TAS5766MRMTEVM

This user's guide describes the operation of the TAS5766MRMTEVM. The TAS5766MRMTEVM is connected to the PurePath™ Console Motherboard (PPCMB). For questions and support go to the E2E forums (e2e.ti.com). The main contents of this document are:

- Hardware descriptions and implementation
- Start up procedure using PurePath Console (PPC) software with TAS5766M plug-in

Related documents:

- TAS5766M Data Sheet (SLAS965)
- *PurePath Console Motherboard User's Guide* (SLOU366)
- PurePath Graphic Development Suite (PurePath Console)

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1 Hardware Overview

The TAS5766MRMTEVM showcases the latest TI digital input class D closed loop amplifier. The TAS5766MRMT is an I2S or TDM input class D amplifier with PurePath Smart Amp. The EVM is used in conjunction with the PurePath Console Motherboard (PPCMB). The PVDD supply is provided via the TAS5766MRMTEVM and is regulated to 5 VDC and 3.3 VDC on the PPCMB. The PPCMB provides the I2S, I2C and 3.3 VDC to the TAS5766MRMTEVM.

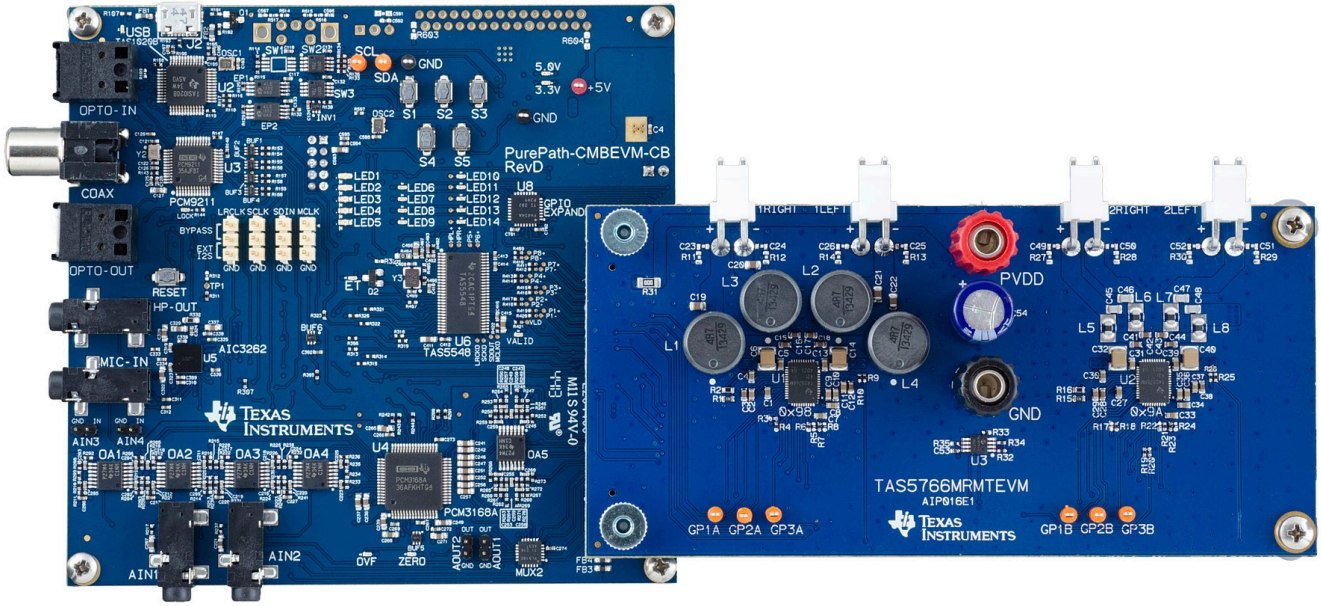

Figure 1. PPCMB and TAS5766MRMTEVM

1.1 *TAS5766MRMTEVM Features*

- GUI control via USB port
- Dual stereo channels or 2.1 system with I2S input or TDM

1.2 TAS5766MRMTEVM Functions

The TAS5766MRMTEVM is controlled by the PPCMB. The PPCMB sends I2C commands from PPC to the TAS5766M. Upon PPC execution and connection, the TAS5766M is put in software mode.

The digital audio data input to the TAS5766MRMTEVM is sent from PPCMB and is selectable from USB audio, optical SPDIF, coaxial SPDIF, and analog ADC sources. When a digital audio data input is selected, the PPC automatically sends appropriate scripts to the device in use.

1.3 TAS5766MRMTEVM Detailed Operations

Upon power-on, the PPCMB uses USB audio input (default). The I2S signals, LRCLK, SCLK, SDIN, and MCLK, come from the TAS1020B. Microsoft® Windows Media® Player can stream audio. The TAS1020B enumerates as the following device on the Microsoft® Windows® operating system: USB audio (USB-AudioEVM), human interface devices and USB composite device, see Figure 2.

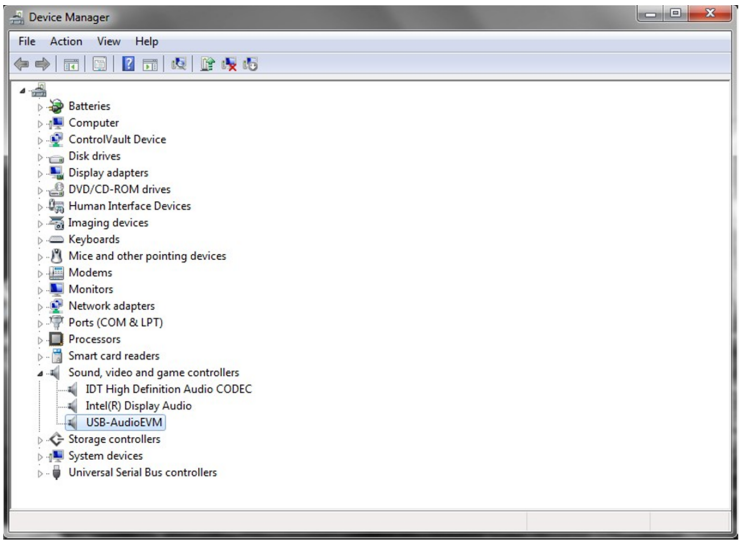

Figure 2. Device Manager

2 TAS5766MRMTEVM Setup

This section describes the TAS5766MRMTEVM setup and software installation. Since PPCMB connects to one of the device under test (DUT) EVMs, it is necessary to show the connection in this section. The TAS5766MRMTEVM is used for this purpose.

2.1 TAS5766MRMTEVM Setup

Figure 3 shows the EVM with the parts labeled.

