

# Modifications for the YAESU

created 28-03-2002

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(VR-5000) [Show the Firmware for Yaesu VR-5000](#) English language

(VX-110) [Expanded Transmit for the Vertex VX-110 & VX-150](#) English language

(VX-150) [MARS/CAP modification for VX-150R 140-174 MHz](#) English language

(VX-150) [Expanded Transmit for the Vertex VX-110 & VX-150](#) English language

(VX-1R) [VX-1R Cell and expanded TX RX Mod](#) English language

(VX-1R) [Version test Yaesu VX-1R](#) English language

(VX-1R) [VX-1R Internal System Alignment Routine](#) English language

(VX-1R) [Yaesu VX-1R - Expanded Transmit 137 - 175, 410 - 470 MHz](#) English language

(VX-1R) [Bad connection with the antenna](#) English language

(VX-1R) [Template modifier for VX1R](#) English language

(VX-1R) [Schematic diagram for PC programming cable.](#) English language

(VX-1R) [Quick Reference for YAESU VX-1R](#) English language

(VX-1R) [VX-1R crossband operation](#) English language

(VX-1R) [Lost data in VX-1 CPU for Squelch & S meter functions](#) English language

(VX-1R) [Continuous single-band RX modification for Yaesu VX-1R](#) English language

(VX-1R) [vx-1r MARS/CAP mod](#) English language

(VX-1R) [Determine Firmware version](#) English language



- (VX-1R)

[Greate site for VX-1r and VX-5r](#) English language
- (VX-5R)

[Some modification does not work.!!](#) English language
- (VX-5R)

[VX-5R Expanded frequency](#) English language
- (VX-5R)

[PC software MARS/CAP or FREEBAND mods.](#) English language
- (VX-5R)

[Expanded range for VX5R.](#) English language
- (VX-5R)

[TX frequency expansion](#) English language
- (VX-5R)

[Use Nokia 7110 Belt Clip for an VX-5R](#) English language
- (VX-5R)

[VX 5 R modification for German](#) English language
- (VX-5R)

[Vx-5r Free Band](#) English language
- (VX-5R)

[VX-5R Loose antenna "cure"](#) English language
- (VX-5R)

[VX-5R expanded frequency mod](#) English language
- (VX-5R)

[Greate site for VX-1r and VX-5r](#) English language
- (VXA-100)

[How to program the Book memories \(without the compter interface\)](#) English language

19-07-1998

(4PINMIC) YAESU 4 PIN Microphone connections to TNC'S

1

u

4

2

3

Pin 1 = Ground

Pin 2 = MIC input

Pin 3 = PTT (Push To Talk)

Pin 4 =

DISCLAIMER

The information above is given in good faith and I DO NOT, under any circumstances accept any liability.

NOTE

Please make sure that you are familiar with the pin numbers on the mic sokets (fitted to end of mic leads) before you make any connections.

This modification is read 853 times.

top of page

19-07-1998

(8PINMIC) YAESU 8 PIN Microphone connections to TNC'S

1

u

7

2

8

6

3

5

4

Pin 1 =

Pin 2 =

- Pin 3 =
- Pin 4 = RX audio (Only available on some radio's)
- Pin 5 =
- Pin 6 = PTT (Push To Talk)
- Pin 7 = Ground
- Pin 8 = MIC input

**DISCLAIMER**

The information above is given in good faith and I DO NOT, under any circumstances accept any liability.

**NOTE**

Please make sure that you are familiar with the pin numbers on the mic sokets (fitted to end of mic leads) before you make any connections.

| Date: 23-03-2002                                                                                                                                                                                                                          | User comment | From: <a href="#">SM6XQY</a> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------------------|
| <b>Subject:</b> Yaesu 8-pin mic                                                                                                                                                                                                           |              |                              |
| <div><div>1. = Channel Up</div><div>2. = +B (5V)</div><div>3. = Channel Down</div><div>4. = LF Out (Speaker)</div><div>5. = 1750Hz Tone via 1k resistor to Ground</div><div>6. = PTT</div><div>7. = Ground</div><div>8. = Mic</div></div> |              |                              |

**19-07-1998**  
**(FL-2100) FL-2100B 12 meter modification**

If you do not mind losing 10 meters on your FL2100B, this quick mod should have you up and running on 12 meters with near full power output.

Place the FL2100B on its side with the LOADING control nearest the surface that the amp is setting on. Make sure that the amp has been UNPLUGED and that the PLATE VOLTAGE has dissipated before you proceed. Remove the screws that hold the bottom cover on and remove the bottom cover of the amp.

Set the BANDSWITCH to : 10  
Set the PLATE CONTROL to : 9  
Set the LOADING CONTROL to: Fully counter-clockwise

Disconnect the 850 volt red wire that leads from the transformer to the DIODE BOARD (located right behind the TRANS - OPERATE switch. Install a SWR bridge between the EXCITER and the FL2100B. Tune your HF rig to 24.950. Turn the FL2100B on and place the amp in the OPERATE MODE. Excite the the AMP with an AM signal, enough so that you can calibrate (set) your SWR meter. Place your SWR meter in the REV position and read the SWR. While in the TX mode, tune L206 (located near the GROUNDING WINGNUT just inside of the amp chassis) untill you achive your lowest SWR reading. You have just completed the retuning proceedure of the 10 meter ANTENNA INPUT COIL.

If you would like to operate both 10 meters and 12 meters, you may want to tune L206 on a frequency between your operating fre-quencys on 10 and 12.

Re-solder the 850 volt red wire (with the AMP off and un-plugged). Re-assemble the AMP and enjoy INCREASED POWER OUTPUT on 12 METERS.

**21-08-2001**

## **(FL-2500) Yaesu FL-2500 mod**

**Author:** Eion Gibson - ZL3AG - [eion.gibson@tait.co.nz](mailto:eion.gibson@tait.co.nz).[MODIFICATION.NET](http://MODIFICATION.NET)

To improve tube life and IMD, place a 10 ohm 2 Watt resitor in the cathode circuit of each tube. ( Five 6KD6's) This balances the gm of each tube such that no good tube carries more than its share of the current load.

The input power is reduced from 2KW to about 1700 Watts, but is still capable of producing 1KW output.

ZL3AG

This modification is read 840 times.

[top of page](#)

**19-07-1998**

## **(FL-7000) FL-7000 10 meter transmit mods**

1. Remove power and all other cables.
2. Remove 4 screws from top cover.
3. Remove top cover and right and left panels.
4. Remove 4 screws from power combiner unit and remove screen plate.
5. Locate switch so1 on the cpu unit and set to off position ( a small screwdriver can be used to reach switch)
6. Reassemble unit.

This modification is read 789 times.

[top of page](#)

**22-08-1998**

## **(FL-7000) FL-7000 desensitize the protection circuitry**

*From: Howard Ryder W4NTW@ix.netcom.com*

Most Yaesu FL-7000 Solid State Linears have a hypersensitive protection circuit that causes the "protect" to trip when no improper conditions exist. This modification will desensitize the protection circuitry; but still allow it to function when an improper condition exists.

The modification is as follows:

### PROTECTOR UNIT

- Remove D7006 P/N HZ15-1L
- Remove R7029 P/N J02245102
- Remove R7033 P/N J02245104
- Remove Q7004 P/N G3107331Q
- Add R7060 Resistor 10K 1/4w P/N J01225103 This resistor must be added from pin 7 of Q01 (1/2 of AN6552) to pin 5 of Q7003 (1/2 of AN6552)after removing R33 10ohms.I carefully snipped the lead in the center and put my 10K in series with the existing 10 ohm resistor.

### POWER SUPPLY UNIT

- Replace C8019 P/N K13179009 WITH 1uf 50VDC P/N 59V010M5X11TR5.

This capacitor goes between the base and emitter of Q8008 P/N 2SC2229.

### NOTE:

The positive lead goes to the base of the transistor.I put mine in parallel with th existing 0.047.

### ALIGNMENT OF NEW CICUITRY

### CM COUPLER

top of page



**03-01-1999**

## **(FRG-100) FRG-100 AGC 3 times faster**

The original AGC is to slow for serious DX.

- R 1091 (original 1.5 Mohm) replace with 750 Kohm
- C 1225 (original 1 uF ) replace with 0,33 uF

It works really very well!

This modification is read 896 times.

[top of page](#)

**03-03-2001**

## **(FRG-100) FRG-100 audio mods**

**Author:** Frank - [Fcathell@aol.com](mailto:Fcathell@aol.com).[MODIFICATION.NET](http://MODIFICATION.NET)

Here are mods that will clean up the "muddy" audio of the FRG-100:

1. Omit C1183.
2. Change C1164 to 100 pF.
3. Change C1157 to 0.1 F.

All of the above components are on the top PC board and are accessable by removing the top cover.

Frank

This modification is read 956 times.

[top of page](#)

**24-05-2001**

## **(FRG-100) AGC Off switch for Yaesu FRG-100**

by Maurizio Bonfanti, Omegna (VB) Italy & i3HEV Mario Held, Venice Italy

This mod, which lets you disable AGC is very easy, and should work properly without problems, but should be implemented with care not to damage the PCB.

The part of schematics below shows receiver AGC circuit; the mod, marked in red, consists simply in switching off the first stage in the AGC voltage amplifier chain; to obtain this, a simple switch brings base of Q1020 (transistor) to ground potential, so effectively zeroing control voltage (thus bringing to zero S-meter too).

The switch should preferably be a slider, but can also be a common miniature toggle type; first side should be connected to ground by a very short wire, whilst the other side should be brought to Q1020 base by a very short (10-15 cm) piece of thin coax (e.g. RG162, RG174, but definitely not an AF type, whose shielding is not very good). Coax braid should be grounded at switch end only; the other end should be cut and insulated by a small piece of tape, or a short piece of plastic sheath. Shielding is very important because, when AGC is on, spurious signals could enter the circuit and be amplified by the transistor, thus modulating incoming signals in IF stages and spoiling receiver output. A last notice: when switching AGC to off, audio level can increase dramatically, so causing ear shock in headphone listeners: remember to set audio gain to **zero before switching**.



16-12-2000

## (FRG-7700) Yaesu-FRG7700 tip

**Author:** Derk, PE4CL - [d.zeedijk@home.nl](mailto:d.zeedijk@home.nl).[MODIFICATION.NET](http://MODIFICATION.NET)

Today I suppose that your YAESU FRG-7700 must be several years old, maybe even 20 years...  
So, dust did its job, and dust is very effective on switches as you know.

One switch in particular can make your receiver quite def.

This is the attenuator switch on the rear panel. It's easely overlooked, but this dusty att.-switch can make the difference between a receiver, and a piece of useless furniture in your room.

So, if your receiver doesn't quite receive as it used to, JUST CLEAN this little switch on the back-panel with contact-spray. You don't need to open the receiver, just spray a little bit in from the outside.

**Pull the mains-plug before you spray**, spray a LITTLE, move the switch a few times and give it 30 minutes to dry.  
(because you accidentely sprayed on active parts inside ofcourse)

73' Derk

This modification is read 1036 times.

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16-12-2000

## (FRG-7700) Info for used frg-7700 Yaesu

**Author:** Derk, PE4CL - [d.zeedijk@home.nl](mailto:d.zeedijk@home.nl).[MODIFICATION.NET](http://MODIFICATION.NET)

So you've bought an used Yaesu FRG-7700 ?? Congrats !! Good choise!  
Didn't get any manual with it I suppose...??

Now you can't get the memory function to work wich stores upto 12 channels??

### Solution:

The backup batteries are empty (since your receiver could be 20 years old it is a good possibillity). At the bottom of the receiver you'll find a small metall plate, wich is fixed by a black knob.  
Pull this knob till you feel a click and remove this plate. You will now see a storage-pack for penlight batteries. Refresh those batteries.

But... maybe you are unlucky and there is no storage-pack for batteries at all. This means that the memory-module was never installed, as it is optional... (I'm sorry)  
With no optional memory-pcb the FINE-TUNE knob WON'T work either...

To enter a frequency:    Choose the freq. with the tuning-dial  
                                 Turn the Mch knob to one of the 12 mem presets  
                                 press   'M'

-stored-

                                 To recall press the button right next to 'M'  
-the fine-tuning will now operate-

73' Derk PE4CL

This modification is read 986 times.

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**15-11-2001**

## **(FRG-7700) FRG 7700 extra memories mod ! 12 -----> 256**

**Author:** Nicolas JN18 - [n.chazal.nospam@carpa-adp.fr](mailto:n.chazal.nospam@carpa-adp.fr).[MODIFICATION.NET](http://MODIFICATION.NET)

Important!. I could not be held responsible for all the modification describes below, you do it at your own risk, if you are able to solder and to understand an electronic scheme please forget this mod. I will not accept any comment from thus who destroy there equipment by forgetting this simple fact : don't play with the fire. Accept all apologise for the poor English you'll find here, Froggy's and proud of it ;-).

Here is a powerfull tips to expand the memory capabilities of your beloved FRG7700.

Unfortunately I don't still have the RX and its scheme but I can easily remember what I've done few years ago.

During my first opération on this receiver I have been surprised by the memory option of the 7700. As a confirmed Electronic Engineer I have never seen a memory chip with only twelve position (simply because 12 is not a multiple of 2). Its why I have carefully studied the memory electronic scheme and quickly discovered the monstrous Yaesu solution!

Once you have located the memory chip you can differentiate the adress bus from the data bus. The adress bus is a 8 wire one corresponding to  $2 \times 8$  binary possibilities = 256 !! Yes 256 adressable area.

I presume that Yaesu designer wanted to find a cheap solution to remote the memory ( which was sold as an option). The actual twelve positions rotary knob is the cheapest commutator you can find.

What I propose you is to leave this knob on the RX ( better than a big hole on the front side) and to add a little box on one side with the new memory control.

First of all you have to locate (the electronic diagram is highly requested) the 9 wires coming from the memory printed board to the 12 pos. knob. Once you have located it you have now to find which wire is the common one and which others are the adress one.

You will extract those wires out from the apparatus.

You need 2 coding wheels (not sure of the translation) in order to code from 00 to FF on 8 wires.

At the rear side of each coding weels you'll find 5 contact, one is the common one and the four others are the coding output. Take 4 wires form the 8 you select as the adress one and connect it on this four contact and then take the 4 last coming from the RX and connect it to the second commutator on the four coding contact. Take the common wire and by a strap connect it to both of the common contact of the commutator. It doesn't matter how you connect the 8 addresses wires on the 2 commutator because you don't care if the information is in a correct order in the chip or not, what you need is 256 different frequencies.

If you have performed the mod correctly you have know 256 memories better the my actual FRG100 (50 mem).

If you need more help, please send attached with your mail a clean scan of the memory scheme.

I will make a small drawing to explain my mod.

73 to all listeners.

Regards

Nicolas JN18 PARIS

Email : [n.chazal.nospam@carpa-adp.fr](mailto:n.chazal.nospam@carpa-adp.fr) (remove .nospam)

# Yaesu FRG-9600 VHF/UHF radio

## ~~~ DISCRIMINATOR MODIFICATION ~~~

By Donald Gray G3YPL/ Ex ZL1AZC

© Copyright Donald Gray 1998

**Disclaimer:** The following is given in good faith. I cannot be held responsible for any omissions or errors, or to any damage caused to any radio howsoever caused....All care but no responsibility!!!!

### Tools required:

- cross head screwdriver
- 25 watt, fine tip soldering iron
- tweezers or needle tip pliers
- side cutters
- needle files
- sharp knife (to cut one pcb track)
- a small container to hold screws & washers. \*

\* The last item is very important. There are many screws to remove. It is all too easy to loose one. Make a habit of ALWAYS putting the removed screws & washers into a small container such as a 35mm film container, cup, coffee jar lid etc. NEVER ever leave them loose on the table or bench.

### Components required:

- 1 x .01 capacitor
- 1 x small cable tie
- Approx 12 to 18 inches of smallish diameter Audio cable (coaxial screened essential)
- 1 cup of coffee

To gain access to the NFM discriminator on this radio is easy BUT only do it if you feel capable of doing one very fine solder connection....

Basically what you have to do is connect a short length of audio coax, via a small capacitor, from **pin 14** of the mixer/nfm **discriminator chip (MC3357P)**. to an unused socket on the back of the radio. There are several sockets on the back and I have used the "MPX" socket on my radio because I will never want to put a stereo multiplexer on it! The instructions below relate to the MPX socket. You can choose any of the sockets that you will not need but you **must** cut the tracks leading to that socket **before** adding soldering the coax thereto!

---

### Step-by-step Instructions

1. Disconnect power and other cables at the back.
2. Remove top and bottom covers.
3. From the top, locate the N.F.M. board (4.25 inches [115mm] from the back panel)
4. Very carefully solder one leg of the 0.1µF capacitor to the solder side of the pcb **where pin 14 pokes out**. Be careful to correctly identify this pin AND be careful with the soldering, it is a fine bit of soldering and is easy to short out this to the adjacent pads. **CHECK and double check that you have done a good "clean" solder job here** -It's vital to be very careful - I cannot stress this enough! Leave the capacitor hanging in the air for the moment...
5. Use a small needle file to drill a small hole in the top portion of the nfm pcb where there are no tracks. through this hole, thread a small cable tie and leave in situ for the time being. (Later, you will secure the audio coax here. See step 9 below.)
6. With a sharp knife, scrape a section of the solder resist from the top, right hand "Earth" track (as seen from the solder side of the pcb) and tin it with solder (To confirm that you have the correct track, it is the track also connected to the can of the xtal on that board!)
7. Prepare the coax by:- (a) Stripping back the outer insulation by about one inch. (25mm), twist the shielding together



and tin it for about .25 inch [6mm] and then trim it down to this length. (b) Stripping back the inner by about 1/16 inch (2mm) and tin the inner conductor.

8. Solder the screen of the coax to the earth track so that it will present the inner conductor very close to or touching the free leg of the capacitor.
9. Now clamp this coax cable into position using the cable tie (as mentioned in 5 above) to secure it.
10. Solder the inner conductor to the free end of the capacitor
11. Orientate the radio so that the front panel is facing you and looking into the radio from the top, thread the free end of the coax to the bottom, by way of gap between the main pcb and the case at the back, right hand side (near the two white connector plugs) Tuck the coax under the big choke (the thing that looks like a transformer). BE CAREFUL not to put any strain on the coax. Leave a little slack ...
12. now turn the radio upside down and **orientate it so that the dial is facing your right**. The coax should be poking up at the left hand side nearest you! To use the "MPX" jack socket as the access point:-
13. Identify the 3 mounting pins of the MPX jack. They are 2 5/8 inch [65mm] from the edge facing you, of the main pcb . The pin on the left is the earth (ground) pin. The centre if the "live" pin and the right pin is not used electronically (only as a mechanical mounting point and is ignored in this mod)
14. Carefully cut the track leading to the centre "live" pin about half way along its length (This removes the unused "MPX" signal to the jack socket.
15. Prepare the audio coax appropriately and solder the screen to the earth pin and the inner core to the middle pin. Replace the top and bottom covers, making sure that there is no strain on the coax and that it is not being "pinched" by the covers.

**IMPORTANT** - Add a "MOD NOTE to the inside of the radio and also in the instruction book:-

- a small self adhesive label stuck to the metal screen on the underside of the pcb with words to the effect : "21 Jan 98 - track cut to remove mpx and coax added to give access to the NFM discriminator output"
- Similar label on the back denoting the MPX now to be "NFM Discriminator"
- If you have a circuit diagram, note the change also thereon!!!

The discriminator output is at a fixed level (about .7 volt) and totally isolated from the volume control - the setting of the volume control will not effect the discriminator level. The squelch control WILL cut in and out on the discriminator line in the same fashion as on the normal audio.

BTW: e-hum, why do you want a discriminator output on the radio anyway?:>)

This modification is read 1087 times.

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**05-03-1999**

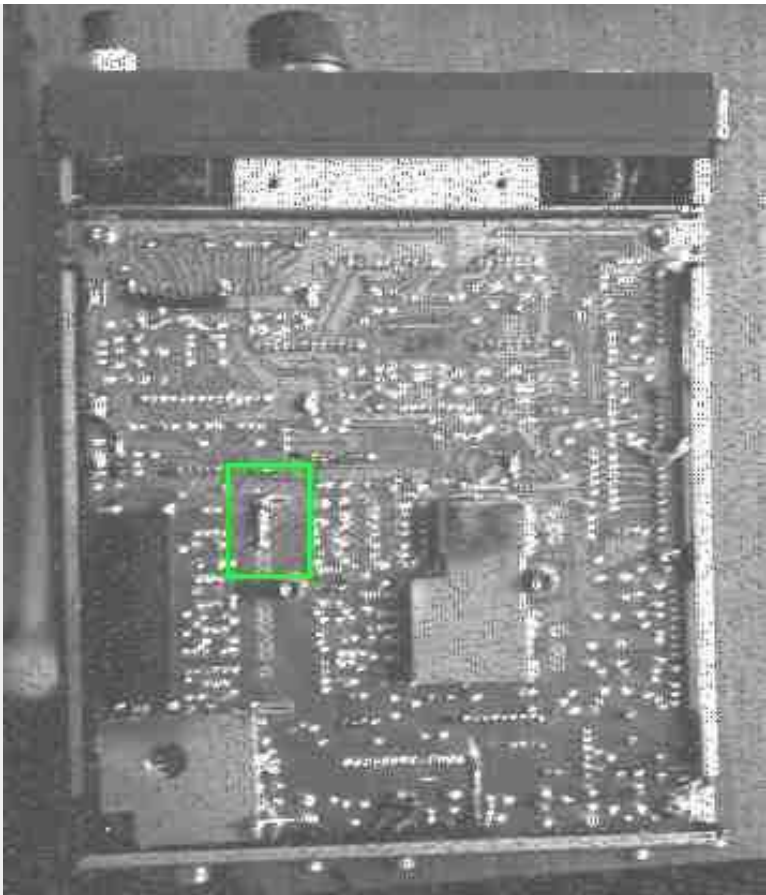
## **(FRG-9600) How to expand the frequency range og the FRG-9600 from 60-905 to 20-950 MHz**

**Waring!** Do not attempt to do this if you do not feel confident when using soldering equipment. Do not blame me if you screw up your receiver or do any damage to anything you are using.

First write down all the stored frequencies, in case the memories of the receiver get lost. Then turn it off and disconnect all cables.

I will not explain how to open the case. If you can't find it out by yourself, you sure won't be able to do the work.

What you see above, is the Printed Circuit Board (PCB) of the FRG9600, seen from the bottom.



What you need: 1 resistor 1 KOhm 1/4 or 1/2 Watt, 3 pieces of wire, soldering iron GREEN SQUARE: This is the 1 KOhm resistor, soldered between the pin # 1 (Counting from the top) and the nearby ground terminal of the pin array marked J8001/J9001, next to the black rubber piece.

Beware, the the sensitivity is not very good in the expanded frequency range, but it is still usable. Also interference from the computer might matter. I've also noticed that some receivers might be better, others might be less good, depending on how the front-end is aligned. I'm working on this, so stay tuned :-).

Now turn around the opened FRG9600, so that you can look inside from the top.

Locate the BAND UNIT. This is the vertical circuit board with a metal frame, closest to the front panel. Next to it, on the main Circuit Board, there is the text BAND UNIT written. You have to solder the 3 jumper wires on this Band Unit. When you look at the front of the Band Unit, near its top, you will see 6 empty holes, marked on the below drawing with x.

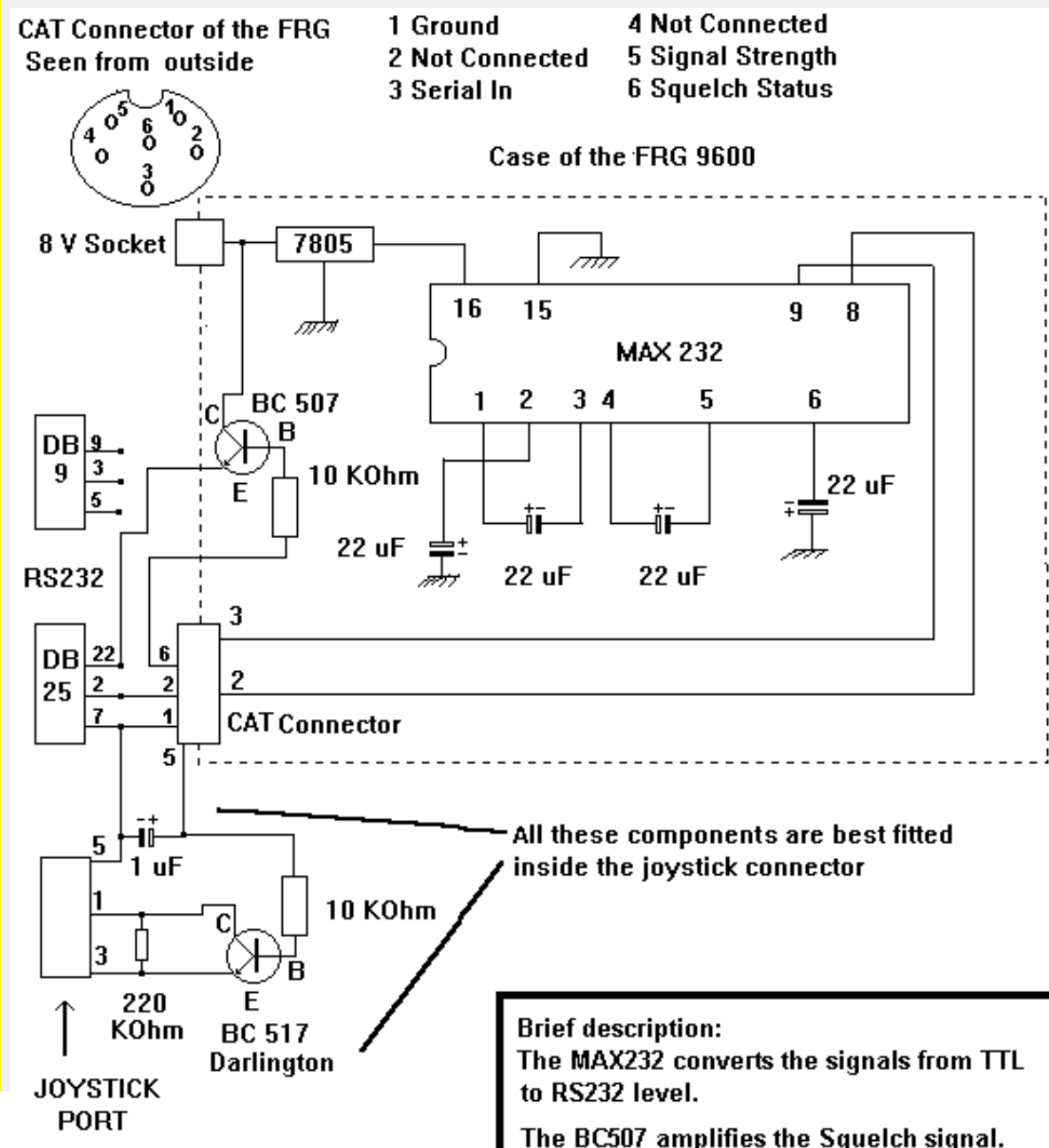


You have to solder the jumpers marked x....x, either by connecting the soldering points on the back, or inserting the jumpers through the holes on the front. If you have the switch S01 inserted, this must be on the OFF position. Usually this switch is not installed, its use is to limit the frequency range of the FRG, probably for some countries who required it.

Now check your solderings. They must be clean, and must not touch the nearby pins. Check also that you have not left any metal chips from the jumpers or the soldering lead inside the receiver. Close the box, connect the cables and turn it on. With the dial you can now select all frequencies between 0.0000 and 999.0000 Mhz, but only the range 20.0000 - 950.0000 will be operational.

**Waring:** On some frg's the frequency on the display is off by 27.250 Mhz from the real frequency you are receiving on the low band, i.e. if you want to listen to 50.000 Mhz you have to enter 22.750 Mhz.

## (FRG-9600) Accessing the discriminator output on the FRG-9600



**05-03-1999****(FRG-9600) 900Mhz + UP Selectivity**

WATCH OUT: This step is not as simple as the previous one, You really need a lot of caution and ability with the soldering iron.

We now will retouch a little the local oscillator, in order to able to improve tuning of the frequencies above 900 mhz, for which the receiver was not adjusted in the factory.

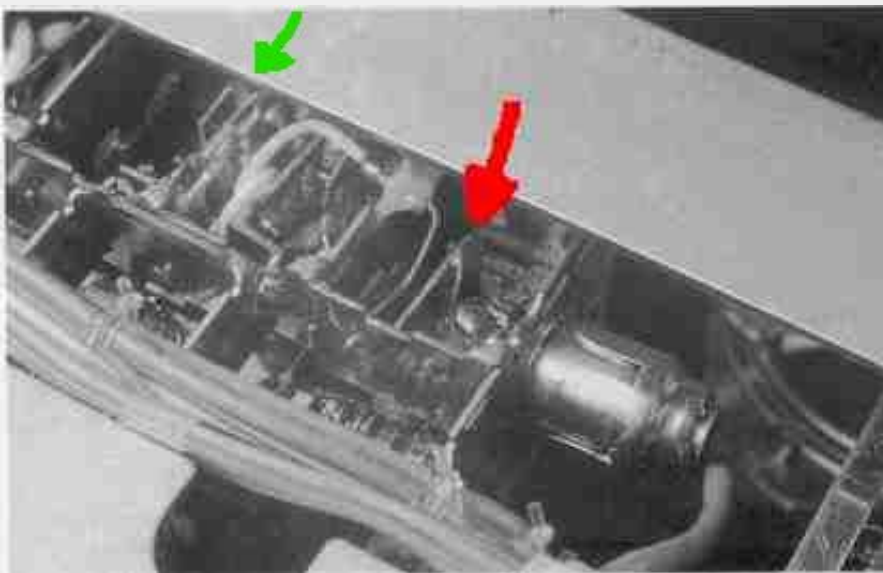
The tuning circuits are inside the metal box next to the antenna plug, manufactured by SHARP.

Inside here there are two oscillators, for the UHF and VHF. We will adjust a link in the UHF circuit, to enable it to work on slightly higher frequencies.

1. Open the lid on the metal box. Inside there's the circuit in the following figure.

2. Tune the FRG on 460 Mhz.

On the PLL unit, below the IC MC 145158, you can see the pin marked TP02. With a digital tester measure the voltage on this TP02, it should be around 1,1-1,5 V. The PLL unit is, among the two high printed circuits, the one closer to our metal box, next to it there's written 'PLL UNIT'.



3. On the figure, next to the red arrow, there's a horizontal copper strip, with another vertical copper strip soldered at its end. These two strips make an angle of 90°.

With a very fine tipped soldering iron melt the soldering which connects these two strips, and bend the vertical strip a bit towards the beginning of the horizontal strip, to shorten a bit this loop.

A fraction of a millimeter (about 0,5 mm) should be enough. Measure again the voltage on TP02, receiver tuned on 460 Mhz. The voltage should be now around 0,6 V. If not, you can still make small adjustments to the copper link. Now, with the FRG tuned on 950 Mhz, you should have a voltage on TP02 of about 30,5 V.

4. Now, let's improve the reception sensibility in this high band.

Connect the digital tester on pin nr. 12 of the IC MC3357, the FM discriminator.

The voltage should vary from about 0,6 V with no signal received, to about 1,2 V with maximum signal, with the squelch unblocked.

Tune the receiver to a frequency around 460 mhz, which has to be busy with some signal. (A repeater output would do fine)

Next to the green arrow in above figure there are some pairs of copper strips, which make some resonating links. With a little NON INDUCTIVE screwdriver adjust these strips a little closer or farther from each other, until you read the maximum value on the tester, always while receiving the same signal.

Repeat this step also on higher frequencies, the corrections on the copper links must be very fine.

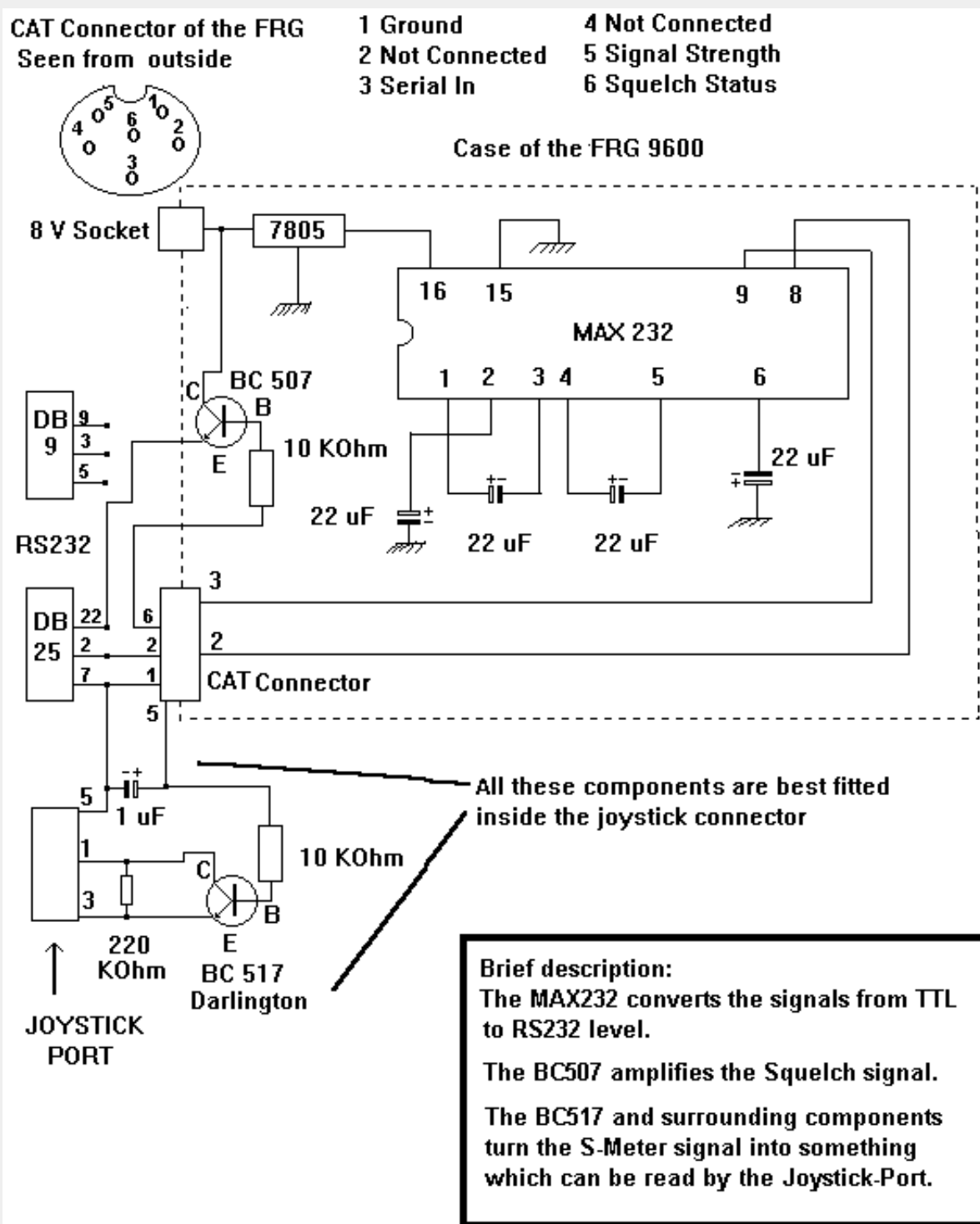
Now the reception on 900 and more mhz should be much better.

This modification is read 1118 times.

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16-12-2000

## (FRG-9600) Computer interface to connect the FRG9600



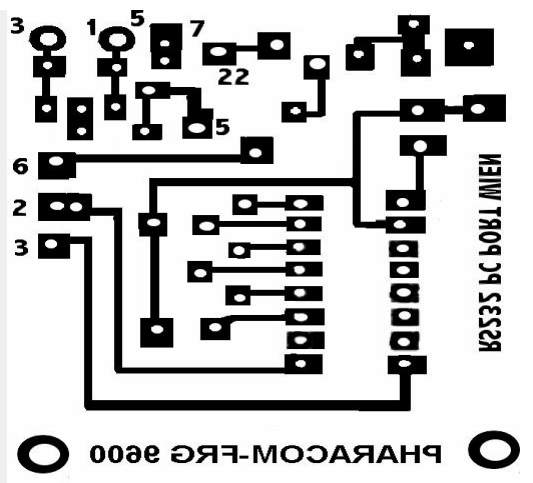
### Some transistor equivalents

BC507 = NPN, 40V 0,2Amp = BC174, BC182, BC190, BC546

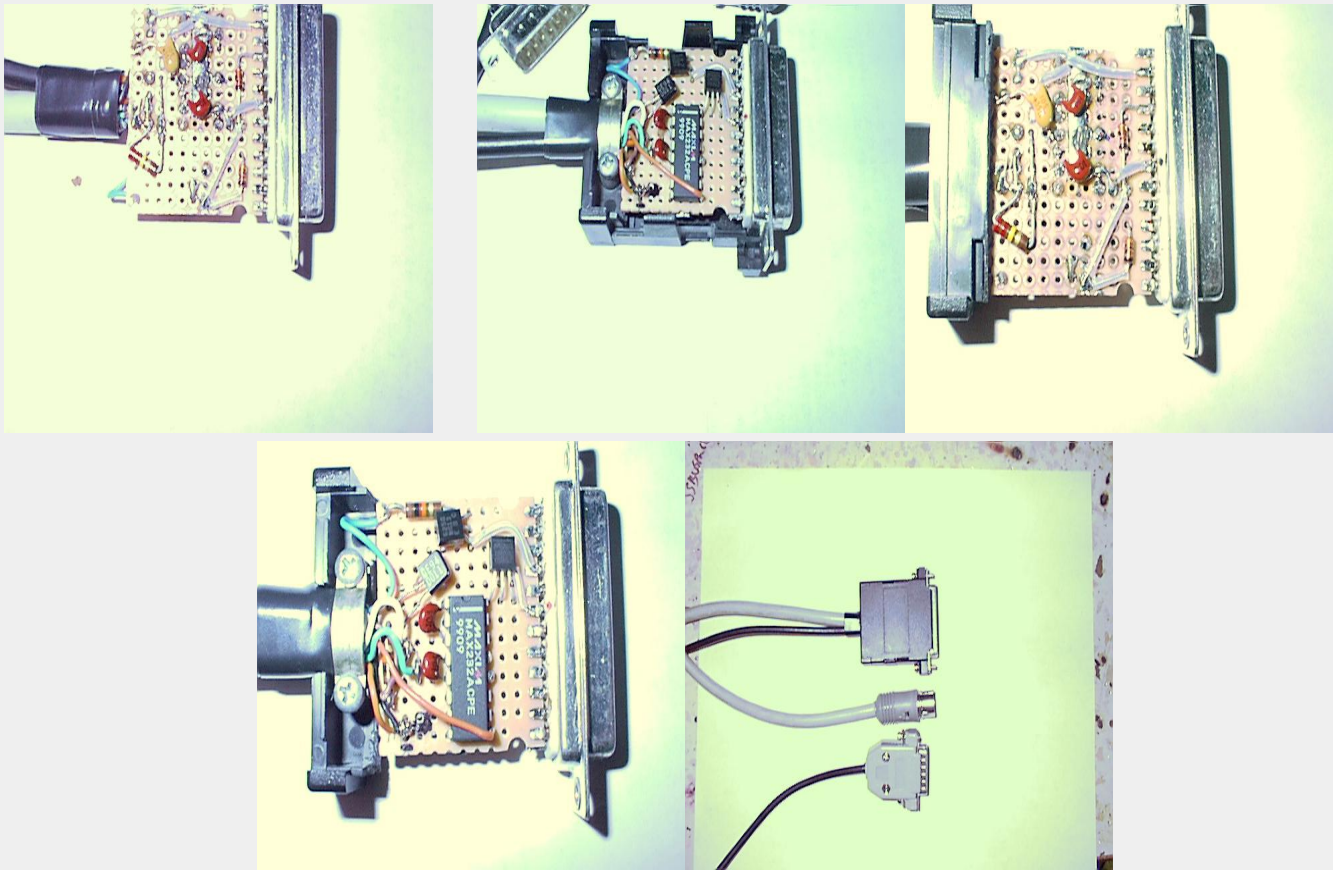
BC517 = NPN Darlington, 40V 0,4Amp = BC875, BC877, 2SC4017

Thanks to Giovanni, HE9LSA, who supplied me with the drawing for a Circuit Board:

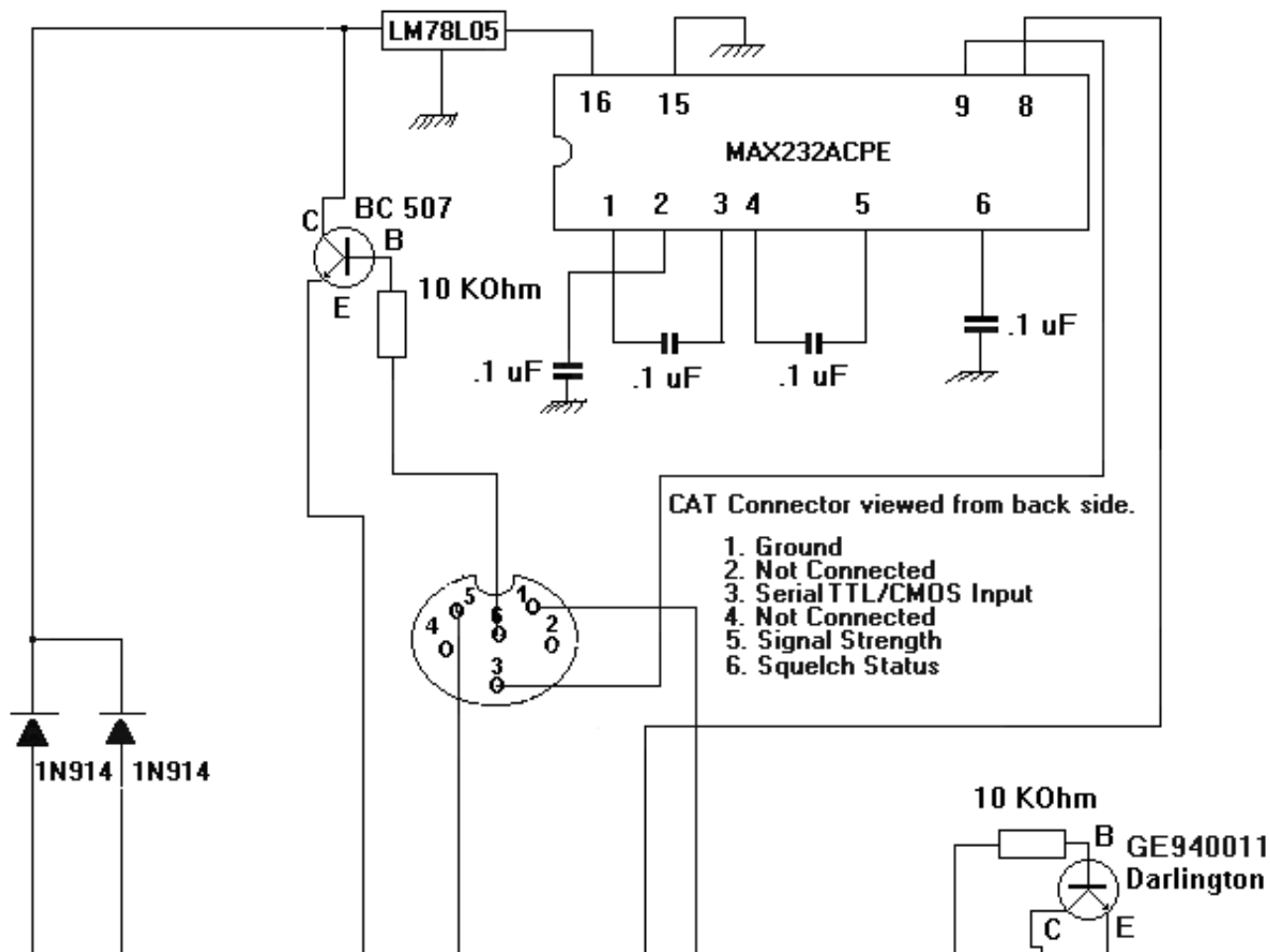


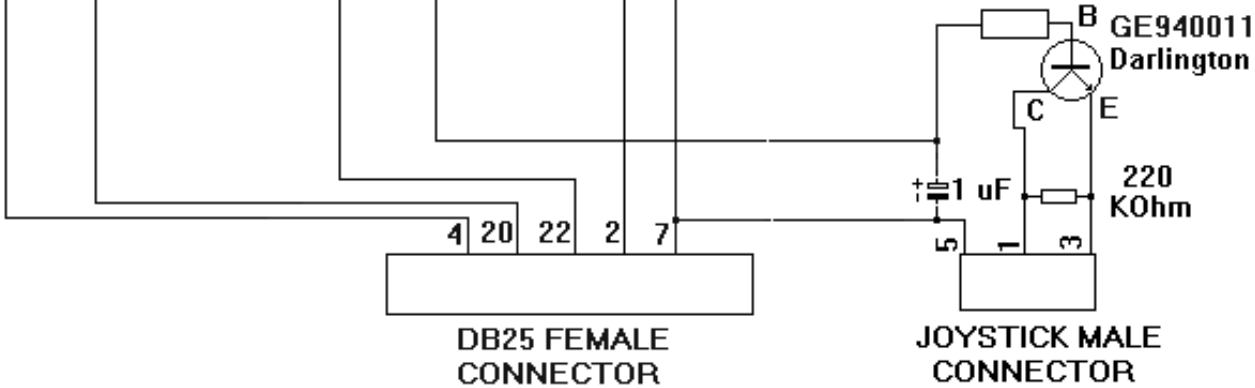


Thanks to Anthony, WB8MLA for the pictures and the modification to the circuit, to make it all fit inside a serial connector:



FRG-9600 self powered, self contained,  
(in a DB25 snap together shell) RS232  
to TTL/CMOS voltage level translator.





**A description for this, by Anthony:**

The chip I used is the MAX232ACPE which is available from DigiKey. The part number is # MAX232ACPE-ND and is about \$4.25 U.S. Their phone number is 1-800-344-4539 With this chip, you use little tiny .1 caps in the exact same place where your 22uF caps were. Also, the .1 caps do not have to be polarized!

I also can tell you that there is another chip, that doesn't require any capacitors at all, and its called the MAX233..(its a little bigger though) I did some minor changes to your circuit, and am happy with the results! I used a GE940011 Darlington (a little more gain) rather than the BC517. But, what I am most happy about is, I was able to fit all the parts into the DB-25 shell, and no power supply necessary! The way I did this was to steal power from the RTS line (pin 4) and the DTR line (pin 20) by soldering the anode ends of two 1N914 to each pin, and then TYING the cathode ends (the cathode end has the band around it) of both together. This gives me double the current (which is usually about 12 volts @ 12 ma or so). From there, I feed the squelch transistors collector (about 12 volts!) and, I also tie the input of the 78L05 regulator here, to get 5 volts out of the other side, which runs the MAX232A very nicely! Also, the MAX232A draws less current!

Even the joystick components are inside the DB-25 shell..

**Do not attempt to do this if you do not feel confident when using soldering equipment.**

This mod is also available at <http://members.tripod.com/~brossi/schema.htm>

This modification is read 1159 times.

[top of page](#)

**16-12-2000**  
**(FRG-9600) Yaesu FRG-9600 Manual, Part 1 of 2**

## Introduction

Providing features that have never been offered before, the FRG-9600 is an all-mode scanning receiver that covers 60 through 905 MHZ continuously and comes complete with 100 keypad-programmable memory channels.

In addition to FM wide (for FM and Television broadcasts), FM narrow (for two-way police, military, business and amateur communications) and AM wide and narrow (for aeronautical and amateur communications), the FRG-9600 also provides SSB (single sideband) reception up to 460 MHZ, allowing reception of amateur and military SSB, as well as the new ACSB mode now being utilized by the military and experimentally as the mode of the future for VHF. The SSB mode also provides for easy reception of CW (radiotelegraph), and a front panel tuning knob is provided to simplify the tuning of SSB, CW and narrow-band AM frequencies.

Seven scanning/tuning rates between 100 Hz and 100 kHz assure quick and efficient tuning and scanning in all modes.

The scanning system allows either full or limited (keypad programmed) band scanning as well as memory channel scanning with auto-resume. In addition to carrier sensing scan stop, audio scan stop sensing is also selectable to avoid stopping on inactive "carrier-only" channels.

Scanning steps are selectable, with the wide steps indicated on the front panel display. Signal strength is indicated by a dual color graphic S-meter on the front display. A 24-hour clock/timer is also included, along with a recorder output (for automatic power on/off switching and recording of transmissions at any time). Additional jacks provide CPU band selection outputs, multiplexed (FM wide) output, AF and RF mute and other control signals for maximum expansion potential with future options or for those who wish to provide their own add-on hardware for special applications. A mobile mounting bracket is also supplied for use in an automobile.

The Yaesu CAT system provides a direct control link to the CPU in the FRG-9600, thus allowing operators of personal computers to add virtually unlimited customized control functions in software (such as multiple, organized memory banks,

automatic tuning and customized scanning systems) using most of any personal computers and a Yaesu FIF CAT interface unit.

For AC operation the FRG-9600 requires one of the optional PA-4 series AC adapters, available from all dealers where the receiver is sold. A television video IF unit may also be installed as an option, allowing reception of television images (NTSC format) with a video monitor connected to the video jack on the rear panel.

Specifications

|                          |                                                                                                                                                        |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency Range          | 60 - 905 MHZ (up to 460 MHZ for SSB)                                                                                                                   |
| Modes, 3dB Bandwidth     | FM Narrow (15 kHz BW)<br>FM Wide (180 kHz BW)<br>AM Narrow (2.4 kHz BW)<br>AM Wide (6 kHz BW)<br>SSB (2.4 kHz BW)                                      |
| Conversion Schemes       | Triple (FM-N, AM, SSB)<br>Double (FM-W)<br>Single (Optional TV Video Unit)                                                                             |
| Intermediate Frequencies | 45.754, 10.7 MHZ and 455 kHz                                                                                                                           |
| Image Rejection          | 60 - 460 MHZ -50dB typical<br>460 - 905 MHZ -40dB typical                                                                                              |
| Typical Sensitivity      | FM-N 0.5uV (for 12dB SINAD)<br>FM-W 1.0uV (for 12dB SINAD)<br>AM-N 1.0uV (for 10dB S+N/N)<br>AM-W 1.5uV (for 10dB S+N/N)<br>SSB 1.0uV (for 15dB S+N/N) |
| Tuning Steps             | FM-N: 5/10/12.5/25 kHz<br>FM-W: 100 kHz<br>AM-N: 100 Hz/1 kHz<br>AM-W: 5/10/12.5/25 kHz                                                                |
| Memory Channels          | 100 Channels                                                                                                                                           |
| Audio Output             | 1W (into 8Ω with less than 10% THD)                                                                                                                    |
| Power Supply Voltage     | 12 - 15 VDC                                                                                                                                            |
| Power Supply Current     | Operating: 550 mA (maximum)<br>Power Off: 100 mA<br>DC Supply Off: 3 uA max (B/U)                                                                      |
| Case Size (WxHxD)        | 180 x 80 x 220 (mm)                                                                                                                                    |
| Weight                   | 2.2 kg (4.9 lbs) without options                                                                                                                       |
| Supplied Accessories     | Whip antenna (0.6m)<br>DC power cord (1.8m)<br>MMB-28 Mobile mounting bracket<br>Wire Stand                                                            |
| Options                  | AC-DC Wall Adapter (PA-4B for 110-120v<br>PA-4C for 220-240 v)<br>Video Unit (NTSC)<br>SP-55 external speaker                                          |

Front panel controls

1. SQL (Squelch)

This control adjusts the sensitivity of the all mode squelch system, which quiets the receiver audio unless a signal is received that is stronger than the threshold level set by this control. If you wish to intercept all the signals (strong and weak), this control should be set fully counter-clockwise. However, for normal FM-N and M reception this control should normally be rotated clockwise just to the point where the received noise disappears (FM) or is reduced (AM, SSB). This control is disabled in the FM-W mode.

2. TONE (outer knob)

This control adjusts the treble and bass response of the audio amplifier in the receiver to allow the most comfortable listening position. Normally it is set to about the center (12 O'clock) position with clockwise rotation decreasing the bass response and counterclockwise having the opposite effect.

**3. VOL (and OFF)**

The inner knob is the main ON/OFF switch and volume control for the receiver. It should be adjusted for a comfortable volume on a signal or noise when the SQL control is set counter-clockwise. Rotate the control fully counterclockwise into the click-stop to switch off the receiver when it is not being used. The clock/timer and memory backup functions will not be affected.

**4. AF SCAN**

This two-position grey push button selects the scan-stop condition. In the undepressed (out) position, the scanner will stop whenever any signal is detected (whether or not it is modulated by voice). When this switch is depressed, the scanner will stop only on those signals that have audio modulation, skipping over unmodulated carriers.

**5. PHONES**

Standard monaural or stereo headphones with either a 2- or 3-contact plug may be connected to this jack. Either arrangement will reproduce the monaural style of audio in both ears. Inserting a plug into this jack disables the internal speaker, or external speaker if connected.

Impedance of the headphones should be 32Ω for best results.

**6. ATT (ATTenuator)**

This two-position grey push button decreases the level of all signals from the antenna to protect the receiver input from overloading by very strong signals. Normally this button is not depressed provided maximum receiver sensitivity.

**7. M CLEAR (Memory Clear)**

Pressing this grey button when receiving a memory channel clears all data from that channel ( a beep will sound) and transfers the frequency and the mode data to the Dial state. That memory will then be vacant (and thus ignored by the scanner) until data is rewritten to it from the Dial state. The button is disabled while receiving frequencies in the Dial state.

**8. Tuning Knob**

This knob allows convenient step-tuning across the band in the Dial state, or through the memories. Tuning steps are determined by the MODE and STEP buttons.

**9. DOWN and UP keys**

If pressed momentarily, these two large metallic keys move the displayed receiving frequency down or up by one tuning step when the receiver is in the Dial state or the next stored memory channel when in the Memory state. If pressed and held for more than a half-second, the scanner will be activated. Press either of these keys again to deactivate the scanner.

**10. Small Metallic Function Keys**

A beep will sound when any function controlled by these keys is activated. If a beep does not sound, or if two beeps sound in quick succession, the function is not activated because that function is not accessible in the current operating state.

STEP selects the frequency steps for tuning and scanning in the Dial state. These are 100Hz or 1kHz for LSB, USB and AM-N operation, and 5, 10, 12.5 or 25kHz for AM-W and FM-N (step size for these latter two modes is shown at the right side of the display). This key is disabled in the FM-W mode and at all times in the Memory state.

MODE selects the receiver detector type and IF bandwidth when receiving in the Dial state. Repeated pressing of this key cycles through the modes as follows:

LSB USB AM-N AM-W FM-N FM-W

The selected mode is displayed just above the frequency. The MODE key is deactivated when receiving on a memory.

PRI (Priority) toggles the automatic priority channel checking function on and off. This function momentarily tests a preselected "priority" memory for activity every three seconds during normal reception on other frequencies. See the "Operation" section for details.

D/M (Dial-to-Memory) transfers the frequency and mode data from Dial to a memory. The memory channel (two digits) must be keyed in beforehand or the data will be stored in the selected memory. Pressing this key does not change the selected state (Dial or Memory); it only transfers the data.

DIAL selects the Dial state (from the Memory state). The frequency and mode last used in the Dial state will be recalled (so the Dial actually serves as a 101st memory). Specific details are provided in the "Operation" section.

MR (Memory Recall) selects reception on a memory (the Memory state) after receiving a frequency in the Dial state. If a two-digit memory channel is keyed in before pressing this key, memory operation will be on that channel; otherwise, operation will be on the memory that was last used (before the Dial state was last entered), unless that memory was cleared. See the "Operation" section.

CLOCK displays the clock/timer status (without affecting reception). The first press of this key activates the clock display and allows setting of the time (by the numeric keypad). Pressing the CLOCK key again activates the Timer On mode, which displays (and allows resetting of) the time at which the receiver will be switched on automatically. Pressing CLOCK again activates the Timer Off mode, which is similar to the Timer On mode. Pressing CLOCK once more activates the Timer On/Off select mode, indicated by display of a single decimal in the center of the display:

TIME ON TIME OFF TIME ". "(ON/OFF)

To escape the clock/timer status and return to frequency display, press DIAL or MR. See the "Operation" section for more details.

M/D (Memory-to-Dial) transfers the frequency and mode data from the memory to the Dial, overwriting previous data in the Dial. The source memory channel digits may be keyed in first, or the last selected memory will be transferred. Operation will always be shifted to the Dial when this key is pressed, and the original memory data will remain intact (in the memory channel). This button is also used in conjunction with the DOWN/UP keys for Limited Band Operation, described later.

**11. CE (ON) (Clear Enter & Timer On)**

The Clear Enter function of this blue key allows cancellation of the numerical digits that have been entered by mistake on the keypad. The Timer On function is used only in the time ON/OFF select mode (when the display shows only a single decimal and "OFF" or "ON OFF"), to toggle the auto-ON timer on and off.

**12. White Keypad Keys (1-9 and 0 [OFF])**

The numeric keys allow entry of frequency, memory channel or clock/timer setting, according to the operating status of the receiver selected by the metallic function buttons. In the timer ON/OFF select mode, the "0" key toggles the auto-OFF timer.

**13. TIMER SET**

This blue key is enabled only in the clock/timer modes to set the clock and the on or off times after keying in the desired time digits on the keypad.

**14. Display**

During regular reception the display shows the relative received signal strength on the 2-color bar-graph indicator at the left, the frequency in the center and the reception mode indicated just above the frequency digits. When receiving in the Memory state, the two-digit memory channel is displayed at the right. PRI or DIAL is indicated between the bar-graph and frequency when these features are activated. OFF or ON/OFF are shown just above the memory channel when these timer features are activated. In the clock/timer modes only time (or ".") is displayed as well as the ON/OFF status when set.

**Rear panel jacks**

**15. 13.8 VDC**

This coaxial jack accepts the DC supply voltage for the receiver (12-15VDC). Current is 550mA when the receiver is on and 100 mA when off. This supply should be connected at all times to retain the clock/timer settings. The optional PA-4B or -4C Wall Adapters can be used to supply the operating voltage from the AC line, however AC voltage must never be connected directed to this jack. See the "Installation" section for further details and important precautions.

**16. 8 VDC**



This RCA jack provides 8VDC ñ10% at up to 200mA for powering external devices. The center contact is positive.

17. REC

This jack provides constant level (approx. 70mV @ 50kê) audio output, which is unaffected by the VOL and TONE controls. Use this jack for tape recording or data decoding purposes where a constant audio level is required.

18. EXT SPKR (External Speaker)

This two-contact mini phone jack is for connection of an external loudspeaker such as the Yaesu SP-55 with an impedance of 4 to 16 ê. When a plug is inserted into this jack the internal speaker is disabled.

19. AF MUTE (Potentiometer)

This control sets the squelch threshold level at which signals will be heard in the FM-W mode only. It should be normally be set so that the noise and signals that are too weak to be heard clearly (without distortion) are muted.

20. MPX (Multiplex)

This two-contact mini phone jack provides output from the FM-W detector (in the FM-W mode) for an external stereo demultiplexer (not available from Yaesu). Level is approximately 400mV (rms) @ 50kê with -6dB ripple between 20Hz and 60kHz.

21. VIDEO

This RCA jack provides baseband video output (approx. 1V p-p) when the optional Video Unit is installed in the receiver. Use this jack for connection to a video monitor.

22. TV AGC (Potentiometer)

This control allows adjustment of the video Automatic Gain Control which provides constant level video output with varying received signal levels when the optional Video Unit is installed.

23. MUTE

This RCA jack allows the receiver to be disabled (in any mode) by shorting the center and outer contacts of the jack. This should be done whenever the FRG-9600 is utilized in conjunction with a transmitter. Do not apply any voltage to this jack.

24. BAND

This four-pin molex jack provides binary band data (on three pins, the other being signal ground) for possible future options. Maximum open circuit voltage that may be applied is 30V.

25. CAT

This six-pin DIN jack provides connections for a microcomputer interface unit (such as the Yaesu FIF series). Pin-out is shown below:

|       |             |
|-------|-------------|
| PIN 1 | Ground      |
| PIN 2 | Serial Out  |
| PIN 3 | Serial In   |
| PIN 4 | PTT Signal  |
| PIN 5 | AGC Signal  |
| PIN 6 | BUSY Signal |

26. ANT

This type M coaxial jack is for connection of the antenna. The supplied telescoping whip antenna may be used for casual listening, however, a proper outdoor antenna should be used for optimum performance. See the "Installation" section for details.

Installation

Proper performance of the FRG-9600 depends on correct installation. Please take a moment to study this section carefully before connecting the receiver to the power source. While the setup procedure for the FRG-9600 is simple, permanent damage to the receiver can occur if improper voltage is applied or if external connections are improperly made.

## **Initial Inspection**

After carefully removing the FRG-9600 from the carton, inspect it for any signs of physical damage. Rotate the knobs and push the buttons, checking each for normal freedom of action. If damage is suspected write down your observations and notify the shipping company (if the set was shipped to you) or your dealer immediately. Save the carton and packing material for possible future use later.

## **Physical Location of the Receiver**

The FRG-9600 can be located just about any place, but there are a few important factors to keep in mind for certain installations. Of course it will be necessary to keep the top panel clear if the internal speaker is to be used, and necessary space for the rear panel connectors and access to the front panel controls should be considered - especially in mobile mounting. Do not locate the FRG-9600 in front of a heater vent or directly above a heat-generating device.

There are two other factors to consider in certain applications: the distance to the antenna feedpoint (when the receiver is used with an external antenna) and the proximity and grounding or shielding of computer equipment (when the FRG-9600 is used in conjunction with same). For optimum reception the receiver should be located as close to the antenna as possible, so that the feedline length is kept to a minimum. However, unless a computer is well shielded for RF noise (a rare case), the antenna may pick up objectionable noise from the computer if they are very close to one another.

Experimentation in several different locations, perhaps with different ground connections, may be necessary to determine the best overall placement of the receiver, antenna and computer.

## **Power Connections**

The FRG-9600 is equipped for operation from 12 to 15 VDC, which may be supplied from the optional PA-4B or PA-4C AC-DC adapter when operating the receiver from the AC mains. The PA-4B is for use with 110-120 VAC only, while the PA-4C is for use with 220-240 VAC only.

The FRG 9600 requires 550mA when the receiver is on and 100mA for clock/timer operation when the receiver is off, so be sure that any battery or DC source that will be used is capable of handling this current. The center pin of the coaxial 13.8 VDC power jack on the receiver must connected to the positive side of the DC source. Make certain that the plug used for this connection has the correct size hole for the center pin of this jack, and that the polarity is not reversed (or the receiver will be damaged). Be certain that the VOL control is set to OFF before connecting the power plug to the rear panel.

## **WARNING**

Never apply AC power to the rear panel power jack of the receiver. Never connect DC voltage of more than 15 volts to the power jack. Make certain that the center contact of the power jack is connected to the positive side of the supply. Failure to observe these precautions will damage the equipment and void the warranty.

The SP-55 External Speaker is an optional accessory for the FRG-9600 allowing the source of audio from the receiver to be repositioned for optimum listening. Especially practical for the noisy environment, the SP-55 includes its own swivel-type mounting bracket and is available from your Yaesu dealer.

## **Mobile Installation**

The FRG-9600 must only be installed in automobiles having a negative ground electrical system. The receiver should be located where the display and controls are easily accessible and should be securely affixed using the supplied MMB-28 mobile mounting bracket. The receiver may be installed in any position without adversely affecting its performance, however it should not be mounted near a heater vent or where it could interfere with the safe operation of the vehicle.

## **Mobile Mounting Procedure**

1. Use the mounting bracket as a template for positioning the mounting holes, after determining the proper location with sufficient clearance for the receiver. Use a 3/16" bit for drilling the holes. Secure the bracket with the screws, washers and nuts supplied.
2. Screw the mounting knobs loosely to the receiver using the supplied flat washers.
3. Align the mounting knobs with the notches in the bracket, and slide the receiver backward and upward into the bracket. Then tighten the knobs to affix the receiver securely.

To remove the receiver from the bracket, first loosen the four knobs and then pull the receiver straight forward, with slight upward pressure at the rear if necessary.

Before connecting the power cable, the maximum battery charging voltage should be checked to ensure that it remains below 15V when the engine is at high speed. If there is more than 15V present the voltage regulator of the automobile should be adjusted before connecting the receiver.

Power connections may be made to the cigarette lighter or other convenient circuit, but if the supply is switch off when the motor ignition switch is off, then the clock will reset to 00:00. Therefore, if clock operation is desired, an unswitched circuit should be used (or direct connection to the battery). In this case, remember that 100mA will be drawn at all times, so that the car battery charge will be depleted if the automobile is to stored for a considerable time. Use good quality insulated stranded copper wire and make certain that POSITIVE (+) is connected to the center contact of the coaxial power plug.

### **Antenna Installation and Connection**

The FRG-9600 is designed to operate only with an antenna connected to the rear panel connector. While the supplied telescoping whip antenna will give fair results on strong local signals on some frequencies if the radio is well located, optimum performance requires a good outdoor antenna located as high and in the clear as possible, with good quality feedline to the receiver.

Only 50 $\Omega$  coaxial cable should be used for the connection and it should be as short as possible while still allowing the antenna to be mounted high above surrounding objects. For general AM and FM scanning and monitoring a vertical ground plane antenna is usually preferred, since it does not need to be rotated to cover all directions. However, in some locations a high gain unidirectional (vertical) Yagi antenna is best if most activity is in one direction from the receiving station, or if a rotator is available and the extra gain required. The best antenna performance will usually be obtained at some sacrifice of frequency coverage (bandwidth) so if optimum performance is to be achieved at all frequencies, several different antennas should be used. SSB, CW and TV modes generally use horizontal polarization, while FM uses vertical polarization. Both of these orientations should be taken into account when choosing and installing the antennas. Contact your local dealer for advice on the best antenna for your needs.

### **MUTE Jack Connection**

The MUTE terminal on the rear panel allows the receiver to be silenced during transmission when the FRG-9600 is used for two-way communication in conjunction with a transmitter or transceiver. Separate antennas, well isolated from each other, must be used to prevent damage to the receiver. Shorting the MUTE terminal contacts will silence the receiver.

### **REC Jack Connection**

Receiver audio is available at high impedance (50k $\Omega$ ) from the REC jack on the rear panel for direct connection to the high-impedance (HI-Z) audio input of a tape recorder. Shielded cable should be used for interconnections to minimize noise pickup that might otherwise interfere with reception. Note that the VOL and TONE controls do not affect the audio at the REC jack.

## **Personal computer interconnection**

The CAT system allows external control of the mode and frequency functions of the FRG-9600 via a variety of brands of personal computers (not available from Yaesu). "CAT" stands for "Computer Aided Transceiver," since this system was originally developed for amateur radio transceivers.

Interconnection between the computer and receiver requires a digital interface unit to convert the parallel 8-bit ASCII data from the computer into 4800 bits/sc serial data at the correct voltage level required by the FRG-9600. Yaesu offers the FIF series CAT interface units for this purpose. Some of these units are for installation on certain brands of computers, however the FIF-232C unit is designed for use with any computer that is equipped with an EIA standard RS-232C serial output port capable of 4800 bits/sec operation. Except for the FIF-232C, all of the Yaesu CAT interface units also include an analog-to-digital converter to allow the computer to measure the relative strength of received signals (for interactive operation between the computer and receiver when so programmed).

The FIF interface units include a DIN plug for connection to the CAT jack on the rear of the FRG-9600 and some means of easy connection to (or installation within) the computer. The FIF-232C also requires connection at the AC line.

Additional details are provided at the end of the "Operation" section of this manual and in the manual supplied with each FIF interface unit.

**NOTE:** While the FRG-9600 was designed to be well shielded against RF interference from computer noise, personal computers are generally not designed to limit the amount of RF noise that they may produce, except within very broad limitations. Some computers may produce enough noise to interfere with reception, particular on lower frequencies. Some computer manufacturers and suppliers offer modifications and outboard noise filters to suppress RF noise, but Yaesu cannot accept responsibility for interference that may be caused by your computer.

However, if such interference is encountered, it can often be minimized or eliminated by the following steps (first tune in the

noise on the receiver and switch the computer off and on to determine that it is the source of interference):

1. Locate the antenna as far as practicable from the receiver and computer, and use only the best coaxial cable feedline available with proper connection to the coaxial jack on the receiver and impedance at the antenna. This usually calls for a self-resonant (and generally narrow-band) antenna.
2. Pay special attention to the chassis grounding of the receiver and computer. In some cases it may be necessary to not connect the earth or receiver chassis ground to the computer chassis. A specially filtered signal ground line for the CAT system is provided in the CAT interface cable. However, there is no fixed rule for grounding to minimize noise so some experimentation may be necessary.
3. Use only good quality shielded cable for all external connections to the receiver and to the computer. Noise can easily be picked up by a device such as an external speaker cable or tape recorder and passed to the receiver. Disconnecting one accessory at a time from the receiver may help to isolate the culprit.

## Operation

Basic operation of the FRG-9600 is quite simple. However, some of the advanced digital functions can be confusing at first if the operator is not familiar with the operation intended by the designers. Please read this section through carefully while trying out each function on the receiver after making sure that the power and antenna connections have been made correctly as described in the previous section.

Rotate the VOL control out of the click-stop to turn on the radio. If it has not been used previously, the display will show "60.000.0" (MHz) in the "FM-N" mode, "% kHz" steps at the left and "DIAL" to the right of the frequency. Otherwise the frequency, mode and status last used (before the radio was last switched off) will be displayed. If you wish to clear all data (frequency, mode and memories) at any time, see the "Memory Backup" reset procedure later in the manual.

### FM Broadcast Reception - the FM-W mode

The wide FM mode is described first mainly because it is generally the most universal in terms of frequency band and channel steps and the simplest to receive. Make sure that the grey ATT and AF SCAN switches (to the left of the main knob) are set to their undepressed (out) positions. Press the MODE button (just to the right of the main Knob) once to verify that the "FM-W" mode is now displayed above the frequency. If not, continue pressing the MODE button while watching for the correct mode display.

Use the white numerical keys to enter the frequency of a local FM broadcasting station (usually this will be between 88 and 108 MHz, but remember that most television stations also transmit their audio on FM-W). Note that if the frequency is below 100 MHz it will be necessary to key in "0" first. For example, if the station is 90.5 MHz, press 0,9,0,5. Each time a digit is entered the next digit to the right will blink indicating that it is to be entered next (if needed - you need only enter the digits you wish to change). If you accidentally press a wrong digit key, just press the orange CE key to clear your entry and start over.

Once the desired frequency is shown on the display (with leading zero if below 100 MHz, press the DIAL button just below the display. The flashing digit will stop flashing, the leading zero (if present) will disappear and the FRG-9600 will now be receiving on the entered frequency. Adjust the VOL control at a comfortable listening level and set the TONE control as desired.

Either the main tuning knob or the DOWN/UP buttons (above the knob) can be used to tune to a different station if desired. Tuning steps will always be 100 kHz in the FM-W mode.

Alternately, the scanning function can be used if the AF MUTE control on the rear panel is set properly:

1. Using a small screwdriver, first set the control fully counterclockwise.
2. Tune to a clear channel (where only noise is heard) and gradually turn the control clockwise just to the point where the noise is silenced.

To activate the scanner press the DOWN or UP button and hold it for a « second. The scanner will skip over vacant channels and stop close to the next lower or higher station (a beep will sound). When the scanner has paused the digits will each blink once from left to right. If you press the DOWN or UP button again, the scanner will be disengaged and you can then use the DOWN/UP buttons or the main knob to tune in the station clearly.

If the DOWN or UP button is not pressed to disengage the scanner it will resume scanning automatically after the rightmost digit has blinked. Note that in this condition the scanner will continue indefinitely in the same direction to the very edge of the receiving range (60 or 905 MHz) and then jump to the other edge and keep scanning. Use Limited Band Operation (mentioned later) to keep the scanner within a certain range.



**Memory Storage, Recall and Memory Scanning**

The FRG-9600 has two "states" of operation: Dial or Memory, selected by the DIAL or MR (Memory Recall) keys respectively. The Dial state, used in the procedures above and indicated by "DIAL" shown just to the left of the frequency on the display, allows selection of frequency, mode and tuning steps with unrestricted knob tuning, scanning or keypad entries anywhere within the range of the receiver. The Memory state, on the other hand, permits instant recall of any frequency and mode previously stored from the Dial state. Operation in the Memory state is indicated by the presence of "CH" and the memory channel number to the right of the frequency displayed. In the Memory state scanning and stepping (with the DOWN/UP buttons) is in blocks of ten memory channels.

The 100 memory channels are numbered from 00 to 99. Note that two digits are always used to describe a channel (i.e. 00, 01, 02 ... 09, 10, 11, etc.), since two digits must be used when entering a memory channel number on the keypad. For scanning purposes, each group of channels with the same tens digit is one block. Thus, 00-09 comprise one block, 10-19 compose another and so on. When keying in memory channels 00 through 09, remember to enter the leading zero.

When a station has been tuned in as desired in the Dial state, just press the two memory channel number digits and then D-m to store the Dial frequency and mode into that memory channel (operation remains in the Dial state).

Example: In the FM-W mode, assume that your favorite FM broadcasting stations are at 90.1, 95.6, 101.5, 103 and 104.5 MHz and that you wish to store them in memory channels 90 through 94. First, in he Dial state, tune in the station at 90.1 MHz using any of the tuning methods described before. Then press the "9" and "0" (white) keys, following immediately with the D-M key (lower right side of the main knob). Next retune the dial to 95.6 MHz and press "9", "1" and D-M. Then retune the dial to the next frequency and press the keys to store channel 92 and so forth for channels 93 and 94.

When finished the receiver will still be in the Dial state. Note that the memory channels (90-94) chosen are all in the "90's". The 80's 40' or even 00"s (00-09) could just as well have been used, but the fact that they are all in the same block will allow convenient channel stepping and scanning of these memories at a later time.

To recall the channels just stored, just press the MR key to enter the Memory state. Notice that "CH 94" appears. Even if the dial had been returned to another frequency and mode, 104.5 MHz, FM-W would be recalled. To recall a memory other than the last one stored, just enter the memory channel digits on the keypad before pressing MR (of course the memory channel keyed in must have been stored at some past time).

End part 1 of 2.

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Now rotate the tuning knob or press the DOWN/UP keys to recall the other channels. If any other memories have been stored previously, they will be recalled when the tuning knob is used in the memory state. When the DOWN/UP keys are used in the Memory state, only the selected blocks of memories will be recalled. When you want to remove memories stored in a particular block previously, press the M CLEAR button. Operation will shift to the Dial state and the memory will be cleared so it will be necessary to either restore data to that memory (from the Dial, press the memory digits and D-M), or recall another (occupied) memory by pressing the memory digits and MR.

Press and hold the DOWN or UP key for « second to scan the memory block. In this case, when more than one block of memories is stored, scanning will cover only the block containing the memory that is selected when the scanner is started. Later, when you have stored memories in different blocks, the tuning knob will allow selection of any of the occupied memories (irrespective of blocks).

There are two possible ways to return to the Dial state from the Memory state: one is shifting the receiving mode and frequency back to those last used in the Dial (just before MR was pressed) and the other overwriting the old Dial data with that of the selected memory. The first method is useful when you want to resume whatever you were doing before going to the memories. In this instance, just press the DIAL button. Use the second method when you want to continue in the same band or mode as the memory but need to tune around the memory frequency )or change the memory slightly). For this example, press the M-D (Memory-to-Dial) button.

**Two-Way Communications Monitoring - The FM-N mode**

To change modes from FM-W to FM-N (narrow), press the MODE button five times when in the Dial state. It is not possible to change modes in the Memory state.



Make sure that the grey ATT and AF SCAN switches are in their undepressed positions. Rotate the SQL control fully counterclockwise and then advance the VOL control to a comfortable level of background noise (or signal). Now turn the SQL control clockwise just to the point where the noise is silenced (Turning it further will reduce sensitivity to weak signals). The setting of the SQL control in this manner eliminates uncomfortable noise that would otherwise be heard when no signal is present on the receiving frequency while still allowing signals to be received.

Narrow FM is now the most commonly used mode for two-way business, military and amateur communications on VHF and UHF in most countries of the world. However, channel spacing (tuning steps), especially on frequencies below 200 MHz, are often different from one area to another. 12.5 and 25 kHz steps are common in Europe with 5 or 10 kHz steps more common elsewhere. Above 200 MHz wider steps (25 kHz or greater) are used so the 25 kHz setting should suffice. For now, unless you know the channel steps that are used in a particular band that you wish to monitor, use the smallest (5 kHz) steps. To select this option, press the STEP button (just below the displayed frequency) while watching the right side of the display for the selected step size indication. Your Yaesu dealer may be able to inform you as to which steps are utilized on certain bands, but in some instances this information may be unavailable in which case you can find out by experimentation using the 5 KHz steps, as mentioned later.

Now tune to a frequency range known to have two-way FM communications: 145 - 146 or 148 MHz, 222 - 225 MHz or 430 - 440 or 440 - 450 MHz for amateur; 68 - 88, 134 - 174 or 400 - 512 MHz for police, commercial business and marine. Mobile telephone also uses narrow FM, usually above 800 MHz. The nature and degree of activity on these bands, as well as their limits, vary widely from one country to another so some exploring may be necessary. Note that two-way communications are distinct from broadcasting in that stations do not normally transmit constantly, so a frequency that is vacant one minute may be crowded with activity the next. The section on Limited Band Operation will describe the most convenient way to monitor the band. The above frequencies are meant only as general guidelines to get started.

Use the tuning knob of DOWN/UP keys to scan around the band until you find a signal. In some countries, constant-carrier repeaters are used. These transmit an unmodulated signal constantly which may open the squelch (a slight hissing may be heard) even when no voice may be present. Often, just listening to the frequency long enough will reveal who the users are. Also, signals in other modes may produce carriers or distorted sounds in FM-N. If this is suspected, try pressing the MODE button to check the other modes. if 12.5 kHz steps are used in your area, tuning in 5 kHz steps will result in some stations being impossible to tune in clearly. In this case just press the STEP button to select the right steps.

One other potential source of strange signals is intermodulation, which is the interaction of very strong signals in the receiver. This can cause signals to appear in the receiver that are really not on the tuned frequency at all. If you find such strong signals (which produce a full or nearly full-scale indication on the signal meter), press the ATT button. In the depressed position this button attenuates signals enough so that weaker signals may often be heard without interference from strong ones.

Scanning is similar to the FM-W mode described previously except that the AF SCAN button may be depressed to prevent the scanner from stopping on stations that have only a carrier (with no audio modulation). The memory functions are identical to those described in the previous section.

### **Airband Communications Monitoring - AM-W and AM-N**

Practically the only AM (Amplitude Modulation) communications on VHF are in the aeronautical mobile band, from 118 to 136 MHz using 100 kHz channel spacing (50 kHz in North America). Set the FRG-9600 to the AM-W mode, 25 kHz (the widest available) steps.

Communications are primarily between airport control towers and aircraft, with the AM wide mode being the best for general monitoring. Each airport generally has certain frequencies assigned to it so the memories can be put to good use - storing the local airport frequencies together in one block of memories. Note that the transmissions are not made constantly so the band should be scanned to find the active frequencies in your area. See the Limited Band Scanning section below.

The SQL control for AM operation is set up in the same manner as for FM-N except that in AM the receiver is not completely quieted when the squelch is closed but only reduced in volume. This allows any weak signals that the scanner may skip to still be heard while reducing noise to a comfortable level. The AM-N mode may provide better reception of weak signals or those having interference from nearby frequencies. However, fidelity will be reduced so the AM-W mode should be used whenever possible. Tuning steps for AM-N are much finer than AM-W so it is generally most convenient to tune in stations first in AM-W before switching to AM-N. The SQL control should be reset as required whenever changing modes.

### **Single-Sideband (SSB) Communication - LSB & USB modes**

SSB has been used for amateur and military communicators for many years because of its greater efficiency, providing greater range with lower power than FM-N and is now being experimented with for business communications at VHF and UHF in the form of ACSB (Amplitude Compandored Sideband). Typical (amateur) frequencies to monitor for SSB activity are

144 - 145 MHz and 430 - 440 MHz. Military SSB frequencies are harder to pinpoint but may be found by scanning, particularly around 136 - 144 MHz in some areas. ACSB has not, as of this writing, been assigned any specific frequencies but experiments are being carried out in the VHF business bands mentioned earlier for FM-N. ACSB signals are distinguishable by a weak, high-pitch "pilot" tone.

SSB signals require very careful fine tuning provided by the fine (0.1 kHz) steps and the tuning knob. When the stepping buttons or scanner is used to locate SSB signals, some fine tuning with the knob will generally be necessary to tune the signal clearly (so the voice sounds normal).

The majority of SSB signals at VHF and UHF are sent in the USB (Upper Sideband) mode and this should be the one normally selected for monitoring. If you find a signal that sounds like SSB but cannot be tuned clearly, switch to LSB and retune slightly.

The SQL control may be set as for FM-N and signals will still be audible at reduced levels when the squelch is closed. However, when tuning around for weak SSB signals it is best to keep the squelch open (SQL fully counterclockwise) since there is no carrier in SSB to keep the squelch open during pauses in speech.

Radio telegraphy (CW) stations may also be monitored with the FRG-9600 using either the USB or LSB modes. Amateur CW signals may be found with and just below the frequencies indicated previously for amateur SSB.

### **Limited Band Operation**

Practical use of the scanner in any mode generally requires that the limits of the scanning range be set to correspond with the particular frequency band of interest. This is easily accomplished with the FRG-9600 for any desired band, using two adjacent memory channels and the Dial. Not only are the scanning limits set, but also the tuning limits of the main dial: the receiver is actually programmed to behave like a limited band receiver.

The following example uses the procedure for the FM broadcast band between 88 and 108 MHz but the same procedure may be used in any other mode or frequency range.

First select the desired mode (FM-W for this example) and tune the Dial to the high band edge (108.7 MHz) using the keypad (press 1,0,8,0,0 and Dial), the UP/DOWN buttons or the main knob. Then store this in any memory channel whose number ends in "1" (Ch 01 for this example) by pressing 1,0 and D-M.

Next tune the dial to the low edge (88 MHz in this example) and store this in the next lower memory channel (Ch 00) by pressing 0,0 and then D-M. Only Chs 00/01, 10/11, 20/21 etc. may be used for limited band scanning.

Now to start limited band scanning, press M-D followed by the DOWN or UP button, holding this button in for « second. If the DOWN button is used to start, the scanner will begin at the high band edge (108 MHz) and scan to the low band edge (88 MHz) before jumping back to the high edge. If the UP button is used to start, scanning will begin at 88 MHz and work up to 108 MHz before jumping back to 88 MHz.

Note that the highest frequency is stored in the higher numbered memory first and that the receiver is operating on the lower numbered memory at the instant the M-D button is pressed. If the highest frequency is stored in the lower numbered channel, the limited scan feature will still operate and the UP/DOWN buttons will correspond with the direction of frequency change but it may be more difficult for you to remember. However, scanning will always be between the memory number selected when the M-D key is pressed and the next higher-numbered memory so if the scanner does not loop within the desired range, you may have started it with the wrong memory. If nothing is stored in the next higher memory, the scanner will not be limited.

To deactivate limited scanning press the DOWN or UP button momentarily. Operation will be in the Dial state but all tuning with the main knob or scanning with the DOWN/UP buttons will be limited to the present band.

To escape from limited band operation use the keypad to enter another (occupied) memory channel followed by the MR button. Otherwise, simply enter another frequency and press DIAL.

Once the desired band limits are stored properly in the memories, limited band operation between those memories may be restarted at any time thereafter without the necessity of leaving the Dial state just by pressing M-D and the DOWN or UP buttons.

### **Priority Channel Monitoring**

This feature allows periodic checking of one frequency for activity while tuning around or listening on another frequency or mode. When a signal appears on the priority channel reception will automatically shift to that frequency. Priority monitoring is especially useful when waiting for emergency police or fire calls while listening to other stations.

Priority monitoring can be activated in either the Dial or Memory state, but will remain active only while receiving in the state.

Before activating the priority function, tune the Dial or select the memory channel for the desired frequency (and mode) and set the SQL so that the noise is just silenced. Press the PRI button so that the "PRI" will appear to the left of the frequency display (with "DIAL" if in the Dial mode) indicating the priority function is now active.

Frequency and mode may now be changed as normal, as long as the state (Dial or Memory) is not changed. If receiving on the Dial, all buttons and controls can be utilized except the MR button (which will cancel priority operation and shift reception to memory). If in the Memory state, the tuning knob, DOWN/UP buttons and the D-M button may be utilized normally; the other buttons will be inactive or will cancel the priority checking. The receiver will jump to the priority frequency (and mode) every few seconds to check for activity. When a signal appears on the priority channel strong enough to open the squelch, the receiver will jump to the priority channel and remain there.

Limited band operation may be combined with the priority function by first setting up limited band operation as described earlier and then setting the priority channel on the Dial (it can be recalled from a memory with M-D, if desired). Once the priority channel is set in the Dial, press MR and use the main Knob to select the (prestored) memory on which to start limited band operation. Then press Dial and PRI to start priority checking, followed by M-D and DOWN or UP to start limited band operation.

The priority function is inactive while frequency scanning is activated but will resume when scanning is stopped manually.

Priority monitoring may be canceled by pressing the PRI button again but this will set the receiver to the priority channel. If this is not desired, use the DIAL and MR buttons to momentarily change state, canceling priority checking but saving the current receiving frequency.

## **Clock/Timer Operations**

The clock/timer functions are displayed by pressing the CLOCK button which will then cycle through the different functions as described in the "Front Panel Controls" section. Reception will not be affected, although the tuning controls will be disabled. Press the DIAL or MR buttons at any time to cancel the clock/timer display and return to the regular frequency display.

1. Press the CLOCK button once to display the clock time. This is in 24-hour format, so add 12 hours after noon. To reset the clock, key in two hours digits (with leading zero if before 10 AM) and two minutes digits (again including zeros if needed). Then press the blue TIME SET button at the exact minute.

The automatic power on/off timer in the FRG-9600 requires that the power switch be on (VOL control clockwise out of the click-stop) at all times when the timer is activated. Therefore, the OFF timer must be set to allow the timer to switch the receiver off and only then can the ON timer be used (to switch the receiver back on automatically within the next 24 hours). If the power is manually switched off by the VOL control, the OFF time will be deactivated (at least for the next 24 hours) and thus so also the ON timer. See the example below after studying the next steps.

2. Press the CLOCK button again to display the timer ON time ("ON" will blink on the display). This may be set in the same manner as the regular clock as described in (1). However, the ON timer will have no function unless the OFF timer (3) is also set.
3. Press the CLOCK button again to display the timer OFF time ("OFF" will appear blinking). This is also set in the same manner as above and must be set if the automatic timer is to be utilized.
4. Press the CLOCK button again to display the timer status (either OFF, OFF/ON or inactive). If the timer is not activated, only a decimal point will be displayed. After the ON and OFF timers have been set in steps (2) and (3), they may be activated while the timer status is displayed:

OFF Timer Only - Press (white) 0 off key. "OFF" will appear (non-blinking) on the display whenever the receiver is turned on and the receiver will turn off at the time set in (3).

OFF/ON Timer(s) - Press the 0 OFF key and then the CE ON key. "ON OFF" will appear (non-blinking) whenever the receiver is on and the receiver will turn off at the time set in (3) and back on at the time set in (2).

Use the following exercise as an example of timer operation. Assume your local time is now 7 PM and you're listening to the 10 minute VHF marine weather forecast on 162 MHZ (in a memory channel and shown on the display) which you would like to listen to every evening at this time.

Press CLOCK and check that the time display shows 19.00 (indicating 7 PM). If not, press "1", "9", "0" and "0" and then the TIME SET button. Press the CLOCK button again and check that "ON" is blinking at the upper right side of the display. Press the same five keys as in the previous step to set the ON timer to 8 PM also. Press CLOCK again and check that "OFF" is now

blinking. Press "1", "9", "1" and "0" and the TIME SET button to set the OFF timer at 7:10 ON. Press CLOCK once more to enter the timer status mode and press "OFF" to activate the OFF timer, and "CE ON" to activate the ON timer (OFF and ON should now appear).

Press MR to return to the receiver frequency display (or press CLOCK again to return to the local clock display). When the forecast finishes at 7:10 PM, the FRG-9600 will shut off. If you do not turn the VOL control off, the receiver will automatically switch back on at 7 PM the next evening (and every evening thereafter).

If you turn the receiver off manually at any time, the timer will be deactivated (though all settings will be retained in memory as long as the DC supply is not interrupted). However, you can turn the receiver on manually after turning it off and the timer will resume its activity at the OFF time (7:10 PM in this example).

Perhaps it should be called an "OFF/ON" timer, but once accustomed to its behavior you should have no trouble making use of the timer for preset monitoring times.

**Note:** If the DC supply is interrupted for more than about 10 seconds, all clock/timer settings will be reset to zero/off.

## Remote computer control

The CAT (Computer-Aided Transceiver) System was originally developed for external control of Amateur Transceivers by external personal computers. The simplified but powerful version of this system in the FRG-9600 offers vast potential for expanding the present functions of the receiver and adding new functions as may be desired for specialized reception techniques that are not possible with the receiver alone.

Physically, the CAT System is a serial data input port to the microprocessor in the FRG-9600 which will accept commands from an external computer via pin 3 of the CAT jack on the rear panel (pin 1 is ground). This control data must be sent in groups of five bytes, two stop bits and no parity at 4800 bits/sec. Within the groups of five bytes, each byte must be sent within 200ms of the last. Since most computers are not equipped with an output port that provides this format, Yaesu offers the FIF-series CAT Interface Units, the appropriate one of which should be installed between the computer and the receiver.

The CAT jack on the FRG-9600 also provides a sample of the AGC (S-meter) voltage at pin 5 and of the SCAN STOP (SCANNING=0v) status at pin 6. The AGC voltage can be converted into a digital pulse and used to inform the computer of the received signal level, either via the analog-to-digital converter in certain of the FIF-Units or by an external A-to-D converter, either outboard or located in the computer. The SCAN STOP status can be passed to the computer via a TTL-level digital input port. While neither of these connections is necessary for external control, they do provide a means by which the operating conditions of the receiver can be fed back to the computer allowing interactive ("intelligent") control by the external computer.

### External Control Programming

There are just two types of commands used to control the FRG-9600: Frequency Set and Mode Set. While this makes programming very simple, the tremendous flexibility that these offer when wisely applied in a creative program should be borne in mind. The CAT Command Chart shows the format of these commands. Note that the bytes are actually sent from left to right, chronologically on the serial data line so that the Instruction byte is always sent first. For clarity, all bytes (8-bit values) are depicted in their hexadecimal (base 16) forms with this indicated by an "H" appended to the last two digits.

### Frequency Set Command

This command has an Instruction byte (1) of the value 0AH and has just one function: To change the receiving frequency to that encoded in bytes 2 - 5 of the command. The encoded byte values appear on the data line as they appear on the frequency display, with the largest frequency increments (hundred's and ten's of MHZ digits) in byte 2 sent first, and the smallest frequency increments (least significant digits, hundred's of Hz) in byte 5, sent last.

All of the frequency data bytes (2 - 5) are encoded with the total byte value (both digits) which is simply the hex number with the same two digits as the corresponding two decimal digits of the frequency. Byte 2 represents the hundred's and ten's (MHZ) decimal digits of the frequency, byte 3 the one's of MHZ and hundred's of kHz and byte 4 the ten's and one's kHz.

However, in byte 5, only the leftmost hex digit (high nibble) is used - for hundred's of Hz. The rightmost digit value is ignored, so use zero.

Note that the decimally converted hex value of each byte is not the same as the encoded value. For example, if byte 2 is 12H (hexadecimal), this represents a frequency of 120 MHZ, while the decimal conversion of 12H is actually  $1 \times 16 + 2 \times 1$  or 18 decimal. Make sure this point is clear before attempting to write a program.

Let's use this example to further illustrate this coding. To convert 65.4321 MHZ into the proper byte code for sending to the receiver, try this:



1. The 100's of MHZ is zero and the 10's of MHZ is 6, so byte 2 is 06H. If you are setting a frequency below 100 MHZ, don't forget to include the zero in the high nibble.
2. The 1's of MHZ and 100's of Hz digits are 5 and 4, so byte 3 is 54H (which is actually 5 X 16 + 4 or 84 decimal. Don't forget the encoding).
3. The 10's and 1's of Hz digits are 3 and 2 respectively, so byte 4 is just 32H (50 decimal).
4. Since the 100's of Hz digit is 1, byte 5 should be 10H (16 decimal) although any number between 10H and 19H would produce the same result, keeping the low nibble zero should make programming easier to understand.

Since byte 1 is sent first, the command to send to set the FRG-9600 to 65.4321 MHZ is, from right to left in the order of sending:

0AH 06H 54H 32H 10H

Notice that the alphabetic digits of base 16 numbers "A" through "F" are never used in bytes 2 - 5 of frequency commands. Also, since the values of bytes 2 through 5 are only relevant to the frequency set command, they can be left unchanged (as "dummy" values) when sending mode commands. This can be used to advantage in programming.

### Mode Set Command

This command has six types, one for each mode. Only Instruction Byte 1 is significant (although four more bytes must be sent as dummies - their values are irrelevant). The Instruction Byte must be 10H (16 decimal) for LSB, 11H (17 decimal) for USB, 14H (20 decimal) for AM-N, 15H (21 decimal) for AM-W, 16H (22 decimal) for FM-N and 17H (23 decimal) for FM-W. Again, the values of bytes 2 - 5 do not matter, but they must still be sent for the command to be recognized.

CAT control programs can be written in most any computer language, as long as the time between sending bytes does not exceed the m limit. In most cases the BASIC language will suffice. While it is not possible to give enough examples to cover all of the different dialects of BASIC, the following are a few possible ways using general BASIC statements to send commands to the FRG-9600. They will need to be modified for different brands of computers.

The first example illustrates use of the BASIC "OUT" command for single byte "port poking." This technique requires that the hardware interface include a port address decoder and parallel-to-serial converter that has been preset for 4800 bits/sec:

```
REM  PTADDR = PORT ADDRESS OF SERIAL OUT

OUT(PTADDR), &H0A:
OUT(PTADDR), &H06:
OUT(PTADDR), &H54:
OUT(PTADDR), &H32:
OUT(PTADDR), &H10:
```

Note that "&H" in the above example signifies for that BASIC statement that the following digits are a hexadecimal byte. In computers that do not have a hex number handling capability, the hex code must first be translated into decimal, in which case &H0A would be replaced with 10 (decimal), &H54 with 84 (decimal), &H32 with 50 (decimal) and &H10 with 16 (decimal). In either case the result of the command would be the same: To set the FRG-9600 to 65.4321 MHZ.

Another way to send the same command, when using a computer that is equipped with an RS-232C serial port and the FIF-232C CAT Interface Unit, is shown below (this example is for the Radio Shack Model 100, NEC PC-8201 or Olivetti M-10 portable computers):

```
10  OPEN "COM:7N82NN" FOR OUTPUT AS#1
20  PRINT#1,CHR$(10)+CHR$(6)+CHR$(84)+CHR$(50)+CHR$(16)
30  CLOSE#1
```

The result would be the same as in the previous example: Set the FRG-9600 to 65.4321 MHZ. However, in this case the decimal equivalents of the properly selected hex digits have been substituted in the arguments. Note that this conversion is only necessary if the computer cannot accept hex arguments in the CHR\$ command. If the conversion is necessary, make an array with the subscripts equal to the hex bytes and the contents equal to the associated decimal byte.

If the FRG-9600 is actively scanning frequencies via the internal scanner when the command is sent, it may be ignored. Internal scanning should be halted before external commands are sent (of course, this does not affect scanning by your CAT program).

Using only the main CAT serial input command line you should have no trouble with simple programs, such as incorporating your own memory banks and blocks, referencing the frequencies to station call-signs and automatically selecting the most



popularly used mode for frequency range in your area.

When the S-meter and scan stop status lines in the CAT system are also used in programming, the external computer has some indication from the FRG-9600 of the results of commands it has issued: Especially, whether or not a signal is present on the frequency and how strong it is. This information can be used for programming just about any type of automatic scanning system, limited only by the imagination of the programmer.

|          |     |     |     |     |     |                 |
|----------|-----|-----|-----|-----|-----|-----------------|
| Byte No  | 1   | 2   | 3   | 4   | 5   | Function        |
| Freq Set | 0AH | NNH | NNH | NNH | NNH | See below       |
| LSB      | 10H | X   | X   | X   | X   | Lower Side-Band |
| USB      | 11H | X   | X   | X   | X   | Upper Side-Band |
| AM-N     | 14H | X   | X   | X   | X   | AM Narrow       |
| AM-W     | 15H | X   | X   | X   | X   | AM Wide         |
| FM-N     | 16H | X   | X   | X   | X   | FM Narrow       |
| FM-W     | 17H | X   | X   | X   | X   | FM Wide         |

Notes:

1. Instruction Byte sent first: determines nature of command.
2. "NNH" values are hexadecimal codes for frequency data, explained in the text.
3. 3. "X" signifies "dummy" byte: Values are unimportant but must be sent to fill command to 5 byte format.

Memory Backup Information

Mode and frequency data is stored in the FRG-9600 by a lithium backup battery which has an estimated lifetime of at least five years. During that time if it is necessary or desirable to clear all of the stored data, use the following procedure:

1. Rotate the VOL control fully counterclockwise to switch off the receiver. Remove the power plug from the 13,8 VDC jack on the rear panel.
2. Remove the two screws on either side of the top cover and carefully remove the cover by lifting the back edge slightly while sliding the cover toward the rear. It is necessary to slide the cover back about 1 cm to disengage the internal spring clips before pulling the cover away (gradually, to avoid straining the speaker wires).
3. Locate the miniature (backup on/off) slide switch just behind the top right-hand corner of he front panel and set this switch to the right. Wait about 30 seconds and then return the switch to the left (if you desire to continue the memory operation).
4. Replace the top cover by first sliding it from the back to the front so that the two mounting clips on the inside of the cover catch on the internal frame and then replace the four screws. Reconnect the DC power.

If the memory backup feature begins to fail, see you authorized Yaesu dealer for installation of a replacement backup battery.

FIF-232C CAT system interface

Description

The FIF-232C is a TTL-to-RS-232C level adapter which allows external control of Yaesu CAT System transceivers and receivers by a personal computer. The FIF-232C converts between the 0/+5 volts at the CAT jack of the radio and the +15/-15 volts used by IEEE-standard RS-232C serial ports commonly used on personal computers. An opto-isolator in each data line of the FIF-232C enhances immunity to noise.

Software is not provided with the FIF-232C, but programming information is provided in the CAT System chapter of this manual.

This unit contains the following:

|                                                                                         |              |
|-----------------------------------------------------------------------------------------|--------------|
| FIF-232C Interface Unit                                                                 | P/N D3000307 |
| Radio-to-FIF Control Cables                                                             | P/N T9204640 |
| Standard 6-pin DIN plug for FT-980, -747GX, -767GX, -736, -990, -1000, FRG-8800 & -9600 |              |
| Spare Fuse (0.5A)                                                                       | P/N Q0000001 |

Interconnections

Before connecting the FIF-232C, make sure the power switches on the radio and the computer are both off. Do not connect the AC power cord of the FIF-232C to the wall outlet until after all connections have been made.

Connect the appropriate supplied connection cable between the radio and the FIF-232C, and connect your RS-232C cable between the FIF-232C and your computer. The RS-232C cable for connection to the computer is not supplied with this kit, and must be obtained separately (see your computer dealer).

After all connections have been made, switch on the radio first, followed by the computer and finally connect the FIF-232C to the wall outlet and switch it on. Your external control program may now be loaded into the computer.

Polarity Selection & External AGC/PTT Connections

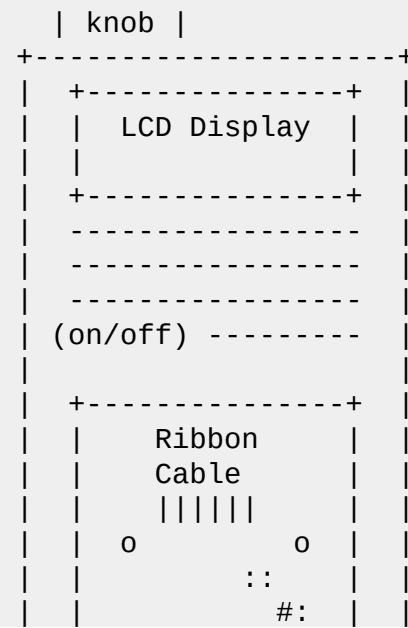
The FIF-232C is set at the factory to provide output signals in the opposite polarity from the input signals. Should your computer require that the interface output and input signals be the same polarity, you can reconfigure the FIF-232C by a small internal slide switch on the pc board. When this switch is set to position 1 (nearest the power transformer), polarity is inverted. Simply move this switch to position 2 to set the input and output polarities the same.

The CAT System uses only the TXD and RXD lines of the RS-232C bus for data transfer. However, the small jack on the side of the FIF-232C provides access to the AGC and PTT signals lines of some radios, for external A/D conversion of the receiver AGC and transmitter control. Most radios have A/D conversation and CAT PTT control built in and accessible through CAT commands, so these lines are not needed for all models.

End part 2 of 2.

22-08-1998  
(FT-10) Yaesu FT-10 Extended Transmit Mod for 140-174MHz use

- 1. Remove antenna and battery.
- 2. Locate the Ni-Cd battery sticker on the back of the radio chassis. Pry up the corner of the sticker and peel it off carefully.
- 3. Remove the two screws located under the sticker. These retain the keypad.
- 4. Slowly lift off the keypad. Use care not to dislodge the gasket.
- 5. Locate and unsolder the 0 ohm chip resistor at location "M" (see diagram below).
- 6. Re-install keypad with two screws. Be sure gasket is properly seated.
- 7. Replace the Ni-Cd sticker if desired. Reattach battery and antenna.
- 8. Press down and hold the Top-Notch and Lamp button while turning the radio on.



| +-----+ |  
+-----+

# = Location "M", chip resistor to remove

If memory serves me, the board actually has an "M" near the correct resistor.

23-04-2000

(FT-10) VFO access blocking mod

**Author:** Bryce P Rumery - [k1gax@juno.com](mailto:k1gax@juno.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This mod applies to either the FT-10 or FT-50.

Once programmed the radio can be set to block out access to VFO and frequency display. Only memory channel names will be displayed. User can not switch to a frequency not programmed into memory.

With radio off press & hold LAMP & PTT simultaneously and power radio on.  
To switch radio back into VFO available mode repeat the process.

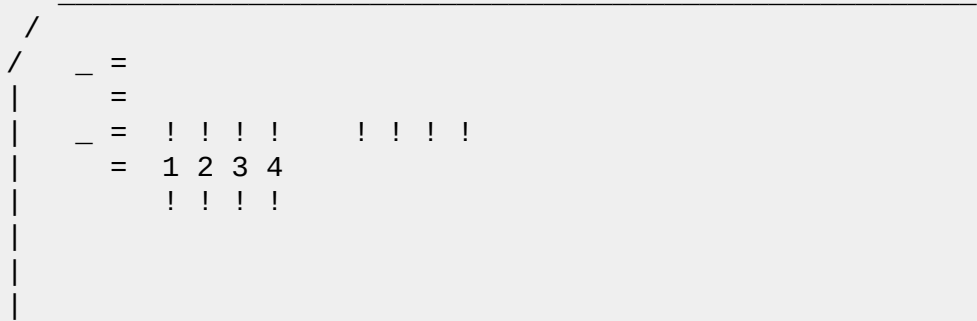
73, Bryce, K1GAX

02-05-1999

(FT-100) Transmit coverage for FT-100

Be careful not to transmit outside the Amateur Bands.  
RX: 30KHz-824MHz, 849MHz-859MHz, 894MHz-961MHz.  
TX: 1.8MHz-30MHz, 50MHz-54MHz, 140MHz-174MHz, 420MHz-470MHz.

1. Remove Front Panel from radio and open the rear cover from the Front Panel unit. Be careful, a cable connects them together.
2. Locate and remove R6035 (1) and R6036 (2) on the display board.  
**Note:** The factory removed R6035 on my radio so I only had to remove R6036. You should end up like the picture below.



Back of front panel. Top left corner.Remove jumpers 1 & 2, leave 3 & 4.



3. Reassemble and install the Front Panel on the radio.
4. Press and hold [DWN] and [STEP] keys; while holding them in, press and hold in the [PWR] switch for 1/2 second to turn the transceiver On. Now let go of all keys.  
The display will read "r on" for a 1/2 second or less (it may be so quick that you don't see it but continue with the mod).
5. Set the dial frequency to 375.72727MHz and turn the power off.  
**Note:** You may need to use LSB, USB, or CW to get the last digit.
6. Press and hold [DWN] and [STEP] keys; while holding them in, press and hold in the [PWR] switch for 1/2 second to turn the transceiver On. Now let go of all keys.  
The display will read "HF on" for a 1/2 second or less (it may be so quick that you don't see it but continue with the mod).
7. Set the dial frequency to 549.61163MHz and turn the power off.
8. Press and hold [DWN] and [STEP] keys; while holding them in, press and hold in the [PWR] switch for 1/2 second to turn the transceiver On. Now let go of all keys.  
The display will read "vU on" for a 1/2 second or less (it may be so quick that you don't see it but continue with the mod).
9. The modification is complete. Turn the radio off and back on to continue.

**Date:** 10-03-2000

**User comment**

**From:** [Thomas from Germany](#)

**Subject:** Tip

Note if the 2 SMD diodes not are present, then you should begin with step 4.

02-05-1999

(FT-100) Second set of menu fuctions

Their is a second set of menu functions F01 to F59.  
**WARNING:** changing these will reset all the memories.  
I want to warn you do not change these values unless you are sure of what you are doing.

To get them turn transceiver off. Press and hold the A,B,C keys; while holding them in, press and hold in the [PWR] switch for 1/2 second to turn the transceiver On. Now let go of all keys. Then press and hold func key for 1/2 second to get to the menu and then rotate the select knob to get to a second menu (F01 to F59) it's after #66 or before #01.  
When you turn the rig off and back on it returns to normal menu.

Here is a list of the 59 second menu functions.

| Function |       |      |       | Setting in my radio |
|----------|-------|------|-------|---------------------|
| F01      | 144   | RF   | GAIN  | 166                 |
| F02      | 430   | RF   | GAIN  | 166                 |
| F03      | HF    | RX   | IF G  | 098                 |
| F04      | 50    | RX   | IF G  | 112                 |
| F05      | 144   | RX   | IF G  | 108                 |
| F06      | 430   | RX   | IF G  | 082                 |
| F07      | S     | FULL | SCALE | 144                 |
| F08      | SSB   | SQL  |       | 033                 |
| F09      | FM    | N    | SQL   | 088                 |
| F10      | FM    | RF   | SQL   | 056                 |
| F11      | HF    | IC   | ALC   | 023                 |
| F12      | V/UHF | IC   | ALC   | 022                 |
| F13      | HF    | PO   | 10W   | 026                 |
| F14      | HF    | PO   | 50W   | 083                 |
| F15      | HF    | PO   | 100W  | 123                 |
| F16      | 50    | PO   | 10W   | 025                 |
| F17      | 50    | PO   | 20W   | 045                 |
| F18      | 50    | PO   | 50W   | 083                 |

|     |         |       |       |                                                    |            |
|-----|---------|-------|-------|----------------------------------------------------|------------|
| F19 | 50      | P0    | 100W  | 123                                                |            |
| F20 | 70      | P0    | 10W   | 063                                                | <<< 70 MHz |
| F21 | 144     | P0    | 20W   | 065                                                |            |
| F22 | 144     | P0    | 50W   | 120                                                |            |
| F23 | 430     | P0    | 20W   | 139                                                |            |
| F24 | 1.8     | TX    | IF G  | 076                                                |            |
| F25 | 3.5     | TX    | IF G  | 069                                                |            |
| F26 | 7       | TX    | IF G  | 063                                                |            |
| F27 | 10      | TX    | IF G  | 063                                                |            |
| F28 | 14      | TX    | IF G  | 067                                                |            |
| F29 | 18      | TX    | IF G  | 071                                                |            |
| F30 | 21      | TX    | IF G  | 072                                                |            |
| F31 | 24      | TX    | IF G  | 072                                                |            |
| F32 | 28      | TX    | IF G  | 075                                                |            |
| F33 | 50      | TX    | IF G  | 104                                                |            |
| F34 | 70      | TX    | IF G  | 127                                                |            |
| F35 | 144     | TX    | IF G  | 097                                                |            |
| F36 | 430     | TX    | IF G  | 093                                                |            |
| F37 | ALC     | METER |       | 196                                                |            |
| F38 | HF      | P0    | METER | 170                                                |            |
| F39 | 50      | P0    | METER | 172                                                |            |
| F40 | 144     | P0    | METER | 105                                                |            |
| F41 | 430     | P0    | METER | 063                                                |            |
| F42 | HF      | REV   | ALC   | 034                                                |            |
| F43 | 50      | REV   | ALC   | 034                                                |            |
| F44 | 70      | REV   | ALC   | 127                                                | <<< 70 MHz |
| F45 | 144     | REV   | ALC   | 173                                                |            |
| F46 | 430     | REV   | ALC   | 060                                                |            |
| F47 | SWR     | METER |       | 141                                                |            |
| F48 | OVER    | HEAT  | 1     | 230                                                |            |
| F49 | OVER    | HEAT  | 2     | 235                                                |            |
| F50 | CW      | CAR   | LEVEL | 166                                                |            |
| F51 | AM      | CAR   | LEVEL | 113                                                |            |
| F52 | FM      | TX    | FREQ  | -32.470                                            |            |
| F53 | TRX     | LSB   | CAR   | 0.110                                              |            |
| F54 | TRX     | USB   | CAR   | -0.010                                             |            |
| F55 | blank   |       |       |                                                    |            |
| F56 | blank   |       |       |                                                    |            |
| F57 | DESTINA | HF    | USA   | < JPN, JAIA, STD, EU, FRAN, BEL, GER, USA, AUS, UT |            |
| F58 | DESTINA | V/U   | USA   | < JPN, USA, EU1, EU2, EU3, EU4, AUS                |            |
| F59 | blank   |       |       |                                                    |            |

OOPS! When I looked at the F57 and F58 choices on my radio and set them back to USA the radio initialized and I had to reprogram the memories. The TX mod was still ok.

Date: 30-11-2001

User comment

From: [john, N1GMV](#)

Subject: Extra info

You must put the radio in VFO mode before you turn it off to start the initiation sequence of holing down the buttons while turning it on.

04-02-2001

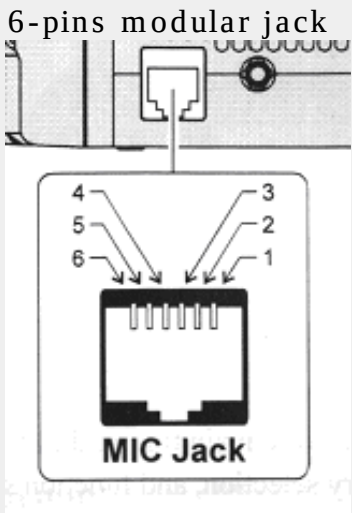
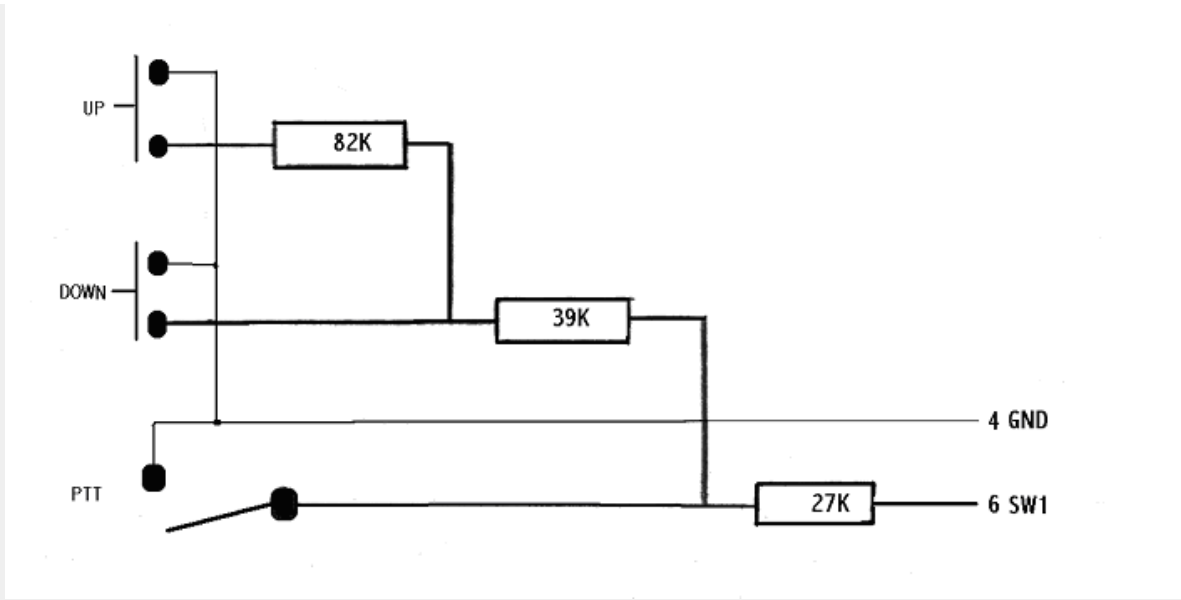
(FT-100) Connect other microphone to Yaesu FT-100

Author: Björn Karlsson - [bjorn.dunder.karlsson@mail.bip.net](mailto:bjorn.dunder.karlsson@mail.bip.net).[MODIFICATION.NET](#)

Here´s a description on how connect UP/DOWN and PTT to Yaesu FT-100.

Here below does I a description how components shall connect to radio.





Mic-jack Yaesu FT-100 / 90 / 8100.

- Pin 1:** SW 2 multi-function switching
- Pin 2:** N.C. (9600bps packet data output FT-90)
- Pin 3:** + 9 v
- Pin 4:** GND
- Pin 5:** Microphone Input
- Pin 6:** SW 1 PTT, UP och DOWN

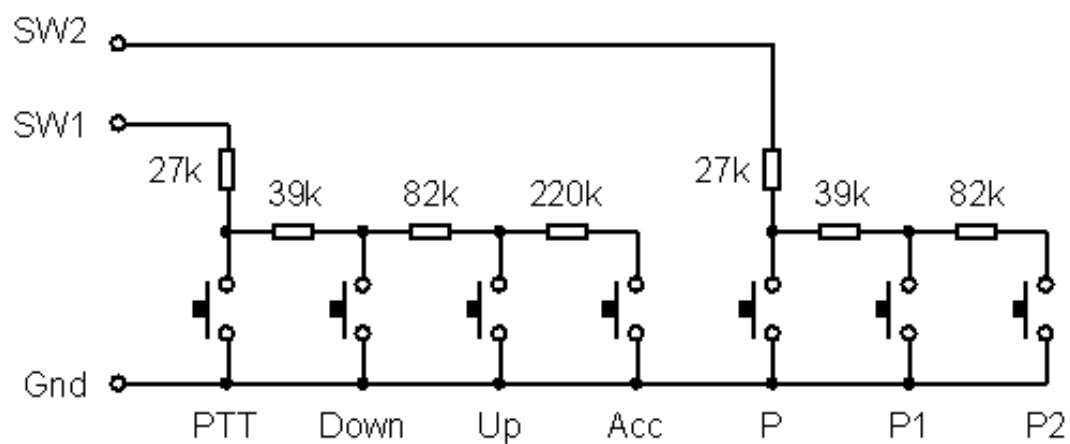
73 Bjorn SM5SWI

**Date:** 11-08-2001 **User comment** **From:** [John Shepherd](#)  
**Subject:**

I was interested to see Björn Karlsson's information on how to "Connect other microphone to Yaesu FT-100", as I have been looking for some time for a way of using PTT, rather than VOX, with another microphone.

My curiosity pushed me to try the same circuit on SW2 and it works. It gives you the P, P1 and P2 buttons. However, there was still the ACC button missing, so I put a variable resistor from SW1 to ground and found a fourth position.

The circuit below gives you PTT, UP, DOWN, ACC, P, P1, and P. At least, it works on my rig. Don't forget that you can programme the functions of P, P1 and P2 on the FT-100.



John F5FML

This modification is read 6010 times.

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**23-10-2001**

## **(FT-100) FT-100 Thermal modification**

**Author:** Björn - [bjp@multiweb.nl](mailto:bjp@multiweb.nl).[MODIFICATION.NET](http://MODIFICATION.NET)

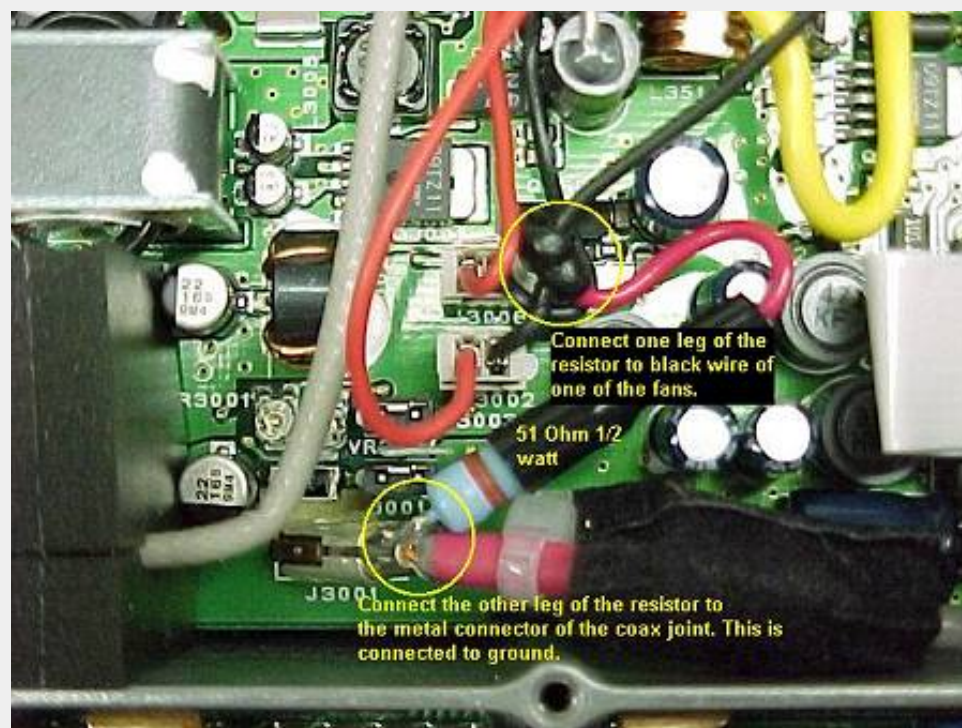
Hi all you FT-100 users!

On 2m and 70cm you all noticed that the cooling fans do not run at slow speed on stand by, like on HF and 6m.

This causes the radio get warm/hot for just doing nothing.. and that will shorten the lifetime of the parts.

Here is how you could resolve this problem by just adding 1 51ohm 1/2watt resistor between one of the black wires of the fans and ground, for instance the chassis. See picture below for my solution.(open up the bottom of the radio to get to the fan wires)

This mod will cause the fans always run at low speed. and when transmitting the fans will go fast as normaly, so you're radio stays cool!!.



Lot's of fun with this mod!.

Greets!.

Björn - 19 ET 108  
Netherlands

**21-03-2002****(FT-100) Microphone mod for FT-100(D)****Author:** - [cgarner@harris.com](mailto:cgarner@harris.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This modification to the stock mic will bring you excellent transmit audio reports:

1. Open the mic case.
2. Remove the 3 larger internal screws and the 1 smaller screw in the microswitch.
3. Move the PC board away from the tiny mic element so you can access it.
4. VERY carefully remove the tiny electret mic element from its cylindrical housing using a fine tipped tool. Work it out beginning at the edge where you can pull on the rubber "grommet".
5. Shake the plastic baffle out of the electret housing.
6. Carefully force a sewing needle through the 3rd mic hole that's normally blocked.
7. Insert the electret element back into its cylindrical housing carefully, leaving the plastic baffle out.
8. Re-assemble the mic case.
9. Set the MIC gain to about 55 and enjoy the excellent transmit audio that was previously limited by the plastic "noise baffle".

The improvement is dramatic.

**19-07-1998****(FT-1000) Some info**

Hello once again from Athens!

Just a quick update regarding my most recent phone conversation with Yaesu in California. Last night 17 Aug 94, I spoke with a representative of the yaesu company in California re the FT-1000. I mentioned to the rep that I'd heard over the air of a version 4 of the FT-1000 soon to be released. The rep advised that this was news to him and that the current design of the ft-1000 would not repeat would not be changed in the foreseeable future.

I mentioned that my FT-1000 has a serial number begining with 2H and I was interested to know if there had been any modifications since my radio was produce.

His answer to my question was no, there had been no design modifications since my radio was manufactured. Also the 2H indicated that my radio started down the assembly line in June of 1992 - and that the design of the FT-1000 has been "stable" since that time.

The rep went on to give a plug to the new FT-900 which will appear in magazine this September. The rep described the FT-900 as being a FT-890 with a detactable head.

If this is the case - I believe kenwood's TS-50S is in big trouble - sales wise. Cheers from athens. P.S. I am interested in starting a FT-1000 users data base/packet group to share information about the radio - so drop me a line if you are a ft-1000 user and I'll add your name to my database - 73 de Lee/wy3v

19-07-1998

(FT-1000) FT-1000MP RX-Clarifier Check

If the use of the FT-1000MP RX-Clarifier yields unexpected results (freq. jumping etc) do the following test.

1. USB or SSB

2. Select wide bandwidth 6 KHz

3. Tune to an S9 steady carrier with little or no QRM

4. Tune to a beat note of approx. 1000Hz

5. Switch RX-Clarifier ON

6. Turn clarifier knob counterclockwise and listen to the change of beat note. Also watch the graphical display.

7. Turn to about -2.5 KHz then reverse the action and turn the clarifier knob clockwise. Again listen to the beat note. There must be no sudden frequency change and no forward/backward jumps on the display. Frequency should change proportionally with the movements of the clarifier knob. If there is a problem it may even be worse if you turn the clarifier knob more rapidly.

In my unit the frequency changes are not proportionally to the movement of the clarifier knob. Occasionally the frequency does even jump in the opposite direction. This is also visible on the bar display above the main frequency display. This finding was verified by other local FT-1000MP owners.

Guess I have to see my Yaesu-Dealer again.

73 / Klaus (DJ6RX)

| Date: 07-07-2001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | User comment | From: <a href="#">Franki - ON5ZO</a> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------|
| <b>Subject:</b> Solution for the FT-1000MP RX-Clarifier Check                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |                                      |
| <p>I found a solution the the "FT-1000MP RX-Clarifier Check" posting of 19-07-1998.</p> <p>The problem is the rotary encoder of the Clarifier function. To smoothen rotation, the manufacturer of this type of encoder, puts some grease into the shaft of the encoder. Due to extensive usage, this lubricant comes into the encoder itself, where it flows between the fixed contact pads and the rotary contacts (you can compare it to the wiper contact of a potmeter). As the lubricant is not electrically conducting, some contact points (representing digital values) are not detected by the digital control.</p> <p>Solution is simple:</p> <div><div>1. open TRX (both covers)</div><div>2. remove all knobs and dials from frontpanel (only those needed - it'll point itself out)</div><div>3. tilt front panel towards you and locate little PCB (printed circuit board) holding the Clarifier encoder</div><div>4. loosen connectors + screws and pull out the little board as a whole</div><div>5. on the encoder (shaft facing upwards) you see 4 clips; bend them 90° upwards and CAREFULLY pull away the upper part</div><div>6. now you see a black disk with metallic contact pads, and in your other hand, you see three brittle springs, all covered with grease.</div><div>7. clean both parts thoroughly using Q-tips with alcohol (or something similar not aggressive to plastic), but BE CAREFULL not to bend the springs.</div><div>8. now assemble everyting back together by following above steps in reverse order, but take care of the springs when closing the encoder!</div></div> <p>Should work 100% ok! Good luck!</p> |              |                                      |

**19-07-1998**

## **(FT-1000) Out of band TX mod FT-1000**

1. Remove power and ant.
2. Open case like explained in your "operating manual".
3. Locate four screws attaching front panel and remove the top screws. loosen the bottom screws.
4. Tilt front panel forward.
5. On the left side of the radio, remove the plug from power supply to the front panel. (gray and white wires.)
6. Locate the jumper position 3 on control board.
7. Change the jumper status in position 3.
8. Reassemble radio.
9. Reset CPU (see your OPERATING MANUAL).

73's de Phil, F1LOU @ ON7RC.BT.BEL.EU

This modification is read 2270 times.

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**22-08-1998**

## **(FT-1000) How is the FT-1000 MP modified to transmit in general coverage?**

Turn the radio with the FAST and the LOCK key pressed at the same time.  
then press the FAST and the ENT key to access the menu.  
then go to menu 9-9 and set it to GEN then press ENT to get out. To get it back to normal repeat the steps and select 15 instead of GEN.

Turn ON the radio with fast and lock keys depressed this should enable the further menu items, note it is fast and lock use fast and enter after this to enable normal menu mode You should see further menu items 9-1 to 9-9 now

This modification is read 2178 times.

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**21-03-1999**

## **(FT-1000) QSK with FT-990 and FT-1000**

Steve Ellington ( [n4lq@iglou.com](mailto:n4lq@iglou.com) )

Fri, 26 Jul 1996

Here is the way I do QSK with my FT-1000MP which is basically the same set up as the 990 as far as qsk is concerned.

I have an Ameritron AL-80b which has an output of up to 900 watts.

In 1974, I built an Electronic TR switch from plans in the ARRL handbook. It consists of nothing more than a 12AU7 tube, a coil, switch, variable capacitor and a simple dc power supply. There are 3 coax jacks on the back.

To connect this, you run the transceiver's main antenna input into the amplifier's antenna input as you normally would. Run the amplifiers output into and back out of the TR switch. Inside the tr switch, we simply tap off the center conductor of the coax, run this through the tube then to the 3rd coax jack on the tr switch which goes to the receiver input of your transceiver.

As you can see, there is NO switching of the RF involved here at all. No worries of hot switching or dot clipping. The TR switch provides another stage of RF for the receiver too. Keep all leads as short as possible.

When the amplifier is turned off, simply hit the antenna switch on the transceiver to change the rx back to the main antenna input.

In the past, TR switches were known to cause TVI but with cable tv, there is little to be concerned with. It's a great system. E-mail me if you have any questions.  
Steve Ellington

This modification is read 1574 times.

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06-08-2000  
(FT-1000) Yaesu 1000 MP Mark V mod.

Here is the new mod for the Yaesu 1000 MP mark V

**Note.** Don't touch any other items in menu 9 it will erase the system in the new mark v and ruin it.

- 1. Press[lock] &[fast] and turn radio on.
- 2. Press[fast] & [ent] keys.
- 3. Select [9-9] on the memory channel block by turning [mem/vfo] knob counter clockwise.
- 4. Select [gen] by turning the main dial.
- 5. Press and release the [ent] key.

|        |         |       |       |
|--------|---------|-------|-------|
| Before | [ 15 ]  | [000] | [9-9] |
| After  | [ gen ] | [000] | [9-9] |

To restore amateur bands only.

- 1. Press [fast] & [ent] keys.
- 2. Select [ 15 ] by turning the main dial then press [ ent ] key.

Same as the old 1000 mp but on the mark v any other menu setting will ruin the system as noted above thanks.

This modification is read 2432 times.

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03-03-2001  
(FT-1000) General (TX) coverage in FT-1000MP MARK-V

Since most of us use their Transceiver also as an Signal Transmitter here the way how to extend the FT-1000MP MARK-V, only by pressing switches and keys it really is a few seconds job!

Press the POWER on while pressing FAST and LOCK switch “gives you an extended menu up to 9-9”

Press the ENT key while pressing the FAST switch “gets you into the menu”

Turn the VRF/MEM knob up to Function number 9-9 = selection name “t-SELEct”  
Turn the MAIN VFO counter clockwise till you find at the very end “Gen” and press the ENT switch.

73’ Henk Teunissen [pa7ht@amsat.org](mailto:pa7ht@amsat.org)

This modification is read 2189 times.

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13-07-2001  
(FT-1000) Keyclicks FT-1000MP

**Author:** Tom Rauch - W8JI - [webmaster@w8ji.com](mailto:webmaster@w8ji.com).[MODIFICATION.NET](http://MODIFICATION.NET)

Clicks are often a problem on congested bands. They are most problematic when we try to copy weak signals next to moderately strong signals. While a fast rise and fall time guarantee excessive bandwidth, a long rise and fall is no guarantee a radio will be "click-free". Some radios switch into transmit while the synthesizer (VCO) circuits are still settling to a new frequency. These radios generally produce a loud "thump" on key closure that happens to be right on the DX station, when the operator is working split. If the operator is using QSK, VCO switching thumps can be particularly annoying. The thumps will occur every time the VCO moves from the receive frequency to the transmit frequency.

Many radios have rise and fall times that are much too fast, but how fast is much too fast? For now let's ignore VCO switching problems, and consider envelope shape.

The ARRL recommends 5 mS rise and fall times for CW, based on data in section 2.202 of FCC rules and CCIR Radio regulations. According to professional sources, 5 ms rise and fall times are not harmful to readability at 35 wpm under marginal (fading) conditions, and 60 wpm when signals are reasonably far above noise floor. This rise and fall results in a occupied bandwidth of 150 Hz, although unwanted transient energy caused by the shape of the waveform slope appears at wider bandwidths.

Two things come into play; the slope of the envelope rise and fall at any point controls bandwidth of keying sidebands, and the amount of voltage change during that slope controls the power level of the sidebands (clicks). The shape (bandwidth) and amount of signal level change in a slope area (level) combine to determine how offensive the transmitted signal is. Very subtle changes in envelope shape can have a profound effect on key click amplitude. This makes it difficult (if not almost impossible) to determine whether our radios are as clean as they should be when considering only overall time required for a CW envelope to reach full power levels.

Reference Data for Radio Engineers, in the section of Radio Noise and Interference, addresses key clicks in a manner the ARRL Handbook does not. They give an example of multi-pole shaping of waveform. While this would amount to perhaps a \$5 parts addition, virtually everyone ignores the roll-off we could have on all CW signals!

Here are the bandwidth curves of three basic envelope shapes, one rectangular (some radios are this bad!), one for a proper single pole R/C filter with slightly rounded shape (the ARRL suggests this shape probably because it was practical in the early years and "stuck" even though it is not ideal), and one for a filtered rise and fall (this would be a sine-shaped rise and fall from a multi-pole filter). We can clearly see a large difference in bandwidth in the curves below:

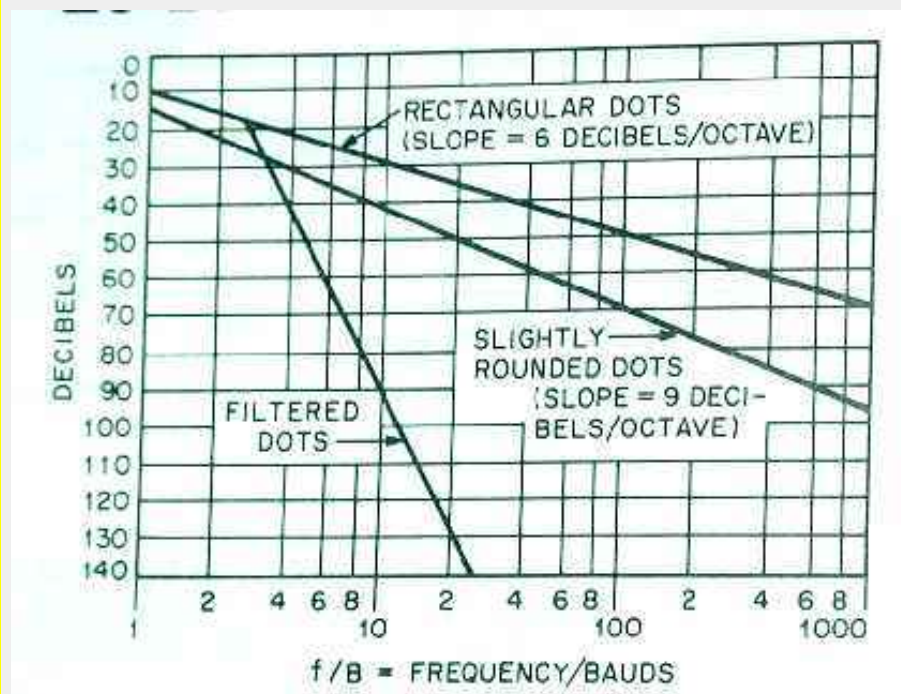


Fig. 12—Curves giving the envelopes for Fourier spectra of the emission resulting from several shapes of a single telegraph dot. For the upper curve the dot is taken to be rectangular and its length is  $\frac{1}{2}$  of the period  $T$  corresponding to the fundamental dotting frequency. The dotting speed in bauds is  $B = 1/t = 2/T$ . The bottom curve would result from the insertion of a filter with a pass band equal to 5 units on the  $f/B$  scale, and having a slope of 30 decibels/octave outside of the pass band.

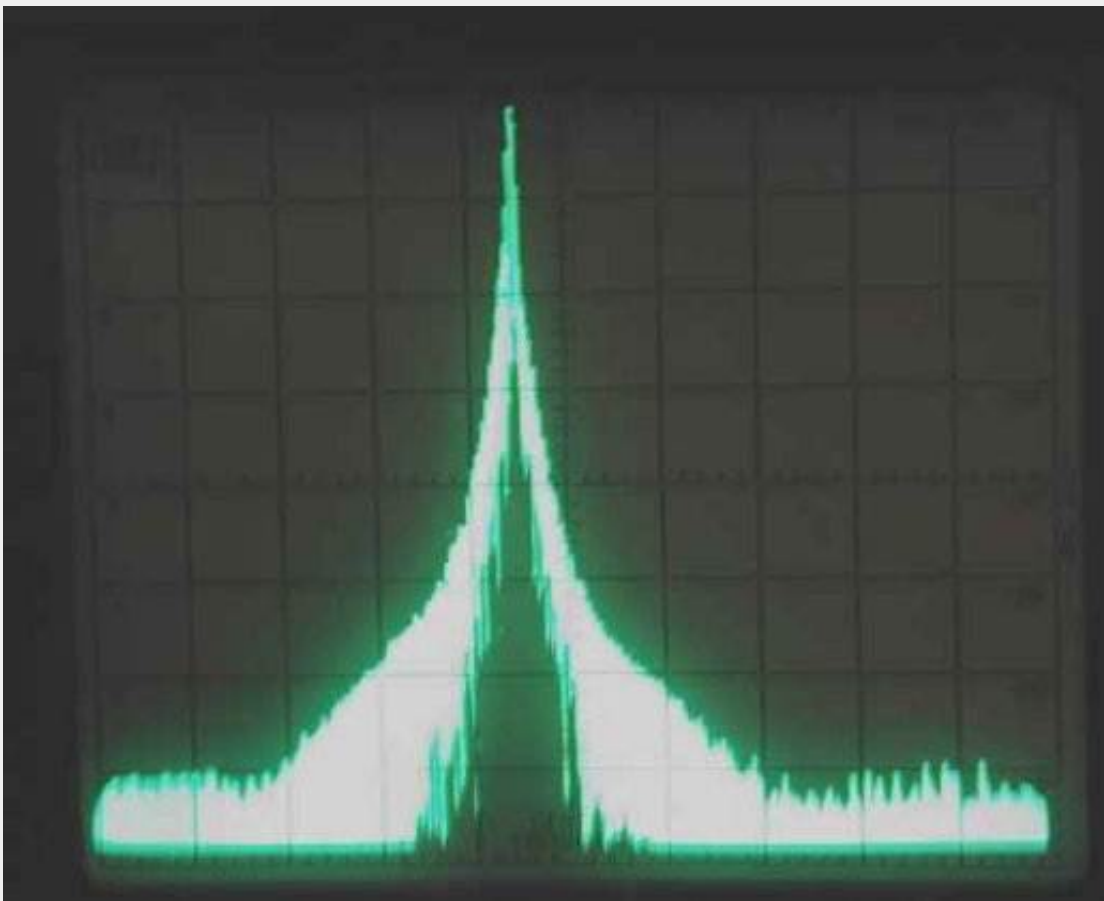
From Ref Data for Radio Engineers 29-10 1977 Edition

### FT-1000MP Measurements

I measured two sample FT-1000MP's (an early and a late model) by operating them into a high power fixed 30 dB attenuator pad. The output of the 30 dB pad was connected through a 3-way splitter to a step attenuator and conventional receiver, a spectrum analyzer, and an oscilloscope. The receiver used a 300 Hz eight-pole filter, the spectrum analyzer used a 50 Hz filter, and the scope was triggered from an external keying signal. Power was measured on a conventional Bird average reading meter.

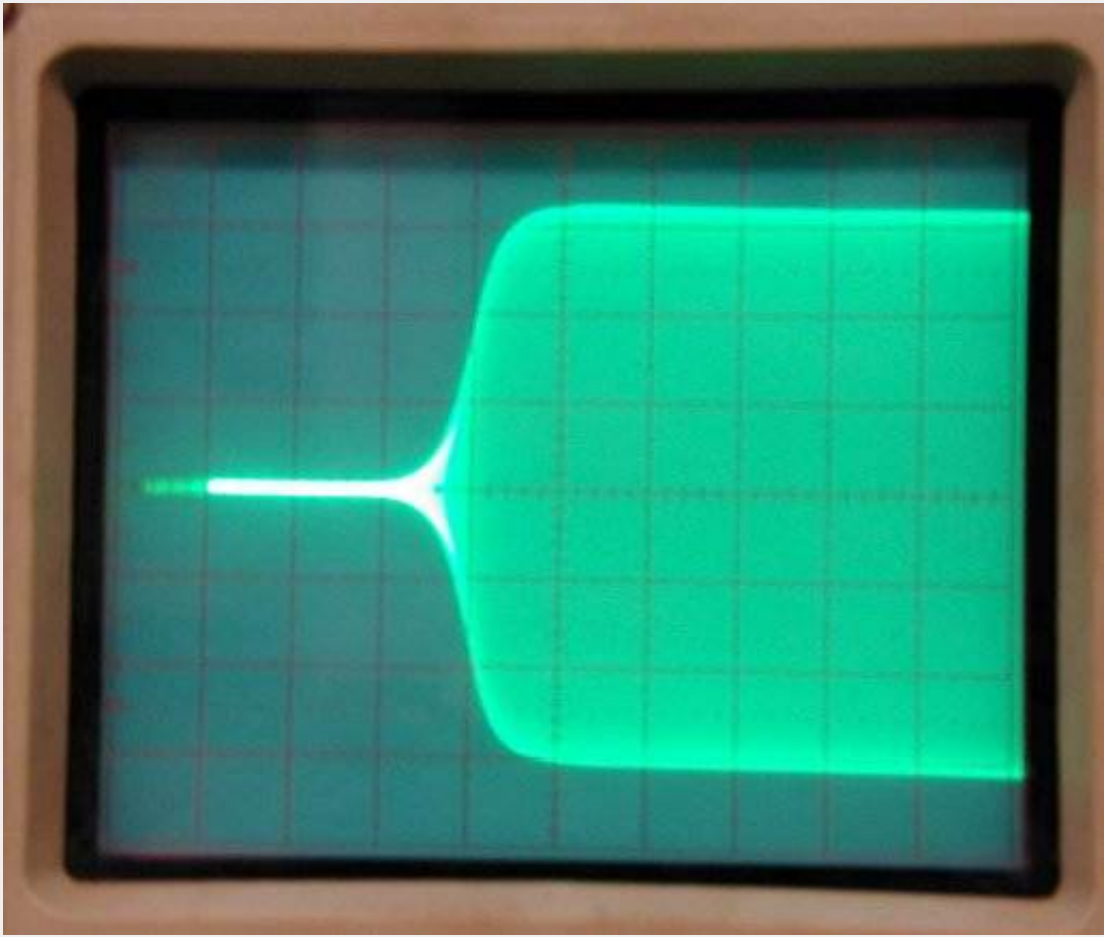
At 1kHz spacing clicks from the stock FT1000MP's were about 15 dB worse than clicks from my old test bench radio (a well-worn ICOM IC-751A) and more than 20dB worse than the clicks from my click-reduced FT-1000D!

