

Nintendo NES-001 Capacitor Replacement Kit Installation Guide

Thank you for your purchase of a Nintendo NES capacitor replacement kit from Mortoff Games. We appreciate your business and look forward to serving you again in the future. This guide is intended to take you through the steps involved in the installation of your capacitor replacement kit. If you have any questions along the way please contact us at Customerservice@MotoffGames.com

Thing you will need

- Nintendo NES-001 capacitor replacement kit
- Small Philips head screw driver
- Small flat head screw driver
- Soldering iron
- Solder
- Soldering braid
- Fume hood
- Patience
- A clean work area where small parts will not get lost
- About 1.5-2hrs of spare time

Safety

This repair requires hours of extensive solder and unsoldering. Much of the old solder is composed of lead and other harmful toxins. In addition the board is covered in plastic and glue that will be melted during this repair. All of these substances should not be inhaled. Throughout this repair you should use a fume hood to protect yourself from the dangers associated with breathing these fumes in. Please do not try to do these repairs without one. We are more than happy to provide you with a full refund on this repair kit rather than have you endanger yourself because you lack the proper protection equipment.

Soldering Skills Needed

This repair requires extensive soldering skills and should not be attempted by a novice. You are more likely to damage the system if you don't have the proper skills. We recommend that if you are not completely comfortable with your soldering skills you return this repair kit for a full refund at this time.

Patience

This repair requires roughly one and a half to two hours of work. If you start to get tired we recommend that you stop and come back to the project at a different time. Attention to detail is an absolute must during this repair.

Index of Capacitors in Kit

In case you are interested here is an index of all of the capacitors include in this repair kit. As you may notice the capacitors are packaged by type and labeled accordingly for ease of usage. If you ever find what you need more of a particular type of capacitor please contact us at Starwander@Comcast.net. We are more than happy to sell them individually.

Master Index

Capacitor Rating	Mounting Type	Quantity
1uf 50V	Radial	3
100uf 25V	Radial	1
100uf 10V	Radial	1
2200uf 25V	Radial	1
10uf 16V	Radial	1
2.2uf 50V	Radial	1
100uf 6.3V	Radial	1

Index of Part Numbers and their Associated Capacitor

When looking at the circuit board you will notice there is a number next to each capacitor that identifies its part number. The part number will always start with the letter “C”. This is an index of those part numbers and their associated capacitors.

Power Board

Part Number	Rating	Mounting Type
C21	25V 2200uf	Radial
C23	25V 100uf	Radial
C25	10V 100uf	Radial
C29	50V 1uf	Radial
C35	1uf 50V	Radial
C36	10uf 16V	Radial

Main Board

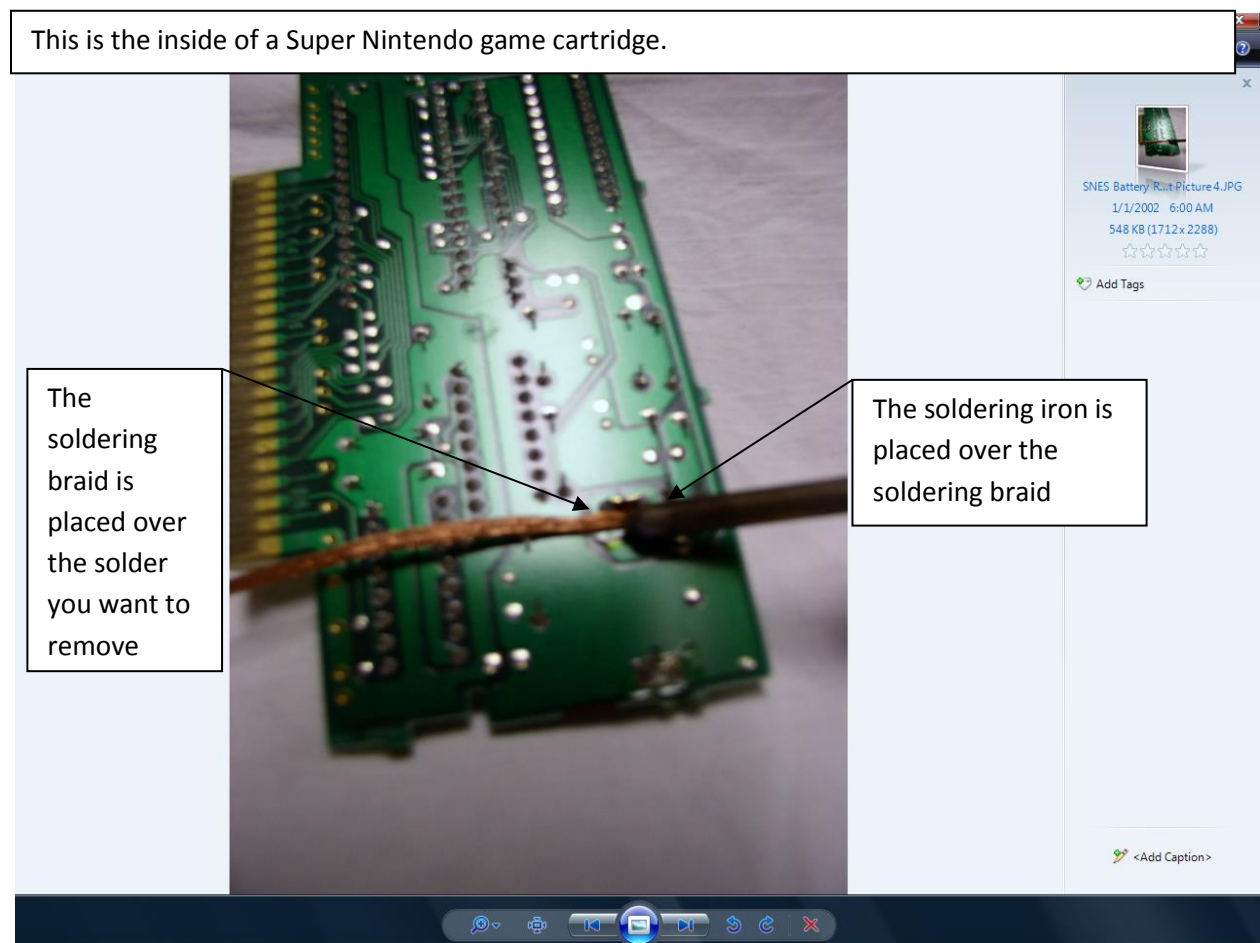
Part Number	Rating	Mounting Type
C1	100uf 6.3V	Radial
C9	2.2uf 50V	Radial
C23	10uf 50V	Radial

Soldering Techniques:

In order to solder and unsolder correctly you will need a soldering iron, solder and soldering braid. Once you have these items it is safe to proceed forward. For the duration of this project it is not recommended that you use a cold heat or any other instantaneous heating soldering gun, since these guns use an electrical current to melt the solder. Passing a strong electrical current through your games or systems is not recommended and as such should be avoided. We recommend that you use a typical soldering gun, the type that you have to plug in and wait to heat up. In addition it is recommended that you set your soldering iron to 30watts for the duration of this project.

Unsoldering:

Correctly unsoldering a joint is rather easy once you get the hang of it. In order to unsolder a joint place soldering braid over the solder you wish to remove and then place the soldering iron over the soldering braid. The soldering iron will heat the braid and in turn the solder will liquefy, which will be sucked up by the braid. Please see the picture below.



Picture Introduction: Proper usage of solder braid

Although it might take a little while to completely remove all of the solder, patience and persistence will pay off in this case. Every 10-15 seconds remove the soldering braid and check to see if the solder have been fully removed. As soldering braid is takes up solder periodically cut off these used sections as needed.

Soldering:

Now that the solder has been removed you can now remove the object that the solder was holding in place and you are now ready to solder something new into place. During this project it is not safe to use excessive soldering material as bridging between joints is very easy due to their close proximity to each other.

