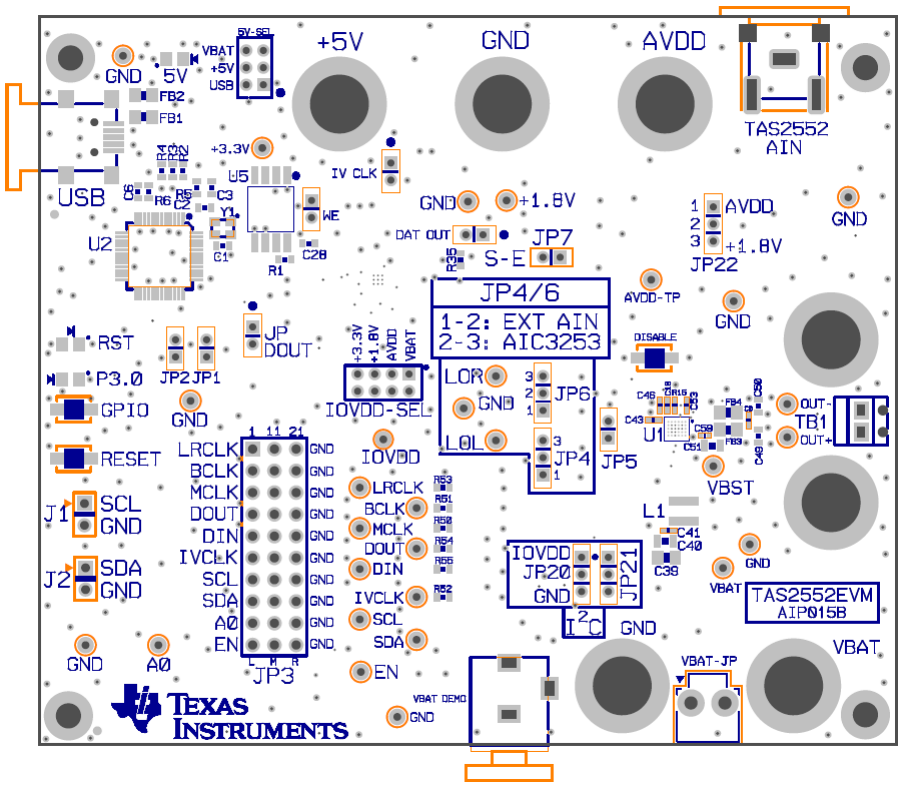
TAS2552 EVM

This user's guide contains support documentation for the TAS2552 evaluation module (EVM). Also included are the performance specifications, operating instructions, schematics, printed-circuit board (PCB) layouts and the bill of materials (BOM) for the TAS2552 EVM.



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1 Introduction

This section provides an overview of the Texas Instruments (TI) TAS2552 Class-D mono speaker amplifier evaluation module (EVM). It includes a brief description of the module and a list of EVM specifications.

1.1 Description

The TAS2552 is a high efficiency Class-D audio power amplifier with advanced battery current measurement and an integrated boost converter. It drives up to 3.5 W into an 8-Ω speaker. The built-in boost converter generates the Class-D amplifier supply rail. This boosted supply rail provides louder audio than a stand-alone amplifier directly connected to the battery.

The AGC function automatically adjusts Class-D gain to reduce battery current at end-of-charge voltages, and prevents output clipping and distortion.

The Class-D output switching is adjustable by the I^2C interface, providing a method to slow the Class-D switching edge rate to improve EMI. For more information about the TAS2552, refer to the datasheet (SLAS898).

1.2 EVM Specifications

Table 1. EVM Specifications

Boost input supply voltage	2.7 V to 5.5 V
Analog supply voltage	1.6 V to 2.0 V
Digital I/O supply voltage	1.5 V to 3.3 V
Continuous output power, P_O, V_{DD} = 3.6 V, 8 Ω, THD+N 1%	3.5 W
USB Connection	Mini-USB

1.3 GUI Installation

Copy the supplied GUI into a directory and unzip it. Place the supplied scripts in the same directory

There is no set-up or other install necessary, simply run the GUI as described in Section 2.1.3 of this document.

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2 Operation

This section describes how to operate the TAS2552EVM.

2.1 Quick-Start List for Stand-Alone Operation

Use the following steps when operating the TAS2552EVM stand alone or when connecting the EVM into an existing circuit.

2.1.1 Power and Ground

Use the following steps to operate the EVM:

1. Verify that the external power sources are set to OFF.
2. Connect a 3.6-V supply to the VBAT terminal in the lower right corner of the EVM and the GND terminal located to the left of the VBAT terminal.
3. Make sure the 5V-SEL jumper in the upper left corner is in the “USB” Position (the red box in Figure 1). Connect the USB cable to the EVM. This will supply power to required blocks of the EVM.

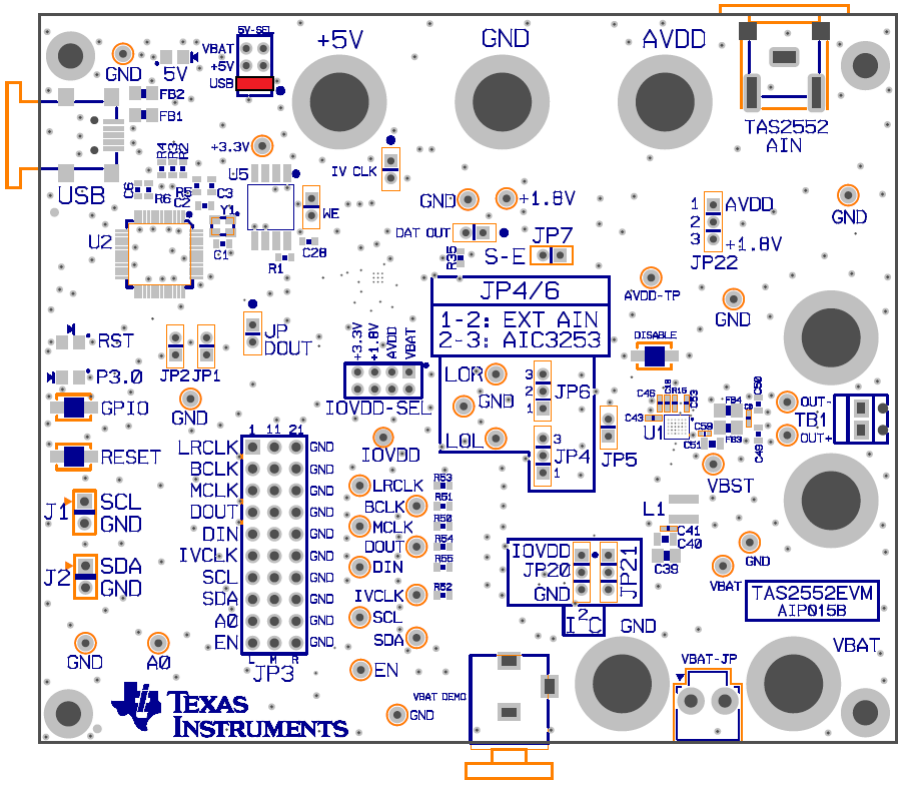


Figure 1. Power Connections

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4. Ensure the jumpers are set according to Table 2 and Figure 2:

