

10. REPAIRS

10.1 GENERAL INFORMATION

Electro-Cap International's limited warranty provides for repair or replacement of any item that, due to defects in material or workmanship, fails to function properly within ninety (90) days from receipt. Following the warranty period, there will be a minimal charge for repairs on broken wires in caps and Electrode Board Adapters.

The following items are considered repairable:

1. Electrode wires broken at the electrode mount or at the other points inside the cap.
2. Wires broken at the connector plug on the Electrode Board Adapter.
3. Internally broken wires at the connector on a cap or an Electrode Board Adapter.

Electro-Cap International, Inc., repairs broken wires in caps and Electrode Board Adapters. If needed, caps and Electrode Board Adapters are available for loan during the time required to make the repair. To arrange cap loaners and repairs call 1-800-527-2193. Broken wires on ECI Electro-Caps may also be repaired by the EEG technologist or the hospital's Bio-Medical Engineering Department. Special repair kits are available from Electro-Cap International.

ECI Electro-Caps are considered to be expendable items. Elasticity of the material dictates the life of the cap. When a cap becomes stretched and loses its elasticity, it must be discarded and replaced. The electrode placements will be inaccurate and artifacts will occur more often.

10.2 REPAIR INSTRUCTIONS

10.2.1 **BROKEN ELECTRODE WIRE**

Items Needed:

1. ECI Electrode Mount Removal Tool to remove outer disk from mount.*
If not available, a small hex wrench may be used.
2. New electrode disk*
3. Soldering iron with 18 watt element and tip*
4. Paste flux (zinc chloride)*
5. Lead-free solder*
6. Wire strippers*
7. Scissors
8. Impedance meter or ohmmeter

*These items, along with some other necessary items, such as shrink tubing and mounts, are included in the Electro-Cap Repair Kit. Please call Electro-Cap for further details.

1. Remove the electrode mount assembly from the cap. From the outside, lift the plastic outer disk from the larger inner cap mount with the ECI Electrode Mount Removal Tool. After the mount is removed from the cap, turn the cap inside out.
2. Cut the white mount off of the wire at the edge of the shrink tubing. Cut shrink tubing from mount. Using soldering iron, remove wire from mount.
3. Push the electrode out of the white mount with the eraser on the end of a pencil. Inspect for cuts, nicks or deterioration. Replace if necessary. Make sure a piece of clear silicone tubing (1/16" long) is on the pin attached to the disk.
4. Strip the plastic jacket from the wire with wire strippers so that approximately 1 mm (1/16") of wire is bared. Examine the wire to see if it is shiny. If it is, proceed to Step 5. If not, cut another 1/4" off the wire. Restrip the end of the wire. Examine it to see if the wire is shiny. If it is, proceed to Step 5. If not, continue cutting and stripping until the wire is shiny. If it takes more than 1/2" to obtain a shiny wire, splice in a piece of hook-up wire. Insulate the solder joint with a short piece of shrink tubing. Shrink the tubing with a heat gun. Proceed to Step 5.
5. Dip the shiny bared wire into liquid flux.

NOTES:

6. Tin the wire tip. (To tin a wire, apply a small amount of lead free solder to the hot soldering iron tip. Hold the tip to the exposed wire for approximately two to four seconds, or until the plastic jacket stops shrinking back.) Do not touch the soldering iron tip to the plastic jacket; the hot tip will burn the plastic.
7. Trim the tinned wire with a pair of scissors to 1mm in length.
8. On the wire place a piece of white silicone tubing 3/8" long, followed by a piece of white shrink tubing 1/16" x 1/2", followed by a piece of black shrink tubing 1/16" x 1/4".
9. Clean any old solder from the soldering iron tip with a damp sponge or wet paper towel. (Do not touch the extremely hot tip.)
10. Put the soldering iron tip in flux for one second. Solder the pre-tinned electrode wire to the center of the wire extending from the mount.
11. Center the black tubing over the solder joint. Barely touch the side of the hot soldering iron to the tubing, causing it to shrink. Do not over shrink.
12. Slide the white tubing up against the mount. Shrink the tubing, using the soldering iron.
13. Slide the silicone tubing up against the mount. Do not shrink the tubing.
14. Hold the inner mount on the cap material. Center the mount by visually lining the hole in the mount with the hole in the cap material. The electrode wire should be pointed toward the cable entry point. Snap the outer disk, **FLARED EDGE DOWN**, into the mount.
15. Connect the repaired cap to the Electrode Board Adapter. Check the continuity from the electrode disk (inside the mount) to the Electrode Board Adapter pin [socket] with an impedance meter or ohmmeter.

10.2.2 WIRE INTERNALLY BROKEN AT THE CONNECTOR

Items Needed:

1. Scissors
2. Small hammer
3. Paring knife or thin bladed scissors
4. Connector

Repair procedure:

1. Cut the ribbon cable with a pair of scissors approximately 1/4" from the connector. Square the end of cable with the scissors.

2a. *Electrode Board Connector*

Hold the connector so that the long row of pins is on top.

Insert the ribbon cable into the slot with the first brown wire of the ribbon cable on the extreme *right*. Push the cable through the slot so that no more than 1 mm of ribbon cable extends out the opposite side.

2b. *Electro-Cap Connector*

Hold the connector so that the long row of pins is on top. Insert the ribbon cable into the slot with the brown wire of the ribbon cable on the extreme *left*. Push the cable through the slot so that no more than one millimeter of the ribbon cable extends out the opposite side.

3. Push the back portion of the connector until it snaps. Make sure that the center of each wire is located over the metal "V" shaped contact in the connector. Placing the front side of the connector on a sturdy surface, use a small hammer to tap the back of the connector until the wires are firmly sandwiched between the front and back surfaces.
4. Fold the cable over the top of the connector. Snap the strain relief cover back into place.
5. Connect a cap and an unplugged Electrode Board Adapter together. Check the continuity of all electrodes by touching the leads from an impedance meter or ohmmeter to an electrode disk and its pin [socket] . Refer to page 6 for the chart on the electrode wire color codes.