EVM User's Guide: TMUXS7614DEVM

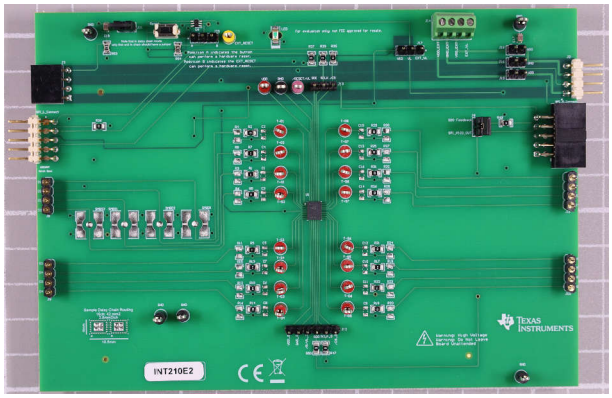
TMUXS7614D Evaluation Module

Description

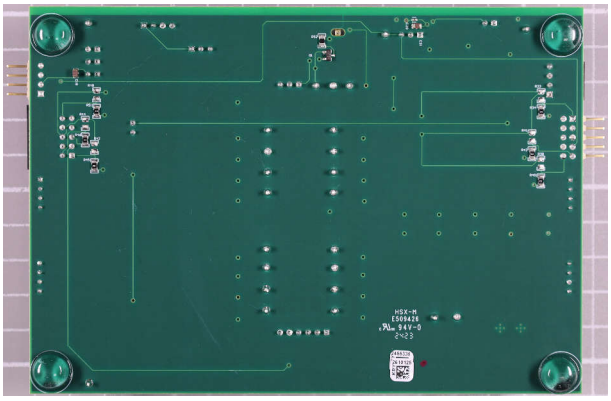
The TMUXS7614DEVM is used to evaluate the performance of the TMUXS7614D. The evaluation module (EVM) comes with the TMUXS7614D device soldered on. The EVM allows for engineers to easily evaluate the TMUXS7614D for applications, such as test and measurement. The TMUXS7614DEVM connects to a USB2ANY controller (ordered separately on ti.com) through the SPI_L_Connect header. Users can choose to use an SPI with this header if desired. Headers are also provided for each of the source and drain pins. Multiple terminals provide power to the device with an option for the user to provide a defined digital logic supply voltage. The digital logic supply voltage can be supplied from the USB2ANY as well.

Features

- TMUXS7614D pre-soldered on board
- 16 test points on I/Os
- Four SMB connectors
- LED indicator for VL supply
- Reset button
- External PC control in tandem with TI evaluation software
- SPI GUI



TMUXS7614DEVM (Top View)



TMUXS7614DEVM (Bottom View)

1 Evaluation Module Overview

1.1 Introduction

This user's guide describes the characteristics, operation, and recommended use cases of the TMUXS7614DEVM evaluation module (EVM) and the intended use. This board allows for the quick prototyping and characterization of TI's TMUXS7614D multiplexers in a 30-pin ZEM package. This EVM allows for evaluation of both the signal path and operating modes of the TMUXS7614D. Multiple boards can be connected to evaluate daisy chain operation. This document also includes schematics, printed circuit board (PCB) layouts, and a complete bill of materials (BOM).

1.2 Kit Contents

The EVM kit includes the following:

- TMUXS7614DEVM board

1.3 Specification

The EVM has two 10-pin headers denoted *SPI_L_Connect* and *SPI_R_Connect* for use with a SPI controller, such as USB2ANY available on ti.com. There are two more 4 pin headers denoted *J2* and *J3* to allow for connecting power to the device. All four of these headers are configured such that users can connect two or more EVMs in tandem for daisy chain mode. There is a reset button denoted *Reset* that allows for a manually hardware reset. The EVM has test points on each I/O for a total of sixteen total test points to support testing the TMUXS7614D.

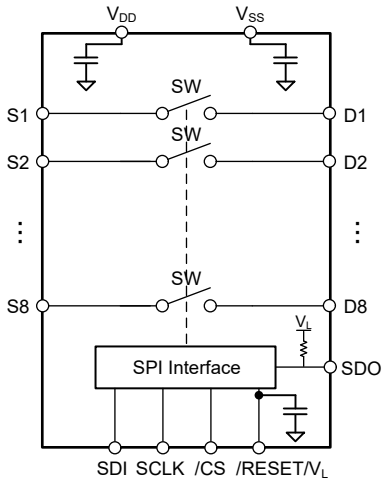


Figure 1-1. TMUXS7614D Block Diagram

1.4 Device Information

The TMUXS7614D is a complementary metal-oxide semiconductor (CMOS) switch device with eight independently selectable 1:1, single-pole, single-throw (SPST) switch channels. The device works with a single supply (4.5V to 42V), dual supplies (±4.5V to ±25V), or asymmetric supplies (such as VDD = 37.5V, VSS = –12V). The TMUXS7614D supports bidirectional analog and digital signals on the source (Sx) and drain (Dx) pins ranging from VSS to VDD. The switches of the TMUXS7614D are controlled with a serial peripheral interface (SPI). The SPI interface has many error detection features, such as CRC, invalid read/write, and clock count error detection. The SPI also supports daisy chain mode. Coupled with the flow through routing of the SPI pins, this allows for increased channel density in the system. The TMUXS7614D is a part of the precision switches and multiplexers family of devices and have very low on and off leakage currents allowing them to be used in high precision measurement applications.

2 Hardware

2.1 Power Requirements

The TMUXS7614DEVM requires a single supply (4.5V to 42V), dual supplies (±4.5V to ±25V), or asymmetric supplies (such as VDD = 37.5V, VSS = –12V) provided either through the J3/J2 terminals or J14 terminal. The VDD supply can also be provided directly to the VDD test point in the center of the board. The green LED acts as a power indicator for the digital supply VL. On revision 1 boards, this LED can only be powered by the 3.3V supply from the USB2ANY. On revision 2 boards, the LED can be powered by either the USB2ANY interface or an external source via the EXT_VL path.

CAUTION

Do not leave EVM powered when unattended.

2.2 Header and Jumper Information

The TMUXS7614DEVM has various headers that provide various points of functionality on the board. From left to right:

1. J8, J9, J10 and J11 provide a means of accessing signal paths for S1-S8 and D1-D8.
2. J20 allows users to place a jumper to choose whether hardware reset is performed by the reset button (position A) or by an outside source (position B). If position B is chosen, then the device resets when a rising pulse is applied to EXT_RESET.
3. J13 provides an interface to tap into the SDL, SCLK and /CS pins.
4. J17 allows you to place a jumper to choose whether VL is driven by the USB2ANY (VIO) or an external source (EXT_VL)
5. J6 allows users to place a jumper to control whether the SPI_PICO_Out signal path propagates onto another EVM or device. No jumper on J6 allows for read back via the SDO feedback signal path.
6. Place a jumper across J15, J16 and J18 to utilize the J14 power block.
7. J12 provides a block to interface with the VDD_D, GND_D, /RESET/VL_D, SDO, SCLK_D and /CS_D pins.

