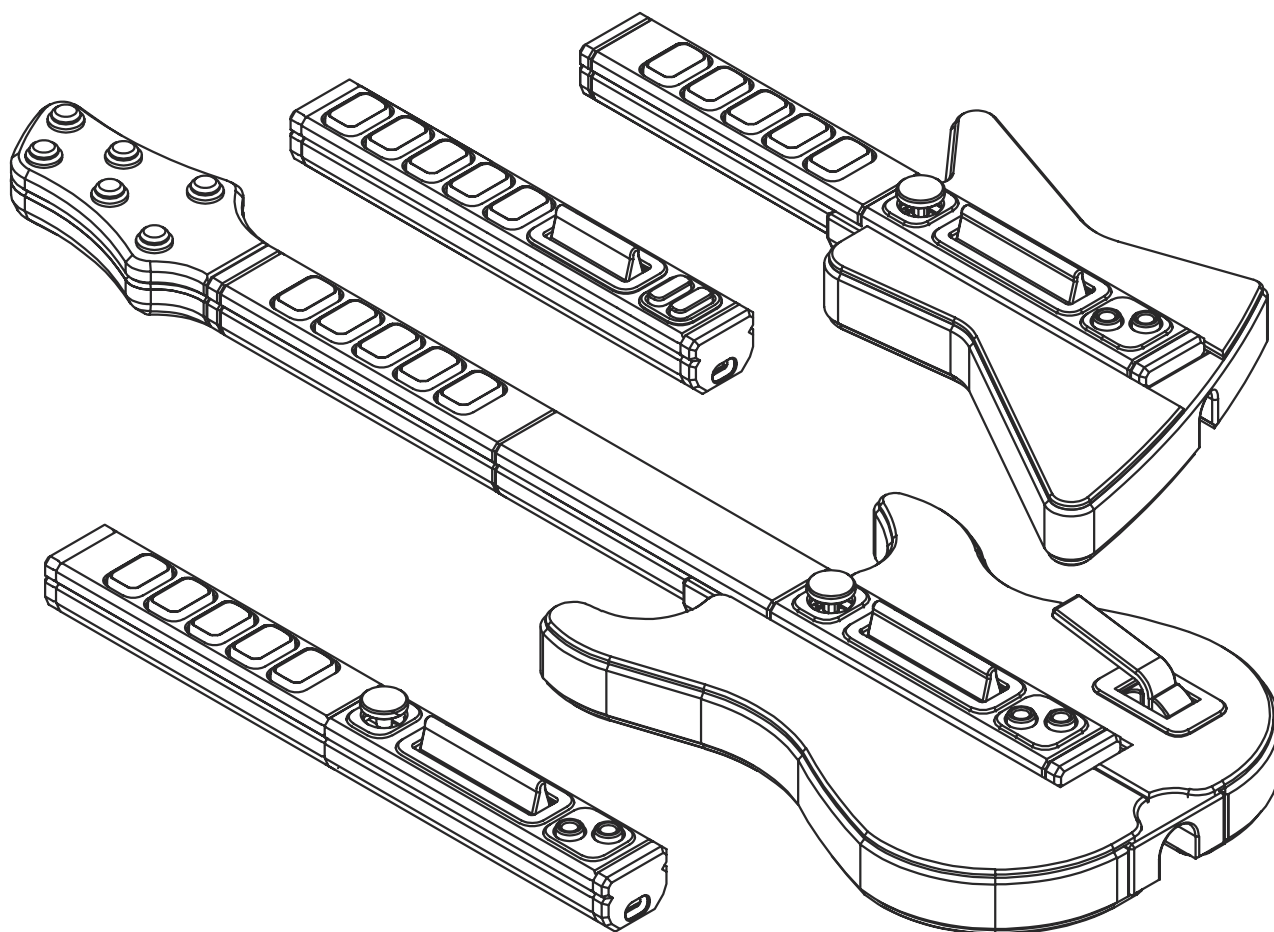


HANDWIRE BUILD GUIDE

— FOR THE —

Polybar SYSTEM



INTRODUCTION

THANK YOU FOR DOWNLOADING THE POLYBAR PROJECT!

This guide will assist you with assembling the handwired internal components of your guitar controller.

This guide assumes that you have a general understanding of soldering as a concept. This guide does provide a soldering tutorial for the handwired option for the internals of your controller.

You can find a build guide for the 3D-printed components of this build on our Discord server. Don't be afraid to ask for help!



**Join our
Discord!**

We are more than happy to help!

CREDITS

I have worked on the Polybar project for over four years at this point. I've met a lot of awesome people along the way. Contributors, friends and community members that I all appreciate so much.

Music games have always meant a lot to me, and my mission statement from the beginning was that, I wanted to create the best feeling music game controller you could get your hands on.

It had to be cheap, it had to be easy to build, and be totally free for everyone to make. The project has come a very long way since it's inception, and evolved to be so much greater than I could have imagined.

I hope the Polybar System can meet your highest expectations! I have spent hundreds of hours designing, testing and ensuring that when you hit print, the best guitar controller you have ever used comes out of your printer.

