

# Modifications for the ICOM

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**(IC-Q7)** [IC-Q7 Erfahrungen](#) German language

**(IC-Q7)** [Extending fq-tx coverage on IC-Q7E](#) English language

**(IC-Q7)** [Icom Q7A mods from the factory](#) English language

**(IC-Q7)** [Modifying the ICOM IC-Q7A for RX/TX](#) English language

**(IC-Q7)** [Expand transmit from 136-174 and 400-470 for IC-Q7E. \(Australian version\)](#) English language

**(IC-Q7)** [IC-Q7 Programming utility 1.05 \( Goran Vlaski \), Wide RX 0-30MHz, Adjustment mode](#) English language

**(IC-Q7)** [IC-Q7A Full Transmit From 140 - 174 MHz and 400 - 470 MHz](#) English language

**(IC-Q7)** [9k6 with ICOM IC-Q7E](#) German language

**(IC-R10)** [IC-R10 Instruction Manual QUICK REFERENCE by PY3PSI](#) English language

**(IC-R10)** [ICOM R10 Receiver Modification to Provide S-Meter Output](#) English language

**(IC-R10)** [IC-R10 discriminator output modification](#) English language

**(IC-R3)** [IC-R3 to receive SSB from DC to 2.450GHz including the AO-40 satellite](#) English language

**(IC-R71)** [RAM Card Backup Battery Replacement Instructions](#) English language

**(IC-R71)** [RAM board programming interface & R71A modification](#) English language

**(IC-RP3010)** [IC-RP3010 disable the CTCSS](#) English language

**(IC-T2)** [Expand TX/RX frequency](#) English language

**(IC-T2)** [IC-T2H Receive 100-200 MHz](#) English language

**(IC-T22)** [To expand receive from 136-174MHz FM to 136-174/270-410MHz FM:](#) English language

**(IC-T22)** [Extended transmit for IC-T22](#) English language

**(IC-T3H)** [Extended RX/TX](#) English language

**(IC-T7A)** [Icom IC-T7A Mods](#) English language

**(IC-T7H)** [Expand frequency](#) English language

**(IC-T7H)** [Disassembly instructions for IC-T7H](#) English language

**(IC-T8)** [IC-T8 AM/FM/Wfm function](#) English language

**(IC-T8)** [Software mods to open the RX-band](#) English language

**(IC-T8)** [Problem with the battery pack](#) English language

**(IC-T8)** [TX Mod for the IC-T8a](#) English language

**(IC-T8)** [Sensitivity for the IC-T8E after freq modification](#) English language

**(IC-T8)** [Cellular mod](#) English language

**(IC-T81)** [IC-T81 AM/FM/Wfm function](#) English language

**(IC-T81)** [IC-T81 Frequency Expansion](#) English language

**(IC-T81)** [ICOM IC-T81A Cellular Mod](#) English language

**(IC-U16)** [How to program the ICOM-U16](#) English language

**(IC-U2AT)** [Extended TX mod for the Icom IC-u2AT](#) English language

**(IC-V8)** [IC-V8 MOD for expanded RX/TX range. \(136 – 174MHz\)](#) English language

**(IC-V8000)** [v8000 gne caper](#) English language

**(IC-W21)** [Receive only expansion for IC-W21](#) English language

**(IC-W21)** [Transmit expansion for IC-W21](#) English language

**(IC-W21)** [Full cross band repeater operation](#) English language

**(IC-W21)** [Band expansion 50-999 MHz for IC-W21](#) English language

**(IC-W2A)** [IC-W2A Expand frequency](#) English language

**(IC-W2A)** [IC-W2A Cross Band Repeat Function](#) English language

**(IC-W2A)** [IC-W2A Extended Transmit Mod](#) English language

**(IC-W2A)** [IC-W2A signal level](#) English language

**(IC-W2A)** [IC-W2A Weak transmit audio](#) English language



**(IC-W2E)** [IC-W2E Expand frequency](#) English language

**(IC-W31)** [IC-W31E Frequenzbereichs-Erweiterung](#) German language

**(IC-W31)** [IC-W31E CROSS-BAND-REPEATER](#) German language

**(IC-W31)** [IC-W31 RX Mod](#) English language

**(IC-W31)** [RX/TX expand for ICOM IC-W31E](#) English language

**(IC-W31)** [IC-W31 RX mod part 2.](#) English language

**(IC-W31)** [Cross Band Repeating with the Icom IC-W31A](#) English language

**(IC-W32)** [Expanded Frequency Coverage on TX/RX for the Icom IC-W32A/E](#) English language

**(IC-W32)** [Crossband repeater and extended RX/TX mods](#) English language

**(IC-W32)** [To extend the receiver and open up 800 MHz receive \(cellular blocked\) for IC-W32A](#) English language

**(IC-W32)** [IC-W32 TX modification. Only a picture.](#) English language

**(IC-W32)** [ICW32 E Crossband repeater](#) German language

**(IC-W32)** [Icom IC-W32A programming glitch](#) English language

**(IC-X2A)** [Cross Band Repeat Function for the ICOM IC-X2A](#) English language

**(IC-Z1A)** [IC-Z1A Extended Receive](#) English language

**(IC-Z1A)** [IC-Z1A 800-900 MHz Receive](#) English language

**(IC-Z1A)** [Pictures for the two modification above](#) English language

**(MISC)** [ICxx71 ram adaptor for use with eprom programmer](#) English language

**(MISC)** [BNC connectors for ICOM HTs replacement](#) English language

**(MISC)** [CAT interface for any ICOM](#) English language

**(MISC)** [Reset ICOM radios](#) English language

**(MISC)** [Use ICOM SM-20 Mic to Yaesu ,Kenwood, etc.](#) English language

**(MISC)** [Icom Hex Addresses](#) English language

**(MISC)** [QRP mod for ICOM transceivers](#) English language

**(PS85)** [ICOM PS85 fan modification](#) English language

**(R-1)** [R1 \(and IC-nSAT\) Owners Note](#) English language

**(R-7000)** [Examining the icom ic-r7000 receiver](#) English language

**(R-7000)** [Cool your R-7000 receiver with another heat sink](#) English language

**(R-7000)** [Add a cooling fan to your R-7000 receiver](#) English language

**(R-7000)** [TV interface for R-7000](#) English language

**(R-7000)** [198 channels for your R-7000](#) English language

**(R-7000)** [Modify your ICOM R7000 to scan and search faster](#) English language

**(R-7000)** [A low cost panadaptor for the R-7000](#) English language

**(R-7000)** [The frequency displayed and actually received are not the same](#) English language

**(R-7000)** [The S-meter may not drop to 0 when recieve 500-800 MHz](#) English language

**(R-7000)** [Increase the number of memory channels to 200](#) English language

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**(R-7000)** [R-7000 Display/Sensitivity Problem](#) English language

**(R-7000)** [IC-R7000 scanning improvement](#) English language

**(R-7000)** [Intermittent display](#) English language

**(R-71)** [Tricking the ICOM R-71A to tune below 100 KHz](#) English language

**(R-71)** [Modifications to the Icom R71A IF filter selection circuit](#) English language

**(R-71)** [Here is the R-71 version of the Drake R7/R8 type passband tuning system](#) English language

**(R-71)** [R-71A Memory Notes](#) English language

**(R-7100)** [Modify your Icom R7100 to provide an output directly from the discriminator](#) English language

**(R-7100)** [Icom R7100 Discriminator Mod](#) English language

**(R-8500)** [Operating the Icom R8500 in other contries](#) English language

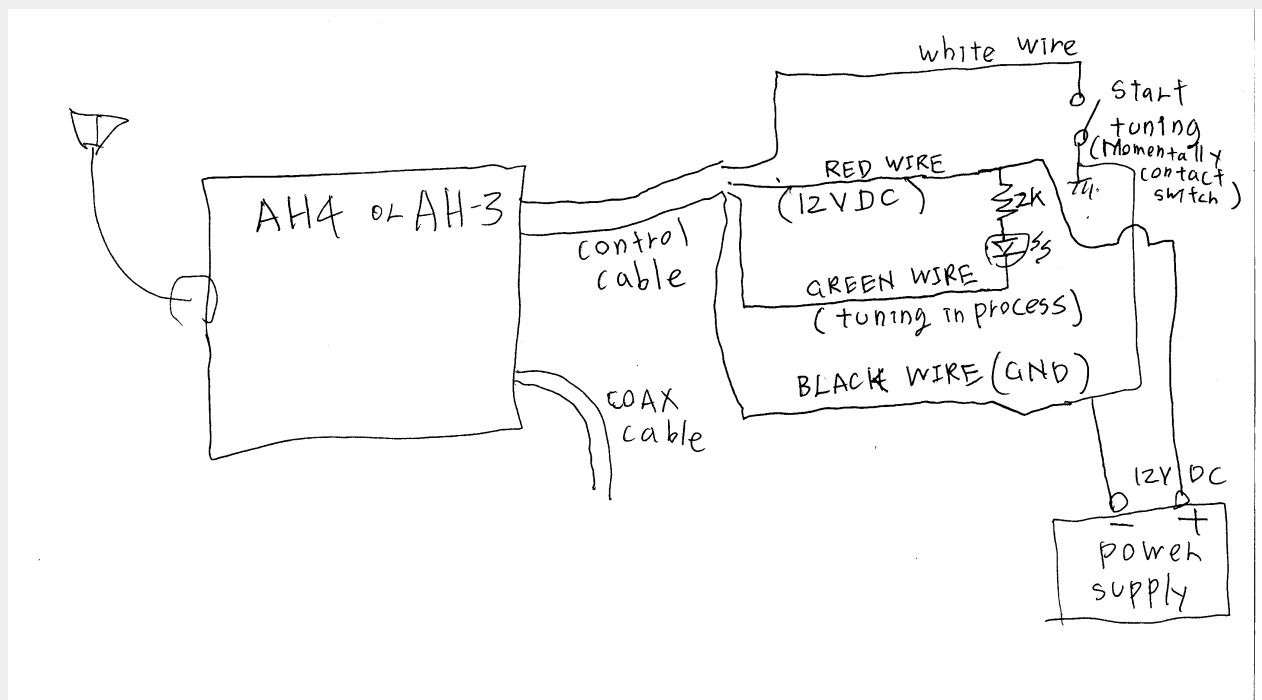
**(SM-20)** [Icom SM-20 desktop microphone wiring](#) English language

31-01-2000

## (AH-4) Icom, AH-4, AH-3 ( automatic antenna tuner ) connection to any radio.

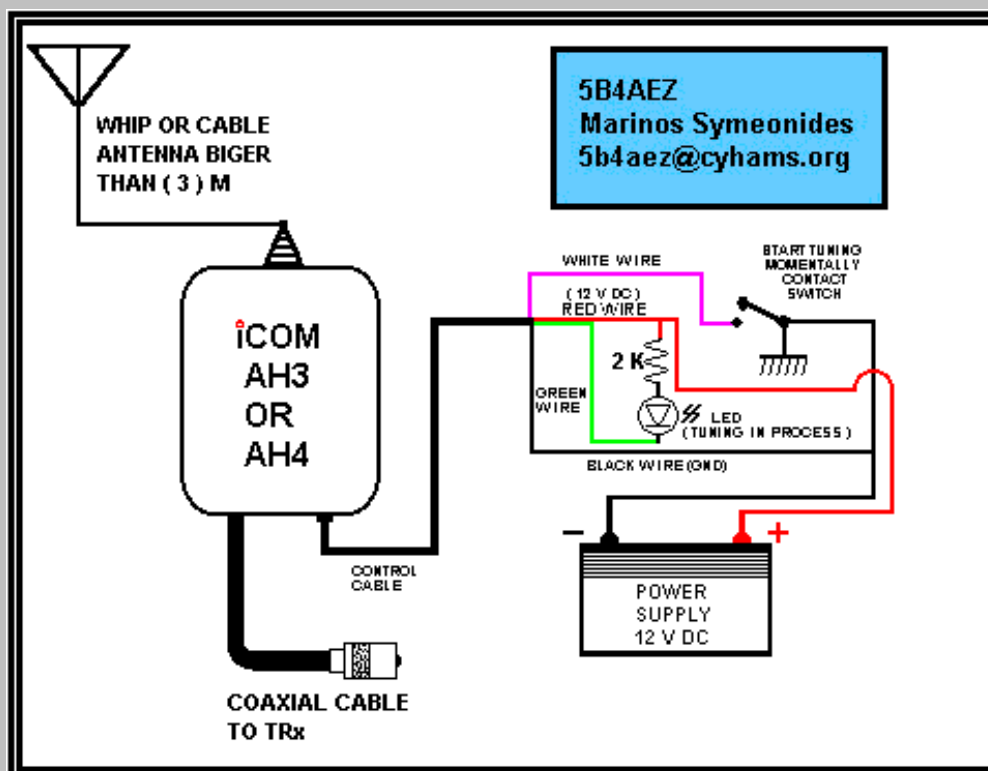
Author: AA7OL Niko Takahashi - [aa7ol@hotmail.com](mailto:aa7ol@hotmail.com). [MODIFICATION.NET](http://MODIFICATION.NET)

Icom AH-4 and AH-3 ( automatic antenna tuner ) connection to any radio



Both AH-3 and AH-4 are similar

Here is a redesign of connection diagram of the ICOM IC-AH3 and IC-AH4 by 5B4AEZ.



There is four wire control cable coming out beside coax cable.

Control cable has

White: Start tuning

Green: Tuning in process

RED: 12 V DC input

Black: GND

### Tuning Process

1. Put about 10 watts of power into tuner. ( CW )

2. After about 0.5 second, press start switch for a moment. ( use momentary contact switch )
3. LED start blinking , which indicate tuning is in process.
4. After about 3 seconds or so, LED shut off, and tuning is completed,

If tuning is successful SWR should be less than 1.2

---

Some radio start to reduce the power when SWR is high, this tuner takes at least 10 watts of power for tuner to work properly. Most of the 100 watts radio should not have any problem, since they still put out 10 watts or so, even with high SWR.

But, it does not work with some QRP radio ( 5 watts or less ).

Adjust power level, if necessary.

You may extend control cable to 100 feet , it still work fine, you can put this tuner on top of tower.

Let me know , how it worked

[aa7ol@hotmail.com](mailto:aa7ol@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This modification is read 1503 times.

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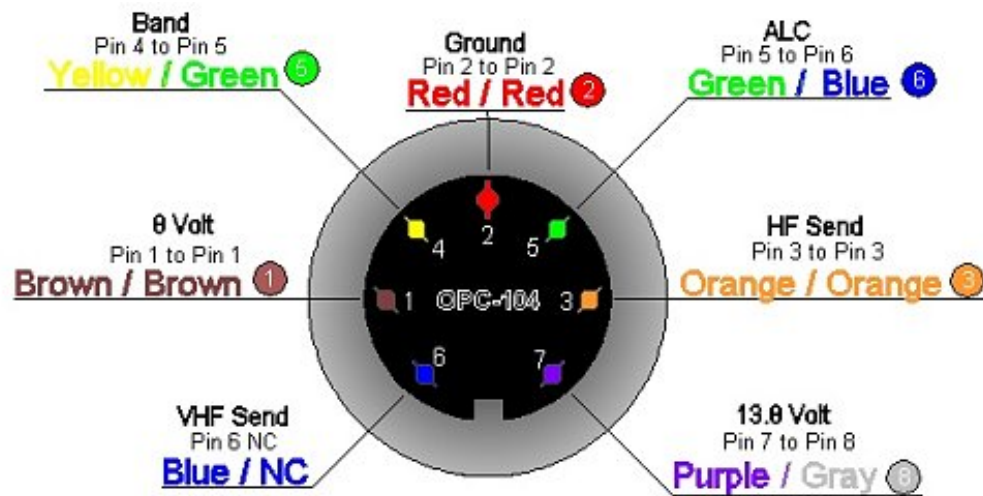
**07-06-2001**

## **(AT-160) Using the AT-160 with the IC-706MKII**

**Author:** Dave Abshire Sr. - KG4KOX - [KG4KOX@aol.com](mailto:KG4KOX@aol.com).[MODIFICATION.NET](http://MODIFICATION.NET)

ICOM's IC-706MKII transceiver and AT-180 antenna tuner are designed to work together. However, ICOM's AT-160 is a very popular antenna tuner. Originally designed to work with the IC-728 and IC-729 transceivers (now out of production), the AT-160 will work with the IC-706MKII if the following instructions are followed:

1. (IC-706MKII only, not IC-706) The IC-706MKII will transmit on VHF constantly when connected to the AT-160. To stop this, remove the wire attached to pin 6 of the DIN connector within the OPC-104 cable.
2. Open the AT-160 and make sure the switch labelled "S1" on the circuit board is switched to the bottom, shown as "IC-725/726" in the AT-160 instructions.
3. Make sure that the connections to the AT-160, using the OPC-319, OPC-104, or OPC-125C cables, are according to the AT-160 instruction manual. ICOM America suggests using the OPC-599 adapter cable for connection of the OPC-104 to the IC-706MKII.
4. Connect the radio to the transmitter terminal and connect an antenna to the ANT terminal. Make sure the antenna has less than a 3:1 SWR. Place the radio in FM, AM or RTTY mode and key the mic. The AT-160 will now tune properly.
5. The tuning button on the front of the IC-706MKII will not operate when using the AT-160 antenna tuner. This feature was designed to work with the AT-180.
6. Check the SWR presented to the radio. It should be less than 1.5:1. The AT-160 operates with the IC-706MKII as it would with the IC-725 or 726 transceivers. Included with the AT-160 instructions is a page dedicated to the antenna tuner's operation with an IC-725 and IC-726 transceiver. This is not the way the AT-160 operates with the IC-706MKII.
7. There is no way to turn the AT-160 off or place it into "thru" mode when operating with the IC-706MKII.



**For hooking up a Icom AT-160 to a IC-706 MKII,  
Just match the Colors and Numbers on the adapter  
plug that came with the 706 MKII and the OPC-104  
that came with the AT-160.**

*Drawn on Paintshop Pro by  
KG4KOX  
Dave Abshire Sr.*

IC 706  
Rear Pannel  
View



**Date:** 18-06-2001

**User comment**

**From:** [Dave KG4KOX](#)

**Subject:** Extra note

I cut one end off the OPC-104 that came with the AT-160 and used the small 13 pin adaptor that came with the 706 MKII. NOW you must leave pin 6 un-connected or your radio will stay keyed on 2 meters.

I did the mod and it works great on HF but I can't get it to tune proper on 6 meters, It will tune to a 1:1 then next time you key up it will retune again. If anyone knows a way around this please let me know.

Dave  
KG4KOX

This modification is read 711 times.

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**19-07-1998**

## **(AT-500) AT-500 Automatic Antenna Tuner Modification**

I have been using the icom at-500 automatic antenna tuner for six months, and it is a great piece of gear. however, there is a very minor modification i performed to the tuner to better suit my needs.

The tuner automatiacally selects one of four antenna s0-239 connectors on the back depending upon which band you are operating. Many of us utilize one feed line for an 80 and 40 meter dipole or inverted vee. The at-500 (and at-100) has two seperate antenna terminals for these bands. If you desire to use one feed line for both of these lower band antennas, you either have to install a coax switch and manually switch the tuner in line, or unscrew the pl-259 connector from one antenna terminal and install it on the other. All of this is inconvenient and defeats the purpose of an automatic tuner.

The mod i performed is extremely simple. I moved the wire going to antenna terminal #3 and moved it to terminal #2. This directs the 80 meter rf to the same terminal as the rf for 40 meters and allows one to use the same antenna terminal for both bands and one feed line. To perform the change, remove the top cover of the tuner, locate the two correct terminals using page 6 of the manual, unsolder the one to be move, and solder it to the correct terminal. The terminals are easy to reach. Just be sure all connections are good.

This modification is read 912 times.

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**21-10-1999**

## **(AT-500) ICOM AT-500 Tuner Hint**

**Author:** Dave Parlier - [dcparlier.nj@worldnet.att.net](mailto:dcparlier.nj@worldnet.att.net).[MODIFICATION.NET](http://MODIFICATION.NET)

10/12/99

The IC AT-500 Auto Tuner has four (4) antenna coax plugs on the rear for various bands. You can solder all band wires needed to a single terminal lug and use only one (1) coax connector, if desired (per ICOM user manual). If you prefer not to "go inside" , then two short coax pieces fed into a "T" coax connector will feed two separate frequency ranges (e.g. 80m & 40M) into a single connection point.

Dave Parlier W2CGG  
Chatham, NJ

This modification is read 822 times.

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**19-07-1998**

## **(I290) Icom I290 scan modification**

The objective of the modification is to implement a delay before scanning restarts when, in SCAN-STOP mode on BUSY frequency, the received signal disappears.

The modification will then allow a frequency to be free for a while before scanning resumes. With this modification, it will be given a chance to a signal to come back within a few seconds before the scanning restarts. Now multiple QSOs or poor signals won't be truncated any more because of a too much impatient scanning !

### WHAT TO DO:

Very simple. On the SENSOR UNIT, just solder a jumper between:

- the unused contact of switch S3 (the one corresponding to the TIMER OFF position of the circuit commanding the SEL pin of IC1)
- and the EMPTY signal of connector J3 (this is the extreme pin nearest S2 on the SENSOR unit)

**ATTENTION**, there are some errors on the electrical scheme that I possess reference A-0488 :

- The S3 switch is represented in position TIMER OFF and not ON as written. You have to reverse labels OFF and ON.
- The signals BUSY and EMPTY on connected are reversed. EMPTY (SQ1) is on the extreme left pin of S3 and BUSY is on 2nd pin of this connector S3. In fact, the switch S2 is drawn in the BUSY position and not EMPTY.

### HOW IT WORKS :

The TIMER starts when pin SEL of IC1 goes to 0V. When the TIMER is running, the scanning is halted.

The scanning also stops when the BUSY signal is low level (0V) on pin SQL of IC1.

Let us suppose that a signal is received. Then BUSY goes to 0V and scanning halts. At the same time the EMPTY signal , which is the inverse of BUSY, goes to 5V and the TIMER remains off.

If the received signal disappears BUSY goes high and EMPTY low, then the TIMER is enabled and starts running. It also maintains the scanning in halt mode.

If, at the end of the TIMER delay, no signal has come back then the scanning restarts.

If a signal comes back before the end of the TIMER delay then the BUSY signal returns to 0V and maintains the scanning in halt mode. In the meantime the TIMER will run until the end of its delay without any action on the process.

The TIMER delay is chosen with the R32 potentiometer on the SENSOR UNIT. The minimum value is about 4 to 5 seconds which is perfect for this working mode.

Small modification .... great effect !  
Gabriel F6DQM @ FF6PTT.FRPA.FRA.EU

This modification is read 407 times.

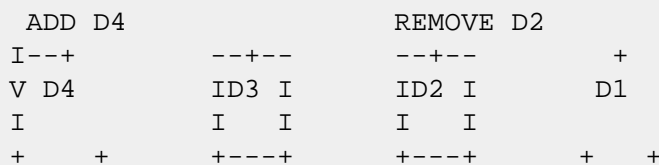
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**19-07-1998**

## **(IC-02) Band expansion modification for IC-02AT**

FOR SERIAL NUMBERS ABOVE 34000  
BY LTC STEVE PETERS, CAP

1. Remove back from radio (5 screws) and bottom plate (4 screws).
2. Carefully remove radio chassis from front case by pulling out top of radio and lifting slightly (to remove battery contacts from bottom case). Be extremely careful of ribbon cable and heat sink compound on power amplifier module.
3. Remove diode D2 from matrix board.
4. Add diode D4 (any small diode 1N4148; 1SS211)
5. The following is a schematic of the matrix board:



6. Install radio chassis back into front cover. Leave back off temporarily.
7. Carefully apply power to radio and enter the lowest desired frequency.
8. Adjust slug through bottom hole on VCO corr for .5 VDC at VCO test point (just below VCO shield) at lowest desired operating frequency.
9. This completes the modification. A few words of caution: 1. The radio is not type accepted for use in the commercial band. 2. Make sure you reinstall the battery latch correctly on bottom of radio or battery will become permanently locked onto radio. 3. Tighten screws on bottom of radio snugly. If they loosen while battery is connected you cannot remove the battery. (This has happened to any units and it would be prudent to periodically check these screws to assure their tightness.)

This modification is read 1612 times.

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**19-07-1998**

## **(IC-02) Audio modification for IC-02 AND IC-04**

This audio mod works on the 02 and 04AT. It increases the level of audio, as well as rolling off some of the lows. Sounds real nice. It involves the circuit around Q105.

1. Replace C119 with a .01 uF cap (disc ceramic is fine).
2. Parallel R131 with a 1 uF cap (use a tantalum cap).
3. Parallel R132 with a .01 uF cap (disc ceramic is fine).

This is not the same mod as the one International Radio is advertising, which involves changing C117.

I tried an AB-1 Audiolaster from Engineering Consulting, and was very unhappy with the results. I am very pleased with the audio given by this mod (much cheaper too!).

This modification is read 1146 times.

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**19-07-1998**

## **(IC-02) IC-02A Modified PLL rigs**

The modification to the IC-02A to increase the receiver is fairly straight forward although a little delicate. The programming diodes are located on the board directly behind the front panel, and are located in the corner of the board. They are little rectangular black three leaded devices.

The procedure to modify the radio is as follows:

1. Remove diode D2 - use a very small iron and solder wick to remove most of the solder, then lift the diode GENTLY while heating the single tab side. After getting the first tab free, proceed to the other two tabs, lifting them one at a time. Do NOT use a large iron or too much heat.
2. Take the diode and locate in the position labeled D5. Carefully solder the diode in place.
3. Reassemble the radio except for the back.

4. Program the radio to the local weather channel (162.400 or 162.550) in the following manner: 6 2 4 0 0 or 6 2 5 5 0

**NOTE:**

the programming procedure now requires that you enter the ten's of Mhz when entering a frequency.

5. Look at the back of the radio. In approximately the center of the exposed board is a metal can with two adjustments. The top adjustment is a metal screw (actually a trimmer capacitor) while the bottom adjustment is a black slug with a small rectangular adjusting slot
6. With the squelch open, adjust the lower black core counterclockwise approximately 1 1/4 turns until you receive the weather station. As soon as you receive the weather, STOP turning the adjustment.
7. Replace the back on the radio and you are in business.

With this modification, the radio will tune from 140.000 Mhz to something over 162.550 without difficulty. Just remember that you must enter the ten's of Mhz when entering a frequency. This modification does not affect the transmitter which still covers 140.000 to 151.995 Mhz.

Please note: This mod does not retune any of the RF stages of the receiver so the sensitivity is down some at the weather frequency, however, I have no difficulty receiving it at thirty to forty miles.

I do have the ICOM service manual on the IC-02A. I purchased it from Delaware Amateur Supply at a local hamfest several weeks ago.

According to the manual, the VCO on the PLL should cover 25 Mhz. minimum.

This modification is read 1203 times.

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**19-07-1998**

### **(IC-02) Low audio speaker mike on IC2A, 3A, 4A OR 02AT**

If you own one of the IC2A, 3A, or 02AT series Hand-helds, you may be interested in reading on. I know my hearing is pretty good, but have you ever tried to listen to the audio coming out of your speaker mike on the above ICOM's? For the most part, it's pretty low. I may be the last guy to figure out a cure for this, but here it is anyway. On the 02AT, etc., there is a groove on the back near the top of the rig that is just the right size to accept the HM9 speaker mike turned 90 degrees so that the mike plug fits in that groove in the rear of the rig. Thus allowing all the audio to be heard from the internal speaker of the rig, usually much better than the speaker mike.

Now, in the case of the 2A series, etc., the fix is more complex. These rigs don't have that handy groove built in, so I decided a groove had to be made to accept this configuration. I thought long and hard about a minute, before getting the "Dremel" out and making my own slot or groove. It works well on both hand-helds I have. In fact, you can hook up an external speaker for even more loudness in the auto. So, give it a try or see me for a demo.

This modification is read 1034 times.

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**19-07-1998**

### **(IC-02) ICOM 02/03/04 & Vox Unit**

The ICOM Family of Hand-Held Radios (02/03/04 AT) are well suited for packet radio given the many available power supply options.

The big problem is getting the PTT to operate "CLEANLY" while not compromising the audio level from the TNC when using the resistor or resistor/capacitor interfaces suggested in some manuals.

I am using the ICOM HS10-SA Vox unit to interface the ICOM 02/04 AT here. It has worked somewhat well for some time but I was always plagued with a MINIMUM 200 msec transmit "hang" delay until I tore it apart for examination and correction.

The small "delay" pot on the front of the unit is in series with a 2.2 Megohm resistor (R-19 on the board). The adjustable pot is also about 2 megohms as well. This combination allows a MINIMUM VOX "hang" transmit delay of 200 msec.

By identifying the solder connections for R-19 on the back of the PC board and placing a low value resistor (or jumper) in parallel...I was able to achieve a ZERO "hang" transmit delay time with the delay pot in the FULL COUNTER-CLOCKWISE position. The minimum 200 msec delay has been defeated.

This modification is read 1050 times.

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**19-07-1998**

## **(IC-02) Another band expansion mods for Icom IC-02**

The following method of modifying the Icom IC02 is an alternate to the IC02.MOD file. This one should give you PL out of band without jumpering 5 VDC to the tone chip. Use 1N914 or equivalent when adding diodes.

1. On the logic matrix, remove D402 and D403.
2. Add D402, D403 and D404 with the cathode at 4 o'clock and the anode at 12 o'clock.
3. Retune the VCO to cover your desired frequency spread. My 02AT did not want to go beyond 163 MHz. I have a friend whowas able to get his to the low 170s.
4. To jump from 140 to 150 or from 150 to 160 (or vice versa) you must "tune across" the boundry, in the same way that you do for an unmodified 02AT. For example, key in 149.995 and then move up until you are in the 150s. You can then enter any 150 MHz frequency (starting with the MHz).

This modification is read 1387 times.

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**19-07-1998**

## **(IC-02) For increased receive audio and improved response**

Solution: Remove C117. C117 is a .22 uf capacitor. It can be located by first finding the 8 pin IC that is neart the middle of the "Main Unit". Looking immediatly above it (above pin 4) untill you see 2 round polarized capacitors. The one on the left is C117. It can be successfully removed by just bending it back and forth untill the leads break. Be carefull to get the right one!

This modification is read 1051 times.

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**19-07-1998**

## **(IC-02) To increase the memory scan and search scan speed**

Solution: Install a 100k ohm resistor across R413. To locate R413 Remove the DTMF Board that is attatched to the inside front of the radio by removeing the two small screws. You will now have the logic unit exposed. IC401 (which is the postage stamp sized IC near the middle of the board) is easily visible. Locate the bottom right corner of this device and continue down until you come to the first micro chip resistor. This is R413. Carefully install a 1/8 Watt or smaller 100K ohm resist or across it.

This dramatically increases the scan speed but also raises the "BEEP" tone frequency.

This modification is read 1082 times.

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**19-07-1998**

## **(IC-02) ICOM HS-10SA VOX for IC-02AT Mods**

The ICOM headset VOX model HS-10SA for the IC-02AT can be a handy unit for mobile use but it has a serious limitation as it comes from the box. There is no way to turn it off other than unplugging it! This means any conversation with a passenger, cough or sneeze goes out over the air.

Fortunately there is any easy remedy. Remove the 3 screws holding on the rear cover and the single screw holding the circuit board. Carefully lift out the board and locate R23. It is a 4.7K 1/8 W resistor located near the lower edge of the board.

One end of it connects to the white lead of the cable to the HT. The other end connects to the collector of Q7. This is the keying circuit. In normal operation, Q7 is saturated when the VOX is active. Since the emitter of Q7 is grounded, R23 is effectively connected from the white lead to ground, keying the HT. Carefully unsolder the end of R23 which goes to Q7 and lift this lead out.

Drill a 1/4 inch hole in the center of the end of the case and mount a SPDT switch. The switch the author used was a C & K 7207 which is a 3 position, center off, SPDT, with one side spring return momentary and the other side latching. This allows the momentary side to be used to key the HT manually, the latching side for the VOX operation, and the center OFF.

Now connect the center pole of the switch to the end of R23 which used to go to Q7. Connect the latching side of the switch to the hole in the board where R23 was (Q7) and the momentary side of the switch to ground (shield of cable to HT). Now reassemble the unit and test.

This modification is read 1015 times.

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**19-07-1998**

### **(IC-03) ICOM 02/03/04 & Vox Unit**

The ICOM Family of Hand-Held Radios (02/03/04 AT) are well suited for packet radio given the many available power supply options.

The big problem is getting the PTT to operate "CLEANLY" while not compromising the audio level from the TNC when using the resistor or resistor/capacitor interfaces suggested in some manuals.

I am using the ICOM HS10-SA Vox unit to interface the ICOM 02/04 AT here. It has worked somewhat well for some time but I was always plagued with a MINIMUM 200 msec transmit "hang" delay until I tore it apart for examination and correction.

The small "delay" pot on the front of the unit is in series with a 2.2 Megohm resistor (R-19 on the board). The adjustable pot is also about 2 megohms as well. This combination allows a MINIMUM VOX "hang" transmit delay of 200 msec.

By identifying the solder connections for R-19 on the back of the PC board and placing a low value resistor (or jumper) in parallel...I was able to achieve a ZERO "hang" transmit delay time with the delay pot in the FULL COUNTER-CLOCKWISE position. The minimum 200 msec delay has been defeated.

This modification is read 462 times.

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**19-07-1998**

### **(IC-04) ICOM 02/03/04 & Vox Unit**

The ICOM Family of Hand-Held Radios (02/03/04 AT) are well suited for packet radio given the many available power supply options.

The big problem is getting the PTT to operate "CLEANLY" while not compromising the audio level from the TNC when using the resistor or resistor/capacitor interfaces suggested in some manuals.

I am using the ICOM HS10-SA Vox unit to interface the ICOM 02/04 AT here. It has worked somewhat well for some time but I was always plagued with a MINIMUM 200 msec transmit "hang" delay until I tore it apart for examination and correction.

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This modification is read 588 times.

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**19-07-1998**

### **(IC-04) Out of band modification for IC-04**

1. On the logic matrix, remove D402.
2. Add D402, D403 and D404 with the cathode at 4 o'clock and the anode at 12 o'clock. (You may use any signal diode such as 1N914)
3. Add D405 with the cathode at 8 o'clock and the anode at 12 o'clock.
4. If you have a newer 04AT, the VCO cover will have holes in it that allow access to the tuning coils. If you have an older 04AT you will have to cut a hole in the VCO cover using a pair of small diagonals (be careful!).
5. Retune the VCO to cover your desired frequency spread. My 04AT goes from 441 to 473 MHz, which is pretty good.
6. Any frequency may be entered directly on the keypad (starting with the 10 MHz digit).

This modification is read 673 times.

[top of page](#)

**19-07-1998**

## **(IC-04) Audio modification for IC-02 AND IC-04**

This audio mod works on the 02 and 04AT. It increases the level of audio, as well as rolling off some of the lows. Sounds real nice. It involves the circuit around Q105.

1. Replace C119 with a .01 uF cap (disc ceramic is fine).
2. Parallel R131 with a 1 uF cap (use a tantalum cap).
3. Parallel R132 with a .01 uF cap (disc ceramic is fine).

This is not the same mod as the one International Radio is advertising, which involves changing C117.

I tried an AB-1 Audiolaster from Engineering Consulting, and was very unhappy with the results. I am very pleased with the audio given by this mod (much cheaper too!).

This modification is read 564 times.

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**19-07-1998**

## **(IC-04) Low audio speaker mike on IC2A, 3A, 4A OR 02AT**

If you own one of the IC2A, 3A, or 02AT series Hand-helds, you may be interested in reading on. I know my hearing is pretty good, but have you ever tried to listen to the audio coming out of your speaker mike on the above ICOM's? For the most part, it's pretty low. I may be the last guy to figure out a cure for this, but here it is anyway. On the 02AT, etc., there is a groove on the back near the top of the rig that is just the right size to accept the HM9 speaker mike turned 90 degrees so that the mike plug fits in that groove in the rear of the rig. Thus allowing all the audio to be heard from the internal speaker of the rig, usually much better than the speaker mike.

Now, in the case of the 2A series, etc., the fix is more complex. These rigs don't have that handy groove built in, so I decided a groove had to be made to accept this configuration. I thought long and hard about a minute, before getting the "Dremel" out and making my own slot or groove. It works well on both hand-helds I have. In fact, you can hook up an external speaker for even more loudness in the auto. So, give it a try or see me for a demo.

This modification is read 556 times.

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**19-07-1998**

## **(IC-04) TX delay may be excessive at low temperatures**

Model: IC-04AT

Division: Amateur

Note: This service bulletin is meant for technical personnel with experience working on solid state communications equipment. Damage caused by improperly installing this modification may cause ICOM to charge for subsequent repairs to the product. ICOM does not warrant this modification.

Bulletin #: 02988-002

Date: January 1, 1988

Subject: Transmitter delay may be excessive at low temperatures (can be up to 2 or 3 seconds).

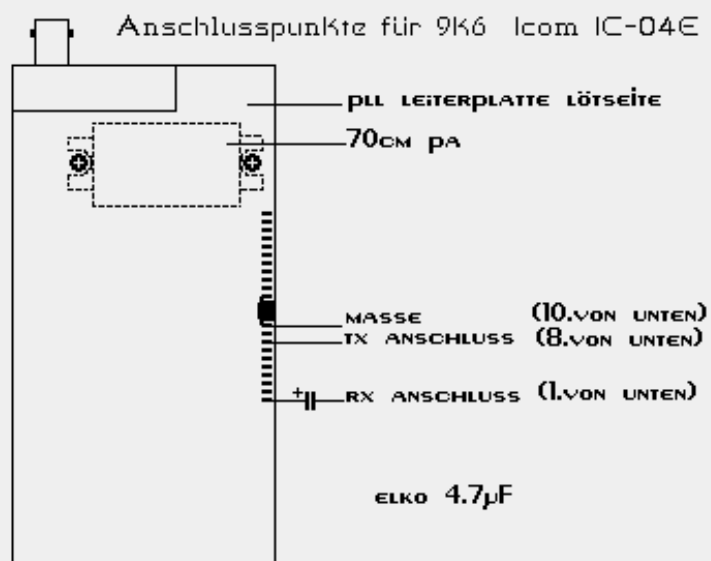
### **Procedure**

1. Remove the front and rear covers.
2. Remove the volume and squelch knobs by pulling up on them. Push down the high/low power and lamp switch. Remove the four screws in the metal chassis corners. Unfold the chassis.
3. Replace R262 (currently 560K) with a 2.2 Meg resistor (ICOM P/N 915-01277).
4. Reassemble the radio.

**19-07-1998****(IC-04) IC-04E fuer 9k6**

Hallo,

hier nun ein Gif-Bild, aus dem man die Einspeis/Abgreifpunkte für 9k6 ersehen kann.



So, damit dürfte alles klar sein...

Der Elko dient der Gleichspannungsentkopplung, da dort ca. 2.5V anliegen

Ausführlichere Erklärung (Um das Gehäuse zu öffnen schraube man...) spare ich mir, da ich jedem Amateurfunker soviel Geschick zutraue..hi Das ganze funktioniert ganz gut, allerdings sind noch keine Langzeit- erfahrungen bekannt. Gewährleistung, welcher Form auch immer, wird natürlich nicht übernommen.

**01-04-2001****(IC-1200) Expanded RF 870 - 960 MHz for ICOM IC-1200****Author:** John kb2ljj

1. Remove power and antenna.
2. remove screws and open the radio.
3. Locate and CUT resistor R-52 on logic " A " unit.
4. Install NEW antenna connector to position J2 on RF board. **Note:** a different antenna is required for the 870-960 bands.
5. Reassemble the radio.
6. Reset the microprocessor. ( Hold down the tuning control and Turn the power ON ) or ( Insert a toothpick in hole in the corner of the bottom cover.)

Adjustement: R-8 Low TX power and Hi TX power All the MODS are captured by Packet. KB2LJJ

73s John kb2ljj

**19-07-1998**

## **(IC-1271) VOX of an IC-271,471,1271 usable for FM**

How to make the VOX of an IC-271,471,1271 usable for FM :

1'st type of "main-board" :

The only thing to be done is to add a diode such as 1n4148 or bax13 on the MAIN board on the position D74  
When D74 is inserted ... the vox works in FM also.

The diode is on the schematic diagram of the Main board but is not mounted on the pcb in the factory.

73's de stefaan

ON4BY @ ON4HU

16/03/1990 18.31 h

2'nd type :

(On this board a D74 is present (near PA- and RF-YGR- Unit))

(It might be not present in the plans !)

Disconnect the cathode of D69 from it's old position. It's new position is the cathode of D50 or D51

```
name ! position on main board ! (old) function !
D69 ! near "CW-DELAY". ! "FM -VOX-OFF" ! FM 8V
D50 ! near "RF-YGR-Unit" ! "USB-VOX-ON" ! USB8V
D51 ! near "RF-YGR-Unit" ! "LSB-VOX-ON" ! LSB8V
```

20/03/1990 16.52 h

This modification is read 572 times.

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**30-03-2001**

## **(IC-1271) RAM Card Backup Battery Replacement Instructions**

**Author:** ICOM

In the early 1980s Icom America marketed a group of transceivers and radios that utilized the latest state-of-the-art computer technology to enhance the operation of the radios. This technology improvement allowed hams to afford a reasonably priced high performance transceiver which until then was only available on units costing much more. Features now available to the hams included: higher frequency stability, better frequency resolution, digital frequency display, almost instant recall of saved frequencies (memory channels), quick mode signal processing and built in tones and offsets for the rapidly emerging repeater operation.

Implementation of all these features required a CPU with associated logic circuitry. In the early 80s, the most cost effective way to implement data processing and memory functions was through a DRAM (Dynamic Random Access Memory) to control the CPU. This DRAM was a volatile memory integrated circuit which required a lithium battery to retain its instruction set. The following receivers and transceivers had such RAM units:

IC-271 ; IC-471 ; IC-1271 ; IC-745 ; IC-751/A ; IC-R71A

The lithium batteries in these units typically lasted about 5 to 7 years before replacement was required. This was specifically noted in each of the Owners Manuals for the products.

This lithium battery can be replaced by the radio owner if care is used. The following is a recommended procedure to accomplish this:

### **Procedure**

1. Disconnect the power cable from the radio, and take the cover off.
2. Unplug the RAM board and remove it from the radio.
3. Temporarily solder a 3 Volt DC battery source across the existing battery terminals (see suggested connection points on the circuit board pictures).
4. Unsolder the old lithium battery and replace it with a new one. (BR2325 1HC, ICOM stock number 945 03112)
5. Unsolder your temporary 3 Volt DC source.

6. Reinstall the RAM board into the radio.

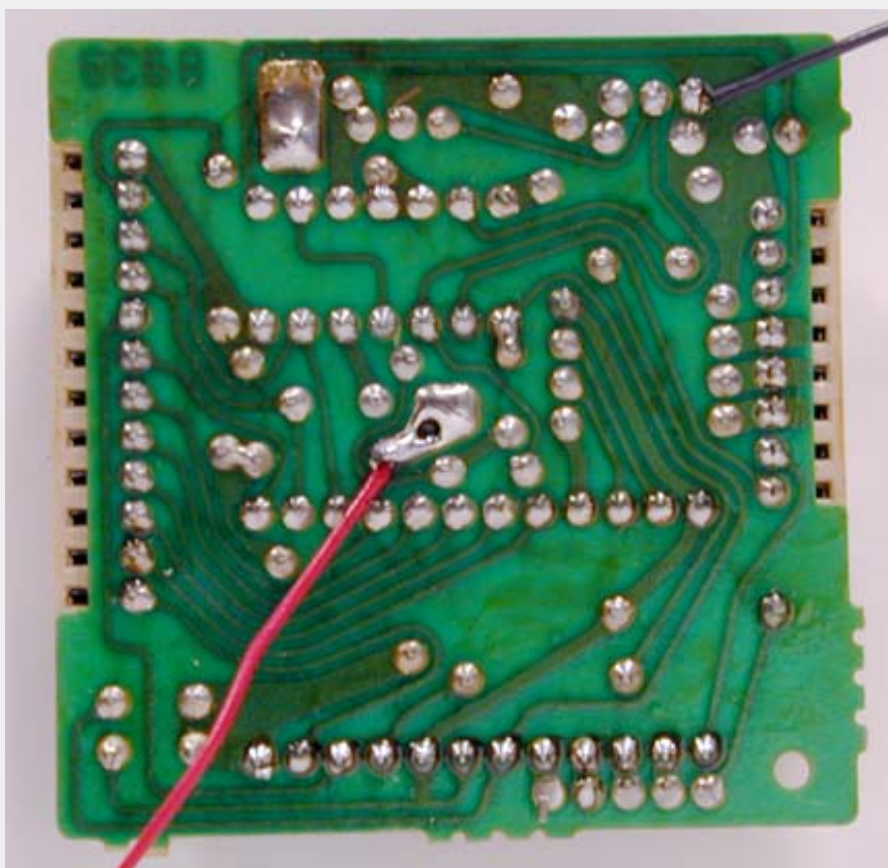
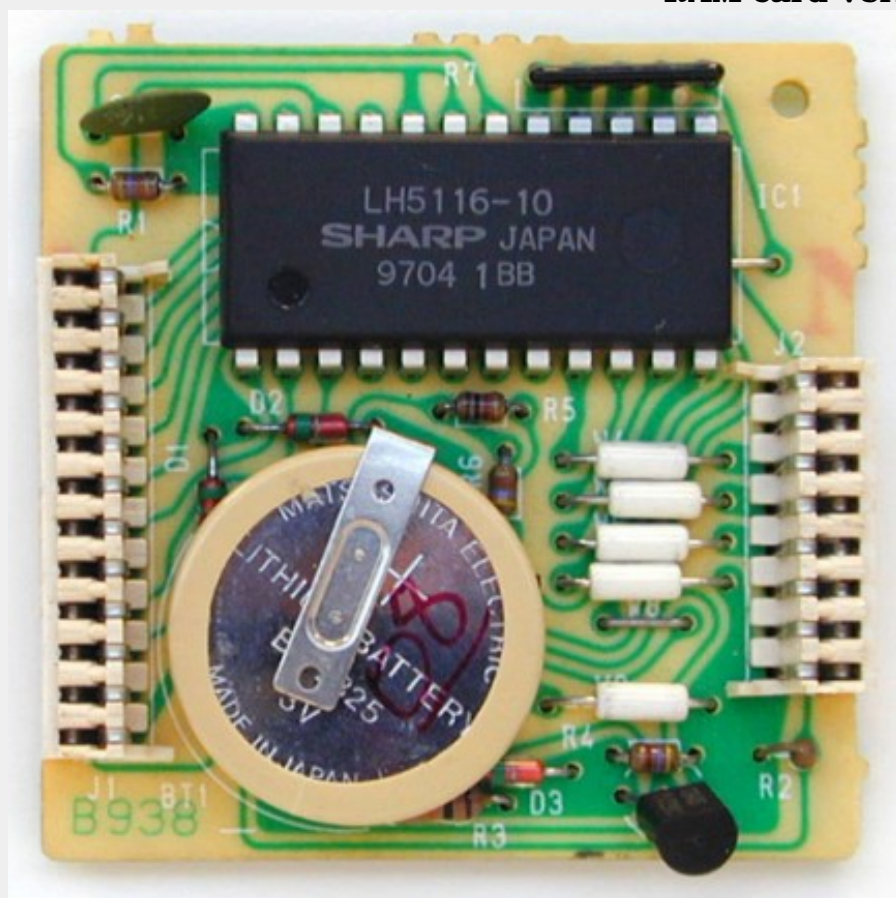
### Cautions

1. Do not use an AC powered 3 Volt DC source, your grounded soldering iron tip could short out the battery (+) terminal. Use a 3 Volt battery DC source only (2 alkaline cells for example).
2. Do not solder the external DC wires directly to the lithium battery tab pads. If you do so, you will not be able unsolder the battery without having the wires drop off.
3. If by accident you lose power to the RAM unit it must be sent to Icom America for reprogramming.
4. Be careful not to damage or bend the connector pins on the radio side while removing or reinstalling the RAM card.

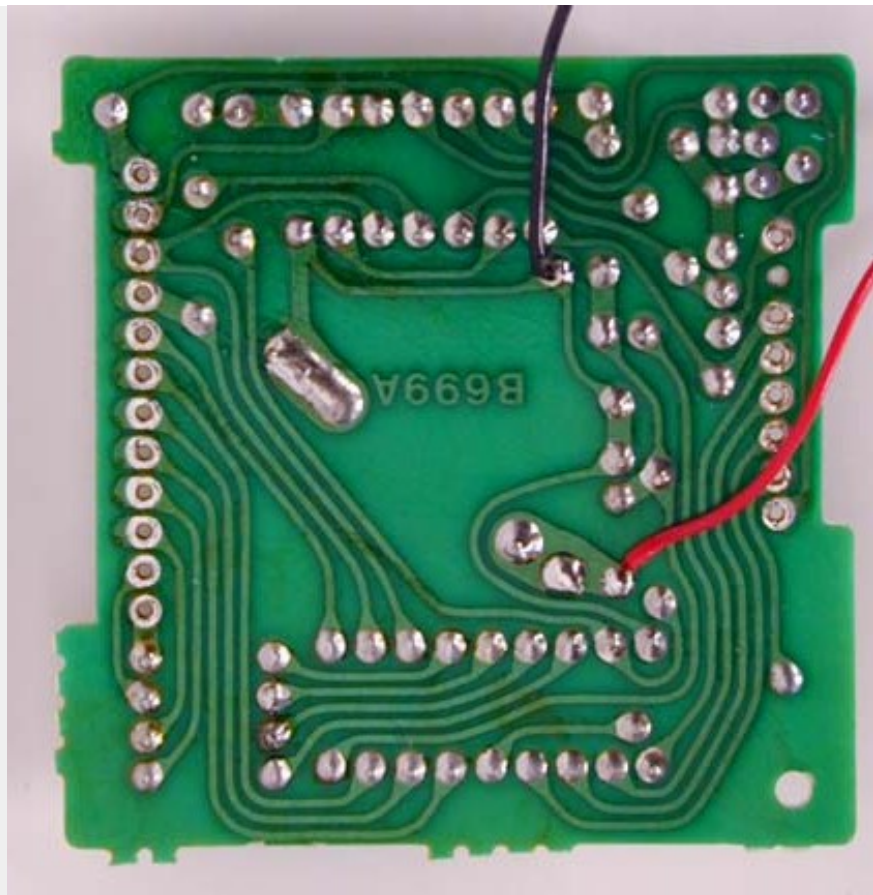
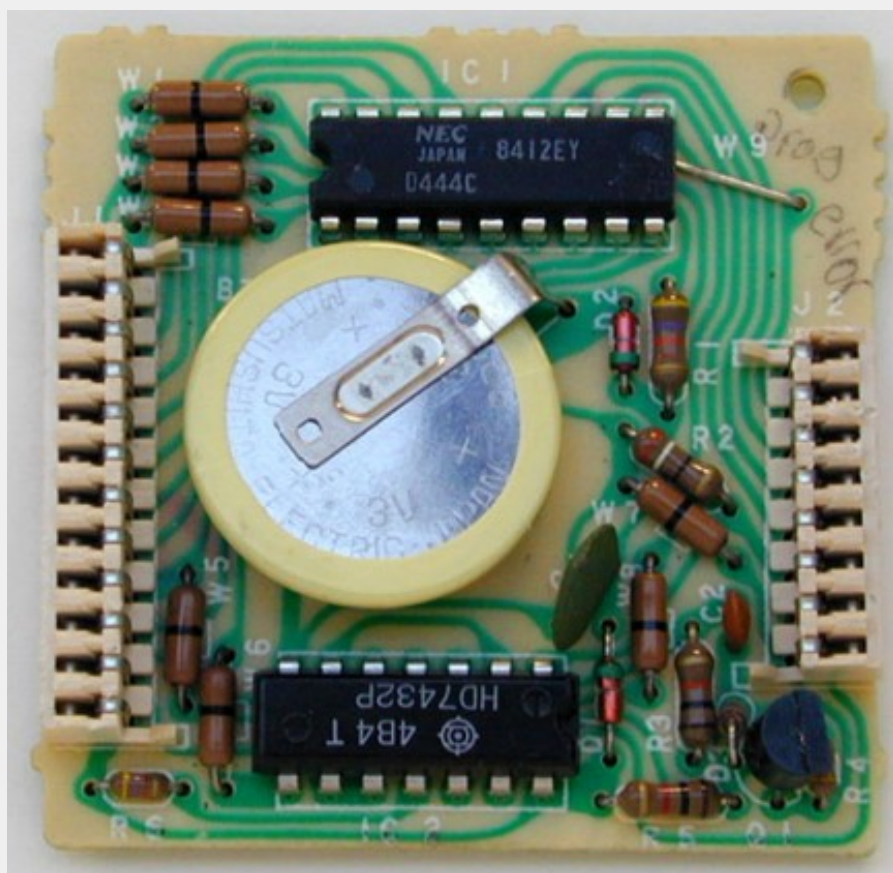
### Pictures

There are two versions of the ICOM RAM boards. Both are identical in operation, and they are interchangeable. The differences are in the circuit board layouts only. Note that the black and red wires visible on these images are the suggested way of connecting the external DC backup voltage while the battery is being replaced. The wires are not a part of the RAM card, and should be removed when the battery replacement procedure is complete. Refer to the replacement procedure outlined above.

#### RAM card version A images:



#### RAM card version B images:



This modification can also be found at ICOM's own homepage on the following URL: "[RAM Card Backup Battery Replacement Instructions](#)"

This modification is read 595 times.

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**19-07-1998**

### **(IC-1275) IC-1275 Freq. steps mod**

Titolo: Tuning steps change for all mode Icom IC-275/475/575/1275

The IC-275/475 FM-Step selectmatrix use these diodes on the front unit: (type 1SS53) D41, D42, D43, D44, (D45), D46

Note: diode D45 is not present but solder holes exist for it on the board just between D44 e D46

installed diodes are marked with X :

| D41 | D42 | D43 | D44 | (*) D45 | (*) D46 | D48 | Steps    | DB4 | DB5 | DB6 | DB7 |
|-----|-----|-----|-----|---------|---------|-----|----------|-----|-----|-----|-----|
| .   | .   | .   | .   | .       | .       | .   | 10.0 Hz  |     |     |     |     |
| .   | .   | .   | X   | .       | .       | .   | 100.0 Hz | 1   | 0   | 0   | 0   |
| .   | X   | .   | .   | .       | .       | .   | 1.0 KHz  | 0   | 0   | 1   | 0   |
| .   | .   | .   | X   | .       | X       | .   | 5.0 KHz  | 1   | 0   | 1   | 0   |
| .   | .   | .   | .   | X       | .       | .   | 10.0 KHz | 0   | 1   | 0   | 0   |
| .   | .   | .   | (*) | X       | X       | .   | 12.5 KHz | (*) | 1   | 1   | 0   |
| .   | .   | .   | .   | .       | .       | X   | 25.0 KHz | 0   | 0   | 0   | 1   |
| X   | .   | X   | .   | .       | .       | .   | 1.0 MHz  | 0   | 1   | 0   | 1   |

(\*)

To set a step of 12.5 KHz in FM mode (TS button off) it is not necessary disconnect the diode D44, just insert the diode D45 (IN4148 or similar) near D44 and "voilà les jeux sont faits".

Unscrew the two lateral screws and unlock the front panel.

Remove also all the connectors of the front board and after that unscrew ALL the screws of the metallic shield covering the front board. It seems too much complicated insert the diodes from the component side of the front board, so it is better insert D45 from the solder side.

This modification is read 537 times.

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**27-10-1998**

## **(IC-1275) Power control modification**

### Problem:

The power control circuit in IC-x75 is an ALC circuit. ALC circuits suffers from several drawbacks:

- slow reaction time due to time constants
- insufficient regulation due to low feed-back factor

These factors gives the problem that if the average power has been set to a low value (e.g. for driving a HPA), peak power can still be in the order of 3-4 dB higher. This leads to either considerable side band distortion or a low average power output.

**note:** If you are always using your transceiver barefoot, without connecting any PA or transverter, this modification will offer no benefit.

### Solution:

The solution to these problems is to use a simple forward gain regulation without the feed back circuit of the ALC. The original ALC is still kept for SWR protection only.

The ALC is working on gate 1 of Q13, which is a IF amplifier (9 or 10.75 MHz). The new power regulation uses gate 2 of Q13. Therefore the two circuits can exist in parallel.

The modification should also give you a bigger dynamic range in the power regulation (lowest power < 5W on the IC-x75H).

### Implementation:

- replace R87 (470k) with 100k
- cut "POCO" wire (pin 3, P1/J1, MAIN, orange) at the plug (P1)
- connect the "POCO" wire to gate 2 of Q13 (e.g. via top of R87)
- adjust R250 (SWR protection), R256 (low power level) & R259 (high power level) fully counter-clockwise. (this will give you full SWR protection, but cancels the ALC in normal operation).
- put the front plate RF PWR in full output position (clockwise) and adjust R82 (Q13 output attenuator) until you have the nominal output power (initially the output power will be higher because you removed the regulation, but the PA will be saturated).
- the balance between FM, CW & SSB output can be adjusted with R137 (CW carrier level) & R105 (FM carrier level).
- other interesting adjustments: R135 (mixer balance i.e. SSB carrier suppression), R133 (TX BFO output level).

This modification is read 535 times.

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**27-10-1998**

## **(IC-1275) Restoration of pass band tuning**

### Problem:

ICOM has chosen to remove the PBT in the later models, and replace it with a "data level adjustment". This change removes the possibility to profit from the PBT in case of QRM or to use the PBT as a cheap CW-filter.

Furthermore the two extra IF-mixings is done with only a minimum of filtering, making the receiver very susceptible to spurious IF breakthrough. This is often heard as high-pitch tones or as a high IF noise level.

### Solution:

The solution is to re-wire the "data level" potentiometer so that it adjusts the PBT VXO-oscillator, and to re-install FI3. FI3 is a 455kHz ceramic SSB filter and can be bought under the type number: MURATA CFJ 455 K6.

### Implementation:

- remove the capacitor (C61) fitted in place of FI3
- solder in FI3
- readjust R72 for proper IF gain
- cut wire PBTV (pin 4, P1/J1, MAIN, yellow) about 5cm from the plug (P1)
- cut wire AMO2 (pin 3, P2/J18, MAIN, red) close to the plug (P2)
- cut wire AMO3 (pin 4, P2/J18, MAIN, metal baird) close to the plug (P2)
- connect PBTV wire (the end not connected to the plug) with AMO2 wire (the end not connected to the plug)
- connect AMO3 (the end not connected to the plug) to +8V e.g. by tapping (pin 1, J4, MAIN, brown).
- connect the wire stubs on the plug (AMO2 & AMO3) together is you wish to use external modulation input for PACKET etc.
- adjust the coil next to X2 (PBT VXO) for correct middle PBT setting

This modification is read 520 times.

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**27-10-1998**

## **(IC-1275) Splitting into RX- and TX paths**

### Problem:

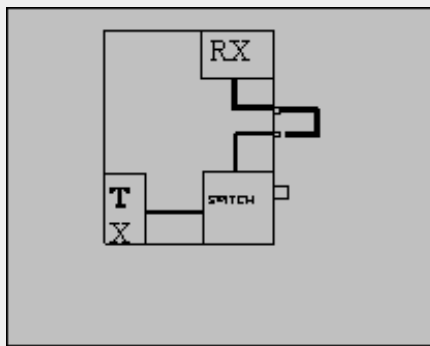
This is a general transceiver problem. If you want to use the transceiver as part of a bigger setup (i.e. with external PA & preamp or with a transverter), it is convenient to have separate access to the RX and the TX of the transceiver. Otherwise you need two coaxial switches every time you add a new accessory. With split RX/TX paths you only need one switch - at the antenna. Furthermore split RX/TX paths eliminates the need for a change-over sequencer.

On the other hand it is also nice to have the transceiver working normally when you are using it barefoot.

### Solution:

The solution is to jump wire the RX path (between RX and the RX/TX switching) trough the rear side of the transceiver with 2 BNC connectors. In normal state these connectors are connected via a short cable. In case you need to "split up" the transceiver, you remove the short coax cable, and you obtain direct access to the RX. The TX is still available using the common connector.

**note:** If you are always using your transceiver barefoot, without connecting any PA, preamp or transverter, this modification will offer no benefit.



Remove the back cover. If you place the holes for the BNC connectors next to and aligned with the two existing DIN-connectors, then ICOM have left enough space on the inside for the connections. You can also add other desired outputs like a phono plug for AF OUT.

The RX cable runs between J4 on the RF YGR PCB and the PA unit.

**note:** In my IC-275H the PIN-diode for the FM RF gain is shared with the RX/TX switch and placed in the PA unit. This means that the control voltage passes through the RX cable.

Therefore the breaking of the RX cable will cancel the FM RF gain function (the SSB/CW RF gain is working on the AGC and is not affected). The solution is to install a new PIN-diode (D5) on the RF-YGR PCB. The PCB has already room for it. To avoid short-circuiting the control voltage the jumper placed in stead of C86 on the RF-YGR PCB, should be replaced by a 1nF capacitor.

This modification is read 523 times.

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27-10-1998

## (IC-1275) Modification of cw pass band (BFO)

### Problem:

In these transceivers ICOM has chosen to shift the CW passband up 200 Hz compared to the SSB passband. This makes it more difficult to copy SSB signals in CW mode.

### Solution:

The extra BFO coil that is added in CW-R is short-circuited, and the BFO is re-adjusted for proper CW RX/TX-tracking and for preferred USB/CW passband.

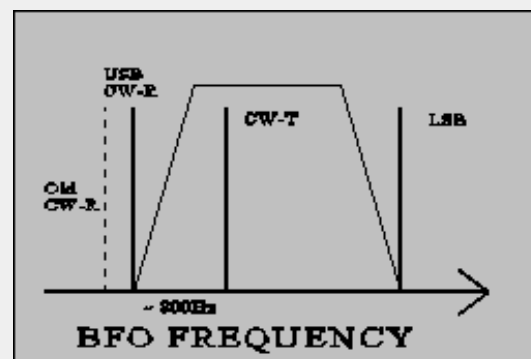
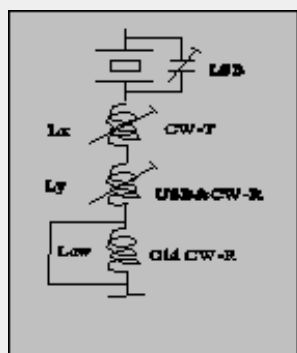
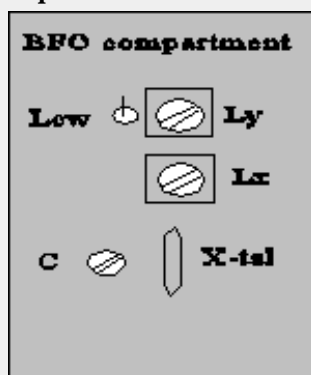
### Implementation:

- short-circuit Lcw in the BFO compartment.

For readjusting the BFO you need another transceiver (TRX2) with correct tracking.

1. Receive on TRX2 and transmit in CW. Adjust the VFO (with the RIT off !) of TRX2 until you have the desired side tone in CW mode. (e.g. 800 Hz - can be found by beating the tone with the side tone oscillator).
2. Transmit on TRX2 and adjust Ly (CW-R) until you have the desired side tone in CW mode. (you are setting the ~800Hz difference between CW-R & CW-T).
3. Adjust Lx (CW-T) for preferred USB/CW receive passband.

You might have to repeat the tuning once again, as there is some interaction between the adjustments (diode switching for high impedance RF circuits are not perfect !). If you would like to adjust the LSB passband, this should be done by adjusting the capacitor C, before adjusting the coils.



**Note:** The BFO coils are switched in successively to give the required offset from the LSB frequency. Therefore adjusting CW-T also changes USB/CW-R.

Re-adjusting all of the BFO frequencies is a good idea in any case to compensate for crystal aging. If the passbands sound different in LSB and USB it is a sure sign of mis-alignment due to crystal drift - they should be more or less the same.

This modification is read 513 times.

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27-10-1998

## (IC-1275) Disabling of SSB squelch

### Problem:

Squelching is nice to have in FM mode, but it doesn't really work for SSB, where you will be looking for weak signals. Therefore you have to adjust the squelch level every time you change mode. Furthermore I enjoy using FM as a monitoring mode on the SSB calling frequency, so changing the mode happens quite often.

### Solution:

The solution is quite simple. Just cut the connection to the SSB input of the squelch circuit in some way.

### Implementation:

The easiest way to break the connection is to connect the base of Q7 to ground. The base is the lead facing into the centre of the PCB.

**Date:** 04-01-2002

**User comment**

**From:** Hiroki Ohashi,JI2EVL

**Subject:** other methode for confortable ssb SQL

R18 (33k)on Main Unit change 68k. And You set SQL position between 9 and 10 o'clock. You can operate sql open on SSB mode, and sql able on FM mode.

It align that FM SQL position to 9 O'clock from 10 o'clock.

This modification is read 522 times.

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**27-10-1998**

## **(IC-1275) Very fast AGC**

Problem:

For some modes of weak signal communication, it can be desirable to have a very fast AGC (e.g. meteor bursts with a sharp rise and a long weak "tail"). The standard fast AGC has a time constant of about 2 secs (!), which also means that a noise pulse can mute you for quite some time.

**Note:** Never use the noise blanker when receiving high speed CW (Meteor Scatter). The noise blanker mistakes the high speed keying for noise pulses, and will seriously corrupt the signal.

Solution:

The solution is to move the "AGC fast" capacitor (C19) to replace the "AGC slow" capacitor (C20). You will lose the "AGC slow" option, but I find "AGC fast" adequate for most signals.

Another solution is to switch out the "AGC fast" capacitor (C19) separately, but then you will get the problem of finding an appropriate front plate switch. I already tried to use the DATA button, but it cannot be activated in CW.

**Note:** a strong signal will be seriously distorted in AGC OFF mode.

Implementation:

- remove C20
- move C19 to the replace C20

This modification is read 521 times.

[top of page](#)

**27-10-1998**

## **(IC-1275) SSB RF Gain**

Problem:

The RF GAIN function is different in FM and in SSB/CW modes. In FM mode the RF GAIN controls a PIN-diode at the input of the preamp. In SSB/CW the RF GAIN simply activates the IF AGC.

The use of the preamp input attenuator (the PIN-diode) can be useful also for SSB/CW e.g. if you have connected a mast head preamp with excessive gain. In this case the attenuator will help you to adjust the signal levels at the mixer, and thus reduce intermodulation and blocking.

Solution:

The solution is to remove the SSB/CW RF GAIN for SSB/CW (this function is of little use anyway), and enable the FM RF GAIN even in SSB/CW.

Implementation:

- Cut the lead (FM8V) connected to (pin5, J6, potmeter PCB, green) about 4 cm from the plug

- Connect the short plug end with R14 (on the potmeter PCB) by soldering it to the end that is connected to the plug (+8V)

This will enable the FM RF GAIN in SSB/CW.

- cut R30 open

This disables the SSB/CW RF GAIN, and you now have a variable input attenuation with a dynamic range of 10dB (IC275 with MI308/1nF) to 16 dB (IC475).

**Note:** The IC-275 might have a shared PIN diode for FM RF GAIN and TX/RX switching. If you choose to split up the RX/TX paths, you must install a new PIN diode (MI301 or equivalent) on the RF YGR PCB to implement this modification. See the note under the section dealing with splitting the RX/TX paths.

This modification is read 515 times.

[top of page](#)

**27-10-1998**

### **(IC-1275) Tuning speed**

The tuning speed is set to a defaults of 100Hz, 1kHz, 5kHz or 1MHz depending on front plate setting and mode. These settings can be manipulated by D41 - 46 at the front plate. At least a setting of 10kHz is also available.

This modification is read 510 times.

[top of page](#)

**27-10-1998**

### **(IC-1275) Frequency range & CTCSS tones**

The IC-275 have capability to cover 138 - 174 MHz and the IC-475 has capability to cover 430 - 450 MHz. Because of hardware restrictions they might not be fully up to specifications in all of the band, but an extended range can be interesting for e.g. use with a transverter. It seems that the IC-275 has a parallel wide band preamp, that can be switch via the WBT pin on RF-YGR PCB.

In the European versions the transceivers are wired for 1750 Hz repeater call, and they have no CTCSS capability. The transceivers have a built-in CTCSS encoder, so these functions can be restored.

Both of these version dependent functions can be set by the diode matrix: D20 - D24 in the logic unit. I do not know the exact mapping, but a lot can be derived from studying the different frequency ranges and the diode matrix coding table found on the schematic diagram.

This modification is read 527 times.

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**20-04-2000**

### **(IC-1275) IC 475H / 1275E mod for 9k6 (G3RUH) use**

This is original the 9600 baud mod for the IC-475H. Yann - F1NGP [f1ngp@wanadoo.fr](mailto:f1ngp@wanadoo.fr).[MODIFICATION.NET](http://MODIFICATION.NET) has reported this to me.

I've tried the MODS for 9600bds for my ICOM IC-475H . Working OK . I've tried to build the same mod on my 23cm ALL-MODE ICOM IC-1275E as the MAIN UNIT is the same as the 475 ... ALL WORKING OK !

Thanks to Yann.

---

The original ICOM IC-475H 9600 baud modification.

#### **Warning:**

I'm writing this message to help out owners of Icoms 475 H to modify their transceivers for use with a G3RUH modem. I will not take any responsibility if you destroy your transceiver while doing this modification. This modification requires that you have a minimum experience in soldering and electronics. If you feel that you cannot undertake this modification, don't even try it and leave it up to someone else!

### Reception of FSK signal:

The reception has to be taken directly off the demodulator chip. This is the chip referenced as IC6 (MC3357P) on the electronics diagram.

Demodulator output is on pin 9 of this chip. You will have to run a SHIELDED wire from this pin to the outside of your transceiver. I've done this by connecting it to pin 11 of J4 (AQS socket on the back). This pin is originally unused. But this is not as easy as it sounds; you will have to unscrew both sides of the transceiver and undo a lot of parts to finally solder on a very small plug! Be careful here.

### Transmission of FSK signal:

The FSK signal is simply injected on pin 2 of the AQS socket. BUT, as you will see on the electronic diagram, this signal goes through a variable resistor (R152) and a capacity (C142). So you might encounter two problems: not enough and/or distorted modulation. In my case, I used a MFJ 9600 Bauds card and I had to put the level almost to the maximum on this board, while also putting the variable resistor to the minimum! The capacity on the other hand is very very bad for the modulation of the FSK signal as the transceiver should respond to DC! My solution: simply short circuit the capacity (C142). This is most easily done directly on the components side of the circuit board, since it's very difficult to take it out of the transceiver.

### Other signals:

You will be able to put the PTT line to pin 6 and the ground to pin 1 of the AQS socket. You will also notice that on pin 13, you have 13.8 V available. This can be used to power the TNC for example...

I have now a much more stable 9k6 signal than before, when I still had the C142 in the line. Although, this was reportedly been working for other people, it simply didn't for me! Maybe you can avoid short circuiting the capacity, so try it first (although I doubt it!).

I hope this will help somebody and if you have any more questions, don't hesitate to contact me at my homeBBS: HB9VBC @ HB9IAP.SROM.CHE.EU

This modification is read 527 times.

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**19-07-1998**

## **(IC-2) Modification For IC-2AT**

If you have studied the schematic diagram for this radio, you will notice that pins 15 and 16 are not indicated on the programmable divider chip IC1 (TC9122).

By simply connecting pin 15 thru a switch to pin 1, you will be able to move the radio up in frequency by 10 MHZ.

Some of these radios were sold without covering 140-150 MHZ.

The modification for this extended coverage is described below:

1. Open up the radio and locate the FLEXIBLE BOARD, this connects the thumbwheel switches to the MAIN BOARD.
2. At the MAIN BOARD end of the FLEXIBLE BOARD, add a jumper at location C4. There should already be a jumper at location C2.
3. At the thumbwheel switch end of the FLEXIBLE BOARD, remove the jumper which connects C3 and COM.
4. Reassemble the radio. Coverage is now 140-150 MHZ. (MARS/CAP)

Now, if you activate the switch described above, the radio will now operate in the 150-160 MHZ range, after L3 adjustment, described below.

### OPERATION and L3 ADJUSTMENT:

1. Activate switch and dial up a known active frequency.
2. Adjust L3 until PLL locks up and radio begins receiving. (you need an active frequency to tell when this happens)
3. To return to 140-150 MHZ, repeat above steps with switch off.

### NOTES and DISCLAIMER

1. Drill a hole in the case of the radio so that L3 can be adjusted from outside of the radio.
2. The above information is presented for educational purposes only, and is not an endorsement of any particular practice.
3. This MOD has been in operation for 6 years with no ill effects on the radio
4. This MOD courtesy N2MOD.

**19-07-1998****(IC-2) Low audio speaker mike on IC2A, 3A, 4A OR O2AT**

If you own one of the IC2A, 3A, or O2AT series Hand-helds, you may be interested in reading on. I know my hearing is pretty good, but have you ever tried to listen to the audio coming out of your speaker mike on the above ICOM's? For the most part, it's pretty low. I may be the last guy to figure out a cure for this, but here it is anyway. On the O2AT, etc., there is a groove on the back near the top of the rig that is just the right size to accept the HM9 speaker mike turned 90 degrees so that the mike plug fits in that groove in the rear of the rig. Thus allowing all the audio to be heard from the internal speaker of the rig, usually much better than the speaker mike.

Now, in the case of the 2A series, etc., the fix is more complex. These rigs don't have that handy groove built in, so I decided a groove had to be made to accept this configuration. I thought long and hard about a minute, before getting the "Dremel" out and making my own slot or groove. It works well on both hand-helds I have. In fact, you can hook up an external speaker for even more loudness in the auto. So, give it a try or see me for a demo.

This modification is read 1012 times.

[top of page](#)**19-07-1998****(IC-2) ICOM IC-2AT internal antenna connection problem**

I routinely use a half wave ant. On my IC-2AT handheld. When collapsed, the antenna has the same gain ( loss ) as a rubber duck antenna while giving me greater range when fully extended.

There is a certain amount of movement of the center pin of the bnc connector with the half wave antenna on the handheld.

This movement causes fatigue fracturing of the wire connecting the printed circuit board to the bnc connector.

After numerous failures, i used the braid of RG-174 coax to make the connection.

First remove the bnc from the radio and brake off the non-used ground lug.  
The pin of the bnc should beplaced into the end of the braid.

A thin pice of wire is then wrapped around the braid 3-4 times, and then secured, then soldered. Reinstal the bnc and dress the braid to the solder pad on the printed circuit board and solder. Do not heat the braid to log while soldering, as solder will be drawn up, making it stiff and subject it to fatigue fracturing...

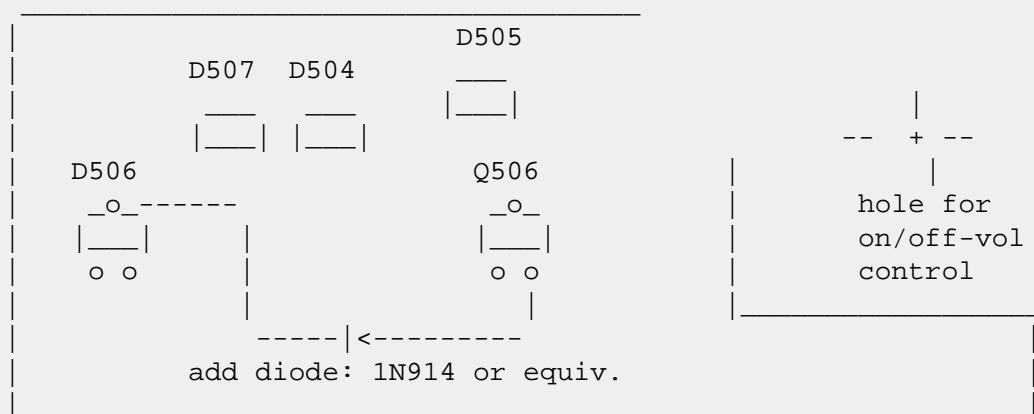
This modification is read 1016 times.

[top of page](#)**19-07-1998****(IC-2) ICOM IC-2GAT ext frq for Transmit**

Out-of-band transmit mod for ICOM IC-2GAT handheld 2M transceiver

(copied from packet radio; origin unknown:)

Back side of display board:



Connect diode between top lead of D506 and lower right lead of Q506 as shown.

Notes:

D506 may be absent. If not, remove it.

Reset CPU if needed.

A friend did this and his IC-2GAT can now transmit 138 to 178 MHz (no RF power output measurements were made). He did no retuning, and did not have to reset the CPU. He used a tiny axial-lead glass diode, replaced its leads with wire-wrap wire, and encased it in shrink-tube. The operation requires a super-tiny soldering iron. Observe CMOS soldering precautions: Unplug the iron and ground the tip before touching the circuit.

Remember: Except for MARS and CAP, it is illegal to transmit outside the ham bands with non-type-approved equipment.

This modification is read 1076 times.

[top of page](#)

**19-07-1998**

## **(IC-2) IC-2AT, If transmit RF indicator network properly**

Model: IC Micro 2AT

Division: Amateur

Note: This service bulletin is meant for technical personnel with experience working on solid state communications equipment. Damage caused by improperly installing this modification may cause ICOM to charge for subsequent repairs to the product. ICOM does not warrant this modification.

Bulletin #: 8988-002

Date: March 29, 1988

Subject: If transmit RF indicator is not reading properly

### **Procedure**

1. Disassemble the radio to gain access to the RF Board.
2. Replace the following parts on the RF Board:

| Reference Designator | Original Value | New Value        | ICOM P/N  |
|----------------------|----------------|------------------|-----------|
| Q309                 | 2SA 1162       | 1SS 196          | 912-00965 |
| D309                 | 1SS 211        | 2.2Meg 1/8W      |           |
| R345                 |                | Remove this part |           |
| C349                 |                | Remove this part |           |

3. Reassemble the radio.

This modification is read 990 times.

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**19-07-1998**

## **(IC-2) Icom IC-2GXAT open RX**

>David, For the IC-2GXAT receiver opening do the following steps as listed.

>

>1. Turn off the radio

>

>2. Press and hold the " Function, Scan and Dupe keys "

>

>3. While holding those keys turn on the radio.

>

>4. WAIT until the display returns to normal then continue to hold the keys for about 2 seconds

> after the display has returned to normal before releasing the keys

>

>5. The receiver is now opened up and will cover 138 to 179 Mhz or so.

> It WILL NOT do aircraft AM receive nor tune into that frequency range.

*That's an interesting note. I recently did this to my rig (Purchased last may, low serial number) and it receives from about*

50MHz to something like 204MHz continuously! Including the AM aircraft band.

This modification is read 1032 times.

[top of page](#)

**23-08-1998**

## **(IC-2000) Icom IC-2000 Extended RX/TX Mod**

Here's the mod for the IC-2000H 2-meter transceiver:

Using a hex wrench, remove the front of the face plate (NOT the main radio back!!) Turning it over, you will see the PC board. Look for 16 solder dots like this:

```
0 0 0x0          x = the offending diode that is begging to be destroyed....  
0 0 0 0  
0 0 0 0  
0 0 0 0
```

Taking a set of needle-nosed pliers (or the equivalent) snip the "x", dust off the PC board, and reassemble the radio. Do a complete memory/factory reset which is described on page #38 of your IC-2000 series instruction manual Here's what's involved in the CPU reset referenced above:

1. Push [POWER] to turn power OFF.
2. While pushing [SET] and [PG/CS-MW}, turn power ON

All LCD segments appear momentarily, the initial display appears and the transceiver's CPU is reset.

This modification should take you less than one minute to accomplish. You will find your transmit capabilities expanded to 136-174 Mhz.

Receive will remain at 118-174Mhz.

NOTE: It is strongly recommended that you purchase the following optional units:

UT-85 Tone Squelch Unit--allows pocket beep functions and tone-squelch receive operation--a must if one is plagued by stupid paging tower inter-mod (a violation of the harmful interference laws...)

UT-101 DTMF Unit--provides pager and code squelch functions for selective call and silent standby, etc.

These extras are available for under \$100 U.S. dollars. Highly recommended!!

This modification is read 1052 times.

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**19-07-1998**

## **(IC-207) Band expansion for IC-207**

Remove the 4 screws attaching the bottom cover and remove the cover. (I had to use a small screwdriver to pry on the cover. It's made to fit tight) with face toward you and belly up look to far right of board and close to you.

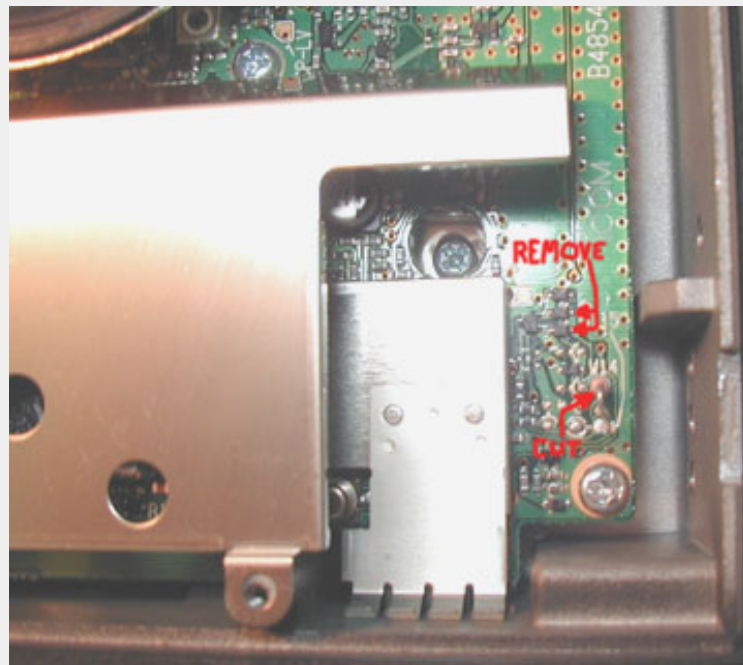
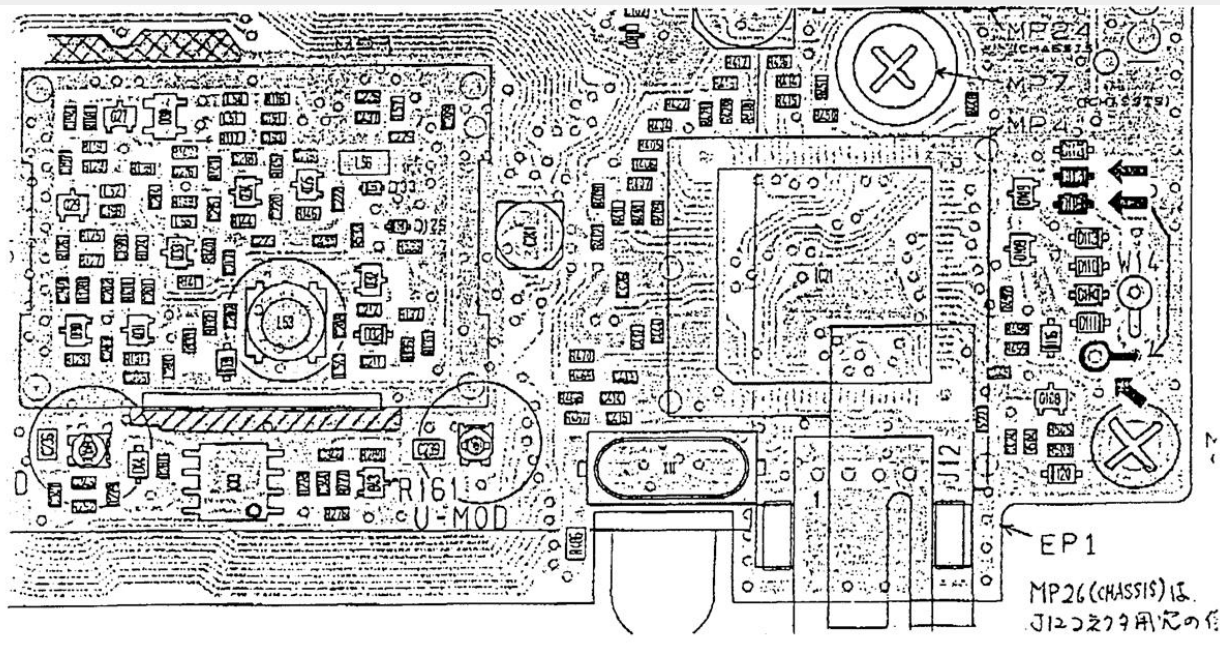
Locate a row of SMT diodes 3 on top then a shift to right and a few more. The three are in a PERFECT row top to bottom! count from the top of the row 1 2 3.

Remove the # 2 & 3 diodes. Now continue looking down from there and you will see a resistor sticking up in the air (W14). Clip the lead off of the resistor. Reassemble the radio and preform a CPU reset by holding the Set and S.MW buttons while turning the radio on...(page 69 of manual).

You now will have :

```
118-135 RX (stock)  
136-174 TX & RX  
320-399 RX (hmmm whats there? I've heard a local radio station DJ  
at a remote location talking to the station)  
400-479 TX & RX  
849-950 RX
```

The Transmitter will work and transmit at ALL of the listed TX freqs. and the power seems to be fairly broad banded and can handle it... I now use my mobilis as Ham AND GMRS. One less piece to lug around!



**Date:** 12-01-2002

**User comment**

**From:** anonymous

**Subject:** Icom 207H RX only Expansion

This modification will open up the RX coverage on the Icom 207H, while preventing out of band TX. This is useful if you need UHF RX coverage above and below 440mhz ham band.

Simply cut the lead on resistor W14 (refer to the photo of the radio as submitted by others) Power up the radio, you do not need to do a reset.

New RX coverage: 320-399.995 mhz Note: Holding the band button down for a second while on this band, will change the detector to AM mode as noted by a decimal point appearing the right of the last digit. AM is used by Military Aircraft communications. Latest band plan is 25khz channel spacing.

Coverage for UHF-FM is now 400.000-478.995

Simple Mod, no mess. Have Fun :)

This modification is read 2917 times.

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**26-07-2001**

## **(IC-207) Band Expansion for IC-207H**

**Author:** Mike VK2ZOC - [jobrowne@bigpond.net.au](mailto:jobrowne@bigpond.net.au).[MODIFICATION.NET](http://MODIFICATION.NET)

When wanting to extend band TX for the IC-207H, follow the instructions for the IC-207. The variation is that there are only 2 diodes present, not the three described.

Remove BOTH of these. Also the resistor sticking up in the air near W14 has already been clipped. Note that these diodes are the surface mount type so be careful when removing them.

Mike VK2ZOC

**Date:** 01-09-2001

**User comment**

**From:** [Mike VK2ZOC](#)

**Subject:**

I've received a large number of emails from the US asking how you get the 850-950MHz band.

The modifications described don't give you extra bands that you don't already have. They remove the restrictions to TX in the 140-179MHz & 400-479MHz bands on the radio. Apparently radios from the US don't have the fifth (850-950MHz) band.

Mike VK2ZOC

This modification is read 3010 times.

[top of page](#)

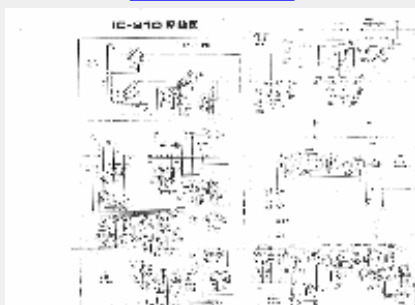
**28-04-2001**

## **(IC-210) Schematic of IC-210**

Schematic of the ICOM IC-210.

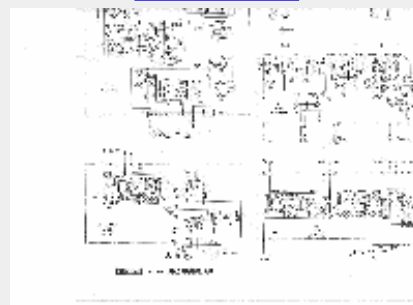
Size: 1867 \* 1355 = 265 Kb

[Part 1 of 4](#)



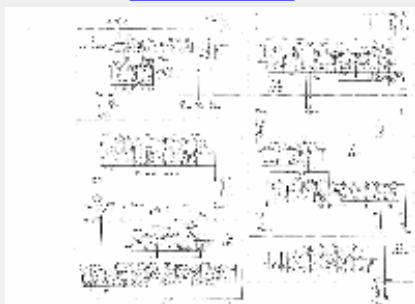
Size: 1867 \* 1355 = 245 Kb

[Part 2 of 4](#)



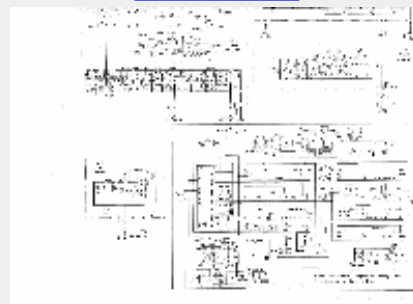
Size: 1867 \* 1355 = 265 Kb

[Part 3 of 4](#)



Size: 1867 \* 1355 = 255 Kb

[Part 4 of 4](#)



This modification is read 321 times.

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**21-03-1999**

## **(IC-2100) Icom IC-2100H Extended Transmit Mod**

For the first time anywhere on the web, the Icom IC-2100H extended frequency transmit modification and mod instruction sheet.

The successor to the very popular IC-2000 unit, the IC-2100H has been around for a few months now and is selling for about \$200 at most hamfests. The unit includes PL encode/decode, and 55 watts out at high power. But up until now the modification instructions have been unavailable!

Brought to you by:

Spectracom Communications, for all your commercial radio needs call 732-989-1091 or e-mail to [Spectracom98@webtv.net](mailto:Spectracom98@webtv.net). [MODIFICATION.NET](http://MODIFICATION.NET)

W3EAX, Amateur Radio Association at the U of Maryland  
KB3CVD, UMBC Amateur Radio Club  
And amateur stations KC2AEI and W2SJW.

Please give us credit when copying these instructions!

1. Hold down the second and third front function buttons while turning the radio on. Now turn it back OFF.
2. Carefully remove the large tuning knob and remove the two hex screws that hold the faceplate on. Pull the faceplate straight off the body without tilting it (you run the risk of bending the pin connectors behind the faceplate).
3. Turn the faceplate over and locate the main ic chip, set at a 45-degree angle. Just to the lower left and right of the IC, you will see the main pin connectors. Under the lower right corner of the left pin connector, you should see a marking on the pc board labeled as "D16". just below this should be the matching diode, close to the bottom edge of the board. Remove this diode and carefully re-assemble the radio(watch those faceplate pins!!)

The radio will now TX 136-174 Mhz. As far as i know, you do not have to reset the memory to make the mod work( i have 70 out-of-band memories stored, all of them worked without resetting the unit!!!!)

September 5, 1998 - KC2AEI



Thanks to [Chris KB3HPF](#) for the pics.

**Date:** 03-02-2002

**User comment**

**From:** Jason

**Subject:** ic-2100h mod

So D-16 is the diode to cut, or the one that looks like it?  
What is the number of the one you cut?

**Date:** 06-03-2002

**User comment**

**From:** [k1phs](#)

**Subject:** ic-2100H mod

I just performed the mod and it worked like a charm. I would however, recommend only lifting one leg of the chip in case you screwed up and did the wrong one.

**20-01-2001****(IC-2100) Expand receiver for IC-2100H EUR version**

Expand receiver for Ver #02. #06 and #07. (EUR version]

By key funktion:

- Switch off the radio.
- Push the [LOW/DUP] and [MONI/ANM] , while turning on power.

**By diode:**

- Cut the D-16 on logic board. D-16 is located at centre, and below J2 and is the only NON-SMT diode.

After either mod, you will have:

136,000 - 174.000 MHz FM

(AM and 118 to 135,995 is NOT possible with the IC-2100H)

**Date:** 26-12-2001**User comment****From:** [kg4qlr](#)**Subject:** modification

Thank you for the info it is greatly appreciated!!!!

**19-07-1998****(IC-211) IC-211 mod**

**SM5BSZ - Dynamic Range of 2 m Transceivers  
Part 3: Modifications to the IC211 and IC245**

Published in VHF communications Nr 2 1982.

The introduction to this series of articles was given in Edition 1/82 of VHF COMMUNICATIONS.

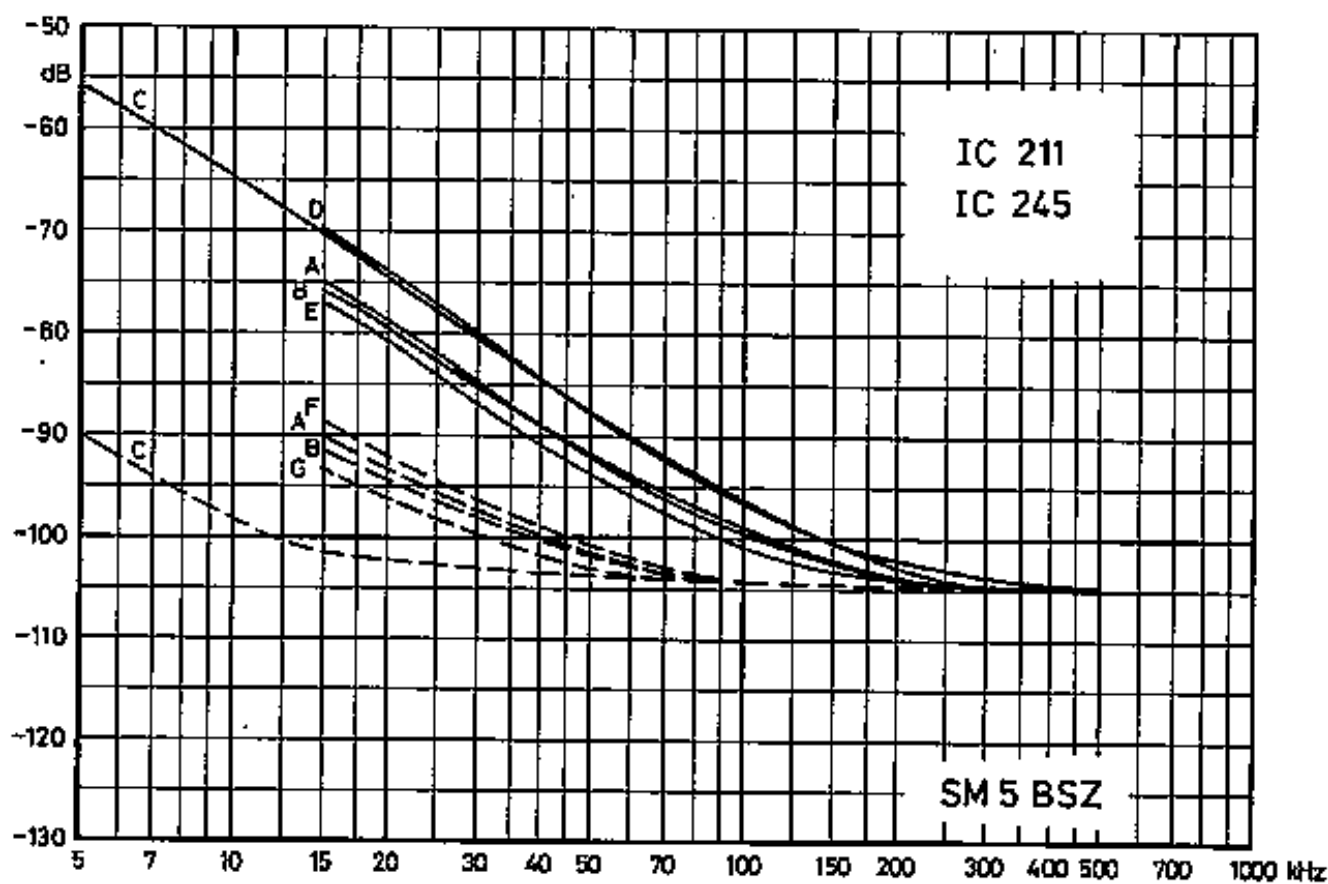
This explained in detail why the dynamic range of transmitters must be as great as possible, and explained this with the aid of examples. A comparison of values measured on well-known commercial 2 m transceivers showed that there was a lot to be desired in this respect. Part 2 of this series of articles, which was published in Edition 1/82, gave a number of modifications to the TS 700.

In the TS 700 the problems were caused by undesired AM-modulation of the carrier. In ICOM IC211 and IC245, like in most other transceivers, the noise is caused by undesired phase- or frequency-modulation.

The measured noise sidebands of a number of IC211 and IC245 transceivers are given in Figure 1. The continuous lines show the measured values before modification, and the dashed lines afterwards.

Transceivers A and B were measured both before and after the described modifications. In the case of transceiver C, the VCO was replaced by a high-quality (!), home-made oscillator.

The other transceivers: D, E, F, and G were only measured before or after the modification.



**Fig. 1:** Sideband noise of various transceivers IC211/IC 245. Measuring bandwidth: 3 kHz.

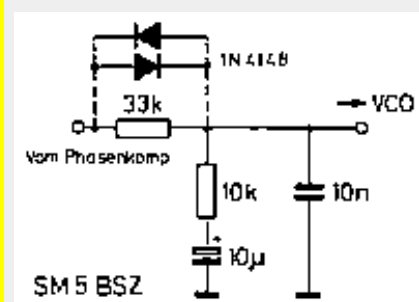
The VCO of the transceiver series IC211 and IC245 exhibit the usual weakness of commercially available transceivers: The varactor diode is fed via a 47 kilohm resistor. The output of the phase comparator is low-impedance and has a relatively low noise component.

However, a considerable noise voltage is present at the varactor diode, which is caused by the leakage current. This voltage has a  $1/f$  component, which causes a correspondingly varying voltage drop across this resistor.

The easiest solution to this problem is to feed the varactor diode from a low-impedance source, which can be easily achieved. It is only necessary to connect an RF-choke in parallel with the 47 kilohm resistor.

After carrying out this modification, the noise sidebands will be considerably reduced, and the main component will now come from the phase comparator.

In order to suppress this noise, it is necessary to build-up a passive filter as shown in Figure 2, and to insert it between phase comparator and VCO.



**Fig. 2:** This filter should be installed between phase comparator and VCO

The filter shown has an output impedance of approximately 1 kilohm at 10 kHz and will completely short out the noise caused by the leakage current. It will also suppress the noise from the phase comparator sufficiently to ensure that it will have no effect on the noise sidebands.

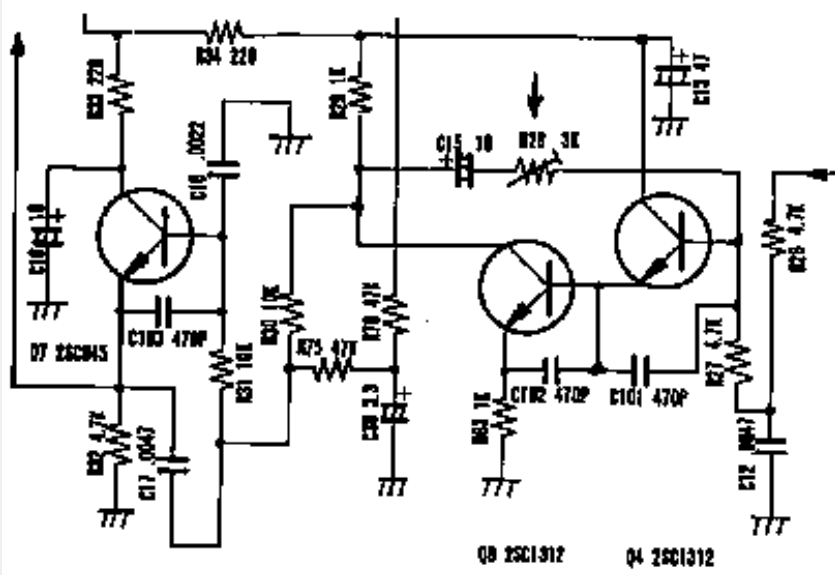
The filter causes an additional phase shift in the control circuit which can lead to instability and poor lock-in characteristics. However, this phase shift can be compensated for by realigning the trimmer potentiometer in the active loop filter so that the control circuit locks in correctly.

There are various different versions of the IC211 and IC245 transceivers and this potentiometer is to be found in different positions in the unit.

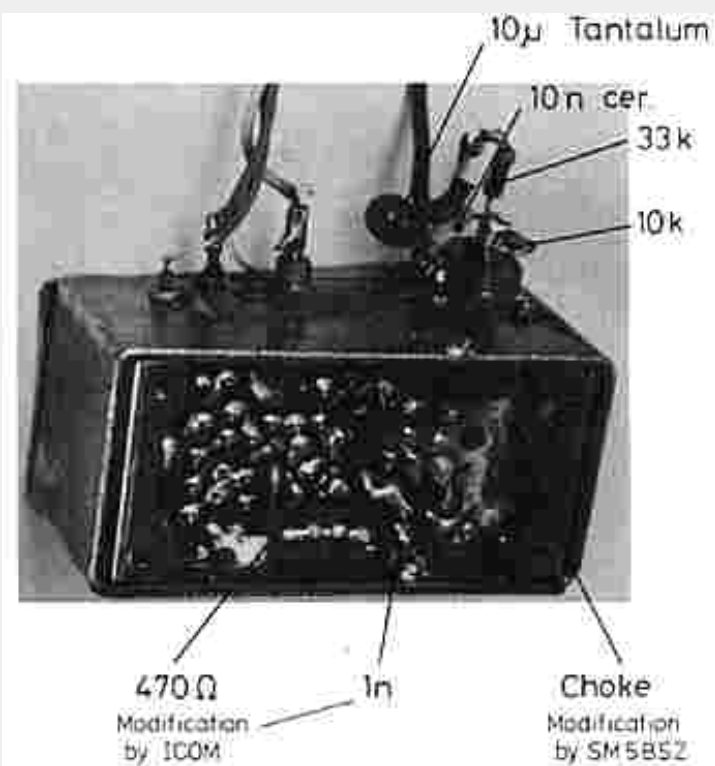
In order to identify the correct potentiometer, one should study the circuit extract given in Figure 3.

It is designated R28 in this circuit, and often it is found that the best lock-in characteristics are obtained with this potentiometer adjusted to one of its limit positions.

The active filter should be soldered with short connections directly to the VCO-module, as can be seen in Figure 4.



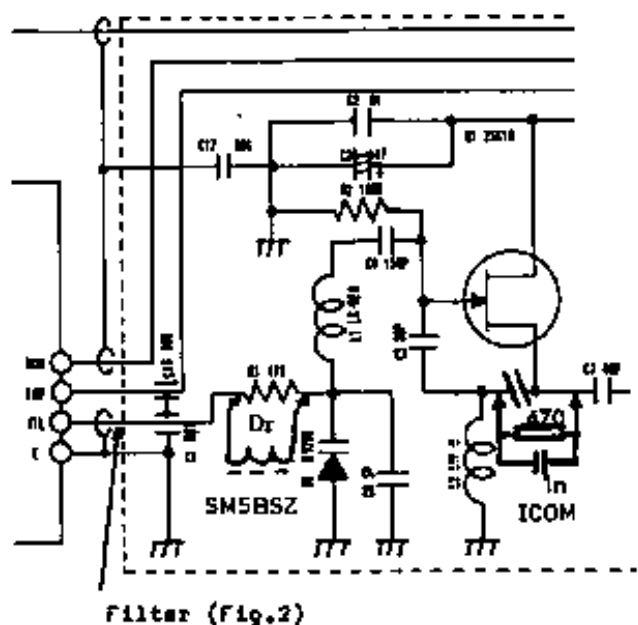
**Fig. 3:** The circuit extract from ICOM shows where the potentiometer is to be found that allows the phase shift to be adjusted.



**Fig. 4:** This photo shows where the parts should be located

The VCO of many transceivers will have been modified already by the manufacturer. This is in the form of a RC-network of 470 ohms / 1 nanofarad, which will have been inserted into the source circuit of the oscillator transistor. These two components are accommodated on the conductor side of the PC-board, after breaking the required conductor lane. Figure 5 shows this ICOM-modification, as well as the modification recommended by the author, in the form of a circuit diagram.

This can be seen from the measured sidebands of transceivers A, B, and E in Figure 1. ICOM probably wanted to reduce the oscillator power with this modification in order to reduce the RF-voltage across the varactor diode. This in turn will reduce the leakage current through the diode, and subsequently the voltage drop across the 47 kΩ resistor. After carrying out the recommended modifications listed in this article, the ICOM-modification will no longer be required, since the voltage source of the varactor diode will exhibit such a low-impedance for lower frequencies that the  $1/f$  component of the leakage current will not be able to cause any voltage drop.



**Fig. 5:** This partial diagram of the VCO shows both the ICOM modification, and the modification recommended by the author. The manufacturer's modification reduces the values of the noise sidebands by approximately 5 dB when compared with the original state.

It should be noted that two components are somewhat critical:

The 10 microfarad capacitor should have a low leakage current, since such leakage currents can have a high noise component. The author uses tantalum electrolytics. The RF-choke should be a good VHF-type, in other words, it should have a high Q so that it does not deteriorate the Q of the resonant circuit.

The inductance and capacitance values are not critical, since any detuning of the oscillator resonant circuit can be compensated for by correcting the core of L1.

A choke made from one layer of enamelled copper wire wound on a 1.5 mm diameter ferrite rod of 10 mm in length has been found to be very suitable.

The author has taken such chokes from transistorized VHF/UHF TV-tuners. A coil wound from a quarter wavelength wire (thin) would also be suitable.

A disadvantage of the recommended modifications should also be mentioned:

The lock-in time is increased for large frequency variations. This will be noticed as a short delay between transmit and receive when operating split frequency operation (repeater operation).

This disadvantage can be avoided by connecting a pair of IN4148 diodes across the 33 kilohm resistor (dashed lines in Figure 2).

The author has not tested such diodes in amateur transceivers, but in a different application where fast locking was required. Such solution worked excellently. For these diodes to work, the output impedance of the phase comparator must be much smaller than 33 k, which is the case for IC211 / IC245.

It is wise to connect an oscilloscope to the comparator output when all modifications are done. The AC component of the output from the phase comparator should be below 0.5 V (peak), also when a considerable audio level is present at the built-in loudspeaker, or knocking at the transceiver to simulate mobile usage.

The RF-choke should be constructed in a mechanically stable manner, since a microphonic effect will be caused if its hot end is vibrated by a high pressure from the built-in loudspeaker, or during mobile operation.

The slow reaction of the phase control will then lead to an unreliable lock-in characteristic.

It is therefore advisable to glue the choke with an adhesive having good RF-characteristics (low tan delta).

The adhesive should be approximately 1 mm thick. It represents the dielectric of a stray capacitance, and if it is made too thin, the high capacitance, and high electric field strength in the dielectric will cause losses and thus increased noise sidebands.

Several dozen IC211/245 were modified according to this description in Sweden and Finland.

According to my knowledge, no problems have been encountered. The average improvement at small frequency spacings from the carrier is approximately 15 dB. This means that the described modifications reduce the interfering noise sidebands by the same value as would be the case when switching off a 300 W linear amplifier and operating the station, "barefoot" with only 10 W !

In the case of the IC211, an improvement of approximately the same value will be present in the receive mode.

This improvement is less pronounced in the case of the IC245 due to its simpler input circuit of the receiver.

Part 4 of this series of articles will describe improvements to the FT 221 transceiver.

**19-07-1998**

## **(IC-22) Icom IC22S Packet Modification**

The Icom IC22S is a ten watt diode matrix PLL synthesized 2 meter rig manufactured in the early 1970's. In it's stock condition it tunes 146-148 MHz in 15 KHz steps. Since I am sure there are a few of these sitting on shelves collecting dust due to the limited tuning range, why not modify them for the perfect packet rig.

First replace the 7.68 MHz Oscillator/Divider crystal (X1) with a 5.12 MHz crystal. This will move the band to 145.00- 146.94 MHz in 10 KHz increments. The repeater offset will now be 400 KHz which should not pose a problem in simplex packet operation. I will give the diode matrix settings for the most commonly used packet frequencies. You can formulate others as needed using the formula  $N=100*(f-145)+61$  and the manual. The diode positions indicated ARE WHERE DIODES ARE PRESENT. The other positions are left empty.

145.01= D5,D4,D3,D2,D1

145.03= D6

145.05= D6,D1

145.07= D6,D2

145.09= D6,D2,D1

This modification is read 719 times.

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**19-07-1998**

## **(IC-22) IC-22S mods for 5 KHz step**

I have prepared information to modify the IC22S synthesizer to allow it to have 5 KHz steps in lieu of the original 15 KHz steps. This will allow the rig to go onto 145.01 MHz for packet radio operation.

In short, the modification requires changing a crystal, making some copper path cuts, adding some jumpers, and installing a new divide by N counter which consists of three CMOS digital integrated circuits.

If you put it on a frequency as low as 145.01 you will also need to re-tune the front end and you may need to re-tune the VCO free running frequency. I have made the mod to my radio and am using it to up-load this file. I re-tuned the front end to increase sensitivity back to the normal although it did work without re-tuning. I did not have to adjust the VCO.

If you would like to receive the information which consists of a schematic of new counter, old and new block diagrams and instructions to incorporate and test the modifications, send an SASE (standard business envelope, 22 cents postage) to:

Jon Reeves, WB9CNE  
12125 Trolley Rd.  
Oaklandon, In 46236-3056

NOTE:

The information which will be mailed is being prepared for publication.

It is requested that the information be used only for modification of your personal radio and not be passed on without this note or placed on any bulletin board system. I am releasing the information now to assist packet radio operators in their efforts to move to 145.01 MHz and would appreciate consideration of this request.

This modification is read 715 times.

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**19-07-1998**

## **(IC-22) Step modification (packet radio operation)**

Before doing any other modification, pins 13 and 16 of IC1 (programmable divider, TC-5080P, PLL board) should be connected together. This allows the PLL to accept all the binary codes and then cover all the frequency range possible with the 22S. This modification is currently done and could be already done on your rig.

### STEP MODIFICATION (PACKET RADIO OPERATION):

The normal STEP between "channels" is 15 KHz. For example, you can tune 146.610, 146.625, 146.640 MHz, but not 146.620, 146.630, etc...

The step is settled by the crystal X1 (on the PLL board), located near the VCO (big metal box). The normal frequency of this crystal is 7.680 MHz. This crystal also sets the offset (normal: 600 KHz) when using duplex mode, since the offset is made by a logic circuit that adds 40 to the binary code applied to the programmable divider (PLL). Think about it:  $40 \times 15 \text{ KHz} = 600 \text{ KHz}!!!$

The step produced by a given crystal is calculated this way:

$$\text{STEP} = \text{Xtal freq. (Hz)} / 512$$

Example: Xtal 7.680 MHz: STEP = 7 680 000 Hz / 512 = 15 000 Hz = 15 KHz.

The offset is calculated this way:

$$\begin{aligned} \text{OFFSET} &= \text{STEP} \times 40 \\ \text{or: } \text{OFFSET} &= \text{Xtal freq.} / 12.8 \end{aligned}$$

Example: 15 KHz x 40 = 600 KHz  
7.680 MHz / 12.8 = 600 KHz

If you want to have a 10 KHz STEP, you need to change the crystal X1 for a 5.120 MHz crystal:

$$\text{STEP} = 5.120 \text{ MHz} / 512 = 10 \text{ KHz}$$

Doing so will make the rig operate from 144.390 to 146.950 MHz, in 10 KHz segments. However, the OFFSET will be 400 KHz instead of 600 KHz. Repeater operation is therefore impossible, but this modification is best for PACKET RADIO operation!

Suggestion: You can use a 10.240 MHz Crystal (which is common in CB rigs and electronic stores) and divide its frequency by 2 with a divider. You can use the unused pins of IC6 (uPD4013C) as a divider. To do this connect pins 9 and 12 together, enter your 10.240 MHz signal on pin 11 and you get a 5.12 MHz square wave on pin 13.

If you want a 5 KHz step, You need a 2.560 MHz crystal.

This modification is read 669 times.

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**19-07-1998**

## **(IC-22) Band segment modification**

The normal frequency coverage of the IC-22S (with X1=7.680 MHz) is 144.390 to 148.215 MHz, a range of 3.825 MHz (Fmax - Fmin), by 15 KHz steps. The frequency segment covered by the IC-22S is settled by Crystal X2 (near X1 on PLL board). Its normal frequency is: 44.563 333 MHz. The lowest frequency (Binary code 00) and the highest frequency (binary code 255) covered by the radio with a given crystal (X2) is calculated this way:

$$\text{Fmin.} = (\text{Xtal freq.} \times 3) + 10.7 \text{ MHz}$$

$$\text{Fmax.} = (\text{Xtal freq.} \times 3) + 10.7 \text{ MHz} + (\text{RANGE})$$

$$\text{RANGE} = (\text{X1} / 2) - (\text{X1} / 512)$$

Example:

$$\text{Fmin} = (44.563 \ 333 \text{ MHz} \times 3) + 10.7 \text{ MHz} = 144.390 \text{ MHz}$$

$$\text{Fmax} = (44.563 \ 333 \text{ MHz} \times 3) + 10.7 \text{ MHz} + ((7.68 \text{ MHz} / 2) - (7.68 \text{ MHz} / 512)) = 148.215 \text{ MHz}$$

As I said before, the normal coverage of the IC-22S is 144.390 to 148.215 MHz (With X1=7.680 MHz). The 215 KHz Higher than 148.000 are useless and limits coverage in the low portion of the 2 meter band. Changing X2 by a 44.488 333 MHz crystal will make the IC-22S covering from 144.165 to 147.990 MHz (15 KHz steps).

$$\text{Fmin} = (44.488 \ 333 \times 3) + 10.7 = 144.165 \text{ MHz}$$

$$\text{Fmax} = (44.488 \ 333 \times 3) + 10.7 + ((7.68 / 2) - (7.68 / 512)) = 147.990 \text{ MHz}$$

An interesting modification is to change X1 for a 5.120 MHz crystal, allowing a 10 KHz step, and change X2 for two appropriate crystal, each one allowing 2 MHz coverage.

With X1=5.120 MHz, replacing X2 by a 44.923 333 MHz crystal will give the following coverage:

$$\text{Fmin} = (44.923 \ 333 \times 3) + 10.7 = 145.470 \text{ MHz}$$

$$\text{Fmax} = (44.923 \ 333 \times 3) + 10.7 + ((5.12 / 2) - (5.12 / 512)) = 148.020 \text{ MHz}$$

With X1=5.120 MHz, replacing X2 by a 44.250 000 MHz crystal will give the following coverage:

$$\text{Fmin} = (44.250 \ 000 \times 3) + 10.7 = 143.450 \text{ MHz}$$

$$\text{Fmax} = (44.250 \ 000 \times 3) + 10.7 + ((5.12 / 2) - (5.12 / 512)) = 146.000 \text{ MHz}$$

These two crystals could be installed with a switching device, to use one at a time. This allows full coverage of the 2 meter amateur band (144-148 MHz), in 10 KHz segments. Local oscillator can be slightly detuned to allow operation on 5 khz steps (146.745 MHz, example). I have not worked on it yet.



**19-07-1998****(IC-22) Recieve SSB and CW on IC-22S**

Would you like to convert your IC-22S to receive SSB and CW signals? If you own a shortwave receiver, or a general-coverage HF rig, you can do it easily, for less than a dollar!

All you need to do is to take a sample of the 455 KHz IF amplifier signal in your IC-22S and apply it to your shortwave receiver, tuned on 455 KHz in USB, LSB or CW.

Connect a 68 K ohms resistor on the collector of Q6 (455 KHz IF amplifier).

It's a 455 KHz IF amplifier, NPN 2SC945; collector is the center pin. Connect the free end of this resistor on the inner conductor of a coaxial cable.

Connect the shield of this coaxial cable on the ground (-) of the IC-22S.

The other end of this coax is connected on the antenna connector of your shortwave receiver, with the appropriate connector. This coax could be RG-58U or shielded speaker wire; the length is according to your convenience. The resistor is used to limit loading of the IF amplifier.

The frequency you want to listen is selected on the IC-22S. Your SW receiver must be tuned on 455 KHz. The mode you want to use (USB, LSB, CW) is selected on your SW receiver. This modification can NOT be done in transmission, because too many modifications of the IC-22S are involved. You would need to change the RF amplifier because it's in class C, which doesn't work in AM and SSB.

R149 pot: adjusts low power. Reducing R148 increases maximum low power (less than 10 Watts...) possible with R149 pot.

R73 pot (30K): adjusts TX meter readout. When this pot is connected on D10 instead of D11, the meter indicates SWR. R73 could therefore be used to calibrate FORWARD reading.

R89 pot (100K): Adjusts SWR feedback, and therefore SWR protection level.

R132 pot: adjusts Mic. Gain.

R124 & R112 pots: Adjusts Maximun deviation.

R124 pot: Adjusts symmetry of clipping of mic. amplifier.

**19-07-1998****(IC-22) Modifying the IC22A for 9600 baud operation****Author:** Mike Curtis

by Mike Curtis, wd6ehr and Dave Shalita, w6mik

This is one of the more difficult rigs to modify - most are even simpler!

This mod will make your IC22A into a dedicated 9600 baud packet radio. Components with \* are added to the crystal board.

Remove the trimmer capacitor for the transmit crystal socket you'll be using for 9600 baud. Replace with the above circuit. The 4-20 pF trimcap should be a good quality ceramic or other low-drift trimmer. (Sorry - Radio Shack doesn't have anything suitable.)

Connect 2 10K resistors to C-53 (both sides) and tie the other ends together. This junction is where you'll pick off your RXA.

Turn R-67 (dev control next to P-1 and P-2) completely counterclockwise. This kills signals that may get into the phase modulator.

Using a service monitor, or oscilloscope connected to the detector of a receiver, adjust the varactor bias for the best eye pattern.

Alternate bias adjustment:

Use the k9ng's 4800 Hz "idle" tone to adjust your modulator for best linearity. Using a service monitor, or a receiver with a fairly wide passband, adjust varactor bias for the "best" sine wave. Thanks to Brian Kantor wb6cyt for this tip.

19-07-1998

## (IC-228) IC-228 mods

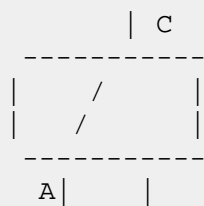
I have the mod info from ICOM. It is best to have the diagram in front of you when performing the mod, but for the bold ones, here goes:

There are three PC boards in the rig. The TX and RX boards are on the top and bottom of the rig. The logic board is behind the front panel, and the LCD display and front panel switches are mounted on it. It is the logic board which will be the object of your surgery.

1. Remove D-19
2. Install D-7 - (Type 1SS193)

D 7 should have three terminals, but only one is used.

It looks something like this:



There is no connection to the terminal on the lower right. The Cathode of a 1N914 diode Can be connected to the upper terminal, and the Anode to the lower left. (as indicated by the C and A.

In locating the positions of D-19 and D-7, reference the lithium battery.

D-19 is at the 1 O'clock position near the edge of the board, and D-7 is at 2 O'Clock and adjacent to the battery.

**Date:** 25-08-1999

**User comment**

**From:** [webmaster](#)

**Subject:** What did this modification.?

Please mail me if you know what this modification do.?

Best regards  
Erik Hansen - OZ2AEP  
webmaster  
www.mods.dk

This modification is read 705 times.

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19-07-1998

## (IC-229) IC-229H, and AM aviation band modification

Eons ago, I asked:

- > Does anyone know what is required to make an Icom IC-229A (or IC-229H)
- > receive in the aviation band (118-136 MHz or so)?
- >
- > For an IC-2SAT handheld, it's just a three-button-down-during-power-up
- > sequence, and it does AM demodulation in that subband. Is it so simple
- > with the IC-229A/H? I called the Icom info line, but they were far from
- > helpful. Eventually said "yes, it does do AM demodulation in that band",
- > but were very reluctant to admit that and flat out said no way they'd tell
- > you how to do it. Sounded like CYA paranoia regarding type acceptance....

Quick summary:

- Yes, it does do AM demodulation. Many people are unhappy with its performance, but I was impressed. Variation in radios, or variation in tastes, who knows....
- Yes, it requires a hardware mod. No, the procedure described in "CQ" magazine is not exactly right. Yes, it is easy to do.
- It has a wide bandwidth and is sensitive. Therefore, you may have intermod problems.

### More detailed:

In the true spirit of the net, I got several responses that were just noise. Along the lines of "No, I know nothing about that radio, but a buddy of mine got a different one once, I think maybe it was a Yaesu, but I'm not certain. It might have done AM demodulation. Or then again maybe it didn't, now that I think about it. Well, I guess I don't know. Hope this is a big help to you!!" Duh.

However, several were helpful, and the more useful ones are excerpted below. There was a review of the radio in "CQ" this past year (don't have the exact date in front of me). The following change/additions need to be made to the text where it describes how to enable aviation-band AM receive:

1. To disassemble the radio,
2. When removing the top and bottom case halves, be careful, as the speaker is connected to one!
3. Remove the three knobs by gently pulling them straight out from the panel.
4. With a spanner (or needle-nose pliers) remove the nut mounting the front panel to the microphone connector.
5. Now remove the screws holding the front panel (black plastic) to the frame, and remove that panel.
6. You will now find that there is a subassembly with a "backbone" of 0.25" machined plexiglass, held to the frame with three machine screws. Remove those screws and gently swing that subassembly away from the frame. You now have access to the diode that must be clipped.

Otherwise, things are done as the review says. The CQ review gave a good report of its AM aviation band performance. I would agree with that, and suspect that at least some of the complaints were due to the original signal -- there's a ton of background noise in a private plane. However, airliners should sound quite clear. Sensitivity, even that far away from the ham band, seems good. Airliners at altitude up to 50-100 miles away can be heard, even with just a J-pole antenna near ground level. (assuming you're not at the bottom of a steep valley, of course!) Sensitivity in other non-ham bands seems good as well, it has no trouble picking up sheriff's dispatchers maybe 45 miles away.

Too much sensitivity and too much bandwidth may cause big problems with intermodulation, if you're in an RF-rich environment. I have no idea how it would perform in, say, downtown Chicago, but I suspect you'd hear all sorts of intermod and images. There were a couple of odd images I noticed, but nothing distractingly bad. The built-in attenuator might help.

My father is now using one, with a J-pole at 53' and an 11-element beam at 48', from relatively high ground in a rural, hilly area. It seems to do very well for such an application, as it gives you three radios (ham, aviation, public-service scanner) in one box. 45-50W output means you can hit what you can hear, and it's sensitive enough to hear quite a bit (some some repeaters out to 100 miles are useful). At least two NOAA weather broadcasters around 162 MHz are audible.

Oh yeah, when you rotate the knob in "VFO" mode to tune up from 174 MHz, it skips to the range 340-380, and then to 870-890, before wrapping around to 118 again. Don't get excited, it doesn't receive in 340-380 or 870-890, as the VCO won't lock up there. It does AM demod 118-134 and FM 134-174 MHz.

On to the excerpts.... For the following, only the pad pair marked as "D5" had a diode in my dad's:

```
> From: jpd@pc.usl.edu (Dugal James P.)
> Date: Tue, 10 Dec 91 13:12:42 -0600
> To: cromwell@rvl2.ecn.purdue.edu
> Subject: Re: IC-229A/H AM aviation band mod
> Newsgroups: rec.radio.amateur.misc
> Organization: Univ. of Southwestern La., Lafayette
>
> I retrieved this from my "archive" -- hope it helps!
> --James N5KNX
>
> Here's some info on the IC229A/H, (indirectly) from ICOM:
>
> The stock radio has RX: 136 - 174, TX: 140-150, FM only.
>
> When diode D5 (conventional, upright diode on the logic board)
> is cut, 118 - 135.995 MHz can be received in AM mode.
> [Local reports indicate the audio is acceptable but not as good as,
> for example, AM received on a PRO-2004 scanner]
>
> To expand TX to 136 - 174 MHz, locate chip diode D9. Ascertain that
> the vertical pair of pads to the right are OPEN. Short the next pair
> of vertical pads to the right [with solder, perhaps].
>
> These changes pertain only to the USA model.
>
> Here's some ASCII art to clarify:
```

```
> _____
>  R5   R4   /
>           R1   /
```

```

>          R2 . .
>          D1  D2
> -----+ .. ..
>          | -D3-
>          | -D4-
> IC4      | -D5-
> -----+ -D6-
>          | -D7-
>          | . .. - -
>          | D8  D9 - -
>          | 0 .. .
>          C7
> X1
> _____/
> _____/

```

*As far as the following two, I got the impression that the IC-229H did as well at aviation band receive as my IC-2SAT.... One thought -- since the "CQ" review described as slightly different physical construction, I wonder if there have been some slight changes during the production run leading to improvements in AM demod performance??*

This modification is read 1101 times.

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**19-07-1998**

## **(IC-229) IC-229H & 9600 bauds (Anglais)**

After trying to solve this the easy way with no luck, by looking for docs already posted, a few of us have decided to bug this out. A quick call to ICOM put us on the rite track. This non-destructive mod for the IC229h works well for 9600 baud packet. You will need your schematic that came with your radio. However, our call to ICOM revealed some discrepancies on the schematic in the FM detector stage, primarily the FM detector chip itself.

Earlier models had the TOKO TK10487M detector and the newer models have the MOTOROLA MC3372M. ICOM, unfortunately, did not make this change in the schematic supplied with the radio. This document will show the connection points for both chips. Remember to use good quality shielded cable like RG-174u, RG-178u or similar. Most of the points are going to require microsurgery, so get out your pencil point soldering irons and magnifying glasses.

### 1. TXA:

On the schematic you will see a block labeled "VCO UNIT". At the bottom of this there is a four pin connector. The third pin is labeled "MOD".

This is where you want to inject the TXA from the modem. The "VCO UNIT" in the radio is shielded by a can. Removing this "CAN" to get to the circuits can be a tedious endeavor. So you can find this "MOD" point on the underside of the radio. It is located beneath a flat metal shield about 1" X 2". After removing this, with the front of the radio towards you, the point can be found in the right corner towards the front where the shield covered. There will be four solder lands rite in a row from left to right. Trace these lands with the schematic to find the "MOD" land. Solder your TXA there. Replace the metal shield. This is as tuff as it gets. I promise!

### 2. RXA:

Well this one is easier. If your radio has the TK10487M, solder RXA to pin 11 of this chip. If your radio has the MC3372M, solder RXA to pin 9 of this chip. Either chip can be found on a board in front of the "metal VFO shield can", on the top side of the radio. You may have to tilt the board a little, but be careful. Don't apply too much heat to the chip or you will have a big problem. I followed the trace away from the chip and attached RXA.

### 3. PTT:

This can be found on the mike jack pin 5. I made this an internal connection for neatness. Neatness counts!

### 4. GND:

If I need to tell you where to find ground, you shouldn't be doing this mod yourself. Attach all the shields from the above wires together outside of the radio to modem ground. Attach only one shield internal to the radio, the "CAN" is a good spot. You don't want to cause any ground loops, do you? Protect the other two shields from shorting to anything in the radio. This is why they make heat shrink tubing.

You may have to add 5-10mF non-polarized capacitors in series with the TXA and RXA lines. Some modems have included these in their circuit, so check. Now you are ready to make the connections to the modem. This will have to be left up to you. There are too many modems and tnc's out there to list all of the connections to them. But you should have the docs with your modem, so it should be easy. Disconnect the radio from the modem if you use the radio for anything else. Well there you have it. This works great, it is what I am presently using.

This modification is read 859 times.

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**19-07-1998**

## **(IC-229) IC-229H Fix CPU/Display board**

Hello From Mike, N3KCT !

For those owners that have encountered CPU RFI from your IC-229, Here's the fix!

The problem is cured by properly grounding the CPU/Display board.

First remove the top and bottom covers. Then carefully remove the threaded mic connector which fastens the mic jack to the front panel.

Remove All Knobs and then the four screws that hold the front panel onto the metal chassis. This exposes the clear display housing and CPU board when you slide the front panel off.

There will be three screws that hold the display panel along with the CPU board onto the main chassis. Two are next to the mic connector, and one is next to the channel control knob. Remove these three screws and the entire display/CPU section will come off in one piece. You will not have to disconnect any of the wiring.

Carefully clean the ground traces that these screws go through on the back of the CPU board and tin them. They are around each screw hole on the CPU board. When the radio is re-assembled, these traces will now properly ground out the CPU section and cure your RFI problem.

Apparently something happened during manufacture that caused these to be covered with that "clearcoat" stuff to prevent them from grounding out.

This fix has been 100% effective on mine and several other radios.

The problem is NOT in the mic, it is just poor grounding of the CPU!

Any questions or comments can be sent to:

N3KCT@NR3U.#NCPA.PA.USA.NA  
73 de Mike !!

P.S.

I do not assume any responsibility for this mod, so procede only at your own risk and capability.

This modification is read 917 times.

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**19-01-2002**

## **(IC-2320) Extended RX/TX**

**Author:** Marcelo - ZZ2MWL - [yoda2@zipmail.com.br](mailto:yoda2@zipmail.com.br). [MODIFICATION.NET](http://MODIFICATION.NET)

Hello radio partner's,

Here I expose what got working in the IC2320.

1. Open the radio and remove the front
2. In her meets the logical plate and it is in her that we will work
3. Remove the diodes marked as D9 and soon below him you will see 3 small diodes, remove only the diode of center marked with "x", doesn't remove other diodes, because in spite of him to be very similar at the IC229 doesn't forget that this is DUAL

With this you will have an opening of:

RX: 118-174 VHF

TX: 140-150 VHF

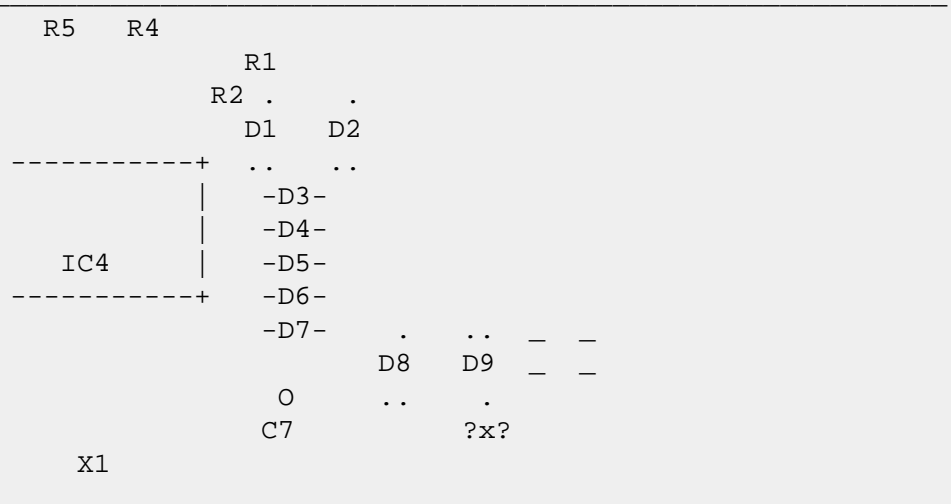
RX: 300-399 UHF

RX: 430-440 UHF

TX: 430-440 UHF

RX: 800-950 UHF

**Is not necessary reset the radio!!!**



So long, 73 from Brazil

Marcelo Medrado  
ZZ2MWL

This modification is read 260 times.

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**19-07-1998**

### **(IC-2330) IC2330A expanded range**

I picked up a IC-2330a and found there were no mods..at least i couldn't find any, so i decided to find them myself! and this is what i found...

I have had no problems since performing these mods, but of course i claim no responsibility if you trash your radio, and of course it will void your warranty!

OK here we go..

on the logic board (behind the display board) are two diodes D5, and D6...  
cut D5 to get 215.00 to 230.00 Mhz TX/RX  
cut D6 to get 118.0 - 135.0 AM/RX

There is a solder pad on the back of the logic board which when the pads are connected together will enable 136-174 TX/RX, but disable the tone encoder on 2meters only...

haven't spent much time on that to figure out why or how to fix that so i left then unconnected (don't need to xmit there anyway) but if someone else can figure it out let me know! i love all mods so if anyone has any more they know of for this radio pass them along to me as well..

Good luck and thanks for reading!! Steve KD6QPQ

This modification is read 628 times.

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**28-05-2000**

### **(IC-2330) IC-2330A expanded range (another way)**

**Author:** Takeshi Kudoh - [takeshikudoh@usa.net](mailto:takeshikudoh@usa.net).[MODIFICATION.NET](http://MODIFICATION.NET)

I found another way of modification for IC-2330. After the modification, we can receive;

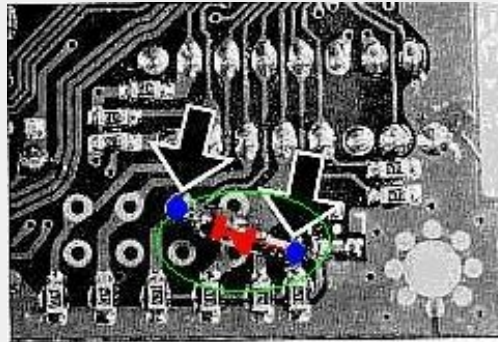
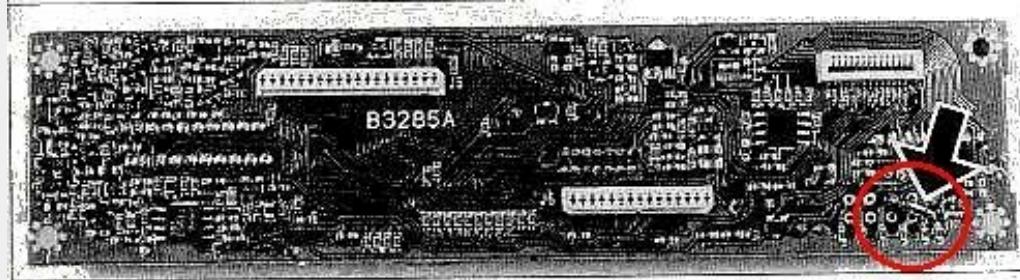
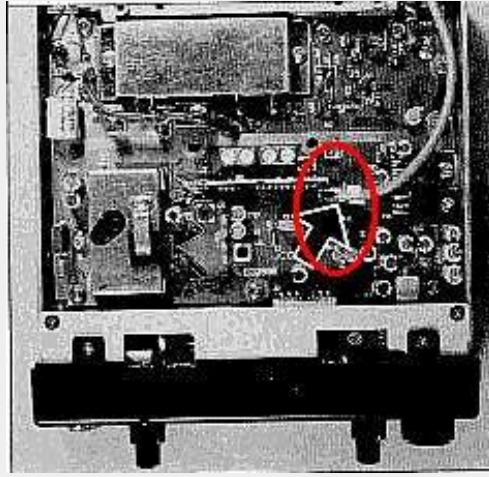
118.000-135.995MHz AM(RX)  
136.000-174.000MHz FM(RX)  
144.000-146.000MHz FM(TRX)  
320.000-479.000MHz FM(RX)  
430.000-440.000MHz FM(TRX)  
830.000-950.000MHz FM(RX)

This way might be more difficult than yours, but it is easy.

First, a switching diode should be put on the circuit board in the circle on this picture.  
Second, the transceiver should be reset. To be reset, turn it on with pushing [SET]+ [MW].  
And turn off and turn it on again with [V/M]+ [SET]+ [DN]. [DN] key is located on microphone.  
That's all of modifications for IC-2330.

In addition, if you want to put an external antenna for 830-950MHz, put coaxial cable in the circle on this picture.

This mod is shown in a web page in Japan. That means it wouldn't work well coz this mod is for IC-2330 sold in Japan.



Please try to do it and let me know the result.

Regards//Takeshi Kudoh  
[takeshikudoh@usa.net](mailto:takeshikudoh@usa.net).[MODIFICATION.NET](http://MODIFICATION.NET)

This modification is read 604 times.

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**19-07-1998**

## **(IC-2340) IC2340H att modification**

*From: 4z4zq@pc.4z7aba.ampr.ORG (Pinhook Ronen)*

This text deals with ICOM's Mobile radio IC2340H. On some of icom dual band mobile transceivers there is an RF attenuator which attenuates the received signal by 20dB. In my opinion this is a great feature especially when you operate in cities or in area's with lot of RF signals, repeater, etc.

The attenuator function reduce the intermodulations that appears while receiving in those areas, and let you listen more quietly on your favorite channel, when you listen to a local repeater you can hardly feel the 20dB attenuator, but the intermodulations almost disappear.

The problem is that the attenuator was featured on old icom mobile rigs (such as IC2340H, IC3230H), but not on the IC2340H. The next lines will guide you how to add this feature. All you need is 2 1p2t small switch, and 2 12Kohms resistors.

### VHF MODIFICATION

1. Open the upper cover of the transceiver.
2. Locate D9 on the print (left to the Power Amplifier while looking from the front of the transceiver)
3. Solder a 12K resistor to the anode of D9 as close as possible to the diode, (with no wire, the pin of the resistor should be soldered to the pin of the diode)

4. The other side of the resistor should be wired to the small switch (the switch can be mounted on the back of the transceiver, there's an hole in the heatsink which you can use to insert the wires to the transceiver).
5. The other side of the switch should be tied to 5V (you can find a 5V terminal at J2 pin 2, j2 & j1 located near the VCO at the front of the print it is a 2\*4pin sip connector, j2 is closer to the VCO).

#### UHF MODIFICATION

1. Open the lower cover of the transceiver.
2. Locate D17 on the board (this diode is wired under the board, just beside L22. there are 2 holes, I am talking about the one located closer to the antenna)
3. Solder another 12K resistor in the same way it was done in the vhf to the anode of D17 just under the print ( the anode is the left pin of the diode ,the pin which located closer to the power amplifier.
4. The other side of the resistor should be wired to the other small switch...
5. The other side of the switch should be tied to 5V (for example to the right pin of the regulator IC7)

#### Explanation

When you turn this switch on, it turns the diodes on, and attenuates the received signal.

This modification was tested, but you will do it on your own risk.

This modification is read 756 times.

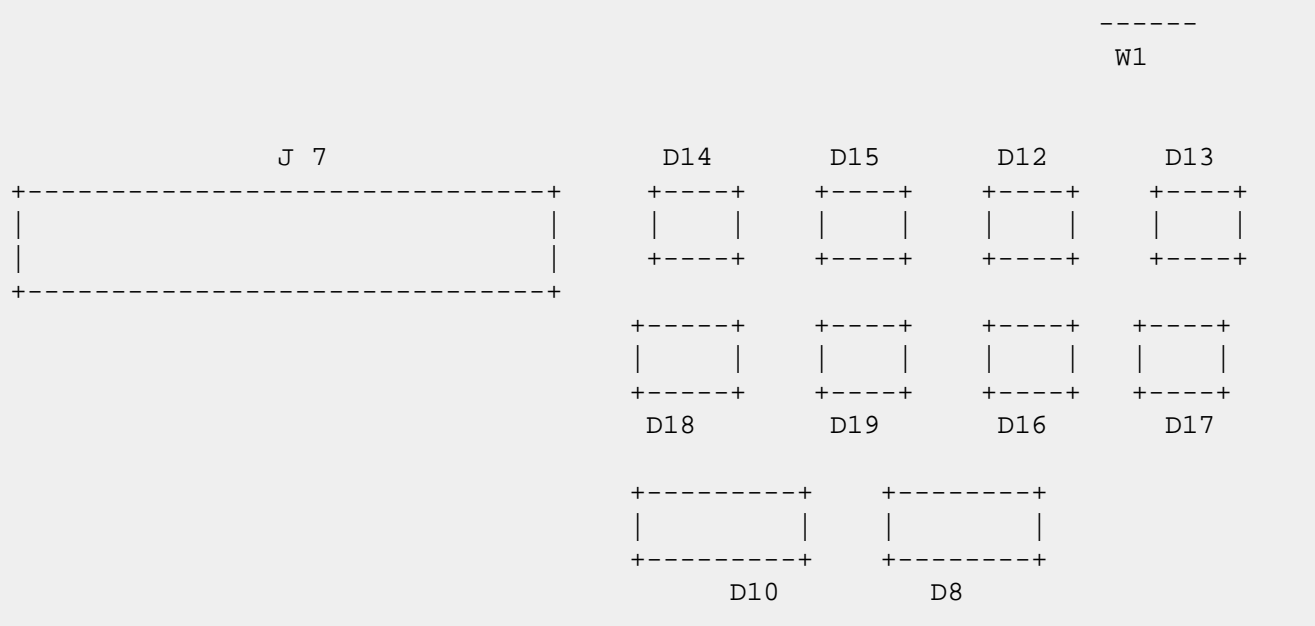
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### 20-01-2001

### (IC-2340) Some mods for the IC-2340H

The diodes D12 to D20 and D10 + D8 on the logic board is the diodes that control frequencyrange and model version.

[Logic board]



#### Minirepeater:

- Remove D16 on logic board. (Not necessary on USA version)
- Set the desired QRG on each band.
- Push the [VHF MAIN] + [UHF MAIN] VFO knob and push [SET] at the same time. The memory channel indication changes to "L" (L=Minirepeater mode)

To return to normal, push and hold [SET].

#### Expand RX for the EUR version:

By key funktion:

- Switch off the radio.
- Push the [V/MHz] (for VHF), and [SET] and [DN] on microphone at the same time, while turning on power.



By diode:

- Remove D17 diode on the logic board.
- Do a full reset by switching off the radio. Then while pushing [SET] + [SPCH], turn on the radio.

After either mod, you will have:

118,000 - 135,995 MHz AM  
136,000 - 174,000 MHz FM  
320,000 - 479,000 MHz FM  
830,000 - 950,000 MHz FM (Needs extra coaxial cable to receive anything)

**Expand RX for the USA version:**

- Cut W1 jumper wire on logic board.

After mod, you will have:

118,000 - 135,995 MHz AM  
136,000 - 174,000 MHz FM  
320,000 - 479,000 MHz FM

This modification is read 766 times.

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**20-01-2001**

**(IC-2340) IC-2340 mods**

**Symptom:**

Any of the following: Cannot change band to UHF, no UHF volume or squelch control, no UHF tuning, or strange-sounding beep tone.

**Cure:**

Rework bad soldering at J3 on display unit and replace the SW-B board with a factory-modified flex PC board.

---

**Symptom:**

No audio output from receiver.

**Cure:**

Remove excessive solder on the Main-A unit near the audio amp.

---

**Symptom:**

Howling if volume is turned up when using UHF.

