Instruction for installing the upgrade-(k)it V2.96

STANDARD C520, C528, C620, C628 ***protection charge 2 Euro***

Helps when permanent transmitting, squelch-problems, loosing memory, PLL-errors,...occur

Instruction for

Installation of upgrade-kit STANDARD C528 / C520

www.HED-TAFELMEYER.de

pcb = printed circuit board

Foreword:
HED TAFELMEYER GERMANY is not responsible for damages and consequences, which might appear on opening and modifying the described electrical appliance. Installation ensues on your own risk and requests experience and education in electronics and repairs.

The needed security instructions must be respected as well on using critical or health risky materials as on working in this electrical appliance. Also ESD-instructions must be respected for keeping the sensitive electrical parts save.

After installation a new justage might be necessary. It is also possible that because of damaged parts which will be replaced by this upgrade-kit some other components got injured before. Those faults will not be described in this manual and have to be done separately.

Nevertheless you can make the installation on your own when you respect the needed instructions, use good tools and take attention.

Introdution:
Actual the STANDARD-Radios C52x and C62x are great handhelds:
They make it possible to listen on 2m and 70cm (23cm) on the same time. They also are quite easy to handle and very sturdy.
Man, I can understand - you just won't get separated from this handheld.

Unfortunately in production there were built in many critical aluminium capacitors. They are exposed to high temperatures inside the handheld. Now your STANDARD is about 15 years old end the end of lifetime of those parts has reached.
The electrolyte makes its way out of the capacitors over the pcb or even under other electronical or mechanical parts.
In sequence there appear total strange errors for example permanent transmitting, squelch doesn't close, audio is low or it keeps no memory any more (reason for last point might also be an empty back-up battery).
For this it is good that you want to act now. Else there might happen bigger errors or even a total damage of your handheld.

This upgrade-kit:
With this upgrade-kit you replace all afflicted capacitors. The new parts are robust tantalum- or high-temperature parts in industrial quality.
So you might be able to reactivate your handheld for some years more. And by this of course the worth of it.
Even the PTT- and Func-Switches will be replaced for best function.

Let's go**...**

Stock-taking upgrade-kit
Please check all parts

Bag 1 – Audio Platine

- 3 tantalium-capacitors 1µF SMD
- 3 tantalium-capacitors 4,7µF SMD, **on C620/C628 only 2 of them**
- 1 tantalium-capacitor 2,2µF SMD, **only on C620/C628 kit**
- 2 switches for Func und PTT
- 6 tantalium-capacitors 33µF SMD
- 4 wired elektrolyt-capacitors 220µF
- each one wired cap 1,0µF and 4,7µF as spare part for damaged pads
- **2,2µF-cap wired only on C620/C628-kit**

Bag 2 – HF-Platine ***– not required on C620, C628***

- 1 wired tantalium-capacitor 10µF
- 1 tantalium-capacitor 10µF SMD

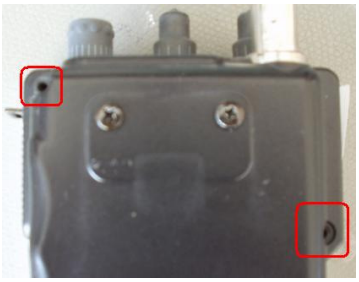
necessary tools:

- Philips srewdriver, Size 0
- Philips srewdriver, Size 1
- srewdriver, 3 - 4 mm
- tongs
- manual and circuit-shematic for your handheld
- soldering-pen for SMD and THT
- soldering wire, must be certified for SMD-mountig, about 0,5mm
- desoldering-equipment
- tweezers
- magnifying glass
- cleaning fluid, eg. special alcohol
- ESD-brush
- cotton sticks
- thermal compound
- fume extractor
- powersupply 12V 2,5A
- wattmeter 5W 2m / 70cm (23cm for 62x)
- dummyload 2m / 70cm 5W (23cm for 62x)

If problems occur please let us know. We do the repair for an all-inclusive-price!

