

Industrial IOT Technical Reference



For more details, visit: www.zerynth.com

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Overview

The Industrial IoT Kit provides a complete hardware platform for developing industrial IoT applications. The kit features an 32-bit WIFI-enabled microcontroller , Industrial temperature and current sensors, switches, RS485 converter and enclosure.

The keystone of the kit is the 4zerobox. The 4ZeroBox is a modular hardware electronic unit that simplifies development of Industrial IoT applications allowing rapid integration with sensors, actuators, and Cloud services.

Zerynth SDK is the official development environment for the 4ZeroBox.

Zerynth SDK is a powerful Python and C development environment that supports many industrial protocols, sensor channels and components. In addition to seamless integration with zCloud.

Package Contents

1. 4ZeroBox

4ZeroBox mounts a powerful ESP32 Microcontroller by Espressif Systems with the following features:

- (240MHz, 16Mb Flash, 512KB SRAM)
- a DIN-rail mountable case with industrial-grade sensor channels
- support for Wi-fi and Ethernet.
- SD Card for local data storage
- Customizable solution, supports LoRa, CAN, RS485, RS232
- Crypto element ATECC608A from Microchip has been integrated to handle ultra-secure connections.

4ZeroBox lets the user choose the best installation strategy, adapting it to the specific industrial environment.

Installation Modes:

PLC mode

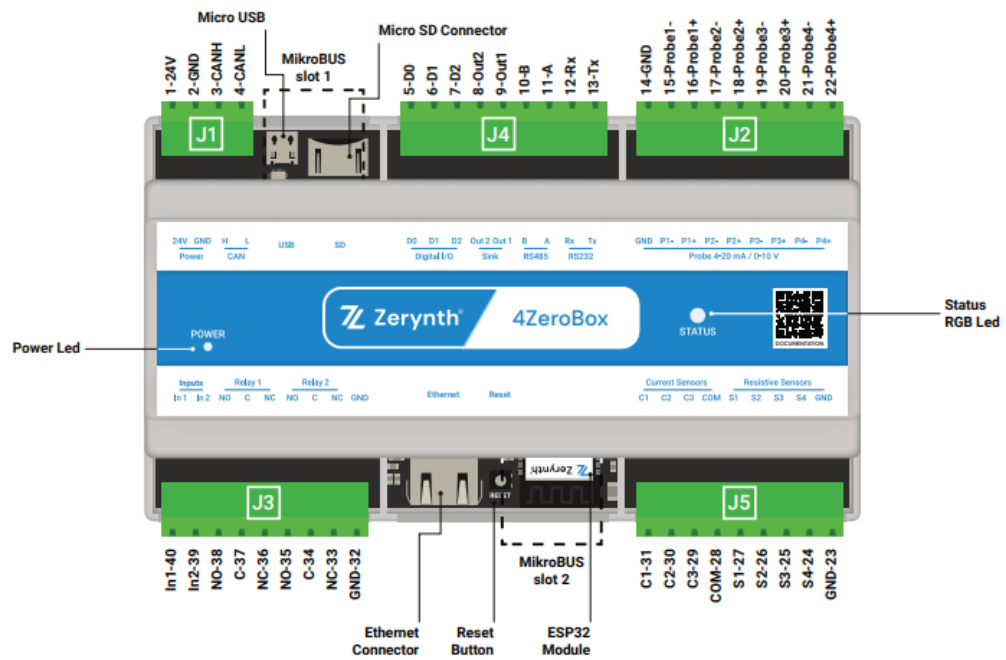
Acquisition of digital data from PLC via digital ports and protocols like Siemens S7, OPC UA, Ethernet/IP, Rockwell, etc.

RETROFITTING mode

Data Acquisition in parallel to the PLC using the equipped sensors or installing new ones.

HYBRID mode

The two options merged to get optimum performance from your machines.



2. Carel passive NTC temperature probe - NTC015HP00

The Carel passive NTC temperature probe has a length of 15mm and a diameter of 6mm. Measurements are within a temperature precision of $\pm 0.3^\circ\text{C}$.



3. Current Sensor - TT 50-SD

Split core transducer for the electronic measurement of AC waveform currents, with galvanic isolation between the primary circuit (power) and the secondary circuit (measurement). Split core transducer for the electronic measurement of AC waveform currents, with galvanic isolation between the primary circuit (power) and the secondary circuit (measurement).

Attribute	Value
Current Ratio	50:1
Bore Size	8mm
Input Current	50A
Output Current	16.66 mA
Minimum Temperature	-25°C
Maximum Temperature	+70°C

4. RS485 Converter - USB-RS485-WE-1800-BT

FTDI Chip USB-RS485 Convertor Cables.

