

olive™ EdgeROS™ System-on-Module

OLV-SOM01-X

PRODUCT DATASHEET



Olive Robotics GmbH | v1.0 August 2023



THE EDGE-ROS SYSTEM ON MODULE: OLIVE OLV-SOM01-X

olive™ Edge-ROS SOM is a robotics optimized System on Module (SOM) that weighs only 5 grams, is capable of running both ROS and ROS 2 simultaneously and is the key to building high-performance, industry-leading software-defined robot hardware components. Its real-time compute capabilities paired with out-of-the-box ROS support, built-in networking solutions and versatile IO offerings enable you to ROSify any sensor or actuator with ease. Furthermore, it optionally features an IMU sensor designed for use in robotics and other applications that require precise attitude and heading information as well as sensing capabilities for air pressure, temperature, humidity, and gas detection measurements.

KEY FEATURES

- Light weight at only 5 grams
- 32 mm x 32 mm footprint
- Native out-of-the-box ROS and ROS 2 communication
- USB Type-C and Ethernet over USB communication options
- Debian-based. Production-grade software stack and OS included
- Rich IO including PWM, I2C, SPI, UART, CAN, USB, ADC
- Optional 9-degree-of-freedom orientation and acceleration measurements
- Optional 4-measurement environmental sensing
- Maximum data rate of 1000 Hz for IMU measurements

COMPONENTS

- ARMv7-based mobile processing unit for data processing and communication
- SD Flash Memory with up to 512GB storage preconfigured with industry-grade custom OS based on Linux Debian 11
- USB-Type C connector offering Ethernet over USB-C connectivity and network host capabilities via RNDIS
- 3-axis gyroscope: The IMU module features a 3-axis gyroscope that provides accurate and reliable angular rate data in all three dimensions (x, y, z). This allows you to measure the

orientation of the IMU module with respect to a fixed reference frame, and to track the changes in orientation over time.

- 3-axis accelerometer: The IMU module also features a 3-axis accelerometer that provides accurate and reliable acceleration data in all three dimensions (x, y, z). This allows you to measure the linear acceleration of the IMU module with respect to a fixed reference frame, and to track the changes in linear acceleration over time.
- 3-axis magnetometer: The IMU module furthermore features a 3-axis magnetometer that provides accurate and reliable magnetic field data in all three dimensions (x, y, z). This allows you to measure the magnetic field of the IMU module with respect to a fixed reference frame, and to track the changes in magnetic field over time.
- 4-measurements environmental sensor: The device further features a gas sensor measuring relative humidity, barometric pressure, ambient temperature, and gas (VOC).

SPECIFICATIONS

- Integrated real-time Linux Debian 11 operating system for data processing, communication, and modular programming.
- Preconfigured onboard embedded processing for ROS Noetic and ROS2 Humble Hawksbill message handling
- Native Virtual Ethernet over USB-C connections interfaces
- Embedded virtual Ethernet communication protocol. The format of the actual networking data encapsulated in each packet is based on IEEE802.3-2008.
- Integrated embedded data logging
- Integrated web graphical user interface for sensor parameter settings, calibration, and data logging.
- Integrated firmware and software updates over the air (OTA) using the web-based user interface.
- Embedded Integrated Development Environment (IDE) for programming on the sensor using Python and/or C/C++.
- Integrated time synchronization using the Network Time Protocol (NTP)
- Integrated ESC protection.
- CE certification under IEC 62368-1:2018

