

Modification Sheet

From German Radio Amateur
Jochen Heilemann (DG2IAQ)

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Dragon SS-201

Version 1.2

25 - 30 MHz AM/FM/SSB Handheld Transceiver, 4 - 6 Watts

Introduction

The beautiful handheld transceiver came with a very quiet and low modulation. The original FM deviation was only 1,5 kHz on mine ! With the FM deviation pot on maximum ! Normally you should have a maximum to 2,5 kHz for german cb transmissions or about 5 kHz for amateur radio use.

Even the modulation sound wasn't good enough for me. I prefer a loud and clear modulation with a sound like the original voice. Also the receiver had to have a more higher sound for recognizing signals in a little loud environments. With more heights in it, I can better understand poor stations. But that's your own prefer.

With this modification sheet I had enhanced the transmitting sound, the modulation loudness and the receiving sound. Only the fm modulation is still a little too dark for me. But I can't find the fm lowpass filter, cause the fm part isn't drawn in the circuit diagram. I only found it in the circuit diagram of the german version called ALBRECHT AE-201S. But the pcb is difficult at these parts. So with my mod and with original fm lowpass I get about 2,5 kHz deviation with much more microphone sensitivity.

You mustn't shout anymore !!!

And with this I mean the original build-in microphone or a external one. You could use preamp mikes of course, which give even more amplification and loudness. But I would like the handheld to work properly with the build-in parts cause in some cases you don't have a preamp mike beside you.

For my mods I only have the circuit diagram of DRAGON SS-201 from:

<http://www.mods.dk/mod/other/ss201ed.pdf>

and the circuit diagram of ALBRECHT AE-201S form:

<http://www.albrecht-online.de/service/Amateurfunk/SS-201/>

If someone has a better or more detailed one, maybe with the fm part or with a pcb layout please send it to me !

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General

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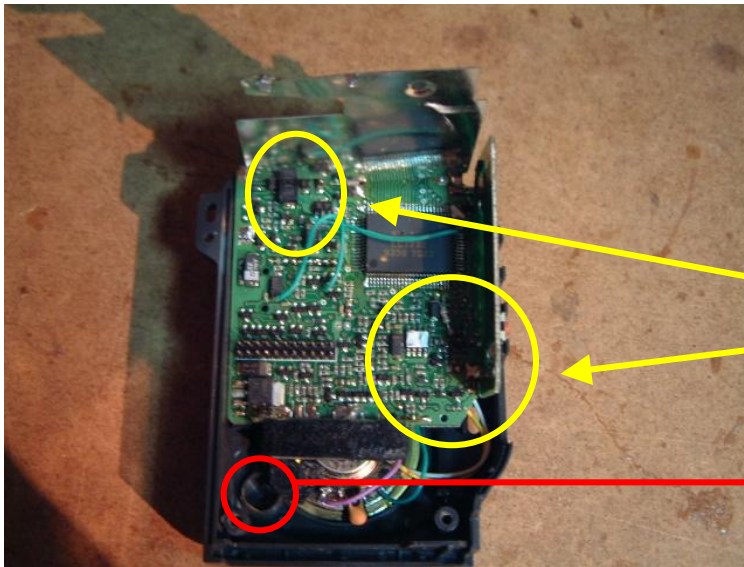
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Transmitter



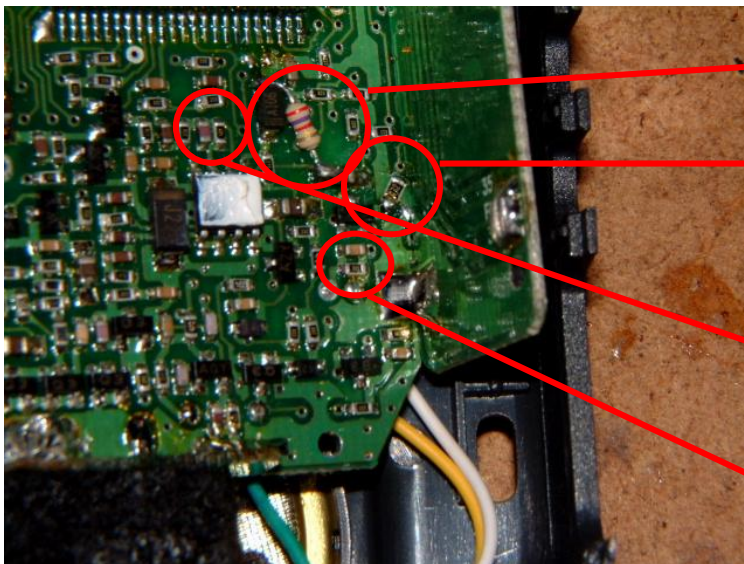
Position the rig like this. You have to do the changes on the back of the frontside of the rig.

