This document is provided with the DRV8307 customer evaluation module (EVM) as a supplement to the DRV8307 datasheet (SLVSCK2). It details the hardware implementation of the EVM.

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1 Printed-Circuit Board (PCB) (Top 3D View)

Figure 1 illustrates the top view of the DRV8307 EVM PCB.

![Figure 1. DRV8307EVM Top View](image)

2 Introduction

The DRV8307EVM is a solution for evaluating the DRV8307, a brushless DC motor controller. It includes a TLC555 timer configuration to supply PWM to the DRV8307, a potentiometer to adjust the speed of the motor by varying the duty cycle of the PWM, and an external PWM input pin. The EVM also supports differential and single-ended hall sensors. The EVM includes surface-mounted test pins for all important signals on the board. The DRV8307EVM is configured so that only connections to the motor, hall sensors and power supply are required.

2.1 Power Connectors

The DRV8307EVM uses a single power supply rail which must be connected to terminal P1. Minimum recommended VM of the EVM is 8.5 V and maximum is 32 V, with a current of at least 2A. A higher current setting is recommended to maintain a stable VM voltage. Please refer to the DRV8307 datasheet (SLVSCK2) for complete voltage range information. When power is supplied to the board, a green LED (D4) in the lower left corner should light up.
2.2 Test Points

Test points are provided and labeled according to the inputs and outputs of the DRV8307 device. The signals brought out to test points are labeled HALLOUT, FAULTn, LOCKn, ENABLE, HU+/-, HV+/-, HW+/-, and GND (Figure 2).

Figure 2. DRV8307EVM Test Points and FAULTn LED

The HALLOUT signal represents the motor speed and phase information.

\[
 \text{RPM} = \frac{(\text{HALLOUT} \times 60)}{\text{pole pairs}} \tag{1}
\]

The FAULTn and LOCKn signals represent DRV8307 outputs and indicate a fault or lock condition of the driver or motor. If there is a fault condition present, a red LED (D3) lights up. LOCKn indicates whether the speed loop is locked.

The HU+/-, HV+/-, HW+/- represent the corresponding hall signals. The ENABLE pin represents whether the DRV8307 is active or off.

The ENABLE signal is active low. The DRV8307 can be disabled by applying a high voltage to this pin.
2.3 Jumpers

Seven jumpers (JP1–JP7) are installed by default on the EVM.

<table>
<thead>
<tr>
<th>Jumper</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP1</td>
<td>HALL POWER: Hall sensor power is “5V” or “current”</td>
</tr>
<tr>
<td>JP2</td>
<td></td>
</tr>
<tr>
<td>JP3</td>
<td>HALL SIGNALS: Hall Signals are “Differential” or “Single Ended”</td>
</tr>
<tr>
<td>JP4</td>
<td></td>
</tr>
<tr>
<td>JP5</td>
<td>DIRECTION: Motor direction is “forward” or “reverse”</td>
</tr>
<tr>
<td>JP7</td>
<td>BRAKE: Motor brake “ON” or “OFF”</td>
</tr>
<tr>
<td>JP6</td>
<td>SPEED: Speed input is from supplied “external” or “potentiometer”</td>
</tr>
</tbody>
</table>

The default jumper settings are JP1 2-3, JP2, JP3 1-2, JP4 2-3 and JP5, JP6, JP7 all installed. This supports "inverse" single-ended hall sensors supplied with 5 V. Speed is supplied from the potentiometer and the motor spins in a forward direction and is not braked.

![Figure 3. DRV8308EVM Jumpers](image_url)
2.3.1  HALL POWER Configuration (JP1/JP2) Jumpers

Sensored BLDC motors typically use either Hall ICs or Hall elements. Most ICs can use 5-V power, while elements typically have power pins that have an equivalent circuit of a resistor, and current must be limited to about 10 mA. In order to support both Hall sensor types the hall power needs to be configured on the DRV8307EVM.

