

FP-GAME

SNES Controller Mod Instructions

Materials Needed



In order to avoid modifying the SNES controller itself, we will modify the plug end of an extension cable to work with DE10-Nano's GPIO headers, and then plug the SNES controller into the socket end.

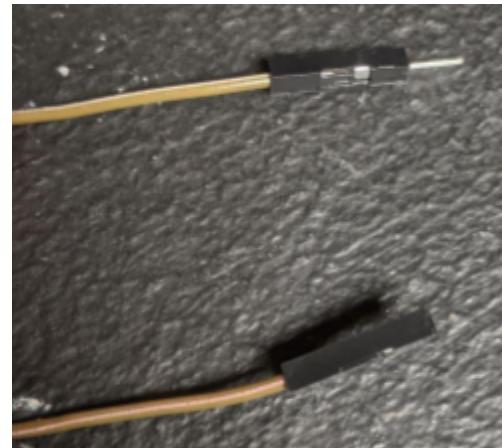
We recommend getting a two pack just in case of failure, as the modification procedure involves delicately cutting plastic around the pins, which may damage the pins.

<https://www.amazon.com/2Pack-Controller-Extension-Retro-Bit-Nintendo/dp/B075K4R86R>



We will be attaching DuPont jumper cables to the plug end of the SNES extension cable so that they can plug into the DE10-Nano's GPIO headers.

We will require 5 of the type with one pin and one socket, as shown below:



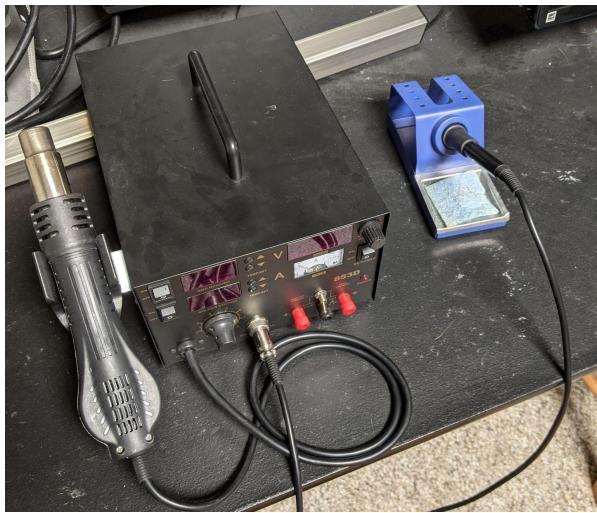
<https://www.amazon.com/Elegoo-EL-CP-004-Multicolored-Breadboard-arduino/dp/B01EV70C78>



We will be peeling away hard plastic, which is hard to do with fingers. Find some pliers, scissors, or other metal tool to assist in removing plastic.

We primarily used needle-nose pliers (the blue tool on the left) to strip away the hard plastic. They are strong enough to do so, but can be more precise than other tools.

Flush-cut pliers (the orange tool on the right in the image) help a lot in cleaning up the surface of the extension cable modification.

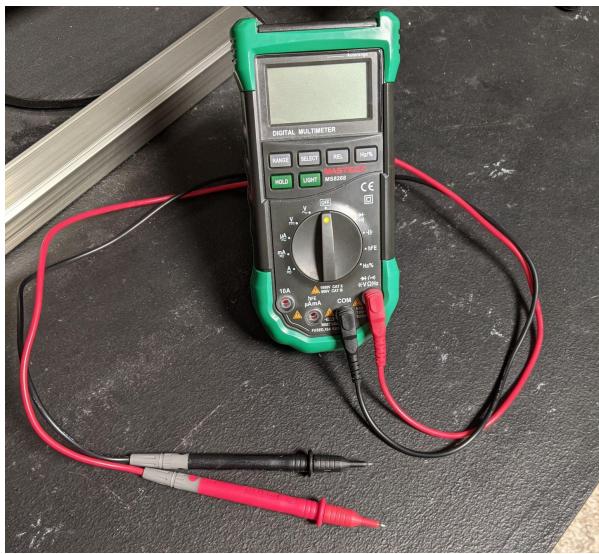


We will be soldering the pin-ends of the DuPont cables to the pin-end of the SNES extension cable.

