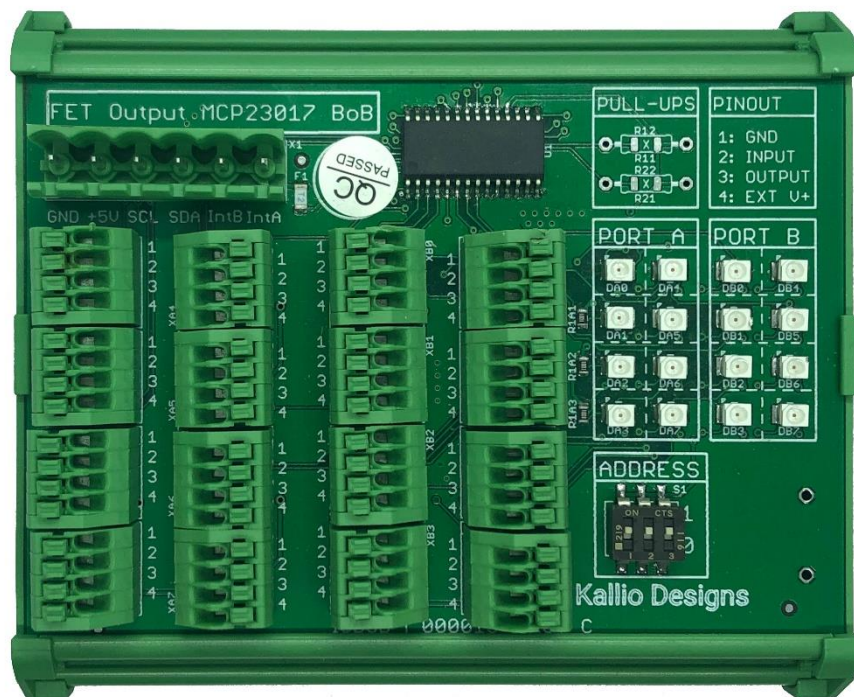


# MCP23017 Buffered GPIO BoB User Manual

PN: 532001  
DOC: 220005-EN



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## 2. Introduction

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### 2.1. Product Summary

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Breakout board for MCP23017 GPIO chip with buffering to maximum of 28 volts and 500 mA.

Buffered GPIO BoB provides 16 inputs or output. Outputs have a parallel signal OUT\_BUFF, that is powered by power inputs V\_IN\_XA, VI\_IN\_XB, more detailed description in [Table 2](#).

The product can be mounted on a DIN rail and control interface is I2C bus, commands according to Microchip MCP23017 specification.

### 2.2. Support

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Contact [sales@kalliodesigns.com](mailto:sales@kalliodesigns.com) for any questions.

## 3. Getting Started

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Connect power and I2C bus according to [pinout](#). Refer to MCP23017 for commands to be sent to control inputs and outputs.

On-board LEDs will be lit when output is set to high.

### 3.1. Address

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Device address can be selected with the onboard dip switches (S1). Refer to MCP23017 datasheet for options.

