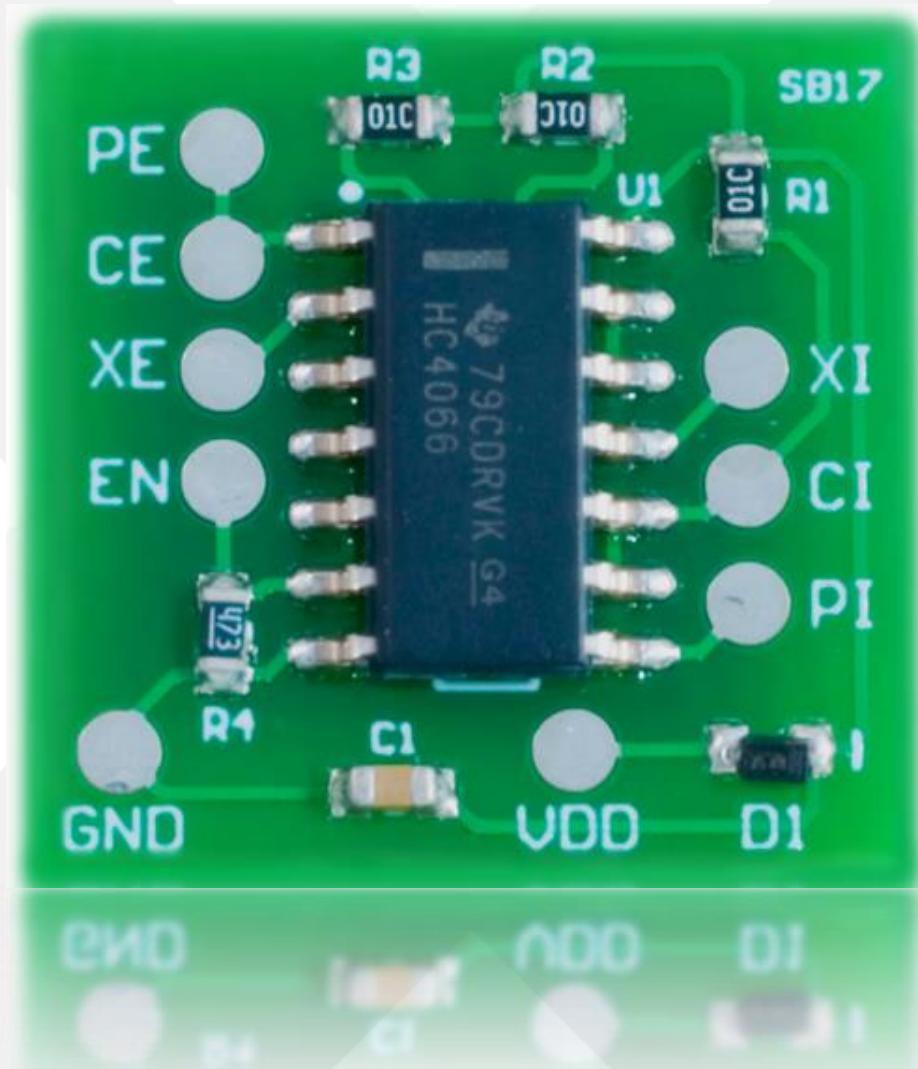


PSIO

Switch Board Installation Guide Revision 1.2

PlayStation Mainboard [PU-22]



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Introduction:

Before playing games from PSIO on your PlayStation 1, the Switch Board must be installed. To install it, some fine soldering is required. This document is a guide on how to install it for your [PU-22] PlayStation mainboard.

The Switch Board is included for free with each PSIO cartridge purchase. If you require additional Switch Boards, they are available for purchase in the 'Store'.

This guide is by no means intended for beginners in soldering or electronics.
We will **NOT** be held responsible for any damage to your PlayStation console, or PSIO cartridge.

By continuing with this installation document, you must be competent with a soldering iron and know how to cut traces on mainboards.

Please check for updated versions of this manual at http://ps-io.com/switch_board.html.
To report any problems, please see <http://ps-io.com/problem.html>.

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1-0: Switch Board:

[1-1: Information]

The Switch Board is required in order for PSIO to work correctly. The reason behind it is that Sony never provided direct access to the CD-ROM CPU on the Parallel I/O bus. In our case, access to the CDDA and XA interrupt lines. What the Switch Board does is it actually switches the required data lines and forwards them through to the PSIO cartridge. The Switch Board also allows PSIO to drive the CD-ROM directly and give us complete control over it.

Keep in mind that the Switch Board is completely invisible to the PlayStation. That means when your PSIO cartridge is unplugged and not in use your PlayStation returns back to normal operation. The CD-ROM drive will work as it normally would, and you will also be able to use Game Shark/Action Replay cartridges like normal.

If you have a Modchip installed in your PlayStation, the Switch Board and Modchip will work fine side by side with each other. Remember, the Switch Board is invisible to the PlayStation.

[1-2: Installation]

First off, you will require some tools:

- Switch Board (included with your PSIO cartridge purchase),
- Kynar Wire (included with your PSIO cartridge purchase),
- Soldering Iron (use a fine tip that is in good condition),
- Solder (preferably rosin cored, 60% lead, 40% tin (also known as 'sixty forty' solder)),
- Rosin Core Flux (used to assist with joint-wetting),
- 25x Magnification Jewellers Loop or Microscope,
- Phillips Head Screwdriver (to disassemble your console),
- A Multimeter or Diode Tester (for continuity testing of your connections),
- A sharp 'hobby' knife (EG: X-Acto), and
- Fine pitch wire strippers or small office scissors.

Let's begin.

First off, you will need to disassemble your PlayStation 1. However, before you start to disassemble your console, you must ensure that your PlayStation 1 is completely **isolated** and **unplugged** from all wall sockets.

Ensure that you have also taken out any CD-ROM's in the drive and have put them away safely.

Once you have ensured your console is isolated and unplugged, turn it over, and unscrew all of the screws on the back. Then, whilst holding the sides with two hands, flip the console over. You can then lift off the top shell to expose the internal components.

The next step is to remove the CD-ROM assembly system. There are two cables that connect the drive to the mainboard. One is a delicate ribbon cable, and the other is a pair of twisted core wire. Both cables simply unplug by pulling on them, but be careful not to tear the ribbon cable (grab this one from the white pull-tab as close as possible to the header it plugs into).

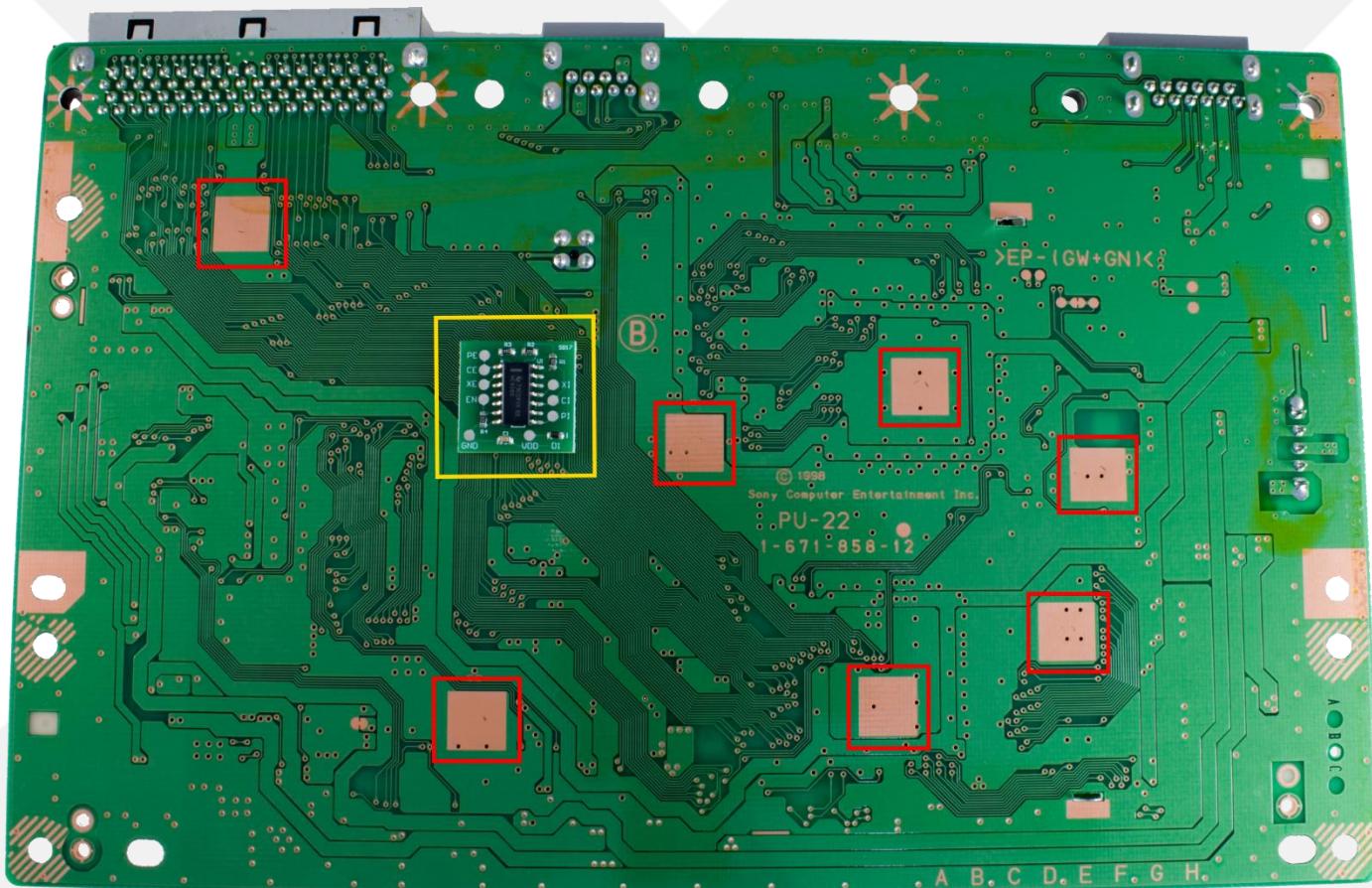
Depending on your PlayStation model, each system disassembles differently from here on in, but the next step is essentially removing the metal chassis.

