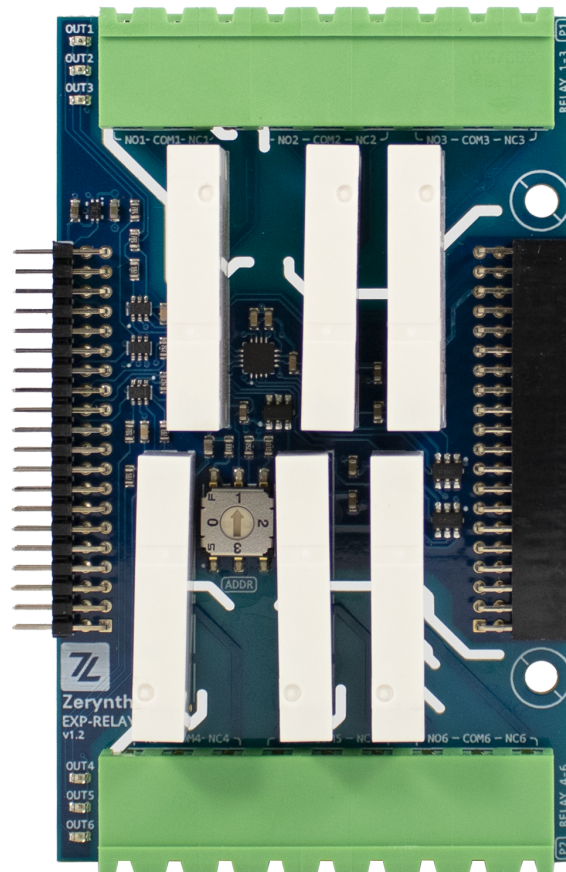


# EXP-Relay User Manual



For more details, visit: [www.zerynth.com](http://www.zerynth.com)

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Contents of the present documentation refers to products and technologies described within. All technical data contained in this document may be modified without prior notice. The content of this documentation is subject to periodic revision.

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## Overview

The **EXP-RELAY expansion board** features 6 General Purpose Relays rated at 6A 250VAC. The board enables developers to control motors, fuel pumps, industrial applications where control of high voltages and currents is intended for controlling large power loads.

Zerynth expansion boards work seamlessly with all of the Zerynth Development boards. Combined, they can act as a Development Board for prototyping a Product, and a core for industrial applications.

The zBUS allows connection in a cascade of different add-on modules to create specific industrial applications that fit into a DIN-RAIL case.

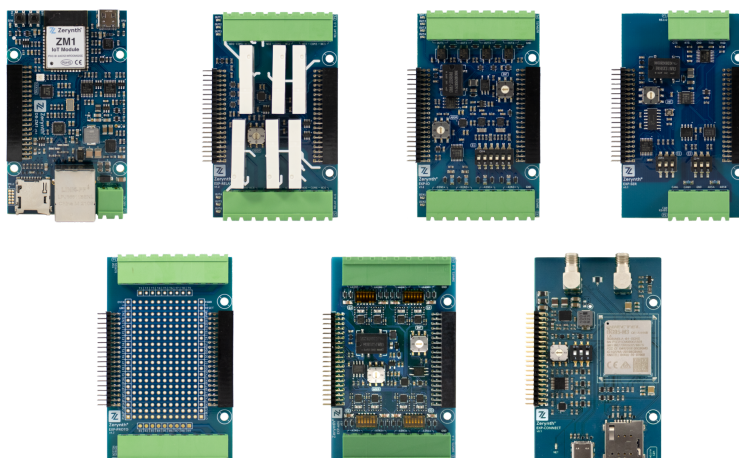
## Modular Expansion System

Zerynth Development boards offer a game-changing way of connecting and adding functionalities to your application in a simple and easy way.

The development board offers a modular expansion system that adds expansion boards through the connectors on the board (zBUS).

