I2C-IN830M0V3, I2C-IN830MA0V3
I2C-IN830M1V3, I2C-IN830MA1V3
8-Input Opto-couplers I2C-Bus Boards

1 Features

- PCF8574 or PCF8574A I2C controller chip
- Support 100kHz I2C bus frequency
- Address by 3 jumpers for use of up to 8 addresses
- Interfacing up to 16 boards on a single bus
- Compatible with most microcontrollers
- 8 Optically isolated digital input channels
- 15-30Vdc input voltage for I2C-IN830M0V3 and I2C-IN830MA0V3
- 5-30Vdc input voltage for I2C-IN830M1V3 and I2C-IN830MA1V3
- 3700Vdc isolation input voltage
- Operating power supply voltage 3.3-5.5Vdc
- Inverse polarity protection circuits
- DIN-rail supports.
- PCB size 42.50x72.00mm

2 Description

These are the third generation of 8-channel opto-isolator boards for input expander over an I2C bus. Each input of the I2C-IN830M0V3 and I2C-IN830MA0V3 accept 15-30Vdc. It is suitable for mechanical contact switching devices such as relays, buttons, and switches. But each input of the I2C-IN830M1V3 and I2C-IN830MA1V3 accept 5-30Vdc. It is suitable for solid-state switching devices such as proximity switches. The boards use PCF8574 and PCF8574A for I2C-bus controller chips. They support 100KHz bus speed and 3.3-5.5Vdc bus voltage. Each board has three jumpers for setting its own I2C bus addresses. So, they can be connected to the bus up to 16 boards on a single bus by setting different addresses. However, I2C bus pull-up resistors are needed because this version doesn't have pull-up resisters on the boards. This version does not have an INT signal, so the I2C bus connector of this board is **4-pin connector**. The board can be placed on a DIN-Rail PCB holder which can be plugged on a DIN rail tray.

