DAC121S101EVM Booster Pack User’s Guide

User's Guide



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DAC121S101 BoosterPack Components

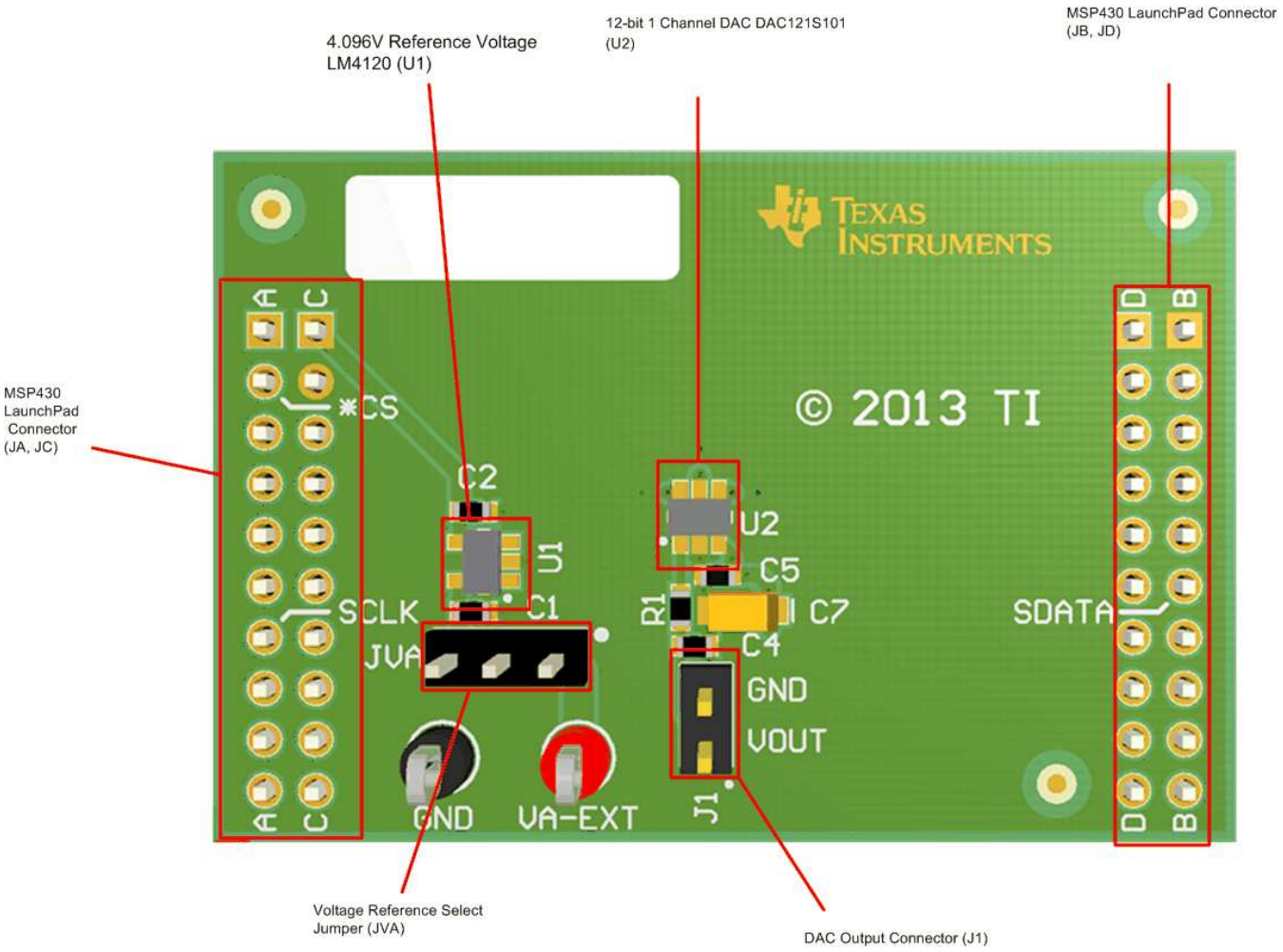


Figure 1-1. DAC121S101EVM Evaluation Board

Table 1-1. Device and Package Configurations

DEVICE	IC	PACKAGE
U1	LM4120IM5-4.1	SOT-23
U2	DAC128S085CIMK	SOT-6

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Software Installation

2.1 Graphical User Interface (GUI)

To use the DAC121S101EVM install the DAC12xSxxx Software:

1. The DAC12xSxxx software is located http://www.ti.com/product/dac121s101, scroll down to the "software" section, and download the latest evaluation software.
2. Unzip the downloaded file into a known directory, and run the "setup.exe" file located in [Unzip location]\ DAC12xSxxx \EVM_GUI\ DAC12xSxxx _Installer_v1.zip\ DAC12xSxxx _Installer\Installer\Volume. Follow the pop-screen instructions by clicking the "Next" button to install the software.