**Probable Cause:**

Microphonics in VCO section. Resolder the ground spring at the UHF VCO shield. You may also add a second spring for further improved resistance to microphones.

This modification is read 748 times.

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**19-07-1998**

## **(IC-2350) IC-2350 expand RX/TX and Crossband rep**

25 Nov 1995

On logic board behind the front panel

1. Remove D9 to expand vhf rx
2. Remove d10 to expand uhf rx
3. Cut w1 jumper wire to expand tx on all bands
4. AM selectable by holding [V/MHZ] button for 2 secs
5. Crossband repeat, set desired freqs press [VHF MAIN] [UHF MAIN] and [SET] simultaneously. To deactivate press [SET] for 2 secs

There is also a remote access feature but its lengthy and I hate typing. Larry G4OXY

This modification is read 849 times.

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**19-07-1998**

## **(IC-24) Frequency expansion for IC24**

1. Remove, if present (S/N < #3000 ??), D13 on the LOGIC UNIT.
2. Reset the CPU ( [func] + [a] and "power on" ).

The frequency-range of the logic unit\* is now :

75 - 195 MHz

200 - 490 MHz

740 - 960 MHz

\* Because some particular sets have VCO's that won't "lock" over the total range, the frequency-range that is really covered by the transceiver can be smaller as the mentioned ranges.

->Verry Interesting: in the "AIR-band" the receiver even switches to AM-mode !! (108 - 138 MHz).

For those who want more.....

1. Remove diode D8 (logic board);
2. Place, if not present yet, D7;
3. Place D12;
4. Remove D13;
5. Push, at the same time, [light], [B], and [#], while turning on the power (probably you need three hands for this), The transceiver now executes a "display-test".

Release the buttons only when the display-test is ended.

The frequency-range of the logic unit\* is now:

VHF: 0 - 355 MHz

UHF: 355 - 1310 MHz

This modification is read 972 times.

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**19-07-1998**

## **(IC-24) Cross-band repeater operation IC-2**

1. Remove diode D14 (if there is anyhow & anywhere still one diode left on the logic board);
2. Select the desired frequency in the VHF range;
3. Select the desired frequency in the UHF range;
4. Switch the transceiver in "SPLIT"-mode ([func] + [c]);
5. Switch on the CROSS-BAND-REPEATER mode by pressing [func] + [5] + [d].  
-> Switching off the REPEATER-mode?: [func] + [d]!

This modification is read 790 times.

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**19-07-1998**

## **(IC-24) Out of band modification of the ICOM IC-24AT**

The Icom IC-24AT is truly a remarkable unit. Having it's genesis in the IC-R1, Icom's extremely wide band Hand Held Receiver, it is capable of receiving a wide range of frequencies, as well as being able to transmit on short excursions, outside of the amateur two meter and 440 MHZ. bands.

The more current models can be modified to receive out of band, by a simple software (not necessary to physically open the transceiver) procedure as follows;

Turn the power switch off. While simultaneously holding the "light" button, the "B" button, and the "#" button, turn the radio on. All elements of the display will light up.

Continue holding the buttons until the display goes out. It may be helpful to have a buddy give you an extra hand during this procedure....Your unit will now receive out of band.

The older models of this transceiver, require the removal of diode D13, before performing the above procedure. D13 is on the main logic board and is a discreet diode near the center of the board. It is the diode on the left of the two on the board when the radio is open and held with the controls away from you.

The "stock" transceiver, was also not designed, to provide full direct keyboard entry of the operating frequency. This can also be modified by one or both of the two procedures below;

To directly key in the 10Mhz. frequency, simultaneously hold the "light" button and the "2" button, while turning the radio on.

To directly key in the 100Mhz. frequency, simultaneously hold the "light" button and the "3" button, while turning the radio on.

The modification of the unit to enable it to transmit out of the amateur bands is a fairly simple procedure. It is however, complicated by the fact that the construction technique used in this transceiver is "Surface Mounted Technology." If you have no experience dealing with this technology, you may well be better advised to defer this procedure to someone who has. It is extremely small and delicate, and is best done with specialized equipment. Also, because the unit may not be FCC type accepted for all the frequencies on which it can then transmit, it may not be legal for you to use it, despite the fact you may be licensed to transmit on those frequencies. This information is provided only for those who are licensed for and want to use the unit on MARS and CAP frequencies, where there are no type acceptance restrictions. The procedure is as follows;

- Order a couple of DA204u diodes from Icom or your Icom dealer. These are a special three terminal device with two diode in one package. They are very very small, about half the size of one of the key buttons on the touch tone pad.
- Locate and remove the diode device in position D8
- Locate the vacant position of diode D7 and attach one of the DA204u diodes at that location.
- Locate the vacant position of diode D12 and attach the other DA204u diode at that position.
- If diode D13 (procedure above) has not been removed, remove it.

The unit will now transmit out of the amateur bands.

The above modifications provided the following capabilities with my particular unit.

### FREQUENCY COVERAGE

| RECEIVE                  | (VHF) | TRANSMIT                |
|--------------------------|-------|-------------------------|
| 74.9 Mhz. - 127.9 Mhz.   |       | OFF                     |
| 138.0 Mhz. - 168.0 MHz.  |       | 138.0 Mhz. - 159.0 Mhz. |
| 174.1 Mhz. - 189.69 Mhz. |       | OFF                     |
| 200.0 Mhz. - 287.22 Mhz. |       | OFF                     |
| 310.0 Mhz. - 349.0 Mhz.  |       | OFF                     |
|                          | (UHF) |                         |
| 355.0 Mhz. - 409.98 Mhz. |       | OFF                     |

412.37 Mhz. - 498.0 Mhz.  
792.85 Mhz. - 966.66 Mhz.

410.5 Mhz. - 470.0 Mhz.  
OFF

Receive sensitivity throughout both of the Ham bands was better than .5 of a microvolt. Sensitivity in the 200 Mhz. range was a disappointing 1 millivolt and in the 800 Mhz. band a good .7 of a microvolt. Remember, while the unit will receive on those frequencies, it is illegal to monitor cellular telephone communications.

This modification is read 1011 times.

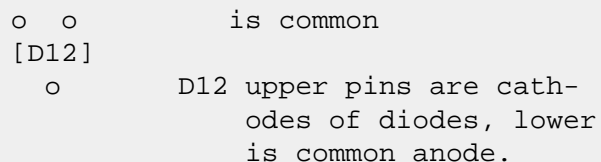
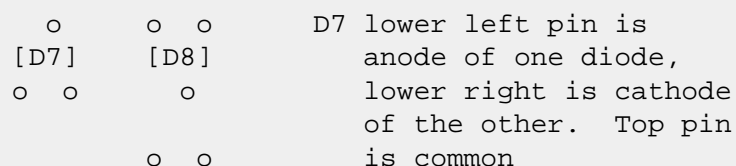
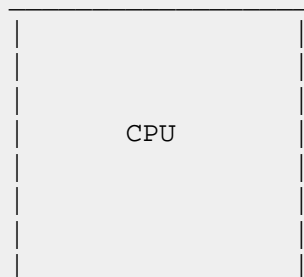
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**19-07-1998**

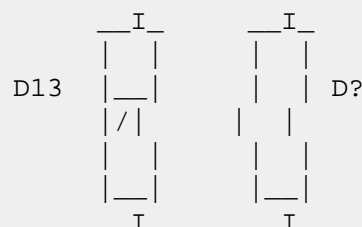
## **(IC-24) IC-24AT ext frquency**

I received the following mods for 24AT out-of-band from a very reliable source (although they don't specify RX only or RX/TX), for 75-195 MHz, 200-490 MHz, and 740-960 MHz. Rumor has it (unconfirmed) that the unit even switches to AM in the air band!

1. Remove diode D8 [see figure below]
2. Attach diode D7 [I believe this is already equipped]
3. Attach diode D12
4. Remove diode D13
5. Simultaneously hold "LIGHT", "B", and "#" keys and turn the power on. Release all keys after the display goes out (checks all LCD segments). [This is supposed to enable the out-of-band frequencies above]
6. Simultaneously hold "LIGHT" and "2" keys and turn the power on. This enables the 10 MHz frequency digit entry.
7. Simultaneously hold "LIGHT" and "3" keys and turn the power on. This enables the 100 MHz frequency digit entry.



See text



**WARNING:** I have NOT tried the hardware mods and cannot vouch for them, so proceed at your own risk!

I am told that the newer 24AT's (believed not to have made it to the US yet) will have the hardware mods in place, so only steps 5-7 will be necessary. So, try this first. Steps 5-7 don't seem to have any effect on a 24AT without the correct hardware mods. BTW, this has been attempted on 2 units with serial numbers around 1000 and mid-1100's, neither of which worked. :( Like I said, the ones with the mods aren't here yet.

There are 5 screws to remove the case (5th is on the strap hook). Keep the top panel controls with the front of the radio, and be VERY careful pulling the back off because there are fine ribbon cables connecting the front & back. I don't think they'll take much flexing.

Additionally, diodes D7, D8, and D12 are surface mount components. They contain 2 diodes connected to 3 pins. Diodes D7 and D12 are different configurations. I believe D8 and D12 are different, so I wouldn't put the removed D8 in the spot for D12. Since they are surface mount, removal of D8 may not be all that difficult for those with steady hands and a fine low power soldering iron, but adding D12 would be a bear. I know of no reason that small discrete diodes couldn't be used in for D12. D13 is a small but standard axial diode, and can be easily cut.

It is for this reason I have not attempted the hardware mods. Now, if the referenced posting is correct, and only D13 needs to be

cut... I'm guessing, but it could be that the rest of the diode changes are for the 10 MHz & 100 MHz digit entry (which I'd like but could live without) or out-of-band TX, or the like.

If anyone has tried only cutting D13 and resetting? Did it work? What is your serial number? Please post to the net!

Mike Pflueger

Packet: WD8KPZ @ W1FJI

Transmit range doesn't appear to be affected unfortunately. I was at least hoping for 420-450 coverage. BTW, I tried each amateur band from 6m to 23cm. The PLL doesn't lock up at either end. Another negative is the frequency step on 220 doesn't allow one to hit each possible repeater slot.

73 de Gene WA1UXA

This modification is read 871 times.

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**19-07-1998**

## **(IC-24) IC-24AT Keyboard command summary**

This is an attempt to document all of the known key sequences for the ICO IC24AT (144/440MHz dual band hand held). Some key sequences may be common with the IC[2,3,4]SAT, therefore a fewkey sequences fr thoseradios re also on this list. Some ke sequenes require optins (such as the PL encode/decode board).

This is not designed to replace the owners manual, but to summarize the information in one place.

Note: Many controls vary depending on the current mode, i.e.: Scan up/down will search frequencies when in VFO mode, and will scan meory channels when in Memory mode. Consult the owners guide for complete iformation.

KEY/COMBINATION = Result, action

-----

0-9,A,B,C,D,#,\* = note: when transmitting these will generate DTMF tones  
0-9 = Enter frequency (can also use the VFO knob)  
A = VFO mode / clear incomplete entry  
B = Memory mode  
C = VHF / UHF change  
D = Call channel  
\* = Step frequency down/scan down  
# = Step frequency up/scan up  
MONI = Open squelch and change to input frequency (if not simplex) while button is depressed  
H/L/DTMF = Select High/Low power, or (while transmitting) send preprogrammed DTMF codes  
FUNC + 0 = Dial set  
FUNC + 1 = PL enable (when option is installed)  
FUNC + 2 = Code squelch [NOT for the IC24AT, IC[2,3,4]SAT option only]  
FUNC + 3 = Skip memory  
FUNC + 4 = Duplexoperatin  
FUNC + 5 = Code [NOT for the IC24AT, IC[2,3,4]SAT option only]  
FUNC + 6 = Mask freuency  
FUNC + 7 = Priority mode on/off (operation dependent on current mode)  
FUNC + 8 = Set mode (several different functions, press A to exit)  
FUNC + 9 = Real time clock and timer functions (press PTT to exit)  
FUNC + A = Memory to VFO transfer  
FUNC + B = Memory Write  
FUNC + C = Split operation (cross band full duplex)  
FUNC + D = Lock mode / Cross Band Repeat disable  
FUNC + \* = Scan programmed limits (down)  
FUNC + # = Scan programmed limits (up)  
FUNC + 5 + D = Cross Band Repeat enable (split mode must be on!)  
Diode D14 (right diode on CPU board) must be removed to enable the use of this function)  
FUNC + MONI = RX/TX light enable / disable  
FUNC + H/L/DTMF = Select DTMF Autodialer memory  
Func + VFO knob = Change frequency/memory channel (according to dial set, see FUNC+0)  
Func + LIGHT = Lock light on (don't time out)  
H/L/DTMF + VFO knob = Change output power (4 power levels when using 13.8 vdc)

The following key combinations selects "power on modes". Start with the radio OFF, then hold down the indicated keys, and continue to hold them while turning the power ON. Some 'modes' override others.

LIGHT + \* = PTT enable  
 LIGHT + 0 = PTT Disabled (inhibits the transmitter, good security method)

LIGHT + 1 = 1 MHz digit set (4 digit frequency entry)  
 LIGHT + 2 = 10 MHz digit set (5 digit frequency entry)  
 LIGHT + 3 = 100 MHz digit set (6 digit frequency entry)  
 LIGHT + 4 = Scan pause until signal disappears  
 LIGHT + 5 = Scan pause for 10 seconds  
 LIGHT + 6 = ??? Unknown action  
 LIGHT + 7 = Power Save deactivated (use this for packet operation)  
 LIGHT + 8 = Power Save (minimum - 0.125 / 0.5 second)  
 LIGHT + 9 = Power Save (maximum - 0.125 / 2.0 seconds)  
 LIGHT + A = ??? Unknown action  
 LIGHT + B = ??? Unknown action  
 LIGHT + C = ??? Unknown action  
 LIGHT + D = ??? Unknown action  
 LIGHT + # = ??? Unknown action  
 LIGHT + B + # = RX Extended Range enable  
 This requires that diode D13 is removed (left diode on CPU board). Note that this diode has already been removed by ICOM at the factory on many units. Be sure to hold these keys down until the activity display stops and is showing a receive frequency.

FUNC + A = Reset the CPU (this will clear all the memory channels to the factory defaults)

This modification is read 820 times.

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**19-07-1998**

## **(IC-24) IC-24AT sensitivity**

Following the frequency expansion modification (as specified by Icom), a sample IC-24 was recently tested for tuning range and input sensitivity for an S9 signal. While the sensitivity measurements should not be directly compared with the manufacturer's specifications (usually measured reference to a signal-to-noise quieting ratio), this "quick and dirty" data should give you a good idea of the sensitivity to a medium-strength signal.

| Tuning Range      | Mode | Band      | Sensitivity for S9 Signal   |
|-------------------|------|-----------|-----------------------------|
| 74 - 107.995 MHz  | (fm) | VHF range | approx 1 mV                 |
| 108 - 136 MHz     | (am) | VHF range | 10 - 30 $\mu$ V             |
| 138 - 240 MHz     | (fm) | VHF range | 1 $\mu$ V - 1 mV (1)        |
| 250 - 302 MHz     | (am) | VHF range | 50 $\mu$ V - 1 mV (2)       |
| 310 - 354.995 MHz | (fm) | VHF range | 50 $\mu$ V - 3 uV (2)       |
| 355 - 409 MHz     | (fm) | UHF range | 3 - 10 $\mu$ V              |
| 417 - 490 MHz     | (fm) | UHF range | 1 $\mu$ V - 100 $\mu$ V (3) |
| 805 - 955 MHz     | (fm) | UHF range | 10 - 100 $\mu$ V            |

### Notes:

(1) The sensitivity from 138 - 150 MHz was 1 uV. From 150 - 240, the sensitivity decreased almost linearly from 1 uV to 1 mV (with input voltage plotted logarithmically).

(2) The sensitivity increased almost linearly for both these ranges (with input voltage plotted logarithmically).

(3) The sensitivity plot looked like a "U" with the bottom of the "U" corresponding to the range 440 - 450 MHz (1 uV). The sensitivity then got worse below 440 and above 450.

(Tests courtesy of WB6GTM)

This modification is read 792 times.

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19-07-1998

## (IC-24) IC-24AT enabling the burst-tone

I have the ICOM-Dualband-Handy IC24AT (Asia Version) and want to modify it to enable the 1750 Hz-tone for repeater-operation.

I searched all the PR-Mailboxes in HB9 for mods but i found nothing about enabling the burst-tone.

The Printed-Circuit-Board look like this:



In my Handy, only D5 and D6 are mounted. I measured the pins with a multimeter and found following:

-D5 is a pair of diodes where the under, center pin is the cathode of both and the upper two pins are the anodes

-D6 is only one diode where the upper left pin is the anode and the lower, center pin is the cathode. The upper right pin of D6 is not used.

So, all I need is the info which diodes are to remove or attach and is there still more to do (like adding some resistors)?

vy 73 de HB9IQW @ HB9OS

This modification is read 766 times.

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19-07-1998

## (IC-24) IC-24 auf 9600 Baud

Umbauanleitung für das Handfunkgerät IC24 auf Packet-Betrieb mit 9600Bd

Sicher sind viele Om's noch im Besitz eines Icom-Handfongerätes IC24. Obwohl das Gerät schon älter ist, habe ich nirgends eine Umbauanleitung für 9k6 ge- funden. Anscheinend hat sich bisher niemand die Mühe gemacht, dieses Gerät umzubauen. Also bin ich beigegangen und habe es selbst versucht, und dies gleich mit Erfolg. Für 9k6 Packet-Radio-Betrieb darf der Frequenzgang des Signals bekanntermaßen nicht beeinflußt werden. Dies bedeutet, daß man alle Frequenzbeeinflussenden Stufen sowohl im Sende- als auch im Empfangszweig umgehen muß. In der Praxis heißt das direkte Einspeisung des Sendesignals am Modulator und im Empfangsfall Abgriff des empfangenen Signals am Demodulator.

Beim IC24 ist es garnicht so schwierig, wie es im ersten Moment erscheint. Es ist ganz hilfreich, wenn man die Schaltung besitzt, es geht aber auch ohne.

Wenn das Gerät geöffnet wird, legt man die Hälfte mit der LCD-Anzeige und dem Microcontroller nach rechts. Das heißt, die Bedienungsknöpfe für Lautstärke usw. zeigen nach oben. Nun kann man sehen, daß in der linken Gehäusehälfte unten rechts noch Platz für eine Mini-Buchse ist. Ich habe dort einen Ausschnitt für eine schmale 4polige Flachbuchse eingesägt und diese dann mit 2-Komponentenkleber eingesetzt. Diese Art von Buchsen dienen als Mini-Stromversorgungsbuchsen in Floppy-Laufwerken, und sind im Elektronikhandel für ca. 2DM erhältlich. Den passenden Stecker gab es gleich dabei. 4polig reicht genau aus für Sende-NF, PTT, Masse und Empfangs-NF. Man kann natürlich auch irgendeine andere Buchse dort unterbringen, wenn man etwas findet, was klein genug ist.

Ich wollte die eingebauten Buchsen für Mic und Lautsprecher im Originalzustand lassen, weil das Gerät weiterhin über die vorhandenen Buchsen für 1k2-Packet oder Betrieb mit Lautsprechermikrofon nutzbar sein soll.

Wenn man sich nun die Schaltung anschaut, sieht man das IC1 TK10487M auf der DET UNIT. Hier müßte man zum 9k6 Empfang an PIN 11 rangehen, dann wären alle Probleme gelöst. Nun ist es aber leider so, daß man nirgends an diese Stelle herankommt. Wenn man in die linke Gehäusehälfte schaut, sieht man ein paar kleine Platinen hochkant auf die Hauptplatine gelötet stehen. Die ganz rechte davon ist die DET UNIT. Das IC sitzt leider auf der nach innen gewandten Seite, und unglücklicherweise mit dem PIN 11 nach unten. Da kommt man also niemals ran. Der AF-Ausgang dieser Platine ist der letzte Anschluß nach oben zu den Potis hin. Da kommt man notfalls ran. Nur leider ist auf dem Weg von PIN 11 zu diesem Anschluß schon ein Tiefpass eingebaut, der 9k6-RX an dieser Stelle nicht mehr möglich macht. Dieser Tiefpaß wird gebildet durch R8 (10k) und die beiden SMD-C's C28 und C29.

Glücklicherweise sitzen diese beiden Kondensatoren auf nach außen zugewandten Seite ganz am rechten Rand der Platine direkt übereinander. Hier kann man auch mit einem Oszi an der rechten Seite der C's die empfangene NF messen. Die linke Seite der C's geht an Masse. Wenn man nun die C's auslötet, kann man an dieser Stelle mit etwas Geschick einen Draht anlöten und zur Buchse führen. Das hat den Nachteil, daß der NF-Frequenzgang etwas beeinflußt wird. Das macht sich so bemerkbar, daß die NF etwas höher klingt, und höherfrequente Rauschanteile des Empfangssignals hörbar werden. Ich vermute, daß der Signal-Rauschabstand dadurch minimal schlechter wird. Aber das nehme ich in Kauf.

Ich habe also diese beiden C's ausgelötet, und zwar indem ich den Lötkolben (15 Watt mit feiner Spitze) an die rechte Seite der C's gehalten habe und ca. 3-4 Sekunden gewartet, bis die andere Seite auch genügend erwärmt war. Nun konnte ich mit einer Lötzinn-Saugpumpe erst den oberen, dann den Unteren C von der Platine entfernen. Das ging bei mir einwandfrei, trotz kalter Schweißausbrüche wegen der Möglichkeit, eventuell eine Leiterbahn abzuheben.

Dann nämlich hätte ich das Gerät wohl entsorgen können...hi. Wie gesagt, es ging einwandfrei und danach konnte ich an der Stelle einen Draht anlöten.

Falls es nicht gelingt, wegen der Enge mit Lötkolben und Lötlutsche gleichzeitig da ranzukommen, muß man versuchen, die C's soweit zu erwärmen, daß das Lötzinn weich wird, und sie dann mit einer Spitze wegschieben.

Das Ganze sollte dann ziemlich fix gemacht werden, damit die Leiterbahn auf der Platine nicht abgehoben wird.

Danach das andere Ende des Drahtes an die Buchse gelötet, und welche Freude, 9k6-Empfang ging auf Anhieb einwandfrei. Es reicht bei mir schon eine Signalstärke von S1 - S2 auf der Balkenanzeige, um einwandfrei zu empfangen.

Das Sendesignal auf das Gerät zu geben, ist überhaupt kein Problem. Und zwar sieht man bei geöffnetem Gerät unten beim Batterieanschluß eine Platine hochkant stehen. Das ist die MIC-Unit. Dort sind oben links zwei kleine Poti's. Vom Batterieanschluß aus gesehen regelt das rechte davon die NF zum UHF-Modulator. Im Schaltbild sieht man, daß von dort eine Leitung zum UHF-VFO geht. Der Schleiferanschluß zeigt nach unten. An den rechten oberen Anschluß bin ich mit dem 9k6-Sendesignal gegangen. Hier klappte es auf Anhieb.

Will man auf 2m 9k6-Packet machen, muß man entsprechend an das andere Poti gehen, mit welchem die NF zum VHF-Modulator eingestellt wird.

Der nächste Punkt ist die PTT. Hier kann man an den Mikrokontroller an PIN1 gehen. Das ist linke Anschluß von der unteren Reihe. Wem das zu heikel ist, kann die Leiterbahn verfolgen. Ein kleines Stück nach links unten in Richtung der Leiterfolie ca 5mm von der Folie entfernt geht die Leitung an einen SMD-Widerstand. Dort habe ich die PTT-Leitung angelötet. Man könnte wohl die PTT auch auf die eingebaute MIC-Buchse geben, aber da ist schwerer ranzukommen. In die PTT-Leitung habe ich noch einen 150kOHM-Widerstand einbauen müssen, weil der Punkt anscheinend sehr hochohmig ist. Er muß zum Senden gegen Masse gezogen werden. Da die PTT-Schaltung im 9k6-Modem mit einem Universaltransistor geschaltet wird, und dieser nur ca. 50kOhm Kollektor-Emitter-Widerstand im unbetätigten Zustand aufweist, geht das Gerät schon davon allein auf Sendung. Diesen Widerstand sollte man auch im Gerät selbst einbauen, damit sich an der Modemschaltung nichts ändert, und alles wie bisher auch mit anderen Geräten benutzt werden kann.

Das war's dann. Damit klappte alles auf Anhieb einwandfrei. Es geht bei mir mit einem TX-Delay von 30 ohne Probleme. Das ist nicht gerade wenig, aber immer noch besser, als überhaupt kein 9600Bd-Betrieb. Im Vergleich dazu kann ich diesen Parameter bei meinem Quarzgerät auf 6 einstellen.

Viel Spaß beim Basteln, und dieses natürlich auf eigene Gefahr. Ich übernehme keinerlei Haftung für eventuelle Schäden. Ich empfehle diesen Umbau nur Om's, die schon etwas Erfahrung im Umgang mit SMD-Geräten haben. Wenn hier etwas vermasselt wird, ist es wohl schwer zu reparieren !

73 de Fred, DL6BAW @ DB0CL



**19-07-1998**

## **(IC-24) Tip to to function bottom for IC-24**

The Icom IC-24AT (and IC-2SAT) Second Keyboard Functions are activated by pressing AND HOLDING the "FUNCTION" button on the side of the transceiver WHILE pressing the keypad with the desired 2nd function. The disadvantage of this procedure is that it requires 2 hands to activate a 2nd key function, 1 to press AND HOLD the FUNCTION button and 1 to press the keypad with the desired 2nd key function.

### The Solution:

I modified the operation of the FUNCTION button so that it only has to be pressed MOMENTERLY to activate the function mode, it remains in the function mode for approximately 4 seconds thereafter. Any second key functions may be selected any time during the 4 second interval the function mode remains active. The beauty of this feature is that now you can squeeze the FUNCTION button with your thumb and then have up to 4 seconds to select the desired 2nd key function with the index finger of the same hand!

### The Mod:

Implementing this modification requires one 4.7uF 10 volt chip capacitor and one 1K Ohm chip resistor. The negative terminal of the chip capacitor is soldered to ground. The 1K Ohm resistor is soldered directly to the positive terminal of the chip capacitor. The other terminal of the chip resistor is soldered to the FUNCTION key PC board contact via a small length of fine wire. THATS IT! It works great! I had mine in operation for over 1 year. I could NEVER go back to the original procedure!

This modification is read 814 times.

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**19-07-1998**

## **(IC-240) 12,5 Khz mods for IC-240**

Here are mods for putting 12,5 kHz step frequency for this rig. The basic step frequency is normally 25 kHz, and the rig uses a diode matrix board as a "memory" for 22 channels.

The modifications are useful if you have put frequencies for repeater in your chart. After upgrade, you can access to 12,5 kHz bandplan, and the total of channels will be  $2 \times 22 = 44$ .

The modifications are based on 3 features, that is to say:

- PLL mods for 12,5 kHz step
- deviation adjustment for narrow FM (+/- 2,5 kHz)
- improving selectivity in IF amplifiers (455 kHz), receiving part

### 1) PLL mods for 12,5 kHz step

All mods are done on PLL board located on the bottom of the rig. The first thing to check is the frequency of X-tal X1. It must be 6,4 MHz. You can measure the value of frequency at pin 11 (25 kHz) and pin 12 (12,5 kHz) of IC6 (uPD4013). This part of IC is used as divider by 2, so the reference frequency for the phase comparator IC1 (TC5081P) is 12,5 kHz. How lucky we are! You can adjust perfectly the value of the reference frequency with C2 trimmer capacitor.

The main modification is done by changing the loop divider ratio (half part of IC6 and IC1). Depending of the programming, the total ratio of dividing is between 128 and 288 but always with even ratio\_(128, 130, 132...286, 288).

The explanation is given by the fact that the second part of IC6 (uPD4013) used as divider by 2 is in front of programmable divider IC1 (TC5080P) which gives 64 to 128 dividing ratio. In order to access 12,5 kHz step, the total dividing ratio must cover values such as 129, 131, 133...285, 287).

Consequently, we have to replace half part of IC6 (uPD4013) and IC1 (TC5080P) by a new and single programmable divider. For doing this job, the MC145151 has been choosen. With this IC, we just use the programmable divider part. Practical job is done by using a small piggy board supporting the MC145151. An IC socket is soldered instead of IC1 (TC5080P), and the small board is plug on it. This board can be something like bicc veroboard. Do not worry about frequency problems, because the highest value encountered is about 3,6 MHz.

If there is a 10 kohms resistor between pin 1 of IC6 (uPD4013) and pin 15 of IC1 (TC5080P), you have to desolder it. On this pin 15, you have to solder a capacitor of 220 pF to pin 3 of IC6 (uPD4013). Mount this capacitor on the copper side of the PC board. Now the piggy board has to be wired following this chart:

| MC145151 pins | IC1 socket pins | remarks |
|---------------|-----------------|---------|
| (1)           | (15)            | f in    |
| (2)           | (9)             | ground  |

|      |               |                     |
|------|---------------|---------------------|
| (3)  | (13)          | + 9 V               |
| (4)  | -             | not used            |
| (5)  | (9)           | grounded            |
| (6)  | (9)           | grounded            |
| (7)  | (9)           | grounded            |
| (8)  | -             | not used            |
| (9)  | -             | not used            |
| (10) | (10)          | f: out              |
| (11) | external wire | N0 (see text below) |
| (12) | (1)           | N1                  |
| (13) | (2)           | N2                  |
| (14) | (3)           | N3                  |
| (15) | (4)           | N4                  |
| (16) | (5)           | N5                  |
| (17) | (6)           | N6                  |
| (18) | (7)           | N7                  |
| (19) | (8)           | N8                  |
| (20) | (9)           | grounded            |
| (21) | -             | not used            |
| (22) | (9)           | grounded            |
| (23) | (9)           | grounded            |
| (24) | (9)           | grounded            |
| (25) | (9)           | grounded            |
| (26) | -             | not used            |
| (27) | (9)           | grounded            |
| (28) | -             | not used            |

Note that instead of pin 9 for socket IC1, you can use also pins 11 or 12.

N0 is the bit of lowest magnitude. When N0 is at zero logic level, you access to "normal" frequencies (divider ratio is even), with 25 kHz step.

When N0 is at one logic level, you access to "normal + 12,5 kHz" frequencies, (divider ratio is odd). On my rig, I use a simple switch on the front panel of the rig. it is mounted instead the 1750 Hz pushbutton. The 1750 Hz is now remote through a pushbutton mounted inside a microphone (pin 3 of microphone socket is free for this use).

N0 is wired through the mid point of the switch with a pull-up resistor on + 9 V. The other point of the switch is grounded.

After doing this, it requires no more adjustment. However, because of the PLL system, using a mix frequency of 131,7 MHz (three times 43,9 MHz freq. of X-tal X2), it is better to check the exact transmit frequency. Fine adjustment is possible through trimmer capacitor C38.

## 2) Deviation adjustment for narrow FM (+/- 2,5 kHz)

In order to comply with 12,5 kHz step frequency, it is necessary to adjust the deviation. It could be done with a deviation meter, but this instrument verder, (A)fbreken, (C)verder geen pag. of (N)volgende ber. -->is not easy available. Here is an alternative method which provides good results (checked with a deviation meter). All the adjustments are done on the main board, which is located on the top of the rig.

- turn the R132 potentiometer (AF gain) for maximum gain,
- turn on the 1750 Hz and check the audio level at mid point of R112 potentiometer, you could read with an oscilloscope about 3,2 V peak to peak. This value is right for +/- 5 kHz deviation. Now reduce the value to 2 V peak to peak with R132. The resulting deviation is +/- 2,5 kHz (exactly close to +/- 3 kHz depending of audio content).
- Adjust the R132 potentiometer (AF gain) according to your voice. For the adjustment of R132, you could also use the original setting. But, NEVER adjust the deviation potentiometer R112 once more. This complete the deviation adjustment.

## 3) Improving IF selectivity (455 kHz) - receiving part

For 12,5 kHz step frequency, the IF bandwidth is sometimes wide. This situation is true when you turn to low signals with a strong nearby signal. The solution is very simple. You have to replace two 455 kHz filters in IF part of the receiver. They are easily available from MURATA distributors. The filters are located on the main board, which is located on the top of the rig.

- replace the two IF filters CFU455 E (black plastic case) by CFU455 G,
- for matching correctly these new filters, changing the following resistors by these new values:

R17 and R18: 820 Ohms (instead of 470 ohms)  
R20: 5,6 Kohms (instead of 3,3 Kohms)  
R14: 470 Ohms (instead of 1 Kohms)  
R15: 2 Kohms (instead of 1,5 kohms)

No more adjustment is required. Sensitivity and signal to noise ratio are equivalent to original one. Closing channels are now well rejected.

This complete the mods done with success on my old rig. For information, I have already change the 1750 Hz PC Board by a cristal controlled one. Drift problems belong to the past. If anyone knows upgrade mods for this reliable and rugged rig, I am also interested. Many thanks, and hope reading any of your comments.

**PS!!**

Please, note that the deviation adjustment is done by decreasing AF voltage from 3,2 to 2 V peak to peak with R112 and not R132 as mentionned.

73 de Jean-Roger / F6EGK @ LXOPAC.LUX.EU.

This modification is read 401 times.

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**19-07-1998**

**(IC-2400) ICOM 2400A mini repeater function**

1. CUT D9 (MAY NOT BE REQUIRED NOT IN ALL RADIOS)
2. TURN OFF POWER
3. PUSH AND HOLD MONI, MHZ, SET BUTTONS & MIC DOWN BUTTON
4. TURN ON POWER
5. RELEASE ALL BUTTONS

ICOM 2400A repeater function cancel

1. Push and hold set button
2. Then depress MHz

NOTES:

If your rig has D9, the diode above it will expand the 440 band recieve if it is cut also.

To find d9, look at the back of the face plate inside radio on left hand side, you should see a vertical line of 7 diodes, D9 for repeater is 2nd from the bottom and 440 expanded recieve is the 3rd one from the bottom. This is kinda hard to explain, as of this writing there are no service manuals available, but icom will send you the mod with a photocopy of the mod if requested.

Call GARY FIBER KF7XV, ICOM TECH. CUSTOMER SERVICE REP. AT PHONE # 206-454-7619, OR FAX AT 206-454-1509.

This modification is read 767 times.

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**19-07-1998**

**(IC-2400) IC-2400 144/430 9K6 mod**

Sezione uhf

Ritenendo di fare cosa gradita a molti utilizzatori del suddetto apparato ho deciso di proporre a mezzo bollettino packet la modifica da attuare per utilizzare detta radio a 9600 bauds.

Innanzitutto, mi preme specificare, che la modifica molto semplice a prova di bambino dal punto di vista elettronico ma alquanto ardua dal punto di vista meccanico vista la costruzione massiccia di tale radio che non lascia molto spazio a voli di fantasia per il passaggio dei cavi necessari al collegamento al modem. Mettetevi quindi calmi e calcolate una buona oretta di lavoro.

Procuratevi un cavetto schermato a quattro poli piu' calza il piu' sottile possibile, poi capirete perch, quindi un buon cacciavite, una capiente vaschetta dove mettere le numerosissime viti, un saldatore di quelli piccoli piccoli per circuiteria SMD, forbici, stagno e bisturi!

Aprite l'apparecchio ,le UHF sono nella parte superiore, Cercate sul circuito il quarzo CR125, posizionato su una basetta ripiegata sul centro destra della radio vicino ai cavi dei toni sub audio, sollevate con delicatezza questa basetta e noterete saldato sul lato saldature un integrato SMD il TK10420M. Bene una volta individuato, aiutatevi con una lente se necessario, trovate il piedino 11 dello stesso, che ad ogni modo il primo a sinistra, saldate su questo pin il cavetto di Ricezione dei 430  
Sullo stesso lato, pero' sulla sinistra, troverete una scatola in metallo saldateci la massa del cavetto schermato.

Per quanto riguarda la trasmissione la modifica risulta molto piu' ardua bisogna smontare il frontalino dell'apparecchio svitando le 4 viti , poi svitare il cavo ant. uhf svitare tutte le viti che fissano la scheda (attenzione che ce' da dissaldare un cavo fisso vicino al finale tx ) ed mettere a nudo la scheda uhf.

la modifica va effettuata nella parte inferiore , armati di un sadatore sottile max 20w collegare il cavo schermato del tx sul pin 2 di ic2 che risulta un TC4S66F (lo schema elettrico ti sara' d'aiuto ).

Quando si parla di destra e sinistra si intende guardare la radio con il frontale rivolto verso di noi.

A questo punto le operazioni per la parte UHF sono finite, occorre recuperare la commutazione del PTT, che conviene prelevarla direttamente dal bocchettone del microfono, per fare cio' occorre smontare il frontale della radio sono solo quattro viti, e quindi armarsi di buona pazienza per cercare il punto esatto della commutazione, in quanto abbastanza arduo saldare sul bocchettone stesso, io ho saldato un filetto volante (per ragioni di spazio) e sono quindi venuto al cavo pentapolare principale. Adesso siete pronti per lavorare a 9600 bauds.

Un'ultima cosa non tenete molto lungo il cavo di uscita, consiglio di attenersi alle lunghezze di quelli delle antenne, e saldare al termine di questo un bocchettone DIN pentapolare oppure un DB9, si da collegarvi poi con facilità un cavo schermato che va al TNC.

Ho notato che l'IC2400 funziona perfettamente senza nessun problema

Spero la modifica sia stata chiara ed esaustiva, attendo eventuali suggerimenti o richieste di chiarimento, non abbiate timore nel procedere verso i 9600 bauds non sono poi quella brutta bestia che uno pensa tutt'altro!

Buon Packet de  
IK7RVX .. Raff.

This modification is read 725 times.

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**19-07-1998**

### **(IC-2410) Expansion of receive range**

The following diodes are located on the Logic Unit circuit board. The Logic Unit circuit board sits behind the front panel of the radio. To get to the board remove the top and bottom of the case. Now notice that the front section of the radio is a separate unit from the main body of the radio. Remove the 4 screws holding the sections together but do not yet separate the sections. Place the radio on a table so that it is right side up. Carefully start to separate the sections being careful of ribbon cables that connect the front section of the radio to the rear. If you look at the back of the circuit board on the front section towards the lower part of the radio, you will clearly see three glass diodes labeled D8, D9 and D10. You will know this is the right circuit board because a lithium battery will be taped to it. These are the diodes to cut to get extended receive range as follows:

D8 320-399, 830-950 800 Mhz coverage requires new antenna input

D9 118-135

D10 400-479

This modification is read 760 times.

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**19-07-1998**

### **(IC-2410) 800 MHz antenna input**

To receive 800 Mhz you need to add a new antenna input to connector J2 on the MAIN-B unit (UHF unit) which is the large circuit board on the bottom of the radio. J2 connects to a the B-band board which is a very small daughterboard, that is connected to the MAIN-B board. The service manual offers no description of this board but it apparently is the 800 Mhz front end.

Two parts are needed:

One 5 3/4" grey coax jumper (this is available from ICOM but it doesn't have a part number)

Either:

One OPC223 pigtail with UHF connector

or

One OPC166 pigtail with N connector

The grey coax jumper has a plug on one end that mates with J2 and bare leads on the other. The pigtail also has two bare leads on one end. This same end also has a metal flange thats designed to screw onto the back panel of the radio after removing one of the dummy caps on either side of the existing antenna pigtail.

Without going into too much detail, you must:

Remove the small metal cap nearest the bottom of the radio and next to the existing pigtail.

Remove the metal shield at the back section of the Main-B unit.

Solder the two pieces of coax together, shield to shield, center to center and screw this assembly on to the back panel.

Plug the grey cable into J2 and then reassemble the radio.

**19-07-1998****(IC-2410) Cross-band repeat**

An edited version from an ICOM info sheet)

1. Set frequencies for both UHF and VHF. If necessary, set transmit offset and tone.
2. Hold the "BAND" switch and the "SET" switch. The memory number display will flash the letter "L". This indicates the 2410 is in the "Mini Repeater" mode.
3. Transmission by PTT is possible. If PTT is operated, the band which is indicated by the flashing decimal point will be transmitted on. This can be done even when in "Mini Repeat" mode. In other words, PTT has priority over the "Mini Repeat" operation.

Transmitted band will be switched by the "UP" or "DN" key on the microphone. The flashing decimal point will indicate which band will be transmitted on.

4. Mini Repeater function will remain even when power is turned off. To disable repeater function, hold the "SET" key until the flashing "L" disappears.

**Remote cross-band activation**

To activate cross-band repeat remotely: after dialing "B", optional 3 digit code then "#", the command for cross-band repeat on is "B", "D", "\*".

To turn off repeat, dial "B", optional 3 digit code, then "#".

**19-07-1998****(IC-2410) IC-2410 Dual Band External & Mike Remote Codes**

|   |       |      |      |
|---|-------|------|------|
| Call  | MR    | VFO  | CLR  |
| 1   | 2     | 3    | A    |
| VHF   | UHF   | High | Acs  |
| 4   | 5     | 6    | B    |
| Vmoni   | Umoni | Low  | Spch |
| 7   | 8     | 9    | C    |
| Dwn   | Mute  | Up   | Ent  |
| Please enter a blank line to continue, anything else to halt output |       |      |      |
| *   | 0     | #    | D    |

Other Functions

|             |   |
|-------------|---|
| B# or B???# | = External On (?=password) Further protection used Tone/Squelch |
| B*          | = External Off  |
| DB*         | = CrossBand On  |
| DB#         | = CrossBand Off   |
| DC          | = Speech Transmit Freq.   |

Notes

- 4,5,7,8,0 Function not available via External Remote Control????
- C Function not available when in CrossBand Mode????
- Display debate, don't know why the original display was boycotted, but I seen both & had a choice. I preferred the original, lovingly refer to, as stealth. Think twice, before you get the other one.????
- There are diodes to be installed for some features, like transmit in Please enter a blank line to continue, anything else to halt output rest of UHF ham band (420-450) and extended receive..etc. Check your local authorities, regarding scanning laws.

**19-07-1998**

## **(IC-2410) IC-2410 Modification area as follows. New and old version**

### For OLD version

1. Turn on the radio with pressing [V/MHz] + [SET] + [DN] on microphone.  
That's All!!!

### X-band repeater modification

Cut diode [D2] on back side of front panel.  
Press [BAND] + [SET] more than 1 sec. cancel => press [SET] more than 1 Sec.

### For NEW version

1. SEE THE BACK SIDE OF FRONT PANEL.
2. YOU CAN FIND Li BATTERY.
3. CUT [W27] or [D10] & [D8]
4. Reset the radio.

After modification, you can receive

118 - 135.995MHz AM

136 - 174MHz

320 - 479MHz

830 - 950MHz

But 830 - 950MHz, you need to add ant for this band. open the lower panel, you can find [J2] ant connector.

**19-07-1998**

## **(IC-2410) IC-2410 TX modification**

### Both bands

Replace the one sided D-14 on the logic board with a 1SS181 two sided diode, and short the solder tabs (position W3) which are directly below the location for D-14.

### Result:

136-174 Mhz tx

400-479 Mhz tx

**19-07-1998**

## **(IC-2500) Run 9k6 with an Icom IC-2500 (70cm/23cm TRX)**

Yes it's possible to run 9k6 with an Icom IC-2500 (70cm/23cm TRX).  
I BELIEVE the 2m/70cm version (IC-2400) is similar to modify (Hopefully!)

Here's my little description:

### RX:

Pin 1 (=MDET) on the DET SW-Unit (mainboard A)

### Note:

You receive on this Pin signals of that band, which is selected in the main display

### TX:

You can take the Signal from R73, R72 or C137

### Note:

as written above

Comment:

These TRX is accorded to my experiences relatively good qualified for 9600 Baud Packet-Radio Signals.

This modification is read 550 times.

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**28-03-1999**

### **(IC-2500) Umbau des ICOM IC-2500E auf 9600 Baud**

1. RX:

NF an Punkt 1 (MDET) der DET SW-Unit auf Mainboard A abgreifen und z.B. auf Punkt 8 der Mikofonbuchse fuehren. Vorher LS-Leitung von Punkt 8 entfernen.

Es steht dann sowohl 70cm als auch 23cm vom Diskriminator zur Verfuegung. Punkt 8 der Mike-Buchse geht dann auf NFRX am TNC. (Evtl 10 Ohm Widerstand im TNC entfernen!!)

2. TX:

Verbindungspunkt R73 (Hub 70cm), R72 (Hub 23cm) und C137 auf dem Mainboard A mit Punkt 4 ( NC ) der Mike-Buchse verbinden! (Leicht zugaenglich nach abschrauben und umklappen des Bedienkopfs) Punkt 4 dann mit NFTX vom TNC ueber einen 10uF-Elko verbinden.

Mit einem Scope Tonrufamplitude an o.g. Verbindungspunkt messen. Dann Datensignal vom TNC auf etwa gleiche Amplitude einstellen! Das wars auch schon!

Dies ist zwar eine Simpeloesung - lauft aber hier hervorragend!

Fragen bitte an DL2GA @ DB0AAB!

Viel Erfolg dann mit 9600!

This modification is read 523 times.

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**19-07-1998**

### **(IC-251) Modifikation af IC-251 for 9600 baud**

Digital modulation applied to top of deviation pot at the junction of R58, R60 and R61 (just below Q13 on circuit diagram). Modulation voltage from standard G3RUH 1200 bps modem wasn't high enough but was boosted by component changes on the modem board. A higher voltage is required from the G3RUH 9600 bps modem; output level pot set to about four fifths of maximum and works well.

PTT connection made inside the rig to the appropriate pins on the rear panel's accessory socket - no complications here, my TNC's PTT comes from a reed relay.

No modifications done for digital output from receiver (yet).

Have investigated modifying to provide up/down control but checks are incomplete. Suspect provision of this facility is possible and have identified (display) DRIVER IC2 pins 3/11 as the likely place to apply it.

Once AO-21/Rudak starts with higher speeds I'll probably expedite the provision of receive output and up/down control.

This modification is read 766 times.

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**28-08-1999**

### **(IC-251) Modifications for the ICOM IC-251**

**Author:** Martin - G1GYC - [Martin@g1gyc.demon.co.uk](mailto:Martin@g1gyc.demon.co.uk). [MODIFICATION.NET](http://MODIFICATION.NET)

1987

#### **SSB & CW VARIABLE POWER**

Place set with the controls towards you and remove lid. If necessary check FM and CW power. Connect set to known good dummy load and power meter. Locate R13 and R14 on the small board behind the front panel RF power control. With RF power control on max, TX on FM and adjust RH pot(R13) for 10-12watts. Turn RF power control fully down and adjust LH pot(R14) for desired low power setting (min 200mw). Short key jack at rear of set, switch to CW, TX and adjust R129 for 10-12watts the same as on FM. Switch off power. Locate the brown wire to the left of the Xtal filter it runs from next to R258 to near R327 its marked with a small b on the main unit board layout diagram. Cut this wire at the front end and solder to the emmitter of Q65 or the purple lead marked I on the main unit layout. Solder the slider of a 4.7k preset to the LH end of the resistor behind R14, then

solder a 3.3k resistor to one leg of the preset, run a wire from this resistor to the top of R272 (scrape the paint off before attempting to solder).

Switch on. Switch to CW, TX and with front panel RF power control fully down adjust the (4.7k preset for desired low power level (min 200mw) SSB power is the same as CW. The front panel control now affects both FM, CW & SSB power levels.

The following modification was carried out to enable the front panel power control to be used on CW/SSB as well as FM.

The modification is in two parts (1) the front panel and (2) the main circuit board.

### **(1) FRONT PANEL**

- i. Remove four retaining screws and top cover.
- ii. Remove four retaining screws and bottom cover, disconnecting the speaker.
- iii. If you have a Mutek front end board fitted remove it now. MAKE NOTE OF THE CONNECTIONS TO IT! \*\*\*WRITE IT DOWN\*\*\*
- iv. Remove the four front panel frame screws
- v. disconnect the wiring harness and remove the front panel. NOTE WHERE ALL THE PLUGS GO! \*\*\*WRITE IT DOWN\*\*\*
- vi. Locate the orange wire linking the mode switch and the board behind the power control potentiometer.
- vii. Desolder it from it's present position on the mode switch and move it to the common side of the switch. That completes the front panel mod.

### **(2) MAIN CIRCUIT BOARD**

- i. Remove the internal PSU if fitted.
- ii. Remove the VCO and screening plate on the underside of the main circuit board.
- iii. Now turn the rig over and find the brown wire that places TX9V(FM) on to Q64/Q65. If you look at the board layout in the manual the wire runs from sectors 3F to 4F and is marked "b".
- iv. Cut this wire where it joins the board, near R327/R46.
- v. Now find the purple wire marked "k" on the board layout on the edge of sectors 5F/6F, locate this point on the underside of the PCB.

I did this by standing the rig on one side panel and shining a light upon the component side of the board. Pointing to the wire with a pencil or radio driver and looking at the track side to see the shadows.

- vi. Once you have identified the point on the trackside of the PCB desolder the wire and clear the hole that is left.
- vii. Join the purple and brown wires, then solder them back into the hole from where the purple wire came from. If the brown wire is too short replace it, as I did. I used a purple wire striped from a ribbon cable.

This now means that when the radio is switched to transmit TX9V is placed on to Q64/Q65 and not TX9V(FM) as before. That completes the mod.

- viii. Reassemble the radio in the reverse order to which you disassembled it, leaving the top cover off.
- ix. The only thing to do now is to check that the rig still works ok and to reset the high and low power levels. This is done by adjusting VR13(high) and VR14(low) with a power meter and dummy load connected to the aerial connector and if possible a two tone audio generator feeding into the microphone socket at around 600mV should be used to set the rig up on SSB. The power reading on the RMS power meter should be approximately half the PEP. When the desired power levels have been set fit the top cover.

### **NOTES:**

I found that the power control on SSB/CW tends to drop the power off rather quickly but if you use it in conjunction with the mic gain control very low power levels are attainable (milliwatts). Since this mod was done, G8RCF Des Sayer has also completed the same and when we last spoke said he had not experienced any problems. An ALC input is included in the multiway socket on the back apron and if you are going to use the rig with a transverter for 6M, 4M, 70Cm, 23Cm or even HF, I suggest you look at a method of using this input to control the drive to the external equipment and not the modified power control as it is far too easy to forget to lower the power or to catch the control.

The afore mentioned note on ALC apart, this mod is useful to run a linear at a lower output, e.i. I run my MML100s at 40 watts or less as this stops breakthrough to a neighbour's television set, yet allowing me to gain a higher ERP than just using the rig to feed in to the aerial.

My thanks go to G8RCF who was the second one to modify an IC251 using the method I used to my knowledge. Hope you find



this mod of use as I have.

Any comments on how well the mod works would be appreciated to G1GYC @ GB7NWP

This modification is read 983 times.

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**21-04-2000**

### **(IC-251) IC-251 Receive-repair**

**Author:** Derk - PE4CL@PI8DAZ. #TWE.NLD.EU

Hello OM,  
In case of suddenly losing receiving of signals.

In this case you can only receive very strong nearby signals, but receiving is weak.  
Also the RF-gain knob has no effect at all.

solution: The HF-amp is defect.

Replace the FET- 'Q47'

This is a dual-gate fet and the replacing type is BF960. (original 3sk40 is somekind)  
or

Going to work:

Desolder the fet q47 and replace it for a BF960.

With the front of the transceiver pointed towards you, and the components-side above, the next are valid:

G1 G2

S D

Your transceiver will now operate (tx & receive) fine again.

Good luck! Derk

This modification is read 852 times.

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**19-07-1998**

### **(IC-260) IC-260E auf 9600BD**

UMBAU ICOM IC260E auf 9600BD FSK mit G3RUH-Modem (z.B.: DK9SJ-TNC2H)

Ich habe diesen 2m ALLMODE Transceiver (TX-seitig) auf 9k6 umgebaut um damit PACSAT (UO-22, KO-23) Uplink machen zu können.

Die FM-Modulation erfolgt mit der Kapazitätsdiode D32, die den 10.75MHz Quarz- oszillator X2 / Q23 moduliert. Man muß jetzt nur das Signal vom G3RUH-Modem / TNC2H auf die ANODE von D32 geben. FERTIG. Masse kann direkt daneben an R113 angelötet werden.

Die beschriebenen Bauteile befinden sich auf der MAIN-UNIT, ziemlich direkt neben (Richtung FRONT) dem Loch für den Lautsprecher. Man muß für den Umbau lediglich den UNTEREN Deckel des IC260 (2 Schrauben) öffnen.

Nach Messung erhält die D32 im 'Normalbetrieb' (mit Mikrofon) bei maximalem Hub genau 1Vss. Man braucht also nichtmal den Pegel des 9k6 Modems zu verändern, weil der TNC2H auch 1Vss als Ausgangsspannung bringt.

Darüberhinaus hab ich mir mal die Beschaltung angeschaut, die sonst noch an der Anode von D32 hängt, und zusammen mit der Ausgangsbeschaltung des 9k6 Modems durch PSPICE durchgelassen - der Frequenzgang müsste von ca. 5Hz bis über 10kHz gehen. Also optimal. Gemessen hab ichs allerdings nicht.

Wenn das 9600Bd Modem eingesteckt und eingeschaltet ist geht natürlich die 'normale' Modulation nicht mehr, weil der AusgangsOP des Modems alle Spannungsschwankungen, die er an seinem Ausgang kriegt über seine Rückkopplung sofort auf 0 ausregelt.

Empfangsseitig (das hab ich NICHT ausprobiert !!!!) verwendet der IC260 ein übliches FM-DEMODO IC. Den MC3357P. Das heißt, man muß das RX-Signal nur an PIN 9 dieses IC's abgreifen und schon müsste es funktionieren.

Die PTT kann direkt an PIN 3 der Erweiterungsbuchse angeschlossen werden.

Zur Mechanik: In der Rückwand des IC260 findet sich noch die eine oder andere Möglichkeit ein Kabel durchzuführen. Ich hab rechts hinten, über der Erweiterungsbuchse, ein Loch gebohrt und das TX-NF Kabel da durchgeführt. In dem Eck ist sicher auch

noch Platz für ein RX-NF Kabel.

Für die NF-Signale müssen vernünftig geschirmte Leitungen geringer Kapazität verwendet werden.

Fragen bitte an DH1SAJ @ DB0RBS. MYBBS DB0SAO ist zur Zeit ohne Link.

73 de Jochen, DH1SAJ @ DB0RBS

This modification is read 429 times.

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**19-07-1998**

### **(IC-27) IC-27 mic-connector mods**

For those interested in an alternate method here is what has been done by wb4fow on several other radios:

Since about 1985 most icom radios have pin 8 of the microphone connector wired to the speaker. This is convenient for the wiring of a tnc and is usually easy to modify so that receive audio is taken from the high side of the volume control.

On the ic-27/37/47 radios, on the bottom side of the radio, since about 1985 most icom radios have pin 8 of the microphone connector wired to the speaker. This is convenient for the wiring of a tnc and is usually easy to modify so that receive audio is taken from the high side of the volume control.

On the IC-27/37/47 Radios, on the bottom side of the radio, just under the area of the speaker, is a two pin connector with a green and red wire attached. The green wire is speaker audio and the red wire is +8 volts.

By cutting these wires and attaching the green wire to the high side of the volume control and atted wire to switched 12 volts.

A TNC can be wired to just the microphone connector and makes a clean installation provided the radio is dedicated to packet.

To get back to the subject of the alternate modification for the ic-3200a you can rewire pin 8 of the microphone connector to the high side of the volume control and avoid the muting circuit but if you plan to leave the tnc wired permanently to the radio and also, to use the radio on voice you will need to change a resistor in the tnc so as not to load down the audio at the volume control. The value of this resistor will have to be determined experimentaly.

If anyone requires more information or assistance with this matter feel free to call clark, wb4fow, at 305-594-4313 monday through friday 10am to 6pm or leave a message in the wb2wpa or n4ldg pbbs's.

Good luck!

This modification is read 751 times.

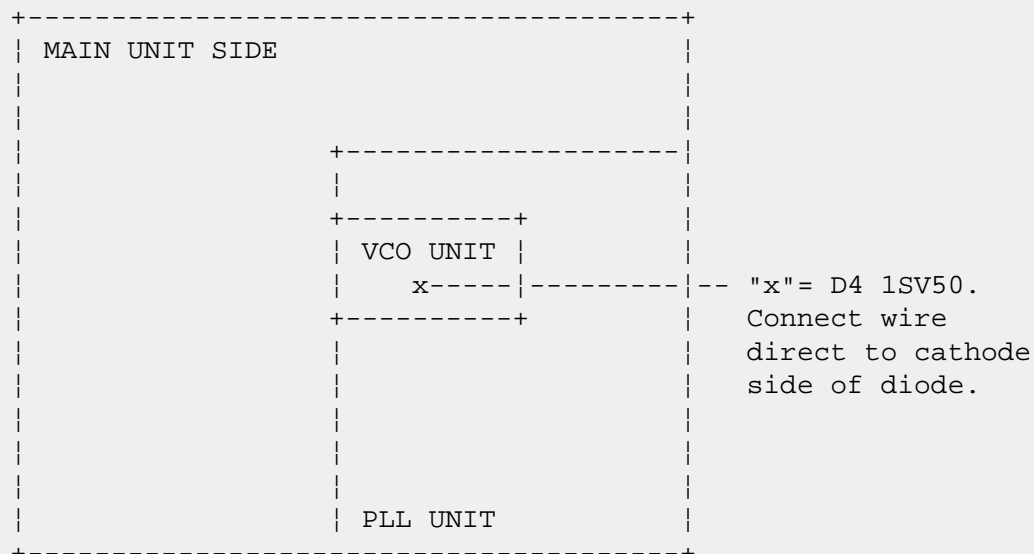
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**19-07-1998**

### **(IC-27) ICOM IC-27H 2M transceiver for use with the 9k6**

Here are the mods I made to my radio for use with 9600 baud modem. I hope they make sence to you...

How to modify the ICOM IC-27H 2M transceiver for use with the 9600 baud modem (for use with uosat-3)



Front of the icom ic27h. viewed from bottom.

Bring a thin single core shield audio cable through the hole on the rear of the set where the power cable comes out, there was quite enough space on my radio. Feed this cable up the side of the radio to the front panel and along to the PLL UNIT where the

other wires come in. Take the cable over to the VCO UNIT enclosure, where there are 2 small holes. Pick the hole closest to D4, solder the shield to the outside of the metal case and feed the inner conductor through the hole and direct solder to the cathode of D4 1SV50, keep the lead as short as possible.

This modification is read 740 times.

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**19-07-1998**

## **(IC-2700) IC-2700 RX/TX expansion**

### RX Expansion Modification

1. Remove Top Cover. (6 Screws)
2. Remove Bottom Cover. (6 Screws)
3. Remove Front Display. (4 Screws)
4. Locate the Logic Board.
5. Remove W1 from the logic.
6. Hold [SET], [SPCH] and turn radio on.

### Expanded Frequency Range

AM Mode 118-136 MHz  
FM Mode 138-174 MHz  
350-470 MHz

### Tx Expansion Modification

1. Remove D16 and D17
2. Hold [FUNC], [A], [CLR] and turn the radio on.

### Expanded Frequency Range

FM Mode 138-174 MHz  
350-470 MHz

That's what Icom's sheet said. I didn't follow it when I modified my radio and it worked very well. Here's what I did:

1. Remove power and antenna from the rig.
2. Remove the face plate from the rig (careful with the small hookup cable that attaches to the logic board).
3. Locate the "Zero-Ohm Resistor" W1 and cut it out with a fine-tipped set of wire cutters. W1 is clearly marked on the board and is along the top edge, just to the right of center of the logic board. In my rig, W1 looked like a 1/8 Watt resistor, solid white in colour.
4. Using the same pair of fine-tipped cutters, remove D16 and D17. They're the first two diodes slightly below W1, going towards the LEFT side of the rig.
5. Carefully re-attach the face plate, mic, antenna and power.
6. Press SET and SPCH together and power on the rig. Keep the buttons depressed for about 4-5 seconds as the radio goes through a reset. ALL MEMORY INFORMATION IS LOST!!!.
7. Re-program in your memories and there you have it!

Futile Attempt at a diagram:

Front View with face plate detached.



Where D = Surface Mount Diode Package  
W = Jumper W1

6 = Diode D16  
7 = Diode D17  
HEAD = Face Plate Connector  
MIC = Mic Connector

I hope that the diagram and description are clear enough to follow.

For X-Band repeating, the only information that Icom gave me was a brochure entitled "With Icom Radios, Crossband Repeating Has Never Been Easier!" In short, the only way I've been able to find to get the 2700 to x-band repeat is to put it into remote mode and use the appropriate DTMF code to turn it on. It works fine in this mode. I've done extensive testing and all these functions appear to work fine:

| DTMF CODE  | FUNCTION  |
|------------|---|
| =====      | =====   |
| B, XXX, #  | Remote function ON (XXX = 3 digit password)         |
| B*         | Remote Function OFF                                 |
| DB*        | Cross Band Repeat ON                                |
| DB, XXX, # | Cross Band Repeat OFF (XXX = 3 digit password)      |
| 1          | Call  |
| 2          | Memory  |
| 3          | VFO   |
| 6          | High Power  |
| 9          | Low Power   |
| DC         | Speech  |
| D (+NNN)   | Enter (Direct entry of mem. chan. or VFO Frequency) |
| #          | Up  |
| *          | Down  |
| A          | Clear   |

That's all the information I've got to date. So far, I haven't been able to find a method of putting the rig into X-Band repeat without using the remote control function. It'd be nice to be able to do that from the rig or mic.

Hope this information helps!

Ray Semenoff VE6RHS  
Chief Engineer (and Bottle Washer)  
CJSR FM  
University of Alberta  
Edmonton, Alberta, CANADA.

This modification is read 745 times.

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**19-07-1998**

## **(IC-2700) IC-2700 Cross Band Repeater**

Removing D14 will allow use of cross band repeater and DTMF remote control functions.

Activate "hang up time" type repeater:

Push the VHF and UHF main knobs and the SET/LOCK key for more than one second.

Activate "no hang up time" type repeater:

Push the VHF and UHF main knobs and the SET/LOCK and DUP keys simultaneously for more than one second.

To return to normal mode, press SET for more than one second.

This modification is read 681 times.

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**17-11-2000**

## **(IC-2700) Enabling ICOM 2700H remote operation**

**Author:** Paul Webster VO1HC - [vo1hc@rac.ca](mailto:vo1hc@rac.ca). [MODIFICATION.NET](http://MODIFICATION.NET)

This is further information to go along with Ray Semenoff's (VE6RHS) note on putting the IC-2700 into remote operation, either from the front panel of the rig or from a remote transceiver.

First you must put the rig in the REMO mode, push the DTMF button one or more times until REMO is flashing to the right of the left side channel display.

I played with this and followed the sequence given in the manual on page 63 to enter commands remotely and that to turn the XBand rpt on, you need only put 'D' in the command part of the sequence. To turn the XBand rpt off, need only to omit the command part of the sequence altogether.

i.e. -       for XBand Rpt on   B000# D B\*  
          for XBand Rpt OFF B000# B\*

Also, to enable the XBand remote from the front panel of the rig, press and hold the SET button, then immediately press and HOLD the DUP button, and then press and HOLD both of the channel buttons until the flashing L appears on both sides of the display.

Regards,

Paul Webster VO1HC

This modification is read 645 times.

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**19-07-1998**

## **(IC-271) PSK Transmit Audio Modification for ICOM IC275 & IC271**

After reading a FUJI-OSCAR-20-PRBBS message from James, G3RUH, regarding the modifications he made to his Yaesu FT736 to improve the PSK transmit audio, I decided to investigate the situation on my ICOM IC275H to see if the same problem existed. I was certainly less than satisfied with the results I was getting in the first few days with FO-20 Mode JD. I was feeding the TX audio in at the front microphone socket and results on the uplink were quite poor but my downlink copy was 100%.

The first change I made was to move the Tx audio to the rear connector, ACC1. Results improved but I was still not satisfied. Some scoping around the Varicap diode, D40, revealed considerable distortion of the PSK audio. To prove if this was the cause of my problem I studied the IC275 circuit to see how I could feed the TX audio in as close to the Varicap modulator diode, D40, as possible.

In the IC275H there are several Audio feeds to D40, including 3 via Q33, and in my unit one of these, the feed from the Tone Squelch is unused. P46 normally plugs into the Tone Sq card but as this option is not installed it is left unterminated inside the rig. I also found that Pin 1 on ACC1 was unused so a shielded wire from P46, pins TSTN and GND to ACC1, Pins 1 and 2 would give easy access from outside the rig to D40 and NOT alter any of the existing functions of the IC275H.

The installation of the wiring is not as easy as it sounds however:

(1) You have to find a way to connect P46. I stripped a small amount of insulation from the wires just behind the plug housing and soldered the extension wire there.

(2) To gain access to ACC1 you must remove the PLL PCB that it is mounted on. With the board removed I soldered the extension wire to the underside of the board taking care not to short out any surrounding tracks. The whole exercise took about 30 minutes.

You will probably need more audio level from you PSK modem (see changes recommended by G3RUH in his FT-736 discussion). You can then use the pot, F151, in the IC275H to set the TX modulation level.

Results from making this change have been outstanding with many less retries on the uplink than previously. The waveform being applied to the Varicap diode is now identical to the output from the modem. Performance via LUSAT and PACSAT digipeaters have been equally pleasing. EXTRA hint: Use DWAIT=0 RESPTIME=0 and start TXDELAY= 100 ms and reduce to as low as possible for your radio - I use 30 ms.

A similar change could be performed on the ICOM IC271 by wiring to J12 on the Main Board. J12 is normally unused in Australian IC271's.

Since the above article referred to G3RUH's FT-736 discussion, I sent a message to James Miller G3RUH on FO20 and asked him to repost it on the bird. I had lost the copy I downloaded since I did not anticipate any need for it.

Jack - the notes about mods to the FT736R were specific to that machine, and won't be relevant to the IC735.

1. What you need to do is work out a way to belt the varactor directly. Then inject a square wave (1200 hz will do) and measure the deviation that results.
2. You can do this measurement with either a proper deviation instrument or more likely with a monitor RX, by looking at the output from it's discriminator.
3. You can calibrate the monitor RX quite easily, Tune in a steady unmodulated carrier and note the discriminator DC output voltage Change the RX frequency by 1 Khz (knob on the RX front) and note the change in DC voltage. That gives you the monitor RX sensitivity in volts per Khz.
4. Now return to the TX, and adjust that driving square wave to give you approx +/- 3 kHz, you want to see about 6x volts peak to peak square wave on the monitor. (Somewhere between 4x and 6x will do, no more.)
5. Now return to the modem and juggle about with the TXAudio output components to achieve this level of drive signal, and look at the monitor RX too.
6. When you have done this, which should take you all of 30 minutes, you should be in business. If you can't get square waves TX to produce squarish waves out of the monitor RX, then the varactor dept. must be suspect, and so on.

All is fairly logical. Hope useful. Let me know the results.

73 de James G3RUH @ GB7SPV 1990 Mar 28

Since I am not going to be able to try the mods until I return from a vacation I won't be able to give you an answer as to whether they work or not. But it is my opinion they will. What is happening is that between the mic connector and the varactor the digital signal is being badly distorted and the bird does not respond to the digital signal. This would not make much difference on voice but on a digital signal it makes all the difference in the world.

Please feel free to contact me further if I can be of any further help.

Best regards Jack W9FMW

Note:

From Bill K7RIE

ICOM has not tried this mod nor have we verified this problem.

This modification is read 731 times.

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**19-07-1998**

## **(IC-271) VOX of an IC-271,471,1271 usable for FM**

How to make the VOX of an IC-271,471,1271 usable for FM :

1'st type of 'main-board' :

The only thing to be done is to add a diode such as 1n4148 or bax13 on the MAIN board on the position D74  
When D74 is inserted ... the vox works in FM also.

The diode is on the schematic diagram of the Main board but is not mounted on the pcb in the factory.

73's de stefaan

ON4BY @ ON4HU

16/03/1990 18.31 h

2'nd type :

(On this board a D74 is present (near PA- and RF-YGR- Unit))

(It might be not present in the plans !)

Disconnect the cathode of D69 from it's old position. It's new position is the cathode of D50 or D51

| name | ! | position on main board | ! | (old) function | ! |       |
|------|---|------------------------|---|----------------|---|-------|
| D69  | ! | near 'CW-DELAY'.       | ! | 'FM -VOX-OFF'  | ! | FM 8V |
| D50  | ! | near 'RF-YGR-Unit'     | ! | 'USB-VOX-ON'   | ! | USB8V |
| D51  | ! | near 'RF-YGR-Unit'     | ! | 'LSB-VOX-ON'   | ! | LSB8V |

20/03/1990

This modification is read 685 times.

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**19-07-1998**

## **(IC-271) IC-271 / 471 fuer 9k6**

es kommen doch noch anfragen wie man die 271/471/(1271?) geraete von icom fuer 9600bd umbaut.  
hier nochmal allgemein:

fuer den empfang geht man an den pin 9 des ics MC3357 auf dem main-board. fuer die rx seite wars das schon.

fuer tx verfolgt man den weg vom evtl. vorhandenen tone-unit zum main-board. dort sollte die leitung ueber einen widerstand an eine varicap-diode gehen.

das ist auch der punkt an dem man das modem anschliessen muss.

es ist sehr ratsam direkt an die diode eine ferritperle mit einer windung anzuloeten, und dann erst auf das g3ruh modem zu gehen.

(gleichniss "pferde vor der apotheke" HI) das wars auch schon.

diese allgemeine umbauanleitung kann fuer die 271er und 471er geraete (a/e/h) benutzt werden. danach haben einige andere oms auch ihre geraete umgebaut.

(ihr solltet erstmal meine englische anleitung lesen HI)

hier jetzt speziell fuer den 471h.

fuer den empfang braucht man nur eine 2pol. stecker(weibl) den man auf den j-14 (der bei mir unbenutzt war), auf dem main-unit, aufsteckt.

fuer den sendezweig geht man mit dem signal, auch auf dem main-unit, am besten an die kapazitaetsdiode d4. und zwar an den knotenpunkt r271-c18-d4-c17. die zuleitung sollte mit einer ferritperle abgeblockt sein.

ich hoffe mit diesem schaltungsvorschlag konnte ich jemandem helfen.

vy 73 de detlef dd1eg

**p.s.** dieses geraet benutze ich auch um via uosat-d qrv zu sein.

This modification is read 676 times.

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**19-07-1998**

## **(IC-271) IC-271 sounds raspy in SSB/CW**

05-08-1998

Hello dear OM,  
thanks for reading this bulletin.

I have an Icom IC-271 since several years. Recently the sound in SSB or in CW sometimes becomes raspy, both in TX as well as in RX. The problem is intermittent and also the 'raspyness' varies.

I already found some hints at the Icom America website, where they describe a similar problem. They advise to replace electrolytic capacitor C2 and replace 2 plastic trimmer caps by ceramic ones. I tried this, but it did not cure the problem.

Is there anyone out there who has had this problem and knows the solution? Please send me a reply or send an email to [amunters@xs4all.nl](mailto:amunters@xs4all.nl)

Thanks in advance,  
73 de Allard PE1NWL  
Amsterdam, Netherlands

This modification is read 733 times.

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**30-03-2001**

## **(IC-271) RAM Card Backup Battery Replacement Instructions**

**Author:** ICOM

In the early 1980s Icom America marketed a group of transceivers and radios that utilized the latest state-of-the-art computer technology to enhance the operation of the radios. This technology improvement allowed hams to afford a reasonably priced high performance transceiver which until then was only available on units costing much more. Features now available to the hams included: higher frequency stability, better frequency resolution, digital frequency display, almost instant recall of saved frequencies (memory channels), quick mode signal processing and built in tones and offsets for the rapidly emerging repeater operation.

Implementation of all these features required a CPU with associated logic circuitry. In the early 80s, the most cost effective way

to implement data processing and memory functions was through a DRAM (Dynamic Random Access Memory) to control the CPU. This DRAM was a volatile memory integrated circuit which required a lithium battery to retain its instruction set. The following receivers and transceivers had such RAM units:

IC-271 ; IC-471 ; IC-1271 ; IC-745 ; IC-751/A ; IC-R71A

The lithium batteries in these units typically lasted about 5 to 7 years before replacement was required. This was specifically noted in each of the Owners Manuals for the products.

This lithium battery can be replaced by the radio owner if care is used. The following is a recommended procedure to accomplish this:

### **Procedure**

1. Disconnect the power cable from the radio, and take the cover off.
2. Unplug the RAM board and remove it from the radio.
3. Temporarily solder a 3 Volt DC battery source across the existing battery terminals (see suggested connection points on the circuit board pictures).
4. Unsolder the old lithium battery and replace it with a new one. (BR2325 1HC, ICOM stock number 945 03112)
5. Unsolder your temporary 3 Volt DC source.
6. Reinstall the RAM board into the radio.

### **Cautions**

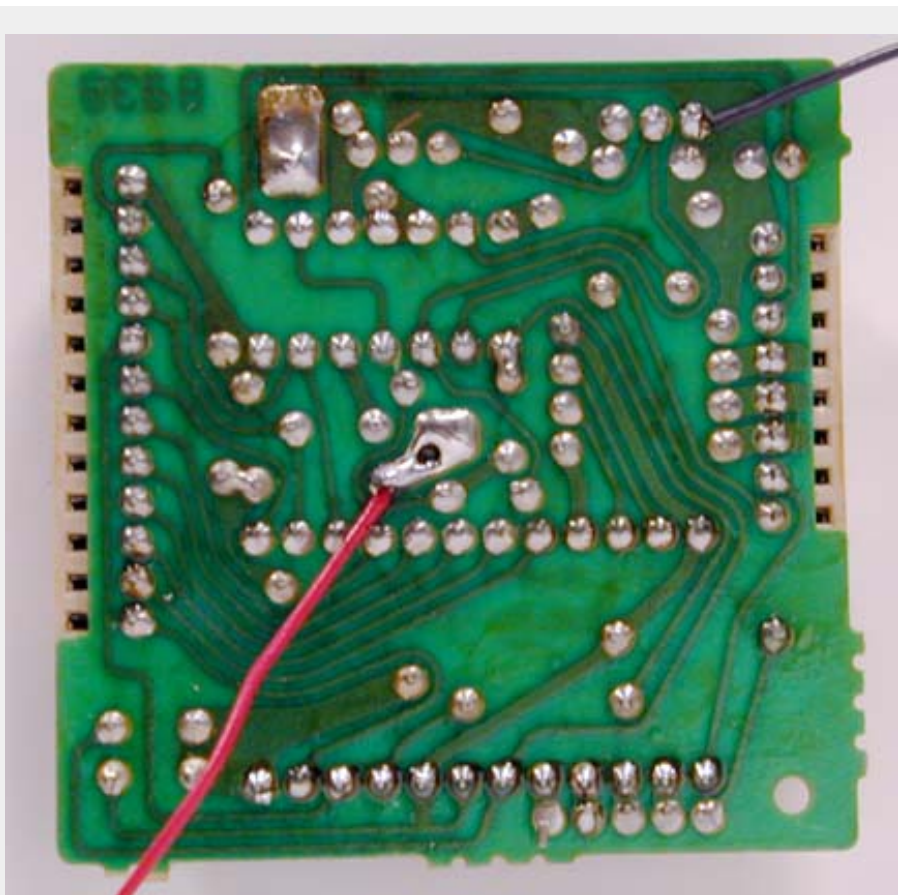
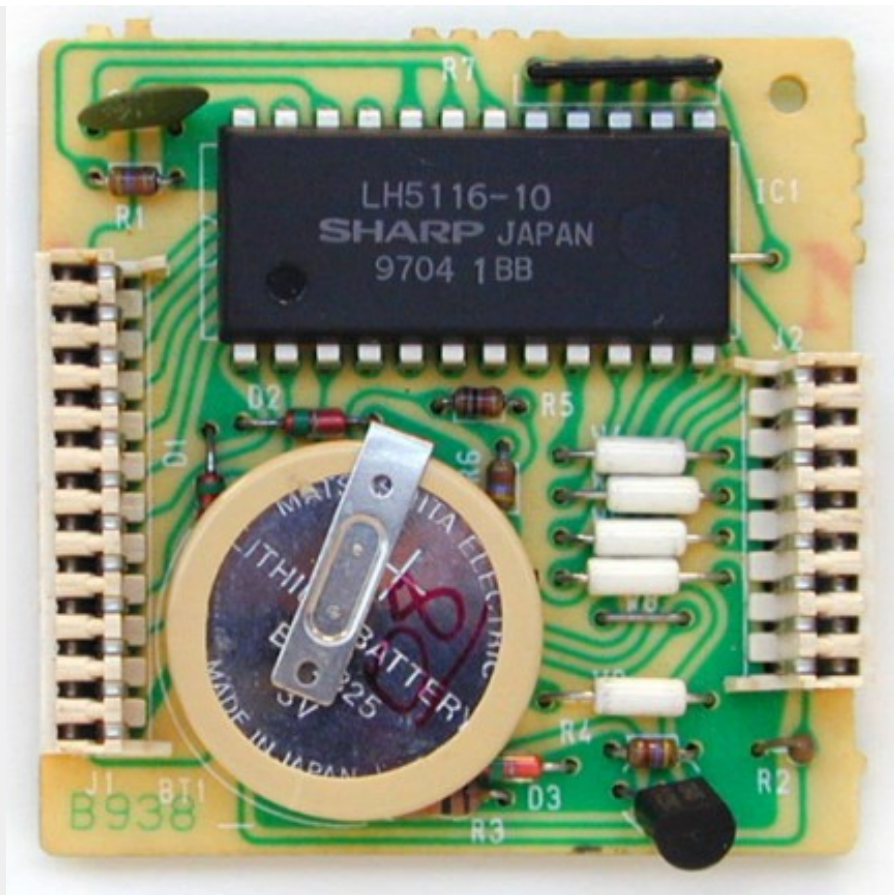
1. Do not use an AC powered 3 Volt DC source, your grounded soldering iron tip could short out the battery (+) terminal. Use a 3 Volt battery DC source only (2 alkaline cells for example).
2. Do not solder the external DC wires directly to the lithium battery tab pads. If you do so, you will not be able unsolder the battery without having the wires drop off.
3. If by accident you lose power to the RAM unit it must be sent to Icom America for reprogramming.
4. Be careful not to damage or bend the connector pins on the radio side while removing or reinstalling the RAM card.

### **Pictures**

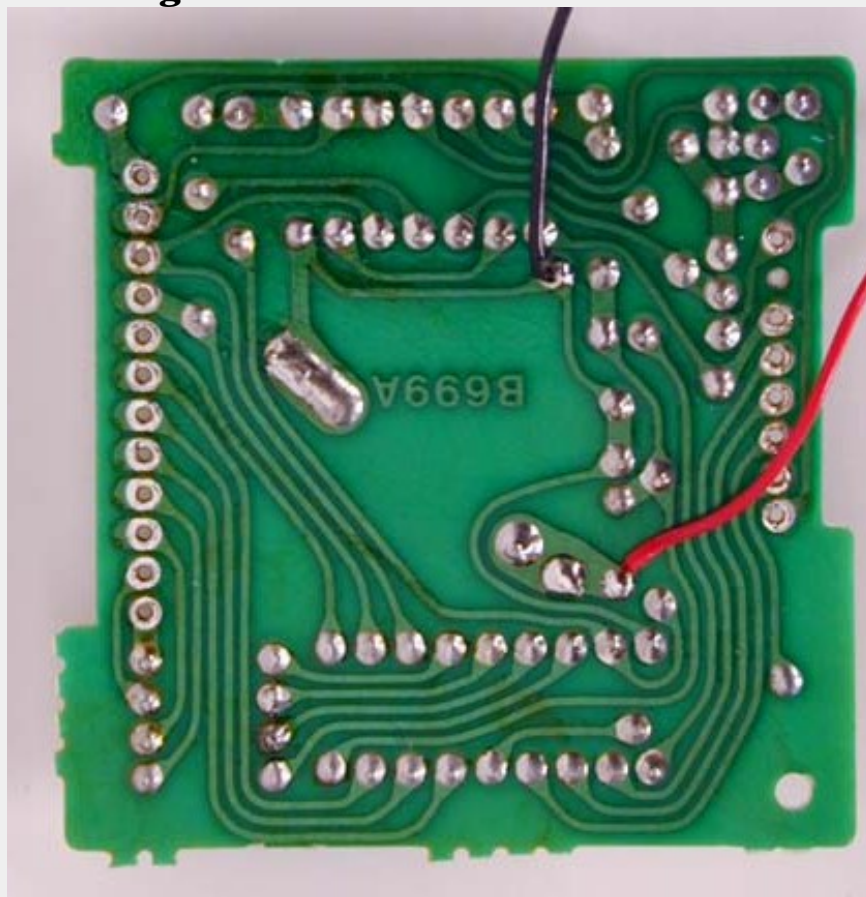
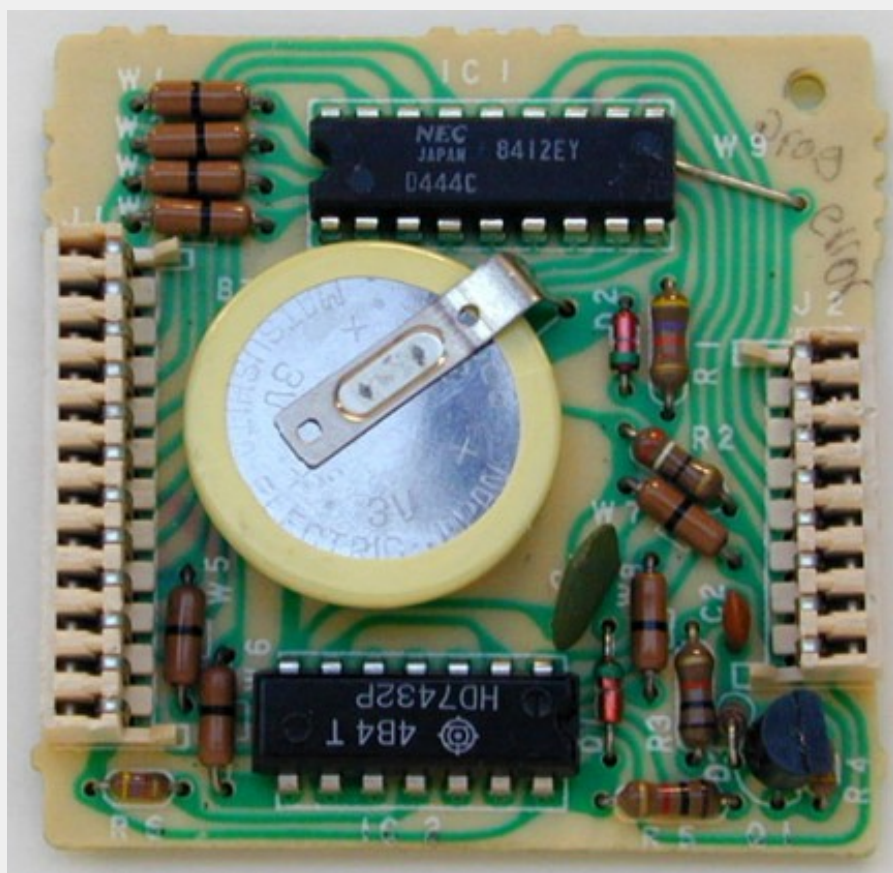
There are two versions of the ICOM RAM boards. Both are identical in operation, and they are interchangeable. The differences are in the circuit board layouts only. Note that the black and red wires visible on these images are the suggested way of connecting the external DC backup voltage while the battery is being replaced. The wires are not a part of the RAM card, and should be removed when the battery replacement procedure is complete. Refer to the replacement procedure outlined above.

#### **RAM card version A images:**





**RAM card version B images:**



This modification can also be found at ICOM's own homepage on the following URL: "[RAM Card Backup Battery Replacement Instructions](#)"

This modification is read 729 times.

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**Maximum supported frequency range:**

- VHF, 118-135.995 MHz RX, 136-174 MHz TX & RX
- UHF, 320-399.995 MHz RX, 400-479 MHz TX & RX
- UHF, 849-869 MHz & 894-950 MHz RX

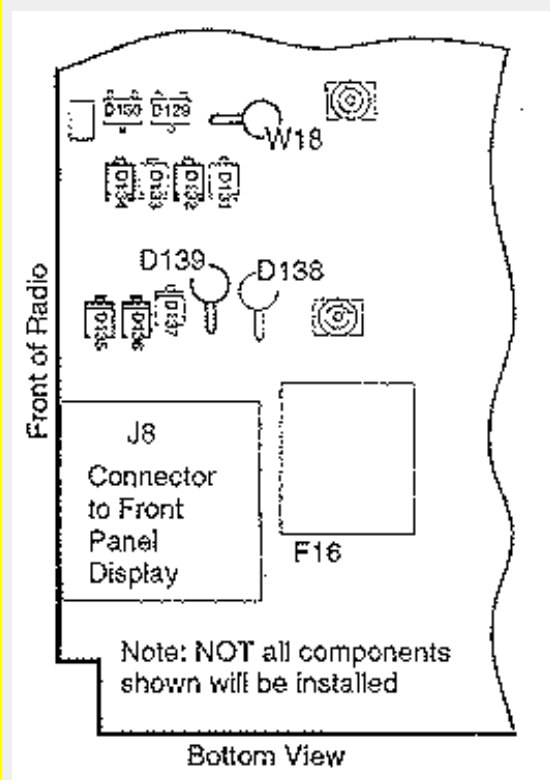
See product literature for frequency limits from factory. Please note, these are the "tunable" frequency ranges only. The receivers are optimized over 20-30 MHz ranges which have been centered around the ham bands at the factory. Performance outside the ranges defined in the product specification is not guaranteed.

**AM/FM mode selection (118-135.995 MHz or 320-399.995 MHz RX only):**

- Select an appropriate frequency (left side display only)
- Push and hold the left side MONI(SQL) switch for about ONE second to toggle AM mode ON or OFF.
- The symbol "<" appears to the right of the frequency when AM mode is enabled

**Frequency range modification:**

- Remove Power and Antenna Leads
- remove the bottom cover of the radio  
(See section 16, Page 65 of instruction manual).
- Viewing the bottom of the radio, orient the chassis with the fan to the right (front of radio to the left)
- refer to the drawing and locate the identified components on the main board in the lower left of the radio

**To enable receive on all supported frequencies:**

- Cut jumper "W-18"

**To enable only some RX frequencies:**

- Remove "D-134" to enable receive on 300 & 800 MHz frequencies, or
- Remove "D-132" to enable receive only 300 MHz frequencies

**To enable extended transmit ranges:**

- For extended VHF TX range, remove "D-135"
- For extended UHF TX range, remove "D-136"

**Author:** Kevin - [Kastle@aol.com](mailto:Kastle@aol.com).[MODIFICATION.NET](http://MODIFICATION.NET)

**Cross Band Repeater Mode:**

- First, verify D-139 is not present (for non USA Versions only)

To ENTER Cross Band Mode:

- Set the desired frequency, tone, & offset on both bands
- Press [VHF] and [UHF] main knobs and the [SET L] key at the same time (An "L" will appear on the display)
- For zero hang time, also press the [LOW] key with the above three key command.

To EXIT Cross Band Mode:

- Press [SET] to exit Cross Band Mode

**Remote Operation (UT-49 DTMF Decoder Unit Required for Remote Operation)**

1. Set the sub band frequency to receive a control signal (DTMF code).
  - The optional tone squelch function can be used for the sub band to increase remote control reliability.

**Password Setup**

2. Program a 3-digit password into the sub band's code channel 5, if desired: (default is 000)
  - a. Push the desired band's tuning dial.
    - \* Each band has separate code channels.
  - b. Push [DTMF] 2 times to turn the pager function ON.
    - \* "P" appears in place of the 100MHz digit.
  - c. Push [(VOL)SET] to select the code channel setting display.
  - d. Rotate the selected band's tuning dial to select the desired code channel, 0-5.
    - \* Code channel P cannot be used for programming.
  - e. Push [(SQL)MONI] or [(VOL)SET] to select the digit to be programmed.
  - f. Rotate the selected band's tuning dial to set the digit.
  - g. Repeat e and f until the last digit is programmed.
  - h. Push [DTMF] to set the code channel for "receive inhibit" or "receive accept."
    - \* When "receive inhibit" is set, "SKIP" APPEARS.
    - \* Code channel 0 cannot be set as "receive inhibit."
  - i. Push the selected band's tuning dial to exit the setting display

**Remote Operation Continued (UT-49 DTMF Decoder Unit Required for Remote Operation)**

3. Select the main band by pushing a tuning dial, then set the desired frequency for operation.
4. Push [DTMF] one or more times until "REMO" appears to select standby for the remote control.
5. Set the operating frequency of the controller transceiver equal to the sub band frequency of the the IC-2710H.
  - \* Make sure a tone frequency is set when using the optional tone squelch function with the IC-2710H.
  - \* The external DTMF remote does not accept a control signal on the main band frequency.
6. From the controller transceiver, transmit the DTMF code as follows:

```
ENTER REMOTE MODE "REMO":      B+XXX (password)+#  
  
X-BAND ON:                      B+XXX(password)+#+DB*  
  
X-BAND OFF:                     B+XXX(password)+#+B*  
  
EXIT REMOTE MODE:              B*
```

**19-07-1998**

## **(IC-275) PSK Transmit Audio Modification for ICOM IC275 & IC271**

From AMSAT-Australia Newsletter #59 (Graham Ratcliff, VK5AGR)

After reading a FUJI-OSCAR-20-PRBBS message from James, G3RUH, regarding the modifications he made to his Yaesu FT736 to improve the PSK transmit audio, I decided to investigate the situation on my ICOM IC275H to see if the same problem existed. I was certainly less than satisfied with the results I was getting in the first few days with FO-20 Mode JD. I was feeding the TX audio in at the front microphone socket and results on the uplink were quite poor but my downlink copy was 100%.

The first change I made was to move the Tx audio to the rear connector, ACC1. Results improved but I was still not satisfied. Some scoping around the Varicap diode, D40, revealed considerable distortion of the PSK audio. To prove if this was the cause of my problem I studied the IC275 circuit to see how I could feed the TX audio in as close to the Varicap modulator diode, D40, as possible.

In the IC275H there are several Audio feeds to D40, including 3 via Q33, and in my unit one of these, the feed from the Tone Squelch is unused. P46 normally plugs into the Tone Sq card but as this option is not installed it is left unterminated inside the rug. I also found that Pin 1 on ACC1 was unused so a shielded wire from P46, pins TSTN and GND to ACC1, Pins 1 and 2 would give easy access from outside the rig to D40 and NOT alter any of the existing functions of the IC275H.

The installation of the wiring is not as easy as it sounds however:

(1) You have to find a way to connect P46. I stripped a small amount of insulation from the wires just behind the plug housing and soldered the extension wire there.

(2) To gain access to ACC1 you must remove the PLL PCB that it is mounted on. With the board removed I soldered the extension wire to the underside of the board taking care not to short out any surrounding tracks. The whole exercise took about 30 minutes.

You will probably need more audio level from you PSK modem (see changes recommended by G3RUH in his FT-736 discussion). You can then use the pot, F151, in the IC275H to set the TX modulation level.

Results from making this change have been outstanding with many less retries on the uplink than previously. The waveform being applied to the Varicap diode is now identical to the output from the modem. Performance via LUSAT and PACSAT digipeaters have been equally pleasing. EXTRA hint: Use DWAIT=0 RESPTIME=0 and start TXDELAY= 100 ms and reduce to as low as possible for your radio - I use 30 ms.

A similar change could be performed on the ICOM IC271 by wiring to J12 on the Main Board. J12 is normally unused in Australian IC271's.

Since the above article referred to G3RUH's FT-736 discussion, I sent a message to James Miller G3RUH on FO20 and asked him to repost it on the bird. I had lost the copy I downloaded since I did not anticipate any need for it.

Jack - the notes about mods to the FT736R were specific to that machine, and won't be relevant to the IC735.

1. What you need to do is work out a way to belt the varactor directly. Then inject a square wave (1200 hz will do) and measure the deviation that results.
2. You can do this measurement with either a proper deviation instrument or more likely with a monitor RX, by looking at the output from it's discriminator.
3. You can calibrate the monitor RX quite easily, Tune in a steady unmodulated carrier and note the discriminator DC output voltage Change the RX frequency by 1 Khz (knob on the RX front) and note the change in DC voltage. That gives you the monitor RX sensitivity in volts per Khz.
4. Now return to the TX, and adjust that driving square wave to give you approx +/- 3 kHz, you want to see about 6x volts peak to peak square wave on the monitor. (Somewhere between 4x and 6x will do, no more.)
5. Now return to the modem and juggle about with the TXAudio output components to achieve this level of drive signal, and look at the monitor RX too.
6. When you have done this, which should take you all of 30 minutes, you should be in business. If you can't get square waves TX to produce squarish waves out of the monitor RX, then the varactor dept. must be suspect, and so on.

All is fairly logical. Hope useful. Let me know the results.

73 de James G3RUH @ GB7SPV 1990 Mar 28

Since I am not going to be able to try the mods until I return from a vacation I won't be able to give you an answer as to whether they work or not. But it is my opinion they will. What is happening is that between the mic connector and the varactor the digital signal is being badly distorted and the bird does not respond to the digital signal. This would not make much difference on voice but on a digital signal it makes all the difference in the world.

Please feel free to contact me further if I can be of any further help.

Best regards Jack W9FMW

Note:  
From Bill K7RIE  
ICOM has not tried this mod nor have we verified this problem.

This modification is read 724 times.

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**19-07-1998**

### **(IC-275) IC-275 Freq. steps mod.**

Titolo: Tuning steps change for all mode Icom IC-275/475/575/1275

The IC-275/475 FM-Step selectmatrix use these diodes on the front unit: (type 1SS53) D41, D42, D43, D44, (D45), D46

Note: diode D45 is not present but solder holes exist for it on the board just between D44 e D46

installed diodes are marked with X :

|     | (*) | (*) |     |     |     |     |          |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|----------|-----|-----|-----|-----|--|
| D41 | D42 | D43 | D44 | D45 | D46 | D48 | Steps    | DB4 | DB5 | DB6 | DB7 |  |
| .   | .   | .   | .   | .   | .   | .   | 10.0 Hz  |     |     |     |     |  |
| .   | .   | .   | X   | .   | .   | .   | 100.0 Hz | 1   | 0   | 0   | 0   |  |
| .   | X   | .   | .   | .   | .   | .   | 1.0 KHz  | 0   | 0   | 1   | 0   |  |
| .   | .   | .   | X   | .   | X   | .   | 5.0 KHz  | 1   | 0   | 1   | 0   |  |
| .   | .   | .   | .   | X   | .   | .   | 10.0 KHz | 0   | 1   | 0   | 0   |  |
| .   | .   | .   | (*) | X   | X   | .   | 12.5 KHz | (*) | 1   | 1   | 0   |  |
| .   | .   | .   | .   | .   | .   | X   | 25.0 KHz | 0   | 0   | 0   | 1   |  |
| X   | .   | X   | .   | .   | .   | .   | 1.0 MHz  | 0   | 1   | 0   | 1   |  |

(\*)

To set a step of 12.5 KHz in FM mode (TS button off) it is not necessary disconnect the diode D44, just insert the diode D45 (IN4148 or similar) near D44 and "voilà! les jeux sont faits".

Unscrew the two lateral screws and unlock the front panel.

Remove also all the connectors of the front board and after that unscrew ALL the screws of the metallic shield covering the front board. It seems too much complicated insert the diodes from the component side of the front board, so it is better insert D45 from the solder side.

This modification is read 812 times.

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**19-07-1998**

### **(IC-275) Band Expand for ICOM IC-275E/H and IC-275A/H**

To expand RX range delete D 44

To expand TX range delete D 27 install D 43

Range 138-174 MHz TX not in full range PLL lockout

This modification is read 952 times.

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**19-07-1998**

### **(IC-275) IC amplifier oscillates**

Note: This service bulletin is meant for technical personnel with experience working on solid state communications equipment. Damage caused by improperly installing this modification may cause ICOM to charge for subsequent repairs to the product. ICOM does not warrant this modification.

Bulletin #: 588-001

Subject: If the IC amplifier oscillates when the noise blanker is turned on and the FL-83 CW narrow filter is installed

Procedure

1. Remove the covers to gain access to the main circuit board.
2. Remove R354 (22K) from the main circuit board and replace it with a 10K (ICOM P/N 915-01113) resistor.
3. Re-install the main circuit board and replace the covers on the radio.

This modification is read 702 times.

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**19-07-1998**

### **(IC-275) Prevent PLL unlock at high ambient temperature**

1. Change the following parts on the PLL board

| Part | Original Value | New Value                      |
|------|----------------|--------------------------------|
| C101 | 12 pf 50V CH   | 6 pf 50V CH                    |
| R137 |                | 35D 45 SN (ICOM P/N 915-04229) |
| R133 | 22K            | 15K                            |
| C191 | 3 pf 50V       | 6 pf 50V                       |

2. The thermister should be installed in series with R133. Unsolder one end of R133 and solder R137 in series with it.

This modification is read 676 times.

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**19-07-1998**

### **(IC-275) Improve voice synthesizer and side tone audio**

1. Remove C214 (.47 uf capacitor) from the main board.
2. Install a .1 mf 16V barrier layer capacitor in series with a 2.2 K 1/8W resistor from the emitter of Q58 and the base of Q59 on the foil side of the board.

This modification is read 662 times.

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**19-07-1998**

### **(IC-275) Prevention of PLL unlock at 174 MHz**

1. Remove and replace the following components on the PLL Board

| Part | Original Value | New Value |
|------|----------------|-----------|
| R130 | 120 Ohm        | 270 Ohm   |
| R131 | 47 Ohm         | 18 Ohm    |
| R132 | 120 Ohm        | 270 Ohm   |
| C42  | 60 pf 50V      | 30 pf 50V |
| C47  | 43 pf 50V      | 62 pf 50V |

This modification is read 701 times.

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**19-07-1998**

### **(IC-275) Improve the stability of the center meter**

Replace C81 on the main board (currently 120pf 50 CH type capacitor) with a 120 pf 50V SH temperature coefficient capacitor (ICOM P/N 918-05960).

This modification is read 685 times.

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**19-07-1998**

### **(IC-275) Noise coming from speaker during transmit with audio turned up**

Replace R125 (currently a 47K resistor) on the main board with a 10K resistor.

This modification is read 674 times.

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**19-07-1998**

### **(IC-275) Eliminate possible spurious emission when thermal switch has turned on during TX**

May 1, 1989

#### Procedure

1. Remove top and bottom covers.
2. Remove PA section from radio.
3. Remove shield from power amplifier.
4. Replace R7 (originally 10K 1/4W) resistor with a 1K 1/4 watt resistor (ICOM part number 915-01165).
5. Replace R8 (originally 10K 1/4W) resistor with a 1K 1/4 watt resistor (ICOM part number 915-01165).
6. Replace the shield on the PA section.
7. Replace the PA section in the radio.
8. Replace the top and bottom covers.

This modification is read 671 times.

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**27-10-1998**

### **(IC-275) Frequency range & CTCSS tones**

The IC-275 have capability to cover 138 - 174 MHz and the IC-475 has capability to cover 430 - 450 MHz. Because of hardware restrictions they might not be fully up to specifications in all of the band, but an extended range can be interesting for e.g. use with a transverter. It seems that the IC-275 has a parallel wide band preamp, that can be switch via the WBT pin on RF-YGR PCB.

In the European versions the transceivers are wired for 1750 Hz repeater call, and they have no CTCSS capability. The transceivers have a built-in CTCSS encoder, so these functions can be restored.

Both of these version dependent functions can be set by the diode matrix: D20 - D24 in the logic unit. I do not know the exact mapping, but a lot can be derived from studying the different frequency ranges and the diode matrix coding table found on the schematic diagram.

This modification is read 742 times.

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**27-10-1998**

## **(IC-275) Power control modification**

### Problem:

The power control circuit in IC-x75 is an ALC circuit. ALC circuits suffers from several drawbacks:

- slow reaction time due to time constants
- insufficient regulation due to low feed-back factor

These factors gives the problem that if the average power has been set to a low value (e.g. for driving a HPA), peak power can still be in the order of 3-4 dB higher. This leads to either considerable side band distortion or a low average power output.

**note:** If you are always using your transceiver barefoot, without connecting any PA or transverter, this modification will offer no benefit.

### Solution:

The solution to these problems is to use a simple forward gain regulation without the feed back circuit of the ALC. The original ALC is still kept for SWR protection only.

The ALC is working on gate 1 of Q13, which is a IF amplifier (9 or 10.75 MHz). The new power regulation uses gate 2 of Q13. Therefore the two circuits can exist in parallel.

The modification should also give you a bigger dynamic range in the power regulation (lowest power < 5W on the IC-x75H).

### Implementation:

- replace R87 (470k) with 100k
- cut "POCO" wire (pin 3, P1/J1, MAIN, orange) at the plug (P1)
- connect the "POCO" wire to gate 2 of Q13 (e.g. via top of R87)
- adjust R250 (SWR protection), R256 (low power level) & R259 (high power level) fully counter-clockwise. (this will give you full SWR protection, but cancels the ALC in normal operation).
- put the front plate RF PWR in full output position (clockwise) and adjust R82 (Q13 output attenuator) until you have the nominal output power (initially the output power will be higher because you removed the regulation, but the PA will be saturated).
- the balance between FM, CW & SSB output can be adjusted with R137 (CW carrier level) & R105 (FM carrier level).
- other interesting adjustments: R135 (mixer balance i.e. SSB carrier suppression), R133 (TX BFO output level).

This modification is read 757 times.

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**27-10-1998**

## **(IC-275) Restoration of pass band tuning**

### Problem:

ICOM has chosen to remove the PBT in the later models, and replace it with a "data level adjustment". This change removes the possibility to profit from the PBT in case of QRM or to use the PBT as a cheap CW-filter.

Furthermore the two extra IF-mixings is done with only a minimum of filtering, making the receiver very susceptible to spurious IF breakthrough. This is often heard as high-pitch tones or as a high IF noise level.

### Solution:

The solution is to re-wire the "data level" potentiometer so that it adjusts the PBT VXO-oscillator, and to re-install FI3. FI3 is a 455kHz ceramic SSB filter and can be bought under the type number: MURATA CFJ 455 K6.

### Implementation:



- remove the capacitor (C61) fitted in place of FI3
- solder in FI3
- readjust R72 for proper IF gain
- cut wire PBTV (pin 4, P1/J1, MAIN, yellow) about 5cm from the plug (P1)
- cut wire AMO2 (pin 3, P2/J18, MAIN, red) close to the plug (P2)
- cut wire AMO3 (pin 4, P2/J18, MAIN, metal baird) close to the plug (P2)
- connect PBTV wire (the end not connected to the plug) with AMO2 wire (the end not connected to the plug)
- connect AMO3 (the end not connected to the plug) to +8V e.g. by tapping (pin 1, J4, MAIN, brown).
- connect the wire stubs on the plug (AMO2 & AMO3) together is you wish to use external modulation input for PACKET etc.
- adjust the coil next to X2 (PBT VXO) for correct middle PBT setting

This modification is read 707 times.

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**27-10-1998**

## **(IC-275) Modification of cw pass band (BFO)**

### Problem:

In these transceivers ICOM has chosen to shift the CW passband up 200 Hz compared to the SSB passband. This makes it more difficult to copy SSB signals in CW mode.

### Solution:

The extra BFO coil that is added in CW-R is short-circuited, and the BFO is re-adjusted for proper CW RX/TX-tracking and for preferred USB/CW passband.

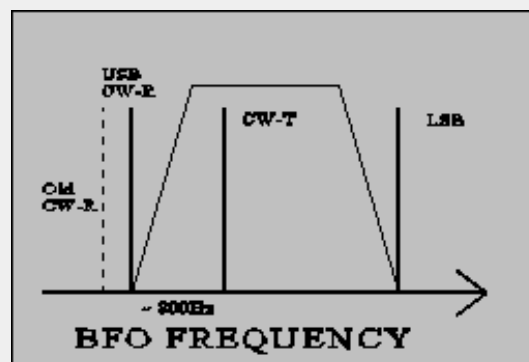
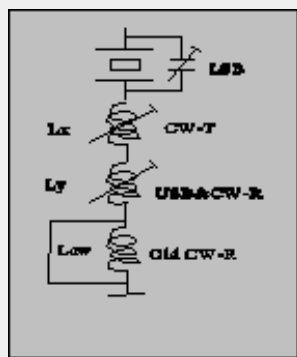
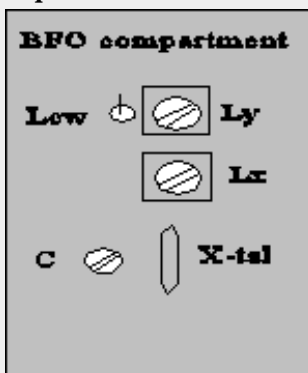
### Implementation:

- short-circuit L<sub>cw</sub> in the BFO compartment.

For readjusting the BFO you need another transceiver (TRX2) with correct tracking.

1. Receive on TRX2 and transmit in CW. Adjust the VFO (with the RIT off !) of TRX2 until you have the desired side tone in CW mode. (e.g. 800 Hz - can be found by beating the tone with the side tone oscillator).
2. Transmit on TRX2 and adjust L<sub>y</sub> (CW-R) until you have the desired side tone in CW mode. (you are setting the ~800Hz difference between CW-R & CW-T).
3. Adjust L<sub>x</sub> (CW-T) for preferred USB/CW receive passband.

You might have to repeat the tuning once again, as there is some interaction between the adjustments (diode switching for high impedance RF circuits are not perfect !). If you would like to adjust the LSB passband, this should be done by adjusting the capacitor C, before adjusting the coils.



**Note:** The BFO coils are switched in successively to give the required offset from the LSB frequency. Therefore adjusting CW-T also changes USB/CW-R.

Re-adjusting all of the BFO frequencies is a good idea in any case to compensate for crystal aging. If the passbands sound different in LSB and USB it is a sure sign of mis-alignment due to crystal drift - they should be more or less the same.

---

### **Disabling of SBB squelch**

Problem:

Squelching is nice to have in FM mode, but it doesn't really work for SSB, where you will be looking for weak signals. Therefore you have to adjust the squelch level every time you change mode. Furthermore I enjoy using FM as a monitoring mode on the SSB calling frequency, so changing the mode happens quite often.

Solution:

The solution is quite simple. Just cut the connection to the SSB input of the squelch circuit in some way.

Implementation:

The easiest way to break the connection is to connect the base of Q7 to ground. The base is the lead facing into the centre of the PCB.

---

This modification is read 667 times.

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**27-10-1998**

### **(IC-275) Disabling of SBB squelch**

Problem:

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Solution:

The solution is quite simple. Just cut the connection to the SSB input of the squelch circuit in some way.

Implementation:

The easiest way to break the connection is to connect the base of Q7 to ground. The base is the lead facing into the centre of the PCB.

This modification is read 660 times.

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**27-10-1998**

### **(IC-275) Very fast AGC**

Problem:

For some modes of weak signal communication, it can be desirable to have a very fast AGC (e.g. meteor bursts with a sharp rise and a long weak "tail"). The standard fast AGC has a time constant of about 2 secs (!), which also means that a noise pulse can mute you for quite some time.

**Note:** Never use the noise blanker when receiving high speed CW (Meteor Scatter). The noise blanker mistakes the high speed keying for noise pulses, and will seriously corrupt the signal.

Solution:

The solution is to move the "AGC fast" capacitor (C19) to replace the "AGC slow" capacitor (C20). You will lose the "AGC slow" option, but I find "AGC fast" adequate for most signals.

Another solution is to switch out the "AGC fast" capacitor (C19) separately, but then you will get the problem of finding an appropriate front plate switch. I already tried to use the DATA button, but it cannot be activated in CW.

**Note:** a strong signal will be seriously distorted in AGC OFF mode.

Implementation:

- remove C20
- move C19 to the replace C20

This modification is read 671 times.

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**27-10-1998**

## **(IC-275) SSB RF Gain**

Problem:

The RF GAIN function is different in FM and in SSB/CW modes. In FM mode the RF GAIN controls a PIN-diode at the input of the preamp. In SSB/CW the RF GAIN simply activates the IF AGC.

The use of the preamp input attenuator (the PIN-diode) can be useful also for SSB/CW e.g. if you have connected a mast head preamp with excessive gain. In this case the attenuator will help you to adjust the signal levels at the mixer, and thus reduce intermodulation and blocking.

Solution:

The solution is to remove the SSB/CW RF GAIN for SSB/CW (this function is of little use anyway), and enable the FM RF GAIN even in SSB/CW.

Implementation:

- Cut the lead (FM8V) conneted to (pin5, J6, potmeter PCB, green) about 4 cm from the plug
- Connect the short plug end with R14 (on the potmeter PCB) by soldering it to the end that is connected to the plug (+8V)

This will enable the FM RF GAIN in SSB/CW.

- cut R30 open

This disables the SSB/CW RF GAIN, and you now have a variable input attenuation with a dynamic range of 10dB (IC275 with MI308/1nF) to 16 dB (IC475).

**Note:** The IC-275 might have a shared PIN diode for FM RF GAIN and TX/RX switching. If you choose to split up the RX/TX paths, you must install a new PIN diode (MI301 or equivalent) on the RF YGR PCB to implement this modification. See the note under the section dealing with splitting the RX/TX paths.

This modification is read 702 times.

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**27-10-1998**

## **(IC-275) Tuning speed**

The tuning speed is set to a defaults of 100Hz, 1kHz, 5kHz or 1MHz depending on front plate setting and mode. These settings can be manipulated by D41 - 46 at the front plate. At least a setting of 10kHz is also available.

This modification is read 679 times.

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**29-10-1998**

## **(IC-275) Splitting into RX- and TX paths**

**Problem:**

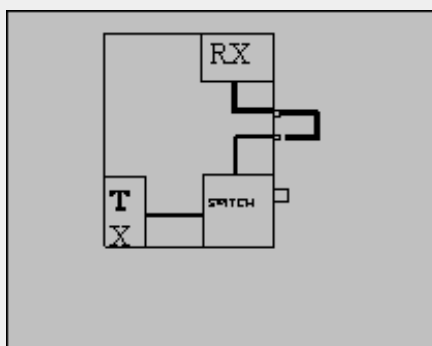
This is a general transceiver problem. If you want to use the transceiver as part of a bigger setup (i.e. with external PA & preamp or with a transverter), it is convenient to have separate access to the RX and the TX of the transceiver. Otherwise you need two coaxial switches every time you add a new accessory. With split RX/TX paths you only need one switch - at the antenna. Furthermore split RX/TX paths eliminates the need for a change-over sequencer.

On the other hand it is also nice to have the transceiver working normally when you are using it barefoot.

**Solution:**

The solution is to jump wire the RX path (between RX and the RX/TX switching) through the rear side of the transceiver with 2 BNC connectors. In normal state these connectors are connected via a short cable. In case you need to "split up" the transceiver, you remove the short coax cable, and you obtain direct access to the RX. The TX is still available using the common connector.

**note:** If you are always using your transceiver barefoot, without connecting any PA, preamp or transverter, this modification will offer no benefit.



Remove the back cover. If you place the holes for the BNC connectors next to and aligned with the two existing DIN-connectors, then ICOM have left enough space on the inside for the connections. You can also add other desired outputs like a phono plug for AF OUT.

The RX cable runs between J4 on the RF YGR PCB and the PA unit.

**note:** In my IC-275H the PIN-diode for the FM RF gain is shared with the RX/TX switch and placed in the PA unit. This means that the control voltage passes through the RX cable.

Therefore the breaking of the RX cable will cancel the FM RF gain function (the SSB/CW RF gain is working on the AGC and is not affected). The solution is to install a new PIN-diode (D5) on the RF-YGR PCB. The PCB has already room for it. To avoid short-circuiting the control voltage the jumper placed in stead of C86 on the RF-YGR PCB, should be replaced by a 1nF capacitor.

This modification is read 691 times.

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**19-07-1998**

## **(IC-28) ICOM IC-28A AND IC-28H ext frq**

To make the IC-28 transmit 138-174 MHz, cut D21 (no retuning required). D21 is a tiny glass diode standing on-end near the center of the upper circuit board, accessible by removing the top cover. The IC-28 is the only convertible ham rig I know that covers the 170-MHz federal government (including national park) frequencies.

[source: W9MKV]

**Date:** 16-01-2002

**User comment**

**From:** [Giovanni Luce, N8IWK](#)

**Subject:** no cut 28-H mod

The 28-H can be modified by removing a wire from a connector that connects to d21. Simply trace the circuit from d21 to the connector and pull the wire out by pressing the small metal tab on the connector and wrap it in electrical tape.

The radio then can easily be "unmodified" by simple plugging the wire back into the connector.

Unsured of pin# or connector number as I modified one over 10 years ago, and didn't bother to note pin or connector number.

This modification is read 1294 times.

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19-07-1998

## (IC-28) The long, noisy squelch-tail of the Icom IC-28

The long, noisy squelch-tail of the Icom IC-28 (A or H model) 2-meter transceiver can be shortened by replacing C110 (4.7 uf) with a smaller value (0.1 to 0.47 uf). (I can't remember the source of this information.)

I put a 0.33 uf in my IC-28H; it's a very worthwhile modification.

The capacitor is on the bottom board (the one with the lithium battery), just southeast of IC4 as you face the front of the upside-down radio. The only difficult part is finding the right p-c pads to desolder on the back of the board.

To remove the board: Remove bottom plate, unplug speaker. Unplug coaxial antenna connector (gray wire). Other connectors may remain in place. Remove 5 mounting screws, one in each corner and one near center. Tilt the board out of the radio. The button in the upper left corner is CPU reset; you may have to reprogram the memories if it is pressed. Remember that, although the radio is off, parts of the circuit are live so be sure not to short any part of the board during the modification.

This modification is read 1031 times.

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05-06-1999

## (IC-2800) Icom IC-2800h Extended RX Mod

Before beginning, I naturally accept NO liability if someone screws up this mod! It is direct from Icom America, and worked well for me!

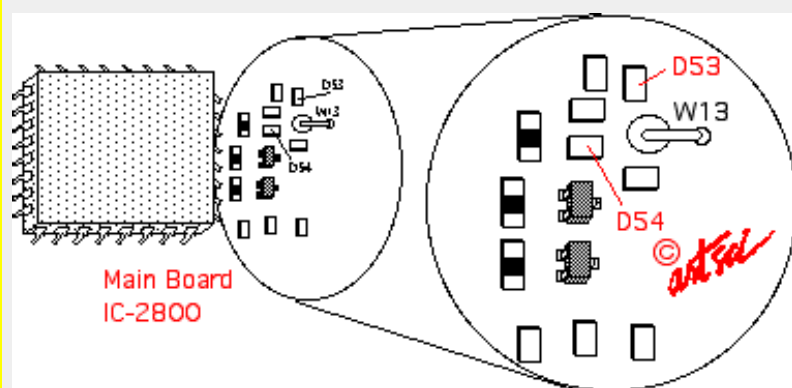
After mod Frequency Range:

118.0 to 135.995 (AM/FM) / 136.00 to 174.00 MHz

320.0 to 399.995 (AM/FM) / 400.00 to 530.00 MHz

Steps:

1. Remove cover (one bolt on cover).
2. Look at the main board. Locate the main processor, under a RF shield. Just to the right of it, among all of the diodes, you should see a vertical jumper marked W13.
3. Cut the jumper (do it on top to allow for reconstruction later if you want).
4. Reassemble to radio, and try it out!



Please email any additional mods for this rig to: [tim@k9tim.com](mailto:tim@k9tim.com).[MODIFICATION.NET](http://MODIFICATION.NET) . Enjoy!!!!

### Additional info.

In some European models RX is not extended even W13 is removed. To Extend VHF and UHF rx do the following trick:

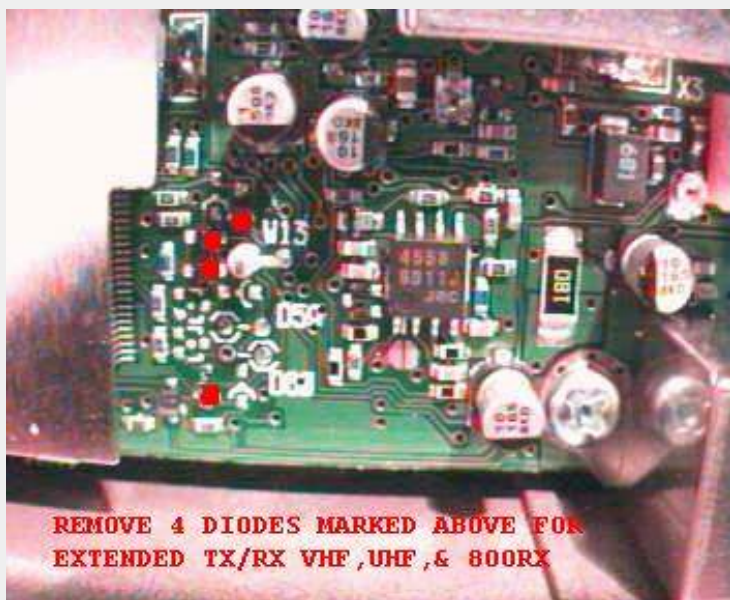
Press and hold 4th buttons from top (both, left and right side of the display) while turning the radio on.

This modification is read 2749 times.

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**05-06-1999**

## **(IC-2800) Icom IC-2800 Extended RX/TX Mod**



**Date:** 16-07-2000

**User comment**

**From:** [José A. Marrero](#)

**Subject:** 2 more diodes installed

Some versions coming with the diodes D59 and D60 installed and it's necessary to cut it for free RX/TX ( plus the 4 diodes indicated for you )

**Date:** 30-12-2001

**User comment**

**From:** [Roy Rodgers](#)

**Subject:** Cloning software

After performing this modification, the cloning software will not be compatible with the radio.

I recommend that if you plan on programming via the cloning software, before the mod clone the radio, and then perform the mod.

I found out by calling icom, the mod turns the radio into the japanese version, and the software for that version is not available.

This modification is read 3237 times.

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**17-07-1999**

## **(IC-2800) Icom IC-2800 Extended RX/TX Mod, Australian model**

Hi all you lucky IC-2800H Owners, I have owned mine for 4 months now and have just performed the expand RX/TX mods and it works very well indeed.

PLEASE NOTE: THE J.PEG PICTURES ATTACHED TO THIS FILE SHOW THE AUSTRALIAN MODEL RADIO, there are two diodes less in the AUS MODEL than what is shown in the radio that is already circulating on the Internet.

Remove the large single screw that holds the only cover on, be careful when lifting this cover off with a small bladed screwdriver because it is held quite tight with spring loaded contacts down both sides, once this is done turn radio so fan end is facing toward you and locate CPU under tin shield at fan end and link W13 is to the right of CPU.

The two J.PEG PICTURES should be easy to follow and you can zoom and print them using PAINTSHOP PRO or COMPUPIC.

My radio will now RX 118 - 175

320 - 530

800 - 999

TX 136 - 175

400 - 479

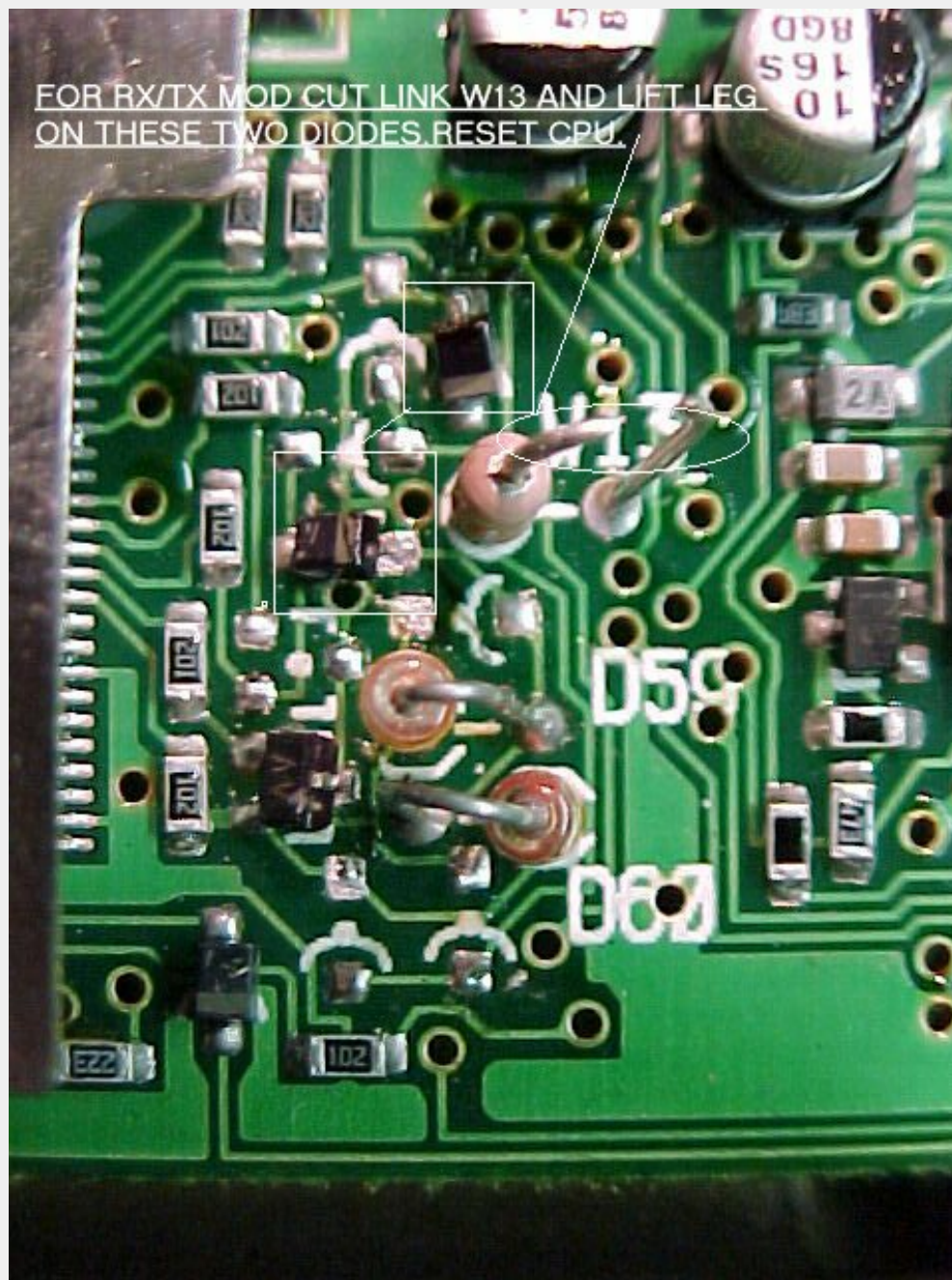
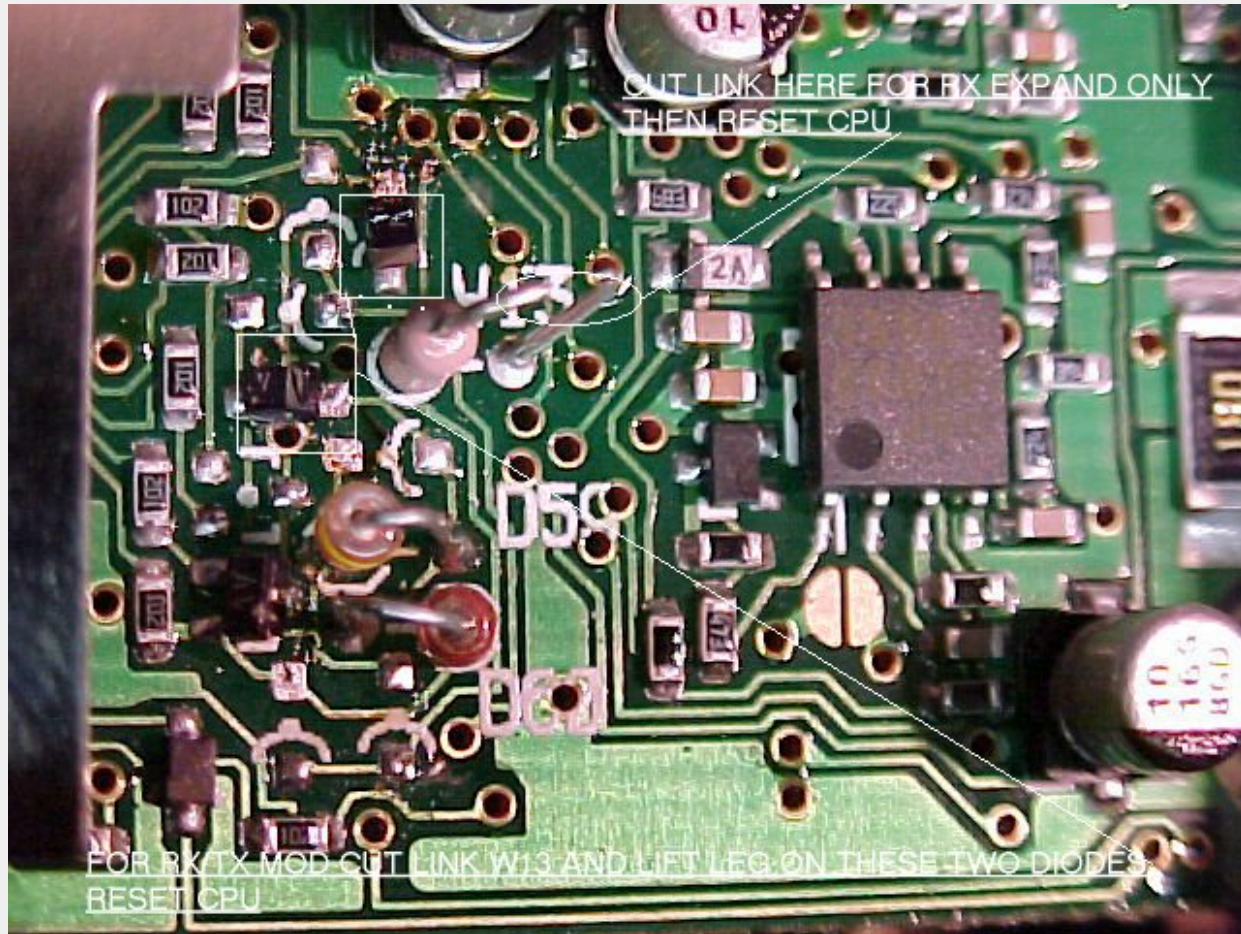
118 - 136 is AM RX ONLY

I have not check its RX or POWER SPECS since I performed the mods but from the reports that I have had it would seem that it works very well.

Now after the mods are finished you have to reset the CPU in a different way to that described in the instruction manual, with the radio OFF hold down the left and right BOTTOM or fourth menu buttons and turn the radio on, it should now be reset, expanded and ready to be programmed because all memory information will be erased.

I take no responsibility for these modifications if you stuff up but if you use a good quality soldering station and are careful it is

not a hard mod to do,.....but my next project could be a different story I also own a new IC-Q7E HANDHELD and I am going to have a go at modifying it as well, if that is successful also I will post that on the NET and WW PACKET with pictures.



For those who maybe interested I use a SONY MAVICA FD71 digital camera .This information has been supplied by David Spicer, VK7ZDJ  
5a Helen Street,  
ULVERSTONE, 7315.

This modification is read 2191 times.

**23-08-1999**

### **(IC-2800) IC-2800/HM98 tx-audio mod**

*From: PA3HGT@ON6AR. #AN.BEL.EU*

When you own a ICOM 2800H with the HM98 mike , use this nice trx in the mobile like i do, receive sometimes complains about the hollow modulation and pick up too many backgroundnoise ? Then maybe this is the solution too eliminate this problem. Solder a capacitor between 10 - 47 nf paralell on the mic-element.

If you opened the HM98-mike , you can see that the audio cannot applied properly to the mike-element . To change that , you've too drill a small hole of 1mm so that the audio is applied into the center of the mic-element.

This modification is read 2312 times.

**31-10-1999**

### **(IC-2800) sensitivity ICOM IC-2800H**

Here are some sensitivitiymeasurements for the Icom IC2800H results are uV/10 db sinad.

|                   |                   |
|-------------------|-------------------|
| 136 Mc : 0.144 uV | 400 Mc : 0.174 uV |
| 140 Mc : 0.167 uV | 405 Mc : 0.163 uV |
| 144 Mc : 0.14 uV  | 410 Mc : 0.144 uV |
| 145 Mc : 0.133 uV | 415 Mc : 0.137 uV |
| 146 Mc : 0.132 uV | 420 Mc : 0.133 uV |
| 147 Mc : 0.11 uV  | 425 Mc : 0.11 uV  |
| 148 Mc : 0.109 uV | 430 Mc : 0.109 uV |
| 150 Mc : 0.114 uV | 431 Mc : 0.11 uV  |
| 155 Mc : 0.11 uV  | 432 Mc : 0.107 uV |
| 160 Mc : 0.138 uV | 433 Mc : 0.109 uV |
| 165 Mc : 0.115 uV | 434 Mc : 0.111 uV |
| 170 Mc : 0.108 uV | 435 Mc : 0.112 uV |
| 174 Mc : 0.108 uV | 436 Mc : 0.111 uV |
|                   | 437 Mc : 0.111 uV |
| -----             | 438 Mc : 0.108 uV |
| Fm narrow mode    | 439 Mc : 0.111 uV |
| used on 2mtrs     | 440 Mc : 0.133 uV |
| only on Europe &  | 441 Mc : 0.103 uV |
| Italy versions !  | 442 Mc : 0.106 uV |
| 144 Mc : 0.088 uV | 443 Mc : 0.095 uV |
| 145 Mc : 0.087 uV | 444 Mc : 0.11 uV  |
| 146 Mc : 0.087 uV | 445 Mc : 0.106 uV |
| 147 Mc : 0.085 uV | 446 Mc : 0.104 uV |
| 148 Mc : 0.085 uV | 447 Mc : 0.107 uV |
|                   | 448 Mc : 0.104 uV |
|                   | 449 Mc : 0.105 uV |
|                   | 450 Mc : 0.107 uV |
|                   | 455 Mc : 0.141 uV |
|                   | 460 Mc : 0.199 uV |
|                   | 465 Mc : 0.167 uV |
|                   | 470 Mc : 0.153 uV |
|                   | 475 Mc : 0.139 uV |
|                   | 480 Mc : 0.151 uV |
|                   | 485 Mc : 0.162 uV |
|                   | 490 Mc : 0.167 uV |
|                   | 495 Mc : 0.168 uV |
|                   | 500 Mc : 0.18 uV  |
|                   | 505 Mc : 0.175 uV |
|                   | 510 Mc : 0.199 uV |
|                   | 515 Mc : 0.225 uV |
|                   | 520 Mc : 0.282 uV |
|                   | 525 Mc : 0.352 uV |
|                   | 530 Mc : 0.485 uV |

This modification is read 2314 times.



**02-04-2000**

## **(IC-2800) IC-2800H cross band mode operation**

**Author:** Colin G1IVG - [colinlowe@jet.es](mailto:colinlowe@jet.es). [MODIFICATION.NET](http://MODIFICATION.NET)

### Step #1:

Prior to the cross band mode, set the squelch delay to short or the audio for the first 3 seconds will be chopped off in your next transmission. (Use the set-up menu shown in the manual).

### Step #2:

To start the cross band mode, set the VHF and UHF frequencies you like to link together for cross band operation, (program the splits, PL tone, etc. all in advance)

### Step #3: (Main Step)

Press and hold "CHG/L" button while holding both VHF and UHF "MAIN" buttons simultaneously for few seconds until the blinking key icon appears.

### Step #4: (This is an optional step)

Set hang up time to ZERO on cross band repeat mode by pressing and holding "CHG/L" button while holding UHF "MAIN" and bottom menu key at VHF side for few seconds. The Key lock indicator will blink, and the unit is ready to operate. (This is a direct translation from the Japanese manual. You may omit this step or experiment with it.)

### Step #5:

To disable the cross band, repeat the step #3 above until the blinking KEY icon disappears.

This modification is read 2638 times.

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**27-01-2001**

## **(IC-2800) DTMF options card**

**Author:** 73 de SMOXKO Peter

If you have ICOM IC-2800 + options DTMF card ( CT-91 ) (in sweden UT-49) you can make changes from other radios through DTMF tones.

First!

Push [DTMF] twice on the radio and it´s light (REMO) in the display.

To make changes press

Open = B code # default code = 000

1 = Call channel

2 = Memory

3 = VFO

6 = High transmit power

9 = Low transmit power

\* = step down

# = step up

A = Escape

D = Clear only in mode 2 or 3. After that you can enter memory channel number or VFO Mhz

DB\* = Log out / Cross band repeater ON

B\* = Log out / Cross band repeater OFF

Good luck! / 73 de SMOXKO Peter

**20-10-2001**

### **(IC-2800) Screen saver Turn OFF option for IC-2800**

**Author:** Chuck Lynn - [stang@tds.net](mailto:stang@tds.net).[MODIFICATION.NET](#)

When the unit is turned off, simultaneously depress the "CHANG/L" key and the "POWER" key. Both located on the bottom corners of the control head.

Screen saver mode will be suspended.

To reactivate screen saver mode repeat the above step.

73  
KG4FKU  
Chuck

**13-01-2002**

### **(IC-2800) Cross Band Repeat for IC-2800**

**Author:** KC5VCF - [KC5VCF@hotmail.com](mailto:KC5VCF@hotmail.com).[MODIFICATION.NET](#)

To cross band repeat with the IC2800

Hold down simultaneously CHG/L and both MAIN/EDIT buttons.

**17-02-2002**

### **(IC-2800) Enable crossband function for IC-2800**

**Author:** - [helmut.knaak@t-online.de](mailto:helmut.knaak@t-online.de).[MODIFICATION.NET](#)

Unsolder or cut D 60 (near W 13)

Press "Main UHF, Main VHF, Chg/L"

For 2 seconds, crossband will be enabled...

**19-07-1998**

### **(IC-281) Crossband repeat**

To enable crossband repeat press and hold the BAND key and the SET key for about a second, a flashing L will appear in the lower right. To turn off hold the SET key.

Unfortunately code squelch does not seem to work when crossband repeat is enabled. Don't know about tone squelch.

19-07-1998

## (IC-281) Extended Receive for IC-281

To enable extended receive a jumper has to be removed. To enable extended transmit a diode has to be removed. I have only tested the extended receive which gives you from 118-174.995 and 320-479.995.

Open the case by removing all the screws on the top, bottom and left/right sides and separating the top and bottom covers from the chassis.

Next remove the plastic front panel that covers the logic circuit board by removing the two top and two bottom screws that attach it to the chassis.

Next remove the front panel logic board by taking out the four front screws that attach it to the chassis.

Position the logic board so that the side normally near the chassis is on top and a round flat battery attached via leads is visible with the connector near the bottom and the cut out at the bottom right.

Below the battery on the lower right there are a number of diodes, most likely surfaced mounted. Look just to the left of the diodes, there will be a very small surface mount jumper at the bottom (-#WW#- on diagram below). There is no silk screen on the board to identify it (on mine at least) but the part itself may have a zero printed on it for zero ohms. Removing this jumper will give you extended receive capability.

Diagram (very bad but hopefully you get the idea)

```

R O U N D
B A T T E R Y

!      ! ! ! !
!      # # # #   -#D#-
        D D D D   -#D#-  -#D#
        # # # #   ! -#D#-  -#D#-
-#WW#-  ! ! ! !   -#D#-  -***-
```

This modification is read 932 times.

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19-07-1998

## (IC-281) Extended Transmit for IC-281

By removing one of the diodes in the area mentioned above extended transmit is purported to be possible. I have not verified this since I don't need this capability but it is supposed to significantly extend the transmit capability in the VHF band.

To enable extended transmit remove the diode that is most near the right hand bottom part of the board as indicated in the diagram above with -\*\*\*-.

Reassemble and reset CPU per instruction manual.

**Note:**When you reset the CPU you loose all memory and have too re-program all.

This modification is read 899 times.

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19-07-1998

## (IC-2AT) Coverage IC-2AT 140-150 MHz

If you have studied the schematic diagram for this radio, you will notice that pins 15 and 16 are not indicated on the programmable divider chip IC1 (TC9122).

By simply connecting pin 15 thru a switch to pin 1, you will be able to move the radio up in frequency by 10 MHz.

Some of these radios were sold without covering 140-150 MHz.

The modification for this extended coverage is described below:

1. Open up the radio and locate the FLEXIBLE BOARD, this connects the thumbwheel switches to the MAIN BOARD.
2. At the MAIN BOARD end of the FLEXIBLE BOARD, add a jumper at location C4. There should already be a jumper at location C2.

3. At the thumbwheel switch end of the FLEXIBLE BOARD, remove the jumper which connects C3 and COM.
4. Reassemble the radio. Coverage is now 140-150 MHZ. (MARS/CAP)

Now, if you activate the switch described above, the radio will now operate in the 150-160 MHZ range, after L3 adjustment, described below.

This modification is read 1054 times.

[top of page](#)

**19-07-1998**

## **(IC-2AT) Operation and L3 ADJUSTMENT**

1. Activate switch and dial up a known active frequency.
2. Adjust L3 until PLL locks up and radio begins receiving.  
(you need an active frequency to tell when this happens)
3. To return to 140-150 MHZ, repeat above steps with switch off.

### Notes and disclaimer

1. Drill a hole in the case of the radio so that L3 can be adjusted from outside of the radio.
2. The above information is presented for educational purposes only, and is not an endorsement of any particular practice.
3. This MOD has been in operation for 6 years with no ill effects on the radio
4. This MOD courtesy N2MOD.

This modification is read 885 times.

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**19-07-1998**

## **(IC-2GAT) Out-of-band transmit mod for IC-2GAT handheld 2M transceiver**

Back side of display board:

```

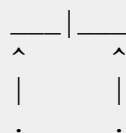
I          D507  D504          D505
I          ____  ____          ____
I          ____  ____          I____I
I          I____I I____I          --  +  --
I  D506          Q506          . . I          I
I  _o_-----          _o_          J  I          hole for
I  I____I          I          I____I          . I          on/off-vol
I  o o          I          o o          I          control
I          I          I          I____I
I          -----K-----          I
I          add diode: 1N914 or equiv.          I
I          I          I

```

Connect diode between top lead of D506 and lower right lead of Q506 as shown.

A surface mount diode may be added right of Q506 at J. note that the . \_\_\_\_ . are the same trace, while above the J is the center pole.o

Note that this diode is 1906-0336, "-" at bottom, both "+" at top.



### Notes:

D506 may be absent. If not, remove it.

Reset CPU if needed.

A friend did this and his IC-2GAT can now transmit 138 to 178 MHz (no RF power output measurements were made). He did no retuning, and did not have to reset the CPU. He used a tiny axial-lead glass diode, replaced its leads with wire-wrap wire, and

encased it in shrink-tube. The operation requires a super-tiny soldering iron. Observe CMOS soldering precautions: Unplug the iron and ground the tip before touching the circuit.

The 2GAT mod is really...

Remove D 504 which is originally a 1SS196 and replace it with a 1SS184 which is a dual diode. The service manual component symbol shows the dual diode but lists the 196.

This modification is read 982 times.

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**19-07-1998**

### **(IC-2GAT) Step mods for IC-2GAT**

To RESET the CPU (and wipe out memory), hold the LIGHT button AND the FUNCTION button while CPU is on, then turn it off, wait a second, and turn it back on. Continue holding the buttons while all the LCD segments display until "46.01" shows (about 1-2 seconds). This puts the radio into 5/10/15/20/25 khz step mode. Its starts in 15 khz steps and other steps in the list may be chosen. I wish 30 khz were in the list.

The instructions for the IC-2GE are similar except that you hold down LIGHT and the WR button on top right next to the power switch. The IC-2GAT also performs this same reset, and also enters the 12.5/25 khz step mode. The step starts at 25 khz. When it is set to 12.5 (the only other choice until you reset the CPU the first way) you can dial up frequencies like 146.0125 which shows like "46.0125" where the "25" are BOTH smaller digits. The "5" never shows in the "American mode". The display goes to "46.01" in the "American mode" and to "46.00" in the European mode.

Another curiosity is that when I RESET my CPU, I did so while it was tuned to 162.55 (weather). When I turned the power back on, EVERY segment was displayed, but the radio was actually receiving 162.55 anyway. Then when the reset finally took effect, the display went to "46.01" and the weather signal was lost. I also notice that sometimes, the "U" for synthesizer unlock (in the 10's position of the memory number) shows up just at the moment the "46.01" or "46.00" does, then ends in a second. I guess the sythesizer is being reset as well.

This modification is read 834 times.

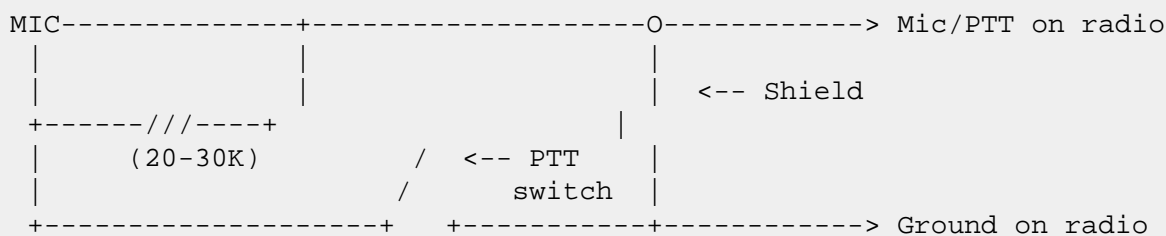
[top of page](#)

**19-07-1998**

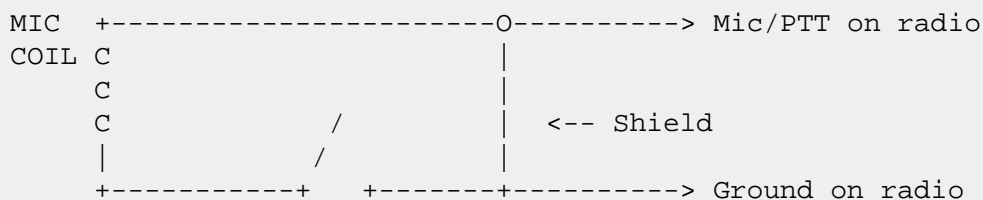
### **(IC-2GAT) IC-2GAT to packet**

For those of you who are trying to interface something to a rig which has a single two-conductor plug for both microphone input and push-to-talk connections, such as many of the handheld rigs including the Icom IC-2AT and IC-02AT, here are three circuits that may be useful to you:

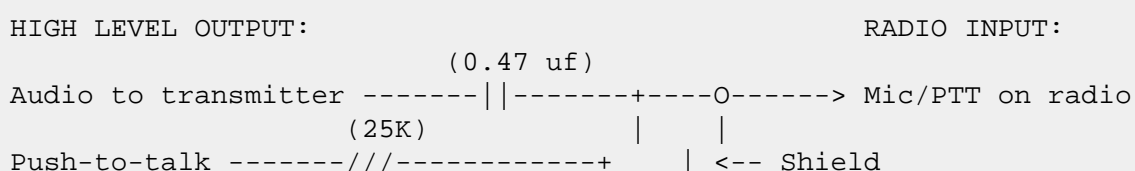
::: Electret condenser microphone to radio:  
Radio Shack #270-092 mic element?