3 Diagrams

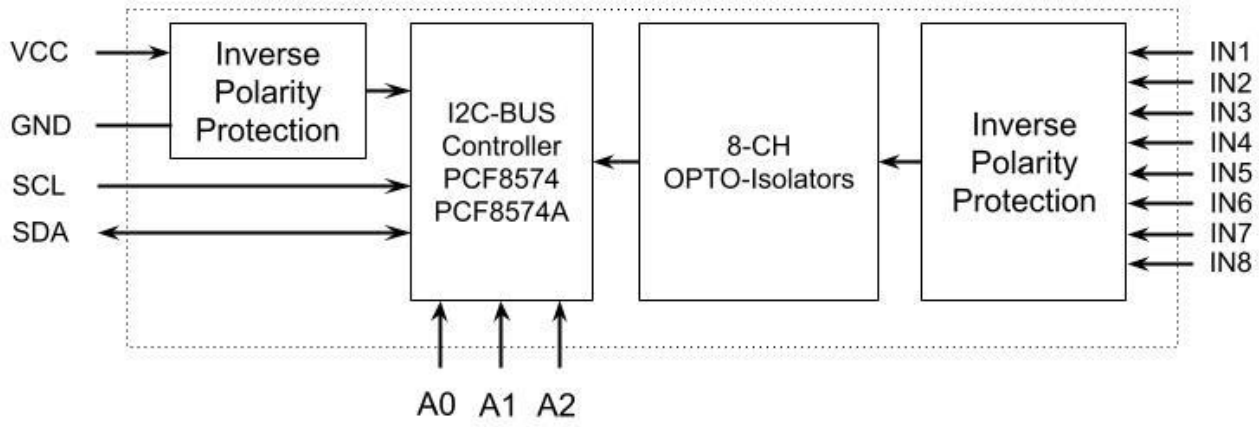

Figure 1: Block diagram

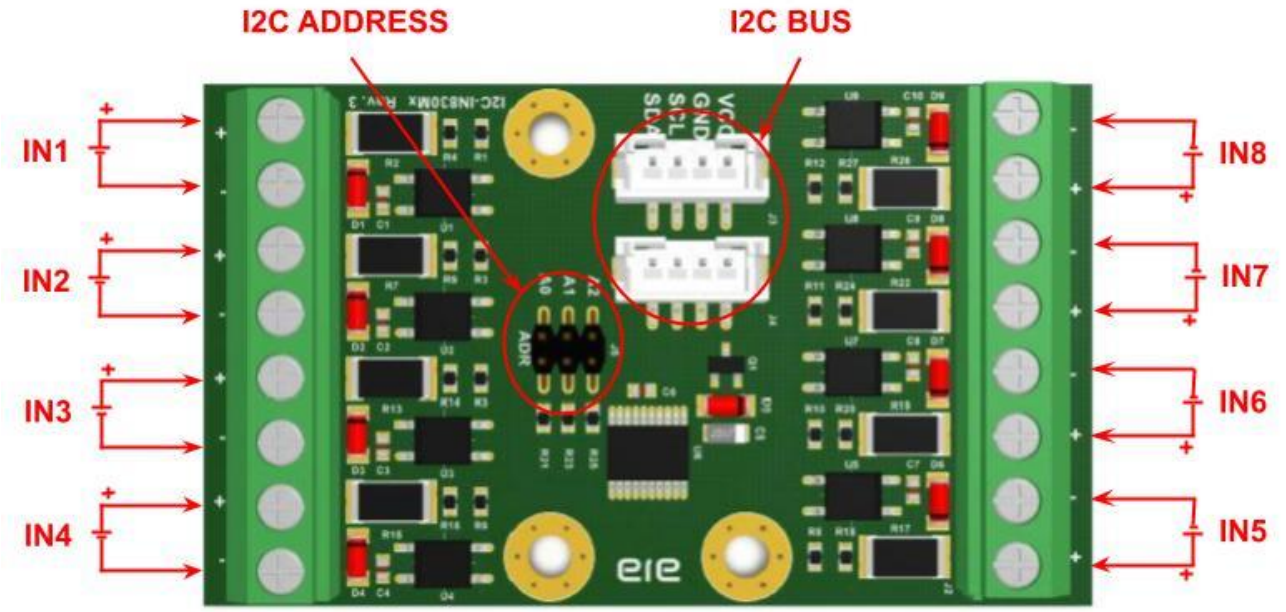

Figure 2: Board diagram

SYMBOL	DESCRIPTIONS
VCC	Bus power supply voltage 3.3-5.5VDC
GND	Ground
SCL	I2C bus serial clock signal
SDA	I2C bus serial data signal
A0	A jumper for selecting address A0
A1	A jumper for selecting address A1
A2	A jumper for selecting address A2
IN1 … IN8	DC input voltage for input1 to input8