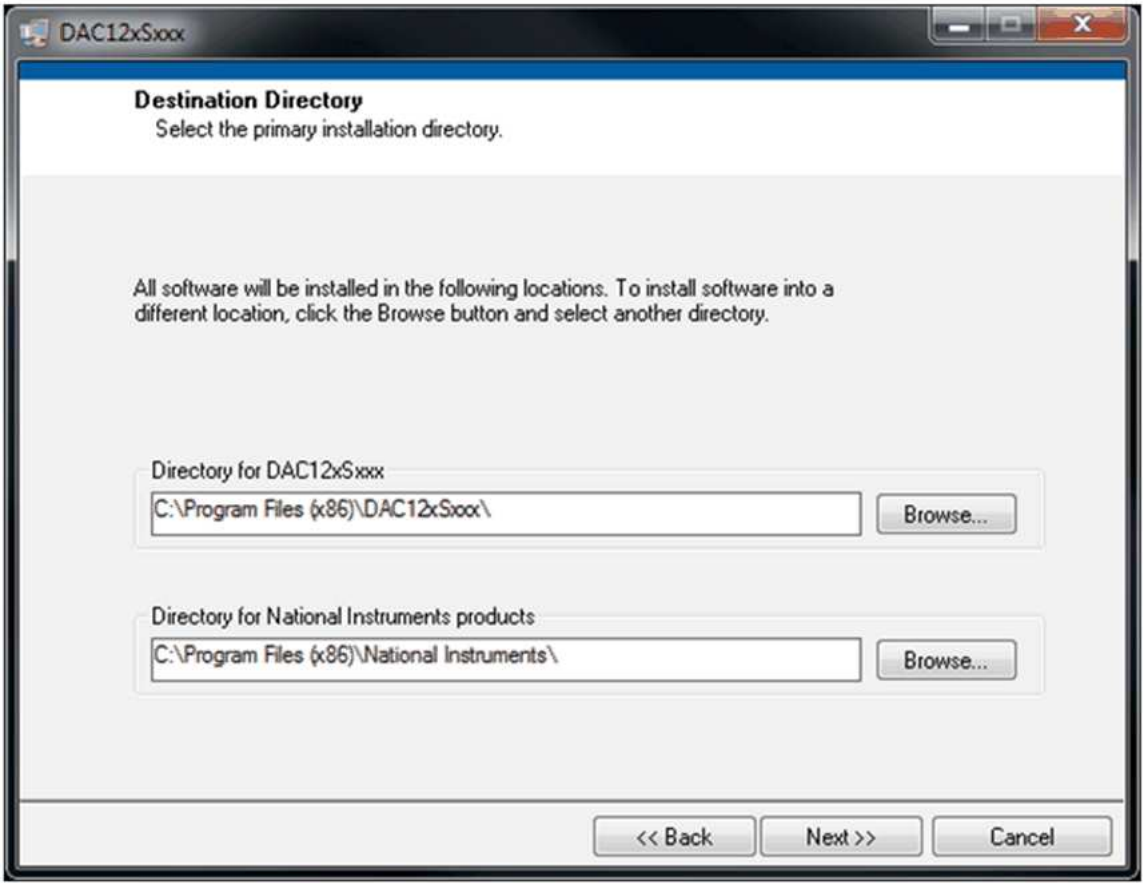


Figure 2-1. DAC12xSxxx Installation Directory

3. When the installation is finished, please click "Finish" button.

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2.2 LaunchPad Firmware Upgrade

The MSP430F5529 LaunchPad board can purchased at http://www.ti.com/tool/msp-exp430f5529lp.

MSP430 Firmware Upgrade Application Installation

1. Navigate tohttp://www.ti.com/tool/msp430usbdevpack and click on Get Software.
2. Scroll-down to the end of the page to find the USB Collateral Installers section.
3. Click on MSP430_USB_Firmware_Upgrade_Example-x-x-x-Setup.exe to download the tool; the page will redirect to a submission form.
4. Complete the information requested and submit the form; if approved, a download button will appear.
5. Run the installation file and follow the on-screen instructions until completion. When asked about the setup type, select Application Only. Click Finish when done.

Firmware upgrade

1. Open the MSP430 USB Firmware Upgrade application. By default, the application can be launched from Start >> Programs >> Texas Instruments >> MSP430 USB Firmware Upgrade Example.
2. Click Next to proceed on the first prompt; read and accept the license agreement and click Next to continue.

