

Converting a HK-5320 servo for use on a Walkera MiniCP Helicopter

By Chubbs

Why do it?

The stock MiniCP servos have a tendency to strip out, especially during inverted crashes. Replacement servos are available from many different websites, and prices range from about \$13 + slow-boat-shipping from China, or upwards of \$20 if you want to buy some here in the US and get them within a week. \$20 for a servo that can strip in one crash? Unacceptable.

Solutions?

The easiest "solution" is to do the "servo saver mod", also known as "ruining your servo arms", in my opinion. The process is detailed elsewhere, but basically you put a cut in the splined part of the servo horn, so that rather than gripping the servo tightly, it is allowed to slip during a crash. The problem I found is that it doesn't just slip during a crash, it slips all the time! Using heat shrink wrap around the servo horn to "tighten it up", didn't work in my case. Many have claimed success with this mod, but all I did is ruin my servo horns. Good luck if you go this route.

There are a couple of options to retrofit cheaper servos into the MiniCP. One option is the HK-282A servo, though I did not successfully get this one to work. There are a couple of issues. First off, it is physically too large to fit. You must dremel/sand/otherwise remove nearly all of the plastic case to get the dimensions small enough to fit within the tight servo arrangement of the MiniCP. You must also swap the two outside wires on the connector (easy to do). Once I finally got it in place, it made a horrible buzzing noise and got tremendously hot. Not a good servo for the MiniCP in my opinion, but some claim success. It is also not available in the US warehouse, so shipping will take a while.

Hobbyking sells a great little servo called the **HK-5320 Ultra Micro Digital Servo**, which is available from the US warehouse for \$3.66 at the time of this writing. This is definitely my pick for a servo replacement. It's actually smaller than the stock walkera servos, but filling a gap is easier than making one. The other issue: These servos move the wrong way once hooked up! How to fix that? Get out your soldering iron!

This process will take you about 20 minutes your first time, especially if you aren't familiar with soldering on a circuit board. After I did 2 though, I now find that I can knock one of these out in 3-5 minutes...easily worth the \$15 cost savings over a walkera servo.



Fig 1: Size comparison between the HK-5320 (white), and the stock walkera servo.

Step 1: get your stuff

You'll want to have all your parts ready first, but don't worry, there aren't many.

1. HK-5320 servo
2. "Microheli balls" like these from an MCPX. Just search "Microheli balls" on ebay and they should come up.
http://www.ebay.com/itm/Microheli-Blade-MCP-X-Precision-CNC-Steel-Swash-Ball-Set-MH-MCPX021S-/280832242732?pt=US_Character_Radio_Control_Toy&hash=item4162e7f42c
3. small soldering iron (see below for recommended \$15 iron from HK USA warehouse)
4. Small screwdrivers (very small, for the servo screws and the ball links)
5. Hot glue gun

Step 2: Swap the servo wires

Figure 2 shows the problem...the signal and ground wires are backwards when comparing the HK-5320 to the walkera servo. This is an easy fix. Just gently pry up on the little white tab holding the servo wire in place, and give the wire a little tug. It should slip out. Remove both the Yellow and brown wires, swap them, and reinsert. If you have trouble with this, please stop now...it gets worse.

