Upgrade-kit for
STANDARD C-520, C-528, C-620, C-628, C-220, C-228

Order-number kit C-520 & C-528 36K1010
Order-number kit C-620 & C-628 36K1015

Helps on permanent transmitting, open squelch, blinking display,…
Including many tipps and tricks out of the experience from more than 1.000 radios

Content

www.hed-radio.com
Version 5.01

Free page for your own notes…

Anleitung zum
pcb = printed circuit board

Foreword:
Matthias Tafelmeyer 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.
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Info pictures
Screws are marked in **red**, **parts for exchange are marked yellow**.

Let's go**...**

Stock-taking upgrade-kit
All parts are sorted into four bags. Those bags have numbers.
Please use those parts step by step.

- 3 Tantalium-caps 1µF SMD and one wired cap for spare or broken pads
- 3 Tantalium-caps 4,7µF SMD and one wired cap for spare or broken pads
- 1 Tantalium-cap 22µF SMD **only included kit for on C-620 and C-628**
- 2 keys for Func and PTT
- 6 Tantalium-caps 33µF SMD and one wired cap for spare or broken pads
- 4 Electrolyte-caps 220µF 10V

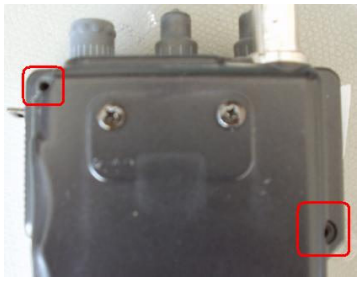
Parts for RF-board **! not required on STANDARD C-620 and C-628**
- 1 Tantalium-cap10µF SMD and one wired cap for spare or broken pads

required 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 ⇒

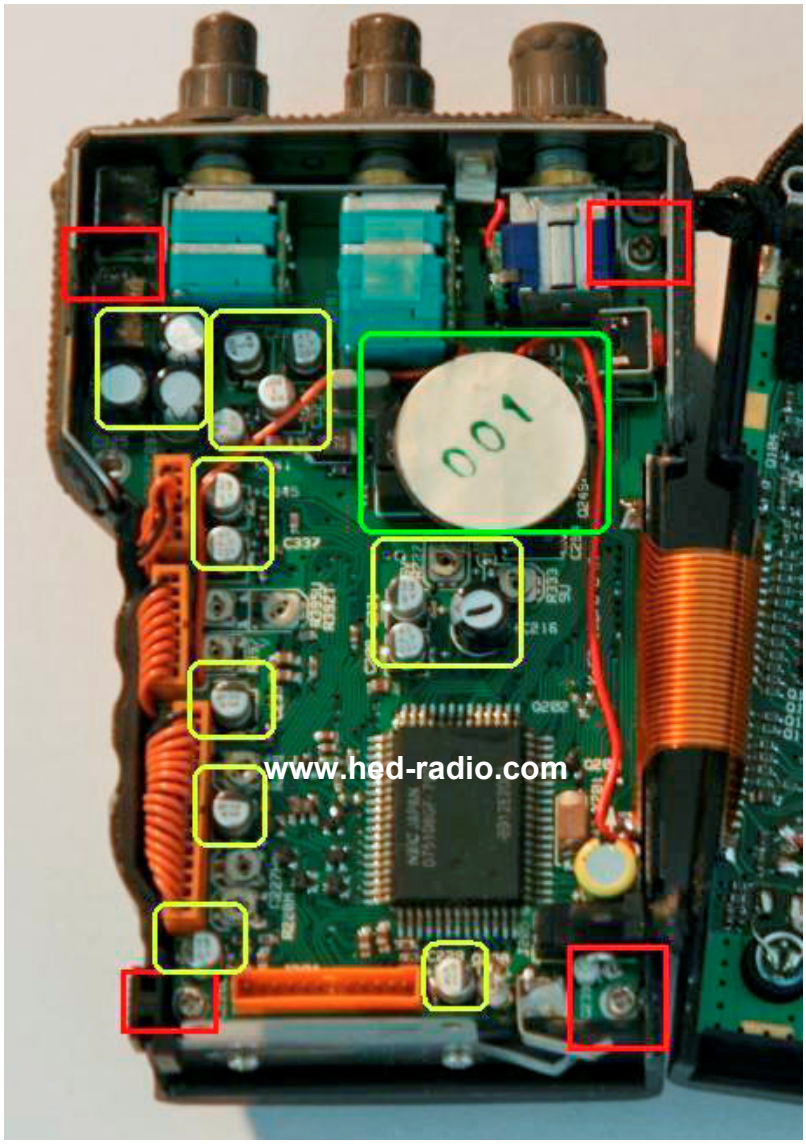
red =
screws which have to be taken out

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
- 22µF: **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.

