Modification Sheet	Jochen Heilemann (DG2IAQ) German Amateur Radio Station	

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

Introduction

I started on doing modifications of CB- and HAM-radios since 1980 at the age of 12 years. I mostly wasn't satisfied with the sound of the modulation or reception of my rigs. This is normally founded by restrictions of the local law or by rationalize productions. Only expensive high-class amateur radios have a good sound.on their basic state.

Therefore there must be some possibilities for improvements. So I learned the basics of RF electronics on myself and did a lot of modifications until today and I would like to spend my experiences to all other electronic interested people, CB- or HAM-radio stations.

You have to recognize your local laws. Mostly modifications aren't allowed by the local law or by the manufactures. So you do it on your own risk. Also the brandnew HAM rigs are mostly build with a lot of teeny-weeny SMD parts. You have to use special equipment and you also must have a great expert knowledge. So some modifications aren't for only hobby electronic technicians.

So this and all of my Modification Sheet are for education purposes only !

All pix with Fujifilm „FinePix 6800 Zoom“ on resolution „6M/Normal“. Pictures reduced for this publication to 640x480.

Modification Sheet	Jochen Heilemann (DG2IAQ) German Amateur Radio Station	

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

General

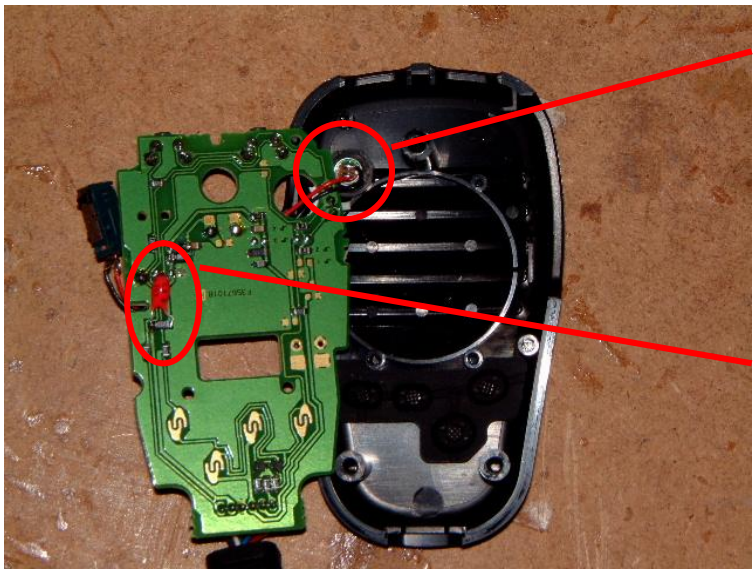
Modification Sheet	Jochen Heilemann (DG2IAQ) German Amateur Radio Station	

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

Transmitter



Remove the electret microphone capsule and **remove their black foam** in front of the capsule. Also **remove the additional black foam in the mic hole** of the mic front.
Reassemble the electret capsule.

→ more heights, no more „foam“ modulation, much more clearance

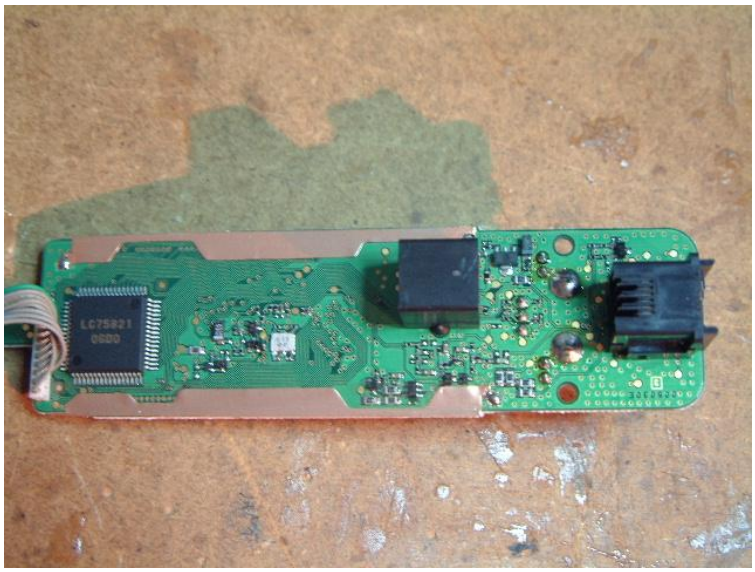
Solder a **1µF electrolyt capacitor** over the output electrolyt capacitor (0,1µF) for more basses.

The direction of the electrolyt is like in the left view:

- O +

Please only do this by using the FT-7100 at home !!
The audio is more natural and has more basses. The distance to the mic can vary in a wider range without loosing too much audio volume.