Any soldering iron and solder should work. Use what you have available.

The soldering station shown in the left image happens to also come with a heat gun, which we use with the optional heat-shrink tubing.

Optional Materials



We recommend having a multimeter handy to verify electrical connectivity between input and output sides of the extension cable and the DuPont extension we will be attaching.

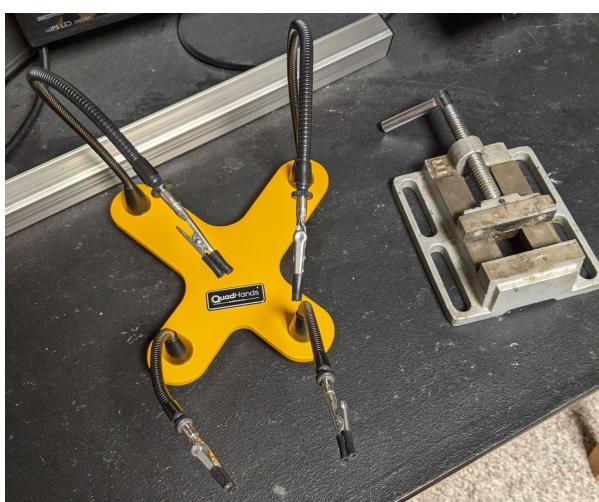
This is to find mistakes or broken connections before spending extra time completing the modification.



Heat-shrink tubing is used to isolate the close-proximity solder connections we are making when we connect the DuPont and SNES extension cables together. It also makes the finished product look a lot cleaner.

This will require a heat-gun of some sort (maybe a hair dryer would work?).

An alternative is to simply wrap electrical tape around the individual solder joints, but this is less clean looking.



For holding wires still during soldering, we used "Helping Hands" (the yellow tool on the left).

Other forms of clamps will also work. Use what you have available, or if you think you can manage it safely, hold the wires yourself while soldering.

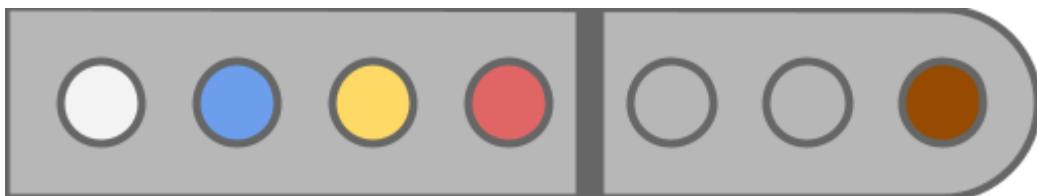
Instructions



1. Prepare the SNES extension cable and your plastic removal tool of choice.

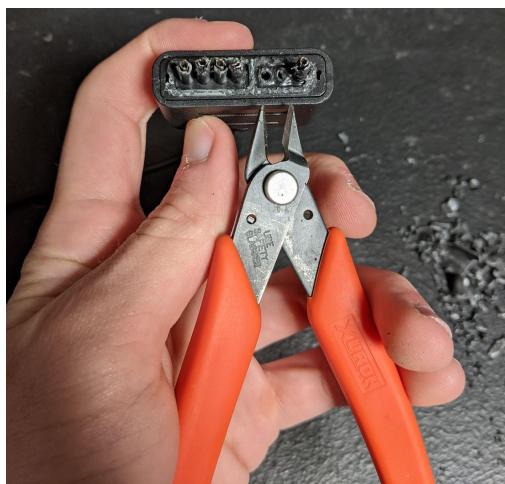


2. Peel away the plastic wall surrounding the plug side connector pins. Be careful not to damage the connector pins themselves. The exception is the 2nd and 3rd pins from the end of the rounded side (represented as grey-filled circles in the diagram below).





