# QCAR 2

Sensor-rich autonomous vehicle for self-driving applications

The QCar 2 is the feature vehicle of the Self-Driving Car Studio, an open-architecture, 1/10th scale vehicle designed for academic self-driving initiatives. Powered by the uncompromising NVIDIA Orin AGX, and equipped with a variety of inertial, visual and ranging sensors, it is ready to take your research, education and outreach to the next level.

Working individually or in a fleet, the QCar 2 is the ideal vehicle for validating concepts related to self-driving stacks, machine vision and learning, traffic and fleet management, platooning, city and highway maneuvering, and many more.

Features
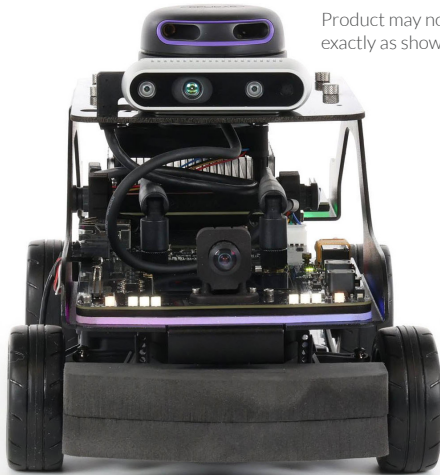
Product may not appear exactly as shown

Performant

Powered by the NVIDIA Jetson Orin AGX running Ubuntu and supporting the latest Jetpack

Reliable

Robust, student-proof and 1/10th scaled mechanical design

Open Software Architecture

Design and deploy applications using Simulink, Python, C/C++, ROS2, TensorFlow, and more

Expandable

Relevant inertial, visual and ranging sensors for self-driving, and variety of expansion IO & USB ports for customization

Research Studio

The Self-Driving Car Studio comes with everything you need to jumpstart your research.

Vehicles

- QCar 2 *
- QCar *

(single vehicle or fleet)
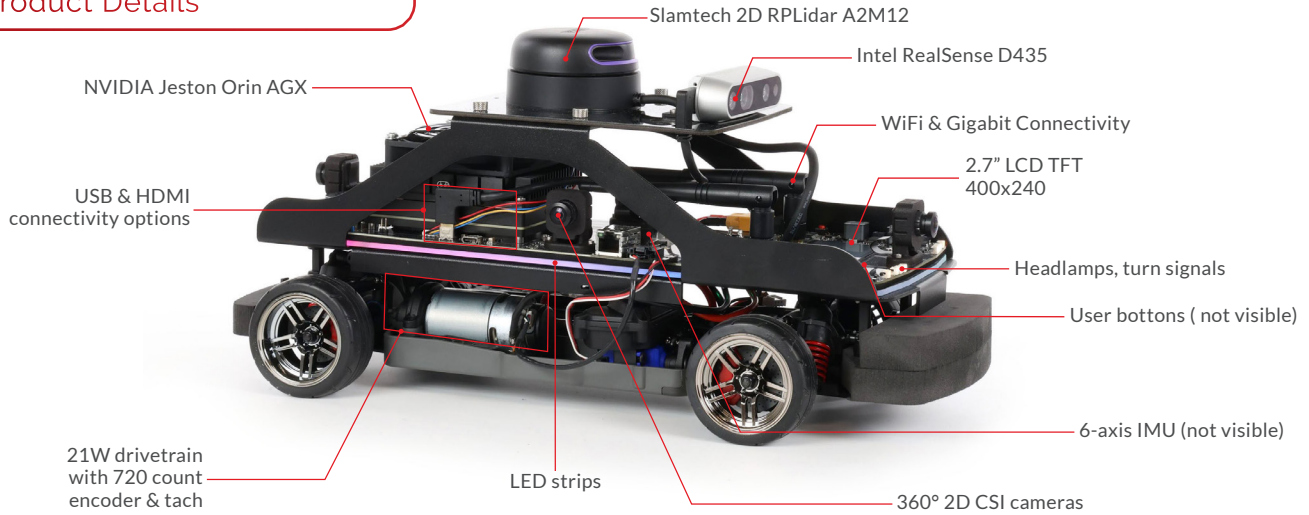
Ground Control Station

