

Yamaha SY-99 Backlight Replacement Tutorial

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The following is a detailed explanation of how to replace the backlight that lights up the LCD display of a Yamaha SY-99 synthesizer. This tutorial will probably work well for an SY-77 also, but I do not have one to verify this with, so please use your discretion if you are trying this process with an SY-77.

Disclaimer: I take no personal responsibility for the operation of your synth if you attempt this process. I will do the best I can to provide appropriate detail and pictures where possible but please read this entire tutorial before beginning the replacement process. If you are not 100% certain that you can complete all the steps involved and troubleshoot related issues if they arise PLEASE do not attempt this yourself. 'Nuff said ☺

Step 1: Decide if you really want to do this

The backlight of the SY-99 display is pretty important if you do any real programming or playing in dark areas. If you cannot read the display, this synth can be very frustrating to use past simply changing presets. However, if you don't really need to see the display in low-light situations this might not be something you want to invest the time and effort into doing. Even if you decide to simply remove the display and take that part to a tech to do the actual "replacement" of the backlight there is still a LOT of work involved so be sure you are up for a long day's work. It is well worth it when you have finished the job though, so if you're up for it - keep reading!



Step 2: Tools, Equipment, Parts Needed

You will need the following equipment to perform this process:

- Large clean working surface – I used a bed since it was large enough and soft enough to keep the synth from getting scratched up during the process.
- Phillips-head screwdriver - you might want a regular sized and a smaller sized screwdriver due to the differing screw diameters involved. Having a driver with a magnetic tip is definitely a plus here.
- Small flat-head screwdriver
- Small needle-nosed pliers
- Soldering Iron – I used a 20-Watt model with a pencil tip and this worked perfectly.
- Solder – Typically 60/40 rosin core (NEVER USE ACID CORE SOLDER ON ELECTRONICS). Silver solder will also work.
- Desoldering Iron or solder wick – I used a desoldering iron with much success here.
- Replacement EL strip (backlight). [Telesis](#) is a great source for these (ask for Ron) although for those of you not in the US, there is also [Backlights-UK](#). I have only personally dealt with Telesis, and the experience was a very positive one. Ron will sell you just the EL strip if you ask, but he will also do the work for you for very reasonable rates so be sure to consider this option if you have doubts about your soldering skills.

Some Highly Suggested Items:

- Paper, pen/pencil, permanent marker
- Clear (Scotch) Tape
- Masking Tape
- Electrical Tape
- Canned Compressed Air
- Canned Electronics Cleaner / Contact Cleaner
- Clean Rags (not paper-based products)
- Static Electricity protection (wrist strap if you have one)
- Digital Camera

Aside from the backlight itself you should either already have most of this stuff lying around the house somewhere or can pick it up at your local Radio Shack or other electronics supply store. If you have never soldered anything before, you should probably search the web for some tutorials on the art of soldering and practice on something besides your SY-99 until you feel comfortable desoldering a connection and soldering something back to the same place (pad) on a Printed Circuit Board (PCB).

Once you have all the parts and tools available place your SY in your working area and prepare to start disassembly...

Step 3: Disassembly

Place your SY in your work area with the bottom of the synth face up and the keys facing you:



Remove all of the screws holding the bottom plate. There are quite a few, and it will make things easier to keep track of if you use the following trick. Make a large drawing of the bottom of the synth on a piece of paper. Make note of the location of all screws on this drawing. When you remove a screw, tape that screw to your drawing so that you can make sure to keep track of exactly what screw goes where. You can also use a digital camera for this type of documentation.