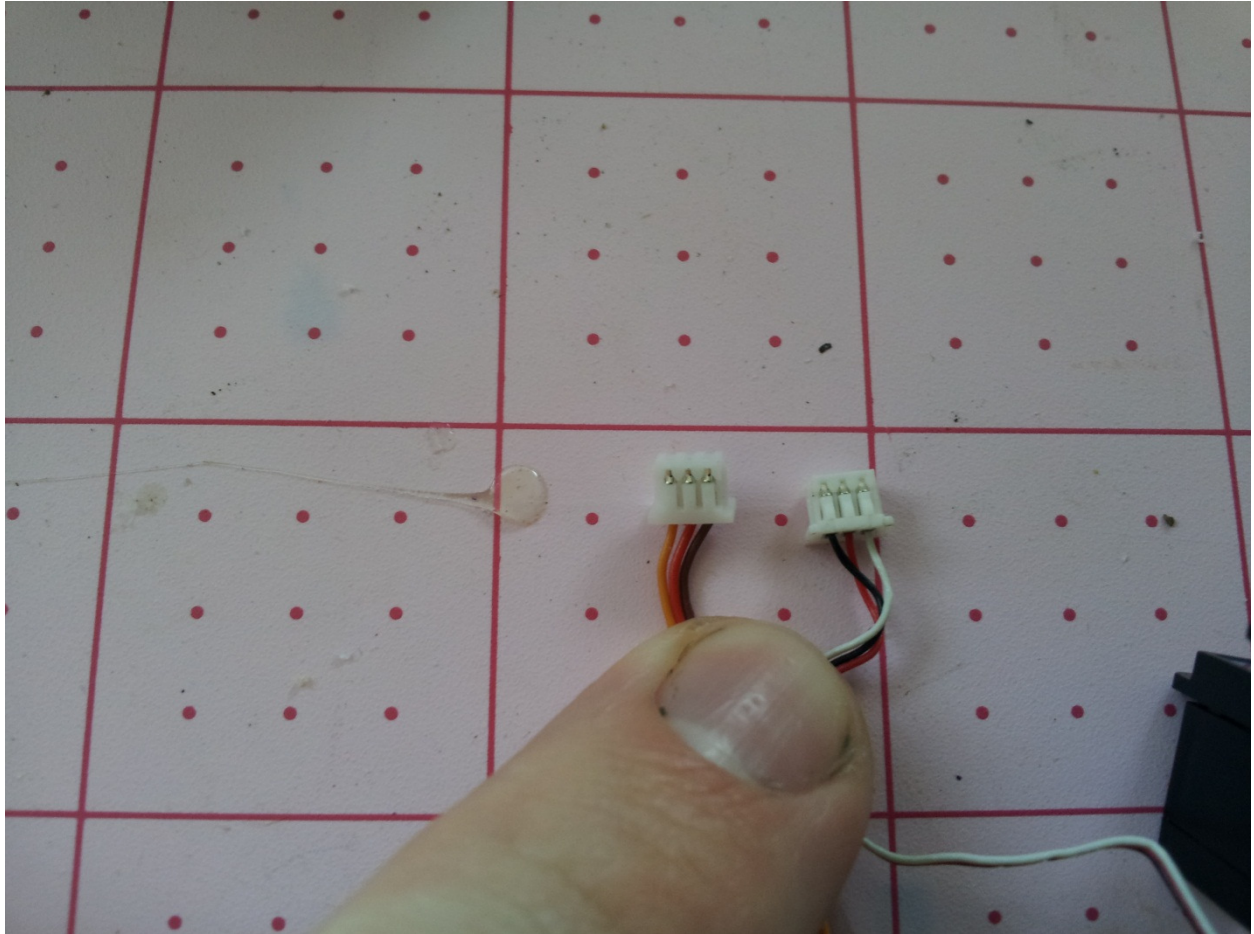


Fig 2: Walkera connector is on the right, HK-5320 connector is on the left. Swap the outside 2 wires on the HK-5320 so that the yellow wire will then be on the right, and the brown is on the left (therefore matching the walkera connector).

Step 3: Open it up

Now we get into the gritty stuff. Open up the servo (one screw on top, one on bottom). Don't lose the screws! Inside, you'll find a motor and a circuit board. The board is what we're after. There is also a tiny little piece of clear plastic under the circuit board. Don't lose that either! I don't know what it does, but don't lose it.

Hold the board as shown in figure 3. You will see 3 wires coming from one side of the board, and running somewhere deep inside the servo (not the 3 wires going to the connector!). The goal here is the **swap the middle wire and the left wire, when held as pictured**. I have seen in other write ups where the wires are different colors...sometimes you swap the red/black, sometimes you swap the red/blue. As you can see here, mine are all blue. You really don't care what color they are, your goal is to swap the left 2.