Here is a spectrum display of my stock IC-751A using 30 Hz analyzer bandwidth and ten second sweep:



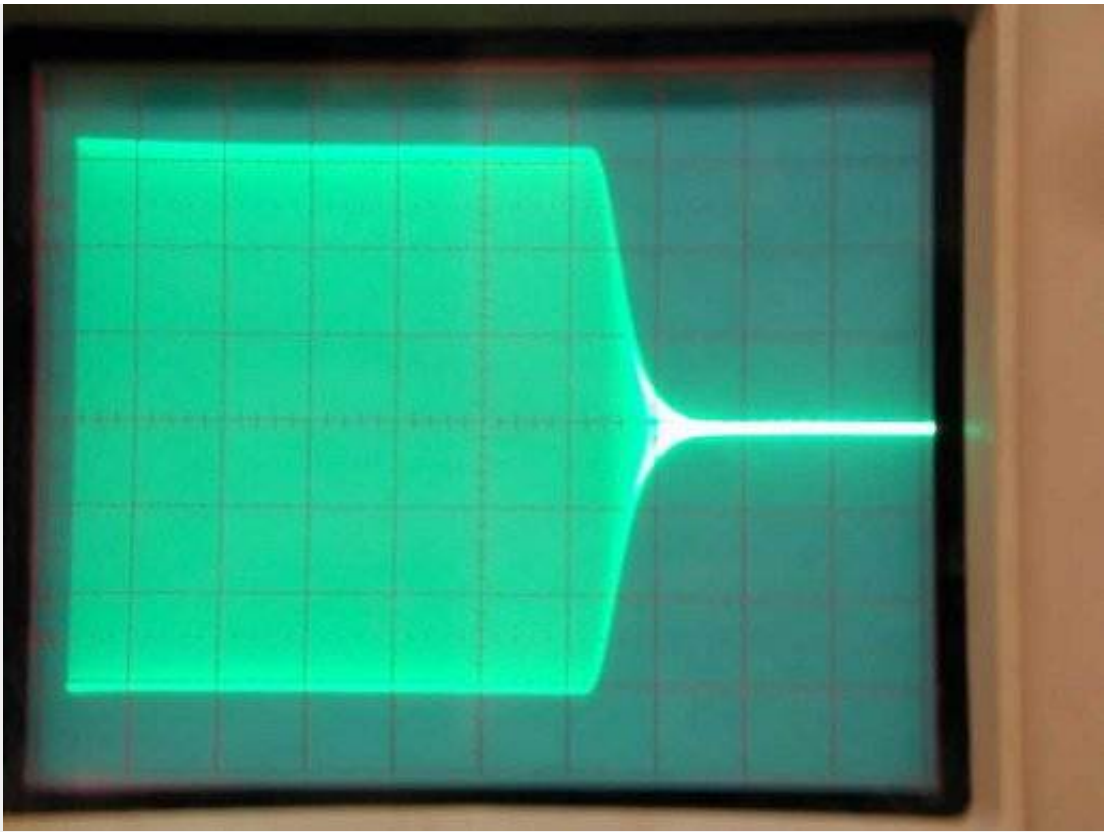
The 751A is approximately -58 dB at 1 kHz, and rolls off smoothly.

Here is the nicely sloped (but too fast) 751A rise:

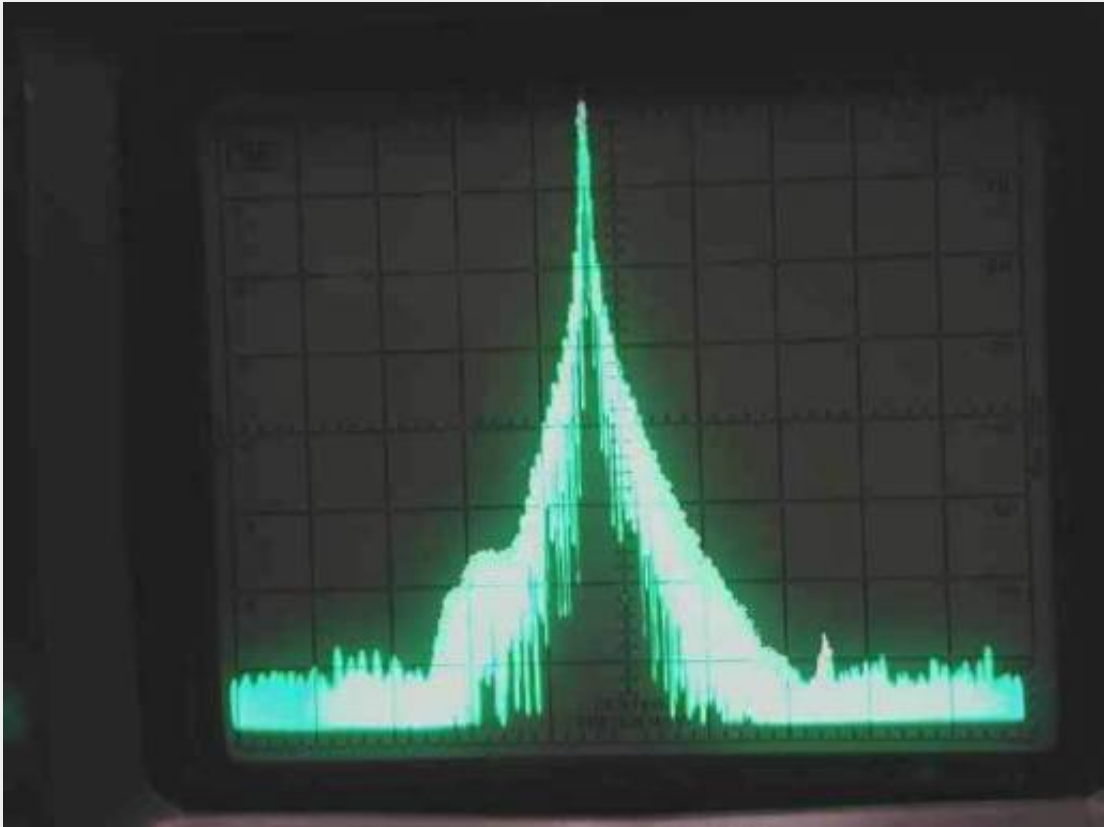


Rise approximately 3 mS....and the fall (which is too sharp at the upper corners):



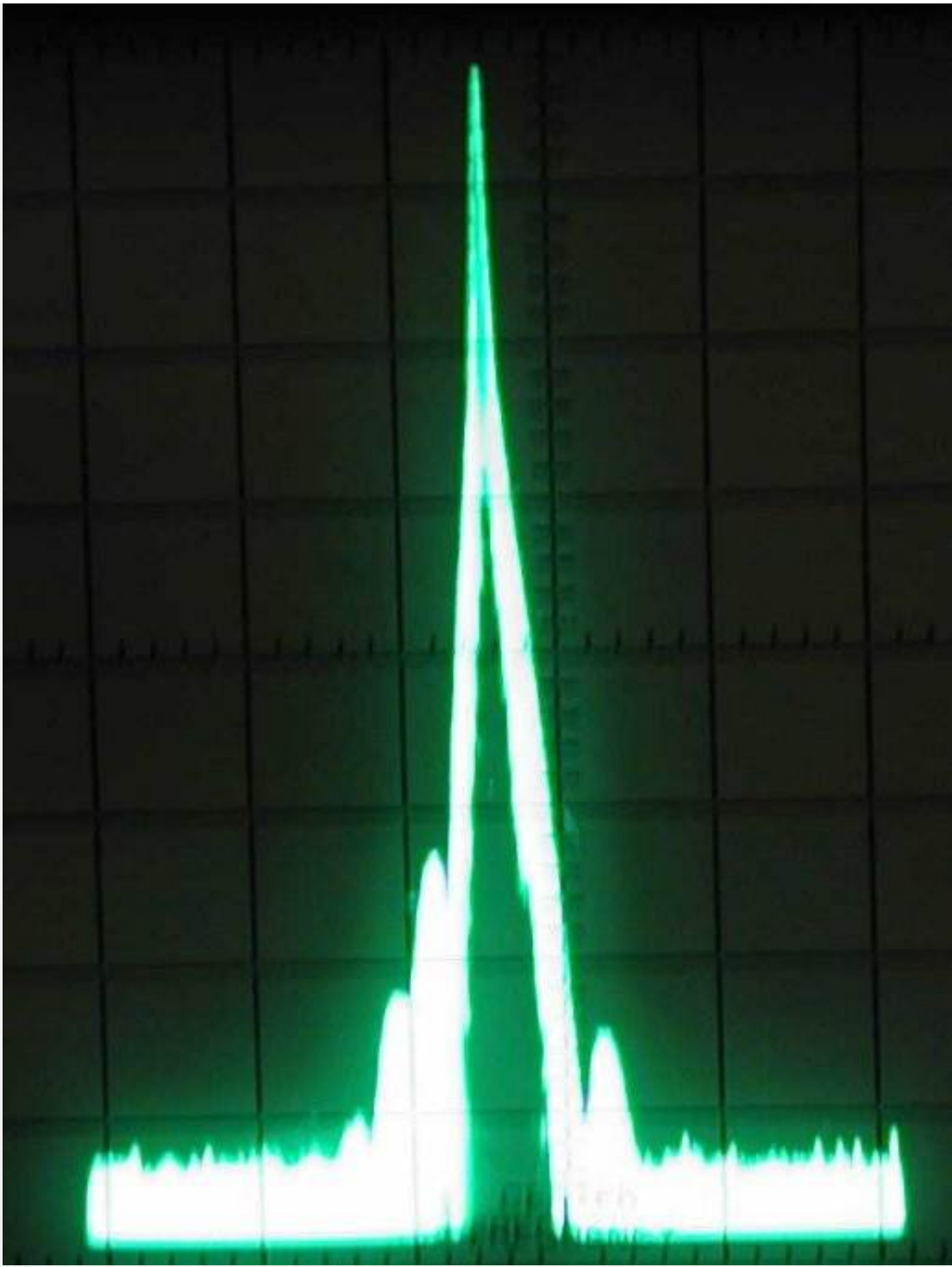


Now the stock 1000MP spectrum:



The FT1000-MP is approximately -50dB at 1kHz. It is 8 dB worse than the already "hard" 751A, and has a "click plateau" below the carrier frequency that hovers around -55dB for around 500Hz bandwidth.

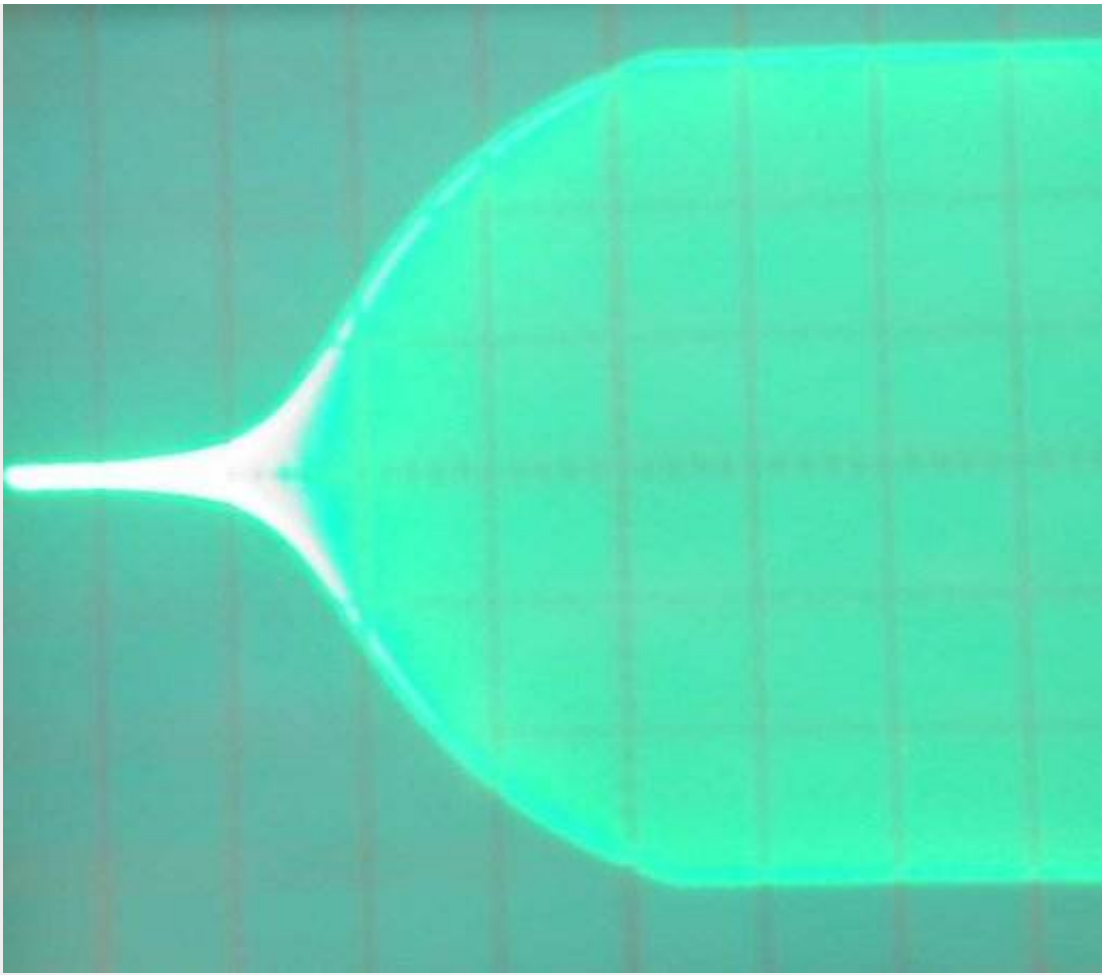
In direct comparison, here is a "de-clicked" FT-1000MP:



The modified FT-1000MP rivals any of the better radios I have tested, including my "de-clicked" FT-1000(D).

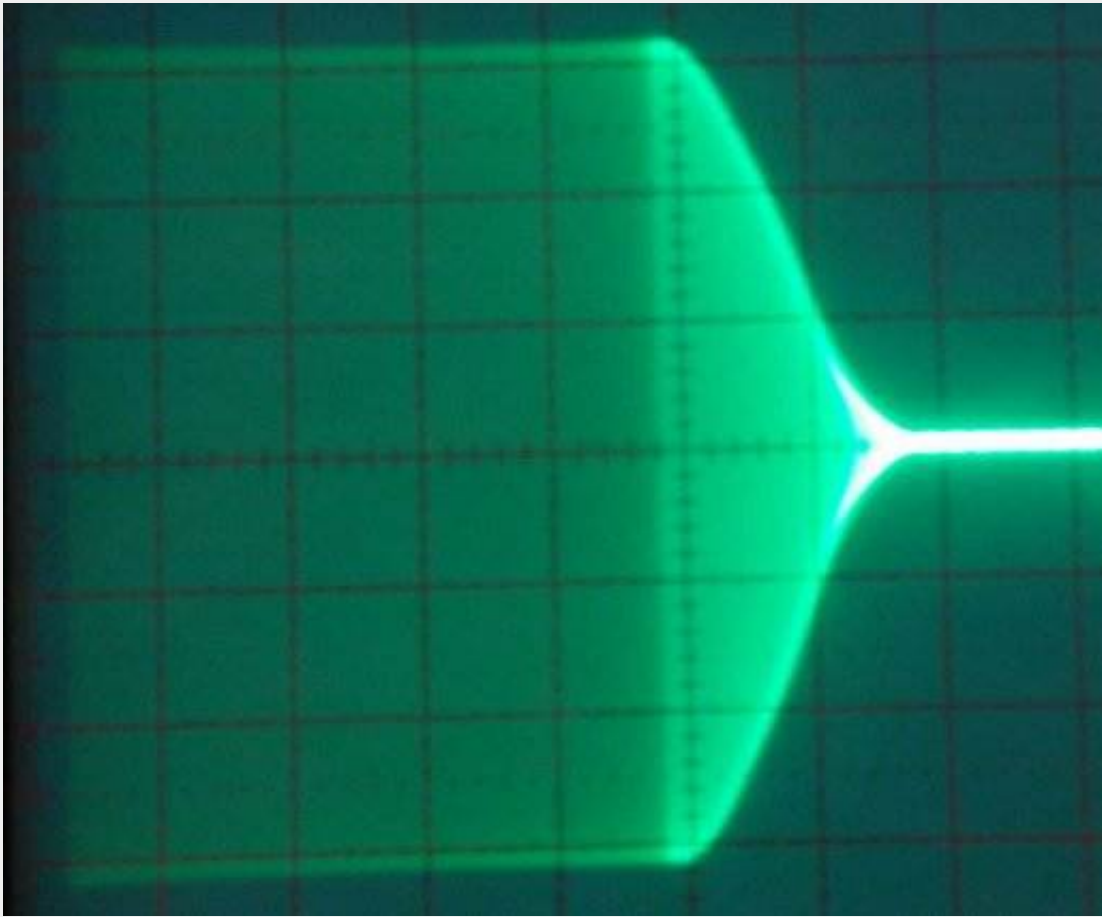
The modified FT-1000MP is around -85 dB at 1 kHz, over 30 dB improvement from the stock MP! Rise time is close to ARRL standards of 5mS, while fall time is around 3 mS. FT1000MP modified rise:





Rise 6 mS. The upper edge is a little sharp, but why worry....clicks are reduced 30dB or more!

Modified MP fall:



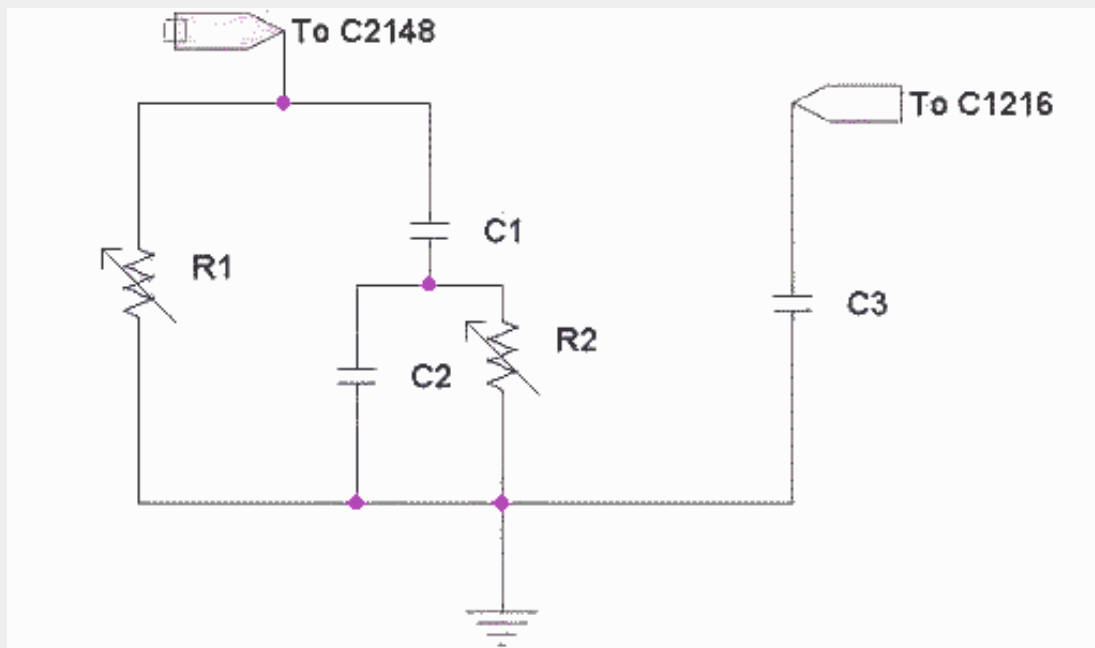
Fall time is around 3mS. While it has much more rounded edges, the slope is still not very "round". Unfortunately we are limited by what is possible to do, and this mod is already difficult enough for laymen.

Some concerned was expressed over the "power" of dots when using long rise and fall times. One simple solution is to turn up the weight control slightly. Keep in mind, even without ANY external weight adjustment, the change in average dot power at 45 WPM was only a few percent! On the air tests with VK3ZL and ZL3REX on 160 meters with fading signals and noise, revealed both could tell absolutely no difference between having the click filter in-line and out-of-line at 40 WPM CW speed. This waveform meets FCC and CCIR specifications for 60-WPM CW modest strength signals, and 35 WPM weak fading signals.

## Doing The Mod

The ideal CW radio would use a high-order filter with controlled group delay, and a reasonably linear attenuator or modulator to control the envelope shape. All other stages should be fully on just outside the output window of the CW signal. I initially hoped a CW "modulator" could be added on, but for now it appears modifying the 1000MP to ideal circuitry would be too involved. My only option was to "hunt and peck" and find a modification that would be reasonable to do, and inexpensive. This is the best solution I could find, reduction of clicks was excellent. The only drawback is two resistors need to be hand-selected, and the radio needs some minor disassembly to reach a connection point on the RF board.

I mounted this mod on a separate terminal strip under a screw on the left front corner of the IF board. This allowed me to experiment with component values while watching bandwidth and other parameters. This is the basic circuit I used:



C3 was a .1uF disk capacitor. This component's value turned out to not be especially critical, it mainly prevents fast rise and fall of the low-level RF amplifier stage that is driven by a gate. There was no combination of resistance across or in series with this capacitor that reduced clicks in any of the radios I tested.

C1 and C2 are also .1uF disc capacitors. In all units tested, I could find no better combination for reducing clicks.

The only critical components appear to be R1 and R2. R1 ranged from 120k to 470k in the units I tested. R2 ranged from 1k to 10k ohms. I initially clipped in potentiometers, so I could listen to the output and adjust the clicks at 1kHz spacing. Both pots were adjusted for a null in click amplitude. That null is rather sharp, and turned out to be around 30 dB deep. This takes the 1000MP from being one of the "clickiest" radios I have found to one of the cleanest!

The best method of nulling clicks is by listening on another receiver with a narrow filter. Make sure you are well below overload on the receiver, and set that receiver so the carrier from the MP is just outside the passband of the test radio filter. It is almost impossible to use any other method for proper adjustment, including watching the envelope on an oscilloscope.

Work in a clear uncluttered location, I like to work with the radio on a clean small carpet on a well-lit bench, and have a container for all the hardware I remove.

Here's how to make connections to necessary points:

1. Remove the top and bottom covers of the radio and set them aside.
2. Invert the radio, so you have the heatsink exposed.



Four main screws hold the heatsink mounting bracket. Two screws are shown above (one under the screwdriver and one a few inches to the right of it). Two more screws are on the side of the radio chassis. You might want to remove the long screws holding the fan bracket, although I got by without doing so.

3. Lay the fan and PA assembly out of the way, you may have to open some of the wire harness clips to get more wire. Unplug the fan so it is totally free from the unit. It should look like this now:



4. The RF board is the green-colored board you see above. There are several screws holding that board down, and two screws on a rear panel DIN connector that is mounted on that board. The board will freely move when you remove ALL the screws. Do NOT pry or force the board out, if you have to pry you missed a screw!
5. Flip the board over, you might have to unplug a wire harness or two...but I managed to work without doing that. The board should look like this:





6. I added the green wire you see above. I tacked it on a foil pad by laying the wire across the point where two chip components soldered in, as shown below:



You can see the little black FET (Q1034) and the slightly triangle-shaped foil trace that connects to Q1034. I bent an "L" in the small wire I used. The wire will route topside to a terminal strip, so it needs to be several inches long.

7. The new wire routes under the RF board to an oval slot in the chassis, where it feeds to the other side and emerges near the IF section unit. Be careful not to pinch any wires when remounting the circuit board. The opening on the right is best for getting the added wire topside:



8. While re-installing the RF section, fan, and heatsink inspect the wiring carefully. Be sure nothing is touching moving parts of the fan, and be sure no wires are pinched or left unplugged. It might be advisable to check the radio quickly on a dummy load to be sure the transmitter section works properly.
9. Flip the radio over, and remove the two ribbon cables connecting to the IF section:



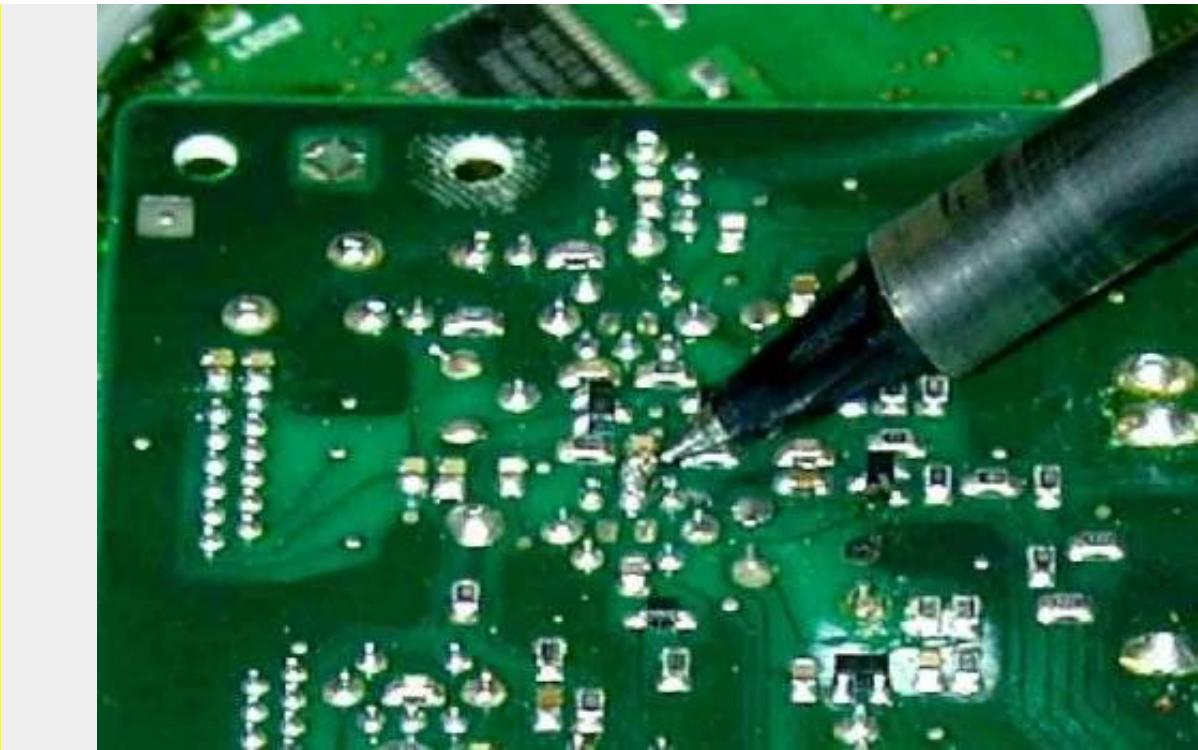


10. Remove the mounting screws and flip the IF board exposing the bottom:



This is the area where the wire attaches to the IF board:





Note the FET above and to the left of the pen, and the IF transformer (two transformer shield connections and five electrical pin-outs, with an unused pad-set for a surface mount device in the center of the transformer leads) below the pen. The connection point for a new small insulated wire is the chip capacitor (C2148) pad that also connects to the center pin of the top three in-line pins of the IF transformer.

- 11. Attach a small wire to the point mentioned above. It will route to the new circuitry.
- 12. Re-install the board. Be sure you do not pinch any wires. Be sure you do not forget to plug in the ribbon cables, or any other wires you removed.

I mounted a small four lug (plus ground) terminal strip at the left front corner of this board, and mounted the components on that strip. The lead lengths and dress are not critical, so the additional circuitry can be added where you like.

As mentioned earlier, all you need to do now is adjust the two resistor values for minimum clicking in another receiver tuned slightly off frequency (be sure you do not overload it) while sending a string of fast dots. You should be able to obtain a very large reduction in off-frequency clicking.

This modification is also available from [www.w8ji.com](http://www.w8ji.com).

This modification is read 2090 times.

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**19-07-1998**  
**(FT-101) FT-101 series, convet 11 meter to 12 meter**

Converting 11 Meter band to 12 Meters for the Yaesu FT 101 series ..

Although this procedure hardly qualifies as a "mod" (too easy), it is certainly useful for the FT 101 series owner. Conversion to the 12 meter WARC band is as simple as replacing a crystal. The 11 meter xtal is replaced with a 30.52 Mhz 3rd overtone xtal in a HC-25/U holder as specified in the FT 101 series maintenance manual. No other modifications are necessary as the new band is close enough to the original that the current components work. To replace the xtal, remove the oop cover and find the xtal board located at right front of the rig. Xtals marked xxxx are standard while oooo are optional on some units. X5, for the 11m, band is an option and may or may not be installed.

|             |      |      |                            |
|-------------|------|------|----------------------------|
| 10B         | xxxx | xxxx | 80                         |
| 10C         | xxxx | xxxx | 40                         |
| JJY/wwV (1) | xxxx | xxxx | 20                         |
| 160         | oooo | xxxx | 15                         |
|             | xxxx | oooo | < X5 the "11 meter" socket |
|             | .... | xxxx | 10A                        |

The xtal was ordered from Marden Electronics (800-222-6093) although it is probably available from the other companies which offer this type of item. I'll skip the business details here, but it is cheap. I found fat fingers a hindrance when yanking

the old and insterting the new so I used a hemostat (narrow nosed locking type device with "seconds" often found in hardware stores, etc.). After checking with a local ham who monitored my transmissions to make sure I was where I thought I was, I was in business with 12 meters for my FT 101B.

How'd it go ?? After warming up the rig, I spun the dial a bit on what has been a mostly dead band this summer. The first station I heard was a little weak .. AA5QC .. no it's A35QC. I had no idea where that was, but I gave him a call. It turned out to be JF1WQC vacationing in TONGA, my first African contact and a 59 report at that! So here's an easy way to add a WARC band and open new possibilities for DX adventure with your FT 101 series rig. Please let me know if you have any additional feedback or comments on what has to be one of the easiest "mods" ever.

(1) This is another story .. note that it is a receive only band for 10 Mhz .. for now. See Page 70 of the Nov 83 issue of 73 Magazine if you can't wait.

This modification is read 2035 times.

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**19-07-1998**

## **(FT-101) Replace finals in FT-101E**

There will come a time when the finals in your FT101E will need replacing. These transceivers were originally equipped with 6JS6C tubes manufactured by NEC.

This tube's properties are slightly different from the 6JS6C tubes available today from American tube manufacturers. By the way, don't bother looking for tubes made by NEC. They got out of the business several years ago.

In order to use the "American" variety 6JS6's, a simple modification to the neutralization circuit must be made to the final section of the transceiver.

The modification consists of replacing the fixed value 100 pf 1000 VDC mica capacitor with a 10 pf 1000 VDC mica capacitor. This capacitor, C125, is in series with the 10 pf variable neutralizing capacitor off of the plate circuit.

If this modification has not already been completed on your rig, be sure to use a mica or silver mica of at least 1000 VDC. Do not substitute a different type, because the heat in the final compartment will change the value, and your tubes will fail prematurely. Also, be very careful to keep all leads short and in exactly the same orientation as the original capacitor.

Before reneutralizing, open the variable neutralizing capacitor all the way to minimum engagement and follow the neutralizing instructions in the manual. While dipping the plate, remember to adjust the neutralizing capacitor for equal value meter reading peaks (IC position) on both sides of the dip when tuning the "Plate" control.

This modification is read 1950 times.

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**19-07-1998**

## **(FT-101) FT-101 Mod for 30-meter (10MHz) Transmit**

I made several of these mods about ten years ago but I am a little fuzzy. The FT101 uses 10mhz for its WWV position but they left out the driver and final coil connections in the transmit section of the radio. So you either add coils or you can jump the band switch in the driver portion and the final section.

Connect a jumper from the 20meter driver coil tab, to the WWV driver tab; and the 40 meter final coil tab to the WWV final tab.

This will make the driver tune in the 40meter position and the final will dip around the 20meter position.

A cheap mod for another band, Good Luck but remember that packet or rtty is continious power so you need to back off the drive to about 1/3 normal or you will cook the finals!!!!!!

Terry WA6RNF @ Boise,Idaho

This modification is read 1596 times.

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**02-12-2000**

## **(FT-101) Audio hum in Yaesu FT-101 ZD**

**Author:** Jose Miguel Fernandez EA4BQN - [JOSEMFG@santandersupernet.com](mailto:JOSEMFG@santandersupernet.com).[MODIFICATION.NET](http://MODIFICATION.NET)

I have always liked transceivers with tubed final stage, for several reasons, but mainly because it is nice to hear from your correspondent: - you have a very good modulation, ... it sounds different, ... the tubes' job is noticed.

In addition of that I have to say that tuning these transceivers is not a trouble for me, and also that up to now all the servicing needed by my 3 tubed transceivers ( 2 Yaesu FT-101 ZD and 1 Yaesu FT-102) has been performed by my self.

One day I noticed in one of the Yaesu FT-101 ZD a little hum which could be heard at minimum volume level and when the radio was switched to transmission with the PTT. It wasn't a great trouble but when you want to have things working as better as possible you are forced to try finding the problem.

The first suspicious were the electrolytic capacitors of the power supply, and they were all replaced by new ones, even the pair of 200 uF, 500 volt, on the high voltage rectifier, but unfortunately the hum was still there.

Then the following step was to check the final audio amplifier located in the PB 1964 af unit, replacing the output module UPC2002, but no improvement was obtained.

After checking the parts around this module I could verify that the problem was in the 2 wire shielded cable connecting the input of Q01 (UPC2002) to the potentiometer of volume in the front panel.

I desoldered this 2 wire shielded cable at potentiometer end and connect there, two new 1 conductor shielded cables, soldering together the braids of these wires at the af board end to a good ground point, for instance to a solder lug inserted in the screw fixing the UPC2002 to the board.

Then I desoldered one end of the resistor R06 4.7 K and the negative end of C07 1uF and soldered there the corresponding wires from the potentiometer

After this operation the audio hum was removed.

I suppose this hum could be picked up by the original shielded cable along its way to the volume control

Best 73'S  
EA4BQN

This modification is read 1732 times.

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**19-07-1998**

## **(FT-102) Yaesu FT-102 mods**

**LOW RX SENSITIVITY :** Check aerial i/p fuse which is a small wire ended bulb located on the small pcb in the top PA compartment. It is not possible to use any old bulb here as most will give several dBs attenuation.

**INTERMITTENT LOW RX SENSITIVITY :** Suspect the relays on the RF pcb around the RF amp. Note that some of the relays are 24v types and not the more usual 12v. Don't miss the relay at the front of the board under the shaft of the bandchange switch which is difficult to change. I have often tried to clean the relays but they usually go intermittent again within a few weeks - it's better to change them.

**RF AMP NOT WORKING :** Check the relays which switch the RF amp and then check the two fets in the RF amplifier (2SK125).

**PRESELECTOR NOT TUNING CORRECTLY :** There is a shaft coupler on the bandswitch shaft - if the screws in this are loose it is possible for the front and rear sections of this switch to be out of physical alignment.

**NO RF OUTPUT (PA DRAWING CURRENT AS NORMAL) :** The main aerial changeover relay (on pcb in the top PA compartment) has been known to burn out.

**VARIOUS PA FAULT CONDITIONS :** Check for physical short circuits around the band switch in the PA compartment. I have once had burnt out tags on the bandchange switch - this was impossible to see before I removed the switch.

**FLUCTUATING POWER OUTPUT :** check the PA valves and check the PA anode choke.

**INTERMITTENT MAINS FUSE BLOWING :** Suspect that one of the PA valves is flashing over occasionally.

NO TX : Check the series pass transistor in the 12v. regulator circuit. I have twice seen cases where it has overheated, melting the solder on its leads, causing a physical short circuit.

NO TX - NO DRIVE : R01 on RECT A UNIT. Check driver valve after replacing this.

POOR NEUTRALISATION : This can sometimes be a problem if 2 or 3 different types of valves are used in the PA.

PA WON'T NEUTRALISE : I had one case where the user had connected the PA screen grid supply to a higher voltage on the rectifier unit, causing this problem.

FREQUENCY SHIFTS WHEN CLARIFIER ON : Dirty contact on RL4001, the clarifier relay.

FM TX WAY OFF FREQUENCY : Failure of Q13 (TC5081P) on AM/FM unit. See Yaesu mod sheet to prevent further failure.

LUMPY VFO DRIVE : The couple of occasions that this has been a problem I have usually improved it by cleaning and relubricating the mechanism. If its really bad the drive will probably need to be replaced.

KEY CLICKS : Some of the earlier models suffered from key clicks on CW. To cure this connect a 0.68 microfarad cap between key 1 on the REC A board and earth.

DRIFT ON CW : Some of the early units suffered from a drift of 50-100Hz during the first couple of minutes of CW transmission. Yaesu suggest removing C153 (3.3 microfarad) on the local unit to cure this problem. It is located between X4002 and T4014.

NO 29-30 MHZ : See CB de-modification below.

CB DE-MODIFICATION : See Yaesu mod sheet. The CB modification allowed the 29-30Mhz range to cover 27-28Mhz and the counter did not display CB frequencies. Careful alignment of the VCOs is essential.

This modification is read 1843 times.

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**28-04-2001**

## **(FT-102) FT102 CW Filter**

**Author:** OE7CSJ - Chris - [oe7csj@qsl.net](mailto:oe7csj@qsl.net).[MODIFICATION.NET](#)

I could not get the original CW Filter for my FT102 anywhere. Recognizing, that FT840 has the same IF frequency.

I tried to insert this type of CW Filter - the pins don't fit, you have to work around, but - it works incredibly fine!

Additionally sensitivity increases, when you activate this 500 Hz filter by about 10 dB. And it is far cheaper than the original part.

73 de OE7CSJ Chris

This modification is read 1254 times.

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**29-08-2001**

## **(FT-102) FT102 mods**

**Author:** G3RZP - [peter.chadwick@ieee.org](mailto:peter.chadwick@ieee.org).[MODIFICATION.NET](#)

The relay problem you can fix easily by a few careful cuts of the tracks on the PC board, and adding a few 22k resistors and blocking caps. This mod bleeds some DC through the relay conatcts and breaks down the oxide film. Mine is still on the original (1983) relays.

The real nasty in the 102 is if you are a CW DXer, especially on the low bands. The key clicks on certain production batches are beyond being fit for human consumption, but that is easily cured, and not by the recommended Yaesu mod. It may well be found that the documentation and the actual rig don't match, too, when you get down to PC Board details. The crystal filter arrangement leaves a lot to be desired - CW wide is SSB bandwidth, CW narrow cascades all the filters. Easy to add a couple of diodes to arrange CW Wide to be a wide (800Hz) CW filter and CW Narrow a narrower filter. The real killer is a receiver spurious on 80 and 40, where a strong signal on 3500kHz or 7000kHz breaks through, getting weaker as the rig is tuned up the band. This is caused by the 6MHz signal used to mix the VFO down to 500kHz to 1MHz bleeding across the



dual gate MOSFET mixer, and substituting an IC mixer cures that. Although it took me 17 hours of solid work one weekend to find and cure, and me! ant borrowing more test gear from work than my house was worth at the time! Another CW problem was a lazy crystal for the CW tx carrier generation. Seen this on a couple of 102's, and dropping the FET source bias resistor gives that extra bit of gain so you don't start calling 'RQ CQ CQ' because of the crystal taking time to start.

Some FT102's have a diode in series with the PA screen grid; this can lead, especially with older well worn tubes, to plate current runaway if/when you get negative screen current. By removing this diode and adding zener screen regulation and zener stabilisation of the bias and selecting 3 tubes with identical plate currents, that problem can be disposed off. I've done a number of contests over the years, a lot of ragchewing and DXing, and 2 of the PA tubes are the 1983 originals: the other one is a better match to the two: it dates from 1971, and I used it at work in a commercial transmitter development.

Some 102's can be a bit unstable on 80 when operated into anything other than 50 ohm wideband load. A damping resistor and series cap in the PA grid fix this OK, and by choosing the correct point, it's only switched in on 80.

Why the FT102 has such a quiet local oscillator is a bit beyond me. There's nothing special about the VCO design, but it's really good. I measured input third order intercept at +16.5dBm. That is OK: I've not yet had the situation where IMD has been a limit (I have biggish antennas - 5 ele monobander on 20m and so on)

Getting extra crystal filters is not so easy. I got a narrow (1.8kHz) filter from International Radio at Dayton this year. George, W2VJN, warned me that he didn't have a mechanical drop in filter, but did have an electrical fit filter. That needed a couple of its ground pins clipping off, and two holes drilling in the PC Board to make it fit - no big deal. But fully kitting up a radio won't be cheap, although from a performance viewpoint, well worthwhile.

Some of the ICs aren't readily (or at least cheaply) available, but there's enough room in the 102 that it's not difficult to rebuild a bit of circuitry around what can be got. The likely biggest problem will be if the display goes, as those are made of unobtainium! Even then, it's not that hard to make something up, together with a new counter board.

Quite a few modern rigs with custom ASICs in will give maintenance problems in a few years, when the manufacturer no longer has any stock.....expensive junk piles will be the result!

my e-mail for anyone needing further info is [peter.chadwick@ieee.org](mailto:peter.chadwick@ieee.org)

G3RZP

19-07-1998

(FT-11) Extended transmission range on a Yeasu FT-11R

I have knowlege that this mod works, but take no responsibility for any damage it does to your radio, the legality of this mod, or any other incurred damages.

After the mod a FT-11R will have:

- Recieve: 110.000-135.995 (AM) 136.000-180.000 (FM)
- Transmit: 136.000-180.000 (FM)
- Empty Memories and a completely reset radio

First, Remove the antenna, battery pack, and pocket clip (if installed) from the radio. Then remove the four black screws from the corners of the main section of the radio, the two black screws from the bottom center section of the main body, and the two silver screws from the bottom of the keyboard section. Now carefully separate the back and front halves of the radio, taking care not to put too much strain on the internal ribbon cable, or loose the small metal strap holder or the battery release button.

Once you have opened the radio, carefully remove the metal plate covering the back of the keyboard. Then remove the "AF" pcbboard by first removing the two copper screws in the middle of the board, then holding the bottom of the pcbboard and the mic/speaker jacks between your thumb and forefinger and pulling straight up. This may take a little force, as you are seperating two connectors. Once you have the "AF" board removed, set it and the connector/keyboard backplane board aside. Now look at the lower left corner of the contrroller board. You should see the 8 jumpers (they are very small), set up like this:

|              |   |     |       |                                                                                                                         |
|--------------|---|-----|-------|-------------------------------------------------------------------------------------------------------------------------|
| Top of radio |   |     |       |                                                                                                                         |
| L            | A | o-o | o o E | I don't know how the jumpers relate to the ones on the schematic, so the letters are just for reference in this article |
| E            | B | o-o | o o F |                                                                                                                         |
| F            | C | o o | o/o G |                                                                                                                         |
| T            | D | o-o | o o H |                                                                                                                         |

"-" means a solder jumper, and "/" means resistor

These are the functions of the jumpers that I know of:

- A- Turns your radio into the euro version (TX between 144.000-146.000)
- B- ?
- C- ?
- D- This is the important one. Gives you extened TX range
- E- Turns your radio into the 440Mhz version. Not Suggested!
- F- ?
- G- ?
- H- Same as jumper "E"

The only jumper that this mod deals with is "D". It currently has a solder jumper across it. Remove the solder across the jumper with really small solder wick or a desoldering station, taking care not to touch any plastic with your soldering iron. Once this solder jumper is removed, you now have extened tx range. Now carefully replace the "AF" board first, and then the connector/keyboard backplane board. Take care to get the copper grounding connector on the side of the mic/speaker jacks well seated. Replace the two copper screws in the middle of the "AF" board, and the two silver screws on the bottom of the keyboard. Replace the battery eject button and strap holder, and then replace the back half of the radio. Replace all the screws, put the battery and antenna back on, and turn the radio on. You should see 144.000 on the screen. Turn the radio off and the hold the MHZ/ and MHZ/ buttons while turning the radio on. You now have the transmit range between 136.000-180.000.

As a suggestion, you can store completely different transmit and recieve frequencies in a memory (see manual), so if you store a service frequency in a memory, you can program a legal HAM frequency as the transmit freq. so you never accidently transmit on an illegal frequency.

Another neat feature that I have found on these radios is the "Clone" feature. You can transfer all memories from one FT-11R to another FT-11R. First, make a cable using two male stereo 1/8" connectors, and connecting the top(gound) and middle conductors of the plugs straight through. Don't connect the tip conductors together though. Plug this cable into the earphone jacks of the two radios, and on each radio, hold down the "FM" button while turining it on. You should see every character flashing on the screen. Now, on the radio which you wish to recieve the memory contents from the other radio, press the MHZ/ button. You should see "RX CLN" on the screen. Then on the radio which is to send it's memory contents, press the MHZ/ button. "TX CLN" should appear on the screen for about 5 seconds, then it should return to the flashing screen state. The recieving radio should now be in normal operating mode. Turn both radios off, and remove the cable. That's it. This function overwrites all of the recieving radio's mem contents, and copies everything from memories to pager codes to the status of the light. WARNING: The instant that you hit the MHZ/, your memories are GONE, even if the transfer is unsuccessful! Also, both radios must have the same jumper settings to successfully complete the cloning process.

That's all I know for now! Have fun!

Any other questions? Contact me at "ijordan@freenet.fsu.edu"  
Ian Jordan

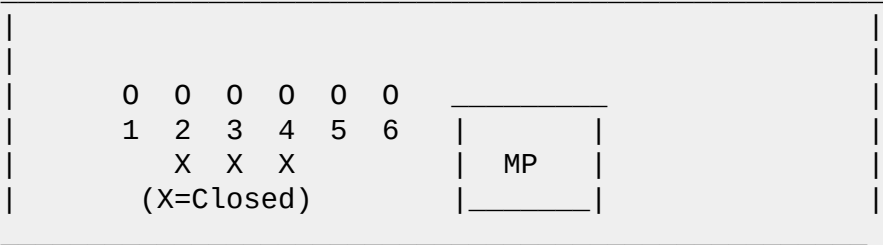
This modification is read 908 times.

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**11-07-2000**  
**(FT-1500) MARS /CAP Modification for the Yaesu FT-1500M.**

Remove Cover

Locate Microprocessor on Control Head.



Remove the Jumper on JP1001 (#1)

Solder Pads JP1002 (#2) & JP1003 (#3)

(Pads Closed after Modicication #2 #3 #4)

Remember it is Illegal to transmit out of band. This Modification is for Informational purposes ONLY. Doing such modifications on your radio may void any warranty and damage your equipment.

**Subject:** Find the 6 pads

I have reduced the size of the photo to better accomodate its downloading size should you choose to publish it.

Rick  
V31RS

**Subject:** More info about pads

One side of each of the pairs of solder pads is connected to ground. (You can, in fact, see this in the photograph --- the lower pads are directly connected to the PC board's ground plane.) The resistor (which, by the markings, appears to have a value one ohm --- more of a jumper, really) just uses JP1 as a convenient place to make a connection to ground. You can safely move the end of the resistor from JP1 to JP2.

**Note:** The mod disables the "automatic repeater shift" (ARS) feature of the transceiver.

Best Regards,  
Jeff

**Subject:** Newer FT 1500 mods

The newer (looks to be 2001 models) have an SMD resistor on pod 1, just completely remove that, continue the mod as above and do reset and it works fine..

Worked for me on 2 new FT 1500's

Chris

**Subject:** ft-1500

The mod. for the FT-1500 caused my radio a few problems on setting the odd/split channel freq.s.I had to add the TX channel in while the channel number was blinking.This is not how the instruckion manual says to add the channel.You still must press the PTT switch also and then press the D/MR button one more time.The radio worked fine after I solved this problem.

28-09-2001

(FT-1500) FT-1500M - reducing bass response in TX audio

**Author:** Mike, M0CQG

The MH-48 electret microphone supplied with the FT-1500M gives a very pronounced bass response (in common with many electret microphones from far-eastern manufacturers). It's an easy task to reduce the bass response and give your TX audio a more balanced quality.

**PLEASE NOTE** - This modification is carried out at your own risk and may void the manufacturer's warranty! I can't be held liable for any loss of warranty or damage to your radio as a result of the modification.

You will need a .01uF ceramic capacitor to carry out the mod, the instructions for which are as follows:

1. Remove all three screws from the back of the microphone, and lift the back cover away from the front.
2. Locate the white plastic connector which attaches the microphone cable to the circuit board. There are six wires leading from the microphone cable to this connector.
3. Locate the 'audio out' wire - this is the second wire in from the right-hand side of the connector (on my microphone it was the white wire).
4. Using wire cutters, snip the audio out wire approximately half way along its exposed length. Be careful not to inadvertently cut any of the other wires!
5. Carefully removed 1/8" insulation from both free ends of the audio out wire, then tin them.
6. Take a .01uF ceramic capacitor (usually marked "103") and snip the legs to around 1/4" in length, then tin them.
7. Now solder one leg of the capacitor to one free end of the audio out wire, and the other leg of the capacitor to the remaining end; ie. place the capacitor in *\*series\** with the audio out wire.
8. Ensure the legs of the capacitor are not touching each other. Then, fold a piece of electrician's tape around the capacitor and the wire connections so that they can't short to the circuit board.
9. Replace the back cover of the microphone (ensuring that the PTT bar is located correctly) and all three screws.

You should now find that the transmitted audio is crisp and clear. Enjoy!

73

Mike, M0CQG

20-10-2001

(FT-1500) Mic color mod for Yaesu FT-1500



**Author:** Rohn Kunnen

The Yaesu FT-1500M comes with a microphone that is backlit red and the radio display is blue. Needless to say, they don't look good together. Here's what I did..

You'll need:

1. Phillips screwdriver (**s**mall)
2. Soldering iron
3. Blue surface mount LED's (**Newark Electronics part # 98B5036**)
4. Solder wick

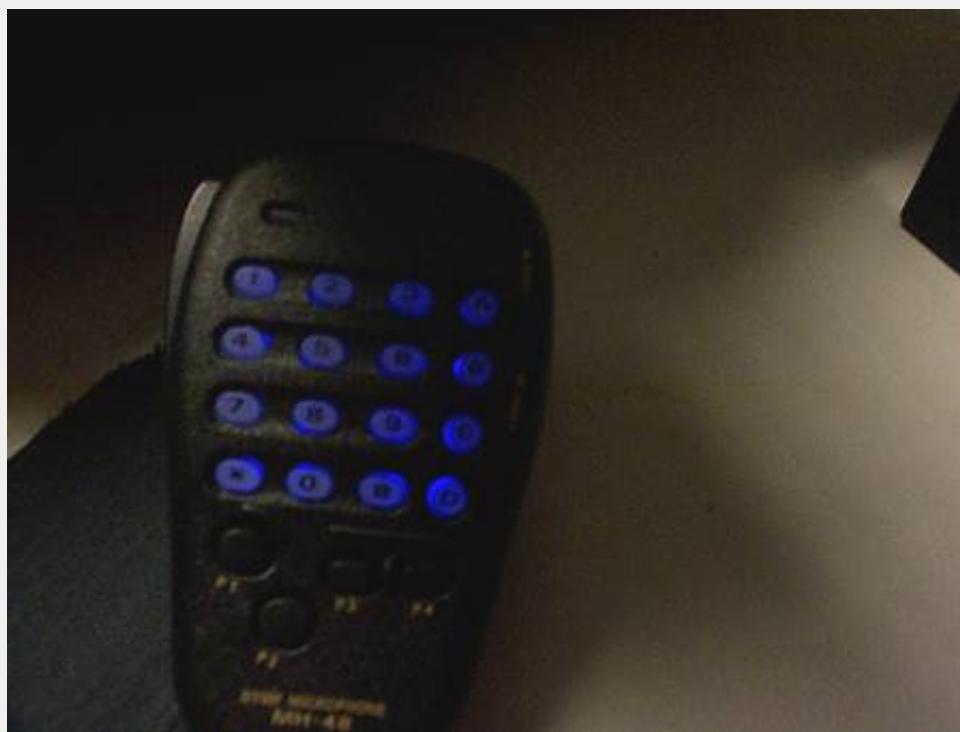
First, remove the three screws from the back of the microphone case. Open the case and unplug the six pin mini-JST connector. Upon opening the case, the PTT button may fall out so be careful. The circuit board has four screws retaining it and the PTT switch has a small phillips screw holding it in place that goes through the circuit board. Once the screws are removed, the circuit board is free and easily removed.

I removed the circuit board like a hinge in that I didn't unsolder the electret microphone from the board in order to remove from the case. Doing it this way is easier and you don't have to worry about ruining the mic. On the switch side of the board is where the LED's are located. They are all 805 size surface mount LED's.

First, check the polarity of each LED and put a little dot by each cathode with a Sharpie pen or small paint marker. Once that is done, remove an LED by heating each side quickly and then apply a small amount of pressure to one side with the soldering iron. Use solder wick to remove all the solder from the pads in order to give a clean flat surface for the new LED.

Carefully solder a blue LED in place of the red observing correct polarity. Repeat this four more times and your done!

The LED that is at the top of the mic by itself is the transmit indicator LED. You can leave this one alone and do the four backlight LED's if you want, but I did all of them. The only time the transmit LED is on is when your transmitting and you don't notice it anyway so I changed it to match the others.



I ordered LED's from Newark Electronics [www.newark.com](http://www.newark.com) and they came in two days with no problems. I ordered part # 98B5036 which are size 805 surface mount, blue, low-profile with a veiwing angle of 170 degrees. The higher the veiwing angle, the better the light will diffuse behind the buttons on the mic. These LED's are made by Agilent Technologies (part #HSMB-C170) and where about 65 cents a peice. They do have a minimum order of \$25.00 though but they are worth it.

Rohn Kunnen

**19-07-1998**

## **(FT-209) FT 209 R /FT 209 RH: Activate 10 MHz segment between 130 and 160 MHz**

It is possible to activate any 10 MHz segment between 130 and 160 MHz on the FT 209 Handy from Yaesu. First you have to solder in the bridge 7 on the control unit board ( pcb with the keypad ). Now after a reset the display shows you "0000" with the first digit flashing and you have to enter the receiving low, receiving high, transmitting low and transmitting high frequency (only the first 4 digits !). For example :

If you wish a receiving segment from 142.500 to 151.800 and a transmitting segment from 144.000 to 146.000 MHz you must enter the following after the reset :

```
1 4 2 5  D
1 5 1 8  D
1 4 4 0  D
1 4 6 0  D
```

Finally you must program the repeater shift. The shift is not set to 600 kHz. Enter 0 6 0 0 F shift. That's all !

The PLL locks only between 138 - 152 MHz successfully and transmitter works only between 140 - 149 MHz. If you want to use other frequencies you must realign the rig.

This modification is read 709 times.

[top of page](#)

**19-07-1998**

## **(FT-209) FT-209 RH Out of band**

The magazine article says to jump pins 1, 7, 9, 10, 11, 13, and 16.

In every 209RH I've opened, pins 1, 9, and 13 are already jumped. Adding jumpers 7, 10, 11 and 16 allows "out-of-band" transmission. But the receiver becomes thoroughly confused, and is not tunable.

The solution:

DON'T jump 11 and 16.

So the final steps are:

1. Add jumpers to 7 and 10.
2. Give the VCO can a 1/2 turn clockwise if you're moving to higher freqs.
3. Reset radio and reprogram rcv and xmit freqs, and rpt offset.

This modification is read 727 times.

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**19-07-1998**

## **(FT-211) 9600 BPS with Yaesu FT-211RH**

The FT-211RH has been shown to be suitable for 9600 baud packet operation. There is no major surgery required just two screened leads are required, one for TX AF the other for RX AF connected as follows:

### **RX AUDIO**

On the RX IF Unit (sub board F2869104) connect the screened lead inner to the TK10420 IC pin 9 with the outerscreen to pin 15. Caution should be taken to solder these if soldered to the underside of the board.

### **TX AUDIO**

On the rear of the main PCB a small potentiometer will be seen (peak deviation adjuster). Unsolder the leg nearest to the rear of the set, and connect the inner of the screened TX leads to this point, the outer to the earth plane adjacent to this point. To ensure that the 9600 baud modem is terminated in the required impedance, it is essential that a suitable terminating resistor be placed across the screened lead inner/outer, eg a 560 ohm resistor; this may usefully be done at the FT-211RH potentiometer connection.

No further adjustments need to be made to the radio. On the tested modem a suitable level of 2.5 kHz deviation was achieved with one third rotation clockwise of the modem TX AF level potentiometer.

This modification is read 312 times.

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**19-07-1998**  
**(FT-212) FT-212RH Extended Frequency Coverage**

Remove the bottom and top covers and remove the front panel cover. You must then remove the front board by carefully unplugging it (try not to touch the lcd display). On the back of this board which is the control unit locate jumpers 1 through 12 and unsolder any that are soldered. All jumpers must be open (1-12 only). Reinstall the control unit and just turn on the radio for a few seconds. now turn it off again and remove the control unit again and solder jumpers 3, 4, 5, 11 only.

Put everything back together and apply power. The display will read 000.  
Push the MHz button and rotate the main dial until 132.000 reads on the display, then press D/MR once. Now press again the MHz button and rotate to 180.000 and press the D/MR again.

the radio is now programmed to operate from 132 to 180 mhz. mine has tx and rx through the entire spectrum with excellent sensitivity from 136 to 178. Dont forget that transmitting outside the amateur band is not allowed so please consult your local athorities for a special permit.

This modification is read 1195 times.

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**19-07-1998**  
**(FT-212) FT-212 and 4800 bps**

I have made the following connections/modifications to the FT212/FT712 transceivers:

For receive, I connected a 10K resistor to pin 11 of Q01 in the IF-unit. The other end of the 10K resistor is the output. The resistor is there to protect the transceiver when you make an error at the external connection...

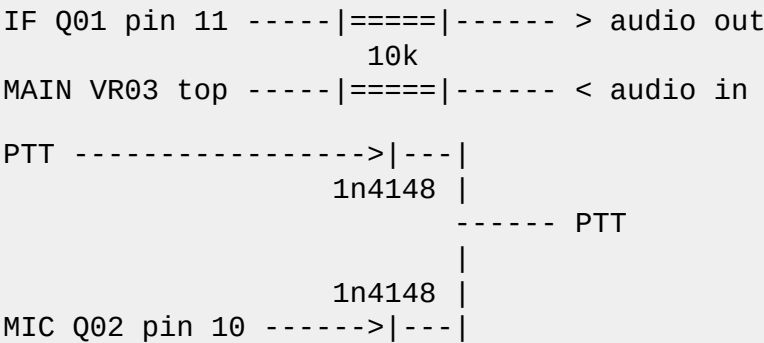
For transmit, I connected a 10K resistor to the top end of VR03 in the main unit (near pin 1 of the MIC unit connection). This point is fed rather directly to the vco varactor.

I have made the external connection with a shielded cable that can run through a hole near the antenna coax. There is a small plate on the heatsink that you can remove and a suitable hole appears.

When you connect the transmit line, it is possible to switchoff the mike amplifier (at least when you don't have the voice recording unit).

Use 2 diodes, with the kathodes connected together to the external "PTT" switching lead. The anode of one diode is connected to the normal PTT point on the mike connector, the anode of the other diode is connected to pin 10 of Q02 in the MIC unit. When you now pull the external lead to 0V, the set will transmit but the microphone does not work. You can leave it connected! Very convenient when you want to use it for fone...

Summary:



(this is a text I sent to someone else before)

I have heard both horror- and success-stories about the TM531 too...  
The problem is, that different people refer to the same results as "It works perfectly, just a few bit errors", or "It's a complete disaster, every 3rd frame I have to send a re-try, killing the throughput".  
We are operating a succesful 4800bps link using the TM531 with the HAPN modem, but that one is a bit less demanding.

73,Rob PE1CHL

**19-07-1998**  
**(FT-2200) FT-2200 expanded frequency range**

I have mobile transceiver FT2200 version B3.  
Hi have 12 programming jumper across on the control unit (under LCD display). My transceiver have :

- Automatic repeater shift version B
- Tone Burst 1750Hz
- RX 110MHz-180MHz FM/AM (110MHz-140MHz automatik AM)
- TX 140MHz-174MHz FM

Jumper across.

|       |      |      |      |      |      |      |      |      |      |      |       |       |
|-------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| Nr.   | Nr.0 | Nr.1 | Nr.2 | Nr.3 | Nr.4 | Nr.5 | Nr.6 | Nr.7 | Nr.8 | Nr.9 | Nr.10 | Nr.11 |
| JUMP> | NO   | YES  | NO   | NO   | NO   | NO   | NO   | NO   | NO   | YES  | NO    | NO    |

NO > JUMPER NOT is  
YES > JUMPER it is  
JUMPER Nr.5 >> AM RX block out (info HB9PD)

**21-04-2000**  
**(FT-2200) Yaesu FT-2200 2m mods**

**Author:** *Tim Skloss - KC5DNA*

I bought my ft-2200 a few months ago and I didn't have the AM recieve activated. So I complained and got the mod for it:

AM receive:

1. Remove top and bottom covers, then remove speaker.
2. Lift the faceplate retaining tabs on top and bottom to slide the face off (pull the knobs off first you knob).
3. Remove the retaining nut on the tuning shaft and lift the clear plastic light guide off.
4. The 12 surface-mount sized jumpers are now visible.
5. If AM is disabled, there should be a jumper across number 5. Remove this and reset radio before use. (I think it is number 5, my radio had only one jumper in place, and it was the one for AM block-out. If you have more than one in place, contact me and I will give you the double-checked version of this mod.)

Now, if you enjoy this mod, please send me any more that you have heard of for this model. I would like a wide open radio to experiment with it's power output across the spectrum. I need FM Rx and Tx extended.

Is it common for a radio to require a jump *\*made\** instead of just *\*cut\**? This would have to be the case for this model since it doesn't have any jumpers soldered into place. (12 pairs of surface-mount sized/spaced pads numbered from left to right).

thanks in advance!  
Tim Skloss - KC5DNA



**13-09-2001**

## **(FT-2200) Expand the TX and RX of a later model Yaesu FT-2200**

**Author:** KJ7K - [KJ7K@juno.com](mailto:KJ7K@juno.com).[MODIFICATION.NET](http://MODIFICATION.NET)

My FT-2200 is a late model---(ser. # 4M220900) The early models were done differently. You can find the other mod elsewhere.

The process for the later models is super easy. It'd sure be nice if ALL manufacturers had the foresight to do it like Yeasu. Yea! Sue!

OK! Here we go!

1. Disconnect the power and antenna cables.
2. Remove the bottom cover (the speaker side) and CATCH the speaker before it drops out. It isn't screwed down; it just rests on a rubber mount.
3. Carefully lay the speaker aside.
4. Find the GREEN wire that's located under the speaker. It has a nice loop in it...just perfect for "snipping."
5. Clip it! One little ol' snip is all it takes.
6. You're almost done. Reattach the lid.
7. Reconnect the power and antenna cables and fire that sucker up!
8. Now you've gotta' RESET your radio. It's easy!

Press the MHZ and the CALL button, hold them down and then press the POWER button.

The power will come on and your MOD will be done!

Here's a neat feature: Resetting doesn't erase your previously programmed memories! Nice! I think I really LIKE the designers at good ol' Yeasu!

The TX used to be 144.000 to 148.000. The RX used to be 144.000 to 174.000.

But NOW...it's 140.000 to 175.000 MHz on TX and 110.000 to 180.000 MHz on RX. And now you've got an AM band, too. A star shows up on the display when you're in AM territory.

This is a nice, easy mod...and the price is right! Even a simpleton like N0QAN could do it!

Remember: Just don't transmit where you aren't licensed or you'll screw it up for all the responsible people! I'm sure you knew this; you're ALREADY one of them there "responsible types," right?

Right!

73!

KJ7K

This modification is read 956 times.

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**19-07-1998**

## **(FT-221) Keying modifications for Yaesu FT-221**

Keying modifications for Yaesu FT-221(225) (S/N 130233D)  
(circuit diagrams are shown in DUBUS info 1991 nr 1)

By Jan-Martin Noeding, LA8AK, Voelien 39/B, N-4623 Kristiansand S.

Several boards in FT-221 and FT-225 are equal, so this article is believed to suit either rig. Some of the older FT-221 do not have the KEY-filter (PB-1568) (I am not sure if this board really helps)

Intentions for modifications: CW-MS TX experiments.

In this article the modifications shown is for maximum speed 200-300 lpm. LA8SJ friendly let me borrow his set to test the experiments, this limited the amount of modifications.

Status before modification.

FT-221/225 has bad reputation for key-clicks, and tone can be heard by local stns between the characters (bad key on/off ratio).

Measurements before modification:

RF measurements (RF RMS mV-meter - eg. LA7MI mV-meter). See fig 1. Q08 emitter 1.5V rms, Q07 emitter 0.6V rms @ Key-down or SSB. RX-carrier(PB-1460B pin 22) 0.5-0.55V. FM-out (pin 3) 22mV. It is not important to measure these voltages very correct, but this is only for reference before and after modifications to see whether some bad changes have been made.

Normally just above the minimum level the rig will work with at the outputs from the board will give output free from overloading other stages in the rig !

Keying for Q07 may be checked at pin 22 (PB1460) RX CARRIER. Original- ly key-up RF voltage is as high as 25mV. This is easily reduced a lot.

### **Modifications PB-1460B MIC AMP (see fig.1)**

Q07 2SC372Y was replaced by the RF transistor type BF199, the keying was improved by 10dB. Oscillator drive to the buffer (Q07) is excessive so it is important to reduce this. This stage pulled frequency when keyed.

It was found easier and sufficient to use a PASSIVE BUFFER (and voltage divider) instead of an active stage to solve the problems, Xtal osc emitter resistor R42 is divided into two resistors, 100 and 120 ohm, an 1nF capacitor is connected between center of the resistors and Q07 base Q (C46).

Control that RF voltage at pin 22 is almost the same as before. R39/40 is changed as in the circuit diagram. This is not important for key-up carrier suppression, but for keying-waveform (key clicks). CW-Modification: R38 is divided into two resistors, 330 and 560 ohm. They were found experimentally in a test circuit. With 0.6V RMS input the emitter-cutoff voltage is increased by 1v DC. CW FM BUFFER Q01 (2SC372Y). The original values are: R02=1K, R03=6k8, R04=3k3 (VR10=5k was not found). If other values are used for R03 and R04 they should be changed. VR10 must be removed, it is connected between pin 8 and 26 on some models. The emitter resistors are re- arranged as shown on the circuit diagram. To achieve highest possible key-up/down ratio this transistor is now operated at much higher gain than earlier, BF199 is also used for Q01. The excessive RF level is reduced at the output with an extra resistor (1R5). It is easiest to use a trimpotmeter here (470 ohm as variable resistor across the point).

The diode D17 1S1555 seems not to give sufficient attenuation when cut-off, so a BA182 (or 2x BA182 in series) is used instead.

### **KEY FILTER and SHAPER (see fig.2 and 3)**

For normal keying it is possible to change the original board, when installed, see figure 3. For a simple circuit it was necessary to use germanium transistor driver (low saturation voltage level).

Good germanium transistor types are: AC125, AC126.

AC162 may have too little current gain. I used OC57 because this was available, perhaps it is just too low current type.

For FT-7 I tried AC162, but it failed in a similar circuit.

For CW-MS a keying unit like the one shown for IC-202E must be made, however higher key-up current must be available.

### **Rewiring (fig. 2 and 3)**

The original wiring cannot be used. This because SIDETONE oscillator is connected to output from KEY-FILTER (I just don't understand why) This must be changed. New circuit diagram is fig. 3.

To use the 'high' voltage-swing in the keying circuit, which is +8V some diodes must be connected to KEY input (SSB-GND) to the PB-1499 AF pin 6 + 7 to isolate these connections. 4x 1N4148 are used to achieve this and have equal operation point for these stages after modification.

### **RX audio line output.(LINE OUTPUT)**

For CW-MS and packet radio audio direct from top of AF gain should be used to feed the external equipment, to achieve independent audio level.

Other problems.

FT-221 has bad AGC. It seems not possible to improve the circuit much, this is because of severely carrier oscillator leakage into the IF stages. One week was used to solve this, a lot of extra decoupling capacitors were installed, but it seems impossible. Possibly the only solution to the AGC problem is to use a combination between the old circuit and a Plessey SL621/1621 AGC IC.

SIGNAL INTELLIGIBILITY is the most important term for efficient DX- and contest operation, I suppose you do not wish to ask several times for locator and other details. When you are not used to the language, pronunciation, or dialect of the station you work this is of extreme importance.

FT-221 and FT-225 are rather old rigs. They compare to FT-101B/FT-301, some one should perhaps expect too much, but in fact, several new rigs have the same troubles, and many other defects than this. So perhaps it is sometimes better to keep the old rig!

### **CW Meteorscatter keying.**

A simple way is to reduce the capacitor in base circuit of the germanium driver transistor. A better way is to use the circuit shown for IC202E with some changes for higher current in key circuit.

This modification is read 792 times.

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**22-08-1998**

## **(FT-221) Yaesu FT-221R repeater modification**

Updating the Yaesu FT-221R

With the recent opening of the 2-meter sub band [144.5-145.5 MHz] to repeater operation, owners of some excellent transceivers find themselves unable to use their rigs to key machines on the newly activated channels. Notable among those radios is the Yaesu FT-221R. In order to prevent out-of-band operation, only the 146.5MHz and the 1470-MHz switch positions permit offset transmission. Yaesu engineers did not anticipate the recent FCC ruling and as manufactured, the 221R cannot work through repeaters having inputs below 146.0-MHz. The solution I describe below is simple and does not mutilate the radio. Only two short pieces of wire and one new offset crystal are required.

Loosen the top cover by pulling up on the four snap fasteners and carefully pry off the cover. Turn the set upside down on the work table. Remove the side screws and slowly lift away the bottom shell. The four-section band switch will be found just behind the front panel. The second band switch from the panel is designated as S2B, the third section as S2C.

The solder lugs of each section of the switch [from lugs 1 through 8] start with number 1 on the left UNDERSIDE of the wafer [looking from the front panel]. Number 2 is the first lug on the left TOPSIDE. Number 3 through 8 follow clockwise so that number 8 is on the extreme right TOPSIDE of the wafer, as you view the switch with the set upside down.

On the wafer S2B solder an insulated wire about 1-1/2 inches [40 mm] long to lugs 3 and 7. Lug 3 is not wired at the factory, and lug 7 has a yellow wire soldered to it. On S2C connect lug 3 to lug 6. Again, lug 3 is not factory wired; lug 6 is solder to a dark blue wire. Be very careful, when soldering, not to melt the insulation of surrounding wires. A helpful idea is to have a friend use to small screwdrivers or similar instruments to separate, and make a path through, the jungle of wiring around the switch while you do the soldering.

Now replace the bottom shell. Turn the radio right-side up. Remove the black plastic cover plate over the LOCAL board and carefully pull out the board. Just rock and lift it gently out of its edge connector. Plug a 13.9666-MHz crystal [case type HC-25/U ] into position 12 on the offset / auxiliary end of the crystal strip. Do Not use socket 9.

At the bottom of the component side of the LOCAL board find connector contacts 28 and 30. They are contiguous to each other. Immediately above the contact strips very carefully solder [ with a low heat iron ] a bonding bridge connecting the printed conductors of 28 and 30. Then, immediately above this solder bridge sever the pc conductor of number 30. Use a razor blade, or X-acto knife. Be sure the 28 to 30 bridge remains intact. Replace the LOCAL board in the chassis-mounted edge-connector. Screw it down tightly.

Turn on the transceiver. Rotate the band switch to 145.0 MHz. Throw the AUX switch to the UP position and the RPT switch to NORM. Key the transmitter [ with dummy load ] and adjust the trimmer capacitor of crystal 12 [ last one on the left , looking from the front panel ] until the transmit frequency is 600 kHz lower than the receive frequency. Replace the plastic cover plate over the LOCAL board. Replace the top cover. The set should now operate through the repeaters on the 144.5-to 145.5-MHz sub band... And surprise!! You are also able to use the 221R on 1-MHz split repeaters in the 146/147MHz "oddball" band. Just turn the band switch to 146.0 MHz, the AUX toggle UP, the RPT toggle to either NORM or REV, as the occasion requires, and you've got 1-MHz split without the need for an additional crystal. You're actually using one of the factory-wired crystals as an offset rock without impairing the normal function.

When I ordered my crystal I also ordered The frequency I use as simplex and that saves a lot of tuning. I ordered Mine from "Jan Crystals", They charge as much for one as they do for two. That was the reason I ordered the simplex one NOTE: On the

LOCAL board contacts at the bottom of board there will be 6 or more contacts in a row then a blank and then another one .The two that are bridged together are the last two before the blank space.The one you cut is next to the blank of the two you bridge together.I hope I have not confused you to much .Have fun!!

73s  
Herman A.Tucker  
wa4oba@juno.com

This modification is read 798 times.

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**12-11-2000**

## **(FT-221) FT-221 PB-1455 (PLL UNIT) SCHEMATIC**

**Author:** Gordon Hardman - [geh@crosslinkinc.com](mailto:geh@crosslinkinc.com).[MODIFICATION.NET](#)

Schematic diagram of the PLL UNIT of the FT-221 in PDF.

[PB1455.pdf](#)

This modification is read 787 times.

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**09-11-2001**

## **(FT-225) FT-225RD Sideband Noise**

**Author:** - [oz2m@qsl.net](mailto:oz2m@qsl.net).[MODIFICATION.NET](#)

Components needed for the modification:

- Capacitor 10 nF,
- capacitor 10 mF,
- radio frequency choke 10 mH, 30 turns on a 12 mm \* 1,5 mm ferrite rod,
- resistor 10 kW and
- resistor 33 kW.

1. Remove top cover.
2. Locate "PLL UNIT".
3. Remove dust cover.
4. Remove "PLL UNIT" board from the transceiver.
5. Open your manual on page 34.
6. Locate the "VCO BOARD" on the "PLL UNIT" board.
7. Unsolder the "VCO BOARD" from the "PLL UNIT", make sure that you have removed all the solder from all pins before you remove the "VCO BOARD" from the "PLL UNIT" board.
8. Remove top cover of the "VCO BOARD".
9. Locate R01.
10. Use a scalpel to cut the resistor free from the wax.
11. Unsolder the resistor.
12. Fit the radio frequency choke in the holes left by R01.
13. Refit top cover of the "VCO BOARD".
14. Solder the "VCO BOARD" to the "PLL UNIT" board.

15. On the soldering side of the "PLL UNIT" board, mount the circuit shown below.
16. Refit the "PLL UNIT" board into the transceiver.
17. Locate capacitor C49 on top of the "PLL UNIT" board.
18. Adjust TC01 until the voltage on C49 is 3 V at 144,000 MHz.
19. Refit dust cover.
20. Refit top cover.

The sideband noise is now reduced. Below you can see some measurements made by SM5BZS.

This modification is read 697 times.

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**09-11-2001**

## **(FT-225) FT-225RD Transmitter sideband noise**

**Author:** - [oz2m@qsl.net](mailto:oz2m@qsl.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Two tone test of the receiver blocking.

ACG off

Components needed for the modification:

- Wire 30 mm,
- wire 50 mm and
- wire 400 mm.

1. Remove top cover.
2. Locate "SSB IF UNIT".
3. Remove dust cover.
4. Remove "SSB IF UNIT" board from the transceiver.
5. Locate base on Q03 (2SC373).
6. Fit a wire (50 mm) to the base of Q03.
7. Fit the other end of the wire to pin B17 on the component side of the "SSB IF UNIT" board.
8. Refit "SSB IF UNIT" board into the transceiver.
9. Refit dust cover.
10. Locate the pins of the "ATT" push button on the rear side of the front plate of the transceiver.
11. Scratch free the upper part of the pins of the "ATT" push button.
12. Connect a wire (30 mm) to pin C.
13. Connect the free end of the wire to shield.
14. Connect a wire (400 mm) to pin B.
15. Remove bottom cover.
16. Run the wire from pin B to the bottom of the transceiver.
17. Refit top cover.
18. Locate edge connector J20 "SSB IF UNIT".
19. Locate pin B17-J20.



20. Remove the shield core from pin B17-J20.
21. Run the wire from pin B through the wire strips to pin B17-J20.
22. Solder the wire to pin B17-J20.
23. Refit bottom cover.

The AGC can now be switched off by the "ATT" push button.

This modification is read 646 times.

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**09-11-2001**

## **(FT-225) FT-225RD AGC Slow and Fast Time Constants**

**Author:** - [oz2m@qsl.net](mailto:oz2m@qsl.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Components needed for the modification:

- Capacitors.

If you want to change the slow time constant, then change C22 to a value that suits you, note that this modification affects the fast time constant. If you want to change the fast time constant, then change C23 to a value that suits you.

1. Remove top cover.
2. Locate "SSB IF UNIT".
3. Remove dust cover.
4. Remove "SSB IF UNIT" board from the transceiver.
5. Locate C22.
6. Locate C23.
7. Refit "SSB IF UNIT" board into the transceiver.
8. Refit dust cover.
9. Refit top cover.

This modification is read 611 times.

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**09-11-2001**

## **(FT-225) FT-225RD Noise Blanker Improvement**

**Author:** - [oz2m@qsl.net](mailto:oz2m@qsl.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Components needed for the modification:

- Diode 1S1555 and
- resistor 33 kW.

1. Remove top cover.
2. Locate "FM IF UNIT".
3. Remove dust cover.

4. Remove "FM IF UNIT" board from the transceiver.
5. Locate the components shown below.
6. Modify as shown below.
7. Refit "FM IF UNIT" board into the transceiver.
8. Refit dust cover.
9. Refit top cover.

This modification is read 624 times.

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**09-11-2001**

## **(FT-225) FT-225RD Power Control in SSB Mode**

**Author:** - [oz2m@qsl.net](mailto:oz2m@qsl.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Components needed for the modification:

- Diode 1N4002.

1. Remove bottom cover.
2. Locate edge connector J21 "TONE BURST UNIT".
3. Locate diode D10 between pin B9-J21 and pin B6-J21.
4. Unsolder D10 from pin B9-J21, do not unsolder the blue wire.
5. Locate edge connector J20 "SSB IF UNIT".
6. Locate pin B7-J20.
7. Unsolder blue and blue-yellow wires.
8. Fit a diode with the cathode on pin B7-J20, and the anode to the free end of D10.
9. Solder the two free wires from pin B7-J20 to the point between D10 and the new diode.
10. Refit bottom cover.

The output power is now controlled by the "PWR CONTROL" in all modes.

This modification is read 669 times.

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**09-11-2001**

## **(FT-225) FT-225RD CW Click**

**Author:** - [oz2m@qsl.net](mailto:oz2m@qsl.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Components needed for the modification:

- Capacitor,
- capacitor 2,2 mF and
- resistor.

You will have to try several values to find the right time constant, that allows you to operate at your maximum CW speed.

1. Remove top cover.

2. Locate "CW KEYING UNIT".
3. Remove dust cover.
4. Remove "CW KEYING UNIT" board from the transceiver.
5. Locate R04.
6. Check the value of R04 (mine was 27 kW).
7. If the value of R04 is not 47 kW, then replace it with a resistor with the right value.
8. Locate Q02 (2S372Y).
9. Between the collector and emitter solder a suitable capacitor and resistor, values in the mF range and kW range is a possible choice.
10. Refit "CW KEYING UNIT" board into the transceiver.
11. Refit dust cover.
12. Locate "MIC AMP UNIT".
13. Remove dust cover.
14. Remove "MIC AMP UNIT" board from the transceiver.
15. Locate C30 (10 nF).
16. Solder a capacitor, 2,2 mF, in parallel with C30.
17. Refit "MIC AMP UNIT" into the transceiver.
18. Refit dust cover.
19. Refit top cover.

This modification is read 603 times.

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**14-11-2001**

## **(FT-225) Modify FT225RD for better performance**

**Author:** SM5BSZ

### **Dynamic range of 2 m transceivers Part 5: Modifications to the FT225RD**

Published in Radio & Television Nr 6 1981.

- ***When we tested the FT225RD we found a rather high level of sideband noise in tx mode and a poor two signal dynamic range in receive mode for the same reason. It also had severe keying clicks and a large bandwidth as SSB transmitter.***
- ***With the modifications described below, the rather poor transceiver is changed to an excellent unit, probably the best on the market.***
- ***It is easy to cure the keying clicks and the excessive bandwidth on SSB transmissions. It is a bit more difficult to reduce the noise sidebands from the VCO. To cure the VCO you need some experience above novice level.***

In the previous issue of RT we treated FT221 by Yaesu-Sommerkamp and showed how to lower the sideband noise. Here we discuss the follower FT225RD and explain not only how to reduce the sideband noise but also how to remove keying clicks and splatter in ssb mode.

After these modifications have been made, the FT225RD is the best factory built synthesis station we have made

measurements on. The noise before and after modifications is shown in fig 1. The figure also shows average values from the modified rigs described earlier in this series. IC202 which uses a VXO is also shown as a comparison.

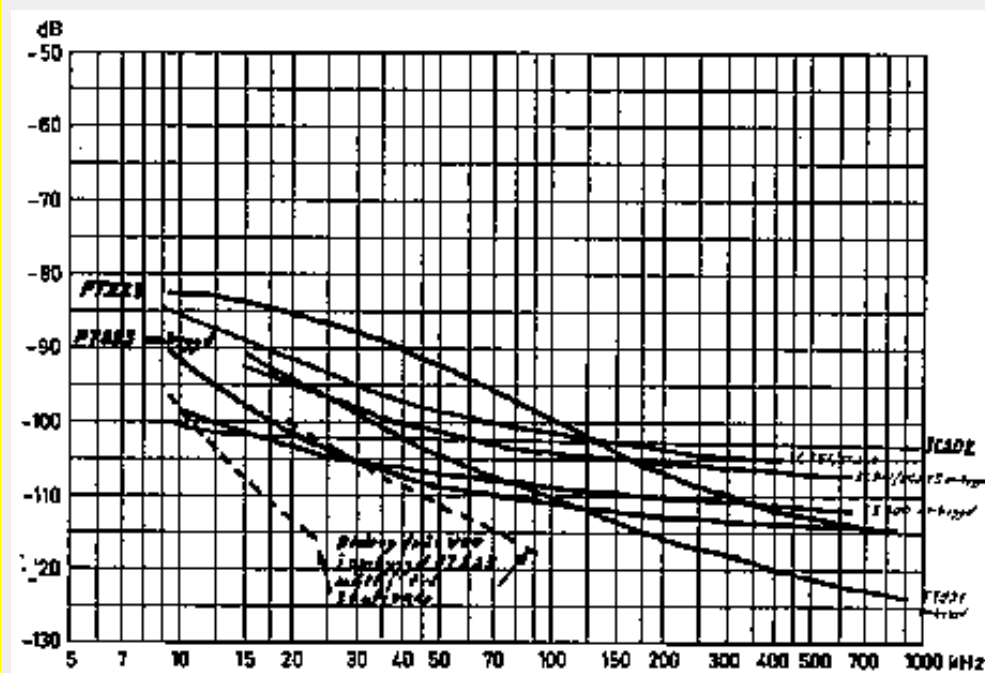


Fig 1. Sideband noise from FT225RD in transmit mode before and after modification. As a comparison some other rigs are also shown in the figure (coloured in the original article - sorry for the poor image quality). The comparison curves (with unreadable text at the right side) are IC202, IC251/IC211(mod), TS700(mod) and FT221(mod). Note that FT225 is the most noisy station before modifications at typical CW interference frequency offsets (10 to 50kHz) while it is the best station of all after modification.

The modifications are tested on two different FT225RD units. The sideband noise is identical between the two units in transmit mode within our accuracy of measurement.

Both units have the original front end replaced by the MuTek board (Kungsimport tel 0300/440 89) The performance of the two FT225RD units differs considerably in receive mode but they are both quite good. The 2-signal dynamic range is shown in fig 2.

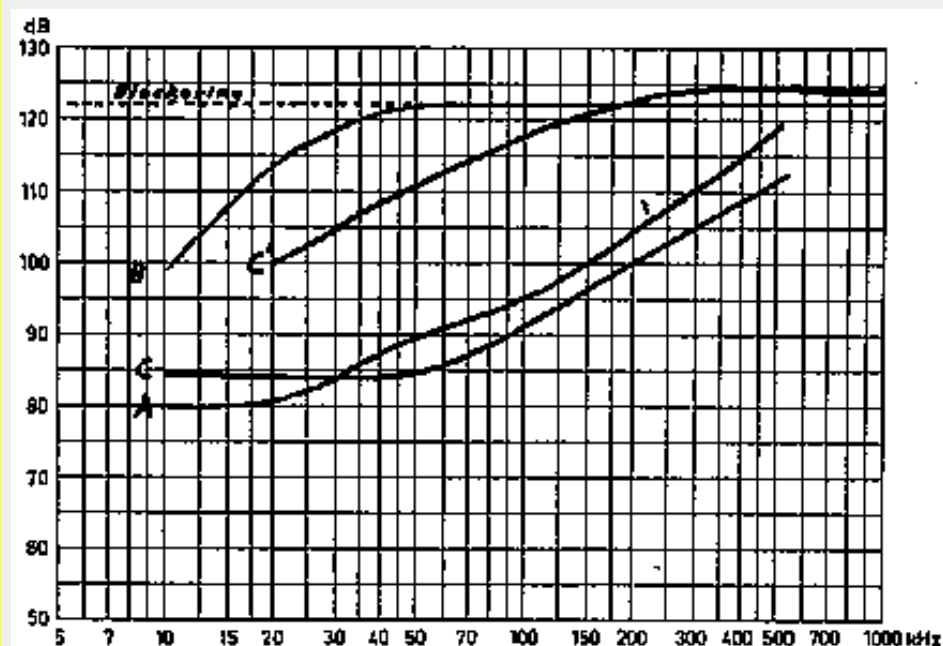


Fig 2. Two tone test of the receiver showing how strong an interfering signal can be (relative to the noise floor) without reducing the S/N of the desired weak signal with more than 3 dB. Curve A shows the performance in the original state. B shows a modified station. C and C' show another station before and after modification. (The MuTek front end board was used in all these tests)

By comparing fig.1 and fig.2 one can say that the side band noise in transmit mode does not come from the VCO. It must be amplitude or phase modulation introduced by later stages. The contribution to the tx noise that comes from the VCO is indicated by dotted lines in fig1. One of the stations, B in fig.2 has extremely low VCO noise. Very probably the wide band tx noise can be reduced by 15dB by simple means, which would make the transmitter equally good as the receiver.

#### Common error causes sideband noise

The modification required to reduce the sideband noise is exactly the same as the one needed for IC211/245. The error in the VCO is the usual one, the capacitance diode is fed through a resistor instead of an inductor. The resistor creates noise that modulates the VCO signal. This FM modulation is the noise sidebands.

Unfortunately the electrically simple change is a bit tricky from a practical point of view since the VCO board has to be desoldered from its motherboard (pll-unit). Some skill in desoldering is required. Watch out for the three pins with +8V, control voltage and RF out to be completely desoldered from the motherboard before you try to remove the VCO! The pins are not well secured to the VCO board, and they are easily pulled out together with parts of the copper conductors of the VCO board.

The modification is to replace R1001, a 100 kohm resistor, with a rf choke. R1001 is located between TC1001 and the two capacitance diodes. It is very important that the choke is mechanically well attached to the board. Vibrations cause FM modulation which the (after modifications) slow PLL will not cope with. You may solder the grounded end to the ground plate on the top side of the VCO board.

### **Choosing a good rf choke**

We have received several letters with questions about what inductor to choose in the modifications for IC245/211 and FT221. Below is some more information about what the rf choke and its operation. It is valid for PLL loops in all transceivers, not only at VHF.

The choke has to pass DC voltages and audio frequency AC voltages to the capacitance diode(s). The choke forms a low pass filter with the capacitance diodes and possibly other capacitances that from an audio frequency point of view is in parallel. This low pass filter has to produce a small phase shift at the highest frequency for which the phase locked loop gain is above unity. Practically a 3dB point of 5kHz may be ok which means that the choke may be up to 100H or so. In other words, there is no upper limit for the inductance.

The choke is in parallel with the resonance circuit. The important thing is that it does not degrade the Q. At VHF a single layer inductor wound on a ferrite rod combines high inductance and low capacitance to form a very high impedance that does not add losses to the resonant circuit. It does not change the resonant frequency much either.

In our modifications of 2 m-transceivers we have used RF chokes from TV-tuners. They are wound by about 30 turns on a 12mm long ferrite rod with about 1.5mm diameter. The inductance is about 10 microhenry.

When you glue the inductor to the board to make it mechanically stable, make sure that you do not create a large and lossy capacitor between the hot end of the inductor and ground. In other words, make sure the glue layer is thick or use some insulating spacer to make the stray capacitance small - and thereby its losses.

### **The noise from the loop is reduced by a filter**

For FT225RD as for IC211/245 it is necessary to add an extra filter in series with the control voltage for the VCO. This filter is shown in fig.5 in the article about IC211/IC245.

The 33 kilohm resistor can be placed between the feed thru capacitor C1049 and the motherboard. The other components are conveniently placed on the back side of the motherboard.

When the modifications are done to the FT225RD it is not necessary to perform any adjustments provided the RF choke did not change the resonant frequency too much of the oscillator. If the frequency has to be adjusted, change TC1001 until the voltage at C1049 becomes 3V when the transceiver is tuned at 144.000MHz.

### **A further improvement is possible**

We have done some experiments in order to further lower the sideband noise from the VCO in FT225 by making the coupling between the transistor and the resonant circuit looser. This was successful in one of the units while the oscillator stopped oscillating in the other. Consequently the unit C in fig 2 has only the modifications described above.

In station B the LC circuit of the oscillator was looser coupled to the transistor by changing of C1005 from 7 to 4.7 pF and by changing C1006 from 3 to 10 pF. (In the schematic diagram C1006 has some other value)

At a frequency separation of 20 kHz the sideband noise is improved by about 2 dB by the looser coupling of the oscillator in station B. We decided that this improvement is insignificant and did not try to optimise or to try to find out why it did not work in station C since we were experimenting with the rig in transmit mode as usual. Afterwards we have found that the sideband noise of the VCO itself does not contribute much to the transmit noise at this frequency separation. It is therefore possible that changing these capacitors improves the receiver by far more than 2 dB, which is indeed the case as shown below.

Afterwards (when we no longer have access to the rigs) we can see that the noise decreases by more than 9 dB going from 10 to 20kHz frequency separation in receive mode. This shows that part of the VCO noise comes from the voltage that controls the frequency through the capacitance diode. It should be possible to get another 5 dB or more at 10kHz frequency separation by increasing the resistor that (after the modification) is located between C1049 and the VCO to 100 kohm. In



order to avoid excessive lock times the resistor should be connected in parallel with two crossed diodes (1N4148 or similar). There may be some complications which we will not discuss here.

### **A poor transceiver converted to a top class unit.**

It is uncertain whether it is possible to devise a reproducible modification scheme that will make all FT 225 transceivers as extremely good as the station B in receive mode. We think it may be valuable to make the mods available already now since it is quite clear that the FT225 after modifications is superiour to it's competitors and that it is possible that it can become even far better. Consider this information when you decide what rig to buy, but do not forget the important modifications. If you use the FT225 in original shape you will cause interference to your fellow amateurs by your transmissions and you will experience avoidable interference in receive mode.

### **Keying clicks, noise and ssb splatter.**

This series of articles is inspired by the large scale test of two meter transceivers that was published in RT 1980 no 3. Besides excessive sideband noise we found that some stations create severe keying clicks - a phenomenon that many two meter operators have obvious experiences of. We also found that the bandwidth of the ssb transmit signal was too large, although not disastrously.

After having treated the sideband noise in four transceiver types it could be appropriate to treat keying clicks and ssb splatter. In the large scale test FT225RD was the worst rig in ssb mode causing quite a lot of splatter. It also has severe keying clicks, so this station is a good candidate to demonstrate how to proceed.

### **It is easy to remove keying clicks completely.**

It is quite simple to make the keying perfect in FT225RD. In the keying circuitry there is a pulse shaper, Q1201. It is followed by a low pass filter R1204 and C1211. C1211 is loaded by R1205 which goes to the base of the keying transistor Q1202. In the original shape the keying clicks spread out over +/-20 kHz.

By replacing C1211, a 0.33 microfarad capacitor by an electrolytic capacitor of 3.3 microfarad (see fig 3) one gets a suitable time constant. The fall time is about 2 milliseconds at the antenna connector. The rise time is shorter. In one of the rigs we adjusted it by connecting a 27 kiloohm in parallel with C1211.

In the other station R1204 was only 10 kiloohm (the schematics show 47 kiloohms). That rig gave equal rise and fall times with R1204 = 33 kiloohm without any resistor in parallel with C1211

After the mods the rise and fall times are 2 milliseconds in both the rigs.

For perfect keying one more modification is required: The signal from the collector of the keying transistor is keying the transmitter in two ways. Firstly it goes to the emitters of two of the transmit amplifier stages. Secondly it goes to the source of Q510, a power regulating transistor. The voltage swing required to control Q510 is much smaller than what is needed to control the emitters.

A voltage divider is required to reduce the amplitude of the keying signal at the source of Q510. Without this voltage divider one gets dual time constants in the output signal.

By use of three resistors one gets perfect keying. The resistors are placed on the connector J22 (mic amp unit PCB connector). See the photo, fig 4. Note that the numbering on the connector does not agree with the numbering in the circuit diagram!

Here is a step by step description:

1. Remove the wire that connects B3 to B6. (B3 on the PCB connector is numbered 6 in the circuit diagram and B6 is numbered 12.)
2. Move the remaining wire from B3 to B6.
3. Solder a 6.8 kiloohm resistor from B6 to B3.
4. Solder a 1.8 kiloohm resistor from B3 to B1 (ground).
5. Solder a 1 kiloohm resistor from B6 to A3(+8V). (A3 is numbered 5 in the circuit diagram).

With the modifications described above the keying speed is limited. The rise and fall times of 2 milliseconds should allow around 1000 letters per minute, but the time delay in the keying circuitry is large and makes the maximum speed much lower. We will come back to that in a later article.

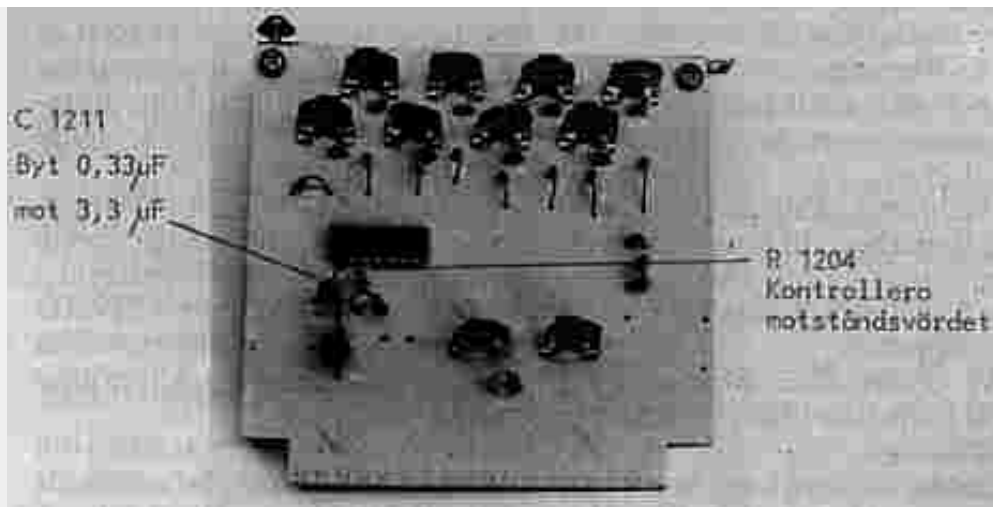


Fig 3. "Cw keying unit (PB-1721)" is the name of the board in this figure. A resistor may be connected in parallel to C1211 on the other side of the board. That resistor and R1204 determine the rise time, see the text. The fall time is determined by C1211 and R1205.

### Peak power versus average power in ssb

The simple and cheap modifications we have described sofar in this series of articles are uncontroversial and we hope the manufacturers will incorporate these in their future production!

For the FT225 RD only one wire has to be moved in order to eliminate completely the splatter in ssb mode. This way of curing ssb splatter is however not entirely uncontroversial but it is of fundamental interest. For that reason here is first a short general discussion about ssb.

When designing a ssb transmitter for amateur use two entirely different starting points are possible:

1. The transmitter shall give the best possible readability for weak signals but the DC input power to the power amplifier must never exceed a certain average level and it shall be measured with an instrument having a time constant of 0.25 seconds.
2. The transmitter shall give the best possible readability for weak signals but the power amplifier has limiting power level and can never produce more than a certain maximum power.

We start by investigating how an optimum transmitter should be designed according to point 1: (Legal limit criterion in SM 1981)

The transmitter shall be completely linear in amplitude and the bandwidth shall be the same as the bandwidth used in the receiver, i.e. around 2 kHz. When one says "aaaaaaaaa..." in the microphone of such a transmitter the peak power is about 12 dB higher than the average power. With normal speech input, the ratio between peak and average power is at least 5 dB higher. All measured with 0.25 seconds time constant.

If we assume that the power amplifier can be operated linearly without any noticeable zero power (which is possible by use of certain tricks) an amateur with a C licence and a maximum permitted power of 10W would need a power amplifier that momentarily uses 500W input power. The average power measured by a 0.25 seconds time constant would still stay below 10W.

We may now compare with the second starting point above. Assume that the power amplifier saturates at 10W. If such a transmitter is driven entirely linearly the average power becomes only 0.2W. The peak power will only be transmitted in the peaks of the voice signal. The letter a (my voice) for example gives pulses with a length of 2 ms separated by 30 ms and is particularly difficult. If one cuts the amplitude to one third (voltage) it is impossible to hear any difference in voice quality, regardless if the amplitude limiting is performed in the AF or in the RF section of the transmitter. Splatter may of course be produced if the limiting is done improperly.

The readability is not affected by this limiting even though the peak level of the received audio signal is reduced by 10 dB because the average power is unaffected. (It is assumed that the limiting process changes the gain slightly to keep the average power constant.)

When the peak power is reduced by 10 dB one can obviously increase the average power by 10 dB to 2W, still without saturation at the 10W maximum level for the power amplifier. The result is 10 dB better signal strength. It is quite ok to use harder limiting, but when very hard limiting is used it matters slightly how the limiting is performed, and then a RF clipper is superiour.

**A two tone test is misleading.**

Many articles have been written on the advantages of RF clippers compared to audio clippers. Usually these articles show how a sine wave or possibly how two equally strong sine waves are affected by RF and AF clipping respectively. That is directly misleading at modest clipping levels because the human voice is very far from a sine wave or two! Audio clipping is not often used on purpose in amateur transceivers, probably because of the undeserved bad reputation. In FT225 RD the alc circuitry is used to produce a clipping function instead. This is very ugly and the reason why this transceiver produces a lot of splatter in it's original shape! har splatter! If the microphone gain control of a FT225 is set for the instrument to show half scale (average power 6 dB below full power), the alc circuitry has to reduce the gain of the transmitter by 10dB to avoid limiting in the final transistors. This gain reduction has to be done to a large extent after the filter, otherwise it acts to slowly. Changing the gain is amplitude modulation. There are no low pass filters in the alc circuitry so the amplitude modulation contains frequencies up to 100kHz or so and consequently the splatter extends about 100kHz on both sides of the signal.

#### **The clipper circuit is already in place in FT225!**

The cure for the splatter is to feed the ssb generator with the beautifully limited and filtered audio signal that is normally used for the FM modulator.

At long distances it is completely impossible to decide whether the clipping is done at AF or by the alc circuitry. The amateurs living nearby will however note a dramatic difference.

The splatter is completely absent even if the ssb power is set at 75 % of the CW power. How the speech quality is affected by the clipper can be checked by listening to the station in FM mode.

#### **The modification is simple: Just move one wire.**

As already mentioned, this modification is extremely simple. Move the wire from pin 14A to pin 6A on the PCB connector J22 (mic amp unit). See the phot in fig 4! With the numbering of the schematic diagram the wire should be moved from pin 27 to pin 11.

Once the wire is moved, the ssb peak power is controlled by "ssb mic gain" at the front panel. The average power, i.e. the clipping level is adjusted by VR501 in "mic amp unit". After the modification VR501 will affect both the FM and the SSB transmissions.

To set the peak power "ssb mic gain", feed a sine wave (whistle in the microphone) in the way that produces maximum power. Adjust for the power to be 10 % below maximum power. Then set VR501 for the power meter to show half that reading when you say "aaaa..." in the microphone - with normal voice and at the normal microphone position.

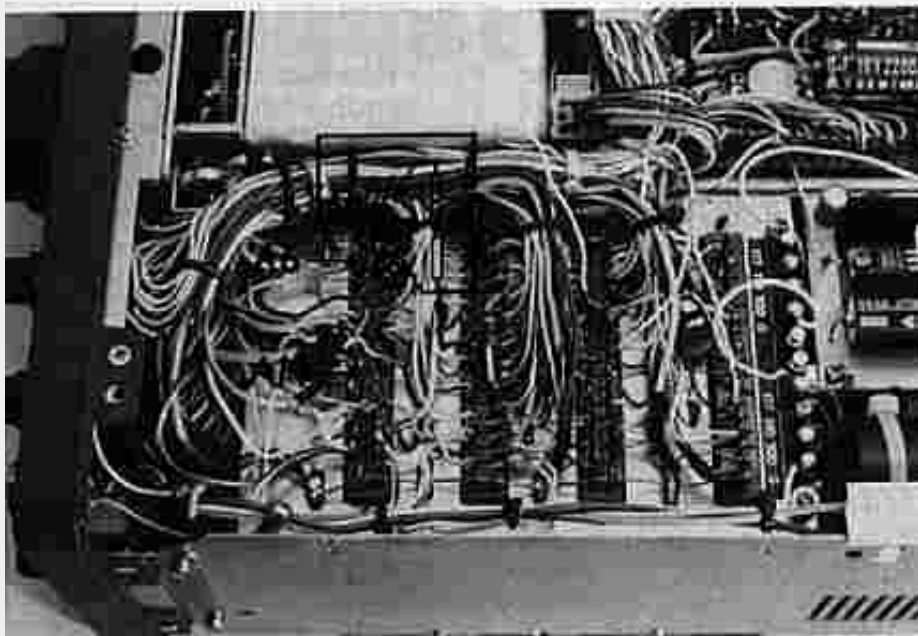


*Fig 4. Lf-klippern kopplas in genom att ledningen som ar ansluten till A14 flyttas till B6. Följ sedan steg-för-steg-bestrirningen beträffande nycklingen.*

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#### **Nearby amateurs no longer a problem.**

Finally we want to point out that FT225RD to our knowledge is the first factory made transceiver that may allow two amateurs to live as close as 500 meters from each other and use 300W output power (Remark: maximum allowed in Sweden in 1981) without causing interference to each other at a frequency separation of 50kHz and with parallel antennas. - During band openings one usually wants to work in the same directions.

The worst case is when the main lobe of one operator points straight into the back lobe of the others antenna. 10 element antennas with 20 dB front to back are assumed. (Compare to table 1 page 11 in RT 1980 no 3.)

This requires the looser coupling between the resonant circuit and the transistor in the VCO is sucessful. It will also be nessecary to lower the wideband noise in the transmitter by about 15dB, which is probably not difficult.

19-07-1998

(FT-227) FT-227R & 9600 baud Packet

Modifying the Yaesu FT227R for 9600 baud operation  
by James Miller G3RUH  
1993 Sep 29

The FT227R "Memoriser" dates from 1977, and was one of the first amateur base/mobile FM radios to use a PLL synthesiser. Power output is 10 watts. Its classic design lends itself well to 9600 baud operation.

The synthesised local oscillator tunes from 133.3 - 135.3 MHz in 10 kHz steps and for any particular channel uses the same frequency for both RX and TX. Being unswitched, the synthesiser doesn't chirp when changing from RX to TX. 5 kHz intermediate steps and 600 kHz repeater shift are effected by using other internal crystals selected with the FUNCTION switch.

The RX IF chain is at 10.7 MHz (144.0 - 133.3), while the TX modulation is applied to a separate 10.7 MHz crystal oscillator for final output at 133.3 + 10.7 = 144.0 MHz.

Reception Notes

On the RX side, the IF filtering consists of a 15 kHz 2-pole roofing filter FMT-15A at 10.7 MHz, two ceramic 4 element LFB-15 (muRata CFU455E2) ceramic filters at 455 kHz, and the discriminator based on a muRata SFD455S4. The frequency response is some -12 db down at 4800 Hz, and is much too heavy for 9600 baud where -6 db is the target, but is perfect for 4800 baud operation.

Most of the damage is done by the ceramic discriminator; changing two resistors partly cures that. Changing the 455 kHz filters to CFU455D2 does the rest, and allows for several kHz of mistuning. You can also change the crystal filter to a 10M30AZ for a slightly better eye, but this is only a marginal improvement and admits some of the adjacent channel. TXEPROM selection 10 or 12 gives the best results.

The discriminator output is very low, 20 mv/kHz, so a typical +/-3 kHz deviation signal gives only +/- 60 mv output. (G3RUH's own PCB implementation of the 9600 baud modem will accept from 8 volts down to 10mv before the circuit noisefloor is encountered. Other implementations are noisier.)

The existing FT227R audio circuit loads the discriminator with a big kerchunk when a signal is initially received; changing (or removing) capacitor C158 cures that.

Transmitter Notes

On the TX side varactor D401 directly frequency modulates the oscillator X401 via the screened cable named MOD. This can be disconnected at the mic amplifier output, and 9600 baud audio injected instead. The load impedance is 18k seen through series 1uf capacitor C401. The charging of C401 when the TX is keyed results (even in standard form) in a 10 kHz swoop of TX frequency with a 20 ms time constant which takes about 40 ms to die away. This can (must) be reduced by 50% in amplitude and duration by decreasing the capacitance.

Because of this, and only this, the recommended minimum TXDELAY is 50 ms. Extra may be needed to accommodate the distant station.

TXAudio drive of 1.2 volts peak-peak gives +/- 3 kHz deviation.

**Other Notes** Although the antenna changeover switching is by PIN diodes, 8 volt power to the TX and RX sections is switched by a miniature G2E style PCB relay. This operates in about 5 ms, but its clicking might annoy. A semiconductor alternative would appeal to some operators, maybe a couple of power JFETs.

The radio has a convenient 5-pin 180 DIN socket on the rear panel. This can be re-wired with data audio input and output as per a conventional TNC for a very neat interface.

Modifications to Radio



You will need:

2 x 2k7 resistors. 1n ceramic capacitor small, 100n ceramic capacitor small, 470n capacitor polyester or ceramic, 2 x muRata CFU455D2 filters, 50 cm fine screened cable, e.g. RG174 coax (or tightly twisted pair).

Tools: small Pozidriv (crosshead) screwdriver, pliers, cutters, solder sucker and soldering iron, solder, sharp knife.

1. Access to the rear of the MAIN UNIT is gained by hinging up the PLL UNIT. This has the big black D857C IC on it. Change the following components:
- R132 to 2k7

R133 to 2k7

C158 to 100n

CF101 to CFU455D2

CF102 to CFU455D2
- Now put the radio correct way up, exposing the top of the MAIN UNIT.
2. About 1cm to the right of the red discriminator block CD101 there is a post, marked CENTRE METER on the circuit. It is joined to R134. Connect a 1nf capacitor from the post to ground. The exposed leg of R135 should be used for this. Now connect a fine screened lead to the post and ground (across the capacitor), route it to the left of the radio, then to the rear and down the corner to below. This service is RXAudio.
3. On the centre left edge of the MAIN UNIT are a pair of posts marked MIC OUT. This is MOD on the circuit diagram. Disconnect the inner of the screened cable from the rear post of the two. Connect a 470 nf capacitor to the inner. Make another screened lead and route it below as previously described. Connect the inner of the new lead to the other leg of the 470nf capacitor, and the outer to the ground post of MIC OUT. Thus the capacitor is in series with the cable run. This service is TXAudio.
4. Turn the radio over, hinge up the MAIN UNIT again and expose the DIN-5 socket. Remove all the wiring from pins 1, 4 and 2. Remove the short blue wire from the adjacent loudspeaker socket, discard, and connect the long blue wire in its place. Connect the TXAudio inner to pin 1, the RXaudio to pin 4, the screens to the ground blade, and connect pin 2 to the ground blade. PTT is already on pin 3, and pin 5 already has +12 volts on it.

Other Modifications

The default frequency shown at switch-on is loaded into the BCD up/down counter ICs Q707, Q708 and Q709 according to the state of their preset pins 3,13,12 and 4 as per the table below.

Some neat work with a sharp knife will be necessary, but all the tracks are easily accessible by removing the cardboard cover.

Q709 does the MHz. N = 0 corresponds to 143 MHz, N=1 to 144 MHz and so on.

Q708 does the 100 kHz digit, and Q707 the 10 kHz.

| PIN                                |  |   |    |    | PIN |   |   |    |    |   |
|------------------------------------|--|---|----|----|-----|---|---|----|----|---|
| N                                  |  | 3 | 13 | 12 | 4   | N | 3 | 13 | 12 | 4 |
| -----+-----                        |  |   |    |    |     |   |   |    |    |   |
| 0                                  |  | L | L  | L  | L   | 5 | L | H  | L  | H |
| 1                                  |  | L | L  | L  | H   | 6 | L | H  | H  | L |
| 2                                  |  | L | L  | H  | L   | 7 | L | H  | H  | H |
| 3                                  |  | L | L  | H  | H   | 8 | H | L  | L  | L |
| 4                                  |  | L | H  | L  | L   | 9 | H | L  | L  | H |
| -----+-----                        |  |   |    |    |     |   |   |    |    |   |
| L = LOW (pin 8), H = HIGH (pin 16) |  |   |    |    |     |   |   |    |    |   |

The ICs are type MC14510. Q709 is at the front centre close to the screw, Q708 is next left and Q707 on the far left.

Thanks

To G4AJJ for the loan of two FT227Rs and carte blanche to hack them.

Notes prepared by James Miller G3RUH @ GB7DDX.#22.GBR.EU 1993 Sep 29



19-07-1998  
(FT-23) FT-23R power save off mods

Hi All, I would like to thank all who sent replys to my request for info in trying to disable the power saver circuit in the 23r. I use it for mobile and portable packet and have not had much luck in making it work unless the freq. would stay busy. The mod is as follows. Take apart the 23R and look at the control board. There will be a bundle of wires tied together basically over pad #10. It is marked, as 10. Soder a jumper across this pad or bridge with soder, put the radio back together. You will find that the battery life is not near as long with out the saver circuit. I would guess if you wanted to do some mode modification. (Sorry Wasnt watching the line) One could put in a very small switch and just disable it when needed. I basically always use the battery eliminator so the battery life dosent bother me. Thanks again to all the help.

Randy WD8EJC @ WD8EJC.NWOH.OH.USA.NA

19-07-1998  
(FT-23) FT-23R extended frequency range

'Circumcising' the FT-23R is remarkably simple. Removing one solder blob (pad #7, clearly marked, 10 o'clock position from the speaker, 9 o'clock from the microprocessor) lets the radio receive and transmit from 140.0 to 163.995 MHz. The two circuit boards with surface-mount components are uncluttered. When opening the radio, be careful not to lose the tiny coil-spring inside the battery-release button. I haven't measured receiver sensitivity, nor do I know about performance in big-city RFI; the FT-23R is considerably more sensitive at 162-MHz weather frequencies than is my modified Icom IC-02AT.

Instructions on modifying the Yaesu FT-23R 2M handheld radio for operation in the Civi Air Patrol service.

\* \* \* \* \* W A R N I N G \* \* \* \* \*

This radio is NOT type accepted other to show Part 15 compliance. Operation in any service requiring the use of type accepted equipment is in violation of FCC regulations.

1. Remove the 3 screws from the top of the radio.
2. Remove the dial knob
3. Remove the 2 screws from the back of the radio.
4. Remove the battery
5. Remove the 6 screws on the bottom of the radio, where the battery attaches.
6. CAREFULLY remove the front of the radio.
7. To the left of the microprocessor and battery are several printed circuit pads. The pair labeled 7 will have a blob of solder across them. Using a small soldering iron and solder wicking, remove the blob of solder.
8. Re-assemble the radio in the reverse order of these steps.
9. The Microprocessor will PROBABLY reset all the memory contents.
10. Operation of the radio remains the same, except that the transmit and receive coverage will now extend from 140.000 Mhz to 164.000 MHZ.

\* \* \* \* \* ANOTHER MODIFICATION \* \* \* \* \*

THE YAESU FT-23R HT MAY BE MODIFIED TO RECEIVE(AND TRANSMIT) FROM 140MHz to 164MHz. TO DO SO, REMOVE THE SOLDER BRIDGE MARKED "7". IT IS NEXT TO THE LCD DISPLAY INSIDE.

The uP's in the FT-23R and the FT-211R/H can be set for several frequency and memory mode combinations. These modes are contorlled by the jumpers (solder pads) marked 7,8 and 9 on the processor board of either radio. Here's a list of what

can be done:

| JUMPER |      |      | CONFIG<br>NUMBER | DISPLAY MODE                    |
|--------|------|------|------------------|---------------------------------|
| 7      | 8    | 9    |                  |                                 |
| open   | open | in   | 1                | 140 to 164 MHz, amateur mode    |
| open   | in   | in   | 2                | 140 to 160 MHz, amateur mode    |
| in     | open | in   | 3                | 144 to 148 MHz, amateur mode    |
| in     | in   | in   | 4                | 144 to 146 MHz, amateur mode    |
| open   | open | open | 5                | 220 to 550 MHz, commercial mode |
| open   | in   | open | 6                | 440 to 450 MHz, amateur mode    |
| in     | open | open | 7                | 50 to 300 MHz, commercial mode  |
| in     | in   | open | 8                | 430 to 440 MHz, amateur mode    |

Both of my radios (USA) were shipped from the factory in config #3. They can be converted to config #1 without re-tuning just by changing the jumpers. Tuning range can be further expanded by changing to jumper config #7. The FT-211 has separate VCO's for transmit and receive and will lock over about 38 MHz from approx. 130 to 180 MHz. The FT-23 has only one VCO and the overlapping lock range (Xmt & Rcv) is about 25 MHz from approx. 135 to 175 MHz. Don't forget, if you adjust the VCO you must re-align every electronically tuned stage in the front end of the radio. The transmitters can be tuned for somewhat higher power output above 164 MHz but at a great power loss at 2m.

The commercial memory mode will cause these functional changes:

1. When in the MR mode, the channel number will be displayed instead of frequency. You can toggle back to the original "amateur" mode display by pressing F. Pressing F takes you back to commercial mode. However, when switching from D to MR, the display will always revert to the commercial mode.
2. The function of the Dot button will be exactly reversed. That means now you can press just one button (Dot) to get into or out of the Primary function. The Pri funtion (in memory mode) will be indicated by a large "P" on the left side of the display.
3. The only indication of low power operation is in the memory mode. A "C" will appear in the upper left corner of the display (where the primary "P" used to be). The bargraph will always read 100%.
4. The band scan is now even more useless. The uP will painfully count from 50 to 300 MHz.

I have been able to modify my FT-211RH to scan at about 10 chan/sec by speeding up the uP clock. This also speeds up every other uP function by x5, so you have to be fast on the "F" key. No squelch sensitivity or synthesizer lock-up problems have been encountered with this modification while scanning.

Basically, I replaced the 800 KHz ceramic resonater (pn CSB800K) with a Radio Shack 3.58 MHz color burst crystal. The resonater is located on a small (2.5 sq cm) sub-board that is stuck with double sided tape to the radio's processer board. This sub-board is actually an outboard clock for the uP. The schematic I got with the radio showed the uP's internal osc. being used - so I don't know if my version differs from newer radios. This mod works fine untill you turn the radio off and then back on again. A startup glitch then wipes out all of the memories. To delay the oscillator start up, I added a 220uF 10V electrolytic cap between the red wire on the sub-board and ground. Positive goes to the red wire. A convenient ground is the bare wire located diagonally across from the red wire (on the sub-bd).

So far I have been unsuccessful with this mod on the FT-23R H-T. Since it uses the uP's on board osc, there seems to be no way to delay it's startup. Every time you turn on the power the uP resets. If anyone can solve this problem I would be very interested in hearing from you!

These are not intended to be step by step instructions. Also, you will want to have a service manual before you begin. If you're not familiar around surface mount components you may want to "learn" on something with cheaper consequences. Finally, don't adjust the VCO's unless you are familiar with how a synthesized radio works. Use your own judgement!

19-07-1998

(FT-23) Extended frequency for FT-23,33, and 73

Extended Frequency Enhancements for the Yaesu FT-23R(2M), FT-33R(220), and FT-73R(70cm). (Revised)

Greetings and hello radio amateur operators.

The topic is increasing the functional frequency coverage of what has been probably Yaesu's most popular handheld transceivers.

To save manufacturing costs, Yaesu engineers designed multiple personalities in the same CPU module found in the FT-23R, FT-33R,UHF FT-73R and the FT-2008/7008 transceiver. The FT-2008/7008 transceiver is the commercial version of the Ft-x3R series.

Unique features of this mod include

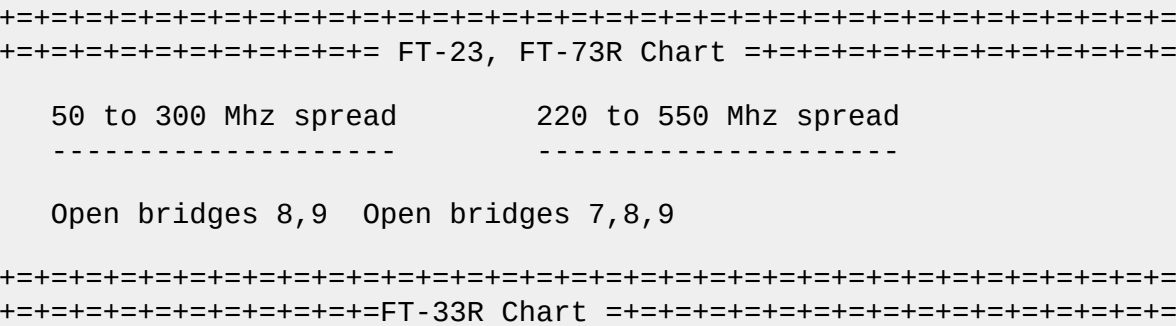
- the just say Mao feature (\*\*)  
(NO FREQUENCY READOUT: Ch 1 thru Ch 9 appear on your display.  
Great when you aren't looking and some fellow ham tries to rip off your simplex frequency)
- the GREAT WHOPPER  
(opens the CPU to 50-300 Mhz or 220-550 Mhz coverage. Full (.100 Mhz to 999.9995 Mhz) adjustable freq coverage available so far only on the FT-33R;this doesn't mean you can actually transmit but the Activity light goes in TX and you get a good fake RF bargraph that indicates that you can transmit on 750 MHz.

How to do it:

- Contemplate invalidating your warranty. No beginners beyond this point. If you don't know how to solder, don't learn here. Ask an elmer to assist.
- If you treasure your memories, write out your contents of your radio on a piece of paper. When you make the changes, the CPU runs a small diagnostic and see that the jumpers have been changed. It will ERASE ALL PRIOR SETTINGS.
- Dissassemble your transceiver.
- Find the line of solder connections running down the CPU board. GENTLY move all wires aside so you won't melt them.
- Using solder wick and a Good low-power soldering Iron, see chart. Read special notes for the FT-33R.
- Rebuild radio and count your blessings.

(\*\*)NO FREQUENCY READOUT

Removal of the solder bridge labeled number nine will activate the commercial side of the CPU module. To flip to the amateur mode, you would press F UP Arrow. To flip to the commercial mode, you would press F Down Arrow.



Same chart as above, but I wanted to add my experience of the Yaesu FT-33R 220 Mhz radio. When I removed number 7 and then did a cold reset , the CPU cleared and showed me a L and a freq. I put .100 in. Press D/MR. Then a U appeared. I turned the VFO knob until 999.999 appeared. Press D/MR.

I also had to reenter the Repeater Split to the proper value.

On the VFO, I could QSY down to those limits (using F UP/DN) and listen to my local Channel 13 on 215.720/.660.

Yes, 216-220 Mhz is available with this mod. Great if 216-220 is the next 220 subband.

Notes

1 Cold Reset of the CPU Board.

With the radio upright and your nose pointing at the CPU board, look at the Lower Right Corner of the CPU chip. You will see two parallel SMT resistors. Below them is a screw with possibly a paper washer. To the right is a SMT device (it's a cap) with a pointed end facing Left. Ground that point to the screw or to the case with a flat screwdriver. Awhile doing that, cycle on/off the radio to ensure a good reset. Remove screwdriver and then reassemble radio.

Dedicated to:

----- the knuckleheads in Barry Electronics who said it was impossible.

----- Yaesu Tech Support who claimed that there are no RESET circuits in their radios, when their schematic diagrams say otherwise.

This modification is read 1888 times.

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**22-08-1998**

## **(FT-23) Yaesu FT-23R 2m walkie talkie anthology**

by Frank Reid, W9MKV1

As the happy owner of several Icom radios, I went to a hamfest intending to buy a new IC-u2AT but my friends talked me into a Yaesu FT-23R instead. I'm glad!

**Construction:** The case is die cast metal (u2AT is plastic) and is well protected against weather except as noted below (see DTMF). The carrying case is rather unattractive, made of odd smelling material; I don't trust its belt loop or Velcro flap closure. I removed the belt loop and cut a slit for the (optional) belt clip. I used a paper punch to round the ends of the slit to prevent tearing.

**Human Engineering:** Yaesu did an excellent job of making a complex radio easy to operate. I especially like the rotary knob which selects presettable channels (10) or tunes in 5 or 10 kHz steps. Six keyboard buttons (one is an alternate function key) control programming and scanning. UP/DOWN keys duplicate the knob's function, and have an alternate 1 MHz "giant step" capability.

The keyboard lock function does not affect the rotary switch. Keyboard lock (indicated by an "L" symbol on the display) is remembered when the radio is turned off (good idea!). The FT-23R has odd offset capability. A button above the transmit switch unsquelches the receiver (transmits tone burst on European model).

There is no display illuminator, which would be practical with knob tuning; display lights in keyboard controlled rigs are nearly useless when it's too dark to see the keyboard.

**Audio:**

Not surprisingly, the tiny flat speaker isn't very loud, and rattles terribly at full volume. Speech from a belt mounted FT-23R is easily drowned out. It fits a shirt pocket, somewhat inconveniently with DTMF2 and large battery installed. It can be secured in a shirt pocket by hand lanyard attached to epaulet of military style shirt, or longer string with sliding cord lock, over the shoulder with loop around opposite armpit.

**Antenna:**

Standard BNC connector. The "short rubber duckie" supplied with the radio is more flexible than most similar antennas, and appears very durable.

**DTMF:**

The optional Touch Tone™ generator mounts between the radio and battery, plugs into a 4 pin internal socket, and is attached by 4 long screws. It makes the radio about 3/4 inch taller, and 1/8" thicker. Other accessories, e.g., the mobile power adapter, also mount between radio and battery; one envisions a future fully equipped walkie-talkie 3 feet long!

The delicate looking membrane type DTMF keyboard is not sealed around the edges. There could be trouble if it takes water. The DTMF keyboard has neither tactile nor audio feedback, however, an LED lights when a button is successfully pressed.

**CTCSS:**

3 The optional subaudible tone squelch module provides "PL" encode . Actual tone squelch frequency is displayed during programming (nice!). The tiny module (\$61) mounts above the battery attachment plate, and does not extend the radio's length. CTCSS modes are "Encode" and "Encode/Decode" but no decode without encode.

**Memory Cloning:** A cable from the earphone jack of one FT-23R to the microphone jack of another transfers memory contents (useful for emergencies). A switch on the bottom of the radio (accessible by removing the battery) puts the radio into clone mode. You cannot reach the clone switch if the DTMF module is installed.

**Scanning:**

The FT-23R has CHANNEL-SCAN (all 10, with lockout), PRIORITY SCAN (checks ch. 1 every 4 seconds) and BAND SCAN (no presettable limits). There is no timeout resume scan mode. Scan rate is 2 preset channels per second. Band scan is much faster; 1 MHz in 9 seconds @ 10 kHz/step, 18 sec @ 5 kHz/step. I encountered NO "BIRDIES" (spurious receiver responses) during 140-164 MHz band scan, with a shielded 50 ohm dummy antenna.

Instructions: Well written in good English, but the book contains NO schematic or block diagram (Boo!). The receiver first IF is 10.7 MHz (not listed in specifications). Being careful not to transmit, I connected the antenna jack to a spectrum analyzer and found a -6 dBm (75 ohms) local oscillator signal 10.7 MHz below the receiving frequency. The spectrum analyser revealed a unique signature: the FT-23R's battery saver feature turns the receiver off (for 600 ms) and on (300 ms), in a cycle beginning a few seconds after the receiver is squelched (and not scanning). I have observed no bursts of TVI when the PLL relocks. Knowing the IF allows using the image response trick to listen to ATC while at airports. (Multiply first i.f. by 2, add to the desired aircraft frequency, tune the radio to the sum; AM comes through weak but readable.) I tried it at the local airport; the Yaesu's FM detector does not perform nearly as well on AM as does the Icom IC-02AT or IC-28H.

Extended Frequency Range:

"Circumcising" the FT-23R is remarkably simple. Removing one solder blob (pad #7, clearly marked, 10 o'clock position from the speaker, 9 o'clock from the microprocessor) lets the radio receive and transmit from 140.0 to 163.995 MHz. Too bad it won't do National Park frequencies.

The two circuit boards with surface mount components are uncluttered. When opening the radio, be careful not to lose the tiny coil spring inside the battery release button. I haven't measured receiver sensitivity, nor do I know about performance in big city RFI; the FT-23R is considerably more sensitive at 162 MHz weather frequencies than is my modified Icom IC-02AT.

Power:

Receiver drain is 19 mA in power save mode. The FT-23R operates at any voltage from 6 to 15v. Three rechargeable battery options offer small size, long duration, or high power. Rated output at 7.2 v is 2.5 watts; a friend's rig and my own both produce 3.5 w with FNB-10 (7.2 v, 600 mAH) battery packs. Two replaceable cell battery packs are available (six AAA and six AA). Alkaline cells are invaluable for emergency service; AA cells are more cost-effective than AAA's. The three NiCd battery packs require three different wall-charger types (15-hour charge time). The optional automatic fast charger charges any NiCd pack in 5 hours.

Speaker Microphone: One is available from Yaesu. The Icom speaker-microphone works with Yaesu transceivers if a resistor inside the spkr-mic is replaced with a lower value, and It still works with Icom radios afterward.

My FT-23R, with DTMF and 7.2 volt 600 mAH battery, was \$249 from some nice folks from Kansas City who didn't soak me for sales tax, at least overtly.

## **MORE ON THE YAESU FT-23R**

by Bob Parnass, AJ9S

Frank's comments on the FT23R walkie-talkie were persuasive. I bought an FT23R, an extra 7.2 V 600 mAH battery, mobile DC adaptor, PL encode/decode deck, and the AA dry cell case.

I filled the \$12 AA dry cell case with six 550 mAH Sanyo NiCd batteries, purchased for an additional \$12 at a hamfest.

The Yaesu belt clip looks flimsy, so I bought an ICOM belt clip (for the ICOM mini-talkie) and reamed the holes to fit the FT23R. The spring steel ICOM clip is \$2 cheaper and fits my belt better.

If I had bought the Touch Tone™ pad with the radio, it would have cost and additional \$30. If pad is \$50 if purchased separately.

Since the same radio case is used in the FT23R and its industrial cousin, the FT23R is built rugged, much more so than its Kenwood and Icom competitors. Reminds me of how my Motorola HT220, or a GE Pocket-Mate feels. The rubber gasketing on the case top and side is impressive. In contrast, the case bottom, near the battery plate, is open, although dust should be prevented from entering as long as the battery is in place.

My fingers aren't big, but seem huge when trying to push the closely spaced rubber buttons or twist the knobs on the Yaesu.

After verifying that the stock radio worked, I carefully opened the case, then made the modification for full 140-164 MHz coverage. There appears to be no modification to enable out of band receive without transmit. This made my dealer nervous, and fearing FCC action, he posted a sign warning that no out of band receive modification was available. The tiny surface mount components on the circuit boards mark a turning point in amateur radio construction, when owners may no longer be able to service their walkie-talkies.

I connected the FT23R to a variable voltage, current limiting bench power supply. The receiver section must have voltage regulation, as increasing the voltage input from 7.2 to 13.6 VDC caused no difference in receiver current consumption.



The fastest charger available for the FT23R is a 5 hour unit. It contains a timer, rather than the more sophisticated thermistor and temperature sensing arrangement of the Kenwood and Motorola rapid chargers. Rather than buy the fast charger, I use a bench power supply connected through a power resistor, and adjust the current for 180 mA, the appropriate 5 hour charge rate.<sup>4</sup>

When in battery save mode, the current consumption alternates between 5 mA and 50 mA.

Based on comparative S-meter readings, the 4.5 inch flexible antenna supplied with the FT23R doesn't hear quite as well as its longer counterpart.

The method of locking out channels is cumbersome, and it's too bad that channel 0 cannot be locked out of the scan. There must have been an early batch of 23R's with a firmware bug, as my unit was packed with an errata sheet, which said early units behaved differently when using the priority mode on certain channels.

I just purchased an FT23R, and like it very much. It was chosen as the least expensive 2 M walkie talkie with over 3 memories available at the Rochester (NY) Hamfest. I considered the DTMF pad as part of the unit and price. The unit turns out to also be rugged and well built; audio is excellent, and size is handy. The PL does need to be purchased as a single (very simple) unit. Installation of the PL is shown in the manual, and is simple. The microprocessor does all the programming and remembering of PL frequencies along with the transmit and receiver frequencies.

My only reservation is the relative complexity of the controls -- that seems to be common in modern ham gear -- and the size of the knobs and buttons. There is a lot more functionality than you would ever expect in an walkie talkie. I would also recommend purchasing the quick charger and the large battery pack.

I hope you enjoy the unit as much as I have.

This modification is read 1975 times.

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**19-07-1998**

### **(FT-2400) FT-2400 expanded TRX frequency range**

Remove the 2 allen screws holding the front panel. On the "CONTROL UNIT", locate the Jumpers Points. JP2 must be OPEN, JP1 AND JP3 must be CLOSED with solder. When JP6 is CLOSED, you can use the 1750hz tone access for european repeaters.

The expanded range is 118 to 174 mhz on the display, but work only for 140 to 174 mhz.

This modification is read 1315 times.

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**10-02-2001**

### **(FT-2400) Yaesu VHF mod for commercial splits**

**Author:** Tom, VO1TV - [tturner@thezone.net.nospam.MODIFICATION.NET](mailto:tturner@thezone.net.nospam.MODIFICATION.NET)

When doing emergency work, It's common for hams to use commercial repeaters, or, more often, to have the ABILITY to use them. In our club's work with the local Red Cross, we have to ensure we can operate on the Societies's commercial repeater in the VHF band. The frequencies are just above and below the 2 meter Ham bands. After deployment, we will use commercial gear to handle comms within the Society, but the first critical 2 hour period requires fast action, so we need to anticipate the need to communicate come what may on ANY frequency. That's what makes Hams so valuable in a crisis. The large split makes for a minor difficulty in attempting to program Yaesu gear. Difficulty until you try this:

This mod worked on the Yaesu 2400, the 411 and the 470. I suspect it is generic for most Yaesu VHF gear. I am indebted to Len, VO1YS for this, who tried it on yet another Yaesu rig.

- Start by setting your rig to low power and by hooking up a dummy load. This mod may take several attempts, and you don't want to be slapping a 50 watt signal at a 600K offset to your served agency's allotted frequency! THAT might bring down wrath from any number of sources !!
- All Yaesu gear I have used has 2 buttons or functions that we will use for this mod: a function button, usually labelled "f" and a button that allows you to tune within a given memory. This button puts an underscore beneath the memory number. I will call it "mr", as that is its label on my 470 and 411.
- Program into memory the receive frequency. That is to say, the commercial repeater output frequency. Put in any tone encoding required as well. Store this memory.
- Set the repeater offset to display a - or + depending on which direction your transmit frequency is. Preserve that as

part of the frequency memory too. Try not to transmit. You have just saved a commercial frequency with a 600K split at this point.

- Press the "mr" button to display an underscore at the memory channel location.
- Enter the transmit frequency at this point. All you are doing is adjusting the memory tuning, and we are about to lock it in.
- Press the (f)button for 1/2 second or until the memory channel number is flashing. Now, while the memory channel number is flashing, momentarily press and hold the PTT button ( press to talk ),then simultaneously press the (f) button again to lock your new split. This may take several tries to get the timing right.
- You may have to press the "mr" button again to remove the underscore from beneath the memory channel number.
- Look for both the - and + repeater split indicators to be displayed. That is your sign that your mod has been successful.
- carefully test your new split.

De VO1TV

This modification is read 1092 times.

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De VO1TV

This modification is read 1092 times.

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**19-07-1998**  
**(FT-2500) FT-2500 freq. expansion**

Hi, and thanks for reading this!

The Yaesu FT2500 is the easiest radio to mod to receive AND transmit out of band! All you need to do, is to remove the top cover (5 screws) and cut a loop of green wire! Instant tx/rx from 140 MHz to 179 MHz.

Is this TOO easy? I think it is. This information was obtained via 2 different ham radio shops AND Yaesu (U.K.) Ltd. All three gave me OFFICIAL Yaesu faxes'.

Right now, there are idiots who WILL transmit on the police bands. All it will take is a FT2500, a phillips screwdriver and a pair of wire cutters! Who knows, it may be you who needs police help.

Have the manufacturers made it TOO easy to transmit out of band? I would like to hear what you think.

|                         |                     |                                           |
|-------------------------|---------------------|-------------------------------------------|
| <b>Date:</b> 01-02-1999 | <b>User comment</b> | <b>From:</b> <a href="#">Kevin Thomas</a> |
| <b>Subject:</b> Waring! |                     |                                           |

Being able to transmit out of band is dangerous for the radio. The finals are way out of tune once out of the 2 meter band and can result in damage to the rig.

This modification is read 1150 times.

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**19-07-1998**  
**(FT-26) Expanded frequency**

1. Remove the battery and antenna.
2. Remove the four screws holding the back track.
3. Remove the two screws in the back case.
4. Carefully seperate the front cover.
5. Locate and remove solder on jumper pad 10. (on the control board)
6. Apply solder to jumper pads 1,3,7 and 8.
7. Reassemble the radio.
8. Turn radio on and each channel indicater will blink.
9. Enter the following frequencies. (use the [F] and up arrow keys)

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

I accept no responsibility or liability for the results of any modification.  
Performing modifications and the use of modified radios may be a violation of laws.If you have any doubts do not perform any modifications.

Gary Stotts  
DA2GY@DB0GV  
73

**Date:** 26-02-2002

### User comment

**From:** [Luis Mariscal](#)

**Subject:** ft26 yaesu problems with RESET

Hello

I write from argentina

## I Have a BIG problem with the full reset of the ft26 YAESU

# I can't RESET

I remove all the pads solder and I put all that...

I Extract the backup battery but the transceiver show allways

144000 to 148000

I can expand that

Do have a solution.?

or any user have a solution...

Thanks

Luis

This modification is read 799 times.

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**21-12-2001**

## (FT-26) Reset of FT-26

## Partical reset:

Press [T] + [Rev] when power on.

### Full reset:

Pres [D/M] + [T] + [Rev] when power on.

This modification is read 600 times.

