

Edition # 7 B

\$19.95

Radio / Tech Modifications & Alignment Controls

This Edition contains everything available
including information contained in all previous
Editions

Modifications for:

Alinco
Standard
Yaesu
Others
CB radios

7B

See back cover for specific radios

Este manual foi doado por PY2WFG Wilson
para ser scaneado e disponibilizado
GRATUITAMENTE a toda a comunidade

Scaneado em cores, 300 DPI (é o maximo que minha maquina faz,
nao me batam) em uma copiadora Lexmark X864de, imagens
tratadas com o programa IRFANVIEW e pdf gerado com o Adobe
Acrobat XI Pro, usando Clearscan

Eu scaneio, trato e disponibilizo manuais gratuitamente meramente
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Obrigado a todos que ajudaram ate aqui

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- <http://tabajara-labs.blogspot.com>
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ATENÇÃO: AS PAGINAS EM BRANCO ESTAO EXATAMENTE
COMO NO MANUAL. O OBJETIVO DE MANTE-LAS É VOCE
PODER IMPRIMIR UM MANUAL IDENTICO AO ORIGINAL.
NAO ESTÁ FALTANDO PAGINA NENHUMA NO MANUAL

Distribuição **GRATUITA**. Respeite o meu trabalho.
São Paulo, Agosto de 2021

The background of the entire page is a stylized, grayscale circuit board pattern. It features a complex network of lines representing traces, with various circular and oval shapes representing vias, pads, and component footprints. The pattern is dense and covers the entire area.

7B

Radio / Tech Modifications

Edition 7
Part B

artsci

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Radio / Tech Modifications

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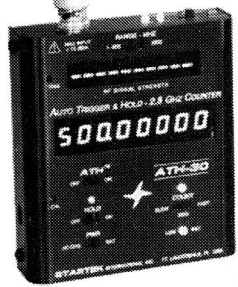


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\$235 value

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WARRANTY
5 Years Parts
1 Year Labor

BAND PASS FILTERS



ACCESSORIES

#CC-90	Soft Case for all models.....	\$12.
#TA-90	Telescope BNC antenna.....	12.
#TA-90-L	Telescope Elbow BNC antenna.....	16.
#RD-150	150 MHz Rubber Duck antenna.....	16.
#RD-2750	27 & 50 MHz Rubber Duck antenna.....	28.
#RD-450	450 MHz Rubber Duck antenna.....	16.
#RD-800	Cellular phone band RD antenna.....	29.
#C/6A ABOVE 7 items, SAVE \$30 ...99.		
#M-207-IC	Interface Cable MFJ ant. analyzers.....	10.
#P-110	200 MHz 1X-10X probe.....	39.
#LP-22	Low Pass, Audio probe.....	25.
#DC-10	Direct, 50 OHM probe.....	20.

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true Pocket Size:
4" High x 3.5" Wide x
1" Deep, <14 cubic in.
and are shipped with
factory installed
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AC charger/adaptor.
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optional.

FEATURES	ATH-10	ATH-15	ATH-30	ATH-50
	\$149 reg \$179	\$189 reg \$235	\$249 reg \$299	\$289 reg \$339
FREQUENCY RANGE	1 MHz - 1200 MHz	1 MHz - 1500 MHz	1 MHz - 2800 MHz	5 HZ - 2800 MHz
AUTO TRIGGER & HOLD	YES	YES	YES	YES
SIGNAL BAR GRAPH	NO	YES	YES	YES
LOW BATTERY IND.	NO	YES	YES	YES
ONE-SHOT & RESET	NO	OPTIONAL	YES	YES
HI-Z LOW RANGE	NO	NO	NO	YES
OPTION #HST-15 is a high accuracy, high stability, time base upgrade that can be ordered with any ATH series model (0.2PPM TCXO)..... \$100.				
Extend readability distance with BAND PASS FILTERS. \$49 ea.				
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#HP-400	400 - 1500 MHz	#HP-800	800 - 2000 MHz	
#BP-4 All 4 Filters \$189				

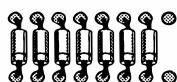
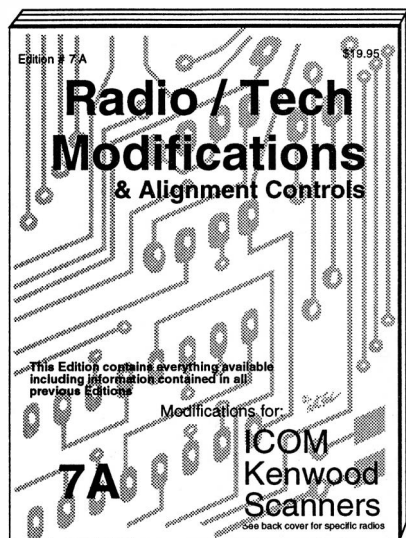
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Radio/Tech Modifications

EDITION 7A

- MODIFICATIONS FOR OUT OF BAND OPERATION
- ALIGNMENT CONTROLS
- OTHER ENHANCEMENTS!!!



Kenwood

TH-21A	∞	TM-711	∞
TH-22A	∞	TM-721	∞
TH-25A	∞	TM-731	∞
TH-26A	∞	TM-732	∞
TH-27A	∞	TM-733A	∞
TH-28A	∞	TM-741	∞
TH-31A/BT	∞	TM-742	∞
TH-41A/BT	∞	TM-941	∞
TH-42AT	∞	TM-942	∞
TH-45A	∞	TM-2530	∞
TH-48A	∞	TM-2550	∞
TH-55A	∞	TM-2570	∞
TH-75A	∞	TR-751	∞
TH-77A	∞	TR-2500	∞
TH-78A	∞	TR-2600	∞
TH-79A	∞	TS-50	∞
TH-215	∞	TS-140S	∞
TH-315	∞	TS-430S	∞
TM-221	∞	TS-440S	∞
TM-231A	∞	TS-450S	∞
TM-241A	∞	TS-680	∞
TM-251A	∞	TS-690S	∞
TM-321	∞	TS-711	∞
TM-331	∞	TS-790A	∞
TM-421	∞	TS-850S	∞
TM-431A	∞	TS-930S	∞
TM-441A	∞	TS-940	∞
TM-621	∞	TS-950SD	∞
TM-631	∞	TS-2400	∞
TM-641	∞	TW-4100	∞
TM-701A	∞	TM SERIES	∞

ICOM

IC-02AT	∞	IC-820	∞
IC-2A/AT	∞	IC-900	∞
IC-2iA	∞	IC-901A	∞
IC-2GAT	∞	IC-970	∞
IC-2GXAT	∞	IC-1200	∞
IC-2SA	∞	IC-2330	∞
IC-2SAT	∞	IC-2340	∞
IC-2SRA	∞	IC-2400	∞
IC-3SAT	∞	IC-2410	∞
IC-04AT	∞	IC-2500	∞
IC-4GAT	∞	IC-2700	∞
IC-4SAT	∞	IC-3200	∞
IC-4SRA	∞	IC-3210	∞
IC-12AT	∞	IC-3220	∞
IC-12GAT	∞	IC-2230	∞
IC-24	∞	IC-H16	∞
IC-25	∞	IC-M600	∞
IC-27A/H	∞	IC-M800	∞
IC-28A/H	∞	IC-P2AT	∞
IC-32AT	∞	IC-P4AT	∞
IC-38	∞	IC-R71	∞
IC-48	∞	IC-R7000	∞
IC-228	∞	IC-RP1220	∞
IC-229	∞	IC-RP1520	∞
IC-281	∞	IC-RP4020	∞
IC-290	∞	IC-RP4520	∞
IC-448	∞	IC-S21	∞
IC-449	∞	IC-S41	∞
IC-575	∞	IC-T21	∞
IC-707	∞	IC-T21	∞
IC-720	∞	IC-DELTA1	∞
IC-725	∞	IC-DELTA100	∞
IC-726	∞	IC-U2AT	∞
IC-729	∞	IC-U4AT	∞
IC-730	∞	IC-U16	∞
IC-735	∞	IC-V21 AT	∞
IC-736	∞	IC-W2A	∞
IC-737	∞	IC-W21A	∞
IC-740	∞	IC-W21AT	∞
IC-745	∞	IC-X2A	∞
IC-751	∞	IC-X21AT	∞
IC-761	∞	IC HTS TO TNC	∞
IC-765	∞		
IC-781	∞		

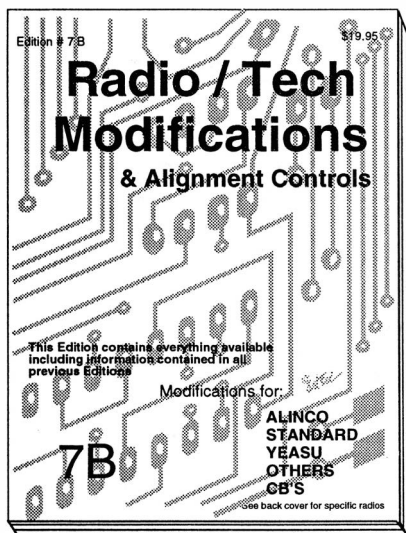
Scanners

Uniden	
Bearcat	
BC-200	∞
BC-205	∞
BC-700	∞
BC-760	∞
BC-855	∞
BC-890	∞
BC-950	∞
BC-2500	∞
MR-8100	∞
Regency	
R-4030	∞
R-1600	∞
R-1600	∞
Radio Shack	
PRO-23	∞
PRO-33	∞
PRO-34	∞
PRO-37	∞
PRO-39	∞
PRO-43	∞
PRO-46	∞
PRO-51	∞
PRO-2004	∞
PRO-2005	∞
PRO-2006	∞
PRO-2022	∞
PRO-2026	∞
PRO-2027	∞
PRO-2030	∞
PRO-2032	∞

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EDITION 7B

- MODIFICATIONS FOR OUT OF BAND OPERATION
- ALIGNMENT CONTROLS
- OTHER ENHANCEMENTS!!!



Alinco

ALD-24T	∞
ALR-22T	∞
DJ-100T	∞
DJ-120T	∞
DJ-160T	∞
DJ-162T	∞
DJ-180T	∞
DJ-460T	∞
DJ-500	∞
DJ-560	∞
DJ-580T	∞
DJ-F1T	∞
DJ-G1T	∞
DR-110T	∞
DR-112T	∞
DR-119T	∞
DR-130T	∞
DR-510	∞
DR-570T	∞
DR-590T	∞
DR-592T	∞
DR-599T	∞
DR-600T	∞
DR-1200T	∞
HT Packet	∞
Mobile	∞

Other

AZDEN	∞
PCS-6000	∞
PCS-7000	∞
PCS-7500	∞
AZ-21A	∞
K D K	∞
FM-240	∞
FM-2033	∞
TEN TEC	∞
PARAGON	∞
RANGER	∞
AR-3300	∞
AR-3500	∞
UNIDEN	∞
HR-2500	∞
HR-2510	∞
HR-2600	∞
RADIO SHACK	∞
HTX-100	∞
MISC.	∞
RCI 2950	∞
HeathKit	∞
H-2-Mini	∞
H4-HT	∞
HW-24	∞
HW-24-HT	∞
SB-1400	∞
Sender/	∞
ADI Corp	∞
TR-450	∞

Standard

C108A	∞
C158A	∞
C168A	∞
C188A	∞
C228A	∞
C468A	∞
C488A	∞
C528A	∞
C558A	∞
C628A	∞
C1208A	∞
C5608DA	∞
C5718A	∞
HT TNC Hook	∞

CB radios

Cobra	President
Realistic	Raider
Alaron	Ranger
Audiovox	R C A
Browning	R C I
Clarion	Regency
Colt	Robyn
Convoy	Royce
Courier	Sanyo
Craig	S B E
Dak	Sears
Fannon	Siltronics
Fuzzbuster	Sharp
G E	Superstar
Gemtronics	Teaberry
Hy-gain	Tenna Phase
J C Penny	Tran
Johnson	Truetone
Kraco	Uniden
Lafayette	VTAC
Midland	Vector
Mopar	Wards
Pace	Whistler
Palomar	Xtal
Panasonic	Zexon
Pearce Sim	

Yaesu

FL-7000	∞	FT-747	∞
FT-11R	∞	FT-757	∞
FT-23R	∞	FT-767GX	∞
FT-26	∞	FT-811	∞
FT-33R	∞	FT-815	∞
FT-411R	∞	FT-816	∞
FT-73R	∞	FT-840	∞
FT-76	∞	FT-890	∞
FT-209	∞	FT-900	∞
FT-211	∞	FT-990	∞
FT-212	∞	FT-1000	∞
FT-227R	∞	FT-2200	∞
FT-290	∞	FT-2311	∞
FT-311	∞	FT-2400	∞
FT-411	∞	FT-2500	∞
FT-415	∞	FT-4700	∞
FT-416	∞	FT-5100	∞
FT-470	∞	FT-5200	∞
FT-530	∞	FT-6200	∞
FT-650	∞	FT-7400	∞
FT-709	∞	FT-2070	∞
FT-711	∞	FT-ONE	∞
FT-712 RH	∞	NC-29	∞
FT-727	∞	NC-42	∞
FT-736R	∞	FT Series	∞
		All Models	∞

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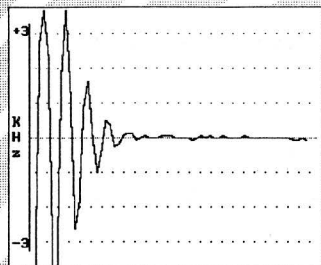
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Auto-Kall® AK-4 DTMF Decoder/Controller Board



The **Auto-Kall® AK-4** may be used for either Selective Calling or Remote Control applications.

- ~All-Call/Group-Call
- ~On-Board 1A Relay
- ~Five Separate Outputs
- ~Fully Assembled and Tested

The outputs can be configured for either 2 latched/2 momentary or 3 latched/1 momentary. On/off codes for latched outputs are unique, NOT toggled. The on-board relay may be used as either a timed audio or auxiliary output. A manually reset latched output turns ON when a Group-Call code is decoded.

AK-4W DTMF Decoder/Controller Board, fully assembled and tested \$99.00

XC-1 DTMF to ASCII Transceiver

The new **XC-1** is an economical bi-directional DTMF to ASCII transceiver. DTMF digits are decoded from the audio line, converted to ASCII, and transmitted out through the RS-232C port. ASCII data is received from the RS-232 port, converted to DTMF digits and transmitted on the audio line. Input, output and power connections are via a 10 position IDC connector. The **XC-1** is a fully assembled and tested printed circuit board.

XC-1 DTMF to ASCII Transceiver \$99.00

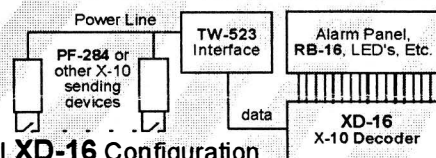
XD-16 X-10 Decoder and RB-16/1 Relay Board

The new **XD-16**, when connected to the required **TW523** power line data interface module, decodes all 256 X-10 codes sent by **PF284**, or similar, X-10 senders. The house code is DIP switch selectable. The 16 open-collector outputs are turned on or off as unit and command codes are decoded. These outputs, as well as power and ground connections are accessed via a 20 position IDC header. The **XD-16** may be used as an Alarm Panel Interface and save hundreds of dollars in cable installation costs! Or drive relays, LEDs, etc. in custom alarm or house control applications. The **XD-16** is a 3" x 3" printed circuit board assembly. Requires 9 to 18 VDC @ 25ma. (12 VDC @ 500ma recommended when powering the RB-16/1)

The new **RB-16/1** Relay Board is a 2.75" x 6" printed circuit board assembly. The board features 16 SPDT relays, each rated for 1 Amp operation. Control lines and power inputs are via a 20 position IDC Connector. Relay connections are made using three 16 position terminal strips. Requires 12 VDC @ 450ma.



X-10 Decoder



A Typical **XD-16** Configuration

XD-16 X-10 Decoder Board \$ 59.00
RB-16/1 Relay Board w/16 Relays @ 1A 199.00
PF284 X-10 Sender (Powerhouse) 29.00
TW523 Power Line Interface (Powerhouse) 29.00



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Introduction

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

The newest versions of RADIO/TECH MODIFICATIONS is Edition 7, part A (7A) Edition 7, part B (7B). Edition 7A contains all known modifications for ICOM and Kenwood Radios and mods for the popular scanners. Edition 7B has all the modifications for Yeasu, Alinco, Standard, Azden, KDK, Ten Tec, Ranger, Uniden, Radio Shack and popular CB radios.

During the past 5 years we have created 7 Editions of Radio/Tech modifications. Each new edition included the information contained in the previous editions. So if you have the current edition, you do not need to purchase the previous ones.

We make every effort to improve the illustrations with each new edition. The modifications presented here have been performed by many people through out the world. Unless the manufacture changes the radio in some significant way, 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. In some cases, additional information is available for a radio that can not be presented in the book. We try and keep this informations on file and will provide it to verifies owners of the current edition for a small fee. 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 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.

A word on the Radio Shack HTX-202

Once in a while we receive a modification for a radio that we are unable to test. If we receive verification that a modification works from a number of people, we will print the modification in our new edition.

We have only had one problem with this policy, the HTX-202. We received copies of a modification from three different people. One person in particular wrote us and we called him back about the mod. He swore that he had done the modification to three radios and it worked perfectly.

Very soon after publication we started to get calls from everyone who tried to perform the modification. No one could find the part specified. It turned out the parts did not exist. Apparently the modification was a hoax created by someone as a joke and published on electronic bulletin boards. (The fellow no longer answers his phone!!!)

After researching the radio, finding the original manufacture (no it not ICOM) and reviewing the radio schematics, it has been determined that there is no modification available for the HTX-202.

We think that Radio Shack requested a radio that could not be modified from the manufacture, to protect itself from FCC problems. If you purchased one of these radios, write a letter the Radio Shack and express your personal dissatisfaction. If they get enough letters and complaints they may think twice before limiting their products in the future.

Good luck and remember to use common sence before you press the Push-To-Talk button.

Modifications and the law

Cellular Phone Bands

The Federal Communications Commission (FCC) is the agency in charge of controlling the airwaves in the United States. It has been their responsibility to oversee the content of the transmissions from broadcasters in the United States.

On April 26, 1993, the FCC has decided that they should not only control what information is broadcasted on the airwaves, they should also control the sale of radios capable of receiving certain frequencies.

The issue in this decision is protecting the privacy of cellular phone users. The Cellular phone frequency band in the upper 800 MHz range has become a favorite scanner listening band. The cellular users deserve their privacy. Hence, the FCC has declared a ban on all scanner style radios or converters capable of receiving the cellular band.

The wording of the new law is intended to regulate what type of receivers may be sold in the United States.

Section 15.121 Scanning receivers and frequency converters designed or marketed for use with scanning receivers.

(a) Except as provided in paragraph (b), scanning receivers, and frequencies converters designed or marketed for use with scanning receivers, must be incapable of operating (tuning), or readily being altered by the user to operate, within the frequency bands allocated to the domestic Public Cellular Radio Telecommunications Service in part 22 of this chapter (cellular telephone bands). Receivers capable of "readily being altered by the user: include, but are not limited to, those for which the ability to receive transmissions in the cellular telephone bands can be added by clipping the leads of, or installing, a simple component such as a diode, resistor and/or jumper wire; replacing a plug-in semiconductor chip; or programming a semiconductor chip using special access codes or an external device, such as a personal computer. Scanning receivers, and frequencies converters designed or marketed for use with scanning receivers, must also be incapable of converting digital cellular transmissions to analog voice audio.

(b) Scanning receivers, and frequency converters designed or marketed for use with scanning receivers, that are manufactured exclusively for, and marketed exclusively to, entities described in 18 U.S.C. Section 2512 (2) are not subject to the requirements of paragraph (a).

It seem apparent that the FCC is attempting to protect the cellular phone users privacy. The Cellular industry is also taking reasonable precautions to protect their users with their new digital technology. Perhaps after digital takes over, the FCC will relax or repeal the rule.

Transmitting out of band

The Federal Communications Commission (FCC) has another set of rules that controls the type of transceivers approved for use in the United States. The purpose is to make sure that transmissions are clean and do not cause interference or emissions on other frequencies.

The FCC has a special relaxed rules for Amateur equipment that help to encourage lower pricing for transceivers. The FCC will approve a radio for use only in the Amateur frequency range, but the same radio may be refused for use in the Business band.

Use of a Amateur approved radio to transmit outside the amateur band is illegal no matter what type of license you have, (MARS & CAP do have a permission to exceed the limits by 3-4 MHz).

No discussion about transmission on the Police bands is needed here. It is illegal and wrong and can cause loss of Human life. If you know of anyone doing it, turn them in.

CALL NOW

OWN THE FREQUENCY DIRECTORY EVERYONE IS RAVING ABOUT

**SAMPLE PAGE
FROM
CALIFORNIA
BOOK**

**ACTUAL
CALIFORNIA
BOOK IS
820 PAGES
8 1/2 X 11**

**BOOKS
FOR EACH
OF THE
50 STATES**

STATE GOVERNMENT MISCELLANEOUS DEL NORTE COUNTY

STATE GOVERNMENT			MISCELLANEOUS		
POLICE			SPECIAL EMERGENCY		
CALIFORNIA, STATE OF	WZR248	42.3400 FB	DEL NORTE, COUNTY OF	WCL656	462.5250 FX2
CALIFORNIA, STATE OF	WZR248	42.5400 FB	DEL NORTE, COUNTY OF	KIB954	463.0000 FB
CALIFORNIA, STATE OF	WZR248	72.2200 FX2	DEL NORTE, COUNTY OF	KIB954	463.0250 FB
CALIFORNIA, STATE OF	KME385	75.7600 FX1	DEL NORTE, COUNTY OF	KIB954	463.0500 FB
CALIFORNIA, STATE OF	KME385	75.9600 FB	DEL NORTE, COUNTY OF	KIB954	463.0750 FB
CALIFORNIA, STATE OF	KSQ445	154.9200 FB	DEL NORTE, COUNTY OF	KIB954	463.1000 FB
CALIFORNIA, STATE OF	WNB336	155.4750 FB	DEL NORTE, COUNTY OF	KIB954	463.1250 FB
800MHz PUBLIC SAFETY			DEL NORTE, COUNTY OF	KIB954	463.1500 FB
CALIFORNIA, STATE OF	KNB6973	857.7375 FB2	DEL NORTE, COUNTY OF	KIB954	463.1750 FB
CALIFORNIA, STATE OF	KNEM203	857.9375 FB	HIGHWAY MAINTENANCE		
CALIFORNIA, STATE OF	WNN5451	858.2625 FB2	DEL NORTE, COUNTY OF	WZJ219	156.2400 FB2
CALIFORNIA, STATE OF	WNN5451	859.2625 FB2	DEL NORTE, COUNTY OF	K448363	159.0150 MO
CALIFORNIA, STATE OF	WNN5451	860.2625 FB2	CRESCENT CITY		
CALIFORNIA, STATE OF	KNB6973	860.7375 FB2	FIRE		
CALIFORNIA, STATE OF	WPG351	867.5375 FB2	CRESCENT FIRE PROTEC	WNNJ623	154.2500 FB
FIRE			CRESCENT FIRE PROTEC	WNNJ623	154.2800 MO
CALIFORNIA, STATE OF	KPC41	33.6600 FX1	CRESCENT FIRE PROTEC	WNNJ623	154.4450 FB
CALIFORNIA, STATE OF	KPC41	33.9800 FX1	LOCAL GOVERNMENT		
CALIFORNIA, STATE OF	KQR617	154.1600 FB2	CRESCENT CITY, CITY OF	KDV790	156.0000 FB
LOCAL GOVERNMENT			SPECIAL EMERGENCY		
CALIFORNIA, STATE OF	WNNK748	37.2600 FB2	AIR MED EVAC	WNCX894	155.2200 FB
CALIFORNIA, STATE OF	KJS712	153.7550 FB2	DEL NORTE AMBULANCE INC	KD20629	150.7750 MO3
FORESTRY CONSERVATION			DEL NORTE AMBULANCE INC	WPC8H86	155.1750 FB
CALIFORNIA, STATE OF	WNJ2478	44.6400 FB2	DEL NORTE UNIFIED SCHOOL DIS	WNNY708	155.2800 FB
CALIFORNIA, STATE OF	KWE503	44.8000 FB	SUTTER COAST HOSPITA	WNNQ425	155.2350 FB
CALIFORNIA, STATE OF	KWE503	44.9600 FX1	SUTTER COAST HOSPITA	KNDV810	463.0000 FB
CALIFORNIA, STATE OF	KBM547	151.2500 FB2	SUTTER COAST HOSPITA	KNDV810	463.0250 FB
CALIFORNIA, STATE OF	KBM547	151.3550 FB2	SUTTER COAST HOSPITA	KNDV810	463.0500 FB
CALIFORNIA, STATE OF	KBM547	151.3850 FB2	SUTTER COAST HOSPITA	KNDV810	463.0750 FB
CALIFORNIA, STATE OF	WNJ2479	151.4150 FB2	SUTTER COAST HOSPITA	KNDV810	463.1000 FB
CALIFORNIA, STATE OF	KVY51	159.2700 FX1	SUTTER COAST HOSPITA	KNDV810	463.1250 FB
CALIFORNIA, STATE OF	KVY51	159.3000 FX1	SUTTER COAST HOSPITA	KNDV810	463.1500 FB
CALIFORNIA, STATE OF	KVY51	159.4050 FX1	SUTTER COAST HOSPITA	KNDV810	463.1750 FB
CALIFORNIA, STATE OF	KVY51	159.3300 FX1	KLAMATH RIVER		
CALIFORNIA, STATE OF	WGC761	169.5000 FXO	FIRE		
CALIFORNIA, STATE OF	KOO93	171.9250 FXO	KLAMATH FIRE PROTECTION DIST	KNA398	153.7700 FB
HIGHWAY MAINTENANCE			SMITH RIVER		
CALIFORNIA, STATE OF	KAE7576	453.8500 FXO	FIRE		
CALIFORNIA, STATE OF	WGU627	47.2000 FB	SMITH RIVER FIRE PROTECTION	KJS725	154.2500 FB
CALIFORNIA, STATE OF	KXQ626	452.9750 FX1	MISCELLANEOUS		
CALIFORNIA, STATE OF	WPN772	453.8500 FXO	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
COUNTY GOVERNMENT			AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
POLICE			AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
DEL NORTE, COUNTY OF	WCL735	154.8150 FX1	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
FIRE			AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
DEL NORTE, COUNTY OF	WNNM296	154.0100 FX1	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
DEL NORTE, COUNTY OF	WNNM296	154.2500 FB	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
DEL NORTE, COUNTY OF	WNNM296	154.4150 FB2	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
DEL NORTE, COUNTY OF	WNNM296	154.4450 FB	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
LOCAL GOVERNMENT			AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
DEL NORTE, COUNTY OF	WNNM296	154.0100 FX1	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
DEL NORTE, COUNTY OF	WNNM296	154.2500 FB	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
DEL NORTE, COUNTY OF	WNNM296	154.4150 FB2	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1
DEL NORTE, COUNTY OF	WNNM296	154.4450 FB	AF AERONAUTICAL RADIOING	WCL735	154.8150 FX1

**WELL KNOWN
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**COVERS ALL
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BETWEEN
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64

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Simplified Frequency format lists county then city.

**Each county lists public safety by state, county and city,
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Inquiries
Welcome**

Surface Mount Components

Many of the modifications presented in this text require you to remove Surface mount components.

Surface mount components come in various configurations, starting with large microprocessors all the way down to single diode packages. You will even find that single diodes and resistors come in different sizes.

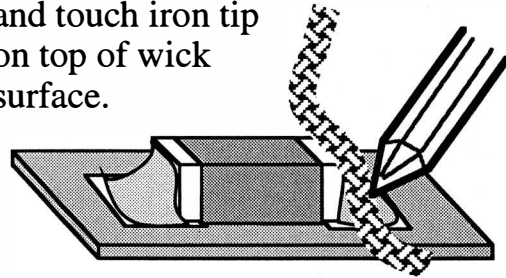
Some of these modifications use very small packages with three leads. About a year ago I ordered 50 of a popular package and accidentally dropped them on the carpet, I lost 20 of them because I couldn't find them!!

You will find that with a little care and the proper tools, you will be able to remove the components.

I suggest solder wick as the best method to remove the solder, some people prefer a solder sucker. This is of course assuming that you do not have access to a desoldering station (\$3,000 plus).

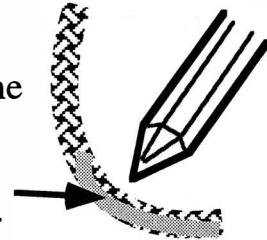
Removing

Place solder wick on solder pad and touch iron tip on top of wick surface.

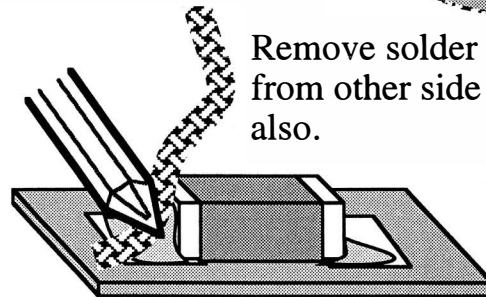


Use clean wick surface every time

Solder should flow off board onto wick.

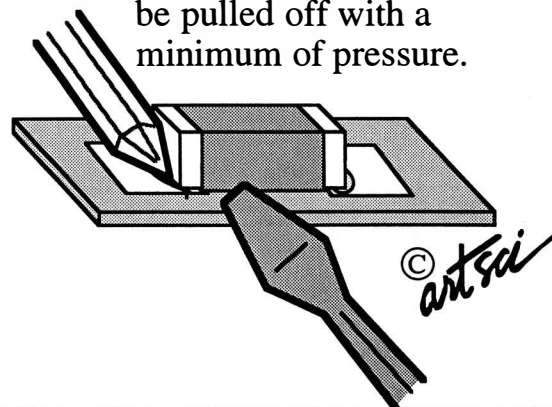


Remove solder from other side also.



You may need to alternate sides 2-5 times to remove 95% of the solder.

After the solder has been removed the component can be pulled off with a minimum of pressure.



Caution must be taken to protect the component (if you will need it again) and the circuit board. Damaging the circuit board is the most expensive accident you can have.

Excess heat can lift the circuit board traces right off the board. A small section might stick to the soldering iron and you might not notice until you discover the radio won't work.

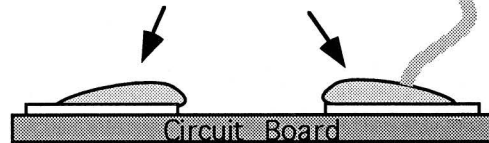
Installing components is easier than removing them. Excess heat during installation should also be avoided.

Remember to hold the component in place using a blunt tool or screwdriver. Small surface mount components seem to jump right off the board in glue themselves to a soldering iron.

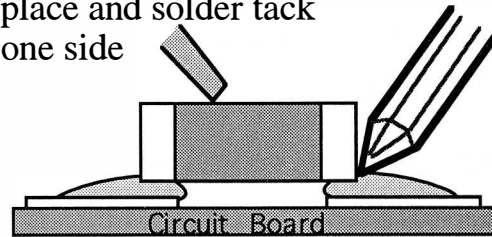
To test if a component is properly attached, use a volt/ohmmeter. Attach a lead to the trace on the circuit board and make sure that continuity is present.

Installing

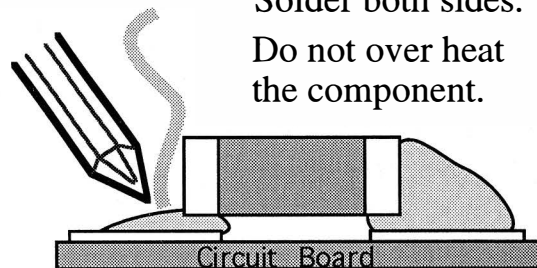
Place a small amount of solder on the installation pads



Place the component on the board
Hold the component in place and solder tack one side



Solder both sides.
Do not over heat the component.



Solder should be smooth and fully bonded to the component

- Some technicians prefer to use a solder sucker to remove solder.
- Components can be damaged by excess heat.
- Components may adhere themselves to the tip of the soldering iron if not held in place.

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

The exact Receive and Transmit Frequency range of a radio are 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 is complete, 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.

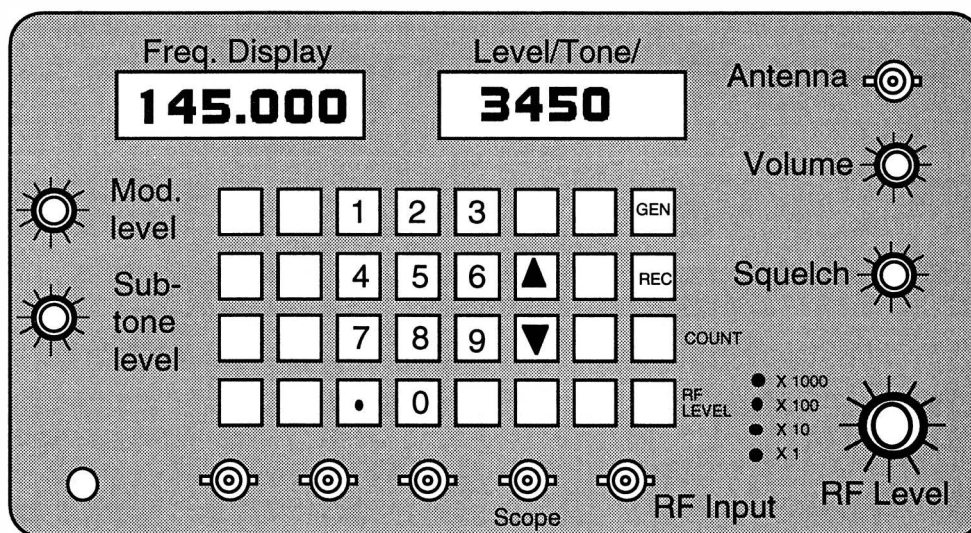
Technicians are welcome to forward comments, suggestions and new modifications. Forward your modifications to our mailing address or FAX a copy to us.

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 transmitter's 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 too 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)

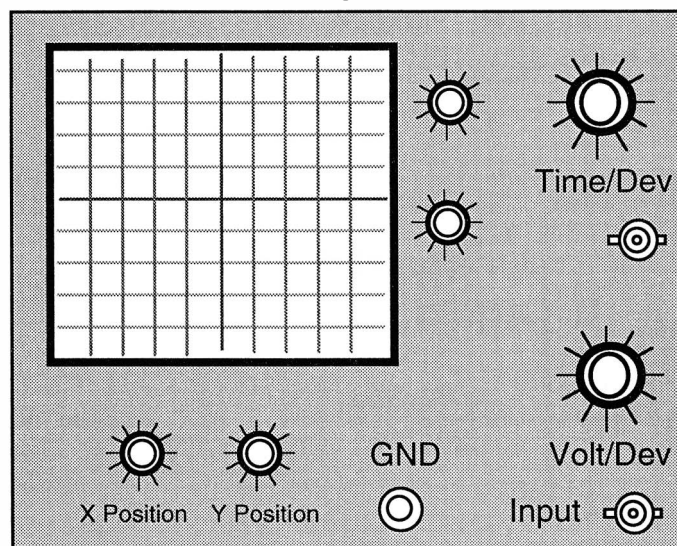
You must get one of these. They are handy for many things. Try to get one that has a continuity tone setting. An auto ranging meter is the best. If you can afford it, get one that has an auto shut off feature. Nothing is worse than grabbing your meter and finding the batteries are dead because you forgot 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.

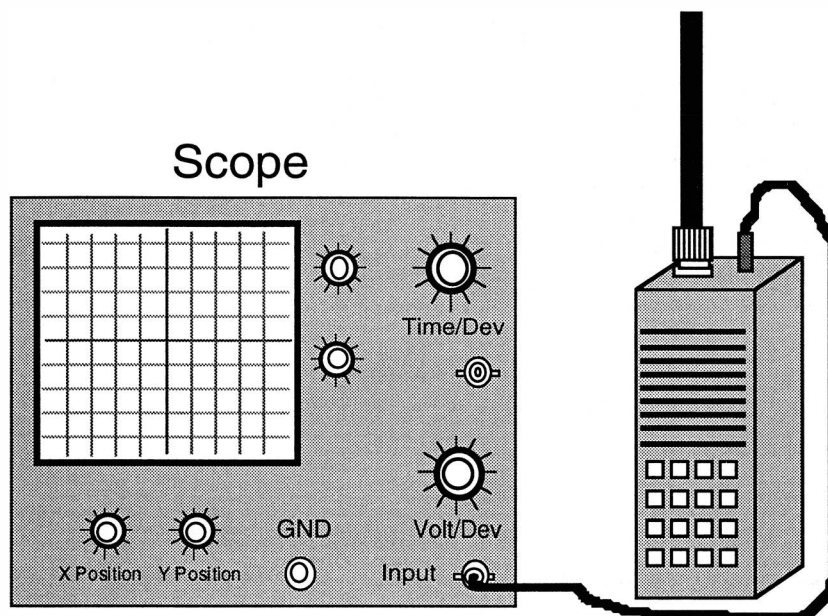
Scope



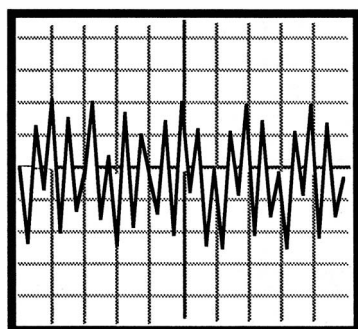
By connecting the receiver audio output (from the speaker jack) to the oscilloscope input, you can get an accurate visual view of the audio wave. With a little practice, you can accurately measure the audio levels.

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.



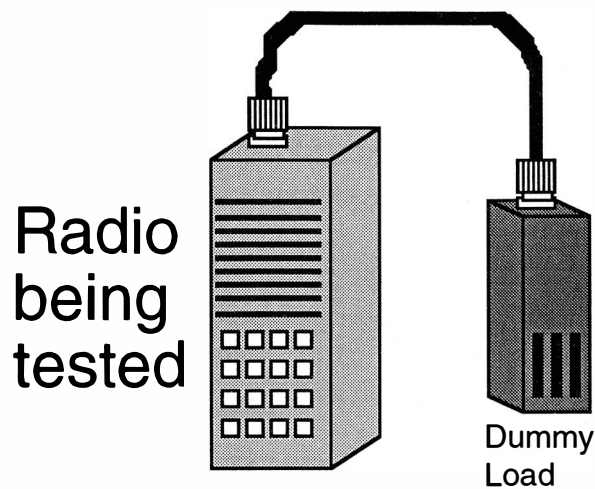
Connect your friends radio up to the oscilloscope through the external speaker jack. Turn the radio and oscilloscope on and adjust the receiver audio level to about 1/3. Turn the squelch off. Turn the Volt/Dev control to adjust the waves until they fill 1/2 of the display.



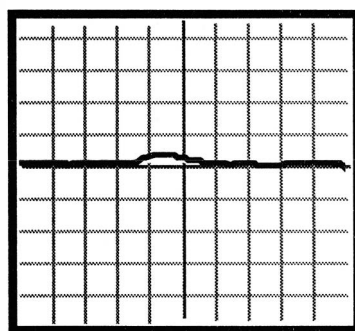
Unsquelched
audio

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.



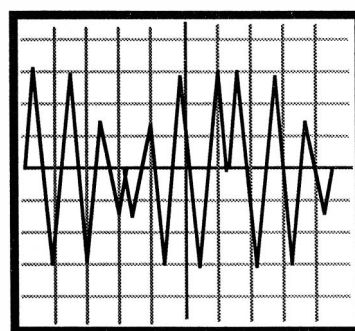
Now using your transmitter, press the PTT. (Make sure you are using a dummy load.) The scope display should appear below.



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

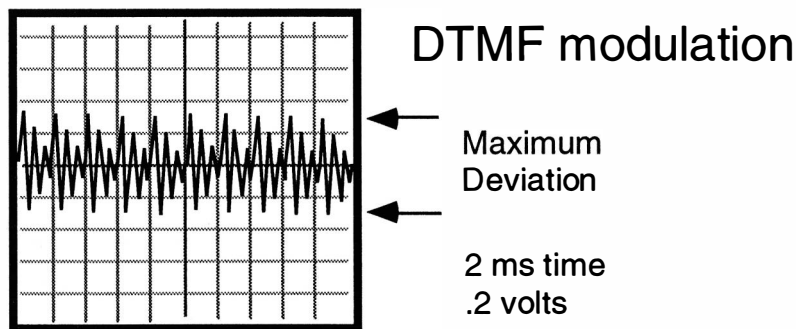
The pattern on the scope is not as important as the maximum height of the wave crests.

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.

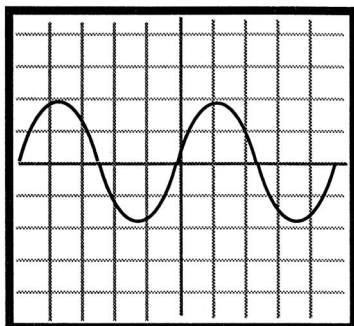
Now transmit with your radio and compare where the voice peaks are placed. If they are higher, adjust the Modulation/Deviation controls in your transmitter to a lower position. If they are lower, increase the control's position.

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 than 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/div 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

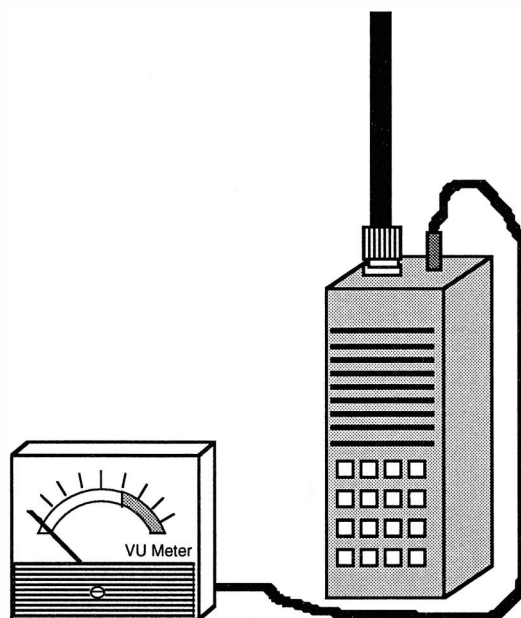
Some receivers will filter out the sub-audible tone before it appears at the speaker jack. Most of the newer receivers do not do this so you should have no trouble watching the sub-audible wave form. If you can not get the expected wave form, check to make sure the transmitter is encoding PL tone. You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

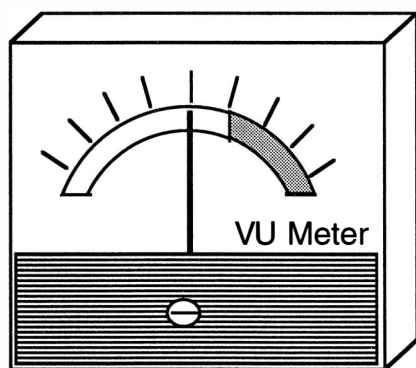
A more inexpensive method.

There is another method of checking the audio deviation levels using an 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 receiver's 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.

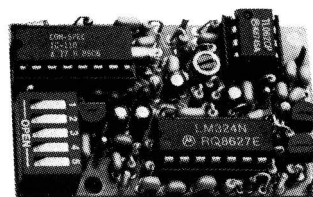
Now using the radio to be tested, perform the same tests and adjust the transmitter's deviation controls to match the levels of the other radio.

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

TS-32P DIP Switch Programmable Encoder-Decoder

\$57.95

Universal design provides CTCSS capability to all FM transceivers. On-board DIP switch allows instant programming without tone elements, counters, or other test equipment. Crystal controlled for high accuracy and stability. The 32 location tone memory is complete with standard EIA tones from 67.0 to 203.5 Hz, or may be ordered with ANY 32 custom tone frequencies between 0 - 250.0 Hz (± 0.1 Hz) at no extra charge. Multiple tone switching is easily done with your radio's channel select switch or separate single pole switch. A high pass tone rejection filter is included on board to remove tone from received audio. Reverse polarity protection and RF immunity are built in. Powered by 6 - 24 vdc, unregulated at 8ma. Supplied with color-coded wires terminated to plug directly onto the TS-32P. Mounting materials include hardware and double sided, insulated tape.

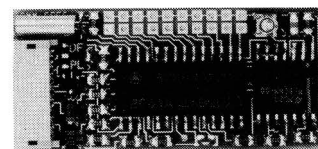


Programmable Encoder-Decoder
1.25"x2.0"x0.40"

TS-64 Microminiature CTCSS Encoder-Decoder

\$64.95

The latest - and smallest - programmable CTCSS encoder-decoder for use in FM transceivers. Ideal for many handheld radios and others with limited space. Select from 64 preset CTCSS tones between 33.0 Hz and 254.1 Hz using six PCB jumpers. Tone stability is crystal controlled with accuracy better than 0.05 Hz. Output level can be adjusted from 0V to 3.0V. A time-out-timer feature permits programming transmit duration to eight different intervals decreasing "stuck mic" problems. Receiver Hi-pass filter and busy channel lockout are included. Decode sensitivity is 15mv. Power can be from 6.0vdc to 20.0vdc @ 9ma. Operating temperature range is from -30°C to +65°C. When P.T.T. switch is released, the TS-64 continues to key transmitter for 160ms. During this time, the TS-64 generates a reverse phase burst which will mute the decoding unit at the other end. A microminiature plug and socket with color coded wires attached is provided for hookup. Comes with double sided tape for quick mounting.

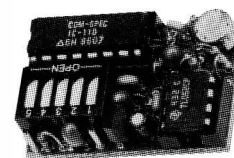


Microminiature CTCSS Encoder-Decoder
.78"x1.70"x.25"

SS-32PA DIP Switch Programmable CTCSS Encoder

\$28.95

Universal design provides CTCSS encode capability to all FM transceivers. On-board DIP switch allows instant programming without tone elements, counters, or other test equipment. Crystal controlled for high accuracy and stability. The standard 32 tone memory contains the EIA tones from 67.0 to 203.5 Hz (or may be ordered with ANY 32 custom tone frequencies between 0 - 250.0 Hz at no extra charge). Multiple tone switching is easily achieved with your radio's channel select switch or a separate single pole switch.



SS-32PA / SS-32PB Encoder
0.9"x1.3"x0.4"

SS-32SMP Micro-Miniature CTCSS Encoder

\$27.95

Super small programmable CTCSS encoder for use in handheld radios and other size restricted applications. Has the same basic features as the SS-32PA (see above), but does not include the on-board DIP switch due to size limitations. Programming is done by soldering binary coded jumpers on the tone board.

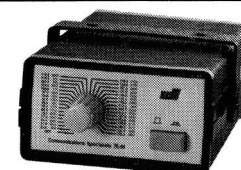


SS-32SMP / SS-32SMP-B Encoder
0.53"x1.00"x0.16"

TE-64 Multi-purpose CTCSS/Burst Tone Encoder

\$79.95

Fully enclosed encoder provides, from a front dial rotary switch, all EIA CTCSS tones from 67.0 to 203.5 Hz PLUS all the common burst tones from 1600 to 2550 in 50 Hz increments. All available tone frequencies are permanently screened onto the faceplate, and selected with a calibrated dial. Great for test bench or service vehicle applications. Operates on 6-30 vdc, and all connections are made to a terminal strip at the rear of the unit. A 9 volt battery plug and cable is included, and may be attached at the terminal strip or soldered directly to the circuit board for field operation. Packaged in a high impact plastic case, with mounting bracket and hardware supplied.



TE-64 Tone Encoder
5.25"x3.3"x1.7"

TE-64D Multi-purpose CTCSS/Burst Tone Encoder w/Display

\$129.90

An enhanced version of the TE-64 encoder (see above). Features a two-digit LED which displays a number from 01 to 32 that in turn corresponds with the CTCSS or burst frequency selected by the front panel rotary switch. The two-digit number displayed is cross-referenced to the tone frequency on a chart located on the faceplate. Perfect for mobile applications, night-time operations, or whenever high visibility read-out is desired. Operates on 6-16 vdc (current draw does not allow operation from 9 volt battery).



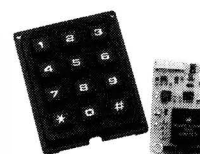
TE-64D Tone Encoder w/Display
5.25"x3.3"x1.7"

NEW!

ID-8 Automatic Morse Station Identifier

\$89.95

Provides automatic Morse station identification for commercial, public safety, and amateur radio applications, including repeaters, base stations, mobiles, beacons, CW memory keyers, etc. Meets all FCC identification requirements. Low voltage/current operation and small size make it universally applicable. Low distortion, low impedance, adjustable sinewave output. High accuracy crystal control. All functions are programmable with plug-on keypad, included with each unit. Programmable options include: Eight selectable messages; CW speed 1-99 seconds; interval timer 1-99 minutes; hold off timer 0-99 seconds; CW tone frequency 100-3000 Hz; front porch delay interval 0-9.9 seconds; CW or MCW; etc. All programming is stored in a non-volatile EEPROM, which may be altered at any time via the included keypad. Supplied with programming keypad, wire set with microminiature plug for easy installation or removal, both hardware and tape mounting materials, and easy to follow instructions.



ID-8 Automatic Morse Code Identifier
1.85"x1.12"x0.35"

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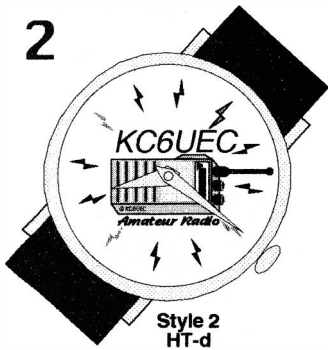
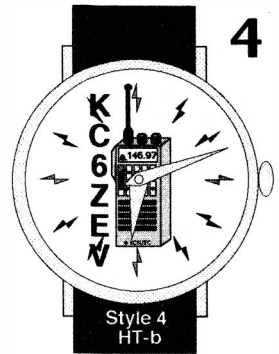
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with JAPANESE movement,
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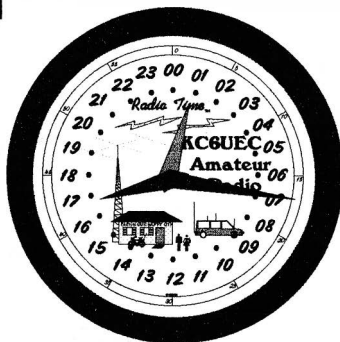
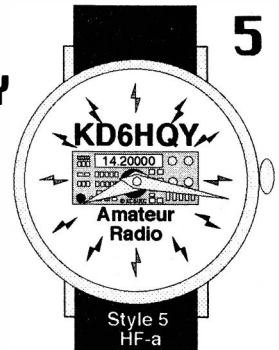
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radios in **pale pastel blue** or **BRILLIANT BLUE**
buttons, knobs, text in clean crisp colors
YELLOW, RED, MAGENTA, TWO BLUES, GREEN
tower, antenna, rubber duck in black, blue, gray

Vanity license plates too (great for non-hams)

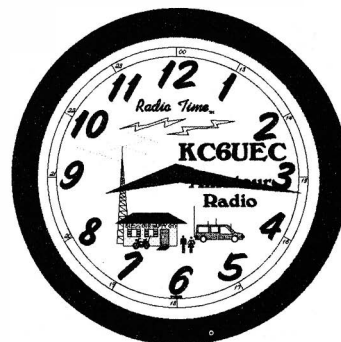
Ask about your state's license plate



Clock Style 7, QTH(24hr)



Clock Style 8, call(24hr)



Clock Style 7, QTH(12hr)

Please send \$27.95 for each callsign watch, and \$22.95 for each 8" clock with 12 hour movement, and \$29.95 for each 8" clock with 24 hour movement and two hour hands (local time and U.T.C.). Include check or money order only. All clocks and watches are quality quartz-analog with sweep second hand. Clocks are made in the U.S.A. Satisfaction guaranteed. Please include applicable California sales tax and \$3.00 per order shipping and handling. Allow four to six weeks for delivery.