The two most important things to keep in mind are:

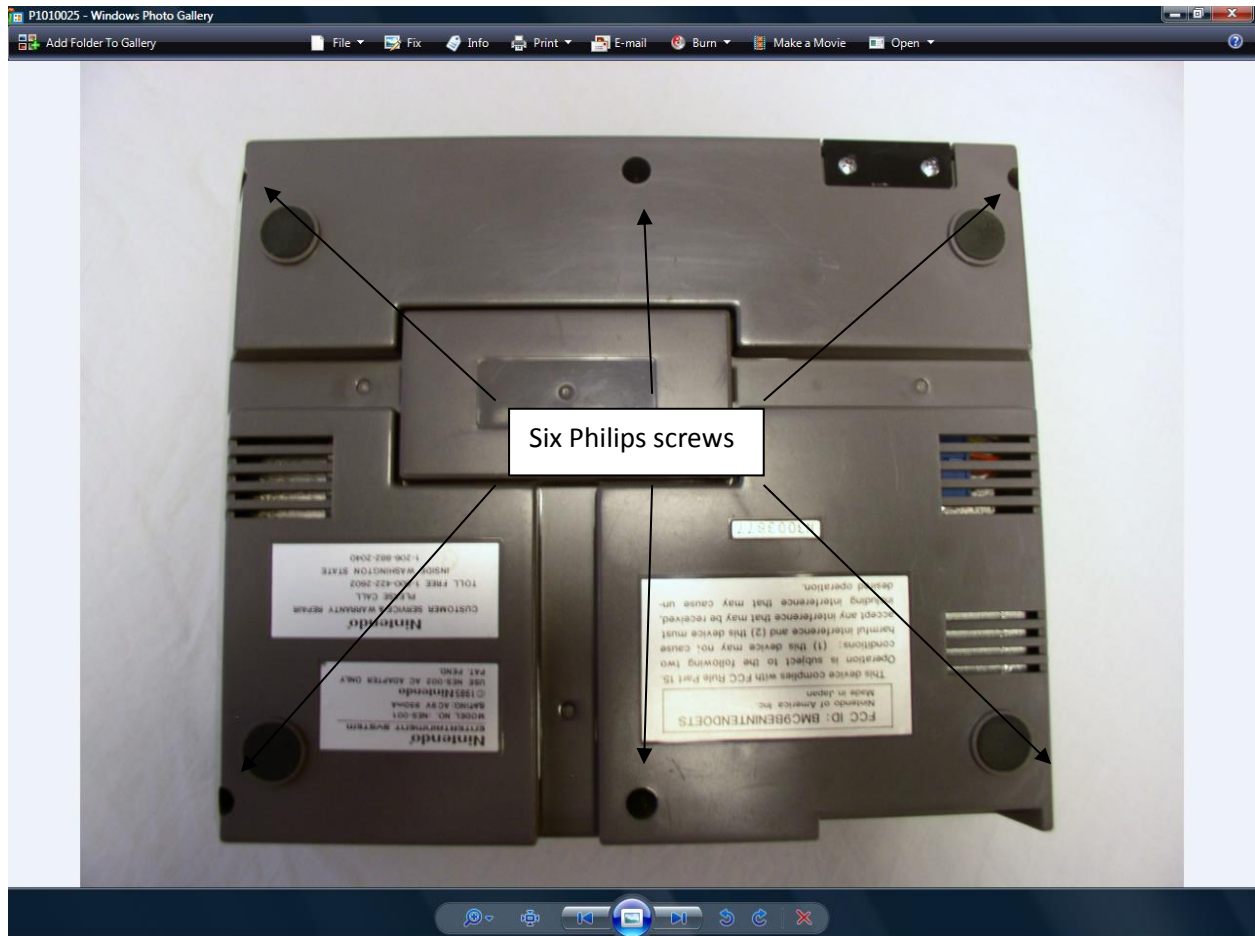
- 1) Never allow patches of solder to overlap or touch, doing so creates a short, thereby rendering the circuit inoperable.
- 2) Make sure to use enough solder to securely attach whatever it is you are soldering, do not be afraid to test the joint out.

Keeping these items in mind lets continue with our demonstration. To apply the solder take it and place it over the soldering joint and then lightly place the soldering iron over the solder. This is just like unsoldering, although this time you are soldering and not unsoldering. This part is a little tricky when you first start and is hard to describe with words alone. It is recommended that you test out melting solder first to get an idea of how it behaves.

One ideal exercise you might want to try is to attempt to solder together two pieces of wire. Take two pieces of wire, strip the ends, twist the ends together and then practice applying solder over this twisted joint. During the course of this project if you run into trouble remember you can always back track and remove the solder and try again, using the soldering braid. Soldering braid and solder are very cheap and as such are worth playing around with to get comfortable with before you go ahead and try to solder in a replacement battery. Now that we have covered the basics of soldering and unsoldering, let's get started with the replacement of those capacitors.

Step 1:

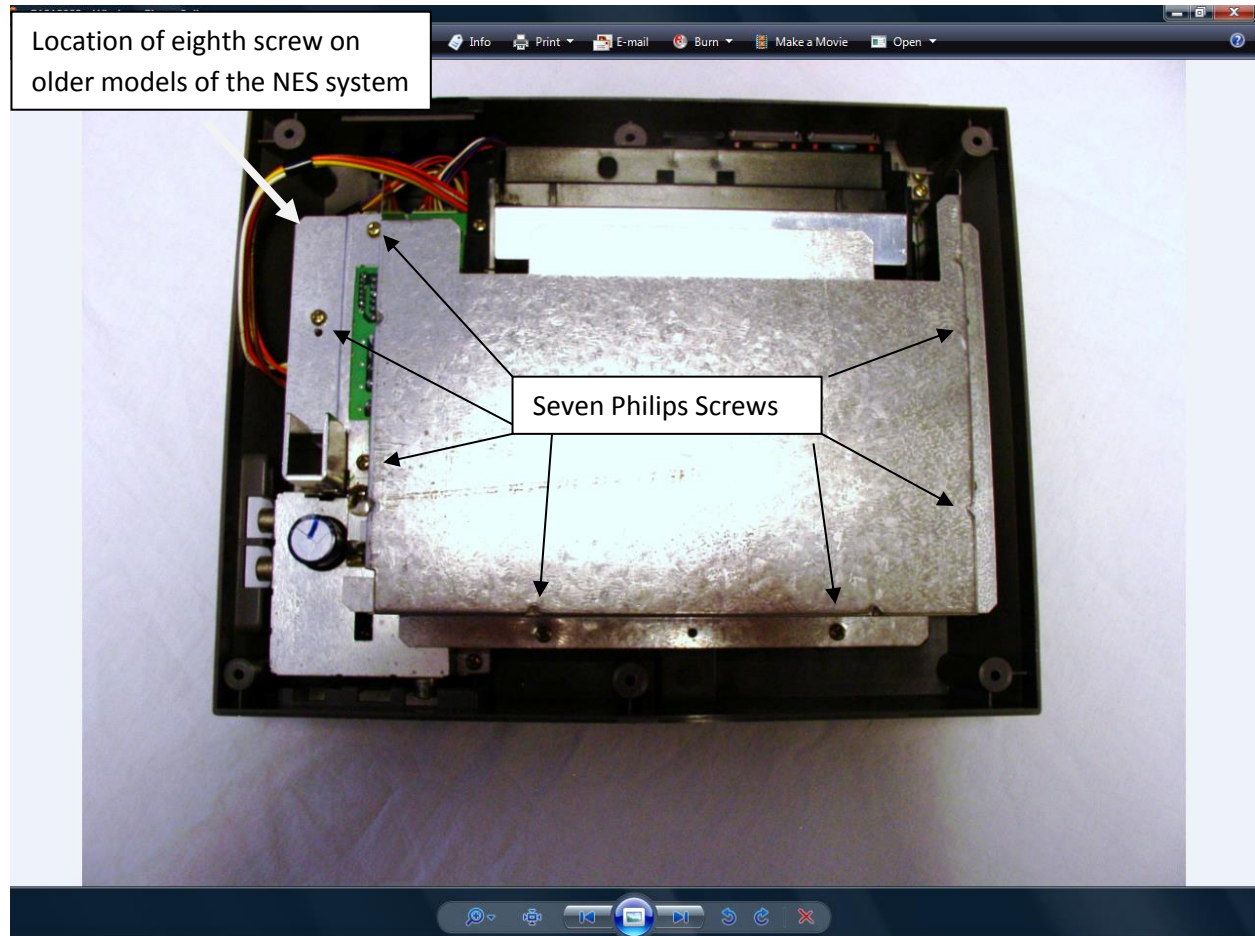
Firstly flip over your system and locate the six casing screws. Unscrew them using a Philips head screw driver. Once the screws are removed simply flip over the system and separate the top from the base by grasping the top and pulling upwards. The top should easily separate from the base; otherwise this indicates that one or more screws still need a bit more loosening.



