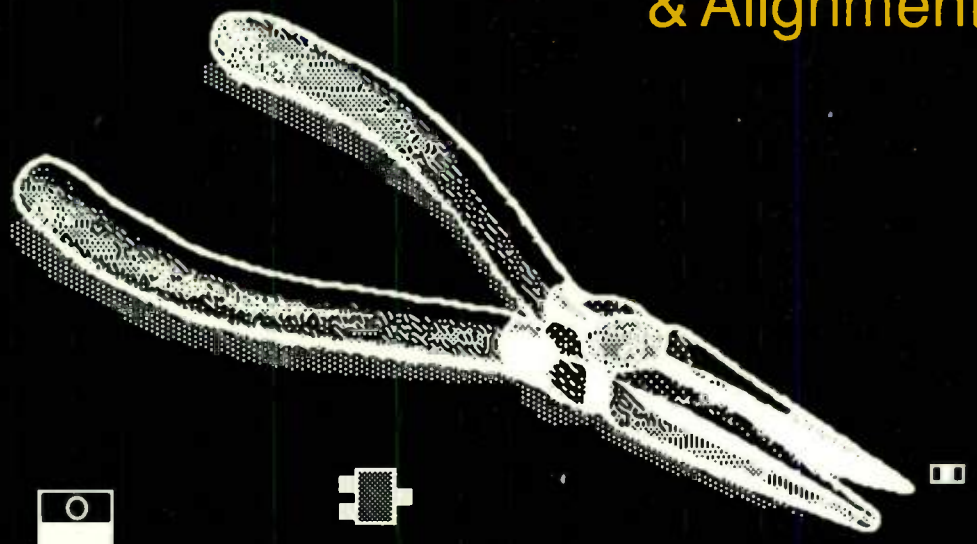
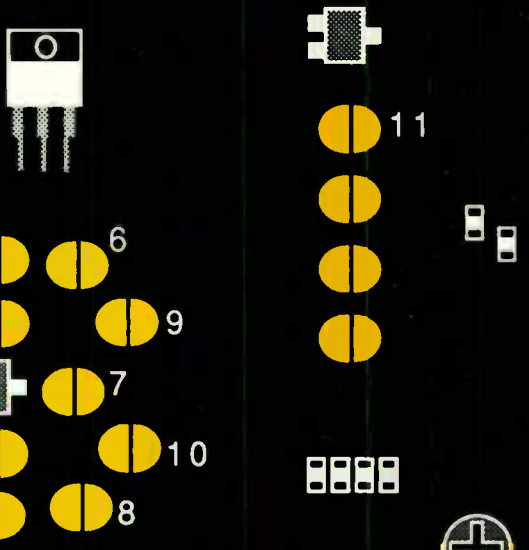
Number 5B

$19.95

Radio / Tech Modifications

& Alignment Controls





Modifications for:

Alinco
Standard
Yaesu
Others
CB radios

Modifications for:

Alinco

ALD-24T ∞•
ALR-22T ∞• +
DJ-100T ∞•
DJ-120T ∞•
DJ-160T ∞•
DJ-162T ∞•
DJ-460T ∞•
DJ-500 ∞•
DJ-560 ∞•
DJ-580T ∞• +
DJ-F1T ∞• +
DR-110T ∞•
DR-112T ∞•
DR-119T ∞•
DR-510 ∞• +
DR-570T ∞• +
DR-590T ∞• +
DR-599T ∞• +
DR-1200T •
Hand-Held Packet
Mobile Packet

CB radios

Cobra
Realistic
Alaron
Audiovox
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Clarion
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Courier
Craig
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JC Penny
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Siltronics
Sharp
Superstar
Teaberry
Tenna Phase
Tram
Truetone
Uniden
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Vector
Wards
Whistler
Xtal
Zexon

Standard

C168A ∞ +
C228A ∞•
C468A ∞ +
C528A ∞
C558A ∞
C5608DA ∞

Heath

HW-2-M ∞
HW-H4-M ∞
HW-24-HT ∞ +
SB-1400 ∞

Other

AZDEN PCS-6000 ∞
PCS-7000 ∞

K D K FM-240 ∞
FM-2033 ∞

TEN TEC PARAGON ∞

RANGER AR-3300 ∞ +
AR-3500 ∞ +

UNIDEN HR-2500 ∞
HR-2510 ∞•
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RADIO SHACK HTX-100 ∞
HTX-202 ∞ +

RCI-2950 ∞

Yaesu

FL-7000 ∞ +
FT-23R ∞•
FT-26 ∞•
FT-33R ∞•
FT-73R ∞•
FT-76 ∞•
FT-209 •
FT-211 ∞•
FT-212 ∞•
FT-227R ∞•
FT-290 ∞•
FT-311 ∞•
FT-411 ∞•
FT-415 ∞•
FT-470 ∞• +
FT-650 ∞
FT-709 •
FT-711 ∞•
FT-712 RH ∞•
FT-727 ∞•
FT-736R ∞
FT-747 ∞
FT-757 ∞
FT-767GX ∞
FT-811 ∞•
FT-815 ∞•
FT-890 ∞
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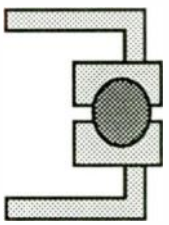
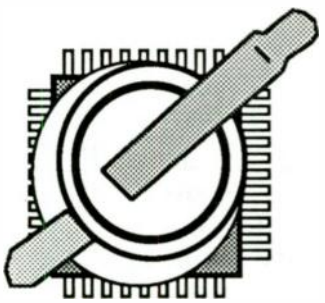
Radio / Tech Modifications

& Alignment Controls

Volume 5B





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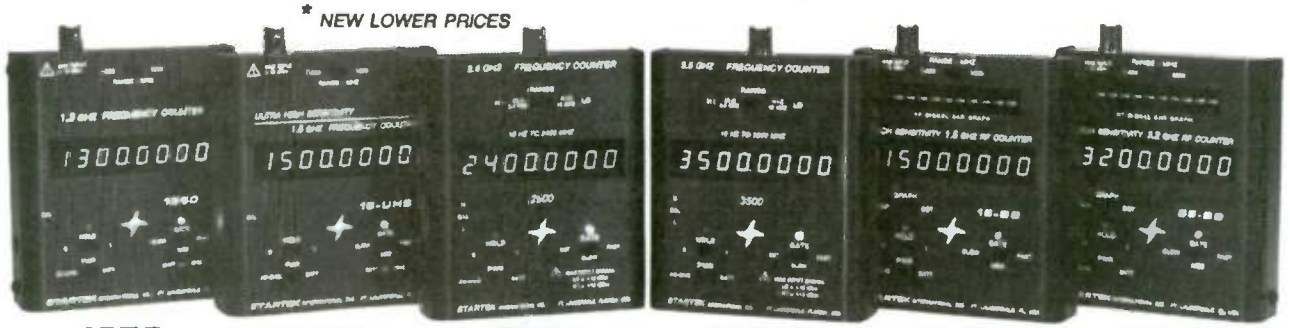

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Preface

THERE ARE 2 BOOKS IN THIS VOLUME. AN ORDER FORM FOR THE OTHER HALF IS AVAILABLE IN THE BACK OF THIS BOOK.

We call them Volume 5A and 5B. Volume 5A contains all modifications for ICOM and Kenwood Radios and mods for the popular scanners. Volume 5B has all the modifications for Yeasu, Alinco, Standard, Azden, KDK, Ten Tec, Ranger, Uniden, Radio Shack and popular CB radios.

During the past 3 years we have created 5 volumes of Radio/Tech modifications. Each new volume included the information contained in the previous volumes. So if you have the current volume, you do not need to purchase the previous ones.

The illustrations have been improved and the modifications have been performed by many people through out the world. The modifications contained in this book are accurate and current.

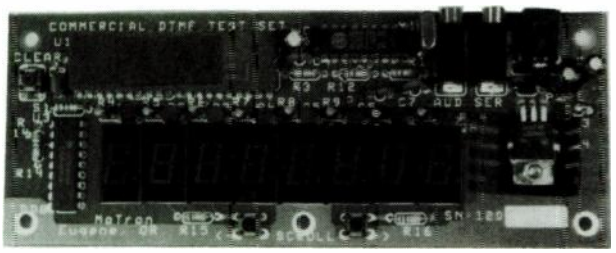
We make every effort to provide all available modifications for every radio we can find. We also try to keep the cost of the modification books as low as possible. We ask that you do not photocopy pages from these books. We will support you however we can, however, if you call us we will ask that you have the book in your hands at the time of the call.

It was only logical that we start to include the alignment points for each of the radios. Since you are inside them performing the modification, it is a good time to adjust the Modulation and Power levels. If you are not familiar with testing the levels, a section on service tools is provided to give you three methods of testing your radios.

If you find a new radio is not listed in these pages, contact us and ask about it. We may have a copy that did not make the printing deadline. If you purchased the book and have proof of purchase, we can make the new modification available to you.

Your comments and suggestions are always welcome. If the mod works great, let us know. If you can't make the mod work, let us know. We can't test every modification, we don't have all the radios. Your help will make the next volumes better for everyone.

HEAR THE TONES. . . SEE THE NUMBERS!



*EIGHT DIGIT DISPLAY
*32 CHARACTER MEMORY
*ASCII SERIAL OUTPUT

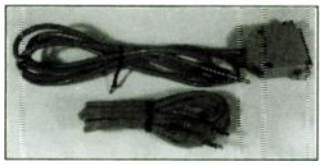
MoTron TDD-8 TOUCH-TONE DECODER DISPLAY AND ASCII CONVERSION BOARD

The MoTron **TDD-8** is a wired and tested commercial touchtone test decoder board. The **TDD-8** decodes and displays all 16 touch-tone signals. The eight digit display, 32 character memory and left-right scroll function allows the user to capture and display up to 40 characters without loss of information. An ASCII serial output can be connected to a computer for automatic logging or remote data entry. The MoTron "Tonelog" IBM compatible software package is included with each TDD-8 at no additional charge. The computer interface cable can be purchased separately if needed.

Connect to almost any audio source - The MoTron **TDD-8** can be connected to a scanner, communications receiver, tape recorder, telephone answering machine etc.

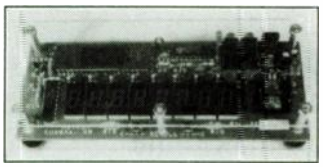
IBM compatable software included - The **TDD-8** is a stand-alone device and does not need to be connected to a computer for decoding and displaying touch-tone digits. However, a serial ASCII output is provided on the board that can be connected to the RS-232 serial port of almost any computer. This allows you to use the **TDD-8** for numerous applications. The "Tonelog" IBM compatible sofware, that is included, will automatically log the date and time a number is decoded.

TDD-8 Touch-tone decoder with eight digit display, 32 character memory and ASCII serial output (wired/tested circuit board) **$99.00**



CAB-1 - Includes audio and computer cables. Audio patch-cord can be connected to most scanner and receiver speaker or earphone jacks. Mini phono plugs (3.5mm) on each end. Computer cable has mini phono (3.5mm) plug for connection to the TDD-8 and female DB-25 on the other end for computer connection **$20.00**

PS-12 - 110VAC adapter **$10.00**



PMK-1 - Plastic Mounting Kit. This is not a complete enclosure, but offers a simple means of protecting the board, making it easier to handle and use. Kit includes hard plastic sheets to cover the bottom and top of the board. Also included are rubber feet, spacers, nuts and bolts **$15.00**

ADD $5.00 FOR SHIPPING AND HANDLING. VISA/MC ACCEPTED.

Satisfaction guaranteed or your money back within 30 days of purchase (less shipping/handling). 90 day warranty on parts and labor.

Specifications: Board size: 6"X 2-3/8", Power requirements: 9 to 12 VDC @200 ma, DTMF response time: 40 ms (can decode fast auto-dialers), Audio input: 100 mv to 6 Vpp, Serial output: 1200 baud, 8 data bits, no parity.

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Introduction

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 judgment.

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 radios have been designed to allow a greatly increased range.

Your radio may operate better 'out of band' towards the 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.

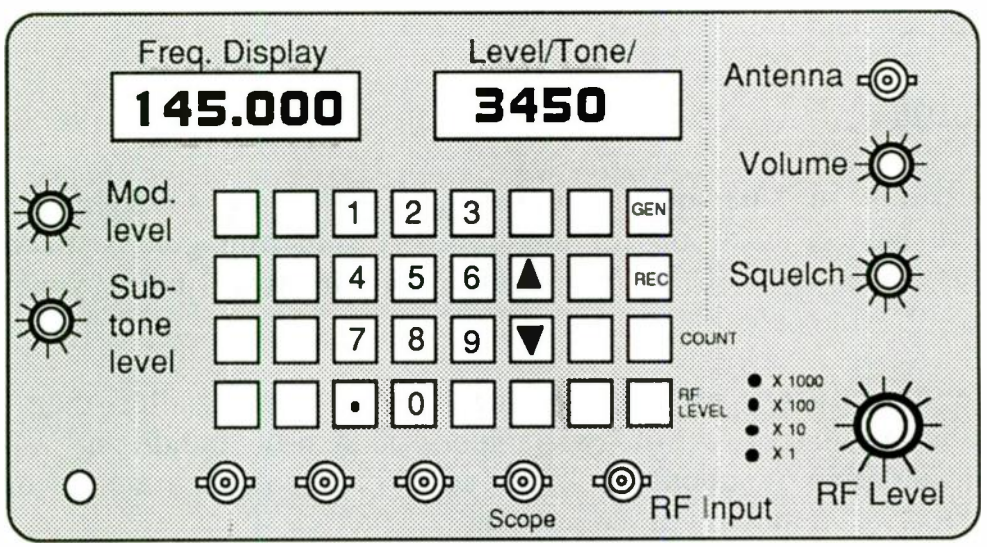
Technicians are welcome to forward comments, suggestions and new modifications. Forward your modifications to our mailing address or FAX a copy to us.

SERVICE TOOLS

The cost of a service monitor, even the least expensive model, is over $2,000. You may be able to pick up a used unit for around $500. If you do manage to find a used service monitor, take it to be tested or calibrated on a new service monitor.

A service monitor performs a number of functions that are invaluable in aligning all types of radios. It can generate a signal on an exact frequency and allow you to control the signal strength and the amount of modulation applied to the signal. This feature will allow you to properly align the S-Meter and test the receiver sensitivity. A good receiver has a sensitivity of less than .2 micro volts.

Service Monitor



Perhaps the most valuable feature of a service monitor is its ability to act as a receiver and measure the frequency error & modulation.

Frequency error is measured in Hertz. A normal transmitter can be aligned or tuned up or down by as much as 5 kHz. (5,000 Hz). Most radios have an alignment control that will allow you to adjust the frequency up or down. A transmitter should be exactly on frequency. Within 200 Hz plus or minus is acceptable.

Measuring the modulation of a signal will allow you adjust the transmitters microphone audio, DTMF pad and Sub-audible tone levels.

Suggested modulation levels:

Audio (microphone)	3,500 - 4,000 Hz
DTMF (touch tone)	3,000 - 3,500 Hz
PL (Sub-audible tone)	600-650 Hz

Alignment controls for these levels are available in most radios.

Other Valuable tools

There are a number of other tools that are a great deal less expensive than a service monitor. Most of these tools you should have in your tool box. If you do not have these tools, it a good idea that you invest a few dollars and pick them up.

Soldering iron

The modifications in this book require a 30-40 watt soldering iron. Make sure you have a small tip for the iron. A soldering gun is much to big. If you have one of the old guns, put it away until you are assembling a PL connector.

Some of the components used in the new radios are smaller than the letters in this sentence. You will need a steady hand and some experience desoldering components. A supply of solder braid is often the best method of removing a component.

Magnifying glass

Don't make a mistake here. The parts in the modern radios are small. You may not need one on some older radios, but open up one of the newer radios and you will wish one was handy.

Digital Volt/OHM Meter (DVM)

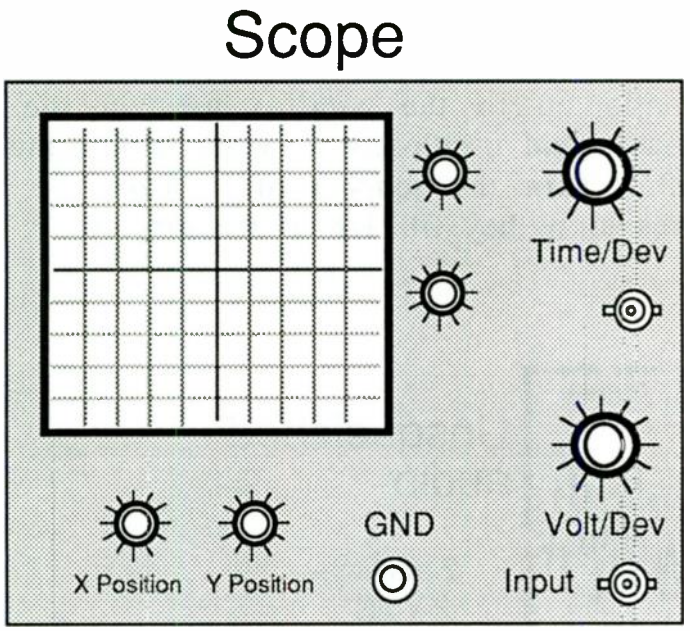
You must get one of these. They are handy for many things. Try to get one that has a continuity tone setting. An auto ranging meter is the best. If you can afford it, get one that has an auto shut off feature.

Nothing is worse than grabbing your meter and finding the batteries are dead because you forgot to shut it off the last time you used it.

POOR MAN'S SERVICE TOOLS

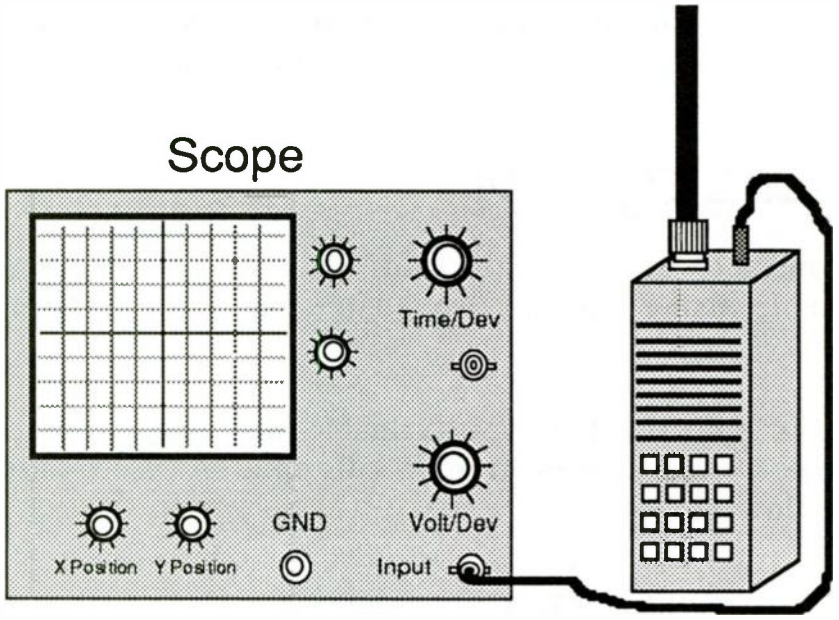
If you are like most of us and can not afford a service monitor, there is a method available using inexpensive tools and a little help from a friend.

An oscilloscope is probably the most valuable instrument you can have. The cost of a new unit ranges from $250 up. A used unit can be purchased for as low as $50.

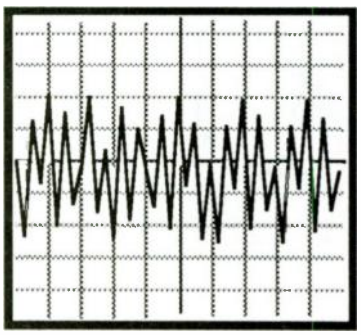


By connecting the receiver audio output (from the speaker jack) to the oscilloscope input, you can get an accurate visual view of the audio wave. With a little practice, you can accurately measure the audio levels.

If you are tuning up a transmitter, or the transmitter section of a transceiver, you will need the use of another receiver. If you have or can borrow a friend's handi-talkie, it will work just fine.



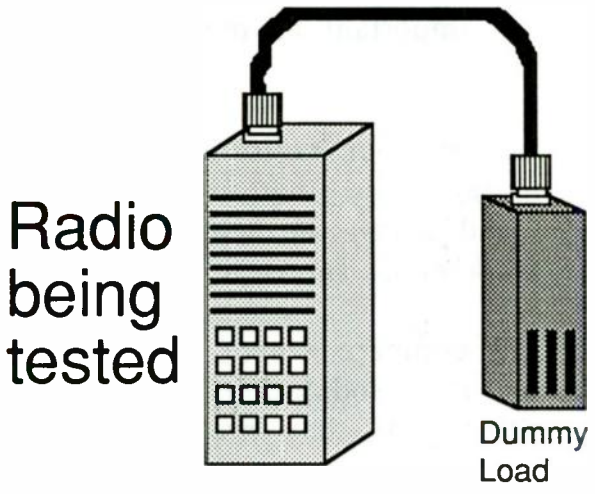
Connect your friends radio up to the oscilloscope via the external speaker jack. Turn the radio and oscilloscope on and adjust the receiver audio level to about 1/3. Turn the squelch off. Turn the Volt/Dev control to adjust the waves until they fill 1/2 of the display.



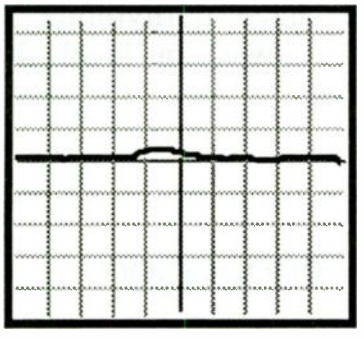
Unsquelched audio

2 ms time
.2 Volts

There is a fine tuning control for both the Volt/Dev and Time/Div controls. Place them in the center position until you are ready to adjust the scope display discussed below.



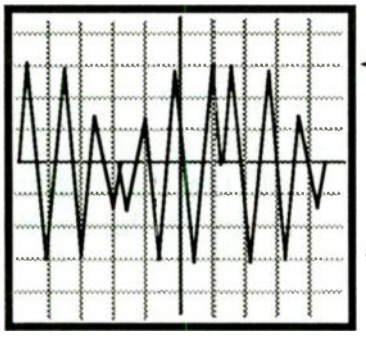
Now using your transmitter, press the PTT. (Make sure you are using a dummy load). The scope display should appear below.



Unmodulated carrier

2 ms time
.2 volts

Now that you have the scope set up. Press the PTT key and talk into the microphone and watch the display. Hold the mic 3-4 inches away and say "FOUR" into the mic. Stretch the "FOUR" for 5 seconds.



Voice modulation
(say "FOUR" into the mic)

Maximum
Deviation

2 ms time
.2 volts

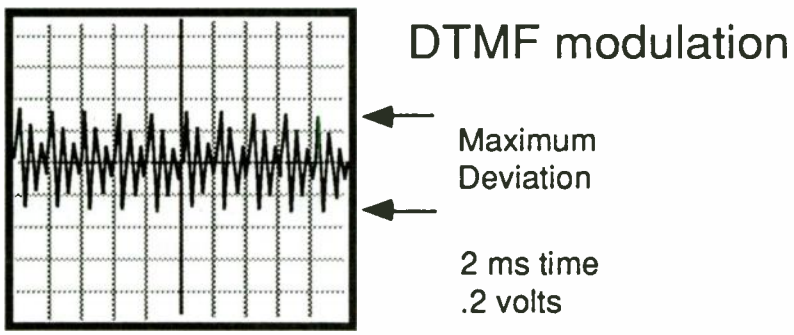
The pattern on the scope is not as important as the maximum height of the wave crests.

The simplest testing method to see if your radio is accurately adjusted is to compare its signal to another radio that is operating properly. Transmit with the "GOOD" radio and adjust the scopes Volts/Div control to place the audio peaks at the markers as shown in the example above.

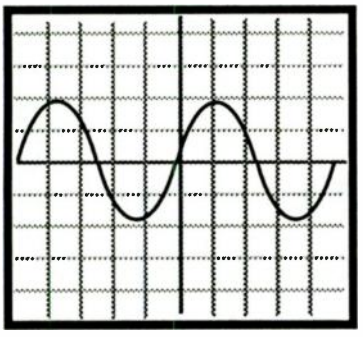
Now transmit with your radio and compare where the voice peaks are placed. If they are higher, adjust the Modulation/Deviation controls in your transmitter to a lower position. If they are lower, increase the controls position.

If possible, adjust the modulation/deviation control while you are transmitting and modulating.

You can adjust the levels of the DTMF key pad using the same method used on audio modulation. All DTMF tones have a rhythmic shape on the scope display. The DTMF tones will be lower in level that audio peaks. This is normal.



You can also adjust the level of the Sub-Audible PL tone using the scope. It will be necessary to adjust the Volt/row control to be more sensitive. A PL tone is only 20% the level of the voice modulation. Adjust the control to approx. 20 milli volts. Do not modulate the carrier with audio while you are adjusting the PL level.



Sub-Audible carrier

2 ms time
20 m volts

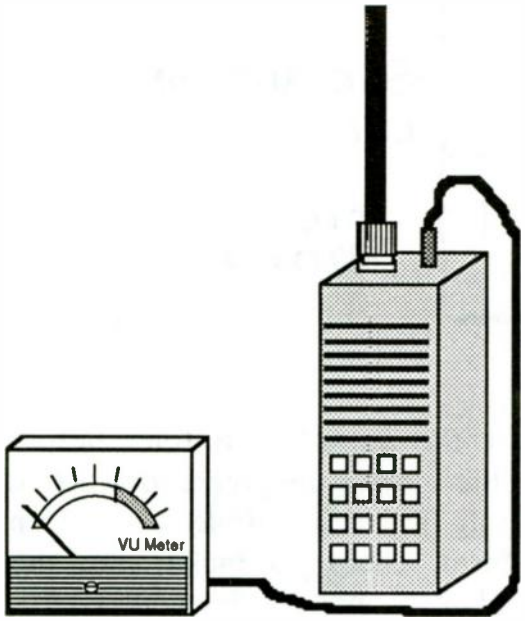
Some receivers will filter out the sub-audible tone before it appears at the speaker jack. Most of the newer receivers do not do this so you should have no trouble watching the sub-audible wave form. If you can not get the expected wave form, check to make sure the transmitter is encoding PL tone. You should also check the receivers PL decode is turn off.

If you have gone this far, watch the display when you modulate a carrier that has a sub-audible tone. You will still see the tone no matter what type of modulation you use.

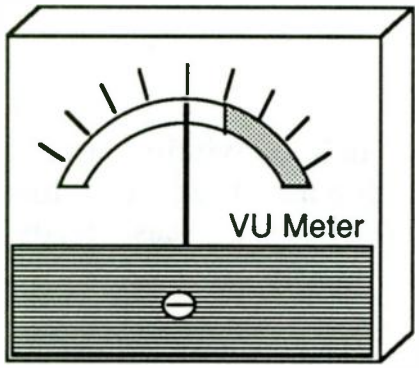
A more inexpensive method.

There is another method of checking the audio deviation levels using a audio VU meter. A VU meter can be purchased at your local Radio Shack. You can purchase the meter by itself, or in a case ready to hook up to your stereo.

Connect the VU meter to the speaker jack of your friend's radio or receiver.



Using a properly working transmitter, transmit and hold down a DTMF tone key and adjust the receivers volume control to cause the VU meter needle to set at the half-way point.



Adjust receiver volume to set meter at half-way position

Again press the PTT and measure where normal speaking audio causes the needle to peak.

Now using the radio to be tested, perform the same tests and adjust the transmitters deviation controls to match the levels of the other radio.

This method will not work accurately enough to test sub-audible tone levels.

j•Com *The Future is Here...*

HamBase™ Callsign Database

Not Just the FCC Data! Instantly retrieve the **Name, Address, Birthday, and County** of US amateurs. Optional **Canadian and DX** address databases are available. **No hard disk required.** Updated twice a year. (570,000 US calls, July '92). Edit address labels on the screen before printing and create QSO info labels for your QSL cards.

```
Find: W3HNK
Joseph Arcure     W3HNK
P O Box 73
Edgemont PA 19028
Born: Dec 25 1933
Class: Advanced
County: Delaware
```

HamBase program and US Data [Macintosh and PC versions.]	**$49.95** ($5 s/h)
Summer Supplement (55,000)	**$19.95** ($2 s/h)
Canadian Database (27,000)	**$19.95** ($2 s/h)
DX and QSL Managers (17,000)	**$11.95** ($2 s/h)
Old Call Database (100,000)	**$9.95** ($2 s/h)
Packet Home BBS Database	**$9.95** ($2 s/h)
HBPopUp (TSR version)	**$19.95** ($2 s/h)
WHamBase (Windows program)	**$19.95** ($2 s/h)
Demo/Program Upgrade Disk	**$5.95** ($2 s/h)

Please Specify 5.25 or 3.5 inch HD diskettes.

SofTNC and Packet Modem

The fully assembled microminiature BayPac packet modem connects directly between your PC and HT or VHF transceiver. Power is taken from the computer, so no external supply is necessary.

The j•Com SofTNC is a software program which works with the Baypac packet modem to provide a very easy to use packet terminal. Simple commands allow you to easily connect to and monitor your local PBBS or DX cluster. Text is automatically captured in a scrollable buffer which can be displayed, printed, or saved to disk.

BayPac modem	**$49.95**
SofTNC	**$19.95**
Package deal	**$59.95**
'AT' 9 pin adapter	**$5.95** ($5 s/h)

California residents, please add sales tax. Foreign orders are welcome, please add $10 to cover shipping and handling. Prices and specifications subject to change without notice.

30 day money back guarantee.
90 day parts and labor warranty.

Call or write for our latest catalog.

MagicLoop™

Restricted Space Antennas

j•Com MagicLoop magnetic loop antennas have been engineered to give high performance in a limited space. On transmit, a magnetic loop antenna often outperforms a dipole at the same height. Because harmonics are attenuated by the high Q of the antenna, TVI is eliminated. On receive, electrical interference and nearby strong signals are substantially reduced, resulting in an exceptional signal to noise ratio.

MagicLoop antennas are tuned remotely for minimum SWR which is less than 1.5:1 over the entire operating range. No other antenna tuner is necessary, even for marine or MARS frequencies.

ML 160-80	1.8-4.2 MHz	134" dia.	**$999**
ML80-30	3.5-11 MHz	67" dia.	**$699**
ML40-15	6.9-24 MHz	31" dia.	**$599**
ML20-10	13.9-30 MHz	31" dia.	**$399**

Shipping charges depend on destination.

Magic Notch®

Ends Heterodyne Headaches!

Why listen to carriers, when the MagicNotch fully **automatic notch audio filter** will remove all CW, computer RFI, tuners and other similar QRM instantly and automatically. Installs in seconds between the rig and external speaker or headphones. **No tuning** or adjustments are necessary. S4 SSB signals have been worked under 20 over 9 carriers. *"I can think of no more useful accessory for the HF SSB operator."* —*QST, October '91.*

MagicNotch $109.95 ($5 s/h)
12V adapter $11.95

Disguised Decal Antennas

146 / 220 / 440 / Cellular • 50 Watt • 110 Watt

This .003 inch thick, **3.5" x 3.5"** antenna just sticks to the inside of your windshield, where it's safe from vandals, carwashes and low garage doors. The **multi-polarized** design reduces QSB in urban and rural areas. Wide bandwidth for **low SWR** on all frequencies. Etched polymide with anti-corrosive graphite colored coating. "Alarm" decal optional. Other frequencies available. ***Please specify band, power and "plain" or "alarm".***

50 Watt $59.95 ($5 s/h)
110 Watt $69.95 ($5 s/h)

Stop Repeating Yourself!

Ventriloquist®

says it all.

Whether you want to contest all weekend, repeat your "last two", personalize your **repeater ID**, or **work the pileups at night** with a sleeping family, Ventriloquist will say it for you. The unique analog memory stores 4 messages of up to 20 seconds for **10 years without battery backup**. Endless loop record for instant replay. Use the internal mike, or an external audio source to record your own messages. CT compatible.

Ventriloquist $149.95 ($5 s/h)
12V adapter $11.95

Computer Interface Cables

j•Com computer interface cables connect the Comm port of your PC directly to the computer control interface on your transceiver. All of the electronics for the interface is hidden in the shielded DB-25 connector for maximum compactness and **minimum RF susceptibility** and radiation. Power is "stolen" from the PC, so **no external power supply** is necessary. Compatible with CT, HamWindows, DXBase, LOGic, and all other rig control software. Completely assembled and ready to plug in. Available for **Kenwood, Icom, Yaesu and TenTec** radios. Please specify the transceiver model number when ordering.

Computer Interface $54.95 ($5 s/h)

Make and Receive Phone Calls on your own Personal Autopatch!

Plug the SDP-600 into any RJ-11 phone jack and connect to the microphone and speaker jacks of your base station. Operates **full duplex** (both parties can talk at the same time) or **simplex** (VOX with turn around beeps). Programmable local and toll call **access codes**. Regenerated DTMF/Pulse dialing. External **logic output** to control other devices. Computer controlled timeout. **CW identification**.

Personal Autopatch $199.95 ($5 s/h)
12V adapter $11.95

j•Com · P O Box 194 A · Ben Lomond, CA 95005-0194 · (408) 335-9120 · FAX 335-9121

Tone/Code Finder

Model TF-1
Model TF-2
Model TCF-3

Pricing

Tone Only	$189.95
Tone & Digital	$299.95
Tone w/Memory	$239.95
Tone & Digital w/Memory	$339.95

The Tone/Code Finder is composed of a high speed display unit mounted to a scanning receiver. Its purpose is to instantly find and display all **CTCSS** and **DIGITAL** codes, including split channel and inverting codes.

On board memory retains all hit and time information which is then transferred to a printer via a RS 232 port upon command. Time is stored in seconds and hits in units. In the event of power loss, the **FINDER** will maintain memory for up to three weeks.

Signal processing is accomplished by an eight pole filter configured as a low pass with a cutoff of 234Hz. The superior filter characteristics eliminates chopping and false reading.

FEATURES:

- INSTAFIND
- Low Power Consumption
- Base or Mobile Capability
- Hit and Time Accumulator
- Micro Processor Control
- Low Cost
- CMOS LSI Technology
- 3 Year Warranty on Display Unit

SPECIFICATIONS:	**TF-1**	**TF-2* or TCF-3***
Companion Receiver	BC560XLT	BC950/760XLT
Frequency Range	up to 512 MHz	up to 950 MHz
Size	5 1/2" x 6 7/8" x 3 1/2"	6 5/16" x 7 3/8" x 3 1/4"
Weight	2 lb. 12 oz.	3 lb. 4 oz.
Power Source	115VAC or 12VDC	115VAC or 12VDC

**Can be configured as a stand alone unit or coupled to other receivers.*

aie

MEASUREMENTS DIVISION

AUTOMATED INDUSTRIAL ELECTRONICS CORP.

141 GRANITE ST. P.O. BOX 70 BATESBURG, S.C. 29006 (803)532-9256 FAX(803)532-9258

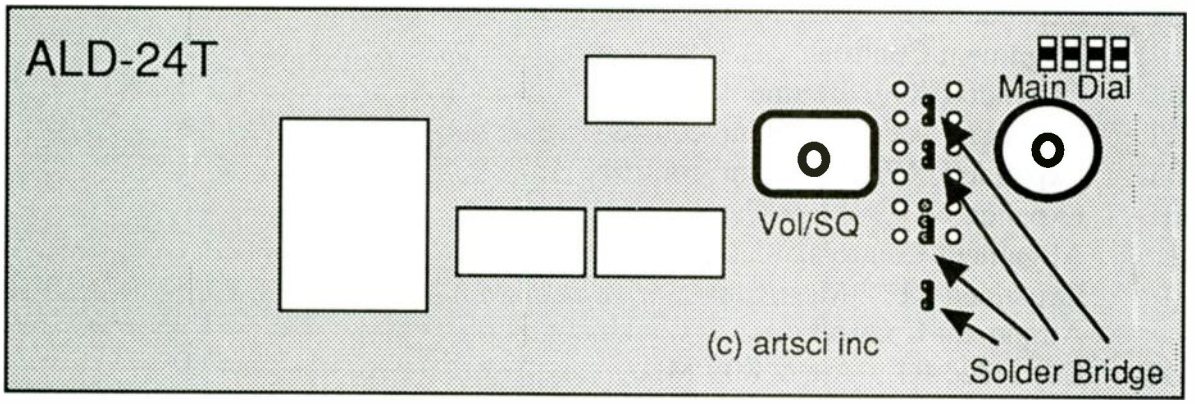
Radio / Tech Modifications

ALINCO Radio Modifications

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)



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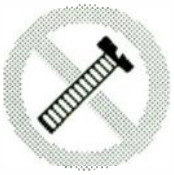
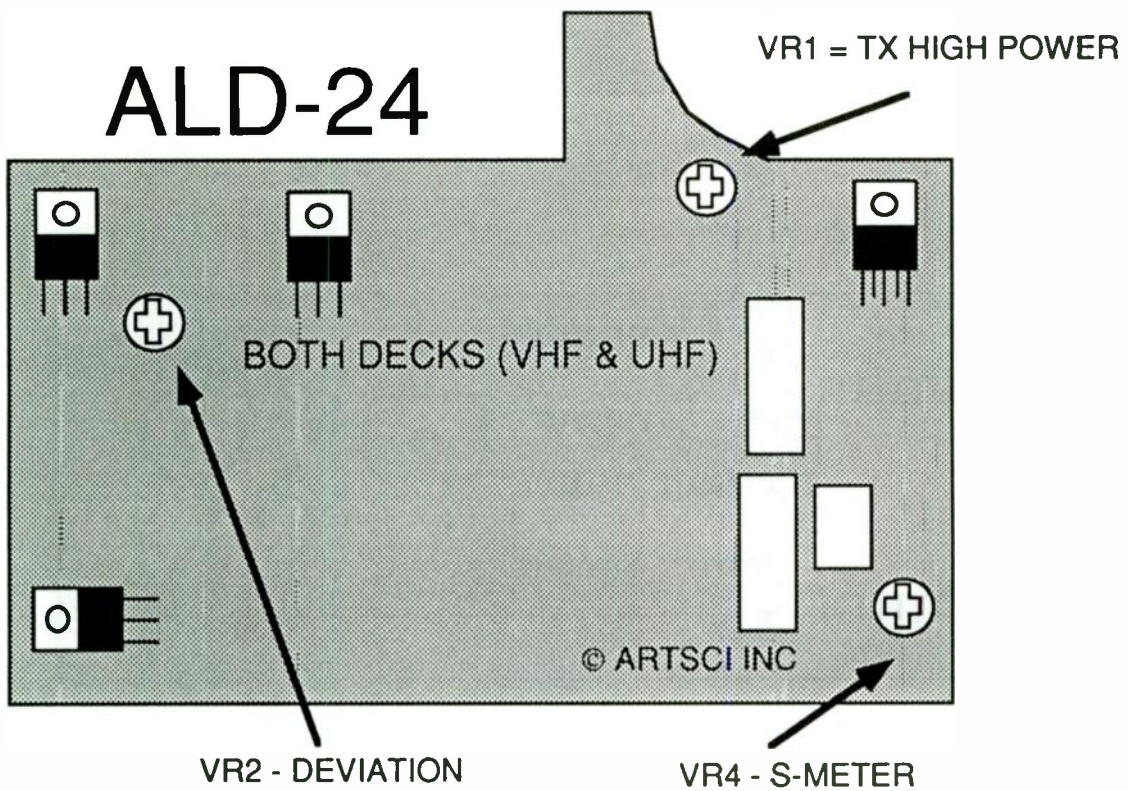


Caution

ALINCO ALD-24T

ALIGNMENT CONTROLS



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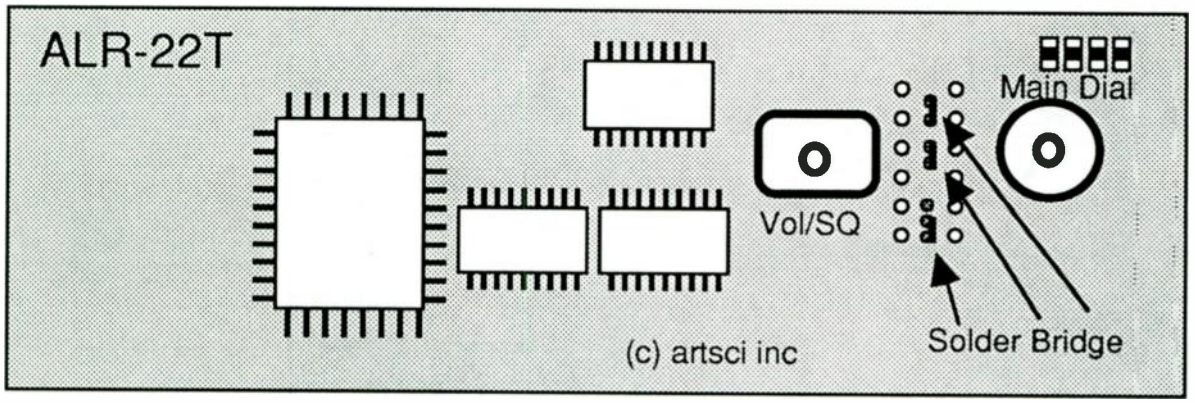
ALINCO ALR-22T

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

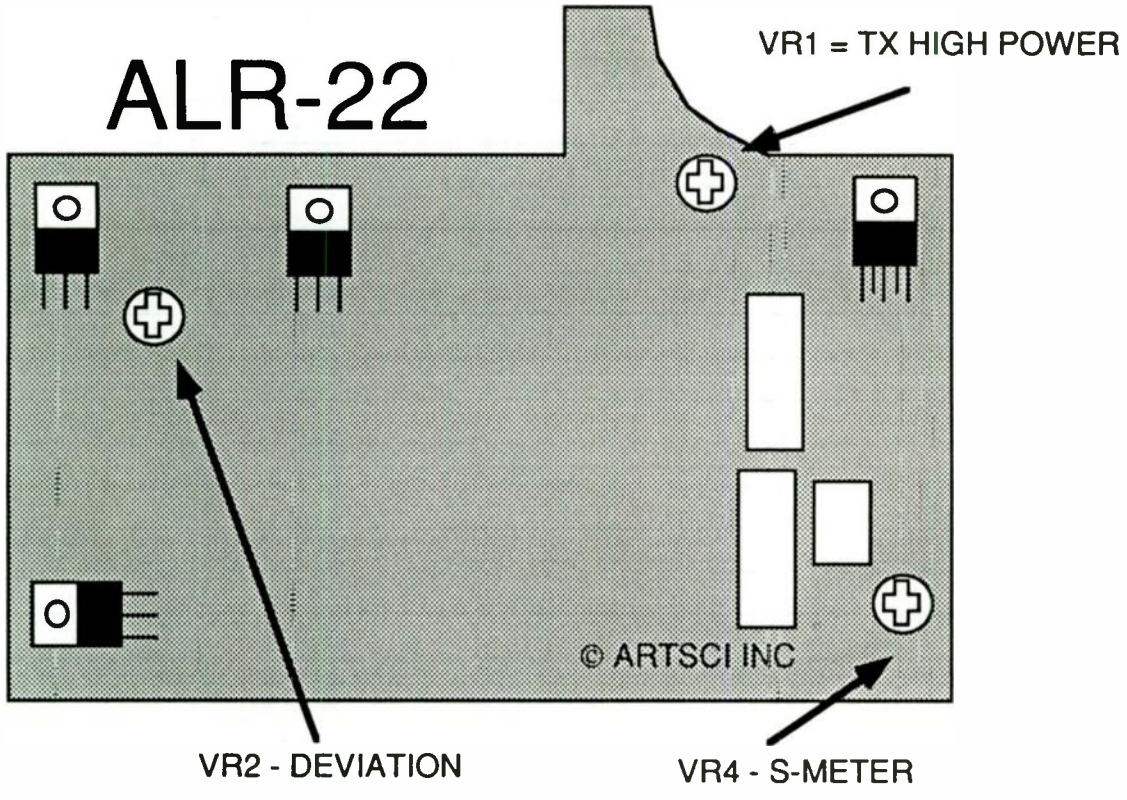


MORE ---

Caution

ALINCO ALR-22T

ALIGNMENT CONTROLS

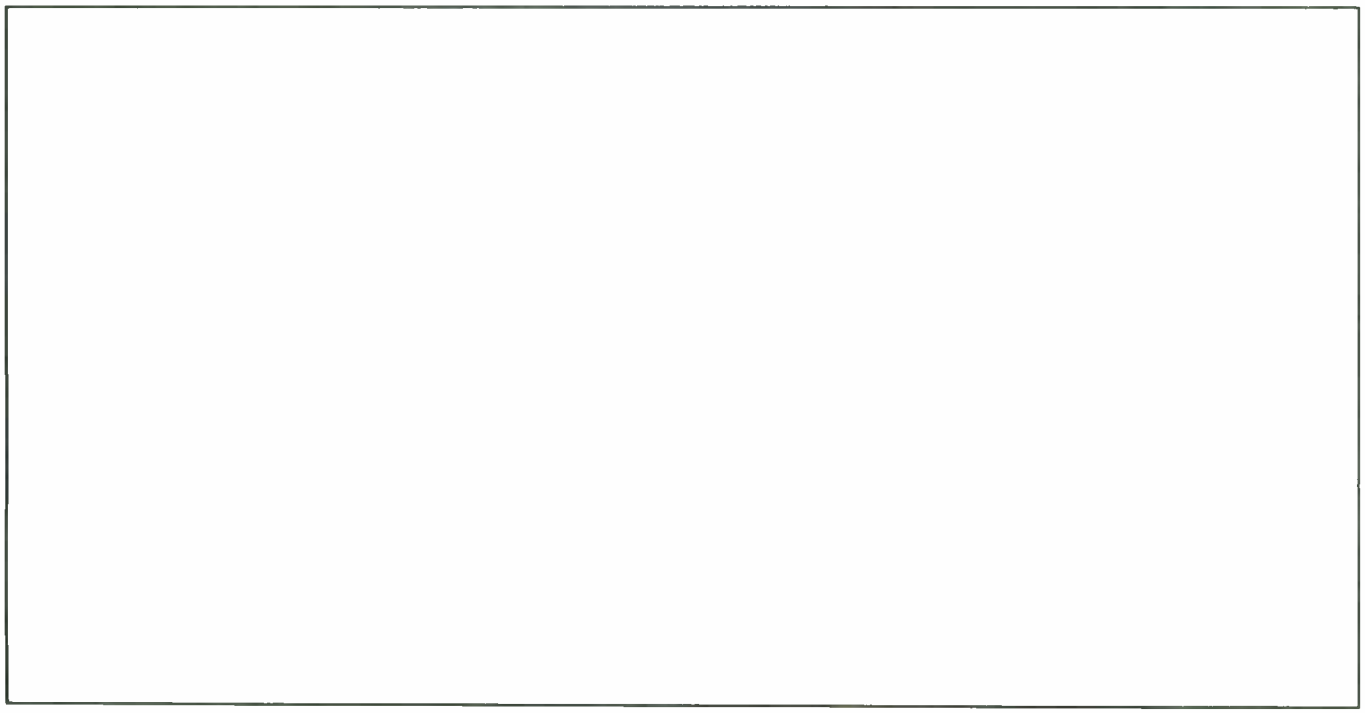


MORE ---

Caution

Radio / Tech Modifications

Notes

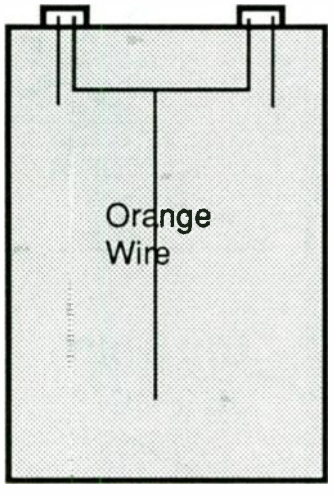


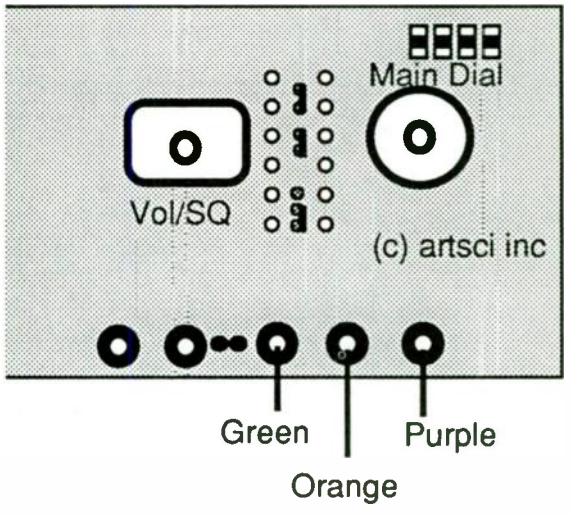
ALINCO ALR-22T

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



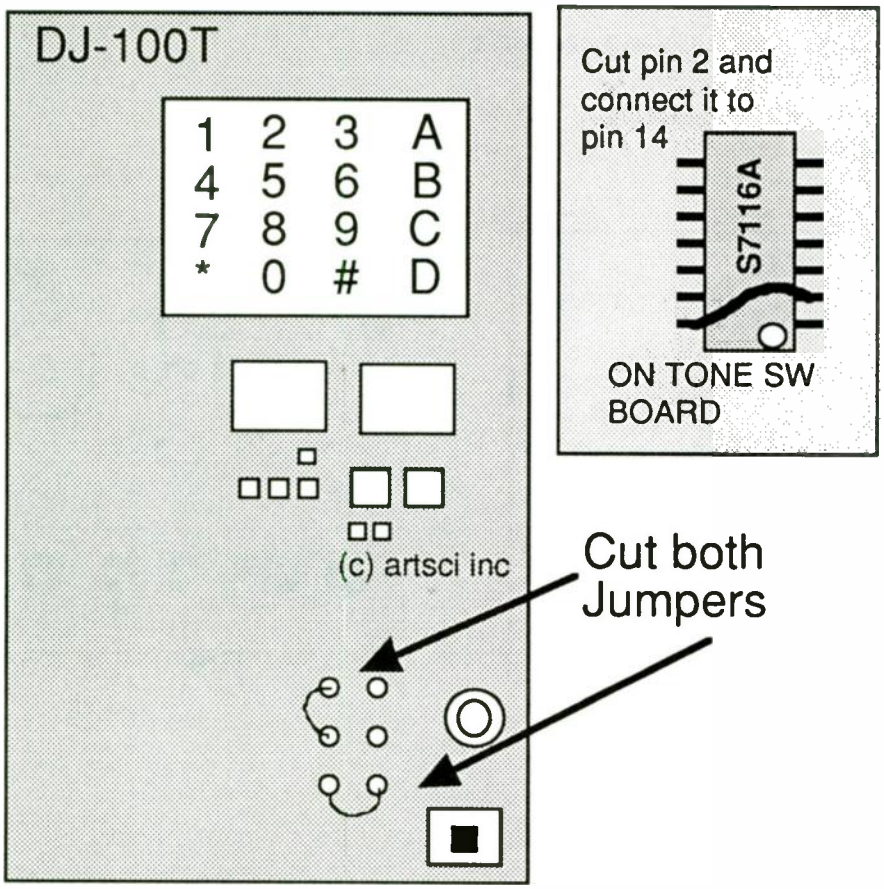


Caution

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.