THIS THING IS TINY!!! I used this soldering station, available from the Hobbyking USA warehouse

http://www.hobbyking.com/hobbyking/store/_19240_Soldering_Station_with_Adjustable_Heat_Range_USA_Warehouse_.html

It has a very precise tip, and works excellent for small circuit board jobs like this. Get one when you order your servos, you will find lots of uses for it.

While soldering, be very careful not to “smear” solder across all the contacts and short them out. I used NO extra solder for any of this mod...the existing solder on the wires and on the solder pads is more than enough. Just melt it, remove the wires, melt it again and reattach the wires.

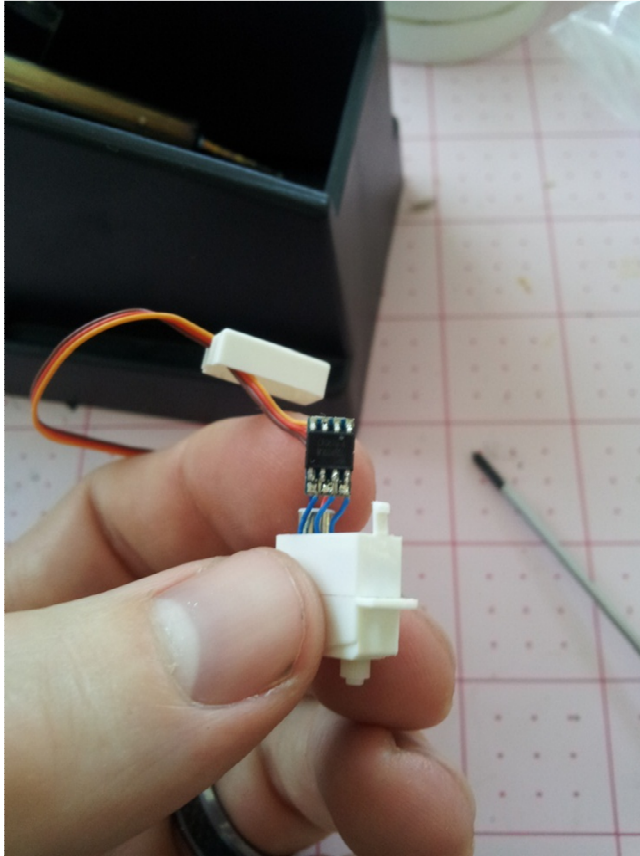


Figure 3: Hold the circuit board as shown. You will need to swap the middle wire with the left wire.