These connector pins can be optionally removed, as they do not house electrical connectors.



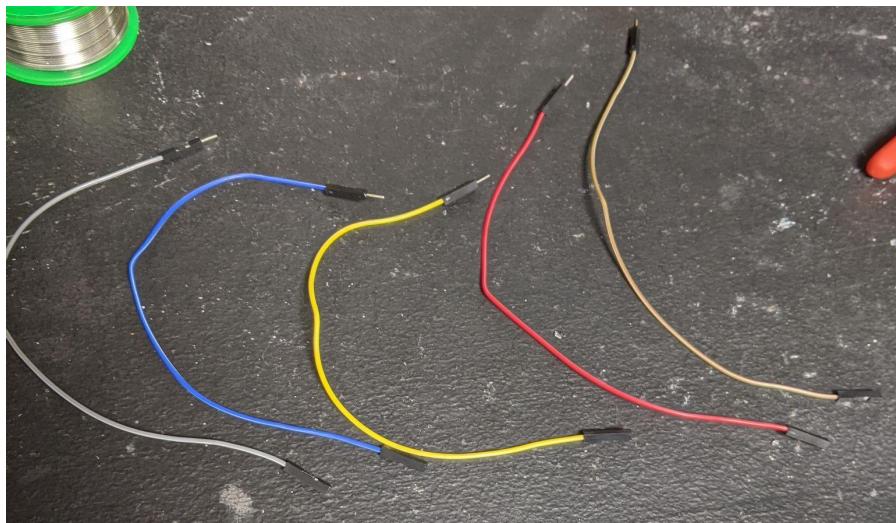
3. (OPTIONAL) Use flush-cut pliers or sanding to clean up the surface of the extension cable mod. This makes the end result look smoother



4. Carefully pull away 2mm or so of plastic surrounding the metal pins. BE VERY CAREFUL TO NOT DAMAGE THE METAL PINS. The purpose of this is to expose enough of the metal pin for soldering. If you think you need more metal surface area exposed, feel free to expose more.