2.3 Push Buttons

The TMUXS7614D EVM provides a physical hardware reset button labeled *Reset*. Note that Revision 1 of the board only allows for the reset button to be utilized in a single EVM mode. Revision 2 allows for use of this hardware reset button in daisy chain mode.

2.4 Test Points

The board has a total of 27 test points. 4 SMB, 4 GND, 1 /RESET/VL, 1 VDD, 1 EXT_RESET and 16 I/O.

Test Point ID	Description	Signal
D1, D2, S1, S2	Surface Mount SMB	D1, D2, S1, S2
GND x4	Black	Ground
/RESET/VL	Purple	/RESET/VL
VDD	Red	VDD
EXT_RESET	Yellow	EXT_RESET
T-Sx/T-Dx x16	Red	S1-S8/D1-D8

3 Software

3.1 GUI Software Installation

1. *Software Download* - live software from dev.ti.comp. The live software currently works on Chrome®, Firefox®, and Safari® browsers. Internet Explorer® is not supported. Users can access the live version through the link a Texas Instruments' representative provides.
2. Click on the application icon within the gallery to launch the software. Click on the prompt to install the TI Cloud Agent Bridge browser plug-in.
3. *Offline Software* - users can access the latest version of the offline software by navigating to the live version as noted previously. Look for the download icon and download both the application and runtime for the operating system as shown in Figure 3-1.
4. To be able to use the GUI properly, a USB2ANY needs to be connected to the computer by the USB cable and connected to the EVM via the 10-pin cable. For more information about the USB2ANY, see the USB2ANY Interface Adapter User's Guide.
5. For the latest GUI version, download Version 1.0.1.

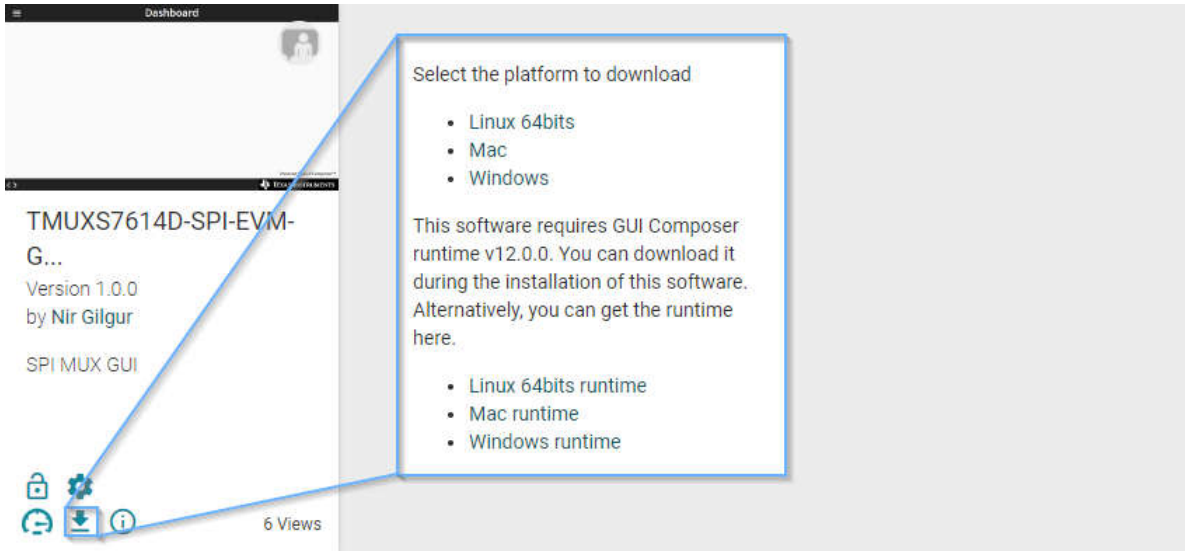


Figure 3-1. Download Icon for TMUX7614D-SPI-EVM GUI

3.2 GUI Software Quick Start

1. *Home Tab*
   a. The *Home* tab is displayed when launching the software. Connect the USB2ANY to the computer via a USB Cable. Make sure the USB2ANY is connected to the EVM with the cable inserted facing notch down to the EVM before using the GUI. If there is a successful connection, *Hardware connected* status will be shown at the bottom left corner of the GUI.

   b. The Home tab includes SPI signal controls using eight toggle switches. Click on the toggle switch to turn on or off the channels.
   c. Address mode turns on automatically when a switch is toggled. This mode can also turn on when the checkbox for Address mode is selected. Please note, when enabling Address mode by clicking on the checkbox, the first switch closes.
   d. The Home Tab also shows a couple of buttons. Sofware Reset and Clear Error Flags. The Sofware reset button writes two commands consecutively to the register 0x0B: 1. 0xA3 2. 0x05. Clear Error Falgs sends a 16-bit command 0x6CA9 to the TMUXS7614D.
   e. From the *Home* tab, the user can access the *Registers Map and Daisy Chain Mode* tabs. They are located on the top left side of the screen in the white tab bar. The Registers Map is symbolised by the

pencil picture and the Daisy Chain Tab is the paper sheet picture. They can be accessed by clicking on their symbol.

