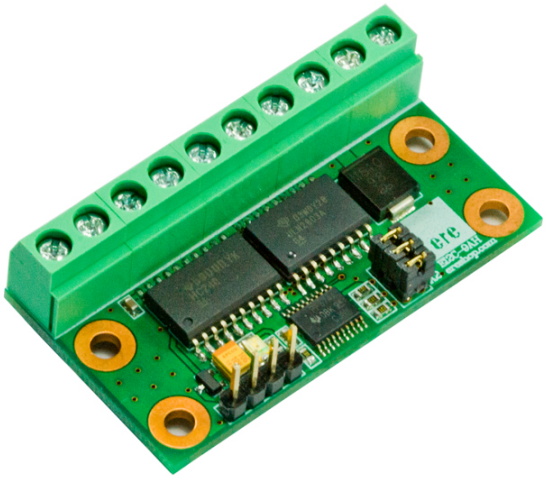
EI2C-9AH, EI2C-9AHA

I2C Bus 8-Output Open Collector



Features

- PCF8574, PCF8574A I2C bus I/O expander
- 8 Outputs
- 2.5V-5.5V power supply input voltage
- Inverse polarity protection circuits
- 100kHz I2C Bus frequency
- Address by 3 jumpers for use of up to 8 addresses
- Up to 16 boards on one bus
- Compatible with almost microcontrollers
- Up to 50V load voltage
- 500mA Rated Collector Current
- Small board, PCB size 28x51mm

Description

These are boards for remote 8-output expander for I2C bus based on PCF8574 and PCF8574A. Making it ideal as open collector expander for I2C bus. They are designed to compatible with almost 2.5V to 5.5V microcontrollers.

The PCF8574 and the PCF8574A are the I2C bus controllers which talk to microcontroller and then take commands to output drivers. The PCF8574 and the PCF8574A support 100kHz bus frequency. And they can be connected to 2.5V-5.5V external logic voltage of I2C port of microcontrollers.

The boards use ULN2803A for output driver which has 8 open collectors. Each outputs support 500mA for current and up to 50V for voltage.

The boards are addressed by 3 jumpers to make 8 different addresses. So that 8 boards can be connected together on one bus. Moreover 16 boards can be connected together on one bus when they have 16 different addresses. By this way, 8 boards of the PCF8574 and 8 boards of the PCF8574A can be connected together on one bus. Because the PCF8574 doesn't have same address as the PCF8574A.

The boards have inverse polarity protection circuit for power supply input voltage to prevent damage from a mistake of connection. The boards have LED to show status of the power supply input voltage.

The boards have a small PCB size 28x51mm.

Board Diagram

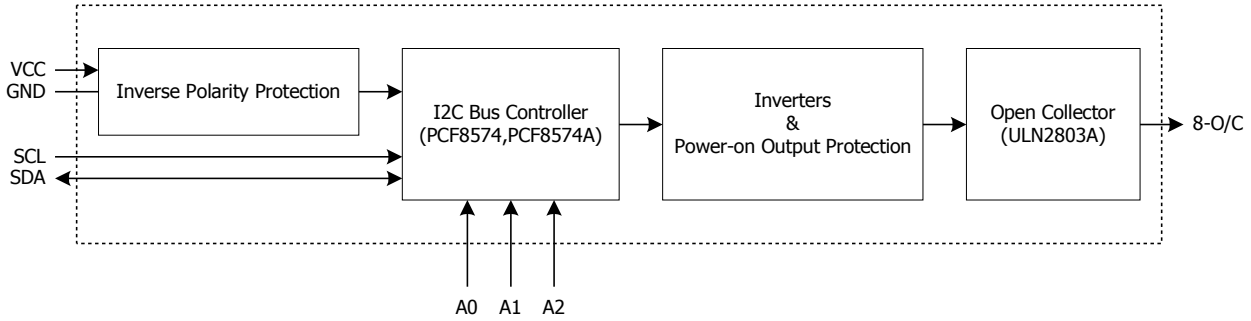


Figure 1: Board Diagram

VCC and I2C Bus Connector

4-Pin 0.1″(2.54mm) connector consists of VCC, GND, SCL and SDA pins. The VCC and GND pins are power supply input voltages which must be supplied from external. The board has an inverse polarity protection circuit to prevent damage from inverse polarity of VCC and GND. The SCL and SDA are I2C bus signals which must be connected to SCL and SDA pins of microcontroller.

