

EVM User's Guide: MSP-DRV-ADAPT-EVM

MSP-DRV-ADAPT-EVM Evaluation Module



Description

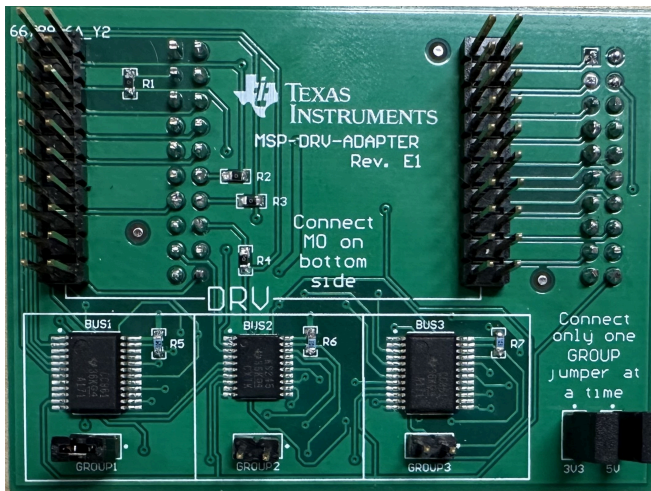
The MSP-DRV-ADAPT-EVM is an adapter board designed for use with the MSPM0G3507 and the DRV83xx devices. The EVM serves to join the MSP and DRV device to allow for easy prototyping of motor driver designs using the MSPM0G3507 and the DRV83xx devices.

The MSPM0G3507 serves as the MCU portion of the motor controller, sending control signals to the DRV83xx device, and returning sensor data to the MCU.

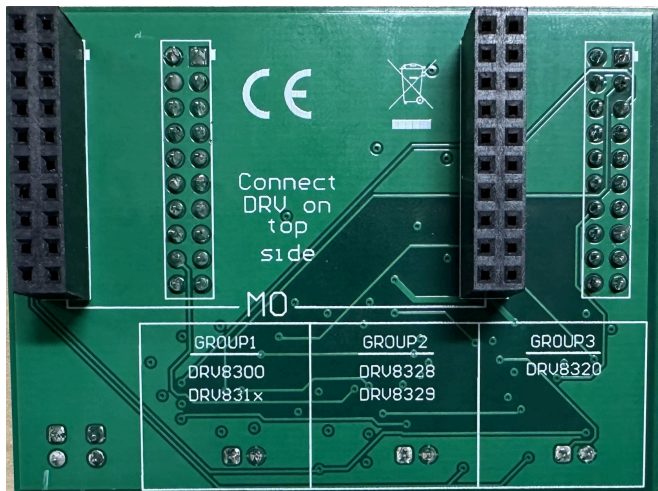
Different DRV83xx boards can be selected for use by moving the jumper between groups 1, 2, and 3.

Features

- 20 pin BoosterPack headers
- 0-Ohm Resistors to connect current sensing pins
- Two SN74CBTD3861DBR switches
- One SN74CB3T3245PW switch
- Five shunt jumpers



Front Side of the MSP-DRV-ADAPT-EVM



Back Side of the MSP-DRV-ADAPT-EVM

1 Evaluation Module Overview

1.1 Introduction

The MSP-DRV-ADAPT-EVM is a BoosterPack EVM that is designed to allow MSPM0 devices to easily join with DRV83xx Motor Control EVMs. The convenient BoosterPack enables users to start spinning a motor using an MSPM0 device in under 10 minutes.

1.2 Kit Contents

- MSP-DRV-ADAPT-EVM
- Quick start pin-out guide

1.3 Specification

The MSP-DRV-ADAPT-EVM is designed for use with the LP-MSPM0G3507 evaluation board, and the DRV83xx Motor Control evaluation boards. The MSP-DRV-ADAPT-EVM has no CPU and requires no code. All of the software to control the motor runs on the MSPM0G3507.

The only configuration that is necessary specifically for the MSP-DRV-ADAPT-EVM is the connection of the shunt jumpers, to power the device and to select the correct configuration. [Table 2-1](#) shows the DRV83xx devices supported by each group, simply close the jumper for the group your device belongs to to configure the wired connections correctly. Then, make sure the 3V3 and 5V jumpers are closed to provide power to the switches.