Once you have removed all the screws from the steel chassis, it should now lift of freely, exposing the bare mainboard.

Next, begin removing the rest of the screws holding the mainboard to the bottom half of the plastic case. Keep in mind that when reassembling your console that the screws go back in a certain method as some are left blank for the steel chassis to mount though.

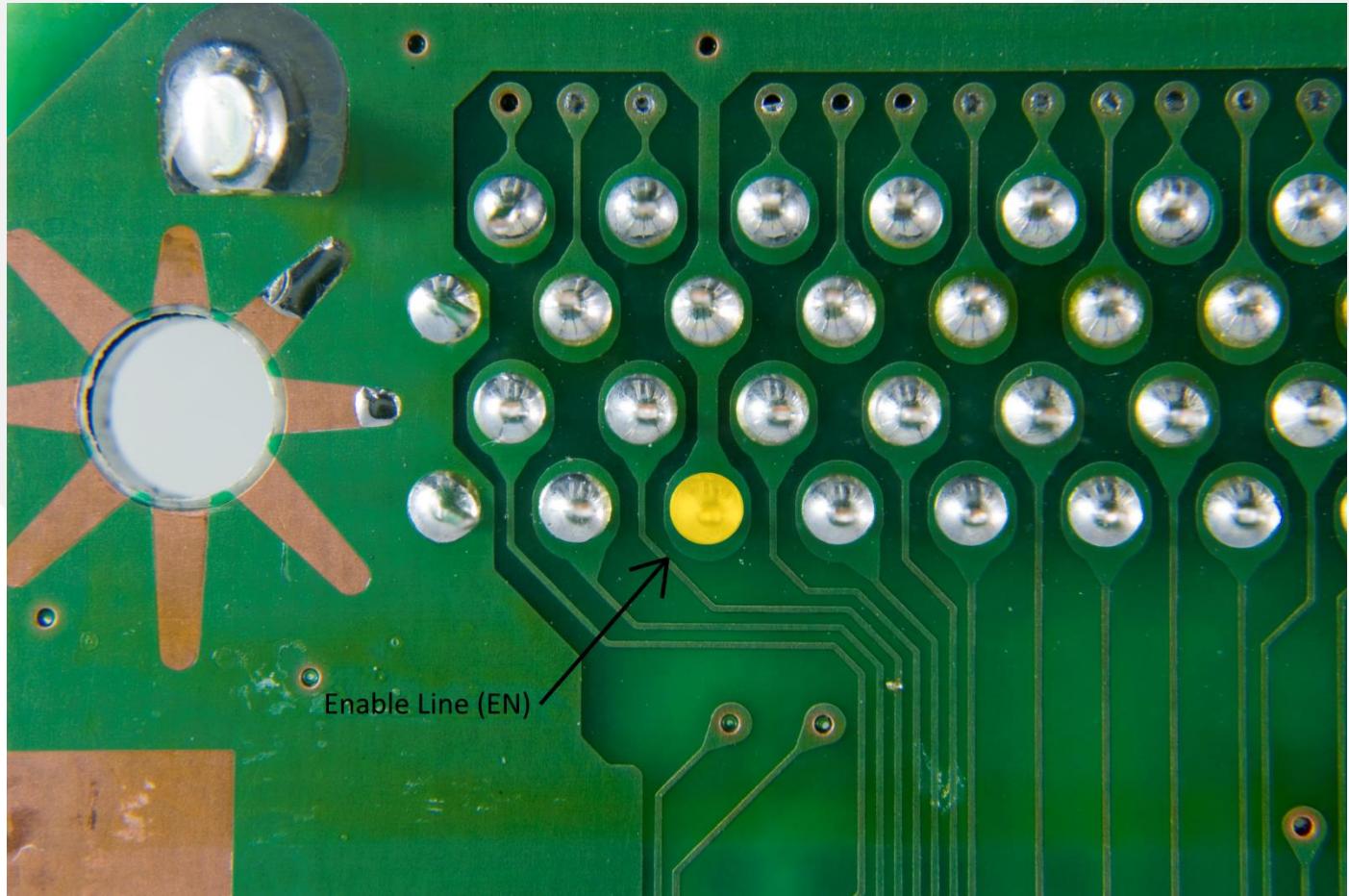
Once you have the board out of the console, flip it over to show the bottom layer of the PCB (as seen in the image below). Next, carefully peel off the double-sided tape on the back of the Switch Board, and adhere it to the seen location marked in **yellow** below. Do not place it anywhere besides the specified area, and ensure that you have the Switch Board orientated in the correct position before sticking it down to the mainboard. Ensure the Switch Board is adhered well by giving it a slight push downwards so it will not fall off and short itself against the steel/metal chassis that is housed under the PlayStation mainboard. Do not push too hard though as the mainboard will flex and cause damage to the integrated circuits.

As a word of warning, do not run any wires across or over the points marked in **red** either. These are ground posts that the mainboard will reset on when placed back into the shell. The reason being is that these ground points contact with a steel plate in the PlayStations grounding/RF (Radio Frequency) shielding/chassis design.

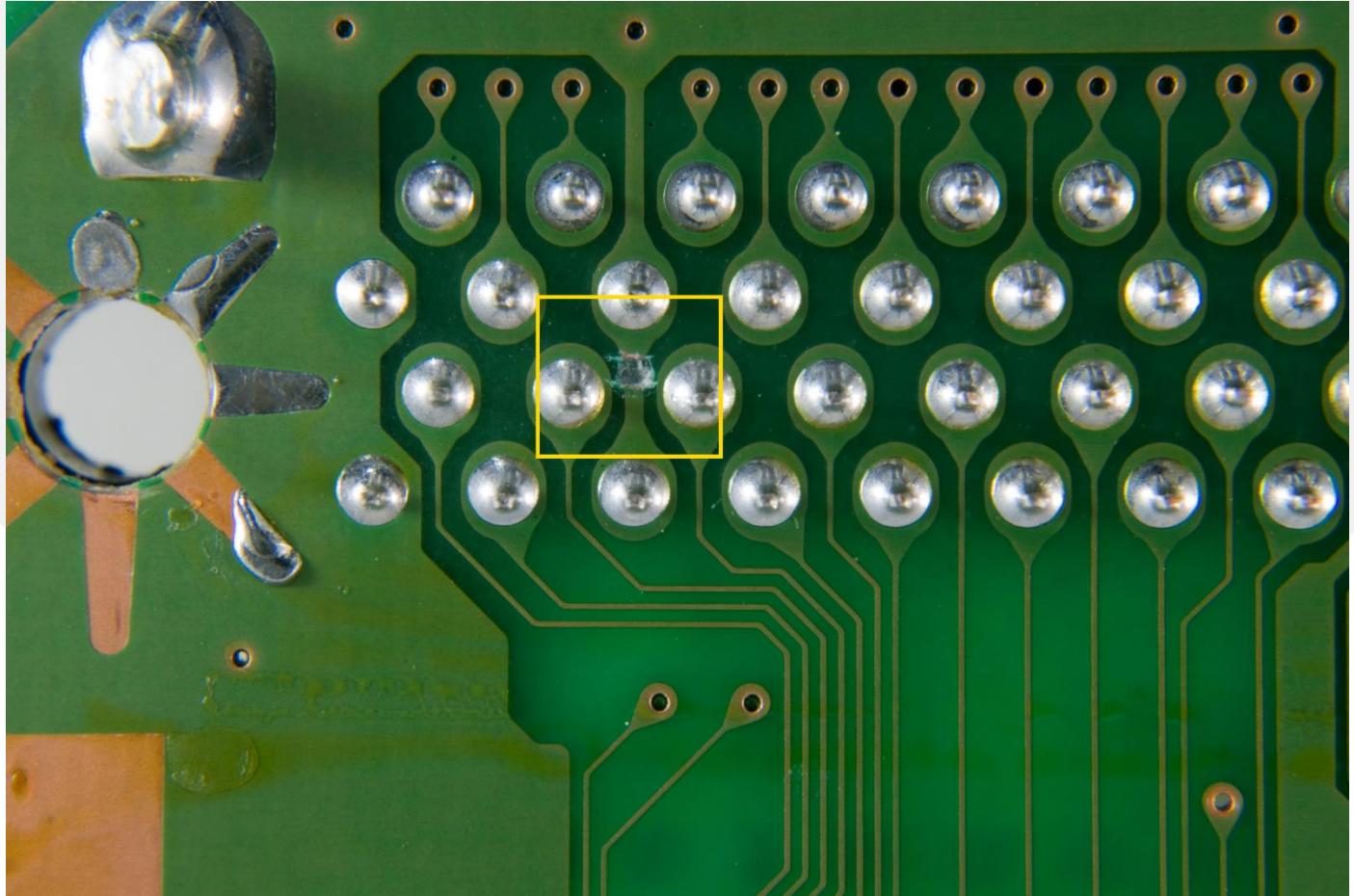


The next stage is to cut a trace on the Parallel Port. It is known as Pin 5 and it is a Ground pin, but it must be used redirected instead for the Switch Boards “EN” (Enable) line.

