

BEHNWENN



**Installing the Game
Gear LCD Kit**

Introduction

Congratulations on your purchase of the BennVenn Game Gear LCD kit. The BennVenn Game Gear LCD Kit uses an IPS LCD for superior reproduction of the Game Gear's 4096 colours, better brightness and no ghosting or tearing. It's performance and image quality far exceeds that of the original LCD or any competing replacement LCD.

Before you Begin

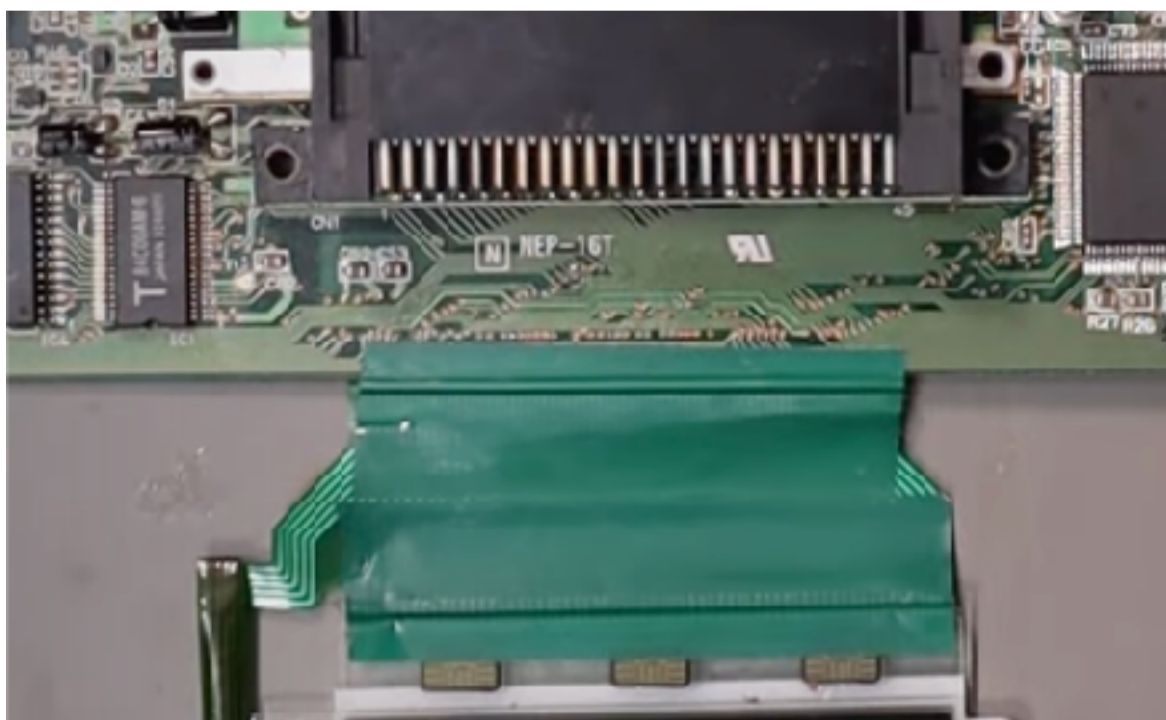
Take the following items into consideration before you begin the installation.

- ☑ The BennVenn LCD Kit officially supports VA0 (double ASIC) and VA1 (single ASIC) revisions of the Game Gear motherboard. It does not yet support VA4 or VA5 revisions. You can identify your revision of the Game Gear using guides on the internet.
- ☑ Ensure your Game Gear is fully functional. While replacing the LCD may fix some issues relating to the screen, it will not fix any other faults, nor will it revive a dead Game Gear.
- ☑ It is strongly recommended that you have recapped your Game Gear even if the original capacitors still work. If they have not been replaced they will be 25 to 30 years old.
- ☑ This guide contains two sets of installation instructions. The Official Instructions are a step by step guide to installing the LCD suitable for those who may not have modded a Game Gear before. The Alternate instructions are for more advanced modders who want a tidier install and do not need the install explained step by step. Which ever set of instructions you choose, the quality of the LCD picture will be the same.
- ☑ If your Game Gear has had a different replacement LCD installed before then the following components will need to be restored if they have been removed:
 - ☑ All components for the Clock circuit.
 - ☑ All components for the Brightness control circuit.
- ☑ Once you have chosen the installation method you prefer, read through it in its entirety, making sure you understand all of it. Once you have done that you are ready to Begin Modding.

Official Instructions

Disassembling the Game Gear

1. Begin by removing any game you have in the system, the rear battery covers and the batteries.
2. Remove the 7 Phillips head screws that hold the shell together. Also remove the single 4.5mm gamebit security screw.
3. Open the unit slowly and carefully and unplug the two blue connectors that connect the main PCB to the sound PCB and the power PCB. Unplug the smaller connector that goes to the speaker. Set the rear half of the Game Gear aside as we will not be modifying it.
4. Remove the six screws holding the main PCB onto the front half of the Game Gear.
5. Slide the main PCB down slightly before lifting it out. Retain any rubber conductive pads that may have fallen out and set the front half of the Game Gear case aside.
6. Remove the four screws holding the LCD onto the PCB.
7. Pick up the LCD and flip it over so it is sitting outside of the board and pull off the green adhesive tape holding the LCD to the PCB:

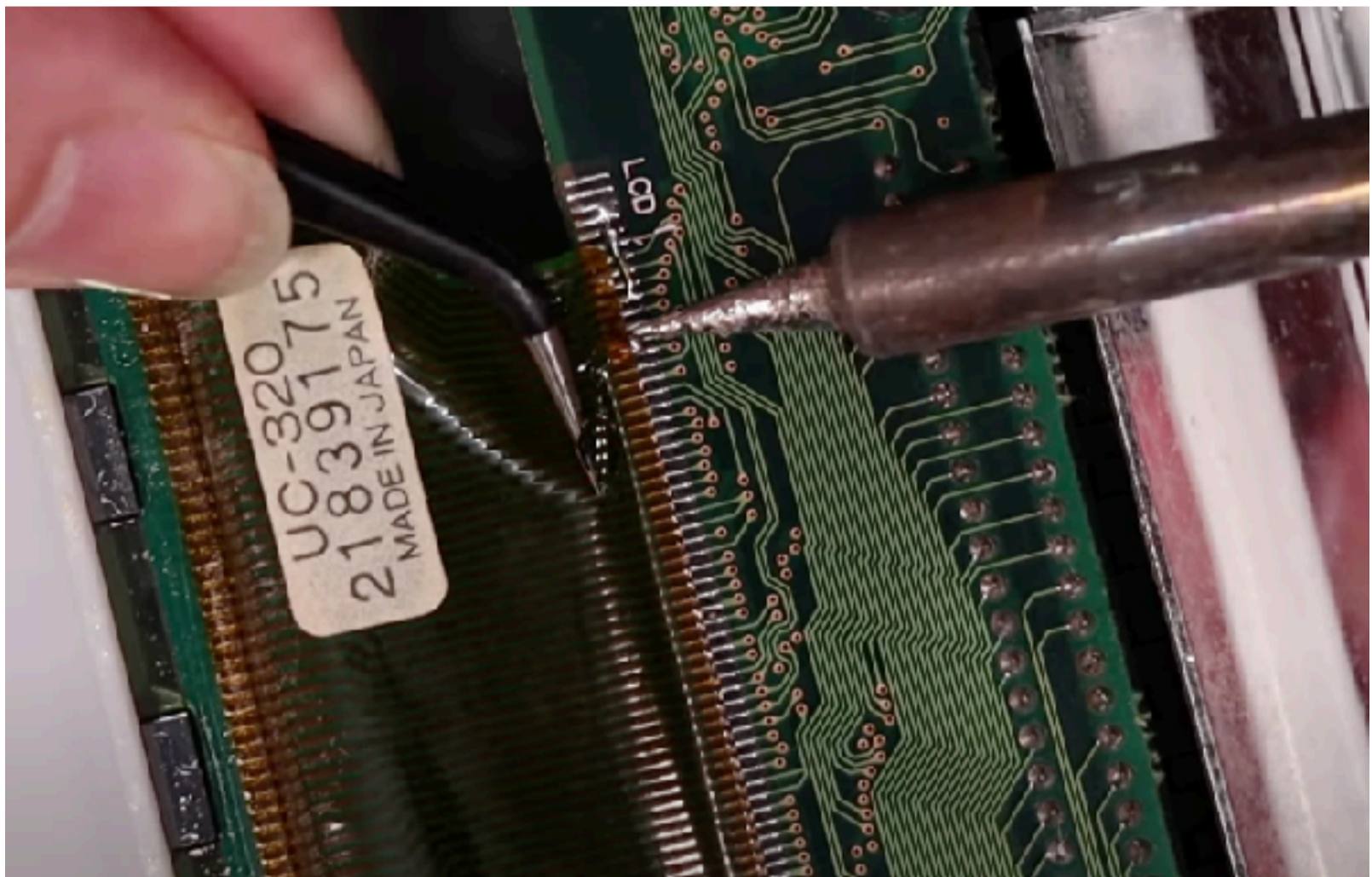


8. Then turn over the whole board and the LCD together so can you access the solder pads holding the LCD to the Main PCB.

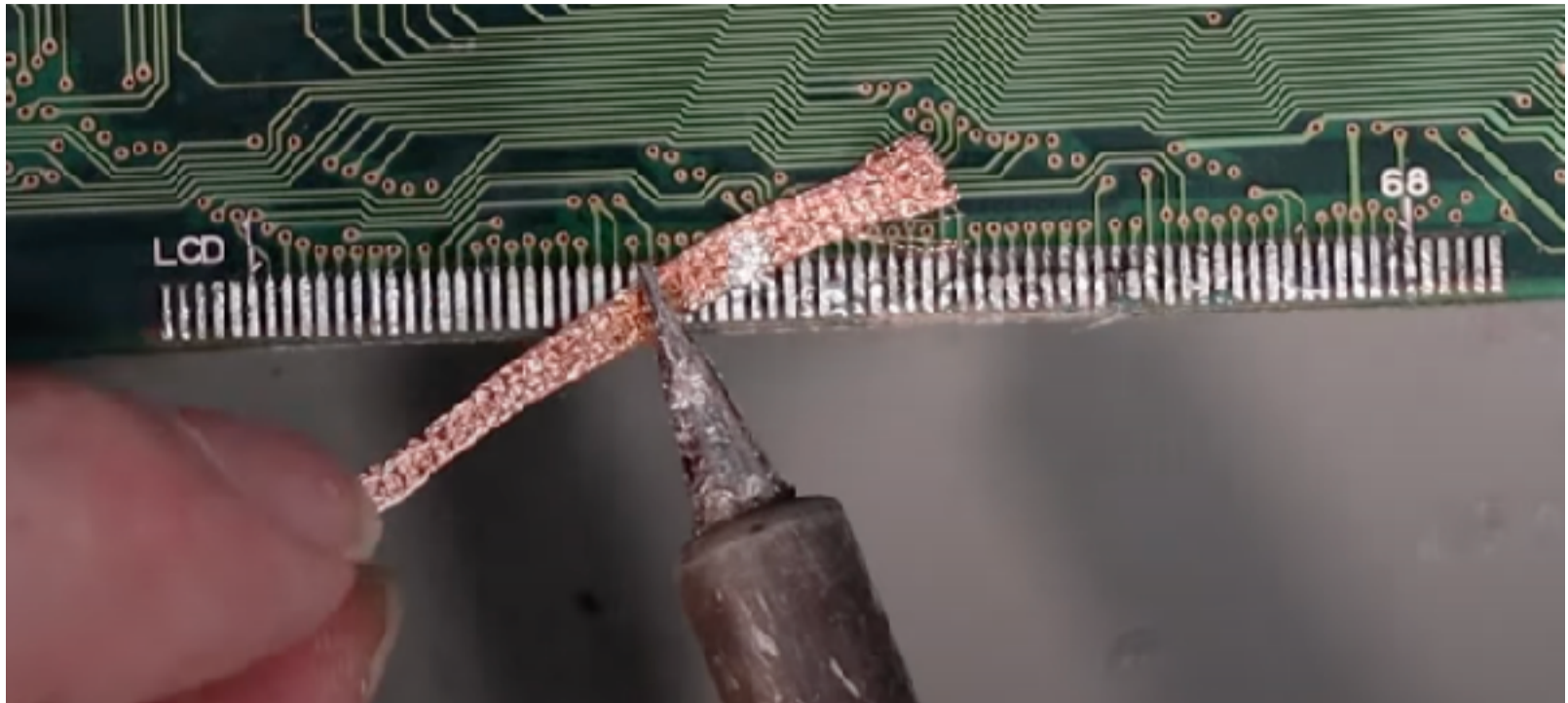


Removing Unneeded Components

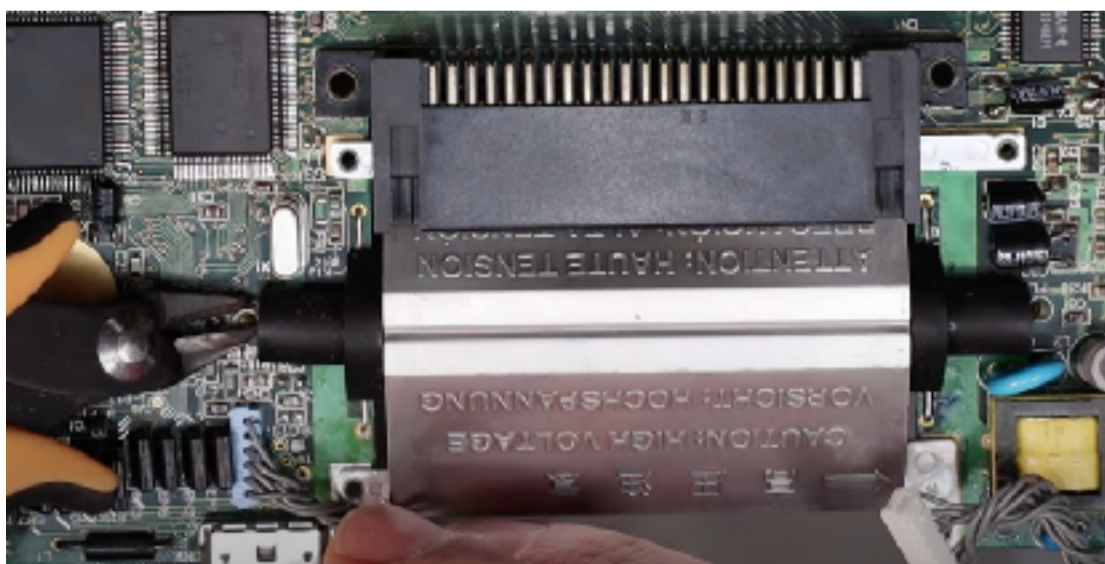
9. Moving from left to right, use your soldering iron with some fresh solder to heat up the ribbon cable and then use your tweezers to gently pry the ribbon cable off. After you have pulled up the entire ribbon cable the old LCD will fall off.



