

MrBaddeley
R2D2 version 2 Holoprojector
instructions
Version 0.1 (Draft)

<https://www.patreon.com/user?u=4294285>
for other parts and instructions

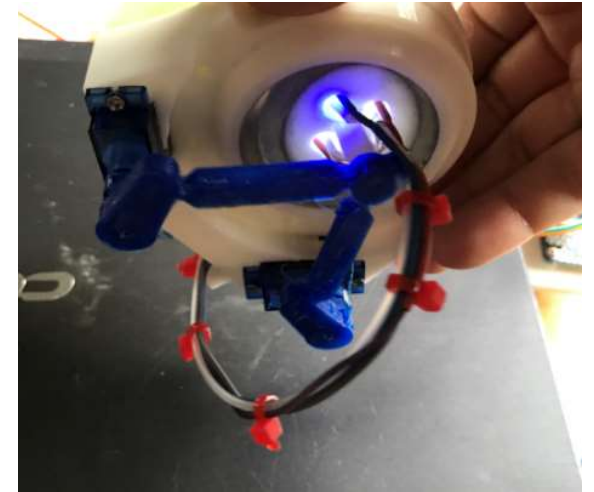
Features...



**Full cable management,
used 1.75mm filament to
reinforce wiring**



4x 5mm LED fittings



Ninjaflex one print hinge

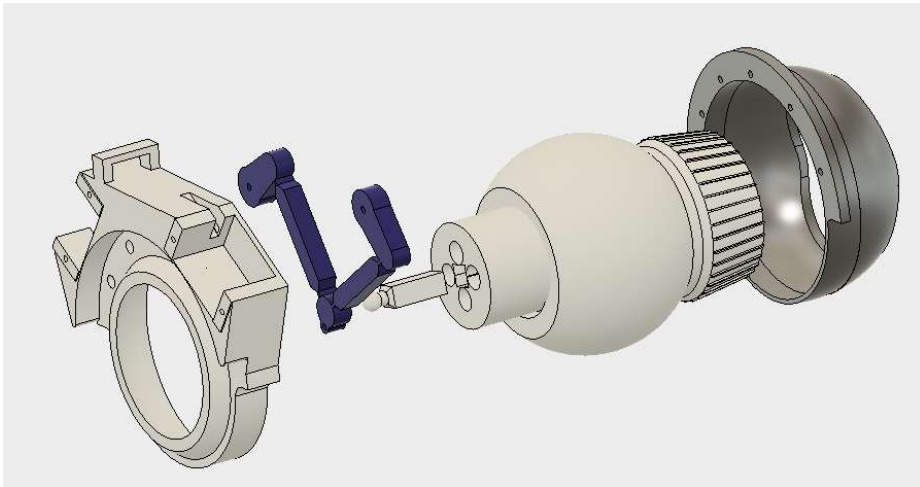


SG90 Servo compatible



Printed diffuser

MrBaddeley R23D printed holoprojector instructions.



Firstly the basics, all parts are printed in ABS except the Servo hinge, this is printed in Ninjaflex. All parts are designed for a .4mm Nozzle.

I've printed all the parts in 3 layers, 20% infill at a .2 layer height (the extra resolution makes a difference on the holoprojector and covers. You can go higher depending on how much sanding / how smooth a finish you want.

The diffuser (Lenscov) is printed in vase mode, this is a single thickness wall and 2 layers on the base. Really want this part to be thin to not absorb any light. I used natural filament for this as it's slightly translucent.

The holoprojector is made for 6mm thick dome panels (the printed dome I published). I've included an optional space (OptionSpace) to take this to 2mm for other domes. (you can adjust the height in your slicer if you want other thicknesses).

Other parts needed, cable ties, 5mm LEDs (I used 3 white and a Blue, but up to you), SG90 servos (ebay) and small self tappers to hold the servos. Also hot glue / solder and shrink cable covers.

Firstly print and familiarise yourself with the build.
Print all the parts once except options noted below.

