



ABSTRACT

This user's guide describes the operation of the TAS5822M Evaluation Modules (EVM). The TAS5822MEVM is a stand-alone EVM. Use the PurePath™ Control Console 3 GUI (PPC3) to initialize and operate this EVM. The main contents of this document are:

1. Hardware descriptions and implementation
2. TAS5822MEVM operations

Required equipment and accessories:

1. TAS5822MEVM
2. A USB micro type-B cable
3. Power Supply Unit (PSU)
4. Speakers and cables
5. Desktop or laptop running Windows 7, Windows 8 or Windows 10
6. Audio source: This can be a DVD player with an optical or analog cable or Playback Media from Windows 7, Windows 8, Windows 10.

Table of Contents

1 Trademarks	1
2 Hardware Overview	2
2.1 Features.....	2
2.2 Functions.....	2
2.3 Detailed Operations.....	3
3 Hardware Setup	3
3.1 I ² C Device Addresses.....	3
4 Schematics, Board Layouts, and Bill of Materials	3
4.1 Schematics.....	4
4.2 Board Layouts.....	9
4.3 Bill of Materials.....	11

1 Trademarks

All trademarks are the property of their respective owners.

2 Hardware Overview

The TAS5822MEVM showcases the latest TI digital input Class-D closed loop amplifier. The TAS5822M is a digital input stereo Class-D audio amplifier with enhanced processing and low idle power dissipation. The TAS5822EVM is a stand-alone EVM, which has a single power supply input, USB control via PurePath Control Console 3 (PPC3) and flexible audio input options.

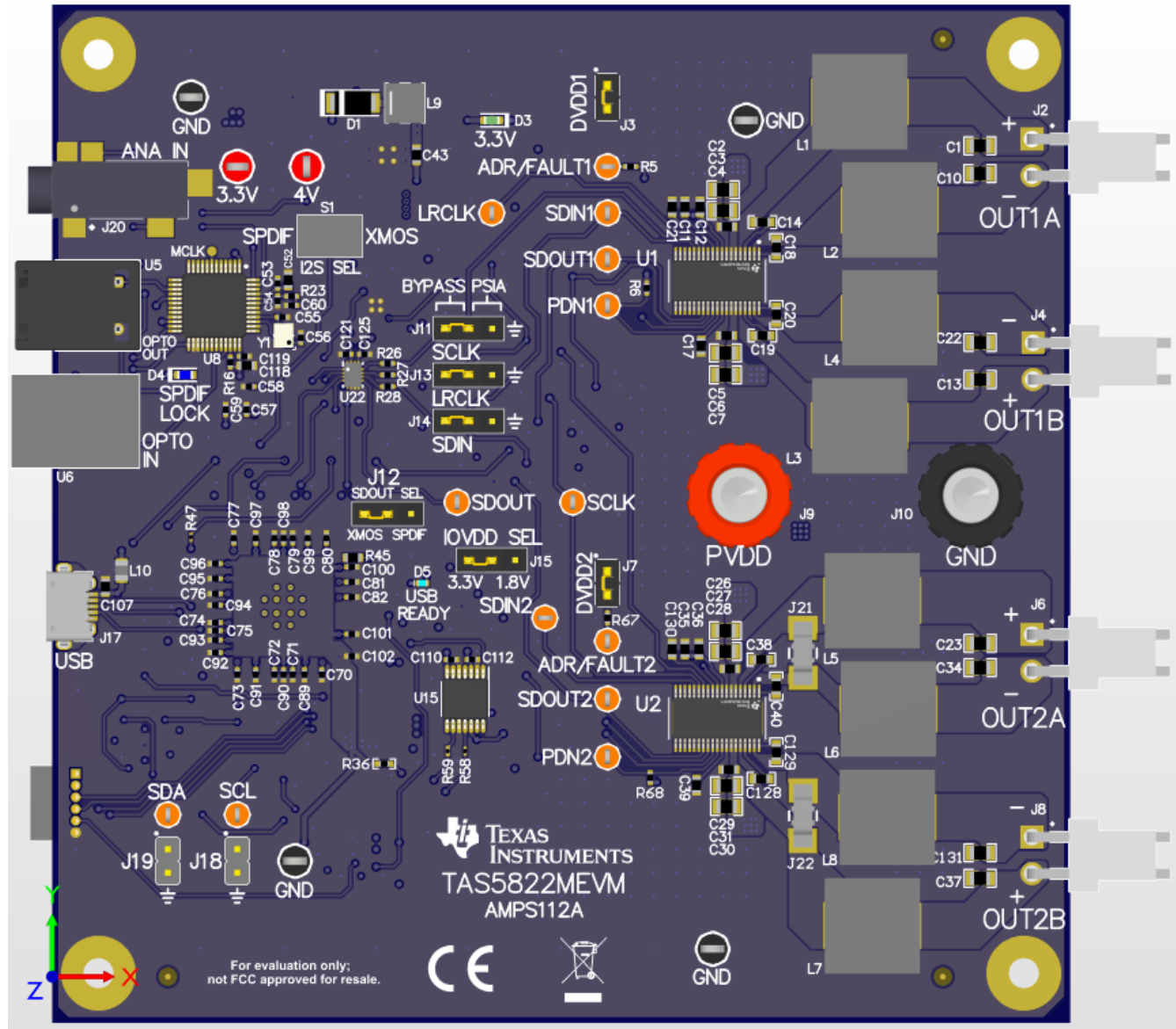


Figure 2-1. TAS5822MEVM

2.1 Features

- 96-kHz Input Sample Rate Support
- 2.0, Mono and 2.1 Capable
- Operates in BTL or PBTL
- Provides flexible input signal routing (USB, Analog, Optical and external I2S)
- Demonstration, Evaluation and Development environment via the PurePath Console 3 software (GUI)

2.2 Functions

The digital audio data input to the TAS5822MEVM is selectable from USB audio, analog, optical and PSIA (external I2S).