INSTALLATION & USE

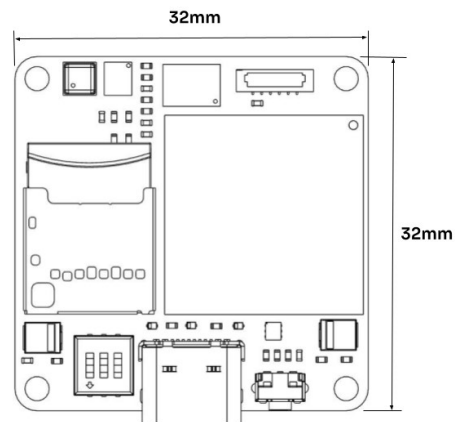
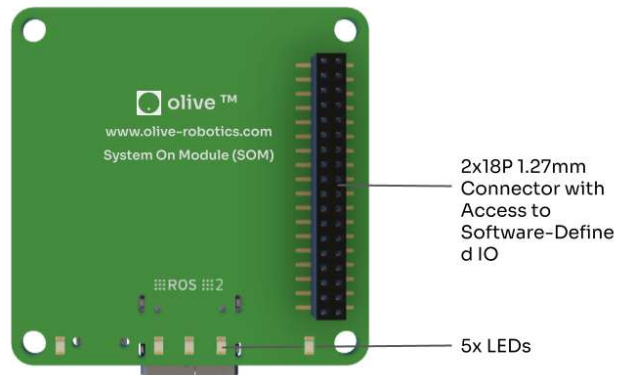
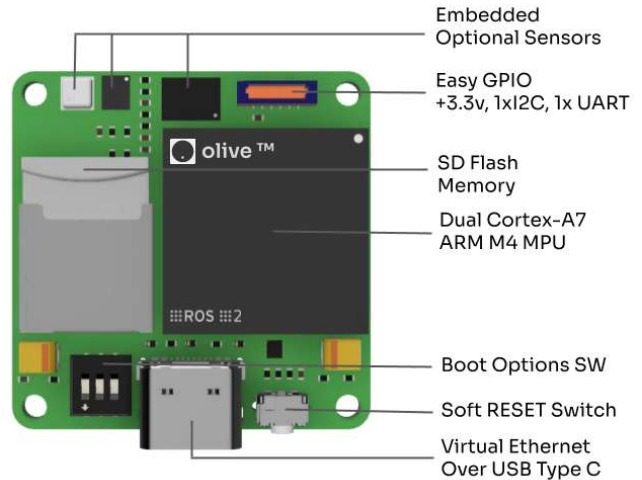
For detailed instructions on how to install and use this product please visit the online [documentation](#). You can find code samples and further instructions at <https://github.com/olive-robotics>. For complaints and feedback please reach out to support@olive-robotics.com.

Technical Specifications

Dimensions	32x32x6mm
Weight	5 grams
Operational Voltage	5V
Max. Current	300mA
Power Consumption	Typical: <1W Max: 1.5W
Temperature Range	Commercial: 0° ... 55°C Industrial: -40° ... 85°C
Hardware Connectors	1x USB Type-C 1x 36-Pin Main GPIO 1x 6-Pin Easy GPIO
Application Processor	Dual Cortex-A7 up to 800MHz
Real-Time Processor	Cortex-M4 MPU up to 200MHz
Memory On Chip (SoC)	512 MB RAM
EEPROM Memory	512 Bytes x 8
On SOM Flash Memory	Default: 64 GB SD Max Expansion: 512 GB
Connectivity	1x Virtual Ethernet over USB-C (up to 0.5 Gbps) I2C, SPI, UART, CAN Bus, PWM, ADC, USB

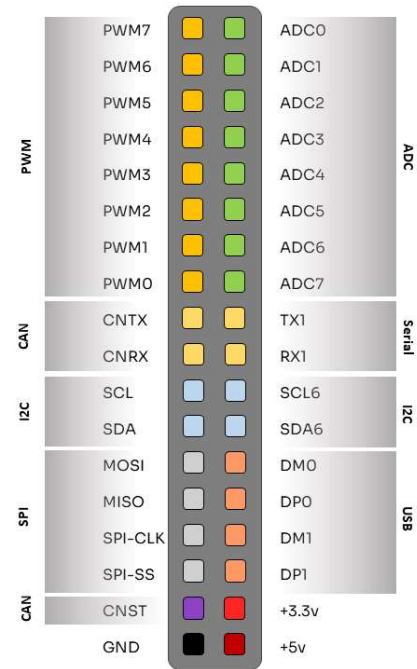
Software Specs

Linux Kernel	Linux 5.10.8 RT24
Base OS	Debian 11 Bullseye
Communication Middleware	Apache Cyclone DDS
Communication Interface	RNDIS, ROS, ROS2, ssh, https
Default IP Address	10.42.0.7
Web GUI address	https://10.42.0.7
Default User	olive
Default Password	one
ROS Versions	Noetic, Humble



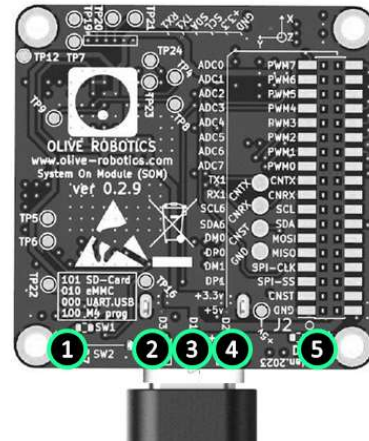
IO Specs Main GPIO 36-Pin Connector

36-Pin Main GPIO	
PWM	8x
ADC	8x
CAN Bus	1x
I2C	2x
SPI	1x
USB	1x
UART	1x
PWR	1x 3.3V, 1x 5V, GND
6-Pin Easy GPIO	
I2C	1x
UART	1x
PWR	1x 3.3V, GND



