OT-2 System Overview

This document seeks to be an initial primer for anyone looking to understand the high level OT-2 electromechanical architecture as well as a compilation point for more in depth documentation of specific subsystems.

[OT-2 Electrical System Block Diagram]

Motors:

3016 - X Motor

X - Moves the gantry in the X direction (left/right)
Moons MS17HD6P4150-20 (Current Motor)
Rated voltage: 3.3V
Rated Current: 1.5A
Phase Resistance: 2.2Ohm +/- 10%
Phase Inductance: 4.9mH +/- 20%

Casun 42SHD0404-24B
Rated voltage: 3V
Rated Current: 1.5A
Phase Resistance: 2Ohm +/- 10%
Phase Inductance: 3.8mH +/- 20%

3056 - Y Motor

Y - Moves the gantry in the Y direction (front/back)
Moons MS17HDBP4200-15 (Current Motor)
Rated voltage: 2.98V
Rated Current: 2.0A
Phase Resistance: 1.49Ohm +/- 10%
Phase Inductance: 3.8mH +/- 20%

Casun 42SHHD0801-19S1
Rated voltage: 2.7V

Rated Current: 1.5A
Phase Resistance: 1.8Ohm +/- 10%
Phase Inductance: 3.2mH +/- 20%

3067 - Z/A Motors

Z - Moves the gantry in the Z direction Left (up/down)
A - Moves the gantry in the Z direction Right (up/down)

Casun 42SHD0238-258NK (Current Motor)
Rated voltage: 5V
Rated Current: 1A
Phase Resistance: 5Ohm +/- 10%
Phase Inductance: 10mH +/- 20%

Raspberry Pi

Some useful documents related to the Raspberry PI.
We use a Model 3 B v1.2

Power Consumption
Power Supply

- 2.5A recommended supply
- 400mA nominal board consumption
- 1.2A USB max consumption

Raspberry PI GPIO Details
Schematics
Pi Audio Output
Pi Audio Pins

Cables

3M Flat ribbon cable

Electrical

Voltage Rating:	USA: 300V
Insulation Resistance:	$> 1 \times 10^{10}$ Ω/10 ft. [3 m]
Characteristic Impedance:	**Unbalanced** 106 Ω
Capacitance:	13.3 pF/ft [43.8 pF/m]
Inductance:	0.15 µH/ft [0.49 µH/m]
Propagation Delay:	1.42 ns/ft [4.66 ns/m]
Velocity of Propagation:	72%

Note: Unbalanced is measured between ground-signal-ground conductors.

- Self Inductance: 0.49uH/m
- Capacitance: 43.8 pF/m
- Characteristic Impedance: 106Ohm
- 28AWG, 19 stands, 0.079mm
- 186Ohms/km

Ethernet to USB

Opentrons Part number: 6011
JP208B
Realtek Driver
22mm (0.86in) wide x 18mm (0.7in) tall x 59mm (2.3in) long
Cable length: 140mm (5.5in)

Uses Realtek 8150B chipset