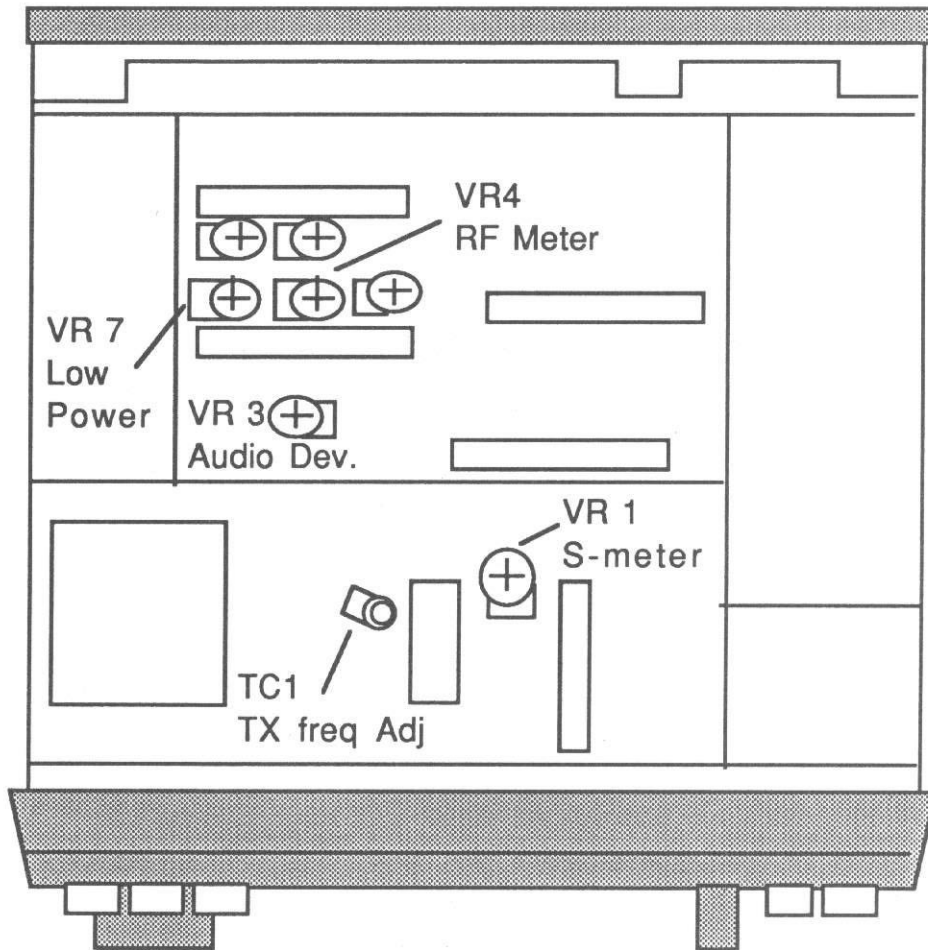
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KENWOOD TM-321A

ADJUSTMENT CONTROLS



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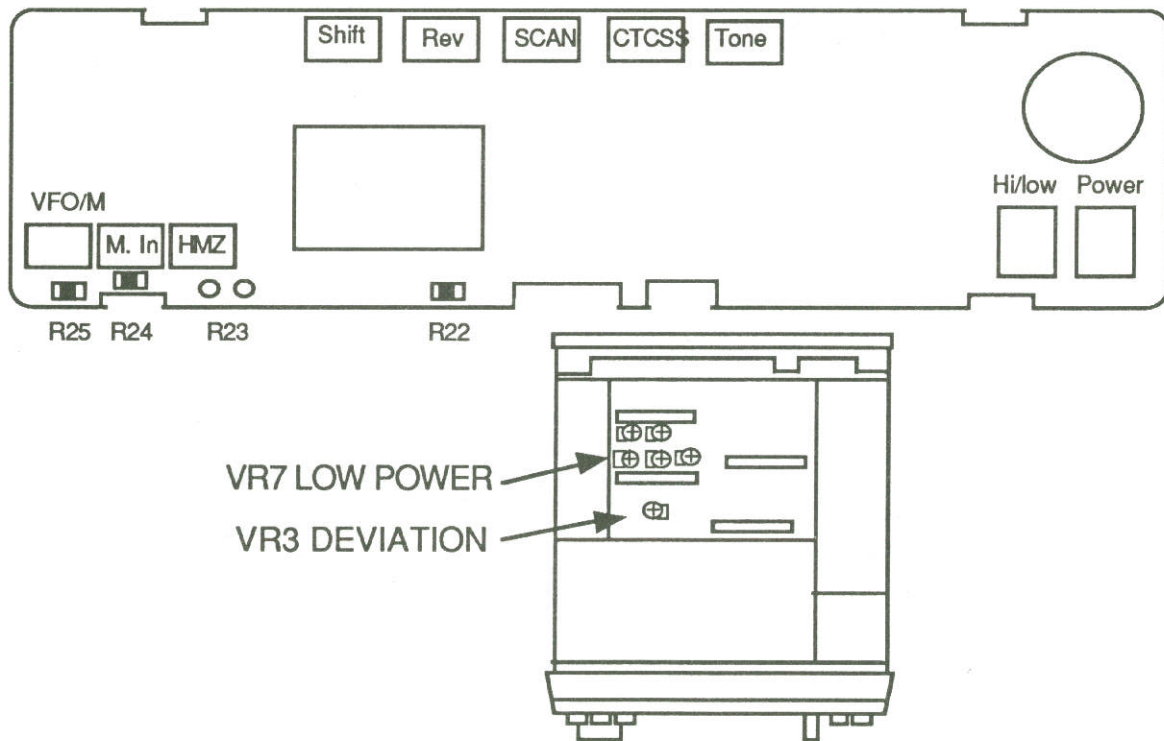
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KENWOOD TM-421A

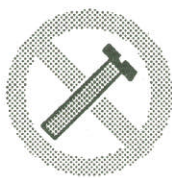
EXTENDED RF

1. Remove power and antenna.
2. Remove the top and bottom covers
3. Remove the channel knob
4. Remove the microphone ring.
5. Remove the volume and squelch knobs
6. Remove the front panel from the unit.
7. Remove the front control unit from the chassis.
8. Locate component side of the Control unit circuit board.
9. Locate chip Resistor R-25.
10. Remove R-25 and place it in the empty position R-23.
11. Remove R-22.
12. Reassemble the radio.
13. Reset the microprocessor.(Press and hold [MR] while turning on the power)

TM-X21



RESET : Press and hold [VFO/M] and [M.IN] and turn power on.



Caution

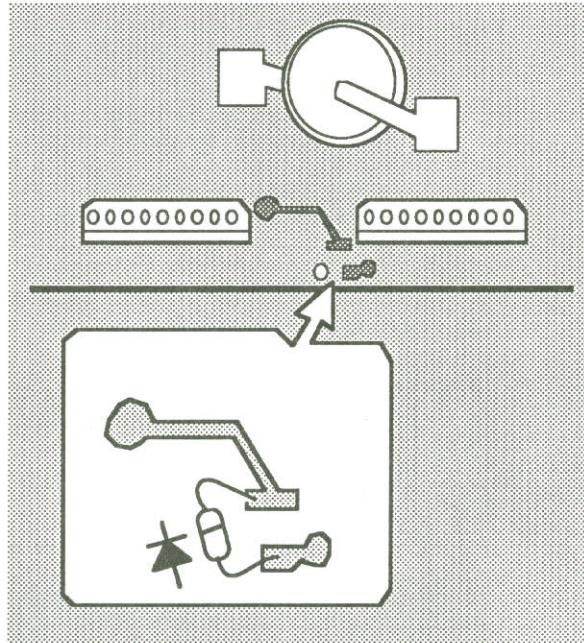
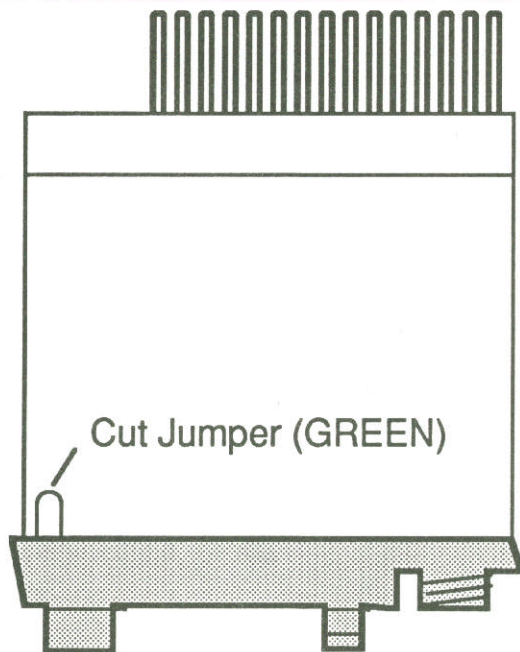
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KENWOOD TM-431A

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove all knobs from front panel.
4. Remove the nut from the mic jack and the nut from the channel switch.
5. Remove four screws holding the front panel.
6. Remove the three screws from the control board.
7. Locate the green jumper wire sticking out the front panel, behind the VFO Button.
8. Cut the green jumper and tape the edges to prevent them from shorting.
9. Install diode D209 Part # MA141A on control board.
10. Reassemble the radio
11. Reset the microprocessor. (Press and hold [MR] while turning on the power)



Caution

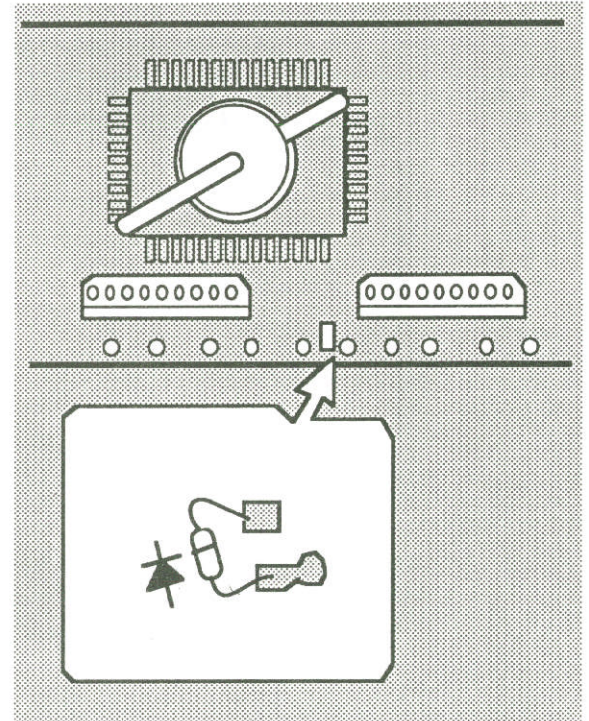
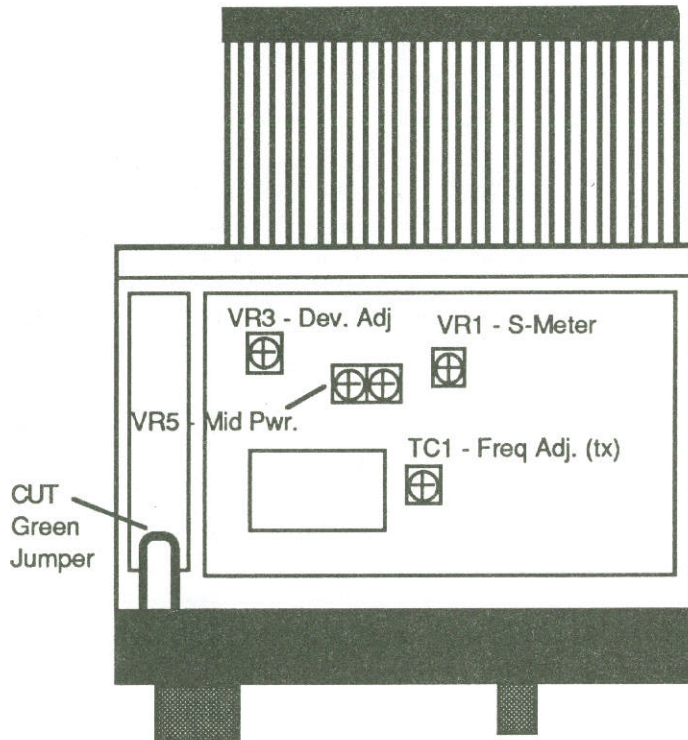
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KENWOOD TM-441A

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove all knobs from front panel.
4. Remove the nut from the mic jack and the nut from the channel switch.
5. Remove four screws holding the front panel.
6. Remove the three screws from the control board.
7. Locate the green jumper wire on the control board.
8. Cut the green jumper and tape the edges to prevent them from shorting.
9. Install chip diode D209 on control board Part # MA141A.
The control board is located on the front panel (Control knobs must be removed.)
10. Reassemble the radio
11. Reset the microprocessor. (Press and hold [MR] while turning on the power)



Caution

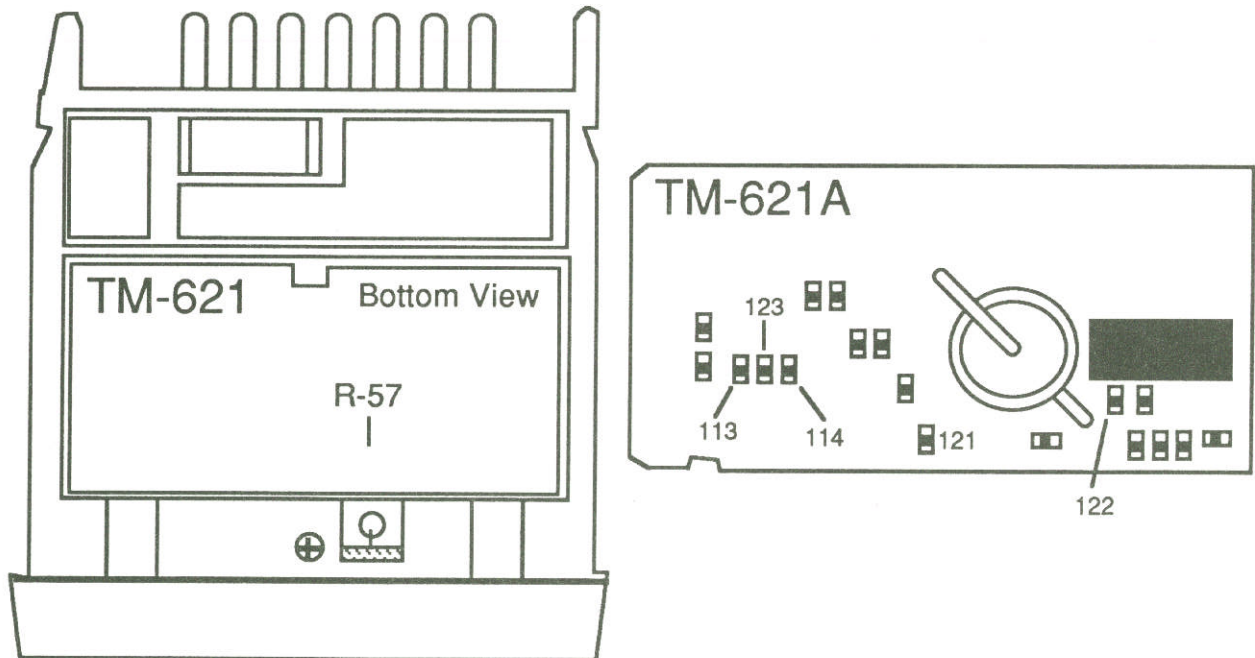
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KENWOOD TM-621A

EXPANDED RF / CROSS BAND REPEATER

1. Disconnect the power and antenna.
2. Remove the top and bottom covers.
3. Locate and cut R57 on Control board. (Bottom side of radio)
4. } Remove the silver colored screws from the front panel.
5. Carefully pull the front panel away from the body of the transceiver.
6. Locate chip resistor R113 and R114 on the Control board. (inside front panel)
7. Remove the chip resistor located between resistors R113 & R114. It is labeled R123.
8. Remove chip resistor R121 (cross band repeater mod)
9. Remove R122 (disable 3 minute time out timer).
10. Reassemble radio.
11. Reset the microprocessor (Press and hold [F] while turning power on).



CROSS BAND OPERATING PROCEDURES

The TM-621 will receive a signal on one band and will automatically retransmit it on the other band. Each band can contain shift information.

Turn on / off the Repeater mode : Press F and then press A.B.C. Key. Three dots should appear in the display when the mode is on.



Caution

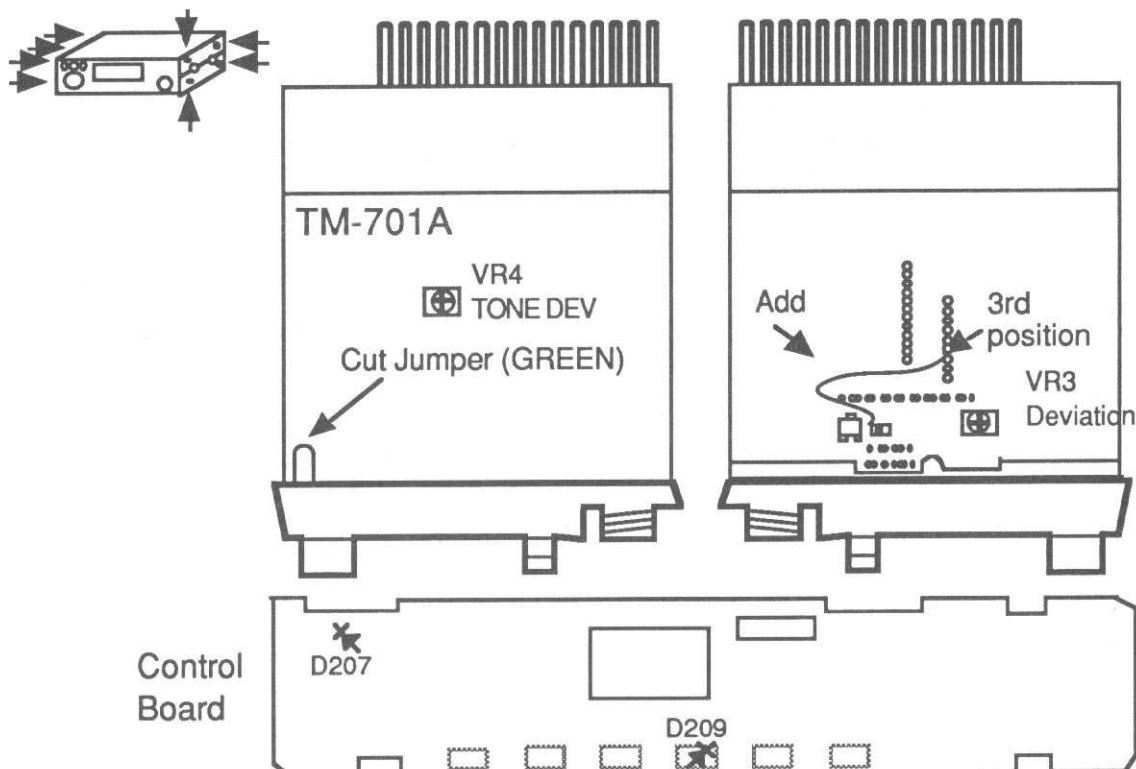
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KENWOOD TM-701A

EXPANDED RF / CROSS BAND REPEATER

1. Disconnect the power and antenna.
2. Remove the top and bottom cover.
3. Remove knobs from front panel and the nuts from the mic and channel switch.
4. Remove 4 screws holding the front panel and the 3 screws on the control board.
5. Locate the green jumper wire sticking out the front panel, behind the VFO button.
6. Cut the green jumper and tape the edges to prevent them from shorting.
7. Optional: Install diodes D207 & D209 on control board X57-3350-00.
8. Solder a jumper to the foil side of the TX-RX board as shown in drawing.
9. Reassemble the radio.
10. Reset the microprocessor (Press and hold [MR] while turning on the power).



CROSS BAND OPERATING PROCEDURES

Turn on the Repeater mode : Press and hold [F] and then press [DUP]. Then Press [F] longer than 1 Second. The F indicator will blink. Press [LOW]. Three dots should appear in the display when the mode is on.

Turn off : Press [VFO].



Caution

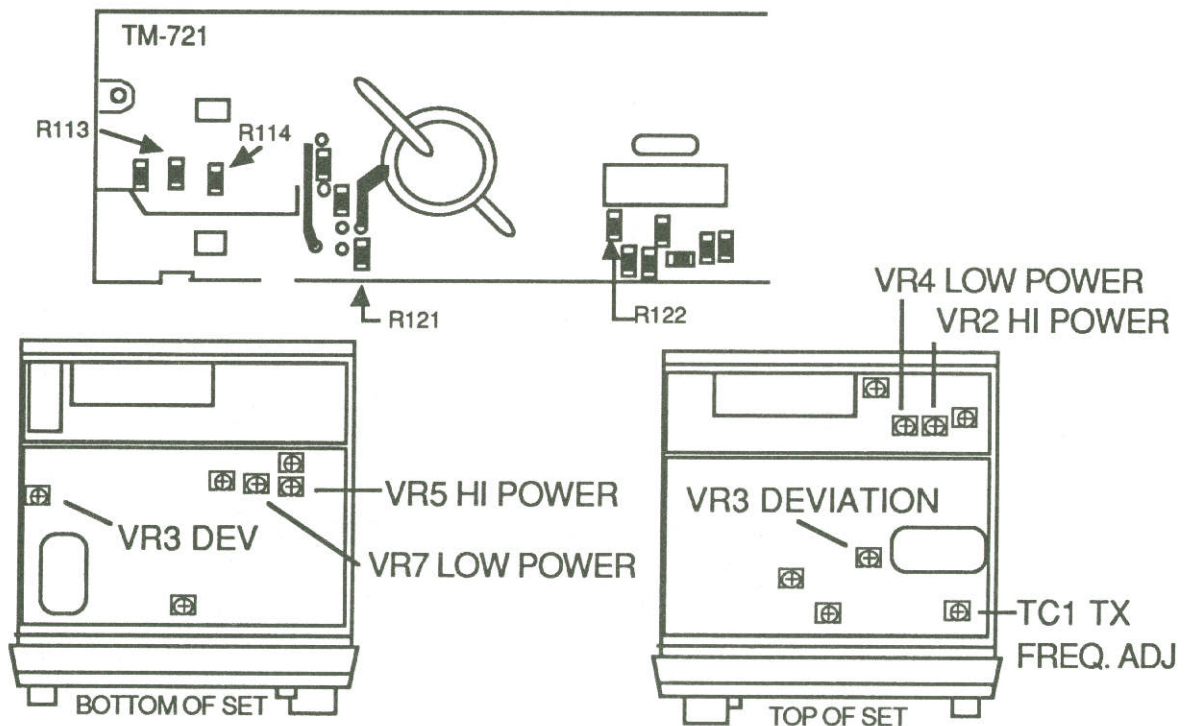
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KENWOOD TM-721

EXPANDED RF/ CROSS BAND REPEATER

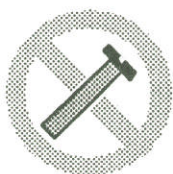
1. Remove power, antenna and the top and bottom covers.
2. Remove the six silver screws holding the front panel to the chassis.
3. Locate R113 and R114
4. Solder a jumper between the open pads between R113 & R114
5. Remove R121. (This is the cross band repeater mod.)
6. Remove R122. (This will override the automatic 3 minute time out timer)
7. Cut R57 from the back of the board. Do not cut R58
8. Reassemble the radio
9. Reset the microprocessor twice. Press and hold the MR key and turn the power switch. Do this twice.



CROSS BAND OPERATING PROCEDURES

The TM-721 will receive a signal on one band and will automatically retransmit it on the other band. Each band can contain shift information. Only one band may contain PL encode/decode information. Do not turn tone and CTCSS on in one band.

Turn on / off the Repeater mode : Press F and then press A.B.C. Key. Three dots should appear in the display when the mode is on.



Caution

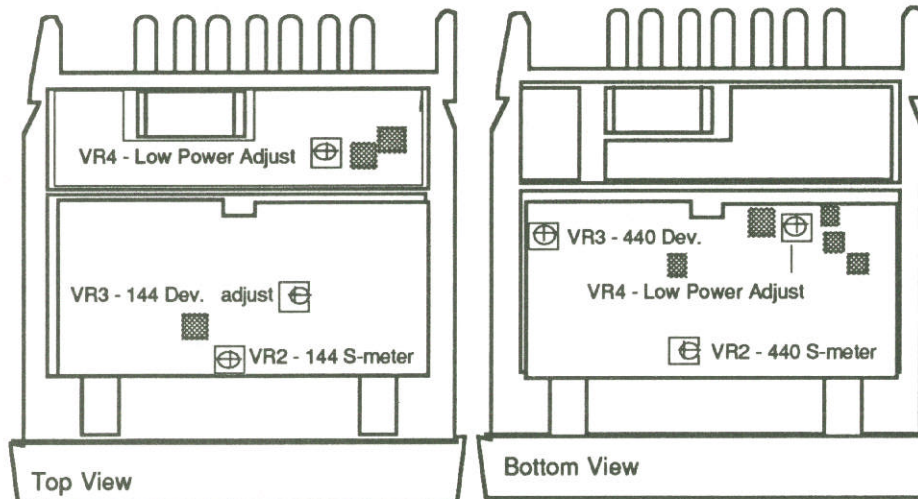
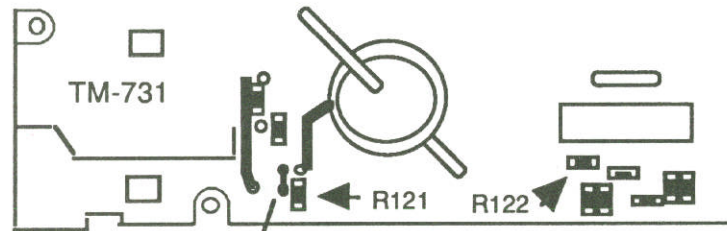
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KENWOOD TM-731

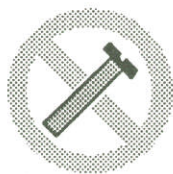
EXPANDED RF/ CROSS BAND REPEATER/ TIME OUT TIMER

1. Remove power and antenna and the top and bottom covers.
2. CUT RESISTOR R25. R25 is located on the Control unit on the bottom side of the Radio. The resistor can be seen by looking through the cutout of the chassis just behind the front panel.
3. Remove silver color screws from the front chassis. The screws are located 2 on each side, 1 on the top and 1 on the bottom.
4. Pull the front panel away from the radio. Do not unplug any cables.
5. Install a jumper wire as shown in diagram 1.
6. Remove R121. (This is the Cross band repeater mod.)
7. Remove R122. (This will override the automatic 3 minute time out timer)
8. Reassemble the radio.
9. Reset the microprocessor twice. Press and hold the MR key and turn radio on.



CROSS BAND OPERATING PROCEDURES: The TM-731 will receive a signal on one band and will automatically retransmit it on the other band. Each band can contain shift information. Only one band may contain PL encode/decode information. Do not turn Tone and CTCSS on in one band.

Turn on / off the Repeater mode : Press [F] and then press [A.B.C.] Key. Three dots should appear in the display when the mode is on.



Caution

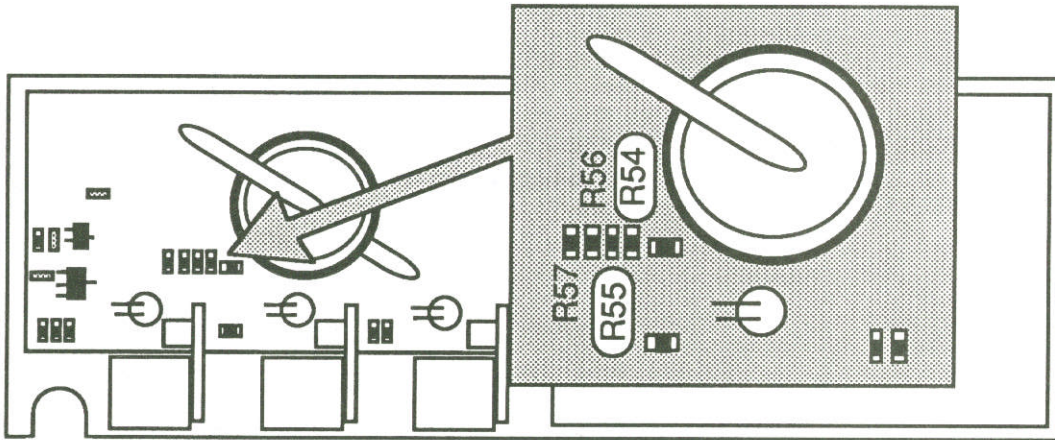
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KENWOOD TM-741 & TM-941

EXPANDED RF

- 1 Remove power and antenna
2. Detach the front control head assembly.
3. Locate and cut the GREEN wire on the control board. The control board is on the body of the radio. The GREEN wire is located towards the left edge of the board. Tape the edges of the green wire to prevent shorting.
4. Remove the back cover from the control head.
5. Locate and remove chip resistors R54 and R55. Caution should be taken while removing these resistors.
6. Reassemble the control head.
7. Reassemble the transceiver.



New Frequency range:

18-54 MHz
 50-90 MHz
 118-174 MHz
 215-260 MHz
 410-470 MHz
 1100-1400 MHz



Caution

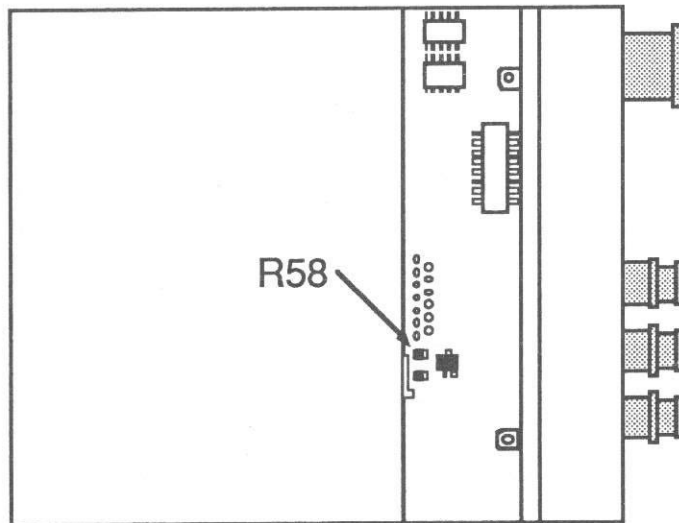
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KENWOOD TM-741 & TM-941

CROSS BAND REPEATER

1. Remove power and antenna and the top and bottom covers.
2. Detach the front panel assembly.
3. Locate and cut the GREEN wire on the control board. The control board is on the body of the radio. The GREEN wire is located towards the left edge of the board.
4. Locate and cut resistor R58. R58 is blue colored and located on the control board (Cross band repeater mod)
5. Reassemble the transceiver.

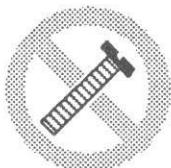


CROSS BAND OPERATING PROCEDURES: The TM-X41 will receive a signal on one band and will automatically retransmit it on the other band. Each band can contain shift information. Only one band may contain PL encode/decode information. Only one band may contain Tone and CTCSS.

1. Select one of the band using the BAND SELECT key.
(The PTT indicator will light.)
2. Select the other band by pressing the CONTROL SELECT key.
(Skip this step for one way repeat only)
(The green light on the key will light.)

Turn on / off the Repeater mode :

Press the [F] key and then press the [MUTE] key.



Caution

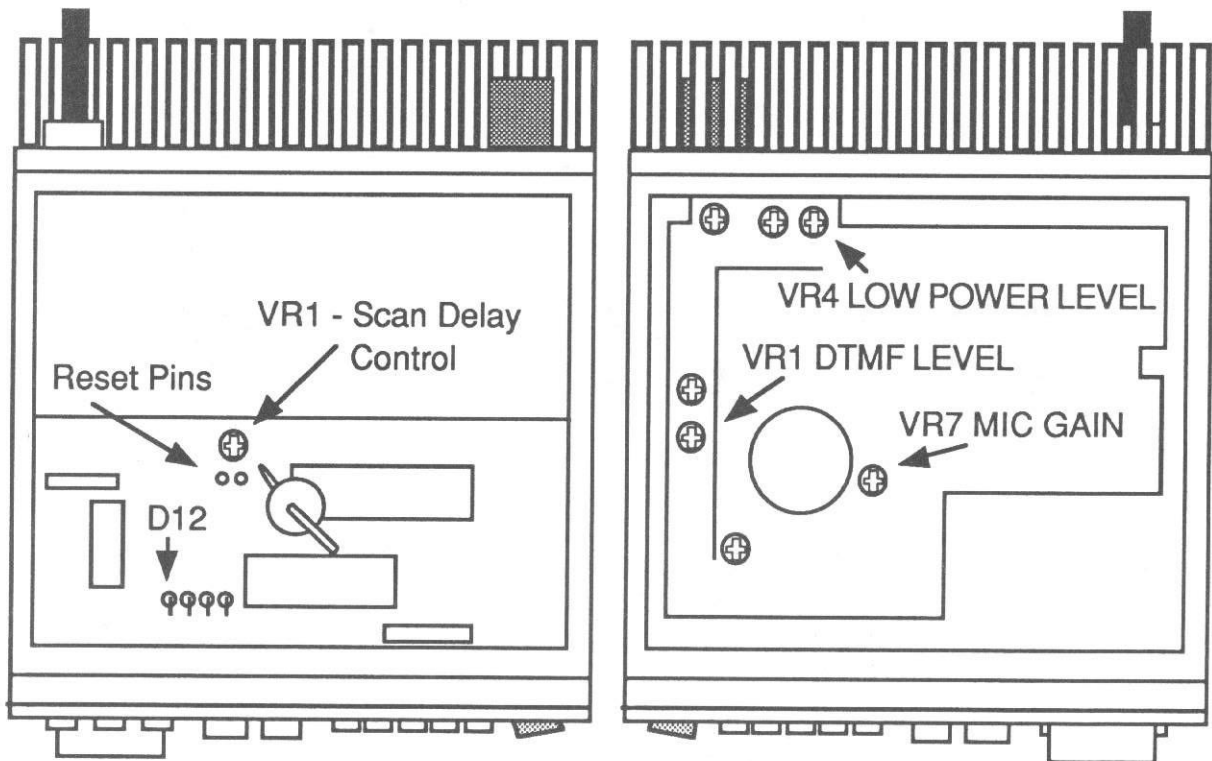
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KENWOOD TM-2530/2550/2570

EXPANDED RF

1. Disconnect the power and antenna.
2. Remove the bottom case .
3. Locate the Control Unit on the bottom of the radio. This is the same board the TU-7 & MU-1 are mounted on.
4. CUT diodes D8 & D11 & D12. They are located to the left of IC3.
5. Reassemble the radio.
6. RESET the CPU. Press and hold the [PS] Key while turning on the radio.



Frequency increases to 150.995 MHz



Caution

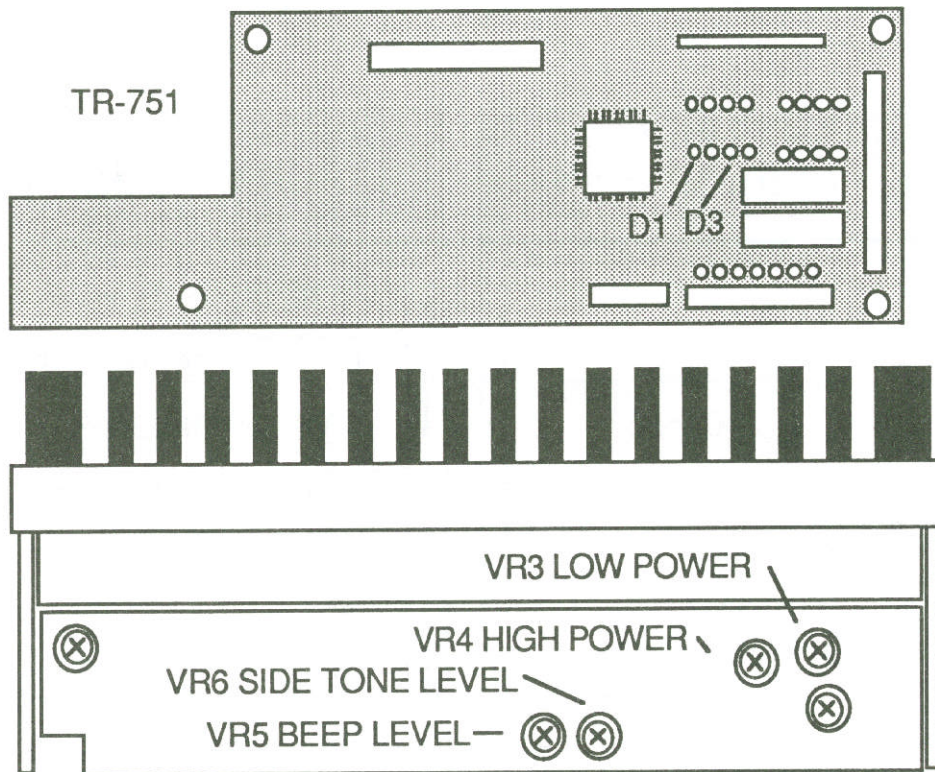
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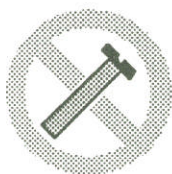
KENWOOD TR-751

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the case .
3. Locate the Control Unit on the radio.
4. CUT diodes D1 & D3. They are located to the left of IC3.
5. Reassemble the radio.
6. RESET the CPU. (Hold [M] key and turn on power)



DEVIATION - VR7 ON RX UNIT (OTHER SIDE)



Caution

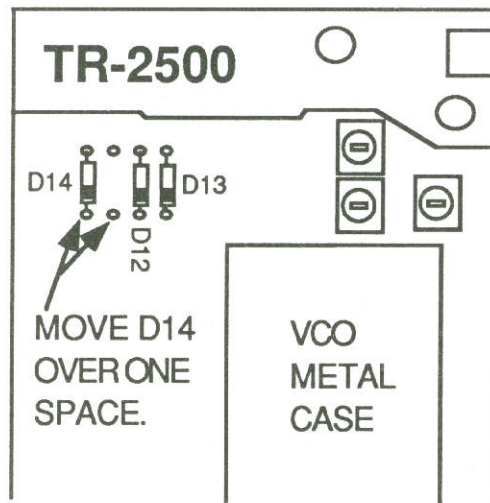
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KENWOOD TR-2500

EXPANDED RF M/C

1. Disconnect the battery and antenna.
2. Remove the 3 screws holding on the back cover.
3. Remove the 2 screws on the bottom of the radio.
4. Unsolder the tabs of the lithium battery.
5. Unsolder Diode D14.
6. Install the diode in the location next to D12.
7. Reinstall the lithium battery.
8. Reassemble the radio.



Range : 141.000 MHz to 151.000 MHz



Caution

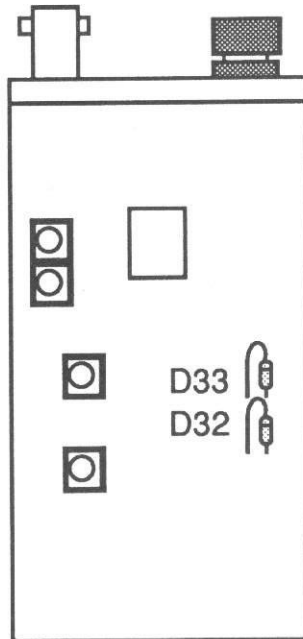
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KENWOOD TR-2600

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the screws and open the radio.
3. Remove diodes D32 & D33. They are located on the RX unit (x%%-1380-XX)
4. Press the RESET Switch
5. Reassemble the radio.



Caution

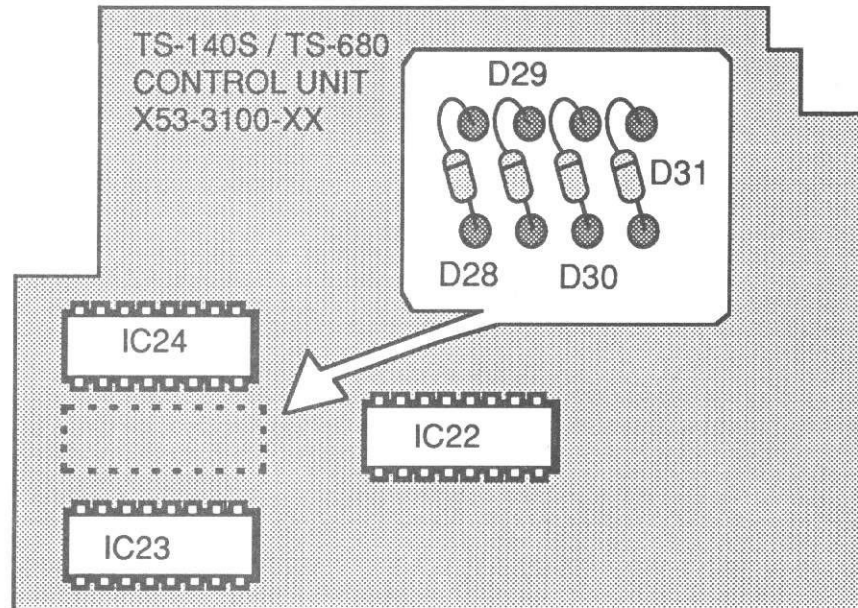
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KENWOOD TS-140S

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom covers from the radio.
3. Locate the Control board on the bottom of the TS-140S
4. Remove diode D31 on the Control board.
5. Reassemble the radio.
6. RESET the CPU.



Auxiliary Function:

1. Put radio in VFO mode and turn power off.
2. Press and hold [VFO/M] & [LSB/USB] and turn power on.

The display will say "-HELLO-"
The CW announcement will please you.



Caution

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KENWOOD TS-430S

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom covers from the radio.
3. Locate connector # 10 on the RF circuit board
4. Cut the two wires that are NOT GREEN. Leave the Green Wire.
5. Wrap Tape around the ends of the cut wires
6. Reassemble the radio.
7. RESET the CPU.



Caution

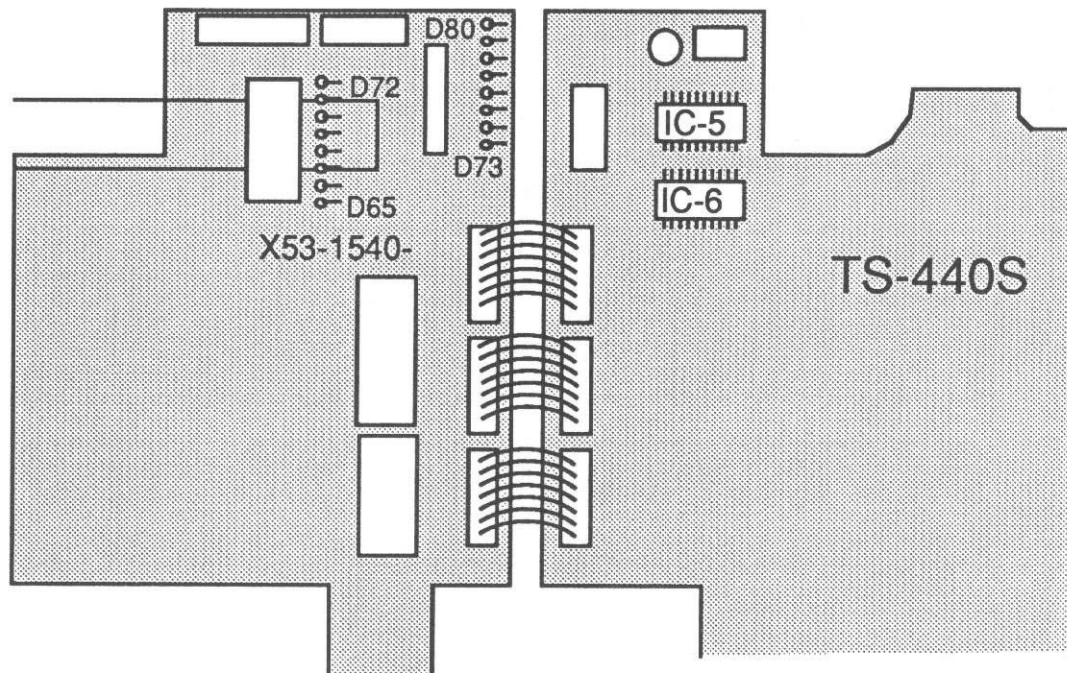
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KENWOOD TS-440S

EXPANDED RF M/C

1. Disconnect the Power and antenna.
2. Remove the top and bottom covers from the radio.
3. Remove the Countersunk screws that secure the front panel to the chassis. There are two on each side
4. Gently pull the front panel forwards.
5. Remove the 5 small round head screws that secure the shield plate to the front panel. There are 2 on top and 3 on the bottom.
6. Remove Diode D80. D80 is located in the corner near Connector 54.
7. Cut Diode 66 for 10 Hz resolution. See page 24 of the instruction manual.
8. Reassemble the radio.
9. RESET the CPU.



RESET CPU: Press and hold [A=B] and turn power on.



Caution

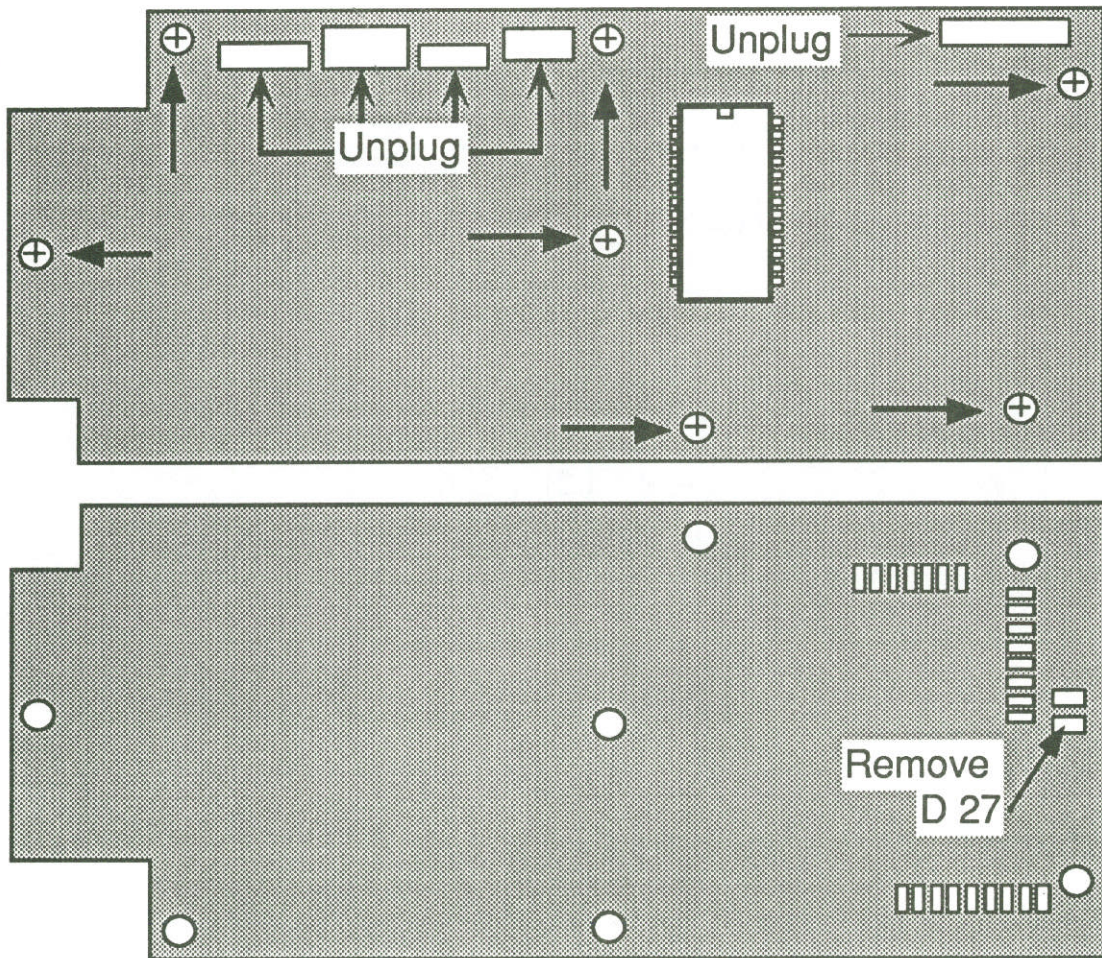
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KENWOOD TS-450S

EXPANDED RF M/C

1. Disconnect the Power and antenna.
2. Remove the top and bottom covers from the radio. (14 Screws)
3. Remove the top screws (countersunk) from each side of the front panel.
4. Loosen the bottom screws (countersunk) from each side of the front panel.
5. Carefully pull the top front of the front panel forward to expose the Digital board.
6. Remove the seven screws from the digital board.
7. Disconnect the 5 cables from the digital board.
8. Rotate the board towards the front panel to gain access to the back side of the board.
9. Locate and remove diode D27. Do not pry up the diode. The traces will rip apart.
10. Reassemble the radio.



Caution

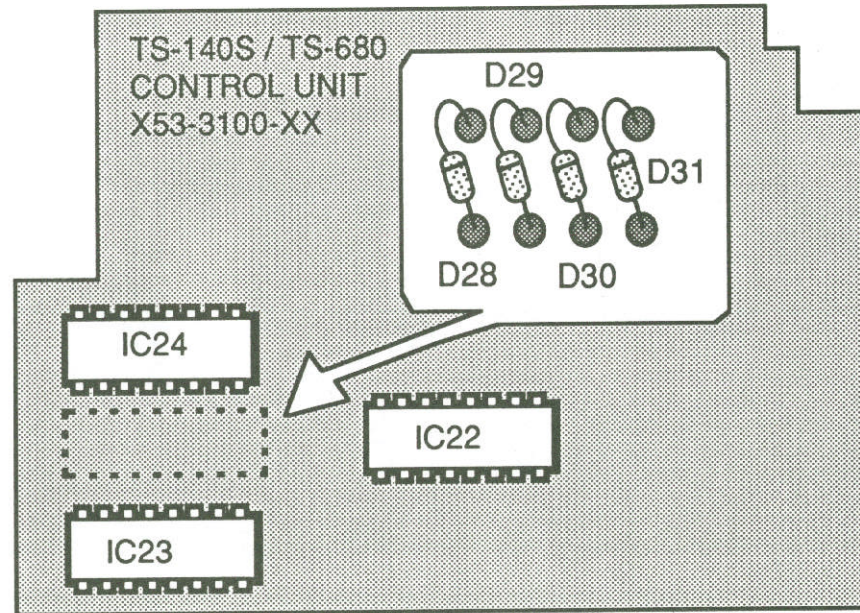
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KENWOOD TS-680

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom covers from the radio.
3. Locate the Control board on the bottom of the TS-680S
4. Remove diode D31 on the Control board.
5. Reassemble the radio.
6. RESET the CPU.



Auxiliary Function:

1. Put radio in VFO mode and turn power off.
2. Press and hold [VFO/M] & [LSB/USB] and turn power on.

The display will say "-HELLO-"
The CW announcement will please you.