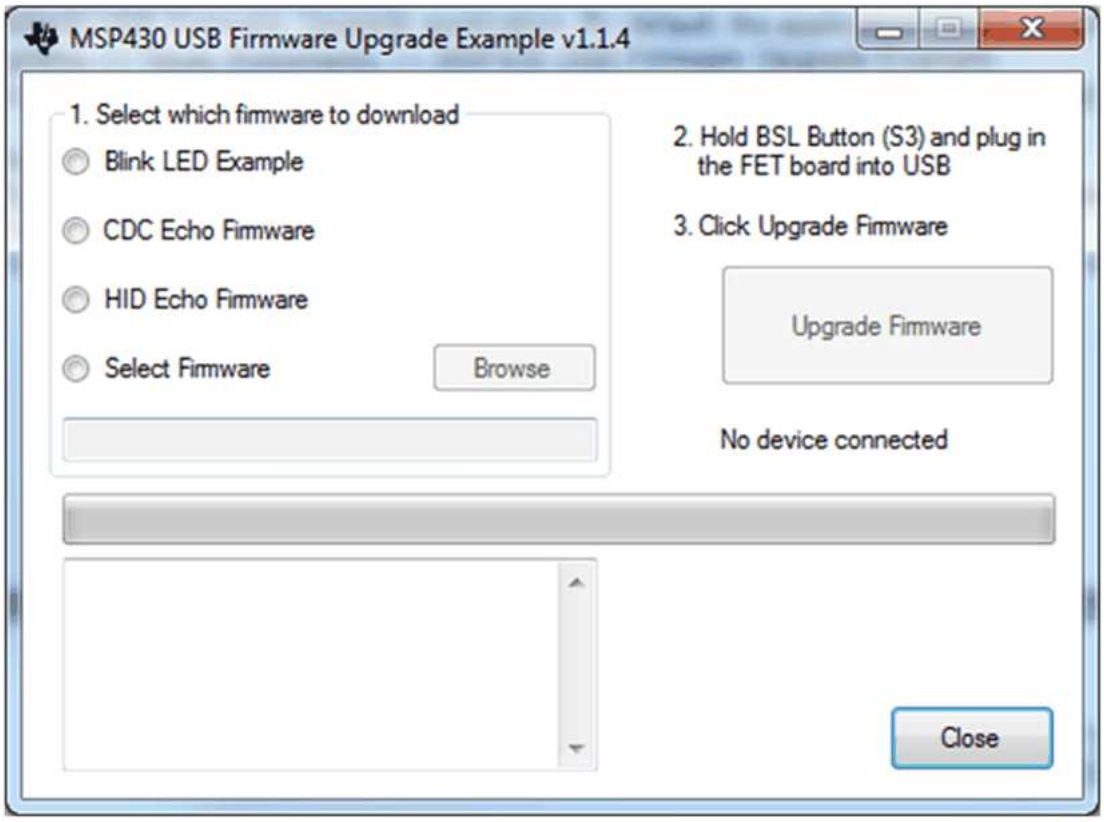


Figure 2-2. USB Firmware Upgrade Window

3. Enable the Select Firmware button and browse to the downloaded firmware “dac12xsxxx_fw-v0.87.txt”.
4. Press the BSL button on the MSP430 LaunchPad and connect to the PC with a USB cable; if detected, the text on the Firmware Upgrade tool will change from “No device connected” to “Found 1 device”.
5. Click on the Upgrade Firmware button to program the LaunchPad. Close the application when done.

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2.3 Update USB Driver

1. Before launching the DAC12xSxxx software, connect the DAC121S101EVM board to a USB port of your PC. Go to Device Manager and find “MSP43-USB Example”. Right click and select Update Driver Software.

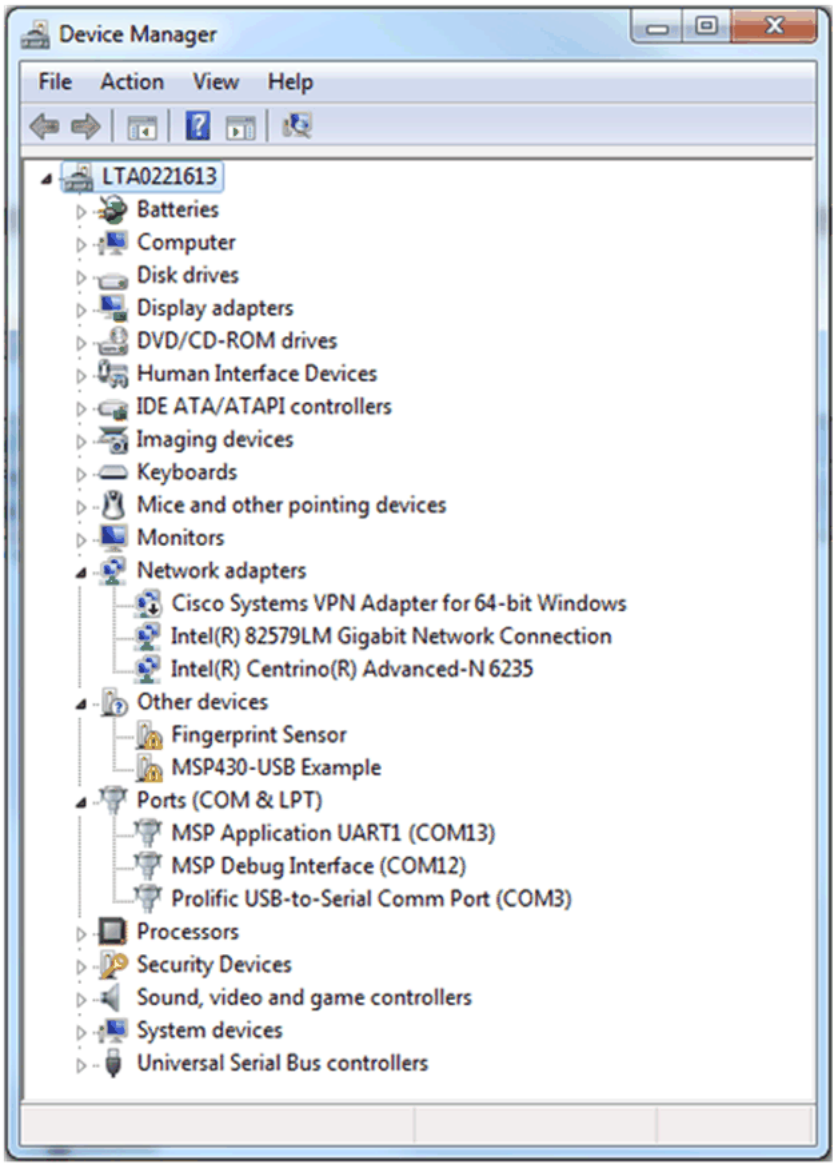


Figure 2-3. Driver Not Installed

2. On the next screen, select the “Browse my computer for driver software” option and go to the directory of your install files and select the “TI_ADC_DAC_EVMs_Driver.inf” file.
3. If prompted with a warning window select “Install this Driver Anyway”. Close the installation window when it is done. The device manager should now display a “TI_ADC_DAC_EVMs” item followed by a COM port number.

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DAC121S101 BoosterPack Setup and Operation

3.1 Connections

1. Attach the DAC121S101EVM BoosterPack onto the MSP430F5529 LaunchPad using connectors JA, JB, JC, JD. The proper orientation of the LaunchPad and DAC121S101EVM is when the text “LaunchPad” and “2013 TI” are in the same direction.



Figure 3-1. DAC121S101EVM Attached to MSP430

2. Connect the USB cable from the LaunchPad to the PC.

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3.2 Launching the Software

1. The DAC12xSxxx GUI software can be run by clicking on Start >> All Program >> DAC12xSxxx. After running the GUI select DAC121S101.