::: Dynamic microphone to radio:

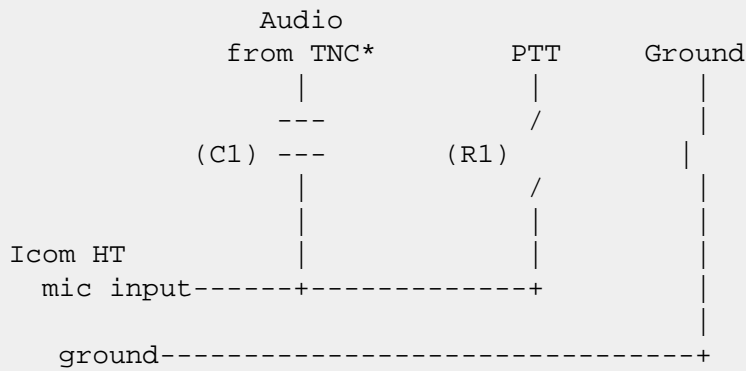


::: High-level input (such as from tape recorder, RTTY AFSK generator,  
or Packet TNC output) to radio:



Ground -----+-----> Ground on radio

I made a big mistake in the previously-posted schematic of the connection between an Icom IC-2A, 2AT, or 02AT and a packet radio TNC, RTTY afsk unit, or another microphone. The resistor and capacitor were backwards. The correct schematic follows:



C1 - 0.47 uf capacitor  
R1 - 25K resistor

\* TNC or RTTY afsk or another microphone or whatever you are interfacing to your Icom HT.

This modification is read 780 times.

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**19-07-1998**

## **(IC-2GAT) ICOM IC-A20 alkaline headset-adapter lost-in-the-soup**

*dralle@roxanne.tmc.edu (Sir Matthew G. Dralle)*

> > ...I paid \$449 + sales tax for a new IC-A20, \$26 for the ICOM  
> >alkaline battery pack, and \$50 (arrgghhh) for the headset adapter  
> >(Sigtronics, with a yoke mounted PTT switch). If you can find  
> >the aviation-standard connectors, it would be easy to fabricate  
> >a headset adaptor and save a few dollars...

> Be careful - There is a LOT more to the ICOM PTT switch than meets the eye.  
> There is no easy way to match up an external mic and the ICOM with out the  
> PTT unit from ICOM. A couple of jacks and a switch or two isn't gonna do it.  
> Icom uses a wierd wiring scheem in the mic jack so that if you were to plug  
> a mic into the Icom directly, you would have to use the PTT \*ON\* the radio. I  
> .....[ stuff deleted some where in here ]  
> can't remember the exact wiring now, but without extensive modification and  
> an additional relay \*ADDED\* to the PTT cicuit from Icom, you won't be able to  
> use your standard PTT that you got with your headphones. I hate to be a  
> downer, but those are the facts...  
>  
> Matt Dralle  
> Serious RV-4 Builder...  
> dralle@roxanne.llnl.gov

*Hi, I have been reading this news group for about 5 years now but this is my first post. Sorry if anything gets screwed up with the post.*

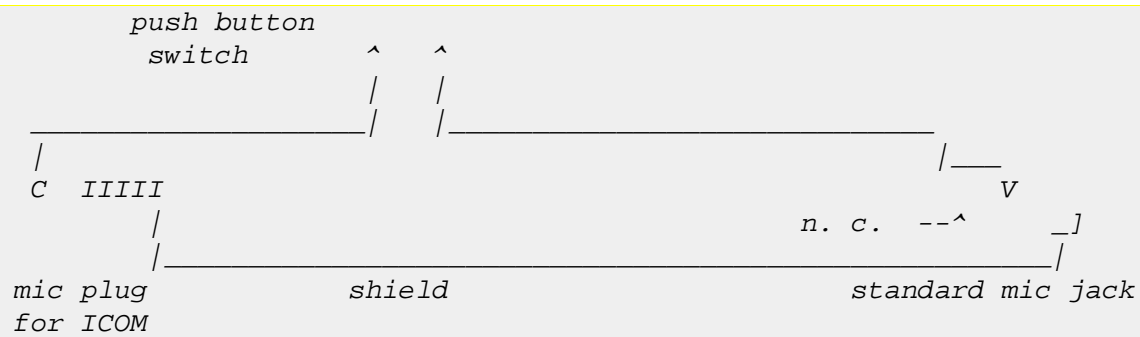
*First, I would like to say thanks to all the knowledgable people who have shared their experiences ( the list of names is to long ). Please keep up the GOOD work !!*

*As to the ICOM question of PPTs.*

*I have just finished installing an ICOM in my RANS S-10 with PTTs on the throttle with a Sigtronics intercom.*

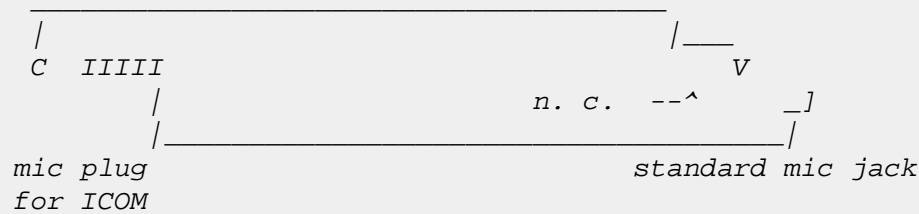
*This is how I made every thing play together. Sorry for the poor graphics.*

*ICOM mic plug tip to one side of a normally open push button switch. Other side of switch to middle ring of a standard mic jack. Carry the shield straight from the mic plug sleve to the standard mic jack sleve. Now you can plug either a headset mic or the mic plug from the Sigtronic intercom into it.*



OR

ICOM mic plug tip to the middle ring of a standard mic jack. Carry the shield straight from the mic plug sleeve to the standard mic jack sleeve. Now you can put a DC PPT in the standard mic jack and then put either a headset mic or the mic plug from the Sigtronic intercom into the PPT mic jack. NOTE that if you plug a mic or the intercom mic plug into this it will key the ICOM.



Standard aircraft radios use the tip to shield to key the transmitter, the ICOM does NOT use this method.

David Clock PPT switch switches BOTH the mic lead AND the tx key lead, I think some others do as well.

Jim Needham N201S

When I wanted to do this, I started out by making two simple straight through adapters, one for the mic and one for the phone. Then I measured all combinations trying to figure out how ICOM did thier trick. I accidently shorted the mic tip to shield and the tx LCD lit. I also plugged a mic from a headset and noticed that the tx keyed, and having another radio on the bench, heard the feedback.

ICOM mic jack, only 2 conductor  
 tip to shield, about 4 or 5 volts  
 phone jack  
 rx, audio from tip to shield  
 tx, same DC as above from tip to shield

My installation does work. In the air, on the ground, upside down B-{}### I have also talked to someone else in my plane from another ICOM and it soded good to me.

Hope you have the same good luck that I have had. Stay out of the trees.  
 Jim Needham N201S

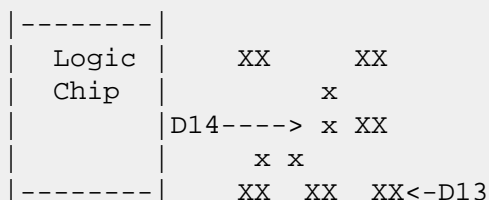
This modification is read 804 times.

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**27-03-2000**

## **(IC-2GXAT) The ICOM 2GXAT HARDWARE MOD**

1. Open the radio by following the manuals instructions.
2. On the half with the display and tone keys find the big chip (logic chip)
3. To the right of it there are some small parts that look like this:



4. Remove both d13 (rx) and d14 (tx) and close the radio back up!

5. Reset the CPU and you're done!

6. If you mess up your radio I take NO RESPONSIBILITY. You do this at your own risk.

If anything you'll break the back light as most people do... But to help not do this the transistor d14 DOES NOT LOOK LIKE d13!!!

This modification is read 757 times.

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**06-03-2002**

## **(IC-2GXAT) Software mod, to open IC-2GXAT**

**Author:** - [Happy\\_Hamer2001@yahoo.com](mailto:Happy_Hamer2001@yahoo.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This is a software mod to open up the receiver for the IC-2GXAT.

(YOU DO NOT NEED TO EVEN TAKE THE RADIO APART!)

1. Turn off the radio.
2. Press and hold the, F KEY, Scan and Dup keys.
3. While holding all 3 keys turn on the radio, continue to hold the keys for about 3 seconds WAITING until the display returns to normal before releasing the keys.

I did this to my HT and it receives from 50Mhz – 204Mhz.

This modification is read 188 times.

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**19-07-1998**

## **(IC-2IA) IC-2Ia mic mods**

Hello folks...I bought an ic-2Ia last week for use by my xyl kb8czl. I chose this particular ht for its simplicity of operation (after initial setup).

However, it didn't take long before we began receiving poor xmit audio reports. It was described as "muffled and constricted - like talking thru a garden hose".

As it turns out the design engineers at icom left no provision to get the melodious tones of your voice to the microphone except to go thru the plastic case.

After i noticed this problem, i returned the radio to my dealer and tried several others. They all sounded the same. Then the salesman called icom service-they admitted they knew of the problem and recommended a hole be drilled in front of the mic.

Heres how to do it - proceed carefully-

1. Shut off radio
2. Remove battery pack
3. Remove 4 phillips head screws from rear of case
4. Carefully pull off front of case
5. Gently remove mic element from rubber holder
6. Unscrew 4 phillips head screws retaining speaker
7. Support case on soft surface
8. Drill hole thru center of mic rubber from inside - i used 5/64 inch (2mm) drill
9. Reassemble in reverse order
10. Marvel at fb audio
11. Thats it, folks...Hope you like your new ht as much as we do...73, ART-K8CIT..

This modification is read 584 times.

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**19-07-1998**

## **(IC-2IA) IC-2IA lousey xmit audio fix**

*From: K8CIT@N8NNN. #SEMI.MI.USA.NA*

Hello folks...i bought an IC-2IA last week for use by my xyl KB8CZL. I chose this particular ht for its simplicity of operation (after initial setup). However, it didn't take long before we began receiving poor xmit audio reports. It was described as "muffled and constricted - like talking thru a garden hose"

As it turns out the design engineers at icom left no provision to get the melodious tones of your voice to the microphone except to go thru the plastic case.

After i noticed this problem, i returned the radio to my dealer and tried several others. They all sounded the same. Then the salesman called icom service-they admitted they knew of the problem and recommended a hole be drilled in front of the mic.

Heres how to do it - proceed carefully-

1. Shut off radio
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5. Gently remove mic element from rubber holder
6. Unscrew 4 phillips head screws retaining speaker
7. Support case on soft surface
8. Drill hole thru center of mic rubber from inside - i used 5/64 inch (2mm) drill
9. Reassemble in reverse order
10. Marvel at FB audio

This modification is read 560 times.

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**05-10-2000**

## **(IC-2IA) IC-2IA mod.**

*Author: D.C. - [kb0dgd@uswest.net](mailto:kb0dgd@uswest.net). [MODIFICATION.NET](http://MODIFICATION.NET)*

This quick mod to open the RX only with aircraft it also tune much more but not as good like 220mhz..

Same mod as the ic-2sat hold all buttons but (S) and turn on that's it!

I had tried it and showed Icom and the local dealer who tested it.. they where amazed!!

See ya & 73s, D C

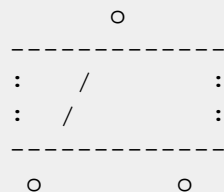
This modification is read 591 times.

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**19-07-1998**

## **(IC-2SAT) IC-2SAT out-of-band transmit mod**

- Remove the back cover as per instructions on page 34 of your manual.



- as indicated by the drawing one diode has to be added to complete the modification
- Beside the lower right corner of the Main IC, there are 3 chip resistors. Just to the right of the resistors, you can see 3 silk screened dots surrounded by a portion of a rectangle where a factory diode package would have been. The new diode (1N914 or whatever you care to use) is placed with the cathode (band) to the top dot and anode to the lower left dot.
- This completes the mod. The HT will now transmit throughout the 150-160 MHz range.

I have completed this mod and on my 2SAT and it and it works well. The components are very small and the soldering has to be precise, BE CAREFUL!!!

This modification is read 1129 times.

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**19-07-1998**

## **(IC-2SAT) Icom IC-2SAT enhancements**

A friend of mine in Germany mailed me a \*very\* intriguing photocopy of a letter he received from someone who works for Icom-Europe. It's an internal ICOM memo with details on how to do all sorts of nifty tricks with the IC-2SE (which may nicely translate to IC-2SAT tricks).

I have attempted to exactly duplicate the memo below, mangled spelling, unclear passages, and all. I don't have an IC-2SAT service manual yet, and so I'm not qualified to say if this is all really applicable or not. And, the German at the closing is a mystery. I typed "fu:r" to indicate "fr". Anyone with more details, please let us know!

Bob Cromwell KC9RG  
cromwell@ecn.purdue.edu

ps:

For the people asking "what was your original diode matrix, that appears at the end. There was some thought that the matrix programming changed after the first few (hundred? thousand?) models. This is from the schematic that came with mine, with serial number in the 9500's.

pps:

Before you ask "where's part 1", that was the article titled "Icom IC-2SAT", where I gave results of signal generator testing....

ICOM (Europe) GmbH  
Himmelgeister Strasse 100  
4000 Du:sseldorf 1  
F. R. Germany  
Phone: 0211 / 34 60 47  
Fax: 0211 / 33 36 39  
Telex: 8588082 ICOM D  
To: Icom Dealer  
Dusseldorf, 14.4.89

| ICOM                                | SERVICE                  | INFORMATION | IC-2SE               |
|-------------------------------------|--------------------------|-------------|----------------------|
| Push Key + switch on                | Requested Mode           |             | Remark               |
| LIGHT + MON                         | CPU RESET                |             | Clear all Memories   |
| LIGHT + FUNC                        | FULL DISPLAY             |             | Display Func Test    |
| -----                               |                          |             |                      |
| LIGHT + V/M                         | SIMPLE MODE              |             | Info on Equipment    |
| LIGHT + C (SCAN)                    | MULTI-FUNCTION MODE      |             | Details in Handb.    |
| -----                               |                          |             |                      |
| LIGHT + FUNC + V/M                  | RECEIVER MODE (All Band) |             | All Band - no Tx     |
| -----                               |                          |             |                      |
| 1. Start SIMPLE MODE                | TRANSCIEVER MODE/        |             | Tx only HAM-Band/    |
| 2. Light + FUNC + C                 | multi-function mode      |             | Rx see list below    |
| -----                               |                          |             |                      |
| Extent Transmitter                  | Install Diode AD (D6)    |             | Tx: 139-163 MHz (FM) |
| -----                               |                          |             |                      |
| Manual AM/FM Mode Change all Bands: |                          |             | Rx Band Ranges:      |

- |   |                    |
|---|--------------------|
| 1. Change to RECEIVER MODE (not receive mode) | 75 - 106 MHz (FM)  |
| 2. FUNC + PTT (working in RECEIVER MODE)      | 108 - 130 MHz (AM) |
|   | 138 - 169 MHz (FM) |
| Note: (+)                                     | 174 - 192 MHz (FM) |
| 1. keep pushing each key at same time,        | 204 - 243 MHz (FM) |
| 2. switch on equipment,                       | 250 - 291 MHz (FM) |
| 3. hold (about 4sec.) until "SET" appear,     | 310 - 370 MHz (FM) |
| 4. release keys and requested mode appear;    |                    |

Easily tuning step change (5 - 50 KHz):

1. push and hold FUNC key for 2sec.
2. rotate TUNING CONTROL.
3. Push FUNC to return to previous mode.

Frequency ranges are appoximately and not garantied. Receiver sensitivity garantied only in HAM-Band (144 - 146 MHz).

In RECEIVER Mode equipment running exclusively as a Receiver, cannot transmit at all.

Achtung:

nur fu:r den Fachha:ndler zum Zwecke des Service bestimmt. Es mu:ssen die Bestimmungen des Fernmelde-Anlagengesetz heachtet werden.

This modification is read 1063 times.

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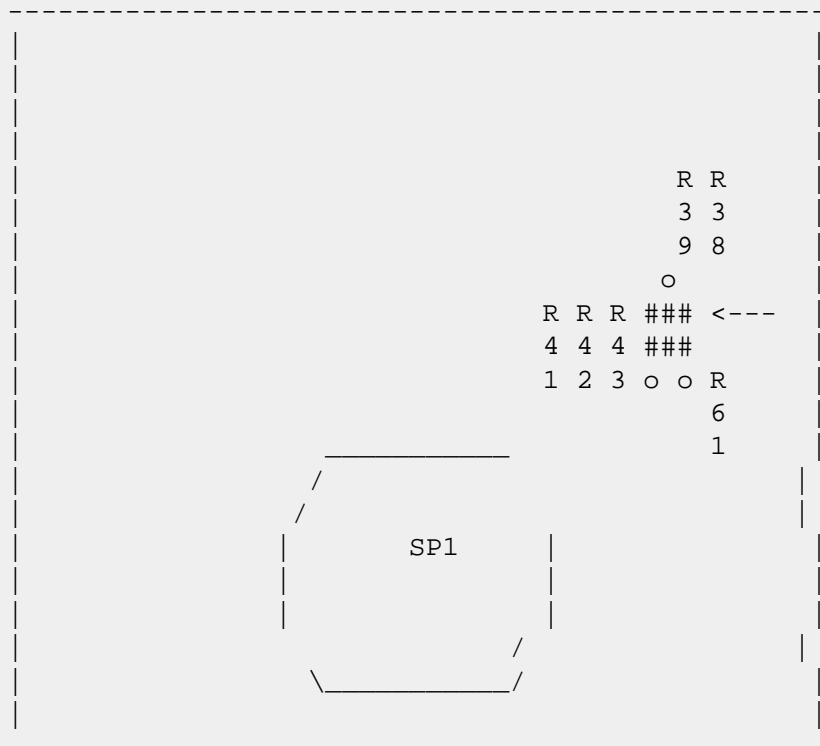
**19-07-1998**

## **(IC-2SAT) IC-2SA/E Frequency range expansion**

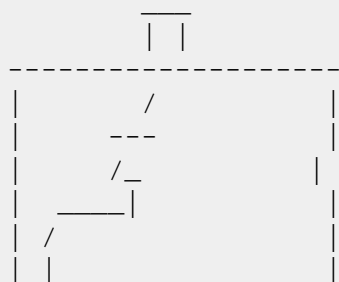
- Remove any diode position on D6
- Install diode DA (code No. 1750000160) position D6

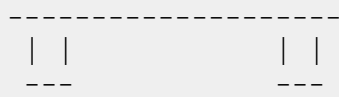
After this modification frequency lock range will be expand typicaly :

RX (MHz) : 108 - 140 (AM) , 138-169 (FM) , 310-370 (FM) ,  
TX (MHz) : 139 - 163 (FM) ,



Yeah, the above is crude, just meant to give the relative locations of the mysterious diode, SP1, R38, R39, R41, R42, R43, and R61. The 3-terminal box with an arrow drawn to it (the arrow is in the original image) looks like the below. A diode is connected from the lower left tab to the upper tab.





**diode matrix programming**

To simplify/fool-proof this, if the schematic has:

(X) ---> |--- (Y)

I'll say "from X to Y". From the "IC-2SAT IC-2SET SCHEMATIC DIAGRAM":

|                   |     |         |                         |
|-------------------|-----|---------|-------------------------|
| Japan Version     | D6: | DA115   | from KEYI2 to KEYS2     |
| Europe Version    | D5: | DA115   | from KEYI0 to KEYS3     |
|                   | D6: | DA115   | from KEYI2 to KEYS2     |
| Italy Version     | D5: | DAN202U | from KEYI1 to KEYS3 and |
|                   |     |         | from KEYI0 to KEYS3     |
|                   | D6: | DA114   | from KEYI0 to KEYS2     |
| U.S.A. Version    | D4: | DA115   | from KEYI2 to KEYS3     |
|                   | D9: | ISS254  | from KEYI1 to KEYS2     |
| Australia Version | D5: | DA114   | from KEYI1 to KEYS3     |
|                   | D6: | DA115   | from KEYI2 to KEYS2     |
| Asia Version      | D4: | DA115   | from KEYI2 to KEYS3     |

Now, can anyone use this to figure out the Icom-Europe memo???

Bob KC9RG  
cromwell@ecn.purdue.edu

This modification is read 1054 times.

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**19-07-1998**

**(IC-2SAT) Icom IC-2SAT unpublished Specifications**

I have access to some test equipment at work and did some studies on this little marvel of a transceiver. Here are some of my studies I have found so far:

**12 dB SINAD Receiver Sensitivity:**

| Frequency:                  | µV                        | dBm  |
|-----------------------------|---------------------------|------|
| 80.00 MHz                   | 217                       | -60  |
| 90.00 MHz                   | 64                        | -70  |
| 100.0 MHz                   | 18                        | -82  |
| 110.0 MHz                   | 2                         | -101 |
| 140.0 MHz                   | .185                      | -122 |
| 150.0 MHz                   | .16                       | -123 |
| 160.0 MHz                   | .3                        | -117 |
| 170.0 MHz                   | .9                        | -108 |
| 180.0 MHz                   | 17                        | -82  |
| 190.0 MHz                   | 74                        | -74  |
| 191.61MHz                   | --- vfo goes unlocked --- |      |
| 210.0 MHz                   | 590                       | -50  |
| 220.0 MHz                   | 590                       | -50  |
| 230.0 MHz                   | 2000                      | -40  |
| 250.0 MHz                   | 173                       | -62  |
| 260.0 MHz                   | 340                       | -56  |
| 270.0 MHz                   | 27                        | -78  |
| 280.0 MHz                   | 4                         | -94  |
| 290.0 MHz                   | .7                        | -110 |
| 300.0 MHz                   | .38                       | -115 |
| 310.0 MHz                   | .5                        | -113 |
| 320.0 MHz                   | .275                      | -118 |
| 330.0 MHz                   | .23                       | -120 |
| 340.0 MHz                   | .23                       | -120 |
| 350.0 MHz                   | .32                       | -117 |
| 360.0 MHz                   | .4                        | -115 |
| 365.0 MHz                   | .72                       | -110 |
| -----vfo goes unlocked----- |                           |      |

**Transmit Power:** Voltage input at Coaxial plug on top of radio versus Power output

|       |      |
|-------|------|
| 15.0V | 5.3W |
| 14.0V | 5.2W |

|       |       |
|-------|-------|
| 13.0V | 5.0W  |
| 12.0V | 5.0W  |
| 11.0V | 5.0W  |
| 10.0V | 4.5W  |
| 9.0V  | 3.75W |
| 8.0V  | 3.0W  |
| 7.0V  | 2.3W  |

Internal Battery Pack (7.2V):

|            |        |       |
|------------|--------|-------|
| HI power   | - 2.5W | 0.9A  |
| LO power 3 | - 2.5W | 0.9A  |
| LO power 2 | - 1.3W | 0.68A |
| LO power 1 | - .4W  | 0.43A |

13.8V input via Coaxial Plug on top of radio:

|             |        |      |
|-------------|--------|------|
| HI Power    | - 5W   | 1.3A |
| LOW power 3 | - 3W   | 1.0A |
| LOW power 2 | - 1.4W | .76A |
| LOW power 1 | - 0.4W | .5A  |

This modification is read 1029 times.

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**19-07-1998**

## **(IC-2SAT) Software coverage mods, IC-2SAT**

*From: kraft@perdita.gac.edu (Steven Kraft)*

Modifying the IC2SAT for extended receive is very simple if a certain diode was not installed at the factory, as was the case with my 2SAT.

Turn the radio off, simultaneously press [#],[B],[light] and turn it on. (The button is not labeled, it is on the side under the wrist strap.) Release those three buttons after the radio beeps. (I think that mine beeped.)

It can now receive over three large frequency ranges and will receive AM aircraft band transmissions acceptably. Experiment to find which frequencies you can get. The memory channel number will display the letter "U" to show that the PLL circuit is unlocked on frequencies that cannot be received. It will tune from 0-1300MHz but the operable ranges are not that big, its highest receiving freq is a little over 300MHz.

If that doesn't work, a diode will have to be removed. It is a glass diode mounted on the PTT switch circuit board, and I think it is the only standard component in that area. It is mostly surface mount components.

Standard disclaimers apply, since I cannot be responsible for whatever you may do if and when you must remove the front to look for a diode. (The owner's manual explains how to open the 2SAT.)

Steven Kraft KRAFT@GAC.EDU KE9RW to other hams

This modification is read 1013 times.

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**23-01-1999**

## **(IC-2SE) Additional functions of the ICOM IC-2SE**

'LIGHT' + '1' + switch on frequency input by keyboard requires only MHz and following digits (example : for 145.500,only "4500" has to be entered)

'LIGHT' + '2' + switch on frequency input by keyboard requires also the 10MHz digit (example : for 145.500, "45500" has to be entered)

'LIGHT' + '2' + switch on full frequency has to be entered (example : for 145500, "145500" has to be entered) 'LIGHT' + 'D' + switch on Display test

Receiver covers approx. 75 to 370MHz. Frequency can be entered from 0 to 1310MHz. Normal sensitivity can only be expected between 110 and 180MHz.

Between 108 and 130MHz, AM can be received. So far no method has been found to switch AM/FM manually. Broadband FM for broadcast stations between 87 and 108MHz is not possible (sensitivity is very low in this range).

This modification is read 787 times.

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23-01-1999

## (IC-2SE) Extended Icom IC-2SE functions

'LIGHT+FUNC' & SWITCH ON: Display test

'LIGHT+FUNC+V/M & SWITCH ON: Extended frequency range, 0 - 1310MHz, enters multi function mode with new PT status 'bA' for receive only, see PTT function table below for detailed operation. Tuning steps above 204MHz only 12.5KHz or 25KHz (channel number indicator changes from U to last ch. no.??)

'LIGHT+FUNC+C' & SWITCH ON: Changes PT from 'bA' to 'P' and enters multi function mode.

### PTT function table

| PT status       | P              | PL              | bA           |
|-----------------|----------------|-----------------|--------------|
| Simple Mode:    |                |                 |              |
| ~~~~~           |                |                 |              |
|                 | (- TX, 144-146 | TX, 144-146 (*) | TX, 144-146  |
| P - selects - ( | 'o.FF' other   | 'o.FF' other    | 'o.FF' other |
|                 | (- ---         | ---             | ---          |
| F&P - selects   | pwr            | low beep@       | pwr          |
| Multi Mode:     |                |                 |              |
| ~~~~~           |                |                 |              |
|                 | (- TX, 144-146 | low beep,       | high beep,   |
| P - selects - ( |                | frequency       | 100MHz steps |
|                 | (- ---         |                 |              |
| F&P - selects   | pwr            | low beep        | AM/FM toggle |

### Notes:

P stands for pushing the PTT switch, table shows in 2nd row also the result of simultaneous rotation of the tuning control, --- = no reaction.

F&P stands for pushing FUNC,PTT; pwr stands for low/high toggle and for stepping by tuning control, ref. to Instruction Manual.

- PT status selection via SET/PRIVATE mode, ref. to Instruction Manual.

- PT status 'bA's only available for extended frequency range (after execution of 'LIGHT+FUNC+V/M' & SWITCH ON), memory contents remain unchanged (approx. working range of ext. band is 75...365MHz).

- Amateur frequency range can only be recovered by 'RESET', => 'LIGHT+MON' & SWITCH ON, all memory contents will be lost!

(\*) THIS OPERATION IS NOT IN ACCORDANCE WITH INSTRUCTION MANUAL, P. 30 - PL SHOULD LOCK PTT (TX DISABLED) ALSO IN SILE MODE!

Information was gleaned from many sources including DL8AAR, PA3FDA

This modification is read 760 times.

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23-01-1999

## (IC-2SE) Extending the Rx. coverage of the IC-2SE and IC-4SE

It is possible to extend the receiver coverage of both of the above radios without removing the covers!

With the radio turned off, but beep enabled, hold down LAMP, FUNC and V/M buttons while simultaneously turning on the radio. Keep all 3 buttons pressed. The display will fill up with all sections on, then there will be a beep, a longish gap and another beep. Once the second beep is over, release the buttons.

Lo and behold, you now have coverage of any freq from 0 to 1300 MHz, except, of course, that the VCO cannot cover the entire range. For example, the 4SE will cover approximately 380 to 480Mhz plus 805 to about 930MHz.

Information originated from G8SEZ

**19-07-1998****(IC-2SRA) Extended Receive, Extended TX (136-174 MHZ)**

The IC-2SRA appears to be very similar to the IC-W2A, with a Wideband Receiver unit replacing the UHF RF unit. Not having an IC-W2A or the service manual for it, I can't be sure. This mod is very much like the IC-W2A mod by AA7BQ, which I used as a starting point.

Extended Receive

Right out of the box, the IC-2SRA Ham Band will tune 136-174 MHZ, and transmit 140-150 MHZ. Although the Receiver Band will tune 25-950 MHZ, sensitivity is better on the Ham Band side. Direct entry of frequencies outside of the amateur band is not as convenient as it could be. But there is an undocumented (by Icom) feature which makes it easier.

Enable extended receive by holding down the 3, B, and # keys while turning on the power. Keep your fingers on the B and # keys for a minute, and you can see the full LCD function display. Besides what is normally seen, there are also VOX, TOT, RIT, and VXO displays. Makes one wonder if there are additional undocumented features? I haven't a clue! There are other key combinations which will do the same thing.

With this done, the dial select step can be set to 10 MHZ, and the first digit for frequency input can be selected as 100 MHZ in SET mode. The display will now go from 50-500 MHZ, but don't think that you can receive in that range. You can believe signals in the 136-174 MHZ range, but outside of that you are most probably hearing images.

Extended Transmit

This is the fun part. The radio is designed to allow a wide range of applications, meeting amateur band requirements all over the world.

This is accomplished with a diode matrix on the Logic unit. For the US, this involves diodes between lines D2 and 10 (D16), and between lines D3 and 11 (D22), on the Main CPU (IC2). To open up the full 136-174 MHZ range for transmit, diode D22 is removed, and diode D19 is installed between IC2 lines D0 and 11. The diodes are very small three legged surface mount components. Icom doesn't publish any information on the CPU logic (that I know of), so I'm not sure just why any of this works. But it does work!

Start by ordering one MA133 diode, order number 1790000860, from Icom America customer service in Bellevue, WA, at (206) 454-7619. Don't bother trying to order through one of the regional service centers, as they normally just forward part orders back to the corporate headquarters anyway. Cost in March 92 was \$2.43, plus \$1.75 handling.

I don't know if they have a minimum; I ordered four diodes which brought the Visa charge to a little over \$10.00.

When the diode arrives, it's time to open up your radio. You need a set of small Phillips head screwdrivers which can be found at any Radio Shack. Remove the five screws on the back, and two smaller screws on the side of the case under the PTT switch. Don't worry about the screw for the handstrap, it is screwed into the metal back and comes off with the back. With the screws removed, the back is easily lifted off. This much is shown pretty well on page 57 of the instruction manual where it talks about installation of the UT-63 (which is already installed in the US version of the IC-2SRA). Now remove the UT-63, and the PTT rubber.

In front of you is the Receiver unit, stacked on top of the VHF RF unit, which is on top of the Logic unit. That is where we need to end up, so start disassembling. The Receiver unit is held to the VHF RF unit by a small screw on each side. You won't have any trouble figuring out which ones they are. There is also a small screw at the bottom of the Receiver unit, which fastens a spring clip holding the two units together. Remove the screws, and keep track of them. Both units are then individually removed by gently unplugging them from the Connector unit with a down and out movement. At this point you should be impressed by the well thought out design of the radio, and the ease with which it can be taken apart. In front of you now is the Logic unit, but there is a plastic encased metal foil, the CPU shield, still in the way.

This shield is under the wiring harness between the Logic unit and the Connector unit. It isn't attached to anything, and can be gently curled and slipped out to the right.

Here's kind of what you'll see under the CPU shield:

```

                IC1                IC2
    -----                -----
    Time Clock Crystal -> X3          D16
    -----                -----
    Periods "." -> .not used
    represent          .          -----
    solder pads          .          X4  <- Tone Clock Crystal
                D22  -----
    .
    .
    D19
    .
  
```

not used

Now the fun really begins! The diode that you received in the mail, and the one that you have to remove, are very small. They are also quite rugged, so don't let the size intimidate you. You do need to be clever about it though, and there is certainly more than one right way to go about it. You need a magnifying glass of some sort, and a fine tipped soldering iron. I wrapped a piece of solid No. 12 copper wire tightly around the tip of my 25 watt Weller. I brought a one inch lead straight out from the tip, and filed the end smooth. Ready for pin point soldering, start by removing diode D22. I put a knife blade under one end and applied light pressure while touching my No. 12 tip to the diode lead closest to the knife. Then the next lead, and the last one.

Pops right off with no problem. You're not going to reuse it (unless restoring to original configuration), so it doesn't matter if it does get dinged up a bit. With D22 out, all that's left is installing D19.

I used a pair of tweezers to place the diode in position, with the three leads sitting on top of the little blobs of solder already on the board.

Then gently holding the diode in place with a toothpick, I tacked each lead in place. Don't add any solder, there's enough on the board already to do the job. After one lead is tacked down, the diode will stay in place without the toothpick. As I said, there are other ways to go about installing this very tiny diode (actually there are two diodes in the little chip), so do what makes you comfortable. Or find a friend with a steadier hand to do it for you!

Now you just put it all back together again, starting with the CPU shield. If you have trouble sliding it into place, you might be trying to put it between the wiring harness and it's plastic backing.

After the extended transmit mod the CPU resets itself (at least it did for me), but now you have the same features provided by the extended receive mod, without having to repeat the mod. You also can transmit 136-174 MHZ. As to be expected with a unit designed with 145 MHZ as the center frequency, performance varies. At 145 MHZ my handheld put out 7 watts into a dummy load. It does that throughout the 2 meter amateur band. At the ends of the "designed" transmit range, 140 and 150 MHZ, the power is down to 6.8 watts. Dropping down from 140 to 136 MHZ, the power is down to 6.2 watts. Going up from 150 MHZ, I got readings of 5.75 at 155, 4.25 at 160, 3.2 at 165, 2.2 at 170, and 1.75 watts at 174 MHZ. These readings are with a Radio Shack meter, so your mileage may vary. Nevertheless, a remarkable radio!

Enjoy, and please don't transmit on frequencies you're not licensed for!

Tim KA3YYP TPDugan@dockmaster.ncsc.mil

This modification is read 536 times.

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**19-07-1998**

### **(IC-3) Low audio speaker mike on IC2A, 3A, 4A OR O2AT**

If you own one of the IC2A, 3A, or O2AT series Hand-helds, you may be interested in reading on. I know my hearing is pretty good, but have you ever tried to listen to the audio coming out of your speaker mike on the above ICOM's? For the most part, it's pretty low. I may be the last guy to figure out a cure for this, but here it is anyway. On the O2AT, etc., there is a groove on the back near the top of the rig that is just the right size to accept the HM9 speaker mike turned 90 degrees so that the mike plug fits in that groove in the rear of the rig. Thus allowing all the audio to be heard from the internal speaker of the rig, usually much better than the speaker mike.

Now, in the case of the 2A series, etc., the fix is more complex. These rigs don't have that handy groove built in, so I decided a groove had to be made to accept this configuration. I thought long and hard about a minute, before getting the "Dremel" out and making my own slot or groove. It works well on both hand-helds I have. In fact, you can hook up an external speaker for even more loudness in the auto. So, give it a try or see me for a demo.

This modification is read 367 times.

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**19-07-1998**

### **(IC-32) Out of band mod for the IC-32AT**

This mod allows the unit to RX-TX outside both ham bands, plus function as a crossband repeater! BE CAREFUL THAT YOU DON'T INADVERTENTLY TRANSMIT!

#### DISASSEMBLY

1. Remove the battery.
2. Loosen but do not remove the two screws holding the PTT switch plate.
3. Remove the 4 screws on the back of the radio.
4. Now remove the front of the HT by carefully lifting the bottom edge and then pulling it down so it clears the top of the HT. Be carefull as there is a ribbon cable attached.
5. Unplug the Speaker/Mic plug from the main chassis to allow the front conever to be fully opened.



**MODIFICATION (Refer to figure 1.)**

1. Remove D907
2. Remove D913.
3. Move D912 down to next pad. (D???, bottom location)
4. Add diodes Da and Db (1N914 or Equiv.).

**VCO ADJUSTMENT**

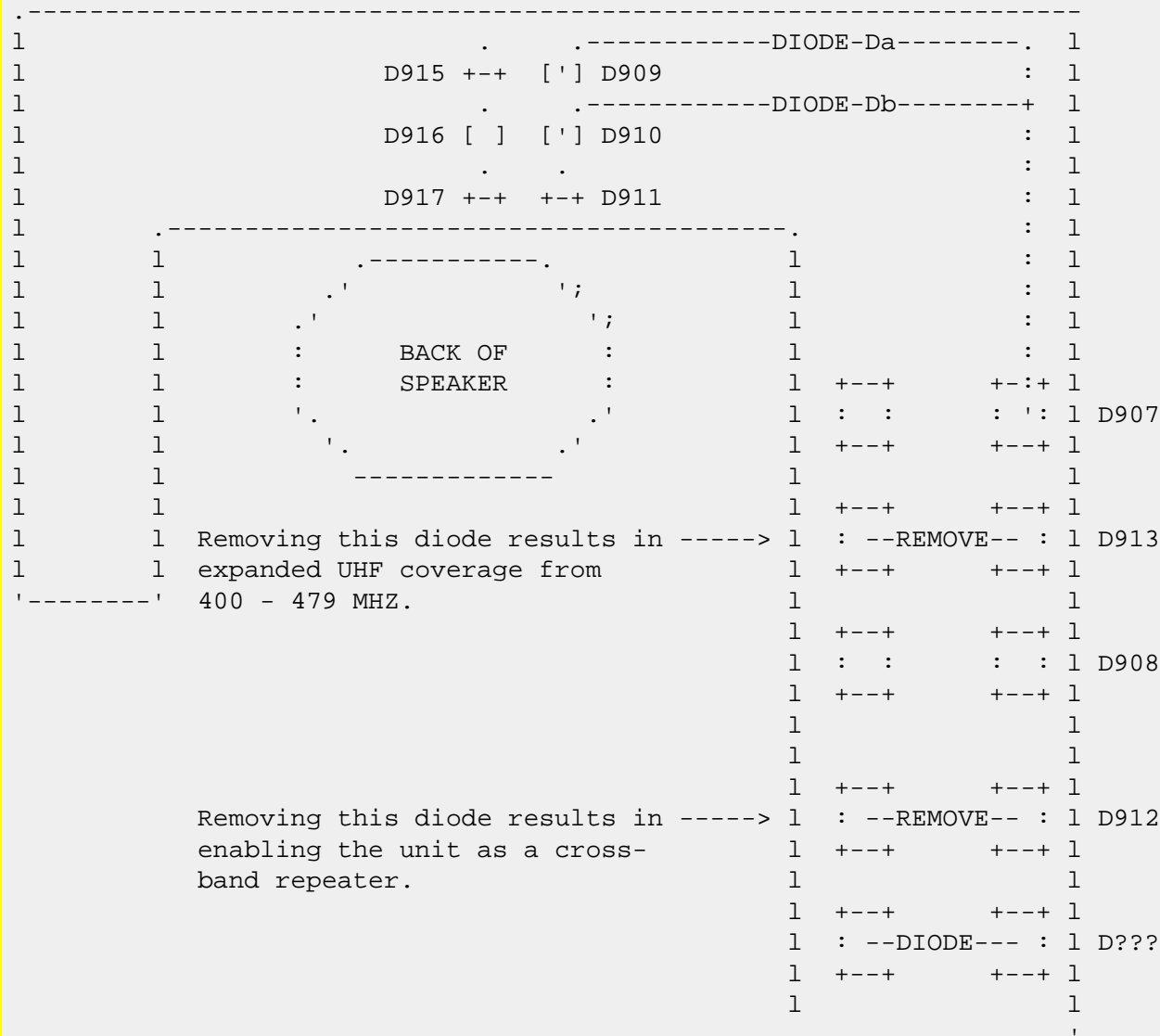
1. Unplug and remove the PTT/FUNCTION circuit board and lay it aside.
2. Remove the top circuit board by removing the screws located in each corner of the board. These are the ones that are recessed and not the ones on top of the board.
3. Carefully pry up the circuit board until it can be folded out. Plug in the PTT/Function button circuit board cable.
4. Hook up the battery and reset the CPU by holding down the "Function" and "A" buttons and cycling power off and on.
5. On the bottom circuit board are located the two VCO's (refer to figure 2). The left hand VCO is for VHF and the right hand VCO is for UHF. Located just to the left of the UHF VCO is a resistor standing on end. Hook the V. O. M. positive lead to the top of this resistor. The negative lead goes to ground.
6. Under aluminum tape on each VCO is the adjustment point. Normally, the VHF VCO will not require adjustment. The VHF adjustment is L554, the UHF adjustment is C510. Adjust the desired VCO for a +.5vdc reading for the lowest frequency you wish to tune on that band. Don't forget to retape the holes on the VCO's.
7. Disconnect the battery and carefully reassemble the radio. **DON'T PINCH ANY WIRES!**

**CROSSBAND REPEATER COMMANDS**

1. Enter one VHF and one UHF frequency into each VFO. (Offsets won't work.)
2. To enable crossband repeater, hold down "FUNCTION" button and key in, [C] [6] [D]. Then release "FUNCTION" button.
3. To disable crossband repeater, wait until handheld is in receive only and then hold down "FUNCTION" button and key in, [D] [C]. Then release "FUNCTION" button.

\*\*\* Once handheld retransmits a signal from opposite band you cannot disable crossband function until squelch closes and handheld quits transmitting! \*\*\*

**Figure 1**



**FIGURE 2**

```

-----
1          .----- .          1
1          :         :          1
1          :         :          1
1          : PA CHIP :          1
1          :         :          1
1          :         :          1
1          :         :          1
1          '-----'          1
1 .----- Attach V.O.M. .----- 1
1 :         : meter lead --> O :         : 1
1 : ( ) :         : ( ) : 1
1 :         :         :         : 1
1 :         :         :         : 1
1 '-----'          '-----' 1
1 VHF VCO          UHF VCO 1
-----

```

Bottom

This modification is read 987 times.

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**19-07-1998**

### **(IC-32) IC-32E auf 9k6**

Hallo, habe mein IC 32E erfolgreich umgebaut auf 9600BD.

NF Ausgang vom IC 32E zum TNC an MAIN UNIT an IC707 TK1042M Pin 11.

NF Eingang vom TNC zum IC 32E andie Leitung R779 nach R781 Signale UMOD VMOD.

PTT an Stecker J710 Signal PTT.

Fragen ueber Box DB0IZ oder Digi DB0END in 1200BD oder 0202/521349.

Sowie ueber DB0IZ-9 in 9600BD

73 55 Joerg aus Wuppertal DD8JM.

PS: UMOD VMOD sind auch auf MAIN UNIT.

This modification is read 786 times.

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**19-07-1998**

### **(IC-32) IC-32AT Elimination of possible faint pulse noise**

Model: IC-32AT

Division: Amateur

Note: This service bulletin is meant for technical personnel with experience working on solid state communications equipment. Damage caused by improperly installing this modification may cause ICOM to charge for subsequent repairs to the product. ICOM does not warrant this modification.

Bulletin #: 13889-004

Date: May 1, 1989

Subject: Elimination of possible faint pulse noise from speaker when radio is in power save mode

Information: The power save mode employs a circuit which creates a high level square wave signal used in the power save function. This modification alters the square wave characteristic to eliminate the noise.

## Procedure

1. Remove the covers from the radio and locate the main board.
2. Locate C-749 and replace it with a 2.2 uf 16 V tantalum chip capacitor.
3. Reassemble the radio, power up and allow the unit to enter the power save mode.
4. Check to see that the pulse type noise has been eliminated.
5. Replace the covers and return the radio to service.

This modification is read 769 times.

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**19-07-1998**

## **(IC-32) Undocumented features of the ICOM IC-32AT**

After having opened the transmit and receive on the Icom IC-32AT, I discovered that I have some other advantages. I am not sure if these will work on an unmodified IC-32AT, but it's worth a try (It doesn't involve opening the radio). Everything is done from the keypad.

### **Self test of system and display**

With the radio turned off, press the FUNCTION key and the digit 2 on the keypad at the same time. While holding these on, turn the radio on. The beep should sound (if enabled) and a full display of all characters should appear on the LCD display. When the self test is complete, the beep will sound and normal operation may be started.

After having opened the transmit and receive on the Icom IC-32AT, I discovered that I have some other advantages. I am not sure if these will work on an unmodified IC-32AT, but it's worth a try (It doesn't involve opening the radio). Everything is done from the keypad.

### **European 430 operation** (if expanded frequency coverage has been done)

As above, with the radio turned off, press and hold the FUNCTION key and the digit 6 and turn the radio on. The UHF portion of the radio will now operate as described in the owners manual for the European version of the IC-32 (except for the tones...). Beware, doing this wipes out the UHF memories and requires that they be reprogrammed. The only way to get the unit back to the USA mode is to do a reset (see owners manual).

After having opened the transmit and receive on the Icom IC-32AT, I discovered that I have some other advantages. I am not sure if these will work on an unmodified IC-32AT, but it's worth a try (It doesn't involve opening the radio). Everything is done from the keypad.

### **European 144 operation**

As above, with the radio turned off, press and hold the FUNCTION key and the digit # and turn on the radio. The VHF portion of the radio will now operate as described in the owners manual for the European version of the IC-32 (except for the tones...) See the caution in the above UHF step as it applies to the VHF in this case.

**Date:** 13-02-2000

**User comment**

**From:** [Geoffrey Dann](#)

**Subject:** More undocumented features

To change the UHF section to North American (5,10,15,20,25 khz steps):  
Power off. Hold Function and 3, turn power on.

To change the VHF section to North American (5,10,15,20,25 khz steps):  
Power off. Hold Function and 9, turn power on.

To change the UHF section to European (12.5 or 25 khz steps):  
Power off. Hold Function and 6 turn power on.

To change the VHF section to European (12.5 or 25 khz steps):  
Power off. Hold Function and #, turn power on.

This modification is read 919 times.

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**19-07-1998**

## **(IC-32) Cross-band repeater (Icom)**

Icom Service Bulletin #13889-005

The IC-32AT has the capability of being used as a cross-band repeater. This function is not enabled as the unit is shipped from the factory.

To enable this function perform the following steps:

1. Cut D912 on LOGIC UNIT. (see above figure)
2. Push and hold the (FUNCTION) switch.
3. Push the (C) key.
4. Push the (6) key.
5. Push the (D) key.
6. Release the (FUNCTION) switch.

To cancel "MINI REPEATER" perform the following steps:

1. Push and hold the (FUNCTION) switch.
2. Push the (D) key.
3. Push the (C) key.
4. Release the (FUNCTION) switch.

This modification is read 837 times.

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**19-07-1998**

## **(IC-32) Receive coverage for VHF & UHF and enable keyboard entry**

1. Remove battery and antenna.
2. Loosen two screws on top of unit as much as possible without removing them.
3. Loosen 4 flat head screws on bottom of unit 1 turn.
4. Loosen 2 screws near PTT switch 1 turn.
5. Remove 4 black screws on back of unit.
6. Lift bottom of front cover .25 inch, slide it down .25 inch, then lift front cover up 1 inch.
7. Disconnect plug on 4 wires coming from the speaker.
8. Lay front panel on table up-side down being careful of the flex circuit.
9. All mods are done to the back of the front panel. Notice places for 5 axial diodes, which I will call 1 through 5, 1 being nearest the display. Add/remove diodes so there are diodes in positions 3 and 5. This will open up receive coverage for VHF & UHF and enable keyboard entry of the 10 MHz digit.
10. Notice 4 surface mount resistors slightly left of center directly above the speaker, lined up in a row. Solder the anode (the side without the bar) of two diodes to the right side of the lower of the four caps. Now find the CPU. It's the PGA under the shield near the top of the board. Find the row of pins on the CPU nearest the speaker. Notice the the 8th pin from the right has a thicker trace coming from it. Now notice that there are small solder pads about .25 inch toward the speaker on both the fat trace and the two traces to the right of it. Solder one each of the cathodes of the 2 diodes to the solder pads on the two smaller traces.  
This will open up the transmit for VHF & UHF.
11. Put unit back together in reverse order.

This procedure worked for my unit (and many others), but I can't guarantee it will work for yours.

Bill Pherigo  
WROY

This modification is read 868 times.

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**19-07-1998**

## **(IC-3200) Fix for IC-3200A used on packet**

For those poor souls who are trying to use the ic-3200a on packet here is here is some relief.

The problem is that when going from transmit to receive there is a delay in the receive audio turn on, which is on the order of 500 milliseconds and may be too long for some packet situations unless everyone had their txdelay set to 750 milliseconds.

There are two ways to resolve the problem. Both are fairley simple. the easiest way is to remove the muting on the audio P.A. I.C.

The instructions follow:

1. Remove the cover that has the speaker attached to it (being careful of the wires)
2. With T2. with the front of the radio facing you, look for the audio P.A. I.C. In audio P.A. I.C. in the right rear part of the radio next to the chassis it is marked "upc2002", looks like a to-220 case transistor, and has five leads on it
3. Immediately to the left of the "upc2002" is a diode standing on end, and marked "D19" on the circuit board this is the diode that mutes the audio P.A. I.C. during transmit
4. Cut one leg of "D19" and the audio P.A. I.C. will no longer be muted during transm ithis is all that is required and my tests have

Shown that the ic-3200a will work with other tnc's with txdelay's set as short as 150 milliseconds where before this modification a txdelay of about 600 milliseconds was required of the station trying to communicate to the IC-3200A.

This modification is read 665 times.

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**19-07-1998**

## **(IC-3200) IC-3200A TX to RX delay fix**

For those poor souls who are trying to use the ic-3200a on packet here is here is some relief.

The problem is that when going from transmit to receive there is a delay in the receive audio turn on, which is on the order of 500 milliseconds and may be too long for some packet situations unless everyone had their txdelay set to 750 milliseconds.

There are two ways to resolve the problem. both are fairley simple. the easiest way is to remove the muting on the audio P.A. I.C.

The instructions follow:

1. Remove the cover that has the speaker attached to it (being careful of the wires)
2. With the front of the radio facing you, look for the audio P.A. I.C. In the right rear part of the radio next to the chassis it is marked "UPC2002", looks like a TO-220 case transistor, and has five leads on it
3. Immediately to the left of the "UPC2002" is a diode standing on end, and marked "D19" on the circuit board this is the diode that mutes the audio P.A. I.C. during transmit
4. Cut one leg of "D19" and the audio P.A. I.C. will no longer be muted during transmit and the receiver will respond almost immediately.

This is all that is req'd and my tests have shown that the IC-3200A will work with other tnc's with txdelay's set as short as 150 msec's where before this modification a txdelay of about 600 msec's was required of the station trying to communicate to the IC-3200A.

For those interested in an alternate method here is what has been done by WB4FOW on several other radios:

Since about 1985 most icom radios have pin 8 of the microphone connector wired to the speaker. This is convenient for the wiring of a tnc and is usually easy to modify so that receive audio is taken from the high side of the volume control.

To get back to the subject of the alternate modification for the IC-3200A, you can rewire pin 8 of the microphone connector to the high side of the volume control and avoid the muting circuit but if you plan to leave the tnc wired permanently to the radio and also, to use the radio on voice you will need to change a resistor in the tnc so as not to load down the audio at the volume control. the value of this resistor will have to be determined experimentaly.

If anyone requires more information or assistance with this matter feel free to call clark, wb4fow, at 305-594-4313 monday through friday 10am to 6pm or leave a message in the w4nvu or aa4tm bbs's.

This modification is read 684 times.

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**19-07-1998**

## **(IC-3200) IC-3200A ext frq 430-440 MHz**

Here is one modification that I found that will convert your ICOM IC-3200A for operation on the 430-440Mhz band. This is a very simple modification and does nothing to harm the radio, no trace cuts, changing IC's or any of those problems. The only minor problem is that you lose all your memories when it is first done, so if you need to, write those 2 meter assignments for re-entry afterwards. Since the radio will only operate on the 430-440Mhz portion of the UHF spectrum afterwards use on 440-450Mhz can only be done only after the modification is cancelled.

Just inside the front panel of the ICOM IC3200A on the top there is a circuit board that can be seen with the top cover of the radio removed.

There are several componets that can be viewed from this angle, look for a jumper marked "J-8", this is for reference only.

To the side of this jumper, towards the small ribbon cable going to the display there is another jumper labled "J-10", this is next to the Capacitor labeled "C-4", also in this neighborhood is a mounting screw (just for reference). The only "mod" that you need to make is to lift the jumper "J-10" for a few minutes and re-install the jumper back in the same location that it was removed from - THAT is all!

To un-do your "mod" turn off the radio and at the same time depress the "function" button and indicated in the owners manual and normal operation of the ICOM IC-3200A is resumed.

I have verified the frequency and sensitivity of the radio after the "mod" was completed and the frequency display is accurate but the sensitivity at the lowest portion of the band on my '3200 was a bit deaf, with proper tuning of the VCO would certainly allow better preformance.

This modification is read 723 times.

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**12-01-2000**

## **(IC-3200) How To Expand The Coverage Of The Icom 3200A Mobile Radio.**

**Author:** Andy Moss VE3YES - [andmoss@home.com](mailto:andmoss@home.com).[MODIFICATION.NET](http://MODIFICATION.NET)

The ICOM 3200A will normally cover from 140-150Mhz and from 440-450Mhz.

The search function of the radio, which can be accessed in either VFO A or B, has to be used to make the radio exceed the above noted coverage limitations.

The search feature causes the radio to scan every frequency between the preset limits. The lower limit is in Channel 0, and the upper limit is in Channel 1. For example, if Ch 0 contained 144Mhz and Ch 1 contained 145Mhz the radio would search, starting at 145Mhz, down until it reached 144Mhz. Of course it would stop on any frequency that broke the Squelch threshold. If you changed Ch 1 to 446Mhz, the radio would search between 446Mhz and 144Mhz. However, it would skip 150.005Mhz to 439.995Mhz.

The trick is to change channels 0 or 1 to a frequency that is outside of the normal coverage range. Thus when you want to go outside of this range, use the search function in VFO mode with the squelch control fully counter-clockwise.

First, decide on whether you wish to go above 150Mhz, below 140Mhz, above 450Mhz or below 440Mhz. Please remember that the upper range will be in channel 1 and the lower range will be in channel 0.

Confused??? I thought so....How about an example.

Mission: receive normal coverage plus from 150Mhz to 152Mhz.

Steps:

1. go into VFO A mode.
2. change the off-set to 10Mhz in the minus mode.
3. select a tuning step of 15Khz

4. select a frequency of 150.000Mhz
5. press function.
6. press and hold, very important not to let go, MR button.
7. simultaneously turn channel selector knob one notch to the right.
8. let go of MR button and press VFO select button TWICE.
9. observe that frequency in VFO A is now 150.015Mhz.
10. repeat from step 5 until frequency in VFO A is 152.000Mhz.
11. store this frequency in channel 1 by pressing MR button.

**Notes:**

Be careful, the radio will transmit out of band.

This modification is read 825 times.

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**17-02-2001**

**(IC-3200) Frequency Extention RX / TX for ICOM 3200 E**

**Author:** Thomas Zimmat - [do6ftz@tntweb.de](mailto:do6ftz@tntweb.de).[MODIFICATION.NET](http://MODIFICATION.NET)

1. Remove power + antenna
2. Open radio
3. Locate diode matrix (located behind display unit)
4. Install or remove Diodes (Tables below )
5. Reassemble radio
6. Reset TRX

| VHF | D 15 | --- | D 16 | --- | D 17 | --- | RANGE     |
|-----|------|-----|------|-----|------|-----|-----------|
|     | open |     | open |     | open |     | 144 - 154 |
|     | set  |     | open |     | open |     | 144 - 146 |
|     | open |     | set  |     | open |     | 140 - 148 |
|     | set  |     | set  |     | open |     | 140 - 150 |
|     | open |     | open |     | set  |     | 144 - 156 |
|     | set  |     | open |     | set  |     | 140 - 154 |
|     | open |     | set  |     | set  |     | 140 - 150 |

| UHF | D 19 | --- | D 20 | --- | D 18 | ---- | RANGE     |
|-----|------|-----|------|-----|------|------|-----------|
|     | open |     | open |     | open |      | 430 - 440 |
|     | set  |     | open |     | open |      | 432 - 437 |
|     | open |     | set  |     | open |      | 430 - 440 |
|     | set  |     | set  |     | open |      | 430 - 440 |
|     | open |     | open |     | set  |      | 440 - 450 |

All the Modifications worked out pretty good. But I haven't found out what happens when you set all 3 Diodes in VHF and UHF.

If somebody finds out,let us know.

**Remember it is not allowed to transmit outside of hambands !!**

VY 73 de DO6FTZ

This modification is read 805 times.

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**19-07-1998**

## **(IC-3210) IC-3210 prevent signals on TX when the PA modul**

Model: IC-3210

Division: Amateur

Note: This service bulletin is meant for technical personnel with experience working on solid state communications equipment. Damage caused by improperly installing this modification may cause ICOM to charge for subsequent repairs to the product. ICOM does not warrant this modification.

Bulletin #: 28Oct86-027

Date: October 26, 1986

Subject: To prevent spurious signals on TX when the PA module was changed from a Toshiba part to a Mitsubishi part

### **Procedure:**

1. Replace the following parts on the main board:

| Current Part | Component Identifier | New Part           |
|--------------|----------------------|--------------------|
| 470K         | R40                  | 680K               |
| 560K         | R41                  | 1Meg               |
| 4.2K         | R42                  | 4.7K RH0521CS3J04A |
| 47K          | R44                  | 100K RH0651C15J1UA |

This modification is read 612 times.

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**19-07-1998**

## **(IC-3210) 9K6 with IC-3210 A/E**

From: SM4OTI@SM4TYA.W.SWE.EU

Just like to inform that I've tried to modify an ICOM IC-3210 for 9k6 use, and it seems to work ok.

1. Inject TX-Audio to junction C90/C91 on the main board (for UHF 9k6). Don't try to disamble the UHF shilded box. Connect outside at the above discribed junction.
2. Inject TX-Audio to junction C89/R2 on the main board (for VHF 9k6). Don't try to disamble the VHF shilded box. Connect outside at the above discribed junction.
3. Pick up RX-Audio at junction of C145/R112 (seems to be a good place, some filtering already taken place at this junction).

### **Note!**

I had to adjust the TX-Delay a little high probably due to som chirping or slow RX/TX shifting, but otherwise it works great.

73 de Stefan (SM4OTI / AA8PH @ SM4TYA.W.SWE.EU)

This modification is read 613 times.

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**19-07-1998**

## **(IC-3220) How to iface Ic-3220 & G3RUH**

The following instructions tells you how to make the right connections to an ICOM IC-3220 in order to be connected to the G3RUH 9600 bauds modem.

### **WARNING !!**

The following steps are not very difficult to follow, but are to be carried by a person with a minimum experience in electronic radio equipment.

If you are not such a person, ask to a friend with the required knowledge to do the job for you. Otherwise, permanent damage to your rig can result.!

Also, (evidently), this manipulation will invalidate the rig warranty, so perhaps you prefer to wait till the end of its validation period...

The author of this note is in no way responsible for any damage that can be caused to your equipment by doing this modification to it.

Do it at your own risk, and think twice before begin !

### **Modification instructions**

(n) = Number of screws.

Material required: Screwdriver, Solder Iron, Coax cable (see text)

1. Remove (4) the BOTTOM cover. (the one without the speaker).
2. Remove (4+2) the shielding plate covering the P.A. output module.
3. Remove (2) and discard the bottom small plate covering the hole behind the antenna coaxial cable. Restore the two screws in place, just to store it for the future.
4. Locate connector J2 (The white big one, near to front panel) which is used to interface the two main boards. (16 pins).
5. Locate pins 1, 2, and 15 of J2. Pin 1 is the nearest to the box side of the rig. Pin 15 (the one before last) is located about the middle of the main board.  
Pin description:  
1 - UHF TX stage modulator voltage input.  
2 - Ground.  
15 - UHF RX detector output.  
If in doubt about pinout, see schematic diagram (Main B unit, left hand)
6. Take two pieces of SMALL diameter coaxial cable, (Z:50 ohms preferred by me, but ordinary AF coax cable will perform pretty well). Aproximate diameter MUST be no more then 4 mm, and lenght as required. Following Murphy's law be generous ...
7. Join the two (outer) shield parts of coax cables and solder them to pin 2 (ground) at the upper (visible) part of J2. Solder the inner (active) part of one cable to pin 1 and the other to pin 15. Soldering should be performed to the upper part of J2 with EXTREME CAUTION, as the plastic support structure of J2 connector, can be seriously damaged !!!
8. Route the two cables trough the main board, up to the hole near the antenna cable, routing them in such a way, that traverses the small square hole at the bottom part of the plate covering the final P.A.
9. Secure the cables at the output hole with a BIG plastic strap.
10. Reinstall (6) the cover of final P.A.
11. Reinstall (4) the bottom cover of the rig.
12. Solder appropriate connectors at the other end of coax cables.

End of installation.

Notes:

With this modification, only the UHF part of the rig is affected, i.e. the mod will only work for the 432 Mc/s. band.

Also, some noise has been observed at RX detector output line, which make the DCD led of the TNC blink, but this does not affect the overall performance of the assembly.

As a guide, using the french TPK program, a serial (rs232) speed of 19200 bds, the well known G3RUH modem, and a standard TNC, a file of 1.5 Mbytes has been transmited in one hour, obtaining an average speed of 364 cps. (TPK measured).

73's QRO of Andreu. EA3CQY @ EA3MM Barcelona.Catalunya.Spain

**19-07-1998**

## **(IC-3220) ICOM IC-3220A/H Frequency expansion**

To extend the receiver range on VHF:  
118.000mhz (AM) to 174.000mhz (FM)  
Cut D6 on the LOGIC board (located on the front of the radio)

To extend the receiver range on UHF:  
400.000mhz to 479.000mhz  
Cut D4 on the LOGIC board.

To extend transmitter range on VHF:  
136.000mhz to 174.000  
Solder a bridge between the solder pads next to D9

To extend transmitter range on UHF:  
400.000mhz to 479.000mhz  
Install 1SS190 (diode) at D9 position on the LOGIC board.

This modification is read 799 times.

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**19-07-1998**

## **(IC-3220) ICOM IC-3220A/H mini repeater function**

1. Set rig to "DUAL" by using the BAND switch.
2. Set frequencies in VHF and UHF. You may set in offset on either band. You may also set it up in VFO or MEMORY.
3. Simultaneously hold BAND and SET key. The memory number will display a flashing "L". It will be in repeater mode

To disable repeater mode, depress and hold "SET" key until the flashing "L" goes to a memory number or VFO mode.

The repeater mode will not be disabled by turning the rig off and on.

This modification is read 897 times.

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**19-07-1998**

## **(IC-3230) ICOM IC-3230 Mods for 9k6**

by IK2XYU/KF6EEZ

Hi to all,  
here you have a step to step way to modify your IC3230 to enhance it with frequency coverage,transponder function and 9k6 Baud packet use.

Is not easy make changes inside this tranceiver, so if you've not skill ask to another ham to help you !!!

A good range of the frequencies are 120 - 175 MHz and 400 - 500 Mhz and 850 - 950 Mhz. Your RIG can surely handle more frequency but not with a big success on sensibility.

If you make this, you'll be the responsible of your RIG.

Make it just if your law permit this to you !!!

1. Take off the screws of the two covers (6+6) and remove them unplugging the speaker plug.
2. Take off the 4 screws of the front panel (2 for each side) and be careful removing it because you have a couple of flat cables.
3. Open the diodes,with a cutter, located under the front panel.  
They look as 1N4148 kind and you cannot make mistakes. More cuts it's meaning more new function, so you must cut all the available diodes.  
The diodes are located on the board called LOGIC UNIT.
4. Replace the front panel with the four screws. Connect a shield-cable (RG-58) on the small coaxial plug on the MAIN-B board and make this cable able to go outside of your RIG when you replace the two covers. To do this you can remove the small cover in the back of the RTX, the one just above the original antenna cable.  
This new coax-cable will be to apply the 900 MHz antenna.  
If you're not interested to listen to this band, you have just to replace the front panel and jump to point 5.
5. Plug in the speaker and replace the covers.  
If you like to make the 9k6 mod jump to point 6.

Now power on and type in the frequency coverage as request, for the VHF and the UHF. Above I already mentioned the sure working frequencies.

To power on the transponder old the BAND and SET button for two seconds.

Same operation is required to disable it.

6. Make same operation as point 1 and 2 if not yet ready.
7. Unplug the two flat cables. Be kindly !!! And use appropriate tool to open the plugs.
8. Unscrew the LOGIC UNIT (4 screws) and unplug it.  
Take off from the back all the screws around the antenna cables Take off the screws on the metal plates to cover the high power section on both sides.
9. Make free the 8 soldered pins with a solder and the tools that you prefer for this operation, located near the VCO Unit on MAIN B.  
Make free the pin near the power cable (+) and the pin near the antenna cable (hot). Practically you have 10 pass through pins to desolder.
10. Unscrew all the screws on the MAIN A and MAIN B boards and remove them from the aluminum block. Unplug the back fan from MAIN A board.  
EASY ??? Now is all open !!!
11. Solder a shield-cable on PIN 2 of J2 of VCO B for the TX Audio on UHF  
Solder a shield-cable on PIN 2 of J2 of VCO B for the TX Audio on VHF  
Choose the smaller cable that you can have for this !!! You just have a little bit of distance. A good idea is to apply a capacitor to filter the signals (100.000 pF usually is good).
12. Place back the MAIN A and MAIN B board. If you're lucky positioning your cables will be easy. But be careful, because you mustn't damage the cables. Use the right screws and solder the 10 PINS.
13. Place back the LOGIC UNIT with the right screws and work on it !  
Solder a shield-cable on PIN 11 of J2 for UHF RX Audio  
Solder a shield-cable on PIN 14 of J3 for VHF RX Audio  
It's always good place the capacitors on this connections.
14. Place back the front panel flat cables and the panel too.  
If you like you can place a wire for the PTT signal directly inside your RTX and then follow the hole in the back where you place the 900 MHz antenna to have all the cables outside. Replace the back fan plug. Replace back all the screws on your table and remember to plug-in the speaker plug before to replace the two covers.

EASY !!!! Now if you done a good job all it's running ....

but check your watch ... you spent here one day and your wife is still waiting for you to make shopping.

You can test your RIG tomorrow !!! Will be better !!!

I hope that you'll be lucky.

73'sss de Flavio IK2XYU or KF6EEZ !!!

For other infos, send me a message:

ik2xyu@ik2hdg.ilom.ita.eu (packet) or fcimardi@vnet.ibm.com (Int.Email)  
ik2xyu@it.ibm.com

This modification is read 713 times.

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**25-10-2000**

## **(IC-3230) IC-3230 repeater function**

**Author:** Jon L - k4iii

If you look at the [IC-3220 repeater mod](#) on this site, you will find a mod that will also work with the IC-3230.

It states that holding down the "set" and "band" buttons for a couple of seconds will cause the 2 "L's" to blink. This will place the Icom 3230 into crossband repeater mode just as it does with the IC-3220.

I tried this and it works with my IC-3230. I'm not sure whether it is stated in the 3230 manual since it is so large and I did not come across it.

This modification is read 702 times.

[top of page](#)

**19-07-1998**

## **(IC-37) some audio mods for IC-37**

Here is a list, transcribed from "220 Notes", of modifications for the ICOM model IC-37A. The 27A and 47A should be very similar:

"We have been using [this mod sheet] in the Southwest Coast ever since the [IC-]37 was in production. This one is the latest revision.

"The design problems of the '37 are greater than ICOM would lead you to believe. The [IC-]'38 has solved a great majority of the '37a problems. However, the microphone and the UHF pigtail problems still remain.

"The fix for the microphone on both rigs is the same. [see below] The fix for the UHF pigtail on the '38 involves removing the pigtail, and installing a bulkhead chassis mount BNC connector in the hole left by the pigtail assembly. Some elongation of the BNC connector holes is necessary for a good fit. A short coaxial jumper may then be installed from the board to the connector.

Now, here is the official Condor Connection IC-37 modification sheet.

1. To restore high-frequency receiver audio response, replace C-103 on the main unit with a .0022 uf mylar capacitor (that's 2200 pf).
2. To restore LOW-frequency receiver audio response, replace C-106 with a .22 uf mylar capacitor.
3. To eliminate the distortion in the transmit audio, install a 4.7k ohm resistor inside the microphone case, in series with the white lead coming from microphone element. Once the resistor is installed, set the DTMF level pot to the middle of its range (this pot is the only one inside the microphone case). To complete the mod, set R88 inside the radio to the desired "mike" level.
4. To improve the receiver sensitivity, power output, SWR at the radio, and reliability, remove the RG-58 pigtail and the UHF connector extending from the rear of the radio.  
Install a BNC chassis mount, screw-in connector (UG-1094/U) in the hole left in the back of the radio. The new connector will screw in as if the modification was done at the factory.
5. To greatly reduce chassis heating in the receive mode, remove the following components: R66, R67, R68, Q32, D42, and D44 in the main unit. Install a 7808 [3-pin voltage regulator] on the transmitter power amp shield behind the space reserved for the optional voice synthesiser. Thermal compound is recommended. Hook the input of the 7808 to the point where R67 and R68 used to connect. Hook the output of the 7808, in series with a 1N4001 diode, to J14-1. The cathode of the diode goes to the connector goes to the connector, and the anode goes to the 7808.

"---Mark Gilmore, WB6RHQ  
Newbury Park, CA."

This modification is read 557 times.

[top of page](#)

**19-07-1998**

## **(IC-37) Now, here is the official Condor Connection IC-37 modification sheet**

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Reduce chassis heating in the receive mode, remove the following components: R66, R67, R68, Q32, D42, and D44 in the main unit.

-pin voltage regulator] on the transmitter power amp shield behind the space reserved for the optional voice synthesiser. Thermal compound is recommended. Hook the input of the 7808 to the point where R67 and R68 used to connect. Hook the output of the 7808, in series with a 1N4001 diode, to J14-1. The cathode of the diode goes to the connector goes to the connector, and the anode goes to the 7808.

Mark Gilmore, WB6RHQ  
Newbury Park, CA."

One note on the above - the BNC connector mentioned for the x7-series radios is sold by Radio Shack as 278-105, \$1.39 each.

This modification is read 554 times.

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**23-08-1999**

### **(IC-3J) Expanded RX for ICOM IC-3J**

Heres a modification for the Icom IC-3J.

This mod will allow wideband RX of this handie de 320 - 480 MHz FM.

The modification is a turn on radio and hold down button.

1. Turn radio off
2. Turn back on holding down light & VFO buttons

Now you have wide band rx on the IC-3J.

If you own this radio let me know its one very rare 70cms handie and i wonder were it came from ?? possibly selling in Japan considering its name ic-3J.

This ones from a rally called longleat we have here in UK.

73S all de Phil 2E1FWP @ GB7YEO.#45.GBR.EU

This modification is read 313 times.

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**19-07-1998**

### **(IC-4) Low audio speaker mike on IC2A, 3A, 4A OR O2AT**

If you own one of the IC2A, 3A, or O2AT series Hand-helds, you may be interested in reading on. I know my hearing is pretty good, but have you ever tried to listen to the audio coming out of your speaker mike on the above ICOM's? For the most part, it's pretty low. I may be the last guy to figure out a cure for this, but here it is anyway. On the O2AT, etc., there is a groove on the back near the top of the rig that is just the right size to accept the HM9 speaker mike turned 90 degrees so that the mike plug fits in that groove in the rear of the rig. Thus allowing all the audio to be heard from the internal speaker of the rig, usually much better than the speaker mike.

Now, in the case of the 2A series, etc., the fix is more complex. These rigs don't have that handy groove built in, so I decided a groove had to be made to accept this configuration. I thought long and hard about a minute, before getting the "Dremel" out and making my own slot or groove. It works well on both hand-helds I have. In fact, you can hook up an external speaker for even more loudness in the auto. So, give it a try or see me for a demo.

This modification is read 560 times.

[top of page](#)

**19-07-1998**

### **(IC-4) IC-4E Umbau auf 9600Bd**

Der Umbau ist im Prinzip nicht schwierig, wenn man geschickt genug ist, sich mit dem Loetkolben in einem eng aufgebauten Handy zurecht- zufinden. Das Geraet wurde von DJ5JT umgebaut und von DL1GGQ an ein TNC-2S mit nachgeruestetem DF9IC-Modem angepasst. Das IC-4E ist im gegenwaertigen Zustand fuer FM-QSOs nicht mehr einsetzbar. Allerdings lassen sich alle Aenderungen problemlos rueckgaengig machen.

#### 1. U M B A U :

##### 1. EINSPEISUNG DES SENDESIGNALS:

1. Auf der PLL-Platine die mit "MOD" gekennzeichnete Leitung, welche an R9/C28 fuehrt, ablöten.
2. Stattdessen wird dort ein abgeschirmtes Kabel angelötet, das zur Einpeisung des FSK-Signals dient. Die Abschirmung ist bis zum Loetpunkt des Innenleiters nach vorn zu ziehen und an Masse zu loeten (Abschirmblech dicht daneben). WICHTIG! Bei der Inbetriebnahme hat sich gezeigt, dass eine ein- wandfreie Abschirmung fuer die Funktion sehr wichtig ist. Jeder nicht abgeschirmte mm Leitung kann sich HF einfangen, wodurch Signal-Verzerrungen verursacht werden koennen.

##### 2. AUSKOPPELN DES EMPFANGSSIGNALS:

1. Zuerst wird der Lautsprecher-Stecker freigemacht. Die Leitungen vom Pin-Anschluss und vom Schaltkontakt werden abgelötet und miteinander verbunden (kurzschliessen, Enden isolieren!).
2. Die NF wird ueber ein abgeschirmtes Kabel von der MAIN-Platine an IC1, Pin 11 abgegriffen und auf den Pin-Anschluss des Lautsprecher-Steckers gefuehrt. Die Abschirmung des Kabels wird bei C28 an Masse gelegt.

## 2. T N C - A N P A S S U N G :

Mit Setzen der Jumper an J4 werden die Filterkurven des G3RUH-Modems und des verwendeten Transceivers aneinander angepasst. Durch Versuche hat DL1GGQ fuer ein TNC-2S mit nachgeruestetem DF9IC-Modem folgende Einstellung als optimal ermittelt:

```

-----
J4      1-2
        3-4
        7-8
-----

```

## 3. P R A X I S E R P R O B U N G :

### 1. VERGLEICHENDER TEST:

Es wurden vergleichende Funktionstests zwischen dem IC-4E und einem ebenfalls fuer 9k6 modifizierten YAESU FT-790RII durchgefuehrt. Dabei zeigte sich, dass die Empfangsqualitaet mit den groesseren, besser ausgelegten FT-790RII durchaus mithalten kann. Bei Beurteilung der Qualitaet des Sendesignals (Linearitaet) schnitt das FT-790 etwas besser ab, als das IC-4E. Fuer den praktischen Gebrauch ist das Signal des IC-4E ohne Einschraenkung tauglich.

### 2. TEST IM RAUHEN ALLTAG:

Das modifizierte Geraet laeuft seit Nov.92 einwandfrei. Taeglich fuer ca. 6 Stunden tut es seinen Dienst an einer "Technik-Datenbank" mit DieBox-Software. Auch normaler QSO- Betrieb wird gelegentlich damit gemacht. Jedenfalls kann man von einer echten Praxiserprobung sprechen.

Eine Gewaehr fuer kaputtgemachte Geraete koennen wir natuerlich nicht uebernehmen, aber wer nicht allzu ungeschickt ist, wird die Sache zum Laufen kriegen.

Viel Erfolg und viel Spass mit 9K6 wuenschen  
DJ5JT, DL1GGQ und DF8UR @ DB0FRB

This modification is read 561 times.

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**19-07-1998**

## **(IC-4) IC-4GAT, fix the +5 V source crystal X-3**

Model: IC-4GAT

Division: Amateur

Note: This service bulletin is meant for technical personnel with experience working on solid state communications equipment. Damage caused by improperly installing this modification may cause ICOM to charge for subsequent repairs to the product. ICOM does not warrant this modification.

Bulletin #: 00389-001

Date: January 3, 1989

Subject: When servicing the radio, the technician may cause failure of the +5 V source by improperly replacing crystal X-3. We have seen cases of this occurring.

Information: When replacing reference crystal X-3, the physical location of the crystal is critical due to close spacing of coil L-17.

### Procedure

1. Make sure the leads of X-3 are insulated with tubing to prevent shorting. If a short does happen the VCO buffer signal will

- be shorted to ground and cause PLL unlock.
2. It is suggested that the body of the crystal as well as the leads be insulated to prevent contact with L-17 in the VCO circuit.
  3. Do not trim the leads of the replacement crystal as all of the supplied length is required.

This modification is read 552 times.

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**13-01-2002**

### **(IC-40) Cloning software for IC-40S**

**Author:** Icom

ICF-3 (Icom Cloning Format-3) [Cloning software](#) for IC-40S

This modification is read 298 times.

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**23-11-2001**

### **(IC-45) IC-45A to IC--45E**

**Author:** Icom UK

Thanks to Geoff Boakes (G8PPQ) Icom UK.

This is now a VERY OLD radio approx 1980-81 !!, unfortunately we have very little information on this set ( no service manuals ).

It would seem that the set uses a xtal mixer PLL, and to get the lower coverage of 430-440 Mhz, you will have to change the Crystals X3 and X4 in the PLL cct.

X3 (tx) was 35.74417 Mhz in the 45A, change to 34.912 Mhz (45E)

X4 (rx) was 33.9275 Mhz in the 45A, change to 33.095 Mhz (45E).

For the 1.6 Mhz repeater shift (if needed) remove diodes D13 and D14..(PLL pcb).

To get the display to show 430-440 (rather than 440-450) ADD diodes D15 and D16. (PLL pcb)

We CANNOT guarantee that these modifications will work sucessfully

Good luck, I wish you every success.

Geoff Boakes (G8PPQ) Icom UK.

This modification is read 500 times.

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**01-01-2002**

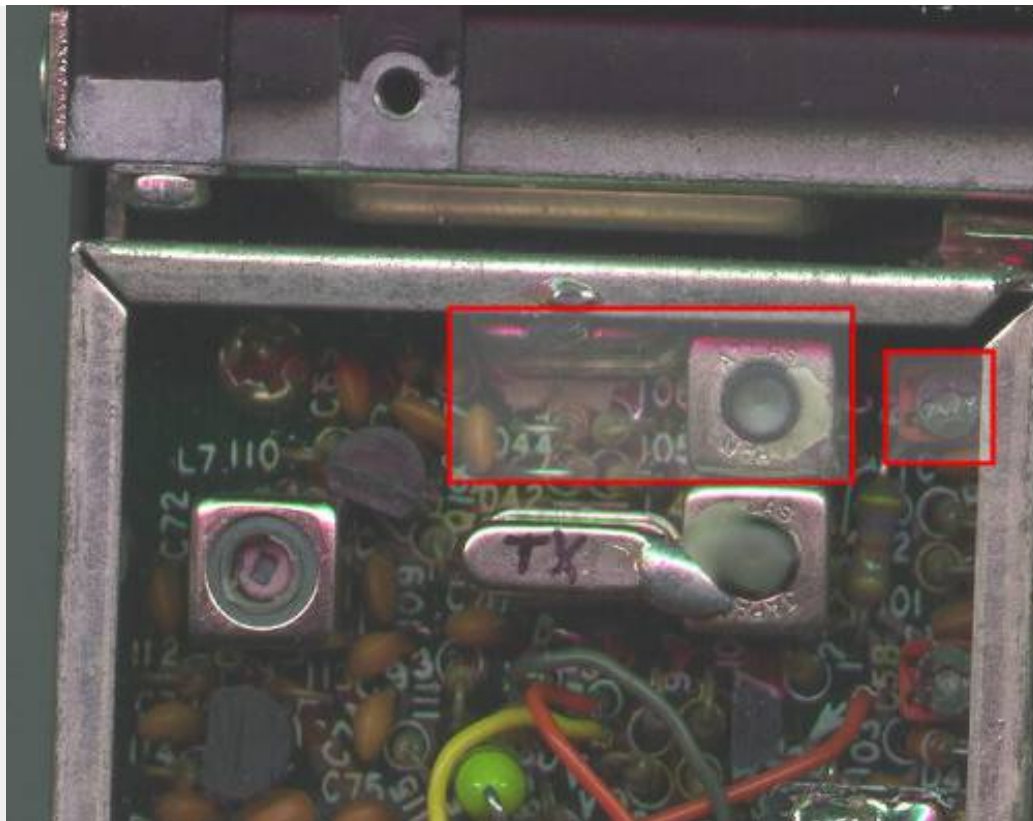
### **(IC-45) Converting IC-45A to IC-45E**

**Author:** Mark - PE3HMP - [pe3hmp@hotmail.com](mailto:pe3hmp@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

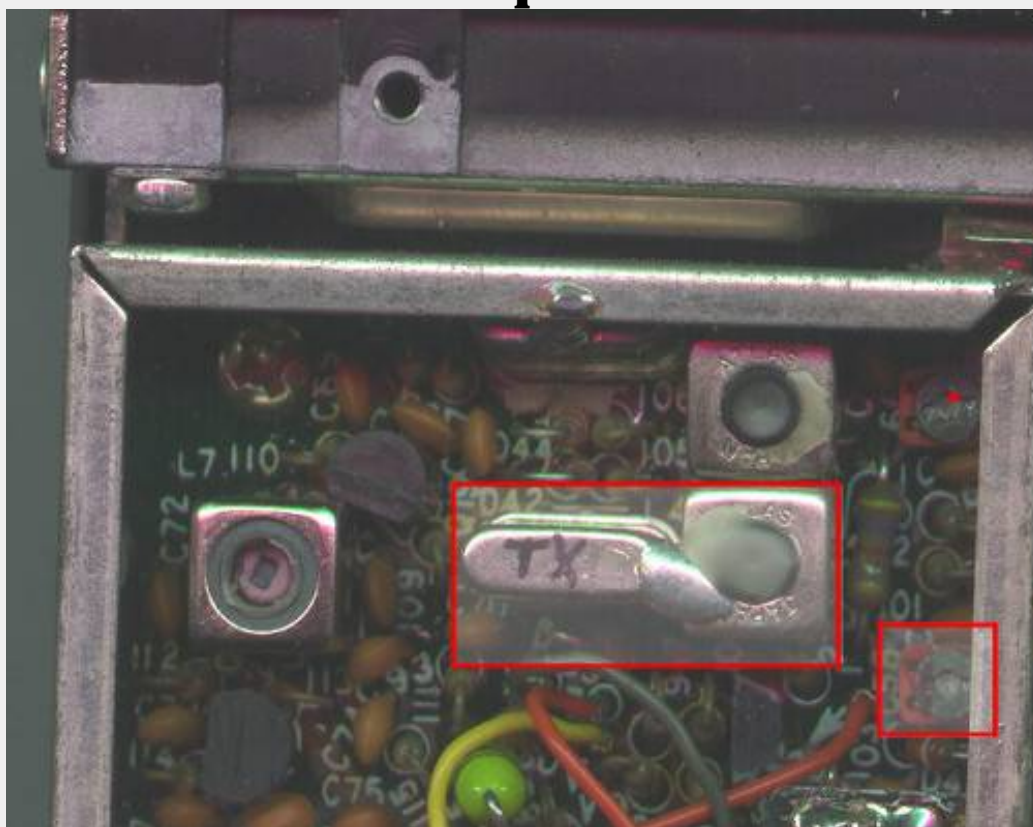
Well most transceivers can be easily converted from 440-450MHz to 430-44-MHz by cutting some diodes, this is one of those cases were it can not be done :-)

To change the RX/TX freq You will have to replace the two PLL crystals (X3 and X4)

**RX part**



### **TX part**



Change X3 from 35.74417 to 34.912MHz

Change X4 from 33.9275 to 33.095 MHz

For the 1.6 MHz repeater shift remove diodes D13 and D14

For the display to show 430-440 Add diodes D15 and D16 (1n4148/1ss53)

Adjusting the IC45 is easy, use the atlas toko to get the freq on 439.000 and then use the 5KHz shift knob and adjust the freq with the red c58 trimmer to 439.005

Be careful with the toko, the core can easily break !

If You have a good signal generator it might be a good idea to align the rx although in most cases it is not necessary

Unfortunately I had no service doc of this rig.

Thanks to [PE3HMP](#) for the modification and picture.



**19-07-1998**

## **(IC-451) IC-451 aus 9600**

Folgende Massnahmen sind erforderlich:

### 1. Diskriminatoranschluss:

Oberen Gehaeusedeckel abnehmen, dann erkennt man im hinteren Teil des Geraetes den Diskriminator-IC MC3357P. An dessen Pin 9 ist der Anschluss zu taetigen. (evtl. ueber einen Schutzwiderstand von 5-10k).

### 2. Modulatoranschluss:

Unteren Gehaeusedeckel entfernen, die Treiberplatine loesen und hochklappen. Darunter werden 2 Weissblechgehaeuse sichtbar. Das kleinere ist der 2. Mischer. Dessen Deckel abhebeln. An der Wand zur Mitte des Geraetes hin erkennt man die Varicapdiode D1. Am Verbindungspunkt R7, R8, C6 und eben dieser D1 ist der Anschlusspunkt fuer den Modulator.

Ich habe diese Punkte mittels RG174 an die 8-polige Mic-Buchse angeschlossen, und benoetige somit fuer die Verbindung TRX-Modem nur ein einziges Kabel.

Der Schwachpunkt des IC451 liegt nach meinen Beobachtungen nur in der etwas traegen RX/TX - Umschaltung.

Ein TX-Delay von unter 20 wird problematisch. Ansonsten laeufts aber recht gut. 73 + 55 de DG4FAA, Heinz aus Biedenkopf-Breidenstein

This modification is read 370 times.

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**19-07-1998**

## **(IC-471) VOX of an IC-271,471,1271 usable for FM**

How to make the VOX of an IC-271,471,1271 usable for FM :

1'st type of "main-board" :

The only thing to be done is to add a diode such as 1n4148 or bax13 on the MAIN board on the position D74

When D74 is inserted ... the vox works in FM also.

The diode is on the schematic diagram of the Main board but is not mounted on the pcb in the factory.

73's de stefaan

ON4BY @ ON4HU

16/03/1990 18.31 h

2'nd type :

(On this board a D74 is present (near PA- and RF-YGR- Unit))

(It might be not present in the plans !)

Disconnect the cathode of D69 from it's old postition. It's new position is the cathode of D50 or D51

| name | ! | position on main board | ! | (old) function | !       |
|------|---|------------------------|---|----------------|---------|
| D69  | ! | near "CW-DELAY".       | ! | "FM -VOX-OFF"  | ! FM 8V |
| D50  | ! | near "RF-YGR-Unit"     | ! | "USB-VOX-ON"   | ! USB8V |
| D51  | ! | near "RF-YGR-Unit"     | ! | "LSB-VOX-ON"   | ! LSB8V |

20/03/1990 16.52 h

This modification is read 581 times.

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**19-07-1998**

## **(IC-471) 9600 baud mod for IC-471**

Digital output taken from discriminator (IC-14) pin 9. This pin, and ground, are brought out to J-14 for feeding the optional tone squelch unit (not fitted on my rig). Rig works well with existing CFW-455E filter (I think its 15KHz bandwidth) but needs retuning after about 4-5 KHz of doppler; a wider filter may require less frequent tuning but, with the advent of 12.5 KHz channel spacing on terrestrial uses, I kept the narrow filter.

Digital modulation would be applied, as with the IC-251, to top of the deviation pot; that's at the junction of R28 and R29, close to Q1 on the circuit diagram. I haven't actually used this yet (see note above about RUDAK).

PTT connection made inside the rig to the appropriate pins on the rear panel's accessory socket - no complications here, my TNC's PTT comes from a reed relay.

Connections made to both rigs via phono sockets using screened cable both inside and outside the rig. The IC-251 has some unused sockets, and the IC-471 has a removable plate which I mounted 3 sockets on.

The IC-471 provides receiver audio on pin 8 (the centre pin) of the mike jack. I modified the IC-251 to put it on the same (previously unused) pin. This is used for "ordinary" 1200 bps operations. Pin 4 of the IC-471's mike jack is the up/down line; that pin is unused on the IC-251 so I'll probably use it if/when I modify the 251 for up/down

This modification is read 582 times.

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**30-03-2001**

## **(IC-471) RAM Card Backup Battery Replacement Instructions**

**Author:** ICOM

In the early 1980s Icom America marketed a group of transceivers and radios that utilized the latest state-of-the-art computer technology to enhance the operation of the radios. This technology improvement allowed hams to afford a reasonably priced high performance transceiver which until then was only available on units costing much more. Features now available to the hams included: higher frequency stability, better frequency resolution, digital frequency display, almost instant recall of saved frequencies (memory channels), quick mode signal processing and built in tones and offsets for the rapidly emerging repeater operation.

Implementation of all these features required a CPU with associated logic circuitry. In the early 80s, the most cost effective way to implement data processing and memory functions was through a DRAM (Dynamic Random Access Memory) to control the CPU. This DRAM was a volatile memory integrated circuit which required a lithium battery to retain its instruction set. The following receivers and transceivers had such RAM units:

IC-271 ; IC-471 ; IC-1271 ; IC-745 ; IC-751/A ; IC-R71A

The lithium batteries in these units typically lasted about 5 to 7 years before replacement was required. This was specifically noted in each of the Owners Manuals for the products.

This lithium battery can be replaced by the radio owner if care is used. The following is a recommended procedure to accomplish this:

### **Procedure**

1. Disconnect the power cable from the radio, and take the cover off.
2. Unplug the RAM board and remove it from the radio.
3. Temporarily solder a 3 Volt DC battery source across the existing battery terminals (see suggested connection points on the circuit board pictures).
4. Unsolder the old lithium battery and replace it with a new one. (BR2325 1HC, ICOM stock number 945 03112)
5. Unsolder your temporary 3 Volt DC source.
6. Reinstall the RAM board into the radio.

### **Cautions**

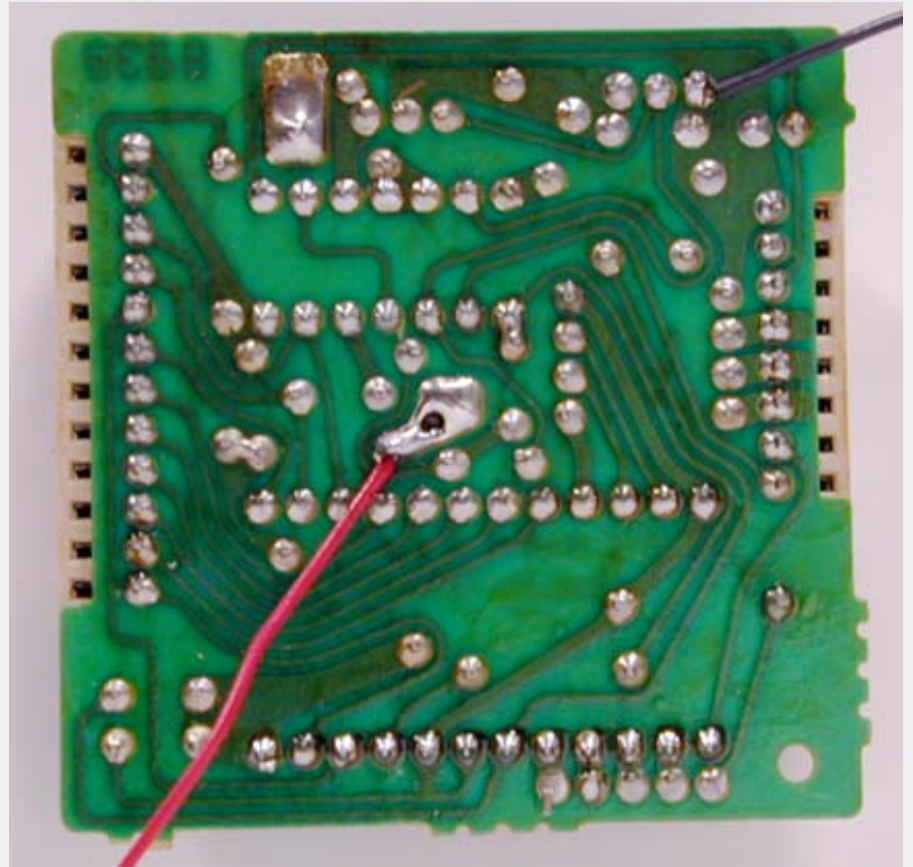
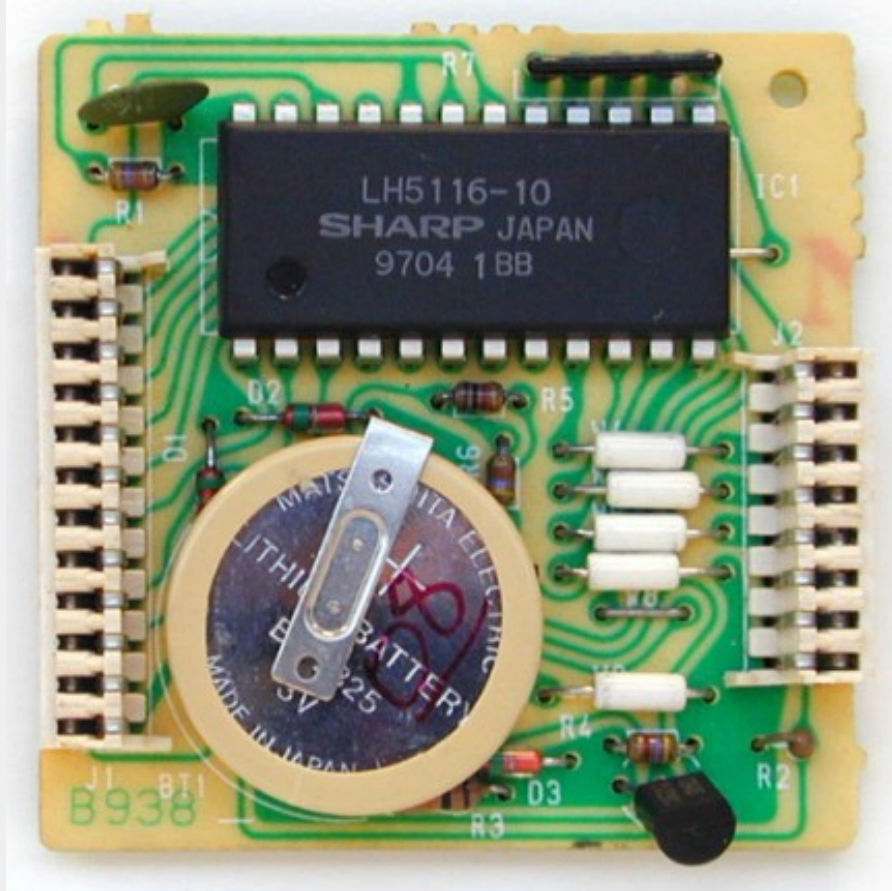
1. Do not use an AC powered 3 Volt DC source, your grounded soldering iron tip could short out the battery (+) terminal. Use a 3 Volt battery DC source only (2 alkaline cells for example).
2. Do not solder the external DC wires directly to the lithium battery tab pads. If you do so, you will not be able unsolder the battery without having the wires drop off.

3. If by accident you lose power to the RAM unit it must be sent to Icom America for reprogramming.
4. Be careful not to damage or bend the connector pins on the radio side while removing or reinstalling the RAM card.

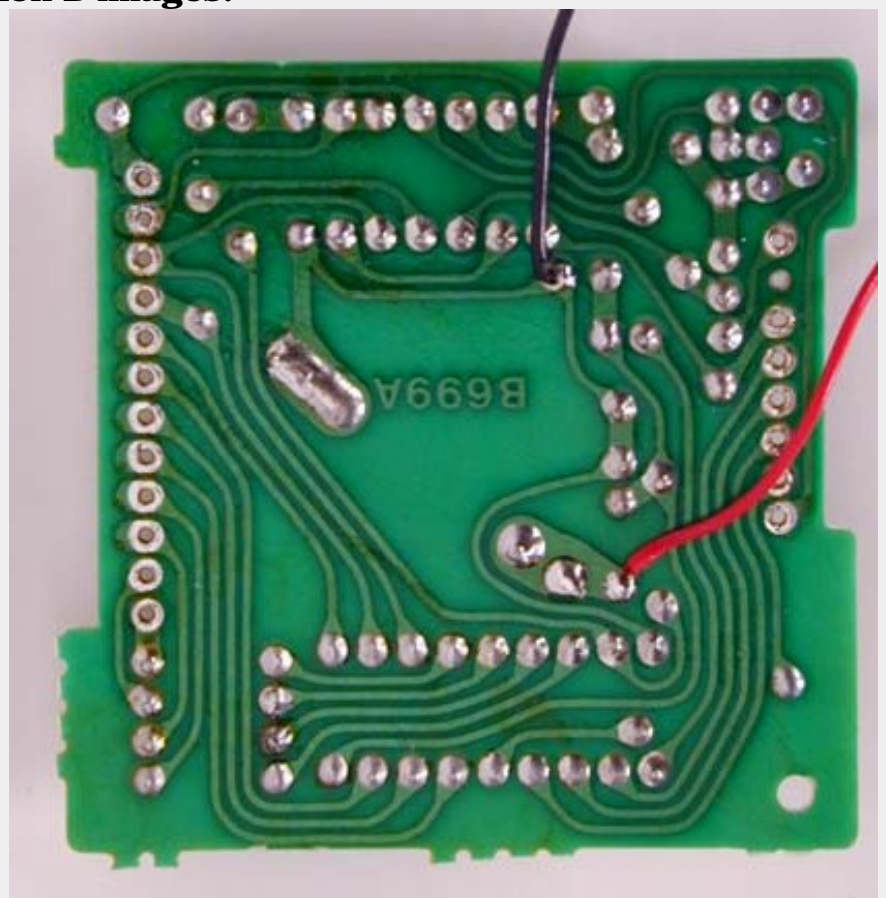
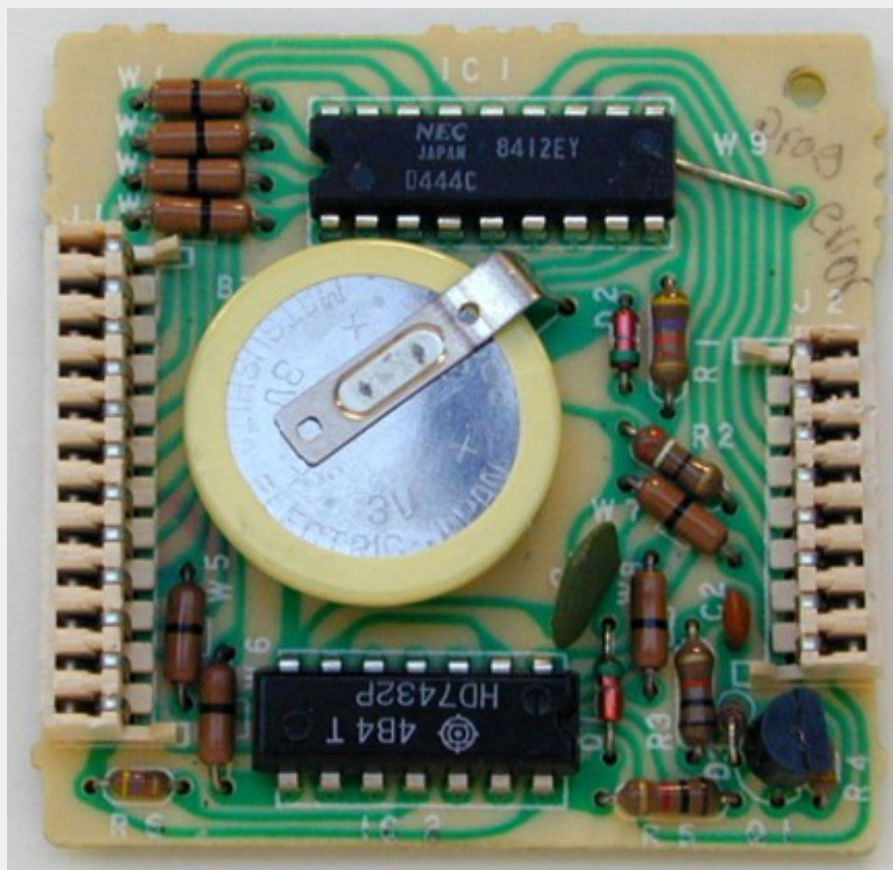
## Pictures

There are two versions of the ICOM RAM boards. Both are identical in operation, and they are interchangeable. The differences are in the circuit board layouts only. Note that the black and red wires visible on these images are the suggested way of connecting the external DC backup voltage while the battery is being replaced. The wires are not a part of the RAM card, and should be removed when the battery replacement procedure is complete. Refer to the replacement procedure outlined above.

### RAM card version A images:



### RAM card version B images:



This modification can also be found at ICOM's own homepage on the following URL: "[RAM Card Backup Battery Replacement Instructions](#)"

**19-07-1998**

## **(IC-475) IC 475H mod for 9k6 (G3RUH) use**

### **Warning:**

I'm writing this message to help out owners of Icoms 475 H to modify their transceivers for use with a G3RUH modem. I will not take any responsibility if you destroy your transceiver while doing this modification. This modification requires that you have a minimum experience in soldering and electronics. If you feel that you cannot undertake this modification, don't even try it and leave it up to someone else!

### **Reception of FSK signal:**

The reception has to be taken directly off the demodulator chip. This is the chip referenced as IC6 (MC3357P) on the electronics diagram.

Demodulator output is on pin 9 of this chip. You will have to run a SHIELDED wire from this pin to the outside of your transceiver. I've done this by connecting it to pin 11 of J4 (AQS socket on the back). This pin is originally unused. But this is not as easy as it sounds; you will have to unscrew both sides of the transceiver and undo a lot of parts to finally solder on a very small plug! Be careful here.

### **Transmission of FSK signal:**

The FSK signal is simply injected on pin 2 of the AQS socket. BUT, as you will see on the electronic diagram, this signal goes through a variable resistor (R152) and a capacity (C142). So you might encounter two problems: not enough and/or distorted modulation. In my case, I used a MFJ 9600 Bauds card and I had to put the level almost to the maximum on this board, while also putting the variable resistor to the minimum! The capacity on the other hand is very very bad for the modulation of the FSK signal as the transceiver should respond to DC! My solution: simply short circuit the capacity (C142). This is most easily done directly on the components side of the circuit board, since it's very difficult to take it out of the transceiver.

### **Other signals:**

You will be able to put the PTT line to pin 6 and the ground to pin 1 of the AQS socket. You will also notice that on pin 13, you have 13.8 V available. This can be used to power the TNC for example...

I have now a much more stable 9k6 signal than before, when I still had the C142 in the line. Although, this was reportedly been working for other people, it simply didn't for me! Maybe you can avoid short circuiting the capacity, so try it first (although I doubt it!).

I hope this will help somebody and if you have any more questions, don't hesitate to contact me at my homeBBS: HB9VBC @ HB9IAP.SROM.CHE.EU

This modification is read 542 times.

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**19-07-1998**

## **(IC-475) Prevent a decrease in RF power output in high ambient temperatures**

### **Note:**

This service bulletin is meant for technical personnel with experience working on solid state communications equipment. Damage caused by improperly installing this modification may cause ICOM to charge for subsequent repairs to the product. ICOM does not warrant this modification.

Bulletin #: 24487-001

### Procedure

Replace R55 on the RFYGR board (currently 22 ohm 1/8 watt) with a 33 ohm 1/8 watt resistor.

This modification is read 517 times.

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**19-07-1998**

## **(IC-475) IC-475 Freq. steps mod**

Titolo: Tuning steps change for all mode Icom IC-275/475/575/1275

The IC-275/475 FM-Step selectmatrix use these diodes on the front unit: (type 1SS53) D41, D42, D43, D44, (D45), D46

Note: diode D45 is not present but solder holes exist for it on the board just between D44 e D46

installed diodes are marked with X :

|     |     |     |     | (*) | (*) |     |          |     |     |     |     |  |
|-----|-----|-----|-----|-----|-----|-----|----------|-----|-----|-----|-----|--|
| D41 | D42 | D43 | D44 | D45 | D46 | D48 | Steps    | DB4 | DB5 | DB6 | DB7 |  |
| .   | .   | .   | .   | .   | .   | .   | 10.0 Hz  |     |     |     |     |  |
| .   | .   | .   | X   | .   | .   | .   | 100.0 Hz | 1   | 0   | 0   | 0   |  |
| .   | X   | .   | .   | .   | .   | .   | 1.0 KHz  | 0   | 0   | 1   | 0   |  |
| .   | .   | .   | X   | .   | X   | .   | 5.0 KHz  | 1   | 0   | 1   | 0   |  |
| .   | .   | .   | .   | X   | .   | .   | 10.0 KHz | 0   | 1   | 0   | 0   |  |
| .   | .   | .   | (*) | X   | X   | .   | 12.5 KHz | (*) | 1   | 1   | 0   |  |
| .   | .   | .   | .   | .   | .   | X   | 25.0 KHz | 0   | 0   | 0   | 1   |  |
| X   | .   | X   | .   | .   | .   | .   | 1.0 MHz  | 0   | 1   | 0   | 1   |  |

(\*)

To set a step of 12.5 KHz in FM mode (TS button off) it is not necessary disconnect the diode D44, just insert the diode D45 (IN4148 or similar) near D44 and "voilà les jeux sont faits".

Unscrew the two lateral screws and unlock the front panel.

Remove also all the connectors of the front board and after that unscrew ALL the screws of the metallic shield covering the front board. It seems too much complicated insert the diodes from the component side of the front board, so it is better insert D45 from the solder side.

This modification is read 545 times.

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**27-10-1998**

## **(IC-475) Power control modification**

Problem:

The power control circuit in IC-x75 is an ALC circuit. ALC circuits suffers from several drawbacks:

- slow reaction time due to time constants
- insufficient regulation due to low feed-back factor

These factors gives the problem that if the average power has been set to a low value (e.g. for driving a HPA), peak power can still be in the order of 3-4 dB higher. This leads to either considerable side band distortion or a low average power output.

**note:** If you are always using your transceiver barefoot, without connecting any PA or transverter, this modification will offer no benefit.

Solution:

The solution to these problems is to use a simple forward gain regulation without the feed back circuit of the ALC. The original ALC is still kept for SWR protection only.

The ALC is working on gate 1 of Q13, which is a IF amplifier (9 or 10.75 MHz). The new power regulation uses gate 2 of Q13. Therefore the two circuits can exist in parallel.

The modification should also give you a bigger dynamic range in the power regulation (lowest power < 5W on the IC-x75H).

Implementation:

- replace R87 (470k) with 100k
- cut "POCO" wire (pin 3, P1/J1, MAIN, orange) at the plug (P1)
- connect the "POCO" wire to gate 2 of Q13 (e.g. via top of R87)

- adjust R250 (SWR protection), R256 (low power level) & R259 (high power level) fully counter-clockwise. (this will give you full SWR protection, but cancels the ALC in normal operation).
- put the front plate RF PWR in full output position (clockwise) and adjust R82 (Q13 output attenuator) until you have the nominal output power (initially the output power will be higher because you removed the regulation, but the PA will be saturated).
- the balance between FM, CW & SSB output can be adjusted with R137 (CW carrier level) & R105 (FM carrier level).
- other interesting adjustments: R135 (mixer balance i.e. SSB carrier suppression), R133 (TX BFO output level).

This modification is read 534 times.

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**27-10-1998**

## **(IC-475) Restoration of pass band tuning**

### Problem:

ICOM has chosen to remove the PBT in the later models, and replace it with a "data level adjustment". This change removes the possibility to profit from the PBT in case of QRM or to use the PBT as a cheap CW-filter.

Furthermore the two extra IF-mixings is done with only a minimum of filtering, making the receiver very susceptible to spurious IF breakthrough. This is often heard as high-pitch tones or as a high IF noise level.

### Solution:

The solution is to re-wire the "data level" potentiometer so that it adjusts the PBT VXO-oscillator, and to re-install FI3. FI3 is a 455kHz ceramic SSB filter and can be bought under the type number: MURATA CFJ 455 K6.

### Implementation:

- remove the capacitor (C61) fitted in place of FI3
- solder in FI3
- readjust R72 for proper IF gain
- cut wire PBTV (pin 4, P1/J1, MAIN, yellow) about 5cm from the plug (P1)
- cut wire AMO2 (pin 3, P2/J18, MAIN, red) close to the plug (P2)
- cut wire AMO3 (pin 4, P2/J18, MAIN, metal baird) close to the plug (P2)
- connect PBTV wire (the end not connected to the plug) with AMO2 wire (the end not connected to the plug)
- connect AMO3 (the end not connected to the plug) to +8V e.g. by tapping (pin 1, J4, MAIN, brown).
- connect the wire stubs on the plug (AMO2 & AMO3) together is you wish to use external modulation input for PACKET etc.
- adjust the coil next to X2 (PBT VXO) for correct middle PBT setting

This modification is read 525 times.

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**27-10-1998**

## **(IC-475) Splitting into RX- and TX paths**

## Problem:

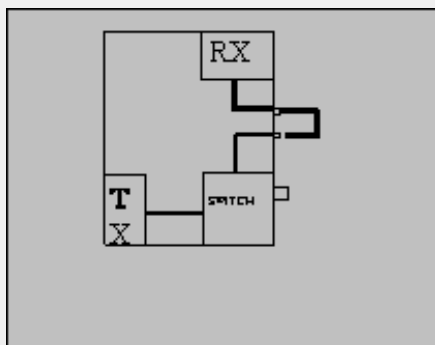
This is a general transceiver problem. If you want to use the transceiver as part of a bigger setup (i.e. with external PA & preamp or with a transverter), it is convenient to have separate access to the RX and the TX of the transceiver. Otherwise you need two coaxial switches every time you add a new accessory. With split RX/TX paths you only need one switch - at the antenna. Furthermore split RX/TX paths eliminates the need for a change-over sequencer.

On the other hand it is also nice to have the transceiver working normally when you are using it barefoot.

## Solution:

The solution is to jump wire the RX path (between RX and the RX/TX switching) through the rear side of the transceiver with 2 BNC connectors. In normal state these connectors are connected via a short cable. In case you need to "split up" the transceiver, you remove the short coax cable, and you obtain direct access to the RX. The TX is still available using the common connector.

**note:** If you are always using your transceiver barefoot, without connecting any PA, preamp or transverter, this modification will offer no benefit.



Remove the back cover. If you place the holes for the BNC connectors next to and aligned with the two existing DIN-connectors, then ICOM have left enough space on the inside for the connections. You can also add other desired outputs like a phono plug for AF OUT.

The RX cable runs between J4 on the RF YGR PCB and the PA unit.

**note:** In my IC-275H the PIN-diode for the FM RF gain is shared with the RX/TX switch and placed in the PA unit. This means that the control voltage passes through the RX cable.

Therefore the breaking of the RX cable will cancel the FM RF gain function (the SSB/CW RF gain is working on the AGC and is not affected). The solution is to install a new PIN-diode (D5) on the RF-YGR PCB. The PCB has already room for it. To avoid short-circuiting the control voltage the jumper placed in stead of C86 on the RF-YGR PCB, should be replaced by a 1nF capacitor.

This modification is read 523 times.

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**27-10-1998**

## **(IC-475) Modification of cw pass band (BFO)**

### Problem:

In these transceivers ICOM has chosen to shift the CW passband up 200 Hz compared to the SSB passband. This makes it more difficult to copy SSB signals in CW mode.

### Solution:

The extra BFO coil that is added in CW-R is short-circuited, and the BFO is re-adjusted for proper CW RX/TX-tracking and for preferred USB/CW passband.

### Implementation:

- short-circuit Lcw in the BFO compartment.

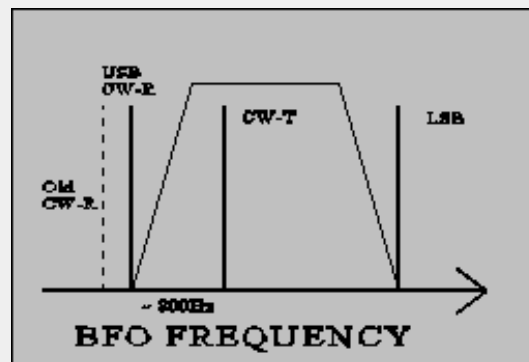
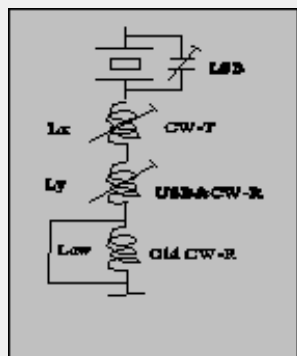
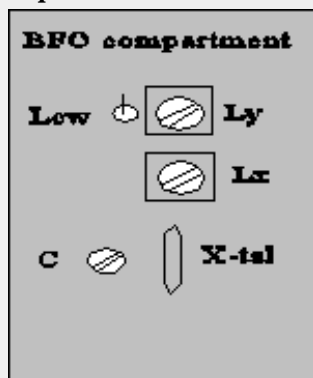
For readjusting the BFO you need another transceiver (TRX2) with correct tracking.

1. Receive on TRX2 and transmit in CW. Adjust the VFO (with the RIT off !) of TRX2 until you have the desired side tone in CW mode. (e.g. 800 Hz - can be found by beating the tone with the side tone oscillator).
2. Transmit on TRX2 and adjust Ly (CW-R) until you have the desired side tone in CW mode. (you are setting the ~800Hz

difference between CW-R & CW-T).

3. Adjust Lx (CW-T) for preferred USB/CW receive passband.

You might have to repeat the tuning once again, as there is some interaction between the adjustments (diode switching for high impedance RF circuits are not perfect !). If you would like to adjust the LSB passband, this should be done by adjusting the capacitor C, before adjusting the coils.



**Note:** The BFO coils are switched in successively to give the required offset from the LSB frequency. Therefore adjusting CW-T also changes USB/CW-R.

Re-adjusting all of the BFO frequencies is a good idea in any case to compensate for crystal aging. If the passbands sound different in LSB and USB it is a sure sign of mis-alignment due to crystal drift - they should be more or less the same.

This modification is read 512 times.

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**27-10-1998**

### **(IC-475) Disabling of SBB squelch**

Problem:

Squelching is nice to have in FM mode, but it doesn't really work for SSB, where you will be looking for weak signals. Therefore you have to adjust the squelch level every time you change mode. Furthermore I enjoy using FM as a monitoring mode on the SSB calling frequency, so changing the mode happens quite often.

Solution:

The solution is quite simple. Just cut the connection to the SSB input of the squelch circuit in some way.

Implementation:

The easiest way to break the connection is to connect the base of Q7 to ground. The base is the lead facing into the centre of the PCB.

This modification is read 513 times.

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**27-10-1998**

### **(IC-475) Very fast AGC**

Problem:

For some modes of weak signal communication, it can be desirable to have a very fast AGC (e.g. meteor bursts with a sharp rise and a long weak "tail"). The standard fast AGC has a time constant of about 2 secs (!), which also means that a noise pulse can mute you for quite some time.

**Note:** Never use the noise blanker when receiving high speed CW (Meteor Scatter). The noise blanker mistakes the high speed keying for noise pulses, and will seriously corrupt the signal.

Solution:

The solution is to move the "AGC fast" capacitor (C19) to replace the "AGC slow" capacitor (C20). You will lose the "AGC slow" option, but I find "AGC fast" adequate for most signals.

Another solution is to switch out the "AGC fast" capacitor (C19) separately, but then you will get the problem of finding an appropriate front plate switch. I already tried to use the DATA button, but it cannot be activated in CW.



**Note:** a strong signal will be seriously distorted in AGC OFF mode.

Implementation:

- remove C20
- move C19 to the replace C20

This modification is read 512 times.

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**27-10-1998**

## **(IC-475) SSB RF Gain**

Problem:

The RF GAIN function is different in FM and in SSB/CW modes. In FM mode the RF GAIN controls a PIN-diode at the input of the preamp. In SSB/CW the RF GAIN simply activates the IF AGC.

The use of the preamp input attenuator (the PIN-diode) can be useful also for SSB/CW e.g. if you have connected a mast head preamp with excessive gain. In this case the attenuator will help you to adjust the signal levels at the mixer, and thus reduce intermodulation and blocking.

Solution:

The solution is to remove the SSB/CW RF GAIN for SSB/CW (this function is of little use anyway), and enable the FM RF GAIN even in SSB/CW.

Implementation:

- Cut the lead (FM8V) conneted to (pin5, J6, potmeter PCB, green) about 4 cm from the plug
- Connect the short plug end with R14 (on the potmeter PCB) by soldering it to the end that is connected to the plug (+8V)

This will enable the FM RF GAIN in SSB/CW.

- cut R30 open

This disables the SSB/CW RF GAIN, and you now have a variable input attenuation with a dynamic range of 10dB (IC275 with MI308/1nF) to 16 dB (IC475).

**Note:** The IC-275 might have a shared PIN diode for FM RF GAIN and TX/RX switching. If you choose to split up the RX/TX paths, you must install a new PIN diode (MI301 or equivalent) on the RF YGR PCB to implement this modification. See the note under the section dealing with splitting the RX/TX paths.

This modification is read 528 times.

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**27-10-1998**

## **(IC-475) Tuning speed**

The tuning speed is set to a defaults of 100Hz, 1kHz, 5kHz or 1MHz depending on front plate setting and mode. These settings can be manipulated by D41 - 46 at the front plate. At least a setting of 10kHz is also available.

### **Frequency range & CTCSS tones**

The IC-275 have capability to cover 138 - 174 MHz and the IC-475 has capability to cover 430 - 450 MHz. Because of hardware restrictions they might not be fully up to specifications in all of the band, but an extended range can be interesting for e.g. use with a transverter. It seems that the IC-275 has a parallel wide band preamp, that can be switch via the WBT pin on RF-YGR PCB.

In the European versions the transceivers are wired for 1750 Hz repeater call, and they have no CTCSS capability. The transceivers have a built-in CTCSS encoder, so these functions can be restored.

Both of these version dependent functions can be set by the diode matrix: D20 - D24 in the logic unit. I do not know the exact mapping, but a lot can be derived from studying the different frequency ranges and the diode matrix coding table found on the schematic diagram.

This modification is read 522 times.

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**27-10-1998**

### **(IC-475) Frequency range & CTCSS tones**

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This modification is read 561 times.

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**28-03-1999**

### **(IC-475) Umbau des IC475E/H zum betrieb mit G3RUH-Modem (9600 Baud)**

1. An der Rueckseite des Tranceiver befindet sich eine 13-polige Buchse, welche an Pin 2 noch nicht belegt ist. Von diesem Pin wird eine abgeschirmte Leitung zum ZF-Ic 6 , MC 3357 P, Anschlusspin 9 gelegt. Dieses ist der direkte Demodulatorausgang.
2. Am Pin 2 der 13-poligen Buchse kann direkt das Sende-Audiosignal vom G3RUH-Modem angelegt werden. Es bedarf keiner weiteren Modifikation im TRX.
3. Am Pin 7 der 13-poligen Buchse wird die PTT-Leitung vom TNC beschaltet.
4. Am Pin 13 der 13-poligen Buchse hole ich mir die Stromversorgung fuer das Modem und den TNC. (die 5 Volt fuer den TNC entnehme ich hinter dem 5 Volt-Spannungsregler vom G3RUH-Modem). So erspart man sich ein Extra-Netzteil fuer die TNC-Modem-Kombination. Allerdings ist dabei auf ausreichende kuehlung des 5V-Reglers auf G3RUH-Platine zu achten, falls nicht alle Bauteile CMOS-TTL,s sind!
5. Die entsprechenden Masseleitungen holt man sich dann noch von den Pin,s 1 und 9 der obig oft genannten Buchse.

Ich wuensche allen Umbauern viel erfolg und gutes gelingen.

Nach diesen Aenderungen betreibe ich meinen 475E schon einige Monate ohne jegliche Probleme.

Das TX-Delay kann bei diesem TRX ohne weiteres unter 5 eingestellt sein! \*\* vorausgesetzt der Digi/Partner hoert einen dann noch hi. \*\*

Sollten noch Fragen offen sein schreibt mir eine Nachricht in die Box unter DG5EM @ DB0IZ.

55 , 73 de Helmut DG5EM aus Duisburg  
From: DH1SAJ @ DBORBS. #BW.DEU.EU

UMBAU ICOM IC475H/E auf 9600Bd FSK mit G3RUH-Modem

Zu diesem Thema wurde von DG5EM schon eine INFO in die Boxen eingespielt.

Hier ein 'UPDATE' dazu:

Der Beschreibung von DGEM ist auf elektrischer Seite nichts mehr hinzuzufügen. Der ganze Umbau läßt sich jedoch MECHANISCH drastisch vereinfachen, wenn man wie folgt vorgeht:

Der Pin 5 der 13-poligen Erweiterungsbuchse ist bereits mit der RX-NF vom PIN 9 des ZF-IC's 6 (MC3357P) belegt. Jedoch wird das Signal über diverse RC-Glieder gepresst, sodaß es für 9k6 total unbrauchbar wird.

Da ich für diesen Ausgang auch keinerlei andere Anwendung sehe, hab ich die Leitung, die an diesen Pin 5 der AQS-Buchse führt und die ja schon im Gerät verlegt ist, einfach direkt auf den IC-Ausgang (IC6/Pin9) gelegt, wie von DG5EM beschrieben.

Das spart einen mords Haufen Arbeit, weil man am 475H nur sehr beschwerlich an die Buchse in der Rückwand hinkommt.

Um diese Leitung umzumünzen muß man am Connector J13 den Pin 4 abklemmen, das ist eben diese Leitung zu Pin5 der Erweiterugsbuchse, und sie an PIN9/IC 6 anlöten. FERTIG. Dazu braucht man nur den unteren Deckel des Gerätes zu öffnen.

J13 sitzt nur ca. 3 cm vom IC6 entfernt, und wenn man die Leitung an PIN 4 (schwarz isoliert) knapp am Stecker abzwickt oder aus dem Stecker herausbastelt reicht es problemlos bis zum IC hinüber.

Die dazugehörige Abschirmung auf Pin5 / J13 läßt man natürlich dran. Das RX-Signal liegt jetzt logischerweise an PIN 5 der AQS-Buchse am Gerät, nicht an PIN 11, wie von DG5EM ursprünglich beschrieben.

Fragen bitte an DH1SAJ @ DB0RBS, MYBBS DB0SAO ist z.Zt. ohne LINK

73 de Jochen, DH1SAJ @ DB0RBS

This modification is read 507 times.

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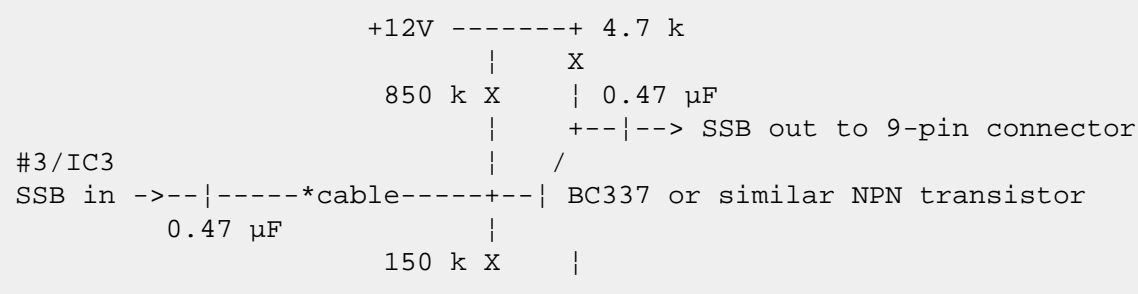
**19-07-1998**

## **(IC-490) Modifikation af IC-490 for 9K6**

1. The back section is fixed by four screws through the side plates. Remove those screws and bend the back section as far as the wiring allows. You will see the screw heads when the top and bottom cover of IC490 have been removed.
2. 470 nF = 0.47 µF The capacitance could be higher, but there are space limitations inside the rig underneath the IC490 Main Unit print.

For the time being you will not need the connection with varactor D3 for any satellite, but you may need it for a 9600 baud terrestrial net. It will, however, be feasible to prepare that connection as well when the AF/FM and AF/SSB connections are being built.

3.



\*cable from 0.47 µF condenser on the Main Unit to the amplifier located at an empty spot within the rig

You will need the above amplifier only when SSB signal level at #3/IC3 will not be sufficient for your TNC. I am not familiar with TAPR 1200 baud psk modem.

4. As you know doppler shifts UO-14 frequency downwards only from rise to set. Often 435.077 ---> 435.058 MHz. Consequently IC490 needs down commands only. It will get such a command each time the calculated frequency drops by 1 kHz. My program calculates the current frequency, not doppler shift only. I initially tune my Rx to the frequency I know UO-14 has, when rising above horizon. I dont need to hear UO-14 at that moment. In fact I know UO-14 frequency any time without listening, just by looking at the monitor. When I tune my Rx at that frequency I know that UO-14 is there. The control system then steps the frequency down as frequency calculation tells it to do.

I think you will not need the diagram for the circuitry since your tracking program apparently does not tell the above things.

You would find Finnish speaking fellows at the subsidiaries of Finnish companies, like EPL-Kone Pty, in your country. That would unfortunately not solve the program problem.

Pate OH2SN @ OH2RBI

This modification is read 551 times.

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**19-07-1998**

## **(IC-490) IC-490A 10MHz up modification**

### PLL, VCO Adjustment:

Remove top and bottom covers. Remove PLL unit cover. Remove four screws on PLL DRIVER board. Take X1 (15.8145MHz) out in the PLL unit and replace with the 16.321MHz crystal.

Connect RF voltmeter to R36 in the PLL unit. Adjust L5, L6, L7 coils for maximum level, (Note: Turn L2 counterclockwise about two turns if there is no signal.). Connect voltmeter to D1. Adjust L2 for 4 volts. Remove connector J4 on the RF, YGR unit. Connect RF voltmeter to the cable from the PLL unit. Adjust C62, C63, C73, L13 caps and coil for maximum level.

Set the display for 444,9985MHz. Connect frequency counter to C54. Adjust R6 in the PLL unit for 202,8100MHz.

### B.P.F. Adjustment:

Connect power meter to the antenna connector. Set the mode switch to FM. Transmit and adjust L19, L20, L21, L22, C67, C74 for maximum output power. Apply RF signal to the antenna connector (RF signal Generator). Adjust L8, L9, L10, and L11 coils for maximum receive sensitivity from 440MHz to 450MHz.

### Receiver Adjustment:

Apply 445MHz signal to the antenna connector (RF signal Generator). Adjust L11 and C18 for maximum sensitivity at 445.000MHZ.

Transmit Adjustment: Connect power meter to the antenna connector. Add a jumper between R218 and R219. Set mode switch to FM. Put display on 445.000MHz. Transmit. Adjust C74 for maximum power output at 445.000MHz. Remove the jumper. Adjust R154 for 10 watts.

Adjust R153 for 1.0 watts.

This modification is read 545 times.

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**31-03-1999**

## **(IC-490) Anschluss eines G3RUH Modems und AFSK-Modem an IC-490E**

*de DL2LK @ DB0EAM*

Das IC490E ist sehr leicht gleichzeitig fuer AFSK und FSK anzuschliessen.

Empfangs-NF direkt am IC12 Pin 9 abnehmen. (MAINUNIT)

Masse wenn gewuenscht direkt am nebenliegenden Bandfiltergehaeuse L19 verloten.

--Dieses Signal ist gleich gut fuer FSK und AFSK zu verwenden. -

FSK-TX Signal an R32 (Widerstand stehend) direkt oben anloeten. (MAINUNIT)

Masse wenn gewuenscht an R33 (Widerstand stehend) direkt oben anloeten.

AFSK-TX Signal an R11 (Widerstand stehend) direkt oben anloeten. (MAINUNIT)

Masse wenn gewuenscht an R8 (Widerstand stehend) direkt oben anloeten.

Achtung vor den loeten an den Widerstaenden natuerlich die Schutzfarbe etwas abkratzen.

Hinten am Geraet ist die ACC Buchse mit 9 Pins. Hier kann man alle Signale sehr leicht draufloeten. Pins 5 und 6 sind nicht beschaltet. Ich habe den PIN 7 (8VDC 20mA) freigemacht, da ich dieses nicht benoetige und die Buchse ist jetzt fuer PACKET folgendermassen beschaltet.

| PIN | Bezeichnung                               |
|-----|---|
| --- | -----                                     |
| 1   | wie bisher                                |
| 2   | wie bisher PTT                            |
| 3   | wie bisher 12 Volt/300mA fuer TNC2C/G3RUH |
| 4   | wie bisher Masse                          |
| 5   | neu NF-RX vom Diskriminator               |
| 6   | neu TX-FSK zur Varactordiode              |
| 7   | neu TX-AFSK                               |
| 8   | wie bisher                                |
| 9   | wie bisher                                |

Also mit einen einzigen Kabel wird der TNC mit eingebauten Modem und das G3RUH Modem mit Daten und der benoetigten Spannung versorgt.

Es ist wichtig bei DIGIPEATERN die gleichzeitig FSK und AFSK machen die beiden DCD's auszuwerten und verknuepft dem TNC zur Verfuegung zu stellen.

Dieses ist mit dieser Schaltung also sehr leicht zu realisieren.

Die Umschaltzeiten mit diesem Geraet sind natuerlich sehr kurz. Das bei AFSK eine digitale DCD Erkennung vorhanden sein muss, versteht sich von selbst.

Viel Spass bei normalen Packet und "High-Speed-PR" auf 70 cm.

73 de Wilfried DL2LK @ DB0EAM

This modification is read 523 times.

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**19-07-1998**

### **(IC-4SAT) ICOM IC-4SAT extended transmit mod**

Ok, I recently asked the net for mods to expand the transmit frequency coverage of the Icom IC-4SAT so that I could access the rest (or at least more ) of the 440 ham band below 440mhz.

Well, the net didn't come through but a local ham made a suggestion to me that I followed up on. I mentioned that I had a mod (see attached message below) for the IC2SAT to expand its transmit range. He suggested that I look at doing the same mod (I know - it sounds crazy). Since I have the tech manual for both units oked at the 2S manual to see what the mod was doing. I then looked at the 4S manual to see if things were similiar. To my suprise (although in retrospect I'm not suprised, just suprised that I didn't think of it) the microprocessor section is IDENTICAL wi th only the initialization matrix of diodes being different between the 2S and the 4S. Even the part numbers of the micro were the same (led me to believe that the code is the same in both). So I tried the mod explained below.

Bottom line - it worked!! I get about 30 mhz of lock range from about 435 MHz to 465 MHz. My next step will be to look at retuning the vco to move it down in the ham band more.

/s/ Bob Gettys N1BRM

This modification is read 341 times.

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**23-01-1999**

### **(IC-4SE) Extending the Rx. coverage of the IC-2SE and IC-4SE**

It is possible to extend the receiver coverage of both of the above radios without removing the covers!

With the radio turned off, but beep enabled, hold down LAMP, FUNC and V/M buttons while simultaneously turning on the radio. Keep all 3 buttons pressed. The display will fill up with all sections on, then there will be a beep, a longish gap and another beep. Once the second beep is over, release the buttons.

Lo and behold, you now have coverage of any freq from 0 to 1300 MHz, except, of course, that the VCO cannot cover the entire range. For example, the 4SE will cover approximately 380 to 480Mhz plus 805 to about 930MHz.

Information originated from G8SEZ

This modification is read 286 times.

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**19-07-1998**

### **(IC-551) Modification of the ScanRate and ScanSpeed for IC551D**

#### Introduction:

Here is a modification for the IC-551D 6-metre multimode radio. The mod. may be applicable to other ICOM radios of that era, eg, the 2-metre version (IC-251?, IC-211?). It is easily carried out and consists of soldering a jumper wire between two other wires. No major disassembly is required.

#### Background:

When the 'VFO' switch is set to the 'MS' position, the IC-551D can be made to scan three user-programmable frequencies. Unfortunately, after scanning has stopped on an active frequency, it never re-starts, even if the signal disappears from the frequency. The radio remains on that frequency indefinitely. The user is forced to manually re-start the scanning, and the cycle repeats when an active frequency again opens the squelch.

#### Modification:

This mod. will cause the scanning to pause on an active frequency for approx 10 seconds; scanning automatically resumes at the

end of the 10 seconds whether the signal is present or not. In essence the mod. consists of changing the 'MS' scan regime from the band-scan 'MODE A' regime (permanent stop) to the band-scan 'MODE B' regime (pause).

#### Note:

The IC-551D handbook says that the pause in 'MODE B' is sixteen seconds, whereas in my radio it is close to ten seconds. It's possible that ICOM revised the design after the handbook was printed, or perhaps the 10-second characteristic of my particular radio is a result of long-term component drift. Whatever, the point here is that the same pause will be used for the 'MS' scan mode as is already used in the 'B' scan mode. So in your particular radio the pause may be 10-16 seconds.

#### Scan Rate:

After modification the scan rate becomes adjustable by the 'SCAN SPEED' control, which was previously rendered non-operative in 'MS' scan mode, although it was operative in the two band-scan modes, A and B.

#### Procedure:

Remove the power plug from the rear of the IC-551D. Turn the set upside-down with the rear closest to you. From this point on, all expressions such as 'left', 'right', 'up', 'down', refer to the radio as viewed by you in this orientation.

1. Remove the four bottom cover screws and CAREFULLY remove the bottom cover, disconnecting the speaker plug as you lift it away.
2. If your IC-551D does not have the optional FM board installed, go to Step 3. Remove the FM board by disconnecting the white plug from the left corner and removing four screws (two at each end). Lift the FM board away carefully as it's still attached to the radio by a flying cable, and place it on the front corner of the case.
3. Remove the sub-bracket on which the FM board was mounted by removing the screws at each side (in my radio: 2 on LHS, 1 on RHS).
4. Cut a length of light, flexible wire 50-60mm long and strip 3mm of insulation from each end. Tin both ends of this jumper wire with solder.
5. Observe the printed circuit board mounted vertically about 40mm behind the front-panel controls. This PCB is the 'DRIVER' board.

This is a CPU/digital processing board and has nothing to do with the transmit driver stages. Observe the three white plugs/sockets (headers) along the upper edge of this PCB. On the left-most header (closest to the centre of the radio) count the wires from right to left as they exit from the plug. This is a six-wire plug/socket (J2/P11). The second wire from the right is a dark-green wire. This is the 'VFO B' wire.

DO NOT cut this wire. At some convenient point, strip about 4mm of insulation from it with a razor blade. Tin the exposed wire and solder one end of your 50-60mm jumper wire to it.

#### **Caution:**

In some photos in the ICOM documentation J2/P11 are shown fitted to the front-panel side of the PCB, rather than the rear side. If J2/P11 have been fitted this way in your radio, you must still use the second wire from the right, since the PCB layout does not change.

However, the wire may not be dark-green as the colour sequence may be reversed.

6. Look down the left-hand edge of the same PCB. Observe the white plug/socket header, the first one you come to as you look down the edge of the PCB. The header is J4/P7. Count the wires as they exit plug P7. The third wire (counting downwards) is an orange wire. This is the 'MS' wire. To make this wire accessible, prise P7 off J4 with a screwdriver and pull P7 up towards you. At some convenient point, cut the wire, creating two ends, one going into P7, the other coming from the loom. Ignore the wire going into P7, it will not be used. Instead, take the wire which comes from the loom, strip 3mm or so of insulation from it and tin it with solder. Solder the free end of your 50-60mm jumper wire to this tinned end.
7. Push P7 back down into the wiring and press it back onto J4. This is a little tricky, but is best done with a short, skinny, screw- driver.
8. Re-fit the FM board sub-bracket and re-fit its screws. Re-fit the FM board to the bracket and re-fit its screws. Plug in its header plug. Ensure that both of your soldered connections and the cut-off end of the 'MS' wire are clear of metal framework, shield compartments. The rest of the re-assembly is in reverse order to that described earlier.

#### Testing:

Turn on the IC-551D. Program three frequencies into memory positions 1,2,3. Set the 'VFO' switch to 'MS' and initiate scanning by pressing the 'MS/MW' button. When one of those frequencies becomes active, scanning will pause for 10-16 seconds; scanning resumes automatically at the end of the pause, whether the signal is present or not. When receiving a prolonged transmission, reception is briefly interrupted every 10-16 seconds as the scanning re-starts. When two or three of the frequencies are active, each transmission is heard in rotation for 10-16 seconds, eg. 1,2,3,1,2,3.

Scanning can still be stopped and re-started by pressing the 'MS/MW' button. The rate at which the frequencies are scanned is now adjustable by the 'SCAN SPEED' control, accessible by removing the small cover in the top of the case. It's probably best to set the control at the slowest setting (fully anti-clockwise). If set too fast, scanning may not stop on active frequencies. No other function of the IC-551D is disturbed by this modification.

I use my IC-551D in the 'MS' scan mode to monitor my three favourite 2-metre repeaters, using a home-brew 144-50 MHz converter connected to the IC-551D.

**26-07-1999****(IC-551) IC-551D to rx down to 47.000 MHz**

First, dial down to the bottom end of the band, eg 50.001, on usb. Press the button on the left side of the dial so that the red light comes on. Keep on pressing this button with your right hand/finger. Now with your left hand change the mode from usb to fm and back, do this many times and you will see the freq going down in 10 increments.

You will notice that the freq read out will not show 49mhz but 59mhz, ignore this. I have listerned to cordless phones down at "59mhz". Take the freq read out down to 48.999mhz, "58.999mhz," only then can you use the dial to dial down after letting the button go. Anything between 48.999mhz"58.999mhz" to 49.999mhz "59.999mhz" will revert back to 53mhz if you let the button go and try to dial down. Between 48.999 to 49.999 you can ownly dial up.

I have listerned to video signals from Europe on 48.250mhz "58.250mz" I hope you have luck with this. 73 Alex

**13-07-2000****(IC-551) IC-551/551D Frequency Alignment**

1. Locate R122 near center of main board, directly in front of center mounting screw. The top of this resistor is bare and is used as the test point for the BFO. Connect frequency counter to this point.
2. Set mode switch to LSB. (Dial frequency unimportant)
3. Adjust C105 for 9.013000 MHz.
4. Set mode switch to CW.
5. Turn on RF power control and set at minimum power output.
6. Set receive/transmit switch to transmit.
7. Short CW key jack on rear of radio or close CW key if attached.
8. Adjust L33 for 9.010500 MHz.
9. Return to receive.
10. Set mode switch to USB.
11. Adjust L32 for 9.010000 MHz.
12. Set mode switch to CW.
13. Adjust L31 for 9.009700 MHz.
14. Remove cover from PLL unit.  
(6 x 17 cm. metal cover on right of main board.)
15. Locate R44 near rear of PLL unit. The top of this resistor is bare and is used as the test point for the VCO. Connect frequency counter to this point.
16. Set mode switch to LSB.
17. Tune dial to 50.101.5 MHz.
18. Adjust R59 for 41.088500 MHz.
19. Tune dial to 50.101.4 MHz.
20. Adjust R60 for 41.008400 Mhz.

The following steps apply only to units equipped with FM unit EX106.

21. Dial 50.100.0 MHz.

22. Adjust L8 in FM unit for 50.100000 MHz on transmit at output to dummy load.

This modification is read 608 times.

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**13-07-2000**

### **(IC-551) IC-551/551D EX-107 VOX UNIT -- Installation**

The VOX unit mounts to the lower mounting plate.  
See instructions for EX-106 and page 29 of your manual.

1. Mount the EX-107 on the lower mounting plate. Mount with the cable toward the centerline of the radio. Secure with 4 screws.
2. Route the cable behind the front panel to the top of the main circuit board. Connect the plug to J4 after removing the jumper plug installed at this location.
3. Reinstall upper mounting plate and top & bottom covers.
4. Adjust VOX gain, ANTI VOX, and VOX delay for proper operation.
5. VOX will work on CW as break-in. There is a delay line in the VOX to allow full transmit operation before the first syllable is transmitted and to prevent chirp on the first CW character.

This modification is read 545 times.

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**13-07-2000**

### **(IC-551) IC-551/551D EX-108 P.B. TUNE UNIT -- Installation**

The EX-108 mounts to the upper mounting plate as shown on page 29 of the manual.

1. Attach the EX-108 to the upper mounting plate with 4 screws.
2. Route cable behind front panel to top of main circuit board.
3. Remove jumper cable connected between J2 and J3. Connect EX-108 cable to J3.
4. If your radio has a choke coil (L44) next to J3, remove it.
5. The cutoff bandwidth is about 700 Hz at -6db point.  
For CW, unit gives +/-500 Hz BW at -6db point and is adjustable. This unit also contains a speech processor for SSB use.

This modification is read 561 times.