2.3 Detailed Operations

The TAS5822MEVM only requires a single supply to operate. Three different audio sources can be selected:

1. If XMOS is selected manually by toggling the S1 switch, the Windows Media Player can be used to stream audio.
2. If SPDIF is selected manually by toggling the S1 switch, a DVD player with an optical cable or an analog cable can be used to provide audio stream.
3. If external digital audio source such as Programmable Serial Interface Adapter (PSIA) from Audio Precision, jumpers can be used to insert external I2S signals.

The USB connection is also used to provide I²C communications with the two TAS5822M devices on the EVM. The Pure Path Console 3 (PPC3) is the software tool which can initialize and operate this EVM.

3 Hardware Setup

1. Connect speakers to TAS5822MEVM.
2. Connect a PSU to the TAS5822MEVM and turn on the power. The 3.3-V LED (Green) is illuminated.
3. Plug in a USB cable from the PC to the TAS5822MEVM. The USB READY LED (Blue) is also illuminated.
4. If an optical source is used, the blue SPDIF LOCK LED is illuminated.

3.1 I²C Device Addresses

The default 7-bit I²C addresses on the EVM are set to 0x2c for the top device (U1) and 0x2d for the bottom one (U2).

4 Schematics, Board Layouts, and Bill of Materials

This section includes the EVM schematics, board layouts and bill of materials.

4.1 Schematics

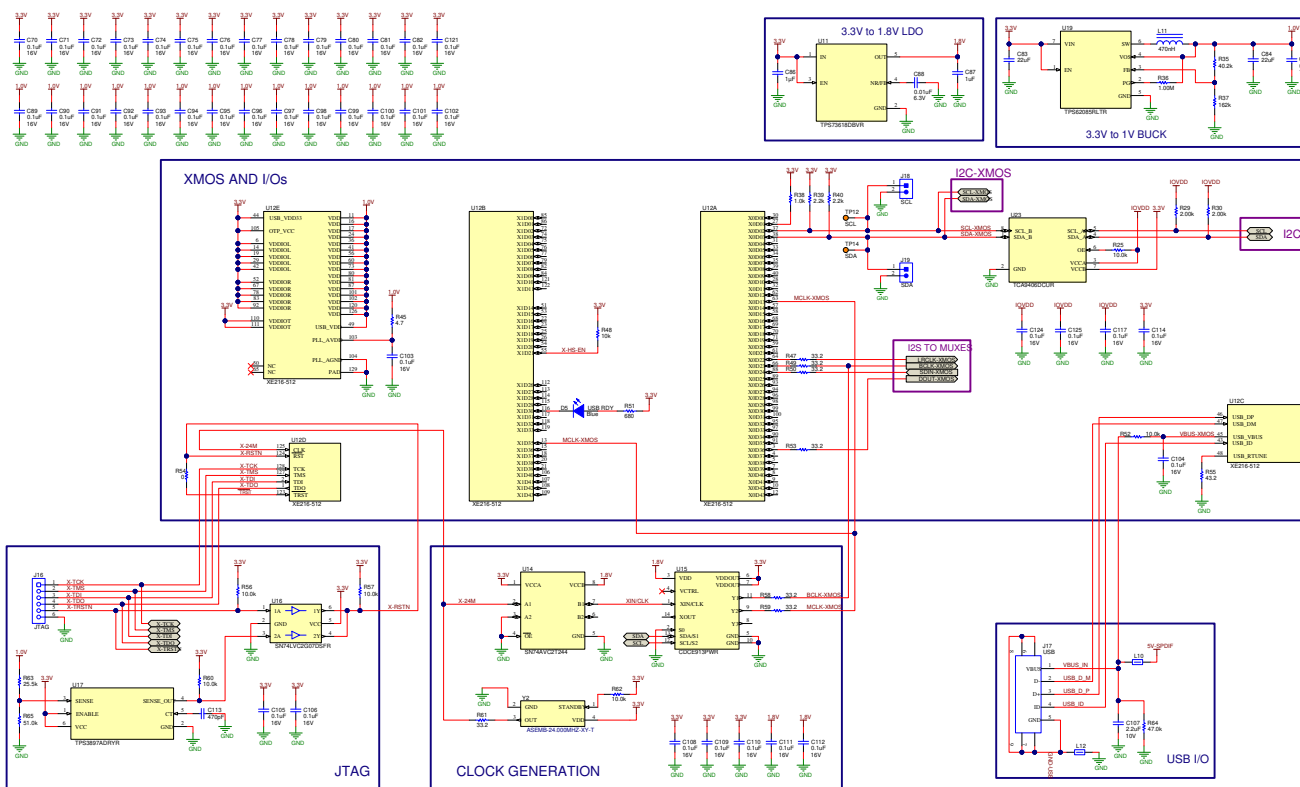


Figure 4-1. TAS5822MEVM Schematic (1 of 5)