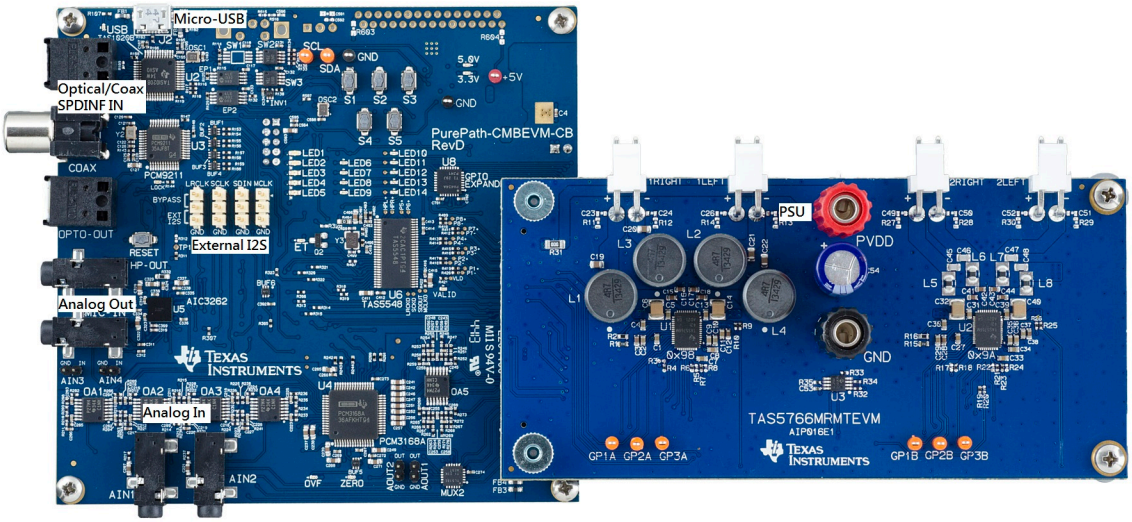

Figure 3. PPCMB and TAS5766MRMTEVM Connection

Hardware requirements:

- Desktop or laptop PC running either Windows XP or Windows 7
- Power supply 7–26 VDC
- Speakers and cable
- A USB micro type B cable
- Audio source: This can be a DVD player with the appropriate SPDIF cable or Windows Media Player from Windows XP or Windows 7

Setup procedure:

- Plug in the USB cable from the PC to the PPCMB; the USB Lock LED (blue) is illuminated
- Connect the PPCMB to the TAS5766MRMTEVM
- Connect the PSU to TAS5766MRMTEVM and turn on the power. 5-V and 3.3-V LEDs are illuminated.
- If an optical SPDIF source is used, the blue SPDIF clock-locked LED is illuminated
- Disregard the orange LED indicating the energy threshold (ET) level is exceeded. Clearing the ET value turns the orange LED off.

2.2 Software Installation

Download the PurePath Console (PPC) GUI from the PurePath Console folder. The TI website has the latest release of the GUI.

Execute the GUI installation program, Setup_PurePathConsole_Main_v**xx**_rev**xx**.exe. Once the program is installed, the program group and shortcut icon is created in Start → Program → Texas Instruments Inc → PurePath Console → Choose Target. The *Target Selection* window is displayed; select *TAS5766 - Dual Smart Amplifier*, as shown in Figure 4.

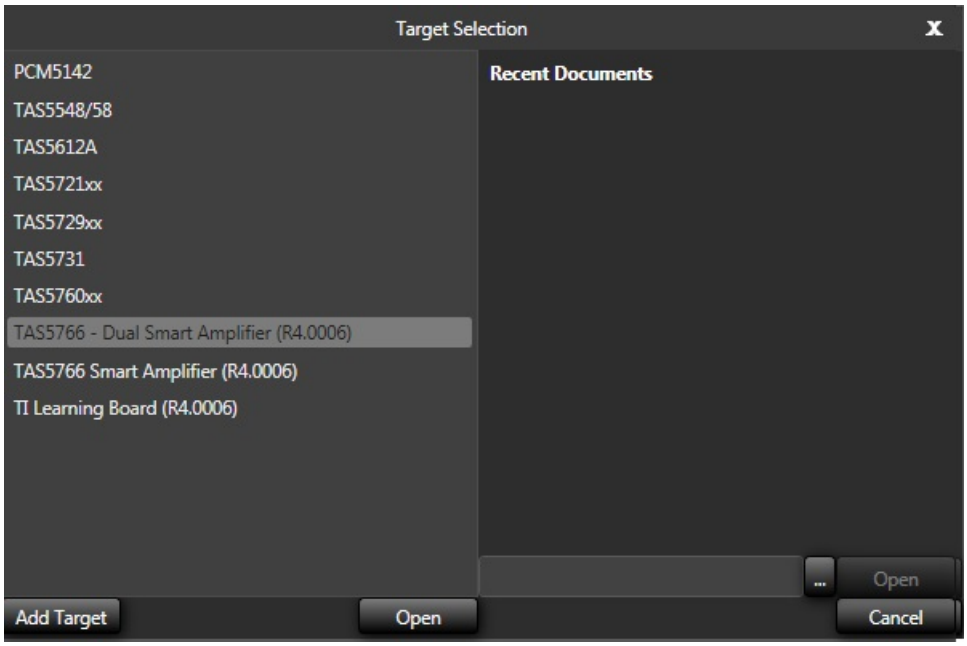

Figure 4. Target Selection List

If the device is not listed in the *Target Selection* list, click on *Add Target* and Windows Explorer displays. Navigate to the folder containing the target .ppc files (plugins) and choose the DUT. Make sure that the plugin has the same version and revision number as the PPC you are using.