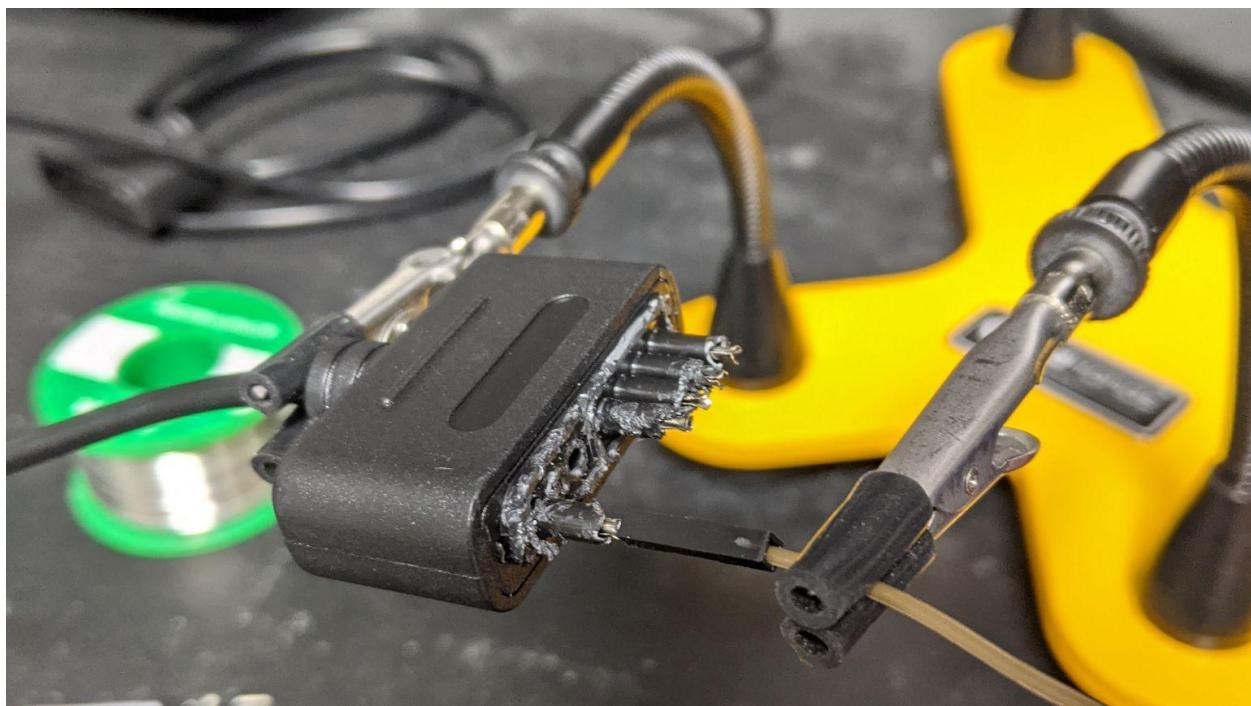
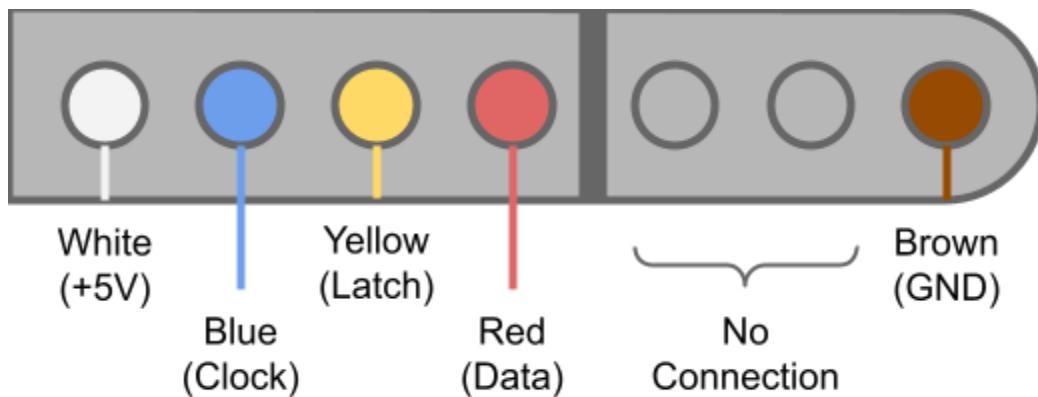


5. (Optional) Now would be a good time to pull out your multimeter and set it to continuity test mode. Probe the exposed plug-side pins and the socket and ensure they are still connected. If they are not, you may have damaged the connection in the process of tearing apart the connector. If this is the case, you can start over with a new extension cable. This possibility of breaking is also the reason we use cheap extension cables rather than modifying the controller directly.