Picture One: Bottom of Nintendo NES System

Step 2:

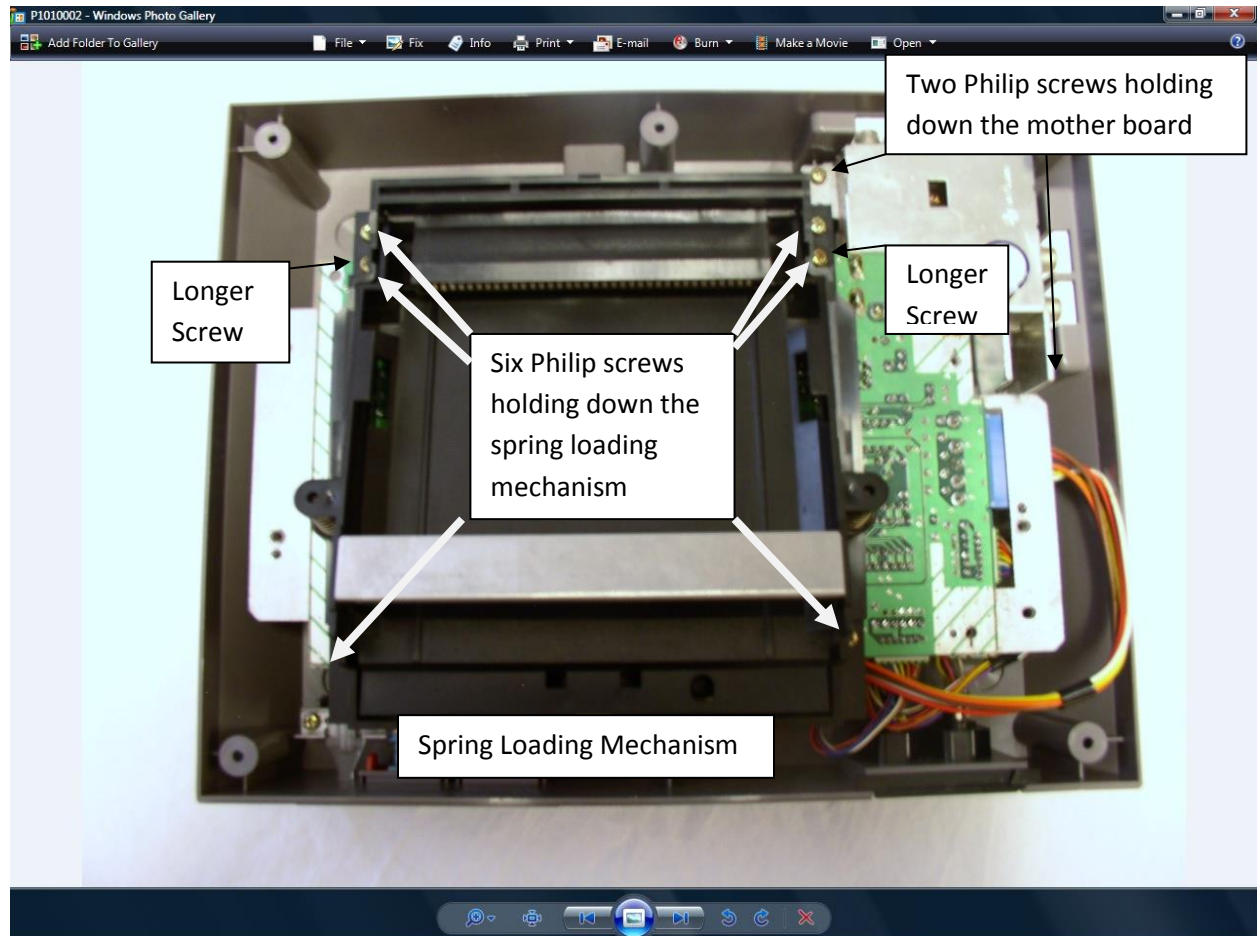
Once you have removed the top casing you will need to remove the top RF shield, which is held on by seven-to-eight Philips screws. On earlier models of the Nintendo NES system there is an eighth screw holding down the top RF shield, as noted on picture three.



Picture Two: Removal of the Top RF Shield

Step 3:

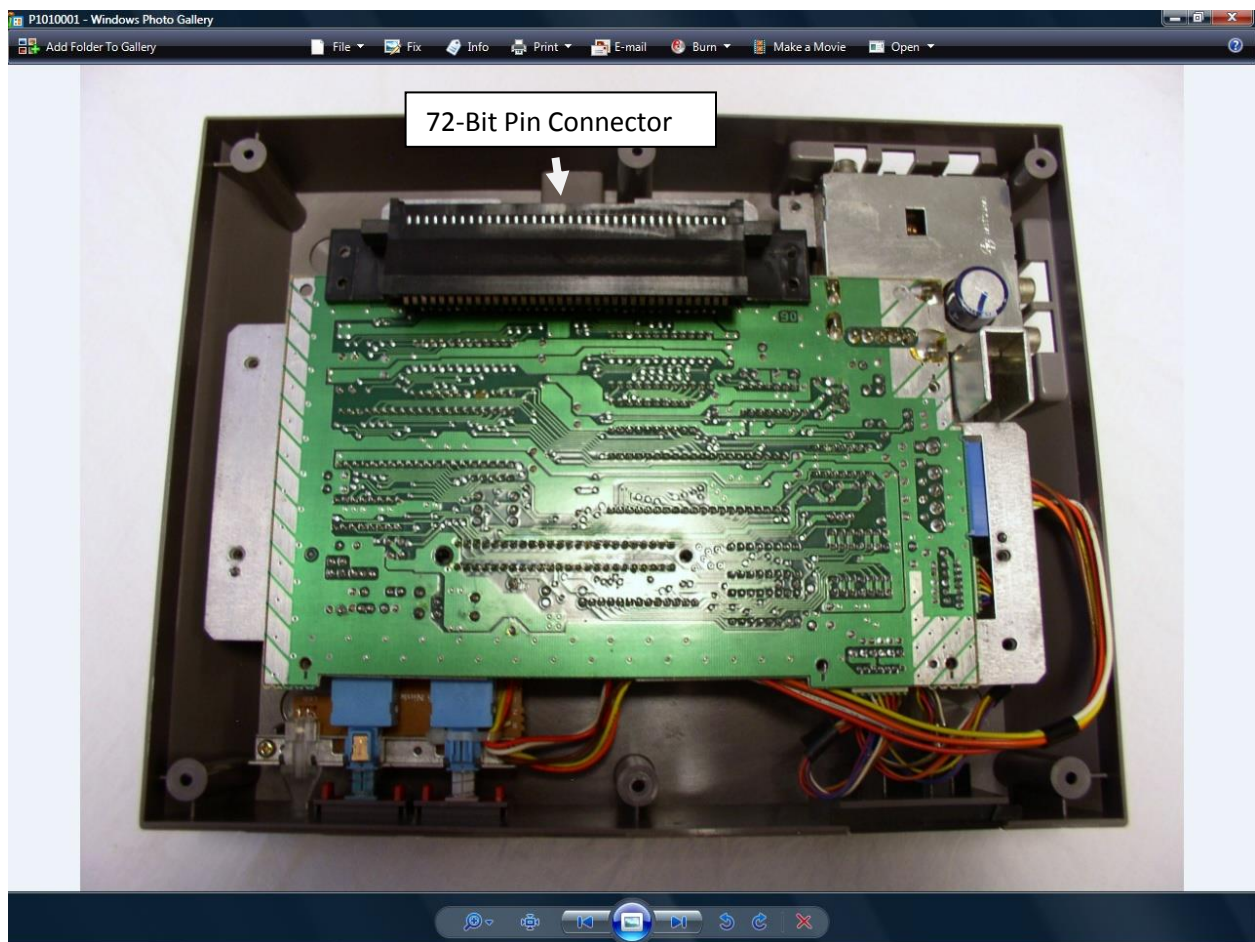
Once the top RF shield has been removed now it is time to unscrew the six screws holding down the spring loading mechanism and the two screws holding down the mother board. Take note to notice that two of the screws holding down the spring loading mechanism are longer than the rest. Remember where these go when reassembling the system.



