At the Repair Bench – Icom ID-4100A Shutdown – March 2023

Sometimes, you have to repair – or at least I have to repair – my own equipment. And, sometimes the old adage about *"getting what you pay for"* is true. In this case, it certainly came true.

I had been having occasional problems with my Icom ID-4100A *(Figure 1)* powering itself off, most often at the end of a transmission, but occasionally during receive operations. There was no rhyme or reason to when this would happen. It might happen twice during a net, or it might go several weeks without occurring. I was always able to restore the radio to operation by power-cycling the power supply, and I was therefore half convinced that the problem was internal to the radio, so I set about trying to locate the problem.

Figure 1 - Icom ID-4100A

My first step was to take the ID-4100A out of service. I unplugged the power cord at the "T" connector *(Figure 2)* that is so common on mobile radios today. The radio that I was swapping in there temporarily, an Icom ID-800H, had the same type of power cord, so it was a plug-in replacement as far as the connections went – power cord and antenna cable.

Figure 2 - Power Cord

I fired up the ID-800H and all was well. I set the ID-4100A aside for repairs when I could fit the job into my schedule, reasoning that there was no hurry as I had yet another 2-meter set available if the ID-800H should fail, a Yaesu FT-1900. In this way, I should not have to resort to my handheld for the nets, right?

Two weeks go by, meaning four nets in which I participated, for two of which I was the Net Control Station, and all was working well. I sat there thinking through the ID-4100A problem, and poring over the schematic and block diagram, looking for the most likely place to start in troubleshooting the shutdown issue, but had not yet reached any definite conclusions.

Another week goes by, with two more nets. During the Thursday net, the old faithful ID-800H shut down, *exactly as the ID-4100A had been doing!* Stop the truck and back it up… I concluded now that the problem was not in the radio after all. At this point, I began suspecting the power supply instead, as it was common to the two radios. I decided to watch carefully the next time the radio went dead to see how the power supply behaved. I got a bit of a surprise doing that.

The next time the radio fell dead was the Tuesday net two weeks later. Throughout the net, I sat there staring at the front of the power supply, studying is backlighting and the output monitor meter. What I saw there puzzled me for a few minutes… the power supply showed a momentary spike in output current just as the radio died, but then dropped to a zero-current state. The output voltage had momentarily sagged a little bit, but then jumped right back up to the normal 13.8VDC available output. This told me that the problem was neither the radio nor the power supply, but something in between them. The only thing between the power supply and the radio was the six-port Powerpole® distribution block that I had mounted behind the desk, and of course the power cables themselves. No fuses had blown through all of this, with either radio.

I went to the Powerpole® distribution block and carefully examined both it and the power cords connected to it. Much to my surprise, I found that the port to which my 2-meter radio was connected looked melted, very slightly on the black connector shell, but quite heavily on the red shell *(Figure 3)*. This melting had occurred on both the cable end *(Figure 4)* and the distribution block port. I disconnected the cable from that port and got another surprise. Inside the red shell of the cable, the contact was not all the way out to the end of the connector shell as it should have been. Instead, it was pushed back a little bit, enough to cause the connection made when the plug bodies were joined to be somewhat less than optimal. Apparently, this connection would occasionally open, usually when heavier current was drawn during transmission. The heat caused by the resistance formed there is what melted the connector bodies.

Figure 4 - Melted block port

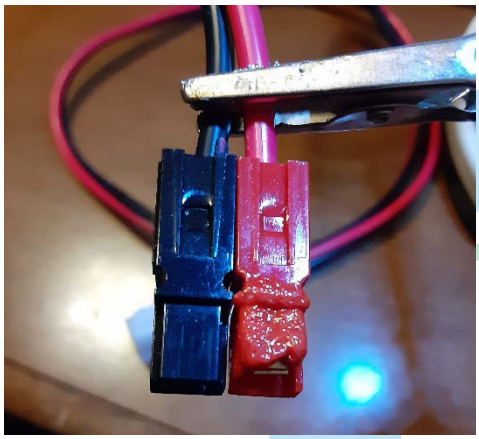

Figure 3 - Melted cable end

This particular cable was an ebay.com buy that I picked up before I got my Powerpole® assembly kit in house. I needed a power pigtail for the mobile-type radios, so I bought a couple of inexpensive ones on the auction site. My guess is that the actual contact was never fully inserted into the connector body far enough to lock into place. It simply pushed away from its mating contact, maintaining a light touch with its mate, but opening up under load. This caused me to inspect the second cable that I bought at that time, but it was assembled correctly, with the contacts in place where they belonged.

The fix for the cable was simple. Cut off the melted connector and crimp on a new pair of Powerpole® connectors. I keep the Powerpole® parts on hand, so that was no problem. The repair to the distribution block was not quite as simple.

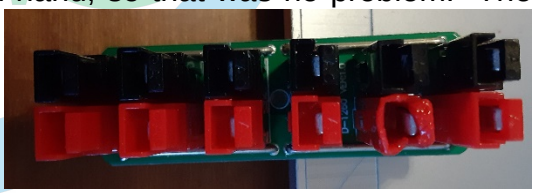

Figure 5 - PCB with bus bars

The distribution block has a metal cover secured in place by four small flat-head machine screws, so disassembly was easy. I removed the screws and lifted off the cover, exposing the inside of the unit. Inside, there was a small printed circuit board *(Figure 5)* having bus bars along its outer edges to help handle the rated current of the unit. Each of the Powerpole® shells was installed to a blade-type contact that is soldered into the PCB. I fooled around with trying to release the contact from the body and to slide the body off, but that was going nowhere fast. Ultimately, I decided to try a more direct approach. I took a pair of pliers and simply crushed the melted red connector body, causing it to separate from its contact a bit. Then it was just a matter of using pliers to grip and wiggle it off the contact, sort of like pulling a tooth *(Figure 6)*. After that, all that was left was the job of

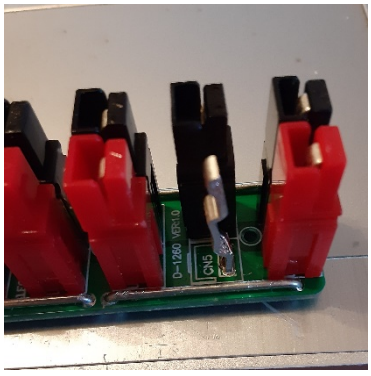

Figure 6 - Connector shell removed

forcing a new connector body down in place of the melted one. The black connector body was intact, so I was able to leave that one alone.

After the connector shell was replaced, reassembly of the distribution block was the reverse of the disassembly procedure. The only tricky part was reinstalling the three miniature truss-head machine screws that secure the PCB to the lower enclosure half, as they are buried down between the Powerpole® shells.

With the distribution block repaired and reassembled *(Figure 7)*, it was time to put it back into service, which I did. The new connectors on the power cable, properly assembled this time, worked as they should, and the problem of the dead radio has not occurred since the repairs.

Figure 7 - Repaired distribution block

The lesson in all of this is to inspect every piece of kit that you buy, because even "brand new" items might be defective. Had I inspected this cable before use, I may have noticed that the contact was not seated and I could have corrected it. All that would have been needed was to properly seat the contact in the connector shell by pushing in until it clicked into place. I failed to do so, and ended up with a mystery to solve as a result.

See you next month!