- High-performance computer with RTX graphics card with Tensor AI cores
- Three monitors
- High-performance router
- Wireless gamepad
- QUARC Complete license

Studio Space

- Driving map featuring intersections, parking spaces, single & double lane roads and roundabouts
- Supporting infrastructure including traffic lights, signs and cones

* Subject to change

Product Details *

- Slamtech 2D RPLidar A2M12
- Intel RealSense D435
- NVIDIA Jeston Orin AGX
- WiFi & Gigabit Connectivity
- 2.7" LCD TFT 400x240
- USB & HDMI connectivity options
- Headlamps, turn signals
- User bottons (not visible)
- 6-axis IMU (not visible)
- 21W drivetrain with 720 count encoder & tach
- LED strips
- 360° 2D CSI cameras

Device Specifications

Dimensions	39 x 19 x 20 cm	
Weight (with batteries)	2.7 kg	
Power	3S 11.1 V LiPo (3300 mAh) with XT60 connector	
Operation time (approximate)	~ 2 hours 11 m (stationary w/ sensor feedback) & 30 min (driving w/o sensor feedback)	
Onboard computer	NVIDIA Jetson Orin AGX CPU: 2.2 GHz 8-core ARM Cortex-A78 64-bit	GPU: 930 MHz 1792-CUDA/56-TENSOR cores NVIDIA Ampere GPU architecture 200 TOPS Memory- 32GB 256-bit LPDDR5 @ 204.8 GB/s
Lidar	LIDAR with 16k points, 5-15 Hz scan rate, 0.2-12m range	
Cameras	Intel D435 RGBD Camera	360° 2D CSI Cameras using 4x 160° FOV wide angle lenses, 21fps to 120fps
Encoders	720 count motor encoder pre-gearing with hardware digital tachometer	
IMU	6-axis IMU (gyroscope & accelerometer)	
Safety features	Hardware 'safe' shutdown button	Auto-power off to protect batteries
Expandable IO	• 2 user PWM output channels • Motor throttle control • Steering control • 2 unipolar user analog input • channels, 12-bit, +3.3V • motor current analog inputs • 3 encoder channels (motor position plusup to two additional encoders) • 1 reconfigurable digital I/O	• 3 user buttons • 2 general purpose 3.3V high-speed serial ports* • 1 high-speed 3.3V SPI port (up to 25 MHz)* • 11.8V I2C port (up to 1 MHz)* • 1 3.3V I2C port (up to 1 MHz)* • 2 CAN bus interfaces (supporting CAN FD) • 1 USB port • 1 USB-C host por • 1 USB-C DRP
Connectivity	Wi-Fi 802.11a/b/g/n/ac 867 Mbps with dual antennas	1x HDMI 1x 10/100/1000 BASE-T Ethernet
Additional QCar features	• Headlamps, brake lights, turn signals and reverse lights • Individually programmable RGB LED strip (33x LEDs)	• Dual microphones • Speaker • 2.7" LCD TFT 400x240 for diagnostic monitoring
Supported Software and APIs	• QUARC for Simulink® • Quanser APIs • TensorFlow • Python™ 2.7 / 3 & ROS 2 • CUDA® • cuDNN • TensorRT • OpenCV • VisionWorks®	• VPI™ • GStreamer • Jetson Multimedia APIs • Docker containers with GPU support • Simulink® with Simulink Coder • Simulation and virtual training environments (Gazebo and Quanser Interactive Labs) • Multi-language development supported with Quanser Stream APIs for inter-process communication

* Subject to change

About Quanser:

For 30 years, Quanser has been the world leader in innovative technology for engineering education and research. With roots in control, mechatronics, and robotics, Quanser has advanced to the forefront of the global movement in engineering education transformation in the face of unprecedented opportunities and challenges triggered by autonomous robotics, IoT, Industry 4.0, and cyber-physical systems.