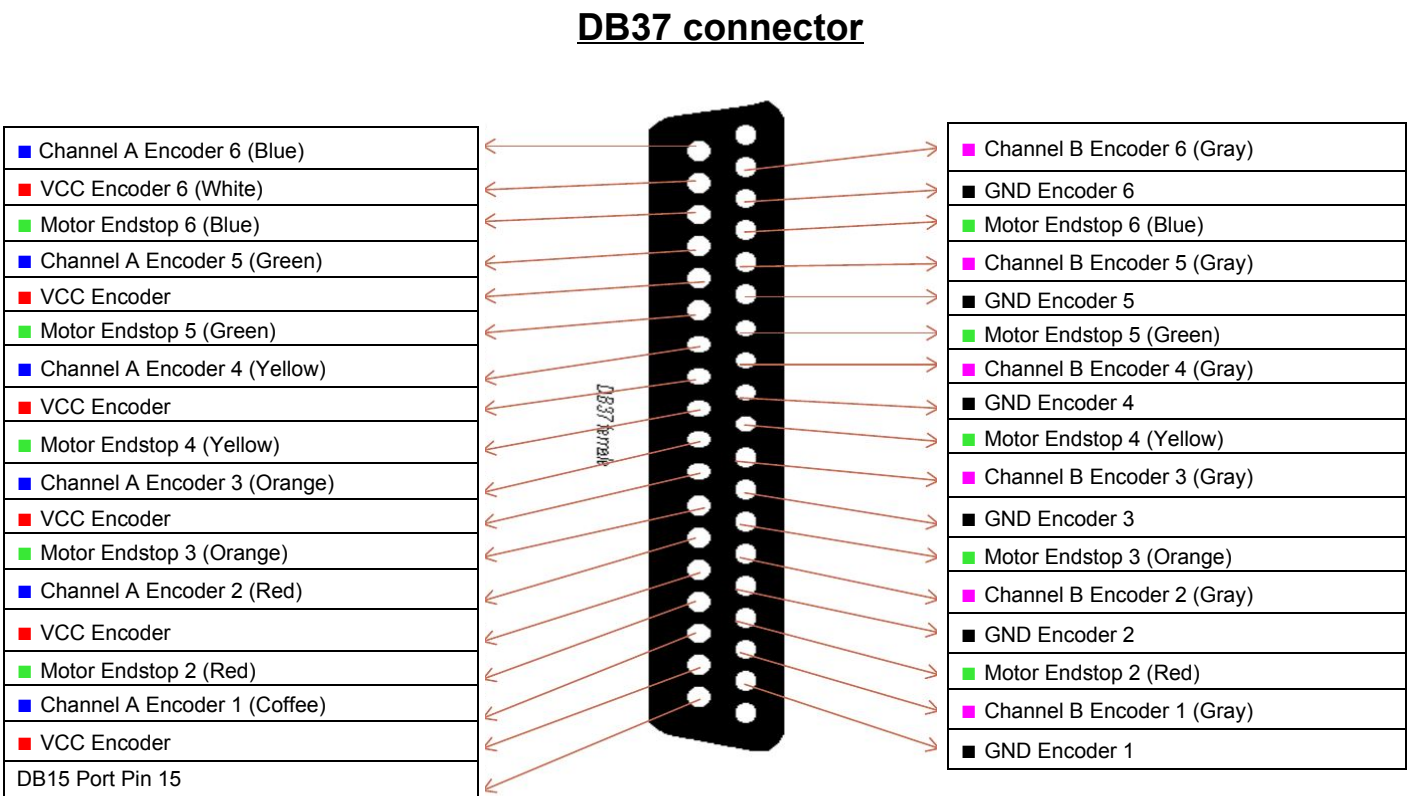The main aspects of ARMDROID 2001 are mechanical, electrical and electronic.