Table 1: Pin descriptions

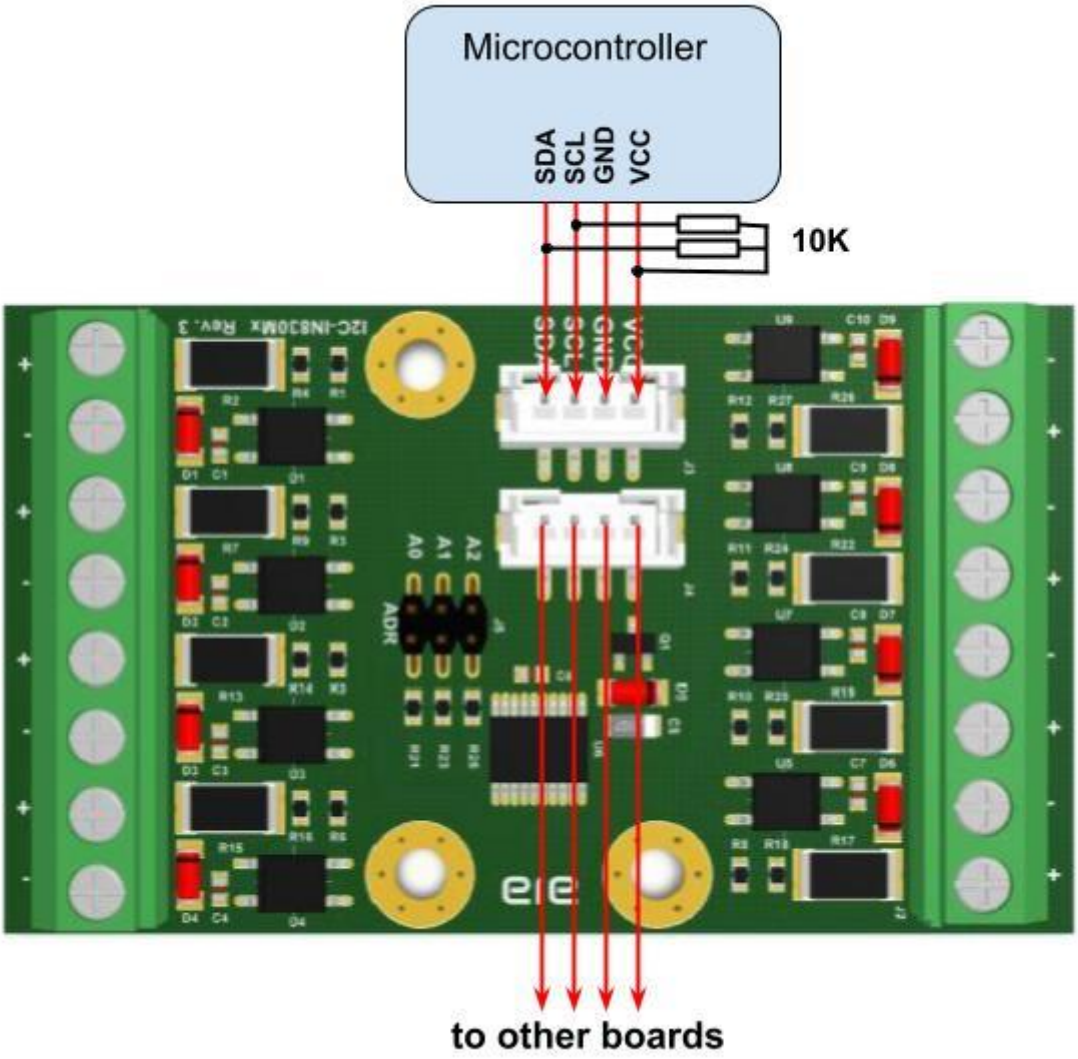

Figure 3: Interfacing

4 I2C Bus Pull-Up Registers

The I2C bus wants two pull-up resistors for SCL and SDA lines. For this version of the boards, the external pull-up resistors must be connected. The 10K resister value is suitable for 100KHz of bus frequency.

5 Daisy Chain

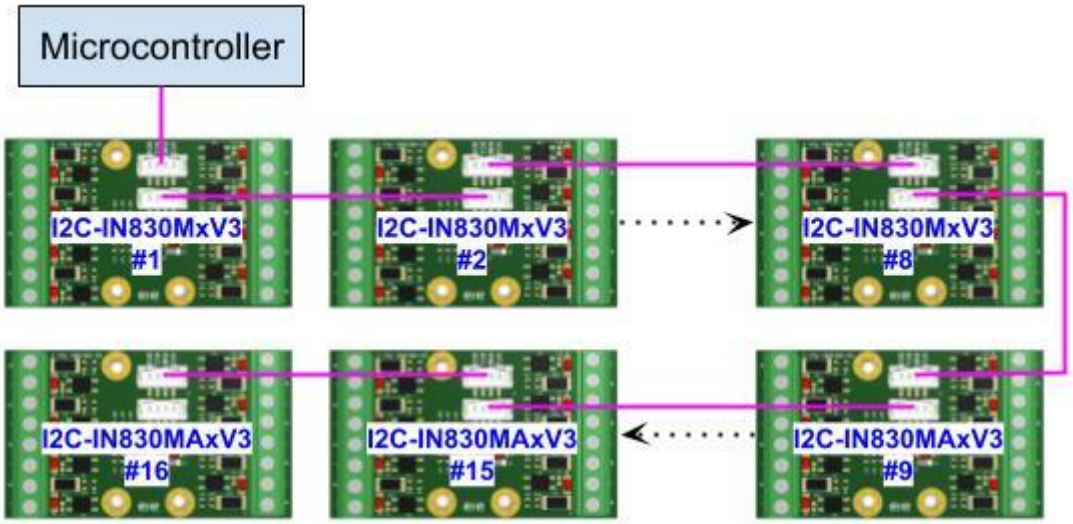

Figure 4: Multiple boards on a single bus

The boards can be connected all together up to 16 boards on a single bus by connecting 8 boards of I2C-IN830MxV3 and 8 boards of I2C-IN830MAxV3. Every board must have a different address.