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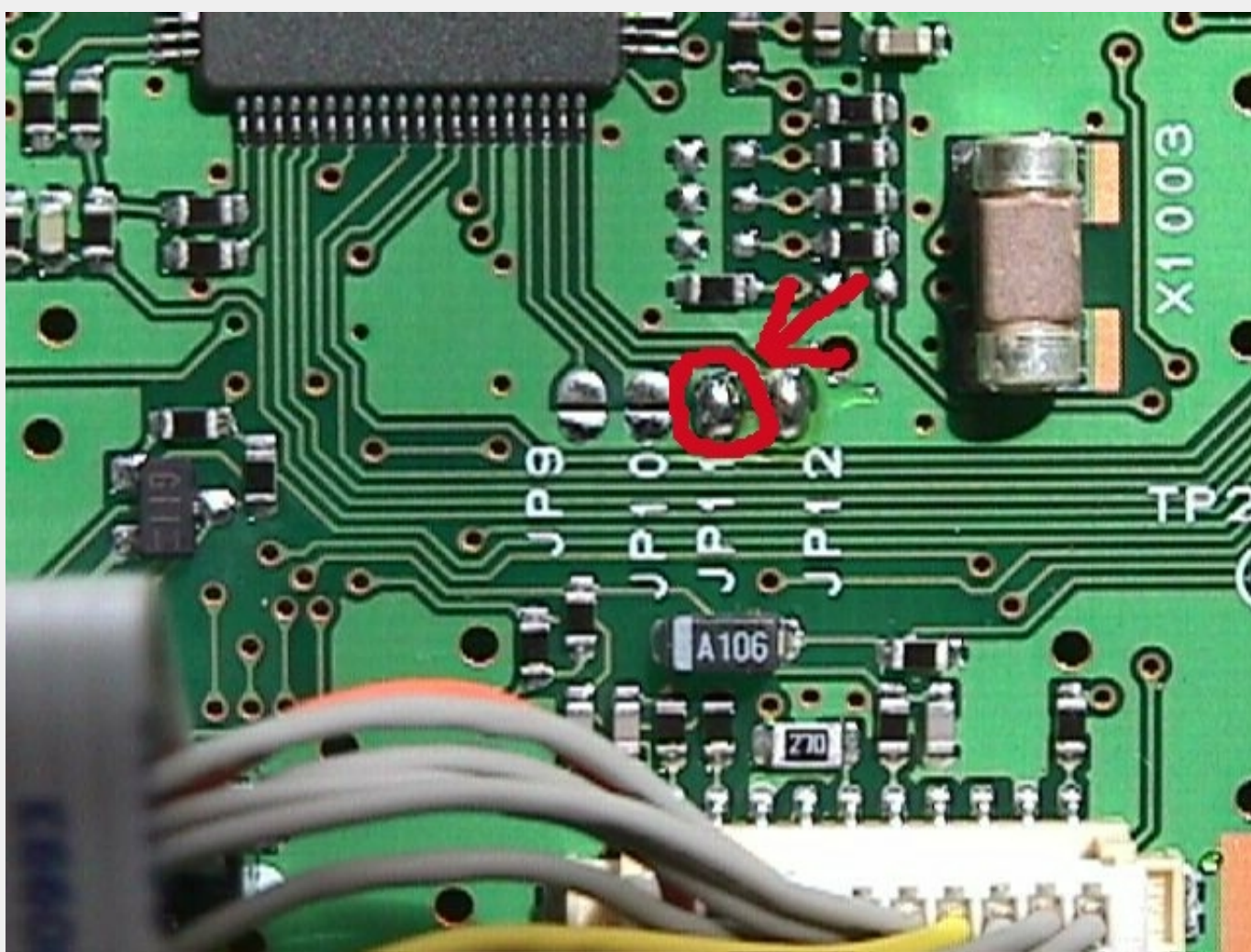
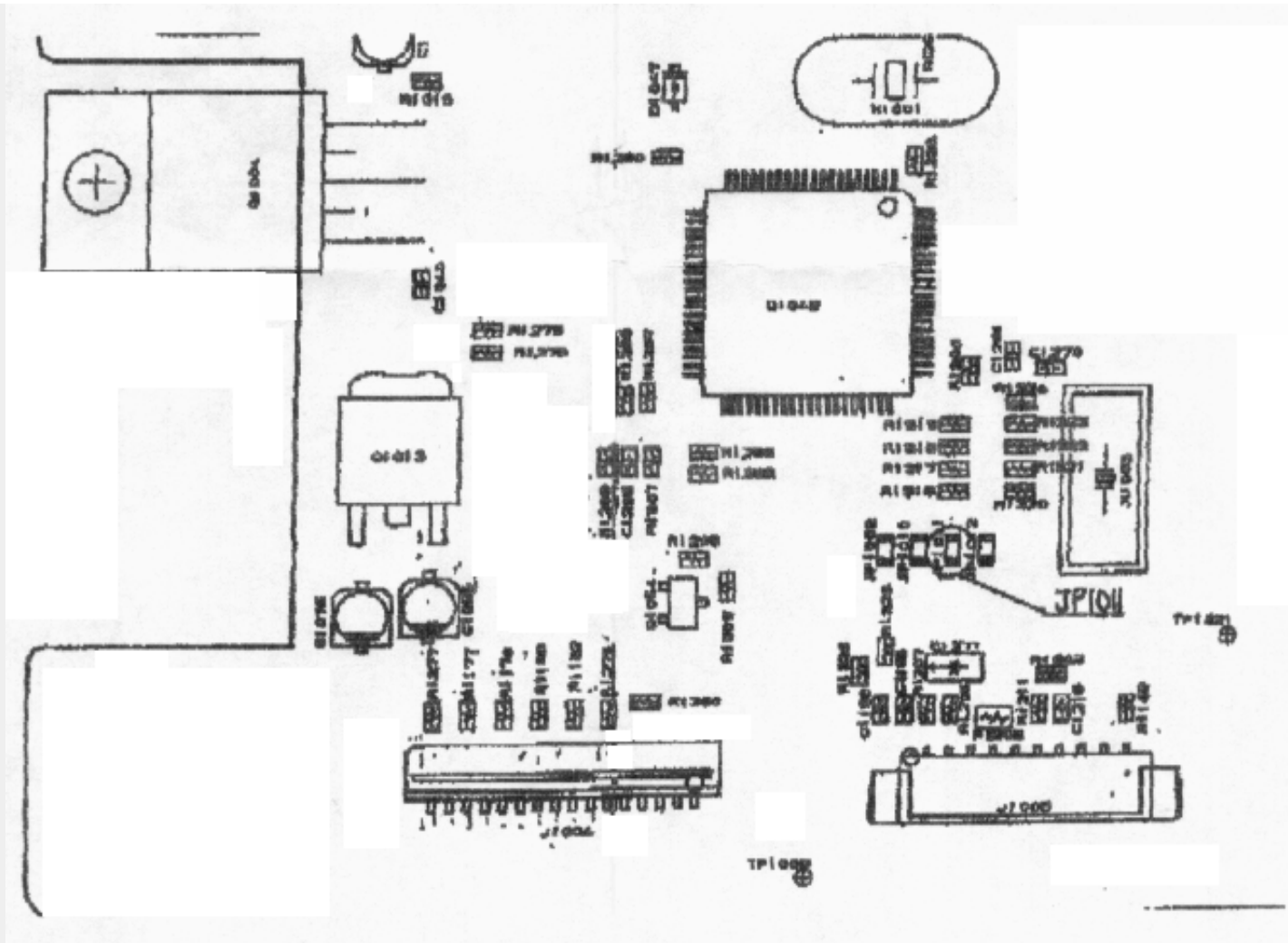
**06-08-1999**

**(FT-2600) Yaesu FT-2600 coverage TX to 134-174 MHz**

This modification opens up transmit coverage. Be careful not to transmit outside the Amateur Bands.

- Turn the FT-2600M off and remove the DC power cord.
- Remove the (5) screws securing the top cover and carefully remove the cover.
- Locate and remove JP1011 (near Q1049) as shown below.
- Reassemble the radio again.
- Press and hold [A/N] + [D/MR] + [MHz] while powering up to reset the microprocessor.





**Date:** 09-12-2000

**User comment**

**From:** Anonymous

**Subject:** Voltage sensitive

The mods on this FT-2600 were sucessfull but these radios do not work properly on any of the 5 radios that have been modified or by others.

It seems these radios are voltage sensitive and the variation of voltage when the engine is not running creates a low voltage condition causing computer to be eratic and shutdown or change channels for no apparent reason. Yaesu service center in Cerritos, CA unofficially claim that starting the engine can spike the voltage regulator throwing it out of calibration.

**Date:** 09-09-2001

### User comment

**From:** [Dan Schwietert](#)

**Subject:** Re: Voltage sensitive

I have modified at least 20 of this model radio using the mod available at this web site. I have found the mod to be dependable, but the FT2600 is very low voltage sensitive.

When the install of the radio wiring is inadequate or the vehicle is started with the radio on, I have seen a couple of results.

The frequency's and all settings stored in memory will be deleted, in one case the protection diode was shorted out. Make sure the power to this radio has adequate wire and comes directly from the battery and the vehicle is never started with the radio on.

**Date:** 30-01-2002

### User comment

**From:** julio gonzalez

**Subject:** modification

yo modifique el ft2600 con las instrucciones que esta pagina da pero al terminar de hacerlo el radio bajo su voltaje y me aparece en la pantalla de vez en cuando "packet" cuando transmito en fonia. es algo raro parece que es un desperfecto que traen de fabrica. agradeceria a algun amigo que lo halla experimentando o tenga la solucion al problema favor escribirme al email tg9gjg@hotmail.com gracias

**Date:** 20-02-2002

### User comment

**From:** [WA1TMQ](#)

**Subject:** Is it JP10 OR JP11?

The modification says change JP1011. There is no JP1011, only JP10 OR JP11.

Can someone clarify this?

Also the display shows only "UNLOCK". The reset didn't seem to do anything.

## What to do now?

This modification is read 2253 times.

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**19-07-1998**

**(FT-27) FT-27 expanded frequency range**

Remove the screws holding battery track and rear cover.

Locate the "CONTROL UNIT".

Close jumpers 1, 3, 7, AND 8.

## Reassemble the radio.

Turn on the radio and program it as following:

"1" 135.000 PRESS D/MR THIS IS LOWER RX LIMIT

"2" 185.000 PRESS D/MR THIS IS UPPER RX LIMIT

"3" 135.000 PRESS D/MR THIS IS LOWER TX LIMIT

"4" 185.000 PRESS D/MR THIS IS UPPER TX LIMIT

Press and hold D/MR, T and REV while TURNING ON if you need to reset or reprogram the radio.

### Notes:

Jumper 5 is for 25 KHZ steps default value.

Jumper 9 is for battery back-up.

Jumper 10 is for 1750 HZ repeater tone access.

This modification is read 270 times.

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19-07-1998

(FT-2700) YAESU FT-2700 straping

| YAESU FT-2700 |     |             |                     |             |       |   |
|---------------|-----|-------------|---------------------|-------------|-------|---|
| D09           | D10 | D11         | D12                 |             |       |   |
| 0             | 0   | 0           | 0                   | NO WORK     |       |   |
| 0             | 0   | 0           | 1                   | AS SHIPPED  |       |   |
| 0             | 0   | 1           | 0                   | -151.600    |       |   |
| 0             | 0   | 1           | 1                   | 144-154 MHZ | 12/25 |   |
| 0             | 1   | 0           | 0                   | -151.600    |       |   |
| 0             | 1   | 0           | 1                   | 144-148 MHZ | 12/25 |   |
| 0             | 1   | 1           | 0                   | 144-154 MHZ | 5/10  |   |
| 0             | 1   | 1           | 1                   | 144-146 MHZ | 10/20 |   |
| 1             | 0   | 0           | 0                   | -151-       |       |   |
| 1             | 0   | 0           | 1                   | 144-146 MHZ | 12/25 |   |
| 1             | 0   | 1           | 0                   | 144-146 MHZ | 5/10  |   |
| 1             | 0   | 1           | 1                   | 144-146 MHZ | 10/20 |   |
| 1             | 1   | 0           | 0                   | -151.600    |       |   |
| 1             | 1   | 0           | 1                   | 140.150     | 12/25 |   |
| 1             | 1   | 1           | 0                   | 144-148 MHZ | 5/10  |   |
| 1             | 1   | 1           | 1                   | 144-154 MHZ | 10/20 |   |
| -----         |     |             |                     |             |       |   |
| -             |     | UHF SETTING |                     |             |       | - |
| -----         |     |             |                     |             |       |   |
| D13           | D14 | D15         |                     |             |       |   |
| 0             | 0   | 0           | NO WORK             |             |       |   |
| 0             | 0   | 1           | 430-440 MHZ         | 12/25       |       |   |
| 0             | 1   | 0           | 430-450 MHZ         | 12/25       |       |   |
| 0             | 1   | 1           | 430-440 MHZ         | 5/10        |       |   |
| 1             | 0   | 0           | *NORMAL* AS SHIPPED |             |       |   |
| 1             | 0   | 1           | 430-440 MHZ         | 12/25       |       |   |
| 1             | 1   | 0           | 430-440 MHZ         | 12/25       |       |   |
| 1             | 1   | 1           | 430-450 MHZ         | 5/10        |       |   |

Date: 05-06-2001

User comment

From: M5GWH

Subject: Info

I recently had a FT2700R which was not set to UK steps and, after, following the info on [www.mods.dk](http://www.mods.dk), I found that the reference crystal needed changing to get the VFO to lock - it seems changing the diodes behing the front panel on their own, in some cases, does not work.

Just thought I would share this so people don't think they've screwed the radio up after doing the diode change.

Leigh....M5GWH

19-07-1998

(FT-2700) FT-2700RH cross band repeater modification

I have been asked a couple of times to send the mod I devised to use this rig in cross-band repeater mode. I've always been a bit reluctant cuz it is not a "cut this trace" or "remove this jumper" type of mod. It is not for the faint at heart HI. It works quite well indeed, though. So here it goes.

Making the modification:

- Use care, and take your time. This is not an easy one!
- Encapsulate both modules in isolating material - I used electric tape.
- Make good connections.
- Before you apply power to test the mod, ensure the "dim" button is released. Turn the radio on. Test it to see it works just as before.
- Nothing should have changed except for the "dim" button.

Using the mod:  
Say you want to cross-link 146.52 simplex to a UHF repeater on 442.00+.

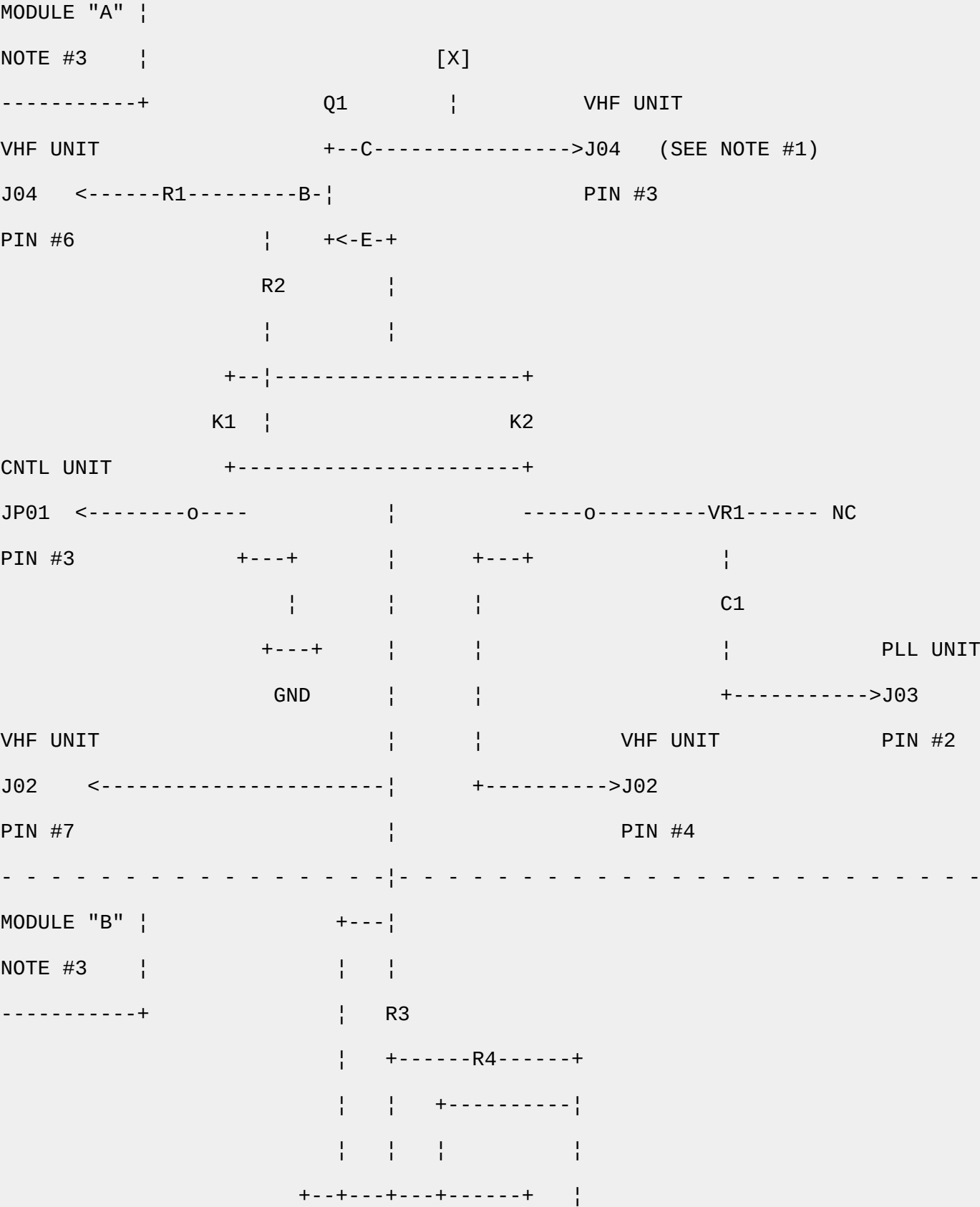
1. Program memory channel #1: 146.52 rx, 447.00 tx, full duplex (consult your manual if necessary on how to do that).
2. Program memory channel #2: 442.00 rx, 146.52 tx, full duplex.
3. Lock out all other memory channels so they will not scan.
4. Select either memory #1 or #2 - doesn't matter.
5. Push "dim" button in. This button has become the RPT ON/OFF switch.

Testing:

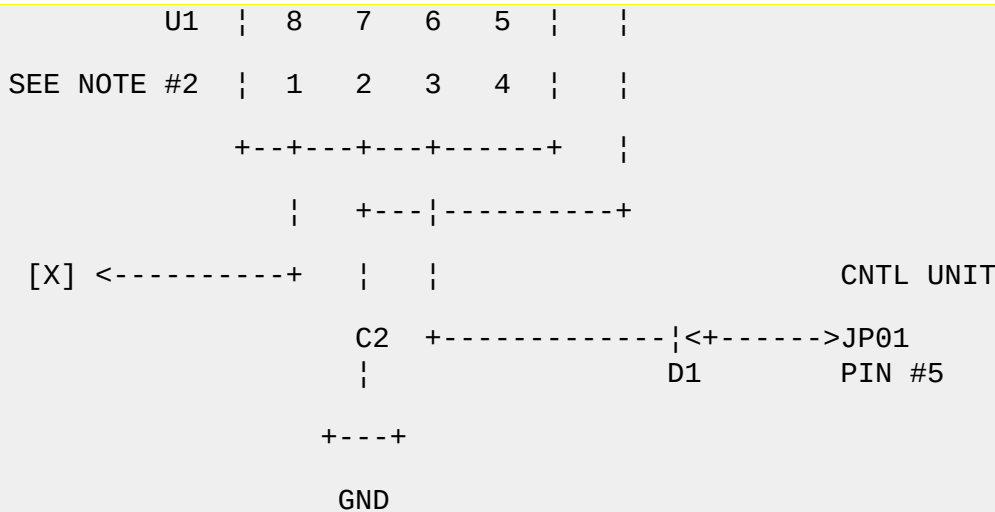
You should see the 2700 scanning between channels #1 and #2 at a rate of about 3 cps. Open the squelch and you should see the tx coming on the air. Close the squelch and scanning should resume. Note that the rx volume control has no effect on audio level going out on the air.

Now the pot VR1 will need to be adjusted. There are 3 ways of doing that:

1. Use reports from other stations
2. Better than that, use the old VU METER trick.
3. Best, use a deviation monitor.







Note #1:

Cut orange wire coming out from plug.

Solder two wires to orange wire coming from CNTL unit, one each to points marked [X] on the diagram above.

Solder orange wire from plug, pin 3, to ground for dim display light, or leave unconnected for bright display light.

Note #2:

Pins #4 and #5 of U1 are No Connection

Note #3:

Both modules are built separately, and encapsulated to prevent shorts

Module "A" is located on top of PA module on VHF board

Module "B" is tucked behind CNTL panel in front of radio.

Components:

- |                           |                 |                       |
|---------------------------|-----------------|-----------------------|
| R1: 2.2K                  | C1: 0.1 UFD     | K1 & K2: reed relays, |
| R2: 3.2K                  | C2: 10 UFD      | 12V @ 1050 ohms       |
| R3: 47K                   | VR1: 35K pot    | RS #275-233           |
| R4: 15K                   | D1: 1N914 diode | U1: NE555             |
| Q1: 2N3638A or equivalent |                 |                       |

## 19-07-1998 (FT-2700) 9k6 & FT-2700RH

de DG8YGZ @ DB0EAM.#HES.DEU.EU (Olaf)

Hallo OM's

hier mal wieder eine Umbauanleitung fuer den Yaesu FT-2700RH...  
Alle bisherigen aufgetauchten Umbauanleitungen waren ja wirklich SEHR knapp gehalten....

Nun hier einmal eine (hoffentlich) verstaendliche Variante....

Als erstes schrauben wir die beiden Gehaeusedeckel ab....  
Dann ueberlegen wir, wie wir die RX/TX-Leitungen aus dem Geraet herausfuehren wollen..ich hab rechts neben der NF-Buchse ein kleines Loch gebohrt(Geraet auf dem Kopf liegend...Backupschalter,etc sind zu sehen)....

ACHTET AUF DEN 100nF Kodensator !!!! Ich hab beim Bohren nicht aufgepasst..hi Dort fuehren wir 2 Abgeschirmte Kabel durch....

Die RX-Signale vom Diskriminator holen wir uns von der Diode D07 vom VHF-Unit Sie liegt genau unter der 8-Poligen-Steckerleiste J03. Neben ihr ist die D06. Das Kabel loeten wir nun einfach an das gebogene Beinchen der Diode.

Nun zur TX....

Dort sehen wir links die PLL-Unit und rechts die UHF-Unit...

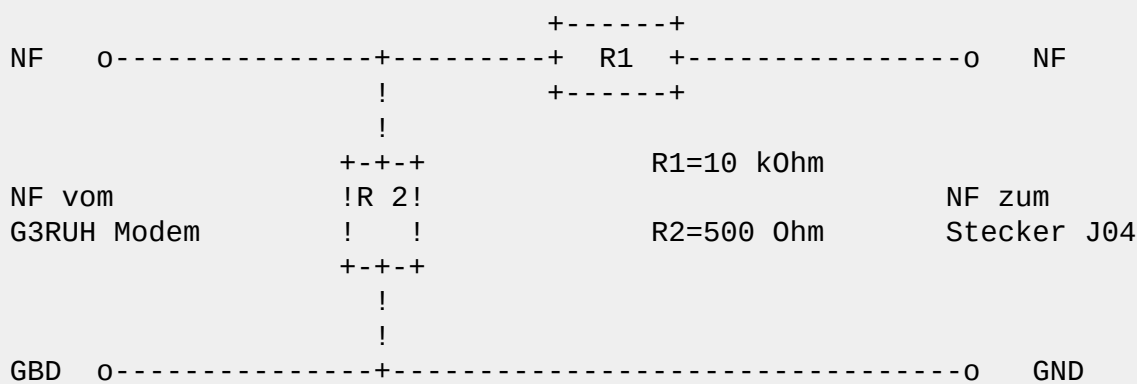
Das Kabel fuer die TX legen wir am besten,wenn wir ausgehend vom Bohrloch, ueber die gesamte VFH-Unit gehen, es hinter dem Kontrol-Unit herziehen und dann durch die Aussparung vor dem PLL-Unit herlegen....

Das wars dann auch schon....

Jetzt loeten wir an dem 1. Draht vom J04 die TX-Leitung an. (Pin1 = MOD) Der Draht kommt aus einer abgeschirmten Leitung und ist Weiss.

Die Masse(Gelfecht) von dem neuen Kabel verbinden wir mit dem Abschirmblech.

Ich habe nachtraeglich noch eine kleine "Anpass-Schaltung" fuer das Orginal-G3RUH Modem eingebaut. Das Modem soll etwas kritisch sein,was den Eingangswiderstand des TRX angeht.Es funktionierte auch ohne, aber sicher ist sicher..hi



Vielen Dank an DG8FBL, der mir das G3RUH abgeglichen und das Geraet TX-Seitig zum laufen bekommen hat...

Fuer ewentuell auftretende Schaeden uebernehme ich natuerlich keine Haftung!!

Fragen, Anregungen, etc sind aber immer willkommen...hi

Viel Spass beim Umbau, vy 73 es 55 de Olaf DG8YGG @ DB0EAM.#HES.DEU.EU

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### (FT-290) Modification of tuning range

There are 4 possible jumpers in the FT-290R close to the CPU on the second small board from the rear.

Numbers are 1 - 4 from the bottom (the most hidden one).

The indicated combination is perhaps the most usable in Europe because the repeater shift is  $\pm 600$  kHz, the steps on FM tunes to X00, X25, X50 and X75 standard frequencies and at the same time it gives a larger tuning range.

But please note that it is not legal to transmit on frequencies outside the ham band. Even by mistake.

In some countries it is not legal to have a receiver that can be tuned outside the ham bands. Please check local regulations.

| Frequency  | Repeater | Step    | 1 | 2 | 3 | 4 |
|------------|----------|---------|---|---|---|---|
| Not usable |          |         | 0 | 0 | 0 | 0 |
| 144 - 148  | 600      | 25 12.5 | 0 | 0 | 0 | 1 |
| 140 - 150  | 1.600    | 100 25  | 0 | 0 | 1 | 0 |
| 144 - 146  | 600      | 10 10   | 0 | 0 | 1 | 1 |
| Not usable |          |         | 0 | 1 | 0 | 0 |
| 144 - 148  | 600      | 10 5    | 0 | 1 | 0 | 1 |
| 140 - 150  | 8.000    | 100 10  | 0 | 1 | 1 | 0 |
| 144 - 148  | 600      | 10 5    | 0 | 1 | 1 | 1 |

|            |   |       |       |         |   |   |   |   |                      |
|------------|---|-------|-------|---------|---|---|---|---|----------------------|
| Not usable |   |       |       |         | 1 | 0 | 0 | 0 |                      |
| 144        | - | 146   | 600   | 25 12.5 | 1 | 0 | 0 | 1 | Standard in Europe   |
| 140        | - | 150   | 5.000 | 100 25  | 1 | 0 | 1 | 0 |                      |
| 143.5      | - | 148.5 | 600   | 10 5    | 1 | 0 | 1 | 1 | Probably most usable |
| 140        | - | 150   | 7.600 | 100 25  | 1 | 1 | 0 | 0 |                      |
| 140        | - | 150   | 600   | 20 10   | 1 | 1 | 0 | 1 |                      |
| 140        | - | 144   | 1.000 | 20 10   | 1 | 1 | 1 | 1 |                      |

19-07-1998

(FT-290) Yaesu FT290R for TXV use

Once in a while I see questions about the use of an FT290R for transverter use.

I have an Yaesu FT-290R, about 12 years old. The look-alike rig for 70 cm is the FT-790R. If I'm correct, the PLL-system was exactly the same (except for the X-tal for mixing up).  
It could well be that the mark II versions still use the same processor type.

The information was printed in the VERON DX-press/VHF-bulletin abt 11 yaers ago. I don't know the author or the exact year. The primary intention of the publication was using an FT-290 as transverter for 70 cm.

The information concerns the microprocessor chip 'HMCS45C' probably noted as Q01. On the pins 38, 39, 40 and 41 jumpers to ground specify the freqency-range, preset and step. With 4 pins there should be 16 different combinations. The factory set position determins the version for European or US-market.

In the table below you find the known combinations for the FT-290R. 'X' means jumper to ground.  
My guess is that removing the jumper at pin 39, the PLL is transformed to a wider frequency range used in the FT-790R. Once you are able to reach the print-board, you could try to (de)solder the jumpers and determin the results.  
These modifications are best made with power and battery backup switched off.

|        |         |         |             |         |         |         |
|--------|---------|---------|-------------|---------|---------|---------|
| band   | 144-146 | 144-148 | 143.5-148.5 | 144-148 | 145-146 | 144-148 |
| preset | 145     | 145     | 146         | 147     | 145     | 145     |
| step   | 12.5/25 | 12.5/25 | 5/10        | 5/10    | 10/20   | 5/10    |
| 41     | X       |         | X           |         |         |         |
| 40     |         |         | X           | X       |         | X       |
| 39     |         |         |             | X       | X       |         |
| 38     | X       | X       | X           | X       | X       | X       |

I hope this information is of some use.

Best 73, good DX and perhaps we meet in an direct QSO.

Tom PA3DXV @ PI8JOP  
QTH: Sittard, JO21WA

19-07-1998

(FT-290) FT-290 Bulb-Replacement

## FT 290 MK1. Bulb replacement instructions.

1. Remove speaker wires (white + & black -)
2. Remove aerial to tag.
3. Remove yellow wire to meter, left hand side (viewed from rear)
4. Remove black wire to meter, right hand side (viewed from rear)
5. Remove earth connection to pc board on front end of unit (thin braid approximately 1/2 inch, 12MM in length)
6. Remove 2 screws from pc board.
7. Remove both support pillars.
8. Take off front.
9. Remove screw (second front panel)
10. Remove meter.
11. Remove led display screws.
12. Remove post.
13. Remove black and red wires.
14. Now test new bulb.
15. Remove unit & fit new bulb, solder bulb wires.
16. Replace items in reverse order.
17. Grab a bottle of your favourite tippie and pour a glass or two from it. You have just saved over 30.00 pounds sterling. Mine has today gone for the second time, that's why i made these notes first time round.

Good luck. now will i get a new bulb quickly?

73. IAN. G0JRE @ GB7GFD. GUILDFORD.

This modification is read 1298 times.

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**19-07-1998**

### **(FT-290) Appendix by DG3UAP (with acknowledgements to Ian, G0JRE)**

Following a few hints about problems which I had during the work and which might save somebodies time.  
(Because of that I had to disassemble my rig three times, hi!)

ALL INFO IS GIVEN WITHOUT WARRANTY BUT WITH VY 55

There might be minor changes during the series of which I am not aware !

- REMEMBER THAT STATIC ELECTRICITY IS POISON FOR YOUR RIG ! YOUR CONTROLLER IS CMOS-TECHNOLOGY !!!
- Ground-connections to front pcb-block has to be unsoldered (at my rig on TWO places: to antenn-ground-tube and to metal box in the center (top view !)
- Unsolder black ground wire to antenn-ground-tube
- Hot wire and ground to antenna coax-cable at the antenna-filter (to get space for handling)
- The bulb size is about 3mm diameter and 6..7 mm long (without wires, hi) I added a resistor of 100 ohms/0.15 watts in series, so the 12 V-bulb can withstand up to 15 volts without trouble, a car battery has about 14 volts which means continuous overload without resistor. This killed my bulb.
- (If your rig's bulb is still ok it might be advisable to add such a resistor on a suitable place of the rear switch-board BEFORE the bulb burns out. This board is much better accessible (remove the battery-case....) This saves a lot of time for your hobbies ! For the lamp change you should calculate half a day if you do it for the first time !)
- The frequency display is only CLAMPED onto the display-pcb which carries the bulb to replace by means of the mounting frame (under which is the bulb). Removing the frame causes the display to fall down or at least result in its displacement.
- Change bulb as mentioned by Ian, add 100 ohms-resistor if desired (If you want to use an extra bright LED 3mm use a 680 ohms-resistor with 0.33 watts for 20 mA current. I have not tested the illumination effect of such a LED. Problem also: The light is not going to both sides for the illumination, meter and LCD.) The resistor should be in series to the red wire, isolation with insulating tape or equivalent.
- Fix the above mentioned frame together with the metal support by means of the two screws. If you want you can remount it to the front plate.
- Now THE IMPORTANT STEP which saves a lot of time in case of display-displacement. \*\*Make sure that you have connected all boards together and that none of the unsoldered wires come to ground !!! REMIND YOU MAKE THIS TEST ON YOUR OWN RISK AND RESPONSIBILITY !!! \*\*\* Switch off your FT 290. Connect a dummy-load (because of the unsoldered antenna) to the rear antenna- connector or a frequency counter via a 20 dB-attenuator. Connect the microphone as usual. Switch your FT 290R to LOW power and apply 10..12 V to the DC extern from a current LIMITED supply (Limit 1 A, NO Car-Battery ! Center to MINUS!) Switch the Lamp-Switch to ON. Last chance: No short-circuits ?



Switch on your FT 290. The new lamp should be on and the display show a frequency. If not: Check current consumption (Be careful, to make no short-circuits in this test-setup !) Try to transmit and check if you can change the transmit-frequency at counter. (With dummy use a second receiver and see if receive-frequency changes Check if the measured transmitted frequency corresponds with the displayed one in the range of tolerances. If all is ok, goto step a10. If you don't have a display on the LCD but can change the frequencywith the knob, you might have the same problem like me: 'Display-Displacement' or bad contact of the LCD. (Try to press slightly against the display, if now figures are announced, it' a big progress.) Switch off the power . Just disassemble the frontpanel with the display again and re-assemble it more accurate. Start again at a8. vy 55 for the second time ! (I had the complete rig together, when I had this fault !)

- Now re-assemble your rig and before resoldering all meter-cables and the antenna you can repeat this test, if you want.
- Check that you didn't forget any screws for fixing the boards together ! (My third partly disassembly !)
- Resolder all wires.

For other details see Ian's instruction which I don't want to repeat.

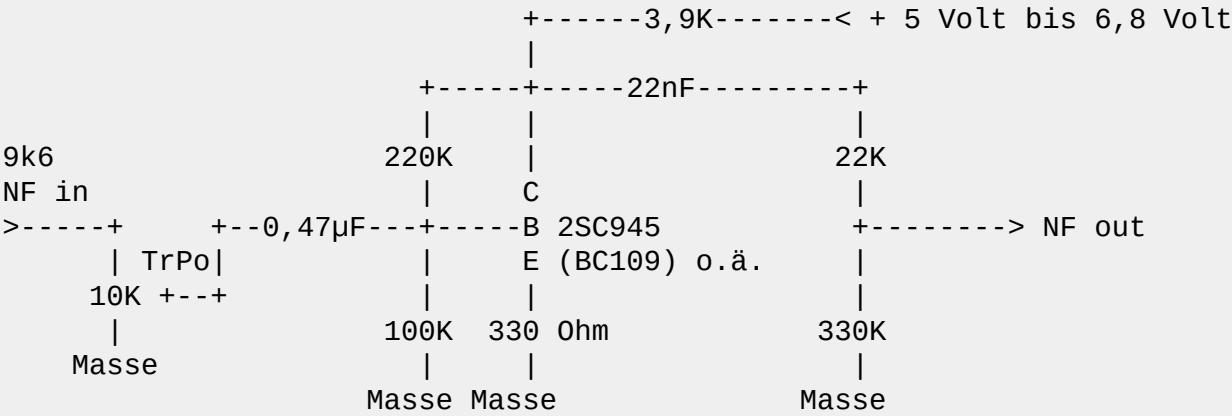
Comments, additional infos and questions welcome. But please understand that.  
I'm not a YAESU-technician. (Otherwise I wouldn't have recommended this serial resistor for the bulb, as I could earn money with this constructive bug and save my job ,hi !

19-07-1998  
(FT-290) FT790RI und FT290RI für 9k9

FROM: DG3OO @ DB0CEL

FT790RI und FT290RI

- NF Rx 1k2, 2k4 Auskopplung über 10 µF C und 25 Kohm Trimpotentiometer (Schleifer nach außen) am Kollektor von Q1021;
- PTT seitlich über Zusatzbuchse, Einkopplung via Schutzdiode;
- NF Rx 9k6 ebenfalls an Pin 9 des Q1019 MC3357 auskoppeln;
- NF Tx 9k6 (1k2, 2k4): Umbau des Hubreglers VR02, sodaß Schleifer und "heißes" Ende vertauscht sind (rechts vom Q2004); Einkopplung des Signales an dem Schleifer über Zusatzverstärker:



TrPo = Trimpoti

Auskopplung auch via 25 K Trimpoti möglich; Schleifer dann gegen Verstärker; "heiße" Ende nach außen;

- Verstärker auch für 1k2, 2k4 Tx-Signal nutzbar;
- bei Verwendung eines XR2211 - siehe oben

Bastlerisch Unerfahrene sollten u.U. die Finger von den Änderungen gerade bei FT290RI lassen!  
73 de dg3oo @ db0cel-7.#nds.deu.eu \*\*\* manfred \*\*\*

19-07-1998

(FT-290) FT-290R (first version) Extensions

I hve nothing about the second version. Perhaps later...  
73's of Ludovic.

-----

The pins no 38,39,40,41 near HMCS45C are used for extensions.

|       | PIN | No |    | BAND        | STEP       | FM/SSB      | SHIFT                                |
|-------|-----|----|----|-------------|------------|-------------|--------------------------------------|
| 38    | 39  | 40 | 41 | MHz         | KHz        | Hz          |                                      |
| ----- |     |    |    |             |            |             |                                      |
| *     | *   |    |    | 140-150     | 25<br>100  | 1000<br>100 | 7.6MHz                               |
| ----- |     |    |    |             |            |             |                                      |
| *     | *   | *  |    | 140-144     | 10<br>20   | 1000<br>100 | 1MHz                                 |
| ----- |     |    |    |             |            |             |                                      |
| *     | *   | *  | *  | 140-150     | 5<br>10    | 1000<br>100 | no shift possible                    |
| ----- |     |    |    |             |            |             |                                      |
| *     |     |    | *  | 144-146     | 12.5<br>25 | 1000<br>100 | 600KHz<br>(European version)         |
| ----- |     |    |    |             |            |             |                                      |
| *     | *   |    | *  | 144-149     | 10<br>20   | 1000<br>100 | 600KHz                               |
| ----- |     |    |    |             |            |             |                                      |
| *     |     | *  |    | 140-150     | 25<br>100  | 1000<br>100 | 5MHz                                 |
| ----- |     |    |    |             |            |             |                                      |
|       | *   | *  |    | 140-150     | 25<br>100  | 1000<br>100 | 5MHz                                 |
| ----- |     |    |    |             |            |             |                                      |
|       | *   | *  | *  | 144-148     | 5<br>10    | 1000<br>100 | 600KHz                               |
| ----- |     |    |    |             |            |             |                                      |
|       | *   |    | *  | 144-148     | 5<br>10    | 1000<br>100 | 600KHz                               |
| ----- |     |    |    |             |            |             |                                      |
|       |     | *  |    | 140-150     | 25<br>100  | 1000<br>100 | 1.6MHz<br>(FB for 70 cm transverter) |
| ----- |     |    |    |             |            |             |                                      |
|       |     | *  | *  | 144-146     | 10<br>20   | 1000<br>100 | 600KHz                               |
| ----- |     |    |    |             |            |             |                                      |
|       |     |    | *  | 144-148     | 12.5<br>25 | 1000<br>100 | 600KHz                               |
| ----- |     |    |    |             |            |             |                                      |
| *     |     | *  | *  | 143.5-148.5 | 5<br>10    | 1000<br>100 | 600KHz                               |
| ----- |     |    |    |             |            |             |                                      |

Thanks to F1GAN for this info.

19-07-1998

(FT-290) Problem width packet

There is a very "hard" de-emphasis in FT-290R. This can cause serious problems copying packet signals with some demodulator chips, eg. like the XR2211. By a common request, here is a modification of this popular TCVR for packet radio. It was made after a RADIO-REF article in several copies, by HA5OB, HA5DI, HA3MA and others. Increasing the intelligibility in noisy environment, this modification is also useful in FM voice communications.

You'll have to add only a serial RC unit, the R being 4.7 kOhm, and C being a 1uF tantalum capacitor. Put them between the pin 9 of IC Q1019 and the collector of transistor Q1021, with the positive leg of the tantalum capacitor to the collector of the transistor. These points can be found as test points, near to IC Q1019. Solder the components together, wrap some insulation around them, then solder to the test points mentioned. That's all you have to do! With this modification, FM reception will sound somewhat noisy, but much louder.

This modification is read 1093 times.

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**19-07-1998**

## **(FT-290) FT-290RII 12,5KHz-Raster!**

*From: DD2TJ @ HB9EAS.CHE.EU (Josef)*

Liebe OM's!

Ich habe bis jetzt schon mehrere Umbauanleitungen gelesen u. auch mein Geraet dementsprechend umgerüstet. Aber im Grunde brauchen wir doch den 12,5KHz-Raster nur für unsere Zwischenkanäle, oder?

Das heißt, wenn ich mich mit dem Abspeichern der Frequenz begnuege, geht's auch ohne Umbau!

1. Die Taste -MR- betätigen u. einen freien Speicherplatz suchen.
2. Auf irgendeinen VFO umschalten und die gewünschte Frequenz bis auf 5KHz genau einstellen.
3. Umschalten der Modulationsart mit der Taste -MODE- auf CW.
4. Nun die gewünschte Frequenz genau einstellen. (richtig, auf CW!)
5. Jetzt die obige Frequenz übernehmen auf den vorher eingestellten freien Speicherplatz durch drücken der Taste -M-. (rechts unten)
6. Nun schalten wir wieder zurück mit der Taste -MR- in unsere Speicherablage, wo jetzt unsere Frequenz mit dem CW-Mode erscheint.
7. Als letztes ändern wir jetzt den CW-Mode auf z.B. FM und legen noch die Ruftonablage (- od. +) fest.
8. Zum Abschluss des Ganzen nochmal's die Taste -M- drücken!

Das war's!

Ich hoffe dem einen oder andern einen Umbau wegen nur einer od. zwei Frequenzen erspart zu haben. Wer natürlich den 12,5KHz-Raster grundsätzlich benötigt, kommt um den Umbau nicht herum.

Etwahige Schreibfehler bitte ich zu entschuldigen!

Für Bedien- oder Programmierfehler kann ich leider keine Haftung übernehmen. Also viel Spass beim ausprobieren!

vy 73 de DD2TJ (Josef)

This modification is read 1265 times.

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**28-03-1999**

## **(FT-290) How to prevent the touch-tone pad from automatically keying up your rig**

Rigs involved: This mic. comes with the Yaesu FT 290 MK II (2 Meter rig), the FT 690 MK II (6 Meter rig), or the FT 490 MK II (UHF rig), and possibly others.

1. Take the three (3) back screws off.
2. Take the two (2) screws off the circuit board to free it from the case.
3. Find the red wire going to the micro-switch, ie, the ptt line.
4. Follow that red wire to the circuit board. At that place on the circuit board another red wire will join the first one.
5. Un-solder both red wires from the circuit board and clean up the solder mess, otherwise hum will occur.
6. Solder the two red wires together and cover with tape or shrink tubing.
7. Put the circuit board in place and screw it down.
8. Put the "lock" slide switch back in place.
9. Put the rest of the case on.
10. Put the outside screws in.
11. You are now ready to try it out, so go ahead and re-attach it to your rig!
12. All should work:
  - PTT works and releases,
  - Mic passes audio,
  - touch tones work when ptt button held,
  - touch-tone red "LED" still lights up when touch-tone pad keys are depressed, even if ptt button is not held down,
  - no hum noticed.

This modification is read 1040 times.

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**28-03-1999**

## **(FT-290) Some small mods for FT-290 MK I**

### **AUDIO DECOUPLING**

It seems important to fit a 0.1uF cap into the receive audio line to the TNC. Fit it inside the five pin plug. The FT290R has no decoupling capacitor in the audio output (See wiring Diag. IC No.Q1027 (uPC575C2) off pin 7.

### **CAP CRUNCH**

Many people have problems getting the Mk1 working on packet. This is due to the receiver filtering attenuating frequencies above 2kHz, thus the 2.2kHz tone is attenuated by 10-15dB. The standard capacitor crunch mod, originally designed to give more +ACI-sparkle+ACI- to the audio cures this. To do the mod, remove the case and turn the rig so the control knobs face away and the SO239 antenna socket is nearest you. At the back of the PCB is a relay (a box shaped component made of semi-clear plastic). Just above the relay are two green capacitors.

Using small pliers, grip the capacitor nearest the relay (C110) and crush it, removing all the debris.

### **DE-EMPHASIS - 1**

There is a very +ACI-hard+ACI- de-emphasis in FT290R. This can cause serious problems copying packet signals with some demodulator chips, e.g. like the XR2211. This modification increases the intelligibility in noisy environments, and is also useful in FM voice communications.

Add a serial RC unit, R +AD0- 4.7k, C +AD0- 1uF tantalum capacitor between pin 9 of IC Q1019 and the collector of transistor Q1021. The positive leg of the capacitor goes to the transistor collector. These can be found as test points near to IC Q1019. Solder the components together, insulate them, then solder to the test points mentioned.

With this modification, FM reception will sound somewhat noisy, but louder.

### **DE-EMPHASIS - 2**

Yaesu seem to have goofed on both the FM de-emphasis and the audio filter. A computer analysis of the audio circuit suggests:

1. Reduce C125 from 10n to 4.7n in filter
2. Reduce C124 from 2.2n to 1.5n (near Q1026)

This isn't perfect but it a lot better - the tones now seem nearly equal. There appears to be plain FM (cf phase) with no pre-emphasis on Tx+ACE-

### **RESET TO 145MHz**

This mod resets the CPU to 145MHz and sounds a bleep to tell you it's been done. Remove top and bottom covers, locate the hole in the case near the SO239 socket covered by a stick-on aluminium label. Make a hole in the label and install a push to make, non-latching switch. Connect one side of the switch to ground and the other to pin 4 of J5003 which connects the keyboard and control units. A 1nF capacitor should also be connected from pin 4 to ground for decoupling. Replace the covers, dial up any frequency, press the button and the set should reset to 145MHz and bleep.

**LISTEN ON INPUT**

Place the set with controls towards you, remove the bottom cover and locate the black/white wire on SK1. It's the tenth one from the left.

Cut this wire at the socket and insulate the free end. Locate the green/white wire on SK1 and solder the anode of a 1N4148 diode to it.

Connect the cathode of the diode to the red/white wire on the PCB adjacent to the mic. socket. Insulate the diode leads to prevent shorts. When the call button is pressed, it allows listen on input on both + -shift and -shift. When you want the rig to transmit a tone burst you must close the PTT at the same time as pressing the call button.

## CURING SYNTHESISER WHINE

Early 290s suffered from a high level of whine. Try moving the wiring harnesses around inside the rig whilst monitoring the whine on another rig. The real cure, if you have a delicate hand for soldering, is locate LO6 in the synthesiser and solder a 15pF capacitor in parallel with it. This can usually be soldered between the hot ends of C24 +ACY- C25 which are at the rear of the IC in the synthesiser unit.

### MODIFIED SQUELCH

This mod reduces the difference in level between the opening and closing points and speeds up the operation of the squelch enabling the scanner to work better. Reduce C94 from 4.7uF to 1uF, increase R79 from 270K to 330K and add a 10uF tantalum or subminiature electrolytic between the leg of R78 (4.7K) and the body of the transistor T1007.

## OPENING UP TO 148MHz

Remove the battery compartment and slide out the power board to allow access to the microprocessor board. Two tinned copper wire jumpers are visible on this board, next to the microprocessor. One is easy to see and the other is not because it is next to the main board.

Cut the jumper which is difficult to see. If the wrong jumper is cut then the frequency display will not be correct when the unit is powered up.

This modification is read 1293 times.

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**28-03-1999**

**(FT-290) FT-290R Mk1 - mod for 1kc and 100hz steps on FM for satellite working**

I asked around for details of this Mod but no-one had attempted it. I decided to take the bit between my teeth and sort it out. Here goes.

1. Remove the covers of the rig and locate the mode select switch on the front panel. (you only need remove the covers...nothing else)
2. Locate the wafer of the switch nearest to the front of the rig and identify the green and yellow wires. Arrange a suitable method of switching the wires around. With the wires transposed the rig will now step 1kc and 100hz on FM. Note though that SSB will be 25/12kc, simply flick the switch to tune SSB normally. (I used an external switch, but I am sure that the noise blanker switch could be used or replaced with a suitable DPDT switch). You will find that the rig will tune on TX making it much more suitable for satellite working.

If you want any more info please give me a call.

Joe. G4XRZ +AEA- GB7WRC.+ACM-16.GBR.EU

**Date:** 14-11-1999

### User comment

**From:** [Ian Vowles](#)

**Subject:** Tip

If you have a European model as I did the spacing on FM is 12.5 or 25kc. Nervous about further mods I discovered that if you tune to the exact frequency you require using cw THEN switch to FM you can work the exact frequency!

For me this was better than risking more trips inside the cover :-)



28-03-1999

(FT-290) Common faults found on the FT-290R

NO RF O/P : PA

If it is not PA (the most likely cause) then check diode D24 in aerial switching, check for L2012 physically shorting to copper screen, and check driver Q2021 and R69.

OFF FREQUENCY RX +- TX

If this is just a couple of KHz then realign PLL local osc. If it is several KHz (possibly 10-12) off frequency then suspect PLL local osc xtal X02 (18.7414MHz).

OFF FREQUENCY FM TX

Realign L1002 (FM TX osc coil). If frequency error is significant then suspect xtal X1001.

ERRATIC FREQUENCY JUMPS

Check X02 as above.

DRIFTING

Check -6.8v. rail, and check Q05 on REG unit if this is missing.

POOR SQUELCH OPERATION

Check Q1019 (MC3357P) and D32 in squelch circuitry.

POOR QUALITY FM RX

Xtal X1003 (11.265MHz).

ERRATIC TUNING

The tuning step switch.

TUNING JUMPS

The tuning step switch.

INTERMITTENT TX+-RX

Check TX/RX relay. Check alignment of VCO in PLL.

NO AUDIO O/P

Check audio IC Q1027. Also check to see if the reverse polarity diode is blown, as reverse polarity causes failure of this IC.

CONTINUOUS CW OR NO CW TX

Check Q2010 (MC14001B). Also check the wire to the key socket is not s/c or broken, as this can happen when the battery compartment is taken in and out.

LOW SENSITIVITY RX

Check T1001 Ae. i/p coil, D25 in aerial switching and RF amp.

LOW SENSITIVITY ON A UNIT WITH A MUTEK BOARD

Check for loose strands from the braid of the Mutek board's coax shorting out the connecting pins on the Mutek board.

Then check BF980 in Mutek board.

FADING LCD DISPLAY

Dismantle LCD display unit and clean the rubber connecting strip and the PCB it makes contact to.

CRACKLING NOISE ON TX AUDIO (FM ONLY)

Q2004 mic amp IC.

CRACKLING NOISE ON TX+-RX

Check X3001 (5.76MHz) in PLL.

MELTED NICADS

Replace DC i/p socket (and nicads). This fault can also occur as a result of using a DC input plug which is not quite the correct diameter or length, because the batteries are then not disconnected when DC is plugged in.

POOR SSB TX (NON-LINEAR)

If the PA has gone non-linear, then replace the PA and change R70 from 390R to 270R.

This modification is read 1482 times.

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18-09-1999

(FT-3000) Yaesu FT-3000 TX mod from 144 to 148 to 140 to 174 MHz.

Remove top cover. Lift out speaker. Cut blue wire. (insulate)  
Reset radio by turning on power while holding VFO/MR and F1.

If you save settings via the PC cable you will find you can't upload them after the mod.  
No problem. Download and save a file from the modded radio and use it as a template file.

Date: 02-01-2002

User comment

From: shayea

Subject: r

hi i need help for freeband yaesu ft-3000m

This modification is read 1223 times.

top of page

13-10-2001

(FT-3000) FT-3000 freeband mod (800 Mhz)

Author: Chip monk

1. Remove covers

2. Gently remove front panel from radio

3. Remove 3 screws that hold control unit from radio. Also remove 2 flat cable connectors that connect control unit with main unit.

4. Locate R2131, R2132, R2133,and JP10, remove chip resistors from each location.

5. Assemble radio, mod complete, 800MHz. Gap restored.

Chip monk

**Date:** 05-02-2002

**User comment**

**From:** [Ken Woods](#)

**Subject:** what about the jumper?

*Step 4:  
Locate R2131, R2132, R2133,and JP10, remove chip resistors from each location.*

**Question:**  
**What about the JP10? Remove or leave alone?**

19-07-1998

(FT-301) Display led's

These run hot and often burn out segments. Cure is to reduce operating voltage which typically runs >5v. From voltage regulator q2 on the main chassis. A 1N4000 diode in series with the output of q2 drops nearly a volt from the supply voltage.

If the displays still work ok, they will run cool. (previously, others have removed red plastic lens for better ventillation, or have even drilled holes thru top of rig.)

**Date:** 20-04-2001

**From:** *CT1DDW - Filipe Ferreira*

In spite of reading about the mods for lower voltage of digital displayintroducing a diode 1N4000 on the output of the 5 Volt regulator, i did not acheve sucess because the voltage/courent reduction with such device its so severe that the VFO and digital readout goes jumping all the time.

My solution its replace all the AVR by a modern regulator ua7805, then put the diode in the output and get 4,3 V more or less.

The use of 2 poliester capacitors 0.1 uF switching the input and output of the 7805 to ground its recomendad, i even use a electrolitic 100 uF capacitor betwen the 7805 and ground for better filtering. The result its stability on the VFO and digital readout with lower heating of the ICs TIL38.

19-07-1998

(FT-301) Speech proc

Often ft301's heard on the air have had distorted audio. A single i.c. contains all the mic amplification and also drives the ring modulator in the ssb transmit path. This amp is driven to horrible distortion if the stock (handheld) mic is used at full clockwise mic gain setting.

This is the wrong place to have clipping occur. Also response of amp is far to "generous." suggest limiting low end response with series 2. uf cap (must be mylar or non-polar) at microphone connector. Have ignored the fact that the hi end response of that amp goes well beyond 50 khz. R.F. Clipping in my ft301 was actually only about 6dB. Due to the lack of rf gain in the clipper stages. This cure for low gain was most effective: an extra stage of gain is available for the taking on the "nb unit" card. (q201 is normally used only with the processer off as an alternate rf path) rig q201 in series q202, and keep both stages powered up regardless of position of "rf proc" switch. With the extra stage, it is easily possible to keep the ring modulator in the linear Region and still develop 15 to 20 dB. Of rf clipping.

To implement this change: jumper pins 10 & 11 on the n.b. Card supplies voltage). Open 1 k r205 at wiper to vr201, let it hang. open 0.01 c204 at transformer, and jumper to wiper of r205 with short lead (unshielded seems ok). Run vr201 at no more than about 3/4 gain. with high levels of rf clipping, it is important that the audio be rather lacking in bass to avoid a muddy sound. Preemphasis accross the full audio bandpass sounds pretty bad, so i would up with a .1 cap in series with the wiper on the mike gain control and finally shunted that cap with about 1000 ohms (adjust that value of resistance to give good articulation and still be semi-pleasant.

19-07-1998

(FT-33) Extended frequency for FT-23,33, and 73

Extended Frequency Enhancements for the Yaesu FT-23R(2M), FT-33R(220), and FT-73R(70cm). (Revised)

Greetings and hello radio amateur operators.

The topic is increasing the functional frequency coverage of what has been probably Yaesu's most popular handheld transceivers.

To save manufacturing costs, Yaesu engineers designed multiple personalities in the same CPU module found in the FT-23R, FT-33R,UHF FT-73R and the FT-2008/7008 transceiver. The FT-2008/7008 transceiver is the commercial version of the Ft-x3R series.

Unique features of this mod include

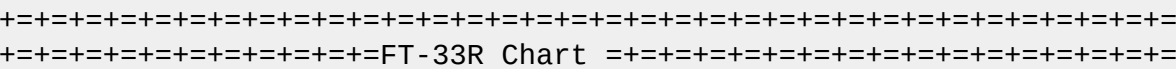
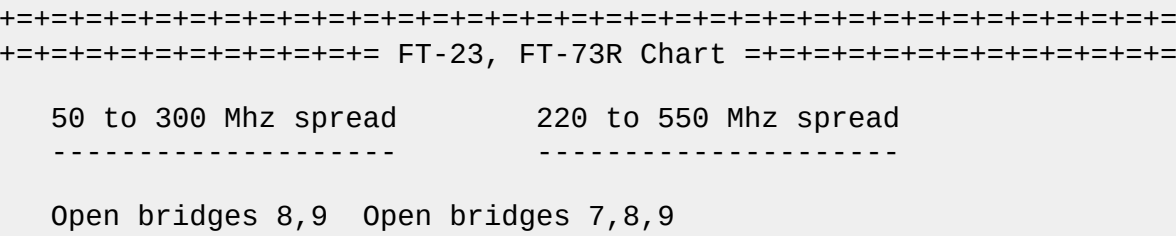
- the just say Mao feature (\*\*) (NO FREQUENCY READOUT: Ch 1 thru Ch 9 appear on your display. Great when you aren't looking and some fellow ham tries to rip off your simplex frequency)
- the GREAT WHOPPER (opens the CPU to 50-300 Mhz or 220-550 Mhz coverage. Full (.100 Mhz to 999.9995 Mhz) adjustable freq coverage available so far only on the FT-33R;this doesn't mean you can actually transmit but the Activity light goes in TX and you get a good fake RF bargraph that indicates that you can transmit on 750 MHz.

How to do it:

1. Contemplate invalidating your warranty. No beginners beyond this point. If you don't know how to solder, don't learn here. Ask an elmer to assist.
2. If you treasure your memories, write out your contents of your radio on a piece of paper. When you make the changes, the CPU runs a small diagnostic and see that the jumpers have been changed. It will ERASE ALL PRIOR SETTINGS.
3. Dissassemble your transceiver.
4. Find the line of solder connections running down the CPU board. GENTLY move all wires aside so you won't melt them.
5. Using solder wick and a Good low-power soldering Iron, see chart. Read special notes for the FT-33R.
6. Rebuild radio and count your blessings.

(\*\*)NO FREQUENCY READOUT

Removal of the solder bridge labeled number nine will activate the commercial side of the CPU module. To flip to the amateur mode, you would press F UP Arrow. To flip to the commercial mode, you would press F Down Arrow.



Same chart as above, but I wanted to add my experience of the Yaesu FT-33R 220 Mhz radio. When I removed number 7 and then did a cold reset , the CPU cleared and showed me a L and a freq. I put .100 in. Press D/MR. Then a U appeared. I turned the VFO knob until 999.999 appeared. Press D/MR.

I also had to reenter the Repeater Split to the proper value.

On the VFO, I could QSY down to those limits (using F UP/DN) and listen to my local Channel 13 on 215.720/.660.

Yes, 216-220 Mhz is available with this mod. Great if 216-220 is the next 220 subband.

Notes

1 Cold Reset of the CPU Board.  
With the radio upright and your nose pointing at the CPU board, look at the Lower Right Corner of the CPU chip. You will see two parallel SMT resistors. Below them is a screw with possibly a paper washer. To the right is a SMT device (it's a cap) with a pointed end facing Left. Ground that point to the screw or to the case with a flat screwdriver. Awhile doing that, cycle on/off the radio to ensure a good reset. Remove screwdriver and then reassemble radio.

Dedicated to:  
----- the knuckleheads in Barry Electronics who said it was impossible.  
----- Yaesu Tech Support who claimed that there are no RESET circuits in their radios, when their schematic diagrams say otherwise.

26-06-1999

(FT-41) Yaesu FT-41 wideband receive

From: 2E1FWP@GB7YEO.#45.GBR.EU

Name here is Phil in Weymouth Dorset South west coast of England... and i have a very simple mod for the YAESU FT 41 R and the YAESU FT 11 R handies to make the radio wideband receive !!

1. Turn the radio off

2. Hold down the two buttens marked MHZ and A + B ...

3. And turn the radio on at the same time.....

4. Now you should have wideband recieve!!

This mod works on my FT 41 and it covers 420 MHz -- 470 MHz FM.

Please if you do this mod and it works well send me a message .. at 2E1FWP @ GB7YEO.#45.GBR.EU

PLEASE NOTE !!  
Not all laws in some countrys permit the listening of these bands so please beware when in public veiw or memoriseing channels e.t.c..

If you dont like the mod just repeat the mod again and that will go back to normal settings..  
Let me know how you get on 73s all take care de Philip..

If you own one let me know what you think and i will more than happy to reply to any one reading this bulliten..

Philip 2E1FWP.  
18 DAWLISH CRESCENT,  
WEYMOUTH,  
DT4 9JN. U.K.

19-07-1998

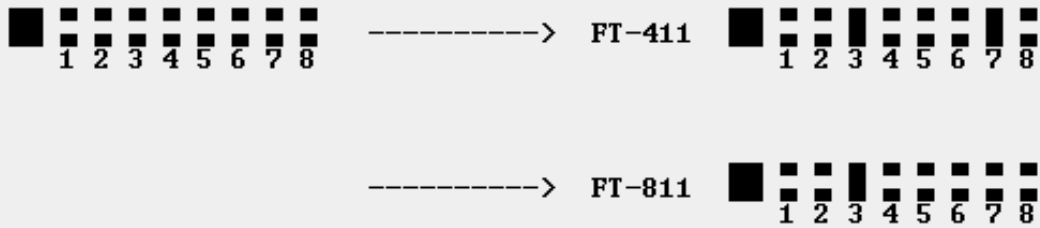
(FT-411) MODS for FT-411 / 811 TRX for a VHF UHF

To allow this TRX for a VHF UHF general cover, do the following mods :

- 1) Remove the front panel.

2) Look for the first part where the Lithium battery is connect.

there are 8 connectors like :



To validate the micro controller, do next :



For the FT-411 : RX 120 - 174 Mhz TX 140 - 174 Mhz

- 1) Reset the TRX by switch on it with [MR] and [VFO] key down.
- 2) Type 1200 [VFO] 1740 [VFO] 1400 [VFO] 1740 [VFO]
- 3) Press the [F] and [7] keys tho change the QSY step.

BE CARREFULL, with this few mods, the TRX looses the automatic AM detection.

For the FT-811 : RX 420 - 470 Mhz TX 420 - 470 Mhz

Do the same but step 2 is different :

- 1) Idem
- 2) Type 4200 [VFO] 4700 [VFO] 4200 [VFO] 4700 [VFO]
- 3) Idem

This modification is read 1604 times.

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19-07-1998

**(FT-411) FT-411 Modification via computer**

I was unhappy with the FT-411's "3" mode because the frequency had to be entered starting with the 100 MHz digit, and the ARS function would not work. I now use it in the "2" (normal) mode with the following mod.

I used the "clone" mode to dump the FT-411's ram to a computer. It's 9600 baud, 1 start bit, 1 stop bit, CMOS logic. 544 bytes are dumped when the up arrow is pressed. Starting with byte \$211 are the upper and lower transmit and receive frequencies, stored in BCD. I changed these to the limits I wanted. My FT-411's upper PLL limit is 195.4 MHz, so I used 195 MHz. The lower limit MUST remain set to 130 MHz (magic number) or the keyboard entry of frequencies will start with the 1 MHz digit .VS. the 10 MHz digit. To put the data back into ram, just press the down arrow and send the new 544 bytes to the FT-411. You could also just clone an H.T. that has the limits you want. You can not clone a mode "3" H.T. to a mode "2" H.T., however. The mode is contained in the first byte, which must match.

This modification is read 1509 times.

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19-07-1998

**(FT-411) FT-411 to packet**

For those that wish to connect a ft 411 to packet via a mfm tnc the following modifications are needed. In the black lead from the tx audio out insert a .01-0.1uf cap. In the red lead from the ptt, insert a 2.2k rst.

Then combine these into a common single lead connected to the tip of the small mike plug. The yellow rx audio goes to the tip of the large speaker plug. And the shield goes to the ring of the large plug. This information can be found in the 1989 august issue of 73. Page 58 it workes for me.

73'S N8KLT@NO8M.OH.USA.NA

This modification is read 1261 times.

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19-07-1998

**(FT-411) Extended frequency coverage mod for the FT-411**

Yaesu has sent out the following as an extended frequency coverage mod for the FT-411. I tried it and it works as advertised. First remove all black screws from case. Remove 4 silver screws holding the battery connector on bottom. Remove the 3 knobs. Carefully separate the front and back. There is a multiconductor trace between the front and back so hinge the front from the back to keep from putting too much tension on the traces. Looking at the board side of the front cover there are 8 little solder pads. They are half hidden by a cover plate and the multiconductor trace. Pad 2 will have a solder connection, the rest are open. Remove the solder fro the battery connector on bottom.

Remove the 3 knobs. Carefully separate the front and back. There is a multiconductor trace between the front and back so hinge the front from the back to keep from putting too much tension on the traces. Looking at the board side of the front cover there are 8 little solder pads. They are half hidden by a cover plate and the multiconductor trace. Pad 2 will have a solder connection, the rest are open. Remove the solder from pad 2 and place a solder bridge on pad 3. All other pads will

be open. Close up radio.

Now when you turn on radio it will come up with 1.000 in the display. Memory channel should say 1. Program in the lower receive frequency.

Example 1 - 4 - 1 - 0 then push VFO key. The Memory channel should go to 2.

Now program in the upper receive frequency. i.e. 1 - 6 - 5 - 0 and push VFO key. Memory will move to 3. Do same for lower and upper transmit frequencies.

Note. The receiver sensitivity falls off at 162.55 to about 1 uv. The step and repeater offset will need to be re-programmed also. Follow instruction manual.

This modification is read 1615 times.

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**19-07-1998**

### **(FT-411) FT-411 out of band modification (Software)**

I discovered a nice trick to increase its frequency coverage.

It is so simple that you don't even have to open your hand held. All you have to do is:

1. Make sure that the power switch is off.
2. press the UP arrow and DOWN arrow together, at the same time (those keys are also called A, and B. and they placed at the upper right side of the keyped)
3. Keep pressing both buttons and turn the power on.

Now you can receive 130-174Mhz, and transmit 140-150Mhz.

CAUTION:

When you do this modification the memories can be erased. Ayhow I think it is not the end, and there are some more options. If you do have some more information about this Hand held, Please leave me a msg with it.

Tnx, AVIAD, 4X6TL@4Z4SV

This modification is read 1418 times.

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**19-07-1998**

### **(FT-411) PTT mod for FT-411**

Hello, a few days ago i was using my friend's Yaseu FT-411 and found out this neat trick!!! First, a little background... As i'm sure some of you know, Yaseu came out with the popular 411 a few years ago. Just recently, they came out with an "enhanced" model, the 411-E. The only found difference is the frequency lock of the radio. THE 411E has a feature that lets you lock the ptt as well as the frequency.

To activate ptt lock on the 411:

- Turn radio off
- Push the 6 button, hold it and turn on the rig while your still holding it.
- Now, press FM 6, you should see "L".
- Press FM 6 again, you should see "PTT"(Both L and PTT will appear in the bottem left corner of the lcd display). Congradulations you have installed ptt lock in ur rig. To turn it off, just repeat those steps.

Mike-N2LPD @ N2IMC.NJ.USA.NA

This modification is read 1355 times.

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**10-02-2001**

## **(FT-411) Yaesu VHF mod for commercial splits**

**Author:** Tom, VO1TV - [tturner@thezone.net.nospam.MODIFICATION.NET](mailto:tturner@thezone.net.nospam.MODIFICATION.NET)

When doing emergency work, It's common for hams to use commercial repeaters, or, more often, to have the ABILITY to use them. In our club's work with the local Red Cross, we have to ensure we can operate on the Societies's commercial repeater in the VHF band. The frequencies are just above and below the 2 meter Ham bands. After deployment, we will use commercial gear to handle comms within the Society, but the first critical 2 hour period requires fast action, so we need to anticipate the need to communicate come what may on ANY frequency. That's what makes Hams so valuable in a crisis. The large split makes for a minor difficulty in attempting to program Yaesu gear. Difficulty until you try this:

This mod worked on the Yaesu 2400, the 411 and the 470. I suspect it is generic for most Yaesu VHF gear. I am indebted to Len, VO1YS for this, who tried it on yet another Yaesu rig.

- Start by setting your rig to low power and by hooking up a dummy load. This mod may take several attempts, and you don't want to be slapping a 50 watt signal at a 600K offset to your served agency's allotted frequency! THAT might bring down wrath from any number of sources !!
- All Yaesu gear I have used has 2 buttons or functions that we will use for this mod: a function button, usually labelled "f" and a button that allows you to tune within a given memory. This button puts an underscore beneath the memory number. I will call it "mr", as that is its label on my 470 and 411.
- Program into memory the receive frequency. That is to say, the commercial repeater output frequency. Put in any tone encoding required as well. Store this memory.
- Set the repeater offset to display a - or + depending on which direction your transmit frequency is. Preserve that as part of the frequency memory too. Try not to transmit. You have just saved a commercial frequency with a 600K split at this point.
- Press the "mr" button to display an underscore at the memory channel location.
- Enter the transmit frequency at this point. All you are doing is adjusting the memory tuning, and we are about to lock it in.
- Press the (f)button for 1/2 second or until the memory channel number is flashing. Now, while the memory channel number is flashing, momentarily press and hold the PTT button ( press to talk ),then simultaneously press the (f) button again to lock your new split. This may take several tries to get the timing right.
- You may have to press the "mr" button again to remove the underscore from beneath the memory channel number.
- Look for both the - and + repeater split indicators to be displayed. That is your sign that your mod has been successful.
- carefully test your new split.

De VO1TV

This modification is read 1310 times.

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**19-07-1998**

## **(FT-415) YAESU FT-415 expanded frequency range**

Remove the screws holding battery track and rear cover. Locate the "CONTROL UNIT".  
Close jumpers 3, 5, AND 7 if not allready closed, 6 must be open. Let other jumpers unchanged.

Reassemble the radio.

Turn on the radio and program it as following:

"1" 135.000 PRESS VFO THIS IS LOWER RX LIMIT

"2" 185.000 PRESS VFO THIS IS UPPER RX LIMIT

"3" 135.000 PRESS VFO THIS IS LOWER TX LIMIT

"4" 185.000 PRESS VFO THIS IS UPPER TX LIMIT

Press and hold MR, VFO and 2 while TURNING ON if you need to reset or reprogram the radio.

**24-04-1999****(FT-415) YAESU FT-415 User's guide QUICK REFERENCE by PY3PSI on 02/dec/1998.**

Only for some NOT custom functions!

Symbols: "+": simultaneously; "-->": after.

Current consumption: 6.5 mA Auto Power off  
 8.0 mA Stby (Saver on)  
 170 mA RX max. Squelched: 1/3 of this value  
 1.5 A TX max (5 W); 600 mA TX min (0.5 W).

To charge a battery through the jack, the supply voltage must be at least 2 volts higher than the nominal battery voltage: 18 Hours for FNB-27.

Battery below 6.5 volts: icon on LCD. Worst: it blink.

Beeper on/off: FM --> 2 --> FM --> 2

LOCK dial knob: FM --> 0 --> 5

1 MHz steps: FM --> ^ or dial

RPT offset: FM --> 0 --> 6

Memory storage: QRG (VFO) --> hold FM (after dial set mem number) --> FM

Memory separate TX QRG: QRG (VFO) --> hold PTT + FM

Memory tuning: MR acts like VFO (to store other QRG too).

Memory mask: hold FM --> MR;

Unmask: --> hold FM, select with dial --> MR (NOT FM!)

Scan subband: memory QRGs Low and Up --> MR --> ^

Scan pause mode: FM --> 7 --> FM (7)

Ringer: (test) FM --> 0 --> 0;  
 --> 2 (off);  
 --> 8 open squelch X bell (1 beep)

DTMF: FM --> PAGE memory (dial) 0 & 7 read only. 1 ur personal ID

DTMF: to RX ID, FM --> PAGE --> FM (then select mem) --> FM (on/off)

DTMF: display: FM --> 0 --> 4

PAGING: my 3 ID, "\*", 3 ur ID. FM --> 0 --> 8: RING instead Squelch open

DTMF delay: FM --> 0 --> 1 (450/750 ms)

Tel DTMF store: FM --> CALL, hold FM (select memory number via KEY) -->  
 hold FM, key. To DEL : PTT; To terminate: CALL  
 To replay: press mem number. CALL returns to QRG  
 To TX: press the number of the DTMF memory

DTMF: FM --> 0 --> FM --> 1: to hold TX 2 seconds every number:  
 --> 3: own tone sequence (= mem 0) for A.P.Off  
 --> 5: DTMF instead single-tones for keys  
 --> 6: fast DTMF playback (10/7.5 digits/sec  
 --> 4: disable DTMF keypad (9: rows, 8: columns)

Resetting the CPU: hold MR + VFO + turn TRX on

Auto Power Off: FM --> 0 --> 3. Switch TRX off and back on for use

SAVER: RX off 3 secs after squelch close (30 ms on); 5 = 1000 ms sleep

BUSY LED: FM --> 0 --> 7 (on/off)

19-07-1998

(FT-416) Expanded RF Range: 123---174 MHz RX, 135---174 MHz TX

Range: 123---174 MHz RX, 135---174 MHz TX

1. Remove battery and antenna.
2. Remove the four screws holding the battery track in place.
3. Remove the two black screws holding the rear case in place.
4. Carefully open the front cover from the radio.
5. Locate and solder jumper pads 5 & 7 pads 3 and 9 are already jumpered. (jumper pads 1 & 10 for 1750 hz tone burst operation)
6. Carefully replace the front cover and replace the two black screws.
7. Replace the battery track and the four screws.
8. Reset the microprocessor. press and hold [mr], [2] and [vfo] and turn the radio on.
9. The radio display will cycle orderly thru the memory channels. enter the following band limits:

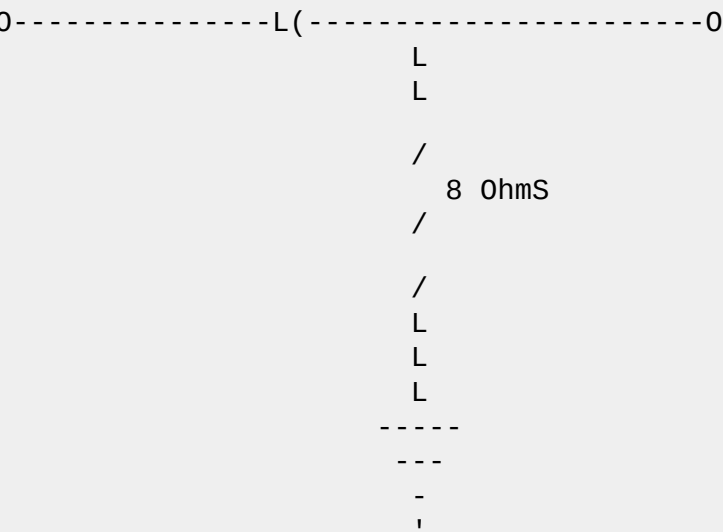
Ch.1 enter 120.00 and then press [vfo] rx low limit.  
Ch.2 enter 174.00 and then press [vfo] rx high limit.  
Ch.3 enter 135.00 and then press [vfo] tx low limit.  
Ch.4 enter 174.00 and then press [vfo] tx high limit

19-07-1998

(FT-470) FT-470 Undocumented feature

The yeasu 470 2 meter/440 handie has a number of undocumented feature that can add to your enjoyment of this neat ht. Two modification can easily be performed from the keypad itself. This first allows the 470 to function as a 2 meter to 440 crossband repeater. The second allows you to increase the vhf receiver range.

Before you can put the 470 into repeater mode, you need to construct the following cable to p



After constructing and installing this cable on the handie you need to put it into repeater mode. This is done by setting the 2 meter receiver transmit frequencies (the repeater does support transmitting an offset of the receiver frequency). second turn off the 470, hold down the rpt button on the keypad and turn the power backions!

19-07-1998

(FT-470) Extended receive by the Up and Down Key

Increasing the receiver coverage of the ft-470 is also very easy to perform. Turn off the 470, while holding down the up down arrow on the keypad now turn the 470 back on. You have now increased your receiver coverage to 130-180 MHz.

19-07-1998

(FT-470) FT 470 Unlimited (more or less) Rx mod

by N8ORO, relayed by N2KYW @ W2SEX.#WNY.NY.USA.NA

It's probably best to start with a clean slate, so reset your rig with the following RESET mod I recently saw on the bbs (I'm sorry but I didn't write down the contributor)

Put rig on 2m band  
Turn rig off  
Hold down MR, 2, VFO, and turn rig on  
Let go, turn rig off  
Turn rig on  
Let go, then press DOWNARROW

Now for the actual mod. This mod is outlined for one band, but must be repeated on the other band (the following mod, not the RESET mod).

Remember, hardware will only support so much. Outside that all you will hear is transistor noise. (thus it's really not a tragedy that 1450 is the upper limit.) Another note of interest - after doing this mod you may observe a repeating pattern of stations as you traverse the spectrum, as if the band repeats, while the display continues to increment (Upon doing a similar, but hardware, mod to my FT 411, I noticed this condition with a cycle of 34.6 MHz. If you want this mod (411) please send me a note). This condition has been observed on the 411, but hasn't been verified on the 470. Keep an eye out just the same. You might also notice this mod is similar to many of the other mods for this rig sent lately - this is in fact a 'mod'ification of those mods. Thanks to the original contributor (again, I've lost track of who that was)

1. Make UHF the primary band, VHF the secondary.
2. Tune to 450 MHz.
3. Press FM, RPTSET, and dial 0000 with the keypad.
4. Turn rig off, then on again.
5. Set the RPTSET to "+".
6. Hit REV. Display should read 1450 MHz.
7. Store this in the "U" memory.
8. Hit REV.
9. Tune to 430 MHz.
10. Set RPTSET to "-".
11. Hit REV.
12. Tune down (and ONLY down) to 600 MHz.
13. Press REV. Display should read 000.00 MHz.
14. Store this in the "L" memory.



15. Press UPARROW once to restore to 430 MHz.

To tune in any freq:

Press MR to bring up the U or L memory.  
Put rig in MT (memory tune) mode by hitting MR again.  
Use UPARROW or DOWNARROW to scan to freq, then store in mem.  
The VFO's operate normally, and TX is still standard.  
Have fun, and thanks again to N8ORO.

19-07-1998  
(FT-470) YAESU FT-470 STRAPS

I Have located a total of eight straps, four to the left of the lithium battery, and four others located under the flat white cable that interconnects the upper half with the lower half.

YAESU FT-470 STRAPS.

R69 Vertical, at the 10 o'clock position by the lithium cell.  
R68 Horizontal, to the lower left of R69.  
R67 Horizontal, just below R68.  
R66 Horizontal, just below R67.

R71 Vertical, the leftmost of three, to the left of the upper corner of the ribbon cable connector.  
R70 Vertical, the center of three of which R71 is the leftmost.  
R72 Vertical, the rightmost of the three.  
R74 Vertical, to the left of the ribbon cable connector, below the three. (Note that R74 is below an unpopulated capacitor that does not have a C number.)

There is no R73, or at least it is not on the circuit board and it is not in the schematic. And, yes, the order of those three is indeed R71, R70, R72, left to right.

R70, R71, R72 select the mode for the UHF portion of the FT-470. The choices are :

| UHF CHOICES |     |     |                |                |
|-------------|-----|-----|----------------|----------------|
| R71         | R70 | R72 | Rx and Tx.     | Receive only   |
| 0           | 0   | 0   | 430 to 440 Mhz | 430 to 500 Mhz |
| 0           | 0   | 1   | 430 to 450 Mhz |                |
| 0           | 1   | 0   | 430 to 440 Mhz |                |
| 0           | 1   | 1   | 432 to 438 Mhz |                |
| 1           | 0   | 0   | 430 to 440 Mhz |                |
| 1           | 0   | 1   | 220 to 225 Mhz |                |
| 1           | 1   | 0   | 430 to 440 Mhz |                |
| 1           | 1   | 1   | 210 to 235 Mhz |                |

R66, R67, R68 and R69 select yhe mode for the VHF portion of the FT-470. The choices are :

| VHF CHOICES |     |     |     |                  |                |
|-------------|-----|-----|-----|------------------|----------------|
| R66         | R67 | R68 | R69 | Rx and Tx        | Receive only   |
| 0           | 0   | 0   | 0   | 144 to 146 Mhz   | 130 to 180 Mhz |
| 0           | 0   | 0   | 1   | 144 to 146 Mhz   |                |
| 0           | 0   | 1   | 0   | 1260 to 1300 Mhz |                |
| 0           | 0   | 1   | 1   | 1240 to 1300 Mhz |                |
| 0           | 1   | 0   | 0   | 140 to 150 Mhz   | 130 to 180 Mhz |
| 0           | 1   | 0   | 1   | 140 to 174 Mhz   |                |
| 0           | 1   | 1   | 0   | 303 to 343 Mhz   |                |
| 0           | 1   | 1   | 1   | 8AL to 242 Mhz   |                |

|   |   |   |   |                  |
|---|---|---|---|------------------|
| 1 | 0 | 0 | 0 | 144 to 148 Mhz   |
| 1 | 0 | 0 | 1 | 144 to 146 Mhz   |
| 1 | 0 | 1 | 0 | 1240 to 1300 Mhz |
| 1 | 0 | 1 | 1 | 404 to 444 Mhz   |
| 1 | 1 | 0 | 0 | 140 to 160 Mhz   |
| 1 | 1 | 0 | 1 | 1260 to 1300 Mhz |
| 1 | 1 | 1 | 0 | 101 to 141 Mhz   |
| 1 | 1 | 1 | 1 | 1R3 to 158L Mhz  |

(Note: The receive only ranges are enabled by powering up the unit with the up and down arrow buttons depressed...)

When there is more the one combination which has the same frequency range, the difference is the default step size and/or the default repeater offset. Of course, choices that do not match the VCO and filters do not actually transmit or receive on those frequencies. A particularly strange example is that the VHF side of the set can be set to tune from 404 to 444 Mhz, but again, it won't actually lock. Even in the 101 to 141 mode, the VHF VCO will not lock - this mustbe for use with some other sort of VCO (It looks like this would cover the aeronautical band rather nicely.) There are two really wierd VHF settings, those for 8AL to 242 and 1R3 to 158L. These must be for use with some other LCD controller - it displays truly unusual and non sequential thins when stepped through the "bands".

R74 seems to have something to do with something like selecting the IF frequency, or something else like that. When set, it really screws up the VHF reception.

My technique for determining these straps is to remove the straps that come in the unit, solder wires to each pad, run the wires out of the unit to a bank of DIP switches, screw the unit back together, and the go trough all of the DIP switch combinations. I usually use a stereo microscope and 30 guage wire for this. Since I didn't try powering the unit on with every combination of keys held down for each DIP switch combination, there may still be other secrets possible.

### TRANSPONDER

The unit does a very good job as a cross-band repeater.

To enable this, turn off the radio, hold down the 'RPT' key and turn on the radio. Now, anything heard on EITHER band will be re-transmitted on the other band. There are, however, a few problems.

First, there is no real internal path for the audio to get from the receiver to the transmitter, so you either have to modify the radio, to provide a path, or do what I did which is to build a short loop back cable connecting the tip of the earphone jack to the tip of the microphone jack like this:

Mick <-----IIIII-----> Ear .

100Kohm

This is the way I did it, others have talked tohave used either just a resistor like me or a small capacitor, or a combination. On my radio, this value of resistor gave me a good range of transmitted audio levels by adjusting the volume control.

The other small problem is that the radio automatically selects low power on transmit in this mode. This is probably because of the lack of a real duplexer.

This modification is read 1040 times.

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19-07-1998

(FT-470) Sensitive for the FT-470, from 130-180, to 430-500 MHz

Empfindlichkeit FT470

MHz

µV

|     |      |
|-----|------|
| 130 | 1    |
| 135 | 0,44 |
| 140 | 0,22 |
| 145 | 0,21 |
| 150 | 0,26 |
| 155 | 0,6  |
| 160 | 0,9  |

165 2,4  
170 8,1  
175 27  
180 90

430 0,21  
435 0,21  
440 0,21  
445 0,21  
450 0,24  
455 0,31  
460 0,5  
465 0,9  
470 1,2  
475 1,3  
480 2,9  
485 6,9  
490 5  
495 6,9  
500 14

Signalgenerator (Marconi 2022) an Antennenbuchse. Am Lautsprecherausgang der Funke wird die NF-Spannung (FM-Rauschen) ohne Signal auf 100mV eingestellt. Dann wird das unmodulierte HF-Signal im Pegel soweit erhöht, bis das Rauschen um 20dB zurückgegangen ist.  
Vorteil dieser Methode: Sie ist äußerst einfach durchzuführen.  
Allerdings können mit dieser Methode die Propagandadaten der Prospekte nicht erreicht werden weil hier ohne Modulation und ohne CCITT-Filter gemessen wird. Zum Vergleich mit anderen Funken geht dies aber hervorragend und der Empfindlichkeitsverlauf über die Bandbreite läßt sich sehr schön darstellen wenn man die Meßwerte in z.B. Excel graphisch auswertet.

19-07-1998

(FT-470) YAESU FT470 cross-band repeater

If you turn on the radio with the RPT key depressed, the radio becomes a crossband repeater. Dial up two frequencies you want to crosslink (be sure to pay attention to transmit offsets, if any), turn the radio off. Depress the RPT key while turning it back on.  
The tone encode/decode flags and the -+ flags will be flashing. When either band's squelch opens, the other band is moved into the primary frequency display and the transmitter keys.  
Note that the power output is decreased to LOW power. I made up an audio interface, using a mini and sub-mini phone plug. Tie the grounds together, and connect the center pins through a 0,01 uF cap. and 47K resistor in series.  
Adjust the volume control to about the 11 O'clock position. It work for both simplex cross-band and using a repeater on one band and a simplex freq on the other band. You do have to wait for the repeater to drop before you transmit on the simplex freq.

19-07-1998

(FT-470) Software RX frequency expansion

1. Program 144.000 simplex into VHF vfo.
2. Press Function key F/M and then press RPT key to obtain the repeater shift.
3. Enter the code 0000 (four time zero).
4. Turn the radio off and then back on.
5. Press the RPT key twice to set + offset.
6. Press REV key once. Now display is 1.144.000 MHZ.

7. Enter this freq. into the U memory (Upper scanning limit) without the repeater offset.
8. Now from 1.144.000 MHZ with + displayed in VFO, go to 1.100.000 MHZ. The fastest way is to push F/M key and DOWN key but if you pass 1.100.000 MHZ, you will need to restart from the beginning.
9. Push REV key to obtain 100.000 MHZ on the display.
10. Enter this into the L memory (Lower scanning limit) without the repeater offset.
11. Enter a value of 200.000 MHZ in U memory.
12. Now you can use the two limit memories L AND U as a third VFO able to scan from 100 to 200 MHZ (push F/M and MR when you are in L memory).
13. For UHF repeat same process at UHF vfo starting from 430.000 MHZ to obtain a range of 400 to 500 MHZ.
14. The sensitivity is lower than specifications outside the amateur band, but there are many transmitters you can stil monitor.
15. After this modifications restore your repeaters offsets.

This modification is read 1033 times.

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**19-07-1998**

**(FT-470) \*\*\*TURBO SCAN\*\*\* 20 frequency in sec**

The way to get it to turbo scan is easy. it's done all on the key board. here's how it goes:

1. Bring up your main band and your sub band on screen
2. Press fm then the alt key
3. Press either the up or down button to scan in alt mode
4. Open sql and look at your main frequency
  - a) if it stopped on a uhf frequency close sql and try again until you get a vhf frequency on main band
5. Now comes the easy part. while the sql is still open hit the vfo button
6. Close the sql and hit either the up or down to scan again.

Bang!!! you got it at 20 frequencies per second.

\*\*\*To get out of this mode\*\*\*

1. Hit either the up or down button to stop scan mode
2. Hit the fm button
3. Then hit the alt button right after and your back in regular mode.

You will not loose any memory with this mode

This modification is read 930 times.

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19-07-1998

## (FT-470) VHF xmit and UHF recive

Here is a reposting of the mod to extend the receive range of the new Yaesu dual band handie to 130 - 180:

1. Turn radio OFF.
2. Hold down both UP and DOWN arrows.
3. Turn radio back ON.

I will trade the mod for VHF xmit for one to open up UHF for recieve...I want to listen to UHF public service (450-470).

To enable VHF transmit:

1. Open the radio such that the two halves open like a sandwich.
2. Locate the internal lithium battery
3. Locate several solder pads to the left of the lithium battery.
4. Just to the top left of the lithium battery is ONE vertical solder pad. It is almost under the top left edge of the battery.
5. solder a jumper accross this pad.

### **Notes:**

The other solder pads do several things, none of which seemed interesting to me: one set VHF band to 144-146, one replaces 2m band with 1260Mhz (would be nice if there was a 1260 Mhz RF module available...), two others seem to disable the squelches for the separate bands...etc. like I said, not too interesting.

Also note that for some reason the automatic repeater shift (- offset below 147, + above etc...) goes away when you enable VHF xmit using this mod. I guess you can't have your cake and eat it to. Oh well...

This modification is read 983 times.

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19-07-1998

## (FT-470) 1240-1300 TX & RX...and...220-225 MHz TX & RX

I have been reviewing the ft-470's capabilities for some time now, and was just wondering if anyone out there in rf land has done two neat mods that i have here! we all know that by removing r69 and jumppering it, you will be able to tx & rx from 140-174 mhz! well, further reviewing made me quite curious!

There are two more mods that you can do with only two (2) micro dip switches, which will give you: 1240-1300 tx & rx...and...220-225 mhz tx & rx! gee, that is two more ham bands, and with the aid of the dip switches, we have a total of 4 ham bands! this idea is not mine in it's entirety, it has been here for some time, but with only two dip switches it is a welcome treat indeed! for the vhf side of things:

Remember r69 that you removed and jumpered? well, if you remove r68 and and a dip, when you engage the switch it will give you 1240-1300 mhz tx & rx! you see, it actully takes two switches, one for r69 and one for r68. Well, r69 is already done so don't worry about it! and when you disengage it, it will perform as normaly as it did before!

UHF side of things:

If your rig already can tx from 430-450 mhz, you are half done! when this mode was performed, you removed and jumperedr72, right? now, all you have to do is remove and jumper r71, which will coexist with r72, and get 220-225 mhz tx & rx! gee, that was neat huh!?

Of course, you did use a dip switch for r71, right!?

I recieved the mods from my local bbs, and at the moment can not remember who gave all this neat info, but there is sure a lot of it! i figured that if you are boared of a certain band, You could change it! i have not done this yet, and am wondering if anyone out there has, and what type of sucess he/she had! what kind of tuning was necessary,(if any!) output power, you know, the rundown bit! well, hope this helps, and again, hats off to all those who contrib uted!

**Date:** 04-05-1999

**User comment**

**From:** [Jim Spragg](#)

**Subject:** 1250 MHz not working

Jim Spragg KA8LGF

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## A2650 FT470 Strappings

```

!-----!
!                                     !
!                                     !
!                                     !
!                                     !
!                                     !
!                                     !
!      HHHHHHHHHHHHHHHHHHHH        !
!      H                          H    !
!      H   micro-                H    !
!      H processor               H    !
!      H                         H    !
!      H                         H    !
!      H                         H    !
!      H                         H    !
!      HHHHHHHHHHHHHHHHHHHH        !
!                                     !
!                                     !
!      R 6 8                        . /         !
!                                     !
!      R 6 7                       R  /         !
!                                     6/         !
!                                     /9         !

```



Onderkant print verder niet getekend.....

This modification is read 911 times.

**19-07-1998**  
**(FT-470) FT-470 fuer 9600 bps packet**

Zunaechst sollte man bedenken, dass der Betrieb in 9600Bd mit einer Handfunke (aber auch mit diversen Mobilgeraeten) sicher nicht das Optimum darstellt. Wie schon mehrfach an anderer Stelle gesagt, ist die Modulation an einem VCO der an eine PLL angebunden ist, problematisch. Fuer eine optimale, retry-arme Uebertragung muss der gesamte NF-Bereich von einigen Hz bis knapp 10KHz ohne nennenswerten Frequenz- und Phasengang uebertragen werden koennen...

## Doch nun zur Praxis:

- Jegliche Ersatzansprueche bitte nicht an mich -

Das Geraet muss komplett zerlegt werden.  
Wer so einen Geraeteeingriff vornimmt, sollte ueber einige Loeterfahrung und etwas Fingerspitzengefuehl verfuegen !  
Ausserdem sollte man sich verschiedene, genau passende Kreuzschlitz- schraubendreher bereitlegen, um die z.T. festsitzenden Schrauben im Geraet sauber loesen zu koennen.

1. Der Akku bzw. der DC-Adapter wird entfernt und die Geraetknoepfe auf der Oberseite des FT470 werden abgezogen. Die Guertelklemme auf der Rueckseite wird abgeschraubt. Die beschriftete Deckplatte (Geraeteoberseite) wird abgeschraubt und die Gummidichtung wird ueber die Knopfachsen und die BNC-Buchse abgezogen.
2. Das Geraet wird mit dem Display nach oben hingelegt und die beiden frontplattenseitigen Schrauben in der Akkubefestigungsplatte werden entfernt.
3. Die drei von der Geraeterueckseite zugaenglichen Schrauben die die Gehaeuse- halbschalen zusammenhalten werden entfernt.
4. Nun werden die auf den Knopfachsen sitzenden, mit jeweils zwei Schlitzen versehenen Befestigungsmuttern ein paar Umdrehungen gelockert. Ebenso die Befestigungsmutter der BNC-Buchse.
5. Das Geraet liegt nun wieder -Frontplatte nach oben- vor dem Umbauer und die beiden Gehaeusehalbschalen werden wie ein Buch v o r s i c h t i g auseinander geklappt.
6. Das Flachbandkabel wird von dem Platinenstecker geloest der sich auf der Platine befindet, die in der linken Gehaeusehalbschale (schwerere Haelfte mit Geraeterueckseite) sitzt. Nicht mit Gewalt ziehen, sondern erst die beiden Kunststoffklaemmerchen an den Seiten des Steckers in Richtung des herausgefuehrten Flachkabels loesen.
7. Beide zu erstellenden Anschuesse, sind in der schweren Gehaeusehaelfte auszufuehren. Um moeglichst nahe an die Kapazitaetsdioden zu kommen, muss die Platine mit dem eben geloesten Platinenstecker entfernt werden. Diese ist mit einem weiteren Platinenstecker huckepack auf der unteren Platine aufgesteckt. (Schrauben waren hier keine zu loesen)

glaub ich..) Man kann den Stecker sehen, wenn man den rechteckigen Gummistopfen in der rechten Seite der Halbschale entfernt. Das Abziehen des Platinensteckers wird erleichtert, wenn man das Oberteil des Steckers mit einem kleinen Schlitzschraubendreher etwas anhebelt, bis sich die obere Platine lösen lässt.

8. Die nun sichtbare Platine wird abgeschraubt. Dazu müssen nur die von oben sichtbaren Schrauben gelöst werden, nicht die an den Seiten des Gehäuses. Wenn die Schrauben gelöst sind, kann die Platine senkrecht nach oben herausgehoben werden. Dabei sollte man die Wärmeleitpaste an den PA-Modulen nicht allzusehr verschmieren. Die Platine wird nun mit der Lötseite nach oben und mit der BNC-Buchse vom Bastler wegzeigend auf den Tisch gelegt.

Die PLL-Einheit mit dem zu modulierenden VCO befindet sich in einem der beiden auf der Bestückungsseite sitzenden Abschirmgehäuse. Auf dem Aufdruck der Platine steht 144 PLL UNIT und 430 PLL UNIT letztere ist hier interessant. Man sucht sich die 430 PLL UNIT heraus und verfolgt nun wieder auf der Lötseite der Platine, die 11 Lötstifte dieses 430 PLL UNIT. Pin Nr. 1 liegt an Masse und an Pin Nr. 10 wird nun ein dünner Draht angelötet. Vorsicht: Keinen Kurzschluss löten ! Pin 10 ist der vorletzte Pin von rechts.

Man sollte parallel zum Umbau den Schaltplan konsultieren.

Der Draht sollte ca. 10cm lang und flexibel sein (Litze).

9. Die Platine wird nun wieder in die Halbschale eingebaut und der Draht kann zwischen rechter Platinenkante und Gehäusewand herausgeführt werden. Die BNC-Mutter kann wieder festgezogen werden. Die obere Platine wird nun wieder mit dem Platinenstecker aufgesteckt. Dabei sollte man NICHT auf die Platine drücken, sondern mit einem Schrauben- zieher durch die Öffnung in der der Gummistopfen in der Gehäusewand war, auf den Stecker drücken. Nun können auch die Knopfmuttern wieder festgezogen werden.
10. Nun kommt der Anschluss des Demodulators. Das Demodulator-IC befindet sich unter der Abschirmplatte die man nun auf der Platine sehen kann. Diese wird an einigen Punkten abgelötet und leicht hochgebogen. Es geht um das IC mit der Nummer "10487" in der Aufschrift, welches unter der Abschirmung sitzt. Man nimmt einen ca. 10 cm langen Draht und lötet diesen an Pin 11 des ICs an. Pin 1 des IC ist da, wo der Punkt sitzt. Pin 11 ist der 11. Pin im Gegenuhrzeigersinn. Die Abschirmung wird wieder angelötet und der Draht so herausgeführt, dass die Isolierung nicht durch spitze Bauteilebeinchen durchstoßen/durchscheuert werden kann.
11. Die Herausführung der beiden Signale aus dem Gerät bleibt der Phantasie des Verbastlers überlassen. Ich habe sie über 10KOhm-Widerstände und eine 2-adrige, abgeschirmte Walkmannkopfhörerleitung durch den seitlichen Gummistopfen herausgeführt. Die Abschirmung der Leitung habe ich am nächstgelegenen Massepunkt der Platine angelötet. Es geht aber sicher auch anders... 3-pol-Klinken-Stereobuchse o.{. ...
12. Das Flachbandkabel wird nun wieder in dem zugehörigen Platinenstecker befestigt und das Gerät in der umgekehrten o.g. Reihenfolge zusammengebaut. Dabei aufpassen, dass die eingebauten Drahte und Widerstände nicht irgendwo eingeklemmt werden. Man kann dazu die Drahte und Widerstände mit Klebeband so über die Platinen führen, dass dies nicht passiert.

-----  
Das wars schon !

Falls das Gerät nun noch funktionieren sollte, kann man mit dem 9600er-Vergnügen beginnen.

-----  
Aber im Ernst: Der Umbau ist wirklich nicht besonders problematisch und kann von jedem vorsichtigen nicht-Steckdosenamateur erfolgreich durchgeführt werden.

Wenn einem Umbauer Verbesserungen, oder ein gänzlich anderes Vorgehen einfallen wäre es nett, diese Gedanken in der Rubrik 9600Bd Allen zugänglich zu machen !

Ich verwende ein TNC2H (ufb!) mit den Filterstellungen 5:0 6:0 7:1 8:1 9:0 (empirisch gefunden, vermutlich nicht optimal ..)

Für die PTT-Umschaltung wird der entsprechende Anschluss des TNC mit der MIC-Buchse des FT470 verbunden. Das TX-Delay muss so bei ca.20 eingestellt werden , d.h. 200ms. Dies ist im Vergleich zu wirklich optimalen 9600er-Geräten sehr langsam, aber es geht trotzdem recht ordentlich.

BER-Tests oder sonstige wirkliche Messungen habe ich bisher nicht gemacht.

Aber man kann sagen, dass es auf jeden Fall mit den hiesigen Digis DB0IZ-9 und DB0AMU(etwas besser von hier) reichlich gut geht. Es gibt ab und zu mal Rejects aber die gabs auch schon bei 1200Bd ..

Alles in Allem hat sich der Umbau voll gelohnt !

73 + viel Erfolg !

de Andreas in Rheinbach nr Bonn. DL2KCL @ DK0MWX

19-07-1998

(FT-470) FT-470 9k6 mods

sorry but I didn't realized that the german discription of the modifikations have no use for you. I hope my english is not too bad to translate it into proper english (that may help you). So know my try:

First you have to get the transmitter unit with the BNC connector on it out of the ft. You have to made the connections to pin 1 and pin 10 of the 430 PLL UNIT (it ist printed )on the rear. Pin 1 is ground an pin 10 will be the new RX. Use aprox. 10 cm cables.

Know the TX: You can reassemble the unit because the point you need is on the front of it. What you need is pin 11 on IC 10487 (it is under the shield). Pin 1 of 10487 is marked with a dot and it counts against clockwise. The guy who have done this recommended to use 10KOhms resistors in line. The TX switch is like in 1200bd packet.

So Peter, i hope this will help you.  
As you can see I have some problems in finding the right word for the electrical things ... sorry.

73, 55 from Carsten DD6TX@DB0GR. #BLN.DEU.EU

19-07-1998

(FT-470) Full Reset

Effect: Severe! :-)

- 1. Make hard (paper) copy of all memory info
- 2. Turn radio off
- 3. Hold down VFO and MR and turn radio on
- 4. Replace all memory contents

Notes:  
This will reset the auto repeater offset function, so you will need to re-enable it if you use it. This will also disable (mask) all memories except #1, so you will have to enable each of them by hand.

Attributed: Yaesu

19-07-1998

(FT-470) FT-470 Clone Mode

Effect: Allow editing of transmit and receive frequencies.

- 1) Turn radio off.
- 2) Hold down F key and turn radio on.

Result: All segments of display are turned on. The radio will send data out the microphone tip when up-arrow is pressed. The radio will receive data when the down-arrow is pressed.

Bugs: I have yet to hear of someone who has done this successfully. Please tell me if you know how it works!

Attributed: szarekw@LONEX.RADC.AF.MIL (William J. Szarek)

**19-07-1998**

## **(FT-470) 1750Hz tone burst**

FT470's in the UK come with the 1750 Hz tone burst option built in. It is on a tiny sub card that is wedged in down the bottom at one side. I bought one from the UK distributors and figured out how to connect it when I got back to the US. As far as I can tell my mod is the same as would be done if it was officially installed although the service manual doesn't show where to connect it. It has just 3 wires, power, ground and audio out. It is activated by applying power using the small button above the PTT so you can press both at once to call and then slide your thumb down to release the tone button.

The board consists of a 2\*color burst freq xtal and a 74HC4060 CMOS oscillator divider giving 7.16MHz divided by 4096 = 1748 Hz. The chip is surface mounted so they can get the whole thing down to less than 0.5" square.

Attributed: gingell%aurfs1%aurgate@mcnc.org (Mike Gingell)

This modification is read 845 times.

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**19-07-1998**

## **(FT-470) Opening Battery Cases**

I`ve opened several FNB-x cases in order to replace the cell pack. The procedure that I've used is very simple, but does require patience to prevent damage to the case:

1. Cut the white label with a sharp knife by following the case separation line. DO NOT remove the nut on the charging connector.
2. Pry the case halves apart by placing a thin wide bladed screwdriver into the case line on the label end. It may be necessary to separate the black band from one case half with a knife tip when it is evident that glue has penetrated the joint. NOTE: The black band is permanently attached to one case half.
3. Use continuous pressure, not excessive force, to separate the case halves. Concentrate the separation procedure on the label end of the case. The steady pressure will allow the glue to cold flow and release its grip.
4. Yes, a frustration level will occur, but then success will appear as the glue gives up after a few minutes.
5. Make a note of where the wires attach to the battery and thermal switch. Also note the pack orientation.
6. Connect the replacement pack into the case and attach the wires per your note in step 5.
7. Close the pack, charge the cells, attach to the radio for a test.
8. If satisfied, place a spot (1/2 inch dia) of clear RTV on each side of the cell pack and press the case together and place it under a weight for a short time until the RTV cures. Because of the reduced amount of glue, the case will have a more flimsy feel than previous to replacement, but will perform like the original.
9. For the next replacement, the RTV will give up much easier than the original glue.

Attributed: Hugh Wells, W6WTU

This modification is read 950 times.

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**19-07-1998**

## **(FT-470) Hyperscan Mode on the FT-470**

1. Go into Alt mode by pressing [F] 2 (Alt).
2. Press the Up or Down Arrow to activate the Memory Scan.
3. When the Scans stops on a VHF frequency on the Left Display (The Main Band), Hit [F] VFO.
4. Press the Up or Down Arrow to activate the HyperScan.
5. To Stop the Function, Press [F] Alt.

A preliminary guess is that there is a software loop underway in the VFO and the Memory Scan features. By pressing these sequences of buttons, the register holding the delay count is changed , resulting in a faster loop.

This modification is read 881 times.

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**19-07-1998**

## **(FT-470) Yaesu FT 470 Extended Tx. Side effect from keyboard Entry Mod**

26 Sep 91

I discovered a side effect from using the Keyboard Entry Modification... I noticed by accident that when inputting a frequency (from 140 Mhz to 155 Mhz instead of the usual 144 to 148 Mhz range), and setting the standard frequency offset of 60 Khz or none at all), i could Transmit. I used a dummy load on the HT and experimenting further and discovered i can use either the standard offset (- or +) or just plain simplex mode and still be able to Transmit without getting the usual "ERROR" message on the display. I verified the transmission capability by using my Scanner and a Spectrum analyzer with a small whip antenna to monitor the output of my Yaesu FT 470 at work. At the Low Power setting, with a 7.2 volt battery, i was able to get approximately +46db at the 0db attenuation level on the analyzer using from 140 Mhz all the way to 155 Mhz range, so the transmit level at the extended frequency ranges of 140 to 144 Mhz and 148 to 155 Mhz matches the same Transmit level elsewhere in the band. That's 4 Mhz and 7 Mhz respectively on the extended Transmit!!! This side effect comes about when you use the Extended Frequency Keyboard Entry Mod. That's when you select a VFO and enter "50 Mhz), set offset to zero by entering four zeroes, turning the HT off/on, hitting FM key and then REVerse key, then RPT to either "-" or "+" and pressing REVerse to select the frequency range(s) you want and storing the Upper and Lower limits...

You might want to try this side benefit yourself and see what you come up with...

I tried to 70 cm side, but the side effect isn't to be found (yet), but i'm still experimenting with the 470.  
73 de KC6VKZ

This modification is read 1110 times.

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**10-02-2001**

## **(FT-470) Yaesu VHF mod for commercial splits**

**Author:** Tom, VO1TV - [tturner@thezone.net.nospam.MODIFICATION.NET](mailto:tturner@thezone.net.nospam.MODIFICATION.NET)

When doing emergency work, It's common for hams to use commercial repeaters, or, more often, to have the ABILITY to use them. In our club's work with the local Red Cross, we have to ensure we can operate on the Societies's commercial repeater in the VHF band. The frequencies are just above and below the 2 meter Ham bands. After deployment, we will use commercial gear to handle comms within the Society, but the first critical 2 hour period requires fast action, so we need to anticipate the need to communicate come what may on ANY frequency. That's what makes Hams so valuable in a crisis. The large split makes for a minor difficulty in attempting to program Yaesu gear. Difficulty until you try this:

This mod worked on the Yaesu 2400, the 411 and the 470. I suspect it is generic for most Yaesu VHF gear. I am indebted to Len, VO1YS for this, who tried it on yet another Yaesu rig.

- Start by setting your rig to low power and by hooking up a dummy load. This mod may take several attempts, and you don't want to be slapping a 50 watt signal at a 600K offset to your served agency's allotted frequency! THAT might bring down wrath from any number of sources !!
- All Yaesu gear I have used has 2 buttons or functions that we will use for this mod: a function button, usually labelled "f" and a button that allows you to tune within a given memory. This button puts an underscore beneath the memory number. I will call it "mr", as that is its label on my 470 and 411.
- Program into memory the receive frequency. That is to say, the commercial repeater output frequency. Put in any tone encoding required as well. Store this memory.
- Set the repeater offset to display a - or + depending on which direction your transmit frequency is. Preserve that as part of the frequency memory too. Try not to transmit. You have just saved a commercial frequency with a 600K split at this point.
- Press the "mr" button to display an underscore at the memory channel location.
- Enter the transmit frequency at this point. All you are doing is adjusting the memory tuning, and we are about to lock



it in.

- Press the (f)button for 1/2 second or until the memory channel number is flashing. Now, while the memory channel number is flashing, momentarily press and hold the PTT button ( press to talk ),then simultaneously press the (f) button again to lock your new split. This may take several tries to get the timing right.
- You may have to press the "mr" button again to remove the underscore from beneath the memory channel number.
- Look for both the - and + repeater split indicators to be displayed. That is your sign that your mod has been successful.
- carefully test your new split.

De VO1TV

This modification is read 991 times.

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**19-07-1998**

### **(FT-4700) FT-4700 Frequency expanding modification**

1. Remove front panel.
2. Locate jumper 1,2,5,9,10,13 on "CONTROL UNIT" and short them with solder. (Other jumpers must remain as current.
3. Turn power on, and set the display for the lower edge of UHF band (420.000), using up/down buttons, and dial. Then press D/MR button.
4. Set the display to 460.000 and press D/MR. The display shows 47.75 (if frequency of uhf band ). Press D/MR, and then uhf coverage is programmed.
5. Set the display to 140.000 and press D/MR. Then set the display to 174.000 and press D/MR again. The display now shows (the VHF if freq.) 17.3. Press D/MR again. Now both band coverages are programmed.
6. After this modification the repeater shift is set to 0 MHZ, so it must be set using the F and RPT buttons on both bands. Refer to page 27 of instruction manual for details.

This modification is read 824 times.

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**19-07-1998**

### **(FT-4700) FT-4700-RH fuer 9600Baud**

de DL1OBO @ DB0KG.DEU.EU

Mir ist es gelungen den 4700RH für 9600bd zunutzen,und von Umbau kann eigentlich auch nicht die Rede sein,denn Umgebaut wird nichts. Bei mir und mit DB0SHG klappt es ufb, auch mit DB0FD (was ich nur im Rauschen aus der City von Hameln höre geht es super.....

Beim Umbau bitte ich mit besonderer Vorsicht an den SMD-TRX heranzugehen. Für Schäden die aus diesem Beitrag entstehen übernehme ich keine Haftung !

Verwendetes Modem: TNC2C mit 9,8 Mhz und G3RUH-9k6 -Modem

Prinzipiell: Bei 9600bd wird die 9k6 NF-in/out im TRX abgegriffen.

#### **ACHTUNG :**

Der 4700 sollte UNBEDINGT SPANNUNGSFREI sein !!!

1. Mann oeffne den 4700 vorsichtig,indem man den unteren

Deckel entfernt.(70cm Unit ) Dann VORSICHTIG die 430 MHz Main Unit F29920000 ausbauen! Vorher das Bedienteil entfernen,und alle Steckverbinder entfernen. Die ca.5 Schrauben ( Main Unit ) sowie zwei fuer das PA-Modul entfernen. NUN NUR KEIN ANGST HI,denn es ist nicht so wild wie es aussieht. ABER VORSICHT IST GEBOTEN ! ! !

2. Abgriff der NF am DISKRIMINATOR

3. Das 9k6 RX-Signal wird unmittelbar am Pin 11 des IC's Q 04 (TK 10487M) abgegriffen. Wenn man die Platine ausgebaut hat, findet man Q 04 sofort.Ich habe nun einen ca.1,5 mm Draht zur Platinenoberseite durchgefuehrt und an Pin 11 angeloehtet. Wenn man Pin 11 verfolgt,findet man eine Durchfuehrung zur Platinenoberseite.( Nur ein paar



mm von Pin 11 entfernt )

So,nun wieder schoen vorsichtig die Platine einbauen... Habe dann eine Abgeschirmte-Leitung aus den TRX gefuehrt. Man braucht dazu kein Loch zubohren,denn auf der Oberen linken Seite ist eine Durchfuehrung.....

#### 4. Einspeisung des 9k6 RX-Signal....

Nun den Steckverbinder J 02 suchen,es ist der dritte Stecker von links mit 6 Leitungen(auf der Main Unit). Dann die MOD-Leitung (es ist die erste von links) abziehen! Habe dann noch 2 Abgeschirmte in den TRX zu J02 gelegt. Die ein Leitung dann direkt in den frei gewordenen Stecker ein- gefuehrt (TX zum VCO).Die zweite Leitung dann mit der weissen freigewordenen Leitung verbunden.

Die Masse von beiden Leitunhen habe ich von VCO-Deckel abgenommen. Alles schoen mit Schrumpfschlauch abisoliert und Deckel wieder schliessen!

Habe nun eine 5 Polige Dinbuchse an den 3 Leitungen angeschlossen. ( RX,TX,Mikrofonverstaerker und Masse )

Dann habe ich einen 5 Poligen Dinstecker genommen,und eine Bruecke fuer TX und Micverstaerker geloehtet!

Steckt nun dier Stecker in der rausgefuehrten Buchse,kann man wie gewohnt in Foni arbeiten....

Entfernt man aber nun den Stecker,ist die MOD.Leitung zum VCO getrennt.

#### 5. So,nun kommen wir zum Abgleich:

Ich setze vorraus,dass Tnc,Modem und 4700 richtig verdrahtet sind.

RX,TX und Masse aus der 5 Poligen Dinbuchse, PTT wie ge wohnt aus der Mikrofonbuchse.

1. Das Potis von G3RUH ganz zudrehen( höchsten Widerstand einstellen.) Also 0 Volt SS

Bei mir geht es am besten,wenn alle Jumper von (JMP 1-4) entfernt sind.

Wenn Ihr nun mitlesen können ist die halbe Miete gewonnen!

2. Nun der Sendeabgleich. Ein Kontrollempfänger (Handy) leistet dazu wertvolle Dienste. Ich habe es auch ohne Oszilloskop hinbekommen. Obwohl ich einen hier habe.

Nun auf Monitor-Kanal schaltet und TX-Dealay auf 120, damit der Sender schoen lange hochgetastet wird.

Drueckt man nun Return,ist in Kontrollempfaenger nur der Traeger zuhoeren.Nun das Poti von G3RUH

Millimeterweise aufdrehen,bis das 9k6 Rauschen zuhoeren ist.

3. Nun in die nächste Mailbox.

Dort eine grosse Rubrik ablisten lassen. Dieses Listen muß EINWAND- FREI funktionieren !!!!

Wenn der Digi die Listingnummern 2..3 mal wiederholt, ist dies nicht OK ! Mit den JMP 1-4 etwas probieren bei mir geht es ohne Jumper am besten, evtl. kann es auch an den TNC-Parametern liegen.

Meine für DB0SHG & DB0FD : W 10 T 65 P 255

Evtl. mit den Parametern spielen....

Aber hohlt die Listennummern nicht zuofft raus hi,denn es gibt so nette Sysop's ,die das als groben Unfug bezeichnen und einen dann SPERREN...(Wie bei mir)

4. SO,DASS WAR ES EIGENTLICH SCHON. Viel Spaß beim Umbau... Ich arbeite nun schon ca.14 Tage mit dem 4700 in 9k6, und es geht ueber DB0SHG und DB0FD ohne FEKLER...

So liebe 9k6 Freunde,sollten noch spezielle Fragen auftreten,dann schreibt mir ruhig.Auch ueber Verbesserungsvorschlaege wuerde ich mich freuen.....

Denn man lernt immer wieder etwas dazu

vy,73 aus Hameln an der Weser Andreas / DL1OBO @ DK0MAV DEU.EU

This modification is read 644 times.

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**19-07-1998**

**(FT-480) FT-480 & 9600 Bps**

## Modification of the Yaesu FT-780/FT-480 for 9600 bps use

The necessary modifications of the FT-780 R are quite simple. All connections can be made without removing the main PCB.

The receiver AF **\*MUST\*** be taken directly from the discriminator. A suitable point for this is the cathode of D02. This part is soldered in with the ring to the top. If the transceiver is so positioned that the tuning knob faces towards yourself, D02 is located in the lower right of the PCB, near the ceramic discriminator, a small grey box, abt. 5 mm x 5mm big).

The transmitter AF is to be fed to the upper left pin (refer to the circuit diagram!) of the modulator unit. This point is also accessible without removing the PCB. Just above of J9 there is the resistor R 265 (labelled C 265 in my unit, 10 kOhm instead of 4.7 kOhm). You have to remove the varnish of the upper lead of this resistor. The TX AF is to be fed to the upper lead of this resistor.

The normal voltage level from the microphone amplifier at this point is about 2 Vpp (just not clipping). The value should be adjusted by VR1 of the G3RUH-FSK-modem.

Both points can be found in the circuit diagram, part "MAIN CIRCUIT".

The only question that should be left is how to get these two points to the outside of the radio. I decided to give out the possibility to switch the 1750 Hz tone from the microphone (not used in US versions!). I gained two line at the microphone plug.

For testing purposes, a 60 kB text files was transferred. There were no retries. Reception of UO-22 and KO-23 is possible without any trouble. Even if signals are weak (AOS/LOS), decoding works well.

vy 73 de Hartmut DL1YDD @ DB0IZ.DEU.EU

P.S.:  
Be careful when using this information on "Sommerkamp" radios.  
They may be different (like a FT480 I saw recently).

This modification is read 781 times.

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**19-07-1998**

## **(FT-480) FT-480R 1200 BPSK and 9600 FSK**

I have modified my FT-480 (Japanese home version of FT480R) for direct FM with G3RUH FO20 modem.

On the FT480R MAIN BOARD, connect a screened lead to FM MOD (XM01) .

On my radio there is a PINK/WHITE wire going to XM01 which is near the centre front of the MAIN BOARD. This is the point that you want to connect in your TXAUDIO.

You can connect the screen of the lead to the case of the XM01.

You will require about 2volts p-p at the FM MOD from the FO20 modem for 3.5KHz deviation.

I modified my G3RUH modem as follows:-

Remove R3 (270K) resistor and fit a wire link (0 ohm).

Remove C9 (10nF) and replace with 1uF foil capacitor.

Remove R5 (1K8) and replace with 22K pot.

Take output from wiper of the pot. (TX Audio).

This has fixed the problem with poor results on FO20 with the Yaesu.

I have also tested it on 9600 FSK terrestrial with good results.

To receive 9600 FSK on the FT280/480R you have to take the O/P direct from the FM RX discriminator. I picked this signal up from D11 on the MAIN BOARD.

I used a screened lead from D11 to a rewired mic socket:-

On Microphone disconnect orange Lead from pin 5 and solder it to pin 2 leaving pin 5 unused.

On the FT280 mic socket, disconnect link from pin 2 to pin 5 and connect the screened lead from FM discriminator O/P D11 Anode to pin 5.

73 de David GM4JJJ @ GB7SAN

This modification is read 737 times.

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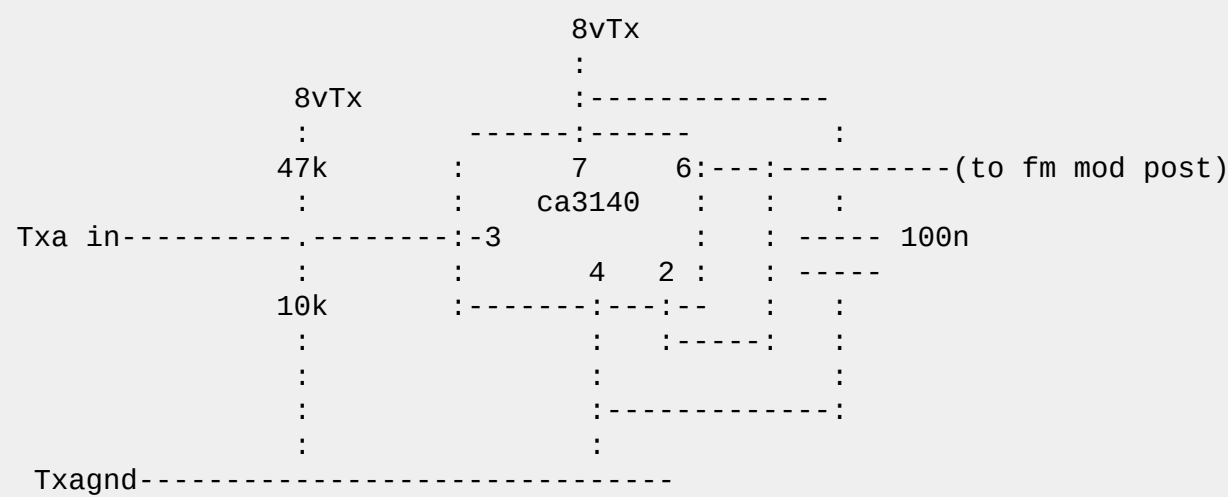
19-07-1998

(FT-480) FT-480R VARACTOR MOD FOR 9600FSK AND 1200PSK

by Dave Hulatt G4WFQ

For those of you who owning an FT480R and would like to be able to modulate the varactor directly heres a simple mod. It will give you a much better uplink on Fo20, Lusat and Pacsat. You will also be able to input 9600bauds directly to the same point and be able to work UoSaT-3 aswell.

First of all make up the following simple small circuit.



Note pin 2 is linked to pin 6 on the ca3140.

Locate the so called FM modulator which is XM01, you will find that there is a connector post nearby which you can apply the output from the above circuit to. Then connect 8vTx from the post which is also nearby. Keep the leads as short as possible. You will have to connect a switch in the 8vtx line so that you can use the mic skt as normal.

Some component changes are needed to the modems.  
G3RUH 9600 Modem :- change C34 for 470n or place in series.

G3RUH Psk Modem :- Remove R5, change R3 for 50k pot, change c9 to 100nf.

Set output of Psk modem for 500mv.

**NB!** This will pull your radio off frequency slightly about 5 khz. Allow for this simply by adding 5khz to your read-out.

26-09-1998

(FT-480) Low power in all modes for the yaesu FT-480R

BY PE1RCS AND PA3FXW.

The FT-480R has a low power switch, which reduces power output on CW and FM to 1 watt. Unfortunately, this has no effect on SSB. If you want to run the 480 on reduced power (e.g. to drive a transverter) this modification might be of some use.

If you look at the schematic, you will find out that switching to low power is done by reducing the voltage on pin 2 of the power module (M57713), probably the power supply of the power module's driver stage. The variable resistor VR1012 on the main board controls the power level on LOW, if desirable down to milliwatts level. When the LOW switch is depressed in CW or FM mode, this switch will ground the base of the voltage control transistor through VR1012 and a diode. (there is some other circuitry involved but I omitted it for reasons of simplicity). However, in either USB or LSB this switch will NOT ground and leaves the transistor's base floating to +13.8V, just like it does when the switch is not depressed at all.

By adding a simple wire between the switch ground and the 480's ground, low power will also be effective in SSB. Open the transceiver, locate the front pcb and solder side of the LOW switch, find out the switch ground with a multimeter (measure a diode in CW or FM and high resistance when in SSB mode) and solder an insulated wire between the switch ground and "real" ground.

On-the-air tests have proven the modification to work excellently, although it has not yet been tested on a spectrum

analyzer to check for possible intermods (there must be a reason why them clever Japanese cunningly left out SSB on low power??? Lowering voltage on a driver stage will usually affect linearity!)

But there is more... Did you know there is an external TX control available, one of the four small pins located on the underside of the 480 gives +13.8V on transmit, excellent for external relay or transverter control! These pins were meant to control an external CTCSS unit.

73 de Teis PE1RCS and Robert PA3FXW@PI8ZAA.#NBO.NLD.EU - QTH Nijmegen JO21VT

19-07-1998

(FT-50) FT-50R TX Mods

19 Apr 1996

From: 73573.1504@compuserve.com (Mike A. Penner)

The web page is advertising a MARS/CAPS mod, so even Yaesu here in the US does not have it so far. They have promised to send it as soon as they have it.

Has anyone used one yet? I am waiting for the local radio shop to get their shipment in. The radio sounds to good to be true. Is it? I have purchased the FT-50R and yes it is a pretty cool little "radidio". I does have a built in game if yo press the MR button while turning the radio on. I have also modified the radio to transmit out of band.. MARs and CAPs ...Here is the information everyone needs to modify it:

1. remove the battery pack
2. remove the two screws contained under the Battery safety sticker on the back of the radio.
3. remove the key board (instuctions on how to remove the keyboard are in the owners manual)
4. by removing the keyboard, it will reveal three jumper pads 1,2,&3
5. Only jumper pad #1 will be bridged by soldier.
6. remove the soldier from jumper #1
7. now, put the radio back together
8. reset the master cpu... instruction in owners manual.
9. reset the extended receive,.. see the owners manual.
10. you now have a modified radio.

any questions e-mail me

For those of you who would like to receive the 869-894 MHz range with your Yaesu FT-50, try tuning it to the corresponding image frequency range, 778.8-803.8 MHz. The sensitivity is the same as when tuned to an 860 MHz signal.

Rob WB8WQA

19-07-1998

(FT-50) FT-50 Info +Mod

de DG8NBR @ DB0BOX.#BAY.DEU.EU (Albert)

Modification und INFO`s Yaesu FT-50R

TX MOD DL-Version FT-50R :

Akku-Pack abnehmen - Infoaufkleber "Contains Nickel Cadmium....." an (in)der Rückseite des FT-50 entfernen - darunterliegende (zwei) Schrauben lösen - Handy umlegen (Display nach oben) - Keypad (Tastefeld) vorsichtig herausnehmen .....

Auf der nun sichtbaren Platiene sind (links) die Zahlen "1" "2" "3" aufgedruckt.... Darüber befinden sich drei (optischrunde)Lötbrücken in der DL-Version ist "1" gebrückt, "2" frei, "3" frei..... Bücke "1" mit LötKolben entfernen .....

entfernen -----> [0]   [ ]   [ ]  
                          1       2       3

Gerät wieder zusammenbauen - Reset durchführen.  
TX nun von 140.000 - 170.000 Mhz + 420.000 - 470.000 Mhz

Game Play: Taste MR(Skip) gedrückt halten und Gerät einschalten

Dank AM,FM,NFM,WFM,DTMF,CTCSS,ARTS,CW-Indicator,Voice Rec.,Voice Playb.- und und und und ..... ach ja ein Mini Game Boy ist auch noch integriert ein High Tech Gerät und das bei 99x57x30mm  
Fazit: 2m + 70cm + Scanner + Taschenradio + Mini "Game Boy"  
vy 73 de Abert DG8NBR @ DB0BOX

**19-07-1998**  
**(FT-50) FT-50R <= > 2k4-Packet ufb**

From: DL5FDI @ DB0SIF.#HES.DEU.EU (Thorsten)

Hallo FT50-Freunde !

Für alle, die es vielleicht interessiert: Packet-Radio mit einer Geschwindigkeit von 2400 Bit/s funktioniert mit dem FT50R einwandfrei. Ich habe hier laut Handbuch einen Widerstand und einen Kondensator in die Mic bzw. PTT-Leitung des TNCs eingebaut und es lief nach einigem Drehen des 1kOhm-Potis im TNC2C auf Anhieb. Wie es mit 9k6 aussieht weiß ich nicht, aber ich denke mal, daß man dann in dem kleinen Gerätchen rumlöten muß (lieber nicht (-:))...

Soweit zu dem....hat denn mittlerweile irgendjemand rausbekommen, wie das eingebaute Spiel funktioniert? Ich weiß nur, daß man beim Einschalten mit dem Wahlknopf die Geschwindigkeit einstellen kann und das Spiel mit der PTT-Taste gestartet wird, achja, mit dem Wahlschalterknopf kann man auf Pause gehen...leider kann ich die Zahlen in keinster Weise beeinflussen (die kommende Zahlen mit der PTT als Morsezeichen einhämmern hat nichts gebracht ;-))

Vielleicht weiß ja jemand mehr und kann mir einen Tip geben...

Tnx im Voraus und 73! de Thorsten aus Oberaula / Knüll

**19-07-1998**  
**(FT-50) FT-50R Features - Specifications Link**

From: DL6RDE @ DB0BOX.#BAY.DEU.EU (Charlie)

Yaesu announces the latest in dual-band handheld technology with the release of the new FT-50R Dual-band handheld transceiver. This engineering achievement offers features never before found in this small palm sized handheld radio, rugged weather resistant construction with a full 5 watts of power output.

Exclusive INDUSTRY-FIRSTS found only in the FT-50R dual-band will enhance your operating pleasure. Wide-band Receive coverage to 999\* MHz with 3-Selectable Filters (AM, FM-N, FM-S), Keyboard or PC programmable, Rugged MIL-STD 810 Rated, CTCSS and DCS (Digital Coded Squelch), distinguish Yaesu as the world leader in amateur radio products.

FT-50R FEATURES

SPECIFICATIONS LINK

Wide Multi-band Receive for the scanning enthusiasts 76-200, 300-540, 800-999\* MHz (\*Cellular blocked)

3-Selectable Rx modes (AM, FM-Narrow, FM-Standard)

Rugged MIL-STD 810 Rated for Shock and Vibration

Auto Range Transpond System<sup>TM</sup> (ARTS) uses DCS to automatically poll other stations, indicating if they are within simplex range.

Digital Coded Squelch (DCS) is used in the commercial industry, DCS provides 113 unique codes in addition to the standard CTCSS tones.

112 Memory Channels each stores offset, CTCSS/DCS & power level.



-----  
Alpha-Numeric Display up to 4 characters may be used to name each memory channel.  
-----

Digital DC Voltage Display monitors current battery voltage.  
-----

Full 5 Watts of Power Output with 4 selectable power levels (Available in 2 and 5 watt versions).  
-----

Automatic Tone Search (ATS) scans for DCS and CTCSS tones. (w/ FTT-12 installed)  
-----

Receive and Transmit Battery Savers built-in.  
-----

ADMS-1C« Windows« PC Programmable (available May 1996)  
-----

Keyboard and Menu Programming allows for simple FT-50R operation.  
-----

MARS/CAP Modifiable with proof of permits.  
-----

This modification is read 3206 times.

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**19-07-1998**

## **(FT-50) FT-50r Problem**

From: DL2ZBV @ DB0ULM.#BAY.DEU.EU (Harry)

hallo ft 50 Besitzer,

ich habe seit der HAM-RADIO auch so ein kleines Wunderwerk der Technik leider hatte ich schon die ersten Probleme damit, beim Empfang war alles klar und das Gerät schien in Ordnung .

Doch nun wollte ich natürlich auch mal ein QSO damit machen und rief ganz erwartungsvoll auf dem Relais in die Runde .....

Man reagierte erst garnicht weil man mich nicht gehört hat , als ich dann mal etwas mehr Hub machte (ich schrie ins Mikrofon) erkannte man mich und fing an mich zu bedauern ???

Meine Modulation war kaum zu verstehen und sehr leise was mich wiederum total fertig machte , ich dachte schon ich müßte das Gerät wieder zurück schicken und Ersatz verlangen . Zu Hause angekommen machte ich einige Versuche und war noch niedergeschlagener als aus den Kontrollempfänger fast nichts zu hören war. also , griff ich mir meine Lupe und untersuchte mal mein kleines Gerät und siehe da , ich fand auch gleich was ...

Man hatte doch tatsächlich das Loch für das Mikrofon nicht richtig gebohrt und so war schon klar , ich mußte das nach holen . Also Minibohrer her und frisch ans Werk. Sollte einer von Euch ebenso ein Problem haben , zeige ich hier wie ich mein Problem gelöst habe.

Ich ging folgendermaßen vor:

Akku abnehmen , den Aufkleber unten (grün) abnehmen , die beiden Schrauben lösen aber nicht ganz rausdrehen, mit den Schrauben die Tastatur nach vorne heraus schieben und dann die Schrauben ganz heraus nehmen .

Die beiden Bedienknöpfe oben abziehen und die Gummiverschlüsse der Anschluß- buchsen rechts und links herausziehen , jetzt kann man mit einem kleinen Schraubendreher am unteren Ende das eigentliche Funkgerät aus dem Gehäuse heraushebeln und nach unten aus dem Gehäuse ziehen . Natürlich macht man das sehr vorsichtig um nichts zu zerstören. Jetzt kann man mit einem kleinen Bohrer das Mikrofonloch aufbohren (0,5 mm) und das Gerät in umgekehrter Reihenfolge wieder zusammen setzen.

Sollte es dann immernoch zu leise sein braucht man einen winzigen Kreuz- schraubendreher um noch etwas nach zu regeln.

Um die Lautstärke (Hub) zu erhöhen braucht man das Gerät nicht wieder auseinander zu nehmen den man kommt an die beiden Poti`s auch so dran. wenn man den Akku noch nicht wieder aufgesetzt hat und das Gerät mit der Tastatur nach unten auf dem Tisch liegen hat (Antenne oben) erkennt man neben der linken Befestigungsschraube für die Tastatur zwei kleine Poti`s Der Poti direkt neben der Befestigungsschraube ändert die Empfindlichkeit des Mikrofones und der Poti daneben (rechts) ändert den Hub .

jetzt kann man selber entscheiden wie man da nun einstellt , ich habe mein Signal mit einem Kontrollempfänger und Kopfhörer abgehört und die beiden Regler auf eine angenehme Lautstärke einreguliert.

Anschliessend habe ich mir bei den Funkfreunden die mich mit anderen Geräten kennen einige Raporte eingeholt und war mit mir zu frieden .

Eines sei noch gesagt , wer selber an seinem Gerät rumschraubt ist auch selbstverantwortlich für das was er da tut. Was ich hier geschrieben habe ist nichts anderes als eine Beschreibung dessen was ich hier mit meinem Gerät gemacht habe. Also , nachmachen nur auf eigene Gefahr . Ich übernehme keine Garantie dafür das es bei Euch auch so klappt wie bei mir.



Ich jedenfalls habe mir so die leidige hin un her schickerei und den damit verbundenen Streß erspart und habe nun endlich meinen Spaß mit dem kleinen Seifenstück großen Gerät hi.

73 all Denen die diesen Text gelesen haben und tschüß DL2ZBV Harald

22-08-1998

(FT-50) FT-50 Game Mode

The FT-50R includes an interesting "game" that's programmed into it. Here's how it works:

1. Power up the radio while holding down the MR key. (PWR + MR).
2. The display will show GAME on the left side, and Spd 1 on the right. You're in game mode!
3. By rotating the knob, you can change the speed of the game. Higher numbers are faster.
4. Press PTT to start the game.
5. Numbers will start to scroll across the screen from left-to-right. As they come, you are supposed to push the number on the keypad that makes a sum of ten, followed by F.  
Example: 6 appears, press 4, F. If 0 appears, enter 10 followed by F.
6. The game is over when the screen fills up with numbers.
7. To exit the game, simply cycle the power.

03-01-1999

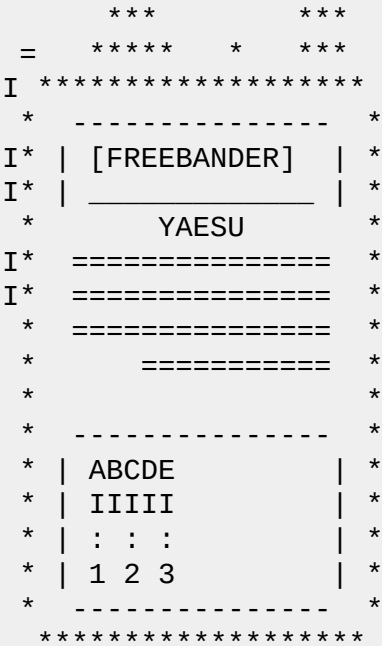
(FT-50) FT-50R Expanded Transmit 120-230, 315-505 MHz

1. Remove battery
2. Remove the Ni-Cd sticker
3. Slowly lift off the keypad and carefully locate the jumper pads
4. Locate and unsolder jumper number "1" (see picture below) it is a solder blob between 2 pads.
5. Locate and unsolder surface mount resistor "A" (see picture below) be carefull!

It is the first resistor on the from left

6. Reinstall the keypad with the two screws
7. Turn radio off
8. Press down and hold the tuning knob and lamp button while turning on the radio.

VIEW: looking down with keypad removed



9. The vfo should display 144.000 Press FW. (this step may not be needed but it worked for me) Power off.
10. Powerup with lamp/ptt/knob held down. It should now be in tune mode with something new (BAND= A 1) change it

- pressing the knob for 1/2 second and then turn the knob to FREE. (BAND=FREE)
11. Power off and back on NOW RADIO DISPLAYS 50~540 590~1000 no gaps!!!  
(Dont change any other function or you could screw up alot of adjustments here) IT will tx where ever it locks. One radio 122~231 and 309~502 and another radio was 120-232mhz and 315-509mhz. This varies radio by radio.  
Tx is only miliwatts near the edges (DONT TX OUT OF BAND!!!).  
Rx locks after about 74mhz. it is very def in the 220 band tx is miliwatts. no tx above 502 but varies radio by radio.
  12. If you have the ADMS 1 software you should have a copy of what was in your radio.before you started.
  13. Copy from the radio. Save and name this file FREEBAND. This is to be saved as a clean copy for future use.
  14. Copy from the radio again (or just copy the file) name this file MERGE.
  15. Merge the old file to this file and send to radio.
  16. With your palms facing forward put your thumbs in your ears, wiggle your fingers and stick out your tongue at your Users manual while it is open to page 10.
  17. Then update page 10.

Dont make the FCC and Yaesu angry at you by trasmitting where you are not supposed to.

This information came from a Newsgroup message by Alan Judd, information gained from the Web Page at <http://members.gnn.com/hca/ft50/index.htm> and my own attempts at restoring the radio using this FREEBAND Mod. Please give Alan Judd great thanks for subjecting his radio to T&E R&D (trial and error research and development).

E. Scott Sykes

**Date:** 09-03-2002

**User comment**

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

**Subject:** Freeband

When i went into the Lamp/PTT/Knob menu i could not change or open the recieve or transmit any more I could not change from BAND A3--, i couldn't get it into Free, any suggestions?

03-01-1999

(FT-50) Software mods for FT-50r. Mod any thing

This is a method to do any MOD to your FT50R. The procedure is very simple and fast done:

1. You make a template from your FT50R
2. Change 3 Bytes in the template
3. Upload the template to your FT50R

So you can switch to any BAND, you don't have do hardware interventions or similar staff like pull the adapter cable out, ...

If you want do return the FT50R to its original state, just upload the old (unmodified) .TPL to the Unit.

Information and explanations:

All MOD's can be made by software only. To do the MOD's you need the ADMS 1C Software (I am using the 1.05 Version) and a HEX editor to manipulate the .TPL file (I am working with .TPL file's only) I am using HIEW 5.24 (Hacker's View) but any HEX editor will do the job (PCT, Norton, Multiedit, ... )

Everyone has noticed the problem after making same MOD's to the Unit that the old .TPL files can not be uploaded to the Unit any more.  
There is a simple protection scheme (2 bytes) that prevents uploading a .TPL file from a different hardware configuration to the Unit.

This is a description how to bypass this protection. By uploading a .TPL file with different hardware configuration, ( from a other Unit or just to change the 2 bytes) the Unit will be assigned to this new configuration.

First a description of Terms and Positions:

1. Current\_Byte

This is the Byte that tells the current Status (Hardware configuration) of the Rig, you can get this Byte as follows:

- Make a .TPL file from the Rig.(Menu: <Radio> <Create template>)
- Edit the .TPL File with e HEX Editor.

- v this is the first byte  
On the File Address 05E2 is the sequence 07 XX  
^ Current\_Byte (Addr.:05E3)
- The Current\_byte can be in the Range from 00 to 06.
- \*the first byte is usually 07, by experimenting with nonstandard Numbers you can change this byte also. (03 or same other value, but very rare)

## **2. Key\_Byte (Security Key)**

The Key\_Byte is at the same place as the Current\_Byte, but in the .TPL file you intend to upload.

If you want to upload a .TPL File to the Rig, the Key\_Byte must match the Current\_Byte (that means that the Hardware configuration of the Unit and the .TPL file you intend to upload must be the same). Just change with the HEX Editor the Key\_Byte of the .TPL file you intend to upload to be the Current\_Byte and you can upload anything (any .TPL file) to the Rig.

!!! No more CERR Messages !!!

(As mentioned in 1. if you change the first byte, you have to change this)  
(byte also (in the .TPL File you intend to upload) to be the same Byte as)  
(in the Template you have just made to read the Current\_Byte.)

## **3. Band-Set\_Byte**

- Edit the .TPL file you intend to upload with e HEX Editor
- v\*      v Sub\_Band-Set\_Byte (Addr.:0CE8)  
On Address 0CE6 is the Sequence 07 XX XX  
^ Band-Set\_Byte (Addr.:0CE7)

This Byte tells the Rig to switch to Band XX (XX is a Nr.between 00 and 06) To change the Band simply change the Band-Set\_Byte to the desired Number.

After Uploading the Modified .TPL File to the Rig, it switches to the desired Band and the Current\_Byte becomes the Band-Set\_Byte. That means if you want to upload later something else to the Rig, you have to change in the .TPL File you intend to upload the Key\_Byte to the new Current\_Byte (with the HEX Editor).

The Sub\_Band-Set\_Byte tells the Rig in with Sub Band to switch (see Table) \*The byte (0CE6) is usually 07, rare 03 or same other number.

## **Example**

Now, to do a band change do as follows:

- let's assume you have BAND\_A1 (USA) and want to switch to BAND\_F3
- make a .TPL file from your unit (let's assume original.tpl)
- copy the original.tpl to mod1.tpl (this file we are going to upload)
- read the Current\_Byte from original.tpl (as described in 1) (for the BAND\_A1 we assumed you have it will be 01))
- set the Key\_Byte in mod1.tpl to be the Current\_Byte (01) (as described in 2). It is logical that the Key\_Byte will already be 01, you've just made the copy, but it is a matter of principle, keep reading.
- set the Band-Set\_Byte in the mod1.tpl to 00 (for the BAND\_F)
- set the Sub\_Band-Set\_Byte in the mod1.tpl to 03 (for the Sub BAND F3)
- upload the mod1.tpl to the unit.
- power off, power on, now you have BAND\_F3, DONE.
- let's assume you want to switch now to BAND\_B2a
- make a .TPL file from you unit (let's assume temp.tpl)
- read the Current\_Byte from temp.tpl, it will be 00. (BAND\_F)
- copy the original.tpl to mod2.tpl
- set the Key\_Byte in the mod2.tpl to be the Current\_Byte (00)
- set the Band-Set\_Byte in the mod2.tpl to 02 (BAND\_B)
- set the Sub\_Band-Set\_Byte in the mod2.tpl to 01 (Sub BAND B2a)
- upload the mod2.tpl to the unit.?
- power off, power on, now you have BAND\_B2a, DONE.

and so on ...

Here are the MOD's (Band's) available:

```

      I 00    01    02    03    I <- Sub_Band-Set_Byte (Address 0CE8)
-----
00 I F1     F2a   F2b   F3     I
01 I A1     A2a   A2b   A3     I
02 I B1     B2a   B2b   B3     I
03 I C1     C2a   C2b   C3     I
04 I D1     D2a   D2b   D3     I
05 I H1     H2a   H2b   H3     I
06 I FrEE   FrEE   FrEE   FrEE  I
-----
^ Band-Set_Byte (Address 0CE7)
```

When you set the Rig in a band (with the Band-Set\_Byte) then you can switch from Sub Band X1 to X3 (if solder jumper 1 removed) with the key sequence:

- Hold Lamp and Knob by powering\_on to switch to X3 Subband
- Hold Lamp and Knob by powering\_on (you will see ALRST prS5) and then press the function key to switch to X1 Subband

The TX for the X3 Bands is:

| BAND | SUB_Band | TX      |          |
|------|----------|---------|----------|
| F    | 3        | 120-222 | 320-500  |
| A    | 3        | 140-174 | 420-470  |
| B    | 3        | 140-174 | 420-470  |
| C    | 3        | 140-174 | 420-470  |
| D    | 3        | 144-146 | 432-438  |
| H    | 3        | 144-148 | 430-450  |
| FrEE |          | 50-300  | 300-540* |

\* It will TX from aprox. 118-233 and 312-508 RX from aprox.71-540 and 600-999 depending from the Unit.