Unsolder the 4 points of the metal plate and open it to the top or unsolder all and remove the metal plate.

For the **RX mods** we have to go to this area.

For the **TX mods** we have to go to this area.

I removed the electret mike and drilled the mic hole up to about 3 mm for better an natural sound input. The original 1 mm hole was to small for my opinion.



Change **R472** to **10k** –yes, the big one- (more af output after mic amp. IC412B)

Remove **R444** (was parallel fm deviation pot RV401 and reduces the fm modulation)

Change **C448** to **68p** (the left, brown)

Change **R473** to **680k** (the right, black)

Gives a higher amplification to the mic amp and opens its lowpass-filter from 2.8 kHz up to 3.4 kHz). On mine I only changed C448 yet and let R473 on the original value of 470k. This works fine. If I think I must have more preamp gain I will change R473 later.

Change **R483** to **10k** (the black one)

It's the internal PTT-Pulldown resistor parallel to the internal electret mike. This is the reason why the internal mike is much gentle like a external one. External mikes mostly have PTT-resistors of approx. 4,7 – 10k. The internal was a 2,2k and reduces mic sensitivity dramatically.

You maybe also have to change the PTT-Pulldown resistor of a new external handmike to 10k for encreasing gain. Some mini-handmikes come also with only 2,2 – 3,3k.

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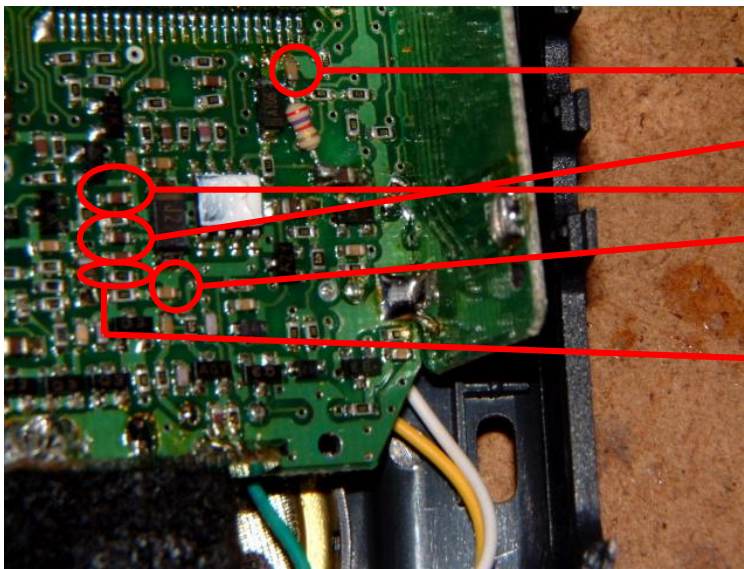
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Open FM lowpass filter:

remove C465

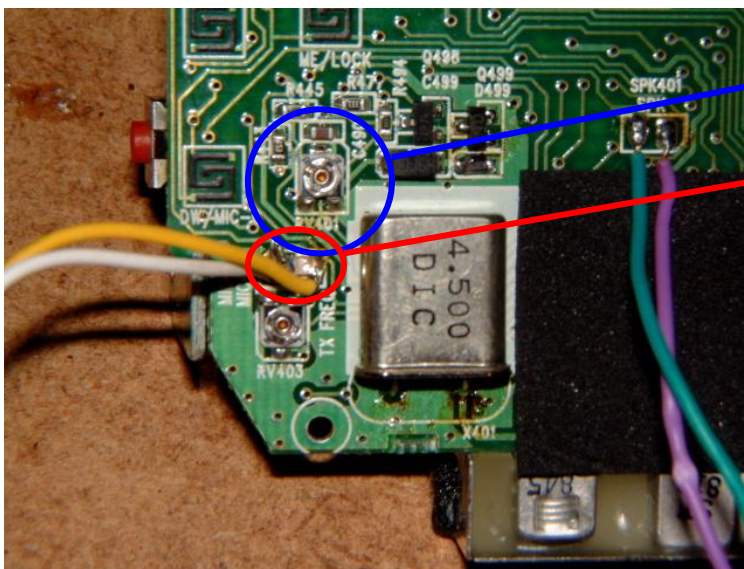
remove C466

remove C467

remove C469

remove R453

Now the FM mod has more heights, clearance and volume.



After this mod I put the fm deviation pot VR401 to the maximum (turn left). Mine has peaks now to about 2,5 kHz deviation (original peaks were only 1,5 kHz !).