1.4 Device Information

The MSP-DRV-ADAPT-EVM uses the following devices from Texas Instruments:

Device Name	Description	Purpose
SN74CBTD3861DBR	5V, 1:1 (SPST), 10-channel general-purpose FET bus switch with level shifting	Switch to enable the correct routing of motor control signals between the MSPM0G3507 and DRV83xx.
SN74CB3T3245PW	3.3V, 1:1 (SPST), 8-channel FET bus switch with level shifter	Switch to enable the correct routing of motor control signals between the MSPM0G3507 and DRV83xx.

2 Hardware

2.1 Setup

The table below shows the DRV83xx devices capable of interfacing with the MSP-DRV-ADAPT-EVM.

Table 2-1. Compatible Devices

MSP-DRV-ADAPT-EVM Group Number	DRV83xx Part Number
Group 1	DRV8311HEVM DRV8316REVM DRV8317HEVM DRV8300Dxxx-EVM
Group 2	DRV8328AEVM DRV8329AEVM
Group 3	BOOSTXL-DRV8320RS

Quick Start

Start to test the prototype design using the MSP-DRV-ADAPT-EVM by following the steps below:

1. Plug the LP-MSPM0G3507 into a PC using the micro-USB cable.
2. Plug the LP-MSPM0G3507 into the bottom side of the MSP-DRV-ADAPT-EVM with the group jumpers oriented away from the micro-USB port of the MSP.
3. Select the Group 1, Group 2, or Group 3 jumper in accordance with which the DRV EVM is using.

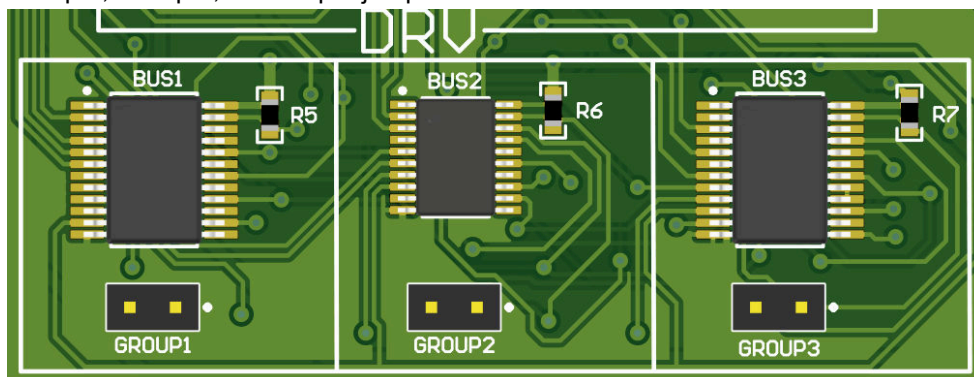


Figure 2-1. Jumper Groups

4. Plug the selected DRV83xx device into the top side of the MSP-DRV-ADAPT-EVM with the motor a, b, and c faces oriented towards the micro-USB port of the MSP.
5. Connect the DRV83xx device to the BLDC motor.
6. Turn on the power supply.
7. Navigate to [GUI Composer](#).
8. Select the GUI to control the motor driver EVM of the choice.
9. Download code directly from the browser to the MSPM0G3507 with CCS Cloud.

This shows automatically with updates at the bottom of the screen showing that the device is connecting, the program is loading, and, finally, once complete, that the hardware is connected.

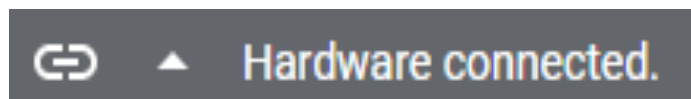


Figure 2-2. Successful Connection Message

10. Begin controlling the motor using the GUI.

3 Hardware Design Files

3.1 Schematics

The schematic for the MSP-DRV-ADAPT-EVM is shown below.