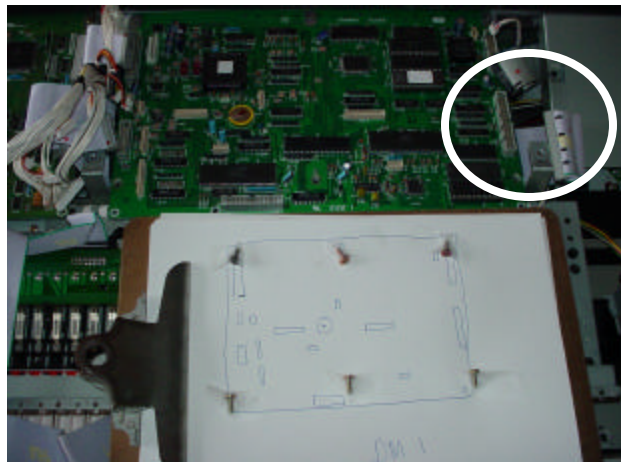


Once you have removed all screws, lift and slide the bottom plate and towards you (towards the keys). Place the plate somewhere out of the way. You will now see the insides of your synth. There are various system boards mounted inside. These boards are screwed down and have many wire harnesses and cables attached to them. You will need to remove most of these boards to get to the display and you will need to be organized here when removing the cables so you know exactly where to put them back. Most of them are “keyed” (meaning they will only go in one way) but the following trick makes

the process easier to keep track of. Take a permanent marker and mark a couple of lines that extend from the base to the connector so that when you remove the cable you will see part of the line on the board connector and part of the line on the cable itself. This allows you to line things up when putting things back together. You can use different color markers if you want for even more differentiation between cables. Also, make your diagram of the board, noting all screw holes, connectors and cables to aid you in reassembly later.



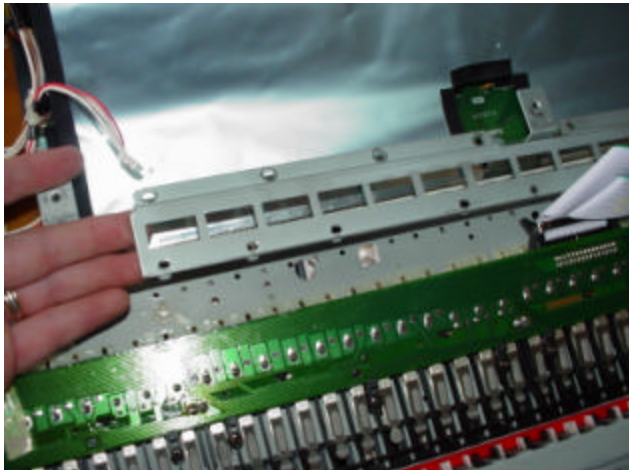
Begin by removing the DM1 System Board on the right-hand side of the synth. Remove and document the locations of the 6 anchor screws and all cables and wire harnesses. Notice the example marker lines on the cable and socket circled below to show cable orientation. Remove the board and place it (along with the documentation and screws) in a safe, out-of-the-way place.



Repeat the process for the DM2 System board located on the left-hand side. This is the bigger board. There is a short cable that connects DM1 and DM2 in the upper right-hand corner of the DM2 board – you can leave this cable attached to DM2 but disconnect all others. Document everything, and remove the board to a safe location.



Under the DM1 and DM2 System Boards you should see some protective coverings. Remove the black plastic sheet under DM2 and place it out of the way with the system board. You will see some blue/silver protective foil blankets covering the next inner layer of the synth. You need to remove the plates securing these blankets by removing the two rows of screws holding these plates down. I didn't bother documenting the screw locations for these but make sure to keep them together and remove the plates to your safe location.



You now need to remove the keybed assembly. There are only four black screws holding the keybed to the metal frame, one on each corner. Remove these screws. Also, remove the aftertouch ribbon cable by carefully pulling up on the lock bracket located on a small circuit board on the upper left-hand side of the keybed. Carefully slide the aftertouch ribbon out (noting the direction it goes in) remove any other wire harnesses connected to the keybed and move the entire keybed to a safe location.



You can now remove the foil blankets by unscrewing them from the attachment plate at the lower edge of the synth case. Remove both blankets and related screws, noting where the screws came from and move them to a safe place. There is a smaller third foil blanket on the left side of the synth that does not need to be removed. Leave those screws in place.

