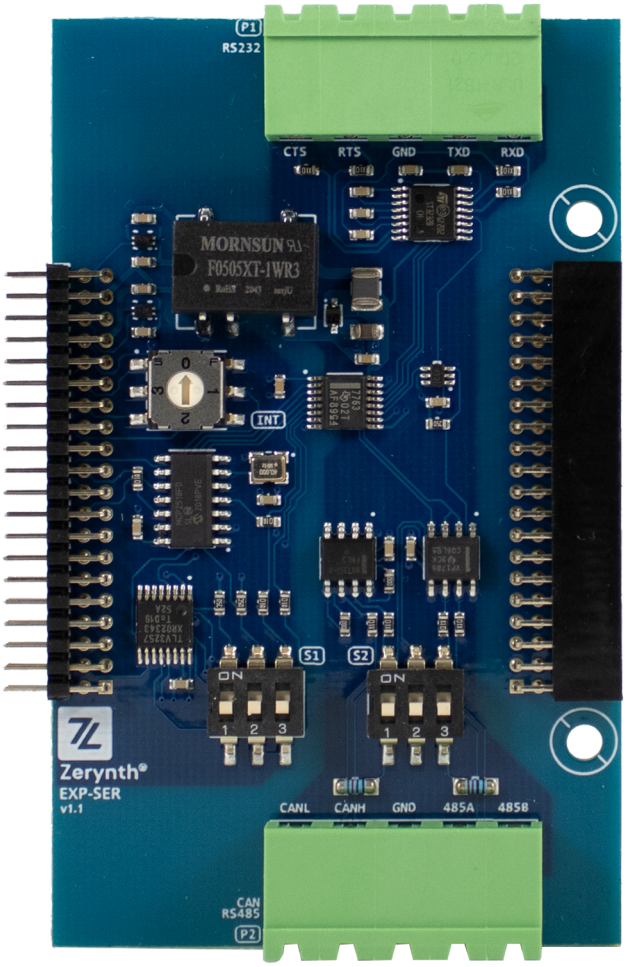
EXP-SER User Manual



For more details, visit: www.zerynth.com

This Document is the property of Zerynth (Zerynth S.r.l.). Duplication and reproduction are forbidden if not authorized.

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.

Table of contents

Overview	**3**
Modular Expansion System	**3**
Screw Description	**4**
Technical Specifications	**4**
Components' Guide	**5**
DIP Switches	**5**
Pin Map	**6**
zBUS Pin Description	**7**
Software	**8**
Zerynth SDK	**8**
Declaration of Conformity	**9**
Warnings	**9**
Instructions for safe use	**9**

Overview

The **EXP-SER expansion board** enables communication over RS485, RS232 and CAN interfaces. It enables communication with PC, Devices, boards or sensors communicating over serial channels.
The board features pin headers to connect terminals of CAN bus, R485 and RS232, in addition to exposing the UART/USART pins, I2C and SPI pins in the zBUS pin header.

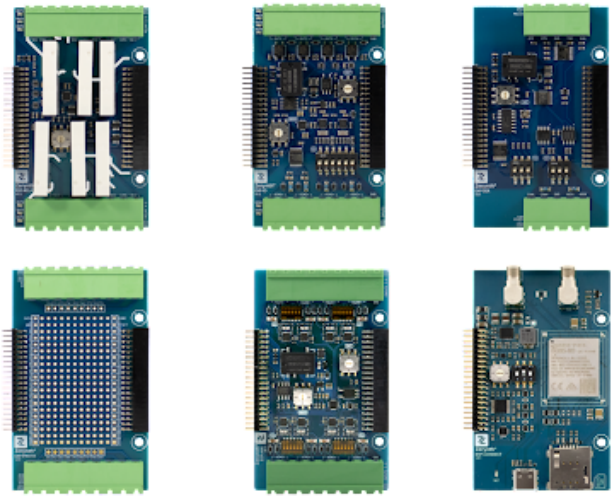
Zerynth expansion boards work seamlessly with all of the Zerynth Development boards. Combined, they can act as a Development Board for prototyping a Product, and a core for industrial applications.

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.



Screw Description

P1 - Upper screw terminal		
Screw Number	**Symbol**	**Description**
1	**CTS**	Clear to send signal for RS232
2	**RTS**	request to send signal for RS232
3	**GND**	Isolated ground for the serial and CAN
4	**TX**	TX signal for RS232
5	**RX**	RX signal for RS232

P2 - Lower screw terminal		
Connector P2	**Symbol**	**Description**
6	**CANL**	CAN low signal
7	**CANH**	CAN High signal
8	**GND**	Isolated ground for the serial and CAN pins.
9	**RS485A**	RS485 Line A
10	**RS485B**	RS485 Line B

NOTE: All I/O pins on screw terminals are isolated from the zBUS interface.