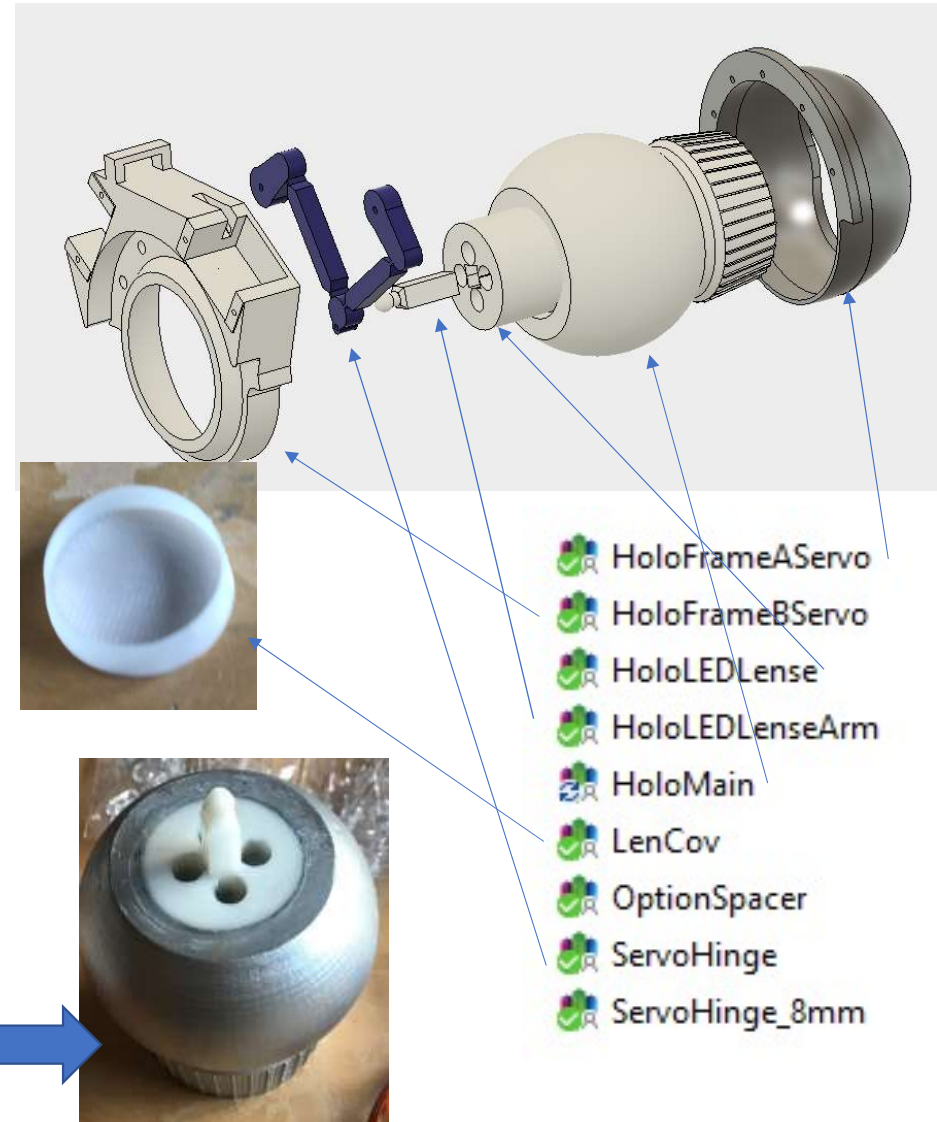
The **ServoHinge_8mm** is the same as ServoHinge, however the thin “Hinges” are .8mm thick rather than .4mm. Just in case you want a stiffer / stronger hinge.

The **OptionSpacer** is glued at the front if you have a dome with thinner panels. The standard is for 6mm thick (my printed design) but the spacer support 2mm thick panels and can be stretched in your slicer to accommodate any other dome sizes.

The HoloFrameBServo will need supports, just for the cable management holes.

Once printed, paint / finish the parts as you wish before assembly. The HoloFrameAServo can be glued into the dome in preparation.

First part of the assembly is to glue HoloLEDLenseArm into the HoloLEDLense, then the HoloLEDLense into the HoloMain. I used ABS acetone sludge to do this. Finished, it looks like this....