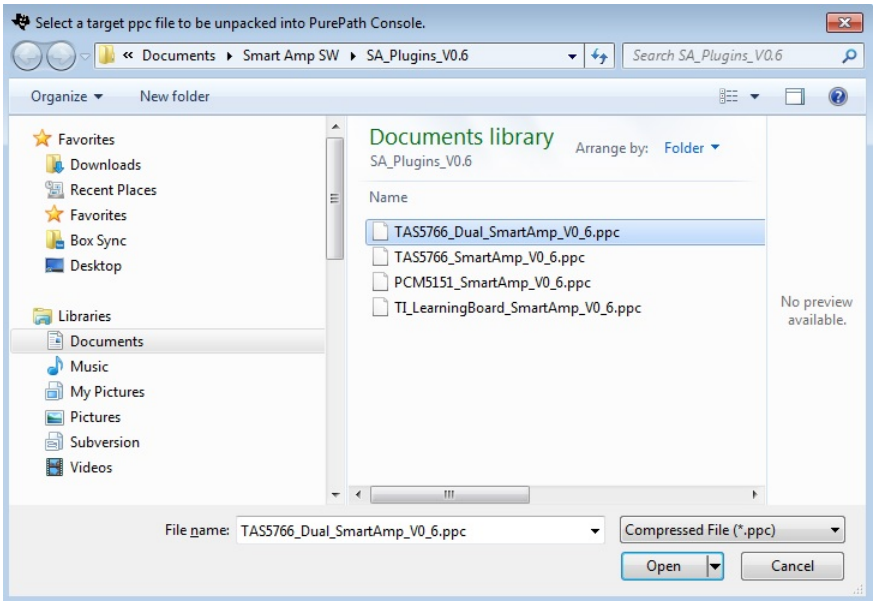

Figure 5. Add Target List

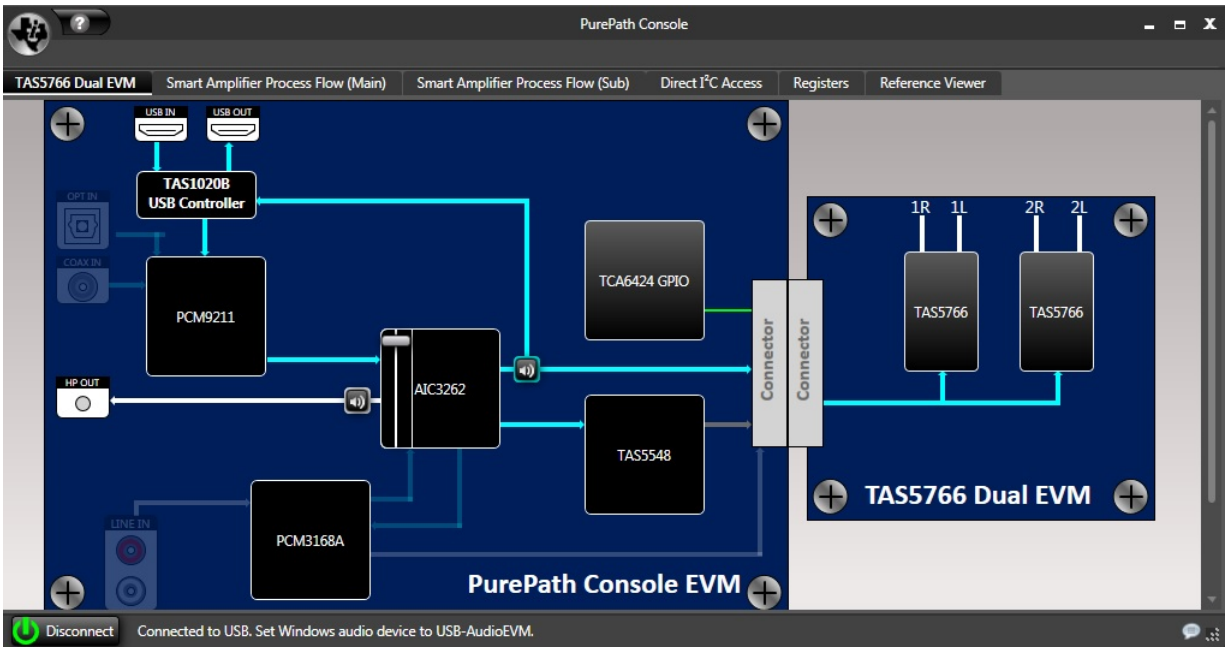

Figure 6. PPCMB and TAS5766MRMTEVM

The green LED on the bottom left corner of the PPC window indicates the initialization of TAS5766M is valid.

The PPCMB is initialized with the USB audio (USB-AudioEVM) selected. Streaming audio from the USB host is routed to the TAS5766M.

If an optical input is used, click on the OPT IN symbol on the PPC software, the I2S is then routed with this signal. Likewise, with a COAX/SPDIF input using the COAX IN symbol. If an analog input is used, click on the LINE IN symbol on the PPC software, the ADC (PCM3168A) is the source of I2S data.

- On the PPCMB, the USB blue LED is on, the green LEDs for 3.3 V and 5 V are on
- On the PPC, the green LED on the bottom left corner is on

3 Using the PurePath Console with the TAS5766MRMTEVM Board

The TAS5766MRMTEVM is initialized upon PurePath Console startup. Audio is streaming to the speakers if Windows Media (or similar program) is playing and USB-AudioEVM is selected in the sound playback properties. The following indicators show both the PPC GUI and TAS5766MRMTEVM are operating correctly:

3.1 TAS5766M Main Tab

Figure 6 shows the DUT tab as displayed when the PPC GUI starts up. Here, you can click on the TAS5766M icon and it directs you to the device block diagram.

3.2 TAS5766M Block Diagram Tab

Figure 7 illustrates the TAS5766M Block Diagram tab, showing the device major blocks. Some of the blocks are selectable. When a block is selected (double click), it shows pop-up settings for the particular setting.

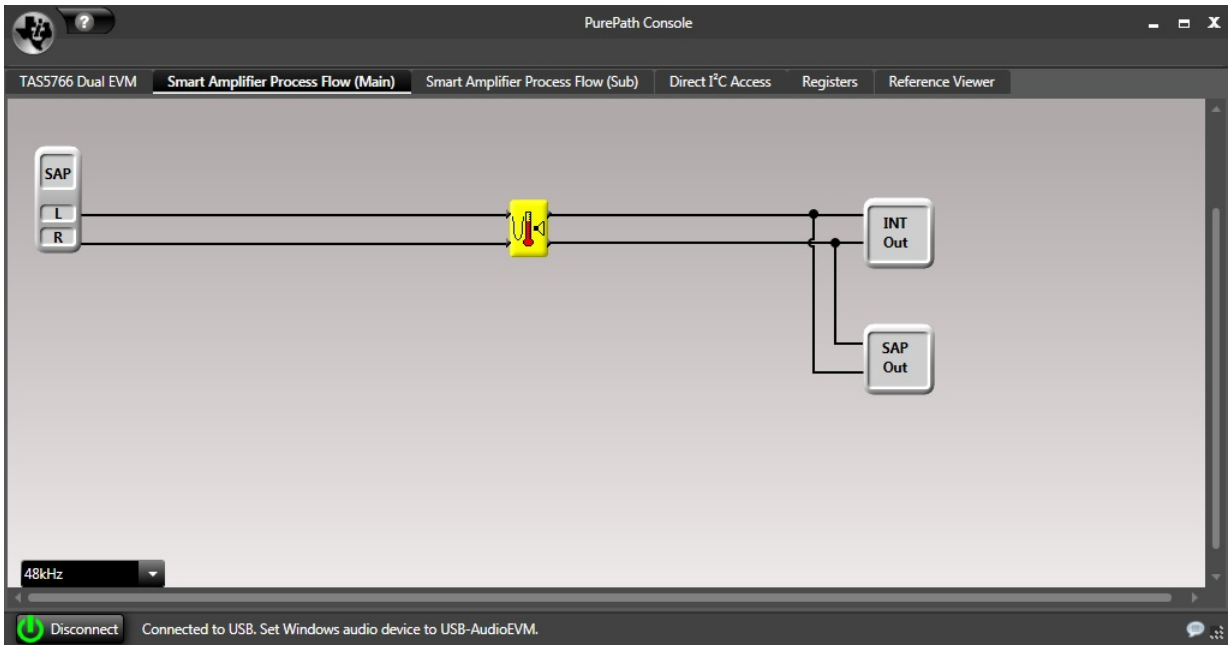

Figure 7. TAS5766M Block Diagram

3.3 Pop-Up Windows

For TAS5766M, there are several settings that are done via I2C. The GUI facilitates these settings seamlessly using the pop-up windows seen in Figure 8 and Figure 9.

