

3DO Capacitor Replacement Kit Installation Guide

Thank you for your purchase of a 3DO capacitor replacement kit from Nintendo Repair Hut. This guide is designed to help you through the many steps involved in the installation of your replacement capacitors. If at any time you have questions or need assistance please don't hesitate to contact us at Starwander@Comcast.net.

Things you will need

- 3DO Capacitor Replacement Kit
- Soldering skills
- Soldering iron
- Soldering braid
- Solder
- Small Philips head screw driver
- Small needle nose pliers
- Clean work area and about two to three hours of time
- Patience
- Fume hood

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 can 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 two to three hours of intensive work. If you start to get tired we recommend that you stop and come back to the work at a difference 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.

Rating	Quantity
470uf 10V	3
22uf 16V	4
47uf 10V	3
100uf 16V	16
1000uf 16V	2
4700uf 35V	1
10uf 50V	1
470uf 16V	5
100uf 6.3V	4
100uf 10V	7
10uf 16V	2
33uf 10V	3
0.22uf 50V	1
0.47uf 50V	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.

Main Mother Board

Part Number	Rating
C3	100uf 16V
C22	100uf 16V
C32	470uf 10V
C35	100uf 16V
C39	100uf 16V
C42	47uf 10V
C43	22uf 16V
C68	470uf 10V
C72	22uf 16V
C73	470uf 10V
C78	100uf 16V
C80	100uf 16V
C83	47uf 10V
C91	100uf 16V
C92	47uf 10V
C93	100uf 16V
C111	100uf 16V
C112	100uf 16V
C120	100uf 16V
C121	100uf 16V
C123	22uf 16V
C124	100uf 16V
C125	100uf 16V
C127	100uf 16V

Power Board

Part Number	Rating
C3	4700uf 35V
C4	1000uf 16V
C9	1000uf 16V
C10	10uf 50V

Continued on next page

Laser Board

Part Number	Rating
C366	0.47uf 50V
C401	470uf 16V
C404	100uf 10V
C501	10uf 16V
C504	33uf 10V
C507	100uf 6.3V
C508	100uf 10V
C510	33uf 10V
C517	100uf 10V
C518	10uf 16V
C522	100uf 10V
C525	100uf 10V
C528	0,22uf 50V
C530	100uf 10V
C540	100uf 10V
C542	22uf 16V
C548	33uf 10V
C559	100uf 6.3V
C701	100uf 6.3V
C809	100uf 6.3V
C814	470uf 16V
C816	470uf 16V
C901	470uf 16V
C903	470uf 16V
C909	100uf 16V

Using a Capacitor Checker

While you can certainly change out every capacitor on the circuit board this is both a tiresome and unnecessary action. While you might have heard or read otherwise on the internet if a capacitor is working it does not need to be replaced if it is working within factory guidelines.

There are devices that allow you to check capacitors to determine if they are operating within appropriate parameters. We use the CapAnalyzer 88A Series II. It is very simple and operator friendly; however it does cost over \$200. This is a great deal of money; although if you are doing regular electronics work it is a great tool to add to your collection along with a voltmeter and oscilloscope.

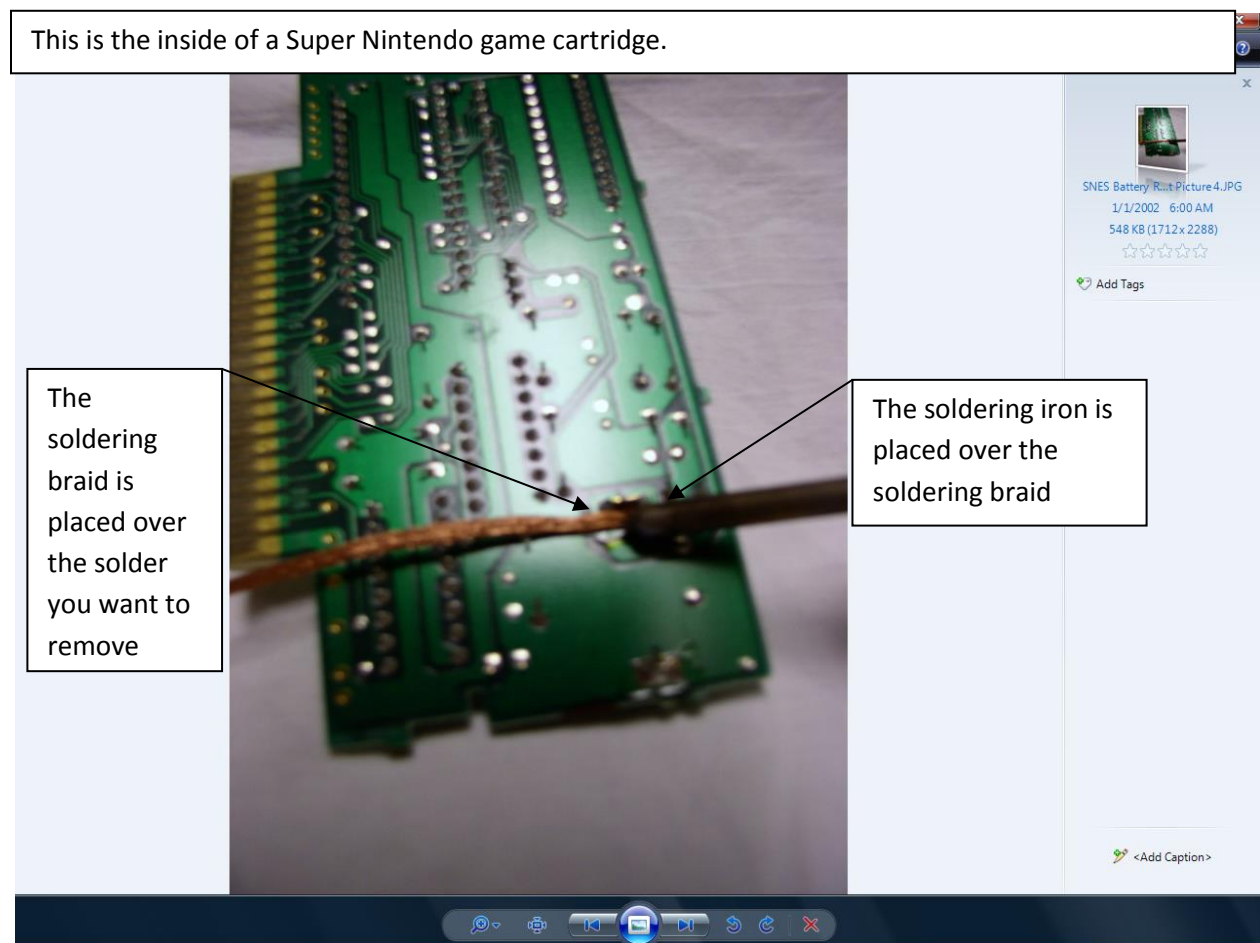
There are many capacitor analyzers on the market, although most cost several hundred dollars. If you do purchase one, we recommend getting one that can check capacitors in circuit. This allows you to check them each capacitor without having to unsolder it.

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 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.

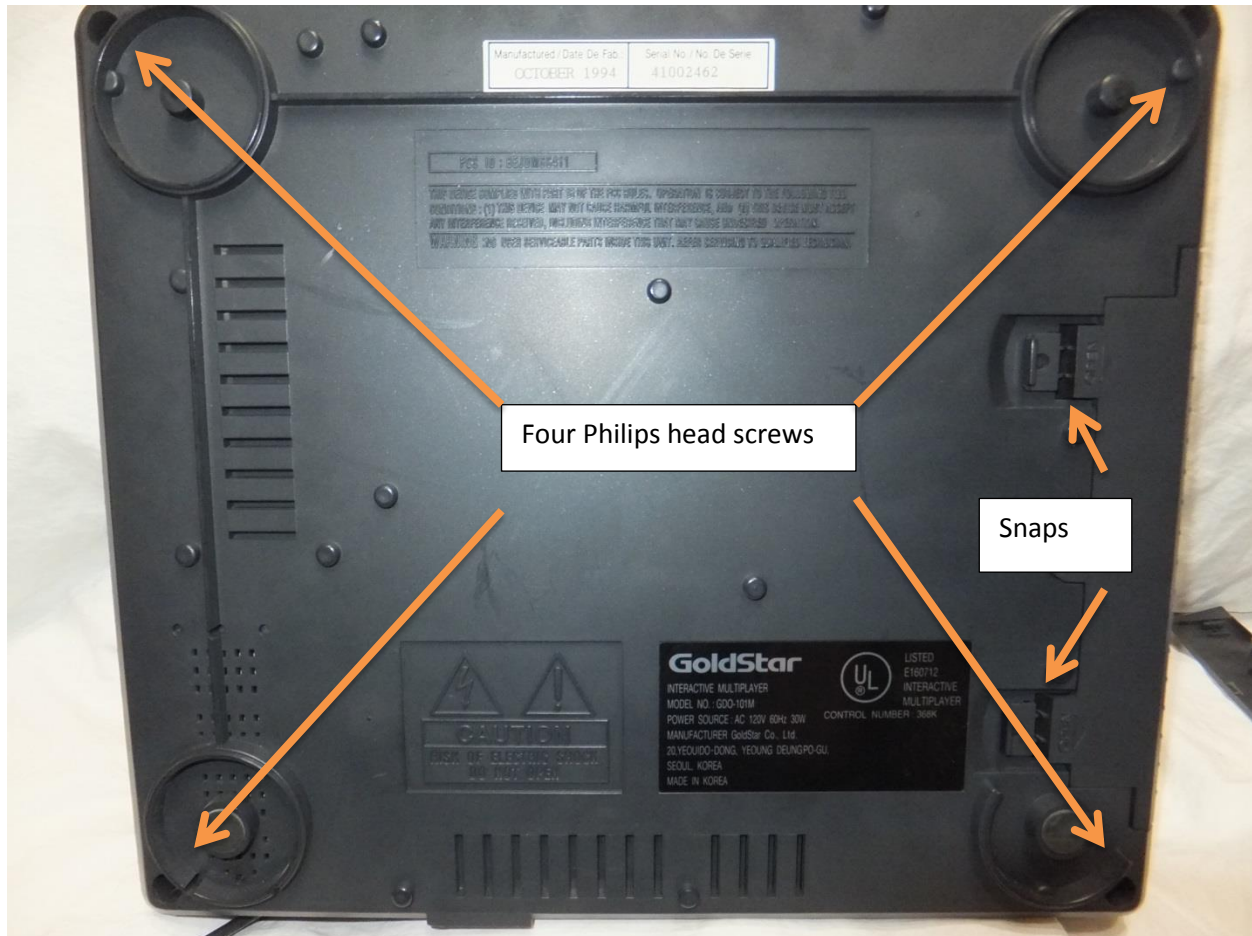
Keeping these items in mind lets continue with our demonstration. To apply the solder take it and place it over the soldering joint and then lightly place the soldering iron over the solder. This is just like unsoldering, although this time you are soldering and not unsoldering. This part is a little 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 install your replacement part.