## 4. Technical Specification

### 4.1. Output circuit

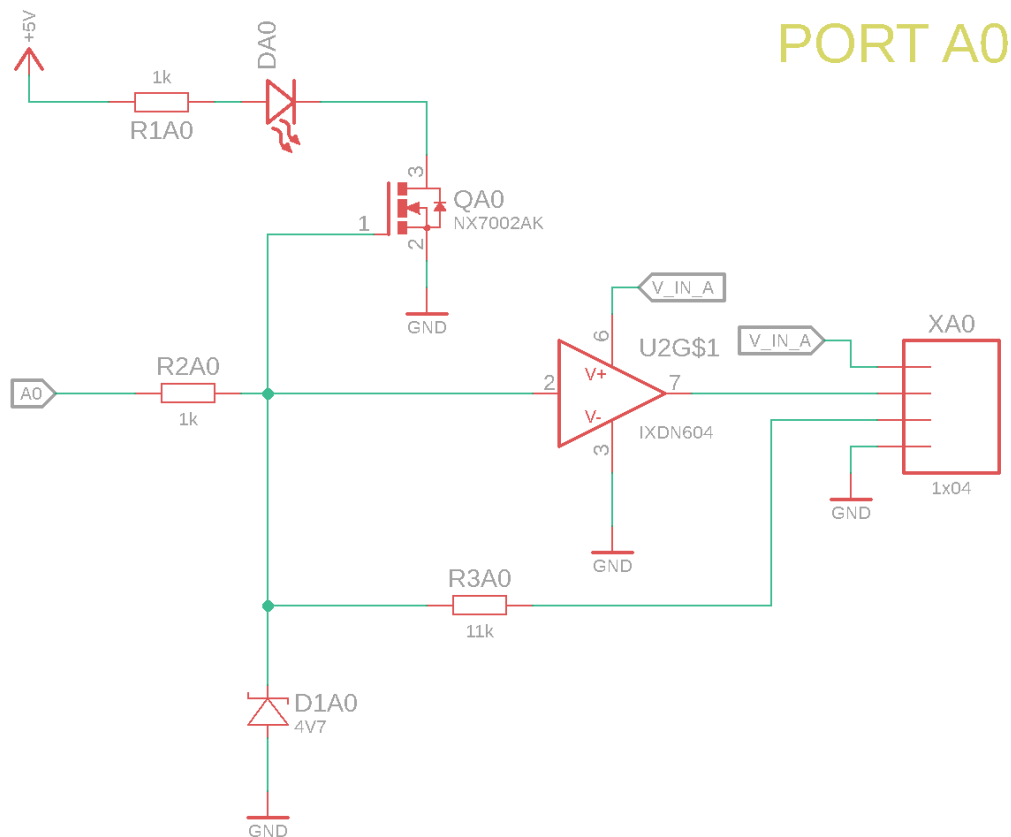


Image 1

### 4.2. I2C Pull Up Resistors

The board offers an option to solder I2C pull up resistors to positions R12 and R22. Only one set of resistors is needed for a bus. If your I2C bus is already functional, no extra pull ups are required. Pull-ups can be either SMD (1206) or through hole resistors (1/4 W). Recommended resistance is 4.7 k $\Omega$ .

### 4.3. Mounting

GPIO BoB can be mounted on standard 35 mm DIN rail. First slide the top part in place and then push the bottom section to secure mounting. Remove in reverse order. Attaching and removing can be done without tools.

## 4.4. Pinout

### 4.4.1. Input connector

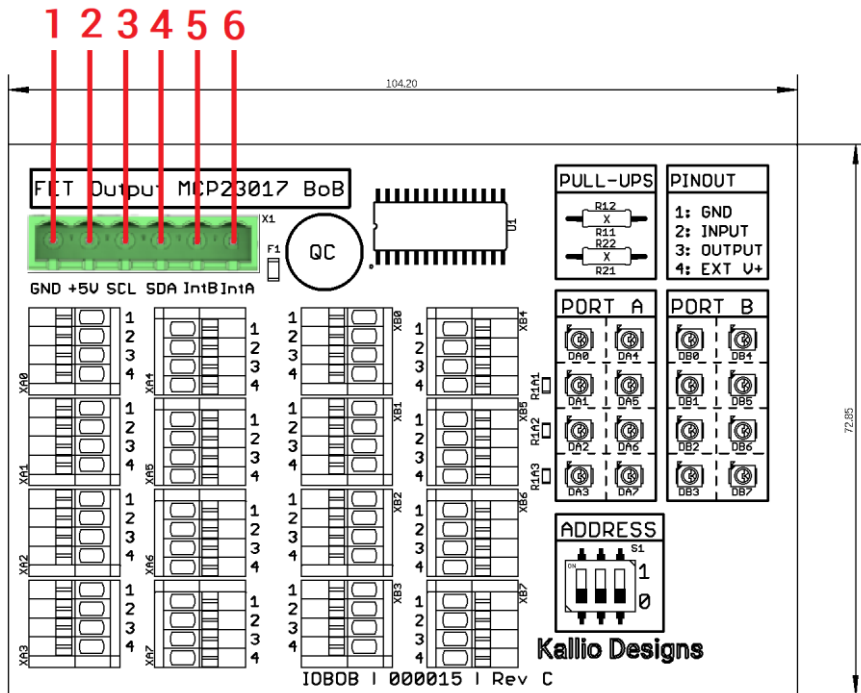


Image 2

Pin no	Description
1	GND
2	5 V Input
3	I <sup>2</sup> C SDA
4	I <sup>2</sup> C SCL
5	External interrupt B
6	External interrupt A

