

IOL Core

Hardware manual

www.pinetek-networks.com

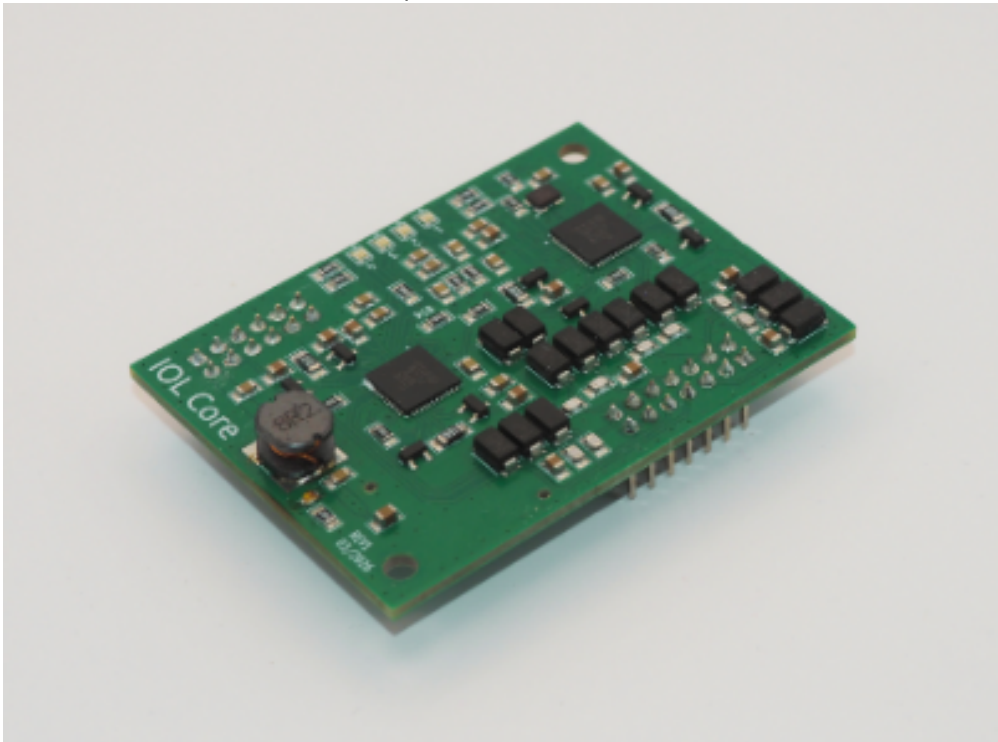


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1. Introduction

1.1 Purpose

The IOL Core4 is a compact IO-Link® ¹⁾ master module designed for integration into embedded host systems. It provides four IO-Link ports compliant with IEC 61131-9 (SDCI), enabling direct connectivity to industrial sensors and actuators in IIoT and automation applications.

This Integration Manual describes the hardware interface of the IOL Core4 and provides all information necessary to integrate the module into a host system. It covers the electrical interface, mechanical dimensions and mounting, connector pinouts, and relevant operating conditions.

The document is intended for hardware engineers and system integrators who are developing host boards or carrier systems for the IOL Core4. Readers are expected to be familiar with standard embedded hardware design practices, including SPI communication and PCB layout for mixed-signal systems.

This manual does not cover firmware integration or IO-Link protocol stack configuration.

The following signs will guide you for dedicated areas of interest. The content is relevant for safe operation of the IOL Core4.



This symbol is used to show information that is relevant for the operation of the IOL Core4



This symbol is used to show areas of special attention that need to be considered for the safe operation of the IOL Core4

1.2 Intended Audience

This Hardware Integration Guide is intended for the following audiences:

- **Hardware Engineers:** Primary audience responsible for implementing the electronic and mechanical design
- **Manufacturing Engineers:** To prepare production processes and tooling
- **Project Managers:** To understand technical scope, dependencies, and resource requirements
- **Technical Management:** For integration review and approval processes
- **Regulatory Compliance Team:** To ensure integration meets applicable standards and regulations
- **Technical Documentation Team:** As source material for user manuals and service documentation

This document assumes the reader has fundamental knowledge of electronic design principles, manufacturing processes, and engineering terminology relevant to electronic hardware development.