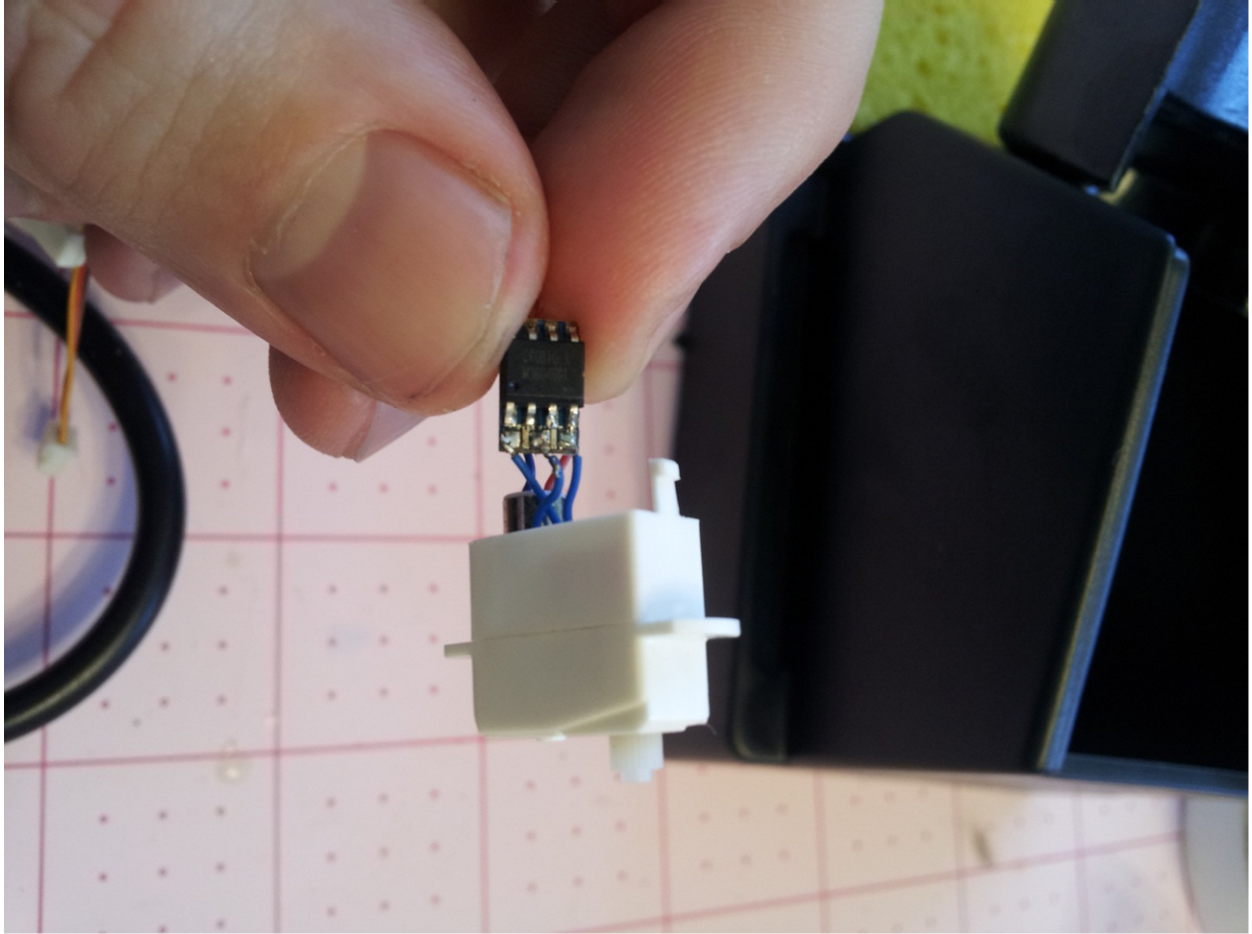


Fig 4: The middle wire is now swapped with the left wire

Step 4: Swap the motor wires

Flip the circuit board over, and you will see two wires running from the board to the servo motor. These wires now need to be switched. See Figure 5 Below.