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**19-07-1998**

### **(IC-575) IC-575 Freq. steps mod**

Titolo: Tuning steps change for all mode Icom IC-275/475/575/1275

The IC-275/475 FM-Step selectmatrix use these diodes on the front unit: (type 1SS53) D41, D42, D43, D44, (D45), D46

Note: diode D45 is not present but solder holes exist for it on the board just between D44 e D46

installed diodes are marked with X :

| D41 | D42 | D43 | D44 | D45 | D46 | D48 | Steps    | DB4 | DB5 | DB6 | DB7 |
|-----|-----|-----|-----|-----|-----|-----|----------|-----|-----|-----|-----|
| .   | .   | .   | .   | (*) | .   | .   | 10.0 Hz  |     |     |     |     |
| .   | .   | .   | X   | .   | .   | .   | 100.0 Hz | 1   | 0   | 0   | 0   |
| .   | X   | .   | .   | .   | .   | .   | 1.0 KHz  | 0   | 0   | 1   | 0   |



|   |   |   |     |   |          |     |   |   |   |
|---|---|---|-----|---|----------|-----|---|---|---|
|   | X | . | X   | . | 5.0 KHz  | 1   | 0 | 1 | 0 |
| . | . | . | .   | X | 10.0 KHz | 0   | 1 | 0 | 0 |
| . | . | . | (*) | X | 12.5 KHz | (*) | 1 | 1 | 0 |
| . | . | . | .   | . | 25.0 KHz | 0   | 0 | 0 | 1 |
| X | . | X | .   | . | 1.0 MHz  | 0   | 1 | 0 | 1 |

(\*)

To set a step of 12.5 KHz in FM mode (TS button off) it is not necessary disconnect the diode D44, just insert the diode D45 (IN4148 or similar) near D44 and "voilà! les jeux sont faits".

Unscrew the two lateral screws and unlock the front panel.

Remove also all the connectors of the front board and after that unscrew ALL the screws of the metallic shield covering the front board. It seems too much complicated insert the diodes from the component side of the front board, so it is better insert D45 from the solder side.

This modification is read 587 times.

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**27-10-1998**

## **(IC-575) Power control modification**

Problem:

The power control circuit in IC-x75 is an ALC circuit. ALC circuits suffers from several drawbacks:

- slow reaction time due to time constants
- insufficient regulation due to low feed-back factor

These factors gives the problem that if the average power has been set to a low value (e.g. for driving a HPA), peak power can still be in the order of 3-4 dB higher. This leads to either considerable side band distortion or a low average power output.

**note:** If you are always using your transceiver barefoot, without connecting any PA or transverter, this modification will offer no benefit.

Solution:

The solution to these problems is to use a simple forward gain regulation without the feed back circuit of the ALC. The original ALC is still kept for SWR protection only.

The ALC is working on gate 1 of Q13, which is a IF amplifier (9 or 10.75 MHz). The new power regulation uses gate 2 of Q13. Therefore the two circuits can exist in parallel.

The modification should also give you a bigger dynamic range in the power regulation (lowest power < 5W on the IC-x75H).

Implementation:

- replace R87 (470k) with 100k
- cut "POCO" wire (pin 3, P1/J1, MAIN, orange) at the plug (P1)
- connect the "POCO" wire to gate 2 of Q13 (e.g. via top of R87)
- adjust R250 (SWR protection), R256 (low power level) & R259 (high power level) fully counter-clockwise. (this will give you full SWR protection, but cancels the ALC in normal operation).
- put the front plate RF PWR in full output position (clockwise) and adjust R82 (Q13 output attenuator) until you have the nominal output power (initially the output power will be higher because you removed the regulation, but the PA will be saturated).
- the balance between FM, CW & SSB output can be adjusted with R137 (CW carrier level) & R105 (FM carrier level).
- other interesting adjustments: R135 (mixer balance i.e. SSB carrier suppression), R133 (TX BFO output level).

This modification is read 576 times.

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**27-10-1998**

## **(IC-575) Restoration of pass band tuning**

### Problem:

ICOM has chosen to remove the PBT in the later models, and replace it with a "data level adjustment". This change removes the possibility to profit from the PBT in case of QRM or to use the PBT as a cheap CW-filter.

Furthermore the two extra IF-mixings is done with only a minimum of filtering, making the receiver very susceptible to spurious IF breakthrough. This is often heard as high-pitch tones or as a high IF noise level.

### Solution:

The solution is to re-wire the "data level" potentiometer so that it adjusts the PBT VXO-oscillator, and to re-install FI3. FI3 is a 455kHz ceramic SSB filter and can be bought under the type number: MURATA CFJ 455 K6.

### Implementation:

- remove the capacitor (C61) fitted in place of FI3
- solder in FI3
- readjust R72 for proper IF gain
- cut wire PBTV (pin 4, P1/J1, MAIN, yellow) about 5cm from the plug (P1)
- cut wire AMO2 (pin 3, P2/J18, MAIN, red) close to the plug (P2)
- cut wire AMO3 (pin 4, P2/J18, MAIN, metal baird) close to the plug (P2)
- connect PBTV wire (the end not connected to the plug) with AMO2 wire (the end not connected to the plug)
- connect AMO3 (the end not connected to the plug) to +8V e.g. by tapping (pin 1, J4, MAIN, brown).
- connect the wire stubs on the plug (AMO2 & AMO3) together is you wish to use external modulation input for PACKET etc.
- adjust the coil next to X2 (PBT VXO) for correct middle PBT setting

This modification is read 548 times.

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**27-10-1998**

## **(IC-575) Splitting into RX- and TX paths**

### Problem:

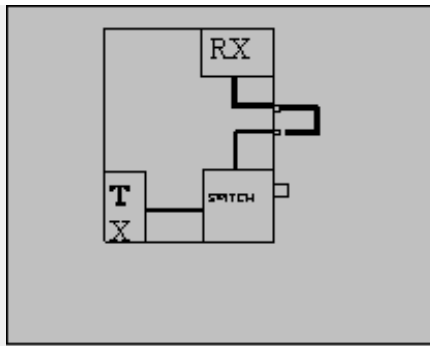
This is a general transceiver problem. If you want to use the transceiver as part of a bigger setup (i.e. with external PA & preamp or with a transverter), it is convenient to have separate access to the RX and the TX of the transceiver. Otherwise you need two coaxial switches every time you add a new accessory. With split RX/TX paths you only need one switch - at the antenna. Furthermore split RX/TX paths eliminates the need for a change-over sequencer.

On the other hand it is also nice to have the transceiver working normally when you are using it barefoot.

### Solution:

The solution is to jump wire the RX path (between RX and the RX/TX switching) trough the rear side of the transceiver with 2 BNC connectors. In normal state these connectors are connected via a short cable. In case you need to "split up" the transceiver, you remove the short coax cable, and you obtain direct access to the RX. The TX is still available using the common connector.

**note:** If you are always using your transceiver barefoot, without connecting any PA, preamp or transverter, this modification will offer no benefit.



Remove the back cover. If you place the holes for the BNC connectors next to and aligned with the two existing DIN-connectors, then ICOM have left enough space on the inside for the connections. You can also add other desired outputs like a phono plug for AF OUT.

The RX cable runs between J4 on the RF YGR PCB and the PA unit.

**note:** In my IC-275H the PIN-diode for the FM RF gain is shared with the RX/TX switch and placed in the PA unit. This means that the control voltage passes through the RX cable. Therefore the breaking of the RX cable will cancel the FM RF gain function (the SSB/CW RF gain is working on the AGC and is not affected). The solution is to install a new PIN-diode (D5) on the RF-YGR PCB. The PCB has already room for it. To avoid short-circuiting the control voltage the jumper placed in stead of C86 on the RF-YGR PCB, should be replaced by a 1nF capacitor.

This modification is read 554 times.

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**27-10-1998**

## (IC-575) Modification of cw pass band (BFO)

Problem:

In these transceivers ICOM has chosen to shift the CW passband up 200 Hz compared to the SSB passband. This makes it more difficult to copy SSB signals in CW mode.

Solution:

The extra BFO coil that is added in CW-R is short-circuited, and the BFO is re-adjusted for proper CW RX/TX-tracking and for preferred USB/CW passband.

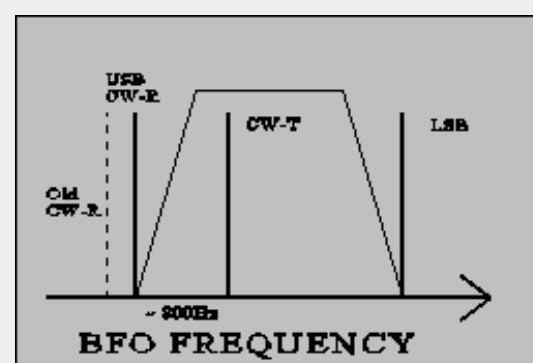
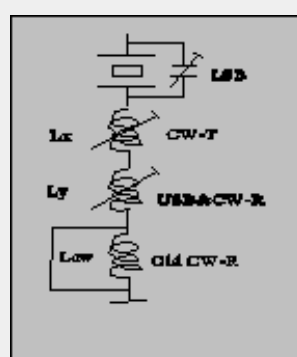
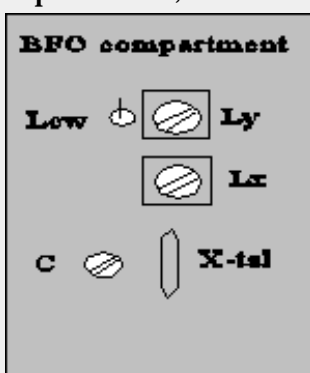
Implementation:

- short-circuit Lcw in the BFO compartment.

For readjusting the BFO you need another transceiver (TRX2) with correct tracking.

1. Receive on TRX2 and transmit in CW. Adjust the VFO (with the RIT off !) of TRX2 until you have the desired side tone in CW mode. (e.g. 800 Hz - can be found by beating the tone with the side tone oscillator).
2. Transmit on TRX2 and adjust Ly (CW-R) until you have the desired side tone in CW mode. (you are setting the ~800Hz difference between CW-R & CW-T).
3. Adjust Lx (CW-T) for preferred USB/CW receive passband.

You might have to repeat the tuning once again, as there is some interaction between the adjustments (diode switching for high impedance RF circuits are not perfect !). If you would like to adjust the LSB passband, this should be done by adjusting the capacitor C, before adjusting the coils.



**Note:** The BFO coils are switched in successively to give the required offset from the LSB frequency. Therefore adjusting CW-T

also changes USB/CW-R.

Re-adjusting all of the BFO frequencies is a good idea in any case to compensate for crystal aging. If the passbands sound different in LSB and USB it is a sure sign of mis-alignment due to crystal drift - they should be more or less the same.

This modification is read 535 times.

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**27-10-1998**

### **(IC-575) Disabling of SBB squelch**

Problem:

Squelching is nice to have in FM mode, but it doesn't really work for SSB, where you will be looking for weak signals. Therefore you have to adjust the squelch level every time you change mode. Furthermore I enjoy using FM as a monitoring mode on the SSB calling frequency, so changing the mode happens quite often.

Solution:

The solution is quite simple. Just cut the connection to the SSB input of the squelch circuit in some way.

Implementation:

The easiest way to break the connection is to connect the base of Q7 to ground. The base is the lead facing into the centre of the PCB.

This modification is read 534 times.

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**27-10-1998**

### **(IC-575) Very fast AGC**

Problem:

For some modes of weak signal communication, it can be desirable to have a very fast AGC (e.g. meteor bursts with a sharp rise and a long weak "tail"). The standard fast AGC has a time constant of about 2 secs (!), which also means that a noise pulse can mute you for quite some time.

**Note:** Never use the noise blanker when receiving high speed CW (Meteor Scatter). The noise blanker mistakes the high speed keying for noise pulses, and will seriously corrupt the signal.

Solution:

The solution is to move the "AGC fast" capacitor (C19) to replace the "AGC slow" capacitor (C20). You will lose the "AGC slow" option, but I find "AGC fast" adequate for most signals.

Another solution is to switch out the "AGC fast" capacitor (C19) separately, but then you will get the problem of finding an appropriate front plate switch. I already tried to use the DATA button, but it cannot be activated in CW.

**Note:** a strong signal will be seriously distorted in AGC OFF mode.

Implementation:

- remove C20
- move C19 to the replace C20

This modification is read 533 times.

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**27-10-1998**

## **(IC-575) SSB RF Gain**

### Problem:

The RF GAIN function is different in FM and in SSB/CW modes. In FM mode the RF GAIN controls a PIN-diode at the input of the preamp. In SSB/CW the RF GAIN simply activates the IF AGC.

The use of the preamp input attenuator (the PIN-diode) can be useful also for SSB/CW e.g. if you have connected a mast head preamp with excessive gain. In this case the attenuator will help you to adjust the signal levels at the mixer, and thus reduce intermodulation and blocking.

### Solution:

The solution is to remove the SSB/CW RF GAIN for SSB/CW (this function is of little use anyway), and enable the FM RF GAIN even in SSB/CW.

### Implementation:

- Cut the lead (FM8V) connected to (pin5, J6, potmeter PCB, green) about 4 cm from the plug
- Connect the short plug end with R14 (on the potmeter PCB) by soldering it to the end that is connected to the plug (+8V)

This will enable the FM RF GAIN in SSB/CW.

- cut R30 open

This disables the SSB/CW RF GAIN, and you now have a variable input attenuation with a dynamic range of 10dB (IC275 with MI308/1nF) to 16 dB (IC475).

**Note:** The IC-275 might have a shared PIN diode for FM RF GAIN and TX/RX switching. If you choose to split up the RX/TX paths, you must install a new PIN diode (MI301 or equivalent) on the RF YGR PCB to implement this modification. See the note under the section dealing with splitting the RX/TX paths.

This modification is read 546 times.

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**27-10-1998**

## **(IC-575) Tuning speed**

The tuning speed is set to a defaults of 100Hz, 1kHz, 5kHz or 1MHz depending on front plate setting and mode. These settings can be manipulated by D41 - 46 at the front plate. At least a setting of 10kHz is also available.

This modification is read 542 times.

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**27-10-1998**

## **(IC-575) Frequency range & CTCSS tones**

The IC-275 have capability to cover 138 - 174 MHz and the IC-475 has capability to cover 430 - 450 MHz. Because of hardware restrictions they might not be fully up to specifications in all of the band, but an extended range can be interesting for e.g. use with a transverter. It seems that the IC-275 has a parallel wide band preamp, that can be switch via the WBT pin on RF-YGR PCB.

In the European versions the transceivers are wired for 1750 Hz repeater call, and they have no CTCSS capability. The transceivers have a built-in CTCSS encoder, so these functions can be restored.

Both of these version dependent functions can be set by the diode matrix: D20 - D24 in the logic unit. I do not know the exact mapping, but a lot can be derived from studying the different frequency ranges and the diode matrix coding table found on the schematic diagram.

This modification is read 576 times.

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26-06-2001

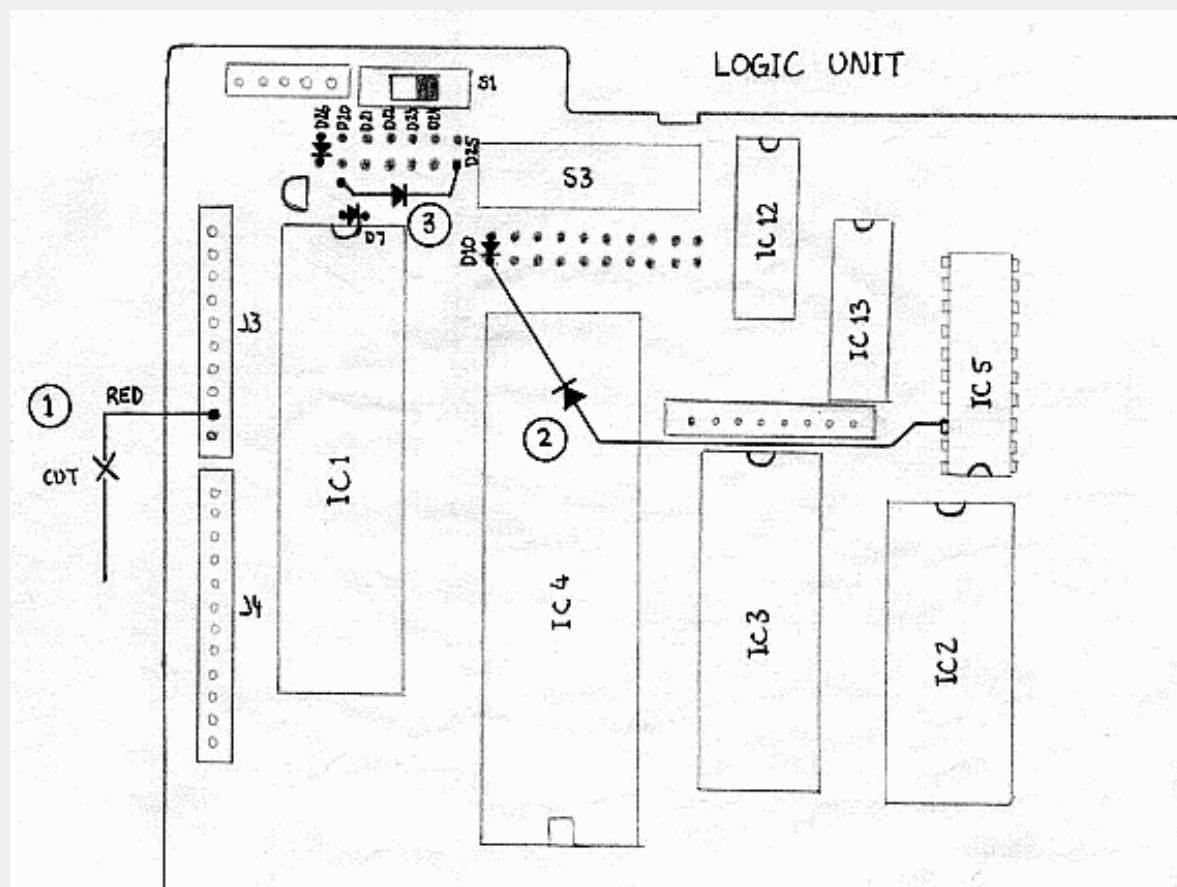
## (IC-575) General Coverage TX Modification

**Author:** Adam MAURER, VK4CP - [vk4cp@bigpond.com](mailto:vk4cp@bigpond.com). [MODIFICATION.NET](http://MODIFICATION.NET)

Access to the LOGIC UNIT is required.

### PREPARATION:

1. Disconnect mains lead and antenna lead.
2. Remove the EIGHT screws from the TOP COVER.
3. Remove the FOUR side screws. (Two left & two right).
4. Remove the top cover.
5. Remove FOUR screws holding the PA/REG UNIT. (Two at top front & two at rear).
6. Carefully hinge PA/REG UNIT back out of the way.
7. Remove shield to LOGIC UNIT. (Unit on right hand side).



### MODIFICATION:

Refer to diagram above.

This modification is done to the LOGIC UNIT in three parts;

1. Cut the red wire to J3
2. Add a diode (small signal type ie; 1N914 etc.) between PIN 18 of IC5 74HC244 [ANODE END OF DIODE] and the CATHODE of D10 [CATHODE END OF DIODE]. The back-up battery may have to be carefully levered out of the way in order to gain better access to PIN 18 of IC5.
3. Add a diode (small signal type ie; 1N914 etc.) between the pad where D25 CATHODE would go [CATHODE END OF DIODE] and the pad just opposite D20 CATHODE [ANODE END OF DIODE]. See diagram for details. (that's coming later)

Thanks to <http://www.qsl.net/vk4cp/> for the modification.

26-06-2001

## (IC-575) Pass band Tuning Modification

**Author:** Adam MAURER, VK4CP - [vk4cp@bigpond.com](mailto:vk4cp@bigpond.com). [MODIFICATION.NET](http://MODIFICATION.NET)

(for those who have that silly Data Level control)

This article appeared in "Six News" Issue 40

17 June 1993 (Revised 15 October 1996)

Although specifically for the IC-575, this modification should apply to both the IC275 and IC-475.

The early versions of the Icom IC-x75 rigs had Pass Band Tuning (PBT), a feature left off later models, but with minimal effort this feature can be retrofitted. An improvement in 2nd I.F. selectivity also results.

The PBTless models use the "PBT" potentiometer as a "Data Level" control which adjusts the level of the external audio input from the accessory socket on the back of the rig. The most obvious use for this is for a RTTY/packet modem. In my opinion the "Data Level" control does not need to be on the front panel because once it has been set correctly for a particular TNC etc. it should not require tweaking.

Interestingly, the "Data Level" pot is still a centre-detent type like the original PBT control. Examination of the schematic reveals that it's the same value, 10K, as the original. Furthermore, the PBT line from the D.A.S. unit is now connected to a fixed-value resistive divider, made up of two 4k7 resistors. Hmmm!

A comparison between the "old" schematic and the "new" schematic also shows that a ceramic filter, FI3, has been deleted from the newer radios, being replaced with a 0.0047uF capacitor. Other than that, everything else is still there. When you think about it, it's the obvious and cheap way out for Icom to remove this feature by making minimal changes to the design and to "hard-wire" the PBT to the centre position, rather than making major changes to its production run.

### The "missing" filter

You will need to purchase a Murata CFJ455K5 filter. The specifications of this filter are;

|                   |               |
|-------------------|---------------|
| Centre frequency: | 455kHz        |
| Bandwidth:        | 2.4kHz @ -6dB |
| Passband Ripple:  | 2dB           |
| Input Impedance:  | 2k Ohm        |
| Output Impedance: | 2k Ohm        |



**Picture 1** - The Murata filter fitted to the "Main Unit" PBA after the modification.

### Modification procedure

1. Remove all connections to the set, eg; power, antenna, mic, accessory leads etc.
2. Remove the 9 screws holding on the bottom cover.

Position the radio so the front of it is towards you.

All the mods are done to the Main Unit PCB (the largest PCB).

3. Remove the six screws holding down the Main Unit PCB.

(Or is that seven??? I have a habit of losing the damn things!)

4. Disconnect the coaxial lead plugged into J2 on the right hand side of the Main Unit PCB.

5. Disconnect the internal speaker feed to J17, located at the rear right hand side of the PCB, next to the external speaker jack.

Disconnecting these two feeds will make it easier to turn the PCB over to gain access to the solder-side.

6. Carefully pry the PCB loose. The "Ext Sp" and "Key" jacks on the back of the PCB make this quite awkward.

The PCB will need to move towards the front of the radio in order to clear the rear panel.

7. When it's in the clear, the rear side of the PCB can now be flipped over.

8. Remove C279 (0.0047uF). This is located front left - see picture 2.

9. Remove the link near C279 designated as W159.

10. De-solder the other nearby holes associated with the filter.

(These holes will be immediately obvious if you have a look at the pin-out of the filter).



**Picture 2** - Location of filter area on Main Unit PBA

11. Solder the CFJ455K5 filter in position.

12. Re-orientate the PCB back to its normal position.

13. The blue wire going to the PCB just near J10 needs to be cut, preferably as close to the pin as possible.

J10 is located front left of the PCB, near where the filter was just installed.

You will find this much easier to do if you temporarily remove the connector plugged into J10.

This blue wire is the "PBTV" line, the Pass Band Tuning Volts line, and was fixed to +4 volts, ie; set for the centre of the "normal" passband.

Now there are a number of ways of providing this line with the adjustable 0 - 8 volts that is required.

I shall now describe the method I used - using the (waste of space) "Data Level" control.

14. Disconnect the connector that goes to J20. This is the feed that goes off to the "Data Level" pot. Put this aside for now.

15. De-solder and remove J20 from the PCB.

16. In J20s place I mounted a vertical 10kohm trimpot - see picture 3.



The trimpot leads will need to be bent in order to fit, and the wiper will need a small length of wire added to it so that it makes the distance to the hole in the PCB.



**Picture 3** - 10k trimpot fitted to where J20 used to be.

This allows you to retain the "Data Level" control, albeit a trimpot inside the radio.

17. The Main Unit PCB can now be re-fitted and screwed back down.

Don't forget to reconnect the coaxial lead to J2 and the internal speaker feed to J17.

This male connector is now used for connecting +8 volts, ground, and the PBTV line to the pot.

18. So, on the "old J20" male connector we now need, matching the leads from the pot on the female connector;

**Red (wiper)      The blue wire (PBTV line)**

**Braid (CW end)      Ground**

**White (CCW end)      +8 volts**

There are many spots around the PCB to obtain +8 volts and ground from, but the easiest spot to access is IC15, a 4066.

This is located just to the rear of the (big) 9.0105MHz crystal - see photo. Connect to Pin 14 for +8 volts and pin 7 for ground.

19. To prevent shorts, tape over where you have soldered the wires to the (J20) connector.

Making use of these connectors, rather than cutting them off and soldering the wires directly to each other, improves access and serviceability to the Main Unit PCB, should that be required at a later date.

### **Alignment**

It's not absolutely necessary to tweak anything but if you are fastidious about alignment and have an accurate Digital Frequency Meter, hook it up to the "test point" at R209, a 100R resistor. Those of you with an IC-575 Service Manual can refer to page 2-4 for PBT alignment.

Here is the procedure anyway;

20-1 With the radio receiving in the AM mode and PBT set to full CCW, adjust L17 for a frequency of 9.46830 MHz.

20-2 Centre the PBT control. Adjust R90 for 9.46500 MHz.

20-3 With the PBT still centred, change to USB mode and adjust R93 for 9.46650 MHz.

20-4 Change to FM mode. Adjust R95 for 9.46650 MHz. (Adjusting the PBT whilst in FM mode should make no difference to this).

21) Before you screw the bottom cover of the radio back on you'd better adjust the "Data Level" trimpot to suit your requirements.

Make sure you have reconnected the internal speaker feed to J17, the coaxial lead to J2, and the connector to J10.

22) Refit the bottom cover and screw in the nine screws.

23) Reconnect power and antenna feeds and confirm normal operation.

## Checkout

Place the "new radio" into USB mode and note the enhancement of the highs at the CW end of the "Data Level" control, err make that the "PBT" control, and the enhancement of the lows at the CCW end of the control. Now, place the radio in the LSB mode and note the complementary effect.

Needless to say, any modifications done outside of an Icom service centre will no doubt void any warranties on the radio.

Having the PBT has been handy when trying to zero-beat TV carriers, although the bass response of the small internal speaker is not particularly good. A larger external speaker or headphones here will help. The poor bass response could be improved by increasing the value of C192, a 0.1uF capacitor in the audio line.

I feel the PBT feature would be more useful in Europe than it has proved to be over here in VK, for the simple reason; there aren't as many 6MX ops over here - even with Summer Es - so QRM from another nearby station is rare.

Happy "PBTing" and good DX!

Thanks to <http://www.qsl.net/vk4cp/> for the modification.

This modification is read 600 times.

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**23-08-1998**

## **(IC-701) Extended frequency coverage on the ICOM IC-701 HF Transceiver**

Grounding pin 14 on the rear panel accessory connector will extend the frequency ranges to:

| Band | - | Extended coverage | - | Factory coverage                                 |
|------|---|-------------------|---|--|
| 160m | - | 1.0 - 3.0 MHz     | - | 1.8 - 2.0 MHz                                    |
| 80m  | - | 3.0 - 5.0 MHz     | - | 3.5 - 4.0 MHz                                    |
| 40m  | - | 7.0 - 9.0 MHz     | - | 7.0 - 7.5 MHz<br>7.3 - 7.5 MHz Receive Only      |
| 20m  | - | 14.0 - 16.0 MHz   | - | 14.0 - 15.2 MHz<br>14.35 - 15.2 MHz Receive Only |
| 15m  | - | 21.0 - 22.0 MHz   | - | 21.0 - 21.5 MHz                                  |
| 10m  | - | 28.0 - 30.0 MHz   | - | 28.0 - 30.0 MHz<br>29.7 - 30.0 MHz Receive Only  |

This modification is read 935 times.

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**23-08-1998**

## **(IC-701) Computer control of ICOM 701 via accessory connector**

The August 1984 issue of QST (page 19) has an article on computer controlling the ICOM IC-701 HF transceiver by it's rear panel accessory connector. Although the article describes controlling the radio by a dedicated Three-Chip Microcomputer which can be built for \$20 (the cost of the three chips) if you already have some common parts. This project can easily be adapted to control the radio by an IBM PC. Please refer to the QST article for more information. The same interface and control commands also work for the IC-211 and IC-245 transceivers.

This modification is read 766 times.

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**19-07-1998**

**(IC-706) Info/mods for IC-706**

```
#####  
New yellow wire disconnect and reattachment to vco switch bank works!!!!  
This mod is great thanks for everyones help out there!!  
#####
```

I have an Icom IC-706 and did the mod. remove the yellow wire (4th from the edge of the plug in connector ) on the top side of the IC-706 right above the FL-30 SSB filter. The yellow wire controls either switching in the 120Mhz LP filter or the 2 meter (pseudo HP filter).

If you just disconnect the yellow wire , the sensitivity increases above the 148-200 Mhz region. I also noticed the FM broadcast sensitivity went down greatly, to over come that, the yellow wire routed from the top side back to the bottom side and attached the VCO switch points (see note below). The +5Volts logic high from the plated hole next to J8, allows the LP 120Mhz to come back when the radio is tuned below 129Mhz.

I did this mod and it works great!!!!

As far as FM Broadcast intermod in the Aircraft band, I noticed the IF is a little overdriven into compression, so I turn the preamp off(green to no light---preamp switch), and noticed no difference in sensitivity, intermod in aircraft band disappeared.

Running the preamp in the Aircraft 118-129 does not really help sensitivity, even though the S-meter shows higher signal levels (jumps around alot due to saturating IF when signals are not there!!! ) the noise floor actually, degrades, thus I leave the switch (no preamp-black instead of green).

Leaving it on green is just fooling yourself, driving the IF into saturation, with worst dynamic range.

I hope someone from Icom reads this, with this mod, now I can say the rig now covers the 30Khz - 200Mhz, rather than the modified statement 30Khz - 120 Mhz.

Now , I am very happy with the receive performance, leaving the yellow wire, and not connecting it to the VCO switch bank logic high point near J8, allowed me to hear 2 meter repeaters in the 82-83Mhz range, and poor FM broadcast reception.

Now connecting it to the VCO switch bank, the radio performs to my satisfaction, hearin weather at 162, forestry at 171, TV audio near 200Mhz and remembering to turn preamp off in 118-129 aircraft region, no 2 meter images/mixes any more in 82-83Mhz area from 2 meters. Can comfortable listen now to FM broadcast in the 88-108Mhz area. I now have no real complaints about the the IC-706.

Having fun with mine, traded in my Kenwood TS-50, and no compaints, don't even miss the TS-50. The IC-706 is a real great rig.! Have fun with your 706's .

ICOM, I HOPE YOU SEE THIS, I THINK THIS MOD IS VIABLE AND SHOULD BE INCORPORATED FOR NEWER ICOM IC-706's!!!

73

Mike

W6TRW

Any comments : Internet e-mail  
aust@gandalf.sp.trw.com

*(Cecil A. Moore~) writes:*

> In article 1995Nov8.090310.1@ntc01.tele.nokia.fi,

> harjula@ntc01.tele.nokia.fi wrote:

>

>>The fourth yellow wire seems to control

>>a lowpass/highpass 120 MHz filter. In the standard configuration the

>>highpass filter is used only on 144-148 MHz, every other frequency uses

>>the lowpass. Anyway, if you want to listen to frequencies above 120 MHz

>>this mod is very useful. It does even remove most of the FM band

>>intermodulation. I just don't understand why Icom has not put the switching

>>limit on 120 MHz instead of 144/148.

>

> Does this mod affect HF or 6m? After the mod, what frequencies use the LP

> and what frequencies use the HP filter?

*The mod affects only frequencies above 60 MHz. If you just cut or remove the yellow wire, the HP or actually 2m bandpass filter is used all the time.*

*Last night I took the loose yellow wire and connected it to a VCO control switch transistor (?) on the lower PC board. Now I have the LP filter in use between 60 and 129 MHz and the 2m bandpass between 129 and 200 MHz.*

There are five SMD transistors on the lower PC board just behind the "MENU" button. The one in the middle controls the VCO that is in use from 60 to 129 MHz. The single pin has 5V when within this range.

The mod affects only frequencies above 60 MHz. If you just cut or remove the yellow wire, the HP or actually 2m bandpass filter is used all the time.

Last night I took the loose yellow wire and connected it to a VCO control switch transistor (?) on the lower PC board. Now I have the LP filter in use between 60 and 129 MHz and the 2m bandpass between 129 and 200 MHz.

There are five SMD transistors on the lower PC board just behind the "MENU" button. The one in the middle controls the VCO that is in use from 60 to 129 MHz. The single pin has 5V when within this range.

There is a trace from this pin to a plated-through hole near J8.

This is a good place to connect the wire. (I haven't even seen the schematic so cannot say if this is the best way to do it. But it works for me.)

129 MHz seems to be quite close to the cross-over point of the LP and 2m BP filters. Here is a listing of the (NBFM) signal strength needed to "light" the first segment on the S-meter on each frequency:

| MHz | uV/LP | uV/BP |
|-----|-------|-------|
| 125 | .8    | 2     |
| 135 | 12    | .5    |
| 145 |       | .15   |
| 155 | 30    | .5    |
| 165 |       | 3     |
| 175 |       | 11    |
| 185 |       | 140   |

After the mod I can listen to the Helsinki airport on 134 MHz but the Meteo on 128.4 is still drowned in intermod from the FM BC band.

>thanks and 73, Cecil, KG7BK, OOTC (not speaking for my employer)

Neither am I. Proceed at your own risk etc. And have more fun with the 706!

This modification is read 4162 times.

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**19-07-1998**

## **(IC-706) IC-706 Expanded frequency**

If you think to change your new little rig into a UFO read following info. Read everything and wait.

"Notice : We can not guarantee specification when expand frequency"

To find every detail you should have the service manual. At this moment I have to deal with some bad copy's. I think they went for 21 times into a Xeroxcopy.

By cutting diode D59 only, "nyea what's up doc?" does not work.

So here are the results (read the above notice) to leave your UFO on the table.

\*\* Cut the D59 diode on main Unit. (TOP SIDE of P.C. Board) \*\* Where do you find this little thing?

If you can locate the Filter option place you will see in the middle of the P.C. board 5 little things on one line and this is what you're looking for. But what.

Maybe this can help you.

-----  
W4. <---JUMPRE WIRE  
-----



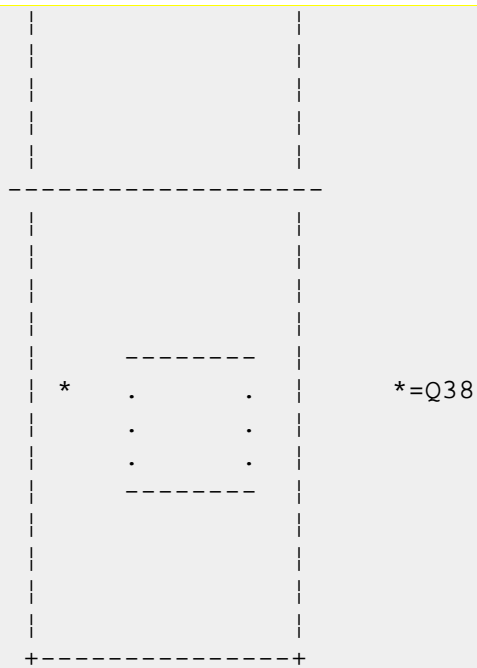
\*\* If you have a USA-version you need additional modification. \*\*

\*\* Cut D60 and jumpre wire W4. \*\*

Next lets find Q38 or R353 on MAIN UNIT (top side of P.C. Board)

You can find this when you are already in the rig, you have a large metal cover (like a box, probably there is a lot of money inside HI)

+-----+



**\*\*Then you have to cut the P.C. board at a certain point on the bottom side.\*\***

It is not so far away from H2, H6 and IC 32

**\*\*And then you have to add a jumper wire from pin 11 of IC32 and a certain point on the bottom of the main unit.....**

So only cutting D59 this is a joke. I can even say a BIG joke.

To explain you the total modification you need a service manual.

In a few day's (around 100 HI) I'm able to put the schematics on packet.

I will try and hopefully you can do something with it.

So don't jump around in your nice equiped shack, do not make a UFO out of your new 706 just wait and I can see what I can do.

Hold your horses. HIHIHIHIHI

Any comments, AA2ZE@ON7RC.#BR.BEL.EU

73 de AA2ZE

This modification is read 4478 times.

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**19-07-1998**

**(IC-706) IC706 - spare 0.3A**

Dr Oms

If you can spare more than 0.3 Amps from battery on /p operation switch off backlight of yellow display (Initial Set Mode, item 5.) This helps much, i have only abt 1.1 Amps for receive now I did not find any info in the manual

Best of luck

73 petr

This modification is read 3154 times.

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**23-08-1998**

**(IC-706) MARS/CAP Modification for ICOM IC-706**

Tools required:

- #0 Philips head screwdriver
- 10 - 15 watt pencil tip soldering iron
- Magnifying glass
- Tweezers

Remove the TOP cover by removing three philips head screws on the top and one on each side. Move the speaker bracket out of the way. Locate D-59, this is a three terminal SMD diode in an SOT package, about 1 x 3 mm (with the radio front panel oriented towards you, D-59 is located in a row of SMD diodes just to the right of the ribbon cable header above the 9 MHz SSB filter FL-30. There are pads for 5 diodes with only three installed. D-59 is the second from the left).

Using tweezers and a low-wattage soldering iron (and magnifying glass, if necessary) remove D-59 by applying some heat to

the single leg side of the device while lifting gently, then apply heat to the other two legs and removing the device. Be careful not to apply too much heat, not to rip or burn any traces or not to leave excess solder on the PCB.

Replace the speaker bracket and top cover. Apply power and reset the microprocessor.

TX = 1600 kHz - 54.00 MHz and 118.000 - 174.000 MHz

De James KG7FU

kg7fu@kb7ogd.or.usa.noam

kg7fu@aol.com

This modification is read 3664 times.

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**23-08-1998**

## **(IC-706) Icom IC-706 Review**

29 Dec 1995

*From: randall@informix.com (Randall Rhea)*

### ICOM IC-706 HF/VHF AMATEUR RADIO TRANSCEIVER

Product Review, Hints and Tips, and Modifications

As Of: December 28, 1995

by Randall Rhea, KG0HW

#### Overall impression

"Too good to be true". This was my understandable reaction to Icom's announcement of the IC-706 amateur radio transceiver last summer. It looked like my dream mobile rig: very small size, detachable face plate, all HF bands, FSK, 6 meters with 100 watts ... AND 2 meters, all in one rig? It sounds too good to be true, but after using this radio in my car for about a month, I can tell you that this radio is real. Although the rig is not without its faults, Icom has produced an innovative masterpiece. The rig does just about everything as advertised. It is an easy-to-use radio that replaces several other radios that I was operating in my car.

Over the Christmas holidays, I took a couple of long car trips here in Texas. The 706 was installed under a car seat, leaving plenty of room for luggage and packages. (Do NOT block the top of the rig. Leave room for air circulation. The rig gets VERY hot when transmitting!) The face plate was installed just below the dash within easy sight when driving. I used headphones, so my wife and daughter could listen to CDs while I was working DX. The headphone plugged into the face plate. I used a 7-foot whip mounted on the trunk of the car tuned for the SSB portion of 6 meters, my favorite band. The radio was a pleasure to use, even while driving.

During a nice opening on 6 meters on the evening of December 27, I worked several new grid squares in the midwest and Arizona. I also worked North Dakota for the first time. I was able to work a station in Mexico City quite easily, despite the pileup. That 100 watts sure helps. (I previously used a 10-watt rig.) The sensitivity of the receiver, although not quite what the "pros" would want, was quite adequate. Noise from the car engine was only a minor problem; the noise blanker was effective for SSB.

During the trip I also listened to a football game on TV channel 2, listened to truckers' traffic reports on CB channel 19 (27.185 MHz), worked a couple of 10m stations during the sporadic E opening on December 27, worked a couple of 20m stations, listened to WWV on 2.5, 5, and 10 MHz, eavesdropped on some interesting baby monitors and cordless phones on 49 MHz, listened to NOAA weather forecasts on 162.55 MHz, monitored some aircraft traffic, and did some ragchewing on 2-meter repeaters. Not bad for ONE radio!

#### PRICE

I paid \$1249 for mine at Tucker Electronics in Dallas. They told me that they have sold about 200 of them in six weeks, making the IC-706 their best selling rig of all time. They are getting them from Icom in lots of 20 and are having trouble keeping them in stock.

Prices for accessories are pretty high. There is little profit margin in the box, so they make up for it with high accessory prices. The cable to allow for front-panel detachment is \$48.

#### UNIQUE FEATURES AND INNOVATIONS

See [www.icomamerica.com/icom/amateur/hf/#IC-706](http://www.icomamerica.com/icom/amateur/hf/#IC-706) for a list of features.

- The smallest HF rig on the market (similar in size to the Kenwood TS-50)
- Detachable face plate with a jack for a speaker or headphone. The mic plugs into the face plate using a plug similar to a modular telephone plug. (A spare plug is included.) The cable to allow for this detachment costs extra.

- Full HF/VHF transmit coverage from 1.6 to 54 MHz and 144-148 MHz (the rig transmits only on the ham bands out of the box, but an easy modification unlocks the transmitter, see below)
- General coverage receive from 50 KHz to 163 MHz (requires modification, see below) Rig receives up to 200 MHz but with poor sensitivity above 162 MHz even with the modification. You will be able to receive: longwave, AM broadcast band, shortwave broadcast, all amateur bands in all modes from 160m to 2m, FM broadcast band (wide FM), aircraft (118-136 MHz AM), VHF from 30 MHz to about 162 MHz, US TV channels 2 through 6, NOAA weather at 162 MHz.
- 6 meters and 2 meters, all-mode
- 100 watts on HF and 6 meters (10 watts on 2 meters)
- Innovative, easy-to-operate menu system. It becomes quite easy and natural to use after reading the well-written manual for about an hour. (In contrast to my Yaesu FT-470 HT, which I still cannot figure out.)
- The manual is very well written, with lots of easy-to-understand diagrams.
- Simple, but useful and configurable band scope. (Previously available only on very expensive rigs like the Icom 781.) This allows you to examine nearby frequencies for activity.
- Split frequency operation appears complicated at first, but the rig's "quick split" mode makes it fast and easy.
- Built-in electronic keyer at no extra charge. The Up/Down buttons on the mic can be used as a paddle. This has rejuvenated by interest in CW. I worked a couple of slow CW stations on the novice portion of 80m, which made me remember how fun CW is.
- FSK (Nice feature for this price range)
- DTMF and programmable offset for repeaters and split frequency work
- Good audio reports from contacted stations. A station on 3.85 MHz reported "a very good signal for a mobile". A 2m FM station reported "very good audio ... so that's the 706 I've been hearing about."
- Works very well with the AH-3 antenna tuner. This is the Icom HF (1.8-30 MHz) random wire tuner that worked with the 725. The tuner is mounted under the trunk lid of my car with cable ties. It can also be mounted outdoors. It will tune any 8-foot whip or wire for any HF band. (You need 40 feet for it to tune to 160m.) You can press a button to enable the tuner, or the tuner can fire off automatically if your SWR is too high. With my 7-foot 6-meter whip, I can tune to any HF band above 3.5 MHz. That means I need only one simple antenna for HF and 6m.
- 100 memories that store frequency, split offset, mode, and FM tone.
- Two antenna connectors: one for HF/6m and one for 2m. The connectors are switched at 60 MHz.
- Jacks for remote speaker and/or headphones on both the face plate and the back of the rig.
- Multifunction meter: S meter, SWR, relative power output, ALC.

#### DRAWBACKS/FLAWS

- Extended VHF receive requires modification (see below).
- Poor sensitivity above 162 MHz.
- Noise blanker does not work on AM. Very irritating pulse noise on AM while the car's engine is on. The blanker works well on other modes (except FM, where it is not needed). Not good for listening to AM while driving. A rather serious flaw in my opinion, since my \$40 CB has a noise blanker that works well.
- Poor QSK (full break-in) capability. Not recommended for high-speed CW operators who want QSK. Use semi-break-in instead.
- No CW narrow filter. You can install one as an extra-cost option or use an external CW filter or DSP unit.
- The built-in speaker provides surprisingly good audio for its size, but you will probably want to use an external speaker. The speaker can be connected to the face plate or to the rig itself.
- Automatic repeater offset is not programmed into the rig. You need to program -600 or +600 yourself through the menu system. This is not a problem if you store your favorite repeaters into one of the 100 memories.
- The S-meter is inaccurate below S9. Above S9, it is quite accurate.
- High prices for accessories (typical of just about all other vendors)

- The AH-3 antenna tuner is shipped with an unshielded cable, which picks up a lot of auto engine noise. You need to make your own shielded 4-wire cable. The AH-3 also blocks signals above 54 MHz. It also only works for HF, not for 6m or 2m.
- Expect performance and receiver sensitivity similar to other rigs in this price range. This is a low-end rig in terms of price. For price vs. performance, this is probably the best amateur radio of all time. However, it will not outperform your \$4000 rig. You probably won't win contests with it. You will have a lot of fun and own a nearly ideal rig for mobile work.

## HINTS AND TIPS

1. Take time to read the manual. The menu system will be bewildering unless you read the manual. Once you get used to it, you will find the rig to be amazingly easy and fun to use.
2. You need to set the mode to wide FM to receive FM or TV broadcasts. Tune to the station, press the MODE key until the front display shows FM, then press and hold the MODE key for 2 seconds. WFM will appear in the display, and you will hear the station with nice audio.
3. Don't use the noise blanker on AM. It will not be effective and may distort your audio.
4. Don't use the QSK feature.
5. The rig gets very hot while transmitting. Keep the top of the radio clear to allow air circulation.

This modification is read 3247 times.

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**23-08-1998**

### **(IC-706) Enables out-of-band transmit for 1.6 MHz to 54 MHz**

Enables out-of-band transmit for 1.6 MHz to 54 MHz. This does not enable extended VHF transmit This does not enable AM or FM broadcast band transmit.

Your memories will be cleared after this modification, since you need to reset the CPU.

1. Open the top of the radio by removing the 3 top screws and 2 side screws. Look at the radio with the front panel facing you.
2. Gently pull up the speaker and set it aside without damaging the speaker or the wires that attach it to the rig.
3. Note the silver rectangular box near the middle of the PCB marked something like "9 MHz SSB Filter".
4. Move your eyes up from this filter toward the back of the radio. Just before you get to the "D 108" marking, you will see two tiny diodes, two blank spaces, and one additional diode. They look something like this:

```

                                D105
                                [ ]
--D108--
                                [XX] [XX] [ ] [ ] [XX]
                                D60  D59  D58  D57  D72
Remove this diode ^^^^

D60 USA low power 50 MHz (remove for 100 W output power)
D59 CPU Tx limit
D58 Eur Fra 144-146 MHz
D57 Den Fra 50 MHz
D72 unknown
D105 unknown

```

**Note:** French versions have diode D84 (parallel with D59) and D85 on the underside of this print.

```

D      D
8      8
4      5

9      1
+-----+
|IC10  | TD62783AF
+-----+
10     18

```



D84 CPU Tx limit  
D85 Fra HF band

5. The second diode from the left needs to be removed. I did this by crushing it with long-nosed pliers. You can also heat it with a low-wattage soldering iron and pull it up with tweezers. Be sure not to damage the other diodes or the PCB. Be sure that you don't apply too much heat, since the heat can damage the PCB and the other diodes.
6. Re-assemble the radio. Reset the CPU by pressing and holding down the UP and DOWN buttons on the front panel and pressing POWER.

This modification is read 3923 times.

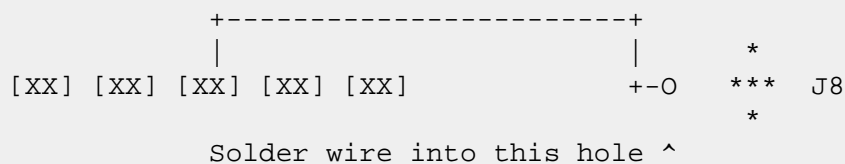
[top of page](#)

**23-08-1998**

### **(IC-706) More sensitive transmit for 2 meter**

Enables more sensitive transmit above the 2 meter band. (148 to about 162 MHz; after that, sensitivity drops off.) Keeps sensitivity for the FM broadcast band.

1. Open the top of the radio by removing the 3 top screws and 2 side screws. Look at the radio from the with the front panel facing you.
2. Note the silver rectangular box near the middle of the PCB marked something like "9 MHz SSB Filter".
3. Move your eyes up from this filter toward the back of the radio. Follow the ribbon cable up. Notice a wide white connector with several colored wires in it on the back of the PCB.
4. The fourth wire from the left is a yellow wire. Cut this wire. Rather than cutting it, you can remove the connector, stick a paper clip in the side of the connector under the wire, push it in, and pull the wire out. Be careful not to remove the other yellow wire.
5. Re-insert the connector back to its original place on the PCB.
6. Open the bottom of the radio. You will again need to remove 5 screws.
7. Look at the radio with the front panel facing you. Note 5 tiny transistors behind the MENU button. Follow the trace from the middle transistor to a hole just to the left of jack J8.



8. Solder a small wire into this hole. Be careful not to apply too much heat; use a low-wattage soldering iron. Be careful not to damage the PCB or the grey cable coming out of J8. Use a magnifying glass.
9. Run the other end of the wire you just soldered to the front of the radio and attach it to the yellow wire you just cut.
10. Re-assemble the radio.

This modification is read 3273 times.

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**23-08-1998**

### **(IC-706) IC-706 60 MHz to 200 MHz bandpass filter**

From: gary@ke4zv.atl.ga.us (Gary Coffman)

Ok, here's the computer simulation info I promised. I modeled the 60 MHz to 200 MHz bandpass response. To say the least, it sucked rocks. There are two poles, one at about 136 MHz and the other at about 160.5 MHz. Response is nice and flat from 60 MHz to 120 MHz with less than 4 db of ripple, but it takes a dive from there. In the 130 MHz to 170 MHz range, the loss is at least 36 db, rising back to only 30 db at 200 MHz. Image rejection at 280 MHz is only 26 db.

Now the ideal fix is to change the inductors so that L49 is 27nH, L40 is 22 nH, and change C152 to 30pF. That gives a lovely passband across 60 MHz to 200 MHz, and gives strong image rejection at 280 MHz and up, with one of the nulls falling right on that frequency. The factory ought to do that.

Unfortunately, examination shows these coils aren't easy to modify. So there's another way that still gives a pretty good response. If you remove C53 and C153, you'll get full response, though with a dip of 4 db in the 160 MHz to 180 MHz range, and only 26 db of image rejection at 280 MHz. But if you increase the value of C152 to 32pF by tacking the removed C153 across it, response flattens and tightens in the upper VHF range, and image rejection improves to 31 db at 280 MHz. That's about as good as we're going to get without replacing L49 and L40 and C152 with the recommended values.

Here's the ARRL Radio Designer file for the filter.

```
*****
*ARRL Radio Designer v1.0
*IC-706 60 MHz to 200 MHz bandpass filter
* Gary Coffman KE4ZV 1/18/96
*****
```

```
Blk
**Component data inductors
```

```
L22:1.2uH
L49:82nH      ;ideal 27nH
L40:68nH      ;ideal 22nH
L25:0.15uH
L26:0.18uH
L27:1.2uH
```

```
**Component data capacitors
```

```
C51:.001uF
C154:20pF
C153:0pF      ;was 12pF
C152:32pF     ;was 20pF
C53:0pF      ;was 20pF
C151:24pF
C52:18pF
C54:220pF
C55:22pF
C56:82pF
C57:27pF
```

```
**Node list
```

```
IND 1 0 L=L22
CAP 1 2 C=C51
CAP 2 0 C=C154
IND 2 3 L=L49
CAP 2 3 C=C153
CAP 3 0 C=C152
IND 3 4 L=L40
CAP 3 4 C=C53
CAP 4 0 C=C52
CAP 4 5 C=C151
CAP 5 6 C=C54
IND 6 0 L=L25
CAP 5 7 C=C55
CAP 7 8 C=C56
IND 8 0 L=L26
CAP 7 9 C=C57
IND 9 0 L=L27
BPF:2POR 1 9
```

```
END
```

```
**Frequency block
```

```
FREQ
```

ESTP 50MHz 300MHz 511  
END  
\*\*\*\*\*

Gary Coffman KE4ZV  
534 Shannon Way  
Lawrenceville, GA 30244  
gary@ke4zv.atl.ga.us

This modification is read 3096 times.

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**23-08-1998**

## **(IC-706) Icom IC-706 Extended RX mod**

By OH6LGM

Icom 706 doesn't out of stock listen to frequencies over 148MHz, although that is advertised. At Least mine didn't.

Studying the schematics I noticed a front-end filter, that should be operating in the range of 60MHz - 200MHz. I studied the filter with a program and noticed, that the passband was 60MHz - 140MHz !! The upper end was blocked out.

I changed the circuit in a way that enables the radio to work as advertised by removing Capacitors C53 and C153. Now the filters upper edge is around 230MHz.

This modification doesn't affect 2m RX in anyway, because 2m has its' own, thight front-end, that is used instead of the modified filter, when in 2m band. HF and 6m aren't affected either.

The Capacitors are found in the PA UNIT board, behind the external speaker connector in a relatively easy place.

The job requires cautiousness because the components dislike static and excessive heat.

This modification works, if the radio isn't already modified with the modification, which puts 2m front-end in use in frequencies above 144MHz.

At Least My unit worked well with this modification. Measured from my IC-706:

| Frequency | Sensitivity (microvolts /20dB SINAD) |
|-----------|--------------------------------------|
| 60-140    | 0.14                                 |
| 144-148   | 0.12                                 |
| 150       | 0.18                                 |
| 155       | 0.15                                 |
| 160       | 0.2                                  |
| 165       | 0.3                                  |
| 170       | 0.4                                  |
| 175       | 0.6                                  |
| 180       | 1.5                                  |
| 185       | 1.5                                  |
| 190       | >100mV -- deaf!                      |
| 195       | 5                                    |
| 200       | 29                                   |

OH6LGM@OH6RBW. #JKL.FIN.EU

This modification is read 3497 times.

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**20-02-2000**

## **(IC-706) Some tips.**

**Author:** Joerg Dierking DJ6CA - [GDierking@t-online.de](mailto:GDierking@t-online.de). [MODIFICATION.NET](http://MODIFICATION.NET)

Here is som tips take from [www.gdierking.de/706/](http://www.gdierking.de/706/)

### **Tipp: 1**

Wenn Sie ausserhalb der Amateurbänder für Messzwecke ein Sendesignal benötigen - einfach die kleine Diode D2030, Mainunit, oben, ganz rechts in der Reihe, herausnehmen. Eigene Menuedaten wieder einfügen.

### **Tipp: 2**

Mehr Dynamik in der Modulation bekommt man durch Einstellen des kleinen Widerstandstrimmer, direkt hinter der Frontwand, links, neben dem Quarzfilter auf der Mainunit, oben.

Einstellen: Menue, Modulationspegel auf 1, den Buchstaben "A" lange ins Mikrofon sprechen und gleichzeitig den Trimmer auf maximale HF einstellen. Wenn das HF-Signal abreisst - den Trimmer wieder etwas zurück drehen.

### **Tipp: 3**

Die Sendeleistung auf HF kann mit dem Trimmer "HF TX power adj." leicht auf 150 W und auf 2 m mit dem Trimmer "144 MHz TX power adj." auf ca. 90 W eingestellt werden. Siehe Seite 63 in der Bedienungsanleitung.

This modification is read 3180 times.

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**16-04-2000**

## **(IC-706) IC-706, MKII, MKIIG xmit mods - tip**

**Author:** Emory - KD3DQ

Ref Xmit Mods for 706s shown above

The xmit expand mod for the IC-706, MKII, MKIIG require removing very small diodes, these diodes are about the size of a flea, and require the use of very small tools.

I have done mods before but these are difficult.

After lots of thought I did my mod with an x-acto knife. I needed a magnifying glass and a new blade for the x-acto knife. I cut just the solder on one side of the tiny diode, making sure that is all I cut, then pushed up on the diode, the other side breaks loose from the board. I cut both diodes this way and it was easy and worked fine.

I could not find a soldering iron small enough to fit into tiny space available. Good luck.... Emory KD3DQ

This modification is read 4862 times.

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**20-08-2000**

## **(IC-706) IC-706 10 watt tune modification/An Icom IC706 Tune Trigger**

**Author:** Larry Lefczik, WA2EHZ - [wa2ehz@netzero.net](mailto:wa2ehz@netzero.net). [MODIFICATION.NET](http://MODIFICATION.NET)

(Some assembly required)

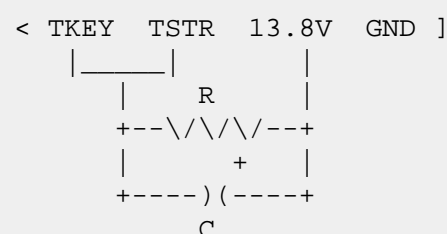
The ICOM IC-706 has a nifty feature built in to help the operator tune the HF antenna SWR. By pushing the TUNE button on the front panel, the radio switches to CW mode and transmits a 10 Watt carrier. This state last for approximately 10 seconds or the operator can terminate sooner by pushing the button again. This was designed to work with the Icom automatic antenna tuners. There have been a few circuits developed to fool the 706 into thinking there is a Icom tuner attached and produce the same tuning signal which can be used with a manual antenna tuner or many automatic tuners, some get quite complex.

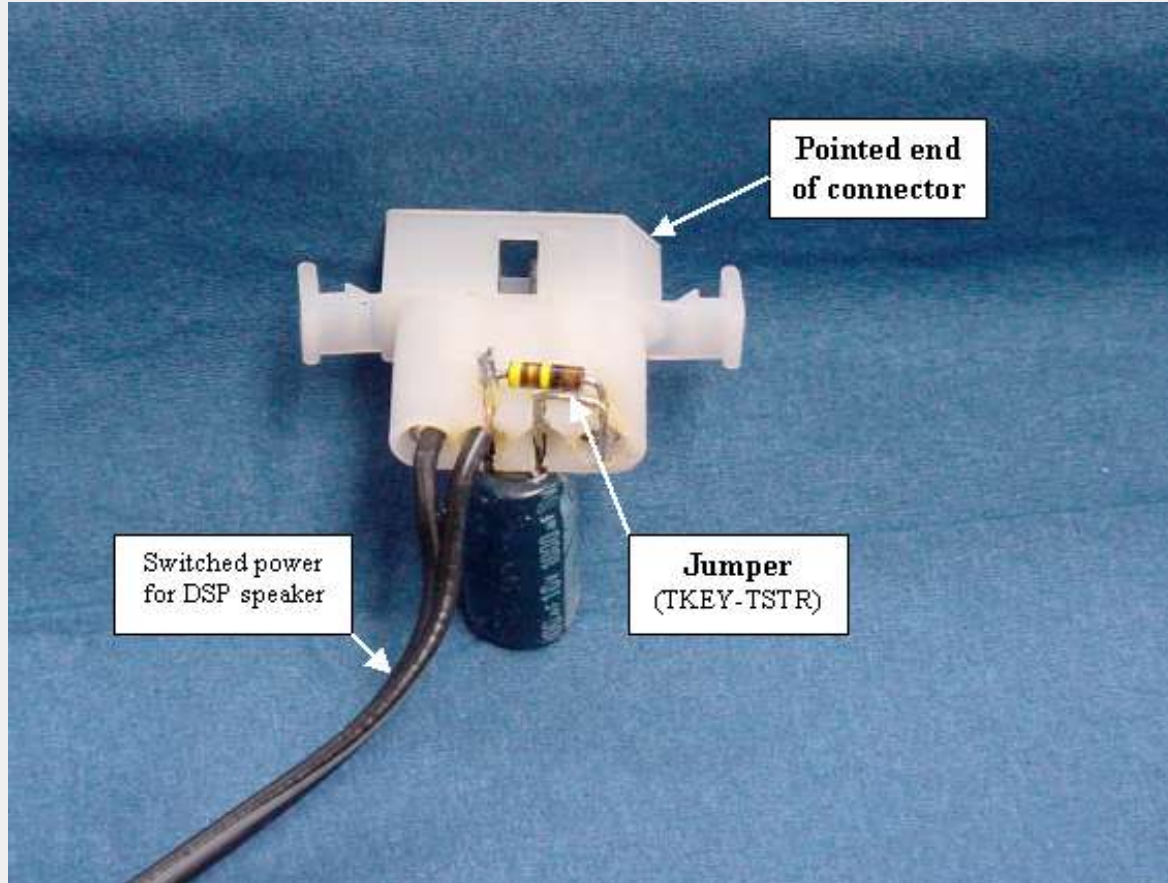
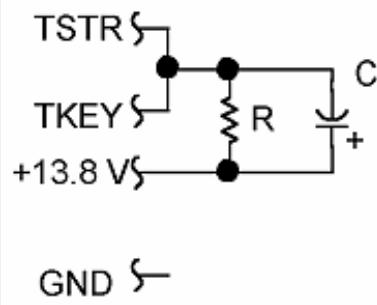
Well, being the cheap guy I am, and being one to tinker, I felt there had to be a simple way to do this. I began reading the various postings on the Internet. I went back to an e-mail exchange I had with Ed, W1AAZ in early April 1999 on Vartel's ICOM 706 Discussion Group. Ed explained the functions of the TKEY and TSTR pins on the "AH-3" connector on the 706.

The outcome was a simple RC circuit which I have built right on a Molex connector which plugs into the AH-3 jack on the back of the IC706.

### **Construction:**

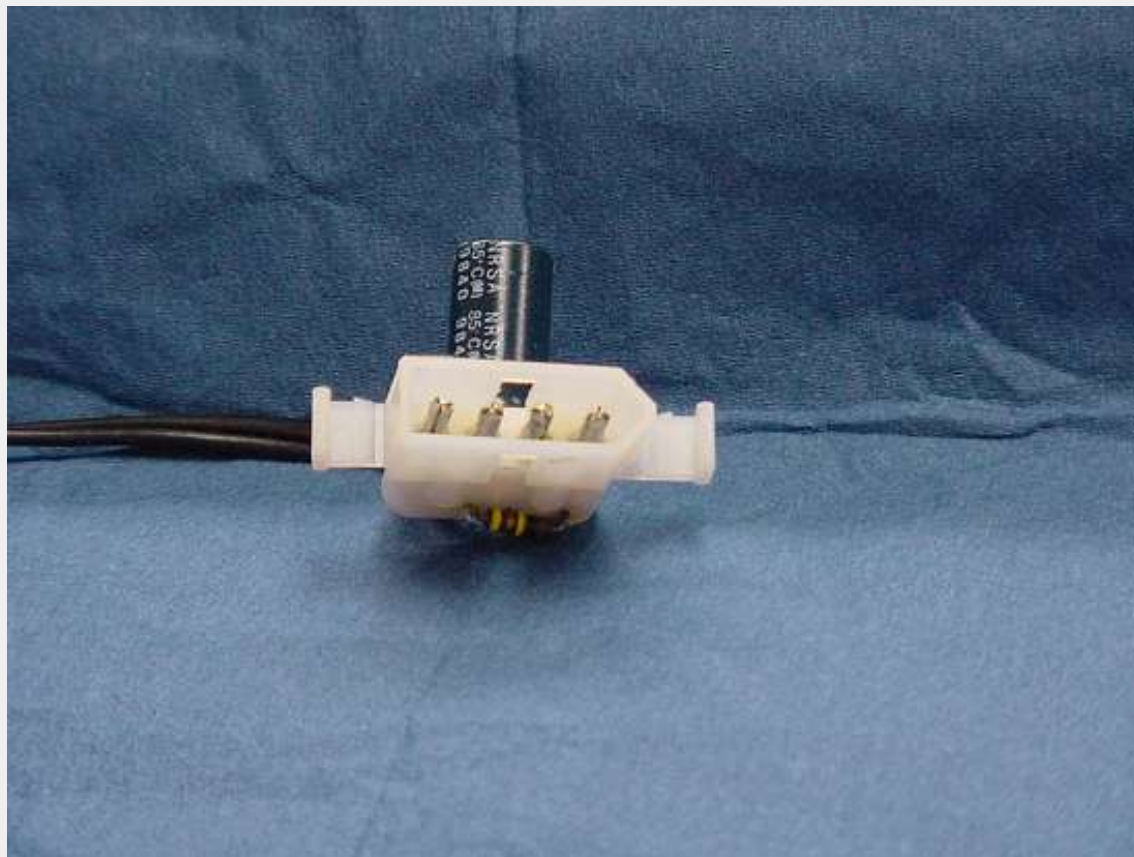
The (+) side of C is connected to the 13.8VDC pin. The (-) side connected to TSTR and TKEY which are connected together. Resistor R is in parallel with C. Below is a diagram of the AH4 connector on the back of the IC706 where the < indicates the pointy end of the connector (Pin 1 = TKEY). You can buy the Molex connector at Radio Shack (#274-0224).





**Bottom view of connector**

Note: I have also used this connector to tap power for "ClearSpeech" DSP speaker. The power cable shown is not part of the TUNE TRIGGER circuit.



The values I use are  $C = 1000\mu\text{F}$  16WV  $R = 92\text{K}$  Ohms 1/8 Watt which result in 15 seconds of tune time. As you can see, these are tied in parallel. If you want to use a physically smaller capacitor such as 440  $\mu\text{F}$ , you can adjust the time by raising R. The extreme values I found are:

$2\text{K} < R < 3.3\text{M}$  Ohms  
 $10\mu\text{F} < C < 4700\mu\text{F}$ .

## Operation:

Be sure to read the manual about the various Initial Settings that can affect the operation with a tuner connected, otherwise you may go into the TUNE mode every time you change frequency or push the PTT.

Turn off the radio and plug in the unit. Make sure you have some sort of load on the HF antenna connector. Turn on the IC706, the radio sees TSTR is high during boot up and thinks there is a tuner connected. Be sure the meter is in the SWR mode. Push the TUNE button. The TUNE light should flash counting the seconds and stay lit when finished, as stated in the manual. You may interrupt the cycle by pressing TUNE again.

If you terminate the TUNE mode early by pressing the button again, you must wait for the remainder of the time-out period to re-start. If you don't then the cycle is started over again when you press TUNE and you still must wait, but longer. This is why I have opted for 15 seconds instead of a possible 30 seconds. One way to reset the timer is by powering the IC706 off then on.

I have noticed false triggering when the supply voltage AT THE IC706 POWER CONNECTOR drops during transmit and C has not yet totally discharged. This is caused by the TKEY voltage dropping through the trigger point because the supply voltage drops while C is discharging. This lead me to upgrade my power supply cable so there is less voltage drop when I transmit.

## Alternate design:

You can eliminate the capacitor and the TKEY to TSTR connection if you want to manually trigger the IC706 into TUNE. You do need the pull-up resistor between TSTR and 13VDC to make the radio think there is a tuner present during power up. Then ground TKEY to trigger the TUNE mode as long as TKEY remains grounded.

Thanks to Ed, W1AAZ for the explanation of the connector.

Enjoy!  
73 de Larry Lefczik

This modification is read 3611 times.

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**26-05-2001**

## **(IC-706) "Halbautomatik" für manuelle Tuner am ICOM IC-706**

**Author:** Joachim Bernhard - [DC4NV@amsat.org](mailto:DC4NV@amsat.org). [MODIFICATION.NET](http://MODIFICATION.NET)

**Joachim Bernhard DC4NV@DB0MRW.#bay.deu.eu e-mail:** [DC4NV@amsat.org](mailto:DC4NV@amsat.org)

**Die Schaltung simuliert einen am IC-706 angeschlossenen Automatik-Tuner ICOM AH-4 und vereinfacht das Abstimmen manueller Antennentuner.**

**Die Verwendbarkeit an anderen ICOM Transceivern mit Anschluss für AH-4 Tuner ist wahrscheinlich, wurde aber von mir nicht getestet.**

Das Abstimmen manueller Antennentuner am IC-706 ist normalerweise etwas aufwendig:

- Wechsel der Betriebsart, um einen Träger zu senden
- Sendeleistung via Menü reduzieren
- PTT drücken und den Tuner einhändig abstimmen
- Sendeleistung via Menü erhöhen
- Betriebsart wechseln
- QSO fahren

Wenn der IC-706 am Tuner-Anschluss einen Automatik-Tuner AH-4 erkennt, wird mit der TUNER-Taste für ca. 20 Sekunden auf CW mit 10 Watt Sendeleistung umgeschaltet. Der AH-4 übernimmt während dieser Zeit die PTT Steuerung. Danach wird auf die ursprüngliche Betriebsart und Sendeleistung zurückgeschaltet.

In PR-Mailboxen gibt es einen Vorschlag zur manuellen Simulation eines Automatik-Tuners, der aber immer noch einen, manuell zu bedienenden, Schalter benötigt [1]. Der Versuch, diesen Schalter äganz einfachö durch ein Monoflop mit NE555 zu ersetzen, schlug fehl: Der kurze Ausgangsimpuls des NE555 beim Anlegen der Versorgungsspannung irritiert den IC-706 und dieser verweigert die Zusammenarbeit mit dem äTunerö. Das verzögerte Einschalten der Versorgungsspannung des NE555 umgeht dieses Problem. Der Tuner-Simulator ( Bild 1 ) pass einschließlich Stecker ( Bild 2 ) auf eine Lochrasterplatine mit 43 mm x 25 mm ( Bild 4 + 5 ). Das Ganze wird in ein äGehäuseö aus Schrumpfschlauch verpackt. Die Bezugsquelle für den Anschlussstecker findet man in [1]. Ein Stromversorgungsstecker für PC Festplatten kann, nach Ausschneiden der in Bild 3 durch Pfeile markierten Stellen, ebenfalls verwendet werden.

Wichtiger Hinweis: Eine superdünne Leiterbahn verbindet im IC-706 den +12V Pin mit der internen 4 A Sicherung und schützt diese bei Kurzschluss. Der Widerstand R7 ( 15 Ohm ) ist also kein Gag.

**Materialaufwand ca. 5,- DM , Aufbauzeit ca. 1 Stunde.**

### **Funktionsbeschreibung:**

Der Widerstand R3 legt den START-Pin des IC-706 hoch und signalisiert einen angeschlossenen AH-4 Tuner. Wenn die TUNER Taste gedrückt wird, legt der IC-706 den START-Pin kurzzeitig auf Massepotential und triggert dadurch den NE555. Das Triggersignal wird auch dem RESET Pin des NE555 zugeführt. C4 verzögert die ansteigende Flanke des Triggersignals, um RESET und TRIGGER zeitlich zu trennen. T1 legt den KEY-Pin des IC-706 auf Massepotential und schaltet den Sender ein.

R1 und C1 bestimmen die Einschaltzeit des Monoflops ( $R1 * C1 * 1,1 = T$ ). T(NE555) muss grösser T(IC706) = 20 Sekunden bei IC-706MKIIG gewählt werden.

Da mir keine detaillierte Funktionsbeschreibung der Prozessorsteuerung des IC-706 und AH-4 vorliegt, wurden diese Werte empirisch ermittelt.

Die Einschaltverzögerung von ca. 1,5 Sekunden wird mit R4 ü R6, T2,T3,C5 und D1 realisiert.

### **Bedienungsanleitung für die "Halbautomatik":**

Die TUNER-Taste hat die gleiche Funktion wie mit Automatik-Tuner, nur Abstimmen muss man manuell. Falls die Antenne vor Ablauf der 20 Sekunden angepasst ist, schaltet ein Druck auf die TUNER-Taste den Transceiver auf QSO Betrieb um.

### **Haftungsausschluss:**

Der Autor übernimmt keine Haftung für eventuelle Schäden an Geräten, Leib und Leben der Nachbauer.

**Literaturhinweis:** [1] ICOM @DL de:DJ9XB  
24.08.99 18:30 21 1555 Bytes  
tune control' fuer IC706, aber Handbetrieb HI  
\*\*\* Bulletin-ID: O89DB0ZDF02H \*\*\*

### **Stückliste**

R1 = 1M Widerstand  
R2 = 10k Widerstand  
R3 = 8k2 Widerstand  
R4 = 100k Widerstand  
R5 = 1k Widerstand  
R6 = 5k6 Widerstand  
R7 = 15 Widerstand  
C1 = 22µTantal-Elko 16V  
C2 = 10n Sibatit  
C3 = 100n Sibatit  
C4 = 100n Sibatit  
C5 = 22µTantal-Elko 16 V  
T1 = BC548 NPN-Transistor  
T2 = BC559 PNP-Transistor  
T3 = BC548 NPN-Transistor  
D1 = ZPD 5V1 Z-Diode  
IC1 = NE 555  
Lochrasterplatine ca. 46mm x 25mm  
Schrumpfschlauch  
St1 = siehe Text

## Alternative zum modifizierten PC Stecker:

Steckergehäuse Molex 03-09-2041, Best.Nr. 143-207, ca. DM 0,40  
Chrimp-Kontakte 02-09-2118, 143-219, ca. DM 12,- (gibt es nur in Beutel = 100 St.)  
Fa. Farnell, Grünwalder Weg 30  
82041 Deisenhofen.  
oder  
Original ICOM Kabel für AH-3 oder AH-4  
zum Preis von ca. DM 80,00

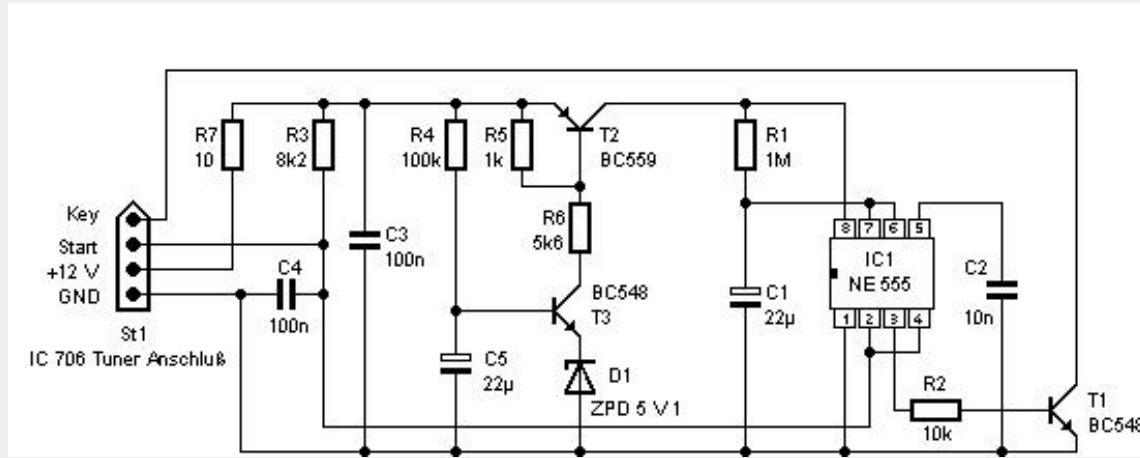


Bild 1 Stromlaufplan

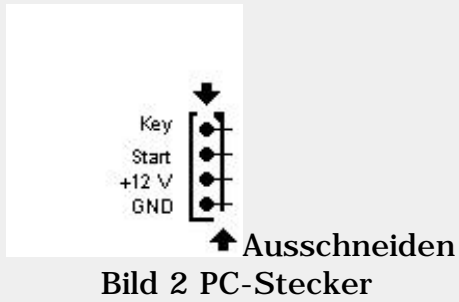


Bild 2 PC-Stecker

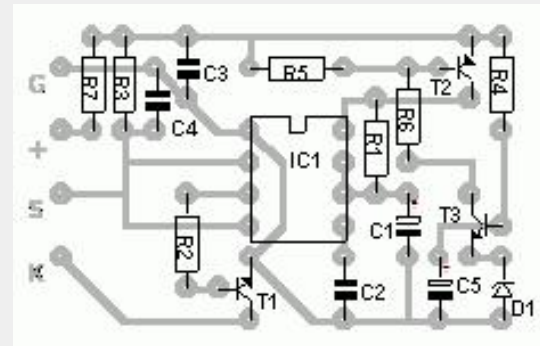


Bild 3 Layout (vergrössert)

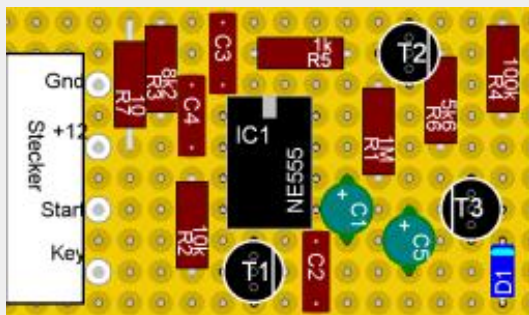


Bild 4 Lochrasterplatine

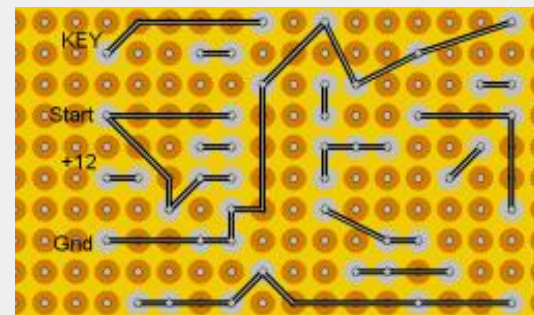


Bild 5 Lochrasterplatine Lötseite



**26-06-2001**

## **(IC-706) FM Transmit Fix**

**Author:** Adam MAURER, VK4CP - [vk4cp@bigpond.com](mailto:vk4cp@bigpond.com). [MODIFICATION.NET](http://MODIFICATION.NET)

(This article appeared in "Six News" Issue 59 and "Radio & Communications" April 1999)

Is your 706 not transmitting on FM properly? This maybe why...

Having taken my Icom IC-706 back for service twice before for the same fault, I was not prepared to be inconvenienced a third time! As it turns out IC-706s all over the World have been exhibiting the same fault. I've had e-mail from other unhappy IC-706 owners as far away as the U.S.A. and the U.K.

Upon checking the previous Fault Reports I noticed that the FM VCO had been tweaked.

Hmmm... There is a 9MHz VCO active during FM mode only which is modulated from the mic amp.

### **Fault condition symptoms are;**

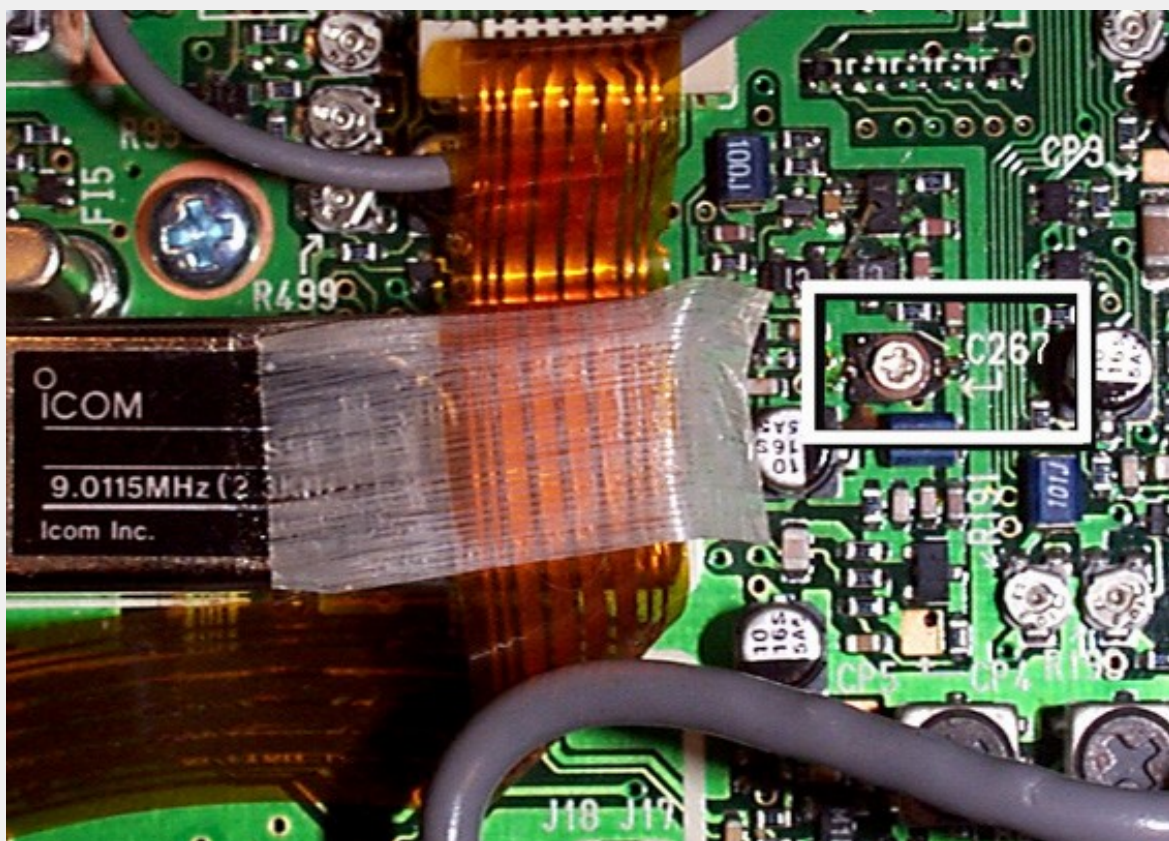
- Very low Output power (enough to be heard on a nearby receiver on the shack bench but that's about it).
- Carrier frequency is NOT what the dial indicates, typically 5 - 30kHz on the low side.
- Carrier tends to wander and sounds spurious.

### **The culprit**

I discovered that C267 a miniature SMT trimmer capacitor located – see picture - 9mm to the right of the 9.0115 MHz IF Filter on the Main Unit was not re-flowed to the PCB to a satisfactory standard. There was insufficient solder paste applied during the printing process and the end result being a poor solder joint and an intermittent 9MHz VCO. After re-touching both pins of C267 with fresh solder it's performed faultlessly since.

Although access to the offending area is easy you will need a very fine tip on your iron to get to the trimmer pin on the filter side without damaging the capacitor itself and disturbing two nearby 0603 chip capacitors.

I cannot stress enough to successfully carry this repair out you need a very very fine tipped soldering iron, and ensure the tip is in good order.



### **Equipment Required**

You'll require the following tools;

- Small Phillips-head screwdriver.
- Accurate Frequency Counter.

- (Another receiver will do).
- Dummy Load, Power Meter & coax patch leads.
- Soldering iron with **very fine tip**.
- Fine solder 0.7 or 0.5mm.
- <![endif--> De-solder wick if required.

**NEVER EVER use a plunger type solder sucker on SMT boards. The re-coil action can damage boards and parts.**

**Procedure;**

1. Turn transceiver off and disconnect all leads. (Obvious?)
2. Using a Phillips-head driver remove top cover only.
3. With radio upright & front facing towards you (ie; normal operating position) the MAIN Unit PBA is the front board.
4. Locate the 9.0115 MHz IF filter and then C267 (identified on silkscreen) 9mm to the right of the filter.
5. Using fresh solder, carefully re-touch up solder joints to both pins of the trimmer cap.

The filter side is difficult to solder due to nearby capacitors and the fact that the ground plane will sink a lot of heat.

**This is the pin that is usually not soldered properly ex the factory.**

6. Inspect solder joints carefully, particularly the ground plane side.
7. Re-connect DC Power lead.
8. Connect Dummy Load via a PWR meter.
9. Turn the transceiver on, select FM mode, and select a convenient test frequency, ie; 29.6MHz.
10. Confirm TX carrier frequency is correct against Frequency Counter (or another receiver).
11. Check Power O/P is appropriate to the PWR setting in the menu.
12. If all ok, turn off and replace the top cover.

It is most unlikely you will need to tweak C267.

The setting should still be correct, otherwise alignment is not that critical, just set it for centre of lock range.

Needless to say, any work performed on your transceiver other than by an authorised Icom service agent may void your warranty, if that is still applicable.

Thanks to <http://www.qsl.net/vk4cp/> for the modification.

This modification is read 3614 times.

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**26-06-2001**

**(IC-706) IC-706 Microphone Audio Response Improvement**

**Author:** PE1MHO

This mod was submitted by Pete PE1MHO.

CAREFULLY open the microphone.

(There's a little spring in there that will fly out and get lost in the carpet, never to appear again. )

Remove the circular metal plate that holds the electret capsule in place, and GENTLY pull out the capsule.

You'll find what can best be described as a "Q"-shaped rubber gasket - remove this and throw it away.

Reassemble everything - that's all there is to it.

You will now have a microphone with a bit more punch, but most importantly the audio bandpass is a lot better.

The difference as measured on an audio spectrum analyzer was quite significant.

I'm not sure if this helps for the Mk II and Mk IIG - maybe Icom have already adapted them....

Thanks to <http://www.qsl.net/vk4cp/> for the modification.

This modification is read 3702 times.

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**25-08-2001**

### **(IC-706) Improved VHF receive mod (see also yellow wire mod)**

**Caution:** This is quite involved. If you are not too good you might be advised to get someone who has the experience to handle this mod! This mod requires the service manual, a propane torch for desoldering the SMDs, and desoldering braid for cleanup.

The two VHF Rx filters are on the PA unit, between the EXT SP jack and L29 L30 (two tunable metal boxes). The wide filter is used if the B8W signal is active ([60--144[ and [148--200] range).

L29 and L30 form the 144-148 band pass filter, with a 2 dB loss.

The wide filter works from 60--120 MHz, see [plotrxold.pdf](#). Since transmitting below 120MHz is impossible due to spurious emission at ftx+70MHz, I decided to modify the rx filter for a 110--180 MHz operation. Note that the low pass VHF input filter has a -7dB roll-off at 160 MHz.

New component values:

|      |                 |      |       |      |       |
|------|-----------------|------|-------|------|-------|
| C57  | 1nF             | L26  | 150nH | L40  | 39nH  |
| C56  | 47pF            | L25  | 120nH | L49  | 33nH  |
| C55  | 18pF            | C52  | 0pF   | C51  | 1nF   |
| C54  | 32.6pF (27+5.6) | C53  | 15pF  | C153 | 12pF  |
| C151 | 15pF            | C152 | 15pF  | C154 | 1.8pF |

Caps in 0603 size, Farnell or Johanson. Inductors in 1008CS size, Coilcraft. Results are in [plotrxnew.pdf](#) and [p\\_nf.pdf](#).

[Noise](#) figure data.

This modification is read 3583 times.

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**25-08-2001**

### **(IC-706) To expand the band on the VHF portion**

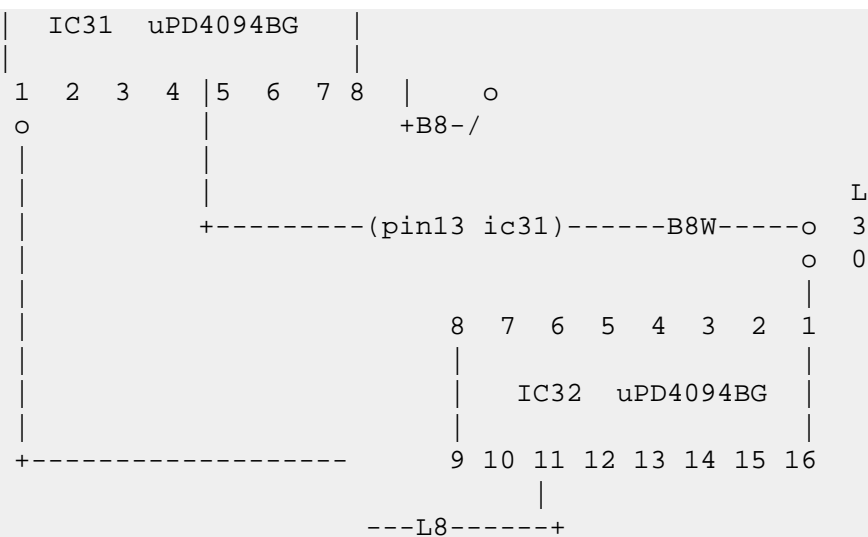
VHF is controlled by the signals

|     |                             |               |
|-----|-----------------------------|---------------|
| T8  | high on Tx                  | (IC11 pin 16) |
| R8  | high on Rx                  | (IC11 pin 17) |
| B8  | [144--148[ MHz              | (IC31 pin 14) |
| B8W | [60--144[ or [148--200] MHz | (IC31 pin 13) |
| L8  | [60--200] MHz               | (IC32 pin 11) |

Out of band Tx is impossible due to two reasons.

- Transistor Q38 realizes B8W and (not R8) to short circuit the VHF signal into the HF low pass filter.
  - The IC38 TA4001F VHF pre-amp is only activated if B8 and T8 holds.
- Remove the main board from the unit. Keep the cutout hole away from you. This I consider the top of the board.
  - Flip the board over its vertical axis and look at the underside. The cutout hole is now on the left. Locate IC32 on the right. There are two IC chips, and IC32 is a bit more to the bottom and to the right. The chip is at 3 cm from the right edge and centered vertically. Pin 1 is the top right pin.

|    |    |    |    |    |    |    |   |
|----|----|----|----|----|----|----|---|
| 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |
|    |    |    |    |    |    |    |   |



3. Above pin 1 you will see two vias. The first via is connected to pin 1, and the second connects to a horizontal trace coming from the left. This trace is B8W and goes to the emitter of the PNP Q38 transistor. Cut the trace just before the via.

--- **alternative not recommended** ---

2. Remove the shield from the top of the board. There are 30-40 solder points from the shield to the board.
3. Under the board on the top of the board, remove R-353 and Q-38. They are located to the left of the IC-36 chip on the top of the board under the shield.

--- **alternative ends** ---

4. On the underside of the board, Locate IC-32. There are two IC chips. IC-32 will be just down and to the right of the shield.
5. Using a pointer, point at the left upper pin, and go toward the top of the board. You will find a trace that stops. It comes out from under IC-31, pin 14, and stops. It should be the sixth trace up from the top of the Chip. This signal activates the VHF preamp.
6. Using a Xacto knife, (or something similar) Cut the trace in the bend halfway between IC-31 and the solder point (via).
7. Make a jumper wire, and jump the connection, from Pin 11 of IC-32 to the newly isolated trace. Alternative: solder the wire from the via at pin 1 (bottom left pin) of IC31 and the newly isolated via.
8. Reassemble the radio.

Transmit from 200 kHz to 200 MHz continuous (works from 1 MHz, Tx HPF)

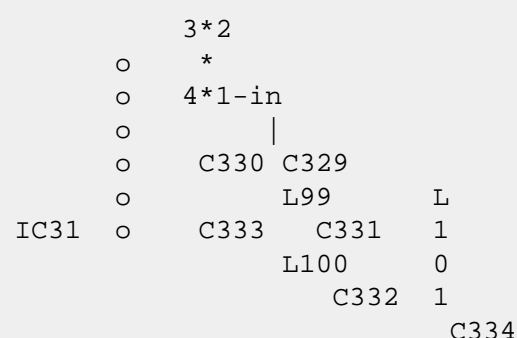
ICOM does not warranty these mods.

Parts of this text are from: test at your own risk, have fun and 73 de OE1GQA Guenter - Vienna

**Expanded VHF part 2**

The VHF IC38 TA4001F 12.5dB preamp has a bandpass input filter from 140 to 150 MHz. If you try to transmit outside of this band you will either transmit nothing or spurious. (e.g. tx= 70 MHz lo= 140 MHz). See [plottxold.pdf](http://plottxold.pdf).

The four pin IC38 is located on the underside of the main board, just on the right of IC31. (cutout hole top left)



**Note:** L101 is ommitted in the schematic of the service manual. It connects at C334 and goes to ground.

## New component values:

|      |       |      |       |      |       |
|------|-------|------|-------|------|-------|
| C334 | 82pF  | C333 | 1.2pF | L99  | 180nH |
| L101 | 180nH | L100 | 100nH | C329 | 3.9pF |
| C332 | 10pF  | C331 | 2.7pF | C330 | 10pF  |

Caps in 0603 size, Farnell or Johanson. Inductors in 1008CS size, Coilcraft. The result is given in [plottxnew.pdf](#). The measured filter response was even better; there was a resonance bump at 120 MHz and 150 MHz.

The power levelling did not work so good outside of the ham bands. This is due to the frequency dependent detection circuit on the PA board. The Tx power was +2dB at 120 MHz and +8.5dB at 165 MHz.

Spurious emission increases at the Tx band edges, 120 and 170 MHz, to about -30 dB. The VCO1 to VCO0 switch, below 120 MHz for my 706, increases the problem since the doubler output power is a bit low at the band edge.

This modification is read 4213 times.

[top of page](#)

**03-03-2002**

## **(IC-706) Adding an extra RX-only port in the Icom IC706**

**Author:** Jaap van oosten - [pa0oos@qsl.net](mailto:pa0oos@qsl.net). [MODIFICATION.NET](http://MODIFICATION.NET)

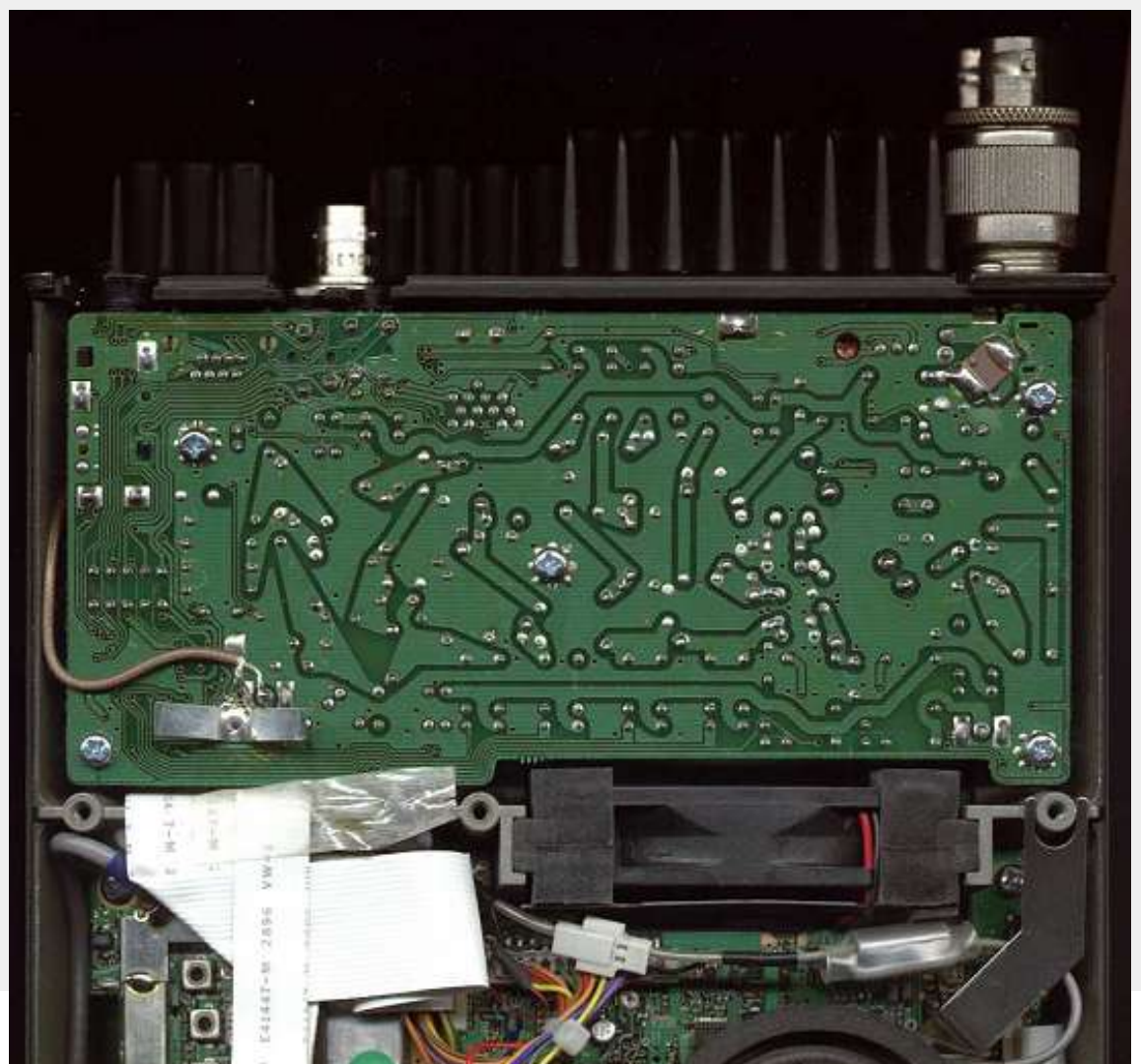
This is usefull when using a big PA and or for RF bandpass filters. My FT102 + transverter recently broke down So i now use the IC706. The sensitivity of the IC706 is not what I was used with the transverter. There is raise of noise when connecting the antenna so in fact it is just sufficiënt.

Using the IC706 with an external PA you might need a lownoise preamp. But it is not so easy to use because without extra protection relays it can, and sure will be destroyed by the driving power of the IC706.

The best solution is having an extra RX-only input like most bigger transceivers have. This way the preamp can be placed direct behind the first antenna relay and the output of it Goes to the RX-only port. The best place for this antennе relay of course is as close as possible to the antennе to avoid extra cable loss however not so practical.

Adding a separate RX port is an easy and clean modification. There is a spare opening in the backpanel where an extra BNC connector can be placed. Extra rings are used to fit because the hole is to big for the BNC. Then this BNC must be connected to J1 (rx) point found at the back of the filterunit.

The filterunit is situated top-backside. After removing 5 screws the board can be moved up at the backside Just enough to mount the BNC underneath it. It is not needed to remove it completely that would be a problem because of all connections to it.





This modification is read 411 times.

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**18-12-1998**

## **(IC-706mkii) ICOM 706 MKII Extended transmit mod**

*From: "Len SantaMaria, KC2ADV"*

This file may be freely distributed as long as it remains intact, with no modifications, additions, or deletions.

### **DISCLAIMER:**

I assume no responsibility for damage or inaccuracies contained in this document. In other words, **USE THIS AT YOUR OWN RISK**. It worked for me, however I don't know if it will work for you.

**WARNING #1:** This mod requires the ability to remove surface mount diodes. Only those who are qualified to do this should attempt this mod.

**WARNING #2:** This mod seems to erase all memory channels, etc. You may want to save this info for reprogramming.

### **Disassembly:**

1. Face the front of the radio towards you.
2. Remove the three screws in a row across the middle of the top of the radio.
3. Remove the two screws at the top rear (on the sides) of the radio.
4. Pry the top cover off from the back.
5. Disconnect the speaker at the connector.

### **Modification:**

6. Near the top rear of the main circuit board, there is an small, oblong metal can. Directly below the right side of this can is two surface mount diodes with a white silk-screened box around them. There is also what appears to be a circuit board part number just to the left of it (mine says B4916D). Remove the **LEFT** diode in the box.
7. To the left of this, there is a test point marked CP3. Just to the left and above this test point is another box with two **\*vertically\*** mounted surface-mount diodes (Note: there is also a place for 5 more **\*horizontally\*** mounted diodes, with 3 installed). Remove the **LEFT** vertically oriented diode.

### **Reassembly:**

8. Reconnect the speaker.
9. Put the top cover back on. Insert the top cover tabs into the slots and lower into position.
10. Replace all of the screws.

My radio did not require a reset, however I did lose all of my channel memories. It seems to be able to transmit everywhere except below .5 Mhz. I have not tested the power output at all frequencies yet.

I hope this helps everyone who have been waiting patiently for this mod.

Any comments can be directed to me:

Len - KC2ADV

email: lenny@handy-man.com.MODIFICATION.NET

From: "Rafel" jarel@box43.gnet.pl

If you can read this, its come from Your www:

Len - KC2ADV

email: lenny@handy-man.com

... wrote:

...

>Modification:

>6. Near the top rear of the main circuit board, there is an small, oblong

>metal can. Directly below the right side of this can is two surface mount

>diodes with a white silk-screened box around them. There is also what

>appears to be a circuit board part number just to the left of it (mine

>says B4916D). Remove the LEFT diode in the box.

>7. To the left of this, there is a test point marked CP3. Just to the left

>and above this test point is another box with two \*vertically\* mounted

>surface-mount diodes (Note: there is also a place for 5 more \*horizontally\*

>mounted diodes, with 3 installed). Remove the LEFT vertically oriented

>diode.

For first, my circuit board part number is B4916F, i don`t understand you what diodes i must cut off, explain me, my smd diodes looks like this:

```

                O<>O 7
                O   O 6
                O<>O 5
J25             O<>O 4
                O<>O 3
                O   O
1[]   [] 2     B4916F  8[]  []9
                O   O
                CP3
                <__]
```

Diodes: 1,2,3,4,5,7,8,9 are instaled

Diode: 6 is not instaled

My version is with Tone 1750Hz, European i think, RX 30kHz-200MHz, TX in amateur bands only, the serial number if needed is: 02101 bought in 18.06.97 as new in Poland.

Sorry for my bugs.

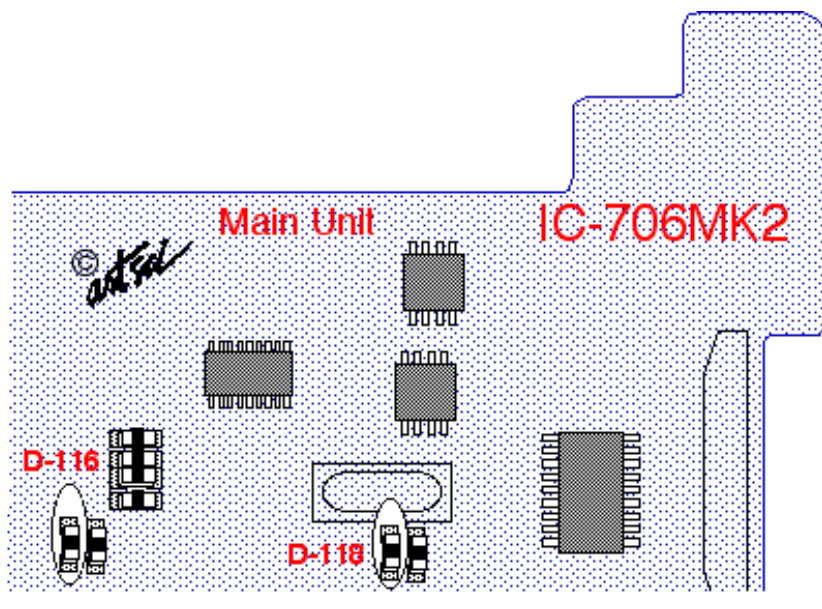
Can You type me what diodes ? I think 1 and 3.

Rafa´ SP6-1313WR, Klub SP6KBE :) Kontakt: jarel@box43.gnet.pl

Info on the diodes from another European user:

```
d129
---- (d111 none)
d112
d113
d114
```

```
d d           d d
1 1           1 1
1 1           1 1
6 5           8 9
```



D116 and D118 are responsible for out of band TX. D115 and D119 enables RX from 30KHz to 200MHz. D113 is responsible for 6M RX and D114 is responsible for 6M TX. I do not have info about D129 and D112.

Rafa3 SP6-1313WR, Klub SP6KBE :) Kontakt: [jarel@box43.gnet.pl](mailto:jarel@box43.gnet.pl). [MODIFICATION.NET](http://MODIFICATION.NET)

This modification is read 7210 times.

[top of page](#)

**13-06-1999**

### **(IC-706mkii) Special on IC706mkII**

*From: SM6WXO@SM6JZZ. #SDE.R.SWE.EU*

I have tried some special buttons on IC706mkII:

Push TS and DISPLAY while power up and you will see a strange power on check.

Push P.AMP/ATT and RIT/SUB while power up and you will be able to see SHIFT-ADJ on your 706mkII. Dont know what this is for, recalibrating ?

I think that these things even works on the older version of 706, dont know.

73 - Dennis, SM6WXO @ SM6JZZ

This modification is read 6358 times.

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**21-08-1999**

### **(IC-706mkii) TX range expansion for IC-706MKIIG**

*Author: Karel OK1DNH - [kebert@ext.epe.cz](mailto:kebert@ext.epe.cz). [MODIFICATION.NET](http://MODIFICATION.NET)*

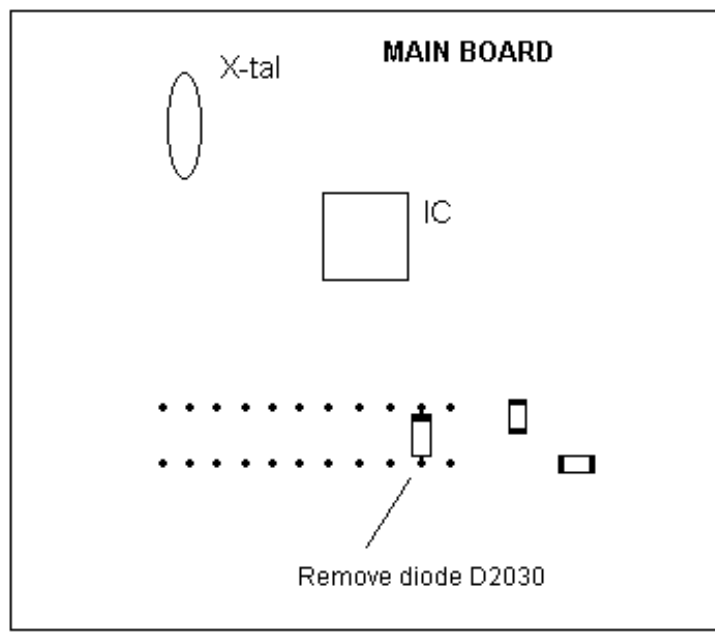
TX range expansion on HF, VHF and UHF is very simple. When modified the radio will also transmit AM mode in the aircraft band with approximately 1 watt at 118 MHz to about 17 watts am carrier at 136 MHz.

On MAIN BOARD under speaker near Xtal you can see two rows of solder dots for SMD components. Only on position 10 (from left) is diode (D2030), which is necessary to remove.

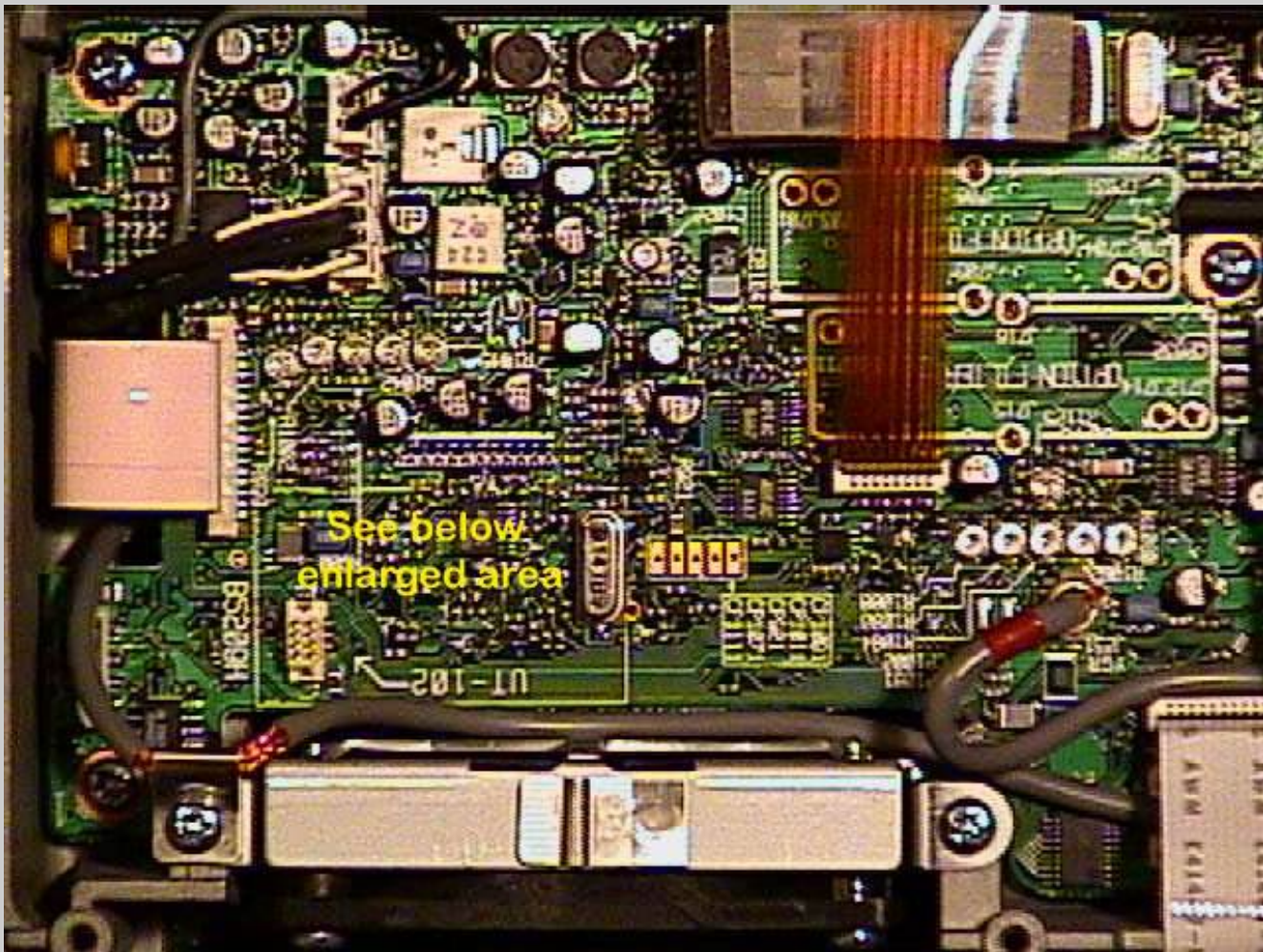
Thats all.

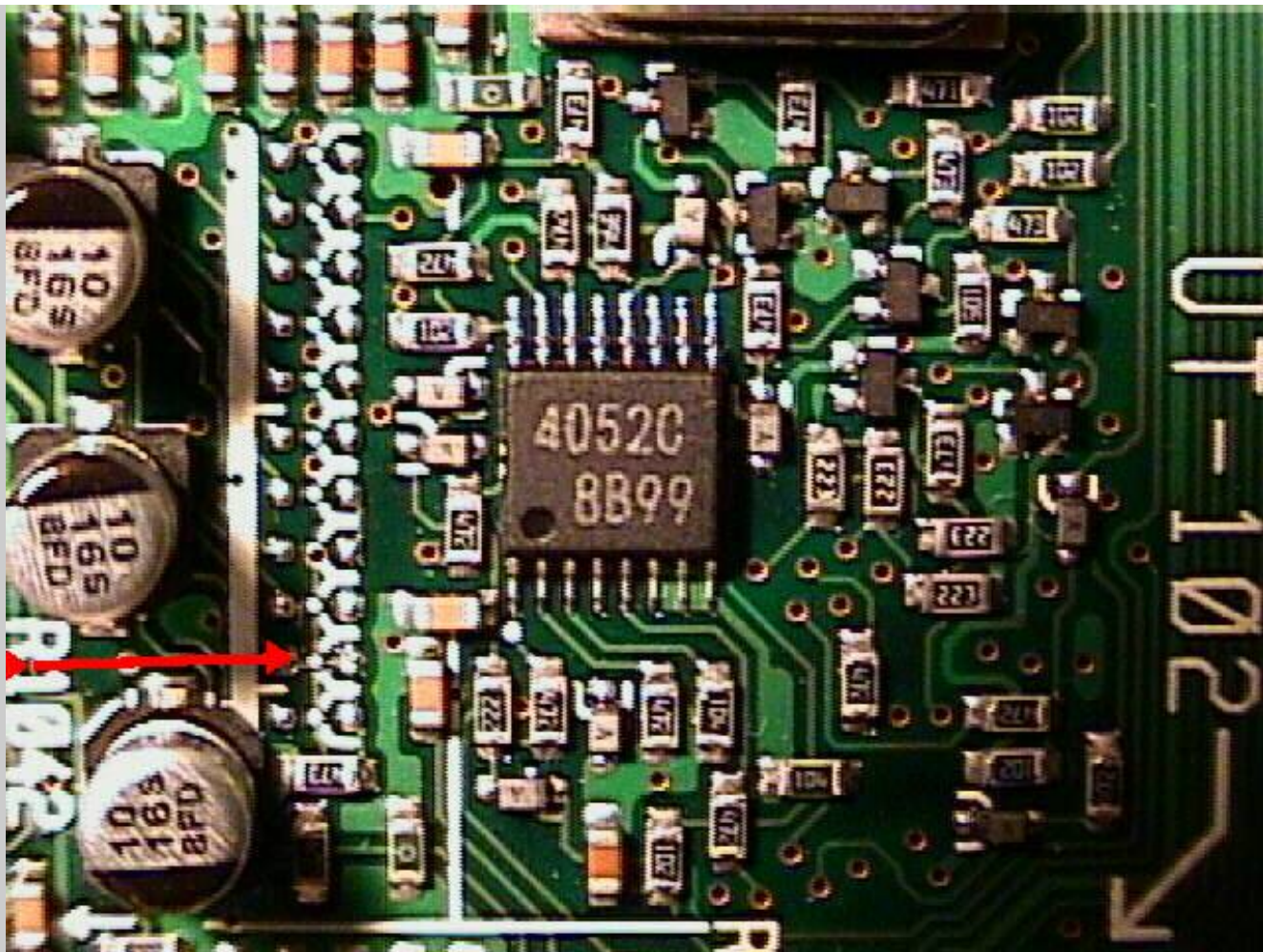
After connecting power radio will be reseted and TX range is expanded.





More pictures from Ken Bessler [KGOWX](#).





### Transmit power output after modification

Power output in watts as measured from an uncalibrated Diawa CN-620 wattmeter with vhf,uhf dummy load. Power output on radio set to highest level.

| FREQ    | FM PWR | AM CARR | FREQ    | FM PWR |
|---------|--------|---------|---------|--------|
| 105 MHz | 1.0    | 0.0     | 400 MHz | 2.0    |
| 110     | 1.0    | 0.0     | 405     | 7.0    |
| 115     | 2.0    | 0.0     | 410     | 9.0    |
| 118     | 3.5    | 0.7     | 415     | 10.0   |
| 120     | 5.0    | 1.0     | 420     | 12.0   |
| 125     | 14.0   | 3.5     | 425     | 15.0   |
| 130     | 20.0   | 15.0    | 430     | 18.0   |
| 135     | 25.0   | 17.0    | 435     | 20.0   |
| 140     | 28.0   | 18.0    | 440     | 20.0   |
| 145     | 32.0   | 18.0    | 445     | 19.0   |
| 150     | 32.0   | 18.0    | 450     | 18.0   |
| 155     | 20.0   | 18.0    | 455     | 15.0   |
| 160     | 13.0   | 10.0    | 460     | 8.0    |
| 165     | 6.0    | 1.5     | 465     | 0.8    |
| 170     | 1.5    | 0.0     | 467     | 0.15   |
| 175     | 0.5    |         | 470     | 0.00   |
| 180     | 0.1    |         |         |        |
| 185     | 0.0    |         |         |        |

**22-08-1999**

## **(IC-706mkii) Expand only mod for the IC-706MkII**

**Author:** David Spicer, VK7ZDJ - [vk7zdj@southcom.com.au](mailto:vk7zdj@southcom.com.au). [MODIFICATION.NET](http://MODIFICATION.NET)

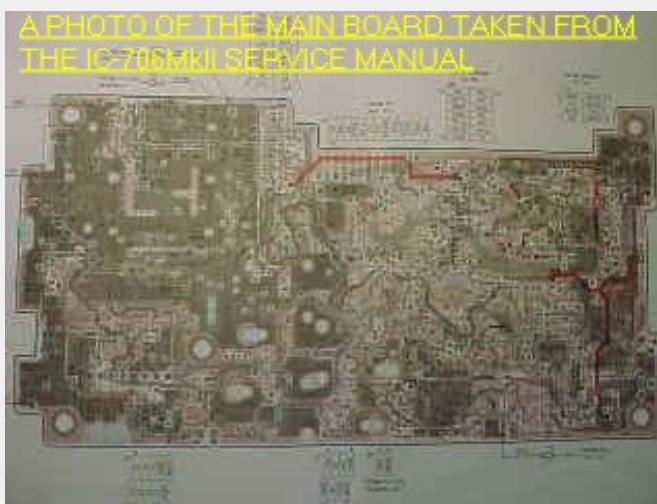
HI ALL, as an owner of a IC-706MkII, I have noticed that there is no detailed photos of how to go about the mods on any of the mod sites, so I pulled my radio out of the car and I have taken some photos of the only mod that I was interested in doing to my radio,.....EXPAND RX /TX.

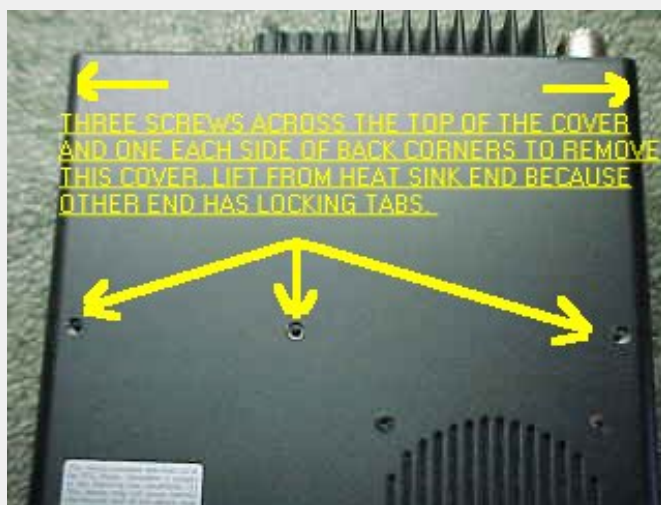
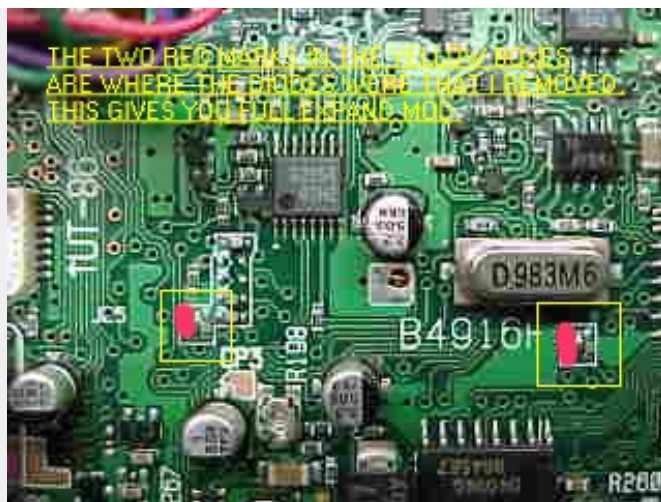
I hope that the photos will help all new owners and or old ones that have not been game enough to tackle the mod, its quite a simple mod to do as long as you have good quality desoldering equipment, if not then do not attempt it, take it to someone that has the gear.

If you follow the text file on this page by "Len SantaMaria, KC2ADV"

headed,.....Icom 706 MkII Extended Transmit Mod and use my photos as a reference then I do not think you can go wrong, my radio works like magic.

PLEASE NOTE THAT THESE MODS WERE DONE TO AN AUSTRALIAN IC-706MkII RADIO,.....AS FAR AS I CAN TELL THERE IS NO DIFFERENCE BETWEEN MY RADIO AND THE AMERICAN MODEL, IF ANYONE FINDS THIS NOT TO BE CORRECT THEN I AM SORRY BECAUSE I CANNOT HELP YOU.



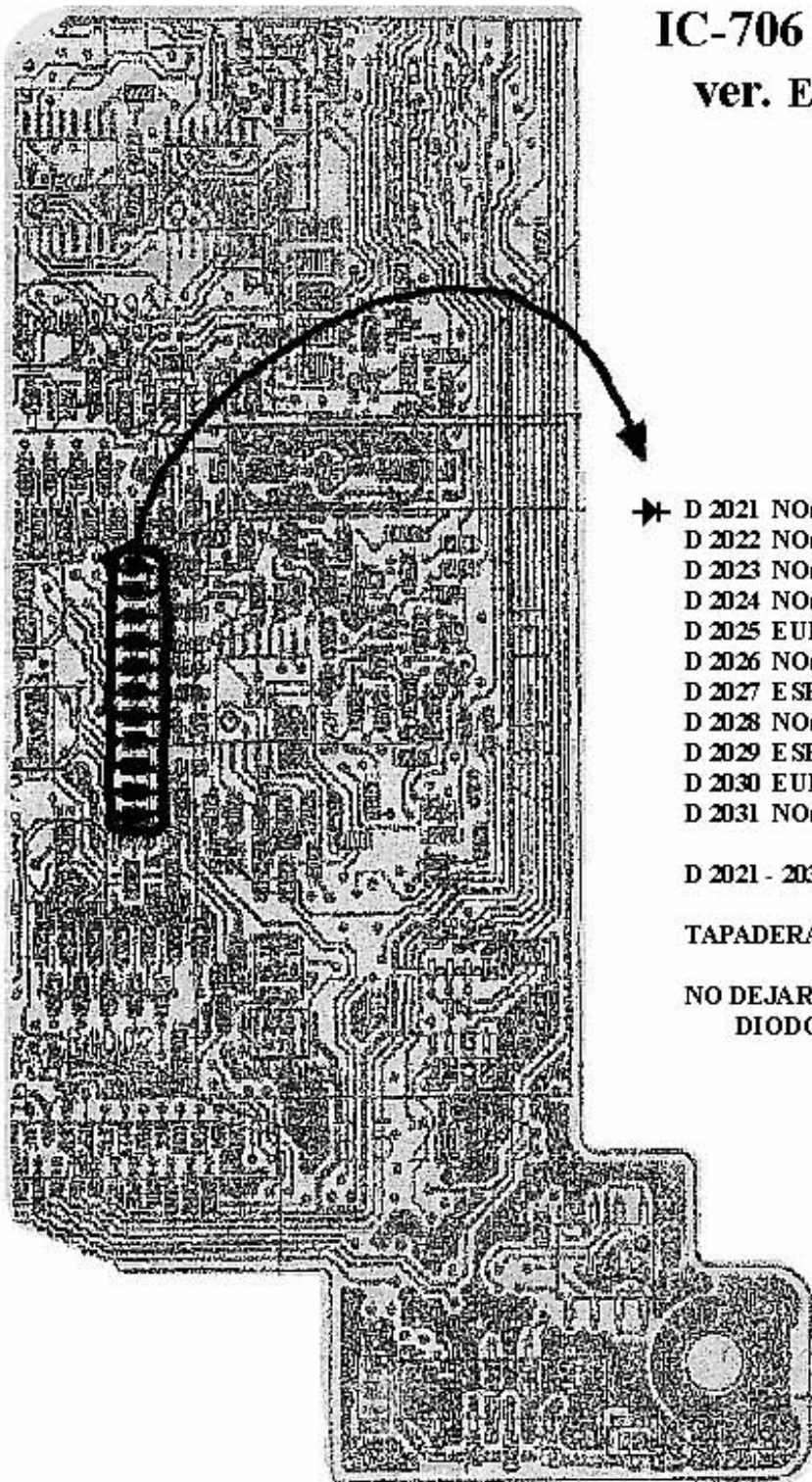


This information and photos was supplied by David Spicer, VK7ZDJ.

[vk7zdj@southcom.com.au](mailto:vk7zdj@southcom.com.au).[MODIFICATION.NET](http://MODIFICATION.NET)

**20-01-2001**

**(IC-706mkii) mods IC706 MKIIG por EA1DOU (ver. Española)**



**IC-706 MKIIG  
ver. ESPAÑA**

- ✦ D 2021 NO(NONE)
- D 2022 NO(NONE)
- D 2023 NO(NONE)
- D 2024 NO(NONE)
- D 2025 EUR ver. & ESP ver.
- D 2026 NO(NONE)
- D 2027 E SP ver. solo(only)
- D 2028 NO(NONE)
- D 2029 E SP ver. solo(only)
- D 2030 EUR ver. & ESP ver.
- D 2031 NO(NONE)

D 2021 - 2031 (DIODOS)

TAPADERA SUPERIOR

NO DEJAR NIGUN  
DIODO

This modification is read 4753 times.

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**16-12-2001**

**(IC-706MKII) Modifikation IC-706MKIIG für 9k6 PR und Pactor**

**Author:** André Loos DO1CAL - [do1cal@dar.de](mailto:do1cal@dar.de) [MODIFICATION.NET](http://MODIFICATION.NET)

Es folgen [4 Bilder im \\*.gif](#) - Format die den Umbau für 9k6 PR und Pactor beschreiben für den IC-706MKIIG.

Viel Spaß damit. Ich übernehme keine Haftung für evtl. entstehende Schäden am Transceiver !

Die 4 Dateien habe ich im PR-Netz gefunden.

This modification is read 2893 times.

[top of page](#)

**22-02-2002**

## **(IC-706MKII) IC-706MKIIG mod**

**Author:** Tobias, DL1TWA - [think@gmx.net](mailto:think@gmx.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Okay, I've got a new Icom IC-706MKIIG info for you:

There is a mod saying:

"Push P.AMP/ATT and RIT/SUB while power up and you will be able to see SHIFT-ADJ on your 706mkII. Dont know what this is for, recalibrating ?"

I have tested this and figured out the following:

When the SHIFT knob is in the middle position and you press SHIFT-ADJ, then "Good" is displayed. Nothing happens after power on.

But when you turn the SHIFT knob a little to the left or to the right, then good is displayed and next time you power up you have a modified shift adjustment. The SHIFT graph is different, too!

If you turn the knob a bit more to the left or to the right, then "Error" is displayed and nothing happens.

I wrote to Icom Europe and they say, that this function (P.AMP/ATT + RIT/SUB) is only used in the factory during the production process of the IC-706MKIIG. to calibrate the centersetting of the shift know.

Afterwards a new calibration shouldn't be necessary.

When you press the arrow in the SHIFT-ADJ menu for one second, the position of the shift know is stored as the new center setting.

This modification is read 1865 times.

[top of page](#)

**01-10-2000**

## **(IC-707) Receive and Transmit Expansion for ICOM IC-707**

1. Remove power and antenna
2. Remove screws and open case
3. Locate front unit board (The one behind the dial)
4. In Version 1: Locate and remove Diode D12

```
|           [ ] D12   [ ] D13
|           [ ] D11
|
```

This modification is read 704 times.

[top of page](#)

**23-12-2000**

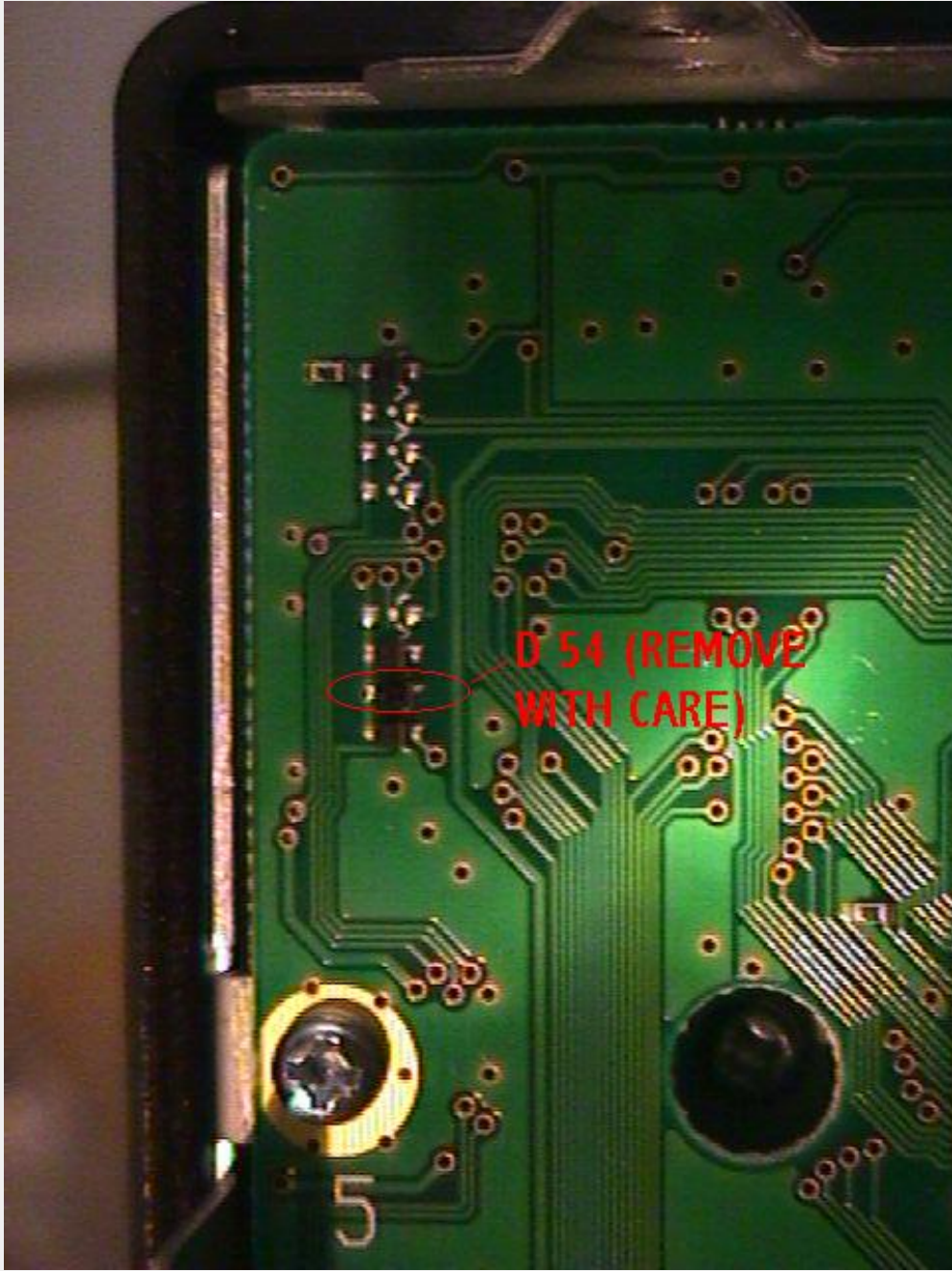
## **(IC-718) IC-718 TX 1.8 - 30 MHz**

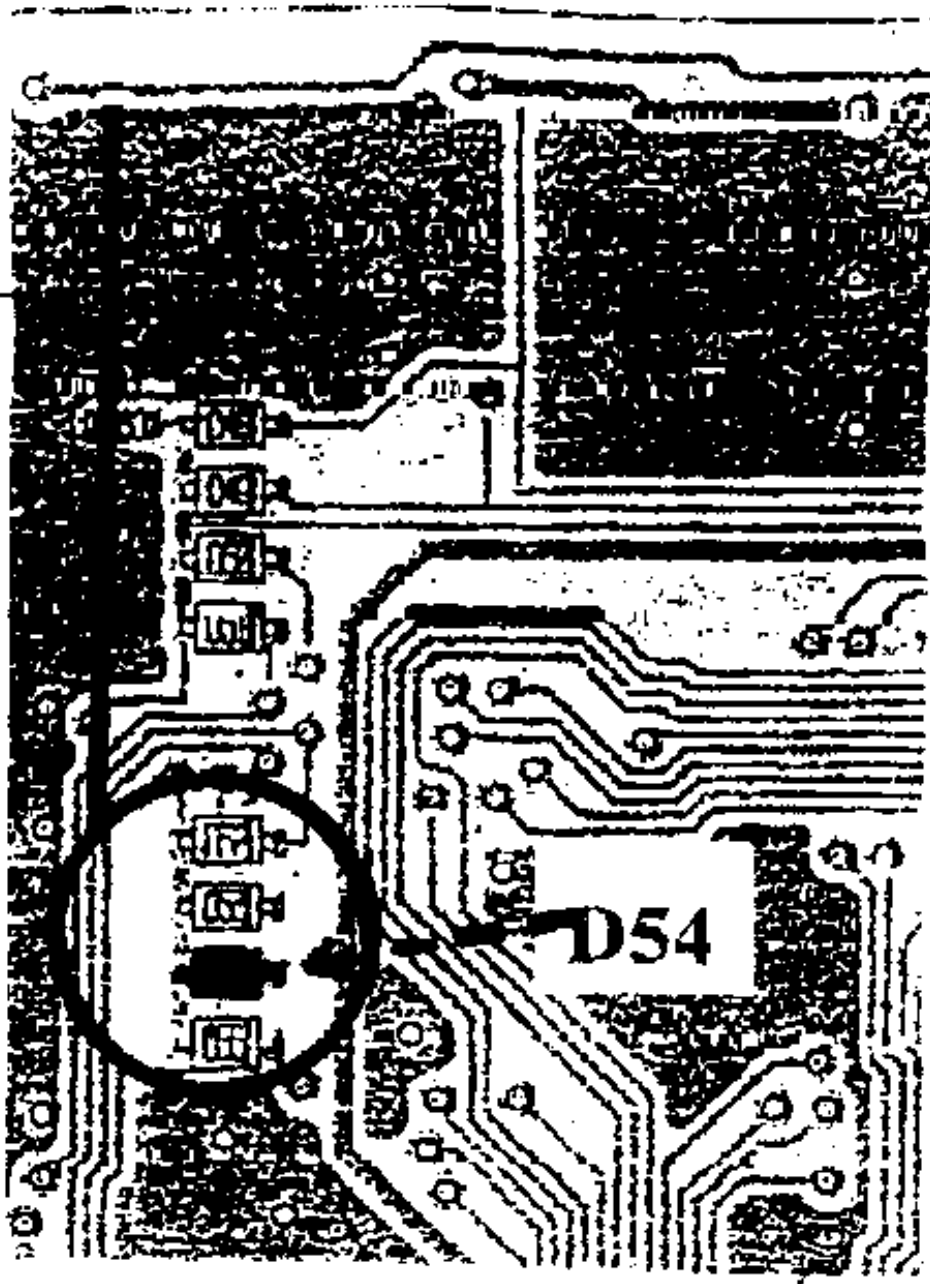
Remove D-54 on the logic board, located behind the front panel.

D-54 is located in the upper left corner in the lower vertical group of diodes.

X  
X  
X  
X

X  
X





This modification is read 2320 times.

[top of page](#)

**06-05-2001**

### **(IC-718) Modify IC-718#04 to IC-718#03**

**Author:** Jan SP2EXE - [sp2exe@poczta.onet.pl](mailto:sp2exe@poczta.onet.pl).[MODIFICATION.NET](http://MODIFICATION.NET)

How to change frequency coverage from version IC-718#04 to IC-718#03?

It is easy to restrict the frequency range (to modify from #04 to #03)

Remove D50 diode in the Logic board is enough.

D50 is located close to D54.

73 de Jan SP2EXE [sp2exe@poczta.onet.pl](mailto:sp2exe@poczta.onet.pl).[MODIFICATION.NET](http://MODIFICATION.NET)

This modification is read 1868 times.

[top of page](#)

**19-07-1998**

### **(IC-720) ICOM IC-720 extended xmit**

Transmitter is unlocked by snipping the light blue wire that's at the very end of the top hatch cover to the left middle side of the transceiver.

This modification is read 1186 times.

[top of page](#)



**19-07-1998**

## **(IC-720) Modifying IC-720A to get rid of rotary relay**

I have just finished modifying an old IC-720A HF transceiver to replace the rotary relay filter control with a set of reed relays and a small digital circuit to select the appropriate relay and provide feedback to the existing CPU in the radio so it thinks it's still on the rotary relay. The cost for parts was about \$25; the cost of my time was slightly more than that, but it was "fun".

The modification is so far successful, and the radio is much quieter in band switching as well as being more reliable (the old rotary relay was impossible to get mechanically aligned correctly, leading to poor connectivity between the rx/tx and the antenna, as well as many missed stepping pulses).

Summary: Use the step-pulse line to drive a small SPDT relay; use the SPDT relay to drive an R/S flip-flop (built from two nand gates) to provide a clean step signal (the existing step signal has some kind of very high speed clock train superimposed on it and therefore was not usable directly). Feed the pulse train into a CMOS decade counter type 4017. Take the appropriate decade outputs (active high) and recreate the switch-position feedback signals using a small diode matrix ala the original design. Also use the decade outputs through 33K resistors to turn on 2N3904 NPN transistors, which are used to select the appropriate (1 of 7) DPST reed relays. The CMOS chips (the nand gates and the decade counter) can be had at Radio Shack and must be powered from 9V (or so) because the radio does not use 5V logic (of course...)

I mounted the reed relays inside the original low-pass filter subassembly, and the rest of the circuitry on a small perf-board near the SWR module (connected by ribbon cable).

This is not a detailed design description but if you are interested I will provide more details. This project did salvage an otherwise-worthless IC-720A, but I don't think I'd do it again (rather time consuming, but perhaps you can benefit from my experience and save some time).

This modification is read 1146 times.

[top of page](#)

**19-07-1998**

## **(IC-720) Amtor mods FOR IC-720A**

I present here again the mods for amtore operation for the Icom IC-720A transceiver.  
I received this info in the year 1984-1985 !

On my Icom IC-720A I did the first set of mods (by G4ICM) and now my Icom IC-720A works well in amtore and packet !

I hope that this info is useful for someone!

73 DE IK3BVD OP.ENRICO

Mods for the Icom IC-720A:

There are 4 sets of mods. Some duplication will be obvious.

*By G4ICM*

Main board:

Change C40 C42 C43 C54 to 0.1 uF

Change C69 TO 0.01uF.

I.F. Board:

C87 may be 33uF, but shown as 0.0047uF, which is on print side.

Change C87 to 2.2uF, leave 0.0047 on print side.

R.F. Board:

Remove C169 C127. Change C165 to 0.47uF.

Noise blanker update. (check if done)

Change C116 to 10uF

Change C171 to 0.01uF

If in difficulties call England 2273 63859

*By KB9IS*

Delete C40 and C43 on main unit

Change C42 and C43 (10uF and 2.2uF) to 1uF.

Disable A.F.Muting- link short-C69.

Delete cap. CT14 at pin 6 of IC3 on I.F. Unit.

Rearrange the R9V to TR Q22 on I.F. Unit so that it is connected to unswitched "9volts supply.

Do a similar mod. To the "9 volt supply to the A.F. unit to overcome surge pulse.

Good luck de " RON " GM3SAE

By PA3AXO

Connections to acc. Jack on the back of the tansceiver:

Pin 3 Keyline (note that 200 mA current capability is required so a dil relay may give problems)

Pin 4 af to convertor

Pin 9 FSK input TTL level

Pin 8 ground

On main board:

Remove C40/42/43/54 and replace by 0.1 uF

Replace C69 by 10 nF

On RF board:

Remove C169 and 127 and replace C165 by 0.68 uF when desired the relay to control an external linear amp can be disconnected to reduce the clicking noises

Good luck and best 73 de Jack PA3AXO

This modification is read 961 times.

[top of page](#)

**19-07-1998**

## **(IC-725) ICOM IC-725 MARS modifications**

DISCLAIMER:

This modification allows the radio to transmit outside of the designated Amateur freq. Transmitting where you are not licensed to do so is unlawful!

Disassemble radio following instructions on page 24 of Instruction manual, steps 1 - 7, or as follows:

NOTE:

All instructions with the radio's front panel facing you unless otherwise specified!

1. Remove all black screws from top & bottom covers and remove both covers.
2. Remove the 2 flat head screws that hold the PA unit to the front unit. (top front of radio - Not the screws that are in the plastic front panel.)
3. Remove the 2 screws that hold the PA unit to the rear panel.  
(Looking at the rear of the radio, 1 is above the ext. speaker jack & 1 is above to ACC(1) jack.)
4. Unplug the 2 plugs from J11 & J12.
5. D
6. Disconnect the large black connector on the left side of radio.
7. Slide up and out, the TUNER CONTROL SOCKET from it's holder in the rear panel.
8. Remove the tape from the right side of the PA unit.
9. Swing the PA unit up to the left and lay over flat.  
located to the left side, rear of the board, next to J4.  
You may have to remove J4 to allow access to D-5.
10. Reassembly is As if you were opening a book! You now have the PLL unit exposed.
11. Cut Diode D-5 from the PLL unit.  
D-5 is loca reverse of above.
12. The radio will now transmit from 1.5 MHz to 33 Mhz. (It will transmit even lower but the power output drops off and I don't know if doing so will damage the transmitter.

ENABLE PREAMP Bve bottom cover.

1. Locate Q12 on Main Unit. 1/3 way from left side of board.

Q12 is the transistor that bypasses the preamp below 1.5 MHz to avoid overload when listening to AM Broadcast Stations.

2. Clip the lead of Q12 closest the front of the radio.

That's it, the preamp will now work below 1.5 MHz! ENABLE NOISE BLANKER IN ALL MODES

1. Remove bottom cover.
2. Locate R44 on Main Unit (100 ohm 1/4 watt resistor).
3. Lift the side of R44 closest the front of the radio.
4. Solder a piece of wire to the end of R44 that you lifted.
5. Solder the other end of the wire to W54 which is located near the left side of IC15.

This will supply a constant 8 Volts lly the 8 Volts is only present when in CW or SSB Modes, disabling the noise blanker in AM & FM modes.

I have done all of the above mods to my own 725 and they work great! These mods should also work with the IC-726. I'll let everyone know for sure when I get one!

Preamp and Noise Blanker Modifications courtesy of N1FCJ

P.S.

If you have any good modifications for any radios, please pass them along to me. I am starting a database of modifications for various radios and I'm happy to pass along info to anyone who needs it.

This modification is read 1461 times.

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**20-04-2000**

### **(IC-725) ICOM IC-725a post 1998 Version.**

[No D5 present on the PLL board]

I asked for the last two years about the mods for the New IC-725A and to my suprise no one knew how to do it.

Everyone mentioned the mods for the old 725a pre 1998. Well Icom changed the boards (or else there are 100's of clone or fake icoms in Asia at the moment)

Well the good news is that this new version of the 725a rig is in fact very simular to the IC-707 and the mods are exactly the same.

Simple remove the D12 located behind the front panel (yes on the front panel not the PLL board) and snip it (it is board monted so simply cut it in half) and you are in business.

I would like to thank "artsci" for NOTHING, what a useless book, and even after Bill promised my money back it was never forth comming.

ICOM USA and ICOM Japan, when you change curcuit boards how about updating the manuals or even offer to help with a hint in where to get the new manuals, other than your dealer has it, and my dealer knows no

This modification is read 1295 times.

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**19-07-1998**

### **(IC-728) Modification Icom IC-728: General coverage TX**

Open up the radio and locate the pll board, cut diode D5. The board should be located on the left hand side at the rear. Reset the cpu by pressing function and the mw button together while turning the radio off and on again. That will give you tx coverage from 1.6 to 30MHz!