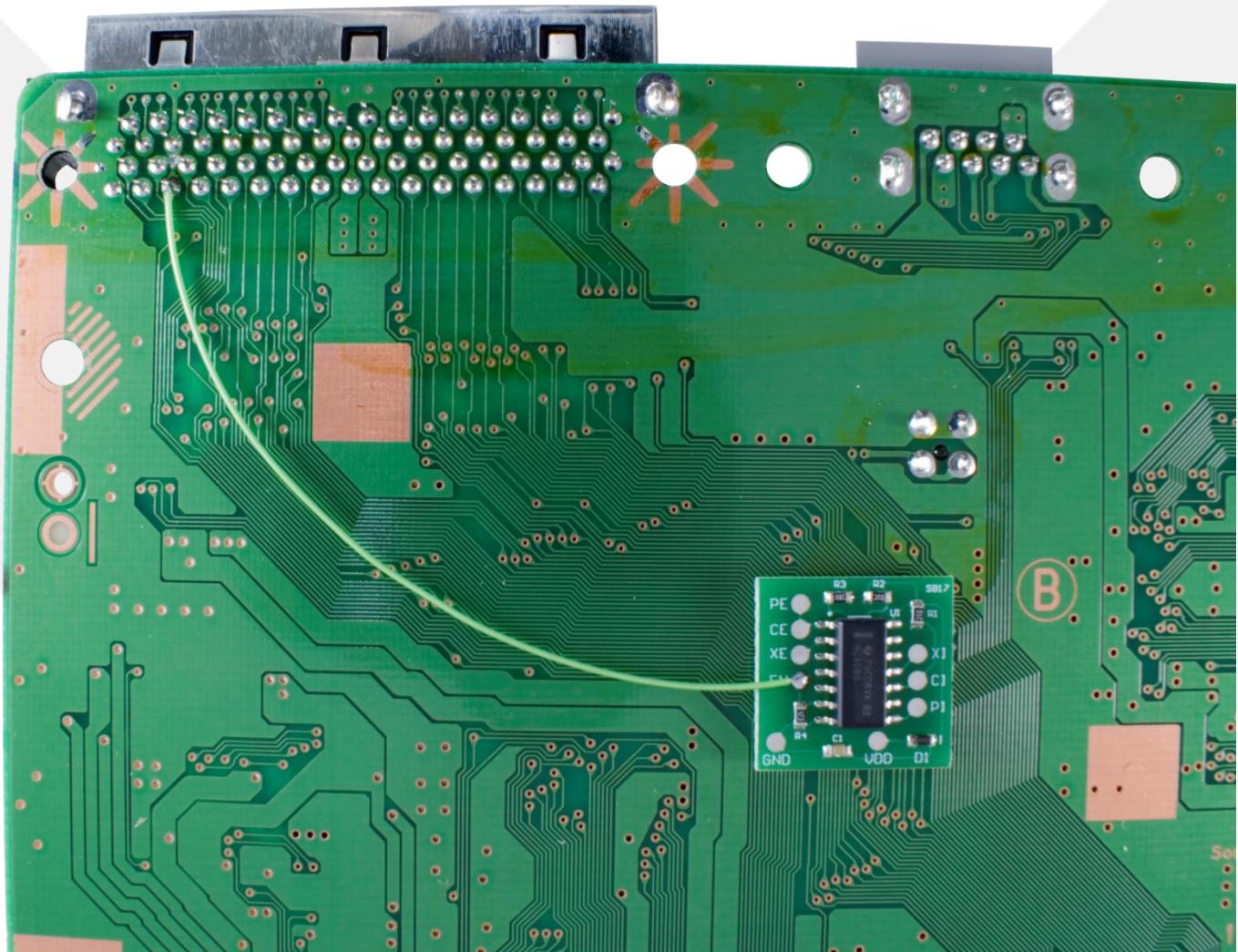
Here is a photo of the parallel port and the pin we will be focusing on.



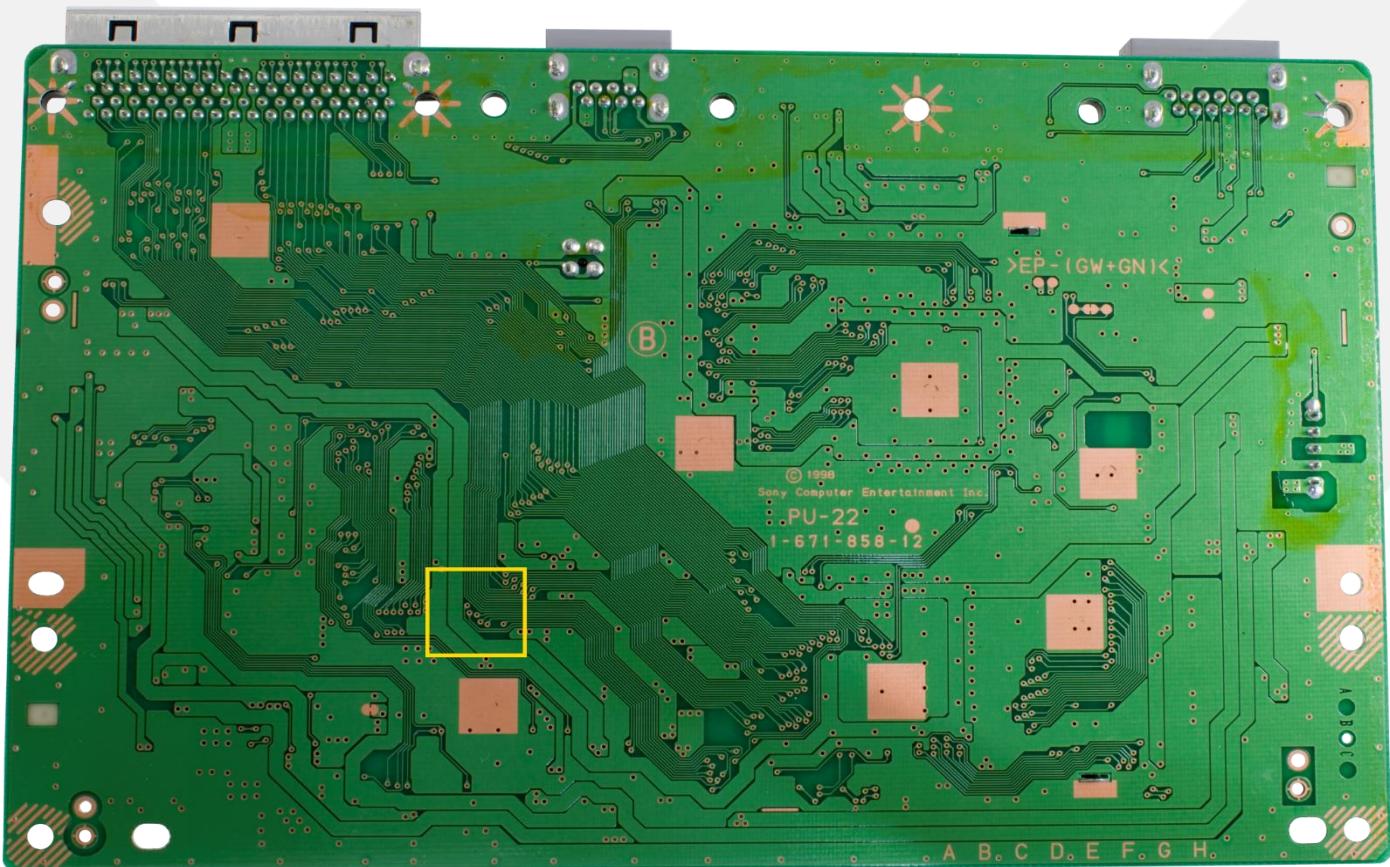
In order to isolate pin 5, we need to cut through the trace as seen in the photo below.



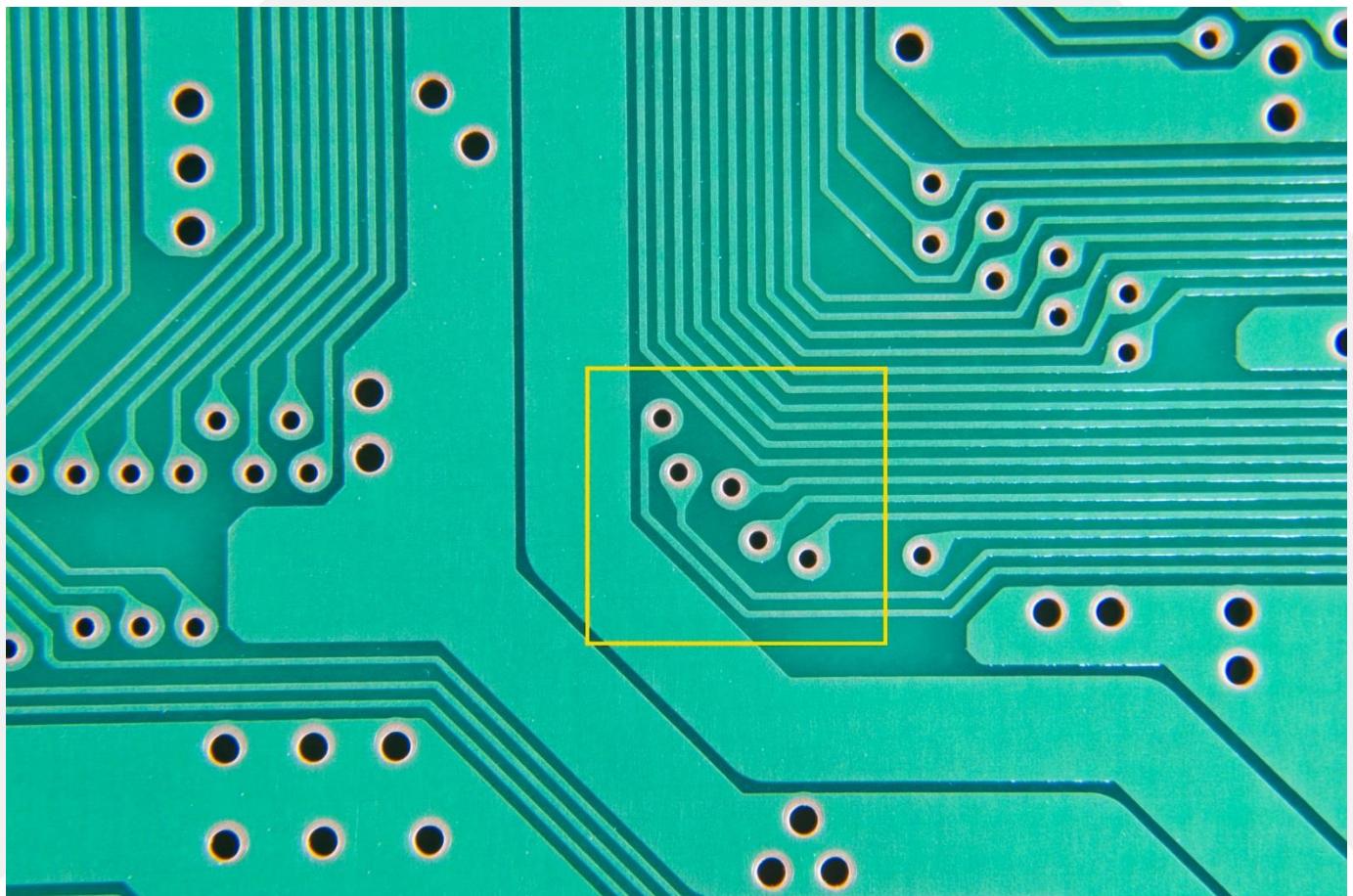
Finally, solder Pin 5 to the “EN” line on the Switch Board to the pin that was marked in yellow in the above image on the parallel port.