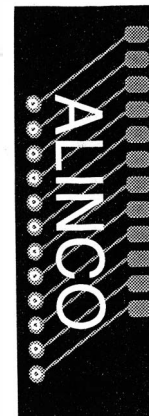
Be sure to include style number, description, and callsign for each watch or clock. Multiple callsigns OK on clocks. Also state whether color graphics, black on white, blue on white, or no graphics are desired.

Thank you for your order. 73, Tom

Thomas Lang Co.
9438 East Broadway
Temple City, CA 91780
(818) 287-5004

Radio / Tech Modifications

ALINCO Radio Modifications

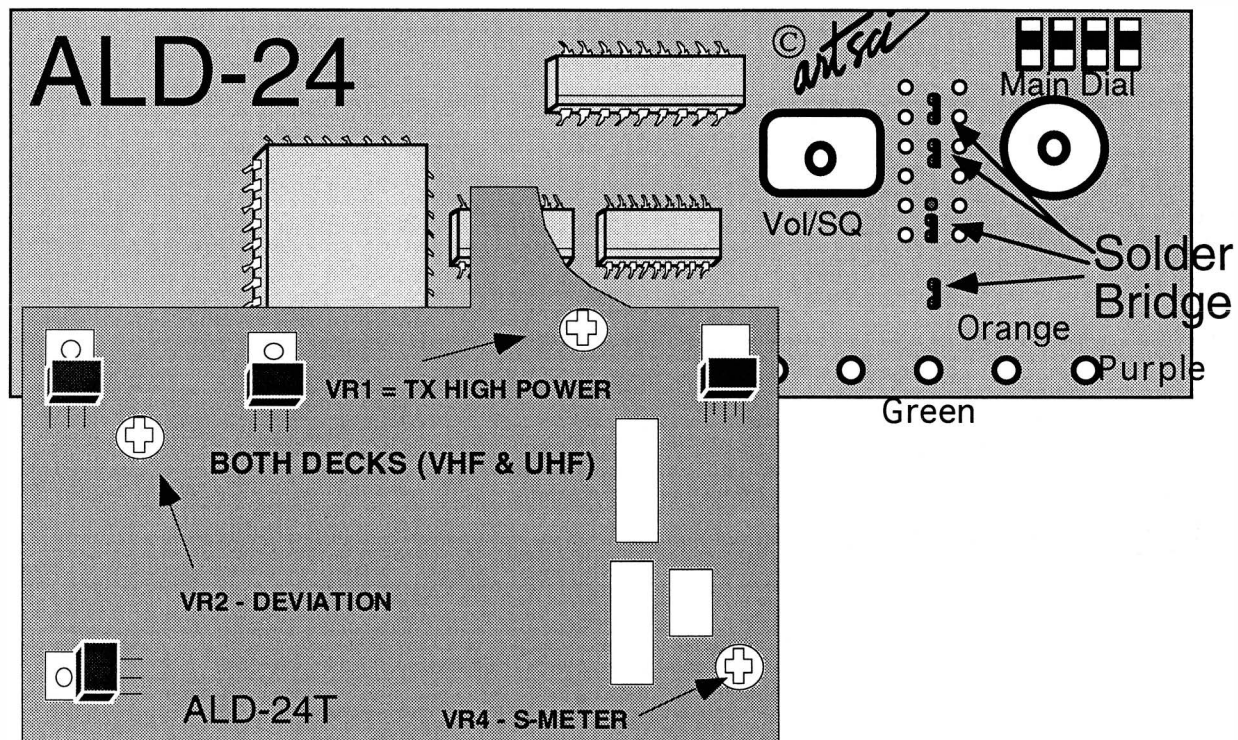


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ALINCO ALD-24T

EXPANDED RF & ALIGNMENT CONTROLS

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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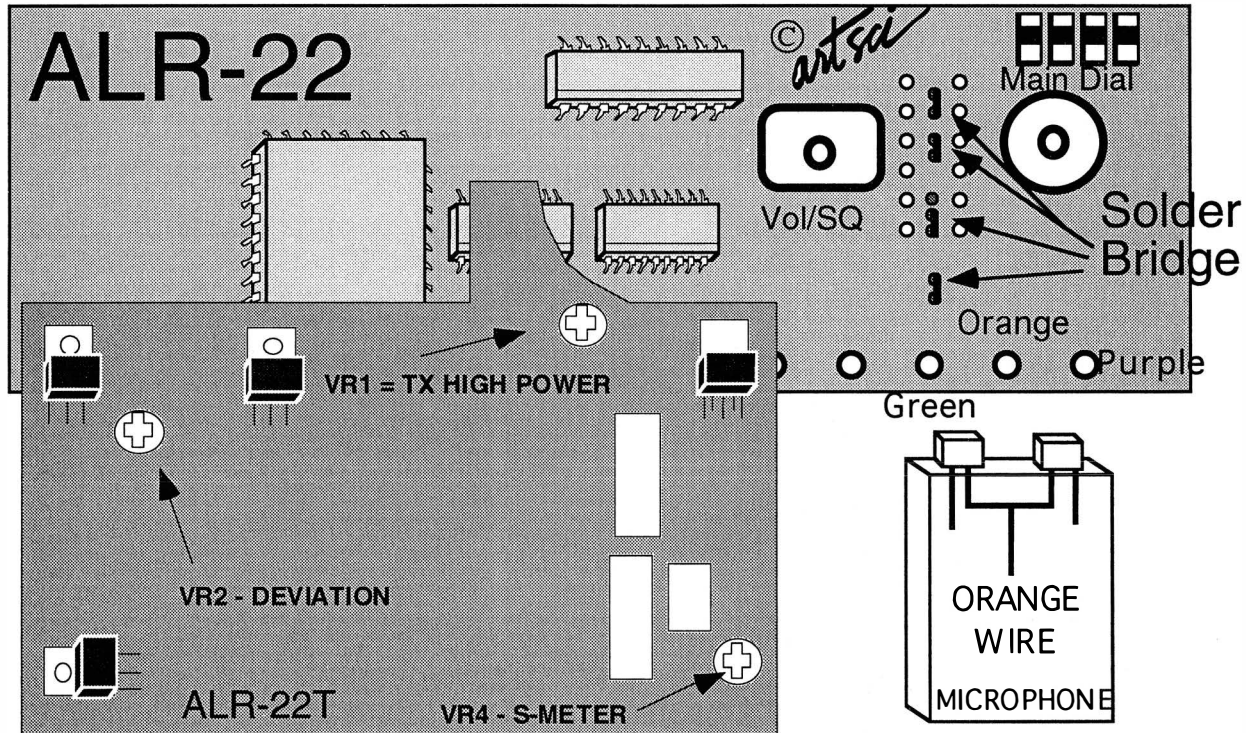
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ALINCO ALR-22T

EXPANDED RF & ALIGNMENT CONTROLS

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



MICROPHONE MOD

1. Open radio as described above.
2. Locate and remove the Microphone Green, Orange & Purple wires.
3. **Solder the wires as shown in drawing**
4. Reassemble radio.
5. Open Microphone.
6. Remove the Ground side of the Up/Down buttons and tie them together.
7. Connect the Orange wire to the two tied wires.
8. Reassemble Microphone.

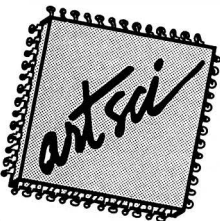
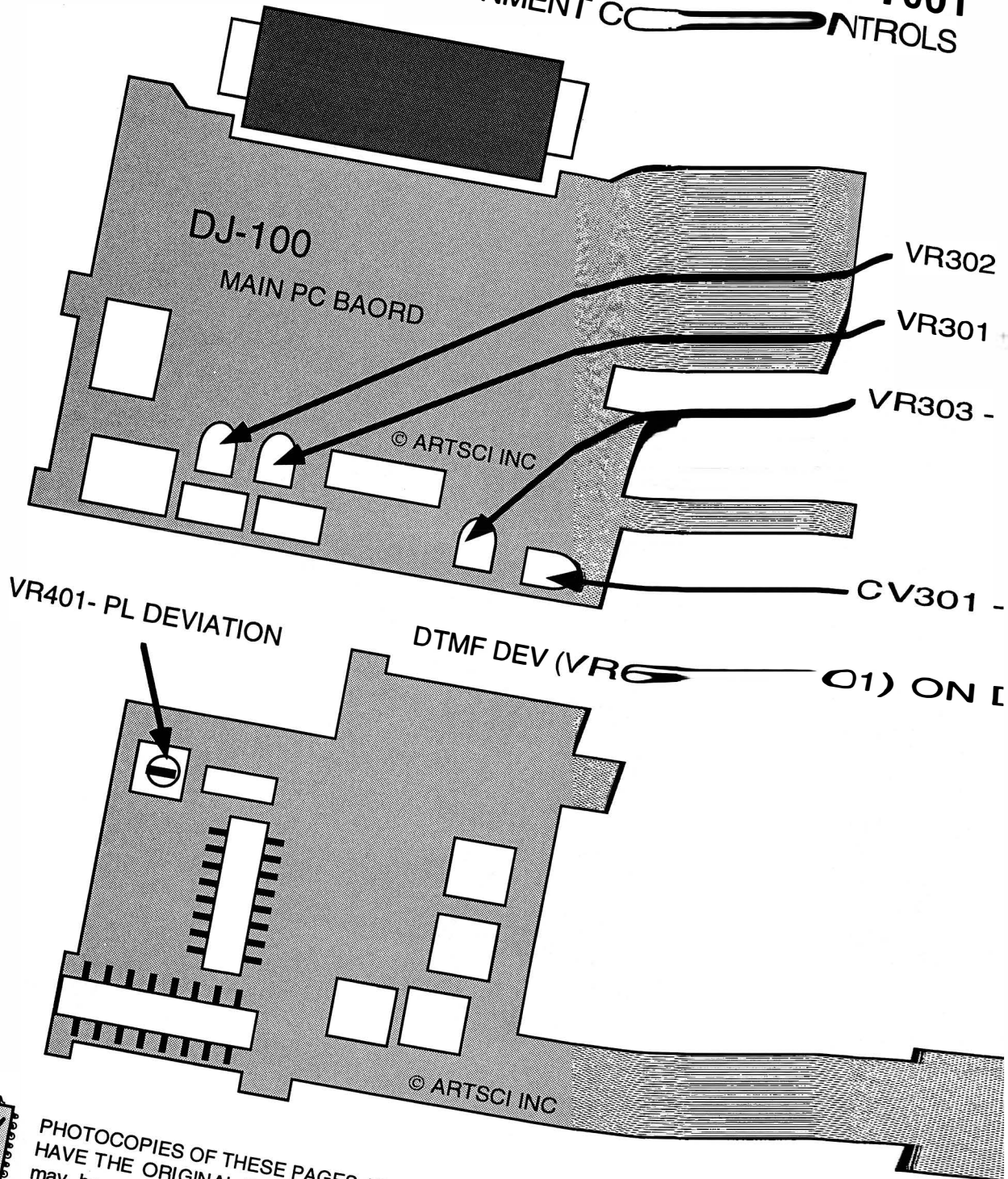


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ALINCO J-100T ALIGNMENT CONTROLS

1. Remove
2. Remove
3. Locate
4. **Clip**
5. This
4. Re
5. Re



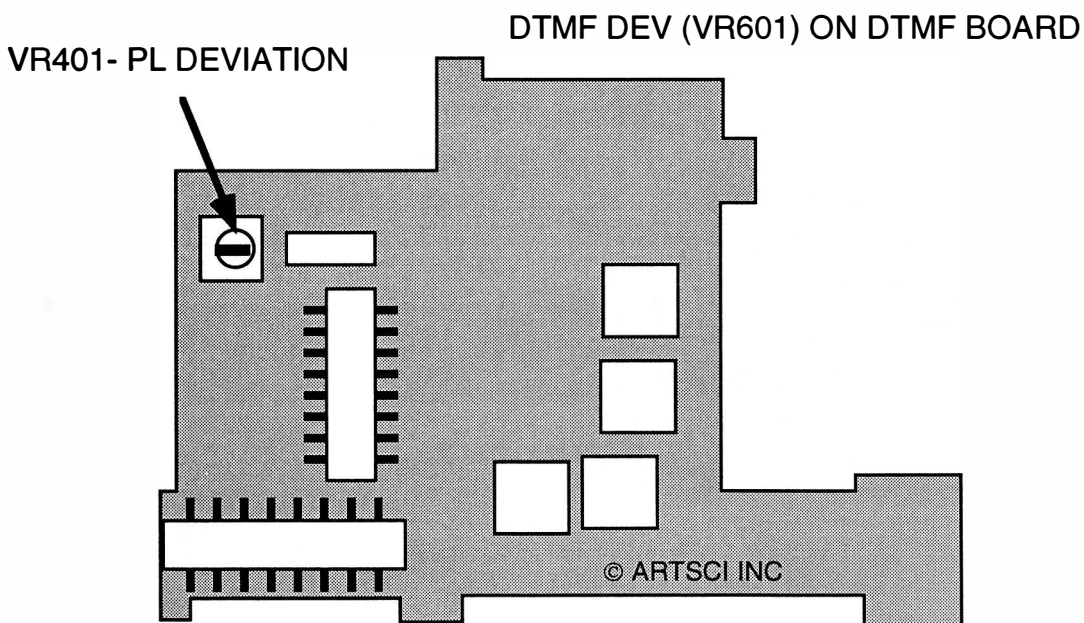
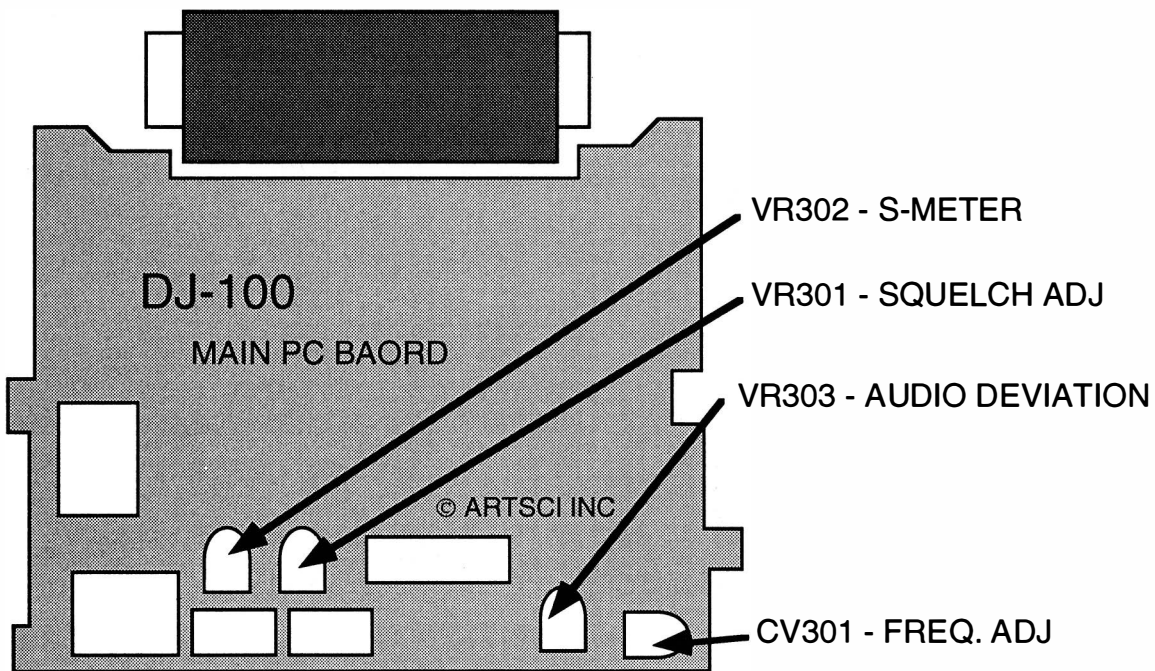
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ALINCO DJ-100T

ALIGNMENT CONTROLS



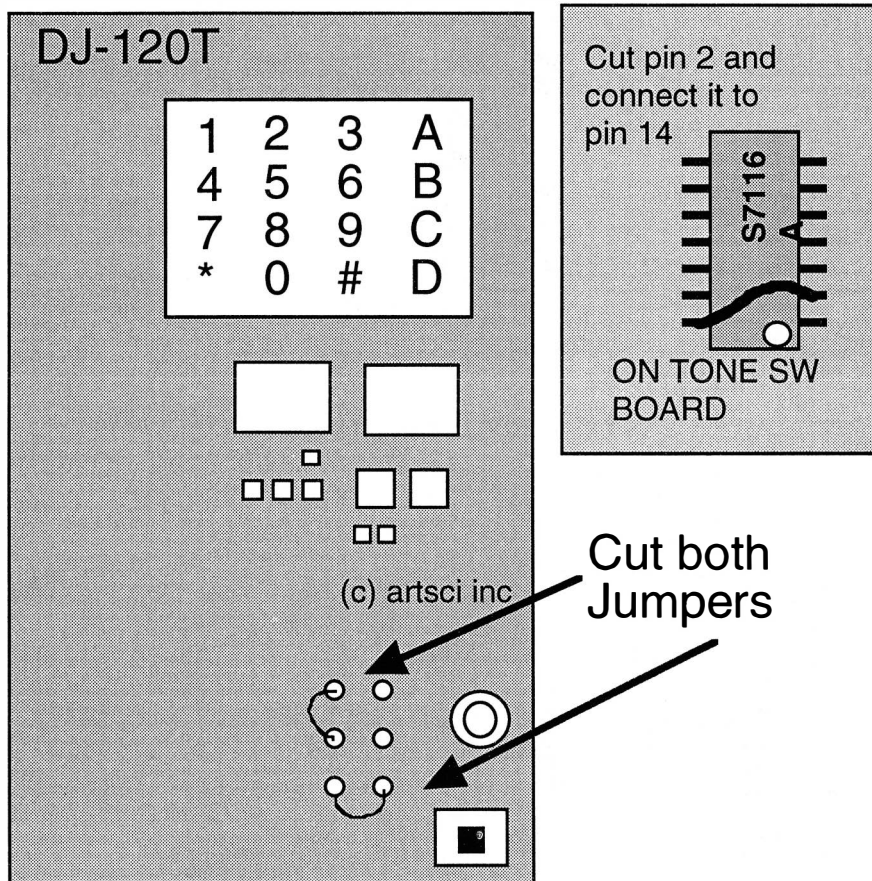
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ALINCO DJ-120T

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 ---

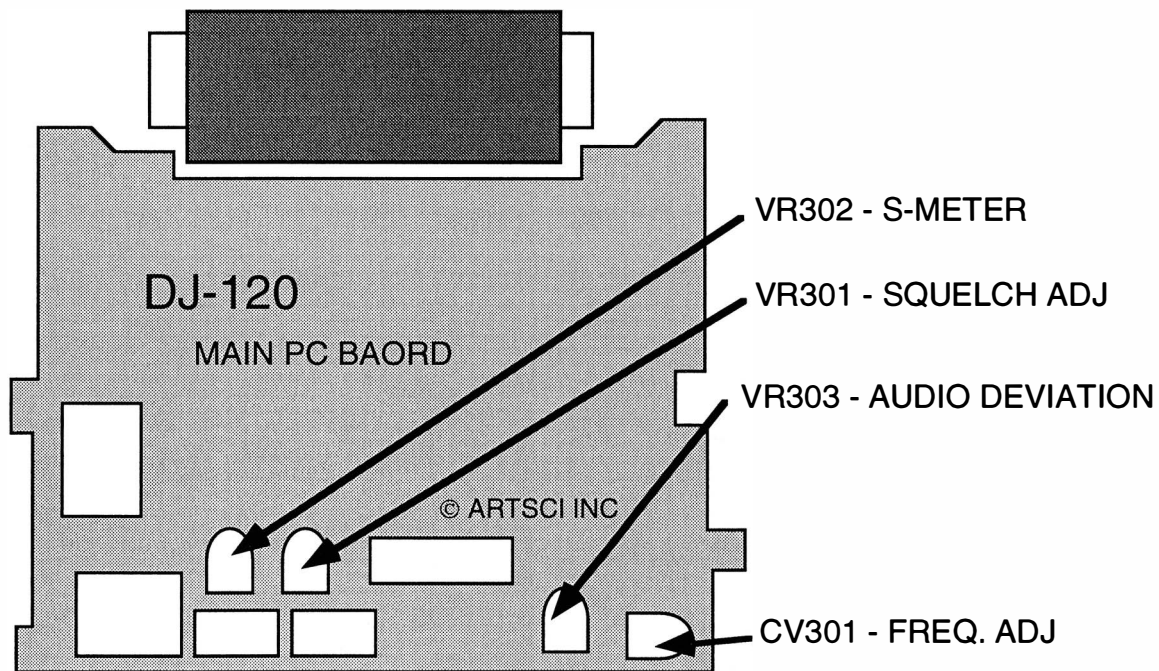
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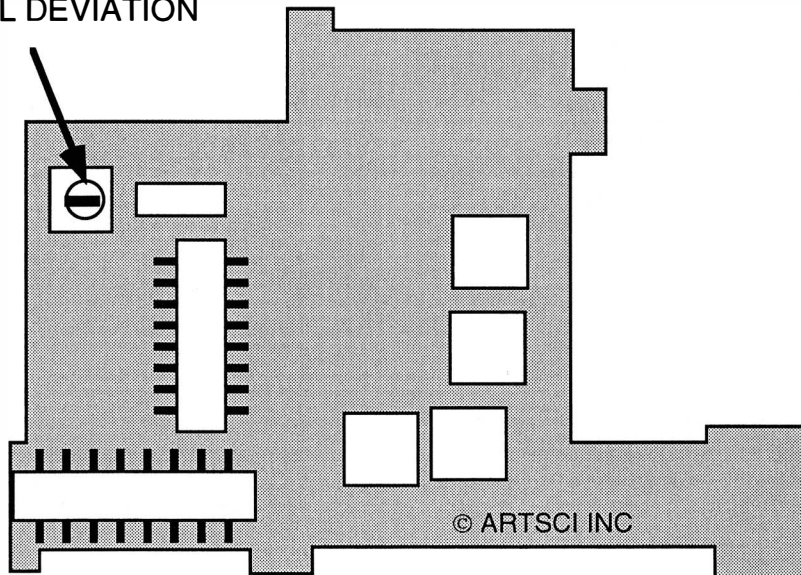
ALINCO DJ-120T

ALIGNMENT CONTROLS



VR401- PL DEVIATION

DTMF DEV (VR601) ON DTMF BOARD



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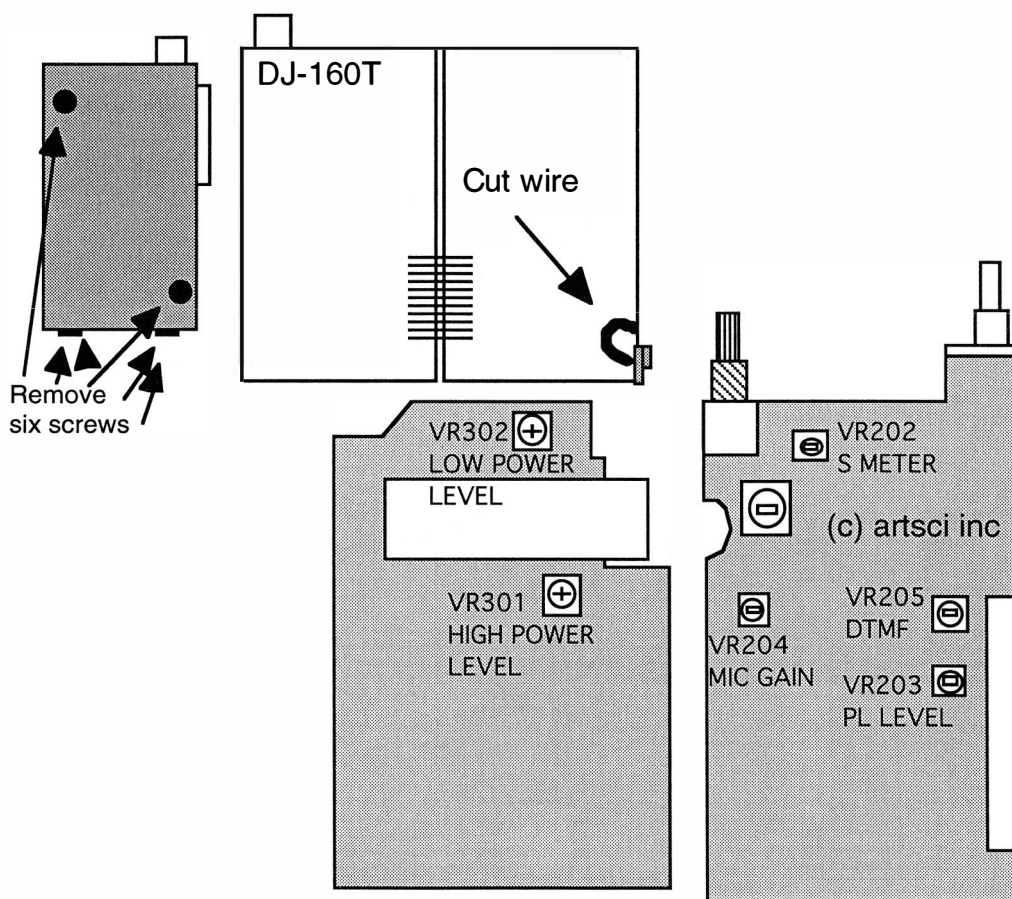
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ALINCO DJ-160T

EXPANDED RF & ALIGNMENT CONTROLS

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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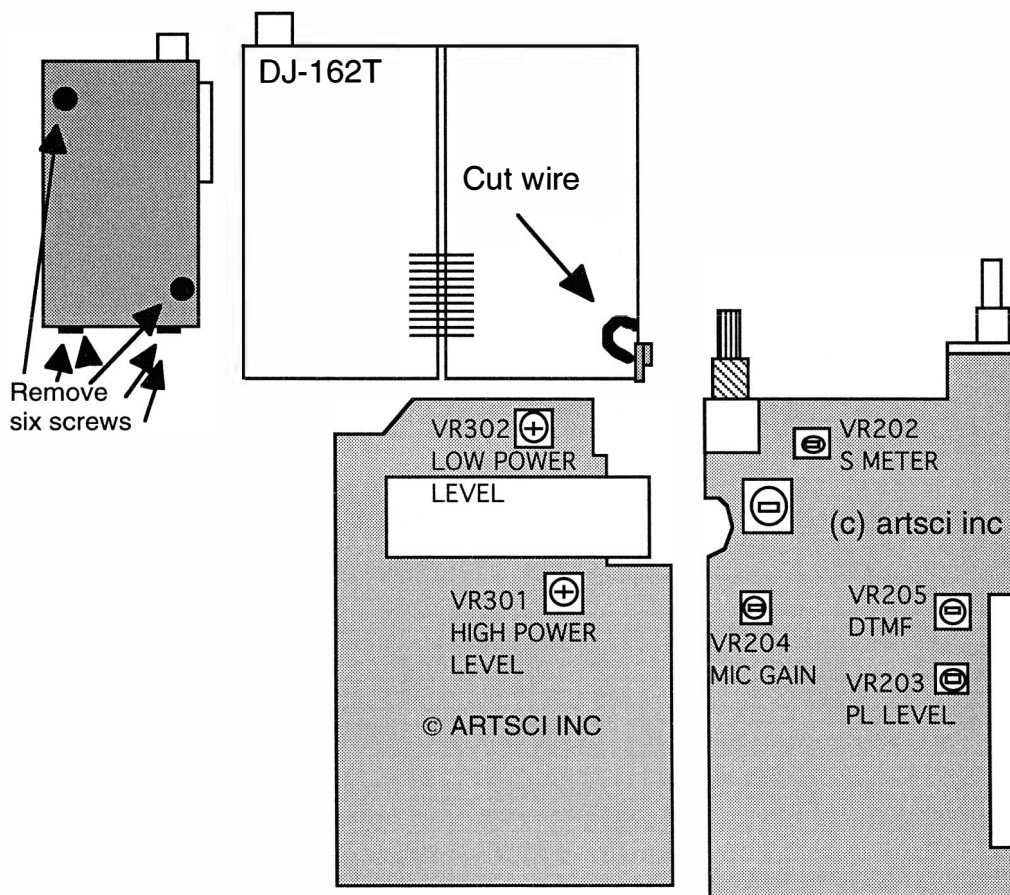


ALINCO DJ-162T

EXPANDED RF & ALIGNMENT CONTROLS

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



Aircraft AM RX: IN VFO Press [B]



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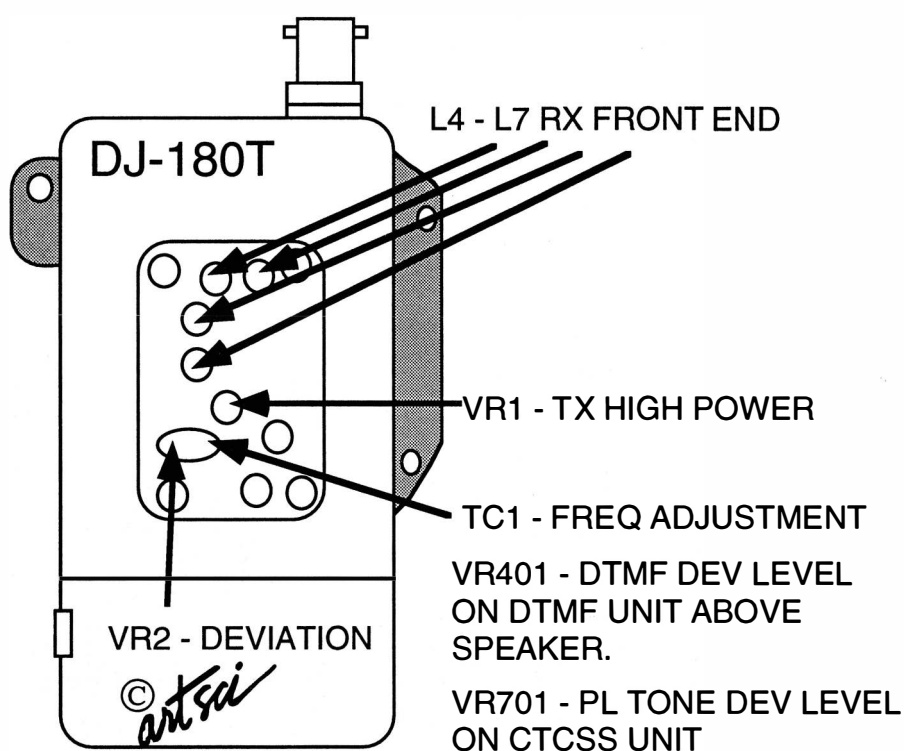
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ALINCO DJ-180T

EXPANDED RF / ALIGNMENTR CONTROLS

This mod will void the warrenty.

1. Remove Battery and Antenna.
2. Remove the four screws holding the battery slide plate in location.
(Careful not to break the battery plate wires)
3. Locate and **cut the "PINK" wire.** (Only the PINK wire)
4. Reassemble the unit.
5. **Reset the microprocessor**
(Press and hold the [LAMP] button and turn the power on.)



Optional Receive only mod: (130 - 173 MHz)

1. Reset the microprocessor
(Press and hold the [LAMP] button and turn the power on.)

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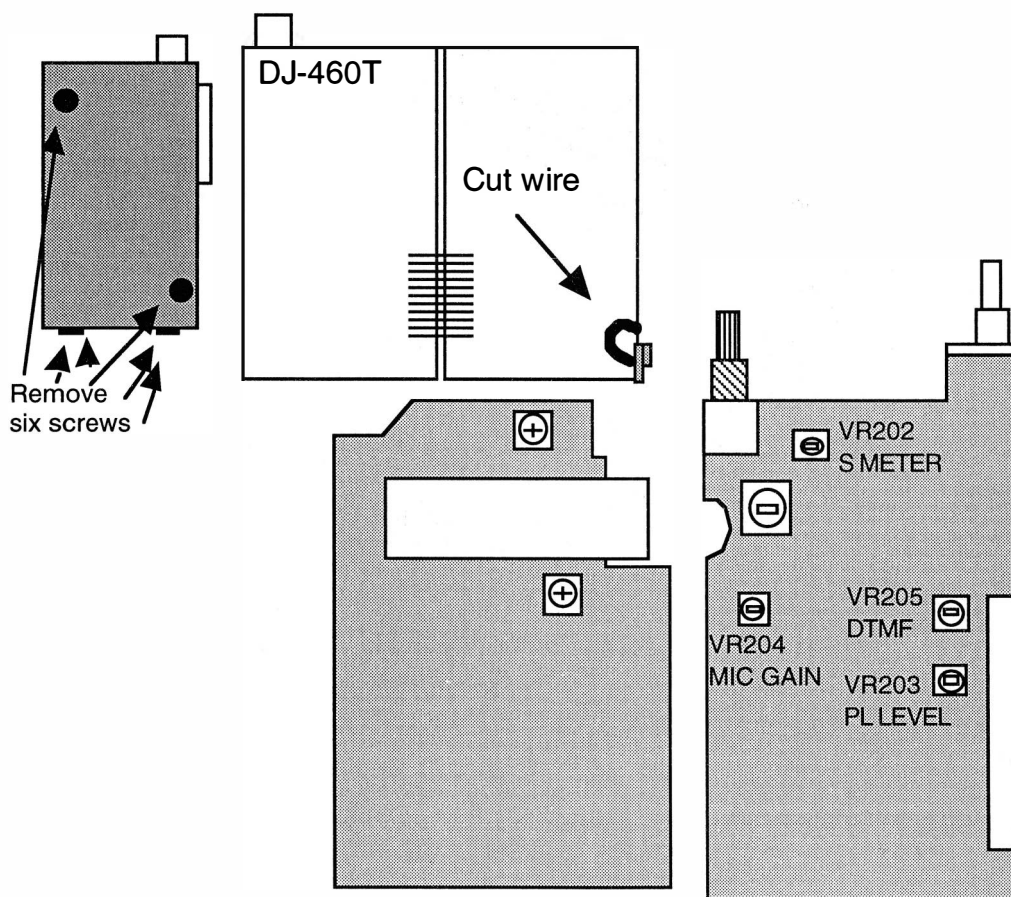


ALINCO DJ-460T

EXPANDED RF & ALIGNMENT CONTROLS

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.

DJ-460



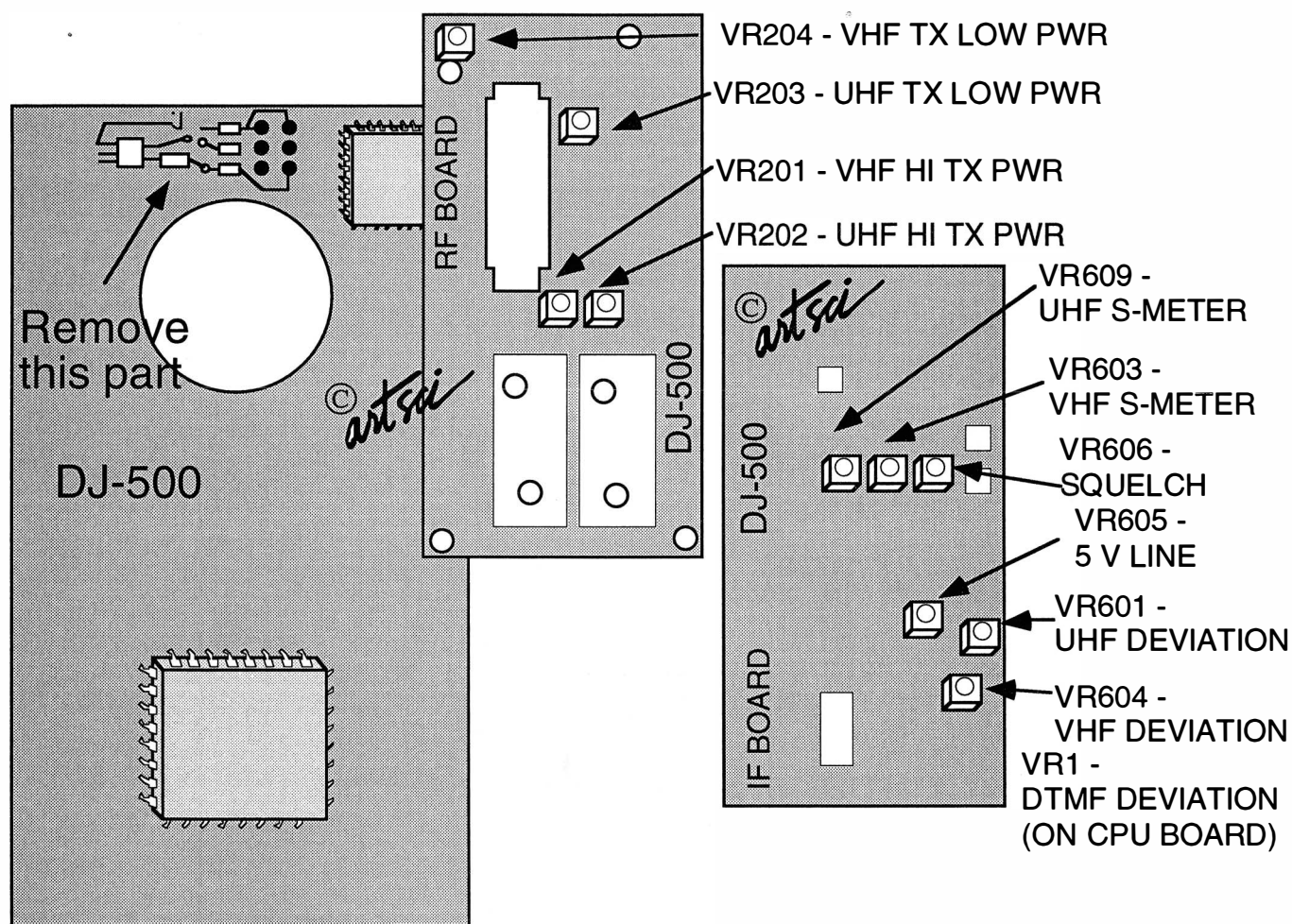
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ALINCO DJ-500T

EXPANDED RF & ALIGNMENT CONTROLS

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)



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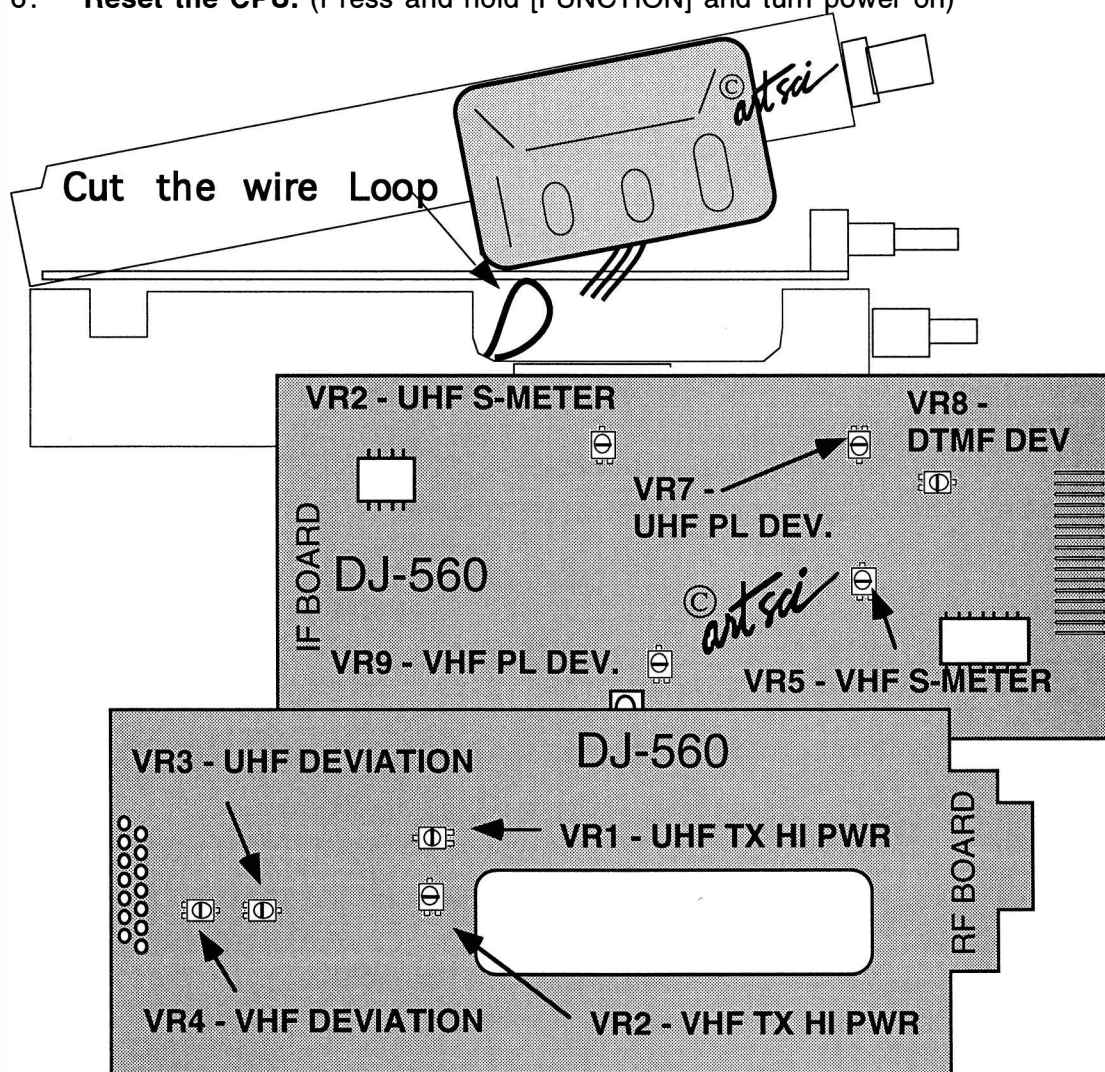
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ALINCO DJ-560

EXPANDED RF & ALIGNMENT CONTROLS

1. Remove battery and antenna.
2. Remove screws from back of case and.
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 and the 4 screws holding the radio together.
4. Locate and **cut orange or Yellow wire** directly below the PTT switch.
5. Reassemble the radio.
6. **Reset the CPU.** (Press and hold [FUNCTION] and turn power on)



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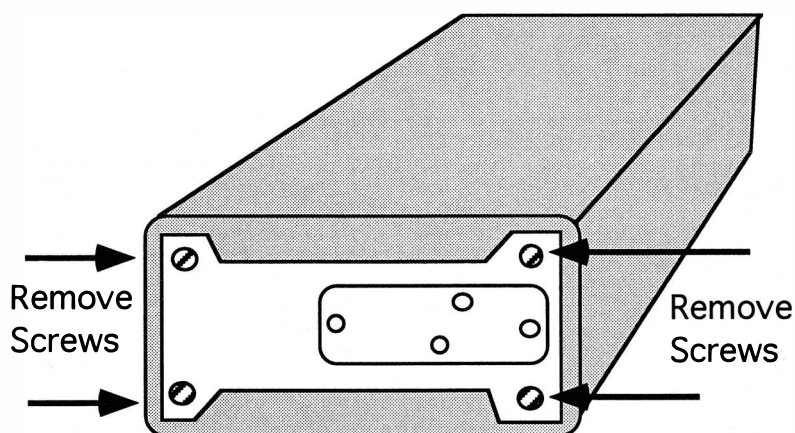
ALINCO DJ-580T

EXPANDED RF

Aircraft Band RX & 800 MHz RX

130-175 MHz, 410-475 MHz

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 ---

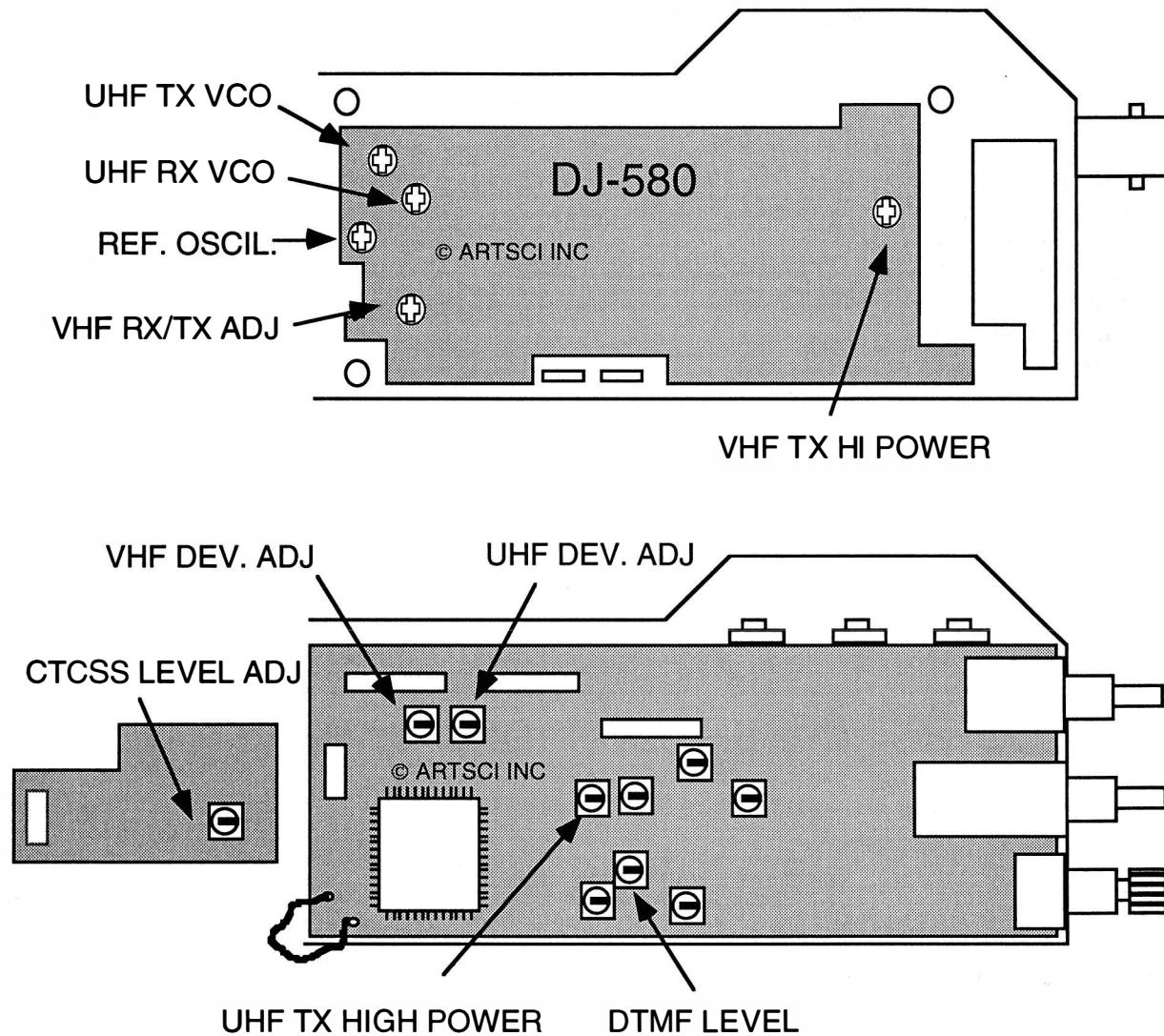
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ALINCO DJ-580T

ALIGNMENT CONTROLS



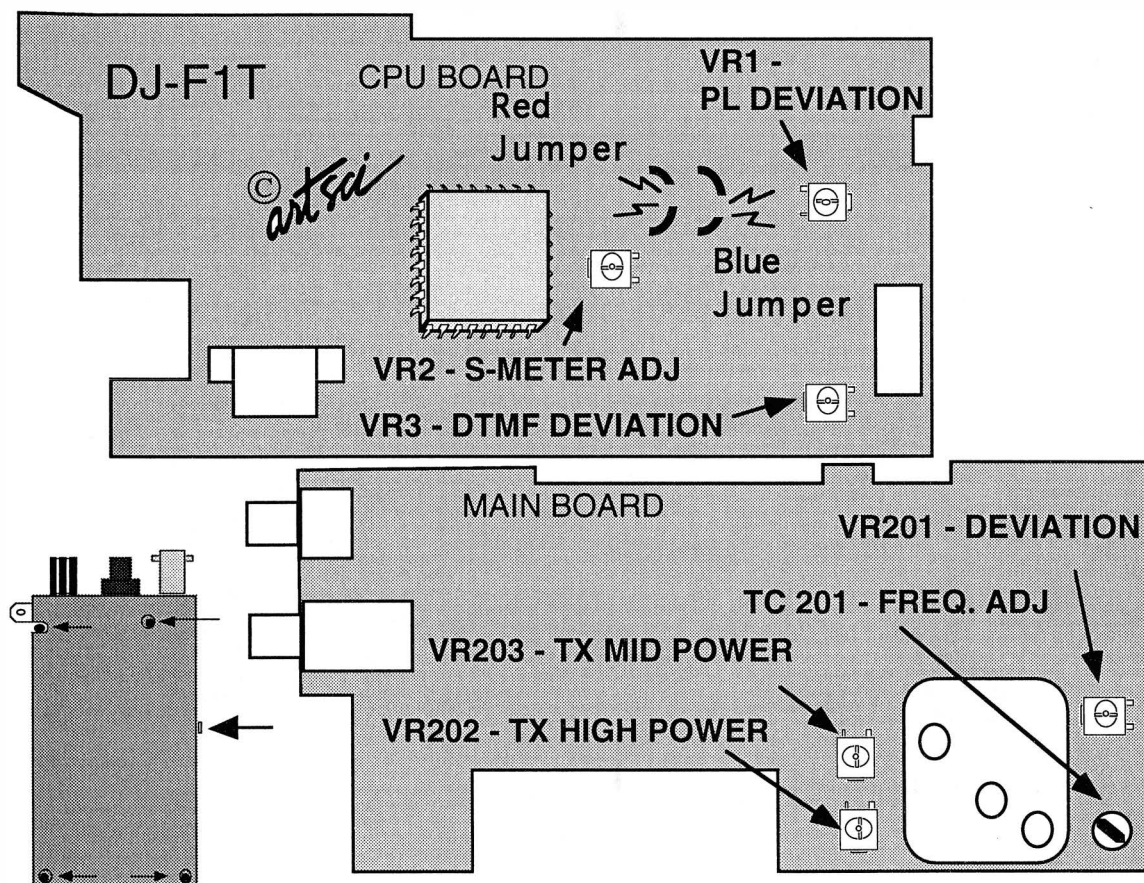
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ALINCO DJ-F1T

EXPANDED RF & ALIGNMENT CONTROLS

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.