Please dont transmit outside of you allocated frequency band as this could result in you losing your licence! Good dx and have fun!

G7NNT@GB7HUL. #15.GBR.EU  
MIKE, QTH HULL, NORTH EAST COAST, UK

This modification is read 566 times.

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**18-06-2000**

## **(IC-729) Using two Icom rigs in transceive**

**Author:** Richard Mekka - [richard@mekka.freemove.co.uk](mailto:richard@mekka.freemove.co.uk).[MODIFICATION.NET](http://MODIFICATION.NET)

I have an IC729 and a R72 rx in the shack here, and I wanted to try some experiments with using separate aerials for receive & transmit. Getting the two pieces of equipment to "talk" to each other using the CI-V interface was no problem, but try as I might I could not see a way to prevent a master-master situation i.e. turning either tuning knob caused the other rig to follow. What I wanted was a master-slave set-up; in my case the IC729 to control the R72 but NOT the opposite. This would mean that having started a QSO I could use the receiver for split operation, or as a kind of RIT.

Initial thoughts consisted of having a switch to break the CI-V line as and when transceive was not needed, but this wasn't very elegant and would involve lots of switching on and off. Then I had a great idea. What common electronic device lets signals pass one way but not the other? Correct! The good old humble diode!

A quick lashup proved that my theory was right. The 0.7 volt drop does not effect operation of the data signal in the desired direction, which is a little surprising as the signal is only a 2 volt signal (unterminated) to begin with. Maybe the fanout is reduced with the diode fitted, but I have been unable to test this.

In the end I made up a lead with the diode in series with the coax "inner", inside one of the jack plug covers Don't bother trying to work out which way round to solder it: if control is the wrong way reverse the lead. It's probably worth marking the lead so that it isn't used for audio work - might cause a few strange effects!

This modification is read 542 times.

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**20-10-2001**

## **(IC-729) Modification Icom IC-729: General coverage TX**

Open up the radio and locate the pll board, cut diode D5. The board should be located on the left hand side at the rear. Reset the cpu by pressing function and the mw button together while turning the radio off and on again.

That will give you tx coverage from 1.6 to 30MHz!

This modification is read 661 times.

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**05-10-1998**

## **(IC-730) Preventative Maintenance for the ICOM IC-730**

Though the IC-730 is a good-performing, reliable radio, many of these units have been in service for a number years and are beginning to show their age. The following preventative maintenance procedures should be done to all IC-730's that come in for repair. You will find that when you take a few minutes to attend these minor details while the radio is on your bench, your return-repair rate for the IC-730 will be almost nil.

1. On the RF unit, resolder the connectors at J2 and J3 on the RF unit. Due to the relatively thick coax cables on the connectors, these joints tend to crack with age and cause intermittent transmit and receive problems.
2. Make sure the receiver preamp works. If inoperative, replace relay RL1 on the RF unit. Install the factory update to prevent relay failure
3. Check transistor Q5 on the RF unit. If it is a 2SC945Q, replace it with the improved 2SC2878B to prevent spurious output from the transmitter and failure of the driver transistors. If Q5 is a type 1636, it doesn't need to be replaced.
4. Clean the RIT pot and switch with tuner cleaner. These controls are usually noisy and erratic, making the RIT hard to use.
5. Tighten the chrome-plated PC board mounting screws. The type of screw and spacer used in the IC-730 tends to come loose if the radio is used in a high-vibration, mobile environment. Don't forget to tighten the screws on the logic and IF units located beneath the main unit.
6. Check the bandwidth coupler for proper tightness. Tighten as needed.

**19-07-1998****(IC-735) Xmit Mods for IC-735**

I don't have either one of my 735's open and I can't seem to find the precise location or information but roughly...

There are two diodes, D30 & D31 (or maybe it's D32&D33 D34&D35 I can't remember) located toward the front center of the board containing the CPU. The diodes were end mounted with yellow insulation over the end of the leads away from the board. Cutting these diodes out of the circuit enables broadband transmit. My radios were purchased new in spring of 1989 so I don't know if they accurately reflect current production units.

This is a particularly nice feature since it allows wide coverage when used with transverters. I use my 735's with my 144MHz - 10.368 GHz transverters with the radios operating in the 20-30 MHz region. It allows 10 MHz of all-mode coverage on every vhf-uhf-uwave amateur band.

73

Glenn Elmore n6gn

From: Glenn Elmore

Date: Mon, 4 Feb 91 9:28:24 PST

&gt;

> Do you have any documentation and/or suggestions on how to build or  
> design the 50 MHz through 902 MHz units ?

&gt;

&gt; Chris

*I don't have anything explicitly written but it is very much along the lines of the microwave stuff I showed.*

*The LOs are partly there already:*

| Band | LO      | circuit   |
|------|---------|---|
| 50M  | 30M     | 3 X 10 (2n5179 tripler from 10M)  |
| 144  | 120M    | I'm presently using the 100 MHz Xtal circuit with a 120 M xtal but 6X20M with filtering would work too. |
| 220  | 200M    | 2X 100M (single stage of 2n5179)  |
| 420  | 410/420 | Just like 260M LO shown   |
| 900  | 620M    | Like 1010M 6th harm of 100M and 20M PLL reference   |

*Only 420 and 900 even need to use another of the PLL boards. The others just take a single stage. I have 50,144 and 220 done. 400 is sitting 90% completed. I have PA bricks for 50 and 400 waiting to be used.*

*As I said, 144 and 1296 have been running for years.*

*I build the RF decks in metal "shoeboxes". I pipe the LO and IF(with tx switching as DC on the line) to each deck which lets me remote them if I want to. The only thing I really need to add that I haven't is an ALC line coming back from each PA to control the 735 so that I keep things linear. Linearity hasn't been a problem but like any of the current commercially available transverters it is possible to overdrive things.*

73

Glenn n6gn

**19-07-1998****(IC-735) TX Mod For ICOM 735**

The mod for gen/cov tx for the IC-735 involves removing D33 and D34 from the main board. You'll have to lift the PA module up to do this, locate the diodes and simply snip one end of each. Very simple, but it's amazing just how many screws need removing in the process!

**19-07-1998**

## **(IC-735) IC-735 Remote Working**

I have finally got the remote control working on the IC735.

The interface is home-made and uses just 2 transistors, 1 diode, 5 resistors, DB25 and a DB15(to get 5v from games port).

The software is a major re-hash of VK7TM's FT757 effort in ARA.

All functions are driven from the XT keyboard and the software allows scanning of a LARGE number of frequencies on the same or on different bands.

The trials and tribulations of all this effort were NOT assisted in any way by the manufacturers local office in Melbourne. A call for information was not very successful. (try it and see!)

If you are contemplating the idea of turning your IC735 into a multi-channel HF scanner, I may be contacted @ VK3YZW BBS..

The software is suitable for use with XT/AT Clone...

Available control functions:

Send a new frequency to the radio from the keyboard.

Send a new Mode to the radio.

Select VFO A or VFO B.

Select a different memory channel

Enable the selected memory channel

Write current Freq/Mode to selected memory channel.

Write current Freq/Mode to last used VFO.

Read/Edit/Use a frequency file from Disk.

SCAN frequencies in a frequency file.

The frequency files contain frequency/mode/description of station all of which is displayed on the screen when the file is active.

This modification is read 1680 times.

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**19-07-1998**

## **(IC-735) ICOM Radio/RS232 interface which meets RS232 specifications**

This circuit has no expressed or implied warranty of any kind.  
It works very well for my IC-735 and with three different computers.  
It has not been used on any other Icom radio but should be compatible  
with a number of other desktop models.  
BUT  
!! USE IT AT YOUR OWN RISK !  
D. W. Bray, K2LMG -- Clarkson University

This design uses a chip designed to produce both the + and - voltages required by RS232 from a single +5 volts, and incorporates two receiving and transmitting inverters which meet the RS232 specifications. The only other chip needed is a buffer which allows its output to be driven from another source.

A circuit drawing is presented below. In words, the implementation is:

### **ICL232 Chip**

Pin 14 is output to RS232 Pin 3; Pin 13 is input from RS232 Pin 2; Pin 11 is tied to 7417 Pin 2 and to a 270 ohm resistor, the other resistor connection is tied to +5V; Pin 12 is tied to 7417 Pin 3.

### **ICL232 Chip**

Capacitors. C3 + lead is tied to Pin 2, C3 - lead is tied to +5V; C1 + lead is tied to Pin 1, C1 - lead to Pin 3; C2 + lead is tied to Pin 4, C2 - lead tied to Pin 5; C4 + lead tied to GND, and C4 - lead tied to Pin 6.

### **ICL232 Chip**

VCC is Pin 16 which is tied to +5V. GND Pin is 15 which is tied to ground. All leads not mentioned should be open.

### **7417 Chip**

Pins 2 and 3 are tied as discussed above. Pins 1 and 4 are connected together and to the center pin of a 1/8" plug for connection to an Icom radio.

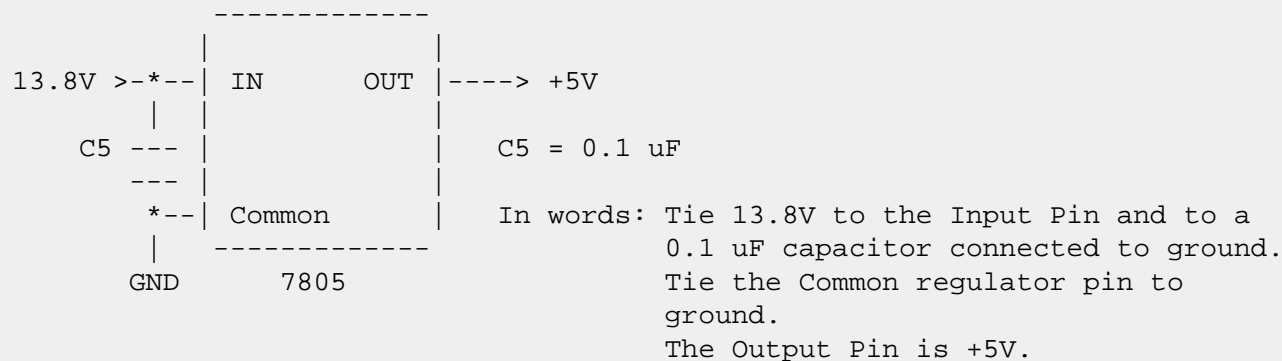
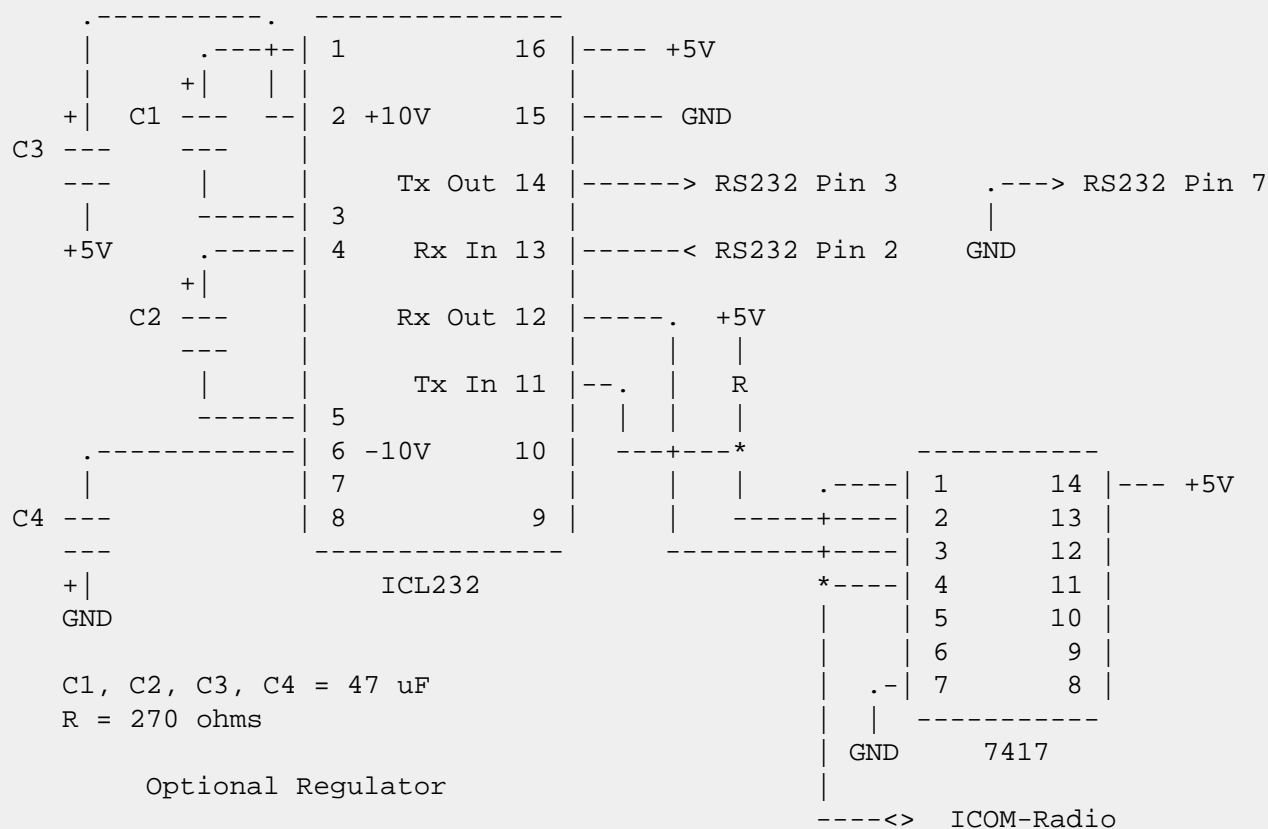
7417 Chip VCC is Pin 14 which is tied to +5V. GND is Pin 7 which is tied to ground. All leads not mentioned should be open.

The ICL232 chip uses an internal oscillator to create the +- voltages by voltage doublers (which require C1 and C2). Pin 2 is a +10V source, Pin 6 is a -10V source (but are not connect to anything in this design). The Transmitters (Tx) and Receivers (Rx) meet RS232 specifications. One source of the ICL232 is: DigiKey Corp., Thief River Falls, MN 56701-0677 -- 1-800-344-4539. Price approximately \$4.80.

The 7417 is an open collector buffer chip. This allows a buffer output to be driven from another source, and is compatible with the Icom IC-735 internal pull-up circuit. Designs which use 1488/1489 chips, where the Icom input/output lead is tied to a buffer

output (in a similar manner to this circuit), violate chip specifications.

In this diagram "+" means "cross", that is, no connection; '\*' means connection.



This modification is read 1654 times.

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**19-07-1998**

## **(IC-736) Speed-up the ALC for IC-736**

Jun 1995

Hallo, my name is Claus and the QTH is in Rastatt nr Baden-Baden South-West Germany. I got a IC 736 in December 1994. It is a good rig but had also a lot of misstate. After a time of measuring and testing I found the ALC for transmitting is to slow. So I jacked the circuit why is so. I found a C-R delay in the way from the ALC on the Main Unit. It is the C287(1uF) and the R305(150Ohm). The C change or put out is not very easy. So I change the Resistor 305 in to smaller one. But the result was not better. The best result I had without it! So the C-R combination is not in the work for the ALC. The Resistor 305 is very small but it is easy to put out. On the Resistor is the number 151 printed (150Ohm) but you mast find it on the circuit.

To be wide TX you mast only cut the Diode D15 on the Logic Unit.

The IC 736 works very well at the last half year so I send it out in the PR-news now.

This modification is read 892 times.

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**19-07-1998**

## **(IC-736) Icom IC-736 DDS/VCO Bug/Fix**

I have just received confirmation from ICOM Canada that there is a bug in the design of the IC-736 with respect to frequency generation. It seems that although it seems to be a common problem, not all IC-736's exhibit the problem. It seems that there is a "floating" data/address line and at times it floats the wrong direction, giving about 30HZ (maybe 32HZ?) difference in LSB mode. The fix is to solder a 47K resistor between pins 17 and 10 on IC24 on the main board. (bottom of radio, near front). I have not yet tried the fix, as I just got it today.

To see if you too have the problem, try the following test:

1. switch to AM first and tune to a strong AM carrier, and switch to LSB (once and only once) 40M is a good place to try this.
2. tune the carrier to about 400HZ tone and listen carefully.
3. switch to USB and back to LSB quickly. You should hear a different tone. If not, then you are "floating" in the right direction.
4. switching to USB and back to LSB will not produce any more differences. You must LEAVE SSB mode (ie AM) and come back to LSB for the first time to re-set the "floating" line. It is the LSB/USB/LSB switch that shows the difference in the two LSB received frequencies (by tone only, the display does not change...)

I've tried to post this message about 4 times so far with no apparent success. Hopefully this one will make it....73's and hope that helps someone

Steve, VE3CWJ

This modification is read 903 times.

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**23-08-1998**

## **(IC-737) Icom IC-737 general coverage in transmission**

1. Remove the top and bottom covers of the transceiver.
2. Remove the final power amplifier module.
3. Locate the LOGIC-UNIT on witch there is a back-up lithium battery for the RAM memory.
4. On the LOGIC-UNIT, near the chip called IC6 (TMP82C265BF-2), between the output pin PC06 and the input pin PA15, find the diode D3.
5. This diode is not an SMD component.
6. Cut the diode D3.

..Now the ICOM IC-737 will transmit from 1,6 to 30 Mhz !!!.

73's de IW3BKW Riccardo @OE7XCI. \*\*\*

This modification is read 1061 times.

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**23-08-1998**

## **(IC-737) CW Filter Switching Modification for the Icom 737**

The Icom 737 is a wonderful radio for CW operation, but I did not like the filtering switching options offered in normal operation of the radio when you have installed BOTH the 9 Mhz and 455 Khz optional CW filters. The default option is to use the SSB filter for CW in the CW mode, and then switch in BOTH the 9 Mhz and 455 Khz optional IF filters in the CW-N mode. This provides too broad a filter for general tuning in CW, and the CW-N mode (with the two filters in) is far too sharp for just tuning around.

I felt that it would be better to allow the 455 Khz filter to be functioning full time in the CW mode, and then switch in the 9 Mhz CW filter in the CW-N mode. The following simple modification only requires a single wire to added to the radio.

### **MODIFICATION**

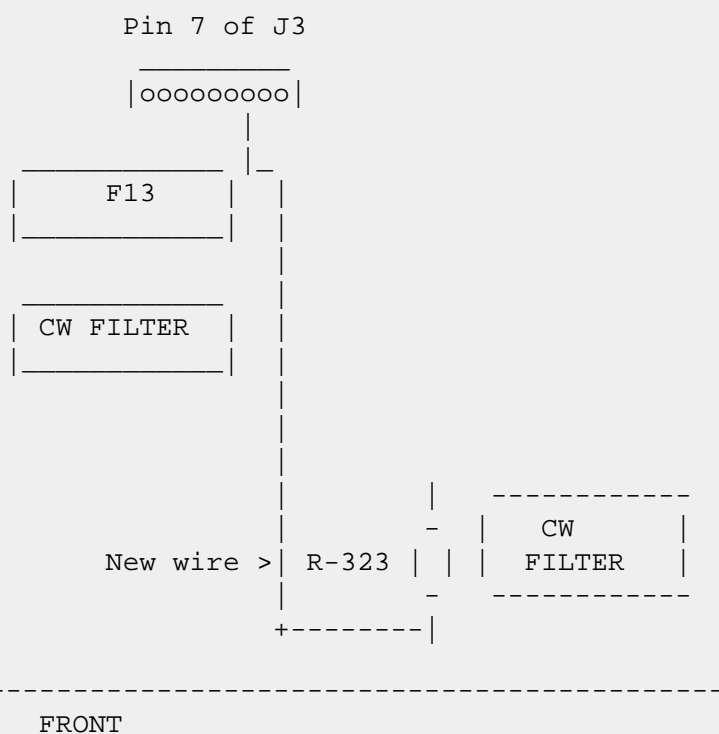
1. Remove the top/bottom cover of the radio as per the manual.



2. Position the radio facing you and locate the resistor R-323 which is simply labeled "323" on the PC board just to the left of the optional 455 Khz CW filter. Solder a wire to the end of R-323 which is closest to the front panel.
3. Locate J-3 just above and to the right of the 9 Mhz filter F-13. Attach a wire to the connector or wire going to pin 7. Pin 7 is the third pin from the right. (The pins are numbered 1-9 from left to right) You may carefully tack solder a wire to the plug by removing it first. I used a solid 28 gauge wire and just pushed it into the connector without soldering.
4. Replace the top and bottom covers.

I'm happy with the function of this modified switching arrangement. The CW-N function is now the mode of last resort when going after the weak ones, or when the QRM gets out of control, and tuning with just the 455 Khz filter is a better than using the SSB filter.

Good luck! 73's  
 Greg Chartrand  
 WA9EYY



This modification is read 814 times.

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### 26-01-2000

## (IC-738) Extended TX modification for Icom IC-738

1. Remove power & antenna.
2. Remove screws & remove top & bottom covers.
3. Swing PA Block aside & fold down the front panel ( you may need to unplug the Q1 Cable. Note connector orientation )
4. Locate D15 and move it over one position to the right ( of its original position )

This modification is read 518 times.

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### 19-07-1998

## (IC-740) Display/distortion problems ICOM IC-740 HF rig

Also probably would apply to IC 735 and IC 745 as well.

The symptoms were distortion on transmit, a very unstable display, often tuning dial would not move frequency, display would give all kinds of random numbers, sometimes no numbers at all on sections of display readout. This appeared to be a mechanical problem, as a sharp "rap" on the case would change things, sometimes curing it temporarily. We pulled off the covers of the set, and gently tapped each board. The PLL board appeared to be the culprit. This is the small covered board to the rear left on the underside of the 740.

We popped off the little cover over the board, loosened the 4 mounting screws and took out the board. Everything looked good, but the points on the board that contacted the metal standoffs were corroded and dirty. We flowed fresh solder around the screw holes on the board (underside), cleaned the standoffs and cleaned the chassis where they connected to it. This cured the problem. Interestingly enough, we did the same fix to an Icom 22S 2 mtr rig several years ago that would keep going out of "lock". It cured that problem as well. The bottom line is, make sure all your board to ground/chassis connections are real clean. Just a thin film of crud can cause all kinds of problems on a unit that uses the mounting screws as the ground return. Sometimes (but not always!) just loosening and retightening the mounting screws will help the problem.

This modification is read 503 times.

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**19-07-1998**

### **(IC-745) IC-745 - PROBLEM: Tuning counts slowly down**

I have a problem with my 745. When I rang Bellevue, WA, they said: Never heard of it. My friend in LA who has the same problem got the same answer.

The problem is as follows:

The tuning counts slowly DOWN whether it's memory or VFO. I temporarily used the set by turning the dial in the UP direction faster than the countdown and then used the lock button when the set arrived on the desired frequency. The XIT?RIT can be used for small corrections.

My friend who has a complete professional lab at his disposal found a temporary fix. He grounded pin 40 of the I/O IC which steers the CPU. Everything works fine except that you miss the slowest tuning speed and that the UP/DOWN button on the mic does not work. I did the same and my set works the same. The tuning is a little bit coarse now but usable except you have to be careful especially with RTTY or AMTOR.

The local ICOM repair shop is too busy at the moment with their normal work, and I don't like to be without this set for too long a time.

I can't use the 730 to drive my linear at least not without a lot of trouble. I suspect that one of the two transistors has gone but which? I just wonder if any of your readers has had the same problem and fixed it. (ED Note: Anyone have the solution?) (Thanks, Bob Bartelings, VE6CBN, 170 Haysboro Crescent, Calgary, Alberta Canada T2V 3G3)

This modification is read 866 times.

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**19-07-1998**

### **(IC-745) ICOM IC-745 Unlocked**

Locate the RF board on the side of the radio and cut the light brown wire at jack 7., which is going to pin 1. Your transmitter is now unlocked.

This modification is read 1021 times.

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**30-03-2001**

### **(IC-745) RAM Card Backup Battery Replacement Instructions**

**Author: ICOM**

In the early 1980s Icom America marketed a group of transceivers and radios that utilized the latest state-of-the-art computer technology to enhance the operation of the radios. This technology improvement allowed hams to afford a reasonably priced high performance transceiver which until then was only available on units costing much more. Features now available to the hams included: higher frequency stability, better frequency resolution, digital frequency display, almost instant recall of saved frequencies (memory channels), quick mode signal processing and built in tones and offsets for the rapidly emerging repeater operation.

Implementation of all these features required a CPU with associated logic circuitry. In the early 80s, the most cost effective way to implement data processing and memory functions was through a DRAM (Dynamic Random Access Memory) to control the CPU. This DRAM was a volatile memory integrated circuit which required a lithium battery to retain its instruction set. The following receivers and transceivers had such RAM units:

IC-271 ; IC-471 ; IC-1271 ; IC-745 ; IC-751/A ; IC-R71A

The lithium batteries in these units typically lasted about 5 to 7 years before replacement was required. This was specifically noted in each of the Owners Manuals for the products.

This lithium battery can be replaced by the radio owner if care is used. The following is a recommended procedure to accomplish this:

### **Procedure**

1. Disconnect the power cable from the radio, and take the cover off.
2. Unplug the RAM board and remove it from the radio.
3. Temporarily solder a 3 Volt DC battery source across the existing battery terminals (see suggested connection points on the circuit board pictures).
4. Unsolder the old lithium battery and replace it with a new one. (BR2325 1HC, ICOM stock number 945 03112)
5. Unsolder your temporary 3 Volt DC source.
6. Reinstall the RAM board into the radio.

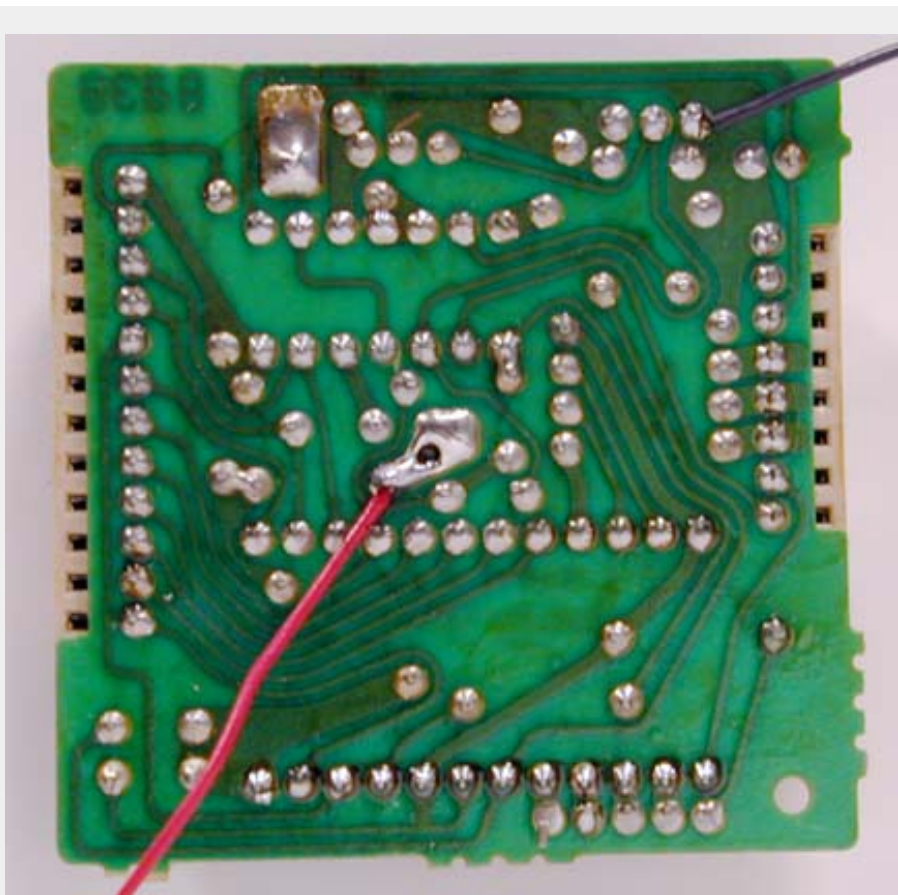
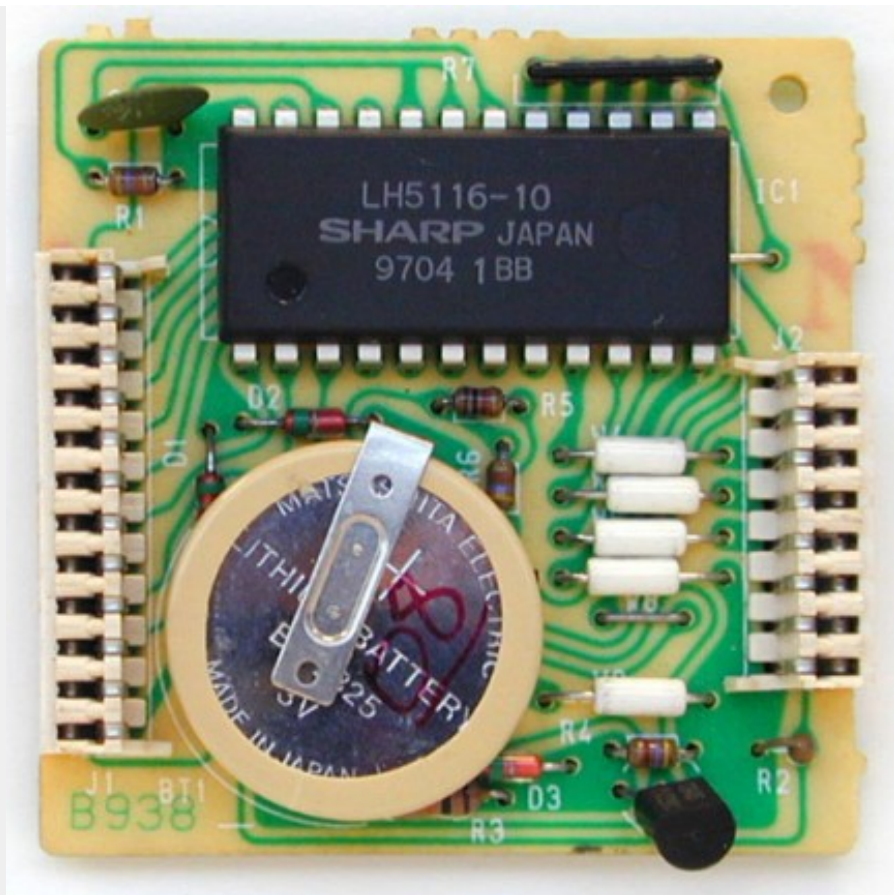
### **Cautions**

1. Do not use an AC powered 3 Volt DC source, your grounded soldering iron tip could short out the battery (+) terminal. Use a 3 Volt battery DC source only (2 alkaline cells for example).
2. Do not solder the external DC wires directly to the lithium battery tab pads. If you do so, you will not be able unsolder the battery without having the wires drop off.
3. If by accident you lose power to the RAM unit it must be sent to Icom America for reprogramming.
4. Be careful not to damage or bend the connector pins on the radio side while removing or reinstalling the RAM card.

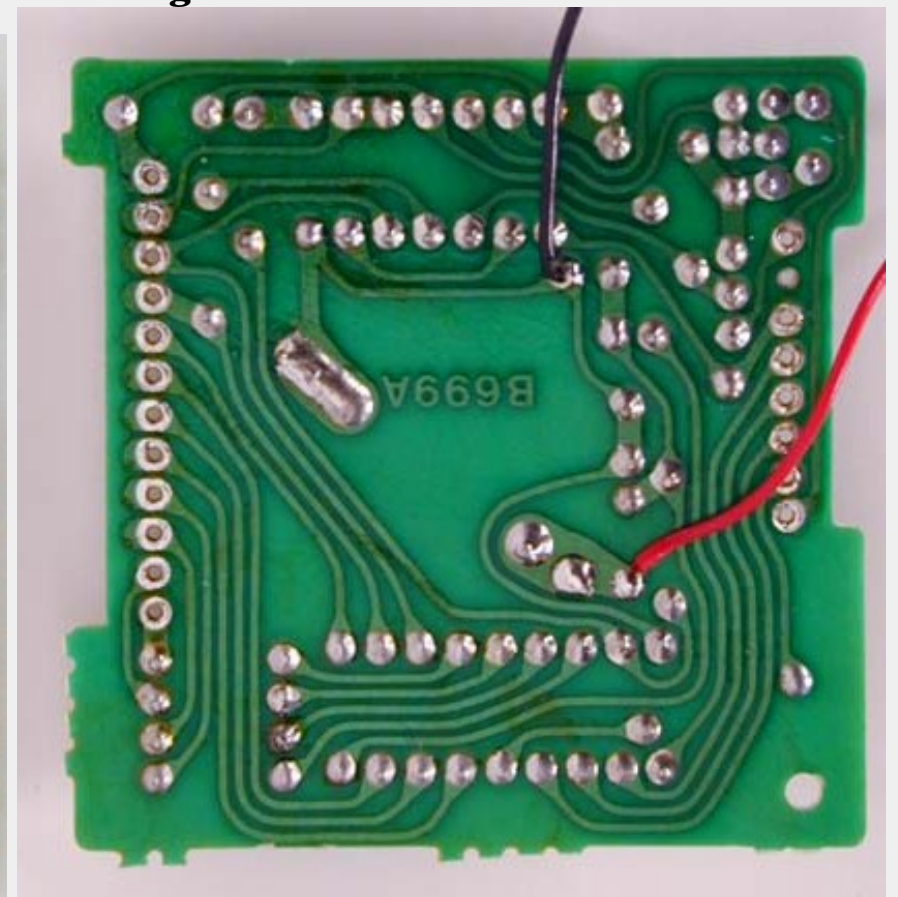
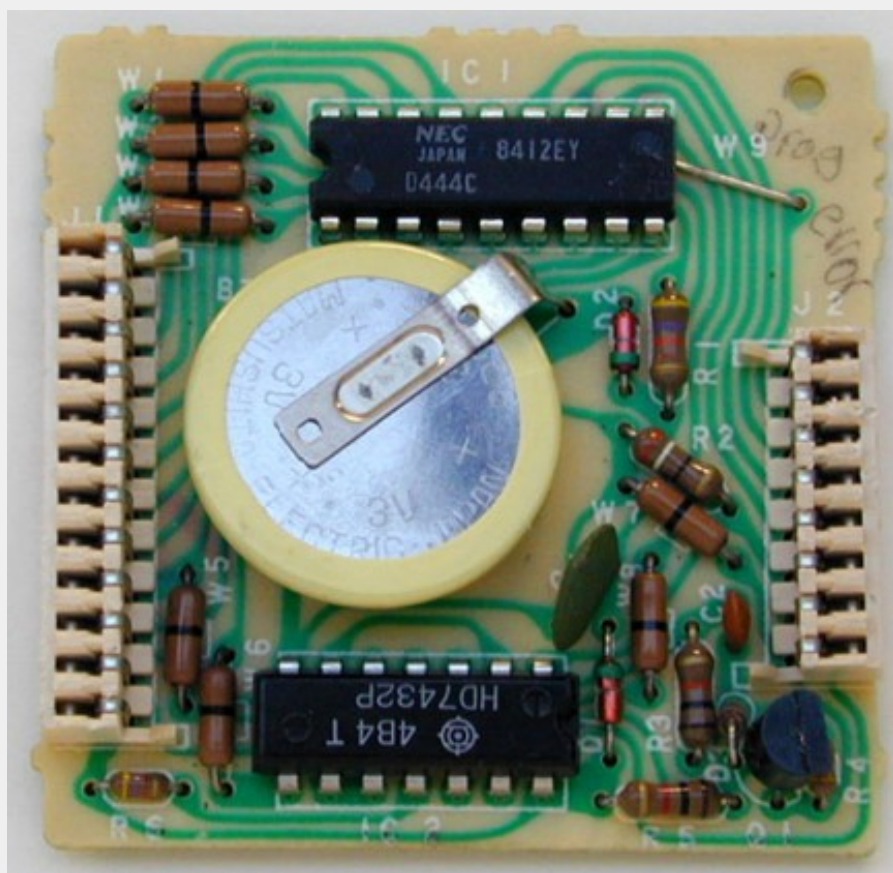
### **Pictures**

There are two versions of the ICOM RAM boards. Both are identical in operation, and they are interchangeable. The differences are in the circuit board layouts only. Note that the black and red wires visible on these images are the suggested way of connecting the external DC backup voltage while the battery is being replaced. The wires are not a part of the RAM card, and should be removed when the battery replacement procedure is complete. Refer to the replacement procedure outlined above.

**RAM card version A images:**



**RAM card version B images:**



This modification can also be found at ICOM's own homepage on the following URL: "[RAM Card Backup Battery Replacement Instructions](#)"

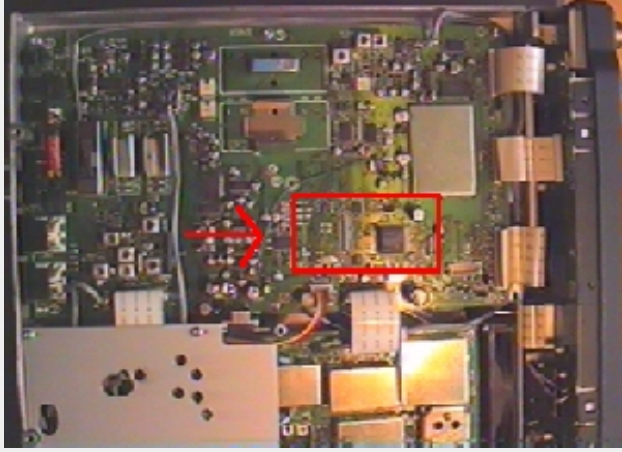
This modification is read 855 times.

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**19-07-1998**

## **(IC-746) IC-746 out of range TX/RX**

In IC746DW.JPG you can see the open bottom side from the transceiver and you will see a red marked area, too.



This marked area you can see again and bigger in the picture IC746SMD.JPG.

Now something about IC746SMD.JPG.

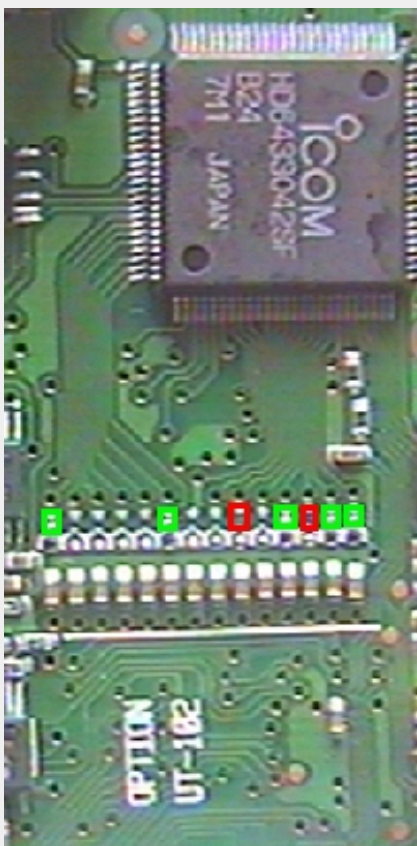
There are some green frames. This are diodes which must be on this place.

There are some red frames. This are diodes which you have to remove. Where no frame is, there is no diode in my transceiver.

After removing the red marked diodes you should can

RX 60 khz - 60 MHz and 118 Mhz - 176 MHz

TX 100 khz - 60 MHz and 118 Mhz - 176 MHz



This modification is read 5022 times.

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**11-12-1999**

## **(IC-746) IC-746 Modification**

**Author:** John Schmitz NS8E

Remove the twelve screws holding on the bottom cover.

With the Radio laying flat on it's top remove the bottom cover. Turn the radio so that the front panel is to your left and the antenna connectors are to your right. Locate the IC labeled "ICOM HD6433042SF".

About 3/4 of an inch to the right is a vertical row of diodes. The left hand column of diodes has 7 diodes (14 possible spaces). The right hand row is full with 14 diodes. Remove the diode in the 6th space from the top in the left hand column. DO NOT remove anything from the right hand column. This should get you TX from about 100KHZ to 60MHZ and 118MHZ to 176MMZ.

Do this totally at your own risk. Never, ever transmit out of the ham bands or your privileges..

John Schmitz NS8E

### **Additional information.**

After having put a forward reading watt meter on my 746 i have found that there is NO loss of power due to this mod. It is still putting out the full 100 watts when you have a good match (5-100 on SSB and FM and 2-40 on AM).

I have also discovered that the TX was NOT opened up above 54MHz to 60MHz the top end of the 6 meter band switch on the 746.

The only effect i have noticed is that sometimes while using the built in antenna tuner in manual tune the LCD display sometimes blinks or lights up with all functions showing or sometimes disappears below the line.

Also the band edge beep function option no longer works because with wide open TX there are no more band edges.

One must be carefull to stay within their operator band privileges. These are the only adverse effects i have noticed with Mr. Schmitz mod.

This modification is read 4622 times.

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**25-10-2000**

### **(IC-746) Extended RX/TX for IC-746**

**Author:** - [trout1000@squonk.net](mailto:trout1000@squonk.net).[MODIFICATION.NET](http://MODIFICATION.NET)

- Open the bottom cover of the IC-746
- Place radio on surface upside down with front to your left.
- Find chip label HD6433042SFB24
- To the right of this chip (3/4 inch) are two rows of diodes.
- 14 diodes in the right column and 7 diodes in the left column.

For Icom 746 Radios with the diodes in the 1, 2, 6, 7, 9, 11 and 14 positions, remove numbers 6 and 7 leaving the other 5 in place.

Mod complete.

This modification is read 4601 times.

[top of page](#)

**02-12-2000**

### **(IC-746) Separating the Tx and Rx lines**

**Author:** David, G4YTL

Separating the Tx and Rx lines on 2 meters in the IC746 could not be easier.

Put the rig on the bench with the front panel facing towards you, and turn upside down, with the front panel still facing towards you.

Remove the bottom cover.

At back-left there is a 5 inch square metal screening plate held in place by four screws - remove it.

You will see a miniature co-ax plug and cocked, labeled VRX. Simply unplug, tuck the original plug out of the way and plug in a new plug attached to a length of miniature coax, which can neatly leave the rig through the hole on the back panel that contains an earth bolt. Now you have your separate receive input!

You could cut off and re-use the miniature co-ax plug, but I preferred to contact my local Icom dealer and buy a new one (a couple of dollars) - the Icom description is: PLUG TMP-P01X-A1 (Min Coax) IC-125.

73

David, G4YTL

This modification is read 3636 times.

[top of page](#)

**02-07-2001**

## **(IC-746) Power mod for the IC-746**

**Author:** NI4L - [mavericktcf@bellsouth.net](mailto:mavericktcf@bellsouth.net). [MODIFICATION.NET](http://MODIFICATION.NET)

Remove bottom cover.

Find the voice module plug-in. Right behind it you will see 4 pots

R993 144 mhz power adj  
R991 50 mhz power adj  
R989 HF bands power adj  
R990 AM power adj

You can tweak these to up the power suggest on hf doing it on 40 meters. you can get close to 180 watts on 40-75 meters about 125 to 150 on 20-10.

The pots are very small be careful not to use something to big. the are all metal pots.

NI4L

This modification is read 4921 times.

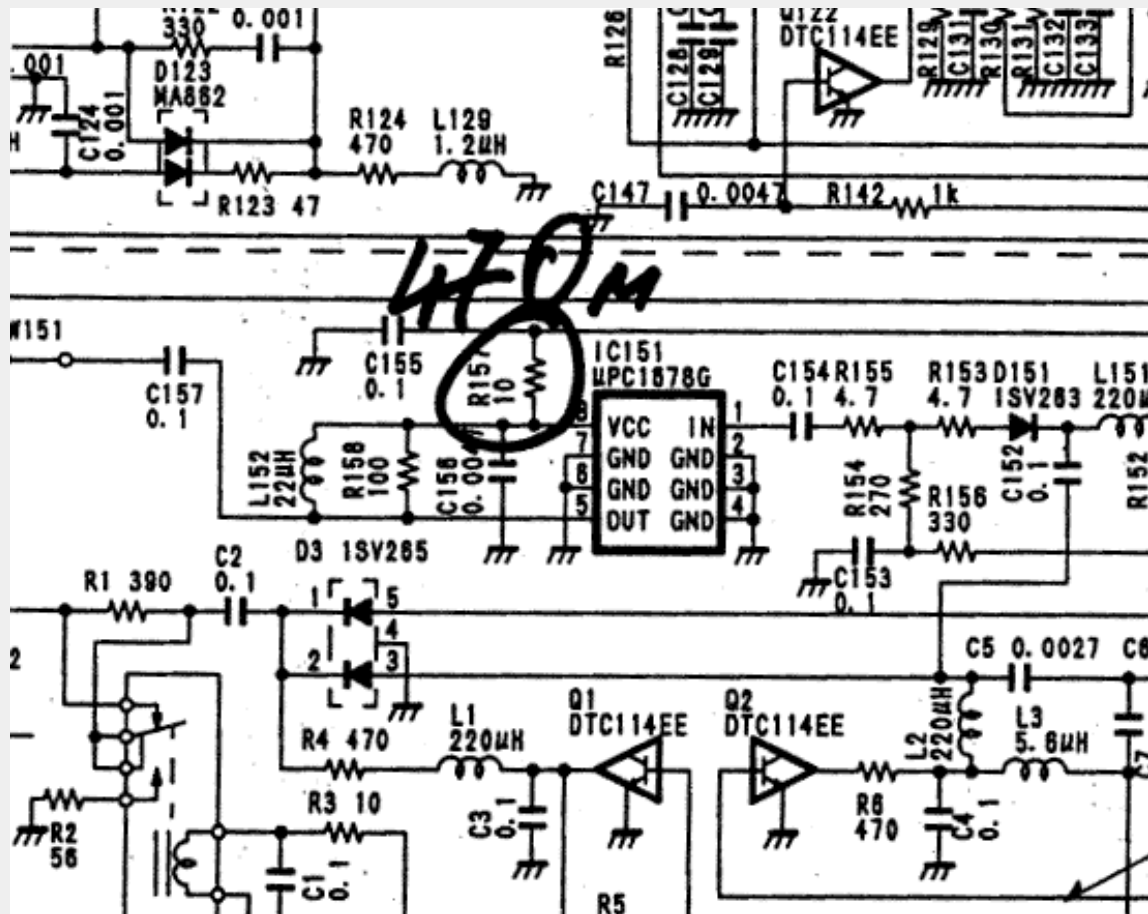
[top of page](#)

**20-10-2001**

## **(IC-746) Solutions for chip blowing with mPC**

**Author:** Sergey L.Chuchanov - [slch@caterpillar.ru](mailto:slch@caterpillar.ru). [MODIFICATION.NET](http://MODIFICATION.NET)

Change resistor R157 from 10 Ohm to 47 Ohm close to this chip.



This modification is read 3367 times.

[top of page](#)

13-01-2002

## (IC-746) Monitor Audio Output Too Low

Author: - [heloxx@hotmail.com](mailto:heloxx@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

The monitor function on the IC-746 tends to have low output compared to receiver AF volume, therefore in order to listen to yourself, you have to increase the volume. When the PTT is released back to receive mode, the AF setting nearly blows your speaker or your headphones.

If the monitor audio output is too low on your ICOM 746, you can add 4.7K resistor in parallel with R1087. This brings up the gain of IC1082 to a more reasonable level that can still be controlled by the monitor level function but with plenty more gain.

### Technical Notes:

These SMDs are located in the Main Board. You will probably need a service manual to locate these parts on the main board. Adding modifications to these very small parts requires some skill and a good magnifier together with the appropriate tools. A 1/8 Watt resistor will be suitable for this modification, but still require some precision.

This modification is read 1450 times.

[top of page](#)

25-01-2002

## (IC-746) Schematic for ICOM CI-V Option

Author: Rick Pemble - [pemble@ix.netcom.com](mailto:pemble@ix.netcom.com).[MODIFICATION.NET](http://MODIFICATION.NET)

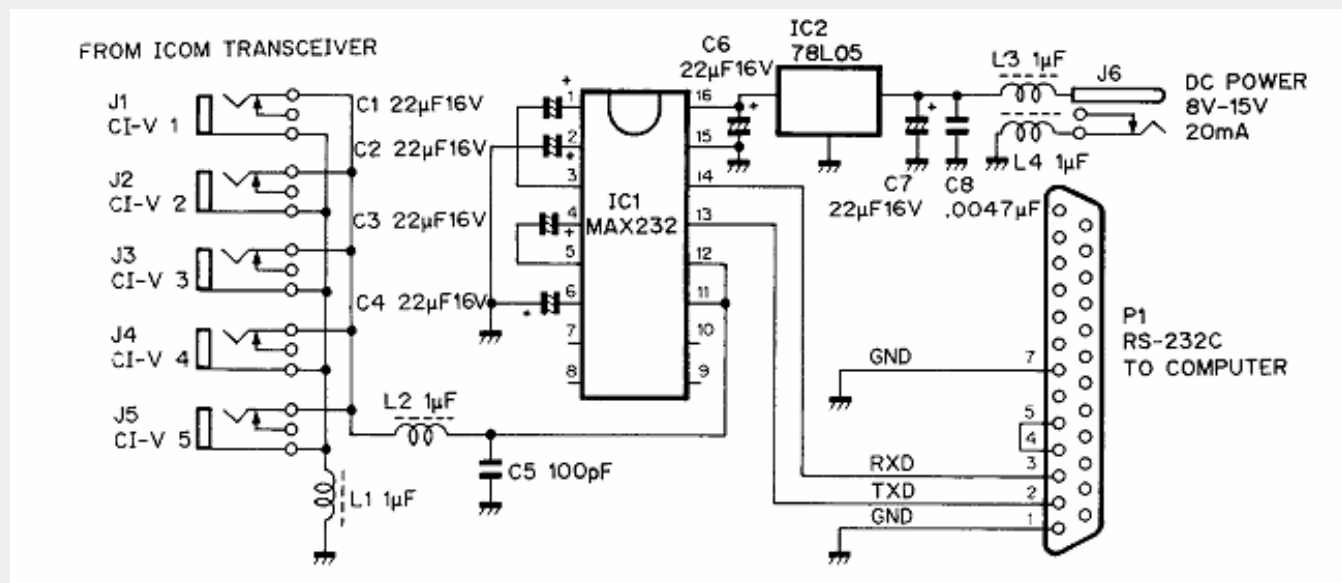
This is a message from usenet alt.ham-radio

There is the interface. This one shows a 5 radio hookup -- just use the one jack if that is all you want. The inductors are all RFI suppressors, you can skip them if you want (L1, L2, L3, L4, as well as C5). The important parts are the five 22uF electrolytics, the Max232 IC and the 7805 regulator.

Easy to build -- works fine.

cheers

Rick W4RP



Tod J. Knapp wrote in message ...

>I'm looking to build a CI-V unit for my ICOM 746. Although I'm not really  
>looking forward to giving ICOM \$100 (or more) for a computer to radio  
>feature, I'd sure enjoy the experience building such a unit.

>

>CI-V allows your computer to communicate with your ICOM radio.

>

>Does such a WORKABLE schematic exist? Has anyone tried it?

>

>Please advise...

>

>Tod N9ZWY



**27-12-2001**

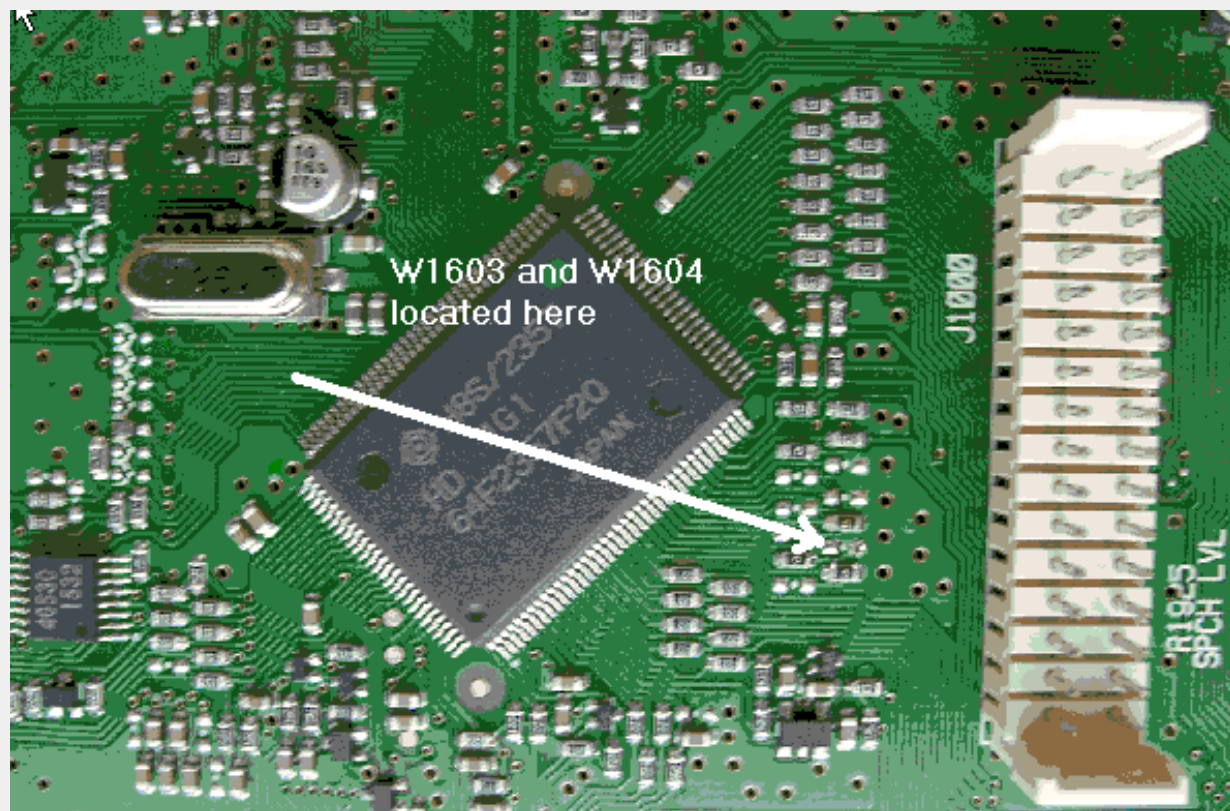
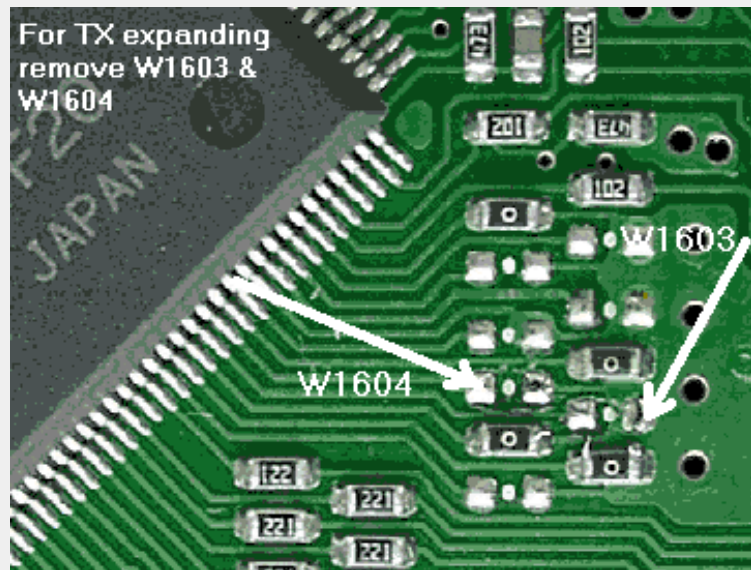
**(ic-746pro) TX modification for IC-746PRO (version #02 USA)**

**Author:** Astra - [astra@softhome.net](mailto:astra@softhome.net). [MODIFICATION.NET](http://MODIFICATION.NET)

1. Remove the bottom cover of IC-746PRO.
2. Remove DSP subblock.
3. Carefully remove two small SMD 0 ohm resistors(jumpers) W1603 and W1604, on the pictures both jumpers already removed, reset of IC-746PRO is not necessary.
4. Enjoy. ....

TX/RX after modification: 0.1 - 0 MHz, 108 - 174 MHz.

Now you can do SWR spot & plot measurement even out of ham bands! Be carefully with transmitting out of 1,8 - 29,7 and 144-148 MHz.



Best regards,  
Astra

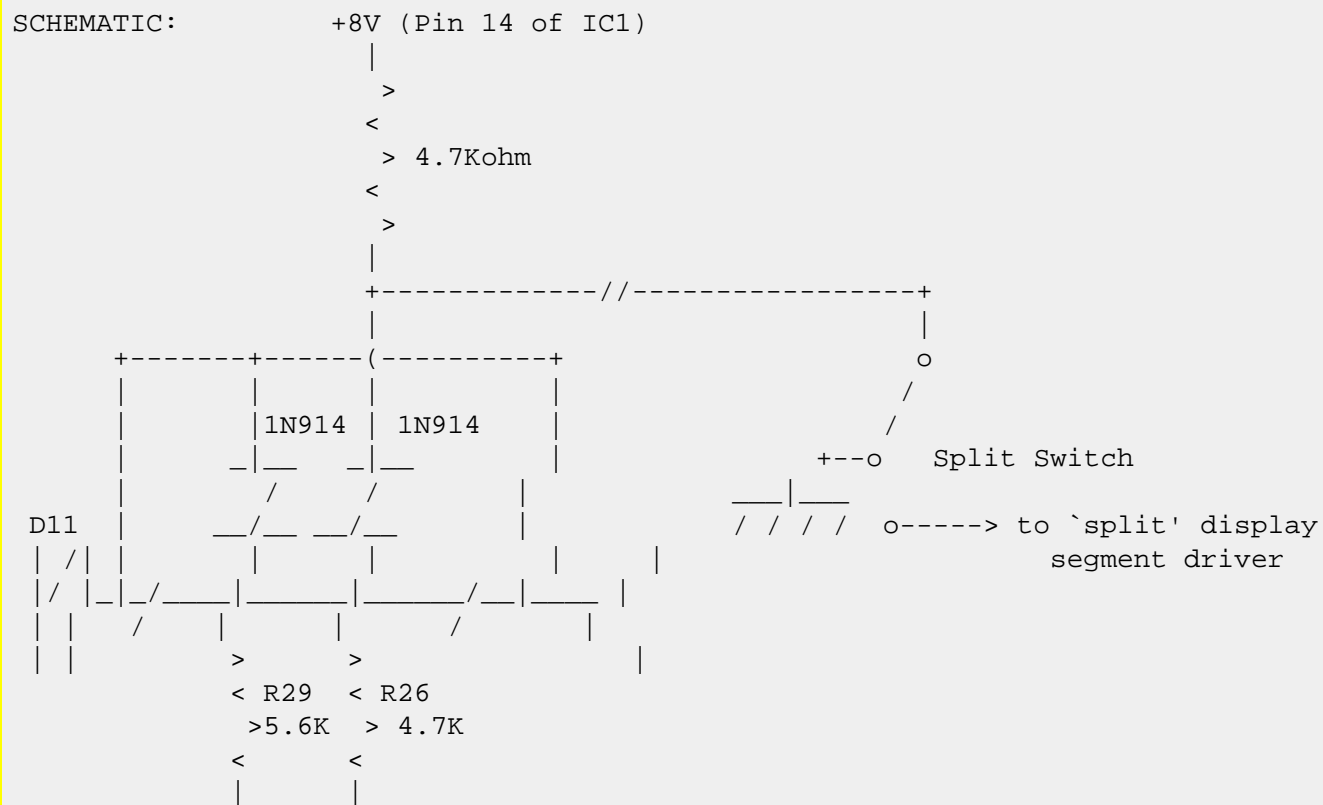
**19-07-1998**

**(IC-751) Allow CW Xmit & USB receive split mode for IC-751**

Allow CW Xmit & USB receive split mode to still use the CW VOX. This allows one to operate with limited privileges when communicating with SSB stations above 10MHz. Below 10MHz, the CW receiver is actually LSB so split operation in that case is effortless and does not require the split operation to be invoked. The original bogus operation can be confirmed by placing the rig into CW Tx and USB Rx split operation and operate the key. A more `graphic' example of this operation is CW Rx and USB Tx split and operate the key (scary eh? :-).

**PARTS REQUIRED:**

1 4.7Kohm resistor and 2 1N914/1N4148/1N4448 diodes



**DESCRIPTION:**

On the Main PC board, there is only one cut trace because R29 & R26 are both fed from 1 trace and isolated from the rest of the circuitry. One of the diodes is surface mounted on the solder side of the board over the cut. R29 is unsoldered so that a thin wire (from w/w or pulled from a ribbon cable) is then subsequently inserted with the R29 lead back into the hole to bring R29+R26 common point up to the top of the main board.

The 4.7Kohm resistor is soldered to pin 14 of IC1, the other end of the resistor is soldered to the anode of the other diode's anode and another long wire to be routed to the split switch. The cathode of the diode is attached to the wire inserted earlier with R29.

All the components may be surface mounted if desired on the bottom of the main board, but I chose to perform this mod on the top of the board to allow easier removal of the main board for servicing. The long wire that was attached to the second diode and the resistor is routed to the empty pin on the split switch that is driven to ground when the switch is in the OFF position.

**BUGS:**

The CW VOX will be active when using split mode, even if neither the transmit or receive mode are the CW mode.

Enjoy, 73 de VE6MGS/Mark -sk-

19-07-1998

## (IC-751) IC-751 to 37 MHz

From: N5OFF@W5DDL.AARA.ORG

With a great amount of help from Mark, VE6MGS, I was able to modify my Icom 751 to operate at an extended frequency range of up to 37 MHz. This is how it was done.

Mark developed a clever way to read and interpret the contents of the Icom RAM chip (the old battery backed-up one) and alter its frequency limits in the GENeral coverage and HAM modes. This was done in conjunction with the modification of his 751A to operate six meters. My interests are in listening to the low band skip present above the ten meter band during band openings, so I asked Mark for simply a new upper frequency limit, leaving the six meter mods to the very ambitious.

First, I changed the battery on my RAM board since mine was eight years old, and I didn't want Icom messing up my custom program if my battery died later.

I then shipped the board off to Mark, and he changed my GEN mode limits from .10-30 MHz, to .01 to 60 MHz (subject to VCO and RF limits, naturally). He also customized my HAM mode limits as shown:

| Before     | After       |   |
|------------|-------------|---|
| 1.8-2.0    | 27.98-30.62 | Default HAM mode selection<br>changed from 160M |
| 3.45-4.1   | 31.98-33.02 |   |
| 6.95-7.5   | 33.98-35.02 |   |
| 9.95-10.5  | 1.78- 2.02  |   |
| 13.95-14.5 | 3.48- 4.02  |   |
| 17.95-18.5 | 6.98- 7.32  |   |
| 20.95-21.5 | 9.98-10.17  |   |
| 24.45-25.1 | 13.98-14.37 |   |
| 27.95-30.0 | 18.05-18.18 |   |
| none       | 20.98-21.47 |   |
| none       | 24.86-25.01 |   |

These new HAM mode limits provide tighter control while hamming.  
Note the tight 12M and 17M limits. Much more realistic.

One problem encountered during the mod was that the rig's processor (IC-14) instructs the rig to select the proper VCO and bandpass filter for a given frequency, and it uses the highest BPF up until 31 MHz, then must be further instructed as to what to do at frequencies > 31 MHz.

IC-14 has several pins which turn on and off to do this instructing. Mark found that pin 18 (originally not used) of IC-14 turns on at >31 MHz. This could be used to turn on the highest BPF and VCO, thus allowing operation to higher frequencies. This was done physically by cutting the trace from pin 17's normal route, adding a diode to each pin 17 and 18 of IC-14, and joining the anodes of the two diodes to the circuit originally driven by pin 17, but now isolated by the trace cut. The effect is the use of the highest BPF and VCO until 31 MHz (pin 17) , and then the same BPF and VCO from 31 MHz and beyond (pin 18).

As expected, VCO4, as originally adjusted, dropped out at a low frequency (32.33 MHz). Since the VCO has a range of about 15 MHz (and was originally employed to cover only 8 MHz with 3.5 MHz of lagniappe on each end), and kicks in at 22 MHz, I adjusted it for a comfortable low limit of 22 MHz (with little margin), which lifted the upper range to a maximum observed limit of 37.175 MHz. This was done by giving C107 on the VCO unit 1/4 turn CW.

I haven't yet done any sensitivity measurements, as I'll have to borrow the equipment from my employer when its convenient for him. I don't know where, or to what extent the bandpass filter will cut off on the way to 37 MHz, if it does at all.

I believe the rig "hears itself" on a few certain frequencies, with strong signals at 30.715, 31.33, and 30.95. I believe this is normal as Icom probably moved these birdies to >30 MHz purposely. There are few other spurs.

CONCLUSIONS: I borrowed an R-7000 from a friend some months ago, and found that my favorite listening was in the lower 30's. Now, my 751 is as good to me as having my own R-7000 for what I would use it for. In the ham mode, its much easier to stay in the ham bands (especially WARC bands) with the new program, and the default band of 10M much more suits my tastes than the old 160M default band.

Thanks to VE6MGS [mark@ve6mgs.uucp] for his great help, without which I could not have accomplished this.

**19-07-1998**

## **(IC-751) IC-751 Bad Cap Problems**

This info may be helpful to ICOM-751 owners with units approaching five years of many operating hours; two UNRELATED problems occurred, both due to a similar 10uf electrolytic opening up. The first was the input cap. to the 5-volt regulator chip which supplies PLL board. Proper by-passing is required, probably to prevent internal oscillations in the chip.

Replaced it with a tantulum. (Also arbitrarily replaced electrolytic on the output side of the 5-volt reg. chip). The symptoms were 3 or 4 minutes delay before unit would function. Also the screw holding the reg-chip to its heat-sink was a little loose...probably due to COLD-FLOW characteristics of aluminum. This can also occur in pheof aluminum. This can also occur in phenolic P-C boards where the groundfoil is supposed to be bolted tightly to the chassis. It would probably be a good idea to use small split-ring lock-washers (along with flat-washers) in these cases to maintain tension over time.

The second malfunction was failure of the display digits etc to appear until a warm-up time of perhaps 10 minutes or more (after which you must power-down up to generate a new reset-pulse). It also turned out to be an open 10uf electrolytic on the -5volt line which supplies IC-1 IC-2 on the Display Unit Board. This board attaches to the front assembly near the display digits...parallel to the floor. The front assembly DOES unscrew with 4 screws and move forward an inch or two, but this is actually not necessary. The board has a 3-position connector attaching, but only the two outside ones have wires....red is 13.8v outside ones have wires....red is 13.8v dc input, and purple is -5v output.

The purple (-5v) wire, but rather is on the opposite side of the inductor (L1) which does connect to the purple wire. A -5v zener-to-ground appears here, and the culprit 10uf is directly in parallel across the zener. I didn't have a 10uf tantulum handy but a 39uf did the job. I also arbitrarily shunted C-17 (easily visible) with a 33uf tantulum, and C-25 which is another 10uf (easily visible) was shunted with a 2.2uf tantulum. (Tack-soldered on foil-side).

I didn't have a 10uf tantulum handy but a 39uf did the job. I also arbitrarily shunted C-17 (easily visible) with a 33uf tantulum, and C-25 which is another 10uf (easily visible) was shunted with a 2.2uf tantulum. (Tack-soldered on foil-side).

With such a trend developing...it would appear that if you are experiencing other kinds of malfunctions, open electrolytics might be under suspicion....

it should not be necessary to remove them in most cases...just tack-solder a tantulum in parallel on the foil-side.

This modification is read 1246 times.

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**19-07-1998**

## **(IC-751) General coverage mod for the ICOM IC-751A**

1. Remove top and bottom covers from rig.
2. Remove cover for RF unit (left side).
3. Locate J2 near center of RF board (multi-pin connector).
4. Clip brown wire (pin 1). Maybe the wire is black
5. Rig will now transmit in Gen. Cov. mode above 1600 khz.

This modification is read 1467 times.

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**19-07-1998**

## **(IC-751) IC-751 Switch Matrix**

This following chart was generated by shorting out the matrix points and watching the function that is performed. Some are intuitive already from the schematic. There are only a couple of "extra" functions in the matrix (ie, USB and LSB, Reset 100&10 Hz [The TS switch does this as well]). The KEY? GENE switches (Y0) are accessed by the RC-10 controller, but I noticed that some "removed" circuitry in the rig was designed to switch the digit switches on the RC-10 controller to the KEY? HAM array (Y3), effectively making the switches directly access each band. However, the removed circuitry (a set of switching transistors) is replaced by a solid jumper to Y0 :-(. The "empty" slots in the following table showed no perceivable function.

The Y5 matrix, acted like it was shorting some other behavior out causing the rig to switch to the specific memory channels (you can observe a binary + 1 selecting behavior) temporarily.

Have fun, Ciao, 73 de VE6MGS/Mark -sk-

IC-751A Switch Matrix (W/ Function)

|    | DB0                  | DB1                   | DB2                         | DB3                         | DB4                         | DB5            | DB6                           | DB7                |                            |
|----|----------------------|-----------------------|-----------------------------|-----------------------------|-----------------------------|----------------|-------------------------------|--------------------|----------------------------|
| Y0 | KEY0<br>GENE         | KEY1<br>GENE          | KEY2<br>GENE                | KEY3<br>GENE                | SCAN                        |                |                               |                    |                            |
| Y1 | MHZ/<br>BAND<br>Up   | MHZ/<br>BAND<br>Down  |                             |                             | VFO<br>A/B                  | VFO/<br>Memory | HAM/<br>GENE                  | Disable<br>RIT/XIT |                            |
| Y2 | FUNC                 |                       |                             | Clear<br>RIT/XIT<br>(->VFO) | A=B<br>(B=A)                |                | MWrite                        | M->VFO             |                            |
| Y3 | KEY0<br>HAM<br>BAND  | KEY1<br>HAM<br>BAND   | KEY2<br>HAM<br>BAND         | KEY3<br>HAM<br>BAND         |                             |                |                               |                    |                            |
| Y4 | LSB                  | USB                   | AM<br>(FM)                  | CW<br>(NAR)                 | RTTY<br>(NAR)               | SSB<br>(REV)   | FM                            | LSB                |                            |
| Y5 | M2<br>Prio.<br>or_M1 | M3<br>Prio.           | M5<br>Prio.                 | M9<br>Prio.                 | M17<br>Prio.                | M33<br>Prio.   | M65<br>Prio.                  | M29<br>Prio.       | Danger<br>Will<br>Robinson |
| Y6 | MODE<br>Scan         | Reset<br>100&10<br>HZ | Change<br>Memory<br>On_Dial |                             |                             |                | Disable<br>RIT/XIT<br>offset_ | Scan<br>OFF        |                            |
| Y7 | I/O<br>Option<br>RP  | I/O<br>Option<br>WP   | HOLD<br>Scan<br>10_Sec.     | Altern-<br>ate VFO          | Band W/<br>DB6&DB7<br>or_TS |                |                               |                    |                            |

This modification is read 1157 times.

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**19-07-1998**

## **(IC-751) How to replace the lithium battery in your ICOM radio**

**Note:** All this information is based upon the IC-751; if your radio is a different model the board references may be different.

1. Go to Radio Shack or your favorite supplier and buy a lithium battery to replace the one in your radio. The actual type used is a BR2325 (3.0 volt 165 mAh), which Radio Shack does not carry. You can order this one from Digikey. I bought a CR2450 at Radio Shack (3.0 volt 500 mAh), which was the largest capacity unit they had in about the same size. I had to solder some short leads to this battery (quickly to avoid overheating), before I could attach it to the RAM board.
2. Find a 5 volt power source to run the RAM board during the transplant. I used a modular plug-in unit rated at 4.5 volts @ 60 ma. I connected a 500 Mfd. capacitor to this supply and then added a resistive divider to reduce the voltage to 5 volts. You may need to re-adjust this divider to supply 5.0 volts after connecting it to the RAM board. Connect several feet of wire to the divider output, which will go to the RAM board.
3. Remove the covers from your ICOM radio to expose the plug-in RAM board, which I found on the bottom of my radio.
4. Turn the power on and locate the 5.0 volt and ground pins, which bring power to the board. In my ICOM radio service manual I found a board overlay for the 'RAM Unit', which shows the two connectors and labels the connections. While looking down at the board note two connectors on opposite sides of the board. Both connectors are closer to the same end of the board. The pin closest to the end of the board on the longest connector (J1) is pin 12, which is the 5 volt input. The pin closest to the end of the board on the shorter connector (J2) is pin 1, which is ground. If you connect a voltmeter between these two pins you should measure 5.0 volts. These are the pins you will connect your external power to.
5. Turn off the power to your radio and remove the one small screw that holds the RAM unit to the main board (you need a jewellers' screwdriver). Now you can remove the RAM board from the radio; remember from now on you do not want to touch any tools or other metal items to the board or its components.
6. With the board removed you now need to solder the two wires from your 5 volt power source to the board. You can solder to the small metal piece that is on the side of the connector toward the inside of the board; this will keep solder out of the connector pins. First make sure that your soldering iron does not have any direct ground connection to the board power source.
7. After the external power source is connected, turn it on and measure the voltage being supplied to the board. You may need to adjust the values of the dividers to get between 4.5 and 5.5 volts. Disconnect the power while making modifications.
8. Now, with the 5 volts connected and on, you are ready to remove the old battery. Use an insulated tool to pry the battery off while heating the solder connections on the backside of the board. Only touch one of the battery connections at a time. Here you need to be careful not to touch any of the board traces or component leads.
9. Once the old battery is removed, you can solder the new one in place, being sure that the polarity is correct. Now carefully

inspect your job to be sure that the battery is connected to the correct pads on the board.

10. Now you can disconnect the external power and unsolder the leads from the board.
11. The final step is to re-install the board in your radio and continue to use it for many more years.

This modification is read 1167 times.

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**30-03-2001**

## **(IC-751) RAM Card Backup Battery Replacement Instructions**

**Author:** ICOM

In the early 1980s Icom America marketed a group of transceivers and radios that utilized the latest state-of-the-art computer technology to enhance the operation of the radios. This technology improvement allowed hams to afford a reasonably priced high performance transceiver which until then was only available on units costing much more. Features now available to the hams included: higher frequency stability, better frequency resolution, digital frequency display, almost instant recall of saved frequencies (memory channels), quick mode signal processing and built in tones and offsets for the rapidly emerging repeater operation.

Implementation of all these features required a CPU with associated logic circuitry. In the early 80s, the most cost effective way to implement data processing and memory functions was through a DRAM (Dynamic Random Access Memory) to control the CPU. This DRAM was a volatile memory integrated circuit which required a lithium battery to retain its instruction set. The following receivers and transceivers had such RAM units:

IC-271 ; IC-471 ; IC-1271 ; IC-745 ; IC-751/A ; IC-R71A

The lithium batteries in these units typically lasted about 5 to 7 years before replacement was required. This was specifically noted in each of the Owners Manuals for the products.

This lithium battery can be replaced by the radio owner if care is used. The following is a recommended procedure to accomplish this:

### **Procedure**

1. Disconnect the power cable from the radio, and take the cover off.
2. Unplug the RAM board and remove it from the radio.
3. Temporarily solder a 3 Volt DC battery source across the existing battery terminals (see suggested connection points on the circuit board pictures).
4. Unsolder the old lithium battery and replace it with a new one. (BR2325 1HC, ICOM stock number 945 03112)
5. Unsolder your temporary 3 Volt DC source.
6. Reinstall the RAM board into the radio.

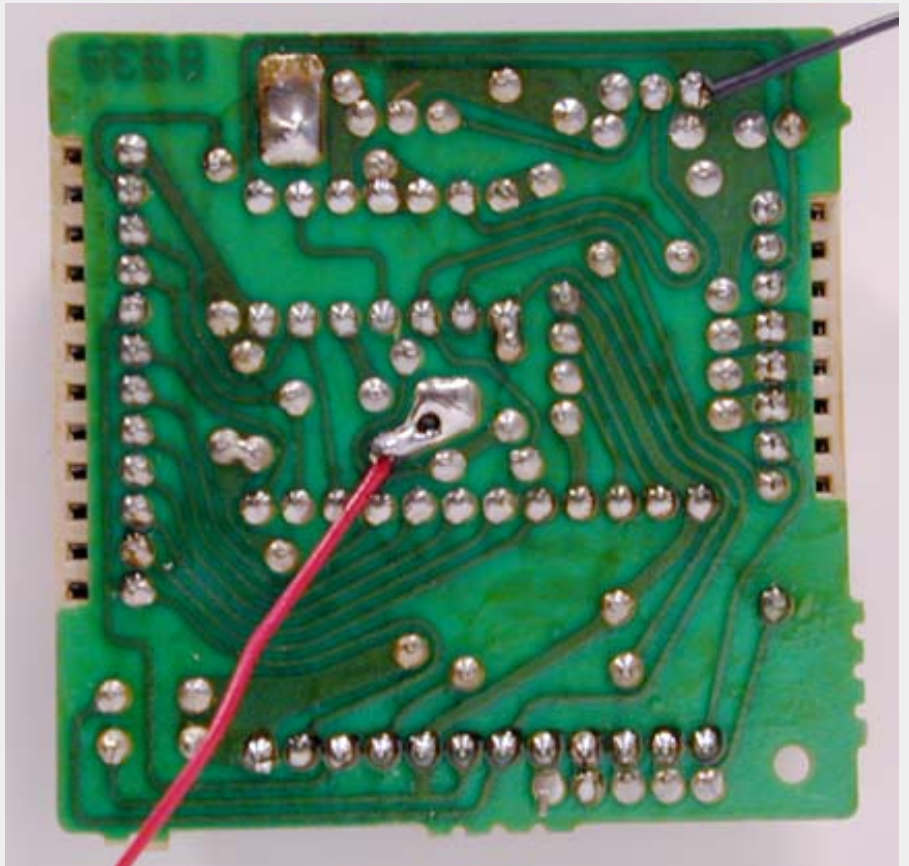
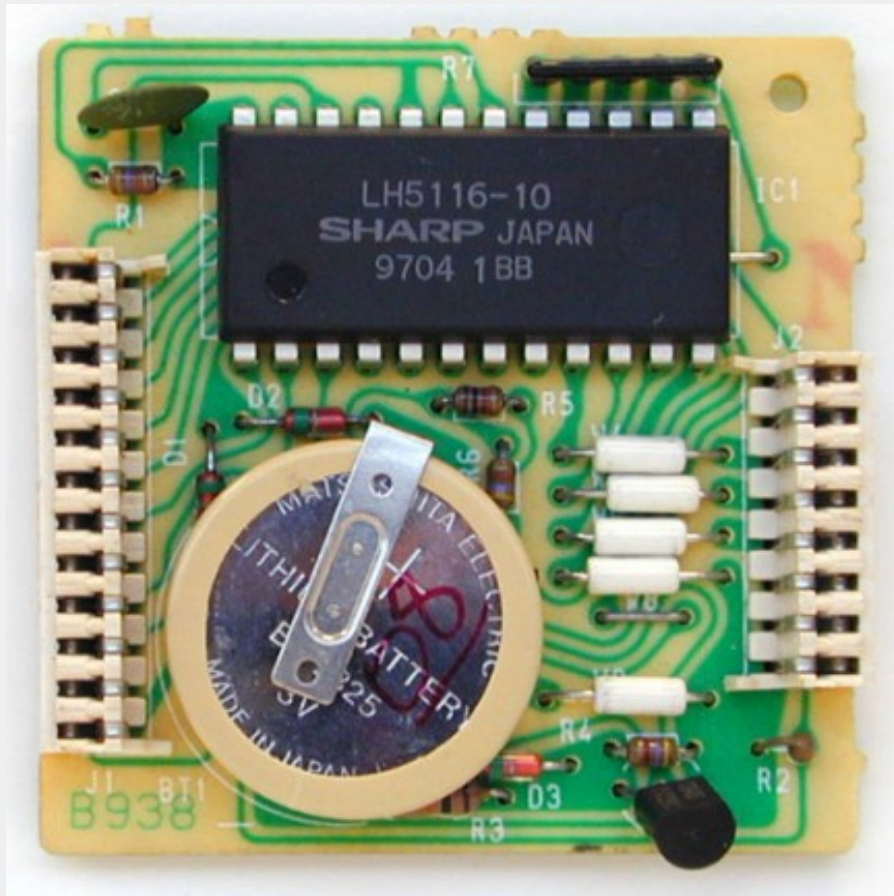
### **Cautions**

1. Do not use an AC powered 3 Volt DC source, your grounded soldering iron tip could short out the battery (+) terminal. Use a 3 Volt battery DC source only (2 alkaline cells for example).
2. Do not solder the external DC wires directly to the lithium battery tab pads. If you do so, you will not be able unsolder the battery without having the wires drop off.
3. If by accident you lose power to the RAM unit it must be sent to Icom America for reprogramming.
4. Be careful not to damage or bend the connector pins on the radio side while removing or reinstalling the RAM card.

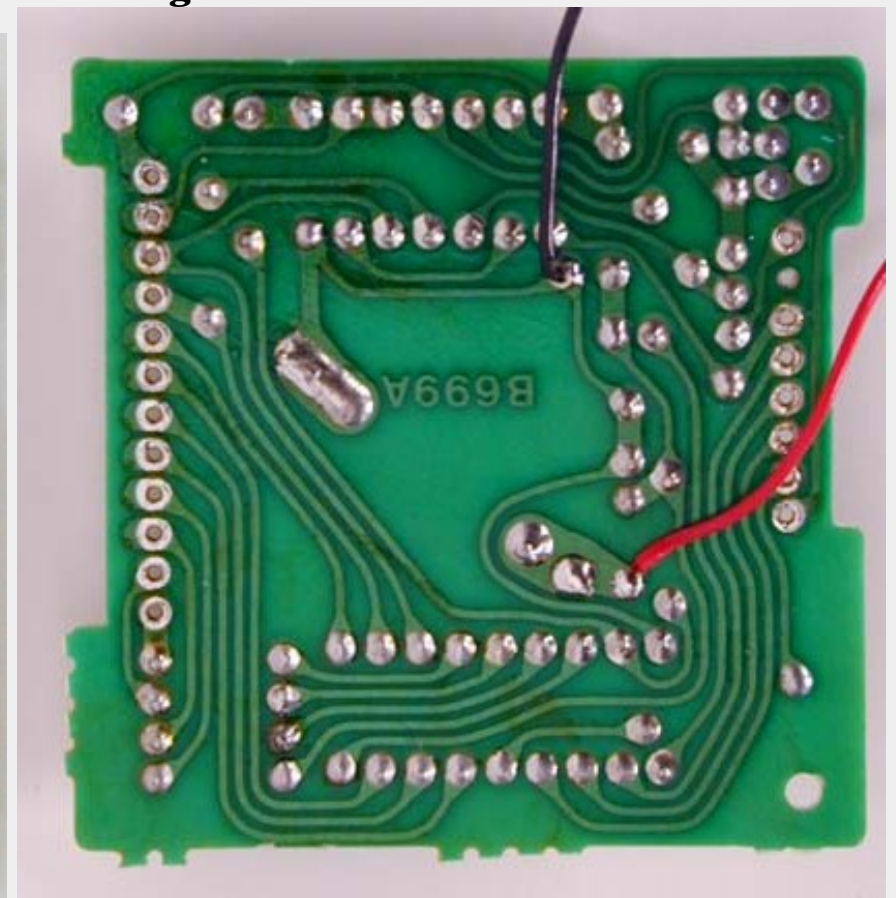
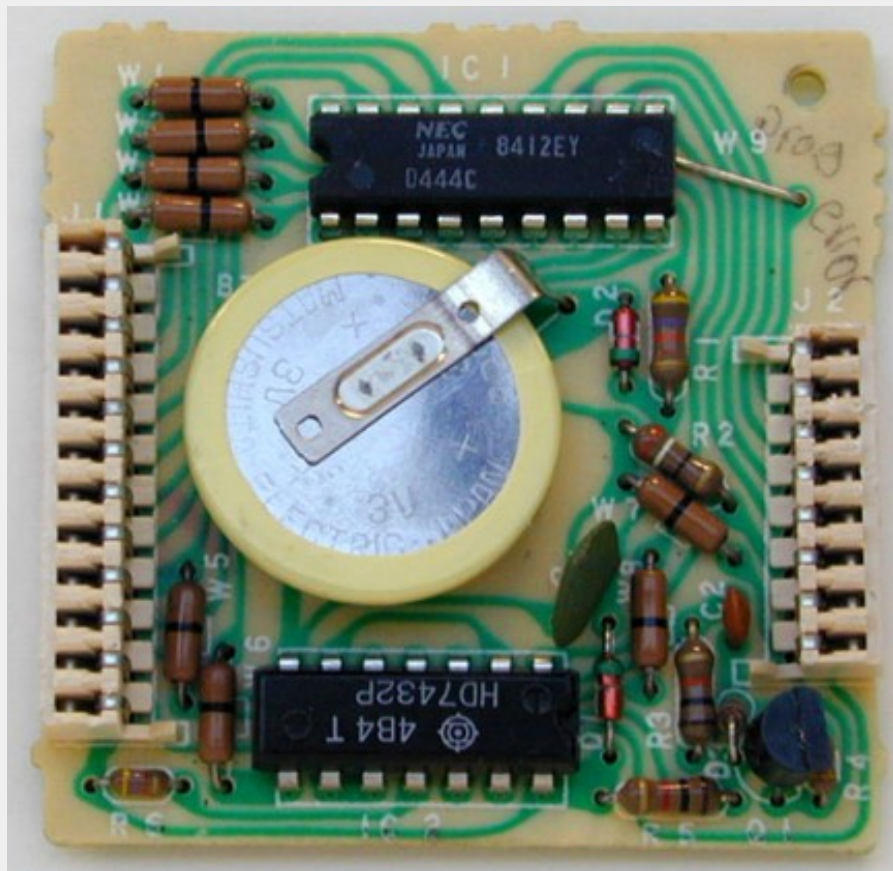
### **Pictures**

There are two versions of the ICOM RAM boards. Both are identical in operation, and they are interchangeable. The differences are in the circuit board layouts only. Note that the black and red wires visible on these images are the suggested way of connecting the external DC backup voltage while the battery is being replaced. The wires are not a part of the RAM card, and should be removed when the battery replacement procedure is complete. Refer to the replacement procedure outlined above.

**RAM card version A images:**



**RAM card version B images:**



This modification can also be found at ICOM's own homepage on the following URL: "[RAM Card Backup Battery Replacement Instructions](#)"

This modification is read 1129 times.

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**28-01-2002**

## **(IC-751) ICOM IC-751 Dual RAM back-up Battery Modification**

**Author:** Stuart - KI6QP - [stuart@valontechnology.com](mailto:stuart@valontechnology.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This modification adds two lithium cells and diode steering to provide future fail-safe cell replacement. You will have to build a little breadboard with a couple of Schottky diodes and battery holders but the cost is way less than the shipping charge to send your rig back.

Stuart Rumley  
ki6qp  
20 January 2002

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The ICOM IC-751 is my all time favorite radio. I haven't personally owned a lot of radios but I have worked on quite a few including Collins, Drake, Yaesu, Kenwood, Alinco, Heathkit, Icom, and many others.

What makes the IC-751 a nice radio for me is its clean, mostly discrete design with only a few high integration integrated circuits. It has a robust receiver with high input IP3 and well balanced gain. The 751 uses real crystal filters and doesn't rely on any phony-baloney last-IF-stage-in-radio-pseudo DSP for selectivity.

The front panel is intuitive and well laid out with a real meter, nothing I hate more than and LCD or plasm meter. There are real medium sized knobs and push-button switches designed for real people's hands and fingers that make operating this radio a joy.

The transmitter is also an excellent design with separate, discrete and robust power amplifier section. The 751 does not include an antenna tuner which I think to some degree is an advantage. For antennas that are not well matched, an external antenna tuner must be used. Generally, external antenna tuners are more efficient and always more reliable than internal antenna tuners and are very simple to maintain.

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RAM battery scheme is a bit dubious. The original design requires the owner to send the radio back to ICOM every decade or so and have the lithium cell replaced. Failure to do so has left a number of owners with a brain dead rig and a conviction to never by another ICOM radio again.

Clearly it was a manufacturing expedience to use a battery backed SRAM instead of a more expensive EPROM for the program code plus an SRAM for the user memory. One can imagine that they could have socketed the lithium cell so that user could replace it while the radio was powered on. I suspect this idea was discarded because of possible product liability issues with having the operator change the cell with the power on.

This modification adds a small, home brew breadboard containing two replaceable 20mm lithium cells. Each cell can be replaced one at a time so that one cell is always powering the RAM. In addition, this modification leaves the original cell in place which greatly reduces the possibility of accidentally clearing the memory.

### **Modification instructions**

This is a pretty simple modification and I think considerably safer to perform than the battery replacement method that [Icom recommends](#). However, you do have to use above average care due to the risk of losing the program memory. If this happens the radio will not be able to tune the synthesizer and you will have to return the RAM board to ICOM for reprogramming.

You will not need any additional power supplies or batteries to power the RAM board during this procedure. The existing RAM board cell will keep the memory alive during this operation. You should be using a grounded soldering iron, however, to minimize the risk of static discharge altering the memory.

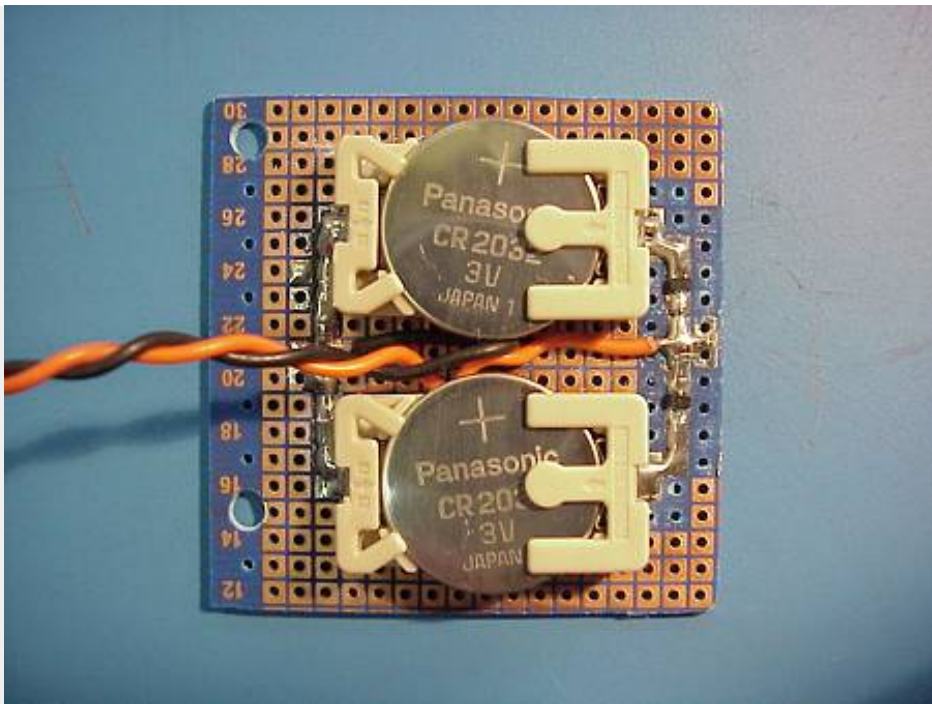
You will be working with rather close spaced traces on the RAM board and the only precaution you need to be aware of is to not allow the battery board leads, soldering iron, or tools to short the RAM board cell.

**Step 1:** Assemble the dual battery board as shown below and in the [schematic shown in pdf](#). Use approximately 10 inches of twisted black and red AWG 26 hook-up wire to make the connection to the RAM board. Prepare the RAM board ends of the black and red wire by stripping back about 1/8" of insulation and tin the leads.

Note that the board has two 2mm mounting holes spaced approximately 35mm. This will facilitate mounting the board in the 751 chassis on the voice module mounting holes.

Test the completed board with a VOM to ensure that the diodes have be correctly installed.





**Note: Do not insert the lithium cells at this time. The cells will be inserted as the last step.**

**Step 2:** Remove the bottom cover from IC-751 and pull out the RAM memory board.

**Step 3:** Carefully solder the negative lead (black) of the dual battery board to the RAM board ground trace at IC2 pin 7.

**Step 4:** Carefully solder the positive lead (red) of the dual battery board to the RAM board at the junction of diodes D1 and D2.

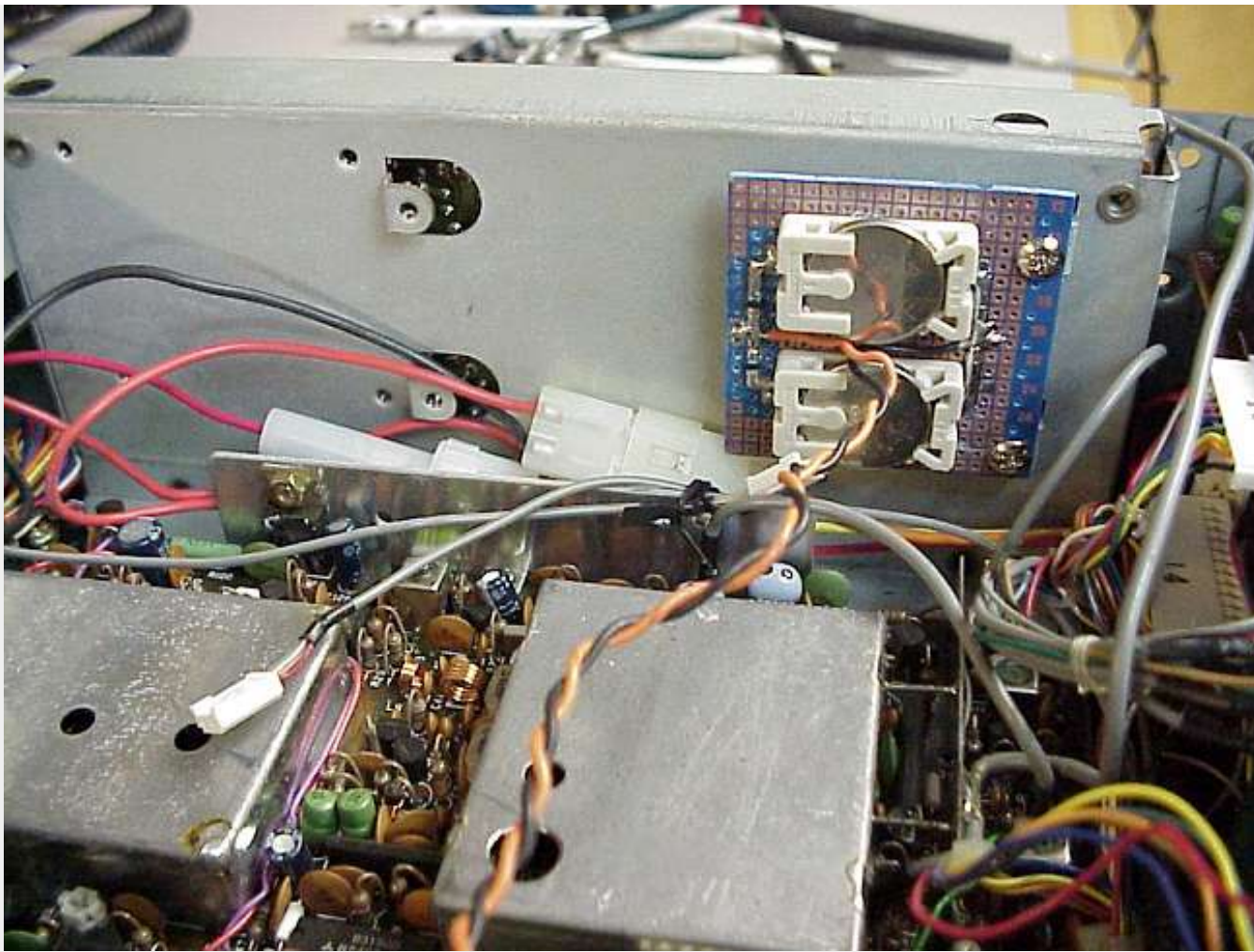


The RAM board connections should look like the photo above.

**Step 5:** Re-install the RAM board back into the 751. You can leave the dual battery board dangling outside temporarily.

**Step 6:** Monitor the voltage at the red wire on the dual battery board. You should see approximately 3.0 volts coming from the RAM board. Now, power on the 751, the voltage should now be approximately 4.8 volts if everything is ok.

**Step 7:** Install the dual batter board in the 751 bottom chassis. I used the mounting holes reserved for the speech module. If you have the speech module installed you will have to look for a suitable location. Fortunately, there is plenty of room in the bottom chassis to mount the board. I can't recommend using double sided foam tape as the adhesive usually fails after some time so its best to use screws.



**Step 8:** Turn the radio off and install the 20mm lithium cells in the holders. That's it, you're done.

You can now conveniently check each cell's voltage including the Icom RAM cell with your VOM. Just connect the negative lead of the VOM to the chassis and touch the positive lead to the top (+) side of each cell. You may notice that the memory RAM cell voltage is slightly higher than the new 20mm cells on the dual battery board. This is because the Schottky diodes have lower forward voltage than the diodes used on the Icom board. The 20mm cells are now powering the RAM and the Icom cell is floating.

In the future, when cell replacement is needed, simply replace one cell at a time and you will never have to worry about losing the RAM program.

73s  
Stuart

Thanks to [Stuart](#) for the modification.

This modification is read 467 times.

[top of page](#)

**19-07-1998**

## **(IC-756) IC-756 Expand TX Frequency**

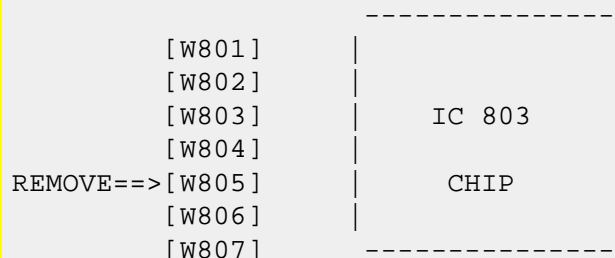
Notice: ICOM can not guarantee specification when expand frequency.

How to change full cover transmit:

Remove the W805 jumper chip on MAIN unit by soldering iron.  
Jumpers matrix located near IC803.

What to do:

Remove bottom cover of IC-756. On MAIN unit board you will see IF filters and daughter board (DSP filter) on the right side. W805 jumper and IC803 chip located under DSP board. You have to remove DSP board (get it up careful) and look for IC803 and line of jumpers (little green bugs). When it done, unsolder W805 jumper. Install DSP board and bottom cover back.



This info are from ICOM SERVICE INFORMATION sheet.

This modification is read 1928 times.

[top of page](#)

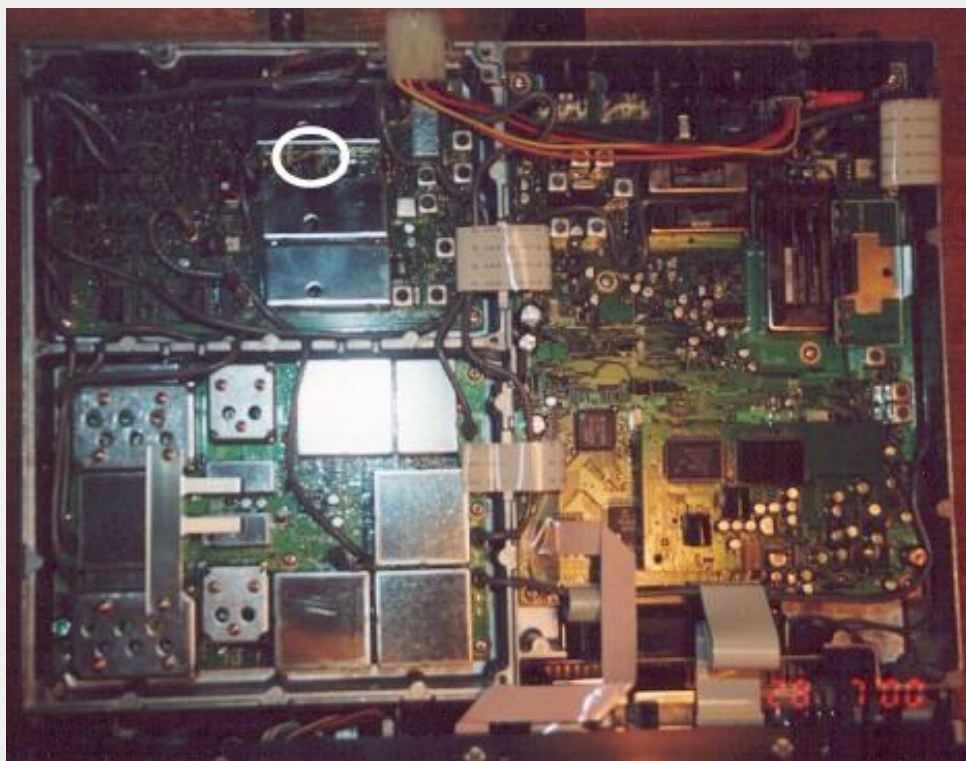
**26-06-2001**

## **(IC-756) Spectrum Scope Adjustments**

**Author:** Adam MAURER, VK4CP - [vk4cp@bigpond.com](mailto:vk4cp@bigpond.com). [MODIFICATION.NET](http://MODIFICATION.NET)

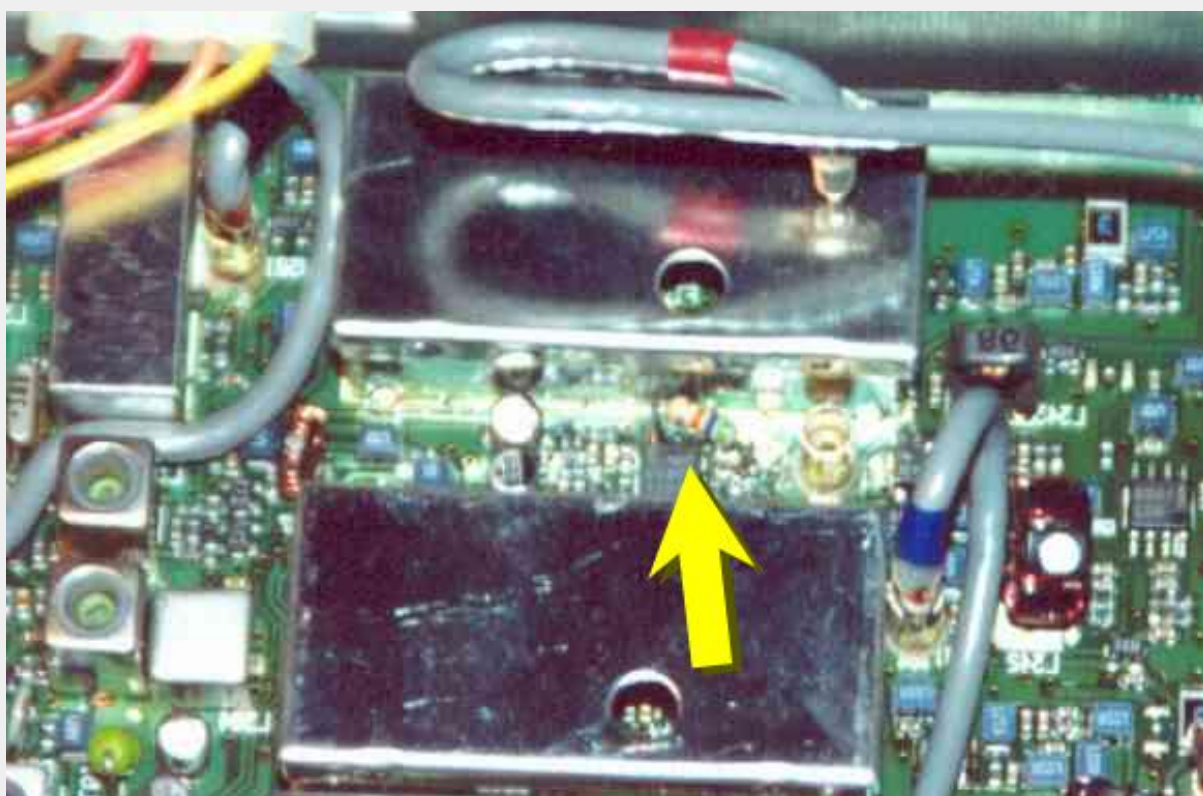
Access to the RF Unit is required.

Remove bottom cover and then remove cover to RF Unit - see below.



**To increase overall Scope gain:**

Lower the value of R963 (100k as fitted).



I put a 56k 1/4w through-hole resistor across R963 - see above - making the combined resistance approx 36k.  
(One resistor leg was soldered to pin 2 of IC-961 and the other leg to the junction of R966 and R964)

To be neater you could remove the small 0603 SMT resistor and replace it with a 39k 0603 part.

### To adjust Scope base-line:

Trimpot R966 will adjust the base-line of the Spectrum Scope.

Thanks to <http://www.qsl.net/vk4cp/> for the modification.

This modification is read 1768 times.

[top of page](#)

**26-06-2001**

## **(IC-756) ACC1 Audio Output Increase**

**Author:** Adam MAURER, VK4CP - [vk4cp@bigpond.com](mailto:vk4cp@bigpond.com). [MODIFICATION.NET](http://www.modification.net)

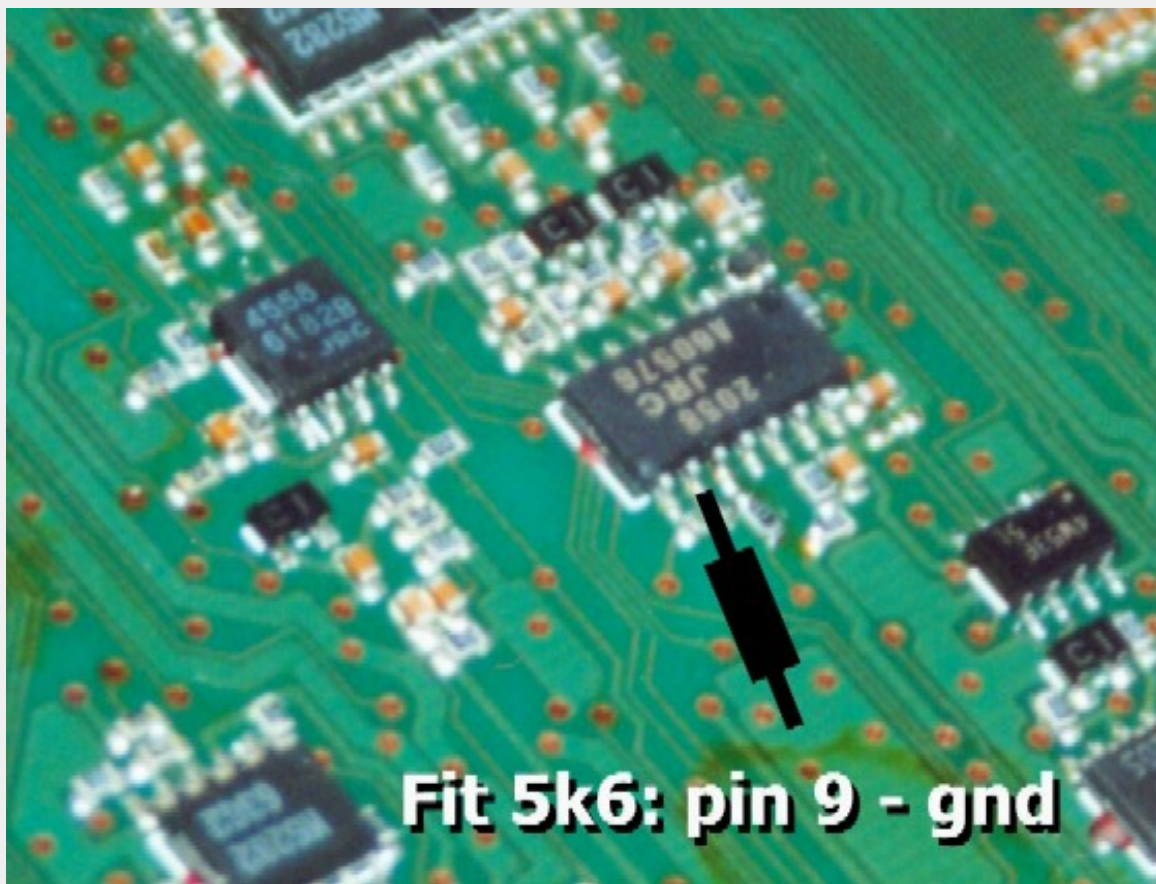
Access to the Main Unit is required.

The "Line Level" audio output on pin 5 of Rear panel connector ACC1 is very low, with the manual stating 300mV. Normal Line Level is regarded as about 700mV. Although my MiniDisc Recorder had a gain control for its Analogue I/P it still couldn't make 0 VU. Here, by adding two resistors we can increase the gain of the audio appearing on pin 5 of ACC1.



- Remove the bottom cover.
- Remove 6 screws holding down Main Unit.
- Remove screw on rear panel inbetween ALC & Send RCA sockets.
- Remove heatsinking clip holding transistor to chassis.
- Remove flat ribbon cable to J3 in far right corner.
- Carefully pry PBA loose and fold over - see at left.  
(I actually had to remove RF Unit shield and loosen a shielded cable to allow the Main Unit PBA to fold out).
- Locate IC-503, a NJM2058 OPAMP in an SMT SOIC14 package.
- Remove W3 0603 SMT link.
- Fit an 10k 0603 SMT resistor in W3's place.

- Fit a 1/8w 5k6 through hole resistor from IC-503 pin 9 to ground.



We have effectively changed the OPAMP IC-503c from being a unity-gain follower into a non-inverting amplifier with a gain of approx 2.5.

Thanks to <http://www.qsl.net/vk4cp/> for the modification.

This modification is read 1531 times.

[top of page](#)

**26-06-2001**

## **(IC-756) General Coverage H.F. TX Mod (1.6 - 30.0MHz)**

**Author:** Adam MAURER, VK4CP - [vk4cp@bigpond.com](mailto:vk4cp@bigpond.com). [MODIFICATION.NET](http://MODIFICATION.NET)

VHF remains 50.0 - 54MHz TX only.

### **Modification summary:**

Remove the W805 jumper chip on MAIN unit by soldering iron.

### **Modification Procedure:**

1. Remove bottom cover of IC-756.
2. On MAIN unit board you will see I.F. filters and daughter board (DSP PBA) on the right hand side.
3. W805 jumper and IC803 chip located under DSP PBA.
4. Remove DSP PBA (lift up carefully!)
5. Look for IC803 and line of jumpers (0603 sized SMT links).
6. Remove W805 jumper - as indicated below.
7. Re-install DSP PBA
8. Re-fit bottom cover.

|        |  |        |  |
|--------|--|--------|--|
| [W801] |  | -----  |  |
| [W802] |  |        |  |
| [W803] |  | IC 803 |  |

```

[W804] | |
Remove=>[W805] | CHIP
[W806] | |
[W807] | -----
[W808]

```

Thanks to <http://www.qsl.net/vk4cp/> for the modification.

This modification is read 1807 times.

[top of page](#)

### 13-02-2002

## (IC-756) IC-756 wide band modulation

**Author:** - [pa1zz@home.nl](mailto:pa1zz@home.nl).[MODIFICATION.NET](http://www.MODIFICATION.NET)

In order to improve the transmitted audio from a IC-756 most off these radios have a tiny switch next to the 455kc wideband x-tal filter.

Open de bottom side off the radio and turn it so you can read the text on de 455kc standard wide ssb filter. Next to te right down side off the filter you will find a tiny smd switch with W-N printed on de pcb. Change the switch position to wide.

Make sure you use a good mike! A bad one will sound even wourse!

And be carefull not overload the ALC. Otherwise you might splatter!!!

BTW Early numbers (below 01900) do not have this secret option!

This modification is read 490 times.

[top of page](#)

### 06-03-2000

## (IC-756pro) Expand tx-frequency for the IC756-PRO

**Author:** Hans , PA3HGT - [pa3hgt@amsat.org](mailto:pa3hgt@amsat.org).[MODIFICATION.NET](http://www.MODIFICATION.NET)

You need a very fine solderiron to remove the 3 diodes from the mainboard!

You have to remove the bottomcover of the 756PRO.

When you removed the cover and you have the backside of the 756-PRO facing you , you can locate the dsp-box on the left-side (the shiny-box). You have lift the dsp-box (with care !) out of the mainboard.

After removing the dsp , you can see a row of diodes with some spaces. You can see on the right of the row the number "3751" , that diode is already missing , hi.

You have to remove 3 small diodes located on the left side of number "3751" (diodes 3752 , 3753 and 3754) when you have a version "#03" Icom IC756-PRO.

When you have a version "#02" : remove diode 3751 , 3752 and 3753 !

```

R R R I I I X X I I X X I I I X diode-row IC756-PRO version "#03"
      3      3          3      3 before modification .
      7      7          7      7
      6      6          5      5
      3      0          5      1

R R R I I I X X I I X X X X X X after version "3" mod.
R R R I I I X X I I X X I X X X after version "2" mod.

```

I = diode installed  
X = diode not installed  
R = resistor

Trouble to find the diode-row ? It's about 1/2 inch located under the CPU.

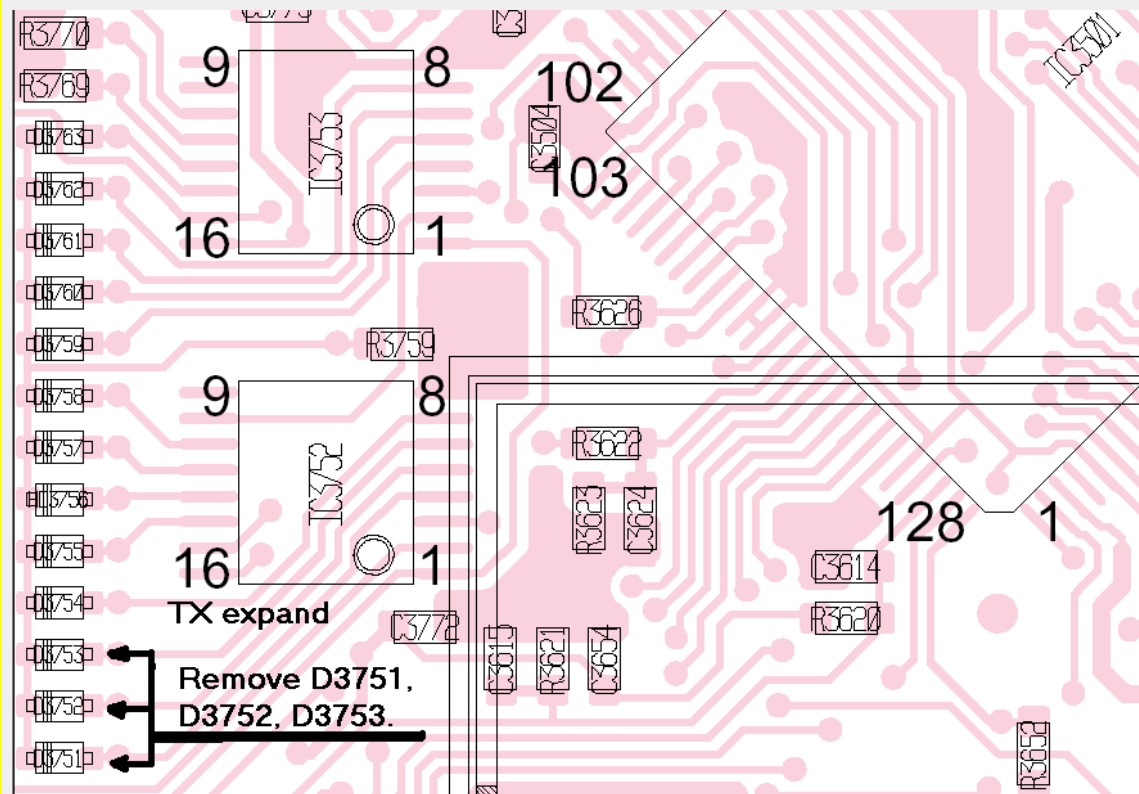
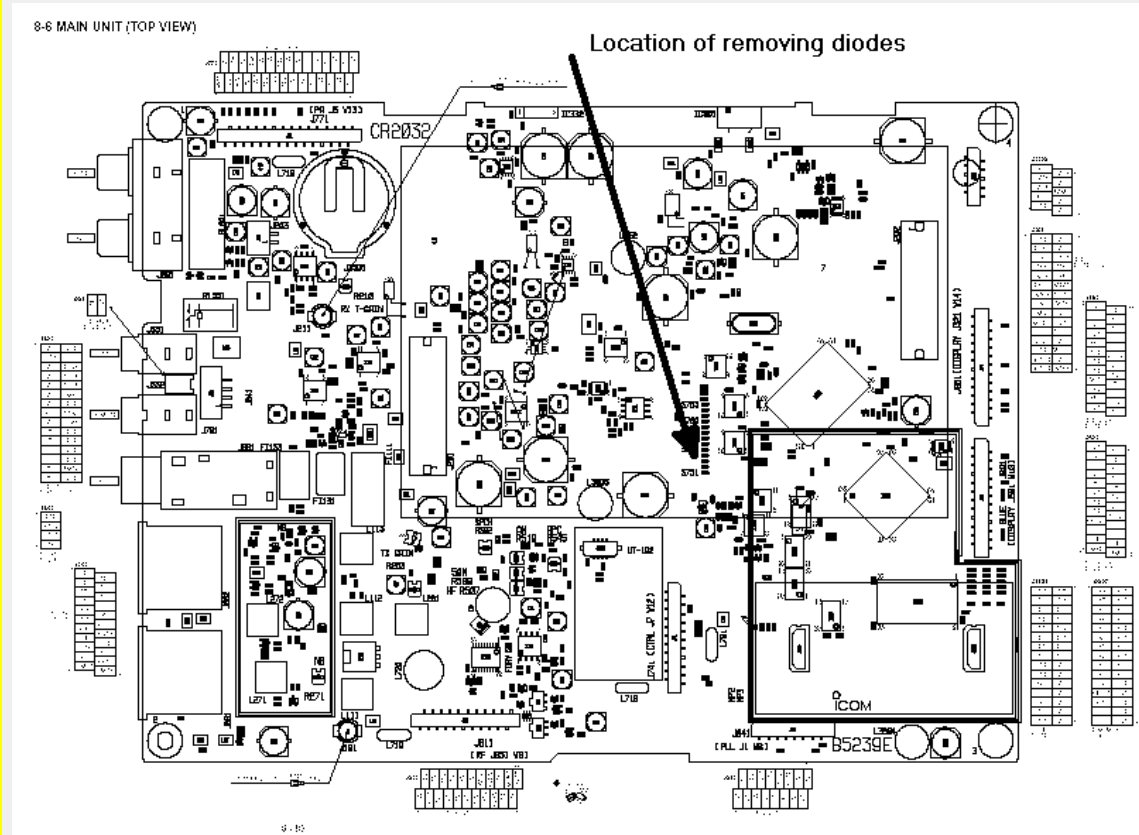
If you can't find out the version of your 756-PRO (#02 or #03) , look at the topside of the box .( see white sticker).

If there's something going wrong ..... i've no reponsebility

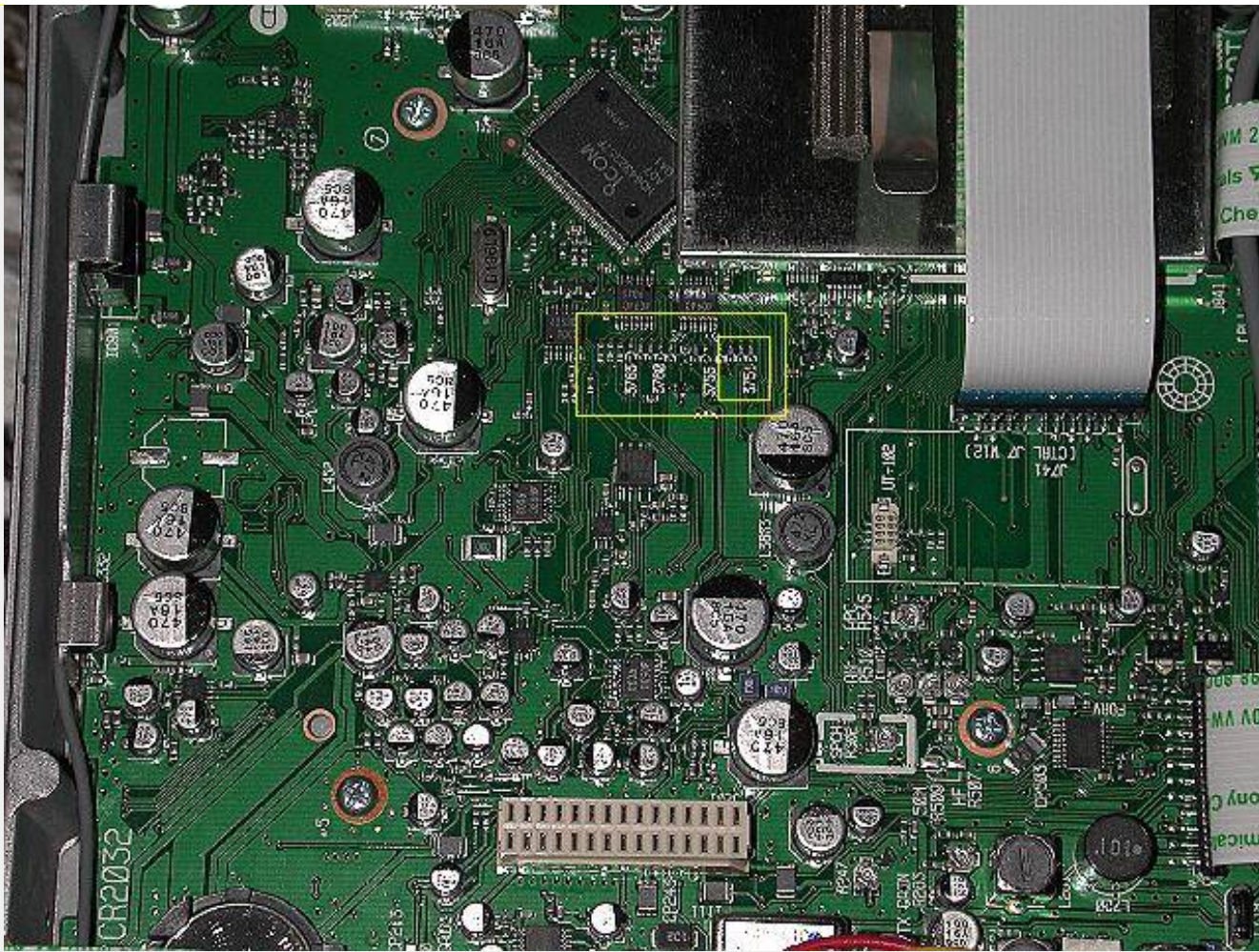
This info is from a Icom-infosheet .

73 van Hans/PA3HGT uit Yerseke

Here is two pictures from [astra](#).



Here is anothe two photo from [kb1vi](#)



**Date:** 23-02-2002

**User comment**

**From:** [Greg/K6QPV San Diego, CA. USA](#)

**Subject:** Making 756P continuous Xmit 1.6 - 29.999 MHz

Mods desired to use 756P as Xverter on 24 MHz which is out of its stock Tx range.

I followed the suggested steps for making 756P continuous Xmit from 1.6 - 29.999. Bottom cover removed by 10 screws (6 on bottom and 4 on sides), no need to remove feet. CPU box is connected to mother board via two multi-conductor connectors. Easy to gently "rock" it back and forth, pops right off. Diodes on my Ver #2 were instantly identifiable. Heated one end, used very small blade knife to lift desoldered end. Left diodes connected and "hanging" by other end.

Total time required approx 10 minutes. Piece of cake. No observable reduction in operation upon firing it up.



**Author:** Greg Ordy - [ordy@seed-solutions.com](mailto:ordy@seed-solutions.com). [MODIFICATION.NET](http://MODIFICATION.NET)

by Greg Ordy

- [Introduction](#)
- [The Undocumented BPF Indicator](#)
- [Two Ways to Specify the Filter Width](#)
- [Do It Yourself](#)
- [The Difference](#)

## Introduction

The ICOM 756PRO documentation is silent when it comes to describing the CW filter shape factor, and how it can be selected. ICOM tried to improve the situation with a brief mention of this topic in its [Advanced Operation Guide](#) for the 756PRO, but it does not clearly describe how to select the filter shape. I will try to do a little better on this page. I would like to thank Rob Peebles, W8LX, for bringing these capabilities of the radio to my attention.

The 756PRO receive audio, coming out of a digital signal processing (DSP) intermediate frequency (IF) stage, is much different in character than other purely analog receivers. I have captured some of my impressions on [another page](#).

On CW, the filter response created by the DSP is extremely sharp. That is, signals outside of the passband are substantially attenuated. In the analog domain, sharp filters can lead to *ringing*, and other artifacts. Digital filters can have similar problems. In addition, it has been claimed that the 756PRO receiver highlights flaws (key clicks) in the transmitted signal. In other words, it hears the clicks better than other receivers. These various factors lead to CW receiver performance which some operators do not like. One suggestion to improve performance has been to alter the CW filter shape. Perhaps if the filter was not as sharp, the artifacts would not be as pronounced. Apparently a [special DSP ROM](#) (software) is available in Japan, but information on this modification has been difficult to obtain, and in any case, changing the DSP software is claimed to be a major project, in terms of taking apart the radio to access the relevant parts.

It turns out that for filter widths of 500 Hz and less, it is possible to select one of two filter shape factors. One is the sharp CW filter, and the other appears to be the SSB shape factor, which is not as sharp. Calling one the CW shape factor and the other the SSB shape factor is my own terminology. Rob Peebles, W8LX, estimated the sharp CW shape factor to be 1.5, and the SSB shape factor to be 2.0. This page describes how to select the two different shape factors (in the CW mode, it cannot be selected in SSB mode).

## The Undocumented BPF Indicator

The top line of the main display contains a yellow indicator labeled **BPF**. This indicator is not mentioned in the documentation (756PRO user's manual). It appears immediately to the right of the *passband width indicator* (page 10 of my manual). It is my belief and claim that this indicator shows the IF filter shape factor state. When the indicator is off, the display is dark, the SSB shape factor is in use. When the **BPF** characters are visible, the CW (sharp) shape factor is being used.

Early 756PRO users discovered the **BPF** indicator soon after the radio was introduced. It was clear that it was tied to the CW filter width. As best as I can tell, you *must* be in CW mode in order to be able to use the sharper filter. When the CW filter width is set to 500 Hz or less, via the BW (F-1) button, in IF filter selection mode, the **BPF** indicator and mode automatically turns on. Until I talked to Rob Peebles, W8LX, I assumed that all CW filters 500 Hz or less in width would have the **BPF** indicator on. This turns out to be untrue. It is possible to have CW filters at and under 500 Hz without having the **BPF** indicator on. Since the **BPF** indicator is not on, you will be using the SSB shape factor, even if the filter width is reduced to the minimum value of 50 Hz.

## Two Ways to Specify the Filter Width

The current filter width and shift (offset) are displayed on the top line of the main display. The **BW** field indicates the filter bandwidth, and the **SFT** field indicates the filter shift. I believe that these two fields, along with the **BPF** indicator, completely capture the IF filter state of the radio. There is no more data to view or change.

There are two different ways to specify the filter width. Until this issue came up, I assumed that both ways would always arrive at identical results. This is not true. One way changes the **BPF** indicator and the other does not. Again, this discussion applies to CW mode. In SSB mode, the **BPF** indicator will never turn on.

The first way to adjust the IF filter width is to use the **BW** [F-1] button in conjunction with the main VFO knob. You must enter the IF filter set mode in order to use this way. When this way is used, the **BPF** indicator will turn on for all widths of 500 Hz or

less.

The second way to adjust the IF filter width is to use the **Twin PBT** knobs. These concentric knobs can be adjusted to narrow the filter width. Here is the entire point of this web page: **When the IF width is adjusted with the Twin PBT knobs, the BPF indicator will not come on, even for widths equal to and under 500 Hz.** Obviously you must start with a width greater than 500 Hz so that the **PBT** indicator is off to begin with.

My own opinion is that this is a *bug* that really is a *feature*. My guess is that ICOM engineers wanted the sharp CW filter to be on for all widths of 500 Hz or less. When using the **BW** button, it works like that. But when the **Twin PBT** controls are used, the check for crossing the 500 Hz boundary is not made, and the filter does not change shape.

## Do It Yourself

The best way to evaluate the two different filter shape factors is to A/B compare them for a constant filter width. Here's my suggestion for doing that.

1. Pick a band like 40 meters that usually has a number of CW signals, and some background noise (especially at night).
2. Set the 756PRO to CW mode, and enter the filter set mode by pressing the **Filter** button for 2 seconds.
3. Select the first filter and press the **DEF** button to return the filter to the factory default width of 1.2 KHz. Since this width is greater than 500 Hz, the **BPF** indicator will be off. Turn the outer **Twin PBT** knob to the right 10 *clicks*. Turn the inner **Twin PBT** knob to the left 10 *clicks*. This should result in a 200 Hz filter. Since the filter was narrowed with the **Twin PBT** knobs, the **BPF** indicator should still be off. You now have a 200 Hz wide filter with the SSB shape factor.
4. Select the second filter and press the **DEF** button to return the filter to the factory default width of 500 Hz. Since the filter width is 500 Hz or less, the **BPF** indicator will be on. Press the **BW** [F-1] button and while holding the button, rotate the main VFO knob to the left until the width reduces to 200 Hz. You now have a 200 Hz wide filter with the CW shape factor.

You now have two filters with identical widths, but with the two different shape factors.

Tune around the band, and use the **Filter** button to select the different filters.

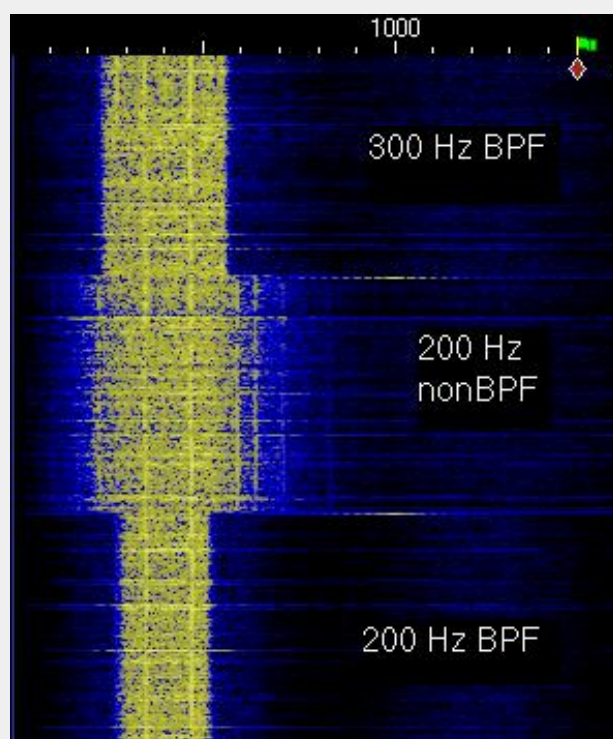
Remember, when evaluating filters, check the **BPF** indicator state. When **BPF** is on, you are using the sharp CW filter shape. When the indicator is off, you are using the broader SSB filter shape.

## The Difference

So, is this a distinction with a difference? While the difference is not large, my own subjective opinion is that it significant. The SSB filter shape sounds much more like traditional filters in an analog IF radio. The CW signal edges are not as sharp and grating. The sound is a bit *softer*. Even the background noise of the band changes. I could imagine that it would be much less tiring on the ears to listen to the SSB filter shape for extended periods. In contest situations, however, with crowded bands, the CW filter shape will probably be more desirable.

Your mileage may vary.

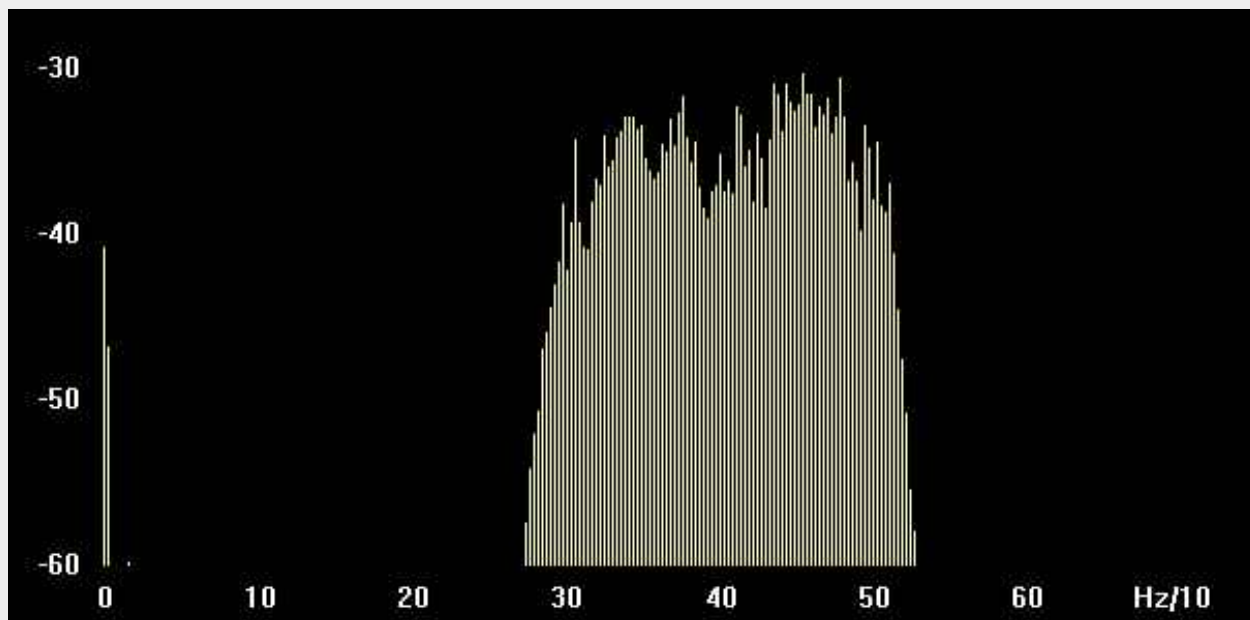
With appropriate test equipment it would be possible to make a more accurate estimate of the shapes of the filters. Although I don't have that equipment, I do have the program [Digipan](#), which is PSK31 software with an integrated audio spectrum analyzer. Here is a Digipan screen capture showing three filter choices.



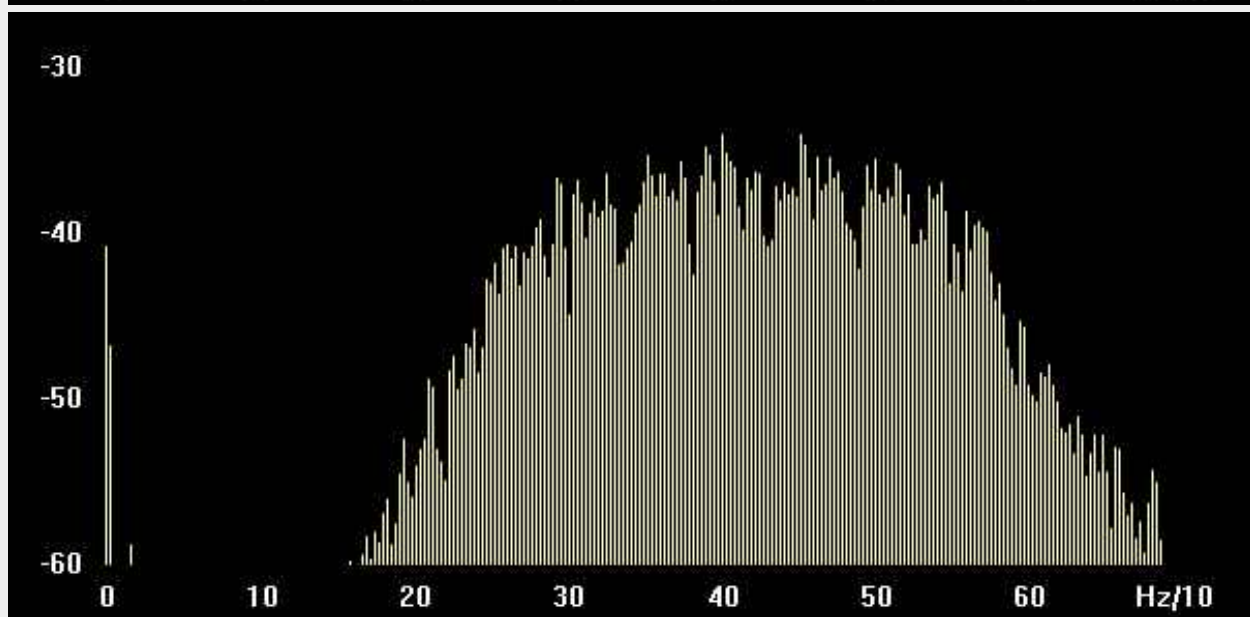
## Digipan Display of Selected Filters

The Digipan screen capture shows the audio spectrum output of three different filters. The capture was made on a noisy 80 meter band, monitoring background noise. My CW center frequency was 400 Hz. Since the program scrolls from top to bottom, the first filter selected is actually at the bottom of the captured screen. The bottom filter is a 200 Hz filter with the CW shape factor (**BPF** is on). Note the sharp edges, indicated by the straight vertical lines that separate the black (no output) zone from the yellow zone (random background noise coming through the filter). Above the 200 Hz **BPF** filter is the 200 Hz non**BPF** (SSB) filter. The edges are no longer as sharp. Additional energy around the 200 Hz width is coming through the filter. The blue lines indicate intermediate energy levels (between yellow and black). Finally, the top and last filter is a 300 Hz **BPF** filter.

Larry Benko, W0QE, a 756PRO user who independently discovered the two CW filter shapes, informed me of another program, [Spectrogram](#), which is a free audio analysis tool. I used Spectrogram to create spectrum plots of the 200 Hz wide **BPF** and non**BPF** CW filters. These screen captures, made while listening to the same noisy 80 meter band, reveal the different filter shapes.



200 HZ BPF filter (CW shape)



200 Hz nonBPF filter (SSB shape)

The non**BPF** filter shape factor does have a character all its own. In some circumstances, you may find it useful, and at the least, ICOM should document it.

The use of a broad-band uniform RF noise source, such as 80 meters at night, combined with an audio spectrum analyzer implemented in software on a computer, is a simple but effective approach for making reasonable measurements of receiver filter passband characteristics. More of these sort of plots can be found on a [web page](#) maintained by Adam, VA7OJ/AB4OJ. These plots compare the ICOM IC-756PRO against the ICOM IC-765.

This modification can also be found on [Greg Ordy](#) homepage.

**23-11-2001**

## **(IC-756pro2) IC-756PRO2 TX mods 100 Khz - 60 MHz**

**Author:** Astra - [astra@softhome.net](mailto:astra@softhome.net).[MODIFICATION.NET](http://MODIFICATION.NET)

- Open the IC-756PRO mods article
- look at the picture, it is similar for PRO2 model.
- Remove only two lowest diodes marks as D3751 and D3752.

Reset is not necessary.

- Done!

Now IC-756PRO2 will transmit from 100 kHz to 60 MHz without any gaps!!! Dunno about RF power on 136 kHz, could be it possible, anyway be carefully with transmitting lower than 1.8 MHz. Enjoy.

This modification is read 2206 times.

[top of page](#)

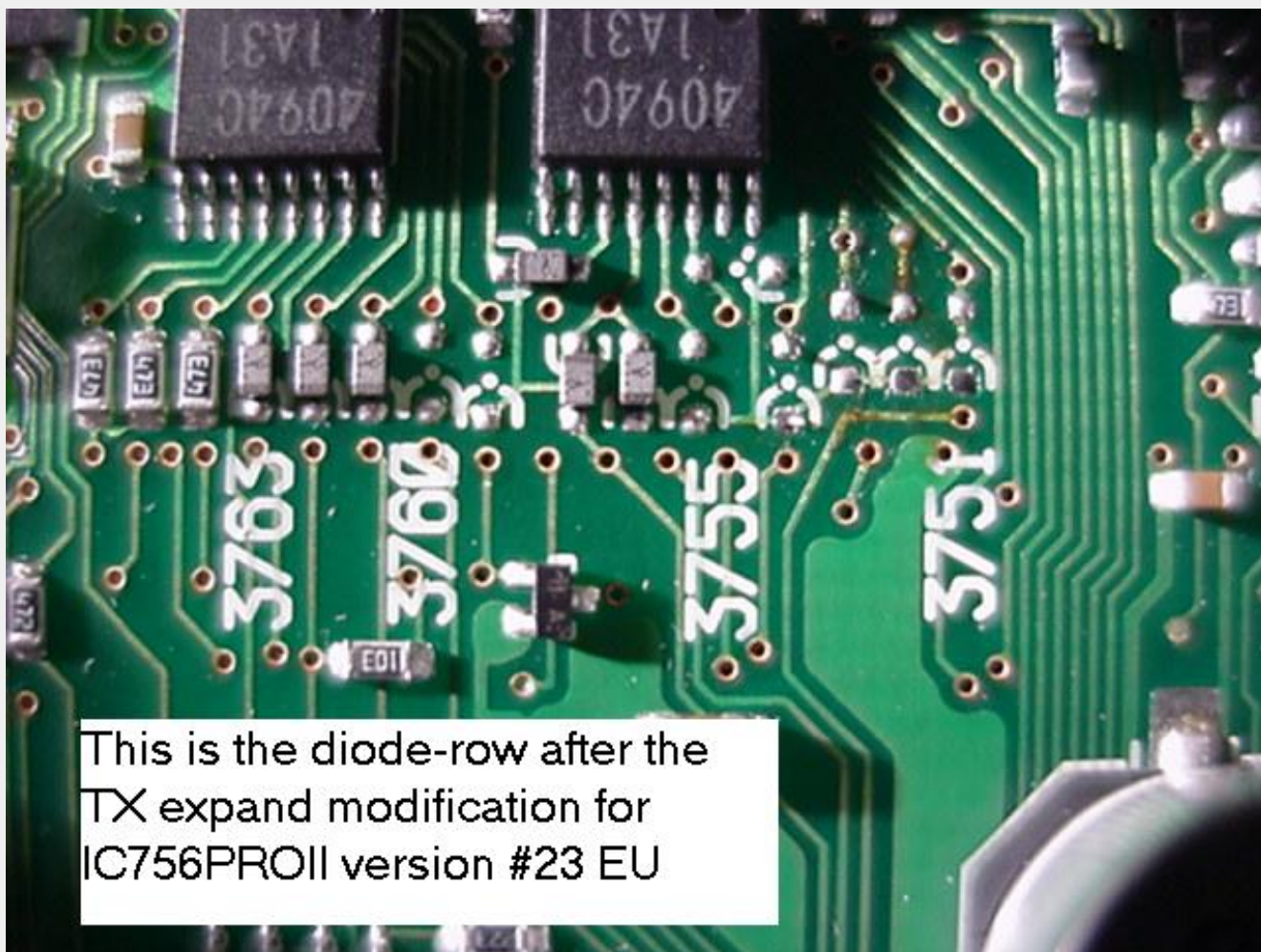
**17-03-2002**

## **(IC-756PRO2) TX expand on IC 756PROII #23 EU models**

**Author:** Hans , PA3HGT - [pa3hgt@amsat.org](mailto:pa3hgt@amsat.org).[MODIFICATION.NET](http://MODIFICATION.NET)

If you have an IC756PROII version #23 EU-model and want expand the TX range: Read my article placed for [IC756PRO](#) and change the diode-row according to "after version 3" mod. You've to remove 3 diodes ( D3752,3753 and 3754).