EXPANDED RF M/C



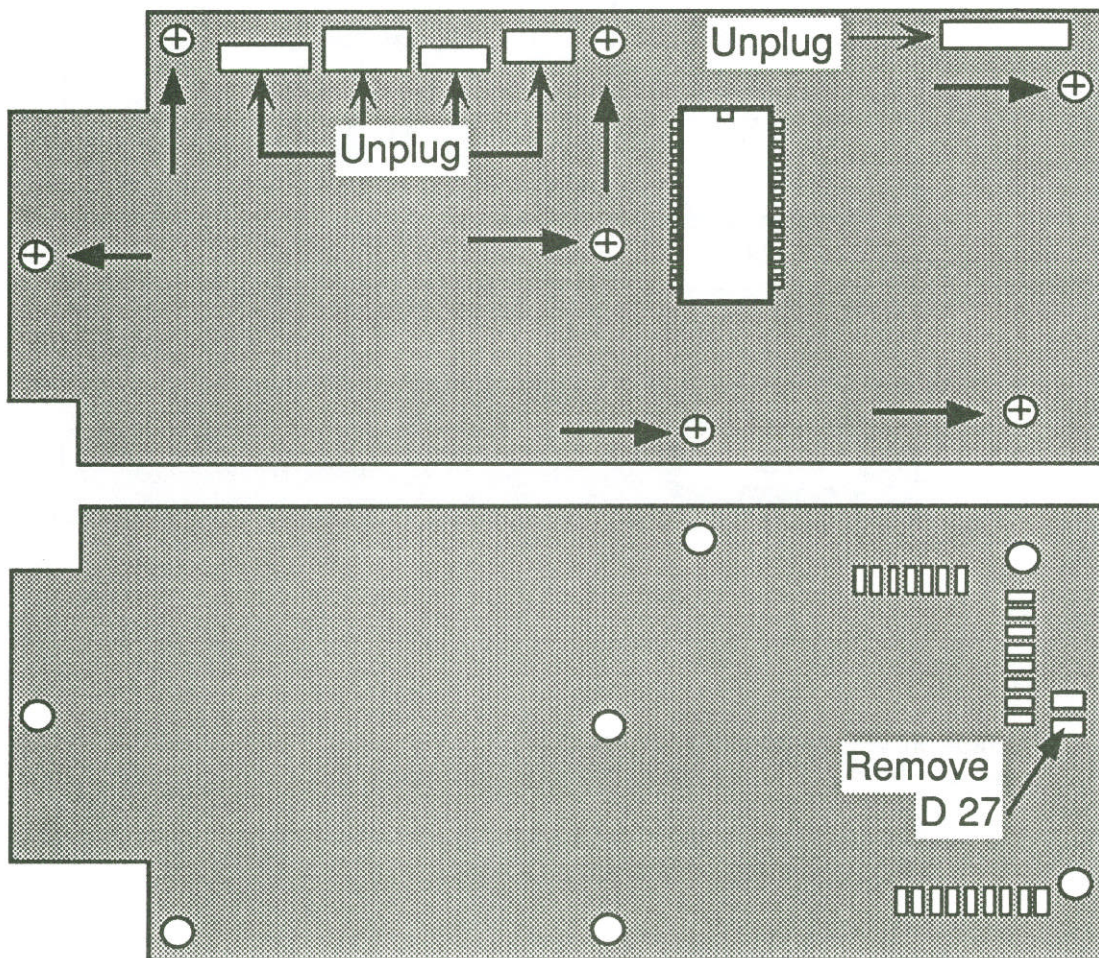
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KENWOOD TS-690S

1. Disconnect the Power and antenna.
2. Remove the top and bottom covers from the radio. (14 Screws)
3. Remove the top screws (countersunk) from each side of the front panel.
4. Loosen the bottom screws (countersunk) from each side of the front panel.
5. Carefully pull the top front of the front panel forward to expose the Digital board.
6. Remove the seven screws from the digital board.
7. Disconnect the 5 cables from the digital board.
8. Rotate the board towards the front panel to gain access to the back side of the board.
9. Locate and remove diode D27. Do not pry up the diode. The traces will rip apart.
10. Reassemble the radio.

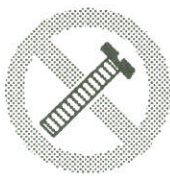


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KENWOOD TS-711

EXPANDED RF

1. Disconnect the power and antenna.
2. Remove the covers.
4. REMOVE D30
5. Reassemble the radio.
6. RESET the CPU.



Caution

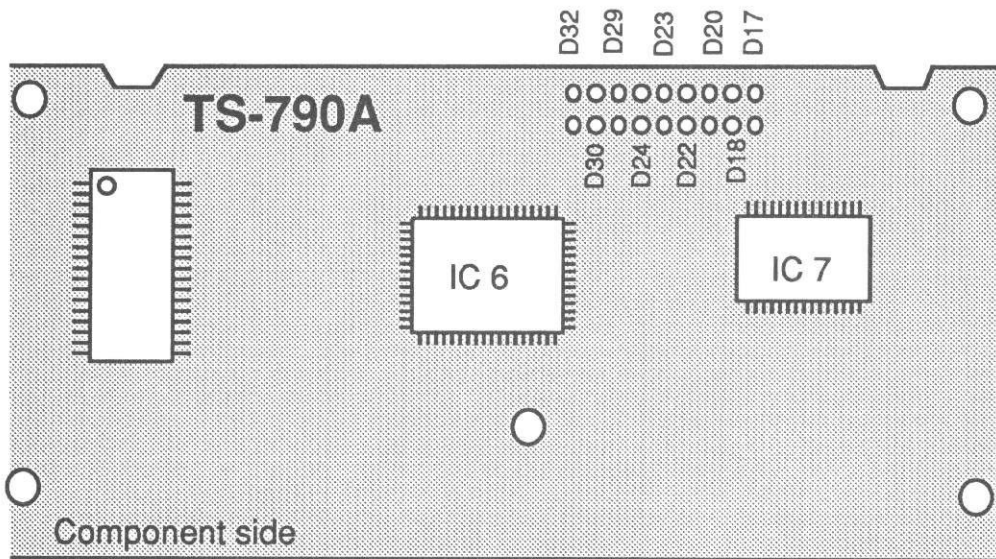
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KENWOOD TS-790A

EXPANDED RF

1. Disconnect the power and antenna.
2. Remove the top cover.
3. Locate circuit board positioned vertically behind the front panel.
4. Locate and remove diodes 29 & 30.
5. Reassemble radio
6. Reset the microprocessor. (Press and hold [A=B] and turn power on)



Note: Factory diode set-up: IN-D22,29,30,32
IN but clipped by factory-D23,24
Empty position=D17,18,20

RANGE: 130-170 MHz & 422.2-463 MHz



Caution

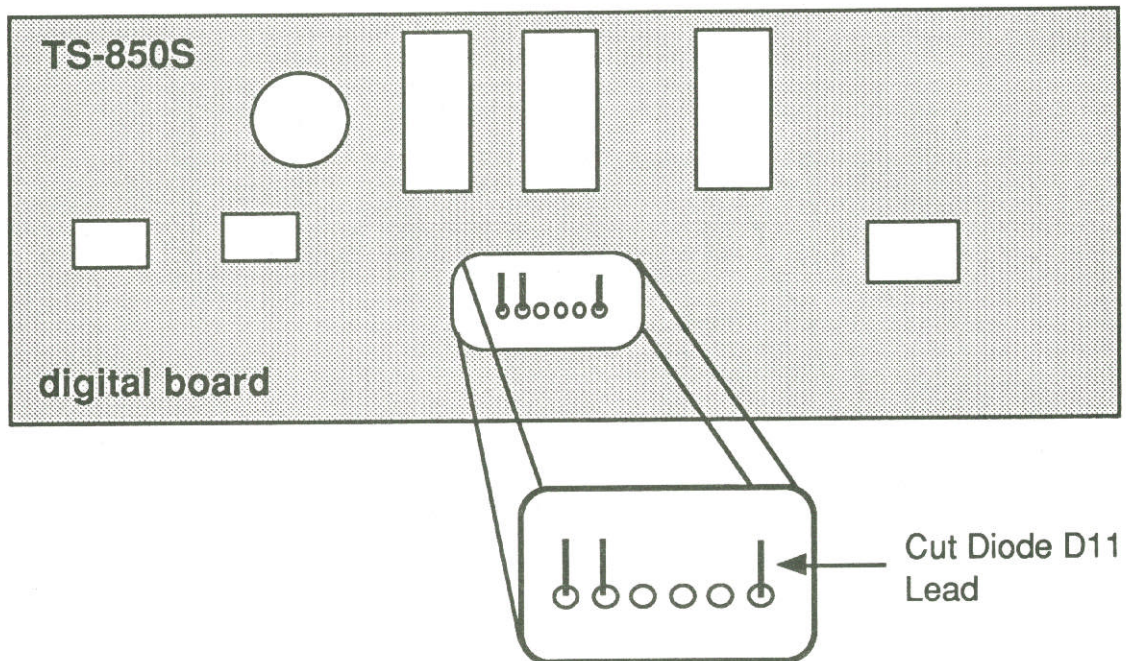
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KENWOOD TS-850S

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the 16 screws top and bottom covers from the radio. Be careful not to break the speaker wires.
3. Remove the top and bottom screws from each side of the front panel assembly.
4. Pull the front panel forward to expose the Digital board.
5. Locate and cut the lead from diode D11.
6. Reassemble the radio.
7. Reset the microprocessor by holding the [A=B] Key while turning the power on.



Caution

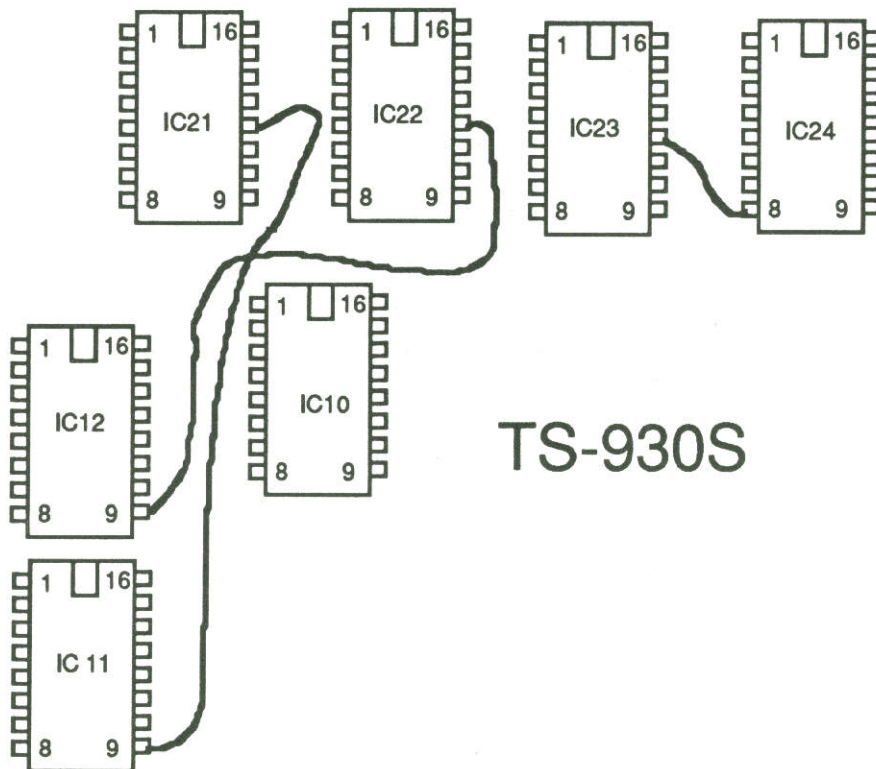
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KENWOOD TS-930S

EXPANDED RF M/C

1. Disconnect the power and antenna.
2. Remove the top and bottom covers from the radio.
3. Remove the four screws from the speaker mounting and the top panel Assembly.
4. Swing the assembly away and unplug the Red/Black battery leads from the Digital unit X54-1680-00.
5. Solder wires between the following locations:
 - IC21 Pin 12 to IC11 Pin 9
 - IC22 Pin 12 to IC12 Pin 9
 - IC23 Pin 12 to IC24 Pin 8
5. Tack-solder on the component side of the board is OK
5. Reassemble the radio.



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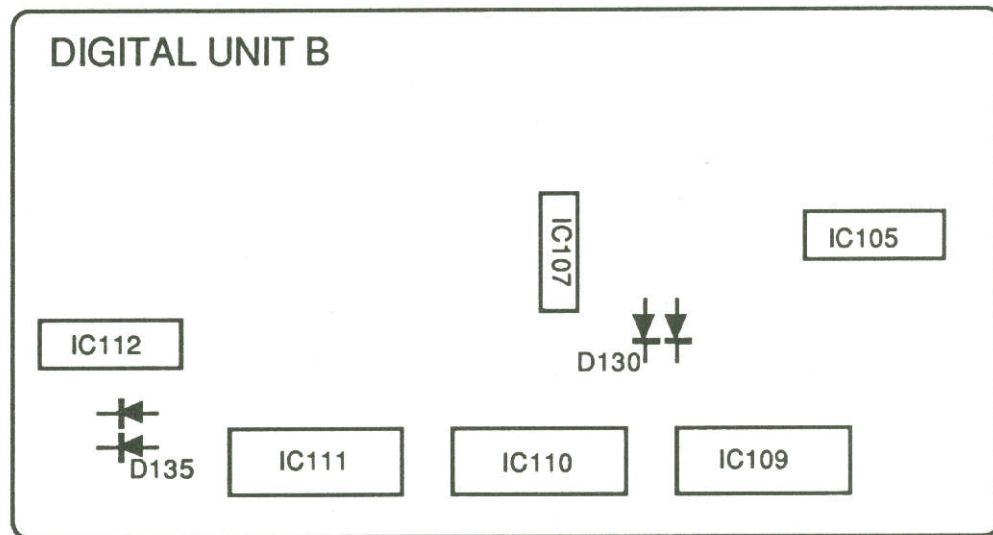
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KENWOOD TS-940

EXPANDED RF

1. Disconnect the power and antenna.
2. Remove case screws and case.
3. Locate Digital Unit B. This is the board that is in the enclosure where the VS-1 is mounted. Digital Unit B is the board closest to the Front Panel.
4. Cut Diodes D130 & D135. Located near IC-109.
5. Reassemble the radio
6. Turn the radio on, Press and Hold the [A=B] Switch and turn off and back on the radio.

TS-940



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KENWOOD TS-950SD

EXTENDED RF

1. Remove power and antenna.
2. Remove the top and bottom covers
3. Locate the Digital Unit.
4. Cut diode D-17
5. Reassemble the Radio
6. Reset the Microprocessor.

RESET: Press and hold [A=B] and turn power on.



Caution

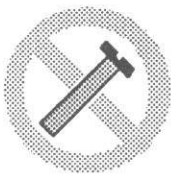
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KENWOOD TS-2400

EXTENDED RF

1. Remove Power and Antenna.
2. Open the radio.
3. Locate the RX Circuit board.
4. Locate and cut Diodes D32 and D33. (Located near the DTMF IC)
5. Reassemble the radio.
6. Reset the Microprocessor.



Caution

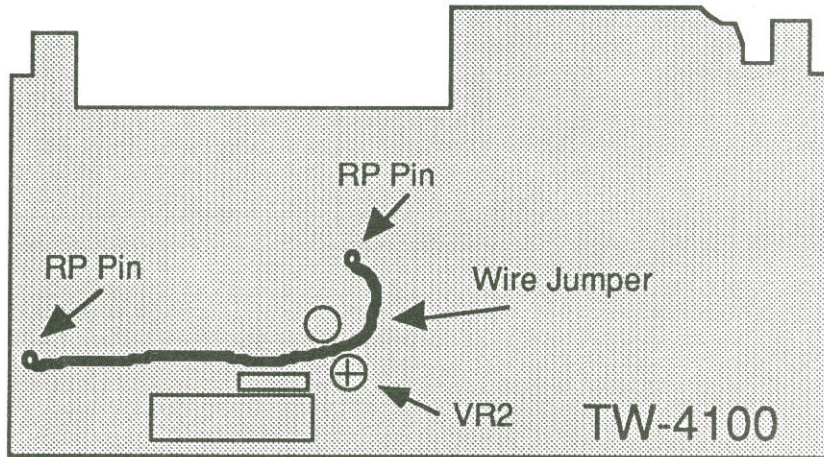
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KENWOOD TW-4100

REPEATER MOD

1. Remove power and antenna.
2. Remove 4 screws securing the top cover.
3. Remove 10 screws securing the bottom cover.
4. Solder a wire jumper connecting the two RP Pins. (see drawing)
5. Reassemble the radio.



CROSS BAND REPEATER PROCEDURES

The VFO and a Memory channel (except 8 & 9) must be used. Select the proper frequencies, offsets & tone. (VFO simplex operation must use DUP with a 0 offset.)

TURN ON - Enter frequencies in a memory and VFO and press [Shift]. Turn power off. Press and hold [REV] and turn radio on.

TURN OFF - Turn Power off.



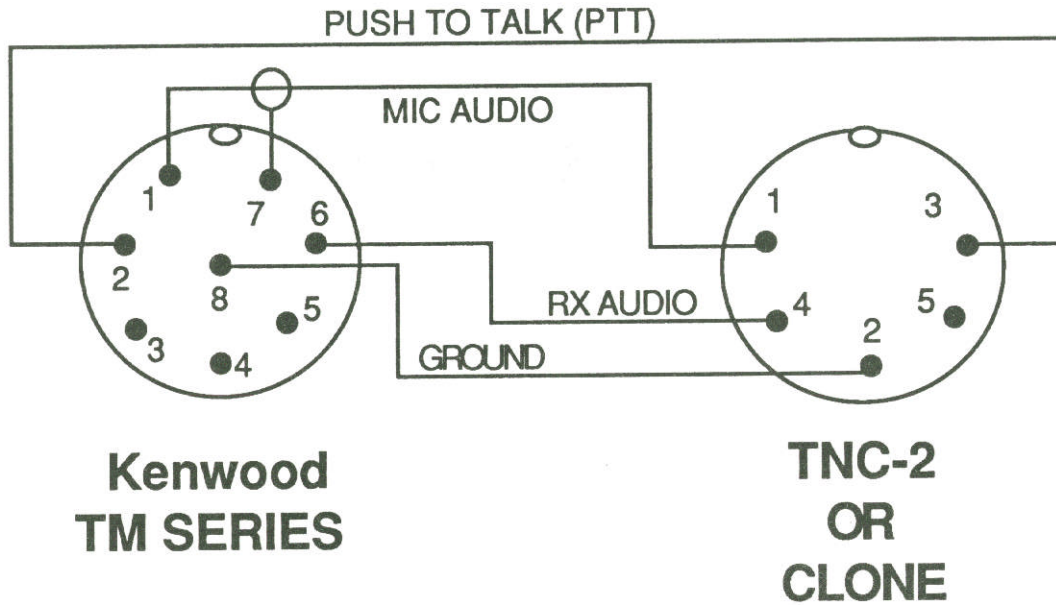
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KENWOOD TM SERIES

TNC-2 HOOKUP



**Kenwood
TM SERIES**

**TNC-2
OR
CLONE**



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Performance Report

Radio _____

Date _____

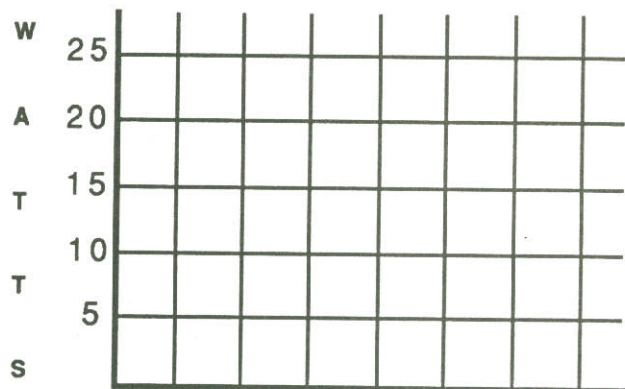
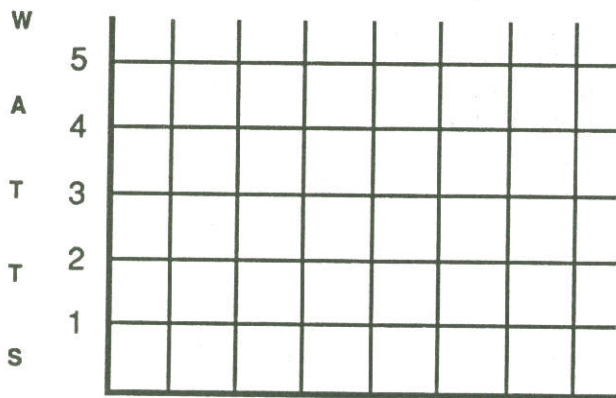
Owner : Name _____

Address _____

City _____ St. _____ Zip _____

Phone (_____) _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
Frequency Error (Offset)	_____Hz	_____Hz
Receive Sensitivity (Mid-band)	_____uv	_____uv
PL Deviation	_____Hz	_____Hz
DTMF Deviation	_____KHz	_____KHz
Audio Deviation	_____KHz	_____KHz
Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



Radio / Tech Modifications

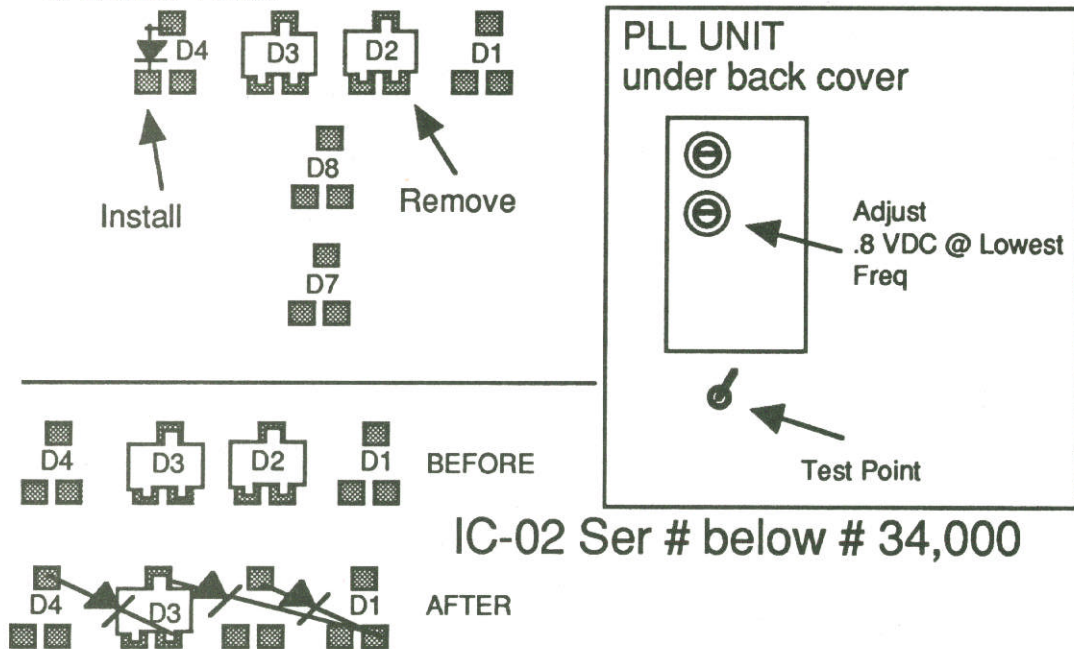
ICOM Radio Modifications

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ICOM IC-02AT EXPANDED RF/ SCAN RATE INCREASE

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and remove chip diode D2 on Logic unit.
4. On 02's with ser # over 34,000 - Install a diode across pads of diode D4 (see drawing) 1N4148 or 1SS211
5. On serial #'s below 34,000 install three diodes. (see drawing)
6. Locate R413 on logic board, it is located below the right hand corner of the microprocessor. The letters C6 are printer above it and 13 is below it.
7. Attach (piggy-back) another 270,000 resistor on to R413. (Scan Mod)
A very small resistor is required. If you use a 1/8 watt or larger use wire rap wire to mount it out of the way.
8. Reassemble the radio.
9. Reset the microprocessor. (ser#<34000 Push button next to litho batt, on >34000 Hold [FUNCTION] and turn power on

Note Adjust VCO for .8 VDC at lowest desired Freq. Measure at VCO test point, tip of resistor R253.



Caution

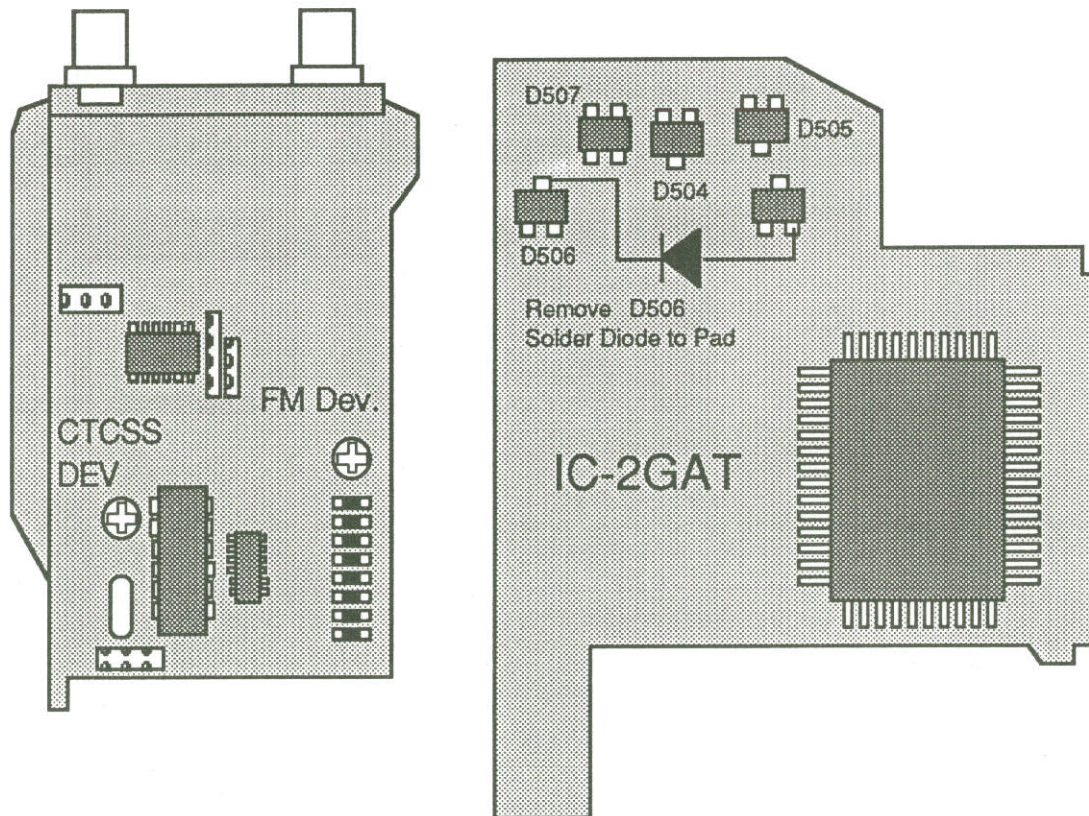
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ICOM IC-2GAT

EXPANDED RF

1. Remove battery and antenna.
2. Remove screws and open radio
3. Remove D506 (this part is already removed on US version)
4. Attach diode as shown (Use 1N914 or equivalent Diode)
Make sure Diode leads will not short anything. Cover them in tape.
5. Reassemble the radio
6. Reset the radio. (Turn radio on, Hold [LIGHT] & [FUNCTION], turn radio off and back on)



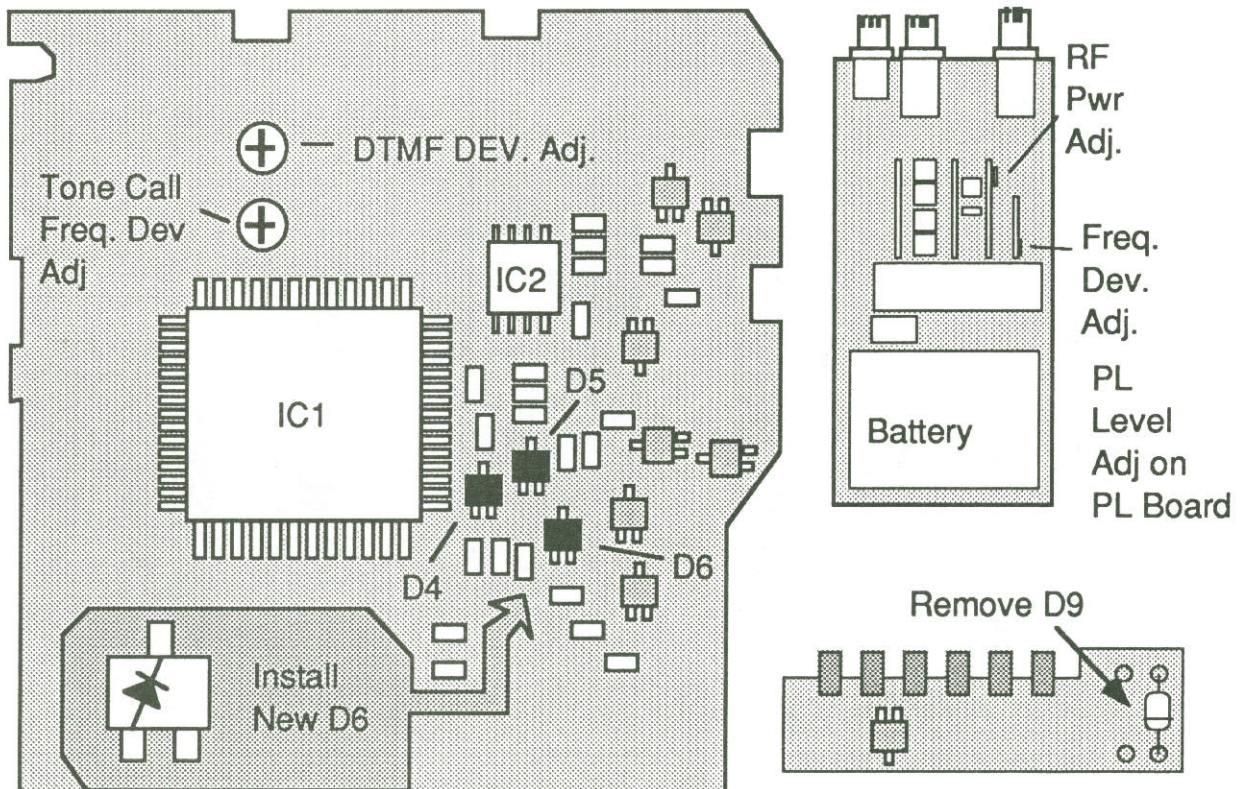
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ICOM IC-2SA, 2SAT & 3SAT EXPANDED RF

1. Remove battery and antenna.
2. Remove screws and open radio.
3. Locate and remove diode D9 on LOGIC A unit (Already removed on USA version)
4. Remove chip diode D6. (Already removed on USA version)
5. Solder install a chip diode (DA114) in place of D6 position.
A 1N4148 or other diode can be used if extreme caution is taken.
6. Reassemble the radio.
7. Reset the microprocessor. (2SAT: Press & hold [#], [B] & Light, Turn power on)
(2SA: Press & hold [FUNC],[CALL] & Light, Turn power on)



2SAT Range RX 108-140 AM, 138-169 FM, 310-370 FM TX 139 - 163 FM

Optional Commands: Push [LAMP] & [Keyboard Key, see below] and Power on.
 [1] Enter 4 digits, [2] Enter 5 digits, [3] Enter 6 digits,
 [4] Pause Scan, [5] to see timer scan, [7] PS off
 [8] PS 1:4 125 msec on/500msec off, [9] PS 1:16
 [0] PTT Disable, [*] PTT Enable, [#] PTT Disable
 [A] Reset, [D] Display Test



Caution

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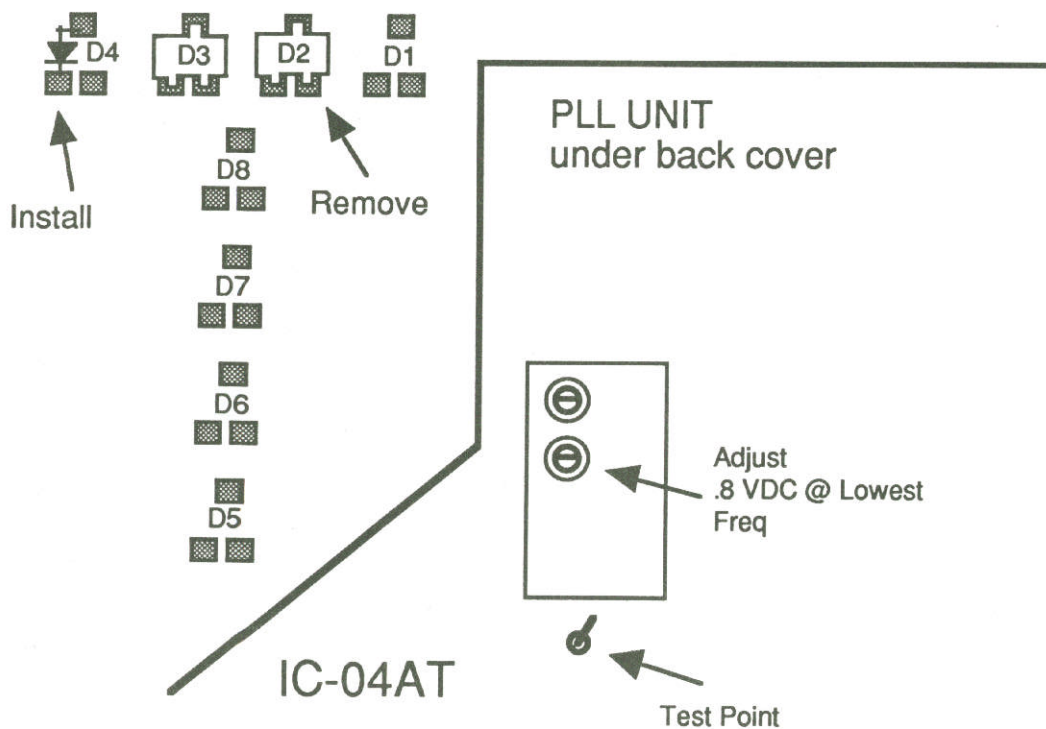
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ICOM IC-04AT

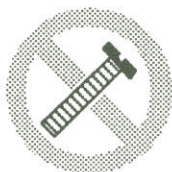
EXPANDED RF

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and remove chip diode D2 on Logic unit.
4. On 02's with ser # over 34,000 - Install a diode across pads of diode D4 (see drawing) 1N4148 or 1SS211
5. On serial #'s below 34,000 install three diodes. (see drawing)
6. Reassemble the radio.
7. Reset the microprocessor. (ser#<34000 Push button next to litho batt, on >34000 Hold [FUNCTION] and turn power on

Note Adjust VCO for .8 VDC at lowest desired Freq. Measure at VCO test point.



IC-02 Ser # below # 34,000



Caution

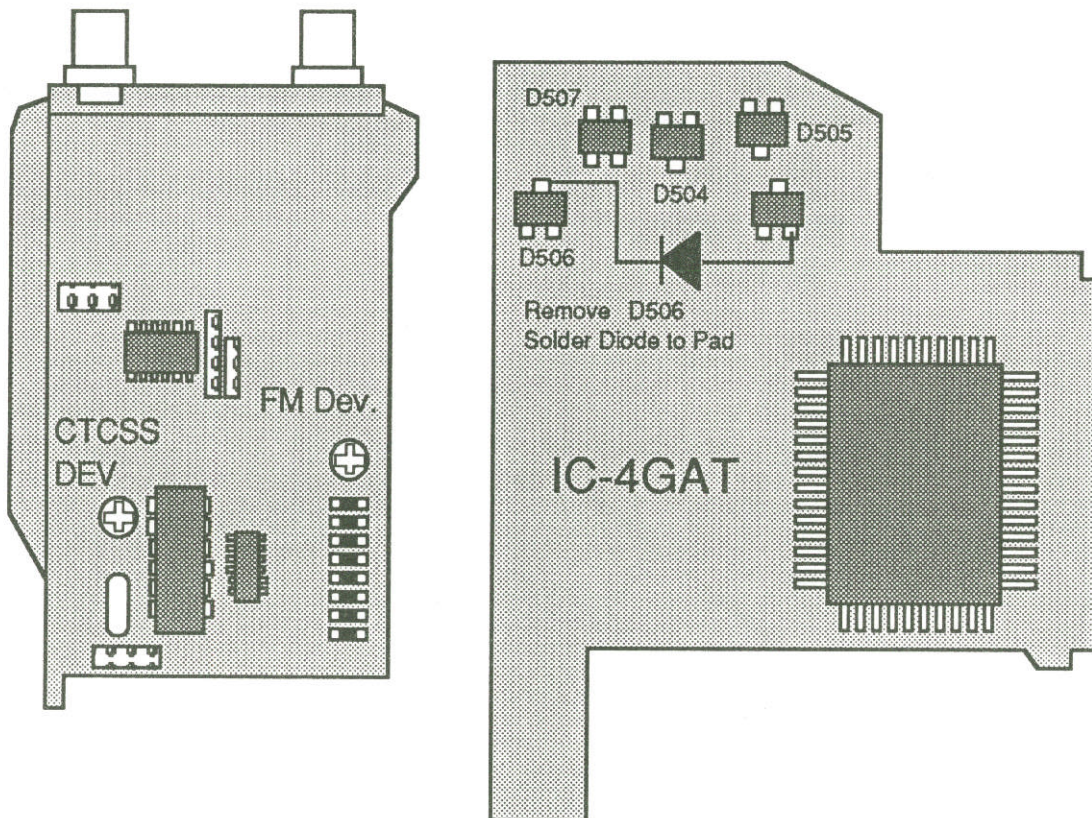
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ICOM IC-4GAT

EXPANDED RF

1. Remove battery and antenna.
2. Remove Screws and open radio
3. Remove D506 (this part is already removed on US version)
4. Attach Diode as shown (Use 1N914 or equivalent Diode)
Make sure Diode leads will not short anything. Cover them in tape.
5. Reassemble the radio.
6. Reset Radio. (Turn radio on, Hold [LIGHT] & [FUNCTION], turn radio off and back on)



Caution

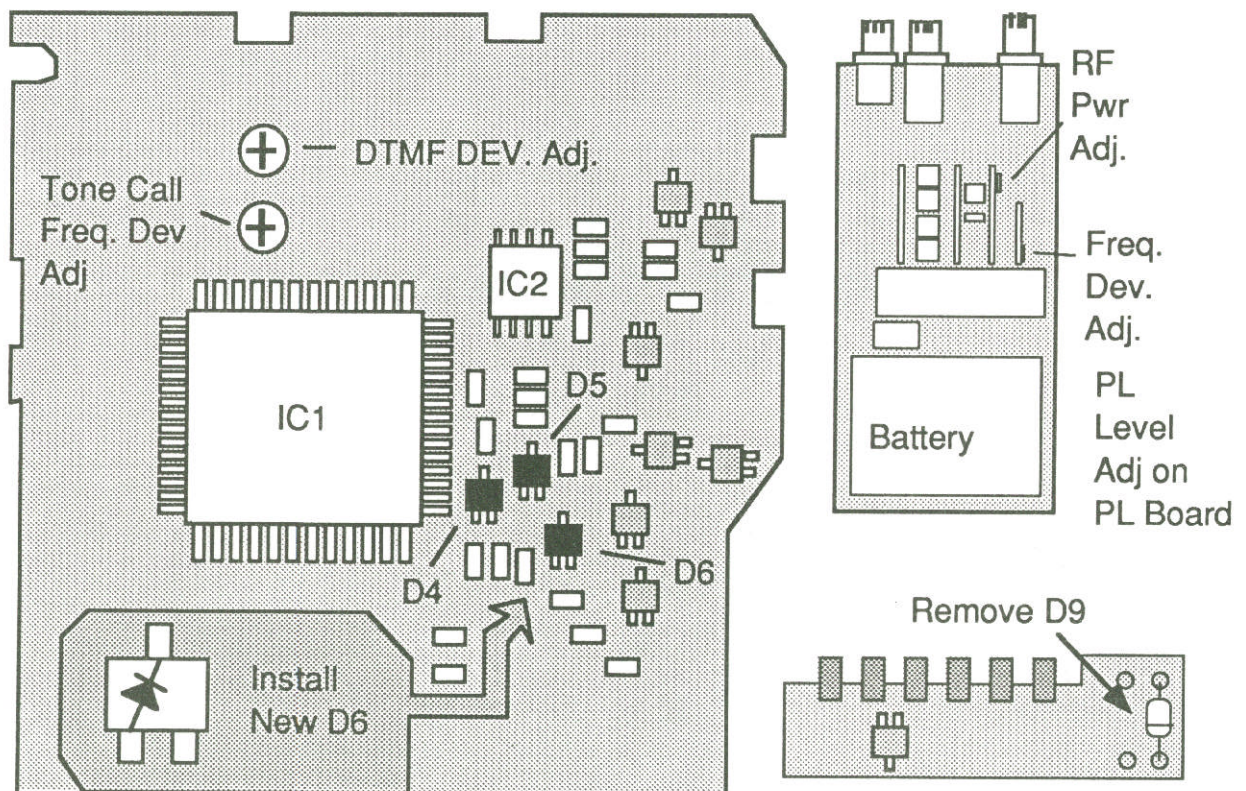
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ICOM IC-4SAT

EXPANDED RF

1. Remove Battery and antenna.
2. Remove Screws and open radio.
3. Locate and remove diode D9 on LOGIC A unit (See Drawing)
4. Solder install a chip diode (DA114 T107) in position D6.
A 1N4148 or other diode can be used if extreme caution is taken.
5. Reassemble the radio.
6. Reset the microprocessor. (Press & hold [#], [B] & Light, Turn power on)



4SAT Range 435 MHz - 465 MHz. (any 30 Meg Segment from 400-490)

Optional Commands: Push [LAMP] & [Keyboard Key, see below] and Power on.
 [1] Enter 4 digits, [2] Enter 5 digits, [3] Enter 6 digits,
 [4] Pause Scan, [5] to see timer scan, [7] PS off
 [8] PS 1:4 125 msec on/500msec off, [9] PS 1:16
 [0] PTT Disable, [*] PTT Enable, [#] PTT Disable
 [A] Reset, [D] Display Test



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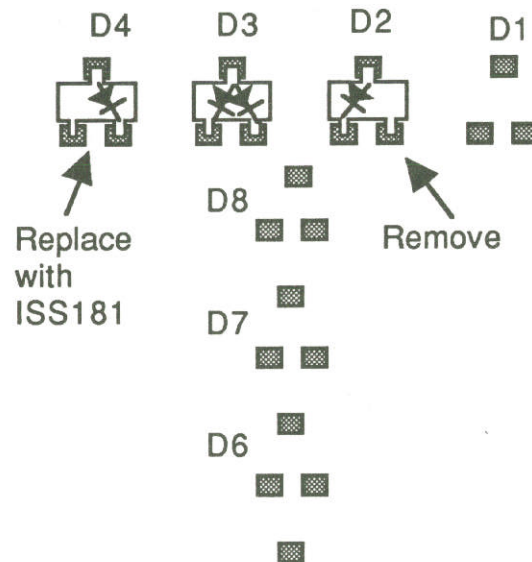
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ICOM IC-12AT

EXPANDED RF

1. Remove battery and antenna.
2. Remove Screws and open radio.
3. Locate and remove diode D2 (See Drawing)
4. Replace diode D4 with ISS 181 (A3)
5. Reassemble the radio.
6. Reset the microprocessor.(Hold [FUNCTION] and turn power on)

IC-12AT



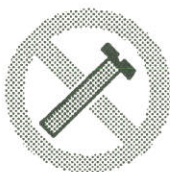
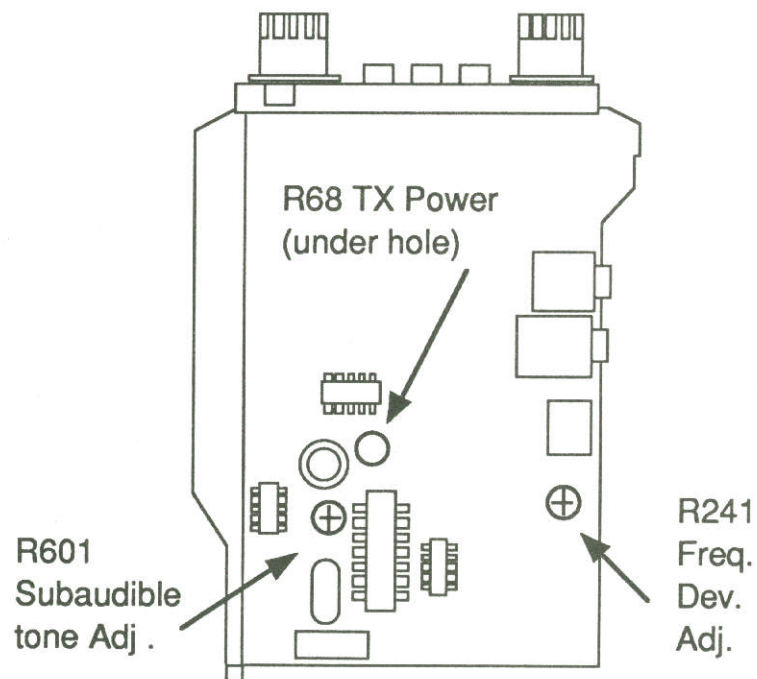
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ICOM IC-12GAT

ALIGNMENT CONTROLS



Caution

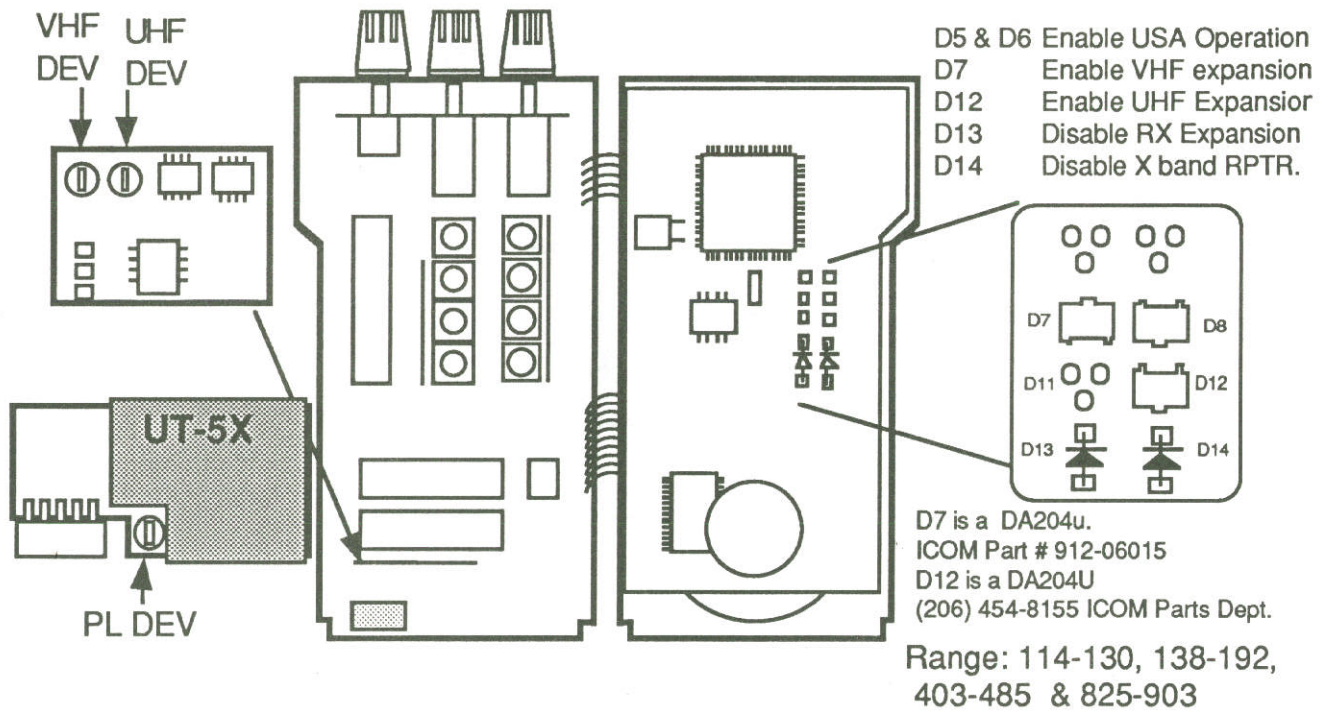
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ICOM IC-24

EXPANDED RF/ Crossband Repeater

1. Remove battery and antenna
2. Remove Screws and open radio
3. Remove Diode D8.
4. Remove Diode D14 (Crossband Repeater)
5. Remove Diode D13 (Expanded RX)
6. Attach Diode DA204u to position D7
7. Attach Diode DA202u to position D12. Note some models require a DA204u.
8. Reassemble the radio.
9. Press and hold [light] & [B] & [#] and turn power on.
 Note: Press and hold [light] & [3] and turn power on for direct Freq entry.
 [light] & [2] will reset the radio for 10MHz input operation.

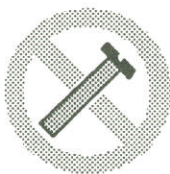


CROSS BAND REPEATER PROCEDURES (VFO MODES ONLY)

TURN ON - HOLD [FUNCTION] & PRESS [C] THEN [5] THEN [D]

TURN OFF - HOLD [FUNCTION] & PRESS [D]

Note: When Transmitting in the 825-900MHz range, the unit is simultaneously transmitting in the 400-450MHz band!!



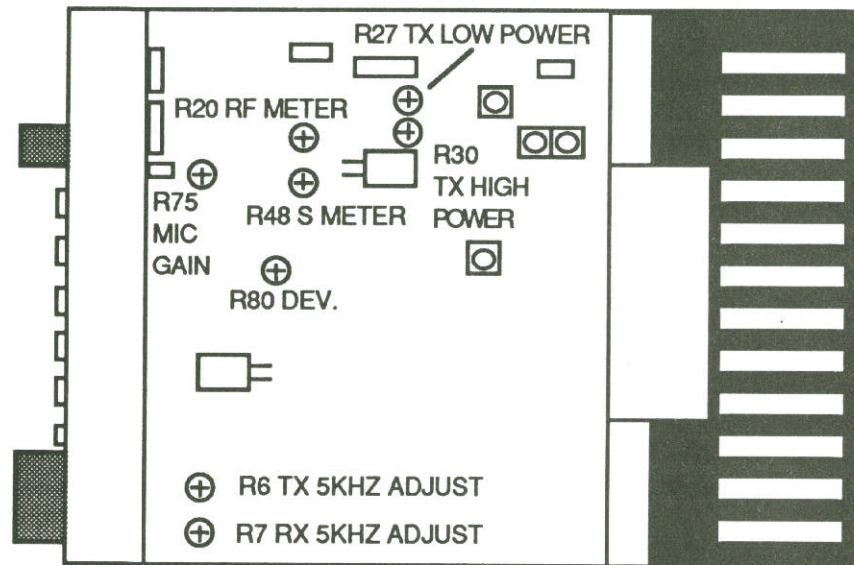
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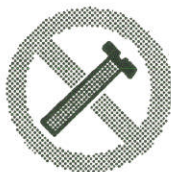
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ICOM IC-27A & H

ADJUSTMENT CONTROLS



CPU Reset by pressing the Reset button under the access cover



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ICOM IC-28A & H

EXPANDED RF

1. Remove Power and Antenna.
2. Remove screws and open case.
3. Locate and cut Diode D21 inside the top of the circuit board.
4. Reset the Microprocessor. (insert a toothpick in hole located in corner of bottom cover.)
5. Reassemble the radio.