After installing the kit

RF-unit - not required on C620, C628

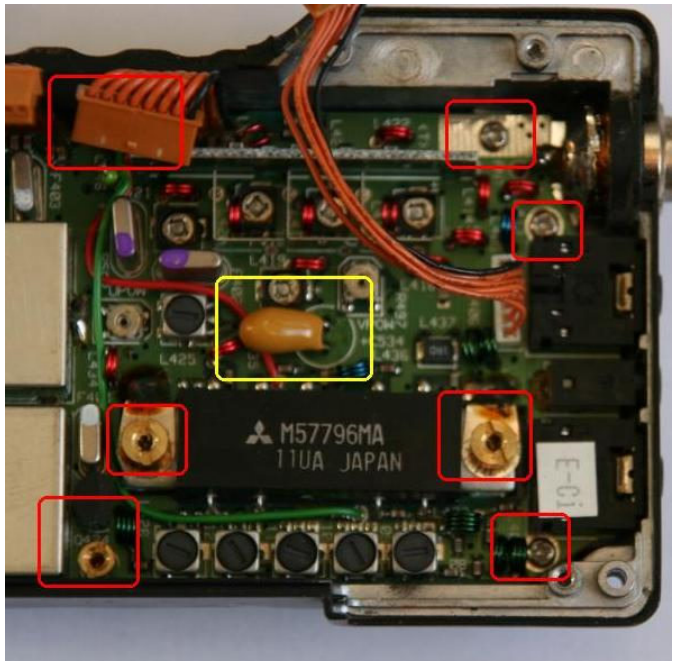
Taking apart

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

After taking out als screws and bolts you can pull out the rf-board. For this you have to heat the connection between rf-jack and antenne-connector.

Exchanging the cap on rf-board

In the first hundred radios I exchanged the big 10µF in picture 3 as well as the SMD-cap in picture 4. In the last years I only exchanged the cap in picture 4 because the big cap in picture 3 never had technical faults. So please renew the 10µF-cap as shown in picture 4, marked yellow.

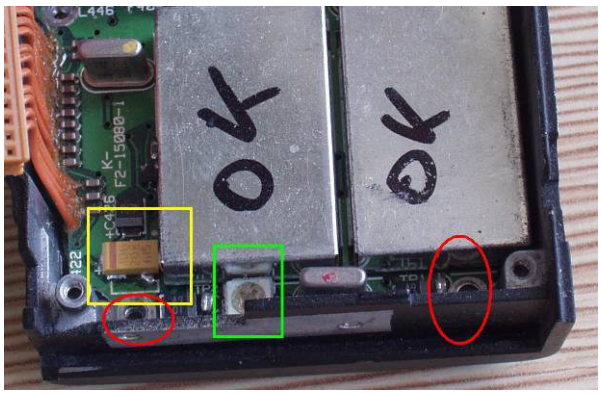


Bild 4

After renewing the cap please renew the thermal compound on the rf-amplifier and reinstallt he rf-board.

Reinstall the antenna-connection between rf-board and BNC-jack. Please be careful, don't use violence and keep soldering-time short to avoid moving the antenna-connetor on the bottom side of board.

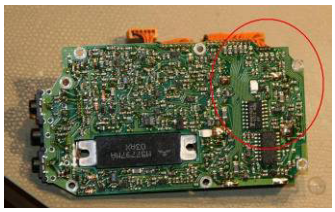
On same step please check condition of your BNC-jack. Renew it if the knobs on the jack are rubbed down to less than ½.

Put together all open parts, als screw, bolts and shield,

Don't forget to solder the rf-connection between BNC-jack and board.

