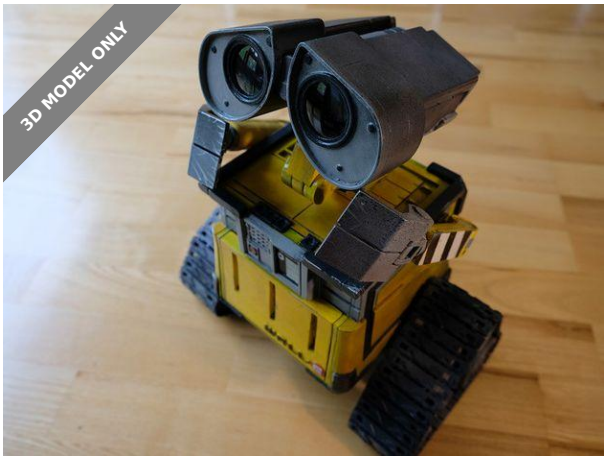


WALL-E

Mr Prints

VIEW IN BROWSER

updated 19. 3. 2023 | published 19. 3. 2023

Summary

I don’t know about you but WALL-E is my favorite Pixar movie! Comment if you agree! (from Thingiverse @chillibasket)

Art & Design > Sculptures

Tags: disney movie pixar

Few robots are more recognisable than WALL·E; his cute appearance and distinctive personality make him instantly endearing to anyone who sees him! In this project, I designed a WALL·E replica with the aim to allow each of the robot's joints to be moveable by hand or using servo motors.

Loosely based on the dimensions and design of ChaosCoreTech's Wall-E replica (https://www.thingiverse.com/thing:1681442), this version was designed from scratch in Solidworks and allows 7 of the joints to be actuated, including the arms, neck, head and eyes. The robot design has the following features:

- Each eye can be raised and lowered independently with servo motors.
- There is room in each eye to add a small camera.
- The head can look left and right using a servo motor.
- The neck is actuated at two joints, allowing the head to look up/down and to be raised/lowered.
- Each arm has a motor at the shoulder to move it up/down.

- The arms consist of pressure-fit joints, hands, and fingers, which can be manually posed.
- The tank treads (skid steering) are fully 3D printed and can be powered using two 12V DC geared motors.

This is an ambitious project, aimed at people who want to build a fully animatronic WALL·E robot with servo-controlled joints. It took me about 3 months to design and assemble the robot, with more than a month spent on just 3D printing all of the parts. In total, there are 310 parts (although 210 of those are very small and make up the tank treads). A PDF containing a list of all the parts and the quantity of each that needs to be printed is included in the download section with the STL files.