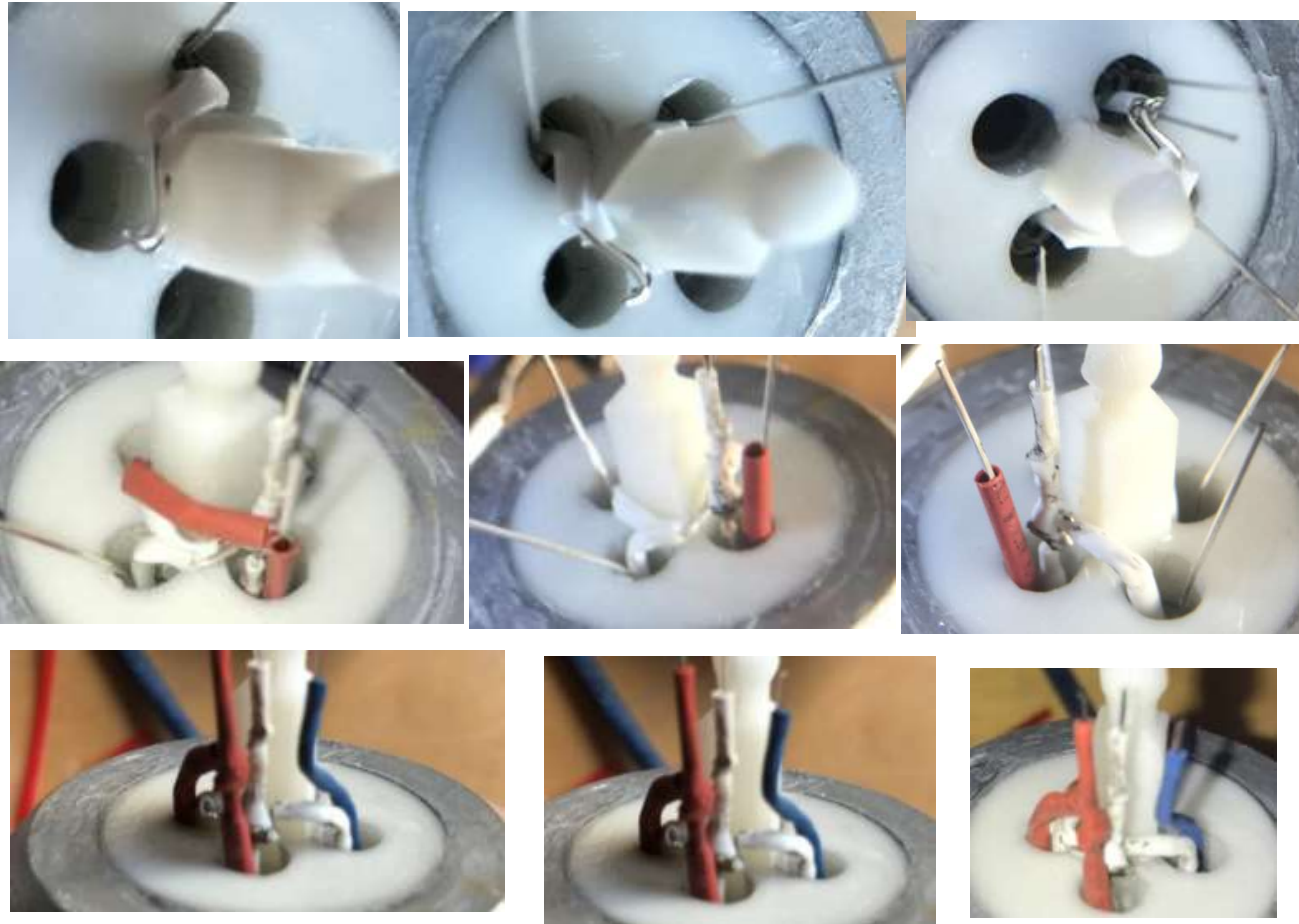


Soldering the LEDS....

OK, first part is to fit / wire the LEDS. Now I'm not a great electrical guru, so please do it your own way if mine seems a little "Heath Robinson".

Take 4 x 5mm LEDS (I used 3 white and one colour, Blue in my case). The short leg of the LED is negative and the long leg of the LED is positive.

Fit 4 LEDS, with the shorter leg toward the centre post, mark the coloured one (I used shrink cable). Start with the Negative (inc Blue), all legs can be connected together. I created a "soldered" ring around the middle at the base with the last LED leg keeping straight (This is the White cable on the pics). Then the same with the three positive legs for the white LEDS (the red on the picture). Finally the Blue (or Coloured LED) just needs a shrink cable on it. What you want to end up with is all Negatives soldered and covered (white), all White LED positives soldered and covered (red) and the coloured LED covered.



I haven't used resistors on my LEDS as the Adafruit 16 channel 12 bit driver board I'm using has a 220ohm resistor on each PWM driver which means I don't need to. (If all this makes no sense, I suggest you google LED and resistors for more gobbledgook... It's important, because if you just hook up the LED to 5v it'll burn out..).

