A3000 DB9 / Mouse Port Repair

Introduction- Mouse Problem

This Amiga came to me in partially working order. The machine would come up to the super kickstart screen, but the mouse had jumpy left/right motion to the point of being useless. I could go no farther as I need to click a button to load a kickstart image to proceed.

My first attempt

Testing connectivity on the left and right pins on the joystick port showed connectivity.

After some research, I found others had luck with replacing the 74LS157 multiplexer chip between the db9 port and Denise. I ordered some chips and replaced it. Socketed this time, figuring I would make it easy to replace in the future.

Unfortunately, this did not fix my problem. But it didn't hurt anything either. At this point, I'm stumped.

Hiatus (for years!!)

I packed up the machine, stacked it in the garage, and move onto my Amiga 500s which has provided me years of fun and entertainment. I love my 500s

My Second Attempt

Over the past year I've been re-doubling my efforts to repair some of my ailing machines and this machine has been top of mind. This time, I decided to bring in reinforcements. My son, Josh, has been doing electronic repairs for years at his current job so I thought he would be a great help on this project. As it turns out, my son is Awesome!

Restarting this project, I jumped in and made some bad decisions and assumptions. I sent Josh down the line of tracing the POT_0Y and POT_0X traces. Those lines traced out perfect and we were once again to the point of trying to swap out components, like the filter and a capacitor on the trace.

Fortunately, while researching the problem with the components in route I found POT_0Y and POT_0X are Mouse Buttons. Not the movement. I had jumped to a thought that POT meant "potentiometer" which sounded like a good name for some mouse movement functionality!! Doh!

LEARN - Be patient, take time and . . .

LEARN - READ THE SCHEMATICS!! Including peripherals (IE. The Mouse schematic)

LEARN - Don't make assumptions. I was assigning meaning to the connectivity labels on the schematic like POT_0Y and POT_0X, M0H and M0Y

Now that we are back on a logical, systematic debugging path, we returned to diagnosing the proper traces off pins 3/4 on the DB9 connector.

With Josh tracing the connectivity and reading the resistance values, he concluded there was a problem because the resistance was very high.

LEARN - Pay attention to resistance values! Very Low (< 1 ohm) resistance is OK, Resistance in the > 1 ohm to 500 k is probably a resister/component in the leg of a trace. A reading in the megs is probably a problem, especially if it cannot be explained by components on the trace.

We examined every segment of the trace from 9PIN port to Denise.

Each leg connected with proper resistance . . . except the VIA.

LEARN - Vias are those little holes in the board with no components attached. They provide for routing a trace from the bottom of the board to the top. This is sometimes used when a trace needs to be cross over another trace to reach its destination.

LEARN - Trace out each leg of the trace paying attention to resistance. Vias holes are their own leg of the trace! These can go bad!! In our case, battery corrosion appeared to take these out.

Cleaning efforts did not change the situation, so we proceeded with a repair.

I do not have the tools to replace a via, so we installed a Bodge wire to bypass the bad vias used for our trace to hop other traces on the way to Denise. One of the vias was VERY close to the Denise socket. We also identified battery damage in the socket. We also pulled out the socket to give us better access to the via and help protect the Denise chip. The yellow bodge wire in the image below is the repair.

