XF551 PCB w/Some Original Parts Salvaged

Before you do anything else check that you have a functioning XF551. If not then any part on that original pcb could be bad, including the disk drive and power supply. Fix that first. This particular version of the reimaged XF551 pcb assumes that you have good original parts and in some cases there are no substitutes for the original parts.

This is mainly a quick tips paper. These following original parts should be easy to desolder from the original board and assuming they are still good should be able to be used again. Due to the fixed footprint of some of these parts, substitution with more modern parts may not be possible. The supplied excel spreadsheet lists the parts necessary and where possible substitute parts and the optional parts.

8.33333MHz OSC (1) (Y1) (Not pictured)

That leaves the rest of the parts either too tedious and/or not economical of time or money to remove. As in the transistors you could end up damaging

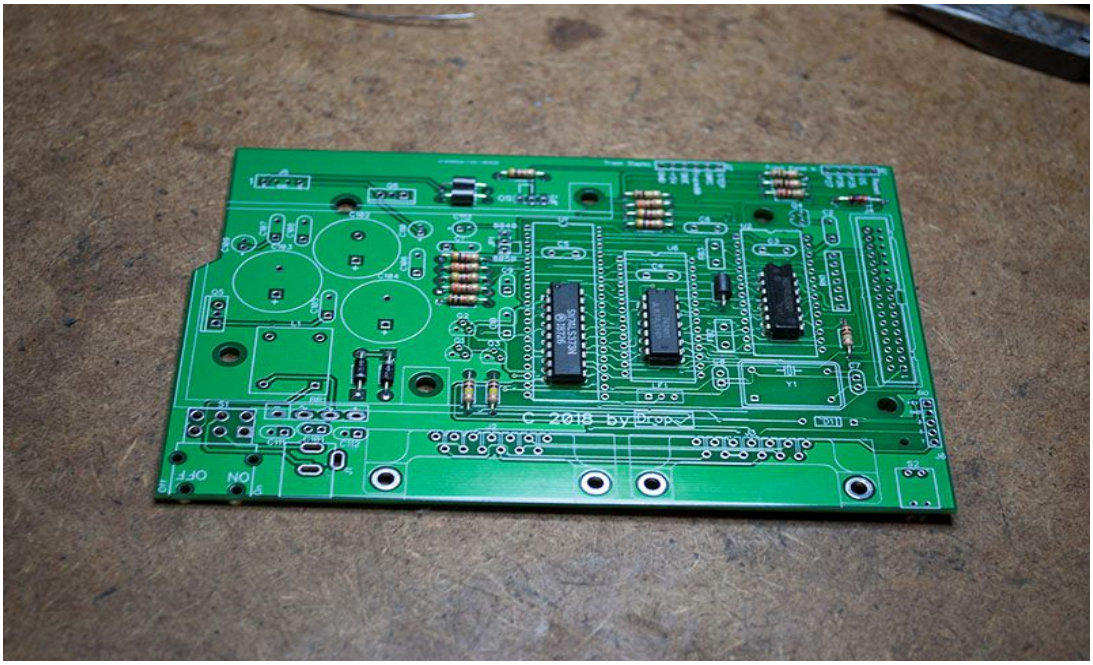
them and have to replace them anyway. Start fresh. If you do reuse any other parts then reuse the resistors. They have the least tendency to be harmed by repeated heating. Verify resistor values with the excel parts spreadsheet, not with the XF551 original pcb part designation. IE don't pair R6 on the original board with R6 in the parts spreadsheet. They may not be the same.

Resistors are relatively generic. Ceramic capacitors are as well. Where specific parts are called for I have listed the part #. Lead spacing is important. All parts can be found on Mouser.com, but may also be found on Digikey.com as well.