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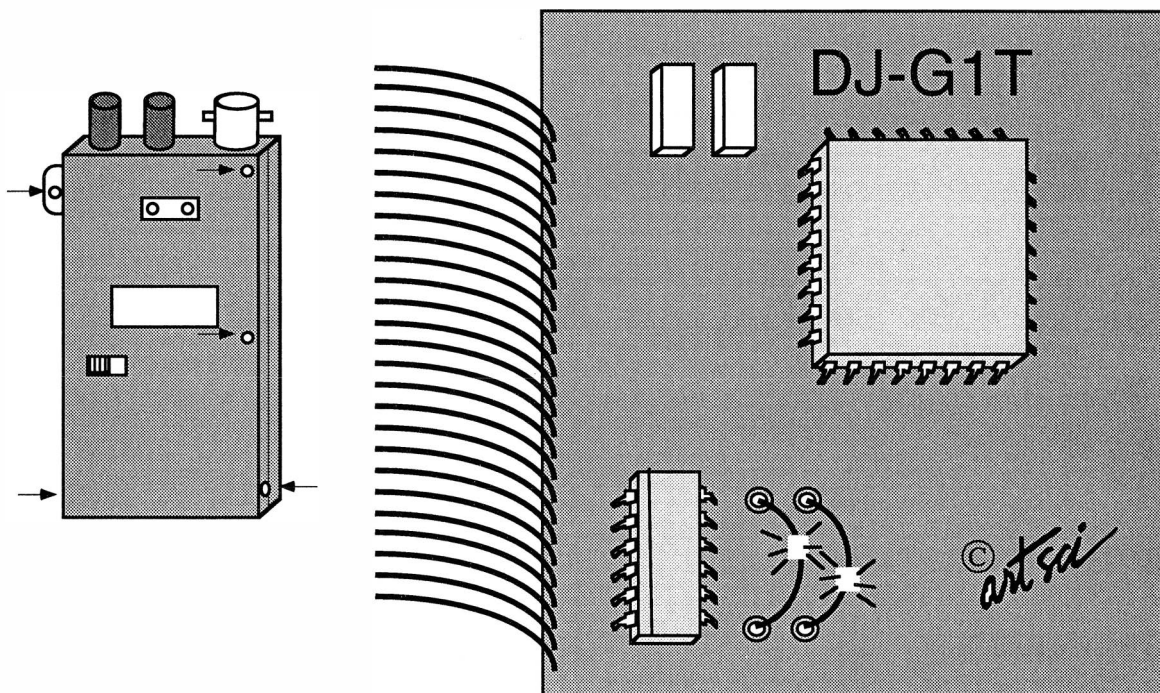
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ALINCO DJ-G1T

EXPANDED RF

1. Remove Battery and Antenna.
2. **Remove five screws** from the back and carefully open the radio.
3. Locate and **cut the BLUE and RED wire loops** on the microprocessor board.
4. Reassemble the radio.
5. Reset the microprocessor. (Press and hold [FUNC] and turn the radio on)



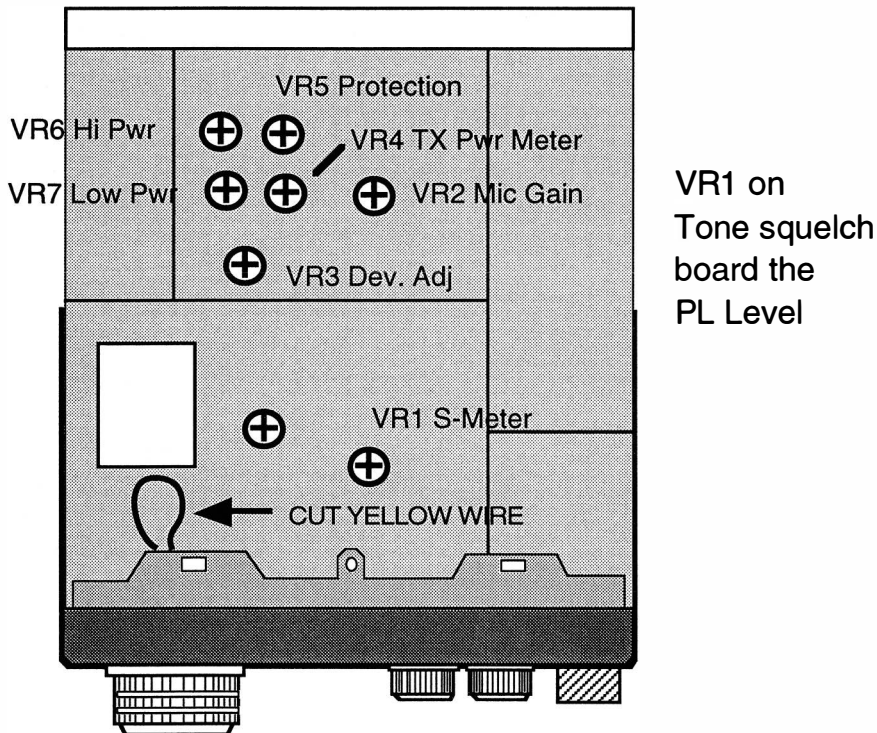
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ALINCO DR-110T

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.



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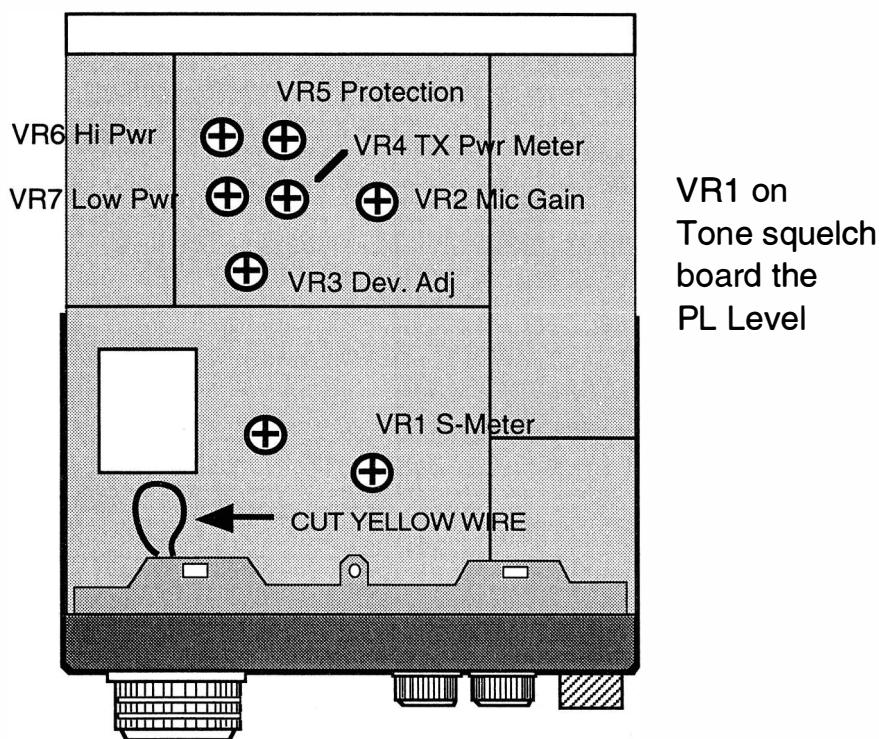
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ALINCO DR-112T

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.

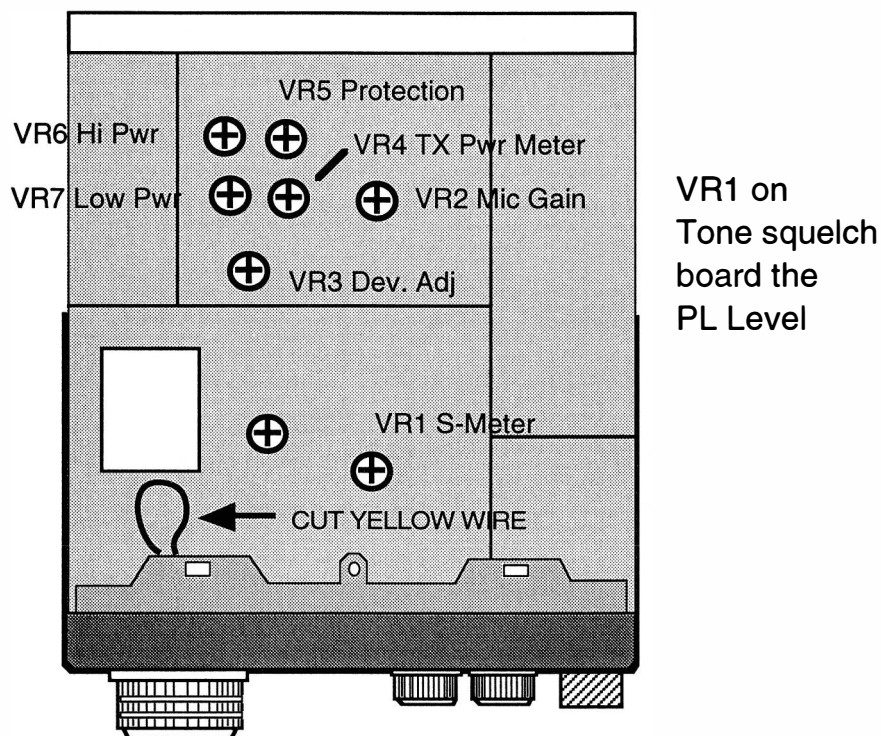


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ALINCO DR-119T

ALIGNMENT CONTROLS



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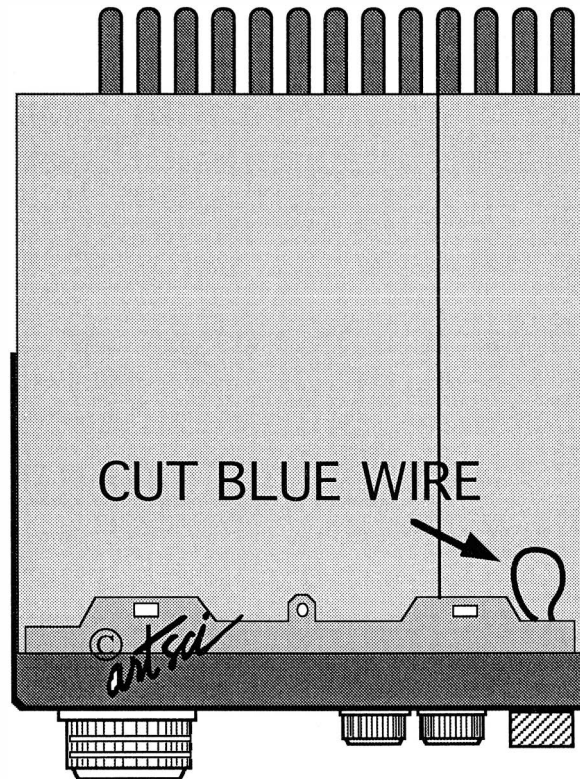
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ALINCO DR-130T

EXPANDED RF

1. Remove power and Antenna.
2. Remove the top cover.
3. Locate and cut the BLUE jumper wire.
4. Reassemble the radio
5. Reset the microprocessor.
(Press and hold the [FUNCTION] button and turn the radio on)



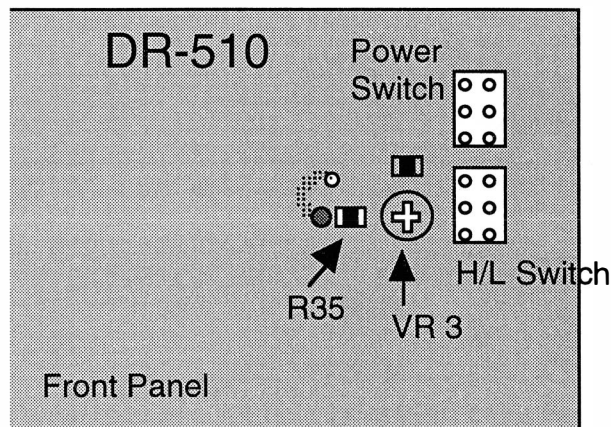
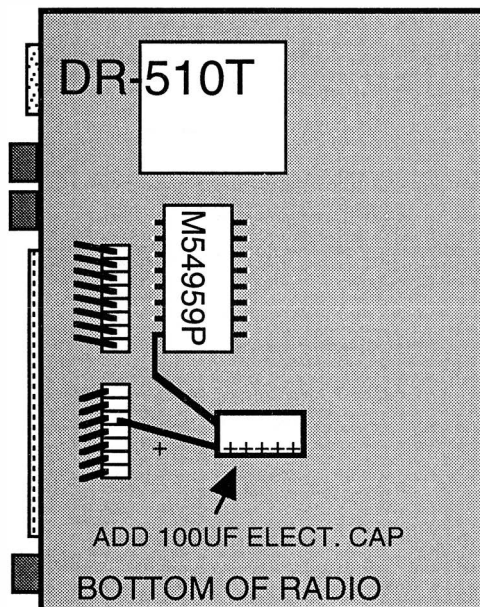
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ALINCO DR-510T

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 ---

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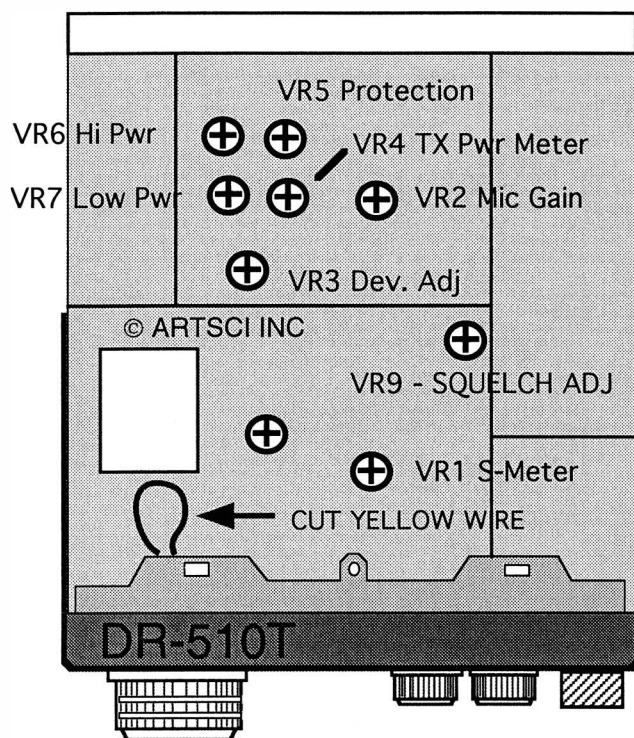
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ALINCO DR-510T

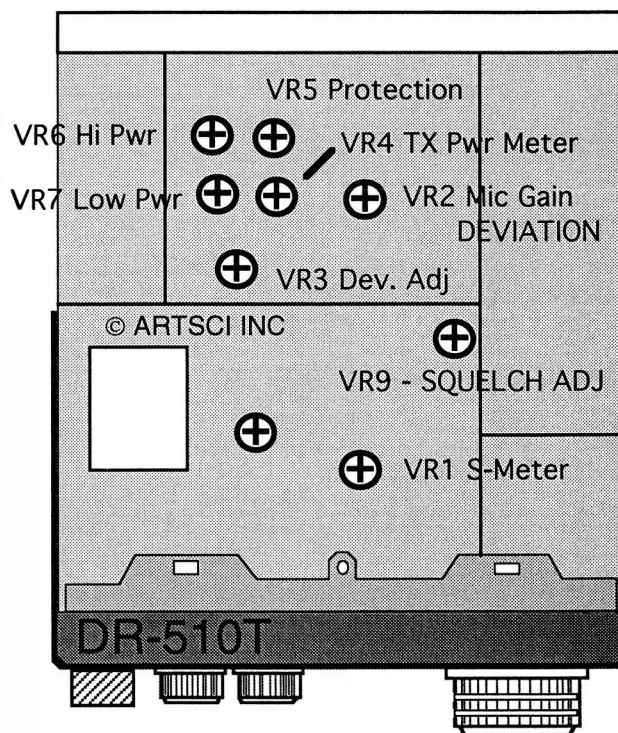
ALIGNMENT CONTROLS

UPPER SIDE (VHF)



VR1 on
Tone squelch
board the
PL Level

BOTTOM SIDE (UHF)



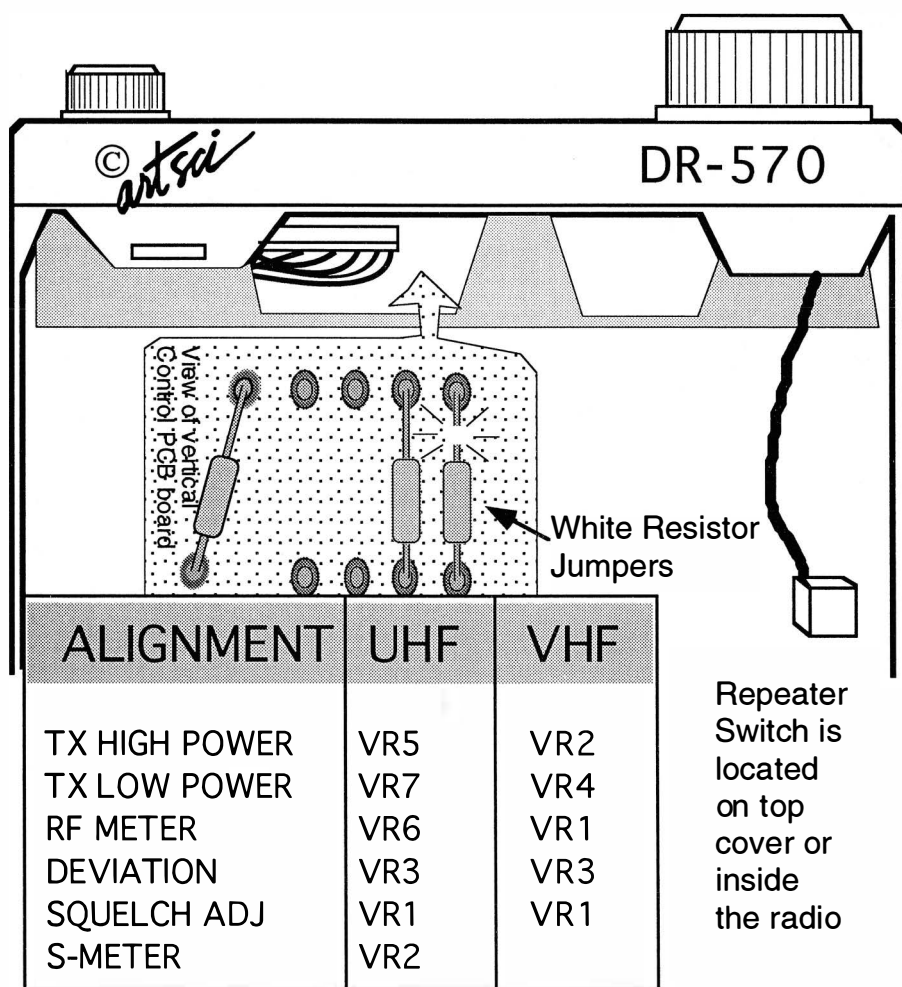
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ALINCO DR-570T

EXPANDED RF / XBAND REP MOD / ALIGNMENT CONTROLS

1. Remove Power and Antenna.
2. Remove screws from case and open radio (3 screws in the top and 2 on each side.)
3. Locate and cut the indicated White resistor jumpers.
(They are located on the vertical control PCB board.)
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.



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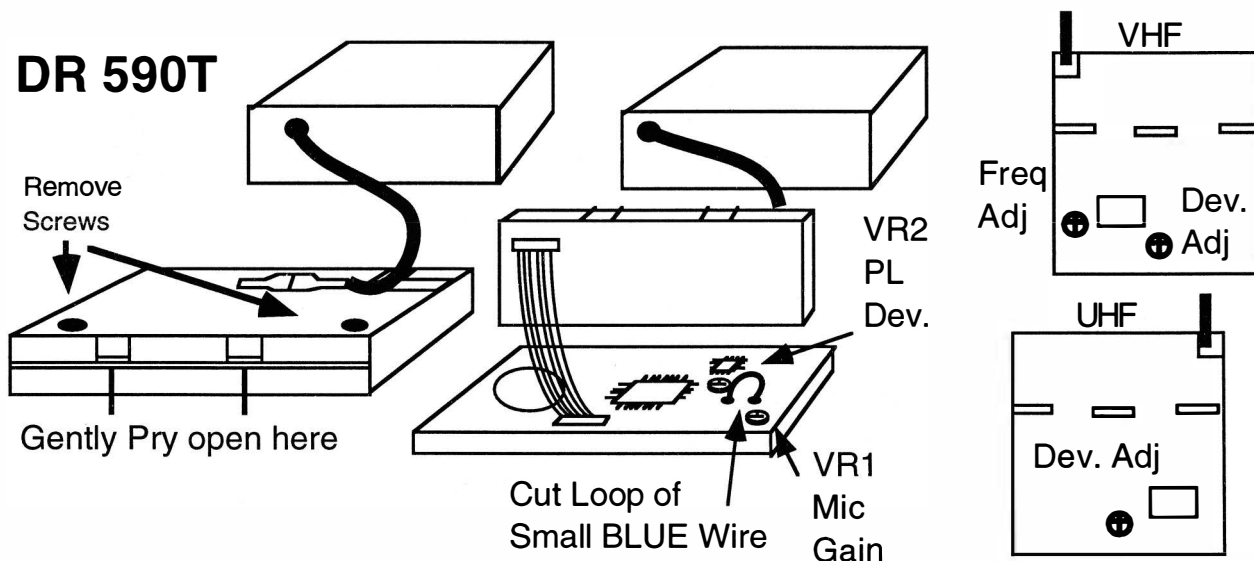
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ALINCO DR-590T/DR-592T

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.

A audio frequency response kit is available from Alinco. Contact them for the parts and instruction sheet. (This is for improving the Cross-band repeater audio)



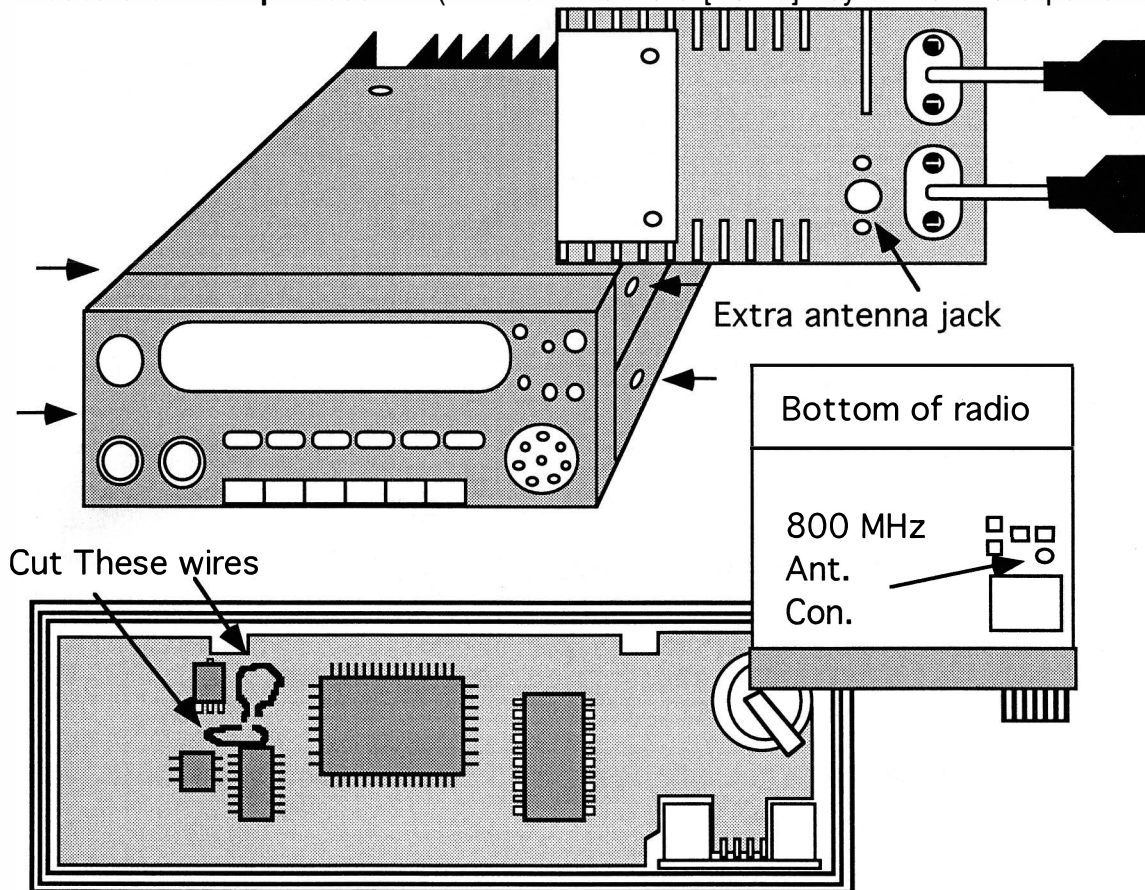
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ALINCO DR-599T

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 separate 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. Reassemble 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 [FUNC] key and turn the power on)



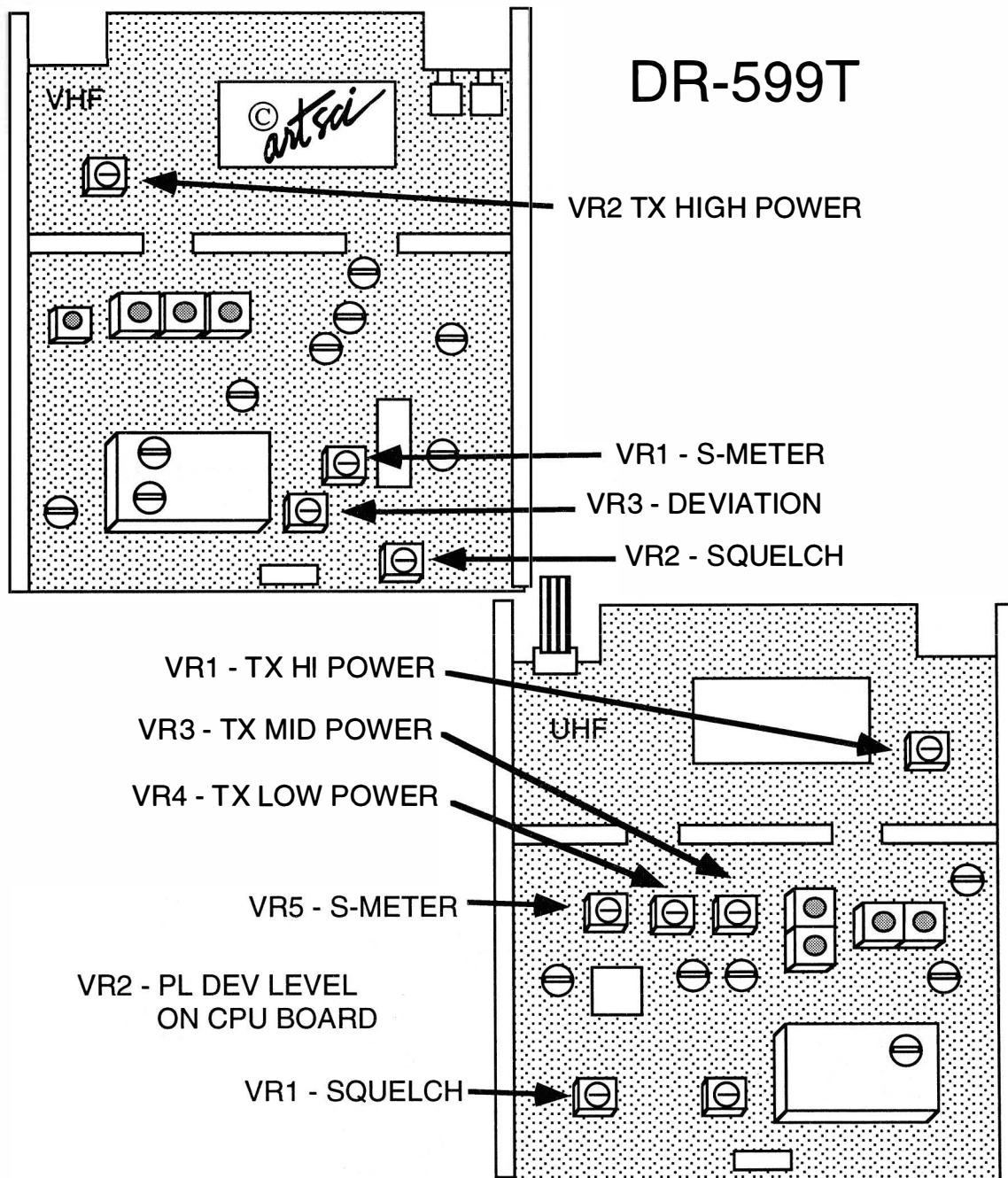
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ALINCO DR-599T

ALIGNMENT CONTROLS



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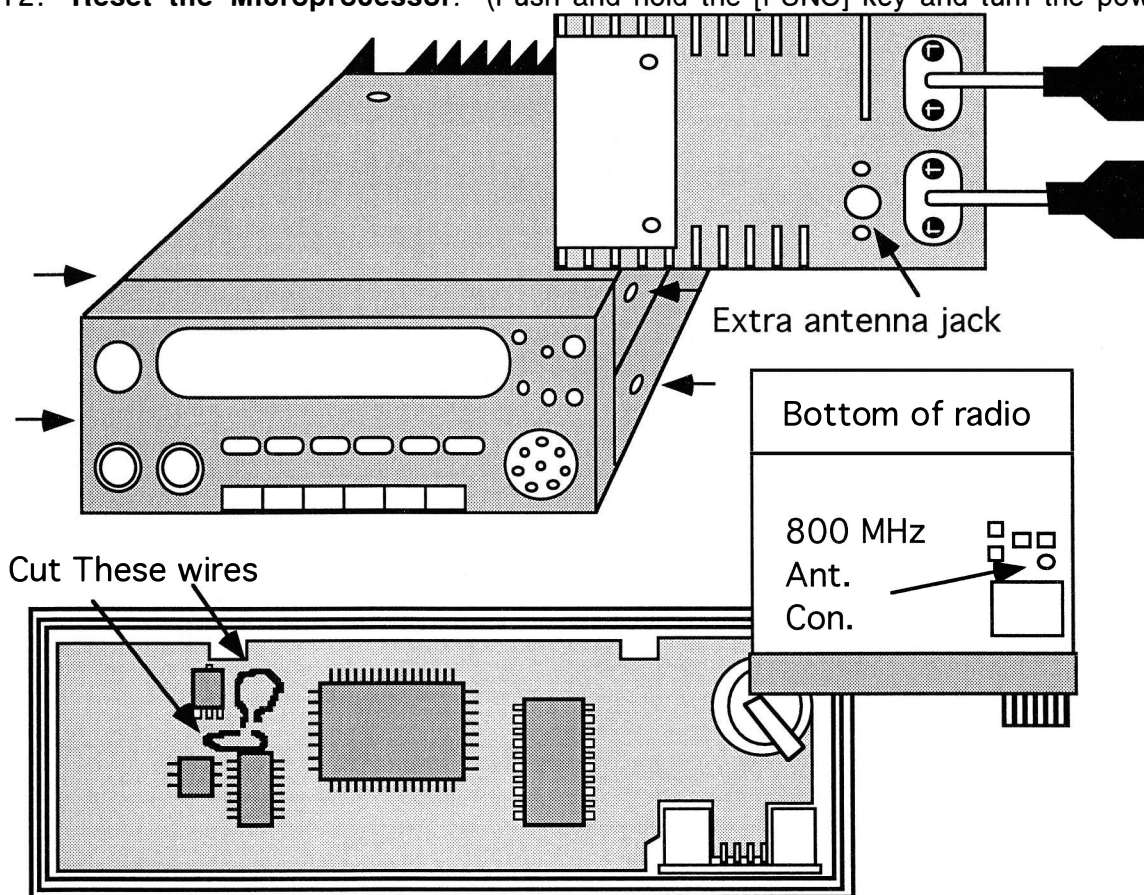
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ALINCO DR-600T

EXPANDED RF / XBAND REP MOD

130-173.999 MHZ & 440-519 MHZ

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 separate 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. Reassemble 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 through the optional antenna jack on the back of the main body of the radio. (NEWER RADIOS HAVE THE 800 REMOVED!!)
10. Locate antenna connector CN59 and attach the antenna cable.
11. Reassemble the radio.
12. **Reset the Microprocessor.** (Push and hold the [FUNC] key and turn the power on)



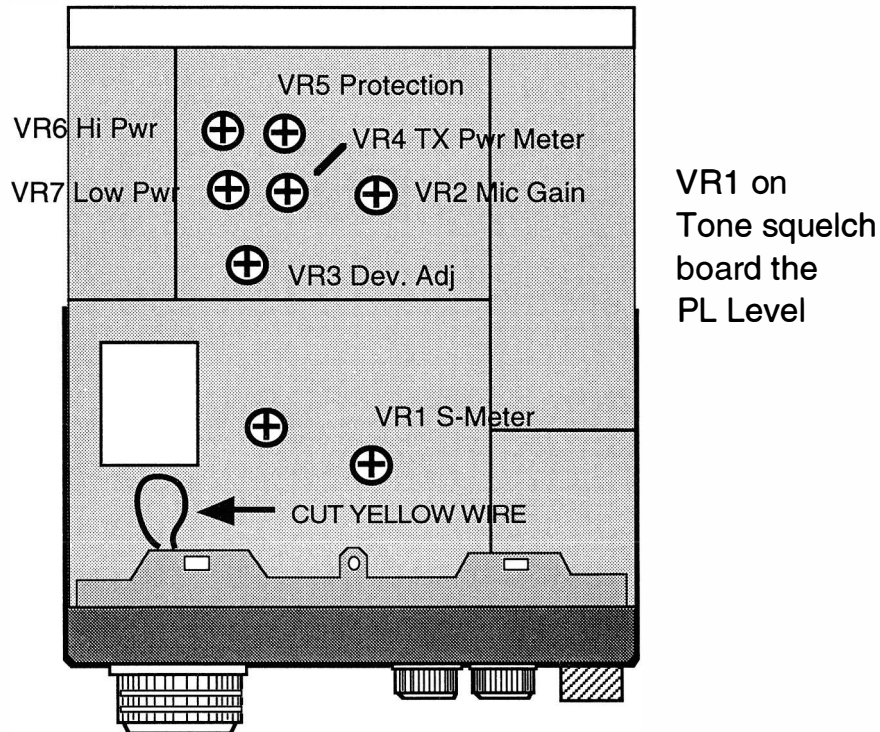
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ALINCO DR-1200T

ALIGNMENT CONTROLS

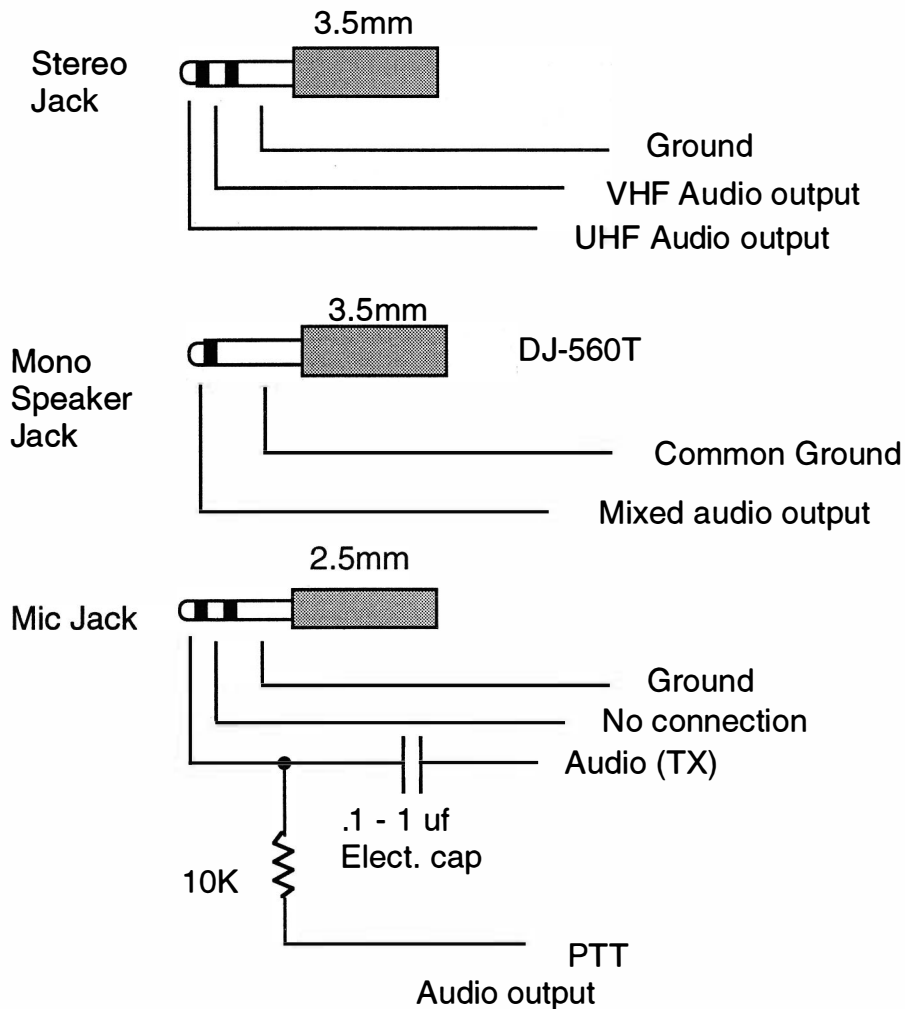


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ALINCO HT

Packet Connections

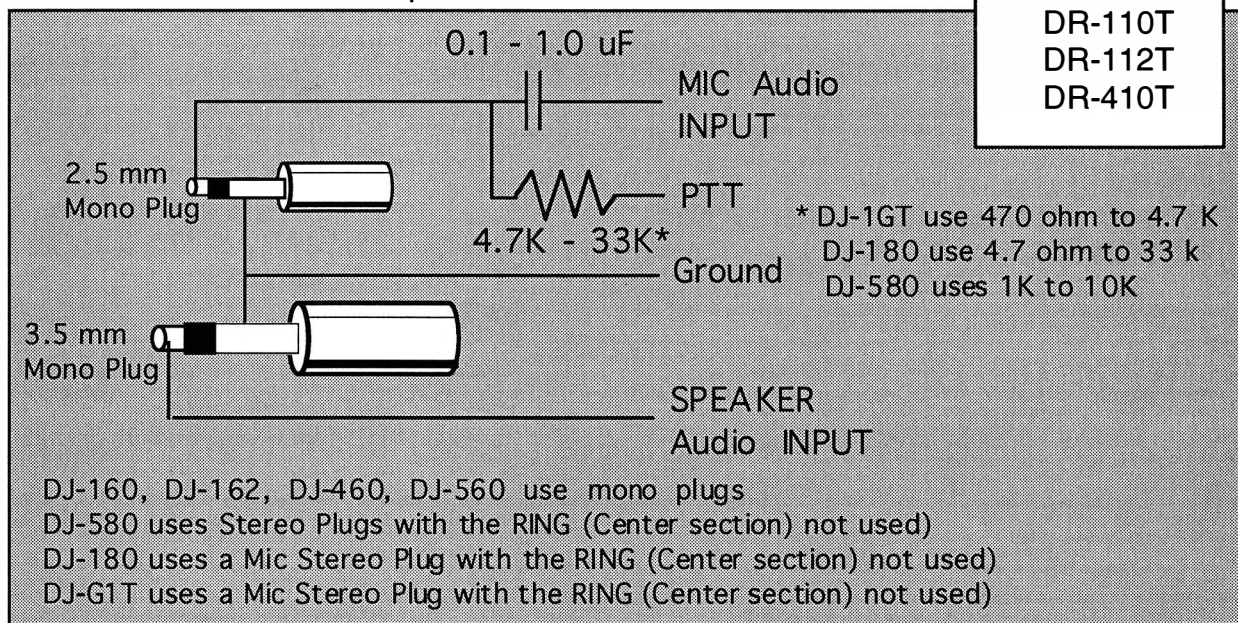
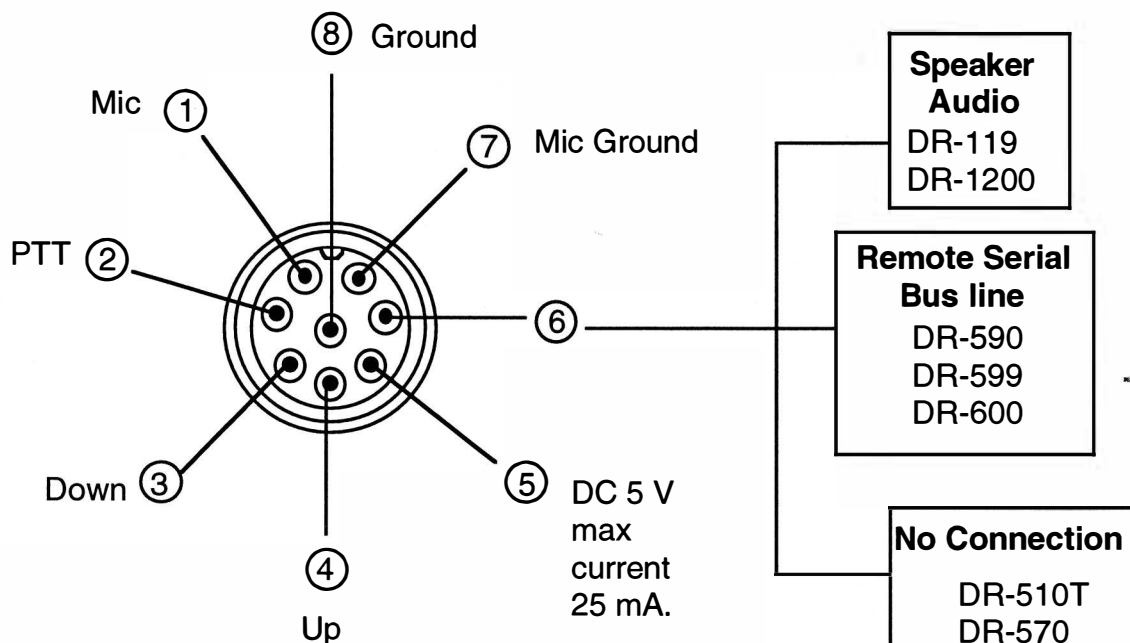


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Packet Connections



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Performance Report

Radio _____

Date _____

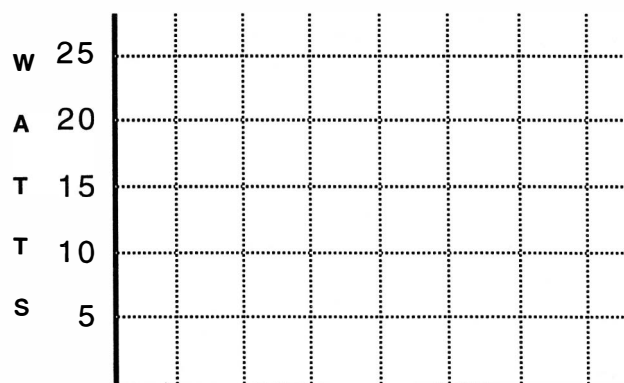
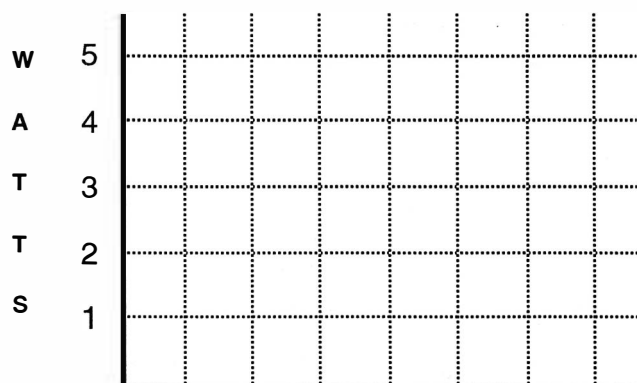
Owner : Name _____

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



Radio / Tech Modifications

STANDARD/HEATH Radio Modifications



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Performance Report

Radio _____

Date _____

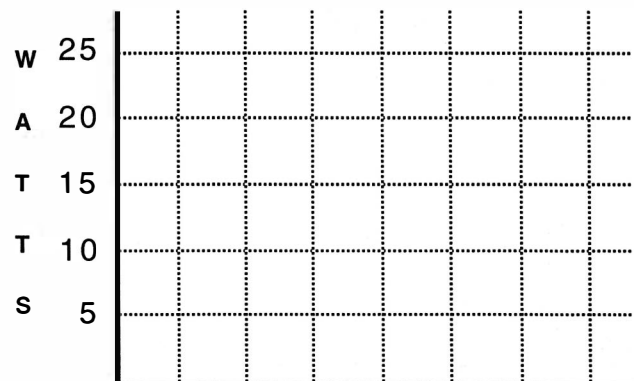
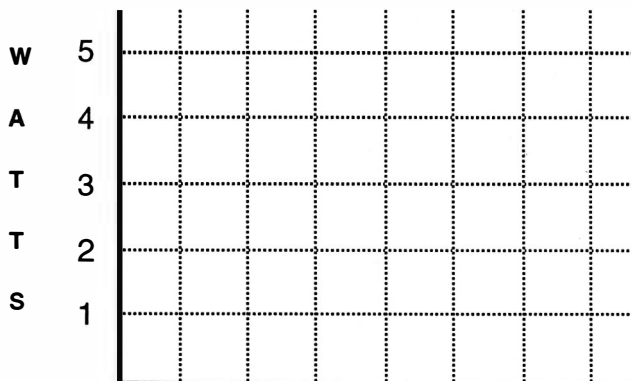
Owner : Name _____

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



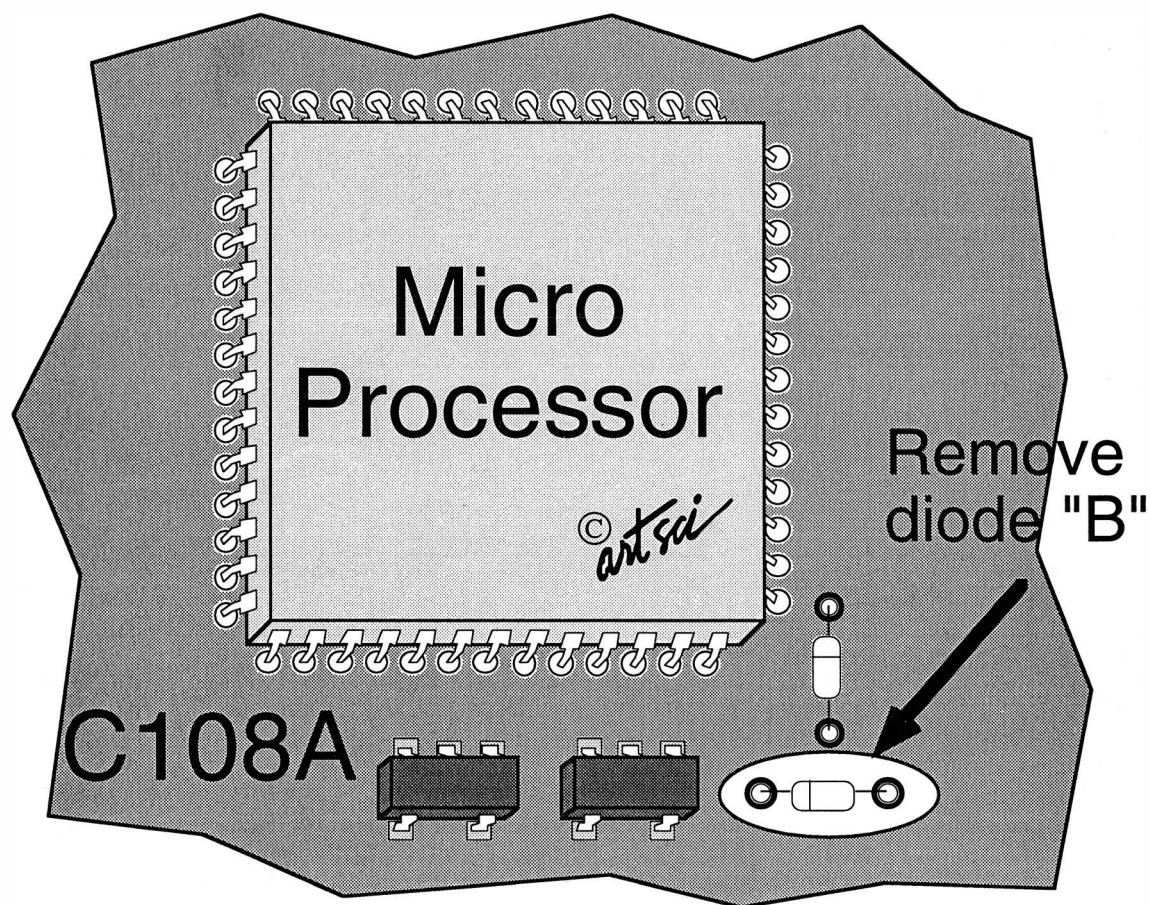
STANDARD C108A

EXPANDED RF

RX: 105 - 138 MHz AM, 140.000 - 174.995 MHz

TX: 120.000 - 160.000 MHz

1. Remove Battery and Antenna.
2. Remove screws and open the case.
3. Locate Microprocessor.
4. Locate and **cut Diode "B"**. (see drawing)
5. Reassemble the radio.
6. Reset the microprocessor. (see owners manual)



