

MCHF Building tips!

I am by no means an expert, but this is my experience in the building of the wonderful mCHF radio by Chris MONKA.

This is the neatest radio I have ever had. It is amazing in what it will do, and a real fun experience (albeit a trying one at times hi hi) to build and get working.

OK, here we go!

If you bought the kit from Chris MONKA with all of the parts , you will pleasantly find that they are separated into 2 bags RF and U board SMT and RF and U boards Post assy parts.

If you bought just the boards bare and ordered all of the parts. I STRONGLY recommend that you get a bunch of little zip bags and do the same.

NOTICE!! If you are going to want to run more than 5 watts, you need to change all of the RF circuit caps to 200v caps.

**Check the RF Board schematic, there is a note for each circuit that needs these changed
Power amp, LPF, Ant switch**

Sort your parts by value eg.. all of the .1 uf caps in one bag for each board and mark which parts they are (C1, c2 etc...)

The RFC's were in with the resistors.

NOTICE! There are parts in the kit that are for optional circuits!! Like R47b ,c d, and e. DON'T install them, it will mess you up!! (Don't ask!)

I know this sounds like a pain but you will be happy that you did it!

Step 1:

Install the CPU first. This is the most critical component on the board. If it don't work nothing works! There are several methods for mounting SMD chips, you can see YOU TUBE vids of this, take the time to watch them!!

After it is installed CHECK and CHECK and then CHECK again that you have NO shorts between the pins. Then I find where the pin connects and check for continuity from the pin to there to make shure the pin is soldered to the pad.

Next I repeated the process with the chips with the smallest pins (like the codec) as they are the hardest for me. Repeat the checking process!

Of course you can skip all this checking, and do it later with a populated board when it doesn't work hihi.

Step 2:

Now this is your choice, you can pick the bag of caps or resistors and have at it!!

Even after I checked every component that I soldered, I came back later in trouble shooting and found several that looked soldered but where not , so again get GOOD magnifiers!!

If you picked capacitors as your first bag, PLEASE do not install any of the aluminum electrolytics until you have installed all of the other SMD components as you can knock these loose if you aren't careful (Don't ask !)

Step3:

Of course now you pick the bag you didn't pick in the previous step hihi.

Step 4: WASH THE BOARD!! Use alcohol, soap and water and alcohol again, dry with a blow dryer, you need to remove all of the flux you have acquired.

Now for the post assembly parts.

Caution! If you install one of those 90 deg headers for P6 jumper, it WILL hit the shield between the boards when you assemble the radio in Frankies case!

Also if you are planning to use Frankies case from China you will need to order these low profile headers from Samtec: part number CLT-120-01-F-D, this is a dual header , you will have to carefully slice it in half (YOU MIGHT WANT TO ORDER 2 JUST IN CASE, again, Don't ask)

Let's talk about the mods for a sec.

Unless you really can't live without 10 watts on 12 and 10 meters, you do not have to do the T7 or SWR Mod, It will work fine without them.

You will have lower power on 12 and 10 meters, but hey it is a QRP rig!!!

The swr meter works well. You just have to check it with a dummy load and know that whatever reading it is, that is your lowest SWR.

I did the SWR mod and don't really see any difference. My lowest SWR is 1.5 so I know if I have 1.5 it is tuned.

You do want to do the T5 mod use this doc: http://www.m0nka.co.uk/wp-content/uploads/2016/03/transformers_winding.pdf

Step 5: Post assy.

Now you can just finish the post assembly parts as you wish.

Much, much , much information is here on the Wiki hub: <https://github.com/df8oe/mchf-github/wiki>

All you need to know about bootloader , firmware, calibration adjustments etc... can be found here thanks go out to Andreas DF8OE and the great bunch in the German group that is supporting this radio.

WHAT IF IT DOESN'T WORK WHEN I TURN IT ON!!

Well, that can open up a whole new world for you!

I have received some great advice from Chris M0NKA and Andreas DF8OE.

Here is kind of a compiled bit of troubleshooting info.

The display will be white until you have firmware.

If after you have firmware the display is still white, you probably have jumper issues R30 to R34 ish

If you can't get it to go into the bootloading process and you are SURE that you are doing it right, you probably have a solder bridge at the CPU. (back to check and re-check) I know, but that's how I found my problems.

Once the bootloader and firmware are installed

The transmit path starts at the Codec. You need to see a signal from pin 12 and 13, you will need a scope with a .10 cap isolation to the probe. And it is a small signal here.

This goes into the Quad amp circuit, you need to see four sine waves at R33 – R36.

This heads to the TX Mixer, you will have all four of these signals as well as you clock signals at pins 2 and 14 of U17.

From here you check Pin 9 of U1, Pin 9 of U2.

Next collector of Q3 and Q4.

Next the Drain of Q5 and Q6.

These should be increasing in amplitude as you go.

If all this is good and you have no output, you probably have a short or open in the LPF, Ant SW or SWR circuit.

I have found solder bridges in all of these locations and it can take you all day to find it hihi!

If you have no receive, CHECK the RF Gain first!, for some reason ic comes on line all the way down! That can be confusing!!

To troubleshoot the receive circuit, I usually start at the BPF, I take a piece of wire and touch it to R1 then R3 and see if you can hear the noise signal come up. If it does but you have no receive, then there is a solder bridge somewhere in the LPF SWR or Ant Sw circuit.

If you do not hear the noise floor come up then the problem is on the other side of the BPF.

I thought I had a problem with too much power out on the low bands, but there is a config menu selection to lower the power on low bands.

I hope that this information is of help to any of us that build the MCHF radio.

I know that it is not a complete work, but it is a place to start, and I know with the help of Chris MONKA and Andreas DF8OE, and the rest of the group we can make it better and our experience can be more satisfying.

NOTES for China case from Frankie

On this case, I have found that you need to take a small file and file the paint from the inside of the button holes so that they will move freely.

Also you need to remove just a bit from the end of each of the four long silver screws so that it doesn't hit the bottom screw coming up through the brass insert.

I have found it helpful to file down the four tabs that are bent in on the bottom of the case. You need to file them from the bottom and make them half as thick as they are, this will help the short silver screw be able to have enough threads to get into the brass insert above it!

If you need more space for the display to fit you can gain some space by filing the four brass spacers flat on each end, this may require you to take a bit more off of each of the four long silver screws.

If you do this, you will have to shave a little bit from the USB port holes on the side. Also I usually file a groove in the underside of the BNC connector to allow the side plate to kind of slip up in to make it go on easier.

Take care, and happy building,

Chuck WD8BXS