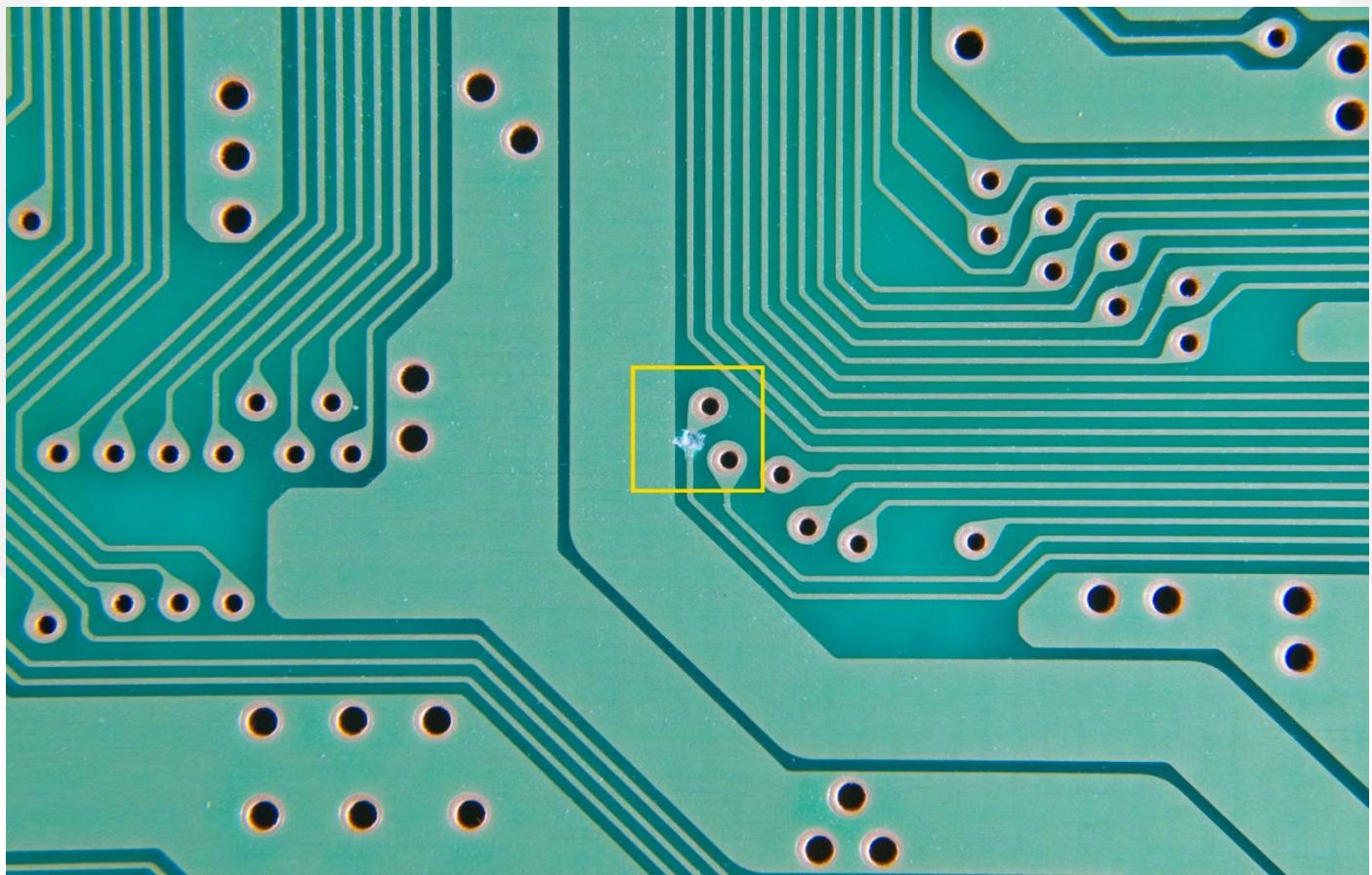
The next trace cut is more difficult. The pin that needs to be cut here is the CD-ROM 'Chip Select' (CS by pin 103) trace. The other pin called CD-ROM 'Interrupt' (INT by pin 117) does not need to be cut however. These vias might take you a while at first to locate on the mainboard, but here is an image marking the area in yellow on where focus on so you know exactly where to find it.



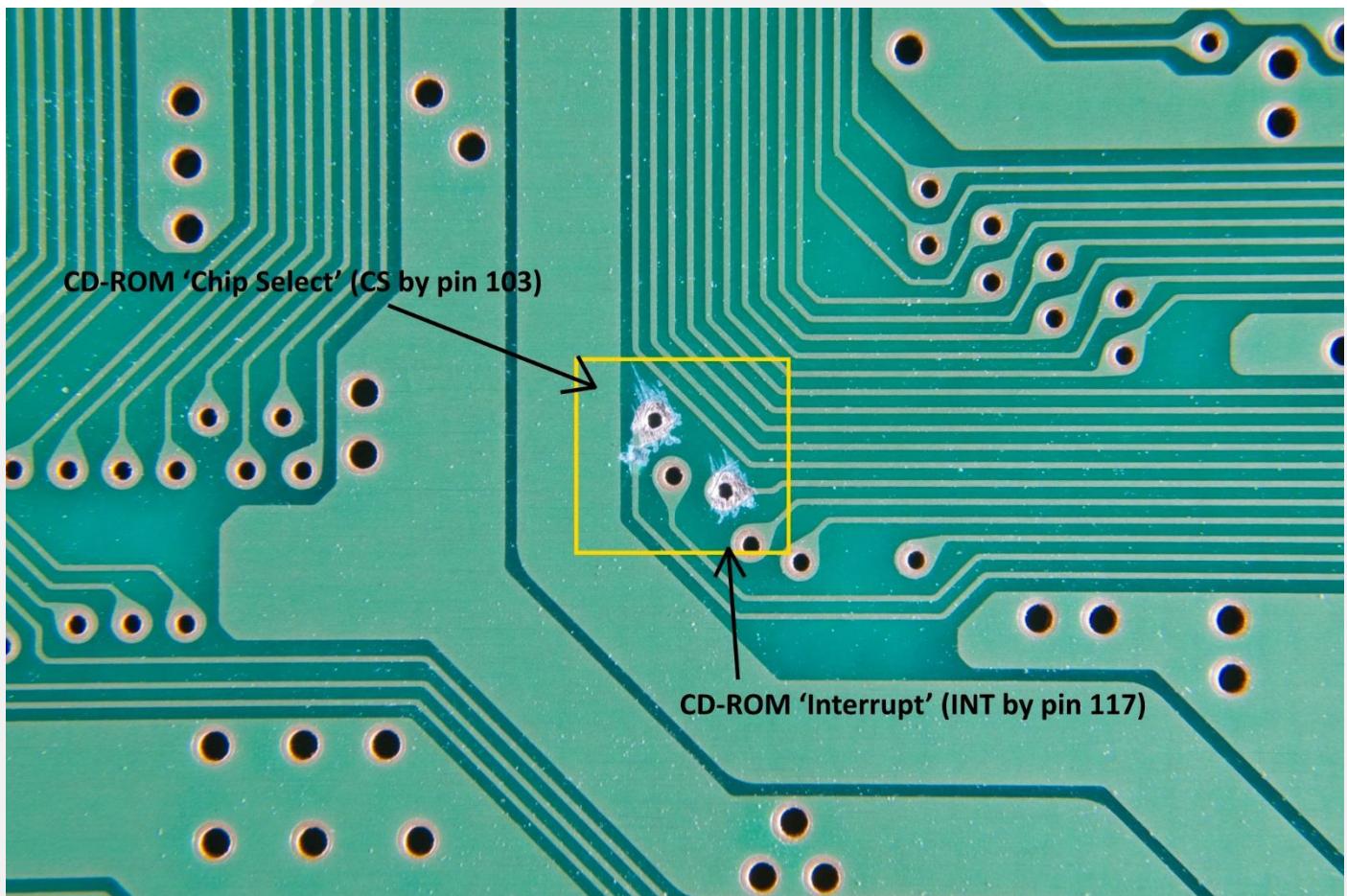
And here is a close-up of the selected area.



You must now carefully cut the CD-ROM 'Chip Select' (CS by pin 103) trace.