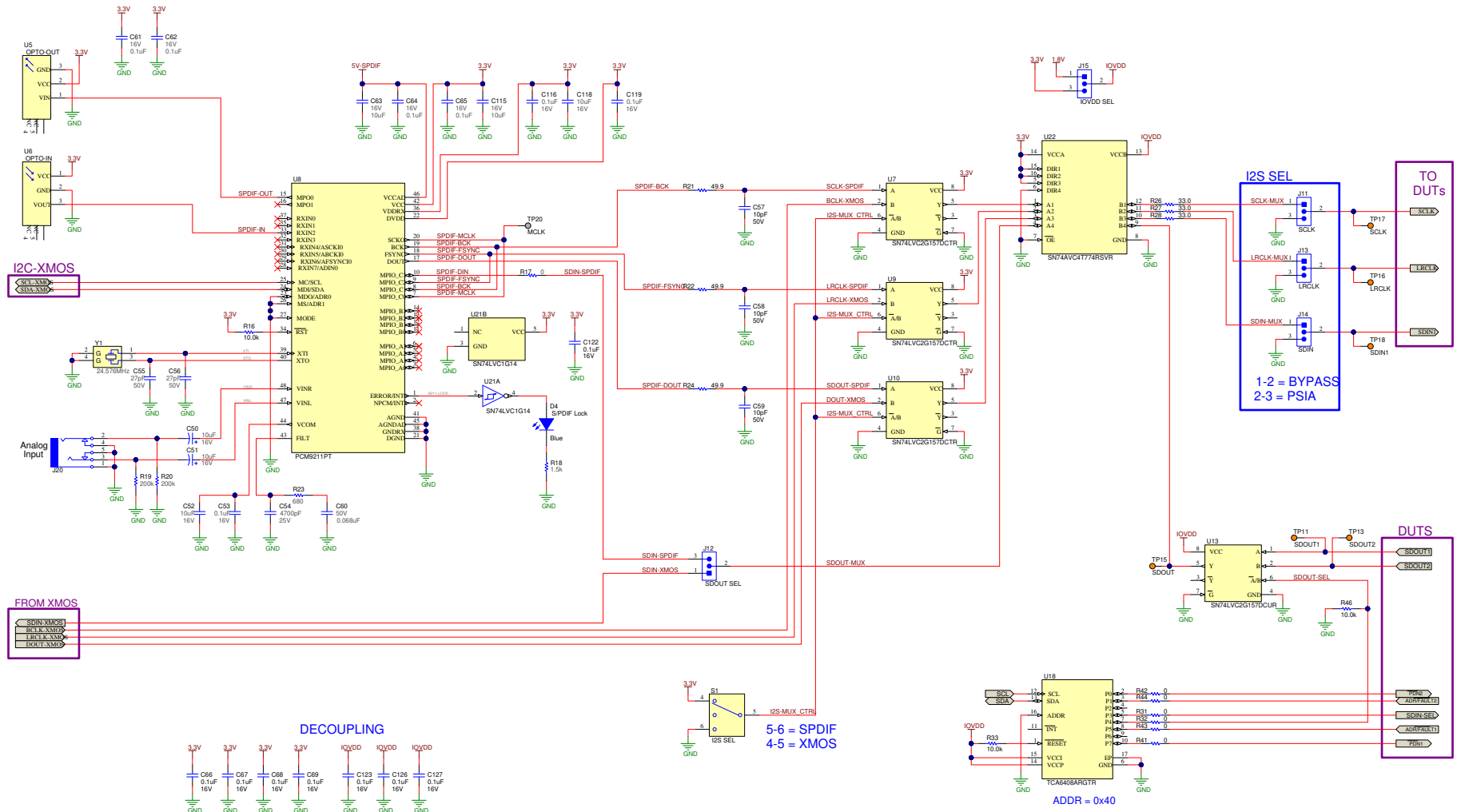


Figure 4-2. TAS5822MEVM Schematic (2 of 5)