But on mobile operations the car noise is raising about more than 70% !! So I get the experience that the mic is working in its original state much better on mobile uses that the modified one.



Now remove the Panel-Unit.

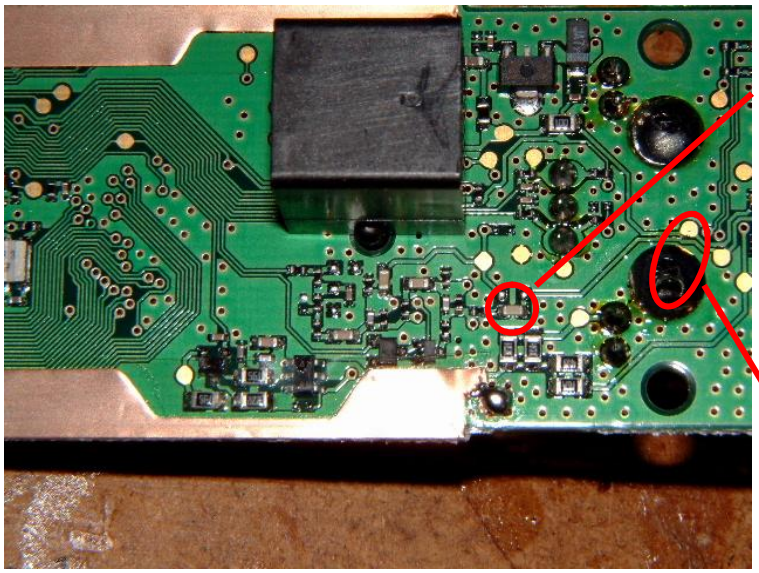
The following modification will get the most drastic improvement for the modulation sound.

Modification Sheet	Jochen Heilemann (DG2IAQ) German Amateur Radio Station	

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver



Solder a **100 nF** electrolyt capacitor **parallel to C2062** (5,6nF) on the Panel-Unit.

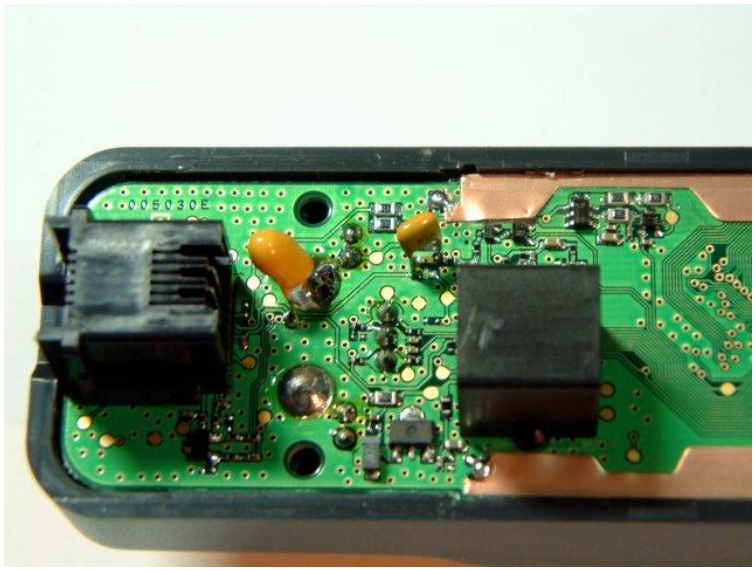
This gives much more basses, volume and loudness. You now can't compare the modificated rig to the original sound before !

- O +

Values can be between 100nF or 4,7µF, depending on the sound of your voice and your personal prefer. *Remark on 13.10.2002: Better use a **100nF** type.*

Add a **10µF/16V** capacitor here to suppress RF problems by using the 9V line for voltage supply of a external microphone. Plus toward the thin line, minus to the big solder point.

+
O
-



Now it looks like this.

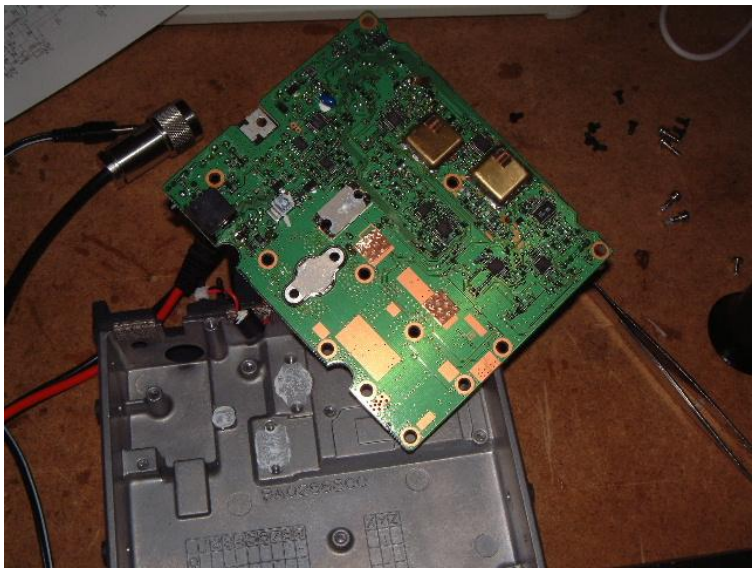
Reassemble the Panel-Unit.