Gyroscopes & Accelerometers

Gyroscope	
Range	+/- 2000 deg/sec
Accuracy	+/- 0.05 deg/sec
Accelerometer	
Range	+/- 16 g
Accuracy	+/- 0.1 g
Magnetometer	
Range	+/- 4 gauss
Accuracy	+/- 0.2 gauss
ROS Messages	sensor_msgs/lmu
Sample rate	1000 Hz



1	Power
2	User
3	System Heartbeat
4	User
5	Power

Environmental Sensing

Operation range (full accuracy)	
Pressure	300 ... 1100 hPa
Humidity	0 ... 100%
Temperature	-40 ... 85°C
Gas sensor	
Response time (τ 33-63%)	< 1 s (for new sensors)
Sensor-to-sensor deviation	+/- 15% +/- 15
Power consumption	< 0.1 mA in ultra-low power mode
Humidity sensor	
Response time (τ 0-63%)	8 s
Accuracy tolerance	\pm 3 % relative humidity
Hysteresis	\leq 1.5 % relative humidity

Pressure sensor RMS Noise Sensitivity Error Temperature coefficient offset	0.12 Pa (equiv. to 1.7 cm) ± 0.25 % (equiv. to 1 m at 400 m height change) ±1.3 Pa/K (equiv. to ±10.9 cm at 1°C temperature change)
ROS Messages	sensor_msgs/Temperature sensor_msgs/RelativeHumidity sensor_msgs/FluidPressure std_msgs/UInt16
Sample Rate	1000 Hz

PRODUCT IDENTIFICATION

Products by Olive Robotics GmbH are labelled with their unique identifiers. where the first three letters indicate the olive product family.

<p>OLV-SOM01-X</p>	OLV	Product of the olive™ product range of Olive Robotics GmbH
	SOM	EdgeROS™ System on Module
	01	Product generation
	X	Specific implementation of EdgeROS™ SoM as a development kit, including cable and appropriate documentation

SAFETY INSTRUCTIONS

Do not operate the device in or near liquids. This device is designed to be used indoors; outdoor use is not recommended. Do not open the device unless you are a trained professional in electrical engineering or similar. Opening the device will void any warranty. Do not use these components to build devices that are capable of harming humans. During operation, a human must always monitor the device. Only connect to third-party devices (computers, power supplies, etc.) that are CE certified under IEC 62368.

DISPOSAL

In general, electrical and electronic equipment (EEE) should not be disposed of along with household waste. EEE may contain hazardous substances which, if exposed, could cause a serious detrimental effect on the environment, wildlife, and human health.

For more information about the disposal of electronic waste, please refer to the EU directive for Waste from Electrical and Electronic Equipment (WEEE).

If you would like to dispose of this product or parts of it, we recommend that you:

- Reach out to contact@olive-robotics.com for instructions on how to return the product to the vendor.
- Donate the unwanted item to a charitable organization.
- Take it to an authorized recycling collection point run by your local authority. For information about collection points, visit <https://erp-recycling.org/en-de/where-to-recycle>.

OLIVE ROBOTICS GMBH

Based in Munich, Germany, Olive Robotics GmbH is a leading provider of advanced software-defined robot hardware components. The sensors and actuators in our product portfolio are designed to be re-programmable and easy to integrate, allowing users to build their own custom robots or extend existing systems with ease. We design, engineer, and assemble the entirety of our product's hardware and software here in Munich. Our plug and play design allows for quick and effortless installation, making it possible for anyone to create their own robot solutions in an fast and intuitive manner. You can find more information about our company on [our website](#). Furthermore, you can find a dedicated overview of our products [here](#).

Headquarter

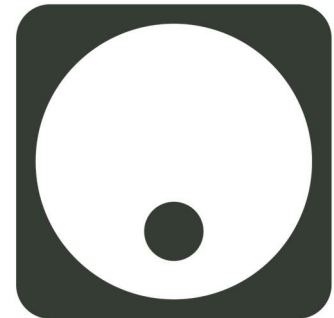
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