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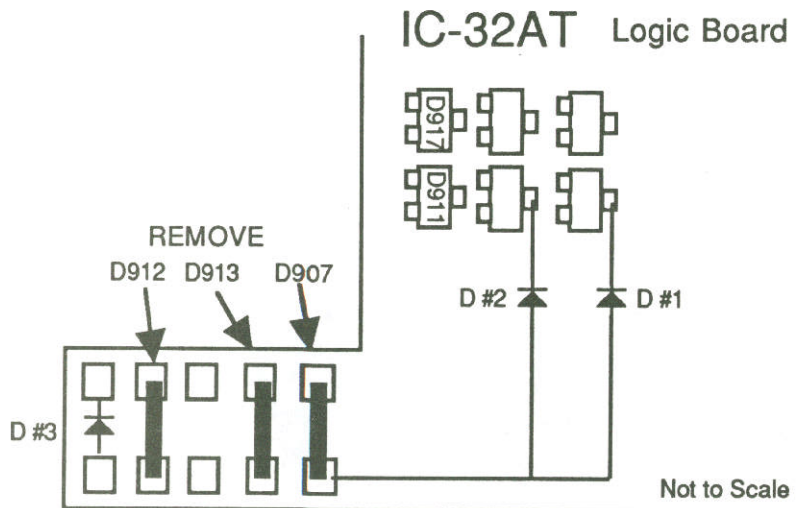
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ICOM IC-32AT

EXPANDED RF / CROSS BAND REPEATER/ 10 MHZ ENTRY

1. Remove battery and antenna.
2. Remove Screws and open radio.
3. Remove D907 (150MHz+) (this part is already removed on US version)
4. Add Diode #1 (1N914).
5. Remove D913 (450MHz+).
6. Add Diode #2 (1N914).
7. Add diode #3 (1N914) 10 MHZ.
8. Remove D912 (Repeater mod).
9. Reset the microprocessor.(HOLD [FUNCTION] & [A] & [LIGHT] and turn power on)
10. Reassemble the radio.

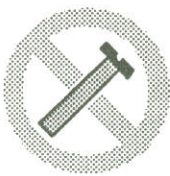
Adjust C-510 to get .25 volts at UHF test point at lowest desired frequency.
C-510 is located in metal box. The test point is located next to the metal box.



CROSS BAND REPEATER PROCEDURES (Simplex Freqs only)

TURN ON - Press & Hold [Function], Press [C] key, Press [6] key, Press [D] key.
Release Function key.

TURN OFF - Press and Hold [Function], Press [D] key, Press [C] key. Release [Function]



Caution

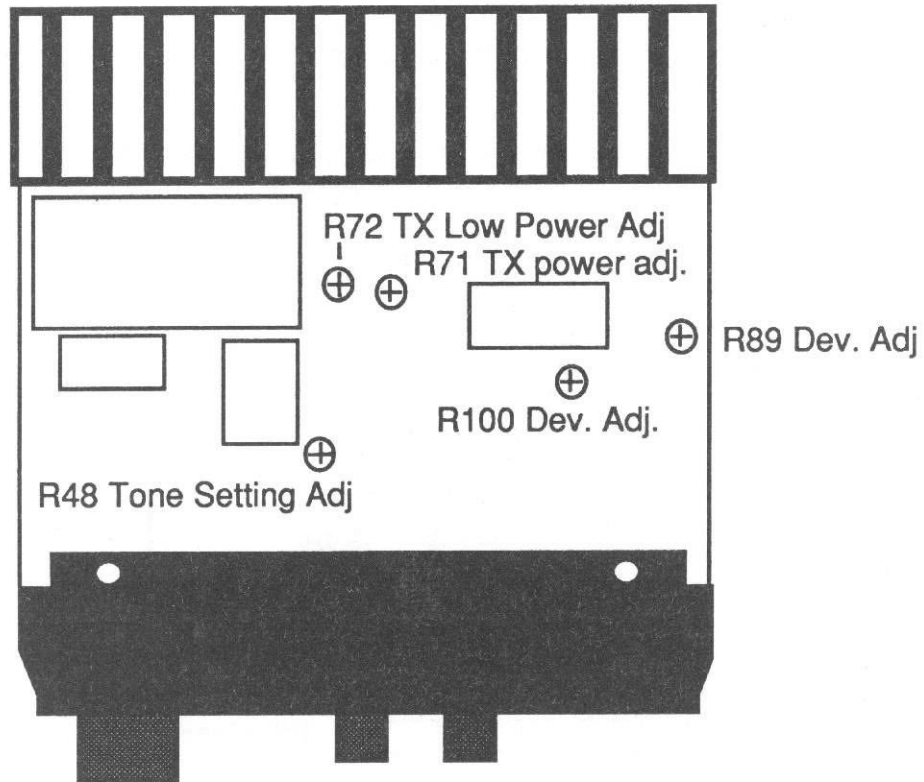
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ICOM IC-38

ALIGNMENT CONTROLS

IC-38A



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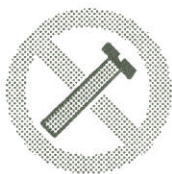
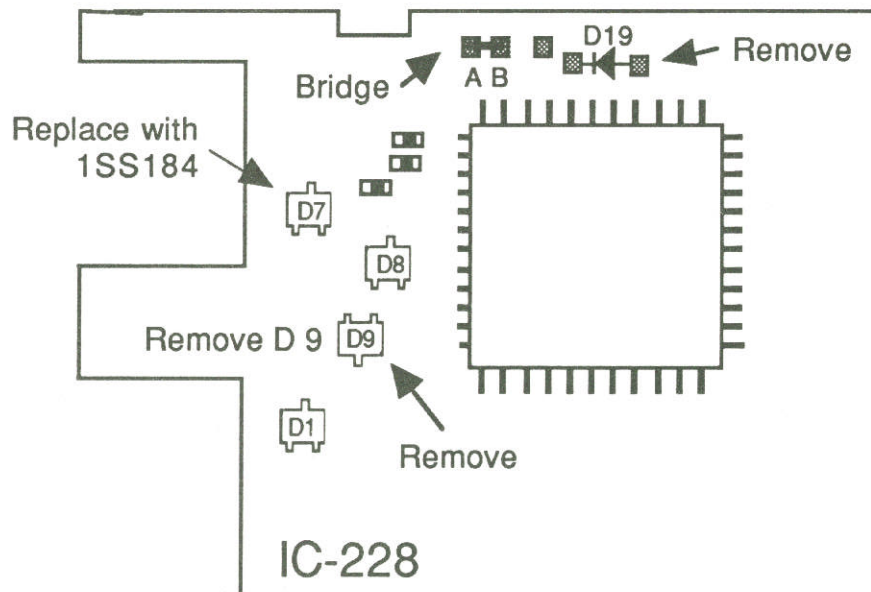
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ICOM IC-228A

EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Remove diode D19 (for all Serial Numbers)
4. Replace chip diode D7 with an 1SS184) (228A Below ser# 02900 & 228H below ser# 06300)
4. Remove chip diode D9 (228A above ser# 02900 & 228H above ser# 06300)
5. Solder bridge Pads A & B (228A above ser# 02900 & 228H above ser# 06300)
6. Reassemble the radio
7. Reset the microprocessor (Push and hold [SQUELCH/Monitor] & [LOCK] and turn power on)

Note : Discriminator output on pin 9 of IC 1 (MC3357P)



Caution

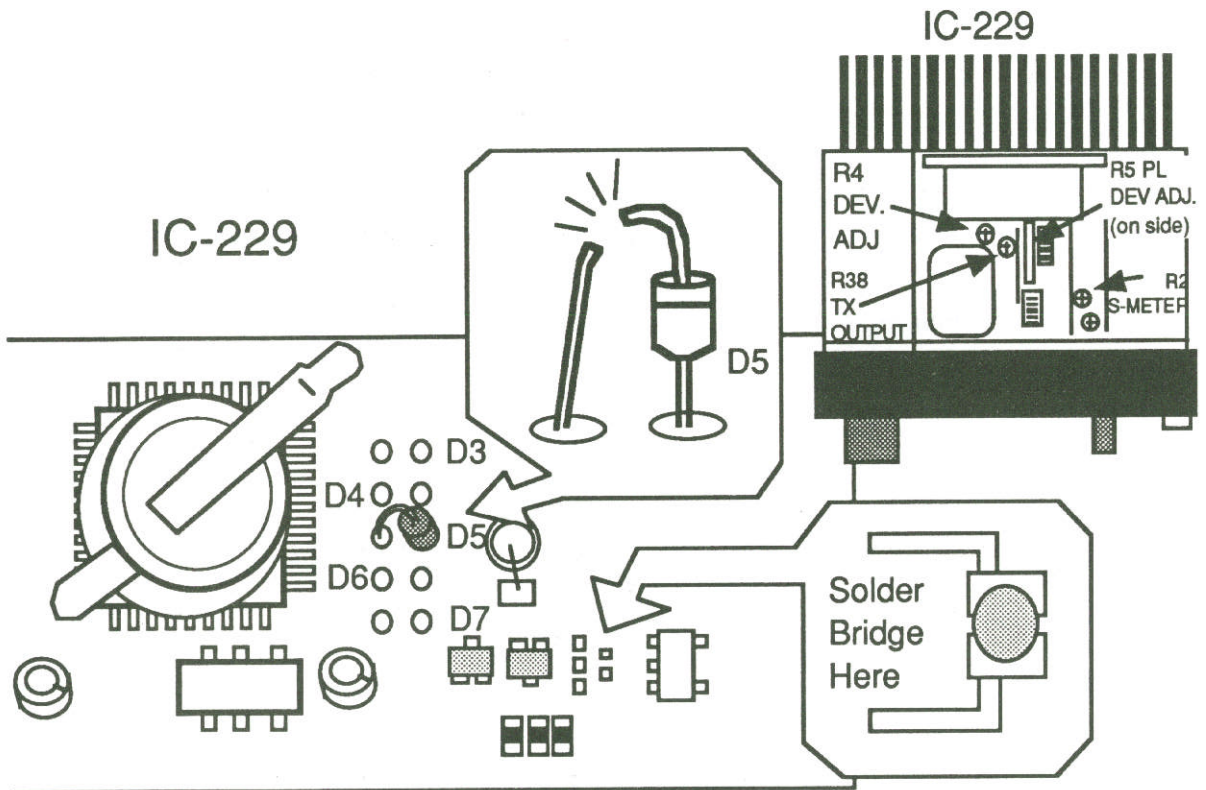
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ICOM IC-229

EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate and cut Diode D5 on the LOGIC board
4. Install a jumper at "land" point.
5. Reassemble the radio.
6. Reset the microprocessor. (Press and hold [SET] & [MW] and turn power on)



FREQ 118.000 - 135.995 MHz (AM) RX
 136.000 - 174.000 MHz (FM) RX

 136.000 - 174.000 MHz (FM) TX



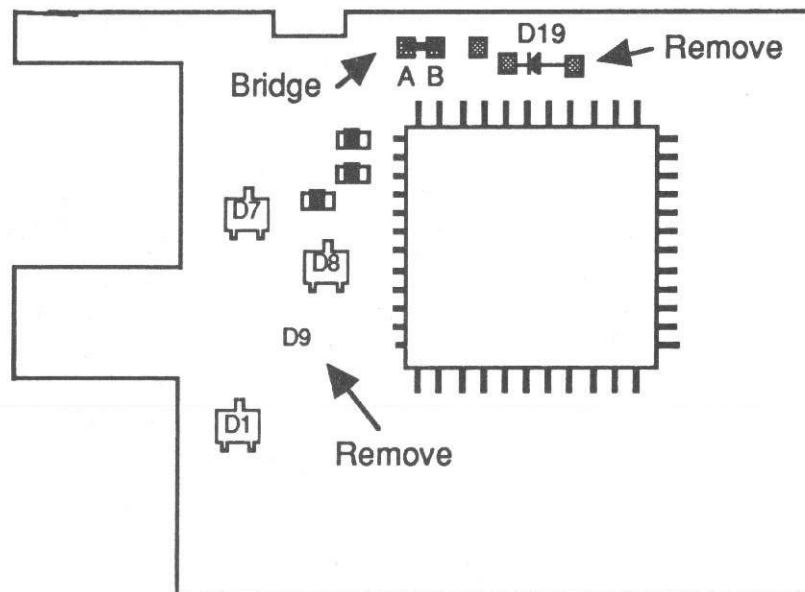
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ICOM IC-448A

EXPANDED RF

1. Remove power and antenna.
2. Remove screws and open the case.
3. Remove diode D19
4. Remove chip diode D9
5. Solder bridge Pads A & B
6. Install Diode D7. (part # 1SS193)
7. Reassemble the radio.
8. Reset the microprocessor (Push and hold [SQUELCH/MONITOR] & [LOCK] and turn power on.

Note : Discriminator output on pin 9 of IC 1 (MC3357P)



Caution

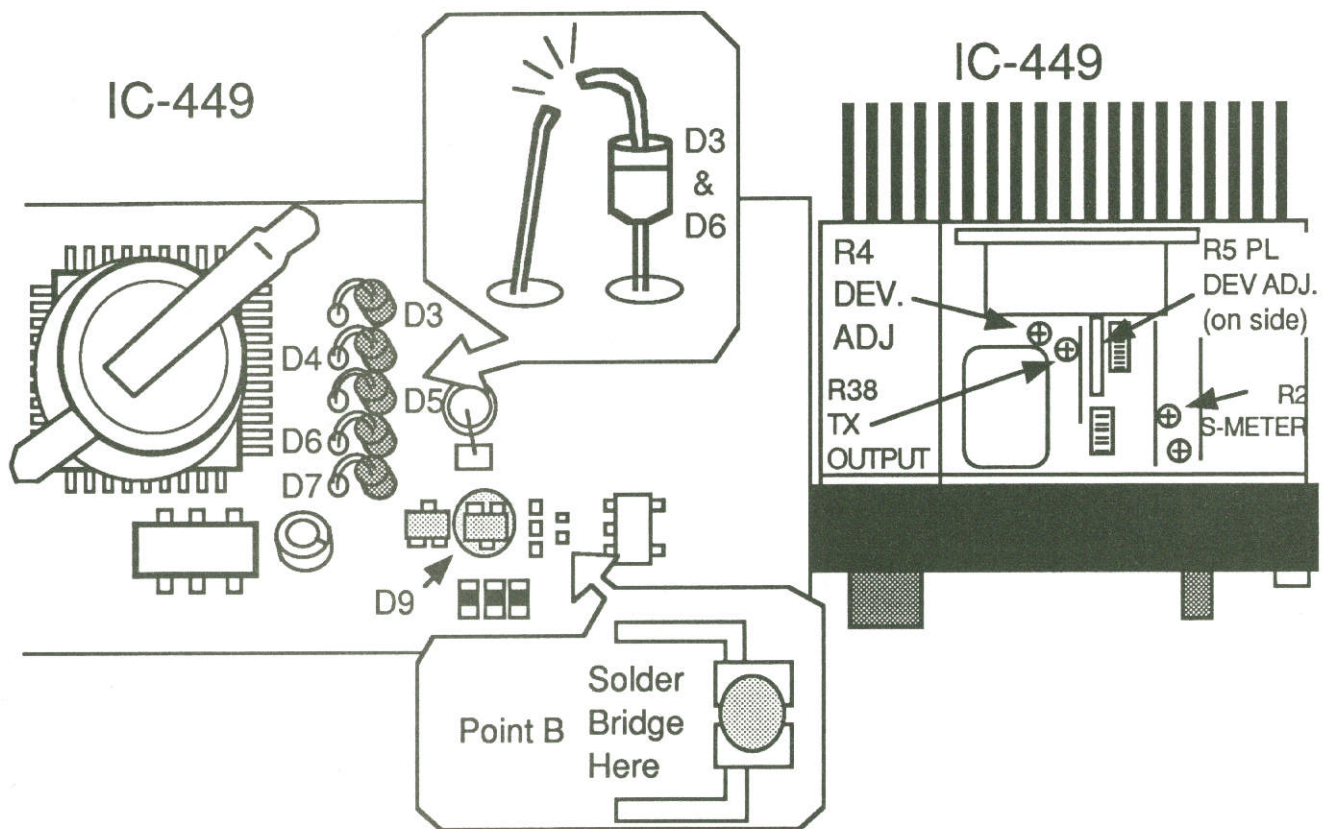
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ICOM IC-449

EXPANDED RF/ ALIGNMENT CONTROLS

1. Remove power and antenna.
2. Remove screws and open the case.
3. Locate and short "point B".
4. Locate and cut diode D3.
5. Locate and cut diode D6.
6. Install diode D9 (1SS187).
7. Reassemble the radio.
8. Reset the microprocessor (Press and hold [SET] & [MW] and turn power on).



Caution

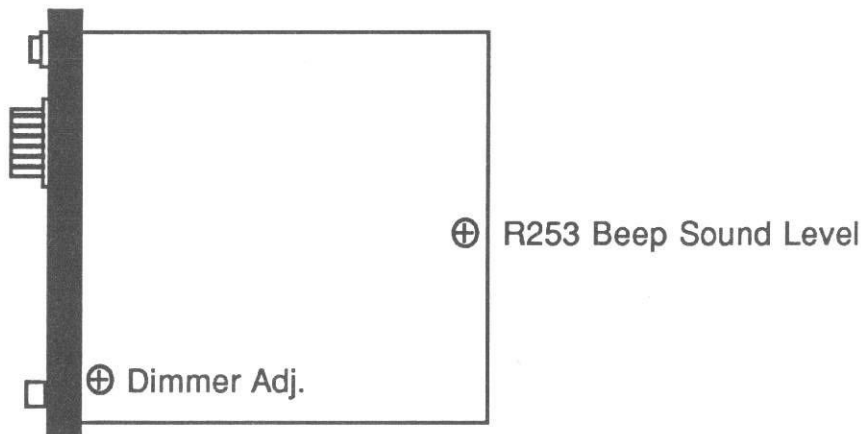
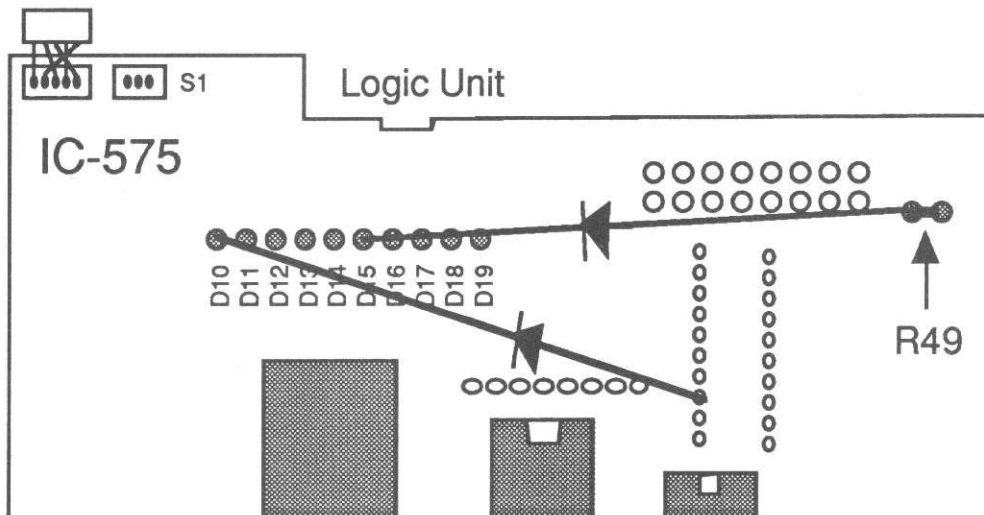
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ICOM IC-575

EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate the Logic Unit. It is located under the PA unit. (the PA unit has the speaker in it.) Follow the instruction used when installing the UT-34 Tone Squelch unit.
4. Attach two diodes as shown. (any standard diode)
D10 to 3rd pin & R49 to D15
5. Reassemble the radio.
6. Reset the microprocessor (Press and hold [M-CL] and turn power on)



Range FX 26 - 56 MHz
 TX 26 - 56 MHz



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ICOM IC-720A EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate main board and cut light blue wire, pin 1 of plug K-10
4. Reset the Microprocessor.
5. Reassemble the radio.



Caution

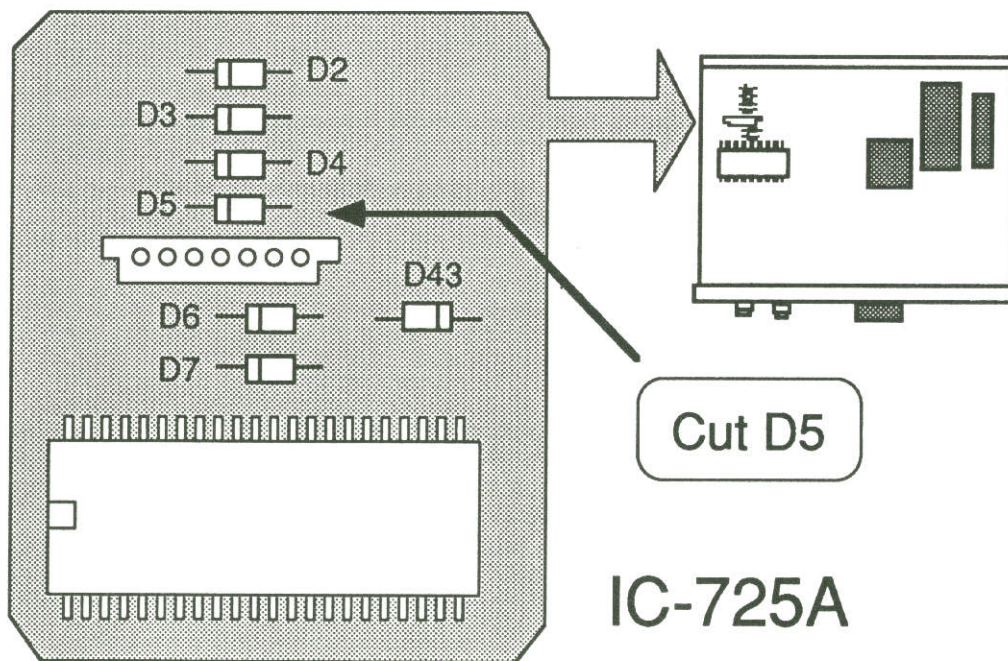
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ICOM IC-725A

EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate PLL board and cut diode D5.
4. Reset the microprocessor. (Hold [FUNCTION] & [MW] and turn power on)
5. Reassemble the radio.



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ICOM IC-730

EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate RF board.
4. Cut green wire(labeled 'D')
5. Cut resistor R-48
6. Reset the microprocessor.
7. Reassemble the radio



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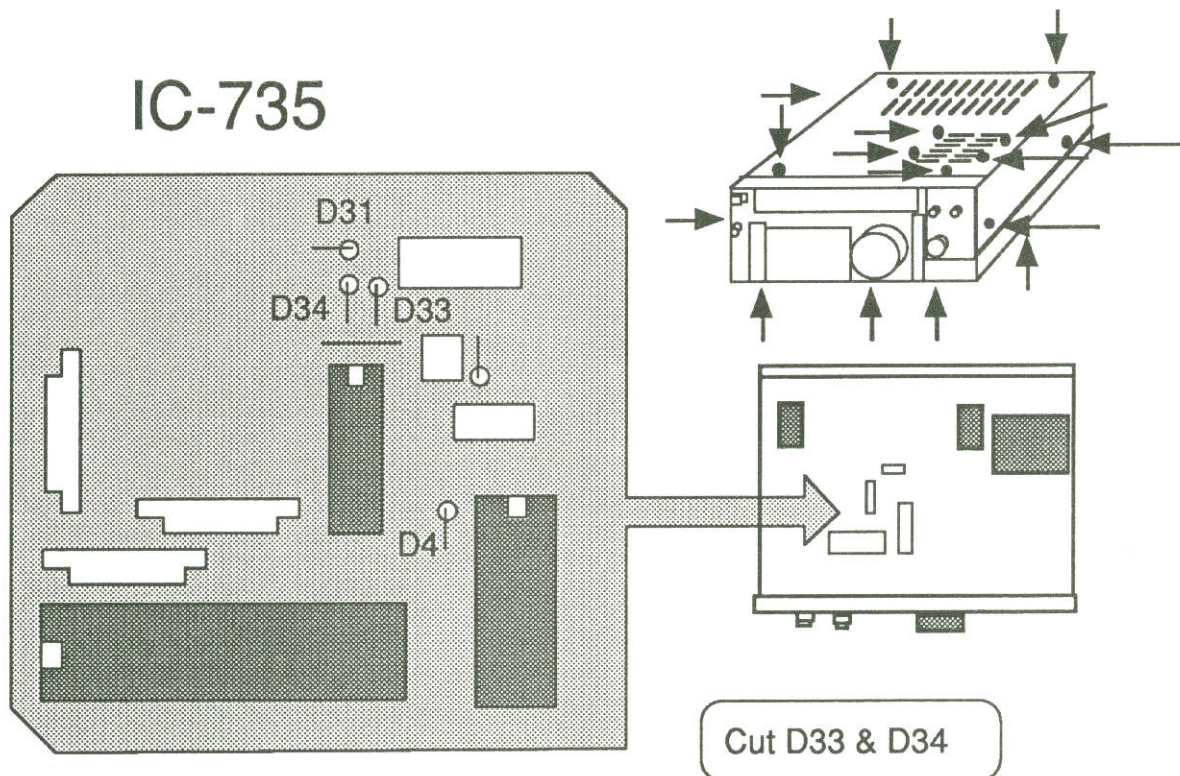
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ICOM IC-735

EXPANDED RF

1. Remove power and antenna.
2. Remove screws and open top cover.
3. Remove screws and set PA unit aside.
4. Locate diodes D33 and D34 on the top of the PLL circuit board.
5. Cut the Teflon covered leads of Diodes D33 and D34.
6. Reassemble the radio.

Note: Accessing the main Board may require taking out many of the other components of the radio.



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ICOM IC-740

EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate RF board.
4. Cut (white resistor) jumper located between D31 and 'C' wire.
5. Reset the microprocessor.
6. Reassemble the radio.



Caution

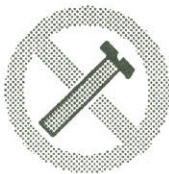
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ICOM IC-745

EXPANDED RF

1. Remove Power and Antenna.
2. Remove screws open case.
3. Locate RF board on the side of the radio.
4. Cut the light brown wire on J7 Pin 1.
5. Reassemble the radio.



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ICOM IC-751

EXPANDED RF

OLDER VERSION

1. Remove Power and Antenna.
2. Remove screws open case.
3. Locate RF board on the side of the radio.
4. Cut the black wire on J2 Pin 1.
5. Reassemble the radio.

NEW VERSION IC-751A

1. Remove Power and Antenna.
2. Remove screws open case.
3. Locate noise blanker board. (Near front panel)
4. Locate and cut resistor R34.
5. Reassemble the radio.



Caution

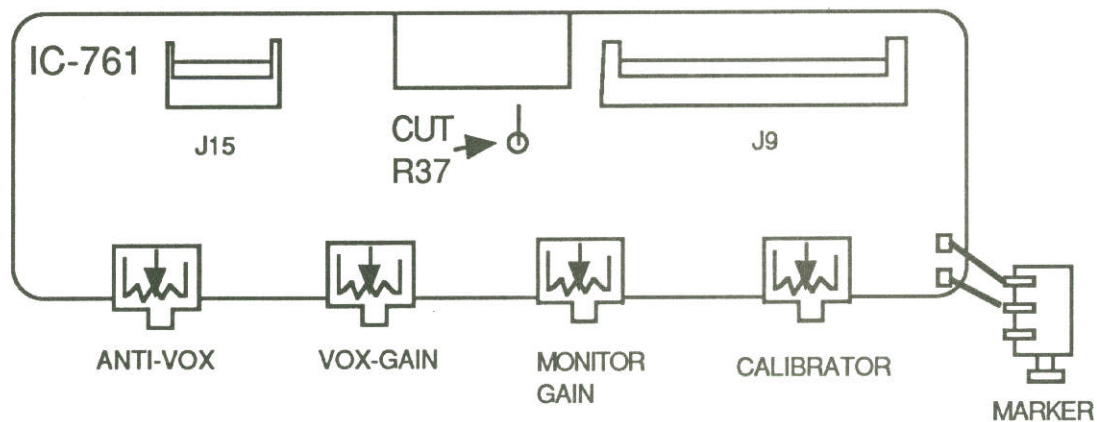
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ICOM IC-761

EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate front (Marker) Unit.
4. Locate and cut Resistor R37
5. Reassemble the radio.
6. Reset the microprocessor. (Hold [M-CLEAR] and turn power on)



Caution

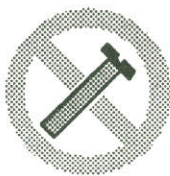
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ICOM IC-765

EXPANDED RF

1. Remove power and antenna.
2. Remove screws and open bottom cover.
3. Locate and remove diode D53.
Note: (It is the only part on the bottom of the circuit board).
4. Reassemble the radio.
5. Reset the microprocessor. (Hold [M-CLEAR] and turn power on)



Caution

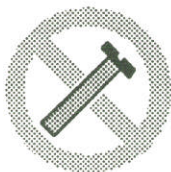
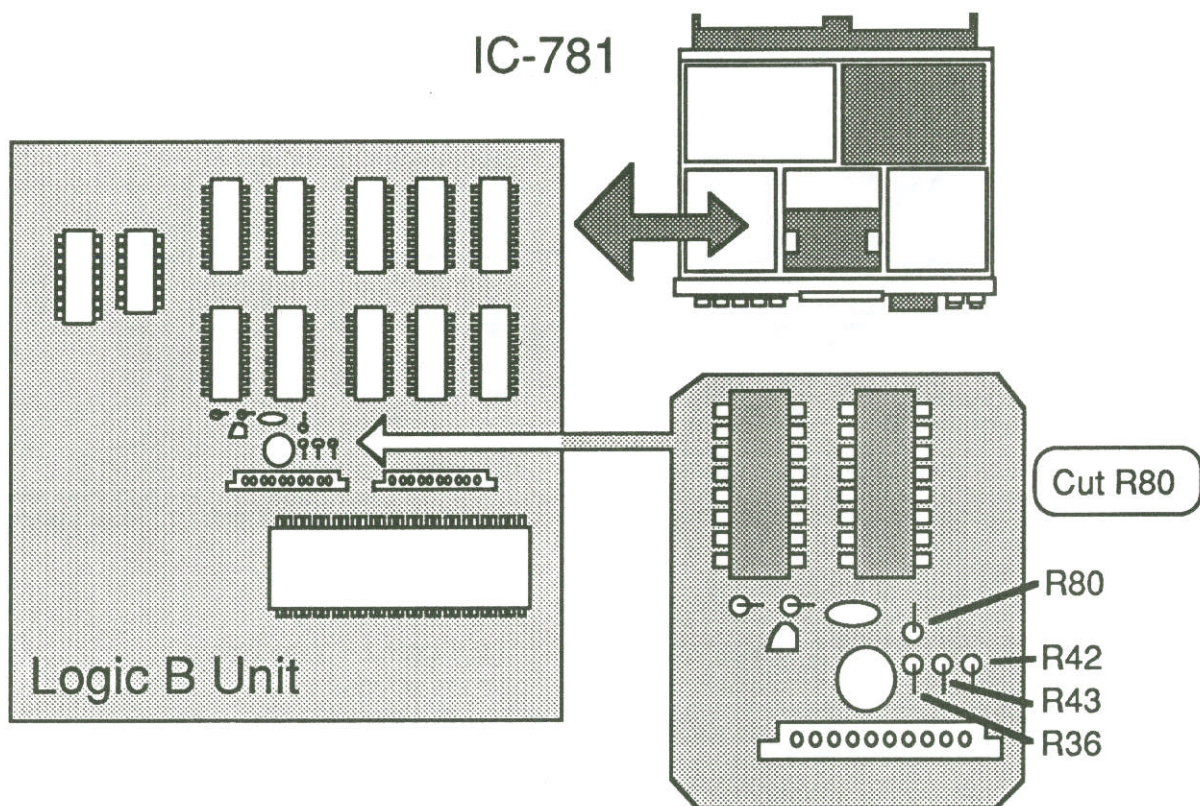
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ICOM IC-781

EXPANDED RF

1. Remove power and antenna.
2. Remove screws open case.
3. Locate and cut resistor R80 on Logic B unit.
4. Reset the microprocessor.
5. Reassemble the radio
6. Reset the microprocessor. (Hold [M-CLEAR] and turn power on)



Caution

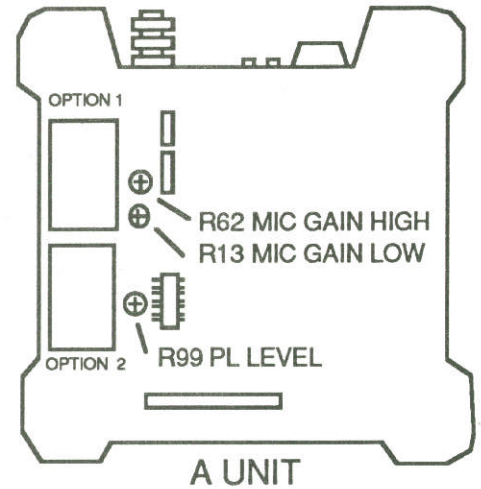
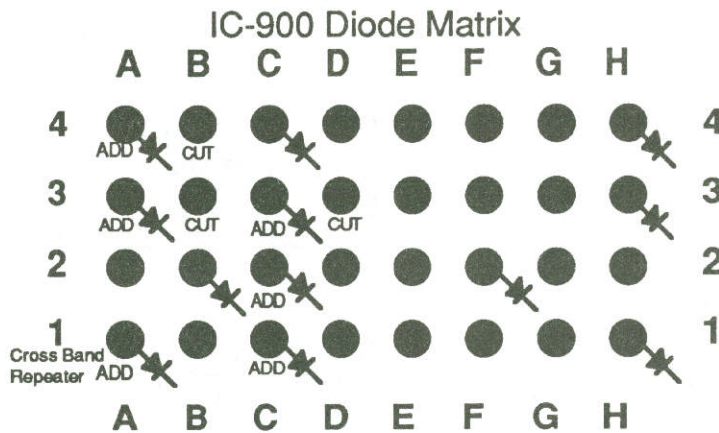
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ICOM IC-900

EXPANDED RF / CROSS BAND REPEATER

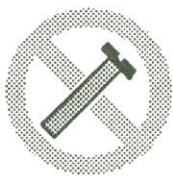
1. Open Control Head
2. Locate Diode Matrix on Display B board of Control Head.
3. Add and remove Diodes according to drawing
4. Reassemble control Head.
5. Open Interface A unit.
6. Change the switch position from "1" (factory) to "2" on interface A board (below the tone units).
7. Reassemble Interface A.
8. Reset the microprocessor. (Press and hold [MR] and turn power off and back on)



CROSS BAND REPEATER PROCEDURES (Simplex Freqs only)

TURN ON - Turn LOCK switch ON.

TURN OFF - Turn LOCK switch OFF.



Caution

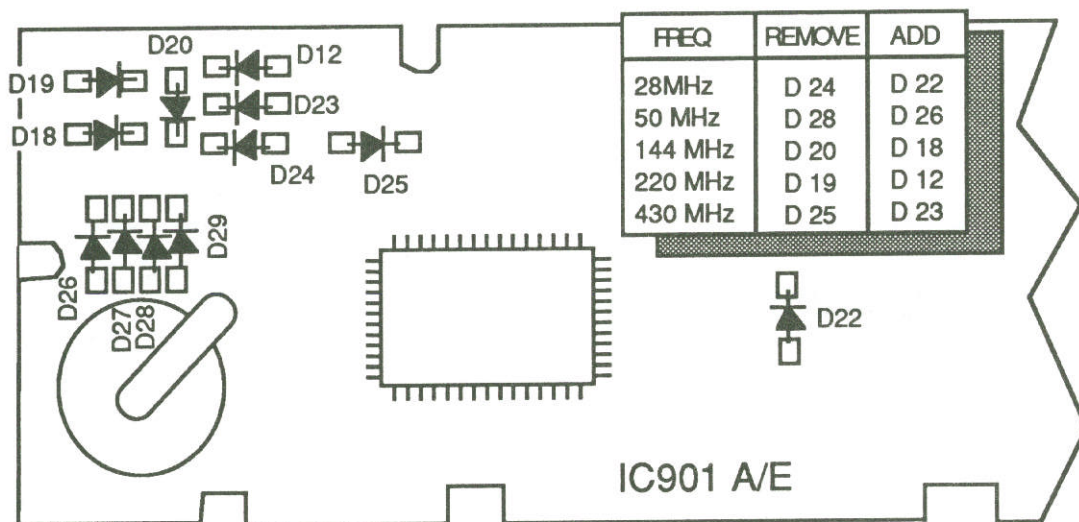
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ICOM IC-901A

EXPANDED RF - CROSS BAND REPEATER

1. Remove control head Cable.
2. Remove screws and open case.
3. Located and remove diodes D24, D28, D20, D19 and D25.
4. Attach diodes D22, D26, D18 D12, D23.
5. Remove Diode D27 (Cross band repeater mod).
6. Reassemble control head.
7. Reset the microprocessor (Turn radio on and press [CHECK] & [MW]).



TO ACTIVATE CROSS BAND REPEATER MODE:

1. Turn the power off.
2. Push and hold [CHECK] and [LOCK] and turn power on.

TO DEACTIVATE CROSS BAND REPEATER MODE:

1. PRESS [LOCK] BUTTON.



Caution

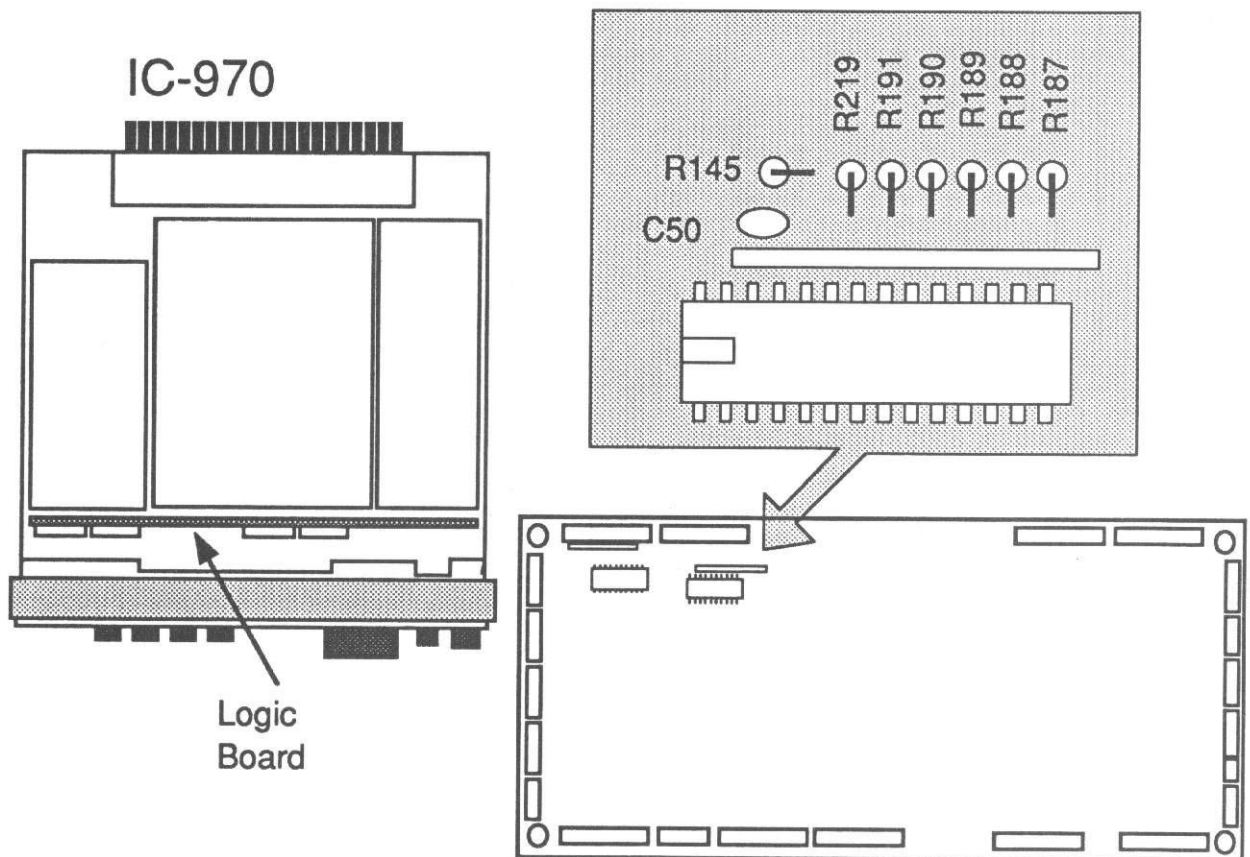
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ICOM IC-970

EXPANDED RF

1. Remove power and antenna.
2. Remove top and bottom covers.
3. Locate and expose the logic board. (see drawing)
4. Locate and cut resistor R187.
5. Locate and cut resistor R190.
6. Locate and cut resistor R219.
7. Locate resistor position R 188 and add a 10K ohm resistor.
8. Reassemble the radio.
9. Reset the microprocessor. (Push and hold [MW] and turn power on).



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ICOM IC-1200

EXPANDED RF 870-960 MHz

1. Remove Power and Antenna.
2. Remove screws open case.
3. Locate and cut Resistor R52 on Logic A unit.
4. Install a new antenna connector to position J2 on RF board.
Note: a different antenna is required for the 870-960 bands
5. Reassemble the radio.
6. Reset the microprocessor (Insert a toothpick in hole in the corner of the bottom cover.)



Caution

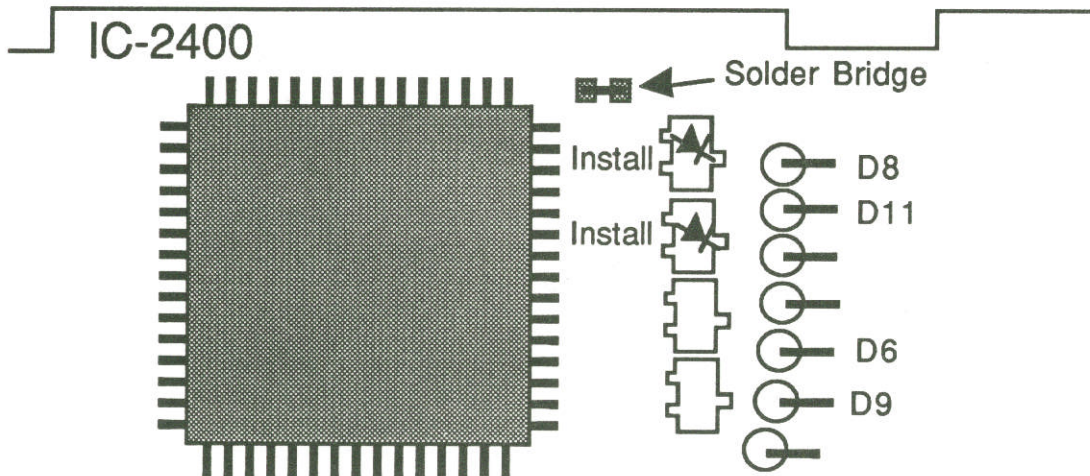
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ICOM IC-2400

EXPANDED RF / CROSS BAND REPEATER

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and cut diode D11. (440 Mod)
4. Locate and cut diode D 6.(440 Mod)
5. Install chip diode . (see drawing)(440 Mod)
6. Locate and cut diode D11
7. Locate and cut diode D8
8. Install chip diode. (see drawing)
9. Solder jump pads.
10. Locate and cut D 9 (Repeater Mod)
11. Reassemble the radio.
12. Reset the microprocessor. (Press and hold [SUB VOL] & [MW] and turn power on)



CROSS BAND REPEATER PROCEDURES

TURN ON - Push and hold [SET], [MONI] & [MHZ] & Mic down Button and turn power on.

TURN OFF - Push and hold [SET] then press [MHZ]



Caution

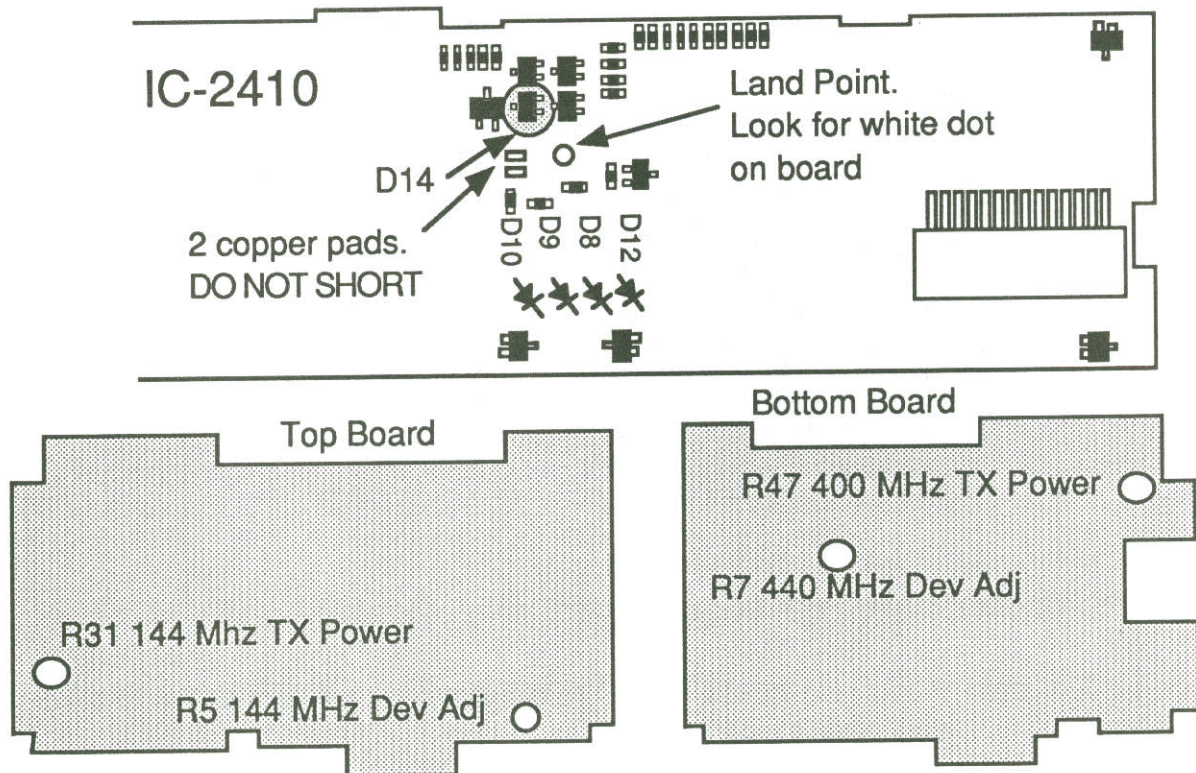
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ICOM IC-2410

EXPANDED RF

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and cut diode D9 on logic board. (VHF Rx mod)
4. Locate and cut diode D10. (UHF R Mod)
5. Locate and cut diode D8. (320-399 MHz & 830-950 Rx Mod)
 Note: An antenna cable is required for 830-950 MHz range. Use Pad J2 on main board B to connect an antenna cable.
6. Locate and solder jump 'LAND' point on logic board.(VHF Tx mod)
7. Locate diode D14 on logic board.
8. Replace D14 with a 1SS181 diode. (UHF Tx mod)
9. Reassemble the radio.



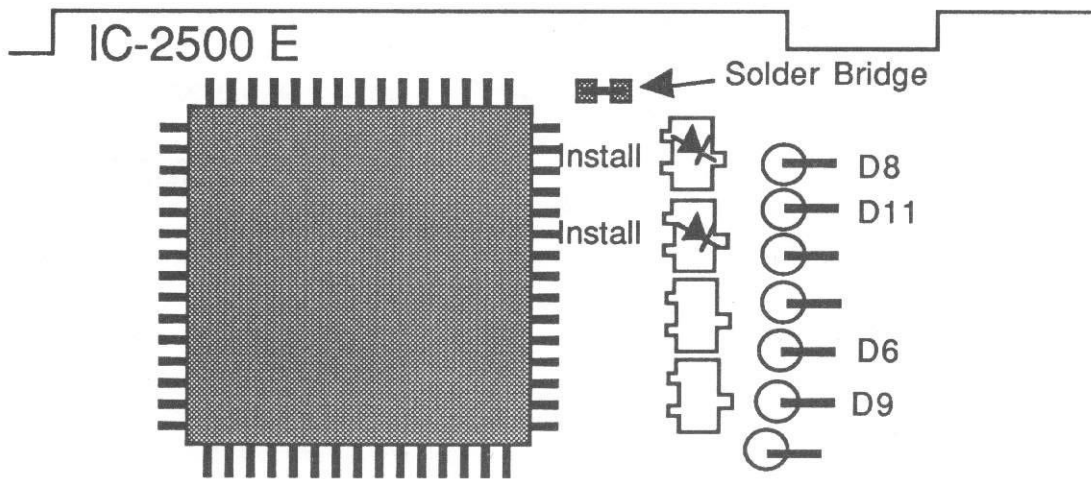
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ICOM IC-2500

EXPANDED RF / CROSS BAND REPEATER

1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and cut diode D11. (440 Mod)
4. Locate and cut diode D 6.(440 Mod)
5. Install chip diode . (see drawing)(440 Mod)
6. Locate and cut diode D11
7. Locate and cut diode D8
8. Install chip diode. (see drawing)
9. Solder jump pads.
10. Locate and cut D 9 (Repeater mod)
11. Reassemble the radio.
12. Reset the microprocessor. (Press and hold [SUB VOL] & [MW] and turn power on)



CROSS BAND REPEATER PROCEDURES

TURN ON - Push and hold [SET], [MONI] & [CALL] & Mic down Button and turn power on.

TURN OFF - Push and hold [SET] then press [MHZ]



Caution

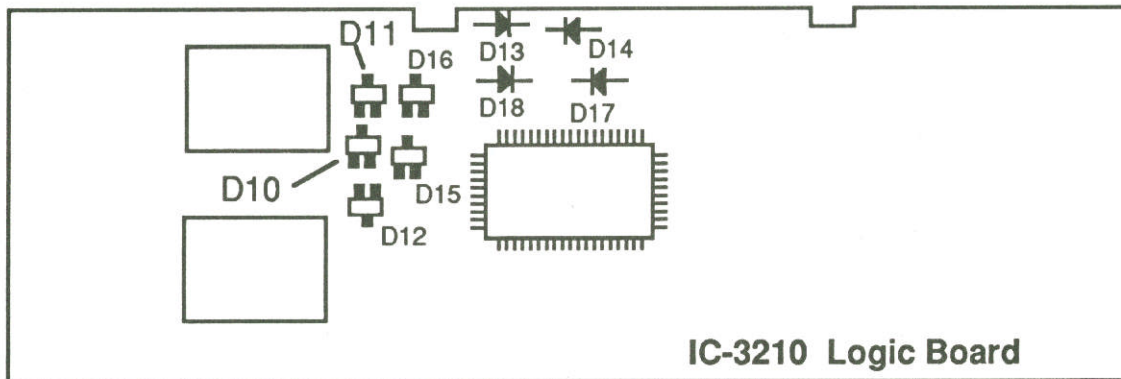
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ICOM IC-3210

EXPANDED RF / CROSS BAND REPEATER

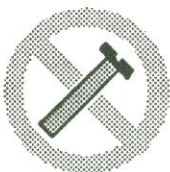
1. Remove battery and antenna.
2. Remove screws open case.
3. Locate and cut diode D17. (Already removed in USA version) (144 mod)
4. Replace chip diode D10 in position A. (New: 1SS184 B3) (144 mod)
5. Locate and cut diode D18. (440 mod)
6. Replace chip diode D11 in position B (old: 1SS196 New: 1SS184 (B3))(440 mod)
7. Locate and cut diode D14. (Repeater mod)
8. Reassemble the radio
9. Reset the microprocessor. (Push and hold [SQUELCH/Monitor] & [LOCK] and turn power on)



CROSS BAND REPEATER PROCEDURES

TURN ON - Set radio to "SPT mode". Push and hold "Band switch & "Lock switch" ("SPT" and "L" will flash)

TURN OFF - Press [LOCK] switch.



