

Jacinto 7 EVM Quick Start Guide for TDA4VM and DRA829V Processors



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1 Introduction

Welcome to the Jacinto™ 7 EVM Quick Start Guide for TDA4VM and DRA829V processors. This guide helps you begin your evaluation quickly by covering the following topics:

- Setup EVM and expansion card hardware.
- Experiencing the Out Of Box (OOB) demonstration to ensure the EVM hardware is functional.
- Download and install Processor SDK (software development kit).
- Complete Project 0, your first 'Hello World' project to ensure interoperability of the EVM and software.



Caution

Caution Hot surface.
Contact may cause burns
Do not touch.

2 Step 1: Setup EVM and Expansion Card Hardware

The minimum configuration of the Jacinto 7 EVM includes the common processor board and a system-on-module (SOM) board. Each board ships separately.

- The common processor board provides basic connectivity to I/O, JTAG and various available expansion boards.
- The SOM includes the TDA4x or DRA82x processor you are going to evaluate, as well as power management and external memory.

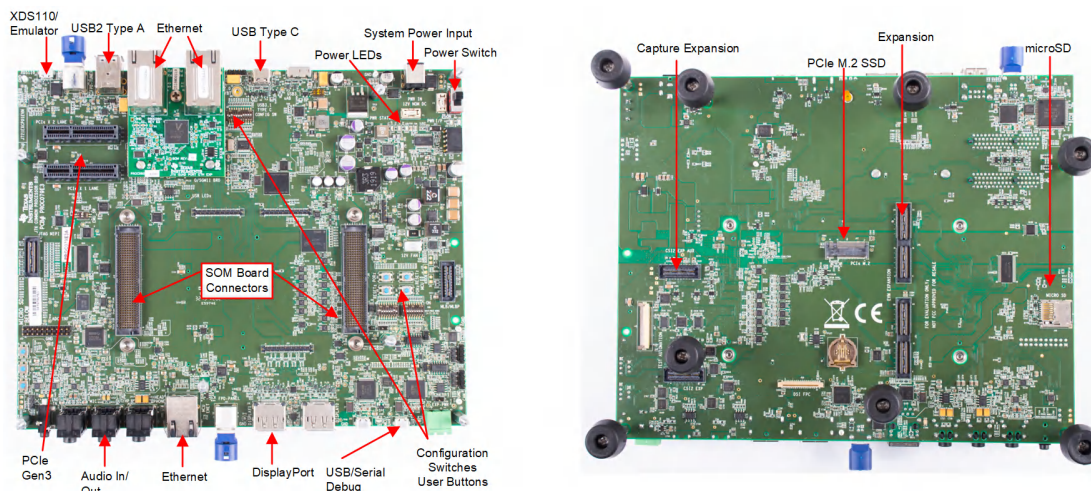


Figure 2-1. Common Processor Board Highlights

Note

Some interfaces may be unavailable depending on the SOM you attach to the common processor board.

