Yahboom Transbot-4B-8G

Yahboom Transbot ROS AI Robot Tank Kit Instruction Manual

Model: Transbot-4B-8G

1. Introduction

The Yahboom Transbot is an advanced AI robot tank kit designed for learning and development in robotics. It integrates a Raspberry Pi 4B, somatosensory depth camera, and SLAM lidar to enable sophisticated functionalities such as 2D and 3D mapping, navigation, object tracking, and robotic arm control. This manual provides essential information for setting up, operating, and maintaining your Transbot.

Figure 1.1: Fully assembled Yahboom Transbot ROS AI Robot Tank Kit.

2. Setup and Assembly

The Transbot kit requires assembly. Please refer to the detailed assembly instructions provided in the official Yahboom documentation or online resources. Key components include a high-end aluminum alloy frame, anti-jamming bearings, SLAM lidar, powerful coding gear motor, metal servo, and a professional robot expansion board.

2.1. Component Overview

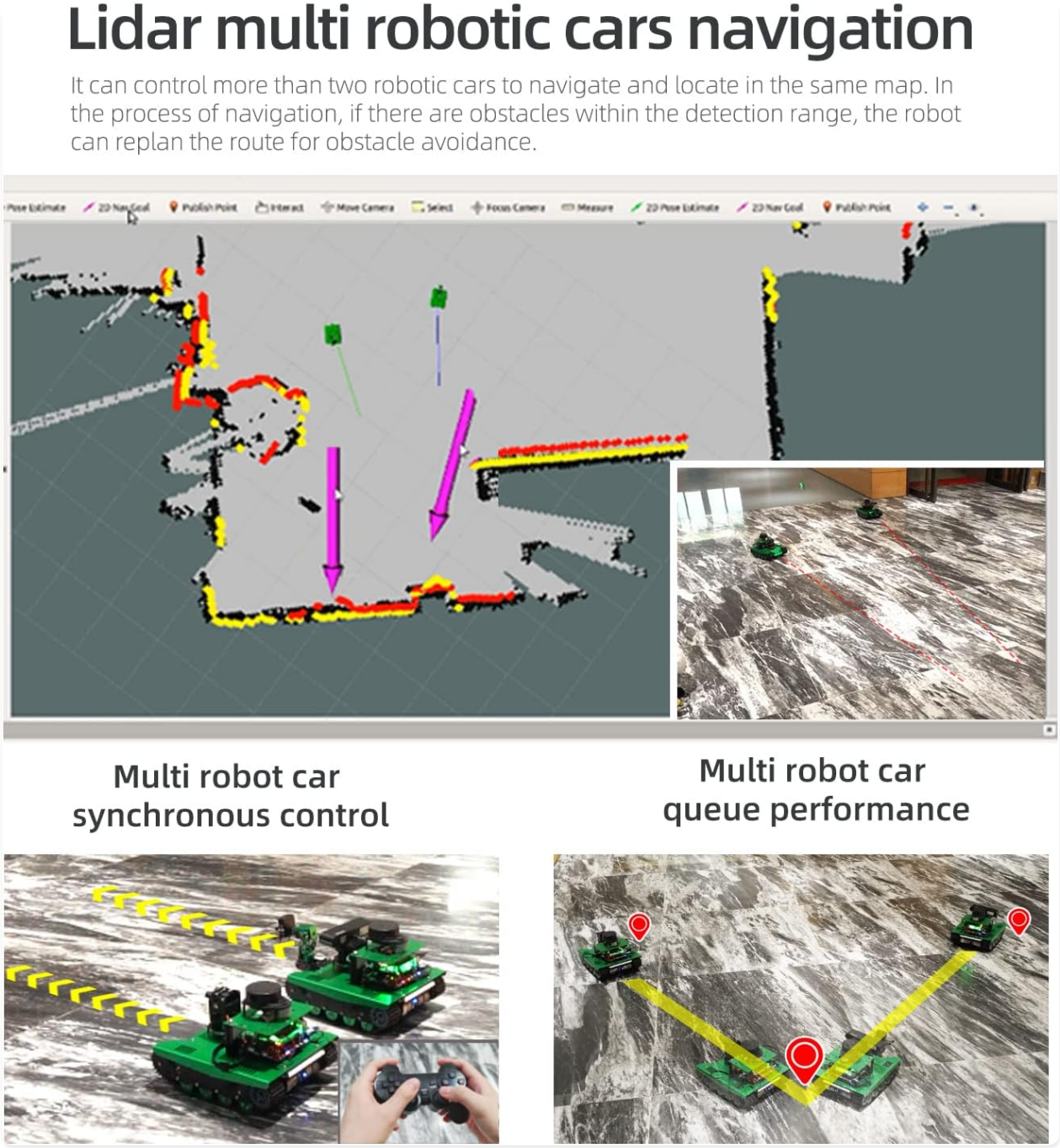

Figure 2.1: Overview of Transbot model options, including 3 DOF robotic arm, Astra Pro Plus depth camera, SLAM A1 Lidar, and 7-inch HD touch screen.