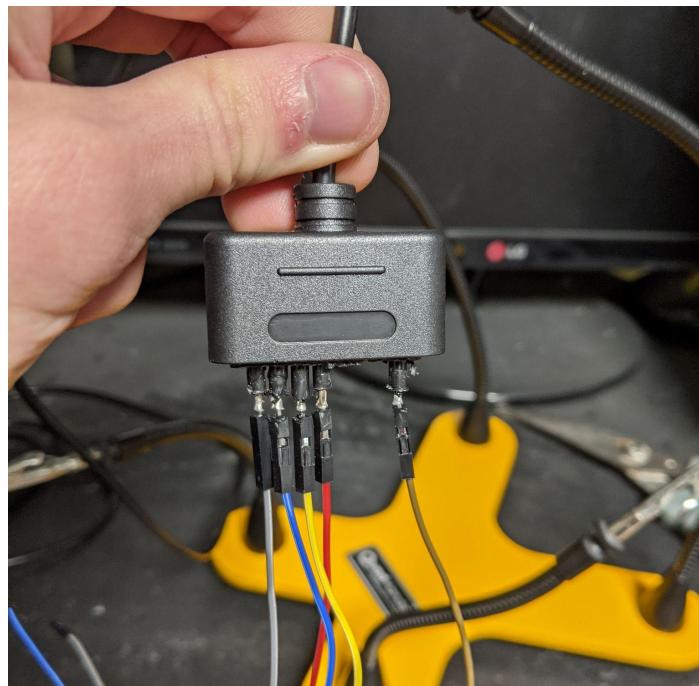
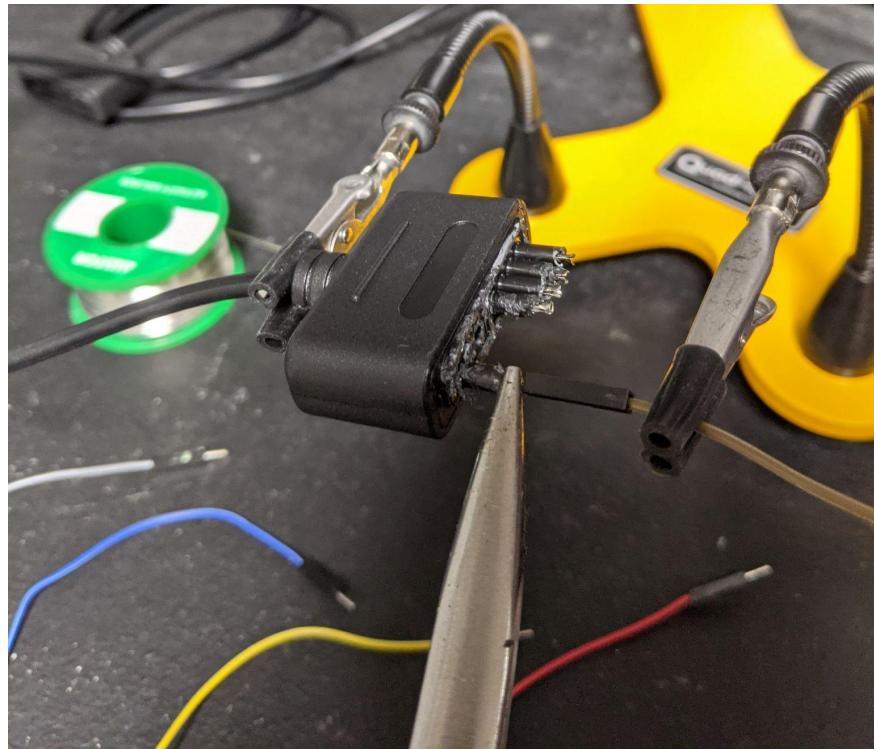
6. Next, you will need to prepare 5 dupont cables. As a reminder: One side of the cable should be a pin, and the other side should be a socket. We will be soldering the pin side to the recently exposed pin of the extension cable.

Additionally, we recommend choosing a different color for each wire to remind you of the power polarity or signal it carries. We used colors corresponding to the diagram below. Again, the grey-filled circles are not connected to anything.