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Performance Report

Radio _____

Date _____

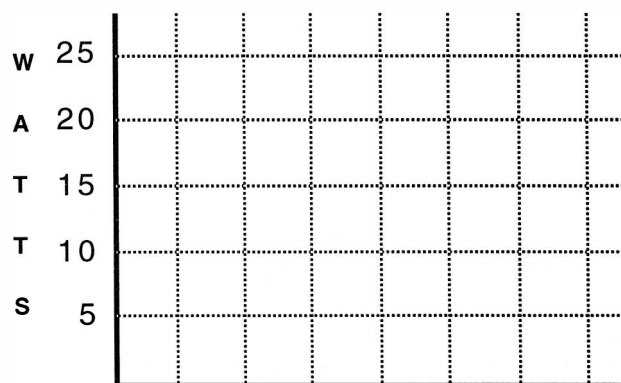
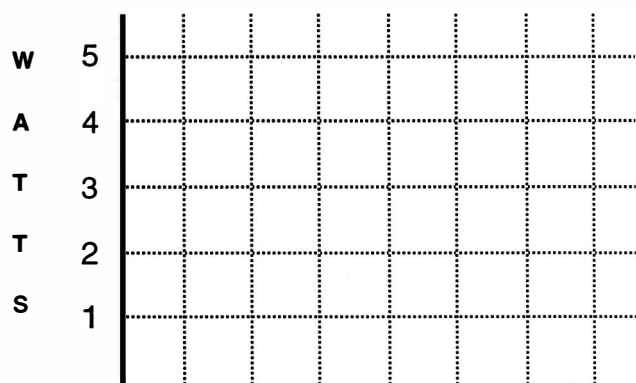
Owner : Name _____

Address _____

City _____ St. _____ Zip _____

Phone () - _____

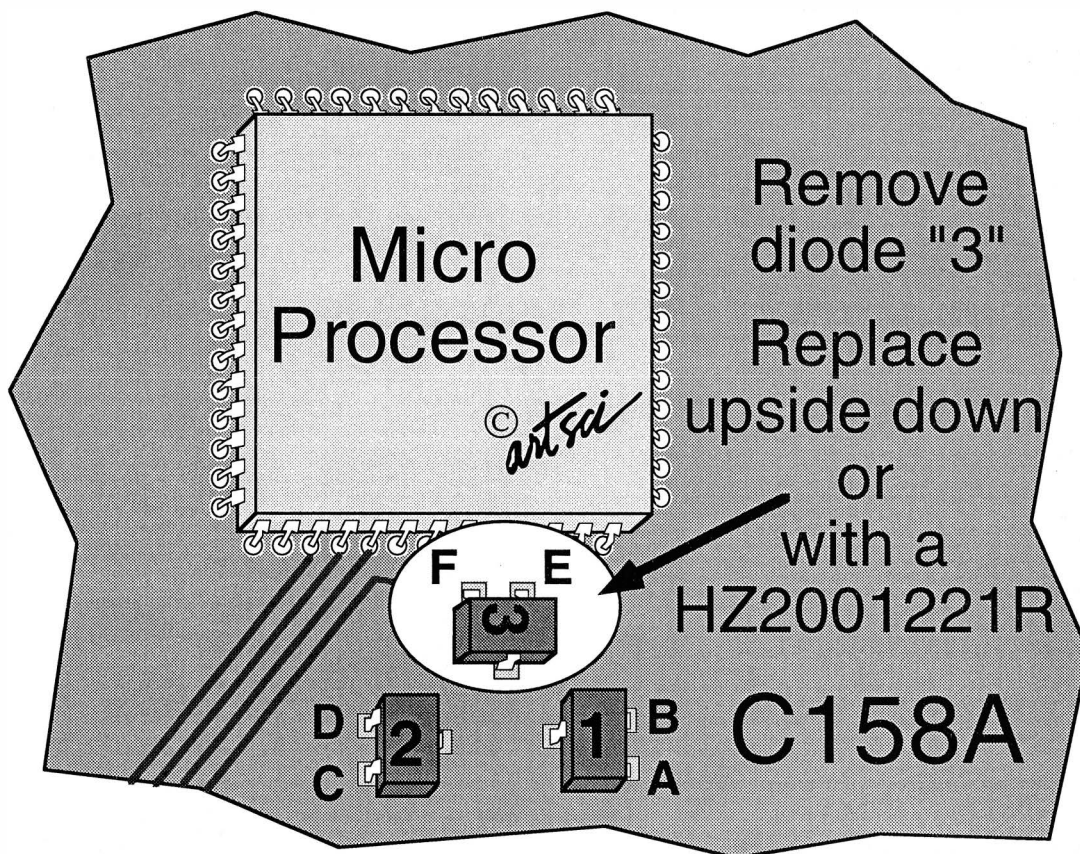
Description	Before	After
Power out (Low)	_____ Watts	_____ Watts
Power out (High)	_____ Watts	_____ Watts
Frequency Error (Simplex)	_____ Hz	_____ Hz
Frequency Error (Offset)	_____ Hz	_____ Hz
Receive Sensitivity (Mid-band)	_____ uv	_____ uv
Receive Sensitivity (____MHz)	_____ uv	_____ uv
Receive Sensitivity (____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 C158A

EXPANDED RF

1. Remove Battery and Antenna.
2. Remove screws and open the case.
3. Locate Chip Diode "3" near microprocessor (see drawing)
4. **Remove Chip Diode "3".**
5. **Reinstall the diode upside down** (reversing legs E & F) or
Install a new Chip Diode. (Standard part # HZ2001221R)
6. Reassemble the radio
7. Reset the microprocessor. (press and hold [FUNC] & turn power on)



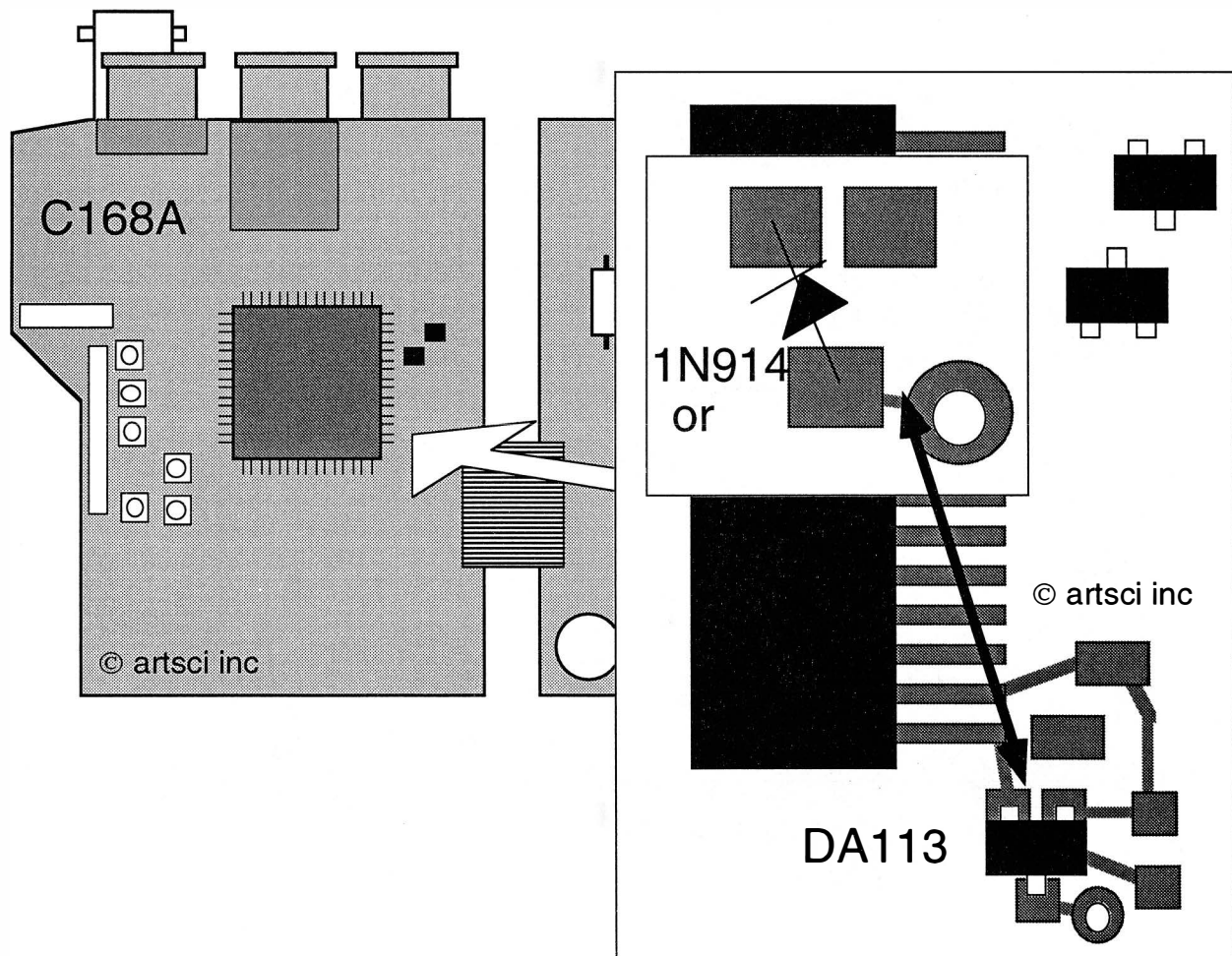
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STANDARD C168A

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. Reassemble 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 FREQUENCY 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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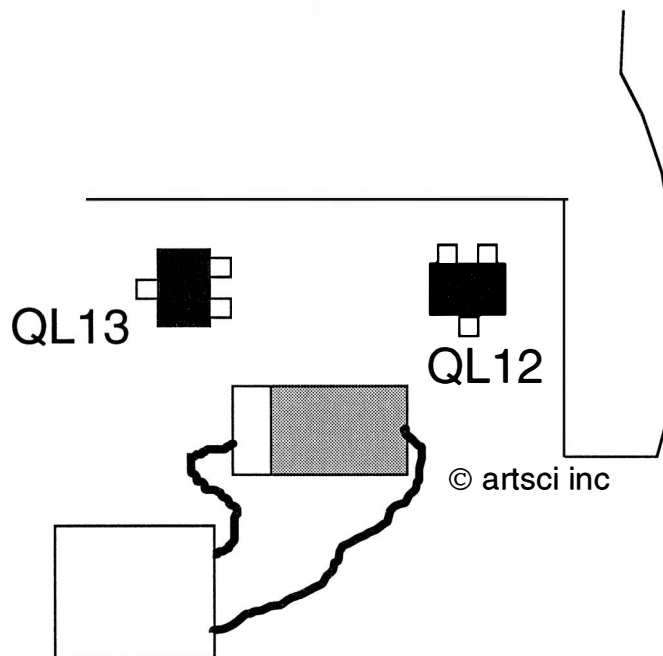
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STANDARD C188A

EXPANDED RX

1. Remove Power and Antenna.
2. Remove screws and open case.
3. Locate the microprocessor board
4. Locate QL12 & QL13. (QL13 may already be missing)
5. **Remove QL12 & QL13.** (QL13 may already be missing)
6. Reassemble the radio
7. **Reset Microprocessor** (set mode 8).



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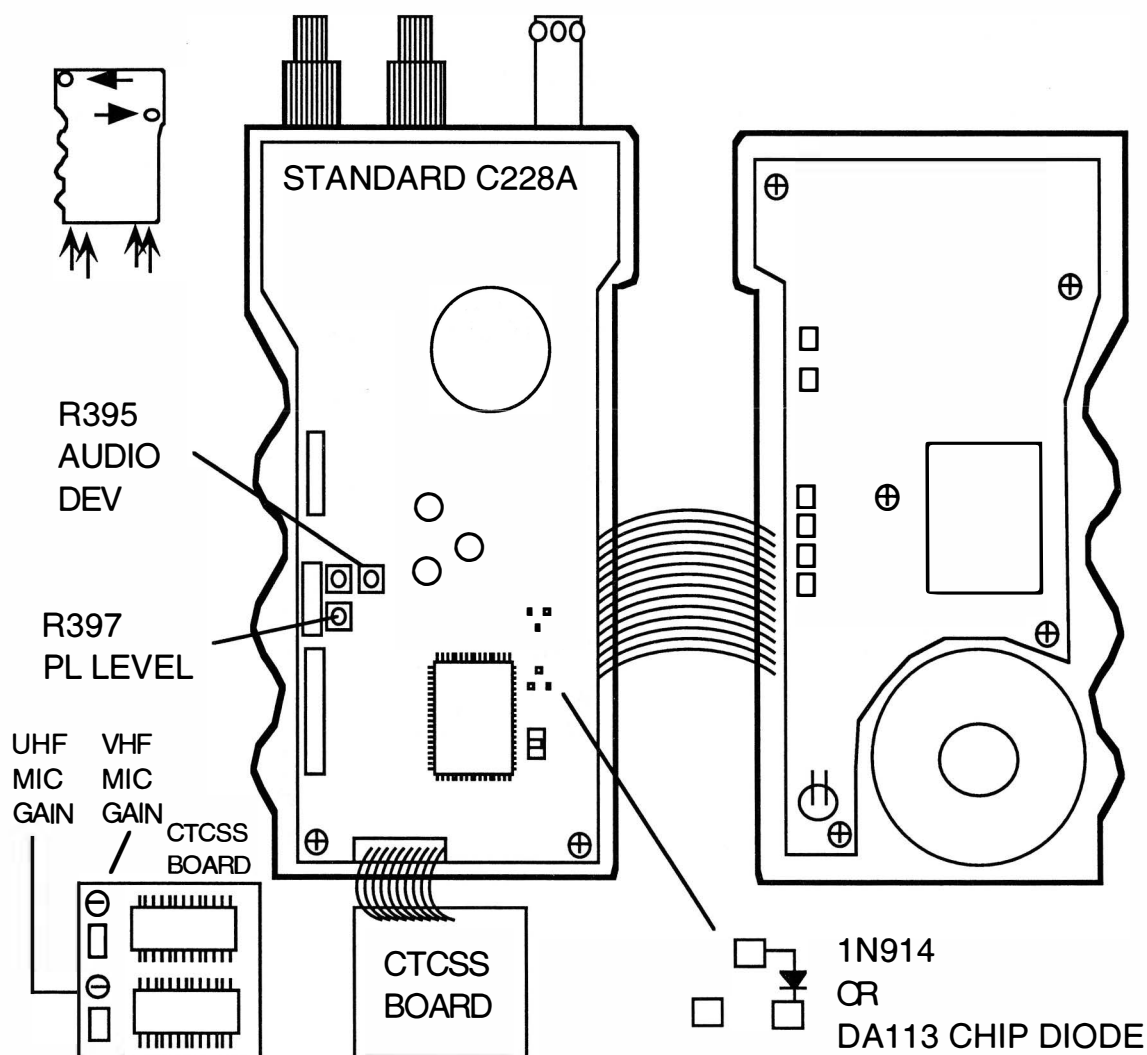


STANDARD C228A

EXPANDED RF

RX: 123.5 - 177 MHZ TX: 125 - 174 MHZ

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.
6. Reset the microprocessor (see owners manual)



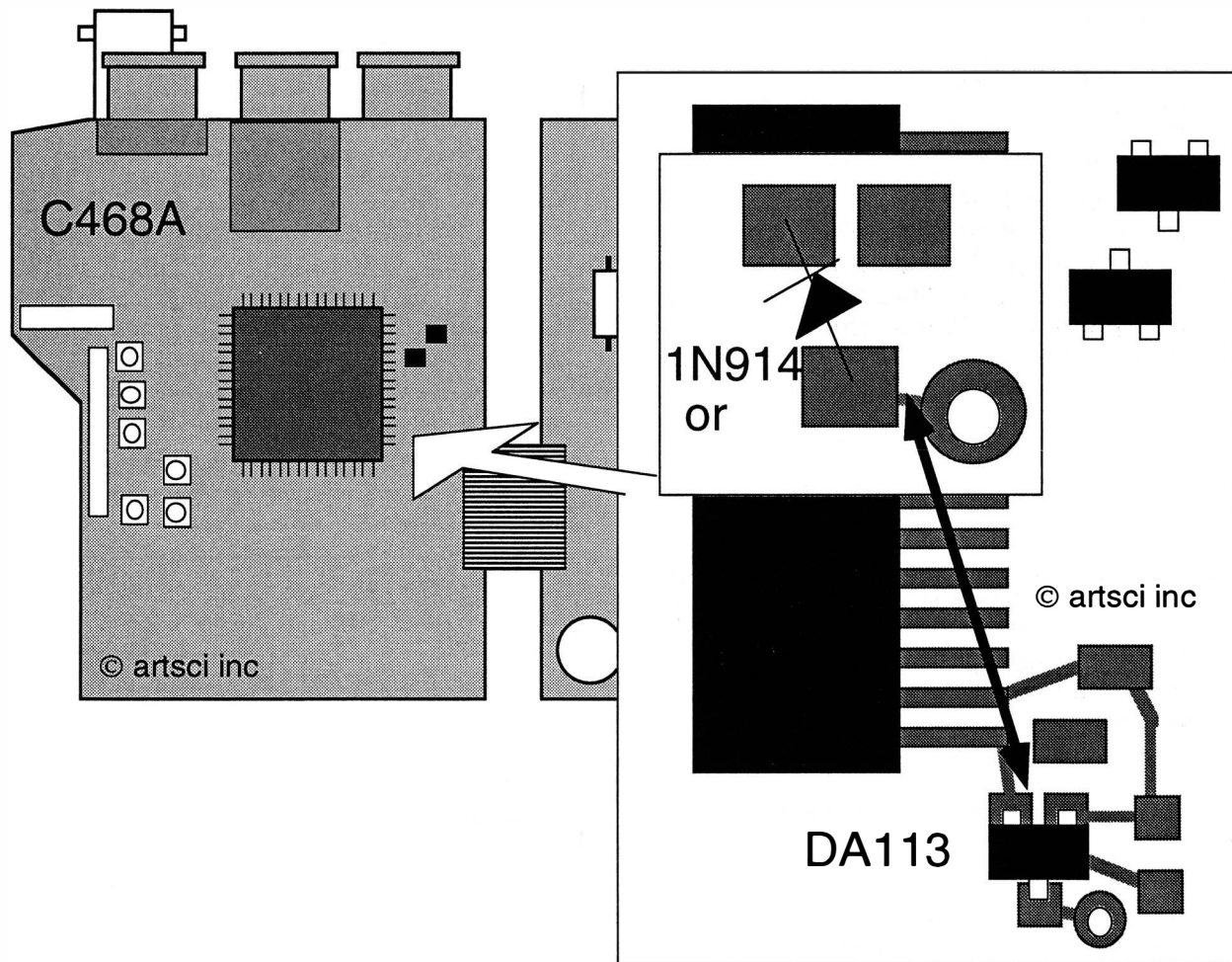
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STANDARD C468A

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. Reassemble the radio.
6. If required, RESET the microprocessor (see instruction manual)



MORE ---

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STANDARD C468

EXPANDED RX / Keyboard

If your radio ends with an "S"

340 - 399.995 MHz RX
400 - 474.000 MHz RX/TX
801 - 980.000 MHz RX

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 FREQUENCY ENTRY

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



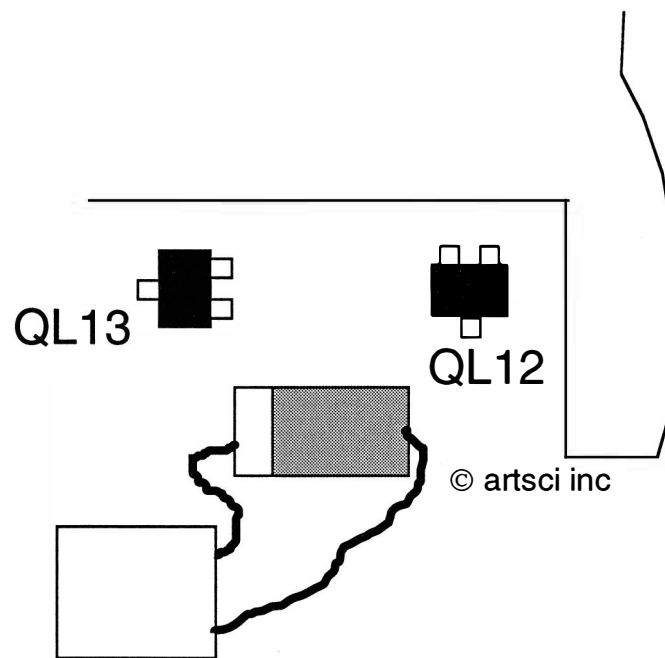
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STANDARD C488A

EXPANDED RX

1. Remove Power and Antenna.
2. Remove screws and open case.
3. Locate the microprocessor board
4. Locate QL12 & QL13. (QL13 may already be missing)
5. **Remove QL12 & QL13.** (QL13 may already be missing)
6. Reassemble the radio
7. Reset Microprocessor (set mode 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 Selector 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



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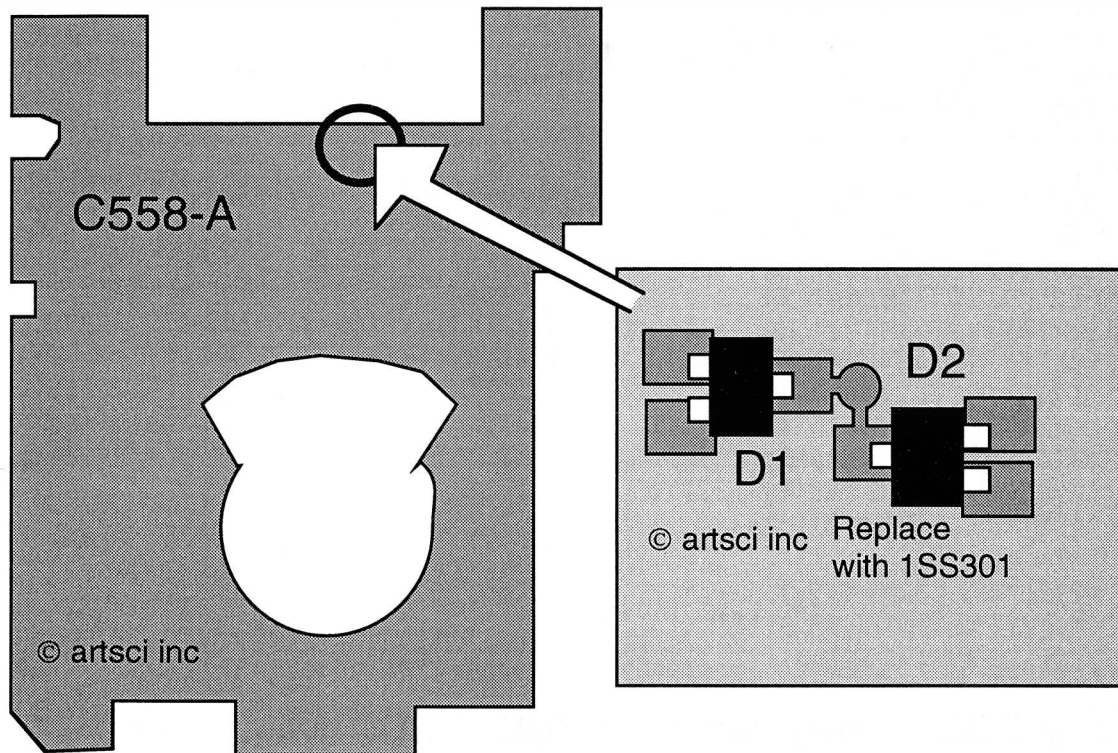
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STANDARD C558A

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 display.
4. Locate and remove chip diode D2. (see drawing)
5. **Attach a 1SS301 chip diode** in the vacant D2 position.
6. Reassemble the radio.
7. Reset the microprocessor, if required.



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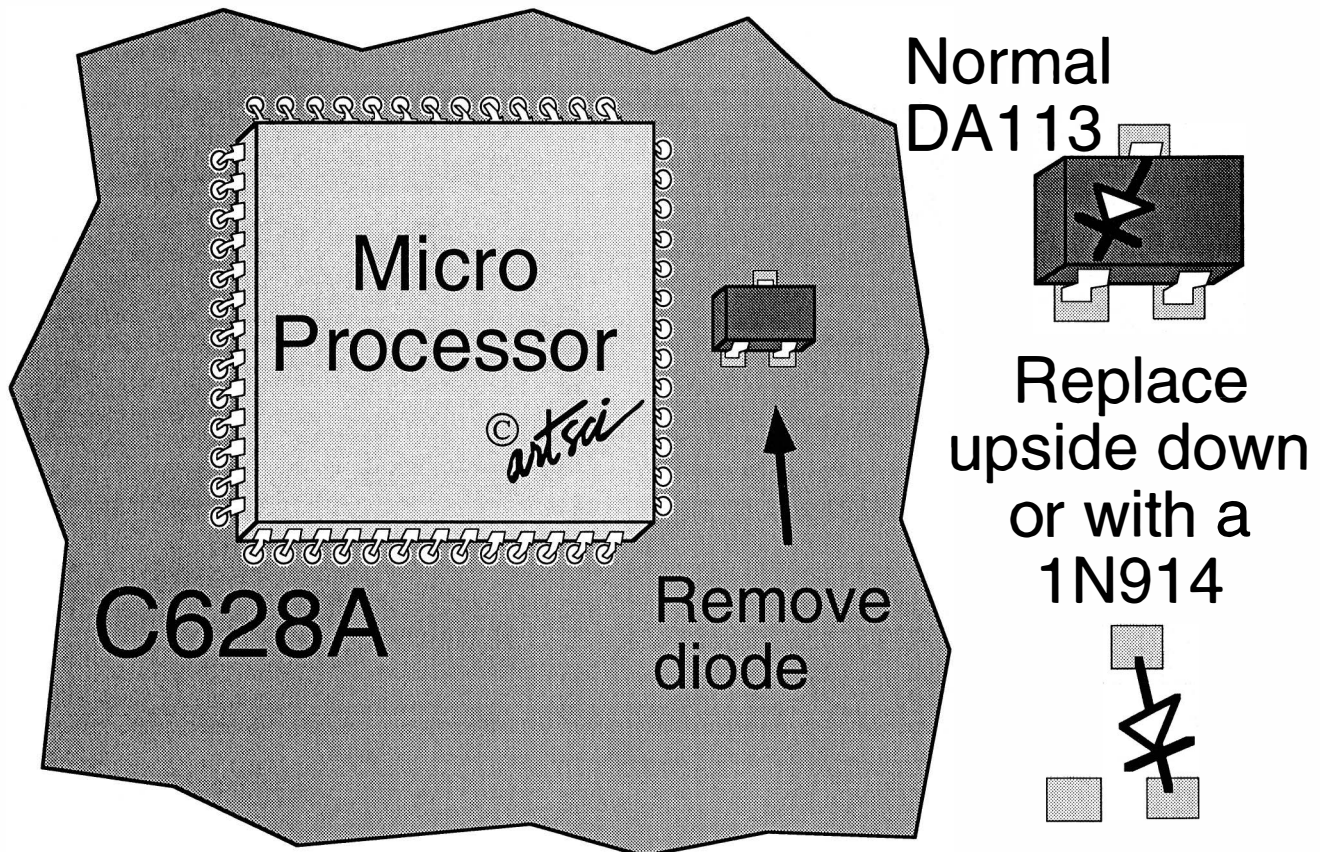
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STANDARD C628A

EXPANDED RX

1. Remove Battery and antenna.
2. Locate and remove body screws and open the case.
3. Locate Microprocessor.
4. Locate DA113 chip Diode. (see drawing)
5. Remove the chip Diode.
6. Reinstall the Diode upside down or with a 1N914 diode.
7. Reassemble the radio.
8. Reset the microprocessor if required. (see owners manual)



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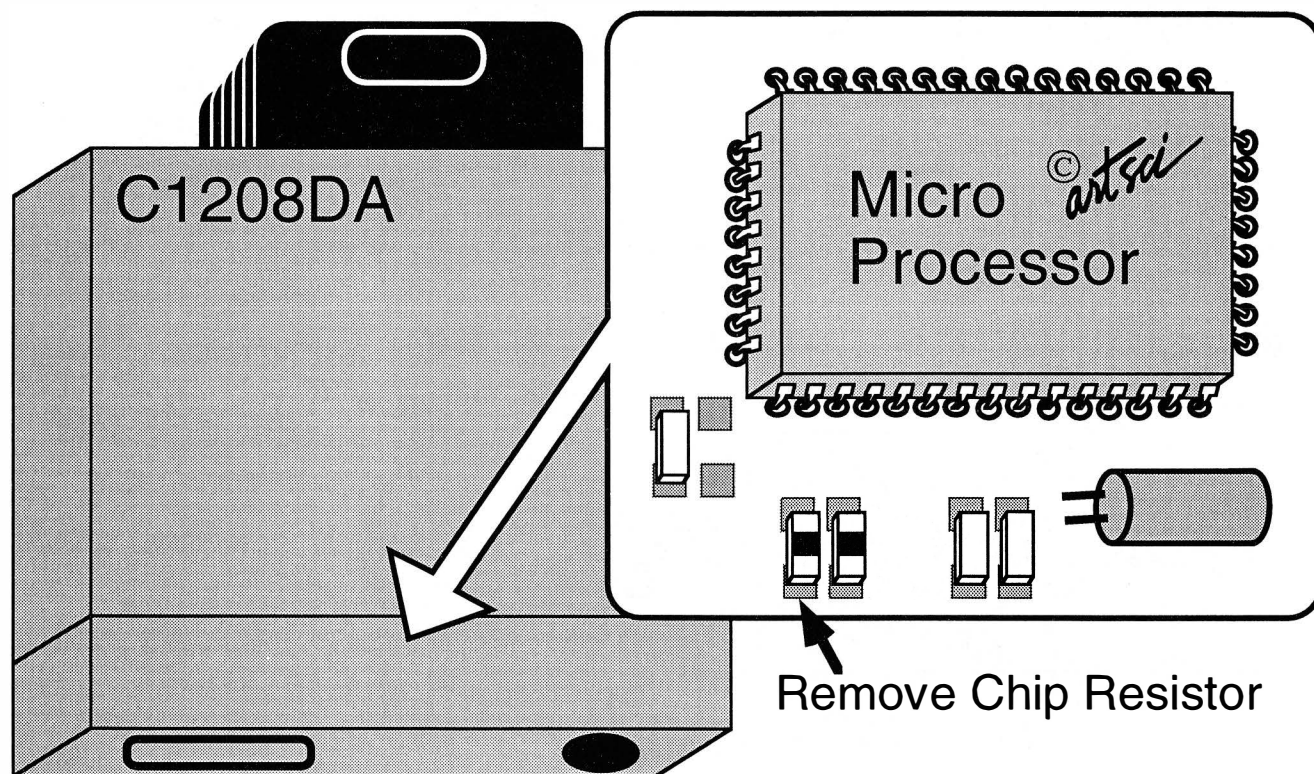
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STANDARD C1208DA

EXPANDED RF

1. Remove power and antenna.
2. Remove four screws and open top cover.
3. Locate microprocessor.
4. Locate chip resistor. (see drawing)
5. Remove chip resistor using caution not to melt the front case plastic.
(YOU MAY WISH TO REMOVE THE FRONT CASE FOR CLEARANCE)
6. Reassemble the radio.
7. Reset the microprocessor if required.



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STANDARD C5608DA

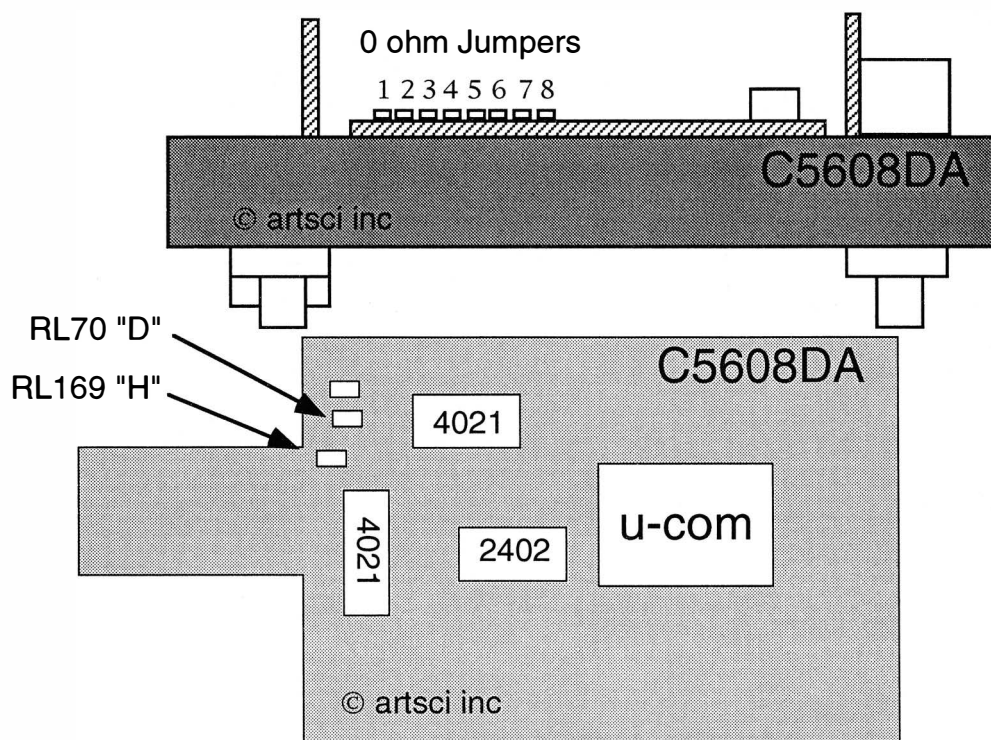
EXPANDED RF

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)



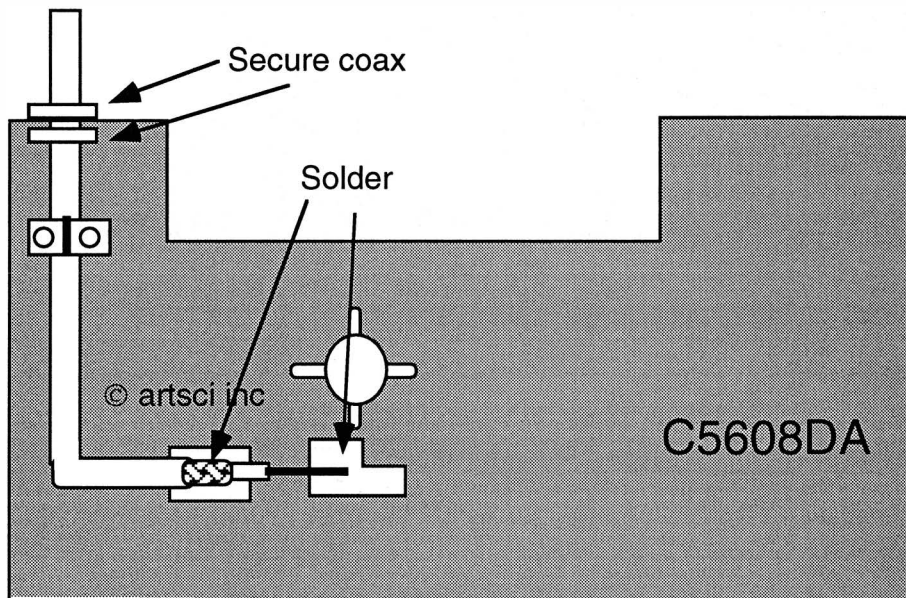
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STANDARD C5608DA

800 MHz Modification

1. Remove power and antenna.
2. Remove covers
3. Remove black tape patch under the VHF antenna connector.
4. Remove cover from transmitter (5 screws)
5. Remove screws securing the red and black power wires.
6. **Solder attach the new antenna coax** as shown.
7. Secure the coax using wire ties or other method.
8. Replace the power cable screws.
9. Replace the covers.



800 MHz activation:

Select 440 as the main band.

Press [UP] button while pressing the rotary switch

Press [UP] button while pressing the [FUNCTION] button.

To Return to 440 - Press [DOWN] while pressing [FUNCTION] button.

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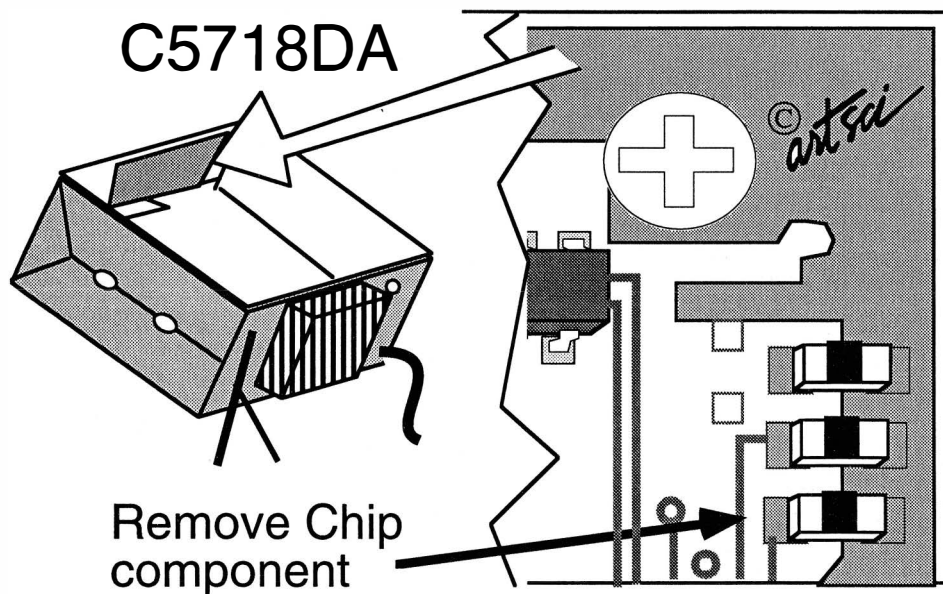
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STANDARD C5718DA

Expanded RF

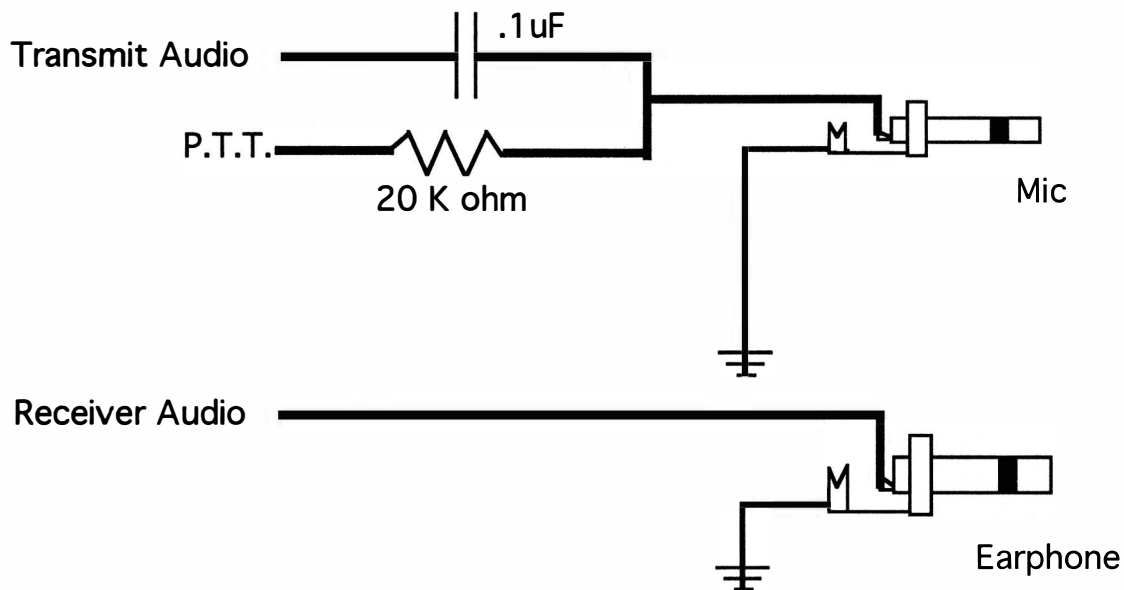
1. Remove power and antenna.
2. Remove four screws and remove top cover.
3. Locate vertical board on the front of the radio.
4. Locate three BLUE chip resistors. (Right side of connector labled "CTD")
5. **Remove lower most chip resistor** (see drawing)
6. Reassemble the radio
7. Reset the microprocessor. (see owners manual)



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STANDARD HT TNC Hookup



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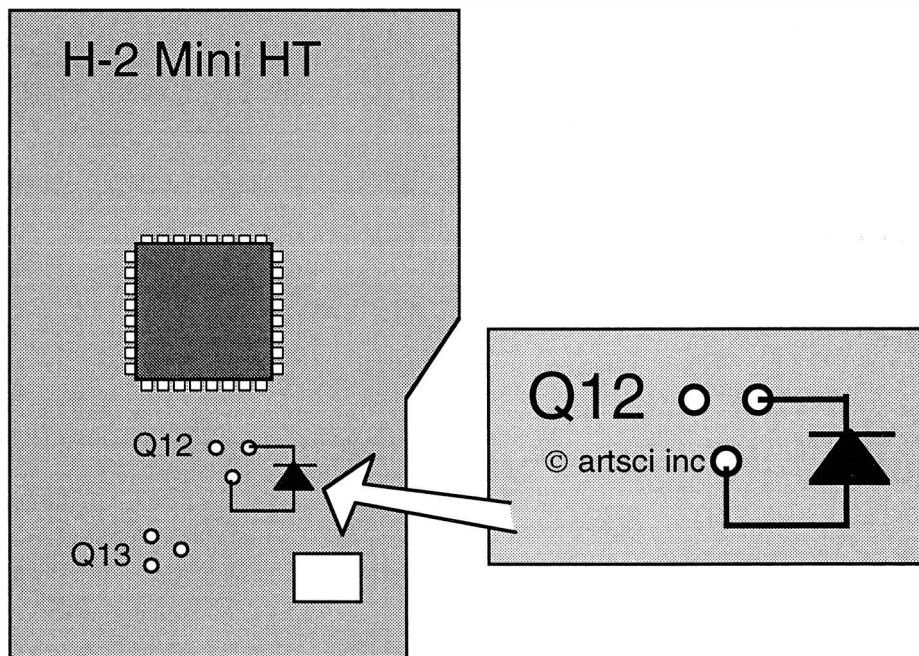
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HEATH H-2 Mini HT

EXPANDED RF
130 - 169.995 MHz

1. Remove battery and Antenna.
2. Remove 2 lower screws from the battery plate.
3. Remove 2 screws securing the 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.
7. Reset the microprocessor.



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Performance Report

Radio _____

Date _____

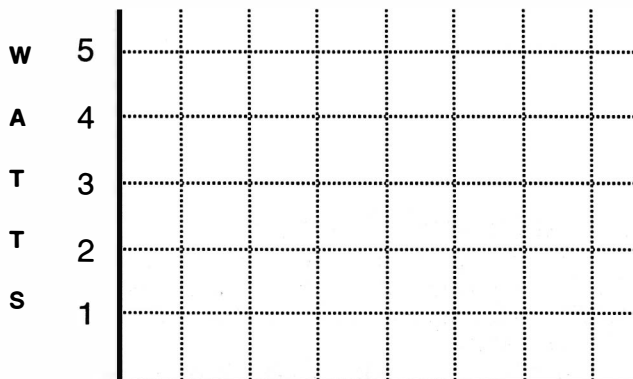
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Address _____

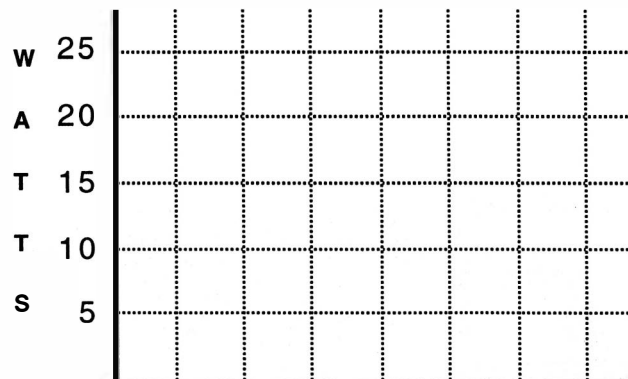
City _____ St. _____ Zip _____

Phone () - _____

Description	Before	After
Power out (Low)	_____ Watts	_____ Watts
Power out (High)	_____ Watts	_____ Watts
Frequency Error (Simplex)	_____ Hz	_____ Hz
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



Frequency



Frequency

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 the 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.



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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.



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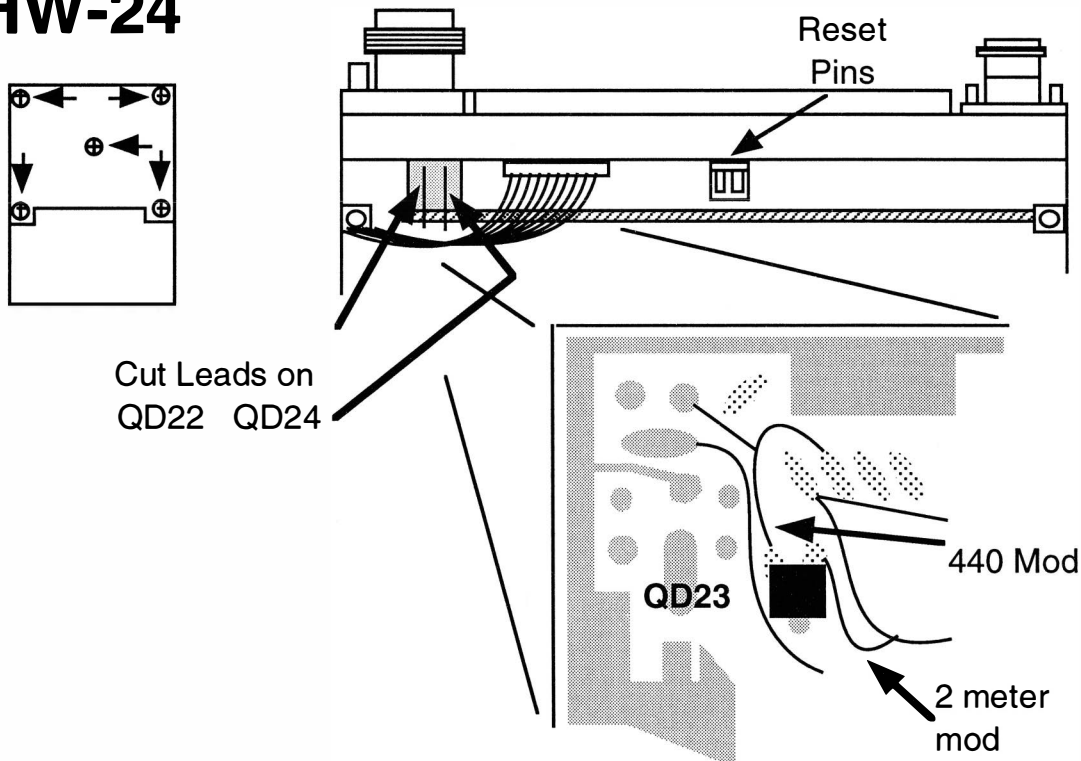
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HEATH HW-24

EXPANDED RF

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

HW-24



MORE ---

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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 Selector 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



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HEATH SB-1400

EXPANDED RF

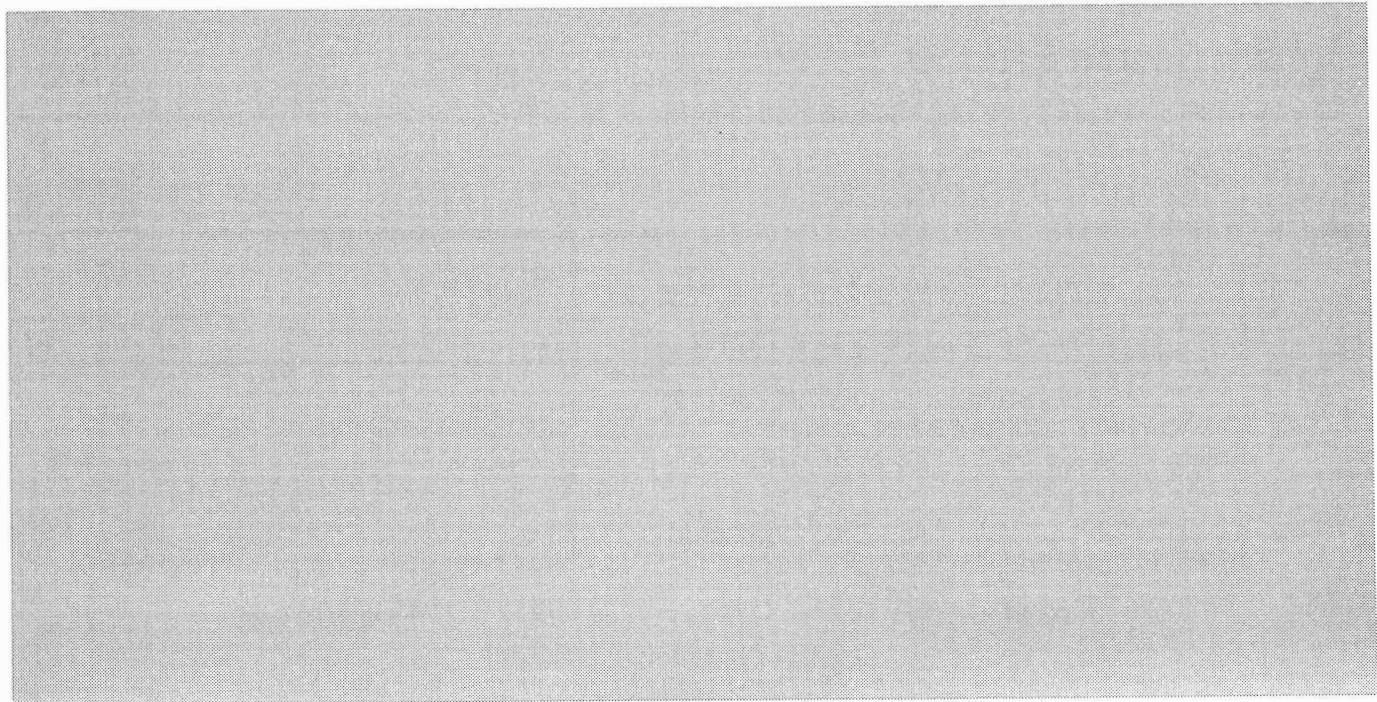
1. Remove power and Antenna.
2. Remove screws and open the case.
3. Locate the BROWN jumper wire on the display unit.
4. **Cut the BROWN jumper wire.**
5. Reassemble the radio.
6. Reset the microprocessor.
(Set VFO at 12.3456 MHz, Turn power off and on again)

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Lined area for notes.