2.2. Expansion Board Connections

The Yahboom professional robot expansion board serves as the central hub for connecting various components. Ensure all connections are secure and correctly oriented according to the provided diagrams.

Figure 2.2: Detailed diagram of the Transbot expansion board, highlighting various interfaces and components.

2.3. Packing List (Raspberry Pi 4B Version)

Verify all components are present before beginning assembly. The basic configuration for the Raspberry Pi 4B version includes:

- Frame
- Lidar fixed plate
- OLED screen
- Raspberry Pi accessory kit
- Expansion board
- Battery pack
- USB wireless handle
- Handle mobile phone holder
- Charger
- Several cables
- Micro USB data cable
- Battery case

- Cable tie
- Screwdriver
- Mechanical code & checkerboard paper
- Transbot manual
- Packing box + anti-collision sponge
- SLAM A1 Lidar pack
- Nox package

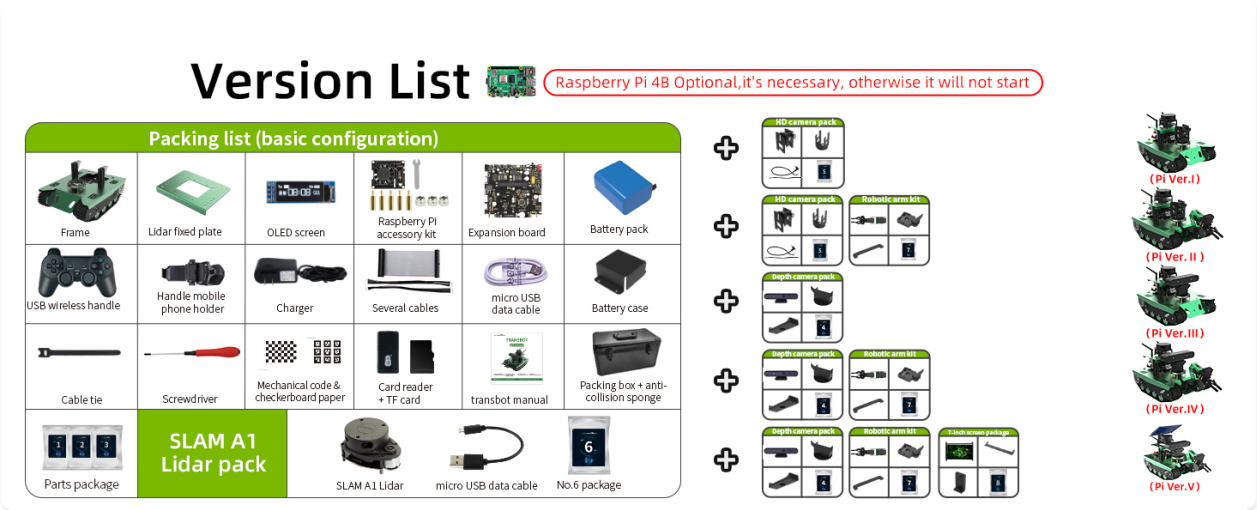

Figure 2.3: Packing list for the Raspberry Pi 4B version of the Transbot kit.