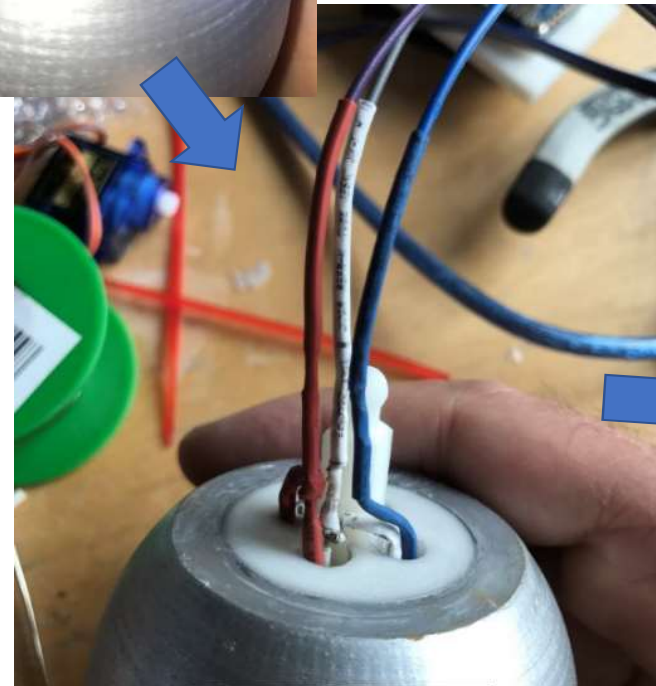
LEDS part 2...

I even confused myself typing the last page. Basically we have three wires leaving the LEDs, a common (negative) which is wire on the pictures and connects to all LEDs. A White LED positive, this connects to the positive on all the White LEDs (three in my case). Finally a Coloured positive, which only connects to one coloured LED. The three legs should all come up at the same point as we're going to cable tie them together.

Then attach the three power cables and shrink cable. Obviously make sure none of the cables / LED legs are unshielded / touching each other. Don't cable tie them yet, but you can first test them with a suitable power source (don't forget the resistor rule) and when happy I popped a small blob of hot glue to hold the LEDs secure in the holes.

You should end up with something like the picture....

This isn't an electronics tutorial, so please do the soldering / cabling how you see fit, I'm just sharing my approach.



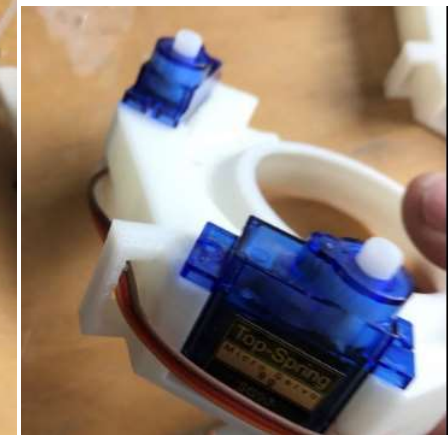
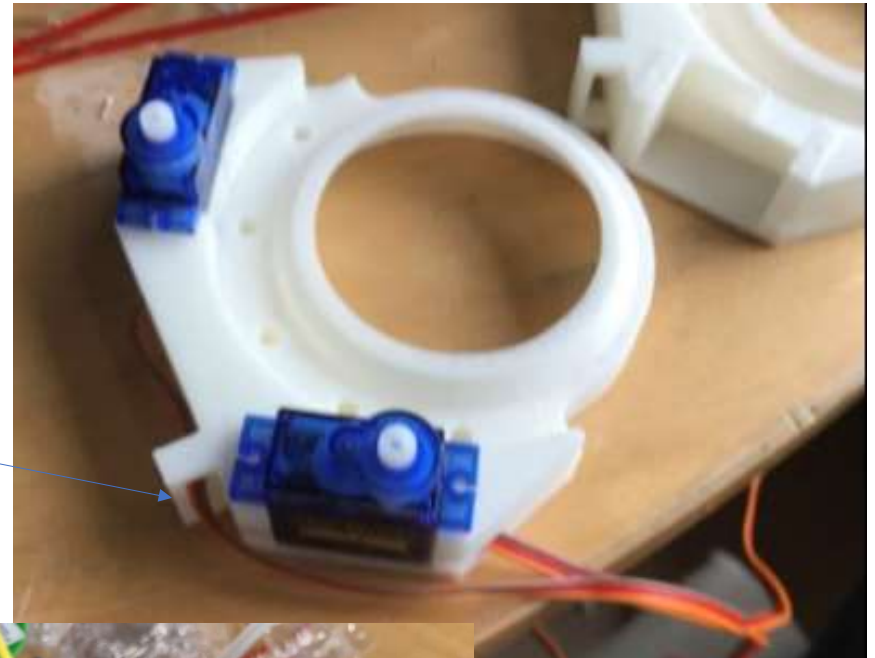
The main frame