6 Addressing

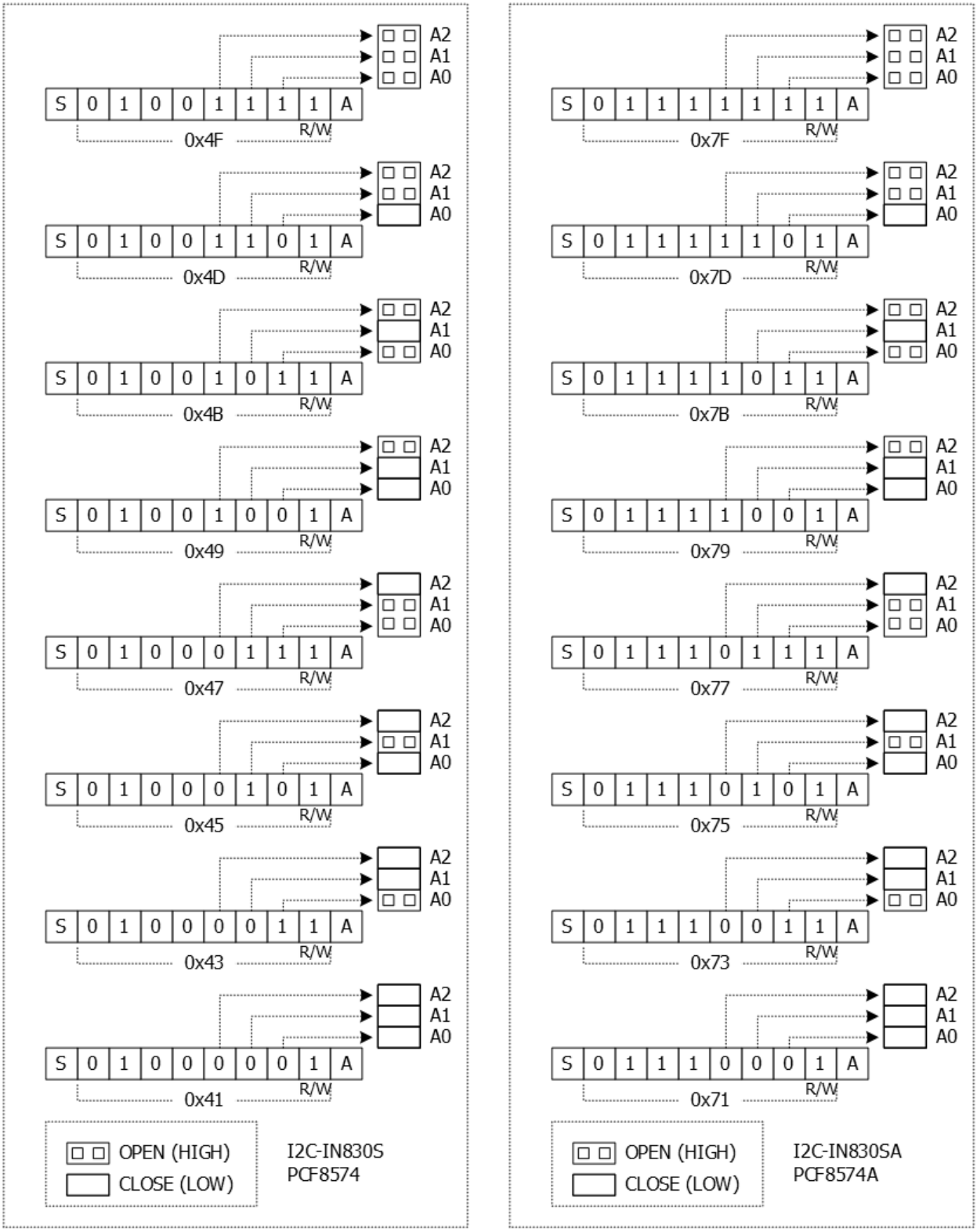

Figure 5: Addressing

For Arduino, Raspberry PI and Linux libraries use 7-bit for I2C bus address, Shifting the address above to the right by 1 bit then the result will be the 7-bit address.