3. Operating Instructions

3.1. ROS Programmable Project

The Transbot utilizes the Robot Operating System (ROS) for its advanced functionalities. It leverages Rviz, Movelt, and Qt toolboxes for robotic arm control simulation and real-machine operation. A 7-inch screen can be optionally installed for direct interaction.

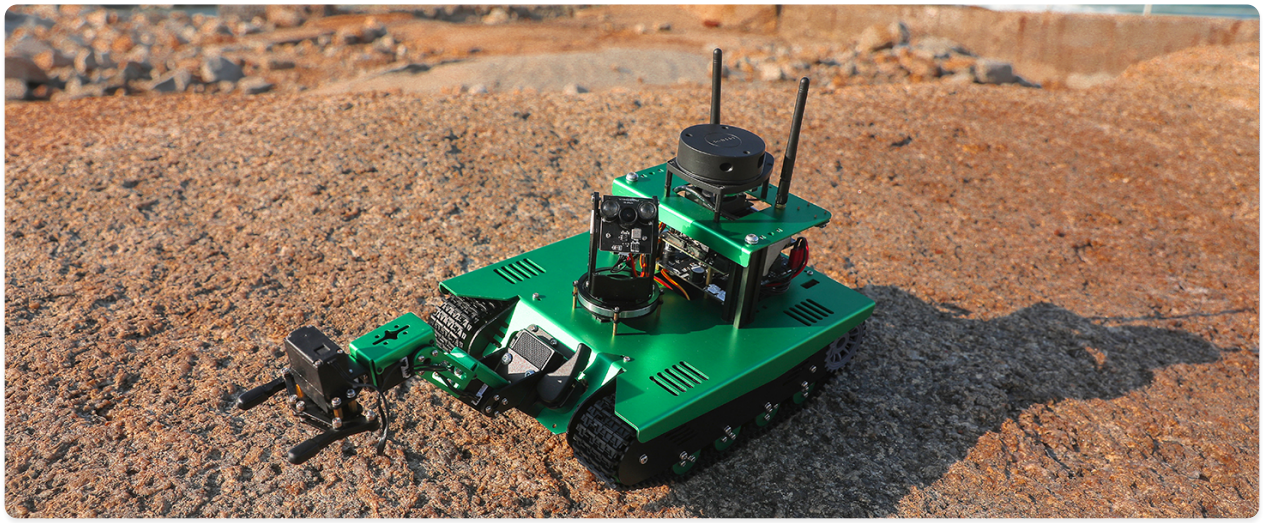

Figure 3.1: Diagram illustrating the components and functionalities of the ROS operating system on Transbot.

3.2. 3D Visual Mapping and Navigation (RTAB-VSLAM)

The Transbot supports RTAB-VSLAM 3D visual mapping and navigation technology, combining pure vision and visual radar fusion. This allows the robot to navigate, avoid obstacles, and perform global relocation within a 3D map. It can quickly obtain image data such as depth maps, color maps, and skeleton data via its API.

