

Hardware Specifications

I Hardware Specifications Overview

3 x 触摸传感器
2 x 2D摄像头

4 x 麦克风
3D摄像头

2 x 惯性传感器

2 x 触摸传感器

6 x 激光传感器

2 x 红外传感器
2 x 声纳传感器

3 x 触摸传感器

Pepper硬件配备

技术参数

身高
120cm

行走
全向轮*3

表达
全向麦克风*4, 扬声器*2, 触摸传感器*5

连接方式
Wi-Fi/Ethernet/Bluetooth

续航能力
12个小时以上, 自主回充

导航
声纳传感器*2, 激光传感器*6, 3轴陀螺仪, 3轴加速计

体重
29kg

视觉
500万像素摄像头*2, 3D摄像头*1

处理器
ATOM E3845 (Bay Trail)

自由度
20个

语言
超过20种

移动
红外传感器*3, 触摸传感器*3

Category	Parameters
Volume (HxWxL)	1210 x 480 x 425 mm
Packaging (HxWxL)	1400 x 580 x 580 mm
Weight	29.10 kg
Weight	29.10 kg
Operating Temperature Range	5 °C to 35 °C
Operating Humidity Range	20% to 80% non-condensing
Storage Temperature Range	-10°C to 60°C
Storage Humidity Range	10% to 90% non-condensing
IP Protection Rating	IPX0
Battery Runtime	4 months (consumed in storage) 19 hours (ready) 12 hours (active)

II Components

1. Head

The components of Pepper's head are mainly used to help human-computer interaction

- 1 - Touch Sensor
- 2 - Microphone
- 3 - 2D camera (top)
- 4 - Binocular Camera
- 5 - Eye LEDs
- 6 - Ear LEDs
- 7 - Speaker
- 8 - 2D camera (bottom)

Pepper's face has human features: two eyes, two ears, and a mouth, but they don't function the same way as a human's does

Connectivity:

! [head_back] (https://oss-sbrc-prod-wp-filestorage.oss-cn-shanghai.aliyuncs.com/g-framework/image/

1 - Ethernet port

2 - USB port

3 - Serial port

Note: Only Softbank Robotics Certified Partners are allowed to open the back cover of the robot's head. Please do not use the USB port to connect external devices, as the power supply may cause damage to the device.

Pepper has two WiFi modules, located in the head and the tablet.

The WiFi standard is IEEE 802.11 a/b/g/n

motherboard:

Parts	Parameters
Processor	Intel ATOM E3845
CPU	4-core
Clock Frequency	1.91 GHz
Memory	4GB DDR3
Flash Storage	32 GB

Speakers:

Components	Parameters
Number of Speakers	Left and Right
Outer Diameter	25mm
Acoustic Impedance	8 ohms
Sensitivity	78dB 1W/1m @ 1 kHz
Input Power (nominal)	5 W
Input Power (peak)	20 W
Frequency Response (-10dB)	70 Hz - 7.2 kHz

2D camera:

Camera	Model	OV5640
	Type	System-on-a-chip (SoC) CMOS image sensor
Image array	Resolution	5Mp
	Optical format	1/4 inch
	Active Pixels (HxV)	2592x1944
Sensitivity	Pixel size	1.4μm*1.4μm
	Dynamic range	68db@8x gain
	Signal/Noise ratio (max)	36dB (maximum)
	Responsivity	600 mV/Lux-sec
Exports	Camera output	640*480@30fps or 2560*1920@1fps
	Data Format	YUV and RGB
	Shutter type	Rolling shutter
Vision	Field of view	67.4°DFOV (56.3°HFOV,43.7°VFOV)
	Focus type	Auto focus

Binocular Stereo Camera :

Consists of two 2D cameras providing binocular vision.

Camera	Model	OV4689
	Type	SOC Image Sensor
Image arrays	Resolution	4Mp
	Optical format	1/3 inch
	Active Pixels (HxV)	1280x720
Sensitivity	Pixel size	2μm*2μm
	Dynamic range	64.6db@ 1x gain
	Signal/Noise ratio (max)	38.3 dB
	Responsivity	1900 mV/Lux-sec
Exports	Camera output	2560*720@15fps
	Data Format	YUV422 color space
	Shutter type	Rolling shutter / frame exposure
Vision	Nominal Field of view	96°HFOV, 60°VFOV
	Focus range	40cm ~ infinity
	Focus type	Fixed focus

2. Touch sensors:

Part	Name
A	Head Touch Sensors Three on top of head
B	Back of Hand Touch Sensors One each on the back of the left and right hand.

3. Tablet:

| Category | Specifications | | Category | Parameters | | --- | --- | | Size | Volume | 246 x 175 x 14.5 mm | CPU | 1.3 x 1.0 mm | CPU | 1.3 GHz quad-core ARM Cortex-A7
Cache 512KB L2
1.6G pixel/sec @416MHz | DDR3 SDRAM | 1GB (512MB * 2) | Flash Memory | 32GB (512MB * 1) | Flash Memory | 32GB (eMMC) | | Display | Type: IPS
Resolution: 1280 800 pixels
Colour: 24bit true colour | Camera Photo Resolution | IPS
Resolution: 1280 800 pixels
640 480 pixels
1240 768 pixels
1280 720 pixels
1280 768 pixels
1280 960 pixels
1440 960 pixels
1600 1200 pixels
1920 1088 pixels | Camera Video Resolution | 176 144 pixels
320 240 pixels
352 288 pixels
480 320 pixels
640 480 pixels
720 480 pixels
864 480 pixels
800 600 pixels pixels
1280 720 pixels
1280 736 pixels
1920 1080 pixels
1920 1088 pixels | Preview frame rate range 15-20 | Touchscreen | Capacitive Multi-Touch (5-point) | | WiFi | 802.11 a/b/g/n | | Sensors | Light Sensor
Accelerometer
Gyroscope
Geomagnetic Sensor |

4. Degrees of freedom:

Note: What are degrees of freedom?

| Part | Total 20 | Axis | Axis | --- | --- | | Head | 2 | Head Yaw
Head Pitch | | Arm (x2) | 4 (8) | Shoulder Pitch
Shoulder Roll
Elbow Yaw
Elbow Roll | | Hand (x2) | 2 (4) | Wrist Yaw
Hand | | Legs | 3 | Hip Roll
Hip Pitch
Knee Pitch | | Chassis | 3 | Wheel FL
WheelFR
Wheel B |

5. Move:

| Category | Parameters | | --- | --- | | Default travelling speed | no more than 0.35 m/s | Max. travelling speed | 0.35 m/s | Maximum travelling speed | 0.55 m/s | Maximum Slope | 5° | Max. Maximum permissible passing distance | 1.1 m |

6. Laser sensors:

The Pepper robot has 3 laser sensors, corresponding to the following positions:

! laser_sensor

| Category | Parameters | | --- | --- | | Laser Class | 1M | Wavelength | 808nm | Wavelength | 808nm | Operating Model | Pulse | Frame Rate | 6.25HZ | Laser Detection Distance | approx. 5 metres |