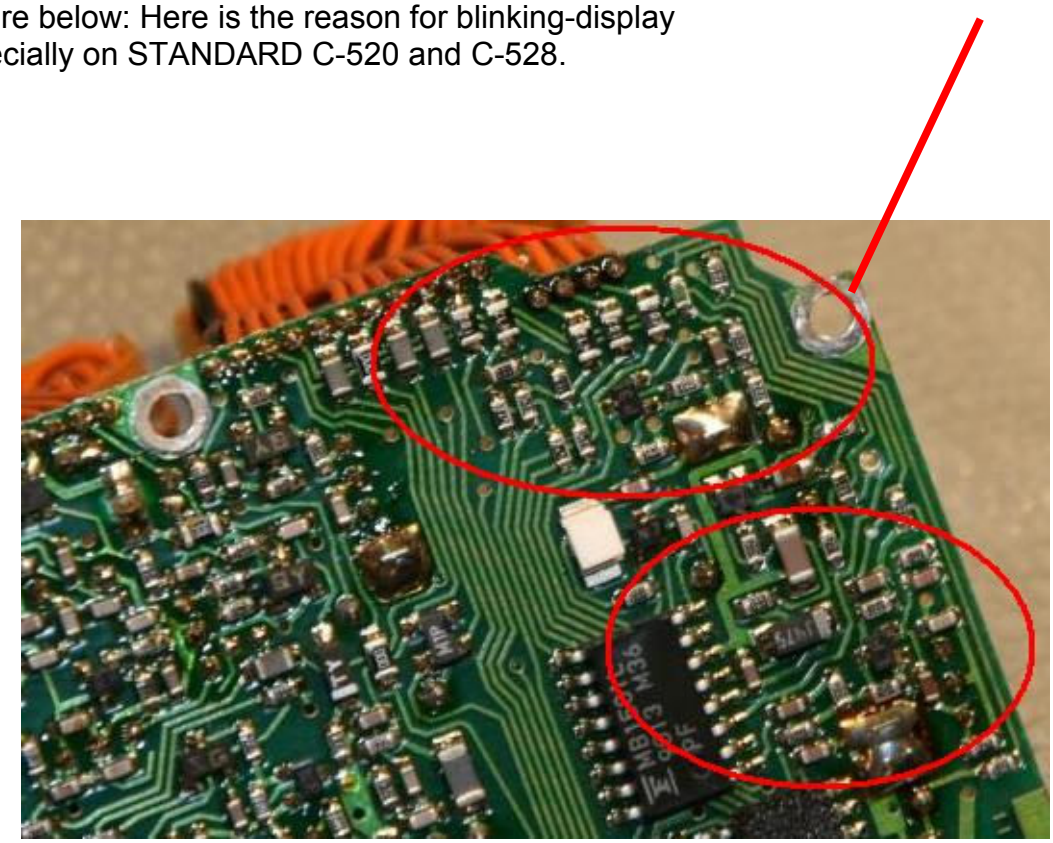
Tipps and tricks for repair

Tipp 1: Blinking display...
The reason for a blinking display is electrolyte between some pins on the bottom side of rf-board.
See pictures for details.
After cleaning those pins with alcohol and a brush this error will disappear.



Picture right: bottom-side rf-board

Picture below: Here is the reason for blinking-display
Especially on STANDARD C-520 and C-528.



Tipp 2: Probleme mit NF-Stecker auf HF-Platine STANDARD C520 / C528

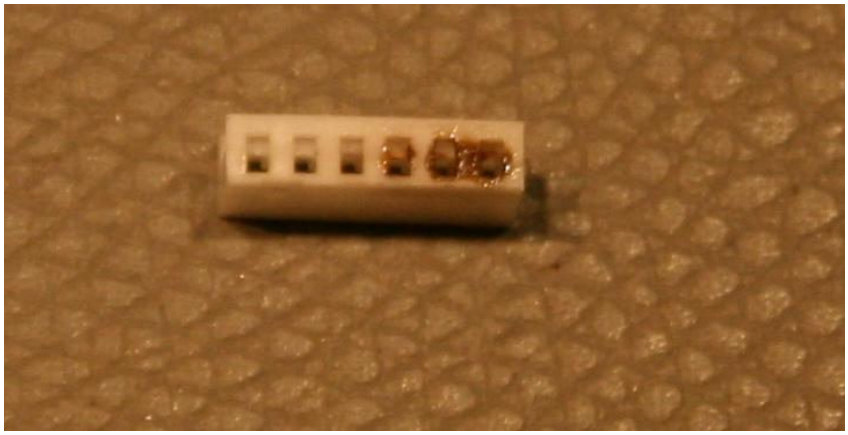
Inzwischen sind einige Geräte aufgetaucht, bei denen selbst nach der Reparatur Dauersenden auftritt.