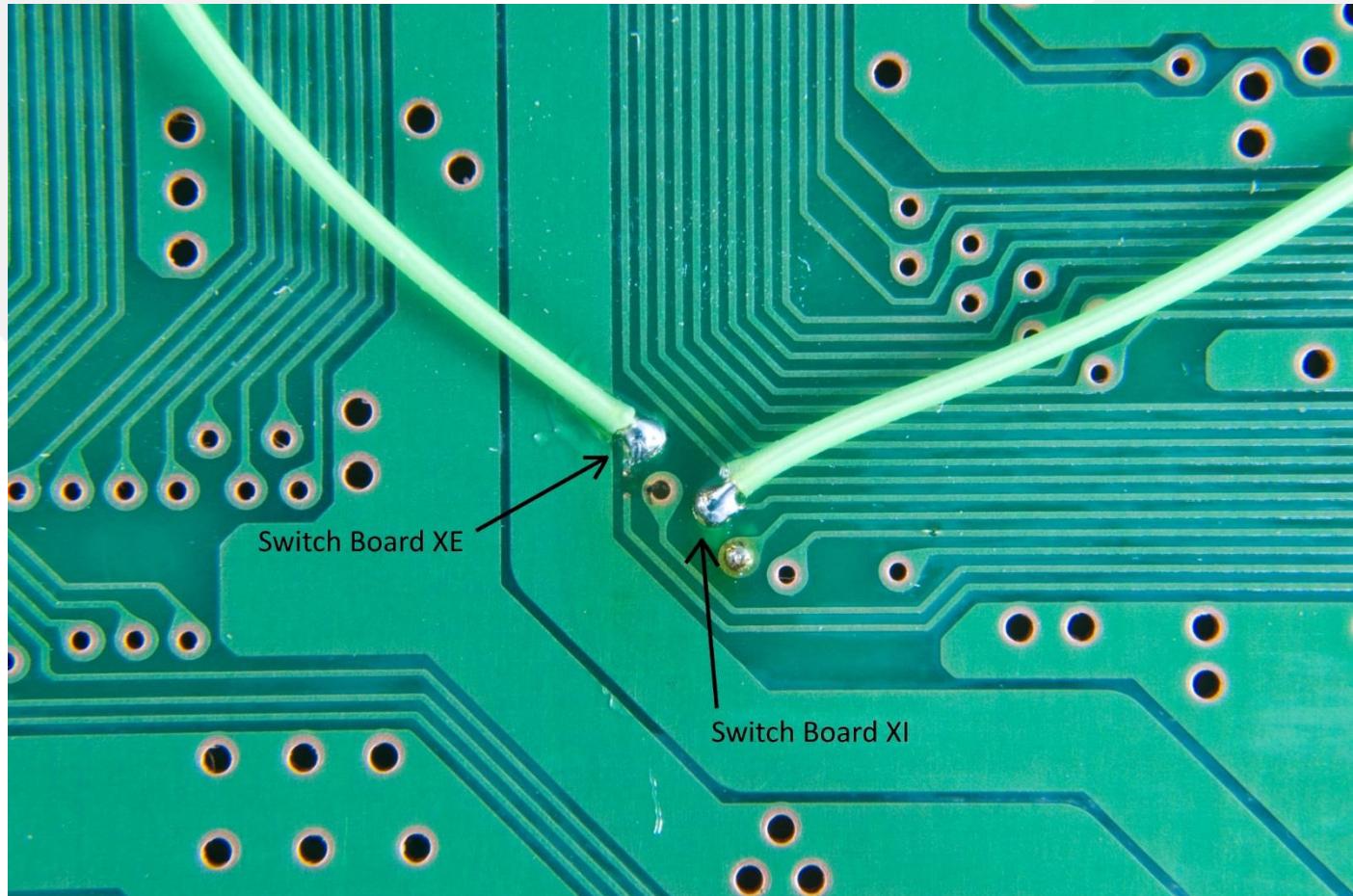


Then, scrape away the solder mask on the CD-ROM 'Chip Select' (CS by pin 103) via which you just cut as well as the CD-ROM 'Interrupt' (INT by pin 117) via so that the copper on the vias is exposed.

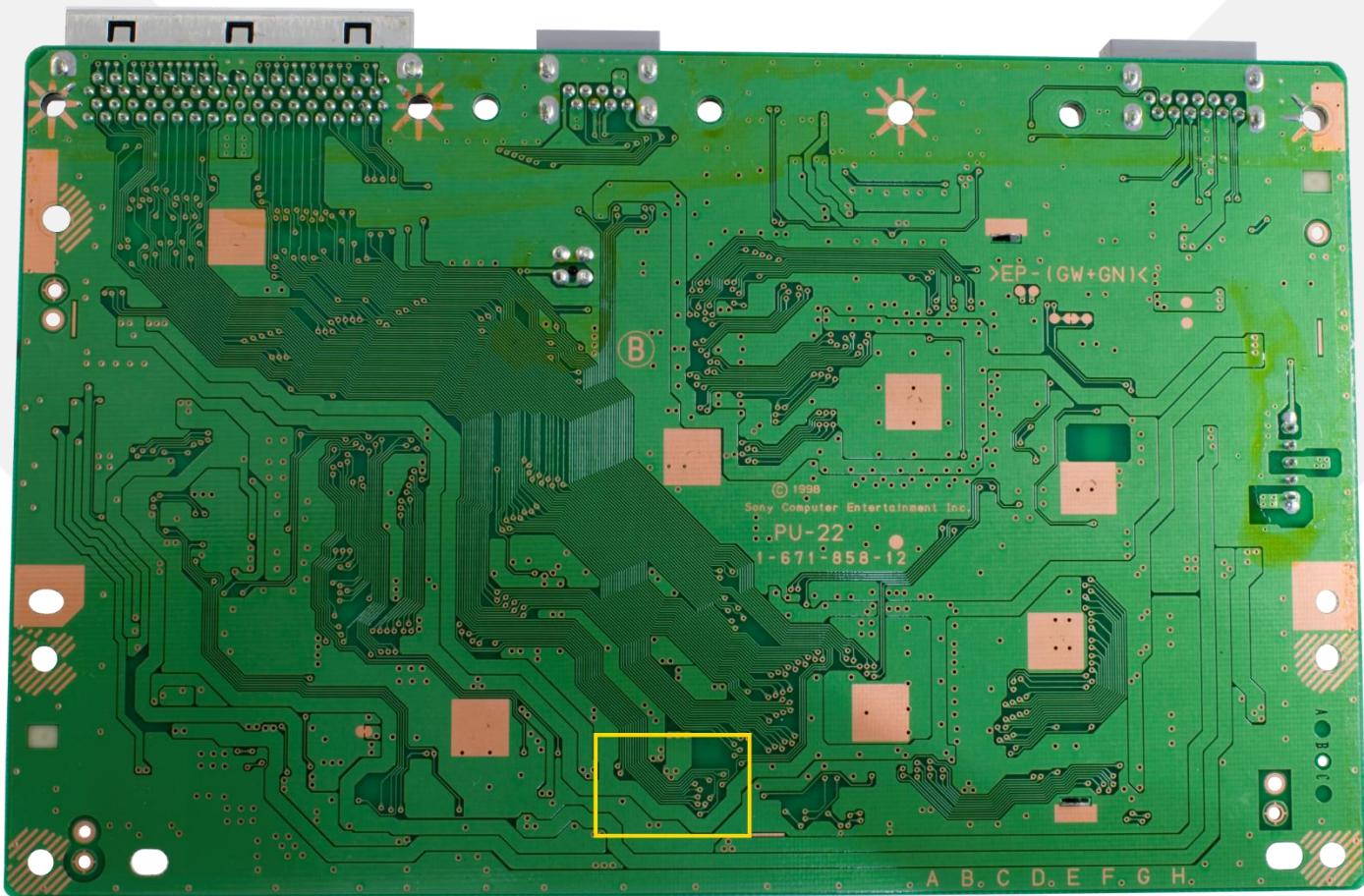


Next, solder the wires to the vias one at a time to and from the Switch Board accordingly. Ensure that you do not put any strain on the wires as they can rip off of the mainboard. Also, take care to not heat the vias too much as this will also make them rip off of the mainboard (it is advisable to check your soldering iron temperature at this stage before attempting to solder). Also, be sure to use flux if needed to ensure good adhesion to the mainboard vias.

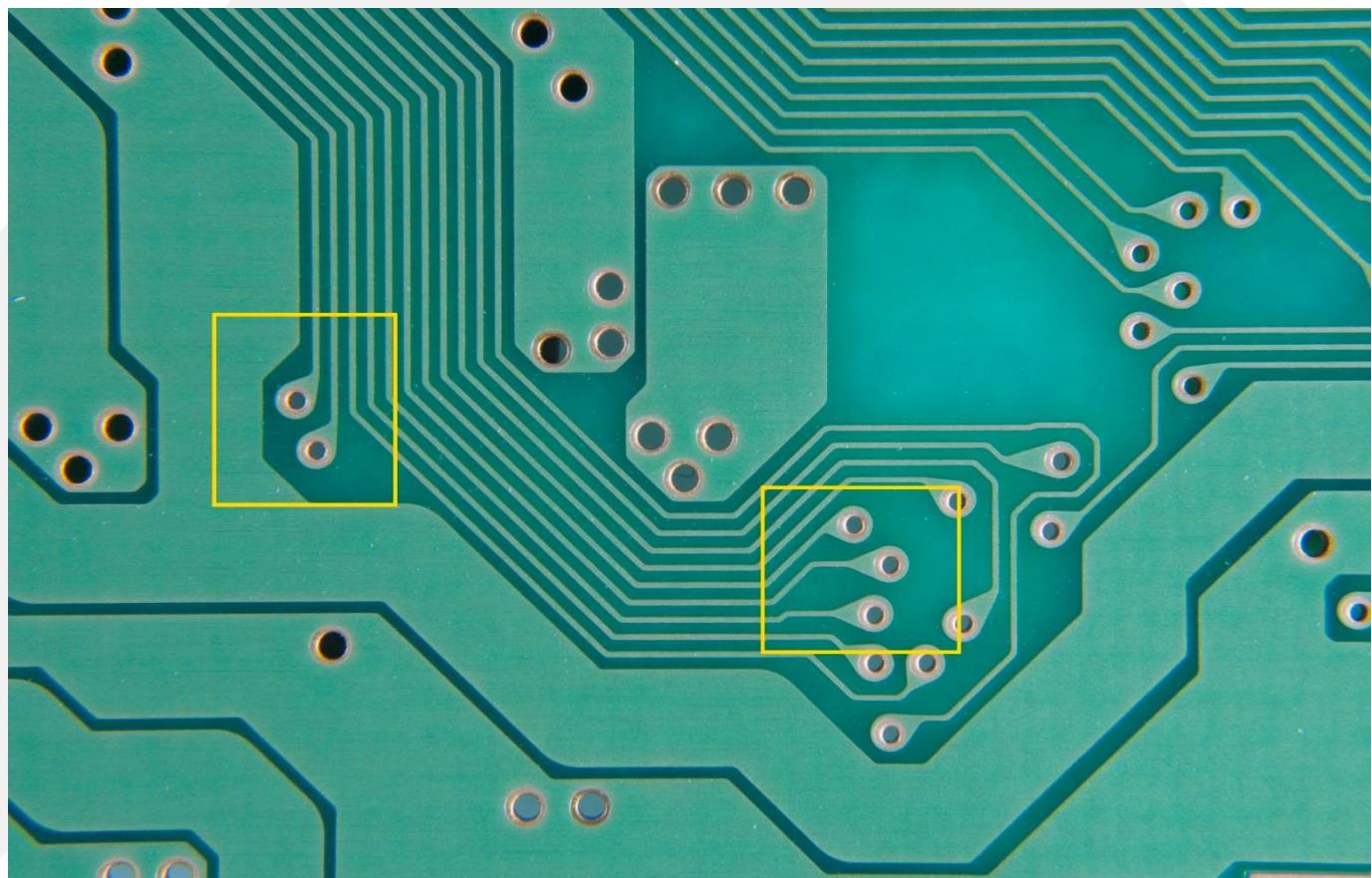
The points of where to solder to the Switch Board are marked in the image below in black writing.