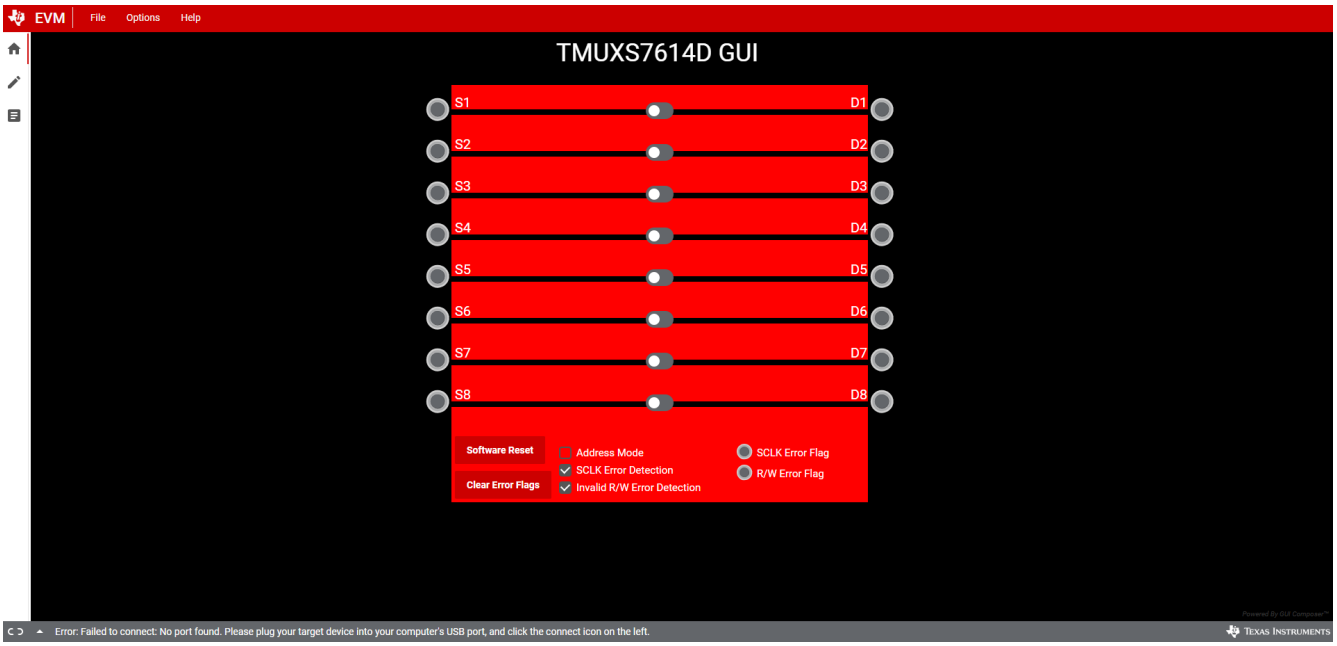


Figure 3-2. TMUXS7614D-SPI-EVM GUI Home Tab

2. *Registers Map Tab*
   a. The Register Map allows toggling the switches in address mode with a register viewpoint.
   b. During operation, the Register Map updates the states of the registers, while toggling the switches or triggering the error flags.
   c. In daisy chain mode, the Register Map is not practical.

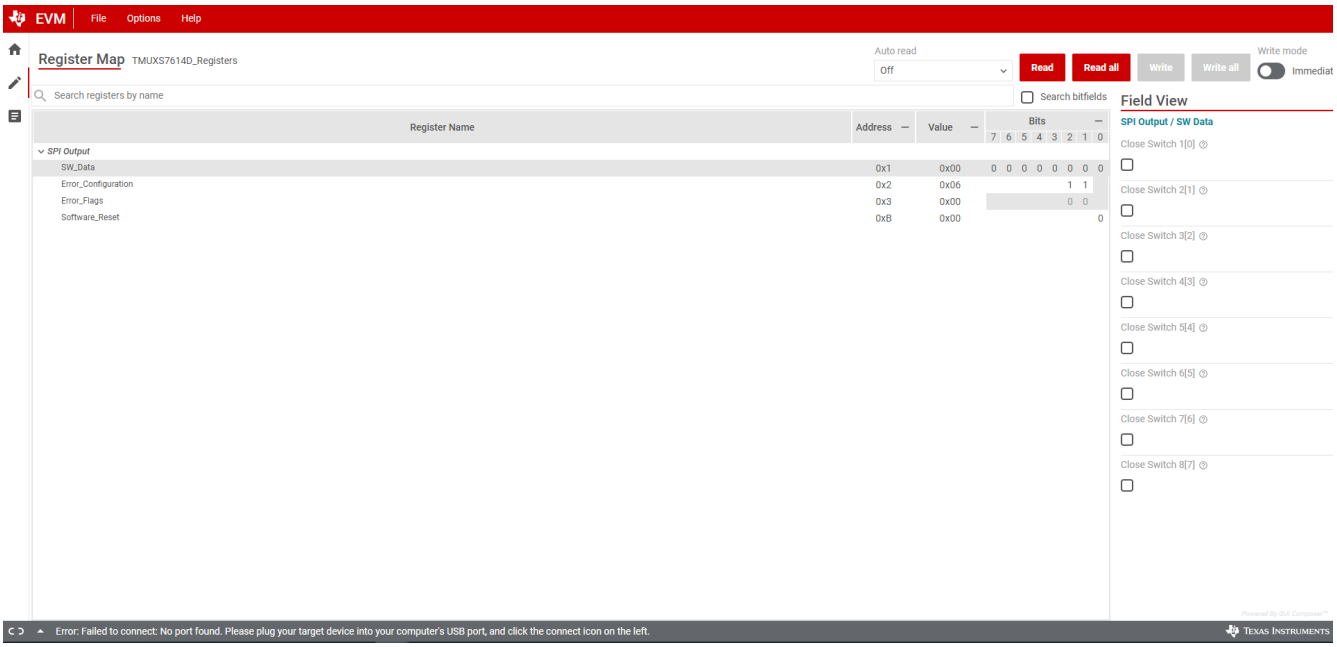


Figure 3-3. TMUXS7614D-SPI-EVM GUI Register Map Tab

3. *Daisy Chain Mode Tab*
   a. Make sure you turn off auto read in the register map tab first before enabling Daisy Chain Mode.
   b. To enbale daisy chain click on the "Enable Daisy Chain" button.
   c. The user can select how many devices they want to control on their chain, by selecting the amount using the drop down bar.
   d. To toggle the switches of the devices in the chain, the user can check the box correlated to the switch they want to close or open.