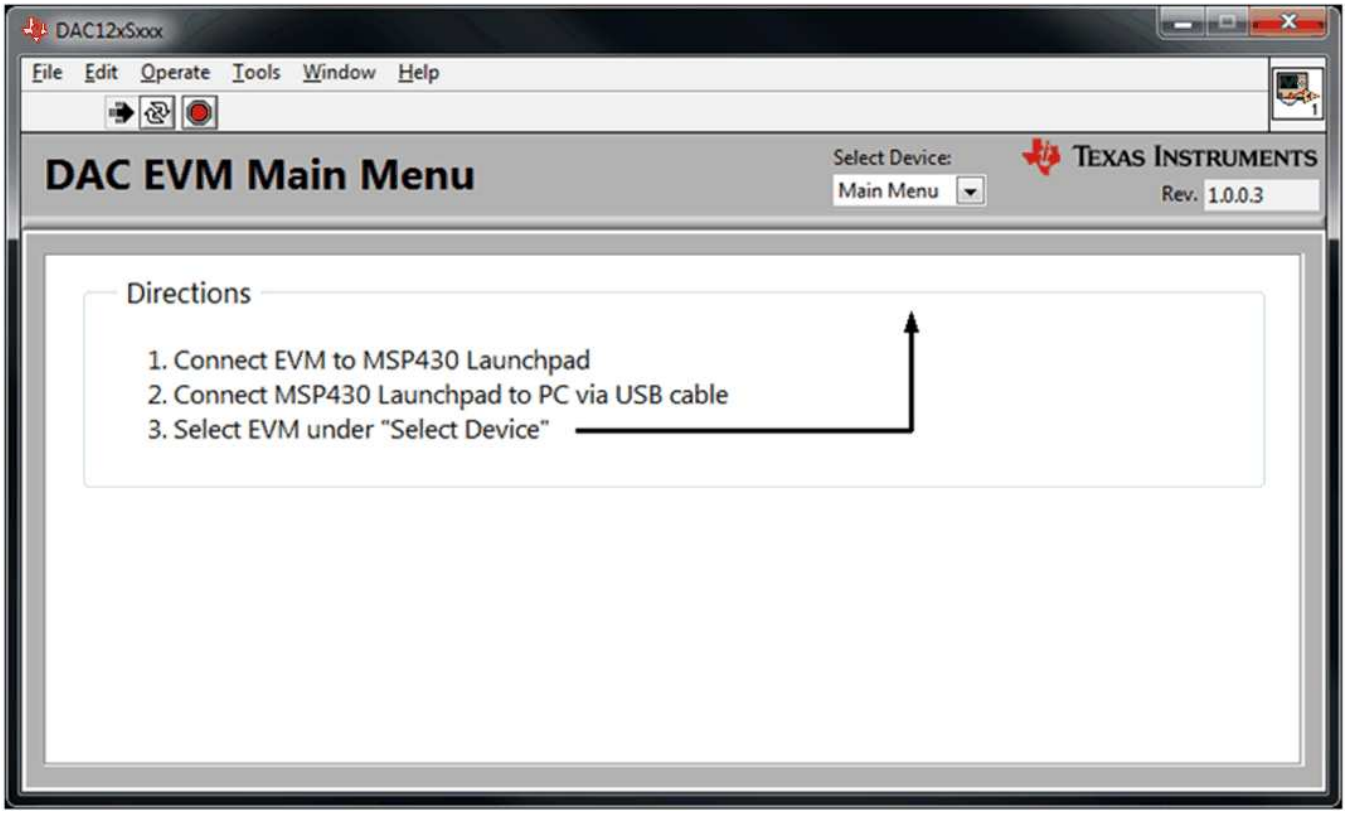


Figure 3-2. Part Select

2. GUI Descriptions
   - DB[15:12]: These 4 bits control different operational and power down modes. Bits 14 and 15 are don't care bits. See the DAC121S101 datasheet for more details.
   - DB[11:0]: These 12 bits are for setting the DAC output codes.
   - DB[11:0] Output Type: This field changes DB[11:0] to either binary, decimal, or hexadecimal type.
3. Quick start:
   (a) Input "0000" to DB[15:12] to go into normal operation mode
   (b) Input "800" to DB[11:0] to output 2.048V (Vref/2)
   (c) Click "Write" to send the command to the DAC121S101 part