Picture Three: Removal of Spring Loading Mechanism

Step 4:

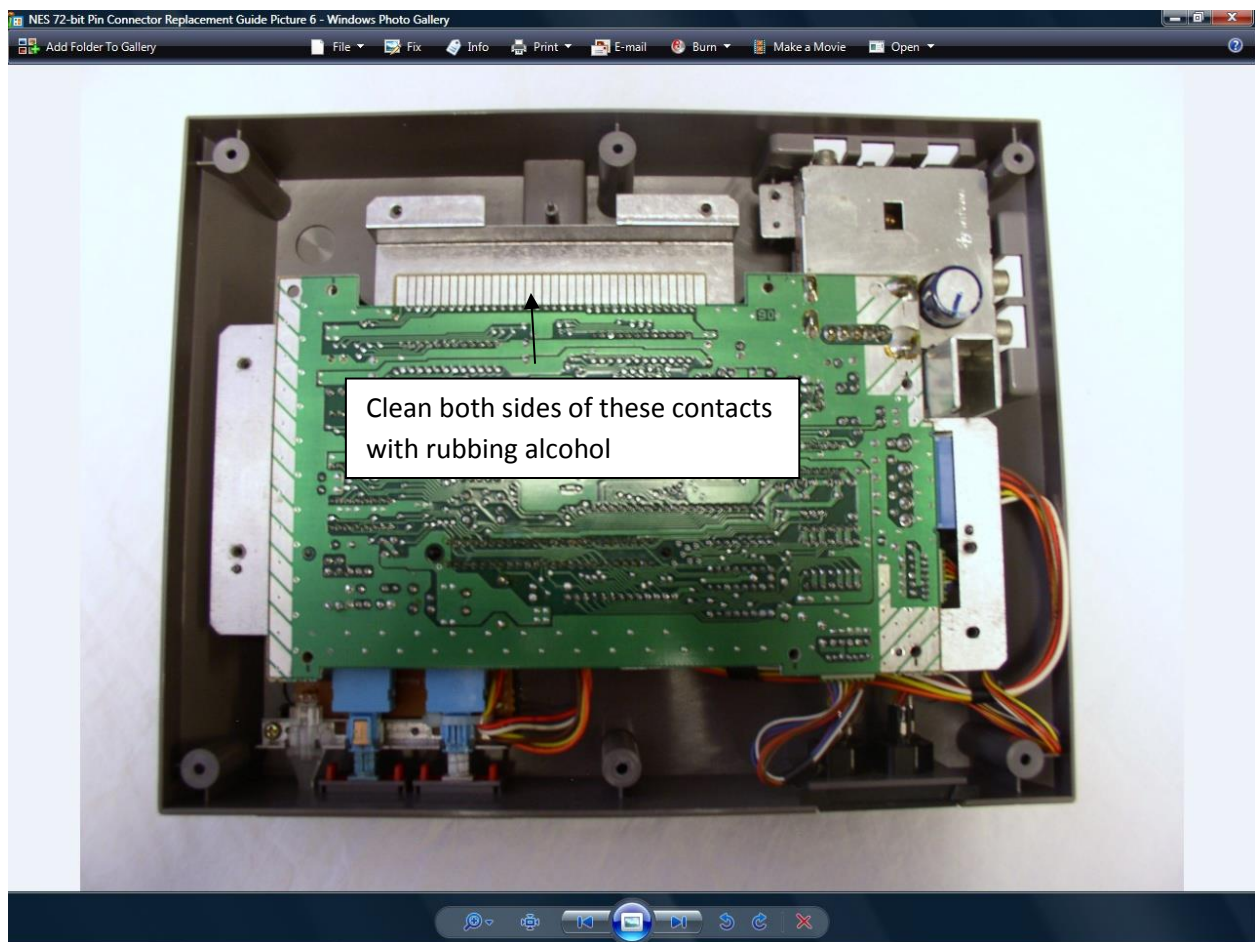
Once the spring loading mechanism and the mother board have been unscrewed it is time to remove the spring loading mechanism. To do this simply lift the front end of the mother board upwards and grasping the metal bar on the spring loading mechanism pull outwards towards you. You might have to wiggle the spring loading mechanism a bit to remove it fully. Do not worry about breaking the spring loading mechanism as it is pretty sturdy. After the spring loading mechanism is removed your system should look like picture five. At this point you will need to remove the old 72-bit pin connector, which involves simply grasping the pin connector and pulling in the direction opposite of the mother board. It typically is hard to remove, so some force might be needed.



Picture Four: Removal of the Pin Connector

Step Five:

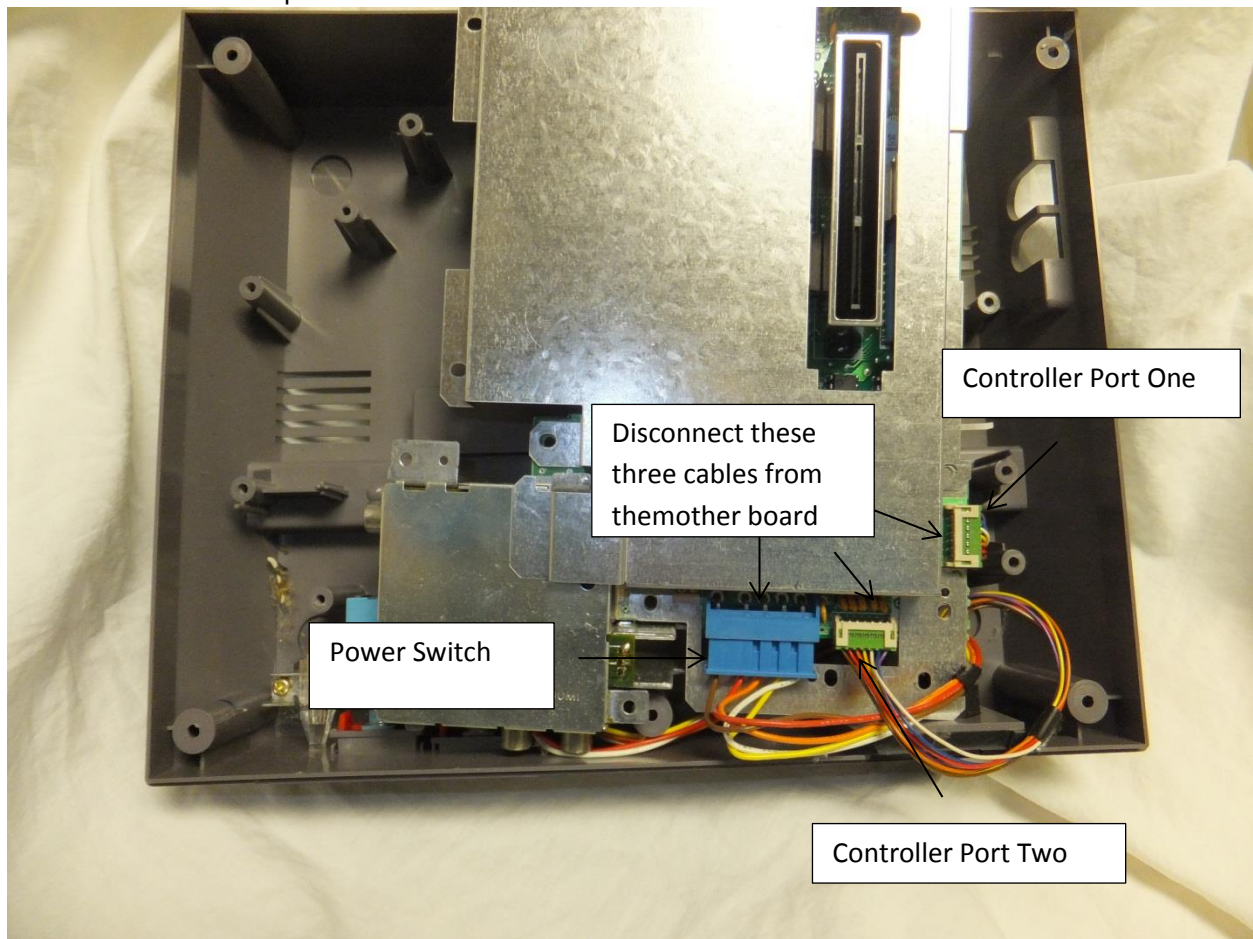
Once the 72-bit pin connector has been removed it is recommend that you clean the metal contacts that the 72-bit pin connector inserts onto with rubbing alcohol and that you remove the dust that has accumulated in your system over the years with canned air. Excessive dust accumulation can interfere with the cooling of your system, which will result in the shorting of the life span of your NES system since excessive heat can cause circuit failure.