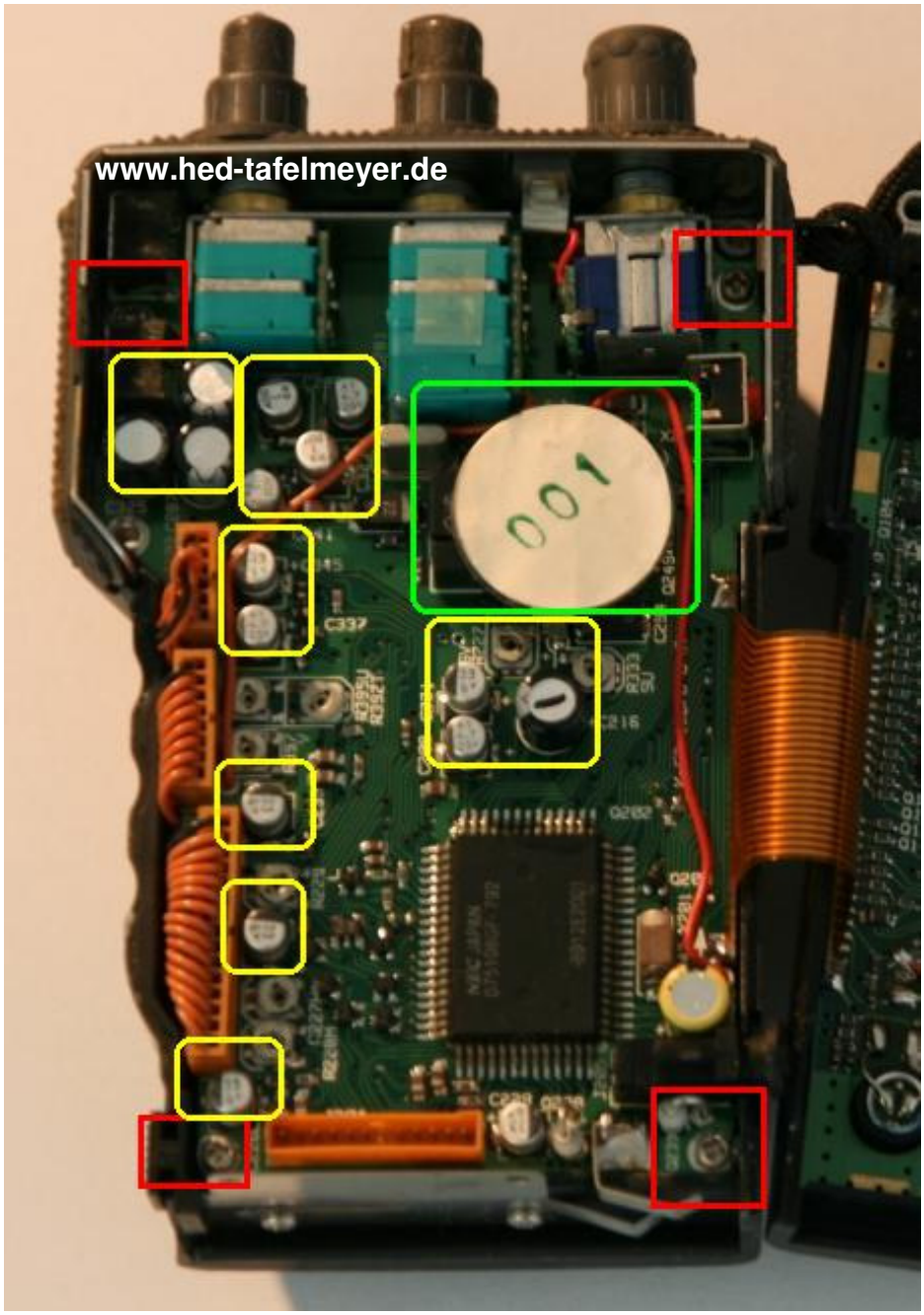
Opening:
Therefor please loose the two screws on the bottom and the two screws on the backside.