Step One:

Before starting the installation process it needs to be noted that this is a complicated disassembly and more important reassembly job. While this guides serves as a great companion towards these goals we recommend that you take notes throughout the process to aid yourself in the reassembly process.

To get started please flip your system over and locate the two snaps and the four Philips head screws located in picture one below. Once located please unsnap the two snaps and remove the expansion port cover and remove the four Philips head screws.

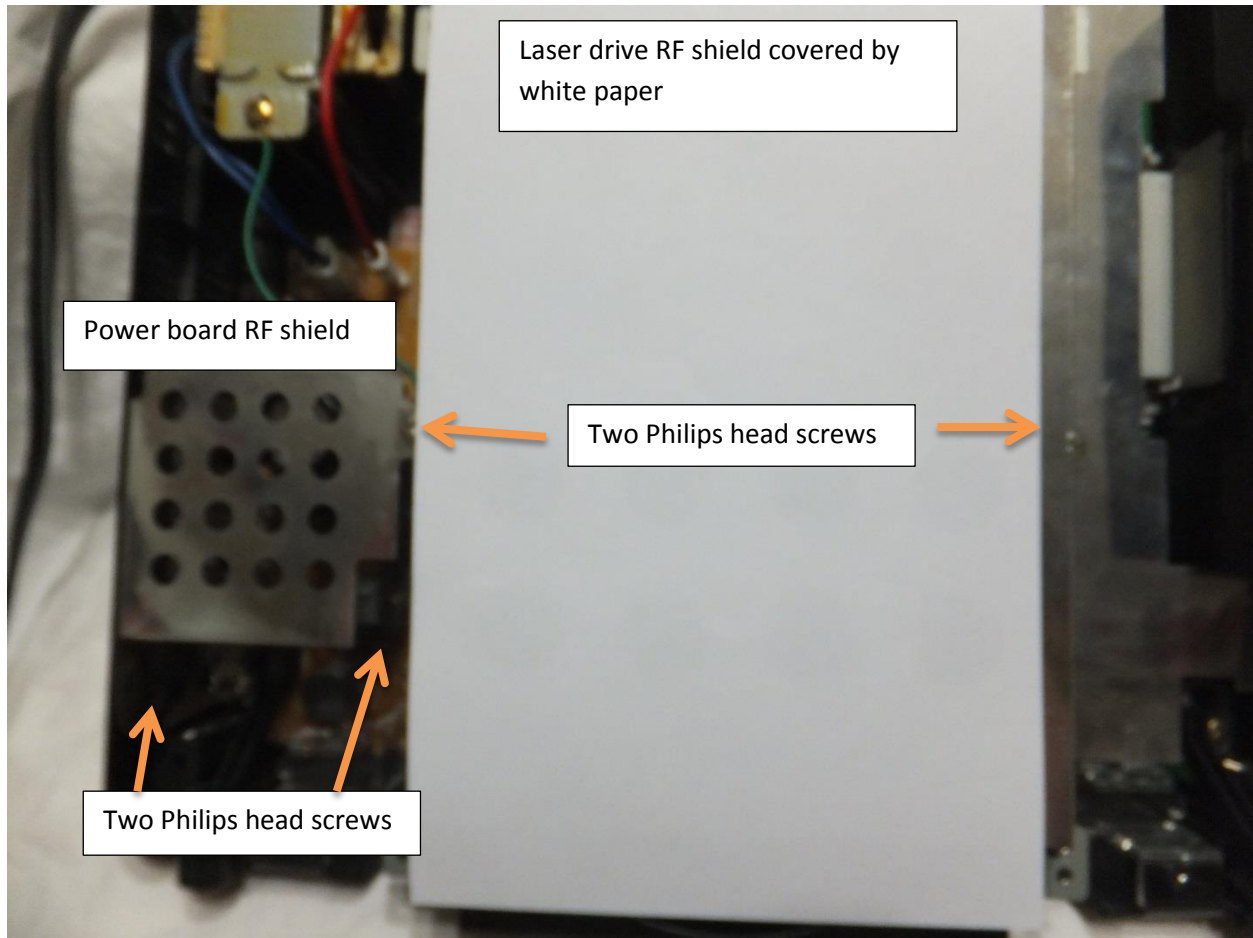


Picture One: Bottom of the 3DO system

Once the four screws are removed and the expansion port cover is removed please remove the top casing of the system taking care not to damage the CD drive lid. Once the casing top is removed please proceed to step two.

Step Two:

Alright now that you have obtained entry to the insides of the systems the real fun begins. To start please remove the two Philips head screws that are holding down the CD drive RF shield as seen in picture two below.



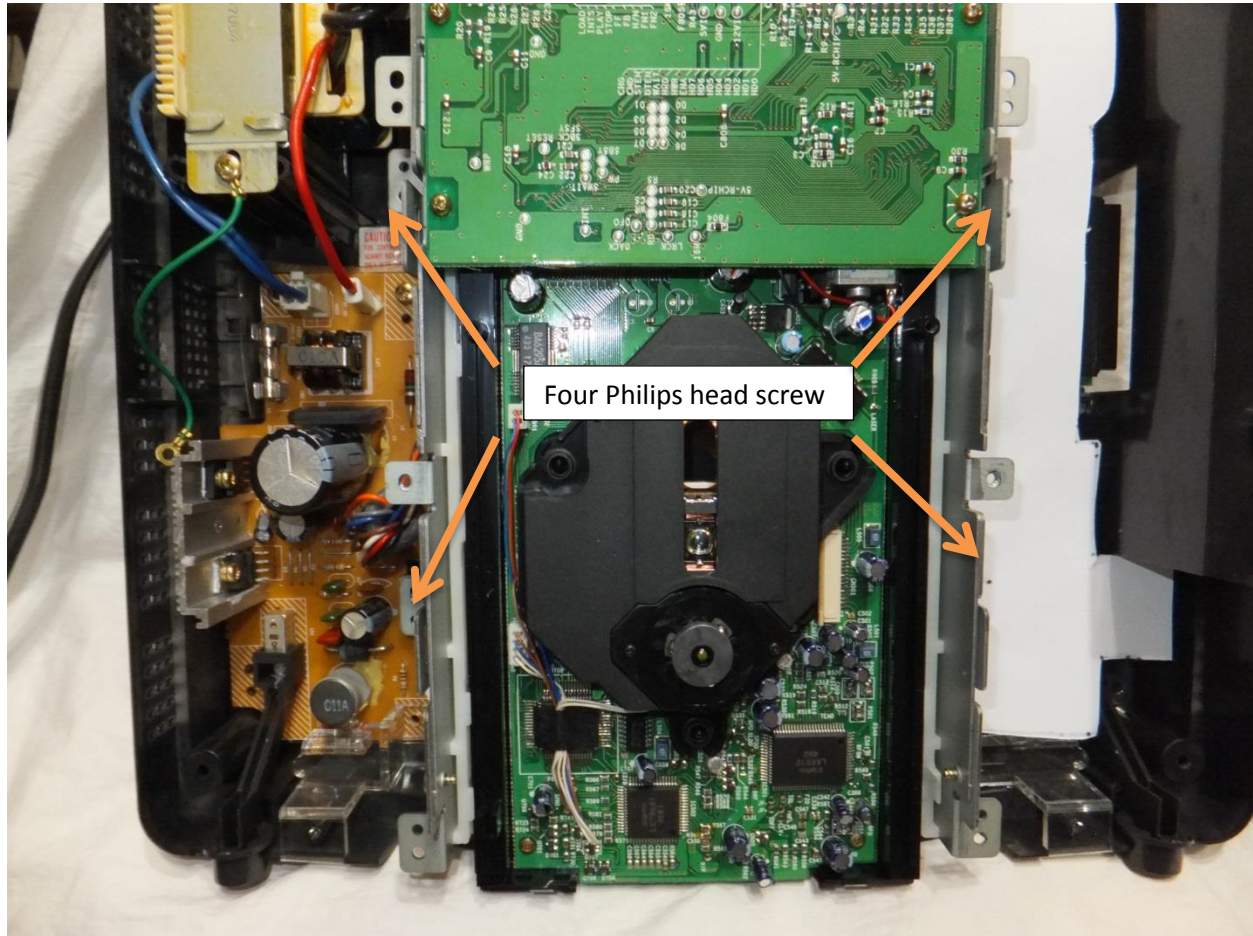
Picture Two: Removing the CD drive RF shield

Once the screws are removed you should be able to remove the RF shield from the CD drive. Next please remove the two Philips head screws holding down the power board RF shield as seen in picture two above. Once they are removed the RF plate should easily come off

Once done please proceed to step three.