Performance Report

Radio _____

Date _____

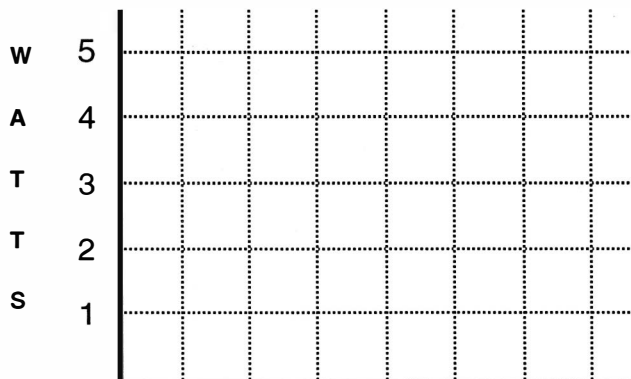
Owner : Name _____

Address _____

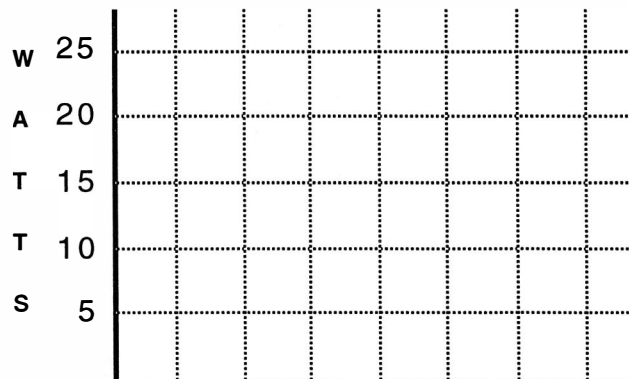
City _____ St. _____ Zip _____

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



Frequency

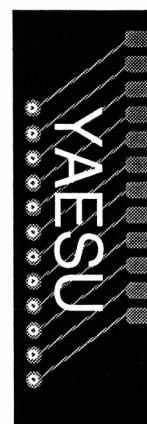


Frequency

Radio / Tech Modifications

YAESU Radio Modifications

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Radio / Tech Modifications

YAESU Radio Modifications

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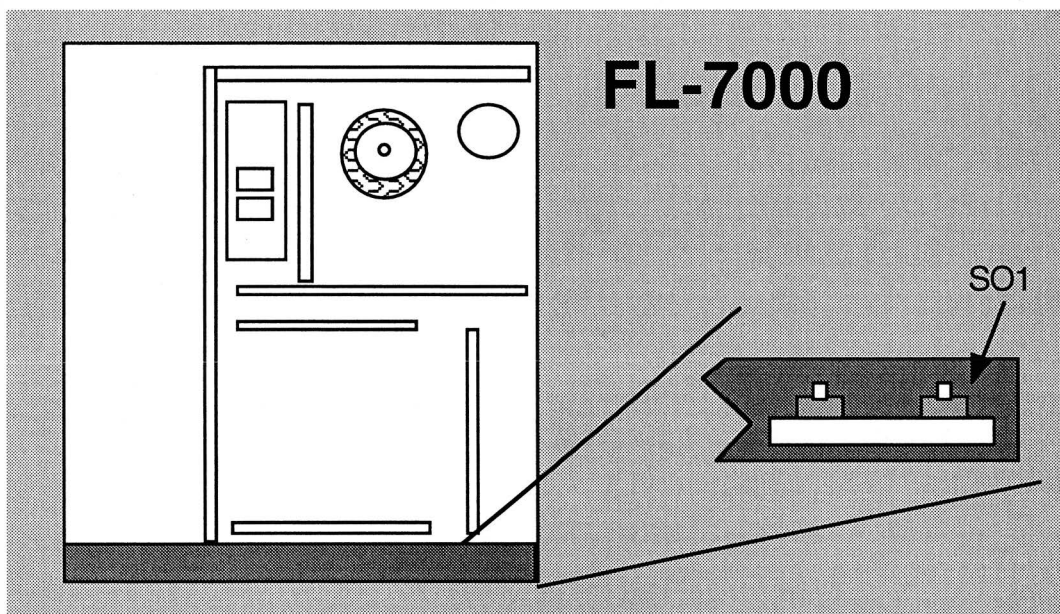
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YAESU FL-7000

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.



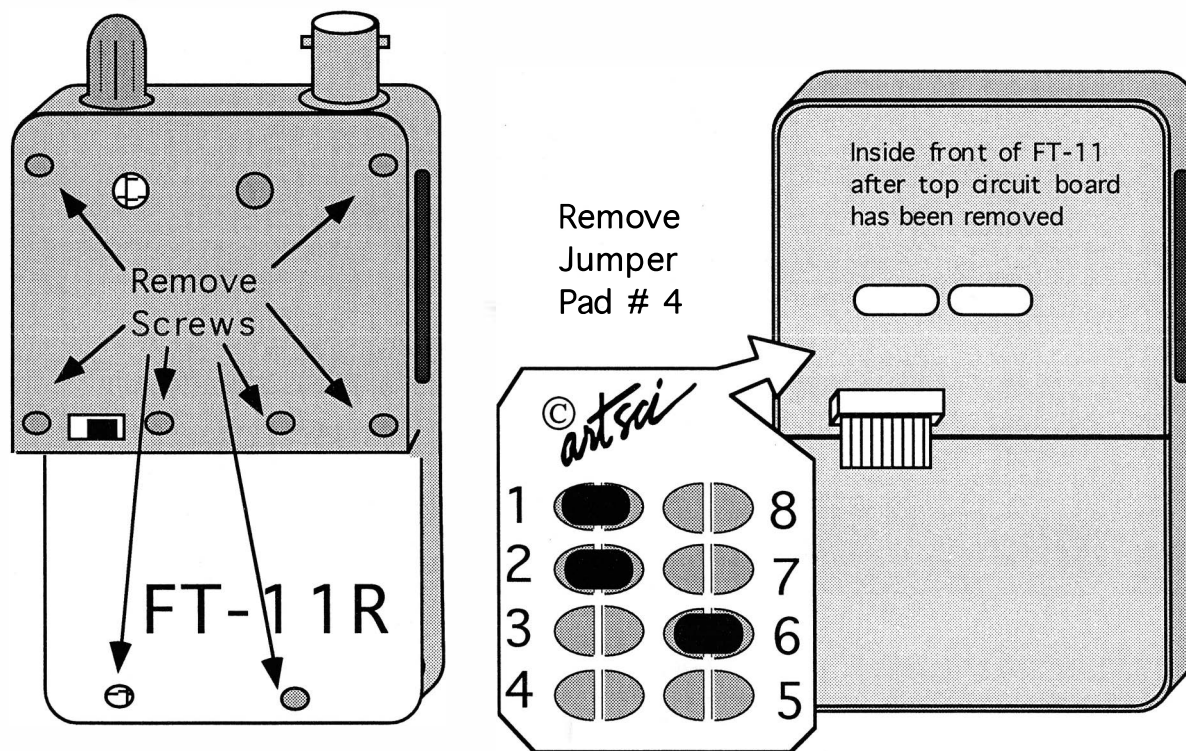
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YAESU FT-11R

EXPANDED RF/ Squelch adjustment

1. Remove Battery and Antenna & belt clip.
2. Remove Screws from the back of the radio. See Drawing.
(note location of battery release & hand strap clip, they will fall out)
3. Open radio and remove silver battery shield.
4. Remove two silver screws from top circuit board (below speaker/mic connector)
5. Gently pry top and bottom circuit boards apart.
6. Locate and **remove solder from pad #4.**
7. Reassemble the radio. Remember the battery clip and hand strap clips.
8. Reset the microprocessor.
(Press and hold [UP] & [DOWN] arrow keys and turn the radio on.)



Squelch adjustment -

Press and hold [CALL], [UP vol] & [DOWN vol] and turn the radio on.
 Press [UP MHz] button 3 times. The display will show SQL TI.
 Inject a signal or tune to a strong signal (weather channel etc.)
 Press [F] Button for 1/2 second this sets the level. ("AD" will blink on display)
 Press the [MR] key to set the level
 Press [CALL] to store the level in EEPROM memory.

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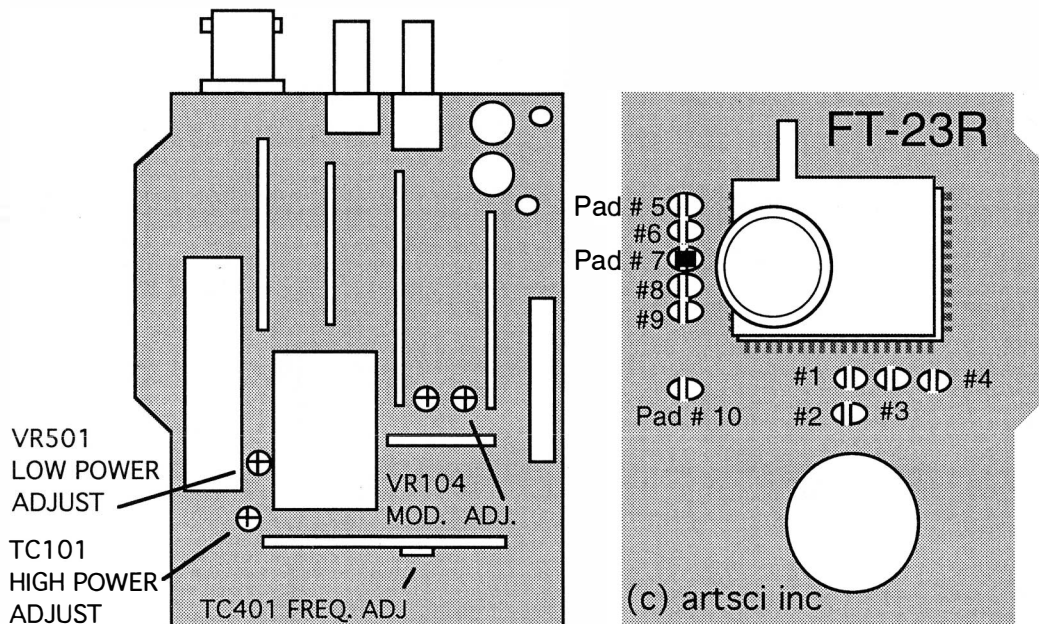
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YAESU FT-23R

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

- Repeater Offset control:
1. PRESS AND HOLD [RPT] & TURN ON THE RADIO.
 2. DIAL OFFSET & PRESS [RPT]



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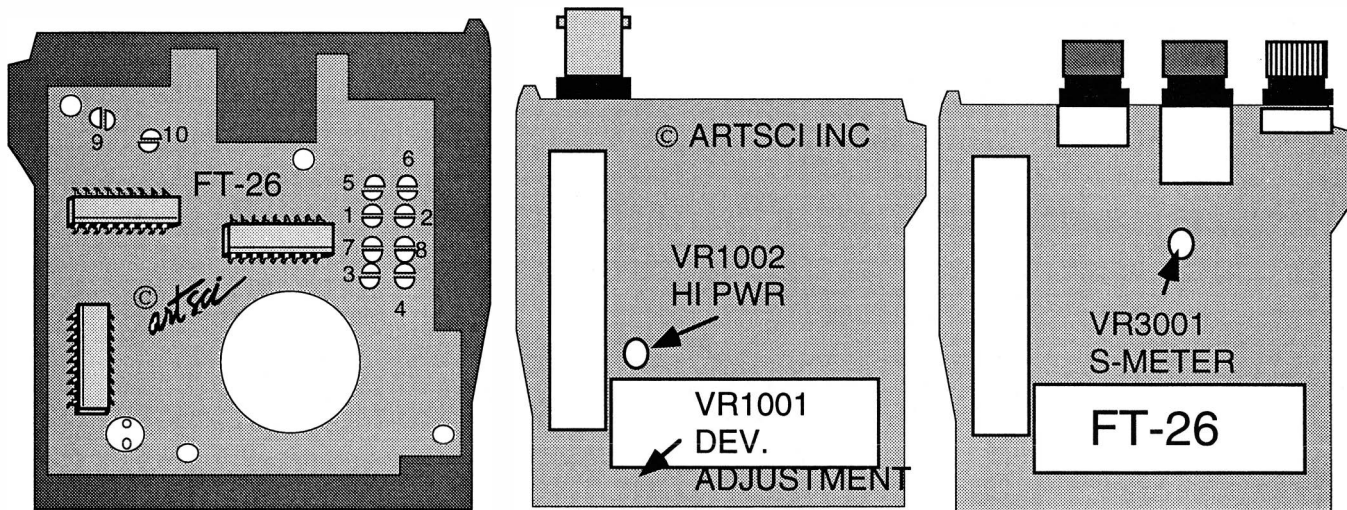
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YAESU FT-26

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

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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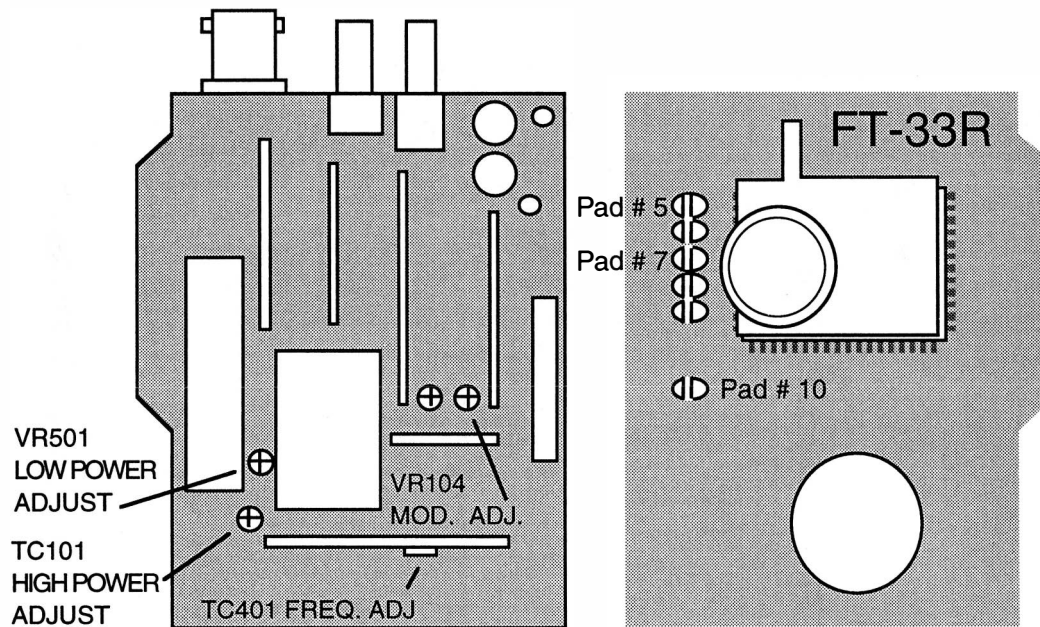
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YAESU FT-33R

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.

- Repeater Offset control:
1. PRESS AND HOLD [RPT] & TURN ON THE RADIO.
 2. DIAL OFFSET & PRESS [RPT]



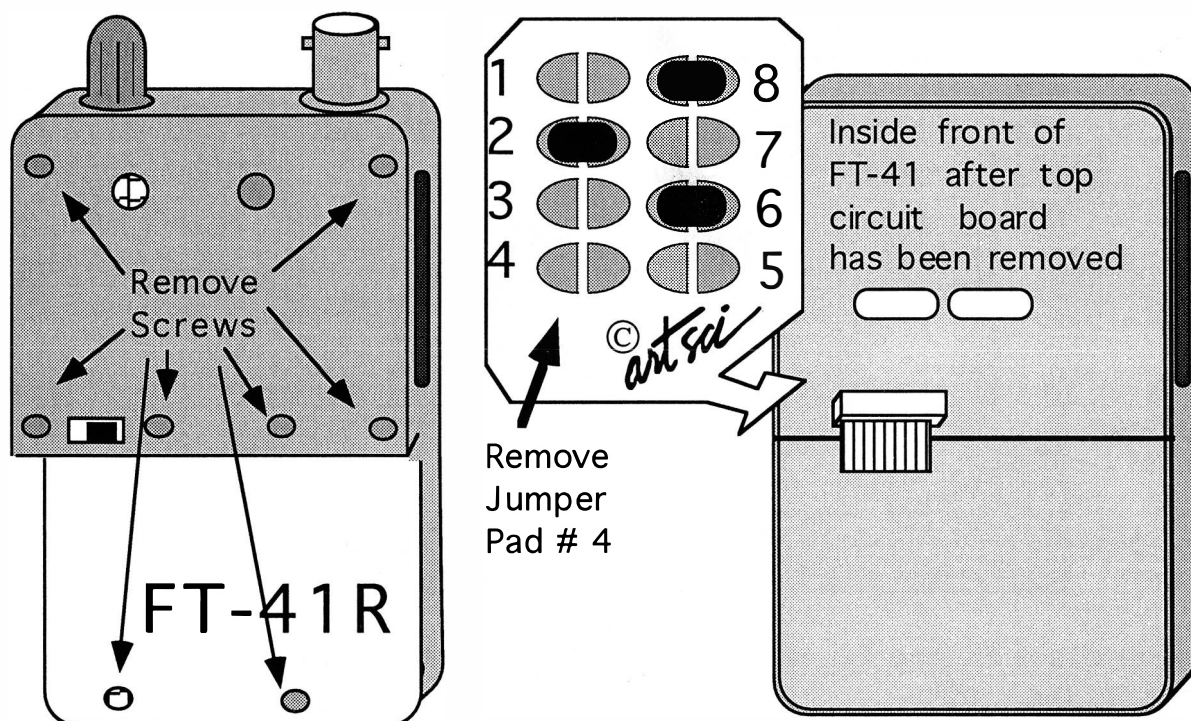
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YAESU FT-41R

EXPANDED RF/ Squelch adjustment

1. Remove Battery and Antenna & belt clip.
2. Remove Screws from the back of the radio. See Drawing.
(note location of battery release & hand strap clip, they will fall out)
3. Open radio and remove silver battery shield. (Hand strap clip & batt release will fall out.)
4. Remove two silver screws from top circuit board (below speaker/mic connector)
5. Gently pry top and bottom circuit boards apart.
6. Locate and **remove solder from pad #4.**
7. Reassemble the radio. Remember the battery clip and hand strap clips.
8. Reset the microprocessor.
(Press and hold [UP] & [DOWN] arrow keys and turn the radio on.)



Squelch adjustment -

Press and hold [CALL], [UP vol] & [DOWN vol] and turn the radio on.
 Press [UP MHz] button 3 times. The display will show SQL T1.
 Inject a signal or tune to a strong signal (weather channel etc)
 Press [F] Button for 1/2 second this sets the level. ("AD" will blink on display)
 Press the [MR] key to set the level
 Press [CALL] to store the level in EEPROM memory.

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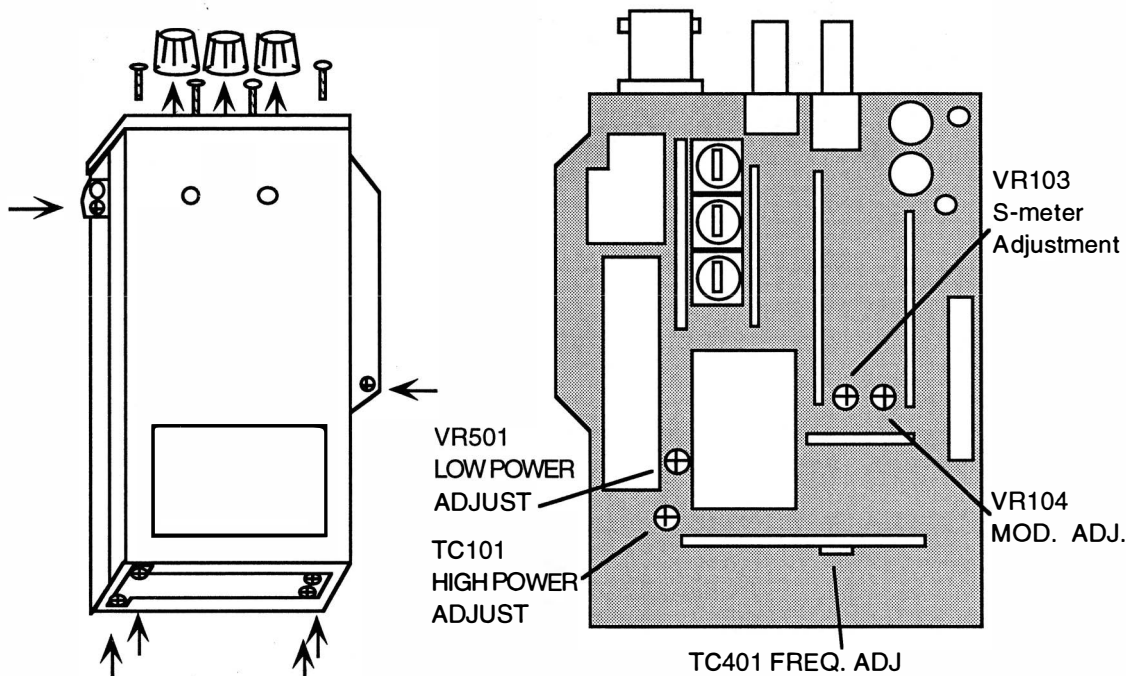
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YAESU FT-73R

ALIGNMENT CONTROLS

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



Repeater Offset control:

1. PRESS AND HOLD [RPT] & TURN ON THE RADIO.
2. DIAL OFFSET & PRESS [RPT]



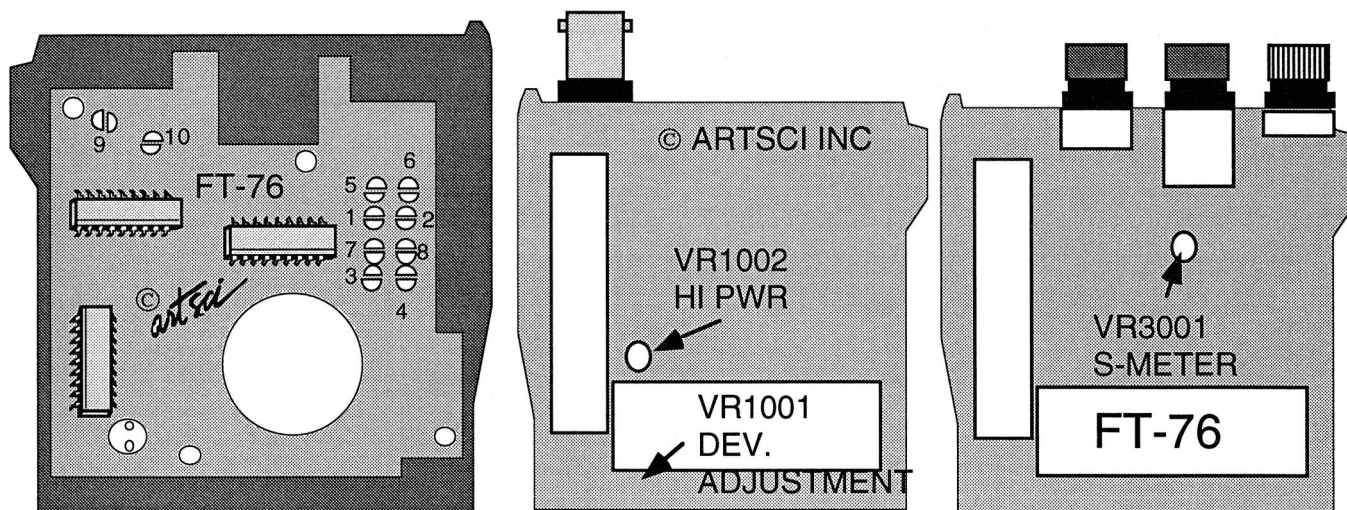
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YAESU FT-76

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, 5, 8, 9 and 10** (old mod had pad 4 in place of 5)



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

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 / Untested Mods

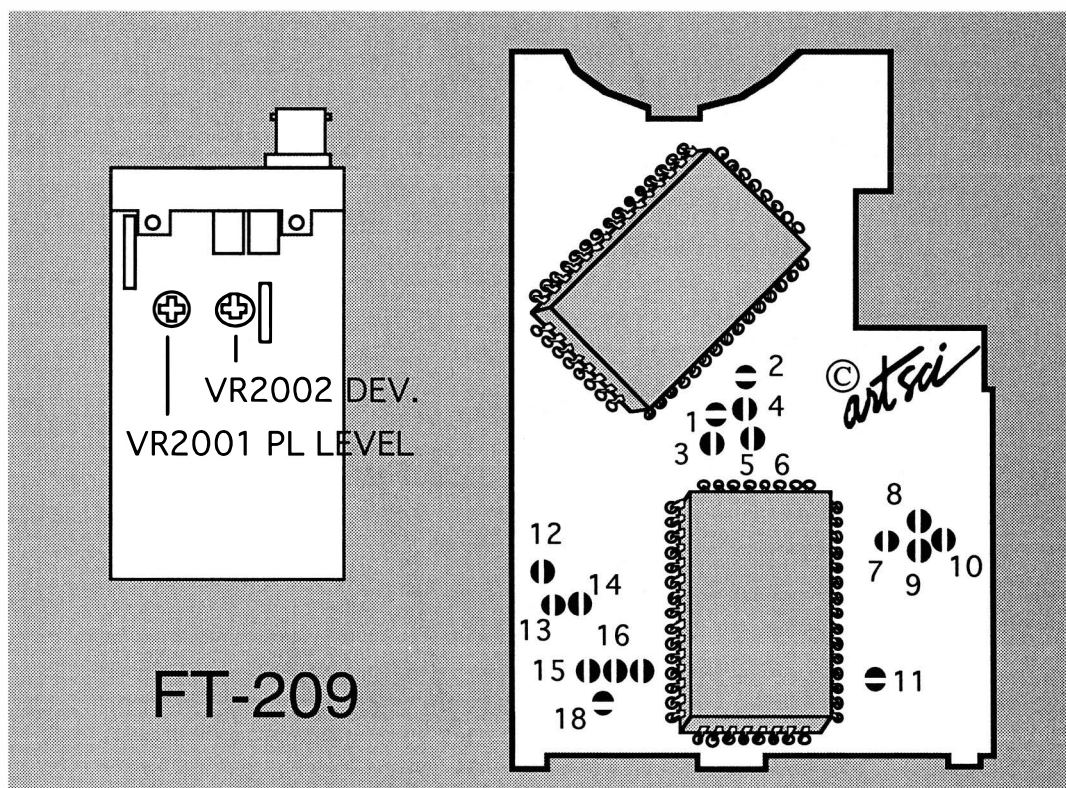
1. Remove battery and antenna.
2. Remove battery screws, belt clip screws and side strap screws.
3. Remove black trim on sides of the radio.
4. Remove the two side screws and slide the u-shaped back cover off.
5. Remove the four tiny Phillips screws holding the front panel on.
6. Fold panel to the right to open the radio.

Untested out of band mod #1: **Jumper pads 1,7,9,10 & 13.**

Untested out of band mod #2: **Jumper pads 7,9,10,11& 13.**

Factory default is pads 1,9 & 13.

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



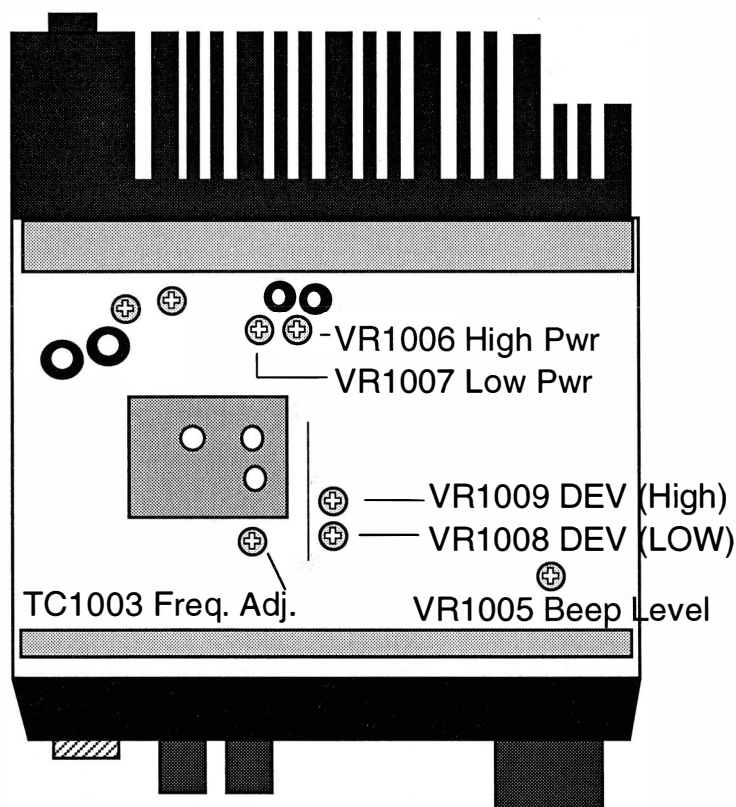
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YAESU FT-211

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.



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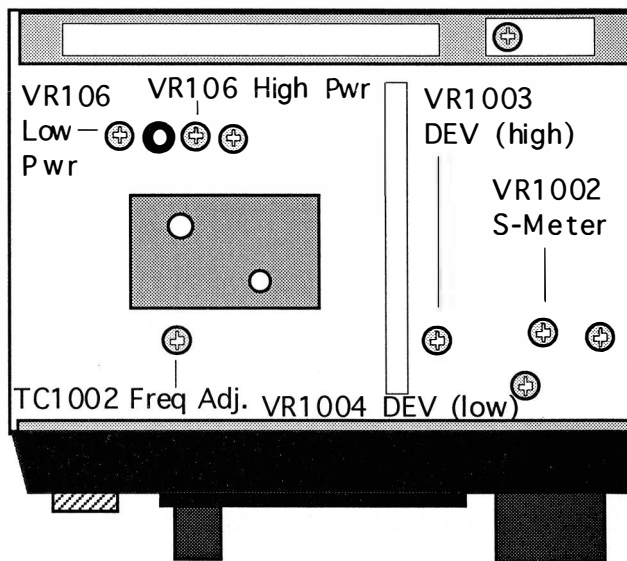
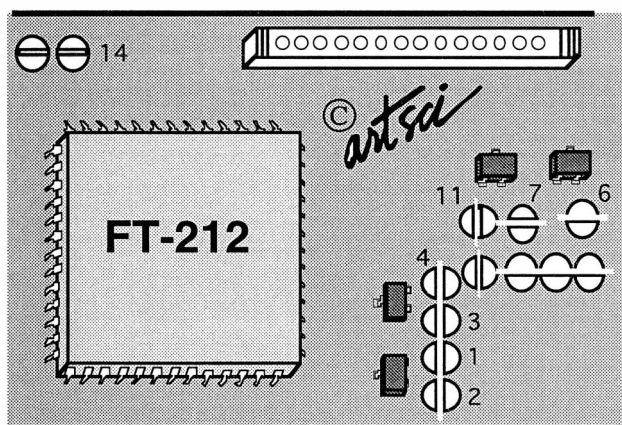


YAESU FT-212

EXPANDED RF

Auto Repeater offset is lost. New range 140 - 164 MHz

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.



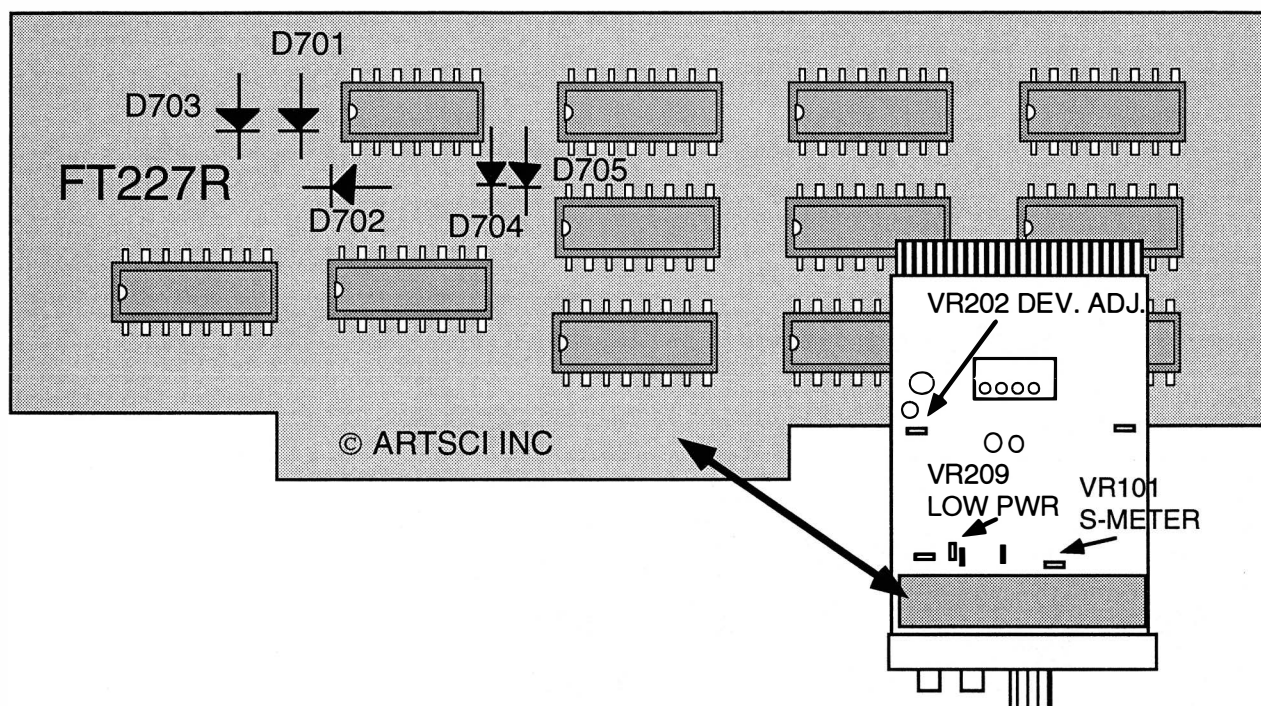
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YAESU FT-227R

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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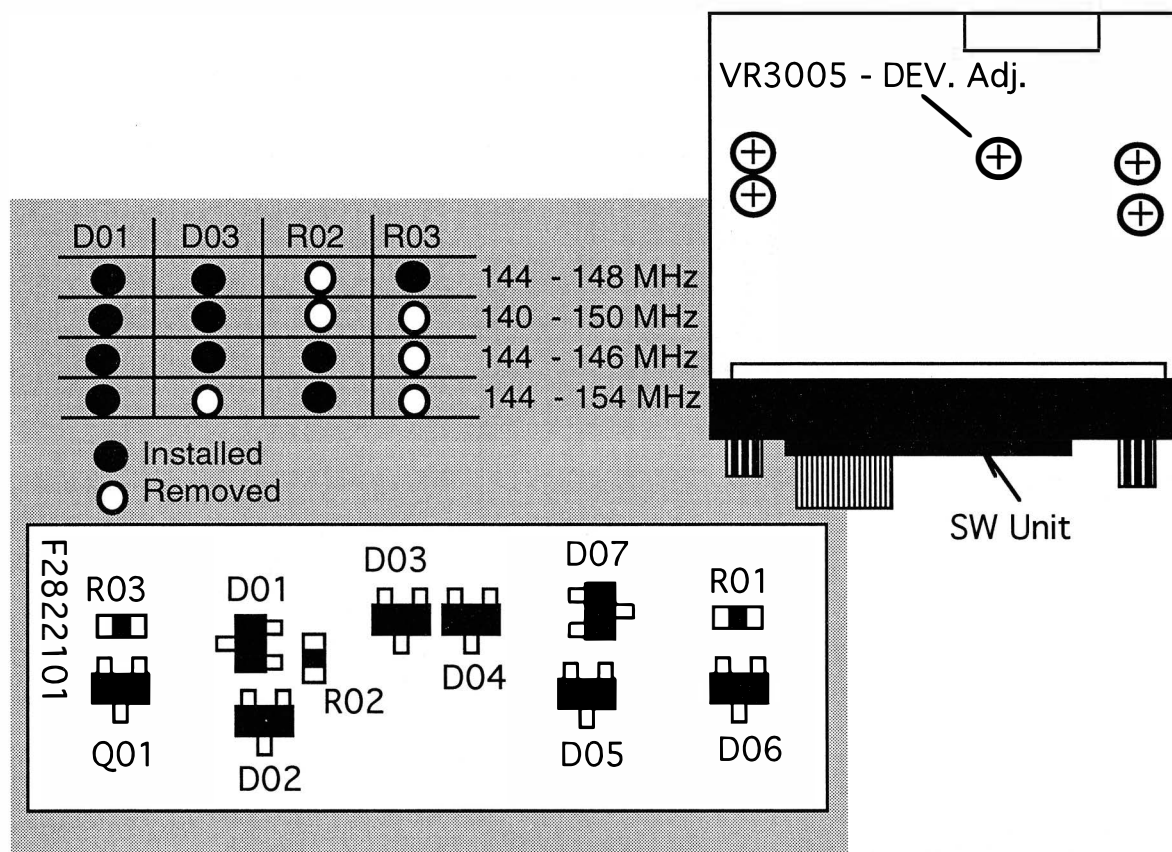
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YAESU FT-290 MKII

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.



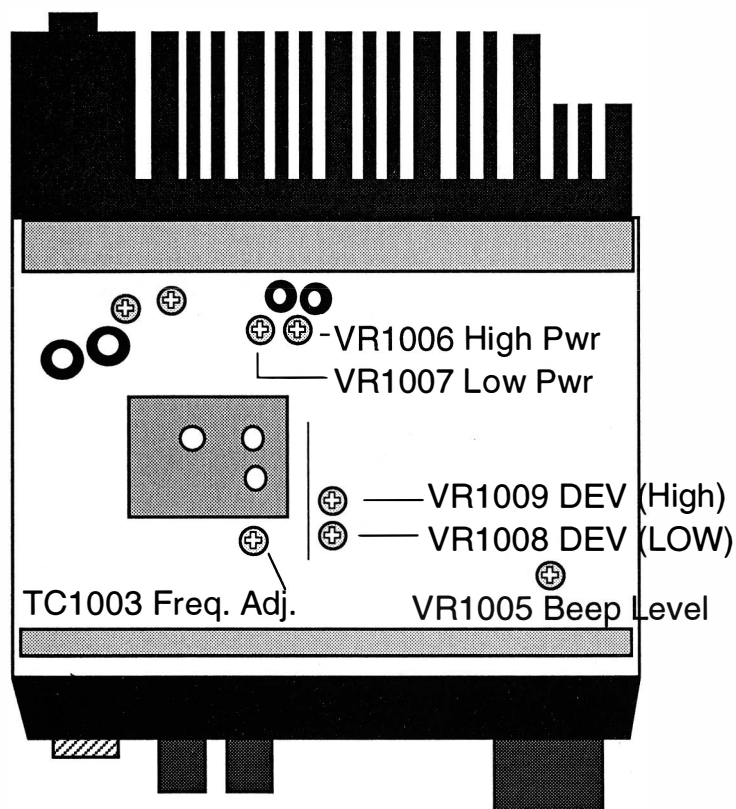
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YAESU FT-311

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.



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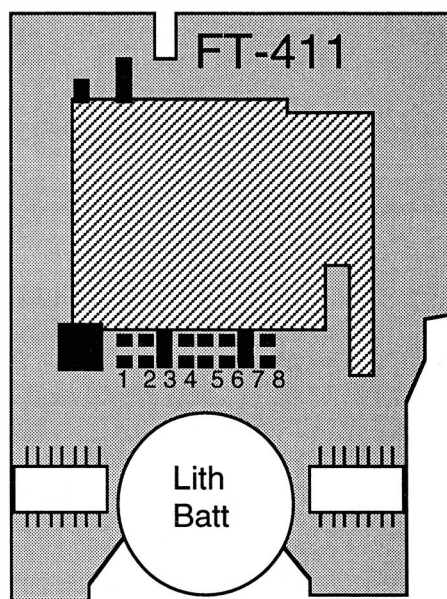
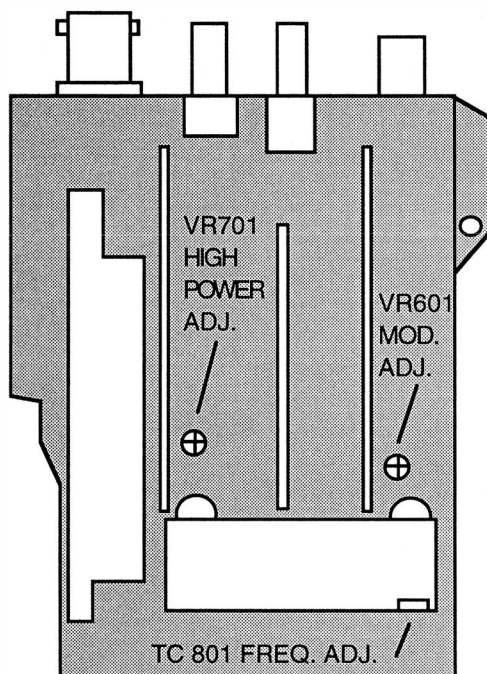


YAESU FT-411 E

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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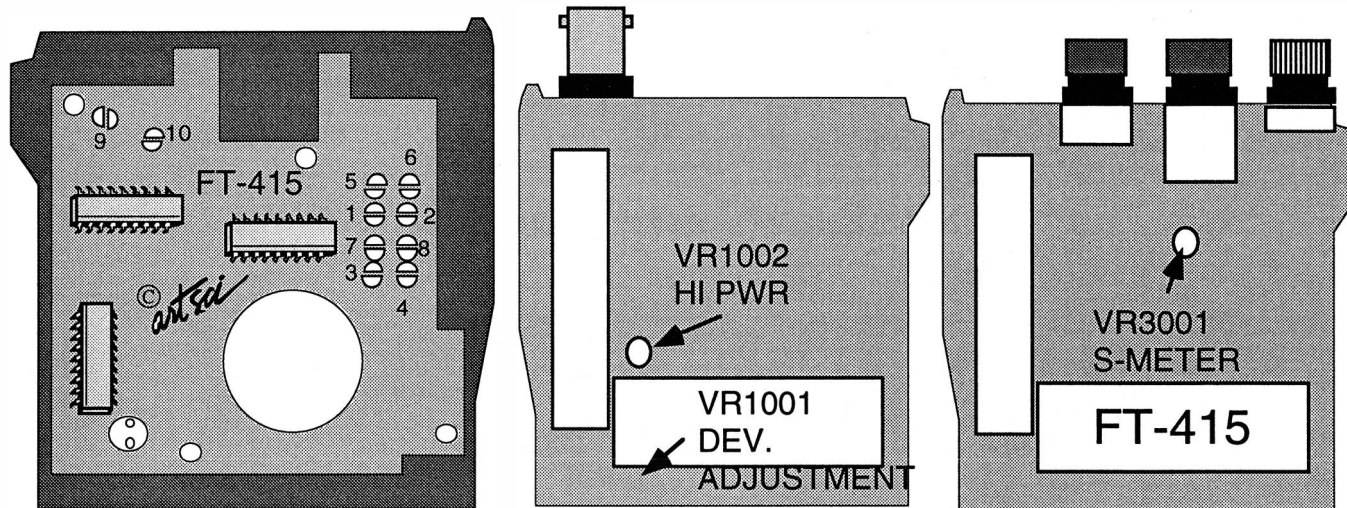
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YAESU FT-415

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 through the memory channels.
Enter the following band limits:
10. Press [F] [7] and select 5 kHz channel spacing in each VFO.

Master Reset Command: Press and hold [MR] & [2] & [VFO] and turn power on, then enter new 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)

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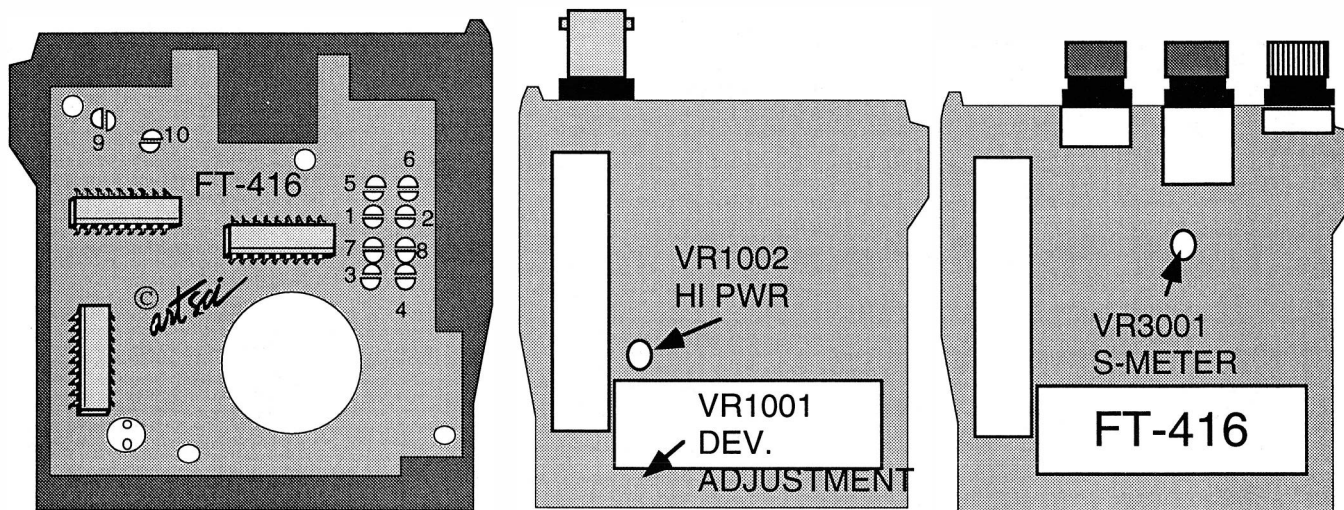


YAESU FT-416

EXPANDED RF

Range : 123 - 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 jumped.
(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 through 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)
10. Press [F] [7] and select 5 kHz channel spacing in each VFO.

Master Reset Command: Press and hold [MR] & [2] & [VFO] and turn power on, then enter new limits



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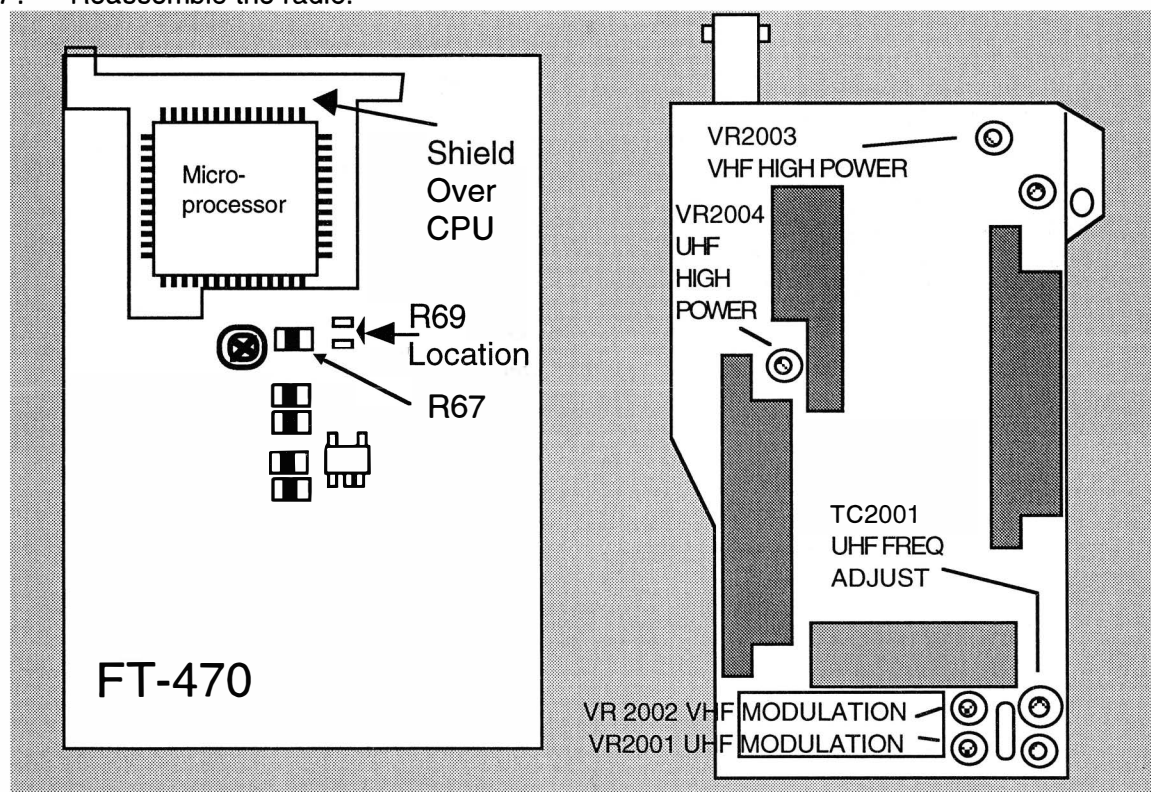
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YAESU FT-470

EXPANDED RF & ALIGNMENT POINTS

THERE IS NO MODIFICATION FOR TRANSMIT EXPANSION ABOVE 449.995 MHz

1. Remove Battery and Antenna.
2. Remove control knobs, screws, top panel & body screws and open Radio
3. Carefully unsolder the lithium battery and lift it to expose resistor position .
4. **Solder a Jumper or 0 ohm resistor(or jumper) in the empty R69 position.**
5. 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.
6. Solder the lithium battery back in place.
7. 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 up 1 MHz at a time until the display reads 400 MHz.
19. Press and hold the [Function] key until your hear two beeps.
20. Rotate the dial knob until the "L" memory channel is displayed.
21. Press the [Function] key to store the frequency in memory.