Beginning:

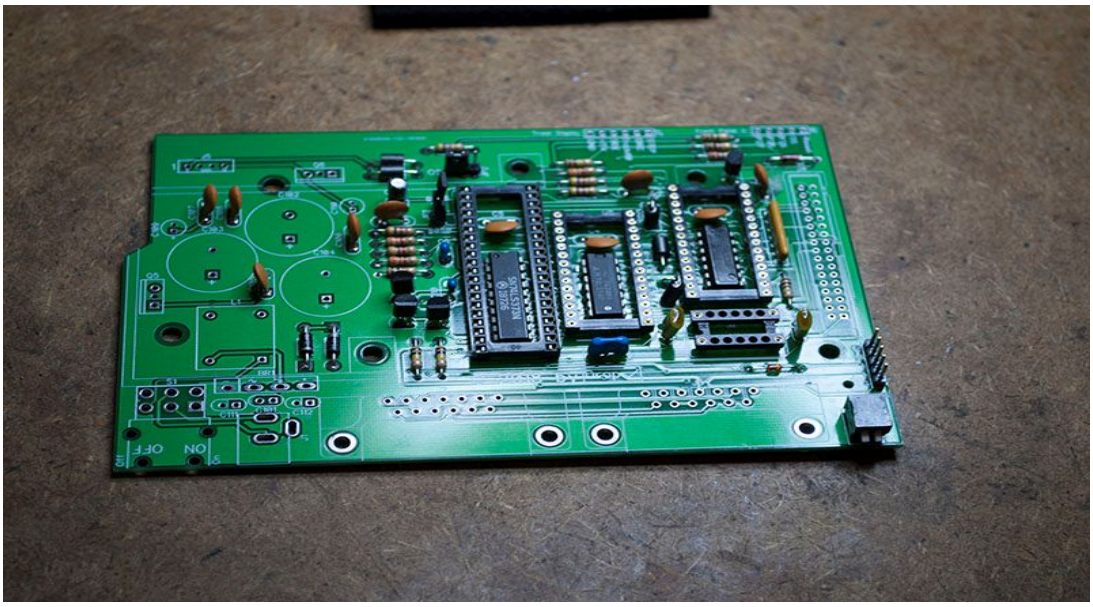
If you have never soldered before, STOP! This is not the time to learn. Let someone else do it for you. Buy them a six pack of whatever they drink.

General tips—Start with the surface mounted parts first. Then with parts that are axial rather than radial. That will usually be the TH resistors, axial inductors and diodes. Then solder the glue chips into the board.