Thank you so much for downloading, and please enjoy the hard work that rest of the team and I have put in to this for you to enjoy.

CREDITS:

Be sure to say thank you when you see these users on the Discord Server! From me to the contributors, thank you!

roadsidebomb - Creator

HeuristicBishop - PCB Contributor

PtigaD - PCB Contributor

Pits - Handwire components and build guide

GetRektRyan - PCB Contributor and wireless support designer

PossumOG - PCB Assembly and solderless kit designer

Moose - Build Guide design and layout

My deepest thanks and gratitude to everyone that has contributed their ideas and time, you are the best! Thank you!

DISCLAIMERS

LIABILITY AND USAGE:

Three Pieces Controllers, its owners, and affiliates are not liable for any consequences arising from the use or misuse of this product or its components. The information provided in this guide is offered without any expressed or implied warranty. The end user is responsible for errors in handling components, assembly, or information interpretation. Exercise caution when working with soldering equipment, 3D printers, and lithium polymer batteries.

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COMPONENTS - PARTS LIST

1



RASPBERRY PI PICO
(PICO W OPTIONAL)

2



MX CHERRY
LINEAR SWITCH (FRETS)

3



MX CHERRY CLICKY
SWITCH (STRUM)

4



TACTILE SWITCH
(6X6X5)

5



BALL TILT SWITCH

6



HOOKUP WIRE

7



JUMPER WIRE
(OPTIONAL)

TOOLS & SUPPLIES



THE TOOLS SHOWN ABOVE ARE RECOMMENDED FOR BUILDING THE POLYBAR & MINIBAR.

While all of these tools aren't completely necessary, it will save you time and headache if you plan on building multiple units.

You can build the polybar & minibar guitars with a basic soldering kit from online retailers such as Amazon or Aliexpress.

- Soldering iron
- Rosin core solder
- Soldering flux
- Flush cutters
- Tweezers
- Helping hands
- Misc. Wire

POLYBAR HANDWIRE ASSEMBLY

!

IMPORTANT:

Ensure that the connection wires can reach the desired length of controller.

STEP 1



Insert your MX Cherry switches into the Fret Bracket in the orientation shown.

STEP 2



Connect all of the same single pin together with a single wire. This will serve as ground. The wires need to lead out of the side of the bracket that is open, I.E. the open end of the "U" shape. Keep this wire long enough to solder the Strum section of the build (step 7) as it will share a ground wire.

NOTE: Use inline stripping for this step, or use multiple small wires to connect the pins.

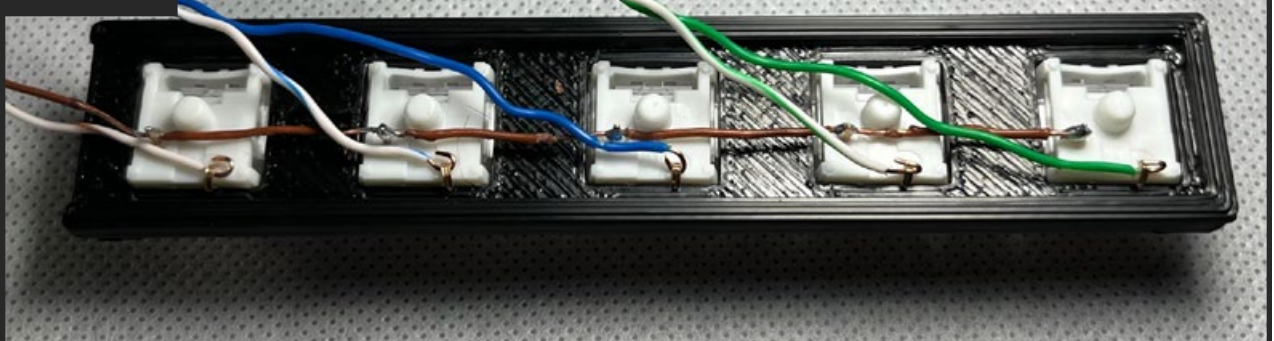
POLYBAR HANDWIRE ASSEMBLY (CONT.)

STEP 3



Solder all five pin connections as shown.

STEP 4



Connect wires to the other pin of each switch, as shown. Loop the wire around the pin, and fold the leg over to keep it in place for the next step.

TIP: If possible, use wire colors that correspond to their input. It makes troubleshooting much easier!

STEP 5



Solder all five pin connections as shown.