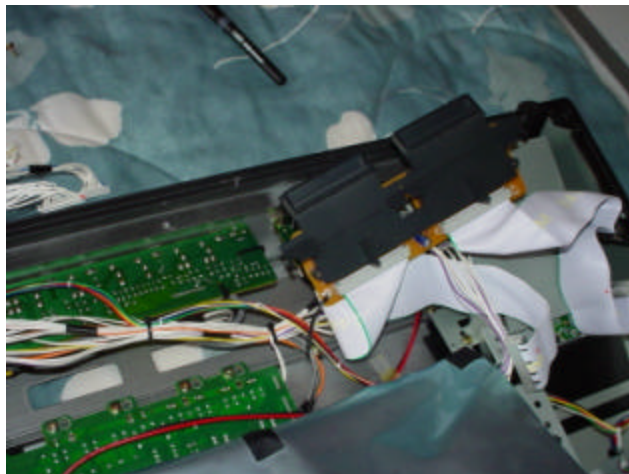
With the foil blankets out of the way, you should now see a metal housing with an L-shaped circuit board attached. This is the Expansion Memory Board housing.



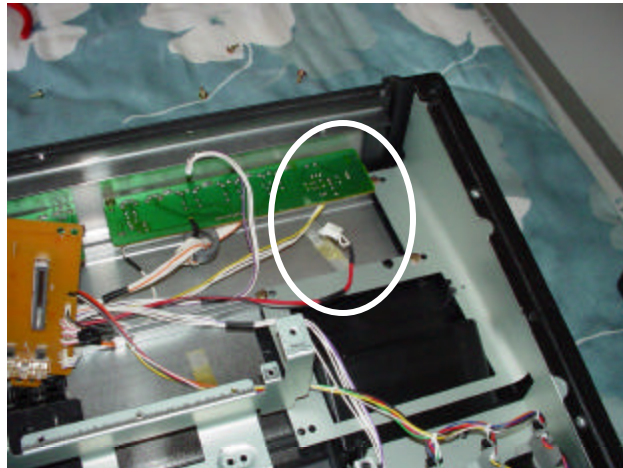
Remove the 5 screws holding the Memory Expansion circuit board in place and the large ribbon cable on the left-hand edge and document their settings. Carefully rearrange the wire harnesses so that the multicolored harness lays over the back edge of the case and the white harnesses are near the empty keyed area. Lever or tilt the Memory Expansion circuit board to the right, basically turning it like a page out of a book to get it off of the metal housing. Remove the 4 screws holding the metal housing in place and remove it from the synth. You will have to push it forward, lift the bottom part over the metal bracket and then angle it out. Make careful note of the screw locations, as this is important when remounting the housing later.



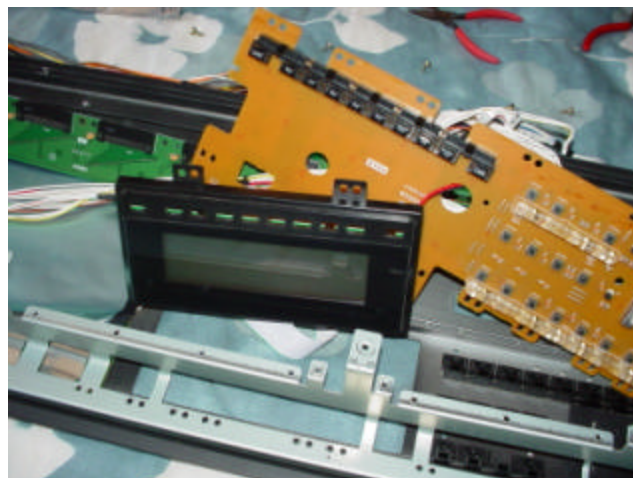
With the metal housing out of the way, you can now see the control board that contains the volume sliders and various controls on the front panel of the synth. We need to remove this board to get to the display, but in order to do that you will need to relocate the Data Card slot board assembly near the top right-hand side of the synth. This assembly is held in place by three screws and a small ground wire attached by a fourth screw. Remove these screws and move the assembly to the side. You should also remove the floppy drive at this time which is held in place by three screws.