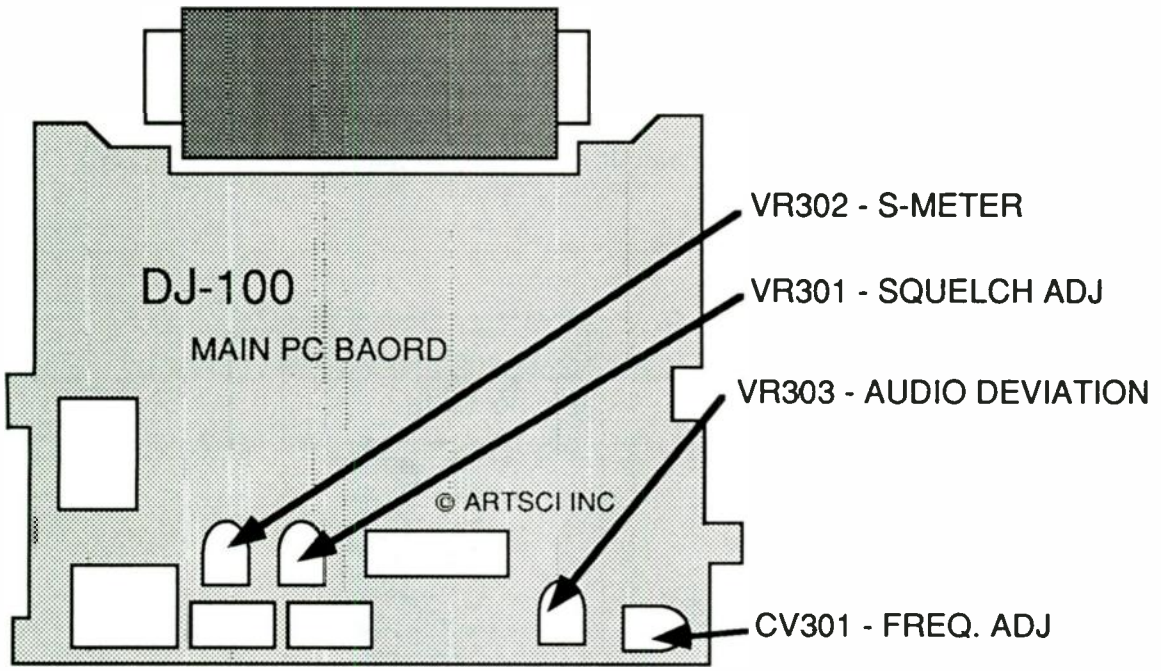


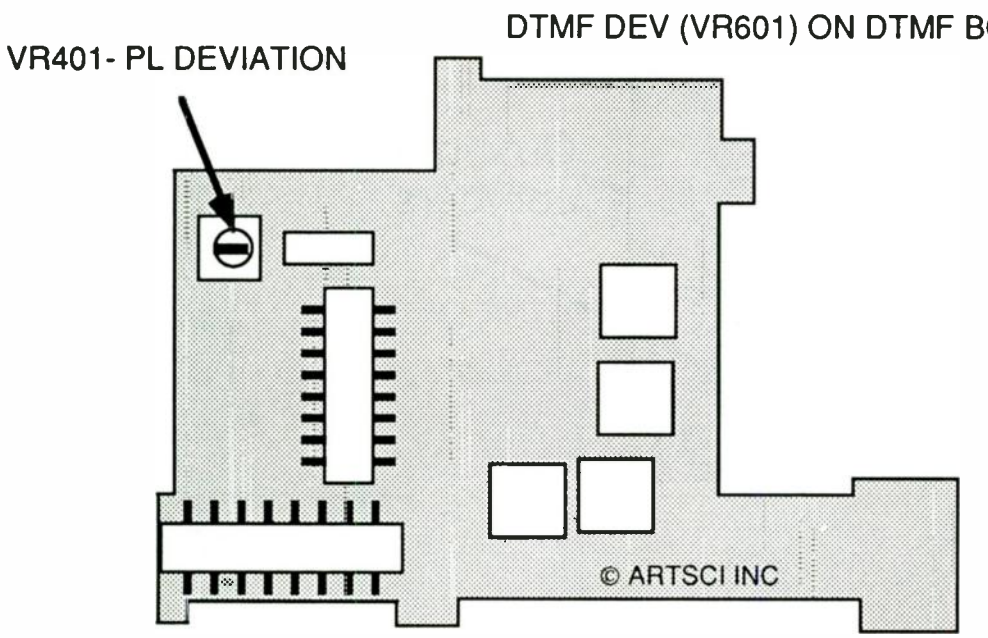
MORE ---

Caution

ALINCO DJ-100T

ALIGNMENT CONTROLS





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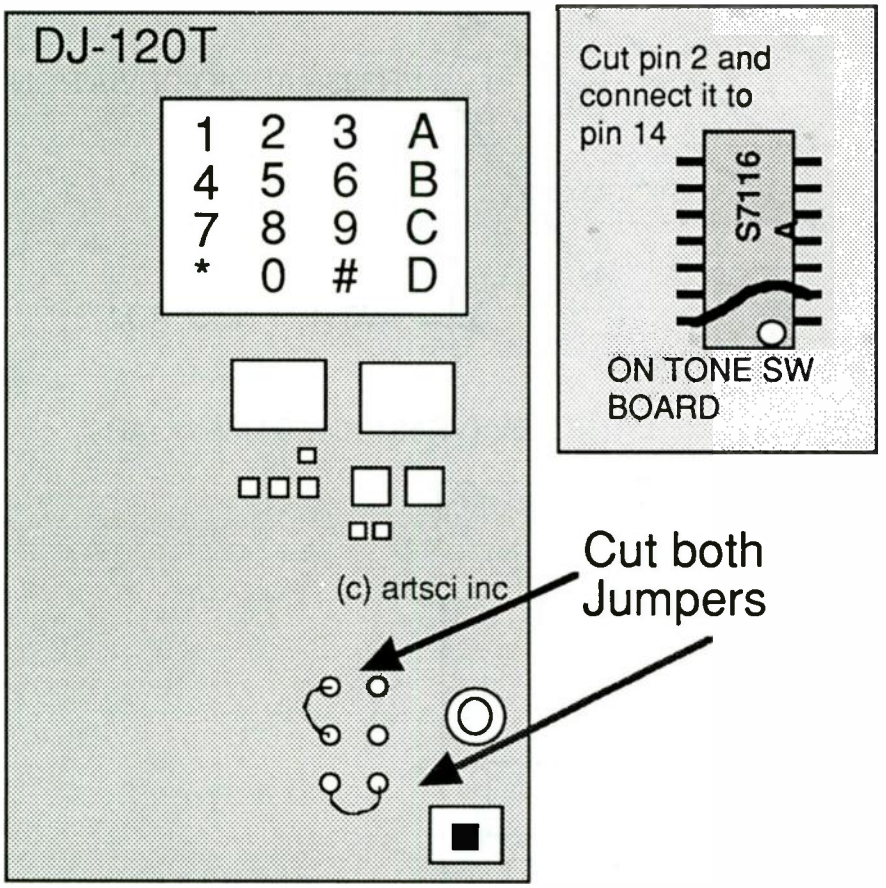
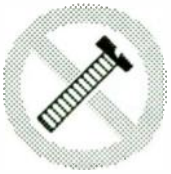
ALINCO DJ-120T

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.



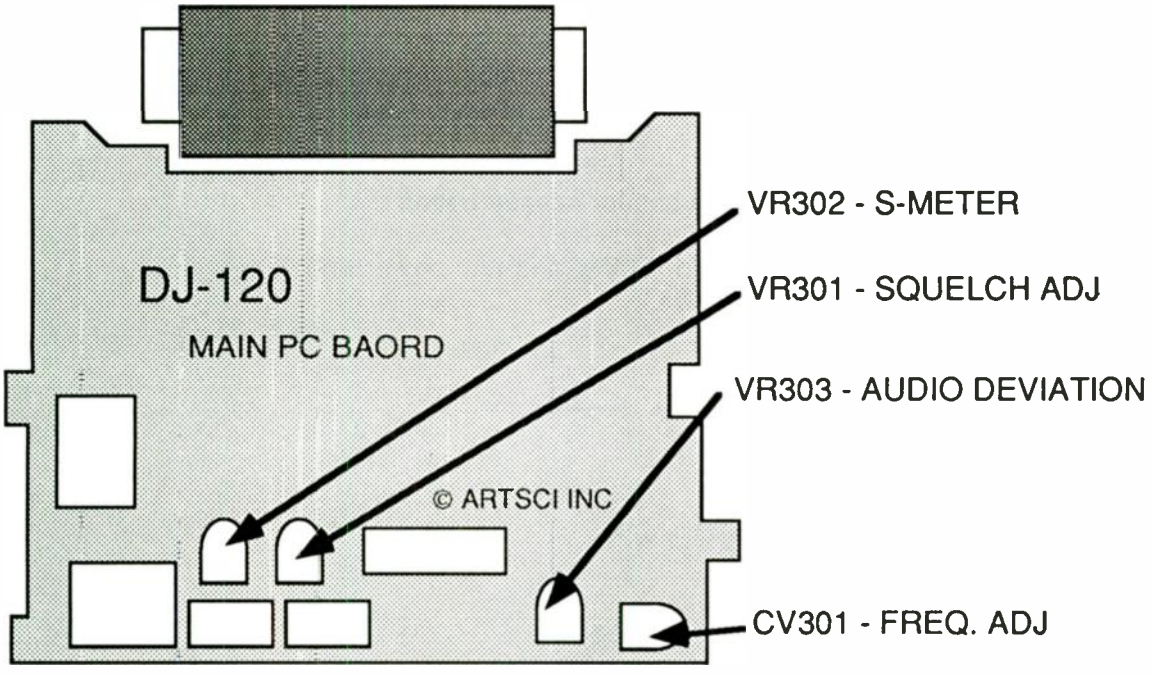
MORE ---

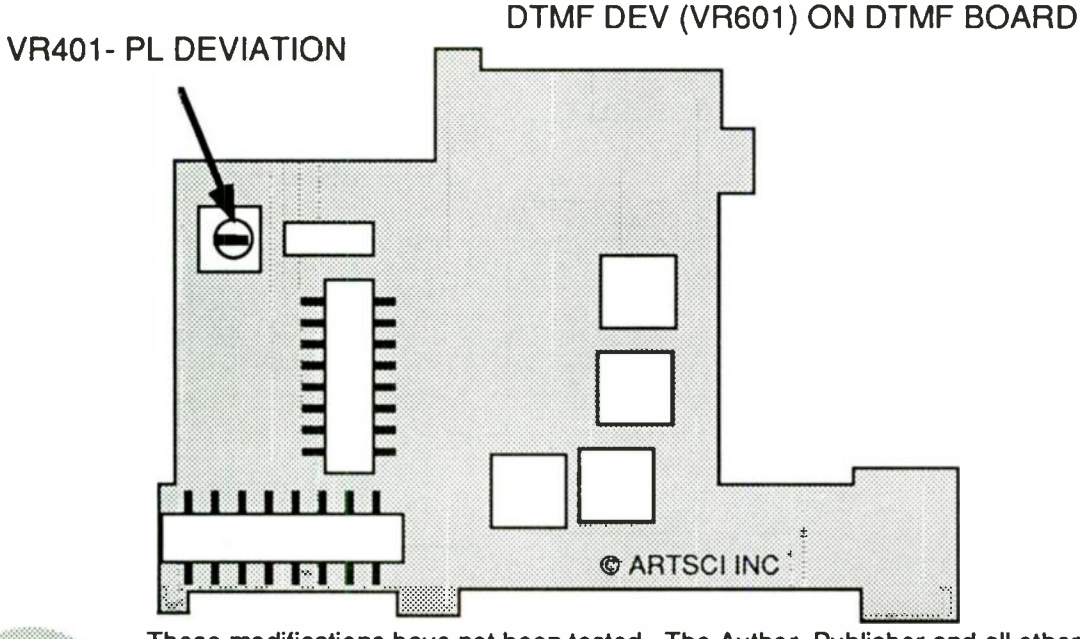


Caution

ALINCO DJ-120T

ALIGNMENT CONTROLS





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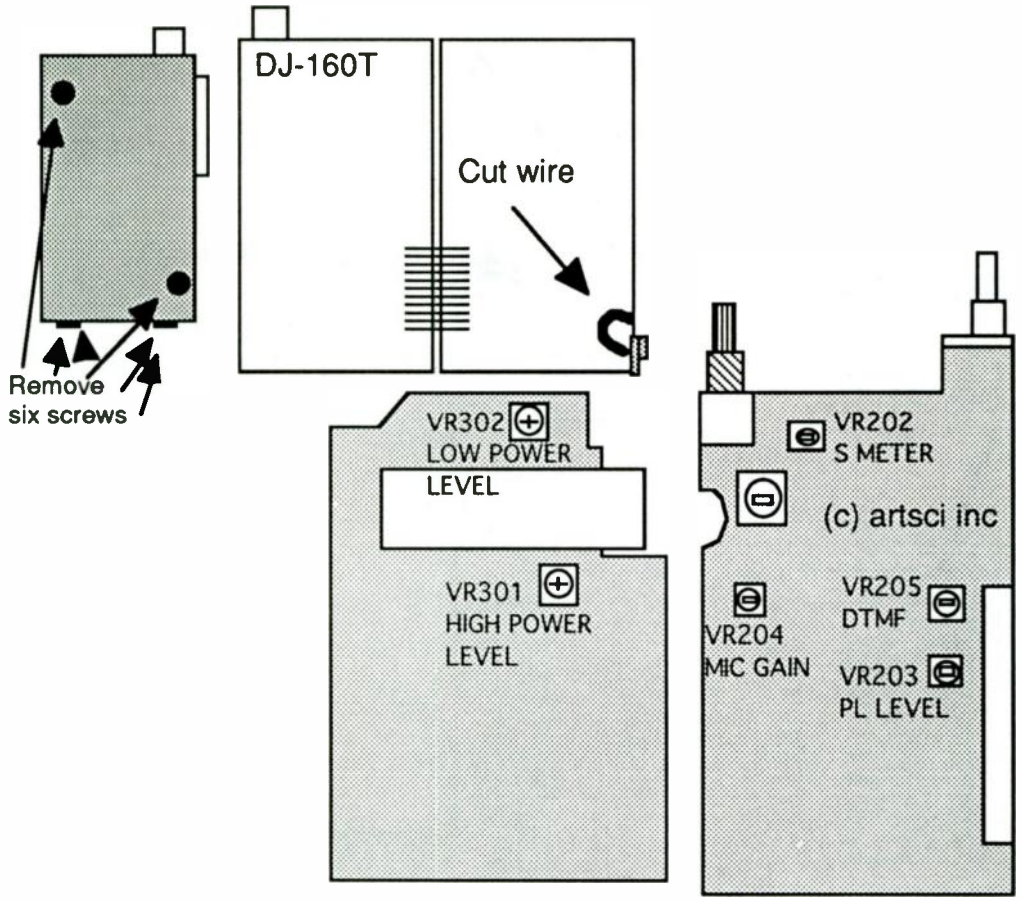
ALINCO DJ-160T

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



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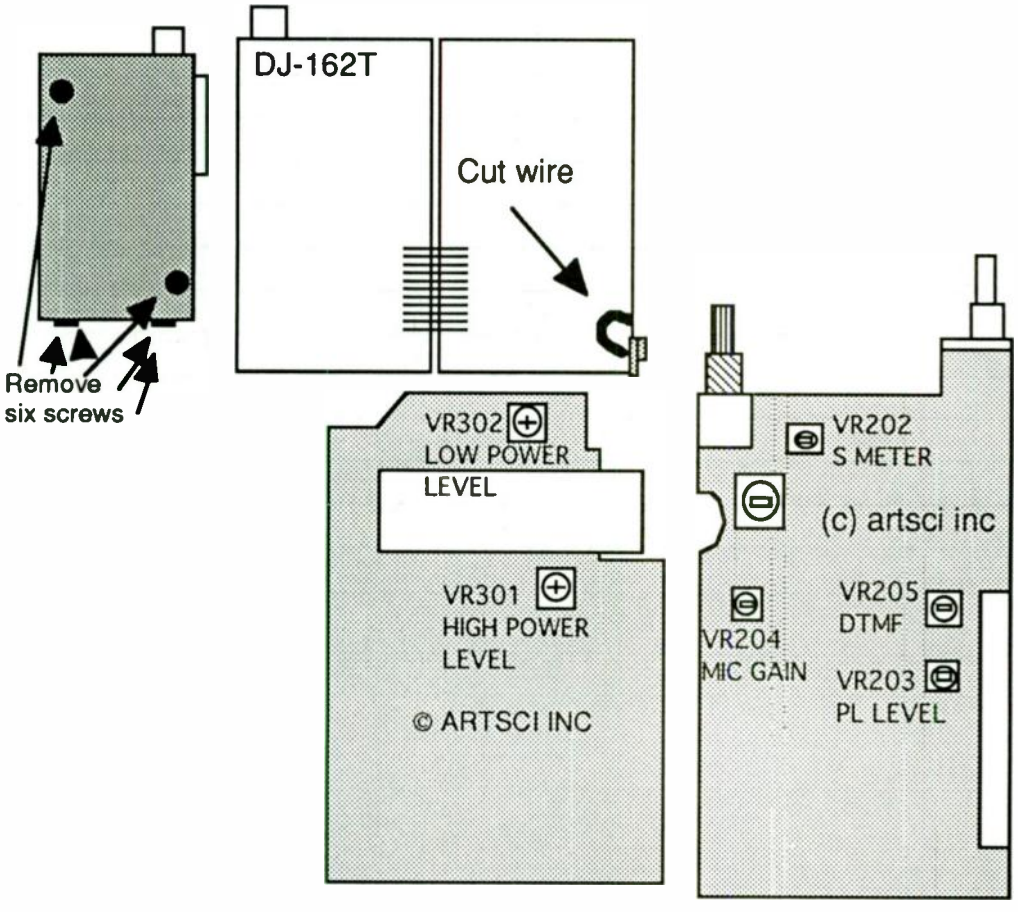
ALINCO DJ-162T

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-162T



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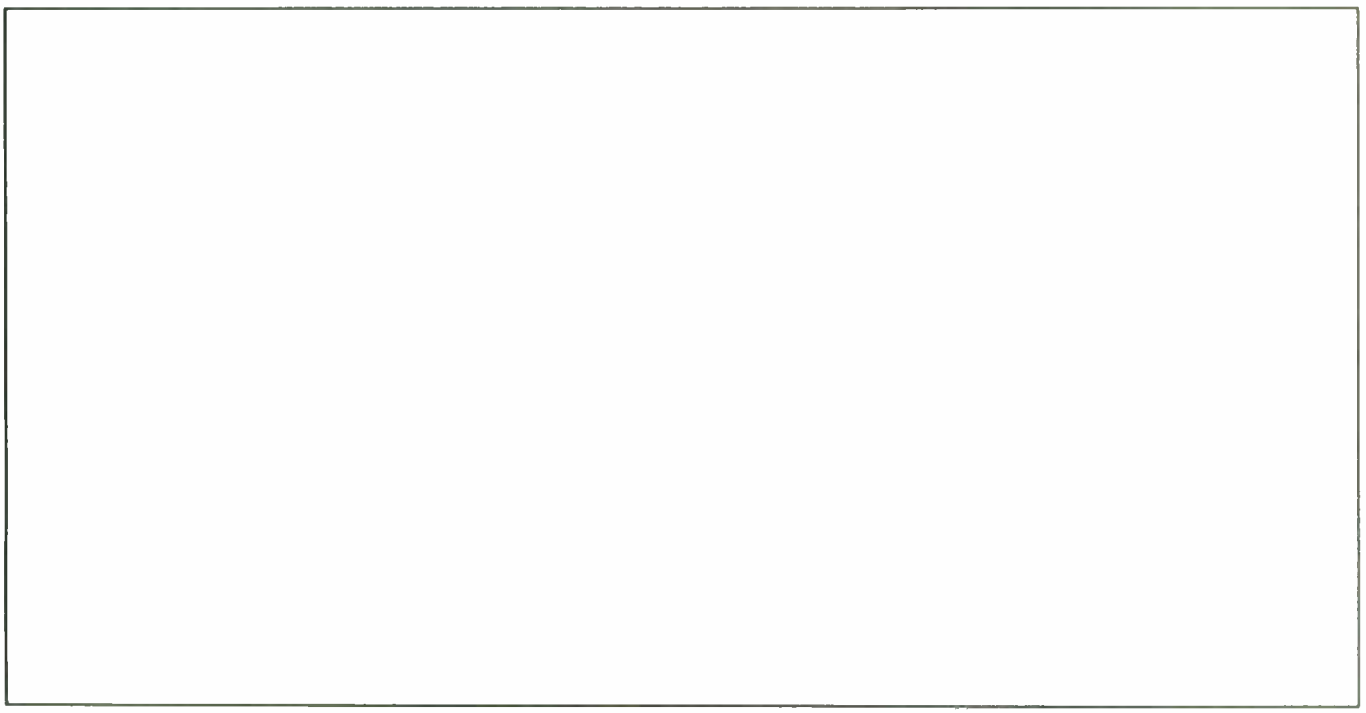
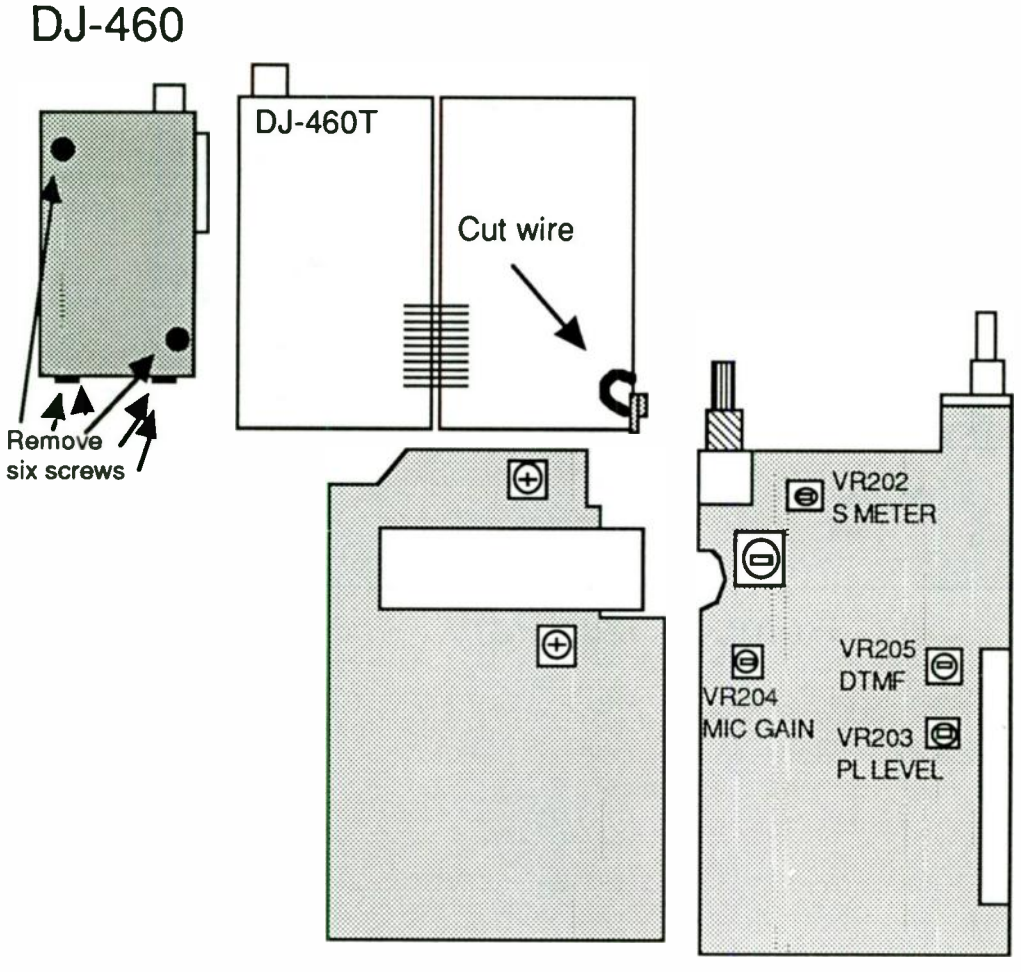
Notes



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.

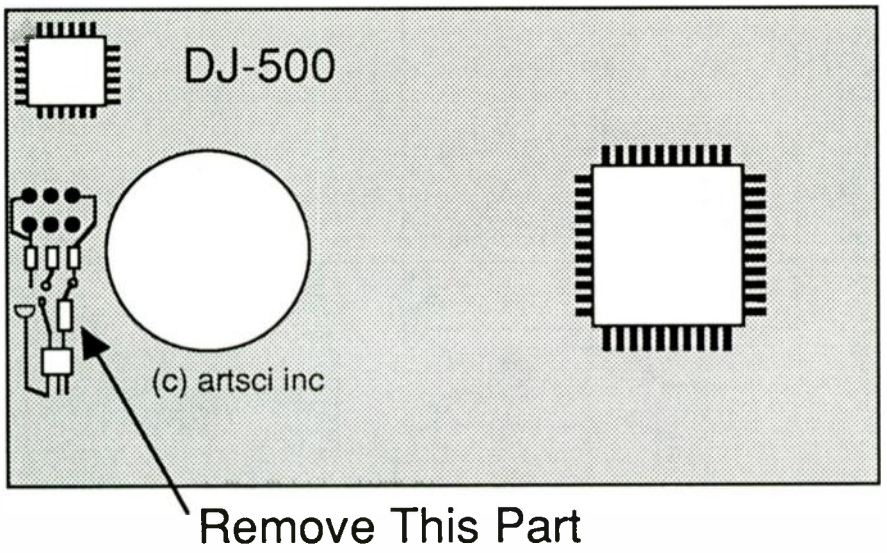


Caution

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

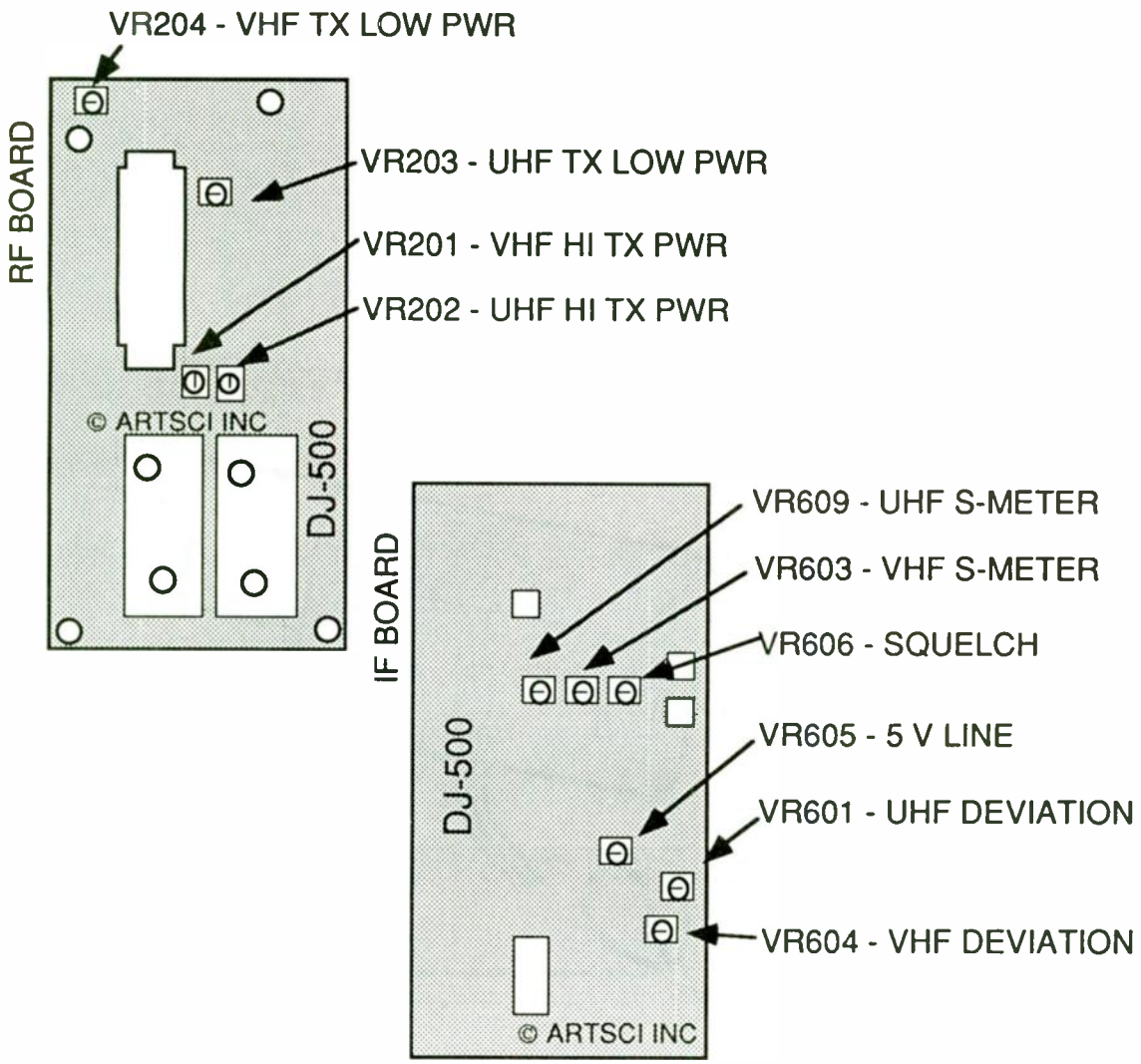


MORE ---

Caution

ALINCO DJ-500T

ALIGNMENT CONTROLS



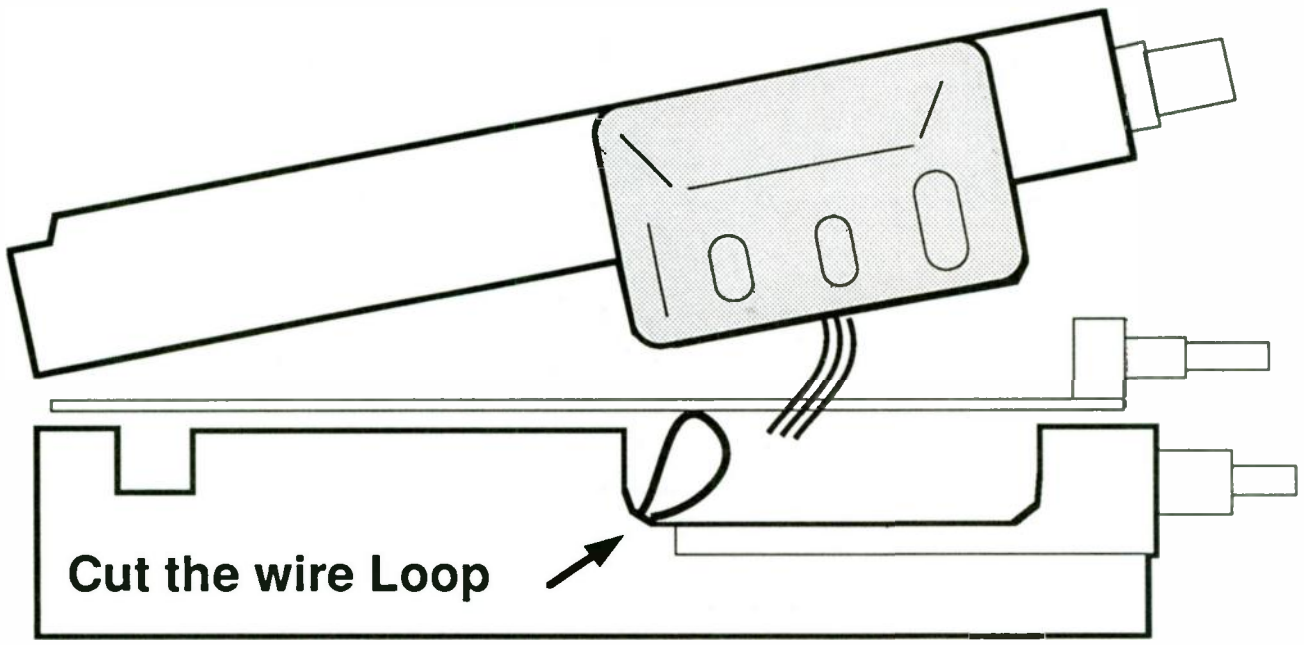
VR1 - DTMF DEVIATION (ON CPU BOARD)

Caution

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)

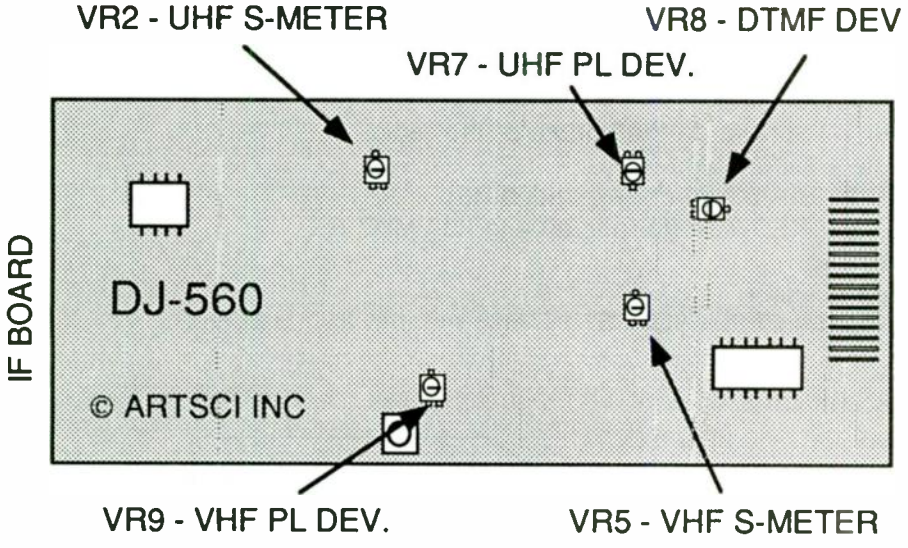


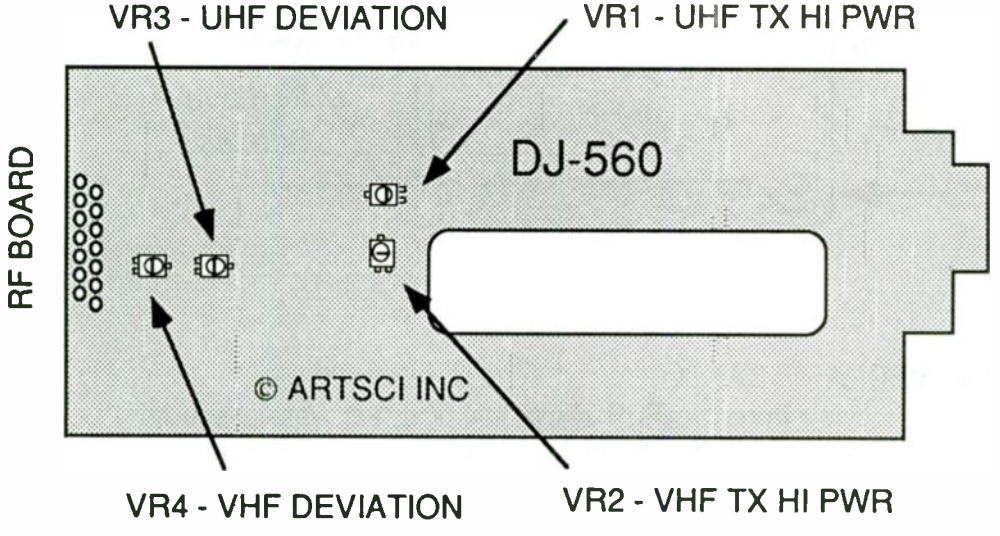
MORE ---

Caution

ALINCO DJ-560

ALIGNMENT CONTROLS





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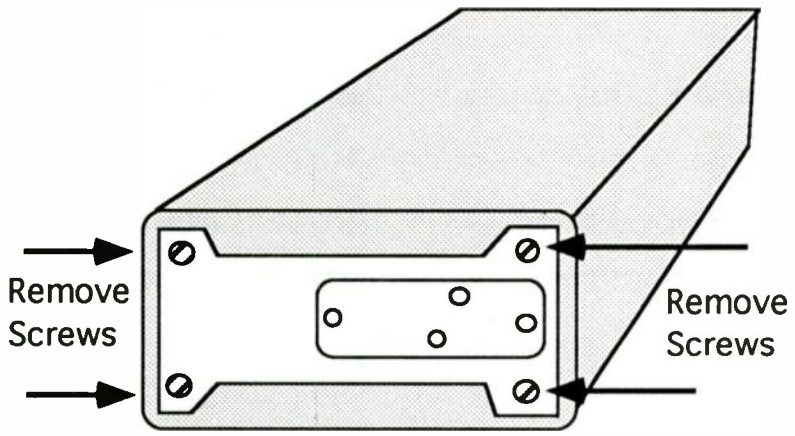
ALINCO DJ-580T

EXPANDED RF
Aircraft Band RX & 800 MHz RX

1. Remove battery and antenna.
2. Remove the four (4) screws on the bottom of the radio.
3. Remove the battery slide plate.
4. Locate and CUT the BLUE wire (for expanded RF)
5. Locate and CUT the RED wire (for aircraft and 800 MHZ RX.
6. Reassemble the radio.
7. Reset the microprocessor.
   (Press and hold the [FUNCTION] key and turn the radio on).



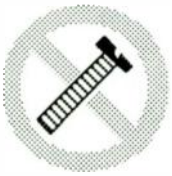
To Select the AIRCRAFT BAND

Press the [FUNCTION] and [VHF] key simultaneously.
The Letter "A" (AM mode) will appear on the display.
(press again to select the 2 meter band)

To Select the 800 MHz BAND

Press the [FUNCTION] and [UHF] key simultaneously.
(press again to select the 440 MHz band)

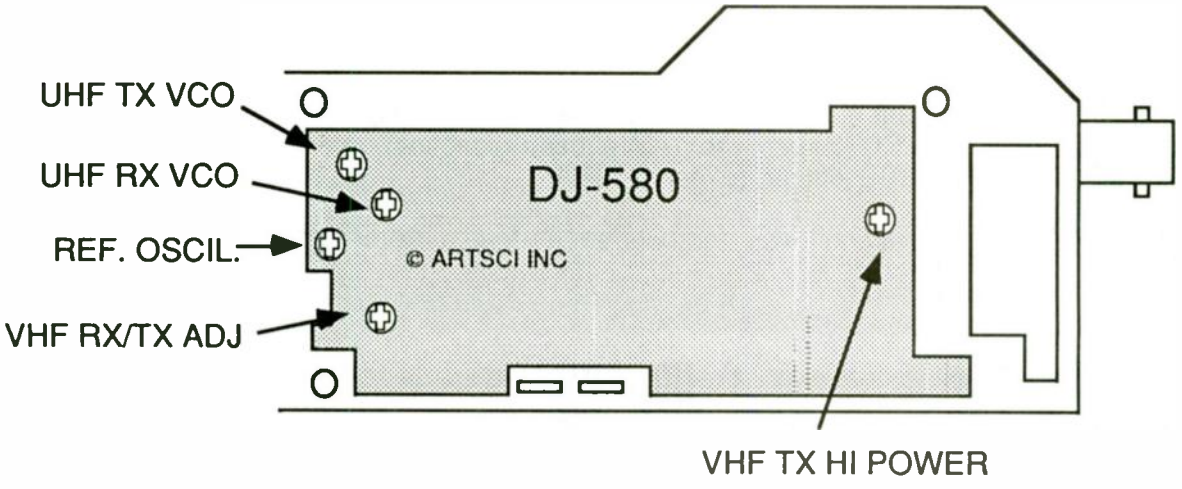
MORE ---

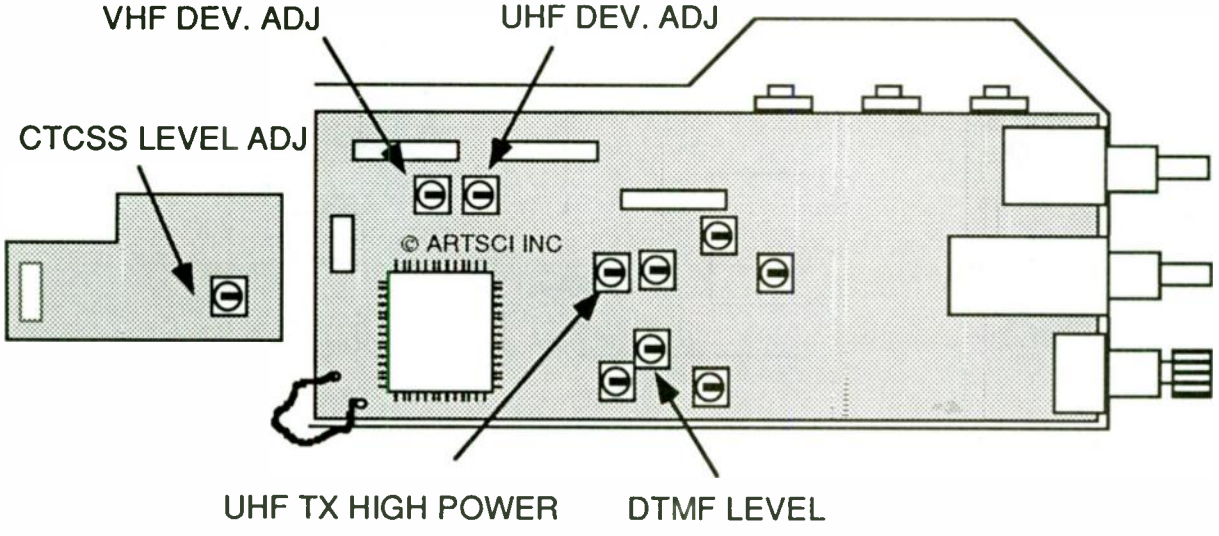


Caution

ALINCO DJ-580T

ALIGNMENT CONTROLS



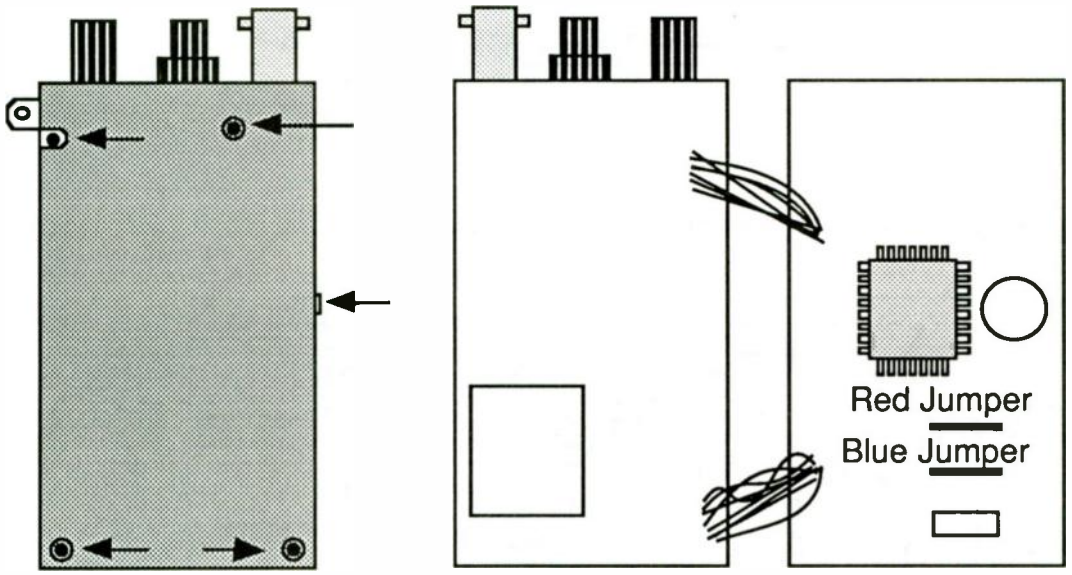


Caution

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.