1.3 Project Overview

1.3.1 Key Hardware Features

- **IO-Link Master Implementation:** Based on the Analog Devices MAX14819ATM+ IO-Link Master Transceiver chip, providing 4x IO-Link ports per IOL Core4 module.
- **Plug-In Design:** The module shall be plugged in via 2x 2,54mm connectors to plug into a host. One

connector provides power and host connection, the other connector shall provide the 4 IOL master ports.

- **Industrial Compliance:** Compatible with SDCL devices according to IEC 61131-9, supporting class A devices (< 500mA consumption).
- The host communication uses one SPI connection with 2x CS signals.

1.3.2 Target Applications

- Industrial automation and monitoring
- Smart factory implementations
- Data acquisition from industrial sensors
- Process control and quality assurance
- Testing and experimental systems
- IIoT edge computing solutions

1.3.3 Product Variants

Variant	Part No.	Description
IOL Core4	1204	The IO-Link master stack runs on the host.
IOL Core4 μ C	1205	The IO-Link master stack runs on an integrated microcontroller on the module.

1.4 References and Related Documents

1. MAX14819: Dual IO-Link Master Transceiver with Integrated Framers and L+ Supply Controllers Data Sheet (Rev.3): <https://www.analog.com/media/en/technical-documentation/data-sheets/MAX14819.pdf>

1.5 Definitions, Acronyms, and Abbreviations

Abbreviation	Meaning
IOL	IO-Link

1.6 Important user information

Please note that the information and procedures described in this manual are subject to change without prior notice. We continuously strive to improve our products and services, which may result in product updates, product modifications and modifications to the content provided herein.

As a user of our product, it is important to acknowledge that you are responsible for following all relevant local laws, standards, and regulations applicable to your usage. These laws, standards, and regulations may vary depending on your location and the intended use of the product. It is your responsibility to ensure compliance with such requirements.

While we make every effort to provide accurate and up-to-date information, we cannot guarantee that the content of this manual will always reflect the latest developments or changes. Therefore, we encourage you to regularly check for updates and revisions to ensure that you have the most current information available.

By using our product and following the procedures outlined in this manual, you agree to accept responsibility for your actions and to comply with all applicable laws, standards, and regulations. If you have any questions or concerns regarding the information provided in this manual, please contact our customer support team for assistance.

Warning: Not for Critical Applications

The device described herein, including all associated hardware and software components, shall not be used for fail-safe, life-supporting, or other critical applications where the failure of the device could result in significant harm, injury, loss of life, or catastrophic damage.



While every effort has been made to design and manufacture the device to high standards of reliability and performance, it is not intended for use in situations where its failure could have severe consequences. Such critical applications may include, but are not limited to, medical devices, transportation systems, industrial control systems, and emergency response systems.

Using the device in critical applications could lead to unpredictable outcomes, including system failures, data loss, or malfunction, which may pose serious risks to safety, health, or property. Therefore, it is imperative that the device is only employed in non-critical applications where the potential impact of its failure is minimal.