Caution

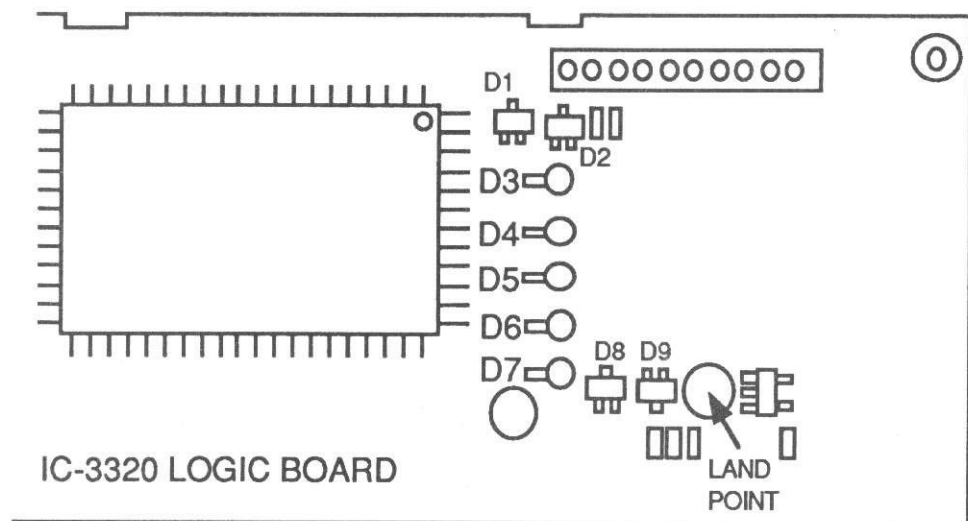
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ICOM IC-3220

EXPANDED RF & Air Craft AM

1. Remove power and antenna.
2. Remove screws open case.
3. Locate and Cut Diode D4 on the LOGIC board. (VHF 118 -135 Mhz)
4. Locate and Cut Diode D5 on the LOGIC board. (UHF)
5. Install a jumper at "land" point. (VHF) Located right of D9.
6. Install a diode (1SS181) at Location D9 on the LOGIC board.
7. Reassemble the radio
8. Reset the microprocessor. (Press and hold [SET] & [MW] and turn radio on)



FREQ 118.000 - 135.995 MHz (AM) RX 136.000 - 174.000 MHz (FM) RX
 136.000 - 174.000 MHz (FM) TX
 440.000 - 479.000 MHz (FM) RX & TX

CROSS BAND REPEATER PROCEDURES

TURN ON - Set VHF & UHF Frequencies in DUAL WATCH mode. Press and hold [BAND] and press [SET]. Memory channel will show a flashing "L"

TURN OFF - Press [SET] key. Turning off the radio will not disable repeater mode.

Note: The Mic PTT will still operate the radio in repeater mode!!!



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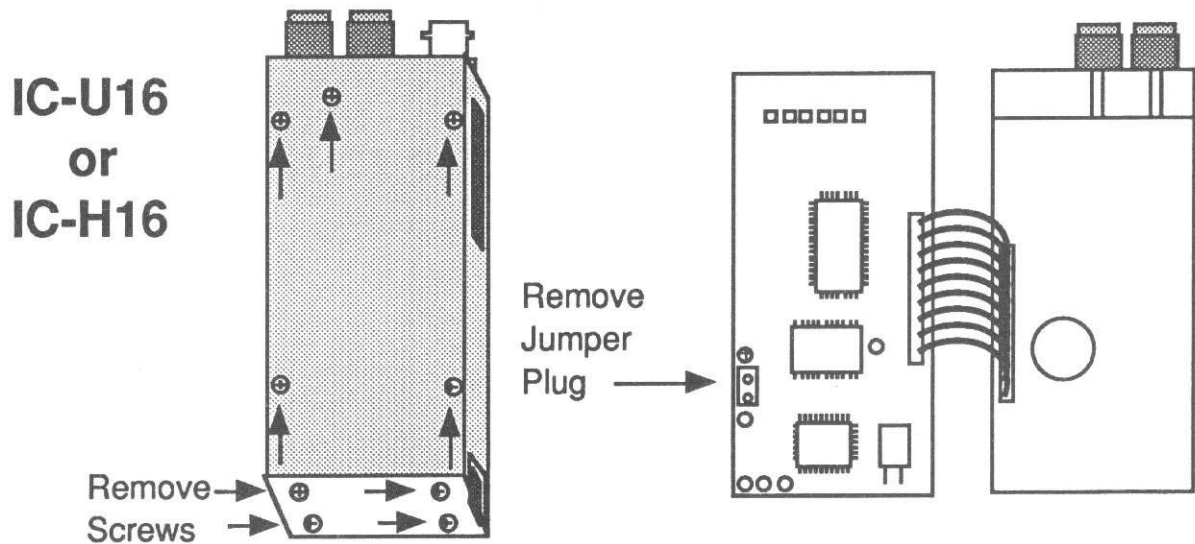
ICOM H16

USER PROGRAMMABLE MODIFICATION

1. Remove battery and antenna.
2. Remove 9 screws and open Radio.
3. Locate and remove Jumper plug.
4. Reassemble the radio.

Programming commands:

- 1) Hold down [FUNCTION] key and press [1] [5] [9] [3] [5] [7].
- 2) Hold down [FUNCTION] and press :
 - [1] - Transmit PL tone. (2 digits)
 - [2] - Receive PL Tone. (2 digits)
 - [4] - Offset in MHz. (ie. +05000 =+5 MHz)
 - [5] - Frequency.
 - [7] - Rename Ch#
 - [8] - Time out Timer
 - [9] - TX Inhibit
- 3) Enter #'s and press [Ent].
- 4) To Exit Programming mode Hold [FUNCTION] and press [CLR].



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ICOM IC-R71

EXPANDED RF Receive down to 5 KHz.

1. Enter the memory channel mode and select any memory channel.
2. Push the [FUNCTION] key and [CLEAR MEMORY] button.
3. Tune (rock) memory channel knob and the main dial at the same time.
Keep rocking both until frequency display goes to 00.00.
4. Tune UP only! If you tune down the display will return to 96 KHz.

Display Failure

Replace the following components:

C14 = 33 μ 16v.
C20 = 10 μ 16v.
C15 = 4.7 μ 25v.
C17 = 3.3 μ 50v.
C18 = 0.1 μ 50v.
C21 = 10 μ 16v.
C19 = 10 μ 16v.
C22 = 10 μ 16v.
C16 = 3.3 μ 50V.



Caution

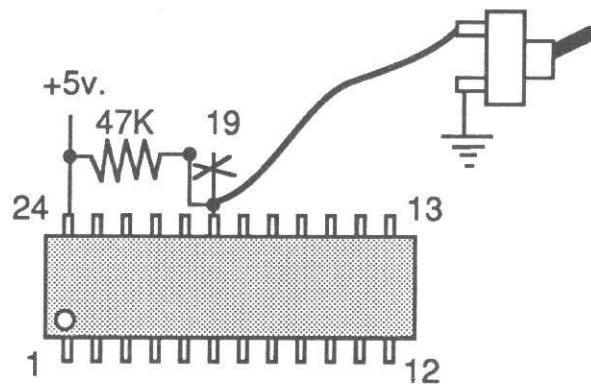
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ICOM IC-R7000

100 MORE MEMORY CHANNELS

1. Remove power and antenna.
2. Remove screws and open case.
3. Locate the logic board.
4. Locate pin 19 on IC-8.
5. Cut foil trace to ground.
6. Attach a 47K Ohm resistor and a switch as shown.
7. Reassemble the radio.



Operation:

When the switch is closed, memory channels 0-99 will operate.
 When the switch is open, memory channel 100-200 will operate.

Scanning will operate in only one memory bank at a time.



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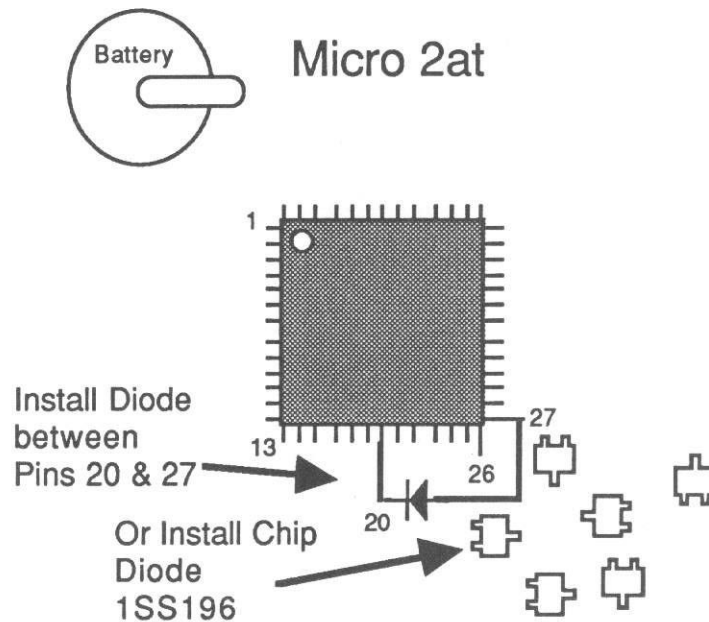
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ICOM μ 2AT

EXPANDED RF

1. Remove battery and antenna.
2. Remove 4 screws and open Radio.
3. Separate shield & top circuit board from bottom board.
4. Locate Microprocessor board.
5. Tack solder a 1N914 Diode across Pin 20 & 27
or attach a chip Diode 1SS196 as shown.
6. Reassemble the radio.
7. Reset the microprocessor. (Push and hold lamp and turn on power.)

Note: This diode is placed across pin 20 & 27 of CPU. Drawing is not to Scale.
MICROPROCESSOR is under the Tone Pad (under shield)



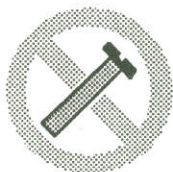
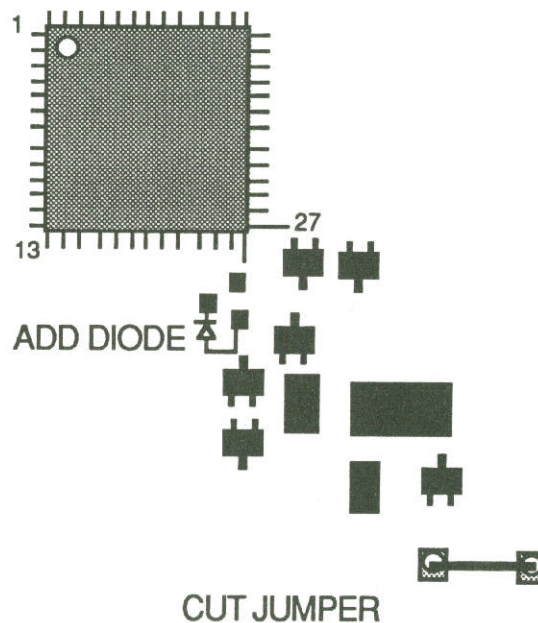
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ICOM μ 4AT

EXPANDED RF

1. Remove battery and antenna.
2. Remove 4 screws and open Radio
4. Tack solder a 1N914 Diode across chip diode position.
or attach a chip Diode 1SS196.
5. Reassemble the radio.
6. Reset the microprocessor. (Push and hold lamp and turn on power.)

Micro 4at



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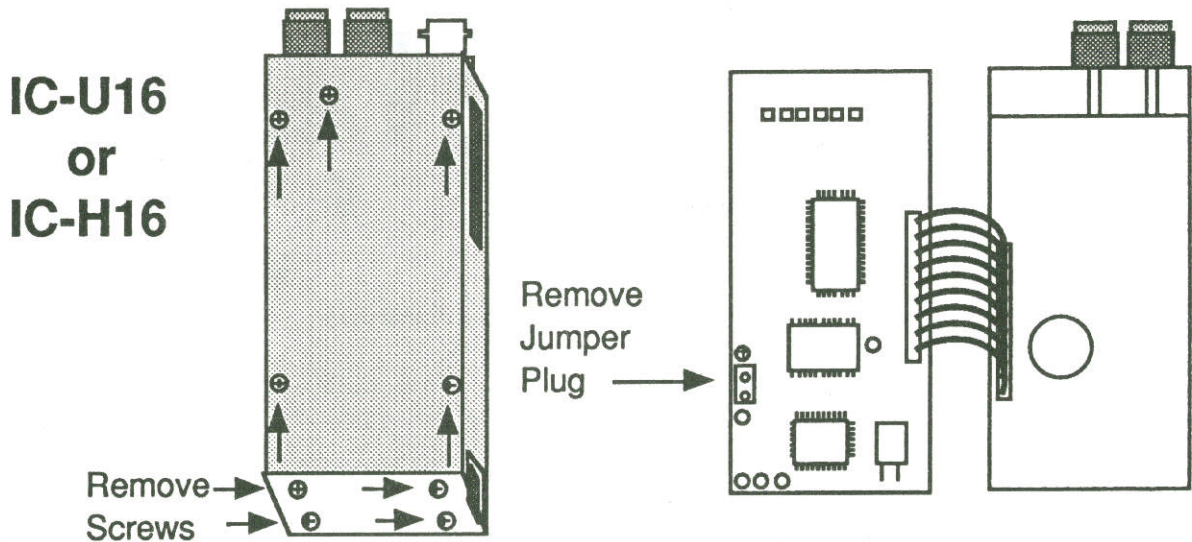
ICOM U16

USER PROGRAMMABLE MODIFICATION

1. Remove battery and antenna.
2. Remove 9 screws and open the radio.
3. Locate and remove Jumper plug.
4. Reassemble the radio.

Programming commands:

- 1) Hold down [FUNCTION] key and press [1] [5] [9] [3] [5] [7].
- 2) Hold down [FUNCTION] and press :
 - [1] - Transmit PL tone. (2 digits)
 - [2] - Receive PL Tone. (2 digits)
 - [4] - Offset in MHz. (ie. +05000 =+5 MHz)
 - [5] - Frequency.
 - [7] - Rename Ch#
 - [8] - Time out Timer
 - [9] - TX Inhibit
- 3) Enter #'s and press [ENT].
- 4) To Exit Programming mode Hold [FUNCTION] and press [CLR].



Caution

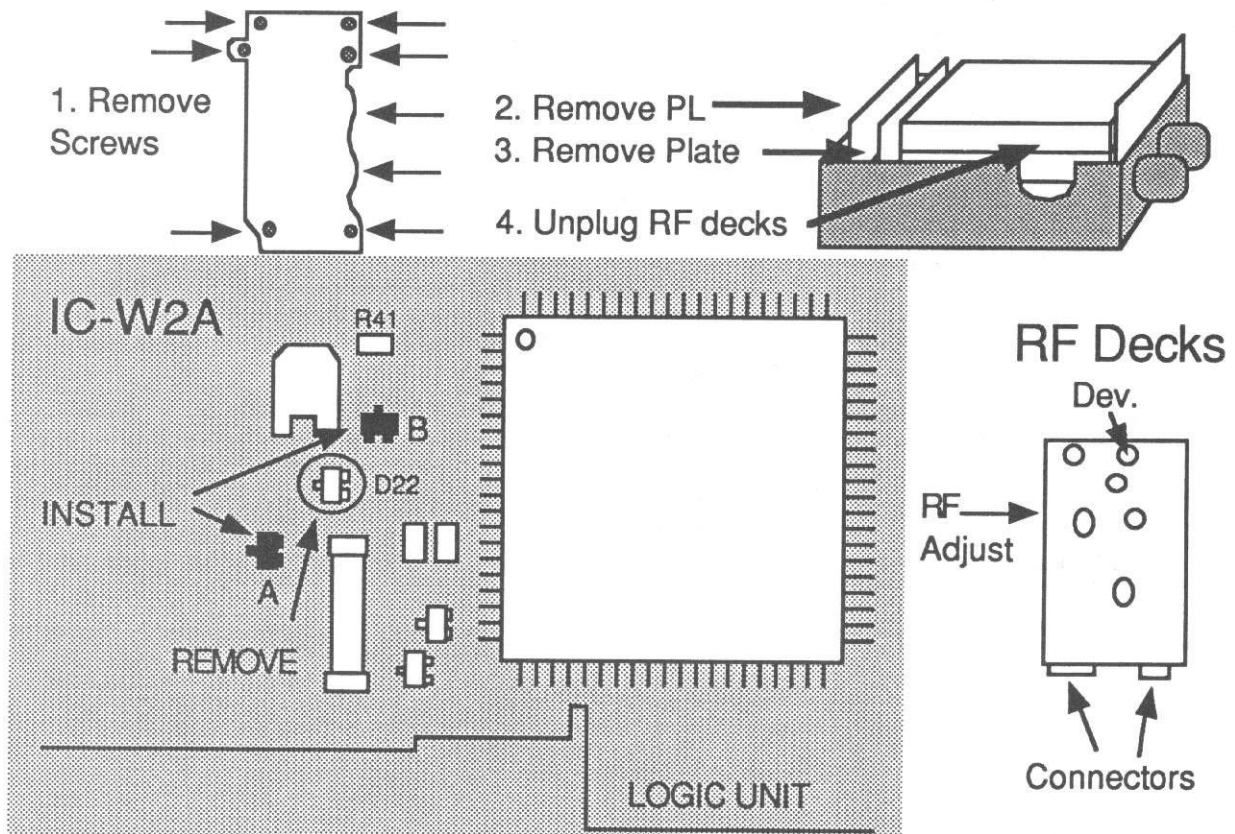
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ICOM IC-W2A

EXPANDED RF

1. Remove battery and antenna.
2. Remove screws from back panel and battery plate and open radio.
3. Remove PL deck and power plate.
4. Unplug VHF & UHF decks.
5. Remove Chip diode D22.
6. Attache Chip diodes to location points A & B.
(Diode MA133 - Icom part # 1790000860)
7. Reassemble the radio.
8. Reset the CPU (Push and hold [FUNCTION] & [A] & [CLR] and turn radio on)



IC-W2A KEYBOARD COMMANDS:

RX Expansion	Push and hold [#] & [B] & [3] and turn power on.
Direct Entry	Set VFO PL to 100 hz on VHF and UHF!!!!
XBand Repeat on	Hold [FUNCTION] press [2] and then [#].
XBand Repeat off	Push and hold [FUNCTION] & [#].

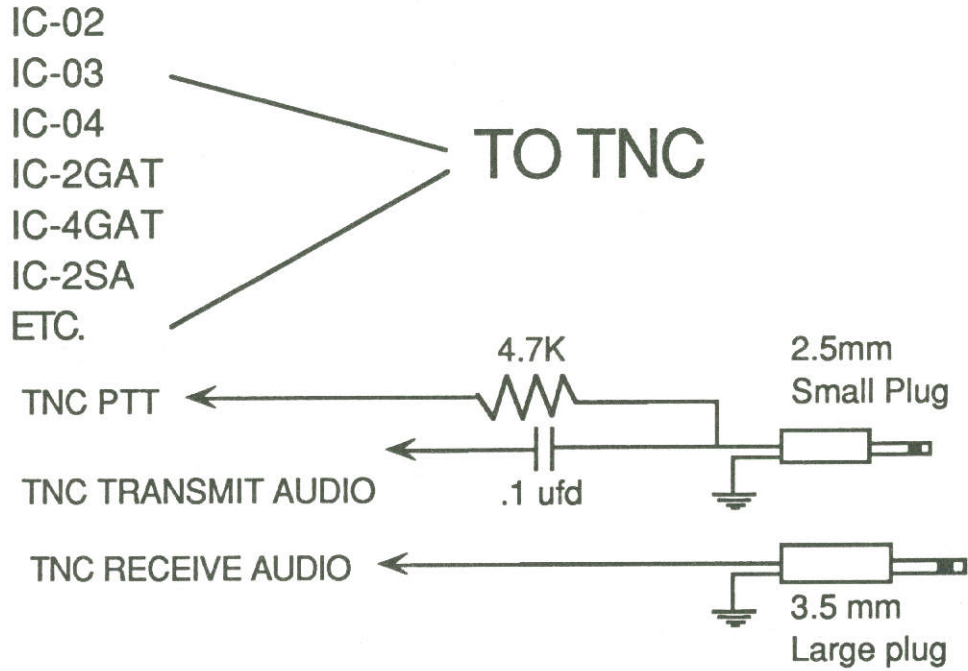


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ICOM HT's TO TNC'S INTERFACE CABLES



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ICOM RADIOS

CPU RESET

- 2GAT TURN RADIO ON, HOLD [LIGHT] & [FUNCTION], TURN RADIO OFF, TURN ON AND RELEASE BUTTONS.
- 02AT BELOW SERIAL # 34,000 - PUSH BUTTON ON MAIN BOARD NEXT TO LITHIUM BATTERY.
 ABOVE SERIAL # 34,000 - HOLD [FUNCTION] AND TURN RADIO ON.
- 2SA HOLD [LIGHT] & [MONITOR] AND TURN RADIO ON.
- 2SAT HOLD [FUNCTION] & [A] AND TURN RADIO ON.
- u2AT HOLD [LIGHT] AND TURN RADIO ON.
- 03AT BELOW SERIAL # 34,000- PUSH BUTTON ON MAIN BOARD NEXT TO LITHIUM BATTERY.
 ABOVE SERIAL # 34,000 - HOLD [FUNCTION] AND TURN RADIO ON.
- 3SA HOLD [LIGHT] & [MONITOR] AND TURN RADIO ON.
- 3SAT HOLD [FUNCTION] & [A] AND TURN RADIO ON.
- 4GAT TURN RADIO ON, HOLD [LIGHT] & [FUNCTION], TURN RADIO OFF, TURN ON AND RELEASE BUTTONS.
- 04AT BELOW SERIAL # 34,000 - PUSH BUTTON ON MAIN BOARD NEXT TO LITHIUM BATTERY.
 ABOVE SERIAL # 34,000 - HOLD [FUNCTION] AND TURN RADIO ON.
- 4SA HOLD [LIGHT] & [MONITOR] AND TURN RADIO ON.
- 4SAT HOLD [FUNCTION] & [A] AND TURN RADIO ON.
- u4AT HOLD [LIGHT] AND TURN RADIO ON.
- 12AT HOLD [FUNCTION] AND TURN RADIO ON.
- 12GAT TURN RADIO ON, HOLD [LIGHT] & [FUNCTION], TURN RADIO OFF, TURN ON AND RELEASE BUTTONS.
- 24AT HOLD [FUNCTION] & [A] AND TURN RADIO ON.
- 27 PUSH RESET BUTTON UNDER TOP COVER



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ICOM RADIOS

CPU RESET (PART 2)

- 28 INSERT A TOOTHPICK INTO HOLE IN THE CORNER OF THE BOTTOM COVER PRESSING THE RESET BUTTON.

- 32AT HOLD [FUNCTION] & [A] & [LIGHT] AND TURN POWER ON.

- 37 PUSH RESET BUTTON UNDER TOP COVER.

- 38 INSERT TOOTHPICK INTO HOLE IN THE CORNER OF THE BOTTOM COVERPRESSING THE RESET BUTTON.

- 47 PUSH RESET BUTTON UNDER TOP COVER

- 48 INSERT TOOTHPICK INTO HOLE IN THE CORNER OF THE BOTTOM COVER PRESSING THE RESET BUTTON.

- 228 HOLD [SQUELCH/MONITOR] & [LOCK] AND TURN RADIO ON.

- 229A HOLD [SET] & [MW] AND TURN RADIO ON.

- 271 REPROGRAM RAM CARD.

- 275 HOLD [M-CL] AND TURN RADIO ON.

- 375 HOLD [M-CL] AND TURN RADIO ON.

- 448 HOLD [SQUELCH/MONITOR] & [CLOCK] AND TURN RADIO ON.

- 471 REPROGRAM RAM CARD.

- 475 HOLD [M-CL] AND TURN RADIO ON.

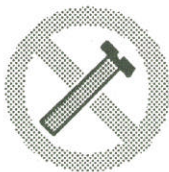
- 575 HOLD [M-CL] AND TURN RADIO ON.

- 725 HOLD [FUNCTION] & [MW] AND TURN RADIO ON.

- 726 HOLD [FUNCTION] & [MW] AND TURN RADIO ON.

- 761 HOLD [M-CLEAR] AND TURN RADIO ON.

- 765 HOLD [M-CLEAR] AND TURN RADIO ON.



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ICOM RADIOS

CPU RESET (PART 3)

- 781 HOLD [M-CLEAR] AND TURN RADIO ON.
- 900 HOLD [MR] AND TURN POWER OFF AND THEN ON AGAIN.
- 901A TURN RADIO ON, PUCH [CHECK] & [MW]
- 970 HOLD [MW] AND TURN RADIO ON.
- 1200 INSERT TOOTHPICK INTO HOLE IN THE CORNER OF THE BOTTOM COVER PRESSING THE RESET BUTTON.
- 1201 HOLD [SQUELCH/MONITOR] & [LOCK] AND TURN RADIO ON.
- 1220 TURN RADIO OFF FOR A FEW MINUTES AND THEN PRESS SWITCH S1 ON LOGIC BOARD.
- 1271 REPROGRAM RAM CARD.
- 1275 HOLD [M-CL] AND TURN RADIO ON.
- 1520 TURN RADIO OFF FOR A FEW MINUTES AND THEN PRESS SWITCH S1 ON LOGIC BOARD.
- 3200 HOLD [F] BUTTON AND TURN POWER ON.
- 3210 HOLD [SQUELCH/MONITOR] & [LOCK] AND TURN RADIO ON.
- 3220 HOLD [SET] & [MW] AND TURN RADIO ON
- 4020 TURN RADIO OFF FOR A FEW MINUTES AND THEN PRESS SWITCH S1 ON LOGIC BOARD.
- 2400 HOLD [SUB VOL] AND [MW] AND TURN RADIO ON.
- 2500 HOLD [SUB VOL] AND [MW] AND TURN RADIO ON.
- R9000 HOLD [M-WRITE] AND TURN RADIO ON.
- W2A HOLD [FUNCTION] & [A] & [CLR] AND TURN RADIO ON.



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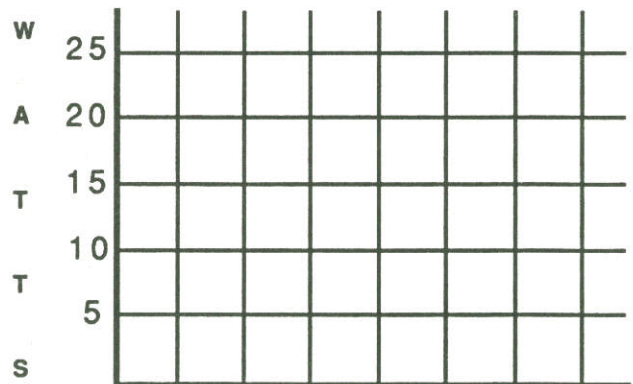
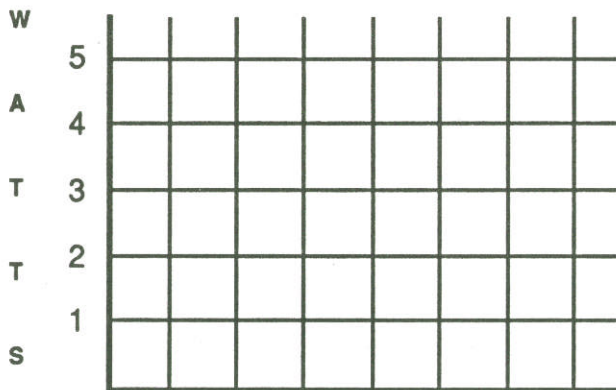
Performance Report

Radio _____

Date _____

Owner : Name _____
 Address _____
 City _____ St. _____ Zip _____
 Phone (_____) _____ - _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
Frequency Error (Offset)	_____Hz	_____Hz
Receive Sensitivity (Mid-band)	_____uv	_____uv
PL Deviation	_____Hz	_____Hz
DTMF Deviation	_____KHz	_____KHz
Audio Deviation	_____KHz	_____KHz
Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



Radio / Tech Modifications

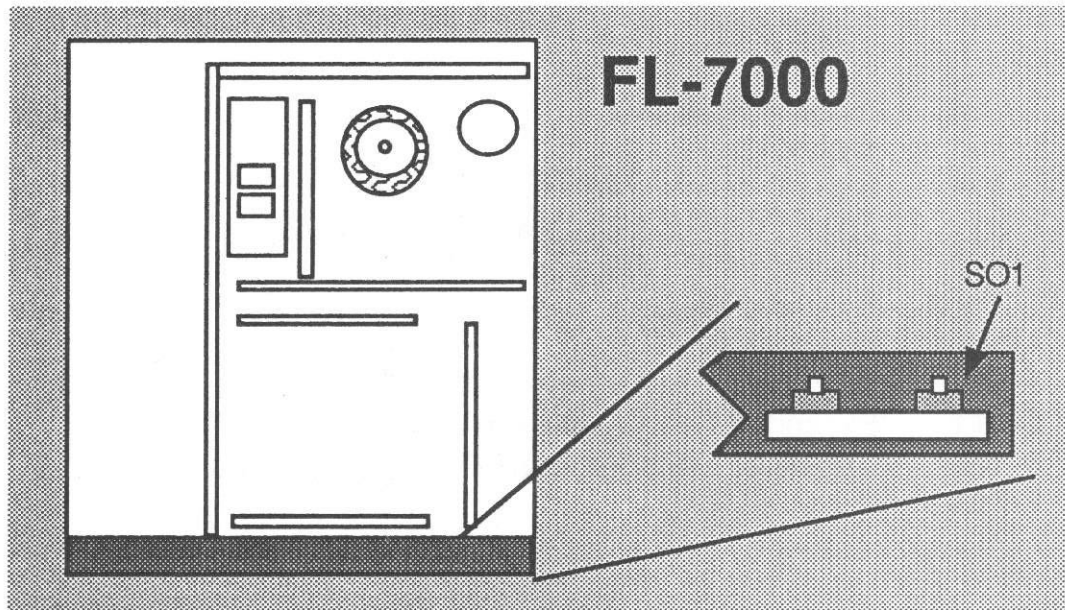
YAESU Radio Modifications

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YAESU FL-7000

EXPANDED RF 24.5 MHz & 28.0 MHz Band

1. Remove Power cable and all other cables.
2. Remove 4 screws from the top cover.
3. Remove the top cover and the right and left panels.
4. Remove 4 screws from the power combiner unit and remove screen plate.
5. Locate Switch SO1 on the CPU unit and set it to the off position. (A small screwdriver can be used to reach the switch.)
6. Reassemble the unit.



Caution

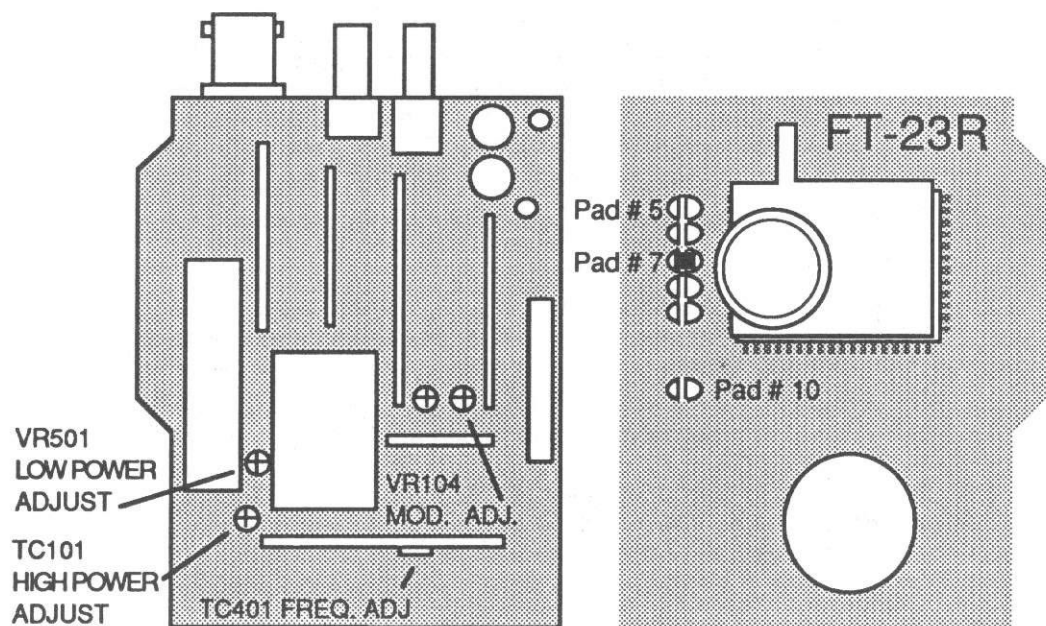
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YAESU FT-23R

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel, battery mounting track & body screws and open Radio
3. Remove solder bridge from Pad # 7
4. Reassemble radio.



Range : RX 140 MHz - 163.995 MHz
TX 140 MHz - 163.995 MHz



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YAESU FT-26

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove the 4 screws holding the battery track.
3. Remove the 2 screws in the back case.
4. Carefully separate the front cover.
5. Locate and remove solder on Jumper pad 10. (on control board)
6. Solder jump pads 1, 3, 7 and 8
7. Reassemble the radio.
8. Turn radio on and each channel indicator will blink.
9. Enter the following frequencies. (use the [F] & up arrow keys)

CH. 1	135.000	Press [D/MR]	Lower Rx limit
CH. 2	174.000	Press [D/MR]	Upper Rx limit
CH. 3	135.000	Press [D/MR]	Lower Tx limit
CH. 4	174.000	Press [D/MR]	Upper Tx limit

RESET COMMANDS:

Soft RESET Press and hold [T] & [REV] and turn power on.

Master RESET Press and hold [D/MR] & [T] & [REV] and turn radio on.
Then enter band Limits above



Caution

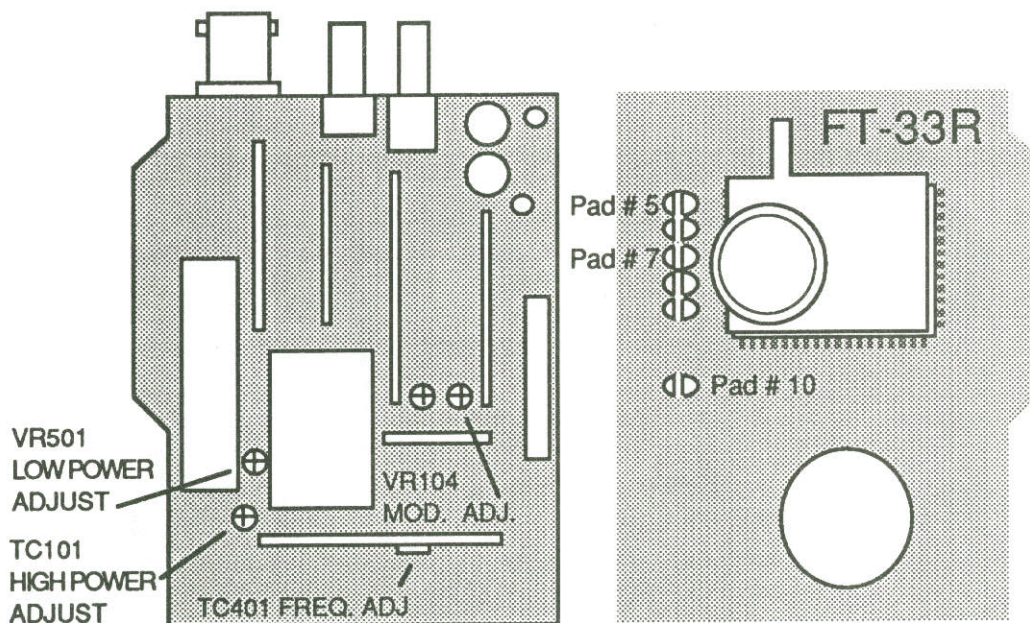
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YAESU FT-33R

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel, battery mounting track & body screws and open Radio
3. For display 220-550 MHz Pads 7,8 and 9 are open
For display 50-300 MHz Pads 8 and 9 are open and 7 is bridged
4. Reassemble radio.



Note: The exact TX and RX range is determined by the coils and other circuitry in the radio.



Caution

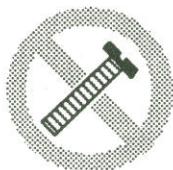
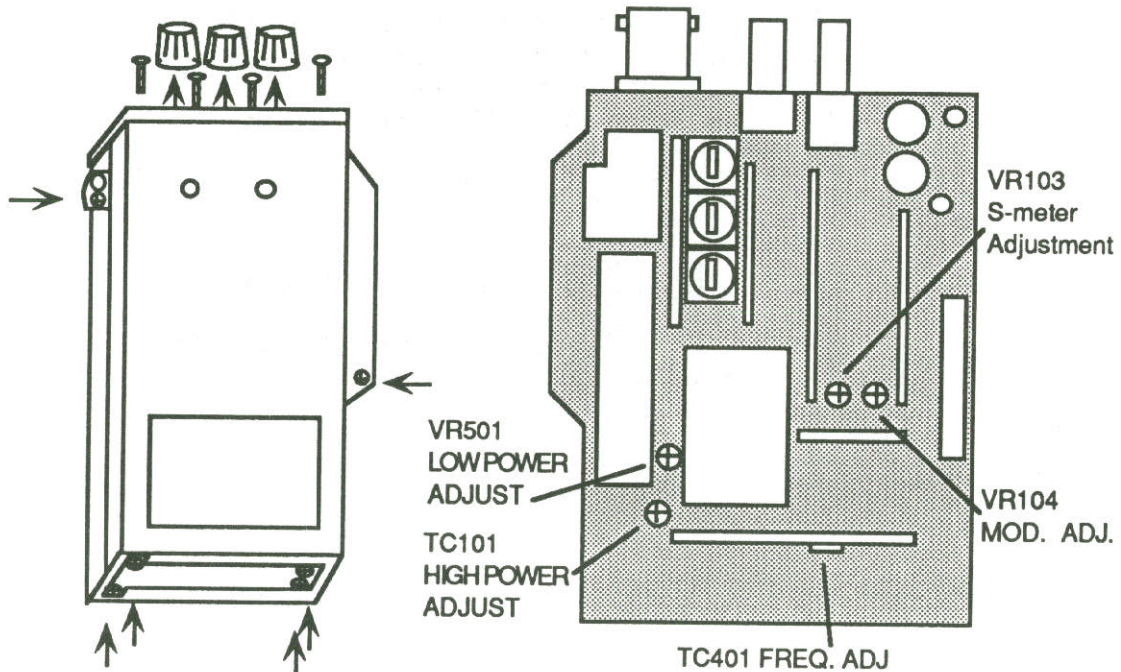
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YAESU FT-73R

ALIGNMENT CONTROLS

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel, battery mounting track & body screws and open Radio
3. Make adjustments.
4. Reassemble the radio.



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YAESU FT-76

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove the 4 screws holding the battery track.
3. Remove the 2 screws in the back case.
4. Carefully separate the front cover.
5. Locate and remove solder on Jumper pads 4 and 7. (on control board)
6. Solder jump pads 1, 3, 4, 8, 9 and 10
7. Reassemble the radio.
8. Turn radio on and each channel indicator will blink.
9. Enter the following frequencies. (use the [F] & up arrow keys)

CH. 1	400.000	Press [D/MR]	Lower Rx limit
CH. 2	485.000	Press [D/MR]	Upper Rx limit
CH. 3	415.000	Press [D/MR]	Lower Tx limit
CH. 4	470.000	Press [D/MR]	Upper Tx limit

RESET COMMANDS:

Soft RESET Press and hold [T] & [REV] and turn power on.

Master RESET Press and hold [D/MR] & [T] & [REV] and turn radio on.
Then enter band Limits above



Caution

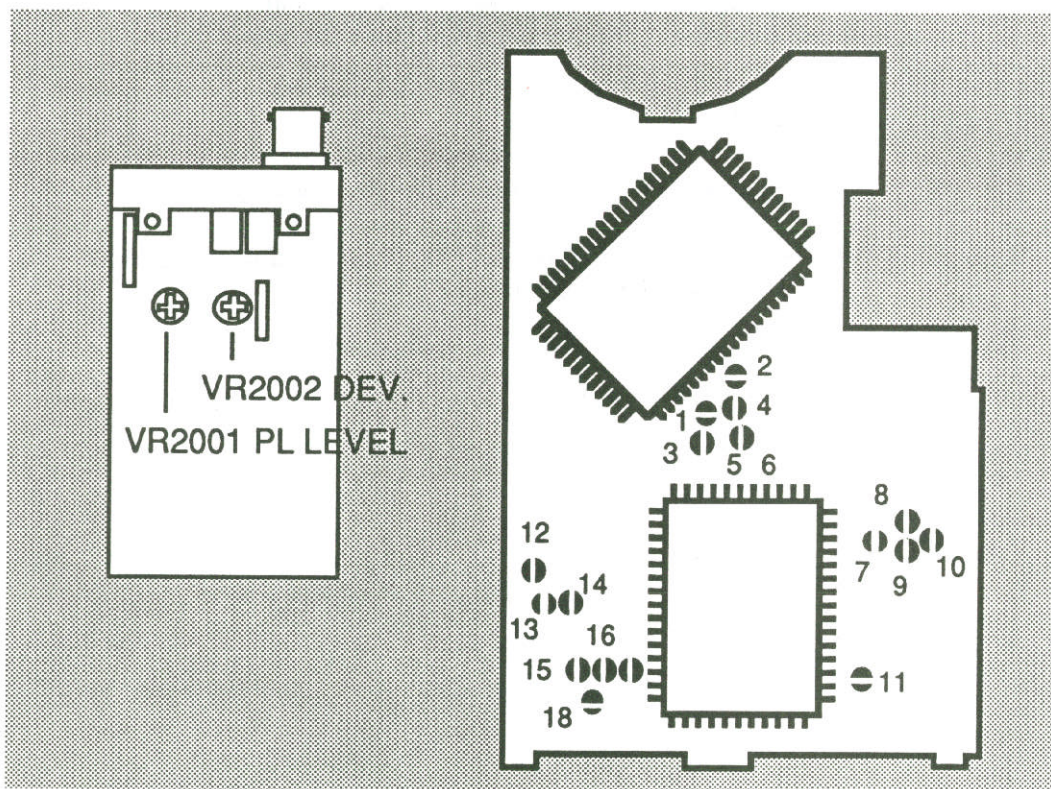
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YAESU FT-209

EXPANDED RF

1. Remove battery and antenna.
2. Remove battery screws, belt clip screws and side strap screws.
3. Remove black trim on sides of the radio.
4. Remove the two side screws and slide the u-shaped back cover off.
5. Remove the four tiny phillips screws holding the front panel on.
6. Fold panel to the right to open the radio
7. Locate Jumpers 1 through 16
8. Jump pins 1,7,9,10,11,13 & 16
9. Reassemble the radio.
10. Reset the microprocessor
11. Enter 1440 [D], 1590 [D], 1440 [D], 1590 [D], 0600 [SHIFT]
Note: RX range of 144.0 - 159.0 MHz and TX range of 144.0 - 159.0 MHz



Caution

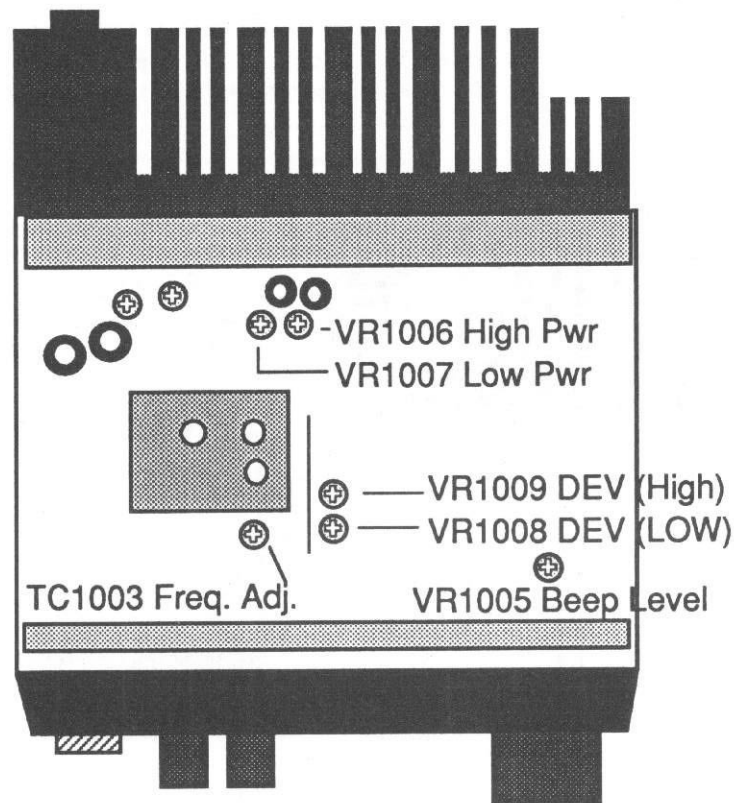
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YAESU FT-211

EXPANDED RF

1. Remove five screws from the top cover and remove the cover.
2. Remove five screws from the bottom cover and remove the cover.
3. Unplug the speaker.
4. Remove the four screws holding the front panel.
5. Locate jumper pad number 7.
6. Solder bridge pad number 7.
7. Locate the reset pins (Located on the front panel and clearly marked).
8. Short the reset pins together for one second.
9. Reassemble the radio.



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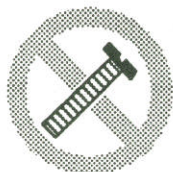
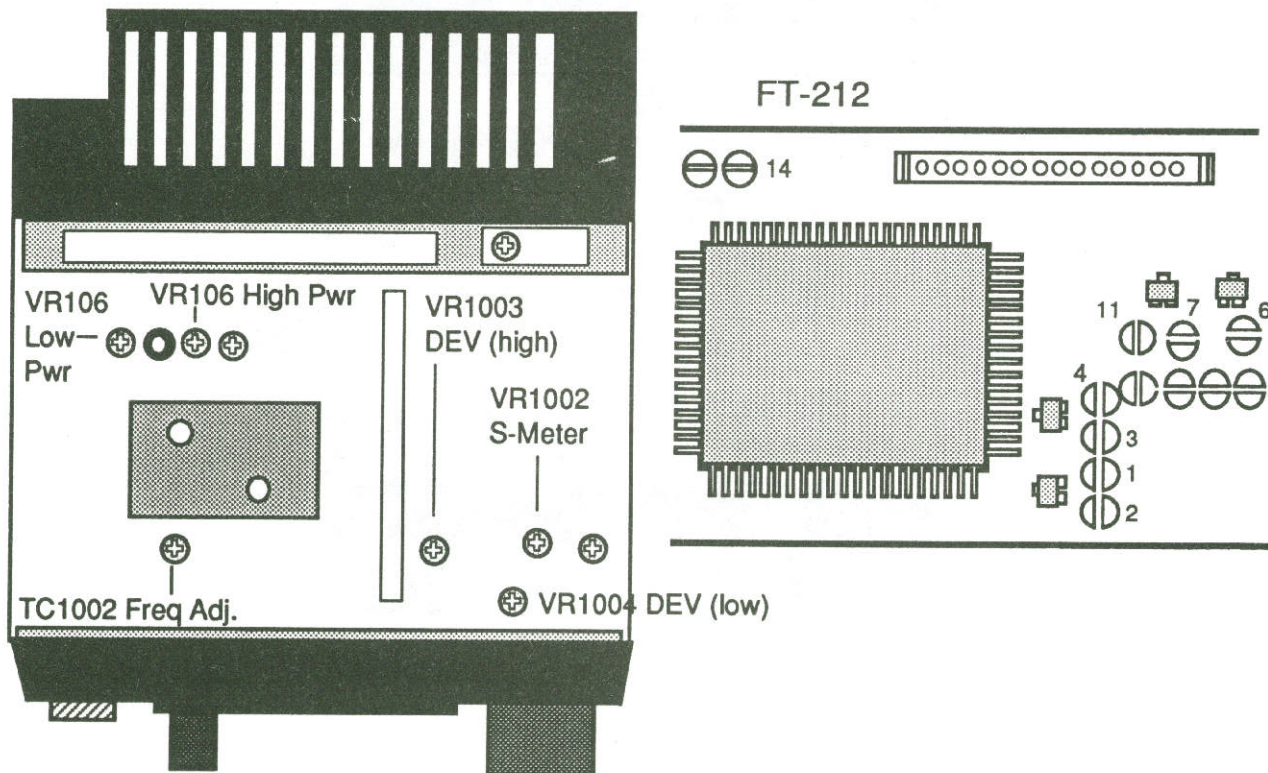
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YAESU FT-212

EXPANDED RF

Auto Repeater offset is lost

1. Unplug the DC power cable from the radio.
2. Remove the top and bottom covers.
3. Remove the speaker.
4. Remove the knobs and nuts from the front panel.
5. Remove the three screws from the control unit.
6. Remove the Control unit from the front panel.
7. Remove solder from pad #1 on control unit.
8. Solder jumper Pads 3,4,11 and 14.
9. Replace the control unit on the front panel.
10. Reset the microprocessor. (using a jumper short D09 on the control unit to ground on the radio. Do not apply power).
11. Apply DC power and turn radio on.
12. Press [MR] & use the control knob to enter 140 and press [D/MR]. (lower limit)
13. Press [MR] and use knob to enter 173 and press [D/MR]. (upper limit)
14. Press [F] and then [RPT] button. use the control knob to enter 0.600. Press the [RPT] button.
15. Reassemble the radio.



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YAESU FT-227R

EXPANDED RF

1. Unplug the power from the radio.
2. Open radio and locate the PLL CONT. UNIT.
3. Remove D701 and D702. Do not place in a jumper.
4. Locate Q712 (MC14028B), and break the connection to Pin 6. (Blue wire)
5. Connect pin 1 of Q711 (red wire) to ground.
6. Reassemble radio

Note: Automatic repeater offset is lost.