MORE ---

Caution

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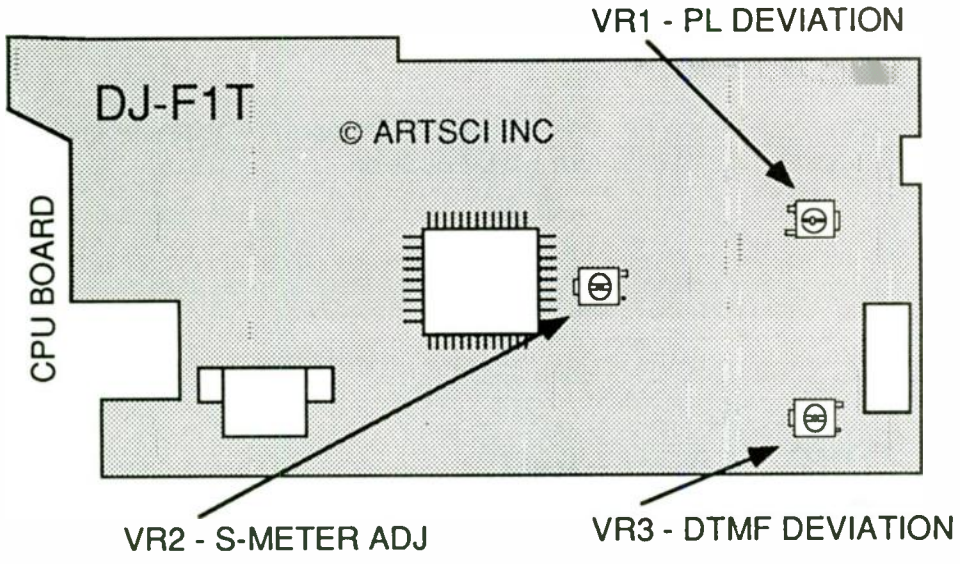
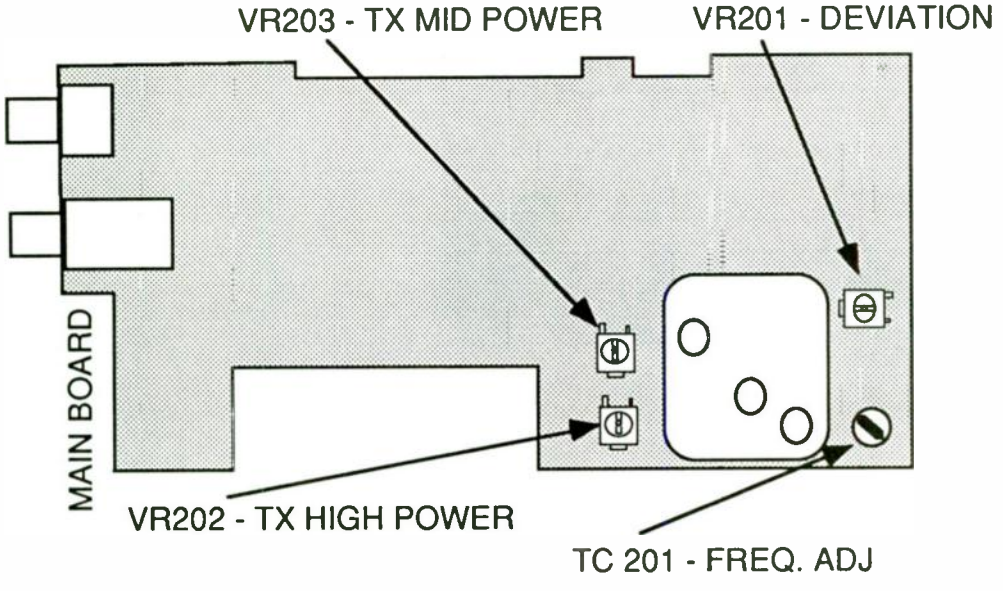
ALINCO DJ-F1T

ALIGNMENT CONTROLS





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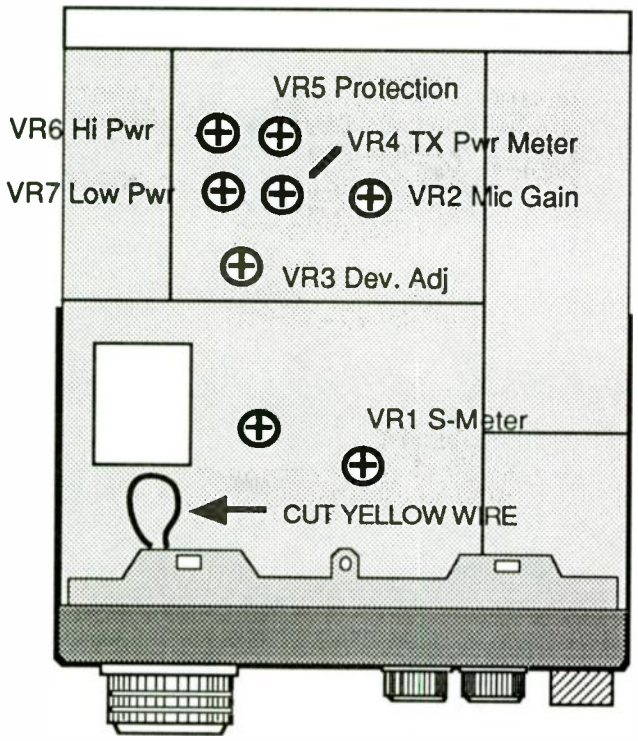
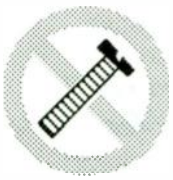
ALINCO DR-110T

EXPANDED RF & ALIGNMENT CONTROLS

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.



VR1 on
Tone squelch
board the
PL Level



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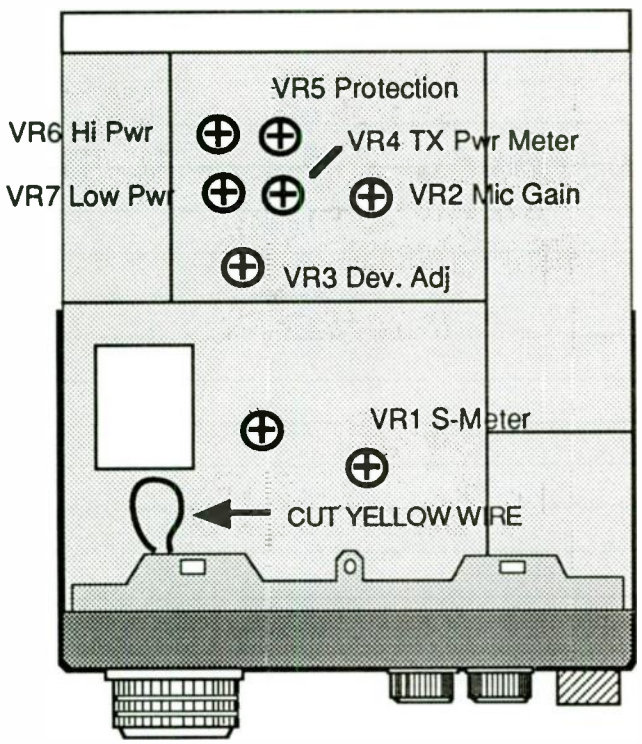
ALINCO DR-112T

EXPANDED RF & ALIGNMENT CONTROLS

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.



VR1 on Tone squelch board the PL Level

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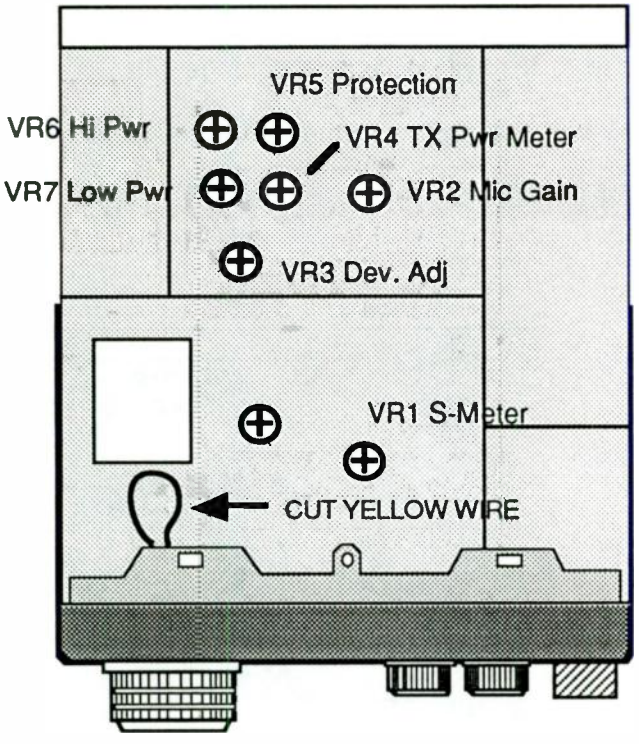
Radio / Tech Modifications

Notes

ALINCO DR-119T

ALIGNMENT CONTROLS



VR1 on Tone squelch board the PL Level

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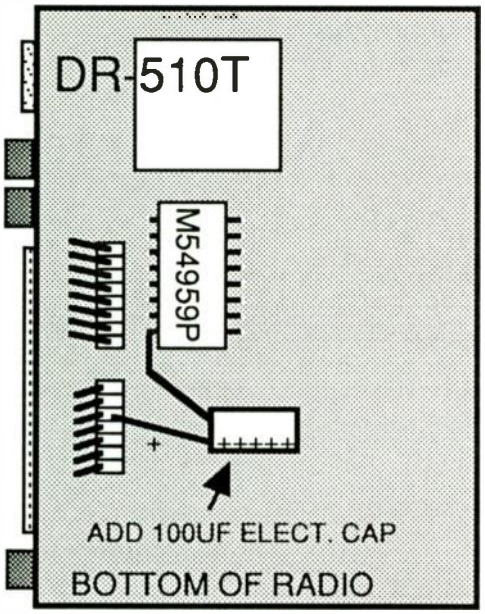
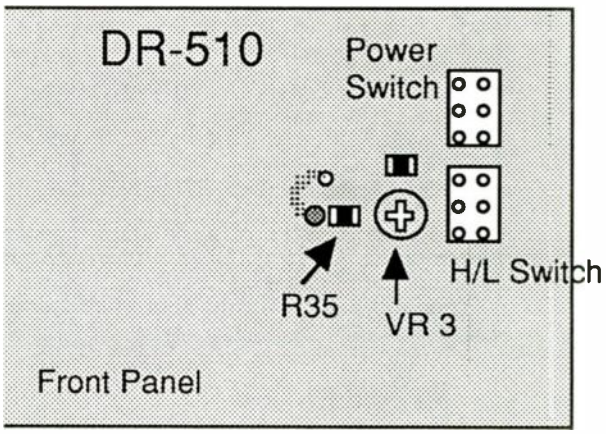
ALINCO DR-510T

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)



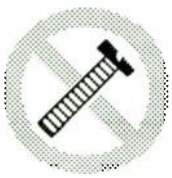


CROSS BAND REPEATER PROCEEDURES - Select the VHF & UHF frequencies and press [SHIFT] until "DUAL" appears.

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

TURN OFF : Turn radio off.

MORE ---

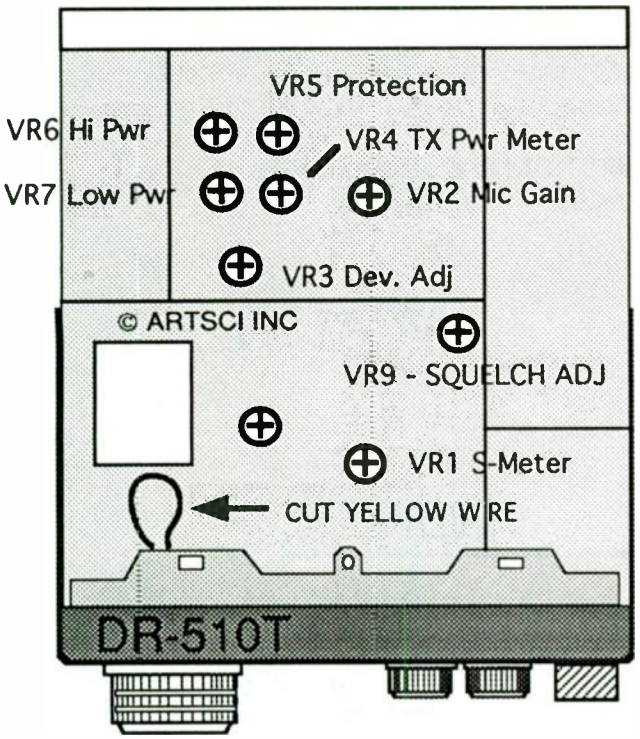


Caution

ALINCO DR-510T

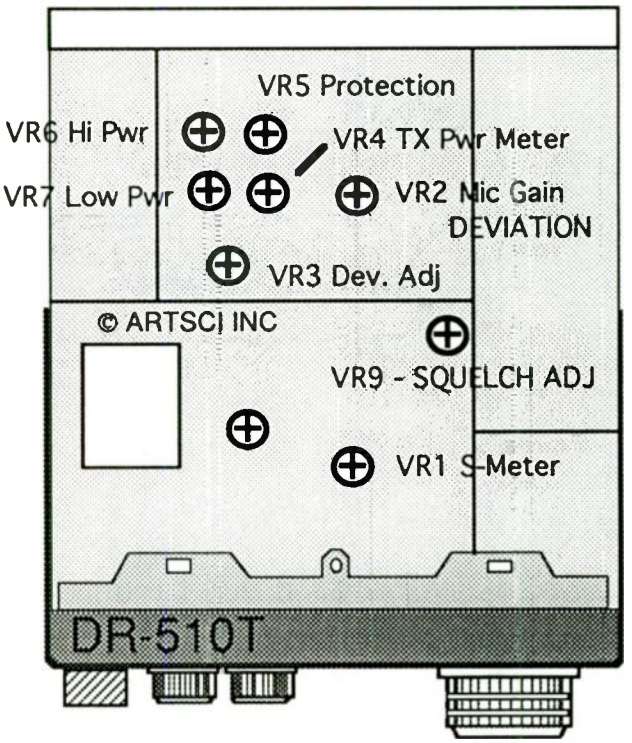
ALIGNMENT CONTROLS

UPPER SIDE (VHF)



VR1 on
Tone squelch
board the
PL Level

BOTTOM SIDE (UHF)



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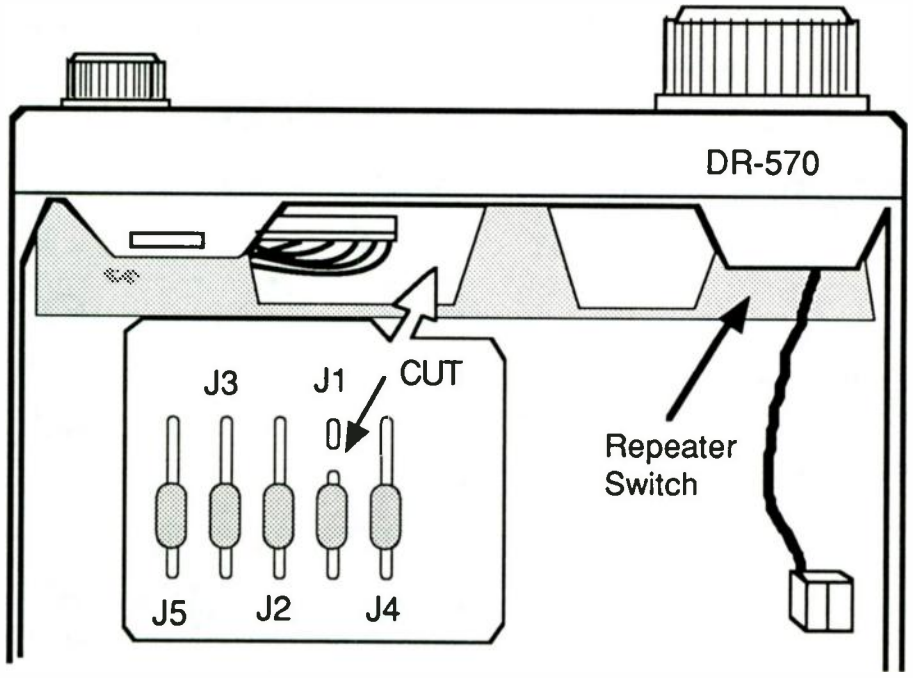
ALINCO DR-570T

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.



MORE ---

Caution

ALINCO DR-570T

ALIGNMENT CONTROLS

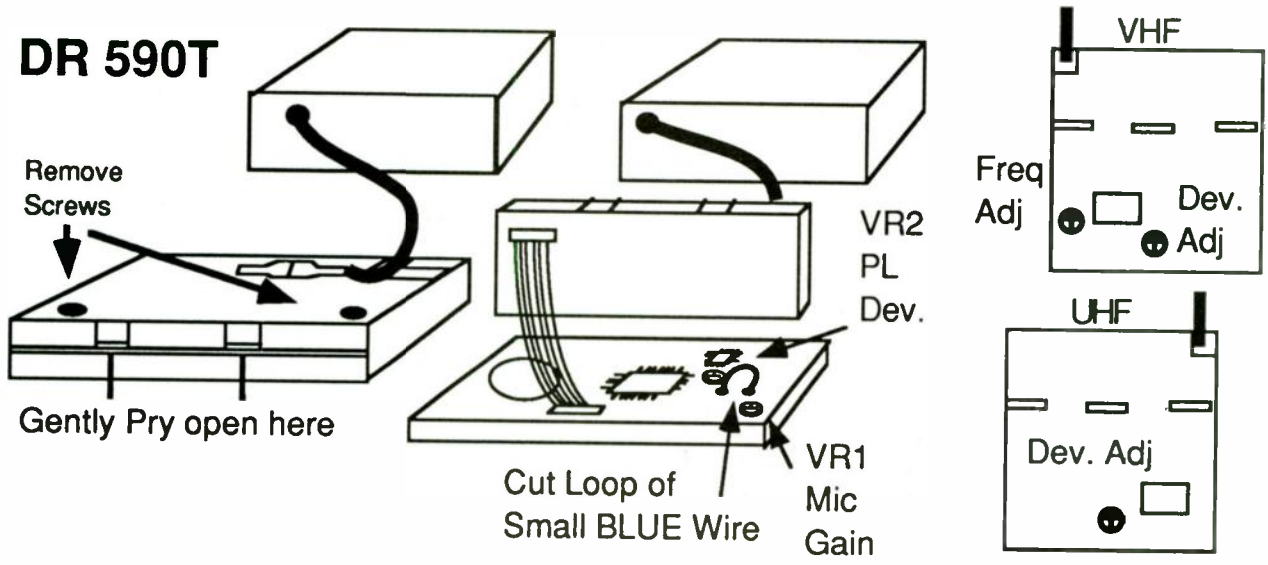
ALIGNMENT	UHF	VHF
TX HIGH POWER	VR5	VR2
TX LOW POWER	VR7	VR4
RF METER	VR6	VR1
DEVIATION	VR3	VR3
SQUELCH ADJ	VR1	VR1
S-METER	VR2	

Caution

ALINCO DR-590T

EXPANDED RF
CROSS BAND REPEATER MOD

1. Remove Power 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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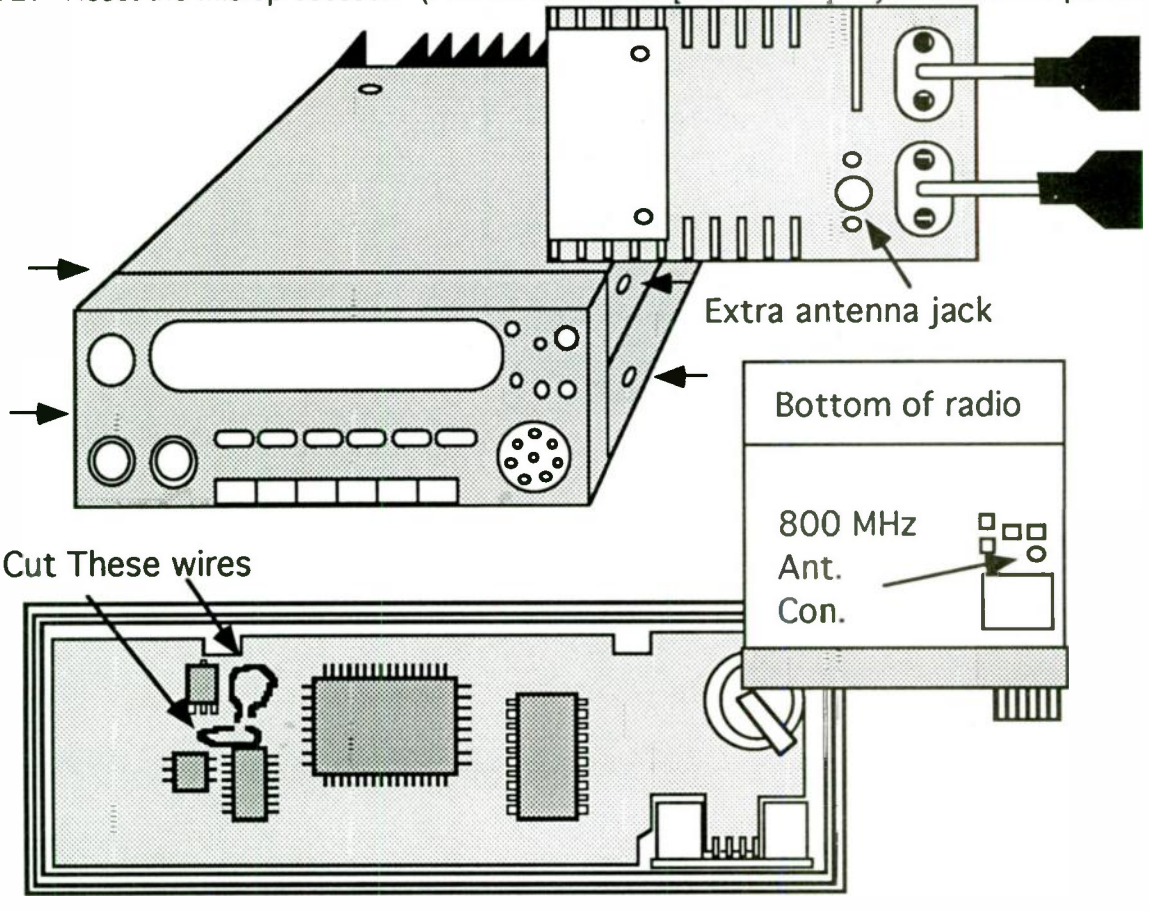
ALINCO DR-599T

EXPANDED RF / CROSS BAND REPEATER MOD

1. Remove the Power cable and Antenna.
2. Remove the 4 screws, (two on each side).
   HOLD THE CONTROL HEAD against the main unit.
3. Remove the 2 screws holding the control head together.
4. Carefully seperate the back and front cover of the control unit.
5. Cut the RED wire to allow reception in the Aircraft and the 800 MHz band.
6. Cut the BLUE wire to expand the TX & RX frequencies.
7. Reasseble the control head.
8. Remove the bottom cover. (two additional screws on the bottom cover)
9. For 800 MHz RX, feed a new antenna cable thru the optional antenna jack on the back of the main body of the radio.
10. Locate antenna connector CN59 and attach the antenna cable.
11. Reassemble the radio .
12. Reset the Microprocessor. (Push and hold the [FUNCTION] key and turn the power on)



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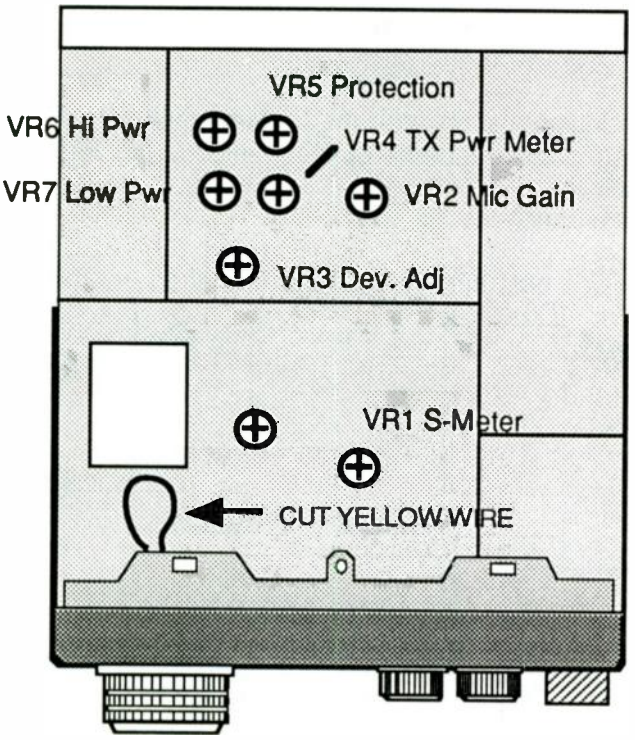
ALINCO DR-1200T

ALIGNMENT CONTROLS

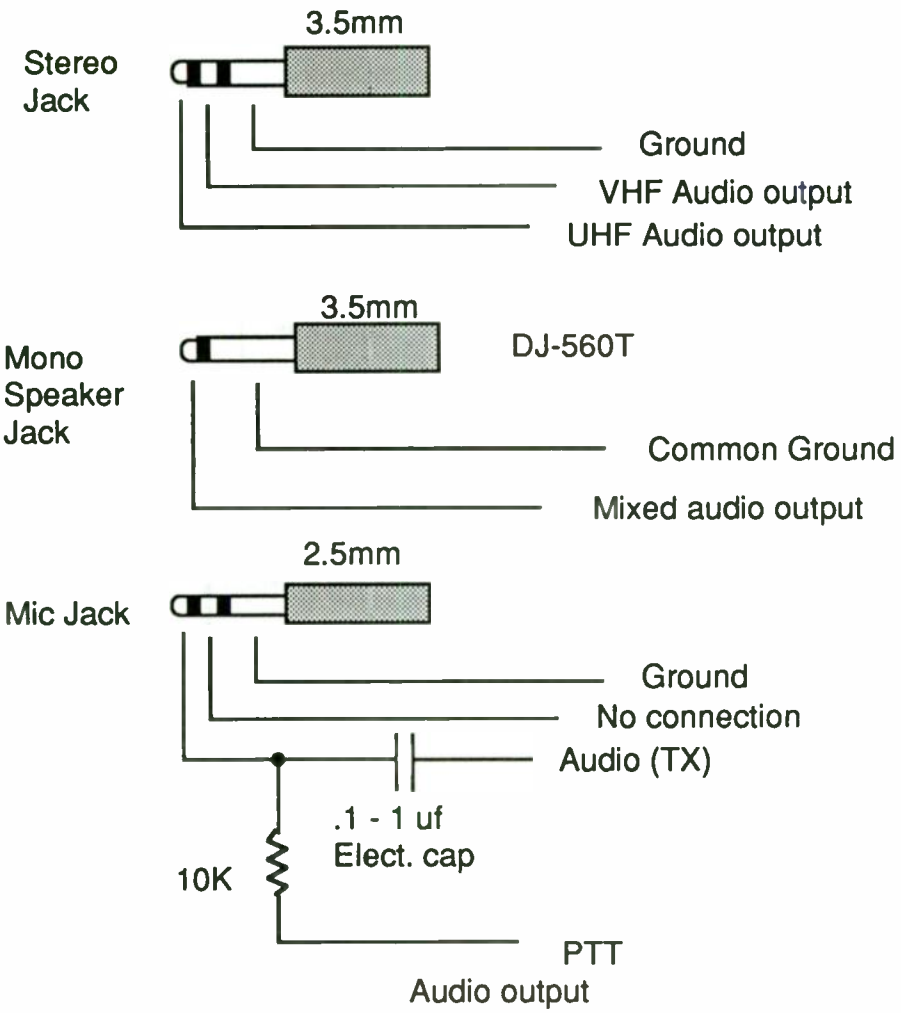


VR1 on Tone squelch board the PL Level

Caution

ALINCO HT

Packet Connections



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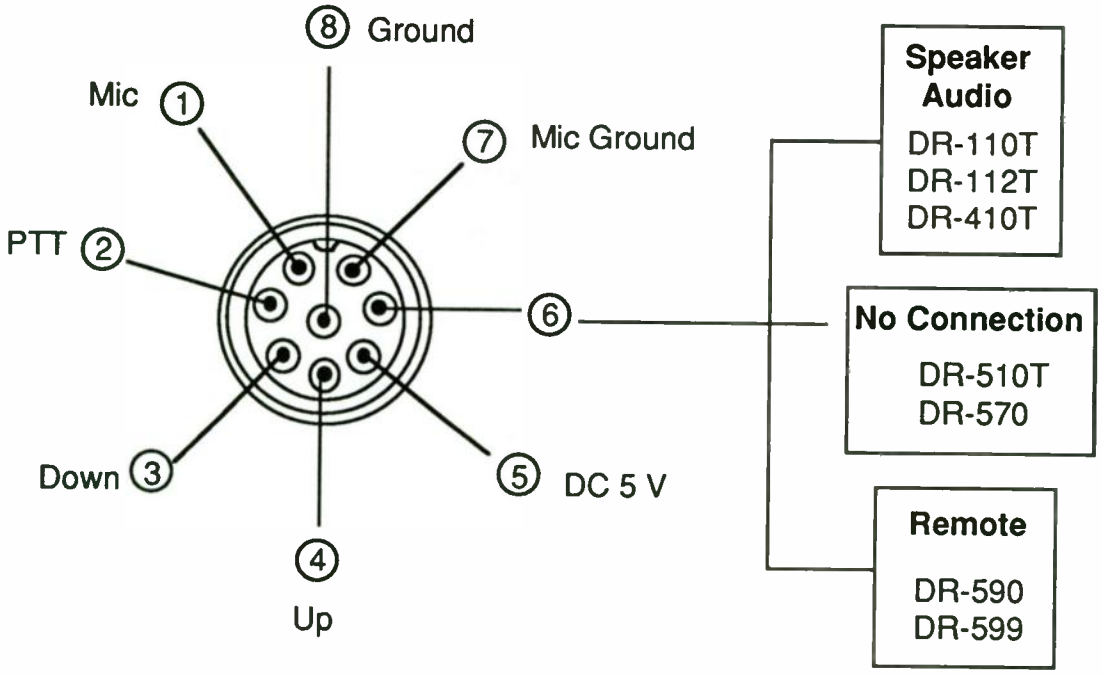
ALINCO Mobile

Packet Connections



Caution

Radio / Tech Modifications

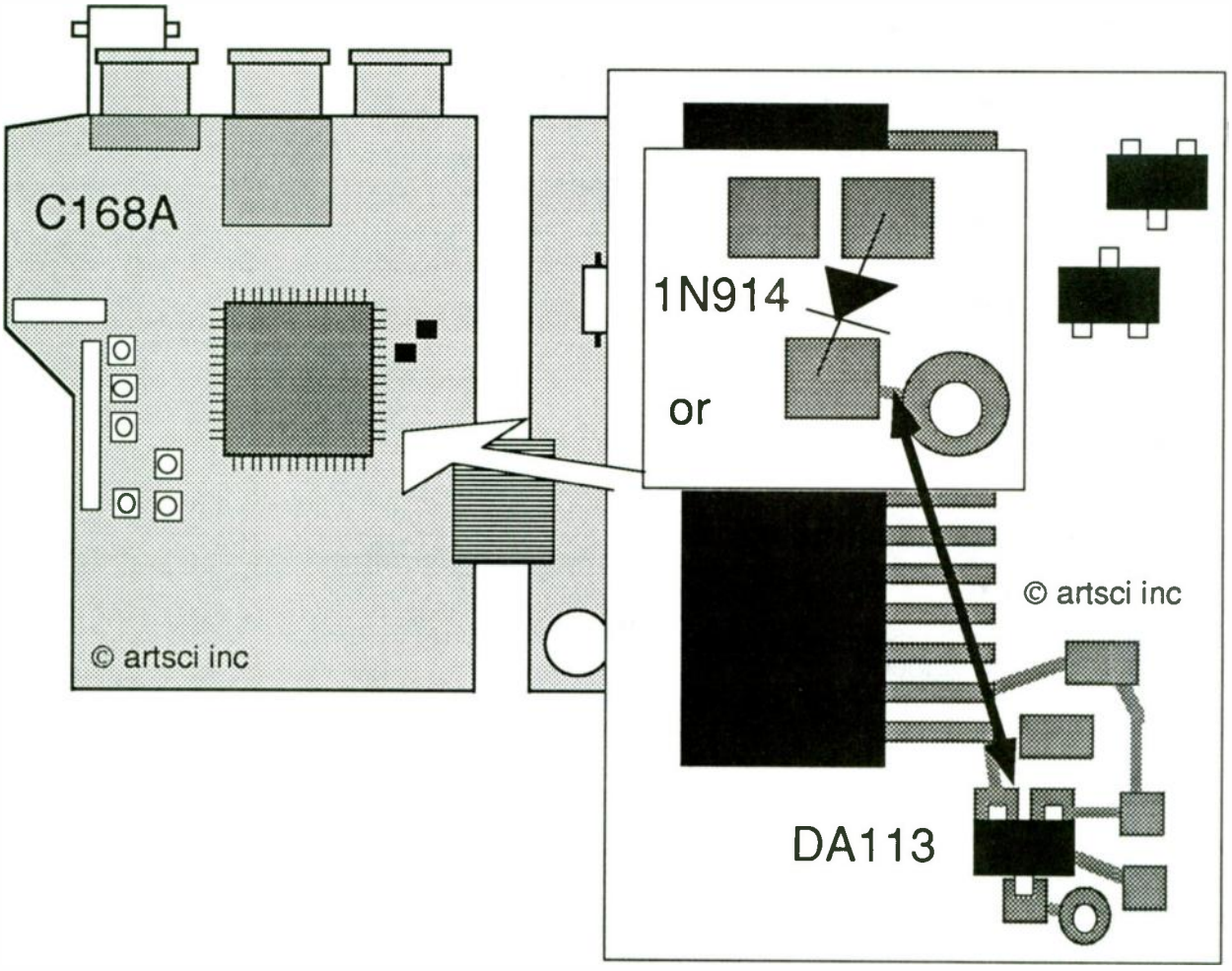
STANDARD/HEATH Radio Modifications

STANDARD

STANDARD C168A

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove screws and open the case. (Be careful. Do not break flat cables)
3. Locate microprocessor. (see Drawing)
4. Install a DA-113 chip diode in place. (A 1N914 may be used)
5. Reasseble the radio.
6. If required, RESET the microprocessor (see instruction manual)



MORE ---

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STANDARD C168S

EXPANDED RX / Keyboard

If your radio ends with an "S"

57 - 97 MHz RX AM/FM /
100 - 175 MHz RX AM/FM
213 - 391 MHz RX AM/FM
115 - 174 MHz TX/RX FM

1. Turn Power on.
2. Press [ENT]
3. Press [0], [9].
4. Press [ENT]
5. Press and hold [F] then [0].
6. Press and hold [F] then [ENT].
7. Press and hold [F] then [0].
8. Press and hold [F] then [0].
9. Press and hold [F] then [8].
10. Press [CL]

All Models

DIRECT FREQENCY ENTRY

1. Press and hold [F] then [0].
2. Press and hold [F] then [0].
3. Press [8].

C168 AM / FM mode switch

1. Press and hold [F] then [0].
2. Press and hold [F] then [2].

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Performance Report

Radio _____ Date _____

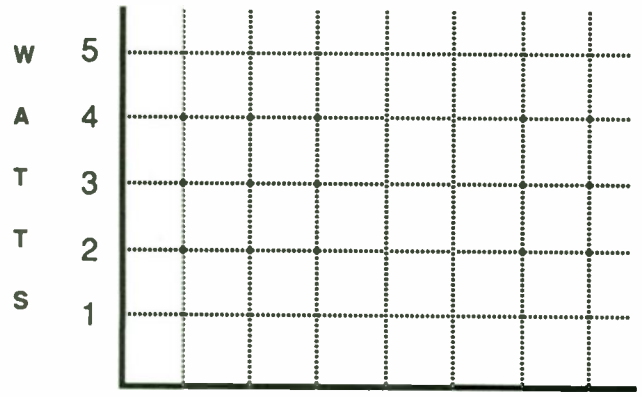
Owner : Name _____

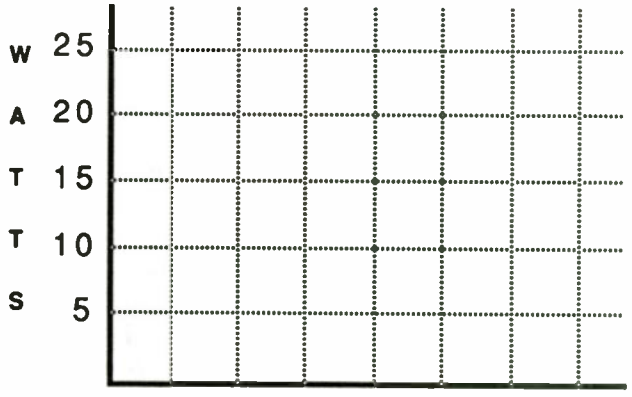
Address _____

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
Receive Sensitivity (____MHz)	_____ uv	_____ uv
Receive Sensitivity (____MHz)	_____ 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

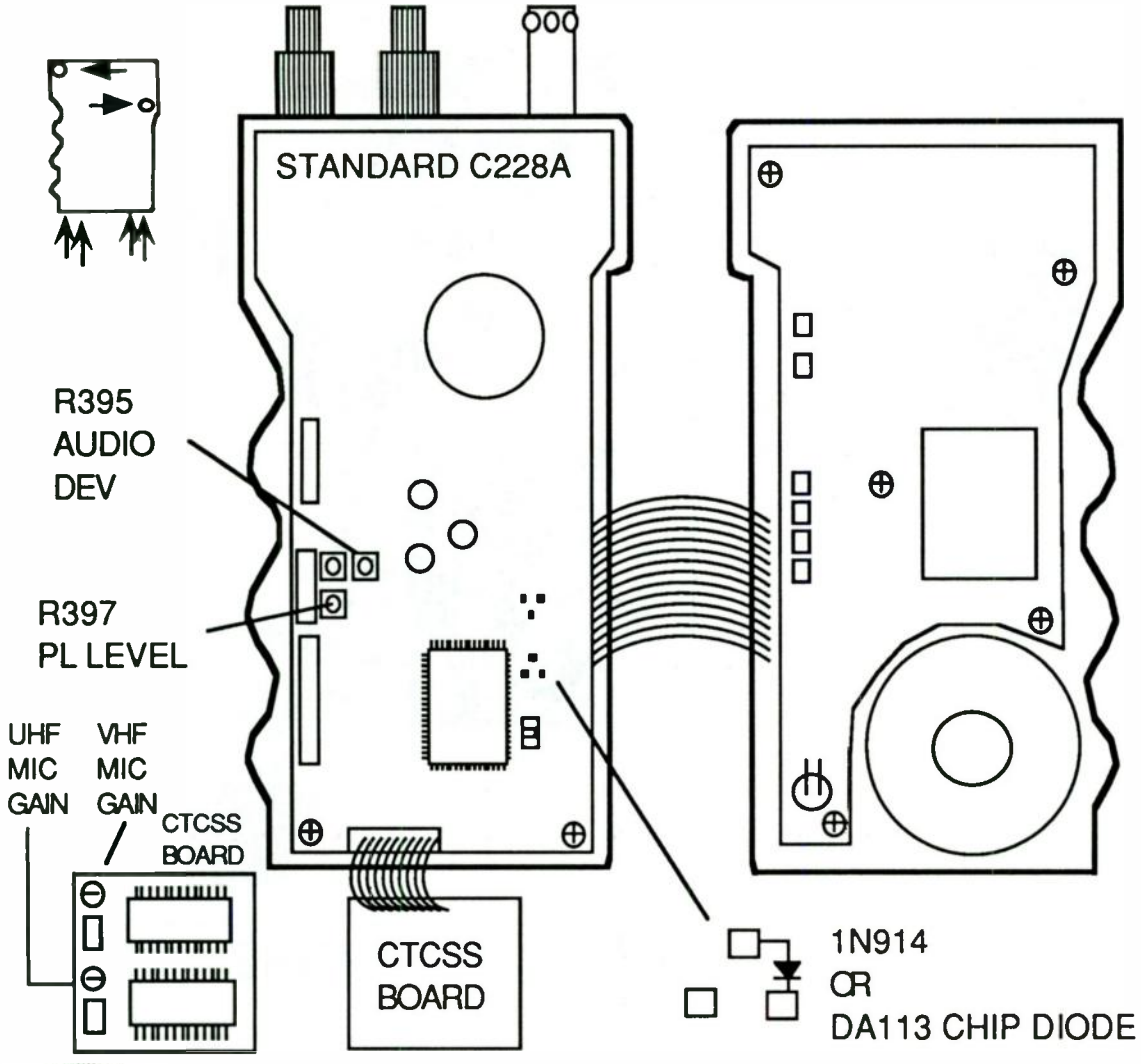




STANDARD C228A

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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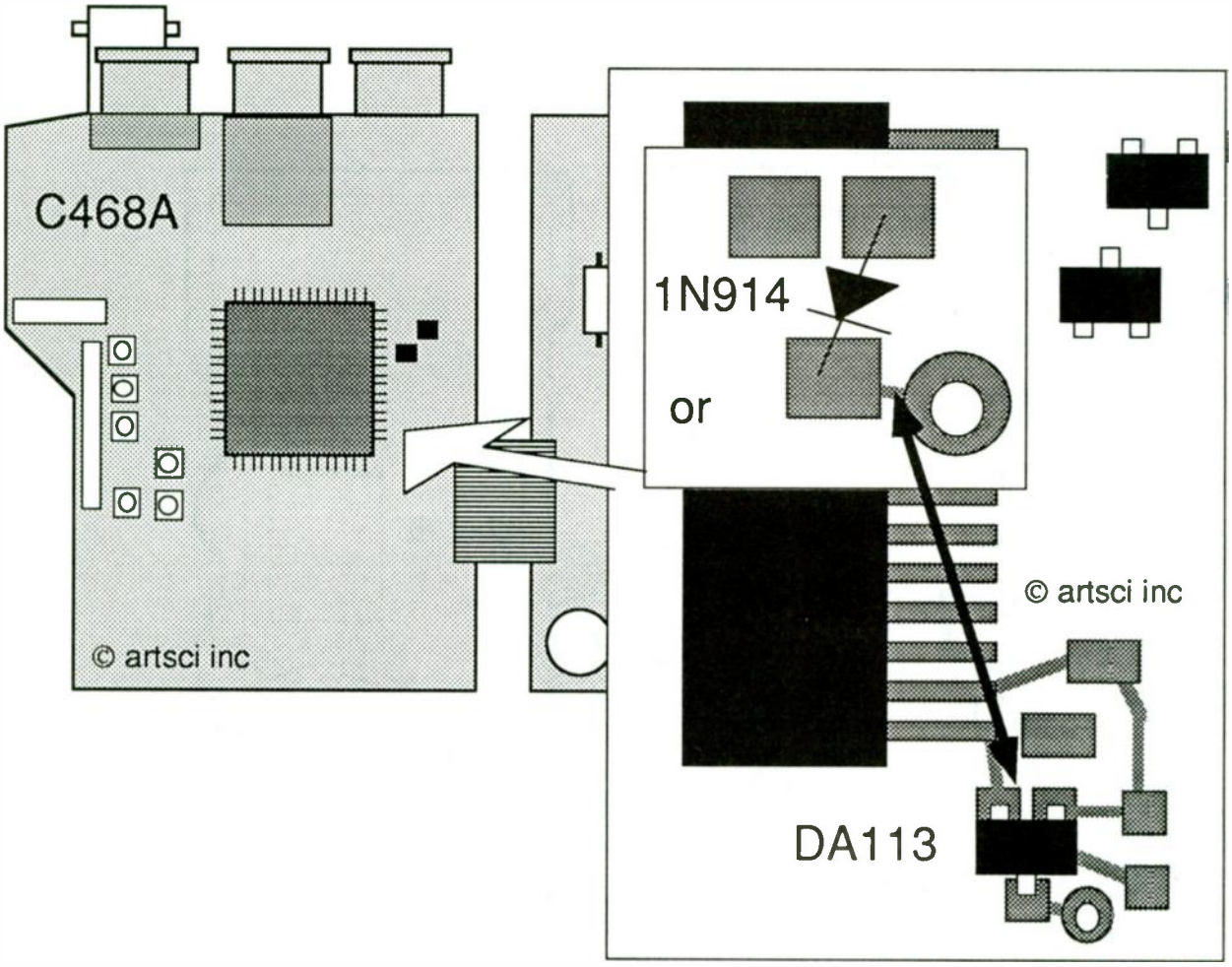
STANDARD C468A

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove screws and open the case. (Be careful. Do not break flat cables)
3. Locate microprocessor. (see Drawing)
4. Install a DA113 chip diode in place. (A 1N914 may be used)
5. Reasseble the radio.
6. If required, RESET the microprocessor (see instruction manual)



MORE ---

Caution

STANDARD C468

EXPANDED RX / Keyboard

If your radio ends with an "S"

57 - 97 MHz RX AM/FM /
100 - 175 MHz RX AM/FM
213 - 391 MHz RX AM/FM
115 - 174 MHz TX/RX FM

1. Turn Power on.
2. Press [ENT]
3. Press [0], [9].
4. Press [ENT]
5. Press and hold [F] then [0].
6. Press and hold [F] then [ENT].
7. Press and hold [F] then [0].
8. Press and hold [F] then [0].
9. Press and hold [F] then [8].
10. Press [CL]

All Models

DIRECT FREQENCY ENTRY

1. Press and hold [F] then [0].
2. Press and hold [F] then [0].
3. Press [8].

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STANDARD C528A

EXPANDED RF / Keyboard / Mars/Cap

1. Turn Power on.
2. Push RESET.
3. Press and hold [FUNCTION] then [0]
4. Press and hold [FUNCTION] then [ENT]
5. Press PTT Briefly.
6. Press [UHF]
7. Press and hold [FUNCTION] then [LAMP]
8. Press and hold [FUNCTION] then [0]
9. Press and hold [FUNCTION] then [CODE]
10. Press and hold [FUNCTION] then [LAMP]
11. Press and hold [FUNCTION] then [3]
12. Press PTT Briefly.
13. Press [VHF]
14. Press and hold [FUNCTION] then [STEP]
15. Select 12.5 KHz. (Use Selectror Knob)
16. Press PTT Briefly.
17. Press and hold [FUNCTION] then [8]
18. Press and hold [FUNCTION] then [8]
19. Press and hold [FUNCTION] then [7]
20. Press and hold [FUNCTION] then [7]
21. Press and hold [FUNCTION] then [MS.M]
22. Select 144.9975 MHz (Use Selector Knob)
23. Press and hold [FUNCTION] then [0]
24. Press and hold [FUNCTION] then [ENT]
25. Press PTT Briefly.
26. Press and hold [FUNCTION] then [8]
27. Press and hold [FUNCTION] then [MS.M]

To Receive 300 - 400 Mhz or 800 - 900 MHz

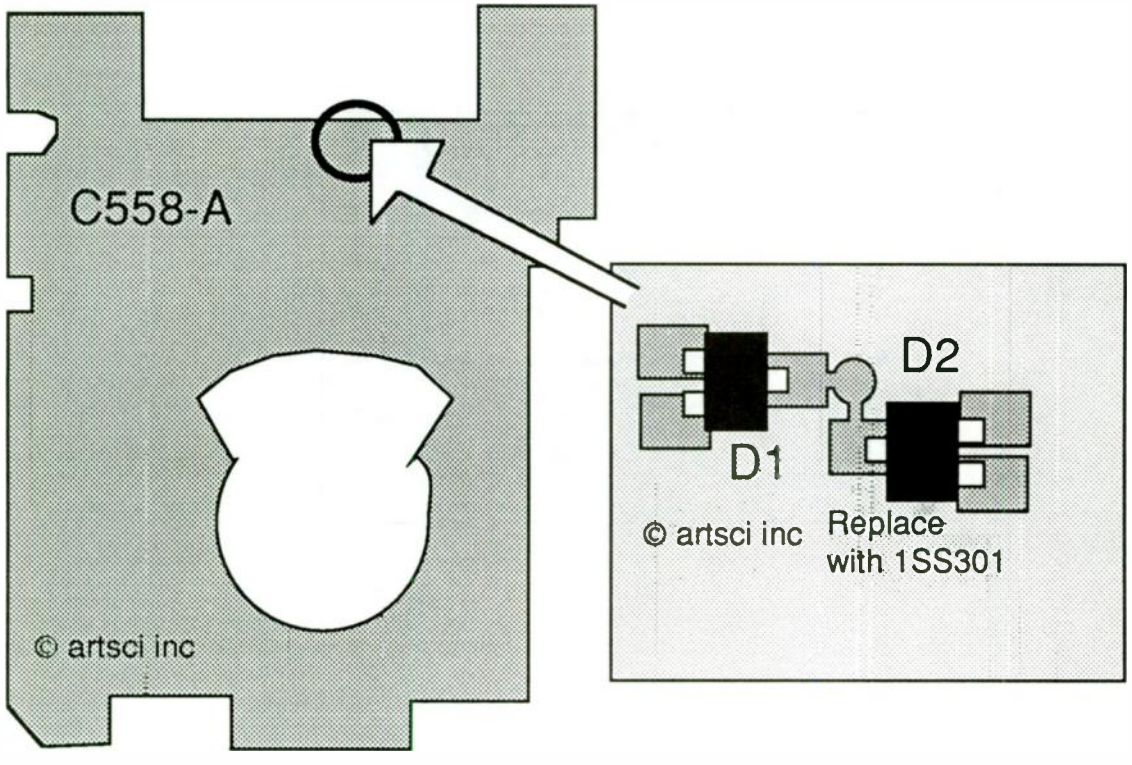
Press [UHF]
Press and hold [FUNCTION] then [SET]
Press and hold [FUNCTION] then [3] to Select Bands

Caution

STANDARD C558A

EXPANDED RX

1. Remove Battery and antenna.
2. Locate and remove body screws and open the case.
3. Locate and unsolder the copper plate from the back side of the LCD displat.
4. Locate and remove chip diode D2. (see drawing)
5. Attach a 1SS301 chip diode in the vacant D2 position.
6. Reassebmle the radio.
7. Reset the microprocessor, if required.