Step Three:

Please locate the four Philips head screws seen in picture three below that are holding down the CD drive and remove them.

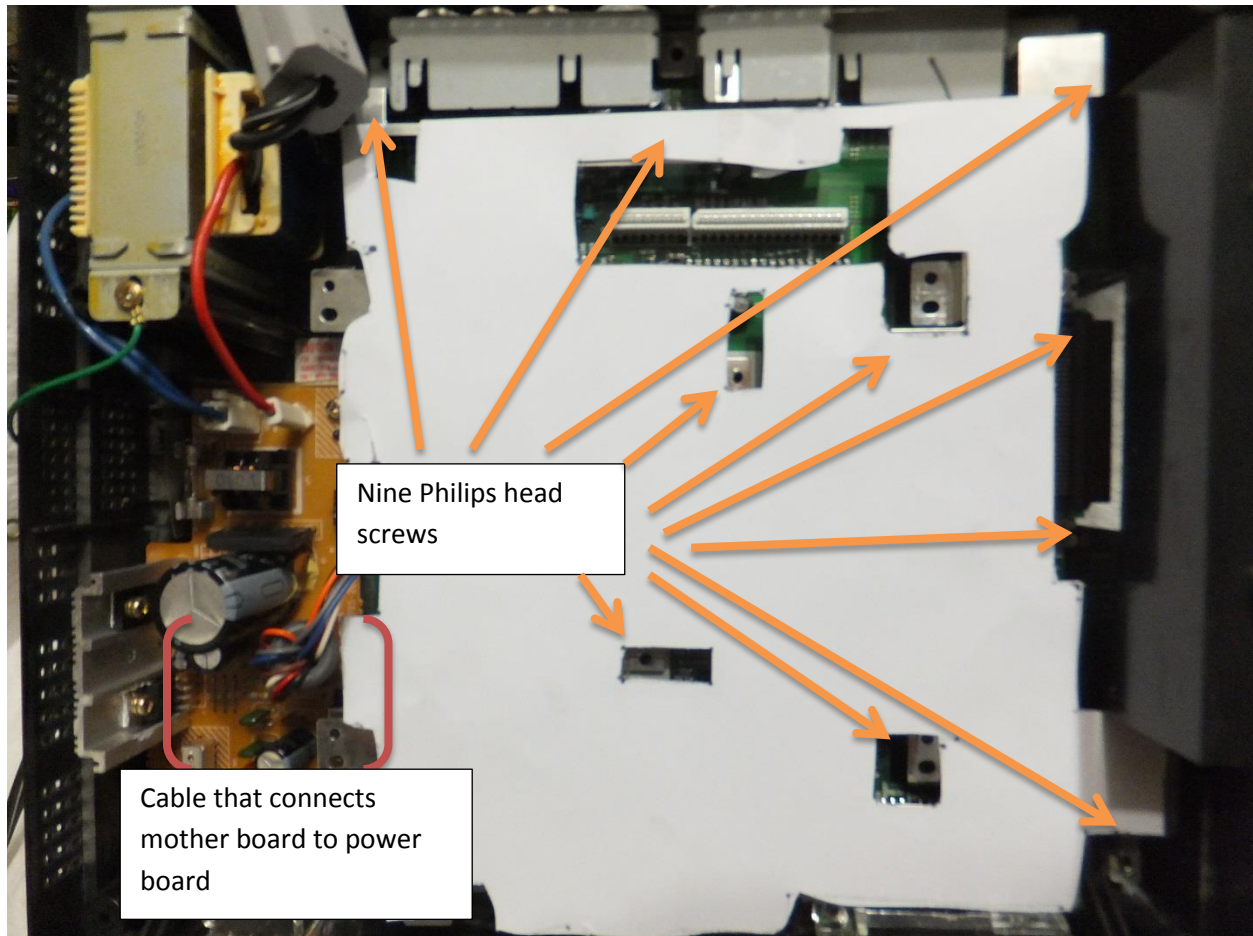


Picture Three: Philips head screws holding down the laser drive

Once the screws are removed you should be able to remove the CD drive; however there are two ribbon cables located at the rear of the drive. To disconnect them simply grasp the cable and pull it free. Once the drive is removed please move forward to step four.

Step Four:

Next it is time to remove the screws that are holding down the RF shield of the main circuit board. To do so please locate the nine (number may vary) Philips head screws seen in picture four below.

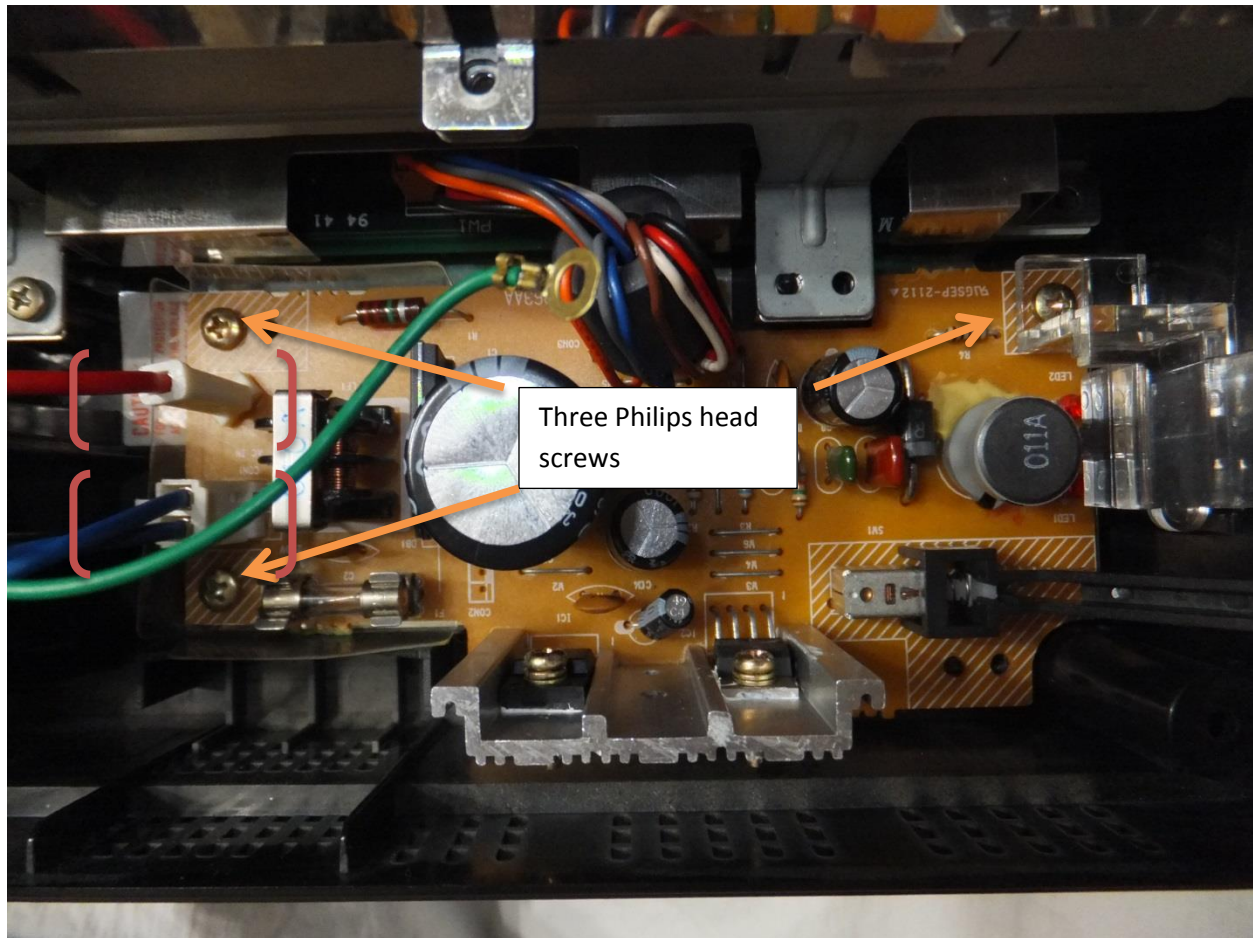


Picture Four: Mother board RF plate removal

Once the screws are removed you should be able to remove the RF shield from the mother board. In order to remove the mother board itself from the system you need to disconnect the cable in the red box above. After the mother board is completely disconnected you can remove this part and move onward to step five.

Step Five:

Now it is time to remove the power board from the system. Please locate the three Philips head screws that are holding down the power board as seen in picture five below. Once you locate them please unscrew them.