TX Range 143.990 MHz - 149.000 MHz



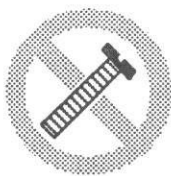
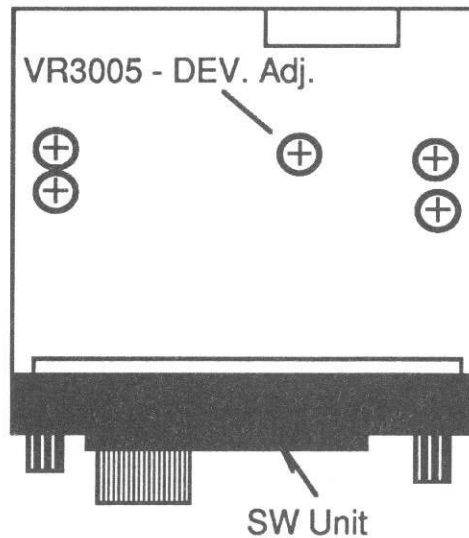
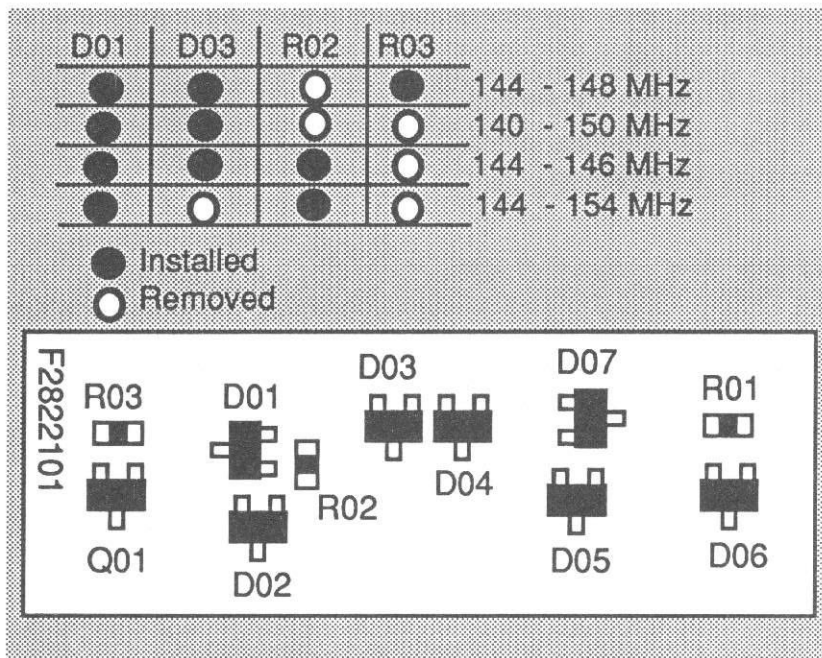
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YAESU FT-290 MKII EXPANDED RF

1. Unplug the power from the radio.
2. Open radio and located SW Unit. The SW unit is located on the front panel, behind the display.
3. Locate components D01, D03, R02 & R03 See drawing.
4. Remove or Install the components per table 1.
5. Reassemble the radio.



Caution

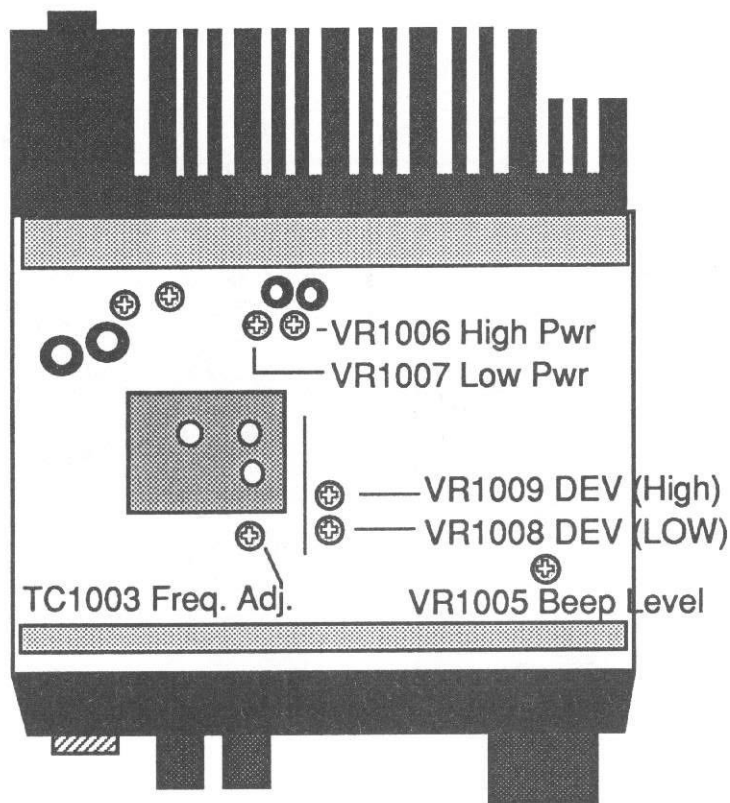
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YAESU FT-311

EXPANDED RF

1. Remove five screws from the top cover and remove the cover.
2. Remove five screws from the bottom cover and remove the cover.
3. Unplug the speaker.
4. Remove the four screws holding the front panel.
5. Locate jumper pad number 7.
6. Solder bridge pad number 7.
7. Locate the reset pins (Located on the front panel and clearly marked).
8. Short the reset pins together for one second.
9. Reassemble the radio.



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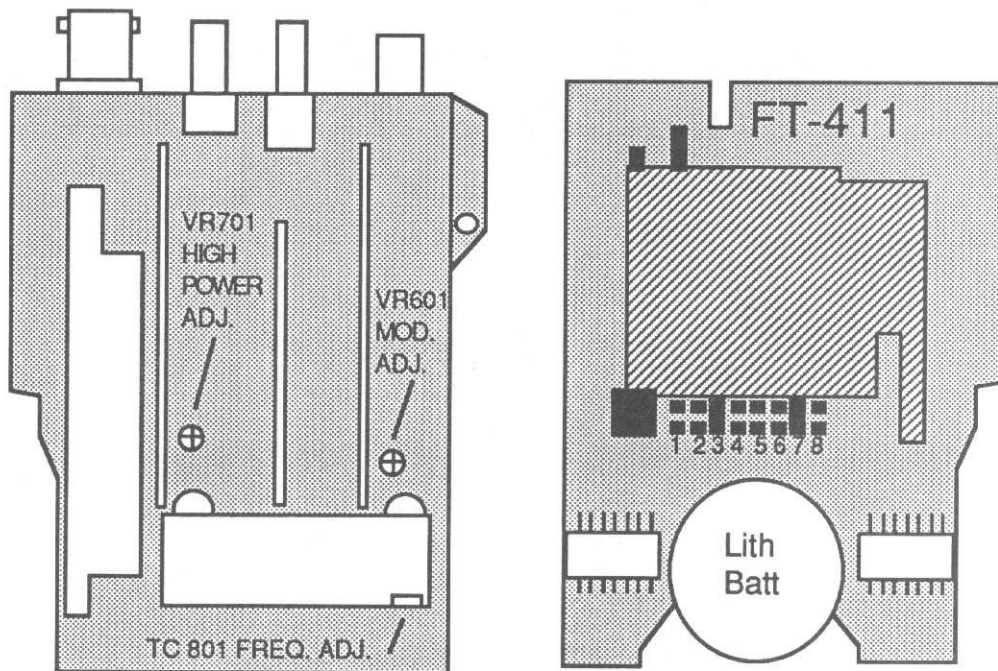
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YAESU FT-411

EXPANDED RF

(disables automatic repeater shift)

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel & body screws and open Radio
3. Remove solder bridge from Pad # 2
4. Place solder Bridge on Pad # 3
5. Reassemble Radio
6. Reset Microprocessor. (Press and hold [MR] & [VFO] and turn radio on then off)
(Press and hold both up and down keys and turn power on)
7. Enter the following: 1200 [VFO] 1740 [VFO] 1400 [VFO] 1740 [VFO]
8. Press [Function] & [7] to change channel step.



RANGE: RX 120 MHz - 174 MHz
TX 140 Mhz - 174 MHz



Caution

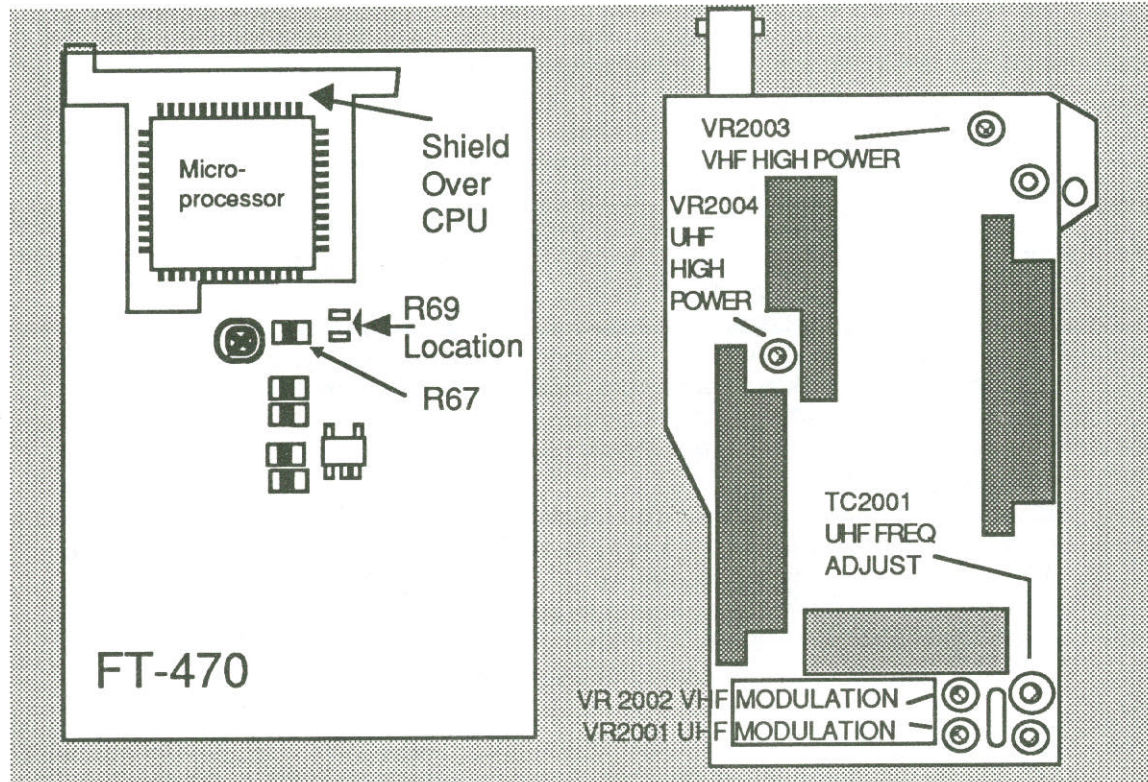
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YAESU FT-470

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel & body screws and open Radio
3. Locate the lithium battery.
4. Carefully unsolder the lithium battery and lift it to expose resistor position .
5. Solder a Jumper or 0 ohm resistor in the empty R69 position.
6. Solder the lithium battery back in place.
7. Reassemble the radio.



Not to Scale!!!

Range 140 MHz - 174 MHz

Note: Freq. expansion is possible using the keyboard only:

1. Press and hold [MR] and [VFO] Buttons and turn radio on
2. Release buttons and turn radio off. (Stop here for normal operation)
3. Press and hold [up] and [down] buttons and turn radio on.

Range: 140-150 MHz TX/RX and 430-450 MHz TX/RX

MORE -



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YAESU FT-470

EXPANDED 400-470 MHz RX/ Hyperscan Mod

The following procedure utilizes the "U" memory location to store the upper limit for the UHF reception. A high UHF frequency (ie 470 MHz) must always be stored in the "U" memory for the expanded UHF reception to work.

1. Program 450.00 MHz simplex.
2. Press [Function] and then [RPT].
3. Enter 0000 into the keypad.
4. Turn the radio off and turn back on.
5. Press [RPT] twice for a + (plus) offset.
6. Press the [REV] button. (The display should now be 1450 MHz)
7. Press [Function] and then [Down Arrow] to drop the frequency down 1 MHz at a time until the display reads 470 MHz.
8. Press and hold the [Function] key until your hear two beeps.
9. Rotate the dial knob until the "U" memory channel is displayed.
10. Press the [Function] key to store the frequency in memory.
11. Press [Function] and then [Down Arrow] to drop the frequency down 1 MHz at a time until the display reads 450 MHz.
12. Press and hold the [Function] key until your hear two beeps.
13. Rotate the dial knob until the "L" memory channel is displayed.
14. Press the [Function] key to store the frequency in memory.
- *** Stop here for 440 - 470 Coverage.
15. Turn radio off and on and select the "U" memory channel.
16. Press [MR] and then [RPT]
17. Press the PTT button 3 times. The display should read 070.00 MHz
18. Press [Function] and then [Up Arrow] to increase the frequency up 1 MHz at a time until the display reads 400 MHz.
19. Press and hold the [Function] key until your hear two beeps.
20. Rotate the dial knob until the "L" memory channel is displayed.
21. Press the [Function] key to store the frequency in memory.

To receive a desired UHF frequency, you must use the following steps:

1. Select the "U" memory channel.
2. Press the [MR] key to enter the "MEMORY TUNE" mode.
3. Use the [arrow] keys or Dial Knob to select the desired frequency.
4. Store the selected in any memory channel, except memory channel "U" & L

Hyperscan Modification:

1. Select the "ALT mode by pressing [F] and [ALT]
2. Press the [UP] or [DOWN] arrow.
3. When the scan stops, Press [F] and then [VFO].
4. Press the [UP] or [DOWN] arrow. (HYPERSCAN MODE)
5. Press [F] and [ALT] to stop scan mode.



Caution

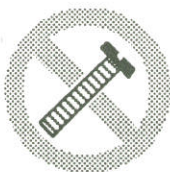
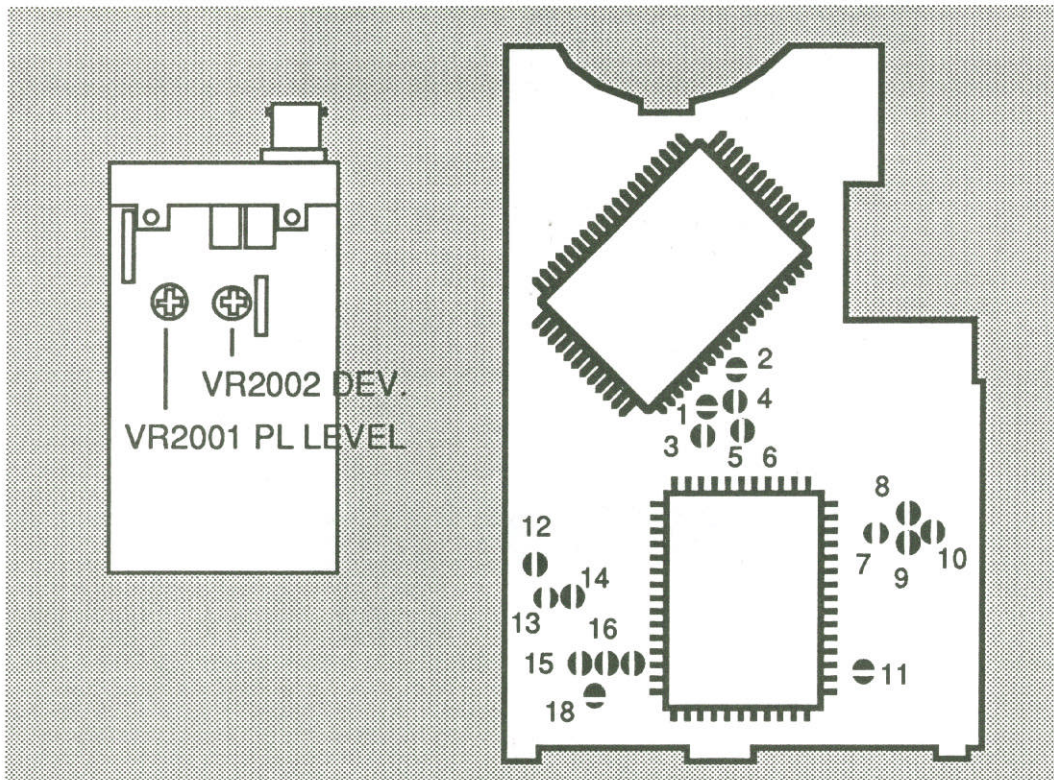
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YAESU FT-709

EXPANDED RF

1. Remove battery and antenna.
2. Remove battery screws, belt clip screws and side strap screws.
3. Remove black trim on sides of the radio.
4. Remove the two side screws and slide the u-shaped back cover off.
5. Remove the four tiny phillips screws holding the front panel on.
6. The ground jumper on the left side needs to be unsoldered.
7. Fold panel to the right to open the radio
8. Locate Jumpers 1 through 16
9. Jump pins 1,4,7,9,10,11,13 & 16
10. Reassemble the radio.
11. Reset the microprocessor
12. On FT-709 enter 4400 [D], 4650 [D], 4400 [D], 4650 [D]. 5000 [SHIFT]
 Note: RX range of 440.0 - 465.0 MHz and TX range of 440.0 - 465.0 MHz



Caution

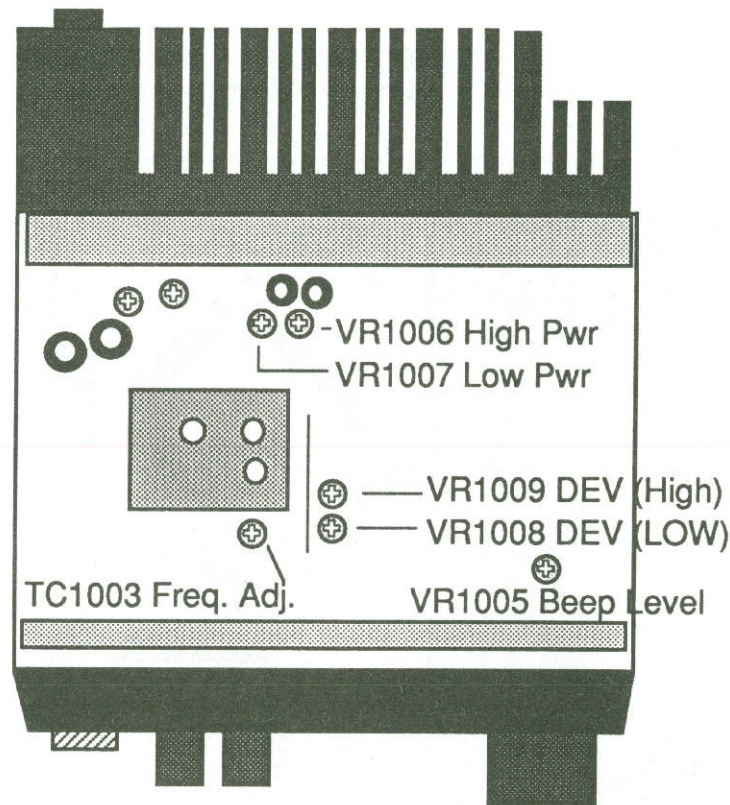
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YAESU FT-711

EXPANDED RF

1. Remove five screws from the top cover and remove the cover.
2. Remove five screws from the bottom cover and remove the cover.
3. Unplug the speaker.
4. Remove the four screws holding the front panel.
5. Locate jumper pad number 7.
6. Solder bridge pad number 7.
7. Locate the reset pins (Located on the front panel and clearly marked).
8. Short the reset pins together for one second.
9. Reassemble the radio.



Caution

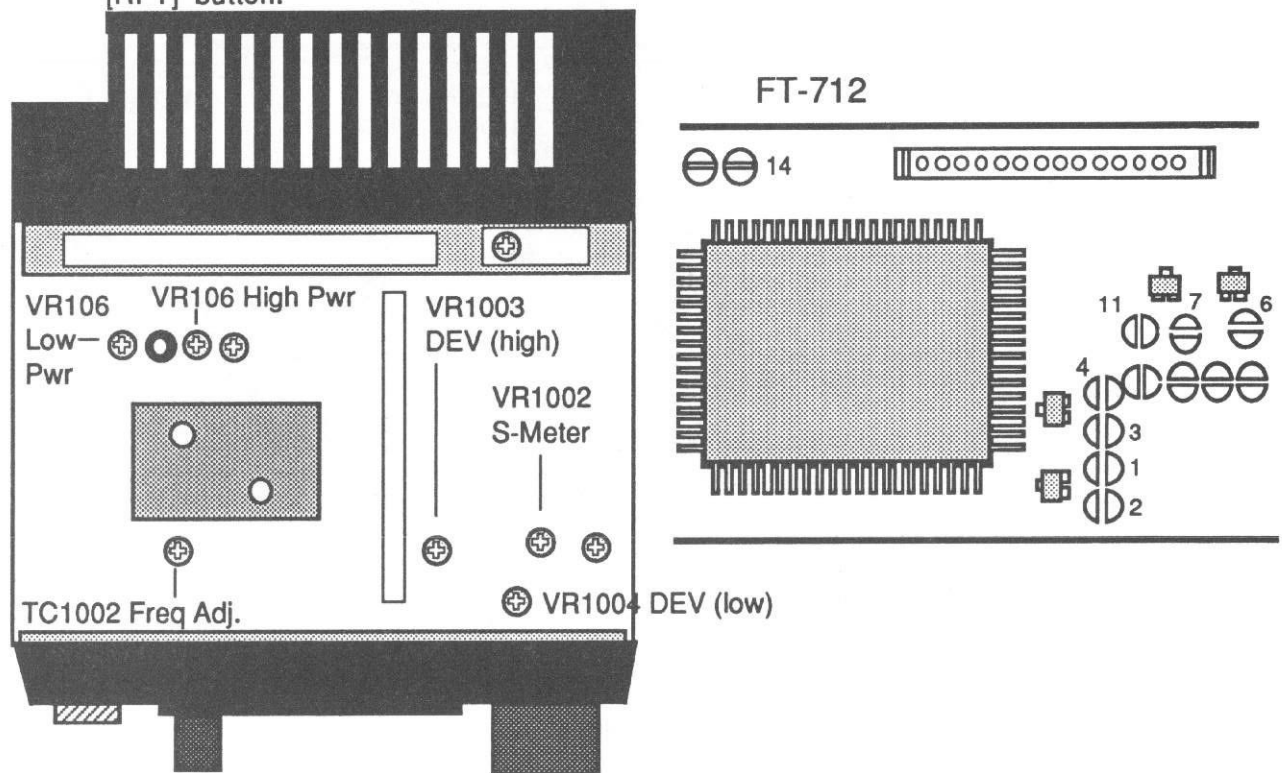
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YAESU FT-712RH

EXPANDED RF

1. Unplug the DC power cable from the radio.
2. Remove the top and bottom covers.
3. Remove the speaker.
4. Remove the knobs and nuts from the front panel.
5. Remove the three screws from the control unit.
6. Remove the Control unit from the front panel.
7. Remove solder from pad #1 and Pad #2 on control unit.
8. Solder jumper Pads 4 and 14. Pads 3,4,5,7,11 and 14 will be bridged
9. Replace the control unit on the front panel.
10. Reset the microprocessor. (using a jumper short D09 on the control unit to ground on the radio. Do not apply power).
11. Apply DC power and turn radio on.
12. Press [MR] & use the control knob to enter 430 and press [D/MR]. (lower limit)
13. Press [MR] and use knob to enter 501 and press [D/MR]. (upper limit)
14. Press [F] and then [RPT] button. use the control knob to enter 5.000. Press the [RPT] button.



RANGE: 430 MHz - 465 MHz



Caution

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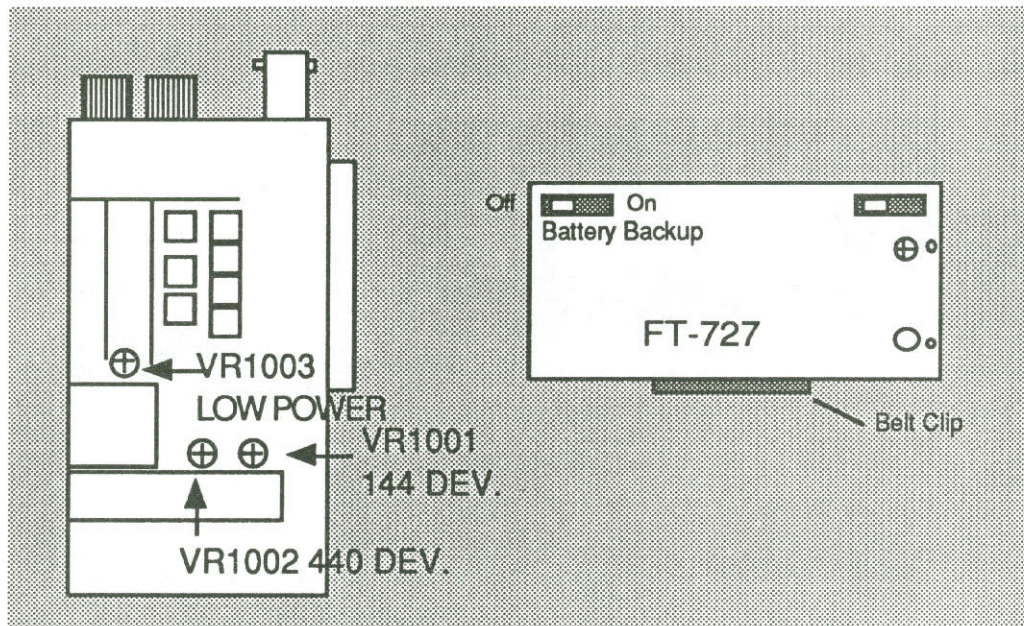
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YAESU FT-727

(no 12.5 KHz steps in 440 band)

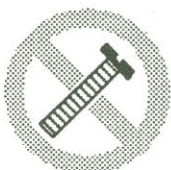
EXPANDED RF

1. Remove Battery
2. Turn off the Battery backup switch. (located on the bottom of the radio)
3. Wait 10 Seconds and Turn the switch back on
4. Replace battery
5. Turn Radio ON. (Display should go blank, if not redo steps 1-4)
6. Enter the following: 001111 (note: factory setting is 443300)
7. Reset the VHF & UHF offsets.
Select VHF then Press [F] then the [Shift] button.
Enter 0600 then [D]
Select UHF then Press [F] then the [Shift] button.
Enter 5000 then [D]



PLL alignment for out of band

1. Remove battery, and belt clip
2. Remove battery track screws
3. Remove rear cover
4. Install the battery track.
5. Turn radio on & enter desired frequency
6. Adjust L01 (black slug) in VCO unit until the on air lamp is lit (red light) (L01 core, turn counter-clock wise)
7. Reassemble the radio.



Caution

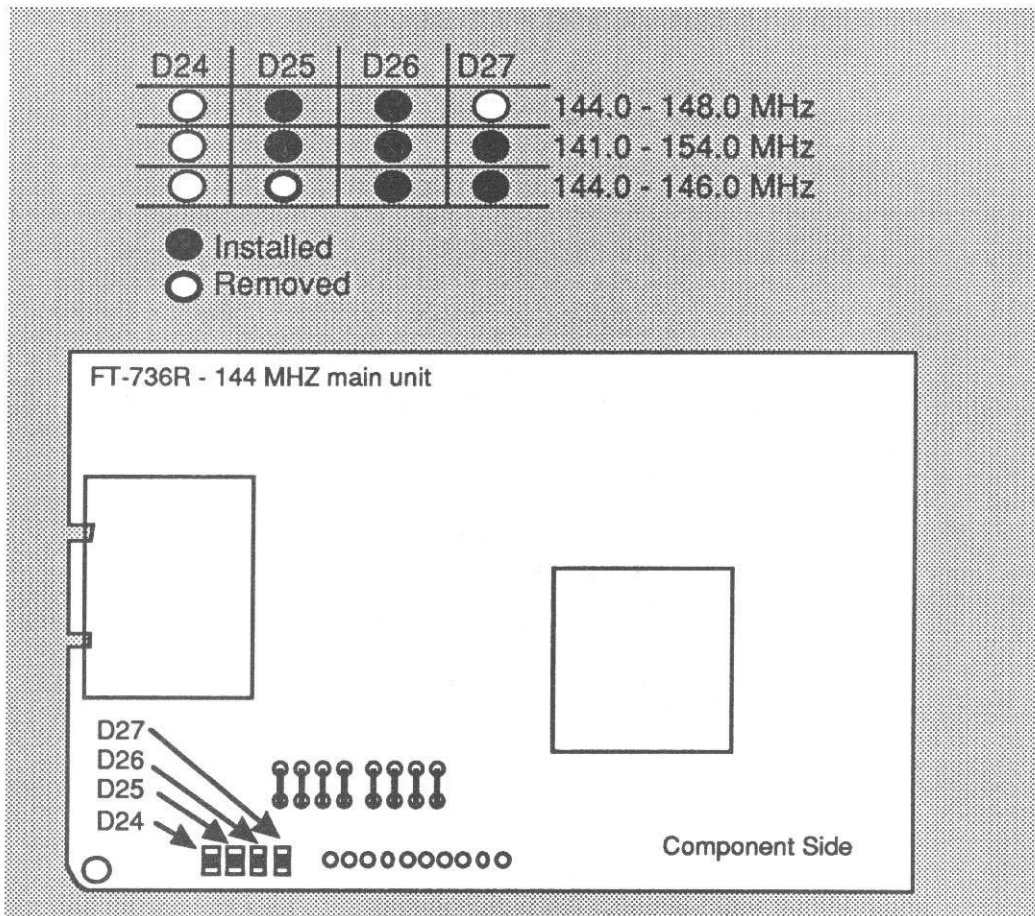
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YAESU FT-736R

EXPANDED RF

1. Unplug the power from the radio.
2. Open the radio and locate the 144 MHz main unit.
3. Locate diodes D24, D25, D26 and D27 See drawing.
4. Remove or Install the diodes per table 1.
5. Reassemble radio.



Caution

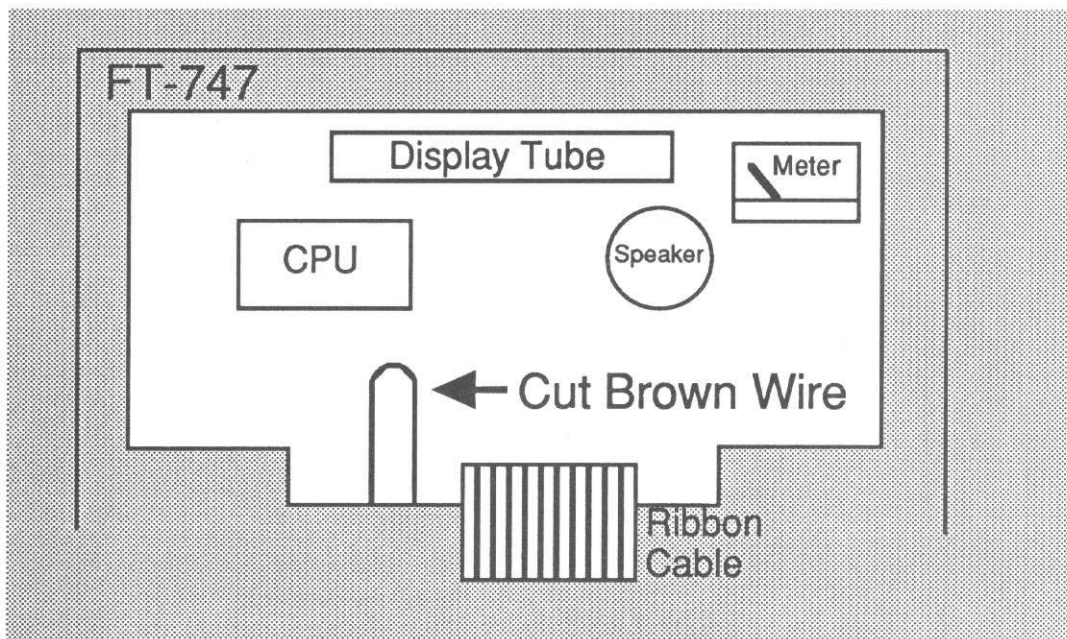
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YAESU FT-747

EXPANDED RF

1. Unplug the DC power cable from the radio
2. Remove the top cover (see instruction manual page 23)
3. Remove or cut the BROWN jumper wire on the display unit. See Drawing
4. Reconnect the power cable and turn the radio on
5. Set the VFO dial to 12.3456 MHz
6. Turn power off and then back on again.
7. Turn power off and reassemble radio. (don't pinch any wires)



Caution

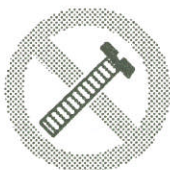
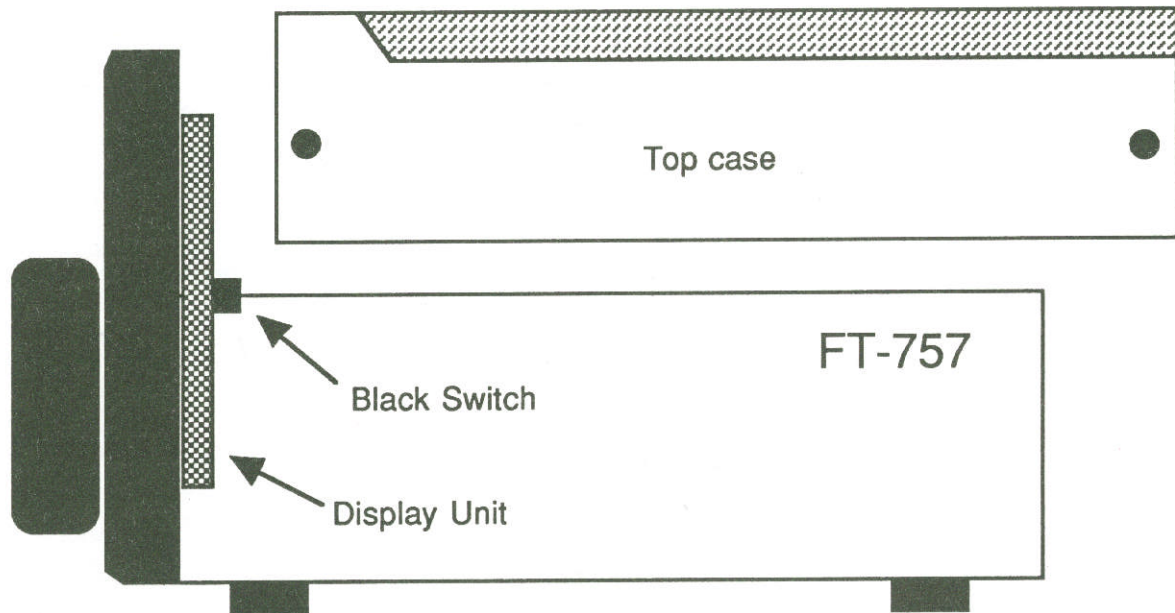
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YAESU FT-757GX & FT 757GX II

EXPANDED RF

1. Unplug the DC power cable from the radio.
2. Remove the top cover (see service manual for cover removal)
3. Locate the Black slide switch on the display panel. (to the right of center and halfway down the backside).
4. Use a screwdriver to set the switch to the left most position.
5. Reassemble the radio.



Caution

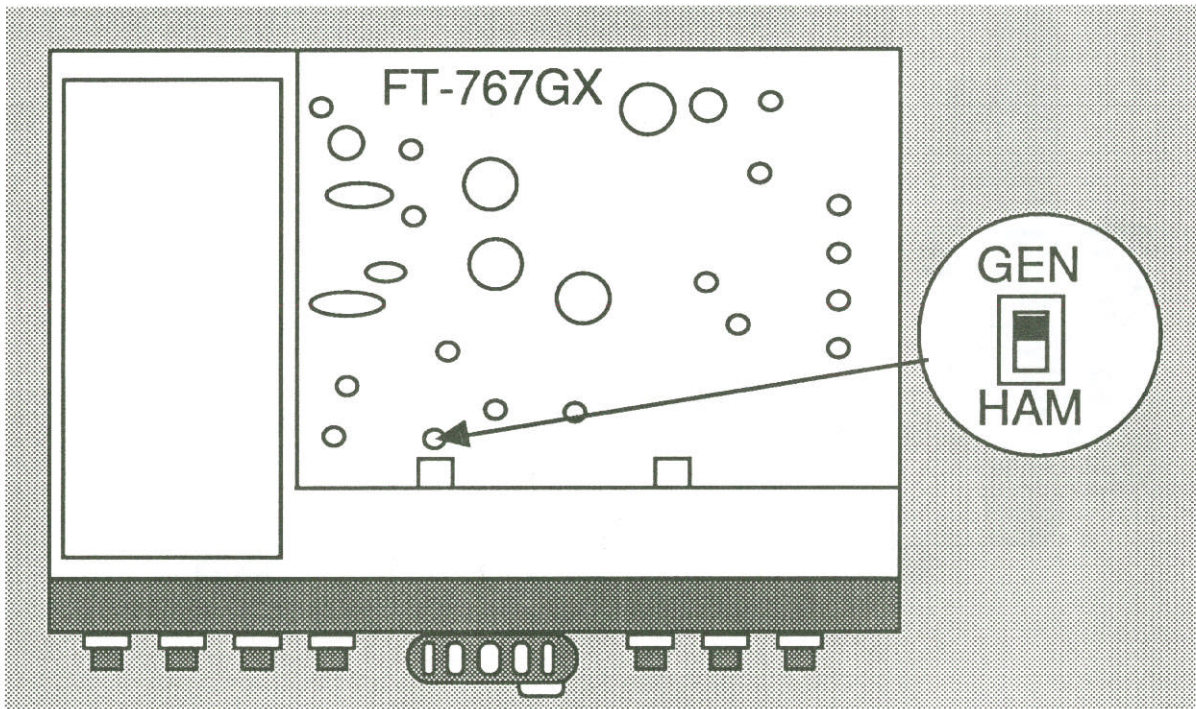
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YAESU FT-767GX

EXPANDED RF

1. Unplug the DC power cable from the radio.
2. Remove any VHF or UHF Band modules.
3. Remove two screws at the front of the top cover and remove the top cover .
4. Locate the GEN/HAM switch inside the shield cover.
5. Use a screwdriver to set the switch to the GEN position.
6. Reassemble the radio.



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YAESU FT-811

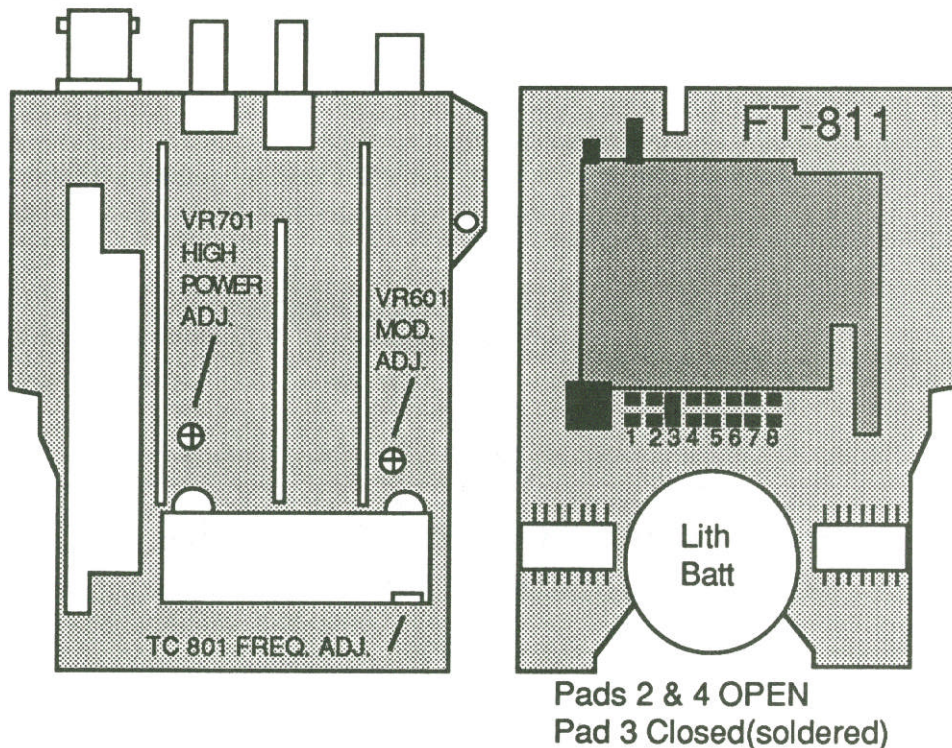
EXPANDED RF

(disables automatic repeater shift)

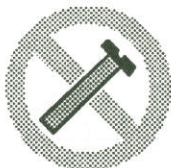
For Serial # 9D, 9F and 9J series only.

Serial Numbers above 9N can not be modified

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel & body screws and open Radio
3. Remove solder bridge from Pad # 2
4. Remove solder bridge from Pad # 4
4. Place solder Bridge on Pad # 3
5. Reassemble the radio
6. Reset microprocessor. (Press and hold [MR] & [VFO] and turn radio on then off)
(Press and hold both up and down keys and turn power on)
7. Enter the following: 4200 [VFO] 4700 [VFO] 4200 [VFO] 4700 [VFO]
8. Press [Function] & [7] to change channel step.



RANGE: RX 420 MHz - 470 MHz
TX 420 Mhz - 470 MHz



Caution

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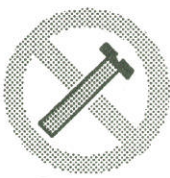
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YAESU FT-900

EXPANDED RF

1. Remove power from the radio.
2. Remove the top cover of the transceiver.
3. Locate the Control unit. It is the rightmost of the vertically-mounted circuits boards.
4. Remove the two mounting screws on the boards restraining brackets.
5. Remove the control unit.
6. Locate Jumper pad JP5002. It is located in the next to IC Q5016. IC Q5016 is the rightmost IC of the three large IC in the center of the board.
7. Solder bridge Pad JP5002.
8. Reinstall the control unit.
9. Locate VR1003 & VR1005 on the RF unit.
10. Connect a 50 Ohm dummy load and a key to the key jack.
11. Set CW mode and the METER to the ALC setting.
12. Dial Frequency 5.000 MHz.
13. Set the RF Power switch fully clockwise.
14. Close PTT and the key. (TRANSMITTING)
15. Adjust VR1003 so that the ALC meter reads to the right edge of the scale.
16. Check frequency range 4.0 - 6.5 MHz to make sure ALC meter reads at least slightly across the entire range.
17. Dial Frequency 8.000 MHz.
18. Adjust VR1005 so that the ALC meter reads to the right edge of the scale.
19. Check frequency range 8.0 - 10.0 MHz to make sure ALC meter reads at least slightly across the entire range.
20. Replace the top cover.

NOTE: Avoid transmissions near 10.940 MHz & 23.60 MHz due to elevated spurious emissions.



Caution

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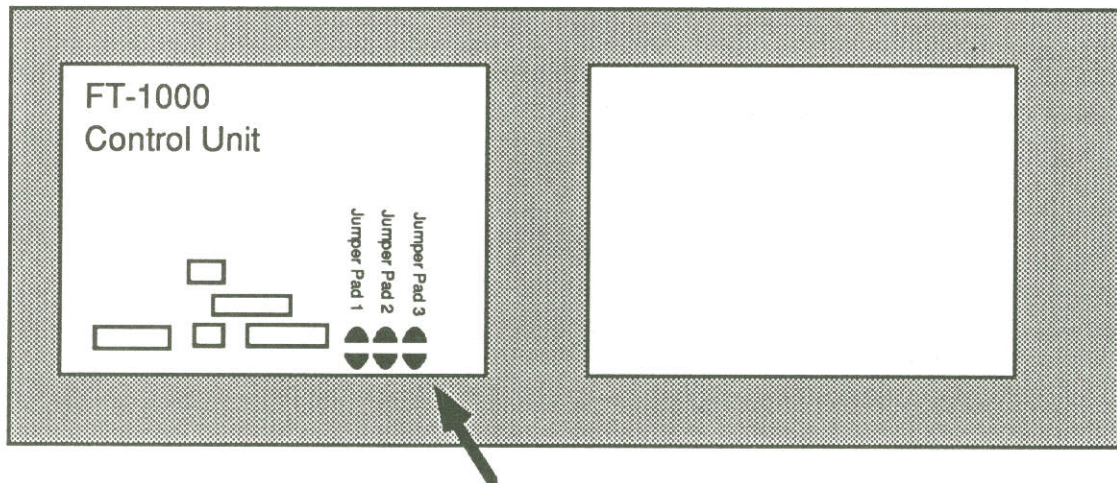
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YAESU FT-1000

EXPANDED RF

1. Remove power from the radio.
2. Open the case top and bottom.
3. Locate four screws attaching front panel and remove the top screws. Loosen the bottom screws.
4. Tilt front panel forward.
5. On the left side of the radio, remove the plug from the power supply to the front panel. (gray and white wires)
6. Locate jumper position 3 on Control board.
7. Change the jumper status in position 3
8. Reassemble the radio.
9. Reset the microprocessor.

FT-1000 FRONT PANEL



Remove Solder Bridge from Pad #3



Caution

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YAESU FT-2311

EXPANDED RF

1. Remove five screws from the top cover and remove the cover.
2. Remove five screws from the bottom cover and remove the cover.
3. Unplug the speaker.
4. Remove the four screws holding the front panel.
5. Locate jumper pad number 7.
6. Solder bridge pad number 7.
7. Locate the reset pins (Located on the front panel and clearly marked).
8. Short the reset pins together for one second.
9. Reassemble the radio.

New range : 1240.00 MHz - 1300.00 MHz



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YAESU FT-2400

EXPANDED RF

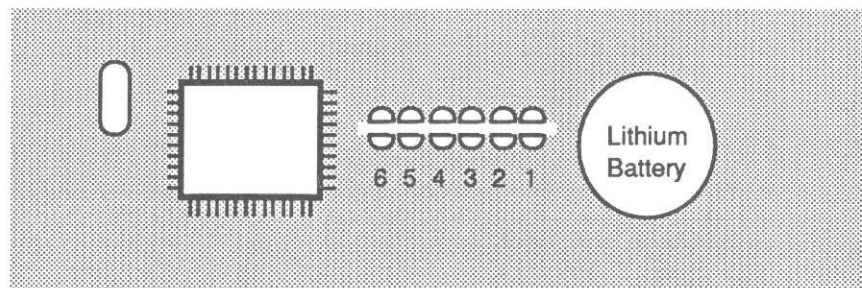
1. Remove Power and Antenna.
2. Locate and remove the two Allen screws from the front panel.
3. Locate and unsolder jumper pad 2.
4. Locate and solder jump pads 1 & 3.
5. Reassemble the radio.

New range : 118-174 MHz Rx, 140-174 MHz Tx .

Option #2

1. Follow steps above, except leave solder pad 2 jumpered.
2. Turn radio on and set the upper and lower limits:

Select 138.00 MHz and Press [D/MR] button	(lower RX limit)
Select 174.00 MHz and Press [D/MR] button	(High RX limit)
Select 138.00 MHz and Press [D/MR] button	(lower TX limit)
Select 174.00 MHz and Press [D/MR] button	(High TX limit)



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YAESU FT-4700

EXPANDED RF

1. Remove Front Panel.
2. Locate jumper pads 1,2,5,9,10 & 13. Solder short them carefully. (The other jumper pads must remain undisturbed)
3. Reassemble radio.
4. Turn power on. (The microprocessor has been reset)
5. Use the up/down buttons and dial to set the UHF range as follows :

420.000 MHz Press [D/MR] button

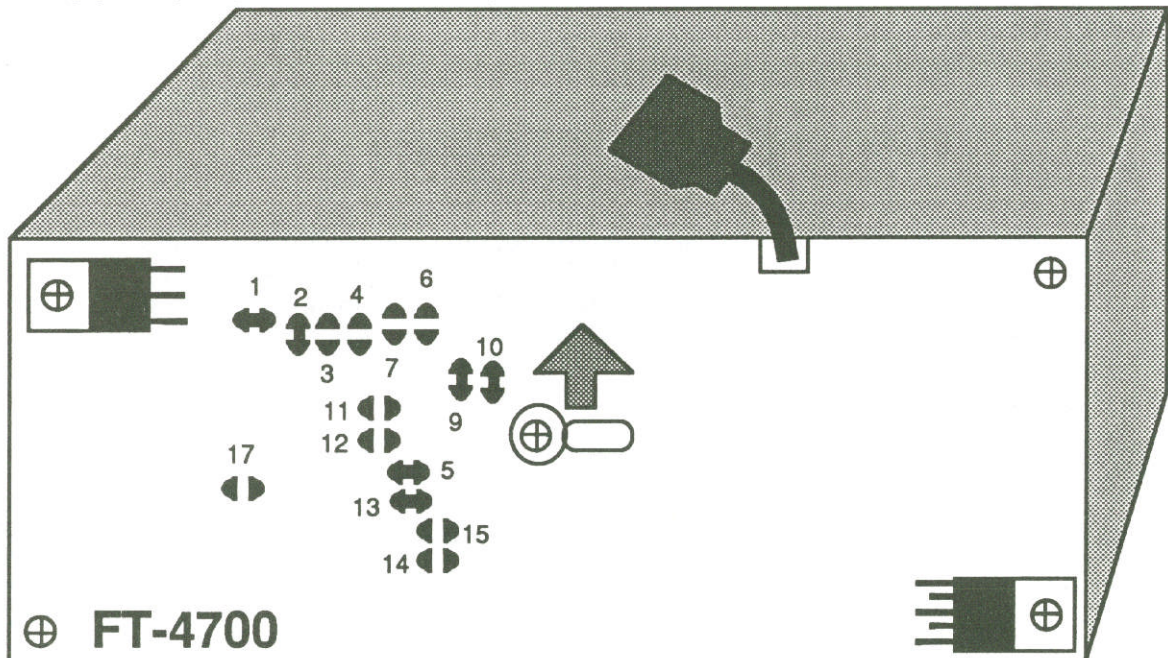
469.000 MHz Press [D/MR] button

6. The display will show 47.75 (IF freq. for UHF). Press [D/MR]
7. Use the up/down buttons and dial to set the VHF range as follows :

138.000 MHz Press [D/MR] button

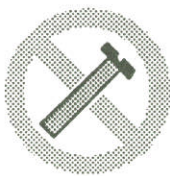
174.000 MHz Press [D/MR] button

8. The display will show 17.3 (IF freq. for VHF). Press [D/MR]
9. The repeater shifts for both bands are reset to 000. They must be set using the [F] and [PRT] buttons. Refer to page 27 in the user manual.



RX Range 138 MHz - 174 MHz
420 MHz - 469 MHz
TX Range 138 MHz - 174 MHz
420 MHz - 469 MHz

MORE -----



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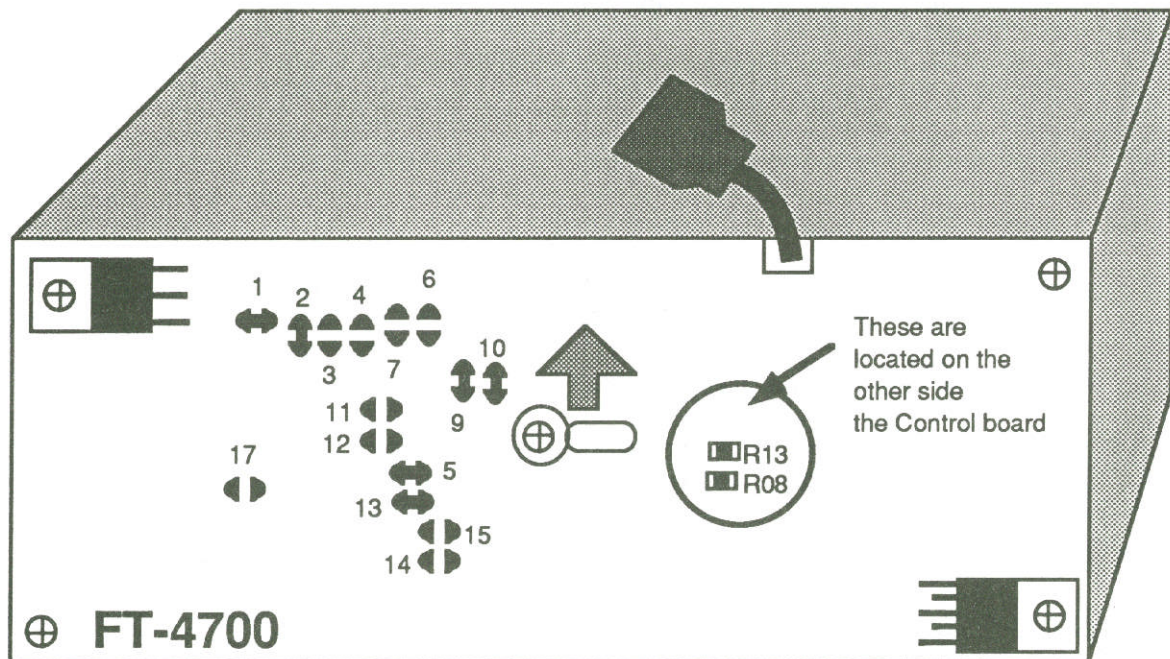
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YAESU FT-4700 FULL CROSSBAND REPEATER MOD

1. Remove R32 (located next to pin 5 of the microphone connector.)
2. Jumper pads 6,9 and 10 located above CPU. (This is also located on the same board as the step above.)