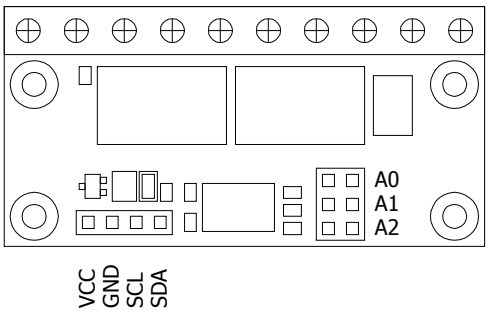


Figure 2: I2C Bus Connector

Interface To Microcontroller

VCC and GND must be supplied from external and also on board has an LED to show status of power supply input voltage. The SCL and SDA pins must be connected to SCL and SDA pins of microcontroller respectively. Remember 10K resistors must be connected to pull-up the SCL and SDA signals of I2C bus, if there is no the pull-up resistors on the microcontroller board.

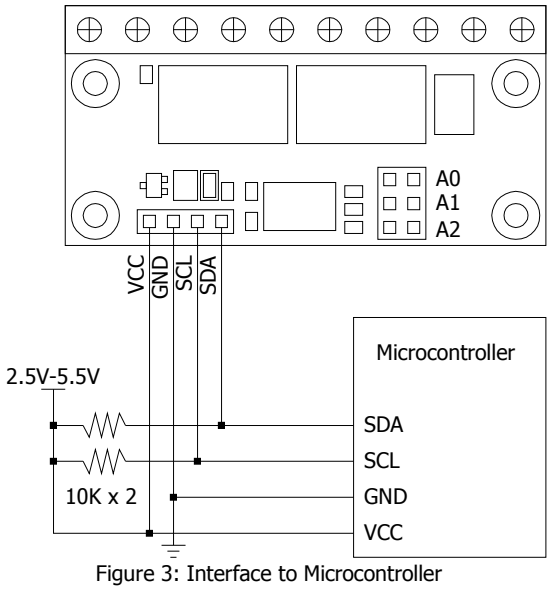


Figure 3: Interface to Microcontroller

Bus Address

The boards use PCF8574 and PCF8574A as remote output expander for I2C bus. Which the PCF8574 and the PCF8574A have address as figure below. Bits D3,D2 and D1 of data frame are changed by jumpers of A2, A1 and A0 respectively.