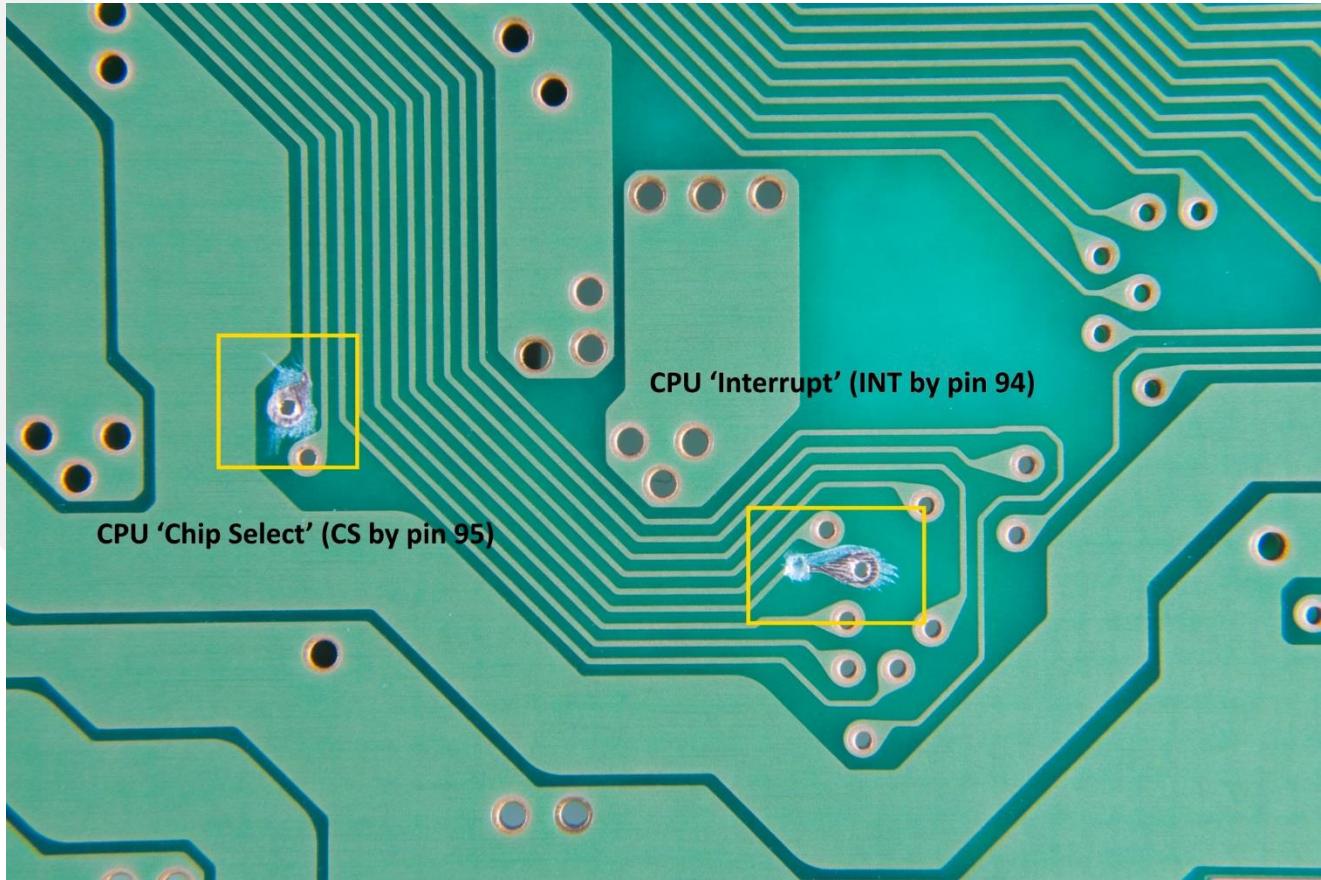
The next trace cut is a little easier. The pin that needs to be cut here is the CPU 'Chip Select' (CS by pin 95) trace. The other pin called CPU 'Interrupt' (INT by pin 94) does not need to be cut however. These vias might take you a while at first to locate on the mainboard, but here is another image marking the area in yellow on where focus on so you know exactly where to find it.



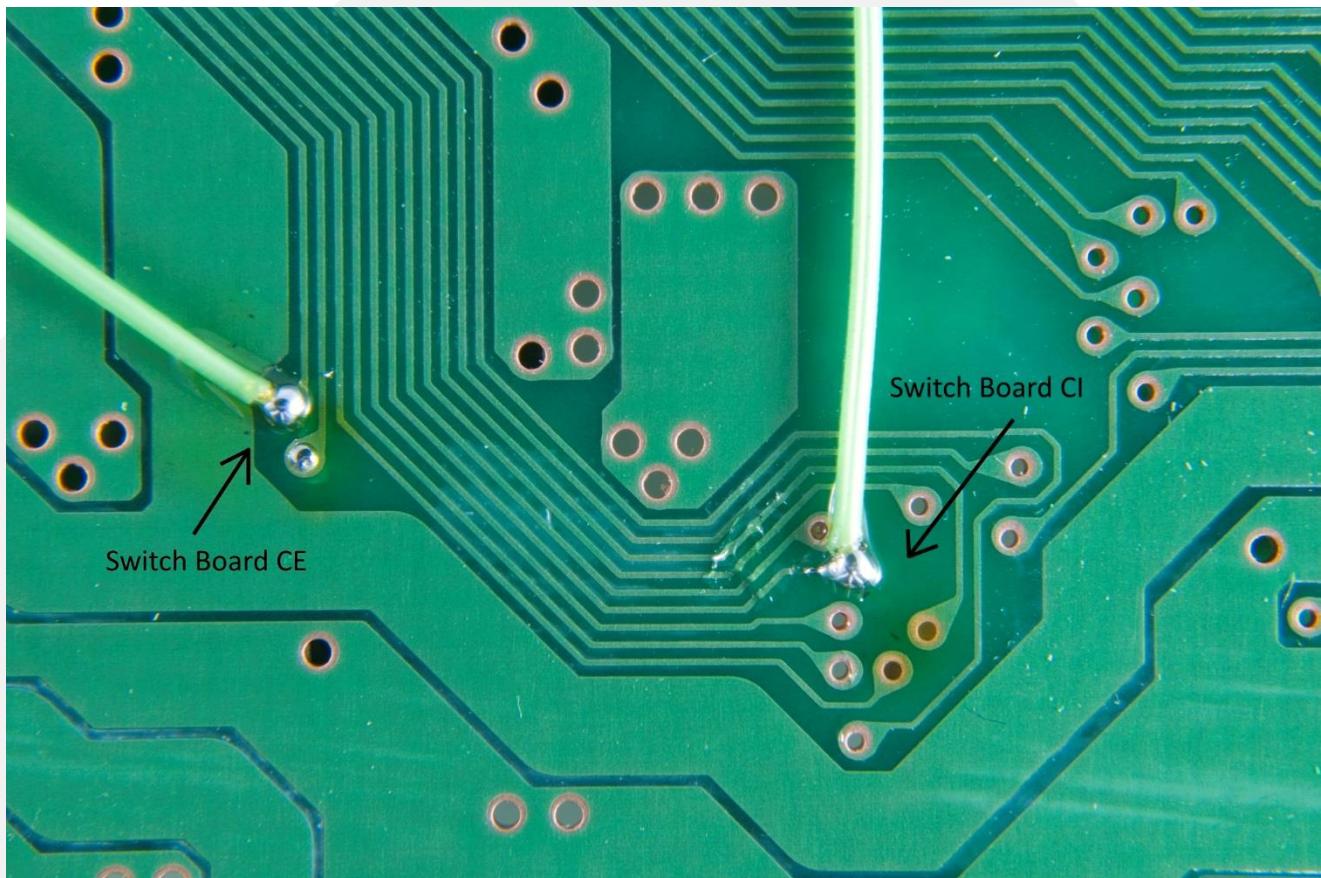
And here is a close-up of the selected area.



You must now carefully cut the CPU 'Interrupt' (INT by pin 94) trace. Once done, scrap away the soldermask on both vias, including CPU 'Chip Select' (CS by pin 95).