10. Use some solder wick to clean up the pads that you just removed the LCD ribbon cable from.

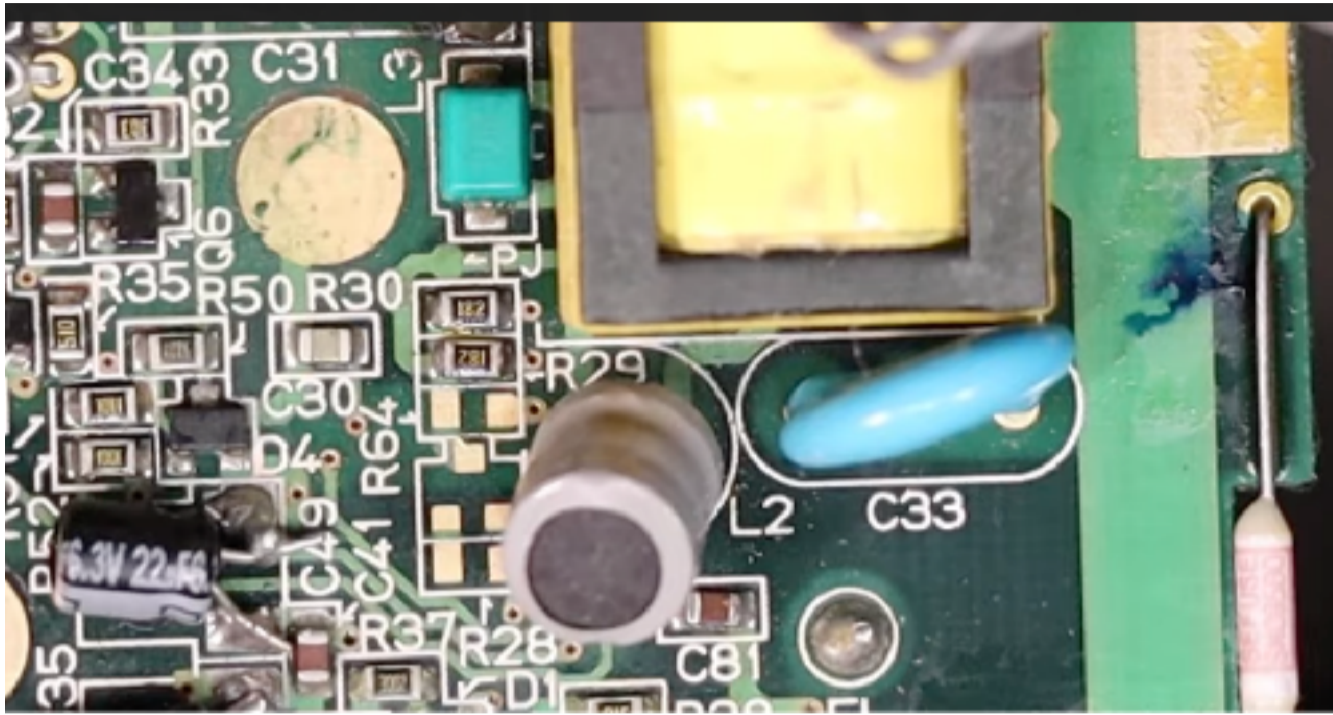


11. Desolder or cut off the two wires holding the old backlight on and slide it out.

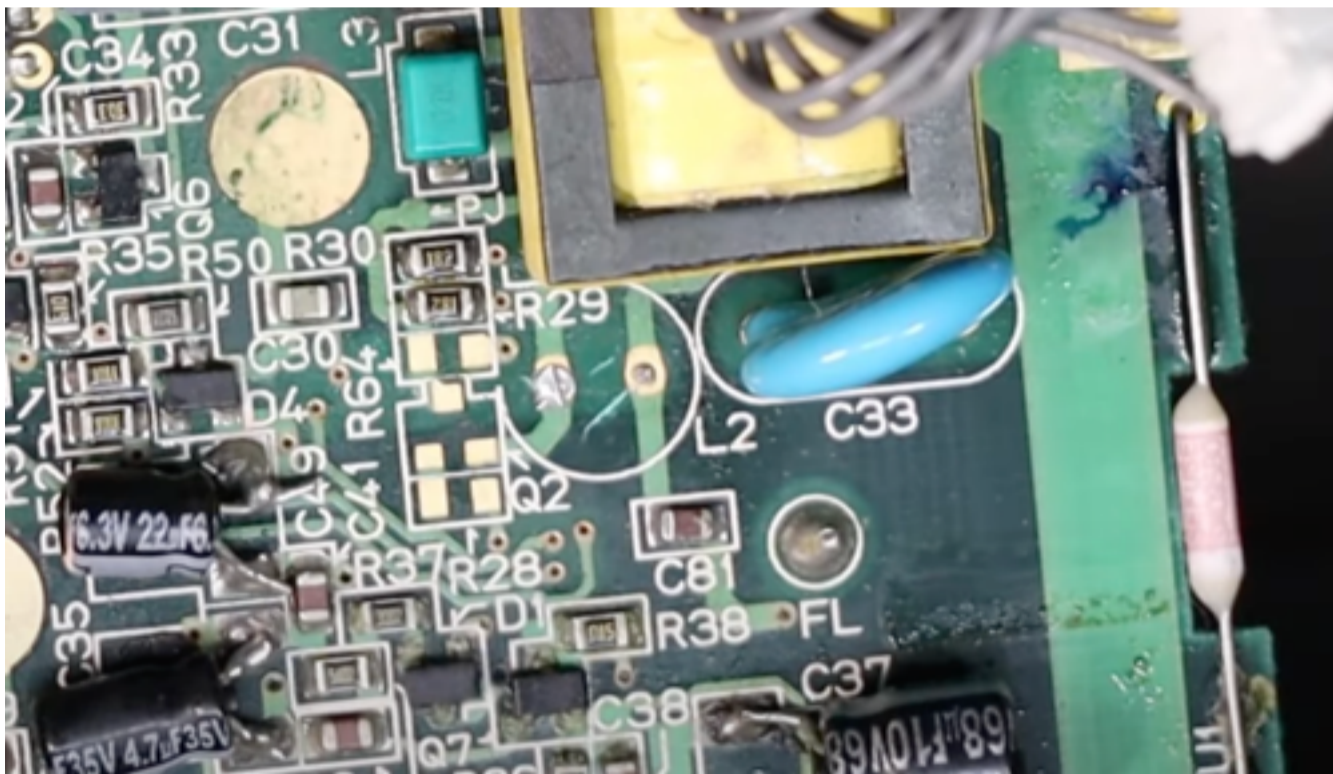


12. Remove the coil marked 'L2'

Before:



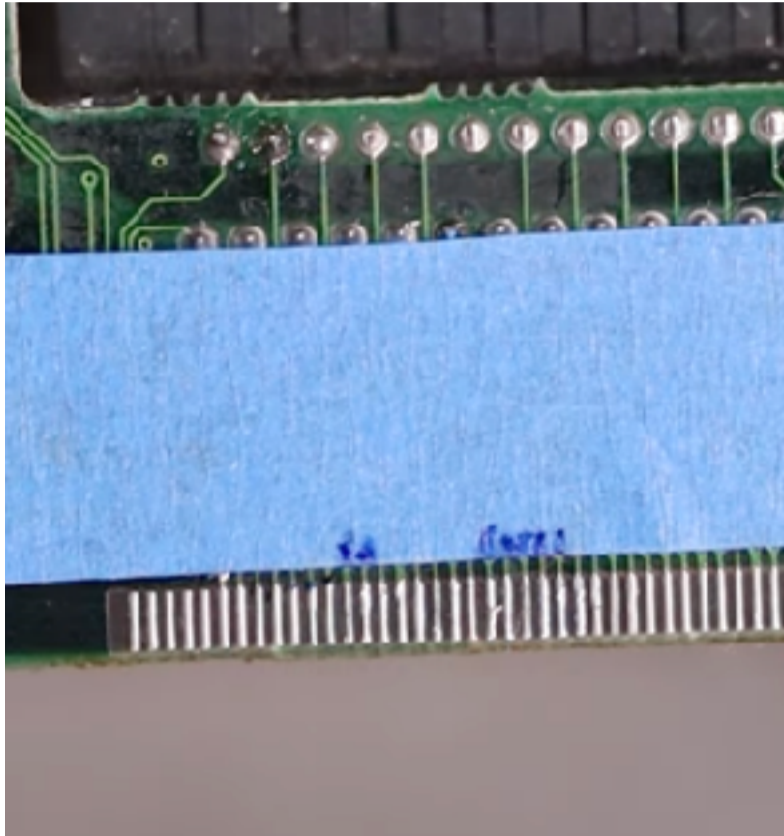
After:



Preparing for soldering:

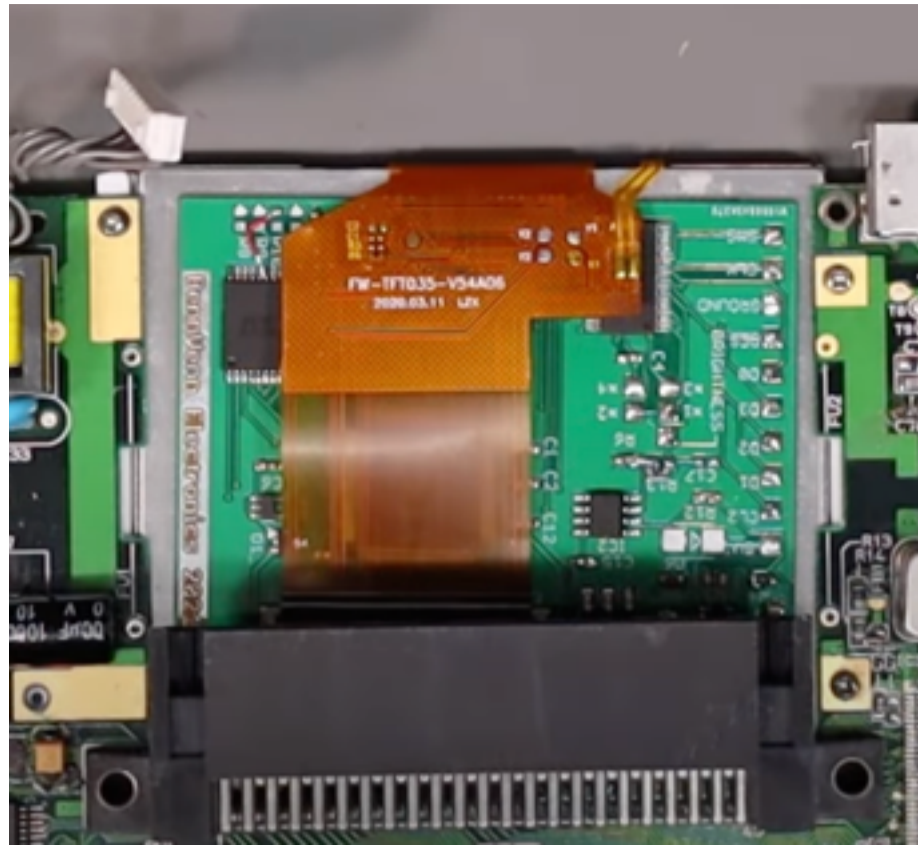
1. Place a strip of masking tape above the LCD ribbon cable, mark the following pads: 8,9,16,17,18,19 and 20. This will save you having to count pads later.

Note: On some Game Gears pin 1 is the left most pin, on others it will be marked on the PCB with a "1".



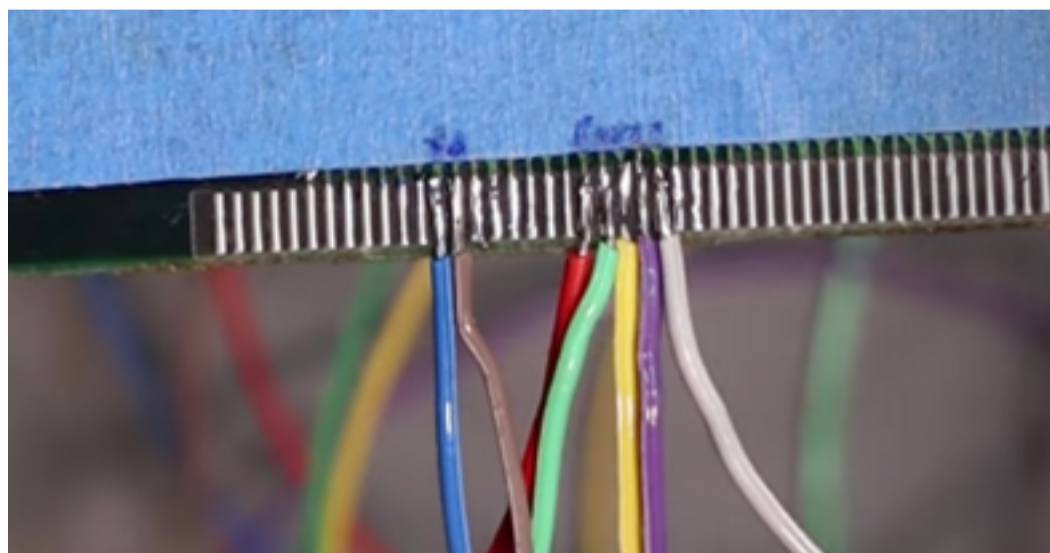
2. Pull the plastic tab on the LCD protective film to the right slightly so you can still use it when it is in the frame. The plastic film should follow it. Slide the LCD into its 3D printed mount and then slide the new LCD module into the Game Gear where the old LCD was. Use the screws from the old LCD module to mount it to the board.