When installing JP1 2-3 and JP2, a 5-V power is supplied to terminal P3 to power the ICs. The used (VREG) voltage is only present when DRV8307 is enabled and regulated from VM (Figure 4).

![Figure 4. Hall PWR/GND Circuits](image)

By installing JP1 1-2 and uninstalling JP2, the circuit illustrated in Figure 5 is available for the Hall elements. The used (VSW) voltage is only present when DRV8307 is enabled. VSW equals VM.

![Figure 5. Circuit when Setting Hall Power to “Current”](image)

The current can be calculated as follows: If VM is 24 V, and 3 Hall elements having a resistance of 400 Ω are connected in parallel, 10.4 mA is supplied. Always refer to your Hall element specifications to understand the proper current. The purpose of the 180-Ω resistor is to bias-up the common mode voltage of Hall element differential signals, since the DRV8307 requires VICM between 1.5 V to 3.5 V.

If you are unsure of your motor’s Hall type, measure the resistance between the Hall power and ground wires. If it is < 250 Ω, they are likely Hall elements. Hall sensors are easily damaged if incorrect power is applied.

2.3.2  HALL SIGNAL Configuration (JP3/JP4) Jumpers

Hall sensors output either a differential signal pair, or a single-ended signal. You can tell which type your motor uses simply by counting the number of wires; a sensored BLDC typically has 3 phase wires, 2 Hall power wires, and 3 or 6 Hall signal wires, so 8 total means single-ended, and 11 total means differential.

The DRV8307 has differential comparators on the Hall inputs, and they can also accommodate single-ended signals with the use of a few passive components. When using differential Halls, directly connect the 6 Hall signals to the DRV8307 pins.

When using single-ended Halls, they require pull-ups. The DRV8307 comparator “-” pins should be biased with a middle voltage, so that a single-ended swing on the “+” pin is detected like a differential voltage. Connect single-ended hall wires to the “+” pins at P3 for normal Hall sensor types or to “-” pins for inverse Hall sensors.
In order to support both single ended and differential hall signals on the DRV8307EVM, the circuit in Figure 6 is implemented:

![Switching Logic to Support Single-Ended and Differential-Hall Signals](image)

Table 2 shows the configuration possibilities supporting a variety of hall sensors.

<table>
<thead>
<tr>
<th>Configuration</th>
<th>JP3</th>
<th>JP4</th>
<th>Comment</th>
<th>Terminal Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differential Hall (Normal)</td>
<td>1-2</td>
<td>1-2</td>
<td>Switches A+B open</td>
<td>Hall wires in normal order</td>
</tr>
<tr>
<td>Differential Hall (Inverse)</td>
<td>1-2</td>
<td>1-2</td>
<td>Switches A+B open</td>
<td>Swap external Hall wires</td>
</tr>
<tr>
<td>Single Ended (Normal)</td>
<td>2-3</td>
<td>2-3</td>
<td>Switch A closed, B open</td>
<td>Hall wires to “+” pins</td>
</tr>
<tr>
<td>Single Ended (Inverse)</td>
<td>1-2</td>
<td>2-3</td>
<td>Switch A open, B close</td>
<td>Swap external Hall wires and connect to “-” pins</td>
</tr>
<tr>
<td>RESERVED</td>
<td>2-3</td>
<td>1-2</td>
<td>NOT ALLOWED</td>
<td></td>
</tr>
</tbody>
</table>

2.3.3 DIR Direction (JP5) Jumper

Installing the jumper JP5 connects the DIR pin on the DRV8307 to GND. When the DIR pin is tied to GND, the DRV8307 connected motor is set to spin in the forward direction. When removed, the pin is pulled high and the motor spins in the reverse direction.