Table 2. TAS2552EVM Default Jumper Settings for Analog Input Operation

Jumper Name	Position	Comments
5V-SEL	USB	Uses USB +5 V
IOVDD-SEL	+3.3V	Supplies +3.3 V to IOVDD from on-board LDO
SPI	ALL OUT	SPI interface is currently not being used
WE	OUT	Write protect for TAS1020 EEPROM
J1, J2	OUT	For external I^2C connectivity only
JP1, JP2 (SDA, SCL)	IN	Connect I^2C bus from TAS1020 to TAS2552 and AIC3253
JP3 – LRCLK	LEFT SIDE	Connects LRCLK to TAS2552
JP3 – BCLK	LEFT SIDE	Connects BCLK to TAS2552
JP3 – MCLK	LEFT SIDE	Connects MCLK to TAS2552
JP3 – DOUT	LEFT SIDE	Data out of the TAS2552
JP3 – DIN	LEFT SIDE	Data coming into the TAS2552
JP3 – IVCLK	LEFT SIDE	Connects IVCLK to TAS2552
JP3 – SCL	LEFT SIDE	Connects SCL to TAS2552
JP3 – SDA	LEFT SIDE	Connects SDA to TAS2552
JP3 – A0	RIGHT SIDE	Address pin of the TAS2552
JP3 – EN	OUT	Leave this pin floating. ENABLE pin pulled high
JP4, JP6	1 – 2	External RCA analog input connector to TAS2552
JP5	OUT	n/a
JP7 – SE	OUT	Default input mode set to differential
JP11 – JP17	ALL OUT	These jumpers are hard pull-ups tied to IOVDD
JP20, JP21	IOVDD	I^2C pull-up resistors for SDA and SCL
JP22	+1.8V	Supplies +1.8 V to AVDD from on-board LDO

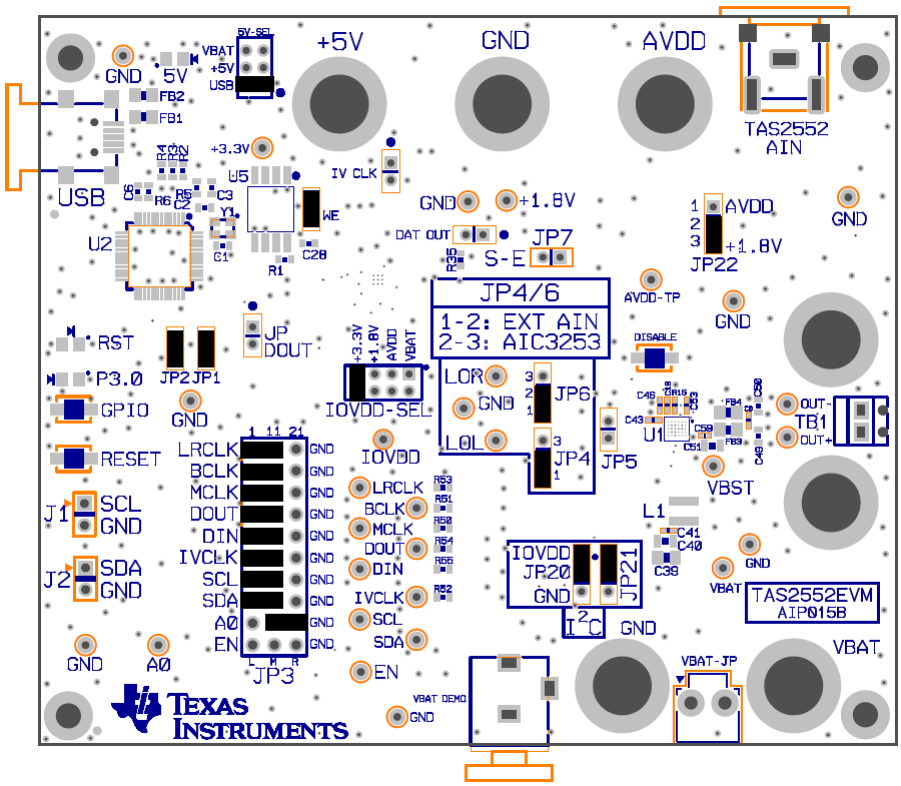


Figure 2. TAS2552EVM Default Jumper Settings

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If this is the first time you connect the EVM to a PC, Windows® will install it as a USB HID device.

2.1.1.1 Jumpering Notes

The EVM can run in several input modes:

1. Analog input – Remove all of the jumpers in the JP3 block except for SDA, SCL, and A0. Be sure that JP4/6 are in the 1 to 2 position and JP5 is not installed. Run the *TAS255x_Analog_Input_Init_Script.cfg* script.
2. Digital input from digital interface when attached to a device like an AP PSIA – Remove all of the jumpers in the JP3 block except for SDA, SCL, and A0. Be sure that jumpers IV CLK, JP DOUT, and DAT OUT are not installed. *Run the TAS255x_I2S_Input_Init_Script.cfg script.*
3. Digital input from a PC media player to the digital input of the TAS2552 – Install all of the jumpers in the JP3 jumper block except for the EN jumper. Be sure that the jumpers IV CLK, JP DOUT, and DAT OUT are not installed. *Run the TAS255x_I2S_Input_Init_Script.cfg script.*

2.1.2 Inputs and Outputs

The inputs and outputs for this EVM are described in this section.

2.1.2.1 Audio

1. Verify that the audio source is set to the minimum level.
2. Connect the audio source to the TAS2552-AIN RCA jack located in the top right corner of the EVM (highlighted in red in Figure 3).
3. Connect an 8-Ω load to the OUT– and OUT+ terminals.

