PSIO

Switch Board Installation Guide
Revision 1.2

PlayStation Mainboard [PU-20]

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-20]** 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:

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 good tip!),
-   Solder (preferably flux cored 60/40),
-   Flux (optional),
-   10x Magnification Jewellers Microscope/Loop (optional),
-   Phillips Screwdriver,
-   A Multimeter (for Continuity Testing),
-   A sharp 'hobby' knife (EG: X-Acto), and
-   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 connections, including most importantly, the main power cable (AC).

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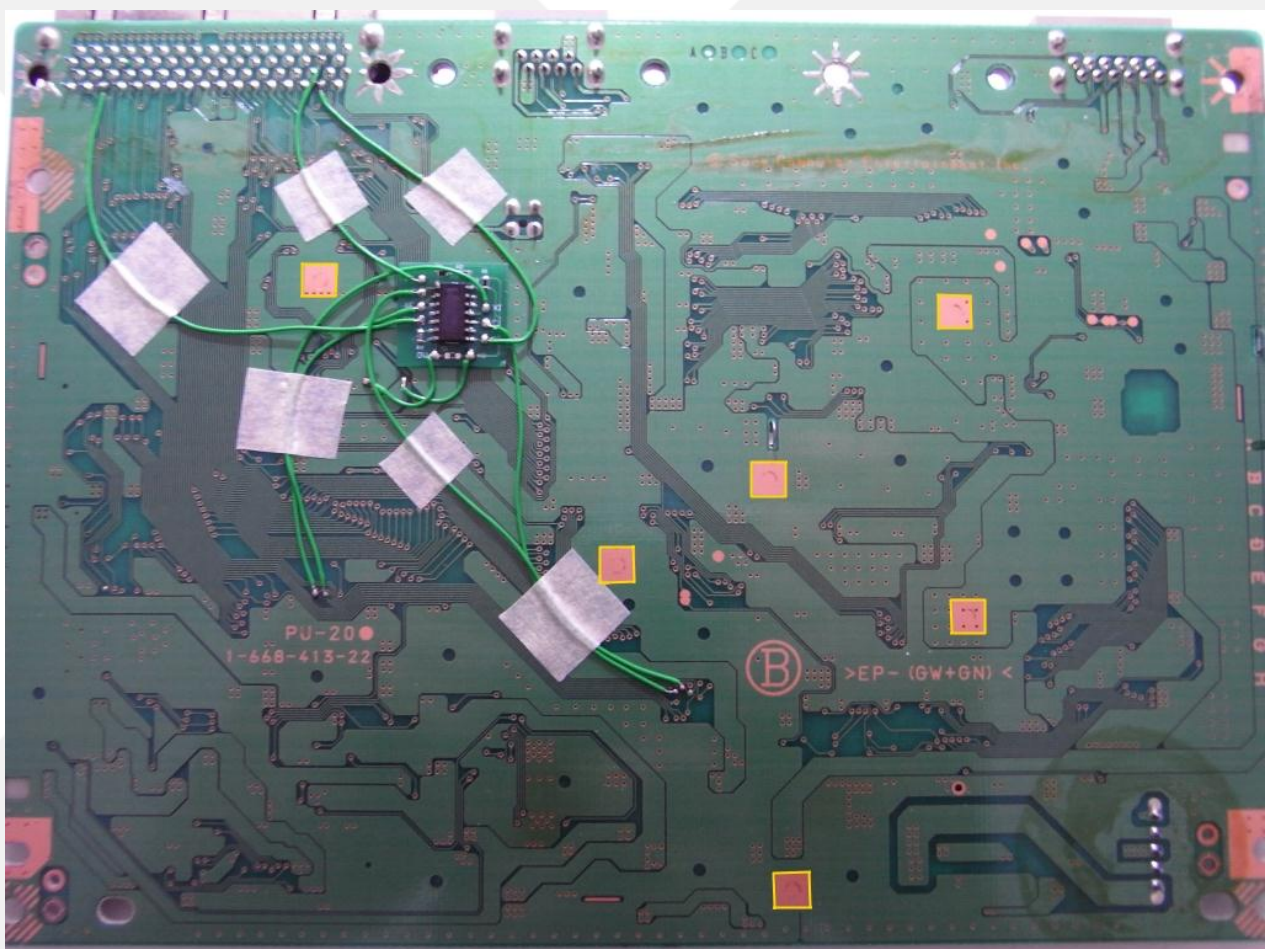
Depending on your PlayStation model, each system disassembles differently from here on in, but the next step is essentially removing the metal chassis.