All components (motors, encoders, endstops, etc) were identified through the PCB, and map to the DB37 and DB15 connectors in the following way:
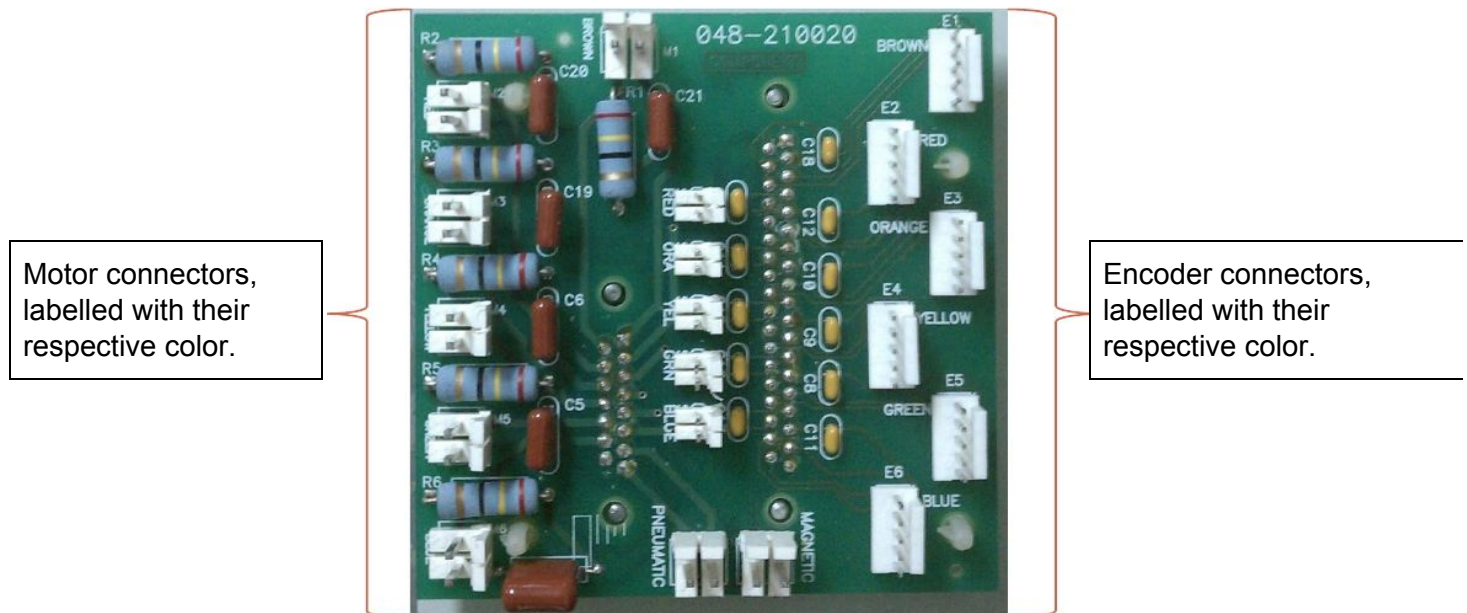
DB37 connector

Left	Right
■ Channel A Encoder 6 (Blue)	■ Channel B Encoder 6 (Gray)
■ VCC Encoder 6 (White)	■ GND Encoder 6
■ Motor Endstop 6 (Blue)	■ Motor Endstop 6 (Blue)
■ Channel A Encoder 5 (Green)	■ Channel B Encoder 5 (Gray)
■ VCC Encoder	■ GND Encoder 5
■ Motor Endstop 5 (Green)	■ Motor Endstop 5 (Green)
■ Channel A Encoder 4 (Yellow)	■ Channel B Encoder 4 (Gray)
■ VCC Encoder	■ GND Encoder 4
■ Motor Endstop 4 (Yellow)	■ Motor Endstop 4 (Yellow)
■ Channel A Encoder 3 (Orange)	■ Channel B Encoder 3 (Gray)
■ VCC Encoder	■ GND Encoder 3
■ Motor Endstop 3 (Orange)	■ Motor Endstop 3 (Orange)
■ Channel A Encoder 2 (Red)	■ Channel B Encoder 2 (Gray)
■ VCC Encoder	■ GND Encoder 2
■ Motor Endstop 2 (Red)	■ Motor Endstop 2 (Red)
■ Channel A Encoder 1 (Coffee)	■ Channel B Encoder 1 (Gray)
■ VCC Encoder	■ GND Encoder 1
DB15 Port Pin 15	