The Sub Bands 1,2a and 2b are with restriction variations in TX and RX and I am to tiered to examine them closely and write them down. I guess that they are not very interesting.

**ARS lost - effect**

The FT50R has e BAND\_PLAN like database and depending for witch country your unit is configured (A,B,C,D & H) it is using the repeater database? from his Memory for that country.

It is understandable that for the BAND\_FrEE and BAND\_F (TX:120-221&320-499) there is no data in the database because those band's are not for any specific country. That is why the ARS does not work any more, and not? same mess up (magic) in the memory of the unit.

That does not mean that it is not possible to enter additional data to the ARS memory database (I am working on it).

If you want to use the ARS again you just have to switch it into any ordinary country BAND\_X and it will work again.

**Original .TPL file**

If you don't have a original .TPL file, you can make (improvise) one:

1. Start the ADMS 1C software
2. Goto the File Menu and save a .RDF file as original.rdf (don't download anything from the Unit, don't use a template)
3. Change with a HEX editor the first 3 bytes from RDF to TPL
4. Set the Key\_Byte in this file to be the Current\_Byte of your Unit
5. Rename the original.rdf to original.tpl
6. Start the ADMS 1C and upload the original.tpl to the Unit.

This will switch your unit to BAND A1 (USA), ARS will work again !

**Disclaimer:**

Don't TX and RX at frequencies that you are not allowed to! I do not guarantee the validity of this information, as Yaesu may change programming or hardware so that some of the techniques in this document may cease to function. I am not

responsible if these instructions damage your rig in some way. All I can say is that I have performed the following procedures to my unit, and I am quite pleased with the results. Your mileage may vary, etc.

**Some newsgroups messages.**

Subject: Re: FT50R Software MOD's  
From: Ingra-Beton@t-online.de (Ingra-Beton)  
Date: 26 Mar 1997 08:21:18 GMT

Just e short explanation of the Message I've send:

It is a Method to do any MOD to your FT50R.  
The procedure is very simple and fast done:

1. You make a Template from your FT50R
2. Change 3 Bytes in the Template
3. Upload the Template to your FT50R

So you can switch to any BAND, you don't have do  
Hardware interventions or similar staff.

If you want do return the FT50R to its Original  
state, just upload the old (unmodified) .TPL  
to the Unit.

It is also a solution to Upload your old .TPL  
files to the Unit, (those files your are not  
able to Upload after making Hardware MOD's)

Indi.

PS. I need various .TPL Files from  
different FT50R's for my further  
investigations, please send  
me a couple of .TPL files  
- The Original  
- After making same MOD's  
- any other  
(I still need the 1.04)

=====

To: mgrand@mbi.net  
Newsgroups: rec.radio.amateur.equipment  
Subject: FT50 Freeband  
From: Ingra-Beton@t-online.de (Ingra-Beton)  
Date: 2 Apr 1997 07:07:40 GMT

> Mark Grandstaff wrote:

>

> O.K. I read through all the info on mods for the FT-50R and am more  
> confused than ever.

>

> My goal is to get expanded transmit and expanded receive (freeband)  
> operation.

>

> I have a newer model (SN begins 6L12) so I realize that "pulling the  
> plug" won't work to achieve freeband. I assume that the expanded Tx  
> MARS/CAP mod of unsoldering the jumper #1 will work though. In an  
> article submitted by E. Scott Sykes in addition to the jumper  
> modification he suggests unsoldering the resister at location "A" to  
> achieve a freeband state. Is this part of the "pulling the plug  
> method"? What is the purpose of this resister? Is this recommended with  
> the newer radios?

>

> It looks as though my best option to get to the freeband state is to  
> first do the MARS/CAP mod as described by Bill Childers (unsolder jumper  
> #1) then follow the software suggestions outlined by Ingra-Beton  
> (3/26/97). Any comments?

>

> --

> Mark Grandstaff KF7JA mgrand@bmi.net

I have a newer model also, the articles by Scott Sykes work's just fine.  
It is not a part of the "pulling the plug method".

You just remove the solder jumper 1 and the freeband resistor and it's done.

The removal of the solder jumper 1 is hardware enabling of the sequence "hold down LAMP and KNOB by powering on"  
(You can switch from BAND\_X1 to BAND\_X3)  
(usually MARS/CAP)

The removal of the freeband resistor is hardware enabling of the sequence "Hold down LAMP and PTT and KNOB by powering on"  
When you see BAND\_X1, push KNOB for 1/2 sec. and rotate.  
(You can switch BAND A , B, C , D , H , F or FrEE)

With the hardware MOD's you will not have the ability to switch to the xxa and xxb BAND's (you probably not need them anyway)

If you don't want to make any hardware MOD's you can use the software MOD's, you can have any BAND you want, you will only not have the ability to switch from one BAND to another because the hardware switches are not enabled.

Of course you can use the hardware and software MOD's together.

**23-04-2000**  
**(FT-50) VFO access blocking mod**

**Author:** Bryce P Rumery - [k1gax@juno.com](mailto:k1gax@juno.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This mod applies to either the FT-10 or FT-50.

Once programmed the radio can be set to block out access to VFO and frequency display. Only memory channel names will be displayed. User can not switch to a frequency not programmed into memory.

With radio off press & hold LAMP & PTT simultaneously and power radio on.  
To switch radio back into VFO available mode repeat the process.

73, Bryce, K1GAX

**02-07-2000**  
**(FT-50) FT-50 modification**

*From: F5PBG@F5PBG.FBRE.FRA.EU*

I have found a modification of the FT-5 on our fax machine. I don't know how it got there :-))))), but perhaps it is usefull for someone. So i did some work and got it in my computer.

I don't have a FT-5, so i didn't try it out. It is all at your own risk.  
Don't blame me if your FT-5 is destroyed by using this info !!!!!!!

Here is wat i found on our fax :

**Modification FT-5**

|          |                  |
|----------|------------------|
| position | CNTL unit jumper |
|          | X=Available      |



| Type | Frequency Range<br>RX TX | RX TX           | R204B | JP1 | JP2 | JP3 |
|------|--------------------------|-----------------|-------|-----|-----|-----|
| A1   | 144-148/144-148          | 430-450/430-450 | X     | X   | X   | X   |
| A2A  | 140-174/144-148          | 420-470/430-450 | X     |     | X   | X   |
| A2B  | 108-174/144-148          | 400-470/430-450 | X     | X   |     | X   |
| A2C  | 76-200/144-148           | 300-824/430-450 | X     |     |     | X   |
| A3   | 76-200/140-174           | 300-824/420-470 | X     |     |     |     |
| B1   | 144-146/144-146          | 430-440/430-440 | X     | X   | X   | X   |
| B2A  | 140-174/144-146          | 420-470/430-440 | X     |     | X   | X   |
| B2B  | 108-174/144-146          | 400-470/430-440 | X     | X   |     | X   |
| B2C  | 76-300/144-146           | 300-999/430-440 | X     |     |     | X   |
| B3   | 76-300/140-174           | 300-999/420-470 | X     |     |     |     |
| C1   | 144-146/144-146          | 430-440/430-440 | X     | X   | X   | X   |
| C2A  | 140-174/144-146          | 420-470/430-440 | X     |     | X   | X   |
| C2B  | 108-174/144-146          | 400-470/430-440 | X     | X   |     | X   |
| C2C  | 76-300/144-146           | 300-999/430-440 | X     |     |     | X   |
| C3   | 76-300/140-174           | 300-999/420-470 | X     |     |     |     |
| D1   | 144-146/144-146          | 432-438/432-438 | X     | X   | X   | X   |
| D2A  | 140-174/144-146          | 420-470/432-438 | X     |     | X   | X   |
| D2B  | 108-174/144-146          | 400-470/432-438 | X     | X   |     | X   |
| D2C  | 76-300/144-146           | 300-999/432-438 | X     |     |     | X   |

After setting the jumper points on the control unit then please do the following.

1. Please press and hold "KNOB" and "T.CALL" button together while powering the radio.
2. Please press "F" button.
3. Power OFF the radio.
4. Please press and hold "KNOB" and "LAMP" button together while powerring the radio.
5. Now, finished.

There was a note written down on it :

RX Only :    JP1 Closed  
                 JP2 Open  
                 JP3 Open

After setting the jumper points on the control unit then please do the following.

1. Please press and hold "KNOB" and "T.CALL" button together while powering the radio.
2. Please press "F" button.
3. Power OFF the radio.
4. Please press and hold "KNOB" and "LAMP" button together while powerring the radio.
5. Now, finished.

There was a note written down on it :

RX Only :    JP1 Closed  
                 JP Open  
                 JP Open

73's de Ludovic.  
e-mail: [radioham@chez.com](mailto:radioham@chez.com)

28-10-2001

## (FT-50) Transmit under 420 MHz

**Author:** Chris Salinas - [salinas63@home.com](mailto:salinas63@home.com).[MODIFICATION.NET](http://MODIFICATION.NET)

Well, after getting a program called "YAESU FT-50 Manager v.99", I was able to get it to transmit lower than 420. I've only tried the low end of 400 Mhz and 380 Mhz. Try this technique with the newer radios.

1. [Download](#) the program.
2. Get the interface cable for your radio.
3. Remove the Jumper and Resistor like the original mod.
  - a. Place radio in CLONE mode (LAMP+PTT).
4. Start the program after unzipping it.
5. Select "FT50 I/O" in menu and then select "Download from FT50".
6. Follow the directions.
7. Save the data that was downloaded.
8. Select "Config" in the menu.
9. Jumper Byte should say "0F". Change Band Byte to "06".
10. Press "UPLOAD" button. Radio should have taken the upload and went into operation mode. If not, turn off the radio.

Now we need to see if the first change worked. Use the Knob+Lamp button to go to expanded mode when you turn the radio on. Press the Knob button to change to the next band. The key here is to see if the display goes from 144 to 222, not 380.

If it did, then we are good to go. If not, then repeat the above steps.

11. Make sure the radio display shows 144 (2m band).
  - a. Place radio in clone mode (Knob+Lamp at powerup)
  - b. Download from the radio again in the FT50 I/O menu selection.
  - c. Click the checkbox in the upper-right by the word MASK.
  - d. Slide the slider to the bottom.
  - e. Enter 076000 in H1, A1 and B1.
  - f. Enter 380000 in H2, A4 and B4.
12. Repeat steps 8 to 10 using Band Byte "07" instead.
13. Try transmitting (low power using a dummy load) on the other bands.

**NOTE** Don't switch to expanded mode or you'll lose the programming. So will resetting the radio.

I used these steps and it worked for me. For some reason it changes its jump points in memory and the "07" puts it into some strange mode. The one thing I noticed was that any memory channels programmed with software doesn't work correctly. So repeater splits, CTCSS, DCS and the like don't store. But you can adjust them from the keyboard on the radio.

Save the new memory in a separate file. Save that first ORIGINAL file in case you have problems. Let me know what works and what doesn't since I haven't had time to try in other bands besides 380-390 and 400-420.

Chris  
N0TTW

**Date:** 13-02-2002

**User comment**

**From:** [Chris N0TTW](#)

**Subject:** My Change of E-Mail address

I would like to know if my mod worked for most of the radios.  
I still haven't had time to try any of the ranges. This Email  
address will be online on March 1, 2002.

13-01-2002

(FT-50) Modification of the Yaesu FT50 transceiver for 9600Bd use

Author: HA5OB

(C) HA5OB , 1998-1999

## Foreword

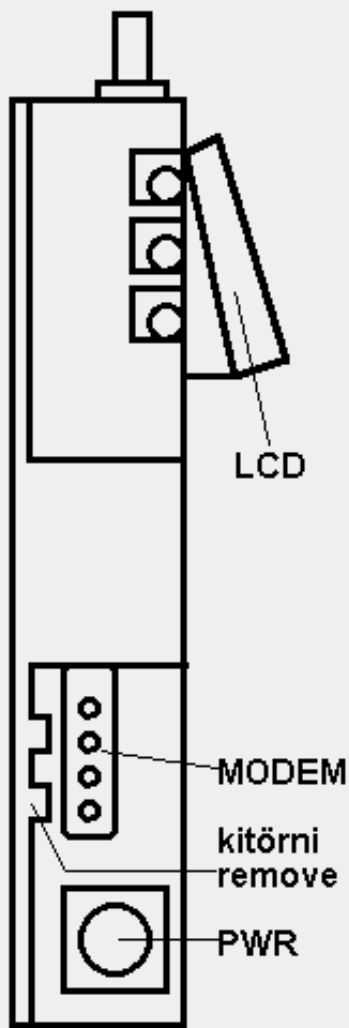
Because of the synthesizer, two-point modulation have to be used for efficiency. We can make good use of the built-in varactor modulator of DCS for modulating the reference oscillator. This works for both bands (VHF&UHF), so by modulating both VCO's, 9600Bd can be used on both bands.

We'll need precision mechanical tools and possibly a temperature controlled fine soldering iron with pin-like tip. All the SMD parts are of size 0805.

**Warning: This modification is not meant for the beginners! be very careful or you can easily make a fatal damage to your transceiver. For a work like this, you should be sharp-eyed and have steady hands. So if you feel just like wrestled three rounds with a grizzly, then better leave it for another time.**

## The modification

Note: you can always click on the pictures to get a more detailed view.



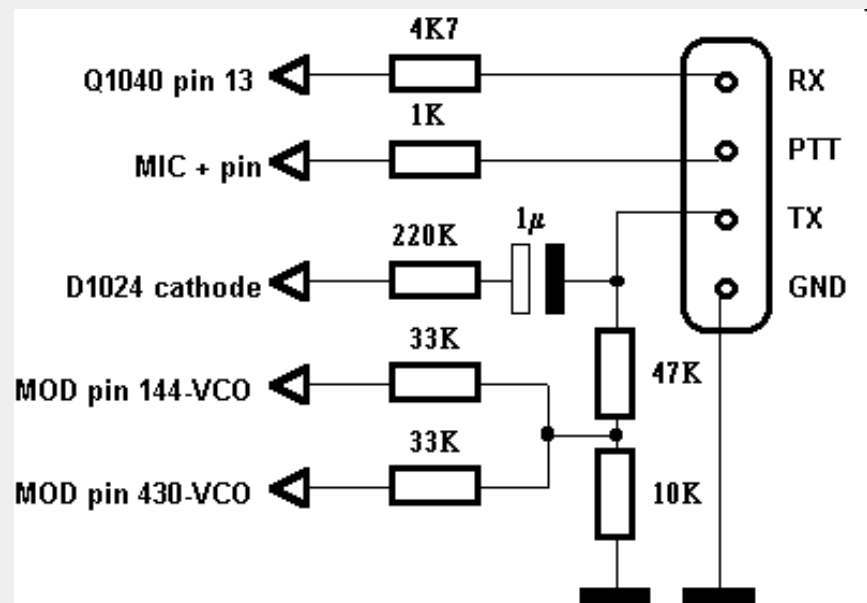
First you'll have to make a slot on the case to fit in the new 4 pin connector. This is made of a piece of breakable female socket, see relevant pictures. Use emery cloth on a flat surface to thin the socket or you'll not be able to install it. The space is very tight, so make it very precisely!

Take 4 pins of a breakable male header and solder a 3 wire, roughly 1m long shielded cable to it. Use heat shrinkable plastic tubing, when shrinked around the plug it will serve as a handle. See appropriate picture (from left to right: male and female connectors and the assembled plug).



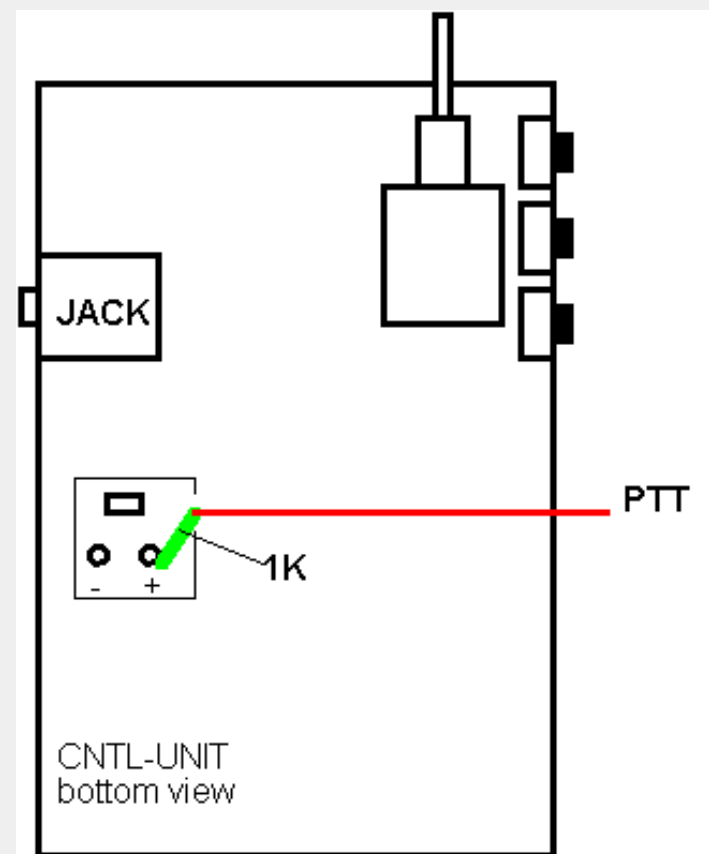
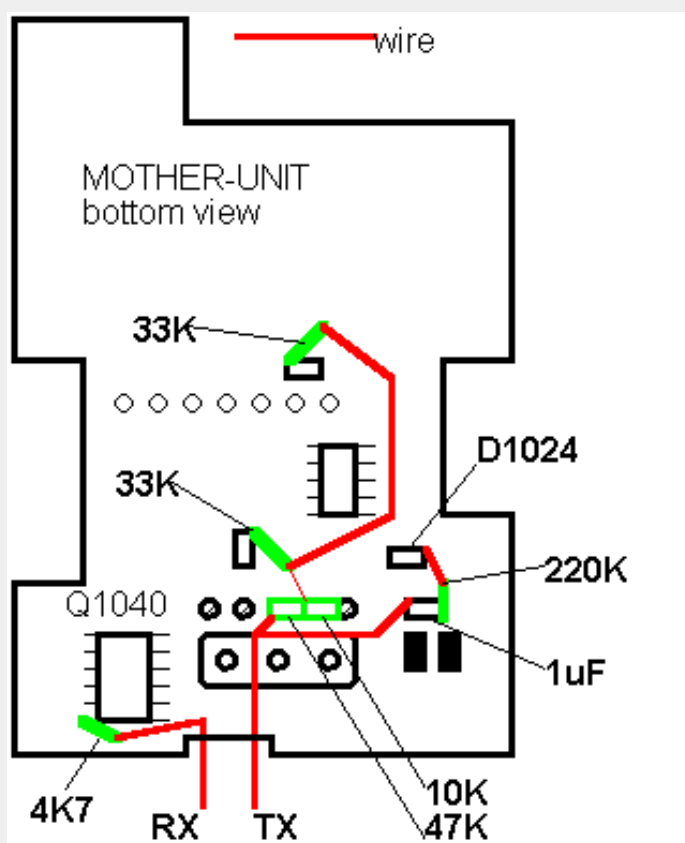
Carefully remove (mean tear off) the marked piece above the external DC connector as can be seen on the figure. Insert the new socket and fasten with 1 minute epoxy. A small piece of wire running from the appropriate pin to the ground on the radio, will hold connector in place untill glue sets. (Practically the metal strip around the DC connector can be used as ground point.) Carefully make a slot by needle file on the side of radio case to fit the new 4 pin socket.

## Circuit diagram



Due to existing varicap diode modulator we'll need only very few new parts. The correct values are found after modifying 4 set of FT-50 radios. Because of space restriction I suggest the use of a (47k/10k) resistive voltage divider and not even the smallest pot. You can increase the value of the 1uF capacitor to improve low-frequency response.

## Layout of components



The new 4 pin connector and the PTT control layout can be seen on the picture with two boards side by side. The mother unit is still in place.

PTT control was made through a resistor in line to the microphone's + pin. After soldering the resistor and the hookup wire, use a small piece of adhesive tape to prevent short circuit. Red colored wire leads to the connector. Use wire no longer than just necessary with boards laid side by side.



Place 0805 size SMD resistors on their side to the appropriate places and carefully solder them. Use 28AWG wrap wire as space is not enough for regular hookup wire! Using a needle file, make some space at the bottom of mother unit board to let wires reach to the connector on the other side. Wires colored blue and green runs to the new connector. Use hot glue to fasten the 1uF tantalum cap laying on it's back.

## Conclusion

This modification was made on 4 radios. All of them work properly using both original facilities (FM phone, 1200Bd packet

through MIC/EAR connector) and on 9600Bd. The synthesizer has a fast lock time, so TXDELAY as low as 70-80msec can be set. According to measurements, roughly 1-1.5Vpp modulating signal is needed to get 3kHz deviation. Receiver IF bandwidth is sufficient for 9600Bd work.

And finally the four satisfied owner of modified transceivers:

- [ON4AVM](#)
- [PA3GEO](#)
- HA8FN
- HA5OB

Pictures were taken by a [NIKON COOLPIX-700](#) digital camera, by courtesy of HA2VR, Gyuszi. Thanks!

This modification can also be found on [http://ha5ob.sch.bme.hu/ft50\\_e.htm](http://ha5ob.sch.bme.hu/ft50_e.htm)

This modification is read 1333 times.

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**19-07-1998**  
**(FT-51) Extended RX and TX frequency**

**Author:** Christopher F. Clulow - [cclulow@sprintmail.com](mailto:cclulow@sprintmail.com).[MODIFICATION.NET](http://www.MODIFICATION.NET)

Disclaimer: Perform this procedure at your own risk. The poster(s) of this procedure assume no liability, and this procedure is posted for general information only. The FT-51R radio is not fcc-type accepted for transmission outside of the amateur radio frequencies. This modification enables transmission on frequencies outside of the amateur radio band, and is legal for those individuals with mars/caps certificates. This modification requires the use of a low power fine tip soldering iron. individuals who are not experienced with soldering of surface mount technology should not attempt this modification, you could ruin your radio.

1. Remove the battery pack from the radio.
2. Remove the four screws directly beneath the battery pack on the radio.
3. Remove the two screws holding the contact portion of the battery compartment
4. Remove the screw and battery pack release lever.

(the following steps make removal of the battery holding compartment easier)

5. Remove the four screws on the bottom portion of the back of the cabinet. Carefully remove the two halves of the radio. Pay attention to the gasket as you are seperating the cabinet.
6. Remove the battery pack holding compartment.

The section you will know be working with is directly underneath the battery pack holding compartment (behind the touch tone pad).

7. There is a ribbon cable connected to the control board. You can leave the ribbon cable attached if you're a GOOD solderer, or you can release the two little black levers on each side of the ribbon cable and CAREFULLY slide the ribbon cable out of the socket and hold it back towards the case with a piece of tape. Be careful not to put a bend in the ribbon cable or pierce it.
8. Locate a set of etched jumpers on the pc board. They are located adjacent to the bend in the ribbon cable. They are not marked, and are situated as follows (o-o indicates closed, o o indicates open):

|        |     |  |     |        |  |
|--------|-----|--|-----|--------|--|
| JP1001 | o-o |  |     |        |  |
|        |     |  | o o | JP1005 |  |
| JP1002 | o o |  |     |        |  |
|        |     |  | o o | JP1006 |  |
| JP1003 | o o |  |     |        |  |
|        |     |  | o-o | JP1007 |  |
| JP1004 | o-o |  |     |        |  |

9. Using solder wick or your preferred method of solder-removal, carefully remove the jumper for JP1007. This enables the 134-174, 420-470 MHz transmit.
10. Reassemble the radio, remembering to reinstall the gasket, and to carefully reinsert the ribbon cable if you removed it from the socket, and fasten down the little black socket locks.
11. Press the MHZ / and MHZ / buttons simultaneously while turning the power on to the radio. This enables the modification.

Some notes:

I experimented with removing JP1004, and it had no apparent effect. I did not experiment with any of the other jumpers except JP1007. There still may be 800 MHz receive buried some where in the radio, the Japanese version has 800 MHz receive. An earlier posting of mine indicates four large resistors (well, non-surface mount) connected between various microprocessor and memory pins, clearly an add-on. Experimentation with removing these produced no effect, HOWEVER, this was prior to my discovery of the JP1007 mod. I've played with the radio enough now, and don't want to push my luck, so let's let someone else try to find out if there are any more secrets buried in this fine piece of gear.

This modification is read 2252 times.

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**19-07-1998**

## **(FT-51) Adjusted the threshold of the Squelsh**

The FT-51R allows several operating parameters to be adjusted through the keypad. I have found that the high and low modulation levels and the squelch threshold can be adjusted this way. The procedure to accomplish this is as follows;

Turn the radio off

Hold the volume up, volume down, and CALL buttons down, while turning the radio on. ( This requires you to carefully place your fingers on the buttons. I had to try a few times, but quickly found the proper finger positions. )

The menu should now read BAND1

Rotate the Rotary Selector Dial to the option you want to adjust. ( There are a number of options to choose from. I have only tried the MOD H and MOD L options. I do NOT recommend adjusting other options without proper test equipment.)

Hold the FM function button for 1/2 sec. This enables you to change the displayed values.

Use the MHZ UP/DOWN buttons to select a new value.

Press the FM function button to save the new value.

Press the BAND button, and repeat the above procedure to adjust the parameters for the other band. (Note: To switch to the other band, both bands had to be "ON" when the radio was previously turned off.)

Press the CALL button to exit the adjustment mode.

This modification is read 1562 times.

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**19-07-1998**

## **(FT-51) FT51: 1750Hz auch im Band**

*From: DG0OLG @ DB0HOT.#SAX.DEU.EU (Sascha)*

Hallo FT-51R User und auch alle anderen...

Nach der Hardware-Erweiterung meines Geraetes habe ich festgestellt, dass beim umstellen des Bandes (im Servicemode) von 2 auf 7 der 1750Hz-Ton N I C H T, wie bisher beschrieben, verloren geht. Somit hat das FT-51R im Band 7 seinen groessten Frequenzbereich bei nutzbarem 1750Hz-Ton. (60-999,99 MHz)

Natuerlich kann dies auf verschiedene Baureihen zurueckzufuehren sein.

Mein FT-51R hatte auch den beschriebenen Jumper 4 (TX-Beschr?nkung auf AFU-Bereiche) nicht in der Originalversion. D.h. nach der im Handbuch beschriebenen Softwareerweiterung war mein Geraet nicht nur Rx sondern auch Tx-maessig erweitert.

!! Bei diesen "Tuning-Massnahmen" sind natuerlich die gesetzlichen Bestimmungen nicht zu vergessen!!v



P.S.

Bei meinem Geraet ist der Empfaenger unter 110MHz ziemlich taub! Je tiefer die Frequenz, desto tauber wird der RX. Bei 60MHz wird wohl kaum noch was zu empfangen bzw. zu hoeren sein. Bei meinem frueheren Geraet (C-558S) war der Empfaenger nicht so taub (100-110Mhz).

Allerdings ist das Geraet ja auch nicht dafuer gebaut...

Bei diesem relativ grossen RX-Bereich ist es natuerlich schade dass man kein Wide-Fm hat!

Ansonsten bin ich mit diesem Geraet doch sehr zufrieden!

Wer noch andere Erfahrungen mit diesem Geraet gesammelt hat, kann mir diese schreiben - ich bin interessiert an jeglicher Info ueber dieses Geraet! Hattet ihr Schaltplaene in den Unterlagen dazu? In der CQ-DL letztes Jahr (Test FT50/FT51) war er eigentlich beim Lieferumfang dabei.

73 de Sascha (DG0OLG @ DB0LPZ)

This modification is read 1533 times.

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**27-02-2000**

## **(FT-51) The updated version mod for the yaesu FT-51r**

This is a mod to RX and TX from 60-999 mhz on the Yaesu FT-51r

This is the only mod of this kind i have ever see!

### **Instructions:**

1. Remove battery.
2. Remove 6 screws holding bottom cover.
3. Remove battery latch.
4. Loosen 4 screws holding outer case together.
5. Remove lower cover.
6. Unfasten ribbon cable and secure with tape.
7. Remove the two bottom of the three diodes found right above where the ribbon connect's.
8. Remove solder joint jp1004 (the lower left hand corner of the six joints), found above where the ribbon cable connects's).
9. Reconnect ribbon cable.
10. Re-assemble radio.
11. Hold down UP and DOWN Volume and CALL buttons while pressing power.

The display will read "BAND 1"

- Hold FM key down until F key blinks.
- Press MHZ UP or DOWN key several times until it reads "BAND 7".
- Press FM key again. It will stop blinking.
- Press CALL button.
- Radio will shut off.

Modification is now complete!

This would not be humanily possible with out Bryan Herbert (ke6zgp) The MOD GOD!!

If you need a radio moded, he will do it !

Bryan Herbert E-mail: [eavesdrop@earthlink.net](mailto:eavesdrop@earthlink.net)

**Date:** 14-09-1999

**User comment**

**From:** [Randy Martens](#)

**Subject:** 7 jumpers!

Please change the jumper label to jp1007 and there are 7 jumper pads and not 6 as stated in you radio mods.

Otherwise the radio mods worked fine.

13-05-2001

(FT-51) Full coverage for FT-51

**Author:** Bryan Fields, KB9MCI - [kb9mci@qsl.net](mailto:kb9mci@qsl.net).[MODIFICATION.NET](#)

Here is the mod to restore your HT to full coverage.

The first we "trick" the CPU to think it is in a test mode on each band. Then the 440 mother board must be modified to switch the incoming rf into a divide by 2 prescaler. the out put of this is then fed into the 440 receiver like a normal 350-500 MHz signal.

Here we go with the first part of the mod.

Going through with this will cause the CPU to be reset and clear all the memory information. Make a back up of the radio first if you don't want to loose any thing.

1. Open up the radio (refer to fig 1)
- a. Remove the Knob and the lock nut from around the shaft. I find a small screw driver to work well for this. If you have a spanner wrench use it!

b. Remove the screw from in between the MIC and speaker jacks.

c. Remove the 4 screws from the back metal panel, and the 4 screws from the plastic L cover over the back of the key pad.

d. Remove the battery release tab from the back, and the 2 screws securing the L cover to the metal back cover.

e. Remove the front cover, beeing careful not to loose the gasket.

f. Release the flat ribbon cable from the Main Unit. Then angle the Main unit upwards and pull it away from the radio.

2. Change the solder jumpers on the radio. (refer to fig 2)

- a. There are 7 jumpers next to the the sub CPU, Q1001 arranged in the below fashion:

|     |        |
|-----|--------|
| ( ) | JP1001 |
| ( ) | JP1002 |
| ( ) | JP1003 |
| ( ) | JP1004 |
| ( ) | JP1005 |
| ( ) | JP1006 |
| ( ) | JP1007 |

- b. If you open solder pad JP1006 you will have extended transmit, JP1007 will allow you to change the Band and IF selection in the internal alignment menu. (more on this in the next part of the mod.) JP1004, if closed, will give you a tone burst in place of the monitor switch, and vice versa.
- c. To make this mod work, you must open JP1006, and JP1007.

3. Once the jumpers are configured, reassemble the radio temporarily.

a. Insert the MAIN Board into the alumion panel and attach the ribbon cable to the main unit.

b. Replace the front cover and L cover, and secure with a few screws.
4. The radio must be put into a "Internal System Alignment Routine".

a. Attach the battery to the radio.

b. Turn the radio on whilst holding the 2 volume and squelch buttons and the call buttons.
5. This will provide access to alignment menu which will allow you to adjust these settings for each band. To select the setting you want to adjust use the dial. To adjust the setting press the FM key until "F" blinks. Once you are done adjusting the setting tap the FM key. This will save the setting. once you are done with every thing, you must make all changes permanent. To do this press the CALL key. The radio will power off.

a. Band and IF

b. S-meter

c. Deviation (low and High)

d. Squelch

I will describe each of these settings in appendix A.

6. All we need to do is adjust the Band edge setting for each band. The setting for each band is "BAND 7". I have a partial list of the different band layouts listed in appendix B.

a. First press the FM key and use the up and down keys to get the display to read "BAND 7" on the VHF Side, press FM to save the setting.

b. Press the band key to get to the other band

c. Press the FM key and use the up and down keys to get the display to read "BAND 7" on the UHF Side, press FM to save the setting.

d. Push the Call key to save all settings. The radio will turn off.
7. Turn the radio on. It should now tune from 60-999 MHz on each Band.
8. If all you wanted was the expanded receive with out 700-999 MHz, you are done! If not, it time for the hard part.

Modifying the 440 board

In this section you will be installing some switching transistors on the 440 Mother Board. This involves very small SMD parts. If you are not careful you can messup your radio!

1. you will need the fowling parts from yaesu:

| PART                 | TYPE  | YAESU P/N |
|----------------------|-------|-----------|
| C3082 -- 2 pF        | ----- | K22148206 |
| C3089 -- 2 pF        | ----- | K22148206 |
| C3090 -- 2 pF        | ----- | K22148206 |
| c3091 -- 2 pF        | ----- | K22148206 |
| C3108 -- .001 µF     | ----- | K22148820 |
| L3021 -- .022 µH     | ----- | L1690381  |
| L3030 -- .0068 µH    | ----- | L1690378  |
| Q3031 -- 2SC4227-R32 | ----- | G3342277B |
| Q3032 -- 2SC4228-R42 | ----- | G3342287B |
| Q3038 -- 2SC4228-R42 | ----- | G3342287B |
| Q3039 -- 2SC4228-R42 | ----- | G3342287B |
| R3054 -- 33K         | ----- | J24189115 |
| R3055 -- 33k         | ----- | J24189115 |
| R3060 -- 1k          | ----- | J24189119 |
| R3066 -- 470         | ----- | J24189111 |
| R3071 -- 470         | ----- | J24189111 |

2. Expose the 440 MHz board. (again refer to fig 1)
- a. Remove the Knob and the lock nut from around the shaft. I find a small screw driver to work well for this. If you have a spanner wrench use it!

b. Remove the screw from in between the MIC and speaker jacks.

c. Remove the 4 screws from the back metal panel, and the 4 screws from the plastic L cover over the back of the key pad.

d. Remove the battery release tab from the back, and the 2 screws securing the L cover to the metal back cover.

e. Remove the front cover, beeing careful not to loose the gasket.

f. Release the flat ribbon cable from the Main Unit. Then angle the Main unit upwards and pull it away from the radio.

g. Remove the contact unit (the small board that the ribbon cable goes into, that is plugged into the 144 and 440 units.) by alternately prying gently up on each corner of it with a small flat screw driver.

h. Remove the 4 screws in shield over the 144 unit, and the 1 screw that goes into the the board it self.

i. Lift the top shield, the 144 board, and the second shield over the 440 board.

j. Remove the screw from the antenna connector, and lift the 440 unit out of the radio.
3. Install these parts according to the parts layout diagram (fig 3 also fig 4 shows the board from my radio)
4. Reassemble the radio.
5. Power the radio on, you should be able to receive 700-999 MHz now.

**Notes on the performance of the mod:**

I have done this to my radio, S/N 5H132340, and it has worked just fine. The sensitivity in not great, but it works well enough to receive my local police department on 856.2125. The step size is fixed to 12.5 kHz, but you can enter any frequency you like on the keypad, and it will work. The shitty software from R/T Sys will not allow you to program or edit any memory that has 700-999 programed into it!

Here is the sensitivity of my radio for a 12 dB SINAD ratio.

| FREQ. | µV   | dBm   |
|-------|------|-------|
| 600   | none | none  |
| 650   | none | none  |
| 700   | 133  | -64.5 |
| 750   | 77.4 | -69.2 |
| 800   | 31.8 | -76.9 |
| 850   | 9.8  | -87.1 |
| 900   | 9.3  | -87.7 |
| 950   | 25.1 | -79.0 |
| 999   | 30.3 | -77.4 |

**Appendix A**

INTERNAL SYSTEM ALIGNMENT

These adjustments are all done in software, if you want to change the deviation, or the responce of the S-meter you can easily do it from the keypad.  
The setting of each adjustment is separate for each band.

1. Deviation adjustment.

The radio will allow you to adjust the high and low gain separately, which allows you to "customize" the transmit audio for you own voice. The adjustment for the high frequency's is "MOD H" and the setting for low frequency's is "MOD L". These can be adjusted with the up and down keys. The factory says to adjust the radio to 4.2-4.5 kHz with a 25mV 1 kHz tone fed into it.

2. S-Meter

The adjustments that can be made here require the radio be receiving a signal to set the adjustment, as it can not be adjusted with the up and down keys, like the deviation can be.

The "S-FULL" adjustment sets the amount of signal that would cause the S-Meter to light fully. The factory says the amount of signal to inject to the receiver, is +20dBu with 1 kHz tone and 3.5 kHz deviation.

The "S-1" adjustment sets the amount of signal that would cause the very first unit to light on the S-meter. The factory says the amount of signal to inject to the receiver, is -5dBu with 1 kHz tone and 3.5 kHz deviation.

3. Squelch

This setting adjusts the action of the squelch. (this is my understanding) The Squelch circuit is a Bi-level acting squelch, meaning that as long as a strong signal is being received the squelch will chop off immediately after losing a Carrier. When the signal is weak, there is some hysteresis introduced into the circuit to prevent it from chopping a weak signal.

The first adjustment, "SQL TH" will set the Threshold for a weak signal. The factory setting is a -11dBu signal. You can mess with this if you want to, but it is best to leave it alone. if you do write down your present settings first.

The second adjustment, "SQL TI" sets the signal level required to cause the squelch to close at the end of a signal with out leaving a burst of static (i.e. a squelch tail). This is set at -5dBu from the factory. This can also cause a signal that is very wide (5-6 kHz of deviation) to clip. If this happens to you, but the signal sounds fine when listing to it with the squelch open, this needs to be set to a larger signal level. I have had to do this to my radio, as quite a few hams have rich audio!

4. IF selection

I have no idea what this does other than setting the receive frequency different from the displayed freq.

I have experimented with this setting on VHF and found the following off sets for the actual RX frequency vs. the displayed frequency.

| IF # | Offset (All in MHz) |
|------|---------------------|
| 1    | +29.8               |
| 2    | +27.8               |
| 3    | +23.25              |

If you have any info on this at all please write me an email and let me know.

Appendix B

Band setting

I have Experimented with the BAND setting and have found the following limits on VHF for the various settings of it.

| Band # | RX Range                 | TX Range |
|--------|--------------------------|----------|
| 0      | 60-180, 300-512          | 144-148  |
| 2      | 110-180                  | 140-174  |
| 3      | 110-180                  | 140-174  |
| 4      | 110-180                  | 144-146  |
| 5      | 144-146                  | 144-146  |
| 6      | 110-180                  | 144-148  |
| 7      | 60-999                   | 60-999   |
|        | UHF                      |          |
| 0      | 300-512, 700-999, 60-180 | 440-443  |

If you have any corrections/additions to this please email me with them.

Appendix C

Settings of my radio (S/N 5H132340) from the factory.

|             |     |
|-------------|-----|
| Setting VHF | UHF |
|-------------|-----|

|        |    |    |
|--------|----|----|
| Band   | 1  | 1  |
| IF #   | 0  | 0  |
| S-FULL | BB | 66 |
| S-1    | 47 | 23 |
| SQL TH | 72 | 84 |
| SQL TI | 45 | 5D |
| MOD L  | 25 | 20 |
| MOD H  | 27 | 24 |

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[All the figure](#)

Bryan Fields, KB9MCI  
[kb9mci@qsl.net](mailto:kb9mci@qsl.net)  
(708)-862-3485

This modification is read 2237 times.

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19-07-1998

(FT-5100) Additional feature on Yaesu FT-5100 found: adjustable timeout

I discovered by accidental application of fat finger: if the high/low button is held while turning on power, that transmitter time-out may be set. If you do this, the left VFO display will show some number between 00 and 60. The factory default appears to be 15. The number can be changed by rotating the frequency knob.

I tried an experiment, setting the number to 01. I keyed up into a dummy load. After one minute, the transmitter shut off with, "Err" displayed in the VFO.

I'll leave it up to you to decide a use for this feature. If you're an O.F. from HF that can't seem to break the habbit of timing out repeaters, you could set your own time-out.

What would be neat would be to have a way to adjust RF power level in a similar fashion, but examining the schematic diagram, it looks like only two power levels are possible.

By the way, the technical manual for the 5100 is finally available. The information is pretty spare. No additonal operating notes or hidden secrets are revealed. It is worthwile for the alignment notes and complete parts list. Call the number in your owners manual to order.

This modification is read 739 times.

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19-07-1998

(FT-5100) Backlight Control

Effect: manual control of backlight

1. Hold down the MHZ key and turn radio on
2. Use tuning knob to adjust brightness
3. When FUNC is active, the tuning knob will adjust brightness again.
4. You can restore automatic control by repeating step 1.

Notes: Manual is fuzzy on this feature.

Attributed: Yaesu



**Subject:** Adjust the backlight

I was reading the mods section for the Yaesu FT-5100... re: the backlight options:

I have found on my radio (purely stock from factory at this point) that I can adjust the backlight per what is listed here, but also as follows:

- Turn on radio
- Push the F/W key (just push, do not hold in)
- Rotate the main tuning knob
- The backlighting will adjust bright or dim (depending on which way you rotate the knob)

You can also do the same thing, but instead of using the tuning dial you can use the up and down buttons on the handmike.

Works for me... I don't know about other radios.

Dr John Kreymer, N5LKM

This modification is read 747 times.

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**19-07-1998**  
**(FT-5100) Crossband Repeat**

(reported as working on 5100 and 5200):

Effect: Enable crossband repeat

1. Dial up two frequencies you want to crosslink (be sure to pay attention to transmit offsets, if any)
2. Turn radio off.
3. Hold down the RPT key and turn radio on

Result: The tone encode/decode flags and the -+ flags will be flashing and the radio will be in low power mode. When either band's squelch opens, the other band is moved into the primary frequency display and the transmitter keys. Audio link appears to be speaker to mike.

Exit crossband repeat mode by repeating steps 2 and 3 above.

Attributed: Yaesu

This modification is read 783 times.

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**19-07-1998**  
**(FT-5100) Transmitter Timeout**

Effect: automatically limit transmitter "on" time

1. Hold down the HIGH/LOW button and turn radio on
2. Use tuning knob to change the number in left VFO. This number is number of minutes for the timeout timer. The factory default appears to be 15 minutes.
3. Transmitter shuts off with "Err" displayed in VFO if the time limit is exceeded.

Attributed: Bill Mayhew, N8WED, wtm@uhura.neoucom.edu

This modification is read 655 times.

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**19-07-1998**

## **(FT-5100) Crossband Audio Enhancement**

Effect: unmuffle crossband audio

Connect a 27K ohm resistor between the audio-in and audio-out leads on the data jack (inside the shell of a mini plug, that is). The mic element stays live while in xband operation. It is a good idea to remove the mic from the rig while cross banding if you need/want to eliminate ambient audio.

Attributed: Bill Mayhew, N8WED, wtm@uhura.neoucom.edu

This modification is read 707 times.

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**19-07-1998**

## **(FT-5100) The 'P' Key on the microphone**

I was curious about that "P" key on my FT-5100, so I called Yeasu and they explained the situation. They designed the mic to accomodate "future products". The "P" key is there to be taken advantage of at a later date by other models. They just did not want to re-design the mic again within a short period of time.

Attributed: Will Collier, KB5WRK, COLLIER@gallant.apple.com

This modification is read 714 times.

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**19-07-1998**

## **(FT-5100) Expanded Receive**

Good Effect: enable extended receive coverage

New range: 128-180MHz and 420-475MHz

Bad Effect: disable automatic repeater shift selection.

Warning: This mod does not apply to the FT-5200 as the design is somewhat different.

Warning: You must have a very steady hand or else! A magnifying glass would help too.

1. Disconnect DC Power cable from radio. ALWAYS!

**\*\*Caution\*\***

NEVER TRY TO TAKE APART (DISASSEMBLE) THE FRONT CONTROL HEAD. It will void your warranty.

2. Remove (6) screws from Top Cover of Radio and (6) screws from Bottom Cover of radio.
3. Remove Top & Bottom Covers from Radio (Be careful of speaker falling out).
4. Remove the (2) silver screws on each side of the radio holding front control head to main body of radio.
5. Carefully pull away (a few inches) the Control Head from the radio body. CAREFUL with the Ribbon Cables.

**\*\*NOTE\*\***

There are no numbers on the circuit board so you will have to match up with the diagram below.

6. On the rear of the Control head locate, Unsolder and remove jumper Pad R4072.
7. Solder across jumper pads: R4070 R4068 & R4064 (use wire or 0 Ohm resistor)

**\*\*NOTE\*\***

If you want to change the D/MR button on the microphone to do Band Switching, now is the time. See the next mod.

8. Install Front Control head, Speaker, Top and Bottom Covers and Reconnect Power to the Radio.
9. Press and hold [D/MR] [F/W] [REV] Keys and turn on the Radio. Radio will now show 300.000 & 20.000 on Display.
10. Set UHF Rx Low - Press [MHz] and dial 420.00, press [D/MR]
11. Set UHF Rx High- Press [MHz] and dial 475.00, press [D/MR]
12. Set UHF Tx Low - Press [MHz] and dial 420.00, press [D/MR]
13. Set UHF Tx High- Press [MHz] and dial 450.00, press [D/MR]
14. Set VHF Rx Low - Press [MHz] and dial 128.00, press [D/MR]

- Diagram: [there are no tabs in this section - ed]

[illegible]

This mod is on Delphi as FT5100.MOD and on [anomaly.sbs.com](http://anomaly.sbs.com).

Attributed: Tony Pelliccio, KD1NR system@garlic.sbs.com

**19-07-1998**  
**(FT-5100) Band Switching and Tone Burst via D/MR button on microphone**

Effect: D/MR button on microphone performs band switching rather than D/MR function.

1. as in above mod
2. as in above mod
3. as in above mod
4. as in above mod
5. as in above mod
6. Remove the jumper on Pad R4067
7. skip above step 7
8. continue with step 8 above

For tone burst:

- 1. as in above mod
- 2. as in above mod
- 3. as in above mod
- 4. as in above mod
- 5. as in above mod
- 6. Add the jumper or 0 Ohm resistor on Pad R4065
- 7. skip above step 7
- 8. continue with step 8 above

Attributed: Tony Pelliccio, KD1NR system@garlic.sbs.com

This modification is read 672 times.

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**19-07-1998**  
**(FT-5100) FT-5100 Copy Memory To Computer**

Hello OM!  
If you are a happy owner of the YAESU FT5100 and a computer, here you have a nice project. This is how you make a copy of the FT5100 memory into a computer file, then you can have a number of files for different locations, for backup etc. You need a converter RS232<=>TTL and some terminal program for your computer, say the MS-Windows Term.

The FT5100 read and write serial data at 9600bps 8N1.

MIC-pin 1 = serial TTL data input.  
MIC-pin 6 = serial TTL data output.  
MIC-pin 7 = GND.

I used the MAXIM MAX232 IC for the conversion of TTL level 0/+5 volt, and the RS232 level of +12/-12 volt for the computer.

Turn on your FT5100 while holding down the F/W button, then press RPT for transmitting data from the FT5100 or the REV button for receiving data into the FT5100.

While capture data from the FT5100 into a file, make sure that you get all the control-characters. There are 1277 characters to be saved.

When transmitting data from a file to the FT5100 make sure that your terminal program makes some delay between the characters, or you will get the FT5100 showing an Err-Err display.

Yes I know, this is a short info, but i hope that you get the idea.

This modification is read 715 times.

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**19-07-1998**  
**(FT-5100) Yaesu FT-5100 CAT/Remote Control Mike Interface**

I own a FT-5100 and became interested in the Remote Control Mike, not for its wirelessness, but because it can control most of the radio's features via a serial data stream through the mircophone jack.

Although I do not own the wireless mike, I was able to build an interface between my PC and my 5100. It is somewhat similar to the CAT interface I have built for my FT-757 HF rig, but mostly like the interface described in the FT-912R manual (loaned to me via a friend from Yaesu). I have recently been working on a micro-controller based radio controller which I use for transmitter hunts, and other ham related activities, and I plan to allow it to control my 5100 soon, but so far I have only controlled the radio from my PC. When using my PC as the source for the serial data, I used a MAX232 chip for a level conversion between the +/- 12 volts levels on the computer and the 0-5 volt levels on the radio.

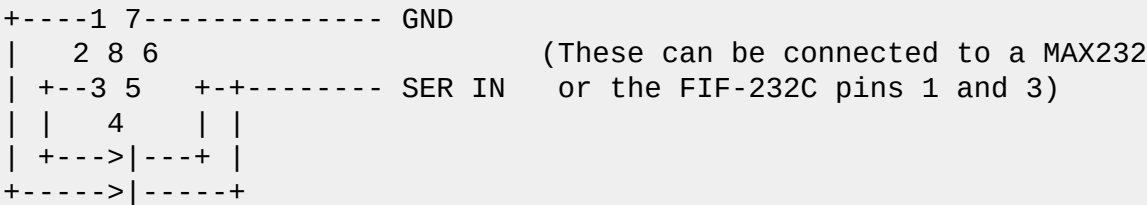
The serial data paramaters are 4800 N82. The commands sent to the radio are simple one byte instructions. The RMC mode ON command (16) must be sent before any other command. When the RMC mode is ON, a small LCD "RMC" icon will light on the display (see owners manual under Display). Also, the Vol, Sql, and Bal knobs are disabled when in the RMC mode because they will be controlled via serial commands, but all other buttons are still active.

The commands are as follows:

- |   |       |    |        |    |          |
|---|-------|----|--------|----|----------|
| 0 | - RPT | 12 | - CALL | 24 | - SQL Up |
| 2 | - REV | 14 | - BAND | 26 | - VOL Up |

|          |           |                |
|----------|-----------|----------------|
| 4 - MHZ  | 16 - RMC  | 28 - BAL Right |
| 6 - D/MR | 18 - SUB  | 30 - BAL Left  |
| 8 - TONE | 20 - PAGE | 32 - SQL Down  |
| 10 - LOW | 22 - F/W  | 33 - VOL Down  |

The interface I built simply wired mike port pin 7 to serial ground and pins 1 and 3 each through a diode then together, to the serial source. Note: I am not a hardware person! Use this hardware at your own risk.



You can wire 1 and 3 together first, then through 1 diode, but that disables the UP and DOWN buttons.

I will continue to study this more. If anyone would like to know more, or has any corrections or feedback, please email me.

19-07-1998

(FT-5100) Transforming the Yaesu FT-5100 for 9600 baud

\*\*\* Do read these instructions carefully \*\*\*

Hello user of a FT-5100. The following instructions describe one possibility to transform the FT-5100 (not tested with a FT-5200) for Packet Radio using 9600 baud.

I want to point out that before starting, you should be familiar with a soldering iron, and have some knowledge in electronics. If not, ask a friend who knows how to handle this. The transformation does not require a genius, but the transceiver does not pardon mistakes.

Let's start:

You will need a schematic diagram, a soldering iron, a capacitor of 100nF, two resistors of 30kOhm, 30cm (1 foot) of 4 wire cable and a 4 pin socket. Open the transceiver. (Attention: you lose your warranty!) Solder one side of the 4 wire cable at the 4 pin socket, no matter with way.

Thereafter, you need to enter the cable into the transceiver. Have a look at the rear side. On your right, you see a fourth, not used exit. It's covered by a small piece of polyvinyl, held by two screws. Unscrew it and you have a clean possibility to get the cable inside.

Doing the transformation at the reception side:

Get the LF at the de-modulator. That's pin 9 at IC MC3372ML (Q404) on the IF unit.

Solder one wire at this pin.

Therewith you are already now able to receive 9600 baud on 70cm and simultaneously, you are still able to work with 1200 baud on 2m or 70cm using the data-connector.

You may also still do phone using the microphone connector.

Doing the transformation at the transmitting side:

First, solder the resistor of 30kOhm at pin 13 of IC MB1504PF-G-BND (Q701) on the 430-PLL-UNIT. Put into series the capacitor of 100nF. Now, solder the second wire at the capacitor. Now, the FT-5100 is nearly ready for transmission. Let's do the PTT switching.

Several tries using the data-connector did not work. What happens to be ok for 1200 baud has to considered disastrous for 9600 baud. But using the microphone jack, it is possible. Open the front panel and solder the third wire to pin 6 of the connector.

When this has been done, all PTT problems are gone.

Last but not least, solder the last wire to ground on each side.

That's all. Not too difficult, isn't it?

Please, check all soldering before the re-assembly. This may avoid later trouble.

The transformation is done. Now, you just need to connect the TNC. Because everybody connected his socket in a different way, have a look at the TNC manual how to connect the right pins. Now you may do your first try.

In general:

After the re-assembly, it should work immediately with 9600 baud, of course your TNC has to be set-up properly. I owe an USCC card with 3 channels and I am using this set-up without trouble. TX-delay may be adjusted till a minimum setting of 7ms. You should always keep in mind, it's no data transceiver, it's still a phone transceiver. Do not expect superb results. Nevertheless, until today, I do not see a disadvantage compared to commercial 9600 baud transceivers.

**Disclaimer:**

You may not declare me being responsible for any destruction due to this transformation. It should show you hoe it is possible to use a FT-5100 for 9600 baud. I never had problems, why should others...

This transformation is probably not the very last you may get out of this transceiver. I am always looking for other possibilities to improve it. Have fun and a lot of success using 9600 baud.

73 de Serge, LX1KX @ LX0PRG.LUX.EU

**19-07-1998**  
**(FT-5100) Yaesu FT-5100 on 9600 Bauds**

There is also mention of the Yaesu FT-5100 dual-band transceiver being 9600 baud ready in the February 1994 QST (Packet Perspective p.98). Stan WA1LOU writes that he spoke with Chip Margelli K7JA of Yeasu Customer Service. The bottem line is:

Yes the FT-5100 will do 9600 baud out of the box. The Japanese manufactures have agreed upon a standard. The spec calls for a transmit signal input level of 2 V p-p at 10 kohm. The receive output as 300 mV p-p at 1 kohm from 50Hz to 5 kHz, + or - 3 dB. All transceivers that conform to this standard will provide a 6-pin miniature DIN jack for the 9600 baud modem interface. However the FT-5100 was developed prior to the adoption of the standard, so it does not feature the DIN port. According to Chip, future Yeasu radios will feature the 9600 baud standard port and optimization. Icom and Standard are mentioned as other manufactures adopting the standard.

Stan says they [QST] will "review the capabilities of each in a future issue."

[the above is paraphrased from QST]

I visited the HRO store in Sunnyvale and looked at the FT-5100. There is what seems like a miniture jack connection on the back of the radio, not a DIN as the future standard will provide. I didn't ask to see the manual from the sales people. The questions I would liked answered are the same as Walt and John expressed in their missives.

Think about it - 9600 baud is now in the reach of everyone. Especially think of the impact it will have on the 9600 baud pacsats. The microsats required at least one all mode radio for the PSK downlink which is not an inexpensive radio. Now, if the Icom or Yeasu radio can do both the up and down link for \$700.00 more people will (hopefully) just on the bandwagon. Don't flame me for the price, I for one have been struggling with 9600 baud trying to convert my Kenwood TR-751 and TR-851. I still don't have it right and I have had to repair my TR-851 twice after the PLL went out and I zapped the FM chip. How can you advocate others to get on the air will 9600 baud when you tell them to open up and possibly zapp their \$700.00 radio?

It would be nice to learn if these radios can be used for the UoSats and Kitsats. Anyone have any experience with either the Yeasu or Icom radios?

73 Steve N7HPR

srbible@cs.nps.navy.mil (Naval Postgraduate School, Monterey, CA)

**19-07-1998**  
**(FT-5100) General Review (with 5100 slant)**

Since Yaesu's advertising has already made the good points known, I'll concentrate on the warts and shortcomings.

Dual In-Band Receive: works as advertised except for sensitivity. The "main" receiver works very well. The "sub" receiver works very well when tuned to the opposite band from the "main" receiver. When tuned to the same band, the "sub" receiver suffers from slightly lower sensitivity in the ham bands and greatly reduced sensitivity out of the ham bands.

There is a 2m VCO/PLL/IF and a 70cm VCO/PLL/IF. I assume that dual in band receive is done with the opposite band's receiver. This would explain the poor sensitivity, but it sure raises some questions about how the duplexer works.

I expected a type "N" connector, the radio came with UHF.

Control wart: (are you listening Yaesu?) You can only transmit on the "main" (ie. left) side of the radio. When both 2m and



70cm receive are active, you change bands with the "BAND" button. This swaps the left and right displays. When dual in-band receive is active, the "BAND" button changes both the main and sub receivers from 2m to 440 or from 440 to 2m. Arrrgh!!!! I would prefer a "SWAP" button to swap left and right regardless of mode. (The "SUB" button is used instead.)

Automatic backlight dim: works as advertised but the backlight level under low ambient lighting is WAY too low. Manual control is the best solution.

DTMF page: works as advertized, but the \*&%\$#@ thing insists on "ringing" like a phone EVERY time it receives the page sequence. This means that you have to co-ordinate with the other station to turn the \*&%\$#@ DTMF stuff off at the same time or tolerate the "ring" at the start of every receive.

CTCSS decode: squelch opens quickly when normal CTCSS decode (an option) is enabled. There is a CTCSS page function that has a distinct delay between receipt of carrier with CTCSS and open squelch. I don't yet understand the use of this "feature."

There is no SCAN button on the front panel. Scan is initiated by holding the up or down button of the mike down for two seconds. The scan is blindingly fast when compared to the Alinco 590 that I used to have.

Memory: memory is divided into four "banks." Two for VHF, two for UHF. Only one bank can be active for each receiver. I consider this an advantage, but you may not. There are two obvious (to me) uses for this configuration. First, you can store frequencies for different uses in different banks. Second, you can activate one 2m(440) bank in the main receiver and one the other 2m(440) bank in the other receiver and scan them simultaneously.

Heat management: After seeing the HUGE heat sink on the back of the Alinco 590, the Yaesu 5100's sink seems too small. In a key down experiment, the heat sink of the Yaesu got almost too hot to touch before the fan kicked on. If I were planning to run a packet station, I would definitely look into some extra forced air over the back of this one. As it is, I'm a bit concerned about how hot it will get mounted in my dashboard. [Others people don't seem to have this problem.]

DTMF Decode and Scan: If you have CTCSS decode (an option) enabled on a memory and you are scanning and there is activity on that frequency but without the correct CTCSS tone, the 5100 stops scan, flashes the strength meter and then continues scanning. It is slower than normal scan, but still quite fast.

Attributed: Brian McMinn, N5PSS, brian.mcminn@amd.com

This modification is read 702 times.

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**19-07-1998**  
**(FT-5100) DTMF decoding**

Effect: display decoded DTMF tones

Ed Note: this works on the FT-530, but not on my 5100. I'm including it here on the chance that it works on the 5200. Please try it on your 5200 (or 5100) and tell me if it works for you.

- 1. Select frequency and turn on the code squelch
- 2. Press Function-Page(Code) to select a code memory
- 3. Dial up to memory #7 [the 5100 won't do this]
- 4. Watch the dtmf's scroll by as they are heard by the radio!

Attributed: jmeyers@ecst.csuchico.edu (Jeff Meyers)

This modification is read 675 times.

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**18-12-1998**  
**(FT-5100) FT-5100 Random reset fix**

March 19, 1995

By KA0RNY

Hi everybody.

I've owned a Yaesu FT-5100 for about a year and a half and I'm delighted with the rig. Recently, I've experienced two mysterious resets of the rig that have required complete reprogramming of the memories. Since I did the extended receive mod, it also requires reprogramming of the upper and lower RX and TX limits for both VHF and UHF. Both resets occurred while using the rig in my Chevy S-10 4x4. The mount I use in the S-10 is a cellular style single post mount that does a nice job of not being in the way, but is prone to vibration of the radio. In my work vehicle I use a Motorola floor mount that does an excellent job of holding the radio sturdy.

Since I brought the rig into the house to do the job of repro-gramming, I decided to open it up and look for any sign of loose hardware or broken cabling. I found that the flat printed cable that runs between the main chassis and the control head circuit board (those that have done the extended RX/TX mod and/or the microphone D/MR button to band change mod will know what I mean) was slightly deformed. Close investigation revealed that there are several metal tabs protruding through the board that are from the metal frame that holds the LCD in place. These tabs are bent slightly to lock the frame to the circuit board. Unfortunately, the flat cable folds and presses tightly against two of the tabs along the edge of the control head circuit board. I noticed that at least one conductor may have been exposed by pressure on the tab. This probably resulted in this line being grounded at some time, a situation that was likely aggravated by vibration in my S-10.

My fix of this problem was to put a small piece of electrical tape over the sharp corner of each tab, then a larger piece that entirely covers the tab and adheres to both the circuit board and the inside of the bezel. Now there is a double layer of tape between the tab and the flat cable, also you may want to put a layer of tape on the flat cable for additional protection. As near as I could tell, the wire was not broken (whew!) by the contact.

Now time will tell if this was the cause my mysterious resets or if the trouble is elsewhere. One thing I am certain of is that I probably headed off some other problem by doing this, like an all expense paid trip for my radio to Yaesu USA! If you are unsure of how to access this area of your FT-5100, complete details can be found in the extended RX/TX mod sheet available on a lot of BBSs.

If nothing else, send me a packet message and I'll send a copy your way.

73 es GUD luck! de Nate

KA0RNY @ KB5TBQ.#NCOK.OK.USA.NOAM

---

Update:

It's been over three and one half years since I applied this fix and so far (knock on wood!) the problem has not re-occured. I've not seen any other mention of this problem, so perhaps this was an isolated case.

73, de Nate

Packet: KA0RNY @ WF0A.#SCKS.KS.USA.NOAM

E-mail: ka0rny@midusa.net

Valley Center, Kansas USA EM17hs

Visit my Linux + Ham Radio pages [homepage.netspaceonline.com/~ka0rny/](http://homepage.netspaceonline.com/~ka0rny/)

This modification is read 708 times.

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**31-03-1999**

**(FT-5100) FT-5100 fuer 9600bd**

de DK9SJ @ DB0LX.BW.DEU.EU

Es wurden 2 FT5100 untersucht. Lieferdatum Anfang Maerz 93.

1. Das FT5100 ist ca 14x15x4cm gross, 2m/70cm Duobander. Hervorragend aufgebaut, trotz Miniformat noch genuegend Platz um ein TNC2M einzubauen.
2. Der Senderfrequenzgang (Data-in Buchse, Breitbandempfaenger z. Messung) reicht von ca 60 bis 5000 Hz (-3dB) bzw von 30 bis 7000 Hz (-10 dB).  
Die untere Grenzfrequenz ist fuer 9600 Baud G3RUH-Modems zu hoch. Trotzdem laesst sich das Signal des 5100 mit 9600 Baud mit vernuenftiger Bitfehlerrate senderseitig betreiben. Zum Packet-Senden muss das Mikrophon

ausgesteckt werden.

3. Die Kombination RX-TX (je FT5100) hat einen Frequenzgang von 70 bis 500 Hz (-3dB) bzw. von 35Hz bis 2,5 kHz (-10 dB). Die untere Grenzfrequenz dieser Anordnung ist fuer G3RUH Modems etwas zu hoch, die obere Grenzfrequenz ist viel zu niedrig, fuer G3RUH Signale ungeeignet, G3RUH empfiehlt 5 kHz bei -3dB.  
Die NF ist nach dem Squelch-Schalter angeschlossen, anstatt direkt am Demodulator. Dazwischen liegen Stufen mit Tiefpassverhalten.

Folgerung: Fuer 9600 Baud nicht mehr und nicht weniger geeignet als jedes vergleichbare FM-Mobilgeraet: Modifikation ist erforderlich. Die Data-Buchsen sind für externe Anschluesse vorteilhaft.

Grundsatzlich sind PLL-Funkgeraete fuer 9600 Baud wenig geeignet: Die PLL braucht typisch 100-200 ms bis das Sendesignal steht bzw. der RX bereit ist.

Das sind schon 10-30 % der Paketdauer. Wuenschenswert sind hier 5-10 ms ! Die PLL regelt Modulationsfrequenzen unterhalb der PLL-Tiefpassfrequenz aus, d.h. dass ein Abfall von -3dB pro Oktave ab etwa 100 Hz typisch ist. Setzt man die Tiefpass-Grenzfrequenz herab, so verlaengert sich die Einschwingdauer.

Ideal sind einfachste Quarzsender und Empfaenger, deren PLL nicht in der Frequenz umgeschaltet wird.

vy 73 ! Ulf, DK9SJ

*From: DG9MHZ @ DB0AAB.#BAY.DEU.EU (Deti)*

Hallo Leute,

Ein Freund kam frustriert mit seinem FT5100 unterm Arm zu mir und sagte, daß des Ding trotz spezieller Buchse nicht für 9k6 Daten funktioniert. Zuerst wollte ich das nicht glauben, aber nach kurzem Test war ich auch davon überzeugt. Daraufhin erfolgte ein Blick in den Schaltplan, der freundlicherweise von Yaesu mitgeliefert wurde. Hm ...

Wollten die Jungs doch glatt das RX Signal erstmal Tiefpaßfiltern.. ärgerlich und die PTT Information kommt auf dem TX-Signal daher - komisch - irgendwie bleibt doch da die Gleichspannungskopplung, die für einen wirklich guten Frequenzgang notwendig ist, auf der Strecke.

Daraufhin nahm ich ein 4 adriges Flachbandkabel und hab

1. das RX Signal direkt vom PIN 9 des ZF ICs auf der (IF-UNIT geholt)
2. das TX Signal über einen zusätzlichen 10K Widerstand bei der UHF-PLL UNIT auf den MOD-Eingang gegeben.
3. die PTT Leitung auf der Steckerleiste vom Bedienteil zur MAIN-UNIT (PIN2) angelötet....

Und siehe da nun tuts - für mich stellt sich nun die Frage ... hätte man das auch einfacher hinbekommen können oder soll der Datenstecker auf der Rückseite des Geräts wirklich die Phantasie der Benutzer anregen?

Beste Grüße aus München

Deti

This modification is read 630 times.

[top of page](#)

**01-01-2002**

## **(FT-5100) FT-1500M Service Menu**

**Author:** Andrew - VK6XAA - [vk6xaa@qsl.net](mailto:vk6xaa@qsl.net).[MODIFICATION.NET](http://MODIFICATION.NET)

I have found that you can access a hidden service menu by holding D/MR and LOW while powering on your FT1500M! From what i can tell there are adjustments for FM Deviation, Tx and Rx Frequency and TX Power levels and other various functions.

Use MHZ key to access the sub menus and dial to scroll through the various options. The REV key will reset the transceiver back to normal operation.

Use the LOW key to access the sub menus for Squelch and TX PWR adjustments.

Be careful when accessing any of these menus and changing settings!  
Do so at your own risk!

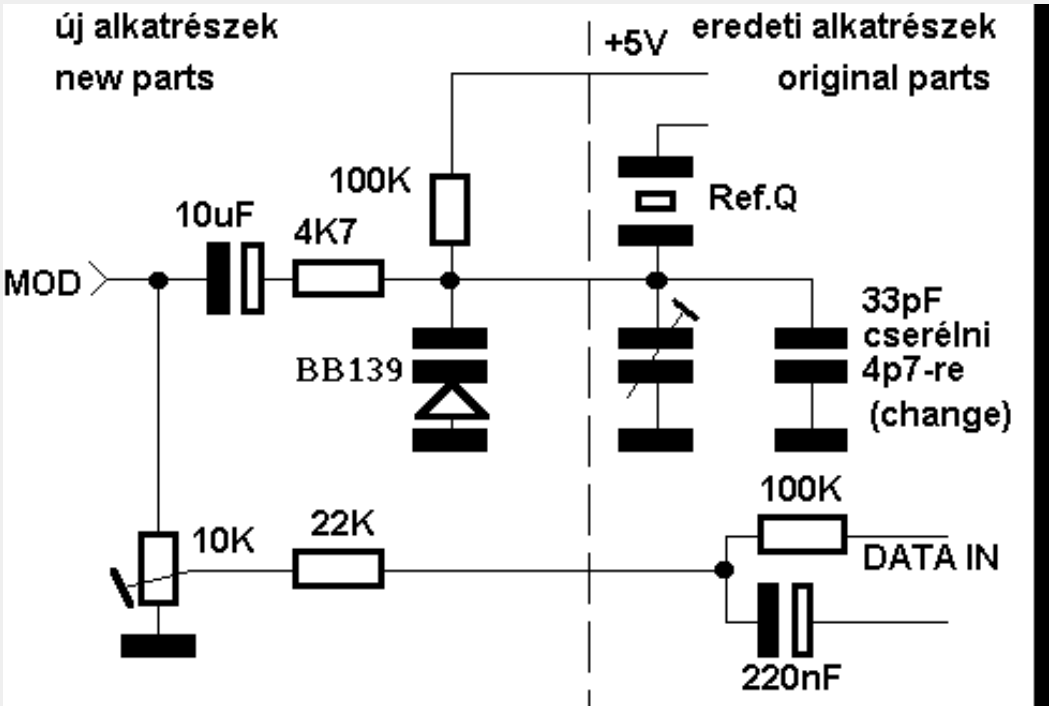
13-01-2002  
(FT-5100) FT-5100 átalakítás 9600 Bd-ra

Author: HA5OB

(C) HA5OB , 1998-1999

AZ ÁTALAKÍTÁST ÓVATOSAN VÉGEZZÜK, MERT EGY ROSSZ MOZDULATTAL KÖNNYEN TÖNKRETEHETJÜK A RÁDIÓT!

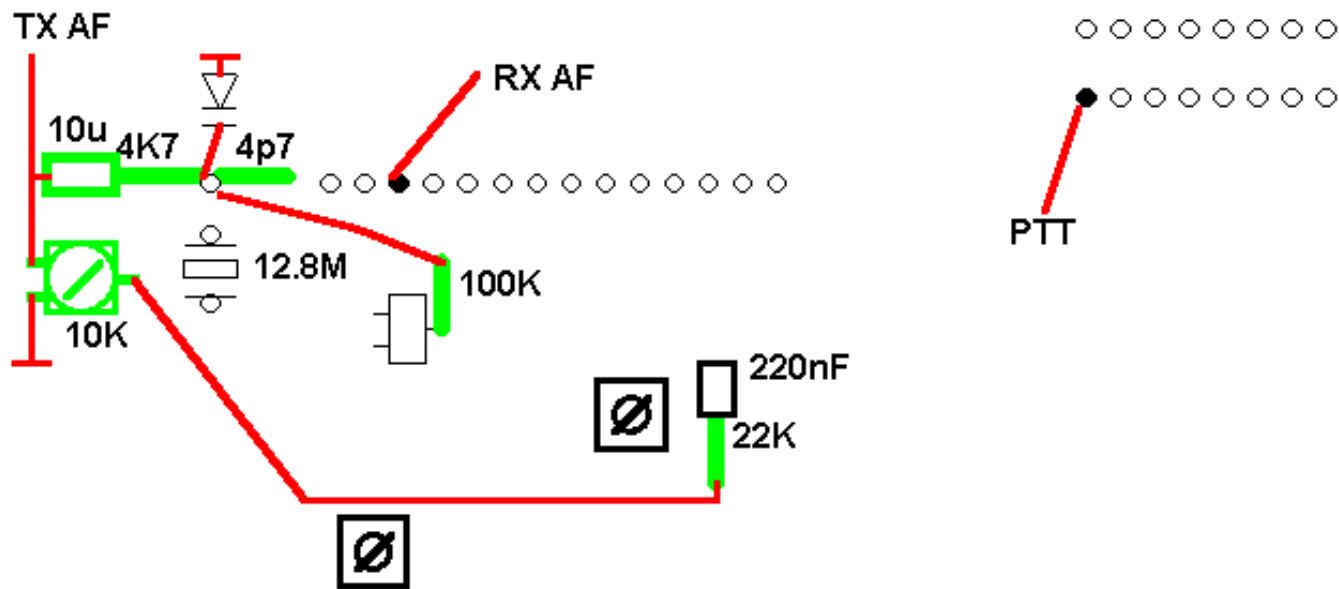
A kapcsolási rajz



Az alkatrészek elhelyezése

eleje / teteje

front / top



FT5100

This modification can also be found on <http://ha5ob.sch.bme.hu/ft5100.htm>

This modification is read 380 times.

[top of page](#)

19-07-1998

## (FT-5200) FT-5200 mod for Ext Frq

Here are a couple of modifications/options for the New Yaesu FT-5200 Dual Band 2M/440 Tranceiver.

To expand the RF coverage so you can take advantage of MARS/CAP or service uses follow the steps provided.

\*\*\*\*\* CAUTION \*\*\*\*\*

Follow proper ESD procedures to prevent  
Electro-Static Discharge damage to semi-conductor components!

- Remove Power.
- Release and remove the front control head from the radio.
- Remove the six screws from the top cove and the six screws from the bottom cover.
- Carefully remove the top and bottom covers (careful not to drop out the speaker).
- Remove the two screws and front control head mounting plate from the radio.
- Locate solder pads 1 - 7 (Standard jumpered pads are 2 and 7 only)
- Use a low wattage(30-40W) soldering iron and good electronic grade rosin core solder, Solder jump pads 1, 3, and 6. (Now pads 1, 2, 3, 6 and 7 are jumpered)
- Reinstall the front control panel mounting plate.
- Reassemble the radio.
- Connect Power.
- Press and HOLD [D/MR], [F/W] & [REV] keys and turn on the radio. (The display will show 000.000 and 300.000)

l. Set the VHF transmit and receive limits as follows:

- Enter 118.00 MHz and press [D/MR] (VHF Rx Low)
- Enter 174.00 MHz and press [D/MR] (VHF Rx High)
- Enter 140.00 MHz and Press [D/MR] (VHF Tx Low)
- Enter 174.00 MHz and press [D/MR] (VHF Tx High)

m. Set the UHF transmit and receive limits as follows:

- Enter 420.00 MHz and press [D/MR] (UHF Rx Low)
- Enter 475.00 MHz and press [D/MR] (UHF Rx High)
- Enter 420.00 MHz and Press [D/MR] (UHF Tx Low)
- Enter 475.00 MHz and press [D/MR] (UHF Tx High)

n. Press [Function] then [REP] and select 5 MHz for UHF band Repeater offset.

o. Press [Function] then [REP] and select 600 KHz for VHF band Repeater offset.

That completes the modification for extended RF coverage of the FT-5200.  
NOTICE! A license from the applicable service is required to operate outside the normal ham bands (i.e. MARS or CAP).

--- Other items of interest for users of the FT-5200 ---

- Overriding the automatic display dimmer...

Press and HOLD [MHz] and turn on the radio, then use the channel knob to select the desired brightness.

- For expanded Receive in the VHF band (no change in transmit coverage)

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

This modification is read 794 times.

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19-07-1998  
(FT-5200) FT-5200 cross band mod

1. Disconnect power from radio.
2. Unlatch and remove the front control head.
3. Remove (6) screws from top cover of radio.
4. Remove (6) screws from bottom cover of radio.
5. Remove top and bottom cover, being careful for the speaker that will want to fall out.
6. Remove the (2) silver screws (on each side of radio) holding front control head mounting plate to main body of radio.  
Remove the front mounting plate.
7. Locate and unsolder jumper pad 17.
8. Install the front mounting plate, and top and bottom covers.
9. Reconnect power.
10. To put in xband repeat press and hold the RPT key while turning on the radio. To stop... turn off the radio.

Notes: It is suggested to disconnect the mic when in xband repeater, as it will be "hot". Adjust the volume knob for the desired repeat audio level.

This might seem confusing when first viewing the jumper pads... they are to the right of the 5 strip connector for the face plate and are numbered as follows:

.. 20 18 16 14 12 10 8 6 4 2  
.. 19 17 15 13 11 09 7 5 3 1

You will see that the number 17 is lower than the rest and that there are 2 pads above it... one in line with all the others (this is the correct one) and one that is horizontal and just above the number "17" (this should be left alone).

There are certain frequency combinations that just don't work, and others that require one, the other, or both sides to transmit at low power.



19-07-1998

(FT-5200) Band Switching via D/MR button on microphone

Effect: change function of D/MR button on mike.

This is based on information from Yaesu in Japan.

The functions of pin 5 (the microphone button) can be altered by changing jumpers in the control head. To find these jumpers, see the section on packet radio in the ordinary instruction book.

| Pin 5 Function     | Control Head Jumper No |   |   |   |   |
|--------------------|------------------------|---|---|---|---|
|                    | 1                      | 2 | 3 | 4 | 5 |
| D/MR               | X                      |   |   |   |   |
| Band               |                        | X |   |   |   |
| 1750Hz Tone Burst  | X                      | X |   |   |   |
| Main band Busy Out |                        |   | X |   |   |
| Sub band Busy Out  |                        |   | X |   |   |
| Call Channel       | X                      |   | X |   |   |

Main / Sub band busy out - When open SQL = 5 Volt DC  
Closed SQL = 0 Volt DC  
[ed - I'm not sure what this means since I don't own a 5200]

Attributed: John Newgas, G7LTQ jnewgas@cix.compulink.co.uk, g7ltq@g7ltq.ampr.org

19-07-1998

(FT-5200) Mute Level

Effect: [ed - I'm not really sure]

See above for location of jumpers, etc.

| Mute Level Selection | 1 | 2 | 3 | 4 | 5 |
|----------------------|---|---|---|---|---|
| No Mute              |   |   |   |   |   |
| Minimum              |   |   |   | X |   |
| Middle               |   |   |   |   | X |
| Maximum              |   |   |   | X | X |

Attributed: John Newgas, G7LTQ jnewgas@cix.compulink.co.uk, g7ltq@g7ltq.ampr.org

19-07-1998

(FT-5200) Crossband Repeat

Effect: crossband repeater  
Bad effect: CTCSS function is lost

[ed -- there is another crossband mod in this list...]

This is based on information from Yaesu in Japan.

These jumpers are located in the main radio case. For location, refer to the FT5200 Technical Guide.

1. Remove (open) JP5017 on the interface unit
2. Press and hold PRI button while switching on the power.
3. The FT5200 will now work as a cross band repeater.
4. The CTCSS function will be lost.

Attributed: John Newgas, G7LTQ jnewgas@cix.compulink.co.uk, g7ltq@g7ltq.ampr.org

This modification is read 660 times.

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**19-07-1998**  
**(FT-5200) Extended Frequency Range**

Effect: set receive and transmit range.  
Bad effect: ARS gone.  
This is based on information from Yaesu in Japan.

These jumpers are located in the main radio case. For location, refer to the FT5200 Technical Guide.

1. Close (short) JP5001, JP5002, JP5003, JP5006 and JP5007
2. Remove (open) JP5004 and JP5005

The frequency range possible will now be approximately :

|     |    |               |    |               |
|-----|----|---------------|----|---------------|
| VHF | Rx | 110 - 180 MHz | Tx | 130 - 180 MHz |
| UHF | Rx | 330 - 480 MHz | Tx | 425 - 465 Mhz |

The radio's alignment was done at the factory for your original frequency bands and so there will not be optimum behavior outside these ranges. Broadening the alignment will sacrifice performance at usual frequencies. In practice, the alignment does not need adjustment.

You can program the frequency limits now. [ed - note the similarity (and dissimilarity!) to the 5100's program-limit sequence above]

3. Press and hold [D/MR] [F/W] [REV] keys and turn radio on.
4. Program in VHF low edge of Rx  
VHF high edge of Rx  
VHF low edge of Tx  
VHF high edge of Tx
5. Repeat for UHF in the same order.

I [John] have not done this so I can give no further advice on programming.

Attributed: John Newgas, G7LTQ jnewgas@cix.compulink.co.uk, g7ltq@g7ltq.ampr.org

This modification is read 696 times.

[top of page](#)

**(FT-5200) Extended Frequency Range (Another)**

[ed - yes, there are two mods and I include them both since they are so different in style (and perhaps content).]

Effect: set receive and transmit range.

Bad effect: ARS gone.

The following explains how to expand the receive and transmit frequency range of the Yaesu FT-5200 and how to enable the cross- band repeater operation.

All the modifications are carried out on the interface board and involve removing or adding links on jumper spots.

You will get considerably increased receive and transmit coverage; however, you will lose the Automatic Repeater Shift (ARS) feature. You may think this is an acceptable price.

Finally, it should be obvious, but during this procedure you will obviously lose any stored memories.

1. Remove the control head and set on one side
2. Remove the upper and lower covers on the main chassis. For convenience, remove the speaker, noting which way the two pin pcb connector is oriented. [ed -- does it matter?]
3. Remove two side screws holding on the front of the chassis and remove chassis front. (The chassis front is the surface with the contacts for the control head.)
4. Locate a double row of ten by two jumper spots, numbered 1 to 20. The jumper configurations will depend on the area for which the rig was intended. Note the arrangement if you ever want to un-modify your radio.
5. Using a fine-tip soldering iron, set the jumper spots as follows:

1. closed
2. closed
3. closed
4. open
5. closed
6. closed
7. closed

6. This completes the alteration for frequency expansion. Reassemble the radio.
7. Reinitialise the radio by simultaneously holding D/MR, F/W, REV and POWER. You must now program in the band limits. The display will show a blinking "1" in the left-hand memory box and "000.000" in the left-hand frequency display. (Ignore the right-hand display for now). The following limits are suggested, but the RF circuitry of the rig will only cover slightly less. Use the dial or up/down buttons to select the frequency and then press D/MR to store it. The blinking "1" will increment.

```
VHF rx:  137.000   174.000
VHF tx:  137.000   174.000
(display will show blinking "1" and "300.000")
UHF rx:  410.000   470.000
UHF tx:  410.000   470.000
```

(Note: it is possible to set the RX limits wider than the TX limits; for obvious reasons you cannot have the reverse situation).

8. You can repeat step 7 above at any time if you need to change the limits.

The pre-set repeater offsets are now no longer available and you will have to set them up manually using the instructions on page 16 of the manual. The Automatic Repeater Shift (ARS) feature (also on page 16 of the manual) will also have disappeared and you will have no way of getting it back (except by changing the jumpers back).

To enable the crossband repeat, remove the link at jumper spot 17. (Note, just below jumper spot 17 is a separate jumper spot, not part of the group of twenty - leave this alone).

Attributed: Hugo Cornwall

19-07-1998

## (FT-5200) FT-5200 Reparaturtip fr PWR-MODUL

Vielleicht ist das fuer den einen oder anderen FT5200 Benutzer interessant, was ich hier berichte. Im Prinzip gehts um ne ganz simple Sache:

Der "Kuehlkoerper" des FT5200 ist garantiert "ausreichend" zu klein und falsch konzipiert. Das besonders dann, wenn, wie selbst erfahren, der angeflanschte Miniluefter nach hier ca. 2 Jahren Betriebszeit den Dienst quittiert.

Eine Ingenieurleistung besonderer Art ist jedoch die Auflageflaeche des SAV-24 Endstufenmodules. Hier liegen jeweils nur die aeusseren beiden Enden des Kuehl- koerperflansches auf dem Zinkspritzgusschassis, welches fuer den Luftdurchsatz unter dem Kuehlkoerper einen Luftkanal hat. Aehnlich sieht es unter der gegenueberliegenden 70 cm PA aus. Dort sind sogar 2 Kanale angebracht.

Nun zum mechanischen Aufbau der "Powermodule":

Unter der schwarzen Kappe befindet sich diverse Halbleitertechnik, verschiedene SMD Bauteile und Leiterbahnen sowie gedruckte Spulen. Alles "klebt" auf einem ca. 1,5mm duennen weissen Porzellantaefelchen. Dieses Taefelchen ist bis auf den Leistungstransistor (er besteht aus 9 parallel geschalteten Transistoren die in transparentes Silikonaehnliches Material gegossen sind, welches keinen Spiritus vertraegt!) plan mit der Metallrueckwand verbunden.

Unterhalb des direkt auf der Metallrueckwand befindlichen "Transistors" ist nun eine Spule aufgelegt (Flachleiterbahn).

Bei einer luefterausfallbedingten Ueberhitzung scheint soviel mechanische Spannung durch die ungleichmaessige Waermeableitung zu entstehen, das die Porzellanschicht genau mitten unter der Spule reisst. Dies hat zur Folge, das natuerlich auch die Spule "reisst".

Jetzt kommt der besondere Gag: Die Endstufe bringt temperaturabhaengig variabel eine Leistung zwischen 15 und 30 Watt.

Ich war gerade dabei, eine neue einzuloeten, als ich den Haarriss an besagter Stelle sah (Lupe). Ein vorsichtig angebrachter Zinnklecks bestaetigte die negative Wirksamkeit des Risses bzw. annullierte dessen Fehlereinfluss und "zauberte" wieder volle 50 Watt Leistung. -Allerdings nur kurz, weil das Risschen bei dem naechsten Temperaturanstieg wieder die Spule trennte. Dort loeten ist auch nicht so ohne, weil im eingebauten Zustand die erforderliche Waerme eines SMD Loetkolbens nicht reicht.

Nun ein Tip fuer HAM`s mit ruhiger Hand und SMD-Loetpraxis:

Es gibt die sog. Faedeltechnik der Firma Siemens. Das ist "hauchduenner" Cul Draht auf einer Rolle mit einem bleistiftaehnlichen Fuehrungsgriff.

Man baut das Modul aus, und nimmt einen potentialfreien (Ersa Isotip) 25 W Loetkolben mit einer neuen spitzen Ersadurspitze und faengt an einer Seite an, die Spule Millimeter fuer Millimeter mit dem Faedeldraht zu "belegen".

Nun wird Zinn zugegeben,- d.h.: die Luecken zwischen den Punkten werden geschlossen.

Bei dieser Taetigkeit schmilzt die Lackschicht des Drahtes unter der Hitze des Loetkolbens und verbindet sich elektrisch mit der "alten" Spule,- ist aber elastischer als die aufgeklebte Zinnschicht auf dem Porzellanplaettchen.

Anschliessend nimmt man noch einen "rasierten" Pinsel und Spiritus, um die Kolophoniumreste zwischen den Spulenbahnen zu beseitigen. Aber Vorsicht: Nicht die weiche transparente Schutzschicht ueber dem "Transistor" mit Spiritus betraeufeln. Sollte "sie" trotzdem mal beschaedigt werden muss man unbedingt farbloses Silikon (Baumarkt)duenn auftragen, damit keine Luft an die Halbleiterchips gelangt und Stoerungen verursacht. Wichtig auch, das man nach einem eventuellen Verguss mit Silikon die Kappe nicht sofort auf die Endstufe setzt. Fugensilikon wird oft mittels Essigsaeure verfluessigt und damit "beweglich" gehalten. Beim aushaerten entstehen aggressive Daempfe, die dem Material wiederum schaedlich sein koennen oder werden.

Vielleicht laesst sich so die eine oder andere totgeglaubte Modulendstufe nochmal zu Leben erwecken. Schliesslich kostet in DL solch ein SAV-24 immer- hin stolze 300,- DM und mehr.

Das Risiko allerdings hat jeder selbst hi,- aber der Versuch kostet ja nichts, weil man ihn ja am eventuell vermeintlich defekten Objekt durchfuehrt.

Und wer sich nicht traut, kann sich ja mit mir in Verbindung setzen.

**19-07-1998**

## **(FT-5200) FT-5200 & 9600 Bps**

Hola a todos...paso a detallarles la reforma para utilizar el transeptor yaesu en 9k6.

De echo se trata de un dual bander, teniendo un buen desempeño en 9k6, Ubicamos la patita 13 del modulo de recepcion (inmediatamente despues del filtro ceramico cf1001, este esta entre las patitas 10, 11, y 12 del modulo) y ahi tomamos la se al de recepcion para VHF, luego buscamos la patita 27 (en este caso el filtro esta entre las patas 24, 25, y 26 ) y ya tenemos el audio para UHF en recepcion.

Para transmosion tenemos un punto comun, que es la union de los preset que ajustan el audio de ambos transmisores...estos son vr1001 y vr1003, muy chiquitos y habra que tener cuidado al trabajar en ese lugar. Justo en ese punto le aplicamos no mas de 1 volt pep y no mas...con eso tendremos la desviacion justa.

Si queremos tener mejor recepcion y la posibilidad de usarlo con los satelites, debemos cambiar el (o los ) filtro ceramico de 455, en estos casos tiene puesto el cfw455 "E" de 12 kcs y reemplazarlo por un cfw455 "D" de 15 kcs (en ambos casos a -6 db), dandonos un poco de tolerancia para compensar el efecto doppler del satellite (tengamos en cuenta que el equipo se corre de 5 a 5 kcs).

Esta reforma la hice hace mas de un a o y recien ahora la probe a fondo y su comportamiento es exelente...cualquier comentario o duda qrv.....Omar

73's de Omar - LU5EO @ LU5Eo.#SUR.BA.ARG.SOAM

This modification is read 624 times.

[top of page](#)

**19-07-1998**

## **(FT-5200) FT-5200 fuer 9k6**

From: DL1MGR @ DB0KCP.#BAY.DEU.EU

Da der Augsburger 70 cm Einstieg DB0ZKA auf die moderne 9600 Baud Technik umgestellt hat, habe ich mich endlich dazu gerungen mein Yaesu FT 5200 auf 9k6 umzubauen und an die USCC Baycom Karte anzupassen.

Nun schreib ich kurz, wie ich den RIESSIGEN Umbau (es besteht aus vier Leitungen, zwei Widerstnde und einem Kondensator und dem Stecker) gemacht habe.

Zuerst noch ein paar Sachen, die eigentlich (fast) selbstverst ndlich sind:

Diesen Umbau sollte jemand machen, der gut l ten kann und den richtigen L tkolben hat (Der 30 oder 50 Watt L tkolben aus der Bastelkiste ist halt zu gro  (auch wenns manche nicht glauben)).

Man sollte sich vorher GENAU vergewissern, das der Punkt zum Anl ten der richtige ist (lieber zwei mal schaun als drei mal L ten)

Ich hoffe auch, das es selbstverst ndlich ist, auch in den Schaltplan zu schauen und nicht nur nach dieser Anleitung zu L ten.

Nun zum Umbau:

N utrich zuerst Ger t aufschrauben

!!! Bedienteil zeigt Richtung OM !!!

!!! Hauptplatine MIT LTSEITE nach oben !!!

RX:

Abgriff am Punkt 4 der AF-UNIT F 3168101 (U DET) LINKS UNTEN neben der LINKEN Befestigungsschraube (J 501 12 L tpunkte) von Links gesehen der 9. Punkt ( von rechts der 4.) <3. und 8. von RECHTS ist Masse>

TX:

Abgriff am Punkt 8 der 430 PLL Unit F 3170102 (MOD) Von der MITTLEREN Befestigungsschraube ca. 45 Grad nach rechts oben der erste Punkt von unten (von den zwei die mit 3 SMD Bauteilen umzingelt sind) ABER NICHT die Testpunkte!!!!!!!!!! (Die Testpunkte sind ja auch 90 Grad nach rechts)

GND:

An Masse angelötet (der absolut schwierigste Teil des Umbau!?)

PTT:

Hab ich leider extern vorne an der Mikrofonbuchse (PIN 6) angesteckt

Die Kabelenden habe ich ÜBER dem Antennenkabel bei der Blindblende ins Freie gelegt und am Ende einen 5Pol Din Stecker gelötet.

Fr die USCC Karte habe ich dann einen Adapter gelötet, in dem im RX Zweig: ein 10 k OHM Widerstand in Reihe zur USCC  
im TX Zweig:

ein 100 OHM und ein 10 fF Elko (besser Bipolar, es geht aber auch ein normaler) in Reihe (Widerstand zur USCC Karte)

GND direkt

PTT auch direkt

Dieser Adapter könnte eventuell bei TNC Betrieb nicht gebraucht werden, konnte ich allerdings nicht testen.

NUN noch die Einstellung der USCC Baycom Karte:

```
J 301  (Baudrate)  natürlich 9k6
J 303  (Data/Ber)  zwischen 1 und 2
J 304  (Filter)    alle gesteckt (Idealkurve)
J 305  (TxNf)      zwischen 2 und 3 (ansonsten macht der Empfänger dicht)
J 302  (Audio Loopback) OFFEN da dies nur zum TESTEN der Karte selbst ist
                        und die RXNF mit der TXNF kurzschliesst
```

der NF Poti P 301 ist bei mir bei Draufsicht von oben Richtung PC Slot im Uhrzeigersinn etwa 1/6 offen

Ich hoffe es einigermaßen gut beschrieben zu haben, natürlich übernehme ich keine Garantie für den Umbau aber ich hab schon mehrere Geräte mit gutem Erfolg umgebaut.

Na dann viel Spass mit 9k6 wünscht DL1MGR Oli aus Augsburg

**19-07-1998**  
**(FT-530) CROSSBAND-REPEATER-FUNKTION**

Wenn die Taste "RPT" = 6 waehrend des Einschaltens gedrueckt wird, ist die Repeater-Funktion geschaltet, d.h. Signale aus dem MAIN-BAND werden in das SUB-BAND und umgekehrt uebertragen. (2-m nach 70-cm und umgekehrt). Hierbei wird die Ausgangsleistung automatisch auf LOW gesetzt. Die CTCSS-Funktion wird eingeschaltet (kann nachtraeglich, wie im Handbuch beschrieben, geaendert werden).

Kommen Signale im "SUB-BAND" an, werden sie im "MAIN-BAND" ausgestrahlt und umgekehrt. Es sind hierbei die Bestimmungen ueber REPEATER zu beachten.

Nach dem Ausschalten des Geraetes ist die "Repeater-Funktion" geloescht und muesste wieder neu gestartet werden.

Wird beim Einschalten des Geraetes die Taste "REV" (CLOCK) gedrueckt gehalten, so werden nur alle empfangenen Sendungen auf dem "SUB-BAND" in das "MAIN-BAND" umgesetzt.

Die CTCSS-Funktion und die LOW-POWER-Steuerung koennen hier selbstverstaendlich auch nachtraeglich geaendert werden.

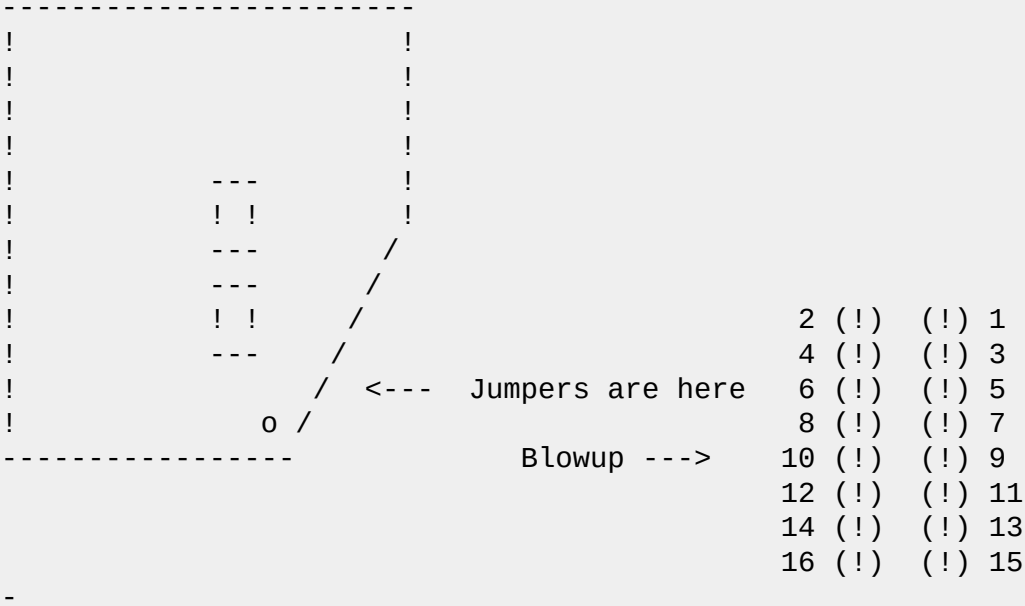
IN JEDEM FALL wird beim Ausschalten des Geraetes die CROSSBAND-REPEATER-Funktion geloescht. Sie muss also immer wieder NEU in der oben angefuehrten Weise aufgerufen werden.



19-07-1998  
(FT-530) RX 110-180, 300-500 MHz and TX 130-180, 400-470 MHz

Expanded Receive 110-180, 300-500 MHz  
Expanded Transmit 130-180, 400-470 MHz

- Remove Antenna and Battery.
- Remove four screws on bottom holding battery track.
- Remove the four (black) screws holding rear case.
- Slowly... open the front cover from transceiver and lay both halves on table.
- Note positioning of white paper insulator in right half of radio and lift out (don't throw away)
- Carefully locate Jumper Pad 13 and remove solder.
- Re-install white paper insulator, make sure ground tab slides through the paper insulator.
- Close radio back up (Careful not to pinch the ribbon cable near lithium battery when closing halves).
- Re-install the four (black) screws holding rear case.
- Re-install the four (small silver) screws on bottom holding battery track to radio body.
- Attach Antenna and Battery.
- Turn off Radio.... Press and hold both arrow keys while turning on the Radio.
- Modification Complete.



Inside the rig, it really did not look quite like that ... more like this:

... 12 (!) (!) 11  
      (!) 13  
      16 (!) (!) 15

In addition to the published receive expansion, it also receives 800-950 MHz...  
trunking radio, cell phone (I would \*never\* listen to that), 33cm ham band...

From: DG5LAZ@DB0HES.#SLH.DEU.EU

Umbau der Yaesu FT-530 für Packet Radio Betrieb mit 9600 Baud

Hallo 9k6-Freaks und sonstige OMs die es interessiert...

Heute ist es mir gelungen, nach langem Studium des Schaltplanes meinen TRX für 9k6 umzubauen. Um anderen die Mühe zu ersparen, beschreibe ich es...

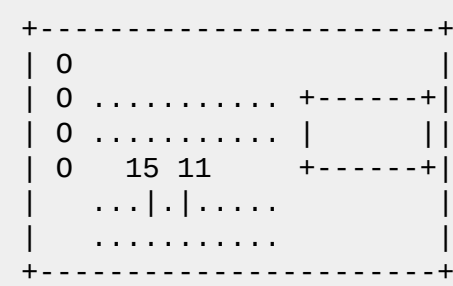
Man nimmt den Batteriekasten, Akku oder die Abdeckplatte ab und schraubt die 4 Schrauben, die die Bodenplatte halten heraus und nimmt die Platte mit den Kontakten vorsichtig heraus (ACHTUNG Folienkabel!!!).

Es wird eine Platine sichtbar, vielmehr deren Rückseite.

Man sieht dort 4 Reihen mit Lötunkten, die jeweils von rechts nach links gehen. Hier sind die Anschlüsse zu machen, jetzt nur keine Panik.

Jetzt sind Mathematiker gefragt, es gehts ums zählen der Pins ! (HI)

Schlachtplan (Handy von unten gesehen):

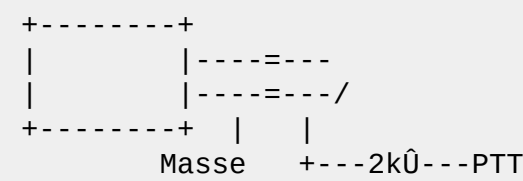


Die Punkte sollen die Pinreihen darstellen. Zwei Pins sind durch Striche ersetzt

und die Zahlen 11 und 15 drangeschrieben. Das sind unsere Kandidaten:

An Pin 11 wird das Empfangssignal fürs TNC abgegriffen und an Pin 15 wird die Sende-NF eingespeist.

Anschlußplan für Masse und PTT:



Der Masseanschluß und die Verbindung der PTT geschieht über die 2,5mm-Klinken- buchse an der Oberseite des TRX (eigentlich für externes Mic gedacht). Die PTT wird über einen 2 Kiloohm-Widerstand an die Spitze des Klinkensteckers gelötet. Die Masse wie immer an den anderen Anschluß des Steckers.

Wie man die Kabelanschlüsse der Unterseite aus dem Gerät herausführt, weiß ich nicht (liegt bei mir noch offen rum,HI), aber vielleicht hat ja einer 'ne GUTE Idee. Wäre nett wenn ich von der "GUTEN" Idee etwas erfahren würde. Es würde mich sehr freuen!!!!

Ich übernehme KEINERLEI Haftung für entstehende Schäden, aber ich stehe für weitere Auskünfte oder Nachfragen gern bereit!

Nachrichten, Anmerkungen, Korrekturen und Verbesserungsvorschläge bitte an:

DG5LAZ @ DB0HES.#SLH.DEU.EU

**19-07-1998**

## **(FT-530) Expanded frequency range up to 950 MHz**

Hi, this message is for those who have done the pad 13 mod to the FT-530.  
This sequence permits putting a 500 mhz or higher freq in a memory channel.

Example:

To enter a freq of 506.8375 make sure you are in the uhf band.

1. Press 'FM'
2. Press 'STEP'
3. Rotate dial to select 12.5 step
4. Press 'STEP'
5. Enter 800.00
6. Press 'FM'
7. Press '/' MHz

799.00 Will show on the display. Turn the dial (top right-rubber duck on left) counter clockwise. The display will decrease in 1 MHz steps. If you pause for more than 2 seconds it will revert to a decrease of KHz steps. To get back to MHz steps just press 'FM' then press '/' MHz. Continue till 507.00 shows on the display. Pause for 3sec. Turn dial counter clockwise and the freq will decrease in KHz steps. Turn till 506.8375 shows on the display.

8. Press 'FM' for 3 sec. The memory channel number will be flashing.
9. Turn dial to select memory channel
10. When channel is selected press 'FM'. The freq is entered in that memory ch. back to MHz steps just press 'FM' then press '/' MHz. Continue till 507.00 shows on the display. Pause for 3sec. Turn dial counter clockwise and the freq will decrease in KHz steps. Turn till 506.8375 shows on the display.

If you go pass the freq you cannot turn the dial clockwise to go up freq. If you do so the display reverts to 300 MHz and you must start at #5.

Helpful hint example: 506.8375 is now in memory channel 5. Press 'MR' and select channel 5. 506.8375 Is now on the display. Pressing 'MR' again will normally let you (>>>> shows under channel number) tune up or down in freq. Now on these over 500 MHz freq you can only tune down (counter clockwise). Tune up (clockwise) and display go to 300.xx MHz. Press 'MR' and the correct memory channel freq is displayed again. The PLL on my unit will not lock above 507.6 MHz on another FT-530 it will lock over 508.4. Pressing the push to talk will display an error on the display and if the PLL will not hold the freq display will flash. 800-950 is the upper range of my unit and receives fb. Any other mods or key inputs please send to WA3YZL @WB3JOE. PA.USA 73 Paul 04-Jan-93

This modification is read 1637 times.

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**19-07-1998**

## **(FT-530) Yaesu FT530 AM receive**

Hello,

There seems to be a difference in the way the AM receive on my new Yaesu FT530 works compared to that of the instruction booklet.

The instruction booklet says that if you enable AM receive (key sequence: FM, Set/0, FM, PRI/VFO) that it affects "the entire VHF receiver". Yet I am finding that I seem to be able to store the mode along with the frequency in the memory channels and then scan a mix of AM and FM frequencies. It also seems that one can set both VHF VFO's to one of AM or FM.

I am curious if anyone can add to the explanation on how AM receive works on this fine radio? I would guess the design engineers made an enhancement to the firmware after the documentation was completed...

Peter A. Stokes  
pas@jupiter.ic.cmc.ca  
VE3ZXT

*From: WB8ZJL*

You can store the "MODE" in memory.  
Setting the unit to AM can be done on either VFO.  
Setting the unit to AM will preclude you from receiving 2M FM.

As for how it's done... from what I heard (I never bothered to check) they run the signal through the S-Meter diode to demodulate AM.

73 paul wb8zjl

This modification is read 1416 times.

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**19-07-1998**

## **(FT-530) Extended range for FT-530 New models**

Here is the summary of a mod that I've put together from talking to people on the phone, radio, and email for the Yaesu FT-530. It is a very simple mod and it allows extended RX & TX.

This mod only applies to the newer models of the 530. I don't know what serial number implies the newer model, but my 530's serial number begins with 4J381xxx and was purchased in June 1995.

1. take off the battery pack from the bottom of the radio.
2. unscrew the four screws on the bottom to release the bottom plate.
3. after you open the plate, you'll see a green wire on the right side of the radio (if you hold it with the front panel on top).
4. simply cut this green wire and use some electrical tape to prevent it from touching other parts of the radio.
5. replace the bottom plate and screw it back in.
6. attach the battery
7. hold both the up & down Mhz arrow buttons and press the power button at the same time. this will enable to the mod. It is like a toggle, if you do it again, it will disable to the mod.
8. Now you should have rx 110-180, 300-500, 800-950, and tx 130-180, 400-480.

Note:

this mod will reset your radio and all memories will be erased.

Here is a second mod you can do to get more rx.

1. On the 70cm band, program your radio's lower (L) and upper (U) memory limits to 300 and 950.
2. Turn to the Lower memory channel.
3. Press MR once and you should see a four tiny little arrows right below the channel number.
4. Once you see these little arrows, you can enter any frequency from 300-950 Mhz directly on the keypad.

You can also store these new rx frequencies in memory if you like. Note: Although you can enter 800-950 Mhz into the radio, I have not heard anything in this range. It is rumored that the components to receive on this band is no longer made in the FT530.

Disclaimer: Perform these mods at your own risk. They are not guaranteed to work on your radio. And remember not to transmit out of band!!!

any questions or comments? Send to [hbcsc274@csun.edu](mailto:hbcsc274@csun.edu)

Jerry Wang

KE6UUX

This modification is read 1531 times.

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**18-12-1998**

## **(FT-530) FT-530 Extended RX/TX Mod Update**

March 19, 1995

By KA0RNY

Hi everybody.

This update is for those of you who have been unsuccessful with the extended RX/TX mod on the Yaesu FT-530. I tried unsuccessfully twice to perform the mod previously. I decided to give it a try again using a tip from a Yaesu Service Technician. The Tech I talked to said the mod should work, but that the reset sequence might need to be performed twice. Viola! It worked!

Before you dig into your radio be sure you have a good copy of the mod sheet. The one I'd recommend is ft530.mod which can be gotten off the Internet via FTP at oak.oakland.edu in the pub/hamradio/mods/yaesu directory. There are several other mod files for the FT-530 as well as other radios. If you don't have Internet access you may retrieve this file via REQDIR in the MODS directory on my home BBS, KB5TBQ.#NCOK.OK.USA.NOAM or any other packet BBS that keeps mod files.

Now that you have the mod info, perform it as instructed. If you have a very new FT-530, then it's possible that all you'll need to do is remove the four screws holding the battery mounting plate to the radio. Looking toward the back of the radio on the opposite side of the latch you might see a small green wire tucked under the white paper insulator. In two FT-530s here in town that are newer than mine, the wire exists and is all that needs to be cut for extended RX/TX. The wire ends are soldered to each side of Pad 13 so no unsoldering is required. For extended RX only with TX limited to ham bands, the small 0 $\Omega$  surface mount chip resistor, Pad 15, needs to be removed also. If your rig is an older model, then you'll need to unsolder Pad 13. I had excellent results using a manual solder sucker to remove the solder bridge. A good set of eyes or a magnifying glass may need to be employed to be sure that all the solder bridge is removed. The mod won't work if any contact exists between each side of Pad 13.

As the mod sheet instructs, be sure that all power has been removed from the radio, I even pulled the lithium battery (you did remember to make a list of ALL your programmed memories didn't you?). Slip the battery back on and power up the radio while holding both arrow buttons down. Now twist the dial knob counter-clockwise. If the frequency will drop below 430 MHz, go no further as the mod should be successful. You may want to press F/M then Down Arrow and tune in 1 MHz steps downward. Check to see that you can tune to 300 MHz and that it wraps around to 500 MHz. If you twist the dial knob and you wrap around to 450 MHz, reset the radio again by turning it on while pressing the arrow buttons.

After you've reset the radio and activated the extended features, check to be sure that your frequency step size and repeater shifts are correct. Now you can enjoy reprogramming your radio again! I haven't found any features that have been disabled by performing the mod. Automatic Repeater Shift is preserved, unlike the mobile units. Also my rig tunes in the 900 MHz range which is quite useful to me since I can monitor a 930 MHz data system that I maintain. It also appears to monitor the entire 902 to 928 MHz band which should be a boon to generating interest in the 33 cm band. All you need to do is punch a frequency from the keypad. From there you can tune up or down with either the arrow keys or the dial knob. Also, you can store any of these frequencies in memory, tune or scan them as any other memories.

I really enjoy the added dimension the extended features give the FT-530. Being able to use one radio to receive so many different frequencies makes it a real Handy Talkie.

73, de Nate

Packet: KA0RNY @ WF0A.#SCKS.KS.USA.NOAM

E-mail: ka0rny@midusa.net

Valley Center, Kansas USA EM17hs

Visit my Linux + Ham Radio pages [homepage.netspaceonline.com/~ka0rny/](http://homepage.netspaceonline.com/~ka0rny/)

22-08-1999

## (FT-530) Yaesu FT-530, Tune Any Freq. EASILY Between 110 and 950 inclusive

On a hardware modified for extended receive and transmit ft-530, you may, without having the difficulty of popping out of range when tuning upward, tune absolutely any frequency between 110 and 950 mhz (although mine only locks between 748-950, 520-300, 183-110).

This is a big improvement over entering 800 in a vfo and tuning down only with the knob.

- Enter 110 in the "L" memory channel on the UHF side of the rig.
- Enter 950 in the "H" memory channel on the UHF side of the rig.
- Be sure that neither "L" nor "H" channels are marked as skip channels.
- In memory mode tune the "H" channel.
- Press MR to get the little adjustment lines ---
- Enter the freq. of your choice, ANY FREQ. BETWEEN 110 AND 950 MHZ.

**Note:** you can only do this once, if you need to enter another freq, you must exit and enter memory mode.

There you go. The VHF side of the rig tunes over a larger VHF range and same for the UHF side of the rig. You can use the xfer (9) button to transfer a freq to the VHF side to the rig will lock (for example tuning 181.000)

Good luck and enjoy.

Tom

[thomas@asan.com](mailto:thomas@asan.com)

This modification is read 1661 times.

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30-07-2000

## (FT-530) FT530 Extended RX/TX software mod.

**Author:** Frank - PA5ZZ

I have a FT530 bought a couple of years ago in the Netherlands. Serial # 3F160408.

This TRX **Already** has the jumper 15 modification as it is bought!

I only needed to press the up and down arrows and switch on the radio to have extended RX and TX!!!

So BEFORE you open up your TRX: CHECK IF HOLDING THE UP AND DOWN ARROWS AND THEN SWITCHING ON, GIVES YOU THE MOD!

Have fun!

73 de Frank, PA5ZZ

This modification is read 1660 times.

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09-11-2000

## (FT-600) Modification for Yaesu FT-600 or System 600

**Author:** - [ricardodc@nettaxi.com](mailto:ricardodc@nettaxi.com).[MODIFICATION.NET](http://MODIFICATION.NET)

### Keypad Beep Muted:

Turn off the transceiver, then press button 8 hold it and turn on the transceiver. Now Key beep is muted.

### Full Coverage:

Look for CK-3 socket at right side from the clarifer, you will see 3 pins inside. Count the pins from left to right 1,2 and 3. Join the pin 3 with 2 (use a thin cable), then push the pins using a Lego block or some similar. Now full coverage is activated.

P.D. the pins need to be pushed, if not full coverage will not work.

**Date:** 08-01-2002

**User comment**

**From:** [Erwin Hubsch Neto, PY2QI](#)



**Subject: FULL COVERAGE FOR FT-600**

I changed the FT-600 for full coverage by an easy way!  
Take the CK unit (marked as FT-600) off from the frontal panel.  
You will see 3 pins inside the hole. Count the pins 1,2 and 3 from left to right.  
At the back of the CK unit you will see a metal jumper.  
Now, using a adesive label or tape, isolate the part of metal corresponding to pin 1.  
Insert the CK unit back to the radio and be sure that pins 2 and 3 are connected.  
Turn on the radio and check if the frequency is fully opened.

73/DX

Erwin, PY2QI  
Indaiatuba, SP - Brazil  
www.radiohaus.com.br  
py2qi@uol.com.br

\*\*\*\*\*

**PORTUGUESE VERSION**

Eu consegui mudar o FT-600 para cobrir toda a faixa de uma forma simples!  
Retire a unidade CK (marcada como FT-600) do painel frontal.  
Você verá 3 pinos no dentro do buraco deixado pela unidade. Conte os pinos 1, 2 e 3 da esquerda para a direita.  
Na parte traseira da unidade CK, você verá um jumper metálico.  
Agora, usando uma etiqueta ou fita adesiva, isole a parte do jumper que corresponda ao pino 1.  
Coloque a unidade CK de volta, estando certo que os pinos 2 e 3 estejam conectados.  
Ligue o rádio e verifique se está operando em toda a faixa de HF.

73/DX

Erwin, PY2QI  
Indaiatuba, SP  
www.radiohaus.com.br  
py2qi@uol.com.br

**19-07-1998**  
**(FT-650) FT-650 noise blanker mods**

If you are unhappy with your FT650 noise blanker here is a quick mod.

The mod involves shorting diode 4013 which will increase the gating time of the agc line to the noise blanker.

This is located on the if board.

This will inprove the noise blanking by several S points under heavy power line noise.

73,S VK4TUB.

**19-07-1998**  
**(FT-650) General coverage for the FT-650**

The YAESU FT-650 can be put into general coverage transmit and receive mode by using the following procedure:

While pressing the "VFO" and "MR" knob, switch the transceivers power to "ON".

For resetting to the factory defaults, repeat the above procedure again.

**19-07-1998**

## **(FT-690) Extending the tuning range of the Yaesu FT690mkII**

Although the FT-690mkII covers 50-54 it can be 'stretched' to cover any six megs between 44-54Mhz. A very useful mod for listening to early warning video signals on 48.25+-, 49.25+- and 49.75+-.

Firstly replace the crystal on the 55Mhz vcxo (part X4002) on the pll/pa unit with a new one of the following spec.

Frequency - 27.34925Mhz, fundamental cut.  
load capacitance - 28pf  
series resistance - low (15-20ohm)  
Holder - HC-18/T/3P, middle pin to case.

To modify the PLL divider and display, first switch off the memory back-up battery and then install a 1N4148 diode, soldering the cathode to pin 5 of P2501 and the anode to pin 6 of P2502 of the CPU unit.

Turning the rig back on, the VFO's will display 5.000.0 (this is 45.000.0). The mark "HIGH" will be displayed above 0.000.0 (50Mhz). Now adjust TC4001 on the VCO unit for the desired range. Next adjust T3018 and T3021 on the transmit path as well as T3001 to T3005 on the receive path for optimum flatness and sensitivity over the chosen frequency range.

In case the range 48 - 54 is required, there is no need for the above VCO and RF circuit adjustments. Please note that the performance will decrease approaching the lower 44Mhz limit.

For accurate frequency display, adjust T4001 on 0.000.0 against a known 50Mhz signal and VR4004 for 25Hz frequency difference between 9.998.475 and 9.998.500 using the 25Hz step mode. The step when moving from 9.998.4 to 9.998.5 is the most critical as it represents the maximum possible error of the display reading.

Modification as supplied by SV1DH and printed in Six News, Issue 41. All modification done at owners risk.

This modification is read 514 times.

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**19-07-1998**

## **(FT-7) FT-7 modifications made**

1. VFO temperature compensation, according to article in Radcom, this did not have desired effect, nor was it necessary, and I got a compensation problem and RIT did not operate satisfactorily so I removed this modification later.
2. extra band segment on 10m uses FIX switch. RIT must be either constantly on or off. Later I heard that someone else made a modification to add full 10m coverage
3. Transverter connection. BNC connectors for RX and TX, RX may not be used with external antenna. TX level without PA module is abt +6dBm/2mW.
4. TX gain. First I used an extra negative bias for CW TX gain. only -1.2V needed. later I modified the transceiver according to FT-7B, this was later changed such that TX gain was used for either SSB/CW, mike gain was set by a trimpotmeter.
5. Noise blanker improvement (see FT-7B circuit). An extra capacitor is connected as for FT-7B.
6. Keying. Some experiments were carried out by LA9DL and LA8AK. It was experienced that the original keying transistor would not function satisfactorily, and a AC125/126 was used with a changed circuit. A high gain germanium PNP transistor is necessary. max 500 lpm worked for CW MS 1000LPM, very little key-clicks
7. Key jack. a new 6.3mm stereo jack was installed (where remote vfo connector was). PTT and key is connected.
8. Mike connection was made similar to that used by kenwood. Yaesu mikes showed advantageous to use in TS-700/TR-7010. Kenwood mikes may be modified with a 47nF series capacitor, but output will be limited.
9. CW carrier xtal was changed such that CW is on same sideband as used on different bands, only 40m is now different. It is now possible to call a stn in CW and listen in cw mode - to LSB on 80, USB on the other bands. Unmodified the receiver in only in accordance for 40m LSB. This is now lost.
10. calibrator modified according to CQ-DL (or QRV?) note described for FT-250 to avoid intermodulation on 40m.
11. Squelch for CW/SSB for use on calling channel (432.200/144.300)

all these modifications was made in 1981-1983, so I cannot remember all

73 de jan-martin

This modification is read 1036 times.

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**19-07-1998**  
**(FT-70) FT-70G work in 50 KHz to 2 MHz**

The Yaesu FT-70G is a very rugged HF-SSB QRP transceiver with a self- contained Ni-Cd battery. This modification restores operation on 160 meters and improves receiver sensitivity between 50 KHz and 2MHz. (It enables transmit operation between 1 and 2 MHz, but 2nd harmonic attenuation will be very poor if used below 1.5 MHz.) The boards are stenciled for the added parts, but this is no "clip the diode" modification:

Low Pass Filter (LPF) Unit:

- Add RL601 SPDT relay, 12Vdc (Yaesu p/n M1190066) I substituted a Radio Shack 275-241 with little trouble. See note.
- " RL-602 (same as above)
  - " C601 0.022uF, 50V, ceramic
  - " C602 560pF, 50V, ceramic
  - " C603 390pF, 50V, ceramic
  - " C604 620pF, 50V, ceramic
  - " C605 2200pF, 50V, mylar
  - " C606 220pF, 50V, ceramic
  - " C607 560pF, 50V, ceramic
  - " C608 680pF, 50V, ceramic
  - " C609 0.01uF, 50V, ceramic
  - " L601 29T of #26 enameled on Amidon T37-2 iron powder torroid
  - " L602 26T of #26 enameled on Amidon T37-2 iron powder torroid

**Note:**  
The R/S relay has 2 pins connected to the wiper arm. Connect only one to the non-grounded circuit board trace. The 2nd pin on the Yaesu relay is a dummy pin and is soldered to the board's ground plane for mechanical stability only.

RF/IF Unit:

- Remove R26 470 Ohm, .25 W
- " R25 4.7 KOhm, .25W

Replace R25 with a 470pF ceramic capacitor

Reg/Cntrl Unit:

- Remove jumper C-A
- Add jumper B-C
- " D601 1N914
  - " C601 0.022uF, 50V, ceramic
  - " Q601 2SC1959Y (SK9229/ECG85)
  - " R601 18 KOhm, .25W
  - " R602 39 KOhm, .25W

This modification is read 383 times.

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**19-07-1998**

## **(FT-708) 9600 Mod for FT-708-R**

Hello Ham's, here is the modification for use the FT-708-R with a G3RHU modem for 9600 bd packet operation.

Audio output from FT 708 R receiver's Discriminator for 9600 bauds  
by Andrea Borgnino IW1CXZ

Here is a very simple way of taking audio direct from the discriminator. Connect a flying lead to pin 9 Q 107 (MC3357P) that is located at the opposite side of the CPU.

You can also take the signal from the GREEN cable that goes to the TONE SQUELCH optional unit.

TxAudio input into FT 708 R Varactor diode for 9600 bauds

You must find the D 209 Varactor diode (FC 53) locate near the output DC connection, or near the VR 202 trimmer in the PLL Unit. Then you must insert the TXA signal in the catode of D 209 and the 9600 modification is made.

My FT-708 can run 9600 operation very well with a TX DELAY value of 17.

Best 73 from IW1CXZ Andrea @I1LYM. #TO.ITA.EURO

This modification is read 548 times.

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**31-03-1999**

## **(FT-708) Anschluss fuer 9k6-Modulation an Yaesu FT-708R**

*de DJ1UV @ DB0CL.HB.DEU.EU*

1. Geraet auf die Tastatur legen, Akkufach oeffnen und Akku herausnehmen.
2. Im Akkufach die vier Kreuzschlitzschrauben in den Ecken herausdrehen; sich merken, wo die langen Schrauben (unten) und die kurzen Schrauben (oben) hingehoeren!
3. Die gesamte Vorderseite mit dem Tastenfeld wird nun abgenommen und nach rechts geklappt.
4. Die untere Geraetehaelfte enthaelt ein Abschirmkaestchen; Deckel mit Schraubenzieher vorsichtig abhebeln und zur Seite legen.
5. Unten, etwa in der Mitte, befindet sich der Modulationshub-Trimmer VR202.
6. Unmittelbar davor (Richtung Kaestchenmitte) steht ein 2k7-Widerstand (R263) aufrecht.
7. An das obere Ende des 2k7-Widerstandes (das ist gleichzeitig der Schleifer von VR202) einen 1k5-Widerstand anloeten, mit Isolierschlauch ueberziehen und durch die Oeffnung im unteren Rand des Abschirmkaestchens nach aussen legen. Der Widerstandskoerper liegt etwa zu gleichen Teilen innerhalb und ausserhalb des Kaestchens.
8. Abschirmkaestchen-Deckel wieder richtig aufsetzen und ringsrum einrasten. An das freie Ende des 1k5-Widerstandes sowohl nach Masse einen kleinen 1 nF Keramik-Abblock-C als auch die Seele eines duennen, abgeschirmten, ca. 20 cm langen Kabels anloeten: den Schirm an das Kaestchen anloeten. Dies ist das Modulationskabel.
9. Kabel an der linken Kaestchenseite entlangfuehren und etwa in der Geraetemitte zur anderen Seite durchstecken; dazu zunaechst...
10. auf der Vorderseite Batteriefachabdeckung einschl. Oberteil mit Typenschild vorsichtig ebenfalls abziehen; dabei Akkukontakte nicht verbiegen.
11. Abgeschirmtes Kabel von Punkt 9.) etwa in Hoehe der Akkukontakte zur Rueckseite vollends durchziehen.
12. Vorderseite (Tastatur, etc.), mit den Nasen oben zuerst, wieder einsetzen und in die richtige Position druecken. Eingezogenes Kabel nicht quetschen!
13. Nun das Geraet wieder auf die Tastatur legen und die kleine Platine mit dem Relais losschrauben (zwei Schrauben). Die Platine haelt sich jetzt noch durch einige Stiftkontakte. Deshalb die Platine z.B. mit einer Winkelpinzette nach oben abhebeln und zur Antennenbuchse wegkippen; evtl. mit Tape voruebergehend arretieren. Darunter wird die Loetseite der Platine MAIN UNIT sichtbar.

14. Jetzt das Geraet so legen, dass die Antennenbuchse nach rechts und die PTT-Taste zu Dir zeigt. Nun wird's eng und aeltere OM's brauchen ihre Brille oder eine Lupe.
15. Nun gilt es, den Demodulatorausgang des RX zu lokalisieren.  
Im Schaltbild der MAIN UNIT ist dies Q107, Pin 9. Ich habe das Signal etwas dahinter, naemlich am Knoten R121, R122 und C132 abgegriffen. Diesen Punkt findet man auf der Loetseite der MAIN UNIT so:
16. Die linke Haelfte der MAIN UNIT ist mit einem Schirmblech abgedeckt. Neben der rechten Kante des Schirmbleches, etwa in der Mitte des Geraetes, sieht man eine rechteckige Masseflaeche, ca. 5 mal 8 mm. An diese Masseflaeche loetet man einen duennen Massedraht fuer das Demodulatorsignal (ca. 10 cm lang).
17. Parallel zur rechten Kante dieser Masseflaeche, direkt rechts neben ihr, laeuft eine Leiterbahn von oben nach unten und knickt dann noch kurz vor ihrem Ende ein paar mm in Richtung Antennenbuchse ab.
18. 1 mm unterhalb des Loetauges dieser Leiterbahn (in Richtung PTT-Taste) befindet sich eine dreieckige Loetinsel, in die von der anderen Seite drei Beine gesteckt sind. Dies ist der unter Punkt 15 beschriebene Knoten. Hier loetet man einen duennen Draht an. Ich habe ihn nicht abgeschirmt.
19. Jetzt kann man die kleine Relaiplatine wieder auf ihre Stiftkontakte stecken und festschrauben.
20. Jetzt brauchen wir noch den PTT-Anschluss: diesen loeten wir an Pin 3 der MIC-Buchse an. Von aussen gesehen ist das der Pin, der in Richtung PTT-Taste weist.
21. Die Wahl der externen Anschlussbuchse fuer den gesamten 9k6-Anschluss ist natuerlich Geschmackssache. Ich habe eine 9-polige D-Sub-Buchse gewaehlt und habe sie in die Geraeterueckwand eingebaut, etwa da, wo das Geraet werkseitig den Befestigungsclip hat. Etwa in die Mitte zwischen der Befestigungsschraube des Clips und das Batteriefach habe ich einen Ausschnitt fuer die D-Sub-Buchse gefeilt und von aussen eingeklebt. Innen ist dann genug Einbautiefe fuer die Loetseite der Buchse. Nachteilig bei diesem Einbau ist allerdings, dass man das Geraet nicht mehr gut auf den Ruecken legen kann, wenn der Stecker steckt.
22. Nun kann man die Modulator-, die Demodulator, die PTT- und die Masseleitungen an die DB-9-Buchse anloeten. In die Modulatorleitung muss man noch einen 10 Microfarad- Kondensator, Plusseite zum Modem, Minusseite zum Modulationkabel, legen, wenn man nicht vorzieht, dieses C ausserhalb des FT708R unterzubringen. In der Naehe der D-Sub-Buchse ist aber genuegend Platz hierfuer.  
  
Der Koppel-C ist nicht umumstritten, bei diesem Geraet aber noetig, weil sich sonst ein tuechtiger Frequenzversatz durch den DC-Anteil mancher Modems ergibt, andererseits ungefaehrlich, weil am oben gewaehlten Einspeisepunkt fuer die Modulationsspannung beim FT-708R keine eigene DC-Vorspannung liegt und dessen VXO bei RX-TX-Umschaltung nicht mit umgeschaltet wird (was bei anderen Geraeten zu Umschalt-Chirps fuehrt).
23. Nun kann man die Geraeterueckseite wieder vorsichtig einsetzen; dabei auf die Akkukontakte achten und evtl. beim Aufsetzen des Deckels diese Kontakte etwas mit einer Pinzette in die Oeffnungen fuehren. Die vier, paarweise verschieden langen, Schrauben und den Akku wieder einsetzen.
24. Wenn alles richtig gemacht wurde, ist das Geraet umgebaut und auch weiterhin voll funktionsfaehig.
25. Betrieb: Lautstaerkeregler und Rauschsperrre bleiben bei mir immer am Linksanschlag. Der Modulationshub wird am Modem so weit aufgedreht, dass ein Testsignal in einem Kontrollempfanger etwa laut rauscht, wie ein 9k6-Signal vom Digipeater. Beim G3RUH/DF9IC-Modem von Landolt war das etwa 3/4 vom Maximum des Potis im Modem.

Viel Erfolg und Spass am Umbau!

Uwe (DJ1UV at DB0CL) Bremen, den 9.Dezember 1992

This modification is read 479 times.

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**03-08-2001**

**(FT-7100) MARC/CAP modification for FT-7100**



Modification is complete.

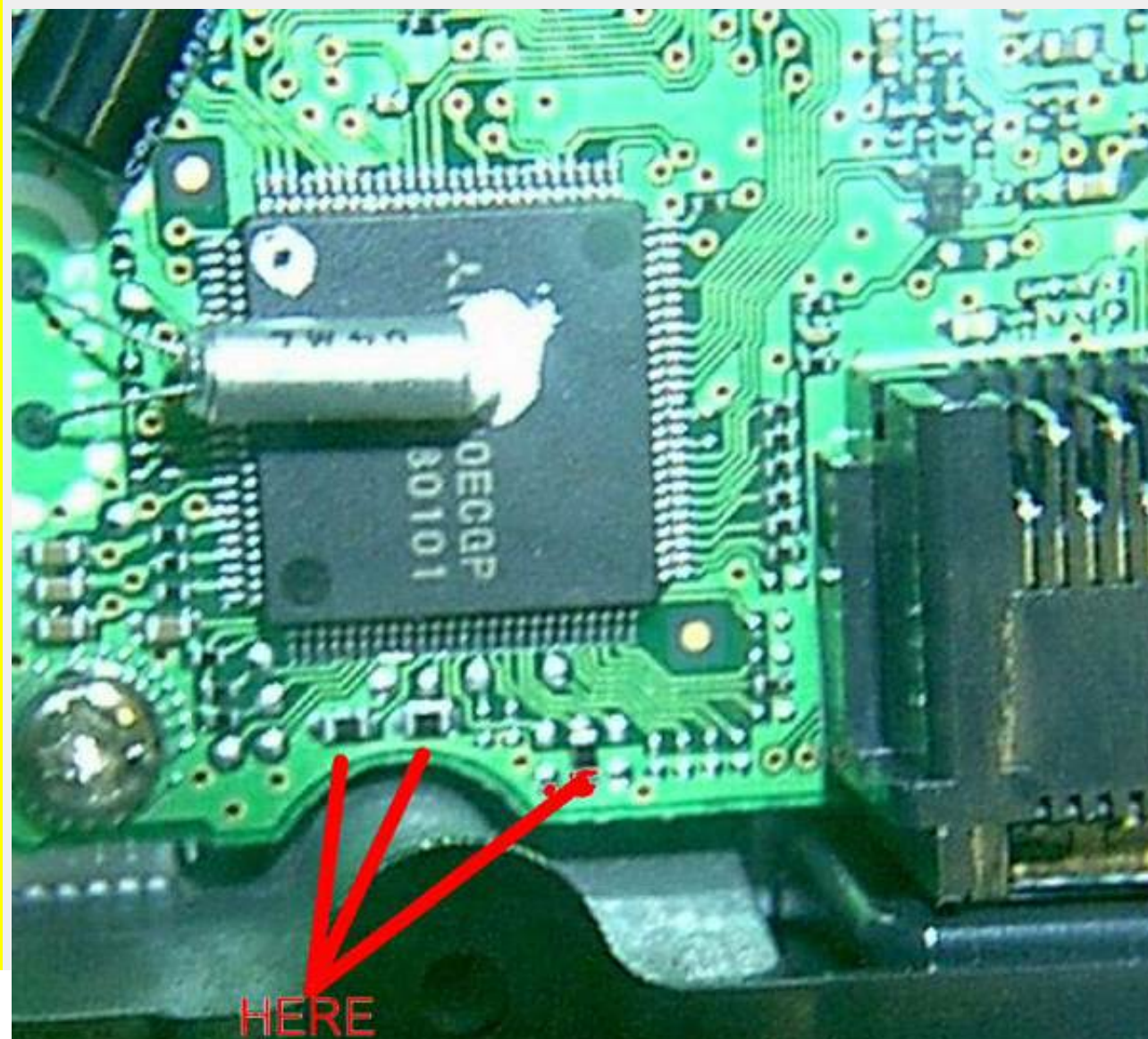
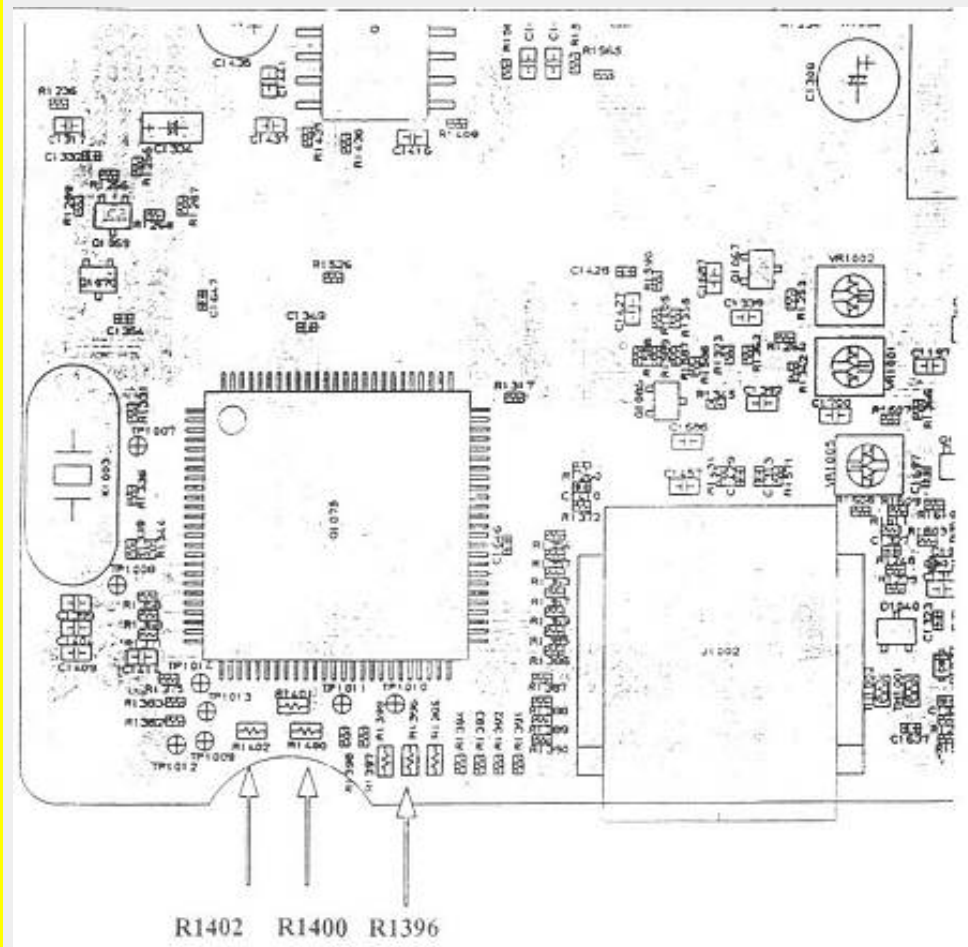
New frequency:

VHF RX 108 - 180 MHz

VHF TX 136 - 174 MHz

UHF RX 320 - 999 MHz

UHF TX 410 - 470 MHz







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

After I did the mars mod I found that in order to skip a memory channel I had to press and hold the V/M button, and then while the display is blinking do a momentary press of the tone button and the skip icon will appear.

**From:** [David KG6FGM](#)

The above comment by Mike, N7LEQ isn't due to the above MARS/CAP modification, it is because the owners manual of the FT-7100M has an error by not adding the below text to it's pages.

On page 36, "Memory Skip Scanning", **after item #1** ("*Recall the memory channel to be skipped*") add the following as there should be another line of text containing this information:

**"Press and hold the V/M key for 1/2 second, the display will flash".**

now continue with pressing the tone key as listed...

*\*Note\*see my next entry as to why your "band scan limit" feature found on page 37 is non operational.*

top of page

## (FT-7100) Memory Skip Scanning update

**Author:** - [wiseguy@attitude.com](mailto:wiseguy@attitude.com).MODIFICATION.NET

The owners manual of the FT-7100M has an error by not adding the below text to it's pages.

On page 36, "Memory Skip Scanning", after item #1 ("Recall the memory channel to be skipped") add the following as there should be another line of text containing this information:

"Press and hold the V/M key for 1/2 second, the display will flash".

now continue with pressing the tone key as listed...

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

First, the bad news: Your radio doesn't respond to the feature: "Band Scan Limit" Found on Page 37 of the Ft-7100 owners manual. Here it explains the 5 pairs of bands limits you can scan by programming the lower limit to the upper limit of the Mhz you desire.

The good news is your high dollar paperweight doesn't need to be sent in for repair.

Your radio just needs to know which set you want to scan. (L1-U1, L2-U2, L3-U3, L4-U4, L5-U5).

To make your radio function as it should for this feature add the following text to your owners manual;

- Recall the band scan limit pair to be *skipped*.
- Press and hold the **V/M** key for ½ second, (the display will flash).

- Press and hold the **Tone** key for ½ second.
- The (triangle or '**delta**') symbol will appear to the bottom of the memory channel number indicating it is to be skipped and ignored durring "Band Limit scanning".

*\*Note: You will need to set skip scan limits pair after you set the scan limit pair when you program more than one pair into your radio.*

stay tuned for more Benchwrench tips...

This modification is read 893 times.

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**19-07-1998**

## **(FT-711) FT-711RH fuer 9600 Baud FSK**

Umbau des YAESU Mobilgeraetes FT-711RH fuer 9600 Baud FSK-Modulation mit G3RUH-Modem oder aehnlich.

Der Umbau ist recht einfach und laesst sich mit geringem Zeitaufwand durchfuehren. Es hat zumindest bei mir geklappt. Garantie fuer Funktion mit verschiedenen TNCs kann ich nicht uebernehmen, da ich es nur mit meinem TNC2C mit G3RUH-Modem und im Verkehr mit DB0FD und DB0SHG ausprobiert habe.

Es muessen Anschluesse hergestellt werden fuer das Empfangssignal, das direkt am Diskriminator abgenommen wird, und zur Einspeisung des Sendesignals in den VCO.

Das Empfangssignal wird an Pin 4 der IF-Unit abgenommen. Dieser Punkt ist auf der Unterseite (Chip-Seite) der Platine leicht zugaenglich. Nach Abnehmen des Gehaeusedeckels schaut man auf diese Seite der Platine. Wenn man das Geraet so legt, dass der Kuehlkoerper nach hinten zeigt, dann ist das die am weitesten rechts liegende Reihe von Loetaugen, die sich etwa in der Mitte des Displays befinden. Die Zaehlung faengt hinten an, Pin 4 ist also der 4. von hinten aus gezaehlt. Die IF-Unit laesst sich auch leicht identifizieren, wenn man von der Bestueckungsseite auf die Platine schaut. Es ist die senkrecht stehende platine neben dem keramischen ZF-Filter. Zur Optimierung des Empfangs sollte man dieses Filter gegen ein 15-kHz-Filter (LF-H15S) auswechseln. Es geht aber auch mit dem Original-Filter.

Das Sendesignal wird ueber einen Laengswiderstand, dessen Groesse den Hub bestimmt, am Anschluss MOD der VCO-Unit eingespeist. Dieser ist gleichfalls von der Loetseite (oder Chip-Seite) der Platine zugaenglich. Um diesen zu lokalisieren, oeffnet man den Deckel der VCO-Unit. Der Pin MOD befindet sich neben der Kathode der Diode D03. Auf der Chip-Seite ist dort auf der etwas verlaengerten Leiterbahn die aus Blickrichtung rechte Seite eines Einstell- reglers angeloetet. Fuer den Laengswiderstand kann man ebenfalls einen kleinen Einstellwiderstand von 500 k nehmen und damit den Hub optimal auf ca. 3 kHz einstellen. Das laesst sich durch Ab hoeren des Signals machen, wenn man keinen Hubmesser zur Verfuegung hat. Die 9600-Bd-FSK-Modulation hoert sich wie ein Rauschen an. Den Hub stellt man dann so ein, dass der Lautstaerkeeindruck etwas geringer ist, als das Rauschen auf dem Kanal ohne Signal. Nachdem ich den optimalen Wert ermittelt hatte, habe ich den Widerstandwert des Reglers gemessen und den Regler aus Platzgruenden gegen einen entsprechenden Fest- widerstand ausgewechselt. In meinem Fall betrug der Wert 200 kOhm.