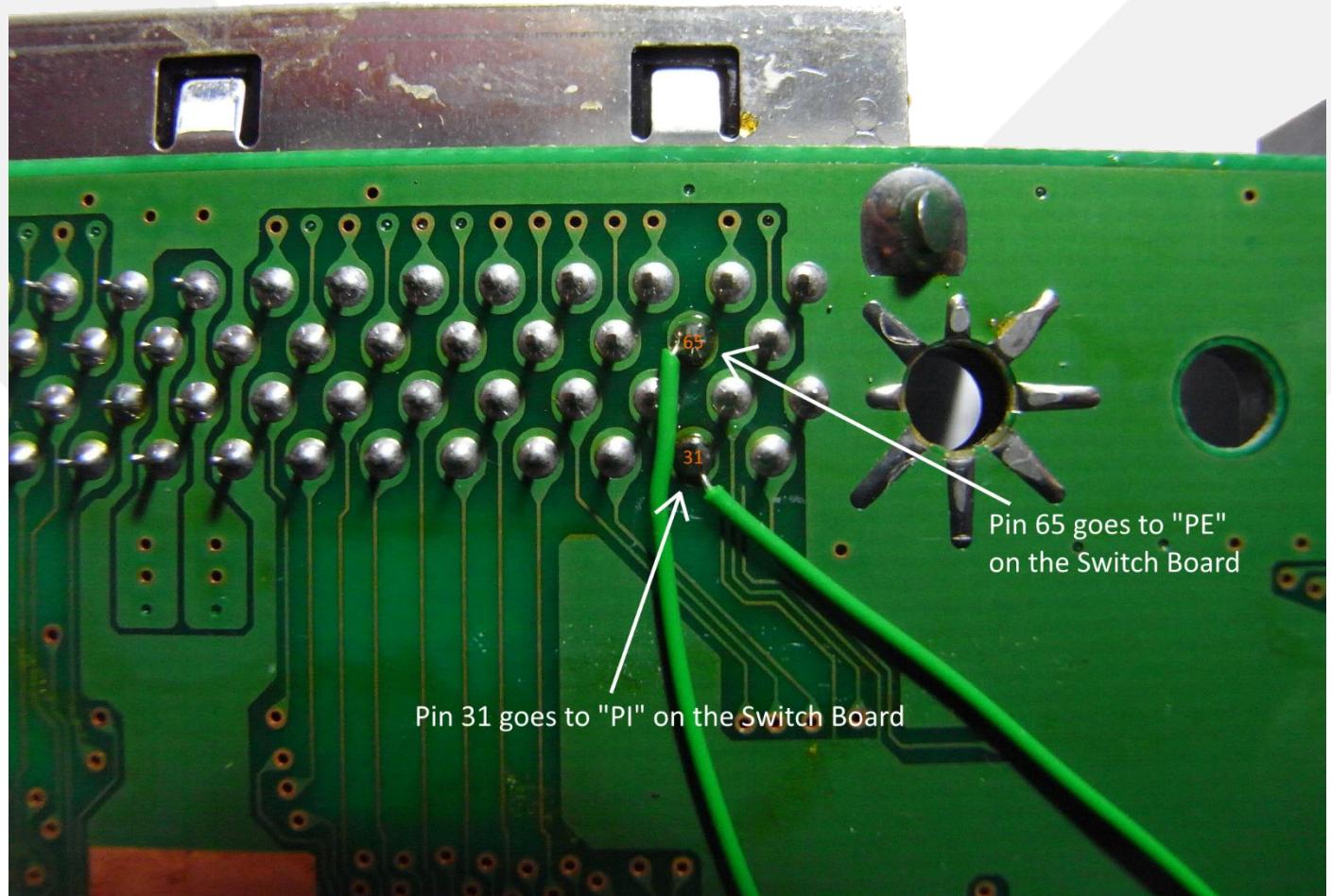


And like before, solder the wires to the vias one at a time to and from the Switch Board accordingly.

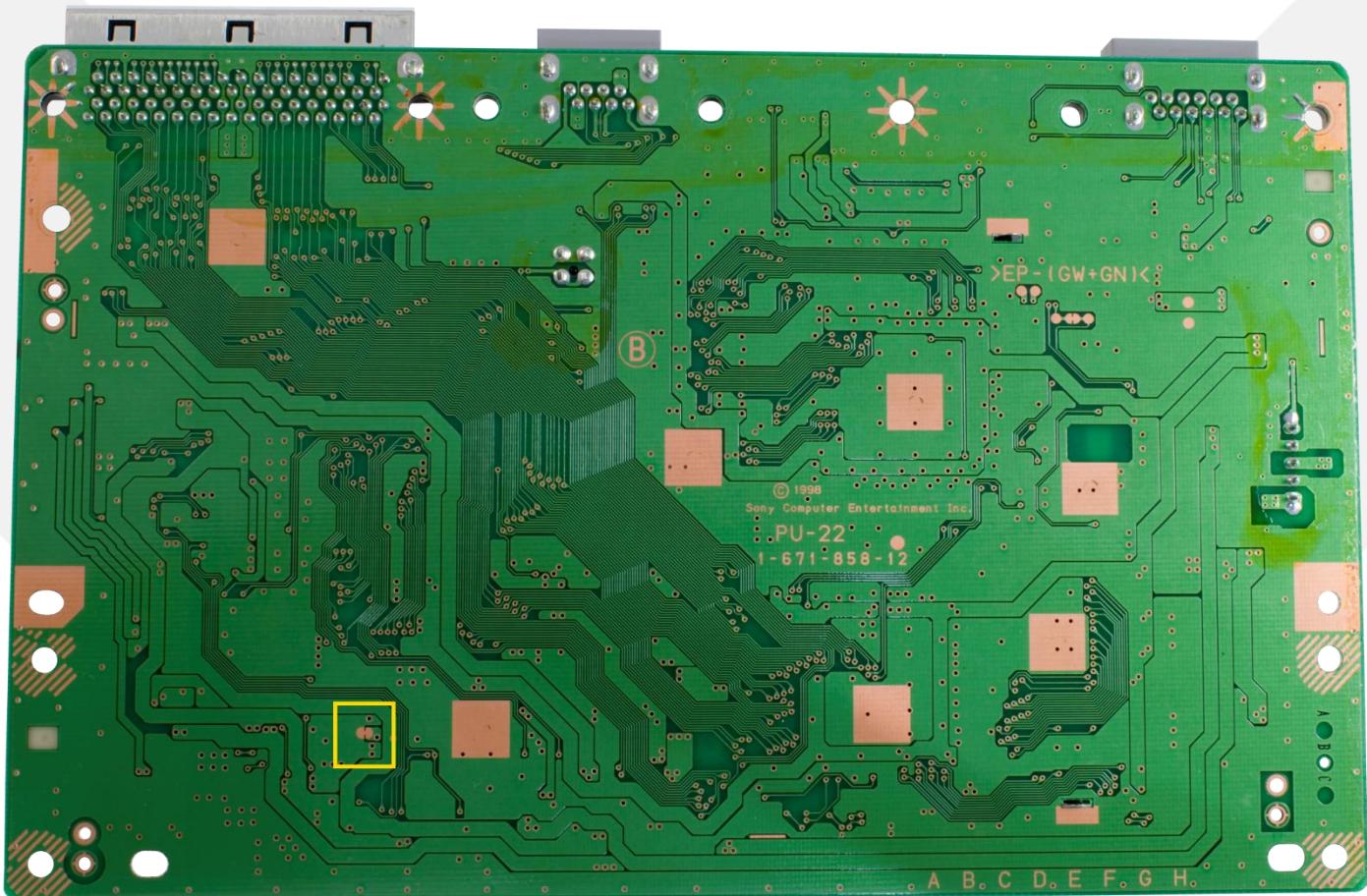


The next two (2) pins to solder are pins 65 and 31 on the Parallel I/O Port. There are no trace cuts needed in this step.

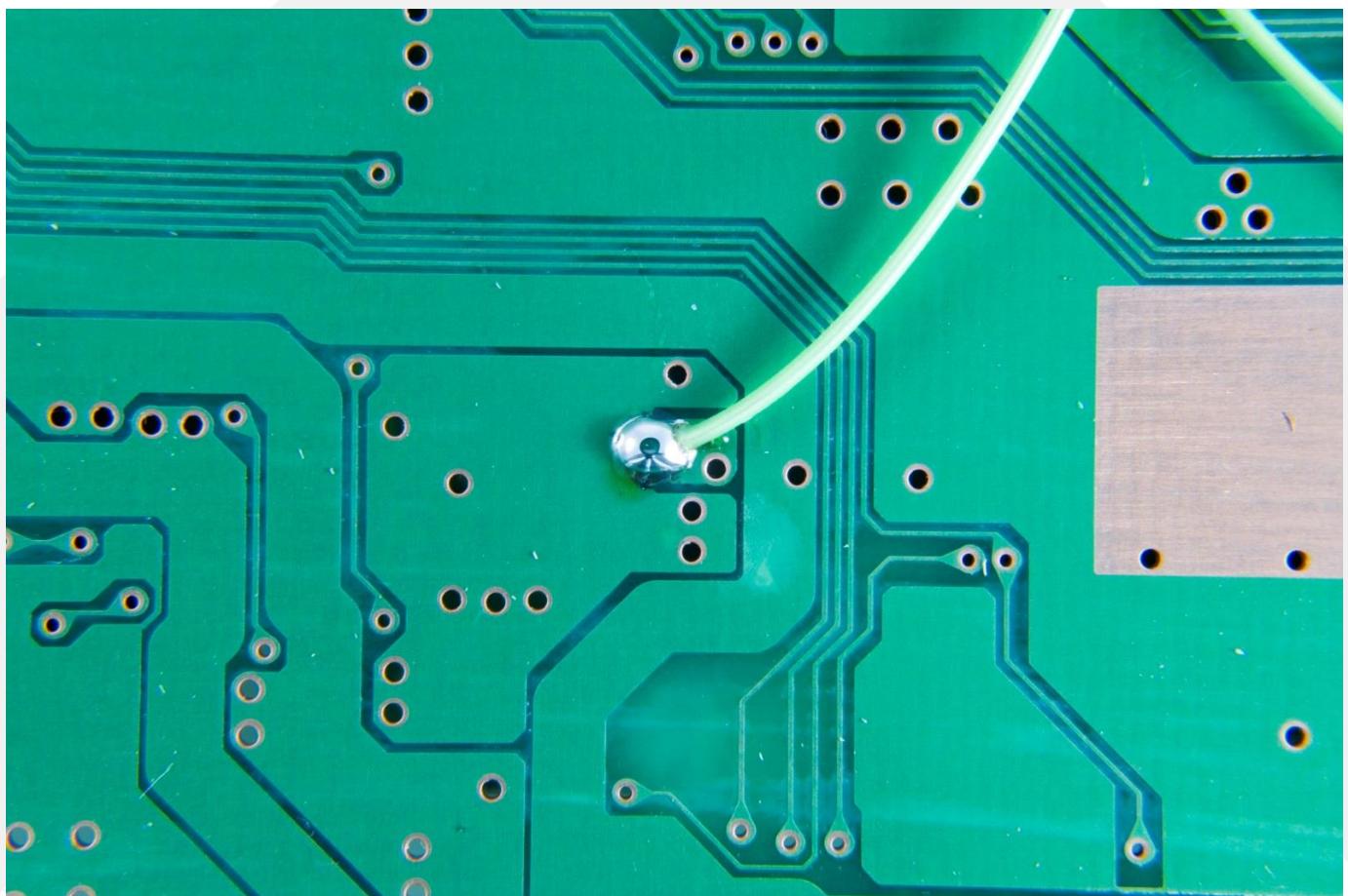
Pin 65 goes to "PE" on the Switch Board and pin 31 goes to "PI" on the Switch Board.



