

PINKPANTHER
a quadruped robotic platform

ABSTRACT



The PinkPanther is based on a mammal-type quadruped leg configuration, similar to that of the MIT Mini Cheetah or Boston Dynamics Spot robot designs. Above is a picture of the assembled physical robot. It weighs roughly 3.6 kg, with 0.15 m and 0.16 m link-lengths for the upper and lower links respectively, and 0.23 m between the front and rear legs. All components, excluding an acrylic sheet for the main body link and off-the-shelf parts, are 3D printed. It was designed to be a robust & low-cost robotic platform which is easy to assemble and service. Here you will find the building process and an electronic diagram. For the Bill of Materials please refer to the drawings in the ‘Drawings’ directory.

THE ROBOT BUILD

1. First, refer to the GrabCAD (<https://grabcad.com/library/pinkpanther-quadruped-robot-1>) to download all files to be 3D-printed and laser-cut.
2. 3D-print and laser-cut the necessary parts.
3. The 3D-printed parts are finished by a 3-step process:
 - 3.1. Removing support structures and sanding.
 - 3.2. Coating with XTC-3D – a resin that made the legs more mechanically sound and made the surface smooth for painting (other epoxy resins are likely equally effective).
 - 3.3. Spray paint priming, painting & finishing.



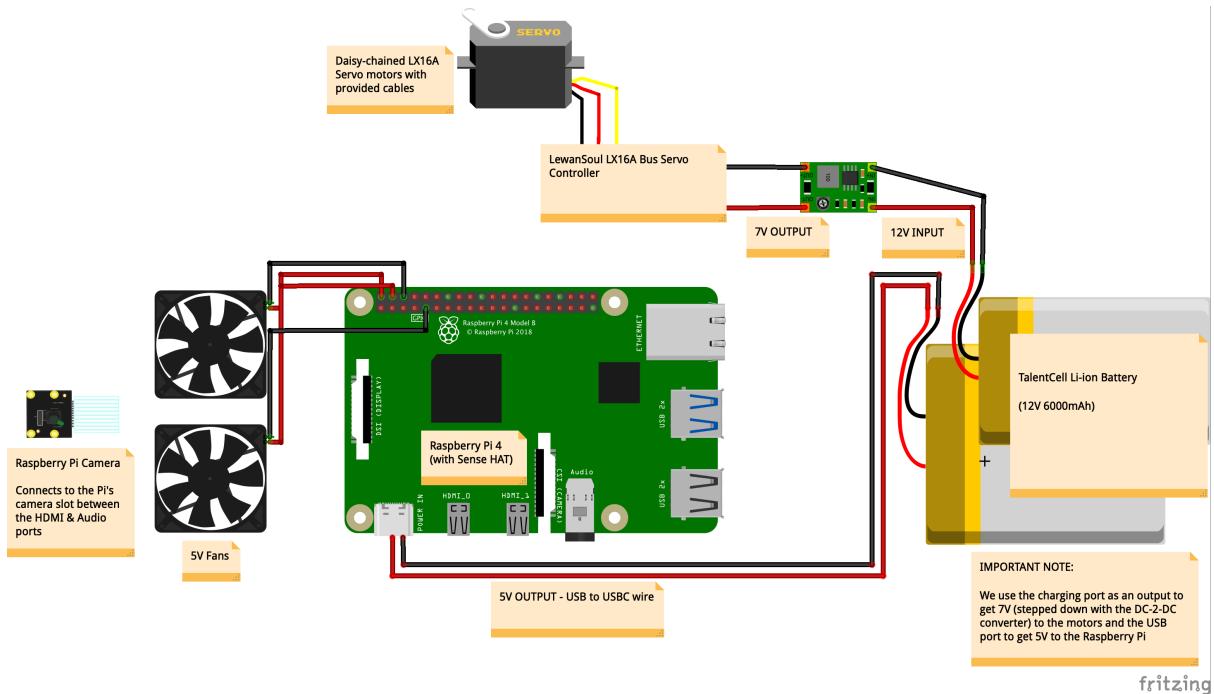
Finishing of 3D printed parts

4. All thermal inserts were then placed in the holes on the 3D-printed parts. A soldering iron was used to heat them up and sink them into the holes.
5. The motors with their corresponding brackets were assembled to create the skeleton of the robot, as shown below.



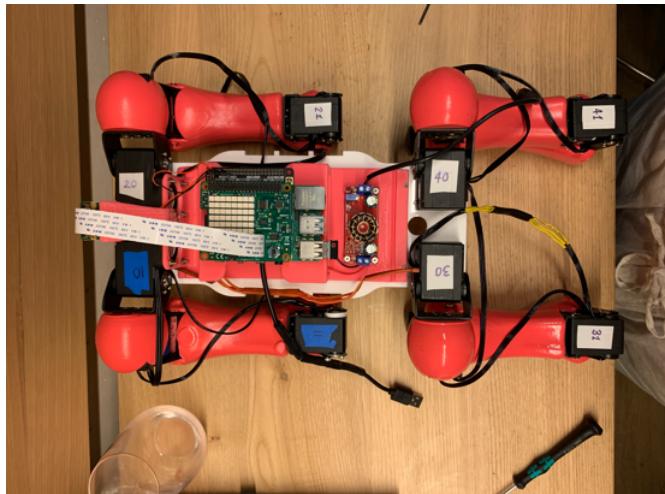
Skeleton of the robot

6. The electronic boards were added to the structure and fixed onto the base link of the robot. The battery was attached to the underside of the base link with heavy duty Velcro.
7. All electronic components were connected according to the diagram below. This includes a *Raspberry Pi 4* as the main control unit, a *Bus Servo Controller* for the motors and a *DC-2-DC Converter* to be able supply 7V to the motors from the 12V battery.



Electric Diagram

- Finally, cable management was done to ensure all cables were the right length and didn't risk fraying or getting caught anywhere.



Fully built and wired robot

- Please follow the LX16A Bus Servo User Manual (<https://images-na.ssl-images-amazon.com/images/I/91DLnW8nTnL.pdf>) for how to set up and control the motors.
- We used the PyLX-16A library (<https://github.com/ethanlipson/PyLX-16A>) to control the motors with python.