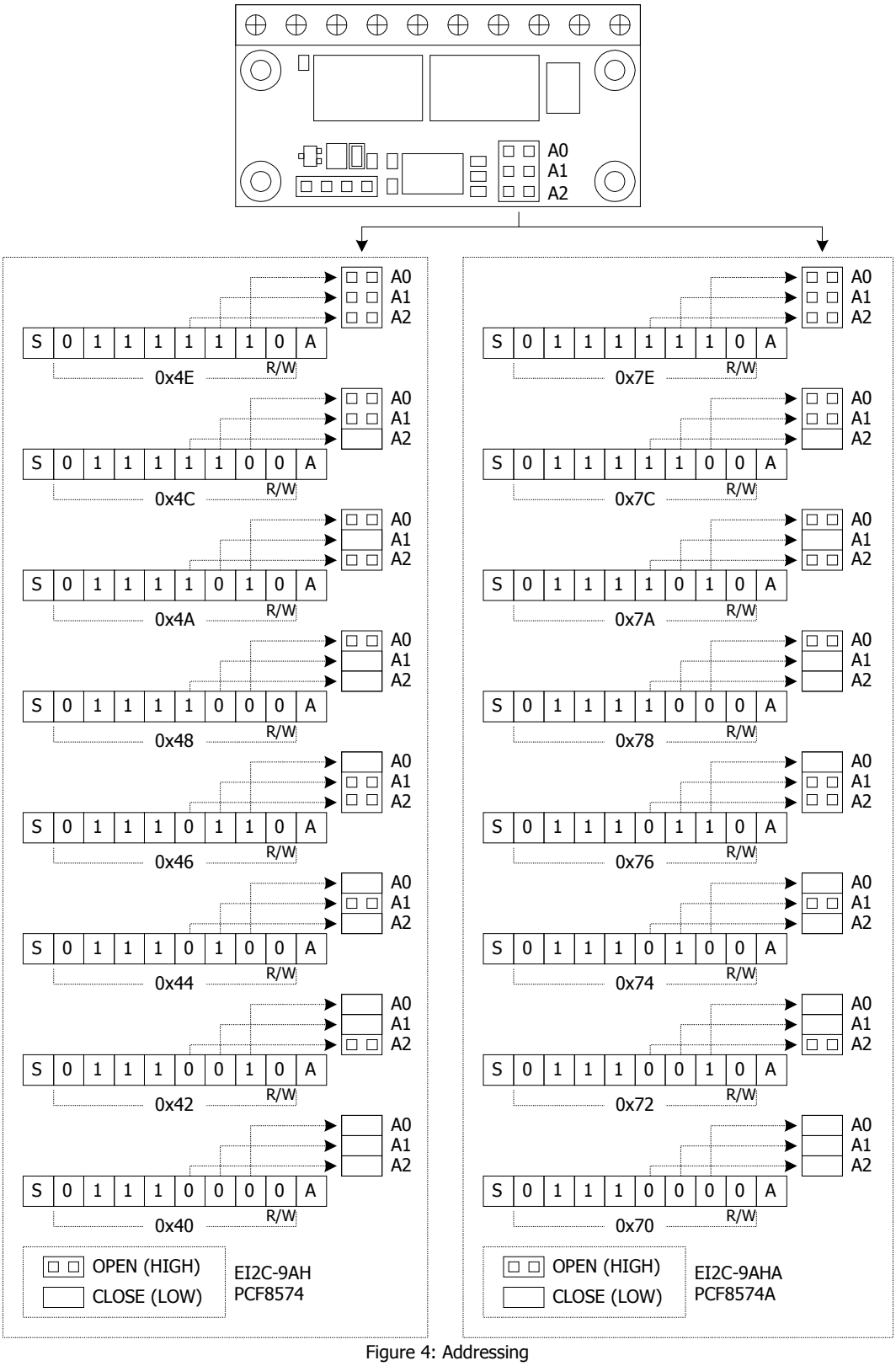


Figure 4: Addressing

Data Frame of Output

When sending data from microcontroller to output board via I2C bus. The first byte is address byte. The second byte is data for outputs. The bit0 of the second byte controls O/C1. Bit value '1' means output off and bit value '0' means output on.