Neben dem Transistor Q205 als Ursache kommt noch ein sehr versteckter Fehler in Betracht.

Auswirkung: Die Spannung an der Basis von Q205 ist einfach um ca. 0,5V zu gering.

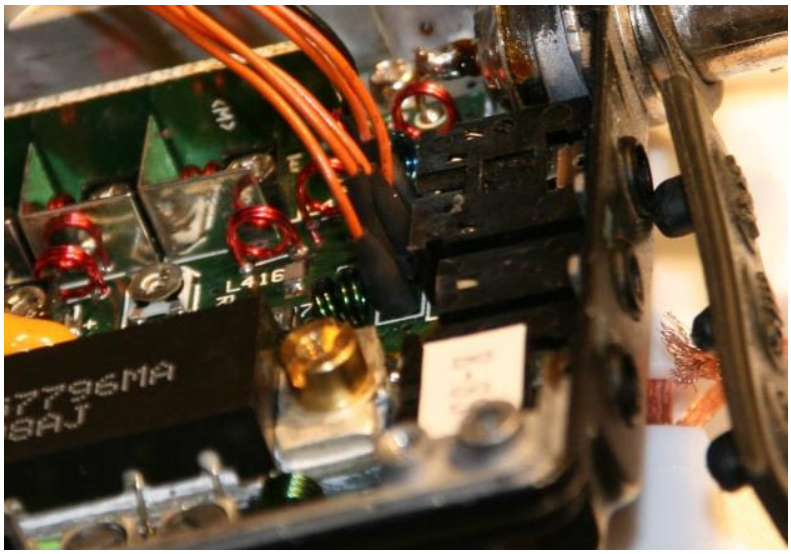
Lösung: Auf der HF-Platine befindet sich unter den MIC- und SPK-Anschlüssen eine Steckerleiste. Diese Steckerleiste wird vermutlich durch Temperatur gammlig. Auch kann Elektrolyt der oberen Platine über die Verdrahtung bis unter den Stecker fließen.

Dies führt zu messbaren Kurzschlüssen im Bereich von circa 50 – 500kOhm auf dem Kunststoff selbst!



Einzige Lösung ohne verrückt zu werden:

- **Leiste auslöten (anzuwendende Technik wie Abschnitt 4 – Stecker)**
- **Kabel aus Buchse befreien (Kunststofffinger aufbiegen, entrasten)**
- **Anschlüsse mit kurzem 1,6er Schrumpfschlauch versehen**
- **und Kabel ohne Buchse direkt anlöten**



Tipp 3: Rauschsperre auf 2m schließt nicht

Variante A (häufig)

Dies wird meistens durch marrode Durchkontaktierungen verursacht.

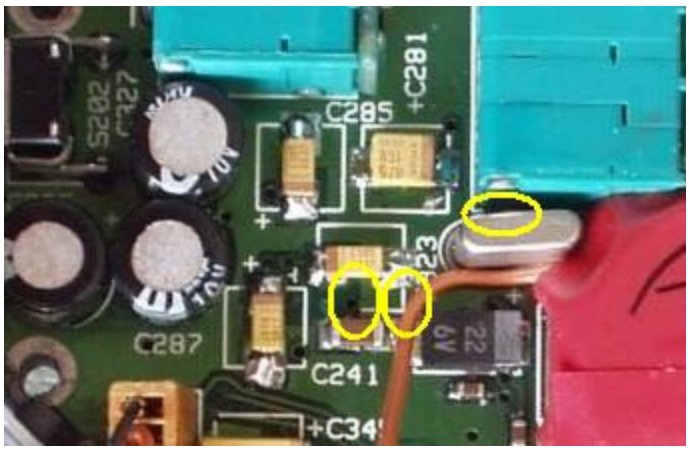
Im Bild sind die 3 relevanten „Dukos“ gelb markiert.

Zwei befinden sich am Keramikkondensator (der unter C323)
Eine befindet sich zwischen dem Quarz und dem UHF-Squelch-Regler.