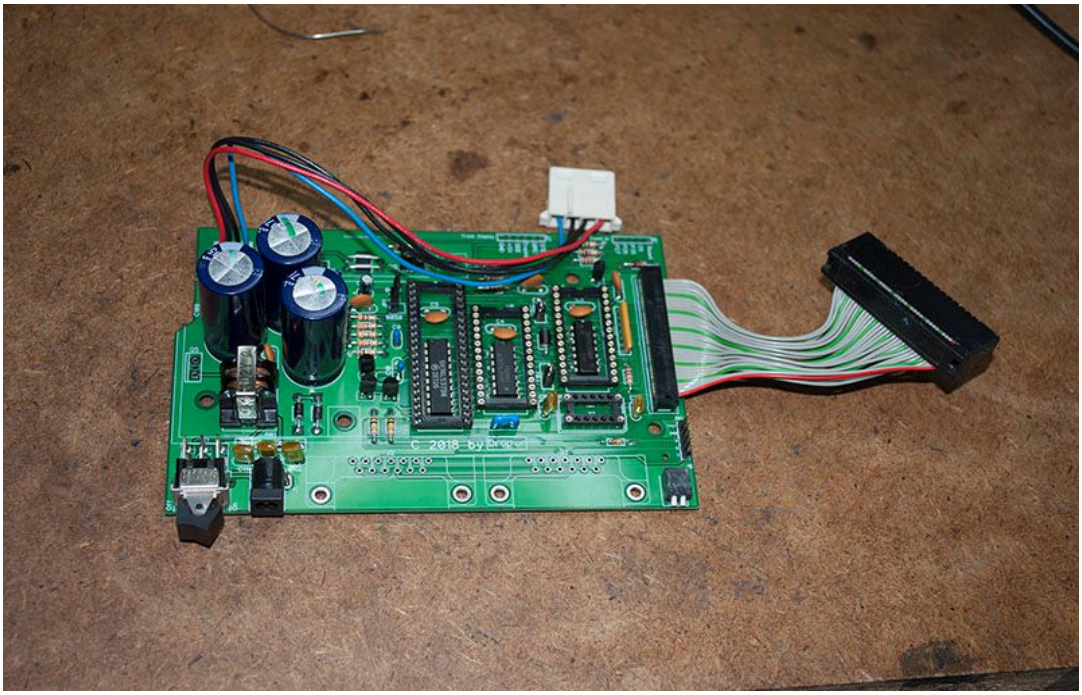


(This is an older version of the pcb, but for demonstration purposes works just fine.)

Then start building up. Solder in the ceramic caps first, resistor array and filter. Then solder in the four sockets. You may have to clip the internal support of the socket if any of the already soldered in chips block your ability to fully seat the socket flat on the board. Next you can solder in the transistors and the small electrolytic caps. Don't forget to solder in the jumpers and aux SIO connector.

