Hardware Assembly

To assemble the hardware, we need to:

- Solder headers to the Raspberry Pi Zero W.
- Solder headers to the Pi Servo Hat.
- Install the Pi Servo Hat on the Pi Zero W.
- Assemble the pan-tilt hardware and connect the servos to the hat.

Let's walk through these steps in more detail!

Solder Headers to the Raspberry Pi Zero W and the Pi Servo Hat

We recommend soldering the male header to the Pi Zero W and the female to the Pi Servo Hat. If you have any issues with soldering, please check out our learn to solder tutorial.

Assemble the Pan-Tilt Mechanism

Assembly of the pan-tilt mechanism is fairly straightforward. The trickiest part is making sure the servo motors are centered during assembly.

Here's the family portrait of the stuff that comes in the kit. You won't be needing the servo horns that come packaged with the servo motors, just the ones that come packaged separately.

Start by identifying the servo horn with two long arms and two short arms. You'll need to clip off the long arms, as shown below.

Identify the smallest screws in the baggie of screws that came with the kit. These will be used to affix this horn to the base of the pan-tilt mechanism.
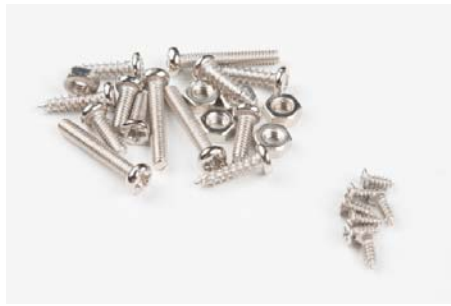
Place the horn in the base as shown, then screw it down by inserting the screws from the bottom and threading them into the horn. Note that there will be extra screws, even beyond the ones to be used later. This is generally true of all the screws in this set.

Next, identify the larger self-tapping screws. These will be used for assembling the next part of the mechanism.

Find the two pieces pictured below that will sandwich the first servo. Note the orientation of the servo in these pieces.
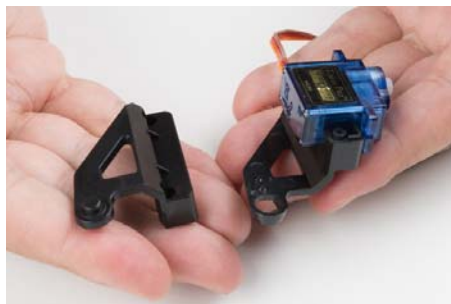

Here's the sandwiched servo. Again, note the orientation for proper assembly.

Here, you can see where the screws identified a couple of steps ago fit into our servo sandwich. Tighten them down, but not too much.

Now fit the shaft of the servo into the fitting on the horn that you previously installed into the base. This is the point where you need to make sure that the shaft is roughly centered in order for the entire assembly to work properly. I do this by turning the shaft all the way to one extreme, then turning it 90 degrees back in the other direction. Then, I remove the base and line it up with the body of the servo motor.
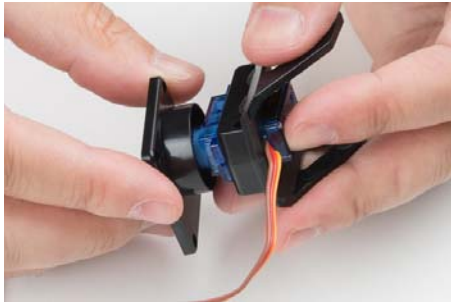
Find the two longer screws that came with the horn kit in the set. There will likely be only two of these, and you need both, so don't lose one!

You'll now need the single arm servo horn, as shown in the image below on the left.

Install the single arm servo horn as shown below. You'll need two of the small self-tapping screws from the first step to affix it to the mechanism.

You'll now need the second servo motor and the last piece of the mechanism. The image below shows the relative orientation of these two pieces.

Here's a picture of the two pieces assembled to one another.

Now, find the longest machine screws in the baggie, as shown below. Once again, you'll find that there are more of these than you need.

Thread these screws through the stand off wings on the servo motor and into the last piece of the mechanism. You can use nuts for these if you like, but I've found it to be unnecessary as they thread into the mechanism quite snugly without the nut.

Now connect the two major pieces of the assembly together. The image below shows the orientation of these two parts.

You may need to assemble and disassemble these two parts a couple of times to find the right rotational position of the servo motor so that the tilting portion has its full range of motion. Here's an image of the two bits put together.

Take the final screw that you identified above as a horn attaching screw and use it to secure the horn to the servo motor.

Congratulations, you've finished assembly of the pan-tilt mechanism!