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

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

Hyperscan Modification:

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



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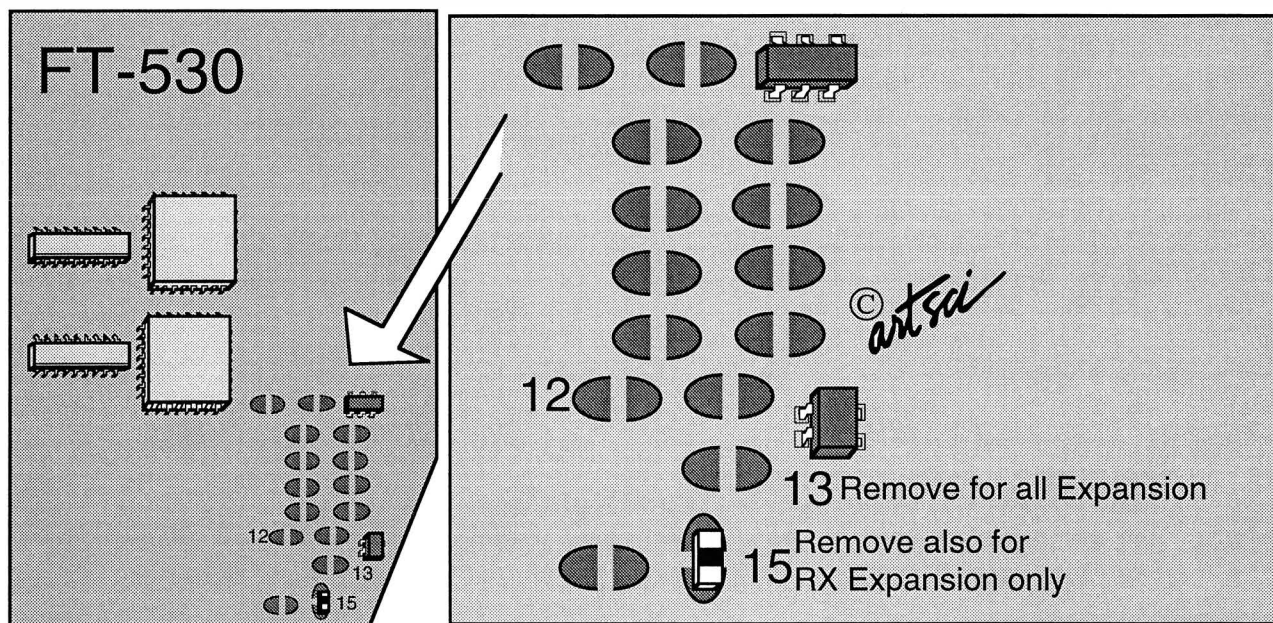
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YAESU FT-530

EXPANDED RF

NEW RANGE 110-180, 200-500 RX, 130-180, 400-470 TX

1. Remove battery and antenna.
2. Locate and remove the 4 screws on the bottom battery track.
3. Locate and remove the 4 black screws on the rear case.
4. Carefully open the front cover and open the radio.
5. Note location of white paper insulator and remove it. (Don't throw away)
6. **Locate jumpers location J13 and remove solder jumper.**
DO NOT DO BOTH JUMPER pads 13 & 15.
7. Replace the paper insulator making sure the ground tabs slide through insulator
8. Close radio being careful not to pinch any wires.
9. Replace all screws.
10. Replace battery and antenna.
11. **Press and hold both [UP] & [DOWN] arrow buttons and turn power on..**



TONE BURST - Jumper Pad # 12.

Stock Pads Soldered: 1, 3, 6, 8, 11, 13, 15

RX ABOVE 500 MHz: Put 300 in lower limit & 950 in upper limit.

Press [MR] [MR]. (a line will appear on the display below "L")
Enter in desired FREQ.

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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

Repeat the step above to return to Normal settings



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YAESU FT-709

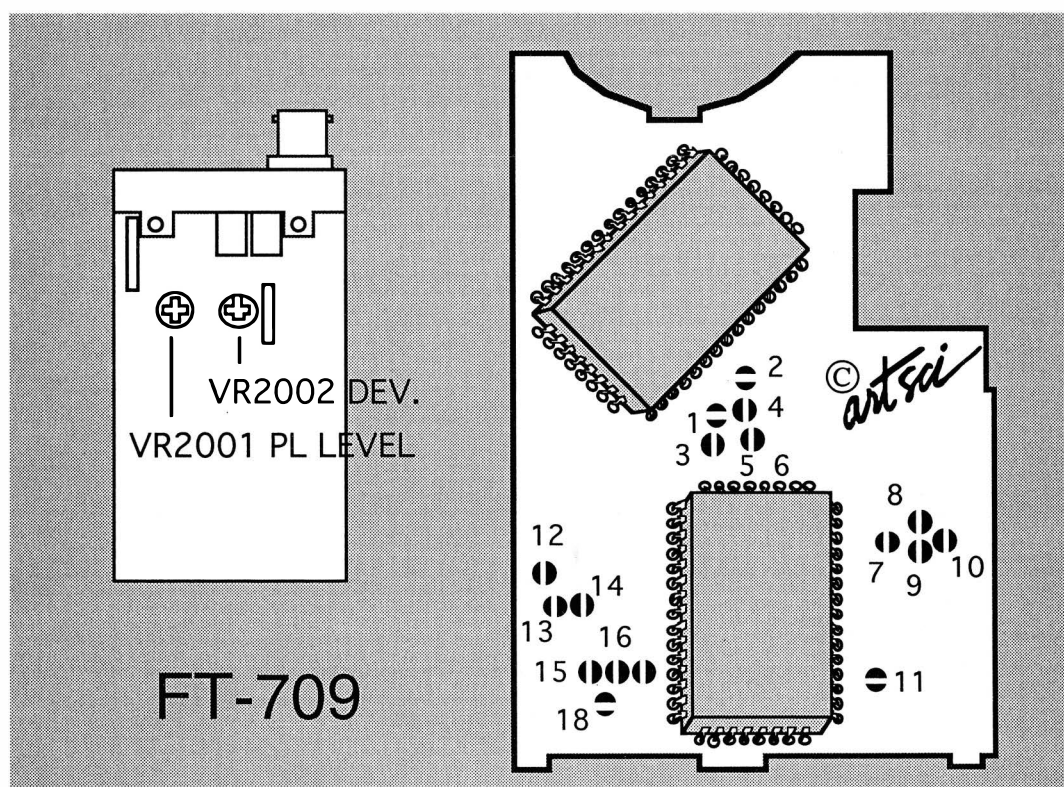
ALIGNMENT POINTS / Untested Mods

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

Untested out of band mod #1: **Jumper pads 1,7,9,10, 13 & 16.**

Untested out of band mod #2: **Jumper pads 7,9,10,1, 13 & 16.**

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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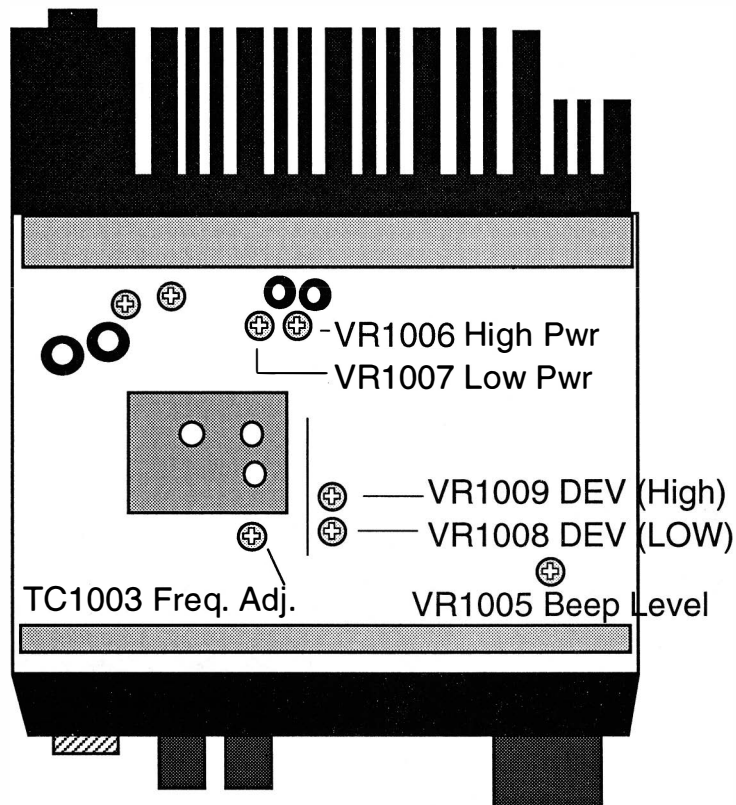
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YAESU FT-711

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.



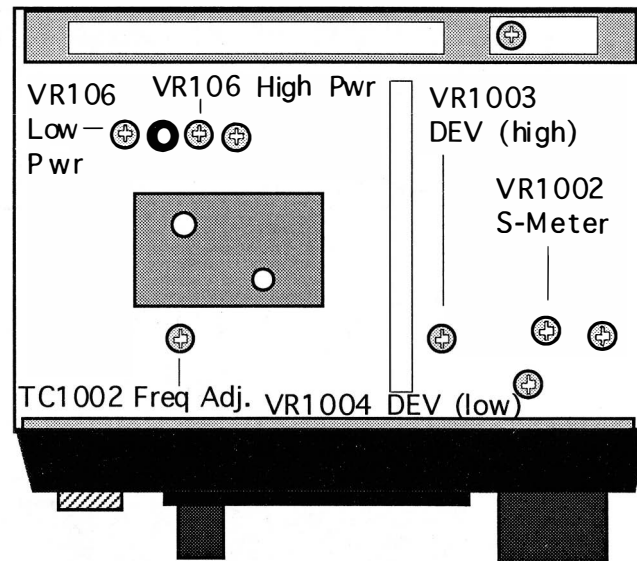
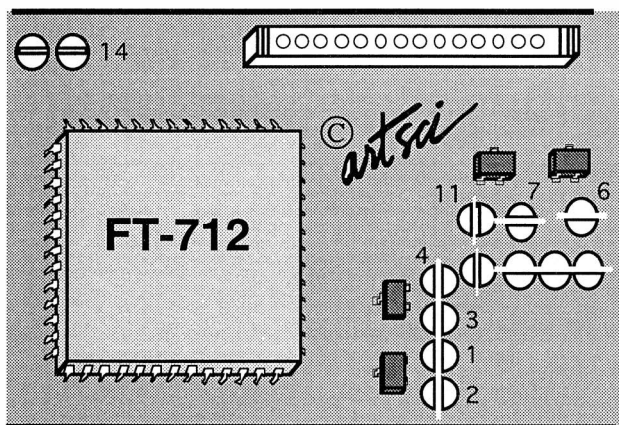
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YAESU FT-712RH

EXPANDED RF

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



RANGE: 430 MHz - 465 MHz

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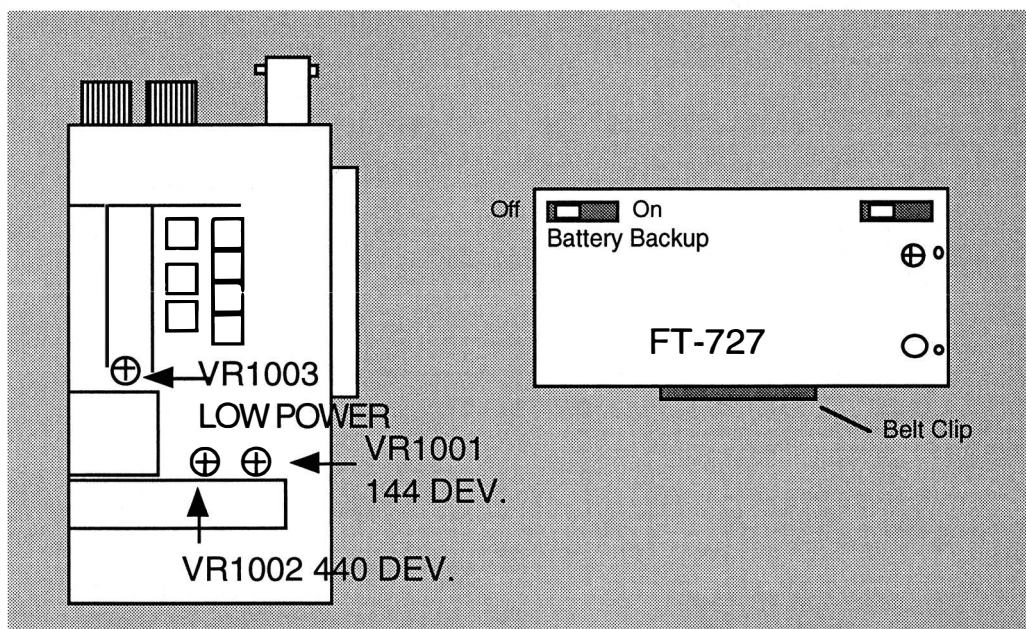


YAESU FT-727

(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.



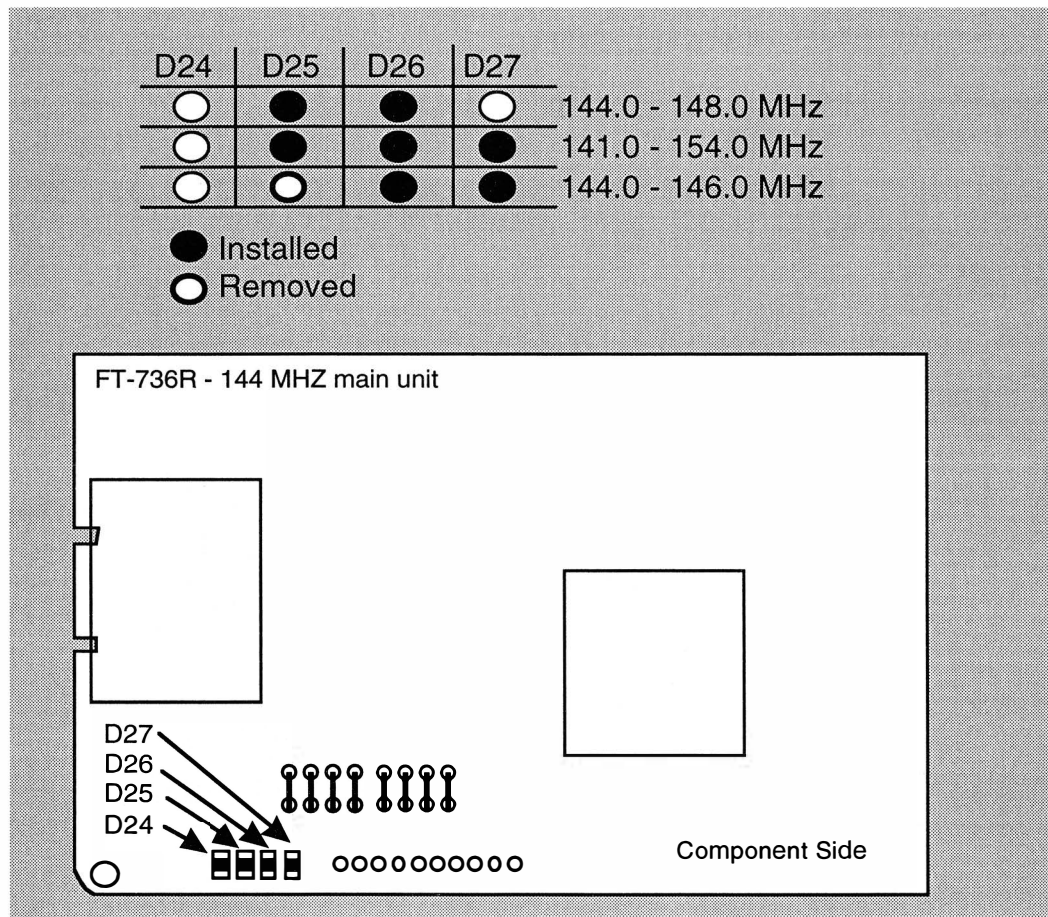
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YAESU FT-736R

EXPANDED RF

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



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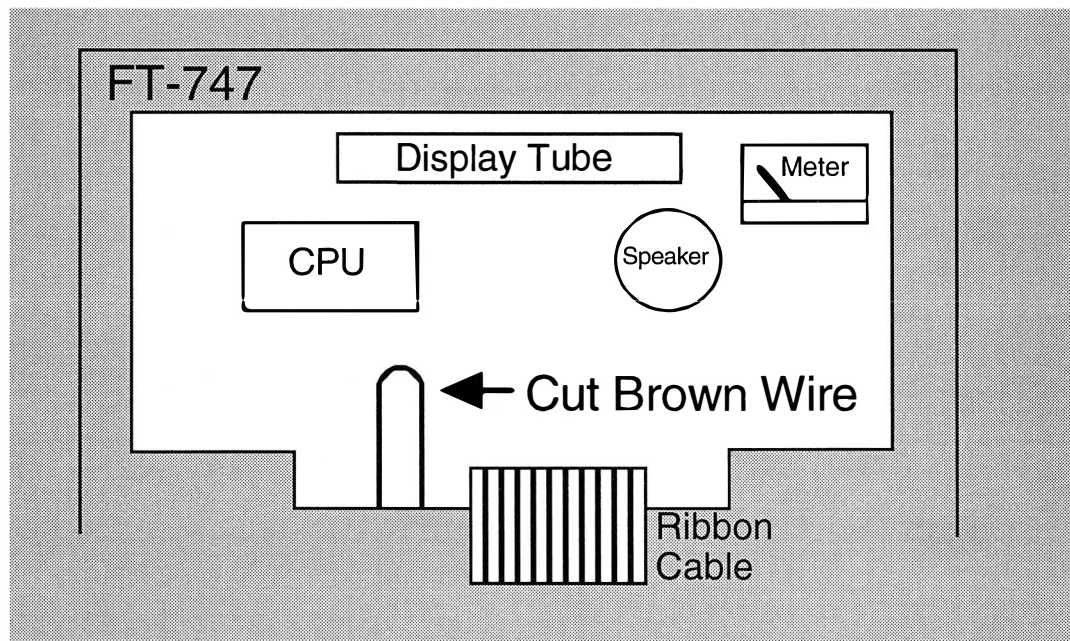
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YAESU FT-747

EXPANDED RF

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



New Range .5 - 30 MHz



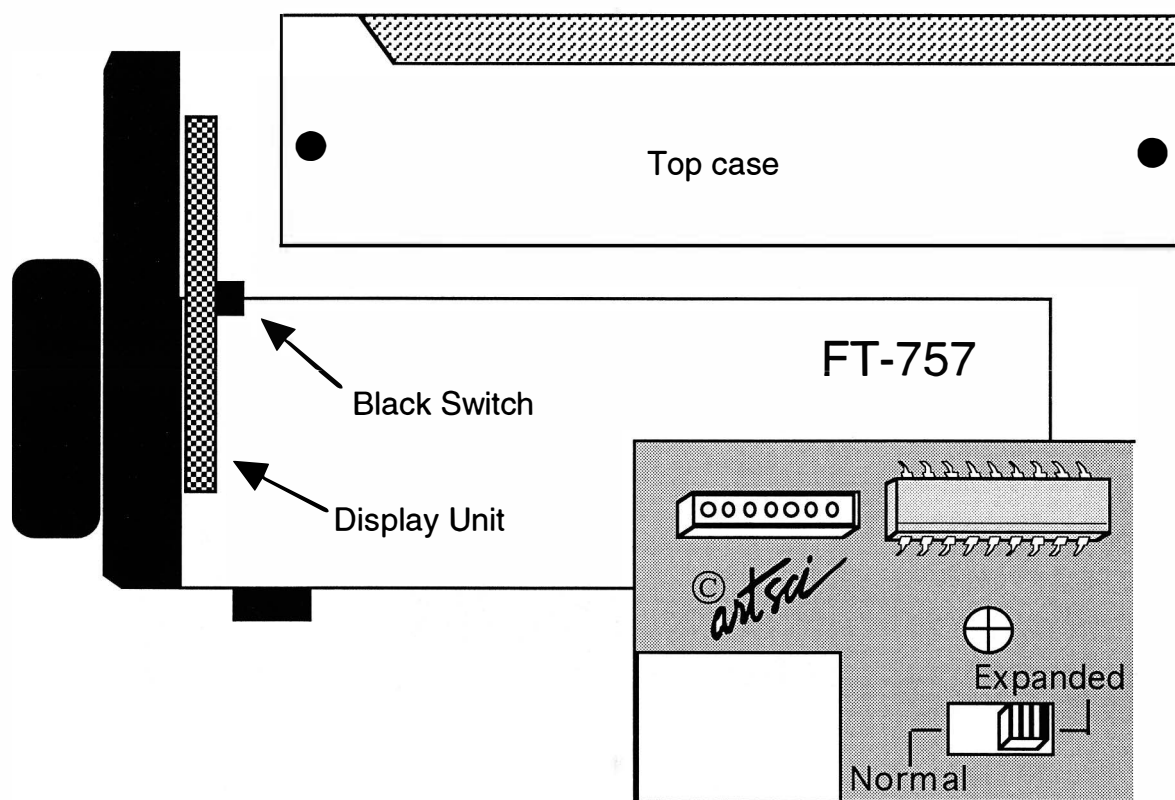
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YAESU FT-757GX & FT 757GX II

EXPANDED RF

1. Unplug the DC power cable from the radio.
2. Remove the top cover. 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.



Some models outside the USA may need the following modification -

1. Isolate pin 19 of IC-67(MC68HC05C) on both side of circuit board.
2. Link pin 19 to pin 16 of IC-66(MC14510) with a 10 resistor.
Be sure to use resistor leads are insulated to prevent shorts.

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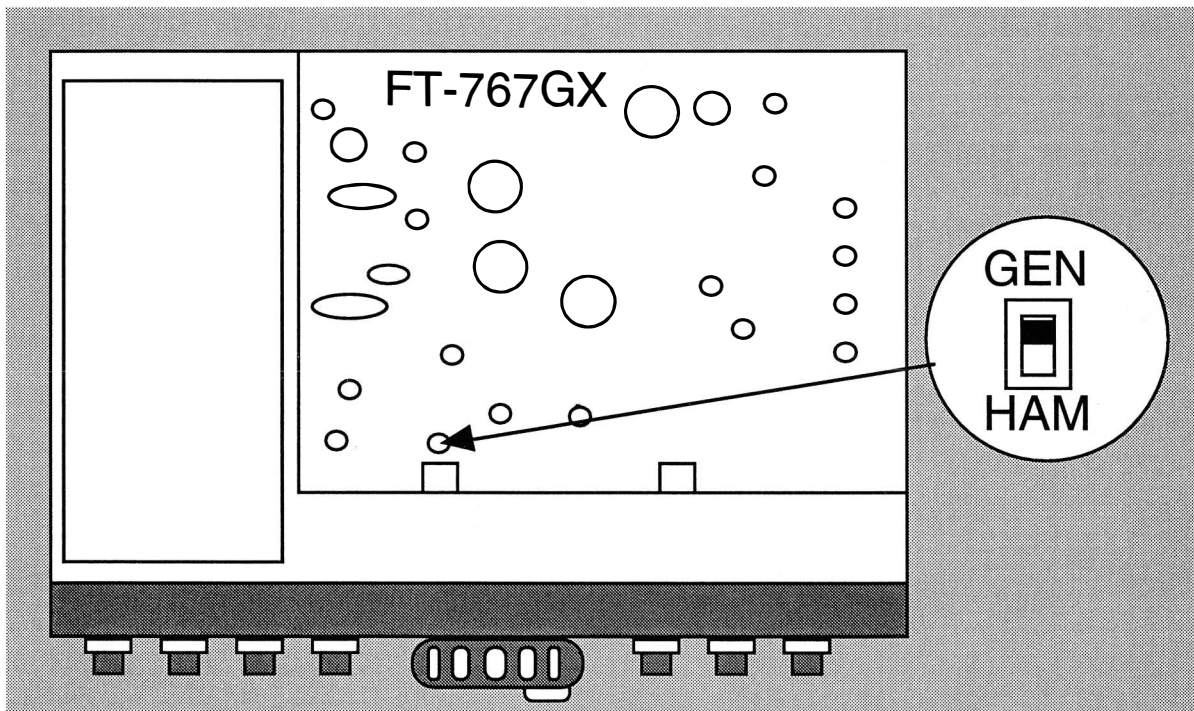
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YAESU FT-767GX

EXPANDED RF

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



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YAESU FT-811

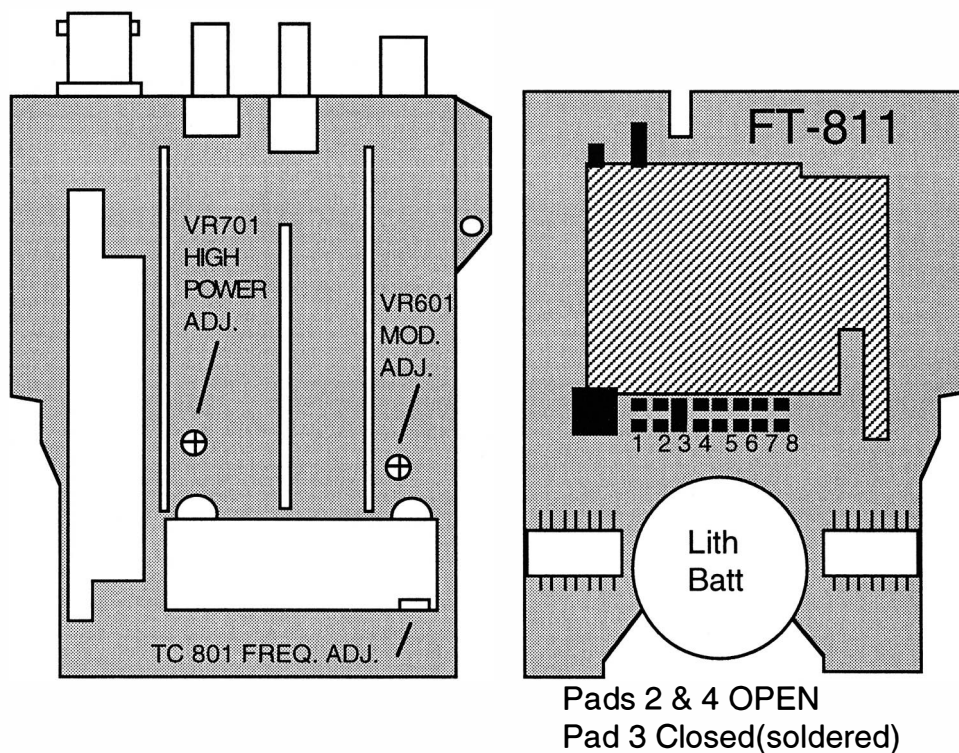
EXPANDED RF & ALIGNMENT CONTROLS

(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)



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

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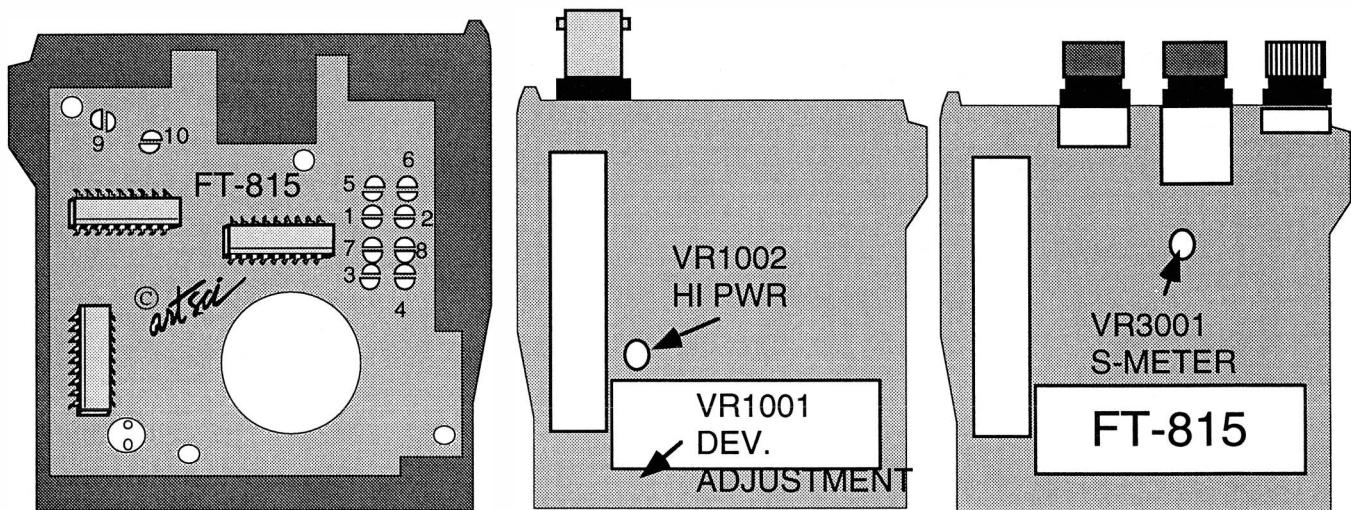
YAESU FT-815

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.**
11. The radio display will cycle orderly through 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.



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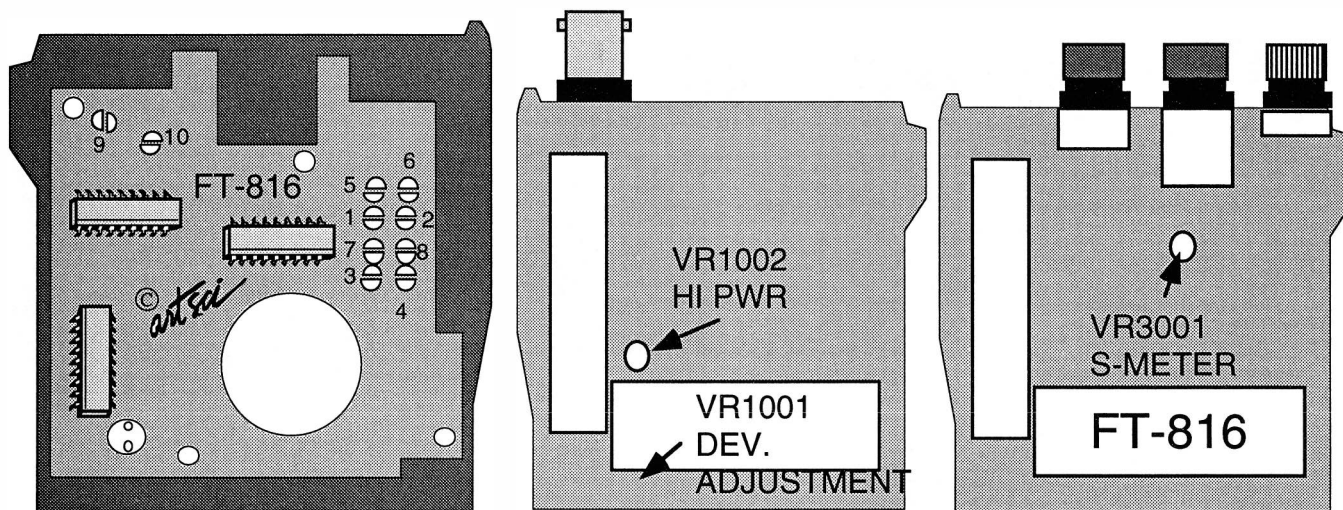
YAESU FT-816

EXPANDED RF

New Range: 400 - 510 MHz RX, 400 - 475 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 jumper pads 5 & 7.
6. **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.**
11. The radio display will cycle orderly through the memory channels.
Enter the following band limits:

- | | | |
|-------|-----------------------------------|-----------------|
| Ch. 1 | Enter 410.00 and then press [VFO] | (Rx low limit) |
| Ch. 2 | Enter 510.00 and then press [VFO] | (Rx high limit) |
| Ch. 3 | Enter 400.00 and then press [VFO] | (Tx low limit) |
| Ch. 4 | Enter 510.00 and then press [VFO] | (Tx high limit) |

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

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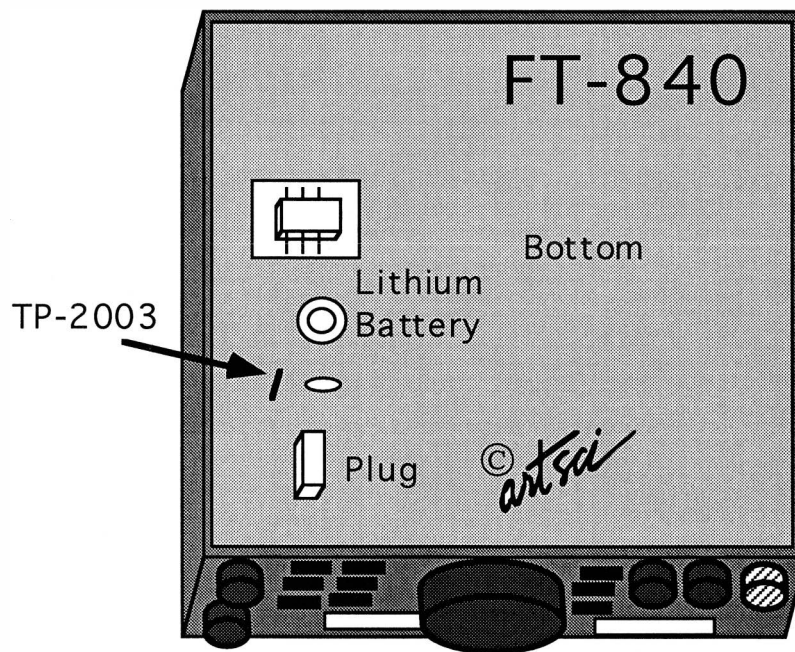
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YAESU FT-840

EXPANDED TX/RX (1.8 - 30 MHz)

1. Remove antenna from the radio.
2. Remove top and bottom covers.
3. On Local Unit, **TEMPORARILY jump TP-2003 to ground.**
4. Press and Hold [SSB] & [AM] & turn power on. (display will show 02-OFF)
5. Rotate main control knob to show 02-ON.
6. Press [AM]. The display should show (7.000.00 LSB)
7. Turn the radio off.
8. Press and hold [MEM], [DOWN] & [UP] and turn the radio on.
9. Turn the radio off.
10. Remove the Jumper to ground on TP-2003
11. Reassemble the radio.



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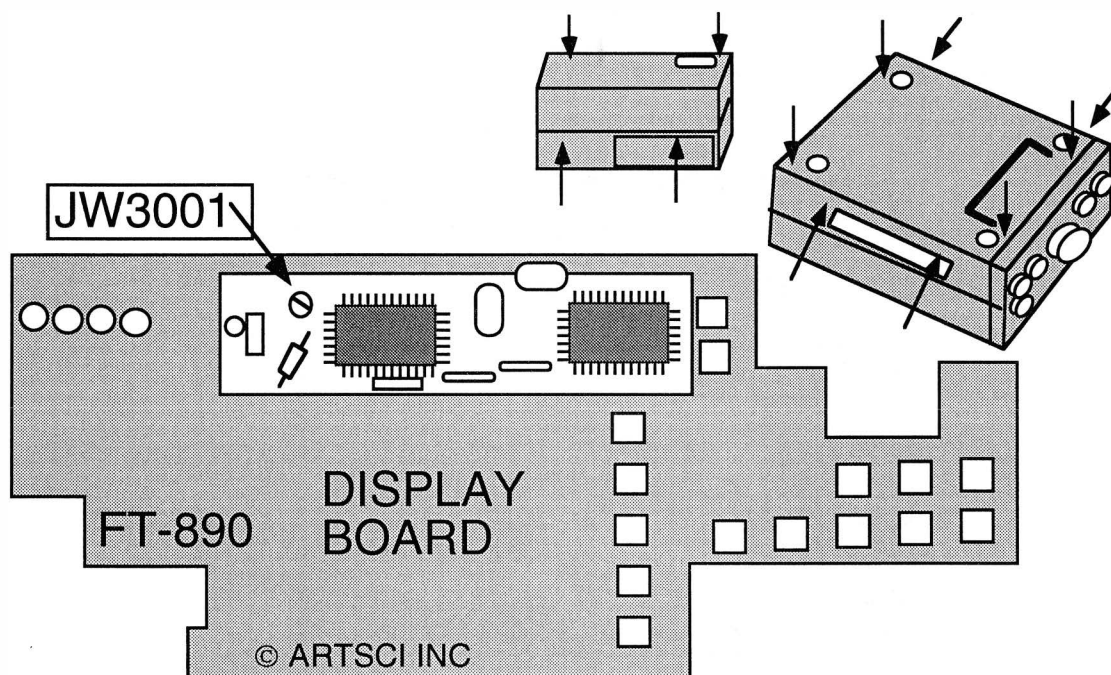
YAESU FT-890, FT-900

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 until 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.

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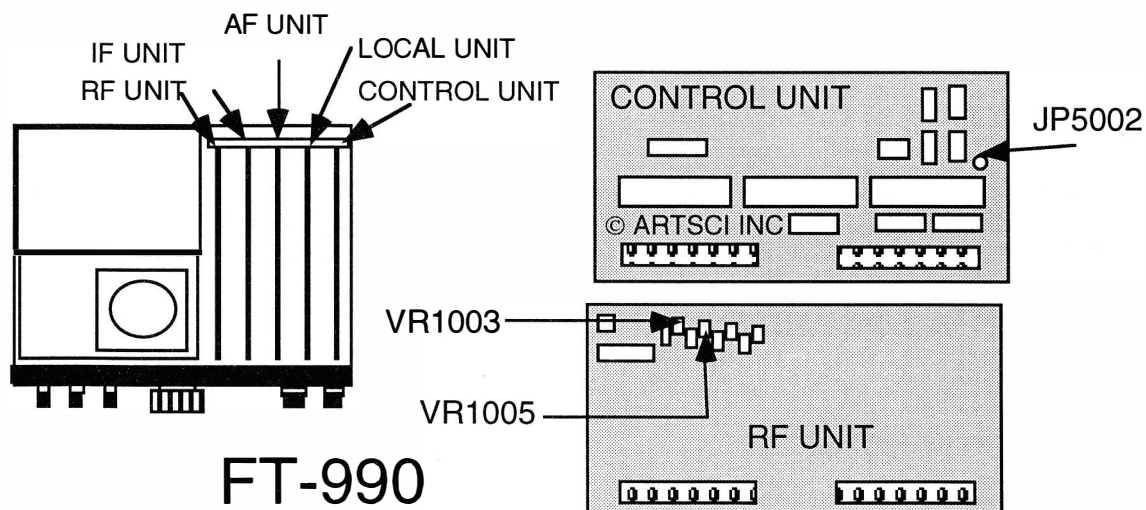
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YAESU FT-990

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.



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



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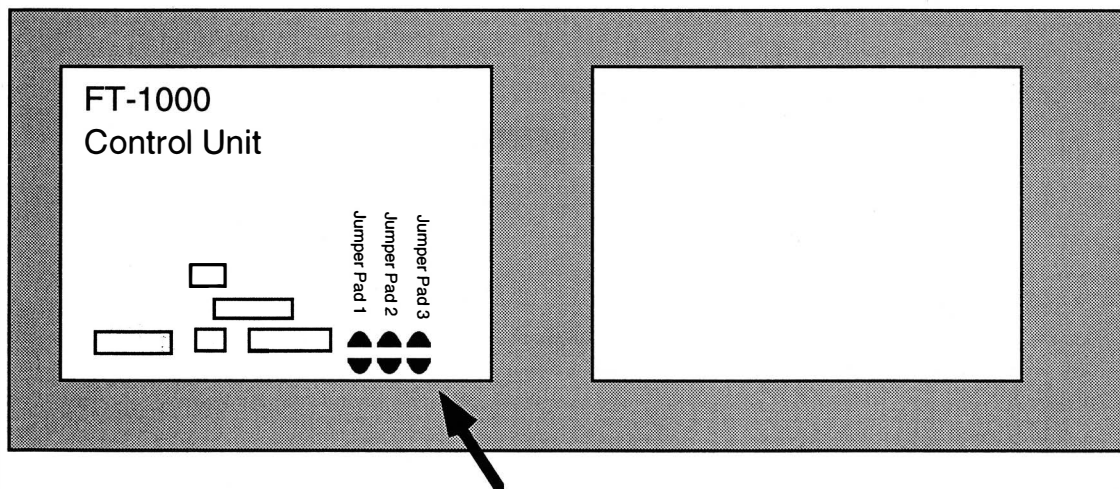
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YAESU FT-1000

EXPANDED RF

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

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YAESU FT-2200

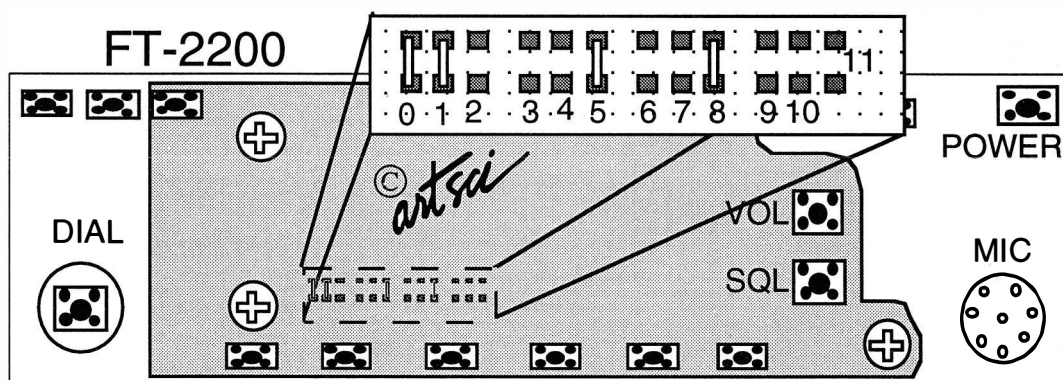
EXPANDED RF

Range 110 - 139.995 AM RX

140 - 174 MHz RX

140- 174 MHz TX

1. Remove power and antenna
2. Remove top and bottom covers. (the speaker may fall out)
3. Remove the Volume, Squelch and Main tuning knobs from the front of the radio.
4. Remove the front panel (push on all four tabs)
5. Remove the tuning knob retainer nut.
6. Lift off the LCD display assembly.
7. Locate jumper Pads #1,2 & 5.
8. **Remove resistor from pads #1 & 2.**
9. **Remove resistor from pads #5.** (AIRCRAFT Rec Mod)
(One report suggests the PAd #8 should be jumped in place of pad #5)
10. Reassemble the radio.
11. Reset the microprocessor.
(Press and hold [MHz] and [CALL] buttons and turn the radio on.



RESET programming -

The radio will power up and display 10.000 MHz.

Press [MHz] and dial 110.00 and press [D/MR] VHF RX low Limit

Press [MHz] and dial 174.00 and press [D/MR] VHF RX High Limit

Press [MHz] and dial 136.00 and press [D/MR] VHF TX low Limit

Press [MHz] and dial 174.00 and press [D/MR] VHF TX High Limit

Press [F/W] and then [RPT] and dial 0.600 and press [RPT] Offset

Note: A "*" will appear when frequency is below 140 MHz.
The AM mode will store in memory channels.



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Performance Report

Radio _____

Date _____

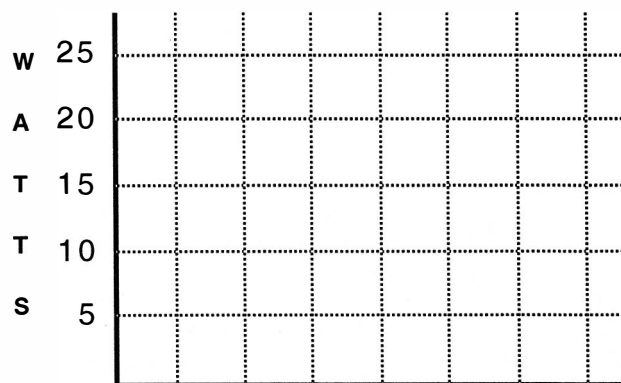
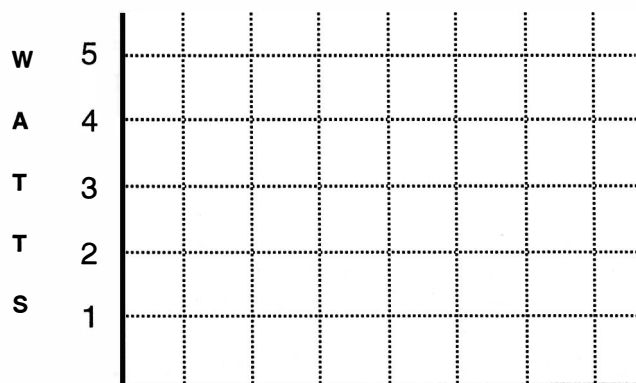
Owner : Name _____

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



YAESU FT-2311

EXPANDED RF

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

New range : 1240.00 MHz - 1300.00 MHz



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YAESU FT-2400

EXPANDED RF

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

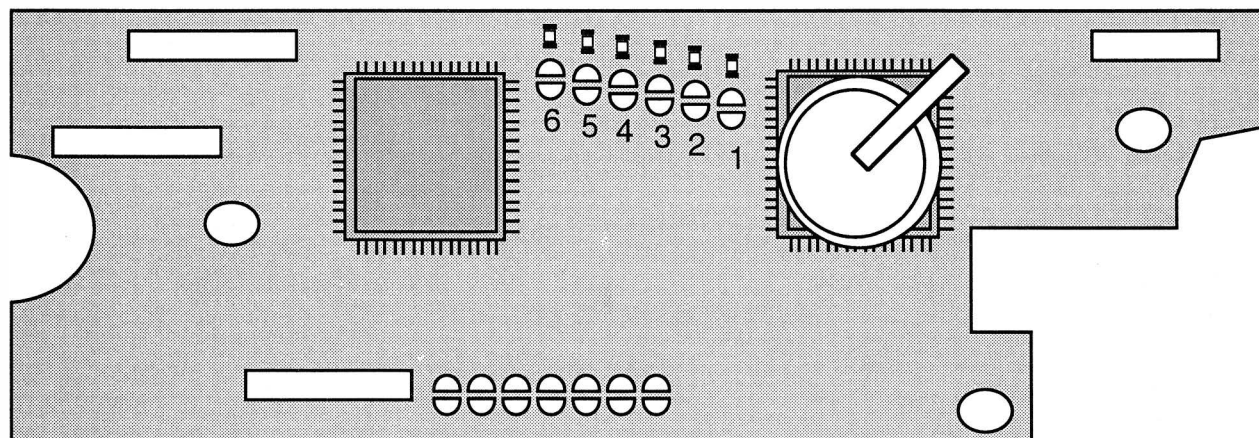
New range : 118-174 MHz Rx, 140-174 MHz Tx .

Option #2

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

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

TONE BURST - Solder Pad # 6



MORE ---

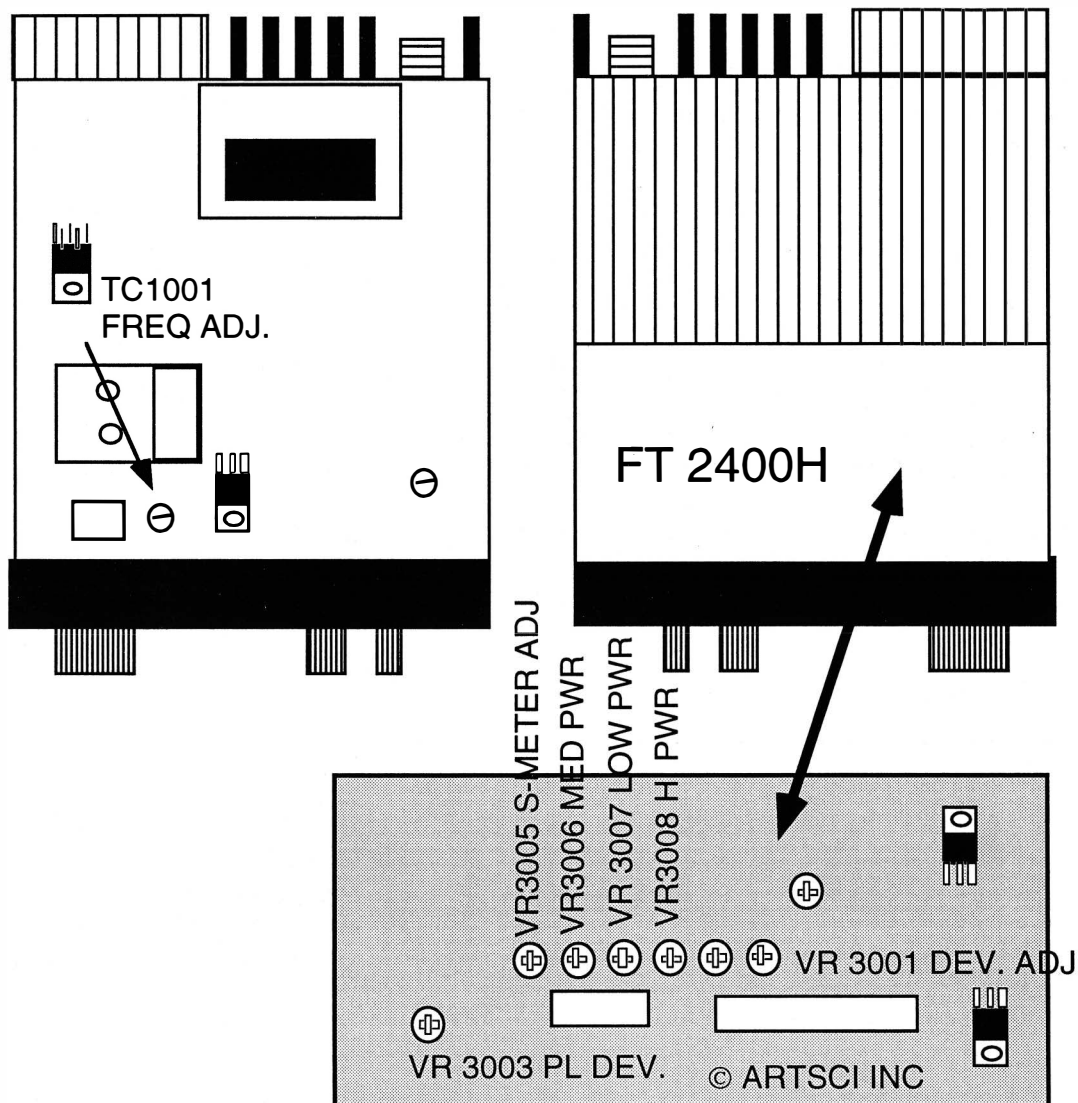
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YAESU FT-2400

ALIGNMENT POINTS



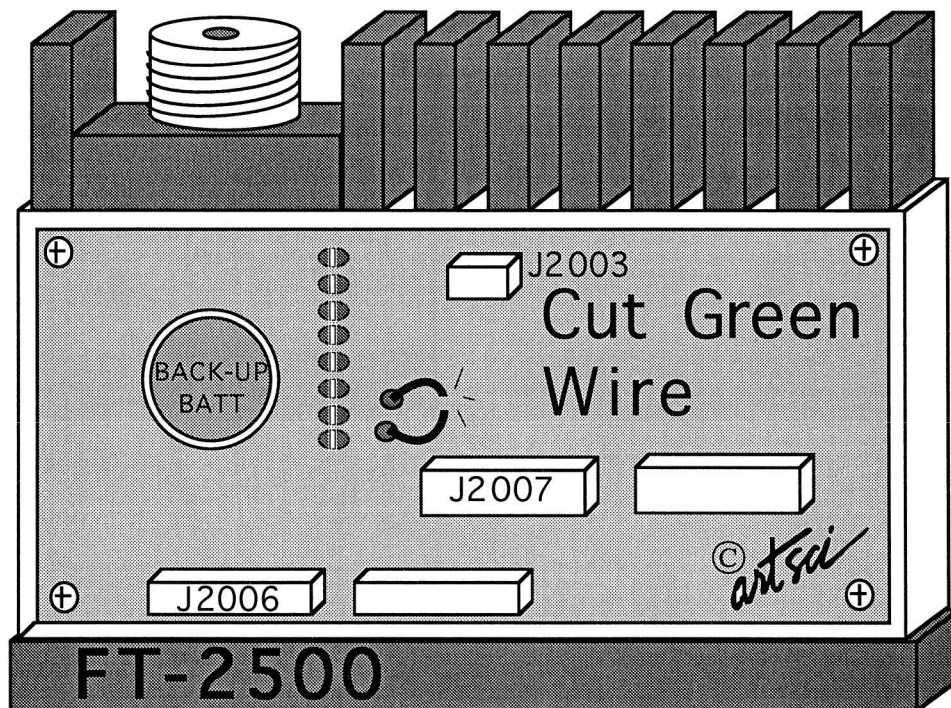
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YAESU FT-2500

EXPANDED RF

1. Remove Power and Antenna.
2. Remove five (5) screws holding the top cover.
3. **Locate and cut GREEN COLOR WIRE.**
(The Green wire is located between jumper pad #8 & Ground.)
4. Reassemble the radio.