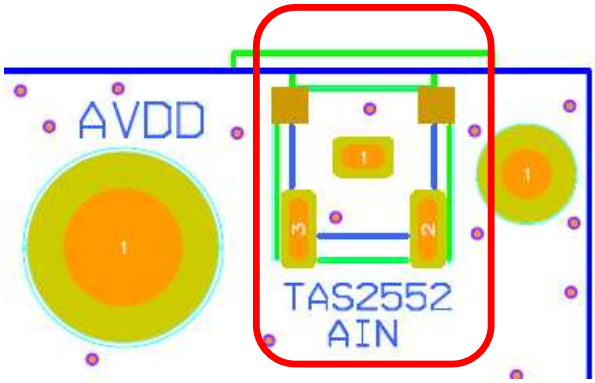


Figure 3. TAS2552EVM Analog Input Connections

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2.1.2.2 Shutdown Controls

Shutdown is controlled with the pushbutton labeled “DISABLE”, see Figure 4. Press and hold DISABLE to place the TAS2552 in shutdown. The device can be activated via the I^2C interface.

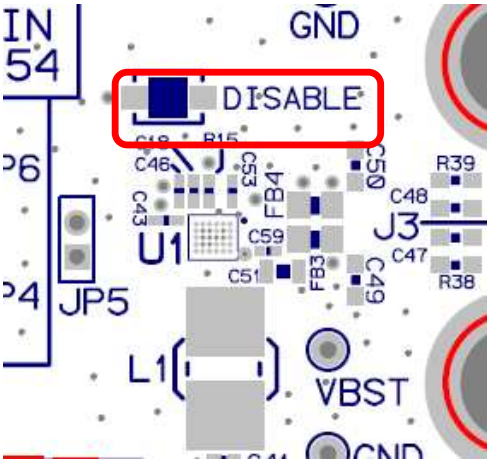


Figure 4. DISABLE Pushbutton

2.1.3 Power Up

1. Verify the correct connections as described in Section 2.1.1 and Section 2.1.2.
2. Verify the correct voltage setting of the power supply and turn ON the power supply.
3. Run CodeControl.exe and select TAS2552EVM. The GUI starts and shows the main TAS2552 block diagram with corresponding controls. The correct EVM name should appear at the top of the screen. If the program fails to detect the EVM properly, try unplugging the USB cable and plug it into the EVM again.

Note: This EVM uses the TAS255x GUII as illustrated in Figure 5.

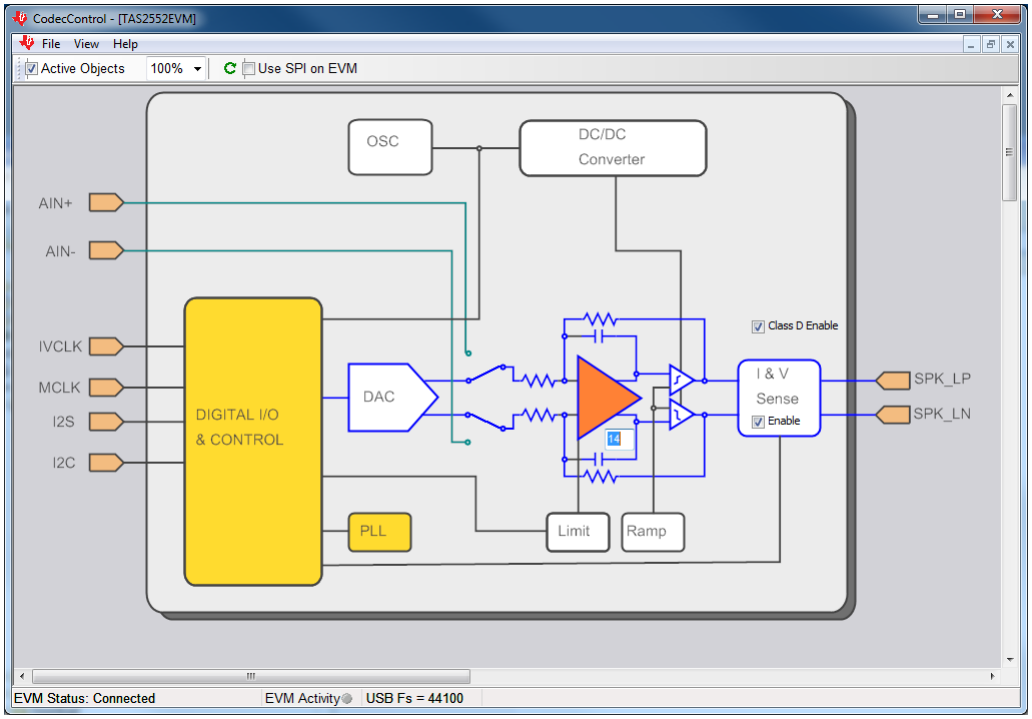


Figure 5. CodecControl GUI

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2.1.4 Gain Setting and Input configuration

The gain and input mode settings are programmed via the I^2C interface. The default gain of the TAS2552 is set to –21.5 dB. The gain can be adjusted by clicking on the orange amplifier block and moving the slider up/down as illustrated in Figure 6. The input can be switched from digital to analog and vice versa by clicking on the input MUX mode switch.

When clicking on the “Class-D Enable” checkbox, the output of the amplifier will be enabled and the Class-D will start switching. Set the Volume Control to 0 dB. Refer to the datasheet SLAS898 for more details on gain settings.

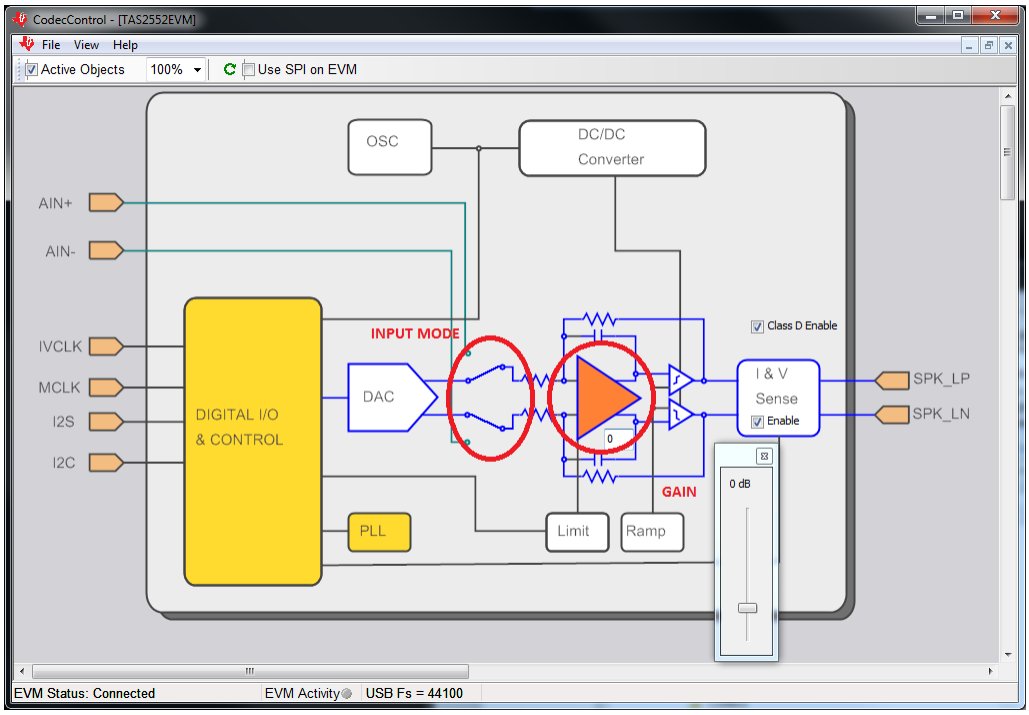


Figure 6. TAS2552 GUI Gain and Input Settings

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2.1.5 Analog Input Configuration