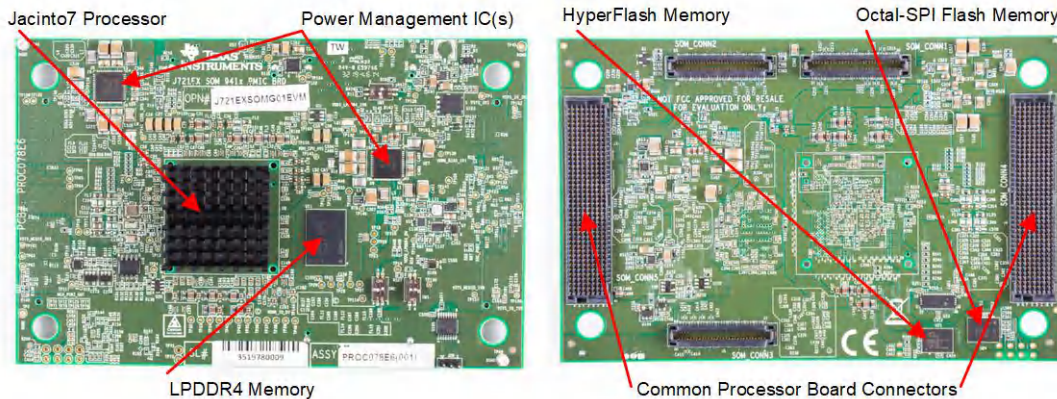
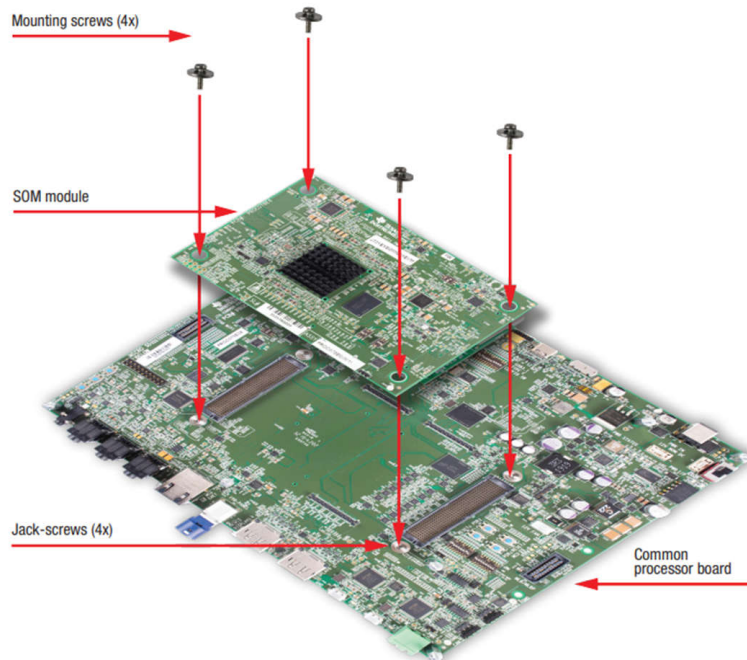


Figure 2-2. System-On-Module Highlights

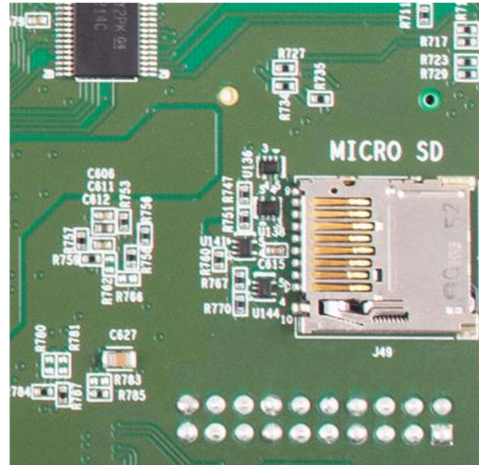
2.1 Attaching the SOM to the Common Processor Board

1. Remove mounting screws (4) from Common Processor board (sold separately). The screws are shipped installed in jack-screws. If existing SOM module is already mounted, use Allen wrench (supplied with SOM) to eject SOM module by inserting the wrench into each jack-screw and turning counter-clockwise at each location until SOM module is loose.
2. Before installing new SOM, make sure all jack-screws are tight by inserting the wrench and turning clockwise at each location.
3. Install the SOM module on the Common Processor Board. Ensure it is oriented such that all connectors are aligned. Press firmly on the edges to ensure the connectors mate (may have to apply significant pressure).
4. Install mounting screws (4x) in each corner of the SOM (see below). Tighten each screw to ensure all connectors are fully mated. Don't over-tighten.



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5. Insert the supplied Linux SD card into the Micro SD card slot (see below). The location of the card slot is on the backside of the Common Processor Board.



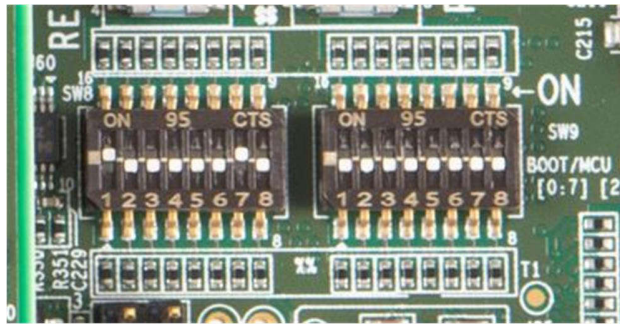
6. Connect the supplied USB cable to the USB/Serial Debug connector as shown. Connect other end to PC. Launch a terminal program (example, TeraTerm) and connect to first of four UARTs that are assigned to USB port. Set terminal to operate at Baud 115200, 8b no parity, and flow control off.