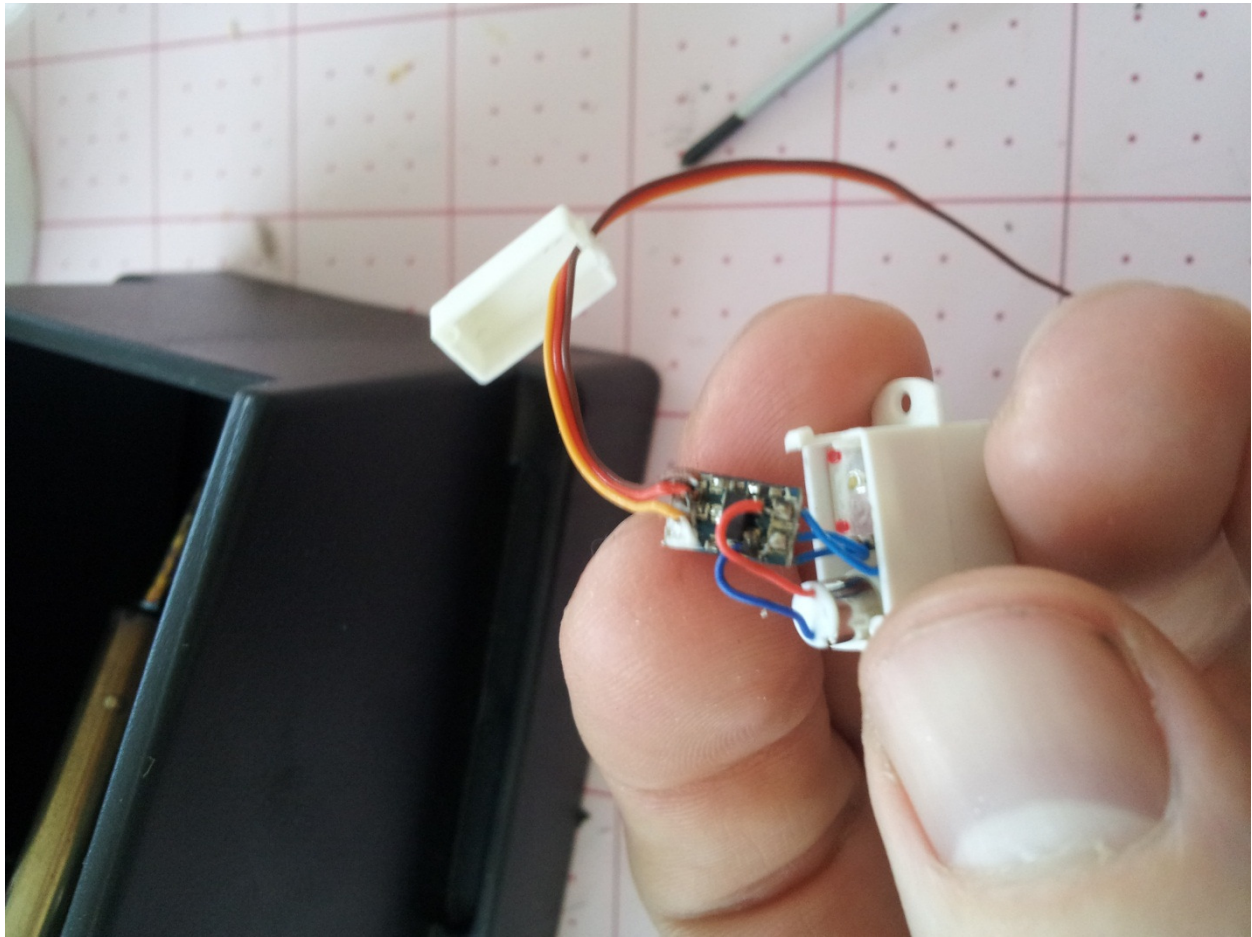


Figure 5: Motor to circuit board connection. Swap these 2 wires.

Step 5: reassemble

Congrats! If you've swapped the 2 outside wires on the servo connector, the two of the 3 wires as shown in step 2, and the two motor wires shown in step 3, you're done with the hard part! Put that tiny little piece of plastic back under the circuit board, and cram the board back in the servo. Smash everything in, make sure no wires are pinched, and close the servo back up. You didn't lose the screws did you? I don't have a picture of the final servo, but it should look the same as when you started (duh).

Step 6: Servo arms and balls

Here, you'll need to take one of your MCPx balls you got from ebay (or your preferred source), and attach them to the innermost hole on the servo arm, on the back side. See Figure 6. It's hard to overstate how tiny these things are, so don't drop them. You'll need a VERY tiny standard screwdriver for them.



Figure 6: The mini heli ball goes on the backside of the servo horn (which will be closest to the servo) on the innermost hole.

Step 7: fitment to MiniCP

The final step! Here we will deal with the size issue of the smaller HK-5320 servo. If you just put them on the MiniCP as is, they will simply fall out; there is just too much play in the mounts. You can fix this however you like, but I decided to simply run a bead of hot glue down each end of the servo (by the mounting tabs). Run a 1mm or so thick bead down each side, and let it cool/dry. Put it back into the heli, and see how it fits. Use more glue if necessary.

The goal here is not to glue the servo to the heli frame, it's simply to fill up space.