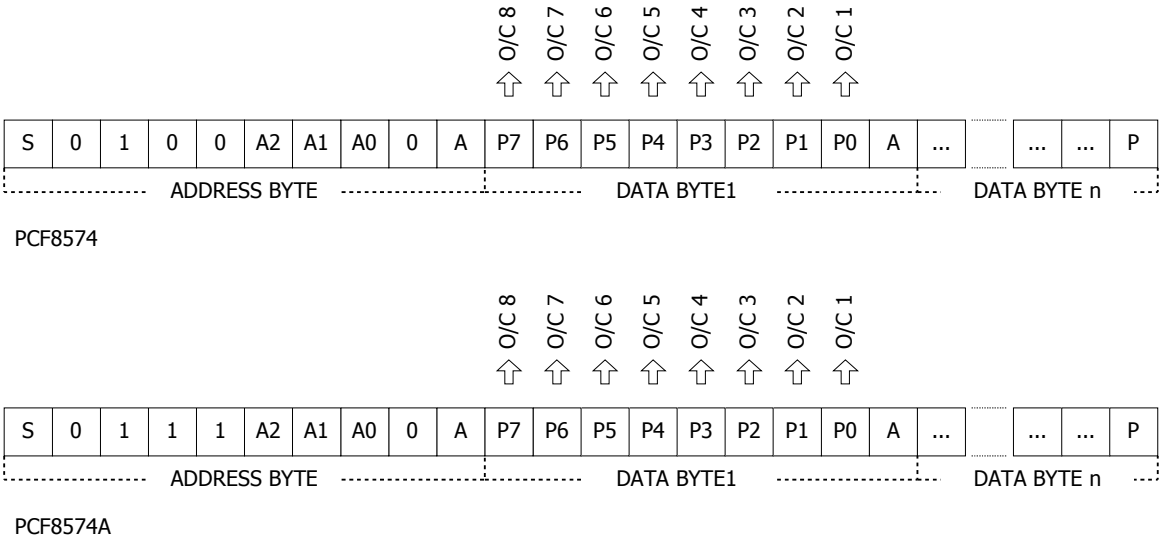


Figure 5: Output Data Frame of PCF8574 and PCF8574A

Output Diagram

Boards have 8 outputs which can be connected to loads. Each outputs are open collectors that can support 500mA of load current and up to 50V of load voltage. The resistive and inductive loads can be connected to the board directly because there are free-wheeling diodes on board. All free-wheeling diodes must be connected to VCC of load. So that, the VCC and GND of loads must be supplied into the boards via VCC and GND terminals.

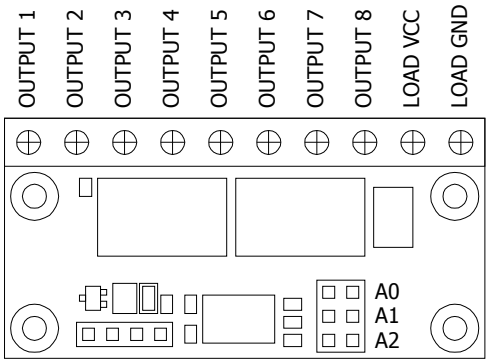


Figure 6: Output Terminals

Application Note 1

This is an example shows how to connect loads to board terminals. The one end of load terminal is connected to board and the opposite end is connected to VCC. Also the VCC and GND are connected to board too. This VCC is VCC for load voltage. It is VCC for logic voltage. This VCC can be up to 50V.

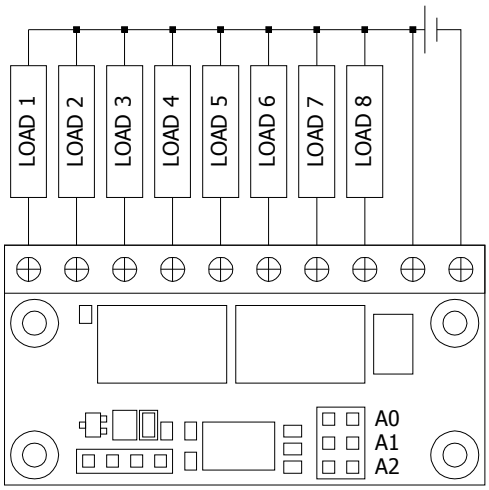


Figure 7: Load Connections

Specification

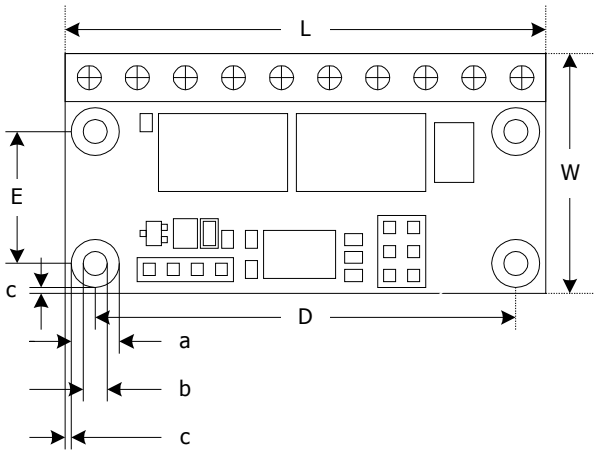
Table 1: Maximum Absolute Rating

Bus frequency	100kHz
Maximum board on a bus	8(16) boards
Maximum load voltage	50V
Maximum load current	500mA
Output channels	8
Power supply input voltage	2.5V – 5.5V

Table 2: Board Comparisons

	EI2C-9AH	EI2C-9AHA
Max. Bus Freq	100kHz	100kHz
Logic and Supply Voltage	2.5V – 5.5V	2.5V – 5.5V
Max. Load Voltage	50V	50V
Max. Load Current	500mA	500mA
Chip	PCF8574	PCF8574A

Dimensions



unit	inch	mm
L	2.007	50.97
W	1.100	27.94
D	1.707	43.35
E	0.476	12.09
a	0.250	6.35
b	0.125	3.18
c	0.025	0.63

Figure 8: Board Dimensions