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.
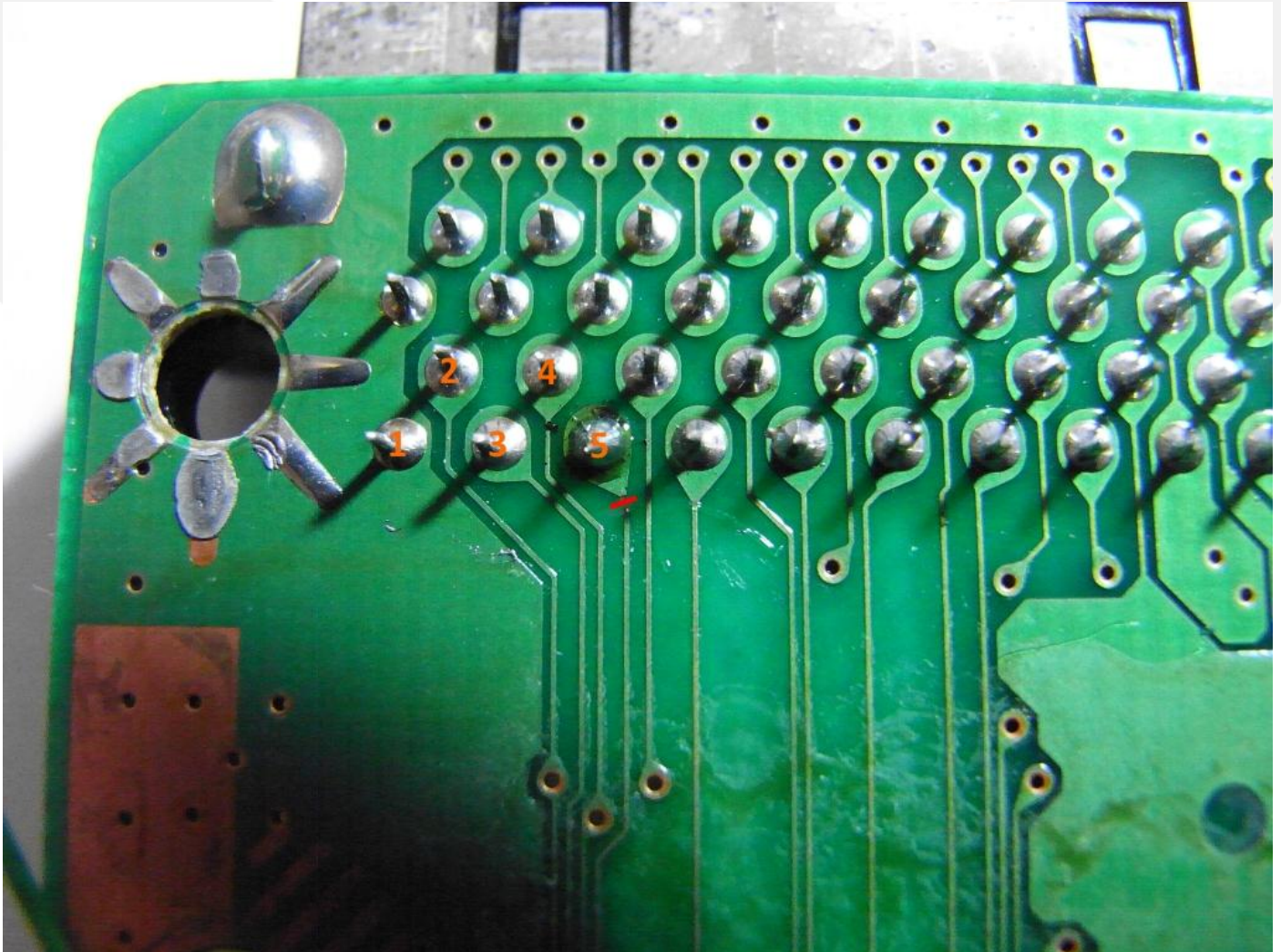
Once you have the board out of the console, flip it over to show the bottom layer of the PCB (as seen in the image below). Next, carefully peel off the double-sided tape on the back of the Switch Board, and adhere it to the seen location marked in red below. Do not place it anywhere besides the specified area, and ensure that you have the Switch Board orientated in the correct position before securing it. Ensure the Switch Board is adhered well and it will not fall off and short itself against the steel/metal chassis that is housed under the PlayStation mainboard.