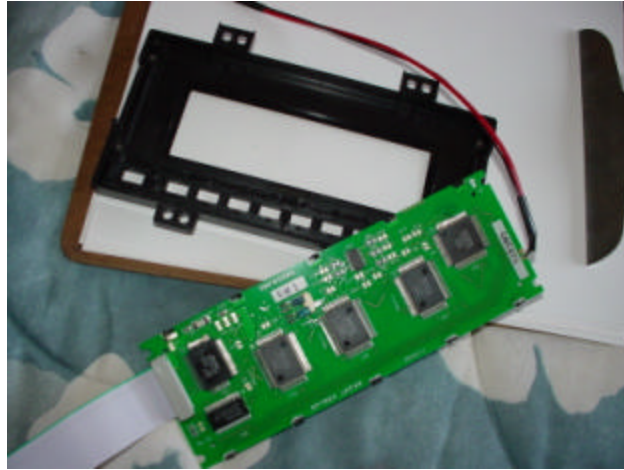
On the right-hand side and underneath the circuit board directly behind the floppy drive area you will see a wire harness with a red and black wire. This is one of the LCD display cables and you will need to remove it from the circuit board. This is tricky, and I carefully used the small flat-head screwdriver to pry open the circuit board connector while gently pulling on the wire harness. You might need to un-tape this wire harness from the bottom of the synth case in order to move it.



You can now start removing the control board and display assembly from the synth case. Unscrew the screws holding the control board and LCD panel in place. Observe the circular hole in the control board where the LCD red/black wire harness is routed through. Be careful when moving this cable as it is very delicately connected to the LCD display (I accidentally broke one lead and had to resolder it later). The control board slides forward and then can be turned to one side. Also be especially careful of the volume slider caps connected to the sliders when lifting the control board out of the synth. You can try to remove these caps from the front of the synth, but I was able to carefully lift the control board up and the caps slid off without any damage to them (use your discretion).



Remove the LCD assembly from the case. It will have a grey ribbon cable and the red/black wire harness still attached. Be careful with these when moving the unit around. Be careful not to scratch or otherwise harm the front of the display area. Set the display assembly face-down on a soft area and remove the four mounting screws holding the LCD circuit board to the plastic face plate. Remove the LCD circuit board from the plastic face plate.



Now, go turn on your soldering iron (and desoldering iron if applicable) and prepare the soldering area for some light work. While the irons are heating up, rest for a minute or two. Proceed to the next step when the irons are ready.

Step 4: Backlight Replacement

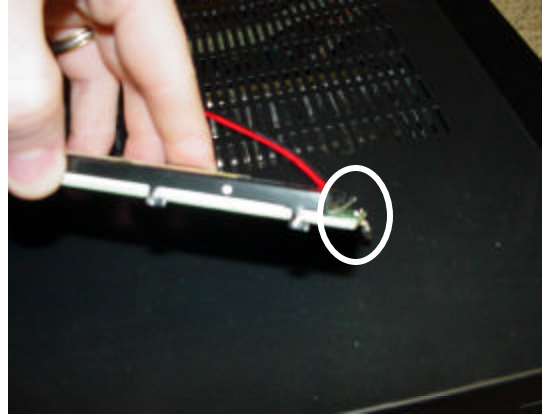
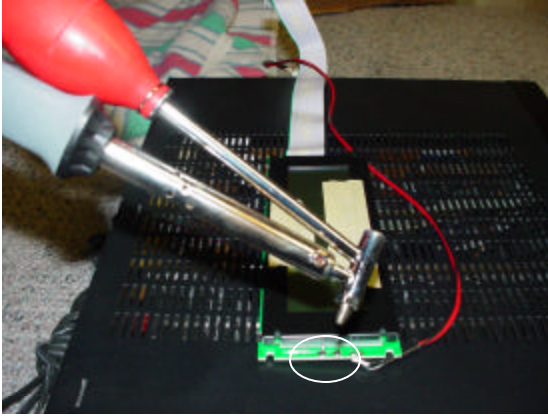
Here's the fun part! This is also the step that you would skip if you decided to send the LCD assembly to a tech for professional repair. Since you've already made it this far, let's just do it...

