RX-7 Logicon Repair/Replacement

Symptoms:

- Ducts do not redirect airflow when different positions are selected (i.e. Defrost, Flow towards feet, Flow towards face etc.)
- Fan does not respond to fan-speed control, or full range of speeds not available.
- Temperature slider does not adjust the mixture of warm/cold air

Solution: Resolder 'cold' solder joints within modules/replace parts

Tools Necessary:

- Phillips Screwdriver
- Soldering iron
- Flathead screwdriver or thin prying device

Background:
Many cars develop this problem with age. For some reason, the electronic components in the early second generation cars leave much to be desired.

My car developed these symptoms slowly. Originally, the buttons would not respond immediately to button presses, necessitating either a ride over a bump on the road, or a tap to the faceplate of the logicon to engage my actual vent selection.

Eventually, the vent selector stopped working entirely. This was fine for most cases (it happened to stick in my preferred position, the 'face' position) but was a major problem when the windows started to fog up. So, I ended up doing the resolder job listed below.

After a while, the temperature potentiometer went south on me, as well. I ended up buying another logicon from a junkyard, and installing it as listed below.

Note: It's been mentioned to me that the symptoms of a bad logicon are almost completely indistinguishable from a bad airmix motor, which also likes to fail on these cars. If following these procedures does not help your cause, the problem could either be that you have actual component failure on the logicon PCB, or your airmix motor has gone to the great scrapyard in the sky.) Mazda likes to replace both of these when a problem arises, costing the poor consumer a huge amount of money (they like $500 for the logicon, $200 for the air-mix motor...plus labor!)

So, my recommendation to you is, try the following! It's really not that hard, and could save you quite a bit of cash!

Step 1: Expose module
On either side of the shifter boot, where the black plastic meets the YIC (your interior color) plastic, insert a THIN screwdriver, gently work it up underneath the black plastic. This should pop each side free. This is a great opportunity to clean out all the junk which accumulates in the crevices in the shifter boot. :)

This will uncover two screws just behind the ashtray. Remove these, putting them in a safe place.

The tricky part: Insert something wide and flat between the two heater vents, and the black frame surrounding them. **Carefully** pry the heater vents away from the console, and they will pop out. This may take a bit of pry here, move a few centimeters, pry again, etc. There are two screws behind the top of the frame which must be removed to successfully remove the frame intact. (This was not mentioned to me, and now I have a cracked frame. I've seen quite a few of these broken, as these screws are not exactly in an obvious place.) This should leave you with a total of 6 screws in your 'safe place,' and a pair of heater vents, and an ashtray. At this point the frame should lift off of the console, exposing the radio, and logicon.

Now, you'll want to remove the connectors which power the cigarette lighter and the ashtray light. The ashtray light removes by twisting the brown (in my car) connector slightly counterclockwise as viewed from the back. The cigarette lighter power plug (black) pulls off.

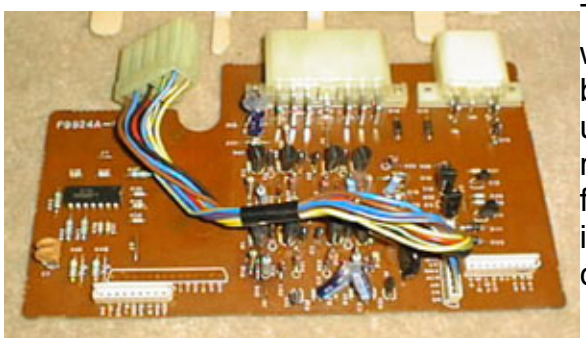
Step 2: Remove module
Four gold screws hold the logicon into console. Remove these, and the console should slide forward a few inches. Again, be very careful, as there are 2 cables coming out of the back of the logicon. One of these is plugged into the back of the logicon, and one will appear to just go into the guts of the logicon. The plugged-in cable is shorter, and can be removed just like any other harness on the car, i.e. by pressing the little tab down and pulling back on the connector. The other cable which disappears into the box is tied onto the beige box via a zip-tie. Cutting this may give you a little bit more room, as the following steps have to happen with the box attached to the console via this cable. (N.B. It IS theoretically possible to find the other end of this connector in the dashboard and detach it, but after I screwed around for a while trying to find where it was attached, I gave up and just lived with it. I found it wasn't bad working this way, and keep in mind that if you DO detach it, you'll later need to reattach it! Alternately, you could take the box apart while you're sitting in the car, and desolder the other end of the long snakey cable (see diagram below for which solder points are involved...they're highlighted in purple on the diagram at the bottom of the page.)) (Second note: There's been some confusion on the wiring harness which plugs into the back of the logicon. Some people have noted that there appear to be two different wiring harnesses which plug back there (for a total of 3 connections total). It's currently not currently clear whether there are actually two different models of logicons, or whether two of the three connections are merely

harnessed together, making it appear like one fat bundle of wires with two connectors).