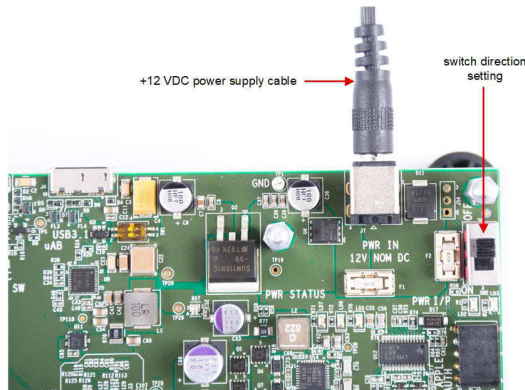
- If a DisplayPort panel is available (not included), connect the supplied DisplayPort cable to the EVM as shown. Connect other end to DisplayPort panel. If no panel is available, this step can be skipped.



- Confirm the boot configuration switches SW8 and SW9 are set as shown.



- Connect a +12 VDC power supply (not included) with minimum output rating of 5 Amp, positive inner and negative outer terminals, female barrel 5.5 mm x 2.5 mm. Recommended power supply is CUI Inc. SDI65-12-U-P6 or equivalent.
- To turn EVM system on, set switch SW2 to the 'ON' position. To turn EVM off, set switch SW2 to 'OFF'.



2.2 Attaching an Optional Expansion Card

Various expansion cards can be added to the common processor board to expand the capabilities of the EVM.

- Automotive Gateway/Ethernet Switch /Industrial Expansion card: this card adds ports for CAN-FD, Gigabit Ethernet and industrial Ethernet protocols. (Installation instructions are covered in [Appendix A](#)).
- Infotainment Expansion card: this card adds more audio I/O, HDMI and LVDS ports for display, a camera input port and tuner interfaces. (Installation instructions are covered in [Appendix B](#)).
- Fusion Serial Capture Application board: this card is developed by Spectrum Digital, a TI ecosystem partner, and adds multiple camera and radar inputs. (Installation instructions are included in the box that the product was packed in.)

3 Step 2: Experiencing the Out Of Box (OOB) Demonstration to Ensure the EVM Hardware is Functional

1. To turn on the EVM, move the SW2 switch to the 'ON' position, as shown in Step 1, #10 above.
2. To experience the Out Of the Box application, a DisplayPort panel is required. Connect the supplied DisplayPort cable to the EVM as shown in Step 1, #7 above. Connect the other end of the cable to DisplayPort panel.
3. After turning on the EVM and connecting a display, the DisplayPort panel will show the following welcome message:

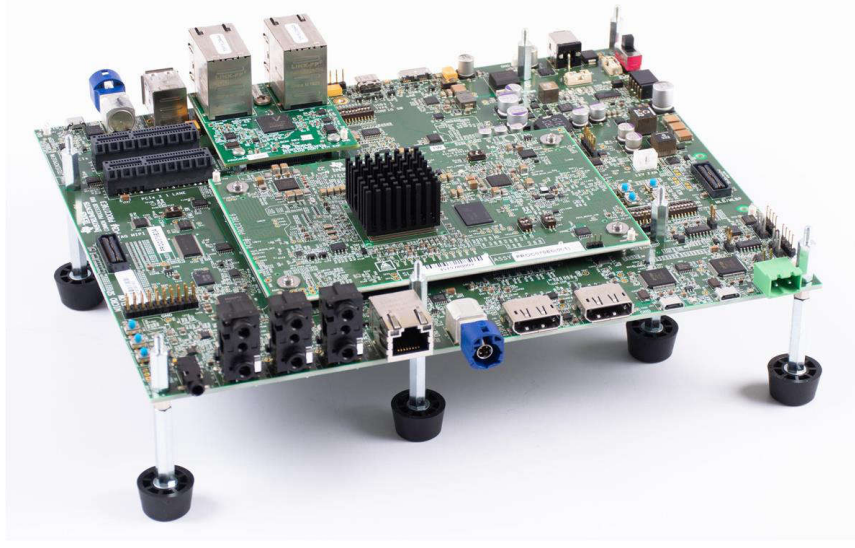


Figure 3-1. Welcome to the Jacinto 7 Automotive Processor EVM!