- Isolation: 125V(rms) / 1500V(peak)
- Overvoltage Cat.II / Pollution Deg.II

Technical Specifications

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

Components' Guide

- **CAN:** The board uses the MCP2518FD IC, It is an External CAN FD Controller.
  The board also uses NCV7357 as a CAN FD Transceiver.
  Connections between the controller and the transceiver are digitally isolated by the ISO7763 IC.
- **RS232 interface:** The board uses the MAX3232 IC, 3-V to 5.5-V Multichannel RS-232 Line Driver/Receiver. The output pins of the IC are directly connected to the header P1.
- **RS485 interface:** The board uses SN65HVD1786D RS485 Transceiver. The output pins of the IC are directly connected to the header P2.

IMPORTANT: RS232 and RS485 peripherals refer to the same hardware serial interface. RS232 and RS485 cannot be used together at the same time.

IMPORTANT: RS232 and RS485 use also the same signal for:

- RS232 → Ready-To-Send (RTS)
- RS485 → Receive/Transmit Enable signal.

DIP Switches

Rotary Switch SW1 : Controls the Interrupt output of the MCP2518 CAN controller.

Position	Pin on zBUS	Pin ZM1-DB
0	INTR	D35
1	INTB	NC
2	INTE1	D46
3	INTE2	D47

S1 Switch

PIN	OFF	ON
1	Select SERIAL1 of ZBUS	Select SERIAL2 of ZBUS
2	-	Use CTS with CAN (MCP2518 Chip Select)
3	-	Use CTS with RS232

IMPORTANT: Never enable together S1.PIN2 and S1.PIN3

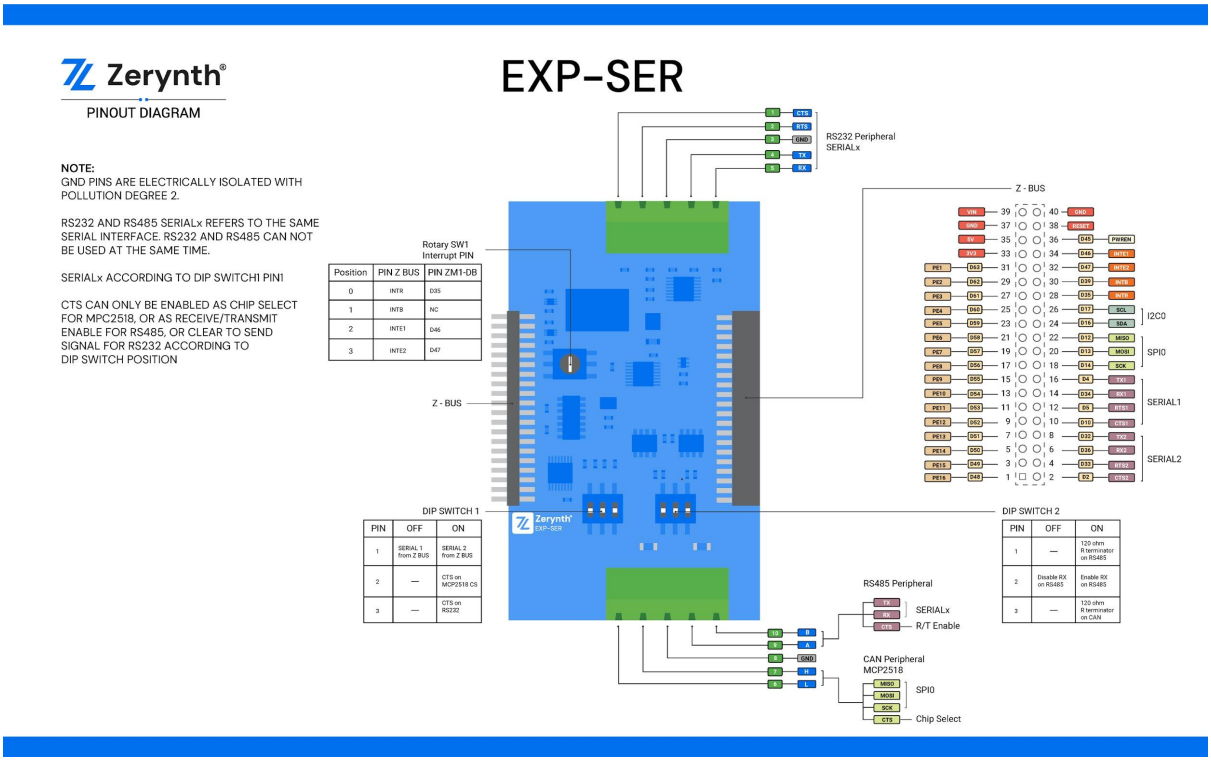
S2 Switch

PIN	OFF	ON
1	-	Enable RS485 termination (120Ω)
2	Disable RX channel RS485	Enable RX channel RS485
3	-	Enable CAN termination (120Ω)

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

Note: Each ground in each expansion board is isolated.

Pin Map



zBUS Pin Description

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

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

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 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.