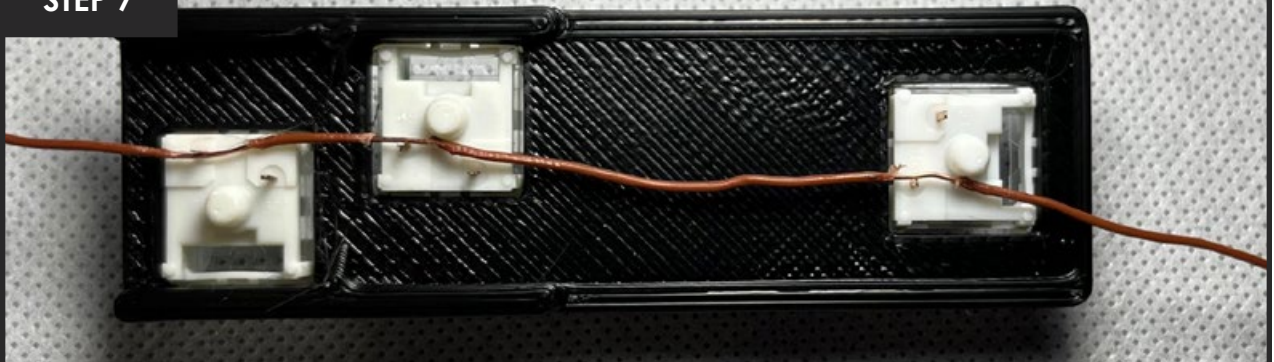
POLYBAR HANDWIRE ASSEMBLY (CONT.)

STEP 6



Now, insert your switches into the Strum Bracket in the orientation shown.

STEP 7



Using the same ground wire from the fret board, connect one pin from each switch. Lead the ground wire out the side near the two offset Strum switches.

NOTE: Use inline stripping for this step, or use multiple small wires to connect the pins as shown.

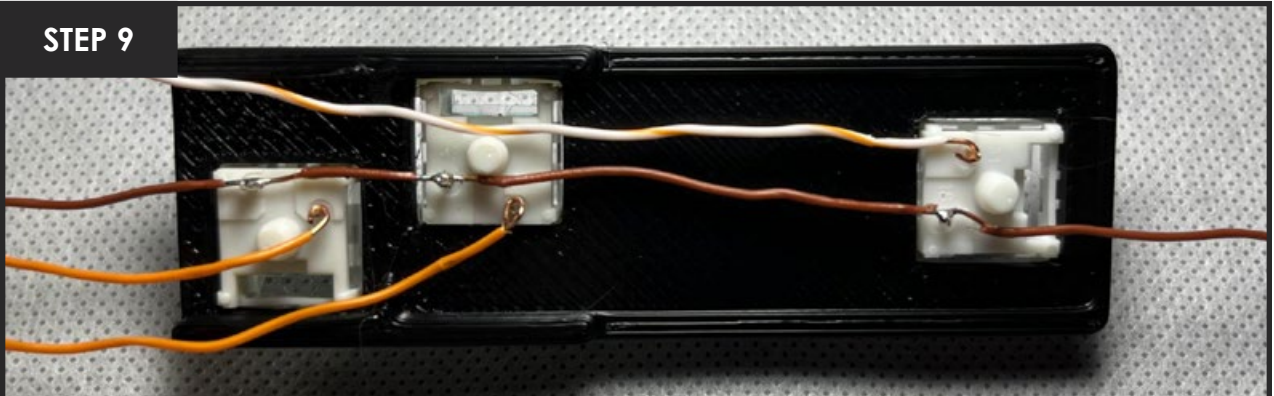
STEP 8



Solder the connections.

POLYBAR HANDWIRE ASSEMBLY (CONT.)

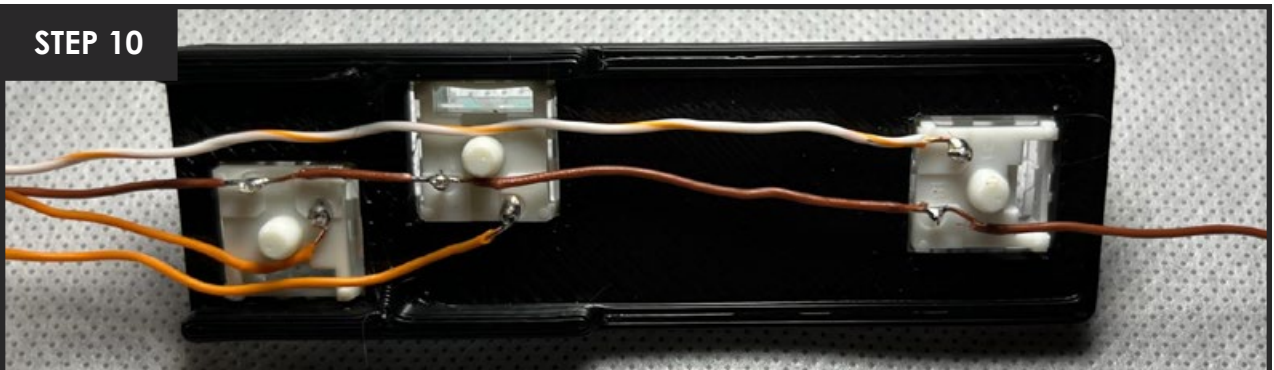
STEP 9



Connect wires to the other pin of each switch, as shown. Loop the wire around the pin, and fold the leg over to keep it in place for the next step.