4 Step 3: Download and Install Processor SDK (software development kit)

Processor SDK RTOS Automotive (PSDKRA) and Processor SDK Linux Automotive (PSDKLA) together form a multiprocessor software development platform for the Texas Instruments Jacinto 7 family of SOCs. The SDK provides a comprehensive set of software tools and components to help users develop and deploy their applications on supported Jacinto processors.

Both PSDKLA and PSDKRA can be used together to implement various automotive use-cases as shown in Figure 4-1.

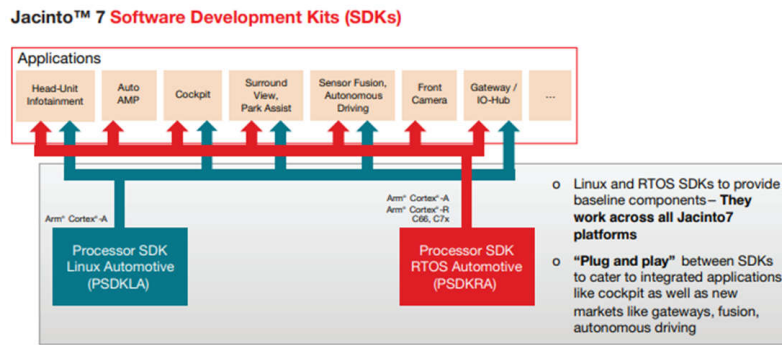


Fig: Processor SDK automotive installers.

Figure 4-1. Processor SDK Automotive Installers

Processor SDK installation instructions are available online:

- Processor SDK RTOS: www.ti.com/Jacinto7PSDKRAInstall
- Processor SDK Linux: www.ti.com/Jacinto7PSDKLAInstall

5 Step 4: Project 0, Your First 'Hello World' project to Ensure Interoperability of EVM and Software

Completing Project 0 ensures that you setup the hardware and configured the software correctly. It also validates that the development environment is ready for you to make code changes and reflect those changes back to the EVM.

Ready to get started?

Access Project 0 instructions online: [GCC ToolChain](#)

Congratulations! This completes your Quick Start experience.

Additional Resources

Now that your EVM is setup and validated, you can continue your evaluation by getting additional support, accessing additional training and exploring further development options with the following resources:

- Support: www.ti.com/Jacinto7Support
- Training: www.ti.com/Jacinto7Training
- Development: www.ti.com/Jacinto7Development

A Installing the Automotive Gateway/Ethernet Switch/Industrial Expansion Card Onto the Common Processor Board

1. Remove the stand-offs (8x) from the EVM. Mate the expansion card to the common processor board expansion connectors (see [Figure A-1](#) left).
2. Press firmly on the edges to ensure the connectors mate (may have to apply significant pressure).
3. If a CSI expansion board is not connected to the CSI expansion connectors on the common processor board, add a 2mm thick washer to each of the four stand-offs (see [Figure A-1](#) right) on the common processor board. Washers are included in the kit.
4. Re-install the eight stand-offs.