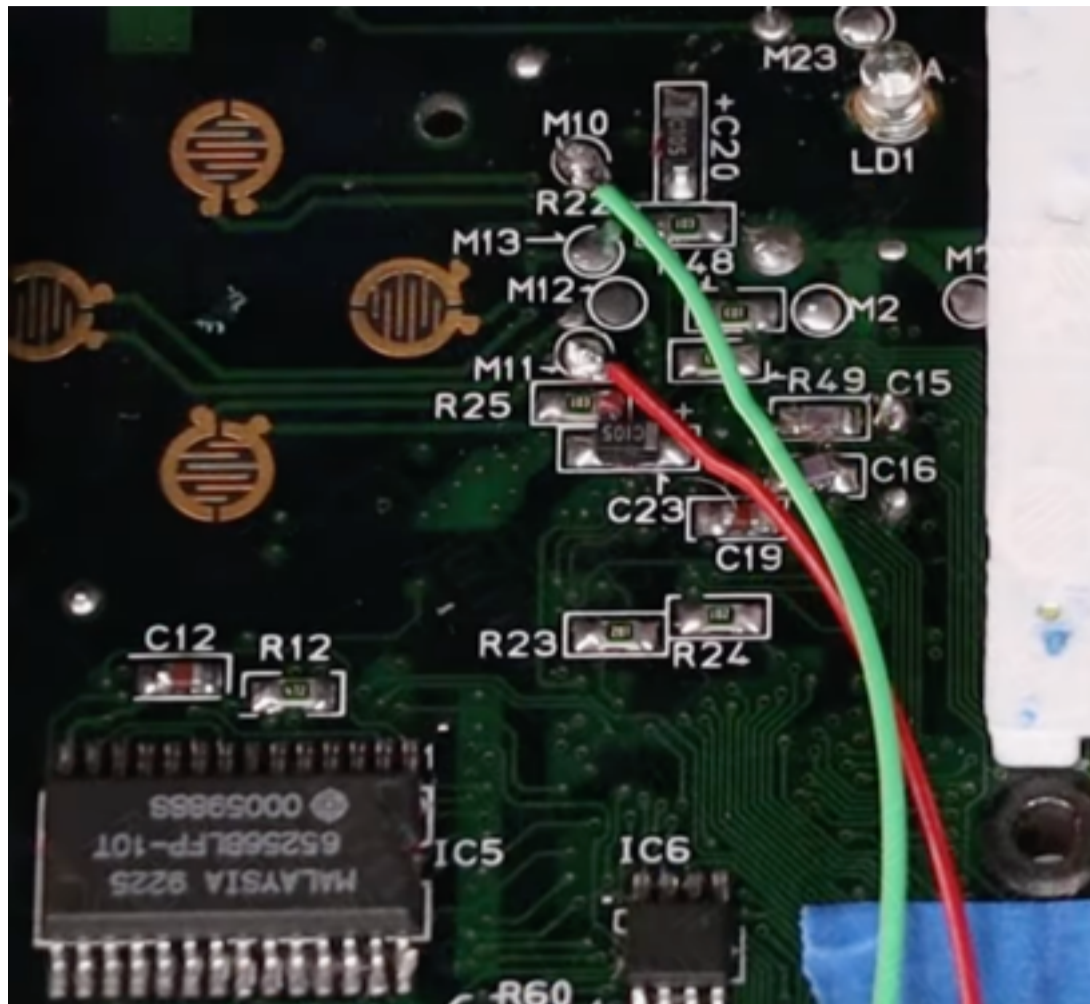


Soldering the wires:

1. Use the pen markings you made earlier to solder a wire to pads 8,9,16,17,18,19 and 20. Use thin gauge wire and make sure it is long enough to reach to the pads on the back of the LCD. As the pads are close together, check your work with a magnifying glass or the zoom function on your Phone's camera to ensure there are no short circuits. If you are still unsure, use the Continuity Tester on your multimeter to check for shorts.



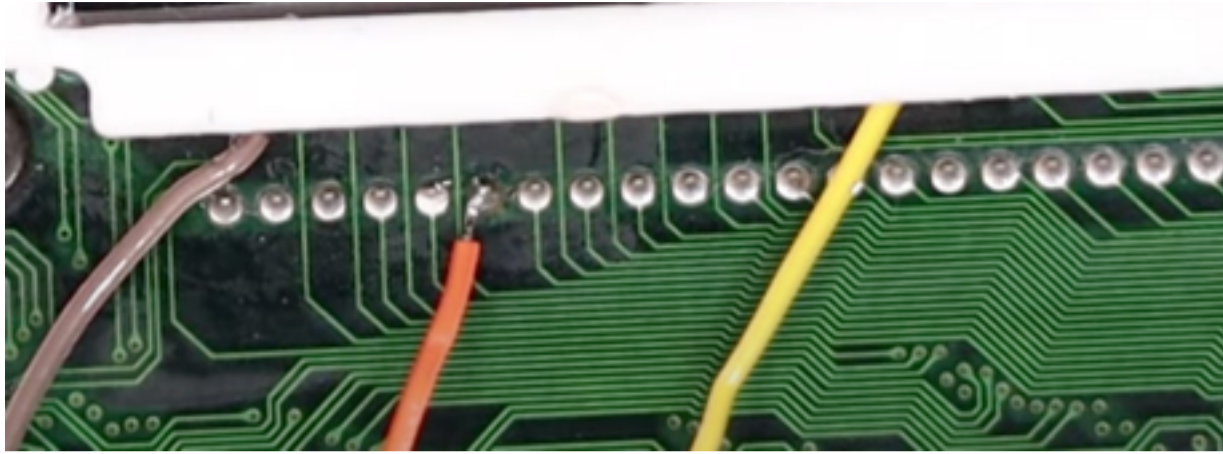
2. Solder wires to pad M10 and M11 on the upper left hand side of the front of the board.



3. Solder a wire to pin 2 and pin 14 on the top row of the cartridge connector pins (just below the LCD module on the front of the PCB).