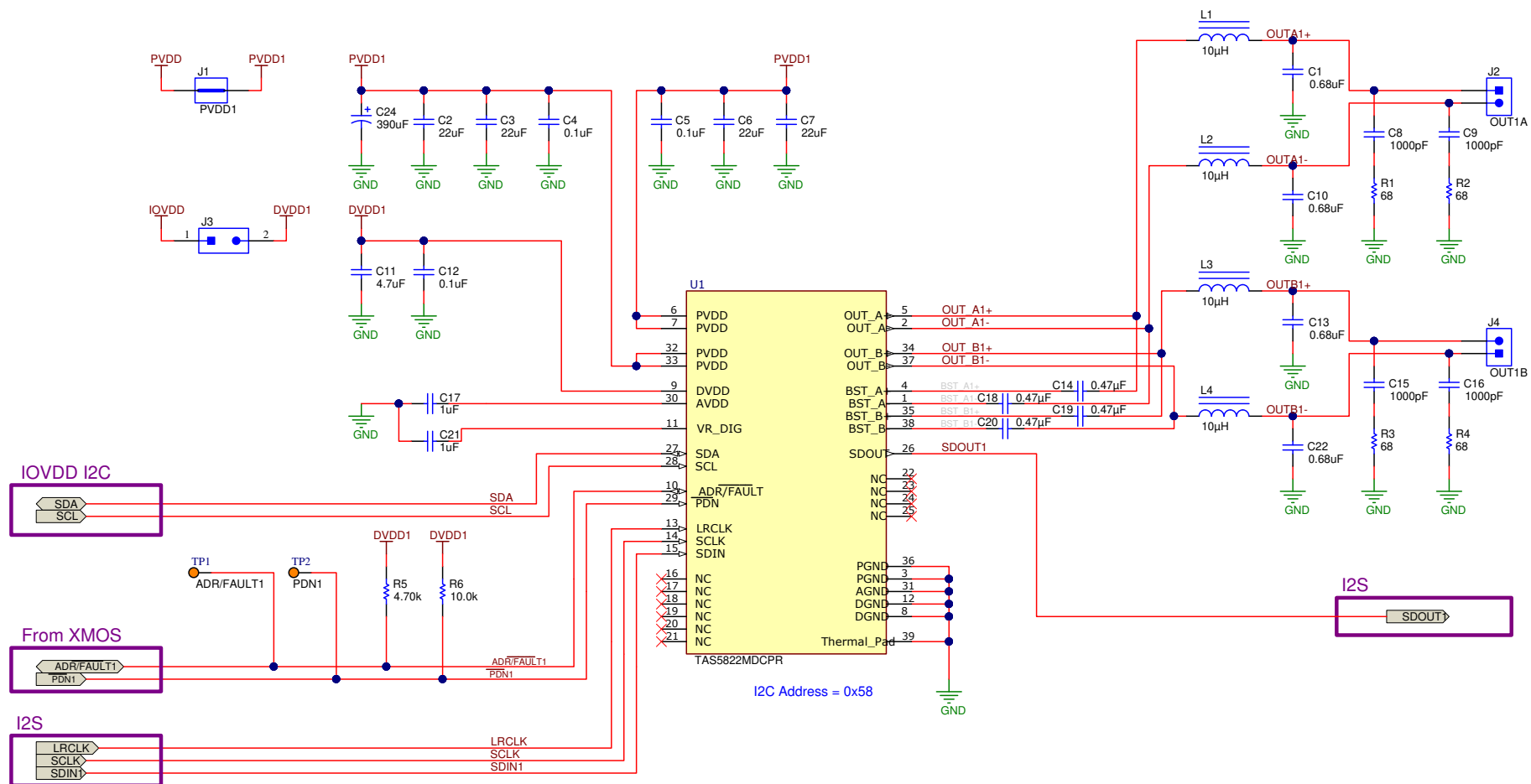


Figure 4-3. TAS5822MEVM Schematic (3 of 5)

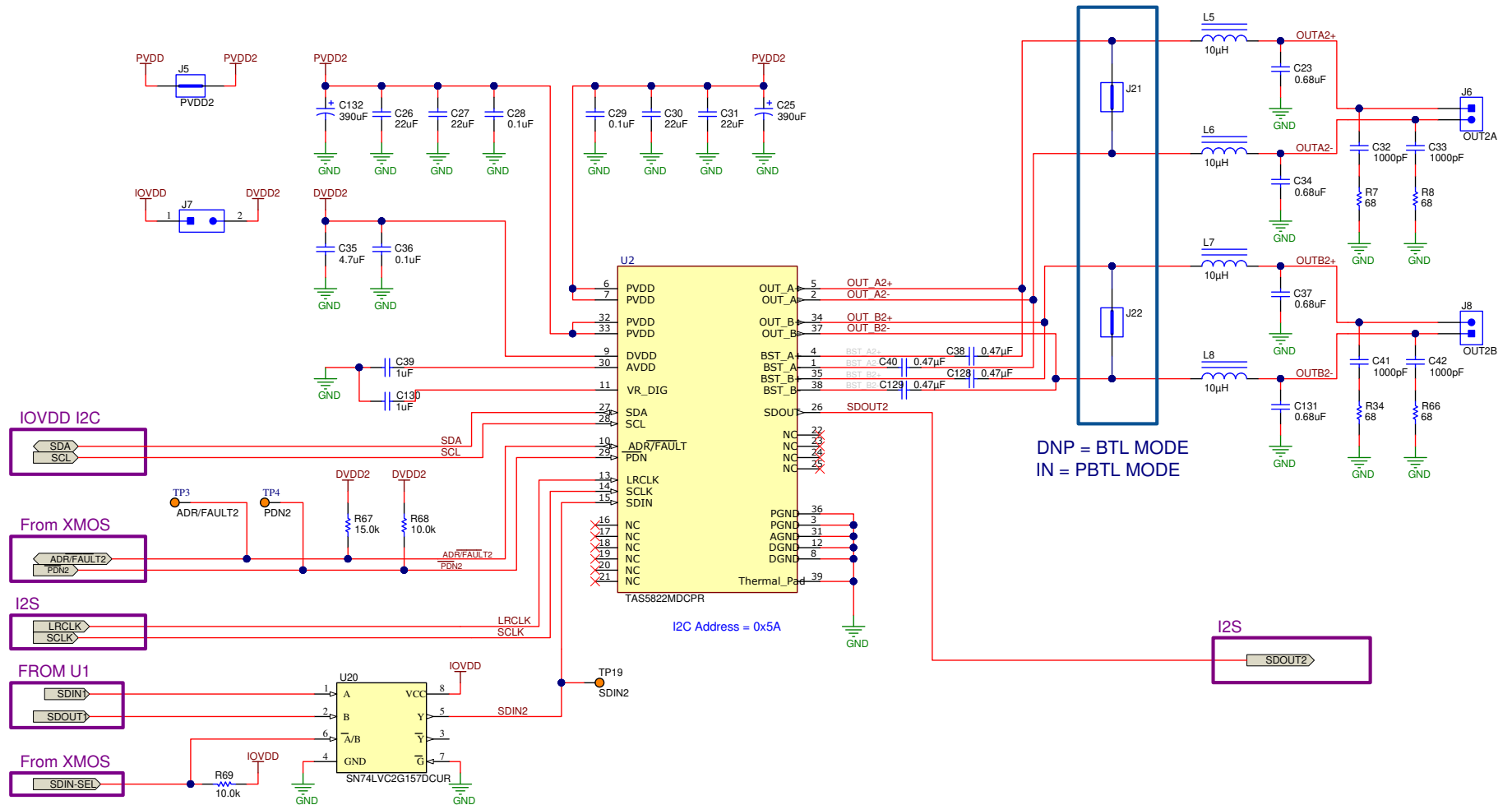


Figure 4-4. TAS5822MEVM Schematic (4 of 5)

