nino-teen
TECHNICAL SPECIFICATIONS
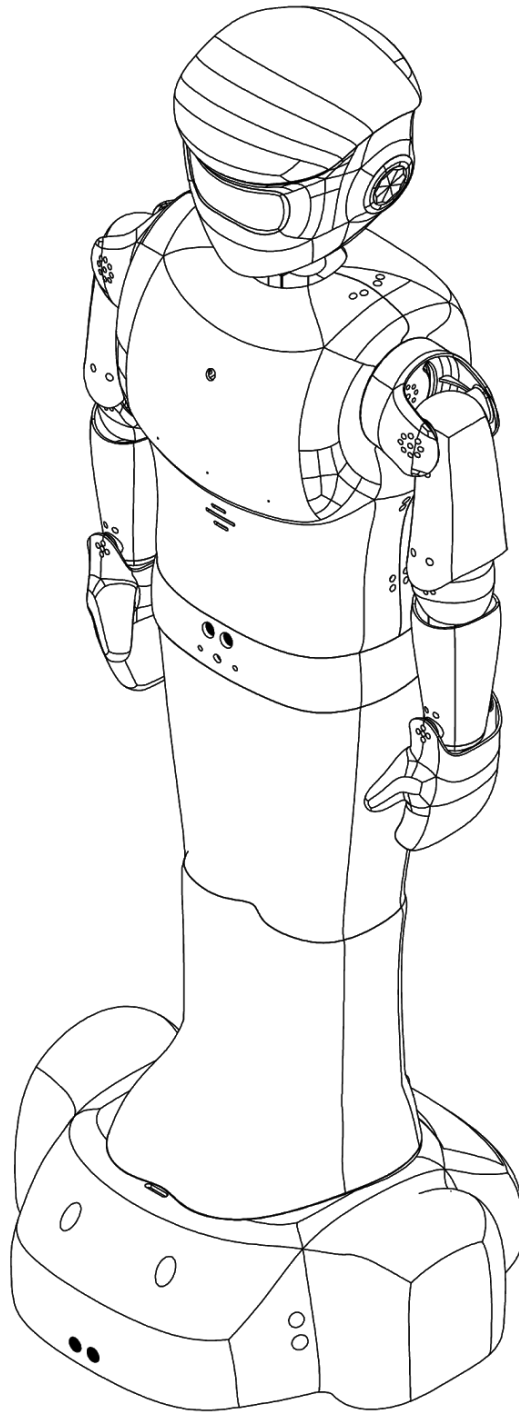
Table of Contents

Technical Specifications

COMPONENT	DESCRIPTION	QUANTITY
Physical Specifications	Dimensions (LxBxH): 56.5x52.9x157.5cm Height: 157.5 cm Weight: 22 kg	
Operating System	● Raspbian ● Custom OS	
User Interface (UI)	English Language for UI (Voice & Display)	
Controller	● Raspberry Pi 3+ ● Arduino Due ● NINO Module ● Custom I/O & Power Board	01 01 01 01
Sensors	● Flame Sensor ● PIR ● LDR ● Ultrasonic ● Tilt Sensor	01 01 01 01 01
Camera	Logitech c310 camera	03
Microphone	Far field echo cancellation microphones	03
Speakers	1.5W, 4 Ohm Speaker drive	02
Battery	Lithium Ion Battery Packs (11,000 mAh each)	01
Power Supply	24V, 14.5A SMPS	01
Material	Engineering Plastic	
Operating Temperature	$8 - 54°C$	
Software Support	● Android ● Python	
Motors	Smart Servo 1 - RDS5160 Smart Servo 2 – RDS3135 Custom Base Motors	06 06 02

Alarm	Static Cathode Based Buzzer	01
Display	LED Module with Max7219 Driver	02
Wheels	Base Wheels Castor Wheels	02 02

Dimensions

HEIGHT (CM)	LENGTH (CM)	WIDTH (CM)
157.5	56.5	52.9

Motherboard Specifications

CPU	SPECIFICATIONS
Raspberry Pi	64 bit Quad-core ARMv8 CPU
NINO Module	Custom Processor with 64 mb RAM, 16 mb Flash
Arduino Due	Atmel SAM3X8E ARM Cortex-M3 CPU

NINO Teen's motherboard consists of a NINO Module. This is our custom, in-house processor and the OS is a derivative of Linux OS.

Battery Specifications

NINO Teen uses rechargeable Li-Ion battery 02 packs (11,000 mAH each).

