

Rebuilding GPS Animal Collar Battery Packs

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Introduction

While GPS wildlife collars can be expertly repaired and serviced by the manufacturer, the service costs charged for the work can be prohibitively high for most project budgets. Simply replacing dead batteries can run into the hundreds of dollars. We have found that ordering replacement battery cells and rebuilding the battery packs ourselves far more affordable.

The following instructions were written for GPS cougar collars. The battery pack is a two-cell type (3.6v lithium D-cell and 3.6v lithium AA-cell) measuring 3"L x 2"W x 1.75"D. Connections include a group of three small wires soldered-taped to a 1/2" x 1/2" quick-release type black connector clip (female, 4-pin clip), which matches up with the GPS unit on the main collar assembly.

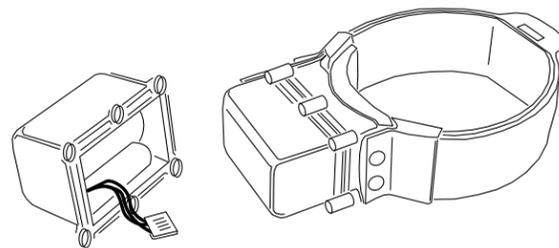


Figure 1: Two-cell battery pack shown alone and attached to the GPS collar.

Disclaimer: Replacing battery packs or making any significant repairs to GPS collars may void the manufacturer's warranty.

Battery Removal & Case Clean Up

1. Remove battery pack from collar and inspect for punctures or cracks in the case. Ours simply unscrew with 6 small allen bolts.

2. Carefully remove O-ring from its groove using tweezers or other thin tool. Take care not to cut or chip the rubber ring. If you do, you may be able to find replacements at your local hardware store, plumbing, electronics supplier, or machine shop, but we found the manufacturer the most reliable source. An email request sent to the customer service rep will probably work. The O-rings on our collars are approximately 1/16" thick x 2.5" diameter.

3. Carefully detach the batteries from the case. A sharp knife or razor blade can be used to slice through the hot glue holding batteries to the case. Start by cutting along the edge of the case. Once the glue is cut, pry cells out gently with the screwdriver. Take it slow and mind the wires, solder tape, O-ring groove, and clip connector. We were able to save the wire assembly (wires, solder tabs, and connector clip) from the old packs by carefully detaching the solder tape from the dead cells (three connections). The wire assembly should be kept together as a unit. Set it aside until you need it during the rebuild.

4. Clean up the case. Once everything is removed from the case, clean it up by scraping out some the old glue with a sharp knife. Wipe it out with a damp paper towel. Swab the O-ring clean of all dirt.

5. Repair the case, if necessary. Quick set epoxy, available at most hardware stores and home centers, can be used to repair minor damage. Epoxy repairs on the inside of the case should be kept smooth and low profile so the material does not interfere with the batteries or cause them to seat improperly. Follow directions on epoxy package.

Supplies List & Tools

- Tadiran 3.6v Lithium AA #TL-5903S XTRA Capacity, \$10.00
 - SEP Technologies SAFT 3.6v Lithium D #LSH-20, \$25.00
 Available from: SEP Technologies LLC
 1410 Apache St., Arlington, TX 76012
 www.septechnologies.biz

- Silica gel packs: MiniPax Sorbent, 1-800-445-9890
 - Solder gun & solder tapes or wire
 - Wires-connector (Check your local electrical supplier)
 - High quality hot glue gun & hot melt glue sticks
 - O-rings: www.allorings.com
 - Two 6-inch spring clamps (those used in woodworking)
 - Paper towels, cotton swabs
 - Long flathead screw driver w/ small head
 - Optional: Quick set epoxy for repairing punctures in case.

Battery Pack Rebuild

1. Heat up the hot glue gun. Lay the batteries together with their negative ends aligned. Lay a bead along the line where the two cylinders touch to connect them. Lay another line of glue along the back side too.

2. Use the spring clamps to secure the batteries to the work table. Heat up the solder gun. Carefully solder wire assembly to battery cells as shown in Figure 2. Wire A to positive (+) end of AA-cell; Wire B to negative (-) end of D-cell and negative (-) end of AA-cell; Wire C to positive (+) end of D-cell.

3. Lay a few drops of over the soldered connections, but not too much since there is limited room in the case.

4. Test-fit the cells and wire assembly in the case before applying any hot melt glue. Slide the battery and wire assembly into the case. Make sure that the wires and clip connector stick up and out of the case opening so it can match up correctly with the connector on the main collar assembly. The smaller cell should sit atop the larger cell. Note that there is only a small amount of space at either end of the batteries once the soldering is completed. A small emery board can help reduce the profile of the soldered connections. When everything fits, hot glue the batteries firmly inside the case.

5. To affix the battery assembly to the case, lay a small bead of hot glue down the midline of the case, parallel to the long axis of the case. Put the glue gun

aside and grab the battery assembly. Gently press the bottom of the D-cell battery down into it and hold for a few seconds. Before the glue sets, make sure that the battery assembly sits 1/8" below the case opening and that the wires are sticking well out of the case about 1.5".

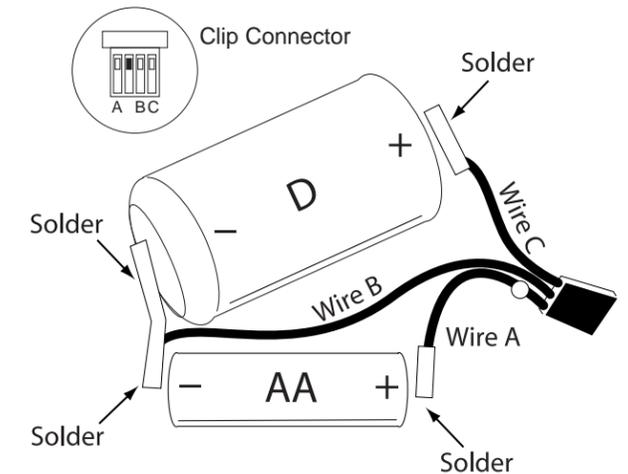


Figure 2: Soldering the batteries and wire assembly.

6. If you want to keep track of the date you built the new battery pack, write the rebuild date on the outside of the battery case with a permanent marker.

7. Drop in one of the small silica gel desiccant packets that came with your collar into the case.

8. Replace the O-ring. Lightly lubricate it, if needed, as per manufacturer's instructions.

9. Store your new battery pack in the freezer (well bagged and clearly labeled) or connect it back to the collar as per manufacturer's instructions if it is to be used right away.

Skye and Hilary Cooley are scientists living and working in the Okanogan Highlands of northeastern Washington State.