

# ROScube-I Series

*Embedded Real-Time Robotic Controller with Intel® Xeon®/Core™ Processor*

## Features

- x86-64 mainstream architecture for ROS 2 development
- Comprehensive I/O for connecting a wide range of devices
- Ruggedized, secure connectivity with locking USB ports
- External PCIe Gen3 expansion with ruggedized cassette
- Integrated both hard and soft real-time mechanism



## Introduction

ADLINK ROScube-I is a real-time ROS 2 enabled robotic controller based on Intel® Xeon® 9<sup>th</sup> Gen Intel® Core™ i7/i3 and 8<sup>th</sup> Gen Intel® Core™ i5 processors featuring exceptional I/O connectivity supporting a wide variety of sensors and actuators for unlimited robotic applications. Also supported are Intel® VPU and NVIDIA GPU cards for computation of AI algorithms and inference. The extension box allows for convenient functional and performance expansion. ROScube-I supports the full complement of resources developed with ADLINK Neuron SDK, a perfect platform for development of industrial use service robotic applications such as autonomous mobile robots (AMR) and autonomous mobile industrial robots (AMIR).

## Software Support

- Ubuntu 18.04 LTS
- ADLINK Neuron SDK
- ROS/ROS 2
- Intel® OpenVINO™

## Ordering Information

- **RQI-58 / RQI-58-E**  
Intel® Xeon® E-2276ME, DDR4 32G, 256G SSD / with expansion box
- **RQI-57 / RQI-57-E**  
Intel® Core™ i7-9850HE, DDR4 32G, 256GB SSD / with expansion box
- **RQI-55 / RQI-55-E**  
Intel® Core™ i5-8400H, DDR4 16G, 128GB SSD / with expansion box
- **RQI-53 / RQI-53-E**  
Intel® Core™ i3-9100HL, DDR4 8G, 64GB SSD / with expansion box

## Optional Accessories

- **DDR 4 SO-DIMM Storage**  
Dual channel non-ECC 2400 MHz DDR4 8 GB memory (P/N: 29-6B800-L430)  
Dual channel non-ECC 2400 MHz DDR4 16 GB memory (P/N: 29-6BC00-L430)
- **Wireless Module**  
Intel® Wireless-AC 9260 M.2 2230, Dual-Band 2x2 Wi-Fi + Bluetooth+ 5 kit (P/N: 91-95266-0010)
- **CAN bus Mini PCIe Module**  
Dual channel: FARO-FS900 (P/N: 92-97142-0010)
- **AC/DC Power adapter**  
220W AC/DC power adapter (P/N: 31-62149-0000)  
280W AC/DC power adapter (P/N: 91-95263-0010)