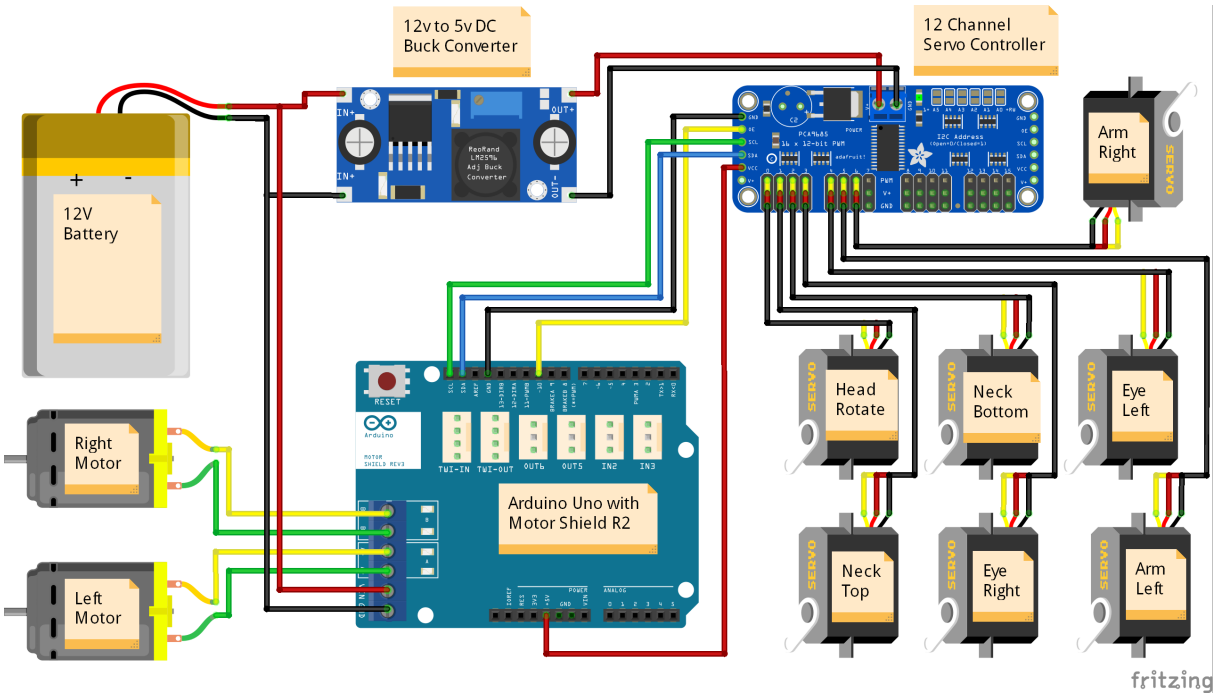
If you feel up for the challenge of tackling this project and printing all the files, please let me know how it goes! Please note that all STL files are in millimetres. The design is scaled at approximately 41% of the size of the robot in the movie.

A detailed description of the robot assembly and coding instructions can be found on my website:
https://wired.chillibasket.com/3d-printed-wall-e/

The code used to program the robot and Raspberry Pi can be found on GitHub. If you have any programming-related issues or questions, please ask them on my website.
https://github.com/chillibasket/walle-replica

Here is a video of my WALL·E robot in action:
https://www.youtube.com/watch?v=QidMAtTzF88

Post-Printing



Changelog

Update 1: (30th June 19) Reuploaded tread-pin-x140.stl; the original file was exported at the wrong scale.
Update 2: (2nd July 19) Modified neck-bottom-right.stl, body-bottom.stl, wheel-bracket-outer-left.stl and wheel-bracket-outer-right.stl to correct minor bolt hole misalignments.
Update 3: (6th July 19) Added wiring digram and an assembly instructions video.
Update 4: (12th July 19) Reuploaded body-back.stl as part of the piston geometry was missing.
Update 5: (15th July 19) Added parts neck-wire-guide-left.stland neck-wire-guide-right.stl.
Update 6: (24th September 19) Updated neck-round-bottom.stl to allow larger servo motors such as the SG90 to fit.
Update 7: (29th October 19) Updated the parts list; the specified lens size for the eyes was too small.
Update 8: (10th April 20) Updated the parts list PDF. Added file wheel-top-larger-x0.stl which can be used instead of wheel-top-x8.stl if you need to increase the tension in the tracks.
Update 9: (11th June 20) Modified the wheel-bracket files to fit motors with speeds below 150RPM; the original files did not have enough room for gearboxes longer than 24mm. Files: wheel-bracket-inner-left.stl, wheel-bracket-inner-right.stl, wheel-bracket-outer-left.stl, wheel-bracket-outer-right.stl.

Additional Hardware

The hardware and electronics required to assemble the robot are:

- (x14) M3 Bolt - 10mm length [link]
- (x12) M3 Bolt - 20mm length
- (x2) M3 Bolt - 6mm length
- (x26) M3 Nut
- (x3) Paper clip - used as linkages
- (x7) High-torque micro servo motor (180° range) [link]
- (x2) Plano-convex lens: ⌀31.5 - 32.5mm - for the eyes
- (x2) 12V DC geared motor - ⌀37mm, 100-150RPM [link]
- (x1) Arduino Uno or equivalent [link]
- (x1) Arduino Motor Shield R3 [link]
- (x1) 16-channel 12-bit PWM servo driver - PCA9685 [link]
- (x1) 12V DC battery pack
- (x1) 12V to 5V DC buck converter [link]