Picture Five: Getting closer

Step Six:

Now please lift the entire mother board out of the system to facilitate the next step. Please locate the three cables located in picture six below.

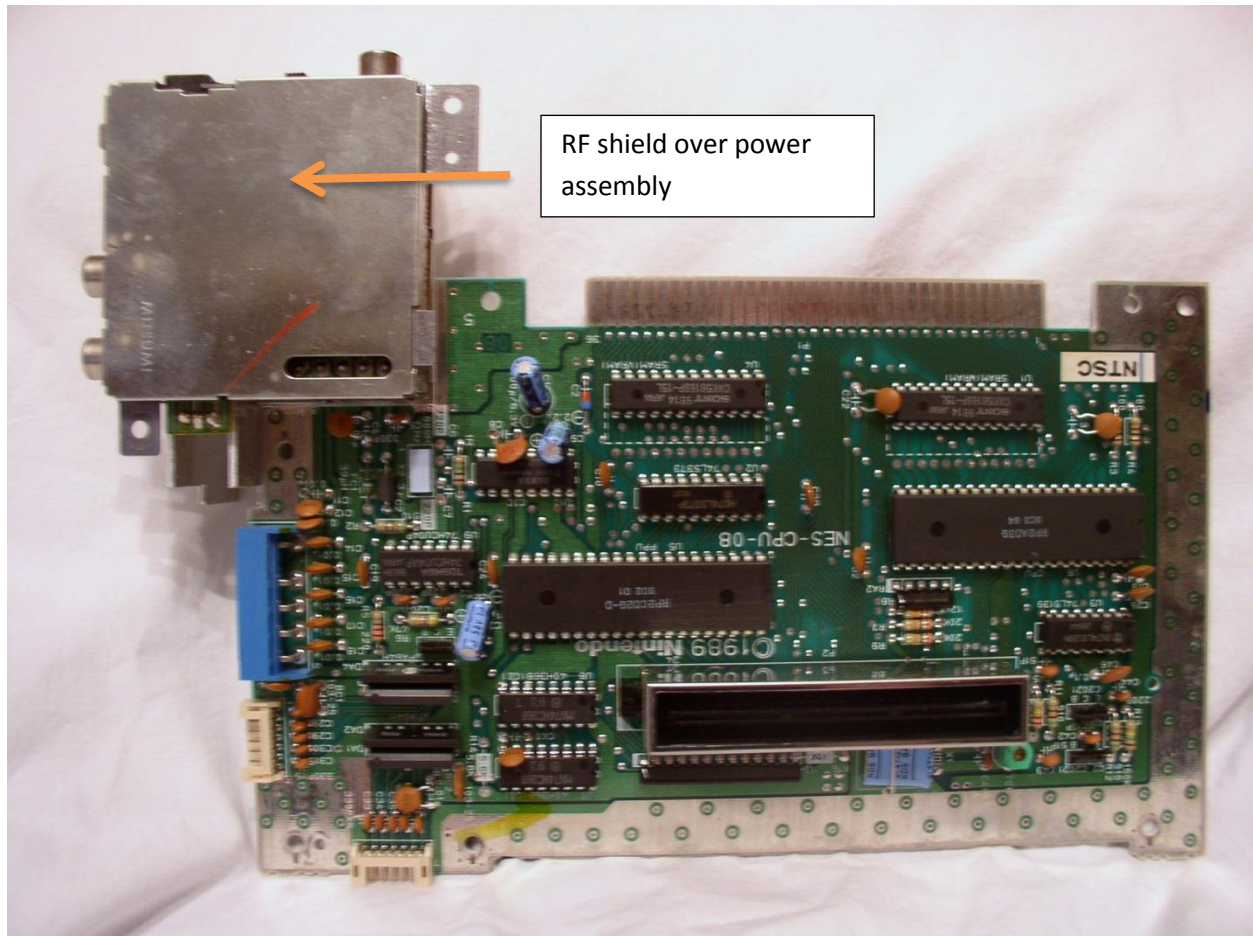


Picture Six: Mother board upside down

In order to disconnect the three cables from the mother board we recommend the following procedure. Using a flat head screw driver press on the sides of the cable as it inserts into the port. This should begin to dislodge the cable from the port. Do not yank on the cable itself as this will most likely result in damage to the cable. Once you have disconnected the three cables proceed to step seven.

Step Seven:

Now that you have disconnected the old mother board you have a choice to make at this point. There are numerous capacitors that are directly accessible without any further disassembly, although there are a number of capacitors that are hidden behind the RF shield over the power assembly as seen below.



Picture Seven: Power assembly RF shield

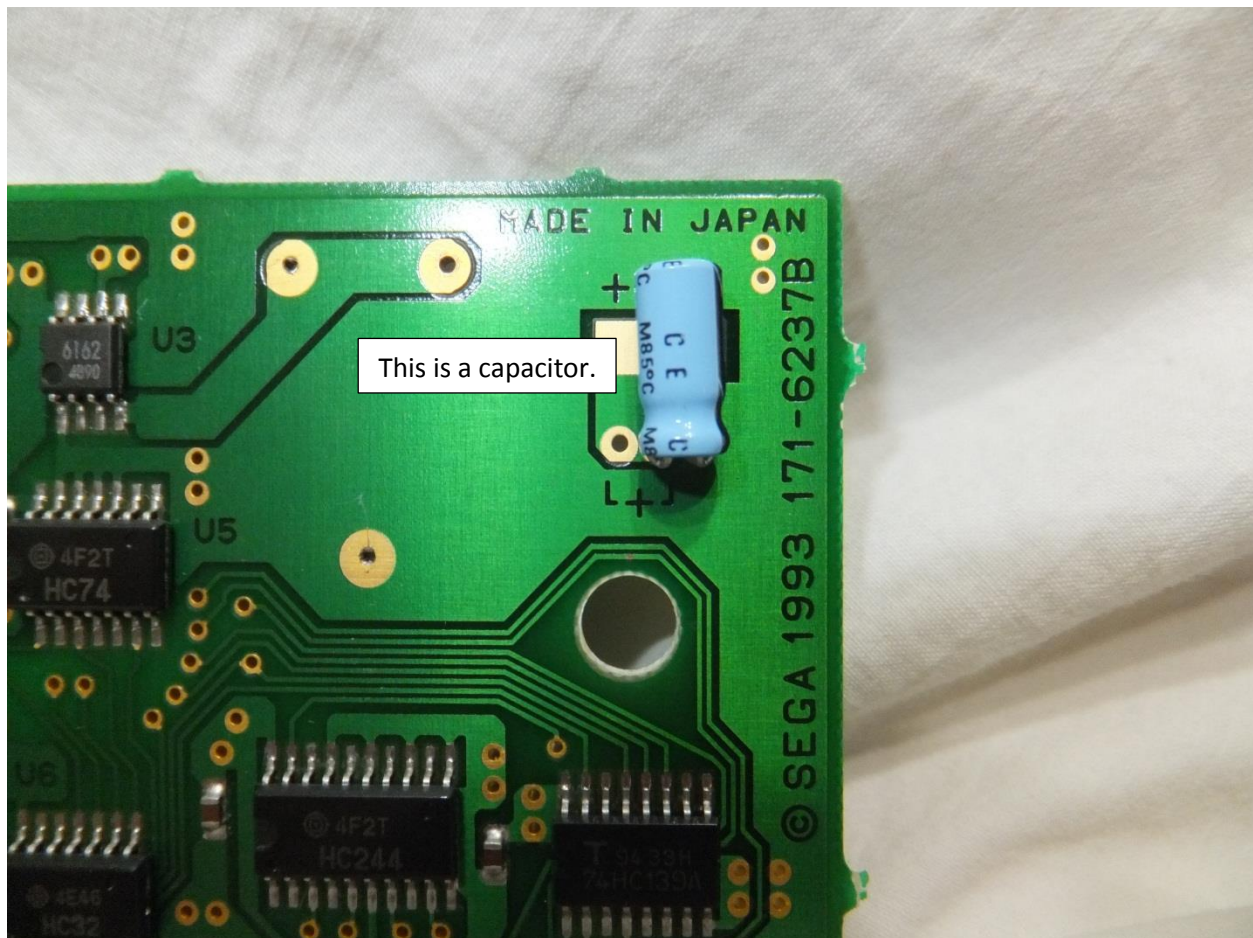
This RF shield is difficult to remove as it is soldered on. If you determine that a capacitor is defective on the power assembly then we recommend taking the time to unsolder the cover, although if this can be avoided please don't try it.