Expansion boards vary in features and functionality. Currently, Zerynth offers :

- EXP-AIN: Expansion board with 8 Industrial analog input channels
- EXP-CONNECT: GSM-NB-IoT and GPS enabled expansion module.
- EXP-IO: Industrial input/output board with 4 solid-state relays, 2 analog channels (4-20mA/0-10V/NTC/current clamp) channels, 2 opto-isolated digital inputs
- EXP-RELAY: Expansion board with 6 Electromechanical power relays.
- EXP-SER: Serial Communication board with : CAN, RS232 and RS485 interfaces.
- EXP-PROTO: Prototyping board for connecting and testing different types of sensors and devices.



## zBUS

The modular expansion system uses **the zBUS**. **The zBUS** is an efficient, powerful standard for connecting and prototyping different sensors and devices.

The zBUS uses the CN1 pin header (20x2) exposing the following:

- 16 GPIO pins.
- 4 interrupt pins.
- 2 USART/UART instances with full support (TX,RX,RTS,CTS)
- I2C, SPI support.
- 5V, 3.3 V output pins.
- Enable pin for controlling the power to attached expansion boards.

Note: The development board supports up to 3 attached expansion boards.

## General Characteristics

**6 General Purpose Relays:** Technical ratings of the relay are noted below.

## Screw Description

### P1 - Upper screw terminal

Screw Number	Symbol	Description
<b>1,2,3</b>	NO1, COM1, NC1	Normally open terminal,COM and NC terminal of relay #1
<b>4,5,6</b>	NO2, COM2, NC2	Normally open terminal,COM and NC terminal of relay #2
<b>7,8,9</b>	NO3, COM3, NC3	Normally open terminal,COM and NC terminal of relay #3

### P2 - Lower Screw terminal

Screw Number	Symbol	Description
<b>10,11,12</b>	NO4, COM4, NC4	Normally open terminal,COM and NC terminal of relay #4
<b>13,14,15</b>	NO5, COM5, NC5	Normally open terminal,COM and NC terminal of relay #5
<b>16,17,18</b>	NO6, COM6, NC6	Normally open terminal,COM and NC terminal of relay #6

## Technical Specifications

Environmental Conditions	
Temperature	-40 to +85 °C
Humidity	Max 80% not condensing
Storage Temperature	-40 to +85 °C
Degree Protection	< IP40

Relay Ratings	
Contact rating	6A 250VAC / 30 VDC
Max switching Voltage	400 VAC / 125 VDC
Max switching Current	6A
Max switching Power	1500 VA / 180 W
Coil Power	5 VDC to 24 VDC: Approx 170 mW 48 VDC, 60 VDC: Approx. 210 mW

## Components' Guide and Pin Mapping

**Rotary Switch SW1** : Chooses the address of the ADC Chip. Enable multiple boards to be connected simultaneously.

Position	Address
0	0x10
1	0x11
2	0x12
3	0x13

**Power Supply**: The board is powered by the 5V internal signal from the ZM1 Development board.

**LED**: The EXP-RELAY has 6 LEDs. Each relay has a dedicated LED that signals its state.

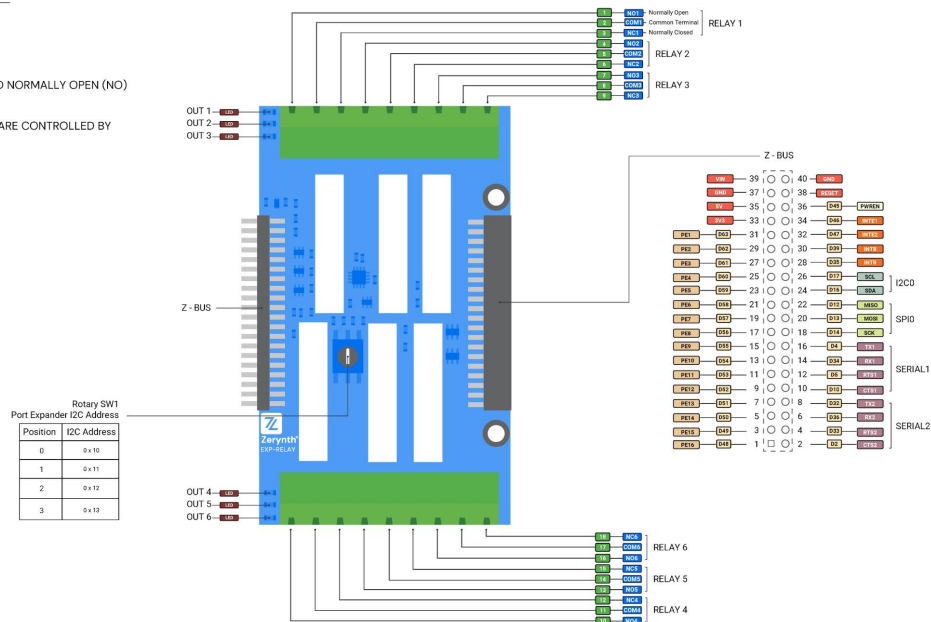
**CN1 Pin Headers:** The Zerynth zBUS consists of a 20x2 pin header.