On my rig there was **another capacitor parallel to the electret mike** and not shown in the circuit diagram. I **removed it** and the modulation rised up significant !

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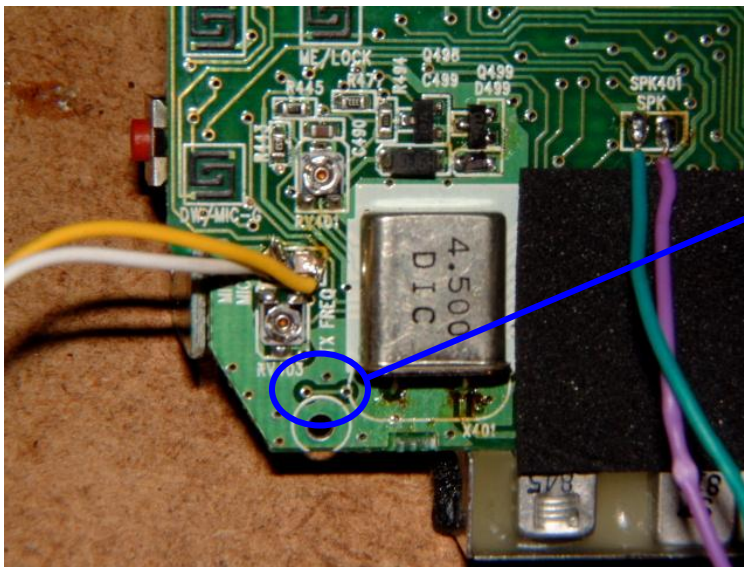
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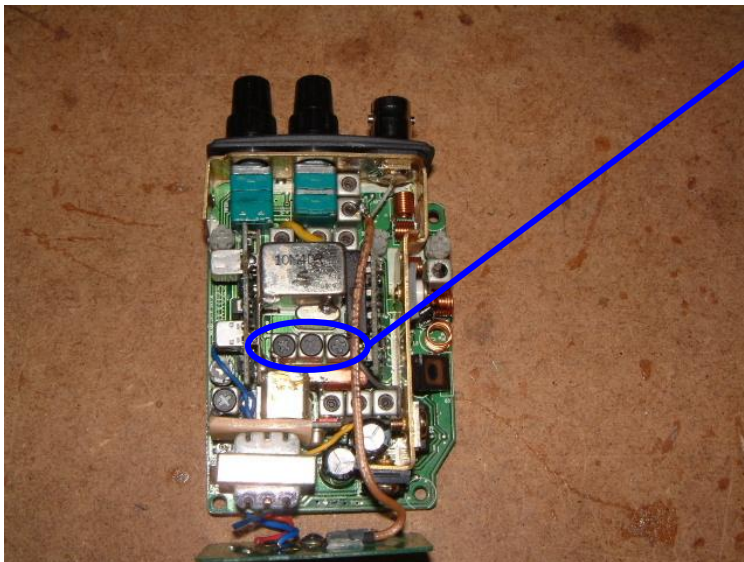
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Now I mounted all pcb's and switch the rig on. I go on FM and send to a dummy load.

- Center clarifier
- Put a DC meter to this short pcb line (= measure point)
On receiving you should readout a voltage of about 1,68 V. The exactly voltage doesn't matter, but the clarifier has to be in the middle position to get the correct receive voltage.
- Now transmit while recognizing the DC meter. **Adjust RV403 for the same voltage as in receiving mode.** Change between tx and rx a little bit until the difference is about max 0,2 V. This is a not critical tolerance.

Now your rig has the same transmit and receiving frequency and has no offset or leakage (...like some cheap ssb export radios in germany...). My SS-201 had a tx voltage of 2,15 V with a receive voltage of 1,68 V !!!
Good DX I say with this good conditions, hi...



After we send and receive now on the same frequency I checked the total frequency.

T6	T7	T8
AM/FM	LSB	USB

On AM/FM you could readout the tx signal with a frequency counter. But my SS-201 worked fine.

On USB + LSB I send with the dummy load and heard the signal in my exactly amateur radio. Therefore I used headphones. While transmitting I adjusted T8 for best USB and T7 for best LSB signal sound without bass swing and without chirp. So when the signal sounds a little bit like FM or AM sound, the frequency should be right.

I always aligned my rigs with this method and never had any problems.

But you must have a exactly reference receiver for this. without a frequency drift or frequency offset.