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Board Layout

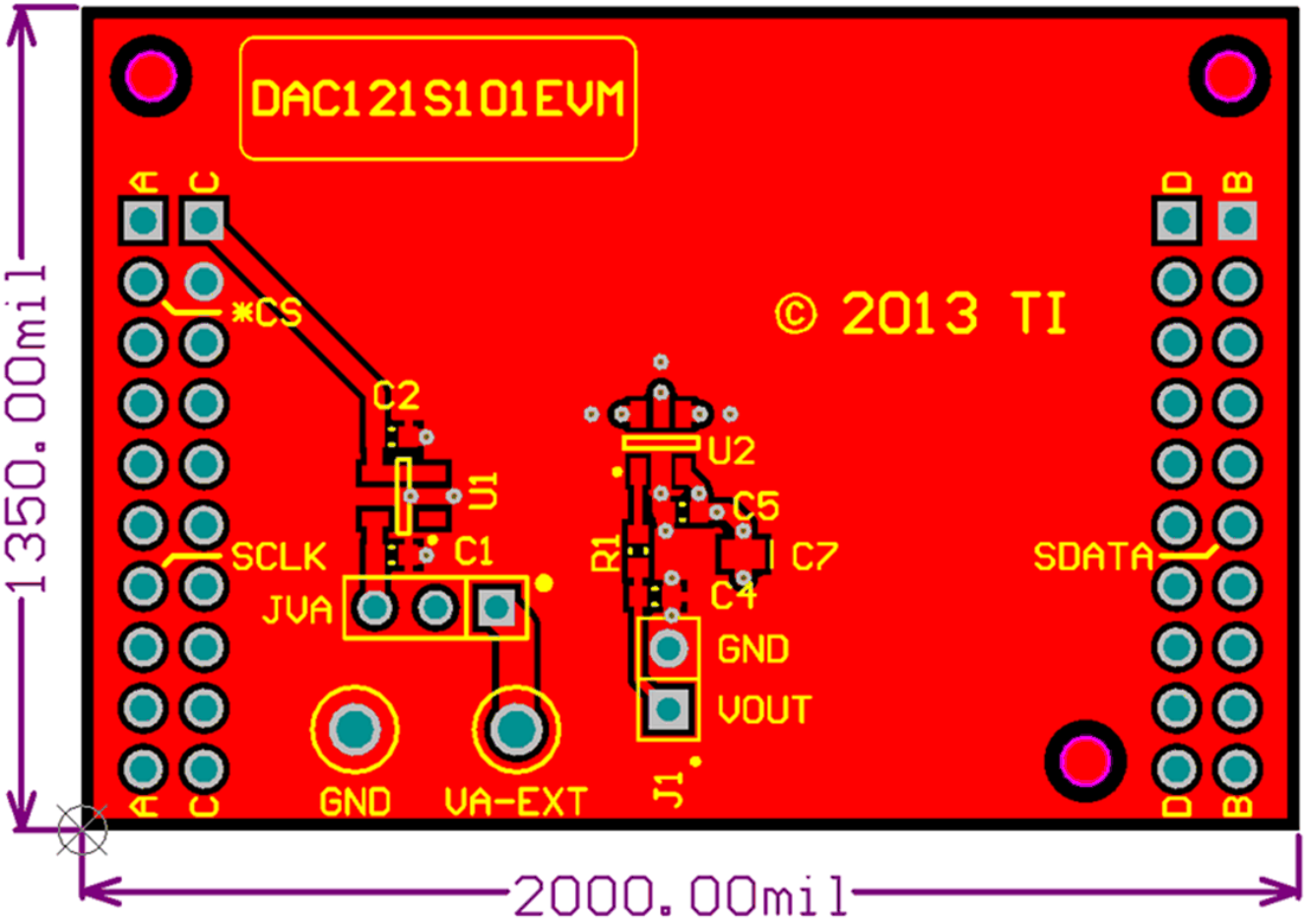


Figure 4-1. Top Assembly Layer

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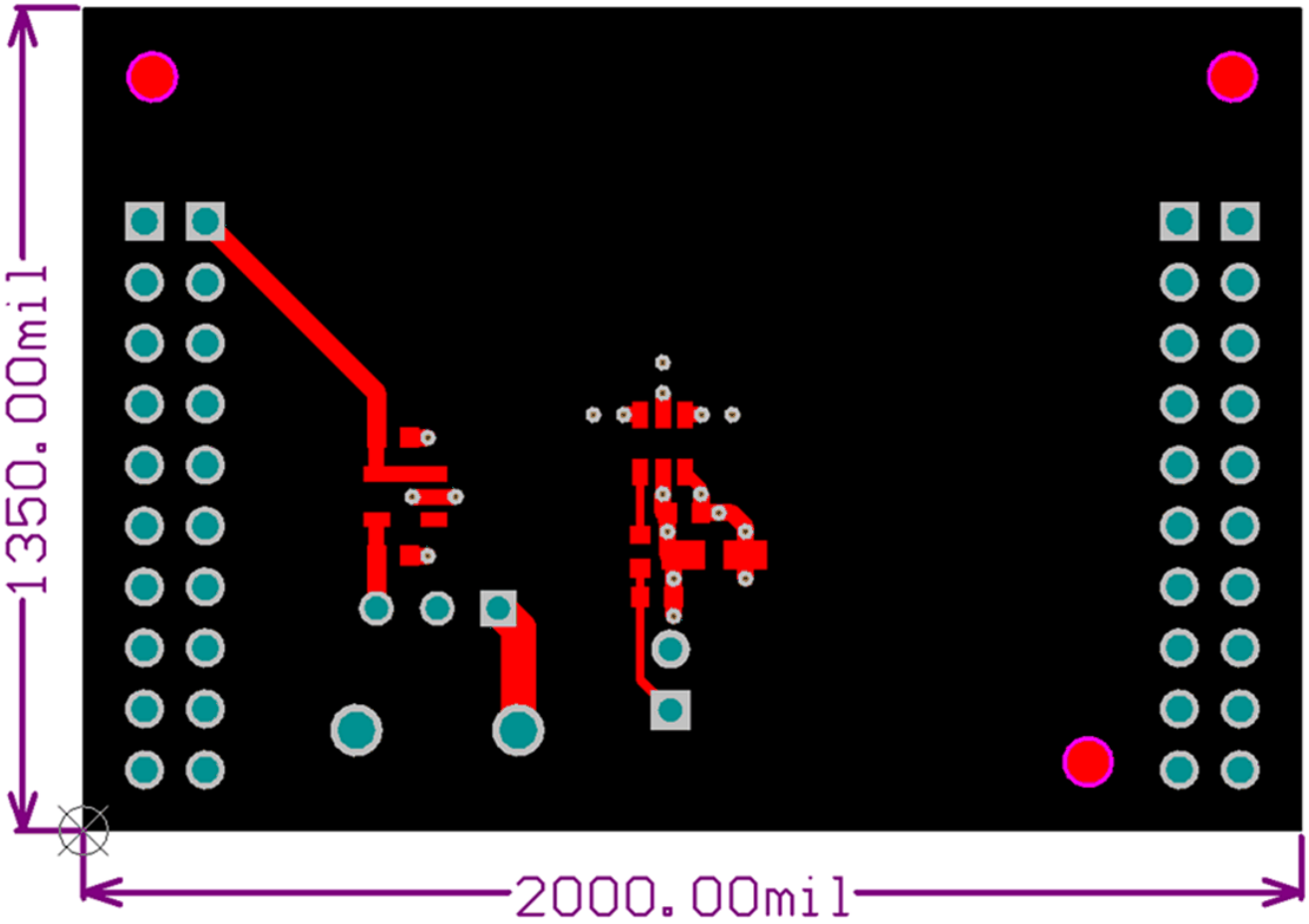