In order to operate the TAS2552 in Analog input mode, go to **View** → **Command**, and open the **TAS255x_Analog_Input_Init_Script.cfg** setup script from the **Scripts** folder. Click **Run** to execute the script.

After running this script, you should be able to input a signal and measure the output.

2.1.6 Digital Input Configuration

In order to operate the TAS2552 in digital input mode (I2S from TAS1020), set the jumpers as shown in Table 3:

Table 3. Jumper Settings for Digital Input Mode

Jumper Name	Position	Comments
JP3 (LRCLK)	L-M	Connects LRCLK line to TAS2552
JP3 (BCLK)	L-M	Connects BCLK line to TAS2552
JP3 (MCLK)	L-M	Connects MCLK line to TAS2552
JP3 (DIN)	L-M	Connects Data In line to TAS2552
JP3 (SCL, SDA)	L-M	Connects I^2C lines to TAS2552
JP3 (FAULT)	L-M	Connects FAULT line from TAS2552 to TAS1020

Go to **View** → **Command** and open the **TAS255x_I2S_Input_Init_Script.cfg** setup script located in the **Scripts** sub-directory. Click **Run** to execute the script.

If using an external I2S interface or PSIA, the clock and data lines can be connected straight to JP3. The rightmost column of headers is GND for each pair. The same I2S script can also be used for direct digital.

Note: The sample rate for this script is 44.1 kHz. The format is I2S.

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3 Reference

This section includes the EVM schematics, board layout views, and the BOM.

3.1 TAS2552EVM Schematic

Figure 7 through Figure 9 illustrate the schematics for this EVM.