2.3.4 BRAKE (JP7) Jumper

Installing the jumper JP7 connects the BRAKE pin on the DRV8307 to GND. When the BRAKE pin is tied to GND, the DRV8307 connected motor is spinning normal without any brake action. When removed, the pin is pulled high and the motor will be braked by the DRV8307 brake functionality.
2.4 SPEED ADJUSTMENT (JP6) Jumper and (R20) Potentiometer

The DRV8307 has a dedicated speed input pin (PWM) that supplies a duty cycle to the DRV8307 to control motor speed.

![Figure 7. SPEED Adjustment Configuration](image)

The DRV8307EVM offers two possibilities to supply this PWM input, controlled by jumper JP6.

Installing JP6 uses the speed adjust potentiometer SPEED ADJUST (R20) as shown in Figure 7 as PWM speed input. The potentiometer adjusts the duty cycle of the PWM signal which, in turn, adjusts the speed of the motor. The lower the duty cycle, therefore, the lower the speed, by turning the potentiometer counter-clockwise. In order to increase the duty cycle, thus increase the speed, turn the potentiometer clockwise.

The onboard PWM signal for the DRV8307 is generated by a circuit based upon TI's TLC555 Low-Power Timer. It is capable of approximately a 25-kHz output that can be adjusted from 5% to 95% duty cycle. This square output signal will switch from 0 V to VREG.

In order to provide an external PWM signal to the DRV8307, remove JP6 and connect the external PWM signal to JP6 pin 1 and the GND pin next to it. For more information on the PWM input required by the DRV8307, please refer to the DRV8307 datasheet (SLVSCK2).
2.5 **Operation of the EVM**

The following steps provide instructions for the operation of the EVM:

1. Connect a three-phase BLDC motor to terminal P2.
2. Connect the hall signals, either single ended or differential, to terminal P3.
3. Configure JP1-JP4 in order to supply the hall signals in the right manner to the DRV8307.
4. Adjust the Speed potentiometer, R20, to minimum voltage by turning it all the way counterclockwise. This minimizes the motor speed. Otherwise, connect your external PWM input to the JP6 PWM pin.
5. Check JP5 and JP7 to be installed.
6. Apply power to VM terminal P1.
7. Adjust the potentiometer clockwise or turn your external PWM source ON to increase the speed of the motor, continue adjusting as desired.
8. To change direction, uninstall JP5.
3 Schematic and Bill of Materials

Figure 8 illustrates the DRV8307EVM schematic and Table 3 is the DRV8307EVM BOM.

![Schematic Diagram]