Damit ist der elektrische Umbau beendet. Das groessere Problem stellt die Steckverbindung zur Aussenwelt dar. Da auf der Rueckseite des Geraetes kein Platz mehr fuer eine Steckverbindung ist, muss man nach einer Loesung auf der Seite oder unten suchen. Man braucht 3 Kontakte, naemlich RX-Signal, TX-Signal und PTT. Wenn man die PTT-Leitung an der Mikrofonbuchse anschliesst, kann man das RX- und TX-Signal auf eine 3,5-mm-Stereo-Klinkenbuchse legen und diese an der rechten Gehaeuseseite an passender Stelle anbringen. Man muss dann nur die Gehaueschale entsprechend ausklinken. Wenn man alle 3 Kontakte auf eine separate Buchse legen will, kommt evtl. eine Mini-DIN-Steckverbindung in Frage. Ich habe eine 5-polige Flachsteckverbindung aus der Bastelkiste genommen, und diese nach unten herausgefuehrt. Hier muss aber der Erfindungs- geist jedes einzelnen einsetzen.

Wichtig ist im uebrigen, dass man die Steckverbindung zum 9600-Baud-Modem trennt oder das Modem ausschaltet, wenn man normalen FM-Sprechfunk oder Packet-Radio ueber die Mikrofonbuchse machen will, da ja staendig die 9600-Bd-FSK-Modulation am VCO anliegt und den Sender mit dem Rauschen moduliert. Dagen haben die anderen Signale keine Chance!

Viel Glueck beim Umbau!

73 de Reinhard in Hannover, DJ1KM

This modification is read 230 times.

[top of page](#)

19-07-1998  
(FT-712) FT-712-rh für 9600 Baud

Hallöchen hier aus Wetten !

Nachfolgende Anleitung beschreibt die 9k6-Anpassung für den FT712RH mit bewährtem Kabeleinführsystem sowie elektronischer Umschaltung (NF-Switch 4066)

Mit der Einspielung ins DL-Netz möchte ich diese jedem zugänglich machen.

Releasestand: 26.10.93

Umbau des TRX FT712RH für 9600bd (Verson 2.0)

Es ist es gelungen den FT712RH für 9600bd umzubauen.  
Hier klappt dies seit ca. 1 1/2 Jahren einwandfrei, beim TXD müssen Abstriche gemacht werden, es ist halt kein Quarzgerät.  
Prinzipiell eignen sich PLL-Geräte NICHT für 9600bps, sie sind zu langsam und belegen den Kanal recht lange.  
Als Usergerät jedoch durchaus brauchbar, da der Digi ja die meiste Zeit sendet.

*Beim Umbau bitte ich mit besonderer Vorsicht an den SMD-TRX heranzugehen. Für Schäden an Ihrem TRX übernehme ich keine Haftung !*

Verwendete Modems:  
TNC2C 1k2/9k6 mit 10Mhz und G3RUH - Modem  
TNC2H 9k6/19k2 mit 10Mhz und DF9IC - Modem  
BAYCOM USCC mit DF9IC-9k6-Modem

**Prinzipiell:**  
Bei 9600bd wird die Modulation/Demdoulationsspannung im TRX abgegriffen.  
Die NF (1200bd) ist beim TNC2C m. G3RUH evtl. notwendig.  
Der Mic-VV wird getrennt, alle anderen Verbindungen wie sonst bei 1200bd.

Ins Gehäuse habe ich nicht gebohrt (s. Pkt 1) Die Verwendung eines Lötkolbens <20Watt mit Nadelspitze, sowie eine ruhige Hand ist die Grundvoraussetzung, sonst TRX lieber zulassen und an dieser Stelle diese Lektüre verlassen ,hi.

*Applications & Text by DL1EER*

DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 1 Kabeleinführung und Einspeisung der Modulations sowie Demodulations-Signale:

1.  
Einführung eines 4adr. abgeschirmten Kabels hinten an der Spgs-Versorgung.  
Sie führen einen kleinen Klingeldraht in den TRX ein,löten anschliessend die Spitzen des 4adrigen Din-Kabel an, daß Sie zuvor ca. 30cm abisoliert haben. Bitte die Abschirmung direkt hinter der Zugentlastungsstopfbuchse enden lassen und mit einer Lage Isolierband umwickeln, damit evtl. kleine Drähtchen beim wiedereinsetzen der Zugentlastung nicht in den TRX eindrin gen können. Schneiden Sie den Mittelsteg in der Zugentlastungstülle etwas an, dann dürfte das Wiedereinsetzen der Zugentlastung kein Problem sein. Bei Veräußerung des Gerätes braucht man, wenn überhaupt erforderlich, nur das eingeführte Kabel ablöten und es herauszunehmen.

2.  
Das Demodulations-Signal wird unmittelbar am Pin 11 des IC's Q01 der IF-Unit abgegriffen. Man kann es auch auf der Platinenunterseite ab- greifen, wenn man diesen Punkt nicht findet. Diese Methode bitte nicht verwenden, da man sehr leicht die Pins verwechselt !  
Nehmen Sie einen hochohmigen Kopfhörer (2kOhm) zum Test. An dem richtigen Punkt wird es rauschen. Die IF-Unit steht senkrecht auf der Hauptplatine und ist ohne Ausbau derselbigen gut zu erreichen.

3.  
Einspeisung des Modulations-Signals:

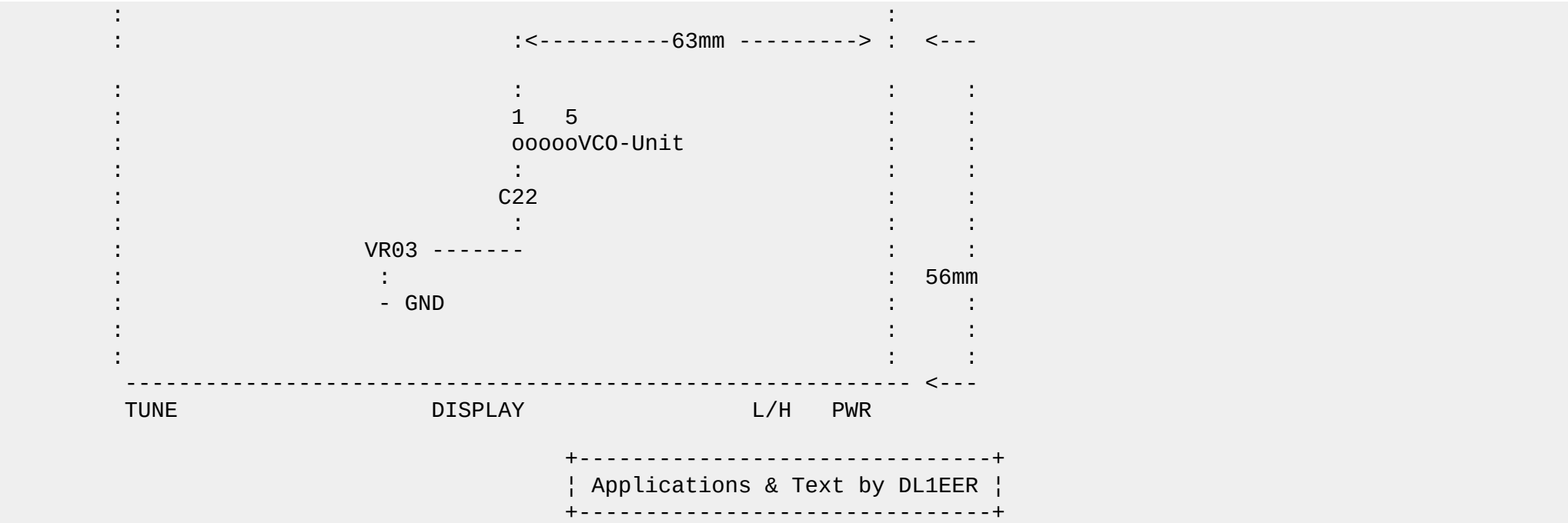
Auf der Hauptplatine C22 suchen.Das ist der Kondensator der mit 100nF den MIC-VV vom Modulator abtrennt.  
Er liegt hinter VR3 und ist, wenn man den TRX aufrecht vor sich stehen hat, wie folgt positioniert.

Sicht von OBEN auf die Platine !

LSP-BU/+UBB

-----

: : <-Gußrand



DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 2

C22, ist ein 100nF-SMD- Kondensator und wird herausge- lötet und aufbewahrt. Dies so machen das man erst eine Seite des Kondensators erwärmt, dann die andere, dann wieder die eine Seite und dabei mit einem kleinen Schraubendreher den Kondensator von den Pads seitlich wegdrücken.  
Bitte keine Leiterbahn(en) trennen, das ging bei einigen Oms die mir schrieben echt daneben !

Die Einspeisung des MOD-Sign. direkt an Pin 1 der VCO- Unit. erfolgt HINTER dem ausgelöteten Kondensator C22. Gehen Sie, falls Sie nicht sicher sein sollten im Schalt bild mit dem Finger vom MIC-VV über VR03 zum C22-Platz und DAHINTER dann anlöten!  
Die Leitung VOR dem C22 wird auch herausgeführt, um den MIC-VV extern durch einen DIN-DUMMY-Stecker mit integriertem 100nF-Kondensator wieder zu verbinden. Bitte machen Sie das so, denn nur mit abgetrenntem MIC-VV sind dessen Beeinflussungen bei Einspeisung eines 9k6-Signals nicht mehr vorhanden !

Der letzte freie Draht wird an Masse angelötet, die am kalten Ende des VR03 zu finden ist. Dieser Draht wird dann in der Din-Kupplung kurz hinter dem TRX auf den Schirm und Pin 2 gelötet ! Dies bitte auch so machen und nicht versuchen die Abschirmung des Kabels ins Gerät einzuführen !

Vom Einbau irgendwelcher MIMIK, zb. eines Umschaltrelais, sowie der erforderlichen Widerstandsanpassung im TRX rate ich aus HF-technologischen Gründen DRINGEND ab !!  
Diese erfolgt extern in einer UMSCHALTBOX.  
Hierzu siehe "Anpassung mit NF-Schalter 4066".

Trennung am TRX:

Die Verbindung zwischen TNC und TRX wird trennbar gestaltet . Setzen Sie kurz hinter dem TRX eine DIN-Kupplung ! Hier erst wird die Masse verbunden !

Bei FM-Betrieb z.B im Urlaub kommt der oben beschriebene DIN-DUMMY dran, der einen 100nF-Kondensator enthält und MIC-VV mit Modulatoreingang verbindet.

Hier die Belegung der DIN-Kupplung:  
+++++

- o --- 1 --- Mic-VV-Ltg vom MIC-Amp (VOR C22)
- o --- 2 --- GND (Extern in DinBuchse verbunden)
- o --- 3 --- DEMODULATOR (IF-Unit)
- o --- 4 --- Leitung zum Detector Pin 1 (HINTER C22)
- o --- 5 --- frei

+-----+  
| Applications & Text by DL1EER |  
+-----+

DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 3

==> Sie sehen, wenn man im Stecker PIN 1 und 4 über einen 100nF verbindet kann man ganz normal FM-Betrieb machen !

Bei PR-Betrieb wird NACHFOLGENDE Umschaltbox eingeschleift, die Sie vor dem Testen in ein Gehäuse aus METALL einbauen sollten (Bitte !)

Diese realisiert die notwendige Widerstandsanpassung an die Modulationsstufe und auch die Umschaltung für FM-Betrieb. So können Sie alles, außer dem Mikrofon dranlassen, wenn Sie das Gerät im Shack stehen haben.

Wenn Sie mit dem TRX später evtl. 1200bd-AFSK machen wollen, modifizieren Sie die Schaltung dementsprechend (NF1k2, SPK)

## DL1EER - FT712RH - Anpassung mit NF-Schalter 4066

Kernstück der NF-Umschaltung für den FT712RH ist der, im Elektronikzubehör erhältliche, NF-Schalter 4066.

Die Anschlüsse für Ub und GND können Sie dem Schaltbild entnehmen, Abbildung mit Sicht von oben (Draufsicht). Die 2 nichtbenötigten Schalter werden mit ihren Anschlüssen definitiv auf Masse gezogen, um eventuelles Übersprechen/Schwingen zu vermeiden.

Bitte beachten Sie, dass der 4066 als Digitalschalter folgende Schaltvarianten bietet:

$U_{\text{Schalt}} < (1/3) \cdot U_B \implies$  Schalter offen  
 $U_{\text{Schalt}} > (2/3) \cdot U_B \implies$  Schalter geschlossen

Verbotener Bereich:  $[(1/3) \cdot U_B] < U_{\text{Schalt}} < [(2/3) \cdot U_B]$

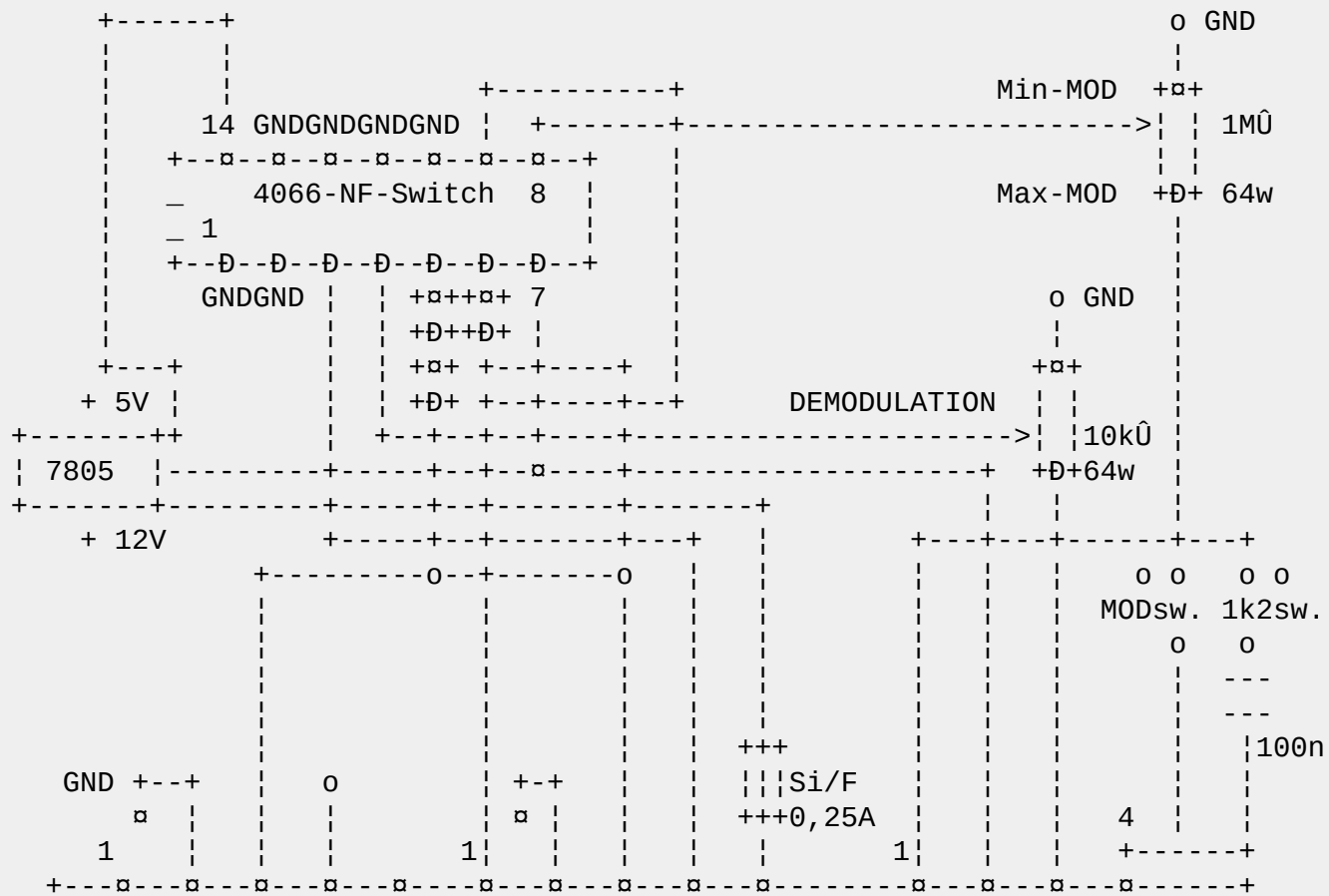
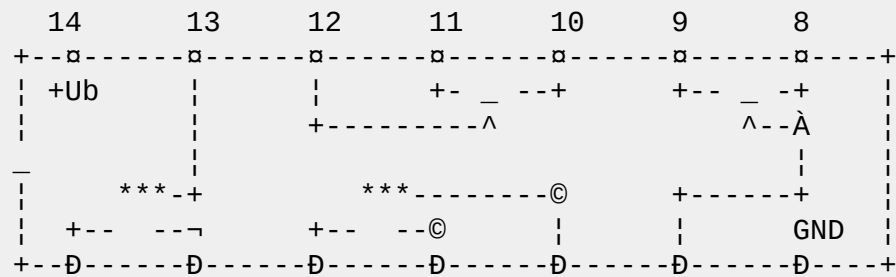
Das Schaltverhalten des 4066 können Sie NICHT mit einem Widerstandsmessgerät messen, da es sich um einen NF-Schalter handelt...

Testhalber sollten Sie nach Zusammenbau der Schaltung mit einem hochohmigen Kopfhörer überprüfen, ob die Einzelschalter des Bausteins auch in Ordnung sind... (Siehe Fkt-Prinzip)

Den ersten 4066 den ich käuflich erhielt war defekt...

## DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 4

Schaltbild:



Schaltungslegende:  
-----

+ 0 +

+D+

GND

+D+ ==> Inverter

GND ==> Masse

1 MVV = Ltq VORM C22

2 GN\* = Ltg GND von aussen

3 DEM = Ltq IF-Unit

4 MOD = Ltq HINTER C22

5 = Frei

DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 5

NOTE:

MODsw. - Schliessen wenn 9k6 erwünscht

1k2sw. - Schliessen wenn 1k2 erwünscht

Kann auch via UMSchalter oder Reedrelais erfolgen, um 1k2 und 9k6 gleichzeitig zu machen. Dadurch erhöht sich aber die Umschaltzeit für 9k6 um einiges !

Die Inverter dienen dazu die PTT-Leitung weitgehend unbefangen zu halten und das gewünschte Schaltverhalten zu erzeugen.

Der FT712 reagiert äusserst argwöhnisch auf Pull-Up Widerstände mit denen man sicherlich zwei Inverter bei RX sparen könnte. Im Inverter IC sind genü- gend Inverter vorhanden !

Der Ausgang der Inverter geht grundsätzlich an den Eingang des 4066 da dieser ja gesteuert werden soll.

So nun zur eigentlichen Schaltung:

In der unteren Leiste sind die benötigten Anschlüsse des TRX und des TNC zu erkennen.

Die Schaltung funktioniert sowohl mit dem TNC2C mit G3RUH, sowie mit TNC2H, das ein reines 9k6-TNC ist.

Im Schaltbeispiel wird die Variante für den TNC2H beschrieben, Sie können den TNC2H-Anschluß ohne grossen Aufwand auf das 2C m. G3RUH portieren, da alle Angaben im Kästchen vorhanden sind !

## Funktionsprinzip

Die Schaltung erhält Betriebsspannung aus dem TNC, die sicherheitshalber mit Si=0,25A/Flink abgesichert ist, um bei Kurzschlüssen das Abfackeln diverser Leiterbahnen im TNC zu vermeiden.

Die Modulatorspannung wird über NF-Sw 8/9 und einem 1 MOhm Spindeltrimmer dem TRX zugeführt.

NODsw. dient zur Trennung der MOD bei FM-Betrieb. 1k2sw. schaltet die NF des MIC-VV dann durch. (=> 2xUM praktikabel

Die Demodulatorspannung wird über NF-Sw 3/4 und einem 10 KOhm Spindeltrimmer der TNC-Schaltung zugeführt.

DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 6

## RX-Zustand:

Im nichtsendenden Zustand ist der NF-Switch 3/4 geschlossen und die DEMod-NF gelangt an das TNC (Kopfhörerprobe!) PTT ist dann nicht LOW, durch die beiden Inverter dann auf jeden Fall HIGH, der NF-Schalter schaltet durch, die DEMod-NF gelangt an das TNC.

Bei Verwendung eines G3RUH liegt die MOD-NF immer an Pin 9 des 4066. Pin 10 muss demnach "Rauschlos" sein Bitte hier auch Kopfhörerpobe !

### TX-Zustand:

Bei PTT wird Sw3/4 geöffnet und Sw8/9 geschlossen.

Dabei gelangt die Modulationsspannung an den Modulator des TRX.

Die RX-NF ist dann komplett abgeschaltet und es wird verhindert, daß die eigene (je nach TNC) noch anliegende Modulationsspannung den eigenen Modulator moduliert...  
und so die Aussendung störend beeinflussen würde..

Dies wäre daran zu sehen das die DCD bei TX dann angeht, darf sie aber NICHT.

Auch beim TNC2H ist keine 100%tige NF-Abschaltung drin, der DCD-Effekt war bei TX-NF deutlichst zu sehen.

Liegt wohl daran das 2..4Vss nur mit einem NF-Schalter wirklich abzutrennen sind..



## Remarks:

Durch den 4066 sind kürzeste Umschaltzeiten zu erreichen.

Wenn die Kopfhörerprobe im RX/TX - Zustand nicht erfolgreich ist, überprüfen Sie die Digitalsignale der vorgeschalteten Inverter... (evtl. Pullup-Widerstand !)

Ein Pullupwiderstand ist hier ca. 1...2,2MOhm und zieht den/die Eingänge der Inverter auf High, da sie an +5V und Eingang der Inverter liegen. Pullupwiderstände können beim 712RH aber zu Problemen führen (s.o)

DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 7

Abgleich

Empfangsabgleich:

a)

Die beiden Potis auf höchsten Widerstand einstellen.

b)

Eine QRG eines 9k6-Digis wählen und Terminal im Monitor-Mode einschalten.

( M UISC nicht vergessen !)

c)

Bei 9k6-Aussendung des Digi's rauscht es kurz.

Den 10k-Trimmer solange (nicht auf 0!) drehen, bis mitgeschrieben werden kann.

Sobald dies der Fall ist, langsam drehen bis RX-Maximum erreicht ist.

Wenn sie nun mitlesen können ist die halbe Miete gewonnen!

Bitte vor dem nachfolgendem Sendeabgleich die SQL anziehen, um die Durchgänge des Digis vom normalen NF-Rauschen unterscheiden zu können. Beim TNC2H können Sie diese nach Abgleich wieder lösen, beim TNC2C mit G3RUH nur wenn eine "echte" 9k6-Dcd eingebaut ist. Einige TNC-Hersteller habens immer noch nicht begriffen und nehmen nur die TCM3105-Rauscherkennung bei den kombinierten TNCs - leider !

Beim TNC2H ist eine "echte" DCD eingebaut, da dies ein reines FSK-TNC ist. Die Lautstärke kann leise gestellt, bzw. mittels 3,5mm Klinkenstecker ausgeschaltet werden.

Bei manchen kombinierten 1k2/9k6 TNC2C-Version mit G3RUH, muss die SQL auch nach dem Abgleich angezogen bleiben, es sei denn die digitale SQL ist bei Ihrem TNC2C aktiv.

DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 8

Sendeabgleich:

Ein Kontrollempfänger (Handy) leistet dazu wertvolle Dienste. Ich habe es auch ohne Oszilloskop hinbekommen.

Voreinstellungen:

MOD-Poti: 750 kOhm

DEM0D-P : 3.3kOhm

TNC2:

NF-Poti auf Potimittelstellung und 100k-Widerstand einsetzen (s. Anl. TNC2H)

DF9IC: NF-Poti auf 5/6 aufdrehen

G3RUH: 1 Umdrehung vor Maximalhub !

Vor etwaigen Connectversuchen auf einer nichtbelegten QRG im Monitormodus unprotokolierte Aussendungen erzeugen, dies geschieht durch Drücken der Return Taste. Wenn die Durchgänge zu kurz sind TX-Delay erhöhen und schauen ob die SQL des Kontrollempfängers aufgeht. Es sollte dann ein deutliches Rauschen zu hören sein, das etwas leiser als das FM-Rauschen bei geöffneter SQL ist !

Wenn nichts zu hören ist, HUB des MODEMS erhöhen, obige Widerstandswerte erst mal so stehen lassen !!!

Wenn dies klappt TXD auf 20..27 heruntersetzen (ich weiss is nich der Bringer, aber dann klappts einwandfrei !) Versuchen Sie IHREN 9k6 Digi zu connecten.

Verschiedene Digis haben 4k8/9k6 bzw. 1k2/9k6 Einstiege. Dafür werden hinter dem Digicall Zahlen (SSID's) angehängt. Bitte auch das richtige SSID verwenden, bei Solingen ist das z.b. DB0IZ-9, oder einfach SG96.

Durch drehen des 1M Potis kann man die Widerstandsanpassung so verstellen, das ein Connecten möglich ist. Gehen Sie dann in den Convers ihres Digis (CH 99 !) und schicken Sie eine vorher aus einer Box abgeschickte CHECK-Datei (ca. 100 Zeilen) zum Digi.

VORHER ESC M UISC+MYCALL (also IHR RUFZEICHEN !!) eingeben, und schauen Sie ob sie Retrys haben.  
Wenn ja am MOD-Poti drehen bis Sie DEN ! Punkt haben wo es keine Retrys mehr gibt. (Bitte bei leerem Digi testen!) Sollte dabei in ihrem Kontrollempfänger bei IHRER Aussendung ab irgendeinem Punkt nichts mehr zu hören sein, drehen sie bitte die Modulation im MODEM etwas herunter.

I.a. ist dies aber nicht nötig !  
Bitte nicht zu "hart" Modulieren, also nicht zu starkes Rauschen bei TX, damit sie in dem Frequenzraster bleiben.

Da die TX-Signale sehr kurz sind, den Parameter T zum Testen evtl. etwas höher stellen ( T 50).

Wenn Sie alles richtig gemacht haben (annähernd), müsste es möglich sein den 9k6 Digi zu connecten.

DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 9

Wenn der Digi connectbar ist, das TXDelay soweit zurücksetzen bis es garnicht mehr klappt, man also nach N-Retrys disconnect ed wird.  
Dies können Sie mit den üblichen Terminalprogrammen prima beobachten, der Retryzähler läuft dann hoch.

Nach dem Disconnect das TXD 2..5 Werte höher setzen, der Digi müsste dann problemlos connectbar sein.

Feinabgleich:

Dieser erfolgt durch das drehen BEIDER POTIS bis zum Erreichen des Optimums !

Die nächste Mailbox connecten !  
Dort C 200 eingeben, oder eine grosse Rubrik ablisten lassen. Dieses Listen muß EINWANDFREI funktionieren !!!!

Wenn der Digi die Check bzw. Listingnummern 2..3 mal wiederholt, ist dies NICHT OK !

Beide Potis nun leicht verändern und nach diesem Verfahren solange vorgehen, bis JEDE Aussendung des Digis, von Ihnen auch gehört und BESTÄTIGT wird.  
Bei leerem Digi sollten keine (wenig) Rejects und Retrys auftreten.

Lassen Sie den anderen Usern durch ein W 12..15 auch genügend Zeit, dazwischen zu kommen. Sie sind mit IHREM FT712RH nicht die allertollste 9k6-Station, da übliche TXDelays im Bereich 1..8 liegen für 9600bps !  
Bitte auch ESC P auf <32 einstellen, das reicht allemale, denn SIE sind ja kein Digi (bei diesem steht P auf 255) sondern brauchen meistens lediglich zu bestätigen. Wenn es geht nehmen Sie BITTE "nur" 3 Watt.

DANKE !

Beim Terminalprogramm SP7 sollten Sie dem Rejectzähler nicht allzu grosse Bedeutung zumessen, sondern den Abgleich besser mit SP6xx vornehmen ... (bei mir ging es mit SP6 besser !)

BEACHTEN SIE !!!

+-----+

9600bd <> 1200bd !

-----

Freiluftverdrahtungen der Widerstandsanpassung, sowie die Verwendung von nichtabgeschirmten Kabeln, Plastikgehäuse usw sind NICHT richtig und führen zum Teil -oder gänzlichem Mißerfolg!

(so ist es eben ! )

+-----+

DL1EER: UMBAUANLEITUNG FT712RH 9600bps - 10

Das war es eigentlich schon. Viel Spaß beim Umbau, und lassen Sie den Kopf nicht hängen wenn, es nicht an einem Abend klappt.  
Ich habe 4 Abende dafür benötigt, da ich bisher keine Umbauanleitung für diesen TRX gefunden habe !  
Bitte machen Sie sich auch die Mühe mit der 4066-Umschaltung zu arbeiten. Sie bekommen dadurch einen ca. 3x höheren Datendurchsatz als wenn Sie das einfach mal so Hanswurstig anklemmen. Die anderen Digibenutzer werden es ihnen danken wenn sie nicht wie ein Weltmeister herumpollen.....

... denn auch bei 9600bps sind SIE mittlerweile nicht mehr alleine !!!

Meinen Dank allen, die mir mit Rat und Tat beiseite standen !

Wer Vorschläge hat die RX/TX-Umschaltung dieses TRX zu verschnellern der sende diese bitte an mein CALL, TNX !!!

Vy 73 de DL1EER - Roland aus Wetten am Niederrhein...

19-07-1998

(FT-712) FT-712 and 4800 bps

I have made the following connections/modifications to the FT212/FT712 transceivers:

For receive, I connected a 10K resistor to pin 11 of Q01 in the IF-unit. The other end of the 10K resistor is the output. The resistor is there to protect the transceiver when you make an error at the external connection...

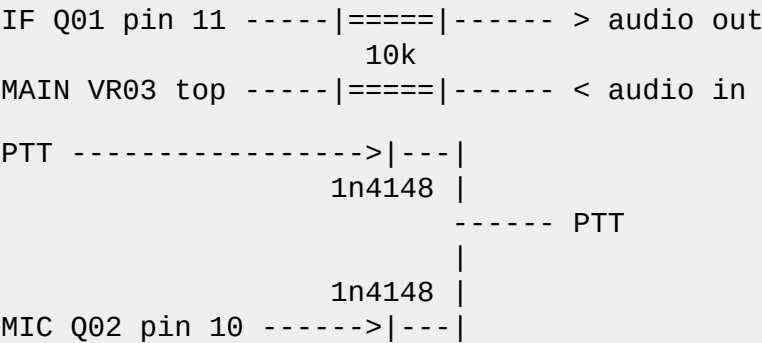
For transmit, I connected a 10K resistor to the top end of VR03 in the main unit (near pin 1 of the MIC unit connection). This point is fed rather directly to the vco varactor.

I have made the external connection with a shielded cable that can run through a hole near the antenna coax. There is a small plate on the heatsink that you can remove and a suitable hole appears.

When you connect the transmit line, it is possible to switchoff the mike amplifier (at least when you don't have the voice recording unit).

Use 2 diodes, with the kathodes connected together to the external "PTT" switching lead. The anode of one diode is connected to the normal PTT point on the mike connector, the anode of the other diode is connected to pin 10 of Q02 in the MIC unit. When you now pull the external lead to 0V, the set will transmit but the microphone does not work. You can leave it connected! Very convenient when you want to use it for fone...

Summary:



(this is a text I sent to someone else before)

I have heard both horror- and success-stories about the TM531 too...  
The problem is, that different people refer to the same results as "It works perfectly, just a few bit errors", or "It's a complete disaster, every 3rd frame I have to send a re-try, killing the throughput".  
We are operating a succesful 4800bps link using the TM531 with the HAPN modem, but that one is a bit less demanding.

73,Rob PE1CHL

30-12-1999

(FT-712) FT-712r Expanded Rx + Tx

- Remove the bottom and top covers and remove the front panel cover.
  - Remove the speaker as it tends to fly out.
  - You must then remove the front board by carefully unplugging it.
  - On the back of this board which is the control unit locate jumpers 1 through 12 and unsolder any that are soldered.
- (Note Original Config Mine is 1,2,3,5,7,11)  
All jumpers must be open (1-12 only).
- Reinstall the control unit and just turn on the radio for a few seconds. Now turn it off again and remove the control unit again and solder jumpers 3, 4, 5, 7 only. (Note -> NOT the same as FT-212)
  - Put everything back together and apply power.

- The display will read 000 or on mine 220.000.  
Radio Should sound like its drifting up/down the band
- Push the MHz button and rotate the main dial until 420.000 reads on the display, then press D/MR once.
- Now press again the MHz button and rotate to 470.000 and press the D/MR again.

I could only go down to 418 & Up to 473 B4 the Radio went out of lock The radio is now programmed to operate from 420 to 470 mhz. Mine has TX 418->452 RX 418->473

This modification is read 593 times.

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**19-07-1998**

## **(FT-7200) FT-7200 für 9600 Baud**

de DG4BAD @ DB0CEL.#NDS.DEU.EU (Martin)

### Anleitung zur Modifikation eines YAESU FT 7200 für 9k6 Packet von DG4BAD

In dieser Anleitung wird beschrieben, welche Modifikationen des FT 7200 notwendig sind um problemlos 9k6 Packet damit zu betreiben. So wie hier beschrieben, habe ich den Umbau an meinem Gerät vorgenommen, und es funktioniert hervorragend. Natürlich kann ich keine Haftung für evtl. auftretende Schäden, die durch den Umbau entstehen könnten, übernehmen.

Zunächst muß das Gerät demontiert werden (Garantiezeiten beachten oder sich einfach nichts draus machen, daß die Garantie dann zu Ende ist). Auch die Frontblende und die Frontplatine müssen entfernt werden. Dazu werden die vorderen, seitlichen Gehäuseschrauben entfernt die Frontblende oben und unten vorsichtig aus den Rasten gehoben und nach vorn gezogen. Anschließend werden die Überwurfmutter von Kanalschalter und Mikrofonbuchse entfernt, damit der Metallrahmen abgenommen werden kann. Löst man dann die drei Schrauben auf der Frontplatine, kann man diese nach vorne abziehen.

Die PTT-Leitung wird direkt an PIN 6 der Mikrofonbuchse abgenommen. Sie kann durch eine Öffnung des vorderen Gehäusebleches ins Gehäuseinnere geführt werden. Anschließend kann die Frontpartie des Gerätes wieder montiert werden.

Die beiden NF-Leitungen können auf der Lötseite der Hauptplatine abgenommen werden. Auf dieser sind unter dem Lautsprecher drei senkrecht stehende Platinen befestigt. Von diesen ist die mittlere die IF-UNIT. Hier kann an PIN 8 die RX-NF abgenommen werden. Man dreht das Gerät so, daß die Lötseite nach oben und die Frontplatte zu einem hin zeigt. Etwa in der Mitte der IF-UNIT sind zwei nebeneinanderliegende Massepins, deren Leiterbahnen verbunden sind. Der PIN rechts daneben ist die RX-NF.

Aus dieser Sicht befindet sich der VCO im rechten Teil der Platine in einem Metallgehäuse. Die Massepins des VCO sind gestrichelt eingekreist. Eingegrenzt von diesen Massepunkten befinden sich mehrere etwas dickere Lötstellen, von denen die links hinten die TX-NF ist. Am besten ist es, mit einem Oszilloskop an diesem Punkt zu messen und mit aufgestecktem Mikrofon den Tonruf zu betätigen. Dann muß hier ein NF-Signal liegen. Auf dem TX-NF-Signal liegt eine Gleichspannung von 2 V, die mit einem 1 uF Kondensator ausgekoppelt werden muß. Die Polung des Kondensators spielt hier keine Rolle, da auch im TNC an dieser Leitung 2 V liegen.

Alle Kabel lassen sich durch Spalte zwischen Platine und Gehäuse ins Geräteinnere führen.

Die Masse nimmt man am zweckmäßigsten von einer Lötstelle vorne, in der Nähe der Frontplatte ab. Auf der Gehäuseunterseite läßt sich bequem eine 9-polige SUB-D Buchse oder eine DIN 5-Pol Buchse unterbringen, mit der die Leitungen verbunden werden.

Viel Spaß und viel Erfolg beim Umbauen wünscht DG4BAD, Martin!

This modification is read 509 times.

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**31-03-1999**

## **(FT-7200) INFO FT 7200 für 9K6 Anschlußpunkte**

de DC8PM @ DB0RUE.#RPL.DEU.EU (Matthias)

Hallo OM´s..

Ich habe den FT7200 auf den Scanner gelegt und die Lötseite mit den Abgriff-punkten in ein \*.gif format gepackt.



Der Betrieb auf 9k6 geht recht gut.. 2000-4000 baut..

vy 73 de DC8PM,Matthias K39

This modification is read 531 times.

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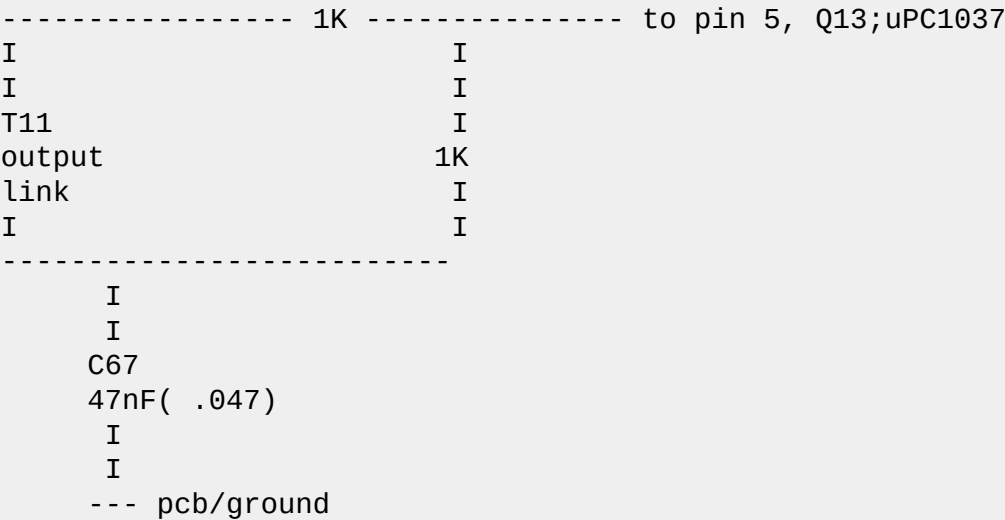
19-07-1998  
(FT-726) FT-726 AUDIO Modifications

Hello my name is Juan, this text talk about the mods for transceivers of Ham Radio... I hope you interest this... If you need mods for others tranceivers, ask me....  
BE CAREFUL! Procede at your own risk.  
Dont forget that transmitting outside the amateur band is not allowed so please consult your local athorities for a special permit.

THANKS EA5SP.EA5FDS.EAV.ESP.EU.WW

Subject: FT-726 AUDIO MODIFICATIONS

Further improvement in FT-726 audio quality can be achieved by a simple modification to the product detector. The product detector seems to be overloaded by the input IF signal, the 6dB attenuuator described here will improve the RX-quality  
The circuit is proposed by LA8AK, and tested by LA7BI (Egil);



the two resistors (1000 ohms) are easily mounted below the PCB Break the pcb between the coil and IC pin 5, mount the resistor, and connect the other resistor from the capacitor to IC pin 5 The audio quality should be much improved, and you should at least be capable of understanding somebody who does not exactly speak the same language as you. Englishmen should now be able to read foreigners who speak english, although it is well known that foreigners from different countries who use english understand each other, but the englishmen often do not understand them.



**19-07-1998**  
**(FT-726) TAPR PSK mods for the FT-726R**

Throughput improvement for the FT726R - Tapr PSK modem

On the Lo-19 and Ao-16 digipeaters I was only averaging 1 in 5 UI frames returned. Viewing my PSK signal on a scope at the FM varactor driver (Q08) on the Sat Unit revealed a very distorted and jittery audio waveform. Replacing the Tapr's obsolete 4030 (U21) with a 4070 gave me a steady but still distorted wave. My throughput was now 1 in 3; better but not good.

Modifying Tapr's low pass output filter (as suggested by G3RUH for his PSK modem) and a change in the Tapr's attenuator and alignment has given me almost 100% throughput.

TAPR Attenuator mod:  
Remove R5 (22K) by putting a jumper on JP7. Replace R6 (5K trim pot) with a 100K trim pot. Be careful when unsoldering as those small trace pads come off very easily.

TAPR filter mod:  
Replace R7 (22K) with a 47K resistor and C8 (.047 mf) with a .01 mf disk capacitor.

FT726R mod:  
Find plug J04 on the Satellite Unit (front left corner). Buy an equivalent plug and header pins and solder them together with short bare wire, attaching the center conductor of RG174U coax to pin 2 and the shield to pin 1 of the adapter. Then plug the Yaesu's plug onto the adaptor's header pins, and the adaptor's plug onto the Sat Unit board's male header pins. You could solder the cable directly to the board or connector, but this way the board's original condition is retained.

Alignment:  
The waveform out of the TAPR (ungrounded end of JP8) will now be a somewhat rounded sawtooth. Adjust the 100K pot (R6) to mid range. Set the FT726R's Mic Gain to the first "tick" (8 O'clock).

Attach your scope to the RG174U coax and slowly increase the Tapr's output (R6). You will see the PSK's distorted waveform smooth out and grow to become more like a sine wave. Around .6 v pp it will be at it's best. As you continue to increase the PSK output distortions will reappear as the FT- 726R's FM limiter clips the signal. Back off the audio until you get the least distorted wave shape. It will be almost a sine wave.

When you set your transmit power lever, back off so your ALC is not active.

Assuming you have all your software switches and parameters set properly you should now have greatly improved throughput. Let me know how this works for you or if you improved your throughput in other ways so we can write it up.

**19-07-1998**  
**(FT-726) Sensitivity for FT726, 50-54, 144-148,430-440 MHz**

Empfindlichkeit FT470

| MHz | µV   |
|-----|------|
| 50  | 0,25 |
| 51  | 0,26 |
| 52  | 0,27 |
| 53  | 0,28 |
| 54  | 0,33 |
| 144 | 0,22 |
| 145 | 0,23 |
| 146 | 0,23 |
| 147 | 0,23 |
| 148 | 0,25 |
| 430 | 0,2  |
| 431 | 0,18 |
| 432 | 0,18 |



|     |      |
|-----|------|
| 433 | 0,18 |
| 434 | 0,18 |
| 435 | 0,18 |
| 436 | 0,18 |
| 437 | 0,18 |
| 438 | 0,18 |
| 439 | 0,19 |
| 440 | 0,28 |

Messung wie folgt:

Signalgenerator (Marconi 2022) an Antennenbuchse. Am Lautsprecherausgang der Funke wird die NF-Spannung (FM-Rauschen) ohne Signal auf 100mV eingestellt. Dann wird das unmodulierte HF-Signal im Pegel soweit erhöht, bis das Rauschen um 20dB zurückgegangen ist.

Vorteil dieser Methode: Sie ist äußerst einfach durchzuführen.  
Allerdings können mit dieser Methode die Propagandadaten der Prospekte nicht erreicht werden weil hier ohne Modulation und ohne CCITT-Filter gemessen wird. Zum Vergleich mit anderen Funken geht dies aber hervorragend und der Empfindlichkeitsverlauf über die Bandbreite läßt sich sehr schön darstellen wenn man die Meßwerte in z.B. Excel graphisch auswertet.  
Bemerkung:Auf 70cm ist das Gerät außerordentlich empfindlich.  
73 de DD0BI @ PI8AWT

19-07-1998

(FT-726) FT-726R Improvement

Remove the 2mtr module , remove the top cover of the module,,, It the PA module end of the unit you will find Q01, it is a Mos-Fet a 3SK74L2X.  
Replace this with a BF982,,, the leads are slightly thicker than the original, so a 1MM drill is required to open the holes on the PCB.  
The LONG LEAD of the BF982 should be fitted facing away from the PA Module. When the Fet is fitted a very small length of wire should be fitted from the Source lead (The lead facing into the center of the board) to the surrounding groundplane.

This should be it, but if you really want to be a perfectionist tune up on T01, T02 and T03 ONLY!!

Finally, Box up and enjoy the low noise, improved signal reception.

This modification is read 943 times.

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19-07-1998

(FT-726) FT-726 mods for 9.6kbps FSK

1. RX data connection

RX signal is drawn from the junction R44-DO4(1S188) with 10K ohm resistor. It must be connected to RX in of G3RUH modem

2. TX data injection

You must inject both TX unit and Satellite unit if you need full duplex operation ( example for uosat4/5 ). The TX data injection point is DO5(FC-53)-C27 in TX unit and DO6(Fc-53)-C25 in SAT unit. You may be able to direct connect from TXD out of G3RUH modem as DC decoupling is in the modem board.

3.

You need selection SW for TXD injection to select simplex/full duplex operation.

This modification is read 747 times.

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19-07-1998

## (FT-726) Mods for ft726r to do 9600

From James Miller G3RUH:

Inject your modem TXaudio directly to the transmitter varactor in the SAT unit via J04 pin 2.

1. Remove the main lid; remove the SAT unit lid.
2. Locate J04 which is a 3 wire connector in the front left-hand corner.
3. Unplug J04, and inject your audio on pin 2, ground on pin 1, using a screened cable.

This is of course assuming you are using a G3RUH or K9NG 9600 baud FSK modems. The receive side needs to come straight from the discriminator which I haven't had a chance to locate yet. Perhaps if someone else has the necessary hook up information for the receive side, they could post it here.

This modification is read 755 times.

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18-11-1999

## (Ft-726) Hang AGC for FT-726R

**Author:** Chuck - KD9JQ - [kd9jq@mc.net](mailto:kd9jq@mc.net).[MODIFICATION.NET](http://MODIFICATION.NET)

### Instructions

Remove R153, C144 from RX Module.

Use different colors to make identification easier. These are to be connected to the Hang AGC circuit.

Add the following five 10 in. lengths of #22 insulated wires off top of RX Module.

**+8 AGC SW** - Connect to hole of removed C144 + side going to S/F pin 5 J06.

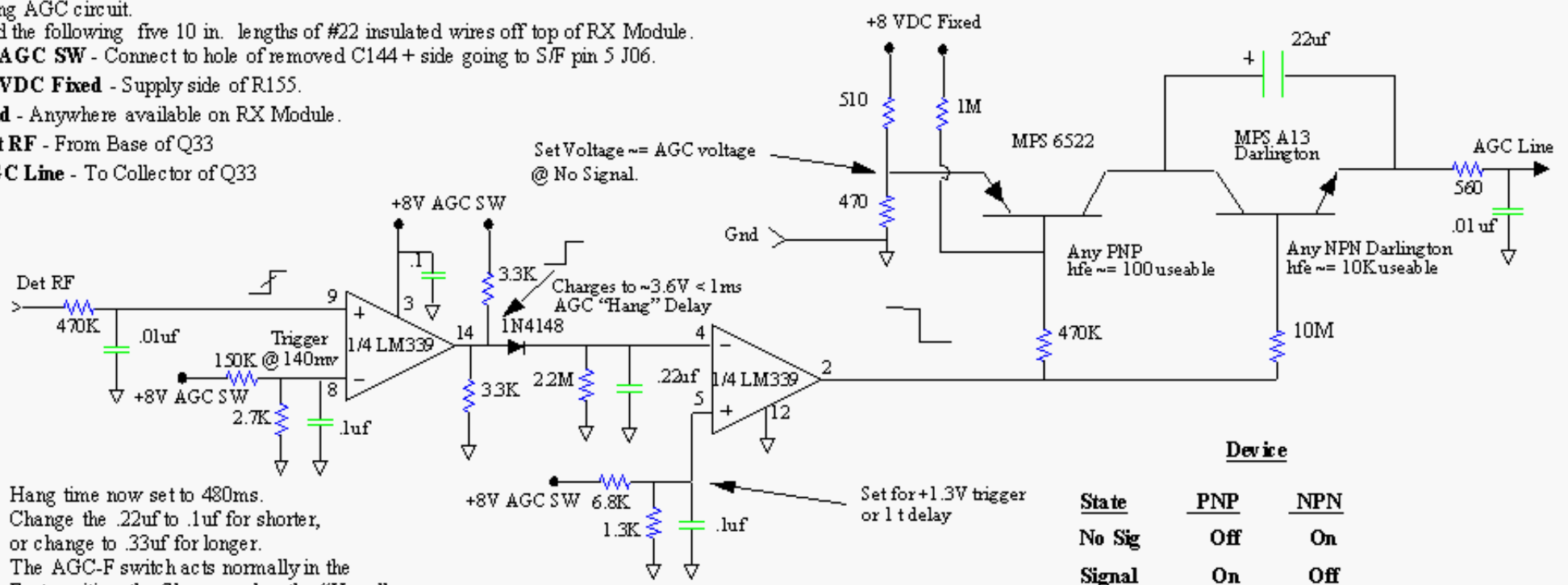
**+8 VDC Fixed** - Supply side of R155.

**Gnd** - Anywhere available on RX Module.

**Det RF** - From Base of Q33

**AGC Line** - To Collector of Q33

### Hang AGC Modification for FT-726R RX Module



Hang time now set to 480ms.  
Change the .22uF to .1uF for shorter,  
or change to .33uF for longer.  
The AGC-F switch acts normally in the  
Fast position, the Slow now has the "Hang".  
Note: All resistors 1/8 to 1/4W.  
Capacitors > 12VDC

Design by KD9JQ 4-12-95

This modification is read 791 times.

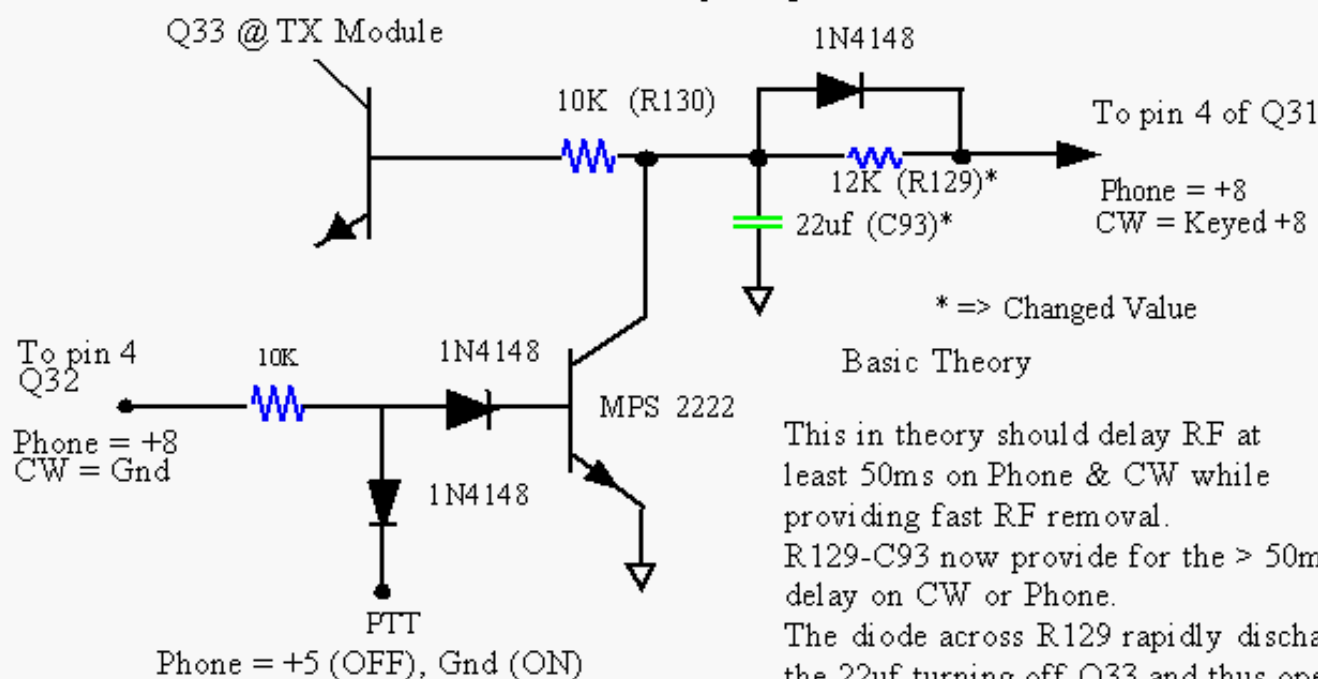
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18-11-1999

## (FT-726) TX module RF Delay for FT-726R

Author: Chuck - KD9JQ - [kd9jq@mc.net](mailto:kd9jq@mc.net).[MODIFICATION.NET](http://MODIFICATION.NET)

### Modification for FT-726R TX Module RF Delay Sequencer



by KD9JQ 4-12-95

#### Basic Theory

This in theory should delay RF at least 50ms on Phone & CW while providing fast RF removal.

R129-C93 now provide for the > 50ms delay on CW or Phone.

The diode across R129 rapidly discharges the 22uf turning off Q33 and thus opening Q18 & Q12.

The addition of the NPN across C93 allows for breaking the RF path via Q18,Q12 until the PTT is activated.

This modification is read 806 times.

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24-09-2000

## (FT-726) Expansion mod for the Yaesu FT-726

Author: Dennis - [us49ca@hotmail.com](mailto:us49ca@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This mod is for the expansion of the RX/TX on 2 Meters.

After this mod the transceiver will work from 143.500 to 148.499

Take off the transceivers top cover, than u will see the 144 and 430 units. Take out the 144 unit and open it up. There are two boards in the unit and you need to work on the board that has two connectors attached to it.

On this board you need to locate diodes numbered D19 up to D26 they're in a corner located all together. How they are lined up in your transceiver right now is different in every transceiver 'cause there are about 6 different units. For out of band functioning make sure D19, D23, D24, D25 are connected by either a Diode or a wire those are the ones necessary for the mod.

D20, D21, D22, D26 Need to be open and Unconnected.

If your set made 12,5 khz steps before, it will now make 5 or 10 Khz steps. I have tried to restore it on my set but closing the other Diode openings only results in the set not working properly meaning the 144 or 430 unit does'nt signal or work anymore.....

Important however is, the fact that the set needs to be resetted to make the set work out of band..... when the top is still of the transceiver and all the cables are re-connected, find a little switch on the top left side of the front of the radio (on the circuit board behind the meters) this switch is for the memory battery and control backup. Switch it to "off" and turn the set on the display should now read 147. Mhz. Now switch the little switch back to the "on" position and reassemble your radio. (The switch positions are also to be seen on the top cover next to rubber cap.)

There is no real expansion for the 430 unit the only one there is, this will only make it work from 440 to 450 instead of 430/440.

Open this 430 unit and make sure D18, D19, D21, D22, D23 are closed and the rest should be open. But in europe there is nothing interesting there so why modify it ???

---

Good luck with this mod and be careful when transmitting out of band.

Released September 16th 2000

Dion US49CA/19DC49

us49ca@hotmail.com

This modification is read 1104 times.

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**19-07-1998**

## **(FT-727) Modification for extended coverage**

YAESU FT-727R

Modification for extended coverage. (This will work for both the old and new CPU versions)

- Remove the battery pack
- locate the RAM backup switch according to your manual ( this will be the switch FARTHEST away from the battery terminals)
- Turn the switch off, count to 4, then turn it back on
- Relace the battery pack Turn the rig on. The readout should be entirely blank. If it is not, you probably did not wait long enough before turning the switch back ON, so repeat the above procedure.
- Type in the following: ' 001111 '
- The rig should now come to life. You will have to reprogram all the memories as well as the repeater splits for both bands. The display will now cover 100-199, 400-499MHz, but bands. The display will now cover 100-199, 400-499MHz, but it obviously won't work over this range. Mine covers 139- 153, 420-460.
- The reset code is in your manual

[From another source:]

The factory code to make the program from the factory is ( 443300 ) and if you enter those digits the talkie will return to normal again. However if you enter the code ( 601111 ) you will notice the talkie will come up in a different mode you can and must input 5 digits instead of 4 to input a freq.

Example in the normal mode to get freq 147.06 you would enter 7060 then hit the dial button.

In the expanded mode you would enter 47060 to get the 147.06 cause your display now takes and controls the last 5 digits of a freq instead of the normal 4.

This modification is read 844 times.

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**19-07-1998**

## **(FT-727) FT-727R cat- and control-information**

This information describes the hardware and software requirements of the CAT (Computer Aided Tranceiver) System in the FT-727R.

### Connections

Four connections are used by the CAT SystemL three at the CAT jack, illustrated below, and one (Signal Ground) at the outer contact of the MIC or EAR jack.

DO NOT SHORT THE OUTER CONTACT OF THE CAT JACK TO GROUND!!!

[Diagram of the CAT plug:

- Looks like a stereo audio jack of the appropriate size.
- The outer sleeve is +6 to +12 V DC (Battery Voltage) I do not think this line needs to be connected.

- The middle contact is the Serial KeyCode Input.
- The center contact is the Serial Meter Output (00h to 0Fh).

See the manual for further description.

Data Format:

All serial data consists of single byte binary codes sent at 4800 baud, TTL levels, with two INVERTED stop bits and one INVERTED start bit.

Key Codes:

CAT Control consists of duplication the keystrokes that can be made on the tranceiver keypad by sending the corresponding keycodes to the Serial Keycode Input contact of the CAT jack. The most significant four bits (MSD) correspond with the key column and the least significant four bits (LSD) correspond with the key row. The Function key (on the side of the tranceiver) is simulated by setting bit 7. Results are identical to those described for manual operation in the FT-727R Operating Manual. Serial Meter Output is sent approximately every 100 ms while receiving.

[Table for the codes. The lines in [] are the original values in the Yaesu handout, and are followed by the corrected lines as determined by KB7ABA. Remove the lines in [] to see what should be the right table.]

|     |       |       |       |      |       |     |   |   |
|-----|-------|-------|-------|------|-------|-----|---|---|
| [   | @     | FUNC  | F     | E    | D     | C   | B | ] |
|     | @     | FUNC  | 8     | 9    | A     | B   | C |   |
| MSD | @     |       |       |      |       |     |   |   |
| [   | @     | NORM  | 7     | 6    | 5     | 4   | 3 | ] |
|     | @     | NORM  | 0     | 1    | 2     | 3   | 4 |   |
| LSD |       |       |       |      |       |     |   |   |
| V   |       |       |       |      |       |     |   |   |
| E   | +RPT  | SIMP  | -RPT  | PMS  | P     | SET |   |   |
|     | 1     | 2     | 3     | V    |       | C   |   |   |
| D   | SAV-T | T-DEC | T-SET | TX-M | S/CH  |     |   |   |
|     | 4     | 5     | 6     | M    | MR    |     |   |   |
| B   | SAVE  | T-ENC | SCAN  | MC   | Shift |     |   |   |
|     | 7     | 8     | 9     | C    | <=>   |     |   |   |
| 7   | LOCK  | BATT  | BEEP  | DUP  | Step  |     |   |   |
|     | *     | 0     | #     | V/U  | D     |     |   |   |

19-07-1998  
(FT-727) Ft-727 review

brian@ucsd.edu (Brian Kantor)

I recently acquired a Yaesu FT-727R dual-band walkie, and a few weeks later sent it in for the \$30 processor upgrade that they now come equipped with.

Performance: not bad. Receiver sensitivity is good (~ .3 uV) in both ham bands (144-148, 440-450), and power output is 6+ watts on both bands. Battery life is short (so have two) - you might have to change batteries once a day if you talk as much as most old farts do - but can be extended significantly if you use the low-power switch and run at 1 watt. Just monitoring the channel it seems to be fully recharged if you stick it on the trickle charger while you sleep. There is a rapid-charge stand for it that supposedly brings a battery up in 1 hour; I don't have one so I don't know much about it.

Yaesu doesn't know how to adjust deviation settings, so you'll have to do this yourself - mine was set to 4KHz peak voice dev, and 600Hz for the subaudible tone - which isn't enough for the voice (should be 4.5 to 4.8) and is too much for the tone - should be 300 - 400 Hz for most radio systems. The tone level from the built-in touch-tone encoder and keypad is low too, but I've not been able to find an adjustment for it. I don't have a service manual (if, indeed, there is one) and absolutely NO adjustment information comes with the radio. You could probably leave the dev. settings as they come from the factory and not sound worse than most of the other rice-box radios.

The transmitter looks fairly clean on a spectrum analyzer; the nearest crud was about 55 dB down but still in the band; stuff

farther away was much lower. They look like synthesizer spikes. You'd expect a walkie to be dirtier than a mobile or base radio anyway. I wasn't able to crossmod the front end with the equipment I had, and I've only once heard crossmod-like crud, and that was standing in the middle of a large ham-radio swap meet with well over 200+ other walkies being used near me, so I'd say the front end is pretty good. Again, you'd expect more performance out of a mobile or base radio than a walkie.

The receiver has lots of audio, but the speaker hobbles it. With an external speaker, it's quite loud. Internal speaker might not be heard if you're on a noisy street and you're wearing the thing on your belt (or stuffed into your back pocket).

The dual-band whip antenna isn't great - a single-band antenna for either band outperforms it on that band - but none of the three or four other dual-band whips I tried (some selling for as much as \$45) did enough better that I'd swap it out.

Transmitter audio is quite reasonable - not as muffled as some of the earlier Yaesu radios were. External microphone uses the standard method of keying (if the DC resistance of the microphone is less than about 5Kohm the radio will go into transmit). It also has a Vox, with two switchable sensitivity levels. The VOX won't work with the internal microphone; probably it's intended to be used with a headset. I've modified a Pacific Plantronics aircraft-style clipon headset and it works well.

Dial illumination is nice. It backlights the LCD panel AND the translucent keyboard - you can operate it in complete darkness - unlike other radios that you have to shine a light on the keyboard to see what you're doing.

It has 10 memories - which store the band, subaudible tone parameters, and offset as well as the channel frequency. 4 of them can store separate transmit and receive frequencies for bizarre splits. It needs more memories. Maybe splitting them so there are 10 for each band, since there is a band-select button. Or maybe just add more channels.

The battery-saver feature is a receiver-power sampling mechanism - it turns the receiver on for 1 second each n (n=1-9) seconds until it hears a signal. I don't use it. Scan is also something I don't use, so I can't really evaluate it for convenience, but it does work.

Crossband operation is possible - TX and RX need not be on the same band. Its easy to swap for repeater-reverse too - just hit a button.

Subaudible-tone squelch (for "PL" receive) isn't anything to write home about. It works, but it requires lots of tone level (500+ Hz dev), which is probably why they set the transmit tone level so high, and a small amount of audio leaks through it even when you aren't receiving a properly-encoded transmission. Its not bad, but in a quiet room you'll hear it.

Ruggedness - well, it's plastic. The window over the LCD scratches quite easily; if you keep it in the vinyl slipcover you won't have this problem, but you have to take it out to change the battery and the buttons on the keyboard are harder to press in the slipcover. The back is die-cast aluminum and is the heatsink for the power amplifiers; the belt clip is attached here and seems quite sturdy. Its a good place to engrave your name, callsign, and driver's license number. The rest of the housing is polystyrene, and shows nicks and dings quite easily. You can also melt it with a soldering iron, which makes hot-stamping your name, etc. into it quite easy. I'm probably going to cut some appropriate-sized notches into a Motorola or RCA holster and use that to hold the radio on my belt, since that will give me 1/8" or more of hard leather to protect the radio.

The battery slides into a track on the bottom of the radio and is held by a plastic latch. Its quick to change. The track is large and heavy enough to survive most drops, but it's held on by two small screws into thin metal brackets that will undoubtably strip out after a couple of falls. At that point, you can ream out the threads and solder a couple of nuts to the back of the brackets, and use some #4 stainless screws to hold the slide in. I haven't had to do that yet; I'm just planning for the future. The latch is also plastic; it will probably shear off if you drop the radio on its side from any great height.

Most of the circuitry is surface-mount components on circuit boards in modules; they look unrepairable by most people without hot-gas soldering equipment. They also look expensive and somewhat fragile since they're not shock mounted or damped. I don't think this radio will survive falling out of my back pocket 60 feet up on a tower like my old Motorola HT-200 did. I don't think I'll pound nails with it either, like the Motorola salesman was doing with the HT-200.

Out-of-band performance is nice. On highband, it works from about 142-154.5 MHz, with power and receiver sensitivity falling off a bit at the upper extreme. It would probably work at higher frequencies if I tweaked the PLL/VCO a bit, but I haven't done that yet. Ask your dealer for the MARS instructions and you'll get two pages of crudely-copied instructions on how to tweak the PLL/VCO. On UHF, it works from 416 to 463 MHz, but really has only marginal sensitivity and low power output outside the range 435 to 455 MHz. It doesn't get dirty out of band either, just doesn't perform as well. On our local DEA repeater frequency (418.x MHz), it's about 10 uV sensitivity, and wouldn't hear them at all if I didn't live about 1.5 miles from the repeater.

I think it's a good buy for \$400. Its got some nice features and works well - better than the alternative of buying TWO other walkies, one for each band.

Brian Kantor WB6CYT UC San Diego



**31-03-1999**

**(FT-727) FT-727R fuer 9600bd**

*de DL7VHS @ DB0BLO.#BLN.DEU.EU*

Hallo PR-Fans,

ja, mit dem Yaesu FT 727 R Handy kann man tatsächlich 9600 Baud machen. Jeder sollte sich aber selbst überlegen, ob er den "Eingriff" wirklich vornimmt. Besonders sendeseitig ist an den FT727R quasi nur mit größeren chirurgischen Operationen heranzukommen. SMD-Löterfahrung, eine ruhig Hand und Schaltungsverständnis sind notwendig.

Dabei ist das Ganze schaltungstechnisch gar nicht schwierig. Man geht so vor, wie man prinzipiell jedes Gerät zum 9k6 Umbau untersucht.

Man benötigt den Schaltplan und die Leiterplattenunterlagen.

### **SCHALTUNG**

#### **EMPFANGSSEITE:**

Geht man in der Schaltung vom Lautstärkeregler rückwärts zum HF-Eingang stößt man irgendwann auf die IF-UNIT (ZF). Dort wird am PIN 9 des Q01 (HA12442V) die NF ausgekoppelt. Dies ist auch gleich unser Kandidat! Hier wird die NF für das G3RUH Modem ausgekoppelt. Aufgrund des starken Pegels mußte ich ein 22k Poti zur Auskopplung herausführen.

#### **SENDESEITE:**

Man sucht einfach nach den Ausgängen des Tonrufgenerators bzw. MIC-Verstärkers. Hier ist der Schaltplan der Main-Unit am hilfreichsten. Das NF-Signal (MOD OUT von der Mic-Unit) gelangt im wesentlichen über ein Poti (VR01, 22k) und einen C (C25, 2.2µ) an den MOD IN Pin der VCO-Unit. Die Einspeisung erfolgt direkt an diesen MOD IN Pin der VCO-Unit (oder auch zwischen C25 und C32, was sich auf der Leiterplatte als analog erweist).

### **UMBAUANLEITUNG**

ICH MÖCHTE HIER EINFÜGEN, DAß DIESER UMBAU NUR ETWAS FÜR VERSIERTE BASTLER IST. ICH ÜBERNEHME KEINERLEI GARANTIE FÜR EVENTUELLE SCHÄDEN. ES SIND ALLE VORSICHTSMASSNAHMEN ZU TREFFEN DIE FÜR DIE ARBEIT AN SOLCHER TECHNIK ÜBLICH SIND (ERDUNG; ENTSPRECHENDER LÖTKOLBEN MIT NETZTRENNUNG...).

#### **EMPFANGSSEITIG**

Mit einem (zwei) Worten - (echt) primitiv. Yaesu hat uns wirklich einen Gefallen getan (und rächt sich dann auf der Sendeseite). Also:

Gerät mit dem Gesicht (Display) auf eine nicht kratzende Unterlage legen (dickes Tuch/Lappen), wobei die Antennenbuchse von uns weg zeigt.

Eventuell vorhandenes Akkupack entfernen. Am Boden des Gerätes befinden sich zwei Schrauben, die die Akkupackhalterung festhalten. Diese müssen vollständig herausgedreht werden.

Wer einen Gürtelclip am Gerät hat (auch Kühlkörper für die PA genannt) muß diesen zuerst lösen ebenso die darunter befindliche Schraube.

Danach sind die 4 Schrauben, die den Gehäusedeckel halten, zu lösen. Nach Abnehmen des Gehäusedeckels blickt man auf die Baugruppen, die auf die Main-Unit aufgelötet sind (hier ist nichts gesteckt, alles ist fest miteinander verbunden). Ganz am rechten Rand etwa in der Mitte befindet sich die IF-Unit. Man erkennt sie an dem ZF-Chip (Q01 - HA12442V) in den Anschlußpins in Zick-Zack Form. Der auf uns zeigende Pin oben ist Pin 9. An diesem muß die NF ausgekoppelt werden (unbedingt abgeschirmtes Kabel benutzen Die Masse des abgeschirmten Kabels habe ich einfach an das Gehäuse des darunterliegenden Filters angelötet. Fertig. Wie bereits oben erwähnt mußte ich das Signal noch mit einem Poti etwas dämpfen (22k oder so) und dann ab zum G3RUH Modem.

#### **SENDESEITIG**

Bis jetzt war es recht primitiv. Nun muß man das Gerät fast komplett zerlegen. Wie man von oben sieht ist an die VCO-Unit von der Seite aus nicht heranzukommen. Daher müssen wir an die Unterseite heran. Dazu muß die "Hülle" des Gerätes entfernt werden. Alle Bedienungselemente an der Kopfseite müssen entfernt werden. Unter dem Volume-Regler und unter dem Squelch-Regler befinden sich zwei Muttern, die gelöst werden müssen. Die drei Schalter lassen sich einfach herausziehen. Nun kann man das Gerät aus der "Verpackung" nehmen. Gehäuse weglegen und Gerät auf den Rücken legen, so daß man ihm in die Augen (sprich ins Display) schauen kann. Nun muß die Control-Unit vom Rest der Welt getrennt werden (von der Main-Unit). In meinem Gerät erfolgt diese Befestigung mit etwas dickeren Drähten jeweils in der Nähe der 4 Ecken des Gerätes. Diese 4 Drähte müssen jeweils an einer Seite abgelötet werden. Danach kann man die Control-Unit in einen rechten Winkel zur Main-Unit klappen.

In der rechten unteren Ecke der Main-Unit befindet sich die VCO-Unit und ist - genialerweise - verdeckt durch eine Abschirmplatte. Diese muß, wie könnte es anders sein, entfernt werden. Sie ist an 4 Punkten mit der Main-Unit verlötet. Für diese Lötarbeit habe ich meinen Lötkolben auf 400°C eingestellt, sonst erreicht man dort gar nichts und raucht nur

irgendwelche anderen Bauteile auf.  
Da man ja nicht an allen 4 Stellen gleichzeitig löten kann, muß man die Platte etwas verbiegen. Das kann man aber nach dem vollständigen Ablöten wieder korrigieren. Wir sind nun endlich an gewünschten der Stelle angelangt. Ich brauchte hier erst mal einen Tupfer für die Stirn und ein Akkupack um zu sehen, ob das gute Stück noch funktionierte. Alles war noch o.k., also weiter. Am unteren Ende des ehemals abgedeckten Teils erkennt man einen ziemlich dicken SMD-C, Farbe orange bei mir. Das ist C25. Rechts unter ihm liegt C31 und rechts darüber C32. Wie man aus der Schaltung und auch auf der Platine sieht, sind C25 und C32 direkt miteinander verbunden und dies ist genau der Punkt, an dem der Output vom Modem angeschlossen werden muß. Dazwischen muß ein ca. 1µF Kondensator um Gleichstrom abzuwimmeln, der zu Frequenzverschiebungen beim VCO führt. Masse findet sich leicht in der näheren Umgebung. Fertig - ach nein - alles wieder zusammenbauen, ganz einfach in umgekehrter Reihenfolge.  
Die Auskopplung aus dem Gerät habe ich über die CAT-Buchse vorgenommen, da ich CAT sowieso nicht mehr benütze. Man kann dann einfach mit einem Stereo-Kopfhörerstecker das Signal am geschlossenen Gerät abnehmen.

HUB-EINSTELLUNG BEIM G3RUH

Die Hub-Einstellung beim G3RUH Modem ist in ihrer ursprünglichen Form ungeeignet für den FT727R (wie übrigens auch bei fast allen anderen Geräten). Man muß das Poti fast ganz zudrehen, sonst sendet man unversehens mit einem Hub von 100kHz, ein bißchen viel. Um diese Einstellung etwas feinfühlicher vornehmen zu können, habe ich einfach einen 33k Widerstand zwischen das Poti P1 (10k) und dem Pin 1 des IC 12 A (LM 324) gelötet.

Wer weitere Informationen, z.B. zum Anschluß an die CAT Buchse benötigt, oder Fragen zum Umbau hat, kann mir gern eine Nachricht in meine neu (9600-) Box DB0BLO in Berlin senden. Je nach meinen zeitlichen Möglichkeiten werde ich mich um eine Antwort bemühen.  
Schaltungen/Leiterplattenpläne und ähnliches kann ich leider nicht verschicken, da meine Kopieen bereits sehr miserabel sind. Falls jemand gute Schaltungs- und Leiterplattenunterlagen vom FT727R besitzt, wäre ich für eine (gute) Kopie dankbar.

Nochmals der Hinweis, daß ich für Umbauten und eventuelle Schäden keinerlei Garantie übernehme.

73 und viel Spaß mit 9600 Baud wünscht Jens, DL7VHS @ DB0BLO

19-07-1998

(FT-73) Extended frequency for FT-23,33, and 73

Extended Frequency Enhancements for the Yaesu FT-23R(2M), FT-33R(220), and FT-73R(70cm). (Revised)

Greetings and hello radio amateur operators.

The topic is increasing the functional frequency coverage of what has been probably Yaesu's most popular handheld transceivers.

To save manufacturing costs, Yaesu engineers designed multiple personalities in the same CPU module found in the FT-23R, FT-33R,UHF FT-73R and the FT-2008/7008 transceiver. The FT-2008/7008 transceiver is the commercial version of the Ft-x3R series.

Unique features of this mod include

- the just say Mao feature (\*\*)  
(NO FREQUENCY READOUT: Ch 1 thru Ch 9 appear on your display.  
Great when you aren't looking and some fellow ham tries to rip off your simplex frequency)
- the GREAT WHOPPER  
(opens the CPU to 50-300 Mhz or 220-550 Mhz coverage. Full (.100 Mhz to 999.9995 Mhz) adjustable freq coverage available so far only on the FT-33R;this doesn't mean you can actually transmit but the Activity light goes in TX and you get a good fake RF bargraph that indicates that you can transmit on 750 MHz.

How to do it:

- Contemplate invalidating your warranty. No beginners beyond this point. If you don't know how to solder, don't learn here. Ask an elmer to assist.
- If you treasure your memories, write out your contents of your radio on a piece of paper. When you make the changes, the CPU runs a small diagnostic and see that the jumpers have been changed. It will ERASE ALL PRIOR SETTINGS.
- Dissassemble your transceiver.

4. Find the line of solder connections running down the CPU board. GENTLY move all wires aside so you won't melt them.
5. Using solder wick and a Good low-power soldering Iron, see chart. Read special notes for the FT-33R.
6. Rebuild radio and count your blessings.

This modification is read 610 times.

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**19-07-1998**

## (FT-73) FT-73R und 9600 Baud

Hallo FT-73-User !

Seit einiger Zeit bin ich mit meinem FT-73 und einem G3RUH-kompatiblen Modem (Eisch) in 9600 Baud qrv. Bei mir funktioniert es doch recht gut, daher möchte ich hier kurz über den Anschluß des Modems berichten.

Bei mir gab es zwei 'Ausbaustufen'. Zunächst eine Möglichkeit, die recht einfach ist und ohne Öffnen des Gehäuses auskommt. Damit konnte ich z.B. bei DB0FD schon recht ordentlich arbeiten. Alsdann eine Version, bei der lediglich noch der Empfangsabgriff verbessert ist (aber Löten an SMDs). Diese Version kann man dann wohl als optimal bezeichnen. Die erste geht aber auch gut, sofern Digi- und eigener TRX gut zusammenspielen.

(1):

Der Anschluß des Modems an das FT-73 war hier denkbar einfach, denn alle benötigten Signale waren auf der Steckverbindung für die Tone-Squelch- Option vorhanden. Also spart man sich das Löten an den SMDs.

Die Steckverbindung befindet sich an der Unterseite des vom Akku bzw DC-Adapter befreiten Geräts. Man löst die 4 Schrauben des Abschirmblechs, entfernt dieses und die dann zum Vorschein kommende Plastikabdeckung.

Der 10-polige Tone-Squelch-Steckverbinder ist folgendermaßen belegt:

|                  |   |          |                       |
|------------------|---|----------|-----------------------|
| Pin 1 (weiß)     | : | 'TONE'   | - TX-Signal vom Modem |
| Pin 6 (gelb)     | : | 'DET IN' | - RX-Signal zum Modem |
| Pin 10 (schwarz) | : | 'GND'    | - Masse               |

An Pin 6 den Widerstand etwas herausziehen, dort das Kabel anlöten.

Der vom Modem kommende Signalpegel ist um einiges zu groß. Daher habe ich das 10k-Poti für den NF-Pegel gegen einen 8k2-Widerstand und ein 1k-Poti getauscht. Nun kann man messen, welchen Pegel z.B. der Tonruf am Einspeise- punkt erzeugt und den Pegel des Modems entsprechend einstellen. Im Betrieb sollte man dann die Einstellung optimieren ( eher weniger als zuviel, hier etwa 100mVpp an Pin 1 ... ).

Gesteckte Jumper sind bei mir Nr. 10 und 12.

Die PTT-Steuerung erfolgt wie gehabt an der Mic.-Buchse über einen 1,2kOhm- Widerstand.

(2):

Unter (1) durchläuft das RX-Signal noch ein RC-Kombination, bevor es zum Modem gelangt. Der QRG-Wechsel zu DB0CEL erforderte eine Verbesserung beim Abgriff. Das RX-Signal wird nun direkt am FM-Demodulator abgenommen. Hierzu wird das Gerät geöffnet: 2 Schrauben seitlich, 4 oben (vorher Knöpfe, Top- Platte und Gummi abziehen. Dann die beiden Hälften vorsichtig auseinander- klappen und zur Orientierung so hinlegen, daß der Akkuanschluß nach unten zeigt. Wir lokalisieren auf der linken Hälfte (dort wo die BNC-Buchse sitzt) unseres so verunstalteten Handys die IF-Unit. Sie befindet sich auf einer kleinen Platine, die fast in der Mitte des Main Boards senkrecht aufgesetzt ist. Sie ist dem Lautstärke-Steller am nächsten und endet an der VCO-Unit. Man erkennt deutlich das orangefarbene Filter auf der IF-Platine.

Nachdem der Lötkolben eingeschaltet wurde, drehen wir den TRX um 90° gegen den Uhrzeigersinn und sehen nun das einzige IC der IF-Unit (TK10420M) auf der uns zugewandten Seite ('Chip-only' side), etwas vom Klebeband verdeckt. In der rechten oberen Ecke der Platine erkennen wir den Widerstand R16 (immer noch 'chip-only' side). Genau dort kann das (dünne!) Kabel für das RX-Signal an der oberen, heißen Seite der Widerstandes angelötet werden. (Vorsicht: hier wird's etwas eng !) Zur Sicherheit sollte man noch einen 10k-Widerstand in diese Leitung einschleifen.

Anmerkung zur TX-Nf-Einspeisung :

Bei der unter (1) beschriebenen Möglichkeit durchläuft das Signal noch einen Tiefpaß mit ca. 16kHz Grenzfrequenz, was theoretisch ja nicht viel ausmachen dürfte. Jedoch hat Axel, DG1BBQ berichtet, daß es bei ihm eine Verbesserung brachte, das C des Passes auszubauen. Das ist etwas aufwendiger und der FT wird bis aufs letzte zerlegt hi. Wer hierzu Infos braucht bitte melden.

(3) Kabelverlegung:

Zum Schluß noch etwas zur Verlegung der Kabel. Die Anschlüsse an den Steck- verbinder habe ich mangels passendem Stecker mit dünnem Draht, an dem dann die Kabel zum Modem angelötet sind realisiert. Da ich das FT-73R selten portabel nutze, habe ich die Akkuverriegelung ausgebaut (VORSICHT: die Feder findet man nicht mehr wieder, wenn sie weghuscht) und dort die Kabel durch- geführt.

Das wars schon. Ich bin sehr am Erfahrungsaustausch interessiert, daher bitte doch mal schreiben, ob's geht oder auch nicht. Sehr zu empfehlen für jeden, der sich mit 9k6 beschäftigt ist das Skript '9600-Bd FSK-Technik nach G3RUH-Standard' von DG3RBU. Hierbei einen Dank an Johannes für das Zusammenstellen dieser interessanten Stoffsammlung !!!

Und nun viel Erfolg beim Umbau und viel Spaß mit 9600 Bd !

73 de Jens in Nienhagen nr Celle, DL8OBE @ DB0CEL.DEU (live DB0CEL 9600)

(PS.: Ale Angaben ohne Gewähr ... )

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hallo FT73 user..

ich habe mein FT73 nun auch auf 9k6 umgebaut, hab ca 3 stunden gebraucht, aber es ist nun vollbracht.. die aktion war zwar recht raubauzig, aber es scheint zu klappen..

grundbedingung war von vornherein:

- alles steckbare anschlüsse (kein stecker mit isoband angeklebt)
- möglichst auf erprobte methode zurückgreifen
- wenig aufwand

das alles brachte mich auf folgende idee:



man nehme die standard-abgriffe die man in den bisherigen anleitungen findet und kombiniere sie mit kabellosen methoden anderer geräte..

dabei stieß ich auf die umbauanleitung des C628 (was ich auch habe).. dort kann man entweder ein loch bohren (iss ja massig platz) oder man baut die klinkenstecker um.. letzteres macht nur mit einem SMD-platz spaß..

ich selber hab die lochbohr-aktion gemacht, würde aber auch gern mal die klinkenbuchsen umbauen..

da ich am ft73 zunäxt keinen platz für die zusätzliche buchse gefunden hab und die akkuverriegelung keinesfalls weichen durfte ( /p betrieb) wollte ich die buchsen wie beim 628 umbauen, bin aber leider an den mono-buchsen gescheitert. also mußte eine 3.5mm klinkenbuchse (selber typ wie bei der 628-anleitung) in dem gerät untergebracht werden..

die buchse wird auf der rechten seite im hinteren gehäuse-teil eingesetzt, auf der linken sitzt das PA modul und die akku-verriegelung.. die höhe der buchse ist nit einfach zu beschreiben, da ich kein genaues maß vor dem bohren genommen habe, es sind von der "unterkante" loch bis zu unterkante gerät ca 8-9mm.. eventuell muß man das loch nach einer richtung weiten, deswegen nur ein 5mm loch statt einem 6mm bohren, notfalls an der plastikbuchse rumfeilen, das plastik iss recht dick..

wer kein geschick für solche haarigen sachen hat, sollte sich den umbau von jemand durchführen lassen, ein 5er loch mit eingebauten platinen zu bohren ist nur was für stahlharte nerven ;->

die anschlußbelegungen der buchse und die abgriffe für die NF kann man sich aus den anderen umbauanleitungen besser zusammensuchen wie ich es jetzt hier darstellen könnte..

verantwortung für zerrupfte FT73 übernehm ich keine, aber vielleicht kauf ich ja den schrott auf, hihhi...

viel spaß beim umbauen, für erfahrungsberichte wär ich dankbar..

42s es 73s de Wolfi, DB6WY@DB0PSC-8, Sys DB0DIG, Co-sys DB0DIG

This modification is read 487 times.

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**31-03-1999**

## **(FT-73) Steckanschluss für Packet an YAESU FT73R**

Seit ich mit 9k6 arbeite und daher den Klinkenbuchsenanschluss nicht mehr verwenden kann, hat sich hier eine Anschlusslösung bewährt, die ich Interessierten nicht vorenthalten möchte:

Aus IC-Fassungen mit gefrästen oder gedrehten Kontakten (das sind die etwas edleren, teureren) lassen sich leicht eine Miniatursteckbuchse und auch der dazu passende Stecker herstellen, weil die Anschlussstifte der Fassungen schön in die Kontaktöffnungen derselben passen.

Aus einer IC-Fassung werden zwei vierpolige Stege herausgeschnitten.

Einer der Stege wird zur Steckbuchse. An ihm werden an den Stiften 1, 2 und 4 dünne farbige Litzendrähtchen angelötet. Kontakt 3 bleibt frei, sein Stift wird abgewickelt und die Oberseite des Kontaktes mit etwas Zinn verschlossen (das wird der Verpolungsschutz). Die Löstellen werden mit etwas Schrumpfschlauch abgedeckt. Das Ganze wird an der rechten Schmalseite der vorderen Gehäuseschale des FT73R etwa in Höhe des Mikrofones mittels etwas 2-Komponentenkleber angeklebt. Die Litzen werden mit einem kurzen Stück Schrumpfschlauch zu einem "Kabel" zusammengefasst und an der Unterkante des Gerätes (zwischen Gerät und Akku/Ladeadapter) ins Geräteinnere geführt und dort entsprechend Umbauanleitung Stufe (1) oder (2) angeschlossen. Ich habe dies hier wie folgt vorgenommen: Stift 1: TX, Stift 2: RX, Stift 4: Masse.

Zwischenbemerkung: bei mir hat sich mittlerweile die Umbaulösung (2) bewährt. Sie ist zwar nicht gerade einfach zu bewerkstelligen, aber mit Leuchtlupe und Mini-Lötnadel gehts.

Der Unterschied zur vorher verwendeten Umbaulösung (1) ist gewaltig und daher diese Version meines Erachtens sehr zu empfehlen.

Bevor der Akku/Ladeadapter wieder aufgeschoben werden kann, muss an der Stelle, wo er auf das "Kabel" trifft, mit einer kleinen Rundfeile eine halbrunde Aussparung ins Akkuoder Ladeadaptergehäuse gefeilt werden, so gross, dass das "Kabel" nicht gequetscht wird. Vorteil dieser Vorgehensweise: am teuren empfindlichen FT73R selbst muss nicht gefeilt oder gebohrt werden.

Der zweite Steg wird zum Stecker: Hier wird ein dünnes flexibles zweiadriges geschirmtes Kabel, welches zum Modem führt, oben auf dem Steg, also dort, wo normalerweise die IC-Beinchen reinkommen, angelötet. Der dritte Stift wird unten abgewickelt (Verpolungsschutz). Am Massekontakt wird zusätzlich ein recht kräftiger Draht (hier 1mm Cu Ag) angelötet, dieser wird nach oben weggeführt und so lang gelassen, dass er, wenn der so gewonnene Stecker in die oben beschriebene

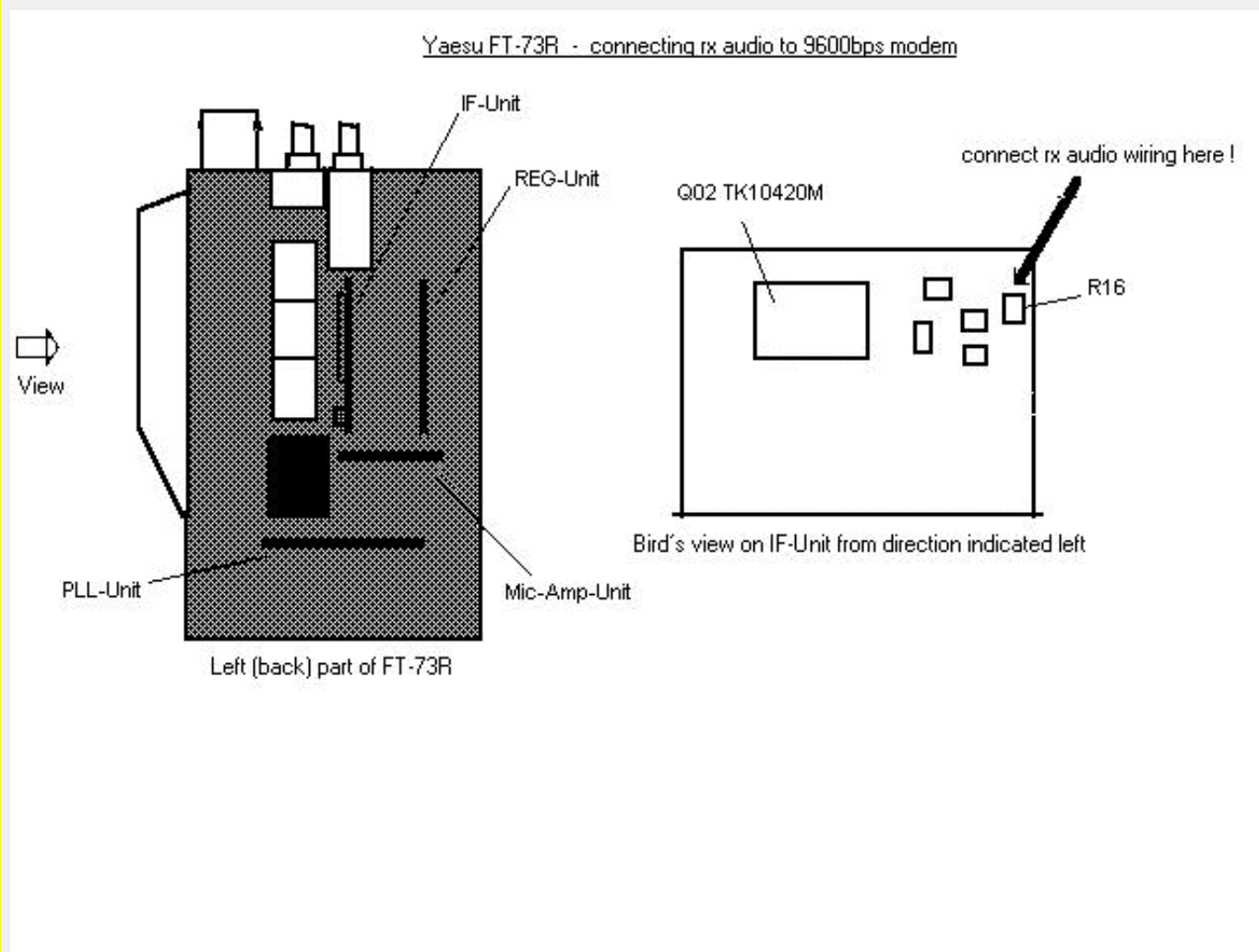
angeklebte Buchse gesteckt ist, zum Haken umgebogen gerade in die oben rechts am FT73R vorhandene Öse passt. Dies wird quasi Zugentlastung und Knickschutz fürs Kabel. Mit etwas Schrumpfschlauch und vielleicht noch etwas Kleber wird das Ganze zu einer stabilen Einheit. Die Zugentlastung wird unbedingt benötigt, denn die kleinen Steckerstifte sind recht empfindlich.

Wenn das FT73R wie hier öfter mal zum p- oder m-Betrieb eingesetzt werden soll, stört die kleine seitliche Steckverbindung kaum. Um Berührungen der Kontakte zu vermeiden klebe ich in solchen Fällen einfach jedesmal ein kleines Stück Isolierband über die Kontakte. Perfektionisten könnten sich z.B. wie oben beschrieben einen kleinen Blindstecker herstellen. Und weil die Buchse sehr flach ist, passt die Funke nach wie vor in die Tragetasche.

Ein Tip: am FT73R wird nur ein sehr kleiner Modulationspegel (hier etwa 100 mVss) verlangt. Das Modem (hier ein Eisch-Modem) liefert einen wesentlich höheren Pegel ( hier bis 8Vss), es muss also ein Spannungsteiler eingefügt werden. Ich habe im Interesse des Störabstandes auf dem Verbindungskabel diesen Spannungsteiler (hier 22 / 1.2k Ohm) aus dem Modemgehäuse, wo er bisher war, herausgenommen und direkt im eben beschriebenen Stecker integriert.

Und noch ein Tip: wenn man die RX-/TX-Signale z.B. mit dem Oszillographen überprüfen will, lässt sich leicht aus einem weiteren 4-poligen IC-Fassungssteg ein "Zwischenstecker" anfertigen. Der wird dann während der Messung zwischen die oben beschriebene Steckverbindung gesetzt. An ihm sind einpaar kurze Strippen als Messanschluss angelötet und seitlich rausgeführt.

Vielleicht helfen meine Ausführungen dem einen oder anderen FT73R-Benutzer. Für eventuelle Fragen stehe ich gerne zur Verfügung.



This modification is read 470 times.

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**13-01-2002**

**(FT-73) FT-73 átalakítás 9600 Bd-ra**

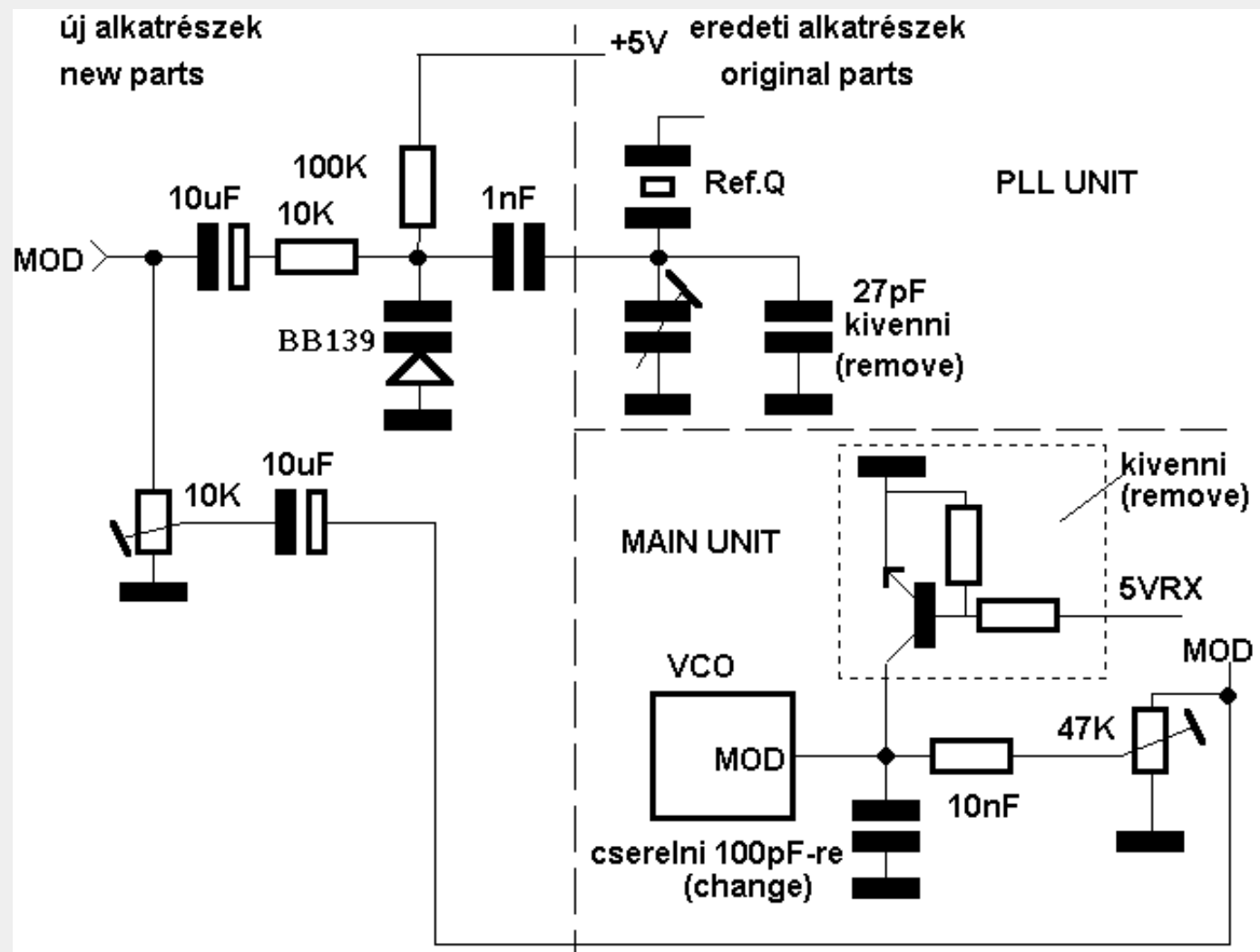
**Author: HA5OB**

(C) HA5OB , 1997

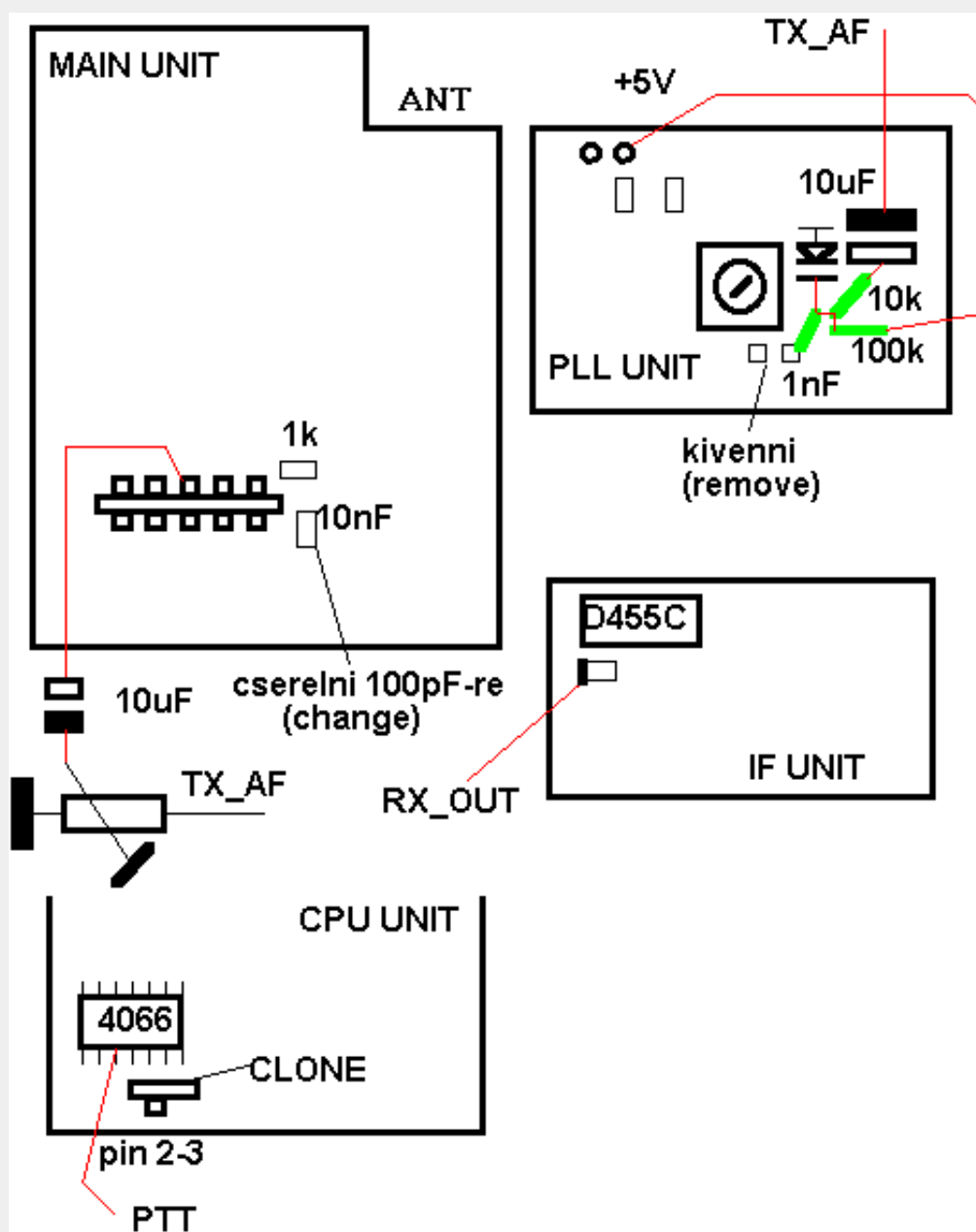
**AZ ÁTALAKÍTÁST ÓVATOSAN VÉGEZZÜK, MERT EGY ROSSZ MOZDULATTAL KÖNNYEN TÖNKRETEHETJÜK A RÁDIÓT!**



## A kapcsolási rajz



## Az alkatrészek elhelyezése



**19-07-1998**  
**(FT-730) Umbau des FT-730R**

Den oberen deckel abschrauben (4 schrauben) geraet mit display zum bauch. (hi,nur zur richtungsbestimmung) unmittelbar hinter der rufton taste ist ein 2 poliger WEISSER STECKER (P4 MOD IN) heisse ende farbe weiss und abschirmung zusehen. unmittelbar vor dem weissen draht (vom stecker) ist ein 2,7 kilo widerstand, DAS IST UNSER KANDIDAT,DA KOMMT TXD VOM 9600BD MODEM RAN.

von dem etwas die farbe abkratzen und den minus pol eines 10æF kondensators anloeten. an den plus pol wird der innenleiter eines abgeschirmten kabels geloetet. die abschirmung wird an die abschirmung des weissen steckers (isolierung mit loetkolben etwas frei machen) geloetet. das kabel dann an der rechten bord-wand nach hinten gefuehrt. unter dem schiebeschalter rechts hinten unter dem wort "clear" ist genug platz fuer ein 6 mm loch zu bohren. so das war die tx-seite, nun die rx-seite.

in der mitte vom display ca.6cm von vorderkante ist ein blanker topf mit einem kern und links daneben ein 16 beiniges IC Q12 (MC3357P) zu erkennen. zwischen ic und dem blanken topf ist ein schmaler spalt, genau in dieser flucht ca.10mm nachhinten steht ein kleiner 0,1æF kondensator und ganz dicht daneben, so in etwa 13uhr stellung ist ein stift (TP2=PIN 9 von Q12) nennt der sich. DAS IST UNSER KANDIDAT, DA KOMMT RXD VOM 9600BD MODEM RAN.

es sind dort 4 stifte in unmittelbarer naehe, der vom display aus gesehene 1.stift (wie oben beschrieben) ist der richtige. rechts neben dem stift steht ein 8 poliger stecker wiederum rechts daneben stehen 4 filter die zum teil mit einem draht unter einander verloetet sind. davon habe ich mir die masse fuer das RXD kabel geholt. das kabel ebenfalls nach hinten verlegen.

nun noch die ptt leitung.

einen ein poligen draht an den linken anschluss der CALL-TASTE anloeten, den anschluss mit isolierband abdecken und ebenfalls nach hinten heraus fuehren. bevor man loetet, wuerde ich kurzzeitig eine bruecke zur daneben liegenden gehaeusewand machen, dann muss dass PTT-RELAIS anziehen. damit man sicher ist, auch den richtigen anschluss erwischt zuhaben. als steckverbinder habe ich eine 5 polige DIN buchse verwendet. ich verwende das modem TNC2C-H (G3RUH/DF9IC) das mit einem 5 poligen DIN stecker ausgeruestet ist. ich habe mir den TNC fertig gekauft, brauchte nix am modem aendern, nicht einmal den hub verstellen. wir sind hier in berlin im moment 51 stationen, mit allen kann ich sehr gut arbeiten.

noch einen tip:

zum mitschreiben bei 1200 und 9600 kann alles drann bleiben, nur beim senden von 1200 baud muss ich die TXD vom 9600BD modem unterbrechen. (stecker trennen oder kleinen schalter einbauen.)

viele gruesse aus BERLIN und erfolg beim umbau wuenscht manfred dl7tt

**19-07-1998**  
**(FT-736) Mods for FT736R VHF**

Modification of the PMS on the FT736R for VHF.  
Extended coverage on receive from the front panel can be achieved by means of a few simple but repetitive actions,  
The receive can be extended from about 139 MHz to around 155 MHz By the use of the Repeater shift,  
This gives a coverage of about 16 MHz,  
There is no need to snip any of the components,  
And you will not need a soldering Iron for this Modification,

Instructions

There are Two Mods for the FT736R for VHF, One is for the European Version, Which is the one that we will deal with first,

And the other is for the American Version, That we will deal with later on.

### Important notice

Make sure that you are in VFO B when you start this Mod Follow the instructions to the letter. Always put the Highest Frequency into VFO B, and the Lowest ones into VFO A.

1. Turn on Your RIG.
2. Put the RIG into Repeater shift for the 144 MHz Band, By Pressing the - RPT KEY.
3. Set the OFFSET to 01.999.9.
4. Tune the RIG to the Highest Band Edge of 145.999.9 MHz
5. Press the REV KEY ( KEY 5 ).
6. Press the DOWN MHZ Button.

You should now have 146.999.9 MHz on your Digital Readout.

7. Repeat Steps 5 & 6 again.

You should now have 147.999.9 MHz on your Digital Readout.

8. Increase the OFFSET to 03.999.9.
9. Repeat Steps 5 & 6 Twice more, Alternating between both until you get 149.999.9 MHz, On you Digital Readout.
10. Increase the OFFSET to 05.999.9.
11. Repeat Steps 5 & 6 Twice more, Alternating between both until you get 151.999.9 MHz, On your Digital Readout.

Keep on Increasing the OFFSET by 2 until you get the OFFSET up to 99.999.9,  
And at the same time keep on Repeating Steps 5 & 6 Twice after every Increase in the OFFSET, until you get the Frequency up to 245.999.9 MHz

For the American Version Only.

some of these moves are the same. but you can do the European Version on an American RIG. Though you can not do the American Version on an European RIG.

### Instructions

Make sure that you put the Highest Frequency into VFO B, and the Lowest Frequency into VFO A.

1. Turn on your RIG.
2. Put the Rig into Repeater shift for the 144 MHz Band, By pressing the - RPT KEY ( KEY 5 ).
3. Set the OFFSET to 03.999.9.
4. Tune the RIG to the Highest Band edge, of 147.999.9 MHz.
5. Press the REV KEY ( KEY 5 ).
6. Press the DOWN MHZ Button.

You Should now see 148.999.9 MHz on your Digital Readout.

7. Repeat Steps 5 & 6 Three times more, Alternating between both until you see 151.999.9 MHz on your Digital Readout.
8. Increase the OFFSET to 07.999.9.
9. Repeat Steps 5 & 6 Four time more, Alternating between both until you see 155.999.9 MHz on your Digital Readout.
10. Increase the OFFSET to 11.999.9.
11. Repeat Steps 5 & 6 Four Times more, Alternating between both until you see 159.999.9 MHz

Keep on Increasing the OFFSET by 4, until you get the OFFSET to 99.999.9. And at the same time Keep on Repeating Steps 5 & 6

Four times more after every Increase in the OFFSET until you get the Frequency to 245.999.9 MHz.

### STAGE 2

Now that you have 245.999.9 MHz in VFO B, And 144.000.0 MHz in VFO A, We come to the next move, Which is this,  
Press the Function key which is marked with an (F),  
Followed by the PMS KEY ( KEY 3 ),  
This stores the New Band edges in the PMS,

Now Press the PMS key again,  
This time Tune to the Highest Frequency in the PMS,  
Which should now be 245.999.9 MHz.

Make sure you have 245.999.9 MHz in VFO B,  
Make sure that the Frequency in VFO A is Lower than the Frequency in VFO B.  
Make sure that the Repeater shift is set to - RPT.  
Make sure that the OFFSET is set to 99.999.9.

1. Press the REV KEY ( KEY 5 ).
2. Press the DOWN MHz Button.
3. Now Repeat Steps 1 & 2, Alternating Between both until you get the Frequency to 345.999.9 MHz in the PMS.
4. Now Press the Following Keys( Key 9,Key 2,Key 4,Key 9 again) in that order.

The Magic Number is 9,2,4,9.

5. Press the F KEY followed by the PMS KEY. This stores the New band edges back in the PMS.
6. Press the PMS KEY again, Now Tune to the Highest Frequency in the PMS, Which should be 345.999.9 MHz.
7. Repeat Steps 1 and 2 Alternating Between both until you get the Frequency up to 445.999.9 MHz.
8. Repeat the Magic Number of 9,2,4,9.
9. Repeat Step 5.
10. Repeat Step 6.  
And Tune to the Highest Frequency in the PMS, Which should be 445.999.9 MHz.
11. 11/ Repeat Steps 1 and 2 Alternating Between both until you get the Frequency to 545.999.9 MHz.
12. Repeat the Magic Number of 9,2,4,9 in that order.
13. Repeat Step 5.
14. Repeat Step 6,  
And Tune to the Highest Frequency in the PMS, Which should be 545.999.9 MHz.
15. Repeat Steps 1 and 2 Alternating between both until you get the Frequency up to 645.999.9 MHz.
16. Repeat the Magic Number 9,2,4,9.
17. Repeat Step 5.
18. Repeat Step 6,  
And Tune to the Highest Frequency in the PMS, Which should be 645.999.9 MHz.
19. Repeat Steps 1 and 2 Alternating Between Both until you get the Frequency up to 745.999.9 MHz.
20. Repeat the Magic number of 9,2,4,9.
21. Repeat Step 5.
22. Repeat Step 6,  
And Tune to the Highest Frequency in the PMS, Which should be 745.999.9 MHz.
23. Repeat Steps 1 and 2 Alternating Between both until you get the Frequency up to 845.999.9 MHz.
24. Repeat the Magic Number of 9,2,4,9 in that order
25. Repeat Step 5.
26. Repeat Step 6, And Tune to the Highest Frequency in the PMS, Which should be 845.999.9 MHz.
27. Repeat Steps 1 and 2 Alternating Between Both until you get the Frequency up to 945.999.9 MHz.
28. Repeat the Magic Number of 9,2,4,9 in that order.
29. Repeat Step 5.
30. Repeat Step 6,  
And Tune to the Highest Frequency in the PMS, Which should be 945.999.9 MHz.
31. Repeat Steps 1 and 2 Alternating Between Both until you get the Frequency up to 999.999.9 MHz, Be careful not to go Passed 999.999.9 MHz, Because the Rig automatically Default back to 945.999.9 MHz, And you will have to start again from that point.
32. Repeat the Magic Number of 9,2,4,9.
33. Repeat Step 5.
34. Repeat Step 6,  
Now slowly Tune Across the Two Band Edges, Until you see 00.000.0 MHz,
35. Now Whilst still in the PMS Press the VFO A Button.
36. Repeat the Magic Number of 9,2,4,9.
37. Repeat Step 5.
38. Repeat Step 6,  
Now Press either of the UP or DOWN scan Buttons, and you will find that the RIG will scan between 00.000.0 MHz to 999.999.9 MHz, or 999.999.9 MHz to 00.000.0 MHz.

Now that you have set your RIG scanning UP and DOWN, you will find a number of signals on the Band.  
However you will hear signals up and down the Band that are not there.

This can be checked out with a scanner, A signal Generator and a Digital Frequency Meter, But if you do not have these, do not worry Because you do not need them, simply put 138.000.0 MHz in to VFO A, And 156,999,9 MHz in to VFO B.

- 39. Repeat the Magic Number of 9,2,4,9 in that Order.
- 40. Repeat Step 5.
- 41. Repeat Step 6.

You have completed this Modification.

This modification is read 1464 times.

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**19-07-1998**  
**(FT-736) Mods for FT736R UHF**

BY G0HEG

Modification of the PMS on the FT736R for the 430 MHz Band, Extended coverage on receive from the front panel can be achieved by means of a few simple but repetitive actions, The receive can be extended from about 425 MHz to around 459 MHz. by the use of the Repeater shift.

This gives a coverage of about 34 MHz, There is no need to snip any of the components, And you will not need a soldering Iron for this Modification.

Instructions

Make sure that when you start this Mod that you are in VFO A.  
Make sure that you put the Highest Frequency in to VFO B,  
and the Lowest one in to VFO A.  
Be careful not to Touch the UP or Down Scan Buttons on your RIG Whilst doing these Mods.  
Be careful not to Touch the Main Tuning knob on your RIG Whilst doing these Mods

Please Note Also,  
Do not Press any scan Buttons on you FT736R,  
Do not Press the Channel Buttons or the Tuning Knob,  
Because if you Do Turn the Channel Knob the wrong way,  
you will lose all that you have done so far,  
What happens is this ( Press the wrong way the RIG will default back to 430 MHz.  
Turned the wrong way it will Default Back to 430 MHz  
Only Press or Turn Those Knobs Buttons or keys specified in these Mods.

- 1. Turn on your RIG.
- 2. Put the RIG into Repeater Shift for the 430 MHz Band, By pressing the + RPT KEY.
- 3. Set the OFFSET to 09.999.9.
- 4. Tune the RIG to the Lowest Band edge of 430.000.0 MHz.
- 5. Press the REV KEY ( KEY 5 ).
- 6. Press the UP MHz Button.
- 7. Repeat Steps 5 & 6 Nine Times more, Alternating Between Both until you get the Frequency down to 420.000.0 MHz.
- 8. Increase the OFFSET to 19.999.9.
- 9. Repeat Steps 5 & 6 Ten Times, Alternating Between both until you get the Frequency down to 410.000.0 MHz.
- 10. Increase the OFFSET to 29.999.9.
- 11. Repeat Steps 5 & 6 Ten Times, until you get down to 400.000.0 MHz.
- 12. Increase the OFFSET to 39.999.9.
- 13. Repeat Steps 5 & 6 Ten Times, until you get down to 390.000.0 MHz.
- 14. Keep on Increasing the OFFSET by Ten, and after every Increase in the OFFSET, Repeat Steps 5 & 6 Ten Times, Until you get the OFFSET to 99.999.9, And the Digital Read out to 330.000.0 MHz.

STAGE 2

Now that you have got so far it is Important that you follow the next few moves to the letter.

- 1. Press the Function Key Which is Marked with an ( F )
- 2. Press the PMS KEY ( KEY 3 ).

You have just stored your New Band Edges in to the PMS,  
to check this out simply Press the PMS KEY,  
and Press either of the up or down Scan Buttons,  
you will find that the RIG will scan up or down either way,

but that Depends on which Button was Pressed first.

Now that you have 330.000.0 MHz in the PMS,

Make sure that you have an OFFSET of 99.999.9. in the PMS, also Make sure that the Repeater Shift is in the + RPT position.

3. Tune to the Lowest Frequency in the PMS which should Now be 330.000.0 MHz.
4. Press the REV KEY ( KEY 5 ).
5. Press the UP MHz Button.
6. Repeat Steps 5 & 6 Alternating Between both until you get your Digital Readout Down to 230.000.0 MHz.
7. Press the Magic Number of 9,2,4,9 in that order.
8. Press the F Key followed by the PMS key.
9. Press the PMS Key again, Now tune to the lowest Frequency in the PMS Which should now be 230.000.0 MHz.
10. Repeat Steps 5 & 6 Alternating Between both until you get the Frequency Down to 130.000.0 MHz
11. Press the Magic Number of 9,2,4,9 in that order.
12. Press the F Key followed by the PMS Key.
13. Press the PMS KEY again, And Tune to the Lowest Frequency in the PMS,
14. Repeat Steps 5 & 6 Alternating until you get the Frequency down to 30.000.0 MHz.
15. Press the Magic Number of 9,2,4,9, in that order.
16. Press the F KEY followed by the PMS Key.
17. Press the PMS Key, Now Tune to the lowest Frequency in the PMS which should now be 30.000.0 MHz
18. Repeat Steps 5 & 6 Alternating Between both until you get the Frequency down to 00.000.0 MHz, Be careful not to go Passed this Frequency, Because the RIG will automatically Default Back to 30.000.0 MHz, And you will have to start again from that point.
19. Press the Magic Number of 9,2,4,9, in that order.
20. Press the F Key followed by the PMS Key.

This modification is read 1205 times.

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**19-07-1998**

## **(FT-736) Modification af the PMS on the FT-736R for The 1296 MHz Band**

BY G0HEG

Modification of the PMS on the FT736R for 1296 MHz, Extended coverage on receive from the front panel can be achieved by means of a few simple but repetitive actions, The receive can be extended from about 1215 MHz to about 1326 MHz, by the use of the Repeater shift, This gives a coverage of about 111 MHz.

There is no need to snip any of the components, and you will not need a soldering Iron for this modification.

### INSTRUCTIONS

Make sure that you put the Highest Frequency into VFO B,  
Make sure that you put the Lowest Frequency into VFO A.

1. Turn on your RIG.
2. Put the RIG into Repeater shift for the 1296 MHz band, By pressing the + RPT KEY.
3. Set the OFFSET to 59.999.9.
4. Tune the RIG to the Lowest band edge, of 1240.000.0 MHz.
5. Press the REV KEY ( KEY 5 ).
6. Press the UP MHz BUTTON.
7. Repeat steps 5 & 6 Alternating between both until you get the Frequency down to 1180.000.0 MHz.
8. Increase the OFFSET to 99.999.9.
9. Repeat steps 5 & 6 Alternating between both until you get the Frequency down to 1140.000.0 MHz.

### STAGE 2

You should now have 1299.999.9 MHz in VFO B,  
And 1140.000.0 MHz in VFO A.

Make sure that the OFFSET in the PMS is set at 99.999.9.  
Make sure that you have the Repeater Shift set in the + RPT position.

1. Press the F key followed,by the PMS KEY ( KEY 3 ).



You have just stored the New band edges in your PMS.

2. Press the PMS KEY again, now Tune to the Lowest Frequency in the PMS. Which should now be 1040.000.0 MHz.
3. Press the REV KEY ( KEY 5 ).
4. Press the UP MHz BUTTON.
5. Keep Alternating between steps 3 & 4 until you get the frequency down to 1040.000.0 MHz.
6. Now Press the following KEYS( KEY 9,KEY 2,KEY 4,KEY 9 ).

The Magic Number is 9,2,4,9.

You should now have 1040.000.0 MHz in VFO A.

7. Repeat Step 1.
8. Repeat step 2,  
and Tune to the lowest Frequency in the PMS.
9. Repeat step 3.
10. Repeat step 4.
11. Keep Alternating between steps 3 & 4 until you get the frequency down to 1000.000.0 MHz, be careful not to go over 1000.000.0 MHz, because the RIG will Automatically Default back to 1040.000.0 MHz, and you will have to start again from that point.
12. Repeat step 6.
13. Repeat step 1,  
By Pressing the Function KEY, Followed by the PMS KEY ( KEY 3 ).
14. Repeat step 2,  
Press the PMS KEY and Tune across the Two band edges, until you see 1999.999.9 MHz on your Digital Readout,
15. Now whilst still in the PMS press the VFO B Button.
16. Press the Magic Number of 9,2,4,9.
17. Repeat step 1.
18. Press the PMS KEY,  
But this time Press either of the UP or DOWN scan buttons, Your RIG will now scan between 1000.000.0 MHz and 1999.999.9 MHz or 1999.999.9 MHz to 1000.000.0 MHz.

As stated at the begining of this Modification the RIG will Receive from about 1215.000.0 MHz to around 1326.000.0 MHz. This Modification is for Receiving only, you can not use it to transmit outside your allowcated Frequency.

This modification is read 1067 times.

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**19-07-1998**

## **(FT-736) Modification of the PMS on the FT-736R for the 220 MHz band**

BY G0HEG

Modification of the PMS on the FT736R for 220 MHz, Extended coverage on receive from the front panel can be achieved by means of a few simple but repetitive actions, The receive can be extended from about 216.6 MHz to around 230 MHz By the use of the repeater shift, This gives a coverage of about 13.4 MHz.

There is no need to snip any of the components, And you will not need a soldering Iron for this Modification.

Important notice

Make sure that you put the Highest Frequency into VFO B,  
Make sure that you Put the lowest Frequency into VFO A.  
When you start this Mod make sure that you are in VFO A,  
Because this will save you a lot of work later on.

Instruction

1. Turn on your Rig.
2. Put the RIG into Repeater shift for 220 MHz Band, by pressing the + RPT KEY.
3. Set the OFFSET to 04.999
4. Tune the RIG to the lowest Band edge of 220.000.0 MHz.
5. Press the REV KEY ( KEY 5 ).
6. Press the UP MHz Button.

You should now have 219.000.0 MHz on your Digital Readout.

7. Repeat Steps 5 & 6 again Four Times More, Alternating between both Until you get 214.000.0 MHz on your Digital Readout.
8. Increase the OFFSET to 09.999.
9. Repeat Steps 5 & 6 five Times More, Alternating Between both until you get 209.000.0 MHz on your Digital Readout.
10. Increase the OFFSET to 13.999.9
11. Repeat Steps 5 & 6 five Times More.
12. Keep on Increasing the OFFSET by FIVE until you get the OFFSET up to 99.999.9.
13. Keep on Repeating Steps 5 & 6 FIVE Times after every increase in the OFFSET until you Get the Frequency to 120.000.0 MHz.

Now that you have 120.000.0 MHz in VFO A,  
you should also have 224.999.9 MHz in VFO B.

## STAGE 2

1. Press the F KEY followed by the PMS KEY ( KEY 3 ).
2. Press the PMS KEY again,

You have Just stored the New Band Edges in to your PMS, Now press either of the UP or DOWN scan Buttons on your RIG, and you will see your RIG scanning Between 120.000 0 MHz and 224.999.9 MHz, or 224.999.9 MHz to 120.000.0 MHz, But that Depends on which Button you Pressed first.  
Make sure that your RIG is in the + RPT position.

3. Now Tune to the Lowest Frequency in your PMS, Which should be 120.000.0 MHz.
4. Set the OFFSET to 99.999.9.
5. Press the REV KEY ( KEY 5 ).
6. Press the DOWN MHZ BUTTON.
7. Repeat Steps 5 & 6 Alternating Between both until you Get the Frequency Down to 20.000.0 MHz.
8. Now Press the following Keys ( Key 9,Key 2,Key 4,Key 9 Again.

The Magic Number is 9,2,4,9.

You should now have 20.000.0 MHz in VFO A, And 224.999.9 MHz in VFO B.

9. Repeat Step 1.
10. Repeat Step 2.
11. Now Tune to the Lowest Frequency in your PMS which should be 20.000.0 MHz
12. Repeat Steps 5 & 6 Alternating between both until you get the Frequency in the PMS to 00.000.0 MHz care should be taken not to go passed 00.000.0 MHz because the RIG will automatically Default back to 20.000.0 MHz and you will have to start again from That point.
13. Now Press the Following KEYS (9,2,4,9 in that order).

The Magic Number is 9,2,4,9.

14. Repeat Step 1.
15. Repeat Step 2.

Now that you are in the PMS you should have 00.000.0 MHz in VFO A and 224.999.9 MHz, Whilst still in the PMS Tune across the Two Band Edges From 249.999.9 MHZ to 00.000.0 MHz until you see 999.999.9 MHz, on your Digital Readout.  
Now Whilst still in the PMS press the VFO B Button.

16. Now Press the Following Keys( Key 9,2,4,9 in that Order )
17. Repeat Step 1
18. Repeat Step 2

You should now have 00.000.0 MHz in VFO A, and 999.999.9 MHz in VFO B.

Now press either of the up or down scan Buttons, and you will find that your RIG will scan up or down depending on the Button you Pressed First.

You will have to set your own Band edges on this Mod Because I am not allowed to have this board in My RIG, as far as I am aware KU2A is the only one who as done this MOD He told me that the Band edges were 216.6 MHz to 230 MHz His comments were "It Works Well "

**19-07-1998**

## **(FT-736) FT-736R CAT Interface Drivers**

Here are some routines to drive a Yaesu FT736R CAT interface.

Note that the radio has TTL levels, so you need to build a circuit to convert RS232 voltages to TTL voltages. You can do this with a MAX231 etc, or a couple of NPN transistors. The latter can be mounted inside your DB25 connector.

1. The Yaesu spec contains one or two typos which are herein corrected.
2. It does not appear to be necessary to space out the 5 control bytes by 50 ms; 20 ms is adequate. Any less sometimes fails.
3. The READ S-meter, squelch functions often fail to return all 5 bytes, so the code (FNget) accomodates this.

```
REM
REM          FT736R CAT Interface Drivers
REM          -----
REM          Last modified 1991 Oct 18
REM
REM          (C)1991 J R Miller G3RUH
REM
REM  Procedures and functions available are:
REM
REM      PROCcat(on|off)
REM      PROCmode(lsb|usb|cw|cwn|fm|fmn)
REM      PROCptt(on|off)
REM      PROCsplit(off|plus|minus)
REM      PROCoffset(MHz)
REM      PROCfreq(MHz)          (* e.g. MHz = 145.6789 etc *)
REM      PROCfull_dup(on|off)
REM      PROCsat_mode(tx|rx , lsb|usb|cw|cwn|fm|fmn)
REM      PROCsat_freq(tx|rx , MHz)
REM      FNsqlch                (* returns 0 if no signal *)
REM      FNmeter                (* returns S-meter value *)
REM
REM
REM      Example - prepare FT736R for FUJI-OSCAR-20 satellite
REM
=====
PROCset_up:  REM Do once only per session!
PROCcat(on)
PROCfull_dup(on)
PROCsat_mode(rx,usb): PROCsat_freq(rx,435.916)
PROCsat_mode(tx,fm ): PROCsat_freq(tx,145.850)
PROCcat(off)
END
:
REM Now follows procedures and functions
:
DEF PROCcat(F%)
IF F%=on B%(5)=0 ELSE B%(5)=&80

PROCput: ENDPROC
:
DEF PROCmode(B%(1))
B%(5)=7: PROCput: ENDPROC
:
DEF PROCptt(F%)
IF F%=on B%(5)=8 ELSE B%(5)=&88

PROCput: ENDPROC
:
DEF PROCsplit(F%)
B%(5)=&89: REM simplex
IF F%=plus B%(5)=&49

IF F%=minus B%(5)=9
PROCput: ENDPROC
:
DEF PROCoffset(F)
B%(5)=&F9
```

```

PROCfr(F)
PROCput: ENDPROC
:
DEF PROCfull_dup(F%)
IF F%=on B%(5)=&E ELSE B%(5)=&8E

PROCput: ENDPROC
:
DEF PROCsat_mode(F%,B%(1))
IF F%=tx B%(5)=&27 ELSE B%(5)=&17

PROCput: ENDPROC
:
DEF PROCfreq(F)
B%(5)=1
PROCfr(F)
PROCput: ENDPROC
:
DEF PROCsat_freq(F%,F)
IF F%=tx B%(5)=&2E ELSE B%(5)=&1E

PROCfr(F)
PROCput: ENDPROC
:
DEF PROCfr(F)
IF F>=1000 FX%=on ELSE FX%=off
F=(F+0.000005)/1000
FOR I%=1 TO 4: F=F*100: F%=INT(F): F=F-F%
B%(I%)=(F% DIV 10)*16 + F% MOD 10
NEXT
IF FX%=on B%(1)=B%(1)AND &F + &C0: REM 1200 MHz band correction
ENDPROC
:
DEF FNsqlch
B%(5)=&E7: PROCput: PROCget
IF B%(1)=0 THEN =0 ELSE= -1
:
DEF FNmeter
B%(5)=&F7: PROCput: PROCget
=B%(1)
:
DEF PROCset_up
REM Establish constants etc
DIM B%(5)
off=0: on=-1
rx =0: tx=-1
plus=+1: minus=-1
lsb=0: usb=1: cw=2: cwn=&82: fm=8: fmn=&88

:
REM Most code after this is for controlling the BBC micro hardware
REM and needs recoding for any other machine. Note "*FXn,m" is
REM merely a BBC micro operating system call, no. n, parameter m.
REM The notation &82 means 82 hex.
REM
REM Set up RS423 = 4800,8,N,2
*FX8,6
*FX7,6
*FX156,16,227
ENDPROC
:
DEF PROCput
REM Procedure sends five bytes to RS432c port, spaced by 50ms
REM bytes are in array B%(1) ... B%(5)
FOR I%=1 TO 5
REM Delay below is in the spec, but can actually be 20 ms
T%=TIME: REPEAT UNTIL TIME >= T%+5: REM Wait 50 ms/byte
REM Now direct output to RS423, o/p char, and restore o/p to
screen
*FX3,3
VDU B%(I%): REM Send byte B%(I%) to RS432
*FX3,0
NEXT
ENDPROC
:

```

```

DEF PROCget
REM Flush RS432 I/P buffer, then read bytes from input stream
REM until op code is detected. Previous value is result.
REM (straight reading 5 bytes found to be unreliable)
*FX15,1
*FX2,1
REPEAT B%(1)=B%: B%=GET: UNTIL B%=B%(5)
*FX2,0
ENDPROC
:
REM End of code
REM de G3RUH @ GB7DDX 1991 Oct 18
JAS>

```

This modification is read 1129 times.

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**19-07-1998**

## **(FT-736) FT-736R poor EMC features**

Hello dear Oms. Here are my experiences with the FT736R, the problems which I have encountered, and the cures that I have found.

1. background noise given by the switching power unit. This problem occurs on 50 MHz and 144 MHz. By using a spectrum analyzer, I have seen that the power unit radiates a wide bandwidth of noise (can be compared to white noise) between 40 and 42 MHz. The level is high, more than the mean value encountered with a switching PSU built for computer using !  
  
--> the cure: no miracle, the simplest and efficient way is to use an external power supply instead of the built in one...
2. overload of the receiver by the path of coaxial cable (between antenna and the TRx). Before introducing the problem, I have to tell that I live not far from a high power broadcast station (medium waves). The first time I have used the FT736R, it has been impossible to hear something on any bands (from 50 MHz to 432 MHz)! I have discovered that the problem comes from the DC sys- -tem used for the supply of the preamps on each band. The DC supply is ensured through the coaxial cable. With high values of RF fields the coaxial cable acts as an antenna. These spurious RF signals come through the DC line called PRE in the FT736R. Note that this problem can be met without any installed preamp or with the front panel push button (PREAMP) in "off" position.  
  
--> the cure: quite simple, you have to solder a 0,1 uF on the existing by-pass capacitor for EACH PRE line of all Rx module. That is to say: C32 for all the bands. The originals values for C32 are always 0,001 uF (1 nF). These by-pass capacitors are closed to each PA unit and can be easily found.  
By increasing the value of each capacitor, you decrease the cut-off frequency of the L11-C32 filter and avoid any problem.
3. background noise given by the PTT lines (input PTT jack for data communi- -cation and output PTT STBY DIN jack for the remote of an external power amp- -lifier). My FT736R is put on a wood shelf and under is located a PA unit. I have also a TNC (HK232) which is also connected. At this time, I have remarked background noise mainly on 144 MHz, which is more noticeable when moving optic VFO encoder. These two PTT lines are sensitive to wide frequency signals given by "computer" signals coming mainly from the front panel (display) and uP unit (clocks, hardware bus).  
  
--> the cure: the only efficient solution is to put LC filter on each PTT line They can be installed outside of the TRx but rather closed to the rear panel of it. The filter uses the "pi" structure with two 0,1 uF capacitors and a small choke coil about 220-470 uH (not critical value). You have to try seve- -ral choke coils in order to avoid the QRM and also to have a normal PTT function (care of added resistance for DC PTT current given by the choke coil)

73 de Jean-Roger F6EGK @ LX0PAC

This modification is read 1056 times.

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**19-07-1998**

## **(FT-736) FT-736R Killing the beep**

I bought a Yaesu FT736 about 6 months ago. It's a great radio but one thing annoyed me about it. When I used in on FO-20 or the microsats with my TAPR PSK modem, the PSK modem adjusts to the doppler frequency shift by sending pulses to the up/down buttons on the microphone. Only problem is, everytime it sent a pulse the radio went BEEP. This beep didn't come thru the speaker, instead it was emitted from a separate buzzer. As a result, even when using the headphomes, the beep would disturb the whole house. This was a particular problem on late night passes. Thanks to a suggestion from WB2IBO and the folks at Yaesu, I've discovered you can fix the problem.

If you remove the top cover you will find a circuit board right behind the front panel. As you are facing the front of the radio on the top left corner you will see capacitor C63 identified on the board with a red wire going into the circuit board next to it. Clip the red wire and no more beep. You won't actually see the beeper. To find the beeper you have to remove the top and bottom covers (see the manual) and then loosen the screws on either side of the front panel (see section 3.5.4 in the manual). At the bottom left of the circuit board is the black buzzer, about the size of a quarter. The red wire you need to clip starts from here. You don't actually have to remove the bottom cover if you clip it where it goes back into the circuit board on the top, however.

You could rig up a switch to turn the buzzer off and on, but I don't why anyone would ever want to turn it back on.

This modification is read 1022 times.

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**19-07-1998**

## **(FT-736) The FT-736R SAT switch can zap pre-amps.**

The 736R SAT switch has break-before-make contacts, which meanhat in between switch positions the circuit is the same as if the SAT switch is in the OFF po sition. If you have set up one of the modules to transmit for non-satellite op erations (i.e., w hen SAT switch is OFF), that module will be enabled between the RX-TX-NOR-REV p ositions of the SAT switch.f you are transmitting while you move the SAT swi tch between these positions you may accidently key up the unintended module and send a burst of RF down the antenna line into your pre-amp.

For example: VFO A happens to be set to operate on 2 meter FM. You don't give this a second thought, since you are working Mode B CW with the SAT switch ON.

You are listening on 2 meters and keying your 70 CM transmitter trying toro your downlink f requency. Changing the SAT switch positions under these conditions is perfectly normal.

However, if you happen to send a dot or dash during the open interval been switch positions it is not your 70 CM transmitter that gets keyed but your 2 meter FM transmitter. This sends a burst of RF down the 2 meter coax that you have configured for receiving. If you have in that coax a preamp without adequate RF-sensed pin-diode switching, then say goodbye to the GaAsFETs in the preamp.

If you are using the FT-736R preamp switch and the 12 VDC on the coax to operate coax relays at the preamp, you might be lucky -- if the relays drop out fastenough. I don't know if the control circuits operate fast enough to take care of this transient condition, but I doubt it.

This cost me two MGF-1402 GaAsFETs in my unprotected homebrew 2 meter preamp be fore I realized that they both departed this world under exactly the same circumstances of operation of the SAT switch while sending. Although I was on CW, the same thing could happen on SSB if you happened to be speaking and the VOX were to be operated during the switch rotation.

Thanks to John, KL7GRF, for clueing me to the real problemhe SAT switch while transmitting.

(2) Use adequate RF sensed mp switching.

This modification is read 1005 times.

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**19-07-1998**

## **(FT-736) A small modification to get A better audio-signal out of the TX from FT-736R**

Hello FT 736 Fans,

The FT736R transceiver is a well done rig, but the TX-signal is not very readable by the QSO-partner if the signal-strength is low. The FT736R prefers the low frequencies in the audio-signal and cuts off all high frequencies in the speech-signal. In FM-Mode it sounds like a bass-man..hi . In SSB-mode the Power-Amplifier is working hard and only the lower speech-band is transmitted. There are a few little modifications to reduce this problem:

1. change the microphone in the handheld-case to a better one. (try several microphones at a resistance about 600 Ohms)
2. open the FT736 (upper case) and locate the TX-Board (on the left upper left side if the front is showing to You). On this TX-UNIT cut the Capacitor C 14 (Value 0.001uf) . The Capacitor is located in the right-bottom corner of the board. Adjust for FM-Mode the Potentiometer VR 01 just a little tick clockwise ( deviation-limiter). If You can use a deviation-meter You can do this in a professional way. (about +- 5 KHz).
3. If You are using a preamp-microphone, make sure to adjust the level from this mike so that the mike-gain-potentiometer at the frontpanel from the FT736R are minimum in the 11 o'clock position for a good drive of the powerstage. Otherwise You will overdrive the first microphone amplifier in the rig. This sounds like speaking in a train-station...  
When You are using a preamp-mike connect a small 600 Ohm resistor directly in the mike-plug between point 8 (middle plug) and point 7 (GND) So the rig always has the correct 600 Ohms resistance.
4. Best results I got with a mike, that produces a strong signal in the higher audio-band (about 2000 Hz).

By the way, the PROC-Switch only works at SSB and only when You get down with the drive-gain... if the ALC-Meter is on the right scale, the PROC- switch has no effect !

ALLWAYS think of losing warranty if You modify something inside the FT736R !!

Vy.73 de Guenter DD9ZO in Mailbox DB0SIF Germany.

This modification is read 1135 times.

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**19-07-1998**

## **(FT-736) FO-20 Microsat & the Yaesu FT-736R**

by James Miller G3RUH

If like me, one of the (many) features that attracted you to the FT736R was the special DATA SOCKET, then you were probably very pleased to read in the manual:

"This 3-contact mini stereo jack allows direct connection to the FM receiver demodulator and FM transmitter modulator for digital equipment such as a packet radio TNC. No pre-emphasis or de-emphasis is added to the signals at this jack" (page 14).

Don't believe a word of it! A cursory inspection of the circuit diagram shows that the TX side is simply merged with the microphone audio just after the Mic Gain control, and is then murdered by several subsequent filters. On the RX side the data audio output is similarly indirect.

My initial day with FO-20 was disastrous. (Yours too?)

So I looked at the FM signal on a calibrated monitor receiver when transmitting FO-20/Microsat "Manchester" uplink signals. The waveform was appallingly distorted.

The problem is that the TX LF response cuts off at 800 Hz. But the data has substantial energy at 600 Hz and below. Indeed, when transmitting a 600 Hz square wave it was clear from the droop distortion that FO-20 or a Microsat would almost certainly not decode the uplink reliably.

The cure is simple; modulate the FM varactor directly. Refer to the circuit diagram; inject your TX audio at the junction of R32/C29 on the TX Unit. The signal level at this point should be 800 mV peak-peak, and will give +/- 3 kHz deviation. DO NOT EXCEED THIS LEVEL. Set Mic Gain to min.

The implementation is simple too.

1. Disconnect FT-736R from the mains electricity. (Safety).

2. Remove top cover only.
3. TX Unit is the module flat on the left (not the one tucked down the side vertically).
4. R32 is just to the left of the rectangular shielded enclosure. The resistor is "on end". Scrape the paint off the free leg.
5. Your TXaudio lead should be a fine screened cable; connect the inner to R32, and the outer braid to the adjacent enclosure.
6. Route the cable out though any convenient aperture in the case.

[ TXAudio of 800 mV pk-pk can be obtained from the G3RUH PSK modem by adjusting the components C9= 1uf, R3=47k, R5=infinity (i.e. remove). C10 stays at 10nf (0.01uf).]

Modulating the FM transmitter this way you get an LF response down to 18 Hz (at which point the associated synthesiser PLL begins to track the modulation), and an HF response which is flat to some 10 kHz.

\*\*\* FO-20/Microsat uplink modulation is now absolutely perfect. \*\*\*

This modification is read 961 times.

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**19-07-1998**

## **(FT-736) FT736 & 9600 Baud Operation**

by James Miller G3RUH

These notes tell you where to get FM RX audio direct from the discriminator, and where to modulate the FM TX varactor directly. These mods are non-destructive and take no more than a few minutes. The signal bypass the "DATA SOCKET" for high grade FM operations.

The RX mod is suitable for:

- UOSAT-D 9600 baud downlink and terrestrial links
- 1200 baud AFSK/FM Standard Packet - BUT IT'S UNSQUELCHED.

The TX mod is suitable for:

- FO-20/PACSAT uplink (1200 bps Manchester FM)
- UOSAT-D 9600 baud uplink direct FSK and terrestrial links
- 1200 baud AFSK/FM Standard Packet.

### **FT736 - FM Direct from Discriminator**

Detected FM direct from the receiver discriminator is available from the RX UNIT at the junction of R91 and C83. These components are shown in the top right-hand corner of the schematic.

Proceed thus:

1. Disconnect FT736 from the mains electricity.(Safety).
2. Remove top cover only.
3. RX Unit is the vertical module on the left.
4. Locate R91 which is about 25mm from the top, 50mm from the radio rear. the resistor is "on-end", and near a couple of glass diodes.
5. Scrape any paint off R91's free end and wet with solder.
6. Your RXaudio lead should be a fine screened cable; connect the inner to R91, and the outer braid to a ground point (e.g. can of TO09)
7. Route the cable out though any convenient aperture in the case.
8. The discriminator sensitivity (FM Normal) as about 6 kHz/volt.