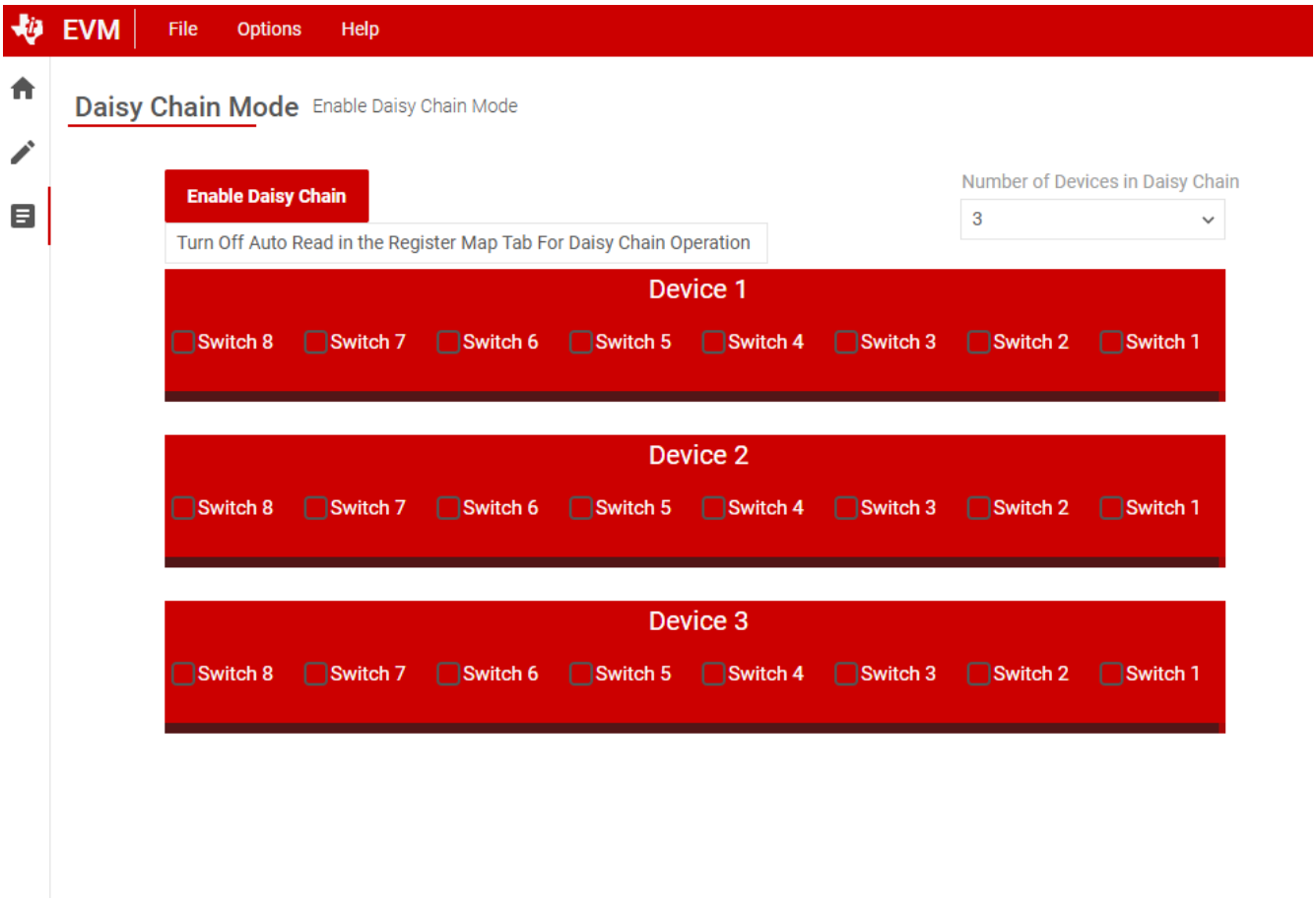


Figure 3-4. TMUXS7614D-SPI-EVM GUI Daisy Chain Tab

4 Hardware Design Files

4.1 Schematics

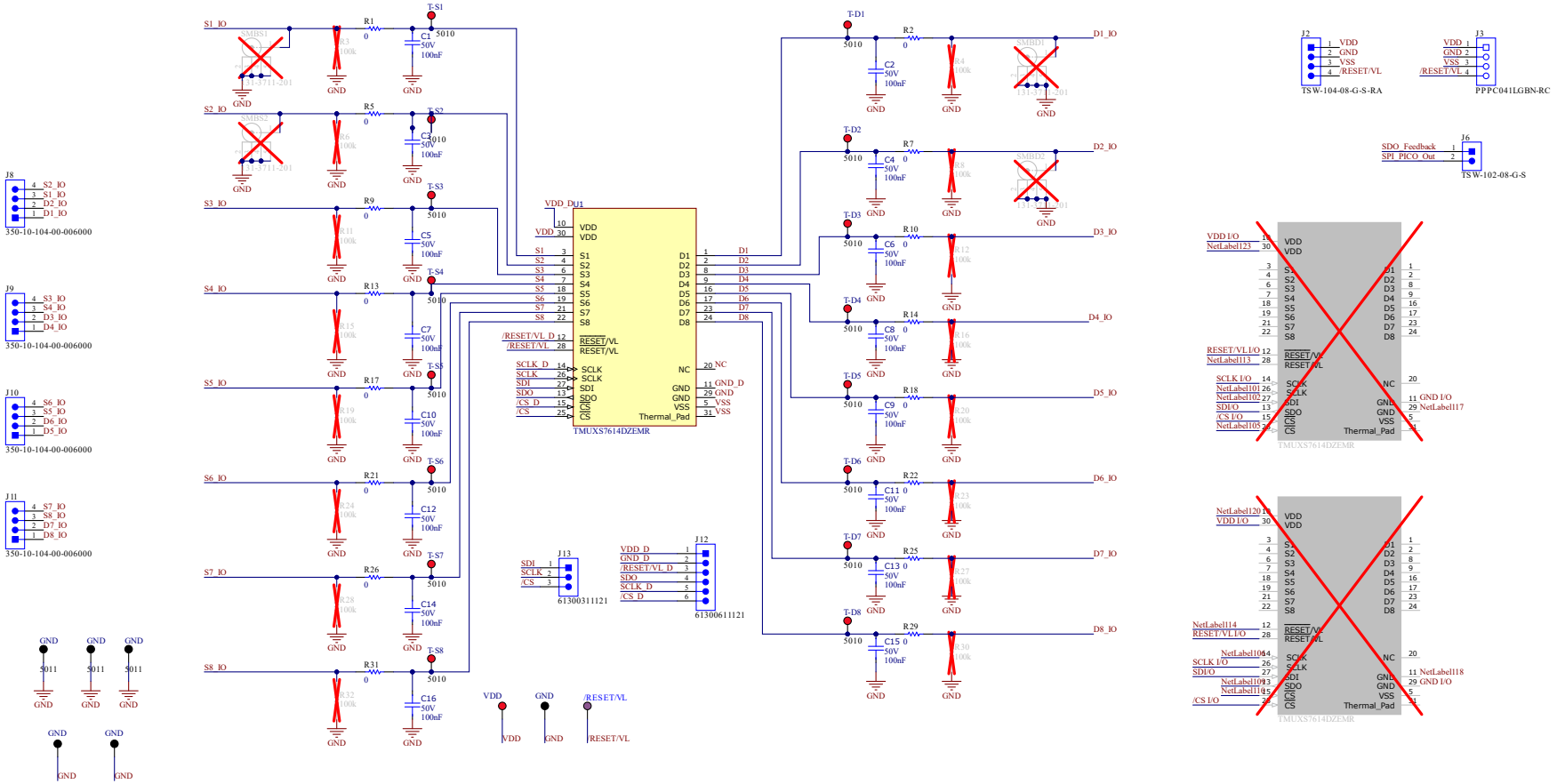


Figure 4-1. TMUXS7614DEVM Schematic Page 1

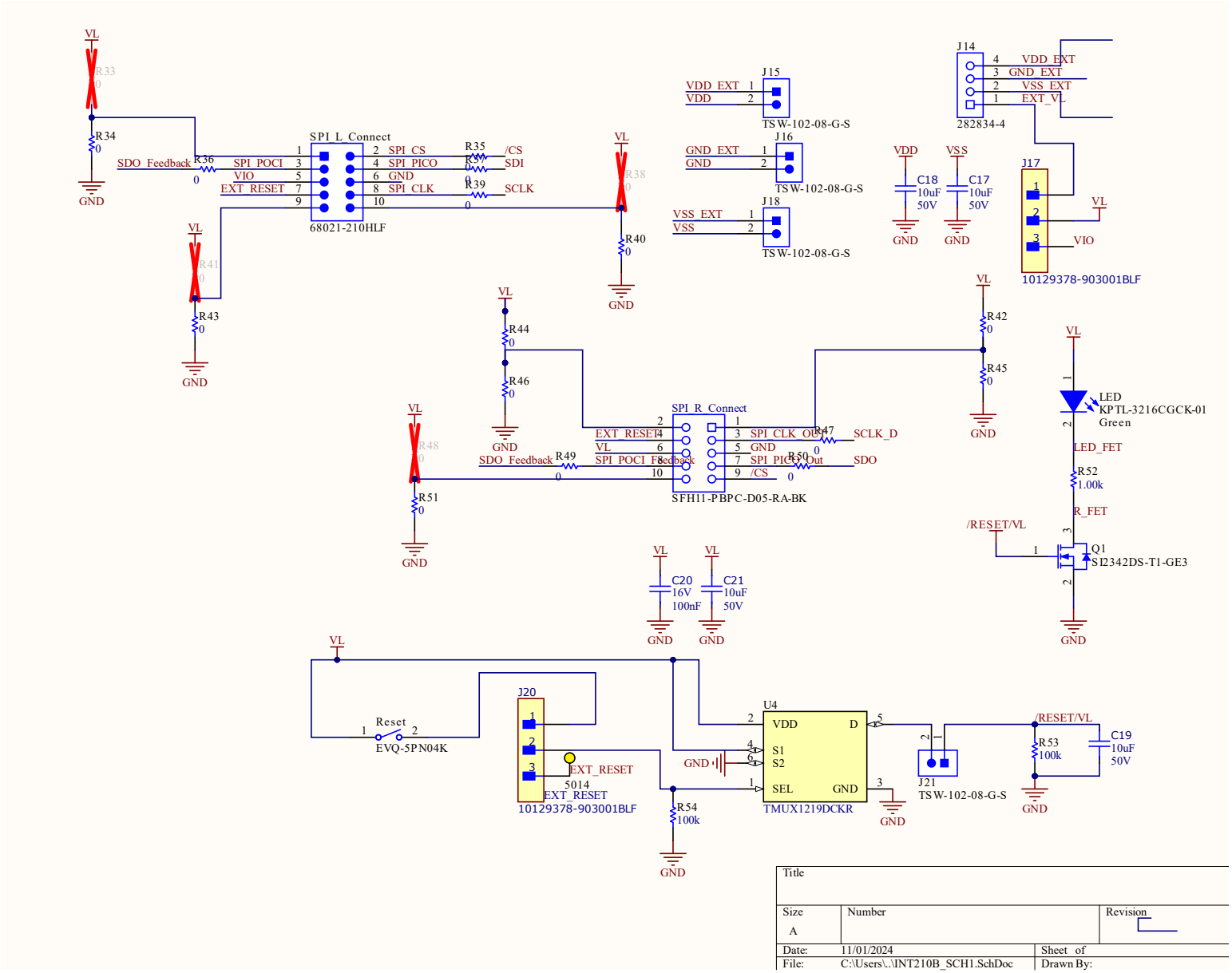


Figure 4-2. TMUXS7614DEVM Schematic Page 2

4.2 PCB Layouts

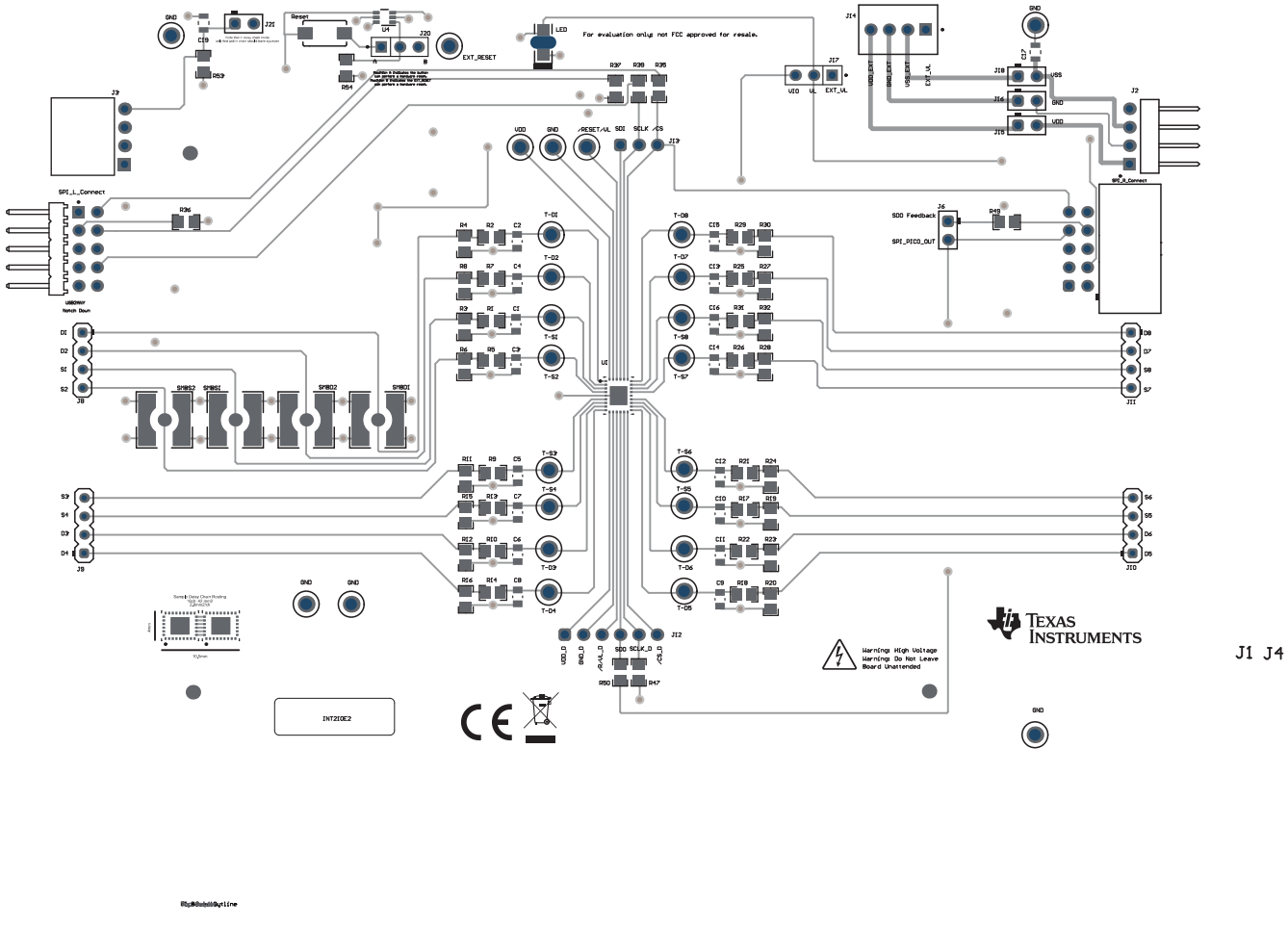


Figure 4-3. TMUXS7614DEVM Top Layer Layout

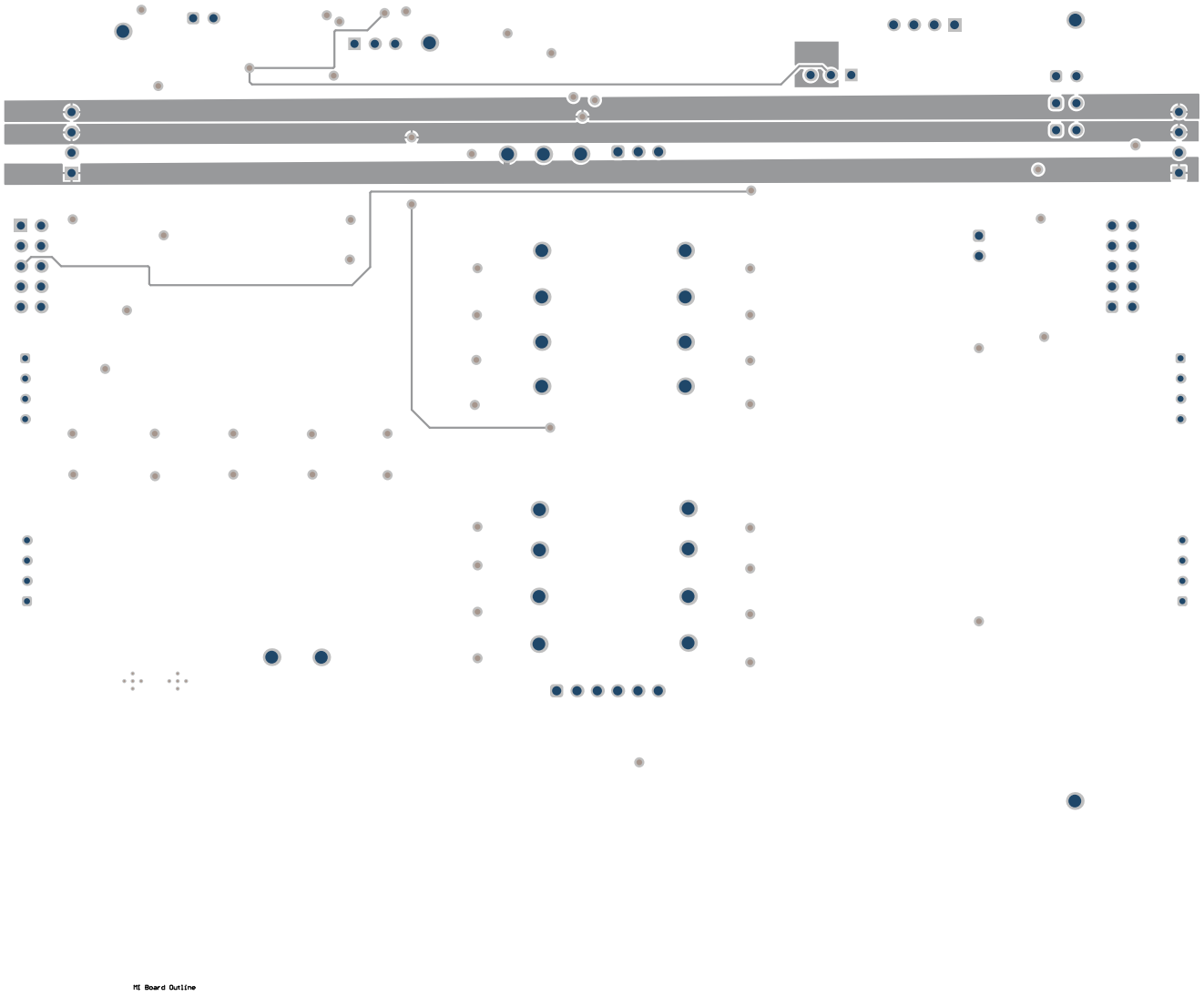


Figure 4-4. TMUXS7614DEVM Power Layer Layout

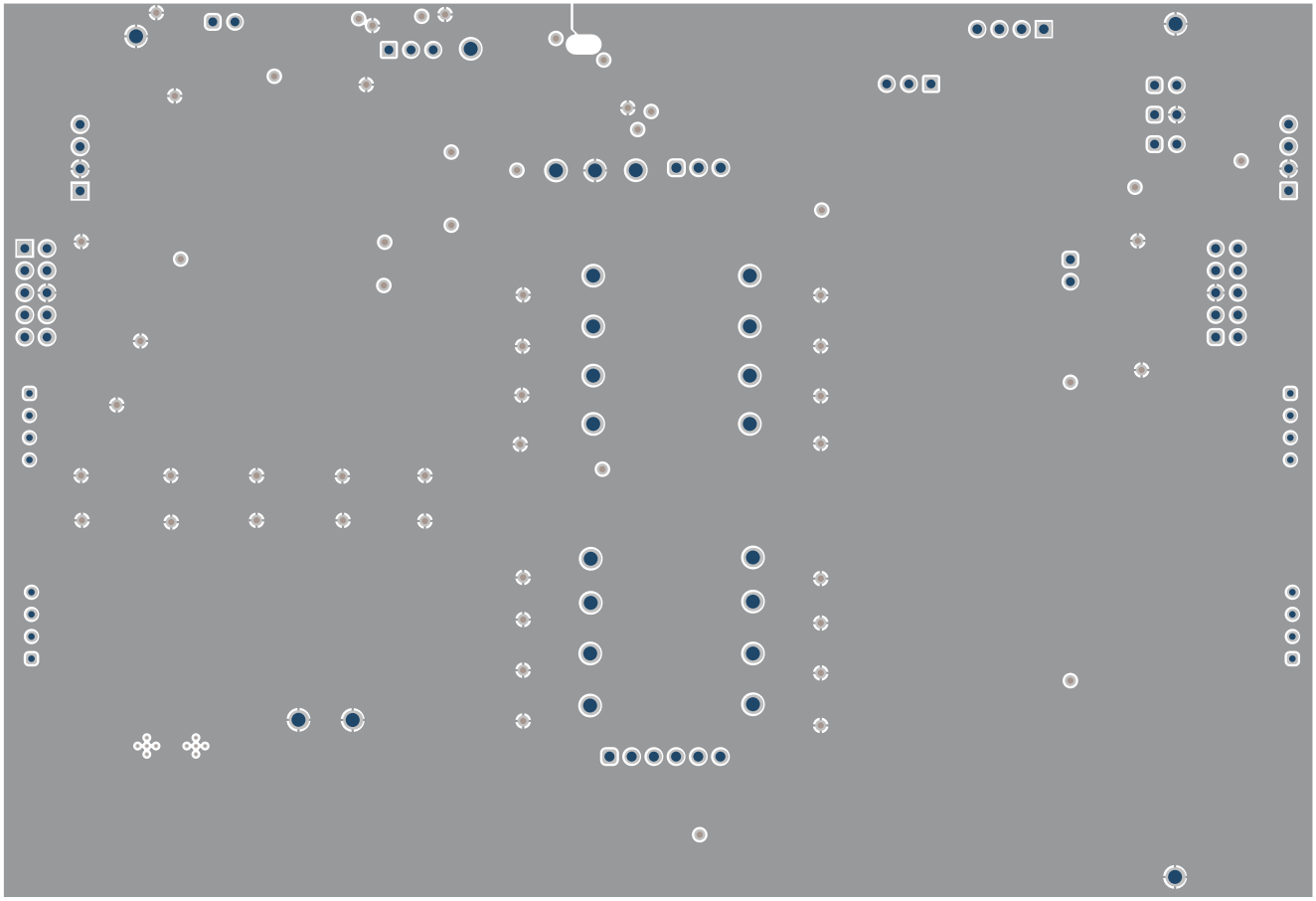


Figure 4-5. TMUXS7614DEVM Ground Layer Layout

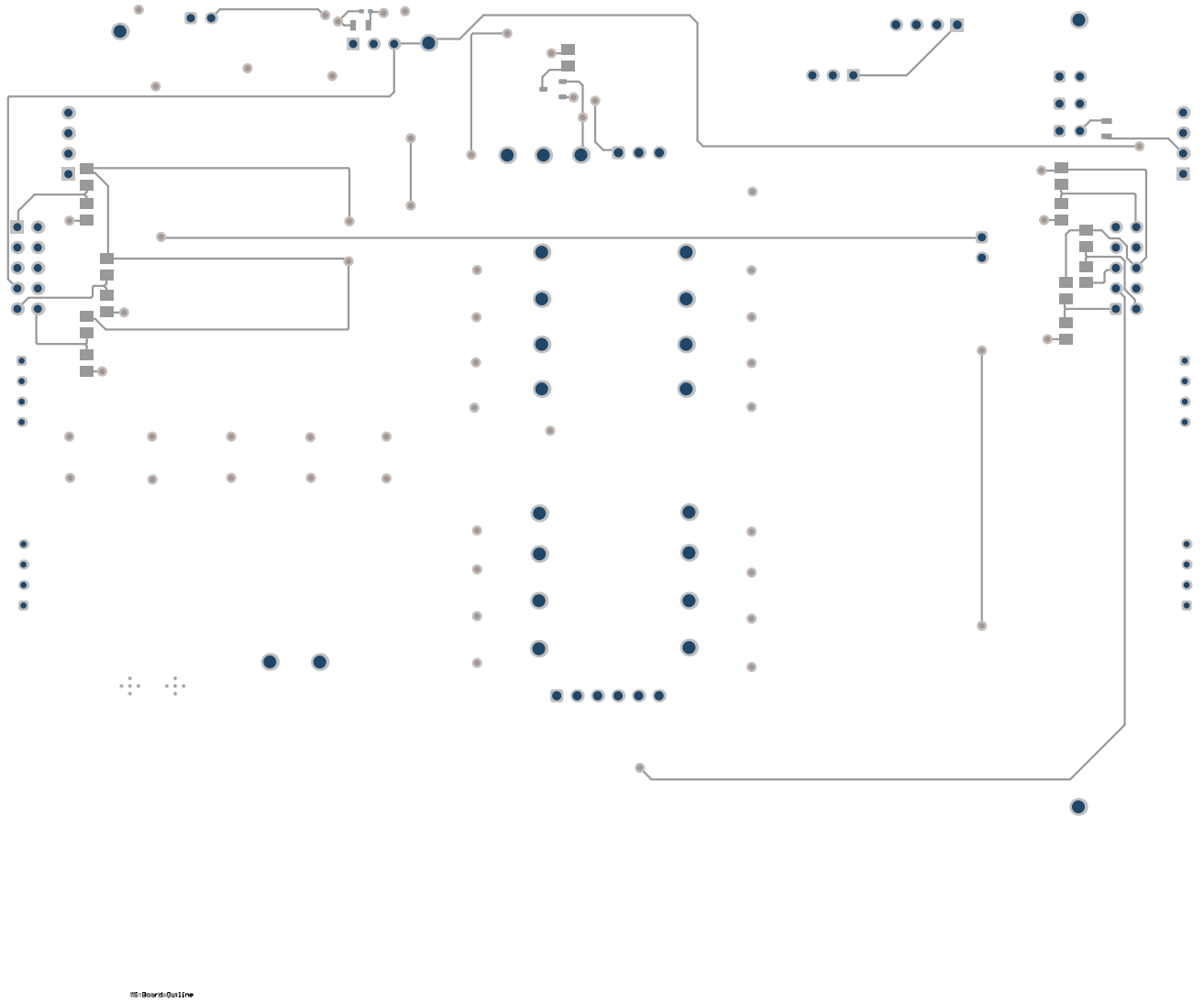