Your Icom IC756PROII version #23 EU is original like the dioderow "version #03 before modification" that you can read in the article .



The tx-range is 1,6 Mc - 30 Mc & 50 Mc - 54 Mc when you execute the mod.

73 , Hans , PA3HGT

This modification is read 235 times.

[top of page](#)

**19-07-1998**

## **(IC-761) Wider SSB band on the IC-761**

When in SSB mode and the filter switch is in the "out position", your normal bandwidth is 2.6kHz. When the filter switch is in the "in position", your normal bandwidth is 2.4kHz. I have noticed there is a 3rd SSB bandwidth for receiving in the SSB mode. Leave the filter switch in the out position and place the IF shift button in the "in position" for IF shift, and now the bandwidth is 3 to 3.2kHz wide.

When using the filter switch only to select the advertised wide and narrow position for SSB bandwidth, you receive and transmit at those bandwidths and are using both the 9MHz and 455MHz filters; however, when using the above method as stated for the wider selectivity, it appears you are receiving through the wide ceramic 455MHz filter only, and bypassing the 9MHz filter. So there are three positions, not two.

| MODE | 9MHZ      | 455       | BANDWIDTH  |
|------|-----------|-----------|------------|
| SSB  | FL-80     | CFJ-455K5 | 2.6        |
| SSB  | FL-80     | FJ-44A    | 2.4        |
| SSB  | By Passed | CFJ-455K5 | Approx 3.0 |

This modification is read 740 times.

[top of page](#)

**19-07-1998**

## **(IC-761) IC-761 activate tuner when in general coverage mod**

Remove the top cover of the IC-761 and locate the tuner band switch unit PC Board which is the 2nd small PC board located behind the antenna tuner preset unit.

On the board, locate J 7 and at that location, you will note a three (3) pin molex plug with a black, brown, and red wire connected to it. Either unplug, remove, or clip the center brown wire coming from the plug. Carefully unplugging the wire and placing heat shrink tubing over the end works very well.

This enables the tuner to be activated on GENERAL as well as the ham bands.

This modification is read 708 times.

[top of page](#)

**19-07-1998**

## **(IC-761) IC-761 Out of band**

out of band transmit for the ic-761  
on the front marker unit  
cut r-37 and you have all band transmit  
--(by wb1erg - steve)

This modification is read 763 times.

[top of page](#)

**19-07-1998**

## **(IC-765) Icom IC-765 improved monitor volume**

For radios with serial numbers below 2000

1. Set radio for 8 mhz in LSB
2. Adjust C226 for 1 to 1.2V at R201.
3. Verify that it goes to 3V at 7.9999MHz

Change R85(10K) on main unit to 4.7K.

This modification is read 1011 times.

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19-07-1998

## (IC-765) Icom IC-765 Passband tuning mod

1. Desolder and lift cathode of D63 from PCB.
2. Add a 1N914 diode to the junction of the 1N914 cathode and the D63 cathode.

After modification: If shift button out = pass band tuning  
 If shift button in = if shift.

**Date:** 28-01-2002

**User comment**

**From:** [Carl Severa, AH8I](#)

**Subject:** Icom 765 Passband Tuning Mod (addition of)

Your PBT modification for the IC765 is not complete.  
 Please refer to your source and read what is on your website.  
 I do not have it or I would give you the correction.  
 Carl Severa

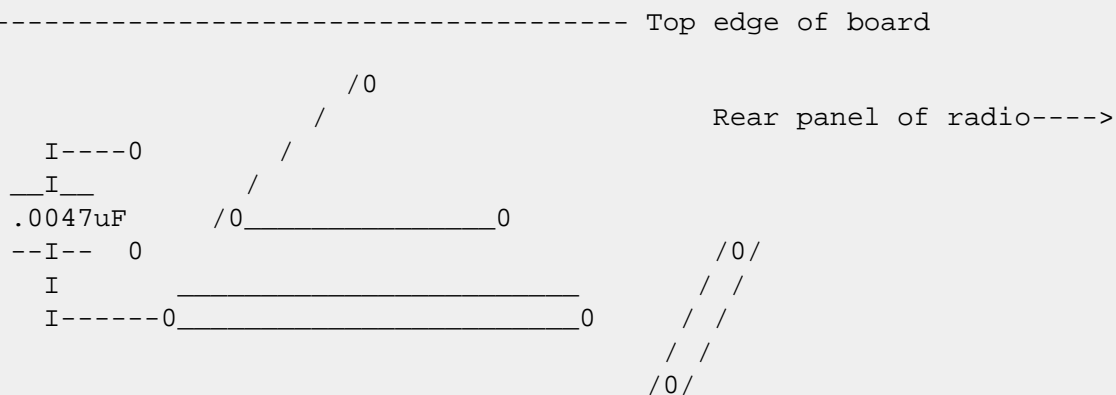
This modification is read 1126 times.

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19-07-1998

## (IC-765) Mod to prevent ant sw unit failure

1. Remove top cover
2. Locate ant sw unit at right rear of radio (at antenna jack).
3. Solder a .0047 uF, 500v ceramic capacitor to back side of pc board as shown. (Board removal is not necessary).
4. Reinstall top cover and check for proper transmitter operation. this modification prevents failure of R1, R2, D1 and L1.



View: back ant sw unit pcb.

This modification is read 984 times.

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19-07-1998

## (IC-765) Adjustment the mortrs control unit

The feedback circuit that controls the tuning motors becomes sensitive after a few months of ageing. It requires a one time adjustment to correct.

1. Remove top cover and locate the antenna tuner board.
2. Locate r5 and R10 and set them to the center of their range.
3. Set radio as follows:  
 Tuner on  
 Frequency 14.100 MHz  
 Mode RTTY

4. After transmit is engaged for 30 seconds,
5. Adjust each control (R5 and R10) so neither motor tunes while changing from SSB to RTTY and back to SSB.  
**Note:**  
R5 (right) controls right motor and R10 (left) controls left motor.
6. Repeat this adjustment to verify proper operation and then check on all other bands.
7. Reinstall top cover and return to operation.

This modification is read 962 times.

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**22-08-1999**

### **(IC-765) IC-765 Extended TX Mod**

1. Remove top and bottom covers
2. From the bottom of the radio locate the matrix board which is next to the front panel.
3. Find diodes D50, D51, D52, D53, D54 and D55.
4. Cut one leg of D53
5. Assemble the radio and stay legal!

This modification is read 1158 times.

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**04-06-2000**

### **(IC-765) Replace 455 SSB filter w fl 44a very nice selectivity.**

**Author:** Chris - [Blakhart@huntel.net](mailto:Blakhart@huntel.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Cut power switch line and wire for on at all times-never lose s-meter lamp again. Better yet pull ps out and rewire for external use to keep heat out.

Replace AM rect diode w schottky for better audio.

Increase prod. detector output cap w larger value to get more bass.

Adjust audio tone contrl for minimum hisssss.

Take out speaker to let heat out-its a killer.

**Date:** 19-01-2002

**User comment**

**From:** [Chris](#)

**Subject:** More info

The fl44a is direct replacement for the fl96 stock 765 ssb filter. If one replaces the 9 meg fl30 filter with an fl80 you then have a 2.3 bandwidth filter with outstanding specs per ICOM. All parts are ICOM standard parts, find em used.

Another even more important tip is to replace C-280 with a 0.82mf cap (observe polarity if need be)and the agc pops are gone and the IMD per QST of DEC 95 pages 78 to 79 are very relevant.

This modification is read 1070 times.

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**(IC-775) New product information IC-775DSP**

Icom's new superior class HF transceiver the IC-775DSP is designed as a successor to the IC765. The IC775DSP offers high quality receive and transmit audio for serious DX'ers. In addition, a non-DSP type, the IC775, is also available.

DSP (Digital Signal Processing; DSP-type only)

DSP digitally transposes transmit and receive audio signals to produce desired AF frequency characteristics and in addition performs the following functions:

- Noise reduction - DSP converts all analog audio components to digital components, then separates them into voice and noise at the digital stage. In this way, voice components can be singled out and demodulated back to analog signals so that weak signals that would normally be drowned out by noise are audible. The reduction level can be adjusted to obtain the most desired audio characteristics.
- PSN modulation - PSN method (Phase Shift Network) generates SSB signals directly without DSB signals or SSB filters. Therefore even audio characteristics, over the entire range from low to high audio components, can be obtained, as well as high quality audio without filter group delays.
- Automatic notch filter - automatically suppresses the highest level beat signals in the audio frequency.
- Twin PBT - One of the more highly praised functions of the IC-781 - twin PBT narrows the IF-passband in two stages to efficiently eliminate interfering signals. This function is especially useful during crowded band conditions such as pileups, contests, or for nets, etc.
- IF Notch - The IC-775's notch filter functions at the IF stage, therefore, sharp and deep filter characteristics are obtained as with the IC-781.
- Automatic Notch (DSP-type only) - An automatic frequency adjusting notch filter is available at the AF stage separate from the IF notch. This automatic notch reduces the maximum beat level with no manual adjustment necessary.
- APF (Audio Peak Filter) - Allows a particular frequency to pass through at the AF stages. This function is convenient for CW operation. In addition, CW pitch is also related changed with APF.
- Dual Watch Functions  
Dual watch monitors 2 frequencies on the same band simultaneously. Ideal for contests, traffic handling, DX chasing and net control work. To operate the dual watch, the IC-775 has two PLLs, two RF circuits and a balance control to balance signal strength.
- Twin Tuning Knobs  
For convenient dual watch operation, the transceiver has two tuning knobs. The large main knob has good tension and response; the small, independent sub small knob can be used to watch a sub frequency.
- Newly designed PLL  
A new design is employed in the PLL circuit using ICOM's DDS technology and removing mixer circuits, resulting in higher quality C/N characteristics and superior spurious rejection.
- Power MOS FET's for clean signal.  
Superior 3rd, 5th, 7th IMD characteristics are obtained by power MOS FET's with high voltage. The IC-775 employs power MOS FETs in the pre-driver, driver and final amplifier stages, providing a clean 200 W of output over all bands.

**GREAT FUNCTIONS FOR CW OPERATIONS**

- Memory Keyer - This function is convenient for contest, etc. an often-used word or phrase can be programmed, such as a callsign, "CQCQ", etc
- Electronic Keyer - Newly designed electronic keyer. Weight control can be adjusted using set mode.
- CW Pitch Control - Adjusts the audio pitch of any CW signal without changing the operation frequency.
- CW Reverse - CW carrier point can be selected on USB and LSB bandwidth while receiving CW to reduce interference.
- Two key jacks - The transceiver has a total of two key jacks on the front and rear panels. The front panel key jack accepts a paddle and a straight key (selectable using set mode) and the rear panel jack accepts a straight key or an external memory keyer.
- Full break-in (QSK) capability
- Variety of filters selectable 3 selectable filters are available to achieve a desired bandwidth:

| Mode | Wide   | Middle | Narrow            |
|------|--------|--------|-------------------|
| CW   | 2,4kHz | 500Hz  | 250Hz (option)    |
| SSB  | 6,0kHz | 2,4kHz | 1,8kHz (optional) |

**OTHER FEATURES**

1 crystal control for high frequency stability

Large heatsink and cooling fan

Selectable tone/shift frequency from set mode for instant data (AFSK) operation.

2 selectable preamplifier gain (18-28MHz only)

CFL (Cold cathode Fluorescent Lamp) back light for large LCD display.



Two antenna connectors with automatic selector.

High speed automatic antenna tuner.

Level/width variable noise blanker.

Gain selectable preamplifier (2 positions)

SWR/Po/ALC/COMP/Id/Vd selectable large analog meter

Improved quick split function

Convenient memo pad function

VOX function

Transmit signal monitor

Double band stacking register

Built-in heavy duty power supply

RF speech compressor

This modification is read 1250 times.

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**15-12-1999**

### **(IC-775) IC-775DSP Out of Band Information**

1. Remove front panel to locate the main unit.
2. Remove W1 chip jumper located next to R111 on the main unit.
3. Re-install front panel.
4. Push clear and turn on rig (CPU reset).

This modification is read 1390 times.

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**19-11-2000**

### **(IC-775) Increase the sensitivity on MW-band 0.5-1.6MHz on IC-775 and IC-775DSP**

**Author:** SM4RNA Anders - [sm4rna@telia.com](mailto:sm4rna@telia.com).[MODIFICATION.NET](http://MODIFICATION.NET)

At the input at the bandpassfilter on RF-Unit for MW, 0.5 to 1.6MHz, a 10dB attenuator is located. This attenuator also is a current limiter for the diode D19.

By removing the attenuators three resistors and lead the diode current thru a inductor instead, the increased sensitivity is achieved. But important is to limit the current by changing the value on R119.

To do the mod:

1. R116 is exchanged with an inductor of 1mH.
2. R117 removed and shorted.
3. R118 is removed.
4. R119 is exchanged with 150 Ohm resistor.

All resistors are surface mount.

The result is that the sensitivity is increased in the 0.5 to 1.6 MHz range is changed from -103dBm to -112dBm at 12 dB SINAD,

70% AM.

My personal findings are that this do MW listening much more interesting and enjoyable and I have no problems with to strong signal distortion what so ever.

[SM4RNA Anders](#)

This modification is read 1124 times.

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**19-07-1998**

### **(IC-781) IC-781 General coverage transmit mod**

1. Remove power and ant.
2. Remove screws open case.
3. Locate and cut resistor r80 on logic b board.
4. Reset cpu.
5. Reassemble radio.

This modification is read 1007 times.

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**05-03-1999**

### **(IC-781) 781 ALC Circuit problem**

Icom 781 Date 13/05/97

The ALC circuit in the 781 is too slow to respond. This results in the following phenomenon: If you set the power level to 30W, for example, there is a leading pulse that can be more than 200W, particularly if the drive control is advanced. This results in a serious problem if you are using an amplifier. It makes it very difficult to limit drive to an amplifier properly.

This behavior is clearly seen on a scope and to some extent on a good peak-reading meter. However I suspect many hams are unaware of the problem as it does not show up on RMS meters due to the short duration of the spike.

I have used three 781's over the years ( ser# 19??, 21?? and now 2589) and they all exhibit the same behavior. This behavior is not exhibited by other Icom radios I have checked such as the IC751A, IC735 or IC765.

When I had my previous 781, the tubes in my amplifier, a Ten-Tec Titan using a pair of 3CX800A7's, developed shorted grids, even though they were only a few years old and lightly used. I suspected the 781 caused the failure, but sold it before the amplifier was repaired. I recently bought another used 781 from Burghardt radio, serial # 2589, and within 3 weeks of obtaining the 781, my tubes (less than 2 years old) are shorted again. I do not believe this is a coincidence! I run the amp conservatively, and I doubt the tubes have 50 hours transmit time on them.

I believe the problem is vaporization of the gold plating from the grid of the 3CX800 causing the tubes to become gassy, which causes arcing.

I spoke to Technical Support at Icom USA and was informed that the 781's just work that way and nothing can be done. That is a ridiculous answer! Of course it can be fixed, the attack time in the ALC circuit has to be shortened.

This turned out to be easy to accomplish....

Locate the following components connected to the base of Q34 in the ALC amp, R107, R108, C47 & C48. These determine the attack and decay time of the ALC amp.

Values as per Service manual:

|      |       |
|------|-------|
| R107 | 1M    |
| R108 | 100   |
| C47  | 2.2uf |
| C48  | .47uf |

Values as per Production ser # 2589:

|      |       |
|------|-------|
| R107 | 1M    |
| R108 | 100   |
| C47  | .47uf |

C48 2.2uf

Note that C47 and C48 have been swapped... a step in the right direction.

Values that work:

R107 1M  
R108 4.7K  
C47 2.2uf  
C48 .022uf - .1uf

.1 reduces the overshoot from 200%+ to 20%, .022 eliminates it almost completely. However, as the value of this capacitor is reduced, I'm concerned that IM products in the audio may start to increase due to syllabic compression of the RF envelope. I had no way to verify this.

Perhaps a project for a better equipped workshop! I would think .047 would be fine, though I'm using .022 without any noticeable degradation of audio quality.

Mel, VE2DC

This modification is read 908 times.

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**26-06-1999**

### **(IC-781) Reduce the internal heat by the speaker**

If you remove the internal speaker, you can reduce the internal heat generated therein by quite a measure!

LEE, KH6BZF

This modification is read 851 times.

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**19-03-2000**

### **(IC-781) Icom IC-781 filter modification**

**Author:** Adam Farson, VA7OJ/AB4OJ - [ab4oj@arrl.net](mailto:ab4oj@arrl.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Adam Farson, VA7OJ/AB4OJ, August 1999

The stock FL-96 (455 kHz SSB: 2,8 kHz wide @ -6 dB) can be replaced with an FL-44A (2,4 kHz wide @ -6 dB) to improve adjacent-channel selectivity and sharpen Twin PBT operation. In addition, the stock FL-102 (9 MHz, AM) can be replaced with an FL-223 (9 MHz SSB: 1,9 kHz wide @ -6 dB) to provide an SSB-NARROW bandwidth setting.

Here is the filter installation procedure:

(I would suggest that you purchase an IC-781 service manual from Icom Parts for guidance, if you do not already have one. Icom Parts should also have the FL-44A).

1. Remove the top and bottom case covers.
2. Lay the radio upside down on a towel, with the front panel facing you.
3. Using a magnetic-tip manual screwdriver with a #2 Phillips tip having rounded blade edges, remove all eleven retaining screws from the IF board (the board with all the filters).
4. Unplug the multi-conductor header cables from the board, to allow the board to be moved aside.
5. Grab the inner edge of the board, and swing the board away from the chassis. Do not stress coax cables on board. Rest board on a stand (e.g. 2 phone books) next to radio.
6. Locate FL-96. Using a solder-sucker or wick, and a temperature-controlled pencil iron, desolder 4 filter pins.
7. Remove nuts & washers from filter mounting studs. (I think the nuts are M3 or M4.)
8. Remove FL-96, wiggling it gently to free pins. You may need to re-heat pins quickly to release filter. The board is G-10, and can take reasonable heat.
9. Place FL-44A on board; tighten down studs with nuts & washers.
10. Re-solder pins of FL-44A; clean excess flux with nylon brush & isopropyl alcohol. Also ensure that there are no solder blobs or slashes.

11. Re-install board and all cables unplugged in Step 4.
12. Pull FL-102; insert FL-223, and flip 2 dip switches (per user manual) from AM to SSB.
13. Test radio, then replace covers.

Good luck! The whole job should take about 30 minutes. Note that the FL-223 is selected in USB or LSB mode by pressing the [WIDE] button.

This modification is read 967 times.

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**19-07-1998**

## **(IC-820) IC-820 Test results G3RUH**

**Author:** James Miller G3RUH

### ICOM's IC-820H - A Satellite User's Perspective

by James Miller G3RUH  
1994 July 18

#### Summary

The ICOM IC-820H will, "straight out of the box":

- Work terrestrial UHF or VHF all-modes simplex/duplex very sweetly
- Work SSB/CW transponding satellites OK, albeit with a somewhat clumsy human interface.
- Work satellite 1200 bps Pacsats OK, if you can accept doppler tracking with 100 Hz steps
- Work terrestrial 9600 bps packet \* perfectly \*

The ICOM IC-820H will NOT:

- Work 9600 bps satellites "outa the box". A mod is needed ...

The ICOM IC-820H has a number of positive features; beautiful construction, small size, excellent documentation, good frequency management - see text.

The ICOM IC-820H has a number of negative features to do with pre-amplifier and linear amplifier control, power output control, internal switches and coarse doppler tracking - see text for details.

#### Introduction

A while ago (June 1994) Icom-UK kindly loaned me a Icom-820H transceiver to evaluate. Like you, loads of questions came to mind. I wanted to know "what's the Icom-820H like? Is it really 9600 baud packet radio "data ready" outa the box? What about 1200 bps Pacsat use? Would PSK be decodeable? Would the VFOs track sensibly? Doppler tuning facilities? Satellite ready?". And many more.

This is not a full blooded QST review plastered with microvolts and decibels. That'll come from the ARRL Lab. But I have measured what I needed to know. I also assume the reader knows how to use a satellite, has a reasonable idea of what to expect from this sort of radio, and doesn't (say) need "reverse tracking" explained.

I'm recording the interesting differences between established practice as popularised by the Yaesu FT736R, and typical user expectation - mine.

#### First Impressions

The manual is a model of clarity. Outstanding. Yaesu please copy. The schematics are not quite up to Kenwood standard; need more annotation, frequencies, signal names and highlighted principal paths. This would help understanding a lot.

Anyway, I located the discriminator and varactor stuff OK, various internal switches etc, and things looked promising.

Then I connected up two dummy loads, switched on the radio, and played with all the knobs and buttons until I'd hacked the lot.

#### The Product

The IC-820H is a dual band 144/430 MHz full-duplex all-mode transceiver. It has 100 tunable memories, 10 tunable satellite memory pairs and six assorted others. Output 30-45 watts. "Mine" also had an extended receive range: 136 to 174 MHz which

was very useful. This feature is not documented in the manual.

The radio is small. It's 2/3rds the height, width and depth of a Yaesu FT-736R. But then it has no internal mains power supply, and neither will it accommodate two extra band modules like the Yaesu. It requires a 13.8 volt supply, about 16 amps, and is suitable for mobile operation. A microphone is not supplied and neither is a carrying handle.

In England the combined cost of the radio and a PS-55 supply (GBP 245) is about GBP 1940; an FT736R from the same dealer is GBP 1700. GBP = Great British pounds sterling.

### The Hidden Features

Being small there are only 32 buttons and knobs on the front panel compared with 67 on the Yaesu, so the lesser used functions, about 20 of them, such as dial dim, pre-amp feed control, RIT rate, CAT baud rate and so on are pre-stored via a configuration process. To invoke this requires the radio to be switched off and on again up to four times, which seemed unnecessarily clumsy to me. Some other functions are relegated to slide switches inside the radio, and adjustment requires you to remove the covers. This takes a few minutes. See later.

### Normal Tuning Management

The radio is organised around a Main Band and a Sub Band, each assigned to UHF or VHF or vice versa. You transmit on the Main band only. You receive on both Main and Sub simultaneously. There are duplicated volume and squelch controls; Main appears in the left headphone, Sub in the right; an internal switch allows these sounds to be mixed or separated. There is an internal speaker and there are two external loudspeaker sockets; smart wiring selects the expected sum/separated combinations.

Storing, retrieving and swapping frequencies and modes is a doddle.

Everything you could possibly expect is provided. Tuning rates are very sensible, and can be quickly adjusted from 1 MHz right down to 1 Hz resolution on SSB/CW, 100 Hz on FM. There are two VFOs each for VHF and UHF plus 100 tunable memories initially apportioned 50/50 between VHF and UHF, but you can alter this up to 80/20 either way.

The idiom is a little different from the FT736R's, and took practice to acquire, but within a couple of hours became second nature. I liked having both frequencies in view. The amber LCD display has very crisp characters and delights the eye.

Because you transmit on Main and receive on Sub, and can control each quite independently, you can (and do) operate satellites when in "normal" mode.

Unfortunately RIT, passband Shift and optional CW-Narrow do not work on the Sub band, i.e. on the full-duplex receive frequency. Neither do manual AGC fast/slow select nor the mechanical S-meter. Instead on Sub band, CW or SSB mode automatically chooses AGC fast or slow for you, and there's an LCD bargraph S-meter.

### Satellite Tuning Management

When you enter "Satellite" mode either the satellite VFO pair is used, or one of the 10 satellite memory pairs, or you can transfer the "Normal" frequency pair across (and back again when you leave).

When in satellite mode, Main and Sub band frequencies track together, either normal or reverse - as for example with Oscar-13 mode-B.

Alas, there is no proper "untrack" facility; to alter one frequency independently of the other you have to hold in one of two alternative front panel buttons whilst turning the main tuning knob. With practice I managed sort-of using my thumb and forefinger for the main knob, and third or fourth finger for the buttons; left handers would find it nearly impossible. It's really a two handed job, and is excruciatingly fiddly.

I discovered an undocumented kludge that partially obviated this; using the microphone Up/Down buttons, only one frequency changed. However the smallest step size from the mic buttons is 100 Hz. (See later).

In fact, to tune TX and RX independently you need to adopt a change of attitude to the radio. Just forget all about a so-called "satellite" mode!

Do your satellite operating in "normal", and only engage "satellite" when you want to do a quick bit of ganged tracking, or retrieve a frequency pair from the 10 satellite memories. I don't think this is how the designers envisaged things.

Intriguingly there is a blank button position actually marked Satellite, sandwiched between Normal and Reverse. I wonder why it's not fitted and called "Untrack"? Perhaps once it was.

As before, since satellite mode receive is on Sub band, passband Shift, CW-Narrow, manual AGC fast/slow select and mechanical S-meter are inoperable, but a RIT has been provided. (Does anyone ever use RIT?)

It would have been far, far better if there were a genuine "satellite" mode with Main receive and Sub for transmit. Main has the larger digits which are square in the middle of the radio and it's clearly the object of your visual, mental and operating focus. And of course Main has all the RIT/SHIFT/CW-N/AGC/METER controls working for it.

I really wish I didn't have to say this, but "satellite" mode looks at best to be an afterthought grafted on because the control microprocessor makes it easy. "It's only software".

The Yaesu FT726R first appeared ten years ago, the FT736R six, so the operational needs of satellite operators are well established. Why have Icom made such heavy weather of it?

### Preamplifiers & Linear Amps

You can send +10v up either, both or neither of the VHF/UHF antenna sockets. This supply is removed from the relevant socket on transmit.

The manual does not specify a maximum loading; I tried 100 ma and 200 ma and the voltage remained steady; at 330 ma it began to droop. The limit is set by dissipation in a PQ20VZ51 regulator on the display unit.

Other than this 10v supply, there is no provision for hard switching of pre-amplifiers or linear amplifiers unless you confine yourself to one band, when you can of course use the PTT line via the accessory socket. Serious operators will regret this omission. In contrast, the Yaesu FT736R has four control lines, one for each band.

Internal TX/RX changeover is by PIN diodes, so it's fast and silent.

### RF Power Control

The front panel sports a high/low power control button. Low power is 4-5 watts.

If you have an external linear amplifier or a transverter you need to be able to vary the output power continuously. There is no knob provided for this.

There is instead an ALC facility on the accessory socket. The control voltage is -4 to 0 volts into "more than 10K", but you must provide a supply and a pot to do this. And a box, and a place to put it. Tacky. There's some free space on the rear panel though ...

There are several ways to key this transmitter; there's the Tone button, mixed in with other frequently used buttons and easily hit. Then there's the bigger Transmit button, and the normal PTT (mic or TNC). More than once I accidentally hit the Tone button, sending a minimum of 4 watts skywards. That would have wiped out my S-band converter had it been connected.

### RF Attenuators

You can attenuate the RF input of either or both receivers, by 15db, from a front panel button. This is in lieu of a (big) RF Gain knob, and an excellent feature. Many preamplifiers have far too much gain; an S-band pre-amp plus converter most certainly does. Being able to cut the signal down to size prevents cross modulation and overloading.

### Digital Satellite/Terrestrial Operation

Before describing this, it's necessary to tell you how the data input and output audio is routed, because it is not unconditional. You might like to draw yourself a little sketch.

Both signals are presented to the 8-pin DIN Accessory socket on the rear panel.

The incoming transmit audio (TXAudio) passes through a slider switch marked PACT/AMOD :

- In the AMOD position the TXAudio passes to the Main subsystem where it meets up with the regular pre-amplified microphone sound for use in FM or SSB modes, and then through some audio processing.
- In the PACT position the audio goes directly to the varactor diode of Main's FM section.

The receive audio (RXAudio) also passes through the PACT/AMOD slider switch:

- In the AMOD position, RXAudio is picked up from either the Main or Sub receiver, according to the setting of another internal slider switch marked MAAF/SAAF, and is squelched.
- In the PACT position the audio is collected directly from the discriminator of the Main FM circuit, via a 4k7 resistor and 100nf coupling capacitor. It's unsquelched of course.

These switches are not accessible without removing the bottom cover. An access hole could surely have been placed next to the accessory socket, which would allow these switches to be tickled with a small screwdriver. Users will probably drill a couple of holes in the bottom, or cut away some of the underside ventilation grille.

But why should you need to touch them at all? Read on ...

### 1200 bps PSK Satellites

FO-20, PacSat, Lusat and Weber require an FM uplink, to which is applied audio PSK. The downlink is conventional carrier PSK, and the system is full duplex. Therefore the internal switches must be set to AMOD and SAAF (see above).

The uplink "eye" as received at the satellite is OK; it's pinched about 4 db. Remember the TXAudio has been through the regular FM modulator circuits. It's a good idea not to yell into the microphone at this time, unless the Mic gain pot is at minimum, since both signals are added. If you flip the MOD switch to PACT the uplink modulation is text-book perfect, but then you lose your

Sub band PSK receive audio! You get Main FM. Grrr!

Downlink 1200 bps PSK reception from the Sub band receiver is excellent, as too is Oscar-13's 400 bps telemetry signal.

The only snag with these PacSats is doppler tracking the PSK signal. (See later).

### 9600 bps DFM Satellites

Uosat-22, KitSat-23 etc require the TXAudio to be applied direct to the transmit FM varactor. RXAudio must be picked off directly from the FM discriminator, and the system is full duplex.

Thus the internal MOD slider switch needs to be set to PACT. But that immediately picks up the wrong RX audio - from FM Main's discriminator. For satellites we need FM Sub's discriminator output.

Consequently you CANNOT operate the 9600 bps satellites with an Icom IC-820H "straight out of the box".

There is a solution, but we're back to modifications I'm afraid.

What you do is locate the Sub receiver discriminator IC20, pin 9 and fly that signal out on your own lead. This requires you to remove the big PCB called Main Unit, turn it over and do some fine re-work among the Sea of SMD. Alternatively you can pick up a downstream version of the signal without removing the PCB at the optional tone-squelch unit-B socket J20, third pin from the "J". Incidentally this signal is DC coupled to the discriminator chip, so you can implement closed-loop AFC externally using one of the many published circuits. The source impedance is 47K (R329).

I checked Uosat-22 and KitSat-23 on Sub-band using this modification. The UO-22 "eye" is poor when it leaves the satellite, with a lot of LF flutter which has always made decoding difficult. But the 9600 bps performance of the Sub band receiver is so good it adds little extra aberration and data decoding was quite satisfactory. The KitSat-23 "eye" was wide open, and data detection perfect.

Since there is no AFC indication for Sub band, tracking the changing doppler shift unaided requires either very good judgement, an external system as above, or computer control.

Oh, and once again set the mic gain to zero, or microphone sounds will be added to your transmission.

### 9600 bps DFM Terrestrial

Terrestrial 9600 bps packet works perfectly, "right outa the box".

Over the last six years I've tested innumerable radios for 9600 bps operation. The Icom IC-820H now shares top place with Kantronics' D4-10. (The latter is however 2-channel, crystal controlled and UHF only).

9600 bps packet requires the TXAudio to be applied direct to the transmit FM varactor. RXAudio must be picked off directly from the FM discriminator, and the system is simplex.

Thus the internal MOD slider switch needs to be set to PACT, which also selects RXAudio from FM Main's discriminator.

The transmitter circuit's frequency response is from about 15 Hz to well beyond 6 kHz, so the outgoing signal has superb fidelity.

If the drive signal exceeds 1.6 volts pk-pk, corresponding to about +/- 5 kHz deviation, modulation is switched off abruptly and stays off until you reduce the drive. A nice touch. The correct drive level is 1 volt pk-pk for +/- 3 kHz deviation and I confirmed this by measurement.

The FM Main and Sub receive circuits are similar. Main uses a pair of Icom part no. FL-211 crystal roofing filters (no spec) and a muRata SFH455E ceramic final filter; Sub uses a pair of FL-212 and the muRata CFW455E. The "E" suffix means 15 kHz bandwidth. The SFH types have particularly flat delay characteristics, and are pin compatible with the more common general purpose CFW series.

Main's fidelity is outstanding, with a flat frequency and delay response to over 6 kHz. The "eye" was essentially perfect. You can be mistuned by up to +/- 4 kHz before the "eye" starts to look mangled, and +/- 5 kHz if the packets are short. The Sub receiver is almost equally good, but you can't get at it without modifying the radio as described earlier.

No quibble with Icom's claims here; 9600 bps simplex works 101%.

### PSK Satellite Doppler Tracking

When using a 1200 bps PSK digital satellite such as FO-20, PacSat, Lusat or Weber it is essential that the PSK modem can control the radio receive frequency in a closed loop fashion, preferably in small steps. The universal means of doing this is via the Up/Down buttons of the microphone socket.

The smallest step from the mic Up/Down buttons of the IC-820H is 100 Hz. This really is too big, as the sudden lurch from one frequency to the next will invariably cause momentary loss of demodulator lock, with attendant corrupted characters.

The Up/Down line is also accessible from the accessory socket, but it shares a pin with the ALC control. You select which from an internal slide switch.

There seemed to be no way of changing the mic button step size to smaller than 100 Hz. An oversight?

### RS-232 Control

Icom's system is called CI-V (Communication Interface 5), and is accessed by a rear panel jack with a bi-directional service. The voltage is TTL ish. You're supposed to buy the CI-V interface which converts to RS232 levels, and also, I assume, de-multiplexes the input and output. The manual only provides a limited description of the control codes required; I guess a full treatise comes with the interface. In particular I couldn't determine what frequency resolution is available via RS-232 control.

### Other Observations

1. There is a miniature 40mm fan inside the PA section which comes on when the radio is too hot, and the TX is keyed. I spotted the fan on the schematic, but I couldn't find it inside the radio until I provoked it into action during a megabyte file transfer at full power and a 75% duty cycle. The noise is less than a typical computer's.
2. If you want to use speech you must switch your TNC off or disconnect it from the accessory socket, otherwise your speech will be obliterated by data. This is not mentioned in the manual!
3. There is no VOX system.

### Witticisms

The manual is beautifully laid out, with explanations crystal clear, quite devoid of Janglish. Fortunately two useful tips escaped the proof-readers:

IF Shift Control, page 24:

"Especially in CW mode, a mechanical noise may sound when rotating the [SHIFT] control, however, it is not a transceiver malfunction."

I'm still decoding that one.

Satellite Notes 1., page 35:

"NEVER set the output power too high. Too much power will shorten the satellite's life." Ah so.

### Conclusion

The IC-820H wasn't really designed with satellite operation as its primary application. It's unlikely to win the hearts of serious satellite users, in the same way as Yaesu's FT736R, mainly because of its lack of flexibility.

But an average user who wants to try out transponding satellites such as Oscar-13 will find it a satisfactory starting point. With the Pacsats, 1200 bps doppler tracking is awkward, and 9600 bps full duplex operation requires you to modify the radio.

The IC-820H is a nice radio if your needs are normal VHF/UHF operating, although serious VHF/UHF users will bemoan the lack of control over external equipment. It is also fine for low speed data transmission, and is the first general purpose radio that provides 9600 bps packet radio simplex capability straight out of the box, at which it excels.

### Acknowledgement

My sincere thanks to Dennis Goodwin at Icom-UK for the IC-820H loan.

(C)1994 James Miller G3RUH

This modification is read 820 times.

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**19-07-1998**

**(IC-820) 1750Hz on IC-820, modif**

Here a description how to activate the 1750Hz tone call with a US IC-820

I've made those modifications with a IC-820 #13 (written on the cover)

1. remove the top and the back cover of the 820.
2. remove the 2 screws on the left and on the right on the front panel Now you see the printed circuit board which is on the other side of the front side of the 820.
3. locate the 8 diodes located near the U-shape hole on the circuit. starting from the hole they are :

/-----  
I     I     D D D D D D D D

I  
I



```

I      I      2 2 2 2 2 2 3 2      ---
I      I      2 5 3 6 4 7 0 8      all diodes : /
                                     -----
                                     I
                                     I

```

D22 : When soldered, Europe version, activate the 1750  
D25 : When not soldered, RX on VHF from 136 to 174 MHz  
D23 : When soldered, USA version, activate the Sub-tone on TX  
D26 : When not soldered, RX on UHF from 420 to 460 MHz  
D24 : ? who knows ?, not soldered  
D27 : When not soldered, TX on VHF from 136 to 174 MHz  
D30 : When soldered, activate the transponder  
D28 : When not soldered, TX on UHF from 420 to 460 MHz

The initial matrix on a US-820 (from D22 to D28) OFF ON ON ON OFF ON OFF ON  
on a European 820 ON ON OFF ON OFF ON OFF ON

4. to activate the 1750, remove the diode on D23 and put it on D30. You don't need to either reset the 820 or remove the battery. You have now a quiet 1750Hz when you push the TONE button, and a standard Europe bandwidth on VHF and UHF (144-146, 430-440 MHz)
5. Now we need to boost the modulated 1750Hz, to do so, you have to short two resistors : R80 100k, located near J16,J1 which is between R79 and R29. Also R17 1k, located near IC11, IC8.
6. Now the level is near to correct. If you wish, you could trim with R64. It's an adjustable resistor marked STBN located on the large printed circuit board on the bottom of the 820.

Remember that you lose the capability of sub-tone on TX (CTCSS), but not on RX, if you have the optional module installed.

What to say more ? It's works fine on my old-US-820 !!!

Please leave me a message on my BBS, if you need more informations !

73 de Francois HB9IBI @ HB9IAP.SROM.CHE.EU (old HB9RTE)

This modification is read 741 times.

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**23-11-2001**

### **(IC-820) ICOM IC-820H extended receive/transmit modification**

This modification is to open the IC-820H for extended receive (and transmit) operation. This is a two (four) step modification which will open the IC-820H to the following frequencies:

```

VHF Band    136 - 174 MHz
UHF Band    420 - 460 MHz

```

These frequencies are not guaranteed for accuracy or sensitivity.

1. Remove Diode D25 on logic board for VHF RX Expansion.
2. Remove Diode D26 on logic board for UHF RX Expansion.
3. Remove Diode D27 on logic board for VHF TX Expansion. \*
4. Remove Diode D28 on logic board for UHF TX Expansion. \*

\* RX modification must be done before the TX modification will work. \*

This modification is read 723 times.

[top of page](#)

**23-11-2001**

### **(IC-820) ICOM IC-820H cross band repeat modification**

Add a diode on the blank position between D27 & D28 on the Logic Board. The part is 1SS353 P/N 1750000390.

### After hardware modification

1. Set lock mode. Push [LOCK]
2. Turn Power off.
3. Hold [M/S] and turn radio on.
4. Turn repeater off. Push [LOCK].

**Note:** If you removed Diode D25 or Diode D26 in the first modification then it can be used in the second modification as it is the same part.

This modification is read 698 times.

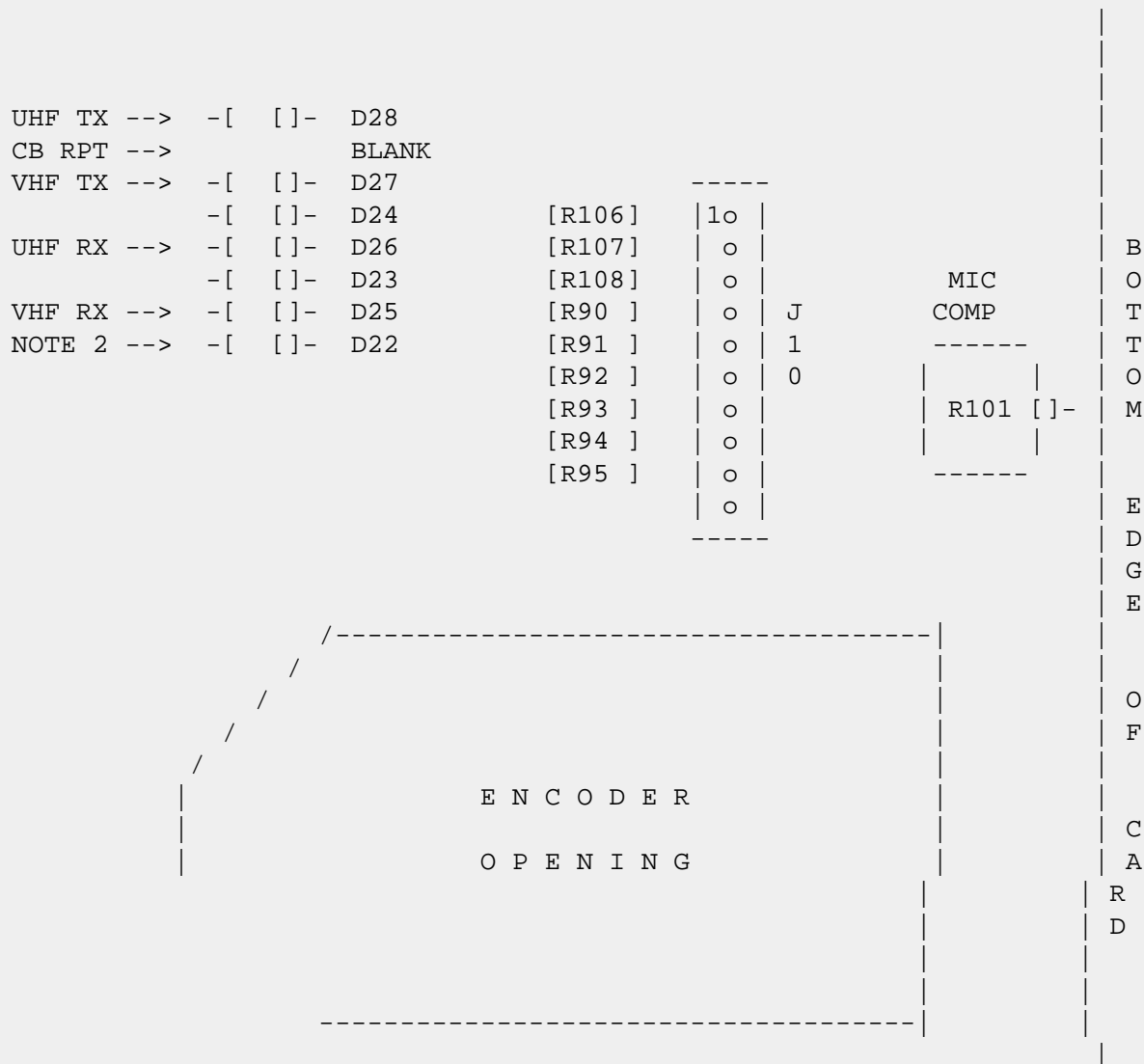
[top of page](#)

**23-11-2001**

## (IC-820) IC-820H display board

The following is a partial, not-to-scale, parts placement layout of the IC-820H DISPLAY UNIT circuit board (bottom view). The DISPLAY UNIT is the large circuit board that is located directly behind the front panel. Locating the following four distinctive parts will ensure you have the right diodes: the main dial encoder, the microphone compression level variable resistor (R101), J10 a ten pin header and a row of surface mount resistors immediately above J10.

**CAUTION:** These diodes are NOT labelled sequential! Ensure you are certain of which diode you wish to remove.



**Note 1:** The IC-820H Service Manual calls this board the "DISPLAY unit" and the modifications call it the "logic board"; they are one and the same.

**Note 2:** Diode D22 is listed as "[EUR],[AUS] only" in the IC-820H Service Manual.

This modification is read 703 times.

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---- gar keine Diode ---- Breitband mit Ton-Encoder

USA: 144-148 und 430-450 Subaudible Tone-Encoder

EUR: 144-146 und 430-440 1750Hz

Breitband: 136-174 und 420-460 (RX und TX)

**Daher:**

Alle Dioden bis auf D102 entfernen. Wird auf den 1750-Tonruf verzichtet, auch D102 entfernen, so daá alle Dioden entfernt sind. Es geht dann der Subaudible-Ton-Encoder (nicht ..-Decoder!).

Ergebnis: RX/TX-Breitband w.o., FM-Raster 5kHz/1kHz in VHF und UHF.  
Es empfiehlt sich ein CPU-Reset mit Neuparametrierung.

Wegen der SMD-L"terei braucht's schon ein ruhiges H,,ndchen, den richtigen L"tkolben mit der passenden Spitze, eine Pinzette, ggf. Arbeitslupe und zur Beruhigung einen Schluck Bier vorher (oder zwei).

Alle Angaben ohne Gew,,hr - versteht sich!

Quelle: IC821H Service-Manual

This modification is read 801 times.

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**05-10-2000**

## **(IC-821) ICOM IC-821H X-Band mod**

**Author:** Mark - [pe3hmp@hotmail.com](mailto:pe3hmp@hotmail.com). [MODIFICATION.NET](http://MODIFICATION.NET)

This mod can also be found on [www.qsl.net/pe3hmp](http://www.qsl.net/pe3hmp).

On this page is the x-band (crossband) repeater mod discribed for the ICOM IC-821h allmode dualband tranciever with photo's

I have not done this mod myselfe (yet) the schematics come from ICOM europe and the mod has been tested by Wolfgang DJ9JY.

You need to locate the row of diodes on the display board, for that You need to remove top and bottom covers of the 821 (discribed in Your owners manual on page 50 and remove two screws witch hold the front of the 821 and turn the 2 other screws 1/4 loose so You can pull the front towards You (about 5cm)

Now You have to solder a diod in to the space reserved for D108. (1ss355) You can use one of the diods you have removed (d101-d107)

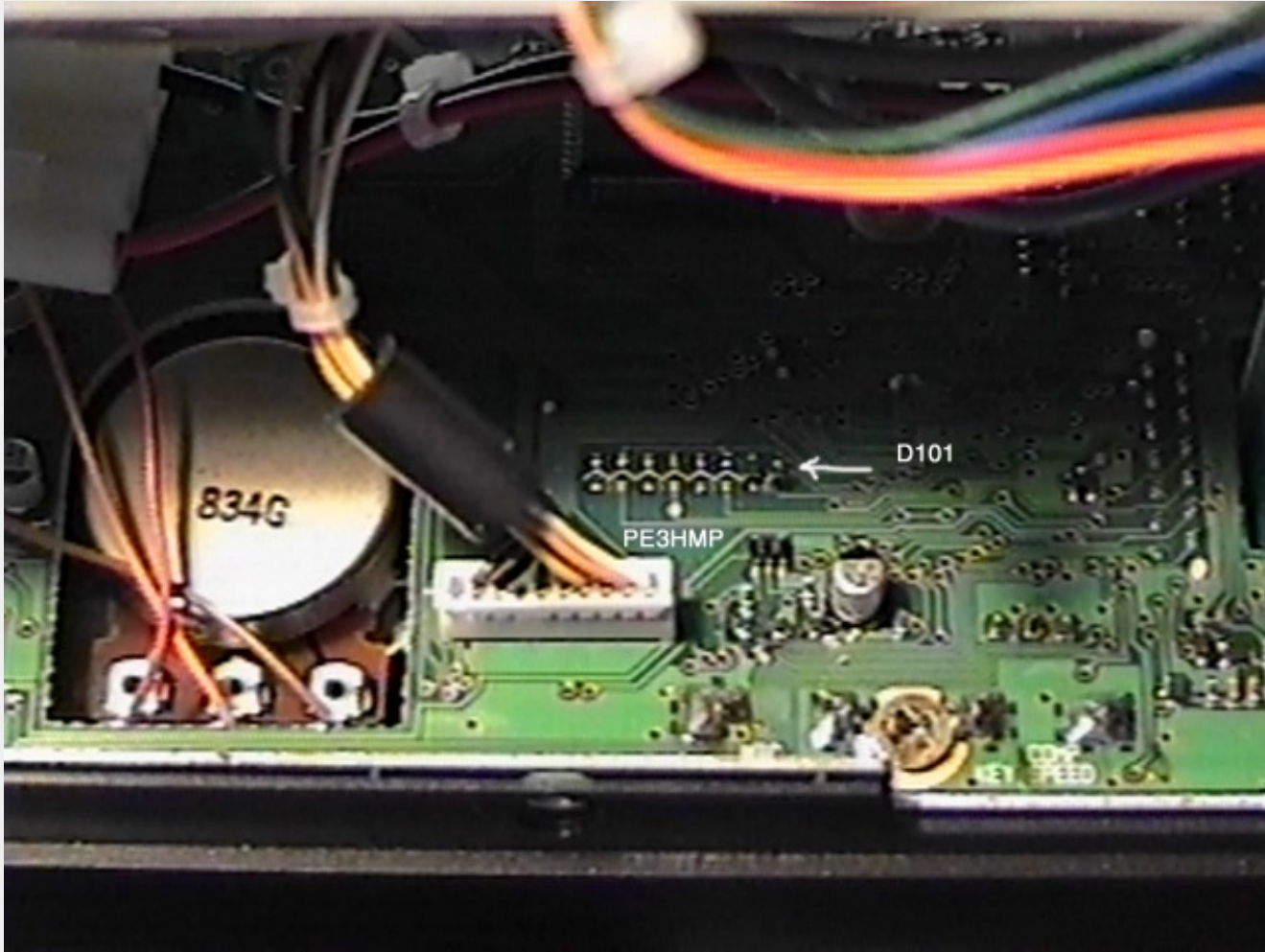
As far as I know D108 is never in place as it leaves the factory.

If this is Your first attempt to solder annything I would suggest to leave it untill You have alot of practice

In this drawing You see were D108 should be placed

[Click for big view](#)

This is a colour photo where the diodes can be found , D108 is on the left, D101 is on the right



After soldering D108 into place you will have to do the following to get the x-band repeater to work:

1. Turn ON the power switch.
2. Set the both band desire frequency at dial
3. Set [LOCK] function (see instruction manual)
4. Turn OFF the the power switch
5. Push [M/S] key and turn on power switch.
6. You can stop pushing the [M/S] key now (LOL)

This enabels the x-band repeater

To disable the x-band repeater just push [LOCK] to release lock function.

This modification is read 899 times.

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**17-02-2001**

## **(IC-821) Icom IC-821H mods**

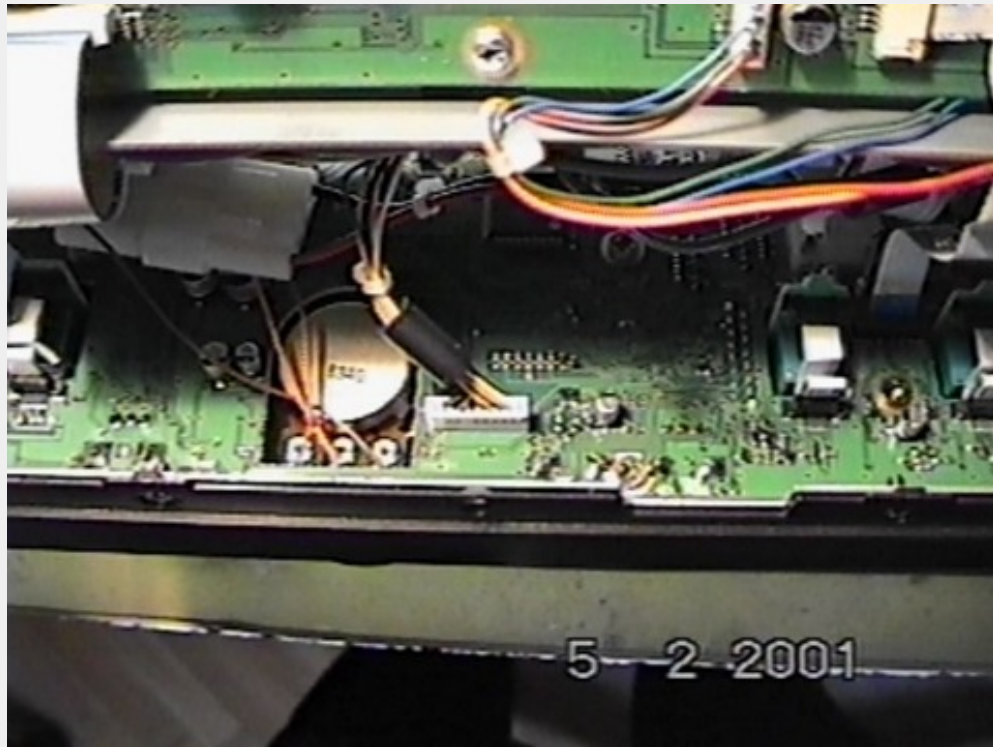
**Author:** Mark - [pe3hmp@hotmail.com](mailto:pe3hmp@hotmail.com). [MODIFICATION.NET](http://MODIFICATION.NET)

On this page is the rx/tx modification discribed for the ICOM IC-821h allmode dualband tranciever with photo's. You can also find this modification on [www.qsl.net/pe3hmp](http://www.qsl.net/pe3hmp).

I have done this mod myselfe but If You do annything wrong I'm not responsible !!

You need to locate the row of diodes on the display board, for that You need to remove top and bottom covers of the 821 (discribed in Your owners manual on page 50 and remove two screws witch hold the front of the 821 and turn the 2 other screws 1/4 loose so You can pull the front towards You (about 5cm)

Now You have enough space to carefully remove the diodes.



can You find them ? (they are SMD diodes)

Removing D101 gives You 136 - 174 Mhz (RX)

Removing D103 gives You 420 - 460 Mhz (RX)

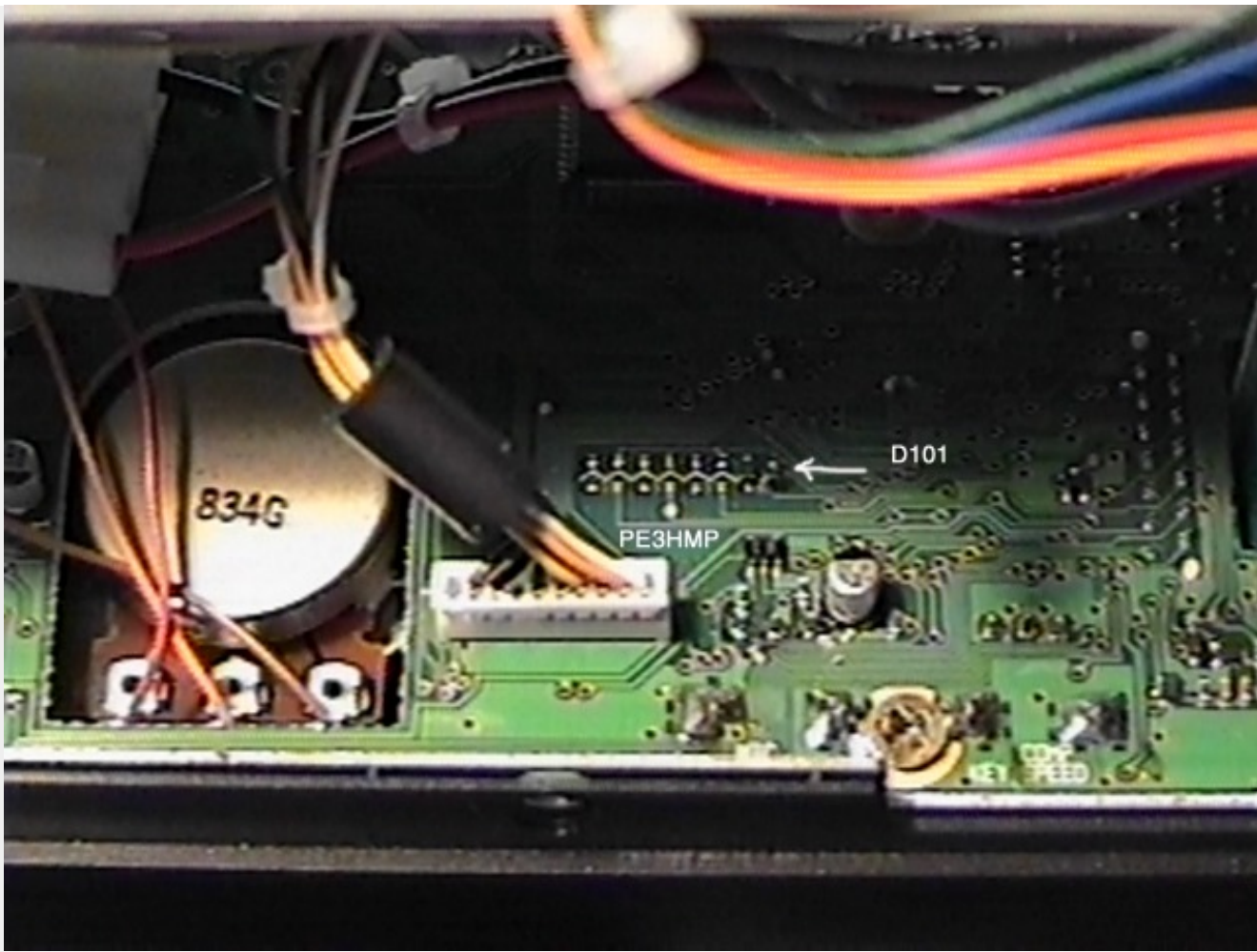
Removing D105 gives You 136 - 174 Mhz (TX)

Removing D107 gives You 420 - 460 Mhz (TX)

And then You will have to make a choice: leaving the D102 diode in place for 1750Hz tone when You press the tone button on the front, or if You remove D102 You can use the subaudio tones (like the ones used at some european repeaters) but no 1750Hz tone.

If this is Your first attempt to solder annything I would suggest to leave it untill You have alot of practice, make sure You have a small soldering tip and some pliers then gently heat one side of the diode and lift that side up, I would suggest leaving the diod hanging there (only connected to one side) in case You want to restore the 821h to its original state.

I removed ALL diodes so now I have RX/TX 136 - 174 Mhz and RX/TX 420 - 460 Mhz and subaudio tones.



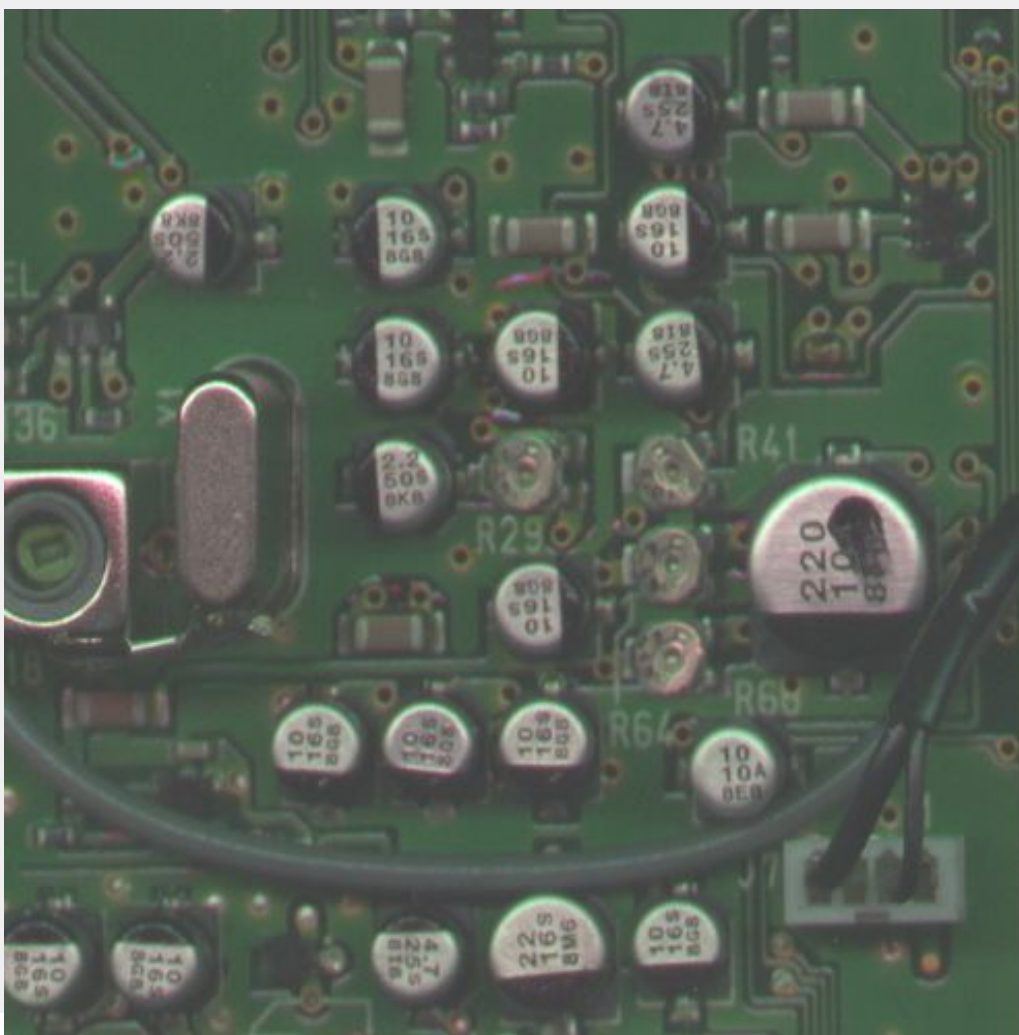
On this photo You can see were the diodes used to be.

After I had done the mod there occurred a problem, the subtone's deviation was too high because the same pot is used for the deviation of the 1750Hz burst tone in the european models, the deviation should be about 1/3 of that of the 1750Hz tone (about 0.6Khz).

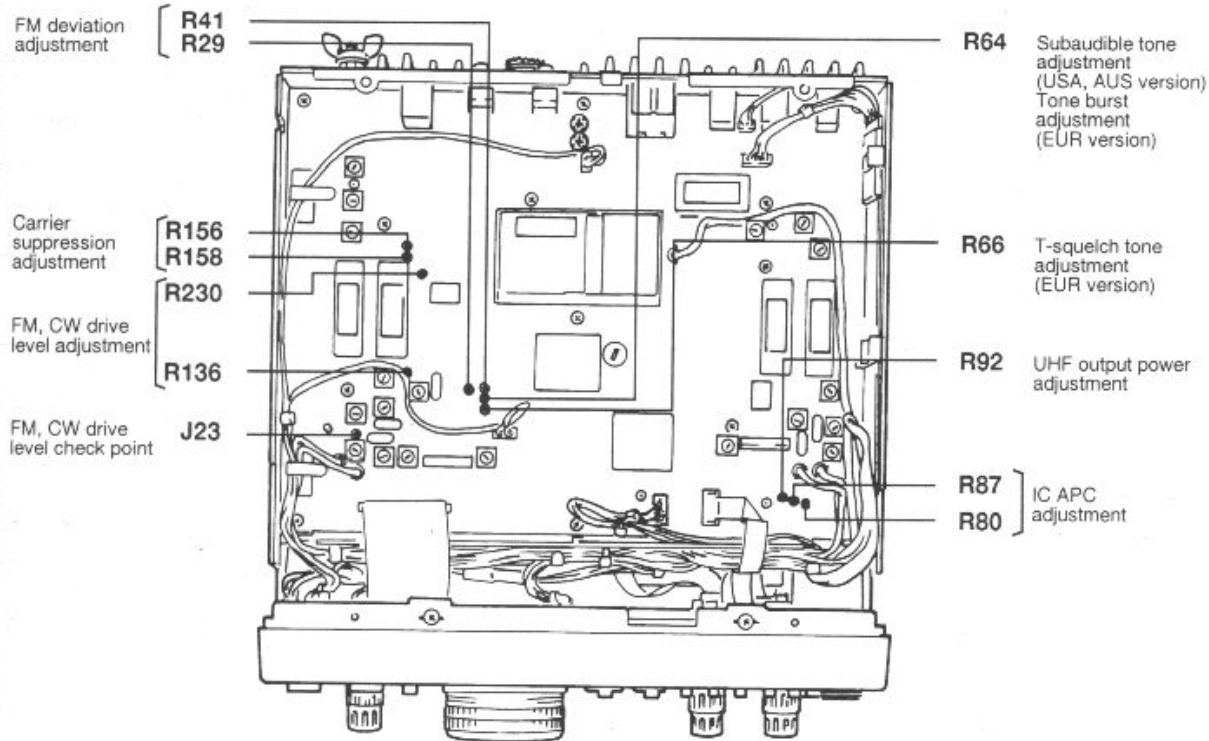
If You have a second receiver just connect a voltmeter over the speaker of Your second receiver (not the 821) and note the meter readout then adjust R64 for 1/3 of the first signal (after the mod You now have a usa+ version).

Where can You find R64 ? well just look at the following photo's and You will find the R64.

Thanks to Amanda G7TUA / MODZO for giving me the info about the subtones (I do not have the service manual yet).



• MAIN UNIT



|                                     |   |   |            |   |           |      |     |
|-------------------------------------|---|---|------------|---|-----------|------|-----|
| T-SQUELCH TONE (EUR version)        | 1 | <ul style="list-style-type: none"> <li>• MAIN band freq. : Any</li> <li>• [TONE SQL] : ON</li> <li>• Tone frequency : 87 Hz</li> <li>• Applied no audio signals to the microphone connector.</li> <li>• Transmitting</li> </ul> | Rear panel | Connect an FM deviation meter to the transmitting band's antenna connector through an attenuator. | ± 0.6 kHz | MAIN | R66 |
| SUBAUDIBLE TONE (USA, AUS versions) | 1 | <ul style="list-style-type: none"> <li>• MAIN band freq. : Any</li> <li>• [TONE] : ON</li> <li>• Tone frequency : 87 Hz</li> <li>• Applied no audio signals to the microphone connector.</li> <li>• Transmitting</li> </ul>     |            |   |           |      | R64 |

Well this should make things very easy for You, If there are any problems or suggestions please e-mail me:

[PE3HMP@hotmail.com](mailto:PE3HMP@hotmail.com). [MODIFICATION.NET](http://MODIFICATION.NET)

This modification is read 935 times.

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**19-07-1998**

**(IC-900) ICOM IC-900 Out of Band Modifications**

| BAND    | OPERATING FREQ | MATRIX CIRCUIT LOCATION                 | CONDITION |
|---------|----------------|---|-----------|
| 28 Mhz  | 28 - 40 Mhz    | Remove D33 (3-B)                        | RX Only   |
|         |                | Remove D33 (3-B) & Install Diode at 3-A | TX/RX     |
| 50 Mhz  | 40 - 54 Mhz    | Remove D32 (4-B)                        | RX Only   |
|         |                | Remove D32 (4-B) & Install Diode at 4-A | TX/RX     |
| 144 Mhz | 138 - 174 Mhz  | Remove D27 (1-D)                        | RX Only   |
|         |                | Remove D27 (1-D) & Install Diode at 1-C | TX/RX     |
| 220 Mhz | 216 - 236 Mhz  | Remove D26 (2-D)                        | RX Only   |
|         |                | Remove D26 (2-D) & Install Diode at 2-C | TX/RX     |
| 440 Mhz | 420 - 470 Mhz  | Remove D25 (3-B)                        | RX Only   |
|         |                | Remove D25 (3-B) & Install Diode at 3-C | TX/RX     |



Diodes are 1SS-211 or any high quality silicon signal diode Matrix is located at display-B of EX-601 remote controller.

|     |     |     |     |     |     |     |     |   |
|-----|-----|-----|-----|-----|-----|-----|-----|---|
| D36 | D32 | D28 | D24 | D20 | D16 | D12 | D8  | 4 |
| D37 | D33 | D29 | D25 | D21 | D17 | D13 | D9  | 3 |
| D38 | D34 | D30 | D26 | D22 | D18 | D14 | D10 | 2 |
| D39 | D35 | D31 | D27 | D23 | D19 | D15 | D11 | 1 |
| A   | B   | C   | D   | E   | F   | G   | H   |   |

All changes are made in the control head.

Diodes are arranged in a 8x4 array: A-H, 1-4.

As shipped from the factory, the diodes are arranged thusly:

X = diode in place

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
|   | X | X |   |   |   |   | X | 4 |
|   | X |   | X |   |   |   |   | 3 |
|   | X |   |   |   | X |   | X | 2 |
|   |   |   |   |   |   |   | X | 1 |
| A | B | C | D | E | F | G | H |   |

To add receive coverage on 6 meter and 70 cm bands only:

C= cut diode, or remove

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
|   | C | X |   |   |   |   | X | 4 |
|   | X |   | C |   |   |   |   | 3 |
|   | X |   |   |   | X |   | X | 2 |
|   |   |   |   |   |   |   | X | 1 |
| A | B | C | D | E | F | G | H |   |

440 Band - to expand coverage from 420 - 470 MHz:

Remove diode D25 (3,D) for RX

Install diode in (3,C) for TX

VCO in 440 module covers a 20 MHz range - re adjust as needed.

220 Band - to expand TX coverage from 216 - 236 MHz:

\* This mod hasn't been tried and verified. \*

Install diode (1,C) for TX

Remove diode (2,D) - ?

144 MHz Band - to expand TX coverage from 138 - 174 MHz:

Install diode in (1,C)

50 MHz Band - to expand coverage from 40 - 54 MHz:

Remove diode D32 (4,B) for RX

Install diode in (4,A) for TX

28 MHz Band - to expand coverage from 28 - 40 MHz:

Remove diode D33 (3,B) for RX

Install diode in (3,A) for TX

Mobile extender (cross band link) operation:

Install a diode in position (1,A) in the control head.

Open the Interface A unit, and look for two switches near where the optional tone and digital squelch boards go. (next to the "option 1" space) Put these two switches in position 2, then reassemble unit.

To operate as a crossband link:

Set radio in VFO mode, and select frequencies (simplex mode) in the two bands of interest, then turn on the "lock" switch on the side of the control head. The "lock" indicator on the LCD display should blink.

A signal received on band 1 will be repeated on band two, and vice versa. For example:

223.500 MHz <=====> IC900 <=====> 146.520 MHz

The frequencies on the display will swap back and forth depending on the frequency being transmitted at the time.

-----> IC900 Modification Corrections <-----

#: 79969 S7/Vendor Support  
16-Aug-88 23:54:53  
Sb: IC900.MOD Correction  
Fm: Larry A. Bronstone 72667,3201  
To: sysop (X)

I just downloaded the file IC900.MOD and noticed a few errors.

1. On the 220 band install a diode at 2C not 1C (1C is for the 144 band).
2. The diagram showing the stock matrix layout has a diode at 2H. The diode is actually at 3H. As a point of clarification

removing diodes 4B, 3B and 3D gives maximum receive coverage on all bands. The diode that ICOM uses on their matrix board is 1SS211. The matrix is inside the REMOTE CONTROLLER along with all of the memory settings. MINI-REPEATER instructions (addition of diode 1A on matrix and (S1 & S2 both in position 2 - interface unit A).

1. Both frequencies in the MAIN and SUB bands must be in the SIMPLEX mode.
2. The LOCK switch acts as the repeat on/off switch. With the LOCK switch activated, the LOCK indicator will flash.
3. When a signal is received on the SUB band it will be retransmitted on the MAIN band. If a signal is received on the MAIN band, the unit will reverse the MAIN and SUB frequencies, then retransmit on the MAIN band.
4. If either of the band units have DUP activated, the LOCK switch will function as normal. The LOCK switch disables the front panel controls when activated even in repeater mode.
5. The MINI-Repeater operation will also operate if the optional tone units are installed, however, both bands to be used in the Mini-Repeater operation MUST have the option installed and activated.

This modification is read 546 times.

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**23-08-1998**

## **(IC-900) IC-900 Memory Expansion Modification (Preliminary Rev II)**

This modification, done to the controller head, will double the amount of available memories to two banks of ten memories per band.

Remove the screw from the back of the control head, and carefully open the unit. Remove the five screws holding the "Display B" unit board to the rear cover, and unplug the white three pin connector that goes to the "beeper".

Locate IC2, the 24 pin RAM chip on the back of the board. Carefully cut the small etch between pins 19 and 20. Solder a #30 wire about 6 inches long to pin 19, (address bit 10). Solder a 22K 1/4 resistor to the cathode of D5, (1N4002). This is a good "pullup" voltage. Locate this resistor next to D5, on the top side of the board. Connect the wire from pin 19 of IC2, and another 3 inch long #30 wire to the other end of the 22K resistor. (Trim the wires as needed).

The "DIM" switch is connected to two fine etches that go between diode D5 (1N4002) and the rectangular cutout on the board. Carefully cut these two etches, removing at least a 1/16 inch section of each etch. Carefully scrape about 1/16 inch of the green varnish on the "upstream" side of these two etches (one of them is connected directly to the cathode of D5. Bridge these two etches together. (The display will now be only "bright", but this is no real loss, since the display isn't all that bright anyway).

On the bottom side of the board, there are three pads for the "DIM" switch, with two of them connected together. There will be a glass zener diode (D2) across this switch. Remove this diode. Solder a short piece of wire from these two pads to a convenient ground point on the board. Solder the 3 inch piece of wire from the 22 K resistor to the third pad of the DIM switch. When the DIM switch is in the "bright" position (down) the memory will contain the original data. If the switch is in the "dim" position (up), then the second bank of memories can be loaded and used. Combined with the RX and TX expansion mods, this is a good way to have the first bank loaded with ham band freqs, and the second bank filled with police/fire/whatever channels.

The new bank of memories will read 999.9995 MHz when first called up, and will have to be loaded with the desired frequencies, offsets and PL tones. (This is not a way to open up the RX to receive the 800 - 950 MHz band, unfortunately). Ed Brown KB1MZ

This modification is read 486 times.

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**19-07-1998**

## **(IC-901) IC-901A Frequency Ranges**

Here are the frequency coverage ranges for the various band modules and the modifications to the control head diodes to get these extended ranges:

| Band | Range (MHz) | RX diode  | TX diode  |
|------|-------------|-----------|-----------|
| 10m  | 28-40       | 24 out    | 21 in     |
| 6m   | 40-54       | 28 out    | 26 in     |
| 2m   | 138-174     | no change | 18 in     |
| 220  | 216-236     | no change | 12 in     |
| 440  | 400-479     | 25 out    | 23 in     |
| 1200 | 1240-1300   | no change | no change |

To modify, remove the back of the control head and add or remove diodes from the marked pads as described in the above table.

### **Notes:**

coverages are for RX. TX may not work over entire range, but will come close. RX sensitivity is front-end tuning dependant. 10m, 6m, 2m and 1200 modules will have OK RX sensitivity over most of their range. 220 RX sensitivity is unknown over its' range. 440 RX sensitivity will cover about 25 MHz with good sensitivity, tuning out of the box is from about 438-463. The 3 helicals can be retuned to any where in the 400-479 MHz range, but you can still only get the 25 MHz or so spread. If you have severe intermod problems while listening to 440 MHz frequencies, I would recommend retuning the helicals down in frequency to attenuate the strong 450-460 MHz signals from the front end.

The intermod will almost completely go away. Of course, the sensitivity above 450 MHz will suffer, but most of the signals you would probably be interested in listening to will probably be quite strong to start with, so you will probably still hear them just fine. If you have access to a tracking generator and spectrum analyser, there is a small two pin jack on the UHF board from which you can monitor the helical response. Connect the tracking generator to the antenna jack and the spectrum analyser to the two pin jack.

This modification is read 602 times.

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**19-07-1998**

## **(IC-901) Memory and microprocessor reset**

Memory and microprocessor reset - turn power on while holding down check and memory write buttons.

This modification is read 521 times.

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**19-07-1998**

## **(IC-901) Crossband repeat**

Crossband repeat - turn power on while holding down check and lock buttons. If crossband repeat has been engaged, the "lock" display will flash. PL can not be selected in either band for crossband repeat to work.

If you need PL to operate the repeater you are linked to, generate it on the radio you are using to talk to the 901. The PL will pass through the 901 just fine to access the linked system. Since the radio is in the locked mode, you can't change frequencies or bands during crossband repeat.

To disengage crossband repeat, turn off power or press lock button. If there is no audio during crossband repeat, open up the front of the dual-band unit by removing the plastic cover behind where the control head would plug in if the 901 is not used in the remote-control head configuration and look for a slide switch mounted on the edge of one of the vertical circuit boards and slide it the other way. The switch does not seem to come in any pre-determined configuration from ICOM, so some radios work OK for crossband repeat right out of the box, and some require the switch to be in the opposite position.

This modification is read 548 times.

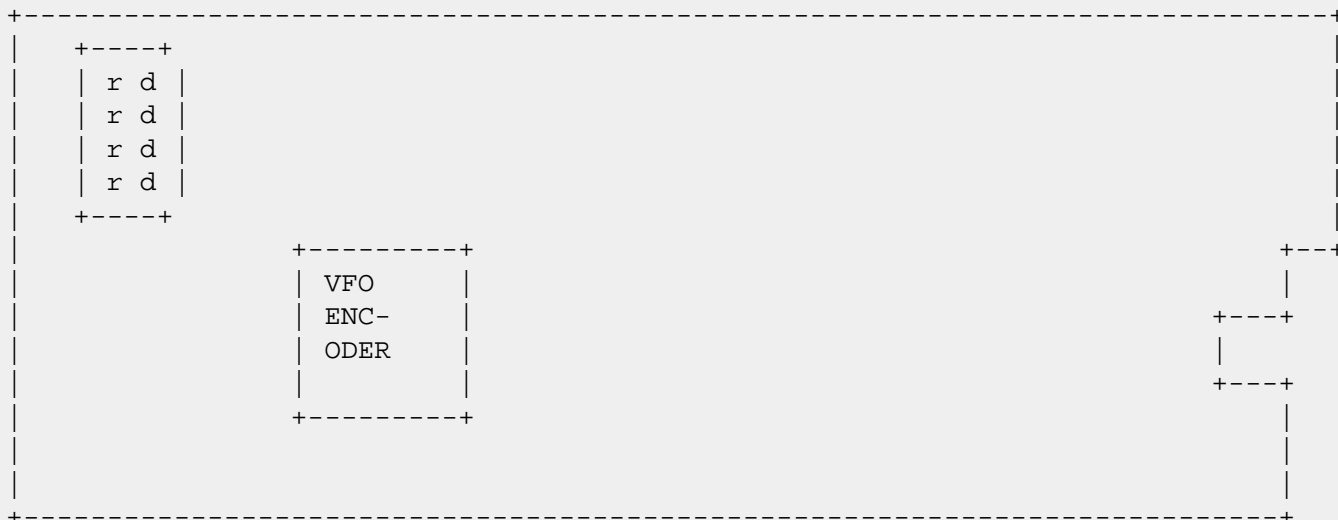
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**27-05-2001**

## **(IC-910) Expanded functions for the IC-910H (All versions)**

**Author:** SM4RNA Anders Janis - [sm4rna@telia.com](mailto:sm4rna@telia.com). [MODIFICATION.NET](http://MODIFICATION.NET)

Backside of the Displayboard looks something like below:



Top left is vertical row with resistors be seen.

Beside the resistors to the right a vertical row with diodes is located.

From top is the diodes called D1, D2, D3, HD4, D5, D6, D7, HD8.

- To enable RX 136-174MHz Remove D5.
- To enable RX 420-480MHz Remove D6.
- To enable RX 1240-1320MHz Remove D7.
- To enable narrow FM on 1,2GHz band install a 1SS355 diode at HD8.
- TO enable crossbandrepeater install HD4

To use crossbandrepeater:

1. Activate [LOCK]
2. Switch off the radio.
3. Puch and hold M/S while switch on the radio.

To exit push [LOCK]

(Crossbandrepeat will not be canceled if power is switched off.)

This modification is read 2473 times.

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**22-07-2001**

## **(IC-910) IC-910H mods**

**Author:** *Unknow*

To modify your rig for:

- TX-144 remove R188 (1k) on the display board. 136-174 MHz
- TX-430 remove R187 (1k) on the display board. 420-480 MHz
- TX-1200 remove R186 (1k) on the display board. 1240-1320 MHz

Narrow FM mode for 1200MHz install HD8 1SS355 on the display board.  
You do not have to reset the CPU.

This modification is read 2323 times.

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**19-07-1998**

### **(IC-970) IC-970 with 9600 Baud**

To use the ICOM IC-970 on the UOSAT's (9600 baud), I made the following modifications:

**Transmit**

Solder a shielded wire (I used RG174) to the anode of D16 (1SV50E). This is at the junction of R52 (470K) and C44 (.0047). Make sure to solder the shield to the adjacent PC board ground plane.

**Receive**

Solder a shielded wire to pin 9 of IC11 (MC3357P), again make sure to solder the shield to the PC board ground plane.

Both transmit and receive are on the main unit circuit board. Make sure that you use IC11 as this is the sub band receiver. If you plan to use the IC-970 for terrestrial packet (ie. simplex on either 145 or 440) you will need to add another shielded wire to IC5, which is the main receiver discriminator.

I then brought the shielded wires out the rear of the radio.

I did this by removing the plate which covers the two holes located below ACC(1). In order to disconnect the wires from the modem, I installed two phono jacks in the center of the holes on the metal plate. I have used this setup with the G3RUH modem, PacComm NB96, and the MFJ-9600.

I found that it was not necessary to add the 10K series resistor to the transmit audio/deviation line. On all three, with the center of the 10K pot range as 12 o'clock, I found that about 1 o'clock to work best on for me.

**Note:**

Make sure that the DC power source for the TNC and 9600 baud modem are on a clean supply (no ripple). Several users have found this to be the reason they could not get their modems to work. Also make sure that the TNC modem switch is set to 9600 baud as this provides the 153.6kHz to the modem. The modem documentation is not very clear in this area. I run the terminal speed at 19,200.

If you have any questions, I can be reached at:

Dale Hagert NMOH  
3881 Serpentine Circle  
Eagan, MN 55122  
612-452-1030

This modification is read 491 times.

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**19-07-1998**

### **(IC-DELTA1) Band expansion modification for IC-Delta1A**

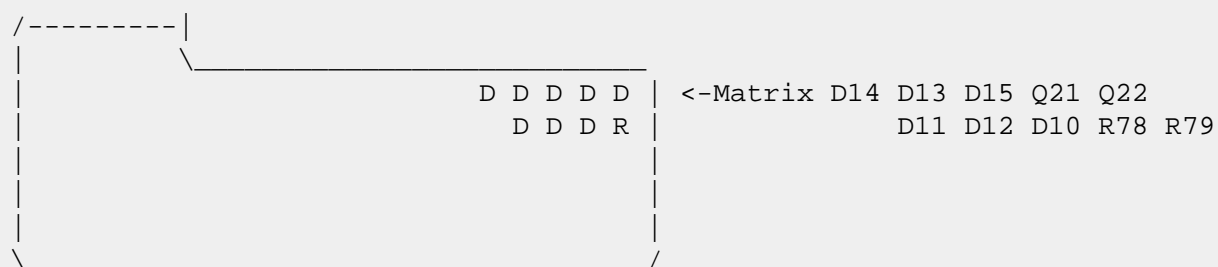
- Remove diode D14
- Replace diode D13 with a MA132HK (icom part#1790000830)
- Replace diode D15 with a MA132WK (icom part#1790000850)
- Reset Radio

After mod, you get:

- 118-136 MHz AM RX
- 136-174 MHz RX/TX

- 350-470 MHz RX/TX
- 800-950 MHz RX
- 1240-1300 MHz RX/TX

IC-Delta1A Logic Unit:



Replacement of D13 -  $\overline{a} = \left| \begin{array}{c} | \\ | \end{array} \right| = k$  MA132HK  
 $a = \left| \begin{array}{c} / \\ \_ \end{array} \right|$

Replacement of D15 -  $\overline{a} = \left| \begin{array}{c} | \\ | \end{array} \right| = k$  MA132WK  
 $a = \left| \begin{array}{c} > \\ / \end{array} \right|$

1N916 or 1N914 can be used too.  
 Reset The Radio When Finished

Cool radio, too bad its so big and doesn't tx on 800mhz...

This modification is read 575 times.

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**14-05-2000**

### **(IC-DELTA1) IC-Delta 1E repeater mode**

**Author:** Walter, DHOKAR

You can change the delta 1 E to -repeater mode- while two of three modules are switched on and squelch is on.

You have to press and hold -func, moni and ent- keys, then two blinking -L's- will show up on the bottom off the display.

When one of the two modules receives a signal strong enough to open the squelch this signal is immediately transmitted on the other module and vice versa.

You stop the mode by pressing the buttons in the same manner as above and see the blinking -L's- going away.

73

Walter, DHOKAR

This modification is read 540 times.

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**09-12-2001**

### **(IC-F3/4) Icom F3/4 extended RX & TX**

**Author:** Jonathan Davis - [jd865@uplink.net](mailto:jd865@uplink.net). [MODIFICATION.NET](http://MODIFICATION.NET)

While holding down the [C] + [Monitor] button turn on radio.

Dealer will appear on LCD.

Input 159357.

You can ch up or down and you will see the freq corresponding with each ch.

Radio will prompt to enter RX. Do so and push [#] to enter or again to del.

Push the **[left arrow]** button to enter TX freq.

I have not been able to get ctcss entered this way yet, I'll keep trying.

This will only work if Dealer set mode is enabled in the common screen in software.

I think enable is by default anyhow.

Jon.

This modification is read 1362 times.

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**30-01-2002**

## **(IC-M100) Icom IC-M56, M58, M59, M100 - M125 Additional frq. range**

**Author:** Honico - [honico@hotmail.com](mailto:honico@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

- Power off radio.
- Unplug.
- Inside, under the cover, all have a switch labeled PRV.
- Centrally located in the small radios; and on circuitry -inside the face, bottom-end - Toggle it to enable \*to be released\* channels.

Coding matches other ICOMs, including handhelds --but not other brands--. [See ICOM IC-M11 for freq. chart.](#)

This modification is read 190 times.

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**28-01-2002**

## **(IC-M11) Icom IC-M11 Additional frequencies and range**

**Author:** honico - [honico@hotmail.com](mailto:honico@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

IC-M11 normally operates in 16K0G3E mode, TX: 156-157.5 and RX 156-163 MHz -but the Normally available channel selections won't allow access to all frequencies -Or- channels; some are "locked out". The MEMO (memory channels) have the optional channels available:

Instructions for unlocking your M-11:

\*actual key/s you'll press\*

1. Power on
2. Push \*MEMO\* for MEMO mode
3. Push-and-hold BOTH \*FUNCTION\* + \*MEMO\* til Right Side (location) flashes.
4. \*UP-DN\* to select a slot number  
Select new channel:
5. Press \*DIAL\* to shift to left side of display to begin selection of Channel number [Left side flashes]
6. Press-and-hold \*FUNCTION\* and click \*H/L\* ['PRV' is displayed on screen, centered between sections]
7. \*UP-DN\* to select 00 ~ 116, F1~ P1~ L1~ E1~ C1~ ...whatever...
8. press \*MEMO\* to save and exit

Now, your newly selected channels are available (but only) via the MEMOry; -not- DIAL mode. :-)

[Frequency Alpha Numerics/](#) Numbers match other Icoms (M58, 59 M100~ 125 -but NOT other brands.

**30-01-2002**

### **(IC-M125) Icom IC-M56, M58, M59, M100 - M125 Additional frq. range**

**Author:** Honico - [honico@hotmail.com](mailto:honico@hotmail.com).[MODIFICATION.NET](#)

- Power off radio.
- Unplug.
- Inside, under the cover, all have a switch labeled PRV.
- Centrally located in the small radios; and on circuitry -inside the face, bottom-end - Toggle it to enable \*to be released\* channels.

Coding matches other ICOMs, including handhelds --but not other brands--. [See ICOM IC-M11 for freq. chart.](#)

**30-01-2002**

### **(IC-M56) Icom IC-M56, M58, M59, M100 - M125 Additional frq. range**

**Author:** Honico - [honico@hotmail.com](mailto:honico@hotmail.com).[MODIFICATION.NET](#)

- Power off radio.
- Unplug.
- Inside, under the cover, all have a switch labeled PRV.
- Centrally located in the small radios; and on circuitry -inside the face, bottom-end - Toggle it to enable \*to be released\* channels.

Coding matches other ICOMs, including handhelds --but not other brands--. [See ICOM IC-M11 for freq. chart.](#)

**03-11-2001**

### **(IC-M58) IC-M58 cloning program**

IC-M58 VHF marine transceiver [cloning program](#).

**30-01-2002**

### **(IC-M58) Icom IC-M56, M58, M59, M100 - M125 Additional frq. range**

**Author:** Honico - [honico@hotmail.com](mailto:honico@hotmail.com).[MODIFICATION.NET](#)

- Power off radio.
- Unplug.
- Inside, under the cover, all have a switch labeled PRV.
- Centrally located in the small radios; and on circuitry -inside the face, bottom-end - Toggle it to enable \*to be released\* channels.



Coding matches other ICOMs, including handhelds --but not other brands--. [See ICOM IC-M11 for freq. chart.](#)

This modification is read 277 times.

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**30-01-2002**

### **(IC-M59) Icom IC-M56, M58, M59, M100 - M125 Additional freq. range**

**Author:** Honico - [honico@hotmail.com](mailto:honico@hotmail.com).[MODIFICATION.NET](#)

- o Power off radio.
- o Unplug.
- o Inside, under the cover, all have a switch labeled PRV.
- o Centrally located in the small radios; and on circuitry -inside the face, bottom-end - Toggle it to enable \*to be released\* channels.

Coding matches other ICOMs, including handhelds --but not other brands--. [See ICOM IC-M11 for freq. chart.](#)

**Date:** 19-03-2002

**User comment**

**From:** Ken WA4BJN

**Subject:** M-58 and M-59 require prog.software

Icom m-58 and m-59 do not have switches ect you must have programing software to add additional channels, you can program the radio to cover a freq. spread of about 130 to 170 MHz in addition to keeping the factory prograded marine channels, dont open these models up looking for jumpers or switches, you need the software!!!

This modification is read 195 times.

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**19-07-1998**

### **(IC-M700) ICOM M-700 Marine Transceiver**

Despite that the literature says, no lock-out is employed. For ham frequencies on 40, 80 or 160 meters, set the mode switch to the hard left position of "A3," to enable the lower sideband filter (all marine HF uses upper sideband).

This modification is read 616 times.

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**05-11-2001**

### **(IC-M710) Cloning program for IC-M710**

[Cloning program](#) for IC-M710 MF/HF Transceiver.

This modification is read 538 times.

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**19-07-1998**

### **(IC-MU2) IC-MU2 Ext Band mods**

1. Remove battery.
2. Remove 4 screws securing battery. Slide from front panel.
3. Remove small black screw below PTT switch.
4. Carefully separate the front speaker from the body by pulling front and rear down toward battery. Flip it over.
5. Next remove steel chassis assembly by gently prying up the sides, lift up, fold it down.
6. Solder in new diode next to Q131 and Diode D113. Looking at Diode Matrix with top of radio to the top, add diode to the empty pad to the left of diode D119. There are 3 points of connection on the diode pad. Two on the left and one centered vertically on the right. The diode should be installed between the lower left and the right centered connection. (Arrow on diode points to right centered connection.)
7. Reset CPU by following instruction manual page 23.

**19-07-1998****(IC-P2AT) ICOM P2AT keyboard mods**

There was a recent posting requesting mods to the ICOM P2AT. I received the following info from ICOM Customer Service and they work fine on my P2AT:

To enable wideband receive and direct keyboard entry of the entire frequency:

with the HT off, hold down "Light" "B" and "#" keys and turn the HT on

Get into the set mode and you will have a new option labeled "PL". Turn the upper right knob to change this to a value of 100. (The rep at ICOM said "PL" stands for "decimal placement")

Get out of set mode

You should now be able to enter VFO mode and just press seven digit keys to enter any freq directly. I don't have mine with me now, but I think you can enter any freq from 0 to 1GHz (within PLL Lock range).

Dave Meer, N6KEF

**02-11-1999****(IC-P2ET) Sensitivity for the Icom IC-P2ET****UHF**

|            |  |             |
|------------|--|-------------|
| 410 MHz    |  | unlock      |
| 415 MHz    |  | 6 $\mu$ V   |
| 420 MHz    |  | 1,6 $\mu$ V |
| 425 MHz    |  | 0,3 $\mu$ V |
| 430 MHz    |  | 0,2 $\mu$ V |
| 435 MHz    |  | 0,2 $\mu$ V |
| 440 MHz    |  | 0,2 $\mu$ V |
| 450,10 MHz |  | 0,6 $\mu$ V |
| 465,10 MHz |  | 12 $\mu$ V  |
| 470,10 MHz |  | 17 $\mu$ V  |
| 475,10 MHz |  | 30 $\mu$ V  |

**VHF**

|             |    |              |
|-------------|----|--------------|
| 112,4 MHz   | AM | 1 $\mu$ V    |
| 118,45 MHz  | AM | 0,6 $\mu$ V  |
| 131,125 MHz | AM | 0,5 $\mu$ V  |
| 137,5 MHz   | FM | 0,5 $\mu$ V  |
| 145,5 MHz   | FM | 0,15 $\mu$ V |
| 155,5 MHz   | FM | 0,15 $\mu$ V |
| 160,5 MHz   | FM | 0,15 $\mu$ V |
| 165,5 MHz   | FM | 0,2 $\mu$ V  |
| 170,5 MHz   | FM | 0,3 $\mu$ V  |
| 175,5 MHz   | FM | 2,5 $\mu$ V  |

**30-12-2000**

## **(IC-P3AT) RX and TX modifications for ICOM P3AT**

### **RX Modification.**

To open up the receiver from 215.00 to 230.00 and allow direct keyboard entry of the entire frequency:

With the HT off, hold down "Light" "B" and "#" keys and turn the HT on.

Get into the set mode and you will have a new option labeled "PL". Turn the upper right knob to change this to a value of 100. (The "PL" stands for "decimal placement")

Get out of set mode, your radio should go from 215 to 230 MHz and allow you to key in the frequency on the key pad.

This mod was courtesy of Icom America.

---

### **Wide band TX mod for ICOM P3-AT.**

This will open up the transmitter from 215 to 230 MHz.

Open the radio as shown on page 66 in the manual.

Look at the back of the CPU board and locate the CPU. Look to the left of it and you will see a surface mount diode (D18 on the diagram) mounted parallel to the CPU. This will be between 3 solder pads that look like they will fit a surface mount transistor.

If for some reason you cannot find it just drop me a note and I will provide you with a copy of the board layout from the service manual.

Remove this part and reset the radio. The radio will now tx over the whole frequency range.

I discovered this mod my self after performing the modification for the p2/4at and discovering that it does not work.

73's,

Bryan Fields, KB9MCI

This modification is read 371 times.

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**23-08-1998**

## **(IC-PCR1000) Icom IC-PCR1000 frequency modification**

You've been waiting.

You've been told it can't be done.

You don't want to pay for it.

Here's how you do it.

The PCR-1000 full coverage mod:

What you'll need:

Small philips screwdriver

Slightly larger philips screwdriver

Soldering iron with \*very\* fine tip

Xacto knife, or other sharp tool

2 0-ohm surface mount resistors, 0804 in size, or 30 guage wire-wrap wire

No fear of surface mount components

Ability to follow instructions

Very very very first step. Read ALL the steps before starting. Make sure you feel comfortable making a mod of this nature. It's not rocket science, but it does require a steady hand.

There are three things that can happen as a result of this mod.

1. You're completely successful.
2. You screw up a surface mount pad, but the radio still works when you're done.
3. You're a total hack using the wrong tools, and you send the radio back to Icom for repair.

Hopefully, you're a result 1 type person. At worst, you're a result 2. If you think your going to be a result 3 type, don't even start. Call a friend.

We've done this mod on 2 radios with complete success. We can't guarantee that in later radios this mod will still work. It works at least with serial numbers up to 1111 in the last 4 digits.

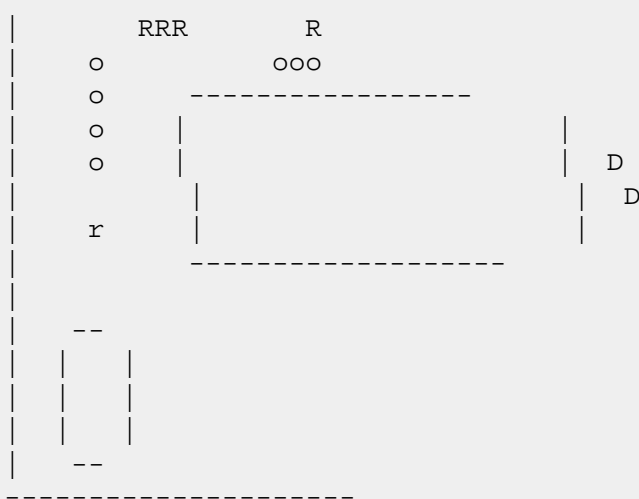
Let's get started!

Remove the 8 screws that attach the cover, and remove the top cover of the radio.

Orient the radio so that serial, power and RF connector are closest to you, and the power switch faces away from you.

On the PC board closest to you, in the upper left hand corner you should see a 80 pin surface mount chip. It has a number such as 64F3334 stamped on it. This is the processor.

Near the upper left hand corner of the chip, you should see 2 small green 0-ohm resistors. To the left of the two resistors you should see an unpopulated pair of pads. These are the 3 "R"s below, on the left. The 4th "R" is used for location reference below.



(Picture courtesy of Alan Adamson, NE1H)

Using the soldering iron and knife, *\*carefully\** remove the right hand resistor. You'll need to alternately heat the two ends, while apply a *\*light\** pressure with the knife. Once it's hot enough, it will left off. It's very easy to destroy the pads the resistor is soldered to, so be *\*careful\**.

You'll now need to short the pads of the left resistor (this is the unpopulated one). You can either try and re-use the resistor you just lifted (least good idea), short them with a short piece of wire wrap wire (OK idea), or use a real 0-ohm resistor (best idea).

For the next step you have two options. One option is easy and does not require removing the board from the radio (recommended). The other option is "more correct", but will require disconnecting all the cables, removing the 5 screws that hold the board down, etc (purist method). We'll presume you're more likely to want easy, so here are the steps for it.

Keeping the radio oriented as described above, look below the right hand resistor (the one we removed). You should see 3 vias (holes) (see picture above). Follow the left most via, and it should go to the left most pin of the processor. The second via should go to the next pin to right, and third via should go to the pin to right. At this point, you should see two pins that don't appear to be connected to anything, then a pin that connects to a small black resistor marked 201 (this is the 4th "R" in the picture).

If you've sucessfully located the 6 pins above, we want to short the pin that is the 4th from the left to ground. Above these 6 pins, you should see a small black rectangle, with 8 pins. I believe it is marked 220. On the side of this part (it's a resistor pack), there is a pin that is soldered to the ground plane.

To short the 4th pin from the left to ground, tack a wire to the pin. Be *\*very\** careful not to short the adjacent pins to the 4th pin. It's very easy to do. If you do, use a piece of Solderwick or coax braid to remove the solder. Better yet, don't short the pins. Tack the other end of the wire to the pin on the resistor pack described above.

OK, you'd rather do it the "more correct" way. Disconnect all the cables from the board. You'll need to remove the shield from the RF section to remove the white ribbon cables. Disconnect the power and speaker cable. Remove the 5 screws that hold the PC card down. Remove the card from the radio.

Orient the board as described above. Look for the white connector above the packet connector (lower left). It's marked J12. Just above that are a pair of solder pads for a resistor. One side goes to ground, the other goes to a via. Follow the trace on the bottom side of the board. You should see that it goes to a via, but that the trace has been cut right next to the via.

Using a sharp knife and a lot of care, scratch away the solder mask to reveal bare copper on the trace. Use a piece of wire wrap wire to repair the cut trace (bridge the trace to the via). Back on the top side, short the pads for the resistor that are open (this is the lower case "R" on the left, off by itself).

Reassemble the radio. If you used the "more correct" way, make sure you get all the screws and cables back in.

Plug it in, turn it on, fire up the software. Tune a frequency you couldn't before. If you can tune it with the software, and the squelch is open, you're working!

If it's not working, review everything we described. Make sure you didn't short any pins. I can't offer you much more help if it didn't work.

Remember, you screw up your radio, it's not my fault. I don't work for Icom, I don't represent Icom. I don't endorse listening to frequencies you're not supposed to, and can't be held liable for anything that happens, anywhere in the universe, as a result of you making this mod, or even thinking about making this mod (Gawd, I hate lawyers. CYA!). This mod was done completely from our own experience and background, and did not reference any material. We don't know about these people selling the mod on the 'net, but we didn't steal it from them.

Hope this helps. If you've got any suggestions to improve how to make this mod, please send e-mail. If you made this mod, let us know how it went. Also, if you want a list of the PCR-1000 commands we know about, drop us e-mail, or use DejaNews(tm) and search the alt.radio.scanner groups for the post (look for PCR-1000 in the subject).

- Chris, KD4DTS

(Thanks to Alan Adamson, NE1H for his being ready and willing to sacrifice his radio to a higher cause, and his drawing).

This modification is read 2922 times.

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**14-03-2001**

## **(IC-PCR1000) ICOM PCR1000 Software**

The [software](#) is for RF tuning and alignment of the Icom PCR1000. This [software](#) is designed to be used along with the software supplied with the PCR1000. It will not work properly if used alone.

This [software](#) has been tested under Windows 95 and Windows 98 but may not run properly if you have changed the IRQ's or Addresses of COM1: and COM2: from the default settings in Windows. This [software](#) will not run properly under some versions of Windows 2000.

I have been told that this software is capable of changing the 'band plan' on the PCR1000, allowing you to unlock blocked frequency ranges in some versions of the PCR1000. (I have not verified this, since there also seems to be hardware modifications to do the same thing.)

Make sure you have backup copies of all .INI and .DAT files before you unzip or copy these files to your PCR1000 software directory.

To install, unzip the archive in the same directory your Icom PCR1000 software is installed in.

This modification is read 2642 times.

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**19-07-1998**

## **(IC-Q7) IC-Q7 Erfahrungen**

*From: DL6BAW @ DBOAHO. #BAY.DEU.EU (Fred)*

Hallo Om's,

hier in der Rubrik waren in der letzten Zeit Anfragen zu Erfahrungen mit dem neuen Duobander IC-Q7 zu lesen. Da ich mir so ein kleines Gerätchen auf der Hamradio zugelegt habe, will ich kurz über meine Erfahrungen berichten.

Erst mal die Überlegungen, die dazu geführt haben, dieses Gerät und nicht das ähnliche VX1R von Yaesu zu nehmen:

1. Der RX-Bereich geht bis 1300Mhz, also 23cm Empfang. Der RX geht zwar "erst" bei 30Mhz los, jedoch brauche ich Mittelwelle und KW nicht.
2. Der niedrigere Preis!
  - Im Betrieb ist das Gerät durch die wenigen Bedienelemente recht praktisch.

- Für Handbetrieb auf Relais-Frequenzen sind meiner Meinung nach die 300mW Sendeleistung völlig ausreichend.
- Der RX ist in den AFU-Bereichen ausreichend empfindlich, vergleichbar mit anderen Handfunkgeräten. Außerhalb der AFU-Bänder ist die Empfindlichkeit aufgrund der Gummiantenne sehr unterschiedlich. An einer Discone-Antenne sieht das dann ganz anders aus. Da ich nicht in der Stadt wohne, habe ich fast keine Großsignalstörungen, nur im 4m-Band sind auf einigen Frequenzen Durchschläge von Rundfunksendern zu hören.
- Für mich interessant: AM-Empfang in den Flugfunkbändern hervorragend!
- Ein kleines Manko ist die fehlende Stromversorgungsbuchse, man kann nur mit Batterien oder Akkus (2 mal Mignon) arbeiten.
- Die Buchse für externes Micro/Lautsprecher ist etwas ungewöhnlich.
- Die Bedienung über die Menü's ist unkompliziert und leicht zu merken.
- Die NF-Wiedergabe ist ausreichend laut und für ein Gerät dieser Größe recht ordentlich.
- Was mich persönlich etwas stört ist folgender Effekt: Die Rauschsperrre öffnet bei schnellem Durchdrehen des Abstimmknopfes nicht. Man muß mit etwas Gefühl langsam drehen, damit belegte Frequenzen auch erkannt werden. Beim automatischen scannen passiert das nicht.
- Die 200 Speicherplätze sind meiner Meinung nach völlig ausreichend.

So, das war erstmal alles, was mir zu dem Gerät einfällt. Für meine Begriffe ist das Gerät zu dem momentanen Preis unschlagbar, zumal man einen RX von 30Mhz bis 1300Mhz durchgehend in FM, FM-breit und AM hat. Ein vergleichbarer Scanner kostet schon mehr. Falls weitere Fragen auftauchen, bin ich gerne bereit, diese zu beantworten.

73 de Fred, DL6BAW @ DB0AHO

**Date:** 02-02-2002

**User comment**

**From:** [db 5 ot](#)

**Subject:** bereichserweiterung

Durch das Einsetzen der geeigneten Software und einem Kabelmodem an der Kopfhörerbuchse, läßt sich der Empfangsbereich wie bei dem äußerlich fast baugleichen Scanner von Icom nach unten auf 500khz Startfrequenz erweitern

This modification is read 2257 times.

[top of page](#)

**19-07-1998**

### **(IC-Q7) Extending fq-tx coverage on IC-Q7E**

Well at last guys I have sat down to work it out its just a matter of removing all of the possible 7 programming diodes sounds simple well its not read on.

Well every one this is a really scary mod to do to the Q7. It is really not for the faint hearted or any one that doesn't have a soldering iron tip less than 0.9mm. I take no responsibility for these mods and am warning you that it does void warranty! It is extremely easy do destroy something so be CAREFUL !!!! This is only a description of what I found. Use this information at you own risk! OK now!

With the radio face down antenna pointing away (this is the orientation the unit will always be in when I refer to part location) remove the antenna and pull the knob off.

Unscrew the switch and SMA ferruls. Cation the SMA ferrul is sealed with a thread sealing compound.

Open the battery compartment and remove the batteries.

This will remove two screws. Remove them. Then the back can be lifted up and towards you.

This will reveal a main board and a sub(RF) board mounted on top of it. Remove the single visible screw on the RF board on the right hand side.

There are two points where the shielding has been soldered to the lower board. On in the lower left corner above a ferrite inductor, the other in the upper left near the blue assembly of the switch. Carefully desolder these with desolder braid. (careful not to melt anything!)

carefully hinge the bottom of the RF board up till the connector in the middle of the board disengages. Then push gently on the SMA connector and pull the RF Board out.

Half way now.

Remove the screw on the right hand side central to the PTT and FUNC button. And the one on the left just bellow the little shield. DO NOT REMOVE the two top corner ones they hold the LCD assembly!!!

Desolder the two speaker wires from the speaker.

Lift the bottom of the board out till the LCD clears its mounts in the case and pull the board out GENTLY so the rubber seal is not dislodged.

Turning this board over with the LCD now facing you there is position for 7 SMD diodes marked A or A2 on the right hand side just above the central mounting point.

The easiest way of removing them without damaging the assembly is to desolder one end with desoldering braid and the while heating the contact with the soldering iron lift that end with a small pointy screw driver (0.7mm jewellers are good!). They just need to clear the board by a fraction and then they can be easily reinstalled if necessary.

Reverse this procedure to reassemble and be bloody carefull!!!.

Cheers  
ERIC.

---

Many tnx to Eric for finding the programming diodes.

In the European version (IC-Q7E) there are 3 diodes mounted. Counting from the screw hole, there are # 1,3 and 7 installed.

Number 1 sets the VHF tx range to 144-146 MHz.

Number 3 sets the UHF tx range to 432-438 Mhz.

Number 7 enables the facilities dedicated to the E-version, 1750Hz etc...

So, if You want to keep the E-version don't remove #7.

Removing #1 and 3 enables tx range from 136-174 and 400-470 MHz.

For expanding only rx at the cellular band on 800 MHz, it seems to be another mod. too.

Take a look at ZANA's home page [www.alles.or.jp/~zana/index.htm](http://www.alles.or.jp/~zana/index.htm) if you are keen on Japanese.

This modification is read 3070 times.

[top of page](#)

**23-03-1999**

## **(IC-Q7) Icom Q7A mods from the factory**

I have received the mods for the Q7A radio from Icom.

You will have to take disassemble the radio by :

1. Removeing the batteries
2. Removeing the 2 screws in the battery compartment
3. Remove rear cover
4. Desolder and remove the back board
5. Remove the last screw on right side of radio
6. Remove the antenna and volume knob and the two nuts
7. Desolder the speaker leads
8. Slide main board out
9. Hold board that faces the front of the radio towards you
10. Remove the SMT (s) as per [ic-q7a.gif](#) image
11. Reassemble
12. Reprogram

I have tried this on my radio and it works just great. TX is from 140 Mhz to 170 Mhz and 400 Mhz to 470 Mhz with no degradation in the receiver or transmitter.

I also placed the radio on a service monitor and specs were the same as manufacturers specs. ( except the transmitter He He He ) Be careful and have fun, Any questions about this mod please feel free to E~Mail me anytime.

Ray N2ZEM

This modification is read 2973 times.

[top of page](#)

**28-03-1999**

## **(IC-Q7) Modifying the ICOM IC-Q7A for RX/TX**

I have discovered by the process of exploration, how to modify the IC-Q7A for out of band and the rest of the 440MHZ amateur band transmission. This is a timely task to do. Here is the process.

1. Remove battery, antenna, and tuning knob.
2. Remove the two screws in the battery housing, and the screws on the SMA jack, and tuning knob.
3. Prycover open near bottom of radio with fingers.
4. Unsolder speaker leads, and solder joints along the top of radio, including SMA jack, and the one joint connecting the shield by the coil and speaker connection.
5. Remove the screws connecting RF board.
6. Gently remove the RF board!
7. Remove screw next to function and PTT switch.
8. Gently lift the main board out using a angle technique.
9. On front of main board there will be a bank of silver color diodes located by the bottom right hand corner of LCD.
10. Remove the first diode in the bank.
11. Reassemble radio go from step 8 to step 1.

After you have assembled radio, insert battery and radio will automatically turn on, and the display should say "CLEAR".

The process is now complete. FREQUENCY RANGES:

RX: 30-1310MHZ, cellular blocked

TX: 136-174VHF, 400-470UHF

73, from KB8WNA ELYRIA, OHIO 44035

This modification is read 2946 times.

[top of page](#)

**26-07-1999**

## **(IC-Q7) Expand transmit from 136-174 and 400-470 for IC-Q7E. (Australian version)**

Hi once again, well I have carried out the mod to expand my IC-Q7E ICOM HANDHELD and it was not as bad as I thought it was going to be.

**The most important thing about this mod is to do it slowly and carefully, do not use force and if you are unsure stop and study it for a while and then proceed.**

You must have a good quality Soldering Station such as HAKKO, WELLER, etc with a 0.5mm conical tip, a very small jewelers screwdriver and some good quality de-soldering braid, If you do not have the above tools then I suggest that you leave the screws in the radio.

Remove the batteries and the two screws under them, remove the antenna and dial knob, remove the slotted retaining nuts below the knob and antenna, the back half of the case can now be removed which will expose the top board and next stage.

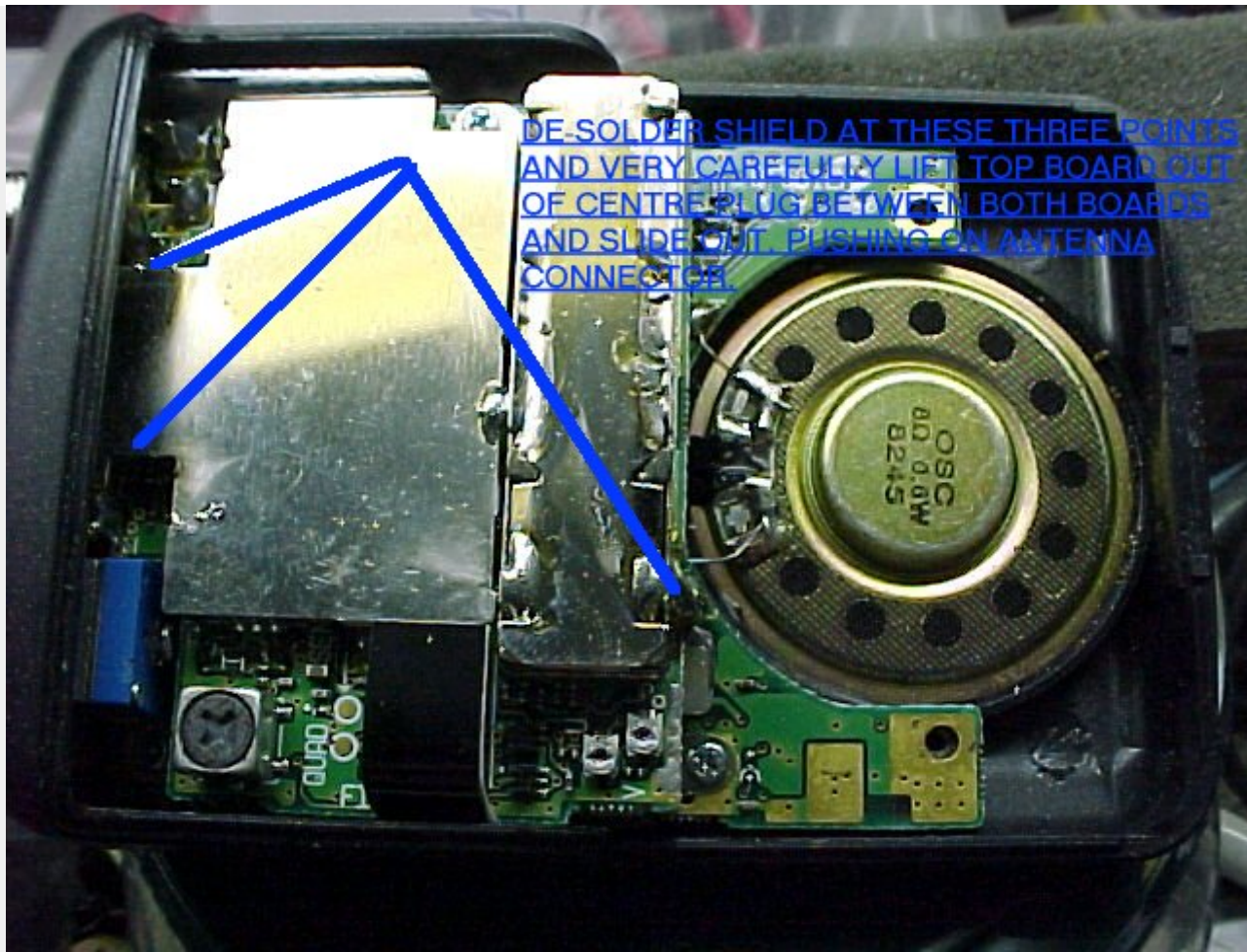
There are three solder points and one screw to be removed on the AUSTRALIAN E MODEL at the top board shielding, two at the top, one next to the blue channel switch and on the other side next to the antenna connector, the third is above the speaker to the left with the speaker closest to you, the screw is at the right bottom corner of the big shield, very slowly lift this board until it clears the multi pin white connector in the centre of both boards and with pressure applied to the end of the antenna connector with the thumb cautiously remove the top board.

The rest is pretty easy, remove the two screws from the bottom main board, one close to the speaker at the bottom of the small tin shield and the other between the PPT and FUNCTION switch, DO NOT TOUCH THE TWO AT THE TOP OF THE BOARD, de-solder the two speaker wires at the speaker and being very careful of the rubber seals lift the board out and turn over and carry out the mod as per my jpeg pictures.

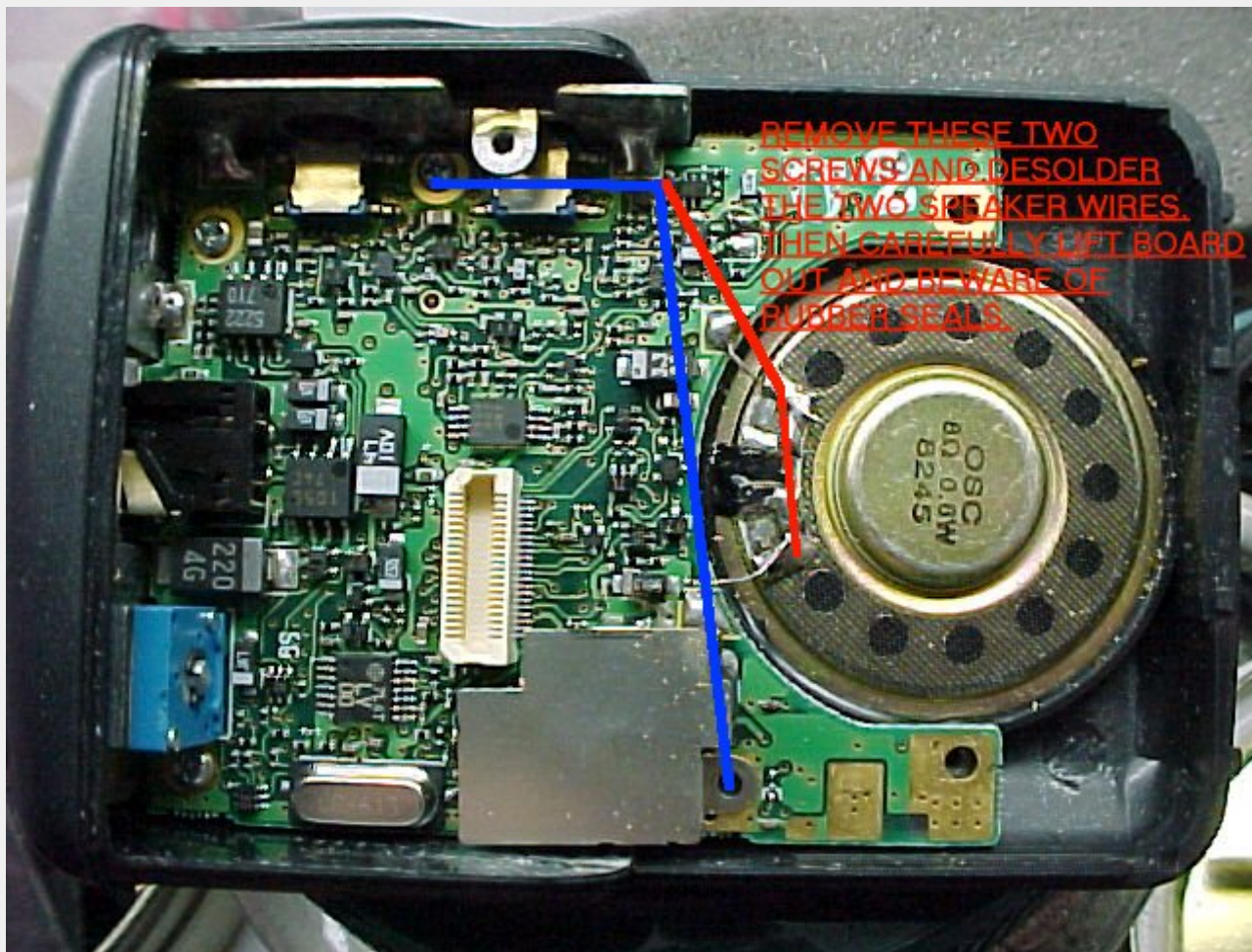
Re-assemble in the opposite manner USING EXTREME CARE my radio will now transmit from, 136 - 174 and 400 - 470.

I have not checked to see if there is any drop off in performance specs now, the mod works and seems to work well so I guess that is the most important thing.



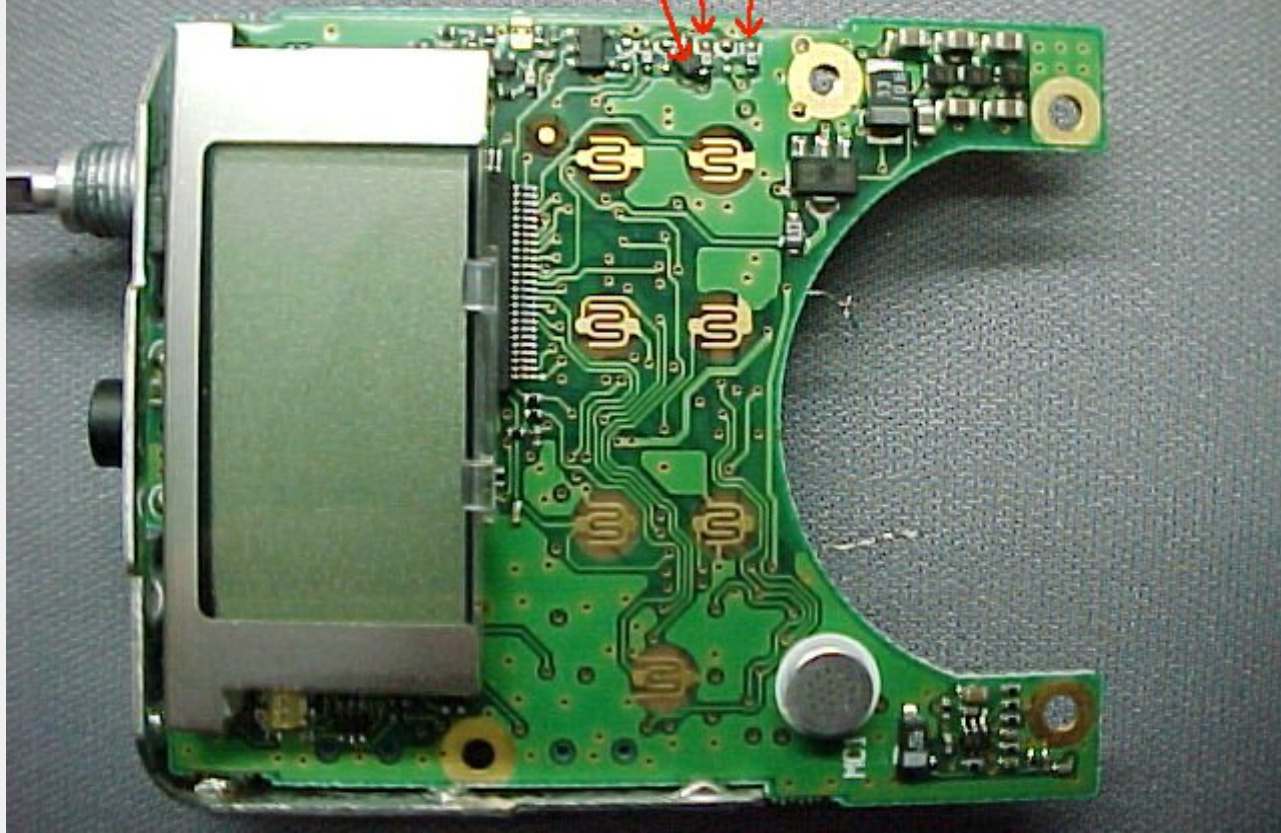


DE-SOLDER SHIELD AT THESE THREE POINTS AND VERY CAREFULLY LIFT TOP BOARD OUT OF CENTRE PLUG BETWEEN BOTH BOARDS AND SLIDE OUT PUSHING ON ANTENNA CONNECTOR.

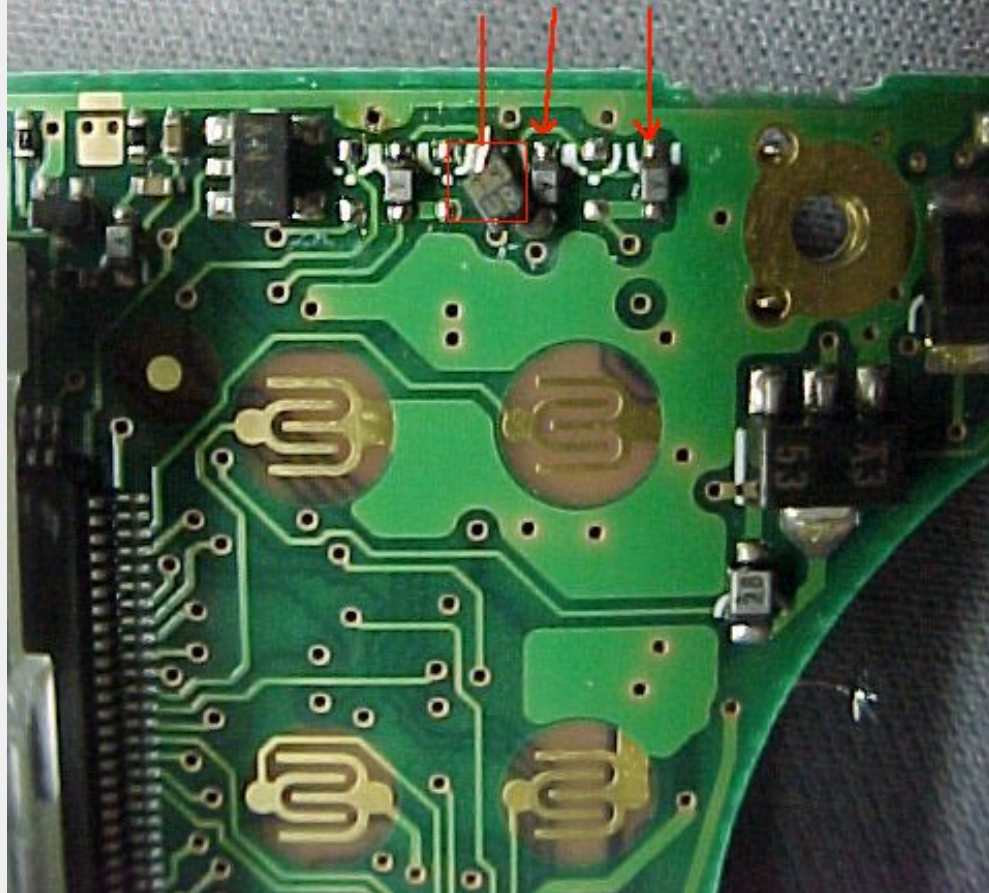


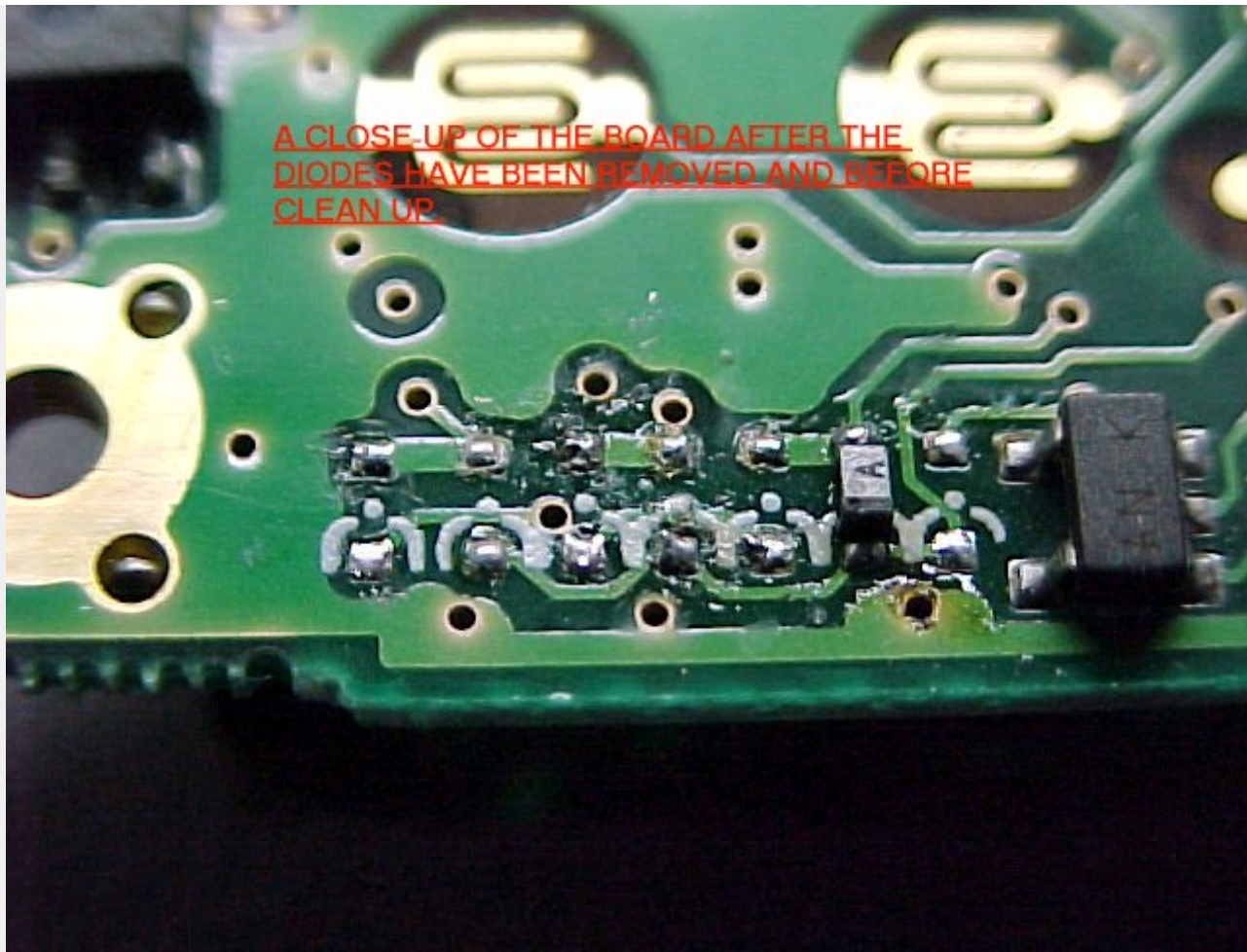
REMOVE THESE TWO SCREWS AND DESOLDER THE TWO SPEAKER WIRES. THEN CAREFULLY LIFT BOARD OUT AND BEWARE OF RUBBER SEALS.

REMOVE THE THREE MARKED COMPONENTS IN THE AUSTRALIAN MODEL IC-Q7E. THIS WILL ALLOW EXPANDED TX 136 - 174 AND 400 - 470. NOT QUITE FAR ENOUGH. WHAT A SHAME



A CLOSE UP OF THE DIODES THAT I REMOVED AND ALSO THE COMPONENT IN THE SQUARE WHICH BRIDGED DIODE THREE AND WHERE FOUR SHOULD BE. NOT SURE ABOUT THIS ONE.





This information was supplied by,  
David Spicer, VK7ZDJ,  
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This modification is read 2260 times.

[top of page](#)

**20-02-2000**

**(IC-Q7) IC-Q7 Programming utility 1.05 ( Goran Vlaski ), Wide RX 0-30MHz, Adjustment mode**

**Author:** Goran Vlaski

[Download the ZIP file](#)

This modification is read 3125 times.

[top of page](#)

**05-10-2000**

**(IC-Q7) IC-Q7A Full Transmit From 140 - 174 MHz and 400 - 470 MHz**

**Author:** Dave Evangelista - N2TRY - [n2try@radioamateur.com](mailto:n2try@radioamateur.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This modification has been taken from <http://www.radioamateur.com/icq7> with permission from [Dave Evangelista \(N2TRY\)](#).

Okay, so you were serious about doing this mod to your radio. COOL.

To do this mod, you have to follow all the rules.

1.) You've spent about 200+ bucks for this radio, now go out and spend another 25 bucks on what you will need to do this mod successfully.

You will need the following equipment:

- A nice soldering iron and a BRAND NEW TIP!
- Some Radio Shack 60/40 thin low rosin core solder the good stuff, I used Catalog #64-009 ([this is not an endorsement](#))

- Desoldering Braid (to suck up solder)
- Desoldering Pen (uses suction to suck up solder)
- A decent magnifying glass (you will need this!)
- A damp sponge (to clean the soldering iron tip with)
- A clean and clear workspace with plenty of elbow room
- A small parts box of some kind to collect parts (hehehe)
- A steady hand, tall glass of water and a change of shorts when you get to the diode section. (this was funny, my wife came into the room and saw the radio in pieces and I was sweating with my mouth open and was drooling when I saw the diodes I needed to unsolder) Now remember, the radio was already disassembled and there was no turning back. OH CRAP!
- PATIENCE! This mod took me nearly 4 hours to complete.



Just a preview of your workspace in a couple of hours!



I GOTTA REMOVE WHAT!

These diodes are about as small as the tip of a lead pencil, you CAN do this if you want.

### **STEP 1**

Orient the radio with it face down and the antenna pointing away from you. This is the orientation you will keep the radio at all times unless otherwise directed to do so. (I used a piece of felt to place the face of the radio on)

### **STEP 2**

You should be looking at the back of the radio at this time. Unscrew the antenna and pull off the dial knob and place them in your parts box for now.

### **STEP 3**

Unscrew the antenna and dial knob ferrules (this is the nut that holds the antenna connector to the case).

**\*\*\* WARNING \*\*\*** The SMA Antenna ferrule is held on with some kind of super glue in the threads so you will need to work this nut loose ever so carefully. Just a piece of information that you may find useful, all the ferrules on the radio rotate clockwise to tighten and counterclockwise to loosen. Thus the old saying (Rightie tightie, leftie loosie). I used a jewellers screwdriver and a pair of needle nose pliers and placed the tip of the screwdriver into one of the notches of the SMA ferrule and "TAPPED" ever so lightly until it began to move. This requires time so take as much of it as you need, no sense screwing up this mod before you begin. It will work loose so take your time. You might also want to remember that you will be taking out the RF module board later and the SMA connector must come out of the case so you will need to remove the nut SORRY. The SMA connector is also glued to the case but using the same "TAPPING" method above, you will work it loose (more on that subject later)

### **STEP 4**

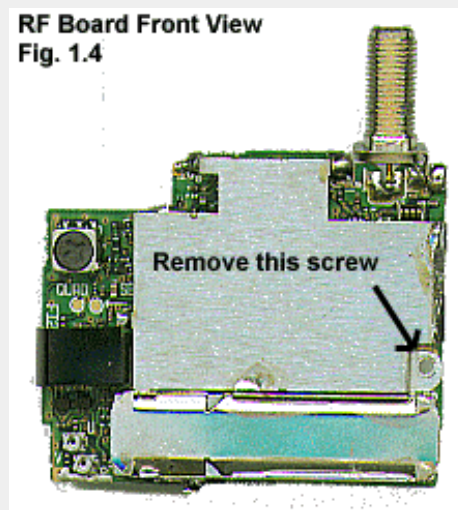
Once you have removed the ferrules in step 3, you can remove the battery cover and batteries from the radio to reveal two screws in the compartment. Remove these screws and place them in your box. Just a note, I taped the screws to a post-it paper and labeled them so I knew where they went when I was re-assembling the radio. Next lift off the rear cover by prying the cover from the front at the rear then up and towards you (keeping in mind the orientation of your radio as described).

### **STEP 5**

You should now see the RF board (daughter board) on top of the main board inside your Q7A. WHEW!

## **STEP 6**

On the RF BOARD! there is one visible screw located on the right side, see figure 1.4 below:



## **STEP 7**

There are three points where the shielding for the RF board has been soldered to the lower board. One is in the lower left corner just above the ferrite inductor figure 1.5 and along the right side of the RF board next to the PTT button figure 1.6 and in the upper left corner near the blue assembly of the dial figure 1.7

Figure 1.5

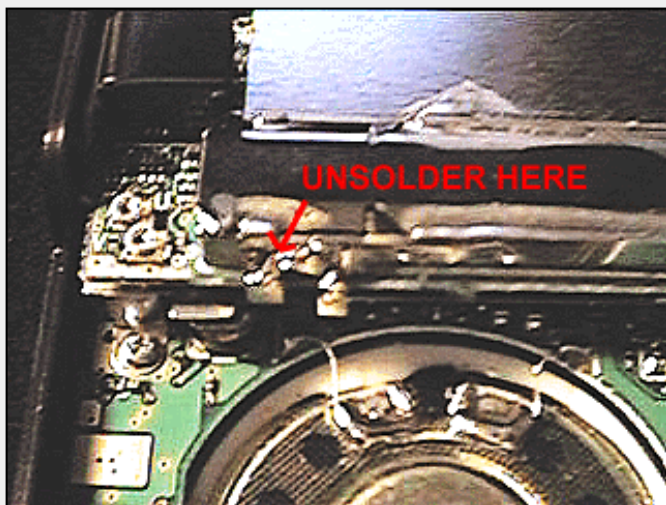


Figure 1.6

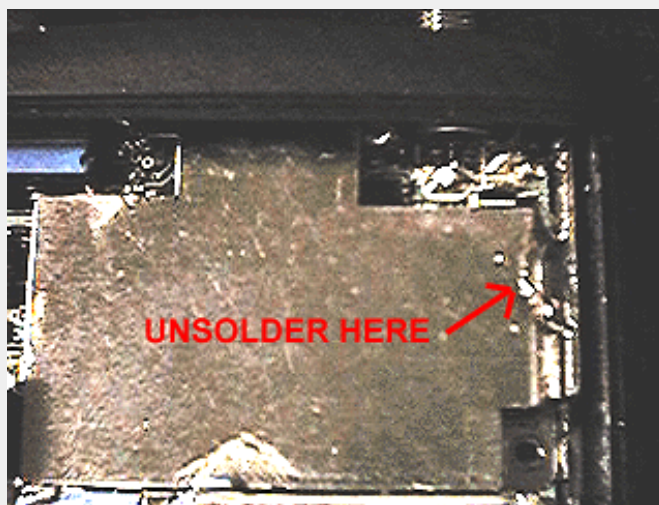
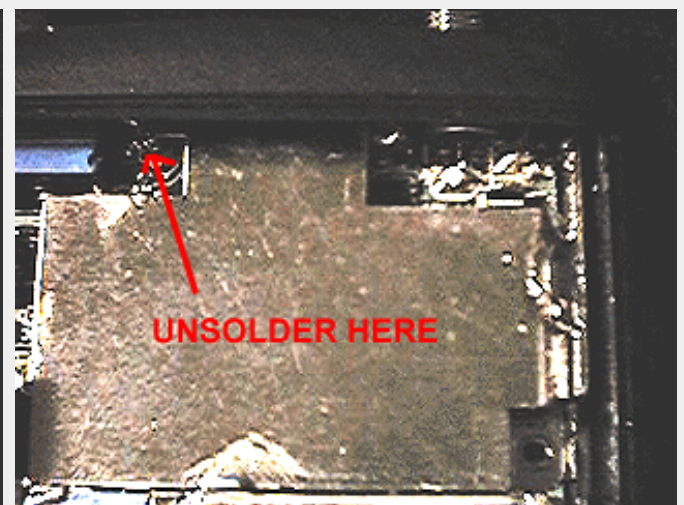


Figure 1.7



Unsolder Figures 1.5, 1.6, and 1.7 with the solder sucker and desoldering braid to wick up any left over solder. Be careful not to melt the plastic case in the procedure in figure 1.7.

**\*\*\* WARNING \*\*\*** ONLY, do a small spot at a time. DO NOT OVERHEAT sections. If you don't get all the solder in one time, don't worry, let things cool down a bit and go back for more later when it cools.

## **STEP 8**

Once you have removed all the solder from the above steps, lift gently with your FINGERS ONLY, the rear of the RF board until the connector on the RF board figure 1.8 dislodges from its counter part on the main board, figure 1.9, use your fingers only because of the surface mount components which are located near the edge of the circuit board, you don't want to pry off any of them with the blade of a screw driver.

Figure 1.8

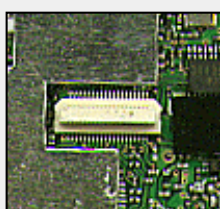
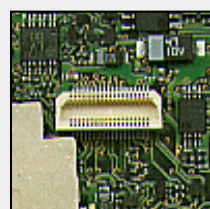


Figure 1.9



Once you have dislodged this connector, the RF board will "Rock" clockwise just a little bit and tap gently on the SMA connector at the same time to dislodge it from the plastic housing (remember, it's glued so be patient). DON'T TAP TOO HARD, the RF board has inductor coils near the SMA connector end that if they get jammed into other parts of the radio could effect performance later. BE GENTILE!

You should now have the RF board completely removed at this time: Figures 1.10 and 1.11 shows both sides of this board

Figure 1.10 Bottom View

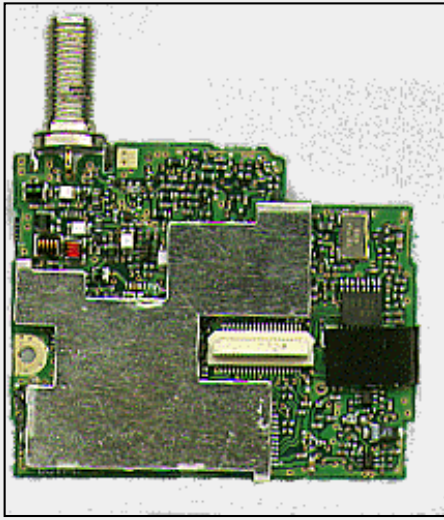
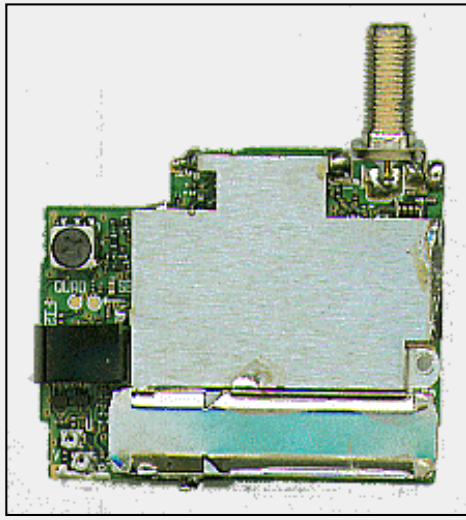


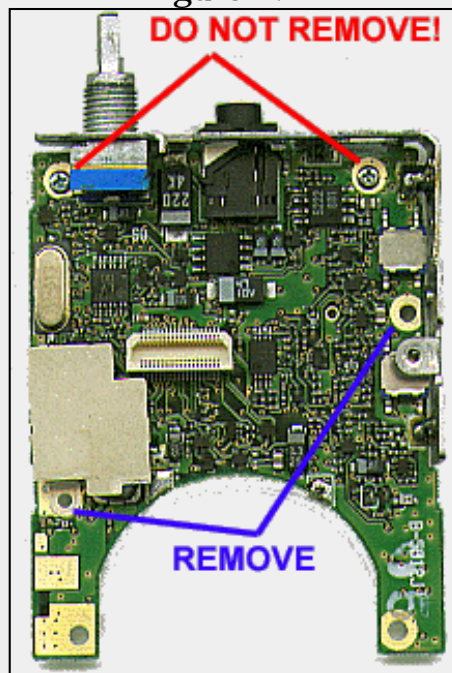
Figure 1.11 Top View



### **STEP 9**

Remove the screw on the right hand side central to the PTT, and FUNC button. And the one on the left just below the little shield. DO NOT REMOVE the two top corner ones they hold the LCD assembly!!! See figure 1.12 for which screws to remove.