PIN-Name	Description
<b>EVIN</b>	External power supply voltage (9-36V)
<b>RESET</b>	Reset pin, Active low.
<b>PWREN</b>	enable/disable the power in the zBUS
<b>5V</b>	Regulated 5V power supply
<b>INTE1</b>	Configurable interrupt for DB-ZM1 on-board port expander.
<b>3V3</b>	Regulated 3.3V power supply.
<b>INTE2</b>	Configurable interrupt for DB-ZM1 on-board port expander.
<b>PE1-16</b>	Digital I/O pins connected to ZM1 on-board Port Expander
<b>INTB</b>	Not Connected for DB-ZM1
<b>INTR</b>	Native Interrupt: user configurable
<b>SCL</b>	I2C Serial Clock
<b>SDA</b>	I2C Serial Data
<b>MISO</b>	SPI Master Input Slave Output
<b>MOSI</b>	SPI Master Output Slave Input
<b>SCK</b>	SPI Serial Clock
<b>TX1</b>	UART/USART 1 Transmit Data
<b>RX1</b>	UART/USART 1 Receive Data
<b>RTS1</b>	UART/USART 1 Request To Send
<b>CTS1</b>	UART/USART 1 Clear To Send
<b>TX2</b>	UART/USART 2 Transmit Data
<b>RX2</b>	UART/USART 2 Receive Data
<b>RTS2</b>	UART/USART 2 Request To Send
<b>CTS2</b>	UART/USART 2 Clear To Send

**NOTE:**  
OUTx LED FOLLOWS RELATED NORMALLY OPEN (NO)  
RELAY STATUS

PINS FOR RELAY SWITCHING ARE CONTROLLED BY  
ON-BOARD PORT EXPANDER

## EXP-RELAY



## Software

Zerynth SDK provides software libraries for each board, alongside API documentation and examples. Please check the Hardware section for more information.

<https://docs.zerynth.com/latest/hardware/>

## Zerynth SDK

Zerynth platform is designed to simplify and accelerate the development of IoT applications. Zerynth offers tools for developers, system integrators, and businesses to enable IoT for their products, rapidly in a secure and connected way.

**Zerynth SDK** is the official development framework for Zerynth hardware. It includes a compiler, device drivers and libraries drivers. In addition to simple tutorials, example codes, and application examples.

Zerynth SDK and all the required libraries can be installed on Windows, Linux and Mac using the Zerynth Installer (<https://www.zerynth.com/zsdk>).

## Declaration of Conformity

IMPORTANT: KEEP THESE INFORMATION FOR FUTURE REFERENCE FOR FULL SET UP AND INSTALLATION INSTRUCTIONS PLEASE VISIT [docs.zerynth.com](https://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.
- The EXP-RELAY board can switch loads up to 250VAC 6A through its relays contacts (C, NO, NC). Those lines must be protected with 6 amps fuses or similar devices to limit the current.
- 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 marking 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 IC 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 the 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 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 looks damaged, do not use it.
- Do not touch the printed circuit board when it is powered and never operate on live electrical parts.
- The printed circuit board must not come into contact with conductive objects when it is powered.
- 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.

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