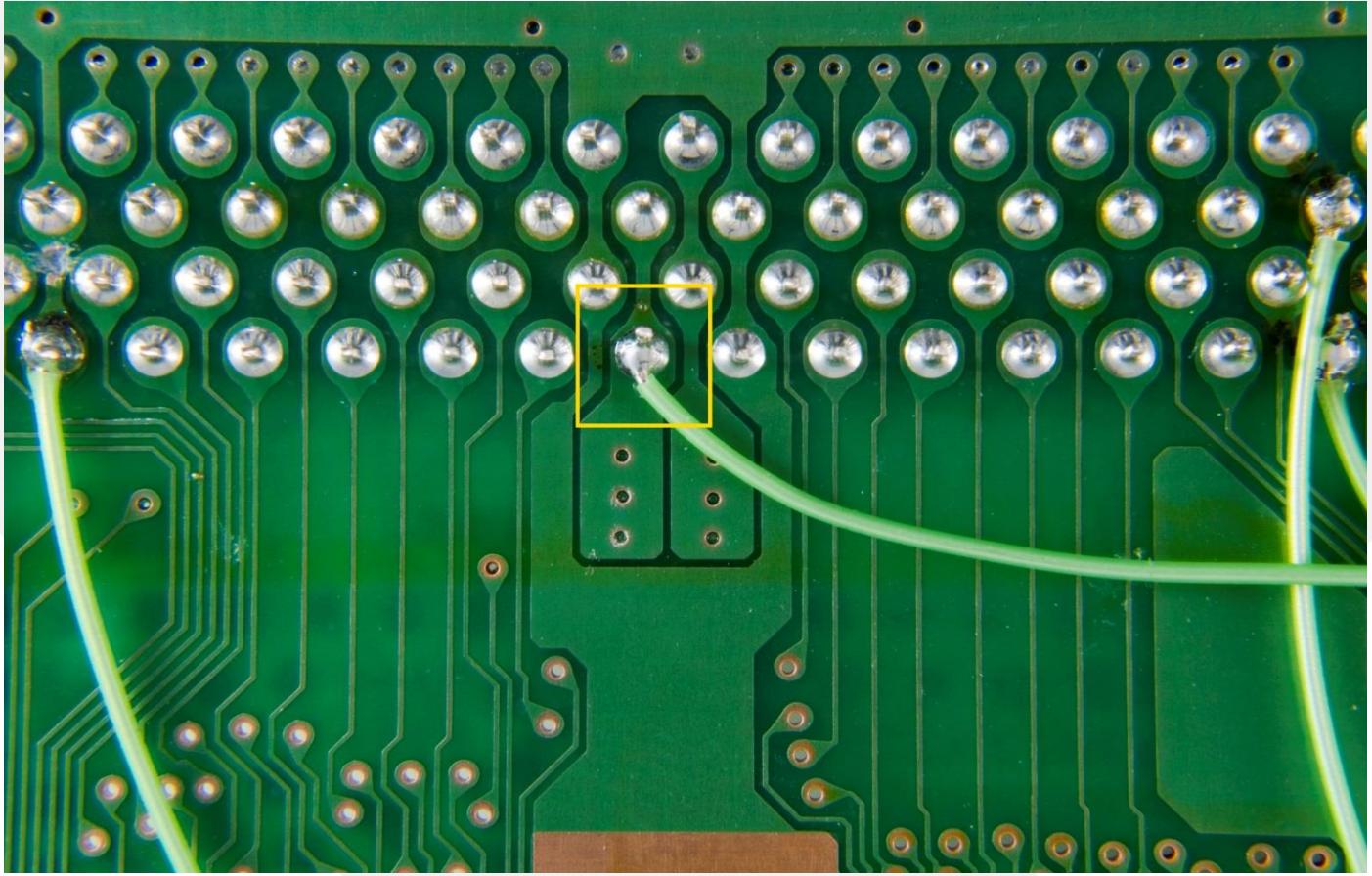
Lastly, the power connections are required. First we will solder the ground. It is located here on the mainboard.



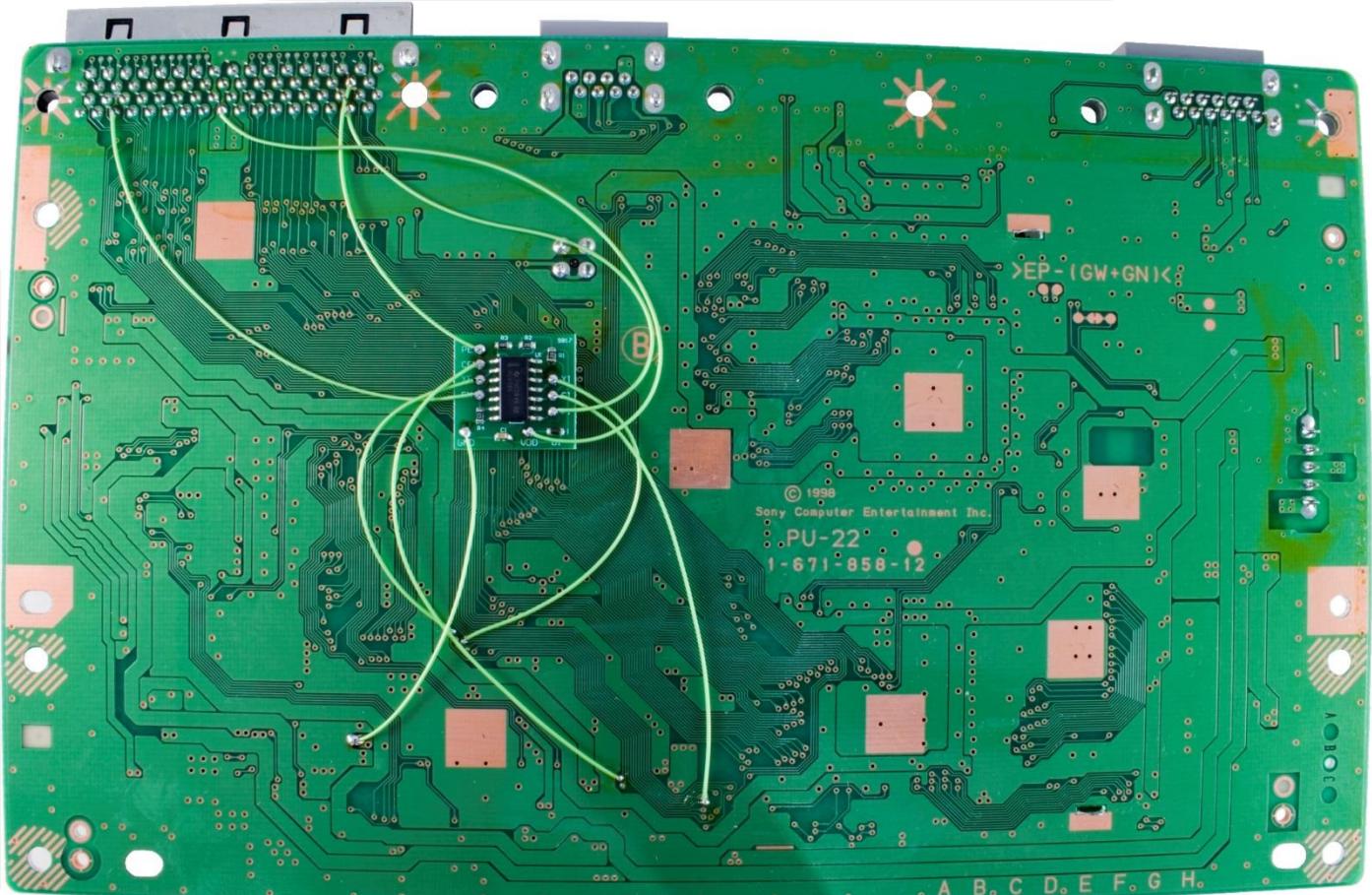
Solder this to the pad marked “GND” on your Switch Board.



And finally, solder the 3.3V connection from the Parallel I/O Port to the “VDD” pad on your Switch Board. Do **not** get this pin mixed up or else you will fry your Switch Board.



Congratulations! You have successfully modified your PlayStation with a Switch Board. This is what your installation should look like. **Triple check this photo with your work to verify your wiring is correct.**



As a warning, we suggest that you check for shorts on the Ground (GND) and 3.3 Volt (VDD) rails using your Multi-Meter (continuity tester). If you do not check and there is a short, you will blow a fuse on your PlayStation mainboard and it will be required to be replaced.

With that being said, you may now re-assemble your console and test CD-ROM loading without a PSIO cartridge plugged in. Once verified working, you may then test PSIO by having the cartridge plugged in.

When booting with the PSIO cartridge however, ensure that an SD Card with "MENU.SYS" is present, otherwise you will have no way of seeing a visual output from your PSIO cartridge indicating that it is in fact booting and working.

Remember to always turn off your PlayStation before unplugging and inserting a PSIO cartridge. Don't forget to also adhere the included "Switch Board Sticker" to the back of your PlayStation case.

2-0: Specifications:

[2-1: Hardware]

The Switch Board is open source, and simply consists of a 4066 bilateral switch and a few passive components. The schematic may be seen below.

If you require a replacement or would like to buy more Switch Boards for installation in more PlayStation consoles to use PSIO on, please see our 'Store' to purchase more completed boards.