Picture Five: Power Board

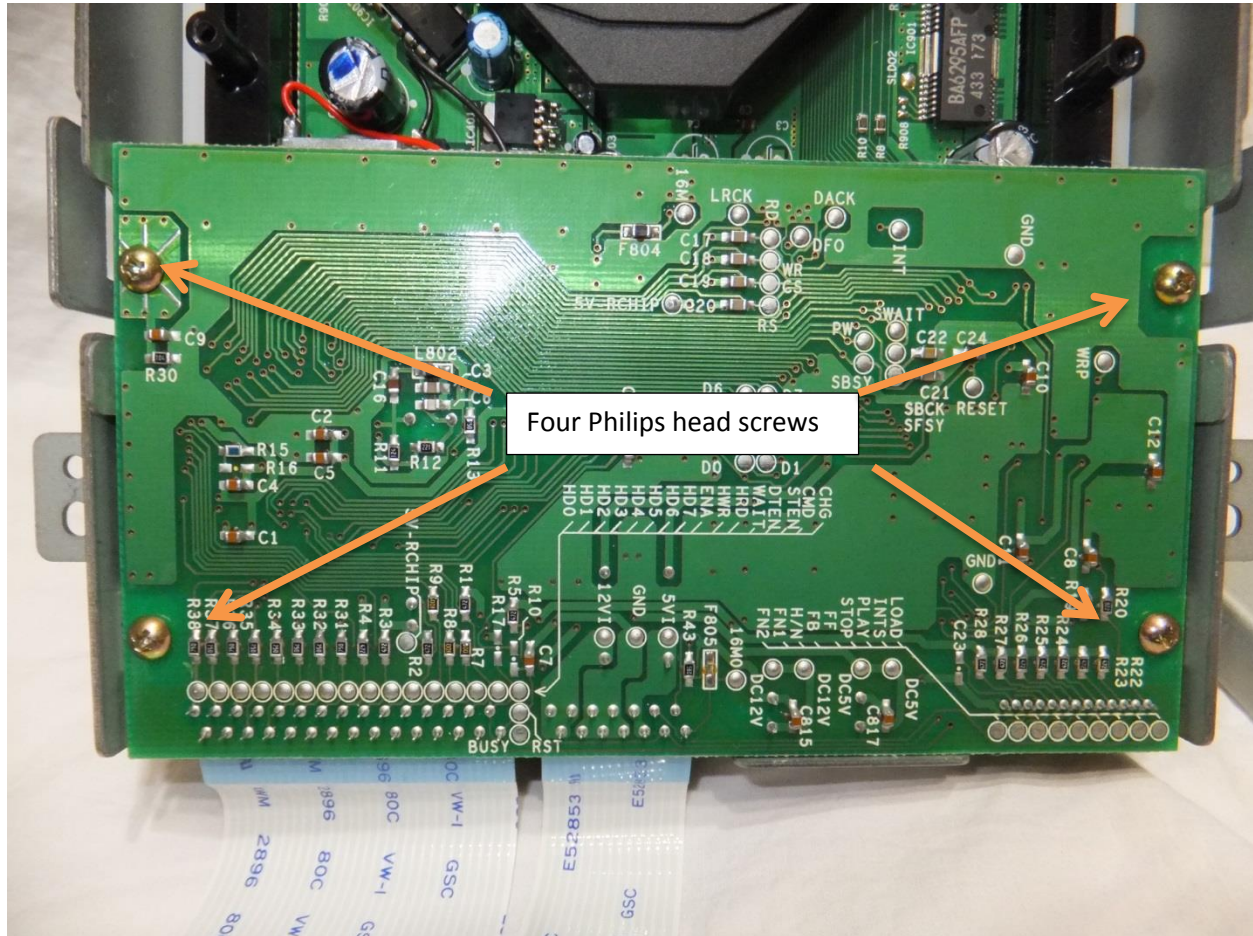
Once the three Philips head screws are removed please disconnect the two cables that are outlined by the red boxes in picture five above.

Once the power board is free please remove it and proceed to step six.

Step Six:

Now that the majority of the system has been disassembled you could certainly stop at this point. Most of the capacitors that are going to cause the problems you see in the 3DO system are located on the main board or power board; however occasionally the ones on the laser board can also fail. The rest of the disassembly guide is dedicated to how to disassemble your CD drive

To start please locate the four Philips head screws seen in picture six below. Once you have located them please unscrew them.



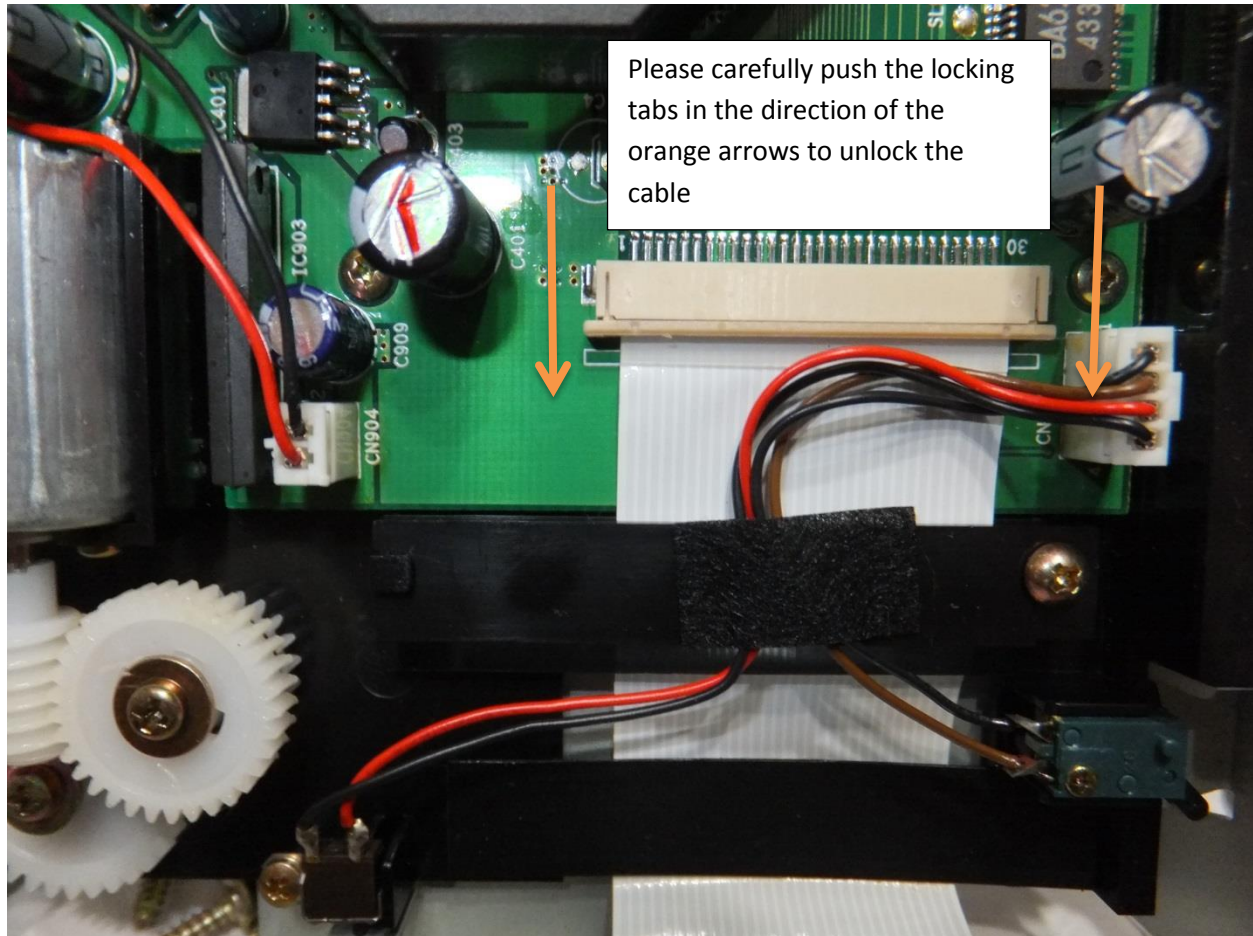
Picture Six: CD drive board one

Once the screws are removed please carefully peel back the circuit board as there is a ribbon cable that connects the board to the CD drive itself that you don't want to damage.

Once you are finished please proceed to step seven.

Step Seven:

The circuit board that you just unscrewed is held onto the CD drive by the ribbon cable seen in picture seven below. To unplug the ribbon cable please carefully press the locking tabs in the direction seen in picture seven below. Please exercise caution as these tabs are very flimsy and if broken the cable will not hold in place. A small flat head screw driver works well for this job.