As a word of warning, do not run any wires across or over the points marked in yellow. These are ground posts where the mainboard will reset on. The 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 instead for the Switch Boards "EN" (Enable) line.
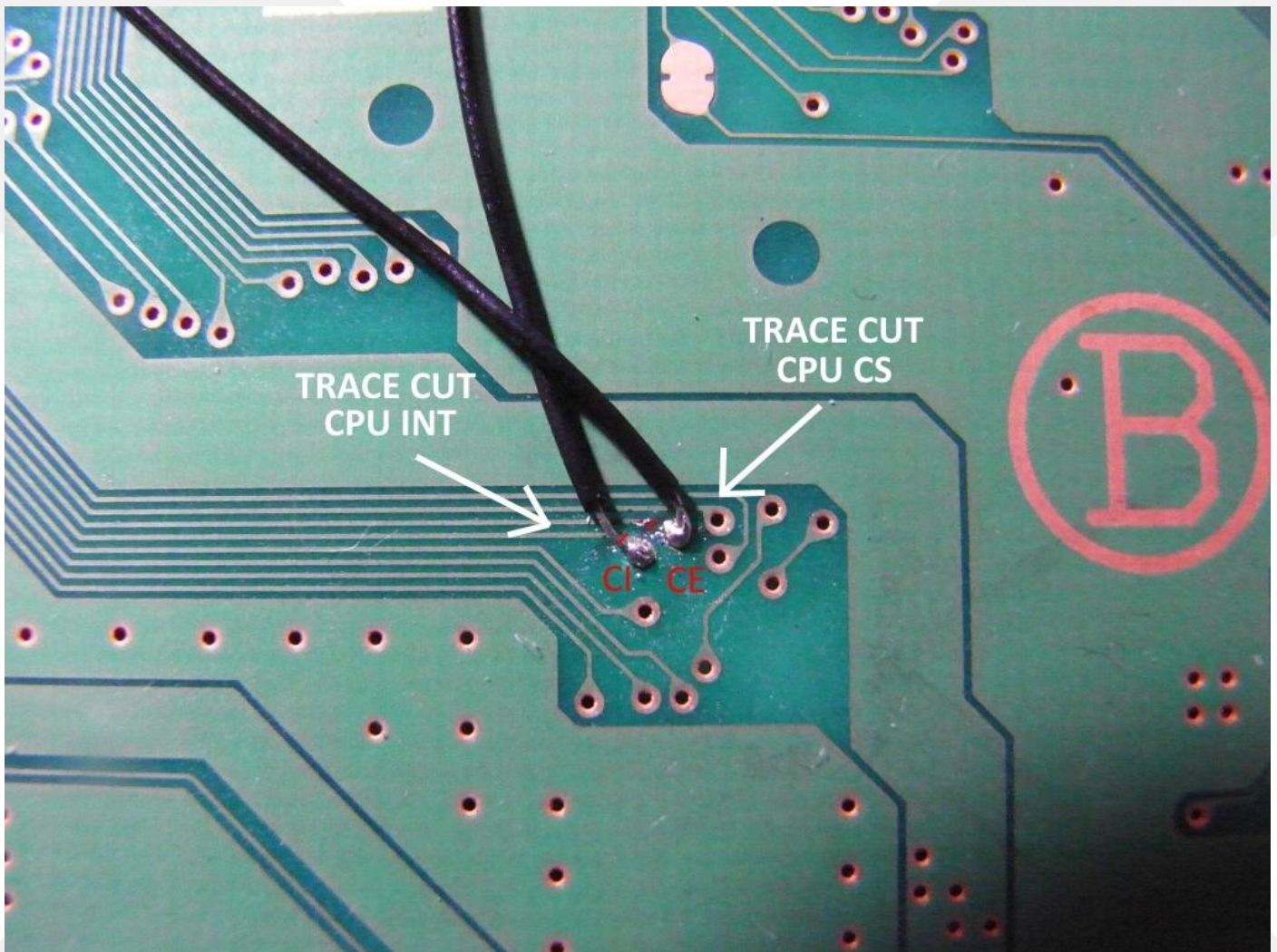
Cut through the marked point in red to isolate Pin 5.
Solder Pin 5 to the "EN" line on the Switch Board.