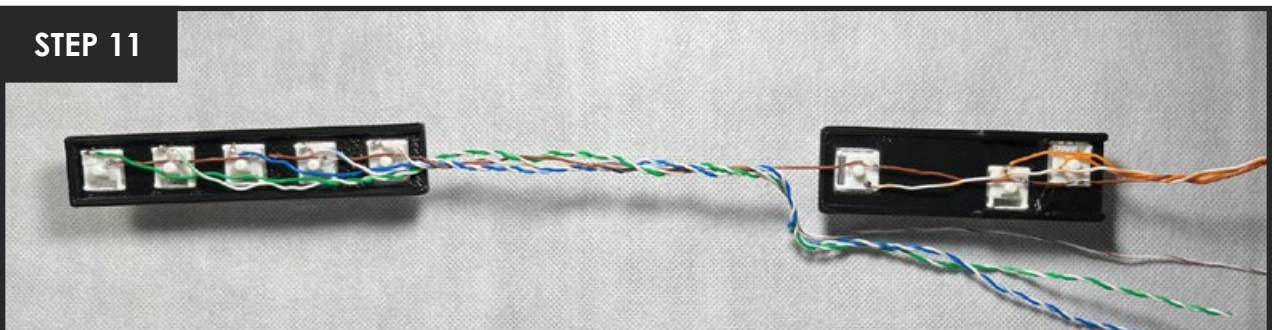
TIP: If possible, use different wire colors for each input. It makes troubleshooting much easier!

STEP 10



Solder the connections.

STEP 11

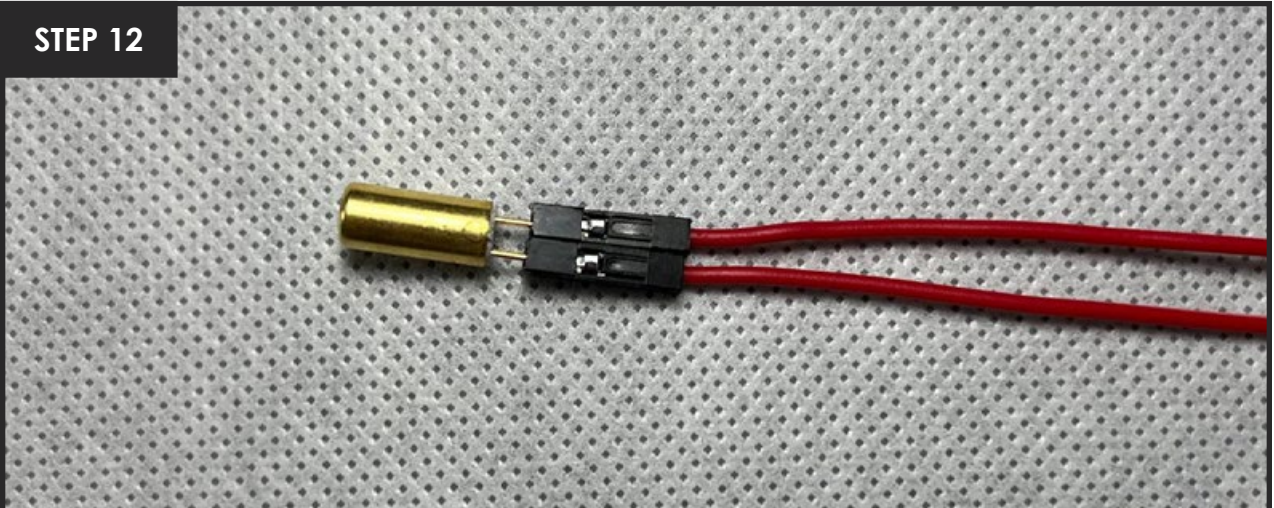


Following the steps above, you will have a wire-switch harness that looks like the image shown.

NOTE: Spin your brackets and twist the wires together to make assembly easier.

POLYBAR HANDWIRE ASSEMBLY (CONT.)