Table 1

4.4.2. I/O Connector

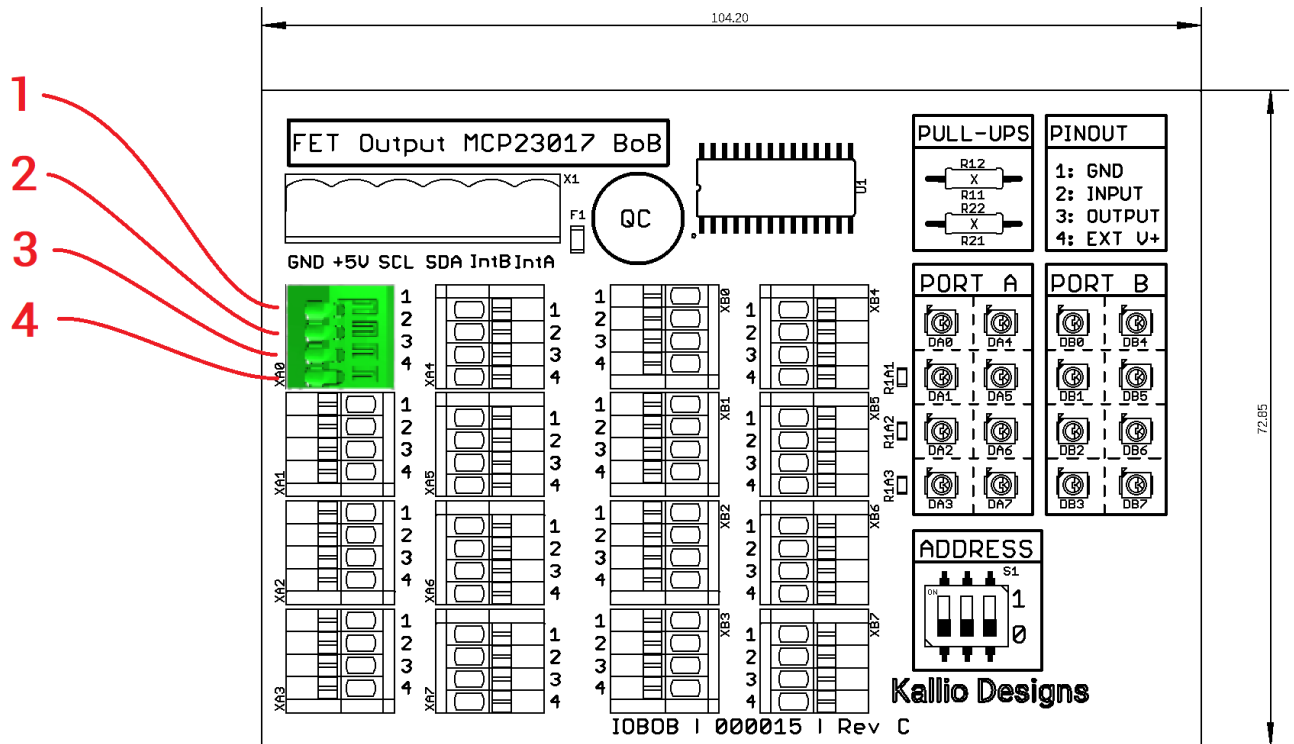


Image 3

Pin	Name	Description
1	GND	Connect to ground reference
2	OUT_IO	MCP23017 I/O, 5V, 12 kOhm output resistance
3	OUT_BUFF	Buffered output (Powered from V_IN_XA/V_IN_XB)
4	V_IN_XA, V_IN_XB	Connect external power supply (max 28 V). XA0 to XA7 pins share the power supply having power pins shorted to each other. Similarly, XB0 to XB7 share the power supply and can be connected to a different voltage.

Table 2

## 4.4.3. Electrical Characteristics

Description	Conditions	Min	Typical	Max	Unit
<b>Power supply</b>					
Supply voltage		4.5		5.5	V
Operating current		5			mA
<b>Non-Buffered outputs (OUT_IO)</b>					
Output voltage		4.5		5.5	V
Output resistance			12		kOhm
<b>Buffered outputs (OUT_BUFF)</b>					
Voltage		4.5		28	V
Output current		0		500	mA
<b>Operating conditions</b>					
Operating temperature	non-condensing	0		60	°C
Storage temperature	non-condensing	-40		80	°C