Modification Sheet	Jochen Heilemann (DG2IAQ) German Amateur Radio Station	

Yaesu FT-7100M

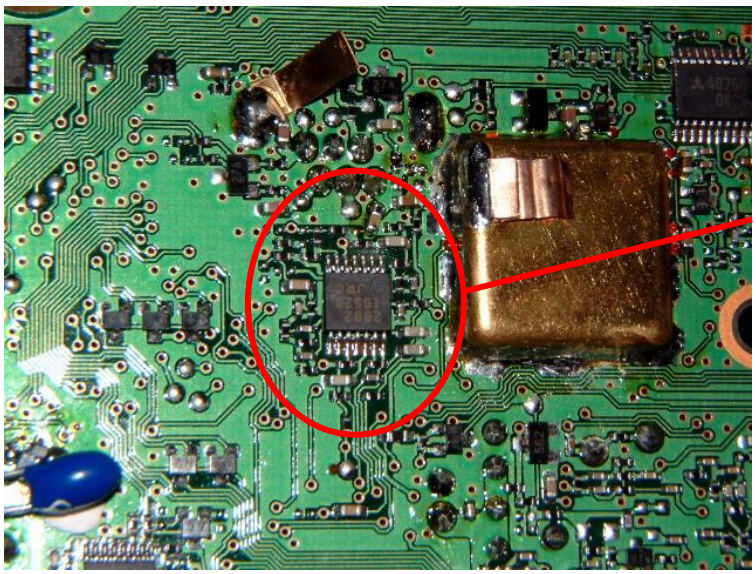
Version 1.4

VHF/UHF Duoband Transceiver



For the optimum of sound clearance I opened the TX af lowpass filter.

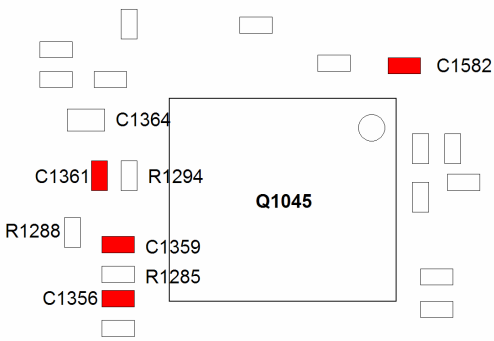
First you have to remove the Main-Unit.



So that's a very critical mod, cause the SMD parts are very, very small and near each other.

Be careful !!

Now have a closer look to this area.



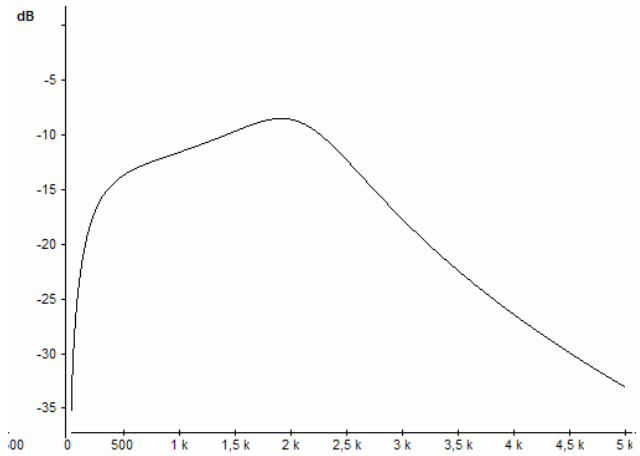
locate:

- C1582
- C1361
- C1359
- C1356

Yaesu FT-7100M

Version 1.4

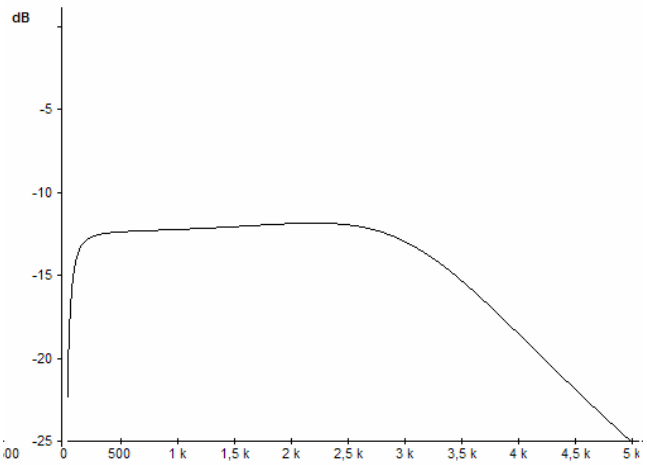
VHF/UHF Duoband Transceiver



af filter curve before modification

You have to check and maybe re-align the FM deviation after these mods !

