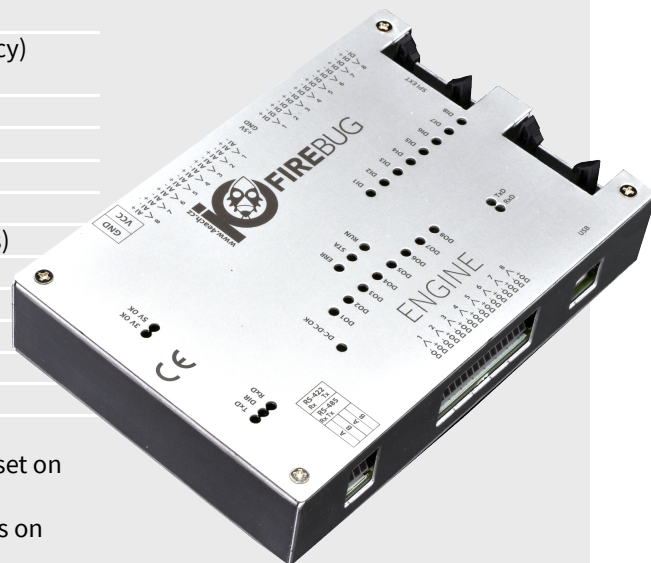## Description

IOFirebug Engine is a unit equipped with a microcontroller and allows connect external devices to PCs. The board connects via USB (or RS-422 / RS-485) to your computer and contains following peripherals:
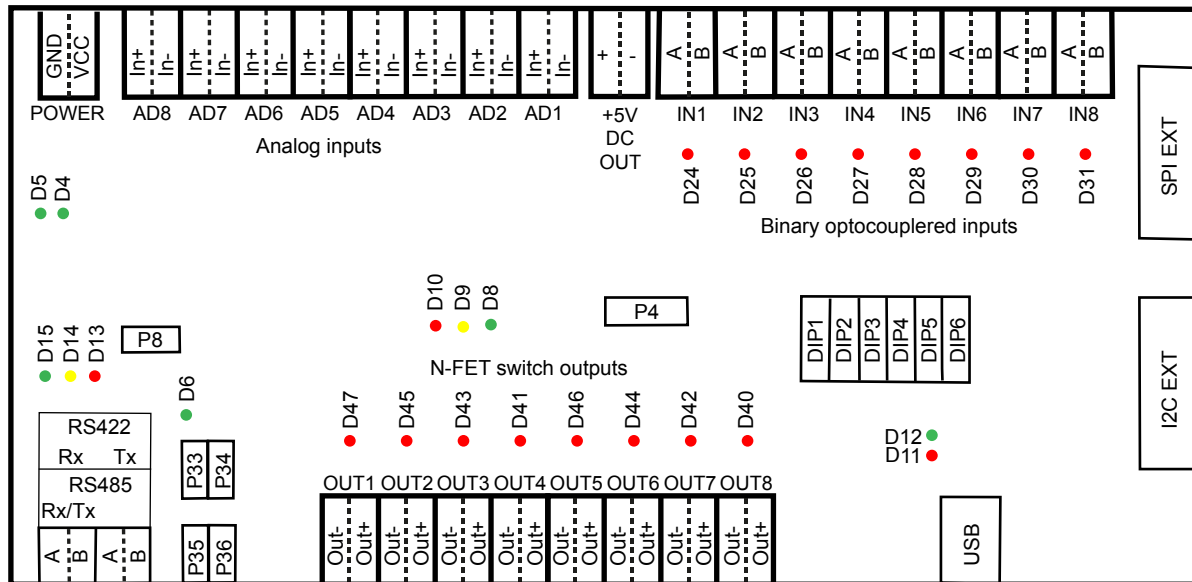
- 8x analog input

- 8x Binary input (galvanically isolated)

- 8x switching N-FET output (galvanically isolated, all channels has common ground)

- RS485/RS422 interface (configurable, galvanically isolated)

- USB to Serial interface (FTDI)

- SPI interface for expansion modules

- Power supply DC +5V for external devices (encoders, RaspBerry Pi etc.)

The main unit Engine can be extended by Wagon modules connected to an SPI interface according to your application needs. SPI interface accept up to eight wagon modules. Wagon modules expands the main unit on inputs and outputs defined by the type of Wagon.

Technical data

Producer	4EACH, s. r. o. (www.4each.cz)
DI Specification	8x galvanically isolated binary input (by optocoupler) Input voltage 5-30V
DO Specification	8x switching N-FET output Max. 50V/3 A All binary outputs are equipped by PWM function (1-20 000Hz)
AI Specification	8x analog input 12bit/1,4MHz (ADC frequency) Input voltage 0 - 10V
Integrated DC 5V supply	5V / 1A
Communication	USB (FTDI - COM port), RS-422/RS-485, SPI
Input voltage	10 – 30 V DC
Consumption	100mA to 500mA/12V (depends on connected expansion modules)
Dimensions	152mm x 102mm x 40 mm (w x h x d)
Transport dimension	200mm x 145mm x 65 mm (w x h x d)
Weight	290 g
Operating temperature	-20° C to 70° C
Protection	Overvoltage, polarity
Additional functions	• Expandable by IOFireBug Wagon modules • Expandable by another IOFireBug Engine set on RS-422 interface • Expandable by more IOFireBug Engine sets on RS-485 interface
Certifications and standards	• 2014/30/EU Electromagnetic Compatibility Directive (EMC) • 2011/65/EU Restriction of the use of certain hazardous substances (ROHS)

Schematics and description

Digital input circuit

Interface

POWER – Input voltage connector

AD1 to AD8 – Analog inputs

+5V DC OUT – power supply DC 5V

IN1 to IN8 – Binary inputs

RS422/RS485 – Serial bus for PC or IOFirebug Engine interconnection

OUT1 to OUT8 – Binary outputs

USB – PC interface (FTDI – internal USB to serial converter)

SPI - Interface for IOFirebug Wagon modules

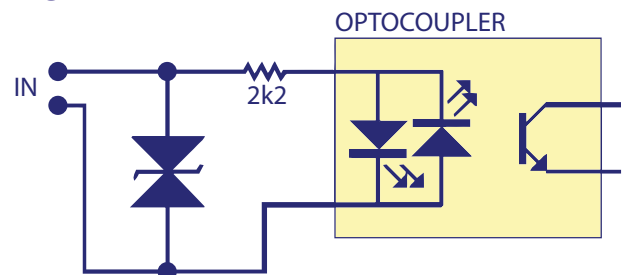I2C EXT – Intentionally unused

Configuration

P8 – Serial bus type switch (RS422/RS485)

P4 – system connector

DIP1 – až DIP6 – link address configuration DIP switch

P33 to P36 – serial bus termination

States

D4 –Internal voltage 5V state

D5 – Internal volatege 3,3V state

D24 to D31 – state of each binary input

D15 – TxD - serial bus transmitter state

D14 – serial bus communication direction

D13 - RxD serial bus receiver state

D8 to D10 – processor and FW state

D6 – DC-DC +5V converter state

D47, D45, D43, D41, D46, D44, D42, D40 – state of each binary output

D12 – TxD - USB transmitter state

D11 – RxD – USB receiver state

Digital output circuit