Figure 4-2. Top Layer Routing

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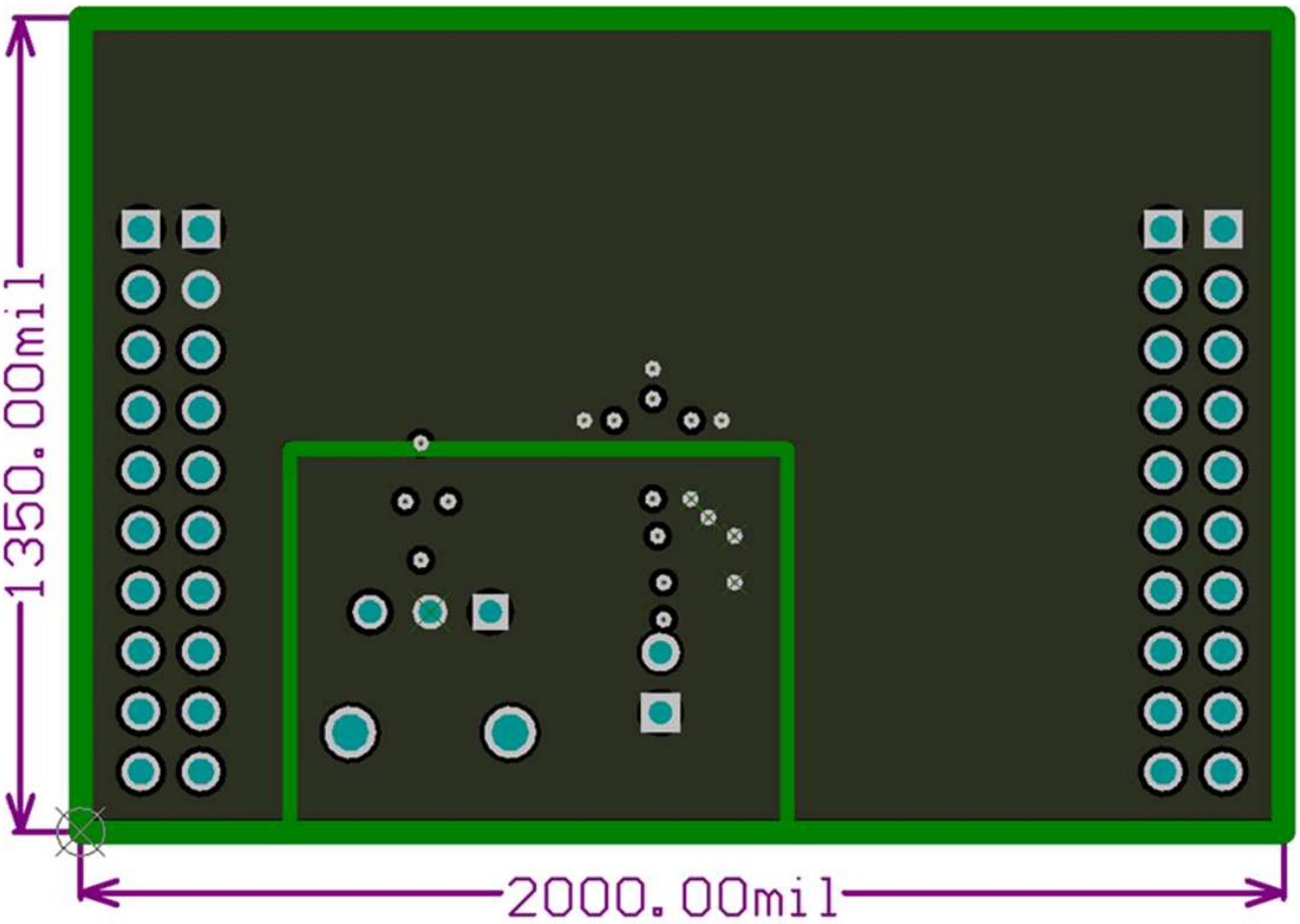