Mod variety 1



af filter curve after modification:

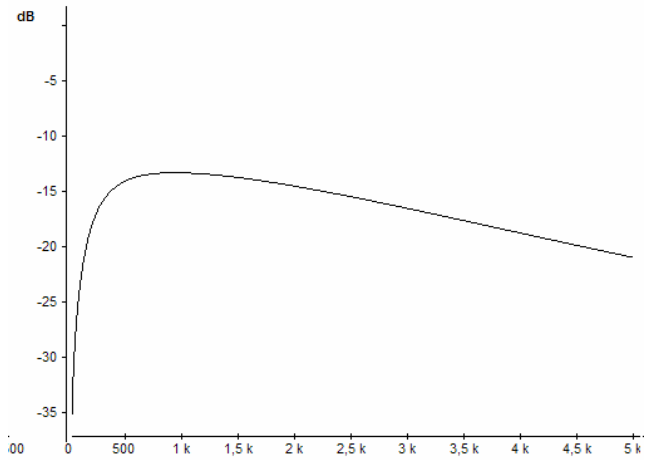
- **Change C1582** (4,7nF) **to 22nF**
- **Change C1356** (33nF) **to 15nF**

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

Mod variety 2

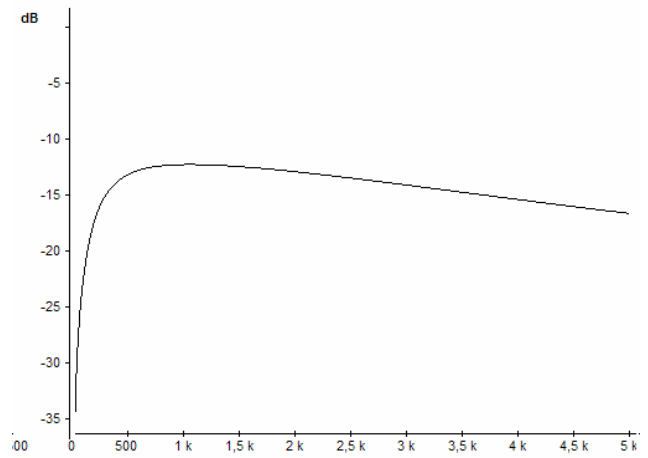


af filter curve after modification:

- **Change C1582** (4,7nF) **to 22nF**
- **Remove C1356** (33nF)
- **Remove C1359** (1nF)

Good results as base station with my desktop microphones "Astatic D104 Silver Eagle" or "Zetagi MB+5", cause they originally have a shrill sound. So this lowpass curve compares this effect a little bit.

Mod variety 3



af filter curve after modification:

- **Change C1582 (4,7nF) to 22nF**
- **Remove C1361 (10nF)**
- **Remove C1356 (33nF)**
- **Remove C1359 (1nF)**

This opens the lowpass filter totally for the whole spectrum of your voice. The modulation sounds as clear as possible.