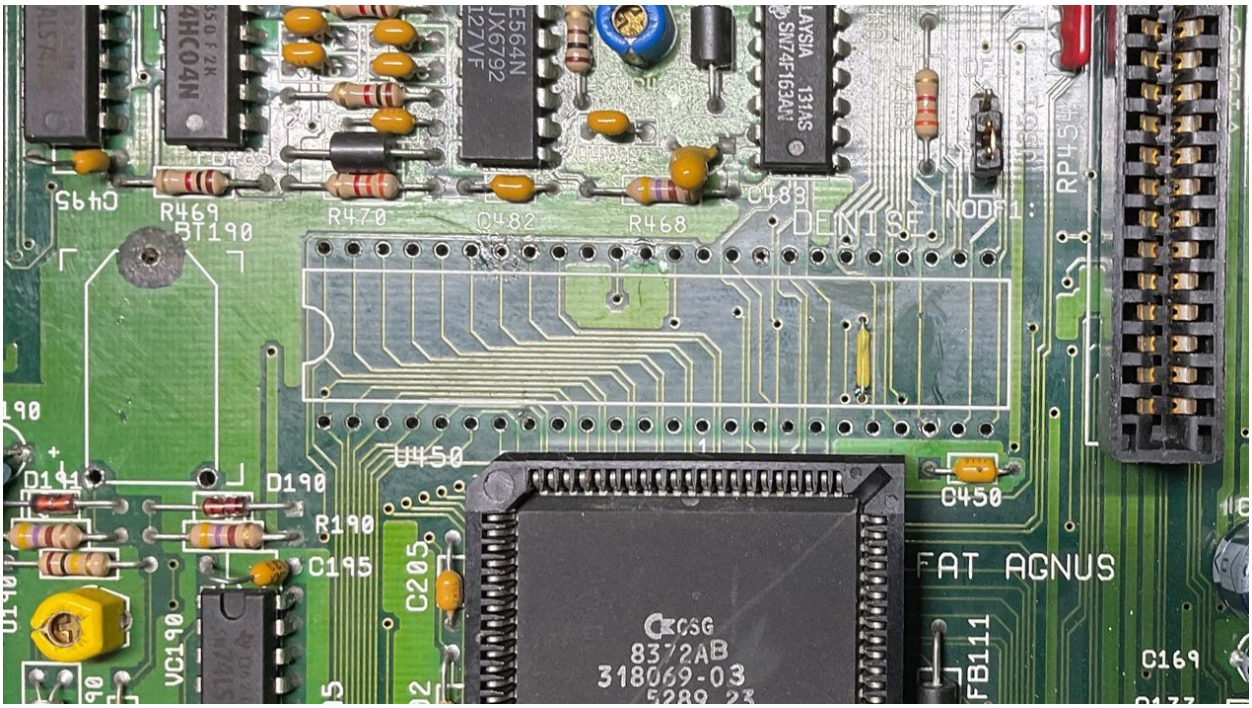

Figure 1-Bodge wire fixing the first DB9 port

After this repair - drum roll please - we have a working mouse/joystick db9 port!

Second Attempt continues

Now that we have a mouse, we can boot up the machine and run diagnostics!!

Before doing so, I noticed in one of the pictures that I have a broken trace we missed! Checking the schematic, I find this is one of four lines for the red channel in the RGB output from Denise to the 25 Pin monitor connection. I expect some red issues.

Learn - My old eyes can easily miss small broken traces!! Use magnification when examining traces to help find small breaks

I get the Amiga Test Kit loaded and confirm that there is indeed weirdness happening on the red color channel.

Also, Amiga Test Kit shows the second Joystick port has a right/down problem.

We did a proper trace of all 4 traces of the red signal our of Denise, Pins 20-23, and found the only problem was indeed on the line with the broken trace.

This was repaired by taking a fiberglass pencil to remove the solder mask and expose the copper trace on each side of the break.

We then soldered in a very short wire to bridge the broken trace. The yellow bodge wire in the image below repairs the second DB9 port. The bare wire fixes the broken red color trace.