DB37 female

DB15 connector

DB37 Port Pin 20
■ Motor 6 (Blue)
■ Motor 5 (Green)
■ Motor 4 (Yellow)
■ Motor 3 (Orange)
■ Motor 2 (Red)
■ Motor 1 (Brown)

DB15 Female
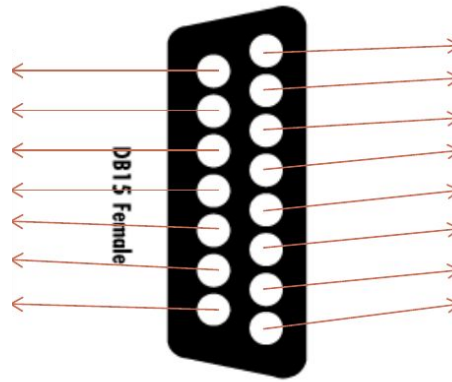
| ■ Pneumatic Signal |
|---|
| ■ Magnetic Signal |
| ■ GND Motor 6 |
| ■ GND Motor 5 |
| ■ GND Motor 4 |
| ■ GND Motor 3 |
| ■ GND Motor 2 |
| ■ GND Motor 1 |

The identification of each terminal gives us important information to be able to apply some control system and thus to be able to analyze the behavior of the arm. Real images of ARMDROID 2001 are presented below:
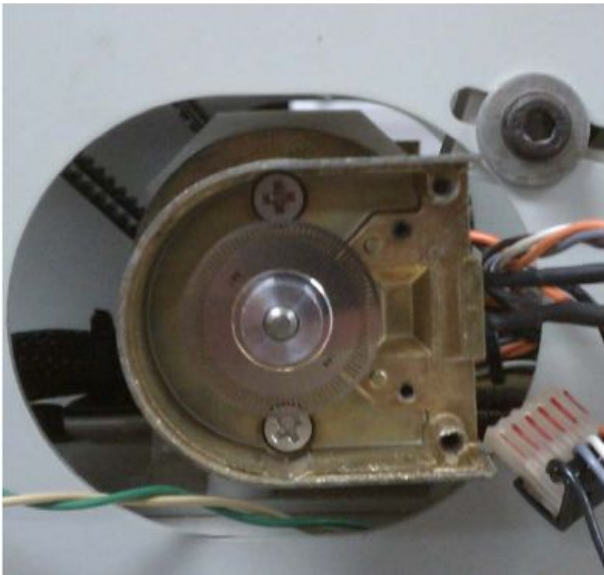

Motor connectors, labelled with their respective color.

Encoder connectors, labelled with their respective color.