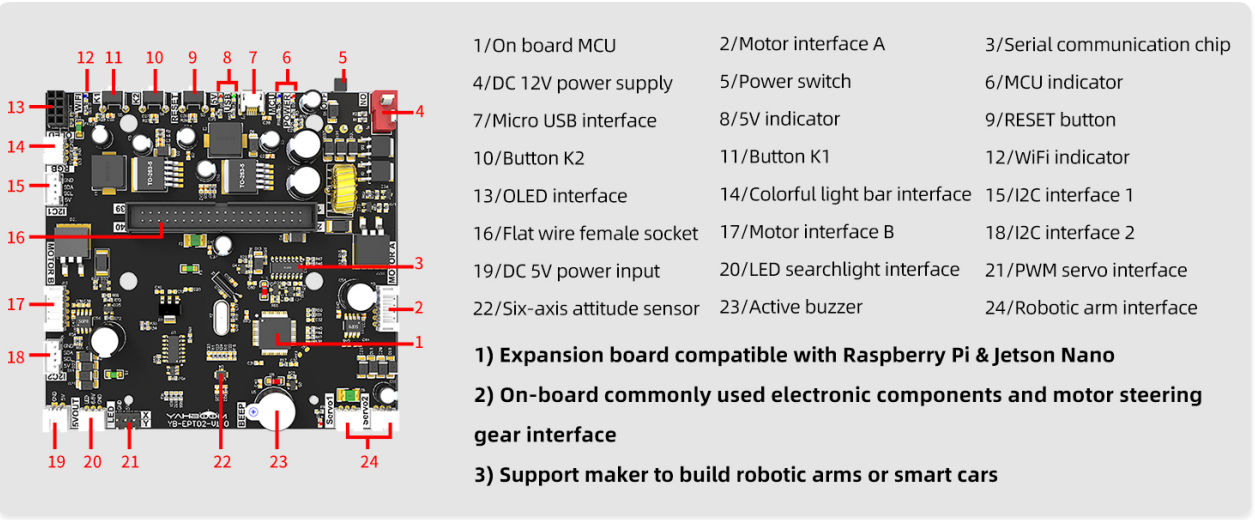

Figure 3.2: Visual representation of RTAB-VSLAM 3D mapping and navigation in action.

The Transbot can also perform multi-robot car navigation, allowing multiple units to navigate and locate within the same map simultaneously.

Figure 3.3: Multiple Transbot robots navigating and coordinating within a shared environment.

3.3. AI Functionalities

The robot integrates a variety of AI functions, including:

- Intelligent patrol
- Radar guard and tracking
- 3-DOF flexible grasping with manipulator
- Fixed-point navigation
- Automatic driving
- Color recognition and tracking
- AR tag recognition and reality enhancement
- Visual image beautification
- Face detection
- Lidar mapping navigation and obstacle avoidance

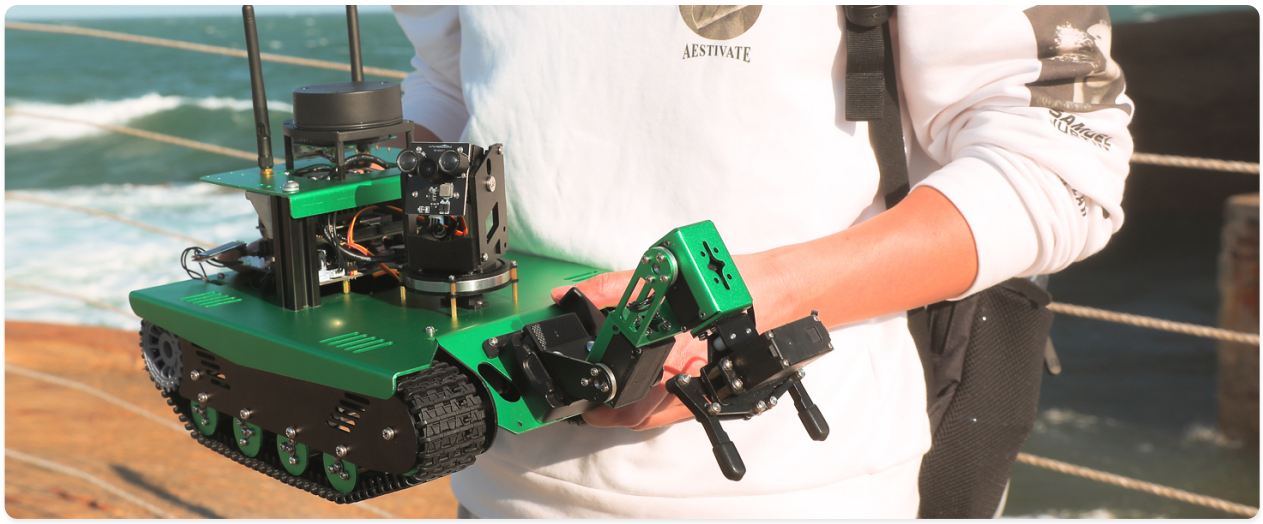

Figure 3.4: Overview of various AI features supported by the Transbot.