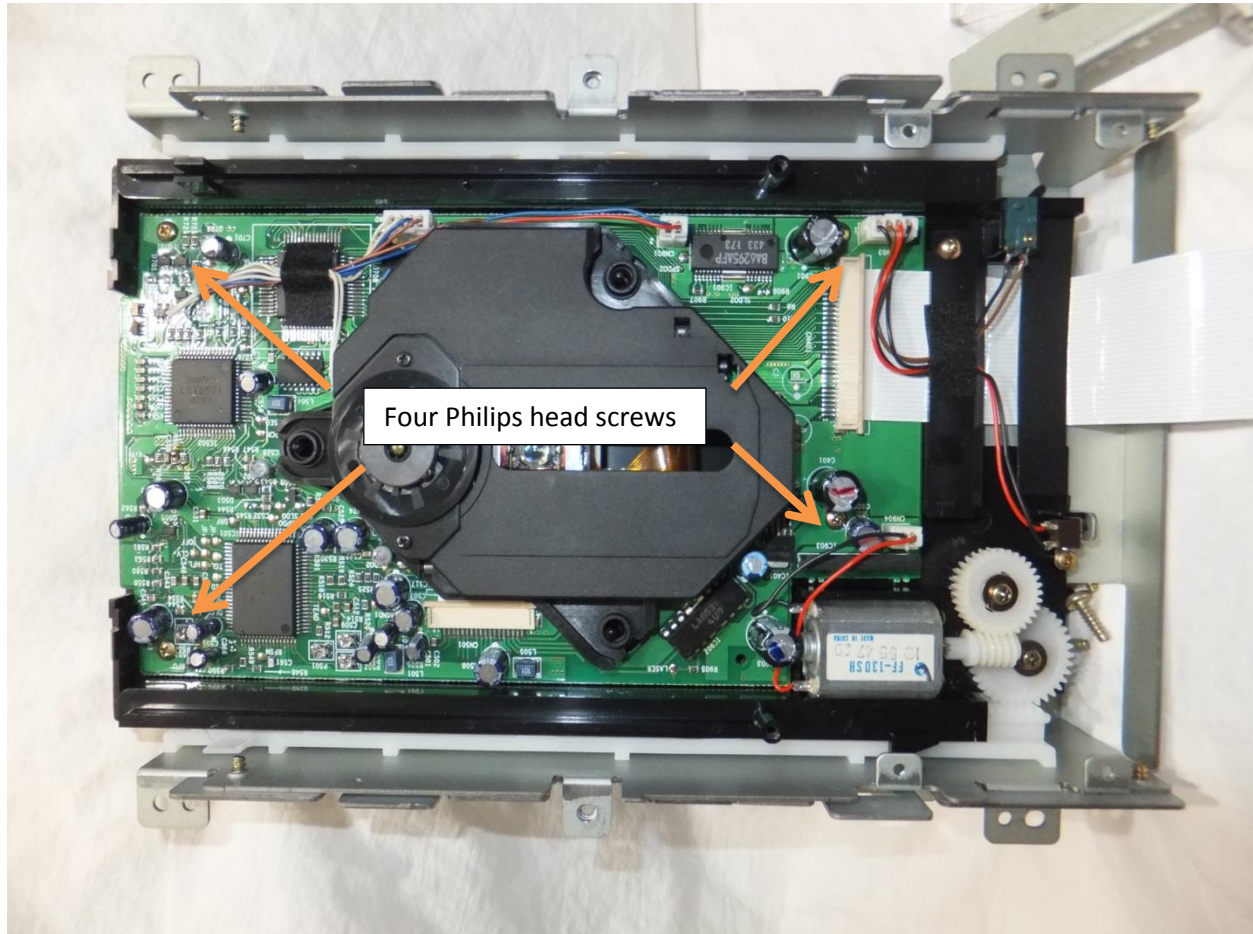


Picture Seven: Ribbon cable unlocking

Once the cable is removed please proceed to step eight.

Step Eight:

Please locate the four Philips head screws seen in picture eight below. Once you locate them please unscrew them.



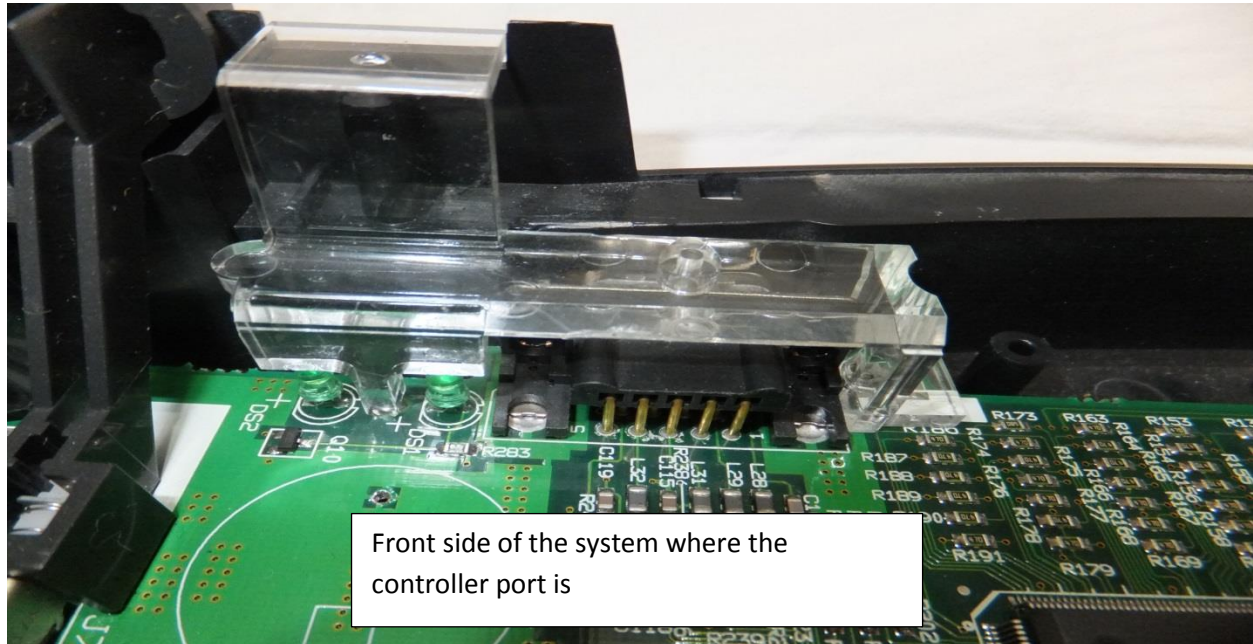
Picture Eight: CD drive main board removal

Once the screws are removed please carefully remove the laser assembly itself from the drive. Unplug any wires that attach the laser to the CD drive as you do. Once the laser is removed and the CD drive is removed please disconnect any other wires that are holding down the circuit board and remove it.

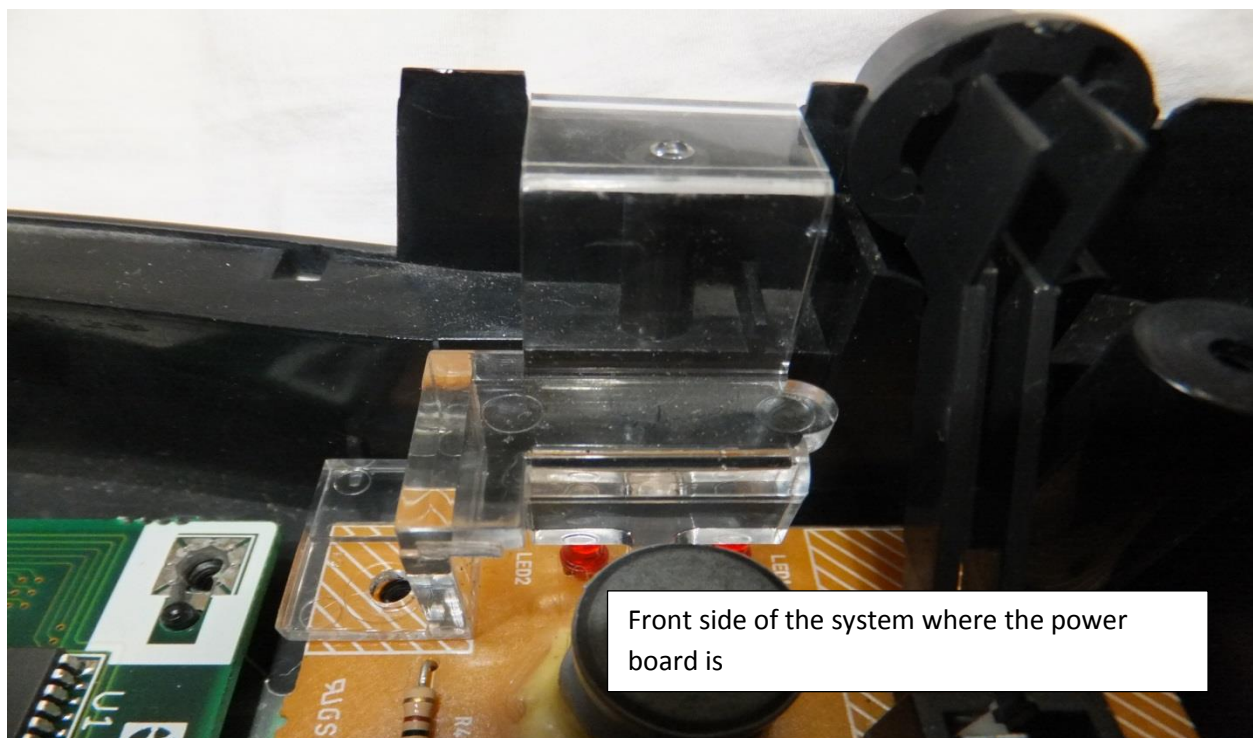
Now that you have access to the circuit board you have finished the disassembly process. To assist you in the reassembly process we will cover a few steps that are easy to miss next.

Reassembly Hints- Clear Plastic Parts

There are two clear plastic parts in the system. Pictures nine and ten below illustrate their proper placement in the system.



