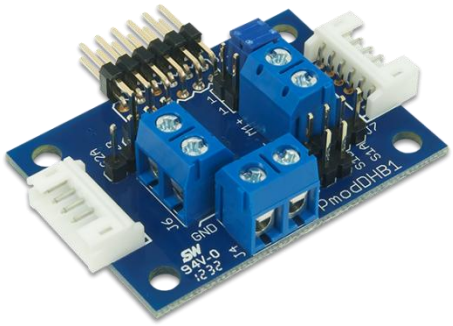
1300 Henley Court
Pullman, WA 99163
509.334.6306
www.digilentinc.com

PmodDHB1™ Reference Manual

Revised May 23, 2013
This manual applies to the PmodDHB1 rev. B

Overview

The Digilent PmodDHB1 is a dual H-Bridge motor driver that is capable of driving two DC motors, a bipolar stepper motor, and other devices with inductive loads.



The PmodDHB1.

Features include:

- Motor voltage can be driven up to 11.8V, with a recommended 10.8V maximum
- Two H-Bridge interfaces capable of 1.5A RMS (2A Peak)
- 2-channel quadrature encoder channels for Hall-effect sensors
- Two JST 6-pin connectors for direct connection to Digilent motor-gearboxes
- Logic input voltage range of 2.5V to 5V

1 Functional Description

The PmodDHB1 utilizes TI's DRV8833 to drive a variety of systems. With the two built in H-Bridges and pull down resistors on the inputs, users may run two DC motors or a single bipolar stepper motor in fast decay mode.

The DRV8833 chip provides over-current protection on the motor drive circuits. Each internal drive FET is independently monitored for an over-current condition and will be shut down internally to protect the chip. When an over-current condition is sensed the chip will shut down the FET with the fault and then set the NFAULT pin low signaling a fault condition on the chip. The remaining FETs will continue to operate as normal. When the fault condition is over, the chip will self-reset and return the NFAULT logic level to logic high.

2 Interfacing with the Pmod

The PmodDHB1 communicates with the host board via the GPIO protocol. By driving the enable (EN) pins with a PWM signal and a logic level low or high voltage signal on the direction (DIR) pins, users are able to run DC motors at various speeds.

A truth table listing out the various possible combinations and results of the EN and DIR pins is provided below:

DIR1	EN1	Result
0	0	Stop
0	1/PWM	Forward
1	0	Stop
1	1/PWM	Reverse

DIR2	EN2	Result
0	0	Stop
0	1/PWM	Forward
1	0	Stop
1	1/PWM	Reverse

Table 1. Truth table list.

Note that like all H-Bridges, it is recommended that the EN pin is driven to a low voltage state before changing the voltage state on the DIR pin to ensure that the FETs are not short-circuited.

Two sensor feedback pins for both motors are provided so users can capture the signals coming from any Hall Effect Sensors in quadrature.

2.1 Pinout Description Tables

Header J1					
Pin	Signal	Description	Pin	Signal	Description
1	EN1	Motor 1 Enable	7	EN2	Motor 2 Enable
2	DIR1	Motor 1 Direction	8	DIR2	Motor 2 Direction
3	S1A	Motor 1 Sensor A Feedback	9	S2A	Motor 2 Sensor A Feedback
4	S1B	Motor 1 Sensor B Feedback	10	S2B	Motor 2 Sensor B Feedback
5	GND	Power Supply Ground	11	GND	Power Supply Ground
6	VCC	Power Supply (3.3V/5V)	12	VCC	Power Supply (3.3V/5V)

Header J4 - Motor Voltage		
Pin	Signal	Description
1	VM	Motor Power
2	GND	Power Supply Ground

Header J5 - M1 Power		
Pin	Signal	Description
1	M1+	Motor 1 Positive Supply
2	M1-	Motor 1 Negative Supply

Header J6- M2 Power		
Pin	Signal	Description
1	M2+	Motor 2 Positive Supply
2	M2-	Motor 2 Negative Supply

Header J7- M1 Feedback		
Pin	Signal	Description
1	SA1-IN	Sensor A From Motor 1
2	SB1-IN	Sensor B From Motor 1
3	GND	Power Supply Ground
4	VCC	Power Supply (3.3V)

Header J2- M1 JST 6-Pin Motor Connector
Header J3- M2 JST 6-Pin Motor Connector
Header J8- M2 Feedback

Pin	Signal	Description
1	SA2-IN	Sensor A From Motor 2
2	SB2-IN	Sensor B From Motor 2
3	GND	Power Supply Ground
4	VCC	Power Supply (3.3V)

Header J9- Fault		
Pin	Signal	Description
1	NFAULT	Overcurrent Condition
2	GND	Power Supply Ground

Header J10- Sleep		
Pin	Signal	Description
1	NSLEEP	Puts device into sleep state
2	GND	Power Supply Ground

Any external power applied to the PmodDHB1 must be within 2.7V and 10.8V; 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 1.3 inches long on the sides parallel to the pins on the pin header and 1.8 inches long on the sides perpendicular to the pin header.