Battery Type	Lithium Ion
No. of Units	02
Max Charge voltage	24.0±0.05V

Standard Charge Current	13.5V
Charging Time	2 hours
Usage	2.5 hours standby, 45 minutes active use

Speakers

NINO Teen uses 02 speakers for Stereo Broadcast. These are located in the ears of NINO.

Speaker Units	02
Specifications	2W, 4 Ohm, full range custom made speakers
Dimensions	40 mm dia, 12 mm thickness

Microphone

NINO Teen comes equipped with 3 custom made microphones for speaker / command input.

Microphone Units	03
Specifications	30 vdB

Sensor Specifications

Following are the sensors used in NINO:

- Flame Sensor
- PIR
- LDR
- Ultrasonic
- Tilt Sensor

A. Flame Sensor Module

Created from a high speed and high sensitive NPN silicon photosensitive sensor, flame sensor module is used to detect fire source or other light sources of the wavelength in the range of 760nm - 1100 nm. The sensor is sensitive to infrared radiation. When the sensor detects flame the Signal LED will light up and the data pin goes LOW.

B. PIR Motion Detector Sensor Module

The Passive Infrared Sensor (PIR) sensor module is used for motion detection. The module has an on-board pyroelectric sensor, conditioning circuitry and a dome shaped Fresnel lens. It is used to sense the movement of people, animals, or other objects. They are commonly used in burglar alarms and automatically-activated lighting systems. It has an adjustable sensitivity and holding time.

- Working Voltage Range: DC 4.5V- 20V
  Current Drain: <60uA
- Detection Range: <140°
- Detection Distance: 3 to 7m (can be adjusted)
- Delay Time: 5 to 200s

C. LDR

This Photosensitive Light-Dependent Control Sensor Module uses a high-quality LM393 voltage comparator. Driving ability is 15mA with the adjustable potentiometer, it can adjust the brightness of the light detected. Working voltage is 3. 3V to 5V. Where output is digital switch output. Since this module is sensitive to the light, usually used for detecting the ambient brightness and light intensity.

D. Ultrasonic Sensor

The ultrasonic sensor is used to measure distance and detect objects. Sensor uses sonar to determine the distance to an object. This module is a transmitter, a receiver and a control circuit in one single pack. Its operation is not affected by sunlight or black material like Sharp rangefinders are (although acoustically soft materials like cloth can be difficult to detect). It measures the distance within a wide range of 2cm to 450cm.

E. Tilt Sensor

The Tilt Sensor Module for detects tilt angle of the object. The module will output logic LOW when not tilted till the threshold angle; it will output logic HIGH when it is tilted over the threshold angle.

- Operating Voltage: 3.3 – 5V

Camera

NINO Teen has 03 high definition cameras that aid in Computer vision and Image processing related tasks. The camera can be used for Object Identification, Facial recognition and also live video streaming. They provide a resolution of up to 720p at 30 frames / second.

Camera Model	Logitech c310
Lens and sensor type	Plastic, CMOS type
Imaging array Resolution	720p/30fps
Field of view	60 degrees
Focus Type	Fixed focus
Focal Length	4.4 mm
Optical Resolution (True)	1280x960 VGA

LED Module

The LED module uses MAX7219 Driver chip. The Led Matrix Module is a serial input common-cathode driver. The individual module features 8×8 LEDs, each controlled very precisely by the driver to generate the colour pattern of choice.

- Input Voltage: 5V
- Operating Current: 320mA

Motors

NINO Teen has 12 Smart servo motors and 2 custom motors in total, spread across the limbs that are responsible for movement.

Type of Motors	Motor Type 1	Motor Type 2	Motor Type 3
Model	RDS5160	RDS3135	Custom Design
No of Motors	06	06	02
Location	Arm / Shoulders	Arm / Head	Base
Weight	162g	64g	1.1 kg
Dimensions	65 x 30 x 48 (mm)	32 x 50 x 40 (mm)	
Voltage	6V – 8.4 V		13.5V
Speed	0.17s / 60 degrees (6V) 0.15s / 60 degrees (7.4V) 0.13s / 60 degrees (8.4V)	97 rpm (at 12V)	High: 50rpm (1A, 12V DC)
Torque	58 kg.cm (6V) 65 kg.cm (7.4V) 70 kg.cm (8.4V)	1.8 Nm (at 12.0V, 2.2A)	13 Nm (13.5V)