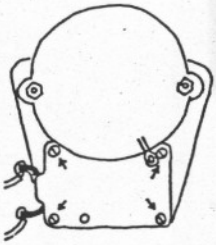
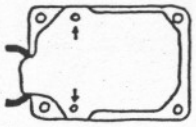
M72-2-1

R-390A Won't Turn Off (Again) ?

Dallas Lankford



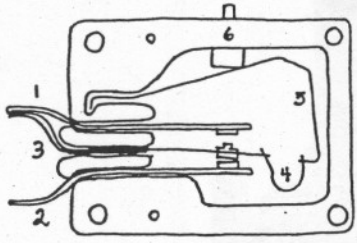
FUNCTION Switch



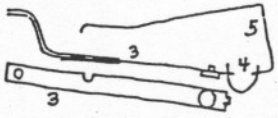
Microswitch

Yep. The first attempted fix, described in HSN 27, was not permanent for my otherwise trusty old 1956 model Motorola. As before, the symptom of the worn microswitch was the dial lights remaining on with the FUNCTION switch set to OFF. And as before, I removed the front panel (see HSN 29) to access the rear of the FUNCTION switch (see sketch at left). And as before, I used ChemWik Lite 0.100 desoldering braid to remove the solder from the two microswitch lugs. Be careful not to touch the hot iron tip to other wires (not shown). The two wires to the microswitch lugs are, maybe, #18 insulated, and not very flexible. Use the hot iron tip to straighten the bends in the wires, and keep the hot iron tip on the wires to aid in pulling the wires through the lug holes without breaking strands. Next remove the four slotted screws, indicated by arrows, and remove the microswitch. If you are lucky, the four flat washers behind the microswitch will be stuck to the FUNCTION switch frame with lock-tite (a varnish-like substance). If not, collect and remove the flat washers, and save them for when you reassemble the microswitch.

When you have removed the microswitch, you will observe two flat metal studs, indicated by arrows above, which attach a plastic cover plate to the side of the microswitch. If you slip the sharp edge of a small knife blade under the edge of the plate near the metal studs, the wedging action of the knife blade will lift the plate and studs slightly, enough to slip a very thin screwdriver blade under the edge to continue the wedging action. By using a succession of larger screwdriver blades (none of them very large), you can remove the plate and studs without damaging the plate, studs, or body of the microswitch. When the plate is removed, the interior of the microswitch should resemble the sketch below.



Microswitch, Interior View



Some Details Of Microswitch

The microswitch has six removable parts, numbered 1 through 6 on the sketches above. Parts 1 and 2 are thick metal plates with small discs attached to them. Part 3 is a thin copper alloy plate. These three parts function similar to the points of an automobile distributor, making and breaking contact for 120 VAC. Parts 4, 5, and 6 move the flexible part 3 to turn the R-390A on and off. Part 6 is

M72-2-2

a miniature lifter, which is controlled by a cam attached to the shaft of the FUNCTION switch. In the sketch above, the switch is shown in the ON position. When the FUNCTION switch is rotated to the OFF position, the cam raises the lifter, which causes internal parts 4 and 5 to move the end of part 3 to the OFF position (end of part 3 resting against end of part 1). Although both microswitches were manufactured by Robertshaw, the lengths of parts 3, 4, and 5 were different for two switches I examined. Also, the semicircle cutout on part 3, which determines how part 3 can be inserted into the case, was on opposite sides for the two switches. This means that for one switch, the small diameter point of part 3 faced the "hot" point on part 2, while for the other switch, the large diameter point faced the "hot" point on part 2. Although I did not try it, it would seem that part 3 can be made reversable by using a small file to file a semicircle into the other side of part 3. Parts 1 and 2 for the switches I observed were reversable; i.e., they has semicircles on both sides. The semicircles mate with small half-cylinders (not shown) at the bases of the mounting slots (apparently to assure proper alignment of the parts).

Part 4 can be removed by using miniature needle nose pliers to slip the end of part 4 off the end of part 3. Part 4 has slots on both ends; parts 3 and 5 have tabs which mate with the slots. After part 4 is removed, part 5 lifts (or falls) out, and then part 6 may be removed. Use a hot soldering iron tip to remove any residual solder from part 3 where it touches part 1, and use the iron tip to move the double end of part 3 away from the end of part 1. With a right angle dental probe slipped under the inside end, and your finger on the outside end, slowly and gently "wiggle" part 2 out of its mounting slot. Apply the hot iron tip to the outside end of part 3 for about 10 or 15 seconds, and then grasp part 3 with miniature needlenose pliers near the inside edge of the mounting slot, and try to "wiggle" part 3 gently but firmly. If part 3 does not move, apply the hot iron tip again, this time for maybe 15 or 20 seconds, and try wiggling part 3 again. In this way you should be able to extrace part 3 without damaging it. Do <u>not</u> pry on part 3 with a dental probe ot other miniature pry bar; part 3 is very delicate, and easily damaged.

With a small piece of #1200 wet-dry (automotive) sandpaper placed on a flat piece of wood or metal, sand the points of parts 2 and 3 until all evidence of pitting is removed. Then polish the points using "used" areas of the # 1200 sandpaper. Making these small points flat again is difficult, and maybe not even desirable. I opted for slightly curved surfaces, so that the refinished points would touch at one point. My theory (untested) is that as arcing evaporates metal from the points surfaces, a small, more-or-less flat circular area would grow on the surfaces of the points (as opposed to small pitted "holes" which would grow if the surfaces were initially flat). If the point of part 2 was so deeply pitted that after sanding not much point surface was left, you can reverse parts 1 and 2 as I did for one switch. It may be possible to reverse part 2, if a small semicircle can be filed into the other side, and if the bent lug end can be bent into an opposite curve without breaking the lug end. I did not try that.

To reassemble, reverse the removal steps above. Use a small but perfectly flat screwdriver blade to seat part 3 completely. You may have to remove parts 2 and/or 3, and install them again to get the points to align properly. For one switch, part 4 touched (or nearly touched) part 2 when the switch was in the OFF position, which would cause the switch to be ON in the OFF position. By bending parts 4 and 5 as shown in the "Interior View" sketch, parts 2 and 4 had plenty of clearance in the OFF position. I also bent part 2 (down) slightly so that the points were parallel.