### **Important note on 9600 Baud Use**

Some FT736 receivers are fitted with an LFH12-S IF filter for FM. (CF01 at the top front of the RX Unit). This is a 12 kHz bandwidth filter which is a little too narrow for 9600 bps FSK operation. It is recommended you change this to 15 kHz or better still for UOSAT-D use, 20 kHz bandwidth which will allow more tolerance for doppler shift, and give a far better "eye". Suitable filters are: LFH-15S or CFW455E, and LFH-20S or CFW455D.

### **FT736 DIRECT VARACTOR FM MODULATION**

Refer to the circuit diagram; inject your TXaudio at the junction of R32/C29 on the TX Unit. The signal level at this point

should be 800 mV peak-peak, and will give +/- 3 kHz deviation. DO NOT EXCEED THIS LEVEL. Set Mic Gain to min.

Modulating the FM transmitter this way you get an LF response down to 18 Hz (at which point the associated synthesiser PLL begins to track the modulation), and an HF response which is flat to some 10 kHz.

Proceed thus:

1. Disconnect FT736 from the mains electricity. (Safety).
2. Remove top cover only.
3. TX Unit is the module flat on the left (not the one tucked down the side vertically).
4. R32 is just to the left of the rectangular shielded enclosure. The resistor is "on end". Scrape any paint off the free leg.
5. Your TXaudio lead should be a fine screened cable; connect the inner to R32, and the outer braid to the adjacent enclosure.
6. Route the cable 0 BAUD FSK MODEM: Adjust TXAudio level with VR1

Notes compiled by G3RUH @ GB7DDX 1990 Mar 16  
Yaesu FT-736R TAPR PSK Modem freq shift prob

I bought a Yaesu FT736 about 6 months ago. It's a great radio but one thing annoyed me about it. When I used in on FO-20 or the microsats with my TAPR PSK modem, the PSK modem adjusts to the doppler frequency shift by sending pulses to the up/down buttons on the microphone. Only problem is, everytime it sent a pulse the radio went BEEP. This beep didn't come thru the speaker, instead it was emitted from a separate buzzer. As a result, even when using the headphomes, the beep would disturb the whole house. This was a particular problem on late night passes. Thanks to a suggestion from WB2IBO and the folks at Yaesu, I've discovered you can fix the problem.

If you remove the top cover you will find a circuit board right behind the front panel. As you are facing the front of the radio on the top left corner you will see capacitor C63 identified on the board with a red wire going into the circuit board next to it. Clip the red wire and no more beep. You won't actually see the beeper. To find the beeper you have to remove the top and bottom covers (see the manual) and then loosen the screws on either side of the front panel (see section 3.5.4 in the manual). At the bottom left of the circuit board is the black buzzer, about the size of a quarter. The red wire you need to clip starts from here. You don't actually have to remove the bottom cover if you clip it where it goes back into the circuit board on the top, however.

You could rig up a switch to turn the buzzer off and on, but I don't why anyone would ever want to turn it back on. 73 de WA0PTV @WA0PTV

(Message originated at NS1N from KC1HO reqMOD Server v2.0)

**TX-PLL Modification**  
YAESU FT-736R 9600 Mod

Modification to the Yaesu FT-736R. G4WFQ 12/1/92.

This modification was given to me by Zeno Wahl, G0NJC/VE3LMX (U.O.S)

The modification lowers the frequency response to 3 HZ, and gives a far better "eye" by reducing L.F flutter.

Proceed thus.

Locate "TXPLL UNIT" (Vertical board on Tx unit).

Locate R01 (Scrape any paint off. Wet component with FINE solder.

Solder 560ohm Resistor on R01 (end nearest to pll board) Solder 47micro fara tantalum in series with 560R. Take (-) negative leg of Cap to Gnd, eg case of Txpll unit.

73 Dave G4WFQ.

=====

**Better UO-22 Decoding**

Dave - you are right. UO-22 is less than optimum. The problem starts in the satellite which does not have a transmit spectrum extending to DC, nor even to the desirable 30 Hz. In fact it is 3db down at 100 Hz. The effect of this is to cause "droop" on short runs of 1s or 0s. It can clearly be seen on a scope. Display the eye diagram, and slow the sweep speed down so that a dozen or so bits is visible. Looked at another way, the poor LF performance introduces wobble on the trace, and this blurrs the eye. So if the receive system was so-so (say with UO-14) then it may well be very error prone from UO-22.

The cure is to make the receive system have as good an HF performance as possible, and a good LF performance. Having a

good HF response ensures a good eye, and thus a better margin to cope with the LF wobble. And having a good LF response minimises and additional self noise from the RX/modem interface.

On the modem increase C25 to 1 uf. This is the RXAudio input coupling capacitor.

On an FT736R:

1. Use a CFW455B (or C or D) IF filter in the RX UNIT.
2. On the RX UNIT, remove C82. This is a little ceramic capacitor tucked in close to the grey cube marked "455D". Bend it back and forth until the legs snap off. You can reach it by removing the radio lid only. DO THIS!

When you have done these changes, TX selection 10 transmitting to an FT736R gives a virtually perfect eye. Since UO-22 also transmits selection 10, you can see the extent of the LF aberration as a blurring at the "eye" convergence point. However you should now have reliable decoding. Other radios seem not to be as reluctant as the FT736R, probably because they have a better basic HF response. However, changing modem C25 should help.

I am evaluating the feasibilty of implementing LF equaliser to rectify the UO-22 LF problem. The perfect project for all you DSP freaks. I'm on holiday for two weeks. I expect one of you lot to have done it by the time I get back. No kidding.

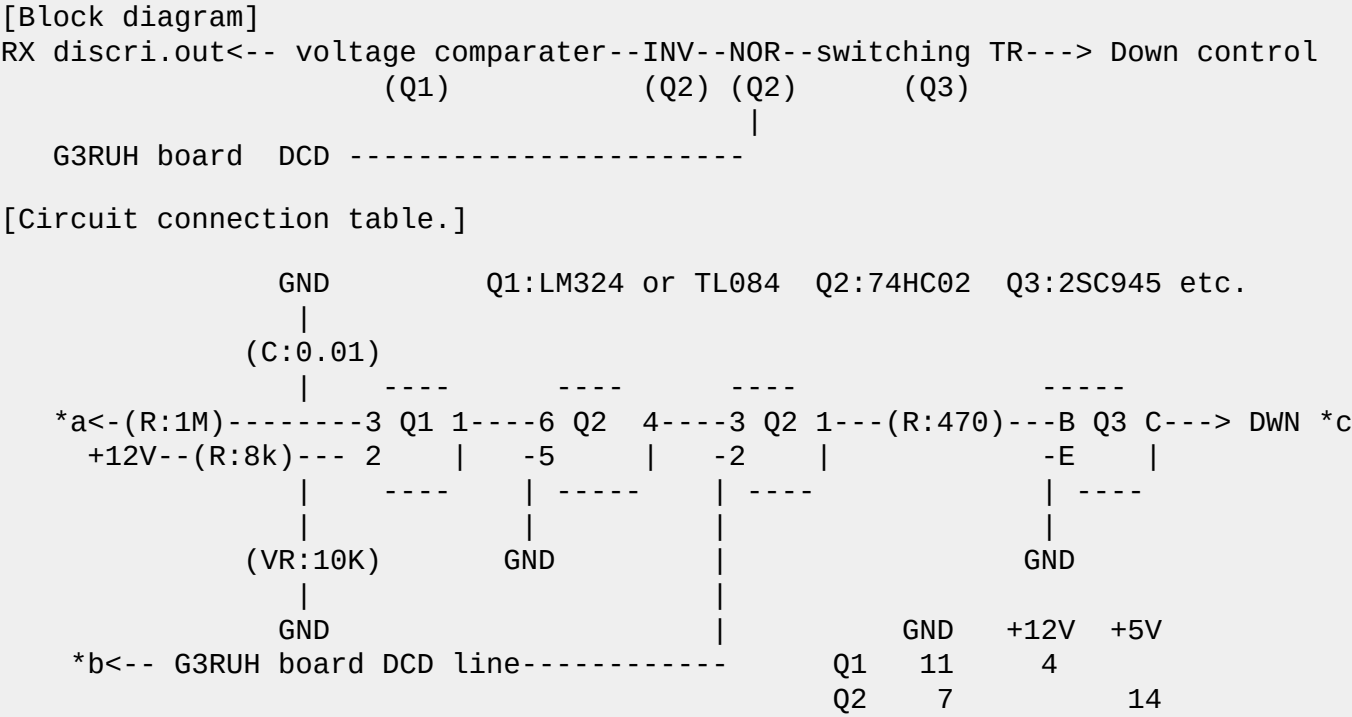
73 de James G3RUH @ GB7DDX.#22.GBR.EU

This modification is read 1011 times.

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19-07-1998  
(FT-736) UO-14 RX frequency tracking for TS-790 / FT-736

The doppler shift range in overhead pass reaches to 20kHz. It is essential to tune-in RX frequency for good through put. I assembled auto freq. tracking for UO-14 FSK signal reception and achieved good result.

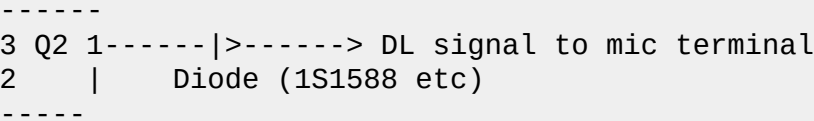


\*a: to RX discri out (=G3RUH board RX IN)  
\*b: to G3RUH board DCD line (U10 pin 13)  
\*c: to down control pin of mic terminal (TS-790 mic pin 3)

setting of VR:10k  
The discriminator IC output level is 5.8V+-2V.  
Whitout RX signal, set the VR to Q1 pin 1 level turn HIGH->LOW.

In my case, I assembled the circuit on a small universal PCB and enclosed into TINY-2 with NB96 board.

In the case of FT-736, DL signal polarity is different from TS-790 so change as follow



73s sueo asato JA6FTL

This modification is read 950 times.

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**23-08-1998**  
**(FT-736) FT736R - VHF Attenuator Mod**

A little trick to built in an RX-Attenuator in the FT736R (VHF Band)

Hello FT736 fans,

Using a preamp in the VHF Band causes sometimes trouble with noise on this band. The S-Meter readout 2-4 without any signal. The AGC is working only to reduce the noise.

A simple trick decrease the sensivity for about 6 dBm.

Look in the schematic-diagramm 144 MHz MAIN-UNIT. The first RX-Stage is at the left side of the sheet. Locate the transistor Q01 3SK122L and look at the source-resistor R02 (47 Ohm). A second resistor with the value 1.2 KOhm in series with R02 decrease the sensivity for 6 dB.

Using the preamp-switch (this switch has a free row) You can easily switch between attunation and normal use by making a bridge over the new 1.2 KOhm Resistor with this contacts.

I think, this trick is not a excellent way of a RX-Attunator, but it works ufb here in my rig.

By the way, remember of loosing warrenty b" modify Your rig ! I am not responsable for failures after modification !

Vy 73 de Guenter DD9ZO @ DB0SIF

This modification is read 990 times.

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**21-03-1999**  
**(FT-736) FT-736 - improving the 2mtr RX**

Just read an article out of OSCAR NEWS about improving the 2mtr RX.  
This is how it is done.....

Remove the 2mtr module , remove the top cover of the module,,, It the PA module end of the unit you will find Q01, it is a Mos-Fet a 3SK74L2X.

Replace this with a BF982,,, the leads are slightly thicker than the original, so a 1MM drill is required to open the holes on the PCB.

The LONG LEAD of the BF982 should be fitted facing away from the PA Module. When the Fet is fitted a very small length of wire should be fitted from the Source lead (The lead facing into the center of the board) to the surrounding groundplane.

This should be it, but if you really want to be a perfectionist tune up on T01, T02 and T03 ONLY!!

Finally, Box up and enjoy the low noise, improved signal reception.

This modification is read 1240 times.

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**15-10-2000**  
**(FT-736) Low power mod for FT736R for transverter driving**

**Author:** GM4PLM - [gm4plm@emn.org.uk](mailto:gm4plm@emn.org.uk).[MODIFICATION.NET](http://MODIFICATION.NET)

To drop the output power to use a transverter:

Remove the top cover taking care not to break the speaker lead.  
There are two circuit boards that we want to check. The board in the middle is the 2M board, and the one on the right is the 70cm board. If you look near the rear end of both boards, you will see a small vertical circuit board. Right near these are three potentiometers.

Let's start with the 2M board.  
The pots are located behind the small vertical circuit board. The pots are labeled VR02, VR03 and VR04 left to right. First we must connect a dummy load and wattmeter and verify that we have 25w RF with the front panel drive control set to MAX. Set the radio to FM and set the freq. to the center of 2M band. Press MOX and adjust VR02 (the left pot) for the required output level. It will go to zero but the end adjustment is touchy. Next check the front panel meter for an indication of 8 on the PO scale. If not, adjust VR04 (the right pot) for the correct meter indication probably won't adjust to full scale on low levels (below 3 watts).

On 70 cm, the pots are labeled VR04, VR05 and VR06. They are located in front of the small vertical circuit board. The same drill is used here for Power out. Set the freq to the middle of the 70 cm band and adjust VR04 (the left pot) for the required watts out and VR06 (the right pot) for 8 on the PO meter. That's it for the 70 cm board.

With this mod I managed to get my transverter input drive to the correct 3 watt level easily - its easy to set max output again if requirerequired - needed no hardware mods and is foolproof - I can even vary the RF drive input to my transverter using the front panel control!

This modification is read 996 times.

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10-02-2001

(FT-736) Extended RX/TX for YAESU FT-736 2 M

*From: "John Kirk, VE6XT"*

This mod extends coverage of the 2 mtr section *\*only\** from it's current 144.0 to 148.0 to 141.0 to 151.0

Great for those of you using it as an IF for microwaves.

Remove the top cover and locate the 10 pin header on the right hand side of the 2 mtr (centre) board.

Beside it will be a handful of diodes or empty holes labelled D24 through D27.

Install a silicon switching diode like the 1N914 or 1N4148 in position D27, polarity the same as its neighbours.

You're done!

For our friends in Europe - your board may have no diode in D25 either - to achieve the above coverage, you will have to add this one as well.

For those who asked, this mod does not affect 6 mtrs. I personally don't beleive it is possible to achieve much out of band coverage on 6, after having done some experiments with the vco in mine, but I would like to be proven wrong! [No "repeated front panel actions mods" though, please].

Good luck!  
John

This modification is read 1349 times.

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**27-11-2001**

## **(FT-736) Yaesu FT-736 preamp power supply**

**Author:** Hartmut DL1YDD - [dl1ydd@amsat.org](mailto:dl1ydd@amsat.org).[MODIFICATION.NET](http://MODIFICATION.NET)

When installing a 23 cm masthead preamplifier which receives its DC voltage through the coax line, I noticed that the coax relays of that preamplifier did not switch properly. When activating the preamp (either by switching it on with the FT 736's PREAMP switch or just by releasing the PTT) the relays emitted a strange buzzing noise.

Further investigation led to the following: The preamp draws about 300 mA DC current. The power supply inside the FT 736 is limited to 300 mA. The current limiter is not working smoothly but abrupt. So the preamp kept switching on and off in a very fast way. That's what was audible!

Solution: Increase the trip point of the current limiter by decreasing the value of R28 on the AF Unit. The original value is 2.2 Ohms, I paralleled another 2.2 Ohms resistor, that leads to a trip point of about 600 mA. Be careful, that may be more than the power supply can permanently deliver.

Tip for the modification: Open the upper part of the enclosure. Be careful not to damage the speaker line. You may want to disconnect the speaker connector to put the lid away. Locate the AF board. If you watch from the back panel, the AF board is located vertically just on the metal divider to the front panel. Unfortunately, R28 is located deeply downwards the PCB. Remove the two screws that hold the AF unit. You then can gently pull the AF unit upwards. R28 is located between J19 and J20. It is mounted vertically. Solder an 2.2 Ohms resistor in parallel with the existing R28 (at the solder side of the PCB) and reinstall the AF unit. Caution: It is possible to install it in a way that the metal sheet produces short circuits! The lower side of the PCB has to fit into the small holders, it's better to have a look at this detail before removing the PCB.

This modification works perfectly for me, the preamp is working now. However: Be aware that the modification changes the protection mean "current limiting". You may burn up the preamp supply in case of a DC short circuit at the preamp or elsewhere in the coax.

Do not make modifications when you are not knowing what you are doing. It's on your own risk. I will not be responsible for anything!

73 Hartmut DL1YDD ([dl1ydd@amsat.org](mailto:dl1ydd@amsat.org))

This modification is read 899 times.

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**20-10-2001**

## **(FT-7400) Extended RX/TX for Yaesu FT-7400**

**Author:** - [nokia\\_trader@hetnet.nl](mailto:nokia_trader@hetnet.nl).[MODIFICATION.NET](http://MODIFICATION.NET)

This is the mod for a Yaesu FT-7400H UHF transceiver.

Do use it at your own risk!!!

You will need a fine tip soldering iron for this job and a phillips screwdriver.

1. Remove the small top lid--It is held on by 5 screws.
2. Remove the ground lead to the faceplate on the front left of the rig.
3. Remove the 2 allen head screws from the front faceplate and lay it on its face.
4. Locate the row of solder pads by the CPU/battery.
5. The pads are numbered 1 - 6 from left to right.
6. Jump pads 1,2,4,6
7. Reset the transceiver

Now You will have TX/RX 418-470 MHz.

19-07-1998

(FT-747) Mod. for FT 747 (GX)

Verbesserungen am YAESU FT 747  
Dipl.-Ing. Thomas Friedrichs, DD0BI, Birkhahnweg 4a, 26603 Aurich

Der leichte Mobiltransceiver FT 747 von YAESU ist ein beliebtes und verbreitetes Gerät. Der kleine Kasten ist außerordentlich robust, hat eine sehr hohe (GX-Version), in allen Betriebsarten regelbare Ausgangsleistung [1], und wartet mit einer Reihe von Vorzügen auf wie z.B. die Fernsteuerung über die YAESU-CAT-Schnittstelle. Allerdings ist der Empfänger (bedingt durch den durchgehenden Empfangs- bereich) auch nur an einer Mobilfunkantenne gut zu gebrauchen. Beim Einsatz als Allwellen-RX an einer aktiven Vertikalantenne ist der Empfänger aber überfordert. Das S-Meter zeigt abends im 40m-Band S9 und im Lautsprecher "brodeln" es. Diesen Zustand galt es zu verbessern. Der Blick in das Schaltbild ergab folgendes:  
Das HF-Signal gelangt über sechs Bandpässe an den 1. Mischer. Die Umschaltung der Bandpässe erfolgt auch hier mit billigen Allzweckdioden. Ein Austausch gegen wesentlich besser geeignete PIN-Dioden ist angeraten [2]. Man sollte konsequenterweise nicht nur die Dioden D04-D17 austauschen (diese gehören zur Filterumschaltung), sondern zusätzlich die Dioden D01-D03, D67 und D18.  
Eine weitere, deutliche Verbesserung läßt sich jedoch noch erzielen, wenn man sich die Bandfilter etwas genauer anschaut. Der Empfangsbereich von 100kHz bis 30MHz ist auf lediglich sechs Filter aufgeteilt. An der Zusatzbuchse für das Antennenabstimmgerät findet sich noch die Zuordnung:

|          |      |                            |
|----------|------|----------------------------|
| Filter 1 | 160m | (Tiefpaß; bis 2,5 MHz)     |
| Filter 2 | 80m  | (Bandpaß; 2,5...4 MHz)     |
| Filter 3 | 40m  | (Bandpaß; 4...7,5 MHz)     |
| Filter 4 | 20m  | (Bandpaß; 7,5...14,5 MHz)  |
| Filter 5 | 15m  | (Bandpaß; 14,5...21,5 MHz) |
| Filter 6 | 10m  | (Bandpaß; 21,5...29,9 MHz) |

Ich habe die Durchlaßkurven aller Filter mit den angegebenen Werten durchgerechnet und die Durchlaßkurven grafisch dargestellt. Die Zuordnung der Empfangsfrequenz und der per Logik und den Schaltdioden eingeschleiften Filtern stimmt natürlich. Aber die Filter zeigen hohe Welligkeiten. Die höchsten Einfügedämpfungen liegen unglücklicherweise meistens genau im jeweiligen Amateurband während die geringste Dämpfung in einen Frequenz- bereich fällt wo starke Signale für Intermodulation sorgen.  
  
Signale aus den Rundfunkbändern 19m, 16m und 13m können an der Diodenkenn- linie der Schaltdioden für Intermodulation sorgen bzw. den Empfänger übersteuern.

Als nächster Schritt erfolgt eine Neuberechnung des Bandfilters mit optimiertem Durchlaßbereich für das 15m-Band. Um die Umrüstung so günstig wie möglich durchzuführen, habe ich zuerst versucht, nur die Kapazitäten auszuwechseln. Das gelingt aber leider nicht. So ließ es sich nicht vermeiden, auch einige der nicht in jeder Bastelkiste vorhandenen Induktivitäten in Widerstandsform auszuwechseln.

Die starken Rundfunksignale sind nun genügend gedämpft um den Empfängerzug nicht zu überfordern. Die ZF-Verstärkung kann mit dem Regler VR01 auf der "main-unit" etwas reduziert werden. Dadurch wird der Empfänger "ruhiger". Wer einen Meßsender zur Verfügung hat, kann dann auch mittels VR03 bei einem HF-Eingangspegel von -73 dBm das S-Meter auf S9 kalibrieren. Dann hat man wenigstens einen Anhaltspunkt. Viel mehr werden es nicht, weil die Linearität des S-Meters nicht viel mehr hergibt.  
Allerdings muß man nun in Kauf nehmen, daß die reine Empfindlichkeit (die aber alleine betrachtet nichts über die wirkliche Empfängerqualität aussagt) in den Rundfunk- und Utilitybändern teilweise etwas geringer ist als vor der Modifikation.

Bei einem einfachen Hörvergleich auf den Amateurbändern mit einem FT 890 bzw. ICOM IC 728 schneidet der preiswerte FT 747 nun überraschend gut ab.  
Ein kleiner Nachteil dieser Modifikation ist allerdings, daß sich die Sendeleistung auf den WARC-Bändern verringert. Die hierfür nicht mehr optimierten Filterdurchlaßkurven reduzieren nun die Treiberleistung für das PA-Modul etwas.

Für manche Empfangsverhältnisse und Betriebsarten ist es vorteilhaft, wenn die AGC abschaltbar ist. Auch dies läßt sich beim FT 747 erreichen. Mit einem Miniaturschalter in der Gehäuserückwand und folgender Beschaltung wird die AGC schaltbar: (Hier folgt eine Abbildung, die in der Beschreibung von mir vorhanden ist).

Wenn die AGC abgeschaltet ist, bekommt der "S-Wert" (die Lautstärke) wieder seine ursprüngliche Bedeutung... Die Zeitkonstante läßt sich erhöhen, wenn C116 (1uF) durch 2.2uF ersetzt wird. Die SSB-Wiedergabe wird dadurch wesentlich verbessert.

Die für manche Geschmäcker dunkle Lautsprecherwiedergabe läßt sich verbessern, wenn man vor dem Eingang des NF-Verstärkers (Q02, TDA2003H auf der Display-unit) einen Kondensator von ca. 4,7nF schaltet. Dazu ist die Verbindung

zwischen R21 (47k) und C23 (16u) aufzutrennen. Dies läßt sich auf der Lötseite der "display unit" zwischen S-Meter und Lautsprecher sehr leicht machen. An dieser Stelle ließe sich auch relativ einfach ein NF-Filter (aktiv oder passiv) einschleifen. Dieses könnte man auf einer kleinen Lochrasterplatine im Gerät unterbringen.

Eine ausführliche Umbauanleitung mit allen benötigten Teilen für die Filtermodifikation ist auf Anfrage beim Verfasser erhältlich.  
[HomeBBS ist PI8AWT]

- [1] Tips & Tricks, FT 747 GX: Leistungsregelung für alle Betriebsarten, H.-J. Pietsch, DJ6HP, cq-DL 4/92, Seite 215
- [2] Verbesserung des Intermodulationsverhaltens moderner KW-Amateur- Empfänger, Dr. Jirmann, DB1NV, Hercher, DL8MX, Beam 9/92, Seite 16 ff. 2.8.1994 20:54 : WinPR (DD0BI-1)

This modification is read 1676 times.

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**19-07-1998**  
**(FT-747) General coverage mods for FT-747GX**

1. Remove top cover like explained in your OPERATING MANUAL.
2. On backside of display unit there is a brown jumper wire near the large ribbon cable.
3. Cut this jumper wire.
4. Turn radio on and set display for 12.345.6 and then turn radio off and then back on.
5. This enables the general coverage mode and a GEN display will appears on at the top of the LCD display.
6. Reassemble the unit. It will now transmit between 1.5 and 30 MHZ.

73's de Phil, F1LOU @ ON7RC.BT.BEL.EU

| Date:                     | User comment | From: |
|---------------------------|--------------|-------|
| 09-02-2002                |              | karl  |
| Subject: my wire was blak |              |       |
| my wire was blak          |              |       |

This modification is read 2072 times.

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**19-07-1998**  
**(FT-747) FT-747 power mods**

For some time now I have wondering about reducing the power output on my Yaesu FT747GX, in the SSB mode. I have looked at using the external ALC to do this, but did not wish to have another lead running out of the back of the radio.

I looked at the schematic of the rig and decided that if I removed the diode D99 from the circuit, I would be able to utilize the drive control on the front panel to reduce power in SSB mode.

After removing the top cover from the radio, I removed the screw holding the crystal filter board in place and removed the board (simply lift squarely), under the board you will see D99 marked on the main board.

I just cut the lead to the diode so as to allow reconnection at any time. After I had done this mod I replaced the crystal filter board (and screw) and tested the rig.

The results were excellent, I have full control of the power from 100W down to less than than 50mW.

I tested the rig on air and worked a station about 2 miles away with 250mW, on the 7 Mhz band, Below that level I was drown out with QRM.

After looking at the prices of some of the commercial QRP rigs available I feel that the FT747 is a rig looking at, I also intend to use it for driving a transverter.

This modification is read 1969 times.

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19-07-1998

## (FT-747) Forbedringer for FT-747

Forbedret skala drev med optisk encoder for FT-747 Optical VFO dial encoder for FT-747

OH6DD Jukka har sendt meg en oversettelse fra finsk til engelsk for en artikkel av OH8LQC i Radioamatøøri mars 1993. Det var ganske mye snakk om denne modifikasjonen på pakkeradio, men en stor hindring at den var på finsk.

Optisk VFO enkoder for FT-747.

Den vanligste klagen en hører på FT-747 er om det mekaniske VFO drivet, det tikker mens en skrur på det.

En ting er å bli vant til det, men den mekaniske løsningen er ikke like lett for alle å bli vant med. Som for andre mekaniske deler vil heller ikke enkoderen var evig.

Jeg bestemte meg for å finne ut om den mekaniske delen kunne bli byttet med en optisk del som er vanlig for HF transceivere. FT-757 enkoder kunne brukes i FT-747-GX. Følgende beskrivelse omtaler hva som er nødvendig for å bytte ut enkoderen.

Fjern dekslet. Ta av VFO knappen ved å trekke gummiringen rundt den og løsne skruen i hullet ved siden av knappen. Ta vekk mutteren på knappen (på akselen) for å kunne fjerne kretskortet. Nå er det en god ide å løsne mike og telefon jakkene. Fjern knappene til høyre ved å løsne skruene og trekke de ut. Du kan godt gjerne mutrene. Som en forberedelse, fjern tilkoplingene til S-meter. Kretskortet er festet til chassis på 4 punkter, så det krever noe tålmodighet å få det til. Hvis det er en plastbit som låser det, må du fjerne denne. Derefter må du trekke ut høyttalerkontakten for å få frontveggen helt vekk.

Den originale enkoderen er loddet til kretskortet. Fordi den optiske enkoderen har større diameter må den plasseres på innsiden av frontplaten og festes med en mutter. Det er bare litt plass mellom frontveggen og kretskortet, så enkoderen må festes så tett inntil fronten som mulig. Det betyr at hullet i panelet må gjøres større slik at den større delen mellom enkoder og aksel passer i hullet. En kan gjøre det ved å bore hullet opp 12mm (3mm dypt). Det er et lite hull rett under hullet for akselen som du kan feste låsestiften i enkoderen slik at den ikke glipper.

Før endelig sammensetting må enkoderens aksel forkortes med 10mm. Det er imidlertid ikke nok. I tillegg må hullet i knappen gjøres 10mm bredt ved å bore til tetningskruen går på akselen. Nå skal knappen gå på perfekt.

Når modifikasjonen av frontpanelet er ferdig, fjern den originale enkoderen fra kretskortet. Det er tilkople 8 punkter, så du trenger en god loddelisse. Du finner lett punktene fordi du kan se de fra begge sider.

Yaesu's teknikere har latt kortet omkring enkoderen tomt så det er nok av plass på begge sider. Det kan kun festes in deep direction. Fjern de 4 kondensatorene som hindrer enkoderen for å bli montert til loddesiden av kortet. Det er også 3 dioder og noen få motstander som du kan trenge å fjerne samtidig. Jeg gjorde ikke det for det var allerede nok plass.

Så lodder du fleksible 15cm tilledninger til det lille kortet på siden av enkoderen; pin v er +5V, g er jord, og s1 og s2 er for skaladrevet. Dekk til skruer på enkoderens chassis med elektrotape for å unngå kortslutning.

Nå er monteringen ferdig for kabling. Sett frontpanelet sammen forsiktig ved å feste kretskortet slik at ledningene fra enkoderen kommer pent til loddesiden på kortet. Lodd på tråder for jord og spenning. Jeg loddet inn en 56 ohm motstand på forbindelsen til +5V for sikkerhets skyld. Spenningen er lett å få fra 7805 regulatoren nede ved høyttaleren. Signaltrådene loddes til de samme punktene som den originale enkoderen hadde -i nederste høyre hjørne (når en ser underfra). Hvis du forveksler trådene, vil du tune i motsatt retning.

Den originale enkoderens chassis var også jord, så de ubrukte gjenstående loddepunktene kan også koples sammen med en tråd. Nå kan du kople alle de fjernede kontaktene og trådene og sette frontplaten på plass. Din radio er klar til prøve.

Den eneste bakdelen med denne modifikasjonen er at chassis for den nye enkoderen ikke styrker kretskortet og trykknapper på fronten virker ikke så følsomme som før. Det problemet kan løses ved å lodde venderne på kretskortet slik at de strekker litt mere ut. Det er ikke nødvendig å fjerne venderne helt, det er nok å skyve benene på komponentene lett ut med en skruetrekker mens tinnets smelter. You can add more holdings if needed.

Tuning er nå 5 ganger hurtigere. Før modifikasjonen var det 50 trinn pr omdreining, nå er det 250. Det tilsvarer 6.25kHz med 25Hz pr trinn.

Denne modifikasjonen er ekstremt nyttig og jeg kan ikke tenke meg å endre tilbake til det originale. Det tok meg 3 timer å gjøre det. En tilsvarende enkoder fra en annen radio kan trolig gjøre enda bedre jobb.

**19-07-1998**

## **(FT-757) FT-757 AM Filtermodification**

The original AM filter is too wide for shortwave listening (6 kHz).

There is a very simple way to decrease the bandwidth on AM mode to abt 3,5 kHz. Just cut the wire (bridge) in front of JP 1020 (left of CF01, looking from front side of transceiver) on RF UNIT board. Now take a new 1N914 (or similar) diode and solder it's anode to cathode of D61 and the cathode of this new diode to cathode of D58 or D59. Now the smaller SSB filter on 455 khz IF side is selected during AM. The function of WIDTH system is also improved on AM now (sideband selection is possible in AM with WIDTH knob). SHIFT is out of function as before modification.

This modification does NOT work on FT757 Mod II, because there is no second SSB filter.

You can find a CW filtermodification for RTTY/AMTOR in an other file.

I will send circuit diagramms of further modifications on request. Write to : Roland Robic (OE6RCD), Augasse 15, A-8430 Leibnitz, Austria. Please enclose 3 IRC's in Europe or 5 IRC's outside Europe (airmail) to cover postage.

vy 73's de Roland OE6RCD @ OE3XBS.AUTEU

This modification is read 1877 times.

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**19-07-1998**

## **(FT-757) FT-757 Mod II Filtermodification**

During RTTY/AMTOR/PACTOR operation it is usefull to have an narrow filter to reduce QRM from other stations. It is possible to use the narrow CW filter of the FT 757 II for SSB, because of the filter shift system.

1. Cut the connection between cathode of diode D 101 and D102 on RF UNIT.
2. Take a new diode (1N914 or similar) and solder it's cathode to the the cathode of D101. Connect the anode to middle contact of a double pole toggle switch.
3. Connect the OFF contact to anode of D102 and ON contact to collector of Q56 (TX 8V).
4. Take another diode of the same type and solder it's cathode to pin 1 of J09 and the anode to ON contact of the second pole of toggle switch.
5. Connect the switching (middle) contact of second pole to collector of Q57 (RX 8V). The OFF contact will be let free.

For the SPDT switch I am using the MOX switch on the front panel.

It is a 2 pole toggle switch and you have to cut the PCB between the contacts. Further you have to remove all wires from the MOX switch.

That's all.

If you want th have a complete modification diagramm together with some other modifications, write to Roland Robic OE6RCD, Augasse 15, A-8430 Leibnitz, Austria.

Please enclose 3 IRC (Europe) or 5 IRC (outside Europe Airmail) for covering postage.

Best 73's de Roland OE6RCD @ OE3XBS.AUT.EU

This modification is read 1735 times.

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**19-07-1998**

## **(FT-757) FT-757 Filtermodification**

During RTTY/AMTOR operation it is usefull to have an narrow filter to reduce QRM from other stations. It is possible to use the narrow CW filter of the FT 757 for SSB, because of the shift/width system.

1. Cut the connection between cathode of diode D 102 and a 150 OHM resistor on RF UNIT. This resistor is not shown in service manual, but it exists on all rigs later LOT 4.
2. Take a new diode (1N914 or similar) and solder the cathode to the open end of the 150 Ohm resistor. Connect the anode to middle contact of a double pole toggle switch.
3. Connect the OFF contact to pin 5 of J10 (SSB 8V) and ON contact to pin 8 of J10 (TX 8V).
4. Take another Diode of the same type and solder it's cathode to pin 1 of J09 and the anode to ON contact of the second pole of toggle switch.
5. Connect the switching (middle) contact of second pole to pin 7 of J10 (RX 8V). The OFF contact will be let free.

For the SPDT switch I am using the MOX switch on the front panel. It is a 2 pole toggle switch and you have to cut the PCB between the contacts. Further you have to remove all wires from the MOX switch.  
That's all.

Attention : There are some errors in the Service Manual. F.e the filter connection is shown wrong. If you want to have a corrected circuit diagramm and complete modification diagramm together with some other modifications, write to Roland Robic OE6RCD, Augasse 15, A-8430 Leibnitz, Austria.

Please enclose 3 IRC (Europe) or 5 IRC (outside Europe Airmail) for covering postage.

Best 73's de Roland OE6RCD @ OE3XBS.AUT.EU

This modification is read 1734 times.

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**19-07-1998**

## **(FT-757) The Display became dimmer more and more**

Hello FT-757GX users!:

This bulletin intends only to provide help if you ever happen to have in your FT-757GX the same trouble I have just had.

### **THE TROUBLE:**

While in receiving position, the figures and symbols on display became dimmer more and more, and then suddenly the display went off and reception stopped at once. No transmission nor reception was possible. Just the two pilot lights of the meter remained on.

### **THE SOLUTION:**

The DISPLAY UNIT (front pannel) has one transistor marked Q01 (or Q4001) 2SC496Y which is a NPN Silicon and its application is as oscillator for the DC to DC converter.

This transistor controls the TO1 (DC to DC converter) which, among other things, generates the -8 volts required in several sections of the circuitry, the RF UNIT in particular is highly affected and the receiver does not work if this voltage is not supplied from the DISPLAY UNIT.

Removing the transistor in bad conditions, and replaced by a cheap BD135 makes the rig feel happy and it worked right off the bat.

Special care is to be observed while removing the DISPLAY UNIT PC board. There are three screws to bbe carefully removed to avoid washers falling into the jungle of wires and small parts. There are some 12 press buttons in the front pannel through which you apply preasure to their small switches on the PC board. Two of them are a little bit difficult to remove, the UP and DWN (band/channel) buttons have squared holes where the shafts for these controls are placed before they reach the PC board. Pulling gently and firmly the PC board backwards (to the rear) with the help of a screwdriver makes easier to free it.

Hope all this is of help to anyone needing to make repairs in this rig. If you are not sure that you can make it for yourself ask your Elmer!

Best 73's de Manuel, EA7PS@EA7MU.EACA.ESP.EU



19-07-1998  
(FT-757) FT-757GXII - TX 1,5 to 30 MHz

- 1. Disconnect FT757 from all connections.
- 2. Open tranceiver like explained in your "**Operating Manual**".
- 3. Locate on the "**Display Unit**" SW03 and change is position.
- 4. Close tranceiver back and reconnect power.
- 5. This give you 100w between 1,5 and 30 mhz.

There is also a temporary solution, without use of tools:

While the PTT-key on the microphone is pressed, -push one of the up/down-keys at the frontpanel. Now your 757GX transmit on the desired frequency, - but just for one transmission (until you depress the PTT-key).

20-02-1999  
(FT-757) Connect an PK232 to a FT-757

Output CNX of PK232 :

| PK232 connector | PK232 cable  | Yaesu FT-757 radio                   |
|-----------------|--------------|--------------------------------------|
| RX Audio = 1    | = GRN wire   | = to AF output BNC behind the FT757  |
| TX Audio = 2    | = White wire | = to AFSK input BNC behind the FT757 |
| --= 3           | = Black wire | = Not connected                      |
| Ground = 4      | = BRN wire   | = Ground of one of the BNC           |
| PTT = 5         | = red wire   | = to PTT input BNC behind the FT757  |

The BRN wire and the shield of the PK232 cable are connected together.

You can use a alone cable for the reception of the PK232 wich is connected to the AF output of the FT757 instead of the RX audio (green wire).

To avoid larsen, you have to not have loop in your ground circuit : So, use only a alone ground link between the PK232 and the FT757.

73's of Ludovic.

14-03-2001  
(FT-757) Reset FT-757 GX and GXII

Having Display trouble with your FT-757 GX.

Try RESETTING the Rig.

How to reset...

Press the LINEAR +WIDTH+ POWER ON...

It should work.....

**Date:** 05-10-2001

**User comment**

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

**Subject:** Reset older FT-757GX

You currently have Reset FT-757GX info , However that only applies to the FT-757GXII.

The correct procedure for the older FT-757GX is:

PRESS & HOLD in LINEAR & MARKER switches at rear of Radio , Then Turn power on via front panel switch.

Restore Marker& Linear Switches to the out position.

This has been tested & works.

27-02-2002

(FT-757) Power MOD For Yaesu-FT-757GX or GXII

**Author:** Haroldo Bradaschia Neto - [roggernet@uol.com.br](mailto:roggernet@uol.com.br)[MODIFICATION.NET](#)

This adjust is to simple ..

1. Put the radio with the VFO in front for you ..
2. Turn the radio (foots up) and loose 4 screws (the other side of transceiver)
3. Locate the 2 VR's VR1006 (HF Bands MHZ Except 10 meters) and VR1005 (for 10 meters) set the VR's Fully Clockwise and Have Aprox. 160 watts All FM/CW/SSB operation and aprox 140 watts for 10 meters.

OBS: the VR's can be a diferent names .. VR1006=VR 06 / VR1005=VR 05

Haroldo Bradaschia Neto

ZZ7-RDB - Brazil

**Date:** 28-02-2002

**User comment**

**From:** [Haroldo Bradaschia Neto](#)

**Subject:** Modificacao de Potencia em Portugues do FT-757GX/II

A modificacao é bem simples ..

- 1 - coloque o radio com o VFO de frente para voce
- 2 - Coloque o radio de cabeça para baixo e remova os 4 parafusos
- 3 - Localize os 2 VR's .. VR1006 (para todas as bandas exceto 10 metros) e o VR1005 (somente para 10 metros) .. regule os VR's para o sentido horario todo aberto e voce terá aproximadamente 160 watts em todos os modos FM/CW/SSB e aproximadamente 140 Watts para 10 metros.

OBS: O nome dos VR's podem ser diferente como no ex: VR1006=VR 06 / VR1005=VR 05

Haroldo Bradaschia Neto ([roggernet@uol.com.br](mailto:roggernet@uol.com.br))  
ZZ7-RDB  
Recife Brazil

**19-07-1998**

## **(FT-76) FT-27, 76 expanded frequency range**

Remove the screws holding battery track and rear cover.

Locate the "CONTROL UNIT".

Close jumpers 1, 3, 7, AND 8.

Reassemble the radio.

Turn on the radio and program it as following:

"1" 135.000 PRESS D/MR THIS IS LOWER RX LIMIT

"2" 185.000 PRESS D/MR THIS IS UPPER RX LIMIT

"3" 135.000 PRESS D/MR THIS IS LOWER TX LIMIT

"4" 185.000 PRESS D/MR THIS IS UPPER TX LIMIT

Press and hold D/MR, T and REV while TURNING ON if you need to reset or reprogram the radio.

### **YAESU FT-76 expanded frequency range:**

Same as above.

Close jumpers 1, 3, 4, 7 AND 8.

Program 420 to 460 mhz as above.

### **Notes:**

Jumper 5 is for 25 KHZ steps default value.

Jumper 9 is for battery back-up.

Jumper 10 is for 1750 HZ repeater tone access.

This modification is read 546 times.

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**19-07-1998**

## **(FT-76) FT-76 fuer 9600 Baud**

DJ5ER @ DB0CL - FT-76 fuer 9600 Baud - Vorschlag!

Hallo FT-76 Besitzer mit Interesse an 9600 Baud !

In meiner Nachbarschaft haben bereits verschiedene Amateure das Standard C-500 zur PR-Verwendung mit 9600 Baud umgeruestet.

Da ich seit kurzer Zeit das YAESU FT-76 besitze und zur Zeit noch keine Notwendigkeit sehe sofort auf 9600 Baud umzustellen, habe ich einmal das Schaltbild genau studiert und mit dem Standard C-500 verglichen.

### RX-Teil (NF fuer 9600 Baud Modem)

In der 2. ZF wird ein Filter CFWW 455E verwendet. Dieses Filter ist fuer 9600 Baud-Betrieb breit genug.

Die NF fuer das G3RUH-Modem (oder kompatibel) findet man in der IF Unit, an der Steckerleiste J3001 / P1090708, Punkt 10.

Dieser ist im Schaltbild mit TSQ bezeichnet.

Die Bezeichnung TSQ ist in der Schaltung mehrfach zu finden. Vielleicht ist konstruktionsbedingt ein anderer Punkt (TSQ) besser zu erreichen. (Weil hier nur ein Draht parallel angeloetet werden muss.)

Trotz des vorgeschalteten Tiefpasses (R3016/C3019 - 15K/0.01uf) sollte an TSQ die NF fuer den erforderlichen Frequenzbereich brauchbar sein.  
(sonst C3019 verkleinern oder ausloeten.)

### TX-Teil:

Der VCO im FT-76 ist sehr aehnlich der Stufe im C-500 aufgebaut. Das ist beim FT-76 der Q6002 auf der PLL UNIT (siehe Schaltbild).

Am Platinenstecker J6001 / P0090675 wird am Punkt 1 die Modulations- Spannung zugefuehrt.  
Punkt 1 ist bezeichnet mit MOD.

Hier wird die NF fuer 9600 Baud-Betrieb zugefuehrt.

Beim Einstecken des Klinkensteckers muss die ankommende Leitung vom Mikrofonverstaerker/Hubbegenzer unbedingt

unterbrochen werden !

(Vielleicht mit einer Stereo-Klinkenbuchse mit Schaltkontakt, die auch die RX-Nf mit uebertraegt.)

Weil bei 9600 Baudbetrieb keine Hubbegrenzung erfolgt, muss die Modulationsspannung mit einem Oszillografen sorgfaeltig eingestellt werden. (natuerlich am Modem)

Dies ist kein Kochrezept, sondern nur ein Vorschlag und jeder muss selbst ueberlegen, ob er sich an einen Umbau des FT-76 herantraut. (Garantieverlust u.s.w.)

Eine Garantie auf die tatsaechliche Funktion wird nicht gegeben, jedoch sollte das FT-76, ebensogut fuer PR mit 9600 Baud zu verwenden sein, wie das Standard C-500.

Uebrigens haben Versuche gezeigt, dass bei 9600 Baud auch ein groesserer Signal/Rauschabstand wichtig ist. Was bei 1200 Baud mit S3 noch klappt, wird bei 9600 Baud mit S3 nicht mehr einwandfrei funktionieren.

Viel Erfolg !

Tschuess, Heino, DJ5ER@DB0CL 31.01.92 15:21:03

de DL9OBU @ DB0EAM.#HES.DEU.EU (Richard)

Jetzt musste nur das FT-76 zerlegt werden um an die von DJ5ER genannten Punkte zu kommen.

PTT und Ground sind einfach: 2,5mm mono Klinke in Mic Buchse! Jetzt kommt es mhhhh..... ohne Gewaehr!!

Vorraussetzung:genug Zeit, ruhige Hand und in der letzten Woche kein Stress gehabt mit QRL und soweit...  
FT-76 nach Handbuch Seite 29 zerlegen.  
Guten SMD L?tkolben anschalten und elektrostatik Schutzmassnahmen beachten!!!

Geraet liegt auf dem Ruecken! Frontplatte nach loesen des schmalen Folienbandes nach rechts klappen.  
Man schaut jetzt auf die IF unit!  
Links befindet sich Aufnahme des Folienbandes.  
Von oben (BNC-Antennenbuchse) nach unten:

|     |        |                                  |
|-----|--------|----------------------------------|
| GND | ( 10 ) |                                  |
| +B  | ( 9 )  |                                  |
| TSQ | ( 8 )  | -----> hier Empfangs NF abnehmen |
|     | .      |                                  |
|     | .      |                                  |
|     | .      |                                  |
| R5  | ( 1 )  |                                  |

Nun Empfangs NF Verbindung schaffen von TSQ (8) zu PAR96 D-SUB 9 (Punkt 5).  
Eventl. Abschirmung auf GND(10).

Gleich ist es geschafft:

Schrauben der IF UNIT loesen.  
IF UNIT vorsichtig nach rechts wegklappen.

Jetzt schaut man auf MotherUNIT. Silberkasten ist PLL UNIT! BNC Antennenbuchsen-verbindungen loesen: Seele und 2 mal GND Schrauben der Motherunit loesen, auch Abstandhalter messing unter BNC Buchse(ist mit Motherunit verloetet)  
vorsicht!!!  
Motherunit etwas nach unter ziehen (wegen MIC und EAR Buchse) und dann auch nach rechts klappen.

Verbindung PLL UNIT zu Motherunit suchen( J6001+ J6002) PLL UNIT (Silberkasten) ist auf Motherunit ueber 2 mal 6 pol Stiftreihen aufgeloeetet. Eine davon(J6001) hat 2 mal GND (mit OHM-Meter pruefen) faellt auch im Platinenlayout ins Auge!

J6001:

|     |     |                                 |
|-----|-----|---------------------------------|
| MOD | (1) | -----> hier Sende NF einspeisen |
| VCV | (2) |                                 |
| 5 V | (3) |                                 |
| GND | (4) | ----- (GND)                     |
| OUT | (5) |                                 |
| GND | (6) | ----- (GND)                     |

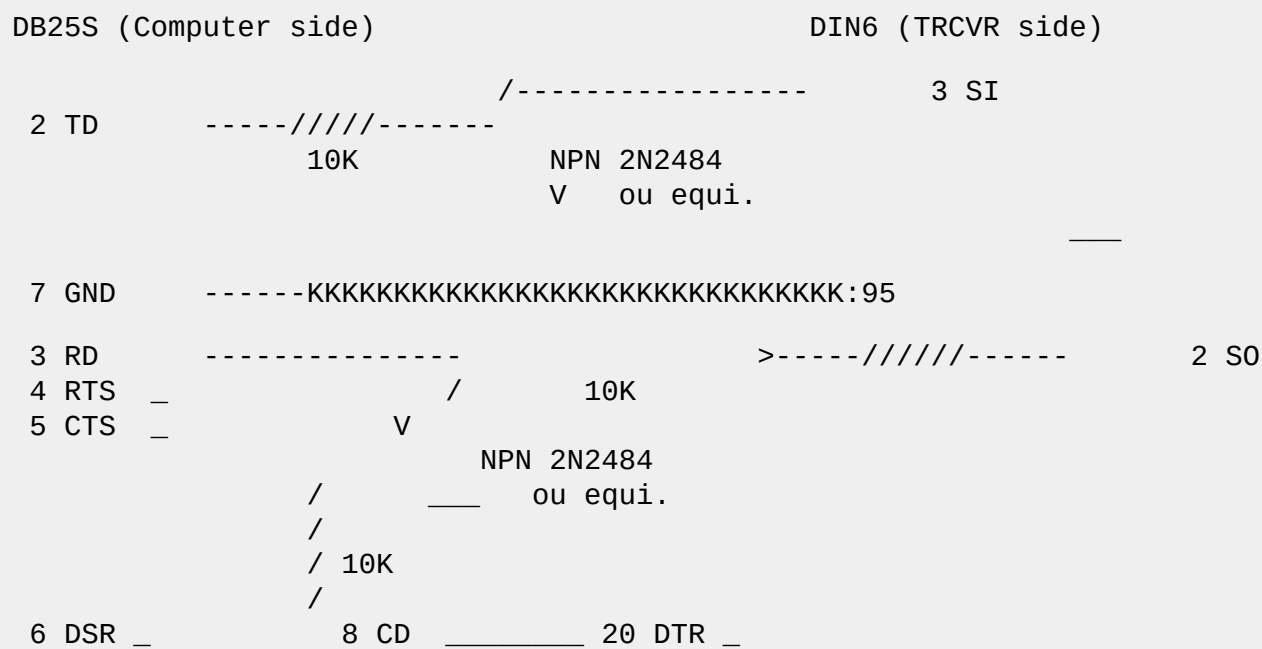
Hier vorsichtig kurze Verbindung schaffen von MOD Punkt 1 zu PAR 96 D-SUB 9 pol. PKT.1.

| Pin | 2 | 3 | 4 | 5 | 6 | Freq. | Range |
|-----|---|---|---|---|---|-------|-------|
| 1   | 1 | 1 | 1 | 1 | 1 | 420   | 430   |
| 1   | 1 | 0 | 1 | 1 | 1 | 430   | 440   |
| 1   | 1 | 1 | 0 | 1 | 1 | 440   | 450   |
| 1   | 1 | 0 | 0 | 1 | 1 | 450   | 460   |
| 1   | 1 | 1 | 1 | 0 | 1 | 460   | 470   |
| 1   | 1 | 0 | 1 | 0 | 1 | 470   | 480   |
| 1   | 1 | 1 | 0 | 0 | 1 | 480   | 490   |
| 1   | 1 | 0 | 0 | 0 | 1 | 490   | 500   |
| 1   | 1 | 1 | 1 | 1 | 0 | 500   | 510   |
| 1   | 1 | 0 | 1 | 1 | 0 | 510   | 520   |

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## (FT-767) FT-767 CAT SYSTEM to a Computer

Hereafter, what I have done to drive an FT-767 with the RS232C of a computer.



Remember to switch on the CAT first, and to switch it off at the end of your instructions, if you have to operate manually the rig later on.

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**(FT-767) FT-767GX General coverage**

1. Switch off the transceiver and remove the AC power cable and all other cables from the rear panel.
2. Remove the two screws affixing each VHF or UHF band module and slide the modules out of the transceiver.
3. Remove the two screws at the front of the top cover (heatsink).
4. Place the transceiver upside down and remove the four screws from the bottom corners and two on either side (including the carrying handle screws). Remove the carrying handle and bottom cover.
5. Remove the seven black painted screws from the rear panel. Then remove the black outer rear panel.
6. Remove the ten screws from the inner rear panel and remove this panel.
7. Remove one screw on either side (rear).
8. Locate the white molex connectors (one for power and one for the speaker) inside the rear of the chassis and disconnect them.
9. Fold the lower half of the chassis away from the upper half, placing a book of about the same thickness of the heatsink under the bottom half.



- 10. Locate the "LOCAL UNIT" board under the metal shield. At this board, locate switch S01 and change its position. The rig will now transmit from 1.5 to 30 MHz.
- 11. Reverse the disassembly procedure.

**Date:** 01-02-2002

**User comment**

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

**Subject:** FT767 GEN/COVER MOD

Sir's

I am the owner of a FT767GX, I don't no if this is different from the one wrote about, but my 767 starts at (0.000.00) oscillates till I wind up to (0.003.50)then it will go gen/trans all the way to 30 all the best malc g7bqs uk.

19-07-1998

(FT-767) VHF Extended range

Turn the battery back-up switch OFF, (you will lose the memories) and turn the rig OFF. Press and hold key #3 while turning the rig back ON.

**Note:**  
In other mods i have seen that it is the #2, so i don't know which is right.?!

VHF band now cover a 10 MHz range (140-150 MHZ).

**Date:** 26-01-2002

**User comment**

**From:** anonymous

**Subject:** freq mod for FT767

Using the "2" button only gives 144.0 to 147.995 MHz coverage. Using the "3" button gives full 140.0 to 149.995 MHz coverage.

19-07-1998

(FT-767) Memory battery circuitry

Previously the circuitry caused unnecessary drain on the memory battery, resulting in shortened battery life. There is a kit available for this modification, which I ordered (free of charge). After reading the instructions and not being able to even find the components involved, I took the unit down to LA to the service facility.

**Date:** 08-02-2002

**User comment**

**From:** [N8TCQ ; Mark L. Wuori](#)

**Subject:** FT-767 Back-up battery mod

I've had the same problem of the memory battery failing rapidly. What I did was remove the original battery and solder wires to the tabs left behind if you remove the battery by carefully prying these tabs off the original battery and then running the wires thru a hole in back to a battery holder (purchased from Radio Shack) that holds 2 AA batteries. Be careful of the polarity. Now if the batteries go dead, they're much easier to change. I've actually had a pair of "C" type batteries attached to my rig for 2 years now without needing replacement. The holder can be just laid on the desk behind the rig or wire tied, twist tied to the back.

19-07-1998

(FT-767) DATA IN/OUT Jack audio control modification

This mod was originated by me. Since I have had the unit, I had not used it for packet because I could not defeat the audio from the speaker in any way without rendering the audio from the DATA IN/OUT jack unusable. This jack was supposed to provide direct connection to the FM modulator and discriminator for packet. It obviously was affected by the AF gain, external speaker disconnect, i.e., anything which affected the audio at the built-in speaker. Examination of the circuit diagram seemed to indicate the audio for this jack came from the headphone circuit.

When I submitted the unit for the previous mods, I asked about the possibility of correcting this obvious design error. The gentleman in charge took all the information, and said he would advise. I got a call from the technician to clarify the requested mod, and he advised he wouldn't be able to perform the mod without factory authorization. After I was notified the unit was ready, (about 2 months later), I went to pick it up. Along with the unit was a note saying, "You were right. We hooked the unit up to a TNC and confirmed the problem. I have reconnected this jack so that output is independent of AF control. Output is about 200 MV." which has proved to be more than adequate. The note was signed by "Rick."

I have run it into a Heath HD-4040, HK-21, and MFJ 1278T, and it works like gangbusters. What a neat machine! This one unit serves all my ham radio needs! I no longer have to hook up my HT just to check into the local board. I now have it hooked up to the MFJ 1278T, using one port for VHF/UHF into the DATA IN/OUT jack, and the other port into the PATCH jack, and out the AUDIO OUT jack, through a Super SCAF, (Switch Capacitor Audio Filter), to the TNC.

I encouraged "Rick" to publish this mod as a factory-approved mod and so far, I have not heard anything about it. If you seek this mod, try to talk to "Rick" and ask for the DATA IN/OUT jack audio control mod. It is well worth the effort. No, the mod was not free, and yes, I think it should have been free, but it wasn't, but the price was very reasonable, I think about \$80 for the whole shebang. 73 and GL.

Dennis N6KDS @ WA6YHJ-1, Livermore.

This modification is read 961 times.

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19-07-1998

(FT-767) FT-767GX mit 9600Bd

From: DL3NDS @ DB0SIF.DEU.EU

Hallo 9k6 User !

Hier ist der Hans-Jürgen aus Wunsiedel im Fichtelgebirge (JO60AB). Vor ein paar Tagen las ich das File von IK2QED, Stefano über den Umbau des FT-767GX von Yaesu auf 9600Bd. Ich hab mich am Sonntag dann mal an die "Arbeit" gemacht den Eingriff vorgenommen.  
Die Sache funktioniert zur vollsten Zufriedenheit, getestet auf den Digis DB0MRW, DB0GU und DB0HOF.  
Auch besteht die Möglichkeit PR mit 9k6 auf allen anderen Bändern zu machen die der Transceiver hat !

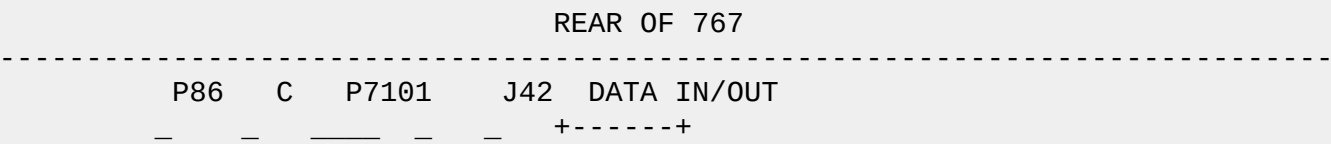
Eines muß ich jedoch hinzufügen :  
Ich betreibe den RX/TX mit einem TNC2H von SYMEK, wenn das TNC eingeschalten ( Vorsorgungsspannung ein ) ist, es nicht mehr möglich das angeschlossene Mikrofon zu betreiben, NF wird gegen Masse gezogen da der NF-Ausgang des TNC's niederohmig ist.  
Schaltet man die Betriebsspannung ab arbeitet der TF-767Gx wieder normal.....wie er mit anderen TNC's arbeitet konnte ich nicht testen.

Hier nun nochmal das File von IK2QED mit kleinen Änderungen :

FT-767GX MODIFICATION FOR 9600 BPS OPERATIONS

- Remove the bottom cover of the FT-767
- Remove the bottom cover (8 screws: 4 underneath, 2 on each side)
- Locate the IF-UNIT board. Is the biggest one of the two cards.

APPROXIMATIVE LAYOUT OF THE IF-UNIT



73' de IK2QED, Stefano.

**19-07-1998**  
**(FT-767) FT-767GX hum modification**

I:  
name here is jerry, if your 767 has a hum there is a mod that you can install on the if unit that will take care of this. it is not all that hard to do once you find the right place.

You will install a ripple filter to the audio amplifier power supply.

First to test to see if you need to do it.

1. Connect a dummy load
2. Disconnect the mic
3. Turn on the if monitor
4. push in the "mox" button and listen if you here a hum you need the mod

Note:  
You can also plug in the mic, if the hum get's worse do the mod.  
You can here it in any mode or band, hf, vhf, uhf.

I called yaesu to git the info for the mod and then got the parts from them. the cost to have them do the mod would have been about \$85.00 + shiping, at first the parts wore going to cost a hole \$1.55 w/shiping but thay gave them to me so the price was right.

Remove  
r1407 2.7 ohm 1/2w resister, L1016 afc coil.

Add  
2sd667c (g3406670c) transister, 560 ohm 1/4w (j01245561) resister, 22uf 25wv (k40149025) cap

At L16 on the if board remove coil L16 and resister r1407

1. connect the brown wire from r1407 to the new 560 ohm resister.
2. connect the "+" side of the cap and the base of the transister to the other side of the 560 ohm resister.
3. connect the collector & the emitter of the transister to the two points on the board whare you removed coil L16.
4. connect the "-" side of the cap to c290 on the board.
5. add a jumper wire between the collactor of the transister and the brown wire on the 560 ohm resister.(i used the trace on the board for the connection at the collector)

that's it. HAVE FUN.

"73"-----jerry n7vbt @ n7ent.wa.usa.na

**20-02-2000**  
**(FT-767) FT-767 VHF wideband mod info**

**Author:** John T. Arthur - [cc732@freenet.buffalo.edu](mailto:cc732@freenet.buffalo.edu).[MODIFICATION.NET](#)

Widebanding VHF is done with #2 (for 2-meters) AND #3 (for 6-meters)! So both are correct.

Pressing #2 and turning the unit on widebands 140-149.995.  
Pressing #3 and turning the unit on widebands 50-59.995.

|                         |                     |                                             |
|-------------------------|---------------------|---------------------------------------------|
| <b>Date:</b> 22-09-2001 | <b>User comment</b> | <b>From:</b> <a href="#">Robert, KD5LOG</a> |
| <b>Subject:</b> Info    |                     |                                             |

The directions instructed that i needed to turn off the power and press down numbers 2 (for the 2 meter frequency extension) and 3 (for the 6 meter frequency extension). However my transceiver extended the ranges by pressing numbers 8 (for 2-meter) and 9 (for 6-meter).

Pressing 9 gave me 50.0-59.999;  
Pressing 8 gave me 144.0-147.999

Robert, KD5LOG

**Date:** 02-02-2002

**User comment**

**From:** [G7BQS](#)

**Subject:** MOD FOR FT767 2mtr EXPAND

I HAVE JUST DONE THE MOD TO EXTEND COVER ON 2 AND I DID IT WITH KEY No 3. GIVING ME 140 TO 150.. ALL THE BEST MALC.

This modification is read 1190 times.

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**19-07-1998**  
**(FT-780) Modification of the Yaesu FT-780/FT-480 for 9600 bps use**

The necessary modifications of the FT-780 R are quite simple. All connections can be made without removing the main PCB.

The receiver AF **\*MUST\*** be taken directly from the discriminator. A suitable point for this is the cathode of D02. This part is soldered in with the ring to the top. If the transceiver is so positioned that the tuning knob faces towards yourself, D02 is located in the lower right of the PCB, near the ceramic discriminator, a small grey box, abt. 5 mm x 5mm big).

The transmitter AF is to be fed to the upper left pin (refer to the circuit diagram!) of the modulator unit. This point is also acessible without removing the PCB. Just above of J9 there is the resistor R 265 (labelled C 265 in my unit, 10 kOhm instead of 4.7 kOhm). You have to remove the varnish of the upper lead of this resistor. The TX AF is to be fed to the upper lead of this resistor.

The normal voltage level from the microphone amplifier at this point is about 2 Vpp (just not clipping). The value should be adjusted by VR1 of the G3RUH-FSK-modem.

Both points can be found in the circuit diagram, part "MAIN CIRCUIT".

The only question that should be left is how to get these two points to the outside of the radio. I decided to give out the possiblity to switch the 1750 Hz tone from the microphone (not used in US versions!). I gained two line at the microphone plug.

For testing purposes, a 60 kB text files was transferred. There were no retries. Reception of UO-22 and KO-23 is possible without any trouble. Even if signals are weak (AOS/LOS), decoding works well.

vy 73 de Hartmut DL1YDD @ DB0IZ.DEU.EU

P.S.:  
Be careful when using this information on "Sommerkamp" radios.  
They may be different (like a FT480 I saw recently).

This modification is read 522 times.

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**19-07-1998**  
**(FT-780) FT-780 fur 9600 baud**

de DJ2VB @ DB0CL.DEU.EU

Hallo, Besitzer des bewaehrten FT780,

hier kommt die Anschlussbeschreibung fuer das Modem nach G3RUH.

Vorweg gesagt, es ist wirklich sehr einfach, und es kann in 30 Minuten ge- schafft sein.

Benoetigtes Material:

- Zwei duenne Koaxkabel - evtl. duennes Mikrofonkabel - von ca. 15cm Laenge.
- 1 Widerstand 4,7 Kilo-Ohm
- 1 Widerstand 10 Kilo-Ohm
- (Natuerlich das uebliche Werkzeug)

#### Demontage des FT780

1. Die vier setlichen Schrauben in den Schienen fuer die Mobilhalterung ca. halb herausdrehen.
2. Den unteren Deckel abnehmen (1 Schraube) Die zwei Lautsprecher-Kabel abziehen. Die zwei Flachstecker im Deckel abziehen.
3. Im Deckel sitzen zwei Buchsen, 3pol und 4pol. Die 3pol-Buchse habe ich zum Verbinden mit der Aussenwelt benutzt. Ist der 3polige Stecker noch vorhanden???

Alle drei Draehte abloeten und mit Schlaeuchen isolieren, oder ganz ent- fernen.

Den Deckel nun erst mal zur Seite legen.

Die Koaxkabel werden zum Schluss hier angeloetet.

#### Anschluss zum Senden (Modulator)

Geraet so legen, dass die Frontplatte zum eigenen Koerper zeigt!

1. An der linken Seitenwand, in Hoehe des grossen Filter-Bausteins "XM-10.7" sieht man den langen Stecker "J 9". Genau hinter J 9, in Richtung Rueckwand steht der Widerstand "R 265". (Bei meinem Geraet ist in Gruen "C 256" gedruckt, soll aber "R" sein. Wert laut Schaltbild 47 kOhm, bei mir ist aber 10 kOhm drin)

An das obere Bein von R 265 recht kurz den bereitgelegten Widerstand mit 10 kOhm anloeten (Bein auf 5mm kuerzen!).

Das andere BEin des 10 kOhm auch auf 5mm kuerzen und die Seele des Koax anloeten; moeglicht vorher einen Schlauch drueberziehen.

2. Rechts neben R 256, ca. 10mm entfernt steht "R 196" (1 kOhm). An das obere Bein von R 196 die Abschirmung anloeten.

#### Anschluss zum Empfangen (Demodulator)

Von der Frontplatte etwa 5cm entfernt, in Hoehe des Memory-Schalters befindet sich der kuerzere Stecker "J 6". Rechts daneben befindet sich ein Quarz; nur zur Orientierung. Etwa 1 cm hinter J 6 findet man ein graues Keramik-Filter mit der Auf- schrift "455 DW".

Vor dem Filter stehen zwei Dioden, D2 und D3.

An das obere Bein von "D 2" wird der Widerstand mit 4,7 kOhm geloetet, wieder das Bein auf 5mm gekuerzt.

An das andere auf 5mm gekuerzte BEin kommt wieder die Seele des zweiten Kabels. Schlauch evtl. drueberziehen.

- Direkt rechts neben dem Filter steht der Widerstand "R 37". Auch hier ist das obere Bein Masse, also hier die Abschirmung anloeten.

Fast fertig!

Kabel an 3pol-Buchse

1. Deckel hinten am FT780 schraeg auflegen, Innenseite natuerlich nach oben.

Beide Abschirmungen werden praktischerweise an den Mittelkontakt geloetet.

- Die Leitung vom Demodulator an die eine Seite, zum Modulator an die andere.



- Aussen sollte man die DEmodulator-Leitung kennzeichnen mit "O" (Output).
2. Zusammenbau, da geht es mit einem Trick schneller:
- Erst Lautsprecherleitungen aufstecken, dann
  - den Deckel richtig plaziert auflegen, jetzt
  - den Deckel vorne ca. 7cm anheben und nun die zwei Flachstecker einstecken.

Nun noch die Deckelschraube eindrehen und die vier seitlichen Schrauben festziehen.

V i e l E r f o l g wuenscht Euer DJ 2 VB, Klaus.

---

### Umbau des Yaesu FT 780 R fuer 9600-Baud-Betrieb

Der Umbau des Yaesu FT 780 R fuer den Betrieb mit dem G3RUH-9600-Baud-Modem gestaltet sich recht einfach. Saemtliche Anschluesse koennen von der Bestueckungsseite erreicht werden.

Die EMPFAENGER-NF ist direkt nach dem Diskriminator abzugreifen. Der geeignete Schaltungspunkt ist die Kathode von D02. Diese Diode ist mit der Kathode (Ring) nach oben stehend eingeloetet. Wenn man den Transceiver mit der Unterseite nach oben und dem Abstimmknopf zu sich hin auf den Tisch legt, befindet sich die Diode rechts unten auf der Platine, in der Naehe des keramischen Diskriminators (kleiner grauer Kasten, ca. 5 mm mal 5 mm groá).

Die SENDER-NF ist direkt am linken oberen Pin (in der Schaltung) des Modulator-Bausteines anzuschlieáen. Auch dieser Punkt ist ohne Ausbau der Platine zugaenglich. sber dem Steckverbinder J9 befindet sich der Widerstand R 265 (bei meinem FT 780 faelschlicherweise als C 265 bezeichnet und 10 kOhm statt 4.7 kOhm). An diesem stehend eingeloeteten Widerstand ist am oberen Ende die Farbe vom Anschluádraht abzukratzen und die Sender-NF aus dem Modem zuzufuehren. Der an diesem Punkt anliegende, normalerweise vom Mikrofonverstaerker gelieferte Pegel ist etwa (ungeclippt) 2 Vss, diesen Wert sollte man mit VR1 des Modems auch einstellen.

Beide Punkte sind im Schaltbild, Teil MAIN UNIT, zu finden.

Nun stellt sich nur noch die Frage, wie man diese zwei zusaetzlichen Leitungen nach auáen fuehrt. Ich habe mich entschlossen, auf die Tonruftaste am Mikrofon zu verzichten und habe dadurch zwei freie Pins in der Mikrofonbuchse gewonnen.

Zu Testzwecken wurde ein 60 kB langes Textfile in 9600 Baud uebertragen. Bei dieser Uebertragung waren keine Wiederholungen feststellbar. Der Empfang von OSCAR 14 ist problemlos moeglich.

vy 73 de Hartmut DL1YDD @ DB0IZ

P.S.:

Diese Anleitung ist NICHT auf den FT 480 R uebertragbar! Eine Anleitung fuer den FT 480 R folgt spaeter.

This modification is read 492 times.

[top of page](#)

**19-07-1998**

### **(FT-790) FT-790 Increasing the Power**

You can readjust the ALC of the transmitter by adjusting VR3002.

Remove the top cover of the rig, then you will see the main unit, (which is called No. 30XX. in the circuit diagram). On the left you find a potentiometer named VR02. (In YAESU devices the component numbers are always composed of the Board number and the 'local' part number so, VR3002 is VR02 on board No. 30XX).

BE CAREFUL: I have not checked yet the specification of the output transistor. It is really possible that you should not raise the power above the specified 2.5 watts!!!

This modification is read 684 times.

[top of page](#)

19-07-1998

(FT-790) FT-790 Reducing the volume of the BEEP and sidetone

You can adjust this volume with VR4002.  
Remove the bottom cover of the rig, then you will see board No. 40XX.  
Look for VR02 (at the rear end of the board in the middle) and you've got it.

For each cover you only have to remove four screws. It is a little difficult to pull off the cover, but be patient.

This modification is read 523 times.

[top of page](#)

19-07-1998

(FT-790) 9600 bauds mods for FT790r

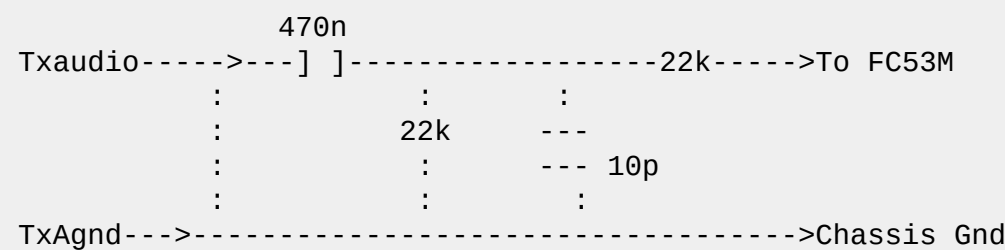
Audio output from FT790R receiver's Discriminator for 9600bauds

Here is a very simple way of taking audio direct from the discriminator.

Connect a flying lead to pin 9 QO8 (MC3357P). (To save you having to burrow, just solder a lead on the IC pin itself). Drill a 1/4 hole in the case between standby and speaker sockets. Insert phono socket here and connect the flying lead and suitable Gnd. Thats it, job done.

TxAudio input into FT790R Varactor diode for 9600 bauds

Here are the details to input 9600 buads into the 790. Firstly make up the following circuit.



Notes:-

When you make up the above circuit, you must use very short leads!!!!

FC53M is a Varactor diode which is D1031 on the FT790r diagram.

73 de Dave G4WFQ @GB7PET 30th May 1990

This modification is read 540 times.

[top of page](#)

19-07-1998

(FT-790) FT-790RII + FT-290RII für 9600 bps

Ergänzungen für den Betrieb mit 9k6:

1. PTT innen an die Mikebuchse legen: Pin 6 laut Plan main unit. Im Plan ist die Sicht von hinten !
2. Niederfrequenz OUT (Rx) für 1k2, 2k4 am heißen Ende des AF-Verbindungs- steckers J03 auf der PLL/PA unit über 25 Kohm Trimpoti; Schleifer auf Mittelstellung einstellen; J03: Kontakte 1 und 3; 3 = Masse; Schleifer
3. Niederfrequenz IN (Tx) für 1k2, 2k4: Stecker J06, Kontakte 3 und 2 (Masse) auf der 70cm main unit;
4. Niederfrequenz OUT (Rx) für 9k6: Pin 9, IC MC 3357 (Q02) PLL/PA unit;
5. Niederfrequenz IN (Tx) für 9k6: Steckverbindung J08, TONE Pin 5 70 cm main unit

Bemerkungen:

- abgeschirmte Kabel verwenden
- sollte ein XR2211 für 1k2, 2k4 als carrier detector genommen werden, dann kann man versuchen, am Pin 9 des MC 3357 das Rx-Signal für 1k2, 2k4 abzugreifen;
- für 1k2, 2k4 sollten die C's C97 und C98 (Eingang MIC, J06 Stecker) einseitig abgelötet oder herausgenommen

- werden, da sie den Frequenzgang beschneiden; 70cm main unit
- folgende C's sollten für 9k6 Betrieb entfernt werden: C127, C117, C115 auf der 70 cm main unit unten mitte bei Q30, Q27 und Q24 in der Gegend Die Widerstandskombination R132/R133 bei Q30 sollte überbrückt werden; diese Maßnahmen dienen zur Frequenzgangbegradigung; Q30 wird hierbei als Nieder- frequenzverstärker für das Tx-Signal 9k6 benutzt; ebenso kann man hier auch 1k2 und 2k4 einspeisen;
  - das ZF Filter CF 01 CFW455F sollte gegen eines mit breiterer Durchlaßkurve getauscht werden: CFW455D, bekommt man bei Andy's Funkladen in Bremen;

**FT-290RII**

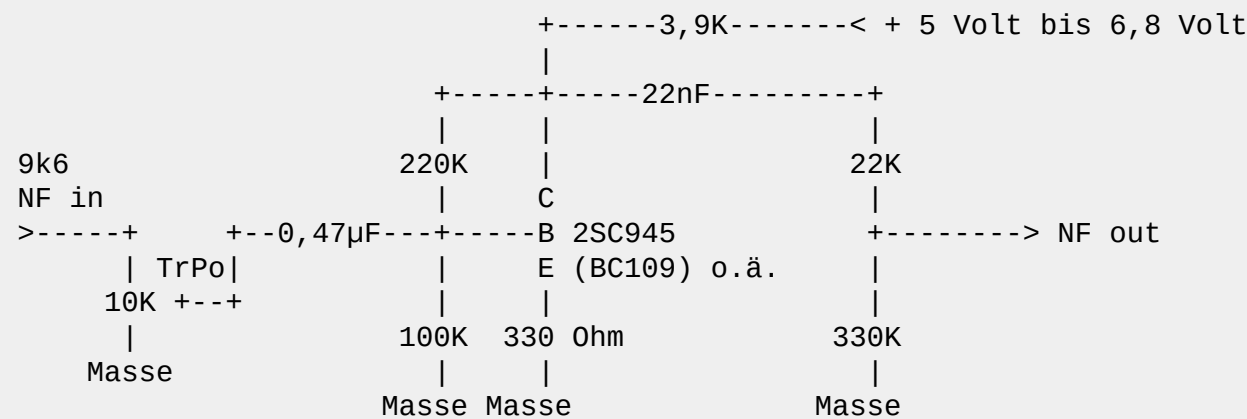
Es ist entsprechend wie beim FT790RII vorzugehen; Geräte sind sich sehr ähnlich;  
73 de dg3oo @ db0cel-7.#nds.deu.eu \*\*\* manfred \*\*\*

**19-07-1998**  
**(FT-790) FT-790RI und FT290RI für 9k9**

FROM: DG3OO @ DB0CEL

FT790RI und FT290RI

- NF Rx 1k2, 2k4 Auskopplung über 10 µF C und 25 Kohm Trimpotentiometer (Schleifer nach außen) am Kollektor von Q1021;
- PTT seitlich über Zusatzbuchse, Einkopplung via Schutzdiode;
- NF Rx 9k6 ebenfalls an Pin 9 des Q1019 MC3357 auskoppeln;
- NF Tx 9k6 (1k2, 2k4): Umbau des Hubreglers VR02, sodaß Schleifer und "heißes" Ende vertauscht sind (rechts vom Q2004); Einkopplung des Signales an dem Schleifer über Zusatzverstärker:



TrPo = Trimpoti

Auskopplung auch via 25 K Trimpoti möglich; Schleifer dann gegen Verstärker; "heiße" Ende nach außen;

- Verstärker auch für 1k2, 2k4 Tx-Signal nutzbar;
- bei Verwendung eines XR2211 - siehe oben

Bastlerisch Unerfahrene sollten u.U. die Finger von den Änderungen gerade bei FT290RI lassen!  
73 de dg3oo @ db0cel-7.#nds.deu.eu \*\*\* manfred \*\*\*

19-07-1998

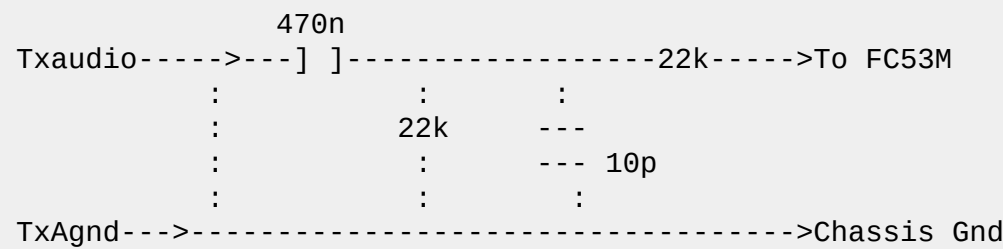
(FT-790) FT-790R receiver's Discriminator for 9600bauds

by Dave Hulatt G4WFQ

Here is a very simple way of taking audio direct from the discriminator. Connect a flying lead to pin 9 QO8 (MC3357P). (To save you having to burrow, just solder a lead on the IC pin itself).  
Drill a 1/4 hole in the case between standby and speaker sockets. Insert phono socket here and connect the flying lead and suitable Gnd.  
Thats it, job done.

TxAudio input into FT790R Varactor diode for 9600 bauds

Here are the details to input 9600 buads into the 790. Firstly make up the following circuit.



Notes:-

When you make up the above circuit, you must use very short leads!!!!

FC53M is a Varactor diode which is D1031 on the FT790r diagram.

This modification is read 521 times.

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19-07-1998

(FT-8000) FT-8000 expanded RX and TX

Hello everbody how ever you read this messsage about the TX-Mod.for the YAESU FT8000 mobil transceiver.

First,in germany the version of the YAESU FT 8000 has a wide range RX in this time.So we can receive from 144 unit till 110 MHZ - 174 MHZ and the 430 unit 410-480MHZ than all frequency 800-1300 MHZ.In 800-1000Mhz the FT 8000 has many of birdy...from the ozilators.The 1300 Band receiving are very bad.Some relaisstation in 5 miles can't listen...so sorry..that will be a big fine point if it were really...

So it can be,that this information about the TX - modifikation, was made from any other radio amateur from anywhere.Also don't look at my sometimes so bad english...hi,hi...All this steps was made by my self.I'm not the big one of SMD parts worker but i'm interessend for modifikationen of allmy amateur radio TRX.For the YAESU FT51 we had with some other om's made also a modifikation before,in summer 1995.

All things and worksteps are without a warranty at me side.But don't give it up, all old boys arrived the finish...if you follow the some mostly simply steps,than you are will be very glad about the use of the FT-8000.

So i've a warning also before you start.Peopels with big and swinging fingers...hi hi,let it be.Somethings are very miniature...use a antimagnetic solderstation with temperature regulation,a rubberground for better work, some boxes for the connectors.How ever you've a perfekt workplace organi- sation,you've no problems with lose of any thing.Also you can check,that all parts of the TRX are really in it....all this it's was happend everybody all around..

1. All kabel disconnect for the TRX from outside.(Mic,Antenna,DC-Kabel ...)
2. The two connectors on the side with the fan,the four on the downside and the four connectors at the left and rightside pse disconnect.Put it sure in on of the boxes.
3. The metalhouse of the TRX carefully and sure pull in the way to the fan.It can be that the house don't want...hi..pull it outside with light swing.
4. Disconnect the connectors from the front on the upper and downside,surely take it in a box.
5. If the loutspeaker made trouble with the wire,disconnect him also.... but it must be long enough for the operation...
6. Frontside carefully pull away to in front of that.Attention for the small bandkabel in the middel!! Holdingparts at the both sidespse don't let fall in the TRX !! It can be made an sudden death for the IC's !! Oh,oh....and bye..
7. The TRX take down so,that it is on the headside on the table.In this situation you must find the lithiumbatterie on the right side on the upperside of the panel ! VERY IMPORTANT! for not exchanging !By the way the batterie is on the

From the lithium battery side on the right, you can see a line of 15 points of some solder points. Some are used and some are open (SMD parts, resistors, connector headers). Look at the little poor picture :

```

I
I      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
I      (X)
I      0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
I      15      10      5      1
I
I      solderpoints ( uppside right)      lithiumbatterie
I      counted from right to left (!)
I
I      The hotpoint are the ( X ) marker !!
I
I      show from the particulation side to the panel
I

```

9. If you want only to open the RX , you must be have follow solder- points at this place are close in the area : 10 ,9 , 6, 4, 3, 1 That the version in DL if you can open the RX only by software Reset and the keysteps : press REV+VFO/MR and switch on the TRX in the same time.
10. Now we are counting the solderpoints from the right side to the left side. On the point 10 of the line,we arrived on the hotpoint of this modifikation. If you had made all counts are ok,the point must be a SMD bright.The SMD are marked with a " 0 " on the upperside ( Version in Germany at this time ). The SMD part it also a little bid bigger if any other parts before.(german version)
11. If you have find that place in the line,make all sure that is right.Then take the SMD part with the solderstation carefully away...Safe that SMD in one of the boxes if you would sell the FT 8000 and the other one will be don't use a full open FT 8000. IMPORTANT : DON'T touch the parts on the panel !! CAREFULLY WITH THE SMALLBANDKABEL !! It's very fast in the sky..hi hi..
12. All steps return.So everytime handle careful with the TRX - parts.The house parts from the front panel are with are click in system.
13. If you have all extern things are connected , we can start with the software steps.The TRX are in the first off.Take your fingers and push the REV plate ( downline of the little knops) and the VFO/MR knops together all time and switch the FT 8000 with the 3. hand (hi) on.Now the TRX is on, you can take fingers away.The prosessor are reset.The TX are now in wide range mode.

```
TX 144 : 137,600 MHZ - 174 MHZ full range of sending !
TX 430 : 410      MHZ - 480 MHZ    "    "    "    "    !
```

Some words about the other functions. The 9k6 packet radio, who will be future is not really in 8 of 10 TRX. Receiving in 9k6 baud are ok but sending, there are mostly problems. The user can't fill that mistake in the first but the most of the packet infos are not correct and the digipeater ask many time for the packet... Really the baudrate are also to 1k2... Someone has problems with crack noise in the loudspeaker. The ground of them are the fan in some one. The noise will be there, when the TX was on most. But in any TRX everytime. It's not a big problem for the user but fine ears of the om's hear it everytime.....

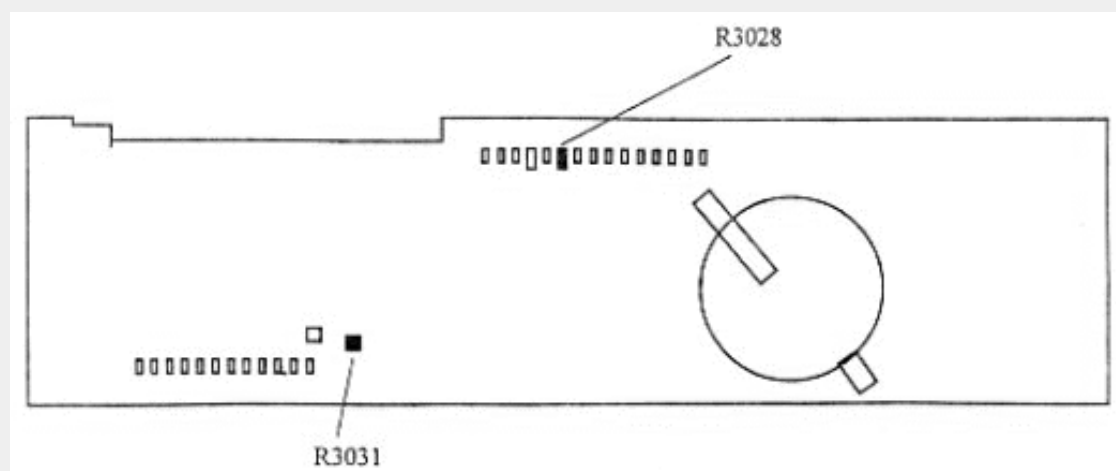
Use that modifikation only for the radio bands!The TX out-side of this are forbidden.We don't wont to have trouble with the national goverments,please use that in this border.....

AM RX-range would be aktiv if you press the button first F/W and VFO/MR in the same time. Range from 110-280 MHZ but only RX (!).

18-12-1998

## (FT-8000) YEASU FT-8000R Free Band mods (MARS/CAP)

- Remove DC Power.
- Remove the top and bottom covers from the radio.
- Gently release the head of the radio by prying the 6 snaps (3 on each side) of the front panel.
- On the control unit (board on radio side), locate R3028 and R3031 and remove the chip resistors.
- Assemble radio.
- Reconnect the DC power.
- Press and hold [VFO][MR][REV] buttons while you turn power on.
- Modifications complete!



This modification is read 833 times.

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18-12-1998

## (FT-8000) FT-8000 fuer 9600bd

de DL4YCM @ DB0BQ.#NRW.DEU.EU (Ulli)

Hallo,

ich hatte vor einigen Wochen in dieser Rubrik eine Anfrage bezueglich FT-8000R + 9k6 RX-Probleme gestartet und moechte euch die bisherigen Ergebnisse nicht vorenthalten:

Der FT-8000R ist im Originalzustand nicht bzw. nur bedingt fuer Packet mit 9k6 zu gebrauchen.

Der Grund hierfuer liegt an einer R/C Kombination direkt am Ausgang des Demodulator-ICs (UHF). Hierdurch werden die hochfrequenten Anteile der NF so stark gedaempft, dass der TNC nur kurze Packete dekodieren kann.

Bei YAESU Deutschland und YAESU Japan war dieses Problem bislang nicht bekannt, allerdings bekam ich aus Japan eine TX-Modifikation.

In USA ist man da schon weiter. Dort gibt es anscheinend eine offizielle Umbauanweisung, die waehrend der Garantie kostenlos von YAESU USA eingebaut wird.

Die folgende Umbauanweisung basiert auf eigenen Experimenten sowie auf denen einiger OMs :

### Modifikation FT-8000R und 9k6 (70cm)

#### **RX:**

An Pin 9 des Demodulator ICs befindet sich eine Reihenschaltung aus R2211 (100k) und C2089 (1uF). Parallel zu R2211 einen keramischen Kondensator von 33nF anloeten. Hierdurch wird der Widerstand NF-seitig ueberbrueckt, sodass nunmehr auch die hochfrequenten NF-Anteile bis zum Datenanschluss durchgelassen werden.

#### **TX:**

Parallel zu R1223 einen 15pf keramischem Kondensator loeten. R1223 befindet sich im VHF-Teil am OP Q1019-2 (naehe Data-Buchse).

Hierdurch wird das Uebertragungsverhalten beim Senden von langen Packeten deutlich verbessert. Den TNC Ausgangspegel auf exakt 2.0 Vp-p einstellen.

Zur Wahrung der Garantie solltet ihr euch vor dem Einbau dieser Modifikation unbedingt mit eurem Haendler absprechen.



Ausserdem sollte die Modifikation nur mit einem entsprechenden SMD-Loetkolben durchgefuehrt werden.

Mein FT-8000R arbeitet in 9K6 Packet nun so hervorragend, wie ich es eigentlich von Anfang an erwartet haette.

Fazit: Geraete mit angepriesender, serienmaessiger 9k6 Data-Buchse sind damit noch lange nicht automatisch 9k6 faehig.

Vy 73, Ulli (DL4YCM @ DB0BQ)

This modification is read 670 times.

[top of page](#)

**19-07-1998**

**(FT-8100) FT-8100 width 9600 baud packet**

01-08-98

*From: G3VEB@GB7OAR.#16.GBR.EU*

Hi All. Some stations have been asking if FT8100 will work on 9k6 without modification.

Answer is yes, but if you use the YEASU CT39 connecting cable be sure to check it. I spent most of a day trying to get my 8100 and PK96 working, but with no success. As a last resort I checked the cable and found that the coloured wires to the pins in the 6 pin mini din plug were wrong. (see page 19 FT-8100 manual).

I found pins 1 and 2 were tranposed which put the orange wire to gnd instead of the yellow. Pins 3 and 4 were also transposed making the green wire PTT instead of the red. Pins 5 and 6 were correct.

Also check TNC deviation, it's more critical on 9k6 but a setting between 2.5 and 2.75 seems ok.

73.Roy

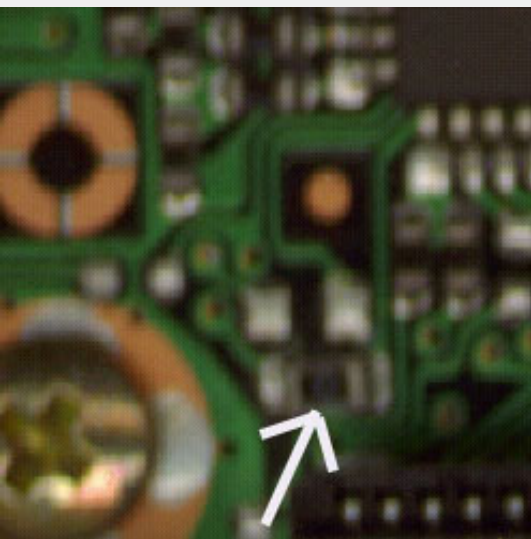
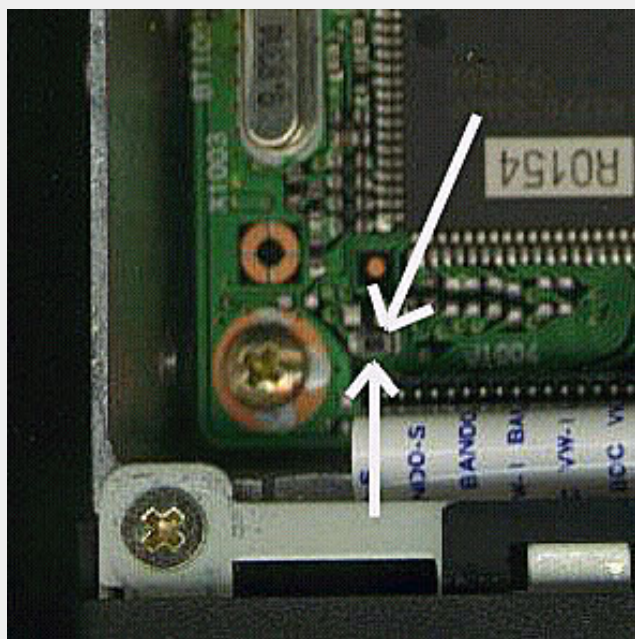
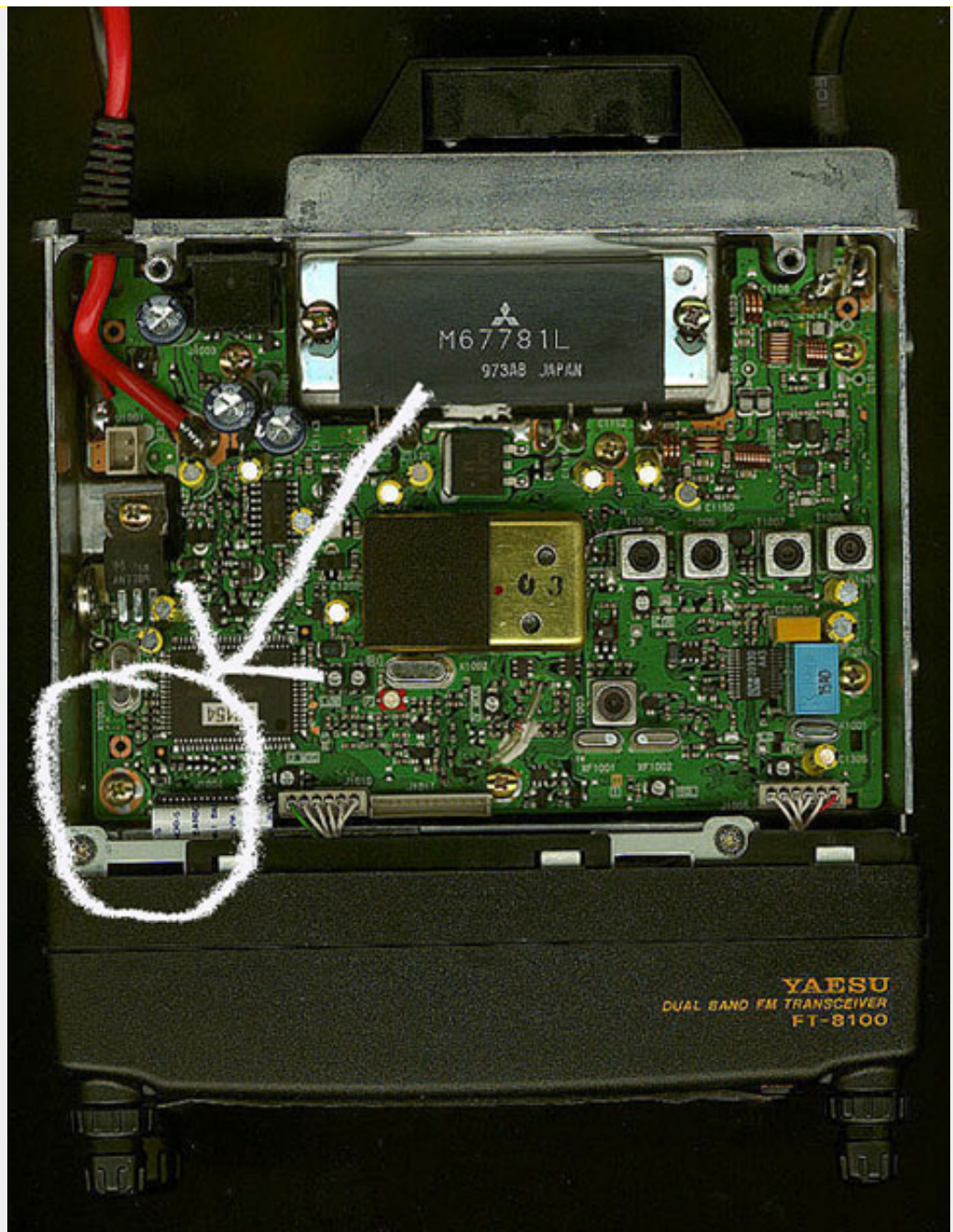
This modification is read 1730 times.

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**15-11-1998**

**(FT-8100) Mars / Cap Mod**

1. Disconnect power & Antenna
2. Remove screws from the top cover (the side with the speaker) 6 screws total
3. Looking down inside the top of the radio, locate & remove the chip resistor shown in the picture
4. Reassemble the radio & reset the Microprocessor



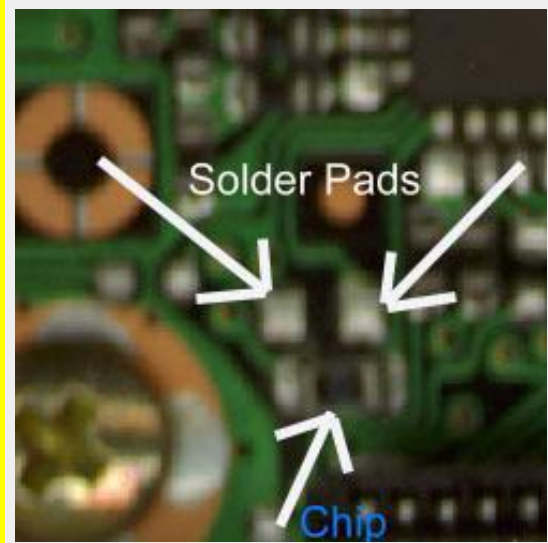
02-12-2000

(FT-8100) FT-8100 RX 144 - 148 & 430 - 450 MHz mod

**Author:** Mac - [mcgyv@hotmail.com](mailto:mcgyv@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

If you remove the Resistor Chip & Place it on the Solder pads Just directly above it (see pic below) it will make it so your radio can only recieve 144.000-148.000 & 430.000-450.000.

However I don't expect you would want to do this mod anyhow.



This modification is read 2151 times.

[top of page](#)

02-12-2000

(FT-8100) Software mods for the FT8100 ver:1.00 date 03/98

The FT8100 uses a little bit differend aproach for the up/download. It is not possible to change the Country Codes via Software. The firmware and EEPROM is a little bit bigger so a secure check can be done and if the Hardware configuration won't match, the FT8100 is refusing to accept the data file.

There must be anyway either a Secret menu or at least 3 Jumpers for setting the country code.

But as usually Software rules, so it is possible to move the lower and upper limits for RX and TX.

With this way the FT8100 will FULL OPEN and can be used on all Frequencies for RX and TX where the Hardware will allow it.

You will get a FREEBAND mod and the good thing is that the ARS will still work.

To make the mod you will need the ADMS 2D Software and a HEX editor.

Or you can download the allready patched [.RDF](#) file.  
It does not matter what Hardware mod you have (or have done) or for witch country your FT8100 is configured.

Technicaly you are only moving the limits for the Frequecny dealing.

Make a .RDF file and edit it with a HEX editor.

The values on the following addresses are defining the lower and upper limits for RX and TX on the VHF and UHF bands

| Band   | Lower limit adr | Upper Limit adr |
|--------|-----------------|-----------------|
| =====  |                 |                 |
| VHF RX | 0A66 and 0B2A   | 0A6A and 0B2E   |
| UHF RX | 0A76 and 0B8F   | 0A7A and 0B93   |
| -----  |                 |                 |
| VHF TX | 0A6E            | 0A72            |
| UHF TX | 0A7E            | 0A82            |
| -----  |                 |                 |

Value example:

|        |      |      |
|--------|------|------|
| -----  |      |      |
| VHF RX | 0050 | 0280 |



|        |      |      |
|--------|------|------|
| UHF RX | 0280 | 0650 |
| VHF TX | 0050 | 0280 |
| UHF TX | 0280 | 0650 |

If you insert the values from the example in the abouve addresses, the FT8100 will be opened for RX and TX from 50-280MHz and 280-650MHz.

After modification the following results are mesured.

RESULTS:  
Upload: [Free.rdf](#) & Stock.tpl

VHF:

|                           |                                                                                                                                                                                                                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RX 50.00 to 109.995       | TX red light active on 80.00 to 109 (notsure if it really TX'ing)<br>Also all the digits "X" are flashing.<br>Example: 50.XX to 109.XX                                                                                      |
| RX 110.000 to 136.995     | Same as above, but has the "AM" displayed.Also all the digits "X" areflashing.<br>But this is only between 110.XX to 111.XX twoards the 110.8 MHZ range, the flashing seems to slow down in "pulse" (not blinking as fast.) |
| RX 137.00 to 210.630      | Does TX but not tested for RX on a scanner.                                                                                                                                                                                 |
| RX 201.630                | the .630 starts to flash. The 201. does not flash.                                                                                                                                                                          |
| RX from 201.63 to 205.995 | flashes, however still unknown if it is true TX.                                                                                                                                                                            |
| RX 206.00 to 280.00       | TX but unknown if it is true TX                                                                                                                                                                                             |

UHF:

|                       |                                                                             |
|-----------------------|-----------------------------------------------------------------------------|
| RX 280.000 to 550.000 | TX light is on, but need to chek for true TX                                |
| RX 551.00 to 650.000  | TX light is on, but need to chek for true TX, also 551.XXXto 650.XXX blinks |
| RX 750 to 869.00      | NO TX                                                                       |

When at 750.00 , if you cycle backwards...you end up at 550.00...rotate foreware to get to the 600.00MHZ band

|                      |       |
|----------------------|-------|
| RX 894.00 to 1330.00 | No TX |
|----------------------|-------|

We are currently seeking others to help us test these mods for other countries & different production codes.

If You have removed the resistor chip & lost it & want the stock mode back in your radio you will need to upload this [Mars to Stock .TPL](#).

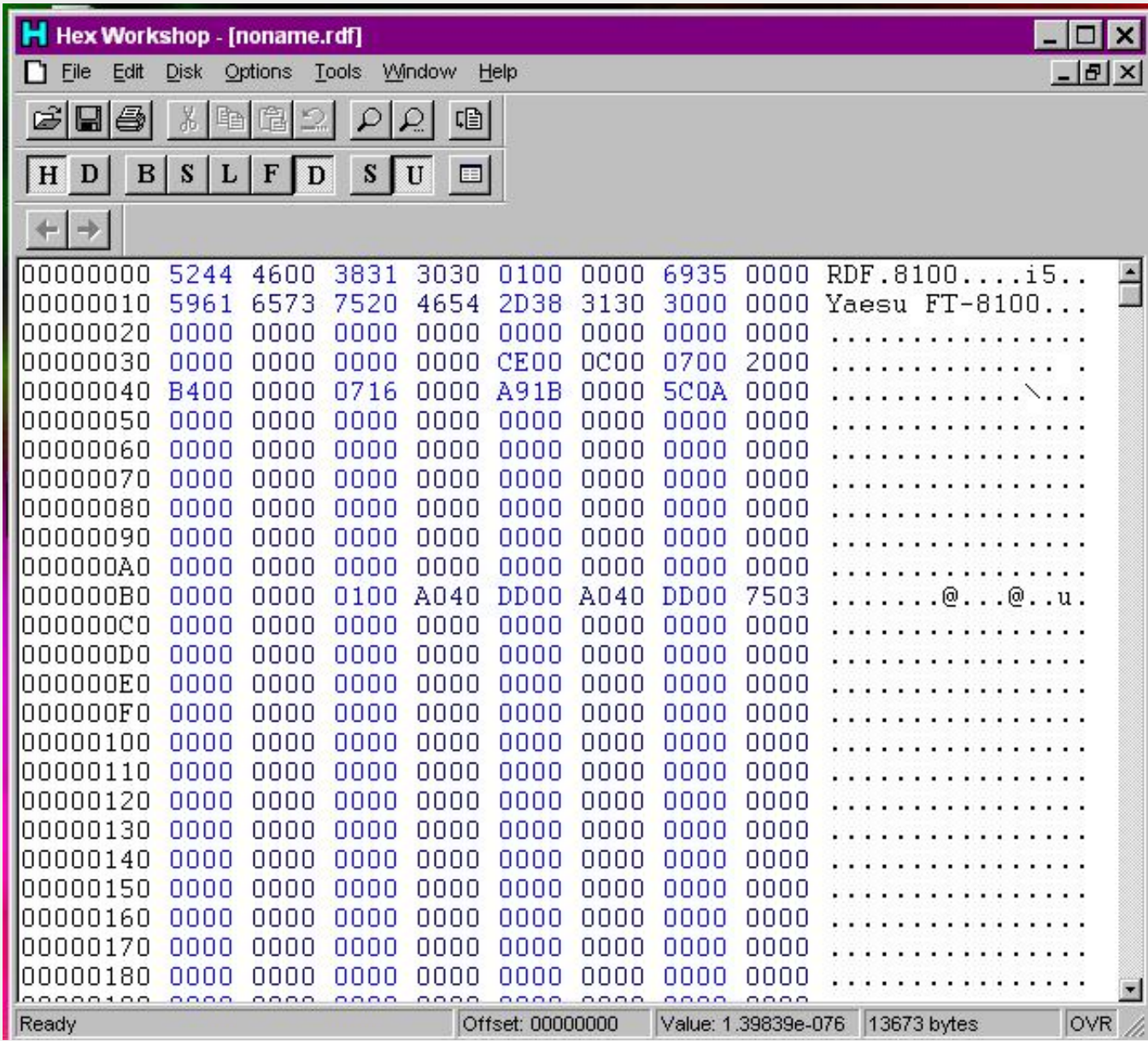
This mod is a product of the intercontinental digital cooperation between:

|           |   |                                                                      |
|-----------|---|----------------------------------------------------------------------|
| Mazedonia | - | <a href="mailto:Ingra-Beton@t-online.de">Ingra-Beton@t-online.de</a> |
| USA       | - | <a href="mailto:mcgyv@hotmail.com">mcgyv@hotmail.com</a>             |

East and West, together on the Net.

02-12-2000  
(FT-8100) FT-8100R Cell Mod

First off you will need the Adams-2D software & a Hex editor.  
You will also need to know the Exact Mhz that you wish to program into your 8100R radio.Below is what you shoud get when you Hex Edit your \*.rdf file

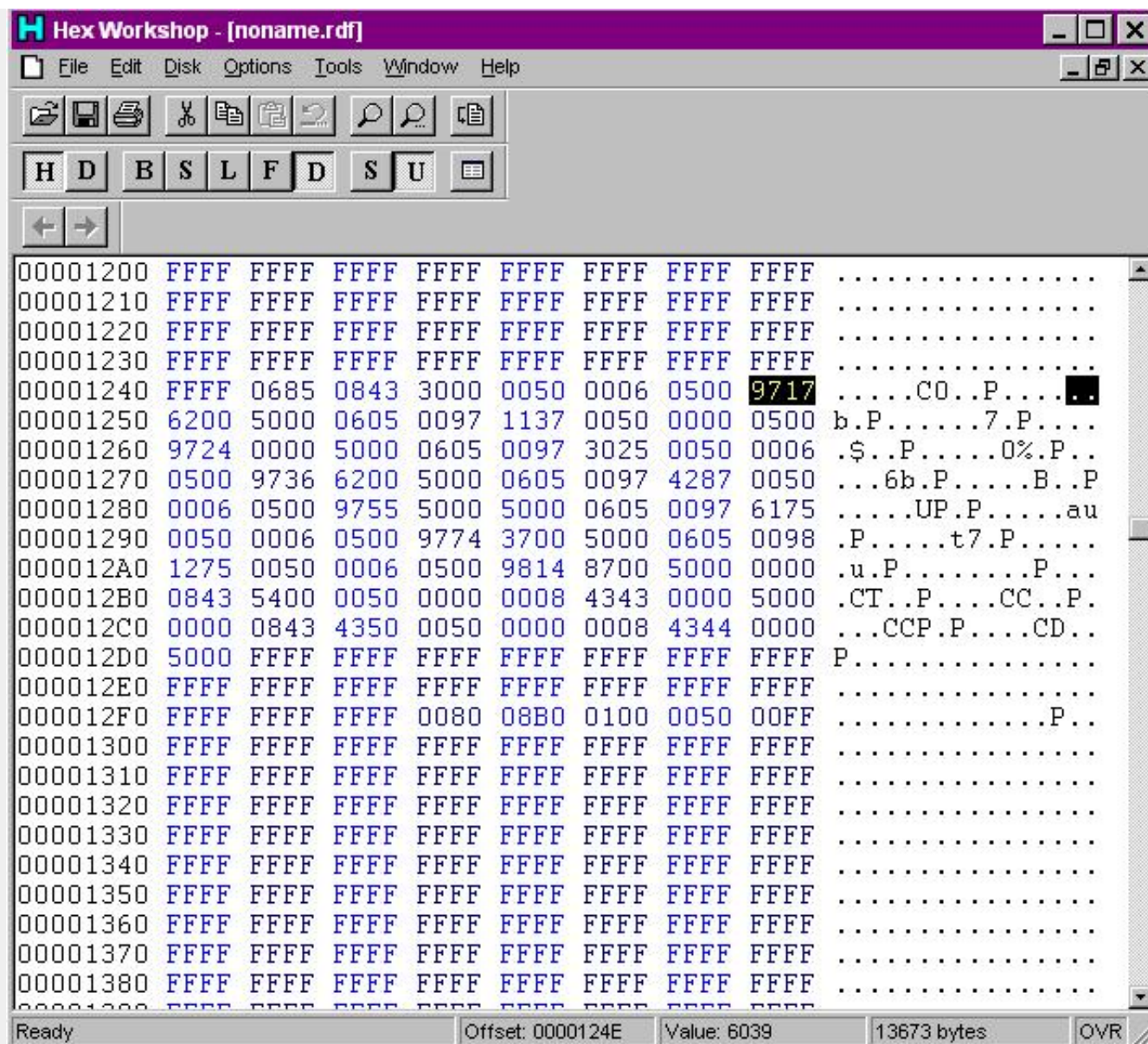


You first need to upload some Mhz, using the 900Mhz range is the easiest. I am using the following in this example:

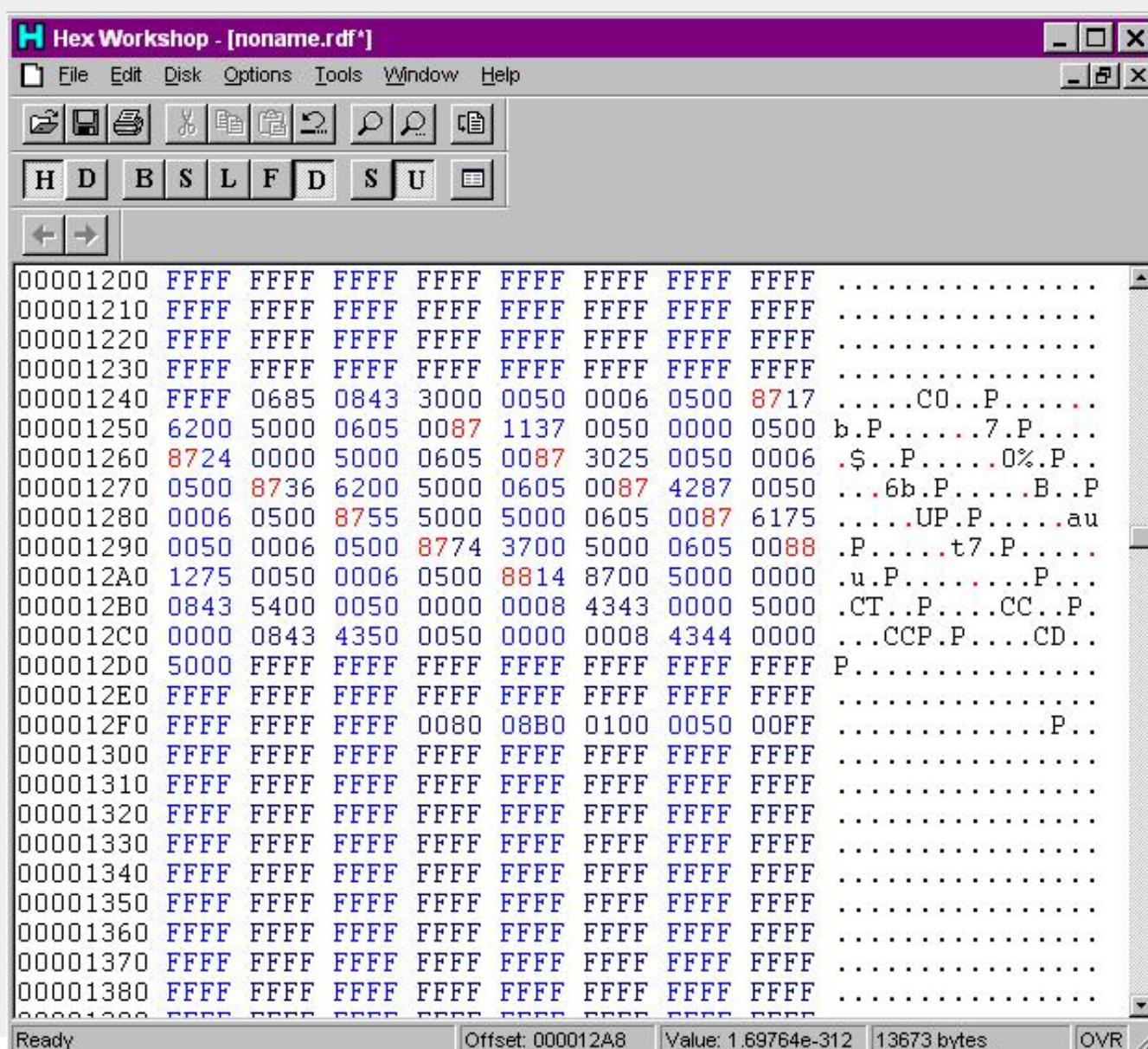
- 433.0000
- 971.7625 = 871.7625
- 971.1375 = 871.1375
- 972.4000 = 872.4000
- 973.0250 = 873.0250
- 973.6625 = 873.6625
- 974.2875 = 874.2875
- 975.5500 = 875.5500
- 976.1750 = 876.1750
- 977.4375 = 877.4375
- 981.2750 = 881.2750
- 981.4875 = 881.4875

After you get the 900Mhz uploaded to the file, then you are ready to Hex Edit them into 800Mhz as shown on the right.





In the above picture, look for the first Mhz you entered. I searched for 9717 because I was looking for 971.7625 Mhz. The rest of the frequencies you need to change are just a few spaces off. Compare the picture below with the Mhz files from above. All you need to do is change the 9 into an 8.





You will see all the changes I made in RED. The second number does not get changed, but turns RED due to the fact that they are in pairs. Also the Red dots on the far right of the pic is automatically changed when you change the number into an 8.

Upload the file into your 8100R radio & you should have the Frequencies in the Cell band in your radio.

This modification is read 2309 times.

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**25-06-2001**

## **(FT-8100) FT8100R frequent thermal failure - repair suggestion**

**Author:** G8SBF - [slarkins@yfi.co.uk](mailto:slarkins@yfi.co.uk).[MODIFICATION.NET](http://MODIFICATION.NET)

Symptoms of this power track particular problem are:-

1. Loss of receive audio - even though the 's' meter still shows the radio is receiving OK. There is NO audio at all from the speaker on either band.
2. When you transmit the transmitter runs virtually no power as the Power Amplifier has no 13.8v feed. You cannot access even very close by repeaters etc.
3. The transmit fan on the back does not operate when you transmit
4. The radio may work for a short time when cold. When it heats up there is a 'click' from the speaker and it dies in the way described above quite quickly.

If these are the symptoms you are seeing then solder a wire onto the top PCB as shown in the picture below (you'll need to scratch off the varnish on the tracks to get a good solder connection). Be careful not to short anything else out other than to attach to the tracks shown with the wire. Obviously where I put the bridging wire, those track positions should ALWAYS be connected together by an underside board track (and plated through holes), which you can't see unless you take the whole radio apart. I would not recommend you doing that as you need to be very careful and have a high wattage soldering iron to unsolder some of the earth solder tags.

My radio is 100% perfect now. I can't take any responsibility if you do anything wrong and cause damage. Do this at your own risk. Martin Lynch want 90 pounds to do this repair. Considering it's a 5 minute fix that's an awful lot of money!!

By the way, the 8100 board is a ten layer PCB so try not to heat it up for too long with the soldering iron and this is another reason why I recommend not taking the radio apart. You'll only need to take the top cover off and disconnect the speaker connector to do this repair - NOTHING ELSE. Apparently if you take the board out (not necessary) and bend the PCB you can cause other inner layer fractures. These problems are also common. If the symptoms you are seeing do not match those described - then you may have another track fracture somewhere. The FT8100 is also known for these faults.



This modification is read 2104 times.

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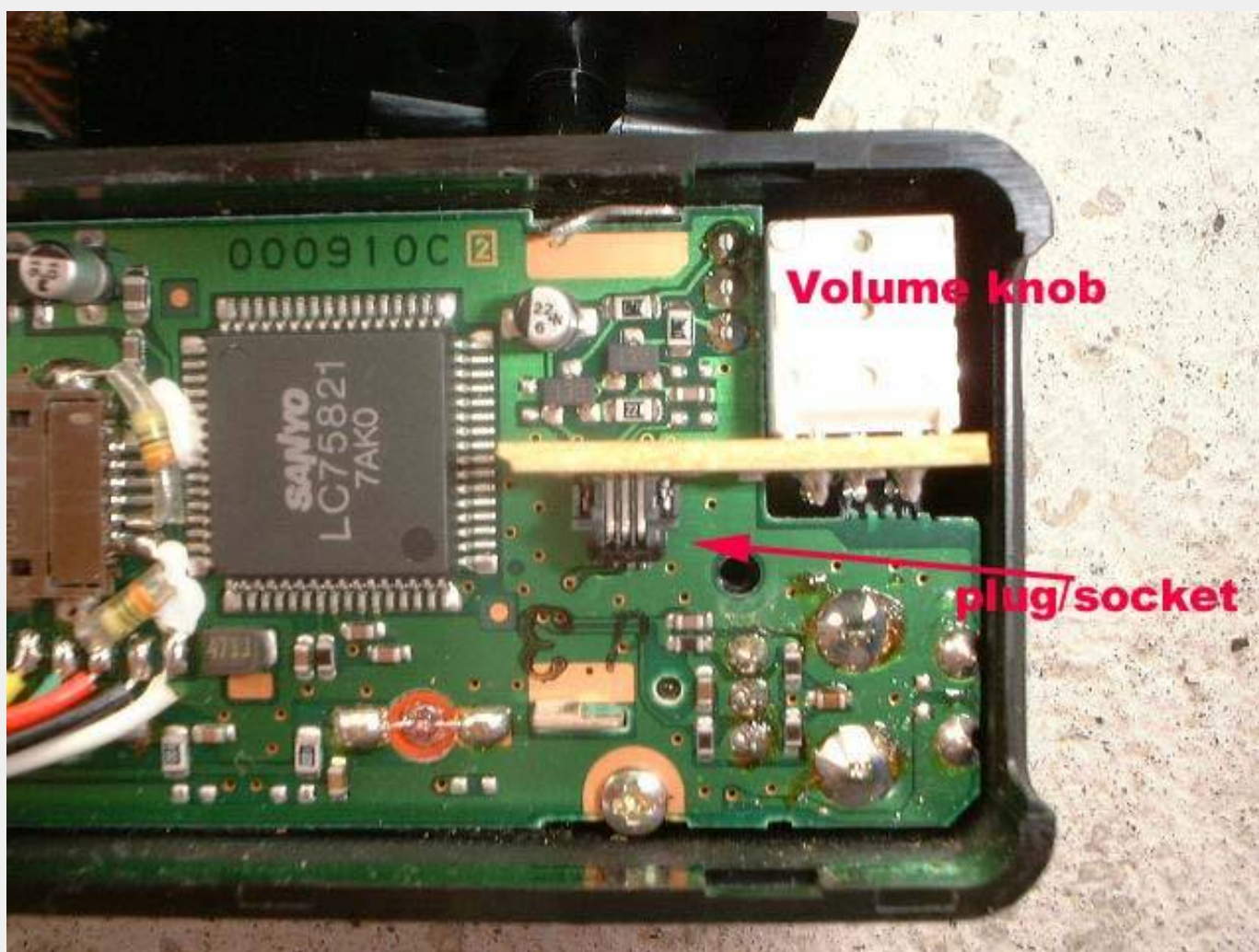
08-09-2001

## (FT-8100) FT8100 volume

**Author:** Sean (ZL2BOF) - [sean.nixon@xtra.co.nz](mailto:sean.nixon@xtra.co.nz) [MODIFICATION.NET](http://MODIFICATION.NET)

Hello, I have read a few reports about the FT8100 and one common complaint was the volume being stuck on one level when the knob was turned down. It happened to mine yesterday and was simple to fix.

- Remove front control panel
- On the back of the front panel are two screws, remove screws and remove cover
- On the circuit board, push the flexi-strip connector towards the strip and remove the flexi-strip from the connector.
- Pull off the volume and squelch plastic knobs, and with a fine screwdriver remove the slotted nut that holds the volume knob in place.
- Press out the volume knob. It has a small circuit board attached to it, and this will pop off a small connector on the main circuit board. On mine the connector was so poorly soldered to the circuit board that it came off with the volume knob. This was the problem.
- Re solder the connector to the board and re assemble.



ZL2BOF  
Sean

**Date:** 29-01-2002

**User comment**

**From:** [Alan Morgan G8PON](#)

**Subject:** UHF Squelch/Volume control

The FT 8100 also suffers from intermittant faults on the UHF Squelch/Volume control. As with the VHF Sq/Vol remove front panel, plastic knobe and unscrew the control and ease the small PC board from its socket and resolder the contacts to the main panel PC. when reassembling ensure the securing slotted nuts are tightened full to ensure the control is secure to the front panel.

**21-10-2001**  
**(FT-8100) Yaesu FT8100R cheap or FREE !!! data conector & cable**

**Author:** James EI2IV - [ei2iv@gofree.indigo.ie](mailto:ei2iv@gofree.indigo.ie).[MODIFICATION.NET](#)

Why spend loads of money or better still why spend any at all on expensive optional data cables. Just get your hands on an old PC PS2 Mouse n cut off the lead !!!!!

(most mouse leads will do, the odd ones are missing 1 wire )

73s  
James EI2IV

This modification is read 1933 times.

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**13-02-2002**  
**(FT-8100) TX fix for FT-8100R**

**Author:** Robin, G1MHU - [robin@rmoseley.co.uk](mailto:robin@rmoseley.co.uk).[MODIFICATION.NET](#)

I had a problem with My FT-8100R, it would TX ok on 70Cm's but 2M side, power output would drop off to almost Zero when the radio was warm.

After looking allover the PCB I found that one of the VIA's on the board was glowing in the dark from the minute arcing caused by the intermittent connection, I soldered a link wire from the VIA to the nearest component.. Voila Problem solved.

I e-mailed Yaesu UK, they tell me it is a common fault, so here is a [jpg image](#) of what was done to repair the radio.

Robin Moseley G1MHU

|                                         |                     |                                          |
|-----------------------------------------|---------------------|------------------------------------------|
| <b>Date:</b> 28-03-2002                 | <b>User comment</b> | <b>From:</b> <a href="#">Mike PA3FPZ</a> |
| <b>Subject:</b> VIA in the power module |                     |                                          |

In my FT8100 all the VIA's after the power module were arcing. Even to such an extent that several components burned out. I had to replace all the coils, capacitors and diodes.

To prevent this: scrape around the VIA's until you can seen bare copper. Insert into the VIA's a small copper lead, like the end of an resistor. Solder into the VIA and make sure the blank copper gets enough solder. This has to be done on both sides of the PCB, so you have to take it out of the tranceiver. Replace the final capacitor at the antenna connector, for a 1KV equivalent.

These modifications are absolutly neccesary if you are running high power on two meters. I found out the hard way!!!!

Mike PA3FPZ

This modification is read 718 times.

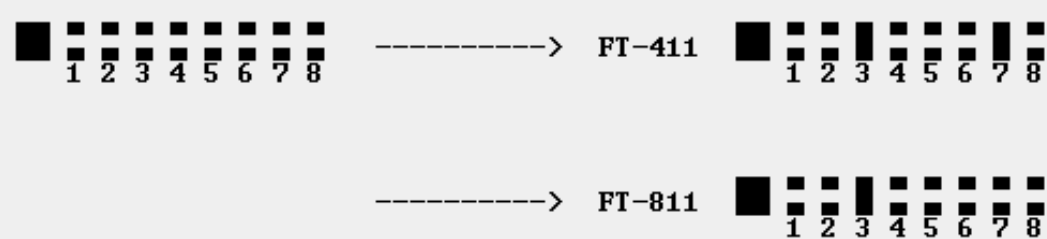
[top of page](#)

**19-07-1998**  
**(FT-811) MODS for FT-411 / 811 TRX for a VHF UHF**

To allow this TRX for a VHF UHF general cover, do the following mods :

- 1) Remove the front panel.
- 2) Look for the first part where the Lithium battery is connect.

there are 8 connectors like :



To validate the micro controller, do next :

For the FT-411 : RX 120 - 174 Mhz TX 140 - 174 Mhz

- 1) Reset the TRX by switch on it with [MR] and [VFO] key down.
- 2) Type 1200 [VFO] 1740 [VFO] 1400 [VFO] 1740 [VFO]
- 3) Press the [F] and [7] keys tho change the QSY step.

BE CARREFULL, with this few mods, the TRX looses the automatic AM detection.

For the FT-811 : RX 420 - 470 Mhz TX 420 - 470 Mhz

Do the same but step 2 is different :

- 1) Idem
- 2) Type 4200 [VFO] 4700 [VFO] 4200 [VFO] 4700 [VFO]
- 3) Idem

This modification is read 486 times.

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**19-07-1998**  
**(FT-811) FT-811 + 9k6-Modifikation**

From: DL2SEW @ DB0LX.#BW.DEU.EU (Walter)

9k6 mit Yaesu FT811 und TNC2H

- Akkupack entfernen
  - 4 Schrauben lösen und Batterieanschluß abziehen
  - Drehknöpfe abziehen, 5 Schrauben lösen und Abdeckung abnehmen
  - 2 Schrauben der Rückseite lösen und Gerät aufklappen ( Vorsicht: Flexprintkabel durch Öffnen der Fassung vorsichtig abziehen)
  - 4 Schrauben der Kupferabschirmung lösen und Abschirmung ablöten
  - Das Gerät (bzw. die hintere Hälfte des Gerätes) so auf den Arbeitstisch legen,daß die Antennenbuchse links oben ist. Man erkennt 3 senkrecht stehende Baugruppen, die Mittlere Platine ist die ZF-Demodulatorplatine ( IF-Unit ).
- Auf der Platine sieht man ein SMD-IC. Das zum Operateur zeigende oberste Beinchen ist Pin 11, der Demodulator-Ausgang.  
Hier kann über 15kOhm die RX-Nf fürs TNC abgegriffen werden.
- Unterhalb dieser 3 Platinen quer dazu befindet sich vollgeschirmt die PLL- Unit. Hier kommt man nur von unten an die Anschlüsse, d.h. das Gerät weiter zerlegen.
- 5 Befestigungsschrauben der Hauptplatine lösen, Antennenbuchse abschrauben und gegebenenfalls ablöten.
- Die Platine komplett herausnehmen, umdrehen und Anschlusspinreihen der Pll- Unit suchen. Eine Reihe mit 6Pins und eine Reihe mit 3 Pins daneben. Der mittlere Lötpin der 3Pin ist der Modulatoreingang. Hier die TX-NF des TNC direkt anschliessen ( ohne R ).
- Die Ptt-Leitung direkt am Ptt-Taster anlöten.
  - Dann wird noch ein Loch in die rechte Seite etwa 1,1cm von der Unterkante entfernt gebohrt (ca. 4mm Durchmesser für Gummitülle). Hier können dann die Leitungen zum TNC durchgeführt werden.
  - Der Zusammenbau erfolgt in umgekehrter Reihenfolge, die abgeschirmten NF- Leitungen irgendwie im Gerät günstig zur Bohrung verlegen.



- TNC2H-Einstellung: Modulationsregler weniger als 9Uhr-Stellung (nur wenig aufgedreht)
- Dip-Schalter zur Filtereinstellung:

5 Unten  
6 und 7 Oben  
8 und 9 Unten

#### SCHLUSSBEMERKUNG:

Der Umbau ist nicht ganz unkritisch. Probleme gab es z. B. beim Ausbau der Antennenbuchse. Der Umbau erfolgt auf eigenes Risiko!

Ich habe an meinem Gerät zusätzlich das 12,5khz ZF-Filter (Subminiatur) gegen ein normales handelsübliches 20khz-Filter ersetzt und an einem freien Platz mit Heisskleber fixiert und mit abgeschirmten Zuleitungen verdrahtet.

Hierzu musste allerdings die ZF-Unit ausgelötet werden, um das Keramikfilter auszubauen.( Vorsicht geboten ! )

Noch Irgendwas an der PLL zu manipulieren, war mir das Risiko nicht wert, da diese total zugelötet ist. Man erreicht ein bescheidenes TX-Delay von etwa 180ms, wobei ich an dieser Stelle auf quarzmodulierte Geräte hinweisen möchte, die in jedem Fall vorzuziehen sind!!!

Trotzdem, vy 55 + 73 de Walter, DL2SEW @ DB0LX

This modification is read 430 times.

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**19-07-1998**

### **(FT-815) YAESU FT-815 expanded frequency range**

Remove the screws holding battery track and rear cover. Locate the "CONTROL UNIT".  
Close jumpers 3, 5, AND 7 if not allready closed, 6 must be open. Let other jumpers unchanged.

Reassemble the radio.

Turn on the radio and program it as following:

"1" 135.000 PRESS VFO THIS IS LOWER RX LIMIT

"2" 185.000 PRESS VFO THIS IS UPPER RX LIMIT

"3" 135.000 PRESS VFO THIS IS LOWER TX LIMIT

"4" 185.000 PRESS VFO THIS IS UPPER TX LIMIT

Press and hold MR, VFO and 2 while TURNING ON if you need to reset or reprogram the radio.

### **YAESU FT-815 expanded frequency range**

Same as above.

Close jumpers 1, 5, and 7.

Program 420 to 460 mhz as above.

NOTES:

Jumper 9 is for battery back-up.

Jumper 10 is for 1750 Hz repeater tone acces.

Jumper 1 is for 25 KHZ steps default value.

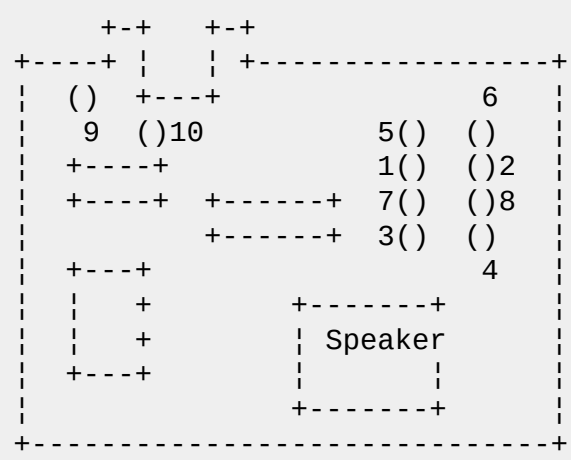
This modification is read 350 times.

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**19-12-2001**

### **(FT-816) Extended frq.**

1. Remove battery and antenna
2. Remove the 4 screws holding battery track.
3. Remove 2 screws in the back case.
4. Carefully separate the front cover.
5. Locate jumper pad 5 and 7



6. Solder pads 5 and 7 (ped 9 already jumped).
  7. Carefully reassemble all radio.
  8. Reset the microprocessor.( press and hold [mr] [2] and [vfo] and turn the radio on.
  9. The radio display will cycle orderly through the memory channel.
  10. Press [f] [0] and [6] and select 5.000 mhz channel spacing in each vfo.
- enter the following band limits.

|       |         |                      |
|-------|---------|----------------------|
| CH. 1 | 410.000 | Press [VF0] Lower Rx |
| 2     | 510.000 | Press [VF0] Upper Rx |
| 3     | 400.000 | Press [VF0] Lower Tx |
| 4     | 510.000 | Press [VF0] Upper Tx |

**Note:** The VCO may need to be adjusted for TX above 460 Mhz

**02-01-2001**  
**(FT-817) Battery mod for ft-817**

Yaesu folks want you to buy the 9.6 vdc battery pack and do not recommend you attempt to charge batts. from the included "stock" alkaline pack. They have even rigged the pack so it will not charge. Poking around with a VOM I discovered that there is a way to make the alkaline pack charge. Pull out the pack and peel the tape off of the end with the wires. You will find 2 red wires, 2 black wires and a green wire. cut and insulate the green wire. Put Nicads or NiMh Batteries in the the pack and set up the charge time circut. I have done this with no problem. This keeps you from breaking the bank buying alkaline cells and give you portable batt. power.

Two words of caution:

As with all mods, the warranty is affected, do so at your own risk.

By during this mod you have now disabled the protection feature and can re-charge alkaline batts. This could be dangerous and messy...be careful not to do that. Of course with this mod, you will have little reason to use alkaline cells.

Enjoy. I look forward to hearing about other ft-817 mods for this nifty little rig.



**Date:** 09-04-2001

**User comment**

**From:** [Bill - WA6CCA](#)

**Subject:** Install fuse.

When you do the "green wire mod" on the FT-817 to permit charging of internal NiMH or NiCad batteries, it's very important to install fuse protection or you could ruin your motherboard (a VERY expensive mistake).

Perhaps the easiest way is to install a 2-3 amp Pico fuse in line with the positive (red) wires leading to the battery pack. Better still, put another Pico fuse in line with the negative (green) wires also.

Bill  
WA6CCA

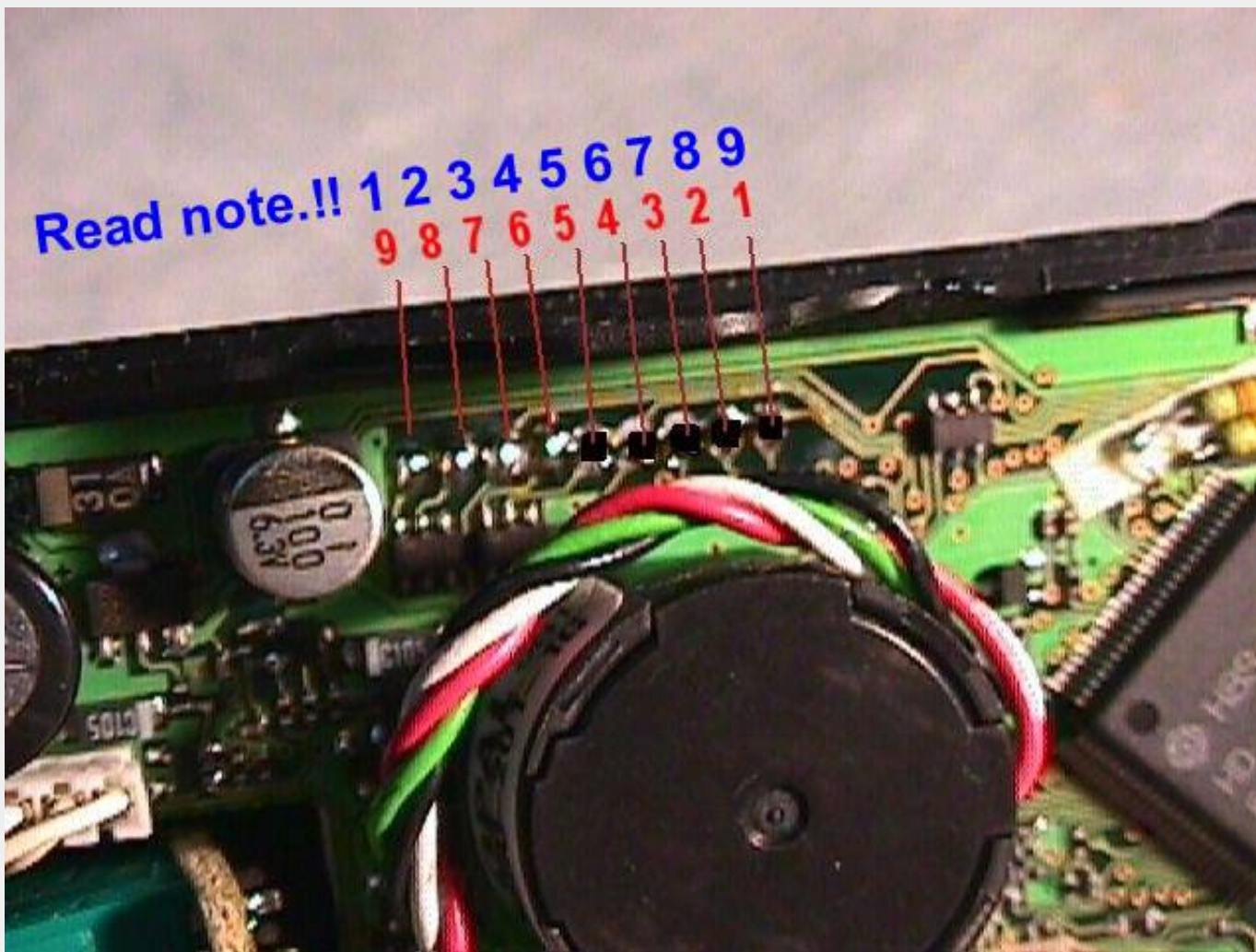
This modification is read 8273 times.

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**20-01-2001**

## **(FT-817) Extended TX for FT-817**

1. Remove the front panel
2. Look down on the back of front panel, with the VFO knob just left of center. Look at the jumper locations just above the VFO knob on the circuit board. Solder the first four jumpers and remove the solder at location five.
3. Reassemble the radio, and reset the cpu by pressing the HOME and the power button.



This will extend the xmit freqs. on HF,VHF and UHF

---

### **Another mod.**

The following Yeasu FT-817 frequency expansion modification is identical to the version provided by the manufacturer for MARS/CAP application.

1. Remove any power or battery from the Radio.
2. Remove the 14 screws holding the top and bottom covers to the radio.

3. Remove the battery cover latch.
4. Remove the covers.
5. Remove the BNC retaining nut.
6. Carefully lift the 4 plastic tabs holding the front panel to the chassis and slightly move the front panel forward.
7. Disconnect the ribbon cable that connects the chassis and the front panel.
8. Remove the jumper at location on Front Panel (J4005)
9. Press and hold the "VFO/MR" key and the "F" key while turning on the radio.
10. Reassemble the radio.

**Note:** The manufacturer states that "this modification opens up transmit coverage for MARS/CAP ONLY!" Other published modifications also have the user bridge the "first four jumpers". The difference between the two modification schemes has not been tested by the author.

Proceed at your own risk.