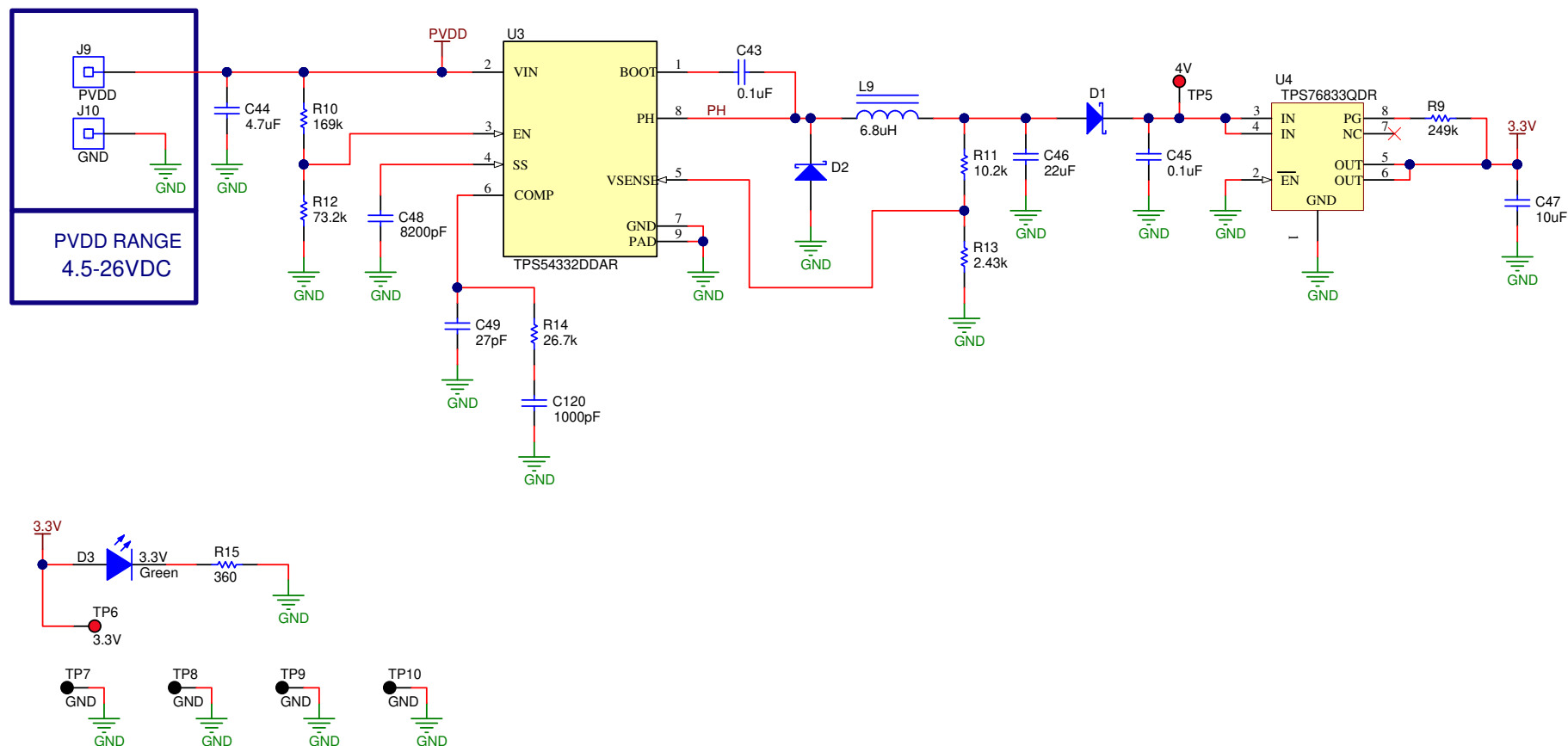


Figure 4-5. TAS5822MEVM Schematic (5 of 5)

4.2 Board Layouts

Figure 4-6 and Figure 4-7 illustrate the board layouts for the EVM.