Note that each motor has a unique wire color, which corresponds to channel A of it's associated encoder (e.g. motor 6 uses a blue wire, as does channel A of it's encoder).
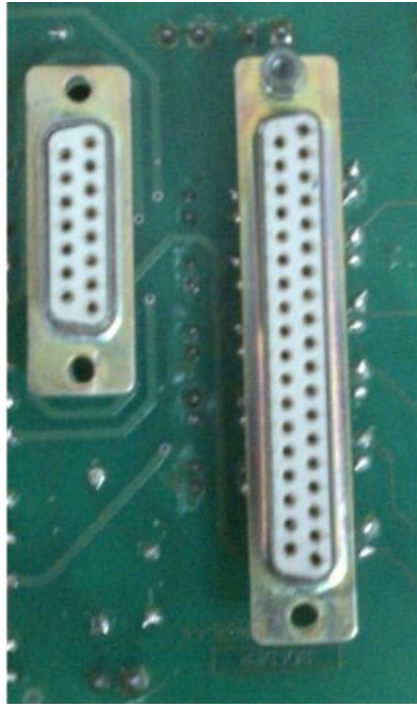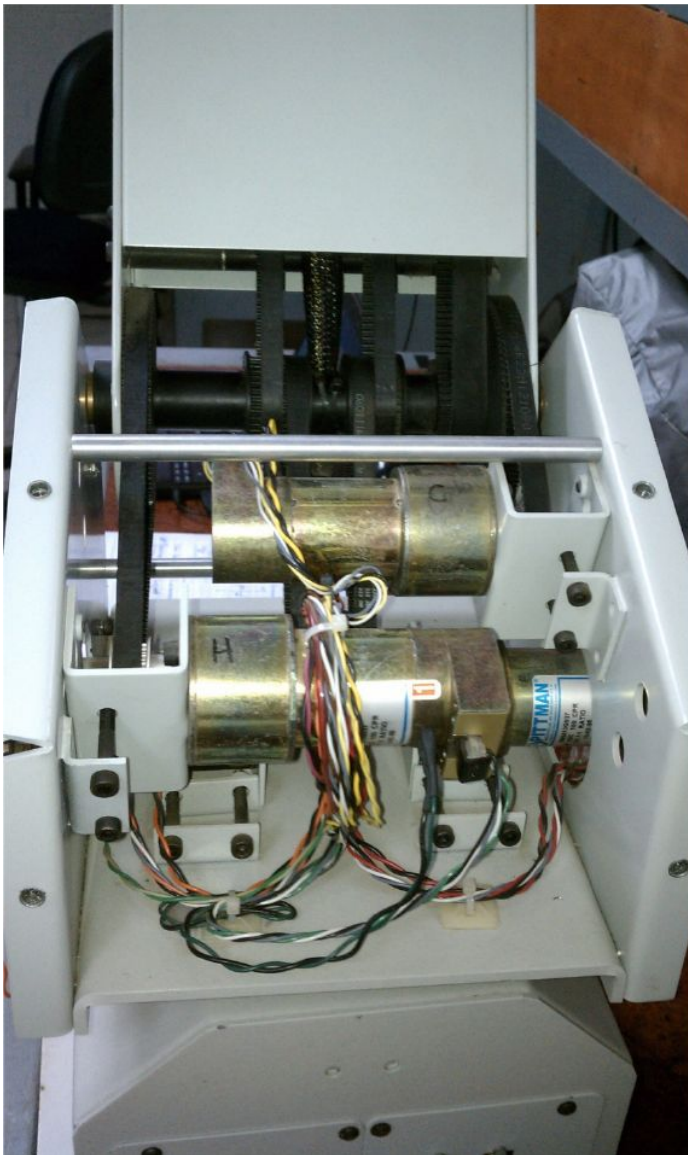

Physical image of ports DB15 (left) and DB37 (right).

Internal view of an encoder.

Notice that the disk has small grooves, which correspond to pulses in the A and B channel signals.

Top view of arm

In this photo you can see some of the motors that perform the movements at the request of the user.