AA7W

[pigeon3@gte.net](mailto:pigeon3@gte.net)

|                                                                                                                                                                                                                                                                                                                 |                     |                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------|
| <b>Date:</b> 22-10-2001                                                                                                                                                                                                                                                                                         | <b>User comment</b> | <b>From:</b> <a href="#">webmaster</a> |
| <b>Subject:</b> Important about the photo.!                                                                                                                                                                                                                                                                     |                     |                                        |
| I have not this radio by myself, so i can verify the modification by myself.                                                                                                                                                                                                                                    |                     |                                        |
| About the photo, i have received messages that telling me that the numbers order should be reverse, so that the smallest number (1) should start from the left side, and not the right side.                                                                                                                    |                     |                                        |
| Following has reported that the <b>BLUE</b> numbering is correct:<br>Rob Boux (ve4rrb) <a href="mailto:boux(a)shaw.ca">boux(a)shaw.ca</a><br>Tim Salisbury (KD7MBN) <a href="mailto:timsalisbury(a)qwest.net">timsalisbury(a)qwest.net</a><br>Jim (W7LS) <a href="mailto:w7ls(a)blarg.net">w7ls(a)blarg.net</a> |                     |                                        |

|                                                                                                                                                                                                                                                                   |                     |                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------------------|
| <b>Date:</b> 29-12-2001                                                                                                                                                                                                                                           | <b>User comment</b> | <b>From:</b> <a href="#">Andrew VK3EGR</a> |
| <b>Subject:</b> The BLUE numbers are correct .                                                                                                                                                                                                                    |                     |                                            |
| I tried the extended TX modification using the blue numbers in the photo ie : where jumper 1 is at the left, and it worked. I found, tho, that you have to hold down the F and V/M buttons together whilst powering up the FT-817 for the changes to take effect. |                     |                                            |

|                                                                                                                                                                                                                                                    |                     |                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------------|
| <b>Date:</b> 15-01-2002                                                                                                                                                                                                                            | <b>User comment</b> | <b>From:</b> <a href="#">Igor OM3CUG</a> |
| <b>Subject:</b> The BLUE numbers are correct                                                                                                                                                                                                       |                     |                                          |
| I tried the extended TX modification using the blue numbers in the photo, where jumper 1 is at the left it works. Reset CPU: hold down the F and V/M buttons together whilst powering up the FT-817 for the changes to take effect. 73 Igor OM3CUG |                     |                                          |

|                                                                         |                     |                                    |
|-------------------------------------------------------------------------|---------------------|------------------------------------|
| <b>Date:</b> 22-02-2002                                                 | <b>User comment</b> | <b>From:</b> <a href="#">9M2ZC</a> |
| <b>Subject:</b> Tx freqs                                                |                     |                                    |
| What are the new TX freqs. after the mods for all the specified bands?? |                     |                                    |

|                             |                     |                                          |
|-----------------------------|---------------------|------------------------------------------|
| <b>Date:</b> 22-02-2002     | <b>User comment</b> | <b>From:</b> <a href="#">Lars SM4IVE</a> |
| <b>Subject:</b> Extended TX |                     |                                          |
|                             |                     |                                          |

Well after doing the mod & soldering the pos 1,2,3,4 and reseting the unit my ARS funtion disapered?  
Have any one else noticed this.  
greetings Lars

|                         |                     |                                          |
|-------------------------|---------------------|------------------------------------------|
| <b>Date:</b> 23-02-2002 | <b>User comment</b> | <b>From:</b> <a href="#">Mike KB3HND</a> |
|-------------------------|---------------------|------------------------------------------|

## Subject: Marine Band Capability?

Will this TX modification permit the 817 to transmit on marine band frequencies? We would like to use the transceiver as a back up on our sailboat.  
Mike KB3HND

| Date: 02-03-2002 | User comment | From: <a href="#">Bill-WD5INA</a> |
|------------------|--------------|-----------------------------------|
|------------------|--------------|-----------------------------------|

**Subject:** Verified Jumper IDs

I rang out the jumpers to the foil traces on my FT-817 and found that the red numbers of the photo above agree with the schematic included with my radio. J4001 ~ J4009 follow the numbering in red from 1 ~ 9. This then changes the four (left hand) jumper IDs to 6 ~ 9 (J4006 ~ J4009) that should be shorted in order to open the transmit range of this rig.

My radio was a type BY3 (purchased in Singapore Feb. 2002). When I opened it up, jumper five (J4005) was not soldered but position 6&8 (J4006 & J4008)were. I soldered position 7&9 (J4007 & J4009)and checked out the rig. This mod opened up the transmit capability just as the posted mods above stated. No negative results were noted.

This modification worked on my rig, I take no credit or blame for your results.

|                         |                     |                                          |
|-------------------------|---------------------|------------------------------------------|
| <b>Date:</b> 27-03-2002 | <b>User comment</b> | <b>From:</b> <a href="#">Steve G8SBF</a> |
|-------------------------|---------------------|------------------------------------------|

**Subject:** Extended TX FT817

I have a UK purchased FT817 and will travel to the USA soon where they use a different 70cm and 2m allocations. I want to modify the UHF Tx band limits to also cover 440-450MHz and 144- 148MHz as well as the 430-440MHz allocation here. Does anyone know whether the modification listed expands the UHF transmit to cover 430-450MHz and whether modifying the rig affects any other features. The US model has a front panel RF gain control - does the mod affect the function of this knob?

Thanks, Steve G8SBF

This modification is read 11558 times.

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**18-03-2001**

## (FT-817) Hidden menu for YAESU FT-817

**Author:** Noel - ON7XV - [noel.vdb@worldonline.be](mailto:noel.vdb@worldonline.be).[MODIFICATION.NET](http://MODIFICATION.NET)

Just push and hold A, B and C simultaneously while putting the rig on, and you're in the hidden menu with about 57 settings.

Number 5 for the 2 meterband will increase sensitivity while increasing the numbers; Default setting / 79.

To leave the menu just push and hold the F function just as the "ignition" switch will do .

It works...

Noel - ON7XV - Belgium

This modification is read 8968 times.

top of page

07-04-2001

## (FT-817) FT-817 Tips

**Author:** Volker - [DL6OBU@qsl.net](mailto:DL6OBU@qsl.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Hallo liebe FT-817 Fans,

ich bin seit kurzem zufriedener Besitzer eines solchen Gerätes und möchte hier ein paar Tips loswerden, die entweder aus dem Internet stammen oder auf meiner eigenen Meinung beruhen.

Bevor es ins Eingemachte geht eine wichtige Anmerkung-ein besonderer Schwachpunkt ist das Batteriefach:

Beim Herausnehmen der Batterien ist darauf zu achten, daß diese nicht den Bodendeckel berühren. Dieser ist an der Seite, wo die Batterien darunter verschwinden, extrem schlecht entgratet. Es gibt leicht Kurzschlüsse nach Masse, wenn die Plastikhülle der Batterien beschädigt wird.

Dies ist besonders unangenehm bei der Bestückung mit Accus, weil diese einen "guten" Kurzschlußstrom liefern. Ich empfehle eine starke Folie dazwischen zu legen.

Grundsätzlich sind VOR dem Öffnen des Gehäuses auf jeden Fall die Batterieen zu entfernen und eine externe Spannungsversorgung abzuklemmen!!!

### Tip1- Betrieb mit Accus:

Das Batteriefach kann natürlich auch mit Accus bestückt werden. Wer die Accus nicht extern, sondern mit dem internen Timer laden möchte muß den grünen Draht, der zum Batteriefach führt irgendwo unterbrechen und die Enden isolieren, damit ein Accu erkannt wird. Wer wegen der Garantie eine reversible Änderung vorzieht kann im Stecker den entsprechenden Pin mit etwas Geschick und einer Nadel herausholen.

Weil der Yaesu-Accu nur 1000mAh hat und es für weniger Geld bereits 1600mAh NiHy Accus gibt kann ich das nur empfehlen! Beim Laden der Accus ist zu beachten, daß eine geeignete Ladezeit im Menü gewählt wird. Der Ladestrom ist etwa 170 mA.

Nach Ladeende fließt ein Erhaltestrom von 15 mA, es dürfen also keine Trockenbatterien mehr eingelegt werden wenn eine extere Spannungsversorgung erfolgt!!!

### Tip2- Erweiterung des TX Frequenzbereiches zum Betrieb mit Transvertern

Hierzu ist zu sagen, daß im Internet Meinungen existieren, daß sich nicht alle FT-817 erweitern lassen- dies scheint zumindest bei den für den japanischen Markt gebauten zu stimmen. Mein Gerät, Serien-Nr. 1C20nnnn, mit CE-Zeichen, war in der Hinsicht freundlicher.

Den Lieferzustand habe ich nicht exakt in Erinnerung, auf KW / 6m waren es die DL Amateurbereiche und auf VHF / UHF erheblich mehr. Nach der u.a. Änderung ergab sich folgendes Bild:

TX: 1,8 - 33 MHz überall max. 5 Watt

TX: 33-56 MHz, 140-154 MHz, 420-470 MHz hier fällt außerhalb der USA-Amateurbänder die Leistung ab.

Die ARS-Funktion ist außer Betrieb, was (mich) aber nicht stört- man kann den Repeaterbetrieb und die Shift weiterhin von Hand einstellen. Der 1750 Hz Tonruf bleibt erhalten.

### Nun zur Änderung:

Batterien entfernen (s.o.)

Alle Schrauben von Bodenblech und Deckel (nicht die direkt am Lautsprecher) lösen. Dann die beiden Bleche entfernen. Hierbei bitte beim Bodenblech den Riegel für das Batteriefach im Auge behalten- die zwei Federn sind schnell weggesprungen!

Wenn man schon mal die Deckel ab hat kann man auch mit einer Feile den Grat beim Batteriefach entfernen...

Das Flachbandkabel zur Frontplatte lösen, hierzu muß dessen Verschuß an der Platine vorsichtig hochgeklappt werden. Die Frontplatte nach vorne lösen, dazu die vier Plastikklemmen anheben.

Die Reihe mit den neun Lötbrücken ist leicht zu finden. Bei mir waren sie folgendermaßen gebrückt: =0=0=====

0 heißt dabei geschlossen und = offen

Mit: 0000===== ergibt sich die oben beschriebene Variante.



Vorsicht beim Löten, etwas Erfahrung sollte man schon haben um keine unerwünschten Kurzschlüsse zu produzieren!

Ganz wichtig- Nach dem Zusammenbau muß unbedingt der folgende Reset durchgeführt werden:

Die F und V/M Tasten gleichzeitig festhalten und den FT-817 einschalten. Dabei werden leider alle Speicher und Einstellungen gelöscht !

So, nun noch eine Frage zum Schluß:  
Der Ft-817 ist ja angeblich "PR-tauglich", hat schon mal wer die Umschalt-zeiten (TXDelay) gemessen- sind sie wirklich für 9600Bd in einer vernünftigen Größenordnung ???

73 de Volker in Hannover,  
packet: DL6OBU @ DB0CEL.#NDS.DEU.EU  
e-mail: DL6OBU @ QSL.NET  
19.03.2001, 17:32:05 (Local Time)

**23-05-2001**  
**(FT-817) YAESU FT-817 Servicepoints**

*Author: DL5GBL*

(push A/B/C synchron and start device)

Number;Content;Point;Declaration;  
1;HF1RXG RX GAIN;1.8MHz;181;  
2;HF2RXG RX GAIN;7MHz;91;  
3;HF3RXG RX GAIN;21MHz;123;  
4;50MRXG RX GAIN;50MHz;66;  
5;VHFRXG RX GAIN;144MHz;90;  
6;UHFRXG RX GAIN;430MHz;117;  
7;SSB-S9 SSB S-Meter;S9;70;  
8;SSB-FS SSB S-Meter;FS;59;  
9;FM-S9 FM S-Meter;S9;76;  
10;FM-FS FM S-Meter;FS;109;  
11;DISC-L FM Center;Meter;35;  
12;DISC-H FM Center;Meter;69;  
13;FM-TH1 FM;Squelch;82;  
14;FM-TH2 FM;Squelch;82;  
15;FM-TI1 FM;Squelch;14;  
16;FM-TI2 FM Squelch;14;  
17;VCC Power Supply;Voltage;138;  
18;HF1-IC Over-current Protection;1.8MHz;111;  
19;HF2-IC Over-current Protection;7MHz;116;  
20;HF3-IC Over-current Protection;21MHz;111;  
21;50M-IC Over-current Protection;50MHz;113;  
22;VHF-IC Over-current Protection;144MHz;126;  
23;UHF-IC Over-current Protection;430MHz;113;  
24;HF1-HI RF Power HI;1.8MHz;116;  
25;HF1-L3 RF Power L3;1.8MHz;67;  
26;HF1-L2 RF Power L2;1.8MHz;21;  
27;HF1-L1 RF Power L1;1.8MHz;4;  
28;HF2-HI RF Power HI;7MHz;119;  
29;HF2-L3 RF Power L3;7MHz;65;  
30;HF2-L2 RF Power L2;7MHz;21;  
31;HF2-L1 RF Power L1;7MHz;3;  
32;HF3-HI RF Power HI;21MHz;117;  
33;HF3-L3 RF Power L3;21MHz;63;  
34;HF3-L2 RF Power L2,21MHz,20;  
35;HF3-L1 RF Power L1;21MHz;2;  
36;50M-HI RF Power HI;50MHz;115;  
37;50M-L3 RF Power L3;50MHz;64;  
38;50M-L2 RF Power L2;50MHz;23;  
39;50M-L1 RF Power L1;50MHz;1;  
40;VHF-HI RF Power HI;144MHz;140;  
41;VHF-L3 RF Power L3;144MHz;93;



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42;VHF-L2 RF Power L2;144MHz;28;
43;VHF-L1 RF Power L1;144MHz;12;
44;UHF-HI RF Power HI;430MHz;103;
45;UHF-L3 RF Power L3;430MHz;68;
46;UHF-L2 RF Power L2;430MHz;21;
47;UHF-L1 RF Power L1;430MHz;9;
48;HF1TXG TX Gain;1.8MHz;67;
49;HF2TXG TX Gain;7MHz;62;
50;HF3TXG TX Gain;21MHz;67;
51;50MTXG TX Gain;50MHz;89;
52;VHFTXG TX Gain;144MHz;79;
53;UHFTXG TX Gain;430MHz;69;
54;HF1POM Power Meter Sensitivity;1.8MHz;71;
55;HF2POM Power Meter Sensitivity;7MHz;72;
56;HF3POM Power Meter Sensitivity;21MHz;71;
57;50MPOM Power Meter Sensitivity;50MHz;70;
58;VHFPOM Power Meter Sensitivity;144MHz;83;
59;UHFPOM Power Meter Sensitivity;430MHz;64;
60;ALC1-M ALC;Meter;204;
61;ALC-M ALC;Meter;125;
62;HF1-RV Reverse;ALC;1.8MHz;13;
63;HF2-RV Reverse;ALC;7MHz;11;
64;HF3-RV Reverse;ALC;21MHz;21;
65;50M-RV Reverse;ALC;50MHz;15;
66;VHF-RV Reverse;ALC;144MHz;7;
67;UHF-RV Reverse;ALC;430MHz;28;
68;CW-CAR Carrier;Level;CW;252;
69;AM-CAR Carrier;Level;AM;210;
70;DEV-W;FM;Modulation;211
71;DEV-N;FM;Modulation;103;
72;M-MTR;FM;Modulation;188;
73;CTCSS;FM;Modulation;151;
74;DCS;FM;Modulation;129;
75;LSB-CP;SSB;Carrier Point;-19;
76;USB-CP;SSB;Carrier Point;-20;
```

Proceed at your own risk.

73 from ron, dl5gbl

This modification is read 7298 times.

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10-07-2001

(FT-817) Improvement of the ALC - better modulation and throughput

**Author:** *Andreas Duessler* - [Andreas.duessler@t-online.de](mailto:Andreas.duessler@t-online.de).[MODIFICATION.NET](http://www.MODIFICATION.NET)

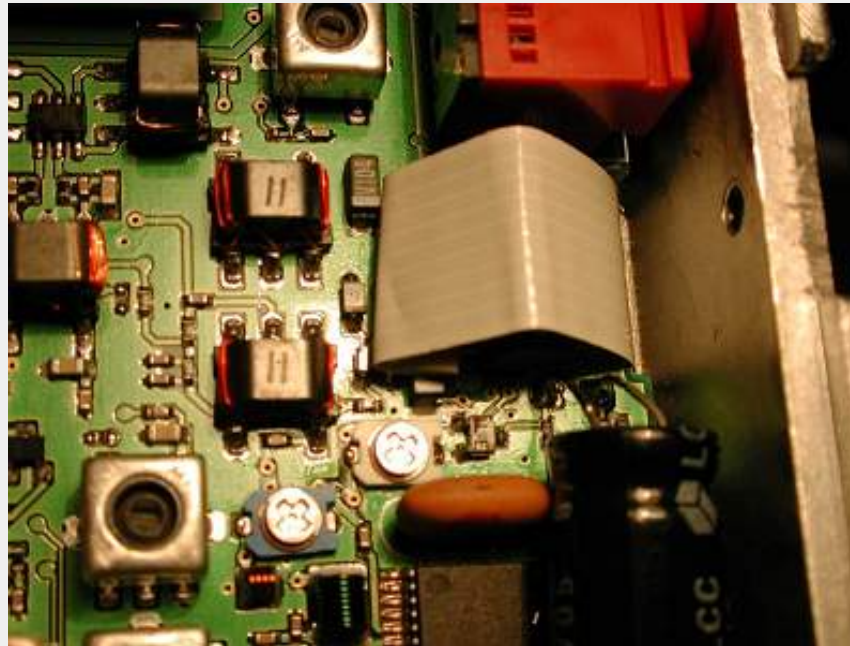
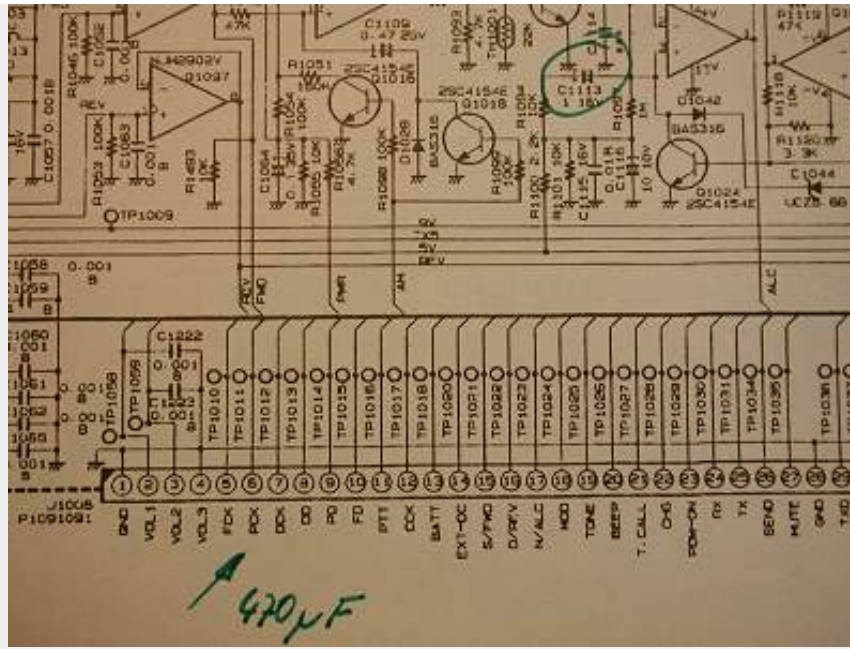
Hi ladies and gents,

The FT-817 is a lovely rig, isn´t it? This is a radio one must have - without special reasons. But anyway, when I got the radio one week ago, I started to test it against excisting others. (like TS-870). Everything was quite okay, but the output in SSB is not reaching the 5W-mark, even when the CW-tone and in FM the rig runs on specified power. I walked through the curcuit-diagram and found the reason. The capacitor C1113 on the mainboard is too small. This has to be changed to bigger values. In my case it´s now 470 uF insted of former 1uF.

To find the place inside the rig .... boy! This took some time. But after locating the place, it´s now easy to descibe:

Open the upper side (where the loudspeaker fits) and locate the red jack on the rear side. Inside a flatband-cable comes up and is connected. Right beside this cable you find C1113, but it´s not labeled. But anyhow, look for the pictures taken and I´m sure you find the place. The new C is visible in the lower right corner of the picture (big and black) I removed the original C from the board before - but it´s still not necessary.

After finalizing, close the rig and test the output in SSB in comparison to FM and CW. The throughput is now there. And believe me, you get better voicereports. And running qrp - it´s sometimes the needed peace of junk !



Best wishes and good luck !

Andreas  
DL6EAT

This modification is read 6839 times.

[top of page](#)

**10-07-2001**

## **(FT-817) Improvement of the optional microphone MH-36 E8J with DTMF**

**Author:** Andreas Duessler - [Andreas.duessler@t-online.de](mailto:Andreas.duessler@t-online.de).[MODIFICATION.NET](http://MODIFICATION.NET)

Hi ladies and gents,

The original microphone works good, but I tested also the DTMF-microphone, which is available now. It sounds really bad, and that wondered me, because a small electret-microphone is inside. But after opening the mic, the reason was easealy located. The necessary DC-voltage, comes to the microphone via a small resistor. The value of this resistor is by far too low - replace it to a value near 10 Kohms.

Now the microphone is better than the original one and has all these options like DTMF and it´s backlighted !

The picture should help to locate the small resistor. The new one is a traditional one ( I had no SMD-resistor )

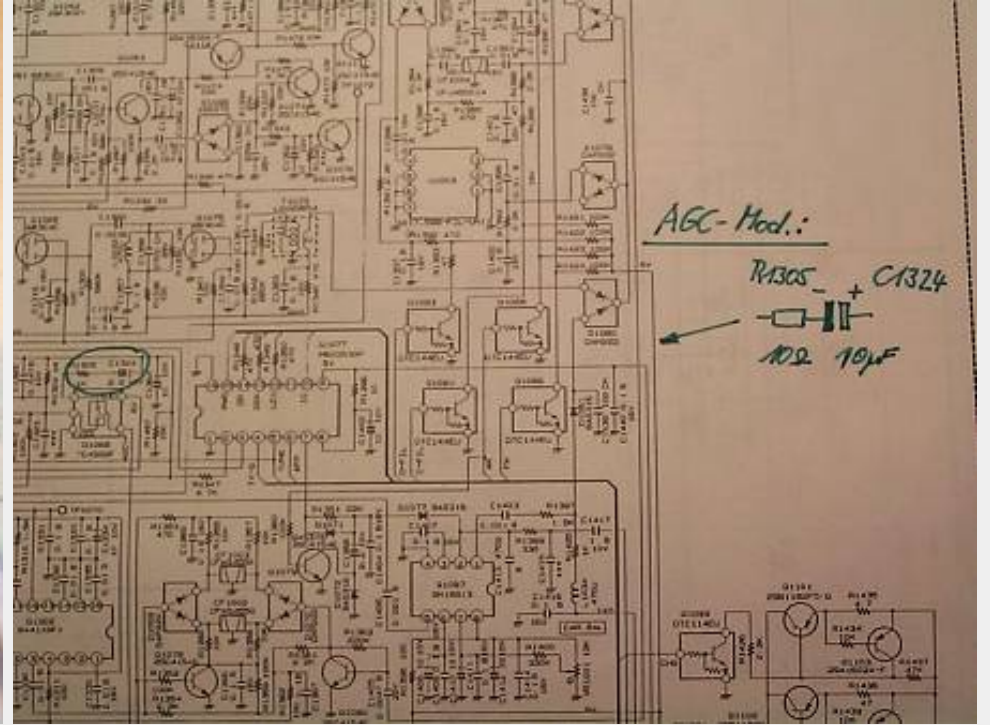
It looks bad, but it works fine....by the way the new microphone is very sensitive now...go down to values of 20 (original is 50 !) in the setup of the FT-817 specially in SSB.





Good luck and again: be carefull!!!

Thanks for reading this and I apologize for the picture, which is not exactly focused. (I saw it too late...)



Andreas  
DL6EAT

This modification is read 7019 times.

[top of page](#)

**08-12-2001**

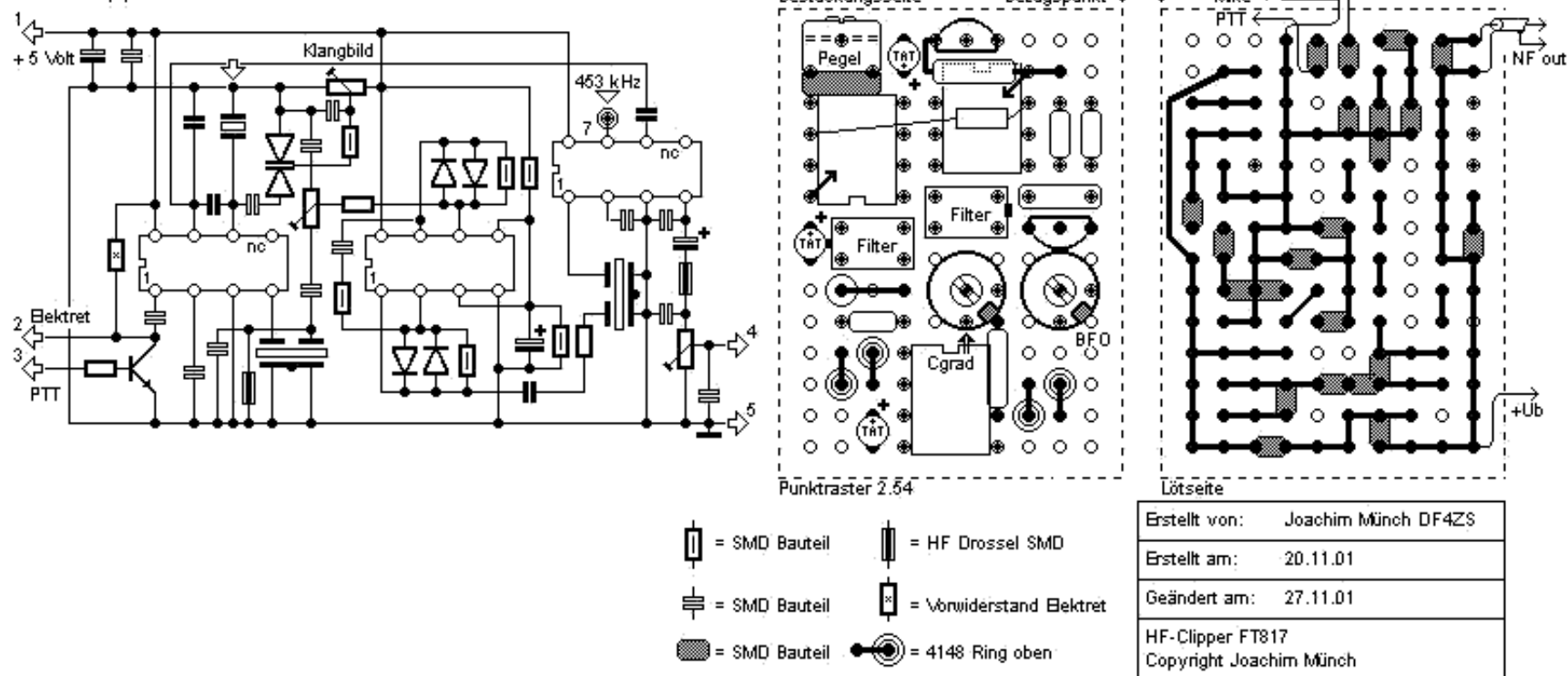
## **(FT-817) HF Clipper für Einbau in das Handmikrofon des Yaesu FT-817**

**Author:** Joachim Münch DF4ZS - [df4zs@t-online.de](mailto:df4zs@t-online.de).[MODIFICATION.NET](http://MODIFICATION.NET)

Joachim Münch DF4ZS - 7 Dezember 2001

Vorweg, für Schäden die durch den Umbau verursacht werden übernehme ich keine Haftung. Bei mir und einigen OM's funktioniert der HF-Clipper bestens und bringt so an die 10 dB. Der Einbau in das Mikrofongehäuse erfolgt durch Austausch der dynamischen Mikrophonkapsel. Richtet man sich nach der unten stehenden Einbauanweisung kann nichts schief gehen, sorgfältiges löten voraus gesetzt. Das Clippermodul eignet sich auch für den Einbau in andere Handmikrofone. Ab einer Versorgungsspannung größer 9 Volt ist die Spannungsversorgung über einen 78L06 Spannungsregler dem Modul zu zuführen.

## HF Clipper - FT817

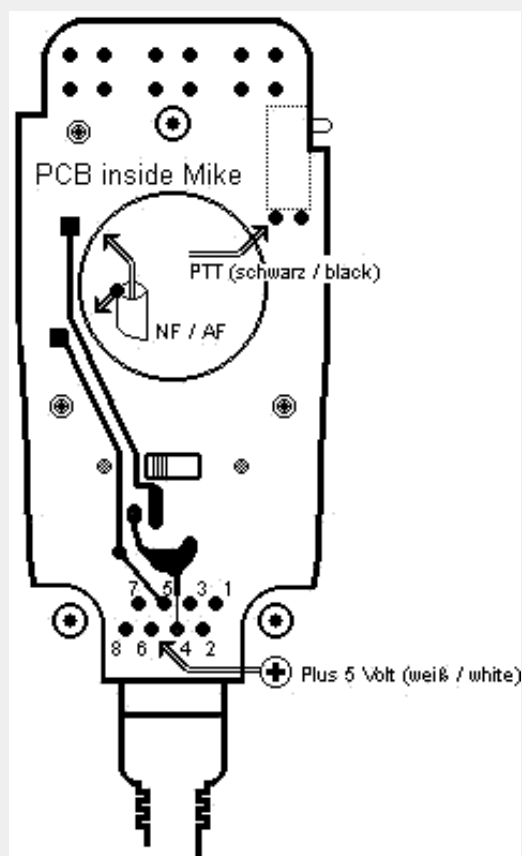


## Der Einbau.

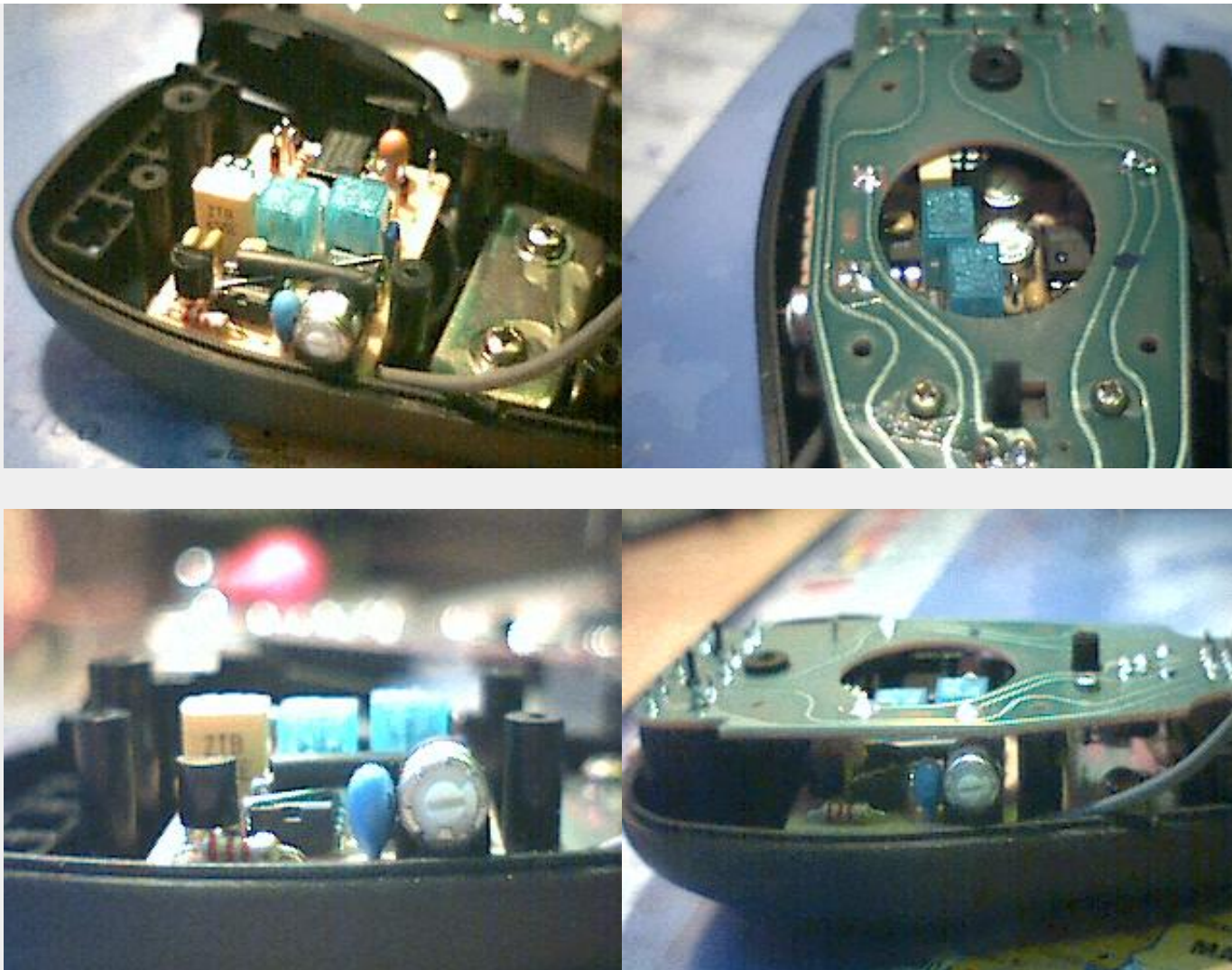
Mit einem Kreuzschlitzdreher wird der hintere Deckel des Mikrofons gelöst, beiseite gelegt und die Drähte der Mikrofonkapsel abgelötet. Die Platine wird durch lösen von drei Schrauben aus dem Gehäuse genommen, die dynamische Kapsel entfernt und gut verwahrt. In die freigewordene runde Aufnahme der Kapsel wird die Elektret-Kapsel des HF-Clippers gelegt und das Loch mit Dämmwolle für Lautsprecher (Boxenbau) gut bis zum oberen Rand der Mikrofonaufnahme gefüllt. Das Mikrofongehäuse legt man für die folgende Anleitung so, dass die Kabelöffnung zum eigenem Körper zeigt. Die PTT Taste ist nun auf der rechten Seite.

Das Clippermodul legt man mit der Lötseite nach unten über das gefüllte Aufnahmeloche, wobei der seitlich stehende Trimmer (Pegel) des Clippermoduls nach links zeigt. Die Anschlussdrähte des Clippers führt man durch die runde Öffnung der Platine und befestigt diese.

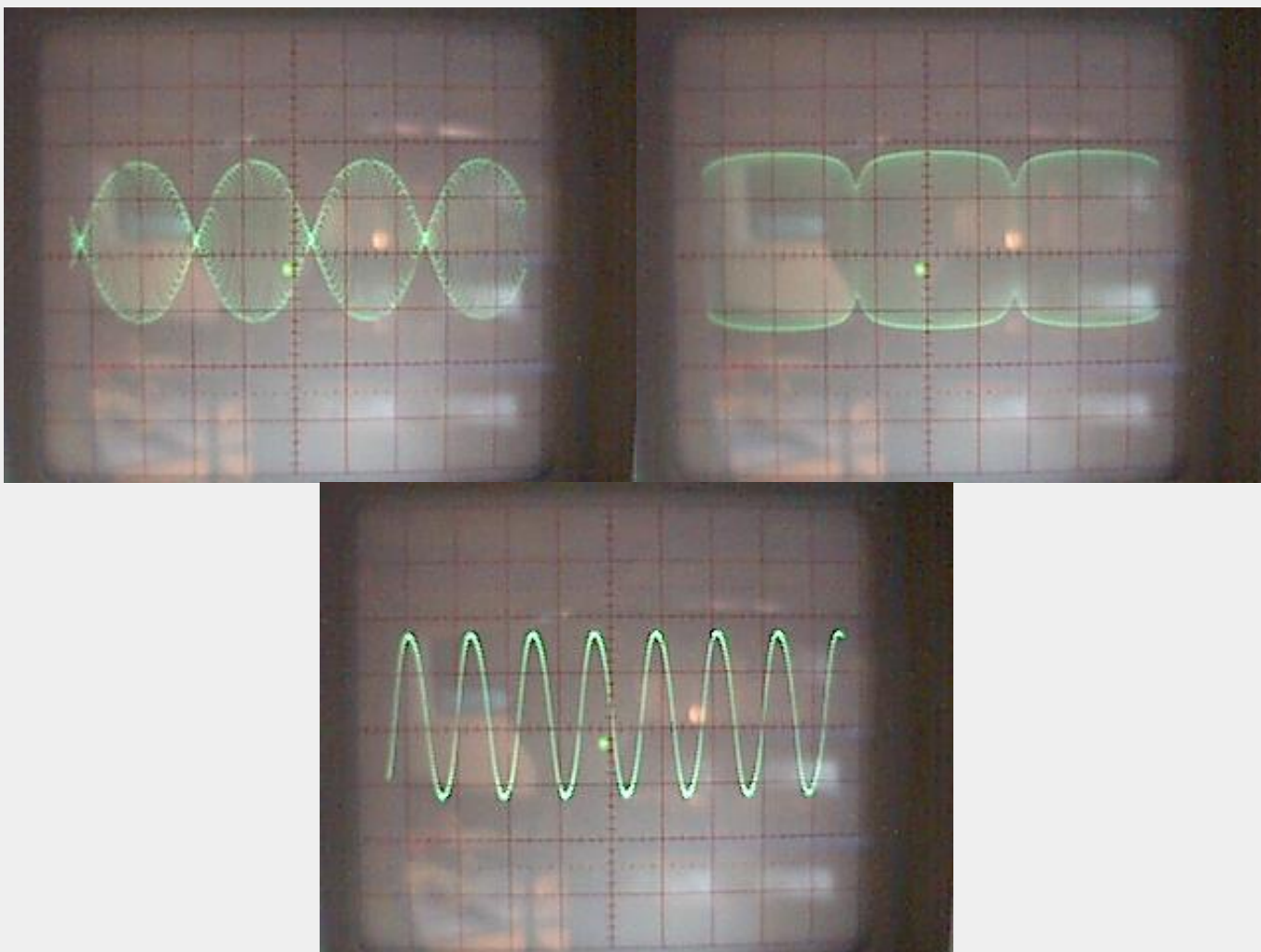
Nach untenstehender Zeichnung werden die Drähte des Moduls angelötet. Mit größter Sorgfalt ist der weiße Draht (Spannungsversorgung) an PIN - 6 zu löten und möglichst mit einer Lupe auf Schluß mit den umliegenden PIN's zu kontrollieren. Das Clipper-Modul kommt abgeglichen. Der Einbau wäre fertig und die Abdeckung kann aufgeschraubt werden. Möchte man Clippgrad und Sprache nach eigenen Empfinden einstellen, lokalisiert man die einzelnen Trimmer und justiert diese. Die ALC des FT-817 ist dabei zu beachten. Die Tendenz der Trimmer jeweils wenn diese nach rechts gedreht werden. BFO-Trimmer erhöht dessen Frequenz ( < > 500 Hz.). Clippgradregler reduziert Clippgrad und Pegeltrimmer minimiert.







**Zweitonsignal ungeclippt - stark geclippt - Eintonsignal**



## Allgemeines

Die Funktion eines HF-Clippers habe ich bereits auf meinen Webseiten beschrieben und gehe hier auf einige Besonderheiten des HF-Clippers für den FT-817 ein. Bei der Konstruktion war zu überlegen ob ex- oder intern. Extern wäre kein Problem gewesen, hätte aber den Sinn und Zweck des FT-817 verfremdet. Es kam also nur eine interne Ausführung in Betracht, die dem Charakter des Transceivers entgegenkommt. Weiter war zu überlegen wie ein Umbau ohne bleibende Veränderungen machbar ist, der auch von jedem nicht so geschicktem OM realisiert werden kann. Die einzige Möglichkeit diesen Überlegungen gerecht zu werden war der Einbau in das Handmikrofon. Um Raum für den

Einbau zu schaffen fiel die Wahl auf den Austausch der dynamischen Mikrofonkapsel. Vor einiger Zeit hatte ich bereits einen Mini-Clipper konstruiert der von OM's die diesen durchweg ungeschirmt in Handmikrofone eingebaut haben, gut beurteilt wurde. Bis 100 Watt sind Probleme mit HF-Einstrahlung nicht bekannt geworden. Diese Ausführung wurde die Basis für den FT-817 HF-Clipper.

Der FT-817 reicht intern über die Mikrofonleitung eine stabilisierte Spannung von 5 Volt durch die für das Modul zur Verfügung steht. Einige Bauteile konnten so eingespart werden und anderen Platz machen. Die Begrenzung des ZF-Signals wurde vom Typ PEP übernommen. Nach den ersten Versuchen in Verbindung mit dem FT-817 stellten sich zwei Nachteile heraus die behoben wurden. Kam das Mikrofon in die Nähe des Transceivergehäuses gab es eine akustische Rückkopplung. Im Empfangsbetrieb wird deshalb das Mikrofon über einen Transistor, von der PTT gesteuert, stumm geschaltet. Lag die Elektretkapsel lose im Gehäuse war die Modulation bei abgenommener Rückseite des Handmikrofons einwandfrei. Bei montierter Rückseite jedoch stark verfremdet. Die Einbettung der Elektretkapsel in Lautsprecherdämmwolle schaffte Abhilfe.

You can also find this modification on <http://www.jwm.de/afu/0ft817.htm>

This modification is read 3692 times.

[top of page](#)

**05-01-2002**

**(FT-817) FT-817 paddle modification, very useful for CW ops.**

**Author:** Dick AF8X - [af8x@arrl.net](mailto:af8x@arrl.net).[MODIFICATION.NET](http://www.modification.net)

I have two excellent pieces of equipment, the Yaesu FT 817 and the Palm Mini-Paddle, which I have combined into an integral unit. The Mini-Paddle comes with an optional magnetic base, however, there is no where on the FT 817 where it can be placed and be in a comfortable operating position, so using this paddle meant attaching it to some kind of base and operating on the desk top in the conventional manner.

The FT 817 has the option of keying the built-in keyer with the mic up and down buttons, enabled in menu # 36. I took advantage of this feature and modified my Mini- Paddle by installing an RJ 45 plug in the base and added an offset tongue to engage the strap bracket on the rig.

The paddle may still be retracted into the housing just as it was intended. To attach the paddle you first engage the tongue into the slot of the strap bracket, and then swing the assembly inward to insert the plug until the locking click is heard. This secures the paddle in an ideal operating position. The paddle can be left attached unless the microphone is needed for phone operation, then a thin piece of whatever is handy, can be inserted between the rig and paddle to release the locking clip on the RJ 45 plug. The paddle may then be removed in the reverse order of attachment.

I have found that having the rig and paddle configured this way is preferable especially when operating portable.

**Attached**



**Detached**





This modification is read 2799 times.

[top of page](#)

**08-01-2002**

## **(FT-817) Yaesu FT-817 CW Filter Installation**

**Author:** Dave Fifield, AD6A - [ad6a@cooltechstuff.com](mailto:ad6a@cooltechstuff.com).[MODIFICATION.NET](http://MODIFICATION.NET)

By Dave Fifield, AD6A

Original 1/19/01

Updated 4/18/01

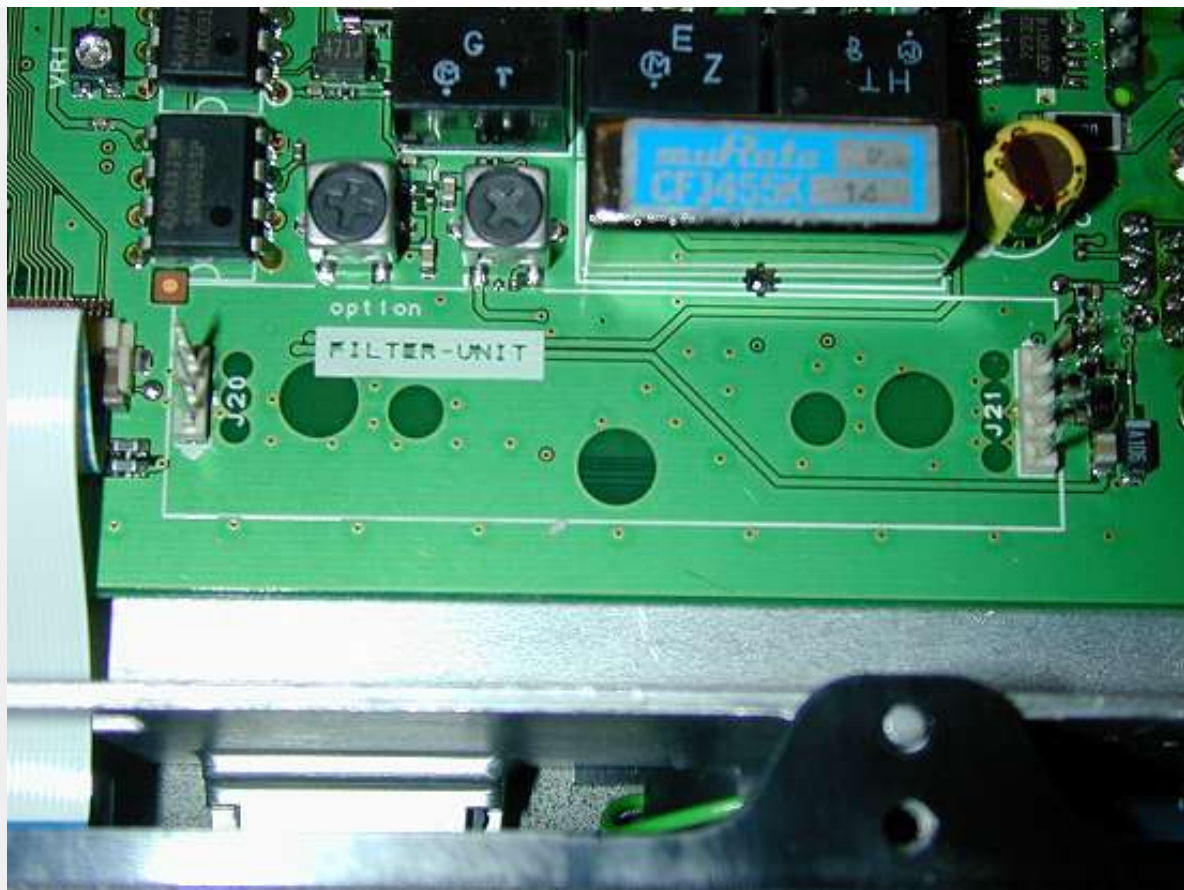
I received my long awaited YF-122C 455KHz Collins Mechanical CW filter today. It was a snap to install, but there are a couple of things to look out for. Here's the photos and story. Click on any of the photos to see the full size version.

1. Removing the top cover is simple - first take off the shoulder strap brackets (4 screws) and then remove the 5 screws in the top cover and it pops right off - don't undo the two screws nearest the speaker grille, those hold the speaker in place on the underside of the top cover. Be sure not to damage the speaker wires or connector. The wire from the speaker is pretty short but there's just enough room to get to the connector to undo it if you tilt the top cover up at the rear.



2. The filter goes in the space at the front of the board.





3. Here's the filter correctly oriented ready to be put in. Note that the 3 pin connector is on the LHS and the 4 pin connector on the RHS. The filter is installed writing side up as shown.



4. Here's the filter after installation. It should look like this.





5. You can go ahead and put the top panel and shoulder strap brackets back on and turn the rig back on. Press the "F" key and hold it for half a second to take you into menu mode. Turn the SEL dial until you get to menu #38. It should say "OP FILTER" and "OFF" just above that. Rotate the main tuning dial until you see "CW" (not "OFF" or "SSB"). Important note - as you go through the "SSB" choice, you will notice that the rig switches to the newly installed CW filter - DON'T PANIC, all is okay. This threw me for a while until I understood what was going on. Make sure that menu #38 is set to "CW" (ignore what the receiver actually does!) and then press the "F" key for half a second again to exit menu mode.
6. You're almost done. You will probably panic at this time (as I did!) because as you switch through the modes from USB/LSB/CW/CWR etc., the rig seems to be stuck in SSB filter mode. There's one more thing you have to do to get the CW filter working. Check out page 14 of your FT-817 Operating Manual - number 7 at the bottom right of the page you will see the "C-Key" setting for "NAR". You have to set this in order for the receiver to switch to the narrow CW filter when you switch the rig to CW or CWR modes. To do this, first put the rig into CW or CWR mode then tap the "F" key once quickly. The FUNC Keys menu items for the A/B/C pushbuttons should appear. Rotate the SEL control until you see "IPO ATT NAR" over the A/B/C buttons. Then press the "C" pushbutton once to set the filter to Narrow. A small right-pointing arrow should appear and the rig should switch to the CW filter - you should hear a marked difference in the receiver noise "tone".
7. That's it. You can swap between the SSB and CW filters anytime by revisiting the FUNC Key menu and toggling the NAR function.

### How does the filter sound?

I did some preliminary tests with my HP8642B signal generator - the receiver is very sensitive indeed. The CW filter is an ABSOLUTE JOY to behold....it has a superb frequency response - very very sharp skirts - great stopband. WOW!!!! I'm blown away by it....I'll have some real measurements to back up my first impressions for y'all sometime soon. It's late, so I tried it on the bottom end of 40m - sounds REAL NICE!!

Folks, if you are going to do CW seriously with the FT-817, you will simply HAVE to get the YF-122C filter option. It's a must have IMO.

This modification can also be found on [http://www.cooltechstuff.com/FT817\\_CWfilterinstall.html](http://www.cooltechstuff.com/FT817_CWfilterinstall.html)



08-01-2002

## (FT-817) Other Observations / Comments on the FT-817 BY AD6A

**Author:** Dave Fifield, AD6A - [ad6a@cooltechstuff.com](mailto:ad6a@cooltechstuff.com).[MODIFICATION.NET](http://MODIFICATION.NET)

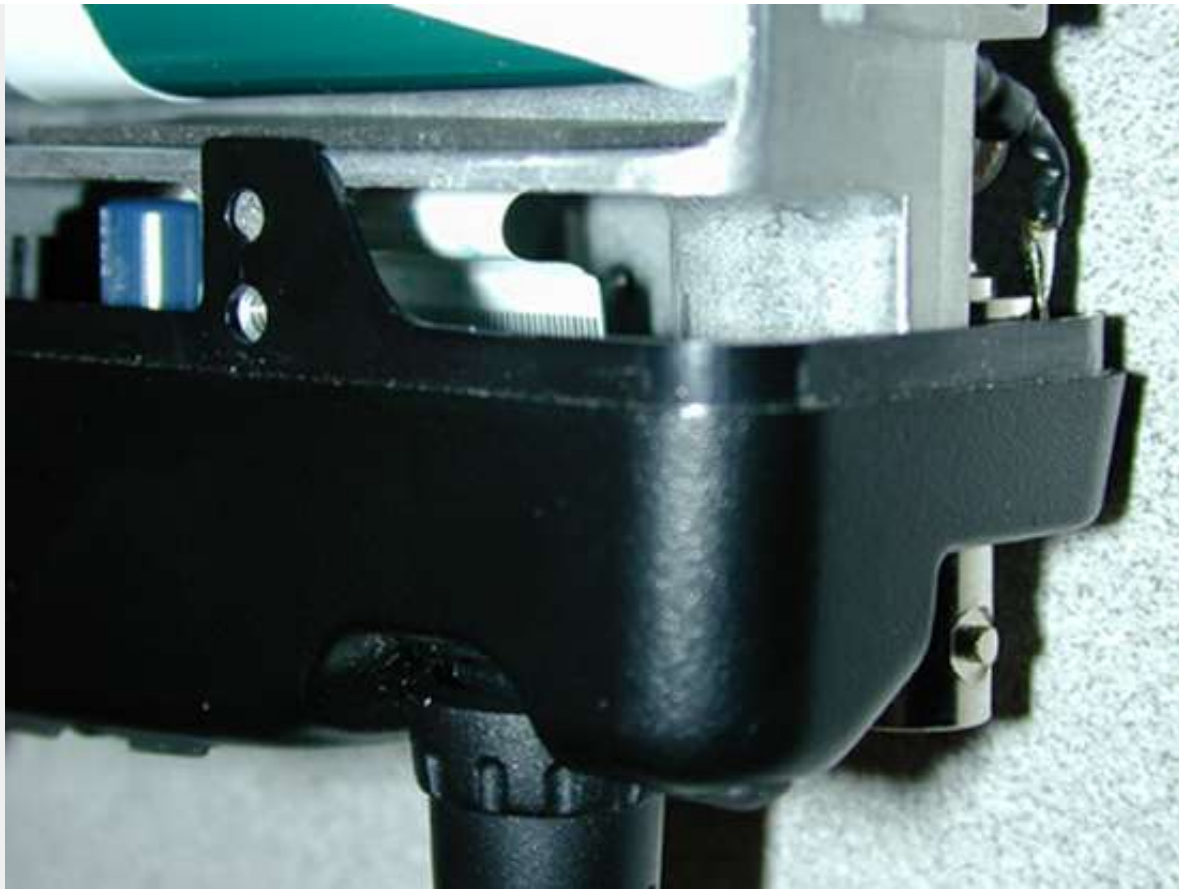
While I had the top off, I thought I may as well disrobe the rig completely and see what make her tick. Here are some photos of the underneath and front panel etc. The first picture shows the NICAD pack in place.



Notice that there's a small amount of space that could be used for mods or add-ons (hmmm, what else does this rig need though?). Here's a blow up of the mod space.



I went searching for other mod space - there's some between the front panel assembly and the diecast chassis...



...and some more between the CW filter and the chassis in the top compartment:

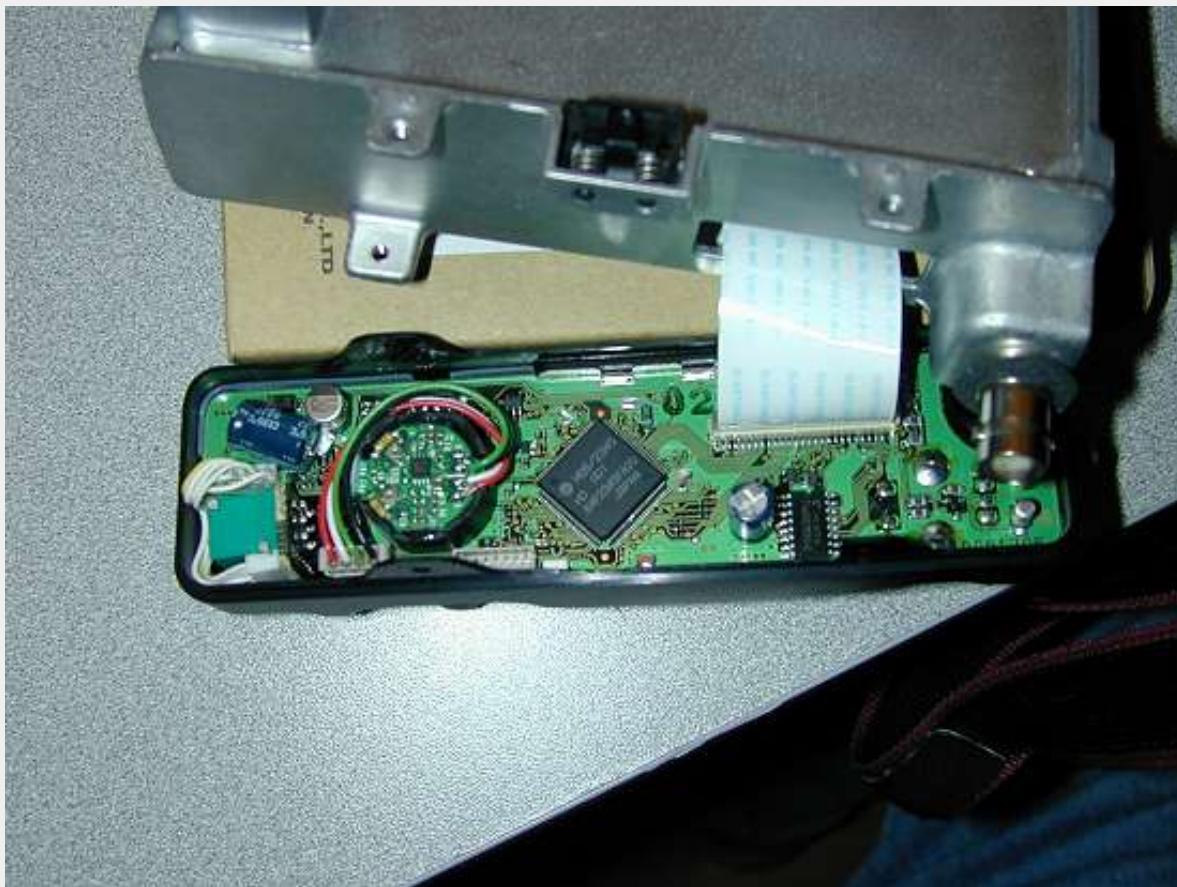


Here's the PA/Filter board (sorry about the focus). Real small PA (bottom of photo). Very neat.





I also took the front panel off for a look - it simply clips onto the chassis over four little "pips" next to the screws that hold the front edges of the top and bottom panels in place. If you take it apart please be VERY careful not to damage the front panel connector ribbon or connectors - they look fairly delicate!



Lastly, you may notice something a bit odd about the speaker mounting. If you look carefully, you will see that there are several grille holes that the speaker doesn't actually cover. The general concensus is that this improves the audio quality of the RX. A quick test I did to move it shows that it DOES sound better mounted like this.





72, Dave Fifield, AD6A

Email me if you have comments or questions

This modification can also be found on [http://www.cooltechstuff.com/FT817\\_CWfilterinstall.html](http://www.cooltechstuff.com/FT817_CWfilterinstall.html)

|                                                                                                                                                                                                               |                     |                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------------------|
| <b>Date:</b> 18-03-2002                                                                                                                                                                                       | <b>User comment</b> | <b>From:</b> <a href="#">Sylvain F1UJT</a> |
| <b>Subject:</b> Complete coverage all mode ?                                                                                                                                                                  |                     |                                            |
| Hi !<br><br>All specimen i tryed aren't all mode on all frequencies. I'm interested in receiving 68-88MHz band in narrow FM instead of wide FM. Ideal would be to choose any mode on anyfrequency.<br><br>TNX |                     |                                            |

This modification is read 3509 times. [top of page](#)

**02-02-2002**  
**(FT-817) FT-817 RX-LED disconnect**

**Author:** AA1QG - [AA1QG@arrl.org](mailto:AA1QG@arrl.org).[MODIFICATION.NET](http://www.MODIFICATION.NET)

By removing a resistor on the back of the front panel you can save approx. 12-15 mA on receive. On long backpacking expeditions this may result in significant power savings.

Disassemble the transceiver, remove the front panel whilst taking care to carefully disconnect the cable between the front panel and the body of the radio.

Remove the rubber band on the VFO knob, and remove this knob as well as the locker underneath.

Then remove the sel knob by pulling it off. Subsequently remove the screw holding the front panel print and carefully pull out the print card.

The LED is located on the front of the print card, above the hole for the VFO knob. It looks like a small plastic rectangle with 4 connections. You will find two resistors just to the left of the LED.

Remove the resistor which is closest to the VFO hole; not the resistor closest to the top edge.

Carefully reassemble the front panel whilst making sure that all the rubber knobs are in place.

When you power up the radio no green light should be on on receive, whilst the red TX lights up on tx as before.

This modification is read 2447 times.

[top of page](#)

19-07-1998

**(FT-840) FT-840 General Coverage Transmit**

1. ON local unit, connect tp2003 to ground
2. Switch radio on
3. Hold SSB and AM down
4. Switch off
5. Switch on
6. 02 OFF will appear on readout
7. Rotate main dial until 02 ON appears
8. Press AM NARROW--display will show 7.000 mhz lsb
9. Press MEM DOWN
10. Press MEM UP
11. Switch off radio
12. REMove earth at TP2003
13. Switch radio on

This modification is read 2857 times.

[top of page](#)

26-07-2001

**(FT-840) Yaesu FT-840 TCXO option**

*Author: NB6Z*

The 840 is a great radio but in digital use the rig will drift pretty much as the fan kicks on and off. A great and cheap fix is just as near as your cache of styrofoam.

Remove the upper and lower covers of the radio, making sure to disconnect the speaker from the top cover. Notice that the back screw on the cover is different from the other screws.

After removing the lower cover leave the rig upside down because that is where your mod will be. Locate the xtal board near the center of the radio. Cut a section of styrofoam close to the size of the xtal board, press down lightly over the xtal to mark the area, then trim away the styrofoam to fit over the crystal, trim pot, and connection points going only deep enough for a snug fit.

That's all there is to it. Why spend that \$100 for the TCXO option? W5ZIP

This modification is read 2356 times.

[top of page](#)

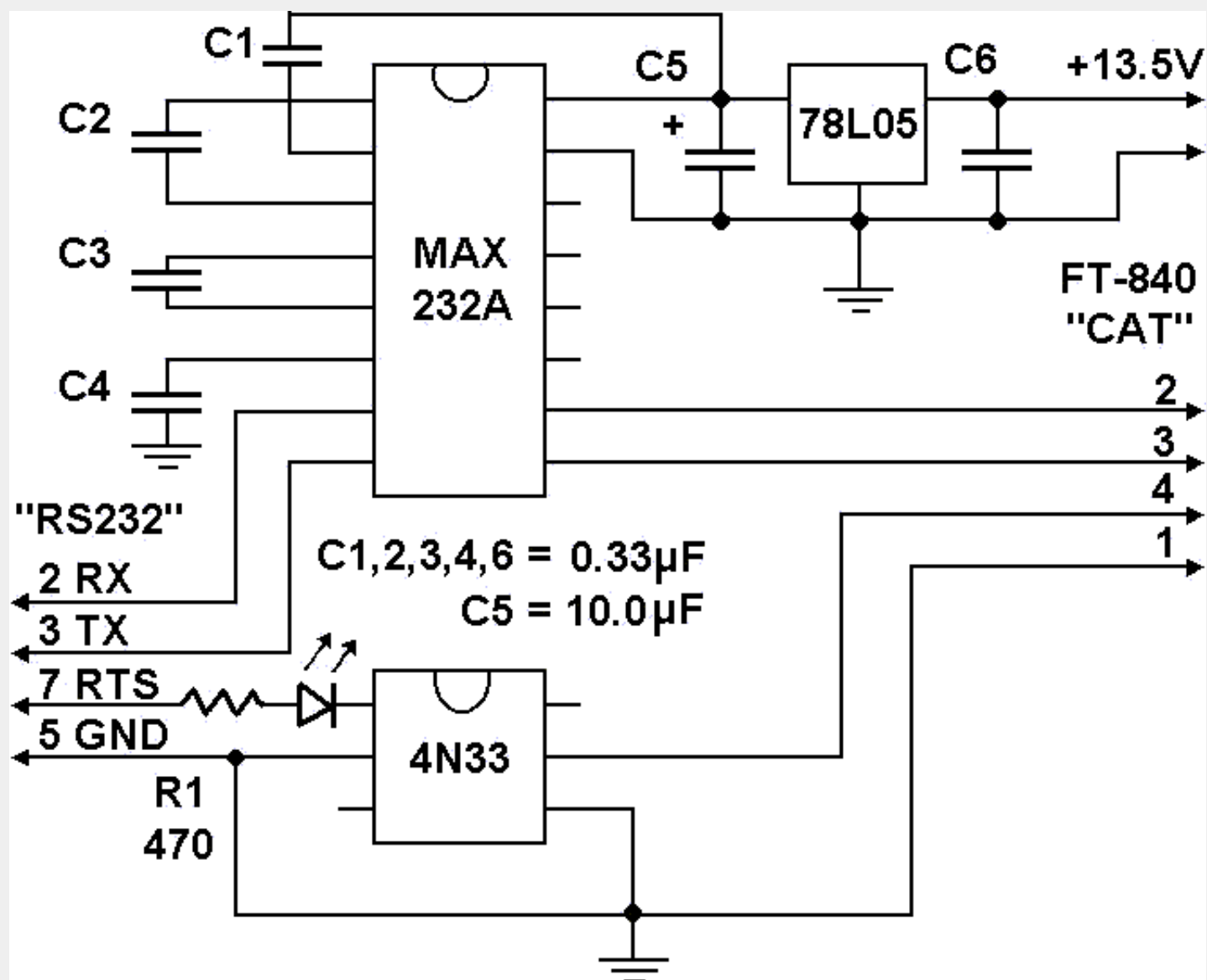
03-11-2001

**(FT-840) FT-840 CAT/PTT interface**



Computer RS-232 port requires voltages between +5 and +15 volts for logical 0, and voltages between -5 and -15 volts for logical 1. However, FT-840 CAT output voltages are TTL standard between 0 and +5 volts only. This radio requires FIF-232C interface that cost about \$100. In addition, FIF-232C requires AC power.

You can make your own interace under \$25, plus you can add computer controlled PTT option for PSK31, RTTY, SSTV and other digital modes sharing the same RS-232 port.



The heart of this interface is MAX232A. You can use any similar chip MAX203, MAX232, MAX233, but check documentation for proper connections. Power supply +5 volts is coming from voltage regulator 78L05 that takes +13.5 volts from the back of FT-840 radio (RCA connector). PTT controlled via optocoupler 4N33 by the RTS signal from RS-232. I used DB9 serial port. If you use DB25, then you have to change pin numbers according DB25 assignment. CAT plug is 6 pin Mini DIN.



PTT circuit is optional. You don't need it, if you just want to read radio frequencies and modes into you logging software. However, it is a good idea to share one serial port for CAT and PTT, if you use computer soundcard for digital modes. Make sure that you configured your software to share PTT and radio port, and set PTT control by RTS. Of cause, you will also need Rx audio cable to your soundcard, and Tx microphone cable with attenuator or isolation transformer. More detailed information can be found on the web ([www.qsl.net/soundcardpacket/cables.htm](http://www.qsl.net/soundcardpacket/cables.htm))



This interface was tested with Logger 6.11 (freeware by K4CY, [www.qsl.net/kc4elo/logger.htm](http://www.qsl.net/kc4elo/logger.htm)). It did not work with Zakanaka 1.24 stand-alone, because this software had limited number of radio types in configuration, but it could read frequency from the Logger ([www.qsl.net/kc4elo/](http://www.qsl.net/kc4elo/)). If your software does not have FT-840 listed in configuration of radio type, then try to use FT-900 settings. It may also work with FT-890 settings, but slow polling rate. Besides radio type, you must set baud rate 4800, 8 data bits, 2 stop bits, no flow control, no parity, echo off.

My design is FREE. If you are not completely satisfied, I will give you a full refund. No extra cost for having fun! If you have some questions, e-mail me at [nn1i@arrl.net](mailto:nn1i@arrl.net)

73 Igor NN1I

This modification is read 1771 times.

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**08-02-2002**

## **(FT-840) SSB Power Modification for FT-840**

**Author:** Phillip Long - [longjewelers@alltel.net](mailto:longjewelers@alltel.net).[MODIFICATION.NET](http://MODIFICATION.NET)

This modification increases the SSB output of your FT-840 by 30-50%.

1. Remove the top cover.
2. Locate the 50w/100w micro switch located toward the front and right on the circuit board.
3. Flip the switch to the 100w position.
4. Find the pot marked FWD located toward the front and to the right of the 50w/100w switch.
5. Turn the pot full clockwise.
6. Re-adjust your AM power if wanted by adjusting the pot labeled AM POWER if needed.
7. Put top cover on.

**Date:** 16-03-2002

**User comment**

**From:** [n0vty](#)

**Subject:** ft-840 power mod

The power mod for ssb I see here only affects how the fwd meter reads on transmit.

This modification is read 873 times.

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19-07-1998

(FT-847) Extending the transmit range

Remove bottom cover..  
near battery there are 6 solder pads numbered 1 thru 6....  
pad 1 is already shorted with a chip resistor.....  
short pads 2 and 3 with solder...  
check pad 6 and if it has a chip resistor on it ...  
remove it...  
this one has to be removed to go out of band on hf and 6m.....  
replace cover and turn on radio while holding in the lock and fast buttons....  
this resets micro and you will also lose all your memories that you have entered...  
you will have to reprogram these....  
TX coverage will be 1.8-76mhz with no gaps...  
DO NOT TX BETWEEN 30-36MHZ -- not only is it illegal, but you may damage the HF PA.

Thanks to Tom KF4TRZ, Brent K9WV, and others for sharing this information.

This modification is read 4690 times.

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19-07-1998

(FT-847) Enter the Alignment Menu

*George Nelson WB7VWK Email: WB7VWK.GEORGE@worldnet.att.net*

I have just received the Technical Supplement (Service Manual) for the Yaesu FT-847.  
This radio has an Alignment Menu in addition to a User Menu. To enter this Alignment Menu, you turn off the transceiver, press the UP, DWN, and FAST keys on the microphone together, while turning the transceiver on again.  
In the alignment procedure, each alignment parameter is selected by rotating the SUB-TUNE dial. The alignment is performed by pressing the MCK/W key while injecting a signal of the required frequency and level. Pressing the MENU key after a setting is made stores the entry. To exit the alignment routine, press POWER.  
This radio seems to be very high tech in all. I have not entered the Alignment Menu, and do not suggest that anyone do so, without the proper test gear and electronic knowledge.

This modification is read 3221 times.

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19-07-1998

(FT-847) Help with a noisy fan

*Dave Sublette K4TO*

A common complaint about the FT-847 is that the fan noise is irritating (and it is). I have been able to quiet the whine using the following method:

Cut a 3" x 3" piece of soft packing foam that is about 2" thick. Be sure to use the "open cell" type of foam. You can tell that it is open cell type construction by holding it up to your mouth and blowing air through it. Wedge the piece of foam between the four coax connectors so that it covers the intake area for the fan. The whine will then disappear. The foam has little effect on the cooling of the radio. I think it works because the foam causes turbulence in the air flow, disrupting the formation of the sound of the whine, which is probably generated by the tips of the fan blades. It may even slow the fan a bit, which stops thenoise. However it works, it works. I can't even see it when it is in place. It should also have an added bonus in that it will filter dust from the air before it enters the radio.

Hope this works for you.

This modification is read 2904 times.

[top of page](#)

19-07-1998

(FT-847) Throttling back the audio output level

Bob Nagy, AB5N

Although Yaesu did a fantastic job of gain distribution in the FT-847's receiver, they bombed when it came to the last stage...the audio output. The volume control's lowest setting results in room filling audio. The TDA200 audio amp chip is not actually being over-driven, it just is getting too much audio signal at the lowest input level from the previous stages. A great improvement can be gotten with the following mod.

Take off the covers and turn the rig over on its top....exposing the bottom. Near the rear, opposite side from the power input connector, you will easily be able to locate the audio amp IC. It has 6 legs and is next to the purple 470mf capacitor which it's output goes through. The input to that amp comes in on it's #1 pin - which is the long leg -at the end nearest the rear of the rig. You can see the small 1uf cap feeding it -quite close to it. The mod is to add a 47K resistor in line with that leg. The easiest way is to snip it in the middle of the leg..seperate the snipped conductor and add the 47K in series with the two leads. Prepair the 1/4 watt 47K resistor with just enough lead length to contact the seperated amp leg. "Tin" resistor and leg contact points and tac solder the resistor in. (be sure that the leg is really seperated). Remember-You can always remove the resistor and bridge the leg together again at a later date.

The 47K gives just enough level reduction that you will now set your volume control at 11am instead of 10am, and the innitial lowest level point will be about half what it was. You may find that 68K or 100K may still provide acceptable volume levels. There is still enough audio to "blast out" the internal speaker...or drive any external unit. I even think that the audio sounds smoother and cleaner at this input level.

Good Luck and 73?s!

Bob Nagy / Chief Eng. KVRX FM / KVR-TV9  
Amateur Radio - AB5N 442.15/R 1292.3/R  
email: www.botany.utexas.edu/facstaff/stfpages/bnagy

This modification is read 2762 times.

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19-07-1998

(FT-847) TX coverage continues on 137MHz to 174MHz and 410MHz to 470MHz

One problem that happens after the mod is the AUTOMATIC REPEATER MODE no longer functions but repeater shift still works.

What really appears to happen is the Auto repeater mode gets set to USA spec.

To recap then here is the pad info

- Pad 1 is short
- Pad 2 is short
- Pad 3 is short
- Pad 4 is open
- Pad 5 is short
- Pad 6 is open

I Hope this helps, Remember that transmitting out of band and on a frequency you are not licenced for is an offence!

One other annoying problem is the fan that is running continously, This can be changed by connecting the fan to the PA fan, which, under rx mode has the fan running at a much slower and quieter speed, but at tx the fan runs as normal. So you are not actually stopping the rx fan, just slowing it down, which basically lowwers the air flow, but still circulates the air during rx.

This modification is read 3794 times.

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**24-04-1999**

## **(FT-847) How to modify FT-847 with full TX-RANGE on HF**

*From: DO5ARD @ DB0ERF.#THR.DEU.EU (Sven)*

It's correct: to close the jumpers 1,2,3 and opening the others ?

The second method sayed:

- pad 1 is already shorted with a chip resistor - NEGATIV ON MY TRX !
- short pad 2 and 3 with solder ... check pad 6 and if it has a chip resistor remove it ...

Here are my factory-settings in FT-847:

pad 1 = open

pad 2 = shorted with a chip resistor

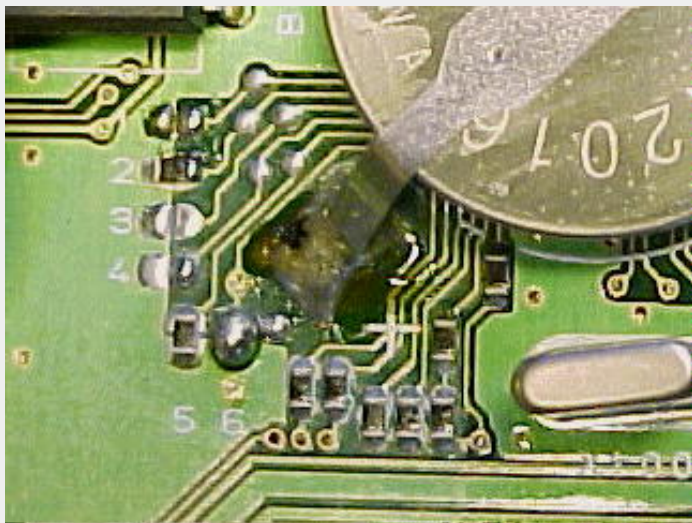
pad 3 = open

pad 4 = open

pad 5 = shorted with a chip resistor

pad 6 = i'm not shure if open or closed, only a big solder-point

I'll send also a foto of my factory-jumper-settings



I'm happy about any detailed information !

This modification is read 4067 times.

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**26-09-1999**

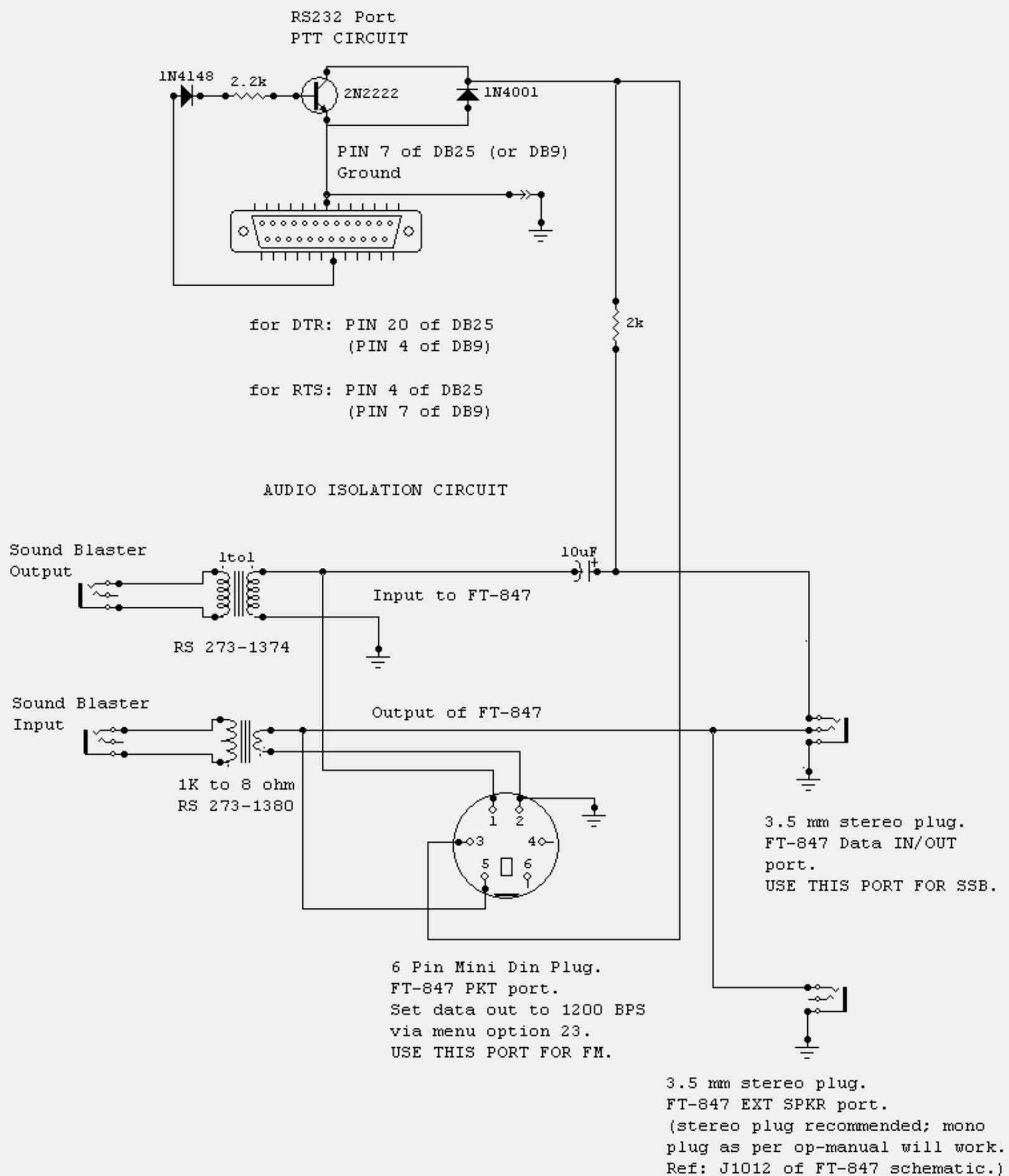
## **(FT-847) SSTV interface width PTT keying for FT-847**

**Author:** *Jim Barber N7CXI*

Original circuit by Jim Barber N7CXI

Redraw v 3.1 by VA3JDH. Updated Jan. 16 1999





**Note.** Due to the low voltage output levels of the PKT and Data IN/OUT ports, it is recommended to use the EXT SPKR port as output to the sound blaster. This will ensure proper SSTV signal triggering and synchronization.

09-02-2000

## (FT-847) External RX Input Modfication for the Yaesu FT-847

Author: Guenter Koellner - DL4MEA - [dl4mea@amsat.org](mailto:dl4mea@amsat.org).[MODIFICATION.NET](http://MODIFICATION.NET)

(C) DL4MEA 09/1998

17.09.98 Creation

D: Beim Einsatz des FT847 mit einem externen Vorverstärker und Endstufen ist es zum Schutz des Vorverstärkers empfehlenswert, eine doppelte Kabelführung aufzubauen. Damit wird in der gesamten Anlage nur ein einziges Koaxrelais benötigt, und der Vorverstärker ist definitiv vor Sende-HF geschützt.

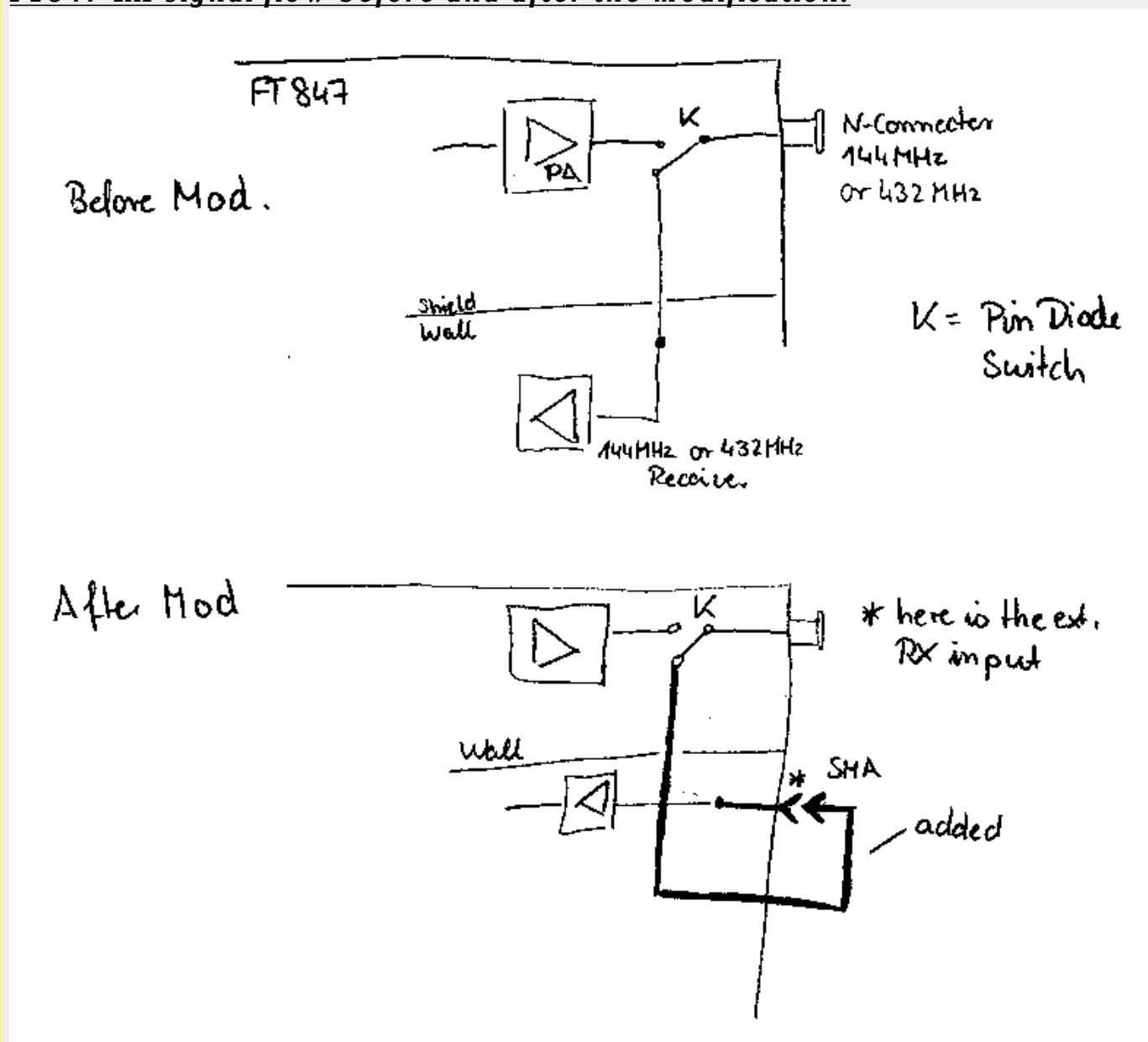
Die hier vorgestellte Modifikation erlaubt es jederzeit den FT847 wieder im Normalbetrieb einzusetzen.

E: If the FT847 is used together with an external mast-mounted preamp, it is suggested to run two coax cables from the mast to the shack. Not only that you save costs for a several coax relays, but also you protect the preamp from any TX power.

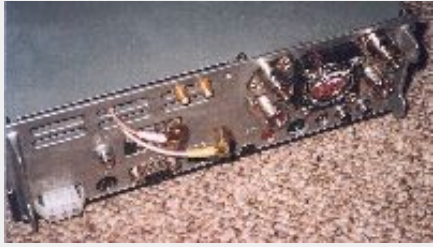
The solution described here allows anytime to use the FT847 in the normal way.

(you may click on the pictures to get them in the full scanned size)

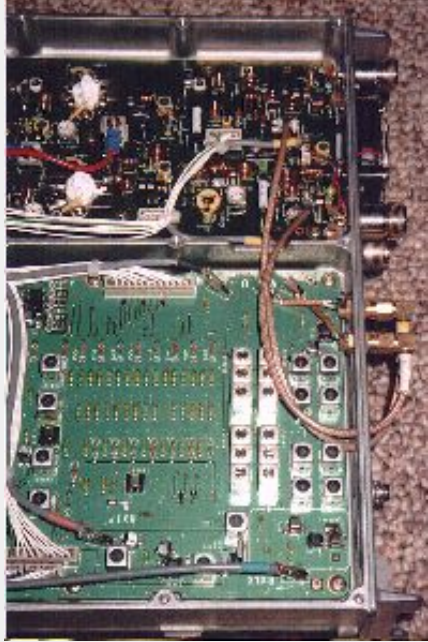
### FT847 RX signal flow before and after the modification:



### FT847 rear view after modification:



### **FT847 inside view of the modification:**



### **Details scanned with higher resolution:**



[www.scn.de/~koellner](http://www.scn.de/~koellner) (C) 09/1998 by [DL4MEA](#)

This modification is read 3204 times.

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**02-03-2000**

## **(FT-847) Sensitivity settings on the FT847**

To change the sensitivity setting on the FT847 power off.

On the MH-31 mic. press & hold the DWN FST UP buttons & power on. This will give access to a menu to change the settings for each individual band & mode, but the operation has to be gone through for each band.

Make a note of settings before changing, otherwise you will have to resort to the restore factory settings Menu to return towere you started.

This modification is read 3256 times.

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**16-07-2000**

## **(FT-847) Throttling Back the FT-847 Audio Output Level, Rev. 1**

**Author:** Serge Miller - [kt6kt@juno.com](mailto:kt6kt@juno.com).[MODIFICATION.NET](http://MODIFICATION.NET)

The following is a revision to the [FT-847 audio modification procedure written by Bob Nagy, AB5N, in 1988, and published on Web page \[www.mods.dk\]\(http://www.mods.dk\)](#). This modification may not be needed on newer FT- 847s.

Although Yaesu did a fantastic job of gain distribution in the FT-847 receiver, they bombed when it came to the last stage, the audio output. Even at lower settings of the AF Gain, the resultant audio is room filling and control is very critical. The TDA2003H audio amplifier integrated circuit (IC) is not being over-driven, it is just getting too much audio signal from the previous stage at the lowest input level. Operational and distortion improvements can be gotten with this modification. Read the entire procedure before starting the actual modification. Later model FT-847s may not have these audio problems. Also remember that if your rig is under warranty, and you modify it, the warranty is void.

Take off the FT-847 covers and turn the rig over on its top, exposing the bottom. Near the rear of the rig, on the opposite side from the input power connector, locate audio amplifier IC Q1086; it has five (5) pins and is close to the purple 470 F audio output capacitor, C1242. The input to the audio amplifier is on Pin 1, the pin with the long leg at the end nearest the rear of the rig. There is a small 1 F audio input capacitor, C1225, close to the pin. The modification consists of opening input Pin 1 of the IC and inserting a 47 K $\Omega$  resistor in the opened input lead. The easiest way is to snip (cut) the middle of the IC pin, separate it, and add the resistor in series with the input lead.

To insert the series resistor:

1. Cut input Pin 1 of audio IC Q1086, observing ESD precautions.
2. Separate the two halves of the cut lead.
3. Prepare the 1/4 W, 47 K $\Omega$  resistor with just enough lead length to contact the separated IC input lead.
4. Tin the resistor leads and the IC leg contact points.
5. Tac solder the resistor to the separated leg of the IC.

The 47 K $\Omega$  resistor gives just enough level reduction, allowing setting of the AF Gain control at 10 or 11 o'clock instead of 8 or 9 o'clock, the initial lowest level settings of the control . There is still enough audio to "blast out" the internal or external speaker.

With this modification, the audio seems even smoother and cleaner, and the problem of erratic audio for the first quarter turn of the AF Gain control, as reported in older units, is also gone. With the above mod and the replacement of the original ceramic SSB IF filter with International Radio #702 SSB crystal filter, for better receiver selectivity, there is a feeling of having acquired a new receiver.

Pleasant listening.

[kt6kt@juno.com](mailto:kt6kt@juno.com)

This modification is read 2754 times.

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**25-10-2000**

## **(FT-847) Easier FT847 audio level fix**

**Author:** Vesa OH3NWQ - [vesa.tervo@nokia.com](mailto:vesa.tervo@nokia.com).[MODIFICATION.NET](http://MODIFICATION.NET)

I installed 33 ohm 4 watt resistor in series with the external speaker. It was the first one that found in my junk box. I am now pleased with the volume control of the FT-847.

You can also do the same for the internal speaker.  
Any value 22-47 ohm will do - and it does not have to be 4W, 1W resistors are ok too.

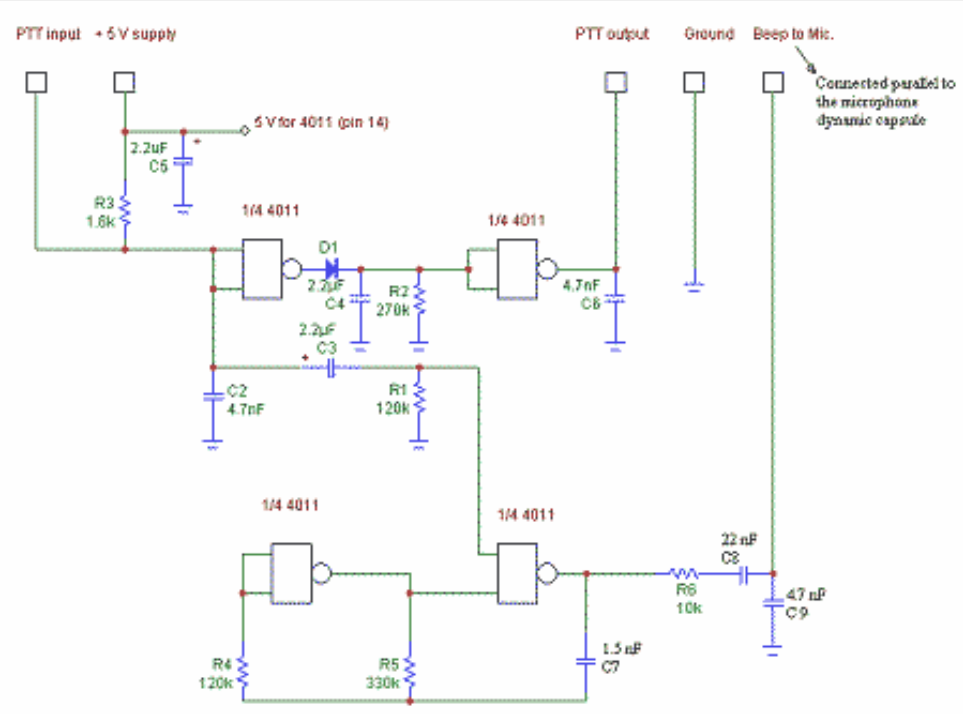
73 de [Vesa OH3NWQ](#)



**05-06-2001**  
**(FT-847) Simple Roger beep for FT-847**

**Author:** Vladimir Petrzilka - [ok1vpz@tesmail.cz](mailto:ok1vpz@tesmail.cz).[MODIFICATION.NET](http://MODIFICATION.NET)

Simple Roger beep circuit designed for FT 847 (installed into microphone) by OK1VPZ



**13-09-2001**  
**(FT-847) FT-847 burned power switch contacts - repair in 10 minutes, no cost.**

**Author:** Emil SP5LBS - [emilk00@hotmail.com](mailto:emilk00@hotmail.com).[MODIFICATION.NET](http://MODIFICATION.NET)

I had problems with power-on button. Temporary solution is very simple, so you may repair your radio and easily look for more time to replace original switch.

After you take out both upper, and bottom covers, you may unscrew upper display panel holding screws, and slightly loosen lower ones. Your display will fold toward you, so PCB will get accessible. At the left side toward you, there is power switch to be patched with two small pieces of wire. (another pair of contacts is not used by Yaesu, so we may use it here).



73 de Emil SP5LBS



**Subject:** Another option

There is another option to install replacement power-on switch outside of the radio.

If you look at the front panel PCB close to the power button location, you will notice board plug with two (green, and white in my case) wires. They go directly to the J1020 junction on control board (close to the big 30Amps fuse. You may unplug these wires, and plug in your own switch (or even relay) controlled from outside of your rig. I would not recommend connecting additional power switch in parallel, because if you switch on one of them, second one would become inoperable. Having original button burned out (or otherwise broken) you may go this way, and install external switch.

Be aware, that neither of the wires should contact case (ground), or you'll burn some pieces inside of your radio. Both wires going to the J1020 socket on the control plate have to be well isolated from the case or other parts. Regards Emil SP5LBS

**Date:** 23-03-2002

### User comment

**From:** [John Lynn KE0OP](#)

**Subject:** FT847 Power Switch

Call yaesu for Power switch Part - it is under \$2 and they will send it N/C -John KE0OP

This modification is read 3478 times.

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**10-07-2001**

## (FT-850) Mods for FT-850 (Japan version only)

**Author:** *Unknown*

Normally this unit is only sold in japan but if you have one go-baby-go on the display pcb (frontpanel) there is a jumper (jw3001) link it

Then push `proc + agc + ipo + att` and power up unit. This will get you into set mode

As per other units rotate vfo and change 02 item to on this will give you full tx! push (proc) button to enter the change

Power down the unit and re power no reset needed then spritsan!!!

This modification is read 436 times.

top of page

**23-08-1998**

## (FT-8500) FT-8500 extended RX/TX

*From: Mike Obermeier ifindem@mail.calypso.com*

The mod is easy. This will give you 137-174mhz and 410-470mhz Tx/Rx.

1. Disconnect power and antenna (like, you would'nt of done it already.)
2. Open up the case by removing the screws and gently removing the cover and unplugging the speaker.
3. Locate and CUT the GREEN WIRE on the CONTROL BOARD ( the vertical board behind the control panel.
4. Reassemble the radio.
5. RESET THE MICROPROCESSOR (so much for the memory!)

(press and hold [D/M] & [REV] & [ENT] & turn the power on)

(turn off the radio).

(press and hold [SCAN] & [HOME] & turn on the radio - extended RX mod).

**19-07-1998****(FT-890) YAESU FT890 / AT (Firmware ROM version 1.21) TX 1,5 to 30 MHz mod**

- Verify your ROM version with the following sequence: hold A/B + A=B knobs while powering up your transceiver. You'll see the display test followed by your ROM version. It's possible that the mod work for other versions but I haven't tried it !
- Disconnect FT890 from all connections.
- Open transceiver like explained in your "OPERATING MANUAL".
- Locate on the "CONTROL UNIT" jumper point JW 3001 and close it with solder.
- Close transceiver back and reconnect power.
- Push PROC, AGC-F, IPO, ATT while power ON.
- Now the display shows two digits of numbers and tree of letters (i.e 13 OFF) Rotate main knob and set the display to "02 ON". Now press the PROC button.
- Power OFF and then back ON. It's all!
- Now every time you want, you can change the programation, but you will allway lose the memories.
- Other settings than "02 ON" are of no interest. This one give you 100 w and automatic antenna tuning between 1,5 and 30 mhz.

Try it at your own risk. 73's and good luck.

Karl, ON9CSK @ ON1BWP.#BTN.BEL.EU

**19-07-1998****(FT-890) Another modification for the FT-890 Frequency**

This is the MOD to open the FT-890 to make it capable of transmit from 1.5Mhz to 30MHz without restrictions!.

First, open both transceiver covers (follow the USER MANUAL instructions). Then locate the JW3001 jumper on the DISPLAY UNIT board (just rear the display).

Close the JW3001 jumper. Then power ON the transceiver with the following keys pressed: PROC, AGC-F, IPO, ATT.

On display you will see two numbers and OFF. Rotate the frequency knob until you see ON. Then press PROC and turn OFF the transceiver. It is not necessary to clear the jumper.

**19-07-1998****(FT-890) FT-890: MOD: FM-HUB erhoehen**

Ich bin seit einigen Tagen stolzer Besitzer eines FT-890.

Mir ist ebenfalls (wie DL6MFV, Remco) aufgefallen, dass in FM der Hub zu gering eingestellt ist...

...So habe ich kurzerhand 2 Modifikation durchgefuehrt:

A. FM-Mikrofonverstaerkerregelung erhoehen:

1. Man loese alle Steckverbindungen zum FT-890
2. Nun stelle man den Transceiver auf den "Kopf", so dass die Bedienelemente zum "modifikationsfreudigen OM" zeigen und entferne den unteren Gehaeusedeckel, der mit 8 Schrauben (2 auf jeder Seite und 4 auf der Oberseite) befestigt ist.
3. Es befinden sich ca. 15 Potis auf der rechten Seite, von denen der vorletzte mit VR22 beschriftet ist.

Skizze:

===== (Platine)  
" " " " " " " " " " " " " "  
\* \* \* \* \* \* \* \* \* \* \* \* \* \* (Potis)  
^  
| (dieses muesste es sein,  
Bitte Beschriftung kontrollieren !!! )

- 4. Bei Bedarf dieses Poti bis Rechtsanschlag (100%) aufdrehen. (Bei mir war dieses von Werk aus auf ca. 70% geoeffnet)
- 5. Modulation mit einem anderen Empfaenger ueberpruefen
- 6. FERTIG !

Sollte dies keinen Erfolg bringen, dann:

B. FM-Hub erhoehen:

- 1. Das noch geoeffnete und in gleicher Lage verharrende Geraet (FT-890 !) beinhaltet auf der Oberseite ungefaehr in der Mitte der RF-UNIT ein Poti mit der Bezeichnung VR2009 (zur besseren Orientierung: in der Naehe ist ein Stecker mit der Bezeichnung J2015)
- 2. Mit diesem Poti wird nun der gewuenschte Hub eingestellt (Natuerlich unter staendiger Kontrolle durch einen Empfaenger). Man sollte sich die Schleiferstellung einpraegen, um im Falle eines Falles (in dem UHU (TM) einfach alles klebt (hi)) wieder die urspruengliche Einstellung zu erhalten.
- 3. Ist der Idealwert erreicht, wird der FT-890 wieder ordnungsgemaess verschlossen.
- 4. PUUUUUHHHH, geschafft... (so erging es zumindest mir !)

Fuer Erfolgsmeldungen (und wirklich NUR solche !) waere ich dankbar !

An dieser Stelle moechte ich noch Eddi, DL2SEP, danken, dass er mir bei dieser "Operation" mit Ratschlaegen zur Seite stand.

73 und viel Glueck !

Markus, DL4SEQ, Moegglingen (JN48XT)

19-07-1998  
(FT-890) Yaesu FT-890 expanded RF

This modification is very easy to preform, however do not force the radio apart !!!!!!!!!!!

Do not pinch any wires when taking it apart, do not turn any of the pots on the left side of the radio.

Please, please use a very small soldering iron so you don't ruin your very nice radio !!!!!!!

Here goes:

- 1. Remove the power from the radio.
- 2. Remove top and bottom covers.

The next step is done temporarily.

- 3. Locate jumper location JW3001 (solder pads) on the display unit and solder bridge the pads.

Don't use too much heat

The jumper is on the left side of the display board next to the left most CPU as looking from the back to the front with the radio in the normal up-right position.

- 4. Reconnect the power.
- 5. Press and hold [PROC], [AGC-F], [IPO], & [ATT] and turn the power on.
- 6. You will now see 02 off
- 7. Rotate the main dial until the display shows ( 02 - on )

8. Press [PROC]. This will confirm and write the data to the EEPROM memory.
9. Turn the power off and disconnect the power cord.
10. Remove the solder jumper that you made in step 3 above.
11. Replace the covers.

And again be careful that you do not pinch any wires and do not force it together.

If you have any questions about this mod, EMAIL me at MarkC57 (AOL) or on internet at corcoran@ncube.com

This is one fantastic radio and I would like to know what you think of yours.

73's N8ORH - Cincinnati, Ohio

This modification is read 1431 times.

[top of page](#)

**13-06-1999**

**(FT-90) Yeasu FT-90 TX 130-180, 410-480 MHz.**

I just figured out the mod for the Yaesu FT-90. It will give you TX 130-180 MHz / 410-480 MHz.

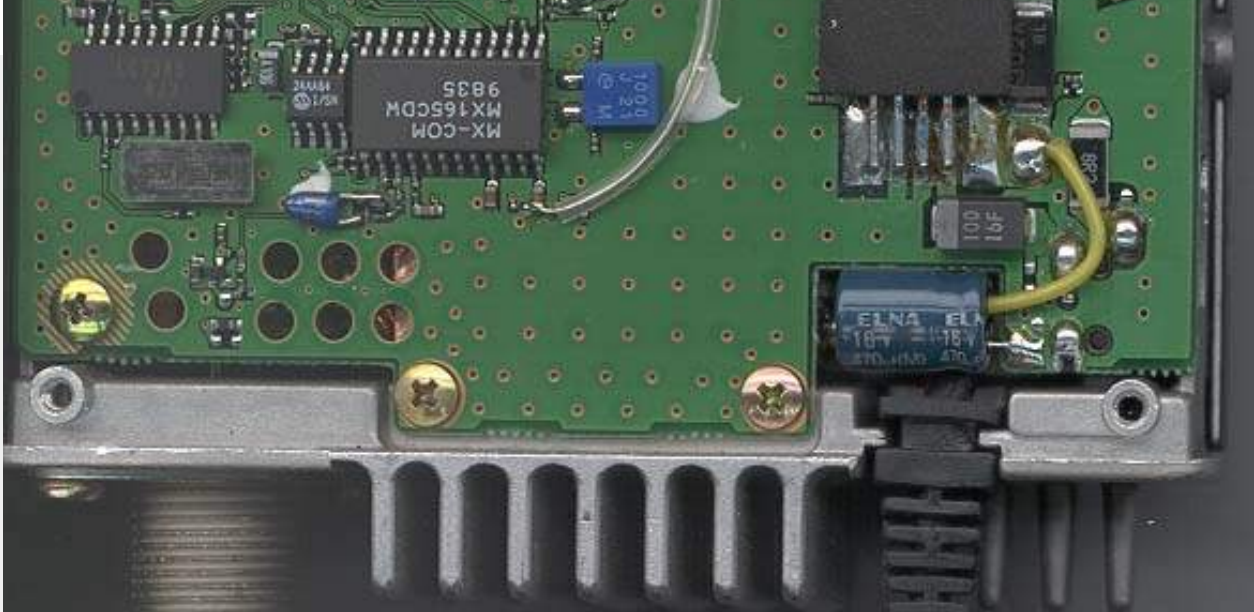
1. Remove 4 screws from bottom of radio.
2. Remove R2156 (connected to pin# 21 on Q2021, the CPU HD6473337YTF16)
3. Replace cover and screws.
4. Perform a Master Reset (hold down DISP/SS, <| >) and turn on power.

That's it!

Perform this Mod at your own risk.







This modification works both for the US and the european version. So the use same R for mod, but different firmware.

73  
Jim - KA8ZGP

|                                                                                                                                                                                                                                                                                           |                     |                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|
| <b>Date:</b> 05-04-2001                                                                                                                                                                                                                                                                   | <b>User comment</b> | <b>From:</b> unknown |
| <b>Subject:</b> Update                                                                                                                                                                                                                                                                    |                     |                      |
| Unless you are good at working with SMD's, do not remove R2156. Instead, cut a small, about 1-2 mm, piece out of the circuit trace that goes from R2156 to the CPU. By cutting the trace right next to R2156, you can always place a solder bridge back in the trace to make it "normal". |                     |                      |
| The value of R2156 is zero Ohms. It provides ground to pin 21 of the CPU.                                                                                                                                                                                                                 |                     |                      |

This modification is read 3649 times. [top of page](#)

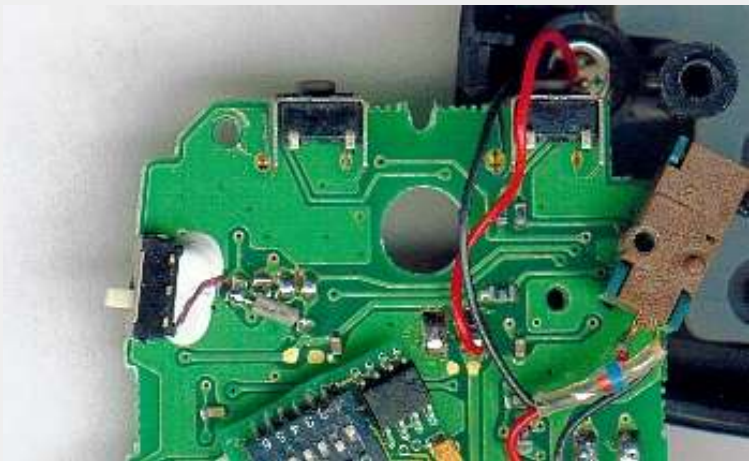
**27-08-2001**  
**(FT-90) FT-90 Microphone PTT Lock Mod**

**Author:** Kevin (K7KCN) - [kcnovak@home.com](mailto:kcnovak@home.com).[MODIFICATION.NET](http://MODIFICATION.NET)

Microphone MH-36, to use the "Lock" switch to lock the PTT as well as the top buttons.

Inside microphone,

1. Cut circuit trace between solder jumpers 3 and 4.
2. Solder jumpers 1, 3, and 4.
3. Place wire jumper from solder pad below jumper 4 to jumper 1.



Happy RFing!  
Kevin, Gresham Oregon USA



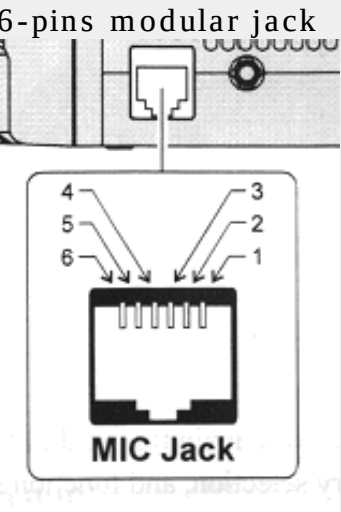
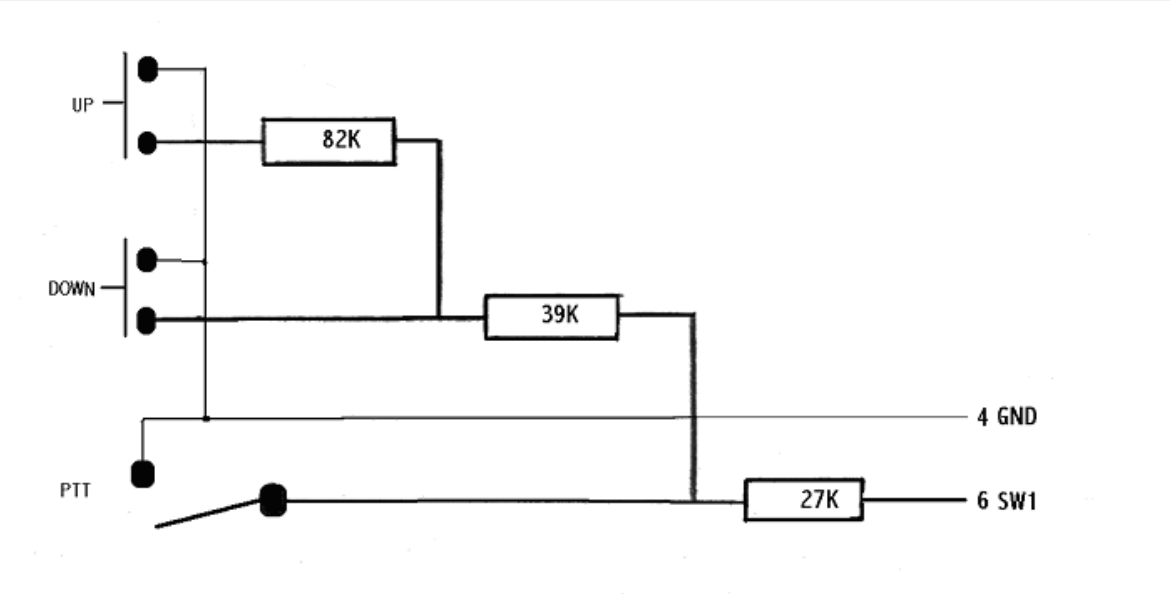
**15-11-2001**  
**(FT-90) Connect other microphone to Yaesu FT-100 & FT-90**

**Author:** Björn Karlsson - [bjorn.dunder.karlsson@mail.bip.net](mailto:bjorn.dunder.karlsson@mail.bip.net).[MODIFICATION.NET](http://MODIFICATION.NET)

**This modification is originally made for FT-100 but should also work for FT-90.**

Here´s a description on how connect UP/DOWN and PTT to Yaesu FT-100.

Here below does I a description how components shall connect to radio.



Mic-jack Yaesu FT-100 / 90 / 8100.

- Pin 1:** SW 2 multi-function switching
- Pin 2:** N.C. (9600bps packet data output FT-90)
- Pin 3:** + 9 v
- Pin 4:** GND
- Pin 5:** Microphone Input
- Pin 6:** SW 1 PTT, UP och DOWN

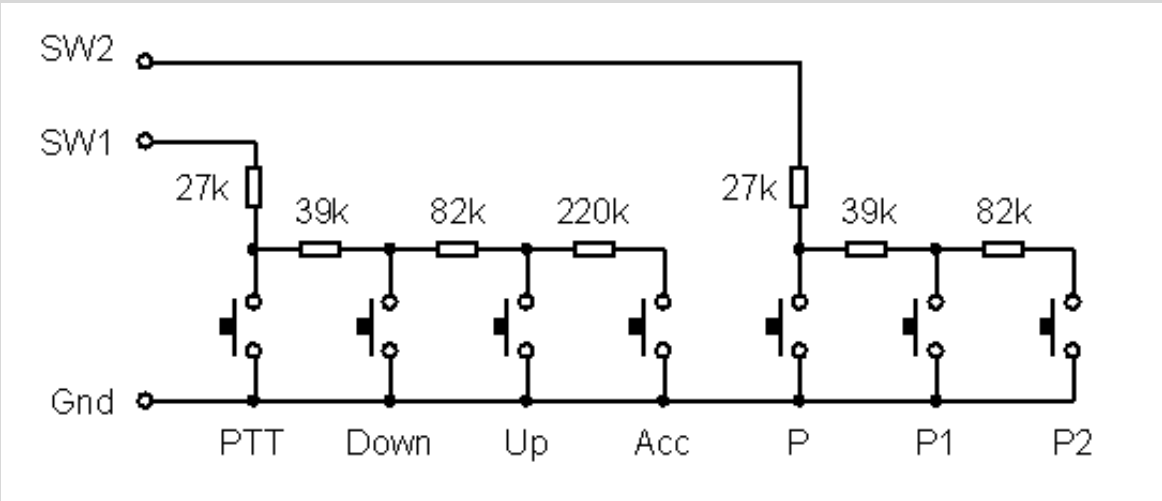
73 Bjorn SM5SWI

|                           |                     |                                            |
|---------------------------|---------------------|--------------------------------------------|
| <b>Date:</b> 11-08-2001   | <b>User comment</b> | <b>From:</b> <a href="#">John Shepherd</a> |
| <b>Subject:</b> More info |                     |                                            |

I was interested to see Björn Karlsson's information on how to "Connect other microphone to Yaesu FT-100", as I have been looking for some time for a way of using PTT, rather than VOX, with another microphone.

My curiosity pushed me to try the same circuit on SW2 and it works. It gives you the P, P1 and P2 buttons. However, there was still the ACC button missing, so I put a variable resistor from SW1 to ground and found a fourth position.

The circuit below gives you PTT, UP, DOWN, ACC, P, P1, and P. At least, it works on my rig. Don't forget that you can programme the functions of P, P1 and P2 on the FT-100.



John F5FML

This modification is read 1746 times.

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## 19-07-1998 (FT-900) FT-900 Frequency Expansion Information

Yaesu U.S.A.  
Amateur Products Division  
Technical Support

Model: FT-900  
Date: 24 August 1994

Original Freq. Range: 160-10M (Ham)  
New Freq. Range: 1.8-29.99MHx TX

### Important Notice Regarding Disclosure Restrictions

This information is authorized for distribution only to individuals who are members of the U.S. Military Affiliate Radio System, Civil Air Patrol, or other government services specifically permitted by the FCC to use non-type accepted equipment such as that

1. Remove the two screws from the top cover, and the two screws from the top rear area of the rear panel, so as to allow the top cover/heat sink to be slid slightly toward the rear. The objective is to be able to see into the CNTL-1 Unit, which is the i
2. Locate test points TP3001 and TP3002 on the CNTL Unit. They are located near the top edge of the board, in the center from left to right. With the transceiver still turned off, connect a jumper (alligator clip is ok) between these 2 test points.
3. Hold in the following 4 buttons: [PROC], [ATT], [IPO], and [NB]. While holding them in, turn the transceiver on. Release the buttons.
4. The display will indicate OFF. Turn the VFO dial slowly until the display reads ON.
5. Press the [PROC] button to write the new instructions to EEPROM.
6. Remove the jumper across the test points.
7. Replace the case screws. Mod is now complete.rea of the rear panel, so as to allow the top cover/heat sink to be slid slightly toward the re

This modification is read 1527 times.

[top of page](#)

19-07-1998

(FT-900) FT-900 Remote improvement

Name is Larry KN4IM@N4CII.#CHS.SC.USA.NA in Charleston, SC. If you are the proud owner of a new Yaesu FT-900 remoteable mobile and have had teh pleasure of installing the YSK-1L Remote Cable Assy, I am sure you would also like to strangle the IDIOT that decided you needed two tiny screws to attach the cable to the front of the radio main unit. These tiny, fine threaded, soft brass, typically Japanese screws will soon be de-threaded, or broken, or LOST! There has got to be a better way.

I just got off the phone with Yaesu's experts in Cerritos and the parts department. No, there are no parts available, yet, for the FT-900 so I don't have any part number or price to give you to order it. Just tell Yaesu parts dept that you want the plastic back they have on order for KN4IM in South Carolina, he'll know what you want.

What I did was to remove the back of my 900's remote head and see if I could install this silly connector to the backshell of the remote head. VOILA! They even gave me the holes to put screws through. The remote cable end that mates to the radio mounts very nicely to the INSIDE of this plastic shell so that the shell is BETWEEN the connector and the radio. You can use small screws/nuts with the nuts pointing out to give you the clearance you need. This will allow you to QUICKLY dismount the 900 from the trunk leaving your EXTRA shell (after they deliver it) PERMANENTLY in the trunk...no screws to break or loose...no tiny phillips to find...just to go portable or fixed. The empty shell will fit the mounting pins and click right into the 900's front panel lock because it's made for it.

I sure hope Yaesu retrofits all the previously sold remote kits with a neat looking blank panel in which to mount my radio end of the remote cable instead of having to resort to this method. Maybe they will already have the radio end moulded into this blank panel for faster installation and will send me a new cable.....sure they will...73,  
Larry KN4IM 14.105 PKT

06-05-2001

(FT-900) RF power mod for FT-900

**Author:** Robert Powell - [jg999@webtv.net](mailto:jg999@webtv.net).[MODIFICATION.NET](#)

To adjust the RF power on the FT-900 remove the bottom cover and place the radio with the controls facing you.

The VR 12 you need to adjust is on the front edge of the board on the left side (the front edge is next to the front controls).

19-05-2001

(FT-900) FT-900, change the RX/TX bandwidth

**Author:** Unknown

Press at the same time **[fast-button]** and **[USB]** or **[LSB]**, so you can change the bandwidth in RX-mode.

You can also change the bandwidth in TX-mode, you have to push the **[PTT]** and then you can change the TX-bandwidth from small to wide...

Date: 16-02-2002

User comment

From: [Haroldo Bradaschia Neto](#)

Subject: Speach Processor Tone Control

Hello

You Can change the Tone of Transmission when you use the Speach processor ..  
Hold FAST and PROC in the same time ..  
00 is the normal position ..UP Smoth and Down fine voice

19-07-1998

## (FT-901) Improving the YAESU FT-901/902 type transceiver

(90.12.20)

By LA8AK, Jan-Martin Noeding,  
Voelien 39/B, N-4623 Kristiansand S.

Several printed circuit boards in either model are very much equal. There has been some modification kits available to obtain the new bands for FT-901, and the RF-unit has also been replaced to achieve the better intermodulation performance as with FT-902.

The FT-902 has been in use here for 3 years, and some changes has been found important. Too often it seems not possible to buy a new trans- ceiver at the required specifications, but many features now found on receivers add only marginally to the on-air performance and just too often there are many new bugs, some of these are caused by incorrect ways of operating a semiconductor device, some rigs have some boring background noise which does not disappear, even for strong signals (IC-730/740). Some of the bugs with FT-902 has been experienced with the later YAESU models. 5-10 years old rigs are much easier to modify and find room for the additions you prefer, compared to last models. But there is of course a limit for when a piece of equipment is worth modifying, exceptions are of course rigs with historical attraction. The first owner has paid most part of the price to the dealer. Therefore it seems quite interesting to buy a secondhand rig.

The following changes/improvements has been made for FT-902 (FT-901):

1. PB-1705A AF Unit. Audio Quality.

This is in my opinion awfull. Very bad bass-response. Looking at the FT-7 audio circuit, will show the solution. C511 to the AF-power- amplifier is decreased to 47nF (.047). Improvement is just inbelie- vable! Measuring the audio RF to audio response now indicate that there are still more room for improvement, but it sounds good ..... even with the built-in load-speaker, at least.

2. PB-1994 NB unit. Carrier Level Control.

This is a 5kW potmeter, with effective 'range' of about 1000 W, ie. 80% of the rotation is outside practical control range. This potmeter is shunted with 1200 W, it is easiest to connect the resistor on PB-1994 (NB-unit) pin 5, and ground, or under the PCB-socket.

3. PB-1720B RIT. (Receiver Incremental Tuning = Clarifier)

One must decide self which RIT-range should be. In my experience the requirements depends on the operation.

```
70000000000000080000000000088800000000008000000000888000000008000000009
.HF SSB      . + 5kHz ... HF CW      . + 1kHz ... 6M aurora. + 5kHz.
.6M CW       . + 5kHz ... 6M SSB     . + 5kHz ... 6M CW MS . + 5kHz.
.2M CW       . + 2kHz ... 2M CW MS.  . + 5kHz ... 2M SSB   . + 5kHz.
.2M Aurora   . + 5kHz ... 70cm CW   . + 5kHz ... 70cm SSB . + 5kHz.
.70cm Aurora . +10kHz ... 23cm CW   . + 5kHz ... 23cm SSB . + 5kHz.
1000000000000020000000000222000000000200000000222000000002000000003
```

I discovered that sintran letter for ohm is converterted to W, so 5kW should read 5k ohm

-----

First I modified my rig for HF CW because it is very important to use correct tuning in HF CW contests. The modification shown in fig.2 makes +1.6/-1.5kHz (original is +5.5/-4.5kHz). VR06 is shunted with 1500W resistor.

Switch RIT on, set VR06 to center, tune RX to 7000.0kHz, switch off RIT and adjust VR01 to frequency reading 7000.0.

4. Mode-dependent RIT.

The modification as shown above was used for about one year, but it was a desire to have some further changes. The circuit shown in Fig.3 switches automaticly between two RIT ranges, dependent on modes 1: AM/SSB/FM "wide" (+4.8kHz), 2: CW/FSK "narrow" (+ 1.4kHz) This is solved by using a dual-OP-amp, LM358=MC3358P1 (TL082 will not function). The circuit is connected on a printed circuit board. Some time was needed to find a suitable location, but at last it was mounted next to RIT-control, at the XTAL OSC. A little angle- bracket was soldered to one end of PCB and fixed using the two available screws which fixes the oscillator assembly. VR01 is adjusted such that RX with and without RIT operate on the same freq. The transistor is a P-FET, which is not too commonly available, I used the only available, a J177 Switch-FET. For "narrow RIT" the FET reduces the gain, but center-frequency remains equal.

5. PB-1994 NB-unit: RF-clipper (so-called RF Processor)

It was not possible to notice any operation of this circuit, reports on the air did not indicate that this circuit did operate at all! I made some measurement using RF mV-meter connected to PB-1994 pin 17.

Whistling into the mike produced 70mV from NB-unit, while "blowing" into the mike produced 200mV rms, this indicate that RF clipper does not work on most sort of speech, while perhaps very good for single tone transmission..... The LIMITER (Q206 TA7060P) was suspected, a pair of 1N4148 diodes were mounted in antiparalell across the output from this IC, and the RF CLIPPER functioned !! Just as easy it was to improve this. The same suspect circuit has been seen in some other FT-line transceivers.

6. PB-1994 NB-unit: Processor Level Control. (NB unit Q206).

This strange circuit did not have any practical function. I used a P- channel FET, the only one available was 2N5462, while it may be possible to use the J177. Some resistors were changed too. 6-10dB variation was achieved. The rotation is now opposite way, so the center connection at the potmeter must be connected to the other side. VR203 must be at maximum, but this was later removed and a strap was inserted on the PCB to get maximum output.

The values for some resistors were later optimized and more than 10dB variation was possible for 2N5462, but for J177 almost 30dB. By the way, I believe that FT-101ZE uses similar speech processor circuit, so it may need the diodes. Later reports on the air 'are possibly the best RF processor ever heard on the bands, it is tested on 80m/40m, 6m, 2m, 70cm, 23cm, and some rather critical persons who too often criticize have said this is good and RF processor may be left on during local QSO's!

7. CARRIER UNIT PB-1706A. FSK-mode.

The dc input level is limited to +1.5V, which is an impractical level, so I have inserted a 4k7 resistor in series with base (Q701). It is now possible to use normal TTL-level input, noise threshold is improved.

8. PB-1707B FM-unit.(PB-1706A \*not cw-ms): Carrier level adjustments.

I believe that it is important to achieve as equal level as possible for the different operations/modes, ie.(1) Normal SSB, (2) SSB with RF-processor, (3) AM, (4) CW, and (5) FM. Difficulties arise because the different units loads the common point, which is NB-unit pin 13. Diode-switching is therefore used. A diode is inserted at the FM- input to this point, see 'Overall Circuit for IF signals between the different boards'. Another diode must be inserted in the other cable from CARRIER Unit, possibly on this unit, and a similar modification like the one for FM-unit must be made there. Fig. --- shows the modification for FM board. In the physical location for TC901 is mounted a trimpotmeter, a capacitor goes to the output, and resistors are installed to bias the diode connected at the input to the NB-Unit. It is now easily possible to adjust the levels from FM-unit, and CW/AM signals from CARRIER unit) independently without interactions to occur. When the diode is inserted between CARRIER unit and NB-unit the capacitor in series with cable must be removed (this has a fixed value, although it is drawn like a trimmcap). Some interesting details with the FM-unit is that it is easy to find suitable connection points for G3RUH 9600 baud modem, but it may be difficult to find some proper free pins on the connector to wire these to.

**FM-DEVIATION.**

It should be pointed out the difference between FM operation on VHF and HF. On VHF/UHF 25kHz channel spacing is used, while on 10M 10kHz channel spacing is employed, this transceiver is built for FM operation with transverter. For 10M deviation must be reduced, and it is an advantage to use a narrower FM RX filter. On VHF/UHF deviation is set to +5kHz, while for 10m it should be adjusted to maximum +2.5kHz (at voice peaks). This is important otherwise you will cause severe interference with the adjacent channels on 10M. Using simple tools, you can just reduce to audio to the varactor diode to about the half of the setting as adjusted for VHF. You may whistle 'hard' into the mike and measure at the input to the varactor diode with a sensitive audio level meter, and adjust the reading to about half of the first reading.

9. FILTER Unit PB-1995: NOISE-BLANKER-improvement.

I made an ignition noise simulator, this was earlier used to improve the FT-7 noise-blanker, so it was interesting to compare FT-7 with FT-902. The noise-blanker seems not to be too bad, but it seems to be room for improvement. Without NB, S-meter reading was about S9, with it was S-3, and after modification, the noise disappeared almost totally, the background noise could be heard without antenna. Change: Add 0.1uF to the capacitor C328 (PB-1995 FILTER Unit), bead-tantalum may be used.

10. PB-1718/1720B: Push-buttons.

After some years in use, the push-buttons will not function properly, the problem is that some small springs, easily seen from above, will not move too well in the tracks, some thin oil improves this.

11. PB-1715 PA-unit (2x 6146B): PA-valves protection.

12. To protect the power-supply against anode-to-screengrid voltage flash- over, a small 1N4148 type diode is connected in series with screen- grid supply to the 6146B's. This is not shown on the circuit diagram. This may be good for power supply, but it may be fatal for the valves in case of some secondary emission due to hard operation. Some compromise is therefore needed. The diode must be paralleled with a 10KW 0.5W resistor. To protect the screen-grid circuit against flash- over I have connected a pair of SIEMENS varistors, SIOV 14K150, they draw 1mA current @ 250V DC.

13. PB-1715 PA-unit, PB-1708 RECT-A-unit: BIAS-circuit improvements.

To stabilize grid supply against drift-off due to gassy valves, a diode is connected in parallel with R05, a 1N4007 is preferred because it is a poor RF rectifier. To avoid that the grid voltage should disappear because of bad contact in BIAS POTMETER VR01 a 100KW resistor is connected from negative side to center. Often this occur if you have left the potmeter in same position for years, and when one needs to adjust the idle-current, the trouble sometimes happen.

14. PB-1708 RECT-A, PB-1717 RECT-C: IMPROVING THE CW-KEYING (Normal CW).

Originally the CW-keying is bad, lots of key-clicks. For HF CW ca. 4-6ms delay is optimum. A single capacitor cannot solve this problem, because of different charge and discharge current. A suitable compromise was made with simple capacitor/diode/resistor combinations see figure ----

15. PB-1705 AF-Unit, PB-1846 VOX/MARK: AUDIO LINE OUTPUT.

For packetradio/RTTY/CW-meteorscatter it is desired to use an in- dependent AUDIO LINE OUTPUT. Surprisingly, there was an unused 1/4- LM324 on the AF board. There was marked but unused component-designations around this, one point was used only to connect two components, they were removed from this common point and connected in the air. Then the components as shown were mounted, the un-numbered components are mounted below PCB or which is practical. It was an unused cable from AF 'MJ6' to VOX 'MJ7', and further to J17 SIDETONE out on rear side. I could not



- see any practical use for this TONE output, so I decided to use this for AUDIO LINE OUTPUT. The 4k7 resistor is changed to 1KW or removed, IN VOX UNIT R52 is loosened in one end.
16. Other changes (PB-1728A and other components):  
MIKE contact is changed to the KENWOOD circuit for 4pin connectors, such that it is possible to use same mikes for different rigs. CW-jack is rewired. One contact is KEY, while the other is PTT in/out. The ELBUG was removed, I like my own HB9ABO Keyer/Memory keyer better. A separate CW-high-speed board was installed (keyfilter and keyed IF amplifier). AM position is wired for CW-Wide (2.4kHz BW) for VHF/UHF CW (normal CW/- Aurora/Meteorscatter) where larger bandwidth is preferred. Perhaps someone else would prefer to have a switch to select between CW-Narrow/CW-Wide, the AMGC switch may be used for this purpose.
17. PB-1715 PA: TRANSVERTER RF OUTPUT.  
RF output level for transverters is far too high, this is reduced by connecting a capacitor in series with C02=10pf. I used 3P3 with 1000 ohms in series (the resistor is used to avoid parasitics). About 20mW is available on 10M.
18. PB-1717A RECT-C: +6V Regulator for RIT.  
OZ1HDA (with FT-901) and I (with FT-902-DM) have been troubled by VFO instantaneous instability, the +6V IC-regulator (Q01-TA7089) is suspected. I changed the +6v regulator with a 78L06 regulator and the problems seem to have disappeared.
19. PB-2154 RF-Unit:  
Forward conductance for Q03=J310 must be adjusted to 20mmho (20mS) for 50W mixer termination. The drain-current must be ca 20 mA. Correct value for R13 ca. 18 W, according to G4DGU, Chris (MUTEK).

Pse note that this manuscript is written in sintran and converted to DOS, therefor some letters will be wrong, here W may mean ohm!

|                                                   |                    |                     |            |   |
|---------------------------------------------------|--------------------|---------------------|------------|---|
| ! Table 1                                         |                    |                     |            | ! |
| ! COMPARING CIRCUIT BOARDS USED IN THE TWO MODELS |                    |                     |            | ! |
| !-----!                                           |                    |                     |            | ! |
| ! Board                                           | ! FT-901           | ! FT-902            | Note       | ! |
| !-----!                                           |                    |                     |            | ! |
| ! RF unit                                         | ! PB-1702          | ! PB-2154           | Different  | ! |
| ! Filter                                          | ! PB-1716 *        | ! PB-1995 *         | Equal ?    | ! |
| ! IF                                              | ! PB-1704C         | ! PB-1704C          |            | ! |
| ! FM                                              | ! PB-1707B         | ! PB-1707B          |            | ! |
| ! CARRIER                                         | ! PB-1706A         | ! PB-1706A          |            | ! |
| ! AF(RX)                                          | ! PB-1705A         | ! PB-1705A          |            | ! |
| ! NOISE BLANKER                                   | ! PB-1703C *       | ! PB-1994 *         | Equivalent | ! |
| ! Keyer                                           | ! PB-1728A         | ! PB-1728A          |            | ! |
| ! VOX/MARK                                        | ! PB-1846          | ! PB-1846           |            | ! |
| ! VFO                                             | ! PB-1440B         | ! PB-1440B          |            | ! |
| ! XO                                              | ! PB-1711A         | ! PB-2165           | New bands  | ! |
| ! VCO                                             | ! PB-1710A         | ! PB-2166           | New bands  | ! |
| ! PLL                                             | ! PB-1709A         | ! PB-1709A          |            | ! |
| ! Counter                                         | ! PB-1729A/PB-1730 | ! PB-2086           | New        | ! |
| ! Memory                                          | ! PB-1787          | ! PB-1787D          |            | ! |
| ! Capacitor                                       | ! PB-1713          | ! PB-1713           |            | ! |
| ! RECT-B                                          | ! PB-1712          | ! PB-1712           |            | ! |
| ! RECT-A                                          | ! PB-1708          | ! PB-1708           |            | ! |
| !                                                 |                    |                     |            | ! |
| ! RECT-C                                          | ! PB-1717A         | ! PB-1717A          |            | ! |
| ! Driver(12BY7)                                   | ! PB-1714          | ! PB-1714           |            | ! |
| ! PA (2x 6146B)                                   | ! PB-1715          | ! PB-1715           |            | ! |
| ! Miscellaneous                                   | ! PB-1718A/PB-1720 | ! PB-1718A/PB-1720B |            | ! |
| !-----!                                           |                    |                     |            | ! |

Almost equal boards but new numbers are marked with an asterisk \*) Note the availability for modification kit to have the 'new' bands with FT-901.

Table 2.  
Some IF measurements to be used for fault-tracing. All readings are in mV-RMS(eff.Werte) +/- 3dB \* Adjusted level, see text for modifications

|              |                              |          |          |                         |         |   |
|--------------|------------------------------|----------|----------|-------------------------|---------|---|
| !-----!      |                              |          |          |                         |         |   |
| ! P.C.B.     | ! PB-1994 (PB-1703C) NB-UNIT |          |          | ! PB-1706A CARRIER-UNIT |         |   |
| !-----!      |                              |          |          |                         |         |   |
| ! MODE (TX)  | ! Pin 8                      | ! Pin 13 | ! Pin 17 | ! Pin 4                 | ! Pin 2 | ! |
| !-----!      |                              |          |          |                         |         |   |
| !FSK CW AM   | ! -                          | ! 55     | ! 70*    | ! 65                    | ! 75    | ! |
| !FM          | ! -                          | ! 65     | ! 70*    | ! -                     | ! -     | ! |
| !SSB(Normal) | ! 60                         | ! -      | ! 70*    | ! 160                   | ! -     | ! |

|             |   |        |   |        |   |        |   |        |   |        |   |
|-------------|---|--------|---|--------|---|--------|---|--------|---|--------|---|
| !SSB(Proc.) | ! | 60     | ! | -      | ! | 20-80  | ! | 160    | ! | -      | ! |
| !-----!     |   | -----! |   | -----! |   | -----! |   | -----! |   | -----! |   |
| !RX         | ! | -      | . | -      | . | -      | ! | 30     | ! | -      | ! |
| !-----!     |   | -----! |   | -----! |   | -----! |   | -----! |   | -----! |   |

19-07-1998

(FT-901) MC3356 S-meter for FT-901/902

MC3356 improves S-meter for HF transceiver (FT-902-DM)

HB9MIN describes in DUBUS nr 1/92 the use of MC3356 to improve the S-meter for IC202E 2m ssb transceiver. For this transceiver he achieved 50dB dynamic range. Since there is few if any good VHF transceivers I decided to use my HF transceiver with transverters for the different VHF/UHF band on cw/ssb modes. I have tested this circuit in my FT-902 and achieved 70dB S-meter range. IF is ca. 9MHz.

The most suitable room for the IC and associated components is at the room for additional AM filter. It was fairly easy to mount the components. I used a 0.5mm tinned iron plate and soldered the groundings to this plate. The components were premounted and tested and this was installed at last.

It is important that no stage ahead of this board has AGC control, co I removed AGC to the RF amplifier and connected it directly to RF gain control. It is now possible to reduce RF gain, and RF gain control may be calibrated as such, range at least 30dB.

An amplifier is used ahead of the MC3356 to match the IF level and impedance of the connection point of receiver. The circuit is fed from IF which has passed the selected filter on the board (CW or SSB). It was found important to adjust the output signal from this amplifier, and with a BF905 quite little gain was needed, it is however important that current in the transistor is not too low, then maximum deflection is not possible! If gain is too high the S-meter will read with only background noise. So a compromise must be found, transistor gain must be adjusted such that S-meter just starts to deflect.

With no signal input at receiver the dc voltage from MC3356 detector is 0.6V. I believe HB9MIN did a fault in order to removed the false deflection, and it is very important to remove this 0.6V the correct way! The use of a series diode is not good at all!!! Remember that voltage drop across at diode at 10uA is about 350mV, increasing logarithmic to about 0.55-0.6V at 1mA, so at bottom end of S-meter deflection two diodes are necessary to obtain zero reading, while the two diodes will have about a volt drop at maximum deflection. Better is to use an emitter follower, because emitter-base voltage drop is fairly constant compared to a simple diode. I used the circuit for about a year now, the only problem is to find a proper S-meter time constant, it must be fast 'attack' and slow 'decay', just like AGC performance. An improved circuit is shown in VHF/UHF dx book (G3SEK), called peak detector, the circuit uses an LM358 (half LM324), this is made at a time constant of 0.5-1second. I have used this additional circuit with several power meters tested last month, and they have rather useful features.

AGC is left untouched for the IF. It runs it own life, while S-meter is derived from MC3356 - with additional transistor (level correction) or LM358 (level correction and peak detector).

The circuit has 70dB range over the noise. (93-11-07)

Circuit is described in Amatör Radio (NRRL) nr 12/92 page 5. circuit diagram is available if you send SASE to address below or as a part of FT-902 modifications

19-07-1998

(FT-901) convert FT-901 front-end

I saw a message from you titled "FT-902: Improving RX-MIXER.....". I own both a FT-901 and a FT-902. Some years ago I changed RF unit of the FT-901 (PB-1702) by a FT-902 RF unit (PB-2154). I can tell you it works fine! The only thing you should be aware of is that the three connectors on top of the module have changed position as follows:

| position | FT-901 | FT-902 |                                         |
|----------|--------|--------|-----------------------------------------|
| top      | Red    | Yellow |                                         |
| middle   | Yellow | Green  | } colour mark of<br>/ the coaxial cable |
| bottom   | Green  | Red    |                                         |

If you make the right connections the PB-2154 works right away in an FT-901. No further modifications necessary.

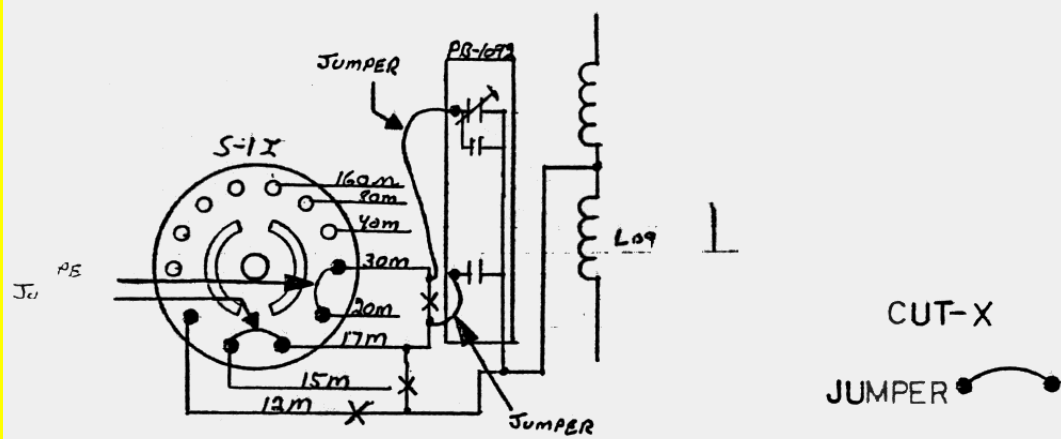
31-10-2000

(FT-901) FT-901DN Frequency modification.

June 4, 1985

YAESU ELECTRONICS CORPORATION  
P.O. Box 49  
6851 Walthall Way  
Paramount, California 90723  
Phone: (213) 633-4007

D Y R LAT TA



FT-901 AND MODIFICATION FOR  
12M 7M 30M BAND

16-04-2001

(FT-901) Shure Mod 444 D to a Yaesu FT 901 D / DM

**Author:** M. Wenzel - [MWPANDEL@aol.com](mailto:MWPANDEL@aol.com).[MODIFICATION.NET](http://MODIFICATION.NET)

This is the Plan to konnect a four PIN Shuredesktop-Microfon, 444d to an Trx 901 D / DM, 301 , 221, 101 ZD, 227 R, FT 7, 225 RD, 224

PIN 1 - Sleeve and Black  
PIN 2 - White  
PIN 3 - Red  
Pin 4 - FREE

And this is the plan for a Shure Mice Mod 444, to a 8 Pin of a Yaesu FT 107 M, 707, 102, FT ONE, 77, 980, 767, 747

Pin 6 - Red  
Pin 7 - Sleeve and Black  
Pin 8 - White

the rest is free !

M. Wenzel

This modification is read 827 times.

[top of page](#)

**19-07-1998**

## **(FT-902) MC3356 S-meter for FT-901/902**

MC3356 improves S-meter for HF transceiver (FT-902-DM)

HB9MIN describes in DUBUS nr 1/92 the use of MC3356 to improve the S-meter for IC202E 2m ssb transceiver. For this transceiver he achieved 50dB dynamic range. Since there is few if any good VHF transceivers I decided to use my HF transceiver with transverters for the different VHF/UHF band on cw/ssb modes. I have tested this circuit in my FT-902 and achieved 70dB S-meter range. IF is ca. 9MHz.

The most suitable room for the IC and associated components is at the room for additional AM filter. It was fairly easy to mount the components. I used a 0.5mm tinned iron plate and soldered the groundings to this plate. The components were premounted and tested and this was installed at last.

It is important that no stage ahead of this board has AGC control, co I removed AGC to the RF amplifier and connected it directly to RF gain control. It is now possible to reduce RF gain, and RF gain control may be calibrated as such, range at least 30dB.

An amplifier is used ahead of the MC3356 to match the IF level and impedance of the connection point of receiver. The circuit is fed from IF which has passed the selected filter on the board (CW or SSB). It was found important to adjust the output signal from this amplifier, and with a BF905 quite little gain was needed, it is however important that current in the transistor is not too low, then maximum deflection is not possible! If gain is too high the S-meter will read with only background noise. So a compromise must be found, transistor gain must be adjusted such that S-meter just starts to deflect.

With no signal input at receiver the dc voltage from MC3356 detector is 0.6V. I believe HB9MIN did a fault in order to removed the false deflection, and it is very important to remove this 0.6V the correct way! The use of a series diode is not good at all!!! Remember that voltage drop across at diode at 10uA is about 350mV, increasing logarithmic to about 0.55-0.6V at 1mA, so at bottom end of S-meter deflection two diodes are necessary to obtain zero reading, while the two diodes will have about a volt drop at maximum deflection. Better is to use an emitter follower, because emitter-base voltage drop is fairly constant compared to a simple diode.

I used the circuit for about a year now, the only problem is to find a proper S-meter time constant, it must be fast 'attack' and slow 'decay', just like AGC performance. An improved circuit is shown in VHF/UHF dx book (G3SEK), called peak detector, the circuit uses an LM358 (half LM324), this is made at a time constant of 0.5-1second. I have used this additional circuit with several power meters tested last month, and they have rather useful features.

AGC is left untouched for the IF. It runs it own life, while S-meter is derived from MC3356 - with additional transistor (level correction) or LM358 (level correction and peak detector).

The circuit has 70dB range over the noise. (93-11-07)

Circuit is described in Amatör Radio (NRRL) nr 12/92 page 5. circuit diagram is available if you send SASE to address below or as a part of FT-902 modifications

19-07-1998

(FT-902) Improving the YAESU FT-901/902 type transceiver

(90.12.20)

By LA8AK, Jan-Martin Noeding,  
Voielien 39/B, N-4623 Kristiansand S.

Several printed circuit boards in either model are very much equal.  
There has been some modification kits available to obtain the new bands for FT-901, and the RF-unit has also been replaced to achieve the better intermodulation performance as with FT-902.

The FT-902 has been in use here for 3 years, and some changes has been found important. Too often it seems not possible to buy a new trans- ceiver at the required specifications, but many features now found on receivers add only marginally to the on-air performance and just too often there are many new bugs, some of these are caused by incorrect ways of operating a semiconductor device, some rigs have some boring background noise which does not disappear, even for strong signals (IC-730/740). Some of the bugs with FT-902 has been experienced with the later YAESU models. 5-10 years old rigs are much easier to modify and find room for the additions you prefer, compared to last models.  
But there is of course a limit for when a piece of equipment is worth modifying, exceptions are of course rigs with historical attraction. The first owner has paid most part of the price to the dealer. Therefore it seems quite interesting to buy a secondhand rig.

The following changes/improvements has been made for FT-902 (FT-901):

1. PB-1705A AF Unit. Audio Quality.  
This is in my opinion awfull. Very bad bass-response. Looking at the FT-7 audio circuit, will show the solution. C511 to the AF-power- amplifier is decreased to 47nF (.047). Improvement is just inbelie- vable! Measuring the audio RF to audio response now indicate that there are still more room for improvement, but it sounds good ..... even with the built-in load-speaker, at least.
2. PB-1994 NB unit. Carrier Level Control.  
This is a 5kW potmeter, with effective 'range' of about 1000 W, ie. 80% of the rotation is outside practical control range. This potmeter is shunted with 1200 W, it is easiest to connect the resistor on PB-1994 (NB-unit) pin 5, and ground, or under the PCB-socket.
3. PB-1720B RIT. (Receiver Incremental Tuning = Clarifier)  
One must decide self which RIT-range should be. In my experience the requirements depends on the operation.