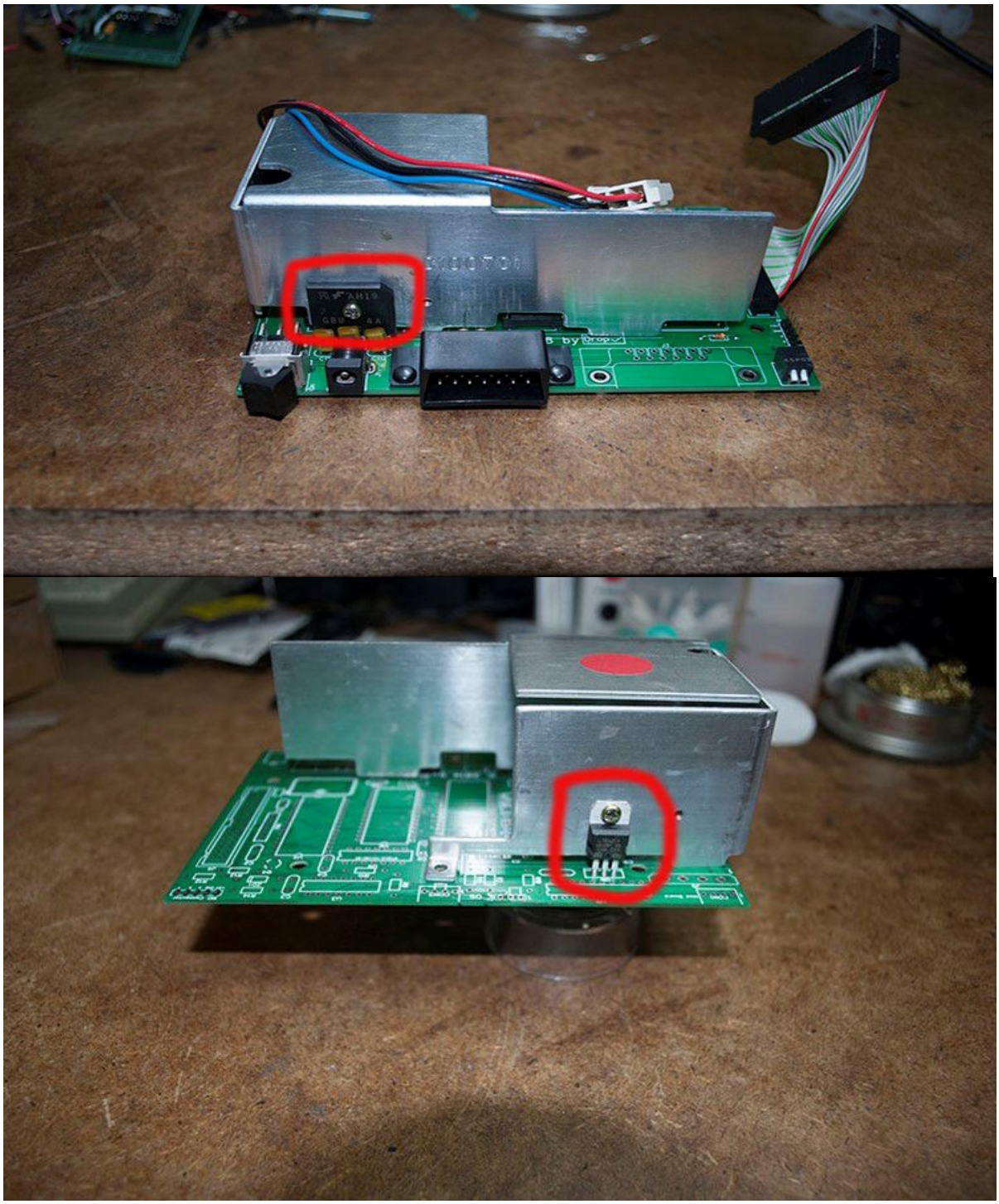


Now install your socketed chips and oscillator into the board. And then finally everything except the heat sink, BR1, Q5 and Q6.

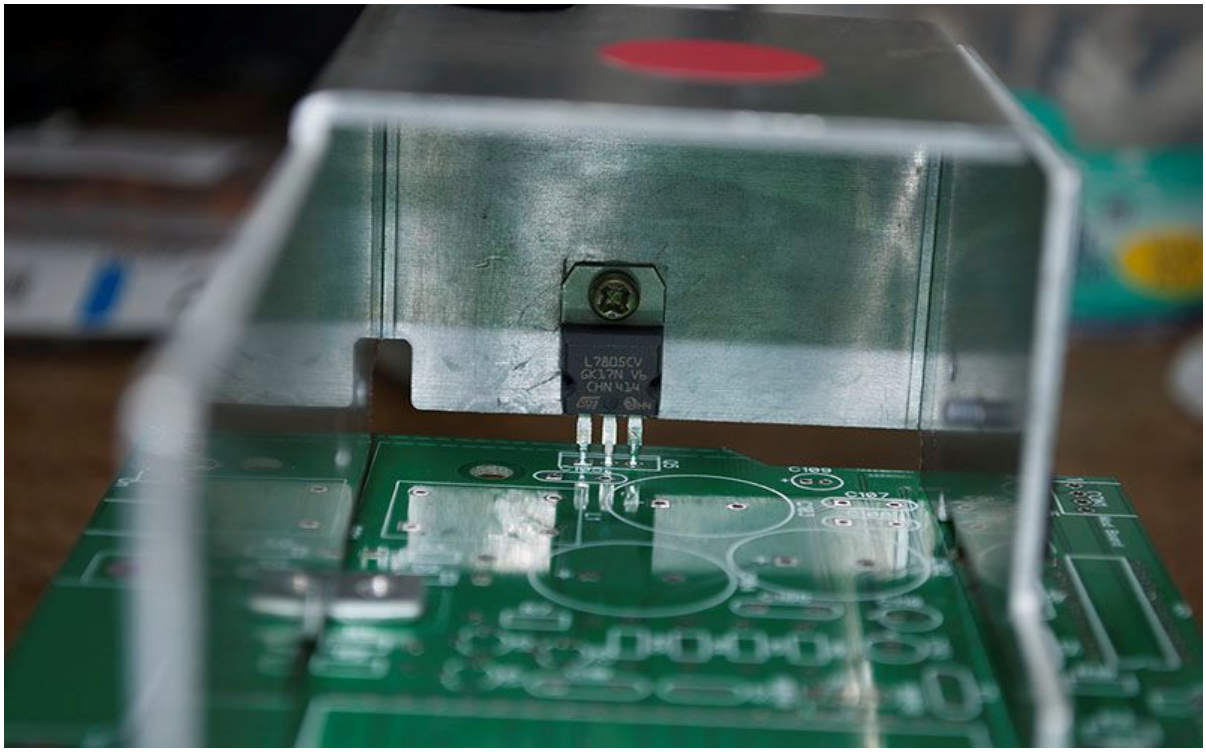


Heat sink, BR1, Q5 and Q6 installation:

BR1 and Q6 are screwed into the outside of the heat sink and are easily then soldered into the board without much ado. On the BR1 match the silkscreen legend orientation on the board.