4. Solder a wire to pin 6 on the bottom row of the cartridge connector pins.

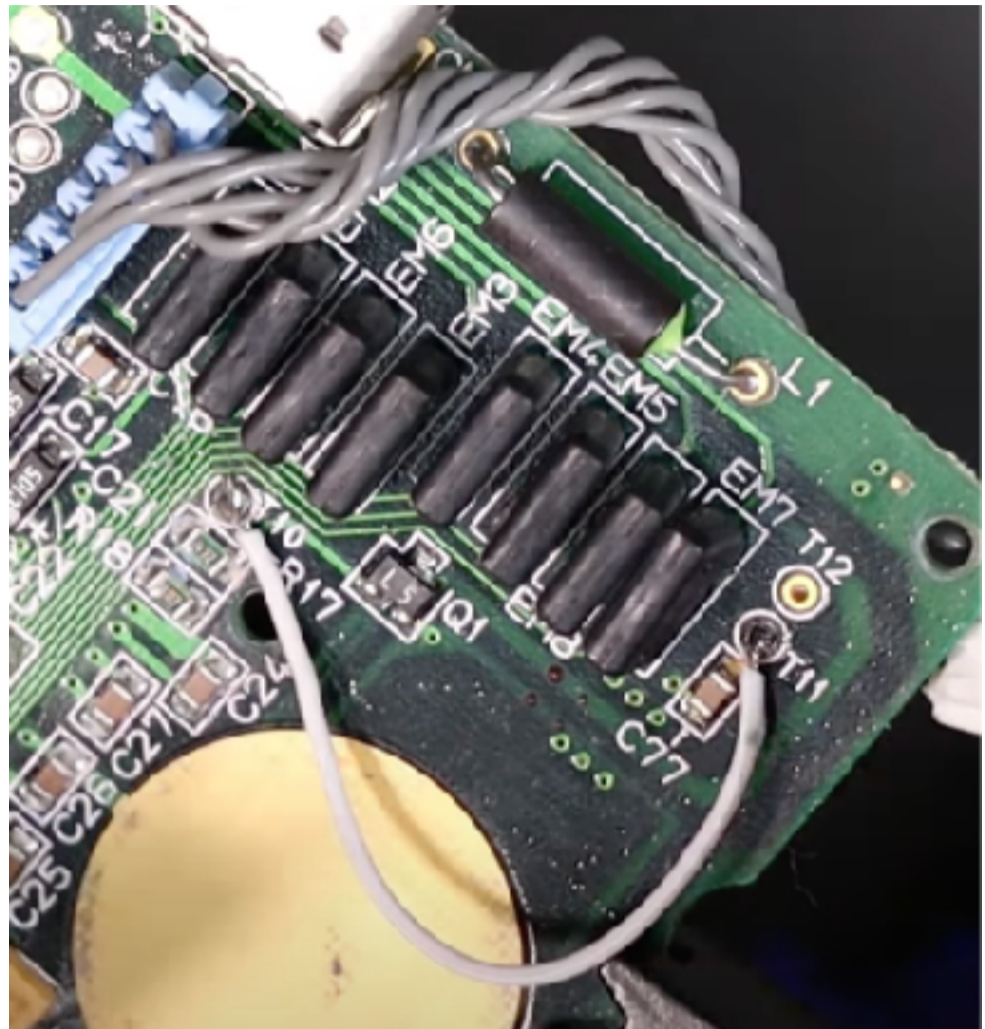


5. Solder a wire to point M16 on the upper right hand side on the front side of the PCB.

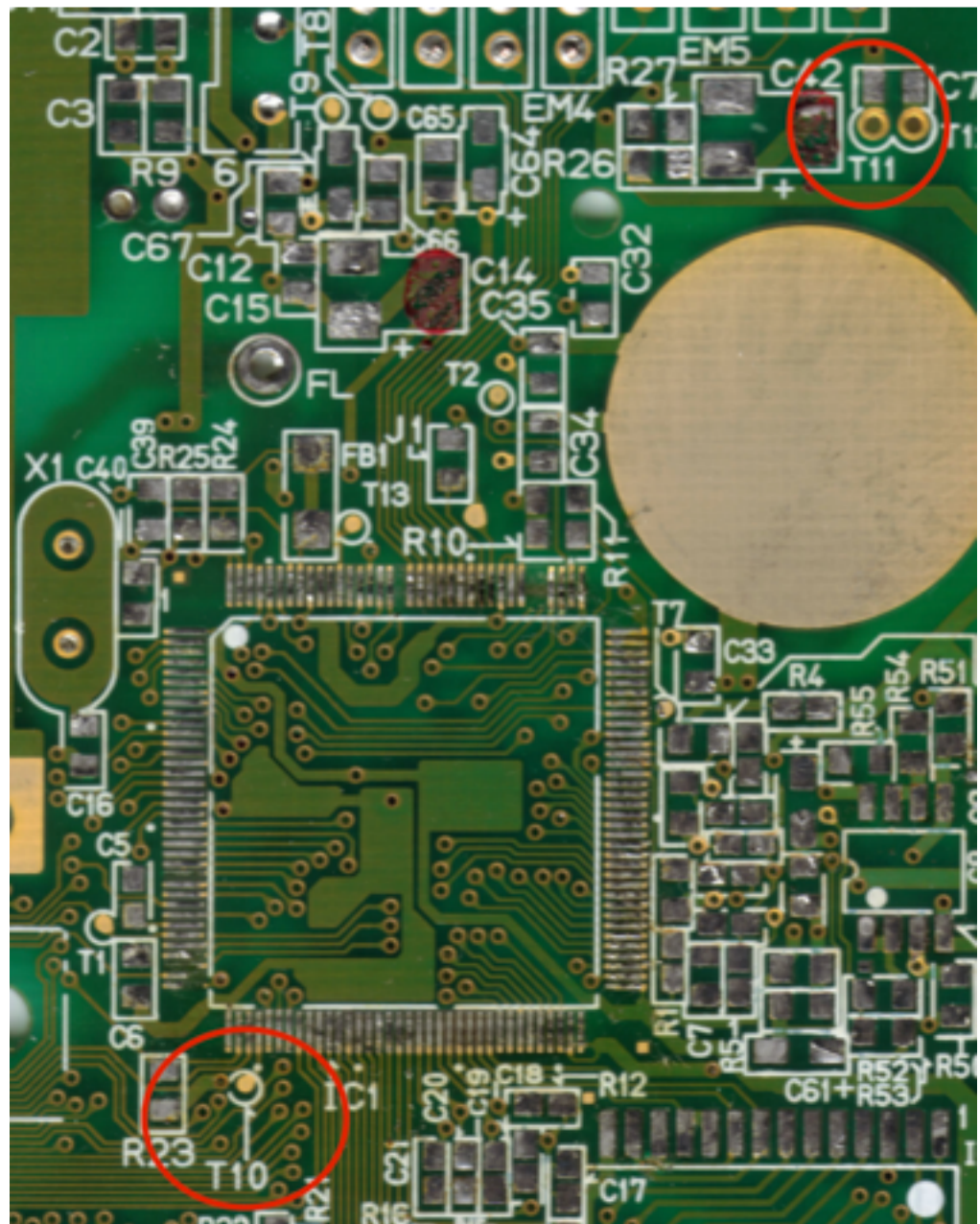


6. Solder a wire from T10 to T11

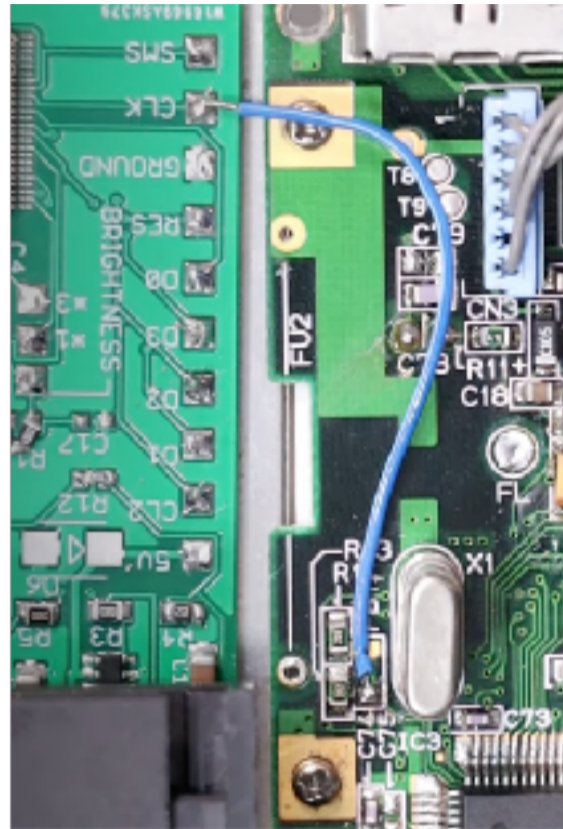
VA0:



VA1:

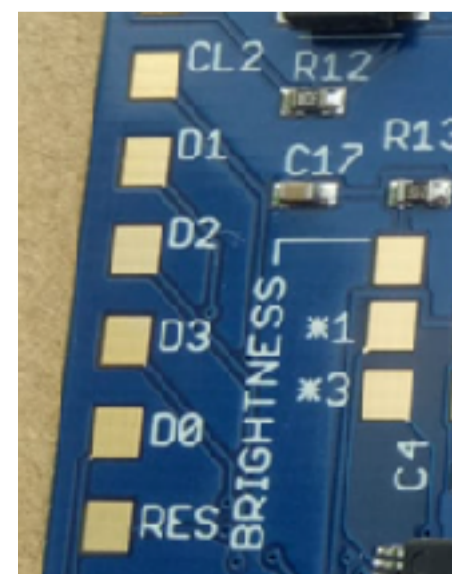


7. Solder a wire from CLK on the LCD Module to either the top or bottom pad of FB1.



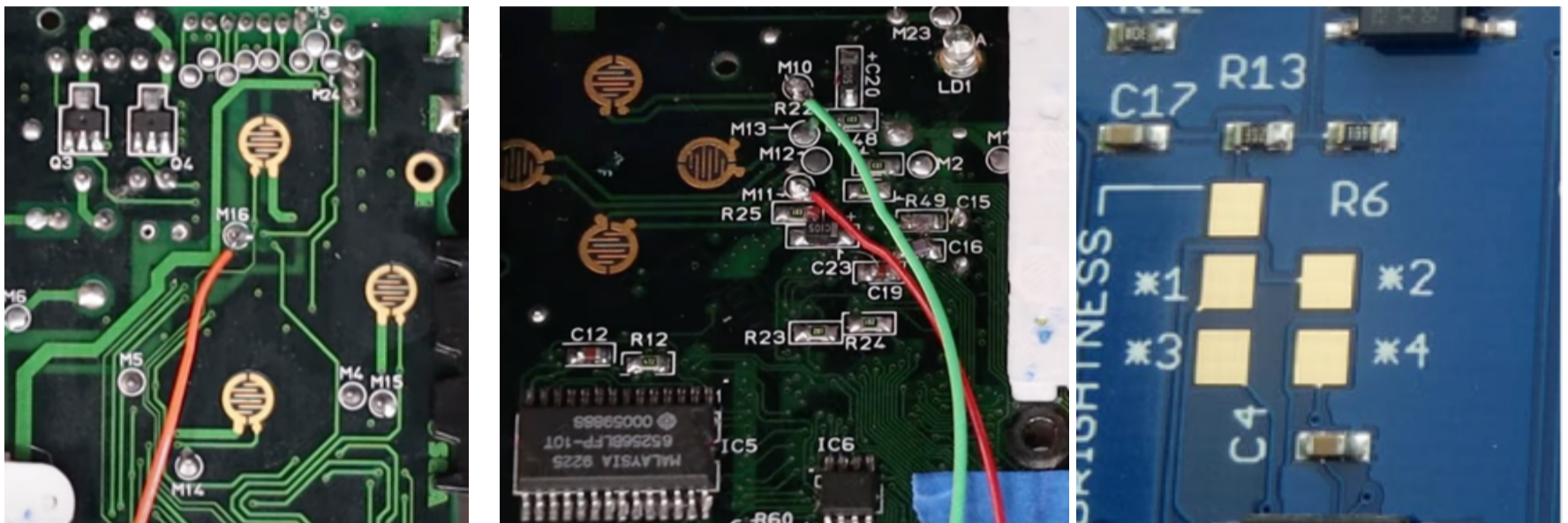
8. Solder the wires from the front LCD pads to these pads on the new LCD Module

Motherboard LCD Pads	New LCD Module Pads
	8 Brightness
	9 CL2
	16 D1
	17 D3
	18 D0
	19 D2
	20 RES



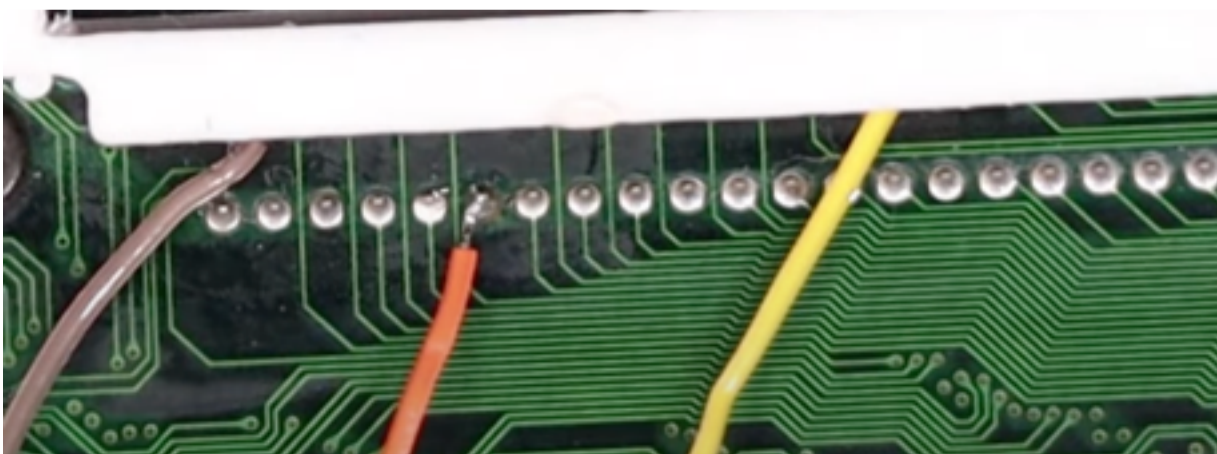
9. Solder the M10, M11 and M16 wires from the front of the board to these pads on the LCD Module (the *4 pad on the LCD is not used)

Motherboard LCD Pads	New LCD Module Pads
M10 (near up button) *2	
M11 (near down button) *3	
M16 (near start button) *1	



10. Solder the three wires from the Cartridge port as follows:

Game Gear Cartridge Connector	New LCD Module Pads
Top Row, Pin 2 SMS	
Bottom Row, Pin 6 5V	
Top Row, Pin 14 GND	



11. At this point you can choose to set the default scaling option for your Game Gear LCD. This means your Game Gear LCD will use the scaling option you choose whenever the Game Gear is switched on. Even if you select a default scaling option, you can still change the scaling mode whenever you like by holding the start button .

First check if your LCD can support this feature:

LCD Batch	Default Scaling Option
Batch 1, without black mark on pad *4	Default scaling option is fixed
Batch 1, with black mark on pad *4	You can set the default scaling option
Batch 2 and beyond	You can set the default scaling option

If your Game Gear LCD supports setting the default scaling option, solder the pads as follows:

Scaling Mode	Jumper SJ1	Pad *4 connected to
2X scaling (Vertical and Horizontal)	Closed	GND
1X scaling (Postage Stamp Size)	Closed	5V
2X scaling (Horizontal scaling only)	Open	5V
Fit to Screen Window	Open	GND

You can use a small amount of solder to close the Jumper SJ1. Solder a wire from Pad *4 to 5V or GND depending on which mode you want.

12. Remove the middle upper screw post on the front part of the Game Gear Shell.

13. Remove the rubber gasket and cut off the plastic nubs that held the gasket in place. This is necessary to prevent pressure on the new LCD causing bright spots.

14. If the metal RF Shield on your Game Gear looks like it might make physical contact with the back of your new LCD, you should trim the shield back a bit and then fold it over for a rounder edge.

15. Plug in the power board, sound board and speakers and test the Game Gear with a Game in. Ensure that the shortcut for changing screen modes (Hold Start) and the shortcut for turning scanlines on and off (Hold Start plus press up/down).

16. If everything works, remove the plastic film from the new LCD and reassemble using the disassembly instructions in reverse.

Alternate Instructions

Remove the following:

- Coil L2
- Old LCD Module
- CCFL Backlight Module
- Cut off the middle upper screw post on the front part of the Game Gear Shell
- Plastic film covering the new LCD
- Rubber Gasket
- Cut off the nubs that were used to align the rubber gasket in place.
- If the metal RF Shield on your Game Gear looks like it might make physical contact with the back of your new LCD, you should trim the shield back a bit and then fold it over.

Mounting the LCD

Slide the new LCD into the 3d printed mount, attach the new LCD module to the motherboard using the screws from the old LCD mount.

Soldering for both VA0 and VA1

On the Game Gear motherboard solder T10 to T11.

If needed, recap the Game Gear.