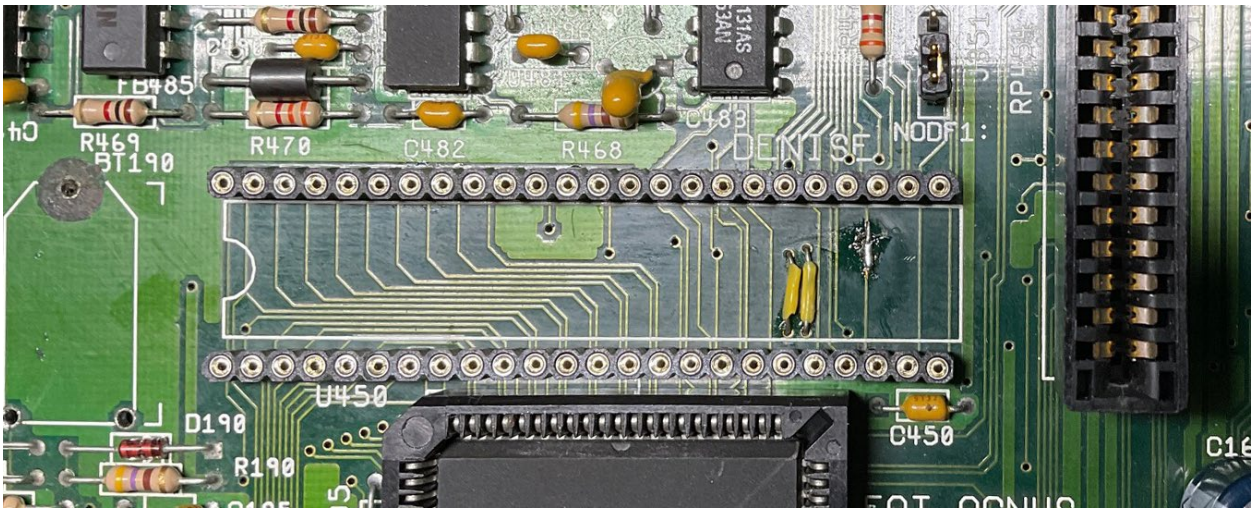

Figure 2- 2 Bodge wires to fix all problems

We covered the exposed copper and wire with a solder mask.

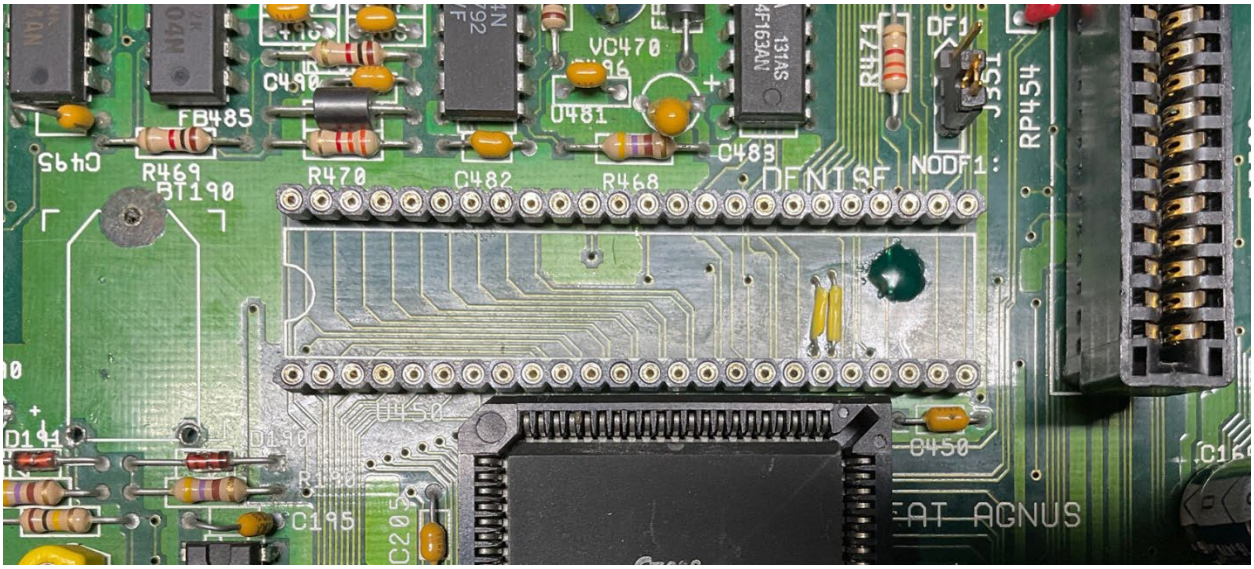

Figure 3- Added solder mask to cover the bare bodge wire

Solder mask is fairly cheap on Amazon and can be cured with a UV flashlight. This little repair only required a small drop of solder mask material.