The next two trace cuts are more difficult. They are known as the 'CPU INT' and 'CPU CS' lines.
They might take you a while at first to locate on the mainboard, but take your time and don't rush.

You must cut the two traces where the red lines are marked in the photo below. You must also carefully scrape away the solder mask on the vias so that the copper on the via is exposed and solderable.

When you have soldered wires to the vias, ensure that you do not put any strain on any on them as they can rip off of the mainboard.
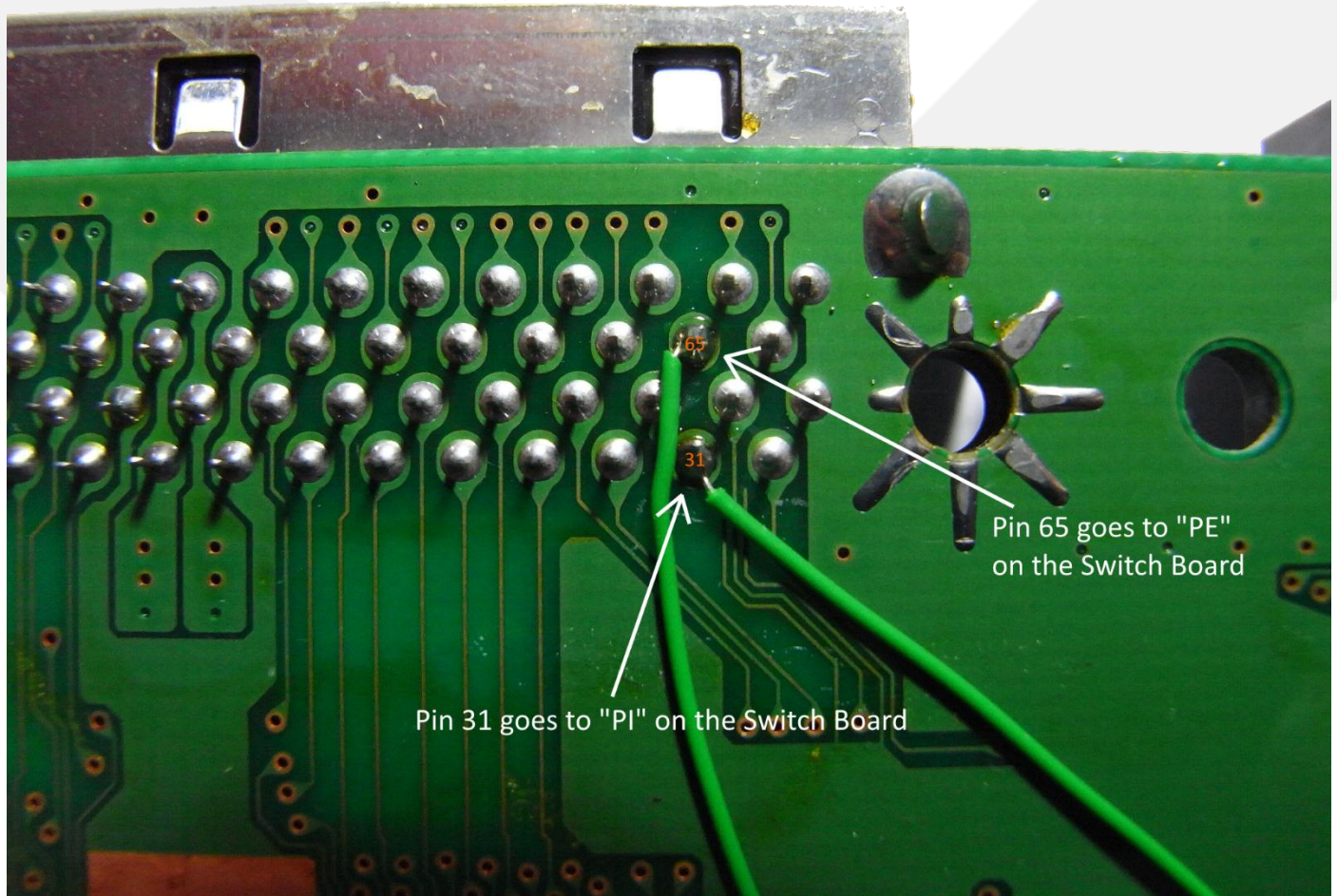