Figure 4-3. Power Layer Routing

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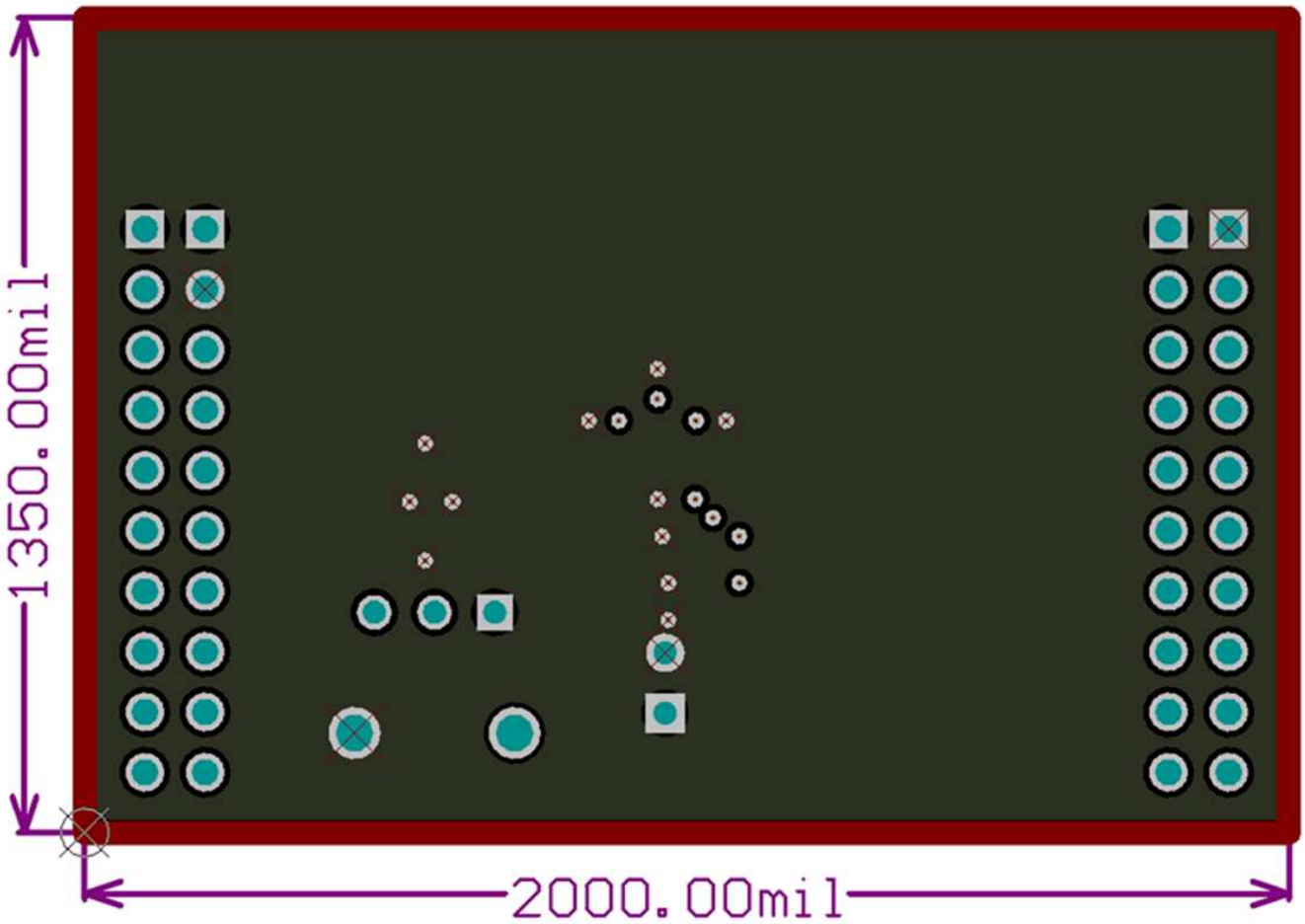


Figure 4-4. Ground Layer Routing

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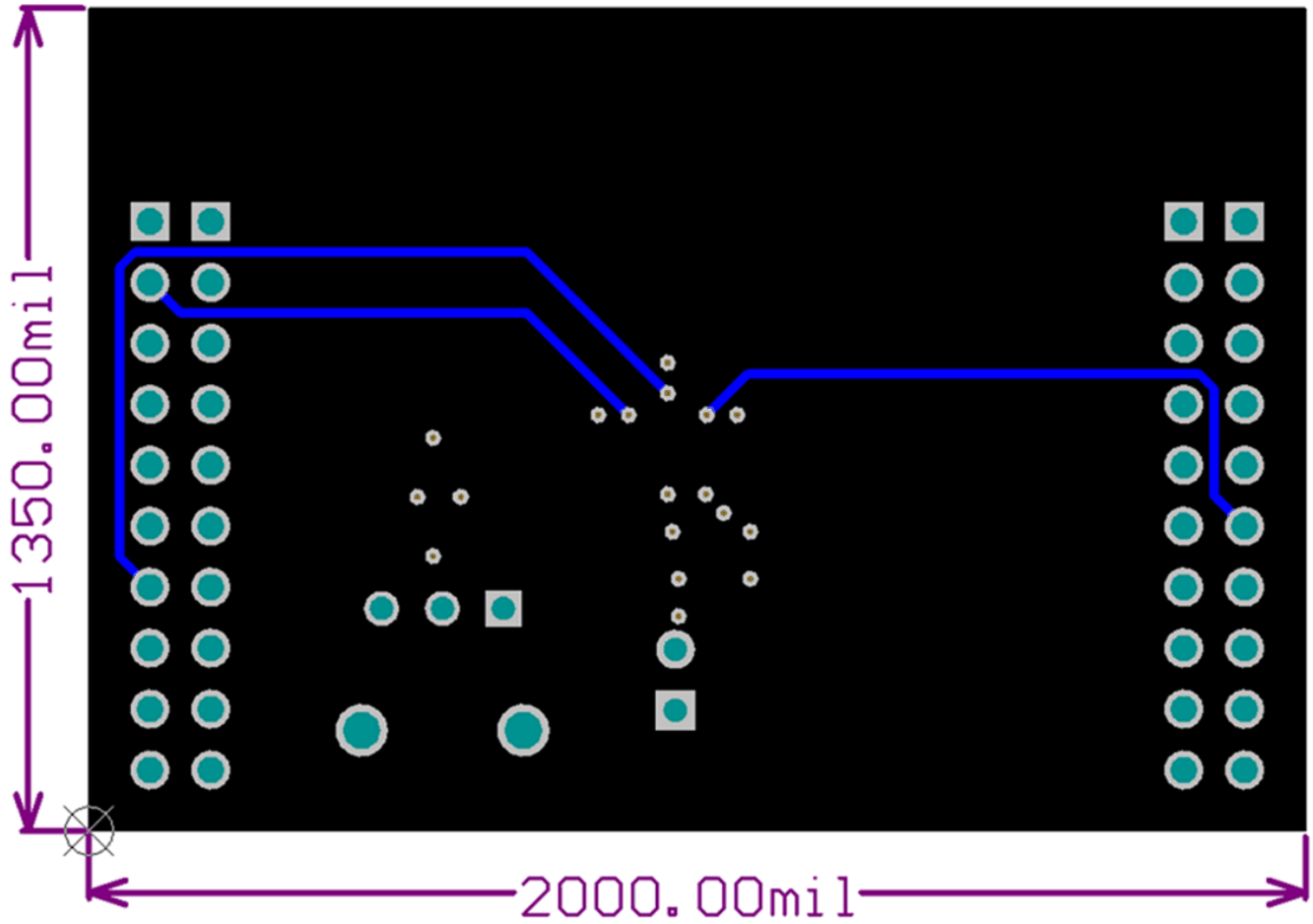