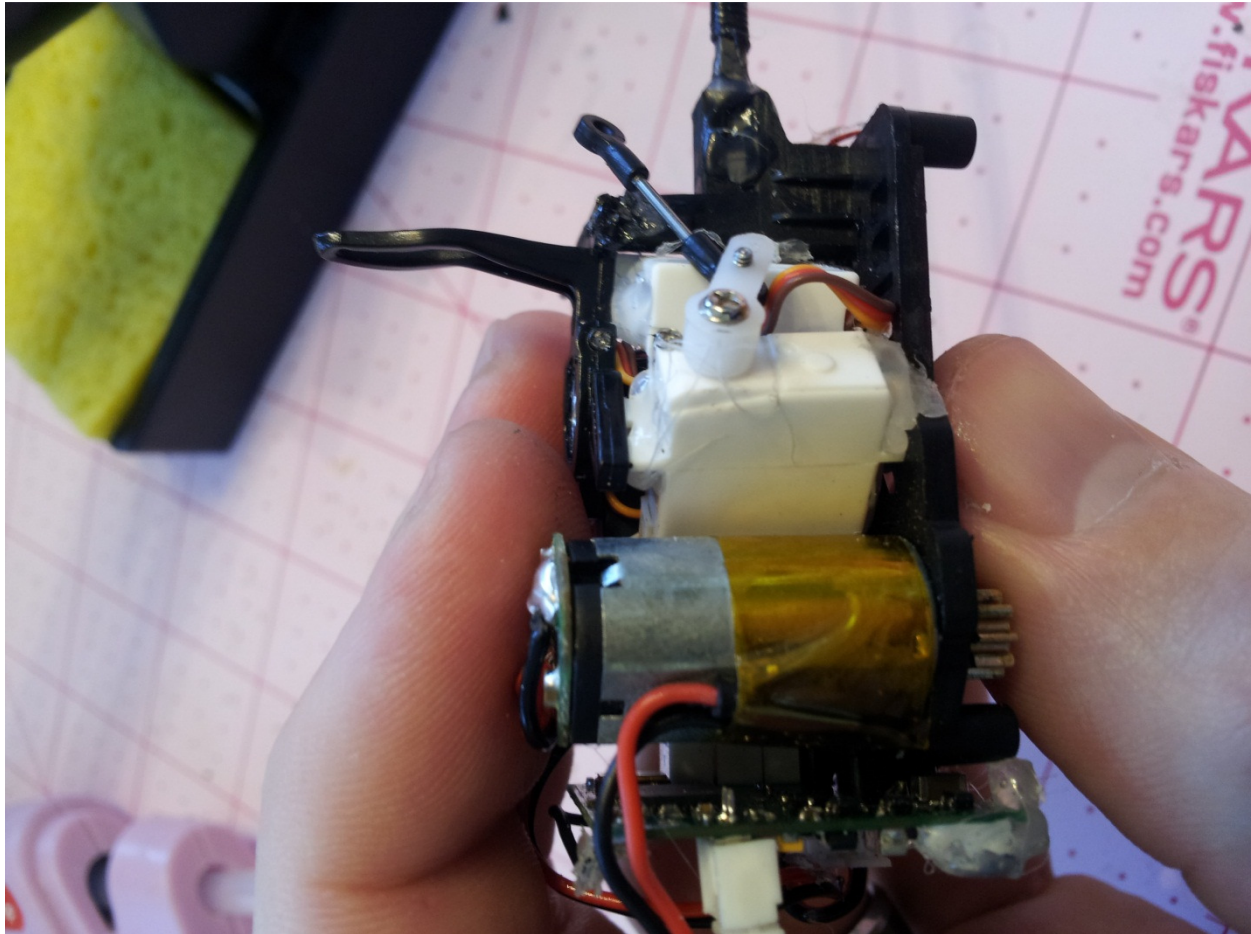


Figure 7: use hot glue to fill the gap between the servo and the original mounting brackets

That's it! Power on the heli to center the servo, then put the servo horn on and screw into place. Reassemble the heli, and reattach your ball links. Check that everything is moving the right direction (it should), and test fly. I have been flying mine with 1 stock walkera servo and 2 HK5320s for probably 2 dozen flights now, with no issues. They work great. Best of all, at \$4 each, there's really no need to do a servo saver mod on them. I have yet to strip one out, but if they strip, simply replace them. Enjoy!