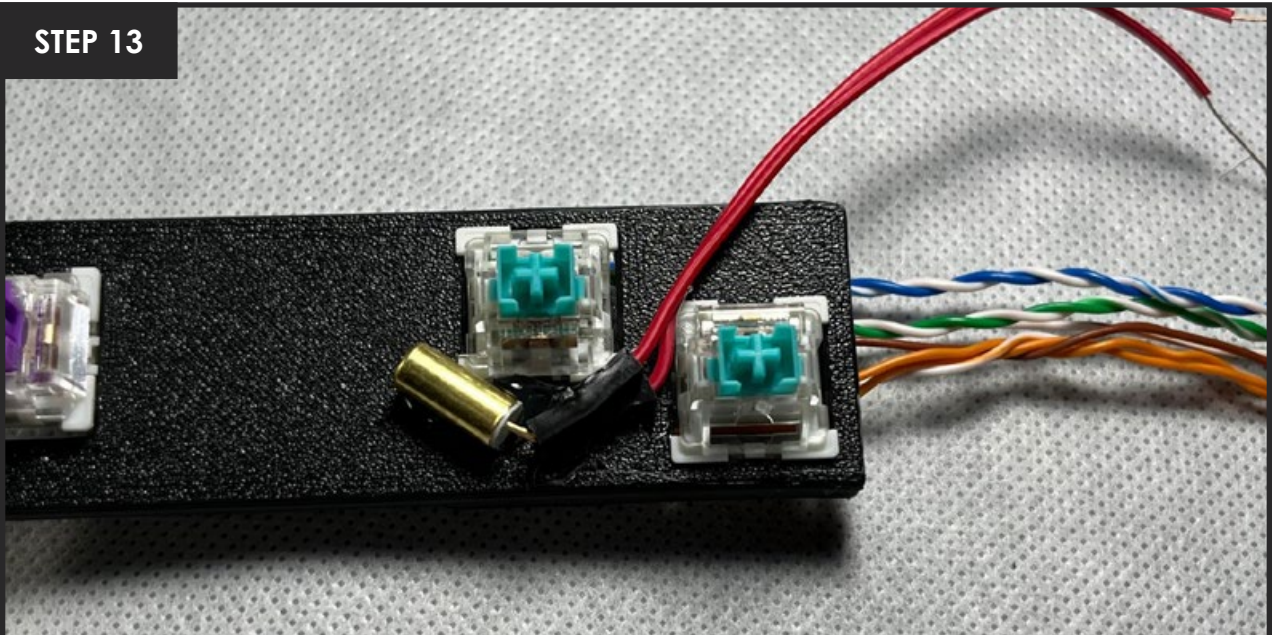
STEP 12



For the tilt sensor, consider using jumper wires as shown. Jumper wires are not required, you may choose to manually wire and solder the connections for this step.

TIP: If using jumper wires, consider adding a small bit of solder to the exposed metal tabs to secure the jumpers to the switch pins.

STEP 13



Use glue to secure the tilt sensor to the Strum Bracket as shown. Adjust as necessary depending on user handedness.

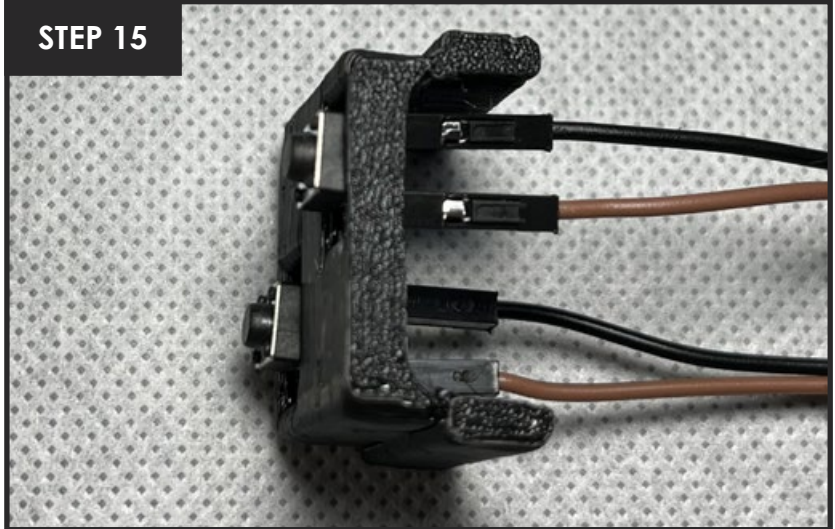
POLYBAR HANDWIRE ASSEMBLY (CONT.)