3.3.1. Robotic Arm Functions

The optional 3-DOF robotic arm allows the Transbot to grasp and transport objects. MoveIt simulation within the ROS system can be used for motion planning and control.

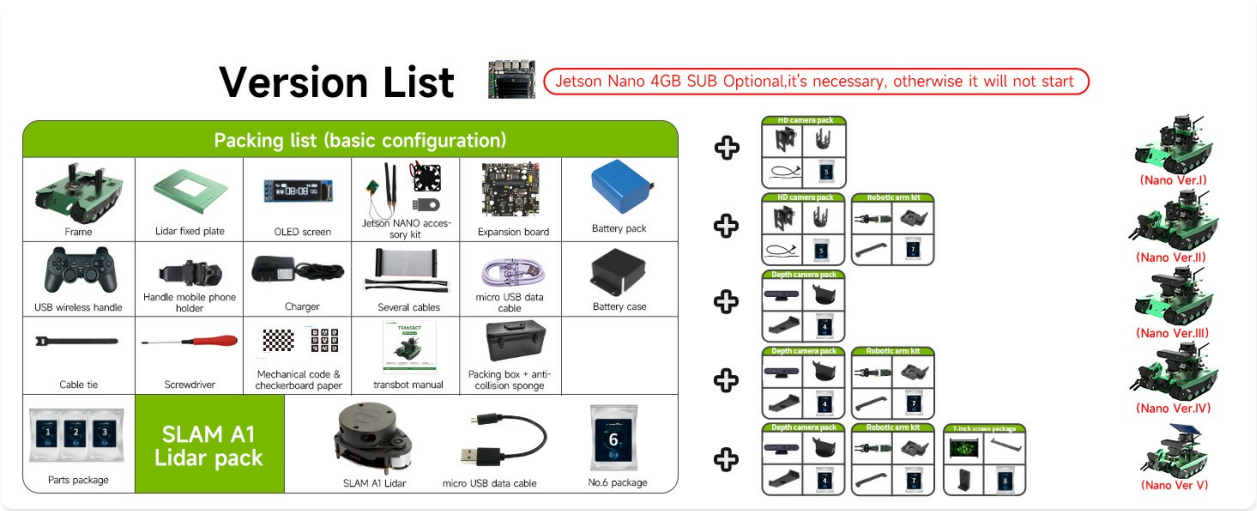

Figure 3.5: Demonstrations of the 3-DOF robotic arm and MoveIt simulation control.

3.3.2. Depth Camera Functions

The somatosensory depth camera enables advanced features like RTAB-VSLAM 3D visual mapping, depth image data acquisition (color map, skeleton), and KCF filter algorithm-based target following.