New Range : 140-174 RX & TX

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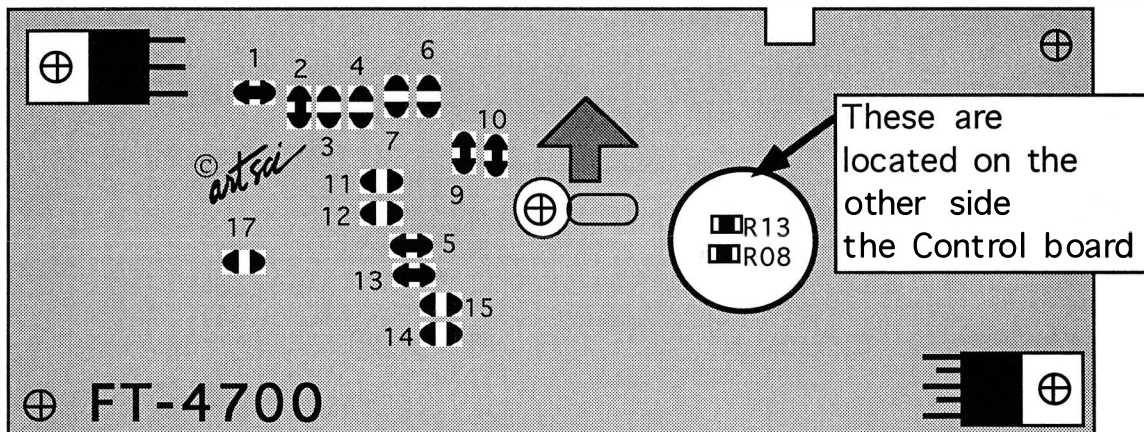
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YAESU FT-4700

EXPANDED RF

1. Remove Front Panel.
2. **Locate and jump 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

Beep Level Reduction

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

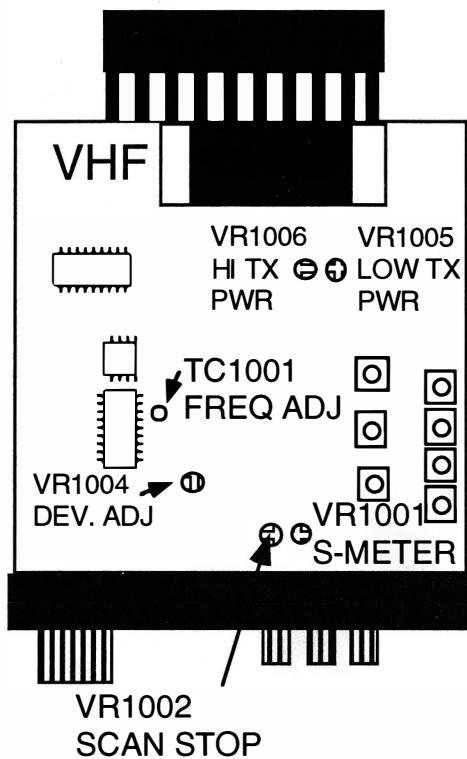


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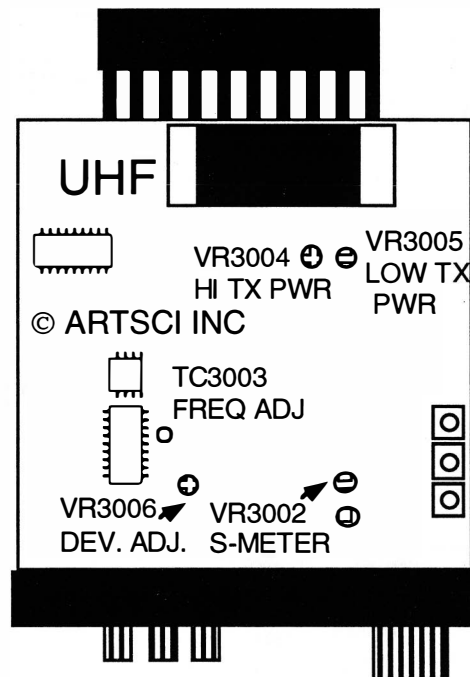
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YAESU FT-4700

ALIGNMENT POINTS



FT-4700RH



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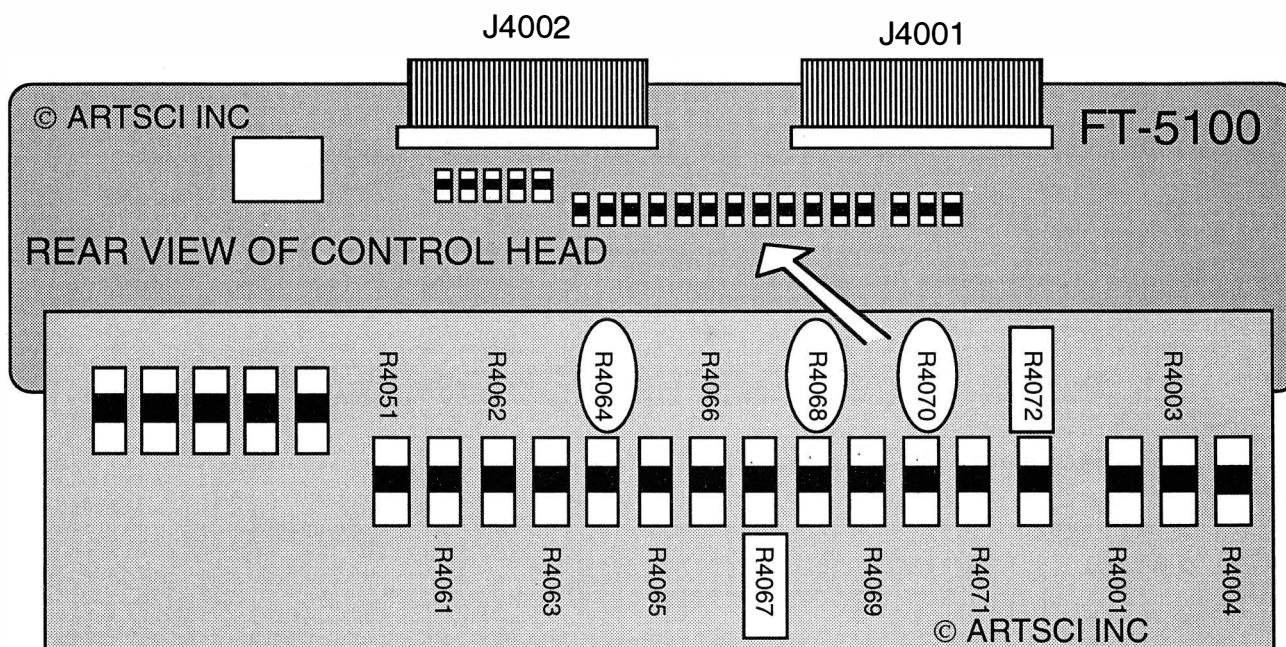
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YAESU FT-5100

EXPANDED RF 128-180 MHz & 420-475 MHz
X-BAND Repeater mod & Mic. Band Change mod.

1. Remove power and antenna from the radio.
 2. Remove 6 screws from top and bottom covers, remove the covers (watch speaker).
 3. Remove the 2 silver screws from each side of the radio securing the control head.
 4. Carefully pull the Control Head from the radio. DO NOT REMOVE RIBBON CABLES.
 5. **Locate and remove chip resistor R4072.** (RX mod)
 6. **Locate and remove chip resistor R4067.** (Mic/Band mod)
 7. **Locate and install jumpers in positions R4070, R4068 & R4064.** (RX mod)
- NOTE: The circuit board has no numbers: use the picture below to locate chip positions.



STOCK US JUMPERS: 4001, 4003, 4004, 4051, 4061, 4062, 4067, 4072

POST MOD JUMPERS 4001, 4003, 4004, 4051, 4061, 4062, 4064, 4068, 4070

8. Reassemble the radio.
9. **PROCEED TO NEXT PAGE -**

MORE -



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YAESU FT-5100

INITIAL PROGRAMMING INFORMATION (MUST DO FOR COMPLETE MODIFICATION)

9. Press and hold [D/MR], [F/W] & [REV] and turn power on.
(The display will show 300.000 & 20.000)
10. Press [MHz] and dial 420.00 and press [D/MR] - UHF RX low limit
11. Press [MHz] and dial 475.00 and press [D/MR] - UHF RX high limit
12. Press [MHz] and dial 420.00 and press [D/MR] - UHF TX low limit
13. Press [MHz] and dial 475.00 and press [D/MR] - UHF TX high limit
14. Press [MHz] and dial 128.00 and press [D/MR] - VHF RX low limit
15. Press [MHz] and dial 180.00 and press [D/MR] - VHF RX high limit
16. Press [MHz] and dial 128.00 and press [D/MR] - VHF TX low limit
17. Press [MHz] and dial 180.00 and press [D/MR] - VHF TX high limit
18. Press [F/W] then [RPT] and dial 5.000 and press [RPT] - UHF offset
19. Press [F/W] then [REV] and dial 25.0 and press [RPT]. - Channel Step
20. Press [BAND] then [F/W] then [RPT] and dial 0.600 and press [RPT] - VHF offset.

* * * *

SOFT RESET (Memory clear) - Press and hold [D/MR] & [REV] and turn radio on.

CROSS-BAND REPEATER OPERATION

1. Select the desired VHF & UHF frequencies
2. Select low power transmit on both bands (To protect your radio)
3. If desired, adjust the TX time out timer value. (The default is 15 minutes)
To adjust: Press and hold [LOW] & turn power on.
Dial desired time out value (0-60 minutes)
Turn radio off.

TURN ON - Press and hold [RPT] and turn radio on.

TURN OFF - Press and hold [RPT] and turn radio on.

EXTRA Modification

Remove solder from Jumper R4067 to make Microphone [D/MR] button switch band on the radio.

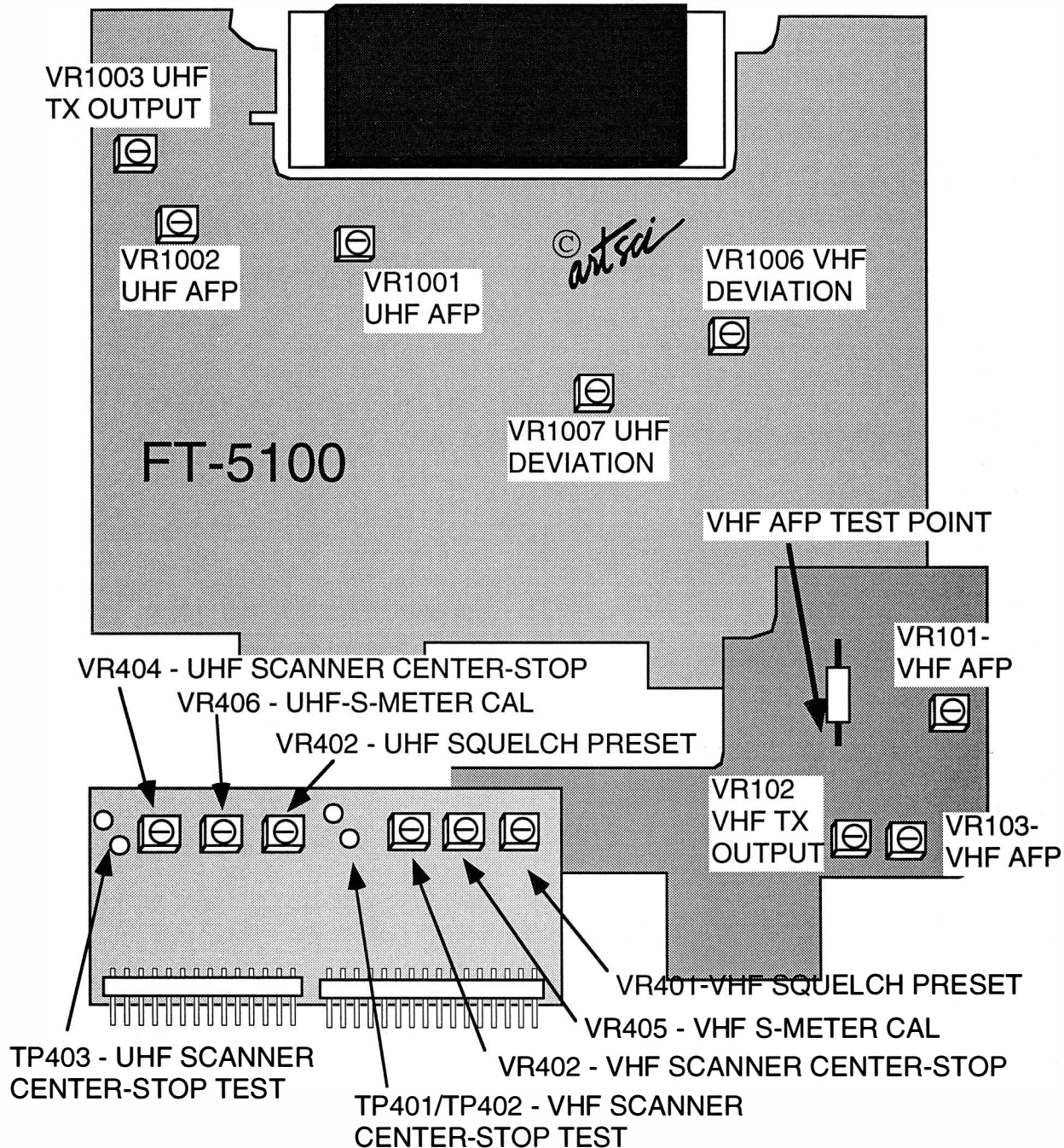
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YAESU FT-5100

ALIGNMENT POINTS



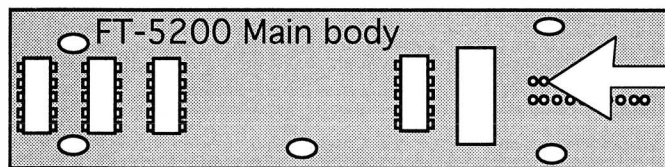
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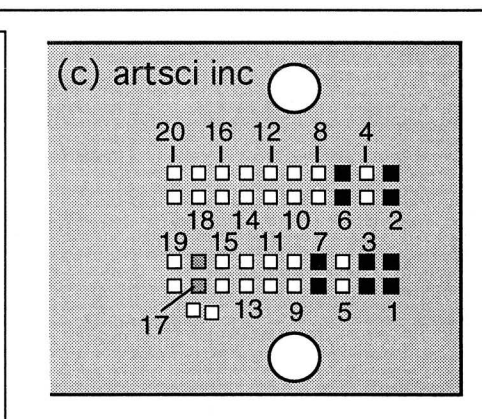
YAESU FT-5200

EXPANDED RF

1. Remove power from the radio.
2. Release and remove the front panel.
3. Remove the six screws from the top cover of the radio.
4. Remove the six screws from the bottom of the radio.
5. Remove the top and bottom covers.
(CAUTION: the speaker might fall out.)
6. Remove the two screws & front control head mounting plate from the radio.
7. Locate solder pads 1 - 7.
(Standard jumpered pads are 2 and 7 only)
8. **Solder jump pads 1,3 and 6**
(Pads 1,2,3,6 & 7 are now jumpered)
9. **Unsolder jump pad 17.** (X-Band repeater mod) May be done at the factory!
Caution: Be sure to work on PAD 17. see drawing below



U - TX - 375.125 → 480.000
 V - TX - 135.725 → 176.000



See Next page for further instructions.

MORE ---

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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 ---

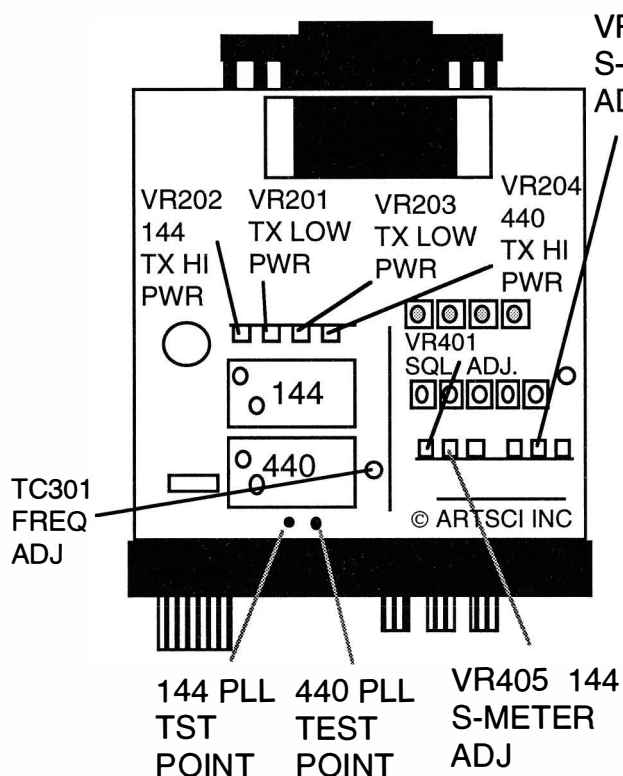


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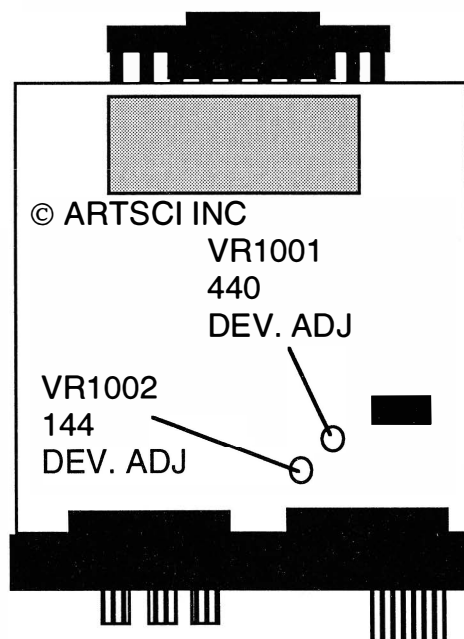
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YAESU FT-5200

ALIGNMENT POINTS



FT-5200



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Performance Report

Radio _____

Date _____

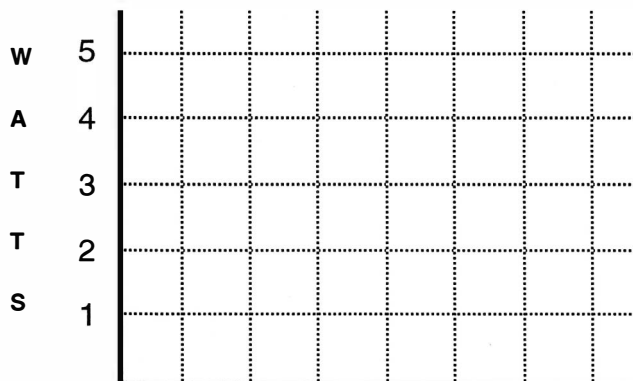
Owner : Name _____

Address _____

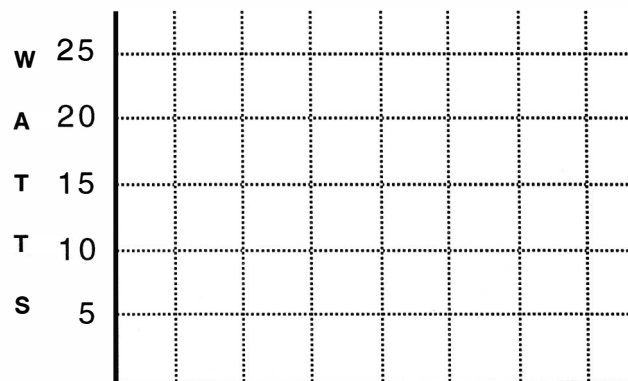
City _____ St. _____ Zip _____

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



Frequency

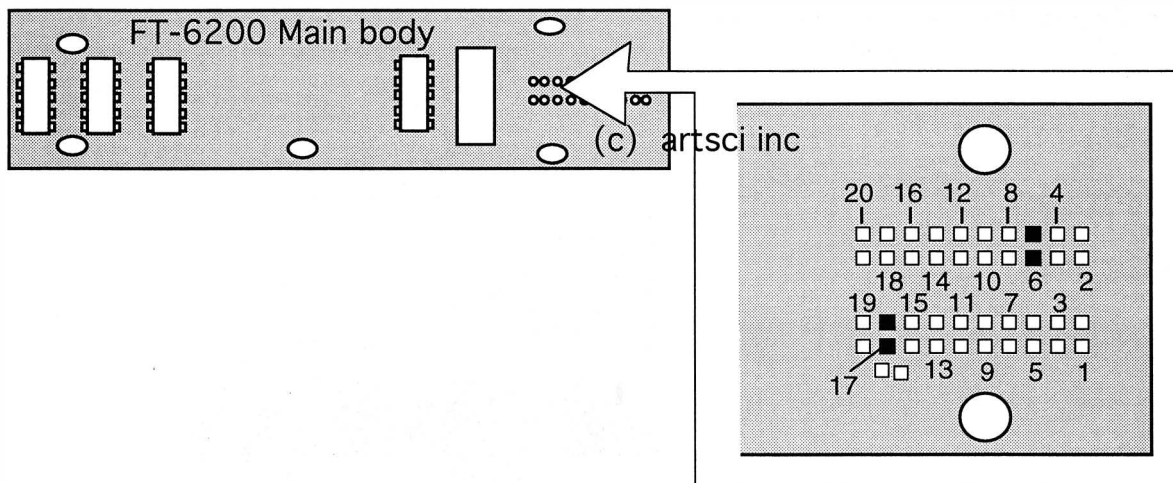


Frequency

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:
To override automatic display dimmer:

Press and hold [RPT] and turn power on.
 Press and hold [MR] and turn power on and
 select the desired brightness level)

MORE ---

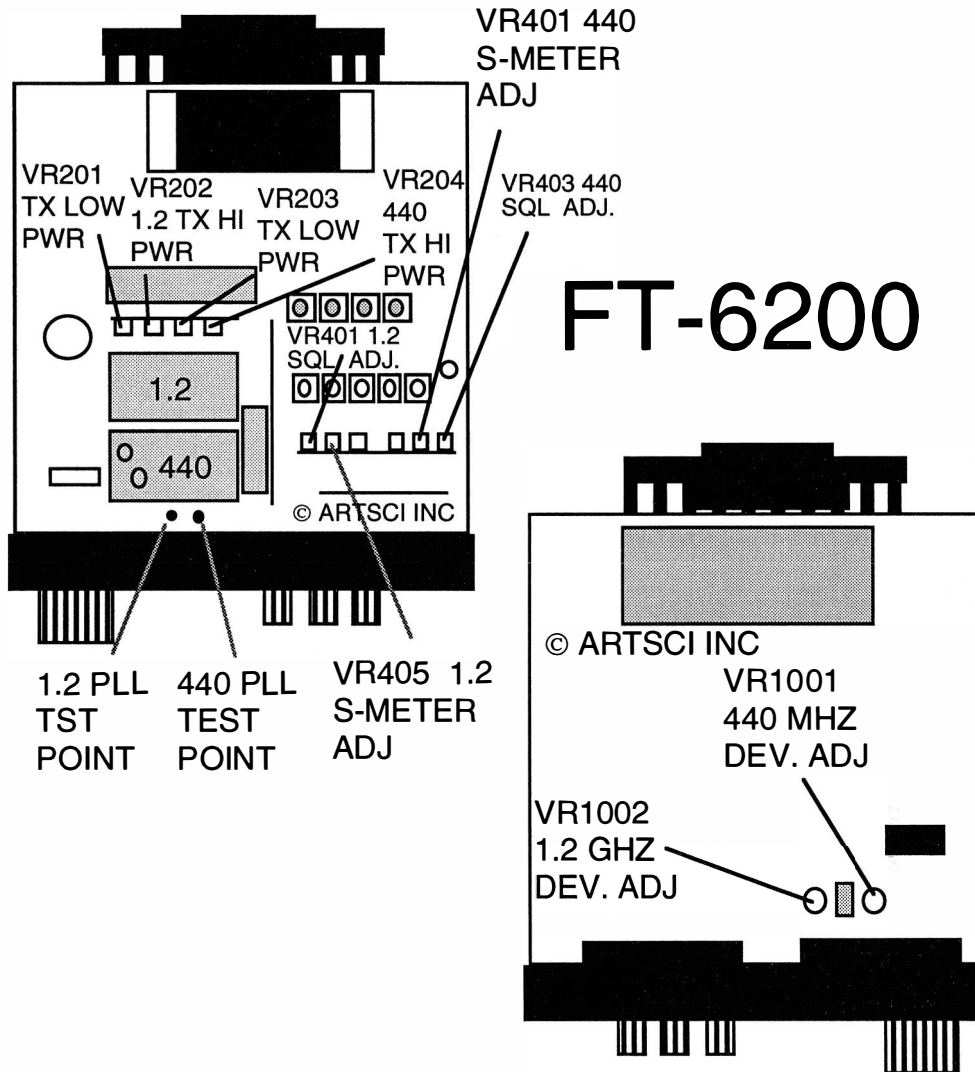
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YAESU FT-6200

ALIGNMENT CONTROLS



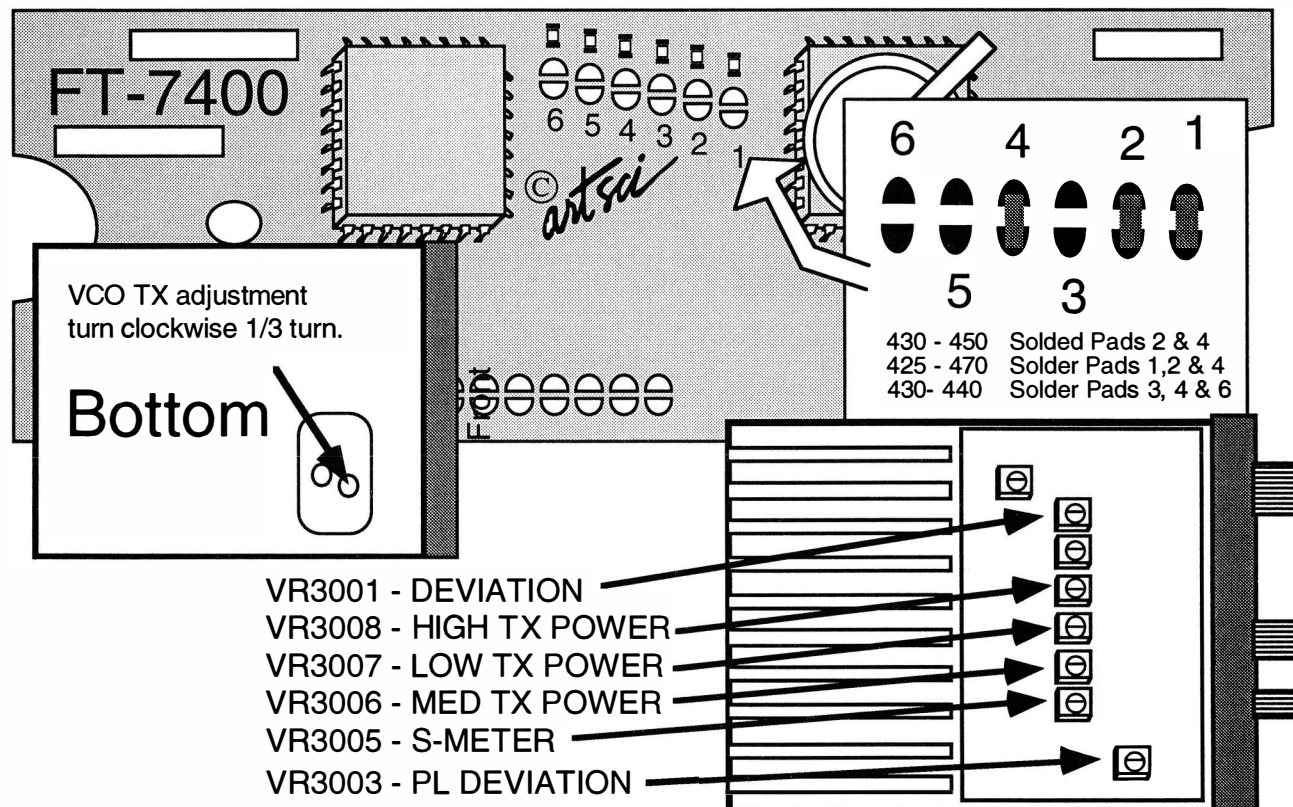
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YAESU FT-7400

EXPANDED RF (420 - 470 MHz)

1. Remove power from the radio.
2. Remove Front Panel.
3. Locate solder pad #1. (Behind front control panel)
4. **Solder jump pad # 1**
5. Reassemble the radio.



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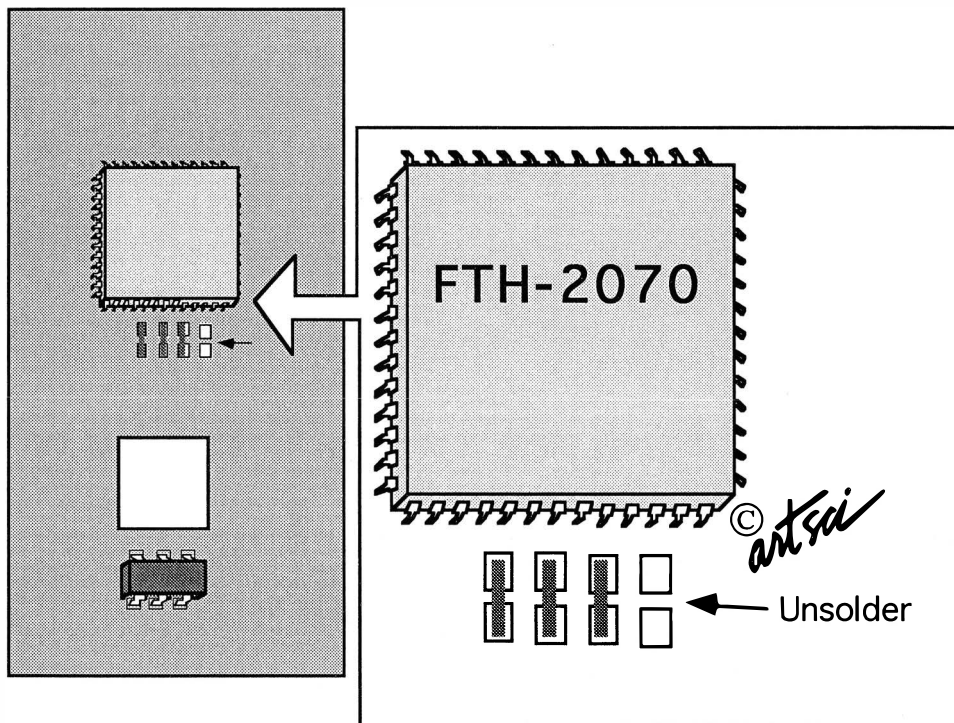
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YAESU FT-2070

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



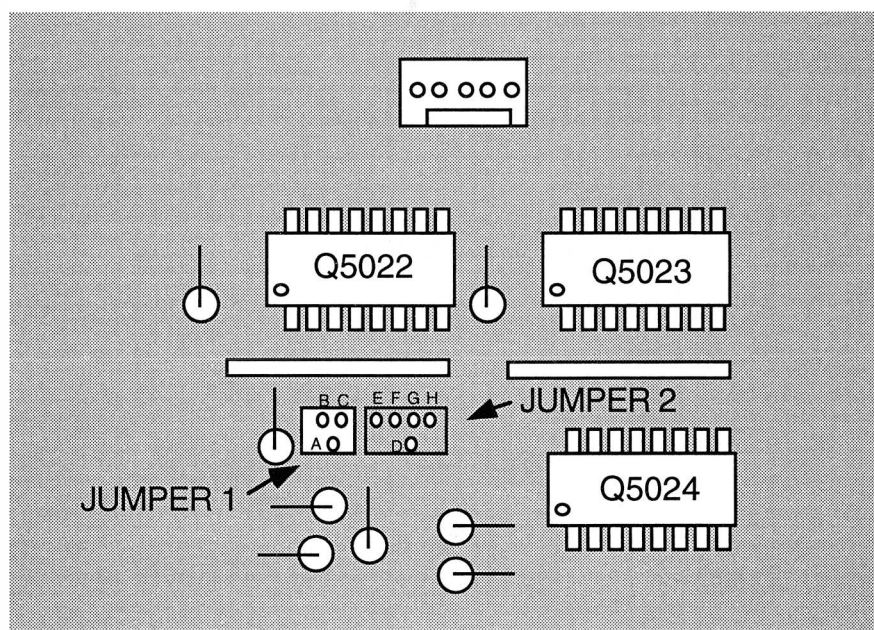
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YAESU FT-ONE

EXPANDED RF

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



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

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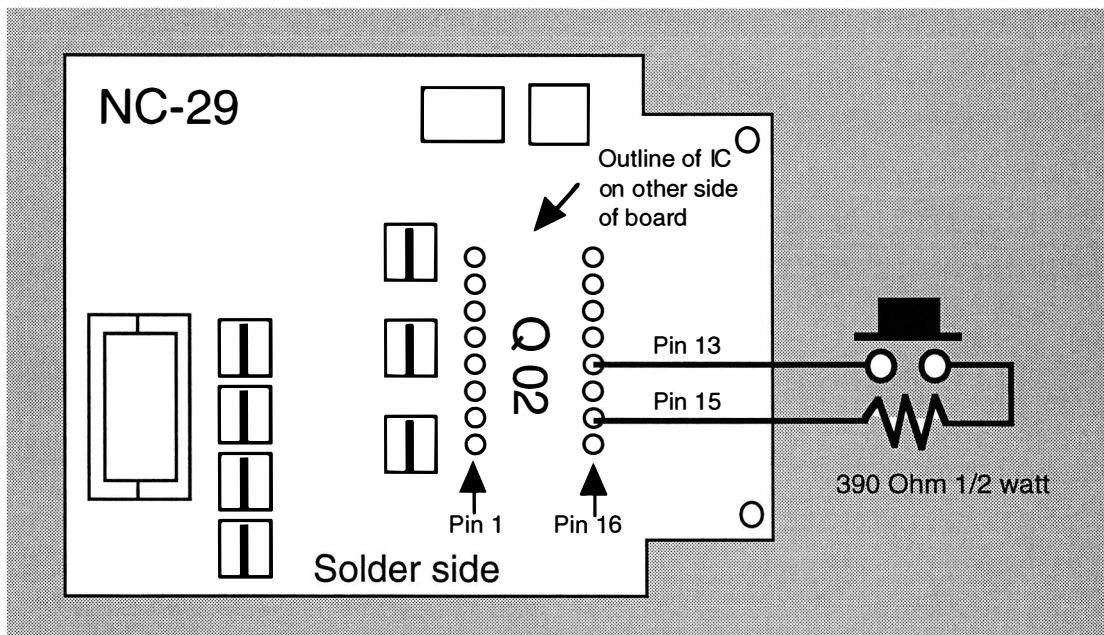
YAESU NC-29

TRICKLE MODE

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

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

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



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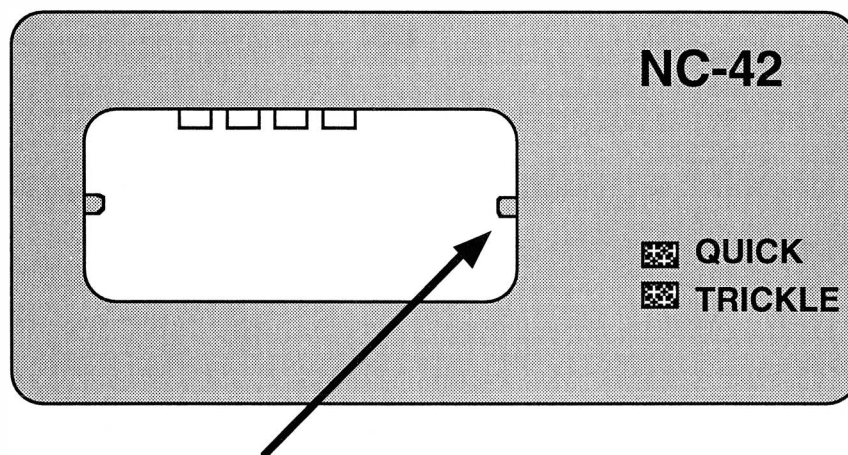
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YAESU NC-42

Charging additional batteries

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

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



Remove this ridge. Use a file or similar tool

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

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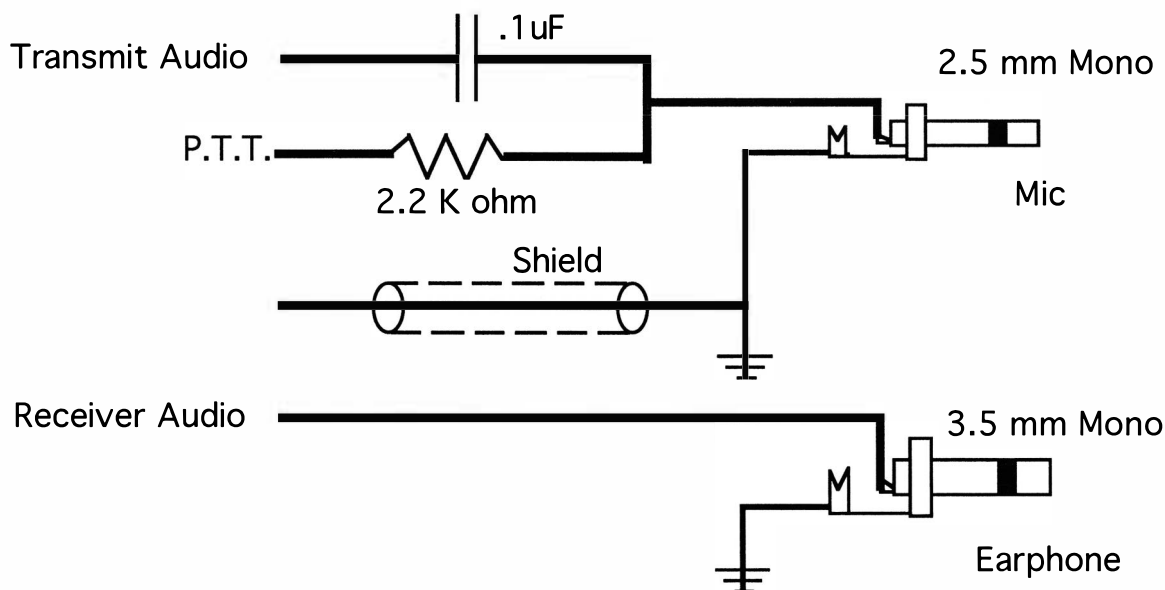


YAESU Hand Held to Packet TNC

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

<u>Radio</u>	<u>Function</u>	<u>Command</u>
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) Press and hold [CLAR] & turn power on. (140.00 - 145.99 MHz) Press and hold [MCK] & turn power on. (140.00 - 1487.99 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
FRG-100	Hard Reset	Turn off backup switch on rear of radio for 5 seconds.

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Yaesu Reset Commands

<u>Radio</u>	<u>Function</u>	<u>Command</u>
FT-11		
FT-41	Master Reset	Press and hold [UP] & [DOWN] & turn on.
FT-26		
FT-76	Ham/Extended RX	Press and hold [UP] & [DOWN] & turn on.
	Factory Defaults	
	Soft Reset (memory clear)	Press and hold [T] & [REV] & turn on.
	Master Reset	Press and hold [D/MR] & [T] & [REV] & turn on. (must enter new band limits)
FT-411E		
FT-811		
FT-911		
FT-415		
FT-416		
FT-470		
FT-815		
FT-530	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-5100	Factory Defaults	Press and hold [D/MR] & [REV] & 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.



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Yaesu Reset Commands

<u>Radio</u>	<u>Function</u>	<u>Command</u>
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.

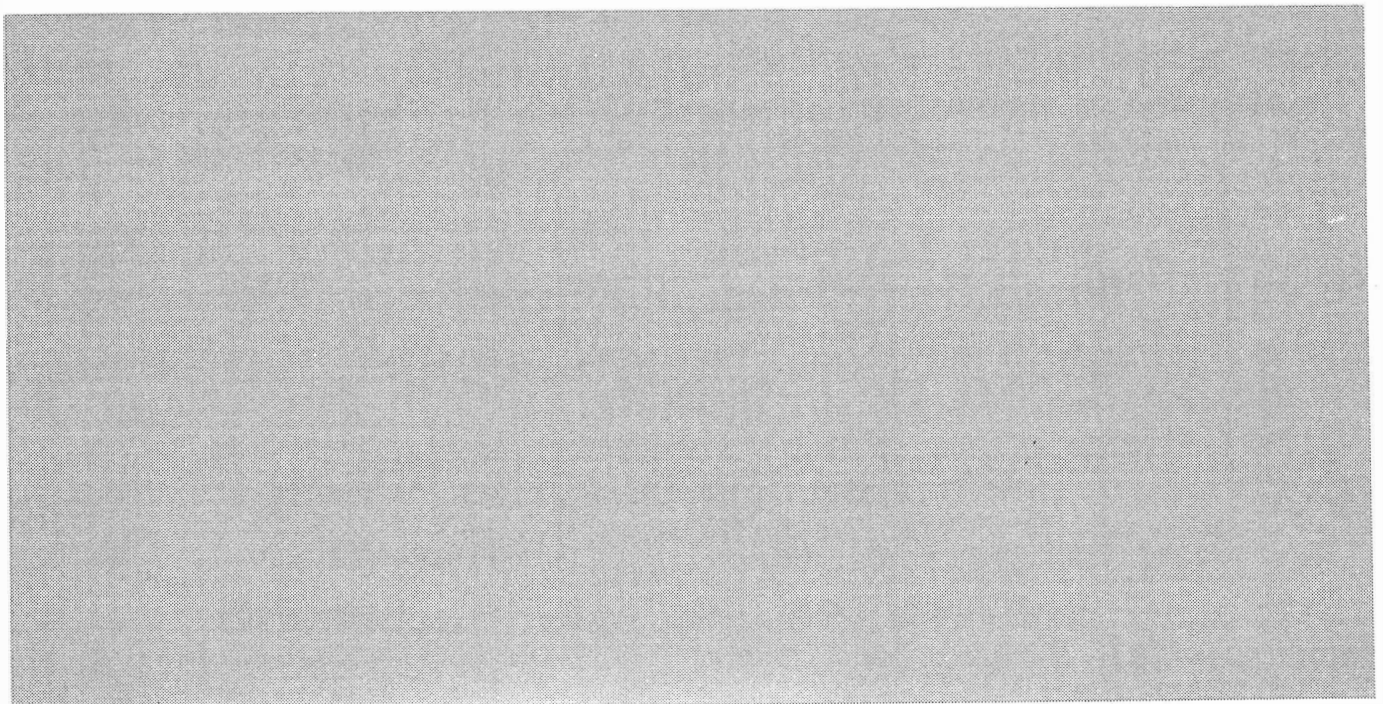
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Radio / Tech Modifications

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Performance Report

Radio _____

Date _____

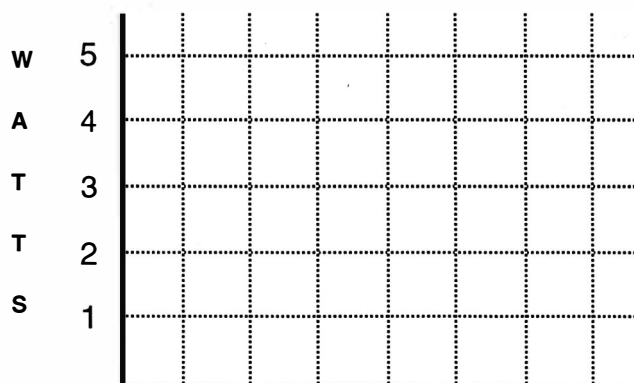
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Address _____

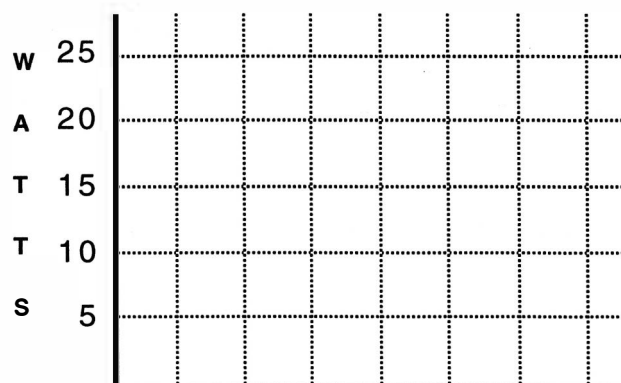
City _____ St. _____ Zip _____

Phone () - _____

Description	Before	After
Power out (Low)	_____ Watts	_____ Watts
Power out (High)	_____ Watts	_____ Watts
Frequency Error (Simplex)	_____ Hz	_____ Hz
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



Frequency

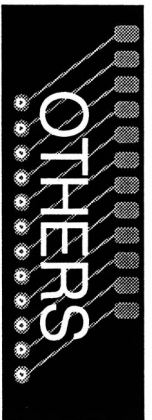


Frequency

Radio / Tech Modifications

OTHER MANUFACTURES

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	AZ-21A	Expanded RF.....	6
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	FM-2033	Expanded RF.....	8
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Performance Report

Radio _____

Date _____

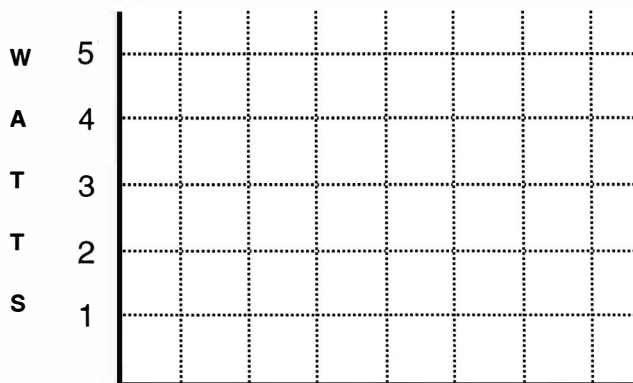
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Address _____

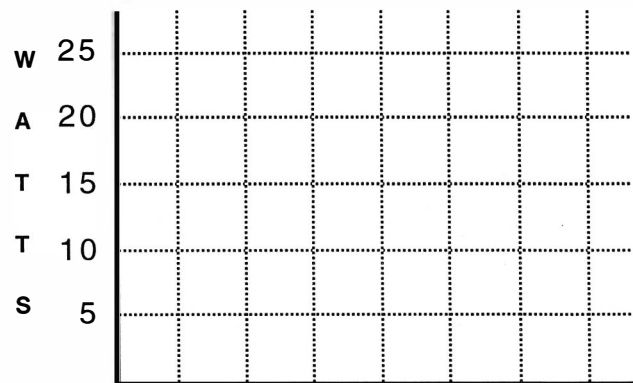
City _____ St. _____ Zip _____

Phone () - _____

Description	Before	After
Power out (Low)	_____ Watts	_____ Watts
Power out (High)	_____ Watts	_____ Watts
Frequency Error (Simplex)	_____ Hz	_____ Hz
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



Frequency



Frequency

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



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AZDEN PCS-7000

EXPANDED RF

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

RANGE: 138.000 MHz - 160.000 MHz

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AZDEN PCS-7500

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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AZDEN AZ-21A

EXPANDED RF

1. Remove Power and Antenna.
2. Remove Speaker & Squelch knobs
3. Remove battery rail screws
4. Remove three back cover screws.
5. Remove top cover and rubber gasket
6. Separate radio. (open like a book)
7. Remove three screws from right hand board and move aside
8. Locate lower board and solder pads B0 through B5
9. Locate and **solder bridge pads B0 & B1.**
10. Reassemble the radio.
11. **Reset the microprocessor**
(Hold down the [CLR] key and turn the radio on)

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KDK FM-240

EXPANDED RF

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

RANGE: 140.00 MHz - 156.00 MHz



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KDK FM-2033

EXPANDED RF

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

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TEN TEC PARAGON

EXPANDED RF

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

RANGE: 1.7 MHz - 30 MHz



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RANGER AR-3300

EXPANDED RF

1. Turn radio on and enter the following:

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

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

[100 HZ UP] [ENTER] [ENTER]

PUSH [1 MHZ UP] UNTIL 29.933.0 APPEARS

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

[SCAN DOWN]

OPEN THE SQUELCH

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

OR

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

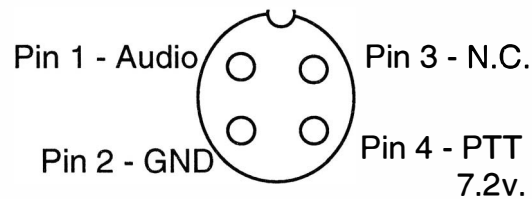
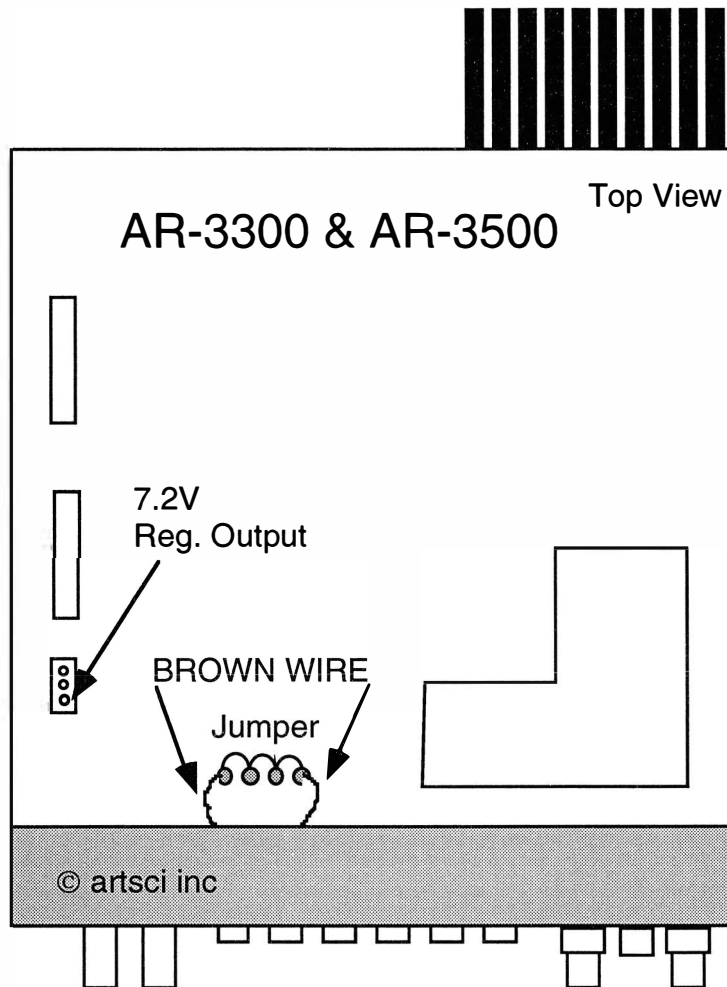
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RANGER AR-3300



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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.