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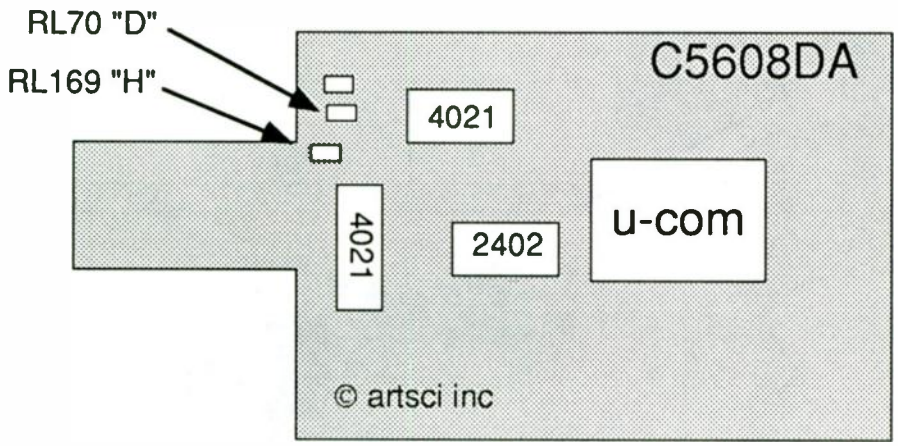
STANDARD C5608DA

EXPANDED RF

1. Remove power and antenna.
2. Remove 0 ohm resistors near the microprocessor.
   Specific data:

RL169 "H" symbol	400-469.996 MHz	TX
	250-499.995 MHz	RX
RL70 "D" symbol	130-173.995 MHz	TX
	100-199.995 MHz	RX

3. Reassemble the radio.
4. Reset the microprocessor (if required)



Caution

HEATH H-2 Mini HT

EXPANDED RF

1. Remove battery and Antenna.
2. Remove 2 lower screws from the battery plate.
3. Remove 2 screws securing thr front & back cases.
4. Locate Q12 Position. (find point A and B)
5. Solder a diode (1N914 or eq.) from point A to point B
   Cathode to point A, Anode to Point B.
6. Reassemble the radio.

Caution

Notes

HEATH H4-HT Twin Band

EXPANDED RF

1. Remove battery and Antenna.
2. Remove 2 lower screws from the battery plate.
3. Remove 2 screws securing thr front & back cases.
4. Locate Q106 Position. (find point A and B)
5. Solder a diode (1N914 or eq.) from point A to point B
   Cathode to point A, Anode to Point B.
6. Reassemble the radio.

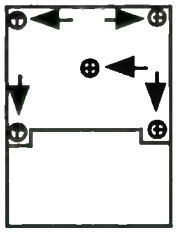
Caution

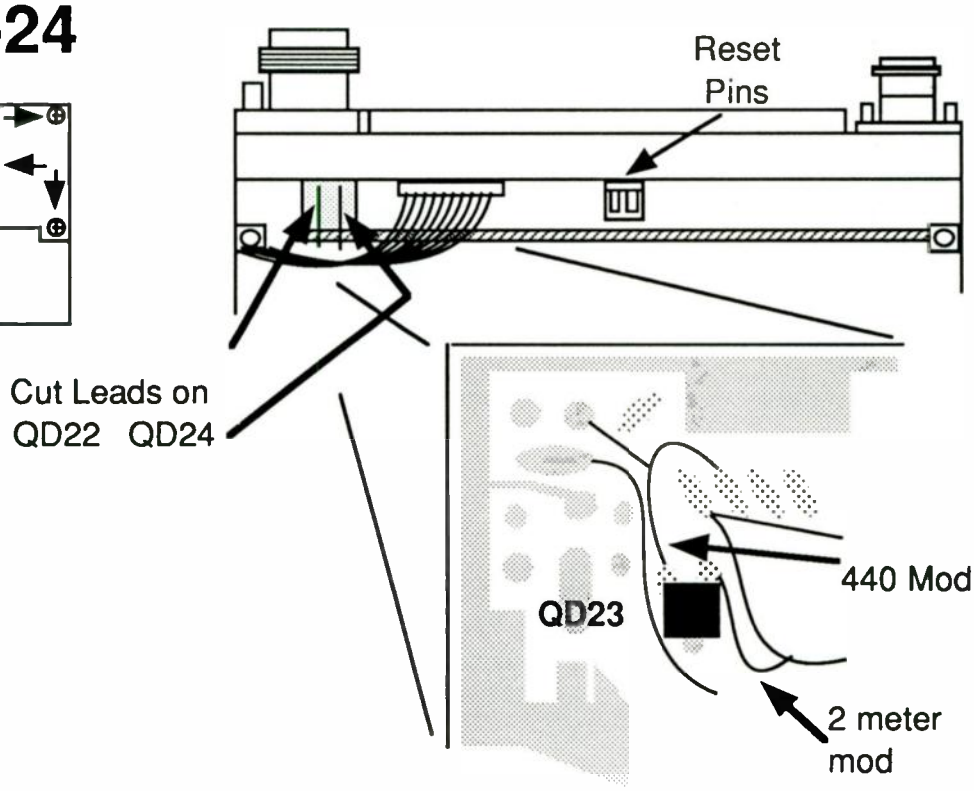
HEATH HW-24

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





MORE ---

Caution

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HEATH HW-24

EXPANDED RF / Keyboard / Mars/Cap

1. Turn Power on.
2. Push RESET.
3. Press and hold [FUNCTION] then [0]
4. Press and hold [FUNCTION] then [ENT]
5. Press PTT Briefly.
6. Press [UHF]
7. Press and hold [FUNCTION] then [LAMP]
8. Press and hold [FUNCTION] then [0]
9. Press and hold [FUNCTION] then [CODE]
10. Press and hold [FUNCTION] then [LAMP]
11. Press and hold [FUNCTION] then [3]
12. Press PTT Briefly.
13. Press [VHF]
14. Press and hold [FUNCTION] then [STEP]
15. Select 12.5 KHz. (Use Selectror Knob)
16. Press PTT Briefly.
17. Press and hold [FUNCTION] then [8]
18. Press and hold [FUNCTION] then [8]
19. Press and hold [FUNCTION] then [7]
20. Press and hold [FUNCTION] then [7]
21. Press and hold [FUNCTION] then [MS.M]
22. Select 144.9975 MHz (Use Selector Knob)
23. Press and hold [FUNCTION] then [0]
24. Press and hold [FUNCTION] then [ENT]
25. Press PTT Briefly.
26. Press and hold [FUNCTION] then [8]
27. Press and hold [FUNCTION] then [MS.M]

To Receive 300 - 400 Mhz or 800 - 900 MHz

Press [UHF]
Press and hold [FUNCTION] then [SET]
Press and hold [FUNCTION] then [3] to Select Bands

Caution

HEATH SB-1400

EXPANDED RF

1. Remove power and Antenna.
2. Remoce screws and ope the case.
3. Locate the BROWN jumper wire on the display unit.
4. Cut the BROWN jumper wire.
5. Reassemble the radio.
6. Reset the microprocessor.
   (Set VFO at 12.3456 MHz, Turn power of and on again)

Caution

Radio / Tech Modifications

YAESU Radio Modifications

YAESU

Radio / Tech Modifications

YAESU Radio Modifications

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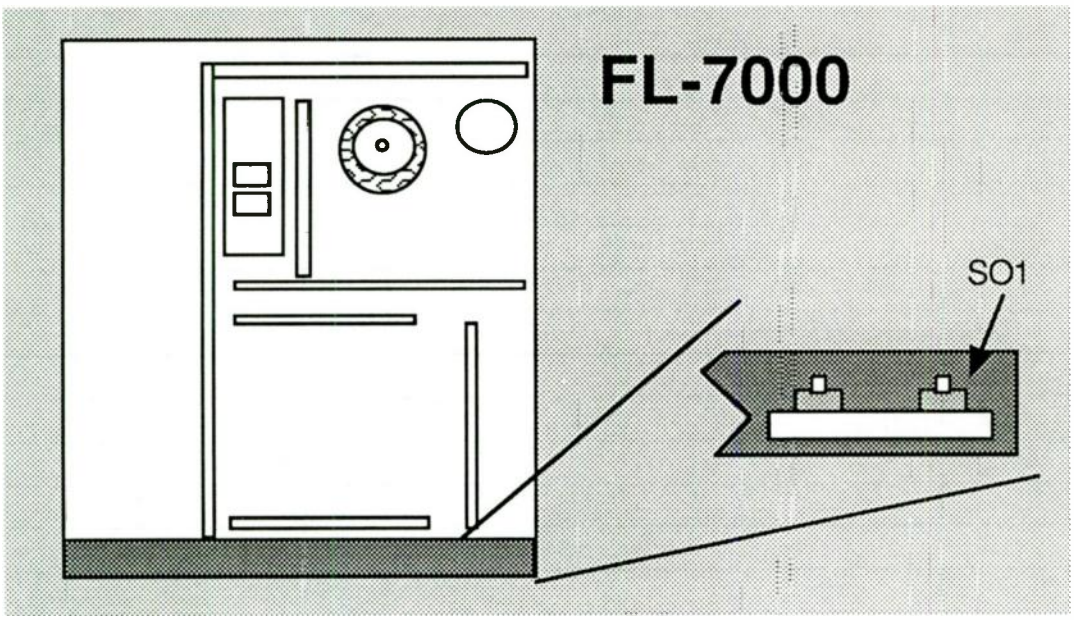
YAESU FL-7000

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

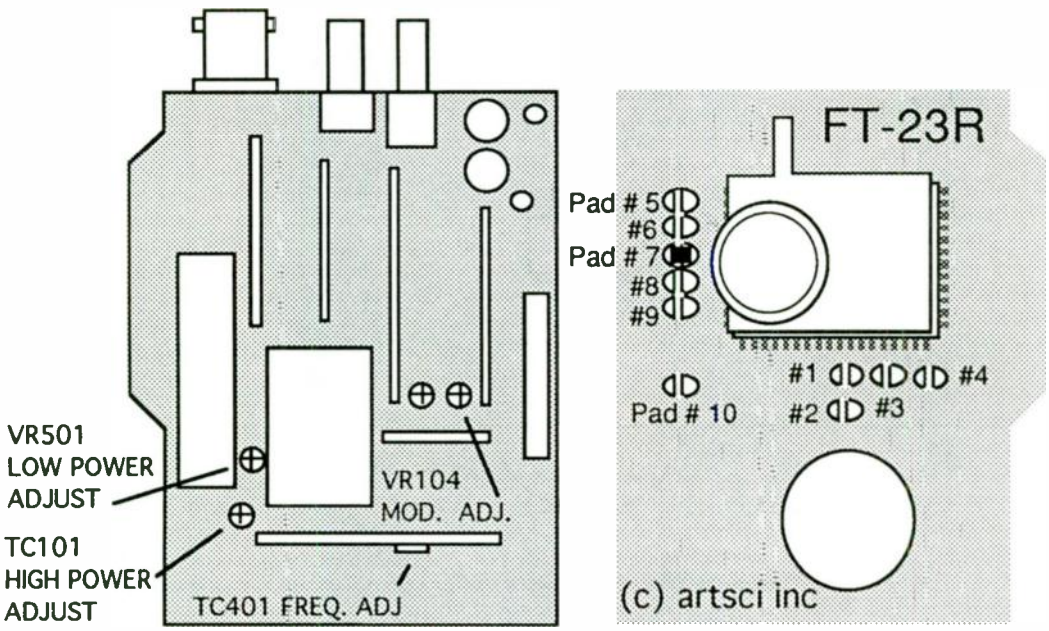
Radio / Tech Modifications

Notes

YAESU FT-23R

EXPANDED RF & ALIGNMENT CONTROLS

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.



Pad #1	Filter for 140-164 RX
Pad #2	Filter for 164-?? RX
Pad #3&4	Step selection 20 or 25 KHz 3&4 unsoldered = 10 KHz step
Pad #5	5 MHz offset
Pad #6	1.6 MHz offset 5&6 unsoldered = 600 kHz offset
Pad #7,8&9	Band selections
Pad #10	Unknown

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

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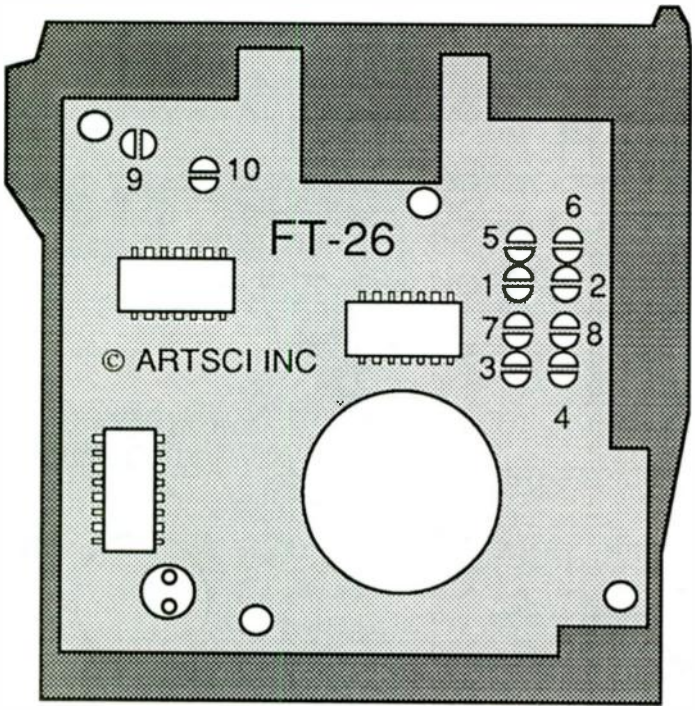
YAESU FT-26

EXPANDED RF

New Range: 135 - 174 MHz

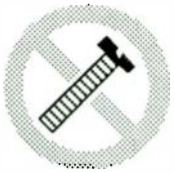
1. Remove Battery and Antenna.
2. Remove the 4 screws holding the battery track.
3. Remove the 2 screws in the back case.
4. Carefully separate the front cover.
5. Locate and remove solder on Jumper pad 10. (on control board)



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

MORE ---



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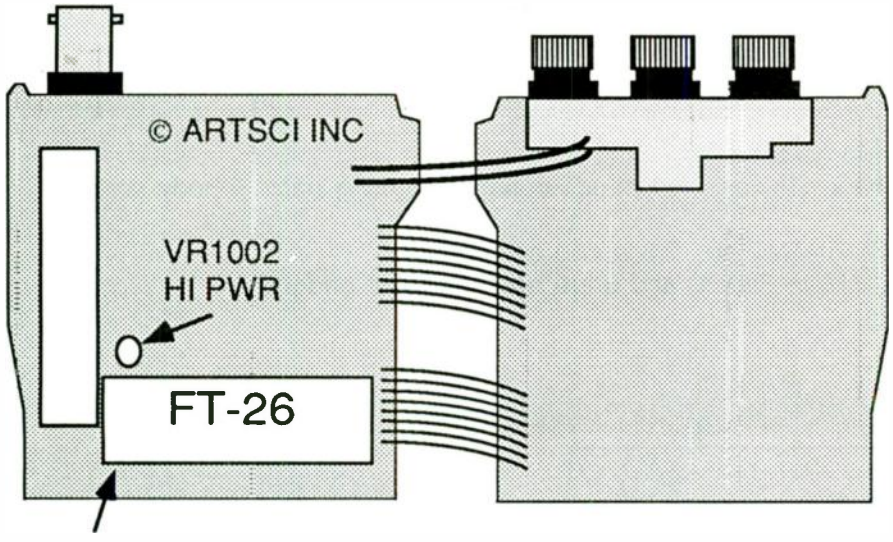
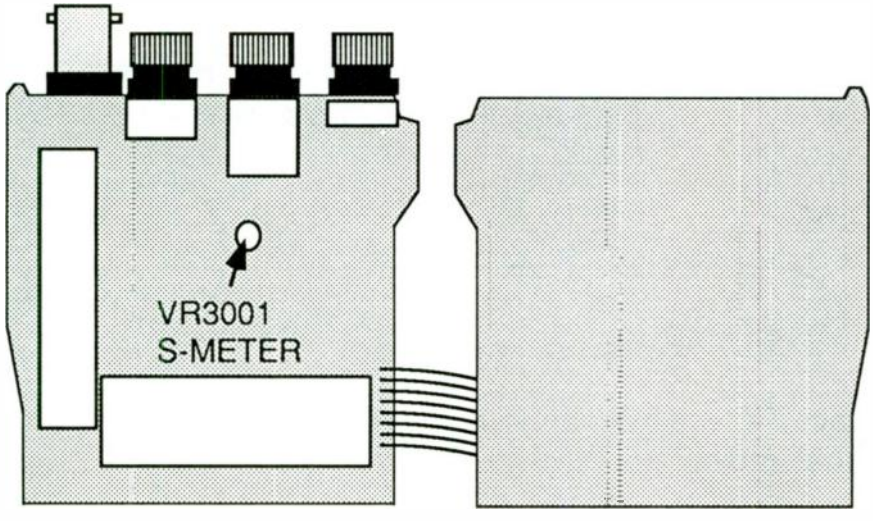
YAESU FT-26

ALIGNMENT POINTS





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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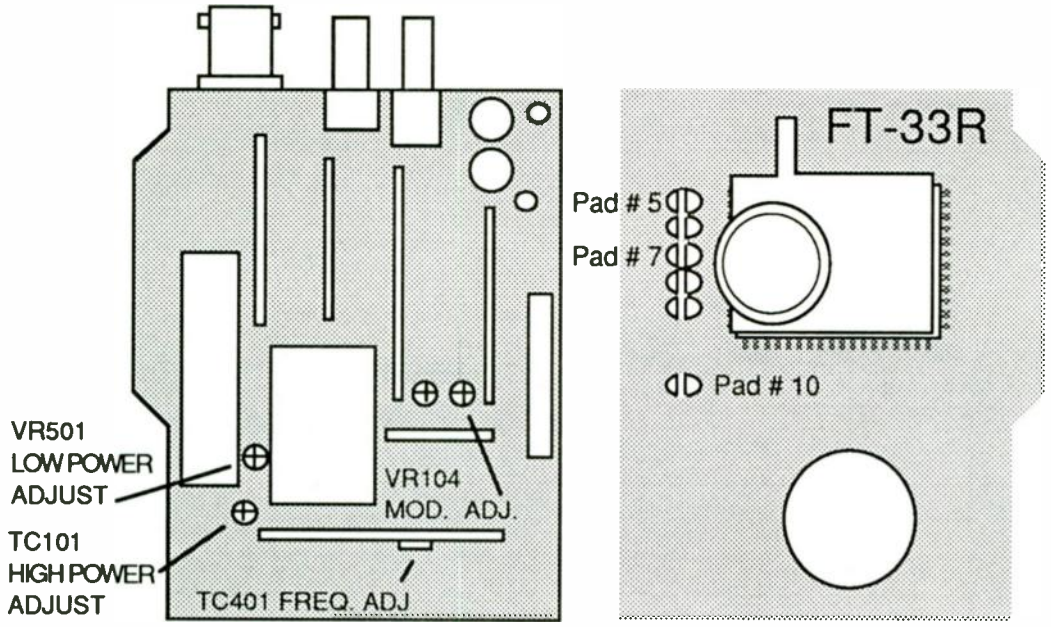
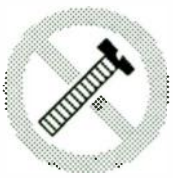
YAESU FT-33R

EXPANDED RF & ALIGNMENT CONTROLS

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.

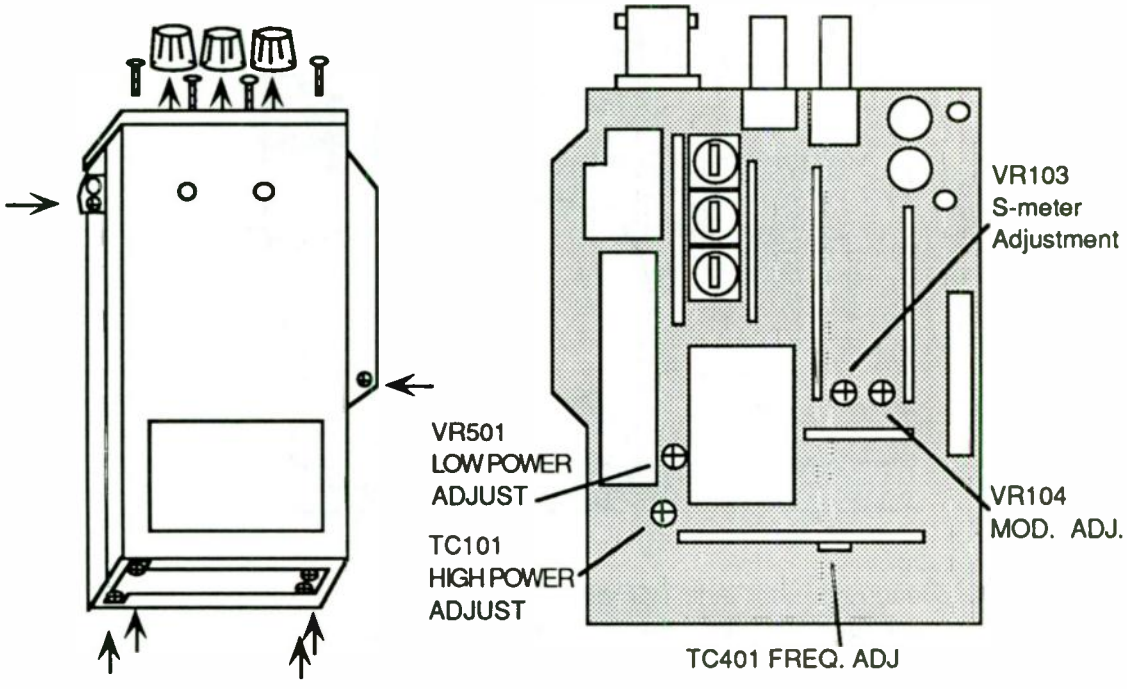


Caution

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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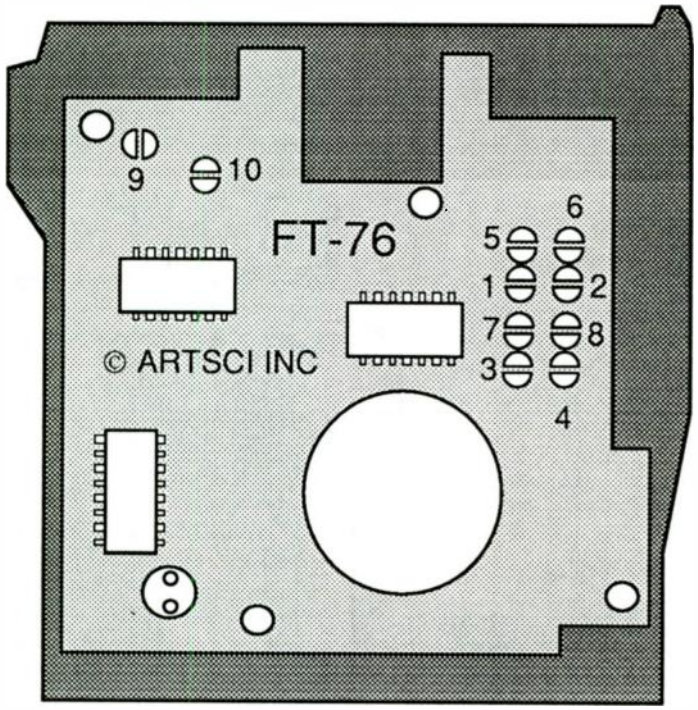
YAESU FT-76

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

New Range: 400 - 485 MHz RX, 415 - 470 MHz TX

MORE ---

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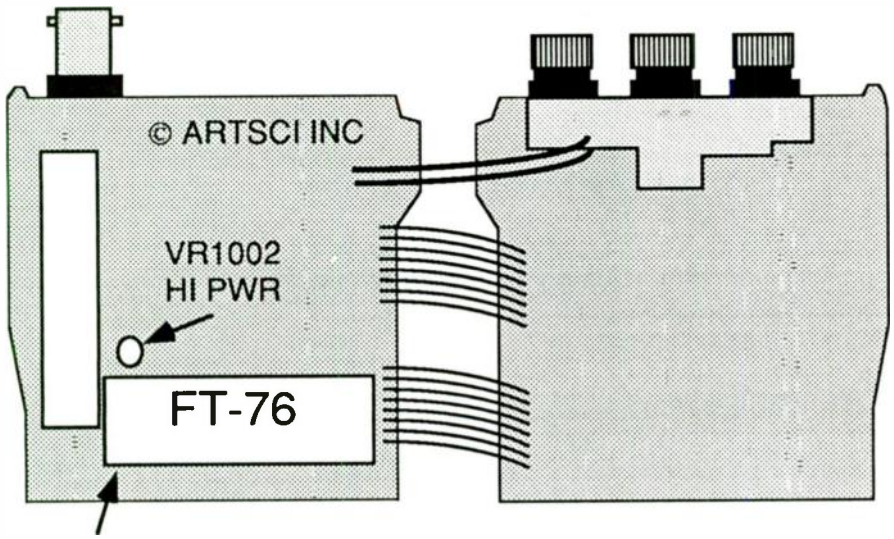
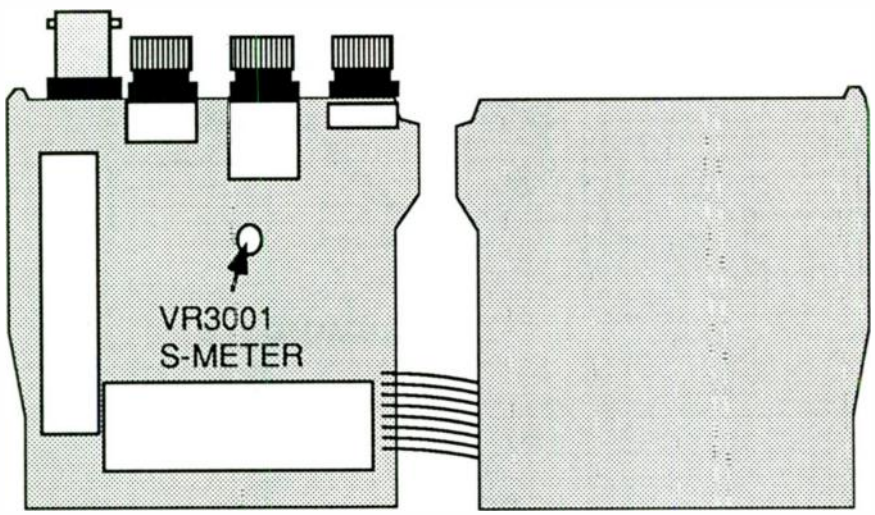
YAESU FT-76

ALIGNMENT POINTS





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

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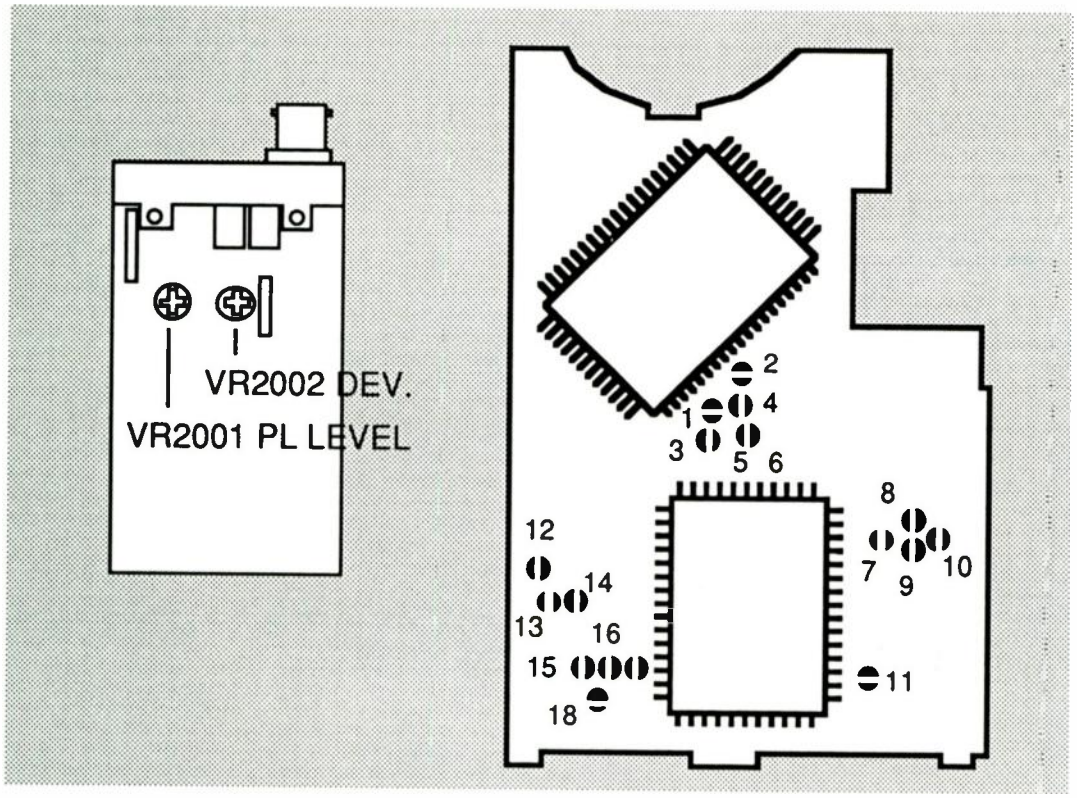
YAESU FT-209

ALIGNMENT POINTS

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 alignment pots. Make adjustments
8. Reassemble the radio.
9. Reset the microprocessor (If desired)
10. Enter 1440 [D], 1480 [D], 1440 [D], 1480 [D], 0600 [SHIFT]
    Note: RX range of 144.0 - 148.0 MHz and TX range of 144.0 - 148.0 MHz

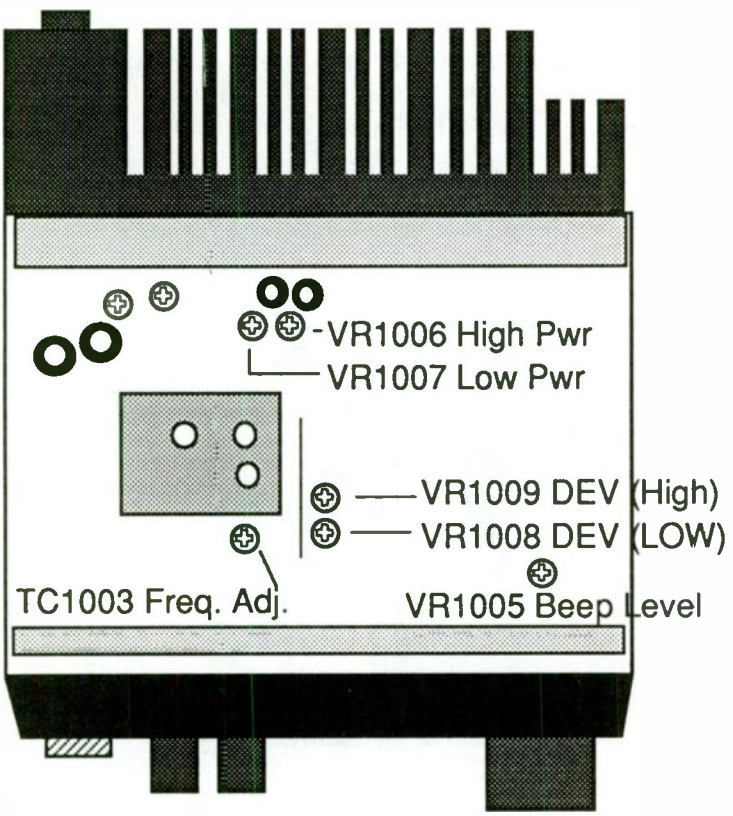


Caution

YAESU FT-211

EXPANDED RF & ALIGNMENT CONTROLS

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.



YAESU FT-212

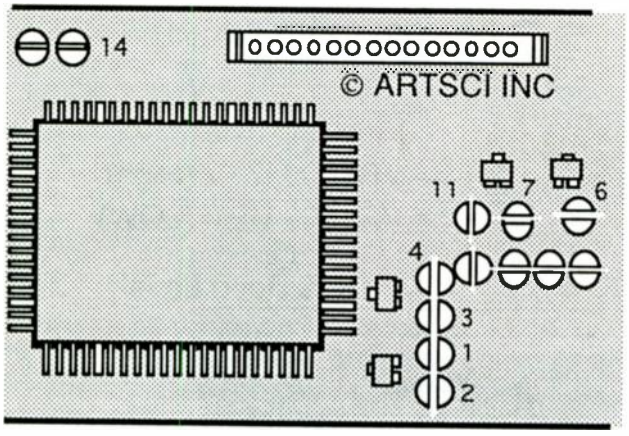
EXPANDED RF

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. Locate & remove solder from pad #1 on control unit.
8. Locate & 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. Reassemble the radio. Replace knobs, screws etc.
12. Apply DC power and turn radio on.
13. Press [MHz] & use the control knob to enter 140 and press [D/MR]. (lower limit)
14. Press [MHz] and use knob to enter 174 and press [D/MR]. (upper limit)
15. Press [F] and then [RPT] button. use the control knob to enter 0.600. Press the [RPT] button.

Note: New range 140 - 164 MHz

FT-212



MORE ---

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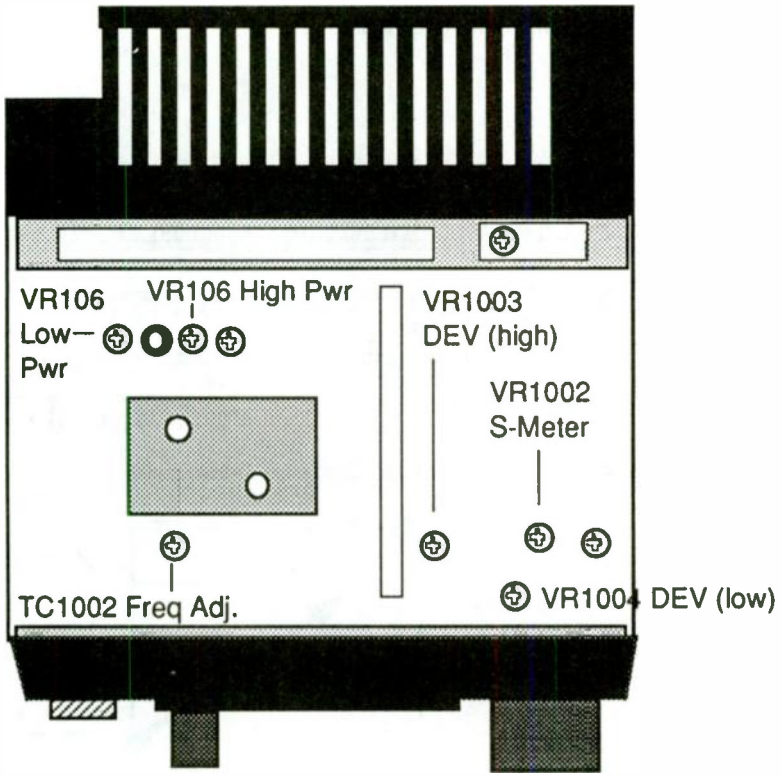
YAESU FT-212

ALIGNMENT CONTROLS



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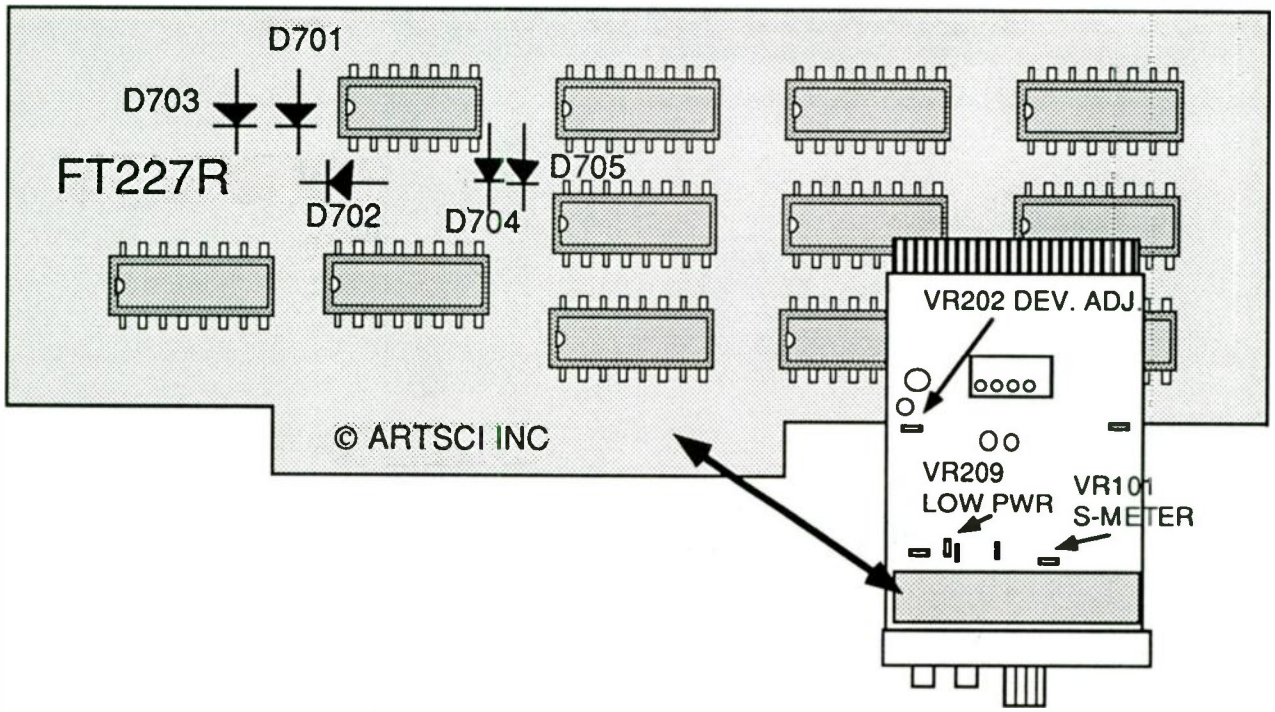
YAESU FT-227R

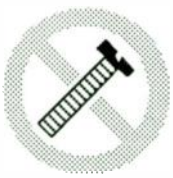
EXPANDED RF & ALIGNMENT CONTROLS

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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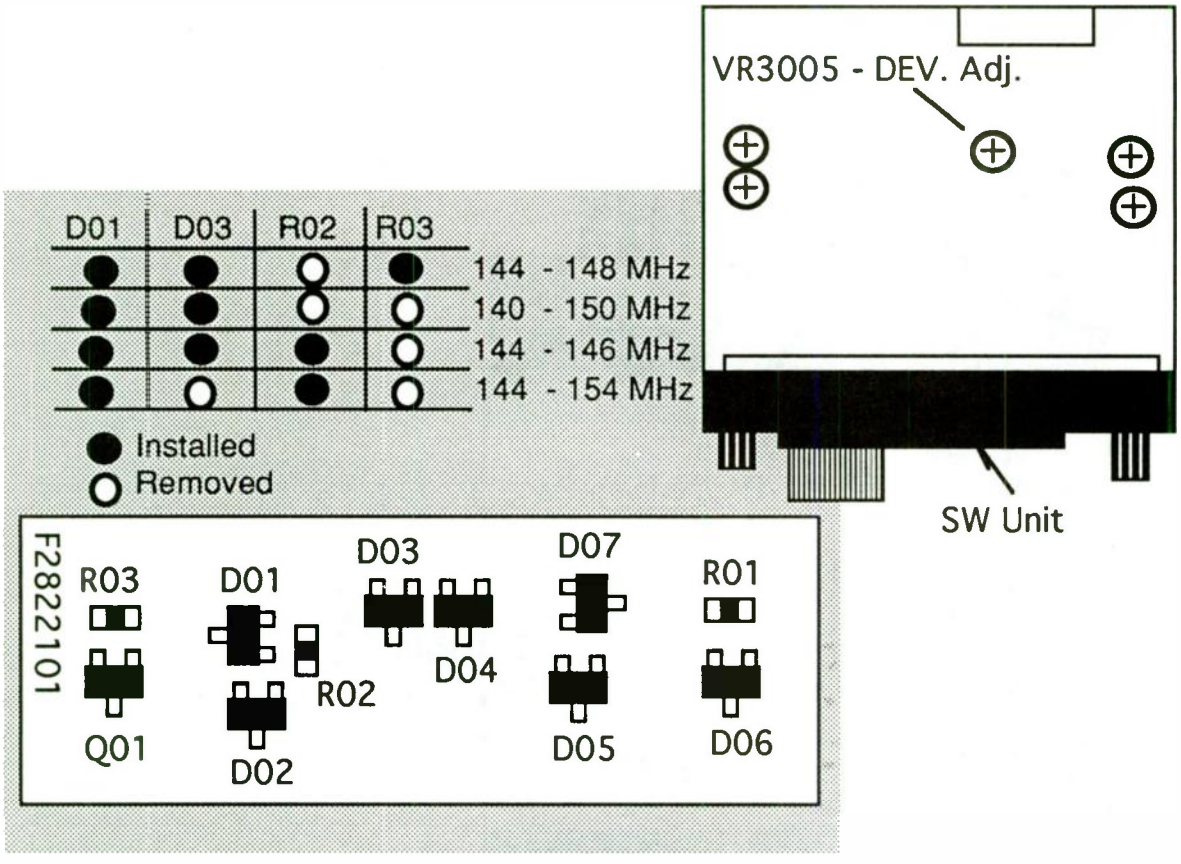
YAESU FT-290 MKII

EXPANDED RF & ALIGNMENT CONTROL

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.