STEP 14



Use glue to mount the Micro Switches to the Start/Select Bracket

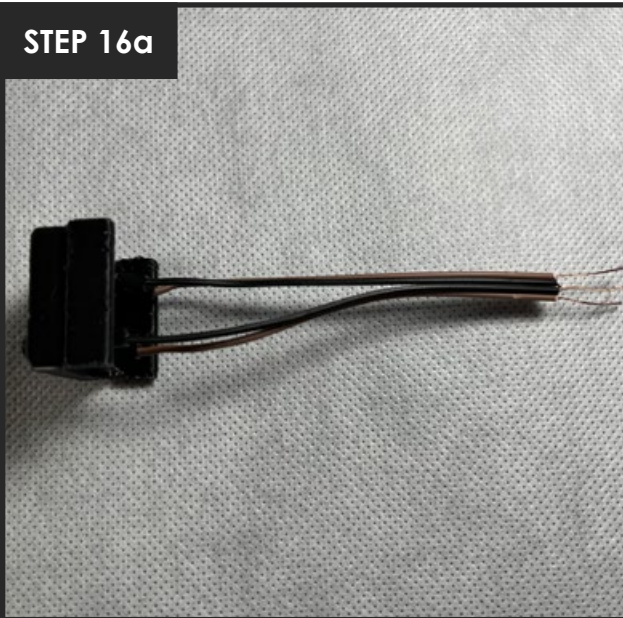
STEP 15



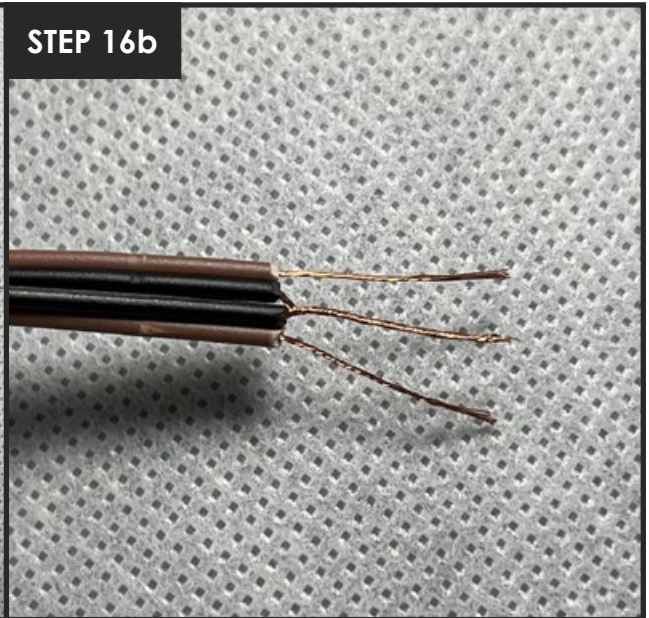
Use Jumper wires on the Micro Switches legs to make assembly easier. Jumper wires are not required, you may choose to manually wire and solder the connections for this step.

TIP: If using jumper wires, consider adding a small bit of solder to the exposed metal tabs to secure the jumpers to the switch pins.

STEP 16a



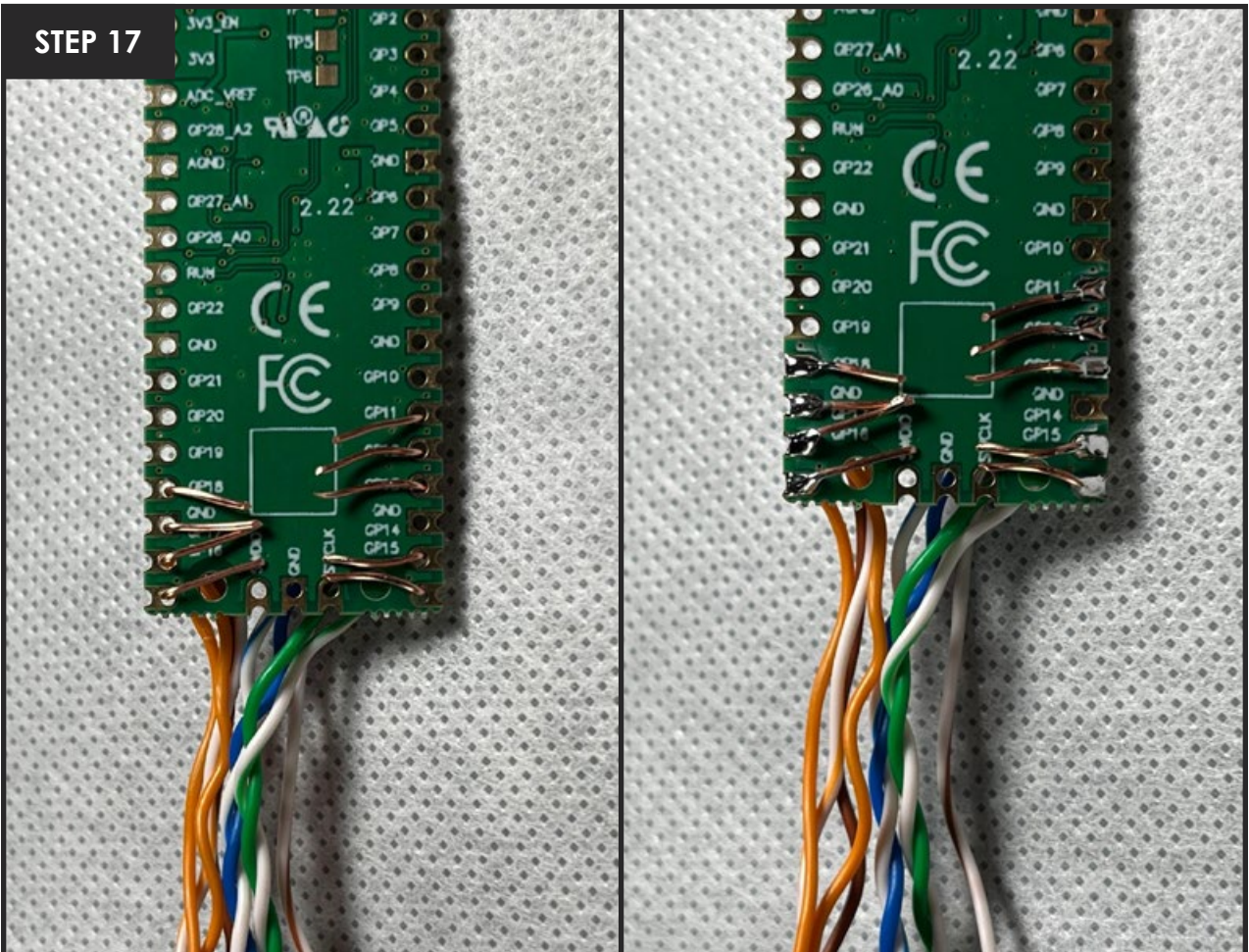
STEP 16b



Combine and twist together one wire from each micro switch as shown. This will serve as ground.

POLYBAR HANDWIRE ASSEMBLY (CONT.)

STEP 17



Now, solder the Wires to the Pico.

Start with the Bracket (Fret Bracket and Strum Bracket) wires, leave the Tilt Sensor and Micro Switches for last .