Please cover the front panel with a piece of paper and mount this with some self adhesive tape. It is necessary to protect it against cleaning fluid.
The front panel, especially the plastic of the display is very sensitive against chemicals!



Now you can flap off the front side. Be careful and take care on the sensitive flat wire!

On the left side (µPC und Audio) you can see 4 silver-screws (red marked).
Please take them out carefully with a fitting screwdriver.



Picture µPC-pcb ⇒

red =
screws which have to be taken out

yellow =
damaged capacitors

green=
Backup-Batterie

pcb = printed circuit board

Sometimes there is a small pcb on the µPC.
Congrats! This is the CTCSS-Unit!
Seldom to get!
Please take it out carefully.

Let's have a look what already has happened...
Now the µPC is on the left and the front panel on the right side.

Please check the left pcb with your eyes:

- Is there a grey-green trace on ground connectors of the relevant capacitors which looks like an oxidation?
  This is a indication that it is time to react!
- Is the pcb already damaged by electrolyte?
- What about modifications in your handheld? Did somebody do changes in it before?

Please make notices about all unusuallities. You could need them after upgrading when troubles occur. Notes likes this can sometimes make finding the errors easier.

Now flap off the audio-pcb.
You will se a silver metal plate, which probably has two stains of thermal compound.

Now the underside of the pcb has to be checked:

- Are some traces of electrolyte visible here?

Very often some small and short wires can be seen. This is ok and mostly was done in manufacture.

Now you have to clean the pcb with alcohol or special cleaning fluid for the first time. For that you should rub both sides of the pcb softly. The dirty fluid can be cleaned up by a cloth (take care on antistatic!). For optimal results please repeat cleaning for two or three times. There may not remain any kind of old electrolyte.
By the way – of course you can take away old thermal compound from the metal plate in same step. It is too old, you don't need it anymore. In some high serial numbers it is even left away. But I think it is better when you put some on again before closing your handheld. But step by step.

Attention!
- Take care on ESD-instrutions!
- Plastics of front side may not get into connection with the cleaning fluid!
- This job should be done near by a fume extractor. Toxic fume might appear!

Don't panic if a pad is ripped out. Just take a wired tantalium capacitor and place it in the responding via. Check after soldering the electrical connection.

Replacing and installation (yellow circles)

Information: tantalium-capacitors are marked on the **+Side!**

1. Capacitors
Let's begin with the top-side of your pcb.
At first resolder the pads of those capacitors which will be changed. Then elect one of the old capacitors, make both pads hot and take it off carefully. It would be best when you begin on groundside each, not on +side. This side is a little larger and less sensitive than the other one.

Important! Spring-clean the pcb after demounting.
In many situitaions burning the remainig electrolyte down by soldering the pads is helpful. Solder the pads, desolder again, clean it with cleaning fluid or warm destilated water and solder it again softly.
Even the vias have to be cleaned as far as possible.

Now we start installing the new caps.

The small ones mostly don't make problems.

After a long row of trials we found out, that especially the big 33µF-caps cause troubles. For this reason, we decided to exchange the C345, C231 and C226 against wired parts.

The benefits are an easy and safe installation, and, if the CTCSS-Modul CTN520 is installed, it will fit onto the µPC even after the upgrade.

Therefore bend the wired parts fitting for the pads and solder them on the pads.
Attention! Take care that marked side is **+**

For the remaining 3 caps C235, C239 and C229 SMD-parts will be installed.
DF2YB gave me a tip for installing them easily:
Just flip the 3 caps on 90°. That makes installation quite comfortable.

Please avoid short cuts with vias!