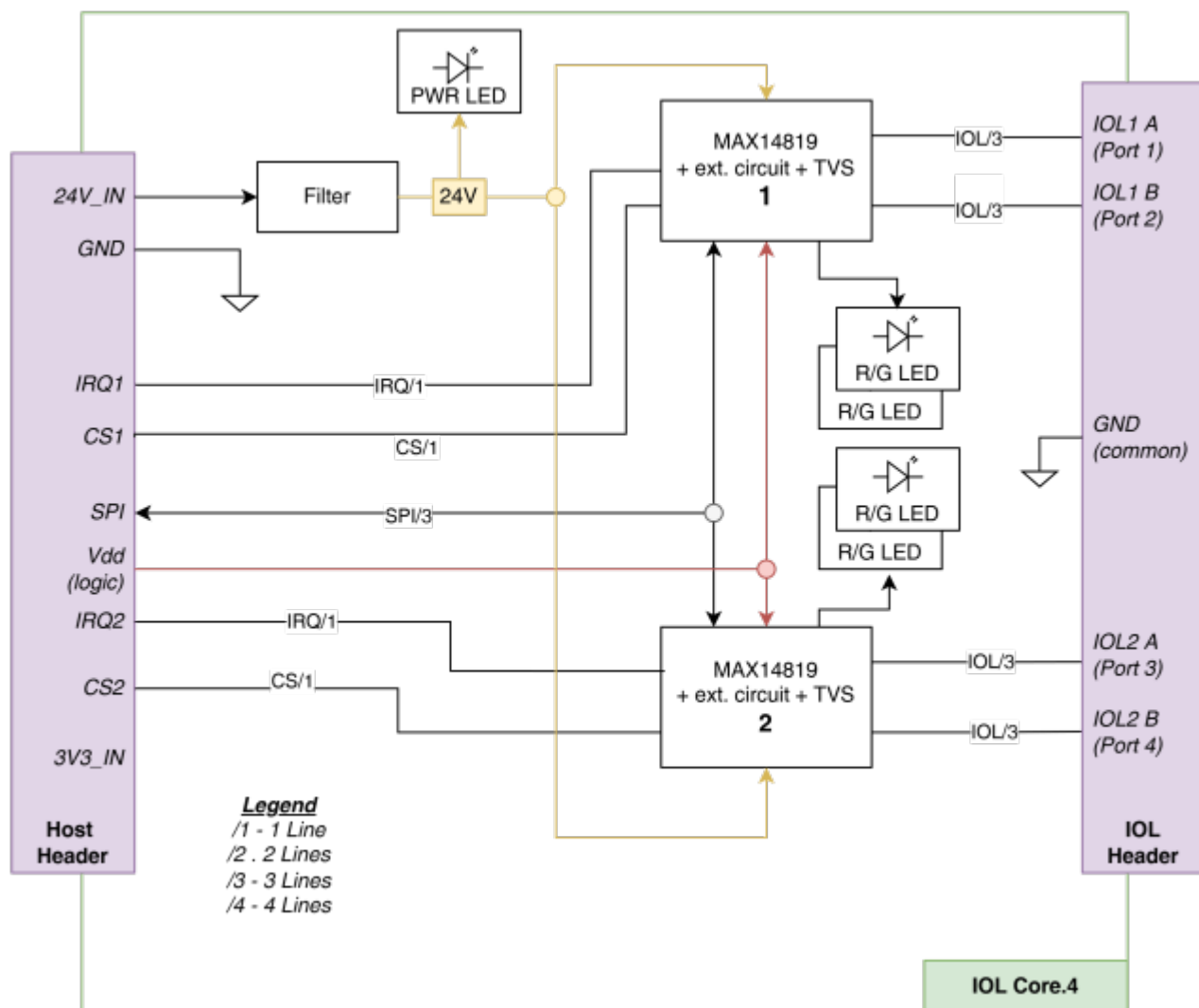
By using the device, you acknowledge and accept this warning, and you agree to indemnify and hold harmless the manufacturer and its affiliates from any liabilities, damages, or losses arising from the improper use of the device in critical applications.