BEEP LEVEL REDUCTION

1. Remove Front Panel
2. Remove the five screws holding Control unit in place.
3. Remove P10 from J04
4. Remove P09 from J03
5. Carefully flip the Control board to access the back side.
6. Locate R08 and R13.
7. Replace R08 and R13 with 560 ohm chip resistors (YAESU # J24205561
8. Reconnect the two Plugs P10 & P09
9. Reassemble the radio.



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YAESU FT-5200

EXPANDED RF

1. Remove power from the radio.
2. Release and remove the front panel.
3. Remove the six screws from the top cover of the radio.
4. Remove the six screws from the bottom of the radio.
5. Remove the top and bottom covers.
(CAUTION: the speaker might fall out.)
6. Remove the two screws & front control head mounting plate from the radio.
7. Locate solder pads 1 - 7.
(Standard jumpered pads are 2 and 7 only)
8. Solder jump pads 1,3 and 6
(Pads 1,2,3,6 & 7 are now jumpered)
9. Install front panel mounting plate.
10. Reassemble the radio.
11. Reconnect the power to the radio.
12. Press and hold [D/MR], [F/W] & [REV] keys and turn radio on.
(Display will show 000.000 & 300.000 on the display)
13. Set the VHF Receive and Transmit limits:

Enter 118.00 MHz and press [D/MR]	(VHF RX Low)
Enter 174.00 MHz and press [D/MR]	(VHF RX High)
Enter 140.00 MHz and press [D/MR]	(VHF TX Low)
Enter 174.00 MHz and press [D/MR]	(VHF TX High)
14. Set the UHF Receive and Transmit limits:

Enter 420.00 MHz and press [D/MR]	(UHF RX Low)
Enter 475.00 MHz and press [D/MR]	(UHF RX High)
Enter 420.00 MHz and press [D/MR]	(UHF TX Low)
Enter 475.00 MHz and press [D/MR]	(UHF TX High)
15. Press [Function] then [REP] and select 5 MHz Repeater offset for UHF band.
16. Press [Function] then [REP] and select 600 kHz Repeater offset for UHF band.

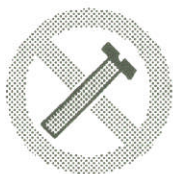
Options:

Override automatic display dimmer:

Press and hold [MHz] and turn radio on: Use Channel knob to select brightness.

Keyboard VHF Expanded Receive:

Press and hold [DVS] & [MHz] keys and turn radio on.



Caution

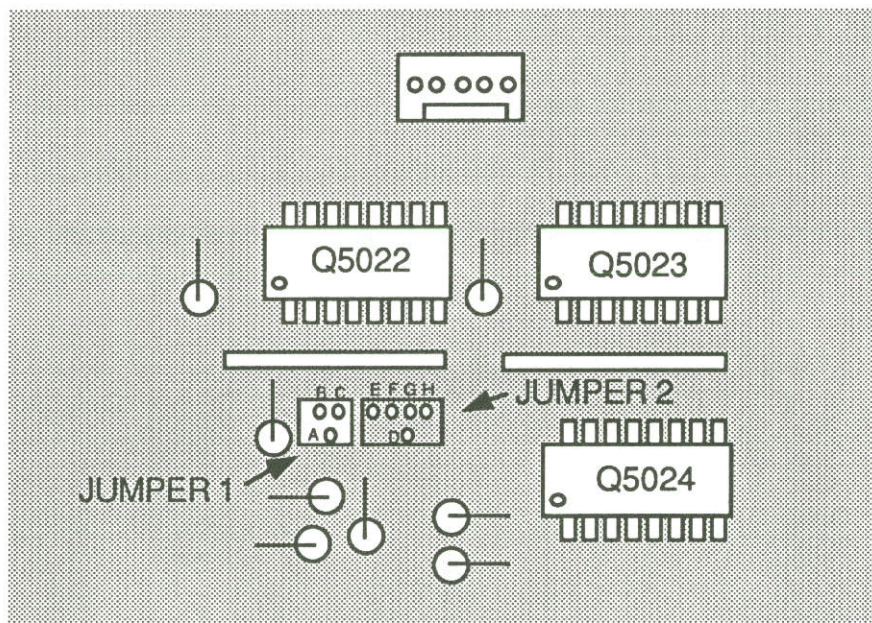
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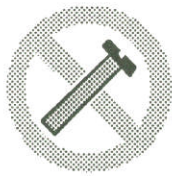
YAESU FT-ONE

EXPANDED RF

1. Unplug the power from the radio.
2. Open radio and locate the CONTROL UNIT.
3. Locate and install a Jumper between Point A and point B. No Jumper to point C.
4. Remove any jumper to point D. (Transmit range point)
5. Reassemble radio.



RX Range 150 KHz - 30 MHz
TX Range 1.8 MHz - 30 MHz



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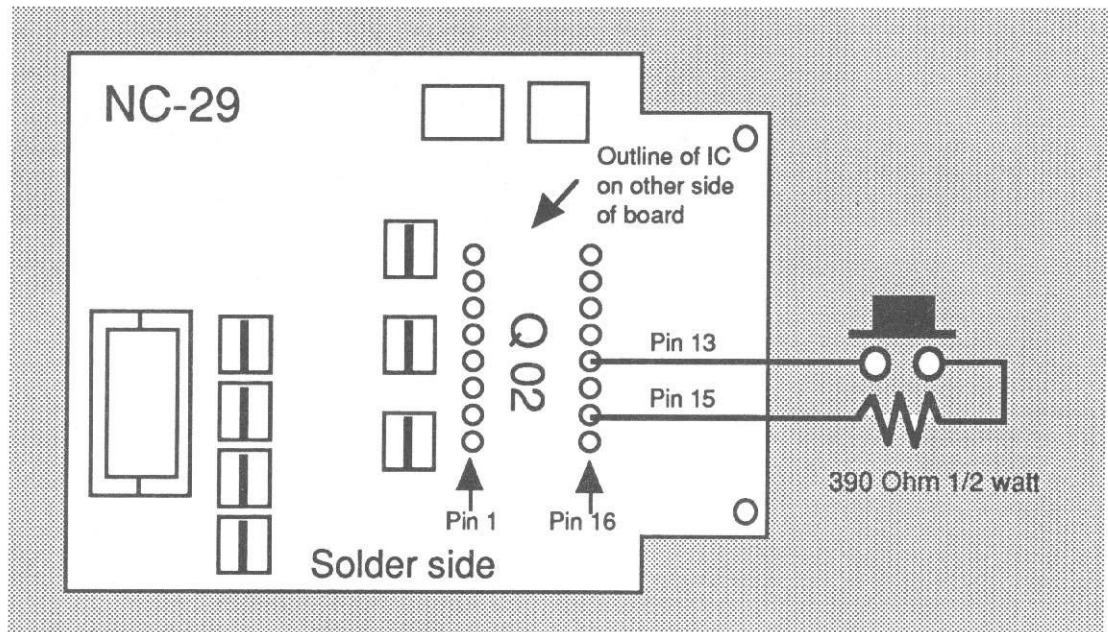
YAESU NC-29

TRICKLE MODE

This modification will allow you to select the amount of time used to fast charge your battery pack. The standard NC-29 will fast charge a battery for five hours and then switch to trickle charge every time a battery is inserted, even if the battery is fully charged.

This modification will provide a push button to speed up the Internal clock. By pressing the button, you can watch the time remaining LEDs on the panel and select the amount of full charging time.

1. Unplug the charger for the AC power
2. Locate IC Q02. see drawing
3. Solder tack a 390 Ohm 1/2 watt resistor and a normally open push button to Pins 13 & 15
4. Position the push button switch in a handy position on the plastic case.



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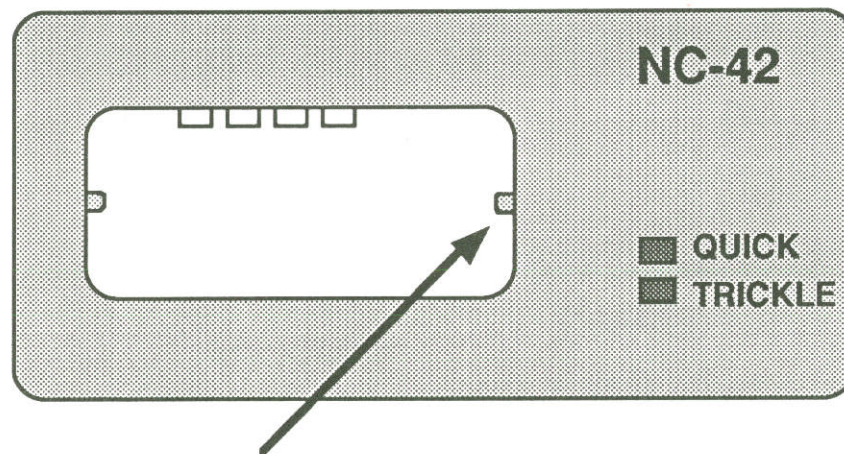
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YAESU NC-42

Charging additional batteries

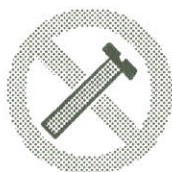
This modification will allow you to charge FNB-12S, FNB-14, FNB-17, FNB-25, FNB-26 and FNB-27 batteries.

1. Remove the ridge on the inside of the battery charging cup. (right side only)



Remove this ridge. Use a file or similar tool

Charging time for all batteries should be about 1 hour or less.



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Performance Report

Radio _____

Date _____

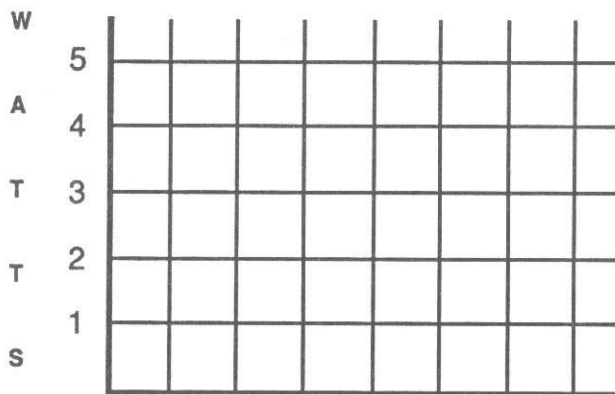
Owner : Name _____

Address _____

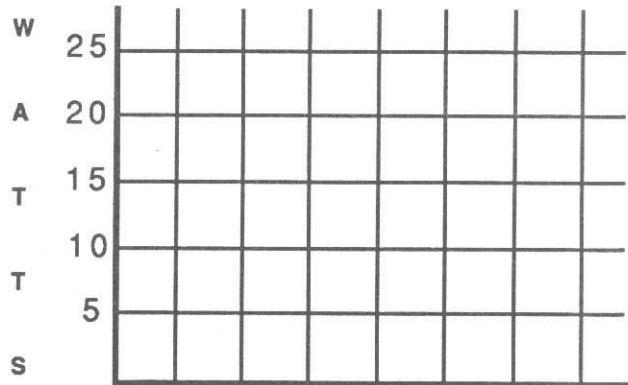
City _____ St. _____ Zip _____

Phone () _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
Frequency Error (Offset)	_____Hz	_____Hz
Receive Sensitivity (Mid-band)	_____uv	_____uv
PL Deviation	_____Hz	_____Hz
DTMF Deviation	_____KHz	_____KHz
Audio Deviation	_____KHz	_____KHz
Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



F R E Q U E N C Y



F R E Q U E N C Y

Radio / Tech Modifications

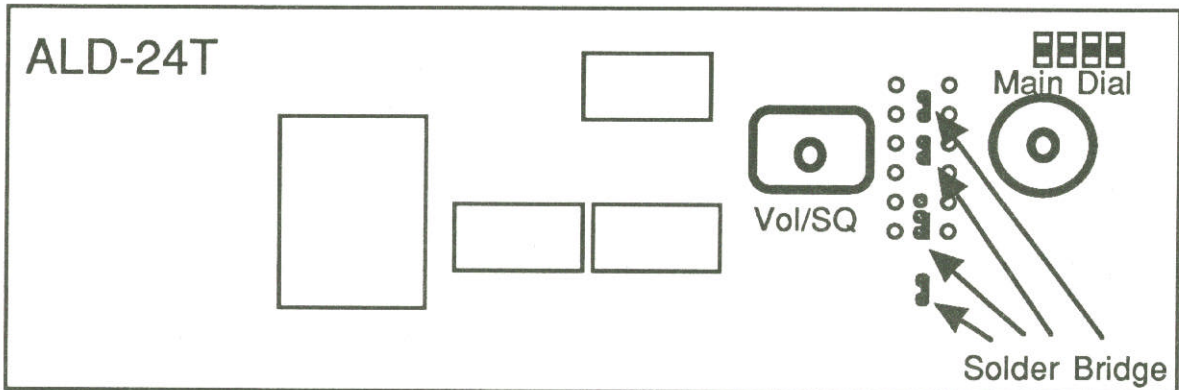
ALINCO Radio Modifications

<u>Model</u>	<u>Modification</u>	<u>Page #</u>
ALD-24T	Expanded RF.....	A-2
ALR-22T	Expanded RF.....	A-3
ALR-22T	Microphone Mod.....	A-4
DJ-100T	Expanded RF - Mars/Cap+.....	A-5
DJ-120T	Expanded RF - Mars/Cap+.....	A-6
DJ-160T	Expanded RF/Alignment controls	A-7
DJ-460T	Expanded RF/Alignment controls	A-8
DJ-500	Expanded RF - Mars/Cap+.....	A-9
DJ-560	Expanded RF - Mars/Cap+.....	A-10
DJ-F1T	Expanded RF - Aircraft AM Mode.....	A-11
DR-110T	Expanded RF/Alignment controls	A-12
DR-112T	Expanded RF/Alignment controls	A-13
DR-510	Expanded RF - Mars/Cap+ X band repeater.....	A-14
DR-570T	Expanded RF - Mars/Cap+ X band repeater.....	A-15
DR-590T	Expanded RF - X Band / Alignment controls....	A-16

ALINCO ALD-24T

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove top and bottom covers.
3. Remove Main dial, Vol & SQL knobs. Remove the retaining rings.
4. Remove front cover to access front panel circuit board.
5. Solder bridge four sets of pads as shown.
6. Reassemble radio.
7. Reset microprocessor (Press reset button)



Caution

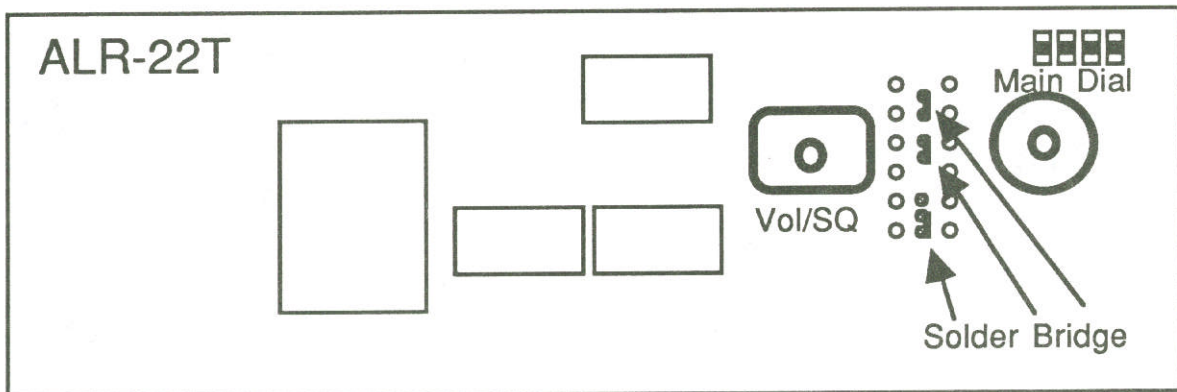
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ALINCO ALR-22T

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove top and bottom covers.
3. Remove Main dial, Vol & SQL knobs. Remove the retaining rings.
4. Remove front cover to access front panel circuit board.
5. Solder bridge Three sets of pads as shown.
6. Reassemble radio



Caution

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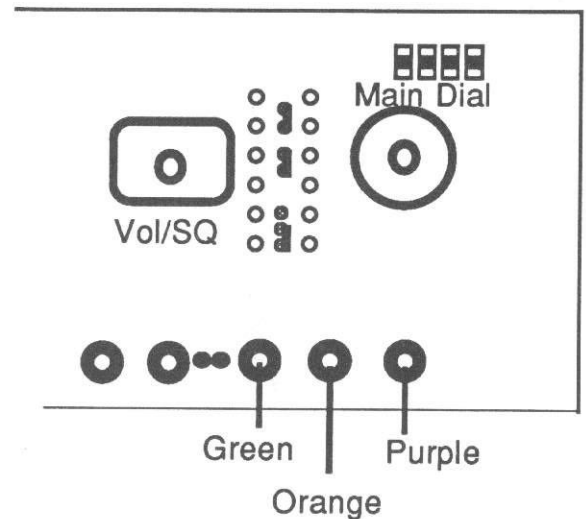
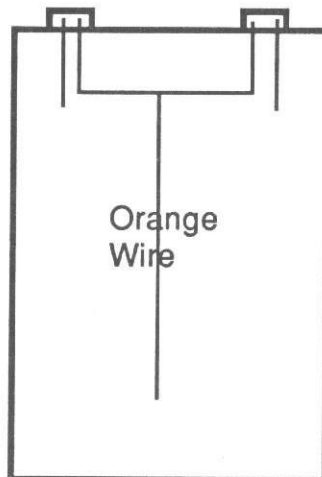
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ALINCO ALR-22T

MICROPHONE MOD

1. Remove Battery and Antenna.
2. Remove top and bottom covers.
3. Remove Main dial, Vol & SQL knobs. Remove the retaining rings.
4. Remove front cover to access front panel circuit board.
5. Locate and remove the Microphone Green, Orange & Purple wires.
6. Solder the wired as shown in drawing
7. Reassemble radio.
8. Open Microphone.
9. Remove the Ground side of the Up/Down buttons and tie them together.
10. Connect the Orange wire to the two tied wires.
11. Reassemble Microphone.

ALR-22T Mic/Memory UP/Down Mod



Caution

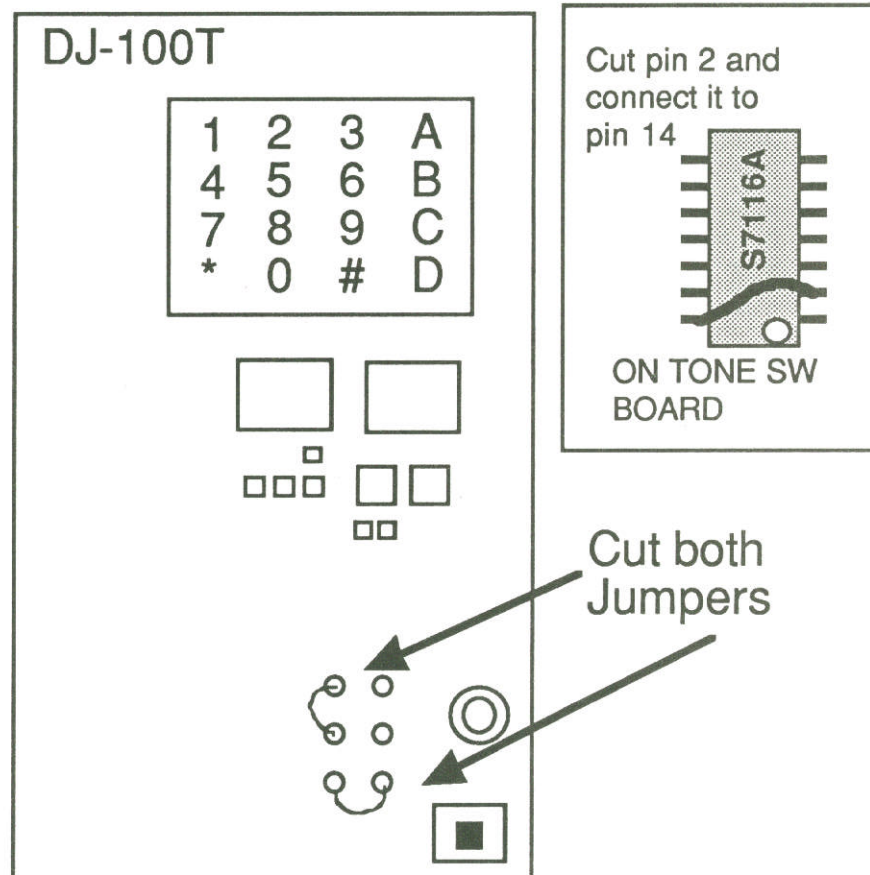
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ALINCO DJ-100T

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove screws from case and open radio.
3. Locate & Cut Jumpers per drawing.
4. Clip pin 2 on IC401(S7116A) and connect it to pin 14 (for simplex PL tone) This chip is located on the TONE SW board.
4. Reassemble radio.
5. Reset Micro Processor.



Caution

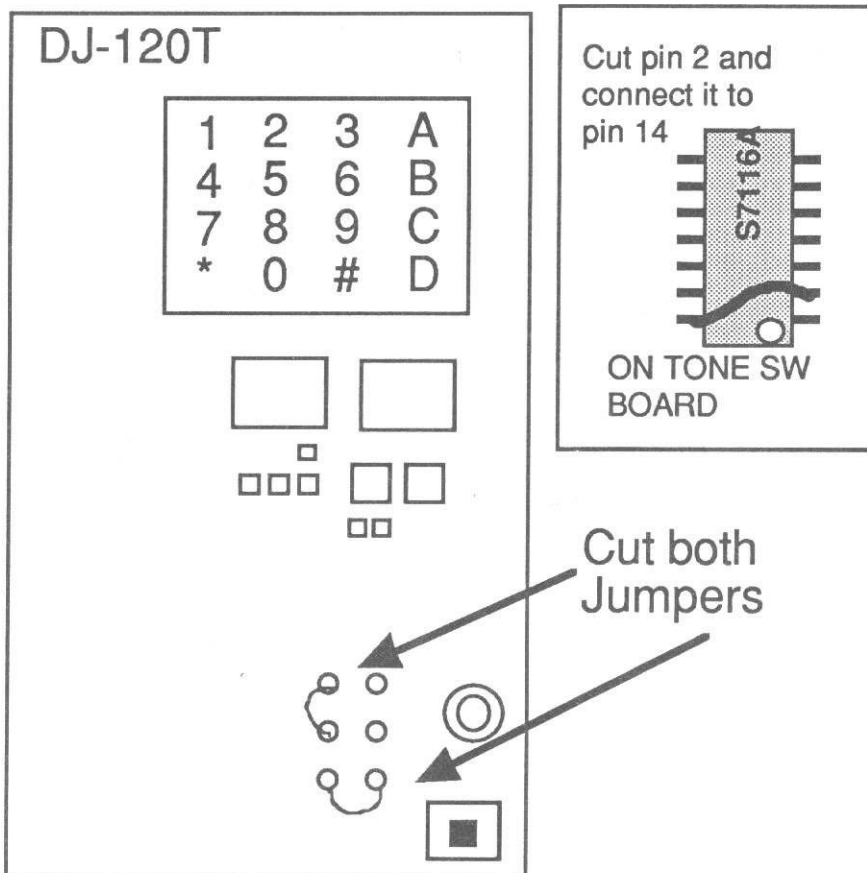
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ALINCO DJ-100T

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove screws from case and open radio.
3. Locate & Cut Jumpers per drawing.
4. Clip pin 2 on IC401(S7116A) and connect it to pin 14 (for simplex PL tone) This chip is located on the TONE SW board.
4. Reassemble the radio.
5. Reset the microprocessor.



Caution

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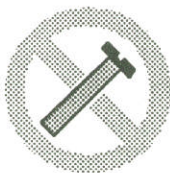
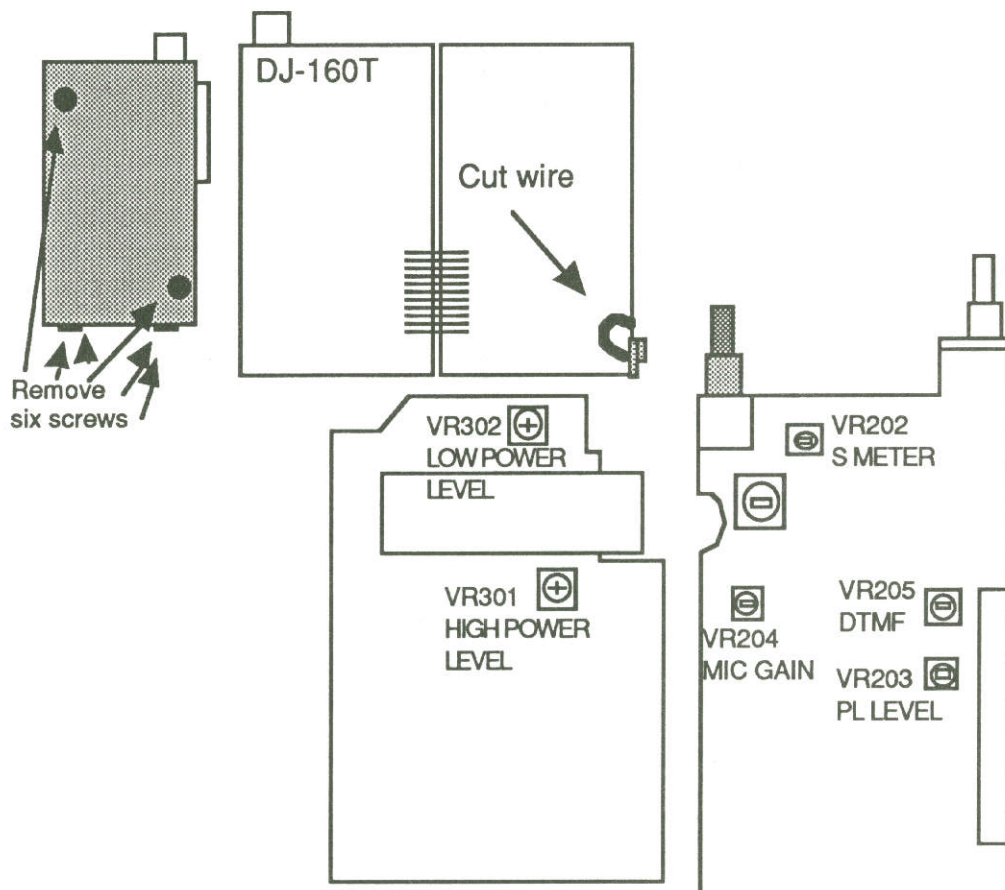
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ALINCO DJ-160T

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove 2 screws back of case and four screws from battery slide clip.
3. Remove Main dial, Vol & SQL knobs. Remove the retaining rings.
4. Remove the top cover.
5. Open radio.
6. Locate and cut yellow wire behind the battery release button.
7. Reassemble radio.
8. Reset microprocessor. (Press and hold [F] key and turn power on.)

DJ-160T



Caution

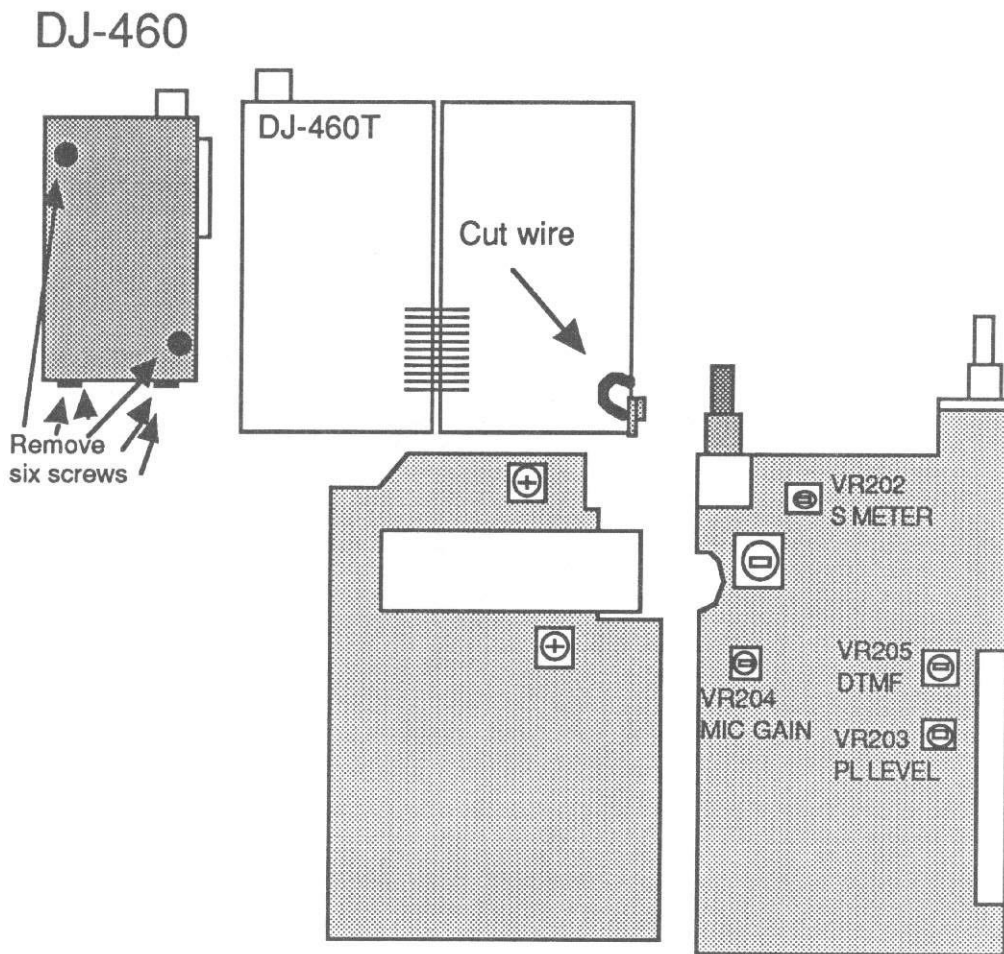
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ALINCO DJ-460T

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove 2 screws back of case and four screws from battery slide clip.
3. Remove Main dial, Vol & SQL knobs. Remove the retaining rings.
4. Remove the top cover.
5. Open radio.
6. Locate and cut wire behind the battery release button.
7. Reassemble radio.
8. Reset microprocessor. (Press and hold [F] key and turn power on.



Caution

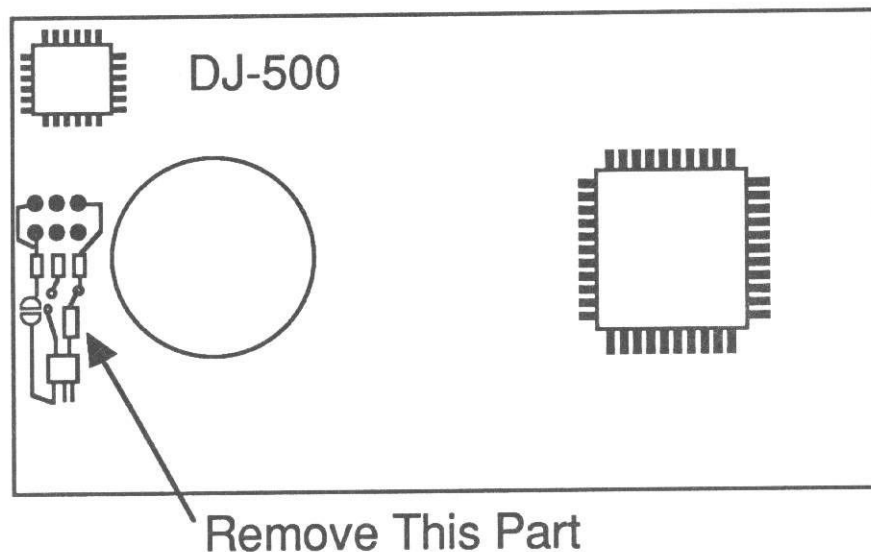
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ALINCO DJ-500T

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove screws from case (3 Long & 2 short)
3. Remove green component per drawing.
4. Reassemble radio.
5. Reset the radio. (Reset switch is located below the PTT Switch)



Caution

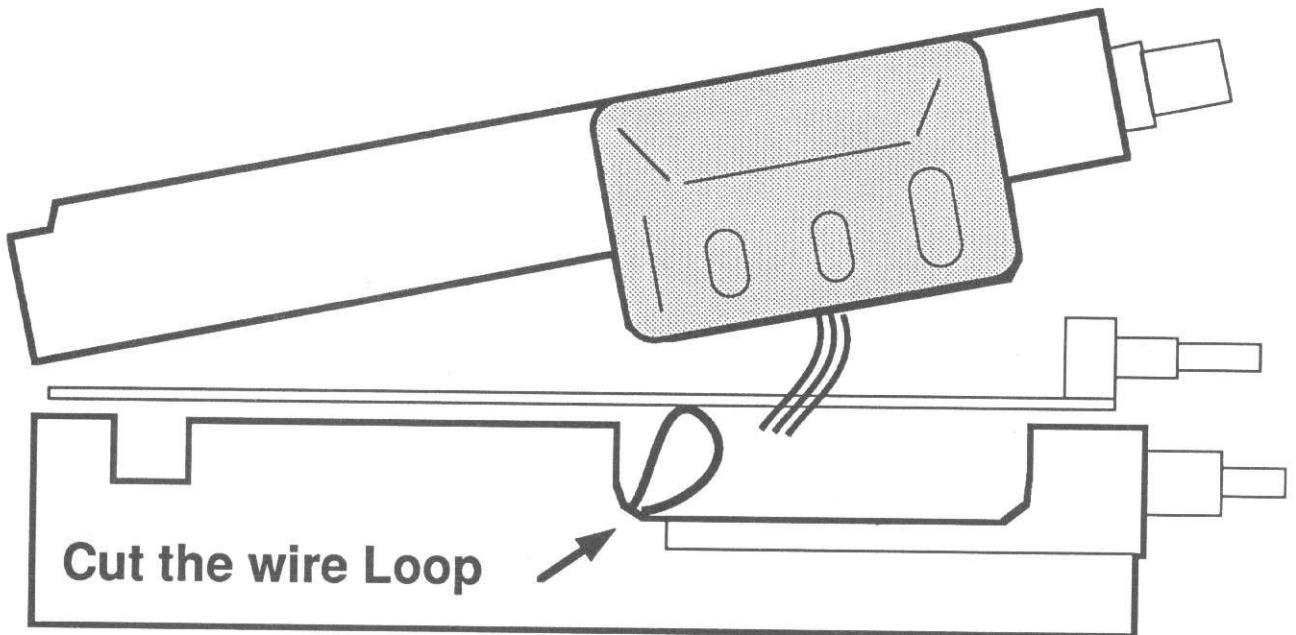
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ALINCO DJ-560

EXPANDED RF

1. Remove battery and antenna.
2. Remove screws from back of case.
3. Remove all 4 screws from battery plate.
4. Remove screw next to the BNC connector.
5. Remove the Dial, UHF and VHF knobs.
6. Unscrew the Lock rings under the Dial, UHF and VHF knobs.
7. Remove the top cover.
8. Remove the 4 screws hold in the radio together.
4. Locate and cut orange wire directly below the PTT switch.
(Some units have a yellow wire)
5. Reassemble the radio.
6. Reset the CPU. (Press and hold [FUNCTION] and turn power on)



Caution

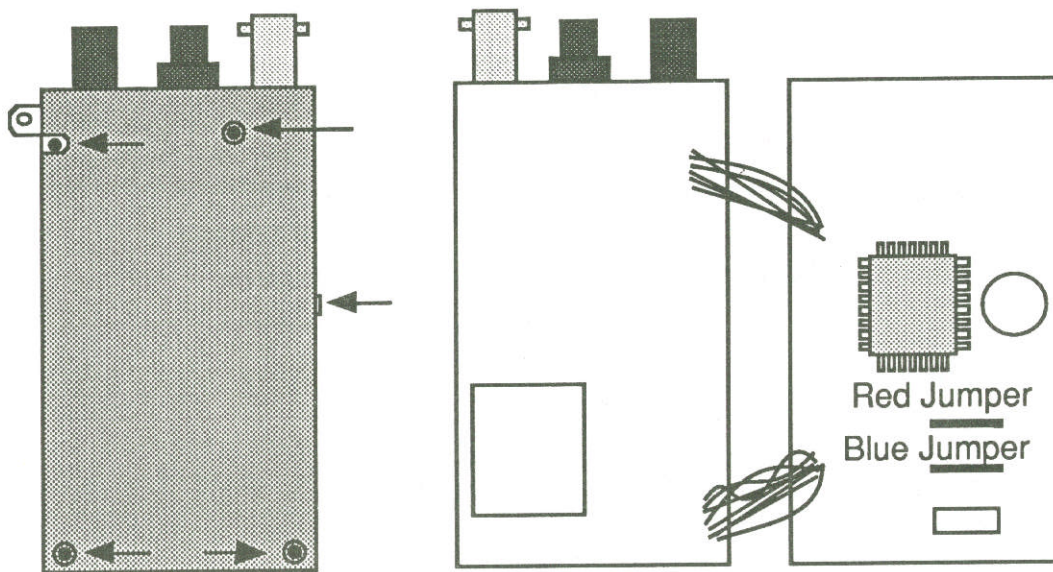
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ALINCO DJ-F1T

EXPANDED RF

1. Remove battery and antenna.
2. Remove 5 screws from the back of the case.
3. Slide and hold the Battery lock button open the radio carefully.
4. Locate and cut the RED jumper wire. (AM airband reception)
5. Locate and cut the BLUE jumper. (Expanded RF)
6. Reassemble the radio.
7. Reset the microprocessor. (Press and hold the [F] key and turn the power on)



TURN ON/OFF AIRBAND:

Press the [B] key. an "A" will appear on the display to indicate the AM mode is operating.



Caution

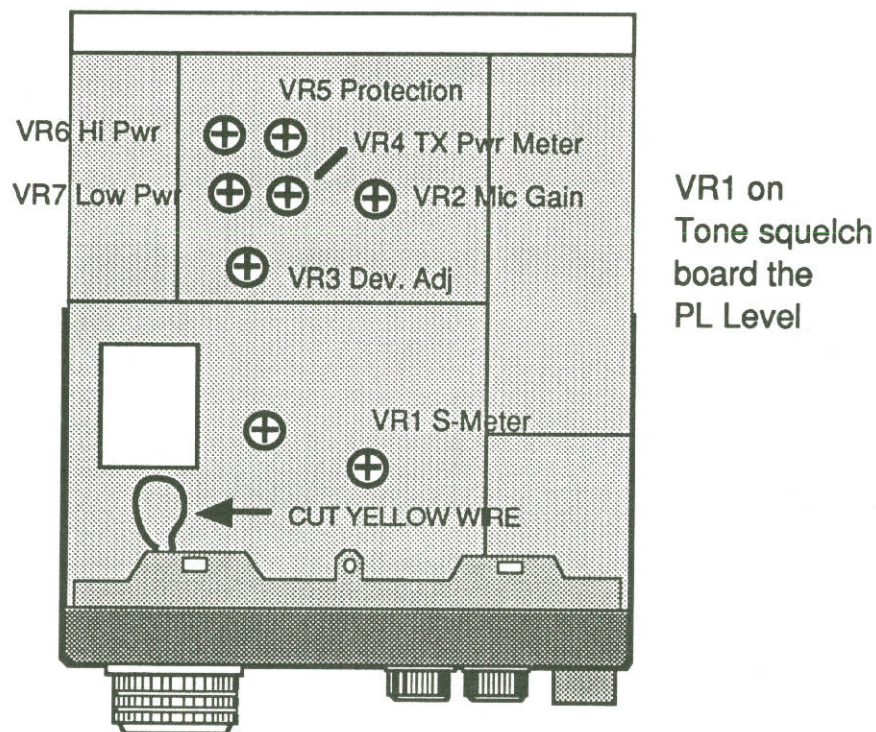
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ALINCO DR-110T

EXPANDED RF

1. Remove Power and Antenna.
2. Remove screws from top case and open radio.
3. Cut the yellow wire on the control board
4. Reassemble radio
5. Reset microprocessor. (Turn radio on. Press and hold [F] and [VFO/M] and turn power off and while still holding keys, turn power back on.



Caution

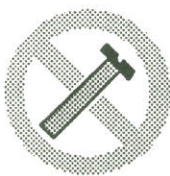
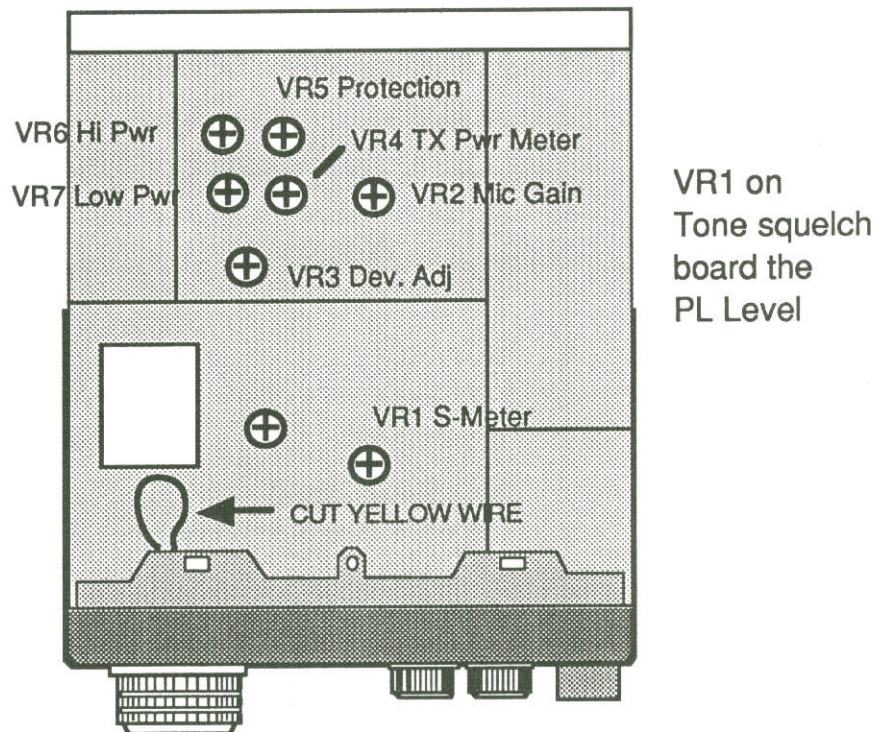
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ALINCO DR-112T

EXPANDED RF

1. Remove Power and Antenna.
2. Remove screws from top case and open radio.
3. Cut the yellow wire on the control board
4. Reassemble radio
5. Reset microprocessor. (Turn radio on. Press and hold [F] and [VFO/M] and turn power off and while still holding keys, turn power back on.



Caution

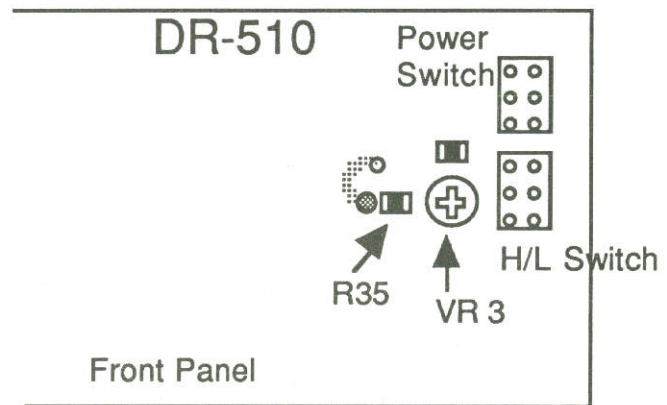
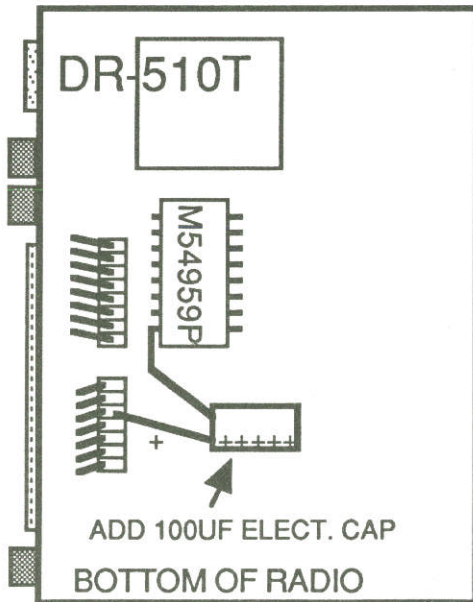
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ALINCO DR-510T

EXPANDED RF / CROSS BAND REPEATER MOD

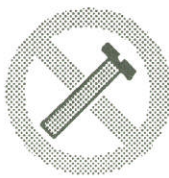
1. Remove Battery and Antenna.
2. Remove screws from case and open radio.
3. Cut the yellow wire looped around the blue condenser
4. Remove 2 screws from corners of tone board, to expose motherboard.
5. Solder a 16 volt 100uf electrolytic as shown. (note 10-100uf)
- lead to pin 8 of M54959P + lead to third pin of socket (Orange wire)
6. Remove the front cover
7. Short chip resistor R35 and solder bridge the pads to the left of the resistor.
8. Reassemble radio
9. Reset microprocessor (Push reset button)



CROSS BAND REPEATER PROCEEDURES - Select the VHF & UHF frequencies and press [SHIFT] until "DUAL" appears.

TURN ON : Press and hold [REV] and turn power on. The volume control controls the amount of repeater audio.

TURN OFF : Turn radio off.



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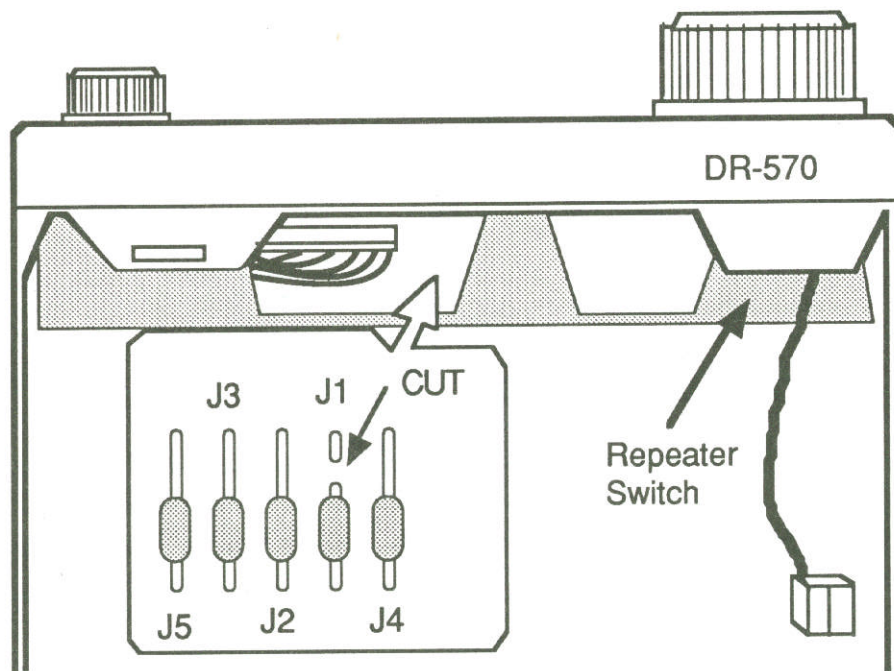
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ALINCO DR-570T

EXPANDED RF / CROSS BAND REPEATER MOD

1. Remove Battery and Antenna.
2. Remove screws from case and open radio (3 screws in the top and 2 in the bottom.)
3. Locate and cut the indicated component. see drawing
4. Turn repeater/normal switch to repeater mode.
5. Reset the microprocessor. (Press and hold [FUNCTION] and turn power on)
6. Remove the two pin connector to disable audio bleed in repeater mode.
7. Reassemble radio.

VR3= VHF Dev. Adj. • VR2= VHF S-Meter • VR5= VHF High Pwr • VR7= VHF Low Pwr
 VR3= UHF Dev. Adj. • VR2= UHF S-Meter • VR5= UHF High Pwr • VR7= UHF Low Pwr



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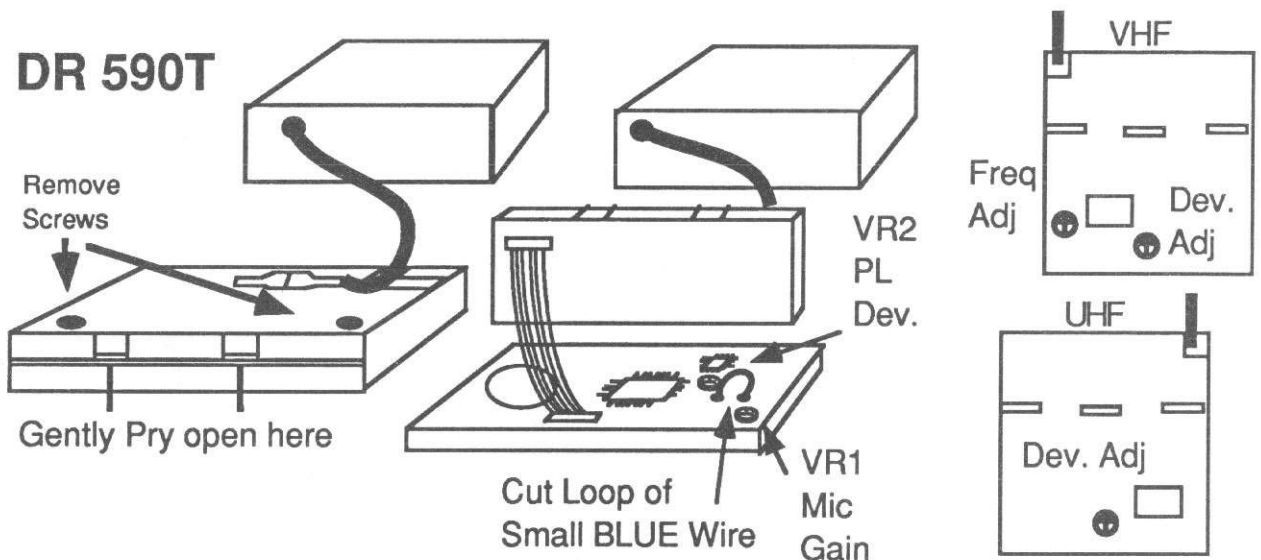
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ALINCO DR-590T

EXPANDED RF

CROSS BAND REPEATER MOD

1. Remove Battery and Antenna.
2. Remove the four screws, (2 on each side) holding the LCD display to the main body of the radio.
3. **DO NOT DISCONNECT THE BLACK CONNECTOR CABLE FROM THE LCD DISPLAY.**
4. Locate and unscrew the 2 screws holding the LCD display together.
5. Carefully separate the back cover of the display from the front cover. Use a flat blade screwdriver to apply slight pressure to the locking tabs in the top of the display.
6. Locate and cut the loop of BLUE wire.
7. Reassemble the radio.
8. Reset the microprocessor. (Press and hold the [FUNCTION] key and turn power on.)