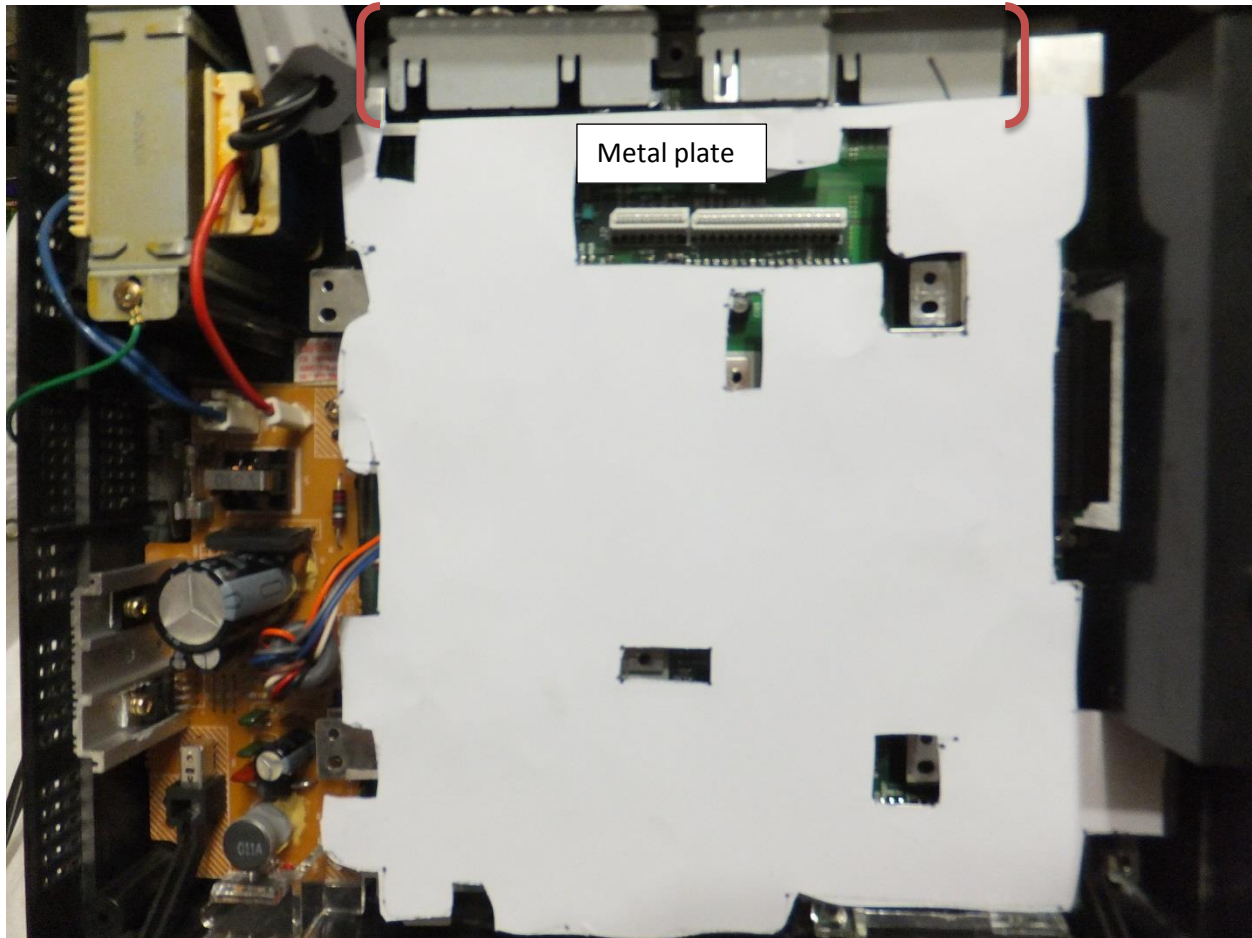
Picture Nine: Left front side of system



Picture Ten: Right front side of the system

Reassembly Hints- Non-Shiny Detachable Metal Plate #1

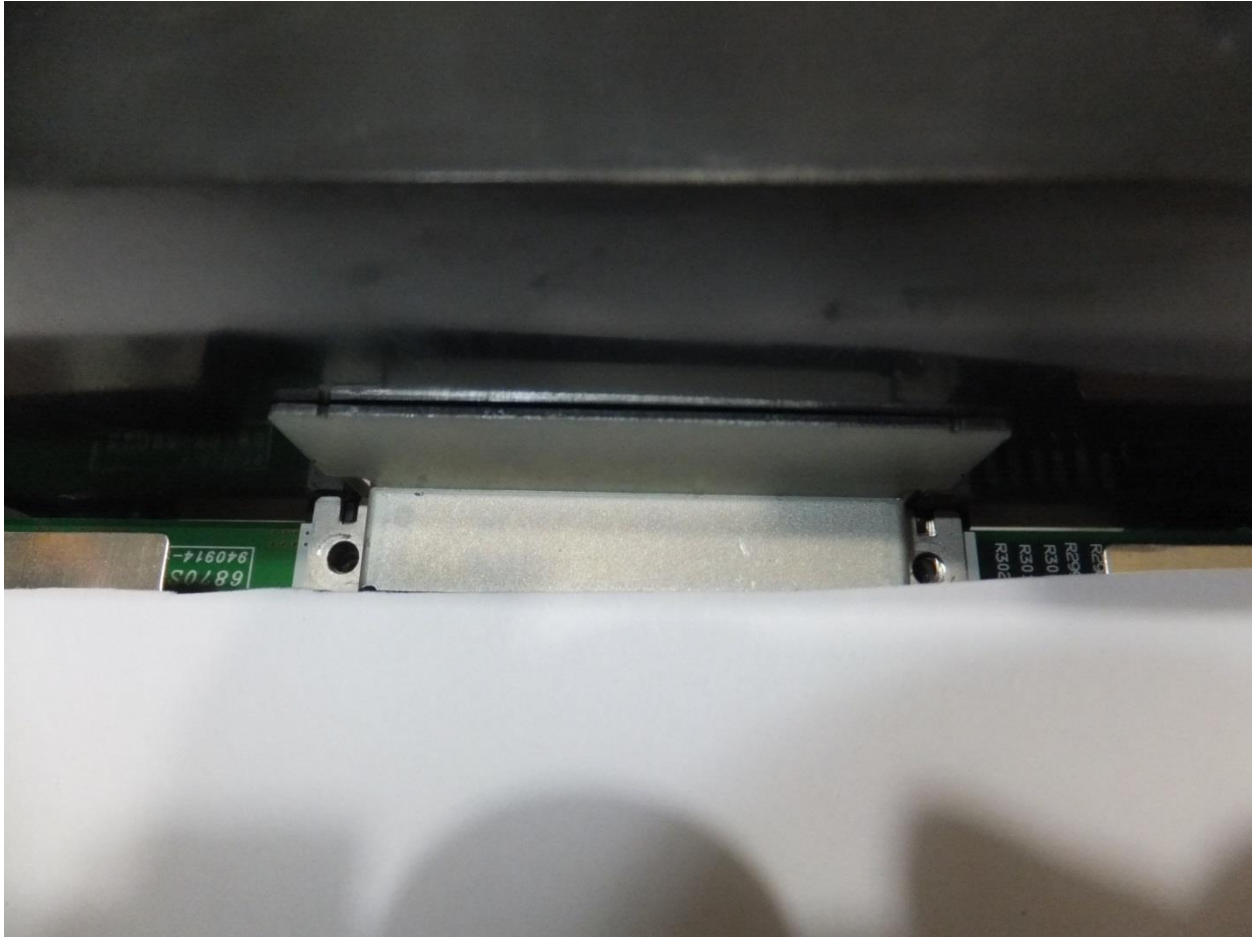
There are two non-shiny detachable metal plates in the system. The larger one is used to cover the AV and power ports on the inside of the system as seen in picture eleven below. To properly install this part please insert the RF plate over the main circuit board first and then insert the metal plate next.