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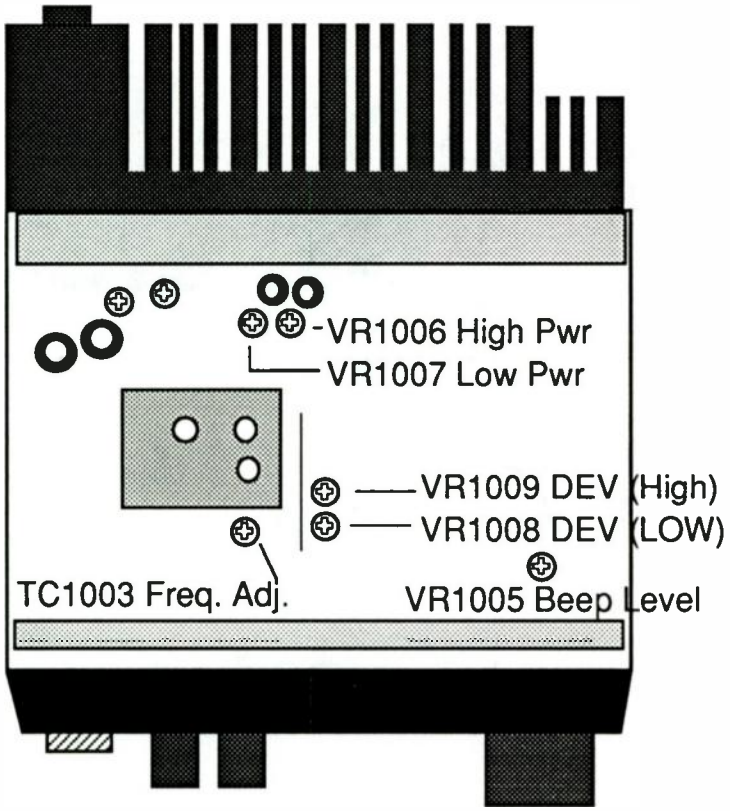
YAESU FT-311

EXPANDED RF & ALIGNMENT CONTROLS

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.



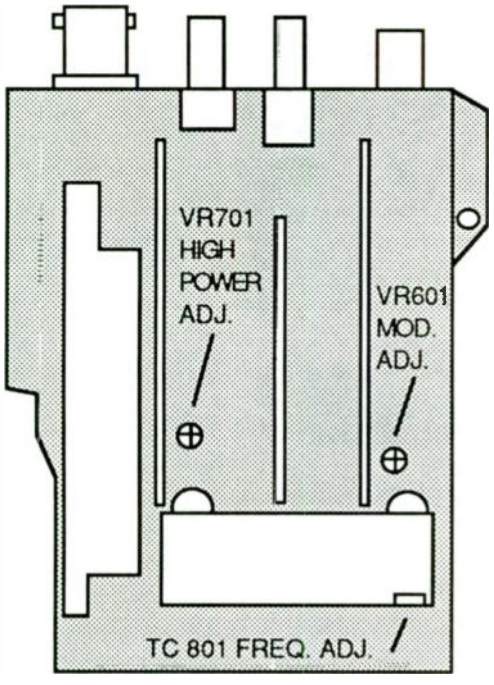
Caution

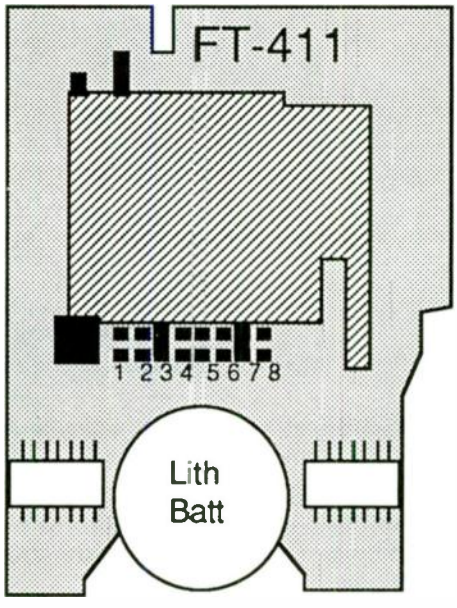
YAESU FT-411 E

EXPANDED RF & ALIGNMENT CONTROLS

(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], [2] & [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

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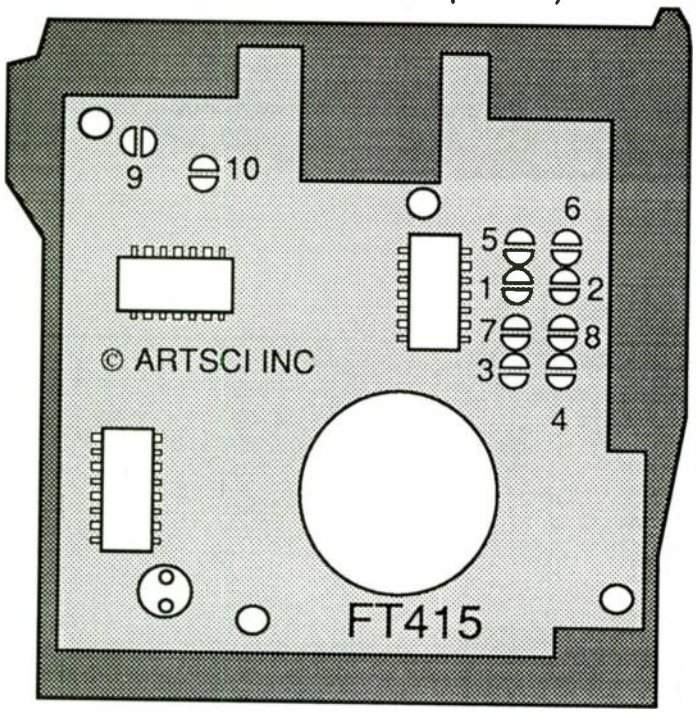
YAESU FT-415

EXPANDED RF

Range : 120 - 174 MHz RX, 135 - 174 MHz TX

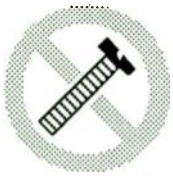
1. Remove Battery and Antenna.
2. Remove the four screws holding the battery track in place.
3. Remove the two black screws holding the rear case in place.
4. Carefully open the front cover from the radio.
5. Locate and solder jumper pads 5 & 7. Pads 3 and 9 are already jumpered.
   (Jumper pads 1 & 10 for 1750 Hz Tone Burst operation)



6. Carefully replace the front cover and replace the two black screws.
7. Replace the battery track and the four screws.
8. Reset the microprocessor.
   Press and hold [MR], [2] and [VFO] and turn the radio on.
9. The radio display will cycle orderly thru the memory channels.
   Enter the following band limits:

Ch. 1	Enter 120.00 and then press [VFO]	(Rx low limit)
Ch. 2	Enter 174.00 and then press [VFO]	(Rx high limit)
Ch. 1	Enter 135.00 and then press [VFO]	(Tx low limit)
Ch. 1	Enter 174.00 and then press [VFO]	(Tx high limit)

MORE---



Caution

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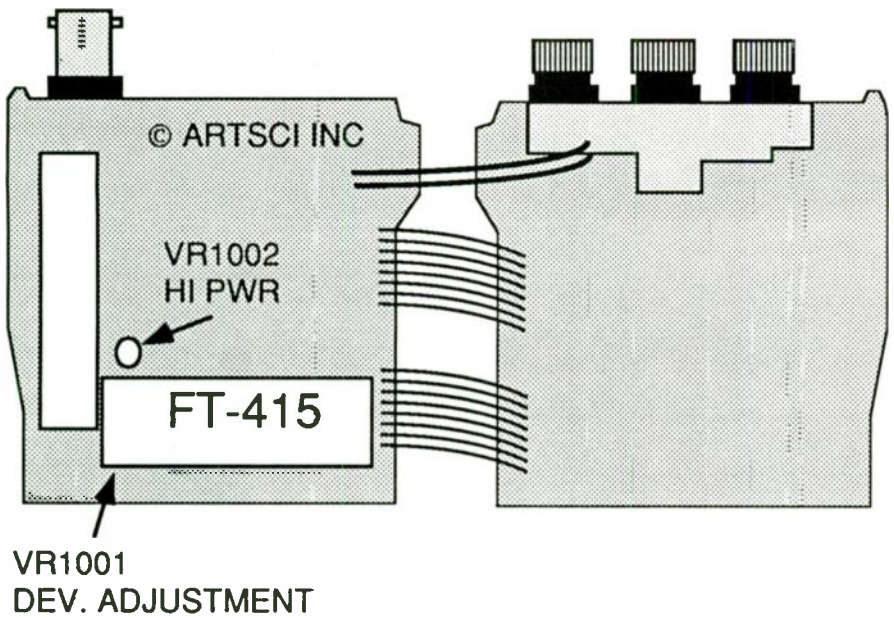
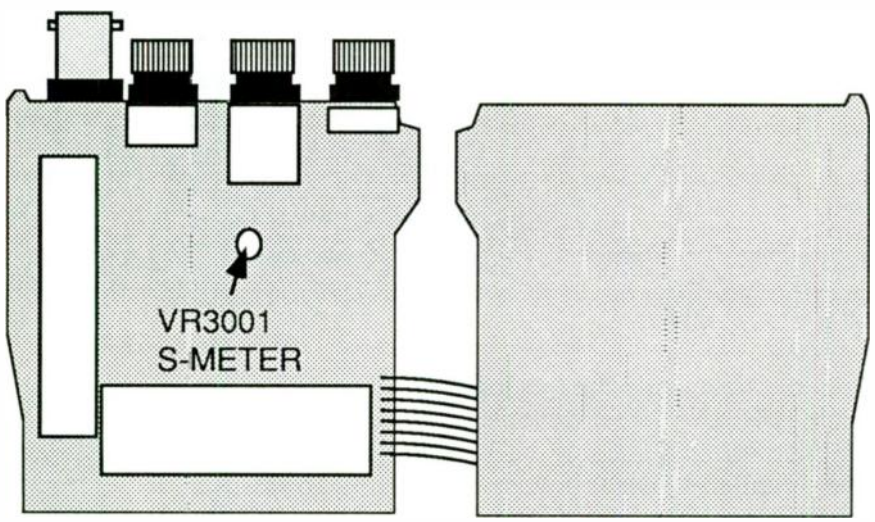
YAESU FT-415

EXPANDED RF & ALIGNMENT POINTS

10. Press [F] [7] and select 5 kHz channel spacing in each VFO.



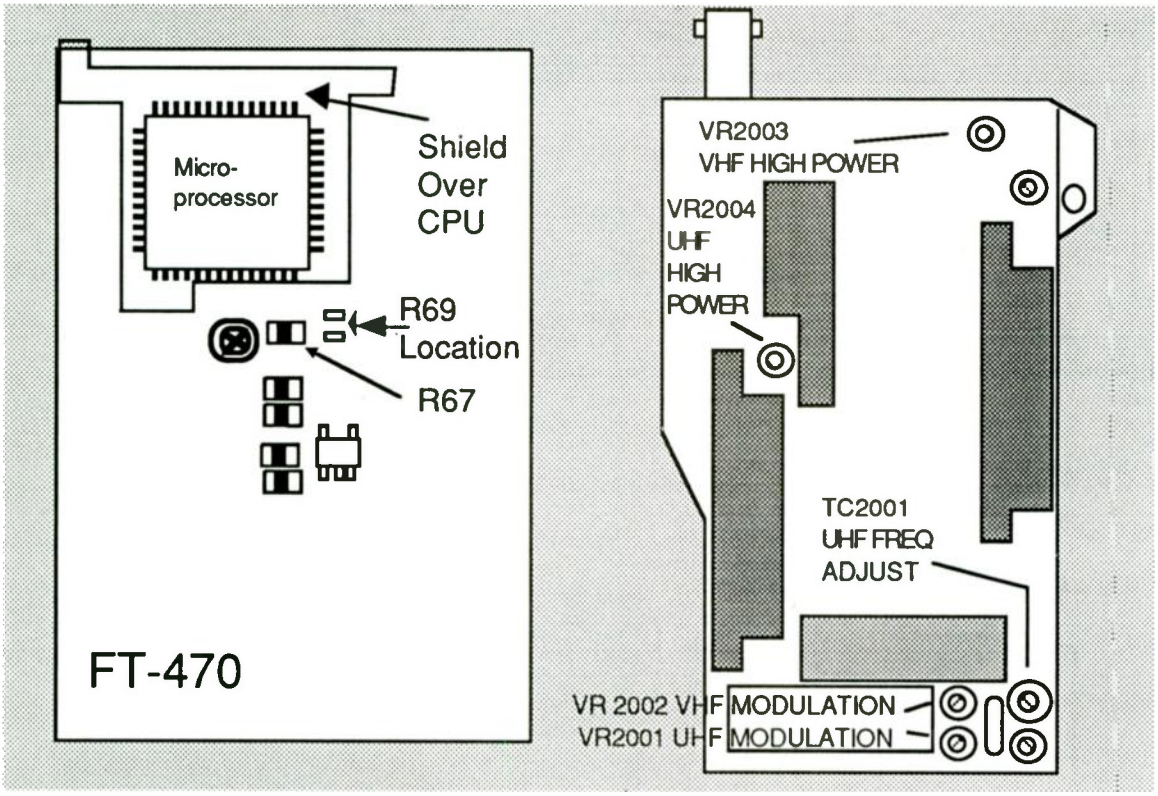


Caution

YAESU FT-470

EXPANDED RF & ALIGNMENT POINTS

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(or jumper) in the empty R69 position.
6. OPTIONAL- Crossband Half Duplex mod. Place a jumper wire from pin 4 & 14 of the flat cable wire connecting the front and back panels. This will use the ON AIR signal to mute the AUDIO CNTL line, muting the other band while transmitting.
7. Solder the lithium battery back in place.
8. Reassemble the radio.

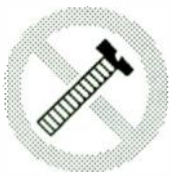


Range 140 MHz - 174 MHz

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 430-500 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 [F/M] 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 500 MHz.
8. Press and hold the [F/M] 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 [F/M] 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 up1 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.

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YAESU FT-650

EXPANDED RF

1. Turn the radio off.
2. Press and hold {VFO] & [MR] and turn on the radio.

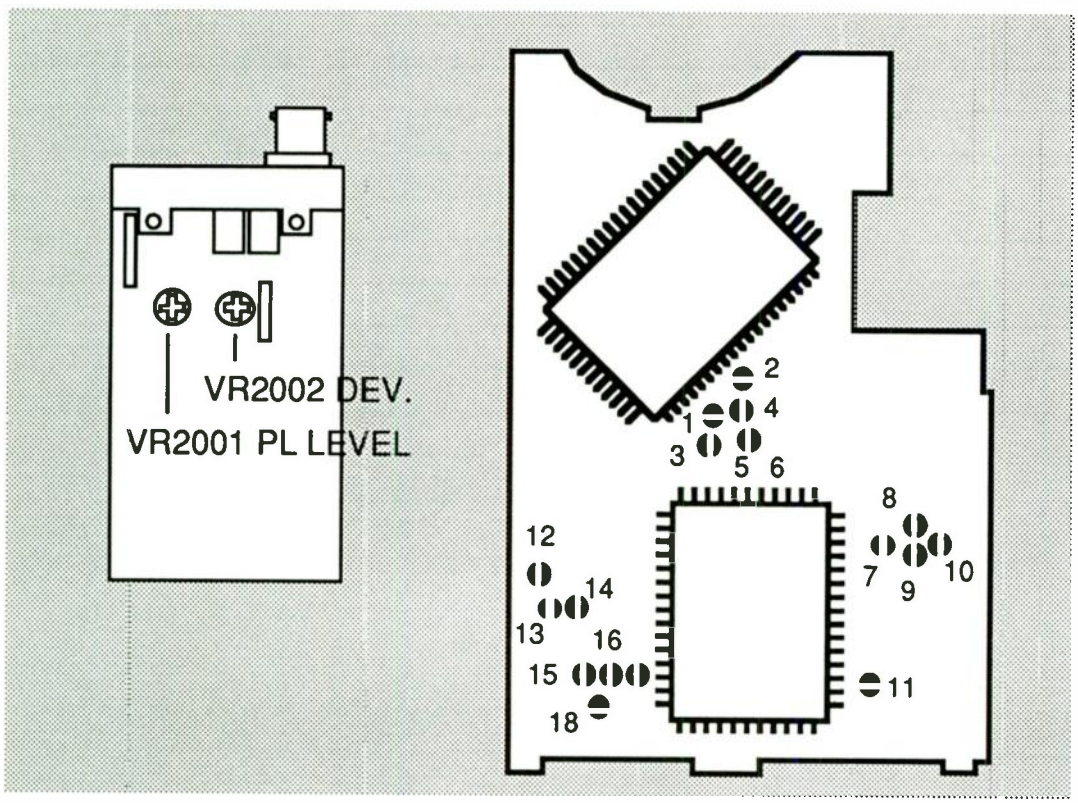
New Range: 24- 56 MHz

Caution

YAESU FT-709

ALIGNMENT POINTS

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 alignment pots. Make adjustments.
9. Reassemble the radio.
10. Reset the microprocessor. (If desired)
11. On FT-709 enter 4400 [D], 4490 [D], 4400 [D], 4490 [D]. 5000 [SHIFT]
    Note: RX range of 440.0 - 449.0 MHz and TX range of 440.0 - 449.0 MHz



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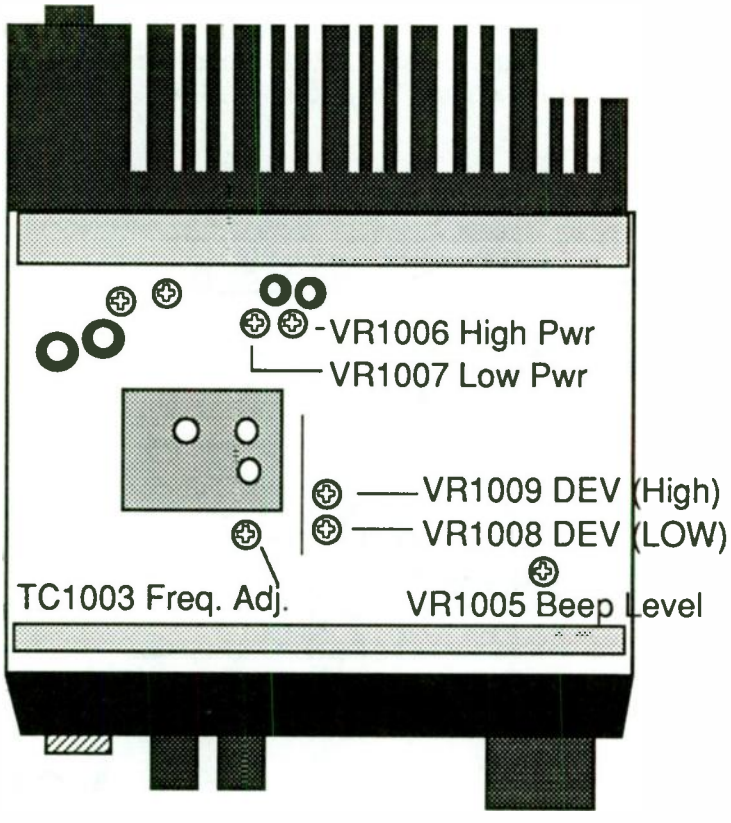
YAESU FT-711

EXPANDED RF & ALIGNMENT CONTROLS

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.

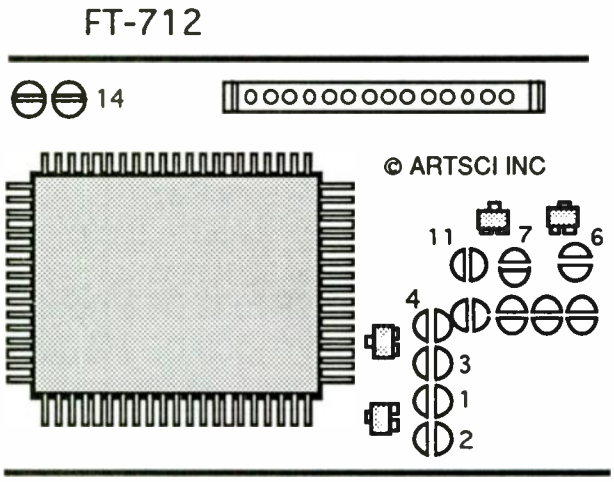


Caution

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.



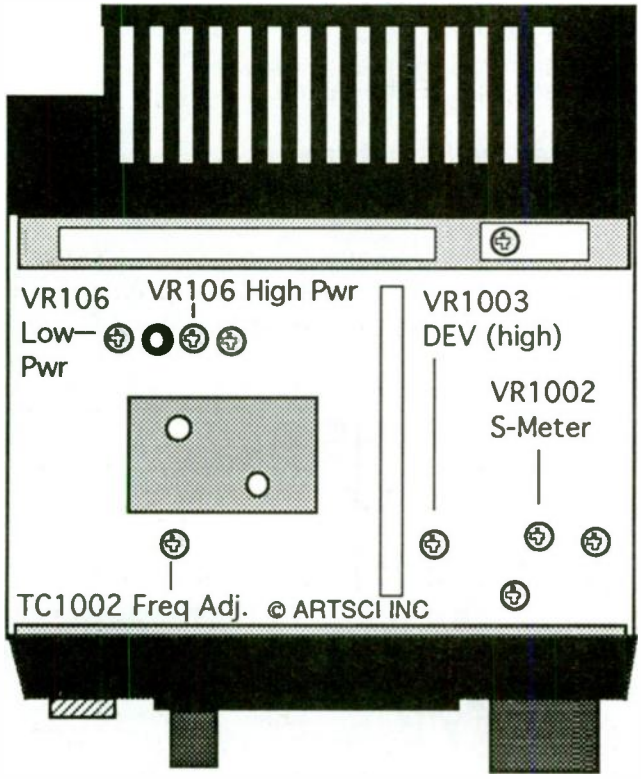
RANGE: 430 MHz - 465 MHz

MORE ---

Caution

YAESU FT-712RH

ALIGNMENT CONTROLS



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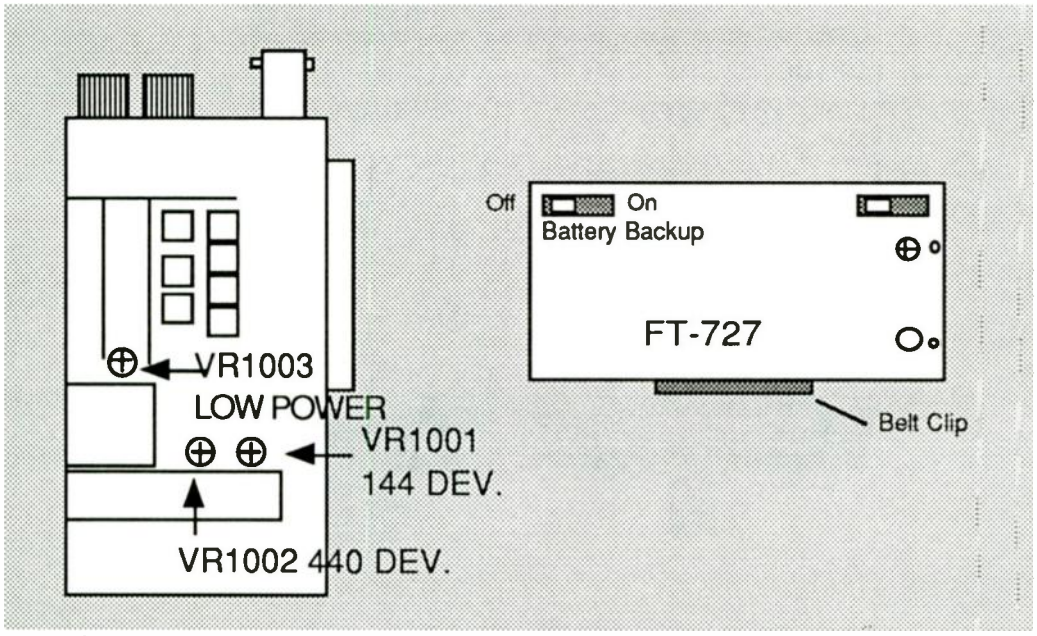
YAESU FT-727

(no 12.5 KHz steps in 440 band)

EXPANDED RF & ALIGNMENT CONTROLS

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

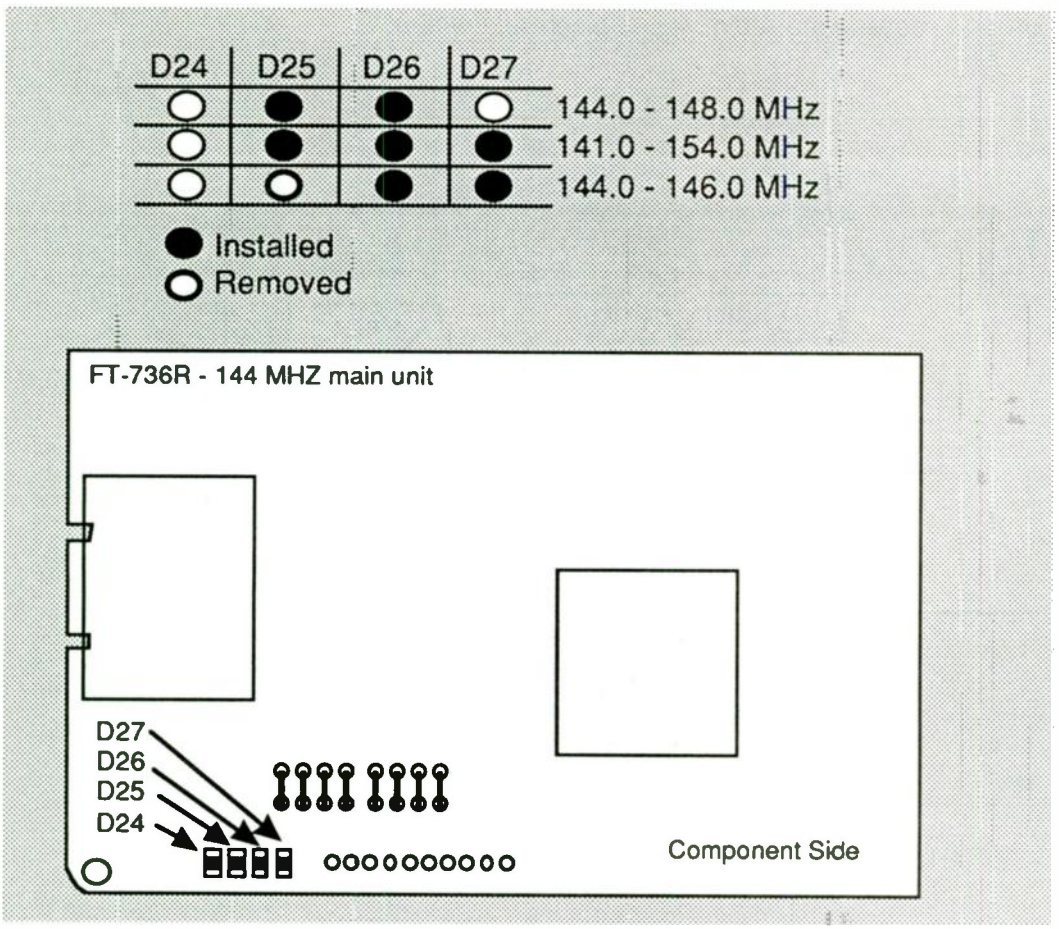
1. Remove battery,and belt clip
2. Remove battery track screws
3. Remove rear cover
4. Install the battery track.
5. Turn radio on & enter desired frequency
6. Adjust L01 (black slug) in VCO unit until the on air lamp is lit (red light)
   (L01 core, turn counter-clock wise)
7. Reassemble the radio.

Caution

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.

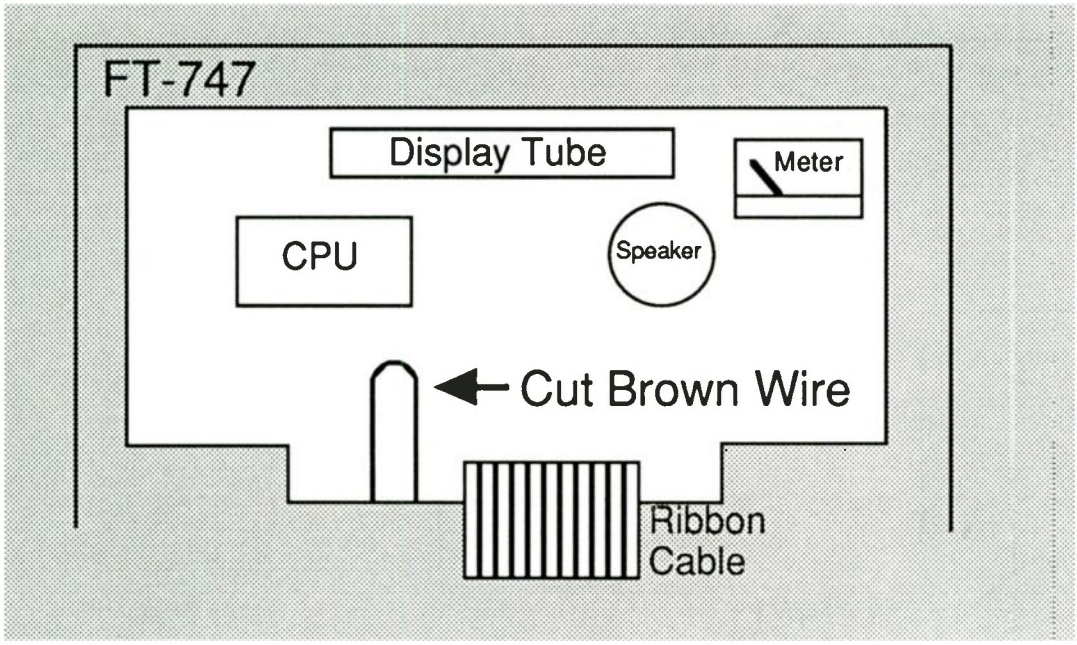


Caution

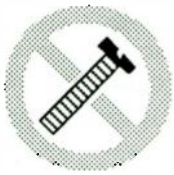
YAESU FT-747

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)



New Range .5 - 30 MHz

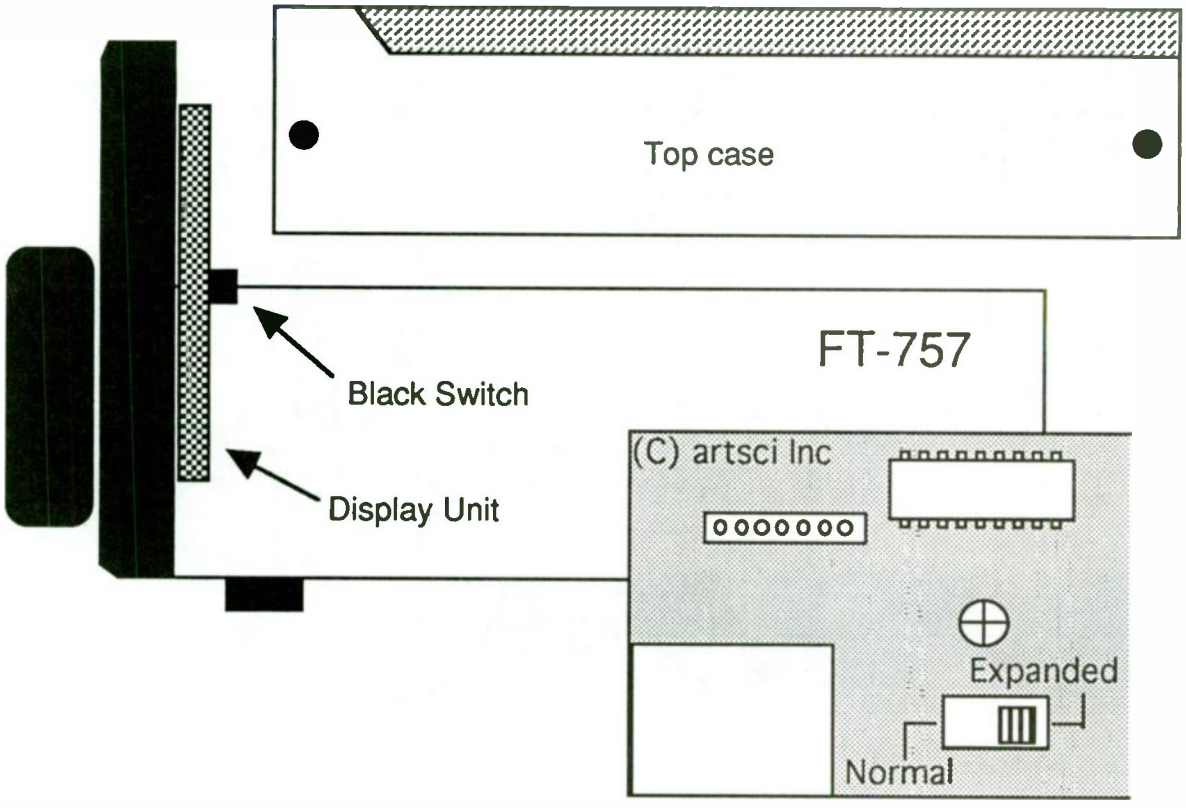


Caution

YAESU FT-757GX & FT 757GX II

EXPANDED RF

1. Unplug the DC power cable from the radio.
2. Remove the top cover. You may need to remove the speaker wire to 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.



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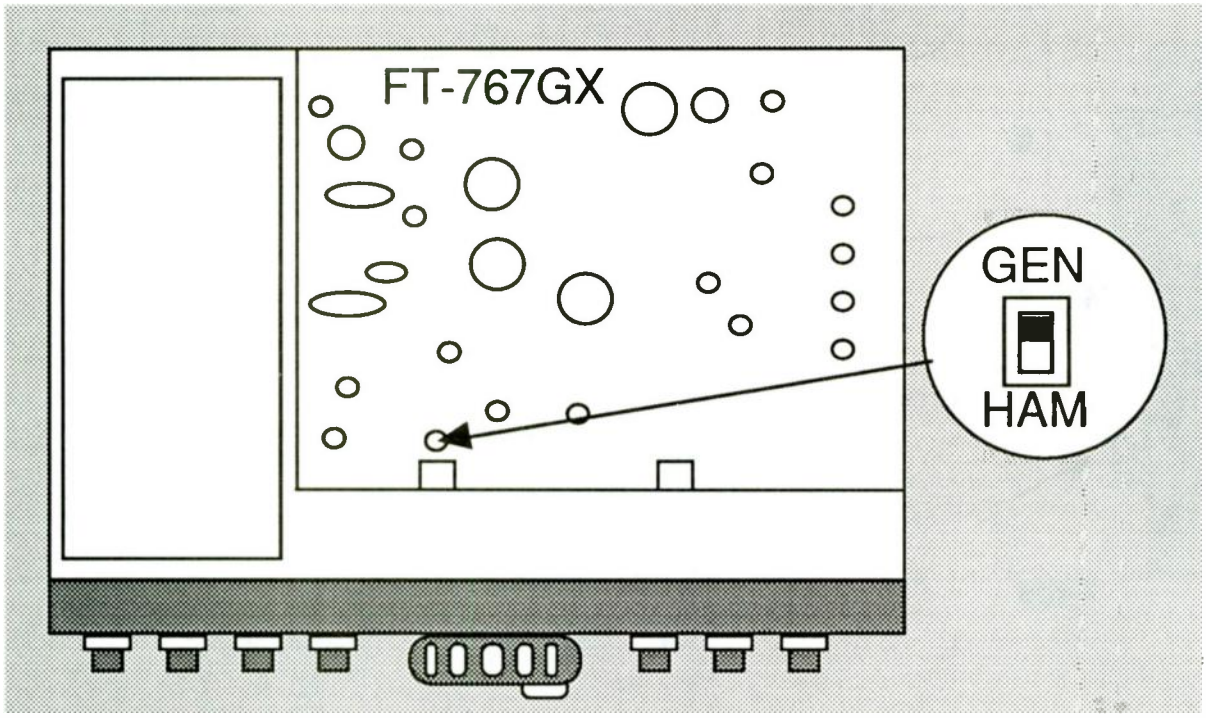
YAESU FT-767GX

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.



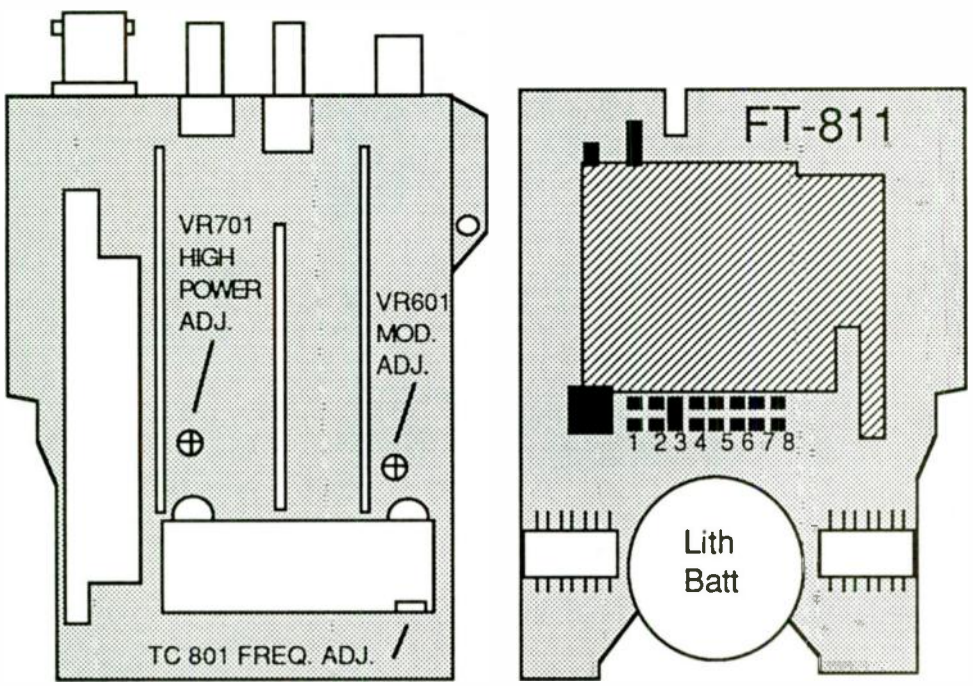
Caution

YAESU FT-811

EXPANDED RF & ALIGNMENT CONTROLS

(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: 4100 [VFO] 4750 [VFO] 4100 [VFO] 4750 [VFO]
8. Press [Function] & [7] to change channel step.
9. Press [F] & [RPT] and enter offset in both VFO. (5.00 Mhz is standard)



Pads 2 & 4 OPEN
Pad 3 Closed(soldered)

RANGE: RX 410 MHz - 475 MHz
TX 410 Mhz - 475 MHz

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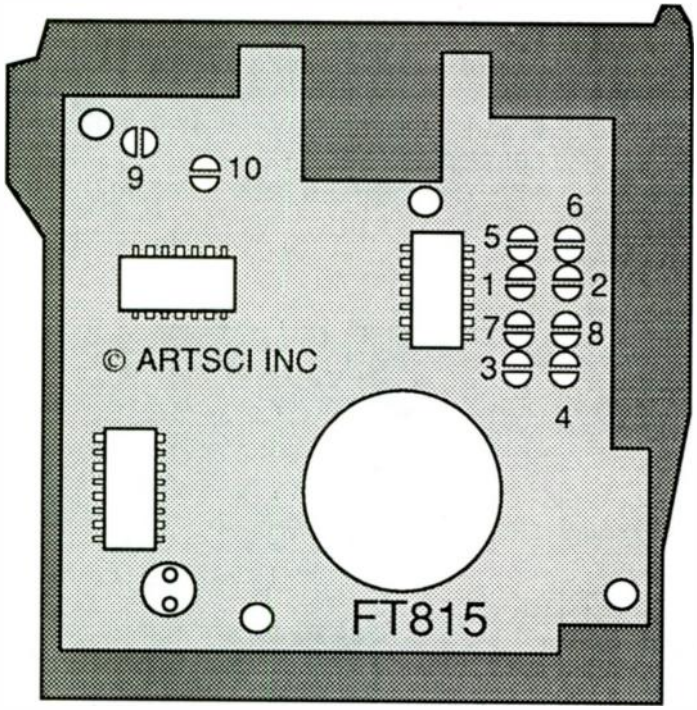
YAESU FT-815

EXPANDED RF

New Range: 410 - 475 MHz RX, 415 - 470 MHz TX
Note: The VCO may need to be adjusted for TX above 460 MHz.

1. Remove Battery and Antenna.
2. Remove the four screws holding the battery track in place.
3. Remove the two black screws holding the rear case in place.
4. Carefully open the front cover from the radio.
5. Locate and remove the solder from jumper pad #8.
6. Locate and solder jumper pads 5 & 7. Pad 9 is already jumpered.



7. Carefully replace the front cover and replace the two black screws.
8. Replace the battery track and the four screws.
9. Reset the microprocessor.
10. Press and hold [MR], [2] and [VFO] and turn the radio on.

MORE ---

Caution

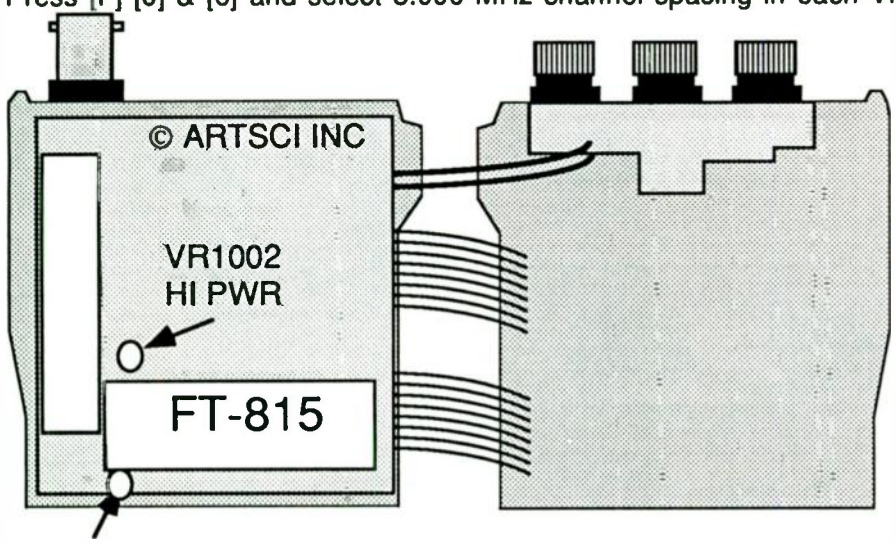
YAESU FT-815

EXPANDED RF & ALIGNMENT POINTS

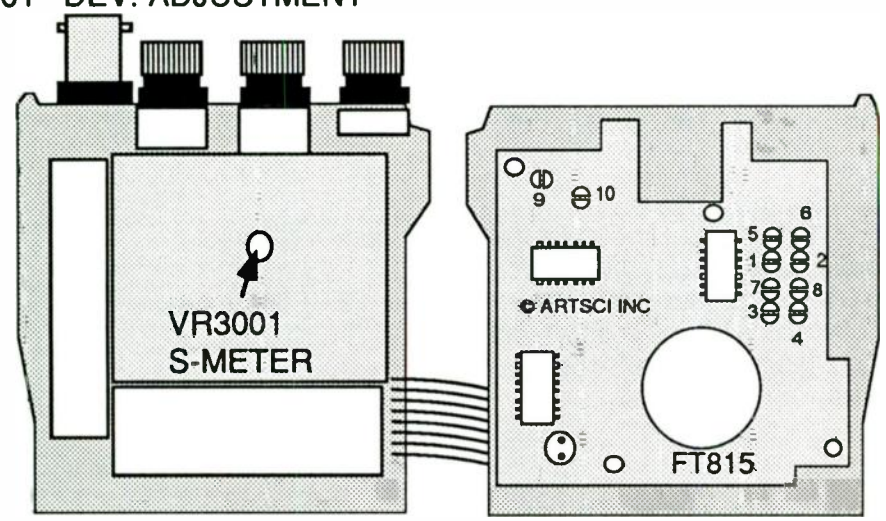
11. The radio display will cycle orderly thru the memory channels.
Enter the following band limits:

Ch. 1	Enter 410.00 and then press [VFO]	(Rx low limit)
Ch. 2	Enter 475.00 and then press [VFO]	(Rx high limit)
Ch. 3	Enter 415.00 and then press [VFO]	(Tx low limit)
Ch. 4	Enter 470.00 and then press [VFO]	(Tx high limit)

16. Press [F] [0] & [6] and select 5.000 MHz channel spacing in each VFO.



VR1001 DEV. ADJUSTMENT



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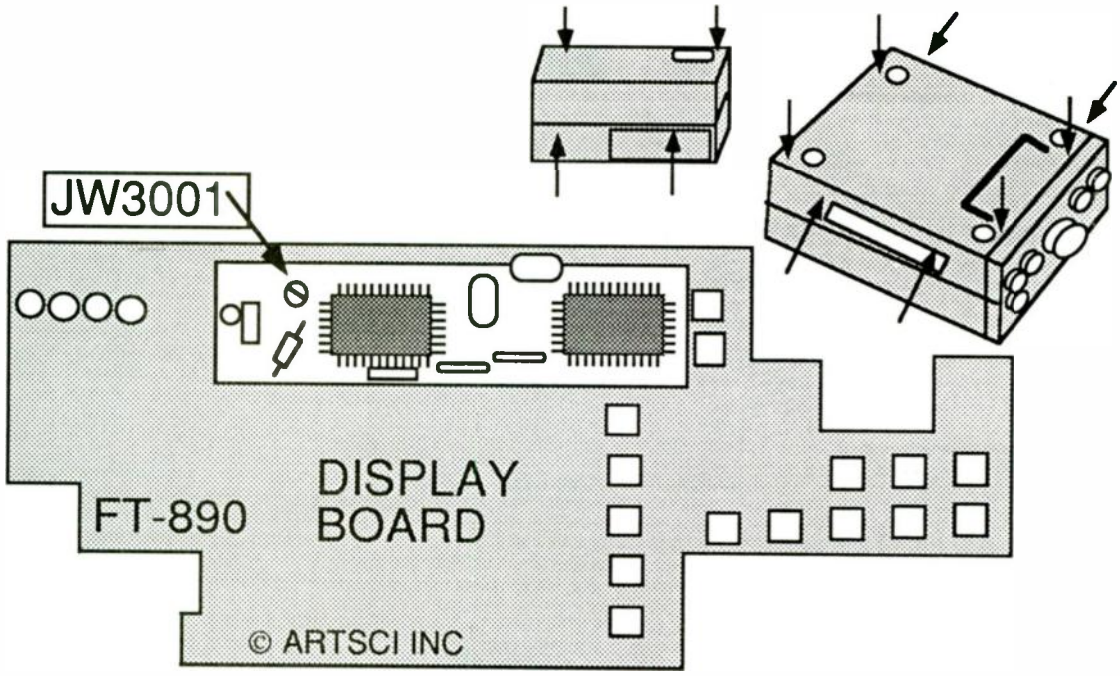
YAESU FT-890

EXPANDED RF (.5 - 30 MHZ)

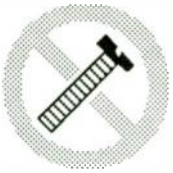
1. Remove power from the radio.
2. Remove covers.

The next step is done TEMPORARILY.

3. Locate jumper location JW3001 on the DISPLAY UNIT and solder bridge the pads.



4. Reconnect the power cable.
5. Press and hold [PROC], [AGC-F], [IPO] & [ATT] and turn the power on.
6. Rotate the main dial unitl the display shows 02-ON
7. Press [PROC]. This will confirm and write the data to EEPROM memory.
8. Turn the power off and remove the power cords.
9. Remove the jumper placed in step 3 above.
10. Replace the covers.

