DRV8436 Evaluation Module User's Guide

This document is provided with the DRV8436 evaluation module (EVM) as a supplement to the DRV8436 Stepper Motor Driver datasheet. This user's guide details the hardware implementation of the EVM. Details on using the graphical user interface (GUI) software with this EVM can be found in the DRV8436EVM GUI User's Guide.

Contents

Trademarks

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1 Board Overview

WARNING

DRV8436EVM is rated for power supply voltages between 4.5 VDC and 40 VDC max. The components can support peak output currents up to a maximum of 2.5 ADC. To minimize risk or personal injury, fire and/or property damage, always maintain component temperatures below the 130°C rating of the printed circuit board material. TI requires that the continuous current into or out of each xOUTx channel be limited to 910 mADC when operating for extended periods of time with a 13.5 VDC. Under these driving conditions, an ambient temperature of 25°C should never be exceeded. Higher voltages and slower slew rates will increase switching losses in the DRV8436, so output current may need to be derated in these cases to keep board temperature below 130°C.

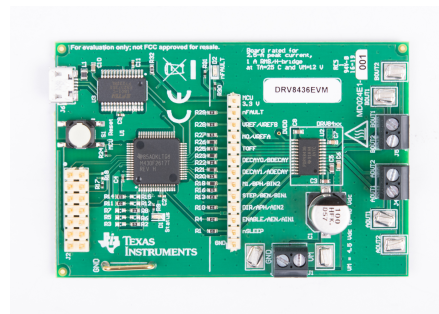Figure 1 shows the top view of the printed circuit board (PCB).

Figure 1. Top view of typical board configuration (EVM provided may vary)

2 Introduction

The DRV8436 customer EVM is a platform to support prototyping and evaluation for the DRV8436, a medium-voltage dual H-bridge driver for stepper driving applications. The DRV8436 drives a single bipolar stepper with microstepping resolutions down to 1/32. It provides a variety of programmable decay settings and can detect stall conditions while driving.

The EVM uses an MSP430™ microcontroller and a USB interface chip to manage communication from the GUI software application installed on a PC computer with Windows®. The GUI sends serial commands to the MSP430 to control the device signals, monitor faults, read and write SPI registers, and drive a stepper motor by issuing the step commands at the desired rate.

This user's guide details the hardware configurability of the evaluation module.

2.1 Connectors

The DRV8436 EVM supplies the VM (motor voltage) power rail through a reverse-battery protection circuit through terminal block (J1). A set of test clips in parallel with the terminal block provide connections to monitor the input power rail.

The user must apply the VM voltage according to recommended parameters listed in the data sheet (4.5 V to 40 V).
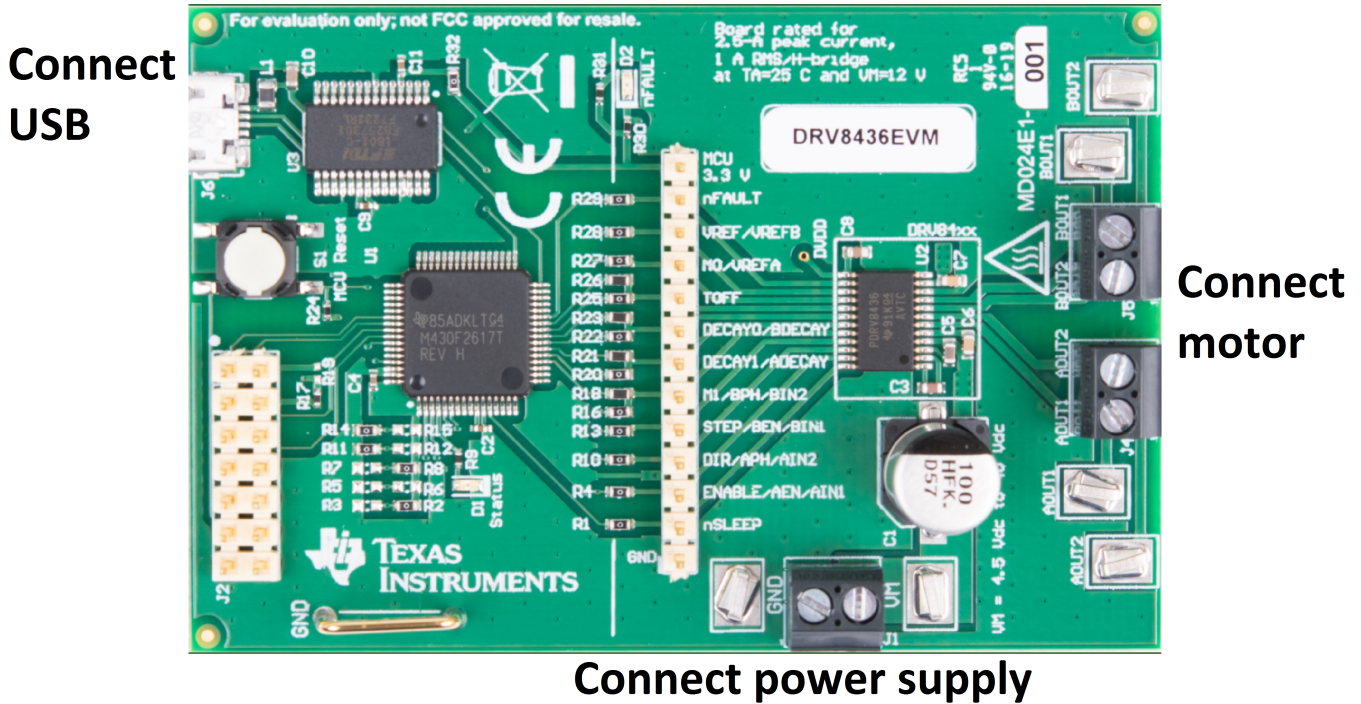