However Q5 is a different story. It is screwed into the inside left hand side of the heat sink as you are looking at the back of the board



(7805 Voltage Regulator Location)

and you normally won't have access to the screw holding it in place. That means you will need to screw BR1, Q5 and Q6 to the heat sink prior to seating it into place. I would do this at the very last, after every other part had been soldered in already. Once the heatsink is seated, then solder BR1, Q5 and Q6 into place.

This is a huge heat sink. It's purpose is to soak up the heat given off by the bridge rectifier and linear voltage regulators. It will resist mightily proper solder melt especially on the ground terminals. The trick is to apply enough, but not to much heat to form a good solder joint.

Troubleshooting Tips:

Now you have it assembled and you are dieing to fire it up. Wait. Do a final visual check that you have all the part leads soldered to the board. Nothing irritates me as much as the device not working because I tacked the part in, but did not finish soldering all the pins in. And I do it all the time. Check for bridges, bad solder joints etc. Make sure that all the socketed chips don't have crimped/bent pins, are fully socketed etc. Make sure that you have the proper CPU ID set and for at least the initial test Drive ID set to 1.

For the moment pretend that you soldered something wrong and you need to protect yourself and your house and your Atari. Seat the pcb in the bottom drive case (you don't have to screw it in), connect the drive mech to the power and data cables. Put the top cover on (you don't have to screw it down). Do not connect the SIO cable from the drive to your Atari. Connect the power supply into a surge suppressor that is off and then plug the power supply into the XF551. The XF551 should be switched off. Now turn on your surge suppressor. The only thing that should happen is the power on light should lite on the surge suppressor. Now turn on the XF551. You should get a short spin up of the drive, the drive led should lite and then go off. That is normal and you should be able to go to the next step.

If the drive wigs out, you hear a bang and smoke and fumes start pouring out of the case, or absolutely nothing at all happens, turn off power at the surge suppressor and begin troubleshooting. Assess the damage. Repair/replace.

The board has been assembled and tested to a working condition if all parts are good and no mistakes were made in soldering. That does not mean that parts won't fail and sometimes very loudly, with fireworks and smoke for good measure. I am providing a schematic of the board in addition to the gerbers, so you have that to aid you in troubleshooting. If you are not confident in your troubleshooting skills, it might be best to enlist help from someone who is. It's extremely hard to troubleshoot remotely. So don't expect a lot if you aren't willing to ship the drive to that person.

A few tips:

Nothing, absolutely nothing happens: Shorting components or power problem

Drive wigs out, constant spin: Data cable is not correctly connected (backwards, off by one pin or row etc) bad eprom or programming

Otherwise it's time to do power and signal tracing. Start with power, make sure you have +5V on all your chips at the proper location. Check that you are getting 8.333MHz clk signal on both U1 and U2 proper pins. Make sure power is off and check for proper grounds and improper shorts.

I've fixed some annoying failures by simply reflowing solder joints. They looked just fine, but obviously weren't.

Okay, say the drive seemed to behave like it's supposed to. Now the next step. Do we have a fully functional pcb. Turn off the drive and connect an SIO cable from your Atari to the drive SIO connector. Turn the drive back on and your monitor and then the Atari. You should hear/see the Atari try to boot from the disk drive, assuming you are not using an alternative boot option. Depending on the selection of the XF551 BIOS you will get either a boot error or the HyperFX screen with no disk in the drive. If so, then it's looking very good. You should be able to continue normally at this point as the drive is responding to the computer.

But what if the Atari doesn't see the drive and boots directly to the READY prompt? Now it's time to have fun. Many times this type of failure is harder to find and sometimes can be multiple failures at once. Or it can be as simple as having the Drive ID set wrong or a bad SIO cable.

Try the other BIOS option. Check for the 8.333MHz OSC signal on both the cpu and disk controller chips. Reflow solder joints, Check for shorts and trace signal flow.