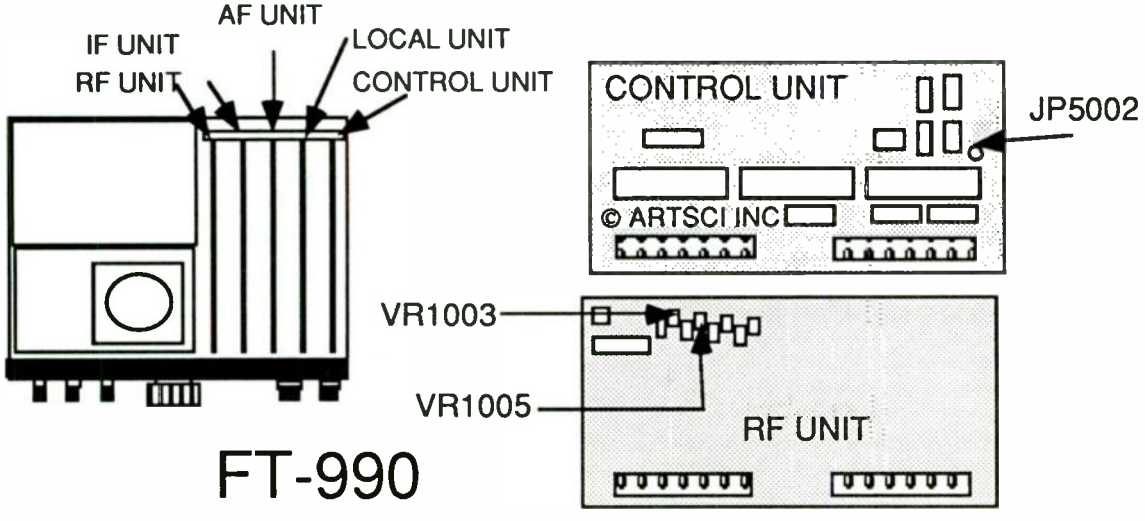


Caution

YAESU FT-990

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.



FT-990

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

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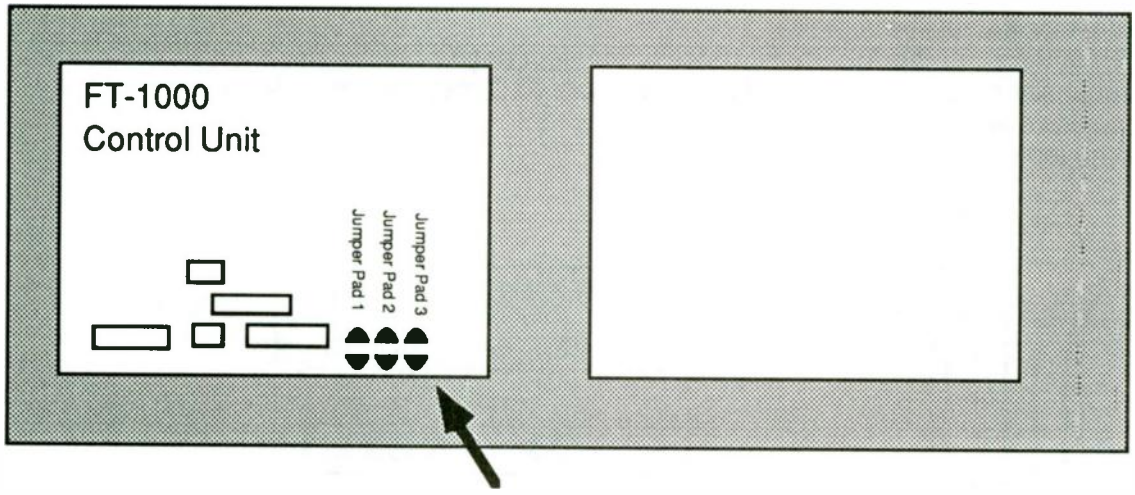
YAESU FT-1000

EXPANDED RF

1. Remove power from the radio.
2. Open the case top and bottom.
3. Locate four crews 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.
   (Turn off the Backup Switch, located inside the panel window)

FT-1000 FRONT PANEL



Remove Solder Bridge from Pad #3

New Range: .1 - 30 MHz

Caution

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

Caution

YAESU FT-2400

EXPANDED RF

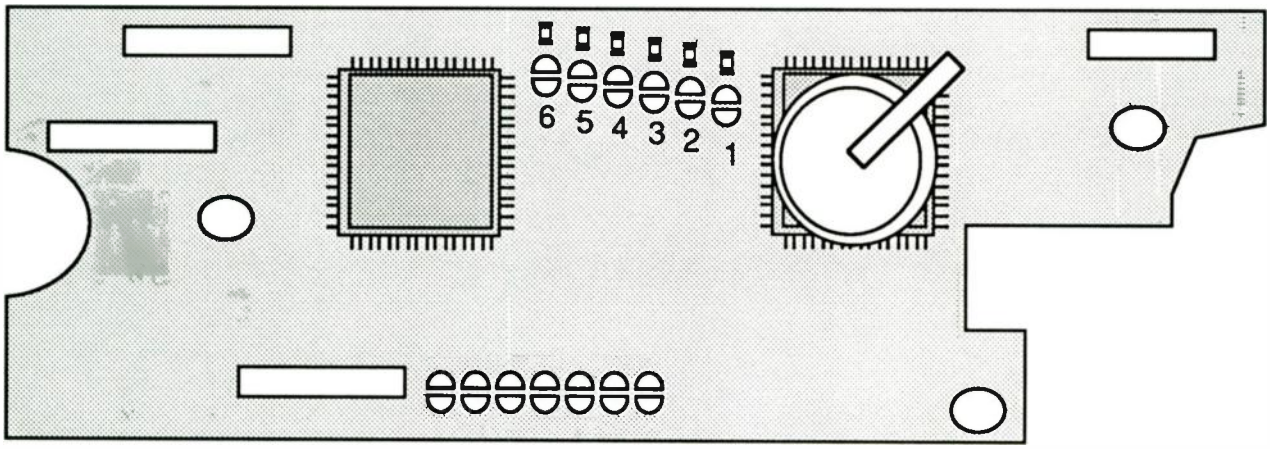
1. Remove Power and Antenna.
2. Locate and remove the two Allen screws from the front panel.
3. Locate and unsolder jumper pad 2.
4. Locate and solder jump pads 1 & 3.
5. Reassemble the radio.

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)



MORE ---

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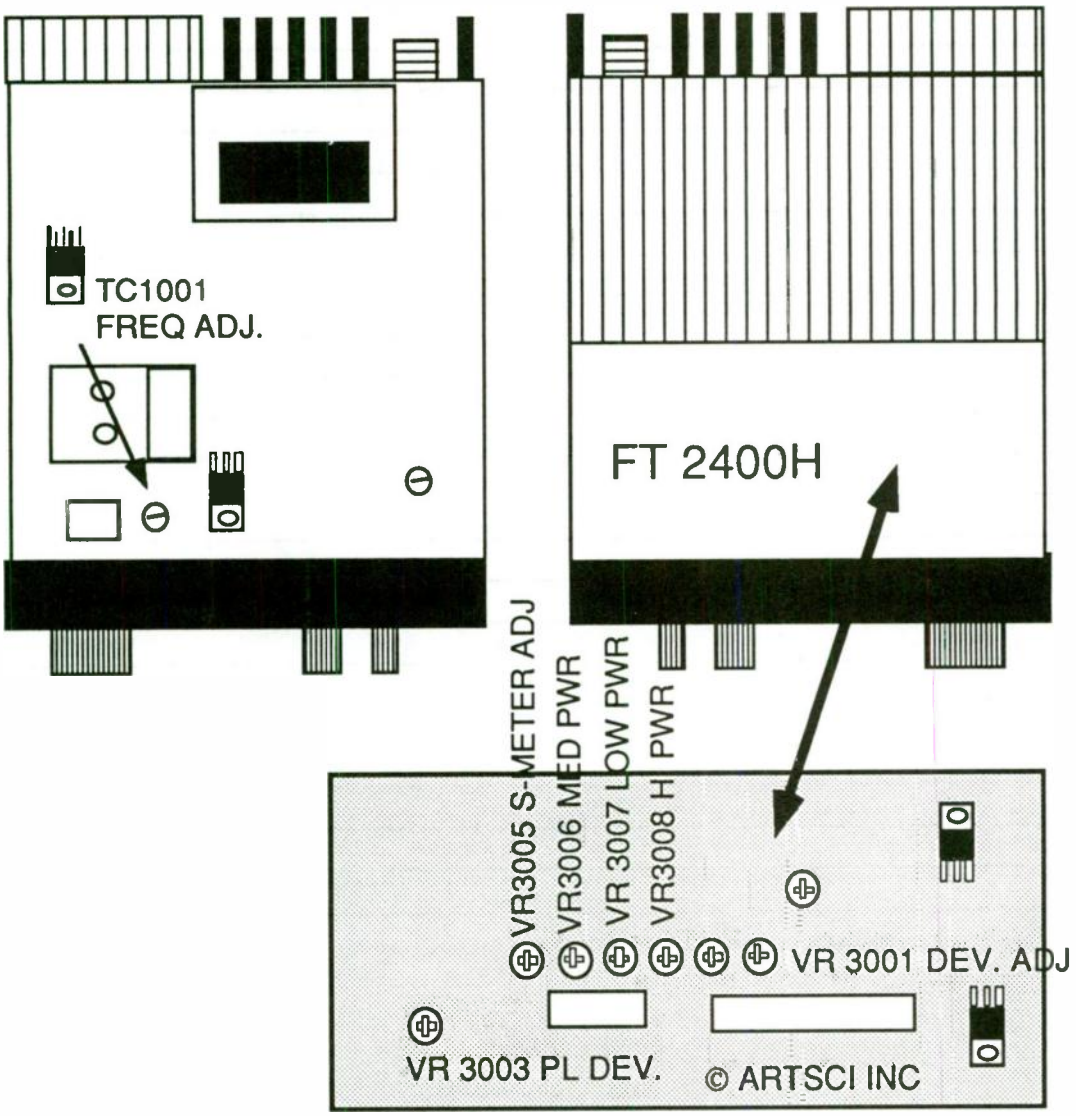
YAESU FT-2400

ALIGNMENT POINTS



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Notes

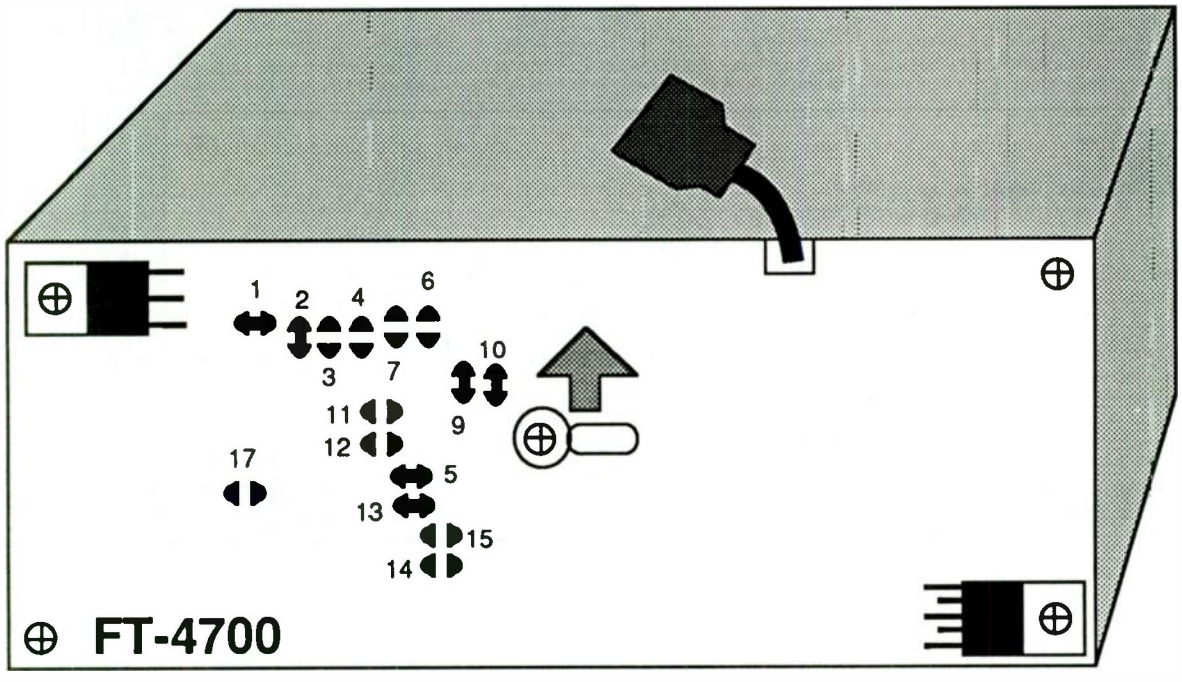
YAESU FT-4700

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 :

   410.000 MHz Press [D/MR] button
   475.000 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
	410 MHz - 475 MHz
TX Range	138 MHz - 174 MHz
	410 MHz - 475 MHz

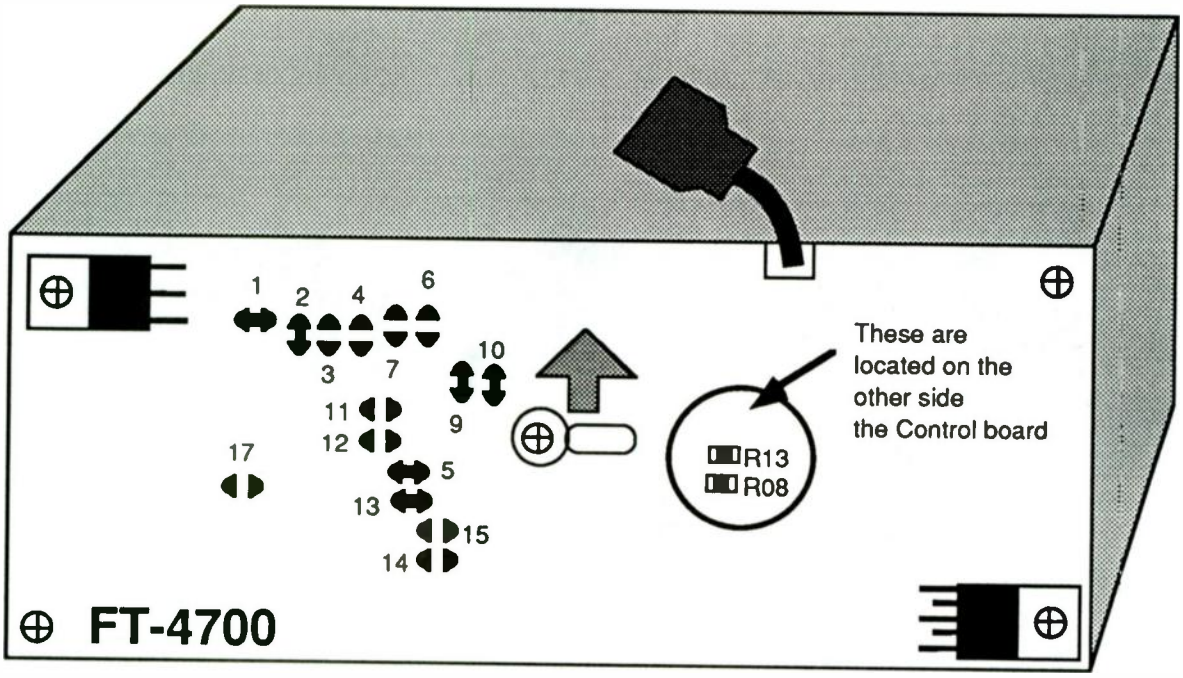
MORE ------

Caution

YAESU FT-4700

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.

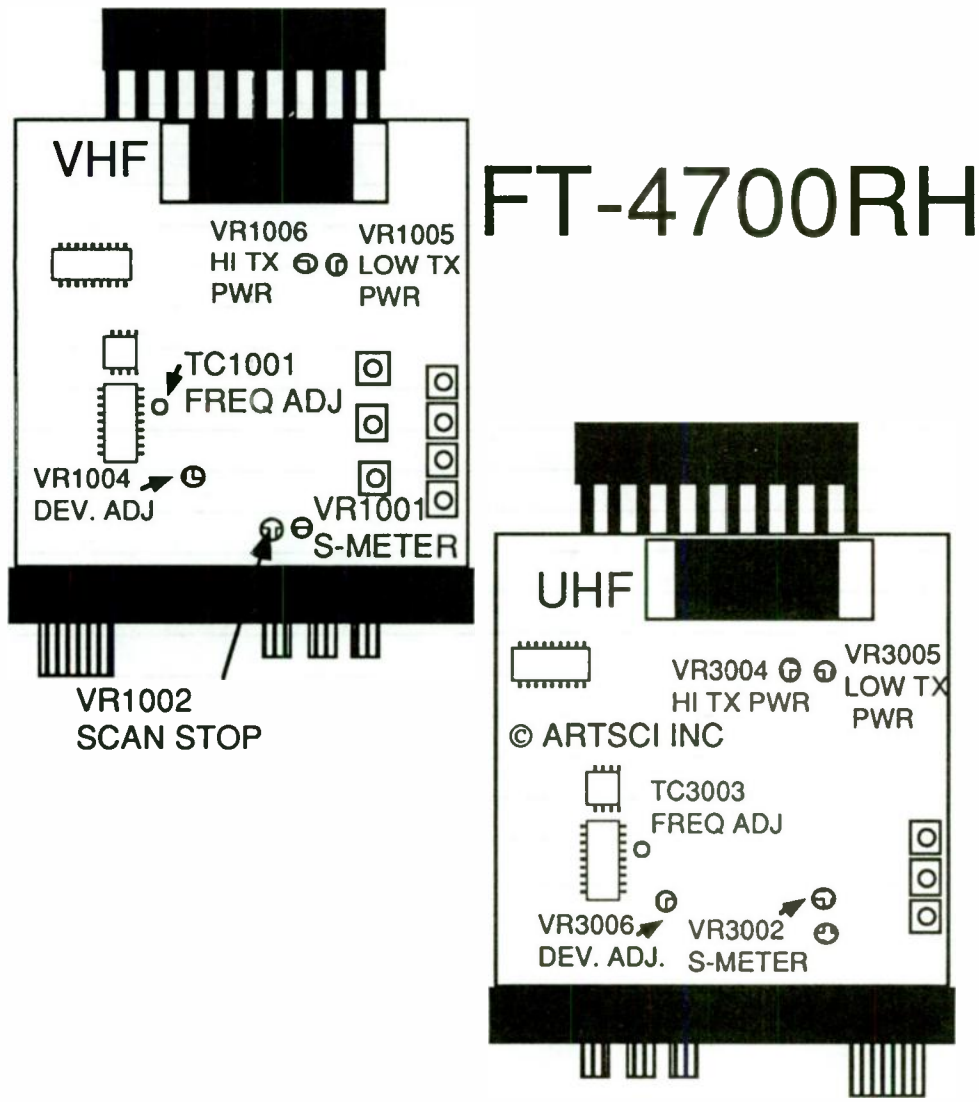


MORE ---

Caution

YAESU FT-4700

ALIGNMENT POINTS



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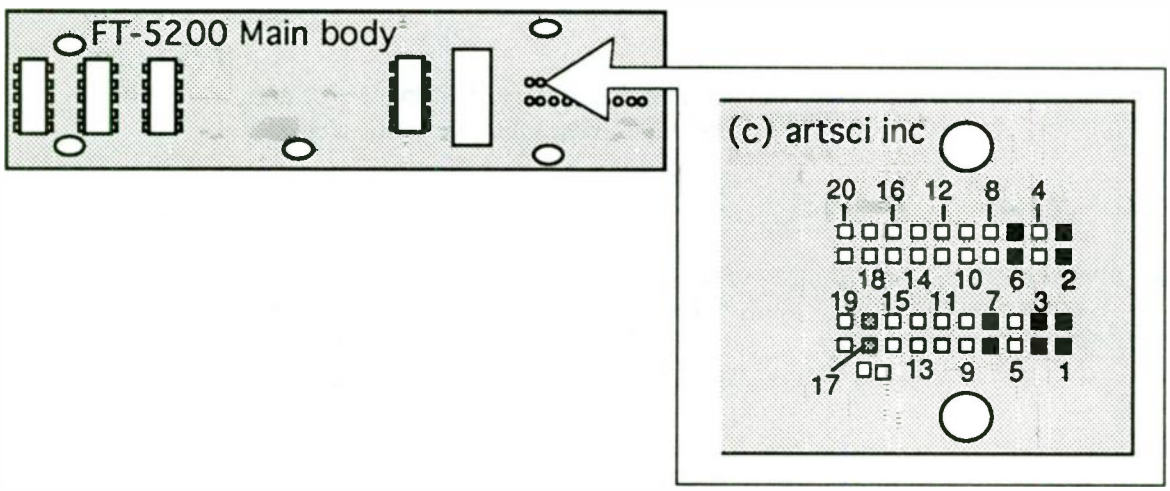
Notes

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. Unsolder jump pad 17. (X-Band repeater mod)
   Caution: Be sure to work on PAD 17. see drawing below



See Next page for further instructions.

MORE ---

Caution

YAESU FT-5200

EXPANDED RF

10. Install front panel mounting plate.
11. Reassemble the radio.
12. Reconnect the power to the radio.
13. Press and hold [D/MR], [F/W] & [REV] keys and turn radio on.
    (Display will show 000.000 & 300.000 on the display)
14. 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)

15 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)

16. Press [Function] then [REP] and select 5 MHz Repeater offset for UHF band.
17. Press [Function] then [REP] and select 600 kHz Repeater offset for UHF band.

To activate X-Band repeater function:

Press and hold [RPT] and turn power on.

It is recommended that you unplug the microphone during X-Band operation. (The Mic is live)

- Adjust the volume control to adjust repeat audio level.

Options:

Override automatic display dimmer:

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

Keyboard VHF Expanded Receive:

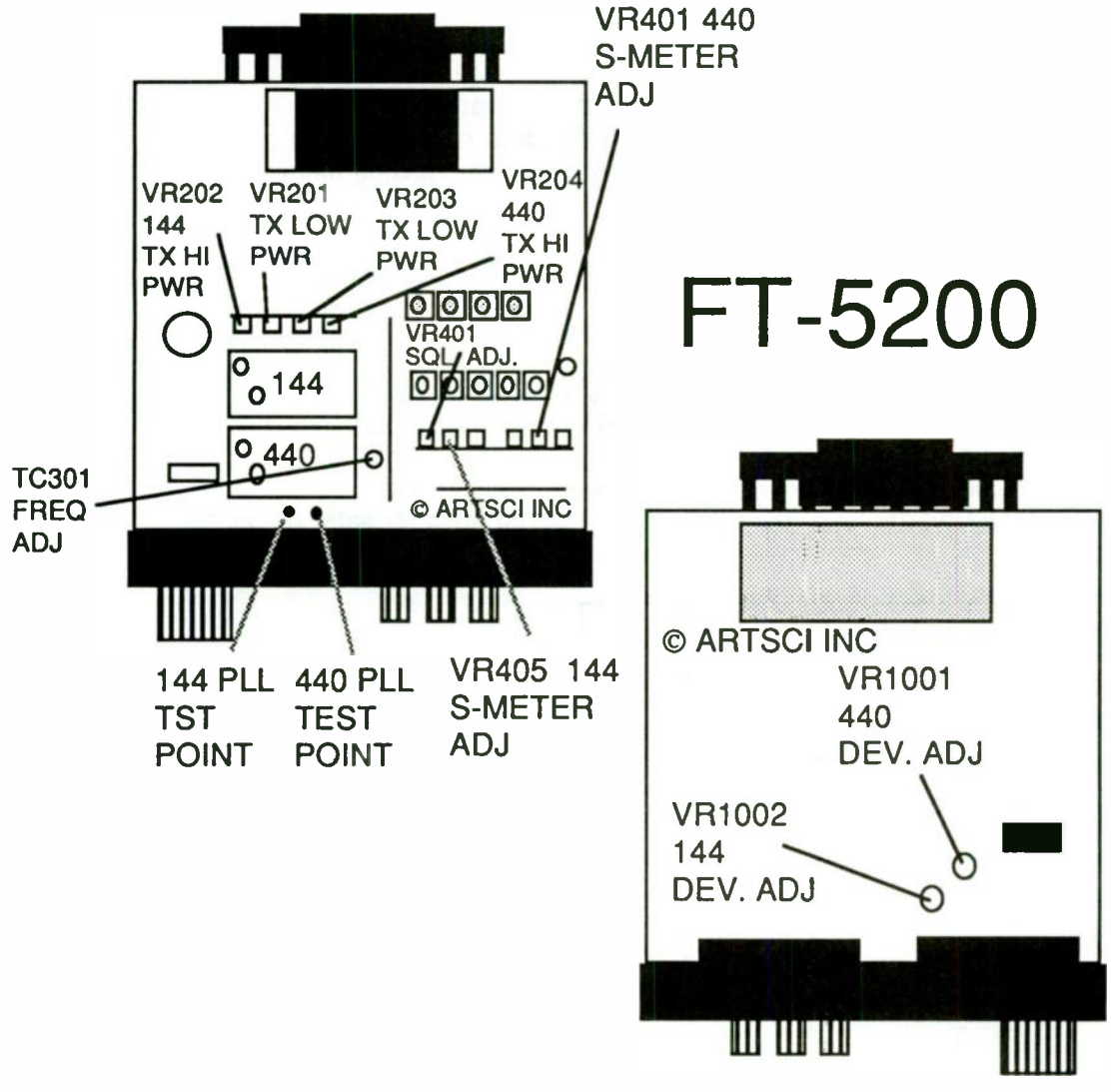
Press and hold [DVS] & [MHz] keys and turn radio on.

MORE ---

Caution

YAESU FT-5200

ALIGNMENT POINTS



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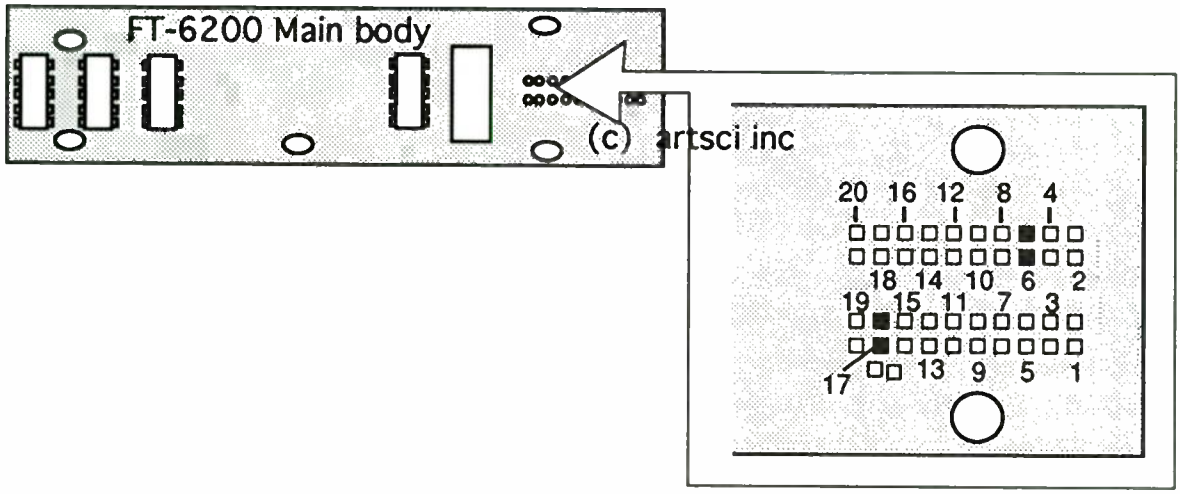
YAESU FT-6200

EXPANDED RF (420 - 475 MHz) / X-Band repeater

1. Remove power from the radio.
2. Release and remove the Control head.
3. Remove the top and bottom covers. Six screws hold the top and bottom covers on.
4. Remove the two silver screws holding the control head mounting bracket.
5. Remove the mounting bracket.
6. Locate and solder jumper pad #6.
   Pads 2, 4, 6, 7, 8, 15, 17 & 18 will now be jumpered.
7. Locate and remove solder jumper pad #17. (X-Band repeater mod)
   Caution: Make sure you jumper the proper pad. see drawing below.
8. Reassemble the radio.
9. Reconnect the power.
10. Press and hold [D/MR], [F/W] & [REV] and turn the power on.
    The radio will now show 300.000
11. Enter the following band limits:

    420.00 and then press [D/MR] (UHF Rx low limit)
    475.00 and then press [D/MR] (UHF Rx high limit)
    420.00 and then press [D/MR] (UHF Tx low limit)
    475.00 and then press [D/MR] (UHF Tx high limit)
12. Press [FUNCTION] and then [RPT] and select 5.000 MHz repeater offset.



To activate X-Band repeater function: Press and hold [RPT] and turn power on.
To override automatic display dimmer: Press and hold [MR] and turn power on and select the desired brightness level)

MORE ---

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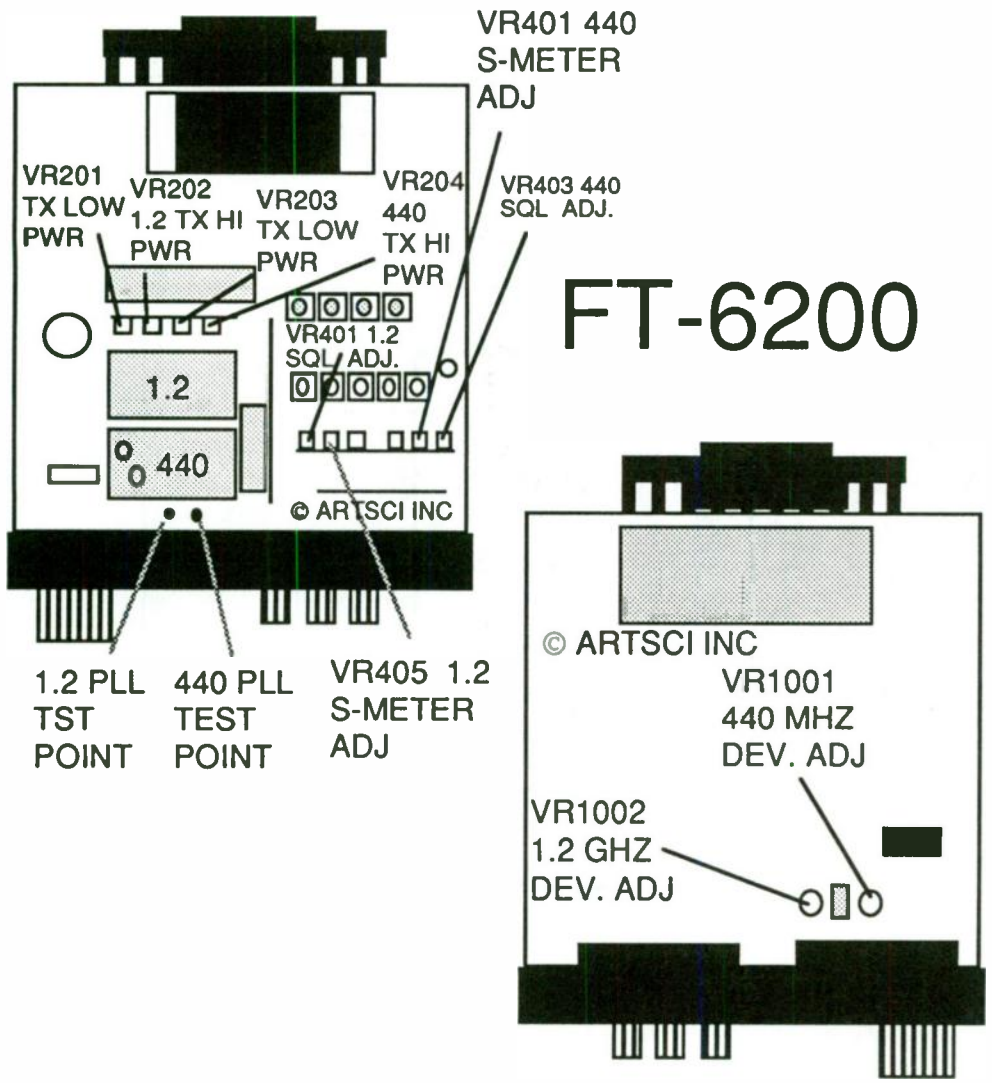
YAESU FT-6200

ALIGNMENT CONTROLS



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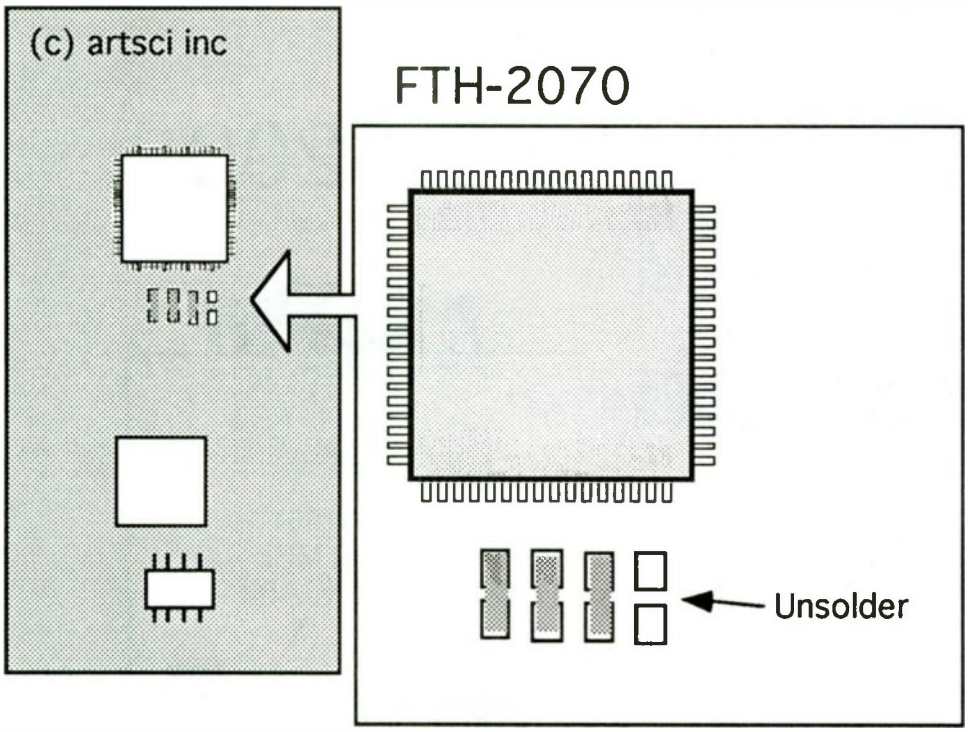
YAESU FT-2070

EXPANDED RF

1. Remove battery and Antenna from the radio.
2. Remove screws and open case
3. Locate and unsolder jumper pad as shown below
   (Pad connected to Microprocessor pin 11)
4. Reassemble the radio.
5. Reset the Microprocessor
   (Press [PRI] and turn the radio on.)



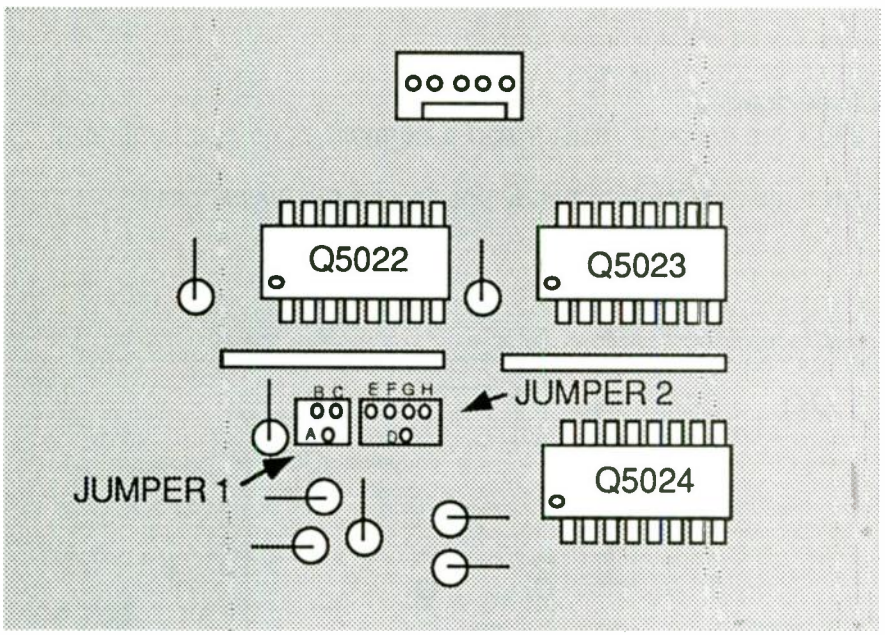
New Range: 134 - 174 MHz & 400 - 500 MHz

Caution

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

Caution

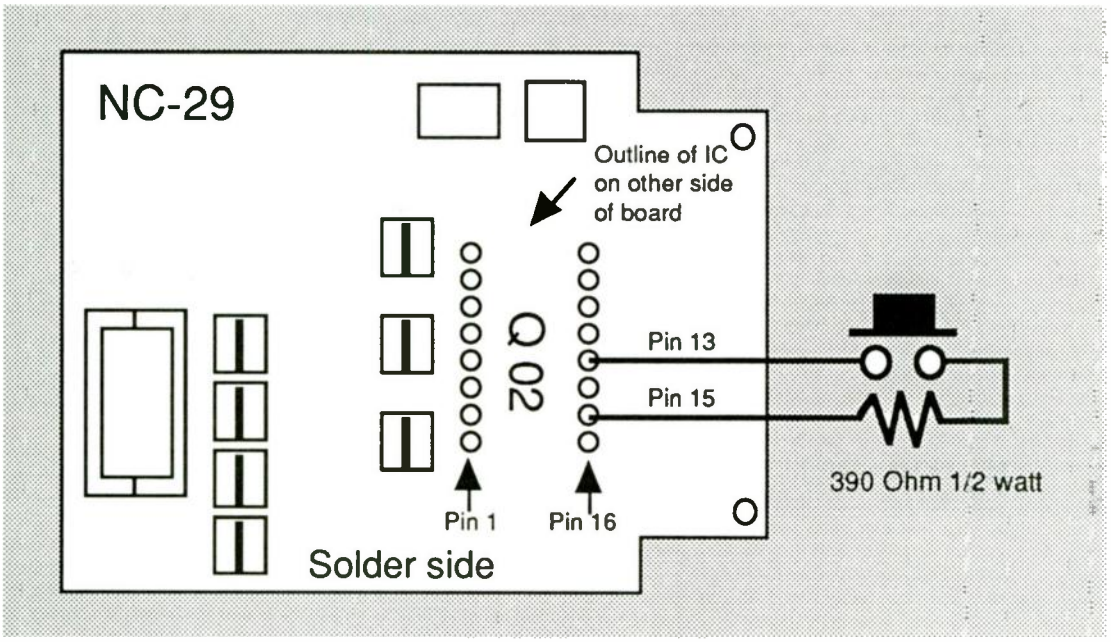
YAESU NC-29

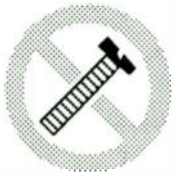
TRICKLE MODE

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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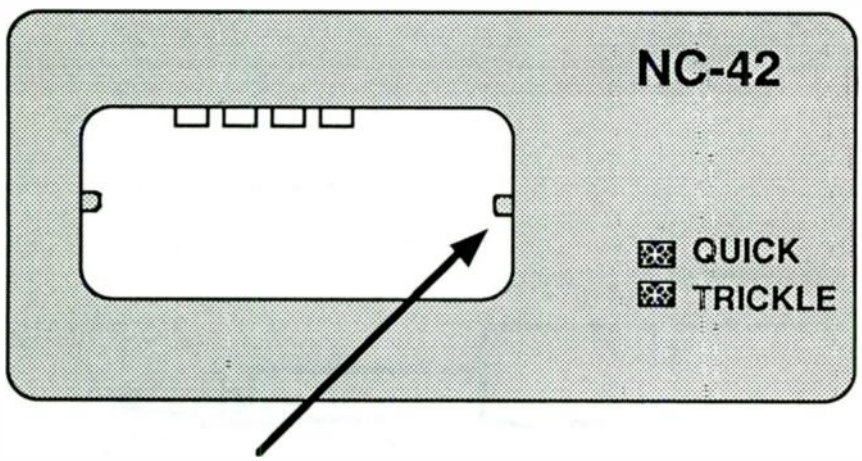
YAESU NC-42

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.

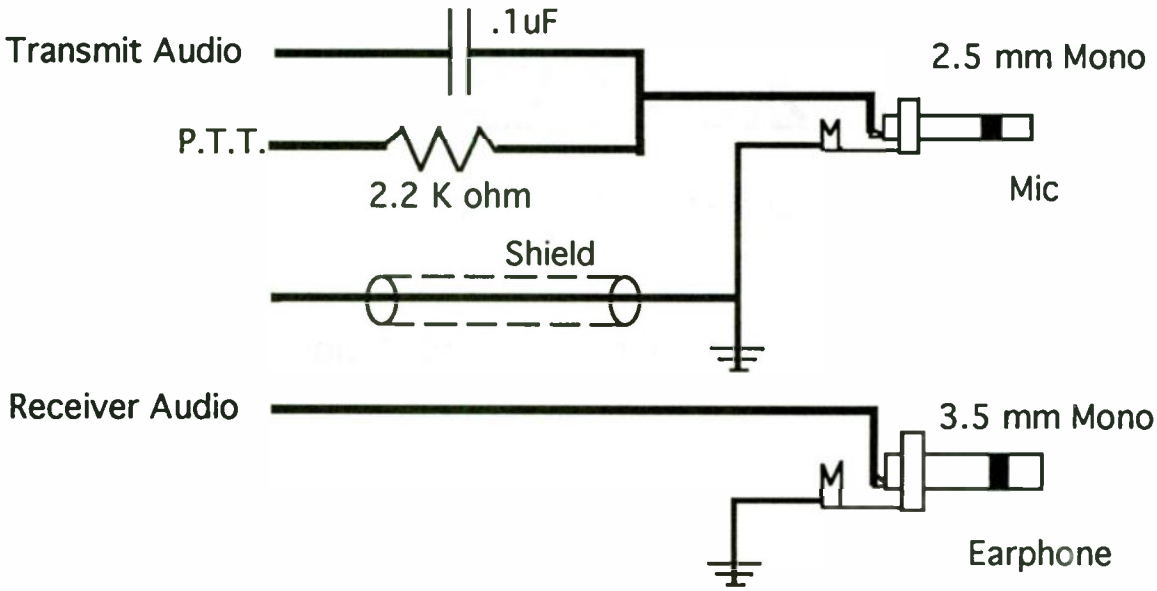
Caution

YAESU Hand Held to Packet TNC

FT-23,33,73,109,209,709,727,470,411,811,911

Parts required:

1 - 0.1 uF, 50V Disk Ceramic Cap
2 - 2.2k Ohms, 1/4 Watt Resistor
1 - 2.5 mm audio plug
1 - 3.5 mm audio plug



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Yaesu Reset Commands

Radio	Function	Command
FT-1000	Hard Reset	Flip off BACKUP switch. (Inside the top panel window)
	Memory Reset	Press & hold [SUB] & [ENTER] & turn power on
	Soft Reset	Press & hold [1.5] & [3.5] & turn power on. (For checking Display and ROM version)
FT-990	Hard Reset	Flip off BACKUP switch. (Inside the top panel window)
	Memory Reset	Press & hold [GEN] & [ENT] & turn power on
	Soft Reset	Press & hold [1.5] & [3.5] & turn power on. (For checking Display and ROM version)
FT-890	Hard Reset	Press & hold [HAM/GEN] & [CLAR] & turn power on.
	Soft Reset	Press & Hold [A/B] & [A=B] & turn power on (For checking Display and ROM version)
FT-767GX	Hard Reset	Switch [B.U.] off & turn radio on.
	Freq. Range Reset	Press and hold [OFFSET] & turn power on. (140.00 - 148.99 MHz)
	430/440 toggle	Press and hold [0] & turn power on.
FT-757GX	Hard Reset	Press & hold [MARKER] & [LINEAR] & turn power on.
FT-747GX	Hard Reset	Slide Backup switch towards tuning dial. (Located on bottom of panel)
FRG-8800	Hard Reset	Remove backup batteries
FT-26 FT-27	Ham/Extended RX	Press and hold [UP] & [DOWN] & turn on.
	Factory Defaults	Press and hold [T] & [REV] & turn on.

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Yaesu Reset Commands

Radio	Function	Command
FT-411E FT-811 FT-911	Ham/Extended RX	Press and hold [UP] & [DOWN] & turn on.
	Factory Defaults	Press and hold [T] & [REV] & turn on.
FT-470	Ham/Extended RX	Press and hold [UP] & [DOWN] & turn on.
	Factory Defaults	Press and hold [T] & [REV] & turn on.
FT-2400H	Ham/Extended RX	Press and hold [UP] & [DOWN] & turn on
	Memory Reset	Press [D/MR] & [F/w] & turn on.
	Factory Defaults	Press [D/MR] & [REV/SKIP] & turn on & turn off & Press & hold [D/MR] & turn on.
FT-5200	Ham/Extended RX	Press and hold [MHz] & [DVS/HOLD] & turn on.
	Factory Defaults	Press and hold [D/MR] & [REV] & turn power on.
FT-212 FT-712 FT-912	Ham/Extended RX	Press and hold [MHz] & [VOICE] & turn power on.
FT-290 FT-690 FT-790II	Hard Reset	Switch internal backup switch off of 30 seconds.
FT-736R	Hard Reset	Switch internal backup switch off of 30 seconds.

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Radio / Tech Modifications

OTHER MANUFACTURES

Notes

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

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

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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

Caution

KDK FM-2033

EXPANDED RF

1. Remove Power and Antenna.
2. Remoce screws and open the case.
3. Connect diode D-21 (ECG-519) to Module INT-2033.
4. Reassemble the radio.

Caution

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

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.

