Carver C-1 Upgrade

Remote Control Modification

Using an existing remote control receiver board sourced from Elliott Sound Products, a simple 12 VDC power supply and a replacement motorized volume potentiometer, it is possible to add remote volume and muting control to the C-1. The remote control receiver uses IR codes from a Sony TV so this *may* cause issues for those who intend to operate a Sony TVs in the same area as their C-1. Not all Sony TVs use the same IR codes so results may vary.

Hand Tools Required:

Soldering Iron; Wire Cutters; Drill; Metal Files; Metal Saw; Hot Glue Gun

1. Start by preparing the new motorized pot. The shaft is too long for direct installation in the C-1, as can be seen in the photo below. Line up the old pot with the new pot to mark the amount of metal to be removed from the shaft. To make it easier to hold the new pot in the vise, extend the flat side with a file first and cut to length after filing is complete.



Note the small collar on the original pot. This sets flush against the chassis when installed and is the reference point for how much material will be removed from the new pot.

2. Seal the potentiometer with tape to prevent filings or metal shavings from entering it. I use painter's tape to limit the sticky residue left behind. Secure it in a vise sturdy enough to allow you to file and cut the shaft.

(Note: I removed the tape for the remaining pictures in an attempt to improve visability)







3. When you are finished it should look similar to this:



4. Now cut the shaft so it is as long as the original pot. Remove all rough edges with a fine file.



5. The index post on the new pot is at 6 o'clock; the original pot index post is at 9 o'clock. Drill a new 1/8" index hole at 6 o'clock.



6. Solder stranded copper leads to the new pot. I use 24 AWG or lighter wire to ease installation. Once installed the distance between the new, larger pot and the PCB is approximately 3/8".



7. Clean the PCB pads for the volume control and be sure the holes are open and clear.



8. Solder the leads from the pot to the PCB. Install the new pot into the C-1 chassis. Tighten the nut firmly.





9. When installing the remote control receiver, the IR receiver LED has to be installed in the C-1 chassis so it can "see" the remote control. A hole can be drilled in the C-1 chassis for the receiver to see through like this:



10. Another method is to re-locate the power-on LED and then use the existing power-on LED hole in the chassis for the IR receiver LED to see through. In this case, I relocated the power-on LED to the volume knob:



11. To begin, I built the ESP remote control board. Once complete, it will need to be mounted securely in the C-1 chassis. I used Rivet Nuts and mounted it to the chassis, right behind where the Carver logo is on the faceplate. I used 6-32 stainless cap screws and nylon standoffs to secure the board to the chassis.



Front Chassis Rivet Nuts Installed

Inside View Of Mounted IR Receiver Board



View Of Nylon Standoffs For IR Receiver Board



12. You will need to drill a hole in the PCB to route the IR receiving LED wires from the IR Receiver board to the LED.



13. If you want to include the muting capability of the IR Receiver board, you will need to add a small DPDT relay board to the install. I chose to mount it right next to the IR receiver board using another Rivet Nut.





14. To facilitate using the existing power on LED hole in the chassis for the IR receiving LED, I relocated the power on LED to the volume knob. First, drill a hole in the volume knob for the LED to fit into. Be sure the fit is tight.



15. Next insert the LED into the knob, pushing it until it is firmly lodged in the hole. Bend the leads over the support rib inside the volume knob.



16. Solder leads to the LED and insert it into the volume knob. Because I replaced the feet on my C-1, I had the original feet left over. I discovered that these feet are the perfect size to press into the knob to hold both the wires and the LED in place. It is important that you wedge the wiring with the foot so that as the knob rotates the wire movement isn't focused on the solder joints at the LED. Wedging the wires with the foot makes the wiring rotate as an assembly, rather than flexing and fatiguing right at the solder joint.



17. Now it is time to create a passageway for the LED wires through the chassis. Start by installing the pot and marking the top edge of it. Remove the pot and drill 4 - 1/8" holes side by side, directly above and a little to the left of the volume pot. Using small files, smooth the rough edges so you end up with a slot like this:



18. Now you can install the pot and route the wires through the slot.



I used a Sharpie to hide the factory volume position indicator dot on the knob. At some point I plan on trying to remove the dot but for now the Sharpie dot is OK.



19. To power the remote control board and the motorized pot, I found it necessary to add a +12VDC power supply to the C-1. I cheated and bought a "battery maintainer" from Harbor Freight for \$5.95. I put the plug in transformer case in my vise and gently squeezed it until it cracked. I then removed the transformer and circuit board and discarded the case. Using a Dremel, cut the outlet prongs off and discard them. Drill two holes in the rectifier circuit board and add a 7812 regulator. Once those tasks are completed, solder a wire to the regulator output and another wire to the rectifier ground for connection to the remote control board power input. Wire the primary side of the transformer to the switched side of the C-1 power outlets.





September, 2012

20. Now it is time to prepare the C-1 for mounting this power supply. There are a couple of existing holes in the PCB that can be used to mount the power supply and support bracket. I added a support bracket to prevent PCB damage from the added weight of the power supply on the PCB.



21. Using the power supply as a guide, put it up against the existing hole and mark the PCB for three additional mounting holes. Drill two 3/32" holes side by side at each of the three marks. Use a small file to smooth the holes into a slot. Use tie wraps as shown to secure the power supply. Don't forget the insulator underneath it !!



22. Get a piece of mild steel and bend a 90° angle ½" from the end and place it on the PCB, directly over the existing hole in the PCB. Mark the bracket through the PCB hole and drill a 3/16" hole at that mark. Mark the bracket at the edge of the chassis and then bend the bracket at the mark. Measure 3/8" from the bend and cut the bracket off. Mount the bracket to the PCB with a machine screw and nut and "adjust" the bracket until it fits snugly under the chassis lip.



23. Drill a hole through the chassis and bracket. Use a countersink to bevel the chassis hole and use a machine screw and nut to secure the bracket to the chassis. The screw head should set flush so the dust cover does not contact it when installed. When you are done the PCB and power supply should be very secure.



24. Wire the power supply output to the IR receiver board. Wire the motor control wires from the motorized volume pot to the IR receiver board. Wire the muting output wires to the DPDT relay board. Mount the IR board to the C-1 chassis.







25. Mount the IR receiver LED in the existing power on hole. Use a dab of hot glue to hold it in place. (If you look closely you can see the leads for the volume control mounted power on LED sticking through the PCB at D400.) Wire the LED receiver to the IR receiver board.



26. If you wired everything correctly you should be able to control the volume and toggle the mute circuit with a remote control. If you find the volume actuation is reversed (volume increases when you press the down button) simply reverse the wires to the motorized pot.