We then traced the down / right joystick lines (pins 2 / 4 on the db9 connector) back to the Denise and found another problem with via holes on that trace! A repeat of the "mouse" fix on these holes fixed the joystick.

In conclusion

We added 3, small, precisely placed bodge wires to address trace damage to bring this machine back in service. I still have concerns that the battery gunk inside traces will eventually cause more problems. If/when that happens, maybe the time will come to strip down a larger area of the board for deeper cleaning and trace repair. Perhaps, more dramatically, prompt a move to a re-amiga board! I try to adhere to a thought of "Do No Harm!" and target the needed repairs and today it's a working machine.

Summary of Lessons Learned

LEARN - Be patient

LEARN - Don't make assumptions.

LEARN - READ THE SCHEMATICS!!

LEARN - Pay attention to resistance values!

LEARN - Trace out each leg of a trace.

LEARN - Vias are those little holes in the board with no components attached.

LEARN - Via holes are their own leg of the trace!

LEARN - Via holes can go bad!

LEARN - Easy to miss small broken traces!

LEARN - Use magnification when examining traces!

LEARN - Phone a friend!! I used this as an opportunity to spend some time with my adult son who has now been working in electronic repairs for nearly 3 years. There are others in the community who are MUCH more knowledgeable than me who are willing to provide information to those who are trying to help themselves. It never hurts to seek them out and ask!

Equipment / Resources

Here are some links and info on my tools. My tool set is not professional grade for the most part, but better than some of the cheaper, entry level gear. It gets the job done without breaking the bank for my level of repair work.

A3000 Schematics - https://www.amigawiki.org/dnl/schematics/A3000.pdf

Amiga Mouse Schematics - http://pavouk.org/hw/en_amigamouse.html

A3000 Schematics (with jumper settings and more) - http://amiga.serveftp.net/Schematics/A3000_schematics/A3000_R9_schematic.pdf

Amiga Schematics site for all Amigas - http://amiga.serveftp.net/schematics.html#A3000

Soldering Iron: AOYUE Int 899A+ - No longer available but similar to https://www.amazon.com/Aoyue-888A-Digital-Soldering-Station/dp/B01NBUJTTS/ref=sr_1_3?crid=35XV8J5IEL3VH&dib=eyJ2IjoiMSJ9.NUHC46VauUXqoo2DPWH4vqs7fgRMpVpyf_-jaMEA948bTo2NP22dYlKieyCzbeVF-EgAYSB-I2U1dx0LdL7MWTp_L6fG2oCOMWe4rEEDLK0g6NX5BDveItXezrP25HfitXm9LoqQ-XfDsHHdHMauOsIiPFed_jHFwQASbzY0brY.5Je_IK5o1xi_YH5HAd8Hqif-Llt_kPJIymkww5S_t_Q&dib_tag=se&keywords=aoyue+int+899a%2B&qid=1739138689&s=hi&sprefix=aoyue+int+899a%2B%2Ctools%2C144&sr=1-3

Desolder Station: Anesty ZD-915 - https://www.amazon.com/Digital-Desoldering-Station-Anesty-Professional/dp/B07542D82F

Meter: Fluke 174 meter – No longer available. Similar to https://www.fluke.com/en-us/product/electrical-testing/digital-multimeters/fluke-177 BUT, a much more basic meter can do this job. I lucked into an unreal deal on my Fluke.

Basic supplies: Solder, Solder wick, fiberglass pencil, tweezers, solid core wire (26 gauge), wire strippers, tooth brush, 99% alcohol, good lighting, and a solder mat