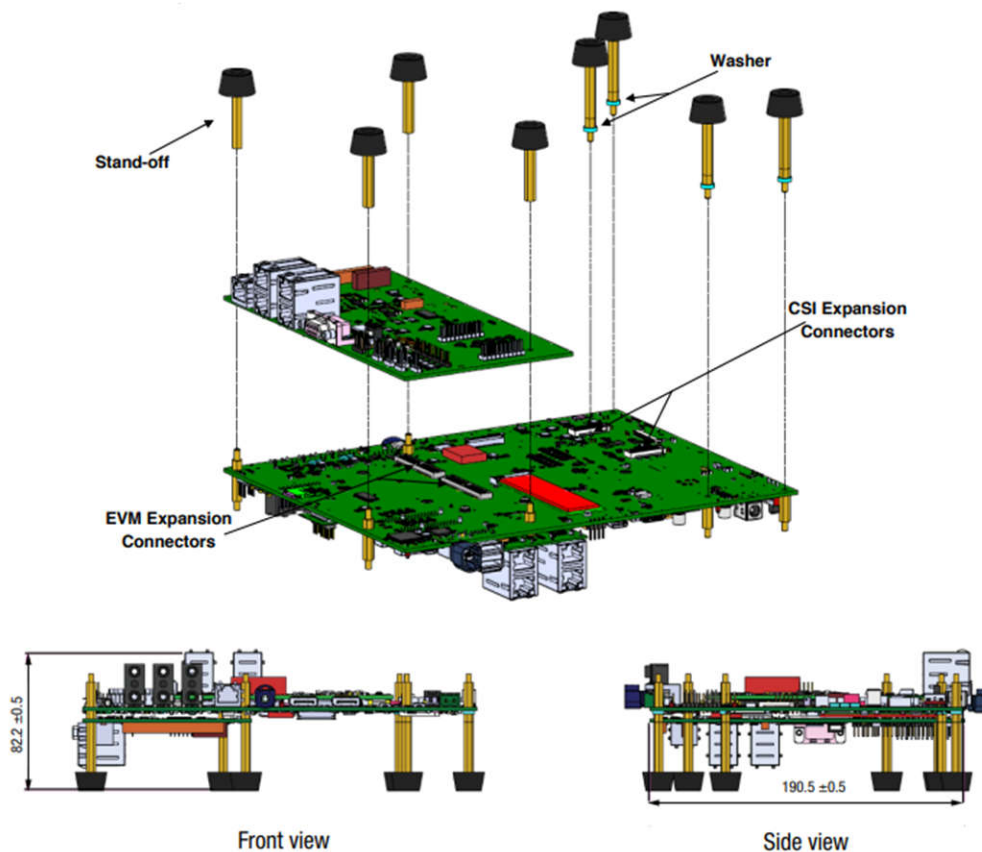


Figure A-1. Installing the Automotive Gateway/Ethernet Switch/Industrial Expansion Card Onto the Common Processor Board

B Installing the Infotainment Expansion Board Onto the Common Processor Board

1. Remove the stand-offs (8x) from the EVM. Mate the Infotainment Expansion Board onto the common processor board expansion connectors (see [Figure B-1](#) left).
2. Press firmly on the edges to ensure the connectors mate (may have to apply significant pressure).
3. If a CSI expansion board is not connected to the CSI expansion connectors on the common processor board, add a 2mm thick washer to each of the four stand-offs (see [Figure B-1](#) right) on the common processor board. Washers are included in the kit.
4. Re-install the eight stand-offs.