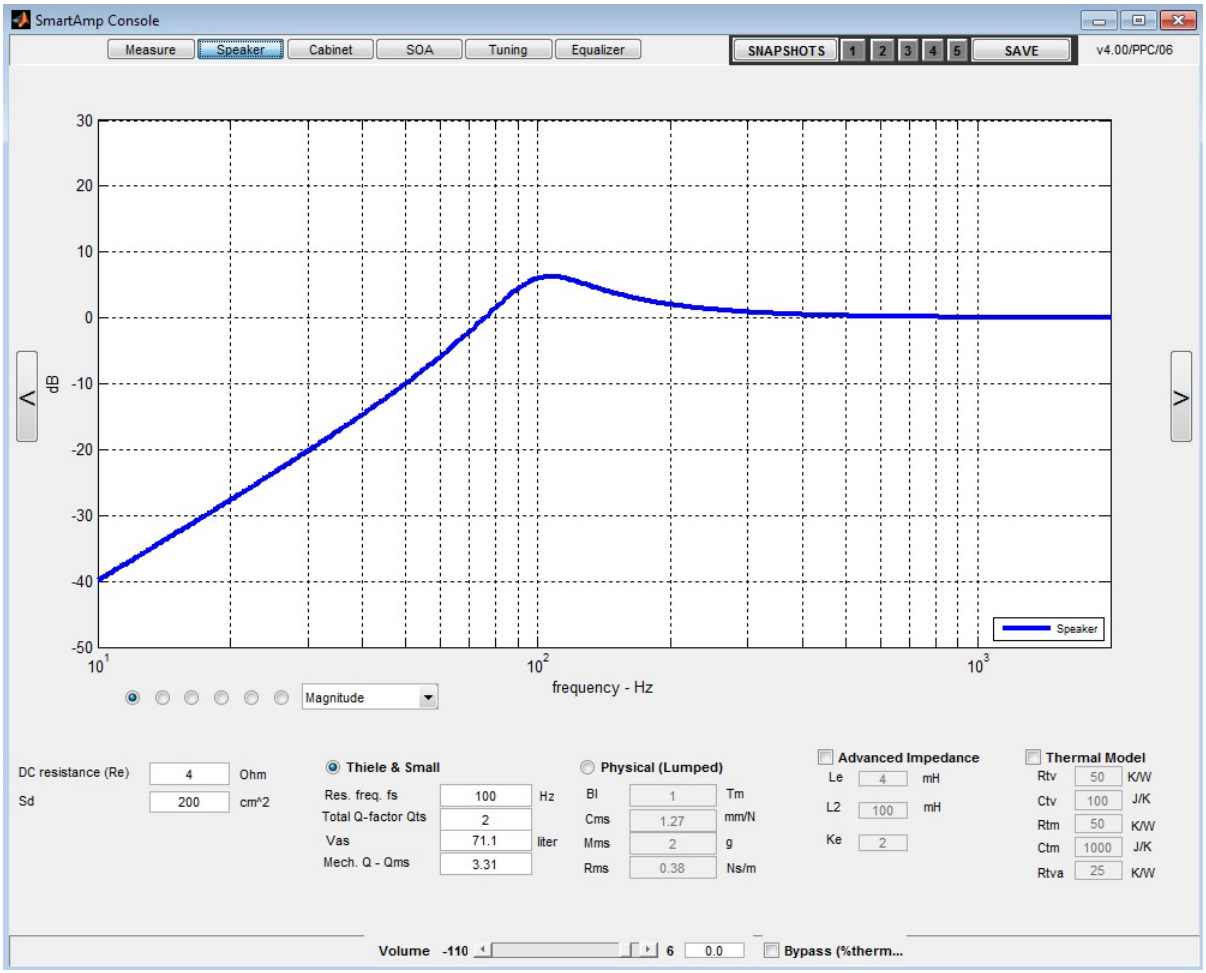

Figure 8. Smart Amplifier GUI Pop-Up

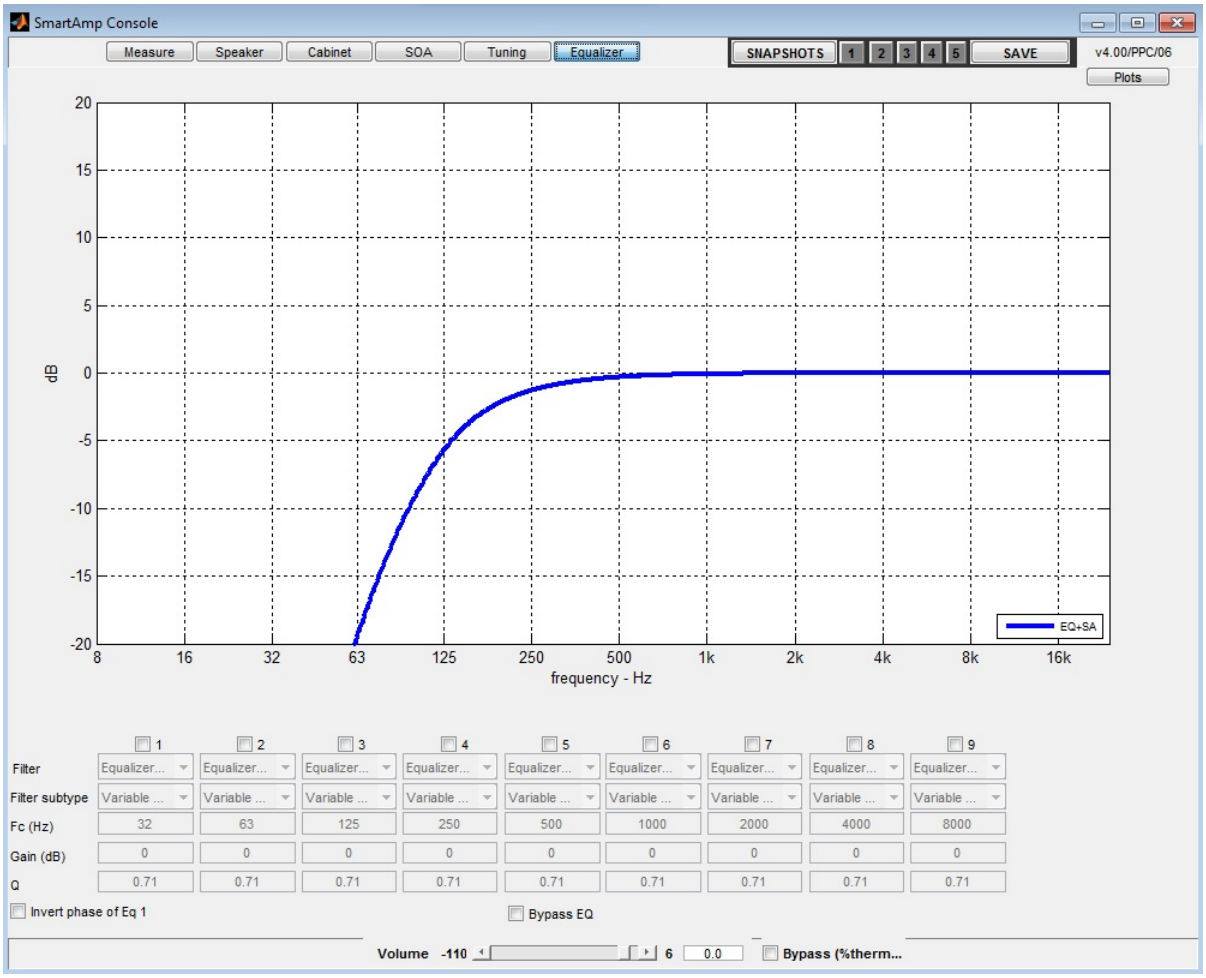

Figure 9. Biquad Block Pop-up

3.4 Direct I²C Access Tab

I²C registers read and write can be performed on this tab (see Figure 10). Type in the device I²C address and click *Set*. On the *Direct I²C Read/Write* box, enter a valid I²C register for read and type in both valid register and data for write.