Figure 1.12



### **STEP 10**

Desolder the two speaker wires from the speaker. Lift the bottom of the board out till the LCD clears its mounts in the case and pull the board out GENTLY so the rubber seal and the rubber keypad is not dislodged. If they do, just re insert them. See figure 1.13 for speaker solder joints.

Figure 1.13



### **STEP 11**

Turning this board over with the LCD now facing you there is position for 7 SMD diodes marked A or A2 on the right hand side just above the central mounting point. All have to be removed I had 4 in my radio! See figure 1.14

Figure 1.14

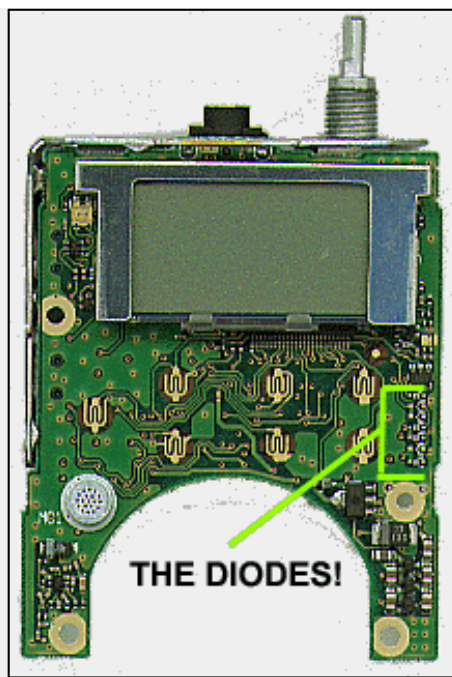
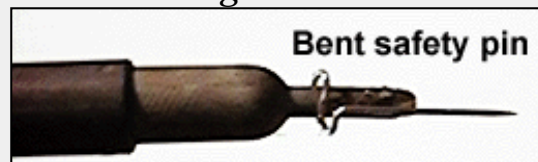


Figure 1.15



The easiest way that I have found of removing the diodes without damaging them or the PCB assembly is to heat one end / contact of the diode with a custom tip I made (pretty ingenious I think) figure 1.15 and using a desoldering braid to wick up the solder and lift that end with a small pointy screw driver (jewelers type works good) \*\*\*\* NOTE \*\*\*\* You don't have to pry the diode up, it just needs to clear the PCB a fraction. Remember, DO NOT over heat the diodes or the contact, this could cause the PCB trace to lift off of the board, that would be a bad thing.

Once you have removed the diodes, take a break! You deserve it.

### **STEP 12**

The re-assembly. The re-assembly is pretty simple. Reverse the procedures. One point of note is when you come to re-applying solder to the RF board to the main housing. Be careful to not apply too much solder so it leaks down into the radio and also do not over heat ANYTHING!

### **CLOSING**

I hope that this mod has been helpful to you. This mod and this page took me quite some time to put together. I am also hosting the mod on my website. All of which is free. I ask nothing in return other than the fact that you email me and let me know how it went for you. As always, remember that you do this mod at your own risk.

73's from Dave Evangelista (N2TRY)

[n2try@radioamateur.com](mailto:n2try@radioamateur.com).[MODIFICATION.NET](http://MODIFICATION.NET)

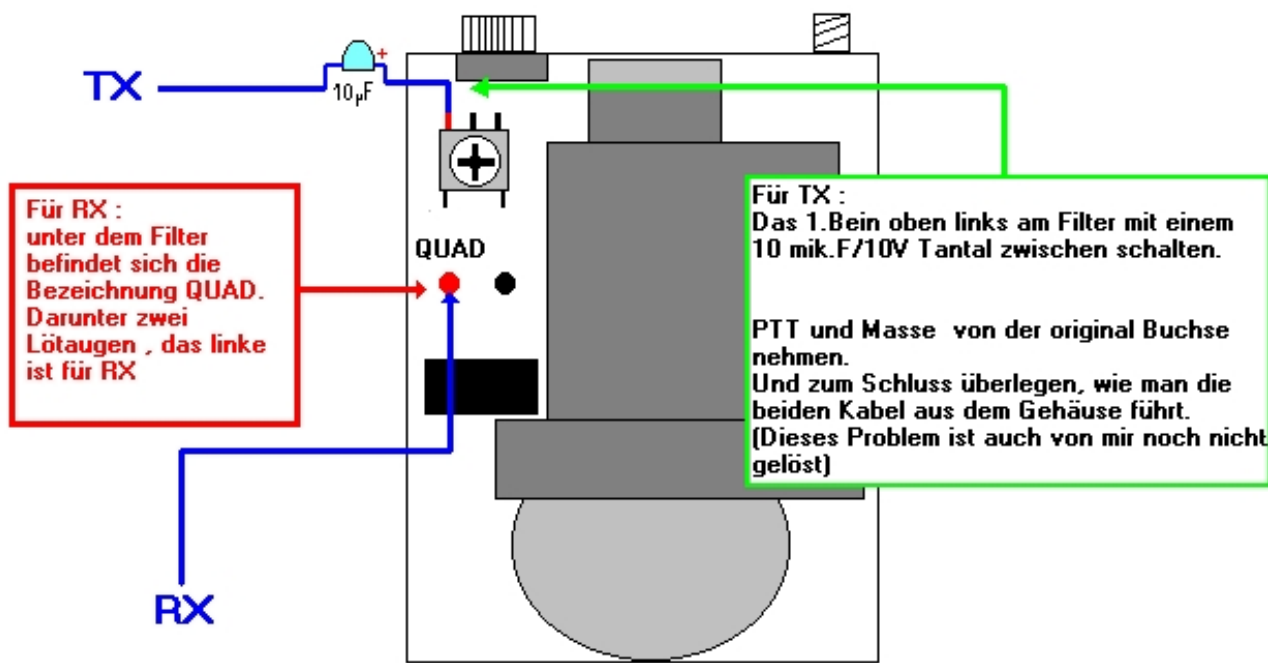
This modification is read 2785 times.

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**07-01-2001**

**(IC-Q7) 9k6 with ICOM IC-Q7E**

**Author:** DL3FDQ - Bülent - [DL3FDQ@t-online.de](mailto:DL3FDQ@t-online.de).[MODIFICATION.NET](http://MODIFICATION.NET)



Für RX :  
unter dem Filter  
befindet sich die  
Bezeichnung QUAD.  
Darunter zwei  
Lötaugen , das linke  
ist für RX

Für TX :  
Das 1.Bein oben links am Filter mit einem  
10 mik.F/10V Tantal zwischen schalten.  
  
PTT und Masse von der original Buchse  
nehmen.  
Und zum Schluss überlegen, wie man die  
beiden Kabel aus dem Gehäuse führt.  
(Dieses Problem ist auch von mir noch nicht  
gelöst)

WER SEIN GERÄT BEIM UMBAU RUINIERT ODER IN DEN  
HALBLEITERHIMMEL BEFÖRDERT IST SELBST SCHULD  
ICH ÜBERNEHME DAFÜR KEINE VERANTWORTUNG  
73 - DL3FDQ (Bülent)

This modification is read 2358 times.

[top of page](#)

**21-03-1999**  
**(IC-R10) IC-R10 Instruction Manual QUICK REFERENCE by PY3PSI**

Icom IC-R10 Instruction Manual QUICK REFERENCE by PY3PSI on 19/mar/1999.

Only for some NOT custom functions!  
Symbols: "+": simultaneously; "-->": after.

NEVER connect the RX to MORE than 16 V DC;  
NEVER expose the RX to rain or snow.  
DO NOT use the RX outside -10 C to 50 C or in direct sunlight.

Current drain (at 13.5 V DC): Rated audio: 180 mA  
Stand-by: 110 mA  
Power saved: 38 mA

When power is OFF, a slight current still flows in the circuits.

CI-V jack: optional OPC-478 cable for remote control or data cloning.

DC jack: charge the Ni-Cd cells. Operate ext. source charge too if CHARGE switch is ON.

SQUELCH: = RF gain in LSB, USB and CW. MONI opens momentarily.

SP jack: ext speaker (8 ohm); & for optional cable for PC or IC-R10

Min step: 100 Hz

Steps: FUNC + MODE: tuning steps (via DIAL. Ending: CLR)

Steps of Dial: FUNC + SCAN (VFO mode)

Dial fast select: FUNC + DIAL

Change Vfo to Memory to VFO: V/M

Copy Vfo x Memory: FUNC + V/M = VFO --> MEM --> VFO (--> DIAL or 2 digits)



--> hold V/M; fast: FUNC + hold V/M for 2 sec

Change Memory BANK: FUNC + DIAL; DIAL only (or 2 digits) change channel

Memory:

push EDIT many times; push ENT on end of each character. Hold EDIT to SAVE.

Search Name on memory:

FUNC + EASY --> DIAL/keypad --> SCAN --> ENT (to select) or SCAN again, for next match

Scan edge set:

FUNC + 4 (VFO mode)

Scan edge set for AUTO MEMORY:

FUNC + 5 (VFO mode)

RX mode set for MODE SELECT scan:

FUNC + 7 (MEMORY mode)

Priority watch:

select QRG --> FUNC + hold 9 (to set); FUNC + 9 turns on/off watch every 5 secs (if signal is present, pauses 5 secs)

BAND SCOPE:

10 channels (max [default] 20 KHz apart each), centred. only with FM in VFO mode! CLR for escape.

SCAN:

DIAL turn scan direction (if running) or starts again while pausing

VSC: scans (pauses) only modulated signal

DELAY: FUNC + CLR --> EDIT many times until SCAN DELAY appears

SKIP: QRGs in BANK R are skipped ("SKIP" is displayed)

STOP scanning: SCAN or CLR

PROGRAM: FUNC + 4 --> DIAL; S = Start E = End --> SCAN; EDIT to change

AUTO WRITE MEMORY:

FUNC + 5 (as above); store in BANK Q

FUNC + V/M skips unwanted signals Automatically overwrite old Q BANK

BANK scan: FUNC + 8 (as above)

MODE scan: FUNC + 7 --> MODE; (as above)

SKIP: FUNC + CLR --> push EDIT until SKIP options (CLR to finish) PROGRAM SKIP ON --> VFO --> SCAN --> to BANK R (FUNC + V/M skips)

SIGNAVI:

only FM! Speeds up scanning.

Jumps up to 100 kHz to the NEXT busy QRG (= max. 5 steps)

VFO --> FUNC + 6 --> FUNC + 4 or 5... (as above)

EASY:

EASY --> number of program --> SCAN (as above); EDIT to change

SET mode:

FUNC + CLR --> EDIT many times as needed

AFC:

only FM! = Automatic Frequency Control when out of center (retunes) FUNC + "."

LOCK:

FUNC + EDIT

ATT:

Attenuator protects strong signals from distorting (20 dB); FUNC + 0

BOOT:

Partial:

MODE + POWER --> DIAL --> ENT (no changes in memory)

All:

CLR + POWER --> DIAL --> ENT

73s de Milton Teuner - PY3PSI SWL: ZZ3-0149

[py3psi@gw.ab6qv.ampr.org](mailto:py3psi@gw.ab6qv.ampr.org).[MODIFICATION.NET](http://MODIFICATION.NET)

This modification is read 1916 times.

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**27-11-2001**

## **(IC-R10) ICOM R10 Receiver Modification to Provide S-Meter Output**

**Author:** *Doppler Systems Inc.*

April 21, 2001

A Technical Application Note from [Doppler Systems Inc.](#)

### **Acknowledgements**

This application note was submitted by Lt. J.G. Peter Arts from USCG Boston and was based on instructions originally received from Phil Godbold of Adur Communications in England.

### **Introduction**

The purpose of this application note is to describe the modification of an ICOM IC-R10 receiver to provide received signal strength indication (RSSI) through the 'ring' terminal of the external speaker jack for use with various Doppler radio direction finders. The modification consists of soldering a resistor between two internal contacts on the radio IC board.

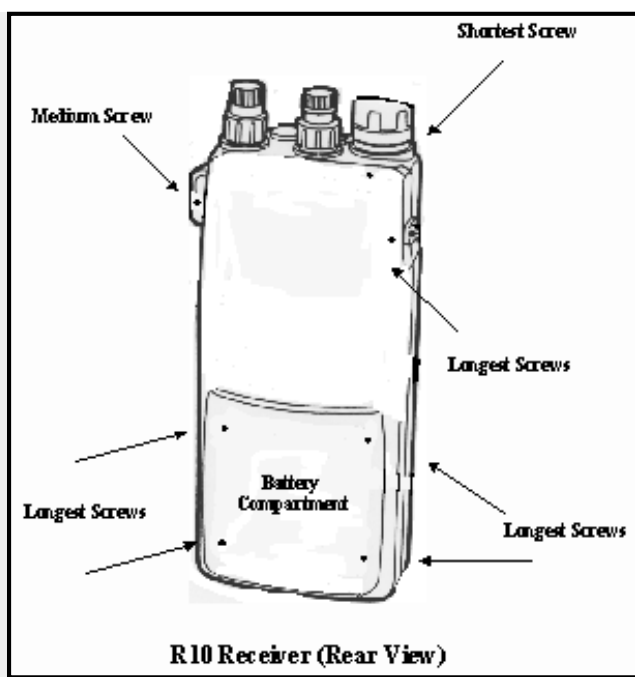
### **Items Required**

- ICOM IC-R10 Communications Receiver
- Radio Shack 2711321 1Kohm (¼ watt) Resistor
- Radio Shack 274375B Stereo Signal Splitter Y Adapter Plug
- Insulation Spray or Small Heat Shrink
- Small Philips Screwdriver
- Soldering Iron with Fine Nib
- Heat Sink Clamp

### **Case Disassembly Instructions**

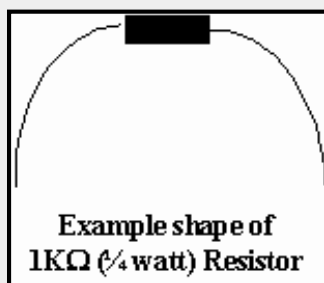
*Note - There are three different size screws used to connect the R10 Receiver. When removing screws, keep the one short, one medium, and five long screws separate.*

1. Manually remove battery cover.



2. Using small screwdriver, remove 7 mounting screws (locations shown in below diagram).
3. Carefully open receiver case to expose electronic circuitry (see photograph at end of instructions).

### 1Kohm Resistor Jumper Preparation



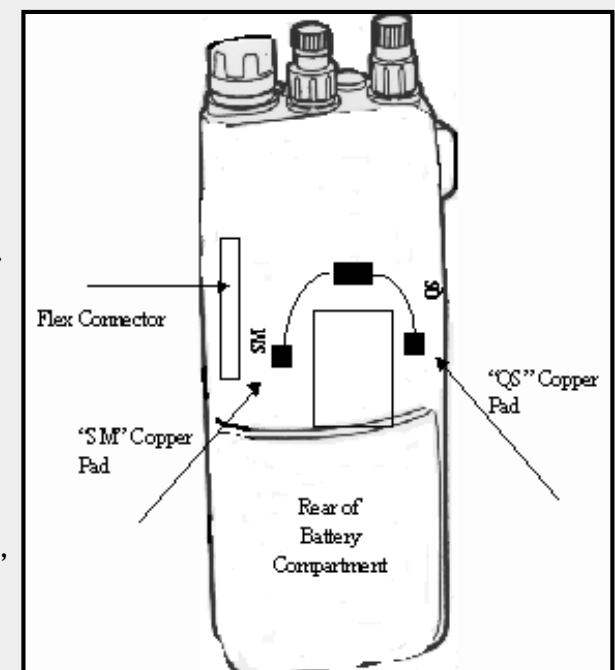
1. Form resistor leads to fit the intended application as shown in the following figure, i.e. a jumper between the Signal Meter output terminal "SM" and the speaker output terminal "QS."
2. After forming the resistor leads, cover the leads with insulated sleeving or insulation spray.
3. Using soldering tools, "tin" each lead end.

### Resistor Installation

1. Using soldering tools, apply a small amount of solder (tin) both the "SM" and "QS" copper pads which are located on the circuitry behind the battery compartment. Refer to the below figure.
2. Using soldering tools, carefully mount each 1Kohm resistor leads (one to the "SM" terminal, the other to the "QS" terminal). Also see photograph at end of instructions. **Avoid excessive or prolonged heating.**

### Case Reassembly;

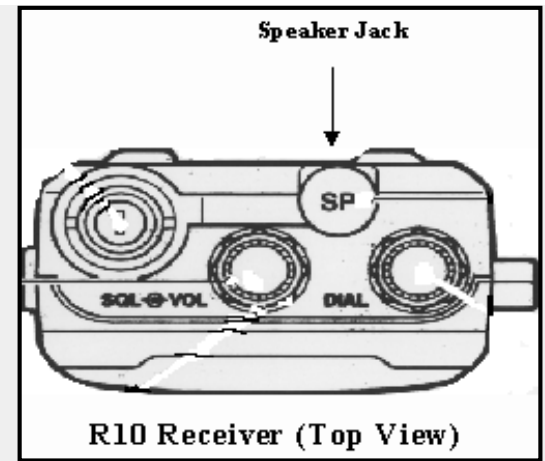
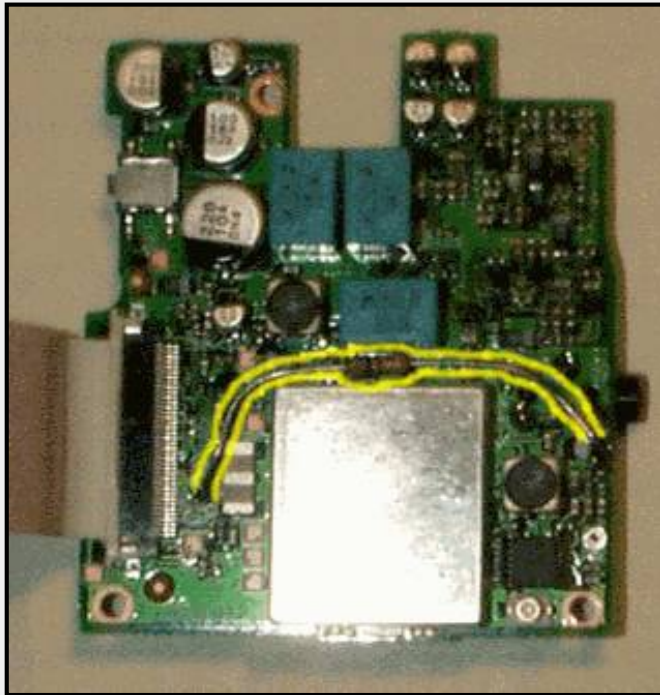
1. Carefully mate the R10 receiver case together, taking care not to jam any rubber plugs or the flex circuit.
2. Re-install the seven (7) screws in the same locations which they were removed from, i.e. 1 short, 1 medium, and 5 long screws (see figure). **Do not over-tighten these screws.**
3. Manually install battery cover to the receiver.



### Installation of Y Adapter Plug

1. Use an ohmmeter to determine which side of the Y adapter jack connects to the TIP. Connect this to the Audio Input on the direction finder. Connect the side of the Y adapter jack wired to the RING terminal to the RSSI input on the direction finder.
2. Remove rubber plug on Speaker Jack on top of R10 Receiver (see figure).
3. Insert Y Adapter Plug into the Speaker Jack.

This completes the modification. Energize the receiver and verify its operation.



This modification is read 1526 times.

[top of page](#)

**09-03-2002**

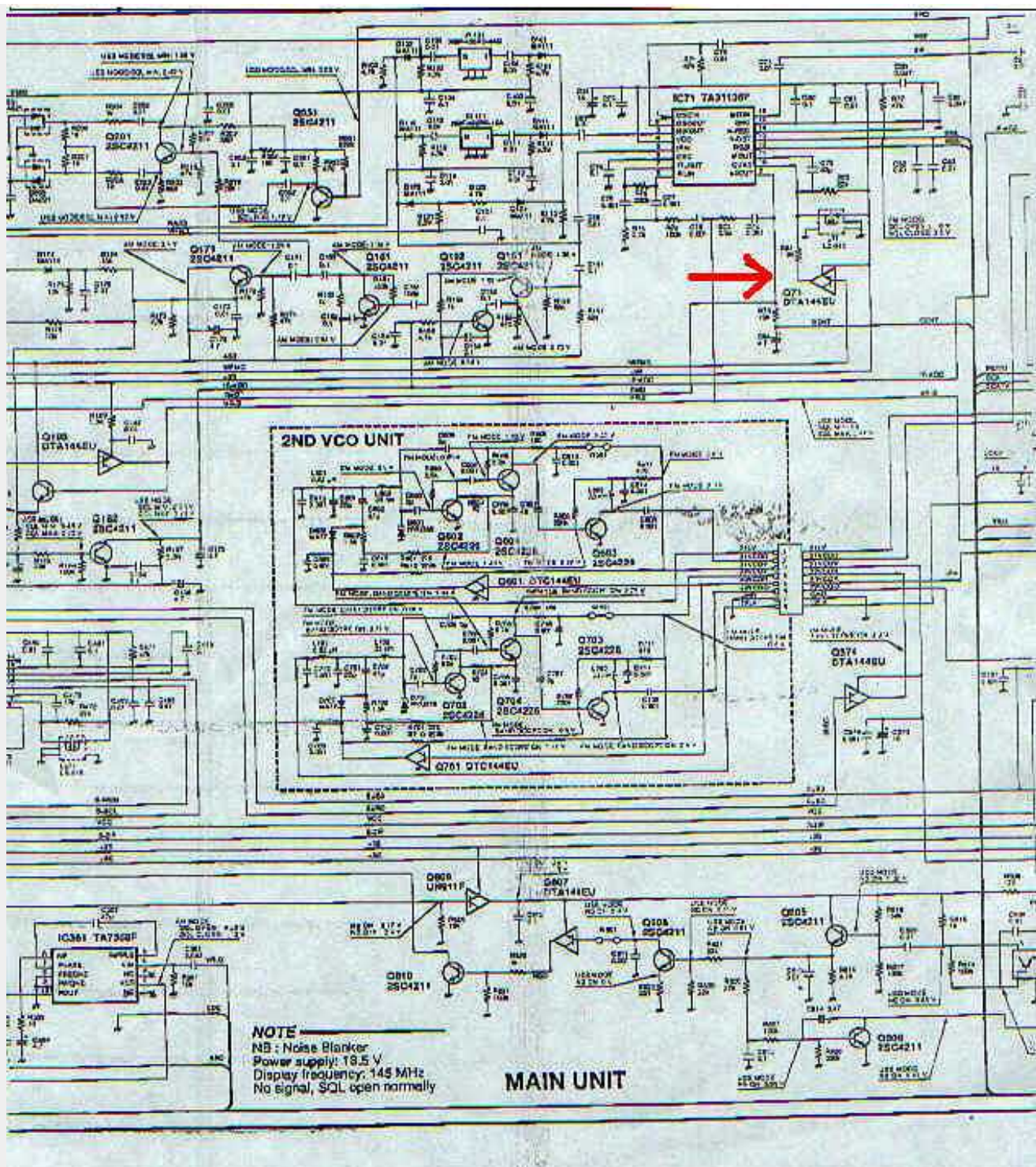
## **(IC-R10) IC-R10 discriminator output modification**

**Author:** - [dtmf@videotron.ca](mailto:dtmf@videotron.ca).[MODIFICATION.NET](http://MODIFICATION.NET)

Here's where to get your "good" audio for your decoder use.

To get a "pure" audio out of your R10 you need to tap off the discriminator, here's where to connect:

On Ic-71 (Ta31136f) pin 9, this is the output of the Fm detector. Watch out because there are two identical chip on the Rx board (the board with the flat cable connector) the chip we want is located on the back of this pcb. Don't forget to turn off your power save as i did! Marc 07/00



If any of this helped you out, [please let me know](#).

This modification is read 276 times.

[top of page](#)

**26-06-2001**

## (IC-R3) IC-R3 to receive SSB from DC to 2.450GHz including the AO-40 satellite

**Author:** Howard Long - [howard@howardlong.com](mailto:howard@howardlong.com). [MODIFICATION.NET](http://MODIFICATION.NET)

**Disclaimer:** if you break your radio, your pride or anything else remotely to do with this procedure, you're on your own.

Here's a mod I've been wanting to do for a while.

Why? The Icom IC-R3 covers upto 2.450GHz, so off the shelf you have a means of receiving S-Band and the AO-40 satellite downlink - err, not quite.

Problem #1: the IC-R3 is only FM, WFM or AM. You need SSB to receive the AO-40 transponder.

Problem #2: the IC-R3 is VERY DEAF at 2.4GHz. It's not quite so bad below 1GHz.

OK, so how do you get the IC-R3 to do SSB? The answer is you don't directly... what you do is tap off the IF and feed the IF into the antenna socket of your General Coverage All Mode HF receiver. This is not a new technique, what's presented here is how you butcher your IC-R3 to do it.

1. Remove belt clip, carry strap & antenna.

2. Remove battery cover and battery (and the AA spacer if you're using AA batteries).
3. Remove the four screws marked in fig. 1. (the top right screw is slightly shorter than the others).



Fig. 1

4. You can now remove the front of the radio.
5. Remove the speaker lead and the screw marked in fig. 2.



Fig. 2 Remove the speaker leads and the screw marked

6. You can now remove the front of the radio.
7. With the antenna connector and tuning knob facing towards you, attach some sub-miniature coax (RG-174/RG-178) to the two points indicated in fig. 3 with the outer shown to the left attaching to the metal shield and the inner attached to the left most pin of the row of three.



Fig. 3. The location of the IF tap

8. Make a hole big enough for the coax to exit the radio - I made a hole near the tuning knob. Alternatively there's probably just room inside around where the carry strap attaches to put a sub-miniature socket. I just left a short SMA lead pigtail fly out.
9. Double check there's no shorts.
10. Reassemble the radio.

In a perfect world...

- a. Capacitively couple your General Coverage all mode HF radio to this IF output with, say, a 1nF cap.
- b. Use an impedance matching attenuator on the IF output.

I didn't bother with (b), and I'm not sure it made a lot of difference as the IF is so strong at this tapping point.

Make sure that having done the mod you don't transmit into the IC-R3, and make sure that if there's any DC short or DC preamp voltage etc on your IF General Coverage All Mode HF Receiver that you capacitively couple (see (a) above) the IF out. I STRONGLY suggest that you either use a receiver (as opposed to a transceiver), or if you do use an HF transceiver, use an RX only (or 'beverage') antenna socket - transmitting directly into an R3 will cost you dearly.

The problem #2 of the deafness of the IC-R3 in the GHz can only be rectified with a low noise preamp with at least 20dB gain to overcome this receiver's poor sensitivity. Yes it really really is very very deaf. I listened to AO-40 with a signal strong enough to decode with a 25dB preamp switched in at the radio, and it was not possible to even tell there was a signal there without the preamp.

The IF tap's centre frequency is 26.050MHz, and is fairly wide so you tune your IC-R3 to within a few tens of kHz, and fine tune your HF RX around 26.050MHz (see fig.4.).



Fig. 4. Receiving AO-40 (at MA= 13)

One last problem is that the VCO is rather sensitive to temperature, which with a unit like this at this frequency is hardly a surprise.

[Howard, G6LVB](#)

This modification is read 3324 times.

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**30-03-2001**

## **(IC-R71) RAM Card Backup Battery Replacement Instructions**

**Author:** ICOM

In the early 1980s Icom America marketed a group of transceivers and radios that utilized the latest state-of-the-art computer technology to enhance the operation of the radios. This technology improvement allowed hams to afford a reasonably priced high performance transceiver which until then was only available on units costing much more. Features now available to the hams included: higher frequency stability, better frequency resolution, digital frequency display, almost instant recall of saved frequencies (memory channels), quick mode signal processing and built in tones and offsets for the rapidly emerging repeater operation.

Implementation of all these features required a CPU with associated logic circuitry. In the early 80s, the most cost effective way to implement data processing and memory functions was through a DRAM (Dynamic Random Access Memory) to control the CPU. This DRAM was a volatile memory integrated circuit which required a lithium battery to retain its instruction set. The following receivers and transceivers had such RAM units:

IC-271 ; IC-471 ; IC-1271 ; IC-745 ; IC-751/A ; IC-R71A

The lithium batteries in these units typically lasted about 5 to 7 years before replacement was required. This was specifically noted in each of the Owners Manuals for the products.

This lithium battery can be replaced by the radio owner if care is used. The following is a recommended procedure to accomplish this:

### **Procedure**

1. Disconnect the power cable from the radio, and take the cover off.
2. Unplug the RAM board and remove it from the radio.
3. Temporarily solder a 3 Volt DC battery source across the existing battery terminals (see suggested connection points on the circuit board pictures).
4. Unsolder the old lithium battery and replace it with a new one. (BR2325 1HC, ICOM stock number 945 03112)
5. Unsolder your temporary 3 Volt DC source.



6. Reinstall the RAM board into the radio.

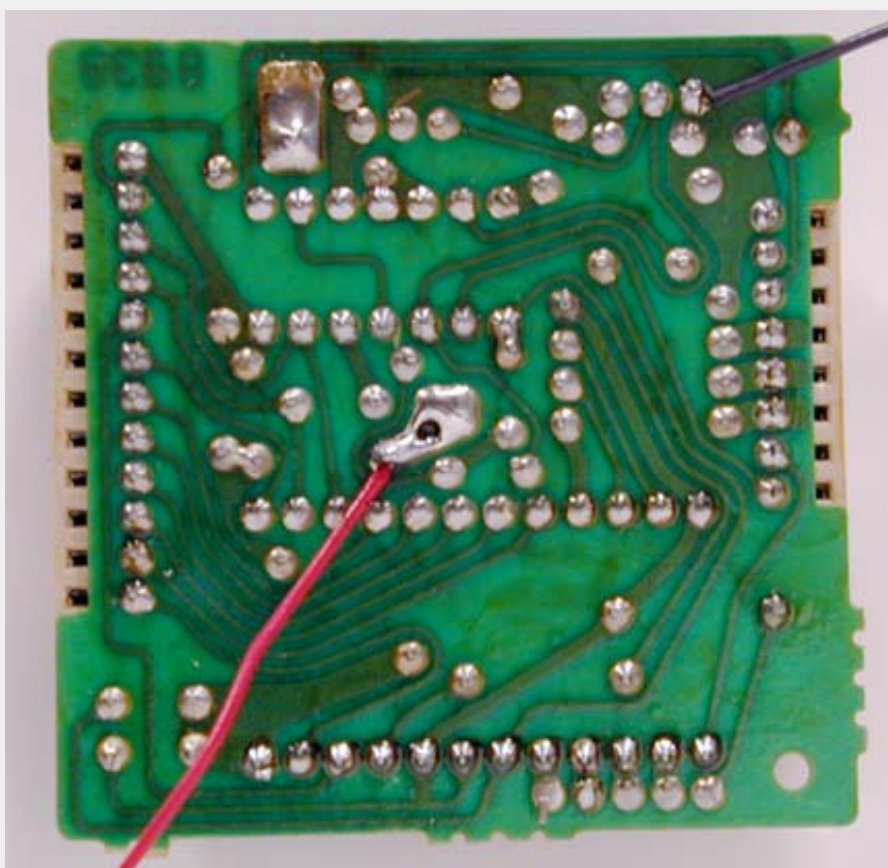
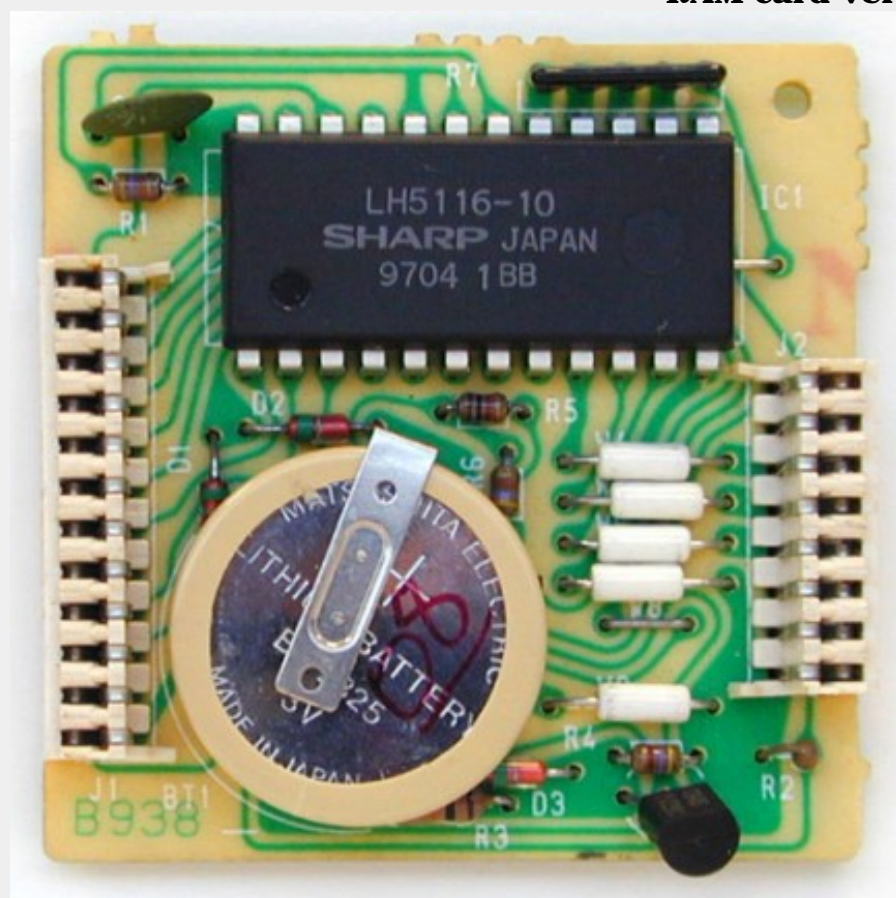
### Cautions

1. Do not use an AC powered 3 Volt DC source, your grounded soldering iron tip could short out the battery (+) terminal. Use a 3 Volt battery DC source only (2 alkaline cells for example).
2. Do not solder the external DC wires directly to the lithium battery tab pads. If you do so, you will not be able unsolder the battery without having the wires drop off.
3. If by accident you lose power to the RAM unit it must be sent to Icom America for reprogramming.
4. Be careful not to damage or bend the connector pins on the radio side while removing or reinstalling the RAM card.

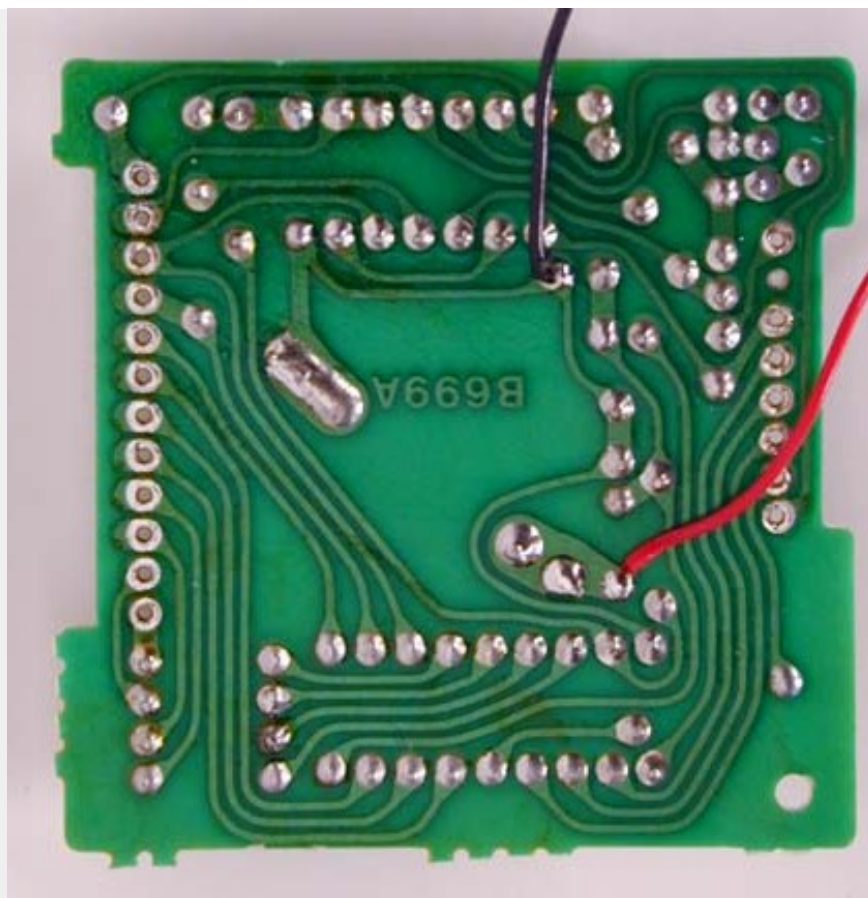
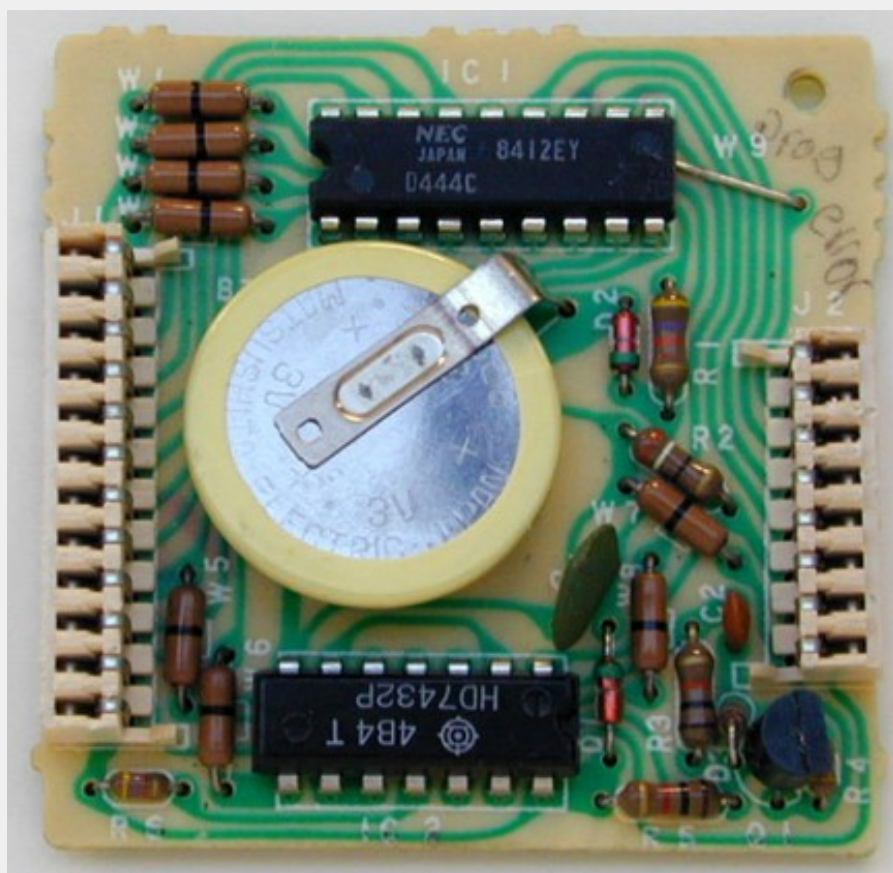
### Pictures

There are two versions of the ICOM RAM boards. Both are identical in operation, and they are interchangeable. The differences are in the circuit board layouts only. Note that the black and red wires visible on these images are the suggested way of connecting the external DC backup voltage while the battery is being replaced. The wires are not a part of the RAM card, and should be removed when the battery replacement procedure is complete. Refer to the replacement procedure outlined above.

#### RAM card version A images:



#### RAM card version B images:



This modification can also be found at ICOM's own homepage on the following URL: "[RAM Card Backup Battery Replacement Instructions](#)"

This modification is read 737 times.

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**18-11-2001**

## **(IC-R71) RAM board programming interface & R71A modification**

11 December 1999 by Andrew Gerald, N2CBU

eMail-1: Lorand@QwestInternet.net

eMail-2: N2CBU@ARRL.NET

### **A word of caution before you begin:**

It's possible that due to a wiring error, parallel port error or software incompatibility you might erase the contents of your RAM module. If your RAM module is from an R71A you can restore its contents from the enclosed "ORIG-R71.BIN" file. I do not have any other "recovery" files and until some become available I urge caution. Perhaps it would be wise to test your interface on a RAM module from a R71A first before reading RAM modules from other radios. I will add "recovery" files for the other radios to this archive if they are sent to me.

**\*\*\* Note-1:** If the "WP" Write-Protect pin (see J2 on the interface schematic) is tied to ground instead of to +5v the critical lower RAM locations in the module are write protected. A simple modification to the interface board would be to add a write protect switch.

**\*\*\* Note-2:** If the "/WR" Write pin (see J2 on the interface schematic) is left unconnected when testing the interface then the entire RAM will be write protected. Thus you can test without much chance of erasing the contents of the RAM module.

### **Icom RAM board programming interface & R71A modification notes**

You will need a CD4040 IC, a 78L05 voltage regulator, an 8-pin strip of 1" tall 0.1" spaced header pins, a 12-pin strip of 1" tall 0.1" spaced header pins, a DB25M, a length of ribbon or other type cable, and a piece of perf board. For the prototype I used a Radio Shack part number 276-149 prototyping board. It should be noted that my prototype does not have an on-board voltage regulator. I included the regulator on a subsequent board I built in 1991 which I gave away.

All parts may be obtained from Digikey ([www.digikey.com](http://www.digikey.com)) and certainly from other sources. A suitable header pin strip is Digikey part number "S1081-36" but any similar header pin material will work.

Circuit layout is simple, just take a look at the ram module in the R71 and imagine how the header material will have to be positioned. What you want to do is make a "socket" on the programming adapter which looks just like the "socket" in the R71A. Build up the circuit on a small piece of perf board with the 4040 in the center. The long side of the header pins will have to be bent slightly outwards for the ram module to fit. The ribbon cable from the PC will attach near the smaller header strip.

For the R71A to tune above 31 MHz, in addition to editing the RAM module, you will have to make a modification to the Logic Unit. I have included a file which describes how to do this. See the file named "R71MEM.TXT" for instructions. Credit for this part of the mod goes to the author of that file.

The software is NOT a polished product. There isn't much in the way of error checking when reading or writing a file to disk. It will however verify writes to the RAM module automatically after writing. I just added an unlisted (V)erify function accessible from the menu and an automatic CPU timing test. The software should work with a standard IBM-PC bi-directional parallel port with base addresses of 3BC, 378 and 278. Most modern computers, including laptops, now have bi-directional parallel ports. You may however need to mess with your parallel port configuration. I have not had any trouble running the software on my IBM Thinkpad 486-25 or on my AMD-K6-III-450 tower. That doesn't mean it will work for everyone though. Bi-directional mode is selected by writing a "one" bit to port base+2.5 and if your port works differently the program will likely fail. I have heard that some of the more advanced parallel port ICs need to have an "unlock" bit set before bi-directional mode can be enabled. If anyone can provide me with the necessary info I will update the software to support these ICs.

Note that values stored in the RAM module are big-endian and that the static RAM IC is only 4-bits wide (nibble mode.) Some important memory addresses (in hex) in the RAM module for the R71A are as follows:

10/11 = LSB offset  
12/13 = USB offset  
14/15 = AM offset  
16/17 = CW offset  
18/19 = RTTY offset  
(FM has no offset)

30/31 = lowest frequency (factory is 100kHz)  
3B/3C = highest frequency (factory 30MHz)

**Example 1 - To change the lower frequency limit to 10kHz:**

```
Original - 000: 00F1FF1FF002FFFF000B59686800032005930005000000000100000030003000
Modified - 000: 00F1FF1FF002FFFF000B59686800032005930005000000000100000030003000
```

**Example 2 - To change the upper frequency limit to 35MHz:**

```
Original - 000: 00F1FF1FF002FFFF000B59686800032005930005000000000100000030003000
Modified - 000: 00F1FF1FF002FFFF000B59686800032005930005000000000100000030053000
```

I have enclosed the file from my R71A receivers (MY-R71.BIN and the hex dump MY-R71.HEX) as a starting point for offset tweekers. The offsets are big-endian meaning that the first value is the least significant. You can compare these files against the non-tweaked files (ORIG-R71.BIN and the hex dump ORIG-R71.HEX) to see what changes have been made.

[Download](#) the whole file.

This modification is read 776 times.

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**19-07-1998**

## **(IC-RP3010) IC-RP3010 disable the CTCSS**

Model: IC-RP3010

Division: Amateur

Note: This service bulletin is meant for technical personnel with experience working on solid state communications equipment. Damage caused by improperly installing this modification may cause ICOM to charge for subsequent repairs to the product. ICOM does not warrant this modification.

Bulletin #: 10789-001

Date: April 18, 1989

Subject: When the power is applied to the repeater the CTCSS is enabled automatically. If it is desired to disable the CTCSS at power up this modification may be made to the repeater.

Information: On the control unit IC8 is a dual D type of latch.

The Q and not Q outputs on this IC control the CTCSS enable line. To disable the CTCSS encoder at power up or system reset pins 12 and 13 on IC8 must be exchanged.

#### Procedure

1. Remove the control board from the chassis.
2. Cut the trace going from R20 to pins 9 and 12 on IC8.
3. Cut the trace going from J2 to pin 13 on IC8.
4. Add a jumper wire from the land cut on R20 to pin 13 on IC8.
5. Add a jumper wire from the cut trace on J2 to pins 9 and 12 of IC8.
6. Reinstall the control PCB back in the chassis.

#### Operation

After this modification is made A125 will turn the CTCSS on and A126 will turn the CTCSS off.

This modification is read 278 times.

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**03-02-2000**

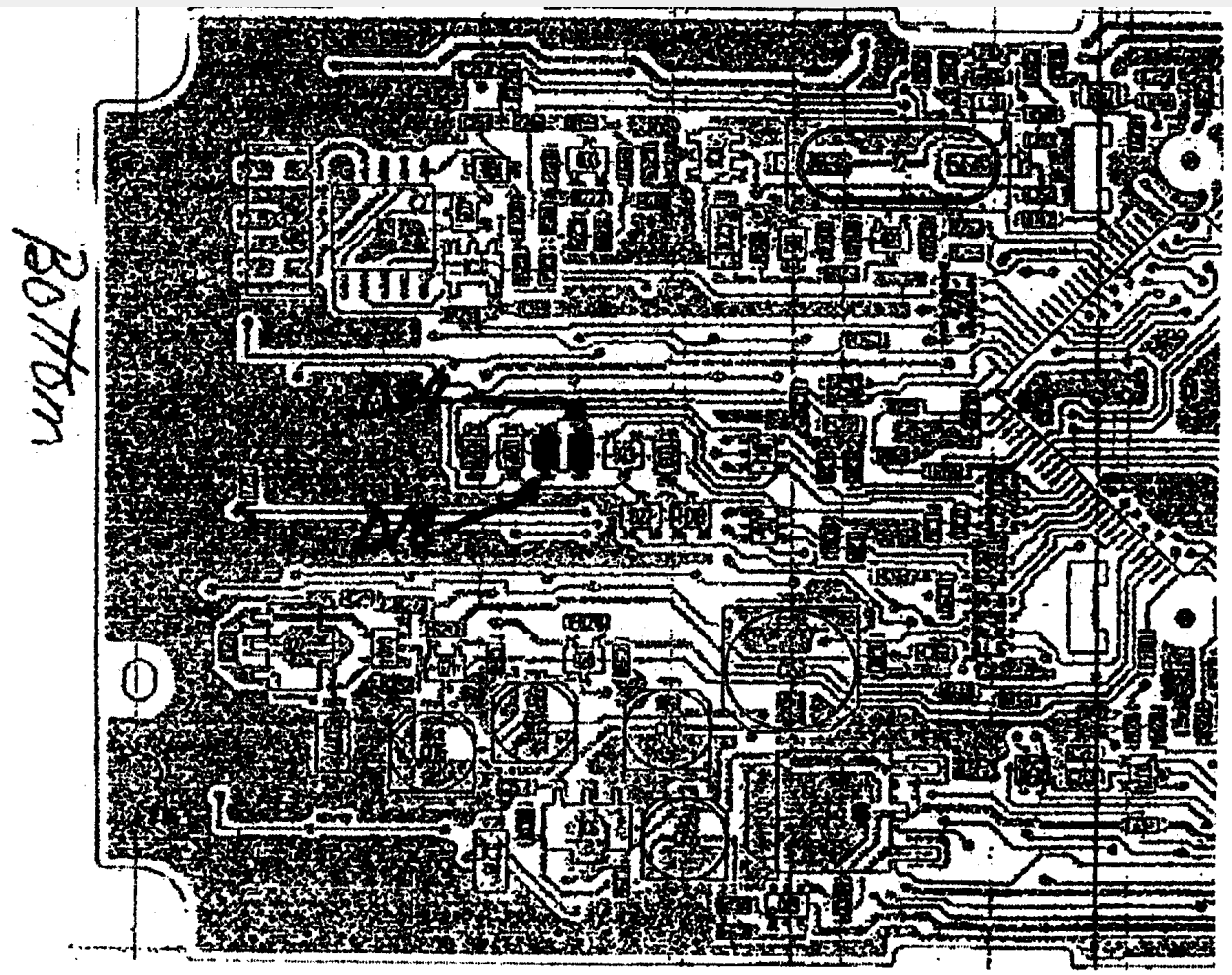
### **(IC-T2) Expand TX/RX frequency**

**Notice:** We can not guarantee specification when expand frequency.

Expand Transmit frequency.

- Remove the "D18 diode on Main unit.

After modification. The IC-T2 display frequency indicate between 100 MHz to 200 MHz, but it is only display. We can not guarantee PLL working range at out of HAM Band.



**Date:** 21-12-2001

**User comment**

**From:** [KC1RW](#)

**Subject:** Extra info

To remove the circuit board you also have to remove the nut around the power/volume switch, and desolder the main power connection at the switch, the switch comes out with the board.

Also, on mine, I already had extended receive with the D34 diode in place, so I left it. I am with a volunteer fire dept. and this radio with the mod is definitely useful in a pinch.

KC1RW

**Date:** 23-02-2002

**User comment**

**From:** [don](#)

**Subject:** Easy access for IC-T2H extended TX mod

No need to remove a single screw for this mod!

1. Remove battery pack.
2. Peel off black cover.
3. Peel off foil at bottom.
4. Remove green paper.
5. Find two small diodes in the middle, both marked 18.
6. Cut through the lower one.

Your new TX range will be about 130-180mhz.  
HAVE FUN! Don..

**Date:** 26-03-2002

**User comment**

**From:** [Brent](#)

**Subject:** great,easy mod

Thank you soooo much for this extremely easy and effective mod. My ic-t2a, (Serial #02869, If it makes any difference) responded GREAT! Displays 136.00 to 174.00Mhz, actually transmits 137.00 to 174.00Mhz. DON IS CORRECT, YOU DON'T EVEN REMOVE ANY SCREWS!!!!!! I work with EMS and am so grateful for this mod.

This modification is read 1891 times.

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**16-06-2001**

**(IC-T2) IC-T2H Receive 100-200 MHz**

**Author:** Russell Rawlings - [ei10@qwest.net](mailto:ei10@qwest.net).[MODIFICATION.NET](http://MODIFICATION.NET)

I found out that if you hold down the up arrow button and the one with the speaker when the radio is off and keep them held down and turn on the radio, and then turn it off and on again with out holding down the buttons, will make the radio's receive range go from 136.000 MHz and 174.000 MHz to 100.000 MHz to 200.000 MHz.

This modification is read 1543 times.

[top of page](#)

**06-03-2000**

**(IC-T22) To expand receive from 136-174MHz FM to 136-174/270-410MHz FM:**

1. Turn radio off
2. Hold MR & UP SCAN arrow down while turning radio on... don't release for 5 seconds
3. Go into the set mode by pressing the function & 8
4. You are looking for the function " 1 PL "
5. Turn the main tuning knob until you see " 100 PL ". Now you can enter the frequency digit by digit and also airband.
6. Press Clear to return to VFO mode.

**Date:** 30-12-2001

**User comment**

**From:** [Web Surf](#)

**Subject:** Icom IC-T22A

I tried the soft mod on the Icom IC-T22a to open up the receive. It works, I can receive Airbands below the 2mtr band as well as stuff uptill about 385 MHz.

Though the LCD can now show a very wide range of frequencies, in practice the Icom IC-T22a can receive roughly 110MHz to 385 Mhz

There is also the undocumented way to shift from AM receive to FM receive : Press Function and Moni together. A little decimal point lights up on the LCD to show you which mode you are in.

A) Can anyone mail me mods HE HAS TRIED HIMSELF to expand transmit range ?

B) I found a company in Florida USA called KENDOO that makes a 9.6V 1000maH battery for this handheld. It enables the T22a to output the max 5W that it can. the 1000maH rating is more than the original ICOM batteries.

This modification is read 1103 times.

[top of page](#)

**06-03-2000**

### **(IC-T22) Extended transmit for IC-T22**

First remove the battery and antenna. Separate the case by removing the four black phillips screws and two bottom silver phillips screws (leave the two top silver phillips screws alone).

On the half that has the PTT switch and 'front' of the radio, locate a bank of diodes just to the right and below the printing 'UHF' on the circuit board down near the lower right side of the board.

There are four of them, three black with 'AY' printed on them and having three leads on them, one silver having the number '18' on it and only two leads.

If you are holding the radio parts vertically, (the printing 'UHF' is right side up), then the block of four will be:

AY 18

(blank) AY

Using a micro solder iron with a pointed tip - be careful to apply just enough heat to loosen the top '18' and 'AY' diodes and lift all but one of the leads off of each with a jeweler's screwdriver or the tip of an x-acto knife. By leaving one of the leads attached you have the option of reattaching them if you choose to. These diodes are so small you would otherwise lose them and if you ever need to send the radio back to Icom for repair the warranty would be voided. I also use a loupe to better see what I'm doing.

Because there's not much clearance (these things are about the size of a pinhead) you have to be VERY careful with the soldering iron.

This modification is read 1126 times.

[top of page](#)

**03-12-2001**

### **(IC-T3H) Extended RX/TX**

**Author:** Mabel Jakobsen - [mabelja@frisurf.no](mailto:mabelja@frisurf.no).[MODIFICATION.NET](http://MODIFICATION.NET)

1. Remove battery
2. Remove the optional connector access cover UT-108 (plastic)
3. On the upper right side you see 10 SMD components. Remove 2 on the down left side
4. Then you tranceiver is open RX-TX 136.00-174.00 MHz

**23-08-1998****(IC-T7A) Icom IC-T7A Mods**

Hold the Moni and band buttons while powering up the radio, wait for at least 5 seconds before you release these buttons. Then press the band button and see what happens. You will be pleased.

Gary

It has also been said that if you remove D15 on the logic board that tx at 420 is possible. The D15 is located on the lower right side of the logic unit in the center of three diodes. It's marked with a P, you will need to turn the unit upside down to read the P.

The modification also work on the Icom IC-T7H, but US version will still be cellular blocked. Here is the frequency range.

50 to 200 MHz  
300 to 824 MHz  
849 to 869 MHz  
894 to 999.99 MHz

**03-03-2001****(IC-T7H) Expand frequency**

**Author:** Icom

**Notice:** We can not guarantee specification when expand frequency.

How to expand RX frequency

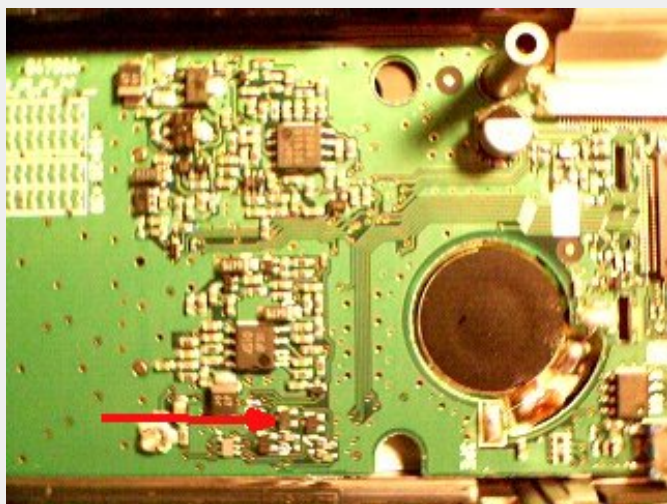
- Push **[BAND]** + **[MONI]** key while turn ON the power switch.

This give you RX 118.0 - 174.0 MHz and 400.0 - 470.0 MHz.

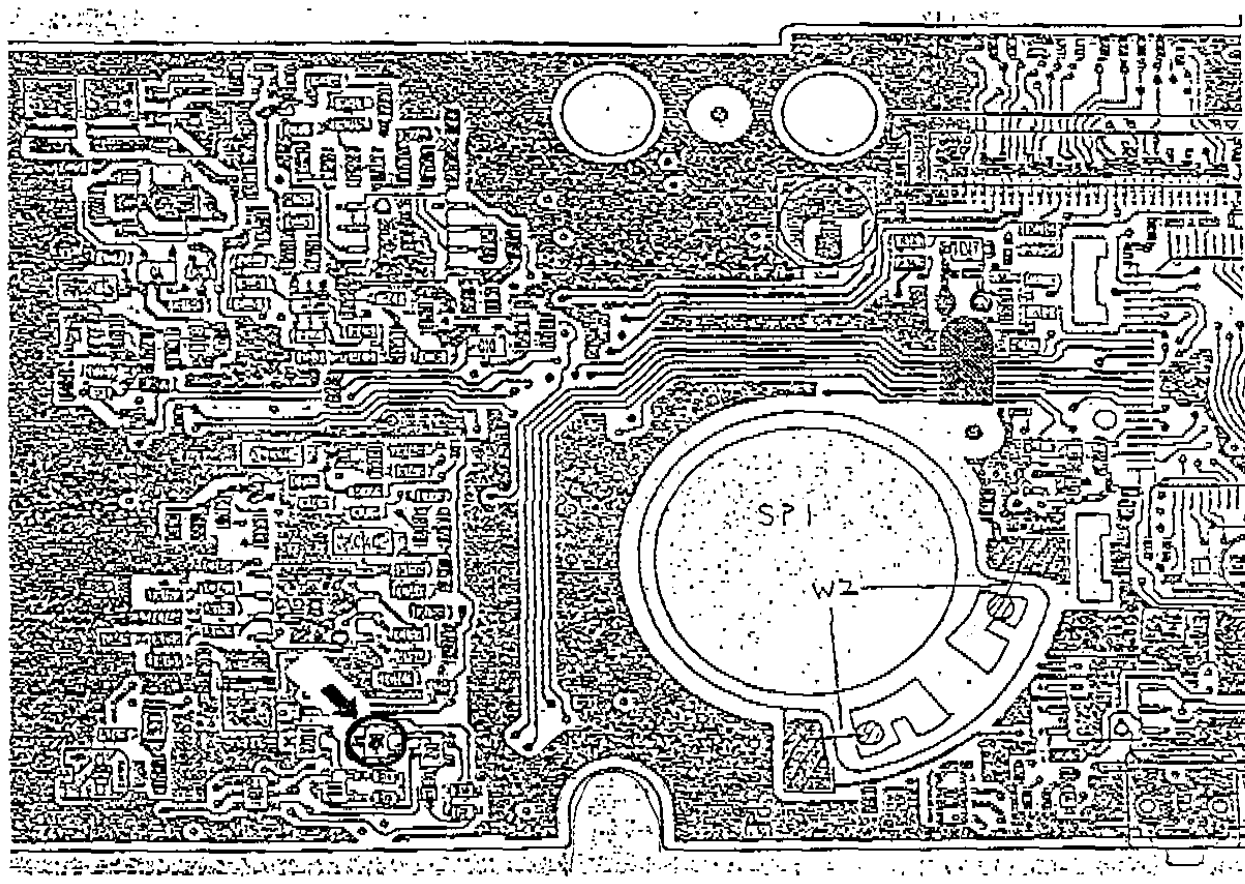
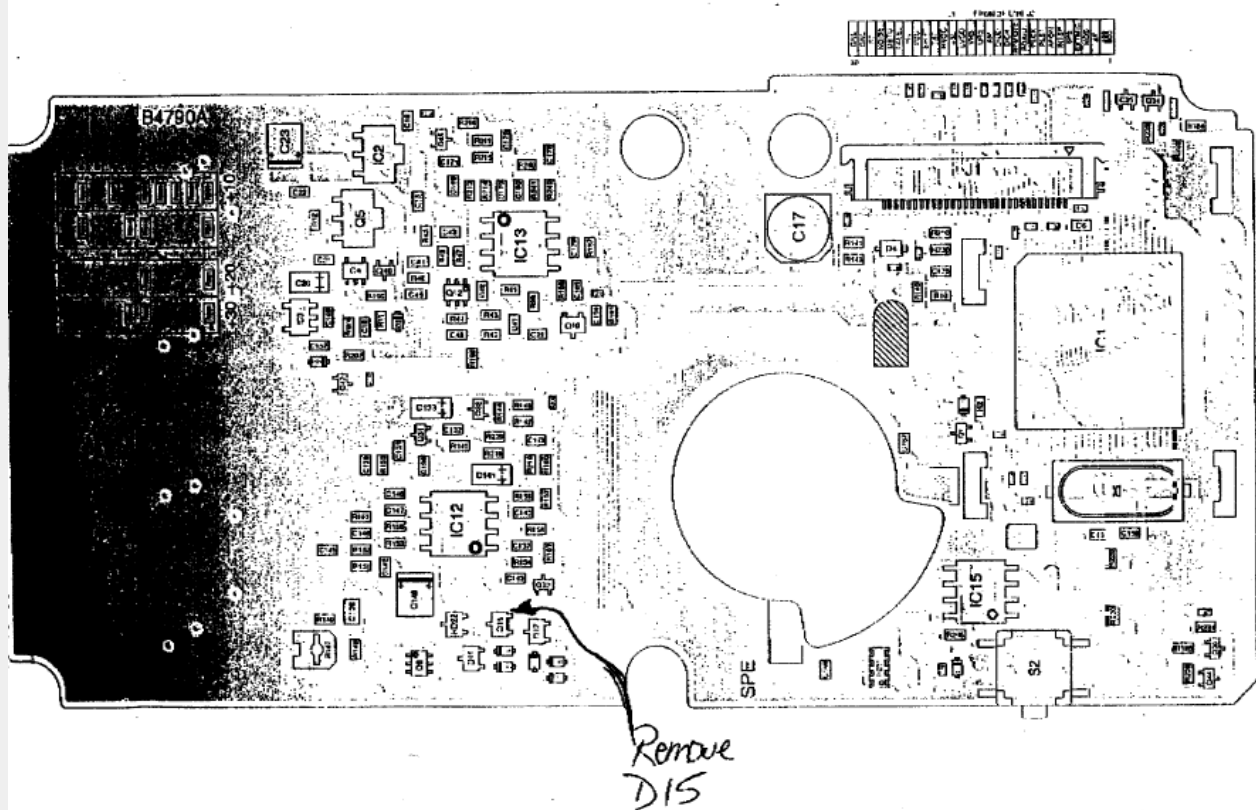
How to expand RX/TX frequency.

- Cut D15 diode on logic unit. (See below board layout).

This give you RX/TX 118.0 - 174.0 MHz and 400.0 - 470.0 MHz.



RX Needs Expanded before it will operate  
Out of band



This modification is read 3462 times.

[top of page](#)

**12-05-2001**

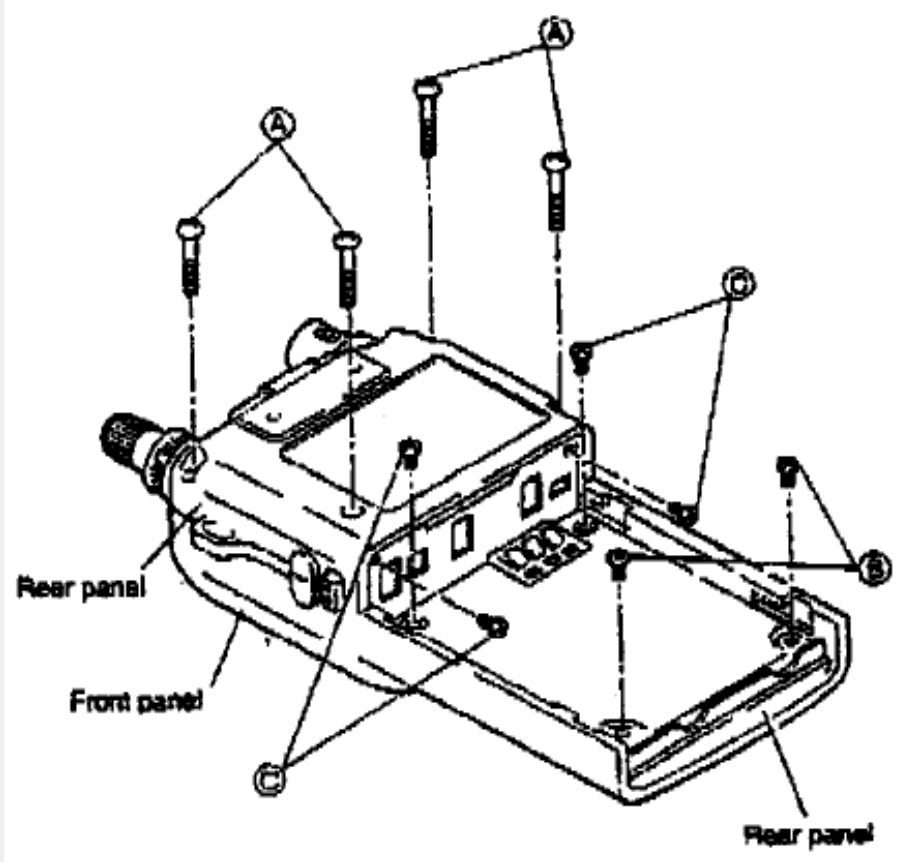
## **(IC-T7H) Disassembly instructions for IC-T7H**

**Author:** ICOM

### **Disassembling Panels**

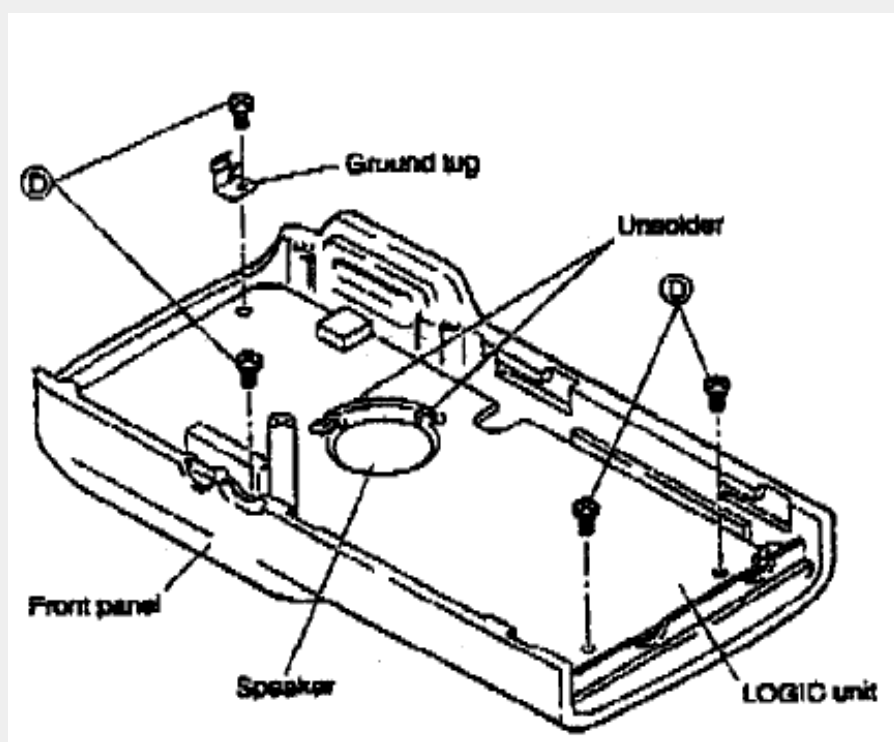
1. Unscrew 4 screws, **A** from the rear panel and 2 screws, **B** from the rear plate to separate front and rear panels.
2. Unscrew 4 screws, **C** from the rear plate to remove it.





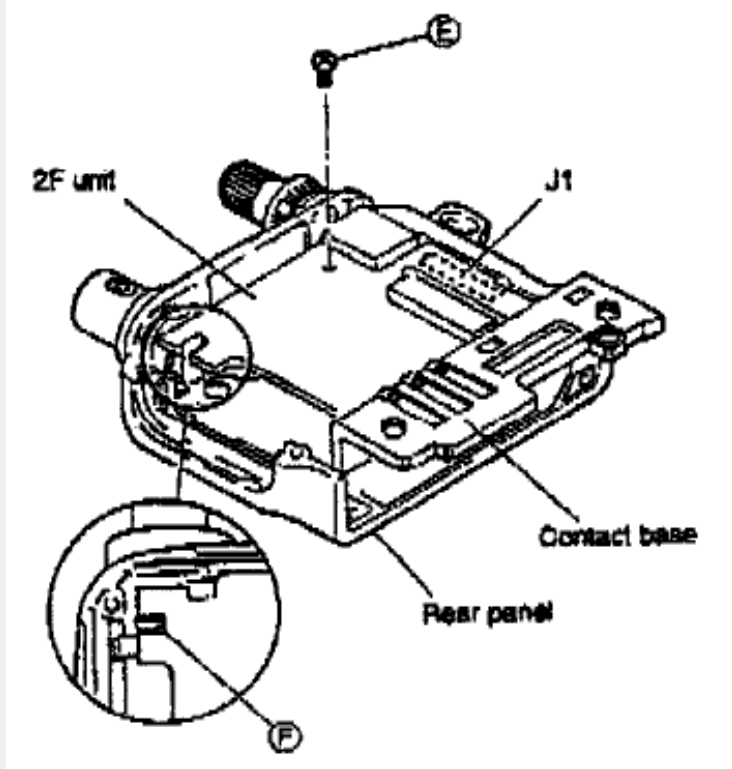
### Removing logic unit

1. Unscrew 4 screws, **D** from the LOGIC Unit.
2. Unsolder jumper wires from the speaker as shown below.



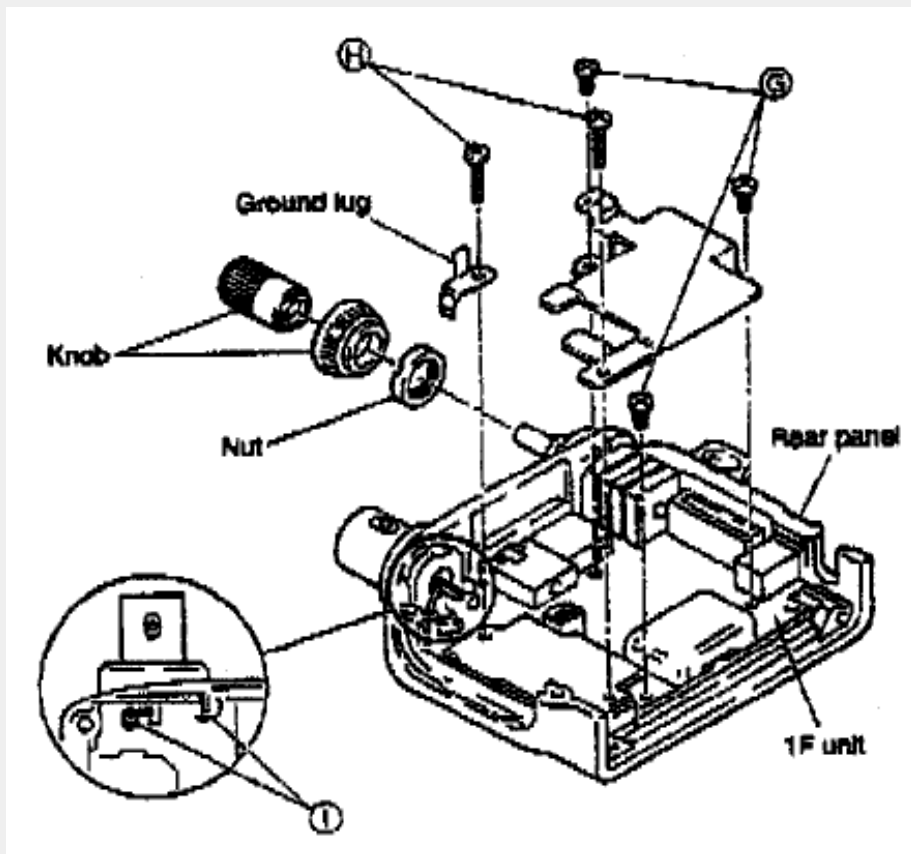
### Removing 2F unit

1. Unscrew 1 screws, **E** from the 2F Unit.
2. Unsolder the point, **F**, then remove the 2F unit with the contact base. (Disconnect J1 on reverse side of the 2F unit to remove).



### Removing 1F unit

1. Pull the 2 knobs off and then unscrew the unit.
2. Unscrew 3 screws, **G** and 2 screws, **H** from the 1F unit.
3. Unsolder 2 points, **J** then remove the 1F unit.



**19-07-1998**

## **(IC-T8) IC-T8 AM/FM/Wfm function**

A few weeks ago ,I send out a request for info on the ICT8e to see if anyone knew how to select AM/FM/WFM. I had a few replies all saying that the rig selects the mode for a given part of its' Rx range.

I have now found that in certain parts of its' Rx range, the pressing + holding of the "SET" H/L button opens the "MO" (Mode command ) It only works in certain places !

Apart from the fixed bands, the following might be of interest. (might!)

174.005 - 229.995 user select FM or WFM.

300.000 - 399.995 user select AM or FM.

470.005 - 799.990 user select FM or WFM.

Not sure how useful Fm/Wfm is in the 174 + range, AM for aircraft in the 300 range might be of some use, WFM in the 470 + range to resolve TV sound.

**Date:** 13-01-2002

**User comment**

**From:** anonymous

**Subject:** Channel 69

In the US, the 799.99/800.000 MHz switch prevents you from listening to channel 69 Audio properly. Its carrier is at 805.75 MHz.

This modification is read 1375 times.

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**21-10-1998**

## **(IC-T8) Software mods to open the RX-band**

*Date:* 03-10-1998 15:00

*From:* KC8DHN@N8MA

Heres what to do.

Hold the BAND and the SQL buttons then turn the radio on that will open up the rx. This will allow you to listen to some of the VHF TV channels and all of the UHF TV Channels I got this from a friend who got it from a guy at Icom.

After Expansion, the following approximate frequencies and Modes become available:

|                  |     |
|------------------|-----|
| 50 - 75.99 Mhz   | NBF |
| 76 - 107.99 Mhz  | WFM |
| 108 - 135.99 Mhz | AM  |
| 136 - 174 Mhz    | NFM |
| 174 - 229.99 Mhz | FM  |
| 300 - 399.99 Mhz | AM  |
| 400 - 599.98 Mhz | NFM |
| 600 - 824 Mhz    | NFM |
| 848 - 869 Mhz    | NFM |
| 894 - 999.99 Mhz | NFM |

73's KC8DHN Chris

### **Supplement:**

Also, in certain freq ranges try hold SET/H/L button and look for mode menu -- AM/FM/WFM

This modification is read 1445 times.

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**16-05-1999**

## **(IC-T8) Problem with the battery pack**

**Author:** Louis Albert - [lalbert@uakron.edu](mailto:lalbert@uakron.edu).[MODIFICATION.NET](http://MODIFICATION.NET)

The T-8 has been selling like wild fire and the batteries have been breaking just as fast! The battery has a spring plastic tab that holds the battery on the back of the transceiver. It's a good idea in that there are no tools required to remove the battery but - after flexing a few times it BREAKS! This renders the battery and the radio useless.

ICOM has been replacing the batteries free but it is the same type of plastic, so they also BREAK. I have received opinions from two individuals familiar with plastic. One is an engineer and the other, a tester in the lab of an independent manufacturer. They both say that the fundamental design of the tab is wrong in that no matter what type of plastic is used, the tab will eventually break at the flex point. They both went on to say that with the proper formulation of the plastic, the tab may possibly last the life of the battery. A portion of the written statement follows:

"There are two problems with the design of the battery pack that effect the performance of the snap. The material appears to be either talc or fiber filled which will increase the impact strength of the material, but will also decrease the materials flexibility. The second issue is that the snap geometry itself is flawed. A well designed snap wing should be tapered in thickness so that the strain is evenly distributed along its length."

"In the case of the ICOM battery snap the strain is concentrated at the base of the snap in the U shaped area. It can be seen that the outer fibers of the U are strained past the materials allowable limit even under normal operation of the snap. Two solutions are available, change the material of the battery pack, or change the geometry of the snap."



As of this time ICOM has shown no willingness to redesign the batter retaining tab, nor have they given any indication that they are going to change the type of plastic used in the manufacturing process. They have yet to acknowledge that there may be a problem with the T-8 batteries. As of this time ICOM is replacing batteries that fail while under warranty.

If you have a broken battery contact ICOM America via [e-mail](#) or phone 425-454-8155 or FAX 425-454-1509 for a replacement.

This modification is read 1215 times.

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**05-06-1999**

## **(IC-T8) TX Mod for the IC-T8a**

**Important note: Transmitting on the 220 MHz band, will blow the TX module!!**



After the modification:

136-174 MHz VHF FM  
 174-229 MHz VHF FM only  
 300-399 MHz FM only  
 400-599 MHz UHF FM

This modification is read 1583 times.

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**27-02-2000**

## (IC-T8) Sensitivity for the IC-T8E after freq modification

**Author:** Martin Swif - [martin.swift@virgin.net](mailto:martin.swift@virgin.net). [MODIFICATION.NET](http://MODIFICATION.NET)

Ref Chris KC8DHN's freq expansion mod, I checked the mute opening sensitivity on my IC-T8E across the bands...and below are the results.

MHz - uVPd

-----  
 80 - 1  
 110 - 0.5  
 140 - <0.4  
 170 - <0.4  
 180 - <0.4  
 200 - 12  
 225 - 80  
 300 - <0.4  
 400 - <0.4  
 450 - <0.4  
 470 - <0.4  
 500 - 0.5  
 525 - 1.4  
 540 - 1.7  
 545 - No Rx  
 550 - No Rx  
 580 - No Rx  
 600 - 43  
 650 - 3  
 700 - 0.6  
 750 - <0.4

800 - <0.4  
850 - <0.4  
900 - 0.6  
950 - 1.2  
999 - 1.2

This modification is read 1251 times.

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**26-03-2000**

### **(IC-T8) Cellular mod**

This Tip comes from Robin (WA4TEM):

The IC-T8A may be blocked from direct entry of cellular frequencies, but you can still receive analog cellular frequencies on it quite nicely. All you need is a little arithmetic...

If you've performed the mods listed on this site to open up the receive range to 999.95MHz, cellular is no problem. All you have to do is dial in the image frequency for cellular. That is, dial in a freq that is the cellular freq plus 2 times the IF frequency for the T8A, which is 41.85 MHz.

The cellular band (for analog phones only) from handheld to cell site is 824-849 MHz. Transmit back from cell site to handheld is 869-894 MHz. (There are a few control and data channels interspersed in those ranges too.) That corresponds to 907.7 to 977.7 MHz display on the T8A.

So, for example, to receive transmissions from a cellular phone at 826 MHz, just set the T8A to  $826 + 83.7 = 909.7$  MHz.

This modification is read 9266 times.

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**03-07-1999**

### **(IC-T81) IC-T81 AM/FM/Wfm function**

Just got an Icom T81A quad bander. There is a simple mod to expand the RX capability. To perform the mod hold the "Multi" key and the SQL keys while turning on the power. The display will light all segments. RX is now enabled for the following frequencies:

50.000 - 75.995 Mhz  
76.000 - 107.995 Mhz  
108.000 - 135.995 Mhz  
136.000 - 174.000 Mhz  
174.000 - 229.995 Mhz  
300.000 - 229.995 Mhz  
400.000 - 470.000 Mhz  
470.000 - 599.995 Mhz  
600.000 - 800.000 Mhz  
800.000 - 824.000 Mhz  
849.000 - 869.000 Mhz  
894.000 - 999.000 Mhz  
1240.000 - 1300.000 Mhz

**Date:** 23-10-2000

**User comment**

**From:** [Steve AI6Q](#)

**Subject:** Software error

Hello....on the mod to expand the receiving capabilities, (powering up while holding the multi and squelch keys), If the xcvr was previously programmed via Icom software and cable via PC, and the mod was enabled, you cannot re-program the radio via PC. The software reports an error that the version doesn't match.....the only way to access the xcvr via PC again is to do a CPU reset (power up while holding the squelch, vfo, and, mr).....

**Solution.**

You can reprogram the radio if it was previously programmed. You just have to rerun the CS-T81 setup option that's in the start menu with the radio turned on. It will retrieve the programming info from the radio. I've done it myself several times. I use my opened T81 with my software and program my buddy's newer t81s that the receive trick does not work on just fine with this little tip.

**Date:** 09-12-2001

**User comment**

**From:** [realist946](#)

**Subject:** Does not work on all!

This Modification DOES NOT WORK ON ALL RADIOS. Please do not e-mail me for more info. I just thought I would point out that it is not valid for all of these radios. Additionally, on some, you must enter VFO Mode then turn the radio off to get the "All Segments Display".

This has been confirmed by ICOM as well. So if you plan to purchase this radio in the hopes of using this mod, be careful. It is not valid.

**Date:** 13-01-2002

**User comment**

**From:** anonymous

**Subject:** Serial numbers

After asking around, it appears that the "new" production IC-T81A had the majority of the extended RX tables taken out of the microprocessor due to FCC part 15 rules.

The IC-T81A has a 1st IF in the 70 MHz range. The image response was poor, and so you could tune in the cell stuff via the image (140 MHz away, using this IF freq as an example).

The FCC and the ECPA now require a minimum of -38 dB of image rejection for cell freqs on comm radios, scanners and yes, HTs. I cannot test my IC-T81A because it won't go into that band. But I hazard a guess that the radio didn't cut it in that department, so the microprocessor was "updated" to reflect the new reality.

To my understanding, there have been at least three, steadily increasing levels of "big brother" wrt to the ECPA and how it affects what your radio toys can do/can't do in the 800 MHz region.

Maybe this also explains why the ICOM "vaporradio" IC-T82A never made it to market...

FYI-my IC-T81A is serial 04553 and it won't do anything above 470.000. This pissed me off as I use my radio to listen to US TV channel 17, where I work (493.75 MHz audio). Oh well, the IC-T8A I got today does just fine, and the loss of 1200 MHz doesn't affect me one bit as there is zip activity where I am located.

This modification is read 3421 times.

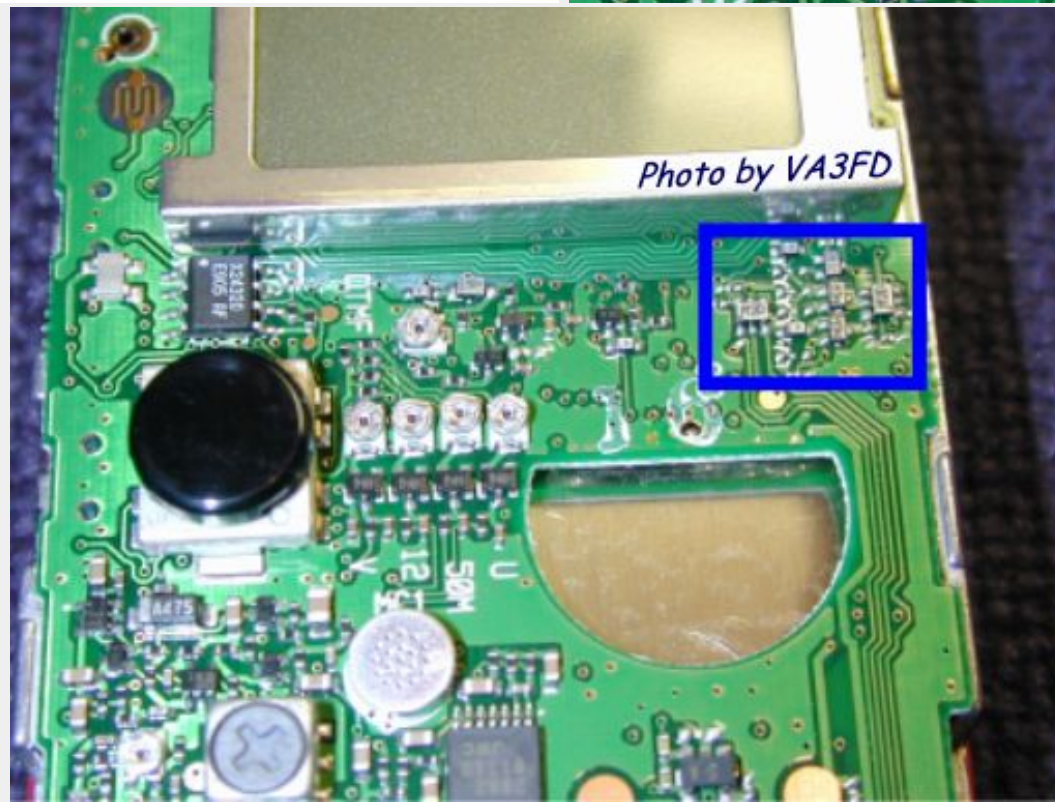
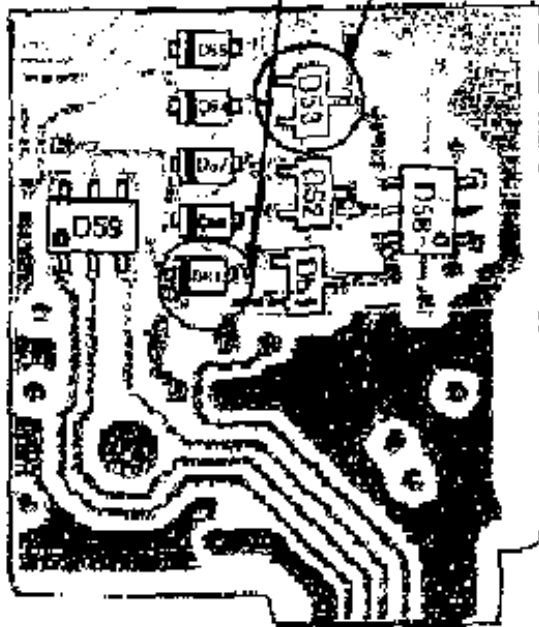
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**05-09-1999**

**(IC-T81) IC-T81 Frequency Expansion**

Remove the Diode D53 and D61.

*Remove diodes  
D53, D61*



Frequencyrange after modification:

50.000 - 53.995 MHz RX/TX

118.000 - 173.995 MHz RX

136.000 - 173.995 MHz TX

400.000 - 469.995 MHz RX/TX

1240.00 - 1300.00 MHz RX/TX

FM Broadcast (WFM):

76.000 - 109.995 MHz RX

This modification is read 3959 times.

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**30-07-2000**

## **(IC-T81) ICOM IC-T81A Cellular Mod**

The IC-T81A may be blocked from direct entry of cellular frequencies, but you can still receive analog cellular frequencies on it quite nicely. All you need is a little arithmetic...

If you've performed the mods listed on this site to open up the receive range to 999.95MHz, cellular is no problem. All you have to do is dial in the image frequency for cellular. That is, dial in a freq that is the cellular freq minus 2 times the IF frequency for the T81A, which is 69.4 MHz.

The cellular band (for analog phones only) from handheld to cell site is 824-849 MHz. Transmit back from cell site to handheld is 869-894 MHz. (There are a few control and data channels interspersed in those ranges too.) That corresponds to 685.1 to 755.1 MHz display on the T81A.

So, for example, to receive transmissions from a cellular phone at 826 MHz, just set the T81A to  $826 - 138.9 = 687.1$  MHz.

Towers Output (display on T81A 730.1 to 755.1 MHz) to RX 869-894 MHz

Cellular Input (display on T81A 685.1 to 710.1 MHz) to RX 824-849 MHz

This modification is read 3528 times.

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**19-07-1998**

## **(IC-U16) How to program the ICOM-U16**

Here's how to program the ICOM-U16 - if the U16 has been made programmable by moving a jumper:

Try holding FUNCT down and entering 159357.

It's now in prog mode. Exit with FUNCT-CLR.

Function + 159357 (Enter program mode)

```
Function + 1      Encoder tones (1-37) 1=67.0,2=71.9,3=74.4,4=77.0,5=79.7,
                  6=82.5,7=85.4,8=88.5,9=91.5,10=94.8,
                  11=100.0,12=103.5,13=107.2,14=110.9,
                  15=114.8,16=118.8,17=123.0,18=127.3,
                  19=131.6,20=136.5,21=141.3,22=146.2,
                  23=151.4,24=156.7,25=162.2,26=167.9,
                  27=173.8,28=179.9,29=186.2,30=192.8?,
                  31=203.5,32=210.7,33=218.1,34=225.7,
                  35=233.6,36=241.8,37=250.3

+ 2      Decoder tones (1-37)
+ 3      ?
+ 4      Delta + / Delta - offset, 5 digits
+ 5      Frequency, 5 digits (400MHz +)
+ 6      ?
+ 7      Sch. Ch. numbers. Allows alias ch numbers.
+ 8      Transmit timeout enable.
+ 9      TI, Transmit Inhibit
+ SCAN Priority Scan/Ch Scan
+ S.CH Channel Masking
+ CLEAR   End programming mode
```

---

Channel select: Standard method (up/down arrows or CH# + [ENTER])  
Frequency: Hold [FUNC], Press [5], enter 6 dig freq, [ENTER], release [FUNC]  
Rx CTCSS: Hold [FUNC], Press [2], enter 2 dig code, [ENTER], release [FUNC]  
Tx CTCSS: Hold [FUNC], Press [1], enter 2 dig code, [ENTER], release [FUNC]

Offset Freq: Hold [FUNC], Press [4], use [#] for up offset, [\*] for down offset, then enter freq to offset by (ie: [#] [0] [0] [0] [0] [0] for no offset, [#] [0] [5] [0] [0] [0] for the standard +5MHz UHF offset), [ENTER]

Timeout Timer: Hold [FUNC], [8], Release [FUNC]

Tx Inhibit: Hold [FUNC], [9], Release [FUNC]

Special Channel Number: Hold [FUNC], Press [7], enter the special channel number (17-99), [ENTER], Release [FUNC]

Data Transfer MASTER: Hold [FUNC], [BEEP], Release [FUNC]

Data Transfer SLAVE: Hold [FUNC] with power off, turn on, release [FUNC]

## Helt to fint the U16 jumper

> *Questions:*

>

> *The file implies that the U16 must have a jumper in a certain spot, in order for it to be user-programmable. Where should this jumper be?*

3/4 way down the left side of the logic board which is inside the front cover.

> *The file contradicts itself: when a new frequency is being inserted,*

> *should it be entered as five or six digits?*

The frequency must be inserted in six digits. The decimal point must return to be a valid frequency entry. Also you must hold the function button while entering the frequency and then press enter before releasing the function button.

**Date:** 07-01-2001

**User comment**

**From:** Drew

**Subject:** Extra info

The mods for the Midland series 70-254A/B/C and -154 radios are the same as for the Icom IC-U16 series! Make sure the jumper on the BOTTOM of the logic board is removed before trying programming the unit.

Drew

**Date:** 21-07-2001

**User comment**

**From:** [Eric van de Weyer](#)

**Subject:** More info

Just a short note to let you know that THE ICOM IC-h16 is the VHF equivalent of the IC-U16 and programs the same way. The Midland 70-154 is also the same as the IC-H16.

Also, the Midland units call the FUNC button SHIFT. In either case it is the button closest to the top of the radio above the PTT.

**Date:** 28-12-2001

**User comment**

**From:** [Michael](#)

**Subject:** ICU-16 Battery

Would like to know where can i find a cheap place in California to buy a Battery for the ICU-16 radio mine isnt working at all

This modification is read 861 times.

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**19-07-1998**

## **(IC-U2AT) Extended TX mod for the Icom IC-u2AT**

This mod will extend the transmit range of the u2AT from 139 Mhz to about 161 Mhz (further if you adjust the PLL). You'll be working with a surface mount PCB, so you will need a fine point soldering iron and a very steady hand. And you will need one diode, like a 1N914, or a tinyier one if you can get it.

You must have the service manual to help you identify where the new diode is to go. Review all the below with the manual before you reach for your scrwdriver and soldering iron!

- remove the battery pack.
- remove 4 screws that hold the sliding guide that the battery pack mounts on. This is the piece of metal that frames the PL tone switches.
- remove the sliding guide. Be careful that you don't lose the battery release button.
- there's a screw on the left side of the HT just below the light switch. Remove it.
- CAREFULLY pry the front panel up. There's speaker wires AND a flexable lead that goes to the front panel.

- There's a shielded PCB that these leads run to. Carefully pry this up. It will then fold down. There's several flexible leads at the bottom.
- You should see the CPU now.  
With the manual, locate where D113, D119, Q131 are.
- Where the new diode goes is not marked in the diagram of the CPU PCB. Locate the anodes of D119. This land connects to pin 27 of the CPU chip ic101. Locate the cathode of D113. This land connects to pin 20 of the CPU chip. These diodes are SMDs, and do not look like what you'd expect diodes to look like.
- In the area between Q131, D119, D113, and the CPU chip, you should see a set of 3 solder pads that form a triangular pattern that would accept a 3 legged SMD, like the neighboring diodes and transistors. one of these pads connects to the anodes of D119. The new diode's anode goes to this pad. Another pad connects to the cathode of D113. The cathode of the new diode goes here. This means that the new diode athode will connect to pin 20 of the CPU, and that the anode will connect to pin 27 of the CPU.
- Carefully prepare the diode leads to line up with the proper pads, and take care that when you solder it on, you don't short to something. Also, take anti-static precautions. I used a bit of double-sticky-foam tape to hold the diode in place when I soldered it. And I left the tape to help keep it in place after I was done. Be sure that you will be able to replace the PCB you pried up, without it touching the diode.
- Reassemble the rig.
- Do a CPU reset. That is: Turn the power on while holding the light switch down.
- You should be able to xmit between 139 to about 160 Mhz. You could tweak the PLL to extend it further, but I didn't do this. The xmit power will be lower on the higher freqs.

Disclaimers: Be sure to have the proper permits for out of band operations. And, do this mod at your own risk!

This modification is read 424 times.

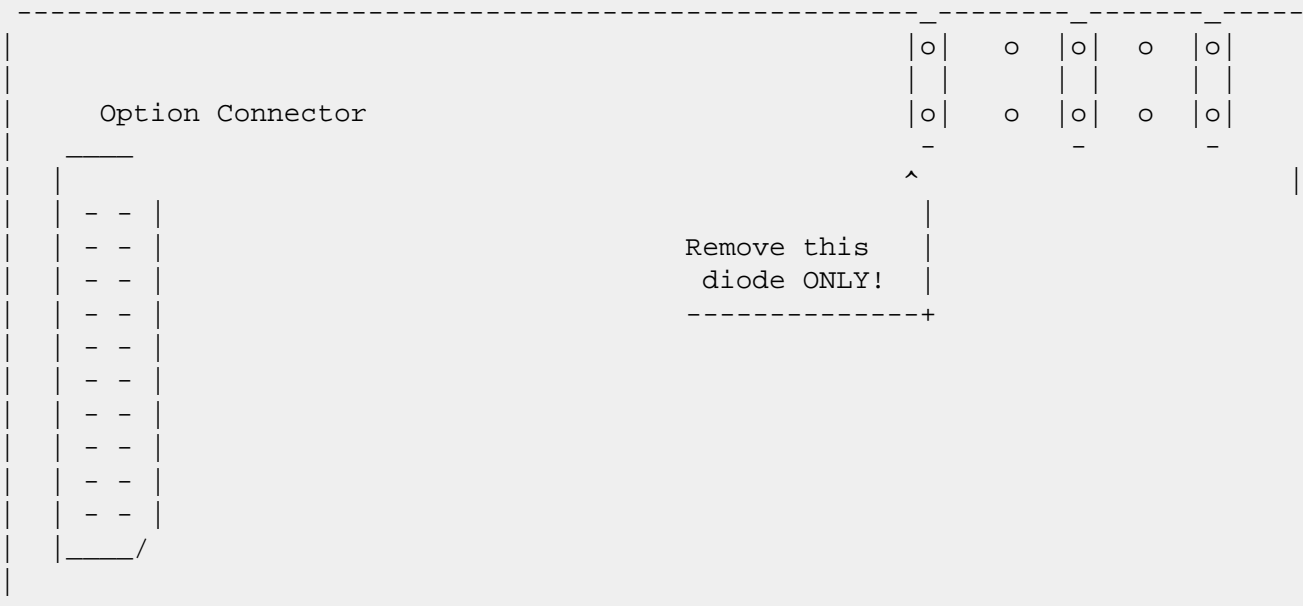
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**08-01-2002**

## **(IC-V8) IC-V8 MOD for expanded RX/TX range. (136 – 174MHz)**

**Author:** Scott KD4CWB - [kd4cwb@aol.com](mailto:kd4cwb@aol.com). [MODIFICATION.NET](http://MODIFICATION.NET)

1. Remove the battery pack.
2. Peel off the black plastic panel on the bottom. (it will re-stick in place).
3. With the white expansion connector on your left side, locate the series of diodes in the upper right side of the opening. Remove the diode located on the far left side on the lower row. (see photo or text diagram).



Mod by: Scott KD4CWB@AOL.COM



This modification is read 866 times.

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**21-03-2002**

**(IC-V8000) v8000 gne caper**

**Author:** spritsan

v8000 mod for genral coverage tx (makes a good marine tx.er)

On the front panel there are 4 diodes side by side they have white cups drawn around them remove all and of you go(go baby go). The diodes are on the top of the pcb very clandestine looking ones the unit will produce at least 31 watts on the marine band

bye form spritsan.

**Date:** 22-03-2002

**User comment**

**From:** [KG6FPC](#)

**Subject:** Power Output

You say at least 31 watt's on the marine band;do you know how stable the the power is elsewhere?  
Also,is the removal of these four diods confined to just the marine band,or 136-174?

This modification is read 108 times.

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**19-07-1998**

**(IC-W21) Receive only expansion for IC-W21**

1. Turn radio off
2. Press [B]+[#] switch and turn ON radio.  
Depress [B] and [#] only when the display shows all functions and the radio emits a beep.
3. Go to SET mode and a new function will appear after TONE selection.The new function is designed by PL. Set PL to "1"for 1 MHz frqcy. enter, to 10 for 10 MHz frqcy. enter and to 100 for 100 MHz frqcy. enter resolution.

Note1:  
This modification does not reset information saved on the CPU.

Note2:

Frequency range is 50,0-107,995 MHz FM  
108,0-135,995 MHz AM (aviation band)  
136,0-299,900 MHz FM  
for the VHF portion;  
300,0-999,900 MHz FM for the UHF portion.

This modification is read 948 times.

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**19-07-1998**

### **(IC-W21) Transmit expansion for IC-W21**

1. Call Icom Parts Dept. and order one diode MA132WK (D.23) for IC-W21AT, Symbol: MU;
2. Open radio and localize the logic unit;  
The logic unit is the half portion of the radio that contains the CPU, display, keyboard, etc...;
3. Localize some orange colour components in the lowset right part of the portion, below the CPU shield plate. Localize the smallest orange colour component. Note a empty place for a surface mount diode (3 dots) near this orange component (see draw below);

```
-----      : . <---- Empty place for surface mount diode MA132WK
|oran-
| ge / :<>. <---- Surface mount diode          | CPU          | | DIAL button
----- /          mounted                    | Shield        | | U vol button
  ^
  |
  |Smallest orange colour component  -----|-----|
                                         ---PTT,F,Moni..
```

4. Add D23 MA132WK diode in the empty place. Do use very fine soldering iron and temperature controlled gear. The circuit is very fragile and may burn if excessive heat is applied. Take care for static damage also; If you can, use professional gear for this purpose or find technical assistance of your choice.

This modification is read 960 times.

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**19-07-1998**

### **(IC-W21) Full cross band repeater operation**

This feature enables HT to receive on one band and retransmit the content to the other band. You can even choose tone squelch selections, repeater offsets and many other features available during normal operation.

1. Select frequencies on VHF&UHF and options (tones, DUP,...);
2. Set "key lock" by pushing [F]+ [C] keys. Then turn radio off;
3. Push [F]+ [MONI]+ [RPT-M] keys and while holding them pressed, turn radio on. You will get flashing "L", telling you cross band rpt. is enable.
4. Press [F]+ [C] ("key lock" release) and you will clear the cross band rpt. mode.

This modification is read 868 times.

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**19-07-1998**

### **(IC-W21) Band expansion 50-999 MHz for IC-W21**

The Icom IC W21AT handi-talkie normally receives two bands: 136 to 174 MHz and 440 to 450 MHz.

You can program it to receive 50 to 300 MHz and 300 to 999 MHz.

To do this, turn it off, then simultaneously hold down the # and the B keys while turning it on. Keep them pressed for 2 seconds after turning the rig on.

The LCD display will go through a self test, and you'll then have a wideband receiver. It's not very sensitive far from the ham bands, but it's handy for listening to 6 Meters or as a portable scanner.

Note that this modification does not require any cutting of diodes or rewiring -- it's entirely front panel.

This modification is read 952 times.

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**19-07-1998**

### **(IC-W2A) IC-W2A Expand frequency**

This is less of a mod than it is a function. To expand the receiver frequency range of the new Icom IC-W2A to 118.00-170.00, 322.00-513.00, and 800.000-970.000, do the following:

Hold down the Light, B, and # keys while turning the power on.

That's actually a four button sequence, since power on is controlled by a keypad button.

This modification is read 1120 times.

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**19-07-1998**

### **(IC-W2A) IC-W2A Cross Band Repeat Function**

To access the cross-band repeat function, first perform the extended receive mod by holding down the Light/B/# keys while turning on the power.

To enable cross-band repeat, set each band to the frequency and mode desired. Set the current band to VHF.

Press (Function-2) (Function-Enter) and the little "L" indicator will flash. The radio is now in the cross-band repeat mode. To disable, press (Function-Enter) again.

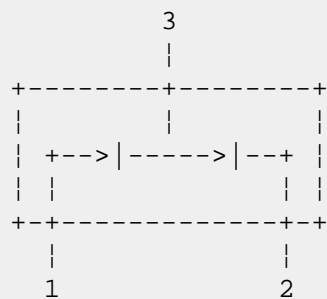
This modification is read 947 times.

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**19-07-1998**

### **(IC-W2A) IC-W2A Extended Transmit Mod**

Call the ICOM parts department ((206) 454-8155) and order a pair of MA133 diodes (P/N 1790000850). These are the three terminal surface mount diode packages. It is probably not advisable to substitute conventional leaded glass diodes here due to size restraints.



The modification involves removing one surface mount component and installing two others. The working parts are extremely small and the mod should not be performed unless you are comfortable with working while using a loop eyepiece or other magnifying device. This is a "surgical" operation. Take all the usual precautions with respect to static electricity, etc.

Remove 5 screws holding back on, and two screws on side of case below the PTT switch. Gently pry the unit apart.

Inside the unit are two RF "stack" units. The complete RF "stack" is composed of two enclosed sheet metal boxes sandwiched

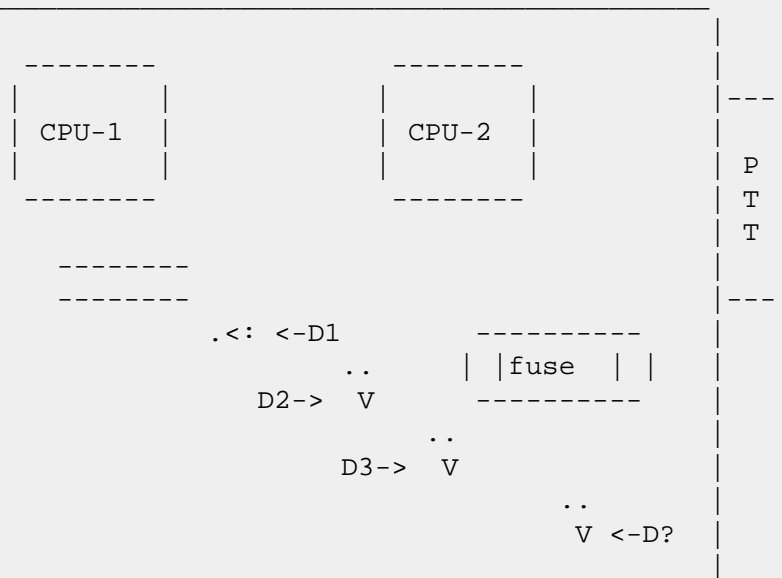
together, about 1.5" wide, 2" tall and .5" thick. Each RF stack unit (one per band) is totally self contained, is about .25" thick, and plugs into the "motherboard" using connectors mounted on one end.

First, remove the stack units. To do this, remove one screw from each side of the stack. Remove the single screw off the bottom end of the stack and gently remove the metal spring clip holding the stack together.

Carefully lift each stack unit out by pulling it back and down. They should easily unplug from the upper motherboard. Set them aside for now.

At this time the back side of the front panel is clearly accessible and the two CPU's are visible side-by-side across the top. Now refer to the following illustration:

#### Top of Radio, Back side of Front Panel



D1, D2 and D3 are locations on the board. Only D2 is installed at the factory. To perform the mod, you must do the following:

Remove D2

Install D1

Install D3

The locations of D1 and D3 are clearly silk screened onto the circuit board and are easy to locate. Don't attempt to re-use D2. The periods (..) show the approximate location of the solder pads for the 2-legged sides of the diodes.

Diode D2 may be removed by carefully heating the leads and prying it up using a sharp tool. Be very careful since it's easy to lift the solder pads.

One method of installing diodes D1 and D3 is to use a very small drop of super glue to mount the part, and then use a soldering iron to tack down the pins.

After the parts are installed, reassemble the radio. Although the manufacturer recommends that the microprocessor be reset after this mod, I have found it to be unnecessary. All memories retained their settings after the mod. Tests using a dummy load and a frequency counter showed TX ability on UHF from under 400MHz to over 490MHz. TX on VHF covers from 136MHz to 174MHz.

#### Now for the added part - multi-digit entry for mhz

After doing the above, **REQUIRED!!**

select the VHF band as MAIN

push F (above the PTT button) and SET (the 8 button)

then using the ^/SCAN button make the lower right symbol of the band say PL

rotate the right knob to set the display to 1,10, or 100 as desired

1 sets entry to single digits only

10 sets entry to 10's and single digits

100 sets entry to all digits

hit PTT

Now - repeat the above for the UHF band - Note It WILL NOT work unless you do it for BOTH bands.

You now have a walkie that requires all the digits (assuming you chose 100) to program it's frequencies.

**19-07-1998**

## **(IC-W2A) IC-W2A signal level**

Here is more info on the the performance of the W2A after the mod.

Well folks I have had my IC-W2A for one week now & am, needless to say suitably impressed. But now my comments... Why did Icom have to change the DC input socket to what the W2A has. It is very unusual & as far as I can find out, Icom are the only people who can supply a plug for it. I think they should have stayed with the more common 2.1mm DC jack as per the IC-32AT.

I did some checks of the receivers using an IFR 500A signal generator & the following is what signal level I needed to get 1 "S" point on the W2A's S meters.

70MHz, 1mV (milli-volts) 80MHz 0.5mV 90MHz 0.25mV 100MHz 75 $\mu$ V (micro-volts) 110MHz 1.5 $\mu$ V From here to 170MHz less than 0.2 $\mu$ V 173MHz 1.5 $\mu$ V 174MHz 75 $\mu$ V 200MHz 75 $\mu$ V 250MHz 0.5mV (whats going on here???) 275MHz 4 $\mu$ V 300MHz 1.5 $\mu$ V 320MHz 5 $\mu$ V (changed to UHF main VFO from here on) 400 - 450MHz less than 0.35 $\mu$ V 460MHz 0.75 $\mu$ V 465 - 510MHz less than 1 $\mu$ V 520 - 690MHz less than 2 $\mu$ V 700 - 999MHz varies from 7.5 $\mu$ V to 2 $\mu$ V, dips to 0.35 $\mu$ V at 900MHz. Quite impressive, but I would really like to get better sensitivity at the 70 - 80mhz end. Studying the circuit diagram shows bandpass/bandstop filters all over the show, so maybe its possible to modify a few to increase sensitivity here.

I am gathering together the ciruits of the Icom IC-R1, IC-24AT & W2A to compare the front ends so we will see what comes of this experiment in the near future.

One other worry was the on/off switch, how do you turn the set off when the battery is flat. I am concerned about running the battery to zero volts, hopefully this does not occur. I have been disconnecting the battery when charging to prevent anything funny happening.

The antenna supplied with my W2A is an FA-1443BB, whats the difference between this & the FA-1443B, & the FA-4B supplied with an IC-R1.

One more gripe, I dont like the plastic plug/covers over the DC jack, headphone, external speaker sockets, they should have been rubber as per the IC-32AT, as I can see already that they will not last very long after prolonged use. Boy what a moaner, you say, small complaints but this would really have made it the best. I wonder what Yaesu & Kenwood are going to do to compete with this?

This modification is read 959 times.

[top of page](#)

**19-07-1998**

## **(IC-W2A) IC-W2A Weak transmit audio**

Trouble: Weak transmit audio, deviation below the specifications, high end of the speech spectrum missing.

Tools needed: A good soldering iron with a sharp tip, desoldering braid, solder, sharp-nosed pliers, small cross-point screwdrivers.

Cure:

1. Open the radio case following the instructions in the owner's manual (p. 45).
2. In radios fitted with the UT-63 board, pull out the board.
3. Unscrew the two small screws holding the tin plate against the bottom ends of the band modules. Pull out the plate.
4. Pull out the band modules.
5. Now you see the microfone fitted to the mother board. It should fit neatly against the inside of the fascia panel. If it doesn't, carry on.
6. Unsolder the microphone leads from the mother board. BE CAREFUL not to overheat the board and the wire insulation.
7. Pull out the microphone and the rubber gasket.
8. Re-install the gasket. Pull in the microphone so that it fits inside the gasket well and press it firmly to the end.
9. Re-solder the mic wires. Install the band modules, the tin plate and don't forget the screws.
10. Replace the rear panel.
11. Tighten the 7 screws.
12. Test the audio response.

This modification is read 891 times.

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19-07-1998

## (IC-W2E) IC-W2E Expand frequency

### Display test / Rx Expanding:

Turn the porto off, press the #,3 and the B, hold this buttons, now turn on your porto (Red Button), you will see now all the functions who are in the lcd display.

When you quit pressing the #,3 and the B button, your porto can now go (On Display) from 100khz <> 999.90Mhz at the 2m Display, and on the 70cm Display he will go from 100khz <> 1310.00Mhz, of course he will not recieve from 100khz <> 1310Mhz, but the low vfo receive at least from 126Mhz <> 190Mhz, the high vfo receive at least from 390Mhz <> 999Mhz, with some steps between 390Mhz <> 999Mhz where he not receive signals, because the vfo is out of his lock.

### Enter Freq via keyboard:

When you enter a freq (in vfo mode) by pressing enter (ENT) you will see that you can press only the last 3 digits, this is simply to change by pressing the function button (above the ptt) and the set (8) button, push now with the ^/scan until you see on the display 'PL', now you can dial 1 - 10 - 100 = 1Mhz - 10Mhz - 100Mhz, set this option to 100 (dial), now you press the clr (\*). Done !!!!

If you now press enter (#) (in vfo mode) you will see that you now can press the whole freq. The same for the other vfo, this go's the same for 1Mhz - 10Mhz PL function.

### Steps with the dial:

Dialing a freq go's with steps in Khz, by pressing the function key (above the ptt) the steps will be now steps of 10Mhz.

Here are some RX reports by JBE;

| RX Freq                | Sensitivity (12db sinad) |
|------------------------|--------------------------|
| -----                  | -----                    |
| 126MHz                 | - 111dBm                 |
| 136MHz                 | - 123dBm                 |
| 145MHz <*** Main ***>  | - 125dBm                 |
| 160MHz                 | - 123dBm                 |
| 174MHz                 | - 110dBm                 |
| 190MHz                 | - 67dBm Low vfo          |
| -----                  | -----                    |
| 390MHz                 | - 108dBm                 |
| 430MHz <*** Main ****> | - 124dBm                 |
| 452MHz                 | - 105dBm                 |
| 470MHz                 | - 103dBm                 |
| 485MHz                 | - 104dBm                 |
| 850MHz                 | - 110dBm                 |
| 900MHz                 | - 116dBm                 |
| 925MHz                 | - 114dBm                 |
| 935MHz                 | - 112dBm                 |
| 950MHz                 | - 107dBm                 |
| 999MHz                 | - 96dBm Hi vfo           |
| -----                  | -----                    |

This modification is read 583 times.

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19-07-1998

## (IC-W31) IC-W31E Frequenzbereichs-Erweiterung

1. Geraet ausschalten
2. "B"- und "#"-Taste gleichzeitig gedruickt halten und dabei das Geraet einschalten.

(Anzeige VHF: 50,000 - 299,990 MHz; UHF: 300,000 - 999,990 MHz.)

(Empfindlichkeit im unteren Bereich nicht sehr gut, im oberen dagegen ueberraschend.)

Nach einem kompletten RESET ist die Bereichserweiterung deaktiviert.

Nach dieser Erweiterung erscheint im SET-Menue ein weiterer Punkt, welcher PLACE heisst. Er bietet die Auswahl "1", "10" und "100" fuer jedes Band. Damit kann gewaehlt werden, ab welcher MHz-Stelle die Eingabe beginnt. Bei "1" ab der Einer-MHz-Stelle, bei "10" ab der 10er-MHz-Stelle und bei "100" kann die Frequenz komplett eingegeben werden (fuehrende Null bei VHF nicht vergessen!).

This modification is read 649 times.

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19-07-1998

## (IC-W31) IC-W31E CROSS-BAND-REPEATER

### EINSCHALTEN

1. Frequenzen VHF und UHF einstellen.
2. Die Tasten "FUNC" und "CALL" gleichzeitig druecken und dabei Geraet ausschalten.
3. "MONI"-, "#"- und "RPT"-Taste gleichzeitig gedrueckt halten und dabei das Geraet einschalten. Es erscheint ein blinkendes "L" unten rechts im Display.

### AUSSCHALTEN

1. Geraet ausschalten.
2. "MONI"-, "#"- und "RPT"-Taste gleichzeitig gedrueckt halten und dabei das Geraet einschalten; das "L" ist jetzt konstant ohne blinken zu sehen (LOCK-Funktion aktiviert).
3. Jetzt noch die LOCK-Funktion aufheben: "FUNC"-Taste und "CALL"-Taste druecken.

This modification is read 626 times.

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23-08-1998

## (IC-W31) IC-W31 RX Mod

*Skip Allison writes:*

Remove chip jumer W1 on the logic unit. This should open it up to receive 100 - 300 on VHF and 300 - 999 on UHF. I don't remember if it's marked too well, but it's near the lower left corner of the microprocessor right next to 2 diodes. It looks like a chip resistor.

Good luck.  
Skip  
K9SA

This modification is read 743 times.

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12-03-2000

## (IC-W31) RX/TX expand for ICOM IC-W31E

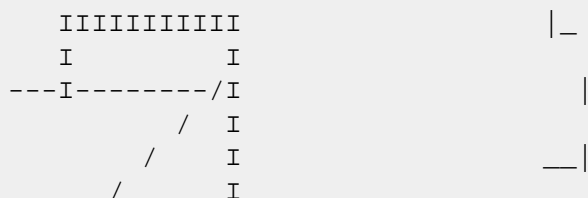
**Author:** Andy - OM1CW - [audis@post.sk.MODIFICATION.NET](mailto:audis@post.sk.MODIFICATION.NET)

### Expand RX:

1. Turn off radio. Press and hold [B] and [#] buttons.
2. Turn on radio while holding these buttons. RX is now expanded to range 50-1000MHz.

### Expand TX:Need remove one diode.

1. Turn off radio and remove the battery.
2. Remove the 4 screws holding the rear cover and the 2 lower screws holding the shield in place in the battery compartment.
3. Carefully lift the rear cover with the battery compartent shield away from the front cover.
4. The front and rear sections are connected together with a flex strip connector. We couldn't disconnect it because diode is near of it.
5. It shoult look someting like this.





**15-10-2000**

## **(IC-W31) Cross Band Repeating with the Icom IC-W31A**

**Author:** Kevin Luker - [kevinluker@yahoo.com](mailto:kevinluker@yahoo.com).[MODIFICATION.NET](http://MODIFICATION.NET)

1. Select the two frequencies you want to crossband on.
2. Press the function button and then the call button. This will place the radio in locked mode. The radio will indicate this by putting a black L in the lower right of the screen.
3. Turn the radio off.
4. While turning the radio back on press and hold the "MONI", the "#", and "RPT" buttons simultaneously.

The black L in the lower right corner should be flashing. You are now crossband repeating!!!

To return the radio to regular operations...

1. Turn the radio off again.
2. While turning the radio back on press and hold the "MONI", "#", and "RPT" buttons again.
3. The black L should not be flashing anymore.
4. Press thr "FUNC" key then the "CALL" key again and the L should disappear. You are now back in Regular radio mode.

Take care and enjoy.

73's [Kevin Luker](#)

This modification is read 687 times.

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**22-08-1998**

## **(IC-W32) Expanded Frequency Coverage on TX/RX for the Icom IC-W32A/E**

9-5-97

NOTICE: We can not guarantee specifications beyond the amateur bands. Not responsible for any damages incurred in attempting this procedure. This modification may void all warranties.

1. Remove the battery.
2. Remove the 4 screws holding the rear cover and the 2 lower screws holding the shield in place in the battery compartment.
3. Carefully lift the rear cover with the battery compartment shield away from the front cover.
4. The front and rear sections are connected together with a flex strip connector. Carefully lay the rear section aside by lifting upward, turning and laying the rear section over away from the front cover leaving the flex strip connected.
5. With the front cover section in front of you, antenna connector to your left, locate the notch at the right side of the exposed PC board. Next locate the three, 3 terminal diodes near the lower corner of the notch. Two are in line from left to right, with the third below the diode to the right. This last diode (the one below the right one) is diode D523. Very carefully remove D523. Use ca
6. Reassemble the radio in reverse order.
7. Perform a system reset by holding down the Squelch button (on the side) and the Band button while turning the radio on. Note that all memories will be erased, so write down anything you want to save and reprogram.

VHF coverage will be from 140 to 170 (plus or minus a bit) on Tx/RX

UHF coverage will be from 430 to 470 (plus or minus a bit) on TX/RX

This modification is read 2905 times.

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20-02-1999

## (IC-W32) Crossband repeater and extended RX/TX mods

Mods for the IC-W32E transceiver by SM6VIT Rickard. 970703

The IC-W32E transceiver is a funny little radio that can do alot more than it does when it leaves the factory.

On my radio i have RX on these FQs:

- AM 108-136MHz
- FM 136-200MHz
- 300-400MHz
- 400-600MHz
- 600-1000MHz

Now these are the FQs that is shown in the display so if U got a FQ far away from ham bands that dont work that is OK. I havent tested the sensitivity on different FQs so that is for U to do.

Now to the really fun part, the TX FQ can be these:

- FM 108-136MHz
- 136-196MHz
- 362-400MHz
- 400-492MHz

The further away from ham FQs U use the lower the output power will be. And remember that your antenna might not be built for all these FQs.

To use extended RX FQs U have to do like this. While pushing [SQL] and [BAND] turn on power.

It is as easy as that at least on my radio. This can be diffrent on some radios that are sold in contrys where it is illegal to listen to other than ham FQs.

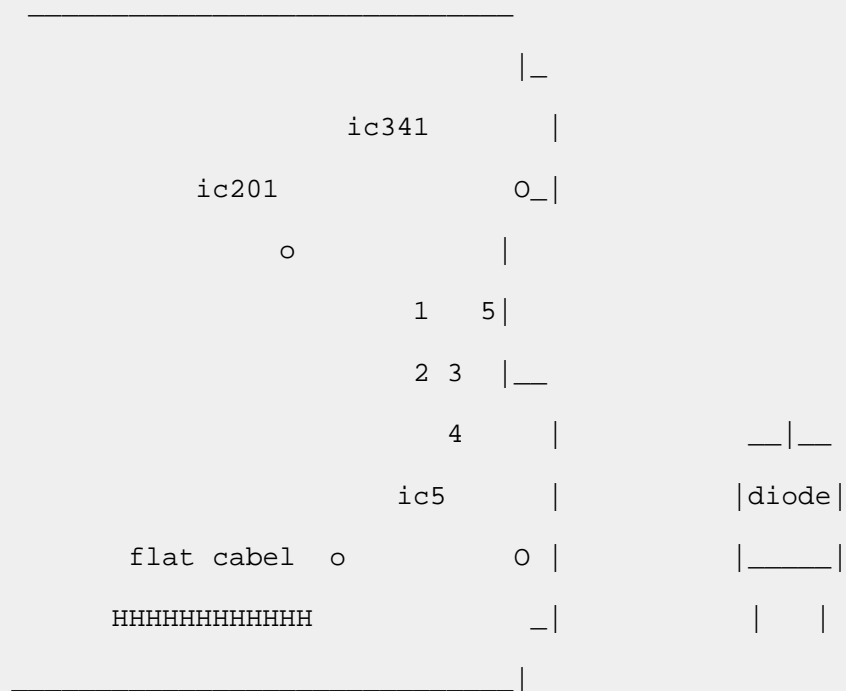
**WARNING!                  WARNING!                  WARNING!                  WARNING!                  WARNING!                  WARNING!**

Your warranty may be expired if U take your radio to pices!  
And most likly it is illigal to have a TX expanded radio in your contry!  
For the TX expansion it is a little bit more difcult. U have to solder in your radio.

First U have to remove D523 (4) on the logic unit.

Remove battery, remove 6 screws on the metal plate under the battery, lift up the metal plate and there is the logic unit.

It shoult look someting like this.



1=D528, 2=D52, 3=D525, 4=D523, 5=D531

All diodes have 3 legs!  
Then push for RX expand.

Crossband repeater function is possible on the IC-W32E but it dosent work on my radio. It depends on witch CPU U have. But U

could always try it.

Set VHF and UHF FQs, turn tone squelch on, turn lock function on, turn off the transceiver, push [SQL], [MAIN] and [BAND] keys and turn power on.

E-mail: [sm6vit@hotmail.com](mailto:sm6vit@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET) [sm6vit@swipnet.se](mailto:sm6vit@swipnet.se).[MODIFICATION.NET](http://MODIFICATION.NET)

packet: [sm6vit@sk6yw.o.swe.eu](mailto:sm6vit@sk6yw.o.swe.eu)

This modification is read 2327 times.

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**28-08-1999**

**(IC-W32) To extend the receiver and open up 800 MHz receive (cellular blocked) for IC-W32A**

- Turn off the radio
- Press and hold the band and squelch buttons.
- Turn on the radio while holding these buttons, wait for 5 seconds before you release the band and squelch buttons.
- Now the receiver should be opened up as far as it will go.

**Date:** 31-12-2001

**User comment**

**From:** [Scott KF4JDP Terry](#)

**Subject:** All IC-W32-A Pushbutton Mods

Not functional any longer, Tried all of them and none of them work.

If anyone has an explanation please E-MAIL me

Thanks

Scott 73

**Date:** 22-03-2002

**User comment**

**From:** [Randy Evans, KE4RWS](#)

**Subject:** IC-W32A Firmware Change

Apparently Icom made a firmware change at some point to comply with FCC guidelines regarding cellular telephone reception. There may have been other issues relating to it, but the short version of it is W32A's after a certain point no longer had the "super-extended" receive the earlier units did. It usually revolves around cell-phone reception though. I mean, God forbid if we overhear someone order a pizza or something . . .

R. Evans

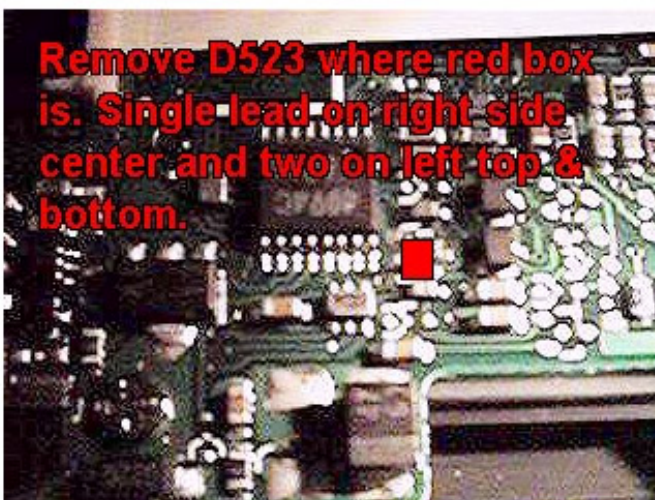
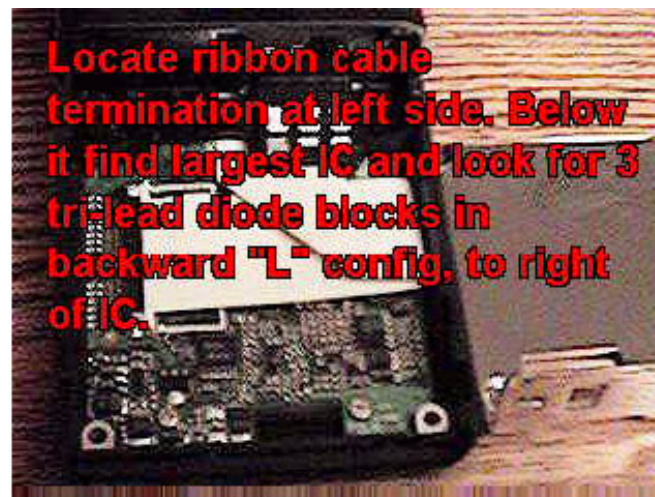
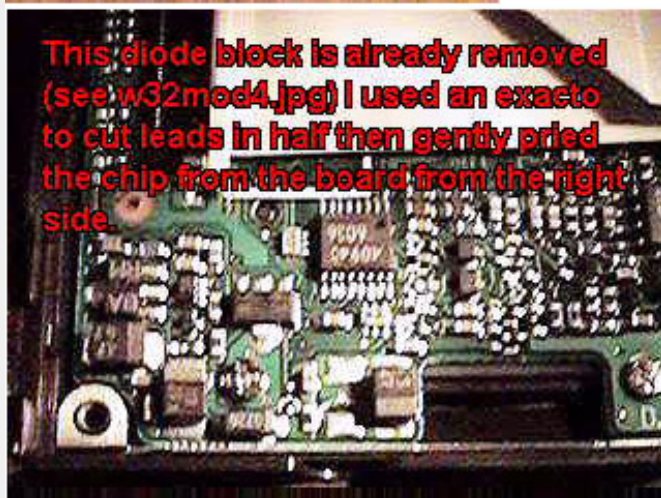
KE4RWS

This modification is read 2466 times.

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**12-09-1999**

**(IC-W32) IC-W32 TX modification. Only a picture.**



This modification is read 2323 times.

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**03-02-2001**

## **(IC-W32) ICW32 E Crossband repeater**

**Author:** Dr. Werner Furlan - [furlan@gmx.net](mailto:furlan@gmx.net). [MODIFICATION.NET](http://MODIFICATION.NET)

### A. Aktivieren des Crossband-Repeater-Betriebs beim Handfunkgeraet IC-W32E:

1. VHF- und UHF-Frequenzen einstellen.
2. Squelch-Funktionen in beiden Baendern auf Rauschunterdrueckung stellen.
3. LOCK aktivieren.
4. Ausschalten
5. SQL+MAIN+BAND gleichzeitig gedruickt halten und einschalten.  
Schluessel im Display blinkt.

### B. Deaktivieren des Crossband-Repeater-Betriebs: SQL halten und LOCK druecken.

73!  
Werner  
OE9FWV

This modification is read 1739 times.

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**31-07-2001**

## **(IC-W32) Icom IC-W32A programming glitch**

**Author:** Bryce, K1GAX - [k1gax@juno.com](mailto:k1gax@juno.com).[MODIFICATION.NET](http://MODIFICATION.NET)

There is a programming glitch in the RT Systems Icom Programming Software (Version 2.05) that does not allow later serial numbers of the Icom IC-W32A to be programmed properly. This does not affect the earlier serial numbers of the W32A.

If you are trying to program a later model W32A with the cloning software and it will not accept the data from the PC, there is a simple fix.

Somewhere along the way, Icom changed the range of the expanded receive and made the expanded receive standard on the later versions of the W32A.

In programming the radio using the programming software (on the later serial numbers), do not check the "Expanded Rx" box in the software.

Checking this block on the later serial numbers will cause the programming not to take in the radio when transferring from the PC.

73, Bryce, K1GAX  
k1gax@arrl.net

This modification is read 2362 times.

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**19-07-1998**

## **(IC-X2A) Cross Band Repeat Function for the ICOM IC-X2A**

You can use the same function set up as for the IC-W2A. The cross band repeater function works the same.

To access the cross-band repeat function, first perform the extended receive mod by holding down the "Light", "B", "#" keys while turning on the power.

This is less of a mod than it is a function. To expand the receiver frequency range of the new Icom IC-X2A to 322.00-513.00, and 800.000-1310.000, do the following:

Hold down the Light, B, and # keys while turning the power on.

That's actually a four button sequence, since power on is controlled by a keypad button.

select the 400 MHZ band as MAIN

Press F (above the PTT button) and SET (the 8 button) then using the ^/SCAN button make the lower right symbol of the band say PL rotate the right knob to set the display to 1, 10, or 100 as desired

1 sets entry to single digits only

10 sets entry to 10's and single digits

100 sets entry to all digits

hit PTT

Now - repeat the above for the UHF band - Note It WILL NOT work unless you do it for BOTH bands.

Marwynne Kuhn WB5PWG

This modification is read 312 times.

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**23-08-1998**

## **(IC-Z1A) IC-Z1A Extended Receive**

Ok, after messing around with the radio on my own and then getting the "official" mod, here's a summary of the various diode mods for the Z1A:

Icom Z1A mods

[B]+[#]+[POWER] = Extended Receive.

VFO \*DISPLAYS\* 50-299.900 and 300-999.900.

AM Aircraft band enabled.

SET mode now has a new "PLACE" function for setting the direct entry starting digit.



There is room for four diodes in the Z1A located on the CPU board to the left of the ribbon cable connector. On a US version, only the bottom two are installed. D15 is just below and to the right of the four diodes. These diodes are bigger than the rest of the surface mounted components and are easy to spot.

The official ICOM mod (which I unofficially saw...) is to remove D15 for extended TX and to use the above keyboard mod for extended receive. According to the sheet, the 800-900 band is NOT available in US versions.

```

+++  +-+
| |  | |  <---- Installing diodes in either of these seems to do
+++  +-+      nothing.

+++  +-+
| |  | |  <---- IN: US Version 144-148 TX 440-450 TX
+++  +-+      OUT: Extended 136-174 TX 380-470 TX (Lose auto-repeater
^              and tone encode)
|
+----- IN: US          144-148 TX 440-450 TX
          OUT: European  144-148 TX 430-440 TX

+++
"D15"---> | |  <---- IN: US Version Stock
+++          OUT: Extended TX 136-174 380-470 (keeps auto-repeater
              and tone encode)

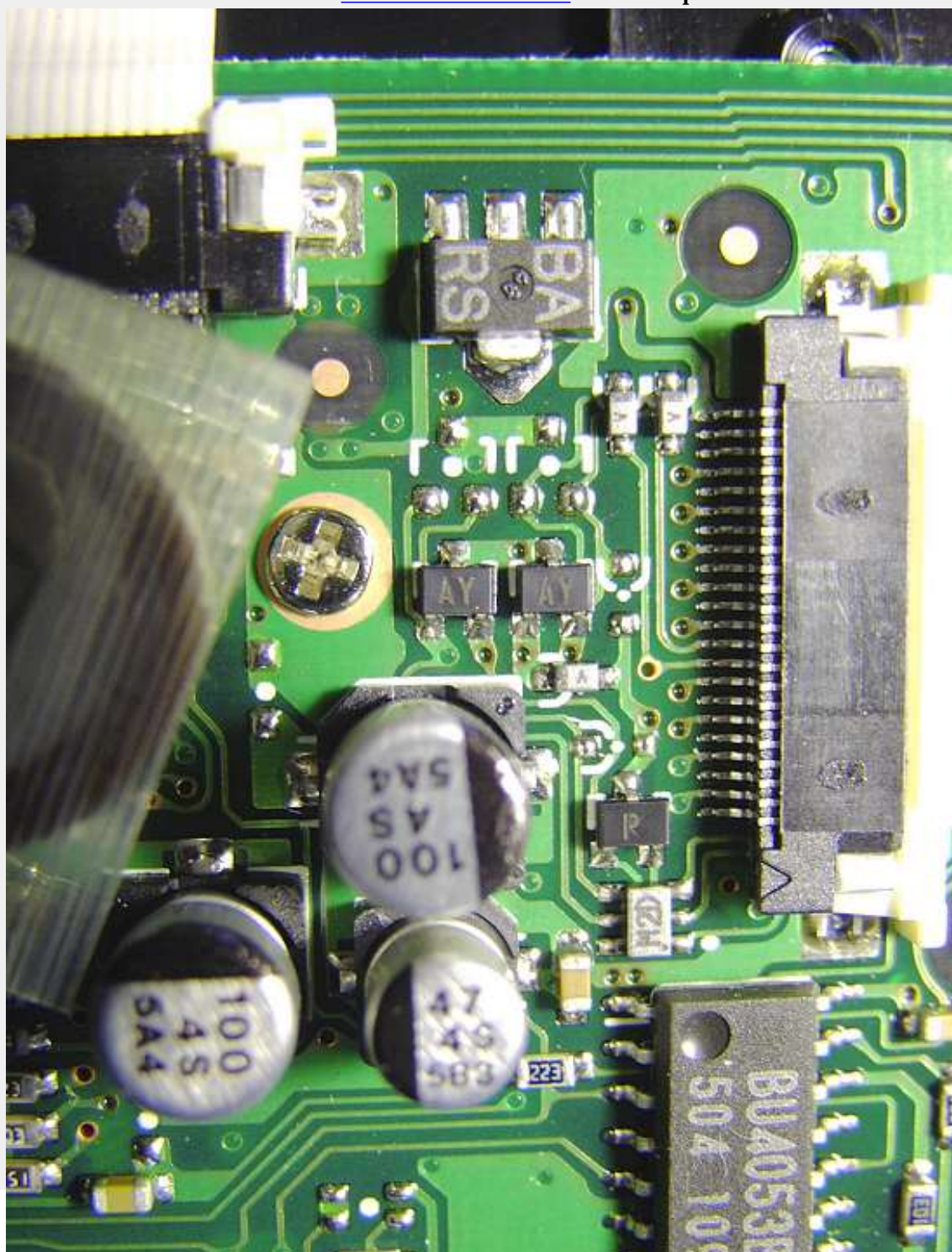
```

A word of warning about messing with the four diode pads: If you detach either one of the installed diodes, the CPU will reset and you'll lose ALL of your memories. (found that out the hard way...) D15 doesn't seem to affect the memories at all.

Since the 800MHz band is not available in US versions, my guess is that there's a keyboard mod to unlock it instead of a diode. The diodes only seem to control the country versions. If anyone has any more keyboard mods, please post them.

Bruce KD6ALI

Thanks to [Edmund F Leavitt](#) for this photo.





This modification is read 697 times.

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**04-12-2001**

## **(IC-Z1A) IC-Z1A 800-900 MHz Receive**

800MHz receive.

Install two transistors.

Part #UN9110 can be ordered from ICOM Service Department.

This mod is not for the non-technical person. The radio pretty much has to be completely disassembled to get to the pads.

1. Remove the control head and battery.
2. Remove the 4 back screws and 4 battery compartment screws.
3. Separate the case.
4. Locate the circuit board with the two channel select/squelch knobs. This is the board we're looking for. Unfortunately, it's on the back.
5. **CAREFULLY** remove the wide ribbon cable that connects the upper and lower circuit boards.
6. **LOOSEN** the three screws on the **LOWER** circuit board.
7. Remove the two screws on the back of the radio, on the top of the battery compartment.
8. Remove the three screws on the battery contacts.
9. Slide the RF assembly up and it should separate from the rest of the radio.
10. Remove the knobs and carefully remove the ring nuts from the case.
11. Remove the metal bracket that is between the case and the pots.
12. **CAREFULLY** Desolder the grounding tab on the left side of the circuit board.
13. Remove the two screws holding the board down.
14. The board should now be free. Carefully wiggle and pull and pry until the board is released. You may have to partially or fully remove the battery spring mechanism.
15. Flip the board over. There is a large multi-pin jack on the back, slightly high and centered. Look for two empty, 3 pin pads right next to it.
16. Carefully solder the two transistors onto the pads.
17. Check your connections. You do NOT want to have to disassemble this twice.
18. Check them again.
19. Reassemble the radio in reverse order. Remember to resolder the grounding tab.
20. Turn it on. Select UHF, key in an 800MHz frequency and listen. There is no need to reset the VFO or memories.

Diagram:

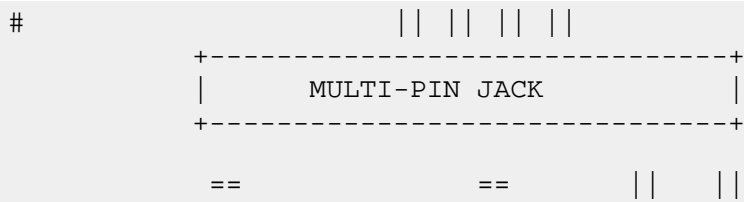
This is a close up view of the area to looking for.  
(sorry, no picture yet.)

# = 3 pin part, diode/transistor

|| = 2 pin SMD diode/resistor

(\*) = 3 pin surface mounted transistor.

(\*) (\*) || || # #



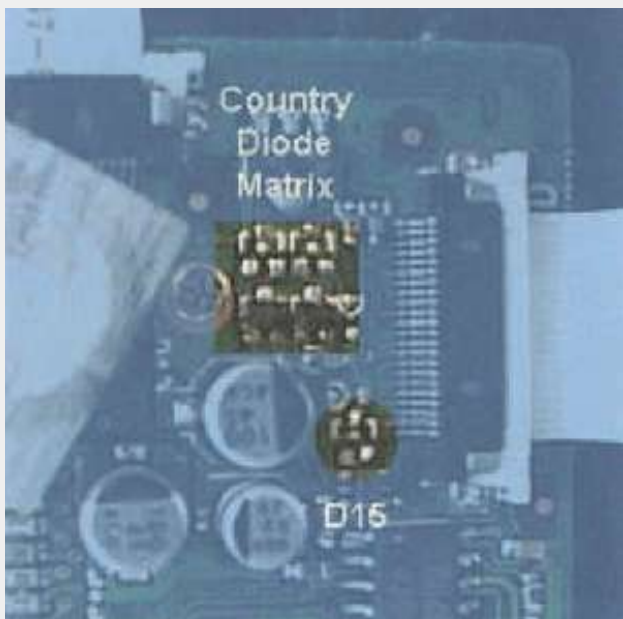
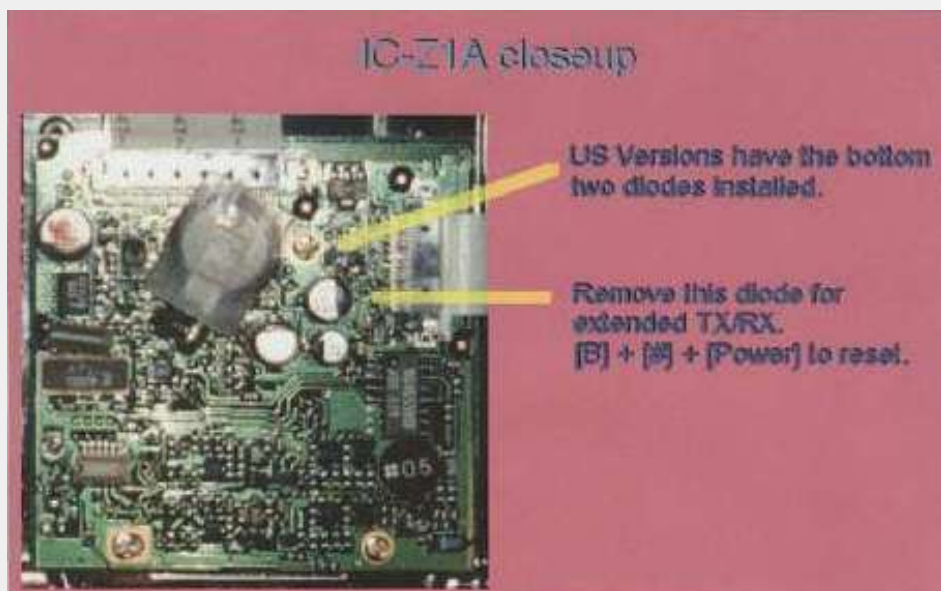
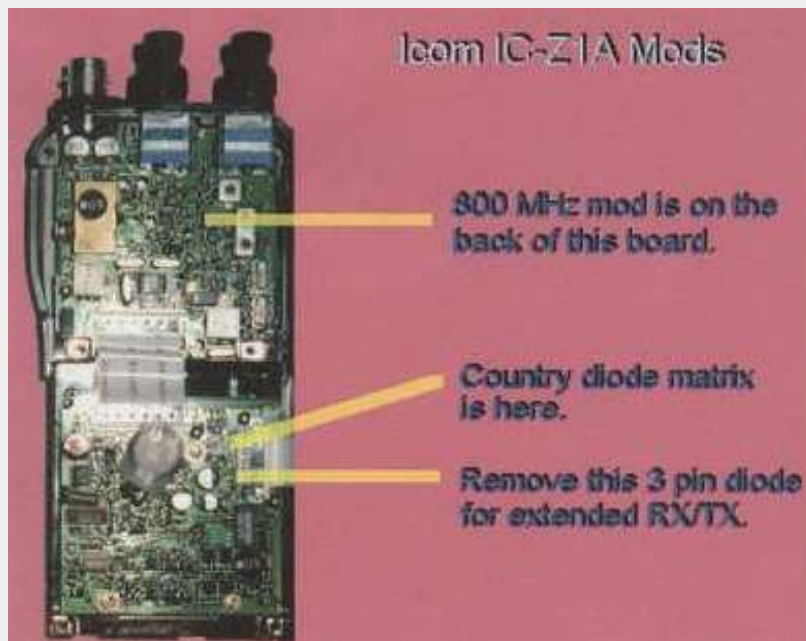
(kinda hard to draw in ascii. This diagram needs a non-proportional font to look right...)