Figure 4-6. TMUXS7614DEVM Bottom Layer Layout

4.3 Bill of Materials (BOM)

Table 4-1. Bill of Materials

/RESET/VL	1		Test Point, Multipurpose, Purple, TH	Purple Multipurpose Testpoint	5129	Keystone Electronics
C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16	16	100nF	0.1µF ±10% 50V Ceramic Capacitor X7R 0805 (2012 Metric)	0805	8.85012E+11	Würth Elektronik
C17, C18, C19, C21	4	10µF	Chip Multilayer Ceramic Capacitors for General Purpose, 0805, 10uF, X5R, 15%, 20%, 50V	0805	GRM21BR61H106ME43L	Murata
C20	1	100nF	0.1µF ±10% 16V Ceramic Capacitor X7R 0402 (1005 Metric)	0402	0402YC104KAT2A	KYOCERA AVX
EXT_RESET	1		Test Point, Multipurpose, Yellow, TH	Yellow Multipurpose Testpoint	5014	Keystone Electronics
GND	6		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone Electronics
H1, H2, H3, H4	4		Bumpon, Hemisphere, 0.44 X 0.20, Clear	Transparent Bumpon	SJ-5303 (CLEAR)	3M
INT210E2	1		Thermal Transfer Printable Labels, 0.650W x 0.200H - 10,000 per roll	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady
J1, J4	2		2 (1 x 2) Position Shunt Connector Black Open Top, Grip 0.100" (2.54mm) Gold	PLASTIC_SHUNT_CONN	6.09002E+11	Wurth Electronics
J2	1		Header, 100mil, 4x1, Gold, R/A, TH	4x1 R/A Header	TSW-104-08-G-S-RA	Samtec
J3	1		Receptacle, 100mil, 4x1, Gold, R/A, TH	10.66x3.15x8.5mm	PPPC041LGBN-RC	Sullins Connector Solutions
J6, J15,J16, J18, J21	5		Header, 2.54mm, 2x1, Gold, TH	Header, 2.54mm, 2x1, TH	TSW-102-08-G-S	Samtec
J8, J9, J10, J11	4		Header, 2.54mm, 4x1, Gold, TH	Header, 2.54mm, 4x1, TH	350-10-104-00-006000	Mill-Max
J12	1		Header, 2.54mm, 6x1, Gold, TH	Header, 2.54mm, 6x1, TH	61300611121	Wurth Elektronik
J13	1		Header, 2.54mm, 3x1, Gold, TH	Header, 2.54mm, 3x1, TH	61300311121	Wurth Elektronik
J14	1		Terminal Block, 100mil, 4X1 TH	10.62 x 10 x 6.5mm	282834-4	TE Connectivity

Table 4-1. Bill of Materials (continued)