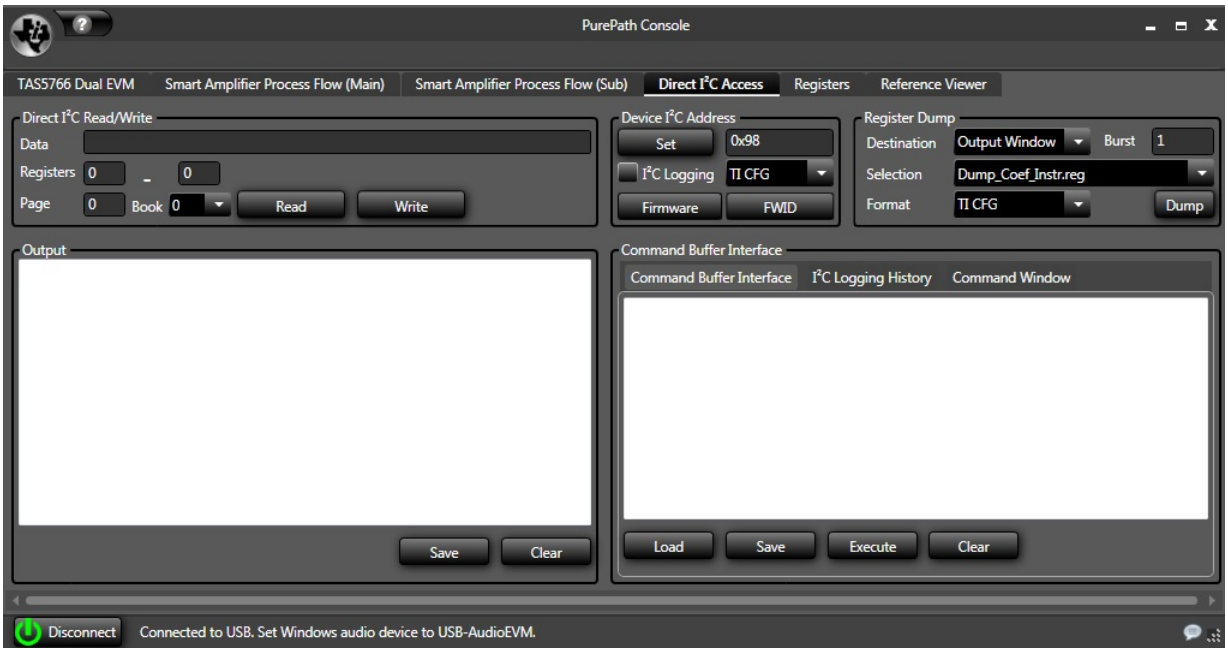

Figure 10. Direct I²C Access

3.5 Device Registers Tab

Figure 11 shows the current I²C registers values (hexadecimal and decimal) in the TAS5766.

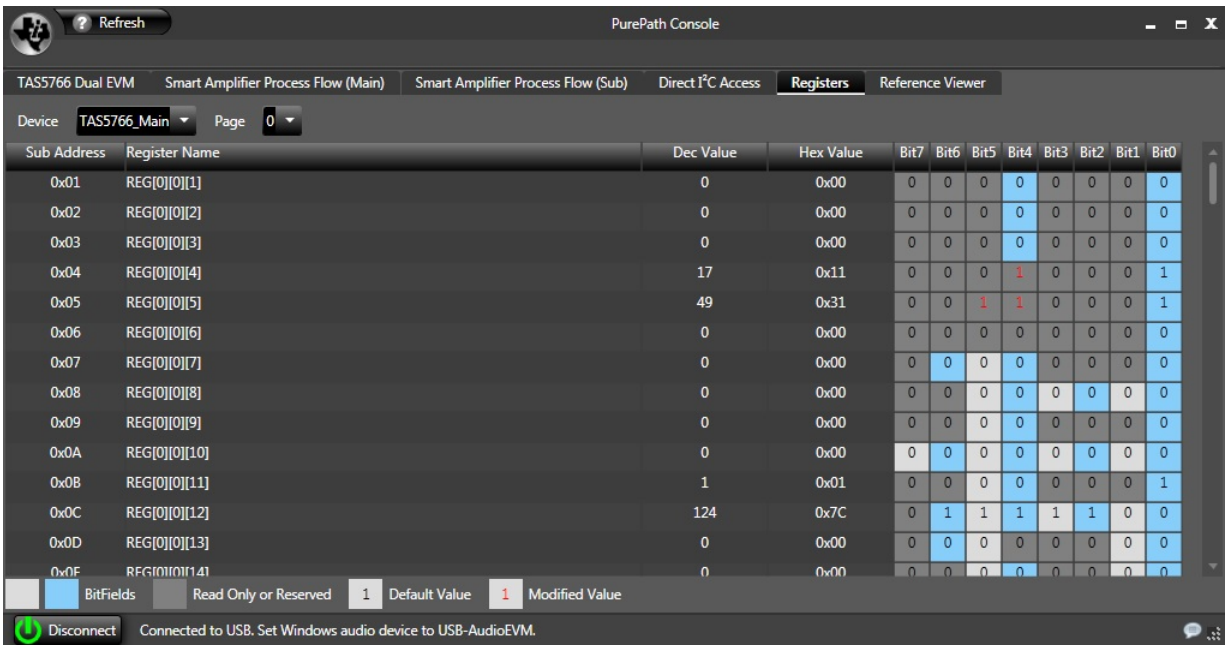

Figure 11. Device Registers Tab

4 Board Layouts, Bill of Materials, and Schematics

4.1 TAS5766MRMTEVM Board Layouts

Figure 12 through Figure 14 illustrate the board layouts for the EVM.