7 Input Diagram

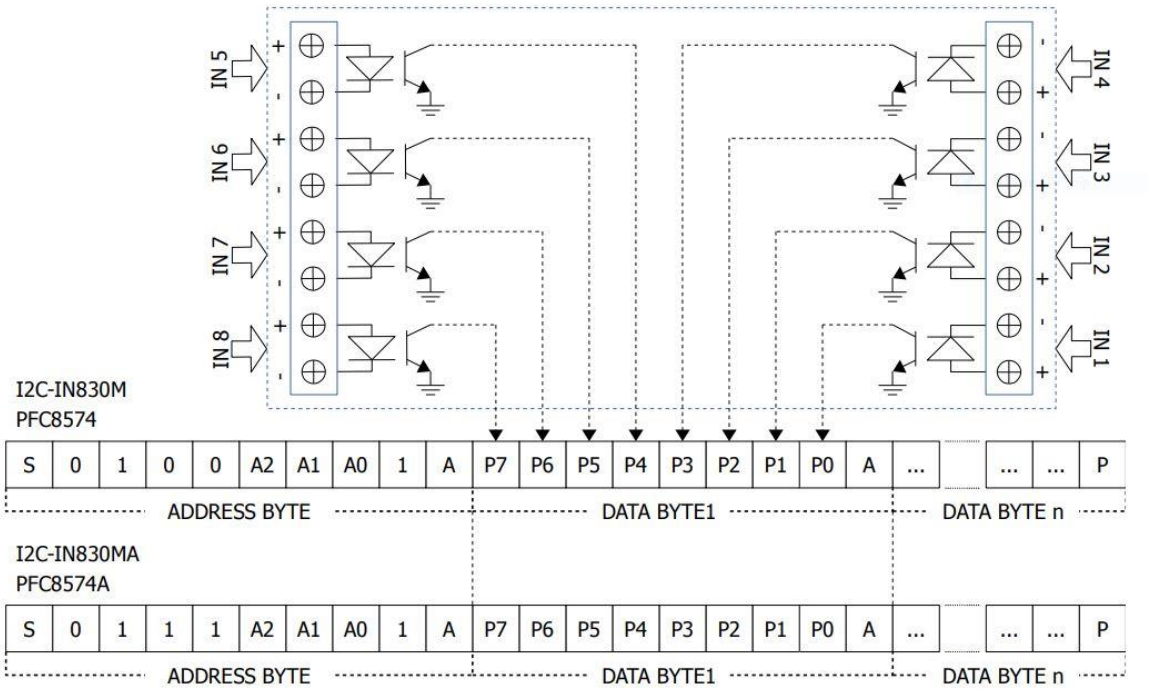

Figure 6: Input data frame

For I2C protocol, the first byte is address and the second byte is data from inputs.

PAPAMETERS	I2C-IN830M0V3, I2C-IN830MA0V3	I2C-IN830M1V3, I2C-IN830MA1V3
Bus frequency	100Khz max	100Khz max
I2C chips	PCF8574 is used in I2C-IN830M0 PCF8574A is used in I2C-IN830MA0	PCF8574 is used in I2C-IN830M1 PCF8574A is used in I2C-IN830MA1
Bus logic voltage	3.3-5.5 Vdc	3.3-5.5Vdc
Max input voltage	30.0 Vdc	30.0 Vdc
ON voltage/current	15.0 Vdc min., 4mA 24.0 Vdc, 7mA 30.0 Vdc, 8.7mA	5.0 Vdc min, 3.5mA 12.0 Vdc, 10.8mA 24.0 Vdc, 22.8mA 30.0 Vdc, 29mA
OFF voltage/current	5.0 Vdc max., 1mA	2.0 Vdc max, 1mA
Input impedance	3.3Kohm	1Kohm
Max. boards on a bus	16 boards	16 boards
Optical isolated input voltage	3.7kVdc	3.7kVdc
Input channels	8 channels	8 channels
Operating Temperature	0-70 C	0-70 C