ENABLE REPEATER MODE: Simultaneously press the [FUNCTION] key and the [VHF] Key. The display will alternate between VHF and UHF every 3 seconds.

DISABLE REPEATER MODE: Simultaneously press the [FUNCTION] key and the [UHF] Key.



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Radio / Tech Modifications

STANDARD Radio Modifications

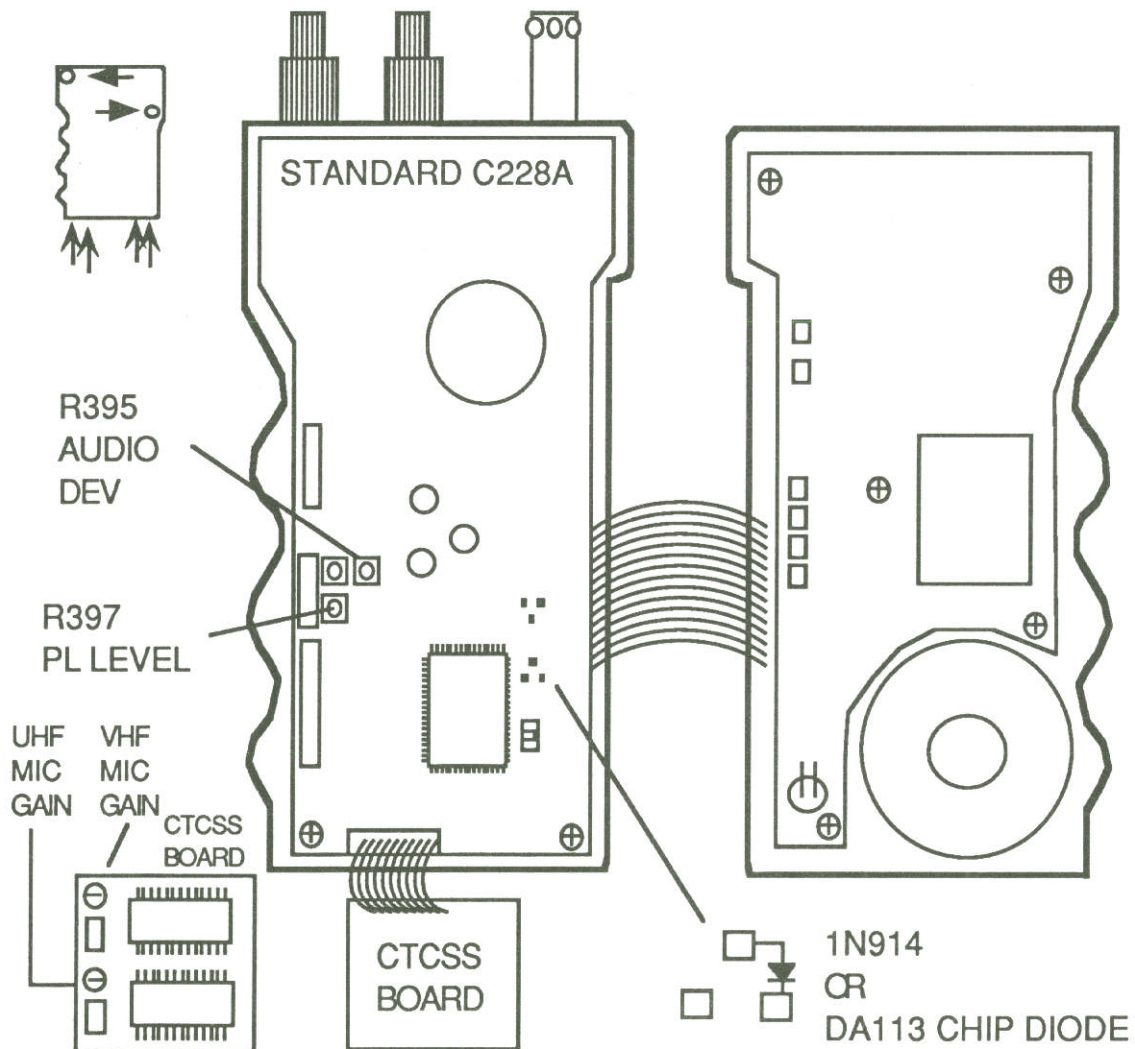
Model **Modification** **Page #**]

C228A	Expanded RF/ Deviation controls.....	S-2
HW-24	Expanded RF.....	S-3

STANDARD C228A

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove two screws from the back case.
3. Remove the four screws from the battery retaining slide.
4. Insert a 1N914 or DA113 chip diode in the pictured location.
5. Reassemble the radio.



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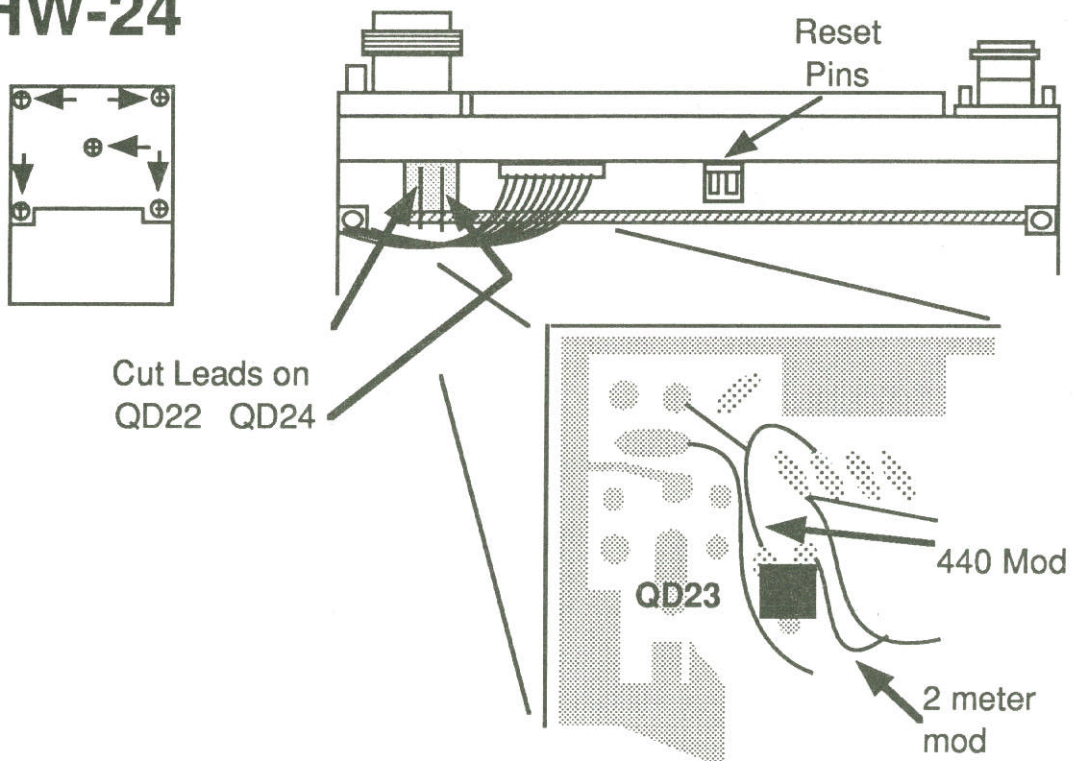
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HEATH HW-24

EXPANDED RF

1. Remove power and Antenna.
2. Remove the wire mounting stand.
3. Remove the five screws that hold the bottom cover.
4. Remove the bottom plate being careful to unplug the speaker as you remove it.
5. Locate and cut the lead of QD22 (2 meter RX Mod)
6. Locate and cut the lead of QD24 (440 RX Mod)
7. Locate Chip Diode QD23 on front panel board.
8. Cut leads to both bottom leads of QD23. (note it may be required to remove the front panel from the body of the radio.)
9. Reassemble the radio (see next step)
10. Reset the Radio. (short the Reset pins with a wire or screw driver.)

HW-24



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Performance Report

Radio _____

Date _____

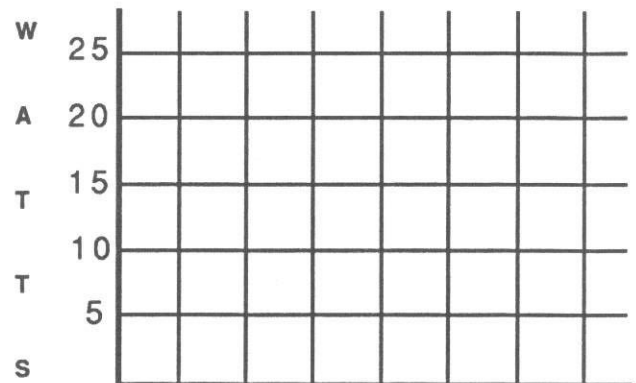
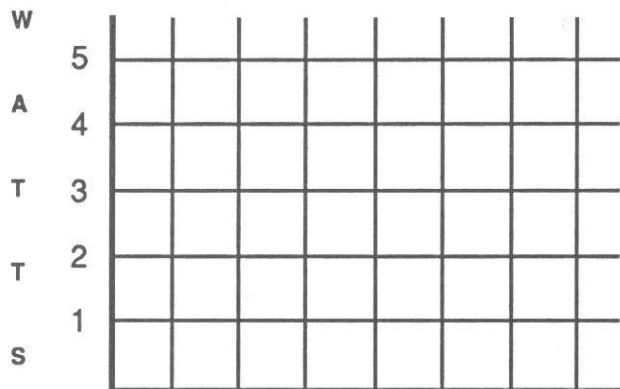
Owner : Name _____

Address _____

City _____ St. _____ Zip _____

Phone (_____) _____ - _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
Frequency Error (Offset)	_____Hz	_____Hz
Receive Sensitivity (Mid-band)	_____uv	_____uv
PL Deviation	_____Hz	_____Hz
DTMF Deviation	_____KHz	_____KHz
Audio Deviation	_____KHz	_____KHz
Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



Radio / Tech Modifications

OTHER MODIFICATIONS

<u>MAKE</u>	<u>Model</u>	<u>Modification</u>	<u>Page #]</u>
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AZDEN	PCS-7000	Expanded RF.....	O-3
KDK	FM-240	Expanded RF.....	O-4
TEN TEC	PARAGON	Expanded RF.....	O-5
RANGER	AR-3300	Expanded RF.....	O-6
RANGER	AR-3500	Expanded RF.....	O-7

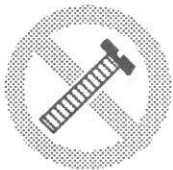
MISC.

AZDEN PCS-6000

EXPANDED RF

1. Remove Power and Antenna.
2. Remove the Top and Bottom covers.
3. Locate and remove the four flat Phillips screws that secure the display to the chassis.
4. Locate and remove the four small Phillips screws securing the PC Board to the chassis.
5. Locate and remove the one Phillips screw above the Microphone connector.
6. Carefully remove the PC board. CAUTION: Do not bend the PIN connectors.
7. Locate and remove Diode D-207. (Unsolder or Cut the diode away)
8. Reassemble the radio.

RANGE: 138.000 MHz - 160.000 MHz



Caution

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AZDEN PCS-7000

EXPANDED RF

1. Remove Power and Antenna.
2. Remove the Top and Bottom covers.
3. Locate and remove the four flat Phillips screws that secure the display to the chassis.
4. Locate and remove the four small Phillips screws securing the PC Board to the chassis.
5. Locate and remove the one Phillips screw above the Microphone connector.
6. Carefully remove the PC board. CAUTION: Do not bend the PIN connectors.
7. Locate and remove Diode D-207. (Unsolder or Cut the diode away)
8. Reassemble the radio.

RANGE: 138.000 MHz - 160.000 MHz



Caution

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KDK FM-240

EXPANDED RF

1. Remove Power and Antenna.
2. Remove the cover.
3. Press the RESET Button.
4. Enter the new limits on the front panel switch. (Range 140-156 MHz)
8. Reassemble the radio.

RANGE: 140.00 MHz - 156.00 MHz



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TEN TEC PARAGON

EXPANDED RF

1. Remove Power and Antenna.
2. Remove the Top cover.
3. Locate and clip small jumper labeled "HAM".
8. Reassemble the radio.

RANGE: 1.7 MHz - 30 MHz



Caution

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RANGER AR-3300

EXPANDED RF

1. Turn radio on and enter the following:

[ENTER] [1 CH] [ENTER] [MANUAL] [ENTER] [100 HZ DOWN]

[ENTER] [MEMORY] [MANUAL] [SCAN] [PROGRAM]

[100 HZ UP] [ENTER] [ENTER]

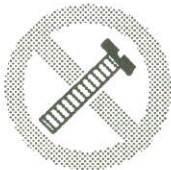
PUSH [1 MHZ UP] UNTIL 29.933.0 APPEARS

[ENTER] [SCAN DOWN] [ENTER] [2 CH] [ENTER]

[SCAN DOWN]

OPEN THE SQUELCH

The radio will now scan down in 10kHz steps. Store desired Frequencies into memory channels for later use.



Caution

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RANGER AR-3500

EXPANDED RF

1. Turn radio on and enter the following:

[ENTER] [1 CH] [ENTER] [MANUAL] [ENTER] [100 HZ DOWN]

[ENTER] [MEMORY] [MANUAL] [SCAN] [PROGRAM]

[100 HZ UP] [ENTER] [ENTER]

PUSH [1 MHZ UP] UNTIL 29.933.0 APPEARS

[ENTER] [SCAN DOWN] [ENTER] [2 CH] [ENTER]

[SCAN DOWN]

OPEN THE SQUELCH

The radio will now scan down in 10kHz steps. Store desired Frequencies into memory channels for later use.



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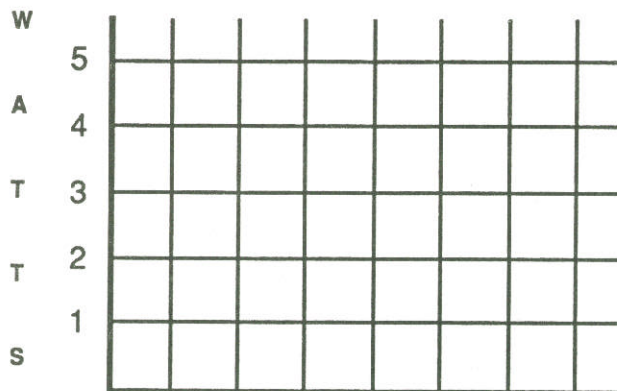
Performance Report

Radio _____

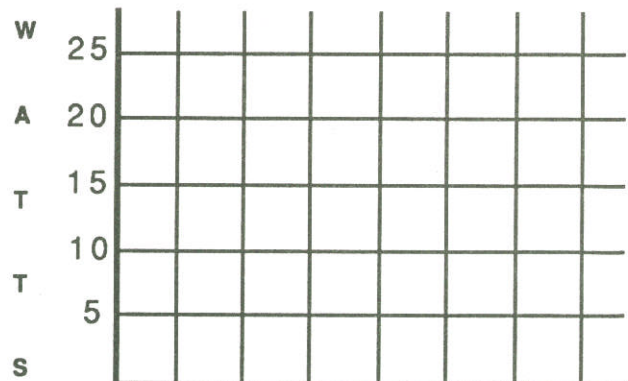
Date _____

Owner : Name _____
 Address _____
 City _____ St. _____ Zip _____
 Phone (_____) _____ - _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
Frequency Error (Offset)	_____Hz	_____Hz
Receive Sensitivity (Mid-band)	_____uv	_____uv
PL Deviation	_____Hz	_____Hz
DTMF Deviation	_____KHz	_____KHz
Audio Deviation	_____KHz	_____KHz
Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



F R E Q U E N C Y



F R E Q U E N C Y

Radio / Tech Modifications

SCANNER / CB Modifications

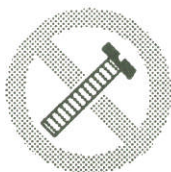
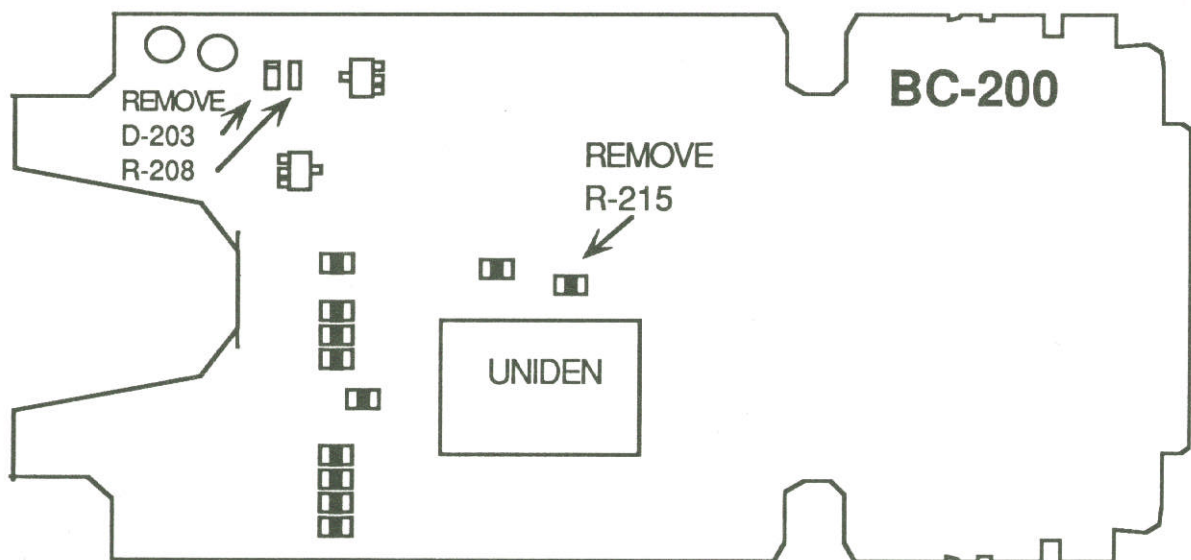
<u>Model</u>	<u>Modification</u>	<u>Page #</u>
BC-200	Expanded RF & Battery Life Extender.....	S-2
BC-205	Expanded RF.....	S-3
BC-760	Expanded RF for older models.....	S-4
BC-760	Expanded RF for newer models.....	S-5
BC-950	Expanded RF for older models.....	S-6
BC-950	Expanded RF for newer models.....	S-7
R-4030	Expanded RF & Battery Life Extender.....	S-8
R-1600	Expanded RF for older models.....	S-9
R-1600	Expanded RF for newer models.....	S-10
PRO-2004	Expanded RF/More memories/Speed Increase..	S-11
PRO-2005	Expanded RF.....	S-12
PRO-2006	Expanded RF.....	S-13
PRO-2022	Expanded RF.....	S-14
PRO-34	Expanded RF.....	S-15
HR-2510	Expanded RF.....	S-16
HR-2600	Expanded RF.....	S-17
148GTL	Expanded RF.....	S-18
Cobra	Remove ALC control.....	S-20
Realistic	Remove ALC control.....	S-21
Others	Remove ALC control.....	S-22
RCI 2950	Expanded RF/Fine Tuning/CB Operation/CH 9..	S-23

BEARCAT BC-200

EXPANDED RF (800MHz) Extended Battery Life

1. Remove Battery and Antenna.
2. Remove 2 screws from case and 2 from the battery retaining plate and open case.
3. Locate and remove two small screws at the base of the circuit board.
4. Gently pull the front panel from the circuits.
5. Locate and remove the 10 K resistor R-215 located above the microprocessor (Uniden UC-1147). Note the resistor is above the "den" letters on the microprocessor.
6. Locate and remove the Diode D-203 and Resistor R-208 located by the Speaker. (Battery Mod)
6. Replace the front panel. Keep the holes in the bottom of the case and board lined up and make sure the dual in-line connector is reconnected properly.
7. Reassemble scanner.

If the radio fails to power up, recharge the battery or, the dual in-line connector was not inserted correctly. If the display will not work, make sure that the rows of fine pin are aligned properly with the socket.



Caution

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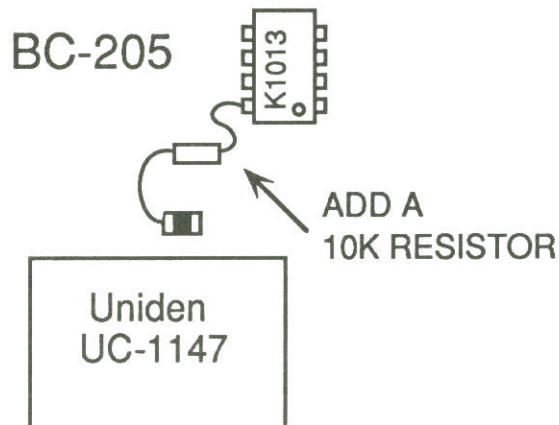
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BEARCAT BC-205

EXPANDED RF (800MHz) Extended Battery Life

1. Remove Battery and Antenna.
2. Remove 2 screws from case and 2 from the battery retaining plate and open case.
3. Locate and remove two small screws at the base of the circuit board.
4. Gently pull the front panel from the circuits.
5. Locate the 10 K resistor located above the microprocessor (Uniden UC-1147). Note the resistor is above the "den" letters on the microprocessor.
6. Add a 10K Resistor to From the Chip resistor to Pin 8 of the adjacent K1013 IC.
7. Reassemble the radio.

If the radio fails to power up, recharge the battery or, the dual in-line connector was not inserted correctly. If the display will not work, make sure that the rows of fine pin are aligned properly with the socket.



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BEARCAT BC-760 EARLY MODELS (NO BNC CONNECTOR)

EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the microprocessor and clip pin 20.
4. Reassemble scanner.



Clip Pin 20



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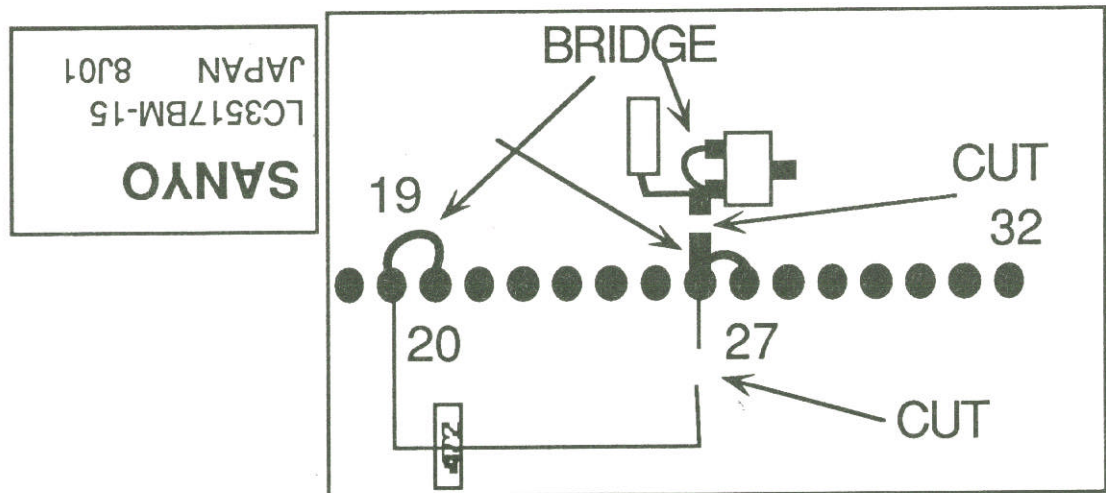
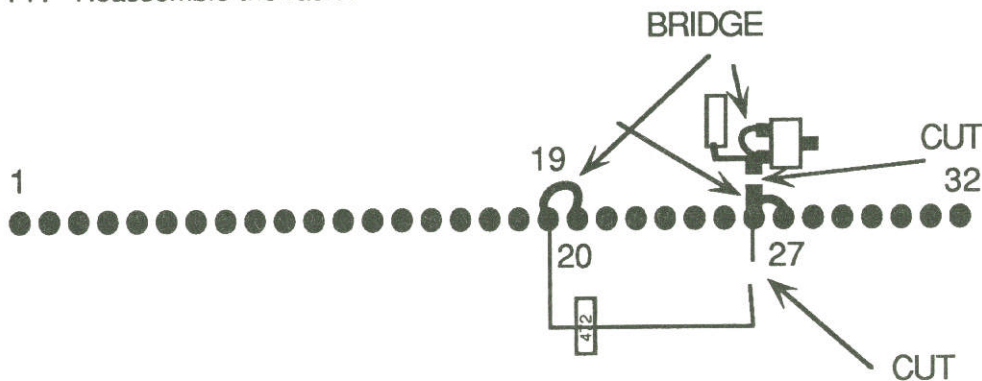
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BEARCAT BC-760

LATER MODELS (WITH BNC CONNECTOR)

EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the SANYO IC. (Identification printed upside down with the front of the radio facing you.
4. Locate the long row of solder pins above the Sanyo IC.
5. Locate Pin 26 of the Microprocessor.
6. Cut the two traces leading to pin 26.
7. Solder bridge Pins 19 & 20 together
8. Solder bridge Pins 26 & 27 together.
9. Solder bridge the two leads of the chip transistor above pin 27.
10. Unsolder or cut the 47K Chip Resistor marked "472"
11. Reassemble the radio.



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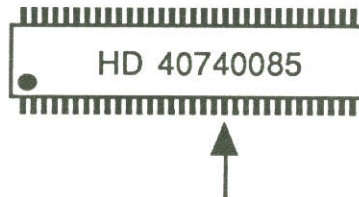
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BEARCAT BC-950

EARLY MODELS (NO BNC CONNECTOR)

EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the microprocessor and clip pin 20.
4. Reassemble scanner.



Clip Pin 20



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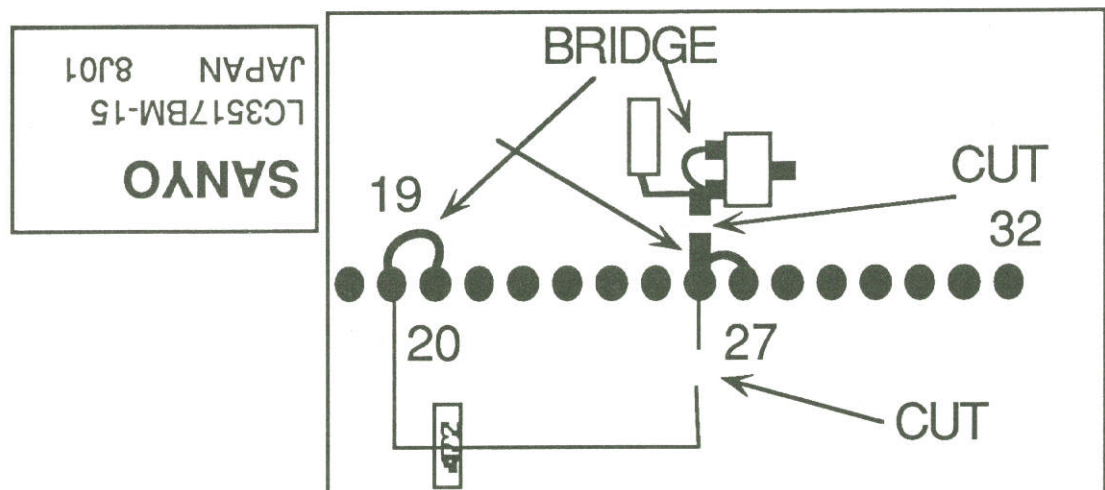
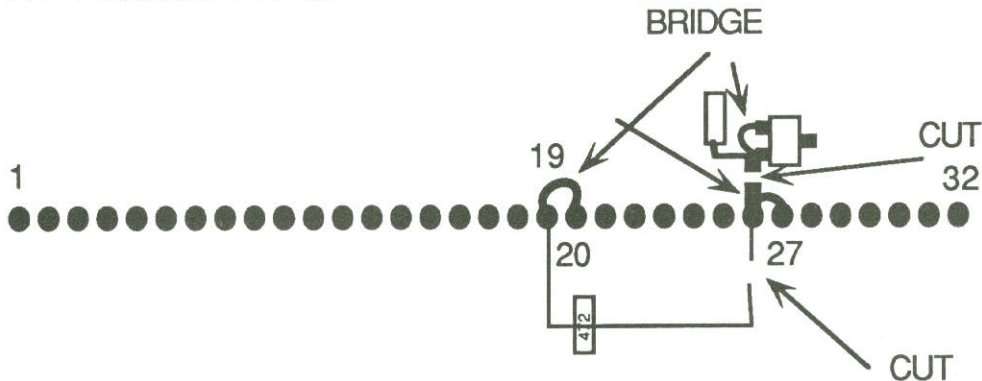
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BEARCAT BC-950XLT

LATER MODELS (WITH BNC CONNECTOR)

EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the SANYO IC. (Identification printed upside down with the front of the radio facing you.
4. Locate the long row of solder pins above the Sanyo IC.
5. Locate Pin 26 of the Microprocessor.
6. Cut the two traces leading to pin 26.
7. Solder bridge Pins 19 & 20 together
8. Solder bridge Pins 26 & 27 together.
9. Solder bridge the two leads of the chip transistor above pin 27.
10. Unsolder or cut the 47K Chip Resistor marked "472"
11. Reassemble the radio.



Caution

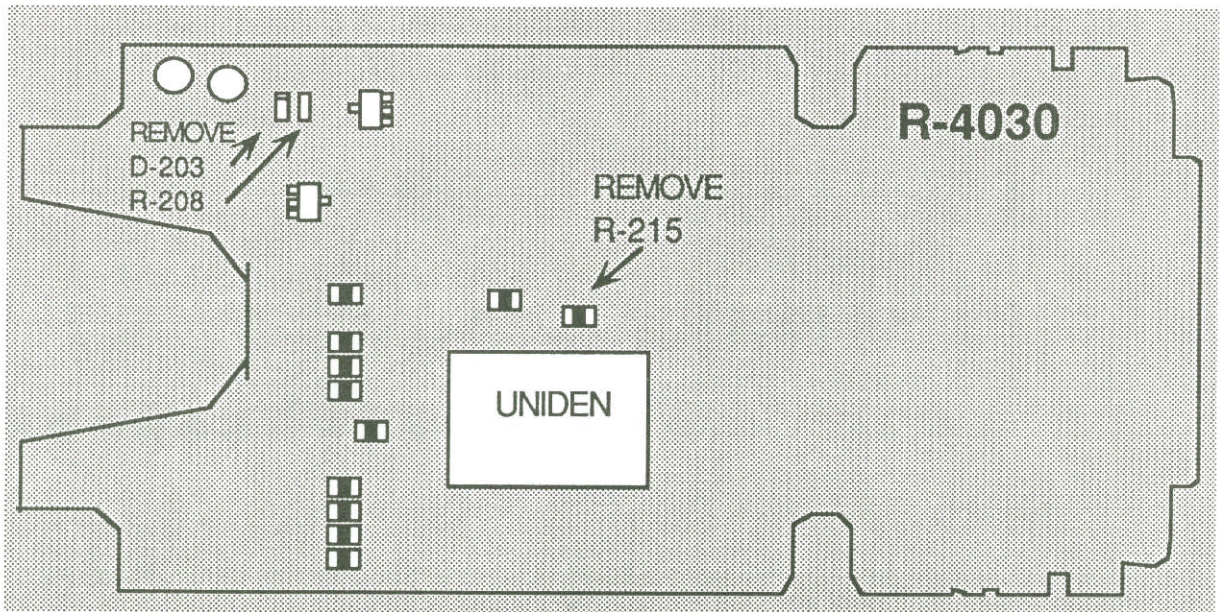
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REGENCY R-4030 EXPANDED RF (800MHz) Extended Battery Life

1. Remove Battery and Antenna.
2. Remove 2 screws from case and 2 from the battery retaining plate and open case.
3. Locate and remove two small screws at the base of the circuit board.
4. Gently pull the front panel from the circuits.
5. Locate and remove the 10 K resistor R-215 located above the microprocessor (Uniden UC-1147). Note the resistor is above the "den" letters on the microprocessor.
6. Locate and remove the Diode D-203 and Resistor R-208 located by the Speaker. (Battery Mod)
6. Replace the front panel. Keep the holes in the bottom of the case and board lined up and make sure the dual in-line connector is reconnected properly.
7. Reassemble scanner.

If the radio fails to power up, recharge the battery or, the dual in-line connector was not inserted correctly. If the display will not work, make sure that the rows of fine pin are aligned properly with the socket.



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REGENCY R-1600 EARLY MODELS (NO BNC CONNECTOR)

EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the microprocessor and clip pin 20.
4. Reassemble scanner.



Clip Pin 20



Caution

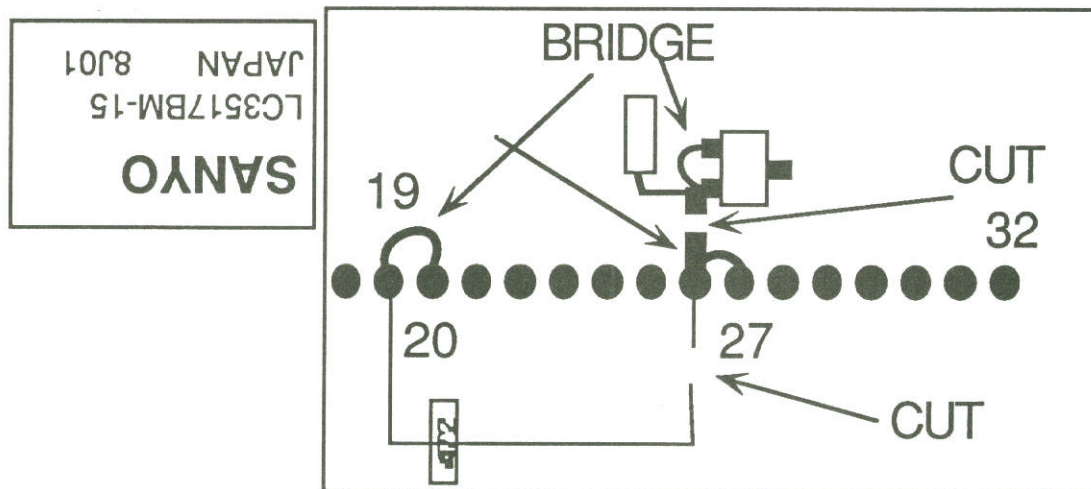
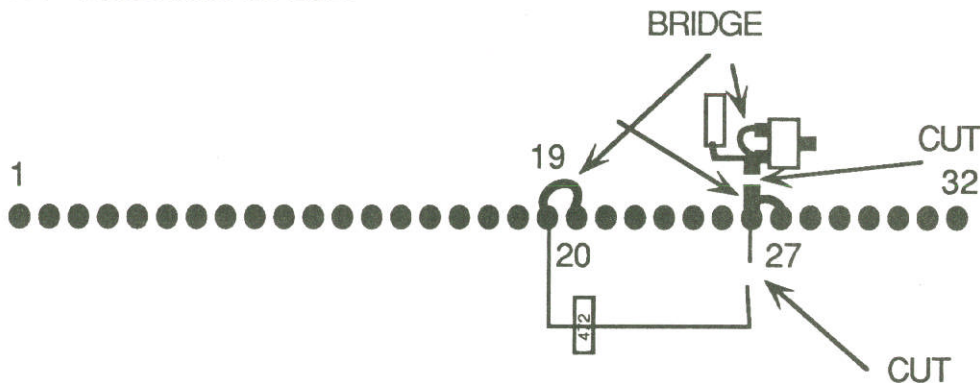
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REGENCY R-1600 LATER MODELS (WITH BNC CONNECTOR)

EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove 4 screws from the bottom case remove the bottom cover.
3. Locate the SANYO IC. (Identification printed upside down with the front of the radio facing you.
4. Locate the long row of solder pins above the Sanyo IC.
5. Locate Pin 26 of the Microprocessor.
6. Cut the two traces leading to pin 26.
7. Solder bridge Pins 19 & 20 together
8. Solder bridge Pins 26 & 27 together.
9. Solder bridge the two leads of the chip transistor above pin 27.
10. Unsolder or cut the 47K Chip Resistor marked "472"
11. Reassemble the radio.



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RADIO SHACK PRO-2004

EXPANDED RF (800MHz) 100 additional Memory Channels

1. Remove Power and Antenna.
2. Remove 4 screws from the case and slide the case off.
3. Locate circuit board PC-3
4. Remove metal cover on top side of PC-3
5. Cut Diode D-513 (800 MHZ Mod)
6. Add a 1N914 or 1N4148 Diode in position D-510. (for 400 memories)
Note: Radio Shack part # 276-1122.
Note: Diode locations D-510 and D-511 are not labeled
7. Replace metal cover
8. Reassemble radio.

DIODE FUNCTIONS:

- D-510 Add for 400 memories
- D-512 Remove for 12.5KHz Stepping. (leave in for 30 KHz)
- D-513 Remove for 800 Band Receive.
- D-514 Add to increase scanning speed to 20 Channels per second



Caution

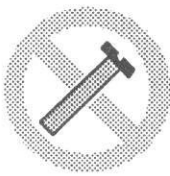
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RADIO SHACK PRO-2005

EXPANDED RF (800MHz)
SCAN SPEED INCREASE.

1. Remove Power and Antenna.
2. Remove screws from the case
3. Locate Diode D502. It is located behind the number 3 key on the keypad.
4. Cut the exposed lead of D502 and push the ends apart.
5. Install a Diode in the empty location D-501. (Speed Increase)
6. Reassemble the radio.



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RADIO SHACK PRO-2006

EXPANDED RF (800MHz) SCAN SPEED INCREASE.

1. Remove Power and Antenna.
2. Remove screws from the case
3. Locate Diode D502. It is located behind the number 3 key on the keypad.
4. Cut the exposed lead of Diode D502 and push the ends apart.
5. Cut Diode D-503. (15 Percent speed increase.)
5. Reassemble the radio.



Caution

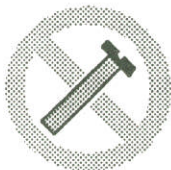
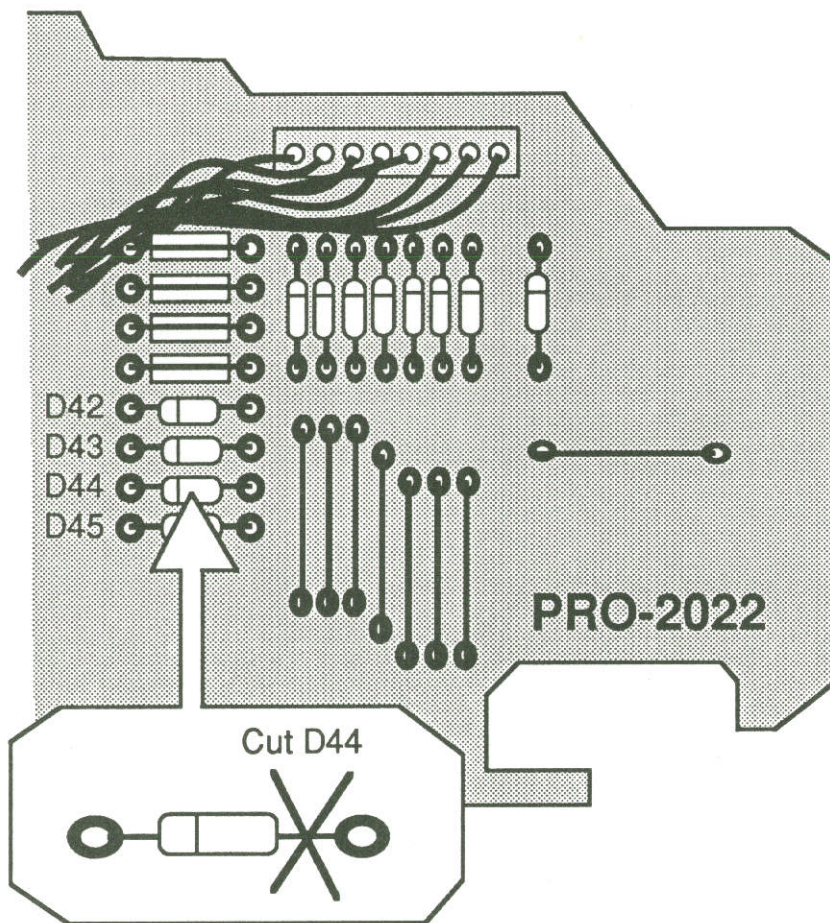
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RADIO SHACK PRO-2022

EXPANDED RF (800MHz)

1. Remove Power and Antenna.
2. Remove screws from the case
3. Locate and cut Diode D44.
4. Reassemble the radio.



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RADIO SHACK PRO-34

1. Remove Power and Antenna.
2. Remove screws from the case
3. Locate LOGIC circuit board.
4. Locate and cut Diode D11
5. Reassemble the radio.



Caution

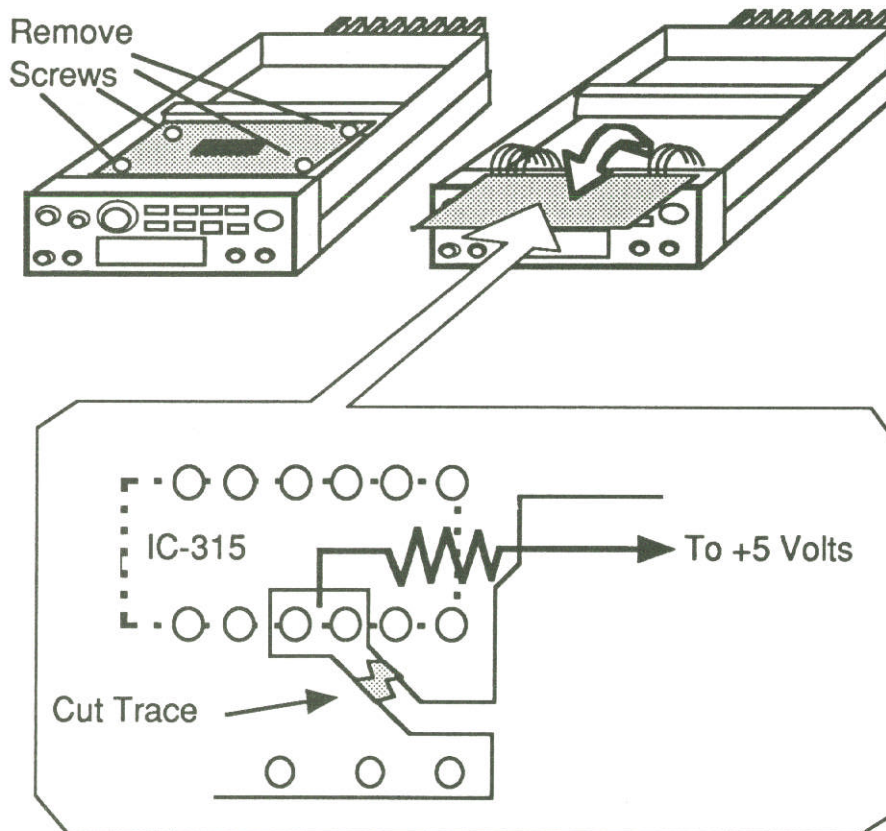
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UNIDEN HR-2510

EXPANDED RF

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate the Synthesizer board.
4. Pins 34 & 35 are grounded together on the underside of the synthesizer board. Cut the traces that connect these two pins to ground.
5. Solder one side of a 10K resistor to the connecting point of pins 34 & 35.
6. Connect the other leg of the 10 K resistor to + 5 volts. (where R181 & 187 are connected together).
7. Reassemble radio



COVERAGE : 26.0000 to 29.9999 MHz



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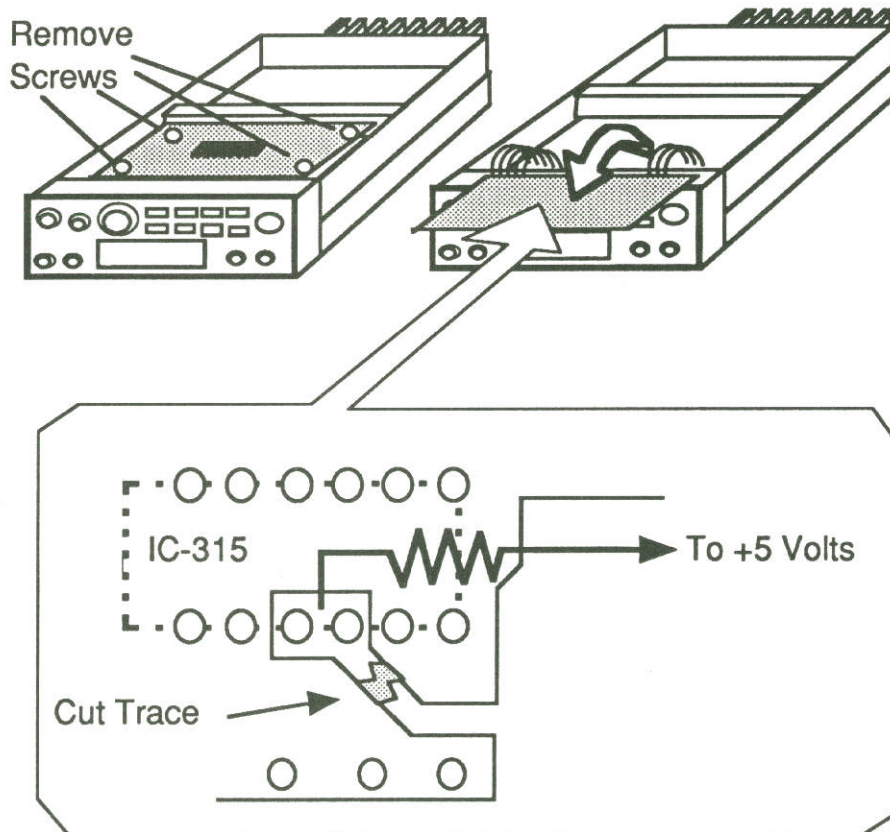
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UNIDEN HR-2600

EXPANDED RF

You will need to replace the microprocessor. Replacement part # is

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate the Synthesizer board.
4. Pins 34 & 35 are grounded together on the underside of the synthesizer board. Cut the traces that connect these two pins to ground.
5. Solder one side of a 10K resistor to the connecting point of pins 34 & 35.
6. Connect the other leg of the 10 K resistor to + 5 volts. (where R181 & 187 are connected together).
7. Reassemble radio



COVERAGE : 26.0000 to 29.9999 MHz



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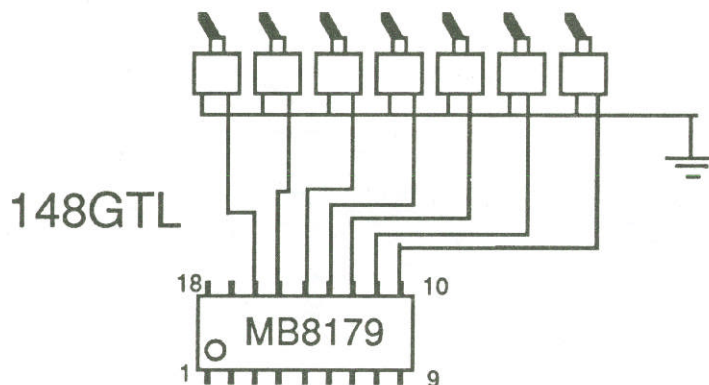
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COBRA 148GTL any other CB using MB8719 IC

EXPANDED RF

Note: This mod requires seven toggle switches to control Frequency. See frequency chart on the next page.

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate Synthesizer chip labeled MB8719
4. Cut wires connecting channel switch and pins 10-16.
5. Solder an on/off switch to each pin (pin 10-16)
6. reassemble radio.



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**TRUTH CHART
FOR MB8719 I.C.**

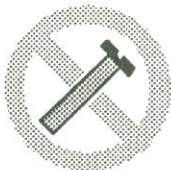
Frequency	10	11	12	13	14	15	16	Frequency	10	11	12	13	14	15	16
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26.825 =	1	0	0	0	0	0	1	27.465 =	0	0	0	0	0	0	1
26.835 =	1	0	0	0	0	1	0	27.475 =	0	0	0	0	0	1	0
26.845 =	1	0	0	0	0	1	1	27.485 =	0	0	0	0	0	1	1
26.855 =	1	0	0	0	1	0	0	27.495 =	0	0	0	0	1	0	0
26.865 =	1	0	0	0	1	0	1	27.505 =	0	0	0	0	1	0	1
26.875 =	1	0	0	0	1	1	0	27.515 =	0	0	0	0	1	1	0
26.885 =	1	0	0	0	1	1	1	27.525 =	0	0	0	0	1	1	1
26.895 =	1	0	0	1	0	0	0	27.535 =	0	0	0	1	0	0	0
26.905 =	1	0	0	1	0	0	1	27.545 =	0	0	0	1	0	0	1
26.915 =	1	0	0	1	0	1	0	27.555 =	0	0	0	1	0	1	0
26.925 =	1	0	0	1	0	1	1	27.565 =	0	0	0	1	0	1	1
26.935 =	1	0	0	1	1	0	0	27.575 =	0	0	0	1	1	0	0
26.945 =	1	0	0	1	1	0	1	27.585 =	0	0	0	1	1	0	1
26.955 =	1	0	0	1	1	1	0	27.595 =	0	0	0	1	1	1	0
26.965 =	1	0	0	1	1	1	1	27.605 =	0	0	0	1	1	1	1
26.975 =	1	0	1	0	0	0	0	27.615 =	0	0	1	0	0	0	0
26.985 =	1	0	1	0	0	0	1	27.625 =	0	0	1	0	0	0	1
26.995 =	1	0	1	0	0	1	0	27.635 =	0	0	1	0	0	1	0
27.005 =	1	0	1	0	0	1	1	27.645 =	0	0	1	0	0	1	1
27.015 =	1	0	1	0	1	0	0	27.655 =	0	0	1	0	1	0	0
27.025 =	1	0	1	0	1	0	1	27.665 =	0	0	1	0	1	0	1
27.035 =	1	0	1	0	1	1	0	27.675 =	0	0	1	0	1	1	0
27.045 =	1	0	1	0	1	1	1	27.685 =	0	0	1	0	1	1	1
27.055 =	1	0	1	1	0	0	0	27.695 =	0	0	1	1	0	0	0
27.065 =	1	0	1	1	0	0	1	27.705 =	0	0	1	1	0	0	1
27.075 =	1	0	1	1	0	1	0	27.715 =	0	0	1	1	0	1	0
27.085 =	1	0	1	1	0	1	1	27.725 =	0	0	1	1	0	1	1
27.095 =	1	0	1	1	1	0	0	27.735 =	0	0	1	1	1	0	0
27.105 =	1	0	1	1	1	0	1	27.745 =	0	0	1	1	1	0	1
27.115 =	1	0	1	1	1	1	0	27.755 =	0	0	1	1	1	1	0
27.125 =	1	0	1	1	1	1	1	27.765 =	0	0	1	1	1	1	1
27.135 =	1	1	0	0	0	0	0	27.775 =	0	1	0	0	0	0	0
27.145 =	1	1	0	0	0	0	1	27.785 =	0	1	0	0	0	0	1
27.155 =	1	1	0	0	0	1	0	27.795 =	0	1	0	0	0	1	0
27.165 =	1	1	0	0	0	1	1	27.805 =	0	1	0	0	0	1	1
27.175 =	1	1	0	0	1	0	0	27.815 =	0	1	0	0	1	0	0
27.185 =	1	1	0	0	1	0	1	27.825 =	0	1	0	0	1	0	1
27.195 =	1	1	0	0	1	1	0	27.835 =	0	1	0	0	1	1	0
27.205 =	1	1	0	0	1	1	1	27.845 =	0	1	0	0	1	1	1
27.215 =	1	1	0	1	0	0	0	27.855 =	0	1	0	1	0	0	0
27.225 =	1	1	0	1	0	0	1	27.865 =	0	1	0	1	0	0	1
27.235 =	1	1	0	1	0	1	0	27.875 =	0	1	0	1	0	1	0
27.245 =	1	1	0	1	0	1	1	27.885 =	0	1	0	1	0	1	1
27.255 =	1	1	0	1	1	0	0	27.895 =	0	1	0	1	1	0	0
27.265 =	1	1	0	1	1	0	1	27.905 =	0	1	0	1	1	0	1
27.275 =	1	1	0	1	1	1	0	27.915 =	0	1	0	1	1	1	0
27.285 =	1	1	0	1	1	1	1	27.925 =	0	1	0	1	1	1	1
27.295 =	1	1	1	0	0	0	0	27.935 =	0	1	1	0	0	0	0
27.305 =	1	1	1	0	0	0	1	27.945 =	0	1	1	0	0	0	1
27.315 =	1	1	1	0	0	1	0	27.955 =	0	1	1	0	0	1	0
27.325 =	1	1	1	0	0	1	1	27.965 =	0	1	1	0	0	1	1
27.335 =	1	1	1	0	1	0	0	27.975 =	0	1	1	0	1	0	0
27.345 =	1	1	1	0	1	0	1	27.985 =	0	1	1	0	1	0	1
27.355 =	1	1	1	0	1	1	0	27.995 =	0	1	1	0	1	1	0
27.365 =	1	1	1	0	1	1	1	28.005 =	0	1	1	0	1	1	1
27.375 =	1	1	1	1	0	0	0	28.015 =	0	1	1	1	0	0	0
27.385 =	1	1	1	1	0	0	1	28.025 =	0	1	1	1	0	0	1
27.395 =	1	1	1	1	0	1	0	28.035 =	0	1	1	1	0	1	0
27.405 =	1	1	1	1	0	1	1	28.045 =	0	1	1	1	0	1	1
27.415 =	1	1	1	1	1	0	0	28.055 =	0	1	1	1	1	0	0
27.425 =	1	1	1	1	1	0	1	28.065 =	0	1	1	1	1	0	1
27.435 =	1	1	1	1	1	1	0	28.075 =	0	1	1	1	1	1	0
27.445 =	1	1	1	1	1	1	1	28.085 =	0	1	1	1	1	1	1

COBRA CB's

REMOVE ALC CIRCUIT

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate the indicated part and remove it.
4. Reassemble radio.