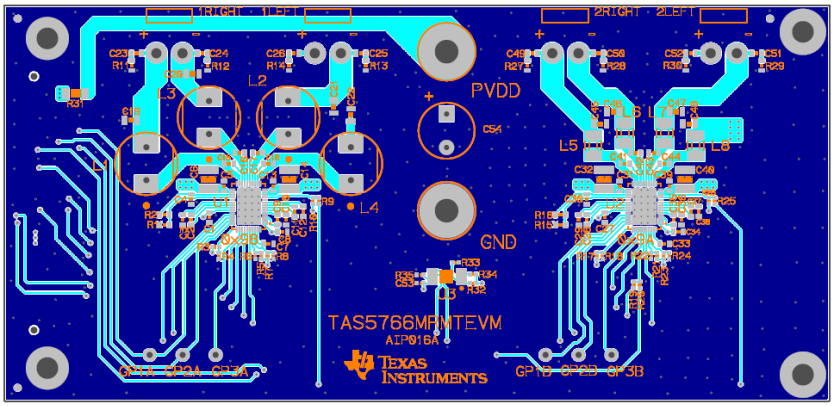

Figure 12. TAS5766MRMTEVM Top Composite Assembly

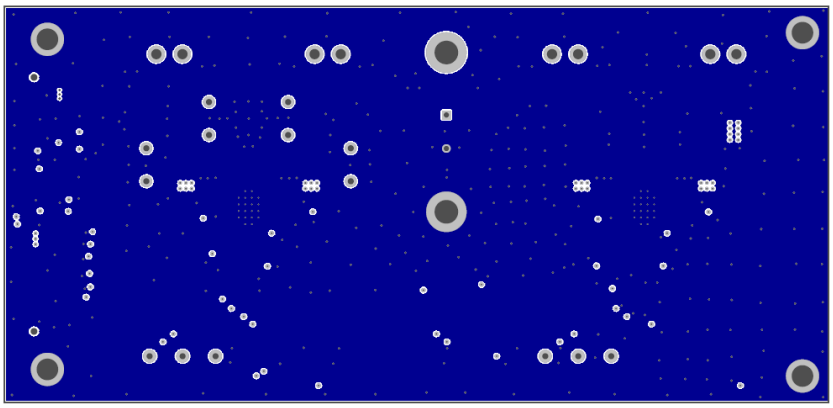

Figure 13. TAS5766MRMTEVM Copper Layer 2

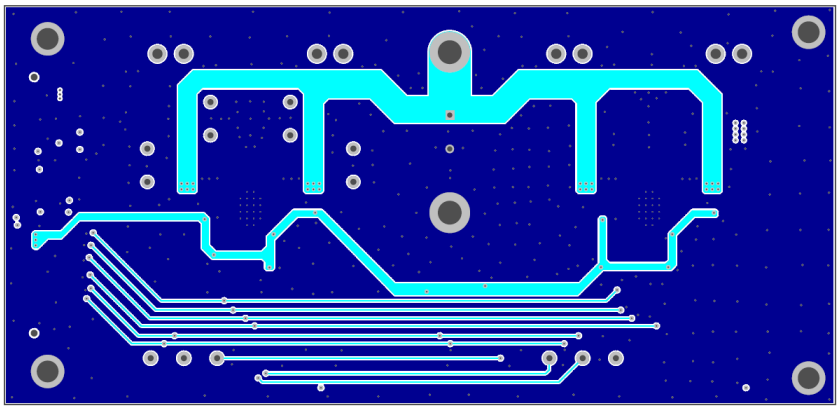

Figure 14. TAS5766MRMTEVM Copper Layer 3

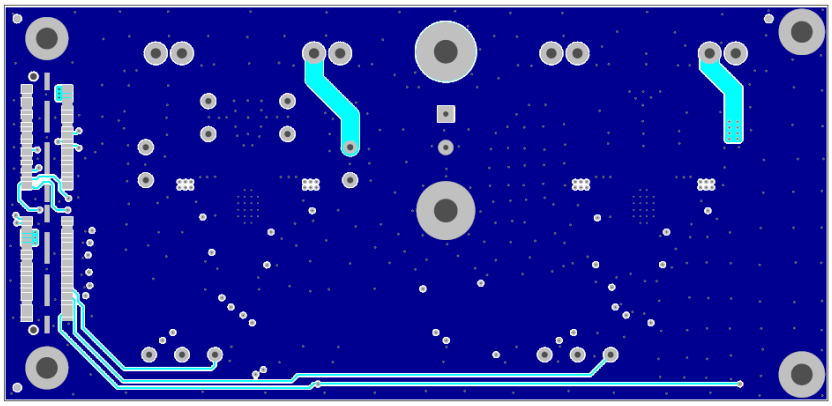

Figure 15. TAS5766MRMT Bottom Copper

4.2 Bill of Materials

Table 1 displays the BOM for this EVM.

Table 1. TAS5766MRMTEVM Bill of Materials

Item	MFR Part Num	MFR	QTY	Ref Designators	Description
1	TAS5766MRMT	TEXAS INSTRUMENTS	2	U1, U2	2x50W/4 OHM PURE PATH SMART AMP QFN48-RMT ROHS
2	24LC256-I/MS	MICROCHIP	1	U3	SERIAL EEPROM I2C 256K 400kHz MSOP8-MS ROHS
3	UMK107AB7105KA-T	TAIYO YUDEN	24	C1, C2, C3, C4, C5, C7, C8, C9, C10, C11, C12, C13, C27, C28, C29, C30, C31, C33, C34, C35, C36, C37, C38, C39	CAP SMD0603 CERM 1.0UFD 50V 10% X7R ROHS
4	C1608X7R1H224K080AB	TDK CORP	8	C15, C16, C17, C18, C41, C42, C43, C44	CAP SMD0603 CERM 0.22UFD 50V 10% X7R ROHS
5	C1210X475K5RACTU	KEMET	4	C6, C14, C32, C40	CAP SMD1210 CERM 4.7UFD 50V 10% X7R ROHS
6	GRM21BR72A474KA73L	MURATA	4	C19, C20, C21, C22	CAP SMD0805 CERM 0.47UFD 100V 10% X7R ROHS
7	GRM188R71H103KA01D	MURATA	4	C23, C24, C25, C26	CAP SMD0603 CERM 0.01UFD 50V 10% X7R ROHS
8	08055A102GAT2A	AVX	4	C45, C46, C47, C48	CAP SMD0805 CERM 1000PFD 50V 2% NPO ROHS
9	C1005X5R1A105K	TDK CORP	1	C53	CAP SMD0402 CERM 1.0UFD 10V 10% X5R ROHS
10	ECA-1HM471	PANASONIC	1	C54	CAP ELECT M 470ufd 50V 20% 10mmDIA 20mm Length ROHS
11	ERJ-3EKF1003V	PANASONIC	2	R1, R15	RESISTOR SMD0603 100K OHM 1% THICK FILM 1/10W ROHS
12	ERJ-3EKF2002V	PANASONIC	2	R2, R16	RESISTOR SDM0603 20.0K OHM 1% THICK FILM 1/16W ROHS
14	CRCW040210K0FKED	VISHAY	10	R4, R6, R10, R18, R21, R26, R32, R33, R34, R35	RESISTOR SMD0402 10.0K OHMS 1% 1/16W ROHS
15	ERJ-2RKF1003X	PANASONIC	2	R7, R23	RESISTOR SMD0402 THICK FILM 100K OHMS 1/16W 1% ROHS
17	CRCW040210R0JNED	VISHAY	3	R9, R19, R25	RESISTOR SMD0402 10 OHMS 1/16W 1% ROHS
18	ERJ-3GEYJ3R3V	PANASONIC	4	R11, R12, R13	RESISTOR SMD0603 3.3 OHMS 5% 1/10W ROHS
20	ERJ-8GEY0R00V	PANASONIC	1	R31	RESISTOR SMD1206 0.0 OHM 5% 1/4W ROHS
21	A7503AY-4R7M	TOKO	4	L1, L2, L3, L4	INDUCTOR SERIES 11RHBP/A7503AY 4.7uH/5.1A ROHS
22	CIS21P300NE	SAMSUNG	4	L5, L6, L7, L8	FERRITE BEAD, 30 Ohms 6A 100MHz SM0805 ROHS
23	B2PS-VH(LF)(SN)	JST	4	1LEFT, 2LEFT, 1RIGHT, 2RIGHT	JACK JST-VH RA 2-PIN 3.96mmLS ROHS
24	QTS-050-01-F-D-A	SAMTEC	1	J1	CONNECTOR SMT/THU 100 POS+GND MATE HEIGHT 5mm ROHS
25	5003	KEYSTONE ELECTRONICS	6	GP1A, GP1B, GP2A, GP2B, GP3A, GP3B	PC TESTPOINT, ORANGE, ROHS
26	7006	KEYSTONE ELECTRONICS	1	PVDD	BINDING POST, RED, 15A ECONO ROHS
27	7007	KEYSTONE ELECTRONICS	1	GND	BINDING POST, BLACK, 15A ECONO ROHS
28	R30-1003002	HARWIN	2	STANDOFFS	STANDOFF M3x30mm 7mm DIA HEX BRASS/NICKEL F-F ROHS
29	3200	KEYSTONE ELECTRONICS	2	SPACING WASHERS (BETWEEN STANDOFFS AND BOARD	WASHER FLAT 3.05mmID 9.53mmOD 1.57mm THICK NYLON ROHS
30	MPMS 003 0005 PH	KEYSTONE ELECTRONICS	2	STANDOFF SCREWS	SCREW M3x5 PHILIPS PANHEAD STAINLESS STEEL ROHS
31	GRM188R71H103KA01D	MURATA	0	C49, C50, C51, C52	CAP SMD0603 CERM 0.01UFD 50V 10% X7R ROHS
32	CRCW040210K0FKED	VISHAY	0	R3, R5, R17, R22	RESISTOR SMD0402 10.0K OHMS 1% 1/16W ROHS
33	ERJ-2RKF1003X	PANASONIC	0	R8, R24	RESISTOR SMD0402 THICK FILM 100K OHMS 1/16W 1% ROHS
34	CRCW040210R0JNED	VISHAY	0	R20	RESISTOR SMD0402 10 OHMS 1/16W 1% ROHS
35	ERJ-3GEYJ3R3V	PANASONIC	0	R27, R28, R29, R30	RESISTOR SMD0603 3.3 OHMS 5% 1/10W ROHS
36	AIP016A	TEXAS INSTRUMENTS	1	NA	TAS5766MRMTEVM Evaluation Module
		TOTAL	105		
SPECIAL NOTES TO THIS BILL OF MATERIALS					
SN1	These assemblies are ESD sensitive, ESD precautions shall be observed.				

