

Chasing (Repairing) PEM Nut Threads

Overview

This repair entails: 1) opening the case; 2) removing the batteries; 3) unplugging the cables between the front and back/bottom sub-assemblies; 4) removing the “outer” heatsink mounting screws; 5) chasing the PEM nut threads; 6) replacing the heatsink mounting screws; 7) reconnecting the cables; 8) replacing the batteries; and 9) closing the case.

Warnings

- Unless it has been specifically designed and is certified to be ESD safe, a vacuum cleaner is **a serious ESD hazard which should never** be within six feet of your KX3 while it's open! (This six-foot halo applies equally to all vacuum cleaner attachment hoses.)
- **Do not** use your KX3 to learn how to use a tap to chase/repair threads. This procedure **should only** be performed by someone who already has this experience. If you don't, then either: practice on something other than your KX3 until you do; have the repair performed by someone who does; or replace the bottom cover sheet metal.

Required Tools

- ESD safe workstation, i.e. a properly grounded mat and a properly grounded wrist strap.
- Two “clip leads”.
- Small Phillips screwdriver. *Never use a power driver to insert or remove stainless steel screws, (unless the screws are specially lubricated).*
- 4-40 tap tool and handle.
- 7X Bausch & Lomb “Hastings Triplet” jeweler’s loupe, or a good magnifying glass.
- ¼” ESD-safe horsehair brush. *(Probably won't be needed, but might come in handy.)*

Assumptions

You are familiar with ESD handling precautions, i.e. you know what “properly grounded” means, you know how to properly wear a wrist strap, etc.

References

www.esda.org/esd_fundamentals.html – a six-part series about ESD for manufacturers.

Procedure

1. Read through this entire procedure **before opening your radio!**
2. Turn off the radio; disconnect all cables; and remove the optional paddles if attached.

3. Put your wrist strap on your left wrist if you're right-handed; otherwise on your right.
4. Open the radio as if you were going to replace the batteries. *If you've never opened the radio, first refer to the section entitled "Internal Batteries" in the owner's manual.*
5. Independently ground the front (digital) and back/bottom (RF) sub-assemblies using clip leads. Specifically, clip one end of each lead to the edge of your ESD mat and the other end to exposed/bare metal on the case. *It is wise to do this when working on "insulated" assemblies, above and beyond using a grounded ESD mat as your work surface.*
6. Separate the two sub-assemblies as follows:
 - a. Remove the batteries (if installed) then unplug the battery connector.
 - b. **Wait two to four minutes** to ensure the caps have discharged.
 - c. After referring to the discussion of the flex cable in the "Final Assembly" section of Elecraft's KX3 kit assembly manual – which includes the comments associated with figures 52, 53, 54, and 56 – unplug the flex cable from the RF sub-assembly, but leave it plugged into the digital sub-assembly.
7. Remove both outer heatsink mounting screws.
8. Using your hand which doesn't have the wrist strap on it, hold the RF sub-assembly at eye level, orienting the case so the top edge where the heatsink mounts is facing down (*this ensures debris can't fall in the case*) and in such a way so you can see the PEM nuts.
 - a. Chase the PEM nuts while watching to ensure you don't thread the tap in so far that it touches any circuitry in the radio.
 - b. While still holding the radio in "this" orientation, use a jeweler's loupe to inspect for black oxide debris on or around the PEM nuts. If there is any, tilt the case and gently tap on it, so the debris falls out; or even better, "sweep" it out using an ESD-safe brush. (*It's best to do this after chasing each PEM nut.*)
9. Verify all three (shiny) 3/8" stainless steel mounting screws included with your Cooler KX™ heatsink now thread effortlessly into both PEM nuts. **Do not** test the 5/8" screw! *If some of these screws don't thread effortlessly, then most likely you damaged them prior to performing this repair, whereas if none thread effortlessly into either PEM nut, then it's equally likely that you've not properly repaired the PEM nut threads.*
10. Replace the "outer" mounting screws with new ones that don't have a black oxide finish. *The use of any other mounting hardware – other than what's included with your Cooler KX™ heatsink – could ruin the PEM nuts due to dissimilar metal corrosion.*
11. Reconnect the flex cable.
12. Remove the two clip leads that are grounding the sub-assemblies to your ESD mat.
13. Reconnect the battery cable, and then reinstall the batteries.
14. Close the case as described in the owner's manual.
15. *If it's installed, the optional KXBC3 (Battery Charger + RTC) will need to be reset.*