¹⁾

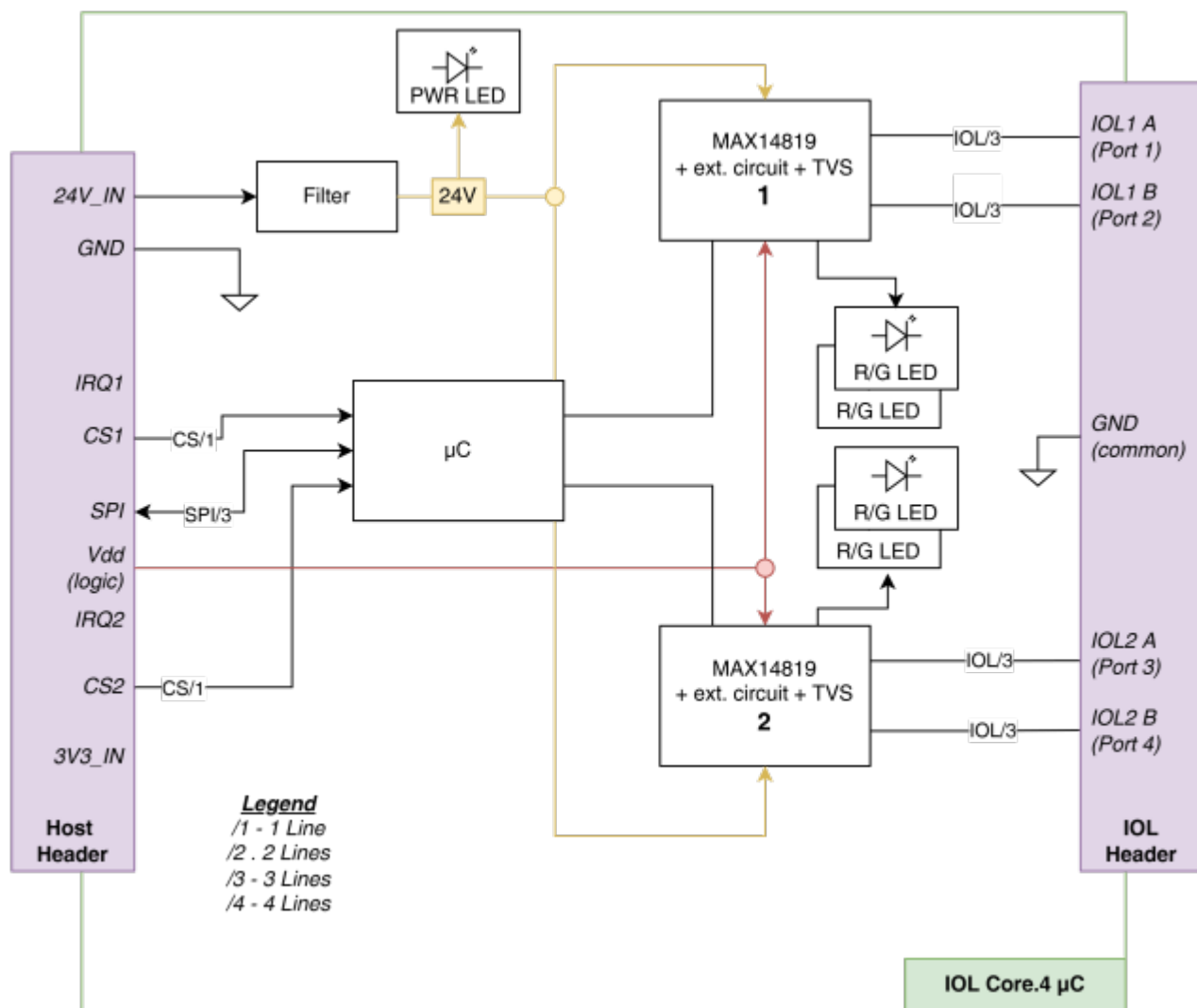
IO-Link is a registered trademark of PROFIBUS Nutzerorganisation e.V.: io-link.com, profibus.com. The IOL Core4 is compatible with IO-Link devices. It is not a certified IO-Link master.