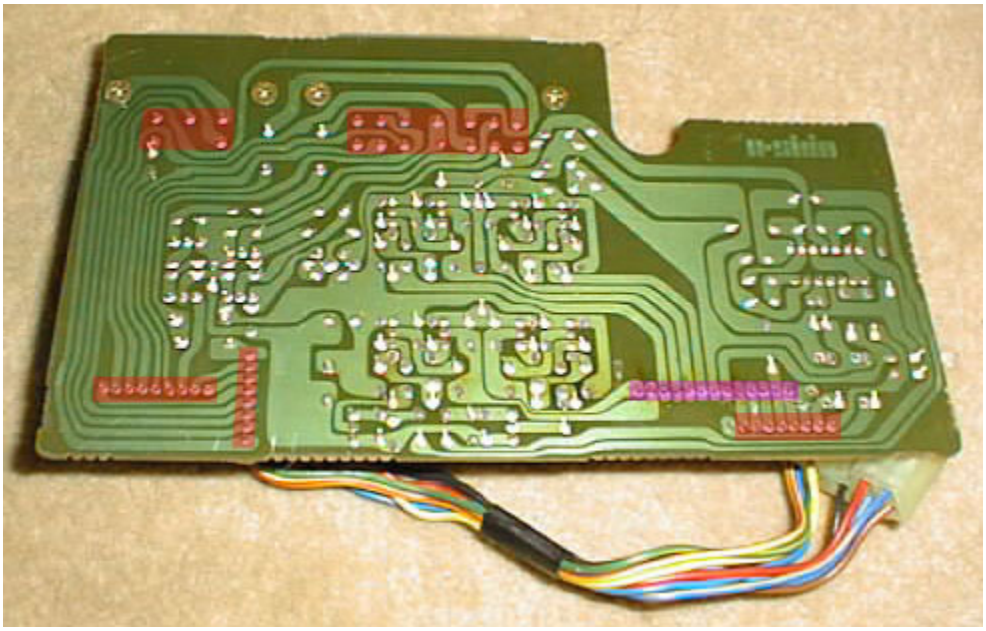
Step 3: Inspect logicon
This isn't really a step, but it helps for us to have an understanding of what I am talking about for the rest of this document. The logicon is made up of 3 discrete modules. There's the faceplate, approximately 1.5 inches deep, containing the slider controls, etc., a small (black) box, and a larger beige one. The black box detaches from the beige one with a single screw, and the faceplate detaches from the beige part with 4 screws, one at each corner. **Note:** Since the original writing of this document, I've found out that the small black box is actually a 'fan mode amplifier,' and is actually the device which controls the fan speed. If your fan has only one or two speeds, this black box may be at the root of your problems.

Now, what happens next depends on your symptoms. I found that resoldering the large solder points fixes problems most of the time, however, I haven't actually opened the faceplate yet to inspect the fan potentiometer, for instance. When my logicon failed for the third time, I just bought another one from a junkyard. The Mazda dealer wanted more than $400 for it! It cost $75 from a junkyard.

To resolder the solder joints:
Step 1: Separate 3 parts of logicon
Separate the black box from the beige box by removing the single screw in the back holding it on (this step isn't strictly necessary, but I found it much easier to deal with the beige unit when separated from the little black box.) Separate the beige box from the faceplate by removing the 4 screws in each of the corners. This will reveal the circuit board inside the beige box. The faceplate will be attached by a wire harness, and the little black box will be attached by another wire harness.

Step 2: Remove the circuit board from the beige box

There are two small plastic retaining clip which holds the circuit board inside the beige box. Sliding a screwdriver underneath one and then the other will release the circuit board. Slide it forward. The solder joints you are interested in are on the underside of the circuit board.

Step 3: Resolder the joints
Usually, the bad solder joints are the ones connecting the long, flat wire harnesses to the PCB (printed circuit board), but it's not a bad idea to go ahead and resolder any of the large solder connections. I didn't have the patience to resolder them ALL, but I did do most of the larger ones, and I've highlighted these in red the diagram below. The purple solder points are those that you would have removed, if you decided to desolder the long snakey cable instead of reaching up behind the dash to disconnect it.



Make sure that your solder joints are nice and shiny (i.e. heat the metal, not the solder, etc.), otherwise you'll be doing this all again in the near future! Slide it back into the beige box when you're done.

I don't want to turn this into a tutorial on soldering, but all of the standard soldering caveats apply, use the right powered iron, good ELECTRICAL solder, etc.

Step 4: Assembly is the reverse of removal
Don't you hate when they say that? Just make sure that you don't overtighten the screws in the frame, as this piece of plastic is very brittle and will not respond well to overstressing.

To replace the logicon, use the instructions above to remove it, however you'll need to either find the end of the wire harness which is buried deep within your dashboard, or alternately do what I did, which is desolder the end of the cable which is attached to the PCB, and resolder the cable to your new unit.