Table 1. TAS5766MRMTEVM Bill of Materials (continued)

Item	MFR Part Num	MFR	QTY	Ref Designators	Description
SN2	These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.				
SN3	These assemblies must comply with workmanship standards IPC-A-610 Class 2.				
SN4	Ref designators marked with an asterisk ('**') cannot be substituted. All other components can be substituted with equivalent MFG's components.				
SN5	See AIP016A_Assembly.pdf for assembly instructions on Standoff Hardware				

4.3 TAS5766MRMTEVM Schematic

The schematics for TAS5766MRMTEVM are illustrated in Figure 16 and Figure 18.

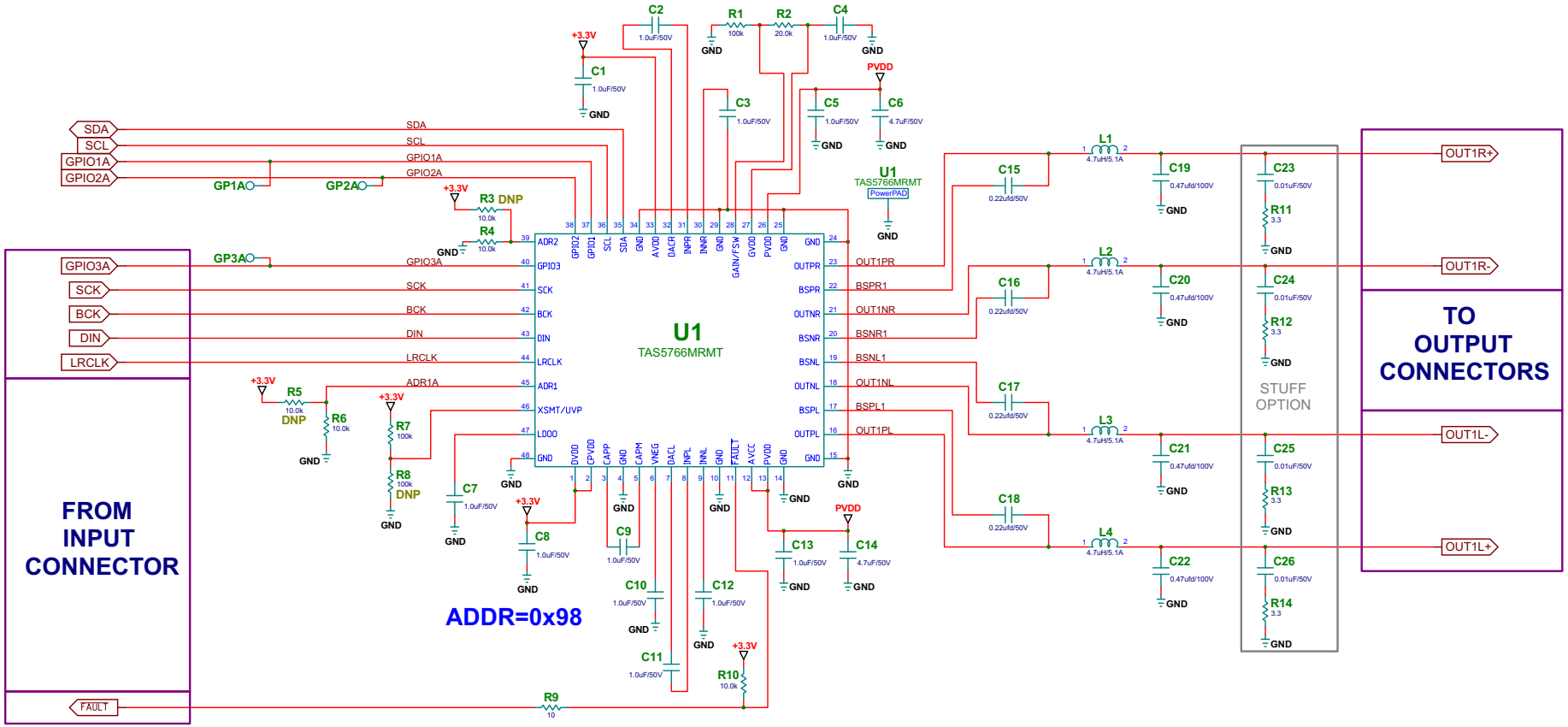

Figure 16. TAS5766MRMTEVM Schematic (Page 1 of 3)