2. System Architecture

2.1 IOL Core4

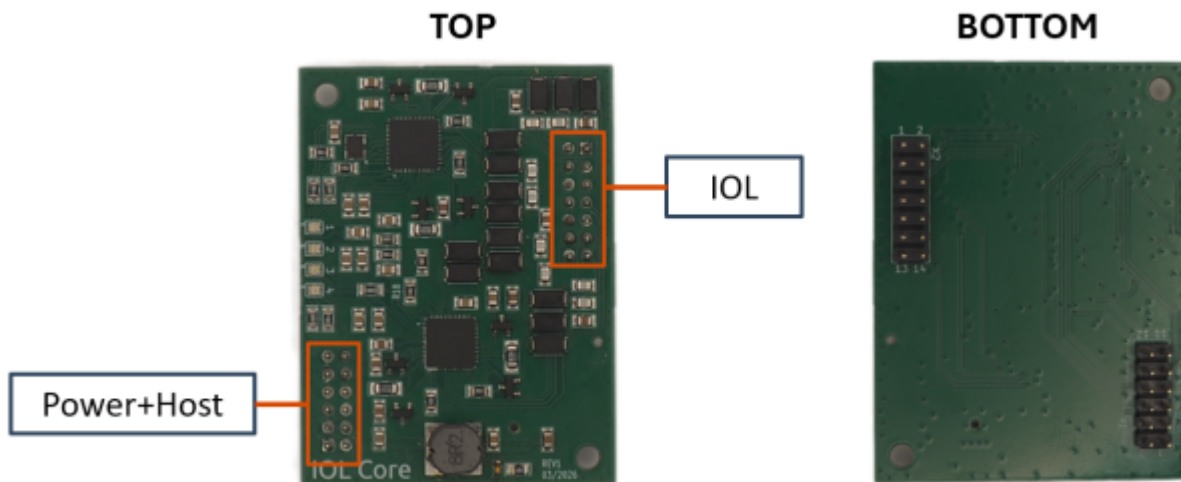


2.2 IOL Core4 Pro



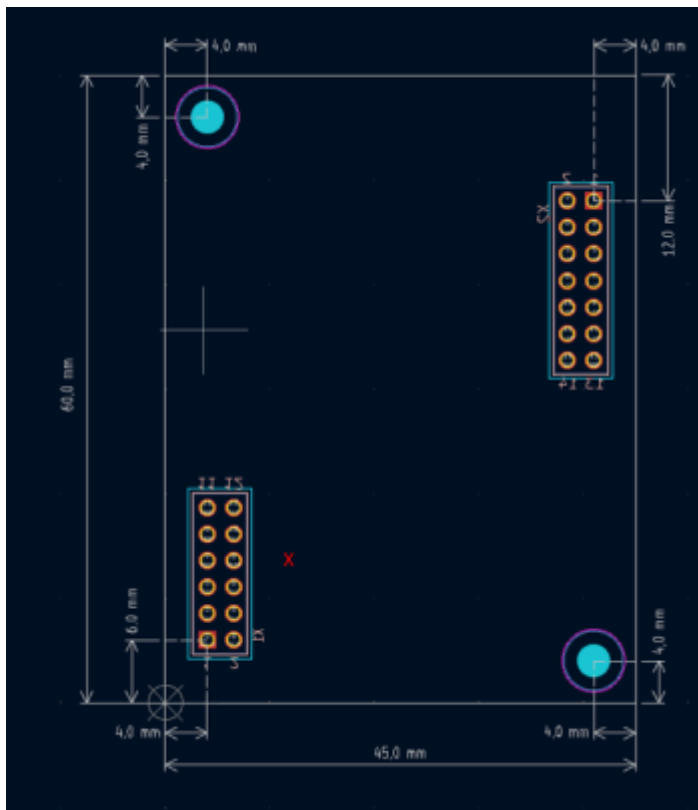
3. Outlines and Connector Positions

3.1 Top and Bottom Definition



Ensure the correct orientation of the IOL Core4 module. Misalignment or rotation can cause damage on the host system and the IOL Core4. Do not plug or unplug while powered.

3.2 Outlines and Positions (TOP View)

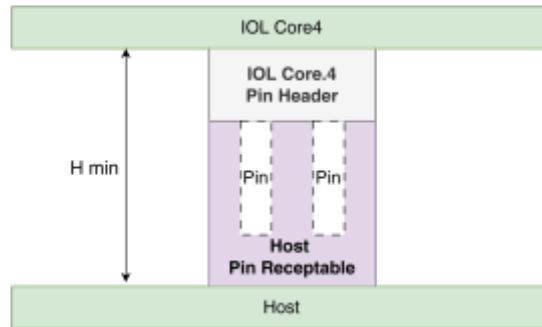


The mounting holes (cyan) are suitable for M3 screws/standoffs

4. Interface

4.1 General Considerations

- The host connector and IOL connectors are 2,54mm pitch pin header with a pin length of 6mm.
- The clearance under the board shall be min. $H=3,5\text{mm}$.



4.2 Power Supply

- The 24V power supply voltage shall be $24\text{V} \pm 20\%$.
- The host connector shall be able to provide 2A on the 24V supply.
- The voltage is filtered to provide EMC compatibility on the IOL ports when integrated.



Please note that the 24V voltage supply is not reverse polarity protected.

4.3 Host Connector X1

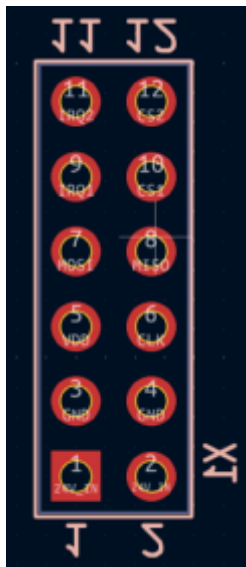
- The Vdd provides a reference level for the logic communication (SPI, IRQ) and supply for the μC on the module (IOL Core4 μC only)
- The Vdd voltage is $3,3\text{V} \pm 10\%$. The maximum current on this line is:
 - IOL Core4 (PT-1204) $<20\text{mA}$.
 - IOL Core4 μC (PT-1205) $<75\text{mA}$.
- The logic communication lines (SPI, IRQ) do not include ESD protection in order to preserve signal integrity. This needs to be considered on the host if the lines are ESD-exposed.