Taking some masking tape, secure the LCD (glass) to the display bezel (black metal case) so that the two pieces stay together when you remove them from the circuit board. If you do not do this, you might get them out of alignment and things may end up looking crooked when putting everything back together.

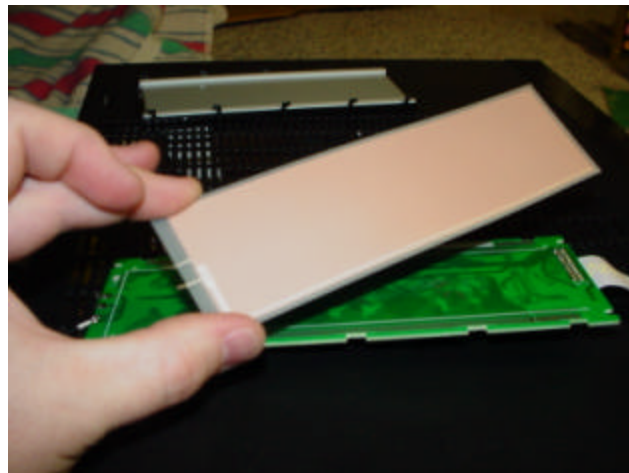


Turn the display assembly over (with a soft cloth underneath) and carefully twist away the metal “fingers” holding the black metal casing to the circuit board using the needle nose pliers. Be VERY careful here that you twist these slowly and gently. Look at the fingers first to determine which way to twist them (some go one way and some go the other). The upper right-hand finger may or may not be soldered in place. If it is, you should first carefully unsolder and then twist the finger away from the board.

At this point, I chose to also unsolder the two EL strip leads before removing the metal case and LCD from the circuit board. Heat is an issue here, so be careful to only remove the solder holding the leads to the board and not the pads on the circuit board themselves. Carefully lift the unsoldered leads away from the circuit board using the needle nose pliers or the small flat-head screwdriver.

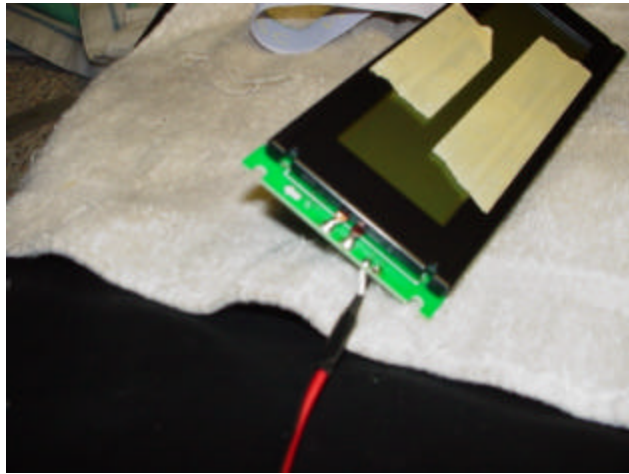


Very carefully separate the LCD glass and black bezel from the circuit board. You may need to use the small flat-head screwdriver to help pry these apart – if so, be very careful not to damage any traces on the circuit board or to touch the LCD glass. Once the LCD/bezel is separated from the circuit board, you will see the old EL strip connected to the circuit board – it is probably held in place with some type of adhesive and will peel off but be gentle and try to avoid bending anything.



The replacement is easy – put the new EL strip in place of the old one, aligning the leads in the right place. You might also want to use the LCD/Bezel as a guide to make sure the new EL strip is aligned left-to-right in the best location. You do not want to have uneven backlight coverage, so take your time getting the EL strip in the right place. Once it is in place, you can probably just use the “sticky” that is left on the circuit board to hold the new EL strip in place. This worked for me, but you might want to find some kind of adhesive (glue stick) to have on hand in case this doesn’t work for you. Make sure the EL strip is firmly in place, and then resolder the two new leads in place.