Connect USB

Connect motor

Connect power supply

Figure 2. Connections

2.2 Test Points

A header connector with 0.100-inch pitch (J3) provides access to the DRV8436 signals. This can be used for measurement or as a connector to control the DRV8436 from an external microcontroller for prototype purposes. To disconnect the on-board MSP430 microcontroller, remove the resistors between the MSP430 and the J3 header (R3, R4, R6, R7, R9, R11, R12, R14, R15, R16, and R17). Table 1 describes the connections available on the J3 header. Each header pin is labeled on the evaluation module, and connects to a similarly named pin of the DRV8436.

Table 1. Connections to DRV8436 Using External Microcontroller

Header Label	Description
MCU 3.3 V	3.3 V rail for the on-board MSP430 and nFAULT LED
nFAULT	Fault output.
VREF/VREFB	Current set reference input.
MO/VREFA	One of Microstepping mode-setting pins.
TOFF	Sets the Decay mode off time during current chopping.
DECAY0/BDECAY	One of Decay-mode setting pins.
DECAY1/ADECAY	One of Decay-mode setting pins.
M1/BPH/BIN2	One of Microstepping mode-setting pins..
STEP/BEN/BIN1	STEP, Step input.
DIR/APH/AIN2	DIR, Direction input.

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Table 1. Connections to DRV8436 Using External Microcontroller (continued)

Header Label	Description
ENABLE/AEN/AIN1	Logic low to disable device outputs; logic high to enable.
nSLEEP	Sleep mode input.
GND	Ground

2.3 Jumpers

The DRV8436 EVM has no jumpers.

2.4 Motor Outputs

Two motor connectors are provided (J6 and J7).

2.5 EVM Operation

Use the following steps to operate the EVM:

Step 1. Install the drivers and GUI. For instructions see DRV8436EVM GUI User's Guide.

Step 2. Connect the wires of the stepper motor to the AOUT1, AOUT2, BOUT1, and BOUT2 terminals.

Step 3. Connect the VM power supply to VM or VBAT connections, but do not apply power at this step.

Step 4. Connect the USB cable between the PC and the EVM. When the USB is connected to the EVM, the status LED will begin to blink.

Step 5. Open the GUI. The GUI can be found in the start menu at Texas Instruments → GUI Composer → DRV8436 → DRV8436 X.Y.Z, where X, Y, and Z are the revision numbers (to be verified) or by typing "DRV8436" into the search bar of the start menu. If a shortcut was created, double-click on the shortcut to open the GUI. The GUI can take up to 30 seconds to establish a connection. If connection is not established, select the COM port under the *Options* menu. The baud rate is 9600.

Step 6. Apply the desired voltage (4.5 to 40 V) to the VM/VBAT and GND connections.

Step 7. For more instructions on how to control the DRV8436 EVM from the GUI, see the DRV8436EVM GUI User's Guide.

2.6 EVM documentation

The EVM schematics, layout, and BOM are provided in the DRV8436EVM hardware files. The GUI, USB drivers, and MSP430F2617 source code are provided in the DRV8436EVM firmware and GUI software files.

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