Picture Eleven: Largest non-shiny metal plate

Reassembly Hints- Non-Shiny Metal Plate #1

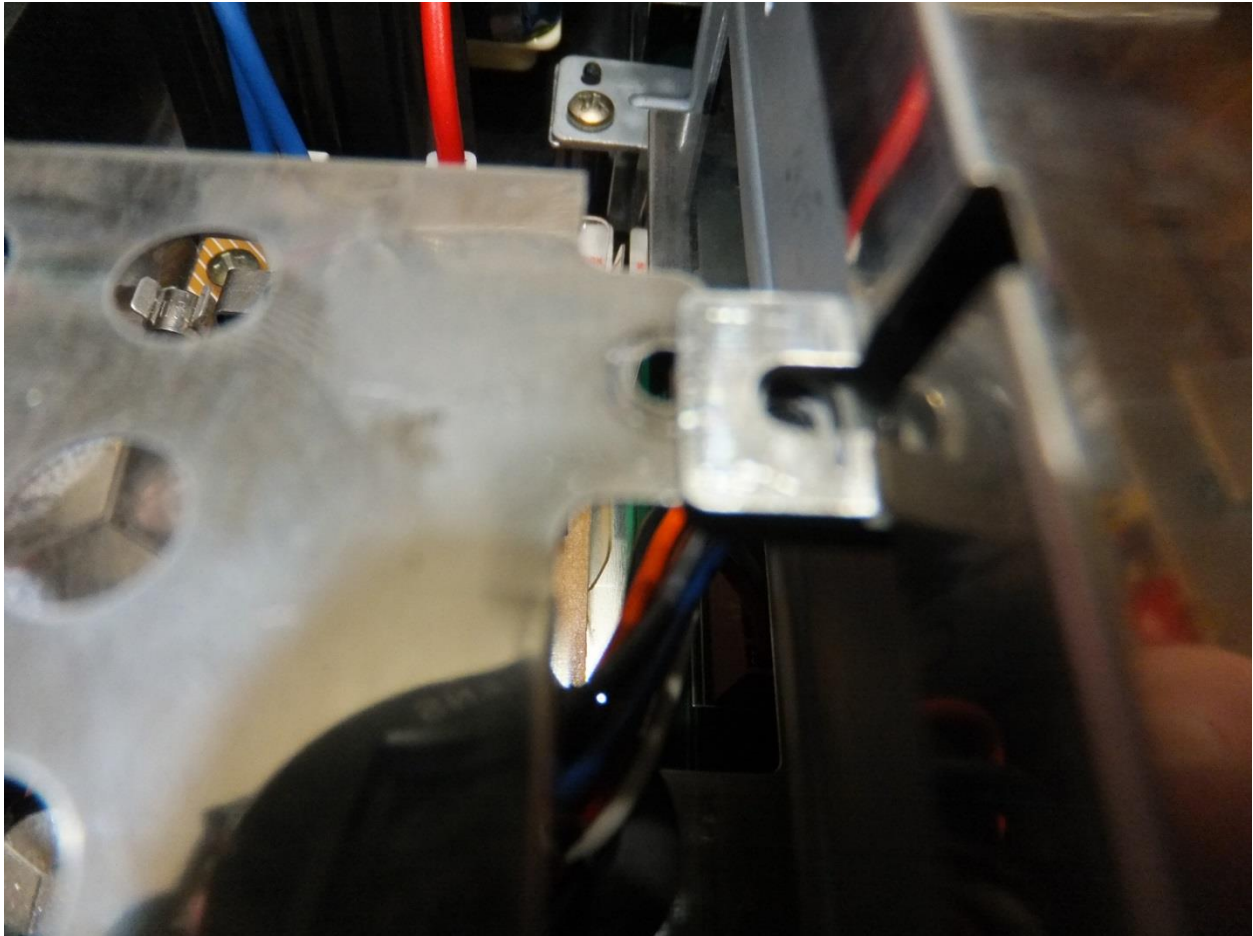
The other non-shiny-metal plate goes over the expansion port itself as seen in picture twelve below.



Picture Twelve: Smaller non-shiny metal plate

Reassembly Hints- Power board RF shield

When replacing the RF shield over the power board, install the CD drive first. Once it is installed please sandwich the tab on the RF shield between the CD drive and the RF plate on the CD drive as seen in picture thirteen below. Once done please reinstall the grounding cable. The grounding cable is the green cable that is seen in picture two.

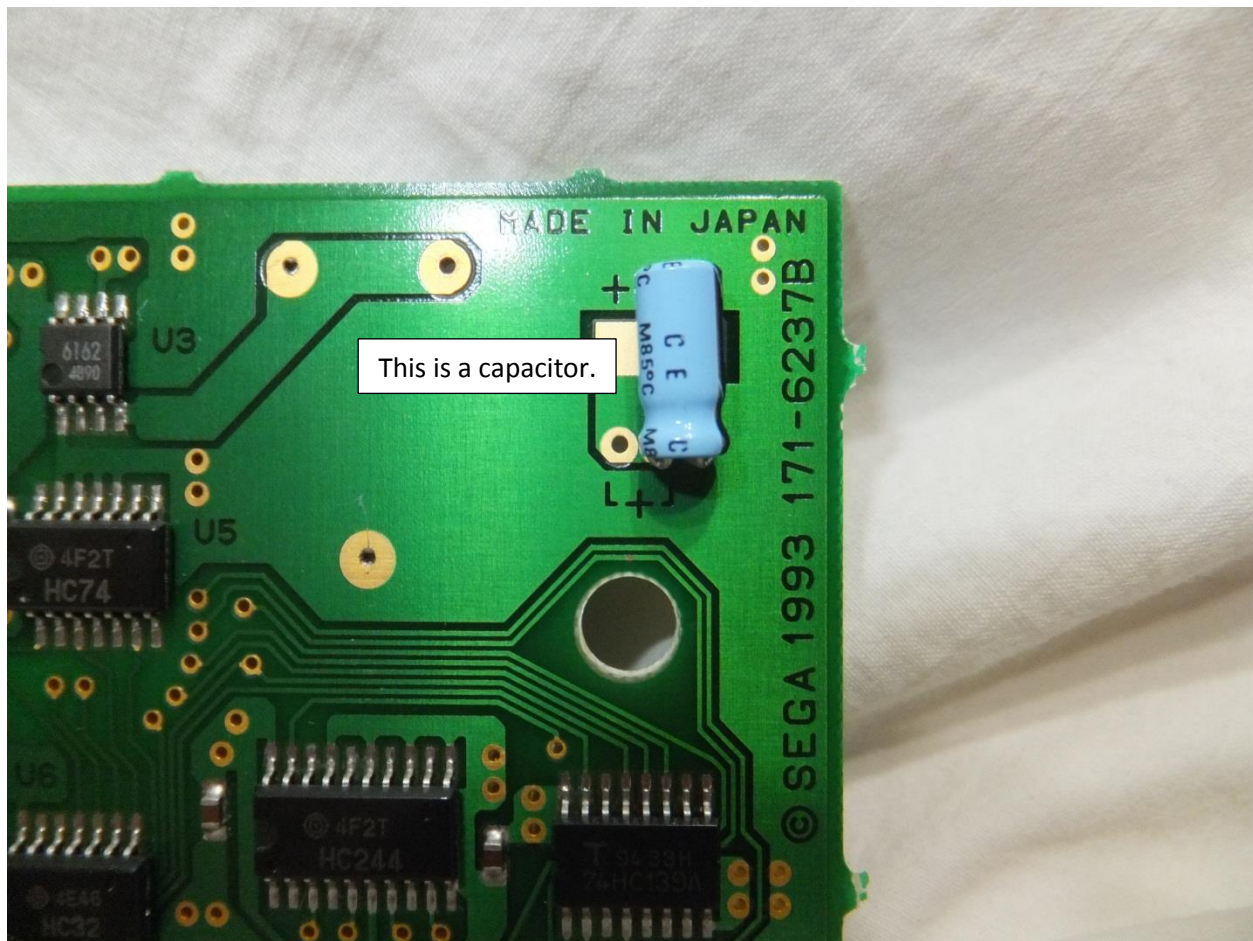


Picture Thirteen: Power board RF shield

Now that we have covered some of the trickier parts of the reassembly process we 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.

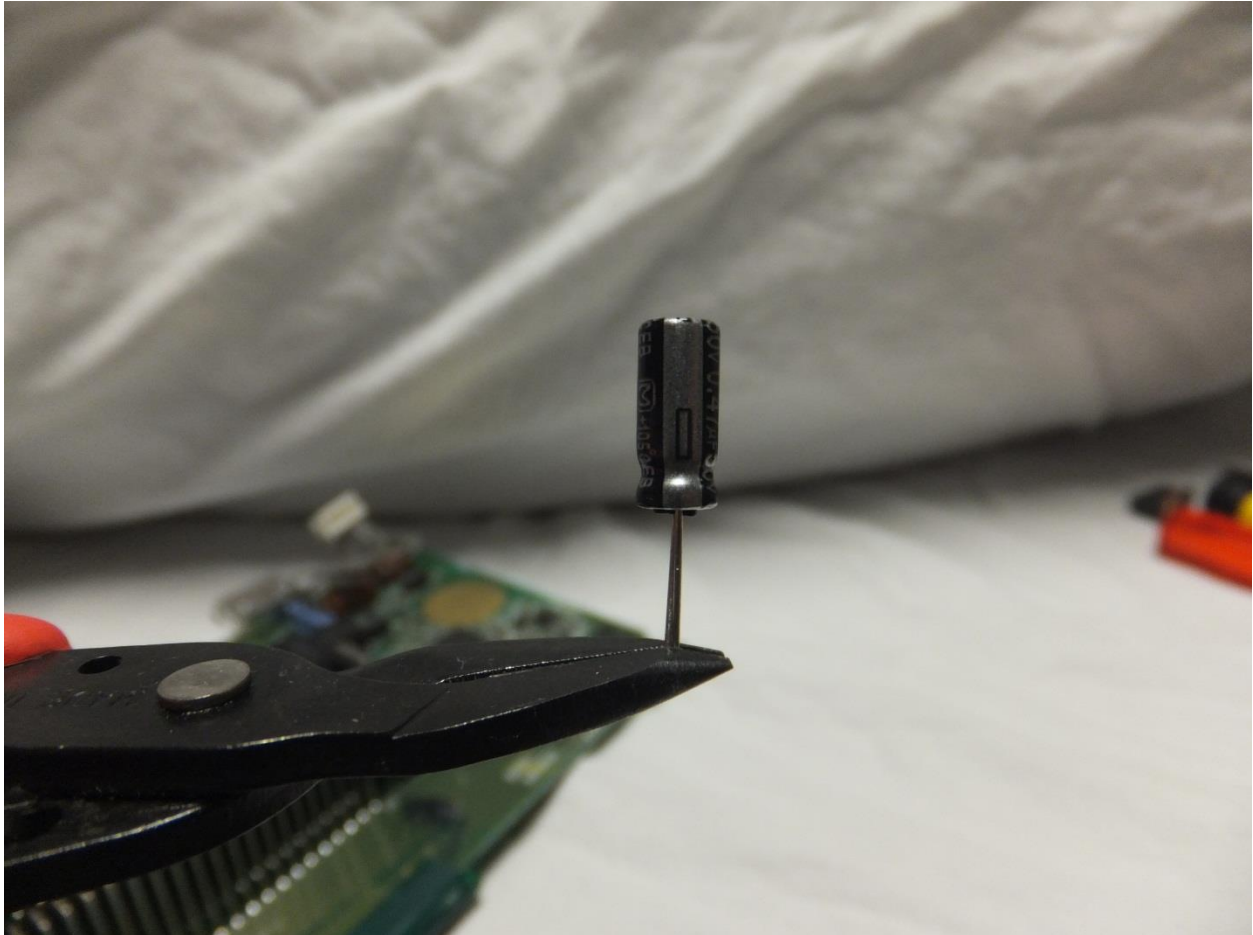


Picture Fourteen: Sample capacitor, radial mount

Each type of capacitor has a negative and positive 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.