## Specifications

| Model Name                                                 | RQI-58<br>RQI-58-E                                                                                                                                                | RQI-57<br>RQI-57-E                                 | RQI-55<br>RQI-55-E                                | RQI-53<br>RQI-53-E                                |
|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------|---------------------------------------------------|
| System Core                                                |                                                                                                                                                                   |                                                    |                                                   |                                                   |
| Processor                                                  | Intel® Xeon® E-2276ME<br>45W                                                                                                                                      | Intel® Core™<br>i7-9850HE 45W                      | Intel® Core™<br>i5-8400H 45W                      | Intel® Core™<br>i3-9100HL 25W                     |
| Core                                                       | 6                                                                                                                                                                 | 6                                                  | 4                                                 | 4                                                 |
| Base Freq.                                                 | 2.8GHz                                                                                                                                                            | 2.7GHz                                             | 2.5GHz                                            | 1.6GHz                                            |
| MAX Turbo Freq.                                            | 4.5GHz                                                                                                                                                            | 4.4GHz                                             | 4.2GHz                                            | 2.9GHz                                            |
| Chipset                                                    | Mobile Intel® CM246 Chipset                                                                                                                                       |                                                    |                                                   |                                                   |
| Memory                                                     | 2x DDR4 16GB 2400MHz,<br>dual SO-DIMMs, up to 32GB                                                                                                                | 2x DDR4 16GB 2400MHz,<br>dual SO-DIMMs, up to 32GB | 2x DDR4 8GB 2400MHz,<br>dual SO-DIMMs, up to 32GB | 2x DDR4 4GB 2400MHz,<br>dual SO-DIMMs, up to 32GB |
| Display                                                    | 2x DP++ and 1x HDMI                                                                                                                                               |                                                    |                                                   |                                                   |
| Front Panel I/O Interface                                  |                                                                                                                                                                   |                                                    |                                                   |                                                   |
| Ethernet                                                   | 4x GbE: 3x Intel® i211AT + 1x Intel® i219LM<br>with iAMT support, IEEE 1588 and 802.1AS                                                                           |                                                    |                                                   |                                                   |
| Series Port                                                | COM 1/2: RS-232/422/485                                                                                                                                           |                                                    |                                                   |                                                   |
| USB                                                        | 2x USB 3.1 Gen1 Type A with lockable connectors<br>4x USB 3.1 Gen 1 Type A<br>4x USB 2.0 Type A                                                                   |                                                    |                                                   |                                                   |
| Multi-I/Os on DB 50<br>connector<br>(Support real time OS) | Two channel I <sup>2</sup> C<br>8x Digital Input: VIH: 2 to 5.25V, VIL: 0 to 0.8V<br>8x Digital Output: VOH: 2.4 to 5V, VOL: 0 to 0.5V, Current: 24mA/per channel |                                                    |                                                   |                                                   |
|                                                            | Optional (Default do not install the module on the system):<br>Dual Channel: FARO-FS900, PEAK IPEH-003049*<br>Single Channel: PEAK IPEH-003048*                   |                                                    |                                                   |                                                   |
|                                                            | *: This module supports real time OS                                                                                                                              |                                                    |                                                   |                                                   |
| Internal I/O Interfaces                                    |                                                                                                                                                                   |                                                    |                                                   |                                                   |
| Mini PCIe                                                  | 2x full size (one for CAN, one for Wi-Fi or LTE)                                                                                                                  |                                                    |                                                   |                                                   |
| M.2                                                        | 1x Socket 1, Key A and A+E key, 2230 for Wi-Fi                                                                                                                    |                                                    |                                                   |                                                   |
| USIM                                                       | 1x Socket                                                                                                                                                         |                                                    |                                                   |                                                   |
| TPM                                                        | TPM 2.0                                                                                                                                                           |                                                    |                                                   |                                                   |
| LED indicator                                              |                                                                                                                                                                   |                                                    |                                                   |                                                   |
| Watchdog                                                   | 1 x Watchdog LED                                                                                                                                                  |                                                    |                                                   |                                                   |
| Diagnostics                                                | 1 x Diag-Alert LED<br>(indicates if no physical storage is connected or memory is installed)                                                                      |                                                    |                                                   |                                                   |
| Storage                                                    | 1x Storage activity LED                                                                                                                                           |                                                    |                                                   |                                                   |
| User Defined                                               | 5x user defined LEDs (Green: U2-U5, Red: U1)                                                                                                                      |                                                    |                                                   |                                                   |
| Storage Devices                                            |                                                                                                                                                                   |                                                    |                                                   |                                                   |
| M.2 B key or B+M Key                                       | 256GB mSATA SSD                                                                                                                                                   |                                                    | 128GB mSATA SSD                                   | 64GB mSATA SSD                                    |
| Expansion Box*                                             |                                                                                                                                                                   |                                                    |                                                   |                                                   |
| Expansion Slots                                            | 1x PCIe Gen3 x 16<br>1x PCIe Gen3 x 4<br>*: Only for –E model                                                                                                     |                                                    |                                                   |                                                   |
| Power Requirements                                         |                                                                                                                                                                   |                                                    |                                                   |                                                   |
| DC Power Input                                             | 9-32V (±5% tolerance, reverse polarity protection)                                                                                                                |                                                    |                                                   |                                                   |
| Power consumption                                          | 16.7-4.7A (w/o expansion box)<br>20-12.5A (w/ expansion box)                                                                                                      |                                                    |                                                   |                                                   |
| AC/DC Power Adapter                                        | Optional: 160W, 220W or 280W AC/DC power adapter, see order information                                                                                           |                                                    |                                                   |                                                   |
| Power Switch                                               | 1x power ON/OFF button                                                                                                                                            |                                                    |                                                   |                                                   |
| System Reset                                               | Hardware reset button                                                                                                                                             |                                                    |                                                   |                                                   |
| EXT Power Header                                           | 1x Extend the power on/off button for robot system                                                                                                                |                                                    |                                                   |                                                   |
| Mechanical                                                 |                                                                                                                                                                   |                                                    |                                                   |                                                   |
| Dimensions                                                 | w/o expansion box: 210(W) x 240(D) x 86(H) mm (8.267 x 9.449 x 3.385 inches)<br>w/ expansion box: 210(W) x 240(D) x 165(H) mm (8.267 x 9.449 x 6.496 inches)      |                                                    |                                                   |                                                   |
| Weight                                                     | 3.6kg w/o expansion box<br>4.6kg w/ expansion box                                                                                                                 |                                                    |                                                   |                                                   |
| Mounting                                                   | Wall mount kit                                                                                                                                                    |                                                    |                                                   |                                                   |