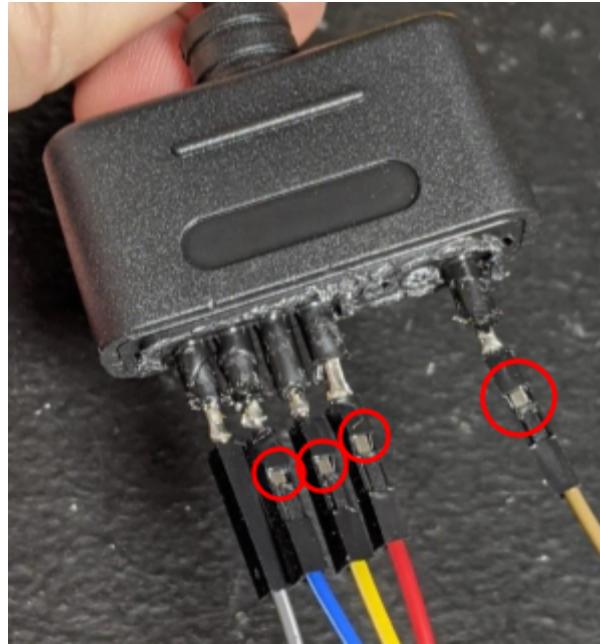


7. Next, insert the pin-end of the DuPont cable into the pin-end of the modified extension cable. Leave enough space for soldering, but ensure the pins are connected and not just floating.

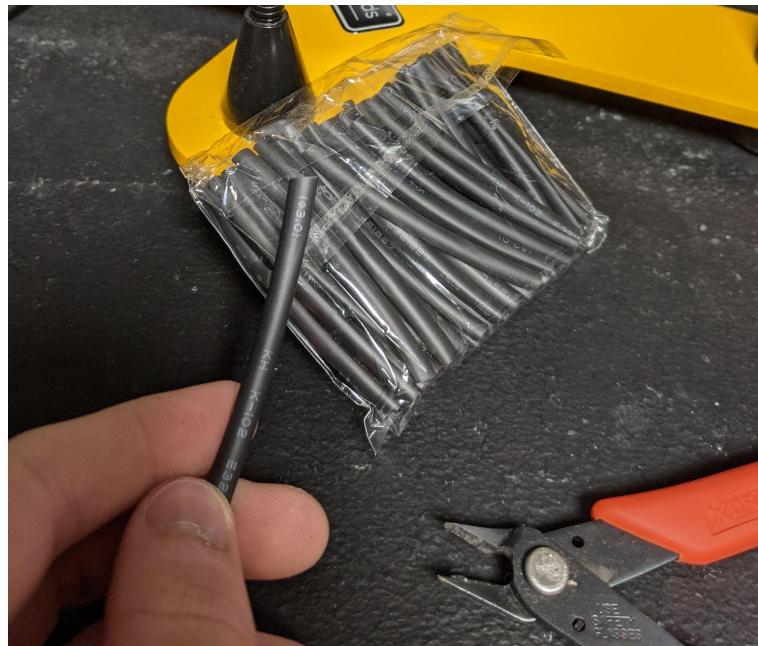
It may help to pinch the extension cable pins to close on the DuPont cable pin. Depending on how flexible (and not brittle) the metal is on your particular controller extension cable, it may help to secure the DuPont cable pin in place while soldering. Our cable did not do this, however, so do so at your own risk!