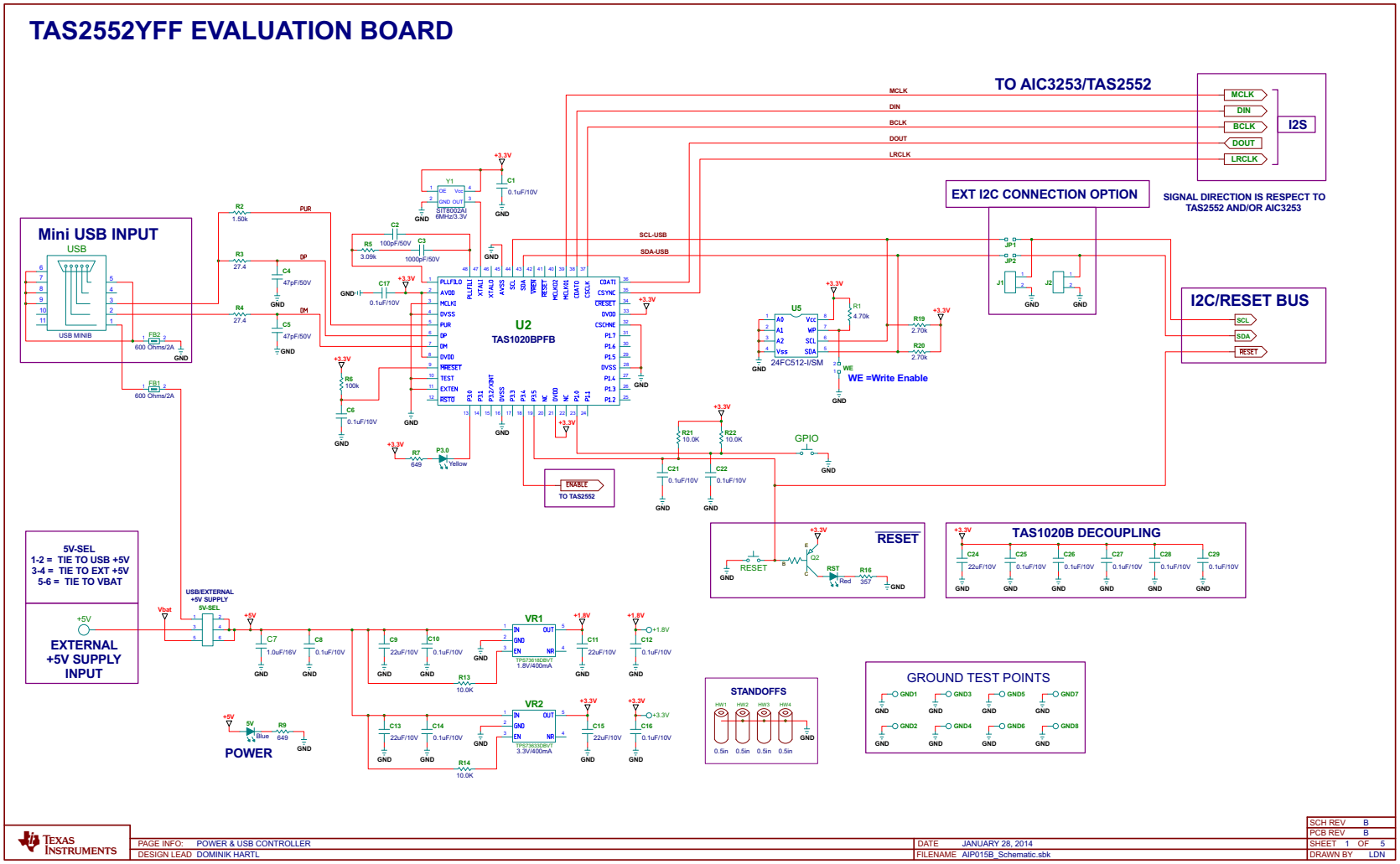


Figure 7. TAS2552 EVM Power and USB Controller Schematic

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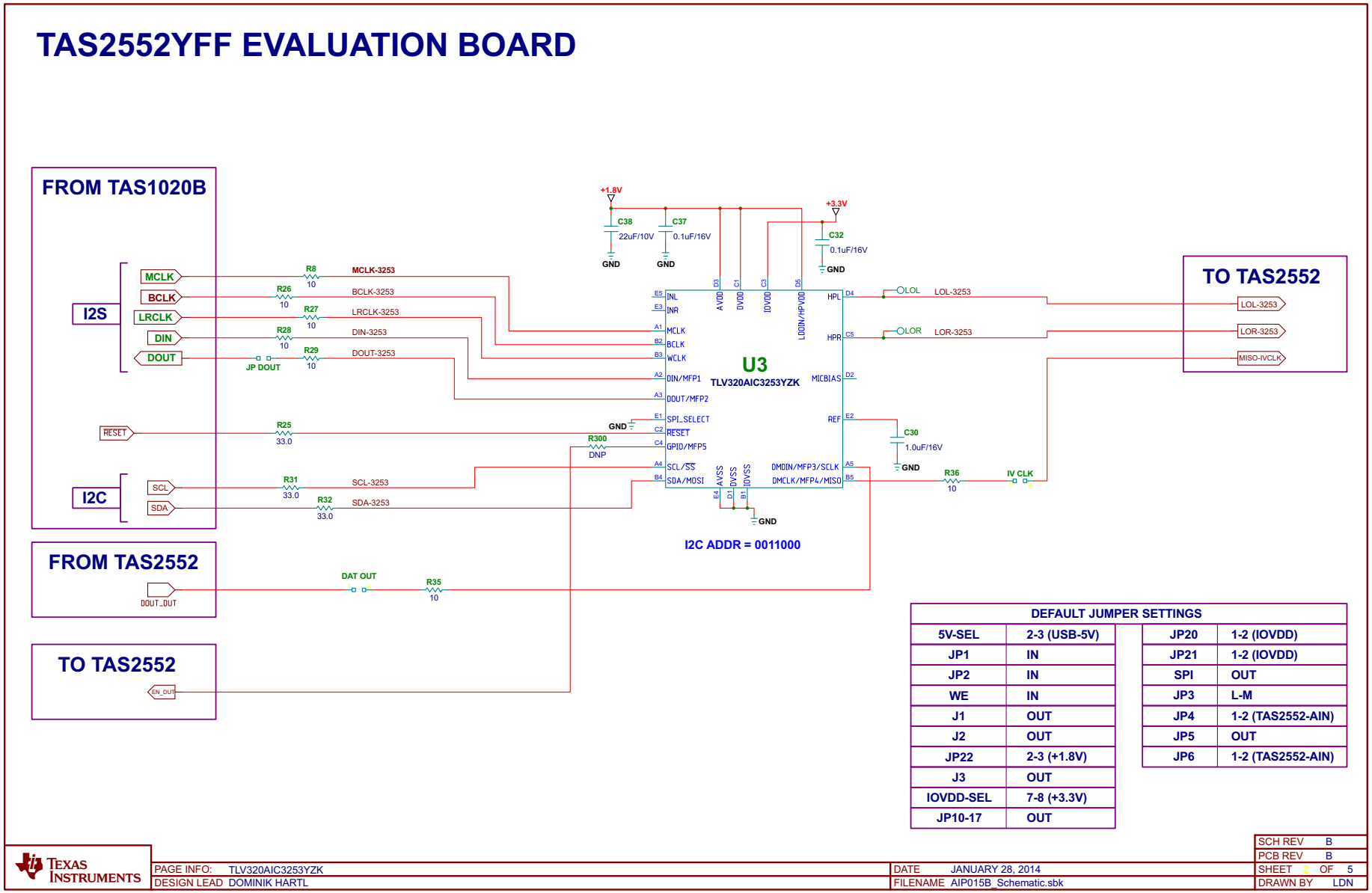


Figure 8. TAS2552 EVM Schematic (2 of 3)

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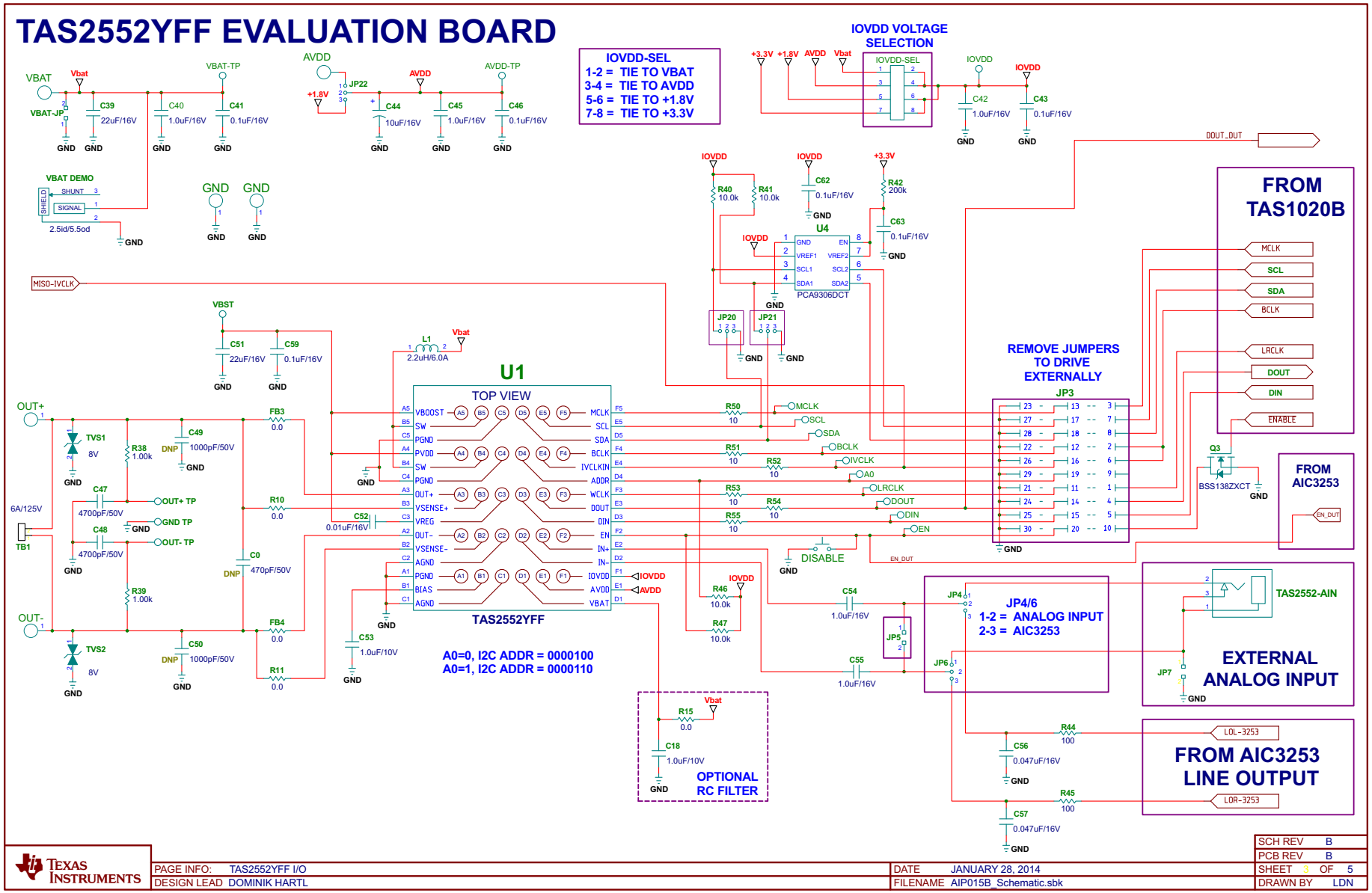