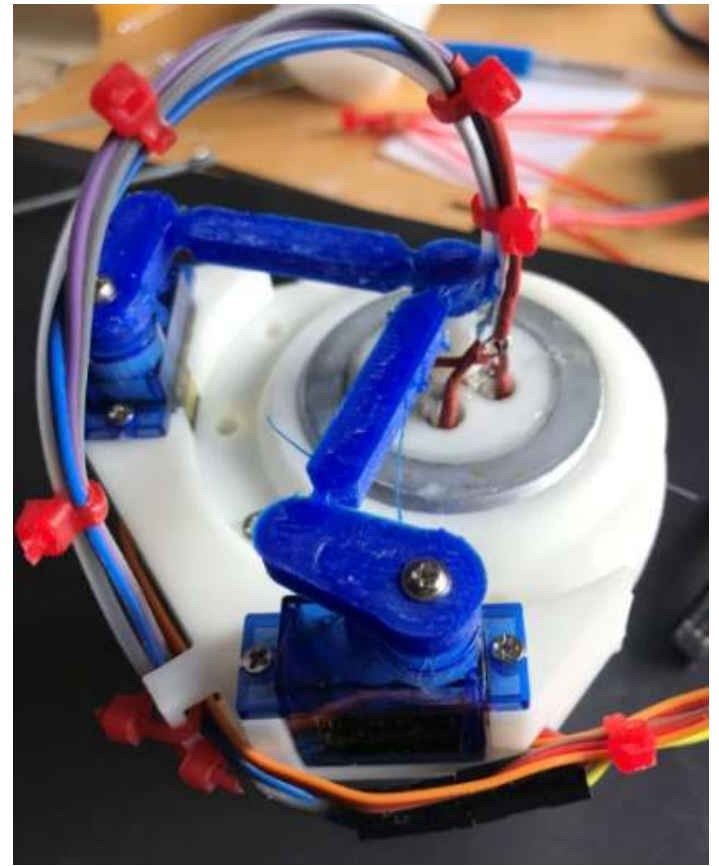
Next, fit the two servos into the Servo frame, the cables should slot into the grooves (quite tight but fits). Feed the cable through the cable management hole for one of the Servos (should be obvious).

Next fit the arms to the Servo (These are the single arms which slot into the Ninjaflex hinge). You want the rest position (the holoprojector facing front) to be the centre position for the Servo.

Then put the main Holoprojector into the frame (the outer cover is fitted to the dome, so it just rests in, or print a space for setting up). Clip the Ninjaflex hinge onto the top ball joint and over the two servo arms and screw through the Ninjaflex to hold the arms onto the Servos.

Take a length of 1.75mm Filament (I used Nylon but any will do). You'll find a hole on the Ninjaflex hinge just near the ball socket, push the filament into that fully. The Filament will create a smooth bend which ends in the cable hole on the Servo frame. This filament is to stop wire fatigue as the servo moves. Using a number of Cable ties, tie the cables to the filament securely to create one cable management length. Feed the LED cables through the Cable Hole. (Pics on next page).





Testing / Finishing...

I used the Adafruit 16 channel 12 bit Servo / PWM board to drive these. This can be configured in blocks of 4, with 0&1 driving the servo and 2&3 driving the LED, hence you can drive three holoprojectors, with Light and movement from one board.

I have included a test sketch (you may have to adjust the servo position numbers) which will get you started, but this isn't a Arduino tutorial (I'm just fumbling by to get this going), but as the Adafruit is a I2C device, it only needs 5v, 0v, and two cables running to the dome to control this from your main body.

The test sketch uses blocks 0&1 for the Servo drive, 2 for the white LED and 3 for the Blue LED.

Servos connect Brown cable to Ground (or 0v). The LEDs are connected with Negative (or Ground) to Ground (0v) and the Positive to PWM (not the 5v please as you may burn the LEDs).

The Diffuser glues into the holoprojector and then add a suitable lens on the outside....

Then it's simply gluing or screwing the frames into the dome, all done!





Supported and tested by Sean Lavigne, Jay Williams, Steven Elford, Robert Gusek, Rob Dinniwell, Joseph Masci, Sam D. Fenimore, LarryJ, tevans, Rick Davis, Brendan Faulkner, Nicolas Carré, Ben Langley, Mathieu Saint-marc, Chistopher Edwards, Mark Oram, Tim Parr, Jon Haag, John Gardener, Ryan Roehitch, Oiva Ranta, Wes Thierry, Robert Bean, Mitchell Young, Jake Danible, Simon Ruel, William Meyer, Brian Bishop, Danny Olsson and Brian.