The USB-RS485 cable is a USB to RS485 level serial UART converter cable incorporating FTDI's FT232RQ USB to serial UART interface IC device which handles all the USB signalling and protocols. The cable provides a fast, simple way to connect devices with a RS485 interface to USB. Each USB-RS485 cable contains a small internal electronic circuit board, utilising the FT232R, which is encapsulated into the USB connector end of the cable. The FT232R datasheet, DS_FT232R, is available at <http://www.ftdichip.com>. The integrated electronics also include the RS485 transceiver plus Tx and Rx LEDs which give a visual indication of traffic on the cable (if transparent USB connector is specified). The other end of the cable is a bare, tinned-wire ended connection by default, but can be customised using different connectors to support various applications.

Features and Benefits.

- USB-RS485 converter cable provides a USB to RS485 serial interface with customised end connectors.
- Entire USB protocol is handled by the electronics in the cable.
- EIA/TIA-485 communication interface with low power requirements.
- UART interface support for 7 or 8 data bits, 1 or 2 stop bits and odd / even / mark / space / no parity.
- Internal EEPROM with a user writable area.
- FTDI's royalty-free VCP allows for communication as a standard emulated COM port and D2XX „direct“ drivers provide DLL application programming interface.
- Visual indication of Tx and Rx traffic via LEDs in the transparent USB connector.
- X-On / X-Off software handshaking.
- Data transfer rates from 300 baud to 3 Mbaud.
- Support for FT232R FTDIChip-ID™ feature for improved security.
- Low USB bandwidth consumption.
- UHCI / OHCI / EHCI host controller compatible.
- USB 2.0 Full Speed compatible.
- -40°C to +85°C operating temperature range.
- RoHS Compliant
- Cable length is 1.80m (6 feet).
- ESD Protection for RS-485 I/O's
 - ±15kV Human Body Model (HBM)
 - ±15kV EN61000-4-2 Air Gap Discharge
 - ±8kV EN61000-4-2 Contact Discharge.

5. Reed switch and Reed Magnet - MMPSA 240/100

MMPSA 240/100

Typical Applications

This kit can be used for a wide range of different applications, starting from some simple temperature measurement or power consumption control units scalable to some really complex independent units which should satisfy industrial grade standards. For example:

- NTC Temperature probes in combination with WiFi or Ethernet connection can be used for almost any type of remote temperature sensing.
- Reed switch in combination with ATECC608A and WiFi connection can be used for some independent security unit like an alarm.
- Industrial Process monitoring

The MikroBUS socket with hundreds of different click boards also increases the level of combinations to almost infinity. The MikroBUS socket thanks to hundreds of different click boards, also increases the level of combinations to almost infinite numbers.

Declaration of Conformity

IMPORTANT: KEEP THIS INFORMATION FOR FUTURE REFERENCE. FOR FULL SET UP AND INSTALLATION INSTRUCTIONS, PLEASE VISIT docs.zerynth.com

Warnings

- All external power supplies used with Zerynth boards must comply with the relevant regulations and standards applicable in the country of use and must provide a voltage between 9 and 36 VDC.
- Hereby, ZERYNTH srl declares that the radio equipment type Zerynth Development boards are in compliance with Directive 2014/53/EU (RED). The full text of the EU declaration of conformity is available at the following internet address:
<https://www.zerynth.com/download/20246/>
- The manufacturer cannot guarantee compliance with the RED directive if the end user uses custom circuits other than those supplied by Zerynth (used in conformity tests).
- All expansion boards that require CE markings have been tested and meet the essential requirements set by the Directives: 2014/30/EU (EMC), 2014/35/EU (LVD), 2011/65/EU (RoHS). The declaration of conformity (DoC) can be downloaded from the website <https://www.zerynth.com/download/20246/>
- All Zerynth boards have undergone compliance testing for conducted and radiated emissions meeting the requirements of the following standards: FCC Part 15 B and ICES-003.
- Any device or component connected to one of the expansion connectors must comply with the electrical characteristics defined in the specifications described in the complete manual to ensure that performance and safety requirements are met.
- Each cable used to connect other devices or components to the Zerynth boards must be less than 300 cm long and must offer adequate insulation and operation so that the appropriate performance and safety requirements are met.

Instructions for safe use

- Do not expose this product to water or moisture and do not place it on a conductive surface while it is operating.
- Do not expose this product to excessive heat sources which could cause it to operate outside of the permitted temperature range defined in the specifications (-40, +85 ° C).
- Be careful when handling the product to avoid mechanical or electrical damage to the printed circuit board and connectors.
- If a board appears to be damaged, do not use it.
- Do not touch the printed circuit board when it is powered on and never operate with live electrical parts.
- The printed circuit board must not come into contact with conductive objects when it is powered on.
- Discharge static electricity from your body and touch only the edges of the board to minimize the risk of damage from electrostatic discharge.



EN - Waste Electrical and Electronic Equipment (WEEE) Symbol

The use of the WEEE symbol indicates that this product/board may not be treated as household waste. By ensuring this product/board is disposed of correctly, you will help protect the environment. For more detailed information about recycling of this product/board, please contact your local authority, your household waste disposal service provider or the shop where you purchased it.