- 4,7µF: **C281 (not on C620/C628),** C337, C208
- 2,2µF: **only in C620 and C628**
- 1µF: C241, C285, C323,
- 33µF SMD C235, C239, C229
- 33µF wired C345, C231, C226

2. switches
Now we exchange PTT- and Func-Switches. Please resolder all points then desolder the switches and take them out. When you put in the new ones please take care that they are tight on pcb.
On the same step you can resolder the connectors of the potentiometer.
Those are each 5 pads on two small, plugged through pcb's.

3. 220µF-capacitors
Next you have to take away 4 wired 220µF-capacitors.
Here you can try to heat up both pins of a cap at the same time while pulling out the part softly. That is much better than desoldering in this tricky area.
Also take care on soldered parts and IC s next to them.

- 220µF: C325, C287, C327, C216

After this please check both 330Ohm-resistors and their vias to the caps. They are located near to the Audio-IC. This can be a reason for distorted AF.

4. Connector J203
This is no easy job. You have to take out the connector J203 without damages! It is the small orange one right under the 220µF-capacitors.
Why must we do that? That's quite simple. Very often electrolyte runs under this connector and causes a shortcut between two pins. Those pins are responsible for PTT-Swich.

- Don't disconnect the connector from HF-Unit!
- Resolder all pins bountifully
- oscillate over the pins slowly and softly with your soldering tip
- pull out the connector slowly and carefully while heating all pins up
- – step by step... till it gets off.

Attention!
Don't use violence!
Use a fume extractor, poisonous fume might appear!
Please take out easy reachable parts first and after that the difficult ones.

CONGRATULAION!
This was the most difficult part.

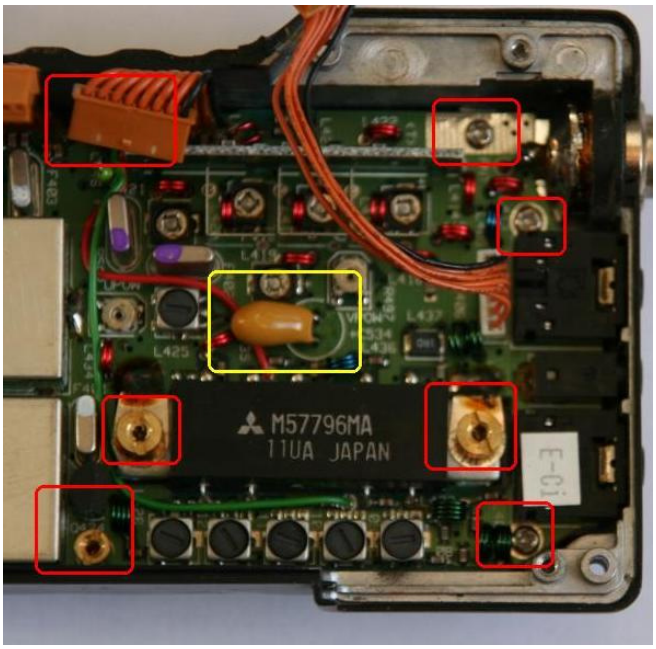
SMD-Cs after installation

RF-unit - not required on C620, C628

Taking apart
Now please disconnect all connectors between rf- and audio-unit.
You'll see a metal-plate for shielding the HF-Unit. Sometimes the screws are pretty fast. Take a good-fitting srewdriver and push and turn into right direction on the same time. Sometimes you have got only one try. Else the screws will get round. If this happens only a thong can help.

Please make loose the red marked screws.
Take care on coils, you may not twist them!

Now make loose the two small screws on the bottom of your handheld (accumulator-connector-plate).



Picture 3

The plastic-protector for Mic-and Speaker-connectors must be taken out before next step.

After that lift the side of pcb on softly where you have taken out the last screws.
On the same time the signal-pin of the antenna-connector must be heated up until you can lift out the pcb totally.