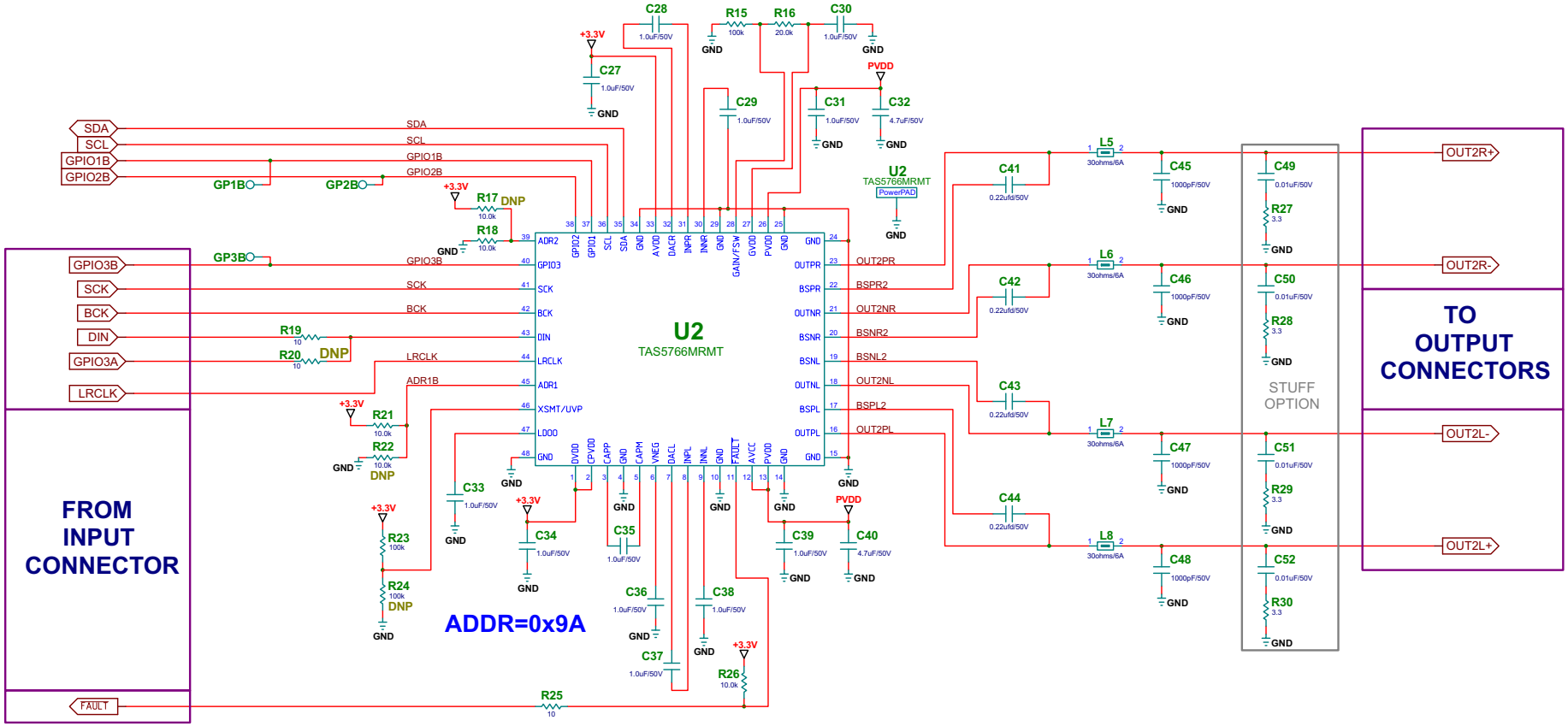

Figure 17. TAS5766MRMTEVM Schematic (Page 2 of 3)

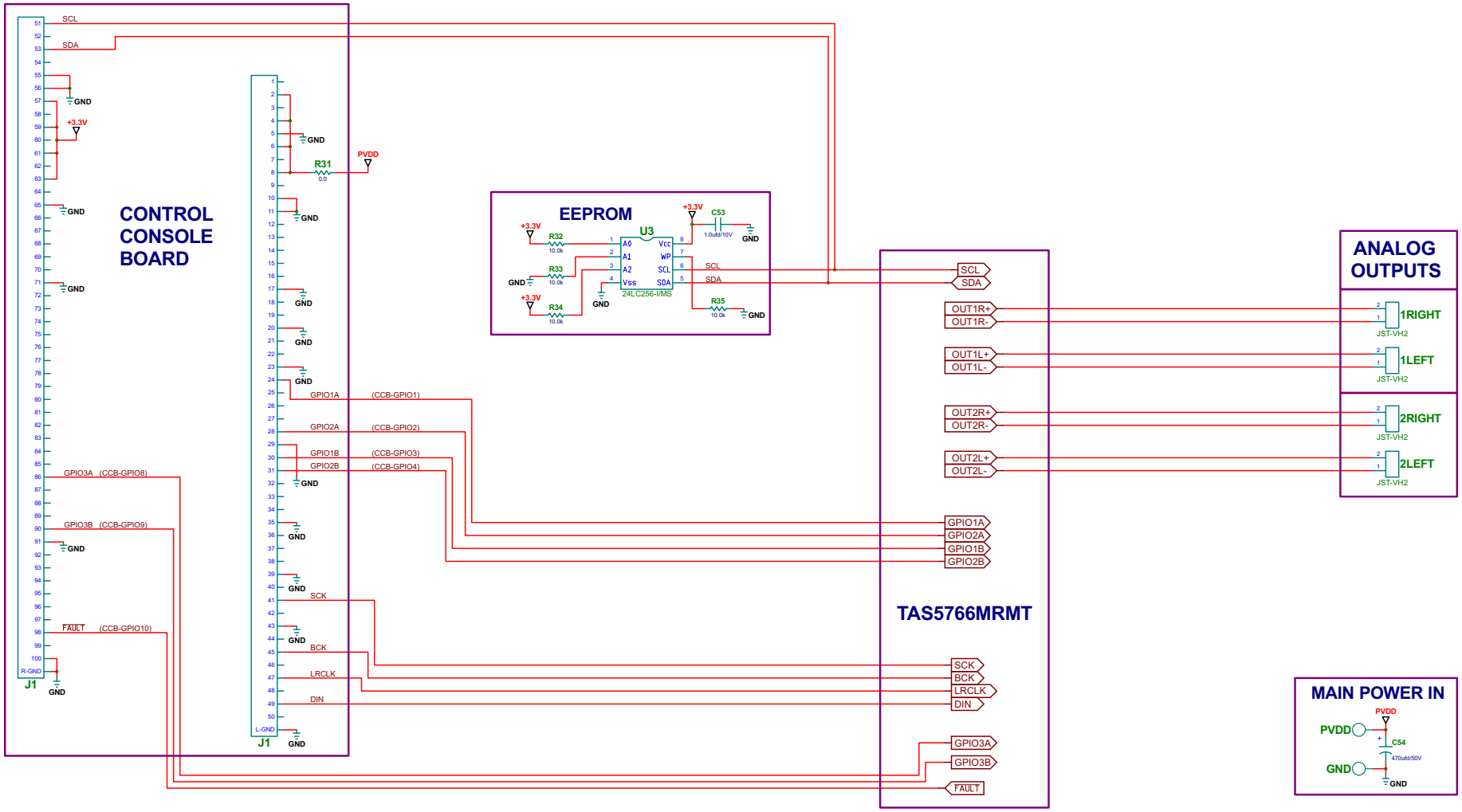

Figure 18. TAS5766MRMTEVM Schematic (Page 3 of 3)

STANDARD TERMS AND CONDITIONS FOR EVALUATION MODULES

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.

   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 and conditions 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 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/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。
http://www.tij.co.jp/lsds/ti_ja/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 User uses EVMs in 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.

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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

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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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