Modification Sheet	Jochen Heilemann (DG2IAQ) German Amateur Radio Station	

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

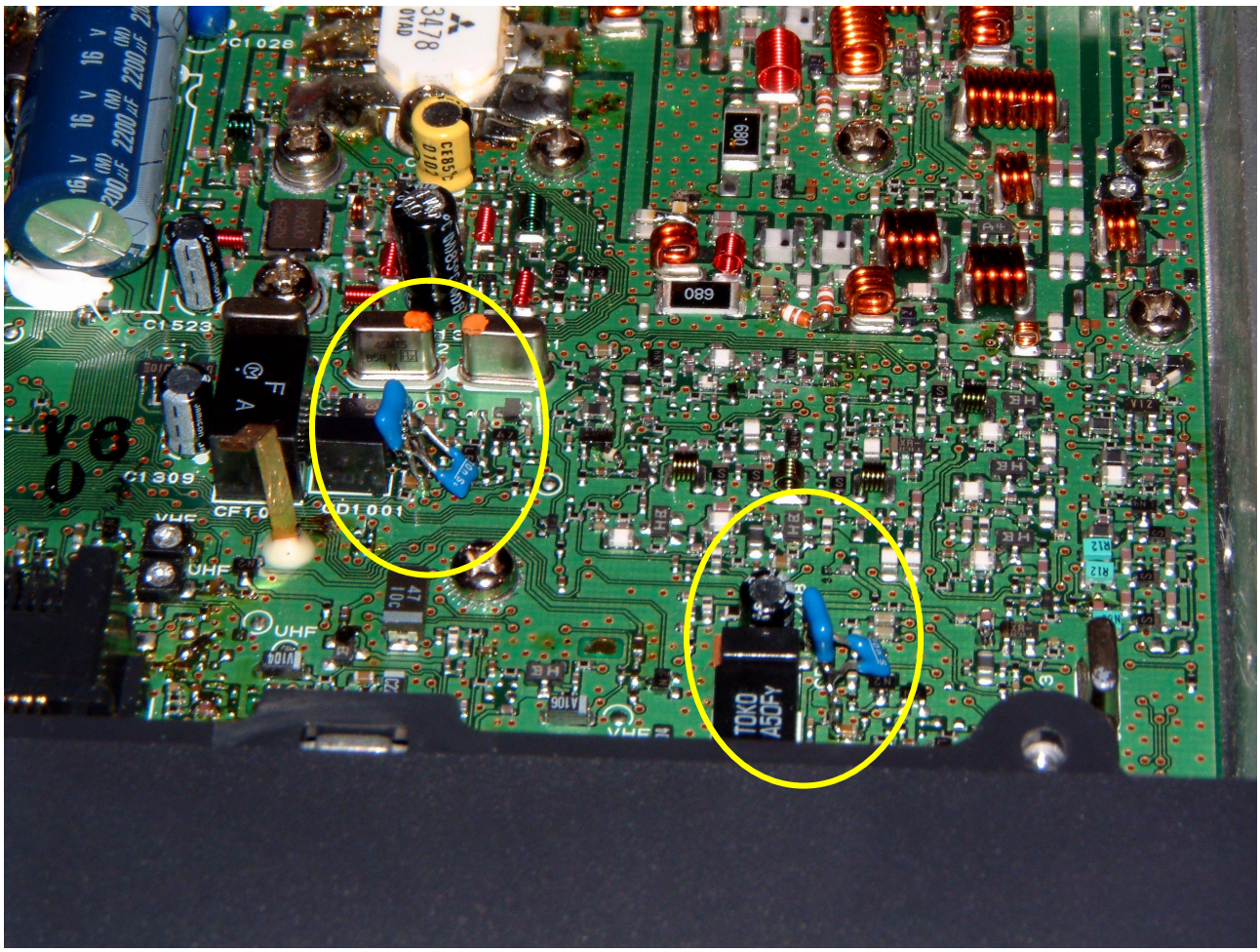
Receiver

-- nothing to do, I'm satisfied with the sound and the volume --

or if you like to remove the darkness:

Change C1333 (100nF) to **22nF** for VHF-RX

Change C1277 (100nF) to **22nF** for UHF-RX



I first did some tests with 10 nF capacitors but the sound was to sharp and the heights were too shrill for me. And the FM noise is raising too, of course.

So finally my best results are with 22 nF capacitors which give a af lowpass of about 1,5 kHz.
The original af lowpass was down on about 500 Hz !!! It is compensated by af highpasses which suppress the basses but the resulting "middle" sound wasn't satisfied for me. So I easily put a 10 nF capacitor parallel to each, therefore you can see 4 caps in the picture.

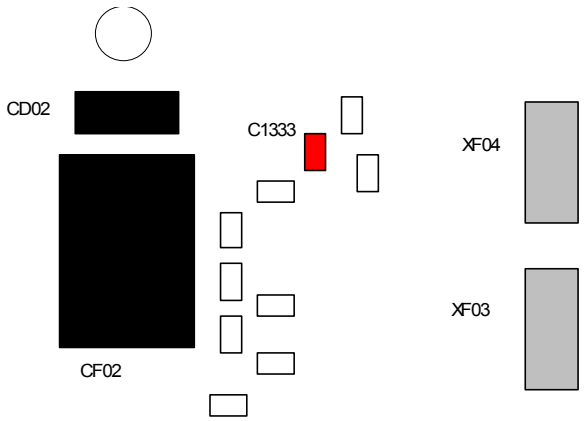
With this modification you should get best results for mobile operations too cause a clearer and brighter sound is much better to understand in loud vehicles than the original dark sounds. And the raised FM noise doesn't matter in the car and even not at home. On most times the squelch is closed anyway, so the better audio result is the only difference.
I did those RX mods to all my mobile transceivers or handhelds and have best RX audio results, even with dark modulations of the conversational partners or while driving fast on the German "Autobahn".