Table 3

## 4.4.4. Enclosure Dimensions

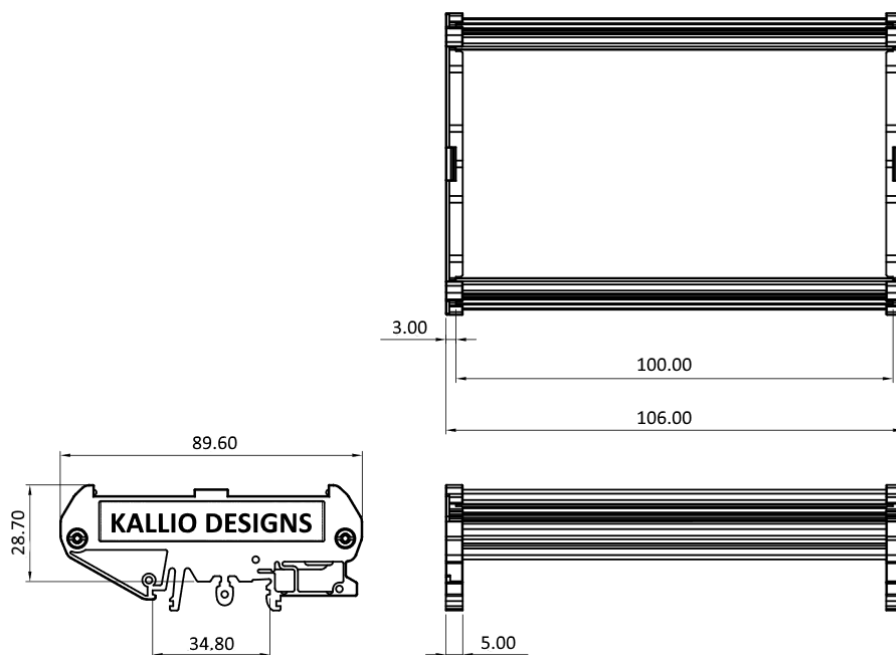


Image 4

### 4.4.5. PCB Dimensions

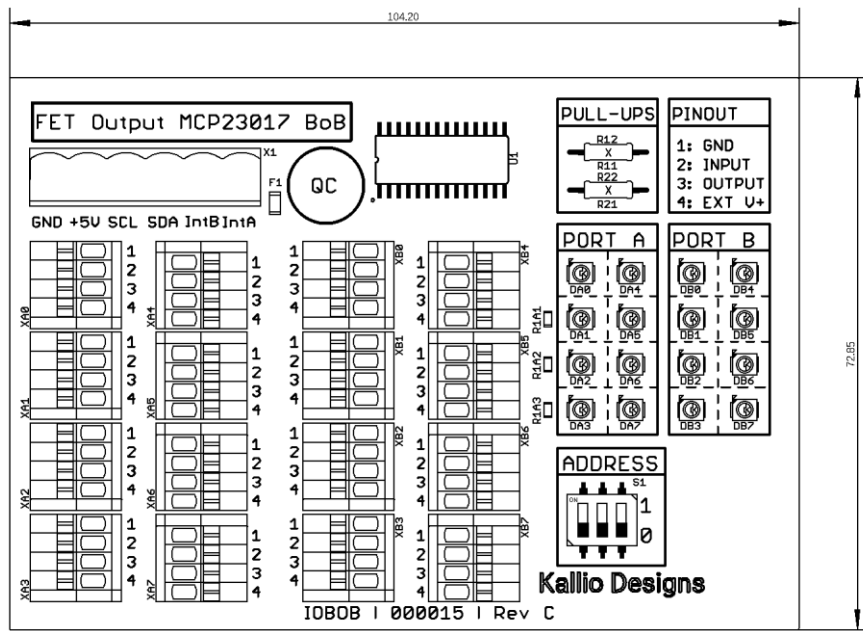


Image 5



## 5. Example Arduino Code

All example codes are written using Adafruit Arduino library ([Adafruit-MCP23017-Arduino-Library](#)).

### 5.1. Simple Button input

```
#include <Wire.h>
#include "Adafruit_MCP23017.h"

// Basic pin reading and pullup test for the MCP23017 I/O expander

// Connect input connector terminal 3 (SCL) of the GBIO BoB to Arduino pin Analog 5 (i2c clock)
// Connect input connector terminal 4 (SDA) of the GBIO BoB to Arduino pin Analog 4 (i2c data)
// Connect all ADDR selector switches of GBIO BoB to 0 (address selection)
// Connect input connector terminal 2 (V+) of the GBIO BoB to 5V (power)
// Connect input connector terminal 1 (GND) of the GBIO to ground (common ground)

// Input #0 is on terminal A0 so connect a button or switch from there to ground

Adafruit_MCP23017 mcp;

void setup() {
  mcp.begin(); // use default address 0

  mcp.pinMode(0, INPUT);
  mcp.pullUp(0, HIGH); // turn on a 100K pullup internally

  pinMode(13, OUTPUT); // use the p13 LED as debugging
}

void loop() {
  // The LED will 'echo' the button
  digitalWrite(13, mcp.digitalRead(0));
}
```

Code block 1