The next two (2) pins to solder are pins 65 and 31 on the parallel port.
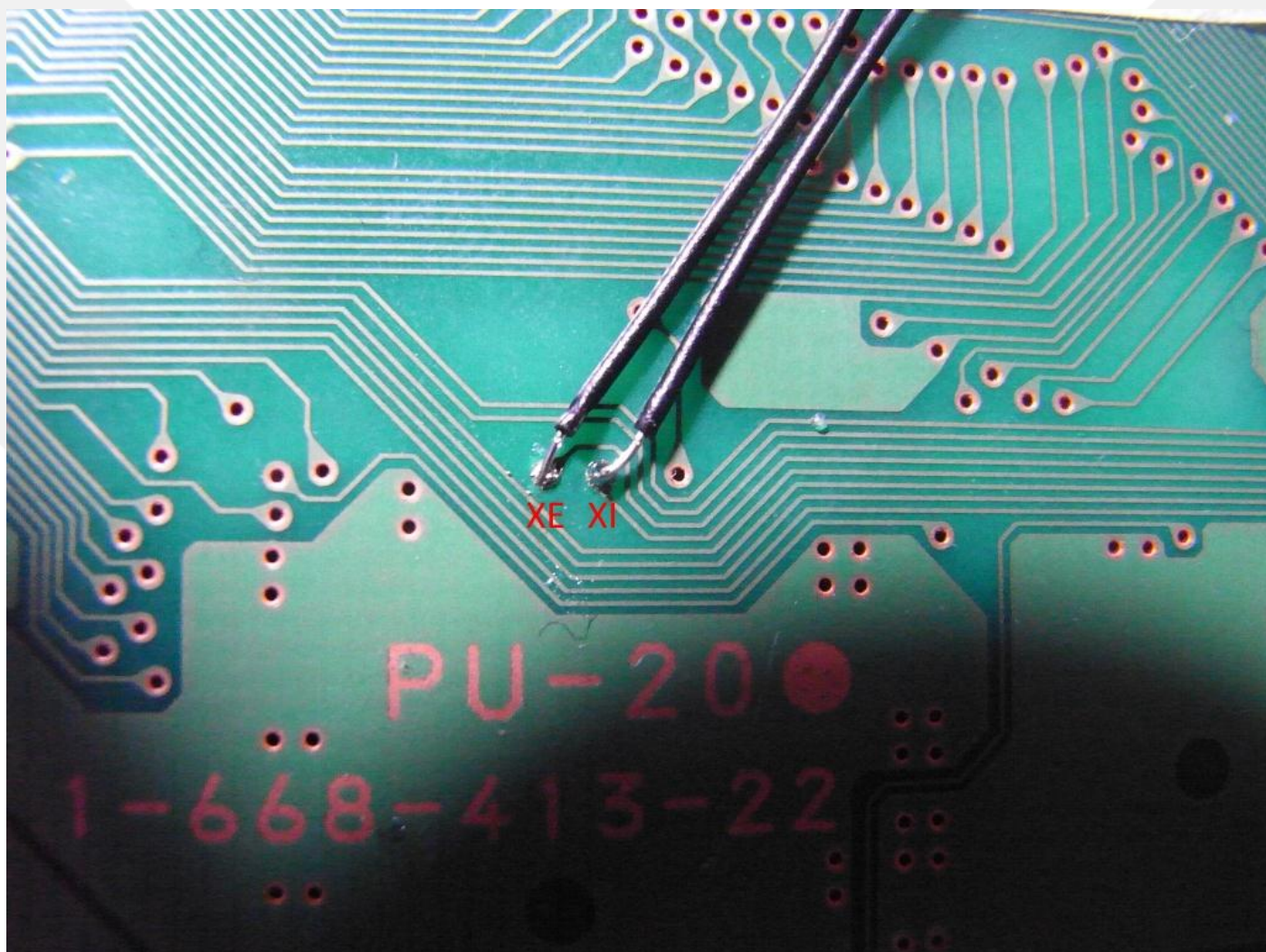
There are no trace cuts needed in this step.
Pin 65 goes to "PE" on the Switch Board.
Pin 31 goes to "PI" on the Switch Board.
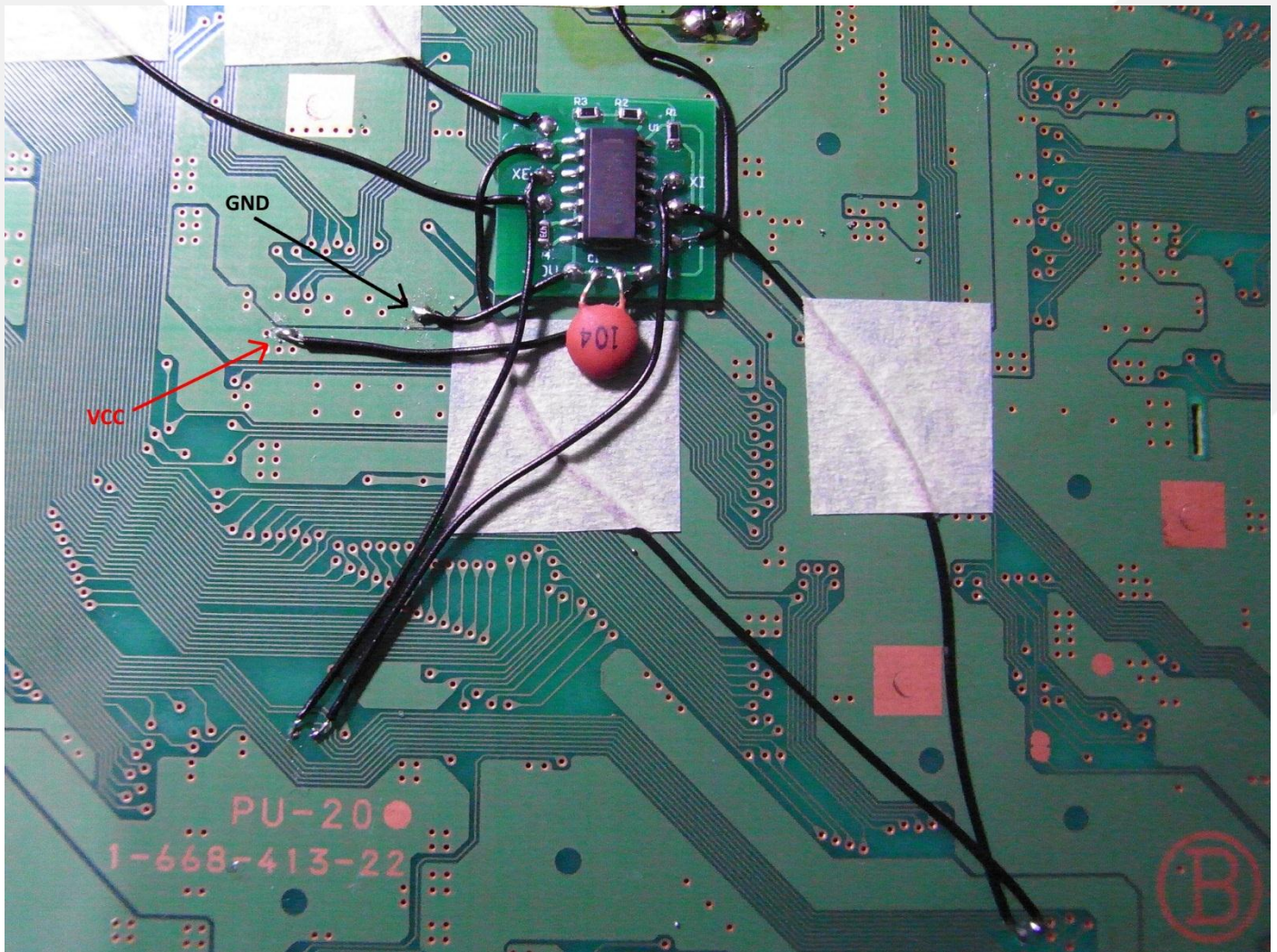