Figure 9. TAS2552 EVM Schematic (3 of 3)

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3.2 TAS2552EVM PCB Layers

Figure 10 and Figure 11 illustrate the PCB layouts for this EVM.

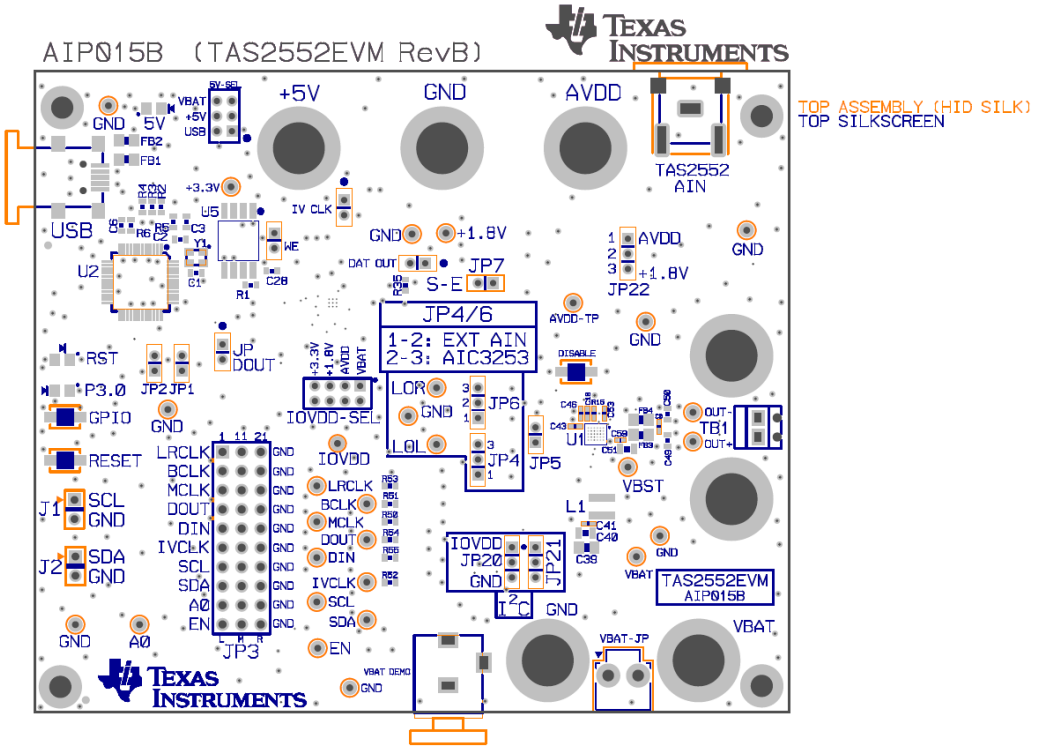


Figure 10. TAS2552 EVM Top X-Ray View

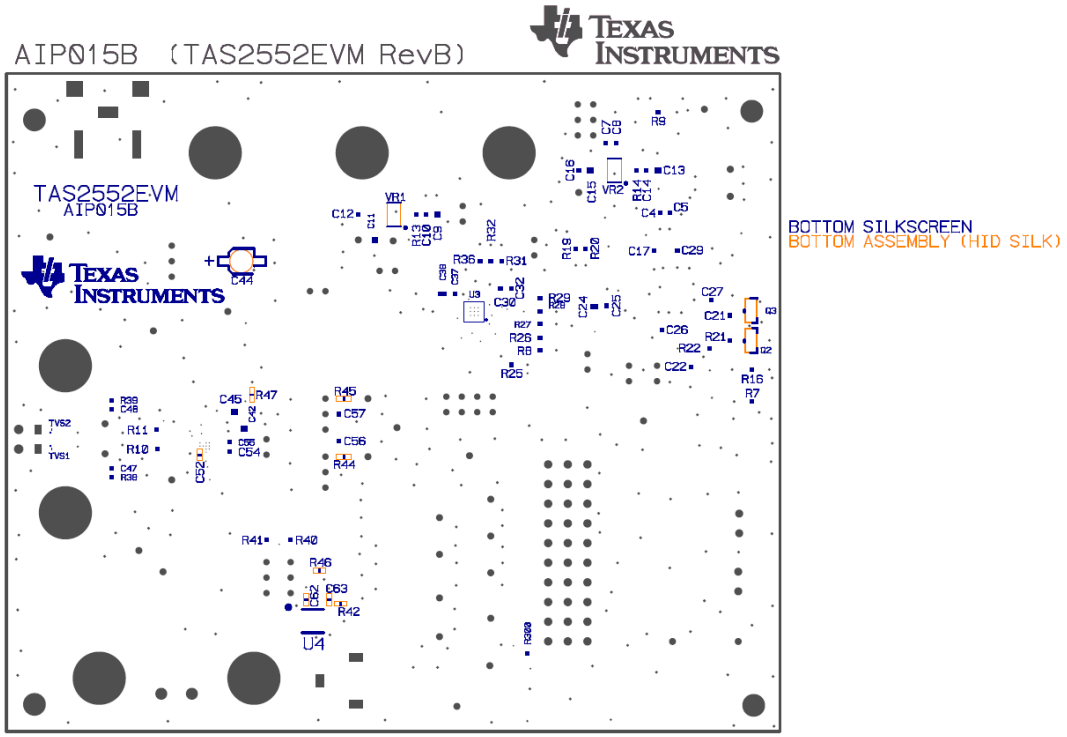


Figure 11. TAS2552 EVM Bottom X-Ray View

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3.3 TAS2552 EVM Bill of Materials

Table 4 contains the BOM for this EVM.