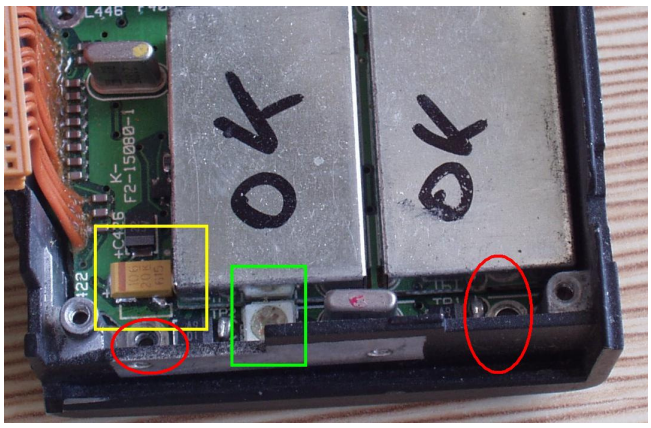
Desoldering and cleaning

Two 10µF-caps have to be exchanged.

In picture 3 and 4 you see the yellow marked capacitors already renewed.

Picture 3
At first you have to bow the wires of the new 10µF capacitor down for 90° before soldering.
Marked side looks down to the pcb, marking shows to power amplifier.

Picture 4



Picture 4
Now the small 10µF SMD-capacitor has to be renewed. It is located between a shield box and the biggest orange connector. At first heat up both sides carefully then lift it off and out. After this the area must be cleaned softly. The pads should be resoldered a little.

Turn around the pcb and take a look around the area of the big connector.
Is there some brown fluid?
If yes, this is the reason for a blinking display. In this area the pll-circuit is at home.
The brown fluid is electrolyte and causes a short cut to the control signal.
Please clean it carefully by the same way as before.

Ok, now you can put in the new 10µF-SMD cap.

Take a short look on the bnc-connector. If it is rubbed down more than 75% it should be renewed.

After that you can put the rf-pcb, screws and metal-plate together again.
Please put some thermal compound on the two relevant locations of the metal plate.

But don't forget the signal-pin of BNC-connector!!!
Be careful when heating up. Else the wire on the underside of pcb might turn away.
Shortcut or power loss might happen which can cause damages of power amp-unit.

First try...
Now everything is ready for first try.

- First 3 connectors between rf- and af-unit have to be plugged
- Connect 12V DC to akkumulator-plate.
- The big metal plate is ground, the small one is +.
- A watt-meter for 2m and 70cm might help you (23cm for 62x)
- Please don't forget to connect a antenna or a dummy

After switching on please push reset-button mostly a reset must be done. Now you can check all functions.

Keypad
Sometimes it is necessary to clean the keypad if some keys don't work.
For that screw out the small black srews on key- and display-pcb.
There are also two golden screws. One fastens the speaker the other one the pcb on the downside. Please screw them out also.
Now you can lift the key-pcb carefully.
Important: The plastic keypad should be cleaned as few as possible. The conductive material can be rubbed away very fast. It is better to clean the golden pads on pcb.

Renewing Backup-Battery.
Battery is not contained in your upgrade-kit. Please order this special Type separately. I'm sure hed-tafelmeyer.de will make you a nice price.

Going to the final
If everything is ok please put some thermal compound on the metal plate were two points stay up a little.
Put in all screws again but be careful! Especially the long black screws may not be screwed so tight. The plastic of your front side has passed its best years and it might have become weak.

Trouble shooting
Problems and errors appear frequently. *Here some tipps::*

- Make a Reset
- Check polarity of all installed capacitors
- Check voltages, especially stabbed 4V and 5V.
- Are some shortcuts visible caused by short pieces of metal for example?
- If no AF can be heard please check low resistance resistors and the FMW-IC in af-unit
- A big source of errors are the connections through the pcb. Interruptions happen very often caused by electrolyte or mechanical damages caused by non-sensitive working – that just happens.

If still no success appears you can consult info@hed-germany.de
There you can also order special spare parts or complete units if everything fails.