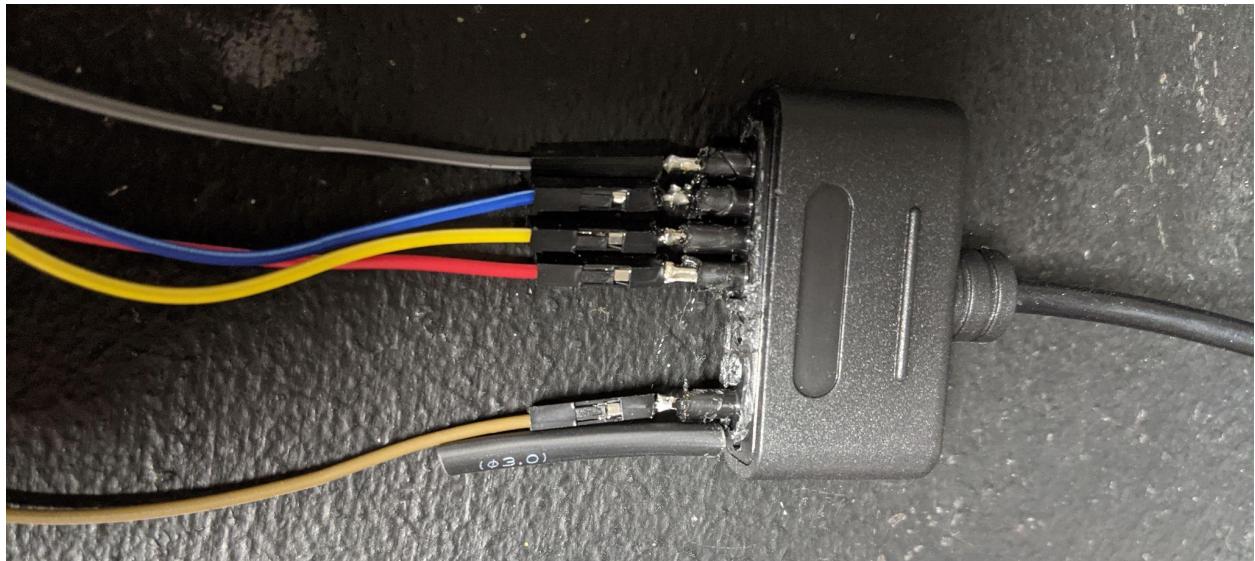
8. Solder the exposed metals and ensure the DuPont cables pins are properly bound to the extension cable's pins. Repeat for all 5 DuPont cables.



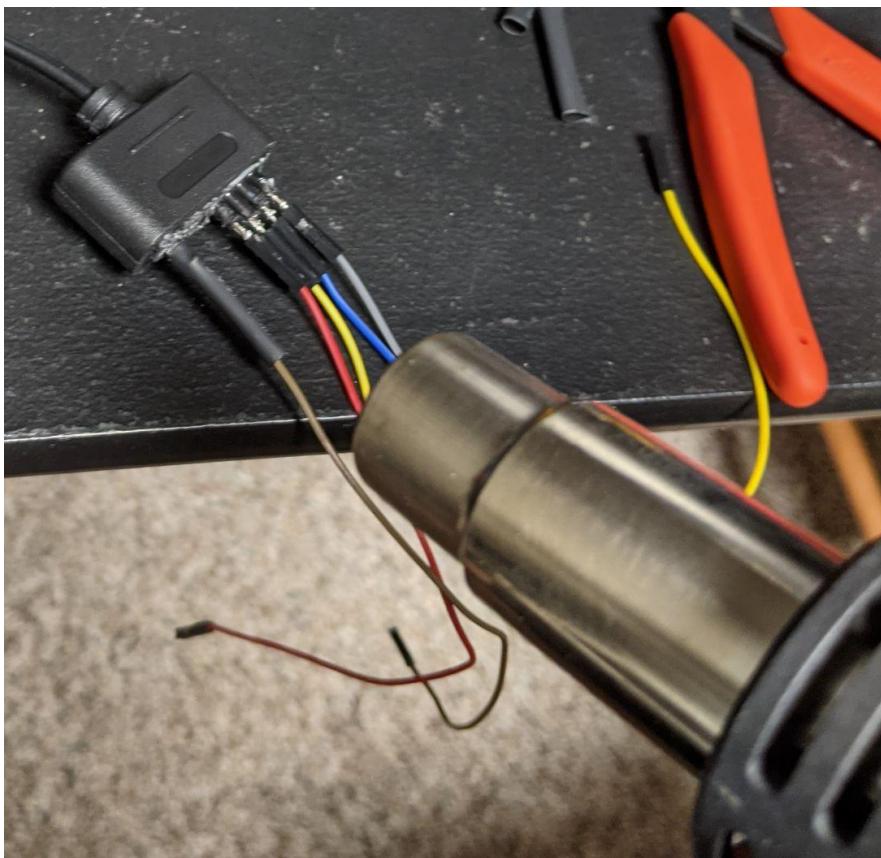
9. (Optional) Now would be another good time to pull out the multimeter and test the continuity between the SNES extension port end (opposite of the modified plug end) and the newly soldered gpio connectors. Since most multimeter probes cannot directly probe the DuPont sockets, use the probe points circled in the image above, which are directly connected to it.