Table 4. Bill of Materials for TAS2552EMV

Item	MFG Part NUM	MFG	Qty	Ref Designators	Description
1	TAS2552YFF	TEXAS INSTRUMENTS	1	U1	DIG IN 3.5W CLASS-D AUDIO AMP ADAPTIVE BOOST SPKR SENSE WCSP30-YFF ROHS
2	TAS1020BPFB	TEXAS INSTRUMENTS	1	U2	USB STREAMING CONTROLLER TQFP48-PFB ROHS
3	TLV320AIC3253IYZKR	TEXAS INSTRUMENTS	1	U3	ULTRA LOW POWER STEREO AUDIO CODEC WITH miniDSP WCSP25-YZK ROHS
4	PCA9306DCTR	TEXAS INSTRUMENTS	1	U4	DUAL BIDIR I2C BUS AND SMBUS VOLT LEVEL TRANS SSOP8-DCT ROHS
5	24FC512-I/SM	MICROCHIP	1	U5	512K (64Kx8) I2C SERIAL EEPROM SOIC8-SM ROHS
6	TPS73618DBVT	TEXAS INSTRUMENTS	1	VR1	VOLT REG 1.8V 400MA LDO CAP FREE NMOS SOT23-DBV5 ROHS
7	TPS73633DBVT	TEXAS INSTRUMENTS	1	VR2	VOLT REG 3.3V 400MA LDO CAP FREE NMOS SOT23-DBV5 ROHS
8	DDTA143TCA-7-F	DIODES INC.	1	Q2	TRANSISTOR-PNP PREBIASED 4.7K SOT23-DBV3 ROHS
9	BSS138TA	ZETEX	1	Q3	N-CH ENHANCEMENT MODE VERT DMOS FET SOT23-DBV3 ROHS
10	ESD8V0R1B-02LSE6327	INFINEON	2	TVS1,TVS2	TVS BIDIR ILINE 8V TSSLP-2-1 ROHS
11	SML-LXT0805YW-TR	LUMEX OPTO	1	P3.0	LED, YELLOW 2.0V SMD0805 ROHS
12	SML-LXT0805SRW-TR	LUMEX OPTO	1	RST	LED, RED 2.0V SMD0805 ROHS
13	LTST-C170TBKT	LITE-ON INC.	1	5V	LED, BLUE 3.3V SMD0805 ROHS
14	SIT8002AI-13-33E-6.00000T	SITIME	1	Y1	OSCILLATOR SMT 6MHz 3.3V OUT-ENABLE ROHS
15	C0402C471K5RACTU	KEMET	0	C0	CAP SMD0402 CERM 470PFD 50V 10% X7R ROHS
16	C0603C104K8RACTU	KEMET	15	C1, C6, C8, C10, C12, C14, C16, C17, C21, C22, C25, C26, C27, C28, C29	CAP SMD0603 CERM 0.1UFD 10V 5% X7R ROHS
17	GRM1885C1H101JA01D	MURATA	1	C2	CAP SMD0603 CERM 100PFD 50V 5% COG ROHS
18	C1608C0G1H102J	TDK CORP.	1	C3	CAP SMD0603 CERM 1000PFD 50V 5% COG ROHS
19	GRM1885C1H470JA01D	MURATA	2	C4, C5	CAP SMD0603 CERM 47PFD 50V 5% COG ROHS
20	C1608X7R1C105K	TDK	4	C7, C30, C54, C55	CAP SMD0603 CERM 1.0UFD 16V 10% X7R ROHS
21	LMK212BJ226MG-T	TAIYO YUDEN	6	C9, C11, C13, C15, C24, C38	CAP SMD0805 CERM 22UFD 10V 20% X5R ROHS
22	C1005X5R1A105K	TDK CORP	2	C18, C53	CAP SMD0402 CERM 1.0UFD 10V 10% X5R ROHS
23	GRM188R71C104KA01D	MURATA	2	C32, C37	CAP SMD0603 CERM 0.1UFD 16V 10% X7R ROHS
24	C2012X5R1C226K	TDK	2	C39, C51	CAP SMD0805 CERM 22UFD 16V 10% X5R ROHS
25	C2012X7R1C105K	TDK	3	C40, C42, C45	CAP SMD0805 CERM 1.0UFD 16V 10% X7R ROHS
26	GRM155R71C104KA88D	MURATA	6	C41, C43, C46, C59, C62, C63	CAP SMD0402 CERM 0.1UFD 16V X7R 10% ROHS
27	EEE-1CS100SR	PANASONIC	1	C44	CAP ALUM-ELECT SMD-VSA 10UFD 16V 20% ROHS
28	GRM188R71H472KA01D	MURATA	2	C47, C48	CAP SMD0603 CERM 4700PFD 50V 10% X7R ROHS
29	C1608C0G1H102J	TDK CORP.	0	C49, C50	CAP SMD0603 CERM 1000PFD 50V 5% COG ROHS
30	0402YC103KAT2A	AVX	1	C52	CAP SMD0402 CERM 0.01ufd 16V 10% X7R ROHS
31	GRM188R71C473KA01D	MURATA	2	C56, C57	CAP SMD0603 CERM 0.047UFD 16V X7R 10% ROHS
32	CRCW06034K70FKEA	VISHAY	1	R1	RESISTOR SMD0603 4.70K OHMS 1% 1/10W 4.70K ROHS
33	ERJ-3EKF1501V	PANASONIC	1	R2	RESISTOR SMD0603 1.50K OHM 1% THICK FILM 1/10W ROHS
34	CRCW060327R4FKEA	VISHAY	2	R3, R4	RESISTOR SMD0603 27.4 OHM 1/10W 1% ROHS
35	ERJ-3EKF3091V	PANASONIC	1	R5	RESISTOR SMD0603 3.09K OHM 1% THICK FILM 1/10W ROHS

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Table 4. Bill of Materials for TAS2552EMV (continued)