This modification is read 598 times.

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**08-12-2001**

**(IC-Z1A) Pictures for the two modification above**



**19-07-1998****(MISC) ICxx71 ram adaptor for use with eprom programmer**

How to read/programm the ICOM-battery-RAM by EPROMER:

```

Adapter ICOM-RAM <==> 2764-Programmer socket
12.dez.89 .....
.          R    5V  20.----- 28  +5V the factory programs
Q4-7 16-19 -+ .    A  CS   19.---(*)    the lower 255 Nibbels...
 0V  14  ----+--- 1 E    M  AD 9  18.----- 24  A 9
      .2          AD 8  17.----- 25  A 8 you find the frequency-
+5V  28  --o..o- 3 WP   U  AD 7  16.----- 3   A 7 range reading the 'hexdump'
Q3   15  ----- .4 D3   N  AD 6  15.----- 4   A 6 backwards.
Q2   13  ----- .5 D2   I  AD 5  14.----- 5   A 5
Q1   12  ----- .6 D1   T  AD 4  13.----- 6   A 4 my tnx to dl8scu @ db0aaa,
Q0   11  ----- .7 D0           AD 3  12.----- 7   A 3           df8wu @ db0lj ,
Prog 27  ----- .8 WR'          AD 2  11.----- 8   A 2           dc4fe          &

testet with: .          AD 1  10.----- 9   A 1           dl8zaw @ db0sif
IC-751 , 271h, . upside AD 0   9.----- 10  A 0
 471e,1271a. ....

CE--20-inv.--
OE--22-      nand--(*)    use a 4011 for the nand's and the inverter.
      nand--          dont forget to set the unused 4011 inputs high.
PGM-27-

```

if your eprommer cancels operation with a 'no eprom inside'-error contact each eprommer-pin to a normal 2764 but dont connect the pins 11,12,13,15,27 of the normal eprom, dont connect the pins 16-19 to 0V as shown above, program the 2764 to all bytes = low before.

73's de Karl (dg8fz @ db0sao.deu.eu) 12.Dez.89, 21.Okt.91

**19-07-1998****(MISC) BNC connectors for ICOM HTs replacement**

The BEST replacement BNC connector that I have seen (and have used to repair the jacks on 3 different Icom radios) is made by Amphenol for Tektronix.

They are not in any catalog I can find, and are not in the salesmans literature. I was told (after the salesman called the factory) that they are not available to the public unless you want to buy 500 of them. I've purchased them on a business trip to Portland (from the Tek Company Store - open to the public) and from the local Tek repair shop. They are very "tight" connectors - the antenna does not slop around, and the center contact has 4 gold fingers to grip the antenna center pin. They are not cheap - \$4-5 each comes to mind - but the oldest one that I fixed is stil going strong after 3 years of daily use. The hole in the metal chassis and the plastic case both have to be enlarged slightly, and the pc board will have to be releived a little. When you install the new connector throw away the solid wire that Icom uses to connect the PC board to the BNC center pin. Replace it with a piece of braid. I used a short length of the narrowest solder -wick I could find, but another friend used a small piece of RG-174 braid. It is 'way too wide, but it worked. You're after a flex connection between the board and the connector pin. It's a little tricky to make a connection with the solder-wick without filling up the braid with solder, but it can be done. Yes, the whole job is tedious, and you'll be swearing at the engineers when you are done, but the couple of hours the entire job will take is worth it.

You'll need, besides common hand tools:

The new connector - the one that I have left has "28JR200-1" stamped on it. When I picked it up from the local Tek fixer I asked for a replacement BNC connector for a Tek scope.

He didn't need a number or anything...

Some white heat sink goop. There is no way that you will not get some on your hands. ANd you'll want to put some back on the radio heat sink anyway - the three radios I've done the mod on have all been short on it. And the less there is the more the final will overheat 'cuz the heat can't be carried away. The small tube I picked up at Radio Shlock 3 years ago is still 1/3 full.

A small piece of solder-wick type braid - the narrowest you can find.

Buy a small roll - you'll need some to clean up the PC board where the old center contact is soldered and wired down.

Small needle-point soldering iron - I use a Weller solder station with a 700-degree PTA tip. I should be using the next narrower

tip but I damaged it a few months ago.

Thin solder. I have a roll of .015" that I bought specially for doing fine work. It goes fast, but in compensation there is a lot on a roll.

A few drops of stiff Loctite or similar thread locking compound. I keep a small bottle of each of four different grades in my automotive tool chest - I've found I have much better reliability from my off-road vehicles when I use it on every bolt and nut - especially the distributor points.

You will have to make your own thin wrench to get the nut on the connector off and the new one on. There is very little room in the radio to do this. I ended up ruining the hinge on a pair of cheap needlenose pliers doing the job.

-- Mike Morris WA6ILQ

This modification is read 1309 times.

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**19-07-1998**

## **(MISC) CAT interface for any ICOM**

Hallo friends,

The file [IFACE.GIF](#). This is schematic diagram of my interface for any ICOM rig CAT, and now I have this circuit succesfully tested with IC-Q7 programming software (you can find this software on [www.hamradio.cz](http://www.hamradio.cz)). The diference between CAT and programming use is only connection to proper pin on 3.5 mm jack.

VY 73! Jiri OK2WY (ok2wy@okdxc.cz)

This modification is read 1691 times.

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**09-11-2000**

## **(MISC) Reset ICOM radios**

[www.icomamerica.com/support/cpureset.html](http://www.icomamerica.com/support/cpureset.html)

### CPU Reset Procedures

This is a list of CPU resets for most ICOM radios. CPU reset returns the radio to out-of-box condition: all memory channels are erased, all items in the set mode returned to default values, and all VFOs cleared. CPU reset procedure usually involves turning the radio off, pushing and holding specific buttons, and then turning the radio back on while still holding down the button combination. Some newer radios have a "partial reset" available, as well as a full CPU reset. Partial reset will clear the VFOs and return the set mode items to default, but it will not erase the memory channels.

Contents:

Amateur radios CPU reset procedures

Receivers CPU reset procedures

Marine radios CPU reset procedures

Avionics radios CPU reset procedures

Land Mobile radios CPU reset procedures

Amateur:

H A N D H E L D S:

IC-Delta1 - Hold [FUNCTION] & [A] & [CLR] buttons and turn the radio on.

IC-2GAT - Turn the radio on, hold [LIGHT] & [FUNCTION], turn the radio off, then turn back on. Release the buttons after the display returns to normal.

IC-2GXAT - Hold [FUNC] & [VMC] & [DUP] & [HI/LO] buttons and turn the radio on.

IC-02AT - Serial numbers below 34000: push the button on the main circuit board next to the lithium battery. Serial numbers above 34000: hold [FUNC] button and turn the radio on.

IC-2iA - Hold [LIGHT] & [MONITOR] buttons and turn the radio on.

IC-2SA - Hold [LIGHT] & [MONITOR] buttons and turn the radio on.

IC-2SAT - Hold [FUNCTION] & [A] buttons and turn the radio on.

IC-2SRA - Hold [FUNCTION] & [A] & [CLR] buttons and turn the radio on.

IC-P2AT - Hold [FUNCTION] & [A] buttons and turn the radio on.

IC-µ2AT - Hold [LIGHT] button and turn the radio on.

IC-03AT - Serial numbers below 34000: push the button on the main circuit board next to the lithium battery. Serial numbers above 34000: hold [FUNC] button and turn the radio on.

IC-3SA - Hold [LIGHT] & [MONITOR] buttons and turn the radio on.

IC-3SAT - Hold [FUNCTION] & [A] buttons and turn the radio on.

IC-4iA - Hold [LIGHT] & [MONITOR] buttons and turn the radio on.

IC-4GAT - Turn the radio on, hold [LIGHT] & [FUNCTION], turn the radio off, then turn back on. Release the buttons after the display returns to normal.

IC-4GXAT - Hold [FUNC] & [VMC] & [DUP] & [HI/LO] buttons and turn the radio on.

IC-04AT - Serial numbers below 34000: push the button on the main circuit board next to the lithium battery. Serial numbers above 34000: hold [FUNC] button and turn the radio on.

IC-4SA - Hold [LIGHT] & [MONITOR] buttons and turn the radio on.

IC-4SAT - Hold [FUNCTION] & [A] buttons and turn the radio on.

IC-4SRA - Hold [FUNCTION] & [A] & [CLR] buttons and turn the radio on.

IC-P4AT - Hold [FUNCTION] & [A] buttons and turn the radio on.

IC-µ4AT - Hold [LIGHT] button and turn the radio on.

IC-12AT - Hold [FUNC] button and turn the radio on.

IC-12GAT - Turn the radio on, hold [LIGHT] & [FUNCTION] buttons, turn the radio off, then turn back on. Release the buttons after the display returns to normal.

IC-24AT - Hold [FUNCTION] & [A] buttons and turn the radio on.

IC-32AT - Hold [FUNCTION] & [A] & [LIGHT] buttons and turn the radio on.

IC-Q7A - Hold [FUNC] & [BAND] & [V/M] buttons and turn the radio on.

IC-T2A - Hold [A] & [C] buttons and turn the radio on.

IC-T2H - Hold [aV] & [cT] buttons and turn the radio on.

IC-T21A - Full reset: hold [A] & [\*] & [FUNC] buttons and turn the radio on. Partial reset: hold [A] button and turn the radio on.

IC-T22A - Full reset: hold [A] & [\*] & [FUNC] buttons and turn the radio on. Partial reset: hold [A] button and turn the radio on.

IC-T41A - Full reset: hold [A] & [\*] & [FUNC] buttons and turn the radio on. Partial reset: hold [A] button and turn the radio on.

IC-T42A - Full reset: hold [A] & [\*] & [FUNC] buttons and turn the radio on. Partial reset: hold [A] button and turn the radio on.

IC-T7A - Hold [MR] & [VFO] & [BAND] buttons and turn the radio on.

IC-T8A - Hold [MR] & [VFO] & [BAND] buttons and turn the radio on.

IC-T81A - Hold [SQL] & [VFO] & [MR] buttons and turn the radio on.

IC-V21AT - Hold [F] & [A] & [\*] buttons and turn the radio on.

IC-W2A - Hold [FUNCTION] & [A] & [CLR] buttons and turn the radio on.

IC-W21A - Hold [HI/LO] button and turn the radio on.

IC-W21AT - Hold [F] & [A] & [\*] buttons and turn the radio on.

IC-W31A - Full reset: hold [A] & [\*] & [MONI] buttons and turn the radio on. Partial reset: hold [A] button and turn the radio on.

IC-W32A - Full reset: hold [SQL] & [VFO] & [MR] buttons and turn the radio on. Partial reset: hold [VFO] button and turn the radio on.

IC-Z1A - Full reset: hold [A] & [\*] & [MONI] buttons and turn the radio on. Partial reset: hold [A] button and turn the radio on.

M O B I L E S:

IC-27A/H - Push the reset button under the top access cover.

IC-28A/H - Push the reset button in the aft left corner under the bottom cover.

IC-37A - Push the reset button under the top access cover.

IC-38A - Push the reset button in the aft left corner under the bottom cover.

IC-47A - Push the reset button under the top access cover.

IC-48A - Push the reset button in the aft left corner under the bottom cover.

IC-Delta100 - Full reset: hold [SET] & [SPCH] buttons and turn the radio on. Partial reset: hold [SPCH] button and turn the radio on.

IC-207H - Full reset: hold [SET] & [S.MW] buttons and turn the radio on. Partial reset: hold [V/MHz] button and turn the radio on.

IC-228A/H - Hold [SQUELCH/MONITOR] & [LOCK] buttons and turn the radio on.

IC-229A/H - Hold [SET] & [MW] buttons and turn the radio on.

IC-281H - Full reset: Hold [SET] & [SPCH] buttons and turn the radio on. Partial reset: hold [SPCH] button and turn the radio on.

IC-448A - Hold [SQUELCH/MONITOR] & [LOCK] buttons and turn the radio on.

IC-449A - Hold [SET] & [MW] buttons and turn the radio on.

IC-481H - Full reset: Hold [SET] & [SPCH] buttons and turn the radio on. Partial reset: hold [SPCH] button and turn the radio on.

IC-706 - Hold [UP] & [DOWN] buttons and turn the radio on.

IC-706MKII - Hold [UP] & [DOWN] buttons and turn the radio on.

IC-706MKIIG - Hold [UP] & [DOWN] buttons and turn the radio on.

IC-900 - Hold [MR] button, turn the power off and then on again.

IC-901A - Hold [CHECK] & [MW] buttons and turn the radio on.

IC-1200A - Hold down the tuning control and turn the power on.

IC-1201A - Hold [SQUELCH/MONITOR] & [LOCK] buttons and turn the radio on.

IC-2000H - Hold [SET] & [PGR/CS/MW] buttons and turn the radio on.

IC-2100H - Full reset: hold [SET] & [S.MW] buttons and turn the radio on. Partial reset: hold [V/MHz] button and turn the radio on.

IC-2340H - Full reset: hold [SET] & [SPCH] buttons and turn the radio on. Partial reset: hold [SPCH] button and turn the radio on.

IC-2350H - Full reset: hold [SET] & [S.MW] buttons and turn the radio on. Partial reset: hold [DUP] & [LOW] and turn the radio on.

IC-2400A - Hold [SUB VOL] & [MW] buttons and turn the power on.

IC-2410A/H - Hold [SET] & [MW] buttons and turn the radio on.

IC-2500A - Hold [SUB VOL] & [MW] buttons and turn the power on.

IC-2700H - Full reset: hold [SET] & [SPCH] buttons and turn the radio on. Partial reset:

hold [SPCH] button and turn the radio on.  
IC-2710H - Hold both [S.MW] buttons and turn the radio on.  
IC-2800H - Full reset: hold 3rd buttons from the top on both sides of the LCD display and turn the radio on. Partial reset: hold 2nd buttons from the top on both sides of the LCD display and turn the radio on.  
IC-3200A - Hold [F] button and turn the radio on.  
IC-3210A - Hold [SQUELCH/MONITOR] & [LOCK] buttons and turn the radio on.  
IC-3220A/H - Hold [SET] & [MW] buttons and turn the radio on.  
V H F / U H F B A S E:  
IC-271A/H - Reprogram the RAM card.  
IC-275A/H - Hold [M-CL] button and turn the radio on.  
IC-375A - Hold [M-CL] button and turn the radio on.  
IC-471A/H - Reprogram the RAM card.  
IC-475A/H - Hold [M-CL] button and turn the radio on.  
IC-575H - Hold [M-CL] button and turn the radio on.  
IC-820H - Hold [MW] button and turn the radio on.  
IC-821H - Hold [MW] button and turn the radio on.  
IC-970A/H - Hold [MW] button and turn the radio on.  
IC-1271 - Reprogram the RAM card.  
IC-1275A - Hold [M-CL] button and turn the radio on.  
H F B A S E:

IC-77 - Clone with a computer.  
IC-706 - Hold [UP] & [DOWN] buttons and turn the radio on.  
IC-706MKII - Hold [UP] & [DOWN] buttons and turn the radio on.  
IC-706MKIIG - Hold [UP] & [DOWN] buttons and turn the radio on.  
IC-707 - Hold [MW] & [LOCK] buttons and turn the radio on.  
IC-718 - Hold [UP] & [DOWN] buttons and turn the radio on.  
IC-725 - Hold [FUNCTION] & [MW] buttons and turn the radio on.  
IC-726 - Hold [FUNCTION] & [MW] buttons and turn the radio on.  
IC-728 - Hold [FUNCTION] & [MW] buttons and turn the radio on.  
IC-729 - Hold [FUNCTION] & [MW] buttons and turn the radio on.  
IC-735 - No CPU reset available.  
IC-736 - Hold [CLR] & [ENT] buttons and turn the radio on.  
IC-737 - Hold [CLR] & [ENT] buttons and turn the radio on.  
IC-737A - Hold [CLR] & [ENT] buttons and turn the radio on.  
IC-738 - Hold [CLR] & [ENT] buttons and turn the radio on.  
IC-746 - Hold [F-INP] & [M-CL] buttons and turn the radio on.  
IC-751 - No CPU reset available.  
IC-751A - No CPU reset available.  
IC-756 - Hold [F-INP] & [M-CL] buttons and turn the radio on.  
IC-756PRO - Hold [F-INP] & [M-CL] buttons and turn the radio on.  
IC-761 - Hold [M-CLEAR] button and turn the radio on.  
IC-765 - Hold [M-WRITE] button and turn the radio on.  
IC-775 - Hold [CLEAR] button and turn the radio on.  
IC-775DSP - Hold [CLEAR] button and turn the radio on.  
IC-781 - Hold [M-CLEAR] button and turn the radio on.  
R E P E A T E R S:  
IC-RP1220 - Turn the power off for a few minutes. Push S1 on the logic circuit board.  
IC-RP1520 - Turn the power off for a few minutes. Push S1 on the logic circuit board.  
IC-RP4020 - Turn the power off for a few minutes. Push S1 on the logic circuit board.

#### Receivers:

H A N D H E L D S:  
IC-R1 - Hold [F] and [CL] buttons and turn the radio on.  
IC-R2 - Hold [FUNC] & [BAND] & [V/M] buttons and turn the radio on.  
IC-R10 - Full reset: hold [CLR] button and turn the receiver on. Rotate the main dial to select YES, then push [ENT] button. Partial reset: hold [MODE] button and turn the radio on.  
B A S E / M O B I L E:  
IC-R71A - Reprogram the RAM card.  
IC-R72 - Hold [MW] button and turn the radio on.  
IC-R75 - Hold [UP] & [DN] buttons and turn the receiver on.  
IC-R100 - Hold [FUNC] & [ENT] buttons and turn the radio on.  
IC-R7100 - Hold [MW] button and turn the power on.  
IC-R8500 - Hold [MW] button and turn the receiver on.  
IC-R9000 - Hold [M-WRITE] button and turn the radio on.

#### Marine:

H A N D H E L D S:  
IC-M1 - Push and hold [ALL CLEAR] button  
IC-M1V - Clone with a computer.  
IC-M5 - Push the button on the main circuit board next to the lithium battery.  
IC-M7 - Turn the radio on, hold [HI-LOW] & [LOCK] buttons, turn the power off and on again. Push [CH16/D] button to select dial mode.  
IC-M8 - Hold [LIGHT] button and turn the radio on.

IC-M9 - Hold [HI/LO] & [DW/SCAN] buttons and turn the radio on. Wait until CH 16 displays on the LCD.

IC-M10 - Clone with a computer.

IC-M11 - Turn the radio on, hold [LIGHT] & [FUNCTION] buttons, turn the radio off, then turn back on. Release the buttons after the display returns to normal.

IC-M15 - Hold [HI/LO] & [CALL] & [DUAL] buttons and turn the radio on.

IC-GM1500 - Clone with a computer.

M O B I L E S:

IC-M45 - Clone with a computer.

IC-M45A - Clone with a computer.

IC-M55/B - Remove the plastic screw from the bottom cover and push the reset button underneath the screw.

IC-M56 - Turn the radio on, hold [CH16] & [MR] buttons, turn off, then turn the radio on again and release the buttons.

IC-M57 - Hold [CH16] & [HI/LO] buttons and turn the radio on. Hold the buttons for approximately 3 seconds after the radio comes back on.

IC-M58 - Clone with a computer.

IC-M59 - Clone with a computer.

IC-M80 - Disconnect the lithium battery, ground all CPU pins to chassis.

IC-M100 - Turn the radio on, hold the squelch knob and press [RESET]

IC-M120 - Turn the radio on, hold [CH16] & [USA], turn the radio off and then back on.

IC-M125 - Hold [FUNC] & [CH16] buttons and turn the radio off and back on.

IC-M126 - Hold [FUNC] & [CH16] buttons and turn the radio off and back on.

IC-M127 - Clone with a computer.

IC-M500 - Hold [DIMMER] & [13/67] buttons and turn the radio on.

N A V I G A T I O N:

FF-88 - No reset available.

FP-561 - Hold [MENU] button, turn the unit on, choose "all reset" and turn the unit off.

MR-40 - No reset available.

MR-61 - No reset available.

MR-610 - No reset available.

S S B R A D I O S:

IC-M600 - Hold [FUNCTION] & [CE] and turn the radio on.

IC-M700 - CPU reset not available.

IC-M700PRO - Clone with a computer.

IC-M710 - Clone with a computer.

IC-M710RT - Clone with a computer.

IC-M800 - Remove DC power from both the control head and the main unit. Wait approximately 5 minutes.

IC-M810 - Remove DC power from both the control head and the main unit. Wait approximately 5 minutes.

Avionics:

H A N D H E L D S:

IC-A2 - Push [F] & [PTT] buttons and turn the radio on.

IC-A3 - Hold [F] & [0] & [ENT] buttons and turn the radio on.

IC-A4 - No keypad reset, clone with a computer.

IC-A20 - Push [F] & [CLEAR] buttons and turn the radio on.

IC-A21 - Push [F] & [CLEAR] buttons and turn the radio on.

IC-A22 - Hold [F] & [0] & [ENT] buttons and turn the radio on.

G R O U N D / M O B I L E:

IC-A110 - Clone with a computer.

IC-A200B/M - No CPU reset.

P A N E L M O U N T:

IC-A200 - No CPU reset.

Land mobile:

P O R T A B L E S:

IC-F3 - Reclone

IC-F3G - Reclone

IC-F3S - Reclone

IC-F4 - Reclone

IC-F4G - Reclone

IC-F4S - Reclone

IC-F4TR - Reclone

IC-F10 - Reclone

IC-F20 - Reclone

IC-F30 - Reclone

IC-F30LT - Reclone

IC-F40 - Reclone

IC-F40LT - Reclone

IC-H8 - Reclone or hold [PTT] & [CLONE] buttons and turn the radio on.

IC-H10 - Reclone or hold [PTT] & [CLONE] buttons and turn the radio on.

IC-H16 - Reclone



IC-H18 - Reclone  
 IC-H19 - Reclone  
 IC-U8 - Hold [PTT] & [CLONE] buttons and turn the radio on.  
 IC-U10 - Hold [PTT] & [CLONE] buttons and turn the radio on.  
 IC-U16 - Reclone  
 IC-U18 - Reclone  
 IC-U19 - Reclone  
 M O B I L E S:  
 IC-F320 - Reclone  
 IC-F320S - Reclone  
 IC-F420 - Reclone  
 IC-F420S - Reclone  
 IC-F1020 - Reclone  
 IC-F2020 - Reclone  
 IC-U200 - Reclone  
 IC-U220 - Reclone  
 IC-U400 - Reclone  
 IC-V100 - Reclone  
 IC-V200 - Reclone  
 IC-V220 - Reclone  
 R E P E A T E R S:  
 IC-RP1620 - Turn the power off, wait a few minutes and turn the power back on.  
 IC-RP4520 - Turn the power off, wait a few minutes and turn the power back on.  
 IC-UR8050 - Turn the power off, wait a few minutes and turn the power back on.

This modification is read 2049 times.

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**13-05-2001**

**(MISC) Use ICOM SM-20 Mic to Yaesu ,Kenwood, etc.**

**Author:** Robert - [jg999@webtv.net](mailto:jg999@webtv.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Well here is a neat mod for the ICOM SM-20 microphone that allows you to use the mic with a non Icon transceiver (Yaesu or Kenwood or any other with proper wiring).

To install the 9volt battery you must remove the weight inside the mic (to make room for the battery ) . now you need to buy a battery end for the battery (Radio Shack #270-324 at \$1.89 and some velcro to hold the battery in Radio hack #64-2345 at \$2.69).

Now there is a plug inside the mic that is connected to the mic cord, cut the RED wire (as far away from the plug as possible) and connect it to the battery POSITIVE lead. Take the NEGATIVE lead from he battery and splice it into the BLACK wire (in the cable). To make sure the battery won't run down (when the transceiver is'nt keyed) you must take take mic plug apart and put the wire that is on pin #7 (witch is the mic ground and put it with the wire on pin #5 witch is the PTT ).

One last thing, with this MOD be sure to take the wire off pin #2 (witch is the red wire that would normally apply 8volts from an ICOM transceiver). I have mine modified like this and it works great.

Robert.

This modification is read 1387 times.

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**03-11-2001**

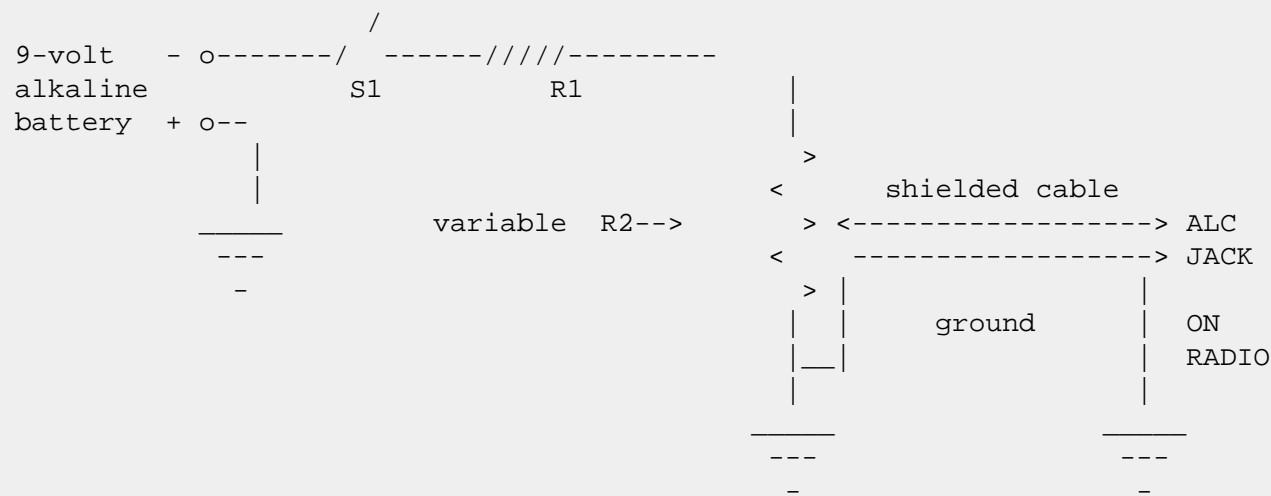
**(MISC) Icom Hex Addresses**

| MODEL   | HEX |
|---------|-----|
| IC-07   | 3E  |
| IC-R72  | 32  |
| IC-75   | 5A  |
| IC-127A | 18  |
| IC-127E | 18  |
| IC-271  | 20  |
| IC-275A | 10  |
| IC-275E | 10  |

|             |    |
|-------------|----|
| IC-275H     | 10 |
| IC-375A     | 12 |
| IC-471      | 22 |
| IC-475A     | 14 |
| IC-475E     | 14 |
| IC-475H     | 14 |
| IC-575A     | 16 |
| IC-575H     | 16 |
| IC-706      | 48 |
| IC-706      | 48 |
| IC-706MKII  | 4E |
| IC-706MKIIG | 58 |
| IC-725      | 28 |
| IC-726      | 30 |
| IC-728      | 38 |
| IC-729      | 3A |
| IC-735      | 04 |
| IC-736      | 40 |
| IC-737      | 3C |
| IC-737A     | 3C |
| IC-738      | 44 |
| IC-746      | 56 |
| IC-75       | 5A |
| IC-751      | 1C |
| IC-756      | 50 |
| IC-756PRO   | 5C |
| IC-756PROII | 64 |
| IC-761      | 1E |
| IC-765      | 2C |
| IC-775      | 46 |
| IC-781      | 26 |
| IC-820      | 42 |
| IC-820H     | 42 |
| IC-821      | 4C |
| IC-910      | 60 |
| IC-970      | 2E |
| IC-970A     | 2E |
| IC-970E     | 2E |
| IC-970H     | 2E |
| IC-1271     | 24 |
| IC-1275     | 18 |
| IC-R7000    | 08 |
| IC-R7100    | 34 |
| IC-R9000    | 2A |

23-11-2001

## (MISC) QRP mod for ICOM transceivers



With this circuit connected to the radio, the power output is adjustable between 0 ---> 100W. For best results. leave the RF power control at maximum and adjust for desired power using R2.

S1 is used to turn off circuit when radio is not in use or QRP operation is not desired.

| Radio Model:                             | R1 value | R2 value |
|--|----------|----------|
| IC-761, 765                              | 47K      | 20K      |
| IC-720(A), 735, 740, 745, 751(A), 275A/H | 2M       | 1M       |
| IC-725, 726, 728, 729, 736, 737(A)       | 220K     | 100K     |

06/01/94 CJR

For the IC-820H use the values for the IC-761, 765. The IC-781, IC-765 and the IC-820H all have the same ALC characteristics:

Control voltage : -4 to 0 volts  
Input impedance : More than 10 K ohms

This modification is read 898 times.

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16-04-2001

## (PS85) ICOM PS85 fan modification

**Author:** Mark - [pe3hmp@hotmail.com](mailto:pe3hmp@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

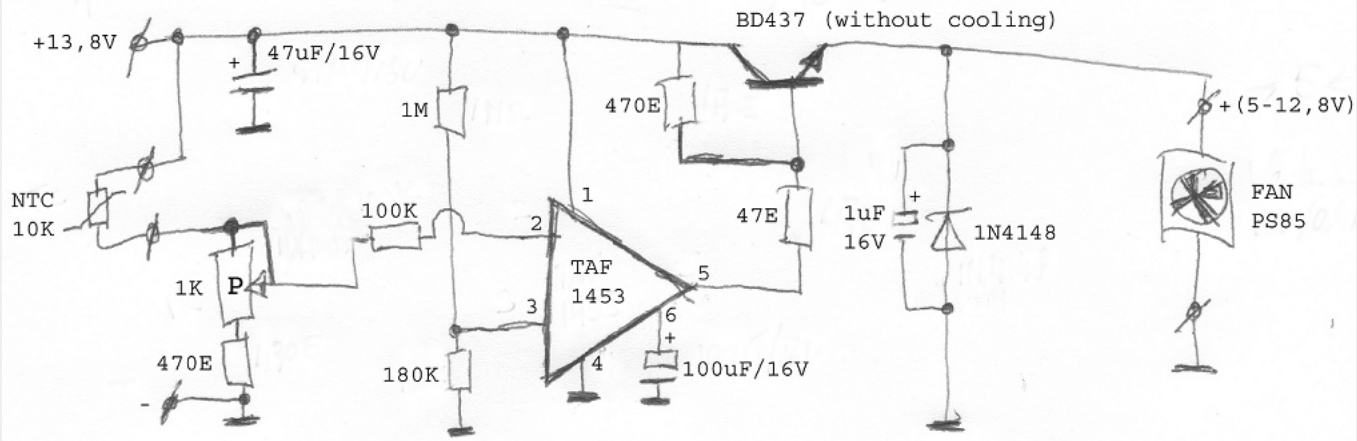
When I bought the icom PS85 power supply one thing immediatly caught my attention, THE NOISY FAN.

You would expect if You pay \$450 usdollar (in the Netherlands) that this would be a great power supply and not a noisy one !

Well after 2 day I decided that it was time to do someting about it, after contacting icom I heard that there was no mod. for it so I had to do it myself.

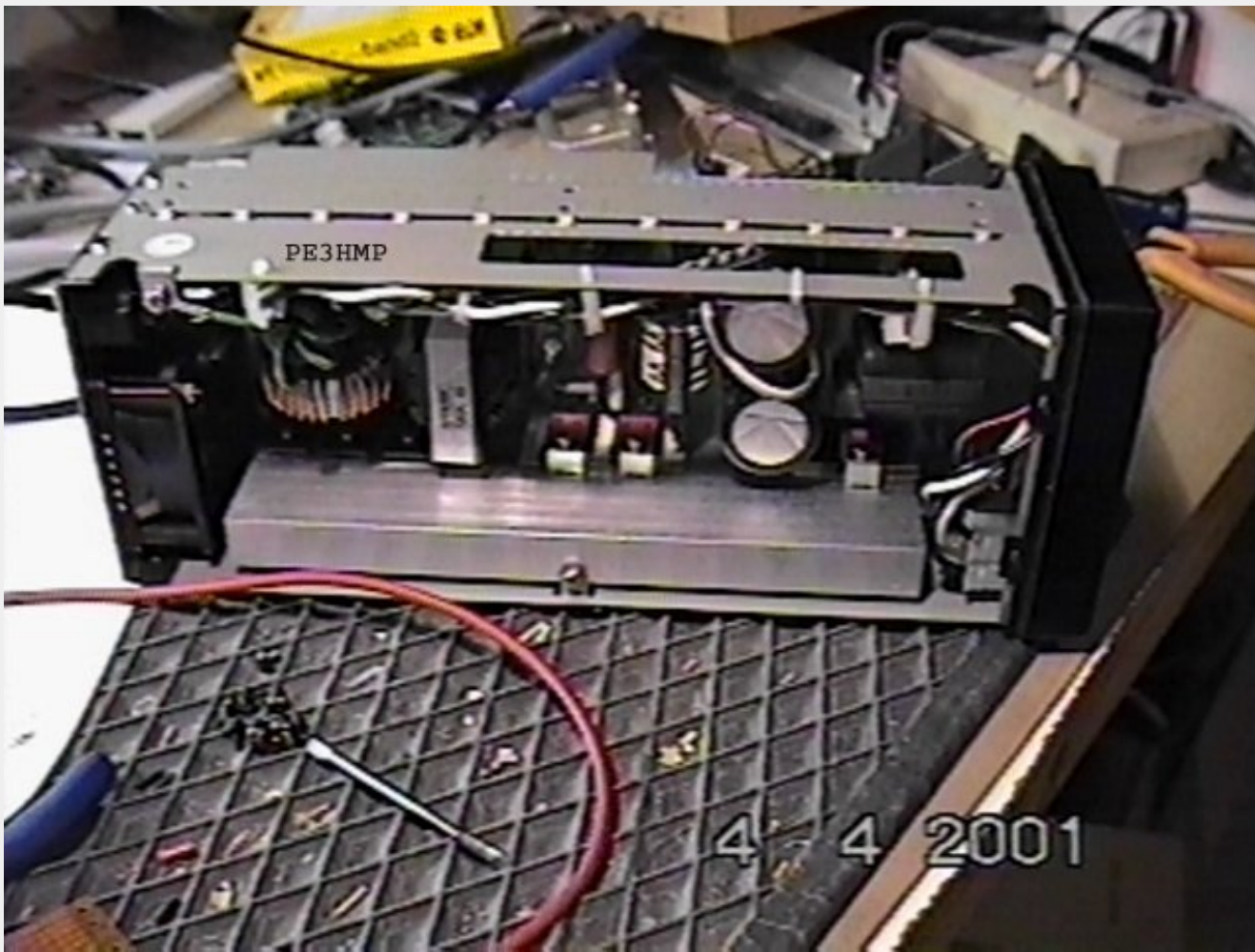
This mod is using a NTC to sense the temp and control the speed of the fan so the temp wil not exeed 50 degrees celcius. Potentiometer P is used to adjust the lowest speed of the fan (I set P so that the fan gets at least 6,5V at 20 degrees celcius)

# ICOM PS85 FAN MOD.

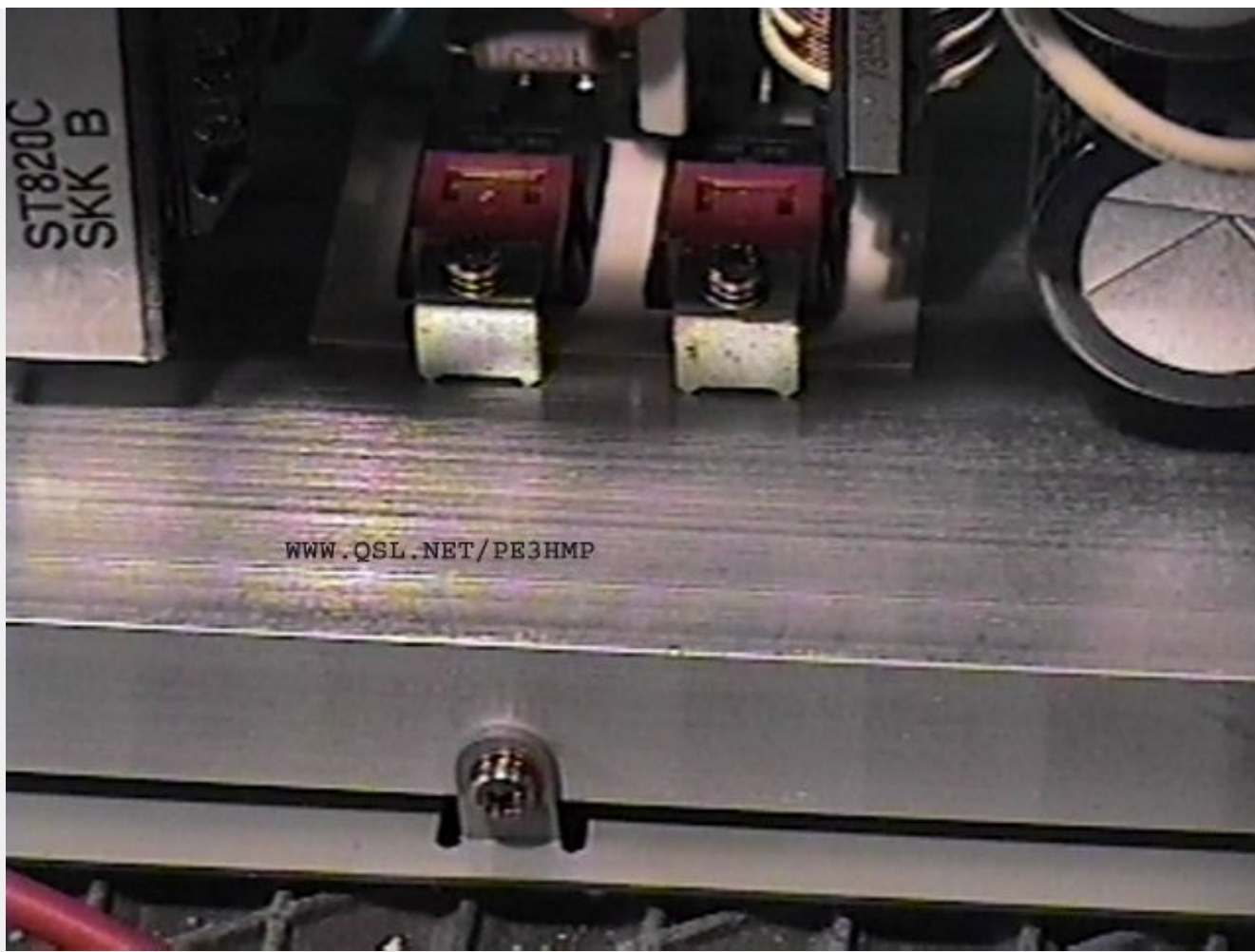


I have tested this mod with a ic-756 and it works great, the noise has gone down with about 50% and the PS85 works as good as before the mod.

**How to proceed** (after building the above)



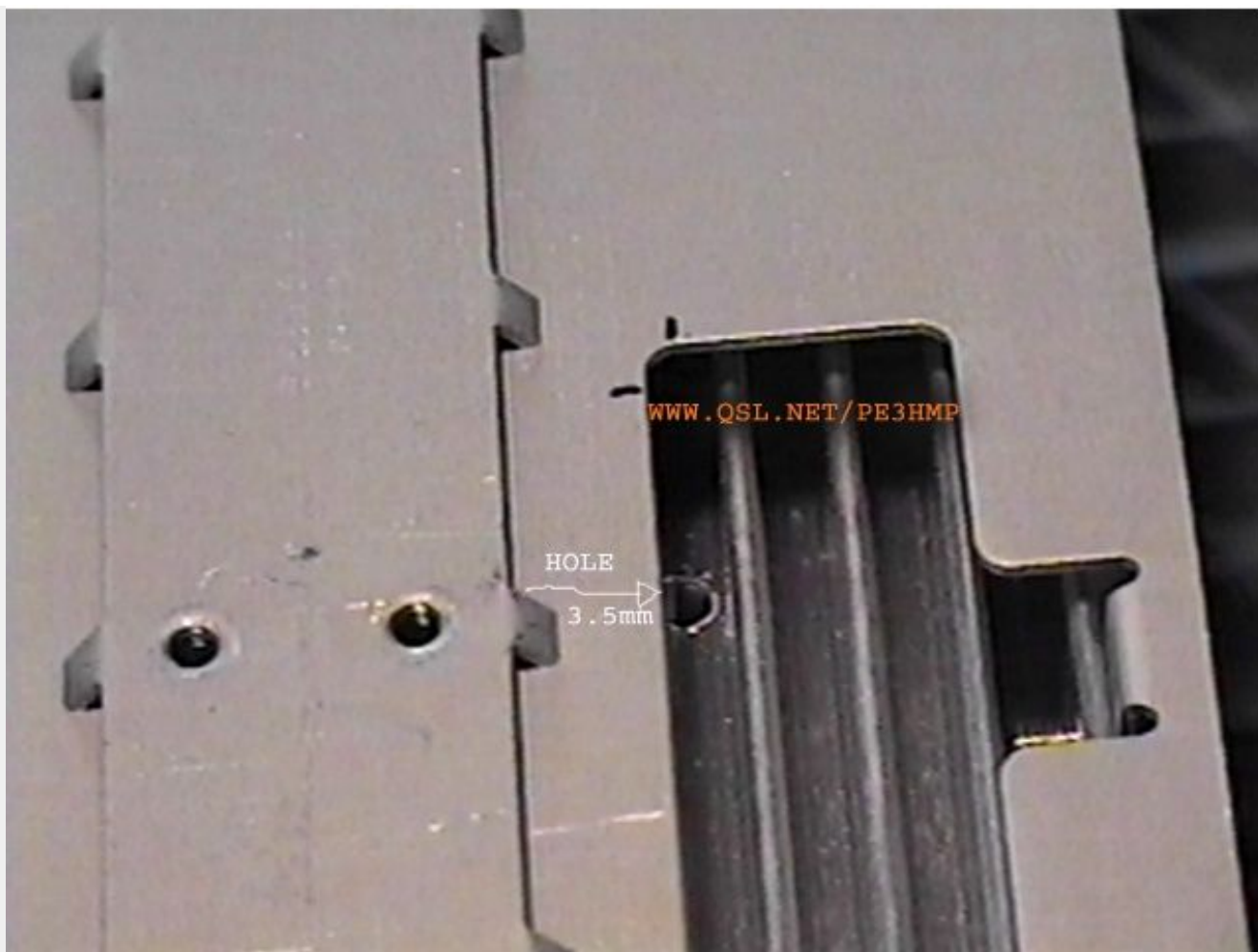
Remove upper and lower covers.



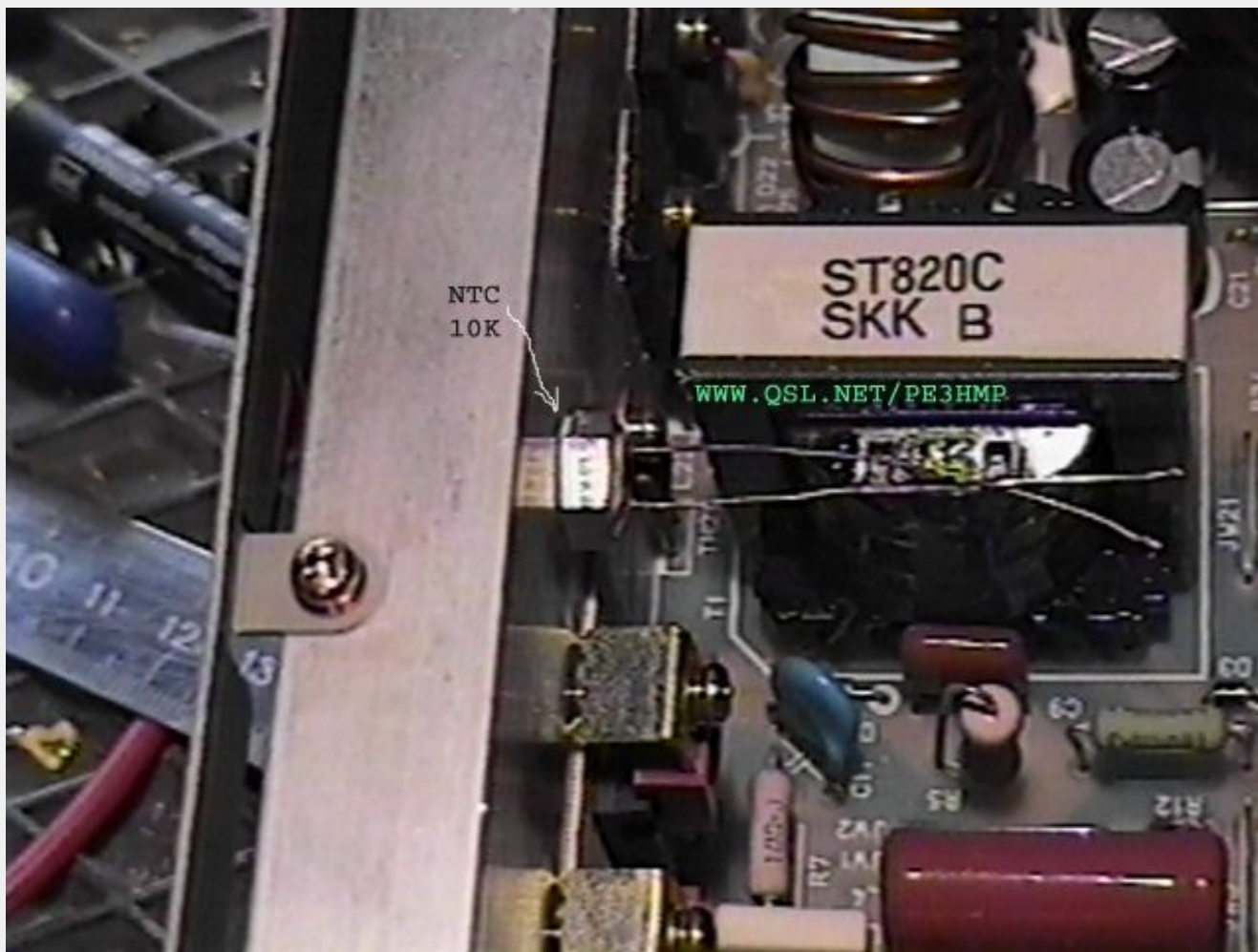
You must find a place to drill a hole for the NTC close to the diodes



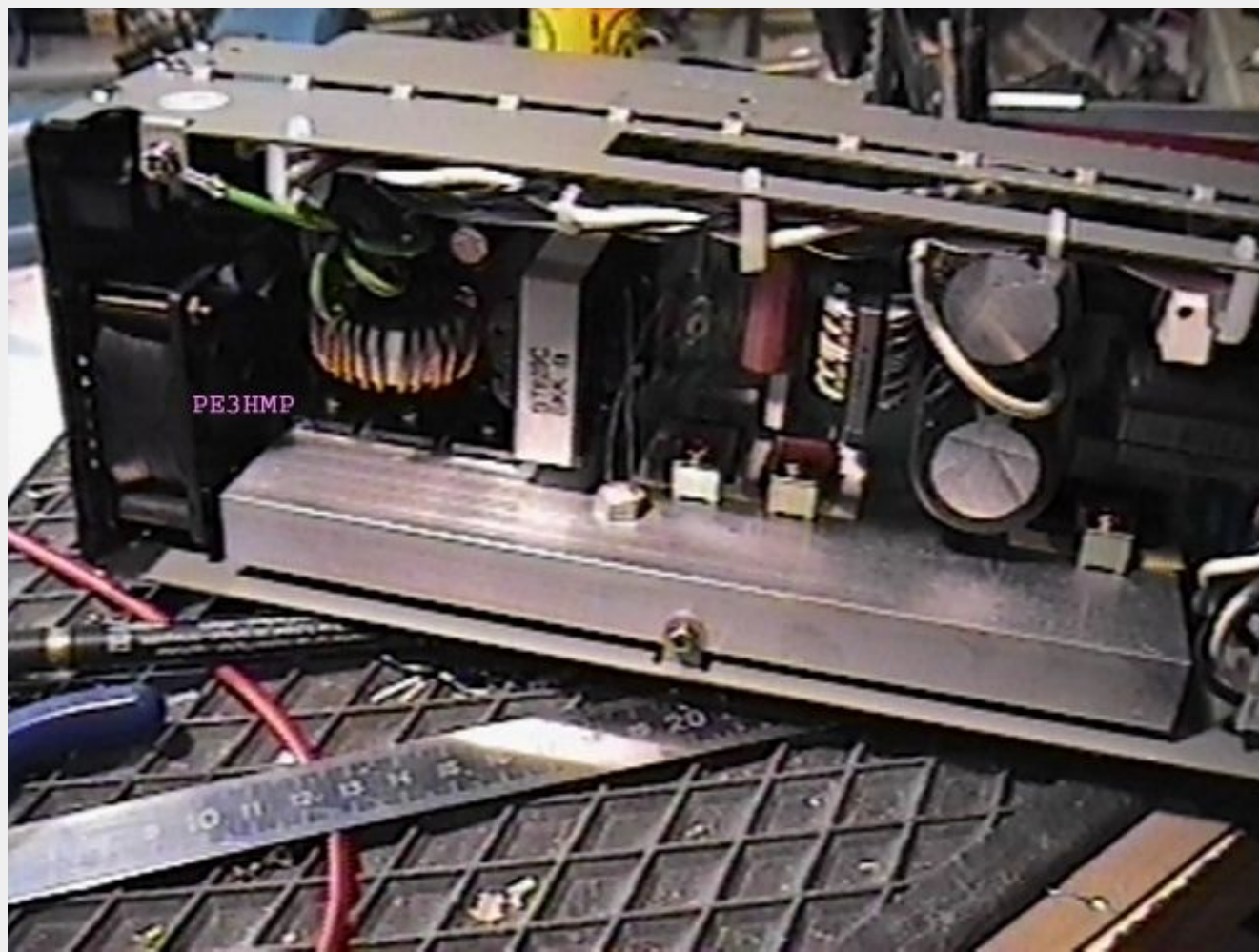
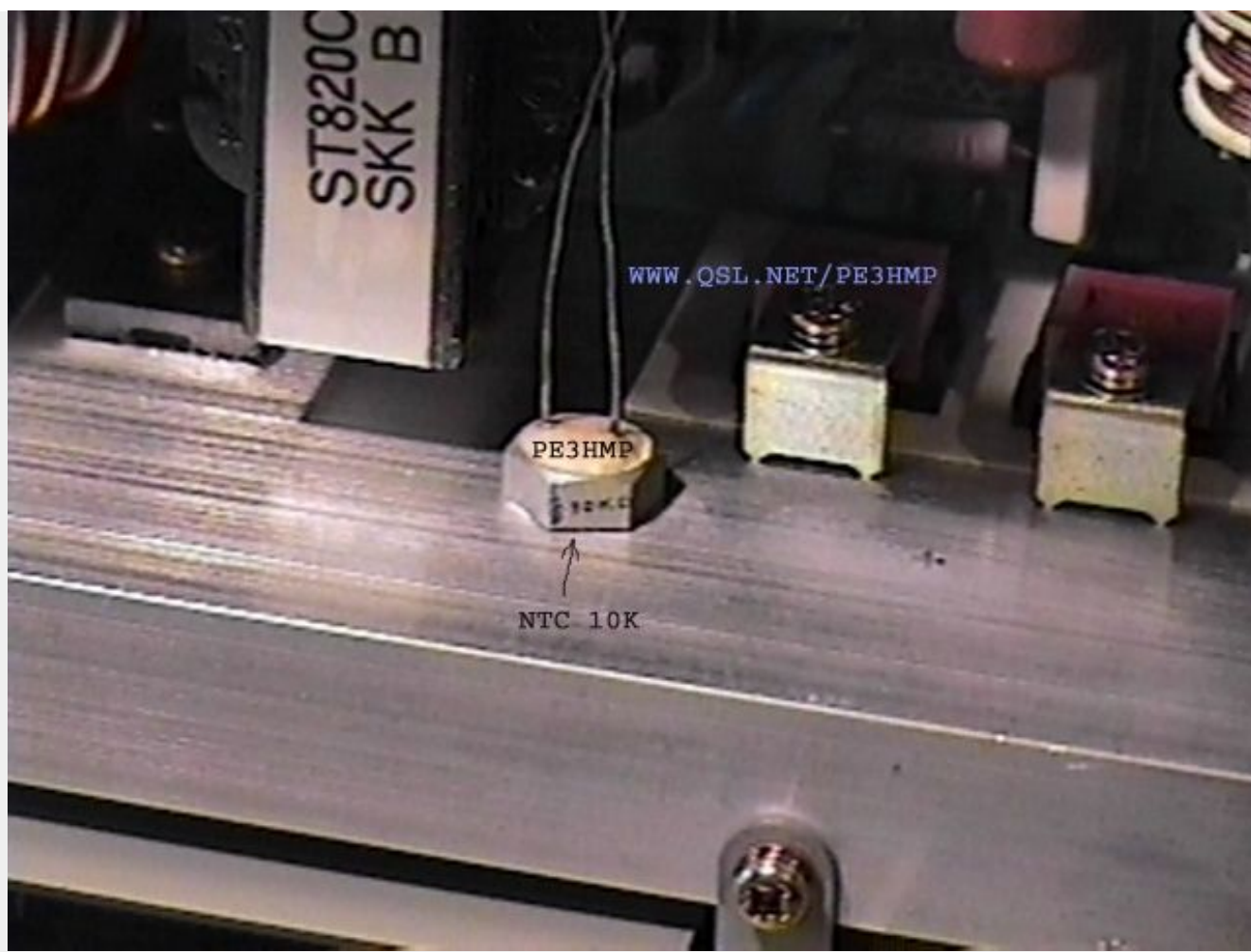
Begin with drilling a hole of 3.5mm (just look on the inside so You wont drill thru a component).



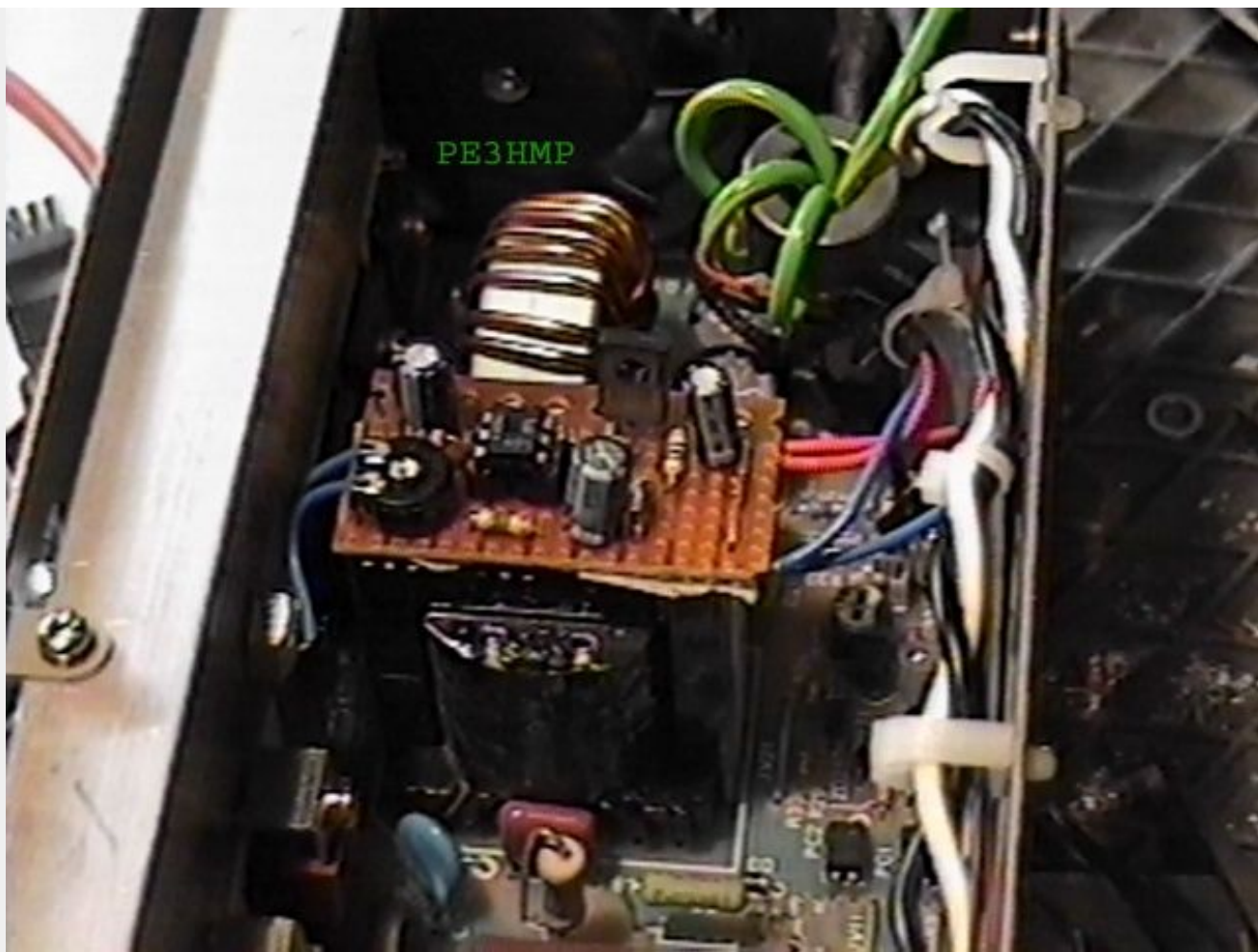
How further up the hole is the better, now You have to tap M4 in the hole (be sure to use a drop of oil).



Now carefully srew in the NTC with a bit of cooling paste on the thread.



Now use 2 sided sticky tape to place the fan control on top of the coil



Connect the NTC, FAN and power and adjust with P the voltage the fan gets (6.5V at 20 degrees celcius).

Just trie it and You will be amazed (and think by Yourselfe why did'nt came ICOM up with that idea).

The cost for all of this was just \$10 us dollar and 1 hour of work.

Thanks to [C@rlos](#) for sending me the schematics.

When You turn on the PS85 the fan will start at full speed (to remind You how noisy it can be) after about 2 seconds it will slow down.

I thought about replacing the red LED in the front for a dual colour one so You can see what the fan is doing but decided not to that (yet).

Any suggestions ?

Just e-mail me: [pe3hmp@hotmail.com](mailto:pe3hmp@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This modification is read 423 times.

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**19-07-1998**

## **(R-1) R1 (and IC-nSAT) Owners Note**

*R1 Tech Note #1 (c) 1991 Paul Flaherty*

The BNC connector on most HTs leaves something to be desired, and the R1 and cousins are no exception. The connector nut and the back case form a smooth - smooth metal boundary, and the connector eventually will come loose.

If this happens to you, do *\*not\** merely retighten the nut. Instead, take it off, place a lock washer underneath the nut, and *\*then\** retighten. If you don't, you'll wind up with a cycle of loosening and retightening. This is not a good thing, since the wire connecting the BNC to the PC motherboard is solid, and the solder connection leaves something to be desired.

If you've already managed to twist the wire loose from the PC board, all is not lost; the wire may be reattached. **WARNING:** The following instructions are *\*NOT\** for the faint of heart. If you have *\*ANY\** doubts about your technical abilities (especially soldering), find someone experienced with repair of handheld radios to do it for you.

You'll need:

A low wattage soldering iron, preferably cordless  
The soldersucker of your choice



A very small phillips screwdriver (the smallest standard Craftsman will do)

Some fresh eutectic solder, thin variety

An anti - static wrist strap

Mouse clips or a small pair of needle nose pliers

Strap yourself in. Doubtless, the R1 can be zapped by static.

1. Take out the two long screws on the upper right of the back case, the small screw in the upper right of the front case, near the tether hole, and the two screws in the bottom of the front case.
2. Separate the front case from the rest of the radio. There is a printed circuit ribbon connecting the front case to the motherboard, and the ribbon is located on the right (viewed from the front) side.
3. Remove the four phillips screws which hold the motherboard to the back.
4. Now, a few notes on how the R1 is put together. The gray plastic plate, on which the three controls on top of the R1 (squelch, volume, tune) are mounted, slides free from the back case. The gray plastic plate, the controls, the power and speaker jacks, and the motherboard all remove as one piece (thank the Great Engineer).
5. Remove the 300 maH battery by pulling toward you (it's held in place by a metal clip) (and note that it's nicely connectorized for replacement somewhere down the road). Now, pull on the lower (eg, the part that was nearest the battery) portion of the motherboard, while pushing the power and speaker jacks thru the holes, and then lift up on the gray plastic top piece. The whole mess will come free. Take note of the small piece of rubber which fits between the motherboard and the back case. This forms the shock mount for the board. Also note the small piece of gray rubber which forms the light/lock pushbutton.
6. Take a breather, or have the nurse sponge down your forehead.
7. Remove the BNC connector. Curse loudly.
8. Remove the solder and wire from the PC board hole (in the corner of the board).
9. Reattach the BNC connector to the PC board.
10. Now for the fun part. Insert the BNC connector into the hole, while pushing the motherboard back into position, taking note to reinsert the gray pushbutton piece on the right side of the case (as viewed from the front). Refit the gray top piece. Place the small rubber shock mount behind the pc board, and reinstall the four screws (I used a pair of surgical mouse clips for this, but a pair of needle nosed pliers will do).
11. Reinsert the battery, replace the front cover, and reinstall screws.
12. Turn on. If you've done everything right, you'll have a working R1. If not, make sure you havn't pinched any wires in between the case halves.

One final note:

The antenna that comes with the R1 leaves a lot to be desired.

Try using a Radio Shack PRO-34 scanner antenna instead; the improvement is impressive.

This modification is read 787 times.

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**19-07-1998**

## **(R-7000) Examining the icom ic-r7000 receiver**

**Author:** Bob Parnass, AJ9S

The long awaited ICOM R7000 is here. I bought my R7000 (S/N 001400) on June 14, 1986 from Spectronics, and agree with other R7000 owners: ICOM did their homework on this radio.

I had several questions about the R7000 that were not answered in ICOM's advertisements, and could only be answered by fiddling with the real thing:

1. Can one set the R7000 to behave like a "normal" scanner, waiting for a transmission to complete before resuming the scan? Contrary to the review in July Monitoring Times, the answer is YES. There are 4 choices of when to resume scanning (or seaching), and this is one of them.
2. Does the R7000 have a "search and store" mode, like the old Bearcat 250? Yes, and it's well done. There is a mode which will search between two frequency limits, and store the active frequencies in the top 20 channels. The R7000 is smart enough not to store duplicate frequencies.
3. Does the R7000 use the concept of a "channel bank"? Yes, one can select and deselect any of the 99 channels to be in a bank. This is much more flexible than traditional scanners. For example, the user can form a bank composed of channels 2,

5, 31, 48, and 79.

4. Does the Priority Scan feature work like a Bearcat scanner? Well, sort of. The best way to describe the ICOM R7000 priority algorithm is to say it resembles using a Bearcat scanner in the manual mode with the priority feature selected. One cannot "scan" more than one channel on the 7000 while sampling the priority channel. On the plus side, the priority frequency does not use up any of the 99 channels, but is programmed from the keyboard and has its own register. The user can use the "scan speed" control to set how often the priority frequency is sampled, a nice touch. In practice, the R7000 dwells on the priority frequency for a little too long, essentially chopping up the signal on the non priority frequency too much.

Using the internal, top-mounted speaker, the R7000 has good audio power and fidelity, better than my R71A.

The user manual is generally good, and a schematic is furnished. Some broken English makes it unclear as to whether the R7000 battery backed up RAM contains firmware as in the R71A.

There are provisions for activating a tape recorder when a signal is received, but there is about a 1 second delay in activation, causing the recorder to miss the start of the transmission. I may replace the capacitor in that relay circuit when I get the nerve to open the cabinet for the first time.

Another relay is used to switch in some filters for reception above 512 MHz, so one hears the relay clicking while scanning a mixture of low and high frequencies, a bit unnerving.

There's a lot of fun to be had with the R7000. It was interesting tuning through the link and paging signals in the 72-76 MHz band, and listening to military aircraft in the 200-400 MHz band.

My UHF antenna system consists of a government surplus FAA discone, good for coverage between 150-1200 MHz. Although not as good as a Butternut SC3000 antenna in the 150-174 and 440-512 MHz ranges, the discone has the edge in the 225-400 and 512-1200 MHz bands. At these frequencies, a low loss feedline is very important, and I use a Belden 9913 clone made by International Wire and Cable.

This modification is read 1004 times.

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**19-07-1998**

### **(R-7000) Cool your R-7000 receiver with another heat sink**

**Author:** Bob Parnass, AJ9S

The new ICOM R7000 25-2000 MHz receiver is a super radio, but the power supply tends to run hot. The two biggest heat generators are the pass transistor and bridge rectifier module. The stock heat sink, a flat piece of metal bolted to the inside of the cabinet rear, is inadequate. After 30 minutes of use, the back panel gets very hot, and the entire cabinet warms.

I added a small heat sink to the outside of my radio, using the screw that holds the bridge rectifier to the stock heat sink. An application of heat conductive grease between the added sink and the cabinet helps the heat transfer process. Now the rest of the cabinet gets barely warm to the touch.

This modification is read 823 times.

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**19-07-1998**

### **(R-7000) Add a cooling fan to your R-7000 receiver**

**Author:** Brian Kantor, WB6CYT1

In my R-7000, adding a fan makes a big difference. I've had it on continuously for three days now, and it's still nice and cool. Turns out most of the heat comes from the transformer core in the AC supply. One of those 3-1/2" 12V DC fans fits just nicely - a pair of 1/4" standoffs screwed through two of the upper back panel ventilation slots holds it in place, the power leads snake through the lower ventilation slots, and some duct tape to form a gasket, and it pulls the hot air right out. If you pick the 12V off the power supply regulator board at W3 (orange lead), it will even work properly when you run the radio off 12 volts.

[In order to blow hot air out, the fan must suck in cool air from somewhere. Users are advised to be on guard for dust being drawn into fan-equipped R-7000s. - Editor]

Brian Kantor, WB6CYT.  
University of California San Diego.  
ARPANET address: brian@ucsd.edu

This modification is read 801 times.

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**19-07-1998**

## **(R-7000) TV interface for R-7000**

**Author:** John Biro

I just got the video interface for the R7000, and to my surprise it is not an internal option. It bolts to the side of the radio (right side were the rubber feet use to mount). It is about 1 inch wide, and the same height and length as the R7000, and in a matching cabinet.

TV video is taken off the 10.7 MHz IF output jack, this presents a problem if you are using it for a Band Scope. It also "steals" the power from the IF output (the center pin of the IF out carries 12VDC so be care- ful not to short it out).

The interface provides RCA type jacks for both Video out and Audio out. The Video is standard levels and the Audio is low level output for input to a typical audio amp (it can not drive a speaker directly). I am not sure why the audio output is there as you can moni- tor the audio on the R7000, looking at the circuit they do have a sideband filter circuit so I would assume the audio is cleaner but I have not tried it and do not have any problem with the R7000 audio receiving WBFM from the TV stations.

Results: The TV-R7000 works OK, but I am just disap- pointed in the fact that it does not mount internally in the R7000. This could also help in its high price tag of \$119. I had a Yaesu FRG9600 with video option (only about \$30), and it worked about the same. The picture quality is good, and it is very stable. My antenna is vertically polarized, so I am working cros- sed polarized for TV stations but still get good results, strangely better on UHF then VHF freq. In fact, I get UHF on this set up better then my late model TV upstairs.

I think that I am most disappointed in the fact that the unit mounts on the side of the R7000. I don't have the extra inch of bench space, so I had to put rubber feet on the unit and lay it on its side on top of the R7000. It works fine and I do not see any difference with the case of each unit tied together or not.

I made a "T" adapter and ran both the BAND-SCOPE and TV on the IF output. I have not tried to add a third option to the IF output yet but it seems to be buffered from the main IF (wide band data 9600 baud).

The unit comes with schematic, installation info, and cables to hook it up to a video/audio monitor. Instal- lation is 5 minutes or less if you know where to find your screw driver the only tool required.

Now to look for some Amateur TV and for Hidden TV sta- tions. There is more out there then featured in the TV Guide.

This modification is read 938 times.

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**19-07-1998**

## **(R-7000) 198 channels for your R-7000**

**Author:** Bob Parnass, AJ9S

The ICOM R7000 appears to use a uPD446C, 16K static RAM chip, for storing 99 memory channels. By looking at the pinout of this chip (IC8 on the Logic Unit) in my service manual, it appears that ICOM is only using 1/2 its memory capacity. Address lead A10 (pin 19) is sol- dered to a ground pad.

To double the number of memory channels in the R7000 to 198, it looks like one could "lift" pin 19 of IC8, and connect it to pin 24 (+Vcc) through a 10,000 ohm resis- tor. A SPST switch could be used to ground pin 19.

Another challenge would be finding a place on the R7000 to put the added "Memory Bank" switch. Perhaps one could use the Noise Blanker switch, and just leave the NB on at all times.

I don't have time to try this experiment, and would be interested in hearing results from any enterprising hobbyist willing to try this.

Long live tinkering!

[PS: Jack Albert, WA9FVP, reports that he tried the modification, and it works! Jack doesn't have the remote control option in his R7000, so he elected to use the front panel REMOTE switch as a bank switch. He installed a 48,000 ohm resistor between IC8 pin 19 and ground, and ran a wire from the REMOTE switch, through an 82,000 ohm resistor, to pin 19. When you switch between banks, you must also rotate the channel selec- tor knob, forcing to the microprocessor to read from memory.]

This modification is read 838 times.

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**19-07-1998**

## **(R-7000) Modify your ICOM R7000 to scan and search faster**

**Author:** Bob Parnass, AJ9S

This article describes how to increase the scan and search speeds of the ICOM R7000 receiver by 60% without noticeable performance degradation.

### Background

The front panel SCAN SPEED control on the R7000 receiver allows the user to adjust the speed of scanning and searching operations, as well as the rate at which the priority channel is sampled. Rotating the control counterclockwise decreases the speed, and rotating it clockwise increases the speed.

When the SCAN SPEED control on my R7000 (serial number 001400) was turned fully clockwise, the radio would scan a maximum of about 8 channels/second, or search about 8 increments/second. As the following table shows, the stock R7000 can scan about as fast as a Radio Shack PRO-30 or PRO-2003.

TABLE 1. Maximum Scan Rates of Selected Receivers

| Scanner                         | Maximum Scan Rate<br>(channels/second) |
|---------------------------------|--|
| Kenwood TR-2600                 | 1.2                                    |
| Radio Shack PRO-30              | 8                                      |
| Radio Shack PRO-2003            | 8                                      |
| ICOM R7000 (stock)              | 8                                      |
| ICOM R7000 (after modification) | 13                                     |
| Regency M400                    | 13                                     |
| Bearcat 20/20                   | 15                                     |
| Bearcat 300                     | 15                                     |

### R7000 Scan Circuits

The scan rate of the R7000 is determined, in part, by a simple clock outside the microprocessor. The front panel SCAN SPEED rheostat and resistor R18 (and other components in the LOGIC UNIT) control the speed of this clock. The clock output is connected to what appears to be an input port on the microprocessor. The upshot is that we can affect the scan rate without affecting the other chores performed by the microprocessor.

The modification consists simply of soldering a 470,000 ohm resistor across the leads of resistor R18 on the LOGIC UNIT circuit board.

How was the value of 470,000 ohms chosen? Experimentation with different resistor values showed that for values both above and below 470,000 ohms, the R7000 scan rate decreases. Not having the R7000 Service Manual, I assume this can be explained by the firmware within the microprocessor associated with the scan rate input port.<sup>2</sup>

Adding the 470,000 ohm resistor in parallel with R18, rather than just replacing R18, has a few advantages:

1. The modification is easily undone, returning the radio to stock condition.
2. The LOGIC UNIT board does not have to be removed, as would be the case if R18 was unsoldered from the foil side.

### Making the Modification

Accessing this circuit board is not difficult, and involves the same steps used when installing the optional Remote Controller or Speech units.

Use a towel to cover your work area to avoid scratching the R7000 cabinet. Unplug the R7000 from the AC line, and turn the radio upside down. Remove the bottom cover by removing the 12 screws holding it in place. Remove the 4 screws holding what ICOM terms the "partition panel". Pictures on pages 32 and 34 of the R7000 Instruction Manual show the partition panel. After removing this panel, the component side of the LOGIC UNIT circuit board is accessible.

Perhaps the firmware polls the scan rate input port infrequently. Another possibility is that the scanning pulses interrupt the processor, and the interrupt firmware is limited in its ability to process frequent interrupts.

Locate R18, a 270,000 ohm 1/8 watt resistor, near connector J5. You may wish to remove plug P5 from J5 temporarily if it gets in your way. Carefully solder a 470,000 ohm resistor in parallel with R18. I used a 1/4 watt resistor as it was the smallest on hand.

Reassemble the radio, connect it to AC power and antenna, and enjoy.

In the modified R7000, the scan and search rates are still adjustable using the SCAN SPEED control. With the control turned fully clockwise (maximum speed), the modified R7000 scans at about 13 channels/second and won't miss weak signals.

This modification is read 863 times.

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**19-07-1998**

## **(R-7000) A low cost panadaptor for the R-7000**

**Author:** Bob Parnass, AJ9S

A panadaptor, or spectrum display, is a device which portrays visually the signals in a part of the radio spectrum. Panadaptors allow radio listeners to "see" activity on a portion of band without requiring the listener to tune the receiver.

They are useful for detecting the presence of spread spectrum signals or "hidden" signals riding on a sub-carrier of a main channel. Panadaptors are invaluable for detecting spurious emissions from transmitters, and unwanted products caused when 2 or more signals mix.

Panadaptors most often employ a cathode ray tube (CRT) for the display, and must be connected to the intermediate frequency (IF) amplifier stage of a receiver, at a point before filtering takes place.

The ICOM R-7000 2-2000 MHz receiver rear panel has a phono jack for wide band 10.7 MHz IF output. A DC voltage is also present at this connector and is used to power an ICOM TV accessory.

I've seen mention of 3 panadaptors for the R7000:

1. John Biro's article on retuning a Yaesu YO901 Multiscope panadaptor for 10.7 MHz, restricted bandwidth use. Selectable bandwidths of 20, 100, or 200 KHz are available.
2. The Sherwood Communications SCA-7000 signal monitor, priced at \$1600, and reviewed in May 1987 "Monitoring Times". 3 Bandwidth adjustable from 1 KHz - 1 MHz.
3. The Spectra-Display, priced at \$350, which requires use of an external scope. 4 Bandwidth

Sherwood Communications, 1310 Industrial Highway,  
Southampton, PA 19866. tel (215)357-9056.

Spectra-Display is sold by GTI Electronics,  
RD 1 Box 272, Lehighton, PA 18235.  
tel (717)386-4032.

adjustable from 200 KHz - 10 MHz. Optional preamplifier required for 12 MHz wide sweep.

In the past month, several Kenwood SM-220 monitor scope/panadaptors have appeared at hamfests selling in the \$200 to \$250 range. The Kenwood SM-220 can display transmitted or received signals. To add spectral display capability to the SM-220, one must purchase the optional BS-5 or BS-8 module, which consist of a printed circuit board, a steel enclosure, interconnecting cables, and a new graticule. The panadaptor module mounts inside the SM-220 cabinet.

The BS-5 is used with the TS520 and TS530 transceivers, which have an IF of 3.395 MHz. The BS-8 is used with the TS820 and TS830 transceivers, which have an IF of 8.830 MHz. Since the IF of the ICOM R7000 is 10.7 MHz, one must alter the panadaptor circuitry to accept 10.7 MHz input.

If you have any choice in the matter, get the BS-8, as it requires fewer changes than the BS-5, and may even require no changes at all!

The panadaptor module circuit consists of several stages, but only two are directly related to the IF frequency:

1. A crystal oscillator is used as a marker generator.
2. A voltage tuned oscillator is swept across the IF of the receiver, and employs a varicap diode, an inductor and capacitors.

The marker generator is not vital for panadaptor operation. It merely provides a single "pip" that one may use to center the display on the CRT screen, and is similar in purpose to the crystal calibrator in older receivers.

The marker generator circuits in the BS-5 and BS-8 are identical except for one crystal. One need only replace the 3.395 MHz crystal (in the BS-5), or 8.830 MHz crystal (in the BS-8) with a 10.7 MHz crystal to adapt the SM-220 marker to 10.7 MHz IF. I did not alter this stage, although I would if I had a 10.7 MHz crystal handy.

The voltage tuned oscillator is the stage that deserves our attention. The changes required depend on whether you have the BS-5 or BS-8 panadaptor module.

### Changes for BS-5 Module

Change the following capacitors:

1. C231 from 1000 pf to 68 pf.
2. C232 from .01 uf to 1000 pf. (You can use the capacitor which used to be C231.)
3. C234 from 100 pf to 22 pf.
4. C236 from 47 pf to 22 pf.
5. C237 from 680 pf to 100 pf. (You can use the capacitor which used to be C234.)

Solder a 10 microhenry inductor in parallel with L204, a 20 microhenry inductor.

#### Changes for BS-8 Module

I haven't tried the BS-8 module, but encourage you to try using it as is, without modification unless necessary.

These steps are needed only if you cannot find settings of the side mounted alignment controls that get the display to behave as specified in the owner's manual:

1. Remove C233, the 33 pf disc capacitor, from the printed circuit board.
2. Replace coil L204, the 4.7 microhenry inductor, with a 6 or 7 microhenry inductor.

#### Alignment

Follow the alignment procedure in the SM-220 owner's manual to adjust the panadaptor. This consists of adjusting 2 potentiometers and 1 trimmer capacitor through holes thoughtfully provided in the side of the cabinet.

The alignment instructions rely on the use of the internal Marker Generator to generate a signal at the center of the passband. If you haven't converted the Marker Generator circuit, you can tune your receiver to a frequency with a signal present at a known frequency (like 162.550 MHz - the National Weather Service), and use that as a frequency standard.

Most of the time spent in alignment will be in alternate adjustments between the trimmer capacitor and the wide band sweep potentiometer, which interact with each other.

#### Wider Bandwidth

The SCAN WIDTH switch on the stock SM-220 can be set to display a 40 KHz or a 200 KHz wide picture. I adjusted my modified SM-220 to display a 100 KHz or a 500 KHz wide picture. By adjusting the controls on the side of the SM-220, wider bandwidths are possible, but wider bandwidths make it more difficult to resolve individual signals close to each other in frequency. As the bandwidth gets wider, the horizontal sweep loses linearity, causing the graticule calibration lines to be inaccurate.

#### Connection to R-7000

As mentioned earlier, a DC voltage is present at the R-7000 IF output connector and is used to power an ICOM TV accessory. A direct connection between the R-7000 IF output connector and SM-220 would damage at least one of these units.

To block the DC voltage, a 0.1 microfarad capacitor was soldered inside the R-7000, between the IF output jack and the adjacent jack labeled "spare". Connection between the R-7000 and SM-220 is then made using a short length of RG-58/U coaxial cable, with one end plugged into the R-7000 "spare" jack, and the other end plugged into the rear of the SM-220.

This leaves the original IF output jack undisturbed so it can be used with the TV adaptor accessory.

#### Vertical Sensitivity

When I connected my modified SM-220 to my R7000, the SM-220 would display only the strongest of signals. To improve the display sensitivity, I inserted a 20 dB gain RF amplifier between the R7000 and SM-220. The amplifier was a spare Ameco PLF2 FET receiver preamp, adjusted for 10.7 MHz, but other amplifiers can be used, provided they have at least a 500 KHz bandwidth, and sufficient gain, at 10.7 MHz.

#### False Readings - Images

The SM-220 circuit is like a superheterodyne receiver. The panadaptor itself has a 455 KHz IF, and like other superheterodyne receivers with a low IF frequency, is prone to images.

An image is manifested as a false pip, which moves across the screen as the receiver is tuned, and is 910 KHz (twice the IF) away from the actual signal.

The images discussed here are in the SM-220, not in the receiver. Images are bothersome on the strongest signals, like those 300 watt paging transmitters that saturate the county with RF, belching out strange digital noises or voices (now illegal to monitor).

#### Use With Other Receivers

The modified SM-220 can be used with other receivers having a 10.7 MHz IF. In other receivers, one would need to find the

proper point in the IF stage (before filtering takes place), install a connector, then wire a DC blocking capacitor between the IF stage and connector.

Bob Parnass AJ9S,  
AT&T Bell Laboratories  
att!ihuxz!parnass - (312)979-5414

This modification is read 880 times.

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**19-07-1998**

### **(R-7000) The frequency displayed and actually received are not the same**

Check the location of C24 and W80 on the logic board (compare against the schematic) to insure that they are installed in the correct position.

This modification is read 828 times.

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**19-07-1998**

### **(R-7000) The S-meter may not drop to 0 when receive 500-800 MHz**

The S-meter may not drop to 0 when using the receiver between 500 MHz and 800 MHz with no signal.

Install a 10mf 16V electrolytic capacitor between the emitter of Q5 and ground on the Dc to DC Converter board.

This modification is read 753 times.

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**19-07-1998**

### **(R-7000) Increase the number of memory channels to 200**

#### Procedure

1. Cut foil trace to IC-8 pin 19 on the logic board to remove it from ground.
2. Add a 47K resistor and between pin 19 and pin 24 of IC-8.
3. Add a SPST switch from pin IC-8 pin 19 to ground.

#### Operation

1. With the new switch closed access to memory channel 0 to 99 is possible.
2. With the new switch open access to memory channels 100 to 199 is possible.

Note: It is not possible to scan between the two banks of memory.

This modification is read 817 times.

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**19-07-1998**

### **(R-7000) The remote relay sometimes stays energized**

The remote relay sometimes stays energized after a signal is no longer present. The radio must be turned off and back on to clear this situation before the modification.

#### Procedure

1. Remove the covers from the radio and remove the main circuit board on the side of the radio.
2. Cut the trace between the base of Q5 and R106 on the foil side of the main board.
3. Install a RD6A diode (this part is critical and must be obtained from ICOM) with its cathode toward R106 across the cut in the trace.
4. Reinstall the board and insure mechanical clearance of the new diode.
5. Verify proper operation of the recorder function.

**19-07-1998**

**(R-7000) To improve audio quality in SSB operation**

Procedure

1. Remove the top and bottom cover from the radio.
2. Remove the PLL board from the radio.
3. Change IC-1 from a MA78M08A to a MA78M08 (ICOM P/N 900-00191) on the PLL board.
4. De-Solder and remove the VCO from the PLL board.
5. Change C6 (33 mf 10V electrolytic) to a 220 mf 10V electrolytic (ICOM P/N 918-01477). Install shrink tubing on the capacitor leads.
6. Change C17 (33 mf 10V electrolytic) to a 220 mf 10V electrolytic (ICOM P/N 918-01477). Install shrink tubing on the capacitor leads.
7. Reinstall the VCO unit on the PLL board.
8. Install the PLL board in the radio.
9. Replace the top and bottom cover.

**19-07-1998**

**(R-7000) If display fails to operate at power on**

Procedure

1. Remove the top and bottom cover from the radio.
2. Remove the front panel sub-assembly from the main chassis of the radio.
3. Remove the DC to DC converter from the radio.
4. Replace the following parts on the indicated boards.

| Designator | Current Part | Board              | New Part   | ICOM P/N  |
|------------|--------------|--------------------|------------|-----------|
| Q1 and Q2  | 2CS1214      | DC to DC Converter | 2SC2655    | 906-00385 |
| R1 and R2  | 3.3 K        | DC to DC Converter | 5.16K      | 915-01173 |
| C2 and C4  |              | DC to DC Converter | .001mf 50V | 918-01500 |
| Q11 & Q12  |              | Display Board      | 2SC2655    | 906-00385 |
| R31 & R32  | 3.3 K        | Display            | 5.16 K     | 915-01173 |
| C13 & C16  |              | Display            | .001mf 50V | 918-01500 |

5. Reassemble the boards and front panel on the radio.
6. Reinstall the top and bottom cover on the radio.
7. Test

**19-07-1998**

**(R-7000) R-7000 Display/Sensitivity Problem**



If you are having trouble with you Icom R7000 display being flaky and then a sudden decess in sensitivity try the following:

**PROBLEM:**  
ICOM R7000 radios that are used 24 hours a day for a long time (2 years ) when shut off the display will become flaky and it is also possible for a lost in overall gain (3 to 40 db).

**SOLUTIONS:**  
Officially there is ICOM ECO SB# 9288-004, attached below.

Unofficially from Tech who repairs R7000 The ECO does help the display problem, but most likely it is not the problem. \*

\*

Note repairing your own radio my void you warranty and only allow a qualified technician to do the job, otherwise damage could happen to your R7000. If the VCO does not track then a major alignment would have to be done after. Check the ICOM IC-R7000 Service Manual for more details before starting this repair, and to make sure I have not made any typeing errors you should get a copy of the ECO from ICOM !

**1st SOLUTION:**

Replace on the DC to DC Board the following capacitor. Check the noise with an oscilloscope on both sides of R3, if the noise is not way down on one side then replace C2 a 33uf 16V capacitor. Noise feedback can decess the overall sensitivity of the R7000.

Replace on the Display Board C19 and C20 a 10 uf 16VDC capacitor

I found that on my R7000 C19 & C20 were the cause of my display problems. They are 10 uf eletrolytics capacitors that are lemmon yellow pc mounted units, when they go bad the base of the yellow caps change to a brown color.

I put in the following ECO first but it did not help. If you look at the service manual you will see that the ECO values are on the schematic but my unit had the old values. I suggest that you check the above first, it is a lot easier to do, C19/C20 can be done in 10-15 min while the ECO will take about a hour.

**2nd SOLUTION:**  
The ECO

ICOM America, INC  
2380-116th Ave, N.E.  
Bellevue, Washington 98004  
206-454-7619

#### SERVICE BULLETIN

UNIT MODEL R7000  
SB# 9288-004  
EFFECTIVE DATE 4/1/88  
SERIAL # AFFECTED: ALL  
PRODUCT GROUP: Amateur  
BACKGROUND INFORMATION:  
Display failure do to weak components

**TECHNICAL INFORMATION:**  
Improvement in DC to DC converter and display power supply.

| PARTS AFFECTED  | BOARD TYPE     | CHANGE TO    | NEW PART NUMBER |
|-----------------|----------------|--------------|-----------------|
| Q1/Q2 2SC 1214  | DC to DC Board | 2SC 2655     | 906-00385       |
| R1/R2 3.3 KOHM  | DC to DC Board | 5.16 K       | 915-01173       |
| C3/C4 PF        | DC to DC Board | 0.001 MF 50V | 918-01500       |
|                 | ceramic cap    |              |                 |
| Q11/Q12         | Display Board  | 2SC2655      | 906-00385       |
| R31/R32 3.3KOHM | Display        | 5.16k Ohm    | 915-01173       |
| C13/C16         | Display        | 0.001 MF     | 918-01500       |

#### DETAIL PROCEDURE:

1. Remove top and bottom cover.
2. Remove front panel sub-assembly from main chassis of radio
3. Remove the DC to DC board and replace components as listed
4. Reinstall DC to DC board.
5. Replace front panel sub-assembly onto main chassis of radio
6. Replace top and bottom covers.

ESTIMATE TIME TO COMPLETE IS 1 hour

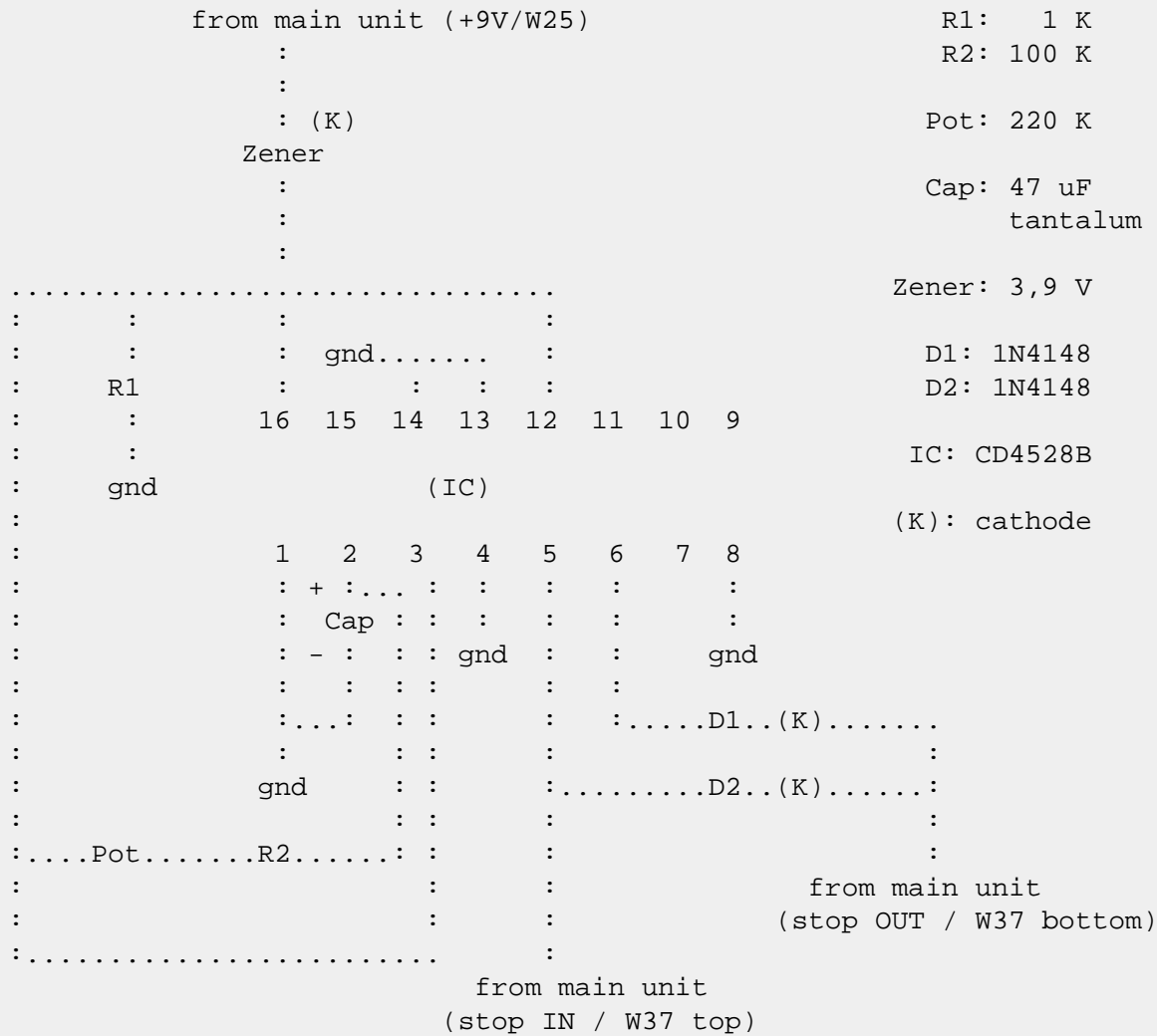
**19-07-1998**

**(R-7000) IC-R7000 scanning improvement**

With the scan delay control in "off" position, the scan function resumes immediatly when the signal heard disappears. Consequently, you lost a two-way communication until the next memory scan has occured. On the ICR7100 this feature has been corrected, and the scan function resumes approximately 2 seconds after the signal has disappeared.

Here is a simple tip for getting the same resume condition on the ICR7000.

On the main unit, there is a signal called "stop" which is available and used by the logic unit. The modification is done by using a monostable multivibrator wired for retriggerable condition on a trailing edge ("stop" signal). The corresponding diagram is drawn below.



All the components are mounted on a small PCB. This PCB is installed behind the S-meter, close to IF board. Power is supplied through link W25. This link is located on main unit near diode D25. The input/output stop signals are picked on the two edges of link W37 (you have to open it). Top of W37 (close to W9) is the IN signal. Bottom of W37 (close to W11, W12) is the OUT signal. Link W37 is also located on main unit (left vertical PCB). It is not necessary to remove the main unit board. You can solder the wires directly on the components side. Please note that IN/OUT signals are TTL levels, so the DC supply for the IC is about 5 volts (through 3,9 V zener diode). Delay can be set between 2,5 and 6,5 seconds by adjusting the potentiometer.

**26-03-2000**

**(R-7000) Intermittent display**

**Author:** Burt I. Weiner - [biwa@pacificnet.net](mailto:biwa@pacificnet.net).[MODIFICATION.NET](http://MODIFICATION.NET)

I have an ICOM R-7000 that has had an intermittent display from the time I purchased it. It has been back several times for repair at an authorized service center. The problem would re-appear after a few weeks. I got tired of sending it back and decided to live with the problem. After a while it became so bad I became too annoyed to live with the problem and decided to track it down for myself. I did discover the actual cause of the problem and after making repair the display has been 100 percent reliable.

The problem turned out to be the flat ribbon type cable that runs between the display and the display board. Checking the conductors of the ribbon cable with a meter was misleading because of the intermittent nature of the problem. The repair was a lot simpler than I had imagined. I did not replace or remove the ribbon cable but instead connected parallel conductors across it.

The process is simple if you have experience with delicate stuff. It's necessary to remove the display board and the display. First and most important - UNPLUG THE RADIO! Remove the top and bottom cover of the radio. Remove the screws on the left and right side of the front panel brackets that attach it to the main chassis. The front panel will hinge down to about a 45 degree angle. Support it in that position. Remove the 2 screws from the back of the display board. Carefully remove the display board and the metal shield on the back of the board. Carefully swing the board back revealing the component side. Unplug the "dimmer" control plug on the right side of the display board. I found it necessary to cut the tie wraps on the wires connecting to the display board. Be very careful not to cut any of the conductors. Once you've done that you can swing the display board back even farther. Next, remove the two flat head screws on the top of the front panel. This releases the bracket that holds the display against the front panel. Again, be very careful in handling the display. You will notice a foil shield along the bottom of the display ribbon cable. Carefully peel it away exposing the ribbon cable and both ends.

I rotated and positioned the board and display so that the pins on both were facing up with the soldered side of the ribbon cable towards me. I used stranded wire from a ribbon cable out of a computer for the jumper wires. DO NOT USE SOLID WIRE! Make the jumpers one at a time. I stripped about 1/16th of an inch of wire, tinned it and then soldered it to one end. Before cutting the other end I dressed it to length following the ribbon cable's "curve" and then cut the other end. Do not make it too tight or leave too much slack. Then I stripped 1/16th of an inch of wire, tinned and soldered it to the other side. Be careful not to bridge any of the connections together. You will note that four of the points, two on each end are connected together. I used only a single conductor for these. Take your time doing this. Check each jumper as you put it in by following the trace in the ribbon cable, which is quite visible, to be sure you are not cross connecting somewhere. JUMPER ALL OF THE CONDUCTORS! If one is intermittent, then the others are or soon will be.

When you are finished and just before you start to re-assemble things, carefully clean the display and the inside of the display window with Windex. I used a clean piece of old t-shirt.

Rotate the board and display back into position for re-assembly. Re-position the foil shield under the (new) conductors and ribbon cable. I did not replace the tie wraps previously cut but carefully positioned the leads so they do not become pinched under brackets during re-assembly. When installing the display make sure that the fingers at the bottom of the display bracket go under the display easily. Reverse the procedure described above for re-assembly of the rest of the radio. Don't forget to replace the "dimmer" control plug on the right side of the display board once the board is mounted.

Since making this repair the display has worked without failure. The sensitivity of the receiver is as good or better than before indicating that the noise output from the display is still well contained. If you have been suffering from the annoying intermittent display as long as I had been this will be well worth the effort.

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**19-07-1998**

## **(R-71) Tricking the ICOM R-71A to tune below 100 KHz**

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The ICOM R71A general coverage receiver is designed for VLF reception down to about 97 kHz.

The following steps will confuse the microprocessorbased controller sufficiently to permit reception down to 0.0 kHz:

1. If all 32 memory channels contain frequencies, use the FUNC and CLEAR buttons to clear a memory channel.
2. Place VFO/M switch into the M (Memory) position.
3. Using all the manual dexterity you can muster, rock the MAIN TUNING knob back and forth, while simultaneously rocking the MEMORY-CH rotary control to switch back and forth between a memory channel with a frequency in it and a clear memory channel.

Continue rocking both the controls until a frequency of 0.000.0 appears on the digital display.

4. Depress the WRITE button. This stores the 0.000 MHz frequency in a memory channel.

You can now rotate the MAIN TUNING knob clockwise to tune up from 0.000 MHz to the frequency you want. Be careful: if you rotate the MAIN TUNING knob counterclockwise, the radio will immediately revert to 29.999 MHz.

To tune below 100 kHz in the future, just recall the 0.000 MHz frequency from the memory channel and use the tuning knob to tune upward. That way, you don't have to use two hands every time you tune to a VLF frequency.

I used a Wavetek 180 sweep/function generator to verify that the R71A is indeed receptive to signals below 100 KHz.

This modification is read 812 times.

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**19-07-1998**

## **(R-71) Modifications to the Icom R71A IF filter selection circuit**

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### INTRODUCTION:

Simple modification to the IF filter selection circuit of the ICOM R71A general coverage receiver can provide additional bandwidth selection options in receivers which have been equipped with the optional FL-44A high grade 2.4 KHz crystal filter (or equivalent). In the AM mode, the modification enables a 2.8 KHz bandwidth to be selected in addition to the 6 KHz and 2.4 KHz bandwidth settings which the "FL-44A"-equipped R71A already offers. In the SSB, CW and RTTY modes, the modification can be used to enable the PBT knob to function as either a passband tuning control or an IF-shift control.

The potential benefit of this modification depends to a large extent on how the receiver is used. R71A owners considering the modification should take some time to decide whether it is worth the effort before proceeding. Much of this article discusses the rationale behind the modification and explains its actual effect. The procedure itself - described at the end of the article - is not very complex, but it does involve some delicate soldering and the ability to read schematic diagrams and identify components on the PC boards.

I can attest that my modified R71A performs as indicated, but I assume no responsibility for the outcome of anyone's modification efforts. Make sure you understand and are comfortable with what you are doing, and proceed at your own risk. While not absolutely critical in this case, it is generally smart to have a service manual handy when modifying equipment.

### BACKGROUND:

Intermediate Frequency (IF) bandwidth filtering in the R71A is accomplished by filters in the 9 MHz 2nd IF stage and in the 455 KHz 3rd IF stage. The stock R71A comes with the following standard filters:

|         |                 |         |                    |
|---------|-----------------|---------|--------------------|
| 2nd IF: | FL-70 (2.8 KHz) | 3rd IF: | CFW455IT (6 KHz)   |
|         | FL-30 (2.3 KHz) |         | CFJ455K5 (2.8 KHz) |

While the 2nd IF filters are of reasonable quality, the 3rd IF filters are inexpensive ceramic filters. ICOM offers the FL-44A 2.4 KHz high grade crystal filter as an optional replacement for the 2.8 KHz CFJ455K5. Other filter manufacturers have comparable replacements available too. One of two optional (additional) CW filters may also be installed in the 2nd IF; the FL-32 (500 Hz) or the FL-63 (250 Hz).

With only its stock filters, the R71A utilizes the following filter combination in its various modes:

2nd IF

3rd IF

```

AM wide.....(none)..... 6 KHz (CFW455IT)
AM normal..... 2.8 KHz (FL-70)..... 2.8 KHz (CFJ455K5)
SSB/CW/RTTY wide..... 2.8 KHz (FL-70)..... 6 KHz (CFW455IT)
SSB/CW/RTTY normal... 2.3 KHz (FL-30)..... 2.8 KHz (CFJ455K5)

```

At first glance, one might think that it would have been more logical to use both 2.8 KHz filters in the SSB "wide" position (similar to the AM "normal" position), rather than a 2.8 KHz filter followed by a 6 KHz filter. (Since the narrower of the filters in the IF chain really determines the overall bandwidth, the 6 KHz filter is actually doing nothing.) However, if things had been set up this way, replacement of the 2.8 KHz 3rd IF filter with the optional FL-44A 2.4 KHz high grade crystal filter would have restricted the SSB "wide" bandwidth to 2.4 KHz. The SSB "wide" and "normal" bandwidths would then have been virtually identical.

Observe that the installation of the FL-44A does in fact reduce the AM "normal" bandwidth from 2.8 KHz to 2.4 KHz. Here's how the filter chart would look for an R71A with both the optional FL-44A and the optional FL-32 CW narrow filter installed:

```

                2nd IF                3rd IF
AM wide..... (none)..... 6 KHz (CFW455IT)
AM normal..... 2.8 KHz (FL-70)..... 2.4 KHz (FL-44A)
SSB/CW/RTTY wide..... 2.8 KHz (FL-70)..... 6 KHz (CFW455IT)
SSB/CW/RTTY normal..... 2.3 KHz (FL-30)..... 2.4 KHz (FL-44A)
Narrow-all modes..... 500 Hz (FL-32)..... 2.4 KHz (FL-44A)

```

Having the razor sharp 2.4 KHz bandwidth of the FL-44A accessible in the AM mode can sometimes be great for critical DXing, but AM audio at that bandwidth does lack sufficient fidelity for comfortable listening.

With some minor rewiring of the filter selection hardware, the 2.8 KHz AM bandwidth can be restored in "FL-44A"-equipped R71A receivers. This is done by making the AM "normal" setting select the same 2.8 KHz (FL-70) / 6 KHz (CFW455IT) filter pair which is used in the SSB "wide" setting. For experimental purposes, I had temporarily configured my R71 to select this filter pair in the AM "wide" setting in order to make direct receive fidelity and skirt selectivity comparisons against the 2.4 KHz AM "normal" setting.

My findings revealed that with the receiver tuned directly to a broadcast station, both bandwidths produced very similar sounding audio without much fidelity. But by tuning the R71A's main tuning dial 1.5 KHz away from the AM carrier frequency, the 2.8 KHz filter passed the carrier and enough of one of its sidebands to provide halfway decent fidelity. (It was noticeably less than the 6 KHz bandwidth, but still quite usable.) The same trick was also tried with the narrower, 2.4 KHz passband by tuning the main dial 1 KHz off frequency; but even then the fidelity was still too restricted for comfortable listening.

Since the 2.8 KHz bandwidth seemed to isolate noisy AM signals just as well as the 2.4 KHz setting in most of my tests, I had initially considered replacing the 2.4 KHz setting with 2.8 KHz in order to take advantage of the additional fidelity. However, I did encounter some relatively rare instances when trying to tune in a weak AM station adjacent to a strong local broadcaster where the 2.8 KHz/6 KHz filter pair allowed some odd residual noise from the strong adjacent signal to become embedded in the desired signal. The noise was not there when using the 2.8 KHz/2.4 KHz filter pair. This revelation led me instead to devise a way of making both bandwidths available in the AM mode (in addition to the 6 KHz bandwidth).

#### TECHNICAL DISCUSSION:

For the following technical discussion of the IF filter selection circuit of the R71, you may wish to refer to your schematic diagram or service manual. The filter select IC is IC3 on the main PC board. It has three input pins (pins 9, 10, and 11); the logic state of which are determined by the operating mode (AM, FM, SSB/CW/RTTY) and by the position of the "wide" and "narrow" filter switches on the front panel. The configuration of these settings determines which IC output pin goes high. (Output pins are pins 1, 2, 4, 5, 12, 14 and 15.) Diodes connected from the output pins to the various filters determine which filters are activated by each specific mode-bandwidth combination. There are two output pins (pins 1 and 4) which are only activated in the FM mode. These outputs are unused (not connected to anything) since the optional FM board has its own IF filter which is automatically selected in the FM mode.

The following table from the service manual shows the input-output relationship of IC-3:

| MODE                | INPUT PIN |    |    | OUTPUT PIN |
|---------------------|-----------|----|----|------------|
|                     | 9         | 10 | 11 |            |
| SSB/CW/RTTY normal  | L         | L  | H  | 14         |
| SSB/CW/RTTY wide    | H         | L  | H  | 5**        |
| SSB/CW/RTTY narrow* | L         | H  | H  | 12         |
| AM normal           | L         | H  | L  | 15         |
| AM wide             | H         | H  | L  | 2          |
| AM narrow*          | L         | H  | H  | 12         |
| FM normal           | H         | L  | L  | 1          |
| FM wide             | H         | L  | L  | 1          |
| FM narrow*          | H         | H  | H  | 4          |

\* assuming optional filter switch (S1 on main PC board) is ON.

\*\* this output was incorrectly listed as pin 3 in the service manual.

There are two wires which send logic data from the filter switches on the front panel to the IC input pins. One goes high when the "wide" button is depressed and the other goes high when the "narrow" button is depressed. The switches are deliberately interconnected in such a way that both wires are low when the switches are simultaneously depressed (just like if neither switch were depressed). By installing two solder bridges on the PC board where the switches are mounted, this interconnection can be defeated so that both wires will go high when the switches are simultaneously depressed. Doing this causes one of the unused "FM" output pins on the filter select IC (pin 4) to be activated in any mode. Installing diodes from this pin to the IF filters essentially provides an additional filter selection option.

I decided that my AM normal "both switches out" configuration would be the 2.8 KHz setting (2.8 KHz FL-70 and 6 KHz CFW455IT), and that the "both switches in" configuration would be the narrower setting employing the 2.4 KHz FL-44A in the 3rd IF. But rather than use the 2.8 KHz (FL-70) filter in the 2nd IF for this narrower setting, it made more sense to use the 2.3 KHz (FL-30) instead since the FL-30's bandwidth more closely matched that of the FL-44A.

There was another advantage to setting the options up this way. The "both switches in" bandwidth selection is the same in all reception modes. Since the FL-30/FL-44A combination was already the "normal" (both switches out) SSB/CW/RTTY selection, I had the opportunity to change that selection without losing access to the FL-30/FL-44A filter combination in the SSB/CW/RTTY modes.

By making the SSB/CW/RTTY "both switches out" setting use only the FL-44A in the 3rd IF (bypassing the 2nd IF filters altogether), the passband tuning control would act like an IF-shift control when this setting was selected. I found this option to be useful when tuning in AM broadcast stations in the SSB mode using ECSS reception. By adjusting the IF shift function so that the passband was centered directly over the AM carrier, the upper and lower sideband components could be heard beating against each other. The main tuning dial could then be adjusted until a "zero beat" was heard; indicating that the signal was properly tuned.

Note that since bypassing the 2nd IF filters does reduce the dynamic range of the receiver, use of the IF-shift function in the presence of very strong signals on nearby frequencies may impair reception (similar to what happens in the AM wide position).

With the above changes done, here's what my filter selection configuration would look like:

|                                 | 2nd IF               | 3rd IF             |
|---------------------------------|----------------------|--------------------|
| AM, wide button in.....         | (none).....          | 6 KHz (CFW455IT)   |
| AM, both buttons out.....       | 2.8 KHz (FL-70)..... | 6 KHz (CFW455IT)   |
| SSB/CW/RTTY, wide button in.... | 2.8 KHz (FL-70)..... | 6 KHz (CFW455IT)   |
| SSB/CW/RTTY, both buttons out.. | (none).....          | 2.4 KHz (FL-44A)   |
| ALL MODES, both buttons in..... | 2.3 KHz (FL-30)..... | 2.4 KHz (FL-44A)   |
| ALL MODES, narrow button in.... | 500 Hz (FL-32).....  | 2.4 KHz (FL-44A)** |

\*\* This bandwidth is of no use in the AM mode, but there is no way to change it without affecting the other modes as well.

The only negative consequence of these changes is that operation of the filter select switches is a bit more complex, but I found it became second nature very quickly.

#### PROCEDURE:

There are many possible ways that the filter selection circuit could potentially be modified. I will detail three options:

1. Implement the modification exactly as I have described above.
2. Implement the modification exactly as I have described above, except use the "narrow" filter switch rather than the "both switches in" configuration to access the extra bandwidth setting. This may only be done if no optional CW narrow filter has been installed.
3. Replace the 2.4 KHz AM "normal" bandwidth with 2.8 KHz. Make no other changes to the filter select circuit.

These three options are listed in decreasing order of complexity. Options 1 and 2 produce identical results, except that different filter switch positions are utilized. Options 2 and 3 only require the top cover of the R71A to be removed. Option 1 requires that both the top and bottom covers be removed so that the front chassis can be partially removed to access the filter switch PC board. For option 1, you will need two small general purpose switching diodes. No additional components are required for options 2 and 3. A short length of thin flexible insulated wire will be needed to make a few small jumper connections.

#### PREPARATION:

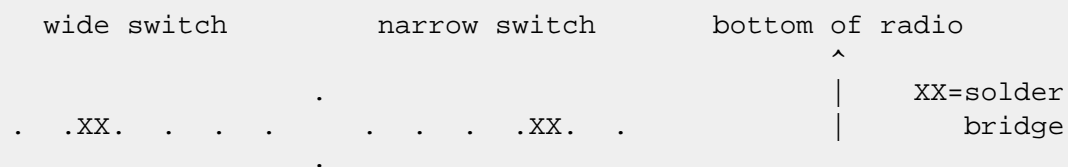
Read the procedures and make sure you have all the necessary part and tools on hand. I suggest taking all appropriate anti-static precautions whenever working on radio gear. Be sure power is disconnected from the receiver. Use only a low wattage, fine point soldering iron. It is important to use as little heat as necessary for all solder connections on the top side of the main PC board to avoid melting the solder on the underside.

[Remember, these modifications will only be of potential benefit if the optional FL-44A crystal filter (or equivalent) has been installed. Some dealers also offer 4 KHz filters as replacements for the 6 KHz CFW455IT ceramic filter in the 3rd IF. Installation of these replacement filters should not have any effect on the results of the modifications.]

## **OPTION 1**

### **CHANGES ARE IMPLEMENTED EXACTLY AS DISCUSSED IN THE PRECEDING TEXT:**

- A. Remove the top and bottom covers. Place the receiver (top side facing up) on a stack of magazines or large books at least 2" thick. Only the metal chassis should rest on the stack, not the front panel.
- B. You will see two flathead screws on either side of the receiver which hold the front chassis assembly to the main chassis. Remove only the top screw on each side and loosen the lower ones slightly. Using the lower two screws as a hinge, carefully fold the front assembly down so that the face of the radio rests on the desk. (A soft cloth may be used to prevent scratches.)
- C. Right beneath the back of the S-meter, you will see a PC board to which the wide and narrow filter switches connect. Locate the 12 solder points in a straight row associated with the two switches. There is a slight gap between the switches which contains two additional solder points just above and below those in the line. (The board layout diagram supplied with the service manual is quite helpful in locating the appropriate solder points.) You need to create solder bridges across the outermost set of normally open/normally closed switch contacts for each of the two switches. The appropriate pins are shown below:



- D. Inspect your work. Carefully return the front assembly to its proper position and secure the four flathead mounting screws. Re-install the bottom cover.
- E. Turn ON the filter switch (S1) on the main PC board. This switch will already be on if an optional CW narrow filter has been installed. S1 is a small slide switch not far from the center of the board.
- F. You may wish to verify that everything is working OK so far. If so, be sure that all tools, etc. are out of harm's way and reconnect power, antenna and an external speaker to the receiver. The bandwidth switches should work the same as before, except that (1) there will be no receive with both switches pushed in and (2) there will be no receive with the "narrow" switch pushed in unless an optional CW filter is installed. Disconnect power again once the tests are complete.
- G. Locate D37 on the main PC board right next to IC3 near the center of the board. Cut the top (cathode) lead of the diode, leaving enough wire on both sides of the cut to make connections to. Bend the wire lead on the diode up. Solder a jumper wire from the cathode lead of D37 to the cathode (top) lead of D39 (located on the opposite side of IC3).
- H. PERFORM THIS STEP ONLY IF YOU WISH TO MAKE THE "IF-SHIFT" MODIFICATION FOR THE SSB/CW/RTTY "BOTH SWITCHES OUT" POSITION, AS DISCUSSED IN THE PREVIOUS TEXT. IF YOU ONLY WANT THE EXTRA AM BANDWIDTH, SKIP TO STEP "I." Cut the top (cathode) lead of D44, leaving enough wire on both sides of the cut to make connections to. Bend the wire lead on the diode up and solder a jumper wire from it to the top (cathode) lead of D42 (located near filter switch S1).
- I. A switching diode must be connected from pin 4 of IC3 to the top (cathode) lead of D36 (located right next to D37). A second diode must be connected from pin 4 of IC3 to the lead sticking out of the PC board which was clipped from D44. If D44 was not clipped in step H, the diode just connects to top (cathode) lead of D44. To make the IC3 connection, tin both pin 4 and the lead which will connect to it; then place the two in contact with each other and heat up the connection.  
  
I performed this step by first soldering the anode of one of the switching diodes to the anode of the second; right where the lead enters its base. I then cut the anode lead of the first diode to a fairly short length and soldered it to pin 4 so that the two diodes were held in a vertical position just a tad above the IC. I then clipped the two cathode leads very short and ran insulated jumper wires from one cathode to D36 and from the other cathode to the D44 clipped lead coming out of the PC board. However you decide to do it, make sure the IC3 connection does not short out any other pins and make sure the switching diode leads cannot come in contact with any other components.
- J. Inspect your work and verify all steps were done properly. Make sure all tools are out of harm's way and test the modification. If everything works OK, reassemble the receiver. Note that with this modification, the narrow button must be in the "out" position for the FM unit (if installed) to function properly.

## **OPTION 2**

**CHANGES ARE IMPLEMENTED EXACTLY AS DISCUSSED IN THE PRECEDING TEXT EXCEPT THE "NARROW" FILTER SWITCH IS USED INSTEAD OF THE "BOTH SWITCHES IN" CONFIGURATION TO ACCESS THE ADDITIONAL BANDWIDTH. THIS OPTION MAY ONLY BE USED IF NO CW NARROW FILTER HAS BEEN INSTALLED IN THE RECEIVER.**

- A. Remove the top cover of the receiver.
- B. Turn ON the filter switch (S1) on the main PC board. S1 is a small slide switch not far from the center of the board.
- C. Locate D37 on the main PC board right next to IC3 near the center of the board. Cut the top (cathode) lead of the diode, leaving enough wire on both sides of the cut to make connections to. Bend the wire lead on the diode up. Solder a jumper wire from the cathode lead of D37 to the cathode (top) lead of D39 (located on the opposite side of IC3).
- D. PERFORM THIS STEP ONLY IF YOU WISH TO MAKE THE "IF-SHIFT" MODIFICATION FOR THE SSB/CW/RTTY "BOTH SWITCHES OUT" POSITION, AS DISCUSSED IN THE PREVIOUS TEXT. IF YOU ONLY WANT THE EXTRA AM BANDWIDTH, SKIP TO STEP "E." Cut the top (cathode) lead of D44, leaving enough wire on both sides of the cut to make connections to. Bend the wire lead on the diode up and solder a jumper wire from it to the top (cathode) lead of D42 (located near filter switch S1).
- E. Cut the top (cathode) lead of D46 (located a little toward the front of the main PC board). Make sure the two clipped leads are not touching.
- F. Locate D45 on the main PC board (near IC3). Cut the top (cathode) lead of the diode, leaving enough wire on both sides of the cut to make connections to. Bend the wire lead on the diode up. Solder a jumper wire from the cathode lead of D45 to the lead sticking out of the PC board which was clipped from D44. If step D was not performed, then solder the jumper to the cathode (top) lead of D44.
- G. Inspect your work and verify all steps were done properly. Make sure all tools are out of harm's way. Reconnect power, antenna and an external speaker, and test the modification. You should now have the following bandwidth settings:

|                         |         |                  |  |
|-------------------------|---------|------------------|--|
| AM wide.....            | 6 KHz   | (CFW455IT)       | [no change]                                  |
| AM normal.....          | 2.8 KHz | (FL-70/CFW455IT) |  |
| SSB/CW/RTTY wide.....   | 2.8 KHz | (FL-70/CFW455IT) | [no change]                                  |
| SSB/CW/RTTY normal..... | 2.4 KHz | (FL-44A)         | [IF-shift, if step D was<br>or<br>performed] |
| SSB/CW/RTTY normal..... | 2.3 KHz | (FL-30/FL-44A)   | [no change, if step D<br>was not performed]  |
| Narrow, all modes.....  | 2.3 KHz | (FL-30/FL-44A)   |  |

If everything works OK. reassemble the receiver.

### **OPTION 3**

**REPLACE THE 2.4 KHz AM "NORMAL" BANDWIDTH WITH 2.8 KHz. MAKE NO OTHER CHANGES TO THE FILTER SELECT CIRCUIT.**

- A. Remove the top cover of the receiver.
- B. Locate D37 on the main PC board right next to IC3 near the center of the board. Cut the top (cathode) lead of the diode, leaving enough wire on both sides of the cut to make connections to. Bend the wire lead on the diode up. Solder a jumper wire from the cathode lead of D37 to the cathode (top) lead of D39 (located on the opposite side of IC3).
- C. Inspect your work and verify it was done properly. Make sure all tools are out of harm's way. Reconnect power, antenna and an external speaker and test the modification. Your AM "normal" bandwidth will now be 2.8 KHz (FL-70/CFW455IT) instead of 2.4 KHz (FL-70/FL-44A) If everything works OK, reassemble the receiver.

This modification is read 787 times.

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**19-07-1998**

**(R-71) Here is the R-71 version of the Drake R7/R8 type passband tuning system**

Add a jumper wire between the cathodes of diodes D42 and D45 on the main unit circuit board. The cathode end of the diode is marked by a band. The diodes are located near Filter Switch 1 (the switch you set when you add the optional narrow filter). Turn Filter Switch 1 on. That's it.

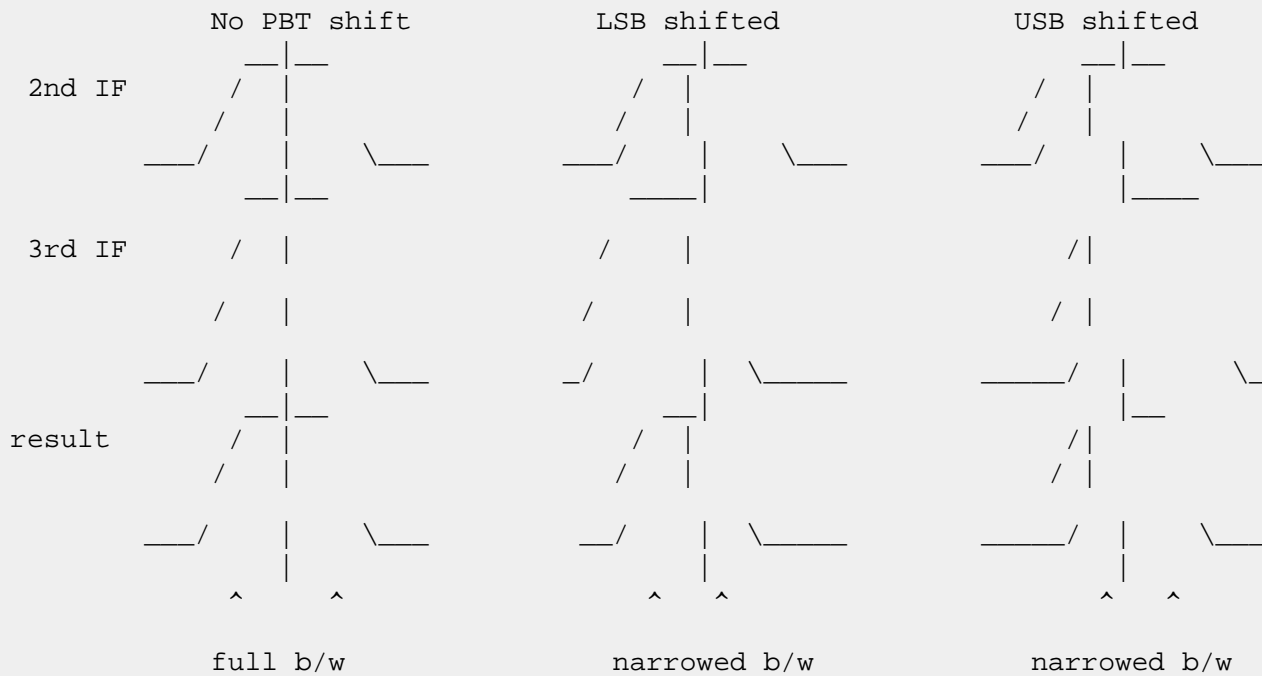
Usage: select LSB mode and narrow filter position, and tune to zero-beat. Rotate the pass-band tuning control to select between LSB and USB, or anywhere in-between. Select normal or wide filter position and you get the original ICOM PBT.

The mod for the R70 should be just as easy, but you'll have to find the diodes on your schematic. Just jumper the cathode of the diode that selects the optional narrow 2nd IF filter to the cathode of the diode that selects the "through" position in the 2nd IF.

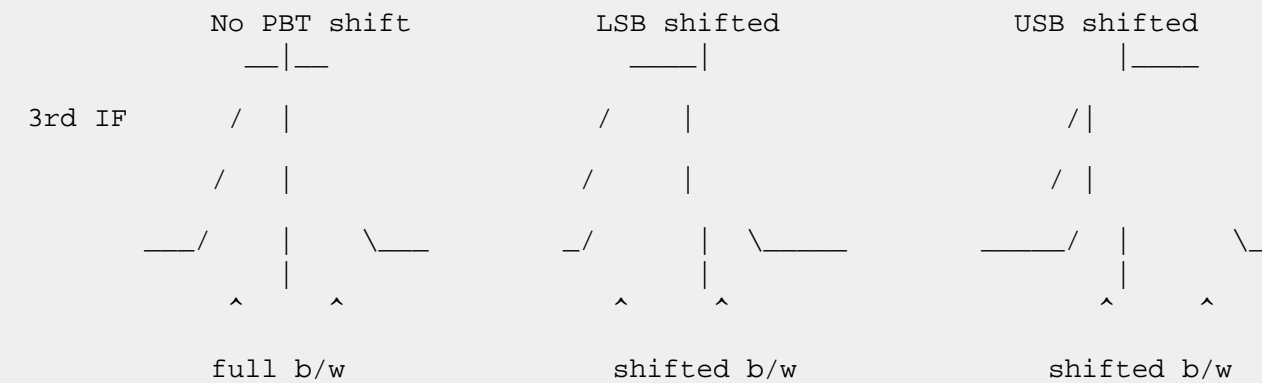
This modification will bypass any narrow filter you may have installed. It forces the narrow filter selection to bypass the 2nd IF



filters, while still selecting the narrow filter in the 3rd IF. The standard ICOM pass-band tuning shifts the 3rd IF passband against the 2nd IF passband:



This mod bypasses the 2nd IF filter, so you have just the 3rd IF filter, which the PBT control can move around relative to the center frequency:



I haven't performed this mod on my R71 (I have to install PBT tuning first - I got one of the ones without PBT), so you're on your own with this one. I expect that the close-in dynamic range will be worse when using this flavor of PBT on the R71, since the 2nd IF filter is bypassed

This modification is read 780 times.

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**23-08-1998**

## **(R-71) R-71A Memory Notes**

I have heard that a new company named Willco is going to sell no fail memory for the Icom radios.

Two models, one with 64 channels for around \$70 and a 1000 memory channels for around \$149 will replace the small battery backup unit. The Willco board will use standard AA batteries. When the batteries die in the Willco unit, the radio won't fail and need servicing as is now the case. (However, the memories would need to be re-programmed.)

Using the lock button and memory switch, one steps through the banks of 32 channels each. One channel in each bank can be used to store the channel number for display to identify the bank number according to the maker.

Willco's address is P.O. box 788 NewLenox Il. 60451

If someone orders one, let me know what you think of it. I am not sure which radios other than the R-71A in which it will work.

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 Mary Washington College        Amateur callsign: AC4IU (ex-KD4ASW/KO4EQ)  
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This modification is read 794 times.

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**08-11-1998**

## **(R-7100) Modify your Icom R7100 to provide an output directly from the discriminator**

This is an involved operation and should NOT be attempted by anyone who does not feel at home with fine electronics work. It is very easy to do serious damage to your radio if you don't know what you're doing.

Please read through this document in its entirety before attempting to carry out the modification.

It is almost essential that you print this out in order to have it handy while carrying out the modification. The diagram at the end of the article will be of great use.

Right, let's get down to the nitty gritty.

You are going to need just one electronic component - a capacitor of a value of between 220n and 10u. It can be either polar or non-polar. In addition, you will need a length of screened audio cable, any type should work but the smaller it is the better. You will need some form of connector to put on the one end of the screened lead - a minijack socket or phono connector would be good.

Of course you'll also need a few basic electronics tools such as a screwdriver, soldering iron, sidecutters etc.

With the front panel of the radio towards you, as you would have it for normal use, locate the four retaining screws on top of the top cover. These are located near each corner. Remove these four screws.

Do not remove the three screws located around the speaker grille.

On each side of the radio are two further retaining screws (a total of four). Remove these.

The top cover may now be lifted off the radio taking care to observe the speaker cable. The speaker is fixed to the inside of the top cover.

There is a connector in the speaker cable which should be unplugged to free the top cover completely.

Looking down on the receiver, locate the converter unit. This is the PCB closest to the external antenna connector at the left rear of the receiver.

Now locate the coaxial connector at the extreme left rear of the converter unit PCB (see diagram). The cable connected at this point bends over and travels downwards into the bottom half of the receiver.

Disconnect this cable by pulling directly upwards. The connector is fairly delicate so do not use too much force.

Now comes the part that requires great care. Take it slowly and do it properly.

The entire top chassis has to be detached in order to reach the main unit PCB beneath.

There are four screws that need to be removed to accomplish this. Two of these are located on the rear panel of the receiver.

Looking at the radio from the rear now, you will see a row of connectors for such things as external speaker etc. Just next to each end of this row of connectors are the two screws you need to remove. Remove them.

The remaining two screws are on the top of the unit. Position the radio as you had it before (normal operating position).

Looking down on the radio, you should see four screws near the front. Two of these go through the top of the plastic front panel and two of them go through the metal chassis (see diagram). Remove the two screws that go through the metal chassis.

Now CAREFULLY lift the top chassis and swing it clear of the radio. Note that there are many wires linking the top chassis to the bottom. Take care not to strain these. There should be enough slack (just) to allow you to swing the top part out and away from the bottom and lower it onto the surface you're working on.

Now you should have a clear view of the main unit PCB. This is where you will be making a connection.

In order to locate the point on the PCB where you will connect the screened cable you will need a ruler or tape measure.

The connection point is approximately half way from the back to the front and approximately one quarter of the way from left to right. This is just to give you a general idea of where to look. (see diagram)

Now, using your ruler, measure inwards 55mm (2 1/8") from the left edge of the radio towards the right. Imagine a line running through this point from the front of the radio to the back.

Now, measure 120mm (4 3/4") from the rear towards the front along the imaginary line.

At this spot on the PCB (see diagram) you should see a wire link marked "W100". This point (the wire link) is output of the discriminator.

Connect one side of the capacitor to this wire link. If the cap is a polar type then the positive lead goes to the wire link.

Connect the remaining lead of the cap to the centre conductor of your screened cable.

The screen of the screened lead can be soldered to the casing of the nearest metal can. There is a suitable can approximately 10mm (3/8") to the rear of the wire link (see diagram). Take care not to overheat the can while doing this. You should be able to get the solder to flow nicely onto the can within two or three seconds.

Exactly how you terminate the other end of the screened lead is up to you but I would suggest that you extend it through a suitably drilled hole in the rear panel of the radio and then terminate it on an in-line mini jack socket or phono connector.

That's it! Well, almost. Now you have to reverse the whole process in order to close up the radio again.

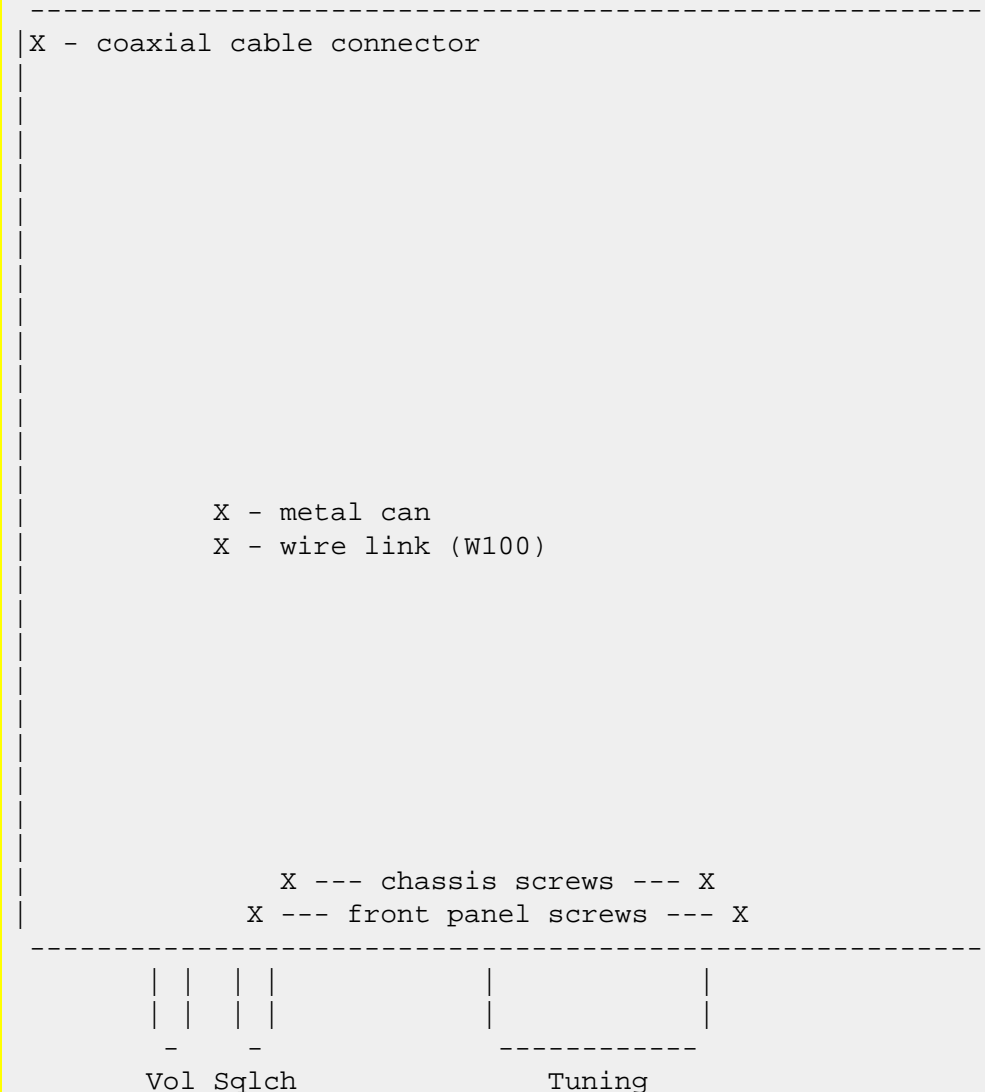
Be extremely careful not to strain any of the wires and take care to ensure none are pinched between metal chassis parts as you close up the radio.

Don't forget to reconnect the coaxial lead at the left rear of the radio once the top chassis is back in place.

The new output you have created is basically just "raw audio". It is the point in the circuit before audio filtering, volume and squelch control. This means that it is a fixed level output unaffected by the position of the volume and/or squelch controls. Be aware that while short circuiting this output shouldn't cause any harm at all, it will deprive the radio of an audio output thus muting the internal loudspeaker. The impedance of this output is around 10k which is perfect for driving the circuit supplied with the software PD.EXE (a pager transmission decoding utility) but may require buffering if you plan to use it for other purposes.

Anyone requiring further assistance is free to Email me at [tim@pixie.co.za](mailto:tim@pixie.co.za). I'll do my best to help.

This diagram shows the relative location of various key points within the receiver. Be aware that the points shown are all inside the radio and that some are visible only once the upper chassis has been removed.



**17-03-2002**

## **(R-7100) Icom R7100 Discriminator Mod**

**Author:** kc8mzm

### **WARNING**

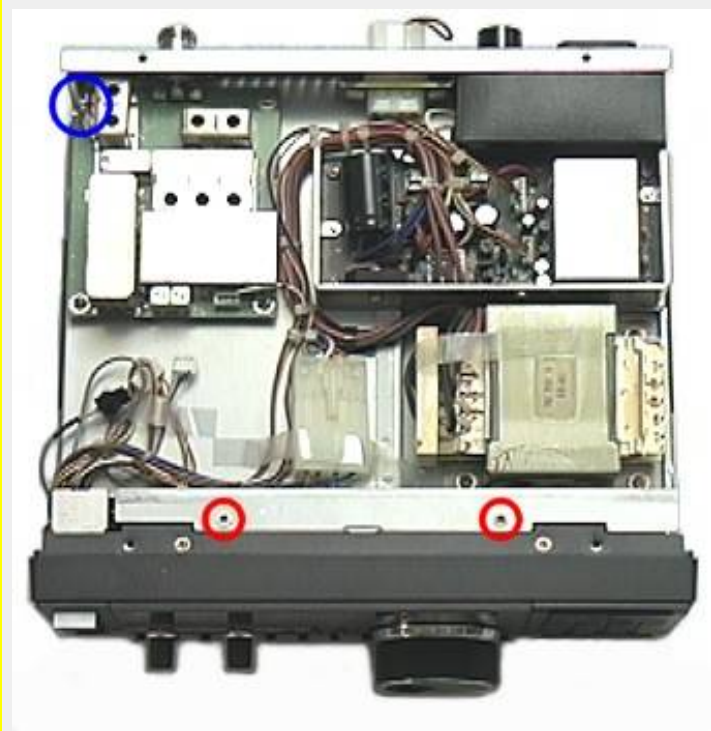
You assume all risks involved with performing this modification I will not be held responsible if you destroy your scanner

The instructions below are what I used to modify my 7100

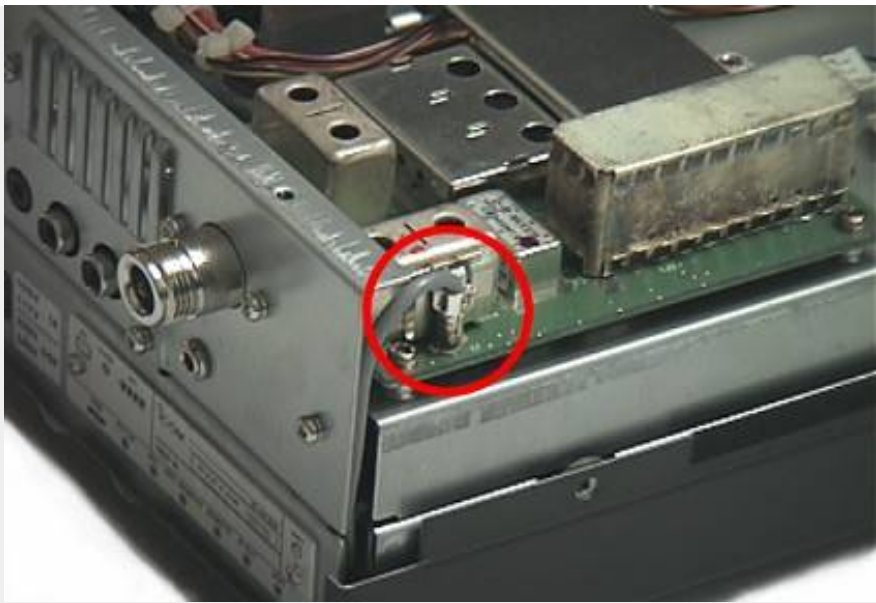
[Icom R7100 discriminator mod instructions](#)



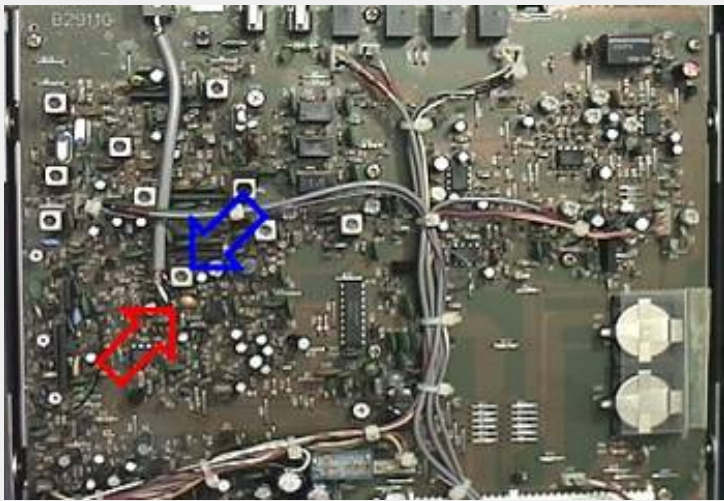
The red circles are the locations of the exterior screws that need to be removed (2 more screws on the left side are not pictured)



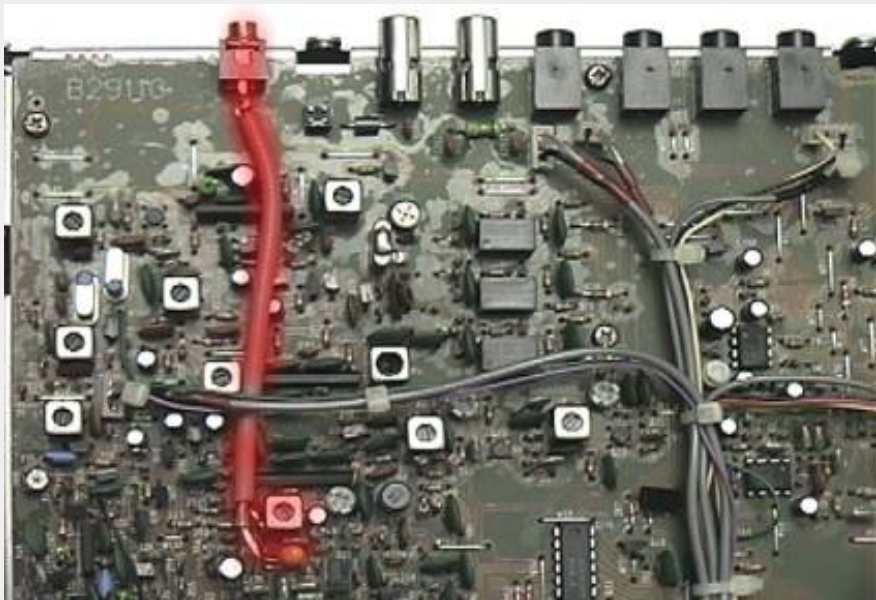
The red circles are the 2 interior screws that need to be removed The blue circle is the location of the coaxial connector (see further detail below)



This is the small coaxial connector that needs to be unplugged



The red arrows indicate the location of wire link "W100" to which a 10u capacitor is soldered The blue arrows indicate the location of the metal can to which the shield from the audio cable is soldered



My completed discriminator tap routed to the rear of the main PC board and terminated with a 3.5mm mini phone jack

This modification can also be found on <http://www.qsl.net/kc8mzm/7100.htm>.

This modification is read 84 times.

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**23-08-1998**

## **(R-8500) Operating the Icom R8500 in other contries**

Caution: Monitoring Cellular frequencies is illegal in the U.S.

If your traveling abroad and you want to re-program your R8500 to match the version in that country. Use the table below.

| Version Programming Resistor | AUS | DEN | EUR | FRA | USA |
|------------------------------|-----|-----|-----|-----|-----|
| R516                         |     |     | X   | X   |     |
| R517                         |     | X   |     | X   | X   |
| R518                         | X   |     | X   | X   | X   |
| R455                         | Z   | Z   | Z   | Z   |     |

**X** = populate the position with a 3.3k ohm 603 size surface mounted resistor

**Z** = populate the position with a 1k ohm 603 size surface mounted resistor

| Version             | Frequency Coverage (MHz)   |
|---------------------|--|
| U.S.A               | 0.10000 - 823.99999<br>849.00001 - 869.99999<br>894.00001 - 1999.99999 |
| Europe<br>Australia | 0.10000 - 1999.99999   |
| France              | 0.10000 - 87.50000<br>108.00000 - 1999.99999                           |

Remove the top cover and locate the main PC board (it's to the rear or the chassis and holds the speech option, see the operators manual). R516, R517 and R518 is located in the right hand corner inside the small metal can.

There will be 4 adjacent resistor positions with 2 positions populated (R517 & R518) the top position is unknown. The small metal can is located on the right hand side of the main board. R455 is located below and to the left of J12 (the speech module connector). R455 is also unpopulated and it's to the left of R140.

If you can't find a 603 size surface mounted resistor, carefully unsolder an exsisting resistor and re-populate it in another position. R455 can be replaced with a zero Ohm resistor by shorting the position with a fine stran of wire that was taken from a ribbon cable.

After the modification, the radio will lose it's memories and will require reprogramming.

This modification is read 1318 times.

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**08-01-2002**

## **(SM-20) Icom SM-20 desktop microphone wiring**

**Author:** Philippe, ON4VP - [on4vp@pandora.be](mailto:on4vp@pandora.be). [MODIFICATION.NET](http://MODIFICATION.NET)

1. microphone output           white
2. +8 VDC input                red
3. frequency up/down         blue
4. no connection
5. PTT                           yellow
6. GND (PTT ground)          black
7. GND (mic ground)          shield
8. No connection

Regards and 73,  
Philippe, ON4VP

This modification is read 623 times.

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