Figure 8. DRV8307EVM Schematic
<table>
<thead>
<tr>
<th>Designator</th>
<th>Description</th>
<th>Value</th>
<th>DigiKey Part#</th>
<th>Manufacturer</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>220μF</td>
<td>220μF</td>
<td>493-1356-ND</td>
<td>Nichicon</td>
<td>1</td>
</tr>
<tr>
<td>C4, C6, C8, C9, C10, C11, C12, C13, C17</td>
<td>CAP, CER, 0.1μF, 5V, 10%, X7R0805</td>
<td>0.1μF</td>
<td>399-1170-2-ND</td>
<td>Kemet</td>
<td>9</td>
</tr>
<tr>
<td>C2, C5</td>
<td>CAP, CERM, 0.01μF, 10%, +/-10%, X5R, 0805</td>
<td>0.01μF</td>
<td>399-1158-2-ND</td>
<td>Kemet</td>
<td>2</td>
</tr>
<tr>
<td>C14, C16</td>
<td>CAP, CER, 1μF, 50V, X7R0805</td>
<td>1μF</td>
<td>399-7409-2-ND</td>
<td>Kemet</td>
<td>2</td>
</tr>
<tr>
<td>C7, C20</td>
<td>CAP, CER, 4.7μF, 25V, X5R0805</td>
<td>4.7μF</td>
<td>399-6505-2-ND</td>
<td>Kemet</td>
<td>2</td>
</tr>
<tr>
<td>C2, C15</td>
<td>CAP, CER, 0.1μF, 100V, 10%, X7R0805</td>
<td>0.1μF</td>
<td>399-3486-2-ND</td>
<td>Kemet</td>
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<tr>
<td>D3</td>
<td>LED, Red, SMB</td>
<td>Red</td>
<td>160-1415-1-ND</td>
<td>Lite-On</td>
<td>1</td>
</tr>
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<td>D4</td>
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<td>Green</td>
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<td>Lite-On</td>
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<td>D8</td>
<td>Zener diode</td>
<td>TVS ZENER UNI DIR 1500W 33V SMC</td>
<td>1.5SMC33AT3GOSCT-ND</td>
<td>On Semiconductor</td>
<td>1</td>
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<tr>
<td>D7, D8</td>
<td>Diode, Schottky, 10V, 2A, SMA</td>
<td>10V</td>
<td>MBRA210LT3GOSCT-ND</td>
<td>On Semiconductor</td>
<td>2</td>
</tr>
<tr>
<td>JP1, JP3, JP4</td>
<td>Three Pin Header</td>
<td>CONN HEADR BRKWAY .100 3POS STR</td>
<td>5-146280-3-ND</td>
<td>TE Connectivity</td>
<td>3</td>
</tr>
<tr>
<td>JP2, JP6, JP7, JP5</td>
<td>Two Pin Header</td>
<td>CONN HEADER 2POS STR .100 GOLD</td>
<td>3M11970-ND</td>
<td>3M</td>
<td>4</td>
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<tr>
<td>JP6a</td>
<td>1x1 header</td>
<td>CONN HEADR BRKWAY .100 1POS STR</td>
<td>A107006-ND</td>
<td>TE Connectivity</td>
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<td>P1</td>
<td>Terminal block</td>
<td>TERM BLOCK 5.0MM VERT 2POS PCB</td>
<td>ED2580-ND</td>
<td>On-Shore Tech.</td>
<td>1</td>
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<tr>
<td>P2</td>
<td>Terminal block</td>
<td>TERM BLOCK 5.0MM VERT 3POS PCB</td>
<td>ED2581-ND</td>
<td>On-Shore Tech.</td>
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<tr>
<td>P3</td>
<td>Terminal block</td>
<td>TERM BLOCK 3.5MM VERT #POS PCB</td>
<td>ED2641-ND</td>
<td>On-Shore Tech.</td>
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<tr>
<td>R1, R2, R11, R13, R16, R22, R23</td>
<td>RES, 30K OHM, 1/8W, 5% 0805 SMD</td>
<td>30K</td>
<td>311-30KARTR-ND</td>
<td>Yageo</td>
<td>7</td>
</tr>
<tr>
<td>R3, R4, R5, R14</td>
<td>RES, 3.0K OHM, 1/8W, 5% 0805 SMD</td>
<td>3K</td>
<td>311-3.0KARTR-ND</td>
<td>Yageo</td>
<td>4</td>
</tr>
<tr>
<td>R12, R9</td>
<td>RES, 15K OHM, 1/8W, 5% 0805 SMD</td>
<td>15K</td>
<td>311-15KARCT-ND</td>
<td>Yageo</td>
<td>2</td>
</tr>
<tr>