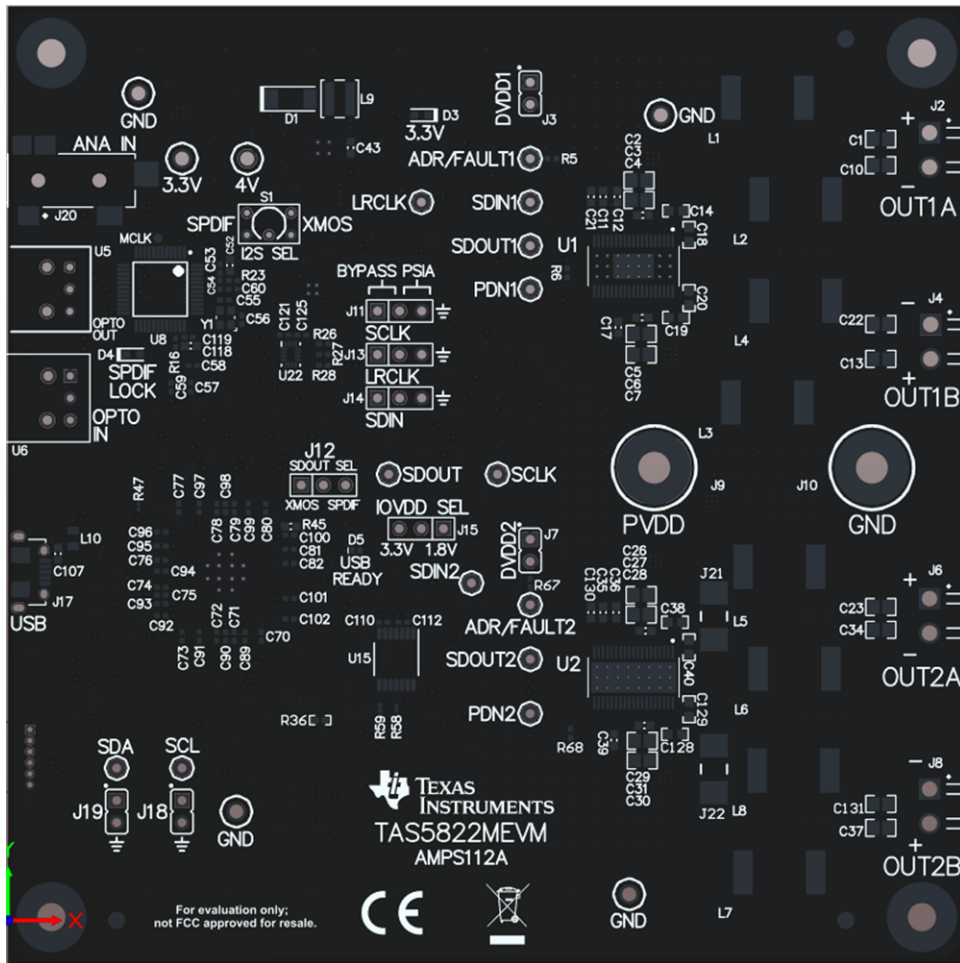


Figure 4-6. TAS5822MEVM Top Overlay

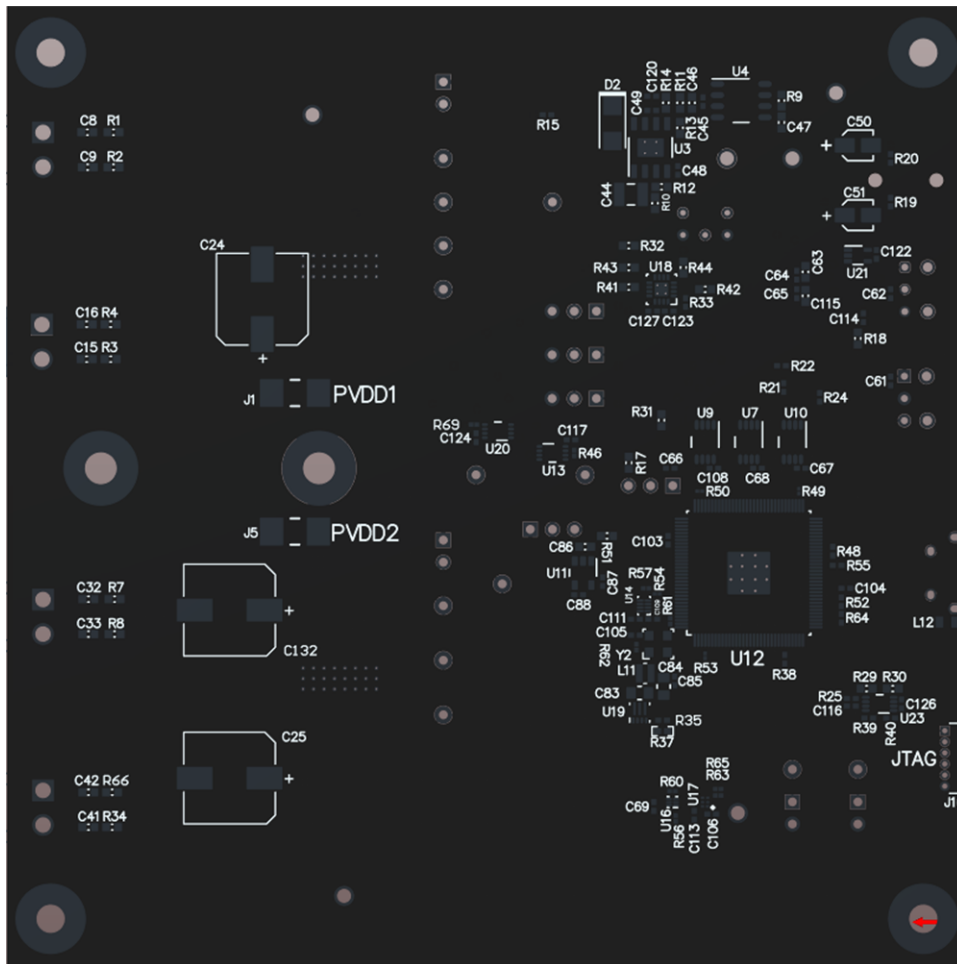


Figure 4-7. TAS5822MEVM Bottom Overlay

4.3 Bill of Materials

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
C1, C10, C13, C22, C23, C34, C37, C131	8	0.68uF	CAP, CERM, 0.68 uF, 50 V, +/- 10%, X7R, 0805	0805	C0805C684K5RAC TU	Kemet
C2, C3, C6, C7, C26, C27, C30, C31	8	22uF	CAP, CERM, 22 uF, 35 V, +/- 20%, JB, 0805	0805	C2012JB1V226M1 25AC	TDK
C4, C5, C12, C28, C29, C36	6	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0603	0603	C0603C104K4RAC TU	Kemet
C11, C35	2	4.7uF	CAP, CERM, 4.7 uF, 10 V, +/- 10%, X5R, 0603	0603	C0603C475K8PACTU	Kemet
C14, C18, C19, C20, C38, C40, C128, C129	8	0.47uF	CAP, CERM, 0.47 uF, 50 V, +/- 10%, X5R, 0603	0603	GRM188R61H474KA12 D	MuRata
C17, C21, C39, C130	4	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X5R, 0603	0603	C0603C105K4PACTU	Kemet
C24, C25, C132	3	390uF	CAP, AL, 390 uF, 35 V, +/- 20%, 0.08 ohm, SMD	10x10	UCL1V391MNL1GS	Nichicon
C43	1	0.1uF	CAP, CERM, 0.1 uF, 50 V, +/- 10%, X7R, 0603	0603	GCM188R71H104KA57 D	MuRata
C44	1	4.7uF	CAP, CERM, 4.7 uF, 50 V, +/- 10%, X7R, 1210	1210	GRM32ER71H475KA88 L	MuRata
C45, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C85, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100, C101, C102, C103, C104, C105, C106, C108, C109, C110, C111, C112, C114, C117, C121, C122, C123, C124, C125, C126, C127	51	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	GRM155R71C104KA88 D	MuRata
C46	1	22uF	CAP, CERM, 22 uF, 6.3 V, +/- 20%, X5R, 0603	0603	GRM188R60J226MEA0 J	MuRata

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
C47	1	10uF	CAP, CERM, 10 uF, 10 V, +/- 20%, X5R, 0603	0603	C1608X5R1A106M080A C	TDK
C48	1	8200pF	CAP, CERM, 8200 pF, 50 V, +/- 10%, X7R, 0402	0402	GRM155R71H822KA88 D	MuRata