Also notice the belts that help increase the torque of the motors (due to differing pulley sizes), thus increasing the capacity of this robotic arm.
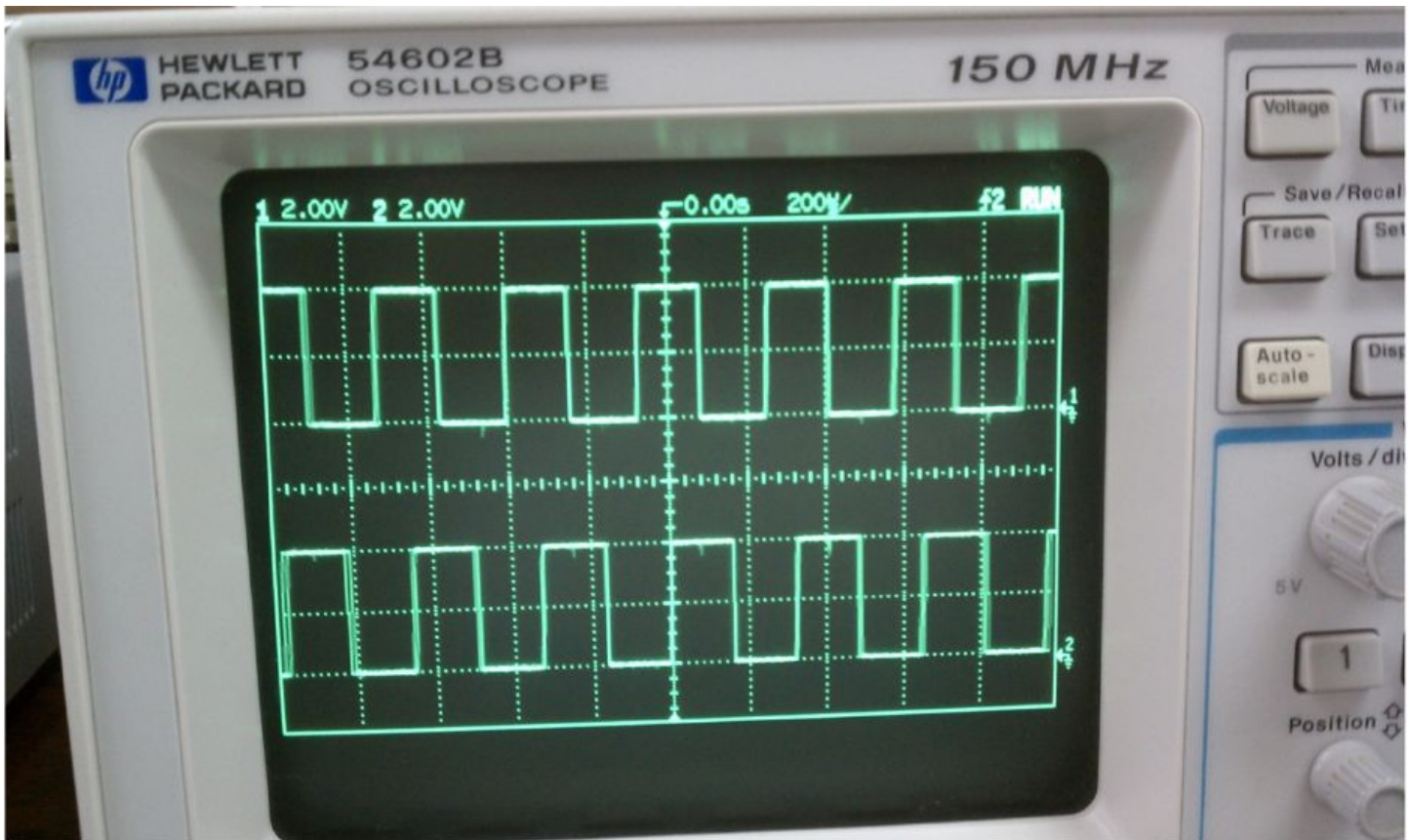
Endstop

This photo shows one of the endstops as well as a spring that helps avoid damage to both the arm itself and to your surroundings.

The photo also shows a cam which is adjustable by the user, which when reaches the established limit it drives a switch and cuts power to the motor and stops it.

This model is a very complete arm, with four axes of movement: Base, Shoulder, Elbow and Wrist.

The angle of rotation of the base has a right-to-left movement and vice versa with an angle of rotation generally limited by the cables connecting the arm body with the support base. However, with good design it is possible to reach angles of rotation very close to 360°.

In the construction of this arm, 6 motors are used. One is used for rotational movement of the base, a second and third motor give movement to the arm and forearm, a fourth and fifth motor to drive the wrist up and down and turn it, and the sixth and last motor to control the Opening and closing of the hand grasper. The motors are located mainly in the base to avoid loading with extra weights the extremities.