Pin 65 goes to "PE" on the Switch Board

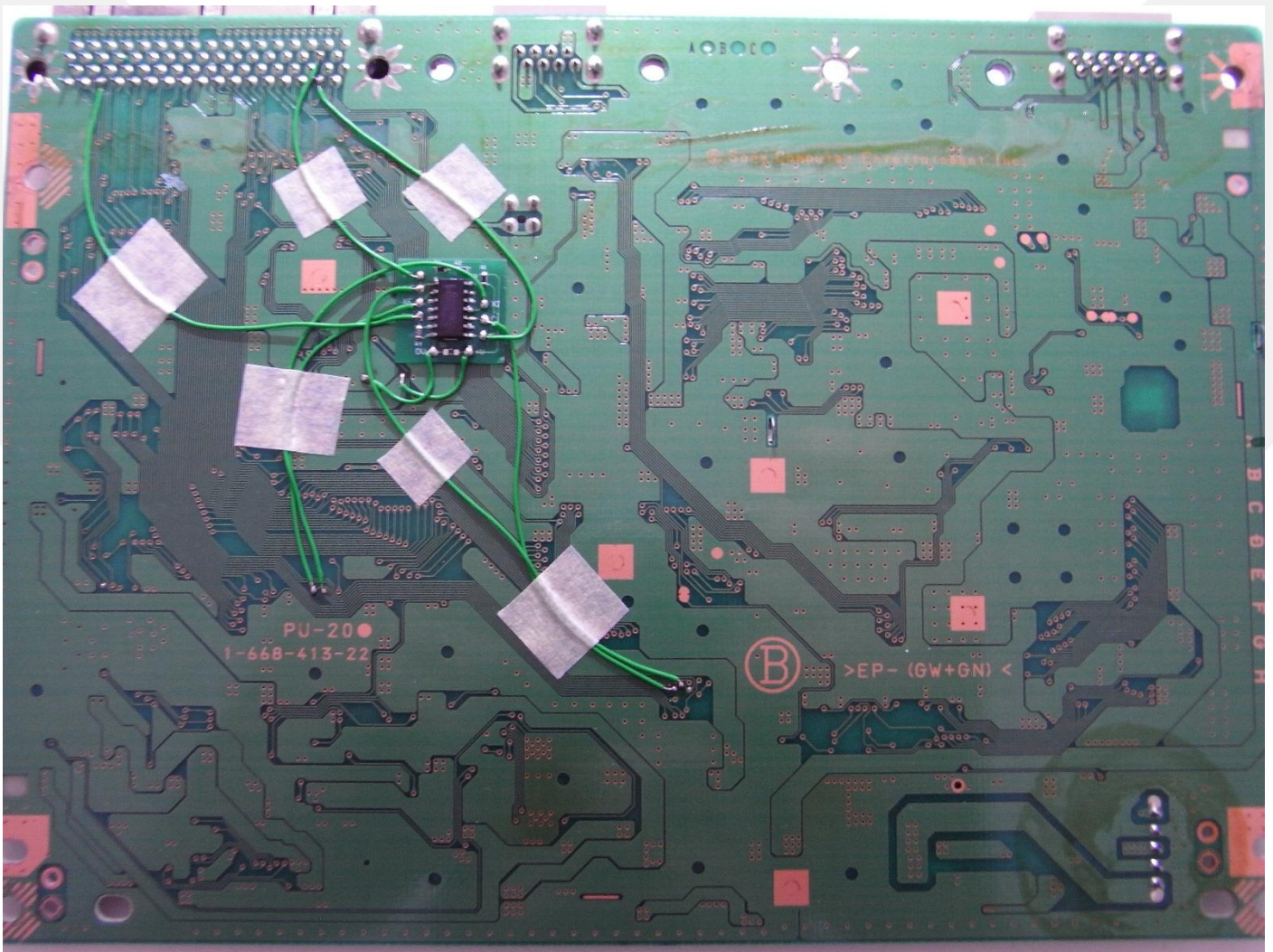Pin 31 goes to "PI" on the Switch Board

Next the "XE" and "XI" pins are soldered. Again, scratch off the solder mask and carefully solder to them. Note that there are no trace cuts in this photo.

The next step is to solder the power (Vcc and Gnd) connections.
Take notice that in this photo where the power connections are.
Both power connections will require the solder mask to be scratched away.

Congratulations! You have successfully modified your PlayStation with a Switch Board.
This is what your final installation should look like.

As a warning, we suggest that you check for shorts on the Ground (Gnd) and 3.3 Volt (Vcc) 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, and then testing 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.

Title:	Switch Board Schematic			
Size: A4	Version:1.0	Revision:1.0	Date: 26/06/2015	Sheet 1 of 1
	PlayStation Input Output Schematic.			

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