C49	1	27pF	CAP, CERM, 27 pF, 50 V, +/- 5%, C0G/ NPO, 0402	0402	GRM1555C1H270JA01 D	MuRata
C50, C51	2	10uF	CAP, AL, 10 uF, 16 V, +/- 20%, SMD	D3xL5.4mm	UWX1C100MCL2GB	Nichicon
C52, C63, C115, C118	4	10uF	CAP, CERM, 10 uF, 16 V, +/- 20%, X5R, 0603	0603	EMK107BBJ106MA-T	Taiyo Yuden
C53, C61, C62, C64, C65, C116, C119	7	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	885012205037	Wurth Elektronik
C54	1	4700pF	CAP, CERM, 4700 pF, 25 V, +/- 10%, X7R, 0402	0402	GRM155R71E472KA01 D	MuRata
C55, C56	2	27pF	CAP, CERM, 27 pF, 50 V, +/- 5%, C0G/ NPO, 0402	0402	GJM1555C1H270JB01	MuRata
C57, C58, C59	3	10pF	CAP, CERM, 10 pF, 50 V, +/- 5%, C0G/ NPO, 0402	0402	GRM1555C1H100JA01 D	MuRata
C60	1	0.068uF	CAP, CERM, 0.068 uF, 50 V, +/- 10%, X7R, 0402	0402	C1005X7R1H683K050B B	TDK
C83, C84	2	22uF	CAP, CERM, 22 uF, 16 V, +/- 20%, X5R, 0805	0805	GRM219R61C226ME15 L	MuRata
C86	1	1uF	CAP, CERM, 1 uF, 16 V, +/- 20%, X7R, 0603	0603	CL10B105MO8NNWC	Samsung
C87	1	1uF	CAP, CERM, 1 uF, 6.3 V, +/- 20%, X5R, 0402	0402	GRM152R60J105ME15 D	MuRata
C88	1	0.01uF	CAP, CERM, 0.01 uF, 6.3 V, +/- 10%, X7R, 0402	0402	GRM155R70J103KA01 D	MuRata
C107	1	2.2uF	CAP, CERM, 2.2 uF, 10 V, +/- 10%, X7R, 0603	0603	GRM188R71A225KE15 D	MuRata
C113	1	470pF	CAP, CERM, 470 pF, 25 V, +/- 5%, C0G/ NPO, 0402	0402	GRM1555C1E471JA01 D	MuRata
C120	1	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, X7R, 0402	0402	GRM155R71H102KA01 D	MuRata
D1	1	30V	Diode, Schottky, 30 V, 3 A, M-FLAT	M-FLAT	CMS01(TE12L,Q,M)	Toshiba
D2	1	60V	Diode, Schottky, 60 V, 3 A, SMA	SMA	B360A-13-F	Diodes Inc.
D3	1	Green	LED, Green, SMD	LED_0603	150060GS75000	Wurth Elektronik
D4	1	Blue	LED, Blue, SMD	LED_0603	150060BS75000	Wurth Elektronik
D5	1	Blue	LED, Blue, SMD	Blue LED	SMLP12BC7TT86	Rohm
H1, H2, H3, H4	4		MACHINE SCREW PAN PHILLIPS 4-40		PMS 440 0038 PH	B&F Fastener Supply