Now that the system is fully disassembled you are ready to start replacing the capacitors; however it is important for us to familiarize you with the basics of how capacitors work.

An Introduction to Capacitors

Before we jump into the capacitor replacement it's important to understand the basics first. A capacitor is used to store electrical energy. It has two listed measurements microfarads (μF) and voltage (V). You will notice when you look at your replacements capacitor it has the microfarads and voltage listed on it. It is important that you replace each capacitor with the same ratings as the original for optimal performance.

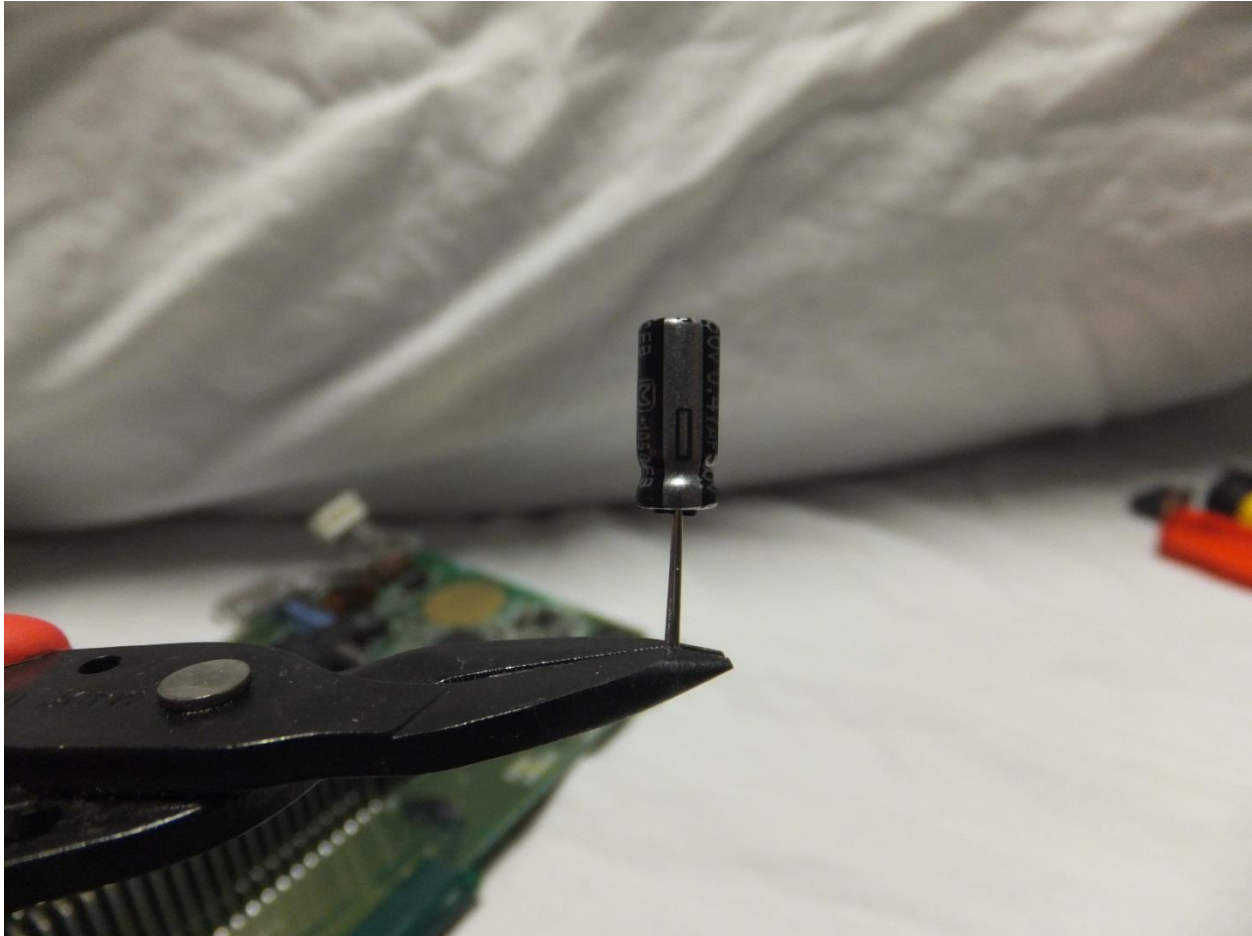
Next you will notice that the capacitor two leads. One is the positive lead and one is the negative lead. It is very important to make sure that you don't get these backwards. The positive terminal should be soldered to the positive terminal on the circuit board and the negative terminal to the negative terminal on the circuit board. Fortunately the positive terminal is marked on the circuit board; however the terminals on the capacitor are not marked. This is discussed on the next page.



Picture Eight: Sample capacitor

An Introduction to Capacitors Continued

Most capacitors do not have the positive and negative terminals marked with symbols, but instead the negative terminal is defined by the terminal that originates from the part of the capacitor that has a strip running down it. This strip can vary in color.