## Specifications

| Model Name            | RQI-58<br>RQI-58-E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | RQI-57<br>RQI-57-E | RQI-55<br>RQI-55-E | RQI-53<br>RQI-53-E |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|
| Environmental         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                    |                    |
| Operating Temperature | -20~70°C(-4°F~140°F w/ 1x SODIMM)<br>-20~60°C(-4°F~140°F, w/ 2x SODIMM)<br>*Default: 2x DDR4 memory                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                    |                    |
| Operating Humidity    | ~95% @40°C (non-condensing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                    |                    |
| Storage Temperature   | -40~85°C(-40°F~185°F)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                    |                    |
| Vibration             | IEC 60068-2-6: 1G, 5-500Hz, 3 axes<br>IEC 60068-2-64: Operating 5Grms, 5-500 Hz, 3 axes w/ M.2 SSD                                                                                                                                                                                                                                                                                                                                                                                                                                               |                    |                    |                    |
| Shock                 | MIL-STD-202G Method 213B,Table 213-I Condition A<br>Operating: 100G, half sine 11ms duration w/ M.2 SSD                                                                                                                                                                                                                                                                                                                                                                                                                                          |                    |                    |                    |
| EMI                   | CE & FCC Class B with validated AC/DC adapter (EN61000-6-4/-2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                    |                    |                    |
| EMS                   | IEC 61000-4-2 (ESD, contact: ±8kV, air: ±15kV)<br>IEC 61000-4-3 (RS, 10V/m from 80-1000MHz, 3V/m from 1400-2000MHz, 1V/m from 2000-2700MHz, 1kHz sine wave, 80% AM)<br>IEC 61000-4-4 (EFT, ±2kV at 5KHz on power port, ±1kV at 5KHz on signal port)<br>IEC 61000-4-5 (Surge, ±2kV line to earth CM on power port, ±1kV line to earth CM on signal port)<br>IEC 61000-4-6 (CS, 10Vrms with 1kHz sine wave, 80% AM from 0.15MHz-80MHz)<br>IEC 61000-4-8 (power-frequency magnetic fields)<br>IEC 61000-4-11 (voltage DIPs & voltage interruptions) |                    |                    |                    |
| Safety                | UL, cUL, CB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                    |                    |
| Software              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                    |                    |
| SDK                   | ADLINK Neuron SDK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                    |                    |
| Environment           | Ubuntu 18.04 LTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                    |                    |
| Middleware            | ROS/ROS 2<br>Intel® OpenVINO™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                    |                    |



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