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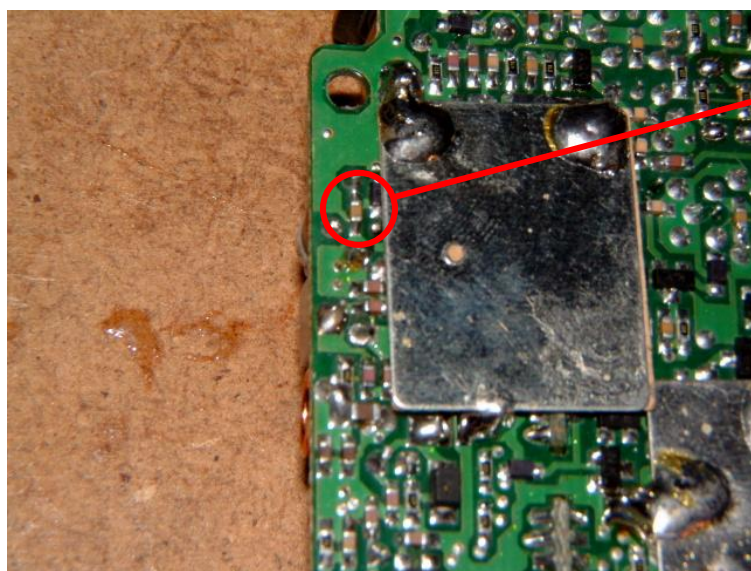
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Replace **C26** with a higher value to give the tx s-meter a better average readout.

I tried a **100n** and it works fine. If you probably use a 1μ the tx s-meter would work as a P.E.P. power meter on tx. This might be useful for ssb tx readout.

But 100n was the better choice for me.

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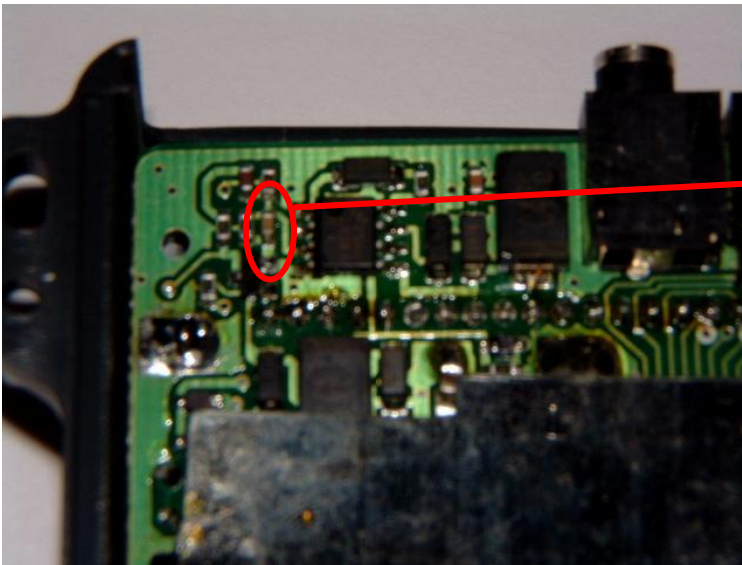
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Receiver



Remove **C407** or change it to **1,2n**.

This gives more heights. Af lowpass with original about max. 500 Hz, after mod at about 2,8 kHz. Receiving signal is much clearer and louder on all modes but the fm noise doesn't raise to much cause of another af lowpass for fm IF amp.



Solder a **1n - 1,5n** (not critical) capacitor between the both ends of the VOL pot. That means parallel to the vol pot.

This will also reduce noise over about 3 kHz and improves the signal noise ratio.