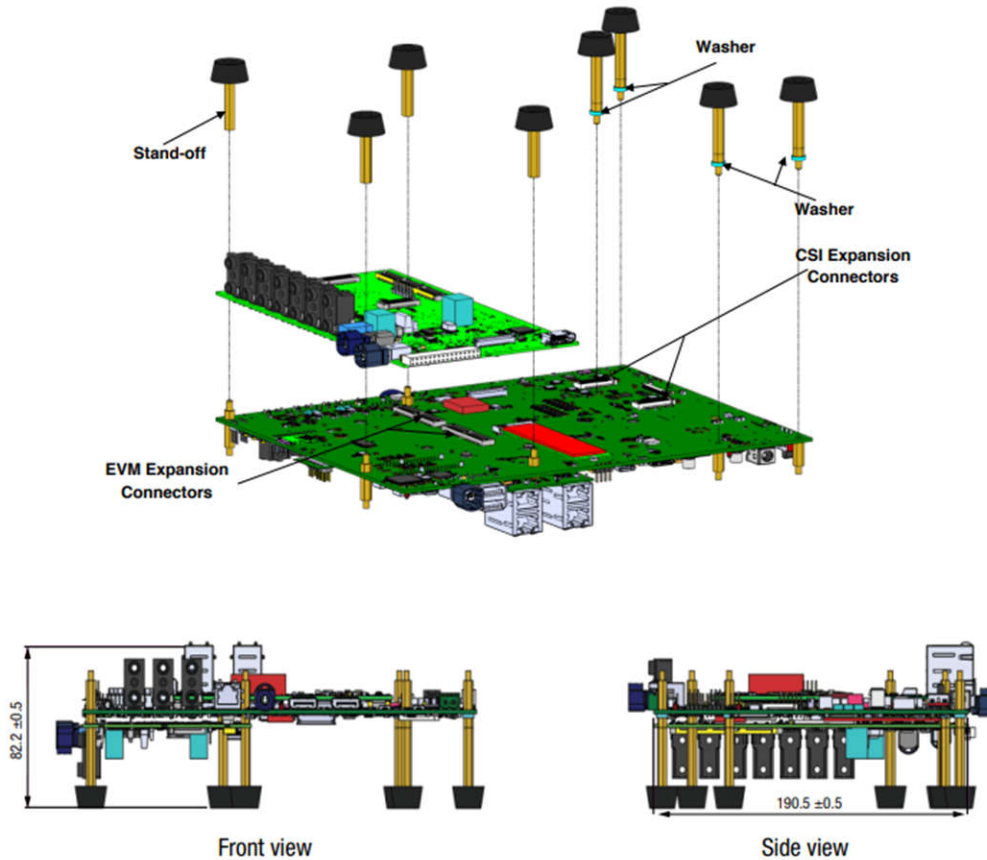


Figure B-1. Installing the Infotainment Expansion Board Onto the Common Processor Board

Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision * (January 2020) to Revision A (August 2023)

Page

- Updated the numbering format for tables, figures and cross-references throughout the document..... **2**
- Updated [Section 5](#)..... **7**

STANDARD TERMS FOR EVALUATION MODULES

1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, and/or documentation which may be provided together or separately (collectively, an "EVM" or "EVMs") to the User ("User") in accordance with the terms set forth herein. User's acceptance of the EVM is expressly subject to the following terms.
 - 1.1 EVMs are intended solely for product or software developers for use in a research and development setting to facilitate feasibility evaluation, experimentation, or scientific analysis of TI semiconductors products. EVMs have no direct function and are not finished products. EVMs shall not be directly or indirectly assembled as a part or subassembly in any finished product. For clarification, any software or software tools provided with the EVM ("Software") shall not be subject to the terms and conditions set forth herein but rather shall be subject to the applicable terms that accompany such Software
 - 1.2 EVMs are not intended for consumer or household use. EVMs may not be sold, sublicensed, leased, rented, loaned, assigned, or otherwise distributed for commercial purposes by Users, in whole or in part, or used in any finished product or production system.
2. *Limited Warranty and Related Remedies/Disclaimers:*
 - 2.1 These terms 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 a nonconforming EVM if (a) the nonconformity was 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, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.
 - 2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, 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.

WARNING

Evaluation Kits 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 shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 Regulatory Notices:

3.1 United States

3.1.1 Notice applicable to EVMs not FCC-Approved:

FCC NOTICE: 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 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.

3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/lstds/ti_ja/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。

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

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 User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

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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3. 技術基準適合証明を取得後ご使用いただく。

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西新宿三井ビル

3.3.3 *Notice for EVMs for Power Line Communication:* Please see http://www.tij.co.jp/lstds/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。 <https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-for-power-line-communication.html>

3.4 European Union

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive):*

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

-
- 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.
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 - 6.1 EXCEPT AS SET FORTH ABOVE, EVMS AND ANY MATERIALS PROVIDED WITH THE EVM (INCLUDING, BUT NOT LIMITED TO, REFERENCE DESIGNS AND THE DESIGN OF THE EVM ITSELF) ARE PROVIDED "AS IS" AND "WITH ALL FAULTS." TI DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, REGARDING SUCH ITEMS, INCLUDING BUT NOT LIMITED TO ANY EPIDEMIC FAILURE WARRANTY OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF ANY THIRD PARTY PATENTS, COPYRIGHTS, TRADE SECRETS OR OTHER INTELLECTUAL PROPERTY RIGHTS.
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