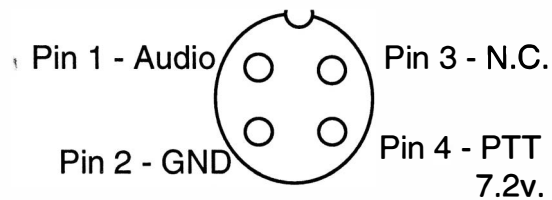
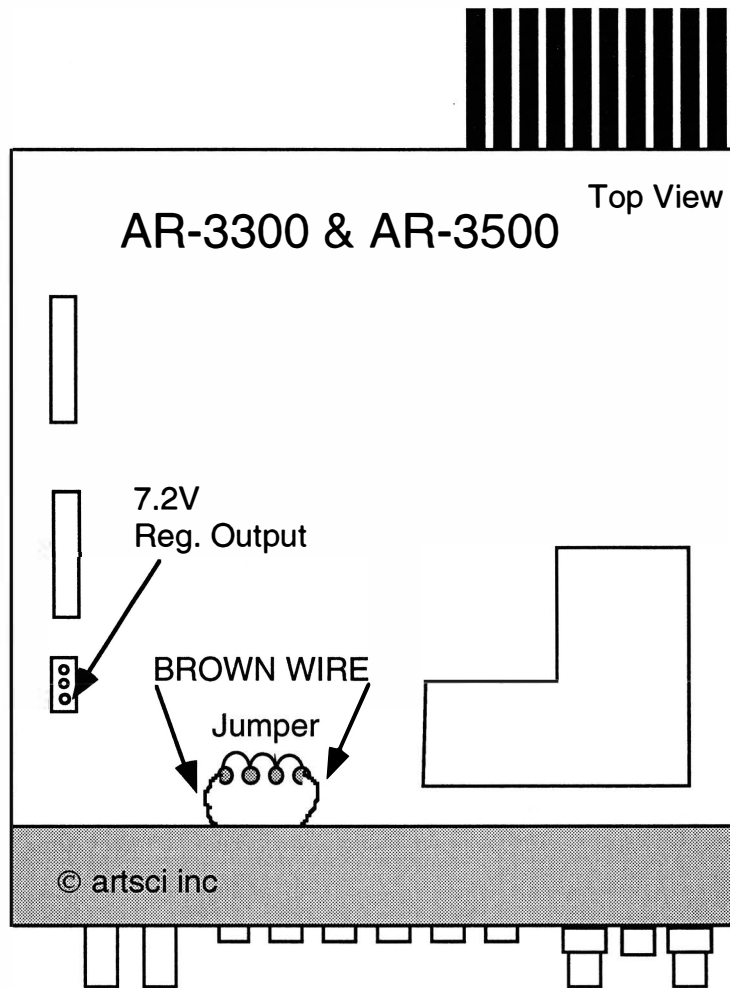
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RANGER AR-3500



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Performance Report

Radio _____

Date _____

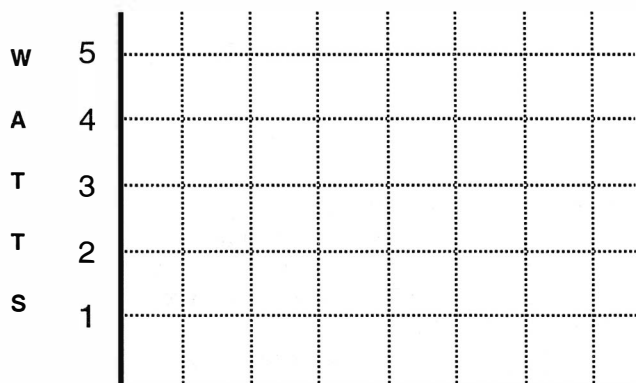
Owner : Name _____

Address _____

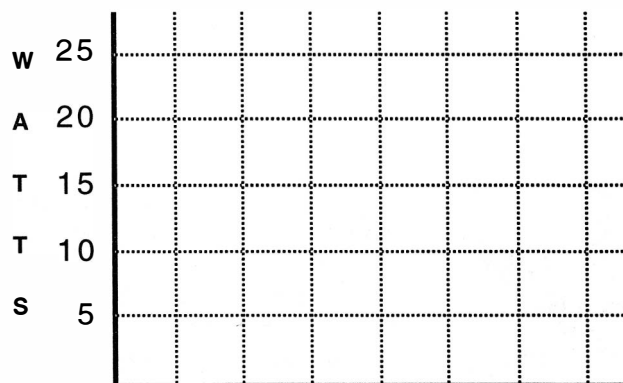
City _____ St. _____ Zip _____

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



Frequency

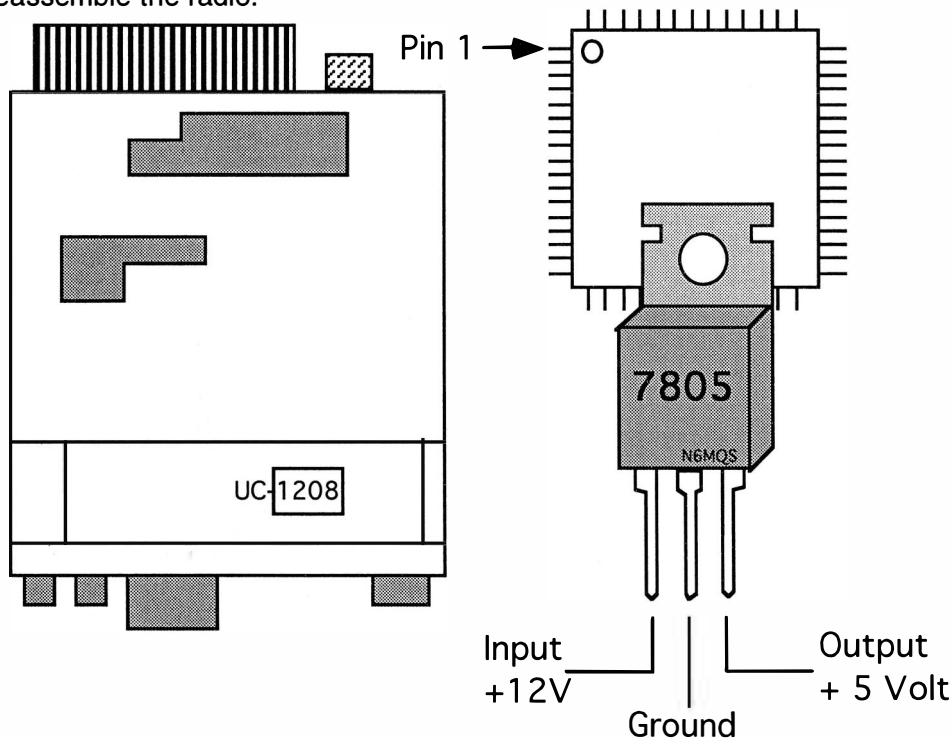


Frequency

UNIDEN HR-2500

EXPANDED RF

1. Remove Power and Antenna.
2. Remove 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 with 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.



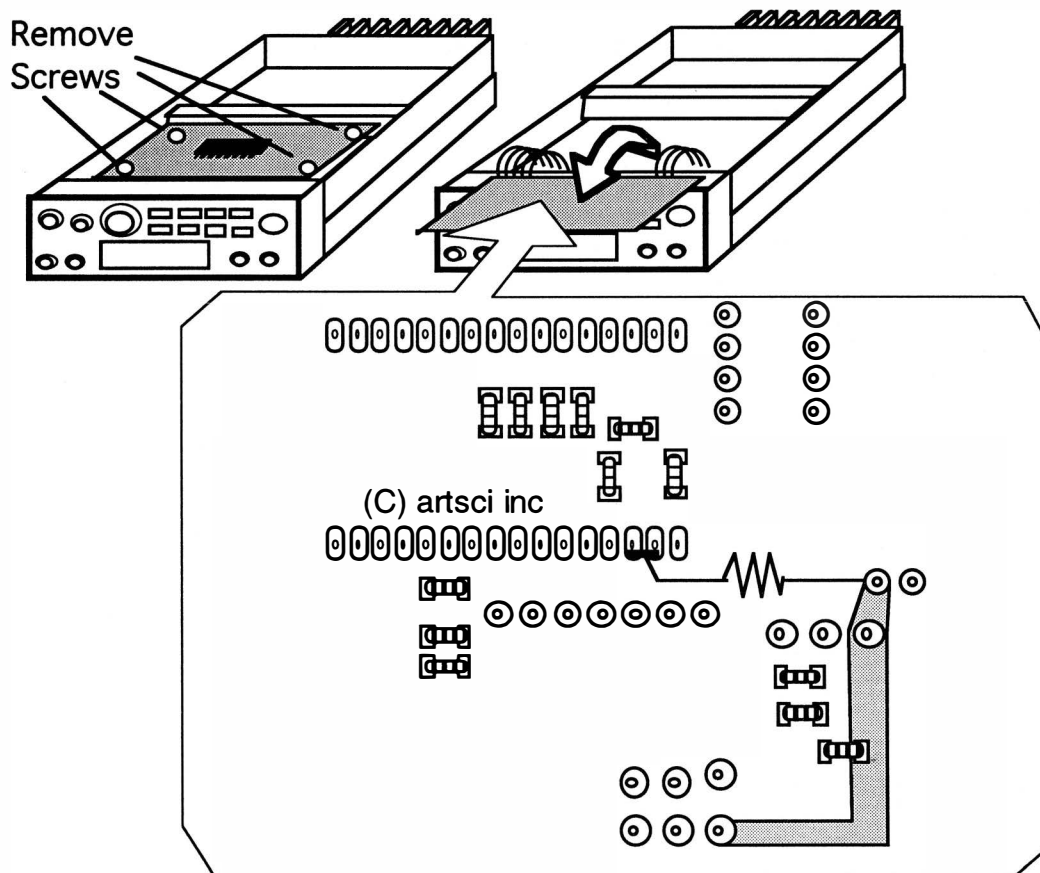
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UNIDEN HR-2510

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

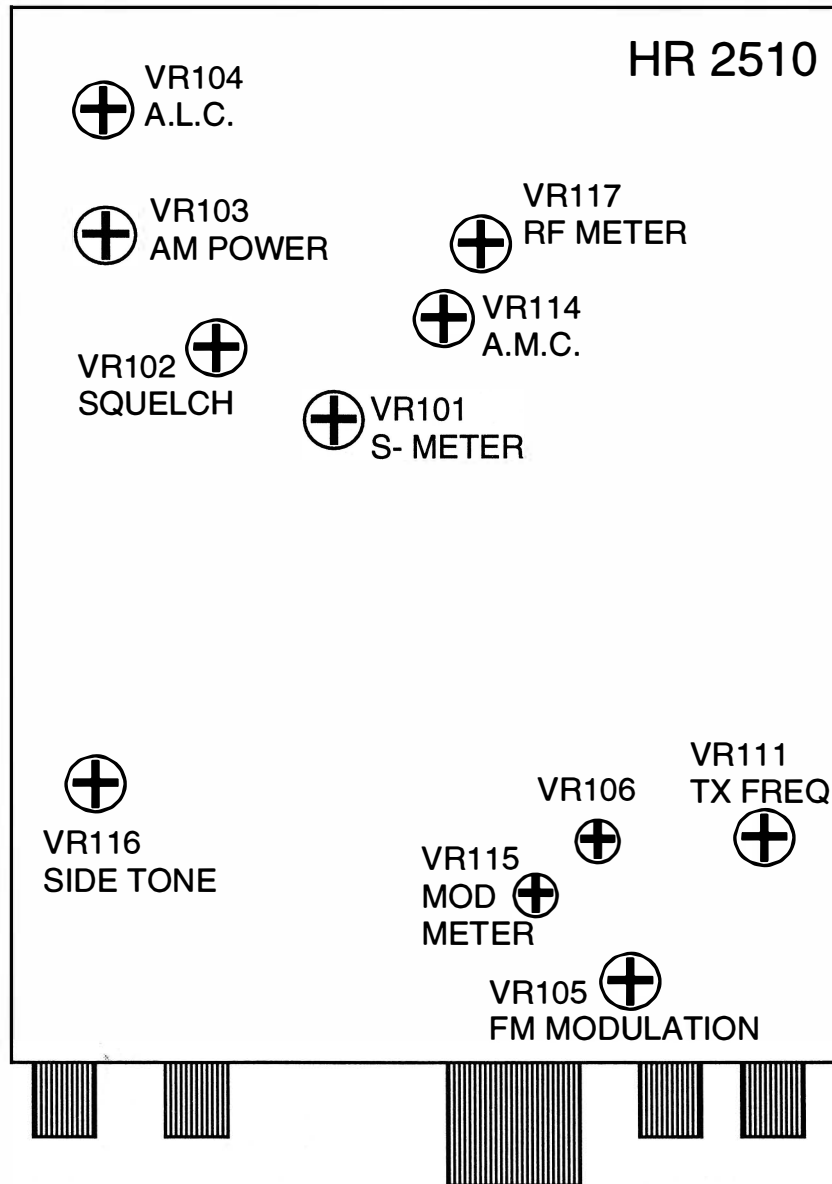
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UNIDEN HR-2510

ALIGNMENT POINTS



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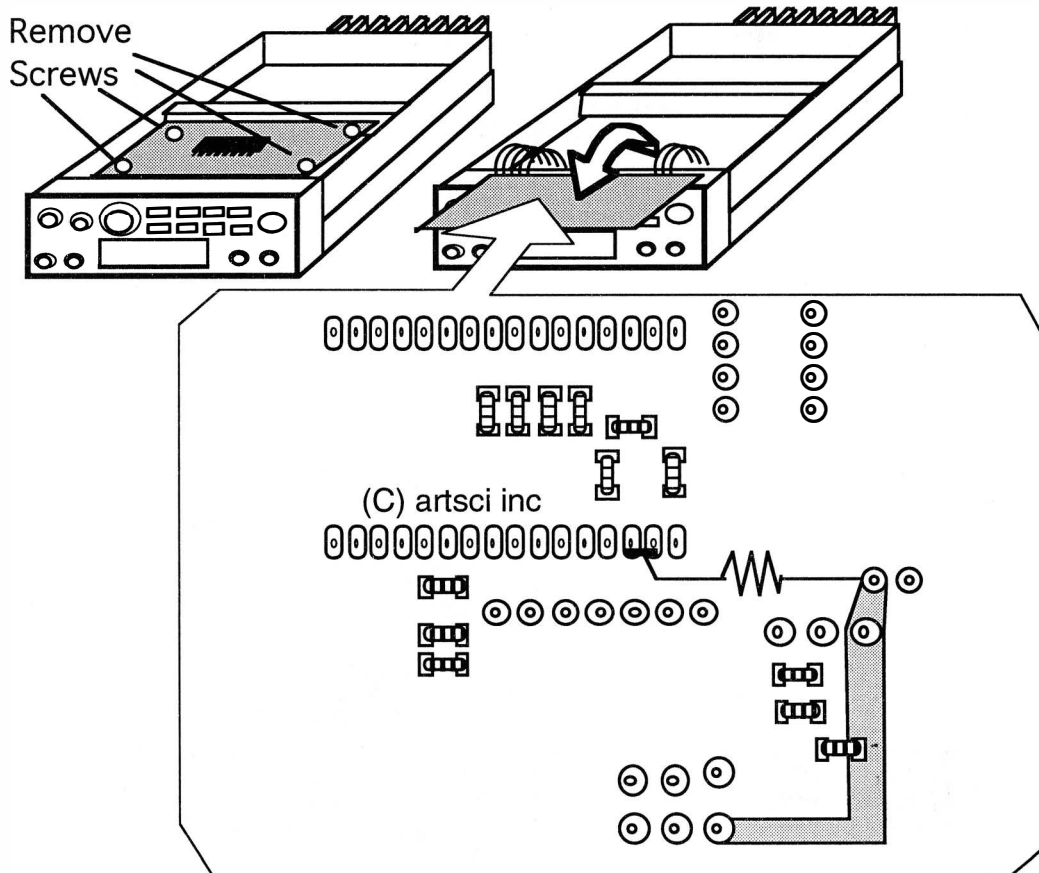
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UNIDEN HR-2600

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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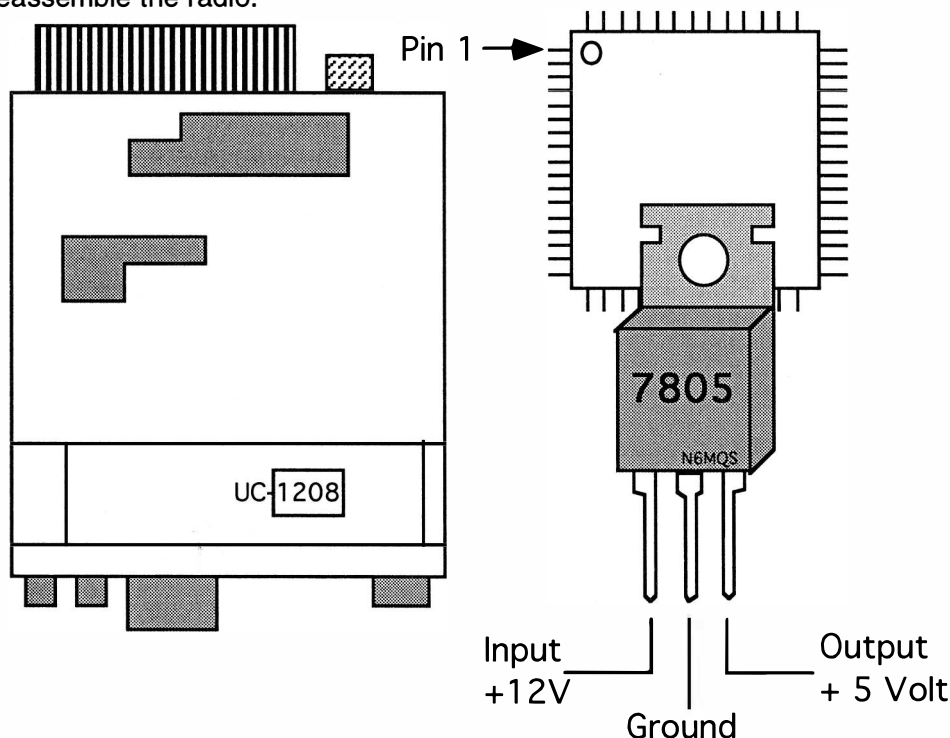
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Radio Shack HTX-100

EXPANDED RF

1. Remove Power and Antenna.
2. Remove 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 through 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.



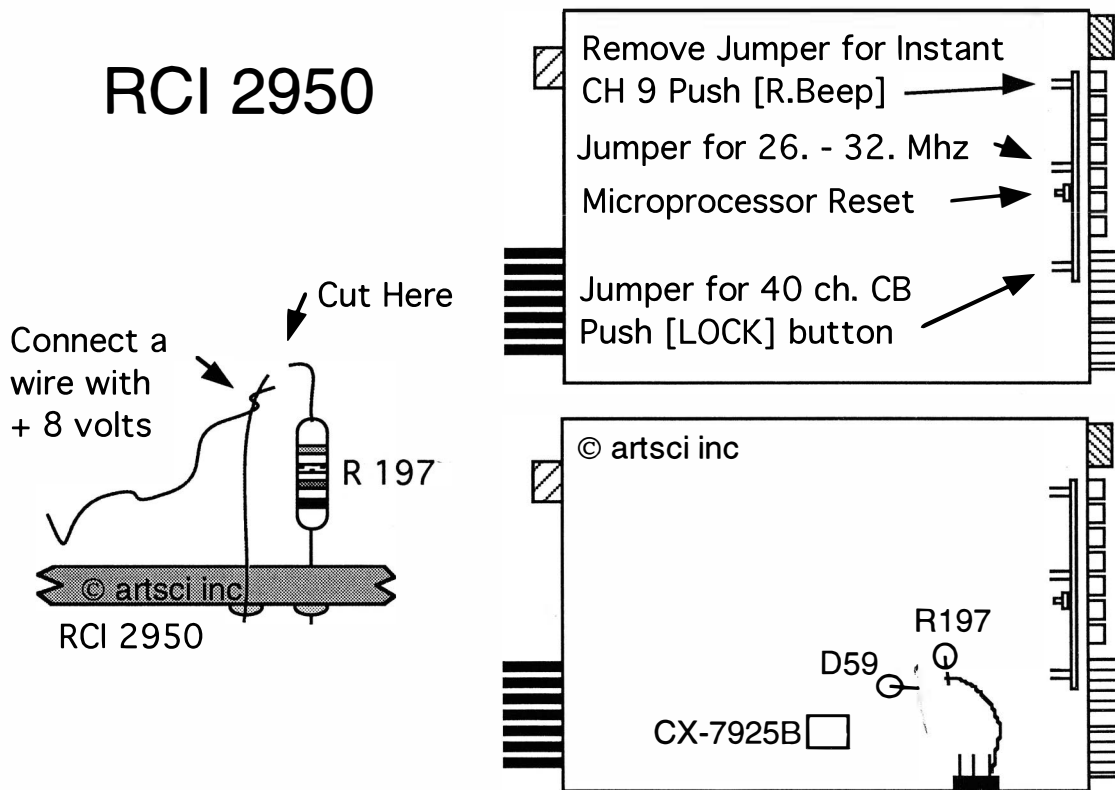
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RCI 2950

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 frequency 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.
Key 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.
Key the transmitter and adjust L28 to zero beat.
Un-key.

More ---



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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. Key the radio 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.

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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.



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Sender TR-450

EXPANDED RF
400 - 469.996 MHz

1. Press [F] and turn power on, then off (RESET Radio)
2. Press [3] and turn power on. (400 - 469 MHz RX)
3. Press [F] & [0] then set CTCSS to 88.5 MHz (use rotary knob)
4. Press [F] & # then set page code to (memory 0 = C000)
5. Press [F] & [3] then set channel step to 5 KHz
6. Press [F] & [9] then keyin 6.1 MHz
7. Press [F] & [0] then [8]
8. Press the [*/ENT] key

Note: during testing, these steps needed to be performed multiple times

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Radio / Tech Modifications

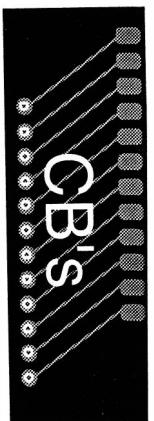
CB Modifications

<u>Model</u>	<u>Modification</u>	<u>Page #</u>]
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Courier	Remove ALC control.....	8
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Dak	Remove ALC control.....	9
Fannon	Remove ALC control.....	9
Fuzzbuster	Remove ALC control.....	9
GE	Remove ALC control.....	9
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Radio / Tech Modifications

CB Modifications

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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
 19 PLUS
 20 PLUS
 21 PLUS
 21 GTL
 21 LTD
 21 XLR
 25 GTL
 25 PLUS
 27
 29 GTL
 29 PLUS
 31 PLUS
 32 XLR
 33 PLUS
 40 PLUS
 78 X
 85
 86 XLR
 87 GTL
 89 GTL
 89 XLR
 132 XLR
 135 XLR
 138 XLR
 139 XLR
 140 GTL
 142 GTL
 148 DX
 148 GTL
 150 GTL
 1000 GTL
 2000 GTL
 REMOTE CONTROL

R-87
 D-502
 VR-502
 D-20
 TR-14
 TR-14 OR D9
 TR-20
 TR-14
 D-20
 X8
 D-20
 R-79 OR D-20
 D-19
 TR-18
 D-17
 VR-104
 C-49
 D-9
 CD-9
 VR-6
 VR-6
 VR-5
 R-134 = AM R-130 = SSB'
 R-134 = AM R-130 = SSB'
 TR-23
 R-132
 TR-32
 TR-32
 VR-14=AM & VR-12=SSB
 TR-24
 RV-14=AM & RV-4=SSB
 VR-6
 TR-24 & C-232
 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.

<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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



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OTHER CB's

CONTINUED

<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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
CRAIG	ROGUE 40	VR-5
	L101	R-226
	L-321	R-605=AM & R-20=SSB

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OTHER CB's

CONTINUED

<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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

<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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
JC PENNY	V SSB	VR-7
	981-6221	D-501
	981-6237	D-7
	681-6241	Q-405
	6218	RV-2

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OTHER CB's

CONTINUED

<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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

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<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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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<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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



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OTHER CB's

CONTINUED

<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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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CONTINUED

<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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

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<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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

<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
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
SILTRONICS	934.381207	D-502
	APACHE	D-14
	MOHAWK	D-14
SHARP	CB-750	R-112
	CB-2260	R-112



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OTHER CB's

CONTINUED

<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
SUPERSTAR	1 2 0 360 FM 3 6 0 0	D-11 VR-14=AM & VR-12=SSB VR-14=AM & VR-12=SSB
TEABERRY	RACER T STALKER I STALKER II STALKER V STALKER IX T BEAR T CHARLIE T COMMAND TITAN T T CONTROL	VR-6 VR-13=AM & VR-12=SSB VR-13=AM & VR-12=SSB VR-4 R-102 VR-5 VR-7 VR-5 D-14 VR-505
TENNA PHASE	CB-22 CB-26	R-46 D-22
TRAM	D-12 D-42 D-60 D-201A D-300	R-61 CD-11 R-98=AM & R-112 SSB VR-77 TR-23
TRUESTONE	CYJ4862A-87 8334	RV-2 Q-15

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OTHER CB's

CONTINUED

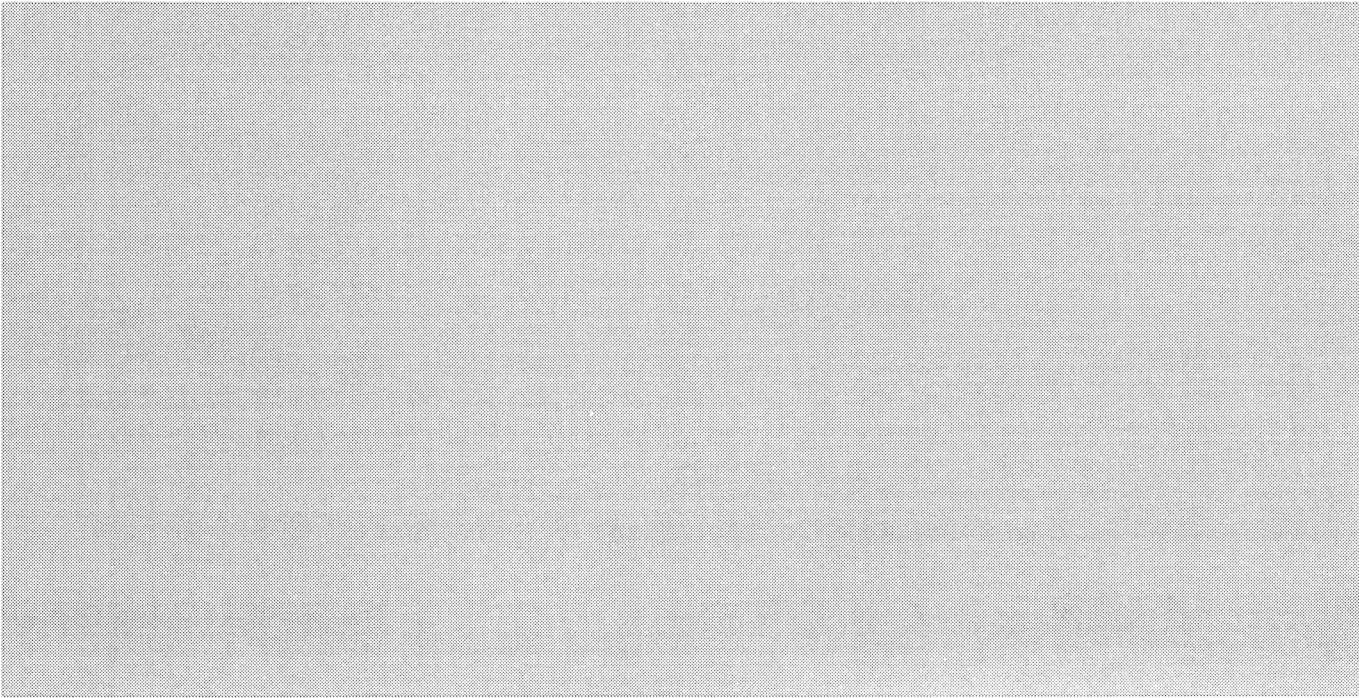
<u>COMPANY</u>	<u>MODEL</u>	<u>REMOVE THIS PART</u>
UNIDEN	2510	VR-112=AM & VR-104=SSB
	2600	VR-112=AM & VR-104=SSB
	PC-3	TR-14
	PRO-640	RV-5=AM & VR-6=SSB
	PC-122	Q-29 (near PL connector)
UTAC	TRX-400	D-11
VECTOR	770	FVR-3
	790	FVR-3
WARDS	GEN-730A	VR-206
	GEN-775A	VR-206
	GEN-828A	VR-206
WHISTLER	700	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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Lined area for notes.



Radio / Tech Modifications

APPENDIX

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



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

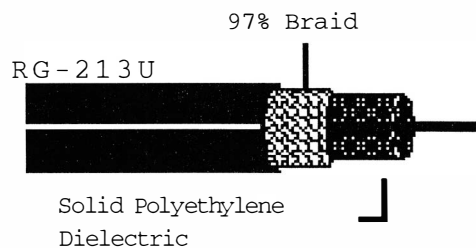
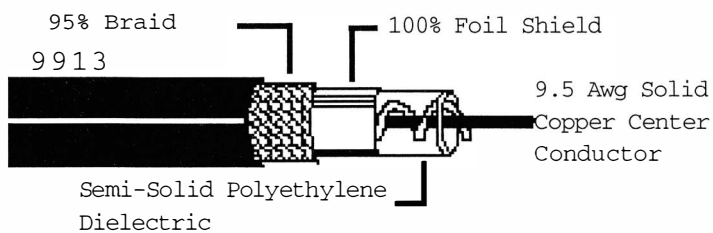
(c)1989 N6MOS

COAX LENGTHS SHOULD BE MULTIPLE HALF WAVELENGTHS.

984

X VEL % = ONE WAVE LENGHT IN FEET.
FREQ. IN MHZ


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



APPENDIX A

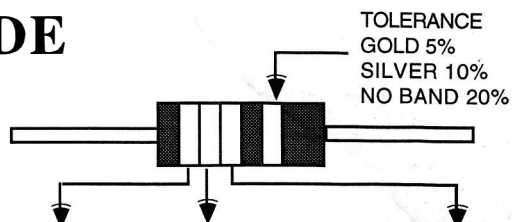
RESISTOR COLOR CODE

Example



BROWN 1
 BLACK 0
 YELLOW 10,000
 SILVER 10%

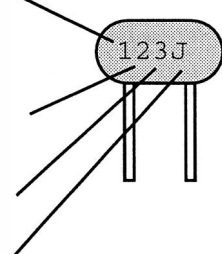
$10 \times 10,000 = 100,000$
 (100K) OHMS



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

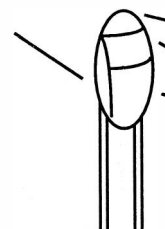
CAPACITORS

1ST DIGIT OF
CAP. VALUE
 2ND DIGIT OF
CAP. VALUE
 MULTIPLIER
 TOLERANCE



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 %

POLARITY &
VOLTAGE

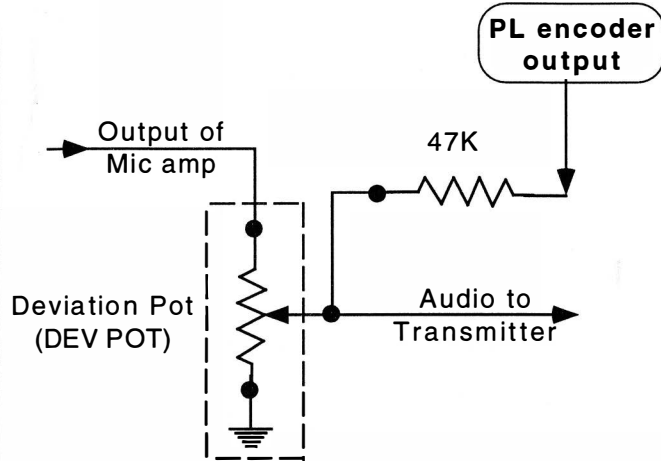


1ST DIGIT
 2ND DIGIT
 MULTIPLIER

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

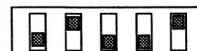
PL Encoder Connections



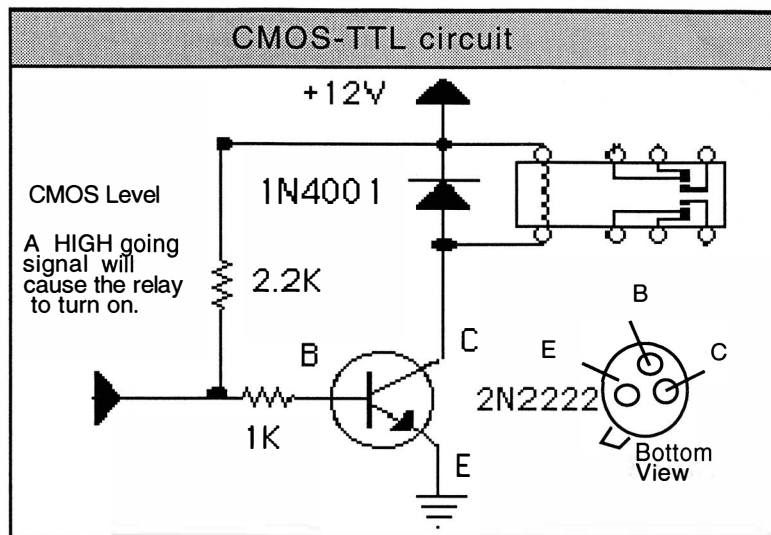
Attach a 47K ohm resistor to the output of the deviation pot. Attach the other end of resistor to the output of the PL encoder.

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						



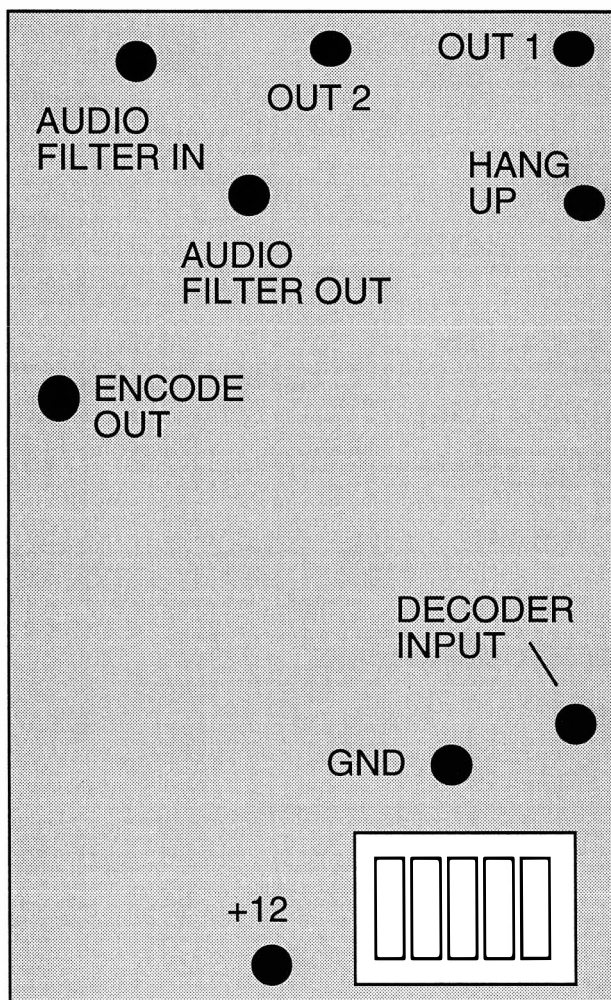
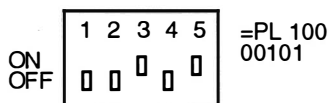
1 = on / 2 = off
example above
01001=107.2



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

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

1 (ON) CLOSED
0 (OFF) OPEN



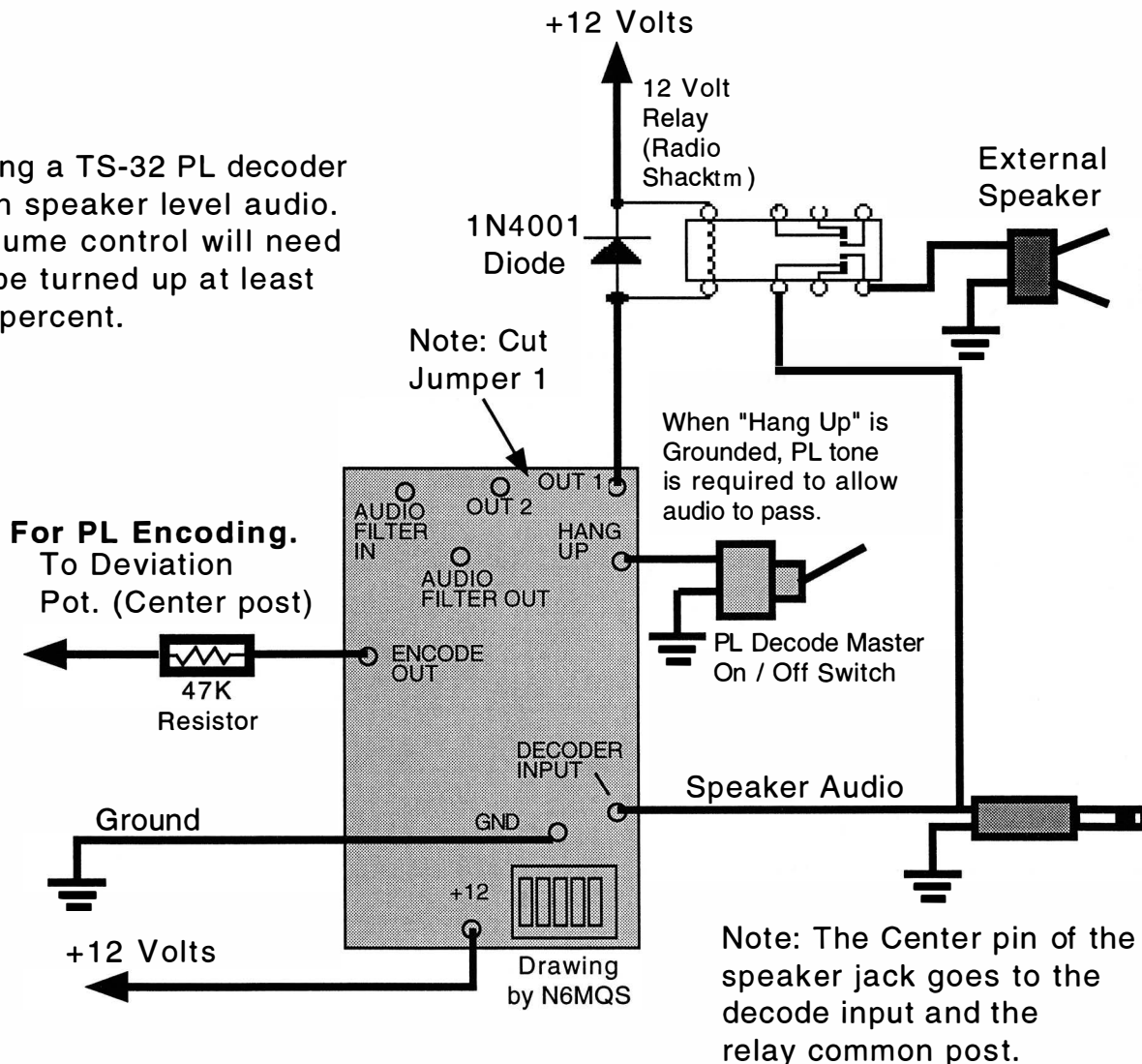
TS-32 LAYOUT

TS-32 HOOKUP

PL Decoder

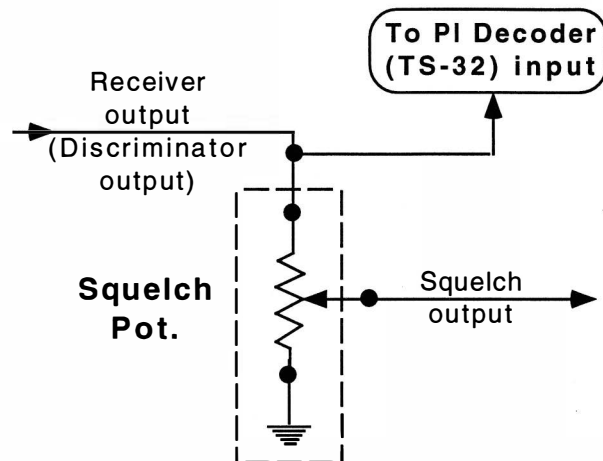
WHEN THE SELECTED PL TONE IS RECEIVED, THE RELAY WILL CLOSE AND AUDIO WILL BE PASSED TO THE SPEAKER.

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



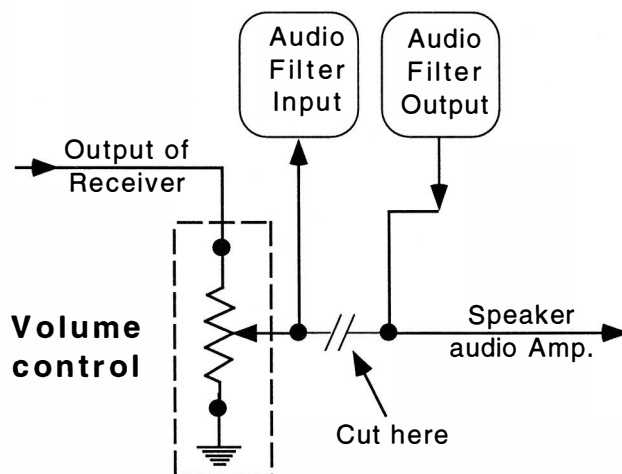
PL DECODER HOOK-UP

PL Decoder Connections



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

PL Decoder/Audio Connections



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


##	FREQ.	DESCRIPTION	HAN	##	FREQ.	DESCRIPTION
----	-------	-------------	-----	----	-------	-------------

1		
2		
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6		
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8		
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100		

QSL Card Order Form

KB6YZD

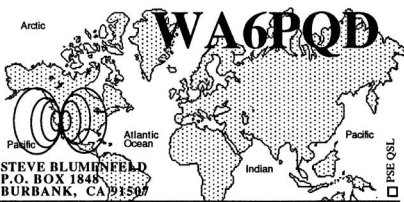


DOUG WYNN
P.O. BOX 1848
BURBANK, CA 91507

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

Globe & Shuttle

WA6POB




STEVE BLUMENFELD
P.O. BOX 1848
BURBANK, CA 91507

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

World Map

N6MQS




AMATEUR RADIO
Bill Smith • P.O. Box 1848 • Burbank, CA 91507

QSO with	DATE	TIME	FREQ	MODE	RST

License Plate

KB6YZD




DOUG WYNN
P.O. BOX 1428
BURBANK, CA 91507

QSO with	mm/dd/yy	UTC	MHz	MODE	RST

Astronaut

KB6SMS

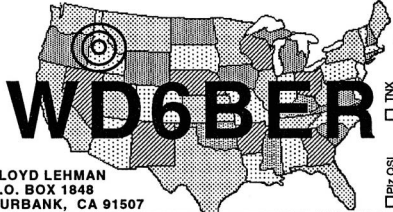


ARNOLD BRATTON
P.O. BOX 1848
BURBANK, CA 91507

QSO with	DATE	TIME	FREQ	MODE	RST

U.S. Map Ham Zones

WD6BER




FLOYD LEHMAN
P.O. BOX 1848
BURBANK, CA 91507

QSO with	DATE	UTC	MHz	MODE	RST

U.S. Map Patchwork

WR6S

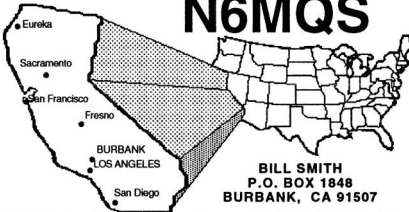


PAT JASPER
P.O. BOX 1848
BURBANK, CA 91507

QSO with	DATE	TIME	FREQ	MODE	RST

Eagle on the moon

N6MQS




BILL SMITH
P.O. BOX 1848
BURBANK, CA 91507

QSO with	DATE	GMT	MHz	MODE	RST

California/U.S. (CAL ONLY)

SWL



DOUG WYNN
P.O. BOX 1848
BURBANK, CA 91507

Station	mm/dd/yy	U.T.C.	Frequency

Globe (Short Wave Listener)

Call Sign _____ or "SWL"

Name _____

Address _____

City, State Zip _____

Phone # (____) _____ - _____

☐ Put Phone # on QSL Card

☐ Put Phone # on Eyeball (small) Card

QSL ORDER FORM

QSL Card Style (Choose one)

- ☐ U.S. Map Patchwork
- ☐ U.S. Map Ham Zones
- ☐ World Map dots
- ☐ World Map
- ☐ California/U.S.
- ☐ License Plate
- ☐ Astronaut
- ☐ Eagle on the moon
- ☐ Globe & Shuttle
- ☐ Globe (SWL)

All QSL cards are printed on five colors of card stock. This gives you 20 cards in each color.

Delivery will be about 2-3 weeks.

SELECT desired QSL style.

Mail the form and Payment to the address below. 73s

☐ First 100

\$ 8.95

☐ Additional 100's

\$ 5.95

☐ 100 Business card size

\$ 7.95

☐ Package of QSL Holders

\$ 4.99

Mail this form and payment to:

Kamko (818) 843-4080
P.O. Box 1428
Burbank, CA 91507

Total

TAX 8.25%

Shipping \$ 4.00

Total Due

Books from

artsci

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Earn your No-CODE amateur license.

The easy way!!



Have you ever wanted to get your Amateur radio license? Want your son or daughter to get their license? This new cartoon book will step you through the questions in a fun and interesting way. Over 100 mini tests will help you study and pass the Novice and No-Code Technician tests.

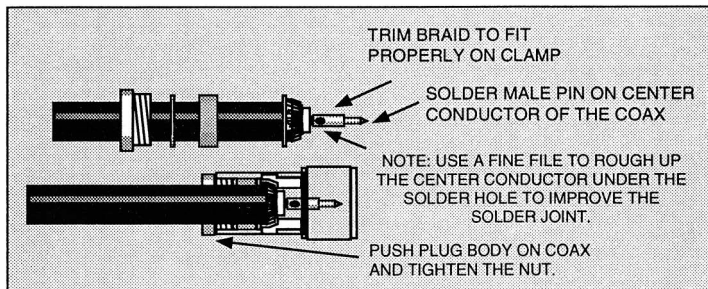
\$ 14.95

You'll meet the Phonetics, as they study and discuss all aspects of amateur radio. Detailed drawings make this book as interesting to adults as it is for kids.

112 comic strips review all the questions and answers in 288 pages.

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Why search through countless books for that one piece of information when it's so easy to find in the Amateur Handbook. A true cornucopia of technical information of information for ham radio. Not only will you find the theoretical aspects, you will find real practical information presented in a no nonsense form.



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

133 pages.

\$ 14.95

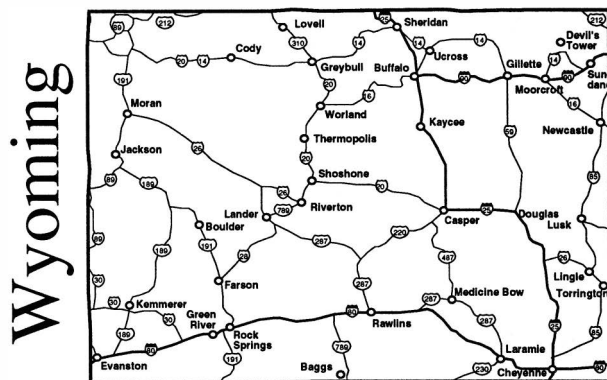
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AMATEUR REFERENCE

U.S. REPEATER MAPBOOK

A PERFECT travelling companion. The Mapbook contains locations of hundreds upon hundreds of open repeaters throughout the U.S., Canada and Mexico.



These DETAILED maps show all highways and major cities in each state. If you travel anywhere in the United States, this MAPbook will be the best investment you ever made!!

NEW in this edition are table listing of every know open repeater in the state. 10,6,2 meter, 220, 440 MHz and 1.2 GHz repeaters are shown.

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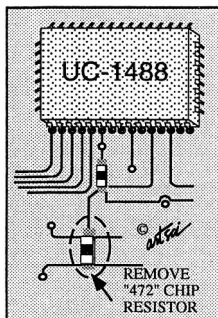
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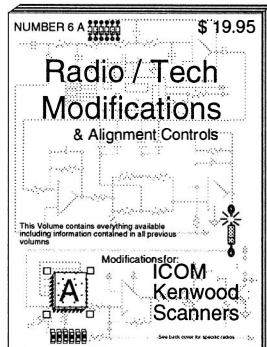
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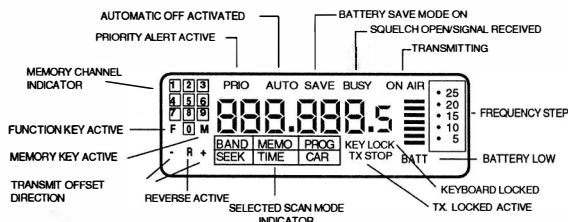


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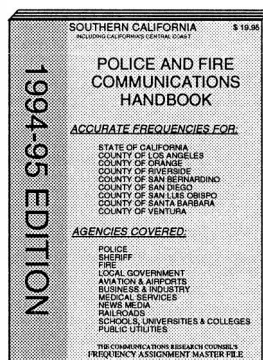
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Palomar	Xtal
Panasonic	Zexon
Pearce Sim	

∞ Frequency Expansion
• Alignment controls

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