Item	MFG Part NUM	MFG	Qty	Ref Designators	Description
36	RMCF0603JT100K	STACKPOLE ELECTRONICS	1	R6	RESISTOR SMD0603 100K OHMS 5% 1/10W ROHS
37	RC0603FR-07649RL	YAGEO	2	R7, R9	RESISTOR SMD0603 THICK FILM 649 OHMS 1% 1/10W ROHS
38	RC0603JR-0710RL	YAGEO	13	R8, R26, R27, R28, R29, R35, R36, R50, R51, R52, R53, R54, R55	RESISTOR SMD0603 THICK FILM 10 OHM 5% 1/10W ROHS
39	ERJ-3GEY0R00V	PANASONIC	2	R10, R11	RESISTOR SMD0603 0.0 OHM 5% THICK FILM 1/10W ROHS
40	ERJ-3EKF1002V	PANASONIC	6	R13, R14, R21, R22, R40, R41	RESISTOR SMD0603 10.0K 1% THICK FILM 1/10W ROHS
41	RMCF0402ZT0R00	STACKPOLE ELECTRONICS	1	R15	ZERO OHM JUMPER SMT 0402 0 OHM 1/16W,5% ROHS
42	ERJ-3EKF3570V	PANASONIC	1	R16	RESISTOR SMD0603 357 OHM 1% THICK FILM 1/10W ROHS
43	ERJ-3EKF2701V	PANASONIC	2	R19, R20	RESISTOR SMD0603 2.70K OHMS 1% 1/10W ROHS
44	ERJ-3EKF33R0V	PANASONIC	3	R25, R31, R32	RESISTOR SMD0603 33.0 OHMS 1% 1/10W ROHS
45	RC0603FR-071KL	YAGEO	2	R38, R39	RESISTOR SMD0603 THICK FILM 1.00K OHM 1% 1/10W ROHS
46	RC0402FR-07200KL	YAGEO	1	R42	RESISTOR SMD0402 THICK FILM 200K OHMS 1% 1/16W ROHS
47	RMCF0402FT100R	STACKPOLE ELECTRONICS	2	R44, R45	RESISTOR SMD0402 100 OHMS 1% 1/16W ROHS
48	CRCW040210K0FKED	VISHAY	2	R46, R47	RESISTOR SMD0402 10.0K OHMS 1% 1/16W ROHS
49	ERJ-3GEY0R00V	PANASONIC	0	R300	RESISTOR SMD0603 0.0 OHM 5% THICK FILM 1/10W ROHS
50	MPZ2012S601A	TDK	2	FB1, FB2	FERRITE BEAD SMD0805 600 Ohms 2A ROHS
51	ERJ-6GEY0R00V	PANASONIC	2	FB3, FB4	RESISTOR SMD0805 ZERO OHM 5% 1/8W ROHS
52	XFL4020-222MEB	COIL CRAFT	1	L1	SHIELDED POWER INDUCTOR 2.2uH 6.0A ROHS
53	PBC02SAAN	SULLINS	2	J1, J2	HEADER THRU MALE 2 PIN 100LS 120 TAIL GOLD ROHS
54	TSW-110-08-T-T	SAMTEC	1	JP3	HEADER,THU,30P,3X10,MALE,TRIPLE ROW,100LS,200TL
55	26630301RP2	NORCOMP	5	JP4, JP6, JP20, JP21, JP22	HEADER 3 PIN, PCB 2.0MM ROHS
56	26630201RP2	NORCOMP	8	DAT OUT, IV CLK, JP1, JP2, JP5, JP7, JP DOUT, WE	HEADER 2 PIN, PCB 2.0MM ROHS
57	26640801RP2	NORCOMP	1	IOVDD-SEL	HEADER 8 PIN 2x4 PCB 2.0MM ROHS
58	26640601RP2	NORCOMP	1	5V-SEL	HEADER 6 PIN 2x3 PCB 2.0MM ROHS
59	B2P-VH(LF)(SN)	JST	1	VBAT-JP	JACK JST-VH 2-PIN 3.96mmLS ROHS
60	UX60-MB-5ST	HIROSE	1	USB	JACK USB MINIB SMT-RA 5PIN ROHS
61	PJRAN1X1U01X	SWITCHCRAFT	1	TAS2552-AIN	JACK, RCA 3-PIN PCB-RA BLACK ROHS
62	PJ-102B	CUI INC.	1	VBAT DEMO	JACK MINI-PWR THRU-RA 2,5ID/5.5OD 16VDC 5A ROHS
63	1725656	PHOENIX CONTACT	1	TB1	TERMINAL BLOCK MPT COMBICON 2PIN 6A/125V GREEN 100LS ROHS
64	5001	KEYSTONE ELECTRONICS	9	GNDx9	PC TESTPOINT, BLACK, ROHS
65	5002	KEYSTONE ELECTRONICS	20	A0, EN, DIN, LOL, LOR, SCL, SDA, BCLK, DOUT, MCLK, VBST, +1.8V, +3.3V, IOVDD, IVCLK, LRCLK, AVDD-TP, OUT+ TP, OUT- TP, VBAT-TP	PC TESTPOINT, WHITE, ROHS
66	TL1015AF160QG	E-SWITCH	3	GPIO, RESET, DISABLE	SWITCH, MOM, 160G SMT 4X3MM ROHS
67	111-2223-001	EMERSON NPCS	7	+5V, GND, AVDD, OUT+, OUT-, VBAT, GND22	BINDING-POST,NONINS,THRU,ROHS
68	2029	KEYSTONE ELECTRONICS	4	STANDOFFS	STANDOFF 4-40 0.5IN 3/16IN DIA ALUM RND F-F ROHS
69	PMSSS 440 0025 PH	B&F FASTENER SUPPLY	4	STANDOFF SCREWS	4-40 SCREW STEEL 0.250 IN ROHS
70	969102-0000-DA	3M	8	JP3-LRCLK(L), JP3-BCLK(L), JP3-MCLK(L), JP3-DOUT(L), JP3-DIN(L), JP3-SCL(L), JP3-SDA(L), JP3-A0(R)	SHUNT BLACK AU FLASH 0.100LS OPEN TOP ROHS
71	810-002-SP2L001	NORCOMP INC.	10	JP1, JP2, JP4(1-2), JP5, JP6(1-2), JP20(1-2), JP21(1-2), JP22(2-3), 5V-SEL (Shunt VBAT), IOVDD-SEL(+3.3V)	SHUNT BLACK AU FLASH 2mmLS OPEN TOP ROHS
		TOTAL	201		

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Table 4. Bill of Materials for TAS2552EMV (continued)

Item	MFG Part NUM	MFG	Qty	Ref Designators	Description
SPECIAL NOTES TO THIS BILL OF MATERIALS					
SN1	These assemblies are ESD sensitive, ESD precautions shall be observed.				
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.				

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Revision History

Changes from Original (February 2014) to A Revision	Page
• Added 'be sure... JP5 is not installed' to *Analog input* bullet in the *Jumpering Notes* section.	5

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

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2 *Limited Warranty and Related Remedies/Disclaimers*:

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

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   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

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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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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.

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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.

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