Table 2:Absolute maximum ratings at Vcc = 5Vdc

8 Dimensions

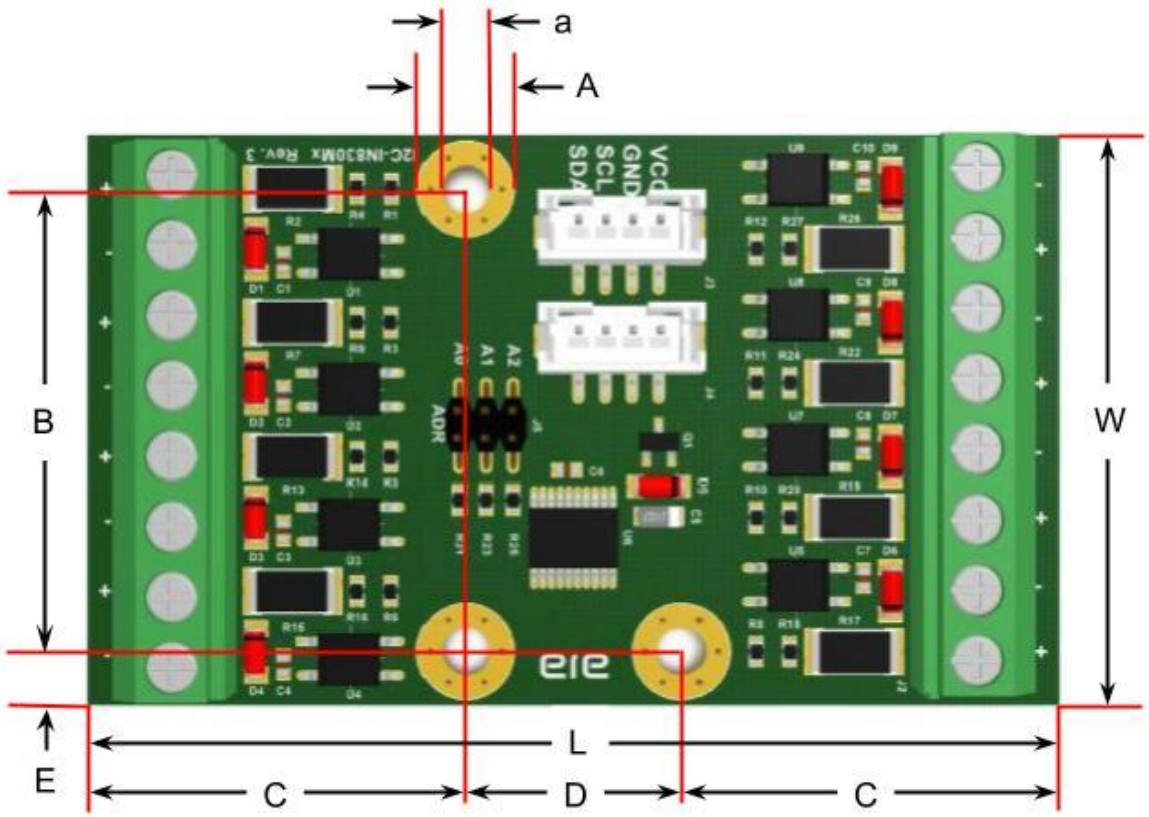

Figure 7: Board dimensions

UNIT	inch	mm
L	2.834	72.00
W	1.673	42.50
C	1.102	28.00
D	0.629	16.00
E	0.157	4.00
B	0.358	34.50
A	0.279	7.10
a	0.141	3.60

Table 3: Board dimensions

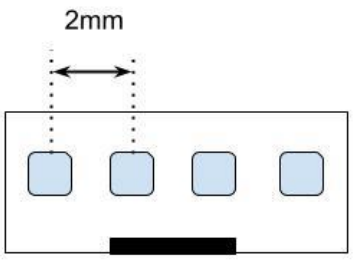

Figure 8: I2C-Bus 4-pin connector

9 Changing of Version3

	Version2	Version3
I2C-Bus connector	5-pin	4-pin
An interrupt signal output	Yes	No
Reduce power consumption by removing LED	an LED	No LED
On board pull-up resistors	Yes	No