<td>R10, R21</td>
<td>RES, 10K OHM, 1/8W, 5% 0805 SMD</td>
<td>10K</td>
<td>311-10KARTR-ND</td>
<td>Yageo</td>
<td>2</td>
</tr>
<tr>
<td>R15</td>
<td>RES, 4.3K OHM, 1/4W, 5% 0805 SMD</td>
<td>4.3K</td>
<td>P4.3KADCT-ND</td>
<td>Panasonic</td>
<td>1</td>
</tr>
<tr>
<td>R16</td>
<td>RES, 2K OHM, 1/8W, 1% 0805 SMD</td>
<td>2K</td>
<td>P2.00KCCNT-ND</td>
<td>Panasonic</td>
<td>1</td>
</tr>
<tr>
<td>R17</td>
<td>RES, 180 OHM, 1/8W, 1% 0805 SMD</td>
<td>180</td>
<td>311-180CRCNT-ND</td>
<td>Yageo</td>
<td>1</td>
</tr>
<tr>
<td>R19</td>
<td>RES, 0.05 OHM, 2W, 1% 2512</td>
<td>0.05</td>
<td>CSRN2512FK50L0CT-ND</td>
<td>Stackpole El.</td>
<td>1</td>
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<tr>
<td>R20</td>
<td>POT, 5.0K OHM, THUMBHHEEL, CERM ST</td>
<td>5K</td>
<td>3352T-502LF-ND</td>
<td>Bourns</td>
<td>1</td>
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<tr>
<td>R24, R26, R28</td>
<td>RES, 240 OHM, 1/10W, 5% 0603 SMD</td>
<td>240</td>
<td>311-240GRT-ND</td>
<td>Yageo</td>
<td>3</td>
</tr>
<tr>
<td>R25, R27, R29</td>
<td>RES, 0.0 OHM, 1/10W, JUMP, 0603 SMD</td>
<td>0</td>
<td>311-0.0GRT-ND</td>
<td>Yageo</td>
<td>3</td>
</tr>
<tr>
<td>TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11</td>
<td>Test point</td>
<td>TEST POINT PC MINI .040&quot; ORANGE</td>
<td>5000K-N</td>
<td>Keystone El.</td>
<td>11</td>
</tr>
<tr>
<td>TP13</td>
<td>Test point</td>
<td>TEST POINT PC MINI .040&quot; BLACK</td>
<td>5000K-N</td>
<td>Keystone El.</td>
<td>1</td>
</tr>
<tr>
<td>U7, U8, U9</td>
<td>FET switch</td>
<td>IC SWITCH BUS OCTAL FET 20-TSSOP</td>
<td>296-19197-1-ND</td>
<td>Texas Instruments</td>
<td>3</td>
</tr>
<tr>
<td>U13, U14</td>
<td>1MM INSULATED SHORTING PLUG</td>
<td>1MM</td>
<td>952-1873-ND</td>
<td>HARWIN</td>
<td>2</td>
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<tr>
<td>U2, U3, U4</td>
<td>Power FET</td>
<td>Dual 60-V N-Channel Power MOSFETs</td>
<td>296-37303-2-ND</td>
<td>Texas Instruments</td>
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<td>U5</td>
<td>IC OSC MONO TIMING 2.1MHZ 8- SOIC</td>
<td>555 Timer</td>
<td>296-10341-1-ND</td>
<td>Texas Instruments</td>
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<td>U11</td>
<td>DUAL SCHMITT-TRIGGER INVERTER</td>
<td>555 Timer</td>
<td>296-13010-1-ND</td>
<td>Texas Instruments</td>
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<tr>
<td>N/A</td>
<td>Jumper</td>
<td>SHUNT JUMPER .5&quot; BLACK GOLD</td>
<td>3M9580-ND</td>
<td>3M</td>
<td>7</td>
</tr>
<tr>
<td>N/A</td>
<td>Screw</td>
<td>MACHINE SCREW PAN SLOTTED M3</td>
<td>29311K-N</td>
<td>Keystone El.</td>
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</tr>
<tr>
<td>N/A</td>
<td>Standoff</td>
<td>HEX STANDOFF M3 ALUMINUM 10MM</td>
<td>24433K-N</td>
<td>Keystone El.</td>
<td>4</td>
</tr>
<tr>
<td>U1</td>
<td>Motor controller</td>
<td>BRUSHLESS DC MOTOR PREDRIVER</td>
<td>supplied from TI</td>
<td>Texas Instruments</td>
<td>1</td>
</tr>
</tbody>
</table>
1. **Delivery:** TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, or documentation (collectively, an “EVM” or “EVMs”) to the User (“User”) in accordance with the terms and conditions set forth herein. Acceptance of the EVM is expressly subject to the following terms and conditions.