```
70000000000000080000000000088800000000008000000000888000000008000000009
.HF SSB      .  + 5kHz  ...  HF CW    .  + 1kHz  ...  6M aurora. + 5kHz.
.6M CW       .  + 5kHz  ...  6M SSB   .  + 5kHz  ...  6M CW MS . + 5kHz.
.2M CW       .  + 2kHz  ...  2M CW MS. + 5kHz  ...  2M SSB   . + 5kHz.
.2M Aurora   .  + 5kHz  ...  70cm CW .  + 5kHz  ...  70cm SSB . + 5kHz.
.70cm Aurora . +10kHz  ...  23cm CW .  + 5kHz  ...  23cm SSB . + 5kHz.
10000000000000200000000000222000000000020000000002220000000002000000003
```

- I discovered that sintran letter for ohm is converterted to W, so 5kW should read 5k ohm  
-----  
First I modified my rig for HF CW because it is very important to use correct tuning in HF CW contests. The modification shown in fig.2 makes +1.6/-1.5kHz (original is +5.5/-4.5kHz). VR06 is shunted with 1500W resistor. Switch RIT on, set VR06 to center, tune RX to 7000.0kHz, switch off RIT and adjust VR01 to frequency reading 7000.0.
4. Mode-dependent RIT.  
The modification as shown above was used for about one year, but it was a desire to have some further changes. The circuit shown in Fig.3 switches automaticly between two RIT ranges, dependent on modes 1: AM/SSB/FM "wide" (+4.8kHz), 2: CW/FSK "narrow" (+ 1.4kHz) This is solved by using a dual-OP-amp, LM358=MC3358P1 (TL082 will not function). The circuit is connected on a printed circuit board. Some time was needed to find a suitable location, but at last it was mounted next to RIT-control, at the XTAL OSC. A little angle- bracket was soldered to one end of PCB and fixed using the two available screws which fixes the oscillator assembly. VR01 is adjusted such that RX with and without RIT operate on the same freq. The transistor is a P-FET, which is not too commonly available, I used the only available, a J177 Switch-FET. For "narrow RIT" the FET reduces the gain, but center-frequency remains equal.
5. PB-1994 NB-unit: RF-clipper (so-called RF Processor)  
It was not possible to notice any operation of this circuit, reports on the air did not indicate that this circuit did operate at all! I made some measurement using RF mV-meter connected to PB-1994 pin 17.  
Whistling into the mike produced 70mV from NB-unit, while "blowing" into the mike produced 200mV rms, this indicate that RF clipper does not work on most sort of speech, while perhaps very good for single tone transmission..... The LIMITER (Q206 TA7060P) was suspected, a pair of 1N4148 diodes were mounted in antiparalell across the output from



this IC, and the RF CLIPPER functioned !! Just as easy it was to improve this. The same suspect circuit has been seen in some other FT-line transceivers.

6. PB-1994 NB-unit: Processor Level Control. (NB unit Q206).

This strange circuit did not have any practical function. I used a P- channel FET, the only one available was 2N5462, while it may be possible to use the J177. Some resistors were changed too. 6-10dB variation was achieved. The rotation is now opposite way, so the center connection at the potmeter must be connected to the other side. VR203 must be at maximum, but this was later removed and a strap was inserted on the PCB to get maximum output.

The values for some resistors were later optimized and more than 10dB variation was possible for 2N5462, but for J177 almost 30dB. By the way, I believe that FT-101ZE uses similar speech processor circuit, so it may need the diodes. Later reports on the air 'are possibly the best RF processor ever heard on the bands, it is tested on 80m/40m, 6m, 2m, 70cm, 23cm, and some rather critical persons who too often criticize have said this is good and RF processor may be left on during local QSO's!

7. CARRIER UNIT PB-1706A. FSK-mode.

The dc input level is limited to +1.5V, which is an impractical level, so I have inserted a 4k7 resistor in series with base (Q701). It is now possible to use normal TTL-level input, noise threshold is improved.

8. PB-1707B FM-unit.(PB-1706A \*not cw-ms): Carrier level adjustments.

I believe that it is important to achieve as equal level as possible for the different operations/modes, ie.(1) Normal SSB, (2) SSB with RF-processor, (3) AM, (4) CW, and (5) FM. Difficulties arise because the different units loads the common point, which is NB-unit pin 13. Diode-switching is therefore used. A diode is inserted at the FM- input to this point, see 'Overall Circuit for IF signals between the different boards'. Another diode must be inserted in the other cable from CARRIER Unit, possibly on this unit, and a similar modification like the one for FM-unit must be made there. Fig. --- shows the modification for FM board. In the physical location for TC901 is mounted a trimpotmeter, a capacitor goes to the output, and resistors are installed to bias the diode connected at the input to the NB-Unit. It is now easily possible to adjust the levels from FM-unit, and CW/AM signals from CARRIER unit) independently without interactions to occur. When the diode is inserted between CARRIER unit and NB-unit the capacitor in series with cable must be removed (this has a fixed value, although it is drawn like a trimmcap). Some interesting details with the FM-unit is that it is easy to find suitable connection points for G3RUH 9600 baud modem, but it may be difficult to find some proper free pins on the connector to wire these to.

### FM-DEVIATION.

It should be pointed out the difference between FM operation on VHF and HF. On VHF/UHF 25kHz channel spacing is used, while on 10M 10kHz channel spacing is employed, this transceiver is built for FM operation with transverter. For 10M deviation must be reduced, and it is an advantage to use a narrower FM RX filter. On VHF/UHF deviation is set to +5kHz, while for 10m it should be adjusted to maximum +2.5kHz (at voice peaks). This is important otherwise you will cause severe interference with the adjacent channels on 10M. Using simple tools, you can just reduce to audio to the varactor diode to about the half of the setting as adjusted for VHF. You may whistle 'hard' into the mike and measure at the input to the varactor diode with a sensitive audio level meter, and adjust the reading to about half of the first reading.

9. FILTER Unit PB-1995: NOISE-BLANKER-improvement.

I made an ignition noise simulator, this was earlier used to improve the FT-7 noise-blanker, so it was interesting to compare FT-7 with FT-902. The noise-blanker seems not to be too bad, but it seems to be room for improvement. Without NB, S-meter reading was about S9, with it was S-3, and after modification, the noise disappeared almost totally, the background noise could be heard without antenna. Change: Add 0.1uF to the capacitor C328 (PB-1995 FILTER Unit), bead-tantalum may be used.

10. PB-1718/1720B: Push-buttons.

After some years in use, the push-buttons will not function properly, the problem is that some small springs, easily seen from above, will not move too well in the tracks, some thin oil improves this.

11. PB-1715 PA-unit (2x 6146B): PA-valves protection.

12. To protect the power-supply against anode-to-screen-grid voltage flash- over, a small 1N4148 type diode is connected in series with screen- grid supply to the 6146B's. This is not shown on the circuit diagram. This may be good for power supply, but it may be fatal for the valves in case of some secondary emission due to hard operation. Some compromise is therefore needed. The diode must be paralleled with a 10KW 0.5W resistor. To protect the screen-grid circuit against flash- over I have connected a pair of SIEMENS varistors, SIOV 14K150, they draw 1mA current @ 250V DC.

13. PB-1715 PA-unit, PB-1708 RECT-A-unit: BIAS-circuit improvements.

To stabilize grid supply against drift-off due to gassy valves, a diode is connected in parallel with R05, a 1N4007 is preferred because it is a poor RF rectifier. To avoid that the grid voltage should disappear because of bad contact in BIAS POTMETER VR01 a 100KW resistor is connected from negative side to center. Often this occur if you have left the potmeter in same position for years, and when one needs to adjust the idle-current, the trouble sometimes happen.

14. PB-1708 RECT-A, PB-1717 RECT-C: IMPROVING THE CW-KEYING (Normal CW).

Originally the CW-keying is bad, lots of key-clicks. For HF CW ca. 4-6ms delay is optimum. A single capacitor cannot solve this problem, because of different charge and discharge current. A suitable compromise was made with simple capacitor/diode/resistor combinations see figure ----

15. PB-1705 AF-Unit, PB-1846 VOX/MARK: AUDIO LINE OUTPUT.

For packetradio/RTTY/CW-meteorscatter it is desired to use an in- dependent AUDIO LINE OUTPUT. Surprisingly, there was an unused 1/4- LM324 on the AF board. There was marked but unused component-designations around this, one

- point was used only to connect two components, they were removed from this common point and connected in the air. Then the components as shown were mounted, the un-numbered components are mounted below PCB or which is practical. It was an unused cable from AF 'MJ6' to VOX 'MJ7', and further to J17 SIDETONE out on rear side. I could not see any practical use for this TONE output, so I decided to use this for AUDIO LINE OUTPUT. The 4k7 resistor is changed to 1KW or removed, IN VOX UNIT R52 is loosened in one end.
16. Other changes (PB-1728A and other components):  
MIKE contact is changed to the KENWOOD circuit for 4pin connectors, such that it is possible to use same mikes for different rigs. CW-jack is rewired. One contact is KEY, while the other is PTT in/out. The ELBUG was removed, I like my own HB9ABO Keyer/Memory keyer better. A separate CW-high-speed board was installed (keyfilter and keyed IF amplifier). AM position is wired for CW-Wide (2.4kHz BW) for VHF/UHF CW (normal CW/- Aurora/Meteorscatter) where larger bandwidth is preferred. Perhaps someone else would prefer to have a switch to select between CW-Narrow/CW-Wide, the AMGC switch may be used for this purpose.
17. PB-1715 PA: TRANSVERTER RF OUTPUT.  
RF output level for transverters is far too high, this is reduced by connecting a capacitor in series with C02=10pf. I used 3P3 with 1000 ohms in series (the resistor is used to avoid parasitics). About 20mW is available on 10M.
18. PB-1717A RECT-C: +6V Regulator for RIT.  
OZ1HDA (with FT-901) and I (with FT-902-DM) have been troubled by VFO instantaneous instability, the +6V IC-regulator (Q01-TA7089) is suspected. I changed the +6v regulator with a 78L06 regulator and the problems seem to have disappeared.
19. PB-2154 RF-Unit:  
Forward conductance for Q03=J310 must be adjusted to 20mmho (20mS) for 50W mixer termination.The drain-current must be ca 20 mA. Correct value for R13 ca. 18 W, according to G4DGU, Chris (MUTEK).

Pse note that this manuscript is written in sintran and converted to DOS, therefor some letters will be wrong, here W may mean ohm!

|                                                   |                    |                     |            |   |
|---------------------------------------------------|--------------------|---------------------|------------|---|
| ! Table 1                                         |                    |                     |            | ! |
| ! COMPARING CIRCUIT BOARDS USED IN THE TWO MODELS |                    |                     |            | ! |
| !-----!                                           |                    |                     |            | ! |
| ! Board                                           | ! FT-901           | ! FT-902            | Note       | ! |
| !-----!                                           |                    |                     |            | ! |
| ! RF unit                                         | ! PB-1702          | ! PB-2154           | Different  | ! |
| ! Filter                                          | ! PB-1716 *        | ! PB-1995 *         | Equal ?    | ! |
| ! IF                                              | ! PB-1704C         | ! PB-1704C          |            | ! |
| ! FM                                              | ! PB-1707B         | ! PB-1707B          |            | ! |
| ! CARRIER                                         | ! PB-1706A         | ! PB-1706A          |            | ! |
| ! AF(RX)                                          | ! PB-1705A         | ! PB-1705A          |            | ! |
| ! NOISE BLANKER                                   | ! PB-1703C *       | ! PB-1994 *         | Equivalent | ! |
| ! Keyer                                           | ! PB-1728A         | ! PB-1728A          |            | ! |
| ! VOX/MARK                                        | ! PB-1846          | ! PB-1846           |            | ! |
| ! VFO                                             | ! PB-1440B         | ! PB-1440B          |            | ! |
| ! XO                                              | ! PB-1711A         | ! PB-2165           | New bands  | ! |
| ! VCO                                             | ! PB-1710A         | ! PB-2166           | New bands  | ! |
| ! PLL                                             | ! PB-1709A         | ! PB-1709A          |            | ! |
| ! Counter                                         | ! PB-1729A/PB-1730 | ! PB-2086           | New        | ! |
| ! Memory                                          | ! PB-1787          | ! PB-1787D          |            | ! |
| ! Capacitor                                       | ! PB-1713          | ! PB-1713           |            | ! |
| ! RECT-B                                          | ! PB-1712          | ! PB-1712           |            | ! |
| ! RECT-A                                          | ! PB-1708          | ! PB-1708           |            | ! |
| !-----!                                           |                    |                     |            | ! |
| ! RECT-C                                          | ! PB-1717A         | ! PB-1717A          |            | ! |
| ! Driver(12BY7)                                   | ! PB-1714          | ! PB-1714           |            | ! |
| ! PA (2x 6146B)                                   | ! PB-1715          | ! PB-1715           |            | ! |
| ! Miscellaneous                                   | ! PB-1718A/PB-1720 | ! PB-1718A/PB-1720B |            | ! |
| !-----!                                           |                    |                     |            | ! |

Almost equal boards but new numbers are marked with an asterisk \*) Note the availability for modification kit to have the 'new' bands with FT-901.

Table 2.  
Some IF measurements to be used for fault-tracing. All readings are in mV-RMS(eff.Werte) +/- 3dB \* Adjusted level, see text for modifications

|             |                    |        |         |                       |       |
|-------------|--------------------|--------|---------|-----------------------|-------|
| !-----!     |                    |        |         |                       |       |
| ! P.C.B.    | PB-1994 (PB-1703C) |        | NB-UNIT | PB-1706A CARRIER-UNIT |       |
| !-----!     |                    |        |         |                       |       |
| ! MODE (TX) | Pin 8              | Pin 13 | Pin 17  | Pin 4                 | Pin 2 |
| !-----!     |                    |        |         |                       |       |

|              |   |       |   |       |   |       |   |       |   |       |   |
|--------------|---|-------|---|-------|---|-------|---|-------|---|-------|---|
| !FSK CW AM   | ! | -     | ! | 55    | ! | 70*   | ! | 65    | ! | 75    | ! |
| !FM          | ! | -     | ! | 65    | ! | 70*   | ! | -     | ! | -     | ! |
| !SSB(Normal) | ! | 60    | ! | -     | ! | 70*   | ! | 160   | ! | -     | ! |
| !SSB(Proc.)  | ! | 60    | ! | -     | ! | 20-80 | ! | 160   | ! | -     | ! |
| !-----       | ! | ----- | ! | ----- | ! | ----- | ! | ----- | ! | ----- | ! |
| ! RX         | ! | -     | . | -     | . | -     | ! | 30    | ! | -     | ! |
| !-----       | ! | ----- | ! | ----- | ! | ----- | ! | ----- | ! | ----- | ! |

This modification is read 717 times.

top of page

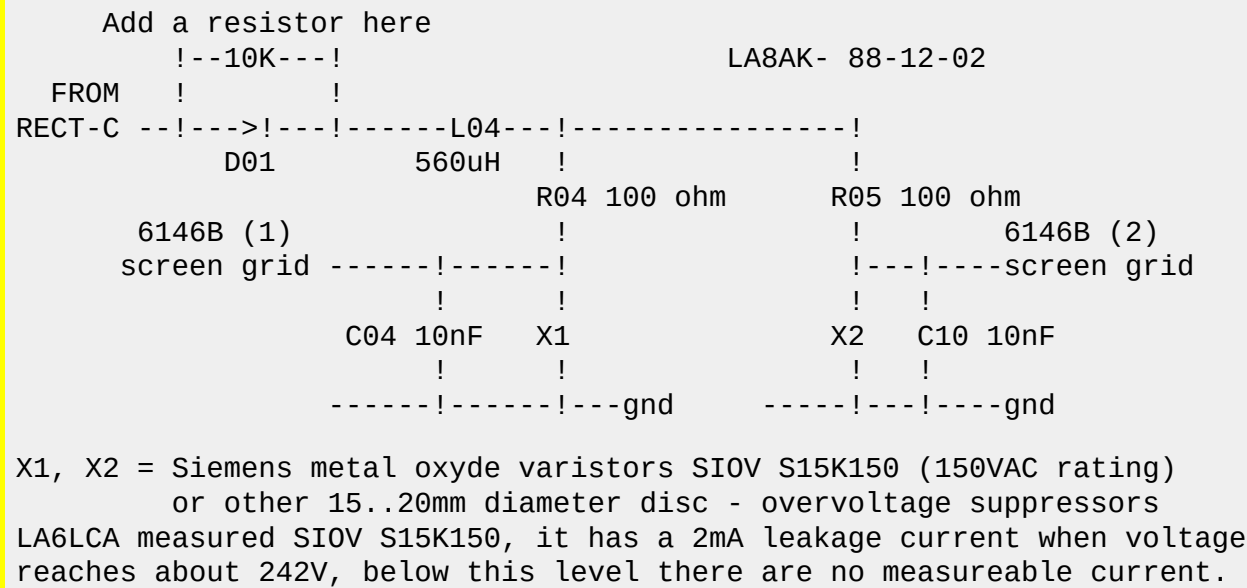
19-07-1998

(FT-902) Protect your 6146B amplifier

The circuit shown (with modifications) is for FT902DM(FT-901). The diode D01 is not shown on circuit diagram, but it is mounted. The reason for this diode is to protect the power supply when there is a flash-over from anode to screen. However, this circuit is bad!

It is a great risk for secondary emission to cause the screen grid voltage to rise, therefore I have added a resistor across the diode D1 to make som sink effect on screen grid circuit. Resistors directly to ground will upset the screen voltage to much and substantial reduced power output is the result, so they must be very large value, but then the effect is too small. So it is better to use the resistor across the diode and ADD some overvoltage suppression across either screen grid circuit to ground, so screen grid voltage will never go far above +250V is cases of flash-over, and as such one defective valve will not kill the other! A 300V peak in screengrid circuit will not damage the screen supply with current(voltage flowing through 10k resistor).

It is also a very good rule to connect a 10 ohm resistor between the anode- supply and the anode circuit at the power supply, this resistor is meant to blow when there is a flash-over. A 1N4007 connected between anode circuit to the PA and screen grid supply will draw current from screengrid circuit and valves are not damaged with only screen voltage on. With the 10 ohm resistor (1W) there are no real need for fuse in anode supply, but it would be an idea to add a fuse in series with screengrid supply to the valves.



73 de Jan-Martin

19-07-1998

(FT-911) FT-911 + 9k6, so gehts!

From: DH6MBM @ DB0KCP.#BAY.DEU.EU (Klaus)

Hallo OM's!

Nachdem viele Anfragen auf den Umbau des Handies Yaesu FT-911 für 9600 Baud Packet Radio in die Boxen eingegangen sind, und ich selbst ein solches Handy besitze, hab ich mich an die Arbeit gemacht und den Umbau mit Hilfe des Schaltplans versucht.

Ich beschränke mich hierbei auf die wichtigsten Angaben, und setze ein gewisses technisches Verständnis voraus:

1. Das Handy wird geöffnet.
  - Kontaktblech für Akku abschrauben
  - Bedienknöpfe abziehen
  - obere Abdeckung abschrauben
  - hinten am Handy 2 Schrauben lösen und es kann auseinandergeklappt werden
2. Der Sende-Anschluß (TX)
  - der Anschlußpunkt befindet sich auf der CNTL UNIT (obere Gehäusehälfte, mit Display, Tastatur)
  - Flachbandkabel, welches die beiden Hälften verbindet, verfolgen
  - flexibles Kabel an Pin 6 von unten (MOD) des Flachbandkabels auf der CNTL UNIT anlöten
  - ggf. Leiterbahn weiterverfolgen und am Widerstand R244 od. R245, 10K anlöten, da Flachbandkabel schlecht zugänglich (vorsicht: Widerstand ist nicht gekennzeichnet)
3. Der Empfangs-Anschluß (RX)
  - Schrauben der Kupferabdeckung auf der MOTHER UNIT (untere Gehäusehälfte) lösen
  - Kupferabdeckung vorsichtig an allen Lötstellen ablöten
  - die IF UNIT kommt zum Vorschein, 2. Steckplatine von rechts
  - auf dieser befindet sich ein IC, Q501 mit der Bezeichnung TK10487M
  - an Pin 11 dieses IC's wieder ein flexibles Kabel anlöten (1. Pin oben links von rechts gesehen)
  - Kabel geeignet herausführen
  - Kupferabdeckung wieder anschrauben und anlöten (keine Lötstelle vergessen!)

\* Wer sich den Aufwand sparen will, kann auch Pin 3 des CTCSS-Steckers verwenden, allerdings ist der Pegel dort sehr gering, es gibt kein zufriedenstellendes Empfangsergebnis!
4. Gerät wieder in umgekehrter Reihenfolge wie bei 1. schließen

So, das war schon das wichtigste.

Für das Herausführen der Kabel für die Verbindung mit dem Modem ist jedem freien Lauf gegeben. Natürlich muß auch die PTT-Leitung über die Mic-Buchse mit dem Modem verbunden werden.

Ich übernehme keinerlei Haftung für eventuell entstandene Schäden, sowie für die einwandfreie Funktion der Anleitung. Es funktioniert allerdings bei meinem Gerät einwandfrei.

Wer technisch nicht so begabt ist, soll lieber einen anderen OM zur Hilfe nehmen, der sich vielleicht besser auskennt.

Noch ein kleiner Tip fürs DF9IC-Modem:

- der Widerstand R19, 27K sollte überbrückt werden, da das Modem sonst recht taub ist

Für Anregungen, Verbesserungsvorschläge und weitere Fragen bin ich jederzeit offen.

Viel Spaß und gutes Gelingen!

73 de Klaus! DH6MBM@DB0KCP

19-07-1998  
(FT-912) Yaesu FT 912 - 23cm Frequenzerweiterung

Sicher hat jeder schon mal mit dem Gedanken gespielt, wie weit laest sich das FT 912 von Yaesu erweitern. Daher habe ich mal einige Stunden Zeit investiert und das Geraet genauer untersucht. Die Umbauanleitung bzw. Ergebnisse sind nachfolgend aufgefuehrt.

- 1. Frontseite demontieren. Dazu ist es notwendig die Schrauben der Deckel zu entfernen, Reglerknoepfe abziehen und die Mutter auf der Microphonbuchse abschrauben.
- 2. Platine unter der Frontseite ist durch 3 versiegelte Schrauben am Geraet befestigt. Schrauben entfernen und Platine von den beiden Steckerleisten vorsichtig abziehen. (Daran denken - Siegelbruch > Garantieverlust)
- 3. Die Platine mit dem Hauptprozessor und den Stiftleisten nach oben vor sich legen. Somit sind verschiedene nummerierte Loetstellen mit den Nummern von 1 - 17 sichtbar. Nachfolgende Skizze beachten.
- 4. Frei Loetstelle Nr. 3 mit einem Loetpunkt versehen. Nicht unbedingt mit einem 100 W Loetkolben arbeiten!
- 5. Das Geraet wieder zusammenbauen.
- 6. Nach dem Einschalten blinkt links oben im Display ein "L" und die Frequenz 1200 Mhz wird angezeigt. Nun kann mit dem Frequenzregler auch eine kleinere Frequenz eingestellt werden (Versuchsweise wurde mal 900 Mhz gewaehlt). Nun ist zur Bestaetigung die Taste "D/MR" zu betaetigen. Die Anzeige links oben wechselt in ein blinkendes "U" und die Frequenz muesste 1599 Mhz anzeigen (sonst mit Frequenzregler oder up/dwn Tasten Frequenz einstellen). Nochmals "D/MR" betaetigen und die Frequenz ist erweitert. Ablage ist nun neu zu programmieren (zwischen 0 - 99) da sie durch die Erweiterung auto= matisch auf 0 gesetzt wird.
- 7. Geraet muesste nun wieder einwandfrei funktionieren. Saemtliche gespeicherte Frequenzen wurden durch den Eingriff geloescht. Daher ist es ratsam sich vor dem Eingriff saemtliche Frequenzen und die dazugehoerigen Ablagen zu notieren. (Leider musste ich schon allzu oft feststellen, dass die Relais auf 23 cm nicht mit der gleichen Ablage von - 28 Mhz arbeiten. Hier sind Frequenzen von -28; -30; -33; +28; +30; +33 Mhz bereits fest= gestellt worden)

Nun noch ein paar technische Informationen nach dem Umbau. Sendermaesig musste mindestens der Bereich von 1196,000 Mhz bis 1358,000 Mhz moeglich sein. Dies macht sich durch eine erhoete Stromaufnahme und durch eine Stehwellenmessung bemerkbar. (cal. im angegebenen Bereich moeglich sowie Leistungsmessung; wenn auch nicht 10 W aber immerhin; Messgeraet SX 1000) Normal muesste ein Empfang auch noch bis ca. 1102,000 Mhz moeglich sein, da bei TX noch eine erhoete Stromaufnahmen zu beachten war. Eine Messung mit dem SX 1000 jedoch war nicht moeglich da es fuer diese Bereiche scheinbar doch ungeeignet ist. Aber wie gesagt, dies ist eine reine Vermutung, da keine Moeglichkeit besteht dies zu ueberpruefen. Ein zweites Geraet fuer diesen Test ist halt doch zu teuer und in meinem Haushalt nicht eingeplant hi!

Skizze der  
Platine mit Hauptprozessor und Stiftleisten oben!

|      |    |    |           |   |   |    |    |   |   |  |  |  |  |  |  |  |  |
|------|----|----|-----------|---|---|----|----|---|---|--|--|--|--|--|--|--|--|
|      | 0  | 0  |           |   |   |    |    |   |   |  |  |  |  |  |  |  |  |
|      | 13 | 14 |           |   |   | 11 | 7  | 5 | 6 |  |  |  |  |  |  |  |  |
|      |    |    |           |   |   | 0  | 0  | 0 | 0 |  |  |  |  |  |  |  |  |
|      |    |    | Haupt=    | 4 | 0 | 0  | 0  | 0 | 0 |  |  |  |  |  |  |  |  |
| 0 15 |    |    | prozessor | 3 | 0 | 12 | 10 | 8 | 9 |  |  |  |  |  |  |  |  |
| 0 16 |    |    |           | 1 | 0 |    |    |   |   |  |  |  |  |  |  |  |  |
| 0 17 |    |    |           | 2 | 0 |    |    |   |   |  |  |  |  |  |  |  |  |

- 0 = zweigeteilter Loetpunkt
- B = Bruecke (Loetpunkt)
- F = Frei
- a.= Belegung im original Zustand
- b.= Frequenzerweiterung (1100 - 1599)
- c.= Frequenzerweiterung ( 220 - 225) wohl nur die Anzeige
- d.= Frequenzerweiterung ( 430 - 450) wohl ebenfalls nur die Anzeige
- e.= Frequenzerweiterung ( 144 - 146) wohl auch nur die Anzeige

|    |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |
|----|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|
|    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| a. | B | B | F | B | B | B | B | F | F | F  | B  | B  | B  | B  | B  | F  | F  |
| b. | B | B | B | B | B | B | B | F | F | F  | B  | B  | B  | B  | B  | F  | F  |
| c. | B | B | F | F | B | B | B | F | F | F  | B  | F  | B  | B  | B  | F  | F  |
| d. | B | B | B | F | B | B | B | F | F | F  | B  | F  | B  | B  | B  | F  | F  |
| e. | F | F | F | F | B | F | B | F | F | F  | F  | F  | B  | B  | B  | F  | F  |



Die Versuchsreihe wurde noch um einige Test erweitert, sollen aber hier aus Platzgruenden nicht unnoetig in die Laenge gezogen werden. Hat jemand daran Interesse oder moechte es weiter probieren, so dass am Ende noch ein 2 m oder 70 cm Geraet daraus wird so kann eine Nachricht fuer "DG8GBB" in "OE9XPI" hinterlassen werden.

Viel Spass beim probieren und immer daran denken die Gesetze zu beachten! Denn nicht alles was Spass macht ist auch erlaubt!

de Bernhard, DG8GBB @OE9XPI

| Date: 21-02-2002                                     | User comment | From: <a href="#">Tom</a> |
|------------------------------------------------------|--------------|---------------------------|
| Subject: Mods in German                              |              |                           |
| It would be nice if the mod info was in English too. |              |                           |

19-07-1998

(FT-912) 9k6 auf 23cm FT-912R

16-8-1998

From: *DD4DN @ DB0FBB.#NRW.DEU.EU (Helmut)*

Umbau eines FT 912 R von Yaesu

Empfänger RX-NF:

Ein 3 - 4 poliges abgeschirmtes Kabel für PTT - Masse - TX-NF - RX-NF kann unter dem Antennenanschluß durchgeführt werden.  
Dort ist eine Bohrung vorhanden und nur mit einem Klebepunkt abgedeckt. Die Masse des Kabels wird an der Hauptplatine verlötet, RX-NF ( Empfänger ) kommt an Pin 11 des TK 1048AM des ZF-ICs ( Q 101 ).  
Die Verbindung sollte über einen 10 kOhm Widerstand erfolgen.  
Die IF- Unit Platine liegt unter der Lautsprecheraufhängung, Sie ist stehend montiert und sichtbar mit 2 Trimmern und Miniarturschalter.  
Wenn das FT-912R mit der Frontplatte nach vorne liegt,dann ist Pin 11 ganz rechts am ZF-ICs TK 1048AM.

Sender TX-NF:

FT-912R liegt wieder nach vorne aber die Geräteunterseite nach oben: links ist ein kleines Blechkästchen mit der PLL-Unit. In diesem Kästchen ist die PLL angeschlossen (10er Pinreihe an der Lötseite ) Dort wird die TX-NF an Pin 5 der PLL-Unit über einen 100 kOhm Widerstand angeschlossen.

PTT-Leitung:

Vom FT-912R sind die Drehknöpfe abzuziehen und der Sicherungsring des Mikrofonnnbuchse entfernen.Die Frontplatte abziehen,die Mikropohnbuchse mit der Platine wwird sichtbar. PTT-Leitung an Pin 6 der Buchse anlöten und die Leitung auf der zulösen,Frontplatte abziehen.Dann wird die Mikrobuchse mit Platine sichtbar.  
PTT-Leitung an Pin 6 der Buchse anlöten.  
An Unterseite der Platine dann die Leitung verlegen.

Das Kabel an den Geräteausgang sollte mit einem 5 pol Din Stecker verbunden werden, fürs TNC2H ( 9k6 Modem).  
Das Gerät bleibt weiterhin für Phonie FM O.K.  
Das ganze läuft an einen TNC2H von Symek mit der Filterkurven Einstellung:an - aus - an - an .  
Das Umschaltverhalten des FT-912R Transceivers, insbesondere die Umschaltzeit von Empfang auf Sendung, liegt bei mir bei 04 bis 11 mSek.  
Die Mindestfeldstärke des Gegendigis oder der Gegenfunkstelle sollte bei S-2 bis S-4 liegen.  
Sollte es trotzdem zu Sendeprobleme kommen, kann man an der TCXO nachgleichen im TNC2H.  
Zur Info: Bei mir steht der Digi DB0FBB mit S9-50db an, und ich arbeite mit dem FT-912R und 13Watt Out an einer 6EL für 23cm in Richtung DB0FBB.

Für diese Anleitung übernehme ich keine Haftung!

Viel Erfolg beim Umbau und Betrieb

D D 4 D N Helmut aus Dortmund

19-07-1998

(FT-919) 9k6 mit 23cm TRX FT-919R

From: DD4DN @ DB0HAG.#NRW.DEU.EU (Helmut)

Umbau eines FT 912 R von Yaesu

Empfänger RX-NF:

Ein 3 - 4 poliges abgeschirmtes Kabel für PTT - Masse - TX-NF - RX-NF kann unter dem Antennenanschluß durchgeführt werden.  
Dort ist eine Bohrung vorhanden und nur mit einem Klebepunkt abgedeckt. Die Masse des Kabels wird an der Hauptplatine verlötet, RX-NF ( Empfänger ) kommt an Pin 11 des TK 1048AM des ZF-ICs ( Q 101 ).  
Die Verbindung sollte über einen 10 kOhm Widerstand erfolgen.  
Die IF- Unit Platine liegt unter der Lautsprecheraufhängung, Sie ist stehend montiert und sichtbar mit 2 Trimmern und Miniarturschalter.  
Wenn das FT-912R mit der Frontplatte nach vorne liegt,dann ist Pin 11 ganz rechts am ZF-ICs TK 1048AM.

Sender TX-NF:

FT-912R liegt wieder nach vorne aber die Geräteunterseite nach oben: links ist ein kleines Blechkästchen mit der PLL-Unit. In diesem Kästchen ist die PLL angeschlossen (10er Pinreihe an der Lötseite ) Dort wird die TX-NF an Pin 5 der PLL-Unit über einen 100 kOhm Widerstand angeschlossen.

PTT-Leitung:

Vom FT-912R sind die Drehknöpfe abzuziehen und der Sicherungsring des Mikrofonnbuchse entfernen.Die Frontplatte abziehen,die Mikropohnbuchse mit der Platine w wird sichtbar.PTT-Leitung an Pin 6 der Buchse anlöten und die Leitung auf der zulösen,Frontplatte abziehen.Dann wird die Mikrobuchse mit Platine sichtbar. PTT-Leitung an Pin 6 der Buchse anlöten. An Unterseite der Platine dann die Leitung verlegen.

Das Kabel an den Geräteausgang sollte mit einem 5 pol Din Stecker verbunden werden, fürs TNC2H ( 9k6 Modem).  
Das Gerät bleibt weiterhin für Phonie FM O.K.  
Das ganze läuft an einen TNC2H von Symek mit der Filterkurven Einstellung:an - aus - an - an .  
Das Umschaltverhalten des FT-912R Transceivers, insbesondere die Umschaltzeit von Empfang auf Sendung, liegt bei mir bei 04 bis 11 mSek.  
Die Mindestfeldstärke des Gegendigis oder der Gegenfunkstelle sollte bei S-2 bis S-4 liegen.  
Sollte es trotzdem zu Sendeprobleme kommen, kann man an der TCXO nachgleichen im TNC2H.  
Zur Info: Bei mir steht der Digi DB0FBB mit S9-50db an, und ich arbeite mit dem FT-912R und 13Watt Out an einer 6EL für 23cm in Richtung DB0FBB.

Für diese Anleitung übernehme ich keine Haftung!

Viel Erfolg beim Umbau und Betrieb

DD4DN Helmut aus Dortmund

This modification is read 209 times.

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19-07-1998

(FT-920) Expanded Digital Mode Operating Instructions

# Application Note

Yaesu U.S.A - Amateur Products Division - Technical Support

**File No.:** AN-97xx **Date:** August 6, 1997  
**Model:** FT-920 **Serial No. Range:** All

*Expanded Digital Mode Operating Instructions*

**This document provides expanded operating instructions for the FT-920 when operating on RTTY, HF Packet, and/or other Digital modes.**

## Digital Mode Operation

While setting up your equipment for digital operation, however, it is important that you understand the differences between the two keying methods provided on the FT-920 for digital mode operation, so that the controls and switches may be set correctly.

- Most operation is accomplished using **Audio Frequency-Shifted Keying** (AFSK), whereby the Terminal Node Controller (TNC) generates audio tones to be transmitted as data by the FT-920. To activate this mode of operation, the front panel Mode selection must be set to DATA-USB (even though "USB" may not be the actual sideband utilized in operation), and the rear panel [**AFSK-FSK**] switch must be set to **AFSK**.
- The FT-920 can also accept input from a TNC or Terminal Unit (TU) operating in the FSK (**Frequency-Shifted Keying**) *mode*, whereby a *closure to ground* of the FSK keying line causes the transmitted carrier to be shifted in frequency; no audio tones are produced by the TNC or TU.

### AFSK RTTY or Packet Operation

The AFSK configuration environment may be the easiest for you to use, as the TNC then has total control of the tone frequencies, Mark/Space relationship (normal/inverted), and other aspects of digital operation which are critical to successful operation.

1. Connect your TNC to the FT-920's **Data** jack per the instructions on page 16. Pin 1 of the **Data** jack should be connected to the TNC's "Mic Audio" or "Tx Audio" line. Be sure to set the [**AFSK-FSK**] switch to **AFSK**.
2. For AFSK RTTY (Baudot) or 300 bps HF Packet operation, press the [**Data**] mode key until [**Data**] and [**USB**] appear on the display. Now enter the Menu system, and select Menu #U-46; set this Menu Item for the frequency appropriate for your operating mode:
  - For typical RTTY operation, select **2125-L**; this sets the carrier injection up for an offset of 2.125 kHz in a pseudo-LSB mode, so that the transceiver actually is operating in the "LSB" mode (even though the display still indicates **Data-USB**).
  - For Packet operation, you may leave Menu #U-46 in its default **2125-U** (pseudo-USB mode), or set it to **1700-U** or some other value as required by the configuration of your TNC. See the documentation provided with your TNC's communication software for details regarding defining the transmitted tones.
3. The packet frequency display (offset) may also be modified via Menu #U-45, allowing you to have the radio's display indicate either Mark or Space frequency, or the center frequency of the two tones.
4. At this point, you are ready to utilize your TNC's software to begin operation. After loading the software, tune in an RTTY station so that it is properly decoded on your computer screen. When solid copy is obtained, you may press the appropriate key on your computer's keyboard to activate the transmitter, and begin typing. See your TNC's instruction manual for further details regarding actual operation.
5. The DSP High- and Low-Cut filters are particularly beneficial in reducing interference in RTTY pile-up situations. A typical setting of the **High Cut** control is at approximately 1 o'clock, while the **Low Cut** control may be set approximately to 11 o'clock.
6. The "CW" Narrow filter may also be used for AFSK operation. Just press the **Narrow** key, then rotate the **IF Shift** control to peak the signal in the narrowed IF passband.
7. Via Menu #U-10, the Enhanced Tuning Scale may be engaged so as to allow a visual representation of precise tuning pursuant to the tone frequency selected via Menu #U-46. However, since your TNC may also have such a facility, and because the TNC is ultimately in control of the tone generation and decoding, you may wish to rely on the TNC's tuning indicator, and use the Enhanced Tuning Scale of your FT-920 for other purposes.
8. For 1200 bps FM packet, press the [**Data**] key until **Data** and **FM** appear on the display.

### FSK RTTY Operation

This mode utilizes the tone generator in the FT-920 for production of the required Mark and Space tones used for RTTY

operation.

1. Follow the interconnection guidelines on page 17 for details on how to hook up your terminal equipment to the transceiver. Be certain to set the [**AFSK-FSK**] switch on the rear panel of the transceiver to **FSK**. In this mode of operation, closing Pin 1 of the **Data** jack to ground causes the carrier to shift; the *magnitude* of the shift (170/425/850 Hz) is set via Menu #U-43, while the carrier's offset from zero beat and its sideband USB/LSB) can be set via Menu #U-42. Do not connect Pin 1 of the **Data** jack to any TNC/TU line which carries "Mic Audio" or "Tx Audio" as these lines are used for **AFSK** operation (see previous section).
2. Press the front panel **Data** switch to select the [**Data**] [**LSB**] mode, which corresponds to "FSK" operation (remember, "**Data USB**" is used for "AFSK" operation).
3. At this point, you are ready to utilize your TNC/TU's software to begin operation. After loading the software, tune in an RTTY station so that it is properly decoded on your computer screen or TU display. When solid copy is obtained, you may press the appropriate key on your computer's keyboard to activate the transmitter, and begin typing. See your TNC/TU instruction manual for further details regarding actual operation.
4. As with AFSK operation, the "CW" filter may be engaged in the FSK mode by pressing the [**Narrow**] key, and the DSP filters may also be used to reduce interference in crowded digital operating situations.

## Operating Tips

- If you are hearing and decoding stations successfully in an AFSK environment, but stations cannot understand you, check to be certain that your TNC's software has not set a shift other than 170 Hz, and be sure that the tones have not been "inverted" in the software configuration.
- If you are getting no shift (only a steady carrier) in RTTY FSK operation, be sure that you have not connected Pin 1 of the **Data** jack to an AFSK output line from your TNC (use only the "FSK" line provided by your TNC). If the FSK line has been properly connected, check to be sure that you have the "FSK" mode properly enabled on your TNC, if the software requires you to do so.
- If you are having trouble decoding HF packet stations, be sure that you have set Menu #U-46 to one of the settings which ends with "**U**" (instead of "**L**"), and that you have chosen a tone frequency compatible with the tones for which your TNC is configured.

This modification is read 2915 times.

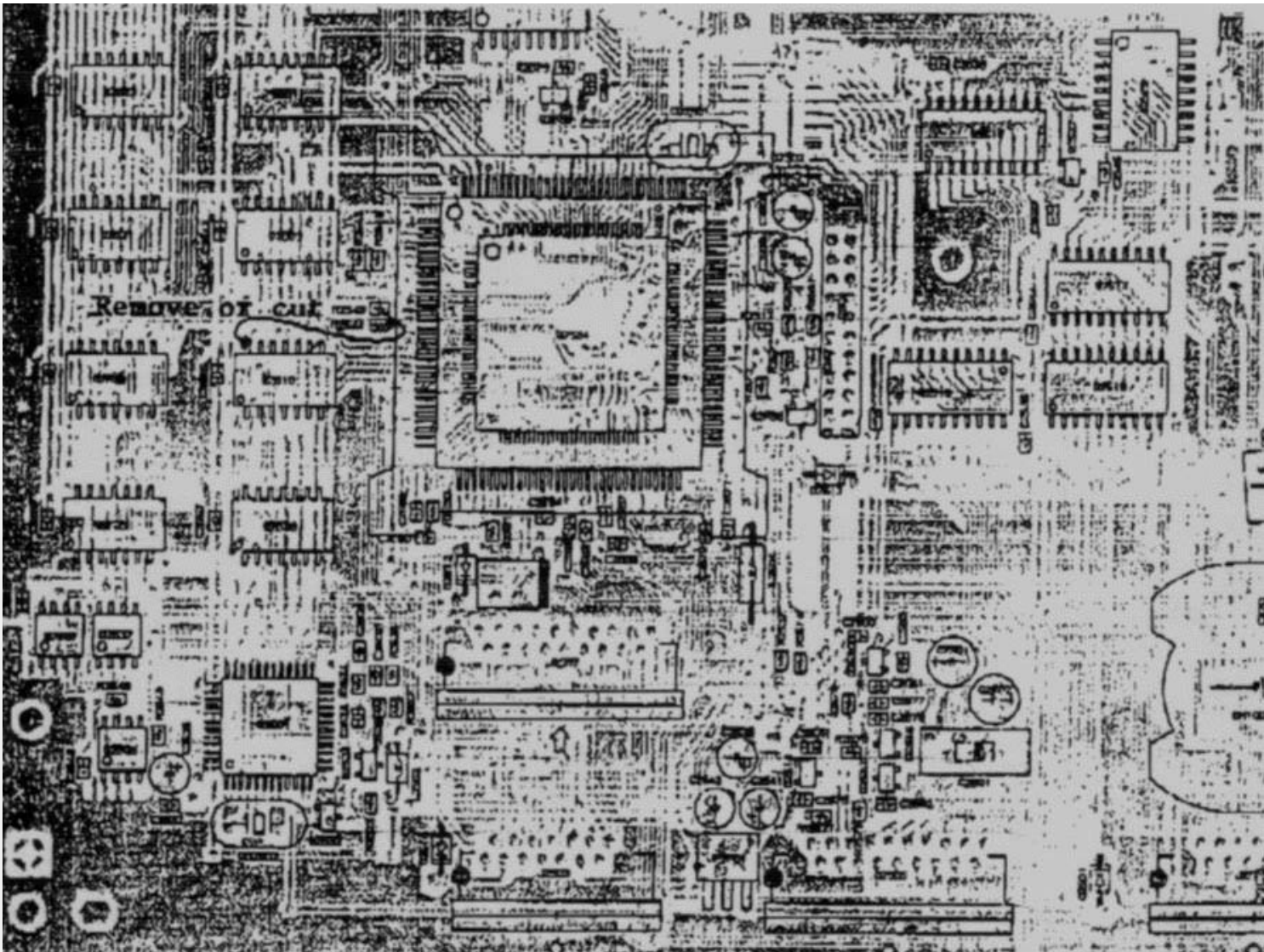
[top of page](#)

**27-02-2000**

## **(FT-920) MARS / CAP modification for the American FT-920**

1. Remove top and bottom cover.
2. Remove DSP unit and remove or cut green wire that connected between R2544 and Q2510. See the picture shown in below.
3. Replace DSP unit.
4. Press and hold STEP and LOCK buttons and POWER ON.
5. Enter 1 9 8 4 1 2 9 then press ENT.
6. Test the radio for correct operation.
7. Turn the radio off and replace top and bottom cover.
8. The modification is now completed.





**Date:** 12-10-2000

**User comment**

**From:** [RUDY N7IEV](#)

**Subject:** Note

I purchased a FT-929 in Sept 2000. I would offer these suggestions to make it easy on the HAM doing the modifications.

1. Remove only the bottom cover. There is no need to remove the top cover.
2. The DSP Unit is the large (3 5/8" x 5 1/2") shiny metal box in the front left corner of the radio, bottom face up. Remove the three (3) screws, lift DSP Unit Box out , carefully. The Green wire is easily visible.
3. Follow the instructions for cutting the green wire, etc.
4. The ten (10)number key pad is superimposed with the HF buttons It is activated when you , " Press and hold STEP & LOCK and POWER ON".

This modification is read 3125 times.

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**25-08-2001**

**(FT-920) Service menu for the ft-920**

[Download the service menu.](#)

This modification is read 3337 times.

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## (FT-980) Mods FT-980 Computer interface

**(FT-990) FT-990 - 1.5 to 30 MHZ TX mod**

- Open FT990 like explained in your OPERATING MANUAL.
- Localise JP5002 on "CONTROL UNIT" and close it with solder.
- If no transmit between 4 to 6.5 MHZ and 8 to 10 MHZ, do the following:
- Display 5.5 MHZ in CW mode, "meter selector" to ALC, push "MOX" button and adjust VR1003 on "RF UNIT" for normal ALC meter deflection.
- Display 9 MHZ and do the same with VR1005.

This modification is read 1714 times.

[top of page](#)

**21-03-1999**

## **(FT-990) FT-990 - JPS antenna**

During transmitting and having selected the separate receiving antenna,

>RF is fed back into the 990 which can lead so far, that the internal  
>power-supply>or the tuner oscillates and the supply voltage is breaking down,  
>which can be seen because the S-meter lamp becomes dark and darker ...

If you look at the diagram on page 27 of the manual (in the side-bar titled "Receive-Only Antennas and Separate Receivers"), it seems to bear your observation out. The TX/RX switch is not where I would put it for connecting a receive antenna all thetime.

However, there is a really nice use for the FT-990 "receive antenna" connection if you are using a JPS noise canceller (I think MFJ makes one too, and CQ Magazine published the schematics for one recently -- I have no idea how that one gets phase reversal, but the author swears it works).

If you were to connect the RX Antenna Out of the FT-990 to the Antenna connector of the JPS, and connect the RX Antenna In of the FT-990 to the Tranceiver connector of the JPS, you getthree things:

1. the TX/RX switch of the FT-990 is used instead of the TX/RX relay in the JPS (much better switch over transients).
2. RF power does not get into the JPS (I don't use a linear amp, but this should do the trick too),
3. you can enable and disable the noise processing by just switching the RX ANT switch on and off, respectively.

73Kok Chen, AA6TY

This modification is read 1333 times.

[top of page](#)

**21-03-1999**

## **(FT-990) QSK with FT-990 and FT-1000**

Steve Ellington ( [n4lq@iglou.com](mailto:n4lq@iglou.com) )

Fri, 26 Jul 1996

Here is the way I do QSK with my FT-1000MP which is basically the same set up as the 990 as far as qsk is concerned.

I have an Ameritron AL-80b which has an output of up to 900 watts.

In 1974, I built an Electronic TR switch from plans in the ARRL handbook. It consists of nothing more than a 12AU7 tube, a coil,switch, variable capacitor and a simple dc power supply. There are 3 coax jacks on the back.

To connect this, you run the transceiver's main antenna input into the amplifier's antenna input as you normally would. Run the amplifiers output into and back out of the TR switch. Inside the tr switch, we simply tap off the center conductor of the coax, run this through the tube then to the 3rd coax jack on the tr switch which goes to the receiver input of your transceiver.

As you can see, there is NO switching of the RF involved here at all. No worrys of hot switching or dot clipping. The TR switch provides another stage of RF for the receiver too. Keep all leads as short as possible.

When the amplifier is turned off, simply hit the antenna switch on the transceiver to change the rx back to the main antenna

input.

In the past, TR switches were known to cause TVI but with cable tv, there is little to be concerned with. It's a great system.  
E-mail me if you have any questions.  
Steve Ellington

This modification is read 1273 times.

[top of page](#)

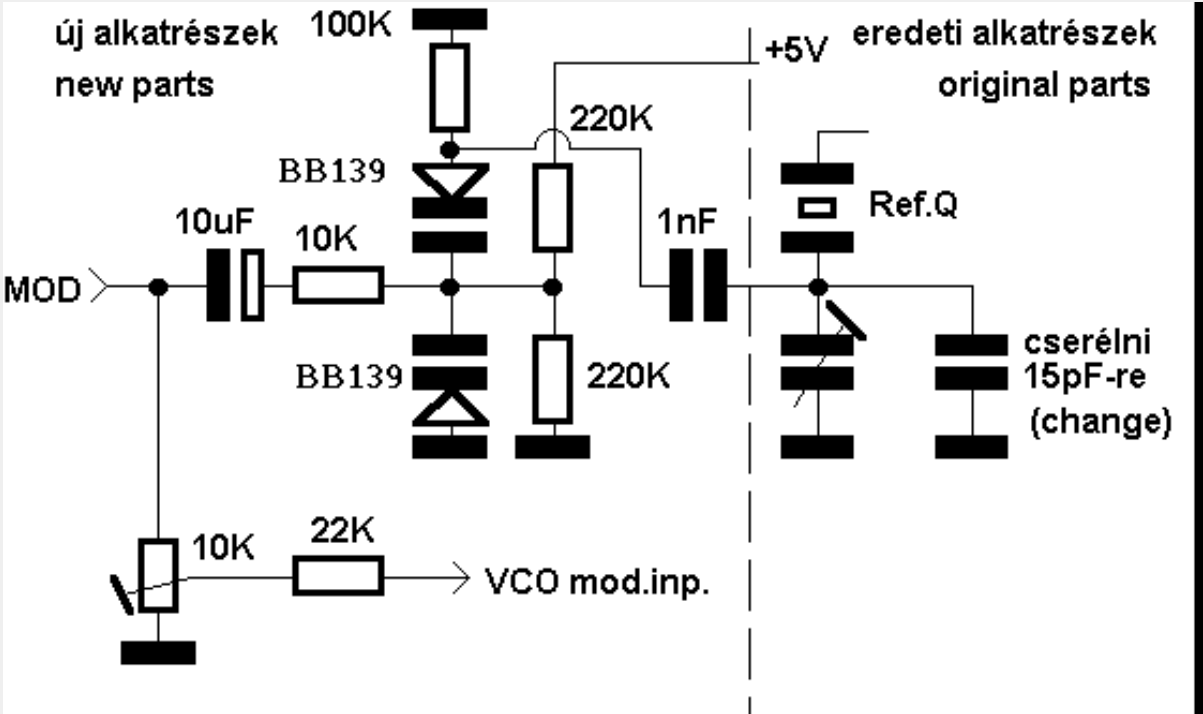
**13-01-2002**  
**(FTH-7010) FTH-7010 átalakítás 9600 Bd-ra**

**Author:** HA5OB

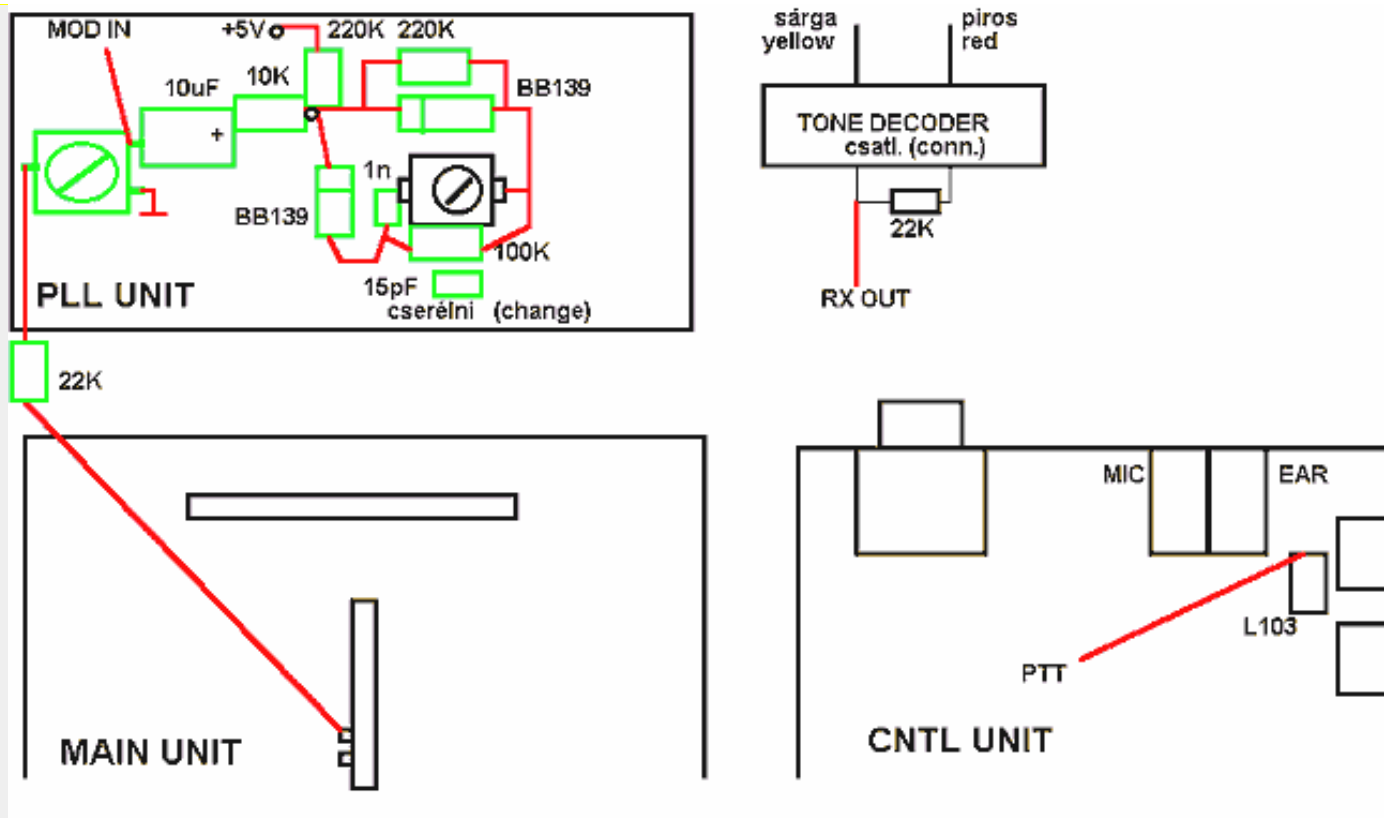
(C) HA5OB , 1997

**AZ ÁTALAKÍTÁST ÓVATOSAN VÉGEZZÜK, MERT EGY ROSSZ MOZDULATTAL KÖNNYEN TÖNKRETEHETJÜK A RÁDIÓT!**

**A kapcsolási rajz**



**Az alkatrészek elhelyezése**



This modification can also be found on <http://ha5ob.sch.bme.hu/fth7010.htm>

This modification is read 286 times.

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**03-11-2001**

## **(GC-1000) Upgrading a conventional rotator controller PA0PLY**

**Author:** Jan PA0PLY - [jk@comtestnl.com](mailto:jk@comtestnl.com).[MODIFICATION.NET](http://www.MODIFICATION.NET)

### **Introduction**

Only after almost 25 years of service, my antenna rotator system died under bad circumstances. Heavy winds and much larger load of 8 long yagi's for 432MHz were too much for the mechanical construction.

A new rotator was selected but it did not fulfil the todays requirements. State of art upgrading was badly needed.



Photo 1.: Large EME array for 432MHz.

### **Selection**

The major goal to be achieved is an mechanical strong motor gear with little backlash and sufficient torque capabilities to withstand the windload.

From the available table, my antennas would generate a windload of about 0.6m<sup>2</sup>. Unfortunately this figure is not the only determining figure to select a rotator system. Large arrays of antennas will cause a lot of stress to the mechanical parts. For this reason I selected the YEASU G-1000C, to handle the next 25 years of service.

| Band (MHz) | Elements        | Area (m <sup>2</sup> ) |
|------------|-----------------|------------------------|
| 14         | 3-elements      | 0.7                    |
| 14         | 5-elements      | 1.7                    |
| 21         | 3-elements      | 0.45                   |
| 21         | 2-el Quad       | 0.3                    |
| 28         | 3-elements      | 0.3                    |
| 14/21      | 4-elem trapped  | 0.5                    |
| 14/21/28   | 4-elem trapped  | 0.5                    |
| 50         | 4-elements      | 0.25                   |
| 50         | 6-elements      | 0.37                   |
| 144        | 10-elements     | 0.2                    |
| 144        | 10-elem x 4 x 2 | 2.0                    |
| 432        | 12-elements     | 0.06                   |
| 432        | 12-elem x 4 x 2 | 0.6                    |

Table 1: Typical wind loading areas for common antennas

### Specifications

The outside unit is a waterproof die-cast aluminium enclosure. It takes advantage of a quiet, reliable gear reduction braking system. The inside unit is equipped with an indicator needle system to indicate the direction of the antenna’s

Wind load:           2.2m<sup>2</sup>  
 Rotation torque: 800 kg/cm  
 Backlash:           1 degree  
 Rotation time:   55 sec.

### Upgrade requirements.

Actually I was little disappointed after initial set-up of the rotator system in the shack. On the indicator unit, the minimum readable indication was written to be 5 degrees only. Even worse turns the fact that the indicator needle kept on moving while the outside unit already stopped. In my application this is unacceptable. Besides this such a type of indicating originates from the ‘70s, rather then state of art technique. Next to the indicating problem, the speed of 55 sec for one 360 degree turn should be reduced for better handling larger loads, such as my antenna’s. Preferable would be an adjustable rotation speed. An optional computer interface would be ideal.



Photo: 2 Front view of original control unit.

### Investigation prior to upgrading

Required modifications could have been done more efficient or even better once electrical schematics were available. Although pushed such a request forward through both the local representative and the official importer, it became not available due to the fact it was a recently introduced new rotor system was said.

Lacking this support, “professional” amateur sense was used to find out what’s in. To provide speed reduction, the type of motor should be known. Most commonly a 2 phase 26Vac motor is used, while larger systems use a 28Vdc motor. Here a DC motor is used.



Position indication originates from two wire information from the outside unit. Lucky enough all three wires from the outside potentiometer are wired to the controller unit. In the controller unit only two wires are used. The mechanical needle indicator system is a separate section with a small connector plug to the indicator PCB. It can be removed as a whole, creating sufficient space for a new, digital, type of indicator.



Photo 3: Mechanical indicator needle system

### Speed reduction.

A small power PCB provides the 28Vdc for the motor unit. This PCB also contains two small relays, which are commanded from the front buttons. A very useful type of speed control is a pulse-controlled system. The advantage of a pulse-controlled driven motor is that it will not loose its torque. In HAM radio, WB4EXW published a simple circuit, which can be used either for DC or AC motor systems. It provides adjustments for both pulse rate and width to tailor it to your application. A two colour LED was added to indicate the direction and rate of the motor. The LED was mounted in the centre hole of the indicator scale and connected in parallel to the motor wires. The speed reduction circuit is mounted in between the minus track o the PCB board. This copper track must be cut just before the connection to the two relays. For AC motors the FET device must be replaced by a TRIAC.

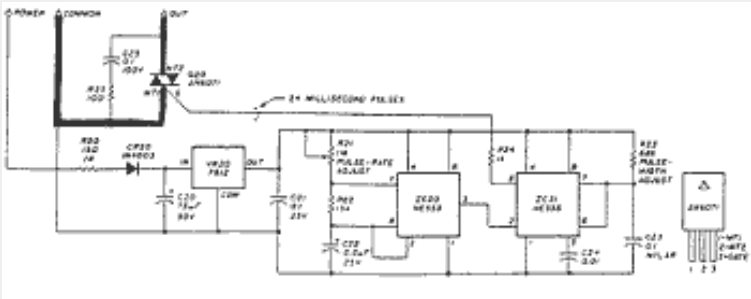


Figure 1 Diagram for speed reduction

### Digital indicator.

Using a 3-digit digital voltmeter PCB, it provides a 1 degree accuracy indication, directly reading the voltage from the outside unit. Therefore there is a need to have access to all three wires of the potentiometer. Since no spare parts for the cable connector could be provided, a new connector system replaces the original connections. It now allows all 6 wires to enter the control unit, leaving 1 wire's purpose unknown. Using a 3-digit voltmeter, such as the Velleman kit: K2032 used here, requires a 0-360mV to show 0-360 degrees. The kit provide both offset null and gain adjustments, which can be effectively used to calibrate the new indicator. In turn voltage divider systems can be used to set for a maximum voltage of 360 mV for this meter. The supply voltage to the outside unit potentiometer is chosen to be 5 Volt, from a 7805 voltage stabiliser. Since the outside resistor covers an over range up to 400 degrees, this voltage is sufficient. A slightly higher voltage will be required for one who needs exactly 3.6 Volt for 360 degrees. (Using 5 Volt it provides about 3.4 Volt at 360 degrees).



Photo 4: Front view modified control unit.

## Mechanical construction

The speed reduction PCB is mounted on the rear wall of the control unit. The speed adjustment can be reached from the rear side of the unit. Pulse rate is shown from the flashing LED on the front, while the colour indicates the direction of movement. Red colour for right and green for left.

The entire mechanical indicator is removed. Also the indicator scale and its plastic cover is temporary removed for rework. A small rectangular hole is prepared just above the horizontal centre line. This area accepts the three 7-segment displays of the voltmeter. On the plastic scale we have to remove a part of the vertical white line crossing the voltmeter indicators. Carefully, again carefully apply some solvent, such a nail polish remover to remove this white line pointing to the 0 degree direction. Using too much solvent will affect the plastic cover as well!! A small PCB is constructed, housing the 5 Volt regulator for the digital voltmeter as well as for the potentiometer voltage supply. Voltage reduction dividers using a 10-turn potentiometer is also available on this board. Using stand-offs it can be mounted on the bottom of the control unit.

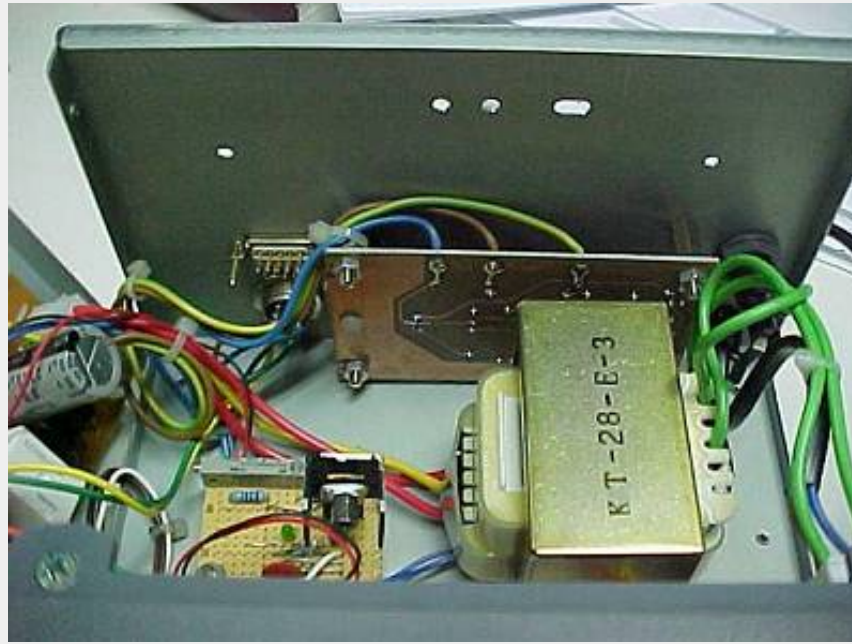


Photo 5: Position of speed reduction PCB

## Adjustment and calibration.

Speed adjustment is straight forward and much dependent on the type of antenna's used as well as the final application. In my application using the array for EME contact, I set the system for a 360 degree turn in 8 minutes.

Calibration of the digital indicator must start at the 0 degree mechanical position. Here one should compensate any indication using the offset control of the digital meter system. Next prepare a small mark on the outside of the motor base and turn it for 360 degrees. Using the gain and/or 10-turn "poti" carefully adjust the indicator for a 360 degree display. The outside potentiometer is linear thus after this adjustment you will find the 270, 180 and 90 degree positions to match with the mechanical position as well.

## Computer control

Adding a 9-pin Sub-D connector, a simple interface can be created. Two pins are connected from the direction buttons, with reference to a third pin supplying 12Vdc.

Two other pins are used for an analogue voltage output of 0-3.6Vdc. Using an A/D converter it will provide digital information required for most tracking systems such as the F1EHN moontracking interface.



Photo 6: Rear view of modified control unit.

Conclusion

Spending a budget of about Euro 70,=, a commercial antenna rotator system of Euro 900,= become a valuable instrument in today's radio amateur shack. At least manufacturers should be able to include this type of upgrades for much less in their current controllers.

References:

HAM-RADIO 1981- January Pulse-position control of the CDE Taitwister rotor W.R. Gabriel, WB4EXW  
YAESU MUSEN Co., Ltd User manual G-1000C  
Velleman Components Catalog, <http://www.velleman.be>

Thanks to <http://www.qsl.net/pa0ply> for the article.

This modification is read 349 times.

[top of page](#)

17-09-2000  
(MD100A8X) MD100A8X for FT-990

Author: Technical Support, Yaesu U.S.A - [amateurtech@yaesuusa.com](mailto:amateurtech@yaesuusa.com).[MODIFICATION.NET](http://www.MODIFICATION.NET)

18-03-1998

Symptom:

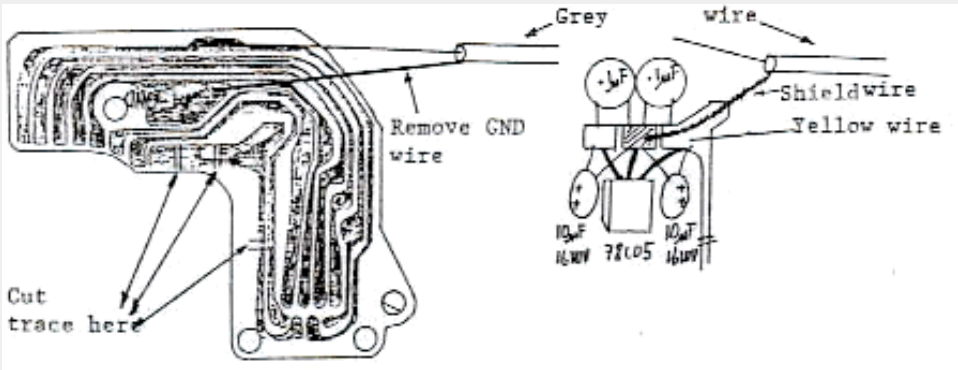
This modification allows the MD100A8X microphone to be used with the FT-990

Component value abd part number.

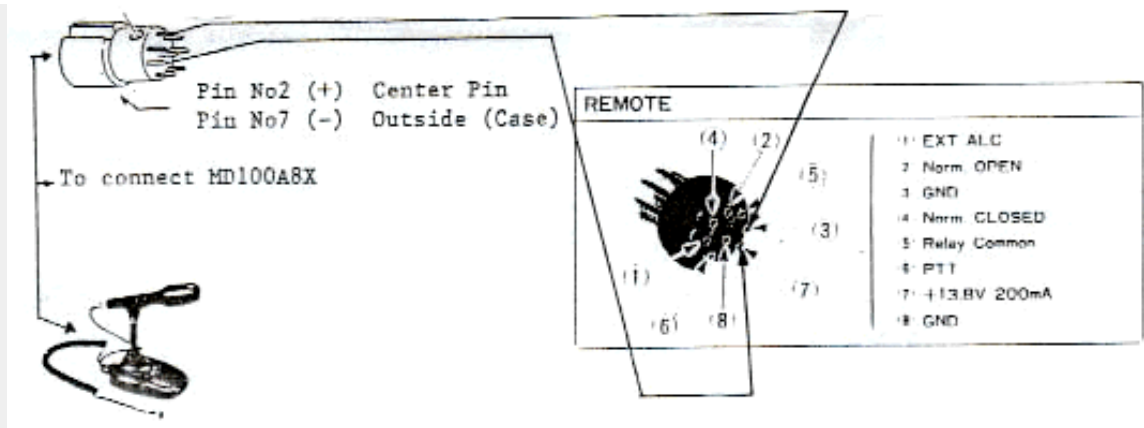
|        |           |              |           |
|--------|-----------|--------------|-----------|
| IC1    | 78L05     | REG 1C       | G1090084  |
| C1, C2 | 10uF 16WV | Tabtalum Cap | K70140013 |
| C3, C4 | .1uF 16WV | Ceramic Cap  | K19149025 |
| P1     | 8Pin Plug |              | P1090164  |
| P2     | RCA Plug  |              | P0090544  |

Procedure:

1. Remove 4 screws from bottom cover of the MD100A8X.
2. Cut PCB trace on 5V line. See the picture below.
3. Install 78L05 two 10uF and two .1uF.
4. Remove shield side wire from M-GND and solder it to the GND of the 78L05. (Center pin)



5. Make DC supply cable for MD100A8X. See the picture below.



This modification should also work for the following rigs:

FT-1000  
 FT-1000D  
 FT-650  
 FT-736R  
 FT-747GX  
 FT-757GXII  
 FT-767GX  
 FT-890  
 FT-890AT  
 FT-990  
 FT-990DC

This modification is read 809 times.

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**19-07-1998**

## **(MH-15) YAESU micro-phone number MH-15 C8**

MOD: How to prevent the touch-tone pad from automatically keying up your rig.

Rigs involved: This mic. comes with the yaesu FT-290 MK II (2 meter rig), the FT-690 MK II (6 meter rig), or the FT-490 MK II (uhf rig), and possibly others.

1. Take the three (3) back screws off.
2. Take the two (2) screws off the circuit board to free it from the case.
3. Find the red wire going to the micro-switch, ie, the ptt line.
4. Follow that red wire to the circuit board at that place on the circuit board another red wire will join the first one.
5. Un-solder both red wires from the circuit board and clean up the solder mess, otherwise hum will occur.
6. Solder the two red wires together and cover with tape or shrink tubing.
7. Put the circuit board in place and screw it down.
8. Put the "lock" slide switch back in place.
9. Put the rest of the case on.
10. Put the outside screws in.
11. You are now ready to try it out, so go ahead and re-attach it to your rig!
12. All should work:
  - ptt works and releases,
  - mic passes audio,
  - touch tones work when ptt button held,
  - touch-tone red "led" still lights up when touch-tone pad keys are depressed, even if ptt button is not held down,
  - no hum noticed.

This modification is read 323 times.

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19-07-1998

## (MH-29A2B) YAESU micro-phone MH-29A2B Test mode

Hello!

Just wanted to let everyone know about a test mode I found on the yaesu remote mic (MH-29A2B). This test mode does all of the following:

Lites the mic's backlight  
Flashes the busy/tx lite red then green  
Flashes every part of the mic's lcd one by one  
Leaves the radio completely unaffected

To enter the mic's test mode:

1. turn off the radio (radio must still be connected to a power source)
2. plug in the mic
3. hold down the mic's call button while pushing the mic's pwr button

The mic will go into test mode and the radio will remain off. The only way I have found to exit test mode is by removing the mic from the radio.

If anyone can find a similar test mode for the yaesu ft-530, please let me know.

Thomas Tumino, N2YTF  
tumino@ubunix.cc.buffalo.edu

This modification is read 385 times.

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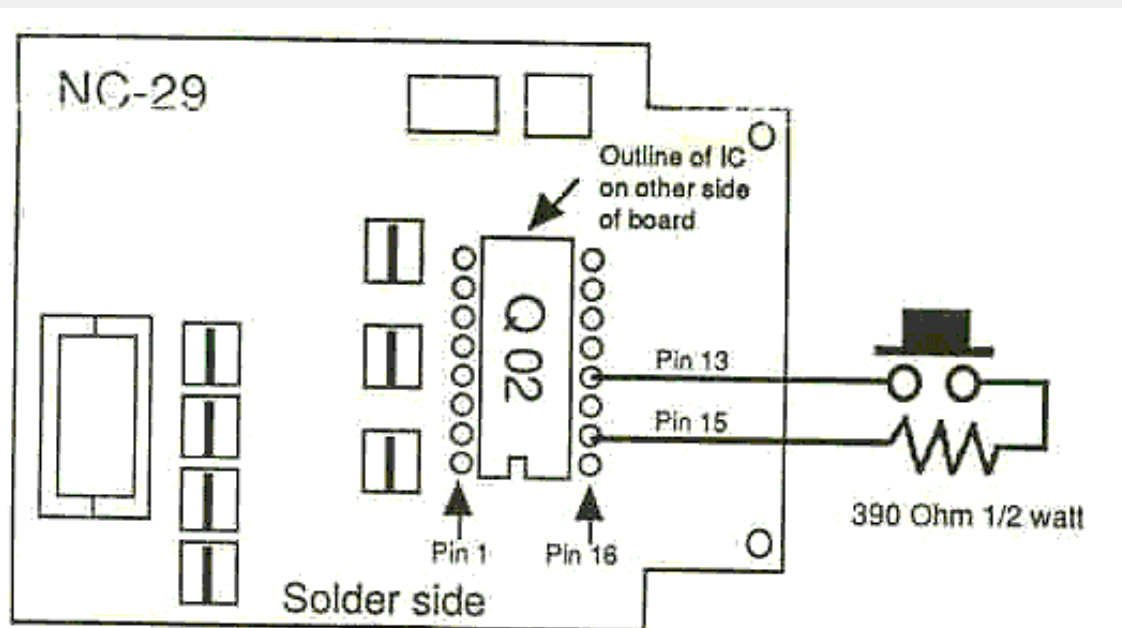
27-02-2002

## (NC-29) YAESU NC-29 trickle mode

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

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

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





**Caution** - These modification have not been tested. The author, publisher and all other parties take NO responsibility or liability for any damage or violation resulting from these modification. Performing any modification may be a violation of FCC rules and will void the warranty of the radio. Use of any modified radio may be a violation of FCC rules. If you have any doubts, **do not perform this modification.**

This modification is read 116 times.

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**26-04-2001**

## **(VL-1000) Mod for the VL1000**

**Author:** Bob - [ka1dmz@netzero.net](mailto:ka1dmz@netzero.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Turn off power and remove top and bottom cover. Remove the two top screws on the front panel and loosen the two lower ones and lean the panel forward. Look and see if you have two test points near C1008 if so short them together, if you dont have them then use a jumper wirer on pin #7 on connector J1015 to ground. With the jumper in place while holding in the FSET-TUNER and 2DISPLAY turn on power.

The LCD should read SPEC USA. Press the select until it reads GEN. Press the FSET to write the new instructions to the eeprom. Remove the jumper wirer. Turn the power off and then back on. Turn the amp back off and put the screws back in front panel and tighten lower ones. Put the covers back on and your set to go. Becareful when you have the covers off not to short anything. Put a board or something flat and clean under it.

It's a easy mod but becareful, watch out for the wirers on the front panel not to pinch them. GOOD LUCK.

This modification is read 585 times.

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**26-03-2000**

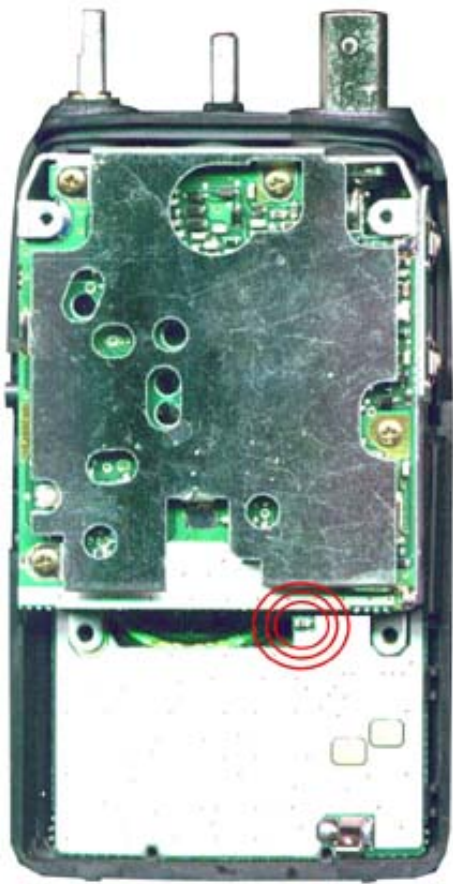
## **(VR-500) VR500 modification**

Please refer to the regulation of your country before reading and applying this modification.

This information is for educational purposes only, and I/we take no responsibility for what you do with this information.

To expand Frequencies on your VR500 remove the rear cover and de-solder the resistor shown in the red circle. After the modification the VR500 will automatically be reset the next time you turn it on.

**Note.!** The modification to expand frequencies in YAESU VR-500 is only the cellular band (824 - 848 - 869 - 893MHz) or other bloqued frequencies (Ex. 1090MHz,. etc...) ?



**NOTE:** from [www.mods.dk](http://www.mods.dk).  
Some has reported that new radios not have the "resistor" install anymore, and then the modification not can be carry out.!

This modification is read 3072 times. [top of page](#)

**13-07-2000**  
**(VR-500) VR-500 rumour**

**Author:** Merville - [merville@globalnet.co.uk](mailto:merville@globalnet.co.uk).[MODIFICATION.NET](http://MODIFICATION.NET)

I have heard [although I have not tried it on my receiver yet] that if you remove about 1cm from the bottom [- terminal] of a regular AA size nicad, that the receiver will allow you to charge the batteries via the power socket.

I have checked and there is a 'nipple' at that point inside the VR-500 case that would facilitate recharging.

**Date:** 01-02-2002 **User comment** **From:** [Mort Arditti, KB6BSN](#)  
**Subject:** VR 500

The rumor about peeling off part of the battery insulation is correct.  
Look at the battery compartment and note a small contact along the length of the battery. Remove the battery insulation, insert rechargeable batteries and they will charge. The display will show CHARGING. I did it and it works. I use 1500 mAH NiMH batteries.  
Do modifications at you own risk.  
Mort

**Date:** 08-02-2002 **User comment** **From:** Rock  
**Subject:** recharging ni-cads

to recharge rechargeable batteries you must strip a portion of the label of the battery at the negative side to recharge. that is a little more understanding.

This modification is read 2466 times. [top of page](#)

01-08-2000  
(VR-500) VR500 recharging

Author: Jing Zhan - BG4AGR - [bg4agr@371.net](mailto:bg4agr@371.net).[MODIFICATION.NET](http://MODIFICATION.NET)

I found the VR500 has the charging function.

You can cut 1cm skin from the normal NI-Cad or NI-MH battery to make the VR500 charge.

When it recharging, VR500 flash charging on the screen. It can charge whenever you turn on it or not. The VR500 recharging current is about 30mA, so you need at least one day to make the battery full.

The current of VR500 is much bigger on SSB mode than on NFM or AM mode. On NFM mode it isonly 30-50mA, but on SSB mode it consumes about 50-80mA. The lamp of screen consumes 5mA, the key lamp consumes 5 mA. And if the battery isn't very full, the sound will be very bad on SSB mode.

Yours Sincerely 73!  
Jing Zhang  
BG4AGR  
Shanghai, China

This modification is read 2079 times.

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30-12-2000  
(VR-5000) VR 5000 Mod

Author: Hanno, DG8JZ - [hanno@dg8jz.de](mailto:hanno@dg8jz.de).[MODIFICATION.NET](http://MODIFICATION.NET)

This is the modification to bring the new YAESU VR 5000 receiver from the ham version into the general version. Just to remove one ship jumper at the follwing place. Rear side of front panel, remove chip jumper xx56 and reset the receiver with <CLR> + Power on followed by <ENT>.



This modification is read 2171 times.

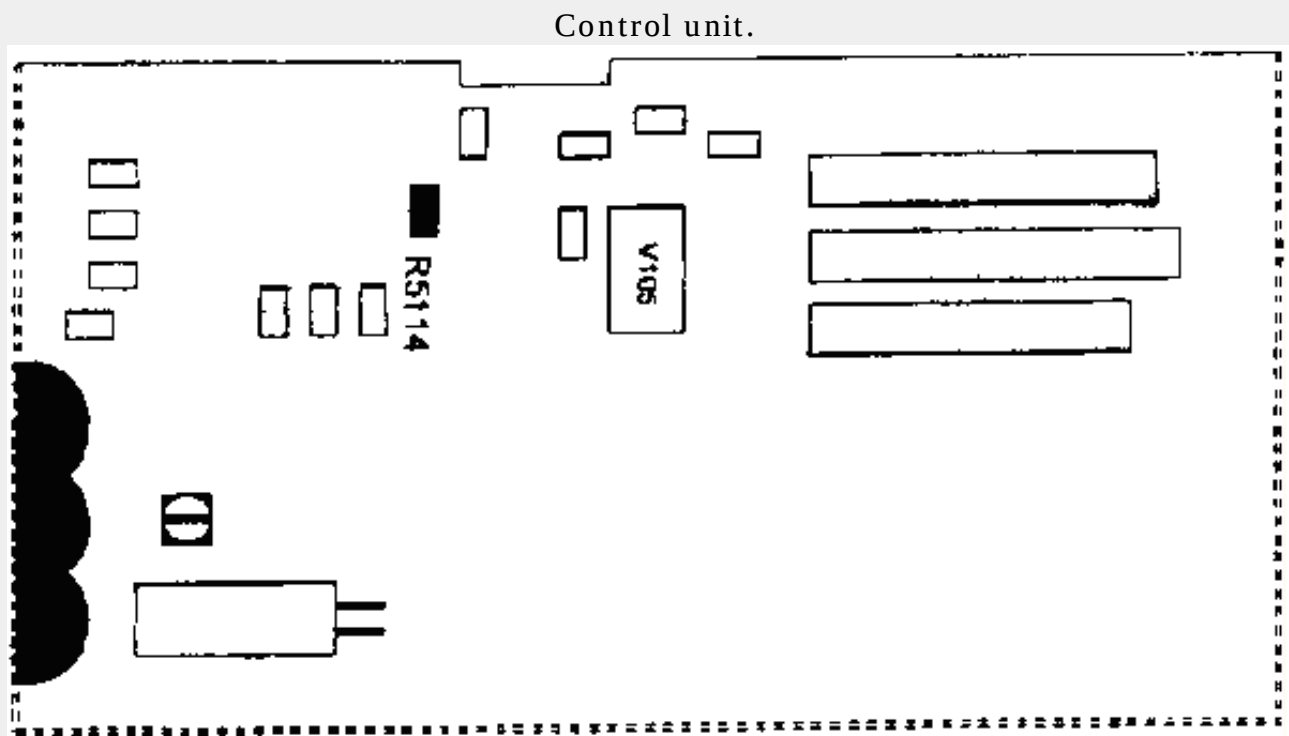
[top of page](#)

03-02-2001  
(VR-5000) Yaesu VR-5000 frequency coverange

Author: charly.st - [charly.st@bluewin.ch](mailto:charly.st@bluewin.ch).[MODIFICATION.NET](http://MODIFICATION.NET)

| Type | RX (MHz)                                                                 | R5114 |
|------|--------------------------------------------------------------------------|-------|
| B1   | 0.1-30/50-54<br>88-136/144-148<br>430-450/850-888<br>1240-1300/2400-2450 | X     |
| B3   | 0.1-2599.999                                                             |       |

- Press and hold **[CLEAR]** while powering up.
- Press **[ENT]** to reset the CPU.



This modification is read 2234 times.

[top of page](#)

**14-03-2001**

### **(VR-5000) Layout of the LCD-screen**

**Author:** Hans Reinhardt - [hans2000@wanadoo.nl](mailto:hans2000@wanadoo.nl).[MODIFICATION.NET](http://MODIFICATION.NET)

Push DIM and POWER, and you see the complete lay-out of the LCD-screen.

This modification is read 1800 times.

[top of page](#)

**12-10-2001**

### **(VR-5000) Show the Firmware for Yaesu VR-5000**

**Author:** Bjorn Pasteuning - [bjp@multiweb.nl](mailto:bjp@multiweb.nl).[MODIFICATION.NET](http://MODIFICATION.NET)

If you press then button "V/M" and keep pressed. when powering up the radio.

It will show you the current Firmware version of the radio. and some other information

Greetings

Bjorn Pasteuning  
Netherlands

This modification is read 1734 times.

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15-09-2001

## (VX-110) Expanded Transmit for the Vertex VX-110 & VX-150

Remove the antenna, belt clip, battery, and top volume & squelch/knobs

Remove the the black sticker (the one with the Ni-Cd battery disposal warning) and the small "sub-board". See Fig 1  
\*removing the sticker/sub-board reveals two smallphillips screws.

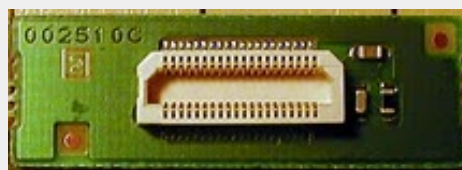


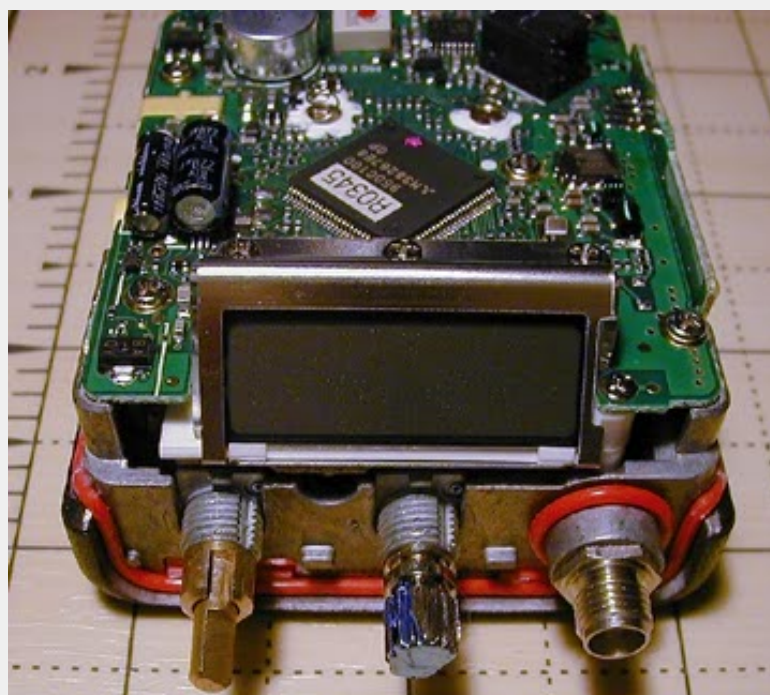
Fig 1 - Sub-Board

Remove the two screws that were under the sticker and sub-board, and remove the top LEFT screw - leaving the right screw alone. See Fig 2



Fig 2 Remove screws

Remove the rubber grommets under the volume & knob controls, and using a pair of hemos or small needle-nose pliers, remove the nuts for the volume & squelch/knob.



\*Photo shown with nuts and case removed



Carefully slide the front and back case apart and remove the rubber piece around the mic element.



Fig 3

For Mars/Cap(140-174Mhz TX) remove R1275, and solder it to the blank solder pads labeled R1274 - Fig 3.

For Freeband (100-200Mhz TX) remove R1275 - Fig 3.

| R1274    | R1275    | Transmit Coverage           |
|----------|----------|-----------------------------|
| Blank    | Soldered | 144-148Mhz (Factory Config) |
| Soldered | Blank    | 140-174Mhz (mars/Cap)       |
| Blank    | Blank    | 100-200Mhz* (Freeband)      |

\*The VX-110 & VX150 can be opened for 100-200Mhz, but the radio's circuitry is not wide-banded enough to cover the entire 100-200Mhz spread. When the radios display starts flashing/blinking, this means the radio's VCO is out-of-lock and no receive or transmitting is possible. A typical radio should RX/TX from approx. 125-180Mhz when the freeband mod is performed.

Reassemble the radio carefully. Most of the time resetting the radio is NOT necessary, but have a backup of your frequencies just in case, because the radio will reset itself most of the time after a modification is made.

I have noticed a major bug in the memory channels. This bug has to do with memory channel #1. Example: Lets say you program: ch. #1 with 147.000, and ch #2 with 154.570, and the last channel (I will call ch # 200) in your memory bank with 144.000

So.....

CH 200 144.000  
CH 1 147.000  
CH 3 154.570

Now, go to memory channel 1, and it will be 147.000, but rotate the knob to memory channel 2 (154.570) and back to 1, and the memory contents from CH 2 are now in CH1, which is 154.570 on memory channel 1(should be 147.000). The same

thing will happen if you go to memory channel 200, and rotate knob one click to to memory CH 1, the contents from CH 200 will be on CH 1. This bug does not rewrite the memory contents in CH 1. This bug basically moves the frequency from the memory channel below CH 1, and above CH 1 to memory CH 1 while your rotating the knob through the memory channels. Scanning seems OK, and is not affected by the memory CH 1 bug.

**Solution #1** for this is to make CH 200, CH 1, and CH 2 all to the same frequency. OR

**Solution #2** set the "edge beep" to on. <---thanks goes to Susie for this info!!



My VX-150 with the LCD display LED changed to Blue. The original LED was removed and replaced with a blue SMT LED (1206 size). R1239 (220Ohm) was removed and replaced with a 0 Ohm resistor.

This mod is also available at <http://www.icongrp.com/~sllewd/vx150main.html>

This modification is read 911 times.

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**06-08-2000**

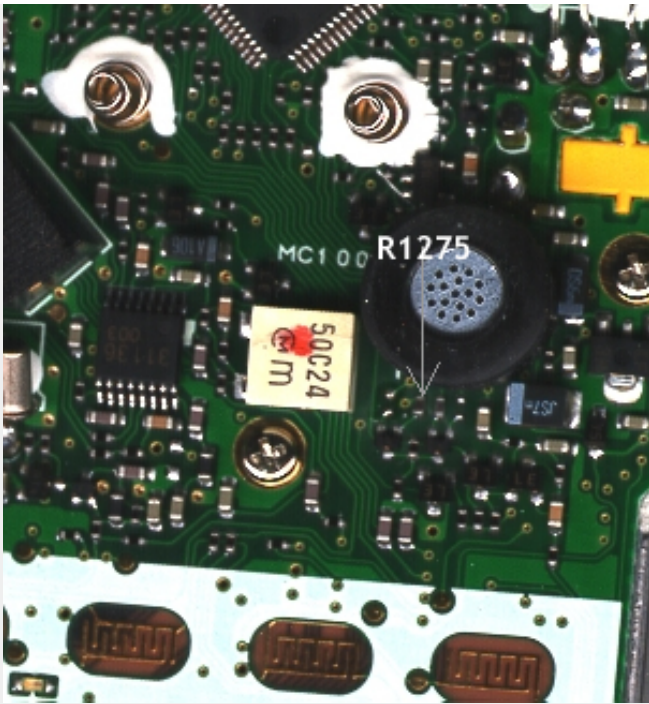
**(VX-150) MARS/CAP modification for VX-150R 140-174 MHz**

**Author:** John Kellas - [jkellas@telusplanet.net](mailto:jkellas@telusplanet.net).[MODIFICATION.NET](http://www.MODIFICATION.NET)

Open the Radio by takeing the battery off lift the black cover off the one say's ni-cd disposed of properley then take the 2 silver.

Things and then the one black one one the top left not the under the belt clip then the 2 nuts under the knobs pull the knobs and rubber things and the ANT off, gently slide the top cover off.

Remove R1275 (see picture)



Then put the radio back together and go be careful and not get a solder bridge!!!!

This modification is read 2191 times.

[top of page](#)

**15-09-2001**  
**(VX-150) Expanded Transmit for the Vertex VX-110 & VX-150**

Remove the antenna, belt clip, battery, and top volume & squelch/knobs

Remove the the black sticker (the one with the Ni-Cd battery disposal warning) and the small "sub-board". See Fig 1  
 \*removing the sticker/sub-board reveals two smallphillips screws.

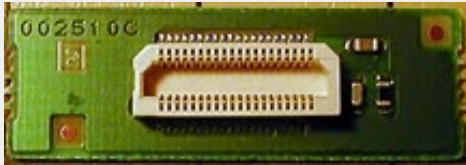


Fig 1 - Sub-Board

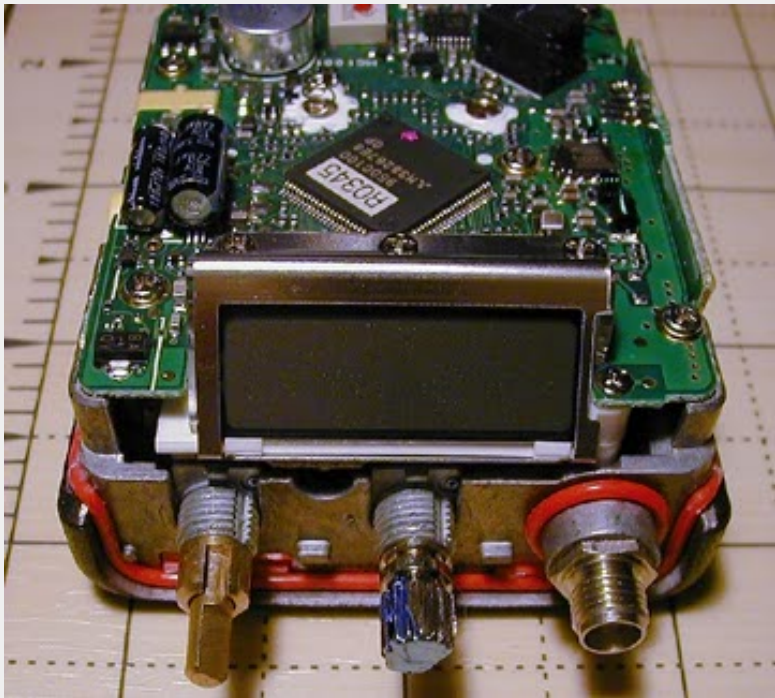
Remove the two screws that were under the sticker and sub-board, and remove the top LEFT screw - leaving the right screw alone. See Fig 2





Fig 2 Remove screws

Remove the rubber grommets under the volume & knob controls, and using a pair of hemos or small needle-nose pliers, remove the nuts for the volume & squelch/knob.



\*Photo shown with nuts and case removed

Carefully slide the front and back case apart and remove the rubber piece around the mic element.



Fig 3

For Mars/Cap(140-174Mhz TX) remove R1275, and solder it to the blank solder pads labeled R1274 - Fig 3.

For Freeband (100-200Mhz TX) remove R1275 - Fig 3.

| R1274    | R1275    | Transmit Coverage           |
|----------|----------|-----------------------------|
| Blank    | Soldered | 144-148Mhz (Factory Config) |
| Soldered | Blank    | 140-174Mhz (mars/Cap)       |

|       |       |                        |
|-------|-------|------------------------|
| Blank | Blank | 100-200Mhz* (Freeband) |
|-------|-------|------------------------|

\*The VX-110 & VX150 can be opened for 100-200Mhz, but the radio's circuitry is not wide-banded enough to cover the entire 100-200Mhz spread. When the radios display starts flashing/blinking, this means the radio's VCO is out-of-lock and no receive or transmitting is possible. A typical radio should RX/TX from approx. 125-180Mhz when the freeband mod is performed.

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So.....

CH 200 144.000  
CH 1 147.000  
CH 3 154.570

Now, go to memory channel 1, and it will be 147.000, but rotate the knob to memory channel 2 (154.570) and back to 1, and the memory contents from CH 2 are now in CH1, which is 154.570 on memory channel 1(should be 147.000). The same thing will happen if you go to memory channel 200, and rotate knob one click to to memory CH 1, the contents from CH 200 will be on CH 1. This bug does not rewrite the memory contents in CH 1. This bug basically moves the frequency from the memory channel below CH 1, and above CH 1 to memory CH 1 while your rotating the knob through the memory channels. Scanning seems OK, and is not affected by the memory CH 1 bug.

**Solution #1** for this is to make CH 200, CH 1, and CH 2 all to the same frequency. OR  
**Solution #2** set the "edge beep" to on. <---thanks goes to Susie for this info!!



My VX-150 with the LCD display LED changed to Blue. The original LED was removed and replaced with a blue SMT LED (1206 size). R1239 (220Ohm) was removed and replaced with a 0 Ohm resistor.

This mod is also available at <http://www.icongrp.com/~sllewd/vx150main.html>

|                                                                                                                                                                                                                                                                             |                     |                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------|
| <b>Date:</b> 26-01-2002                                                                                                                                                                                                                                                     | <b>User comment</b> | <b>From:</b> <a href="#">J. Jenkins, KB4OEW</a> |
| <b>Subject:</b> memory bug in ch 1,2 and 199                                                                                                                                                                                                                                |                     |                                                 |
| I recently purchased a new VX-150 (01/25/2002) and I do not have the bug that is mentioned with the ch 1,2 and 199. Perhaps it has been corrected. Just my two cents worth. I really like the ease of operation with this radio and the features it provides for the price. |                     |                                                 |



Date: 10-02-2002

User comment

From: [J. Jenkins, KB4OEW](#)

Subject: My bug fix

As to my comment about the memory bug, after I made the mod, I discovered the problem. I seem to have overcome this problem in a round about way. By adding alpha tags to mem ch 1, 2 and 199, you can outsmart the radio.The alpha tag will remain as entered and will not change as when using the frquency display. EX: in mem ch 199 I have wx freq of 162.400, named it NOAA, in mem ch 1, I have local ambulance frq 155.325 and named it mems-1, and in mem ch 2 ambulance freq 150.775 named pvt. Now whenever I switch between the three, the tag stays the same as entered. James

Date: 22-02-2002

User comment

From: [KC0LXP](#)

Subject: Yaesu VX-150 extended transceive mod additional info

Looking at the VX-150 mod for extended transmit, it makes sense to do the Freeband mod. With the freeband mod, you simply remove R1275 which is a grain of salt sizedSMT resistor.

This way, you don't have to do any extra work, resoldering. The display will flash when the radio is too far out of band, but it will cover roughly 127-178 MHZ, depending on radio, alignment, and ambient temp. However, the effect of the FREEBAND mod may or may not affect the radios "Smart Search" feature, causing it to stop at the band edge when the radio is out of lock, and not cycling thru to the beginning band edge-this problem needs further research. Also, when removing the VOL and VFO knobs on top, the nuts are somewhat difficult to remove. I held the radio in my left hand(which I had a thick leather glove on) and used a protractor point to get each nut loose, since they are round and only have two notches to work with.

The radio is full of goodies.

KC0LXP

Date: 24-03-2002

User comment

From: [B. Leap](#)

Subject: Battery

Instructions for the VX150 battery say "Do not overcharge". I had difficulty contacting Vertex to determine what is overcharge time. The person I finally reached said the battery should charge in four (4) hours. Not so. I tried different charging times and the one that brings it to the 8.5V level is 12 to 14 hours. I use two different batteries and change them out when one goes dead. Did not want to spend \$70 for a special charger for charging removed battery so I made my own. Big mistake. Cooked the battery. Also, I noticed a comment about the removal of the nuts under the VOL and Dial Select knob. I use a snap ring plier with an angle attachment. Two to five bucks at a discount tool supply.

19-07-1998

(VX-1R) VX-1R Cell and expanded TX RX Mod

I du not represent any of these Yaesu, and cannut be responsible for improper use or performance of the radio after the mod (standard disclaimer BS, yuu all know that..)

VX-1R Cell and expanded TX RX Mod

This is the basic VX-IR mod. Itve taken what I've found on the net, and expanded on it slightly, after perfonning the mod to my radio. Note that after perfonning the mod, ARS (Autumatic Repeater Offset) will nut functiun (whether it's turned on or not), and you will lose any stored memuries and preferences. The mod is very simple. First, put the piece of protective plastic back on the display, or take a 3M Post-It Note (tm), and stick it to the display. Work on top of a piece of 8 I/Z XI 1 paper (good contrast, will also keep from marring the radio). Open the radio by removing the 3 screws. Taking a smallflat screwdriver, release the tab on the left, inside the battery compartment (assume radio is facing down, antenna away from you). Release the 2nd ~ tab and tht's about halfway up the inside of the battery compartment Being very careful, separate the 2 halves the radio. Yuu'll need to apply a kind of rotation along with the separation. Note that the battery compartment lid and hinge pin will fall out. Keep track of these l the left uf the to the edge of the case, you'll see two pads, (closer to the top) O). They look like a gold circle with a line down the middle. You won't move the battery to see these. Each of these pads need to be bridged with a solder blod. Use a small iron, and work careful, or you'll burn the case. After brindgin the pads snap the radio back together. 1 had a slight amount of difficulty getting the right side of the case aligned, so you may have to work at it sligtly. Before you acWly perfonnn the "snapll, put the hinge pin through the battery comparfrnent lid, and reinstalled the lid.

Replace the 3 screws. Add battery, antenna back to radio. Holding the M/V key and AR, apply power (this is the hard reset to the radio). When the menu that sasy "INI? F" appears, press the F/W key to reset the radio. You should now have the expanded mod.

You will lose all the memories and preferences, su either record them, or do the mod before you save lots of frequencies. My tests show that you can also now transmit ftom 108 to 137 (AIR), 137 to 170 (V-HAM) , 170 to 222 (V-TV), 420 to 470 (U-HAM) , and 470 to 580 (part of UHF-TV). 1 haven't measured power output, but am simply going on the fact of the TX LED lighting or not, and whether it made the speakers next to my PC buzz or not. Remember, it's not nice or legal to fransmit out of band, or outside your license class. When tuning around, be sure to check the receive mode. The processor puts the radio into AM in places where it doesn't make any sense, so don't trust the RX-MODE option being in AUTO. I keep mine disabled.

**Date:** 15-01-2002

**User comment**

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

**Subject:** VX1R modification

I was not able to modify the VX-1R by following this manual- the unit still performs the same after the modification- I'm not able to transmit expanded mode...please reply...

Thanks for help

Mary

**Date:** 11-02-2002

**User comment**

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

**Subject:** VX-1R Mod

You need to install two diodes in addition to bridging the pads. I found these instructions at <http://www.icongrp.com/~sllewd/latest.htm>, it works great for me now. I use it to transmit to aircraft from the ground for calling pickups and drops for an aircraft banner crew.

**Date:** 26-03-2002

**User comment**

**From:** [dov 4z5dz](#)

**Subject:** Expended TX

I soldered #0 & 1. Added 2 diods, but nothing works. The vx1 behaves without control. sometimes cannot change bands, or feaures.

Will not respond to soft or hard reset. Any tips or advise?

73' 4z5dz

**19-07-1998**

**(VX-1R) Version test Yaesu VX-1R**

Indicates Software Version/Display Test Mode

1. Power radio off (if it's On)
2. Press and HOLD the "AR" button while you power up the radio.
3. This puts the radio in the "Test Mode". Keep pushing the "AR" button.  
It will cycle through different patterns on the LCD display. At the end, it will display One Letter and Three Numbers. A102/A104 and A105 seem to be the current versions ??? If you sailed by it, just keep pressing the "AR" button.
4. To exit from this "Test Mode" just power down the Radio.

This modification is read 3185 times.

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19-07-1998

(VX-1R) VX-1R Internal System Alignment Routine

including:

- Squelch Hysteresis
- Squelch Threshold & Tightness Adjustment
- Wide FM Squelch Adjustment
- S-Meter Full Scale & S-1 Adjustment

Set TRX to 145MHz and turn it off.  
Press FW VOL and MONITOR switch together while turning the radio on. You can select the parameters by pressing UP or DWN.  
The alignment is performed by pressing th M/V key while injecting a signal of the required frequency and level.  
Pressing FW key after a setting is made stores the entry. To exit press PWR After performing the system alignment in this entirety, individual settings can be returned to and adjusted should the need arise.

VHF Adjustement-----

Squelch Hysteresis HSSQ  
HSSQ03

Auto Squelch Hysteresis HASQ  
HASQ 0C

Squelch Preset Threshold THSQ  
Inject a -15dBµ RF Signal ( 3,5KHz deviation @1-KHz )then Press M/V twice for the next setting.

Squelch Preset Tight TISQ  
Adjust the generator level vor a -4dBµ signal then press V/M twice for the next setting .

Wide Squelch Adjust WDSQ  
WDSQ 10

Low Scale S-1 Adjustment S1VL  
input -7dBµ then press M/V.

S-Meter Full-Scale Adjust S9VL  
Generator Level to +22dBµ then press M/V.

To save and exit press FW key for more than 1 second. Then press PWR

UHF Adjustement-----

The same Routine on 435MHz

19-07-1998

(VX-1R) Yaesu VX-1R - Expanded Transmit 137 - 175, 410 - 470 MHz

- Remove battery
- Remove the (3) small black screws.
- Carefully open the radio, splitting the radio front and rear cases Looking down inside of the top left side of the radio (left of rotary encoder) , locate and ADD Solder to jumpers "0" and "1" (jumper "0" is the top jumper and jumper "1" is below it)
- Assemble radio.
- Press and hold [M/V] and [AR] keys while turning on the radio.

Modification Complete

**08-11-1998**

**(VX-1R) Bad connection with the antenna**

*From: G7IZX@GB7OAR.#16.GBR.EU*

I have one of these little trancivers , when i first got it i was a little dissipated with the receive sensitivity on various bands anyway when i connected it to a large outside antenna it was great so i decided to check out the antenna ( rubber duck ).

and i found that the brass/copper contact that makes the connection was very tarnished , so i used a very fine grade emery paper to clean this connection up , and then sprayed it with some switch cleaner and fisished off using a cotton wool bud , to wipe away any bits of dust and metal particles . when i re connected it , the radio was so much better , things i could not here was booming in.

so just check your' out , like i say mine was receiving but was poor ... but now its much better .

e-mail: [g7izx@windyhill.freerve.co.uk](mailto:g7izx@windyhill.freerve.co.uk)

Best 73s de PAUL

G7IZX @ GB7OAR.#16.GBR.EU

This modification is read 2837 times.

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**24-01-1999**

**(VX-1R) Template modifier for VX1R**

*From: PB0AFK@PI8VNW.#ZH2.NLD.EU*

[tmod.zip](#) is a template-modifier to modify template of the ADSM1-software-pack for the YEASU VX1R software. It really programm to modify the software instead of modify the VX1R on a hardware-base.

You do need the SP3-pack which contains some new .DLL-file because the software is written in Visual Basic v5.0. More information you get when you install the software and look under the option HELP.

I did not test this piece of sofware because I have to buy the ADSM1-pack for the VX1R. This software is freeware and also the SP3-pack is. To use this software you need the software-kit for the VX1R.

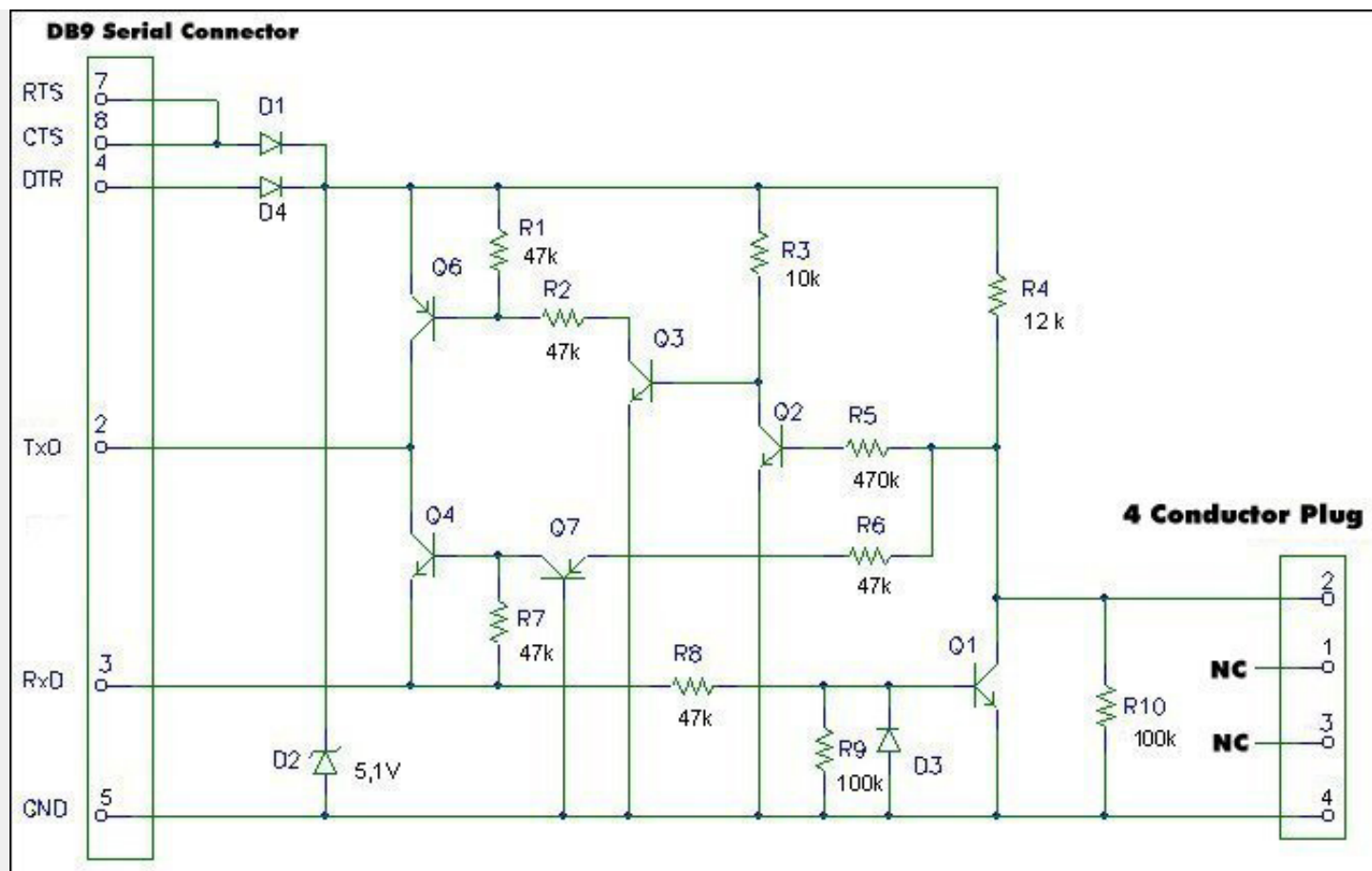
The SP3-pack is 1.265kB long so I won't border you with it..Hi. Have fun with it.

This modification is read 3037 times.

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**12-02-2000**

**(VX-1R) Schematic diagram for PC programming cable.**



#### PC Programming Parts List

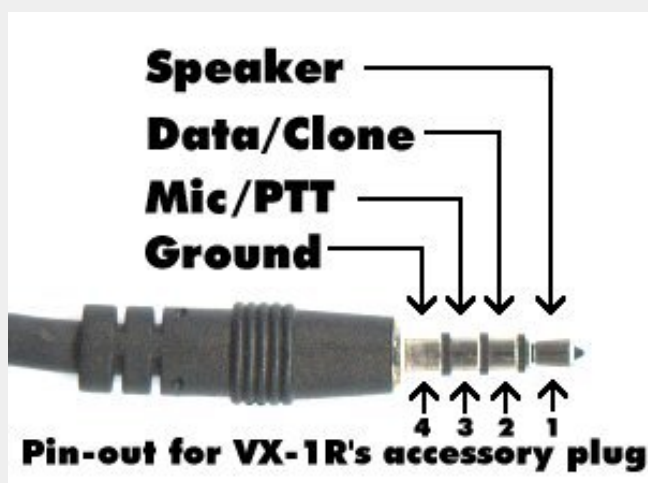
|               |            |
|---------------|------------|
| Q1 = 2N2222   | R1 = 47K   |
| Q2 = 2N2222   | R2 = 47K   |
| Q3 = 2N2222   | R3 = 10K   |
| Q4 = 2N2222   | R4 = 12K   |
| Q5 = Not Used | R5 = 470K  |
| Q6 = 2N3906   | R6 = 47K   |
| Q7 = 2N3906   | R7 = 47K   |
| D1 = 1N914    | R8 = 47K   |
| D2 = 1N751A   | R9 = 100K  |
| D3 = 1N914    | R10 = 100K |
| D4 = 1N914    |            |

The abbreviation NC means no connection.

The DB9 connector can be Radio Shack part # 276-1538 or equivalent.

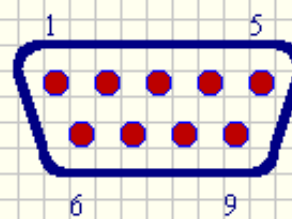
A good place to start looking for the 4 conductor plug is Tower Electronics: 1-800-662-3422. The 2N2222 can be substituted for any general purpose NPN transistor, while the 2N3906 can also be substituted for any general purpose PNP transistor. D1,3,4 are general purpose silicon diodes. D2 is any 5.1V zener diode.

All resistors are 1/4 or 1/8watt - 5% tolerance resistors. This PC programming cable can also be built with SMT (Surface Mount Technology) parts if desired.





- 2 - Transmit Data (TX)
- 3 - Receive Data (RX)
- 4 - Request to Send (RTS)
- 5 - Clear to Send (CTS)
- 6 - Data Set Ready (DSR)
- 7 - Signal GROUND
- 8 - Data Carrier Detect (DCD)
- 20 - Data Terminal Ready (DTR)
- 22 - Ring Indicator (RI)



- 1 - Data Carrier Detect (DCD)
- 2 - Transmit Data (TX)
- 3 - Receive Data (RX)
- 4 - Data Terminal Ready (DTR)
- 5 - Signal GROUND
- 6 - Data Set Ready (DSR)
- 7 - Request to Send (RTS)
- 8 - Clear to Send (CTS)
- 9 - Ring Indicator (RI)

## (VX-1R) Quick Reference for YAESU VX-1R

**Author:** Milton Teuner - PY3PSI - [py3psi@qw.ab6qv.ampr.org](mailto:py3psi@qw.ab6qv.ampr.org).[MODIFICATION.NET](http://MODIFICATION.NET)

by PY3PSI on 27/Nov/1999.

Only for some NOT custom functions!  
Symbols: "+": simultaneously; "-->": after.

NEVER connect the TRX to MORE than 7 V DC

|                      |                     |        |
|----------------------|---------------------|--------|
| Current Consumption: | RX:                 | 150 mA |
|                      | Standby, Saver Off: | 50 mA  |
|                      | Standby, Saver On:  | 16 mA  |
|                      | Auto Power Off:     | 0.2 mA |
|                      | TX (0.5 Watts):     | 400 mA |

TX Power Output: 1 W / 200 mW (@ 6 V EXT DC IN)  
0.5 W / 50 mW (@ 3.6 V FNB-52LI)  
0.1 W / 50 mW (with FBA-20)

Charge FNB-52LI: 2 hours in the radio (turned OFF!) [expected: 0.5 A @ 6 V]

MIC/EAR jack: 50 mW ext speaker (8 Ohms); ext mic (2 k Ohms)

Channel Step/Mode: for each band MENU 7/32; turn OFF auto mode: MENU 31

RPT input ORG monitor: FW + Monitor

Search CTCSS/DCS: MENU 24 = TS0 or DCS --> MENU 25 or 26 --> FW + SCAN

Lock: hold M/V (unlock: the same). AR remain available.

DTMF: PTT + BAND = "MANU 0" (if not, UP/DWN) --> BAND again TX number (DIAL)

DTMF Autodialer: MENU 27 --> Memory 1 to 8 --> hold FW --> DIAL --> FW ...  
--> BAND or PTT: to store  
--> AR: play back

PTT + BAND --> UP/DWN select DTMF memory --> BAND again TX

-----  
Emergency UHF Channel: hold AR; to deactivate hold again

Automatic FM/TV MEMORY: PWR OFF --> BAND + PWR ON

Automatic Memory: MENU 28 (number of sweeps) --> VFO mode --> hold FW  
--> hold DWN/UP  
To recall: FW + M/V

Memory Groups (1 RPT [52] or 2 simplex [142]): M/V + PWR ON

Memory Storage: VFO Mode (set all features) --> hold FW (if blink = occup)  
--> FW

Memory Recall: M/V, select with UP/DWN! Select band. Dial copy to VFO.

Memory Odd Splits: store RX as above without shift; set TX, PTT + FW

Memory MASK: Memory Mode --> hold FW --> Dial --> M/V; to unmask, vice versa

Memory Label: Memory mode --> DIAL --> MENU 3 --> DIAL --> FW... --> BAND  
M/V --> clear right

Memory Band Limit: as above, memory L/U; "PS" appears on LCD

-----  
SCAN: DIAL = direction; STOP: PTT, DWN/UP, BAND or M/V

SCAN memory skip: DWN/UP --> FW --> DWN/UP; to re-enable: vice versa

Priority Watch: select memory --> hold FW --> DIAL --> BAND.  
To activate: FW + BAND  
To cancel: BAND

Priority Channel can't be overwriten! Change Prio first!

ARTS: lock QRG. FW + AR --> DIAL --> AR --> AR; AR again exit

CW ID: MENU 23 --> M/V (clear all) --> DIAL --> FW... AR: play it back

#### SET Mode (MENU) Summary:

- 1 - TX Power
- 2 - QRG x NAME (Memory)
- 3 - Memory name
- 4 - Automatic RPT Shift
- 5 - RPT shift +/-/off
- 6 - RPT shift offset
- 7 - Step: Channel
- 8 - Scan resume mode
- 9 - Scan Stop Lamp
- 10 - Beep on Key
- 11 - ARTS Beep: once, every acknowledge TX (15 sec), never
- 12 - Save battery while RX
- 13 - Automatic switch TRX off
- 14 - Key lock options
- 15 - Rings on CTCSS Tone Squelch
- 16 - Busy/TX LED
- 17 - Lamp (light): if key, 5 sec on PWR, ON/OFF on PWR
- 18 - Monitor switch: Squelch x RPT Tone burst
- 19 - TX timer (Time Out Timer)
- 20 - Busy Channel = no TX (Busy Channel Lock Out)
- 21 - Internal Spurious on some QRG shift (CPU Clock Frequency)
- 22 - CW ID on ARTS
- 23 - CW ID call set
- 24 - CTCSS/DCS switch
- 25 - CTCSS QRG set
- 26 - DCS QRG set
- 27 - DTMF: Manual x Memory Number

28 - Automatic Memory Sweep number (Smart Mode)  
29 - DIAL Mode: QRG x Volume/Squelch  
30 - Voltmeter  
31 - RX Mode each band: AUTOMATIC (ON/OFF)  
32 - RX Mode: change

BOOT: Partial: PWR ON + FW + VOL (MENU to default, no changes in memory)  
All: PWR ON + M/V + AR --> FW (FW again)

This modification is read 3078 times.

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**19-02-2000**

## **(VX-1R) VX-1R crossband operation**

Later versions of the VX-1R will allow you to do a "cross-band operation" ( NOT REPEAT ). I have the ver. A105. I have tried this on earlier versions of the VX-1R and it will not work. AMDS note...the early version of the software ver. 1.01 shows those memory channels in a funny way, it cannot figure out which band you are in when looking at the memory file (a UHF freq. with a VHF tx).

It has not effected the operation of the software. The AMDS ver 1.03 does not have a problem with the operation below and shows up correct in the memory file.

I have several channels on the VX-1R allocated to store a VHF memory channel with a UHF TX freq. to crossband back to the CAR to get on a local 2M repeater. Here is how I set it up. I place my mobile dual-band radio in the CAR to crossband ONE-WAY, because most of the time I can hear the local repeater, but I can't hear me. I set the CAR dual-bander up to receive the UHF simplex frequency ie..446.00 (with PL CTCSS on so every noise does not key up the crossband operation). Then I set it up on the 2M VFO side for the repeater INPUT frequency. I turn the car radio to 5 watts out and turn on the crossband to go UHF to VHF. The car radio only transmits when you are talking. And there you are, you don't have to wait until the squelch tail drops and you can join in with the best of them.

The text below is taken from the manual (page 32) on how to program the VX-1

Independent Tx-Rx Frequency Storage ("Odd Splits").

You may need to use a repeater that has a non-standard shift (an Offset that does not conform to the local repeater band plan). The VX-1R allows you to store the transmit and receive frequencies independently into a single memory; so you can store the non-standard repeater's settings without having to change the "standard" repeater shifts in your VX-1R (+/-600 khz, +/-5 MHz, etc.).

The procedure is very simple:

1. Be sure the transceiver is in the VFO mode. Press [MV] once to change to VFO operation, if necessary.
2. Turn the Dial to the desired receive frequency. Then, as with "Simple Memory Storage" previously, set up all needed CTCSS/DCS tones and modes, but eliminate any repeater shift (+ or -icon) which might be set.
3. Hold [FW] for 1 second so the "F" icon blinks and a memory number appears above the frequency display. The next step must be done within 5 seconds while "F" is blinking.
4. Turn the Dial to select the memory number to store the receive frequency, and press [FW] momentarily. Remember this memory number, as you will need to select it again below. -
5. Now turn the Dial to the desired transmit frequency.  
\*\* At this point change bands, if you have stored a 2m receive frequency, push the [BAND] until you get to UHF ham VFO mode and enter a simplex UHF freq. (446.000 or whatever, NO OFFSET) This process you can also store a 2m simplex TX on a UHF repeater frequency.
6. Again hold [FW] for 1 second so the "F" icon blinks and a memory number appears, and turn the Dial to select the same memory you stored the receive frequency in, which will be blinking. The next step also must be done within 5 seconds while "F" is blinking.
7. Hold the [PTT] switch while pressing [FW] momentarily.

During memory storage, pressing the [PTT] switch does not cause transmission; rather, it signals the radio's microprocessor that a transmit frequency is being stored.

Memory storage is now complete. When you recall a memory containing independent Tx/Rx data per this section, you will notice that the repeater offset is shown as "-+", indicating that the pre-programmed default offset is not in use.

**25-06-2000**  
**(VX-1R) Lost data in VX-1 CPU for Squelch & S meter functions**

Reprogramming Procedure:  
**Note:** \*\* in procedure below represents any number sequence

1. Press & hold the VOL + FW + MON buttons down together and power up the radio. The Display should now show HSSQ03 (note: the important 3 is the small 3 at the top of the display. If anything but 3 appears at the top of the display, press the BAND button until the 3 appears)
2. Press the UP button to display HASQ\*\*
3. Turn the dial until the display shows HASQ08
4. Press the UP button to display THSQ\*\*
5. Turn the dial until the display shows THSQ4F
6. Press the UP button to display TISQ\*\*
7. Turn the dial until the display shows TISQ2F
8. Press the UP button 2 times to display S1LV\*\*
9. Turn the dial until the display shows S1LV34
10. Press the UP button to display S9LV\*\*
11. Turn the dial until the display shows S9LVA3
12. Press the UP button to display HSSQ03
13. Press the BAND button 3 times until the display shows HSSQ06 (again note: this is the small 6 at the top of the display)
14. Press the UP button to display HASQ\*\*
15. Turn the dial until the display shows HASQ08
16. Press the UP button to display THSQ\*\*
17. Turn the dial until the display shows THSQ4D
18. Press the UP button to display TISQ\*\*
19. Turn the dial until the display shows TISQ30
20. Press the UP button 2 times to display S1LV\*\*
21. Turn the dial until the display shows S1LV27
22. Press the UP button to display S9LV\*\*
23. Turn the dial until the display shows S9LV96
24. Press the FW button for 0.5 seconds to store these settings into memory. The radio will return to normal mode.

The reprogramming procedure is now complete.

17-06-2001

## (VX-1R) Continuous single-band RX modification for Yaesu VX-1R

**Author:** Andrew Hobgood / KB1GWQ - [chaos@strange.net](mailto:chaos@strange.net).[MODIFICATION.NET](http://MODIFICATION.NET)

(with limited support for "out of band" TX, ARS, and input monitoring)

**Note:** This mod should more-or-less replace the ADMS single-band monitor mod, but I cannot verify that. This has certain pros and cons that, as far as I know, make it superior to the ADMS mod. See the bottom of the document for some possible implications and technical details, as well as thanks.

1. Switch to FM band, VFO mode.
2. Store 76.000 MHz into PS memory 1L.
3. Store 77.000 MHz into PS memory 1U.
4. Switch to V-HAM band, VFO mode.
5. Store 144.000 MHz into PS memory 2L.
6. Store 145.000 MHz into PS memory 2U.
7. Press M/V, then press UP or DOWN to select memory 2L.
8. Turn dial one notch to remove radio from Memory mode and into PS mode.
9. Press and hold UP until the radio begins scanning through the range.
10. Turn the radio off with the power button.
11. Turn radio back on.
12. Press UP to stop the radio from scanning.
13. Using only the UP, DOWN, and FW buttons and the dial, move to 76.000 MHz.

**Note:** Pressing BAND will kick the radio out of PS mode, and you'll have to repeat starting at step 7.

14. Store the new 76.000 MHz that you just tuned to into PS memory 3L.
15. Go to ACT-2 band, VFO mode.
16. Store 998.000 MHz into 1L, and 999.000 MHz into 1U.
17. Go to the V-HAM band, and enter PS scanning between 2L and 2U, power off, and power on the radio, and stop scanning as in steps 7 through 12.
18. Using the same tuning technique as in step 13, tune to 998.000 MHz, and store it into PS memory 4L. Store 999.000 MHz into 4U.
19. Press M/V to exit PS mode and return to VFO mode.
20. Press UP or DOWN to select memory 3L. Press and hold BAND to enter SET mode, and configure STEP to 5 kHz, RX-MD to FM-N, and SQL TYP to nothing (T, SQ, and DCS do not appear on display).
21. Press and hold FW, select 10L with the dial, and store the memory.
22. Repeat steps 20 and 21 to store memory 4U with new settings into 10U.

You can now delete 1L, 1U, 2L, 2U, 3L, 3U, 4L, and 4U, as they are not needed any more.

By switching to the V-HAM band and doing a PS scan between 10L and 10U, you can access the entire spectrum from 76MHz to 999MHz, without gaps, in any mode or step. As you learned while performing the mod, it is also possible to tune specific stations in that range by tuning without pressing the BAND button. It works much like VFO mode with respect to step, squelch, offsets, and RX mode. After picking a frequency and selecting the tuning parameters, you can also store the frequency. It will place it into the memory bank under the V-HAM band, regardless of frequency.



**What this modification allows you to do:**

- Store frequencies regardless of band all into one band so doing a memory scan will allow you to monitor all of them at once. Put your favorite 144, 222, and 440 repeaters all into one bank for monitoring purposes.
- ARS (Automatic Repeater Shift) will still work, so if you tune a 440MHz frequency under the PS mode in V-HAM, it'll still automatically set the offset to 5 MHz if you have ARS turned on.
- Priority (or Dual Watch) will work with any stored frequencies on the band, even if they are not in-band.
- While in PS mode, if you select a frequency (or repeater with ARS) that is normally within the TX boundaries of the radio, you will be able to transmit as if you were in VFO mode.

**What this modification does not allow you to do:**

- If you store a frequency that is "out of band," you will be able to monitor it, but you will not be able to transmit or monitor the input frequency of a repeater with FW+MON.
- All "out of band" frequencies must be tuned via the PS method. (Duh.) Regular VFO mode will not work to tune "out of band" frequencies.
- In PS mode, when searching through "out of band" frequencies, AT-MD will not work properly, so you will need to turn off AT-MD (from AUTO to MANUAL), and manually set step and RX mode as you scan through frequencies. It's probably a good idea to reset AT-MD back to AUTO after you have done whatever you need to do in PS mode.

**How this differs from the ADMS mod:**

- As far as I know, ARS is completely disabled if you use the ADMS single-band scan modification. I do not own the ADMS software, a cable, or anything else, so I cannot verify this, but a lack of ARS would be a pretty nasty flaw in my mind.
- As far as I know, the ADMS mod requires you to set all of your out-of-band memories from a computer, then upload the frequencies to your radio. That's a little annoying in my book. =)
- This mod also coincidentally gives you \_continuous\_ coverage over the 76-999 MHz range. This has certain implications by now theoretically allowing reception of cellular, cordless, and trunked communications which may be illegal to monitor in your area of the world. Don't do anything illegal, okay, folks?

**Miscellaneous Details:**

Yes, there's likely a much more efficient way to do the programming. I specifically used lots of memories to make it easier for users to do with a minimum of repetition if you mess up.

The modifications has been performed and tested on a US model VX-1R with A106 firmware.

Also, this is based on "The APO Trick" from jeeb@sol.net. I extended and optimized the application of the trick to make the modification fast, easy, and simpler for most users. His technique is a good general way to get any PS range capable to be received by the radio to show up in another band. This bug has been exploited for this mod.

Essentially, we move a chunk of the low end of the band into the V-HAM area, and a chunk of the high end into the same area. We then use those ranges to mark the endpoints of a new, full-band range. Why V-HAM? Well, putting them into one of the -HAM bands where the radio normally transmits allows us to transmit on any memory in that area. So, if you frequent 2m repeaters a lot, but want to monitor UHF repeaters, you can use this technique to store them all in one band. This will allow you to monitor all of them, and still transmit on the VHF ones. If you want to transmit on the UHF ones, switch to the right band and do it. This mod can be performed on the U-HAM band in place of V-HAM by just selecting a different range (444-445 instead of 144-145) and replacing V-HAM with U-HAM in the above procedure.

Let me know if this mod is of any use to you!

Cheers!

/Andrew

|                                                                |                     |                        |
|----------------------------------------------------------------|---------------------|------------------------|
| <b>Date:</b> 07-01-2002                                        | <b>User comment</b> | <b>From:</b> anonymous |
| <b>Subject:</b> european version                               |                     |                        |
| I have tested this mod on euro version A106 and it works great |                     |                        |

**Date:** 11-02-2002

**User comment**

**From:** [Darryl Tidd KC5VZW](#)

**Subject:** Great Mod

I just did this mod on my VX-1R with firmware A105. Seems to work fine.

This modification is read 3800 times.

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**03-03-2002**

**(VX-1R) vx-1r MARS /CAP mod**

In the newer verison VX-1R that is missing the diode pack, you should be able to do a simpler MARS/CAP modification and you will retain the Automatic Repeater Offset finction (TX range not as extensive as the Free-Band mod) by removing the small surface mount resistor next to the "3" jumper, you will need to also do a hard reset as described in the owners manual.

You will not loose the "Automatic Repeater Offset" function by doing the MARS/CAP mod.

This modification is read 508 times.

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**03-03-2002**

**(VX-1R) Determine Firm ware version**

1. Press and hold the AR button while powering up the radio, then press the AR button to step through a test mode, finally revealing the Firmware version.
2. Turn the radio off and back on again to return to normal operation.

If the VX-1R does not reveal any number after repeatedly pressing the AR button, your radio is version A106 (the latest version or later)

This modification is read 468 times.

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**03-03-2002**

**(VX-1R) Greate site for VX-1r and VX-5r**

Here is a link to a great [modification site](#).

This modification is read 634 times.

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**29-01-1999**

**(VX-5R) Some modification does not work.!!**

**Author:** *www.mods.dk* - [mods@mods.dk](mailto:mods@mods.dk).[MODIFICATION.NET](#)

Some has reportet to [www.mods.dk](http://www.mods.dk) that the following modification frm YAESU VX-5R maybe **NOT WORK** with **NEW** radios:

"VX-5R Expanded frequency"  
"PC software MARS/CAP or FREEBAND mods."  
"Expanded range for VX5R."

It looks like Yaesu has change in the radio, so they not can be modify by the above modification.

This modification is read 6509 times.

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**10-02-2001**

## **(VX-5R) TX frequency expansion**

**Author:** Phil Bergan - [philberg@powerbank.net](mailto:philberg@powerbank.net).[MODIFICATION.NET](http://MODIFICATION.NET)

Recently purchased a VX-5R.

Looking at the other mods on the internet for this rig, if you find the 8 solder pads behind the barometer lid; unsolder the middle two that appear to be shorted.

Then reset the microprocessor. Check your owner's manual for reset procedure.

Mod complete.

Excellent coverage!

TX 108-221.950 MHz & 303-580 MHz.

To perform a full reset by holding [MR] ; [VF0] ; [4] at the same time.

This modification is read 6958 times.

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**22-03-2001**

## **(VX-5R) Use Nokia 7110 Belt Clip for an VX-5R**

**Author:** Oki Jamhur Warnaen - [Oki@jsx.co.id](mailto:Oki@jsx.co.id).[MODIFICATION.NET](http://MODIFICATION.NET)

This is Very Easy, just use Handphone BeltClip with a little modification you can Use it for Yaesu Vx-5R (I used Belt clip for Nokia 7110).

Here is the picture show you how to do it



This modification is read 5515 times.

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**27-03-2001**

## **(VX-5R) VX 5 R modification for German**

**Author:** Thomas Dann - [thomas.dann@t-online.de](mailto:thomas.dann@t-online.de).[MODIFICATION.NET](http://MODIFICATION.NET)

Mod for the German Version to use the 6m Band

1. Remove Battery and the cover for Pressure Sensing Unit ( SU - 1 )
2. Locate solder pads on lower side
3. Remove solder from the 6th pad and the 8th pad ( counting left to right )
4. Now soldering the 7th pad
5. Reassemble the radio and reset the microprocessor

Mod complete

Viel Spass !!!

This modification is read 5024 times.

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**11-05-2001**

## **(VX-5R) Vx-5r Free Band**

**Author:** Humberto Gonzalez - [ce3sur@terra.cl](mailto:ce3sur@terra.cl).[MODIFICATION.NET](http://MODIFICATION.NET)

Mod for the new generation´s of Vx-5r serial no. 0E280926

1. I locate solder pads on lower side
2. My Vx-5 have solder the 4th and the 5th pad
3. I remove solder from the 5th pad
4. I reset my radio.

Now my Vx-5 is free band tx-rx

73´s CE3SUR, Humberto Gonzalez  
[ce3sur@terra.cl](mailto:ce3sur@terra.cl)

This modification is read 7923 times.

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**14-06-2001**

## **(VX-5R) VX-5R Loose antenna "cure"**

**Author:** Glenn - [gcerny@megsinet.net](mailto:gcerny@megsinet.net).[MODIFICATION.NET](http://MODIFICATION.NET)

My VX-5R like many others had a chronic loose antenna.

I bought a male smc connector with a 6 point nut for 3.00 at a hamfest and replaced the old spanner type nut with the 6 point. I also used the small washer that came with the new connector under the nut. Using a 8mm - 6 point Craftsman thinwall socket and a firm but gentle twist is all it takes to snug the nut down.

It has been over 2 months and several antenna swaps and the connecor is still tight.

This simple and cheap mod has made the radio much more enjoyable and no more worry about blowing the finals.

One final note: The socket needs to be a quality 6 point thin-wall. The Craftsman 12 point and even their 6 point nut driver



would not drop into the antenna recess. I imagine any higher quality 6 point socket should work just fine.

Good luck and 73  
Glenn Cerny KB9WCM

This modification is read 5633 times.

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**18-06-2001**

**(VX-5R) VX-5R expanded frequency mod**

**Author:** *Kirk Ellis KI4RK*

After performing the reset on a VX5-R (pressing [VFO] + [MR] + [4] + [PWR], the radio only receives and transmits in the 6M, 2M and 79cm hambands, try this to restore full coverage:

Press [BAND] + [HM/RV] + [TX PO} and [PWR] simultaneously.

I had to do this to restore all 11 bands and enable out of band Transmit after performing the VX-5R expanded frequency mod.

Kirk Ellis KI4RK

This modification is read 8197 times.

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**03-03-2002**

**(VX-5R) Greate site for VX-1r and VX-5r**

Here is a link to a great [modification site](#).

This modification is read 1151 times.

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**28-03-1999**

**(VXA-100) How to program the Book memories (without the compter interface)**

The PC Programming Kit is our item CT-64. It includes the serial data cable and the programming software (MS-DOS - based) for the VXA-100.  
Suggested retail is \$99.00. Contact a VXA-100 dealer to purchase this.

You can program the book memory section without the software if you wish. You might or might not have received a half-page sheet explaining this inserted into your Operating Manual

VXA-100 - BOOK Memory Programming Procedure

- Press and hold the PTT and LAMP switches while powering-on the radio to activate the FIELD programming mode. The letters "Fd" appear in the upper left corner of the display.
- Dial or key in the desired frequency to program into memory.
- Press and hold the [MW(SPL.W)] key (on the Aviator Pilot model) or the [MW(SKIP)] key (on the Aviator Pro model) for 2 seconds. The display will show "BOOK \_\_\_" and a channel number in blinking letters.  
An underline appears in the display after the word "BOOK" to indicate currently vacant memory channels.
- Within five seconds, rotate the CHANNEL selector knob to select the desired channel number into which you wish to store this frequency.  
If five seconds elapse with no activity, the channel selection mode cancels.
- Within five seconds of selecting the desired channel number, press and hold the [MW(SPL.W)] or [MW(SKIP)] key as appropriate for two seconds. The frequency is now programmed into the selected memory slot.

- The display will now show a row of eight zeros with the first digit blinking. Rotate the CHANNEL selector knob to scroll through the available characters. When the desired character is displayed in the blinking position, press down on the VOLUME knob to enter this character and move to the next position.
- Select succeeding characters for the alpha/numeric name in the same manner, pressing down on the VOLUME knob after each selection.
- After entering the last desired character, press the [MW(SPL.W)] or [MW(SKIP)] key as appropriate for two seconds. This will save all data into this BOOK memory channel.
- The radio now returns to the frequency tuning stage. Select the next frequency desired per the above instructions.
- When all desired BOOK memories are programmed, power-off the radio to exit the FIELD programming mode. When powered-on again, the radio will enter the normal operating mode.

#### VXA-100 - BOOK Memory Programming Procedure

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