Figure 4-5. Bottom Layer Routing

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Schematic

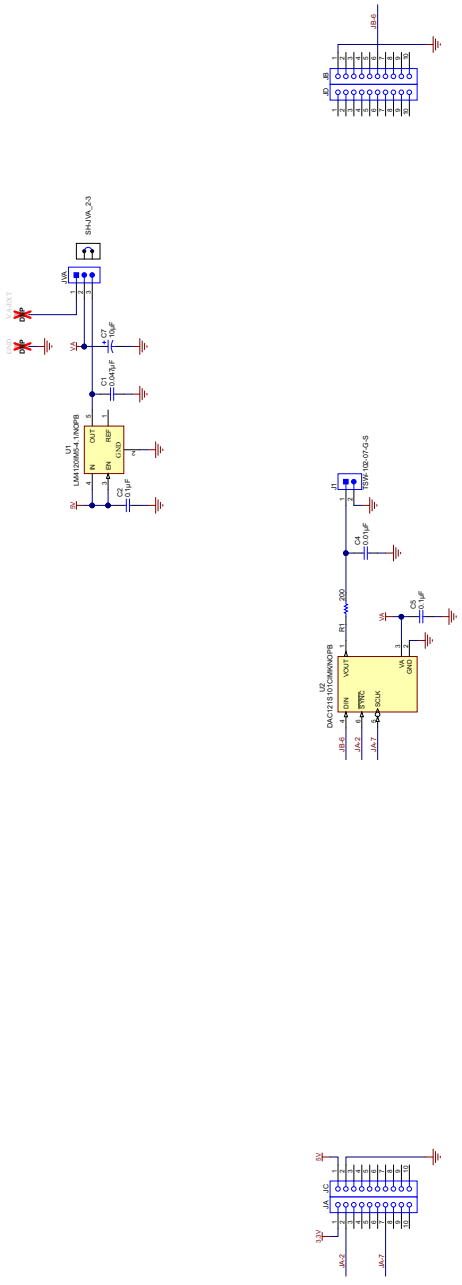


Figure 5-1. DAC121S101EVM Schematic

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Bill of Materials

Table 6-1. DAC121S101 Bill of Materials

Designator	Quantity	Value	Description	Part Number	Manufacturer
!PCB	1		Printed Circuit Board	SV601042	Any
C1	1	0.047µf	CAP, CERM, 0.047uF, 6.3V, +/-10%, X7R, 0603	GRM188R70J473KA01D	MuRata
C2, C5	2	0.1µF	CAP, CERM, 0.1uF, 10V, +/-10%, X7R, 0603	C0603C104K8RACTU	Kemet
C4	1	0.01µF	CAP, CERM, 0.01uF, 25V, +/-10%, X7R, 0603	GRM188R71E103KA01D	MuRata
C7	1	10µF	CAP, TA, 10uF, 10V, +/-10%, 0.9 ohm, SMD	TPSA106K010R0900	AVX
J1	1		Header, TH, 100mil, 2x1, Gold plated, 230 mil above insulator	TSW-102-07-G-S	Samtec
JA, JB, JC, JD	4		Connector, Receptacle, 100mil, 10x1, Gold plated, TH	SSW-110-23-F-S	Samtec
JVA	1		Header, 100mil, 3x1, Tin plated, TH	PEC03SAAN	Sullins Connector Solutions
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	THT-14-423-10	Brady
R1	1	200	RES, 200 ohm, 1%, 0.1W, 0603	CRCW0603200RFKEA	Vishay-Dale
SH-JVA_2-3	1	1×2	Shunt, 100mil, Gold plated, Black	382811-6	AMP
U1	1		Precision Micropower Low Dropout Voltage Reference, 5-pin SOT-23, Pb-Free	LM4120IM5-4.1/NOPB	Texas Instruments
U2	1		12-Bit Micro Power, RRO Digital-to-Analog Converter, 6-pin Tiny SOT23, Pb-Free	DAC121S101CIMK/NOPB	Texas Instruments
FID1, FID2, FID3	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A
GND	0	Black	Test Point, TH, Multipurpose, Black	5011	Keystone Electronics
VA-EXT	0	Red	Test Point, TH, Multipurpose, Red	5010	Keystone Electronics

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10. User has sole responsibility to ensure the safety of any activities to be conducted by it and its employees, affiliates, contractors or designees, with respect to handling and using EVMs. Further, user is responsible to ensure that any interfaces (electronic and/or mechanical) between EVMs 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.
11. User shall employ reasonable safeguards to ensure that user's use of EVMs will not result in any property damage, injury or death, even if EVMs should fail to perform as described or expected.
12. User shall be solely responsible for proper disposal and recycling of EVMs consistent with all applicable federal, state, and local requirements.

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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 could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

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 its own expense.

FCC Interference Statement for Class B EVM devices

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.

Industry Canada Compliance (English)

For EVMs Annotated as IC – INDUSTRY CANADA Compliant:

This Class A or B digital apparatus complies with Canadian ICES-003.

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

Concerning EVMs Including Radio Transmitters

This device complies with Industry Canada licence-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.

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.

Canada Industry Canada Compliance (French)

Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada

Les changements ou les modifications pas expressément approuvés par la partie responsable de la conformité ont pu vider l'autorité de l'utilisateur pour actionner l'équipement.

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.

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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EVMs entering Japan are NOT certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If user uses EVMs in 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.

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