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2. **Limited Warranty and Related Remedies/Disclaimers:**

2.1 These terms and conditions do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.

2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for any defects that are caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI. Moreover, TI shall not be liable for any defects that result from User's design, specifications or instructions for such EVMs. Testing and other quality control techniques are used to the extent TI deems necessary or as mandated by government requirements. TI does not test all parameters of each EVM.

2.3 If any EVM fails to conform to the warranty set forth above, TI's sole liability shall be at its option to repair or replace such EVM, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

3. **Regulatory Notices:**

3.1 United States

3.1.1 Notice applicable to EVMs not FCC-Approved:
This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

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.
FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• 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

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSS standard(s). 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.

3.3 Japan

3.3.1 Notice for EVMs delivered in Japan: Please see http://www.tij.co.jp/sds/ai/ai/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。http://www.tij.co.jp/sds/ai/ai/general/eStore/notice_01.page

3.3.2 Notice for Users of EVMs Considered “Radio Frequency Products” in Japan: EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If EVMs enter Japan, not certified to Technical Regulations of Radio Law of Japan, User is required by Radio Law of Japan to follow the instructions below with respect to EVMs:

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.
開発キットの中には技術基準適合証明を受けていないものがあります。技術基準適合証明を受けていないものご使用に際しては、電波法遵守のため、以下のいずれかの措置を取っていただく必要がありますのでご注意ください。

1. 電波法施行規則第6条第1項第1号に基づく平成18年3月28日総務省告示第173号で定められた電波暗室等の試験設備でご使用いただく。
2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

なお、本製品は、上記の「ご使用にあたっての注意」を譲渡先、移転先に通知しない限り、譲渡、移転できないものとします。

日本テキサス・インスツルメンツ株式会社
東京都新宿区西新宿6丁目24番1号
西新宿三井ビル
3.3.3 Notice for EVMs for Power Line Communication: Please see http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_02.page

電力線搬送波通信についての開発キットをお使いになる際の注意事項については、次のところをご覧ください。http://www.tij.co.jp/lsds/ti_ja/general/eStore/notice_02.page

4 EVM Use Restrictions and Warnings:
4.1 EVMs are not for use in functional safety and/or safety critical evaluations, including but not limited to evaluations of life support applications.
4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.
4.3 Safety-related Warnings and Restrictions:
4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.
4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.
4.4 User assumes all responsibility and liability to determine whether the EVM is subject to any applicable international, federal, state, or local laws and regulations related to User's handling and use of the EVM and, if applicable, User assumes all responsibility and liability for compliance in all respects with such laws and regulations. User assumes all responsibility and liability for proper disposal and recycling of the EVM consistent with all applicable international, federal, state, and local requirements.

5. Accuracy of Information: To the extent TI provides information on the availability and function of EVMs, TI attempts to be as accurate as possible. However, TI does not warrant the accuracy of EVM descriptions, EVM availability or other information on its websites as accurate, complete, reliable, current, or error-free.
6. **Disclaimers:**

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7. **USER’S INDEMNITY OBLIGATIONS AND REPRESENTATIONS.** USER WILL DEFEND, INDEMNIFY AND HOLD TI, ITS LICENSORS AND THEIR REPRESENTATIVES HARMLESS FROM AND AGAINST ANY AND ALL CLAIMS, DAMAGES, LOSSES, EXPENSES, COSTS AND LIABILITIES (COLLECTIVELY, "CLAIMS") ARISING OUT OF OR IN CONNECTION WITH ANY HANDLING OR USE OF THE EVM THAT IS NOT IN ACCORDANCE WITH THESE TERMS AND CONDITIONS. THIS OBLIGATION SHALL APPLY WHETHER CLAIMS ARISE UNDER STATUTE, REGULATION, OR THE LAW OF TORT, CONTRACT OR ANY OTHER LEGAL THEORY, AND EVEN IF THE EVM FAILS TO PERFORM AS DESCRIBED OR EXPECTED.

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