MODEL	REMOVE THIS PART
138XLR	TR-23
21GTL	TR-14
25GTL	TR-14
21LTD	TR-14 OR D9
86XLR	CD-9
19PLUS	D-502
142 GTL	TR-32
32XLR	TR-18
21XLR	TR-20
148GTL	TR-24
31PLUS	D-19
29PLUS	R-79 OR D-20
33PLUS	D-17
REMOTE CONTROL	D-401



Caution

These modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. Performing any modification may be a Violation of FCC Rules and will void the warranty of the radio. Use of any modified radio may be a violation of FCC rules. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

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REALISTIC CB's

REMOVE ALC CIRCUIT

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate the indicated part and remove it.
4. Reassemble radio.

MODEL	REMOVE THIS PART
TRC-421	D-16
TRC-462	D-17
TRC-432	Q-12
TRC-473	D-17
TRC-417	Q-19



Caution

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OTHER CB's

REMOVE ALC CIRCUIT

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Locate the indicated part and remove it.
4. Reassemble the radio.

MODEL	REMOVE THIS PART
COLT 222	C-228
FUZZBUSTER 2-50	Q-8
GE 3-5814A	C-98
PACE CB145	CV-20
PEARCE SIMPSON SUPER LYNX	D-12
ROYCE 1-606	D-17
TEABERRY TITAN "T"	D-14
TENNA CB26	D-22
TRAM D-300	TR-23
UTAC TRX-400	D-11
WHISTLER 700	Q-205
WHISTLER 900	Q-305



Caution

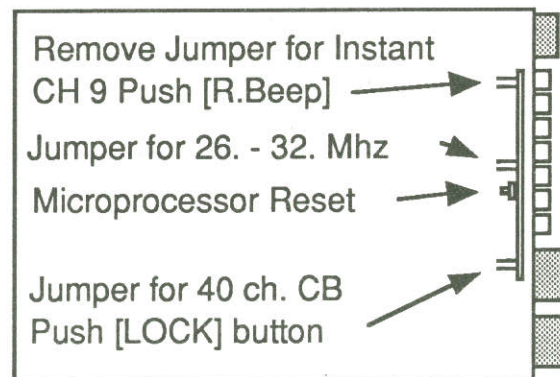
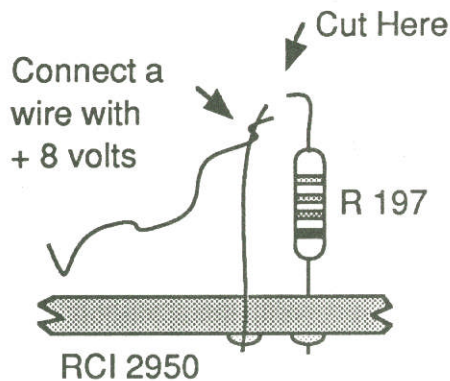
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RCI 2950

Clarifier Fine Tune (Tracks both TX & RX) Expanded Range CB "Style" operation Instant Channel 9

1. Remove Power and Antenna.
2. Remove screws and open the case.
3. Remove Diode D59.
4. Cut lead on Resistor R197.(see Drawing)
5. Apply +8 volts from regulator to Resistor R 197. (see Drawing)
6. Reassemble the radio.



Caution

These modifications have not been tested. The Author, Publisher and all other parties takes NO responsibility or liability for any damage or violation resulting from these modifications. Performing any modification may be a Violation of FCC Rules and will void the warranty of the radio. Use of any modified radio may be a violation of FCC rules. If you have any doubts, DO NOT PERFORM THIS MODIFICATION.

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Radio / Tech Modifications

APPENDIX

Page #	Description]
A	Coax loss chart, db attenuation chart	
B	Resistor, Capacitor color codes	
C	PL Encoder Hook up.	
D	PL tone chart, CMOS-TTL schematic	
E	PL Decoder hook up 1	
F	PL Decoder hook up 2	
G	Memory channel assignments	

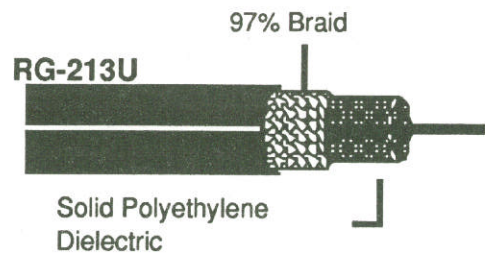
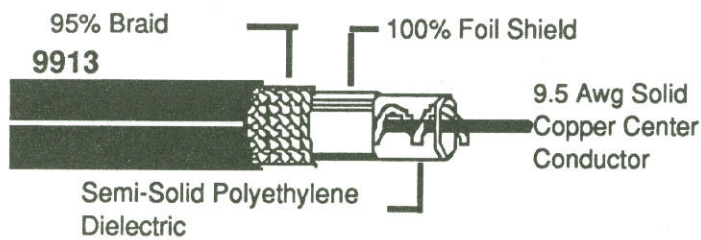
COAX TYPE	VEL %	dB ATTENUATION PER 100 FEET.				LENGTH IN FEET FOR 1 WAVELENGTH		
		100 MHz	200 MHz	400 MHz	1000 MHz	146 MHz	222 MHz	445 MHz
9913 (100% shield)	89	1.4	1.8	2.6	4.5	6.00	3.94	1.97
RG-8U FOAM (8214)	80	1.8	2.7	4.2	7.0	5.39	3.55	1.77
RG-213 (NON-CONTAM.)	66	2.2	3.2	4.7	8.5	4.45	2.93	1.46
RG-8X (MINI-FOAM)	78	3.7	5.4	8.0	13.5	5.26	3.46	1.72
9311 (100% SHIELD 58U)	78	4.5	6.3	9.0	14.5	5.26	3.46	1.72
RG-58U (SOLID CENTER)	66	4.5	6.7	10.0	17.0	4.45	2.93	1.46
RG-58A/U (STRANDED CTR)	66	4.9	7.5	11.5	21.5	4.45	2.93	1.46

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COAX LENGTHS SHOULD BE MULTIPLE HALF WAVELENGTHS.

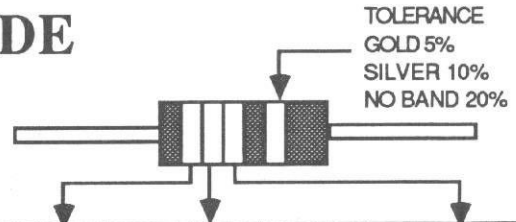
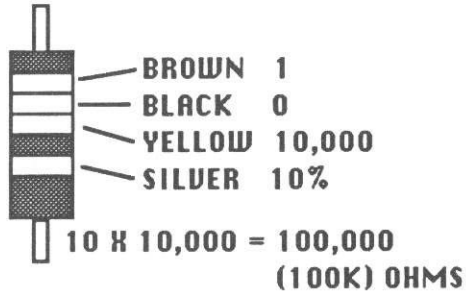
$$\frac{984}{\text{FREQ. IN MHZ}} \times \text{VEL \%} = \text{ONE WAVE LENGTH IN FEET.}$$

db - % loss chart							
db Power Loss	Power Loss	db Power Loss	Power Loss	db Power Loss	Power Loss	db Power Loss	Power Loss
		2.0	37 %	4.0	60 %	6.0	75 %
0.2	4 %	2.2	39 %	4.2	62 %	7.0	80 %
0.4	8 %	2.4	42 %	4.4	63 %	8.0	84 %
0.6	13 %	2.6	45 %	4.6	65 %	9.0	87 %
0.8	17 %	2.8	47 %	4.8	67 %	10.0	90 %
1.0	21 %	3.0	50 %	5.0	68 %	20.0	99 %
1.2	24 %	3.2	52 %	5.2	70 %	30.0	100 %
1.4	27 %	3.4	54 %	5.4	71 %	40.0	100 %
1.6	30 %	3.6	56 %	5.6	73 %		
1.8	33 %	3.8	58 %	5.8	74 %		



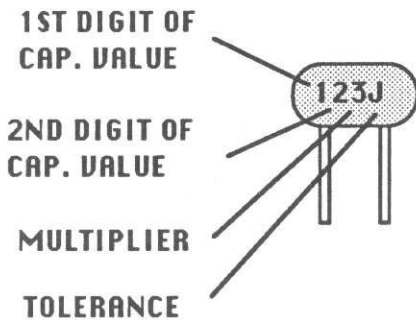
APPENDIX A

RESISTOR COLOR CODE

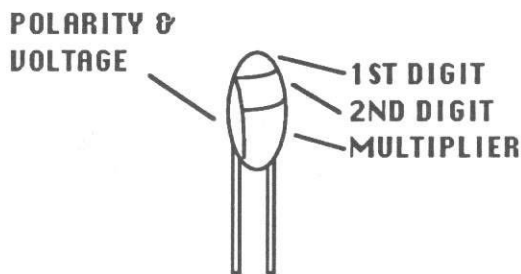


COLOR	1st DIGIT	2nd DIGIT	MULTIPLY BY
BLACK	0	0	1
BROWN	1	1	10
RED	2	2	100
ORANGE	3	3	1,000
YELLOW	4	4	10,000
GREEN	5	5	100,000
BLUE	6	6	1,000,000
VIOLET	7	7	10,000,000
GRAY	8	8	100,000,000
WHITE	9	9	1,000,000,000
GOLD			.1
SILVER			.01

CAPACITORS



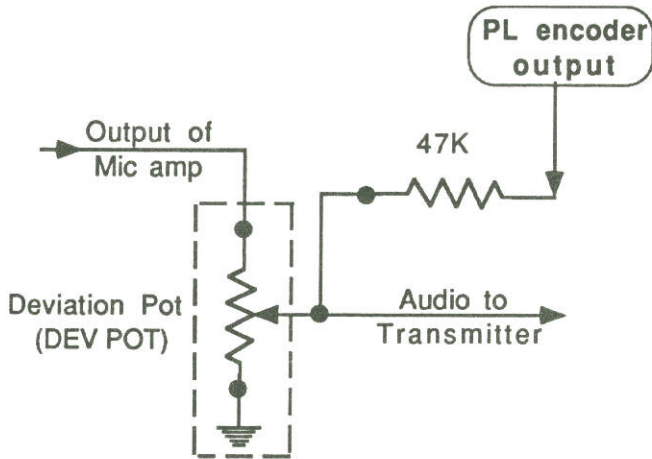
	MULTIPLIER MULTIPLY BY	TOLERANCE	
			10pF or over less 10pF
0	1	B	0.1pF
1	10	C	0.25pF
2	100	D	0.5pF
3	1,000	F	1.0pf 1%
4	10,000	G	2.0pf 2%
5	100,000	H	3%
		J	5%
8	.01	K	10%
9	0.1	M	20%



COLOR	DIGIT	MULTIPLIER	VOLTAGE
BLACK	0	NONE	4
BROWN	1	10	6
RED	2	100	10
ORANGE	3	1,000	15
YELLOW	4	10,000	20
GREEN	5	100,000	25
BLUE	6	1,000,000	35
VIOLET	7	10,000,000	50
GRAY	8		
WHITE	9		

PL ENCODER HOOK-UP

PL Encoder Connections

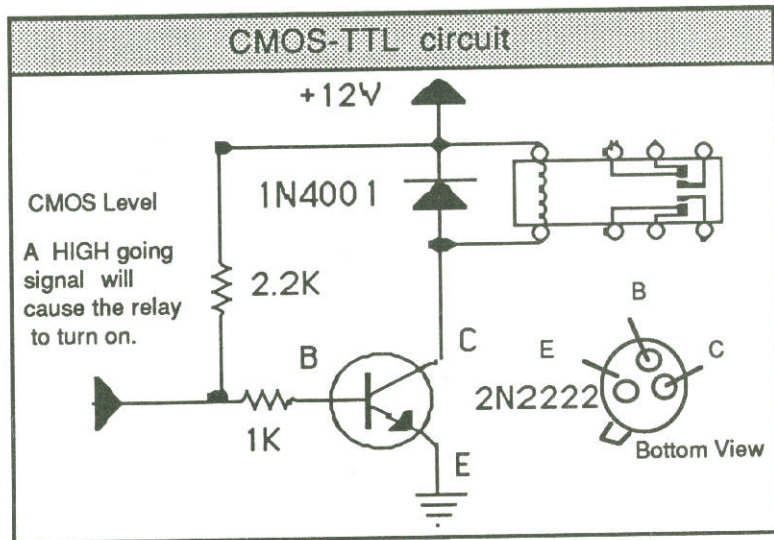


Attach a 47K ohm resistor to the output of the deviation pot. Attach the other end of resistor to the output of the PL encoder.

PL TONE CHART

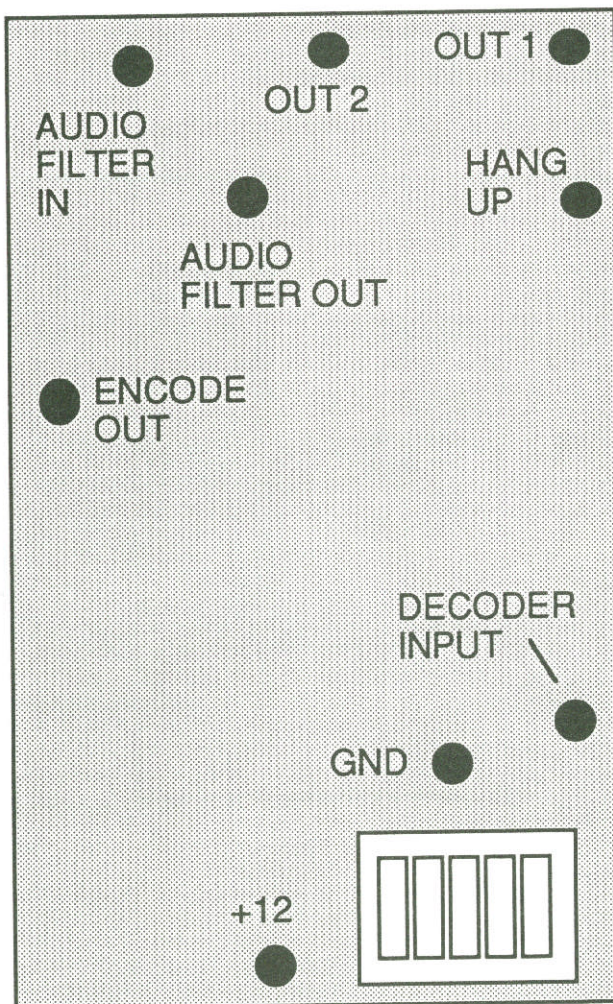
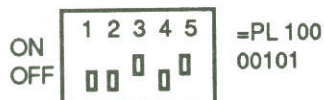
PL TONE	FREQ. CODE	ICOM	YAESU	TS-32 SWITCH				
				1	2	3	4	5
67.0	-XZ	1	1	1	1	1	1	1
71.9	-XA	2	2	0	1	1	1	1
74.4	-WA	3	36	1	0	1	1	1
77.0	-XB	4	3	0	0	1	1	1
79.7	-SP	5	38	1	1	0	1	1
82.5	-YZ	6	4	0	1	0	1	1
85.4	-YA	7	40	1	0	0	1	1
88.5	-YB	8	5	0	0	0	1	1
91.5	-ZZ	9	42	1	1	1	0	1
94.8	-ZA	10	6	0	1	1	0	1
97.4	-ZB	11		1	0	1	0	1
100.0	-1Z	12	7	0	0	1	0	1
103.5	-1A	13	8	1	1	0	0	1
107.2	-1B	14	9	0	1	0	0	1
110.9	-2Z	15	10	1	0	0	0	1
114.8	-2A	16	11	0	0	0	0	1
118.8	-2B	17	12	1	1	1	1	0
123.0	-3Z	18	13	0	1	1	1	0
127.3	-3A	19	14	1	0	1	1	0
131.8	-3B	20	15	0	0	1	1	0
136.5	-4Z	21	16	1	1	0	1	0
141.3	-4A	22	17	0	1	0	1	0
146.3	-4B	23	18	1	0	0	1	0
151.4	-5Z	24	19	0	0	0	1	0
156.7	-5A	25	20	1	1	1	0	0
162.2	-5B	26	21	0	1	1	0	0
167.9	-6Z	27	22	1	0	1	0	0
173.8	-6A	28	23	0	0	1	0	0
179.9	-6B	29	24	1	1	0	0	0
186.2	-7Z	30	25	0	1	0	0	0
192.8	-7A	31	26	1	0	0	0	0
203.5	-M1	32	27	0	0	0	0	0
210.7		33		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1 = on / 2 = off
example above
01001=107.2



Freq.	1	2	3	4	5	Code#
67.0	1	1	1	1	1	XZ 1
71.9	0	1	1	1	1	XA 2
74.4	1	0	1	1	1	WA 3
77.0	0	0	1	1	1	XB 4
79.7	1	1	0	1	1	SP 5
82.5	0	1	0	1	1	YZ 6
85.4	1	0	0	1	1	YA 7
88.5	0	0	0	1	1	YB 8
91.5	1	1	1	0	1	ZZ 9
94.8	0	1	1	0	1	ZA 10
97.4	1	0	1	0	1	ZB 11
100.0	0	0	1	0	1	1Z 12
103.5	1	1	0	0	1	1A 13
107.2	0	1	0	0	1	1B 14
110.9	1	0	0	0	1	2Z 15
114.8	0	0	0	0	1	2A 16
118.8	1	1	1	1	0	2B 17
123.0	0	1	1	1	0	3Z 18
127.3	1	0	1	1	0	3A 19
131.8	0	0	1	1	0	3B 20
136.5	1	1	0	1	0	4Z 21
141.3	0	1	0	1	0	4A 22
146.2	1	0	0	1	0	4B 23
151.4	0	0	0	1	0	5Z 24
156.7	1	1	1	0	0	5A 25
162.2	0	1	1	0	0	5B 26
167.9	1	0	1	0	0	6Z 27
173.8	0	0	1	0	0	6A 28
179.9	1	1	0	0	0	6B 29
186.2	0	1	0	0	0	7Z 30
192.8	1	0	0	0	0	7A 31
203.5	0	0	0	0	0	M1 32

1 (ON) CLOSED
0 (OFF) OPEN

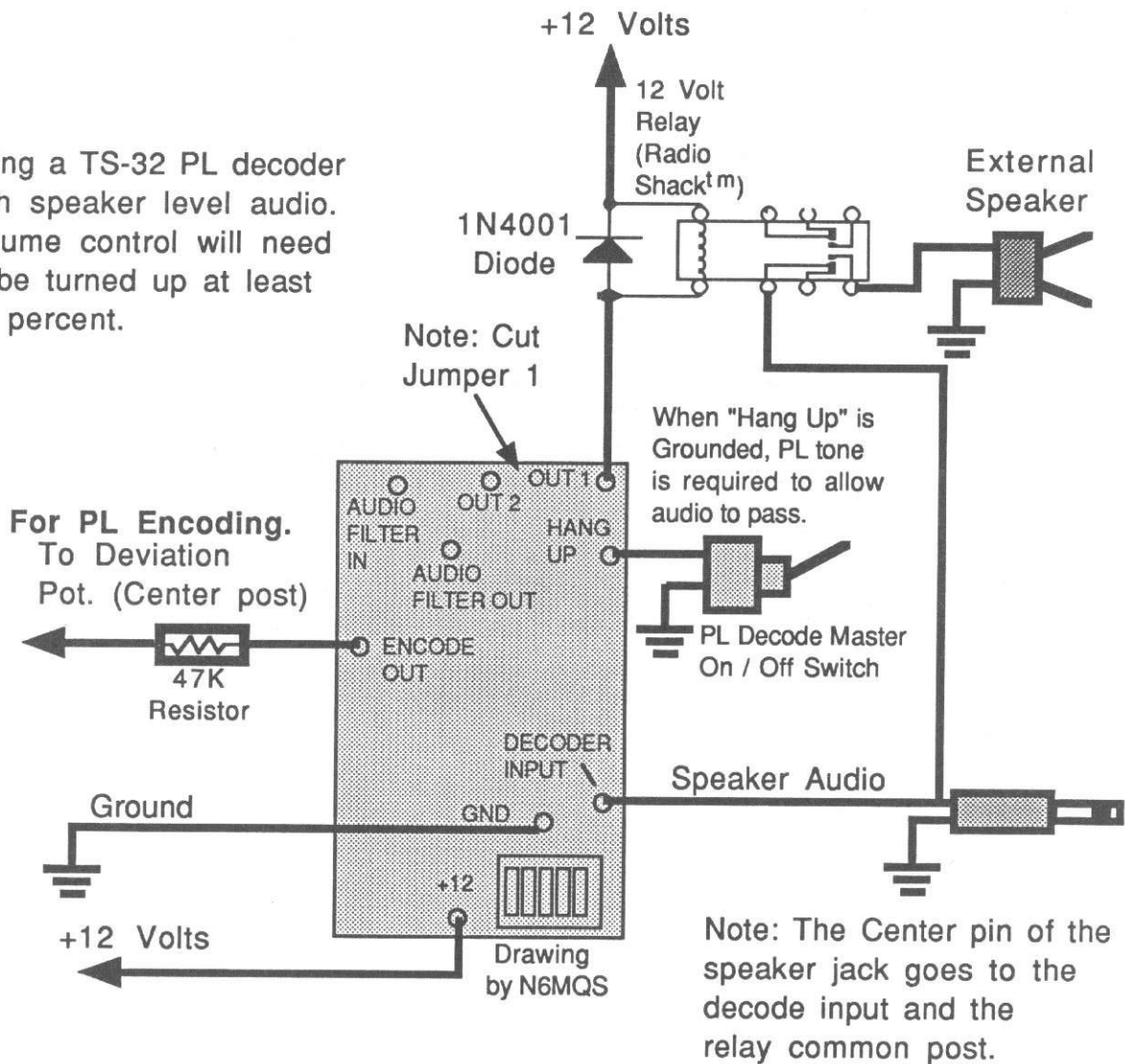


TS-32 LAYOUT

TS-32 HOOKUP

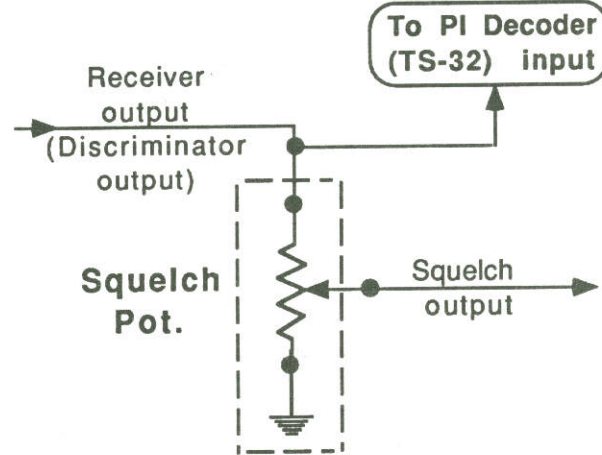
PL Decoder

Using a TS-32 PL decoder with speaker level audio. Volume control will need to be turned up at least 40 percent.



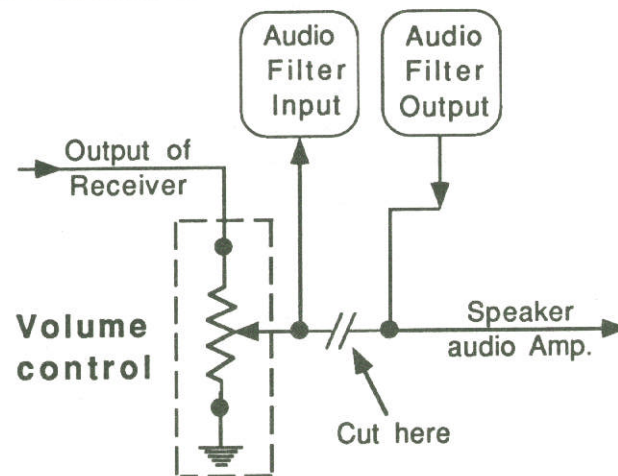
PL DECODER HOOK-UP

PL Decoder Connections



Attach a wire to the discriminator output. Attach the other end to the decoder input. The discriminator output is often connected to the squelch pot. See audio connections below for audio control.

PL Decoder/Audio Connections



Audio muting is controlled by the TS-32 Board. When a PL is present on the signal, audio will pass.

MEMORY CHANNEL ASSIGNMENTS

#	FREQ.	DESCRIPTION	#	FREQ.	DESCRIPTION
1			51		
2			52		
3			53		
4			54		
5			55		
6			56		
7			57		
8			58		
9			59		
10			60		
11			61		
12			62		
13			63		
14			64		
15			65		
16			66		
17			67		
18			68		
19			69		
20			70		
21			71		
22			72		
23			73		
24			74		
25			75		
26			76		
27			77		
28			78		
29			79		
30			80		
31			81		
32			82		
33			83		
34			84		
35			85		
36			86		
37			87		
38			88		
39			89		
40			90		
41			91		
42			92		
43			93		
44			94		
45			95		
46			96		
47			97		
48			98		
49			99		
50			100		

Performance Report

Radio _____

Date _____

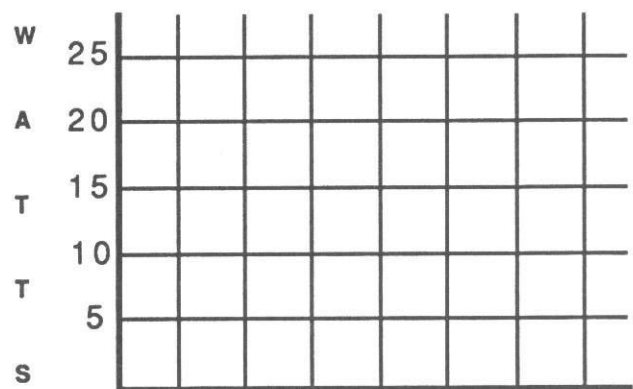
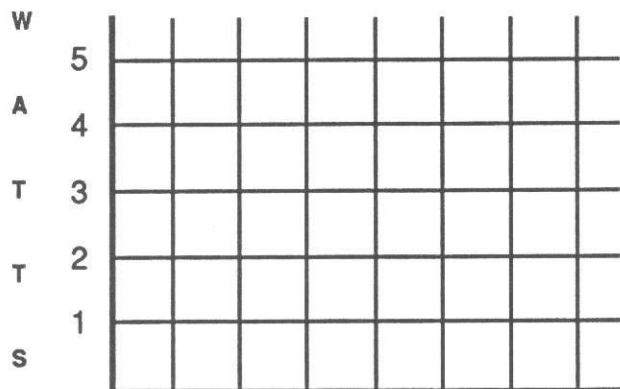
Owner : Name _____

Address _____

City _____ St. _____ Zip _____

Phone (_____) _____ - _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
Frequency Error (Offset)	_____Hz	_____Hz
Receive Sensitivity (Mid-band)	_____uv	_____uv
PL Deviation	_____Hz	_____Hz
DTMF Deviation	_____KHz	_____KHz
Audio Deviation	_____KHz	_____KHz
Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



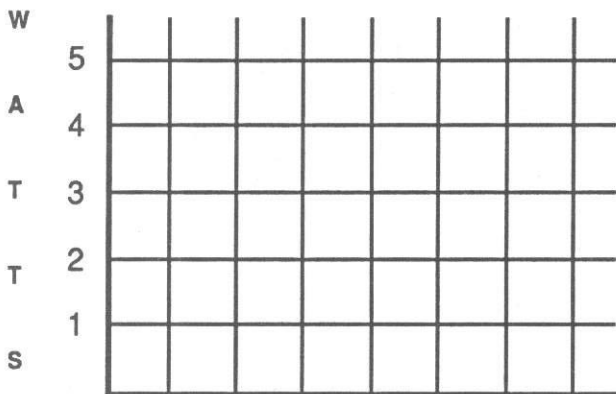
Performance Report

Radio _____

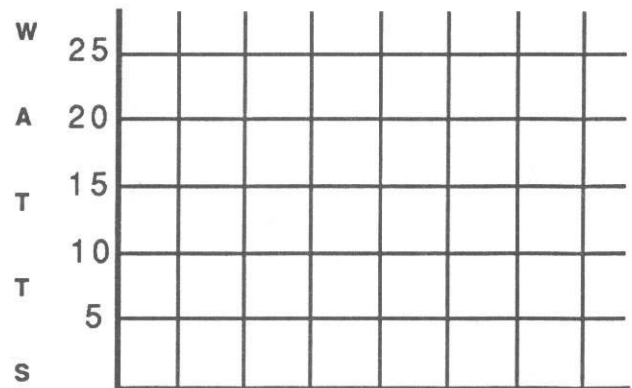
Date _____

Owner : Name _____
 Address _____
 City _____ St. _____ Zip _____
 Phone (_____) _____ - _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
Frequency Error (Offset)	_____Hz	_____Hz
Receive Sensitivity (Mid-band)	_____uv	_____uv
PL Deviation	_____Hz	_____Hz
DTMF Deviation	_____KHz	_____KHz
Audio Deviation	_____KHz	_____KHz
Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



F R E Q U E N C Y



F R E Q U E N C Y

Performance Report

Radio _____

Date _____

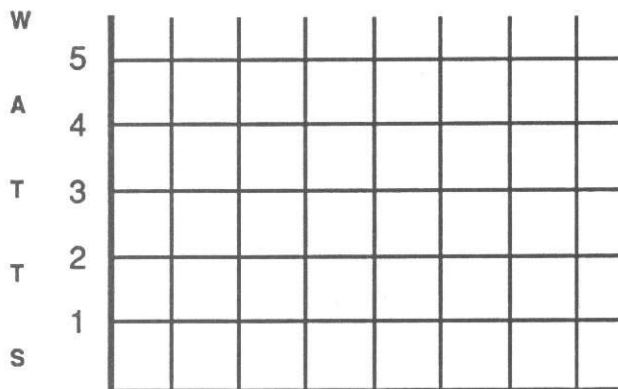
Owner : Name _____

Address _____

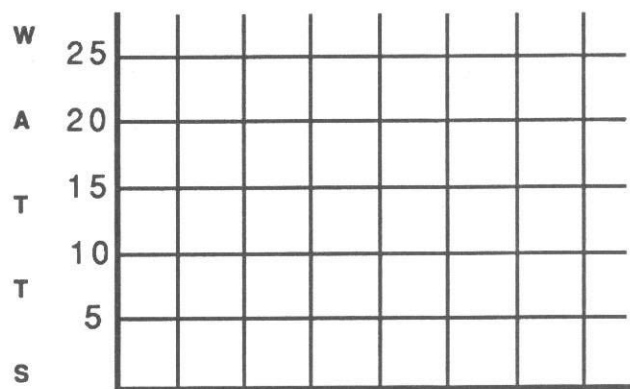
City _____ St. _____ Zip _____

Phone (_____) _____ - _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
Frequency Error (Offset)	_____Hz	_____Hz
Receive Sensitivity (Mid-band)	_____uv	_____uv
PL Deviation	_____Hz	_____Hz
DTMF Deviation	_____KHz	_____KHz
Audio Deviation	_____KHz	_____KHz
Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



F R E Q U E N C Y



F R E Q U E N C Y

Performance Report

Radio _____

Date _____

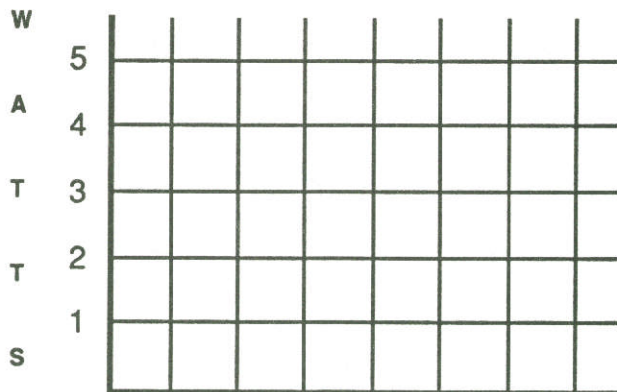
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Address _____

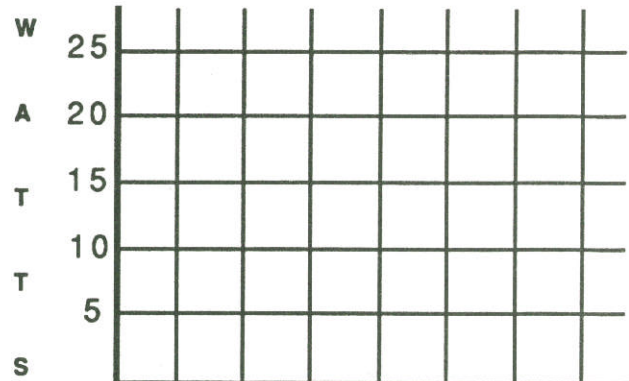
City _____ St. _____ Zip _____

Phone (_____) _____ - _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
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Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



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F R E Q U E N C Y

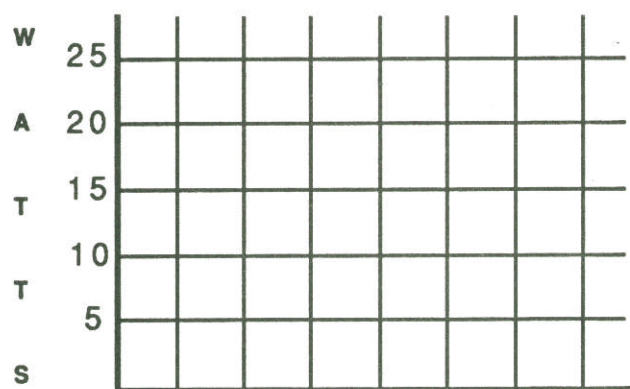
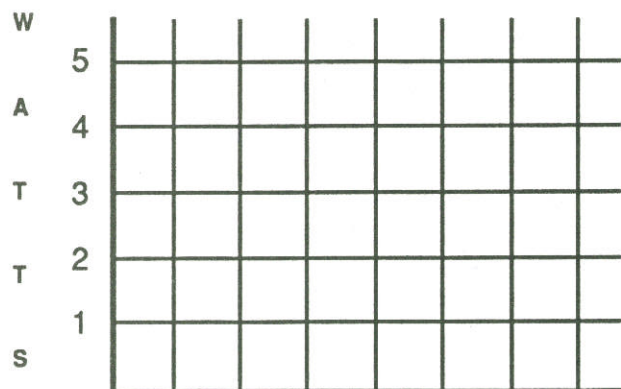
Performance Report

Radio _____

Date _____

Owner : Name _____
 Address _____
 City _____ St. _____ Zip _____
 Phone (_____) _____ - _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
Power out (High)	_____Watts	_____Watts
Frequency Error (Simplex)	_____Hz	_____Hz
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Audio Deviation	_____KHz	_____KHz
Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
Highest usable Freq @ .5 Pwr	_____MHz	_____MHz



Performance Report

Radio _____

Date _____

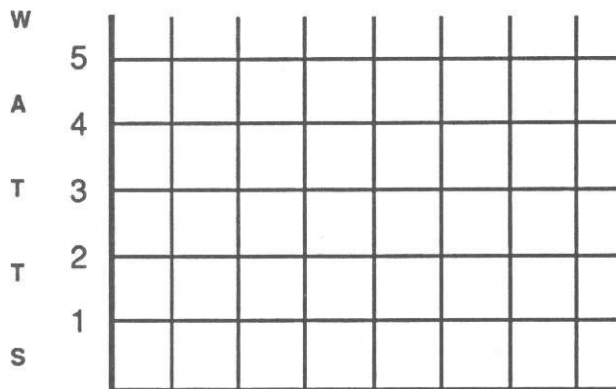
Owner : Name _____

Address _____

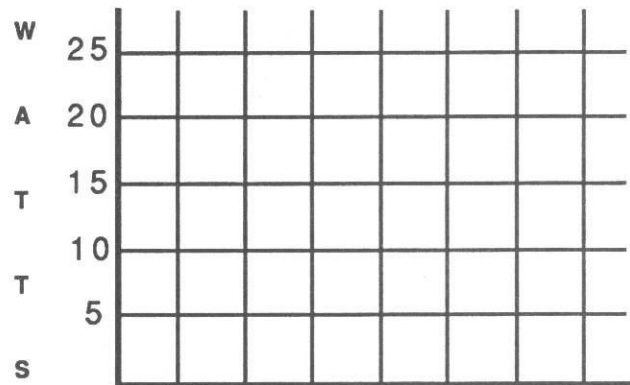
City _____ St. _____ Zip _____

Phone (_____) _____ - _____

Description	Before	After
Power out (Low)	_____Watts	_____Watts
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Lowest usable Freq @ .5 Pwr	_____MHz	_____MHz
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All QSL cards are printed on five colors of card stock. This gives you 20 cards in each color. Delivery will be about 2-3 weeks. SELECT desired QSL style. Mail the form and Payment to the address below. 73s	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"><input type="checkbox"/> First 100</td> <td style="width: 20%; text-align: right;">\$ 8.95</td> <td style="width: 20%; text-align: right;">_____</td> </tr> <tr> <td><input type="checkbox"/> Additional 100's</td> <td style="text-align: right;">\$ 5.95</td> <td style="text-align: right;">_____</td> </tr> <tr> <td><input type="checkbox"/> 100 Business card size</td> <td style="text-align: right;">\$ 7.95</td> <td style="text-align: right;">_____</td> </tr> <tr> <td><input type="checkbox"/> Package of QSL Holders</td> <td style="text-align: right;">\$ 4.99</td> <td style="text-align: right;">_____</td> </tr> <tr> <td colspan="2" style="text-align: right;">Mail this form and payment to:</td> <td style="text-align: right;">Total _____</td> </tr> <tr> <td colspan="2" style="text-align: right;">Kamko (818) 845-9203</td> <td style="text-align: right;">TAX _____</td> </tr> <tr> <td colspan="2" style="text-align: right;">P.O. Box 1848</td> <td style="text-align: right;">Shipping <u>\$ 3.00</u></td> </tr> <tr> <td colspan="2" style="text-align: right;">Burbank, CA 91507</td> <td style="text-align: right;">Total Due _____</td> </tr> </table>	<input type="checkbox"/> First 100	\$ 8.95	_____	<input type="checkbox"/> Additional 100's	\$ 5.95	_____	<input type="checkbox"/> 100 Business card size	\$ 7.95	_____	<input type="checkbox"/> Package of QSL Holders	\$ 4.99	_____	Mail this form and payment to:		Total _____	Kamko (818) 845-9203		TAX _____	P.O. Box 1848		Shipping <u>\$ 3.00</u>	Burbank, CA 91507		Total Due _____
<input type="checkbox"/> First 100	\$ 8.95	_____																							
<input type="checkbox"/> Additional 100's	\$ 5.95	_____																							
<input type="checkbox"/> 100 Business card size	\$ 7.95	_____																							
<input type="checkbox"/> Package of QSL Holders	\$ 4.99	_____																							
Mail this form and payment to:		Total _____																							
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DOUG WYNN
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QSO with	mm/dd/yy	GMT	MHz	MODE	RST
				<input type="checkbox"/> CW <input type="checkbox"/> SSB	

Globe & Shuttle




WA6POD

STEVE BLUMENFELD
P.O. BOX 1848
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QSO with	mm/dd/yy	GMT	MHz	MODE	RST
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World Map dots

PLZ QSL




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DOUG WYNN
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CALIFORNIA


N6MQS

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QSO with	DATE	TIME	FREQ	MODE	RST

License Plate

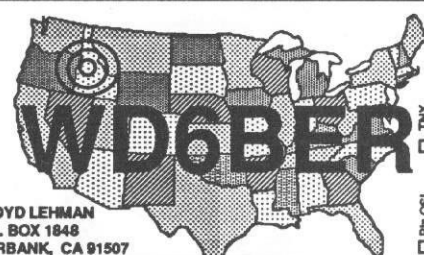


KB6SMS

ARNOLD BRATTON
P.O. BOX 1848
BURBANK, CA 91507

QSO with	DATE	TIME	FREQ	MODE	RST

U.S. Map Ham Zones




WD6BER

FLOYD LEHMAN
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BURBANK, CA 91507

QSO with	DATE	UTC	MHz	MODE	RST

U.S. Map Patchwork



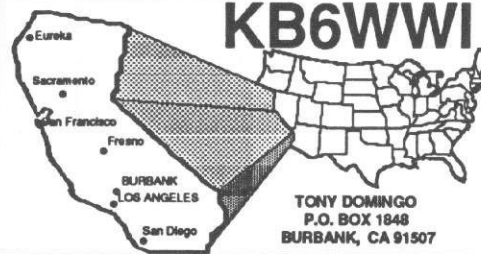
WR6S

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APOLLO 11 "EAGLE ON THE MOON"

QSO with	DATE	TIME	FREQ	MODE	RST

Eagle on the moon

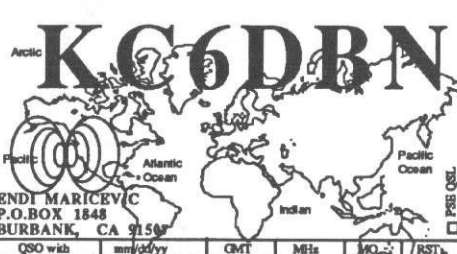


KB6WWI

TONY DOMINGO
P.O. BOX 1848
BURBANK, CA 91507

QSO with	DATE	GMT	MHz	MODE	RST

California/U.S.



KC6DBN

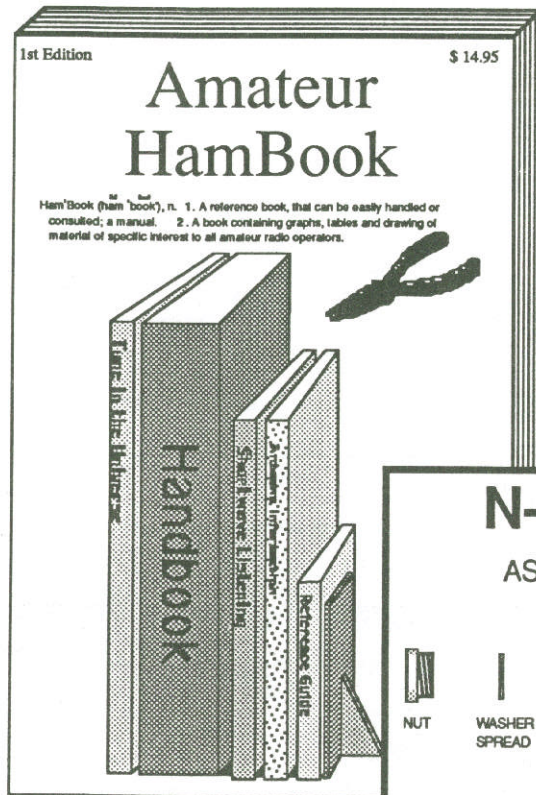
ENDI MARICEVIC
P.O. BOX 1848
BURBANK, CA 91507

QSO with	mm/dd/yy	GMT	MHz	MODE	RST
				<input type="checkbox"/> CW <input type="checkbox"/> SSB	

World Map

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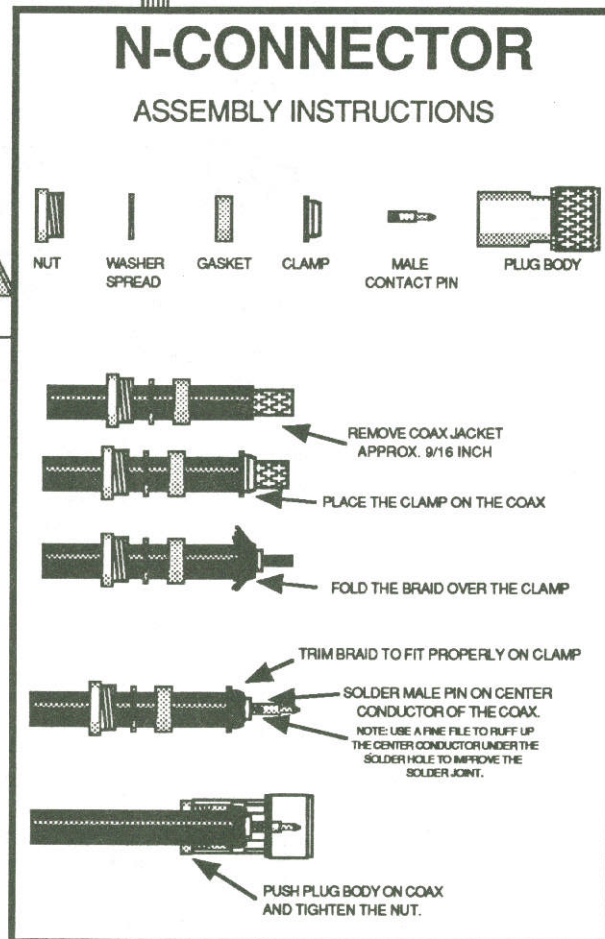


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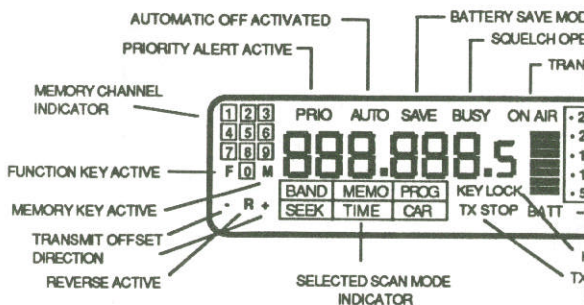
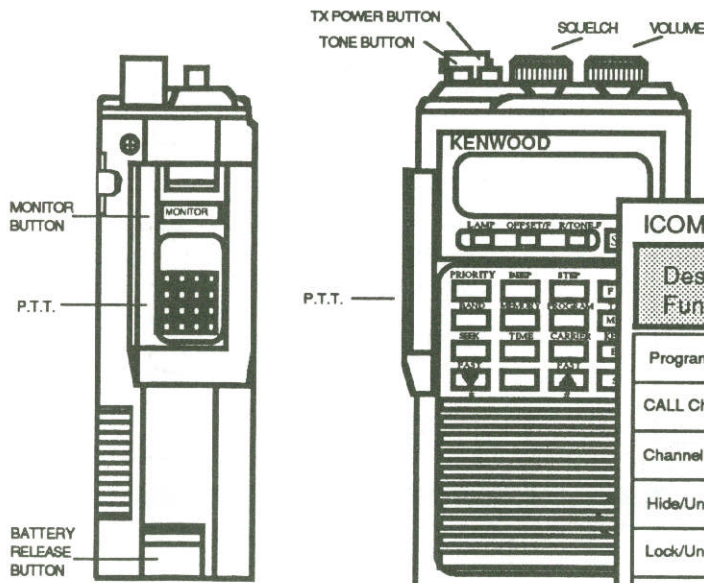
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ICOM IC-XSAT

Desired Function	Dial/Memory	Keystrokes
Programming CALL CH	D/M	CALL LOCK (D) + (F) Push & Hold + (R) MR/MW Hold for 3 beeps
CALL Channel Recall	D/M	CALL LOCK (D)
Channel Step Selection	D	(F) Push & Hold + (D) DIAL SET
Hide/Unhide a Memory	M	(F) Push & Hold + (B) MASK
Lock/Unlock Keyboard	D/M	(F) Push & Hold + (D) CALL LOCK
Memory Recall	D	MR/MW (B)
Memory Storage	D	(F) Push & Hold + (R) MR/MW
Skip/Unskip a Memory	M	(F) Push & Hold + (3) SKIP
Priority Mon (VFO)	D	(F) Push & Hold + (7) PRIO

Program a DTMF Memory	(F) Push & Hold + (W/DTMF) + (C) + (F) Push & Hold + (1) DTMF Memory No. 1 + (1) Enter DTMF Digits + (W/DTMF) + (W/DTMF)
Transmit a DTMF Memory	(F) Push & Hold + (W/DTMF) + (F) Push & Hold + (C) DTMF Memory No. 1 + (W/DTMF)
Set the Clock	(F) Push & Hold + (CLOCK) + (CLOCK) + (F) Push & Hold + (SET) + (H) Set Hours + (M) Set Minutes + (M) Set Minutes + (M) Set Minutes

CLOCK MODE - Clock time, Power on timer (TM), Auto power off (AP)

POWER SAVER FUNCTION	DEACTIVATED	PRIO LIGHT	TURN POWER ON VOL ON
		(7) (L) PRESS AND HOLD	(+) (O) TURN POWER ON VOL ON
	125 msec. ON / 500 msec. OFF	(A) (L) PRESS AND HOLD	(+) (O) TURN POWER ON VOL ON
	125 msec. ON / 2 sec. OFF	(B) (L) PRESS AND HOLD	(+) (O) TURN POWER ON VOL ON

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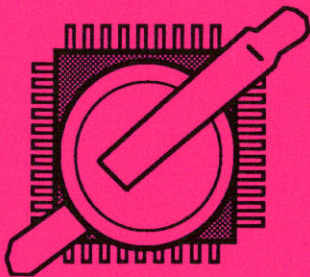
BILLING INFORMATION

<input type="checkbox"/> CHECK ENCLOSED	
<input type="checkbox"/> VISA/MC/DISCOVER/AMERICAN EXPRESS	
CARD #	
	EXP DATE
SIGNATURE	

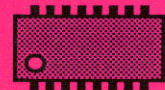
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	TM-441*	IC-229*	FT-712RH*	148GTL
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	TM-701A*	IC-449*	FT-736R	Cobra
	TM-721*	IC-575*	FT-747	Realistic
	TM-731*	IC-720	FT-757	Others
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	TS-790A	IC-3220*		
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