

# **DRV8428x Evaluation Module User's Guide**

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This document is provided with the DRV8428x evaluation module (EVM) as a supplement to the DRV8428x 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 [DRV8428EVM GUI User's Guide](#), [DRV8428EEVM GUI User's Guide](#) and [DRV8428PEVM GUI User's Guide](#).

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## **Trademarks**

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## 1 Board Overview



### **WARNING**

DRV8428xEVM is rated for power supply voltages between 4.2 VDC and 33VDC max. The components can support peak output currents up to a maximum 1.7A. 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.

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 DRV8428x EVM is a platform to support prototyping and evaluation for the DRV8428x devices, a medium-voltage dual H-bridge driver for stepper driving applications. The DRV8428x drives a single bipolar stepper with microstepping resolutions down to 1/256. It provides a variety of programmable decay settings.

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 motor.

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

### 2.1 Connectors

The DRV8428x EVM supplies the VM (motor voltage) power rail through a reverse-battery protection circuit through the 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 the recommended parameters listed in the datasheet (4.2 V to 33 V).

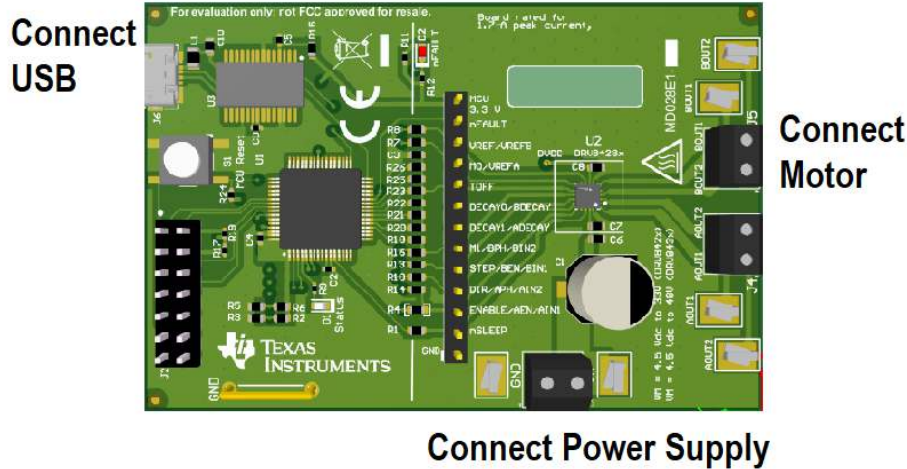


Figure 2. Connections

## 2.2 Test Points

A header connector with 0.100-inch pitch (J3) provides access to the DRV8428x signals. This can be used for measurement or as a connector to control the DRV8428x from an external microcontroller for prototype purposes. To disconnect the on-board MSP430 microcontroller, remove related zero ohm resistors between the MSP430 and the J3 header. 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 DRV8428x.

Table 1. Connections to DRV8428x Using External Microcontroller

Header Label	Description
MCU 3.3 V	3.3 V rail for the on-board MSP430 and nFAULT LED
nFAULT	EN/nFault pin.
VREF/VREFB	Current set reference input (DRV8428x) or Bridge B.current set reference input (DRV8428xE/P).
MO/VREFA	Microstepping mode-setting pin (DRV8428x) or Bridge A.current set reference input (DRV8428xE/P).
TOFF/DECAY	Sets the Decay mode and off time during current chopping.
DECAY0/BDECAY	No connection
DECAY1/ADECAY	No connection
M1/BPH/BIN2	Microstepping mode-setting pin (DRV8428x); or Bridge B phase input (DRV8428xE) or PWM input (DRV8428xP).
STEP/BEN/BIN1	STEP pin (DRV8428x); or Bridge B enable input (DRV8428xE) or PWM input (DRV8428xP).
DIR/APH/AIN2	DIR pin (DRV8428x); or Bridge A phase input (DRV8428xE) or PWM input (DRV8428xP).

**Table 1. Connections to DRV8428x Using External Microcontroller (continued)**

Header Label	Description
ENABLE/AEN/AIN1	En/nFault pin (DRV8428x); or Bridge A enable input (DRV8428xE) or Bridge A PWM input (DRV8428xP).
nSLEEP	Sleep mode input.
GND	Ground

### 2.3 Jumpers

The DRV8428x 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 [DRV8428EVM GUI User's Guide](#), [DRV8428EEVM GUI User's Guide](#) or [DRV8428PEVM 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 → DRV8428x X.Y.Z, where X, Y, and Z are the revision numbers (to be verified) or by typing "DRV8428x" 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 DRV8428x EVM from the GUI, see [DRV8428EVM GUI User's Guide](#), [DRV8428EEVM GUI User's Guide](#) or [DRV8428PEVM GUI User's Guide](#).

### 2.6 EVM documentation

The EVM schematics, layout, and BOM are provided in the [DRV8428xEVM hardware files](#). The GUI, USB drivers, and MSP430F2617 source code are provided in the DRV8428xEVM firmware and GUI software files.

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