Es empfiehlt sich, die Durchkontaktierungen nicht nur mit Lötzinn zu stopfen, sondern die komplette Verbindung von Bauteil zu Bauteil nachzubilden.

Am Besten eignet sich hier dünner Kupferlackdraht, der

- direkt an den Pin oder das Pad des Teils angelötet
- durch die Durchkontaktierung gefädelt und
- mit dem passenden Bauteil nach der Durchkontaktierung verlötet wird.



Variante B (selten)

Sollte das nichts nützen, so gibt es eine zweite Möglichkeit:

Durch einen Sturz oder sonstige mechanische Einwirkung auf die Vol-SQL-Regler kann die Verbindung zur Platine einreißen.

Hierzu die Platine umdrehen und

- die beiden, zu den Poties gehörigen, durchgesteckten Platinen inspizieren. Sturzfolgen sind meist optisch erkennbar.

- Nun die Platinenverbindung nachlöten - oder besser - mit Draht nachbilden.

Tipp 4: Receiver on 2m on C-520, C-528 or 70cm on C-620, C-628 doesn't work

Nice problem. It took me several hours to find.
The reason for this fault is electrolyte again. Please locate the IF-crystal on the bottom side of the mainboard.

What can you do?
Resolder it. Clean the bottom side of the crystal and install it again.
It is a little wonder, cause our receiver will work again.

The resistance of electrolyte is lower than the resistance of the crystal. So the dirtyl crytal will not oszillate and so the IF can't work. Your receiver will remain silent.

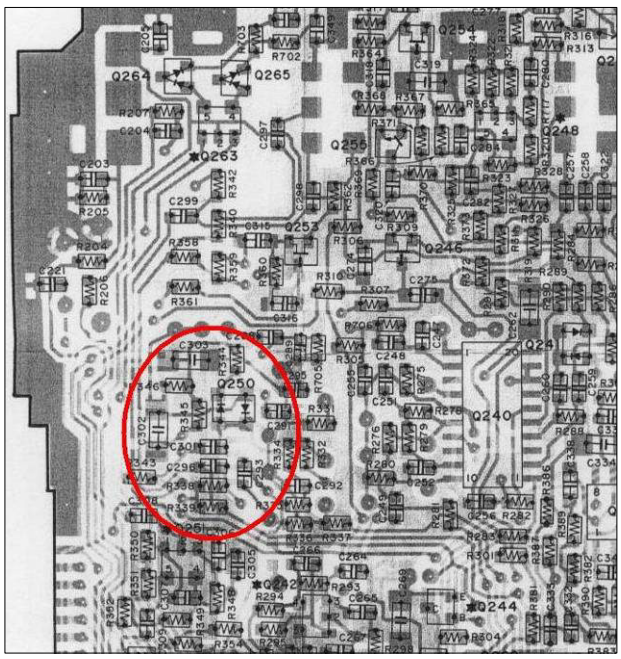
Put out the crystal, clean the bottom side and put it in again – ready.

Tipp 5: S-Meter on 70cm on C-528 or 23cm on C-628
sisplays maximum all the time as soon as squelch opens

Reason:
Electrolyte is under the parts
of the S-Meter driver.

The picture on the right side
shows you the area on the bottom
side of the main-board.

What can you do?:
Clean and check all parts in this
Area. Probably you have to
Uninstall some parts to clean
the bottom side of the parts.
Especially Q250 attracts electrolyte.



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-radio.com
There you can also order special spare parts or complete units if everything fails.

Here you can see some of our

Accessoires and spare-parts for STANDARD C-528 and C-628

For actual prices and availability please visit www.hed-radio.com

Batteries

Item	Order-Number
Batteriepack 7,2V 1500mAh	CNB151
Batteriepack 12V 1000mAh	CNB152

Accessoires

Item	Order-Number
Speakermike	Mike4
CTCSS-Unit remake	CTN520

Spare-Parts

Item	Order-Number
Upgrade-kit C-520 and C-528	36K1010
Upgrade-kit C-620 and C-628	36K1015
Backup-Battery	70L1120
AF-amplifier NJM-2073	NJM2073
Transistor 2SB798	2SB798
HF-Unit 2m M57796MA	M57796MA
HF-Unit 70cm M57797MA	M57797MA

All parts to find on

www.hed-radio.com

If you want to use our repair-service
please contact us

info@hed-radio.com