

A Method for Improving the Reliability of Sound Broadcast Systems Used in Ecology Research and Management – Supporting Information

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This supporting document provides detailed, step-by-step instructions on how to solder the electrical connection of a CD player play button that utilizes a tactile momentary action pushbutton switch. The solder ensures that the electrical connection is constant among the play button's 4 contact poles, which means that once power is applied, the CD player will immediately start. It should be noted that doing this renders all other normal CD player functions connected to the integrated circuit board associated with the play button inoperable.

This process was tested on 3 different models of CD player (INSIGNIA NS-P4112 and NS-P113, INSIGNIA Products, Richfield, MN; Memorex MD-8151SL, Imation Corporation, Oakdale, MN) that use identical pushbutton switch mechanism. We

similarly were able to solder the play button connection on a SONY D-EJ011 (SONY Electronics, Inc., San Diego, CA), which has a right-angle tactile switch housed in a shock and splash proof box. The Memorex and SONY models were found to be less useful in the field because their volume buttons were connected to the same integrated circuit board as the play button, thereby preventing volume control, which was necessary in our experiment to achieve optimal sound levels. As such, the description of the unique methodology used for the SONY model has been left out. Based on our experiences, the following methodological description should be applicable for any CD player that has a pressure-sensitive play button on the top-facing side of the unit.

First, remove the screws from the back (and/or inside) of the CD player and then remove the shell to gain access to the internal electronic components (Fig. 1). Next, expose the integrated circuit board that contains the momentary action pushbutton switch for the play button (Fig. 2). The button itself is then removed from the CD player shell (Fig. 3). While step 3 is not completely necessary, it is recommended because it makes troubleshooting and repair easier if there is a problem with the soldering job. Moreover, it ensures the button cannot get pushed onto and dislodge the solder. Once the play button is removed, extract the convex metal disk below the play button to gain access to the contact poles (Fig. 4). Apply electrically conductive rosin flux onto these contact poles to help secure the connection (Fig. 5), and then connect the contact poles using the solder (Fig. 6). Finally, place all the screws into their original location and cover the hole left where the play button was removed (Fig. 7).



Figure 1. Each screw is removed from the CD player to gain access to the electrical components of the unit. Most CD players have the screws located on the back of the unit, yet some also have them on the CD deck. Make sure all screws are removed before taking off the shell. Carefully pull apart the unit and note that the data ribbon between the integrated circuit board and the main circuit board will still be connected.



Figure 2. To gain access to the play button, the integrated circuit board should be freed from the shell of the CD player. Remove all screws from the board and retain somewhere safe, because they are needed to hold the board in place after the play button has been soldered.



Figure 3. This is a quick process, because the button is only attached via snaps and can be easily removed from underneath. It is easiest to push the button down from the top of the CD player, and then grab it with your finger to dislodge the snaps from the unit.



Figure 4. The convex metal disk is held onto the circuit board by a piece of clear tape and has small clasps that connect with the contact poles. Remove the tape carefully so as not to damage the board. Any damage could cause a disruption in the flow of electricity.



Figure 5. Apply rosin soldering flux to the 4 contact poles so there is a thin layer covering every contact pole. The excess can be wiped off in the next step, so do not worry about the flux touching other parts of the board.



Figure 6. The solder is applied to create an electrical connection among the poles; it needs to be touching each pole without disruption. If the CD player does not turn on once it receives power, we suggest melting the solder again because it is likely that a bubble inside or under the solder has disrupted the electrical flow. Once you have verified that the CD player will begin playing when it receives power, wipe away the excess flux and add a piece of electrical tape across the solder to further prevent the solder from becoming dislodged.



Figure 7. Finally, replace all of the screws into the CD player and close up the unit. If the play button was removed, the hole should be covered with electrical tape to help keep out water and debris while it is in the field.