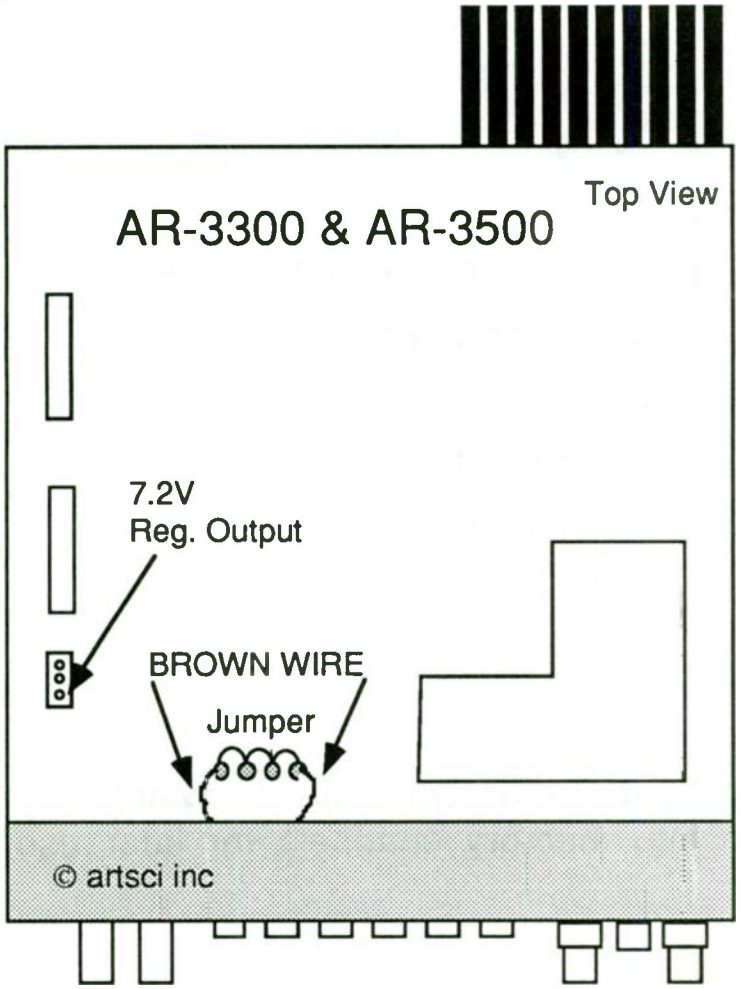
OR

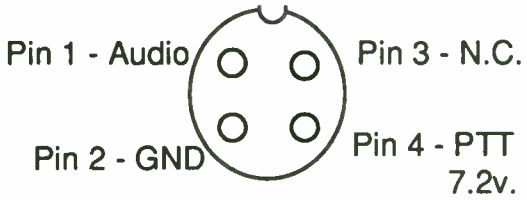
Solder jump the 3 pins located on the back side of the circuit board near the front center.

More ---

Caution

RANGER AR-3300





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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.

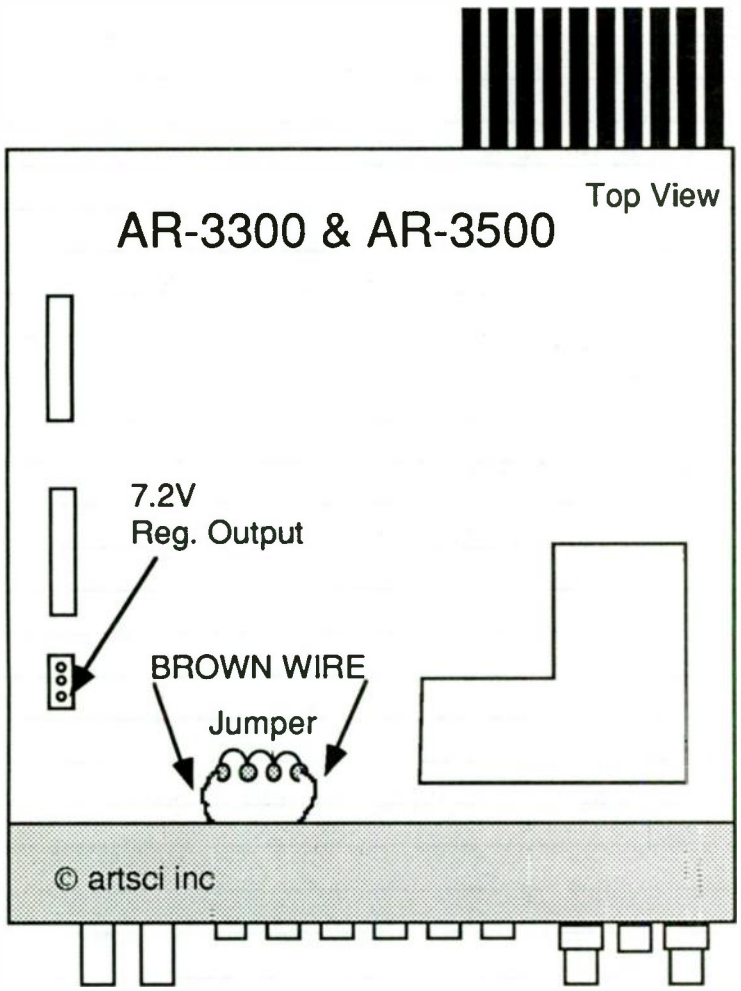
OR

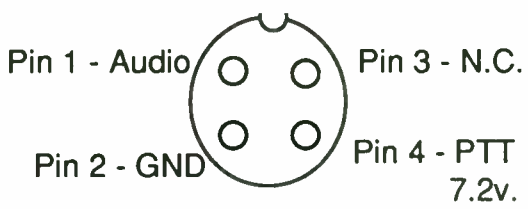
Solder jump the 3 pins located on the back side of the circuit board near the front center.

More ---

Caution

RANGER AR-3500





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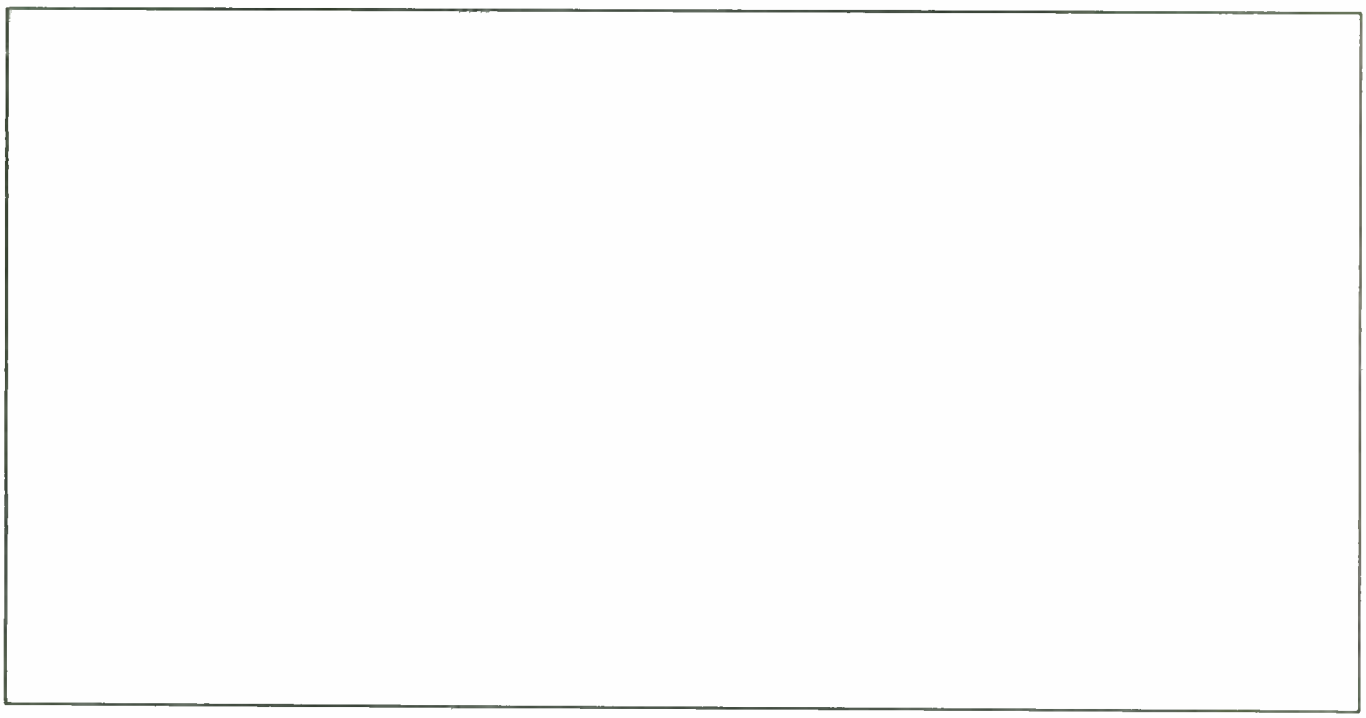
Notes



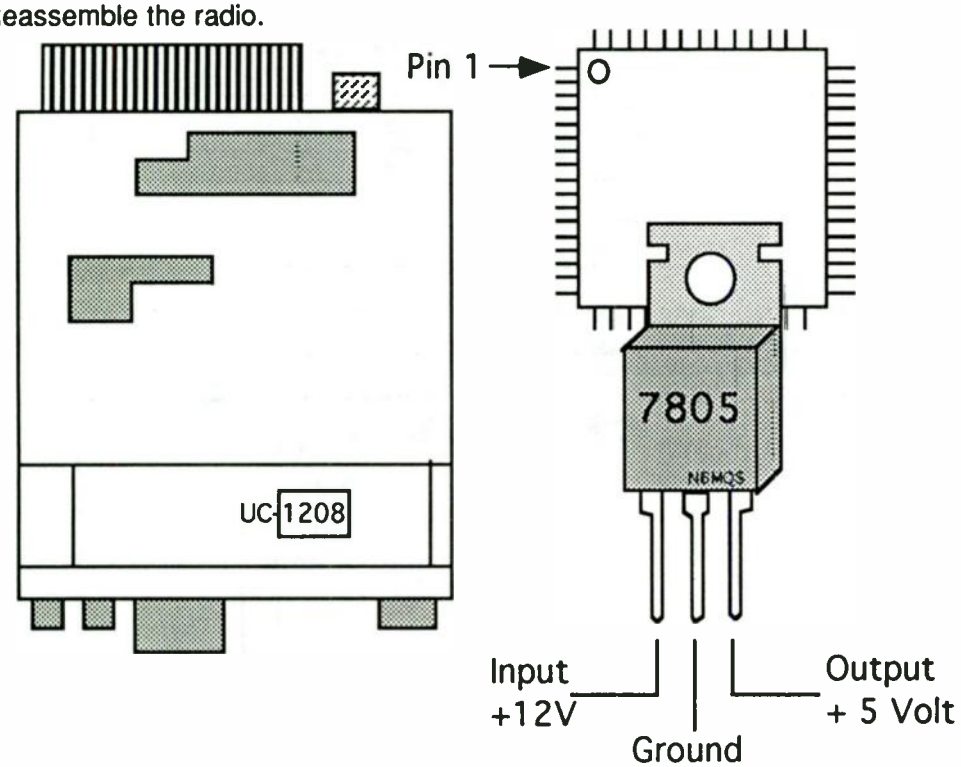
UNIDEN HR-2500

EXPANDED RF

1. Remove Power and Antenna.
2. Remoce screws and open the case.
3. Locate synthesizer board on the bottom of the radio.
4. If your radio has microprocessor # UC-1208
   Unsolder and lift pins 28 & 29 of the microprocessor.
   You may wish to leave the pin soldered and etch the ground trace
   Go to instruction #6

5. If your radio's microprocessor is NOT a UC-1208
   Unsolder and lift pins 20 & 21 of the microprocessor.
   You may wish to leave the pin soldered and etch the ground trace
   Go to instruction #6

6. Connect the lifted pins together and jumper these pins to +5 volts thru a 10K resistor
   +5 volts can be found on the 7805 voltage regulator
   or
   from the Cap. right next to pins 28 & 29.
6. Reassemble the radio.



Caution

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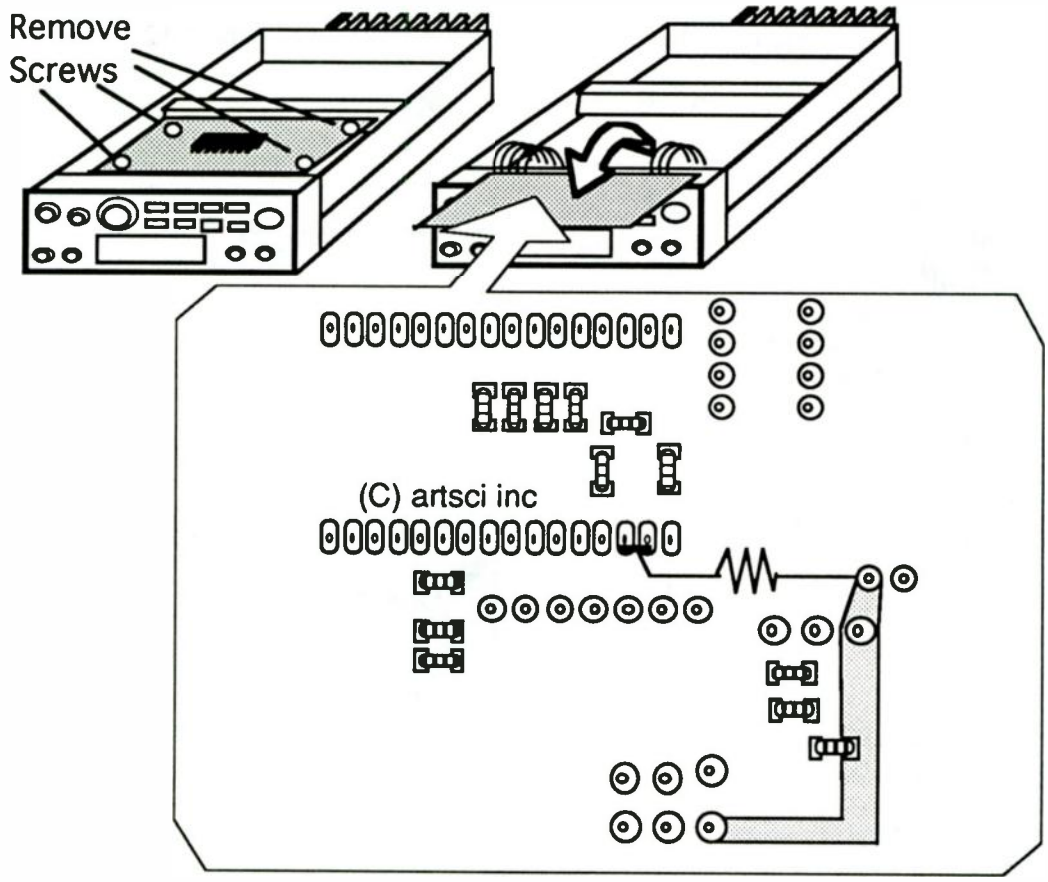
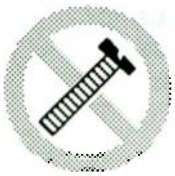
UNIDEN HR-2510

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. (Cut all traces to these pins)
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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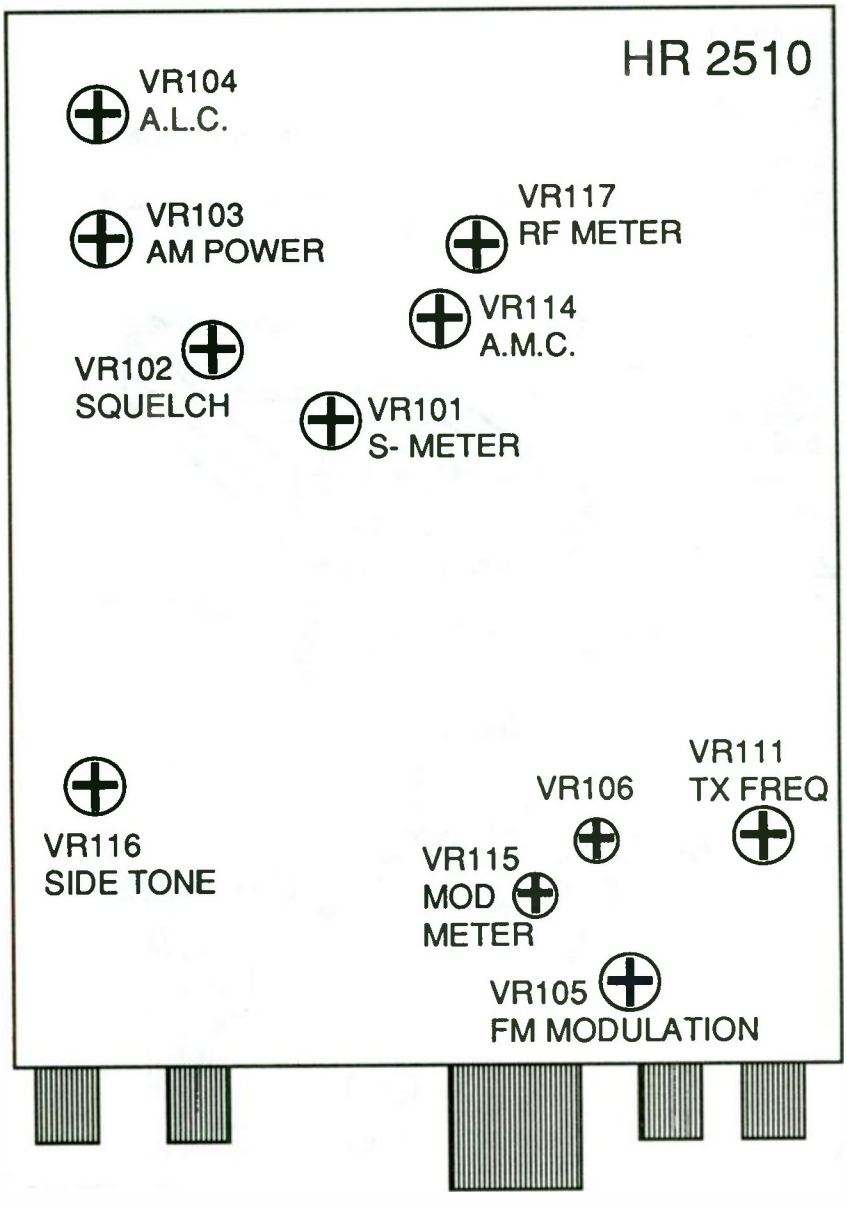
UNIDEN HR-2510

ALIGNMENT POINTS



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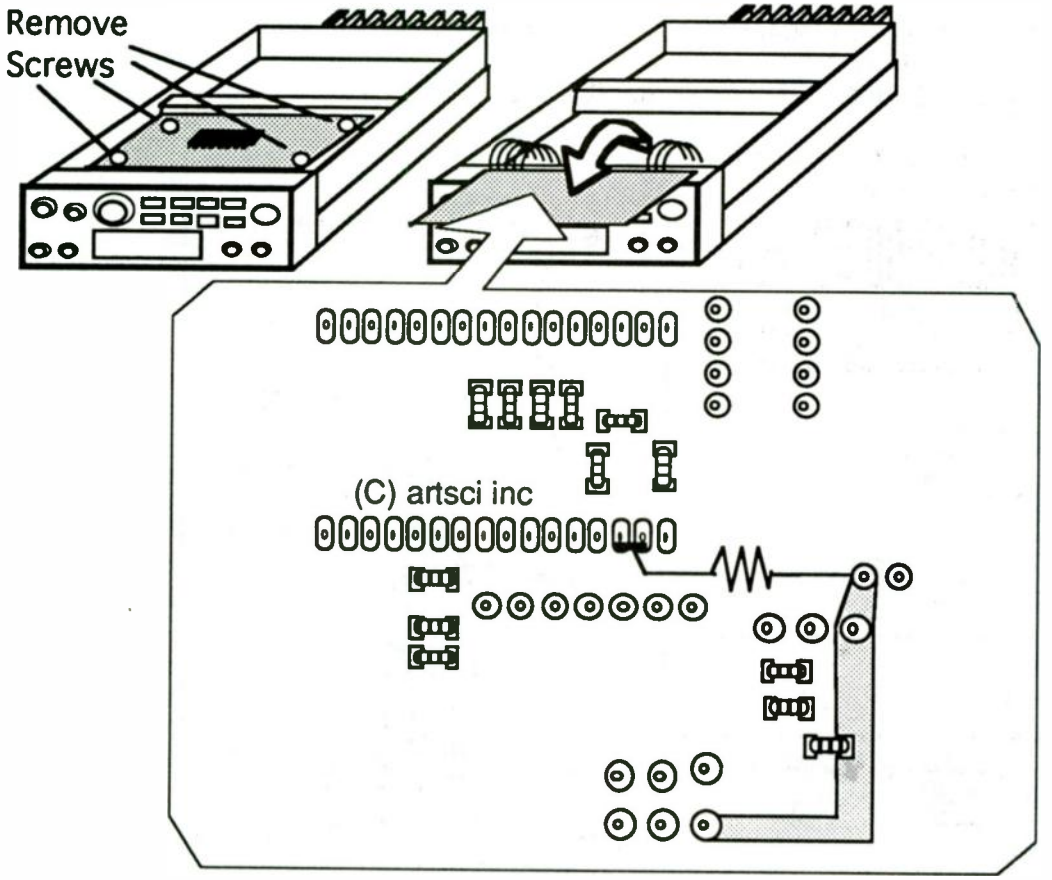
UNIDEN HR-2600

EXPANDED RF

You will need to replace the microprocessor. Replacement part # is UC-1250. You will lose the repeater offset.

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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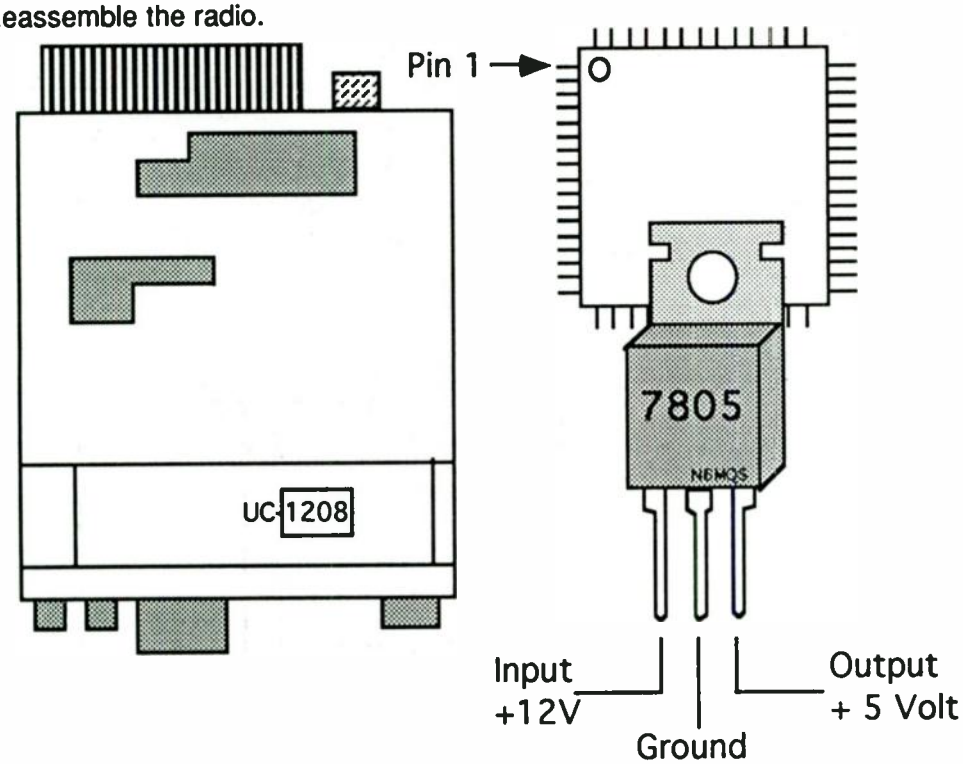
Radio Shack HTX-100

EXPANDED RF

1. Remove Power and Antenna.
2. Remoce screws and open the case.
3. Locate synthesizer board on the bottom of the radio.
4. If your radio has microprocessor # UC-1208
   Unsolder and lift pins 28 & 29 of the microprocessor.
   You may wish to leave the pin soldered and etch the ground trace
   Go to instruction #6

5. If your radio's microprocessor is NOT a UC-1208
   Unsolder and lift pins 20 & 21 of the microprocessor.
   You may wish to leave the pin soldered and etch the ground trace
   Go to instruction #6

6. Connect the lifted pins together and jumper these pins to +5 volts thru a 10K resistor
   (+5 volts can be found on the 7805 voltage regulator
   or
   from the Cap. right next to pins 28 & 29.)
6. Reassemble the radio.



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Radio Shack HTX-202

EXPANDED RF

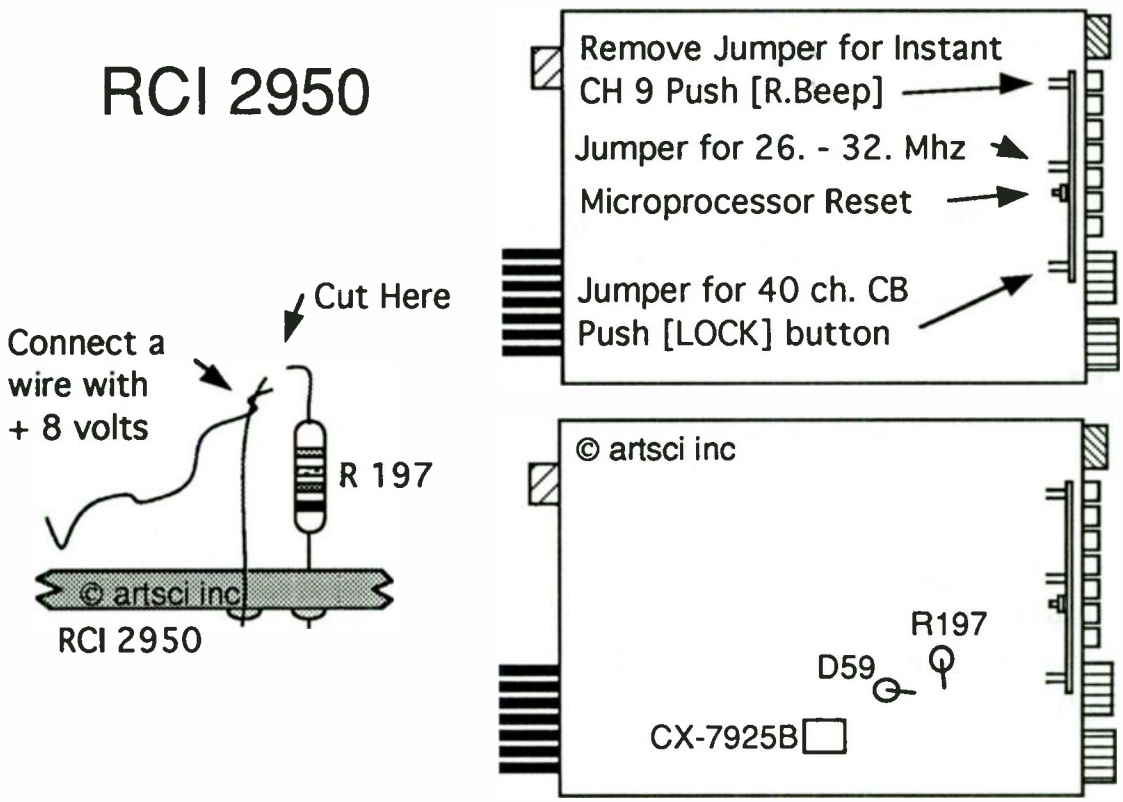
1. Remove Power and Antenna.
2. Remoce screws and open the case.
3. Locate and remove resistor R55 (RX Mod 118 -174 MHz)
4. Locate resistors R77, R123 & R124.
5. Add a jumper from R77 to R123 & R124 (TX Mod 140-174 MHz)
6. Reassemble the radio.

Caution

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.



More ---

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RCI 2950

Alignment Procedure

1. Set the freguency to 26.000 MHz (any mode)

2. Connect a DC voltmeter between J13 and ground.
   (The chassis is not grounded. You can find ground on the main circuit board)
   Adjust L17 to obtain a 1.0 V reading.

3. Set the service monitor to 10.240 MHz, SSB mode.
   Sniff at X2 and zero beat using VC2.

4. Remove the shorting bar located near the final amplifier transistors and key the radio.
   Sniff X2 and adjust VR21 to zero beat.

5. Repeat step 4 for receive at X1.

6. Set the service monitor to 10.695 MHz.
   Key the transmitter and sniff X3 in either AM or FM.
   Adjust L27 and zero beat.

7. Un-key the radio.
   Set the service monitor to 10.6925 MHz, USB mode.
   Ket the transmitter and adjust L29 to zero beat.
   Un-key.

8. Un-key the radio.
   Set the service monitor to 10.6975 MHz, LSB mode.
   Ket the transmitter and adjust L28 to zero beat.
   Un-key.

More ---

Caution

RCI 2950

Alignment Procedure Part 2

9. Replace shorting bar and set the radio to 28.0500 MHZ FM mode.

10. Inject an on-frequency FM signal into the radio and tune for best SINAD by adjusting L8, L9, L11, L12, L14, L4, L3, L5, L6 and L7.
Repeat this step until SINAD reading of 12db or better with a .2 uV input.

11. Ley the raio in UBS with a 1 KHz tone at 30 mV at the mic input.
Adjust VR12 for maximum, approximately 30 W.

12. Adjust VC3, L34, L43, L46, L47, L48 and L19 for peak power out.
Adjust VR12 to set max power to 25 watts.

13. Set mode to FM and key the radio.
Set the output power to 10 watts using VR13.

14. Set the mode to AM and adjust VR14 for 90% modulation.

***** radio is now aligned.

Caution

HEATHKIT SB-1400

EXPANDED RF

1. Turn the radio on.
2. Set display to 12.3456
3. Press [BAND] button.
4. Turn radio off.
5. Turn radio on.

Note: You must perform these steps within 3 seconds to properly reset the radio.

Caution

Radio / Tech Modifications

CB Modifications

Radio / Tech Modifications

CB Modifications

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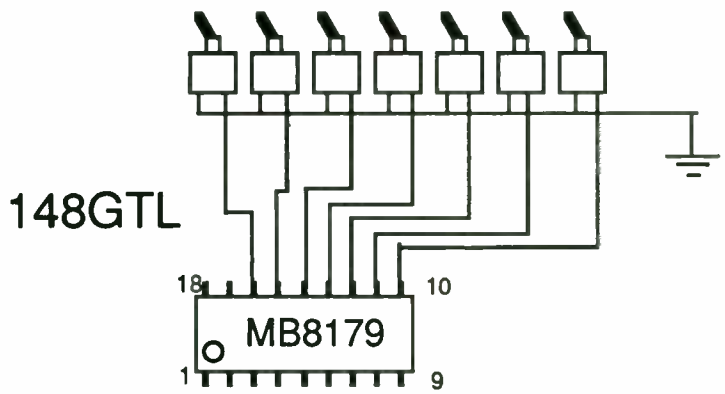
COBRA 148GTL
any other CB using MB8719 IC

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
26.815 =	1	0	0	0	0	0	0
26.825 =	1	0	0	0	0	0	1
26.835 =	1	0	0	0	0	1	0
26.845 =	1	0	0	0	0	1	1
26.855 =	1	0	0	0	1	0	0
26.865 =	1	0	0	0	1	0	1
26.875 =	1	0	0	0	1	1	0
26.885 =	1	0	0	0	1	1	1
26.895 =	1	0	0	1	0	0	0
26.905 =	1	0	0	1	0	0	1
26.915 =	1	0	0	1	0	1	0
26.925 =	1	0	0	1	0	1	1
26.935 =	1	0	0	1	1	0	0
26.945 =	1	0	0	1	1	0	1
26.955 =	1	0	0	1	1	1	0
26.965 =	1	0	0	1	1	1	1
26.975 =	1	0	1	0	0	0	0
26.985 =	1	0	1	0	0	0	1
26.995 =	1	0	1	0	0	1	0
27.005 =	1	0	1	0	0	1	1
27.015 =	1	0	1	0	1	0	0
27.025 =	1	0	1	0	1	0	1
27.035 =	1	0	1	0	1	1	0
27.045 =	1	0	1	0	1	1	1
27.055 =	1	0	1	1	0	0	0
27.065 =	1	0	1	1	0	0	1
27.075 =	1	0	1	1	0	1	0
27.085 =	1	0	1	1	0	1	1
27.095 =	1	0	1	1	1	0	0
27.105 =	1	0	1	1	1	0	1
27.115 =	1	0	1	1	1	1	0
27.125 =	1	0	1	1	1	1	1
27.135 =	1	1	0	0	0	0	0
27.145 =	1	1	0	0	0	0	1
27.155 =	1	1	0	0	0	1	0
27.165 =	1	1	0	0	0	1	1
27.175 =	1	1	0	0	1	0	0
27.185 =	1	1	0	0	1	0	1
27.195 =	1	1	0	0	1	1	0
27.205 =	1	1	0	0	1	1	1
27.215 =	1	1	0	1	0	0	0
27.225 =	1	1	0	1	0	0	1
27.235 =	1	1	0	1	0	1	0
27.245 =	1	1	0	1	0	1	1
27.255 =	1	1	0	1	1	0	0
27.265 =	1	1	0	1	1	0	1
27.275 =	1	1	0	1	1	1	0
27.285 =	1	1	0	1	1	1	1
27.295 =	1	1	1	0	0	0	0
27.305 =	1	1	1	0	0	0	1
27.315 =	1	1	1	0	0	1	0
27.325 =	1	1	1	0	0	1	1
27.335 =	1	1	1	0	1	0	0
27.345 =	1	1	1	0	1	0	1
27.355 =	1	1	1	0	1	1	0
27.365 =	1	1	1	0	1	1	1
27.375 =	1	1	1	1	0	0	0
27.385 =	1	1	1	1	0	0	1
27.395 =	1	1	1	1	0	1	0
27.405 =	1	1	1	1	0	1	1
27.415 =	1	1	1	1	1	0	0
27.425 =	1	1	1	1	1	0	1
27.435 =	1	1	1	1	1	1	0
27.445 =	1	1	1	1	1	1	1

Frequency	10	11	12	13	14	15	16
27.455 =	0	0	0	0	0	0	0
27.465 =	0	0	0	0	0	0	1
27.475 =	0	0	0	0	0	1	0
27.485 =	0	0	0	0	0	1	1
27.495 =	0	0	0	0	1	0	0
27.505 =	0	0	0	0	1	0	1
27.515 =	0	0	0	0	1	1	0
27.525 =	0	0	0	0	1	1	1
27.535 =	0	0	0	1	0	0	0
27.545 =	0	0	0	1	0	0	1
27.555 =	0	0	0	1	0	1	0
27.565 =	0	0	0	1	0	1	1
27.575 =	0	0	0	1	1	0	0
27.585 =	0	0	0	1	1	0	1
27.595 =	0	0	0	1	1	1	0
27.605 =	0	0	0	1	1	1	1
27.615 =	0	0	1	0	0	0	0
27.625 =	0	0	1	0	0	0	1
27.635 =	0	0	1	0	0	1	0
27.645 =	0	0	1	0	0	1	1
27.655 =	0	0	1	0	1	0	0
27.665 =	0	0	1	0	1	0	1
27.675 =	0	0	1	0	1	1	0
27.685 =	0	0	1	0	1	1	1
27.695 =	0	0	1	1	0	0	0
27.705 =	0	0	1	1	0	0	1
27.715 =	0	0	1	1	0	1	0
27.725 =	0	0	1	1	0	1	1
27.735 =	0	0	1	1	1	0	0
27.745 =	0	0	1	1	1	0	1
27.755 =	0	0	1	1	1	1	0
27.765 =	0	0	1	1	1	1	1
27.775 =	0	1	0	0	0	0	0
27.785 =	0	1	0	0	0	0	1
27.795 =	0	1	0	0	0	1	0
27.805 =	0	1	0	0	0	1	1
27.815 =	0	1	0	0	1	0	0
27.825 =	0	1	0	0	1	0	1
27.835 =	0	1	0	0	1	1	0
27.845 =	0	1	0	0	1	1	1
27.855 =	0	1	0	1	0	0	0
27.865 =	0	1	0	1	0	0	1
27.875 =	0	1	0	1	0	1	0
27.885 =	0	1	0	1	0	1	1
27.895 =	0	1	0	1	1	0	0
27.905 =	0	1	0	1	1	0	1
27.915 =	0	1	0	1	1	1	0
27.925 =	0	1	0	1	1	1	1
27.935 =	0	1	1	0	0	0	0
27.945 =	0	1	1	0	0	0	1
27.955 =	0	1	1	0	0	1	0
27.965 =	0	1	1	0	0	1	1
27.975 =	0	1	1	0	1	0	0
27.985 =	0	1	1	0	1	0	1
27.995 =	0	1	1	0	1	1	0
28.005 =	0	1	1	0	1	1	1
28.015 =	0	1	1	1	0	0	0
28.025 =	0	1	1	1	0	0	1
28.035 =	0	1	1	1	0	1	0
28.045 =	0	1	1	1	0	1	1
28.055 =	0	1	1	1	1	0	0
28.065 =	0	1	1	1	1	0	1
28.075 =	0	1	1	1	1	1	0
28.085 =	0	1	1	1	1	1	1

COBRA CB's

REMOVE ALC CIRCUIT (Higher TX power)

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
18-LTD	R-87
19 PLUS	D-502
20 PLUS	VR-502
21 PLUS	D-20
21 GTL	TR-14
21 LTD	TR-14 OR D9
21 XLR	TR-20
25 GTL	TR-14
25 PLUS	D-20
27	X8
29 GTL	D-20
29 PLUS	R-79 OR D-20
31 PLUS	D-19
32 XLR	TR-18
33 PLUS	D-17
40 PLUS	VR-104
78 X	C-49
85	D-9
86 XLR	CD-9
87 GTL	VR-6
89 GTL	VR-6
89 XLR	VR-5
132 XLR	R-134 = AM R-130 = SSB'
135 XLR	R-134 = AM R-130 = SSB'
138 XLR	TR-23
139 XLR	R-132
140 GTL	TR-32
142 GTL	TR-32
148 DX	VR-14=AM & VR-12=SSB
148 GTL	TR-24
150 GTL	RV-14=AM & RV-4=SSB
1000 GTL	VR-6
2000 GTL	TR-24 & C-232
REMOTE CONTROL	D-401

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REALISTIC CB's

REMOVE ALC CIRCUIT (Higher TX power)

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-417	Q-19
TRC-421	D-16
TRC-422	Q-11
TRC-432	Q-12
TRC-440	D-107
TRC-448	VR-5=AM & VR-204=SSB
TRC-449	VR-7=AM & CT-7=SSB
TRC-452	VR-207
TRC-454	VR-702
TRC-455	R-504
TRC-457	VR-7=AM & CT-7=SSB
TRC-461	VR-2
TRC-462	D-17
TRC-467	D-109
TRC-468	R-42
TRC-469	VR-5
TRC-473	D-17
TRC-410	Q-12
TRC-413	R-85
TRC-415	Q-7
TRC-427	C-78
TRC-428	R-90
TRC-433	Q-15
TRC-451	VR-5=AM & VR-6=SSB
TRC-453	R-146
21-1537	D-17

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OTHER CB's

REMOVE ALC CIRCUIT (Higher TX power)

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

COMPANY	MODEL	REMOVE THIS PART
ALARON	B4900	Q-201
AUDIOVOX	WINSOR	D-12
	100	D-12
	CB-930	RV-2
	CB-950	D-39
	CBH-990	RV-2
	CBR-9600	RV-105
BROWNING	BARON	R-134=AM & R-130=SSB
	BROWNIE	Q-13
	MARK III	R-38=AM & R-69=SSB
	SABRE	CD-11
	SST-2	CD-11
CLARICON	PRIVATEER	CR-107

Caution

OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
COLT	190	R-71
	222	C-228
	290	RV-2
	320 DX	RV-14=AM & RV-4=SSB
	320 FM	RV-14=AM & RV-4=SSB
	350	R-121
	390	RV-2
	480	RV-12=AM & RV-11=SSB
	485	RV-12=AM & RV-11=SSB
	800	RV-2
	1000	RV-12=AM & RV-11=SSB
	1200 DX	RV-14=AM & RV-4=SSB
CONVOY	CON-400	R-129
COURIER	BLAZER 40D	VR-9
	CARAVELLE 40D	R-504
	CENTURIAN 40	D-24
	CENTURION 40D	D-46
	CHIEF 23	X-8
	CONQUEROR	R-504
	GLADIATOR	D-46
	NIGHT RIDER 40	VR-301
	RANGLER 40	VR-301
	RENEGADE 40	VR-9
	ROGUE 40	VR-5
CRAIG	L101	R-226
	L-321	R-605=AM & R-20=SSB

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OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
DAK	IX	Q-202
	X	Q-37 & Q-38
FANNON	12SF	R-76
	190 DF	VR-301
	182F	D-12
	184DF	D-12
	185DF	VR-301
	185PLL	VR-301
	SFT 400	D-10
FUZZBUSTER	2-50	Q-8
GE	3-5801A	VR-7
	3-5804A	VR-7
	3-5804D	RV-2
	3-5810B	RV-2
	3-5811B	RV-2
	3-5812A	RV-2
	3-5813A	RV-2
	3-5813B	RV-2
	3-5814A	C-98
	3-5814B	RV-2
	3-5818A	RV-2
	3-5819A	RV-2
	3-5821A	VR-10
	3-5821B	VR-10
	3-5869A	RV-2
	3-5871A	VR-11
	3-5871B	VR-11
	3-5875A	RV-9=AM & VR-201=SSB

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OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
GEMTRONICS	GTX-44	RV-2
	GTX-55	RV-2
	GTX-66	RV-2
	GTX-77	RV-2
	3000-GTX	R-93
	4040	D-481
	5000-GTX	VR-4
HY-GAIN	672 B	RV-2
	674 B	VR-7
	2679 I	RV-2
	2680 II	RV-2
	2681 II	RV-2
	2682 II	RV-2
	2683 III	RV-2
	2701 I	RV-2
	2702 II	RV-2
	2703 III	RV-2
	2795	RV-14=AM & RV-4=SSB
	2795 DX	RV-14=AM & RV-4=SSB
	V SSB	VR-7
JC PENNY	981-6221	D-501
	981-6237	D-7
	681-6241	Q-405
	6218	RV-2

Caution

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OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
JOHNSON	4120	CR-12
	4125	CR-12
	4135	CR-12
	4140	R-37
	4145	R-37
	4230	R-37
KRACO	KCB-4000	VR-4
	KCB-4010	RV-2
	KCB-4020	RV-2
	KCB-4030	RV-2
	KCB-4045	RV-2
LAFAYETTE	HB-650	RV-102
	HB-750	RV-102
	HB-870	RV-14=AM & RV-4=SSB
	HB-940	RV-2
	SSB-100	RV-7=AM & RV-8=SSB
	SSB-140	RV-12=AM & RV-11=SSB
	TELSTAT 1140	RV-2
	TELSTAT 1240	VR-305

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OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
MIDLAND	76-858	RV-2
	76-860	R-218
	76-863	RV-2
	77-101B	RV-201
	77-101C	RV-201
	77-116	RV-2
	77-821	RV-2
	77-824	RV-201
	77-825	D-3
	77-830	RV-2
	77-838	RV-2
	77-849	RV-2
	77-856	VR-5
	77-857	RV-2
	77-861	D-2
	77-866	TR-8
	77-867	D-14
	77-874	X-11
	77-882	Q-15
	77-883	X-11
	77-888	RV-2
	77-889	RV-2
	77-963	RV-2
	79-892	RV-12=AM & RV-11=SSB
	79-893	RT-601=AM & RV-7=SSB
MOPAR	4094177	RV-2
	4094178	RV-2

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OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
PACE	CB-145	CV-20
	CB-166	R-207
	1000-MS	CR-508
	2300	X-9
	CB-8008	R-218
	CB-8010	R-220
	CB-8015	R-220
	CB-8041	R-302
	CB-8046	R-302
	CB-8117	R-220
	CB-8117	R-220
PALOMAR	49	R-208
	SSB-500	RV-12=AM & RV-2=SSB
	4100	RV-2
PANASONIC	RJ-3150	R-117
	RJ-3250	R-70
PEARCE SIMPSON	JAGUAR	FVR-3
	LION	RV-2
	SUPER LYNX	D-12
	TIGER	RV-2

Caution

OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
PRESIDENT	ADAMS (OLD)	VR-7=AM & CT-7=SSB
	ADAMS (NEW)	TR-24
	AR-7	R-54
	AX-43	Q-12
	DWIGHT D	VR-6
	GRANT (OLD)	VR-7=AM & CT-7=SSB
	GRANT (NEW)	R-128=AM & VR-11=SSB
	HONEST ABE	VR-5
	JOHN Q	RT-4
	MADISON (OLD)	VR-7=AB & CT-7=SSB
	MADISON (NEW)	R-128
	MCKINLEY	R-120
	OLD HICKORY	VR-5
	TEDDY R	VR-5
	THOMAS J	VR-4
	WASHINGTON (OLD)	VR-7=AM & CT-7=SSB
	WASHINGTON (NEW)	TR-32
	ZACHARY T	VR-6
RAIDER	404-R	D-52
RANGER	AR-3300	VR-17=AM & VR-15=SSB
	AR-3500	VR-17=AM & VR-15=SSB
RCA	14T260	RV-2
	14T270	RV-2
	14T301	RV-2
	14T302	D-301
	14T303	RV-2
	14T304	RV-2
	14T305	RV-2

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OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
RCI	2900	VR-14=AM & VR-12=SSB
	2950	VR-14=AM & VR-12=SSB
REGENCY	CR-186	D-9
ROBYN	AM-500D	VR-5
	DG-130D	VR-6
	GT-410	VR-13
	LB-120	VR-6
	SX-401	RV-7
	SX-402D	VR-13
	T240D	VR-4
	WV-110	VR-6
	007-140	VR-6
	123-C	D-11
	510-D	VR-7=AM & CT-7=SSB

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OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
ROYCE	1-602	D-6
	1-603	Q-205
	1-606	D-17
	1-607	VR-201
	1-609	Q-205
	1-610	D-202
	1-619	D-301
	1-620	D-301
	1-621	VR-3
	1-625	VR-1602
	1-630	C-79 & D-42 & D-44
	1-639	Q-16
	1-641	VR-7
	1-648	C-82 & C-35 & C-96
	1-653D	D-301
	1-655	D-301
	1-658	D-301
	1-662	D-301
	1-673	D-301
	1-675	D-301
	1-680	D-301
	1-682	D-301
SANYO	TA-2000	D-505
	TA-4000	VR-6

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OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
SBE	ASPEN-41	VR-203
	CONSOLE II	VR-7=AM & VR-1=SSB
	CONSOLE V	VR-803=AM & VR-302=SSB
	CORTEX	VR-203
	FORMULA D	VR-9
	KEYCOM 54	RV-1
	LCB-8	VR-6
	LCMS-5	VR-6
	MALIBU 44	R-226
	TAHOE 49	R-129
	TOUCH COM 174	VR-4
	TRINIDAD 45	R-226
SEARS	370.380507	R-218
	934.36710501	D-6
	934.380607	D-7
	934.380627	R-42
	934.380807	D-7
	934.380817	D-501
	934.381107	D-501
	934.381207	D-502
SILTRONICS	APACHE	D-14
	MOHAWK	D-14
SHARP	CB-750	R-112
	CB-2260	R-112

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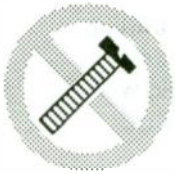
OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
SUPERSTAR	120	D-11
	360 FM	VR-14=AM & VR-12=SSB
	3600	VR-14=AM & VR-12=SSB
TEABERRY	RACER T	VR-6
	STALKER I	VR-13=AM & VR-12=SSB
	STALKER II	VR-13=AM & VR-12=SSB
	STALKER V	VR-4
	STALKER IX	R-102
	T BEAR	VR-5
	T CHARLIE	VR-7
	T COMMAND	VR-5
	TITAN T	D-14
	T CONTROL	VR-505
TENNA PHASE	CB-22	R-46
	CB-26	D-22
TRAM	D-12	R-61
	D-42	CD-11
	D-60	R-98=AM & R-112 SSB
	D-201A	VR-77
	D-300	TR-23
TRUETONE	CYJ4862A-87	RV-2
	8334	Q-15



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OTHER CB's
CONTINUED

COMPANY	MODEL	REMOVE THIS PART
UNIDEN	2510	VR-112=AM & VR-104=SSB
	2600	VR-112=AM & VR-104=SSB
	PC-3	TR-14
	PRO-640	RV-5=AM & VR-6=SSB
	PC-122	Q-29 (near PL connector)
UTAC	TRX-400	D-11
VECTOR	770	FVR-3
	790	FVR-3
WARDS	GEN-730A	VR-206
	GEN-775A	VR-206
	GEN-828A	VR-206
WHISTLER	700	Q-205
	900	Q-305
XTAL	CB-7	D-18
	CB-11	D-14
	SSB-10	D-2
ZEXON	49	Q-201

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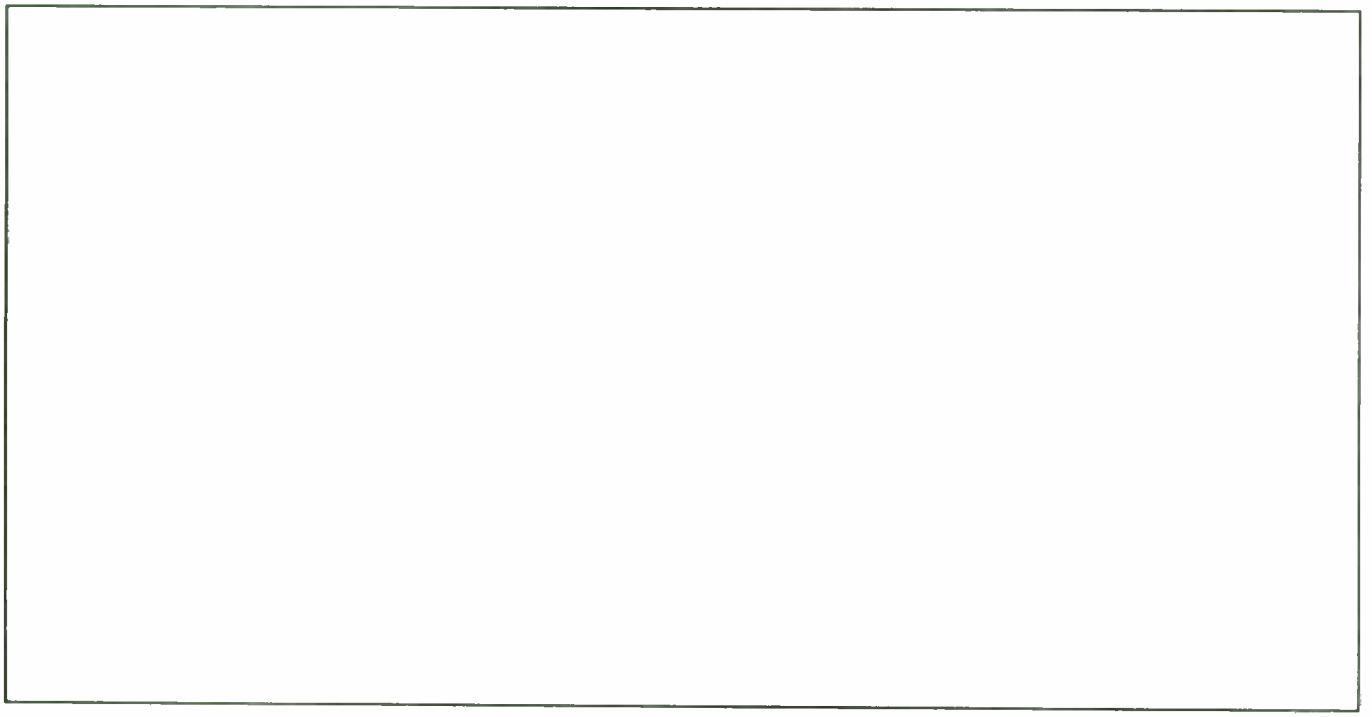
Notes



Radio / Tech Modifications

APPENDIX

APPENDIX

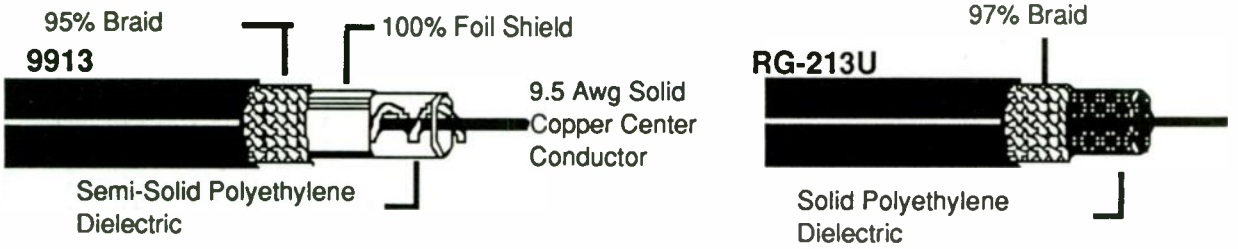
COAX TYPE	VEL %	dB ATTENUATION PER 100 FEET. 100 MHz	200 Mhz	400 MHz	1000 MHz	LENGTH IN FEET FOR 1 WAVELENGHT 146 MHz	222 MHz	445 MHz
9913 (100% shield)	89	1.4	1.8	2.6	4.5	6.00	3.94	1.97
RG-8U FOAM (8214)	80	1.8	2.7	4.2	7.0	5.39	3.55	1.77
RG-213 (NON-CONTAM.)	66	2.2	3.2	4.7	8.5	4.45	2.93	1.46
RG-8X (MINI-FOAM)	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

COAX LENGTHS SHOULD BE MULTIPLE HALF WAVELENGHTS.