/RESET/VL	1		Test Point, Multipurpose, Purple, TH	Purple Multipurpose Testpoint	5129	Keystone Electronics
J17, J20	2		Connector Header Through Hole 3 position 0.100" (2.54mm)	HDR3	10129378-903001BLF	Amphenol ICC
LED	1	Green	LED, Green, SMD	3. 2 x 1.6mm	KPTL-3216CGCK-01	Kingbright
Q1	1	8V	MOSFET, N-CH, 8V, 6A, SOT-23	SOT-23	SI2342DS-T1-GE3	Vishay-Semiconductor
R1, R2, R5, R7, R9, R10, R13, R14, R17, R18, R21, R22, R25, R26, R29, R31, R34, R35, R36, R37, R39, R40, R42, R43, R44, R45, R46, R47, R49, R50, R51	31	0	RES, 0, 5%, 0.125W, 0805	0805	RC0805JR-070RL	Yageo America
R52	1	1.00k	RES, 1.00 k, 0.1%, 0.125W, 0805	0805	RT0805BRD071KL	Yageo America
R53, R54	2	100k	RES, 100 k, 0.1%, 0.125W, 0805	0805	RT0805BRD07100KL	Yageo America
Reset	1		Switch, SPST-NO, Off-Mom, 0.05A, 12 VDC, SMD	6 x 3.5mm	EVQ-5PN04K	Panasonic
SPI_L_Con nect	1		Header, 100mil, 5x2, R/A, Gold, TH	Header, 100mil, 5x2, R/A, TH	68021-210HLF	FCI
SPI_R_Con nect	1		Receptacle, 2.54mm, 5x2, Gold, R/A, TH	Receptacle, 2.54mm, 5x2, R/A, TH	SFH11-PBPC-D05-RA-BK	Sullins Connector Solutions
T-D1, T-D2, T-D3, T-D4, T-D5, T-D6, T-D7, T-D8, T-S1, T-S2, T-S3, T-S4, T-S5, T-S6, T-S7, T-S8, VDD	17		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone Electronics
U1	1		42V, SPI Enabled, Low-RON, 1:1 (SPST), 8-Channel Precision Switches with 1.8V Logic	FCLGA30	TMUXS7614DZEMR	Texas Instruments
	0		42V, SPI Enabled, Low-RON, 1:1 (SPST), 8-Channel Precision Switches with 1.8V Logic	FCLGA30	TMUXS7614DZEMR	Texas Instruments
	0		42V, SPI Enabled, Low-RON, 1:1 (SPST), 8-Channel Precision Switches with 1.8V Logic	FCLGA30	TMUXS7614DZEMR	Texas Instruments

Table 4-1. Bill of Materials (continued)

/RESET/VL	1		Test Point, Multipurpose, Purple, TH	Purple Multipurpose Testpoint	5129	Keystone Electronics
FID1, FID2, FID3	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
R3, R4, R6, R8, R11, R12, R15, R16, R19, R20, R23, R24, R27, R28, R30, R32	0	100k	RES, 100 k, 0.1%, 0.125 W, 0805	0805	RT0805BRD07100KL	Yageo America
R33, R38, R41, R48	0	0	RES, 0, 5%, 0.125 W, 0805	0805	RC0805JR-070RL	Yageo America
SMBD1, SMBD2,SMBS1,SMBS2	0		Connector, SMT, SMB Jack Assembly 50ohm	Connector, SMT, SMB Jack Assembly	131-3711-201	Cinch Connectivity

5 Additional Information

5.1 Trademarks

Chrome® is a registered trademark of Google LLC.
Firefox® is a registered trademark of Mozilla Foundation.
Safari® is a registered trademark of Apple Inc.
Internet Explorer® is a registered trademark of Microsoft Corporation.
All trademarks are the property of their respective owners.

6 Revision History

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

Changes from Revision A (December 2024) to Revision B (April 2025)	Page
• Added "For the latest GUI version, download Version 1.0.1."	4
• Updated *Registers Map Tab* information	4
• Updated Figure 3-2, Figure 3-3, Figure 3-4	4

Changes from Revision * (May 2024) to Revision A (December 2024)	Page
• Updated hardware images	1
• Updated schematic	7
• Updated layouts	9
• Updated Bill of Materials table	13

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 DEGREDATION 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/lsds/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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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。

上記を遵守頂けない場合は、電波法の罰則が適用される可能性があることをご留意ください。 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 2 4 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。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.

6. *Disclaimers:*

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.

6.2 EXCEPT FOR THE LIMITED RIGHT TO USE THE EVM SET FORTH HEREIN, NOTHING IN THESE TERMS SHALL BE CONSTRUED AS GRANTING OR CONFERRING ANY RIGHTS BY LICENSE, PATENT, OR ANY OTHER INDUSTRIAL OR INTELLECTUAL PROPERTY RIGHT OF TI, ITS SUPPLIERS/LICENSORS OR ANY OTHER THIRD PARTY, TO USE THE EVM IN ANY FINISHED END-USER OR READY-TO-USE FINAL PRODUCT, OR FOR ANY INVENTION, DISCOVERY OR IMPROVEMENT, REGARDLESS OF WHEN MADE, CONCEIVED OR ACQUIRED.

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. 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.

8. *Limitations on Damages and Liability:*

   8.1 *General Limitations*. IN NO EVENT SHALL TI BE LIABLE FOR ANY SPECIAL, COLLATERAL, INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES IN CONNECTION WITH OR ARISING OUT OF THESE TERMS OR THE USE OF THE EVMS , REGARDLESS OF WHETHER TI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. EXCLUDED DAMAGES INCLUDE, BUT ARE NOT LIMITED TO, COST OF REMOVAL OR REINSTALLATION, ANCILLARY COSTS TO THE PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, RETESTING, OUTSIDE COMPUTER TIME, LABOR COSTS, LOSS OF GOODWILL, LOSS OF PROFITS, LOSS OF SAVINGS, LOSS OF USE, LOSS OF DATA, OR BUSINESS INTERRUPTION. NO CLAIM, SUIT OR ACTION SHALL BE BROUGHT AGAINST TI MORE THAN TWELVE (12) MONTHS AFTER THE EVENT THAT GAVE RISE TO THE CAUSE OF ACTION HAS OCCURRED.

   8.2 *Specific Limitations.* IN NO EVENT SHALL TI'S AGGREGATE LIABILITY FROM ANY USE OF AN EVM PROVIDED HEREUNDER, INCLUDING FROM ANY WARRANTY, INDEMITY OR OTHER OBLIGATION ARISING OUT OF OR IN CONNECTION WITH THESE TERMS, , EXCEED THE TOTAL AMOUNT PAID TO TI BY USER FOR THE PARTICULAR EVM(S) AT ISSUE DURING THE PRIOR TWELVE (12) MONTHS WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED. THE EXISTENCE OF MORE THAN ONE CLAIM SHALL NOT ENLARGE OR EXTEND THIS LIMIT.

9. *Return Policy.* Except as otherwise provided, TI does not offer any refunds, returns, or exchanges. Furthermore, no return of EVM(s) will be accepted if the package has been opened and no return of the EVM(s) will be accepted if they are damaged or otherwise not in a resalable condition. If User feels it has been incorrectly charged for the EVM(s) it ordered or that delivery violates the applicable order, User should contact TI. All refunds will be made in full within thirty (30) working days from the return of the components(s), excluding any postage or packaging costs.

10. *Governing Law:* These terms and conditions shall be governed by and interpreted in accordance with the laws of the State of Texas, without reference to conflict-of-laws principles. User agrees that non-exclusive jurisdiction for any dispute arising out of or relating to these terms and conditions lies within courts located in the State of Texas and consents to venue in Dallas County, Texas. Notwithstanding the foregoing, any judgment may be enforced in any United States or foreign court, and TI may seek injunctive relief in any United States or foreign court.

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