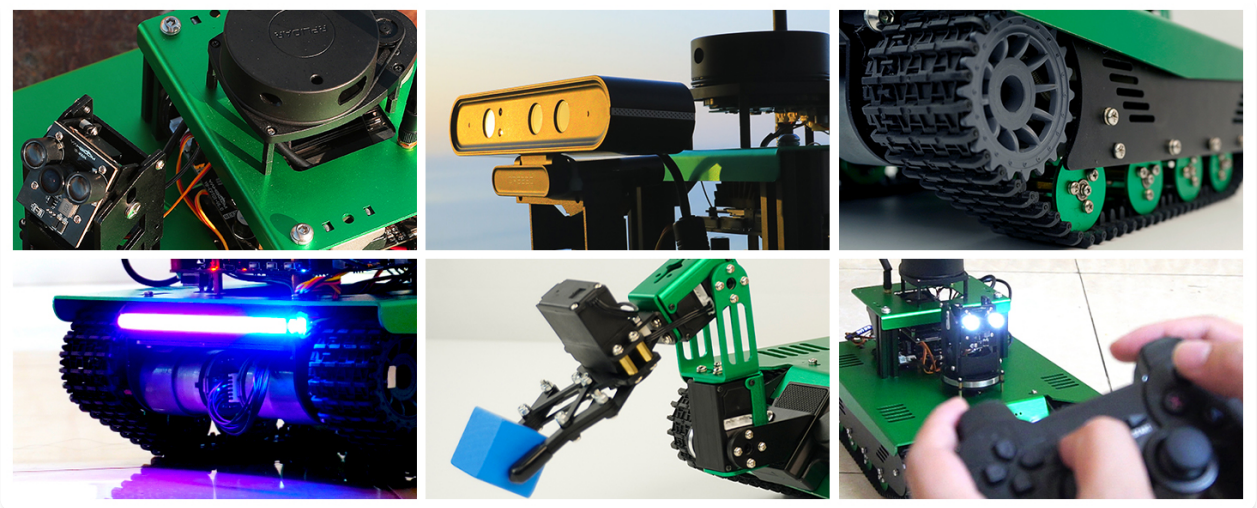

Figure 3.6: Examples of depth camera capabilities, including 3D mapping, depth data, and target following.

3.4. Cross-Platform Interconnection Control

The Transbot offers multiple control methods:

- **Mobile Remote Control APP:** Integrated with various AI functions (Yahboom App supports iOS & Android; ROS robot APP only for Android).
- **Handle Control:** Experience FPV real-time visual effects.
- **JupyterLab:** Online programming.
- **Professional ROS Operating System Control.**

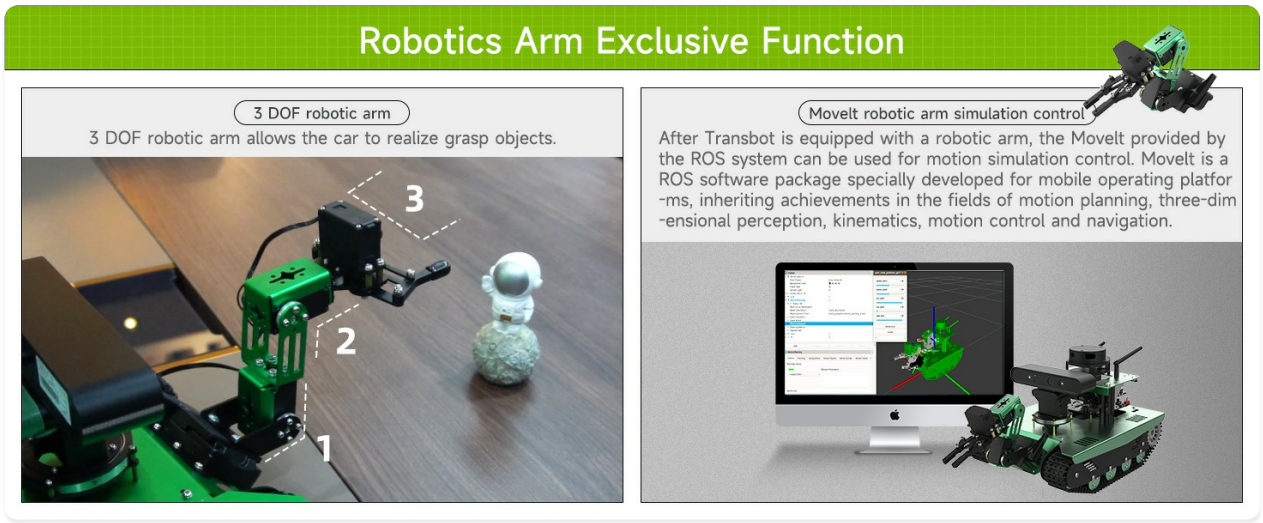

Figure 3.7: Various control interfaces for the Transbot, including mobile app, handle, JupyterLab, and ROS system.

3.5. Hardware Features

The Transbot's robust design includes a crawler shape and powerful coding gear motor, providing excellent off-road capabilities, even allowing it to navigate stairs.

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Video 3.1: Demonstrates the Transbot's off-road capabilities, including navigating rough terrain and stairs.

It is also equipped with high-brightness searchlights and colorful taillights, enabling normal operation even in dark environments.

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Video 3.2: Shows the Transbot operating in low-light conditions, highlighting its searchlights and colorful taillights.

