KURA – Robot Specification

Humanoid Soccer Competition KidSize, RoboCup 2024 Eindhoven

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1 Robot Specification



Robot name: KURA (based on Rhoban Sigmaban

kinematics) **Height:** 65 cm **Weight:** 6.8 kg

Walking speed: 20 cm/s

Motors: 20 DOF

• **Neck:** Dynamixel MX-64 (2 motors)

• Upper Body: Dynamixel MX-64 (2 per arm) and Dynamixel MX-106 (1 per arm)

Lower Body: Dynamixel MX-106 (6 per leg)

Sensors:

- Camera: 2 FLIR Blackfly S GigE (Stereo vision), Beward BL0220M23 135 FoV lens
- **IMU:** GY-88 (magnetometer is not in use)
- **Foot Pressure:** 4 strain Gauge Sensors per foot, ADC AD7124-4BCPZ

Computing units:

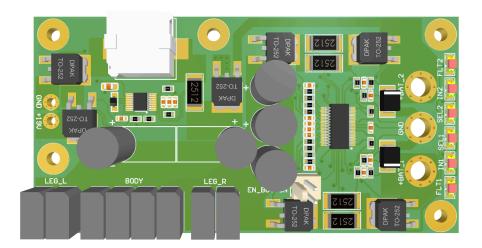
- Low-level: ARM7 (stm32) 72MHz (Maple mini) (Rhoban DXL Board)
- **High-level:** Intel NUC
- Intel Core i7 gen10
- 8GB RAM
- SSD 256GB
- UGreen USB3.0-Ethernet adapter (second camera)

Operating System: Linux (Ubuntu 18.04 Bionic)

Battery: LiPo 3300 mAh, 14.8V

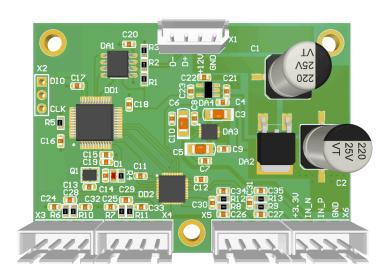
Materials: Carbon fiber plates (all plain parts), milled aluminum (other body parts), PETG (head, handle, hands, feet cover, spikes, uniform), Nylon (front/back dampers)
Other specs: reinforced hip, shoulder and neck joints with needle bearings, front/back nylon dampers, PETG/TPU two-component spikes, 3D-printed red/blue soccer uniform.

2 3D model of power board



Features: Dynamixel TTL compatibility, battery hotswap, current overflow protection, voltage regulation for NUC, connection for emergency button.

3 3D model of pressure sensor processing board



Features: Dynamixel TTL/RS-485 bus compatibility, 100 Hz frequency All the technical design documents could be provided after the competition, since we want to check the performance and usability of these boards.