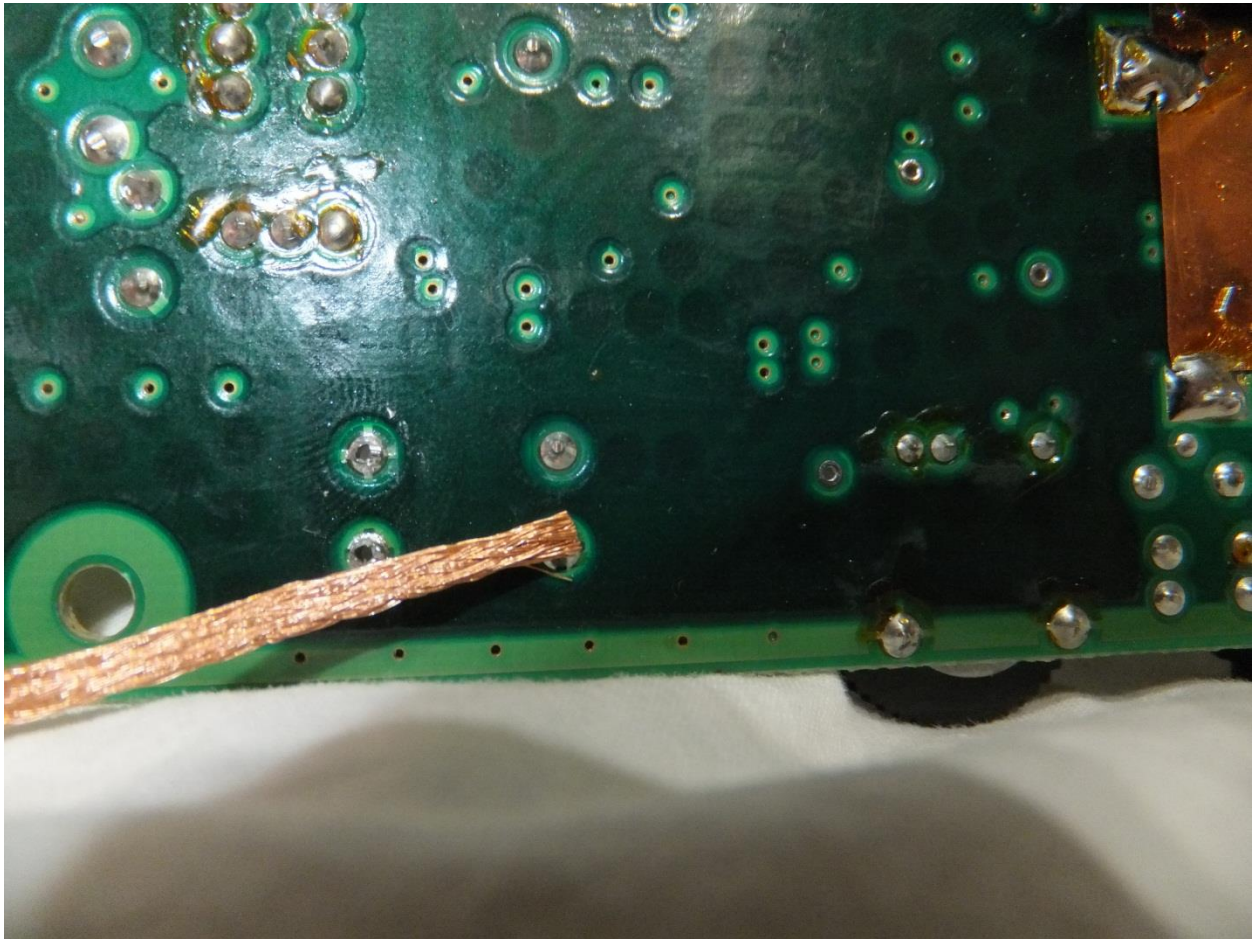


Picture Nine Replacement capacitors

In this case the strip is silver in color. Please don't be fooled as the strip can be different colors. Just remember that the strip always denotes the negative terminal of the capacitor. Now that you have a general understanding of what capacitors are and how to properly identify their microfarad and voltage rating it is time to start replacing them.

Step Five:

Unsolder the capacitor of interest. We recommend the following strategy.



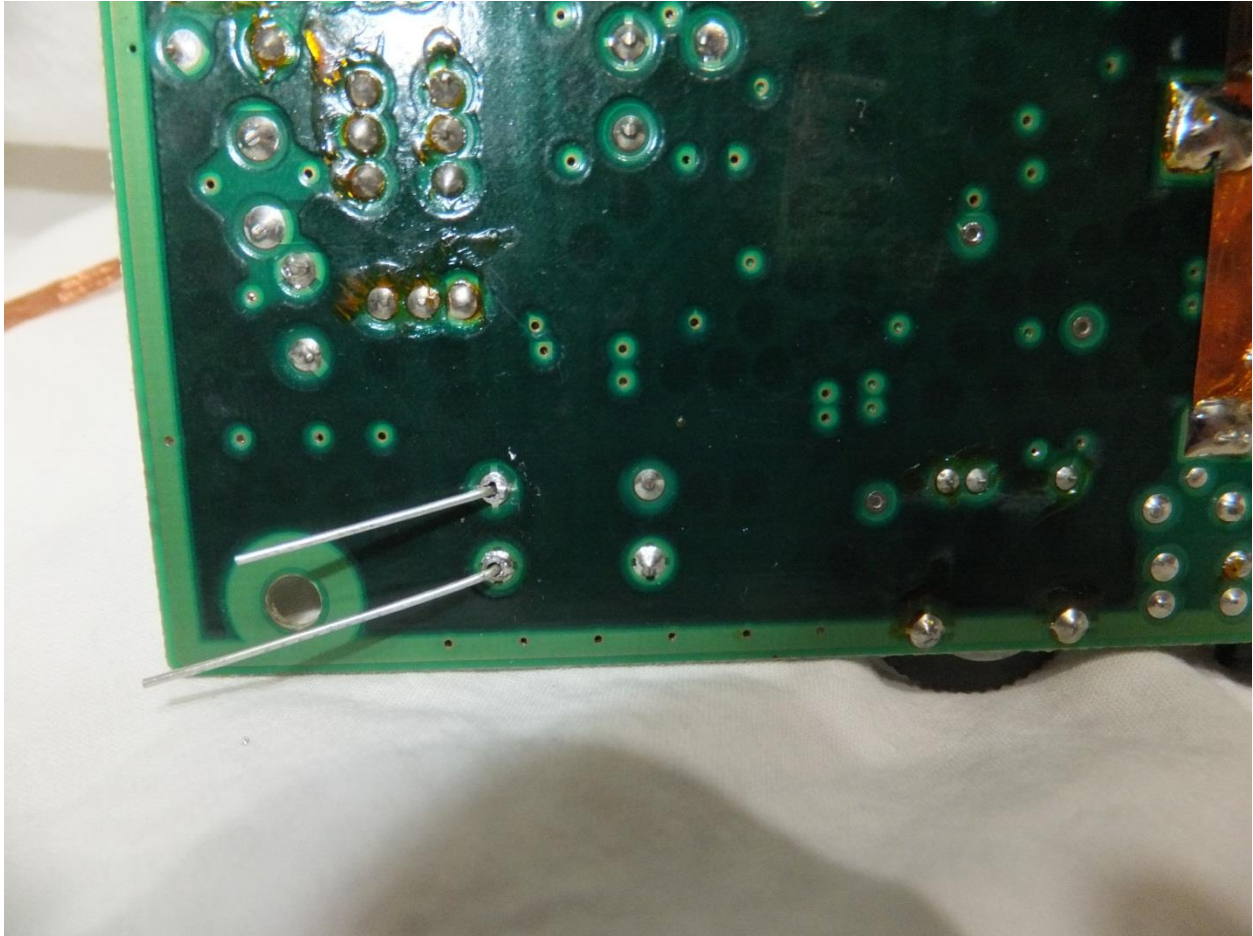
Picture Elven: Proper usage of soldering braid

Place the soldering braid over the solder joint and then heat the joint with your soldering iron. The braid will suck up the solder and free the lead. You can also apply a small amount of traction on the lead by grasping the lead from the other side with a set of needle nose pliers and pulling if needed.

Once the leads are unsoldered please proceed to the next step.

Step Six:

Next you need to solder the replacement capacitor into place. Remember negative to negative and positive to positive. We recommend the following strategy.



Picture Twelve: Lead soldering

Insert the leads and then bend them at a ninety degree angle. Then cut the leads down to the desired length. Finally solder the leads into place.