Modification Sheet	Jochen Heilemann (DG2IAQ) German Amateur Radio Station	

Yaesu FT-7100M

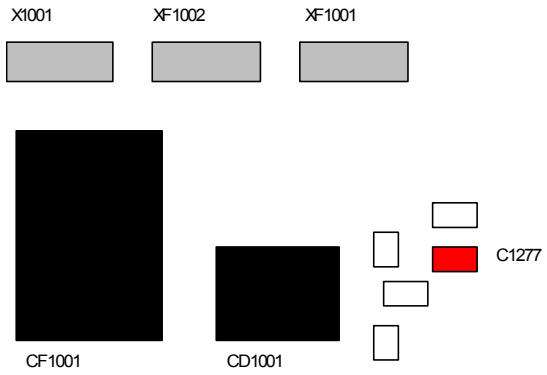
Version 1.4

VHF/UHF Duoband Transceiver



VHF modification

Change C1333 to 22 nF



UHF modification

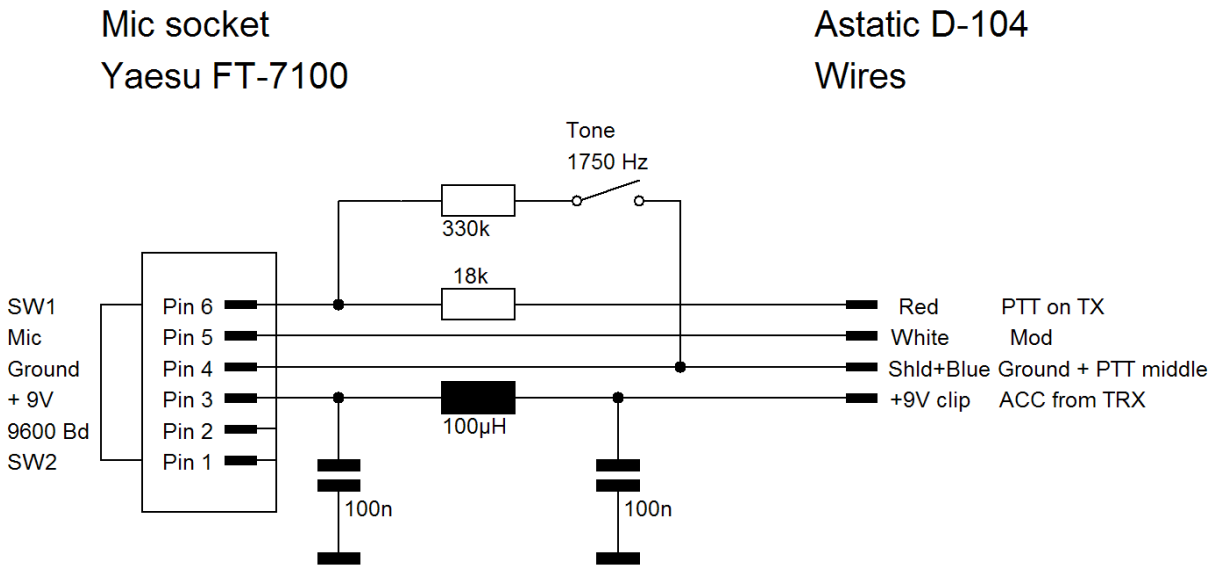
Change C1277 to 22 nF

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

Astatic D-104 Silver Eagle base microphone



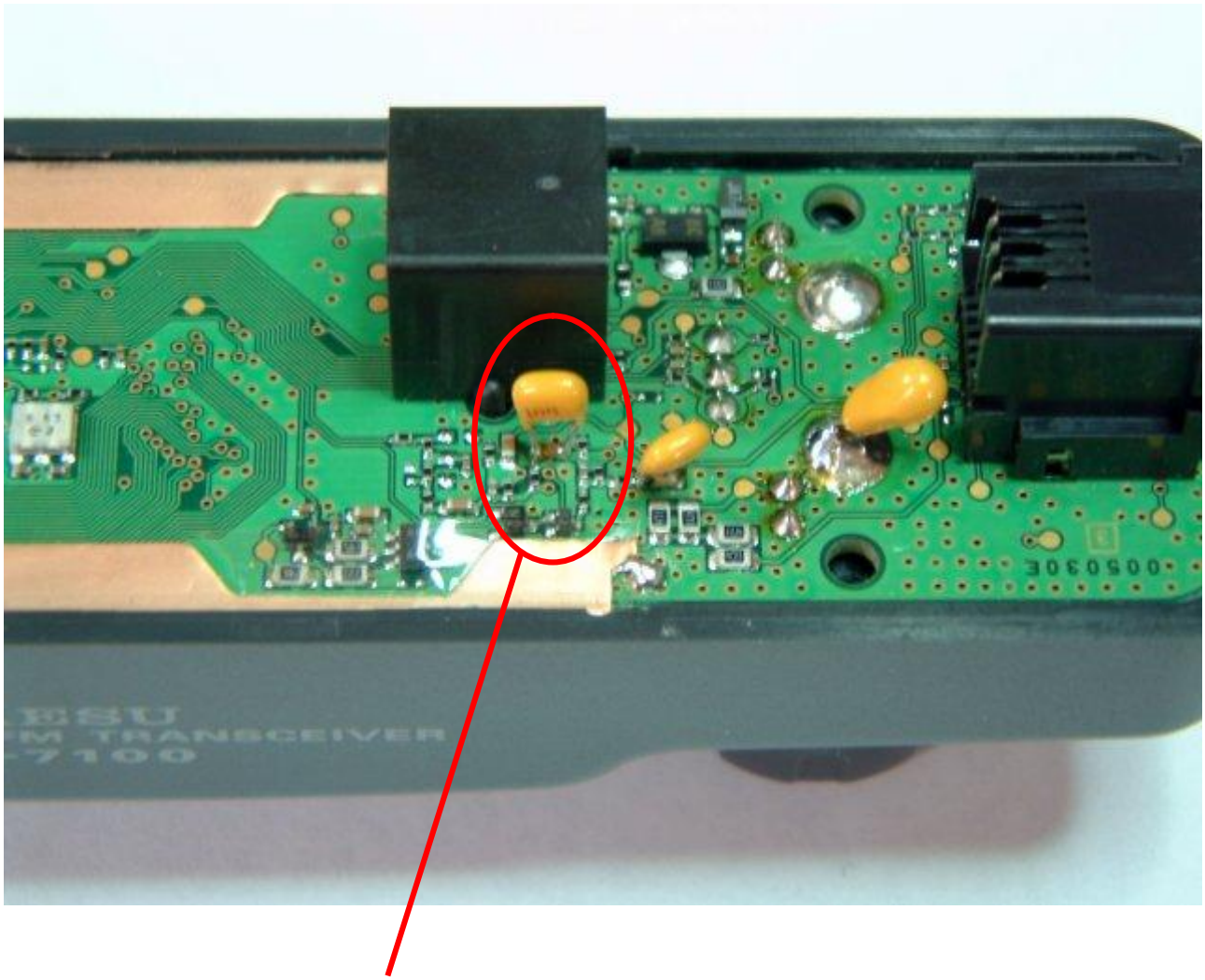
I did some audio modifications to my D-104 to get the (originally lost) basses and to get a better audio on FM. Now I've got a loud crisp clear power modulation on VHF/UHF without any problems.

When I read all the negative articles about the FT-7100 on www.eham.net those people wouldn't believe me that, hihi.

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver



Only by using a Astatic D104 Silver Eagle with its high and crisp sound I got even better results by changing C2057. I soldered another 100 nF parallel to it to get even more basses.

But the sound with the original handmike would be too dark, so you should only do this by using crystal microphones.