All of the wires pass from the “Front” of the “Board” to the Back of it, as the image shows.

Solder the GND wire that goes through all of the mechanical switches to any GND board pin.

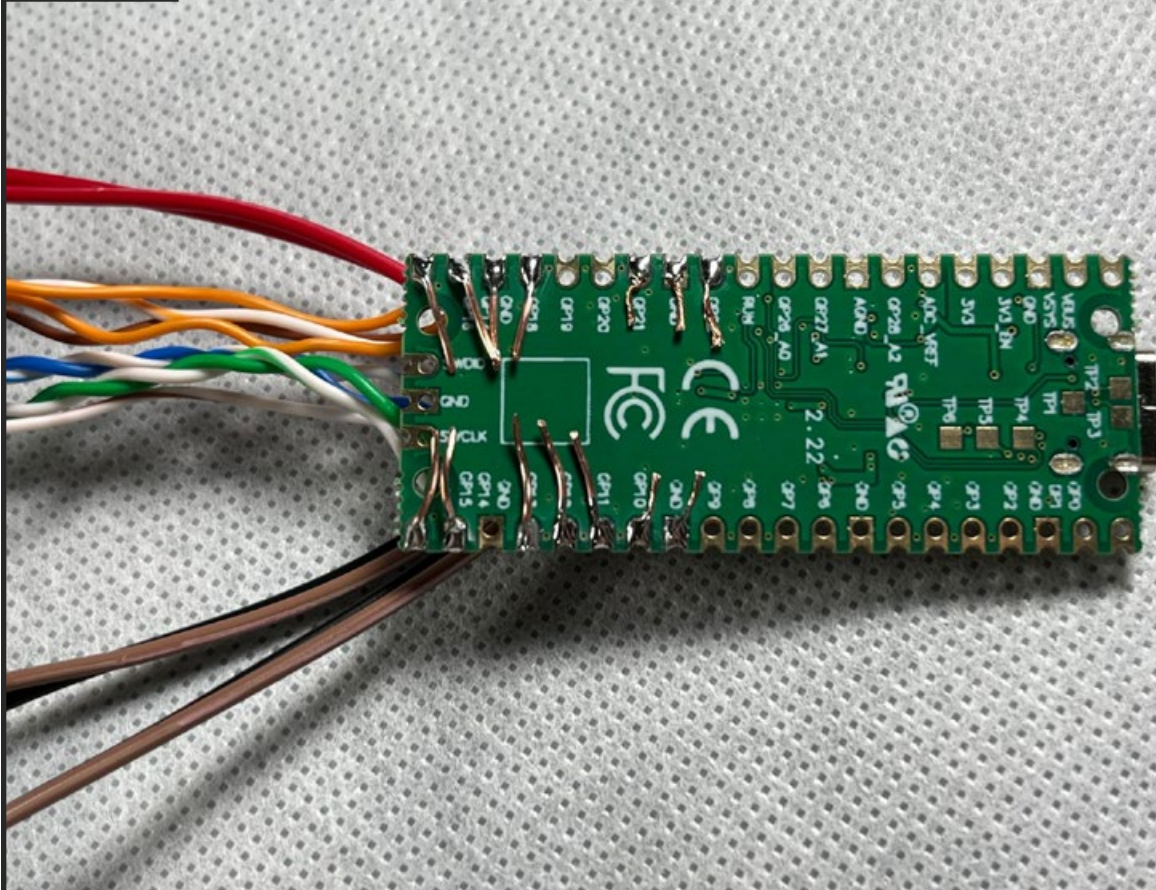
If possible, follow this soldering order:

- Green Fret - GP15
- Red Fret - GP14
- Yellow Fret - GP13
- Blue Fret - GP12
- Orange Fret - GP11
- Strum Down - GP 18
- Strum Up - GP17
- Whammy - GP 16

TIP: Bend your wire after inserting through the hole to hold it in place whilst you solder.

POLYBAR HANDWIRE ASSEMBLY (CONT.)

STEP 18



Solder the Tilt Sensor and Start/Select Jumper Wires you installed in the pico.

The combined twisted ground wire from the Start/Select switches goes to a GND pin, and the other two go to GPIO pins.

One of the wires of the Tilt Sensor goes on a GND pin and the other one on GPIO pin.

If possible, follow this soldering order:

Tilt Sensor - GP10

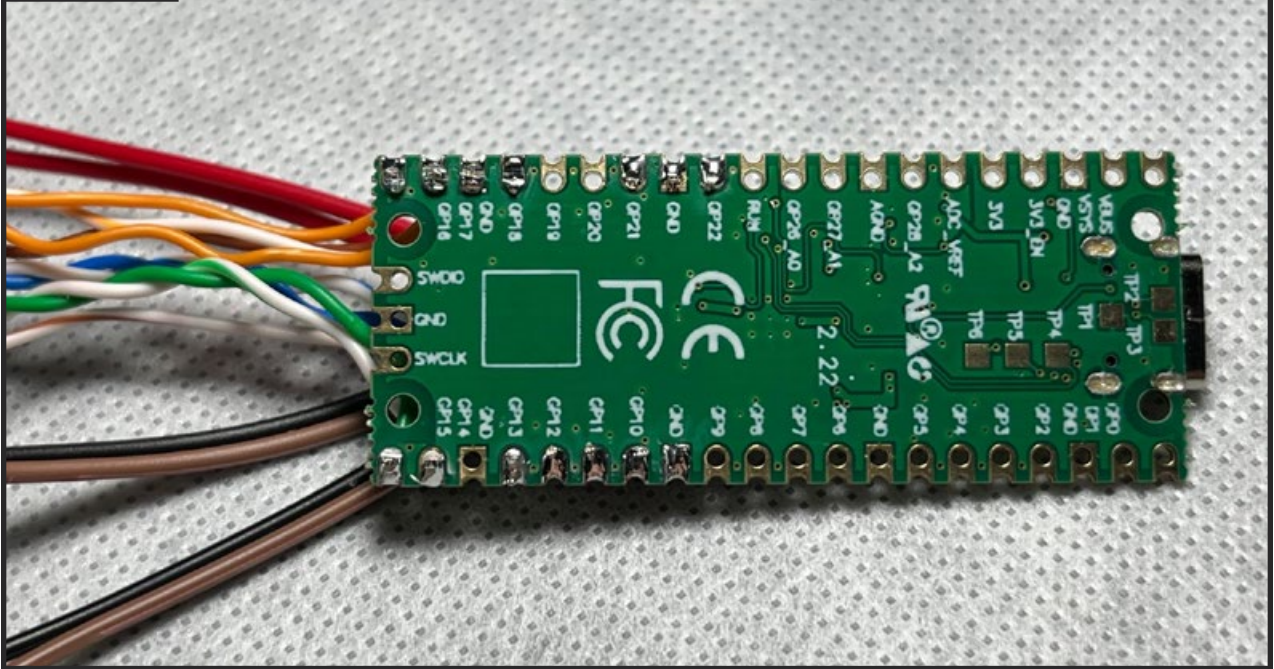
Start - GP21

Select - GP22

TIP: Bend your wire after inserting through the hole to hold it in place whilst you solder.

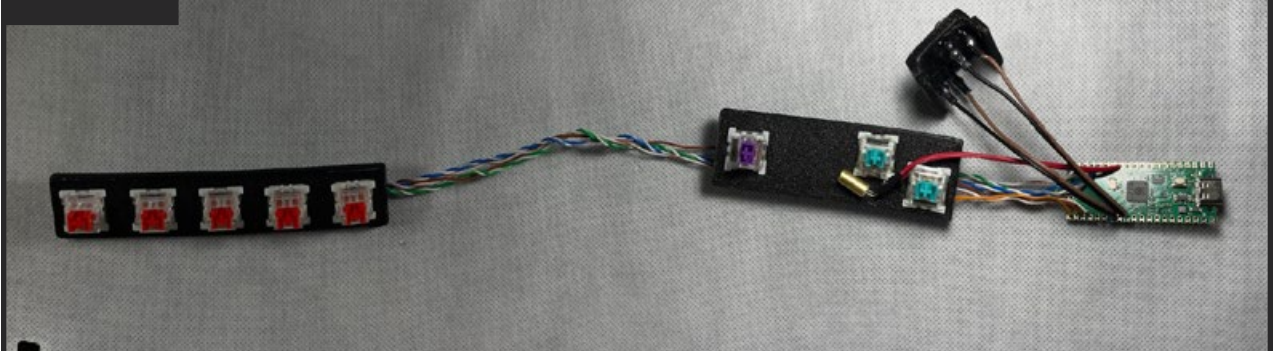
POLYBAR HANDWIRE ASSEMBLY (CONT.)

STEP 19



Using flush cutters, trim the excess wire from your connections as shown. Try to cut as flush as possible, without damaging the boards or breaking your joints.

STEP 20



Once you have soldered and trimmed all of your connections, you should have a Bracket-wire harness that looks like the image shown. Follow the Polybar System build guide, and substitute your completed harness in place of the PCBs. Some steps in the build guide will not correlate to the handwire bracket harness, use the STL files in the folder to complete those substituted components as necessary.

NOTE: Micro handwire process is not shown, but is the same process with the exclusion of the Whammy switch.

PROGRAMMING & CONFIGURING

SETTING UP YOUR CONTROLLER WITH CUSTOM FIRMWARE

Here's how to program your controller with custom firmware. For the latest files and help, check out our Discord server.



Join our
Discord!

CONTROLLER SETUP:

You can either use our provided presets, or create your own:

USING OUR PRESETS

You can find official presets on our Discord server. Download them to get started.

NOTE

If you ever run into problems, you can always reset the controller to factory defaults and flash back to one of our preset. **No harm no foul!**

MAKING YOUR OWN PRESETS

For more control, you can download Sanjay900's Santroller firmware tool. It's the easiest way to customize your controller.

WHAT THE SANTROLLER TOOL DOES:

- It lets you import our presets and save your own.
- You can change things like the LED colors, button mapping, and add shortcuts.
- Play around with the settings to get it just right. You can import our presets, and then change them to your liking if need be.