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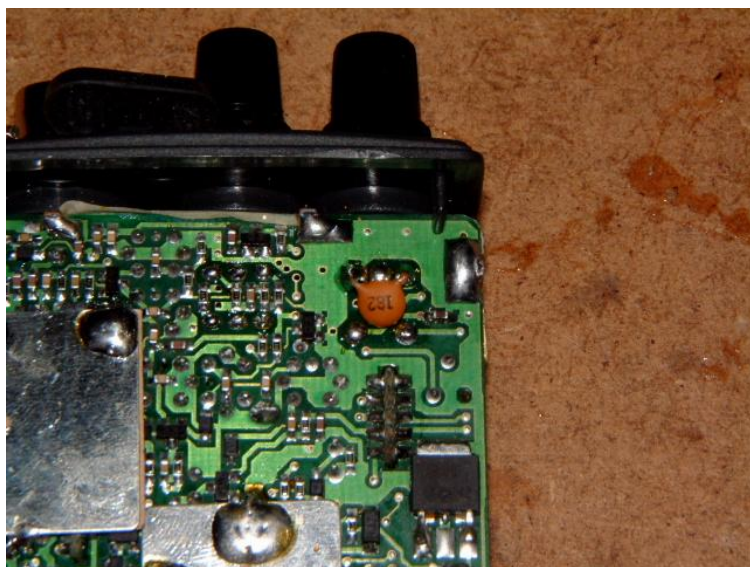
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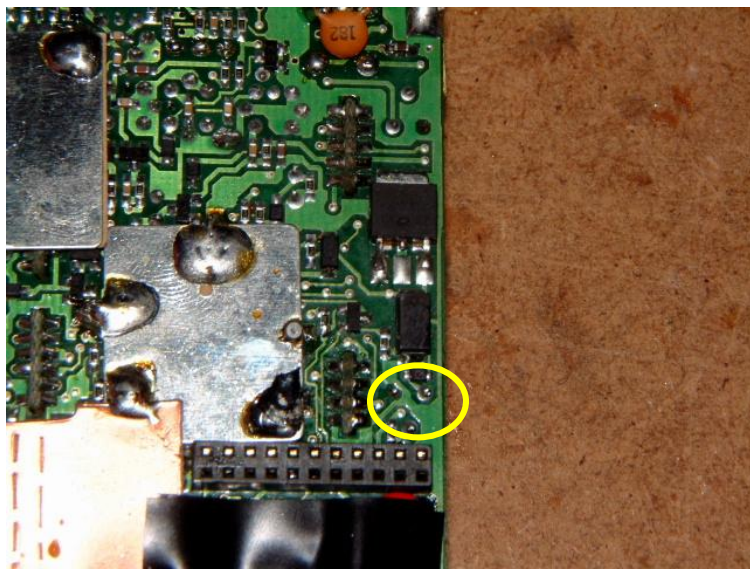
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I only had a 1,8n and it works fine.



Now it's time to also give the rx s-meter a better average readout.

Locate the three pins of the rx s-meter.

Solder a **100n** capacitor from the right (middle) pin to ground.

So the capacitor is between the cathode of diode D10 and RV1 to ground.

You also can do little experiments by using higher values. This would give the rx s-meter also some P.E.P. readout.

But 100n was o.k. for me and the receiving signals now give more exactly readouts.

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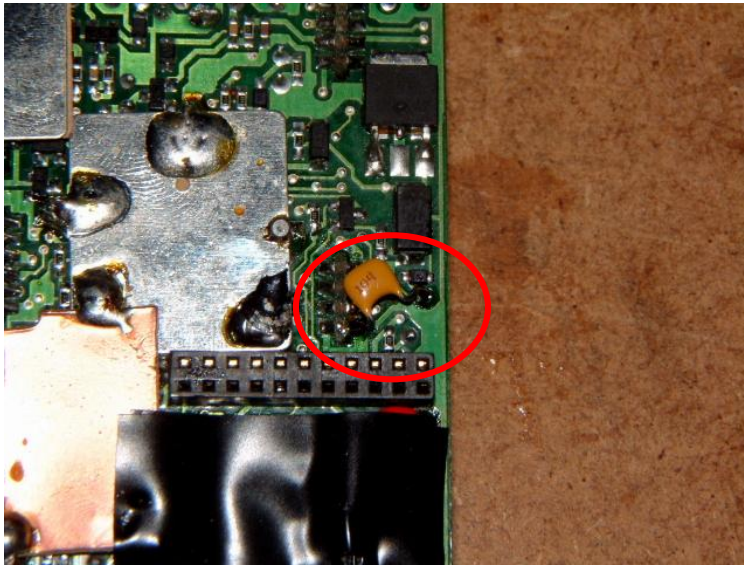
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I solder a small ceramic type.

For ground connection I used the last pin of the left pcb (4 pins, the lowest pin has ground contact, you see it on the pcb)

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Alignment

RV1	RX Meter	
RV2	Squelch	
RV3	TX Meter	
RV4	SSB ALC	
RV5	AMC (AM Mod)	
RV401	FM Deviation	turn left for more deviation
RV403	TX/RX frequency offset	must be „0“
T6	AM/FM Carrier	
T7	LSB Carrier	
T8	USB Carrier	

For further informations have a look at

<http://members.tripod.com/Malzev/cbrn/ss201.htm>

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Document History

Version 1.0	10.06.2002	my first hands-on experience
Version 1.1	12.06.2002	open mike hole to 3 mm tx s-meter average readout rx s-meter average readout 1,8n parallel vol pot new „remarks“ page at end of document
Version 1.2	03.08.2002	better and louder FM modulation (C465, C466, C467, C469, R453)

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You do the modifications on your own risk !

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Remarks