Pin assignment:

Pin	Signal
1,2	24V IN
3,4	GND
5	Vdd, logic reference (3.2V)
6	SPI CLK (logic level)
7	SPI MOSI (logic level)
8	SPI MISO (logic level)
9	IRQ1 (logic level) to MAX1 – has an internal pull-up
10	CS1 (logic level) to MAX1

Pin	Signal
11	IRQ2 (logic level) to MAX2 - has an internal pull-up
12	CS2 (logic level) to MAX2

Host connector X1 TOP view:

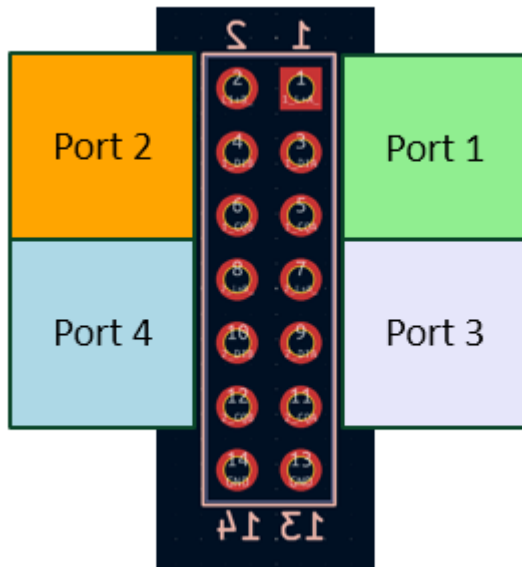


All logic signals (SPI, interrupts) host interface X1 work on 3V3 logic levels.

4.4 IOL Connector

Pin assignment:

Pin	Port	Signal
1	Port 1 (IOL1A)	L+
2	Port 2 (IOL1B)	L+
3	Port 1 (IOL1A)	DIA
4	Port 2 (IOL1B)	DIA
5	Port 1 (IOL1A)	CQB
6	Port 2 (IOL1B)	CQB
7	Port 3 (IOL2A)	L+
8	Port 4 (IOL2B)	L+
9	Port 3 (IOL2A)	DIA
10	Port 4 (IOL2B)	DIA
11	Port 3 (IOL2A)	CQB
12	Port 4 (IOL2B)	CQB
13,14	Common	GND

IOL connector X2 TOP view:

Each SDCI Port is designed to supply max. 500mA on the L+ line and 150mA on the CQ line. The current supply is limited by software (for L+ in connection with a series resistor). If a custom master application is used, the limits must be set in the driver configuration.

5. Environmental Requirements

Operating temperature range: -25°C to +60°C.



The IOL Core4 was tested with a host board with an environmental temperature of 50°C. The final temperature rating needs to be done with the host hardware in the integrated setup.

6. Compliance Requirements

Compliance assessment for the regions EU, US, and Canada (not legally binding). The IOL Core4 is an extension board for integration into control, testing, or measurement hardware; it is not a standalone device and is only sold as a component for integration into other products.

6.1 Certification Statement

Region	Statement
EU	Does not require CE certification as a standalone component; exempt from standalone CE marking as a professional-integrator component per EU product regulations. Does not carry the CE mark.
US (FCC)	Not independently certified as a standalone product, though designed with RFI minimization in mind. Final FCC compliance of the assembled end product is the system integrator's responsibility.
Canada (ISED)	Not independently certified under ISED Canada. The system integrator is responsible for ISED compliance of the assembled product, including a Technical Acceptance Certificate (TAC) if required.

6.2 Integrator Requirements and Recommendations

System integrators using this extension board should:

1. Ensure all final-assembly components (controllers, power supply, enclosure, board) retain their electrical/emissions characteristics when combined.
2. Test the complete assembled product for compliance in each target market.
3. Obtain necessary certifications (FCC, ISED, etc.) for the complete system before marketing or selling it.
4. Apply appropriate regulatory markings and maintain compliance documentation for the final product.

6.3 Environmental Compliance

RoHS and REACH compliance is provided through the general statement by Pinetek Networks.

6.4 Supplier information

Pinetek Networks GmbH
Bachstelzenweg 8
DE-88677 Markdorf

www.pinetek-networks.com
info@pinetek-networks.com

Disposal

The IOL Core4 is marked with the crossed out waste bin symbol with shows the compliance with the WEEE. Pinetek Networks will take back devices that are used in a B2B environment. For devices, that are used in B2C environments, the local disposal through local services, or they can be returned to Pinetek Networks.

If you wish to return used devices, please send them back free of charge to Pinetek Networks.

WEEE Registration

Pinetek Networks GmbH is registered under WEEE-Reg.-Nr: DE241793280