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

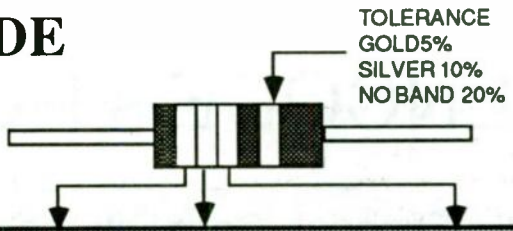
db - % loss chart

db Loss	Power Loss	db Loss	Power Loss	db Loss	Power Loss	db 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 %		



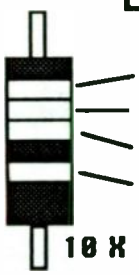
APPENDIX A

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

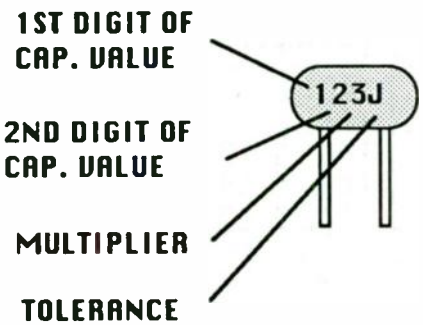
Example



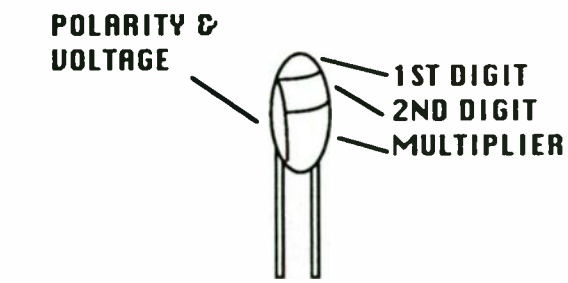
BROWN 1
BLACK 0
YELLOW 10,000
SILVER 10%

10 X 10,000 = 100,000
(100K) OHMS

CAPACITORS



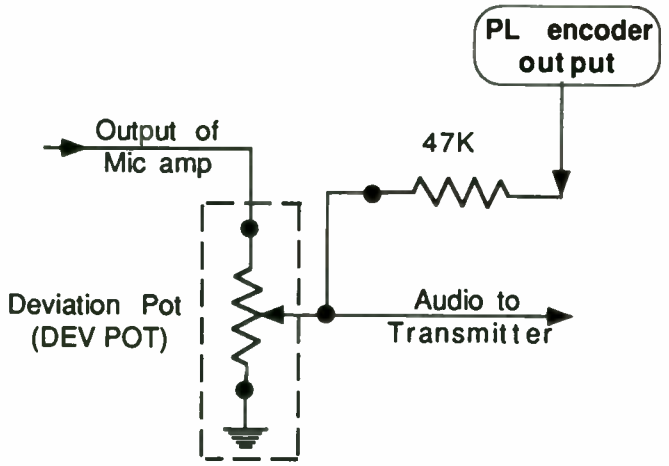
MULTIPLIER		TOLERANCE		
	MULTIPLY BY		10pF or less	over 10pF
0	1	B	0.1pF	
1	10	C	0.25pF	
2	100	D	0.5pF	
3	1,000	F	1.0pf	1%
4	10,000	G	2.0pf	2%
5	100,000	H		3%
		J		5%
8	.01	K		10%
9	0.1	M		20%



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

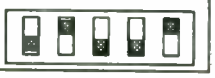
PL Encoder Connections



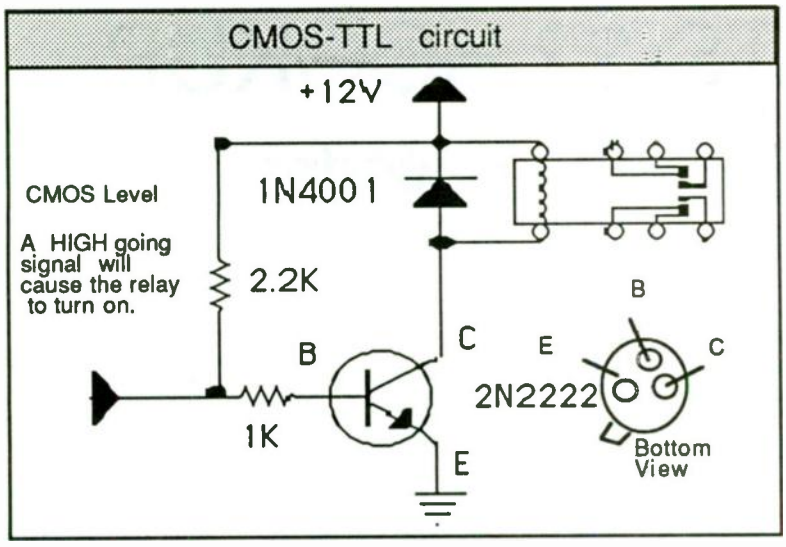
Attach a 47K ohm resistor to the output of the deviation pot. Attach the other end of resistor to the output of the PL encoder.

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		

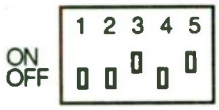


1 = on / 2 = off
example above
01001=107.2

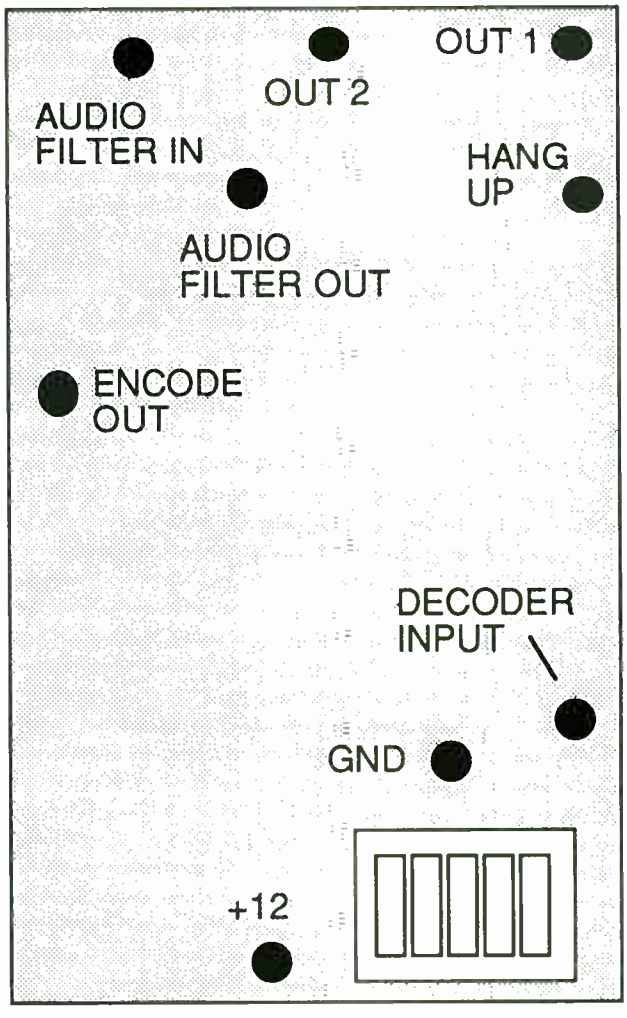


Freq.	1	2	3	4	5	Code	#
67.0	1	1	1	1	1	XZ	1
71.9	0	1	1	1	1	XA	2
74.4	1	0	1	1	1	WA	3
77.0	0	0	1	1	1	XB	4
79.7	1	1	0	1	1	SP	5
82.5	0	1	0	1	1	YZ	6
85.4	1	0	0	1	1	YA	7
88.5	0	0	0	1	1	YB	8
91.5	1	1	1	0	1	ZZ	9
94.8	0	1	1	0	1	ZA	10
97.4	1	0	1	0	1	ZB	11
100.0	0	0	1	0	1	1Z	12
103.5	1	1	0	0	1	1A	13
107.2	0	1	0	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



=PL 100
00101

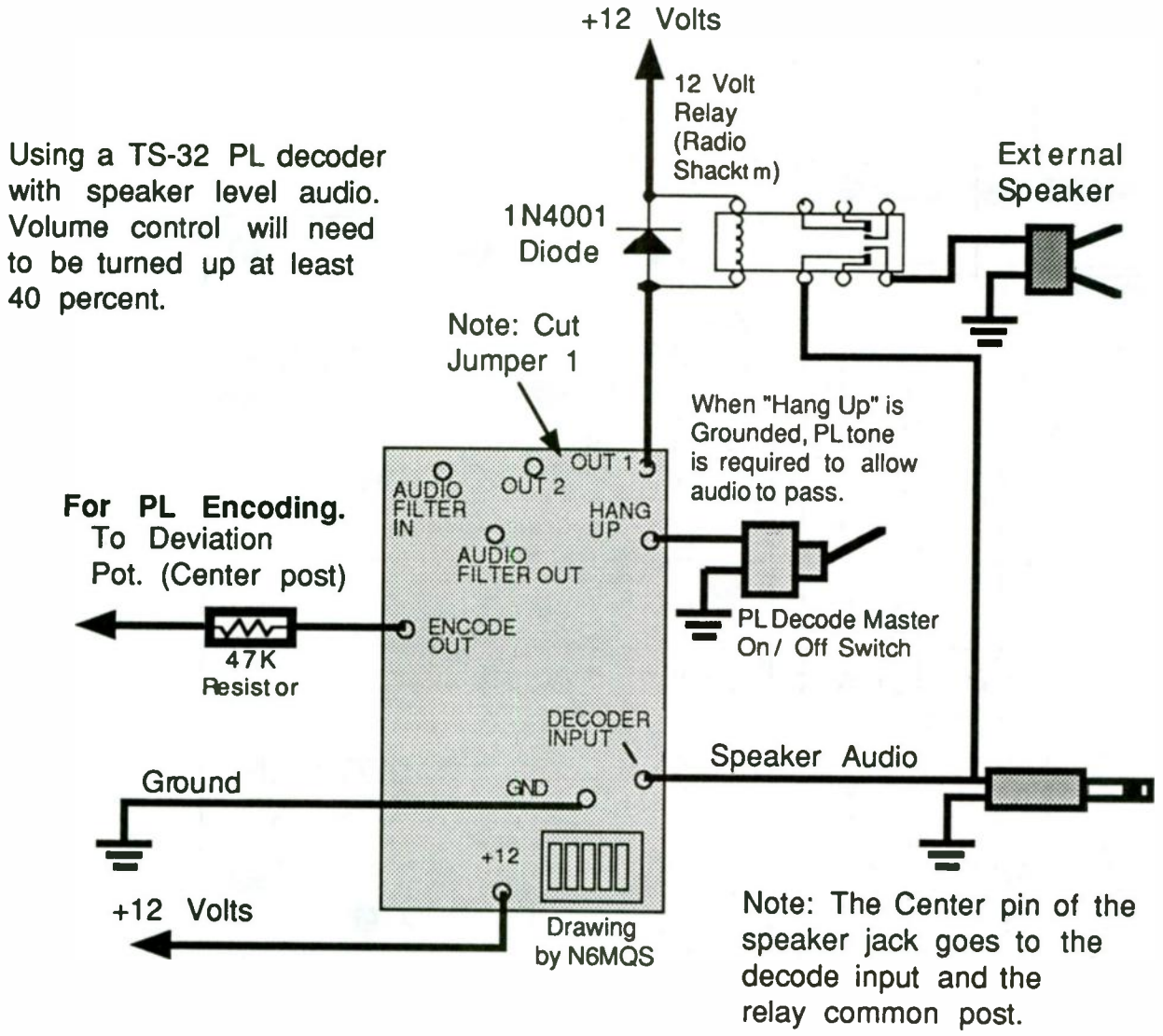


TS-32 LAYOUT

APPENDIX D

TS-32 HOOKUP

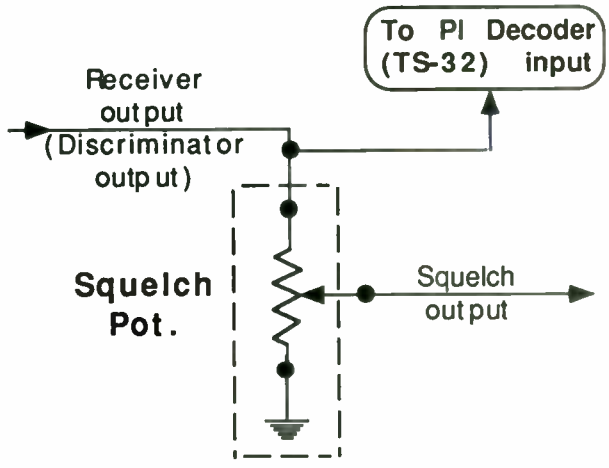
PL Decoder



APPENDIX E

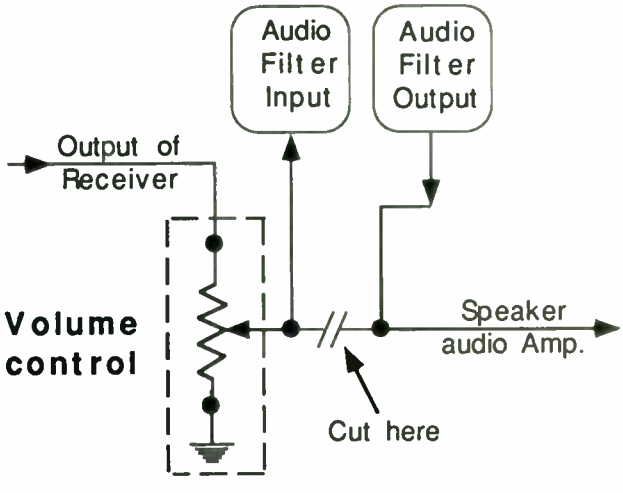
PL DECODER HOOK-UP

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.

APPENDIX F

##	FREQ.	DESCRIPTION	HAN	##	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		

APPENDIX G

Performance Report

Radio _____ Date _____

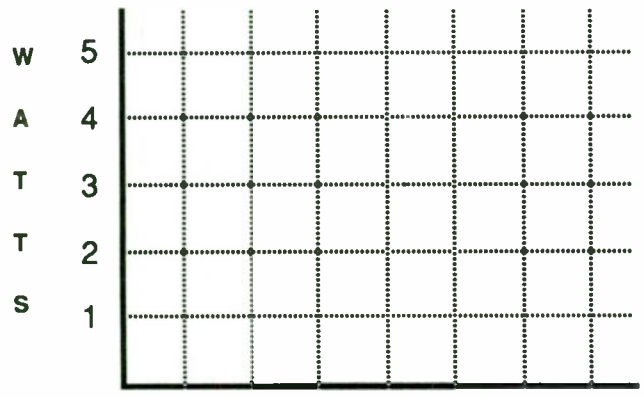
Owner : Name _____

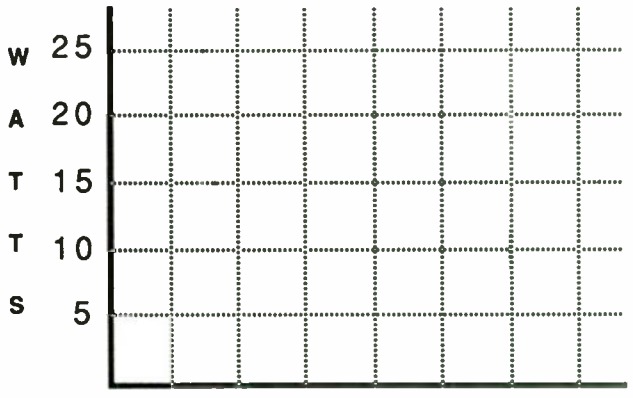
Address _____

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
Receive Sensitivity (____MHz)	_____ uv	_____ uv
Receive Sensitivity (____MHz)	_____ 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
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Audio Deviation	_____ KHz	_____ KHz
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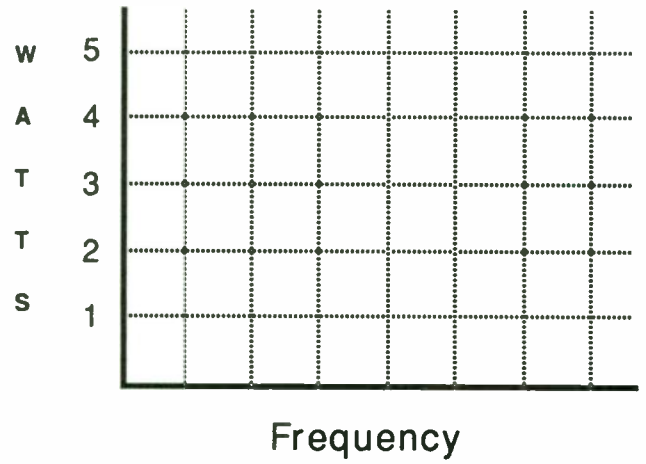

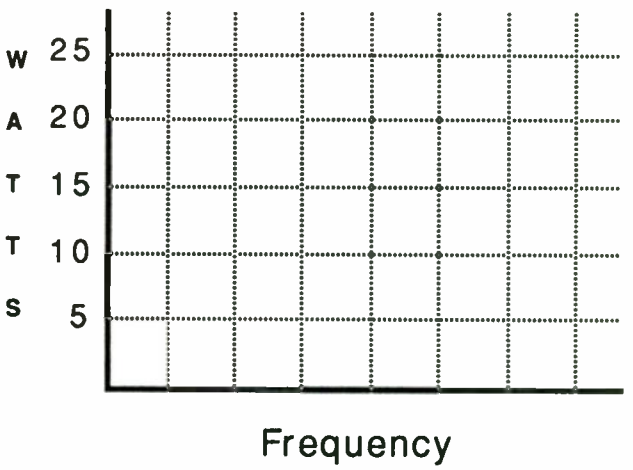

Performance Report

Radio _____ Date _____

Owner : Name _____

Address _____

City _____ St. Zip _____

Phone ( ) -

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Power out (Low)	_____ Watts	_____ Watts
Power out (High)	_____ Watts	_____ Watts
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Frequency Error (Offset)	_____ Hz	_____ Hz
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Receive Sensitivity (____MHz)	_____ uv	_____ uv
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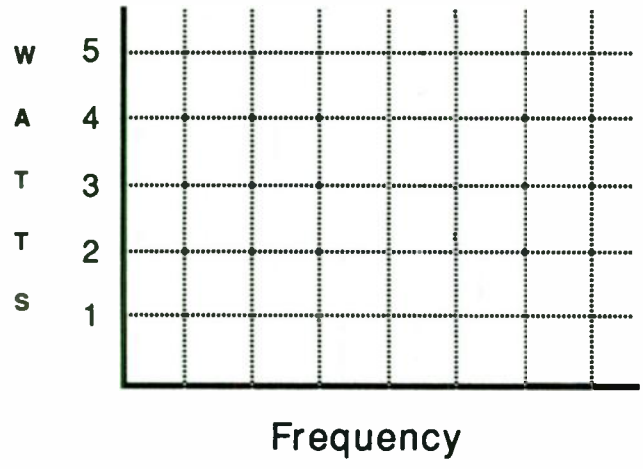
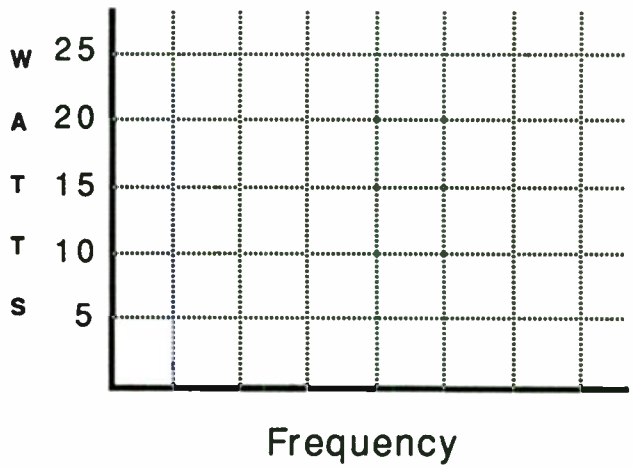
DTMF Deviation	_____ KHz	_____ KHz
Audio Deviation	_____ KHz	_____ KHz
Lowest usable Freq @ .5 Pwr	_____ MHz	_____ MHz
Highest usable Freq @ .5 Pwr	_____ MHz	_____ MHz





Performance Report

Radio _____ Date _____

Owner : Name _____

Address _____

City _____ St. Zip _____

Phone ( ) - _____

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Audio Deviation	_____ KHz	_____ KHz
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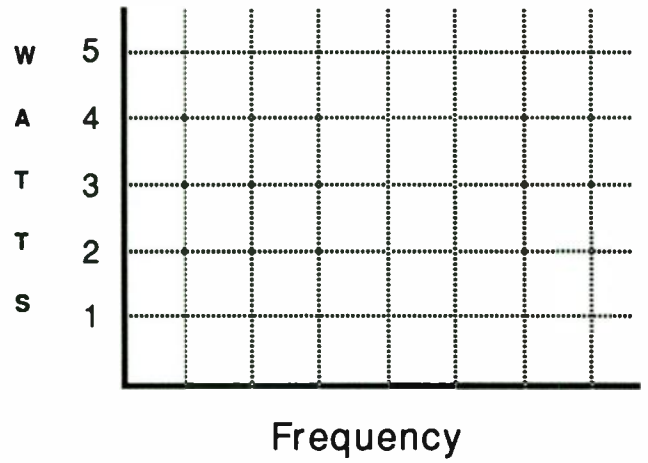
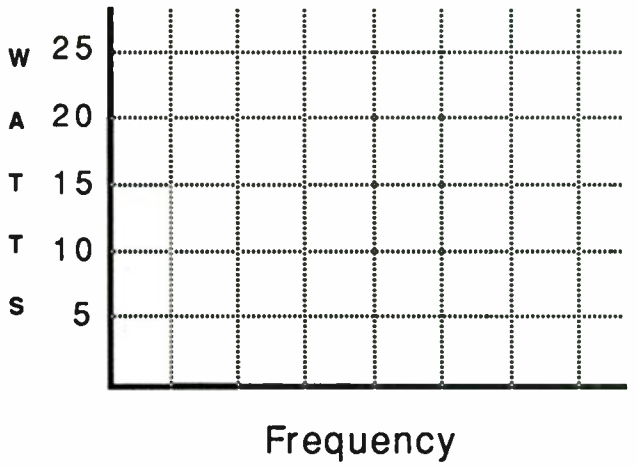
Highest usable Freq @ .5 Pwr	_____ MHz	_____ MHz





Performance Report

Radio _____ Date _____

Owner : Name _____

Address _____

City _____ St. Zip _____

Phone ( ) -

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Audio Deviation	_____ KHz	_____ KHz
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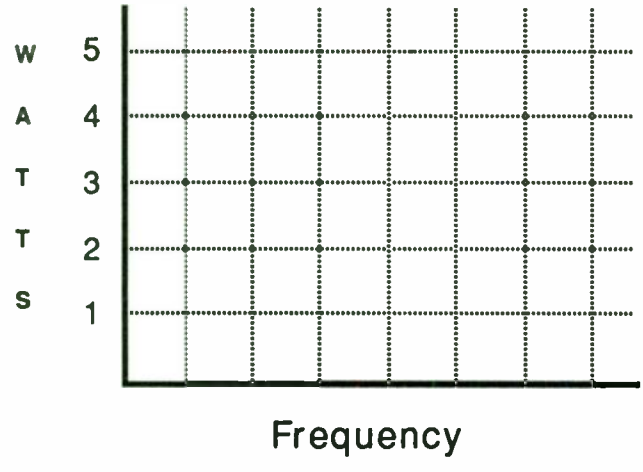

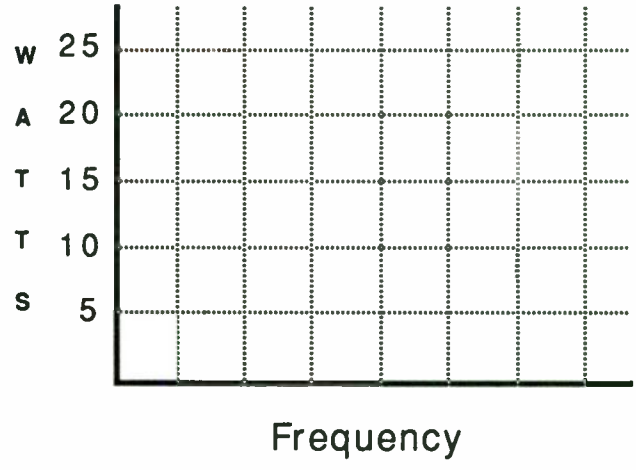

Performance Report

Radio _____ Date _____

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

Description	Before	After
Power out (Low)	_____ Watts	_____ Watts
Power out (High)	_____ Watts	_____ Watts
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Frequency Error (Offset)	_____ Hz	_____ Hz
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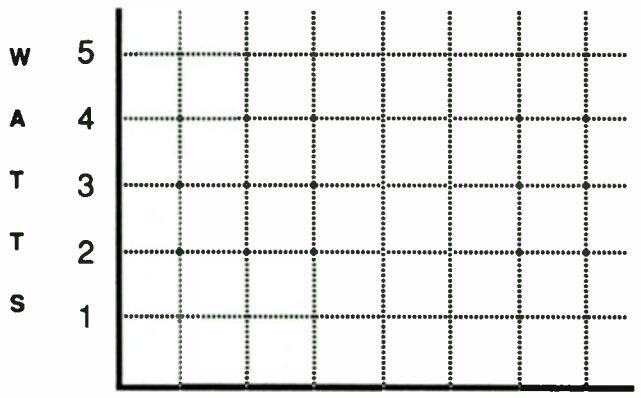
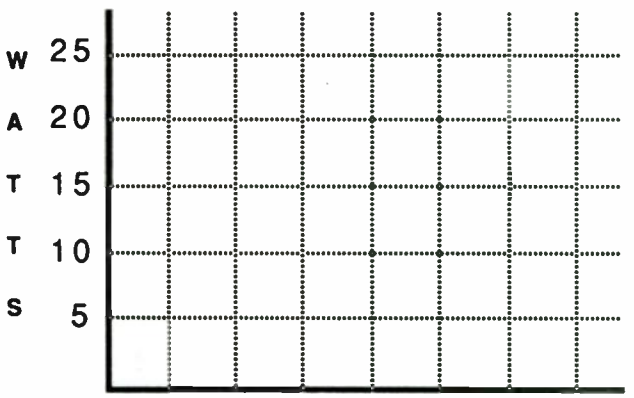
Audio Deviation	_____ KHz	_____ KHz
Lowest usable Freq @ .5 Pwr	_____ MHz	_____ MHz
Highest usable Freq @ .5 Pwr	_____ MHz	_____ MHz





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Address _____

City _____ St. Zip _____

Phone ( ) -

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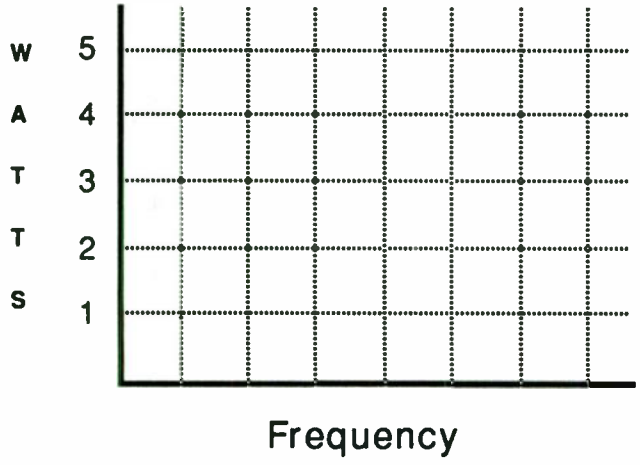

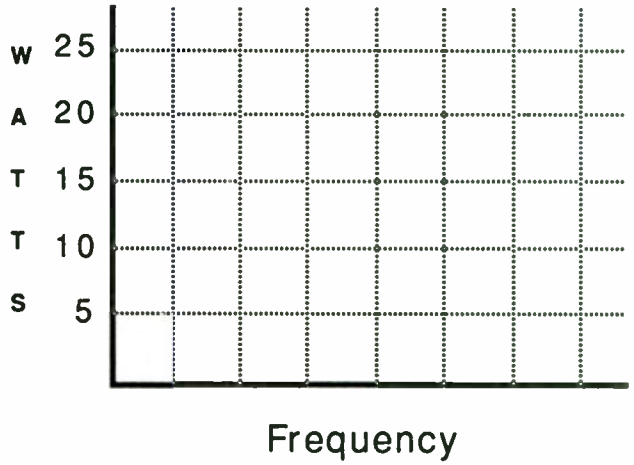

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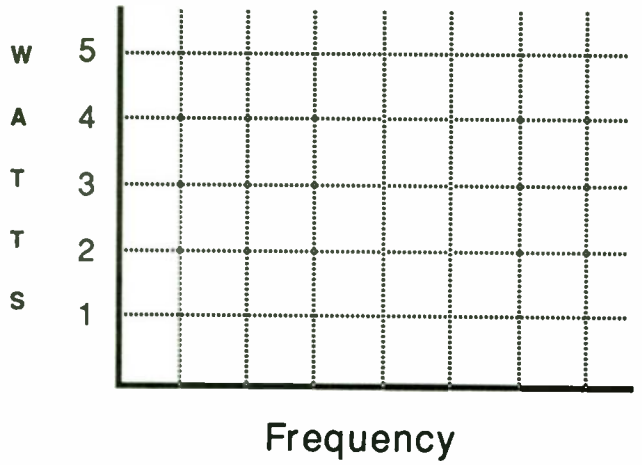

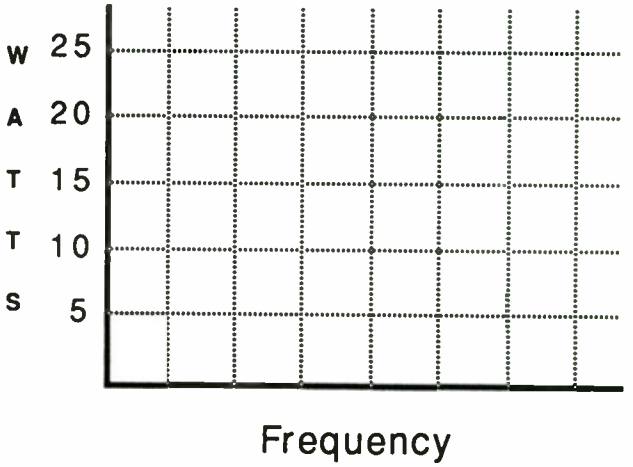

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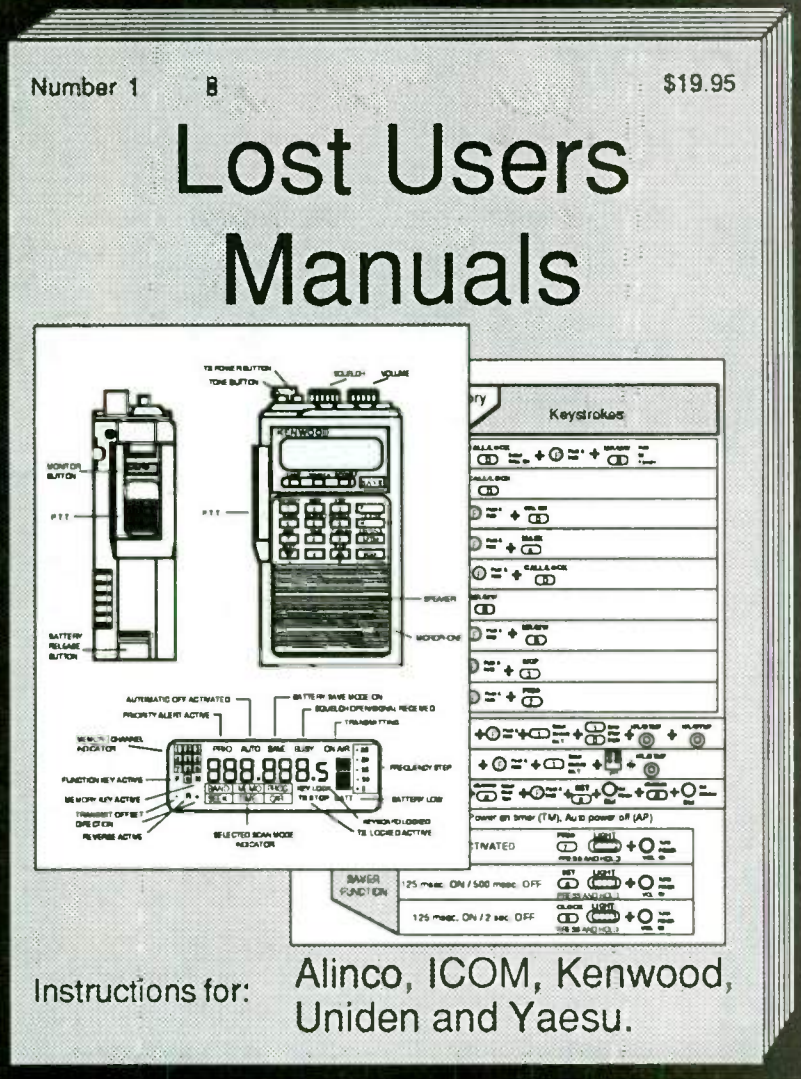

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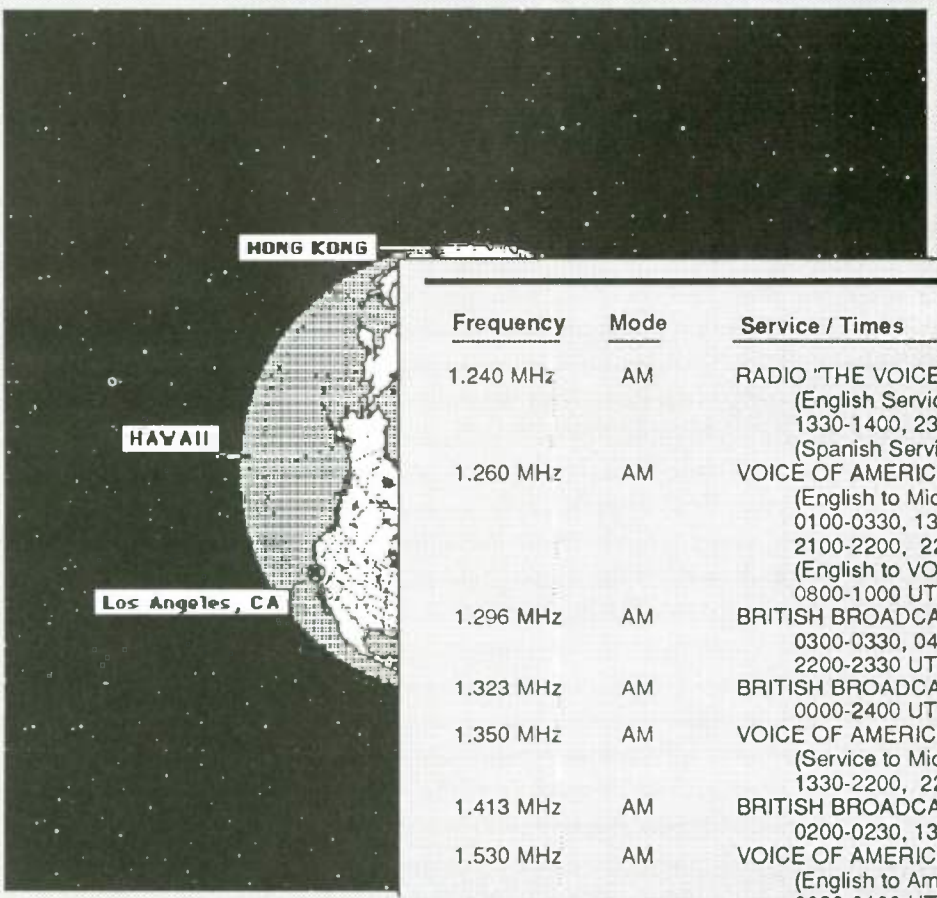

.1

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English & Spanish Broadcasts

Complete Shortwave Listings.

Frequency	Mode	Service / Times
1.240 MHz	AM	RADIO "THE VOICE OF VIETNAM", (English Service), 1000-1030, 1230-1300, 1330-1400, 2330-2400 UTC, (Spanish Service), 1100-1130 UTC
1.260 MHz	AM	VOICE OF AMERICA (English to Middle East/Europe service) 0100-0330, 1330-1400, 1400-1600, 2100-2200, 2230-2400 UTC (English to VOA Europe) 0300-0330, 0800-1000 UTC
1.296 MHz	AM	BRITISH BROADCASTING CORP., 0300-0330, 0430-0500, 0600-0630, 2200-2330 UTC
1.323 MHz	AM	BRITISH BROADCASTING CORP., 0000-2400 UTC
1.350 MHz	AM	VOICE OF AMERICA, (Service to Middle East) 0000-0500, 1330-2200, 2230-2300 UTC
1.413 MHz	AM	BRITISH BROADCASTING CORP., 0200-0230, 1300-1400, 1730-1830
1.530 MHz	AM	VOICE OF AMERICA (English to American Republics service) 0030-0100 UTC
1.575 MHz	AM	VOICE OF AMERICA (English to Pacific service) 2230-2400, 0030-0100 UTC. (English to VOA Europe) 1530-1600 UTC
	AM	ARMED FORCES RADIO, JAPAN, U.S. AIR FORCE, 0005-2205 UTC
1.580 MHz	AM	VOICE OF AMERICA (English to Caribbean) 0000-0200, 1000-1200 UTC (English to American Republics) 0030-0200 UTC
1.610 MHz		TRAVELERS INFORMATION SERVICE ACROSS U.S.
1.800 MHz	CW	**START OF AMATEUR RADIO 160 METER BAND (Ends 2.000 MHz)**
1.890 MHz	LSB	W1AW ARRL VOICE BULLETINS
2.500 MHz	VOICE	WWV INTERNATIONAL STANDARDS TIME FREQUENCY

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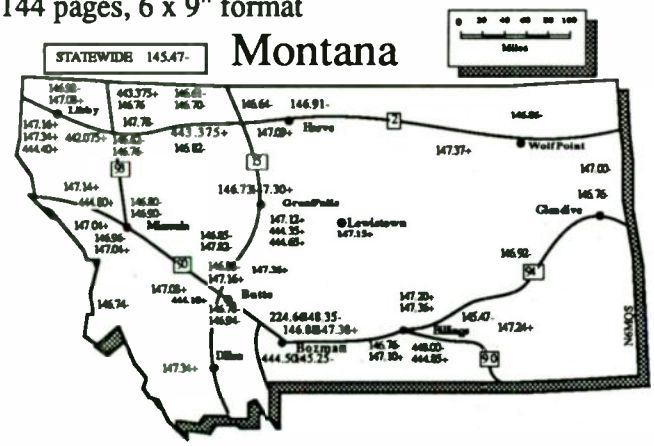

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This book contains all the useful information a amateur radio operator needs to reference.
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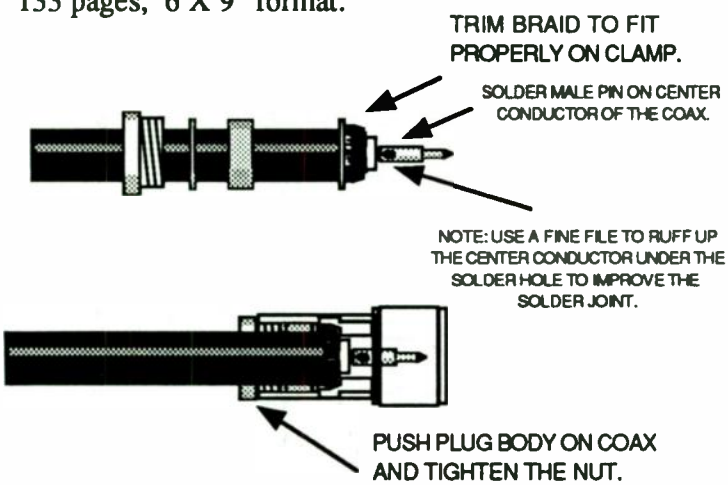

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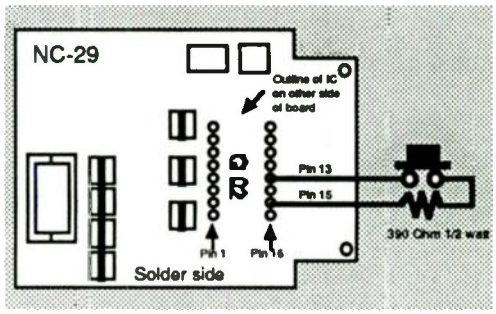

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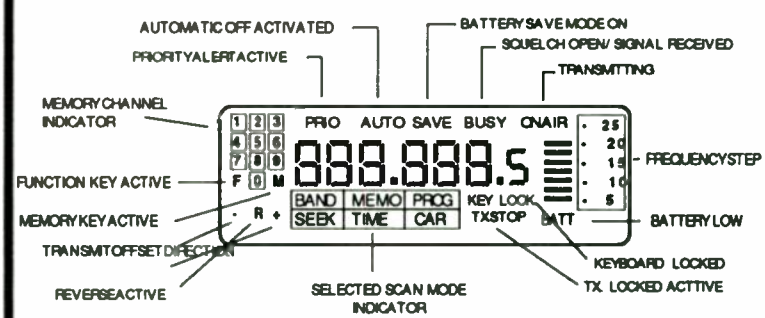

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