10. (Optional) (Recommended for safety) You can use heat-shrink or electrical tape to isolate your new solder points from each other. The instructions here are for heat-shrink, which looks a lot better in the end.

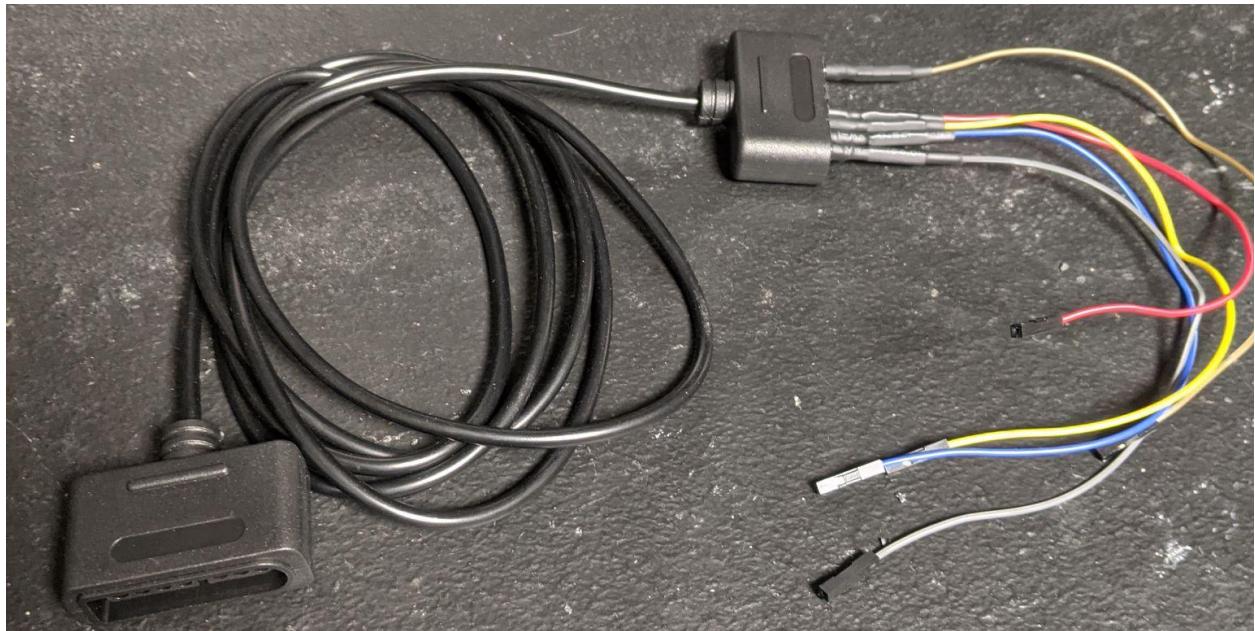


Cut enough heat-shrink to cover the square Dupont Connector and any leftover plastic from the SNES extension cable pin.



Use a heat gun to shrink the shrink-wrap. Be careful not to melt any plastic or the solder joints on the nearby pins. Doing this process slowly (at a larger distance or lower heat) works best.

Repeat the shrink wrapping process for the other pins.



Congratulations!

You should now be able to connect the port end of the modified extension cable to the plug end of your SNES controller, and wire up the GPIO end of the modified extension cable to the DE10-Nano GPIO headers. The instructions for setting up the GPIO connections are included in the FP-GAME Getting Started Document.

Credits

We credit the author of the following webpage for the original source image we based our various SNES controller pinout diagrams from:

[https://www.igorkromin.net/index.php/2013/02/15/converting-a-snes-controller-to-connect-to-a-n
es-controller-port/](https://www.igorkromin.net/index.php/2013/02/15/converting-a-snes-controller-to-connect-to-a-nes-controller-port/)