Carefully reassemble the LCD/bezel (make sure it is right-side up...) to the circuit board bending the fingers back in place and resolder the soldered finger if applicable. At this point, carefully examine the red/black wire leads that are also soldered to the board. These are VERY delicate, and throughout the course of moving the display assembly around these might have become stressed, damaged, or even disconnected. If so, solder them back to the board. You do not have a lot of slack to work with on these wires, so if you need to resolder these and are unsure about having enough wire left you might consider using some other wire to extend these cables. Again, if these solder points are too small for you to work or you are unsure about being able to make this repair if necessary, take it to a tech...



You might also want to cover the newly soldered EL strip leads with a small piece of electrical tape if you feel the need. It is not required, but probably good safety practice. Once you are sure you are done soldering things, turn off your iron and proceed to the next step.

Step 4: Spring Cleaning

I took the opportunity at this point to clean everything out before putting everything back together, and this would be the appropriate time to do that if you feel the need. I used contact cleaner to clean out the scratchy volume slider pots and to help unstick some of the plastic/rubber button pads on the front of the unit. Rubbing Alcohol on a Q-Tip might work better for cleaning the rubber button pads, but the contact cleaner worked fine for my purposes. Be careful when using spray contact cleaner – cover up anything you don't want to get sprayed with a rag to avoid unnecessary overspray and cleanup. I also used a damp cloth (only water, no cleaning solvents) to clean the accumulated grime off of the tops, sides and undersides of the keys. Compressed air came in handy to get rid of dust and debris inside the case as well as to clean small debris out from in between the keys. Once everything is cleaned to your satisfaction, you can begin reassembly of your synth.

Step 5: Reassembly

Basically, this step is just the reverse of the disassembly procedure. Take your time and follow your diagrams, notes and pictures to make sure everything is put back together in the correct order and in the right places.

Make sure to completely clean up the LCD panel and the plastic faceplate before reassembly. Remove the masking tape from the display and carefully clean off any tape residue making sure not to scratch or put undue pressure on the LCD glass. Make sure no lint, dust or other marks such as fingerprints are present on the LCD or on the plastic faceplate. Once these are clean, reassemble the LCD to the faceplate and secure the assembly with the four mounting screws.



Replace the display and control board (making sure to carefully route the LCD red/black wire harness through the circular hole in the control board). Reconnect the red/black harness to its connector.

Replace the floppy drive.

Replace the Data Card slot assembly (making sure to also reattach the ground wire to the synth chassis).

Replace the Memory Expansion metal housing. Make sure to align it correctly – you can tell by removing the Yamaha SY99 plate on the back of the synth and lining the 5 card slots up with the holes. Make sure to carefully reattach the wiring harnesses back to the top center area of the metal housing using the black wire catches.



Replace the Memory Expansion circuit board and reattach the ribbon cable.

Replace the blue foil blankets and the screws that hold them to the metal mounting rail.

Replace the keybed (making sure to plug back in the aftertouch ribbon and other cabling that was removed). You might have to lift the synth chassis up a little bit when screwing the 4 keybed mounting screws back in so you can get the alignment correct.

Replace both the foil blanket security brackets. Fold the blue foil blankets over to cover the exposed circuit boards.

Replace the black plastic sheet.

Replace the DM2 system board and reattach all related wire harnesses and connectors.

Replace the DM1 system board and reattach all related wire harnesses and connectors. Make sure to reconnect the ribbon cable that joins the DM1 and DM2 system boards together.

Replace the bottom cover of the synth and screw it back in place. Take care to remount the power connector correctly to the back of the case.

Turn the synth over and plug it in. Assuming everything went correctly, you will now have an operational backlight! If not, you will likely have to troubleshoot possible cabling issues. If you hear any weird electrical sounds, smell smoke or something burning or your synth gets much warmer than usual, immediately remove the power and begin tracing your steps to see if something is loose, not plugged in correctly or other common-sense things (hint – do NOT leave any tools or loose parts inside the synth). If all else fails and you cannot figure it out, take it to a tech. If you go slow, document everything, observe good static electricity precaution and are careful unplugging things and plugging them back in you will probably not experience any problems.