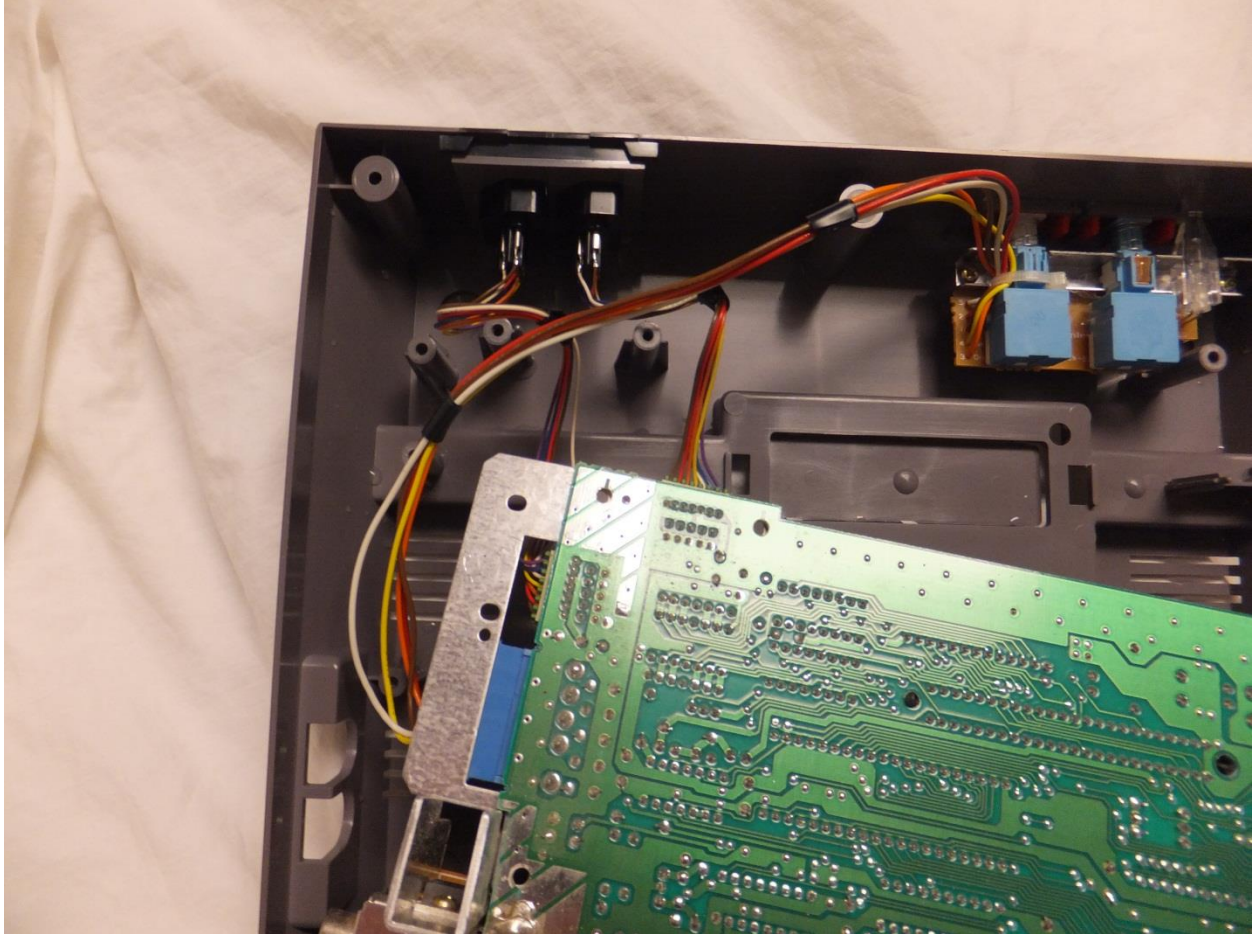
Please continue replacing the capacitors as needed. Here are some very important points not to forget.

- 1) Make sure you do not bridge any terminals
- 2) Make sure the leads of the capacitors don't touch each other.
- 3) Don't be afraid to bend the capacitors leads. You will have to flatten them anyways to get the casing to close.

Reassembly Notes

During the reassembly process we have two important tips for you.

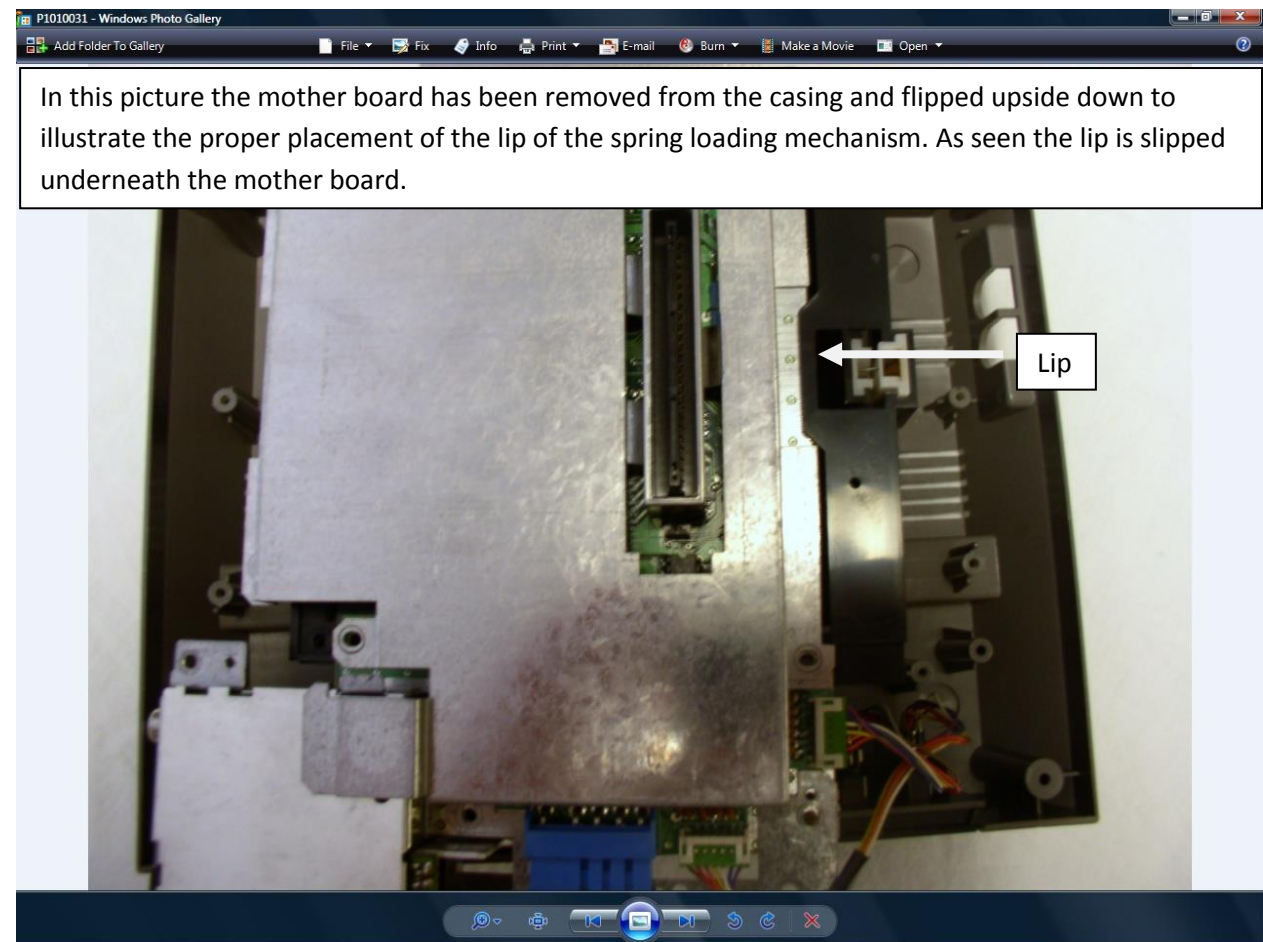
Picture thirteen below demonstrates how the three cables should look when they are hooked up correctly. We recommend that you connect the two controller port cables first and then lastly connect the power cable, making sure that the power cable sits on top of the two controller port cables as seen in picture five below.



Picture Thirteen: Proper arrangement of the three cables

Once you have the three cables attached go ahead and insert in the mother board into the system. It is important to make sure during this period that you do not pinch any of the cables between the mother board and the spikes on the case you screw the mother board to. It is easy to do and will result in damage to that cable when you start to screw everything together.

Once you have removed the dust from your system and cleaned the contact that the 72-bit pin connector inserts onto you can install the 72-bit pin connector. When installing the 72-bit pin connector it is recommend that you insert and remove it three-five times, which ensures a good connection between the mother board and the pin connector. Afterwards install the spring loading mechanism. When re-installing the spring loading mechanism it is extremely important that the lip on the bottom of the spring loading mechanism be slipped underneath the mother board. Failure to do so can result in your system not working. Please see picture seven



Picture Fourteen: Lip under spring loading mechanism

Troubleshooting Section

We are sorry to hear that you ran into complications from your repair. Unfortunately this particular repair is difficult to troubleshoot due to the complexity of the repair job, although here are some general guidelines.

- 1) Make sure that the terminals of each capacitor are firmly soldered in place.
- 2) Make sure that none of the terminals are bridge with solder
- 3) Make sure that none of the leads of the capacitors touch each other.