Continued on next page

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.



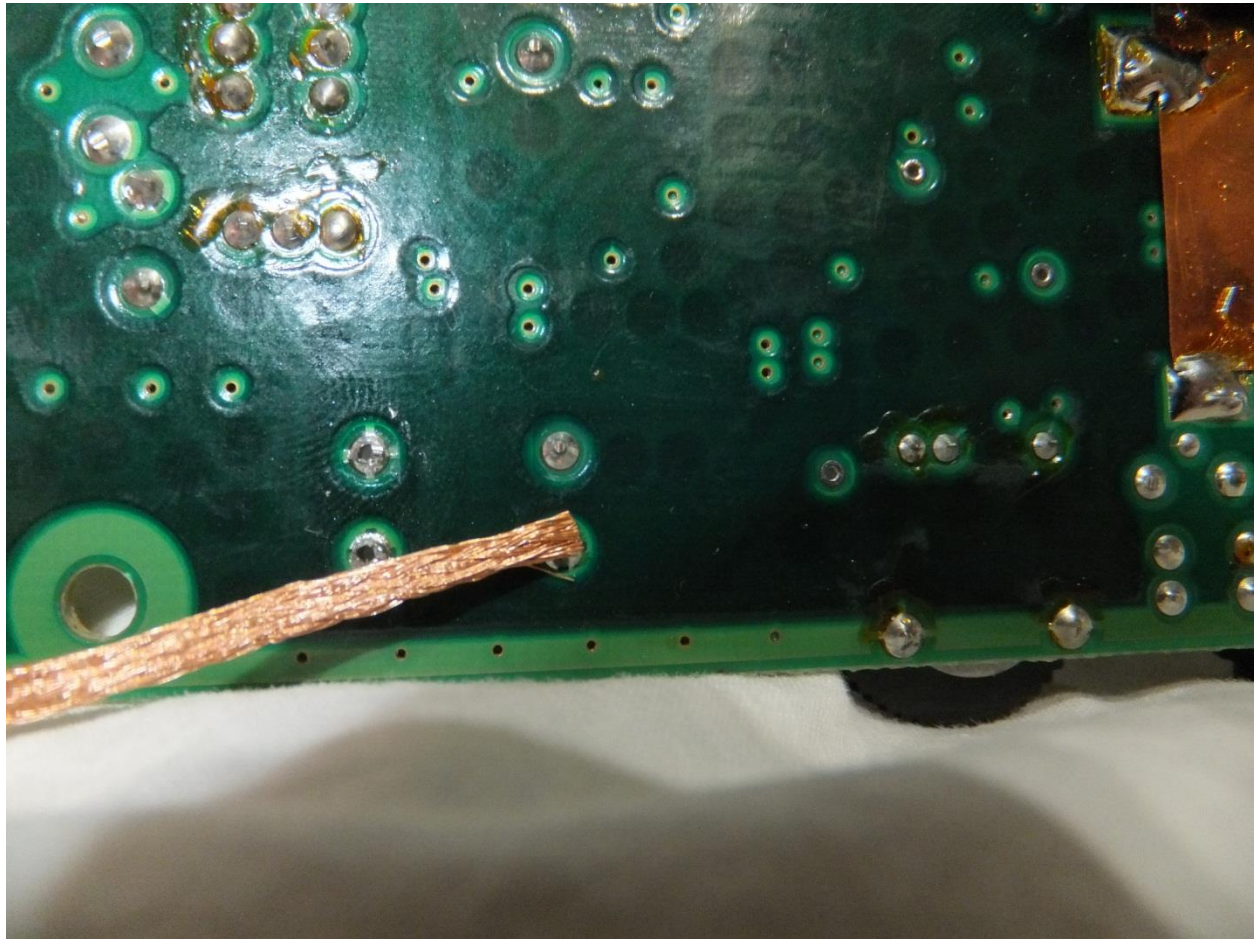
Picture Fifteen: Radial mount capacitor negative terminal

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.

Radial Mounting Capacitors Installation

To start please unsolder the capacitor of interest. We recommend the following strategy.



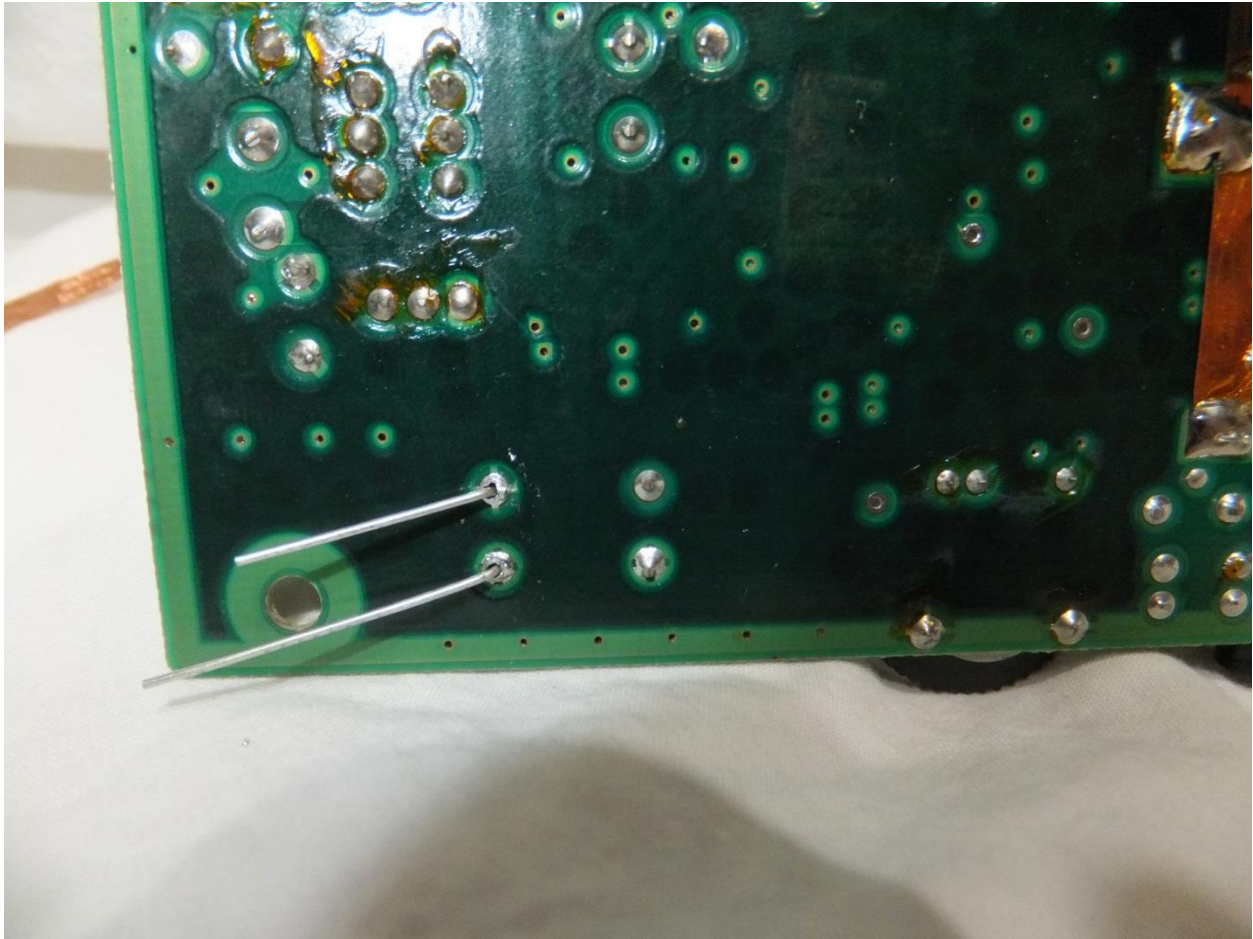
Picture Eleven: Proper usage of soldering braid

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 page.

Continued on next page

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.

Once you are finished please reassembly your system and enjoy your working unit; however if everything is not working correctly after it is back together please see our troubleshooting section at the end of this guide.

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.

We do apologize that we can't be more helpful than this.