For the eyes I took apart some old binoculars that I had lying around; I think that the reflections and shine on the lenses really make the replica seem more realistic. Additionally, a Raspberry Pi can be used to add extra functionality, such as allowing the robot to play sounds, use a camera, and be remote controlled via a web interface:

- (x1) Raspberry Pi (get one with integrated WiFi) [link]
- (x1) Small speaker
- (x1) USB camera

(Note: links are for reference only; please shop around for the best supplier near you!)

Print Settings

- Layer Height: **0.3mm**
- Infill: **15%**
- Supports: **Yes** - for some of the parts
- Material: **Grey PLA**

(All STL files are metric - dimension in millimeters)

- I used a relatively coarse resolution and low infill percentage to speed up the printing times and reduce the weight of the parts. The small servo-motors used to actuate the joints are not very strong, so keeping mass to a minimum is a must.
- I printed all components on a heated glass bed, with a 5mm brim to reduce warping. Some of the parts have overhangs and require supports.
- If you intend to paint the robot, I recommend printing in a metallic grey color so that it looks like metal if any paint is chipped away.
- Tolerances for all slots and interconnecting parts are +-0.20mm.

- The robot requires about 1.5kg of filament (two rolls) in total.

Assembly Instructions

See the video for full instructions about how to assemble the robot.

The wiring diagram is shown in the post printing, illustrating how each of the electronic components were connected in the robot. The USB port of the Arduino Uno was then connected to the USB port of the Raspberry Pi. If the 12v to 5v DC buck converter is capable of delivering up to 5 amps, then the Raspberry Pi can be directly powered from the converter. Otherwise, it should be connected to a separate 5v battery.

This remix is based on

WALL-E Robot Replica
by chillibasket

Model files

Model Files 63 files

body-back.stl

neck-bottom-left.stl

eye-camera-replica.stl

hand-bracket-x2.stl

body-front-pins-x2.stl

wheel-front-x4.stl

wheel-top-larger-x0.stl

eye-back-left.stl

eye-middle-left.stl

body-right.stl

head-axle.stl

wheel-gear-motor-x2.stl

hand-axle-x2.stl

body-front.stl

body-neck-servo-holder.stl

neck-top-linkage.stl

wheel-bracket-outer-left.stl

wheel-bracket-inner-left.stl

arm-servo-bracket-right.stl

wheel-axle-spacer-x8.stl

wall-e_assembly_notforprinting.stl

arm-piston-x2.stl

neck-bottom-axle.stl

wheel-top-x8.stl

body-top.stl

body-left.stl

arm-servo-bracket-left.stl

hand-finger-middle-x2.stl

wheel-frame-right.stl

neck-top.stl

arm-hinge-inner-x2.stl

eye-camera-mount.stl

arm-hinge-axle-x2.stl

wheel-back-x4.stl

eye-front-left.stl

neck-round-top-right.stl

neck-wire-guide-left.stl

neck-middle-axle.stl

body-front-door.stl

wheel-axle-back-x2.stl

tread-pin-x140.stl

neck-bottom-linkage.stl

arm-barrel-end-x2.stl

neck-wire-guide-right.stl

wheel-frame-left.stl

eye-front-right.stl

neck-round-top-left.stl

tread-plate-x70.stl

wheel-bracket-outer-right.stl

wheel-bracket-inner-right.stl

wheel-gear-driven-x2.stl

eye-middle-right.stl

hand-finger-left-x2.stl

eye-back-right.stl

arm-barrel-x2.stl

head-center.stl

wheel-axle-notched-x6.stl

neck-bottom-right.stl

body-bottom.stl

wheel-frame-addon-x2.stl

arm-hinge-outer-x2.stl

hand-finger-right-x2.stl

neck-round-bottom.stl

Other files

wall-e_list_of_parts_v3.pdf

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