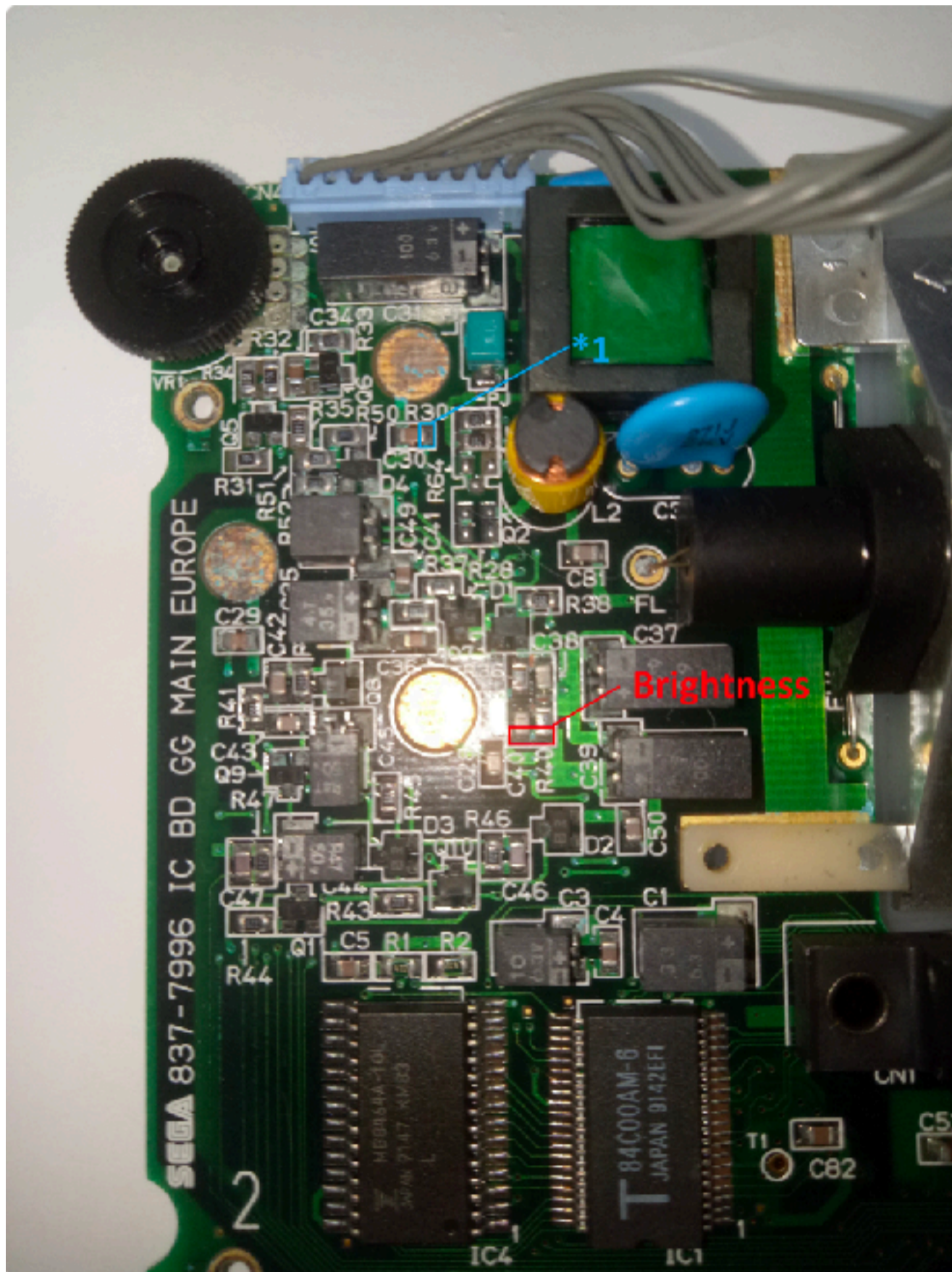
Please refer to step 11 in the official Instructions for how to set the default scaling option.

Choosing Soldering Points:

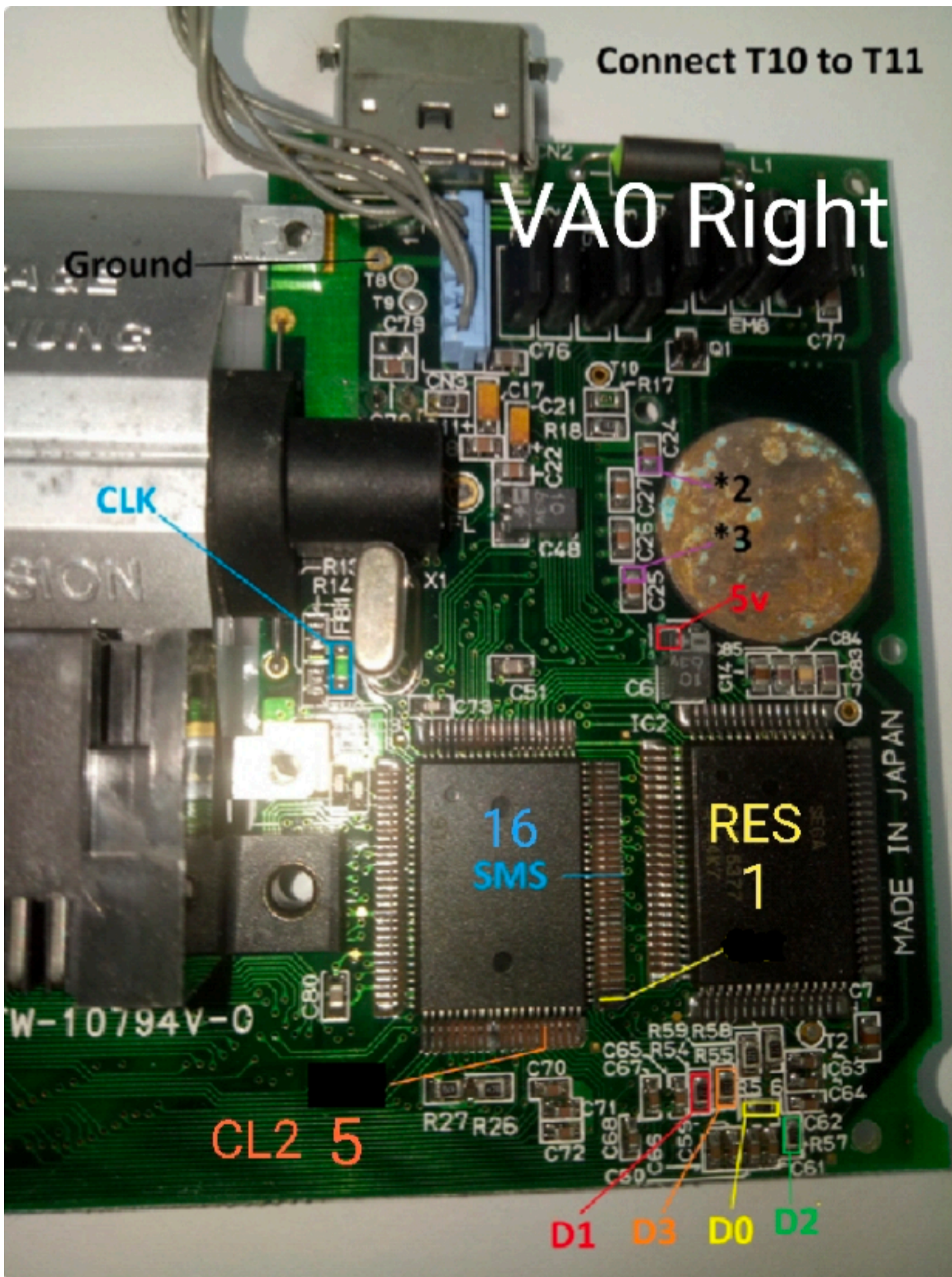
The following points are offered as a suggestion, you may choose other points on the board that you prefer to use. You can also use the points mentioned in the official installation.

VA0

Rear of PCB, left hand side (VA0):



Rear of PCB, right hand side (VA0):



Rear of PCB, right hand side (VA1):