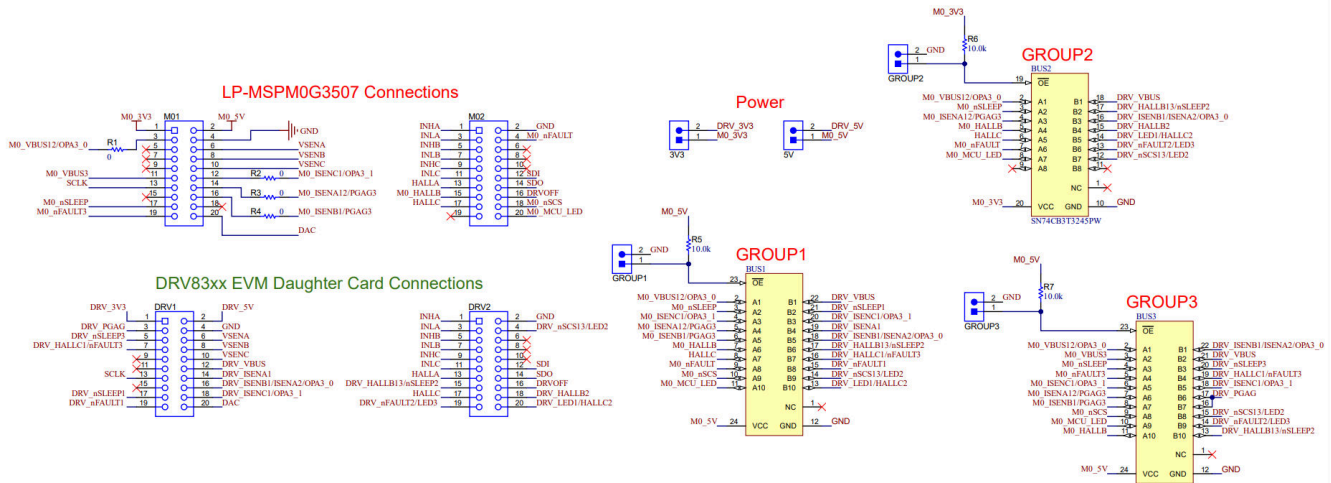


Figure 3-1. MSP-DRV-ADAPT-EVM

3.2 PCB Layouts

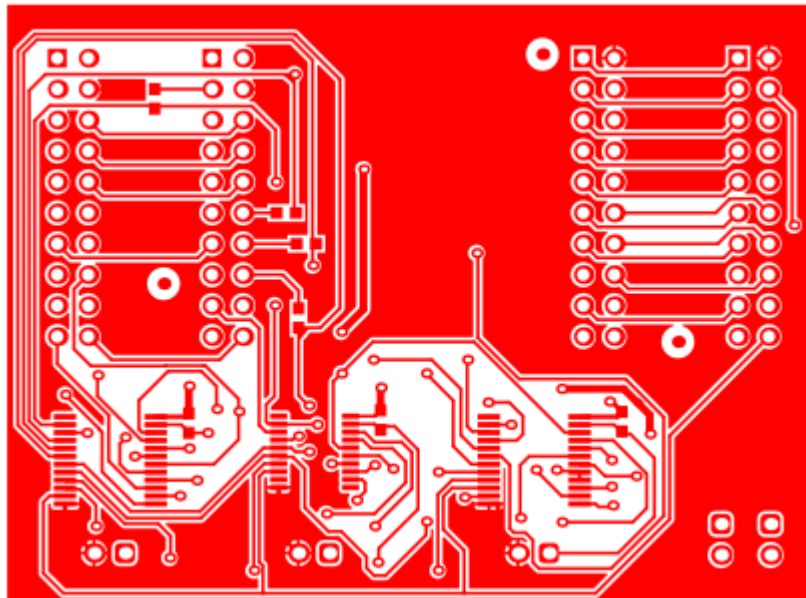


Figure 3-2. Top Layer

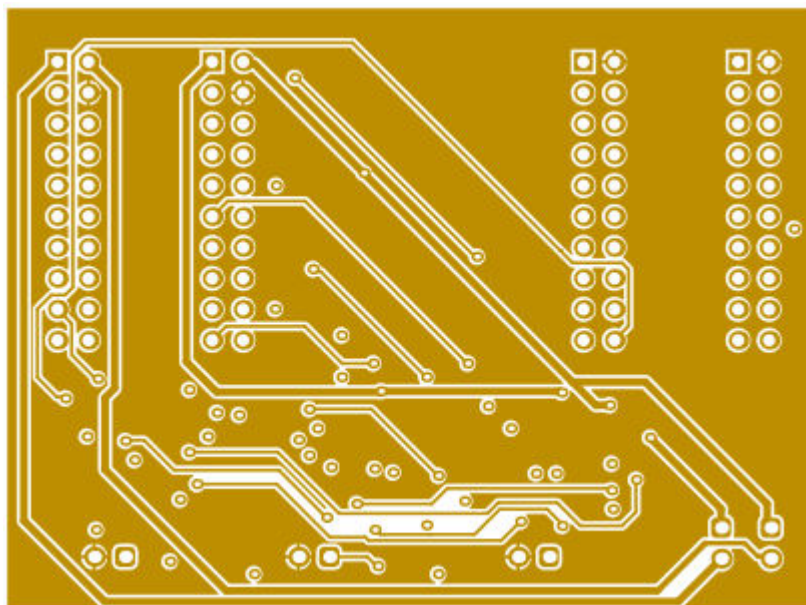


Figure 3-3. VCC

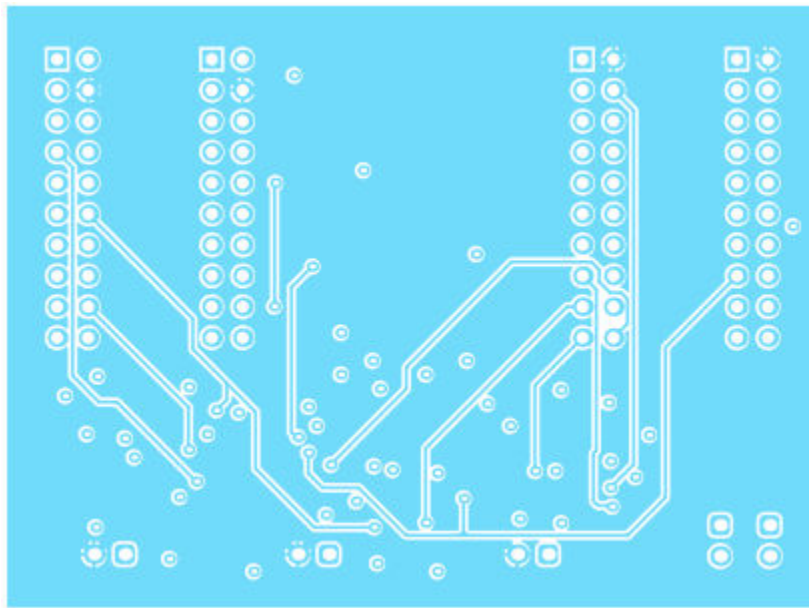


Figure 3-4. GND

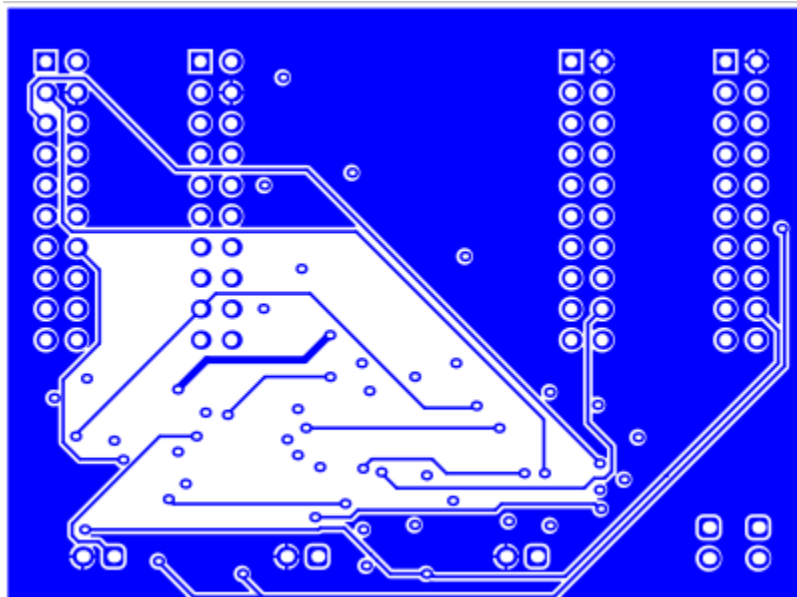


Figure 3-5. Bottom Layer

3.3 Bill of Materials

Table 3-1. Bill of Materials

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
M01, M02	2		Receptacle, 2.54mm, 10x2, Gold	10x2 Header	SSQ-110-03-x-D	Samtec
DRV1, DRV2	2		Header, 2.54mm, 10x2, gold	10x2 Header	SSQ-110-03-x-D	Samtec
3V3, 5V, GROUP1, GROUP2, GROUP3	5		Shunt jumper	2x1 Header	TSW-102-07-G-S	Samtec
BUS1, BUS3	2		10 bit bus switch	24 pin IC	SN74CBTD3861DBR	Texas Instruments
BUS2	1		8 bit bus switch	20 pin IC	SN74CB3T3245PW	Texas Instruments

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3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

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<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html>

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1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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