

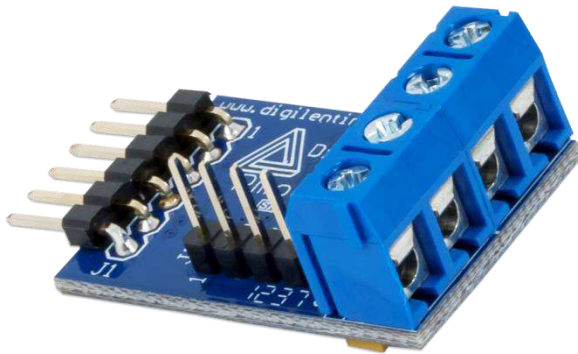
## PmodHB3™ Reference Manual

Revised April 12, 2016

This manual applies to the PmodHB3 rev. E

### Overview

The Digilent PmodHB3 offers a 2A H-Bridge circuit with external feedback to drive small to medium sized DC motors.



*The PmodHB3.*

Features include:

- 2A H-bridge circuit
- Drive a DC motor with operation voltage up to 12V
- Screw terminal blocks for connection to the motor
- Separate header for external motor feedback
- Small PCB size for flexible designs 1.2 in × 0.8 in (3.0 cm × 2.0 cm)
- 6-pin Pmod port with GPIO interface
- Follows Digilent Pmod Interface Specification Type 5
- Example code available in [resource center](#)

## 1 Functional Description

The PmodHB3 utilizes a full H-Bridge circuit to allow users to drive DC motors from the system board. Two external pins are provided on the Pmod for sensor feedback on the DC motor, if desired.

## 2 Interfacing with the Pmod

The PmodHB3 communicates with the host board via the GPIO protocol. Like all H-Bridges, care must be taken to avoid causing a potential short within the circuitry. In terms of this Pmod, this means that the Direction pin must not change state while the Enable pin is at a high voltage state. If this does occur, one set of switches that are driving the motor will be closing while the other set is opening, allowing for the possibility for both sets of switches to be open at the same time, creating a short.

To drive the motor at a specific speed, users will need to choose a static direction (forwards or backwards corresponding to high or low voltage) on the Direction pin, and then perform pulse-width modulation on the

Enable pin. The more often that an enable pin is driven high within a set time frame, the faster the DC motor will spin.

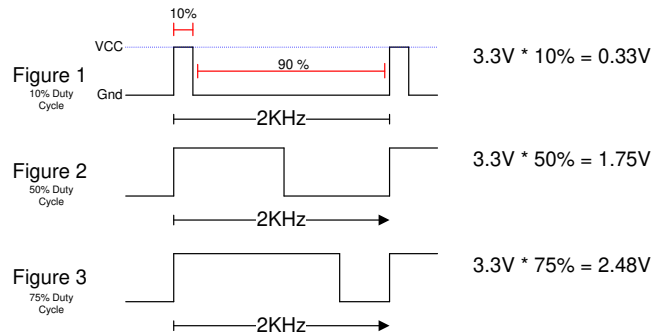


Table 1. Frequency and corresponding rotation.

The way that this works is that when voltage is being applied, the motor is driven by the changing magnetic forces. When voltage is stopped, momentum causes the motor to continue spinning a while. At a high enough frequency, this process of powering and coasting enables the motor to achieve a smooth rotation that can easily be controlled through digital logic.

Pin	Signal	Description
1	DIR	Direction pin
2	EN	Enable pin
3	SA	Sensor A feedback pin
4	SB	Sensor B feedback pin
5	GND	Power Supply Ground
6	VCC	Positive Power Supply (3.3/5V)

Table 1. Pinout description table.

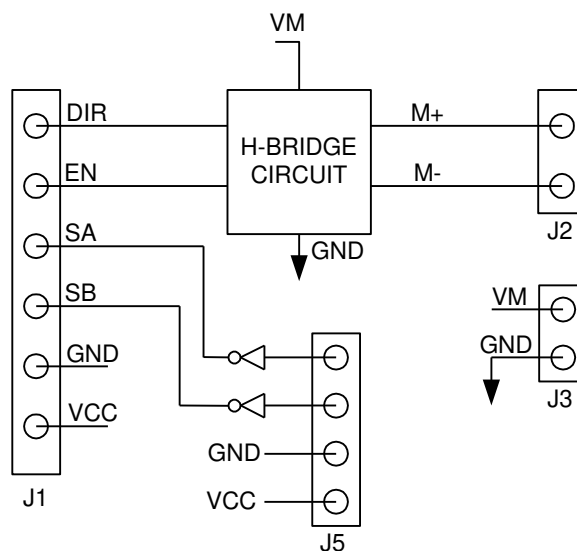


Figure 2. PmodHB3 block diagram.

Any external power applied to the PmodHB3 must be within 2.7V and 5.25V; however, it is recommended that Pmod is operated at 3.3V.



### 3 Physical Dimensions

The pins on the pin header are spaced 100 mil apart. The PCB is 1.2 inches long on the sides parallel to the pins on the pin header and 0.8 inches long on the sides perpendicular to the pin header.