4. Maintenance

Regular maintenance ensures the longevity and optimal performance of your Transbot. Follow these general guidelines:

- **Cleaning:** Keep the robot free from dust and debris, especially around sensors, motors, and tracks. Use

a soft, dry cloth for cleaning.

- **Battery Care:** Charge the 12V battery as needed and avoid over-discharging. Store the robot with a partially charged battery if not in use for extended periods.
- **Connection Checks:** Periodically inspect all cable connections to ensure they are secure and undamaged. Loose connections can lead to erratic behavior or component failure.
- **Software Updates:** Regularly check the Yahboom website for software and firmware updates to ensure you have the latest features and bug fixes.

5. Troubleshooting

If you encounter issues with your Transbot, consider the following common problems and solutions:

Problem	Possible Cause	Solution
Robot does not power on	Battery not charged or improperly connected; power switch off.	Ensure battery is charged and connected. Check power switch.
3D Camera not working	Loose cable connection; software driver issue.	Check camera cable connections. Verify camera drivers are installed and updated. Restart the system.
Mobile app connectivity issues	Incorrect network configuration; app bug.	Ensure the robot and mobile device are on the same network. Re-scan QR code or manually connect via IP. Restart the app and robot.
Erratic movement or navigation	Sensor interference; software calibration needed.	Ensure lidar and camera sensors are clear. Recalibrate navigation parameters in ROS.

If issues persist, please contact Yahboom customer support for further assistance.

6. Specifications

Feature	Detail
Model Number	Transbot-4B-8G
Brand	Yahboom
Package Dimensions	17.56 x 12.48 x 11.54 inches
Item Weight	18.34 pounds
Batteries	1 x 12V battery (included)
Processor	Raspberry Pi 4B (specific configuration may vary)

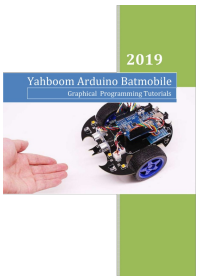
Feature	Detail
Camera	Somatosensory Depth Camera (e.g., Astra Pro 3D Camera)
Lidar	SLAM Lidar (e.g., SLAM A1 Lidar)
Robotic Arm	3-DOF (Degrees of Freedom) (optional)
Display	7-inch Touch Screen (optional)

7. Warranty and Support

For technical support, warranty information, or any inquiries regarding your Yahboom Transbot, please refer to the official Yahboom website or contact their customer service directly. Yahboom provides professional technical support and after-sales service to assist users with their products.
You can often find comprehensive learning materials, video tutorials, and open-source code on the Yahboom website to further enhance your experience with the Transbot.

Related Documents - Transbot-4B-8G

	Yahboom Transbot Robot User Manual and Installation Guide Comprehensive guide to assembling, installing, and operating the Yahboom Transbot robot. Includes packing lists, step-by-step instructions, wiring diagrams, software setup, and detailed explanations of app control features.
	Yahboom Pico Robot Car: Features, Functions, and Programming Guide Explore the Yahboom Pico Robot Car, powered by Raspberry Pi Pico and MicroPython. Discover its extensive features including APP control, various sensors for line tracking, obstacle avoidance, voice control, and more. This guide details its hardware, software, and course content.

	Yahboom Arduino Batmobile: Graphical Programming Tutorials Learn to program the Yahboom Arduino Batmobile robot car with graphical tutorials. This guide covers LED control, buzzer sounds, sensors, motor control, line following, obstacle avoidance, and more.
	Yahboom WOM Sensor Kit for BBC micro:bit - User Manual and Building Models Comprehensive guide to the Yahboom WOM Sensor Kit for BBC micro:bit, covering packing list, module introductions, building models, tutorials, and safety instructions. Learn how to use various sensors and build different models.
	Yahboom Raspblock AI Smart Robot Car for Raspberry Pi 4B | Omnidirectional AI Platform Explore the Yahboom Raspblock, an AI omnidirectional mobile smart car based on the Raspberry Pi 4B. Features include advanced AI functions, 360° Mecanum wheel movement, FPV capabilities, and Python programming via Jupyter Lab.