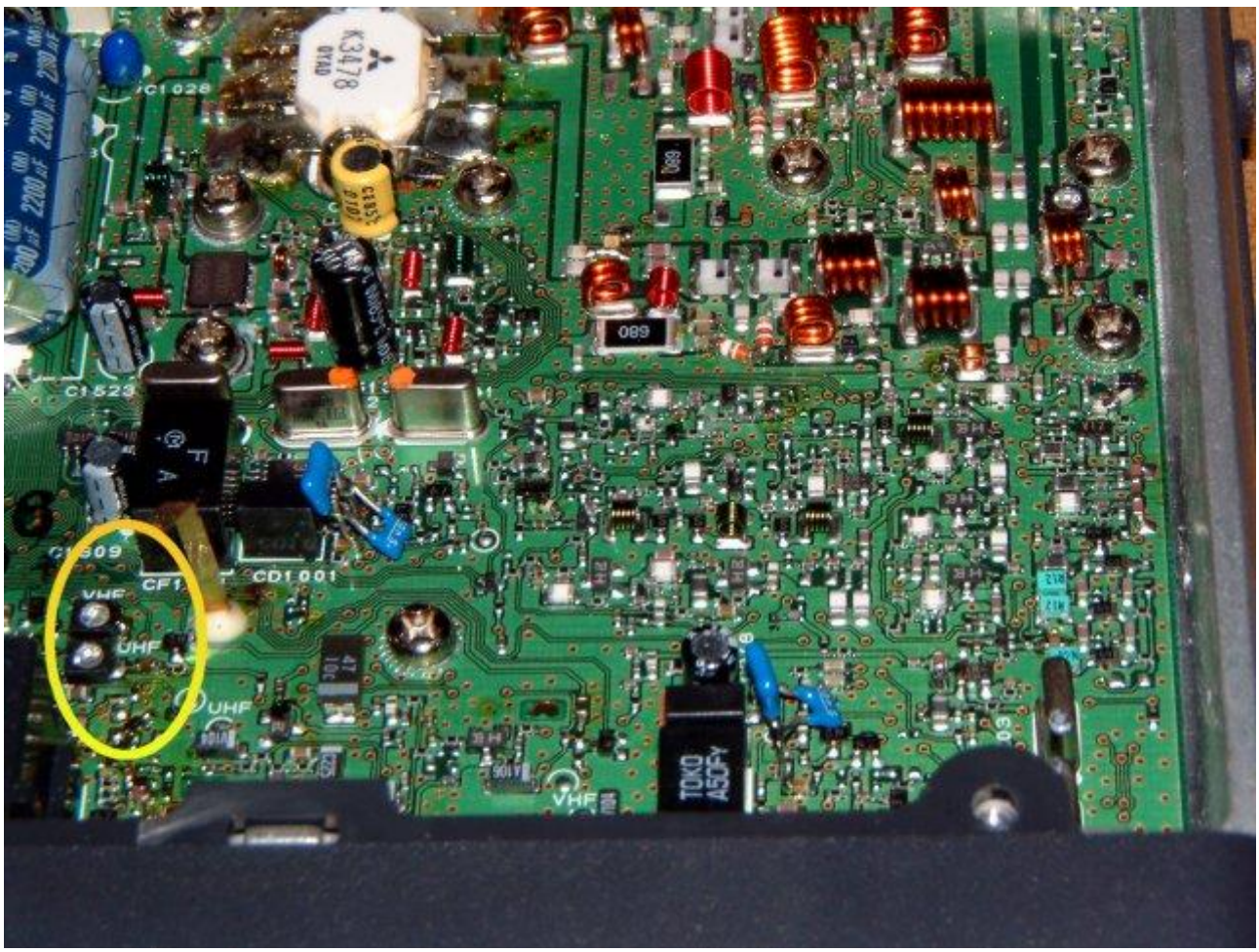
Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

Alignment

VR1001	UHF deviation	see below
VR1002	VHF deviation	see below
VR1005		



The pots are SMD pots. So they don't have a mechanical stop at their electric end ! You can turn them 360° and not only 270° like the normal pots. **But they can't be damaged**. If you would turn too wide the modulation will stop immediately. Then you have to go back a little bit until the modulation is coming back. But normally you shouldn't go to the maximum range.

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

Document History

Version 1.0	06.08.2002	My first hands-on experiences
Version 1.1	02.09.2002	Overworked TX af lowpass filter for better and clearer modulation. Add some diagnostic images of my used filter calculation program “Win-Elektronik 3.0” (from Erwin Rössler).
Version 1.2	13.10.2002	Change C2062 to parallel with only 100nF Not with 0,47µF Electrolyte like before in Version 1.1, cause of some growl, less and too dark modulation with the original handmike cause of a mismatch with the electret capsule of the original mike. But that was no problem with my Astatic D-104 base mike. It only happens with some types of microphones. Add a 10µF Elektrolyt between PIN 3 (+9V) and PIN 4 (Ground) of the mic socket. That suppresses some RF swinging by using the 9V line for the voltage supply of a microphone. I modified my Astatic D-104 Silver Eagle to get the 9V from the FT-7100 to save the internal battery and get the same maximum modulation output at any time of usage.
Version 1.3	26.01.2003	RX modifications for better audio and more heights. I mainly do this to get best audio results cause my FT-7100 now works as my Echolink linkstation too. You can connect me when I’m online: **DG2IAQ-L** node **#69306**
Version 1.4	21.02.2003	No Mic modification on mobile operations. The car noise is raising too much. Description of the deviation alignment pots. Additionally changing C2057 by using a Astatic D104 Silver Eagle base microphone.

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Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

Disclaimer • Disclaimer of liability

This modifications mostly need to be done by a electronic profi who had enough practise and who has knowledge in SMD soldering. **You do the modifications on your own risk !**

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Jochen Heilemann
P.O. Box 1106
D - 75218 Niefern-Öschelbronn
Germany

e-Mail : DG2IAQ@WEB.DE
Fax : +49 (1212) 5-346-52-897

Callsign : DG2IAQ
DOK : A51 („Die Rassler“)
Locator : JN48JW Latitude 48.917(N) • Longitude 8.783(E)

Yaesu FT-7100M

Version 1.4

VHF/UHF Duoband Transceiver

Remarks