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
H5, H6, H7, H8	4		ROUND STANDOFF 4-40 ALUM 1/2"	ROUND STANDOFF 4-40 ALUM 1/2 inch	2027	Keystone
J1, J5	2		JUMPER TIN SMD	6.85x0.97x2.51 mm	S1911-46R	Harwin
J2, J4, J6, J8	4		Header (friction lock), 3.96mm, 2x1, Tin, R/A, TH	Header, 2x1, 3.96mm, R/A	B2PS-VH(LF)(SN)	JST Manufacturing
J3, J7, J18, J19	4		Header, 100mil, 2x1, Gold, TH	Sullins 100mil, 1x2, 230 mil above insulator	PBC02SAAN	Sullins Connector Solutions
J9	1		Binding Post, RED, TH	11.4x27.2mm	7006	Keystone
J10	1		Binding Post, BLACK, TH	11.4x27.2mm	7007	Keystone
J11, J12, J13, J14, J15	5		Header, 100mil, 3x1, Gold, TH	PBC03SAAN	PBC03SAAN	Sullins Connector Solutions
J16	1		Receptacle, 50mil, 6x1, Gold, R/A, TH	6x1 Receptacle	LPPB061NGCN-RC	Sullins Connector Solutions
J17	1		Connector, Receptacle, Micro-USB Type AB, R/A, Bottom Mount SMT	Connector, USB Micro AB	DX4R205JJAR1800	JAE Electronics
J20	1		Audio Jack, 3.5mm, Stereo, R/A, SMT	Phone Jack, 6x5x17mm	35RASMT4BHNTRX	Switchcraft
L1, L2, L3, L4, L5, L6, L7, L8	8	10uH	Inductor, Shielded, Ferrite, 10 µH, 4.4 A, 0.0304 ohm, SMD		1274AS-H-100M=P3	MuRata
L9	1	6.8uH	Inductor, Shielded, Composite, 6.8 uH, 3.6 A, 0.0674 ohm, SMD	4.0x3.1x4.0mm	XAL4030-682MEB	Coilcraft
L10, L12	2	600 ohm	Ferrite Bead, 600 ohm @ 100 MHz, 2 A, 0805	0805	MPZ2012S601AT000	TDK
L11	1	470nH	Inductor, Shielded, Ferrite, 470 nH, 2 A, 0.059 ohm, SMD	Inductor, 2x1.2x2mm	VLS2012ET-R47N	TDK
R5	1	4.70k	RES, 4.70 k, 1%, 0.1 W, 0402	0402	ERJ-2RKF4701X	Panasonic
R6, R16, R33, R68	4	10.0k	RES, 10.0 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040210K0FKED	Vishay-Dale
R9	1	249k	RES, 249 k, 1%, 0.1 W, 0603	0603	RC0603FR-07249KL	Yageo America
R10	1	169k	RES, 169 k, 1%, 0.1 W, 0603	0603	RC0603FR-07169KL	Yageo America
R11	1	10.2k	RES, 10.2 k, 1%, 0.1 W, 0603	0603	RC0603FR-0710K2L	Yageo America
R12	1	73.2k	RES, 73.2 k, 1%, 0.1 W, 0603	0603	RC0603FR-0773K2L	Yageo America
R13	1	2.43k	RES, 2.43 k, 1%, 0.1 W, 0603	0603	RC0603FR-072K43L	Yageo America
R14	1	26.7k	RES, 26.7 k, 1%, 0.1 W, 0603	0603	RC0603FR-0726K7L	Yageo America
R15	1	360	RES, 360, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402360RJNED	Vishay-Dale
R17	1	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R18	1	1.5k	RES, 1.5 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06031K50JNEA	Vishay-Dale

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
R19, R20	2	200k	RES, 200 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402200KJNED	Vishay-Dale
R21, R22, R24	3	49.9	RES, 49.9, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040249R9FKED	Vishay-Dale
R23	1	680	RES, 680, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402680RJNED	Vishay-Dale
R25, R52	2	10.0k	RES, 10.0 k, 1%, 0.1 W, 0402	0402	ERJ-2RKF1002X	Panasonic
R26, R27, R28	3	33.0	RES, 33.0, 1%, 0.1 W, 0402	0402	ERJ-2RKF33R0X	Panasonic
R29, R30	2	2.00k	RES, 2.00 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ3EKF2001V	Panasonic
R31, R32, R41, R42, R43, R44	6	0	RES, 0, 5%, 0.1 W, 0603	0603	RC0603JR-070RL	Yageo America
R35	1	40.2k	RES, 40.2 k, 1%, 0.1 W, AEC-Q200 Grade 0, 0402	0402	ERJ-2RKF4022X	Panasonic
R36	1	1.00Meg	RES, 1.00 M, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04021M00FKED	Vishay-Dale
R37	1	162k	RES, 162 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402162KFKED	Vishay-Dale
R38	1	1.0k	RES, 1.0 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04021K00JNED	Vishay-Dale
R39, R40	2	2.2k	RES, 2.2 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04022K20JNED	Vishay-Dale
R45	1	4.7	RES, 4.7, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06034R70JNEA	Vishay-Dale
R46, R56, R57, R60, R62, R69	6	10.0k	RES, 10.0 k, 1%, 0.05 W, 0201	0201	CRCW020110K0FKED	Vishay-Dale
R47, R49, R50, R53, R58, R59, R61	7	33.2	RES, 33.2, 1%, 0.05 W, 0201	0201	RC0201FR-0733R2L	Yageo America
R48	1	10k	RES, 10 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040210K0JNED	Vishay-Dale
R51	1	680	RES, 680, 1%, 0.1 W, 0603	0603	RC0603FR-07680RL	Yageo America
R54	1	0	RES, 0, 5%, 0.05 W, 0201	0201	ERJ-1GE0R00C	Panasonic
R55	1	43.2	RES, 43.2, 1%, 0.1 W, AEC-Q200 Grade 0, 0402	0402	ERJ2RKF43R2X	Panasonic
R63	1	25.5k	RES, 25.5 k, 1%, 0.05 W, 0201	0201	RC0201FR-0725K5L	Yageo America
R64	1	47.0k	RES, 47.0 k, 1%, 0.0625 W, 0402	0402	RC0402FR-0747KL	Yageo America
R65	1	51.0k	RES, 51.0 k, 1%, 0.05 W, 0201	0201	RC0201FR-0751KL	Yageo America
R67	1	15.0k	RES, 15.0 k, .1%, .063 W, AEC-Q200 Grade 0, 0402	0402	ERA-2AEB153X	Panasonic
S1	1		Switch, Toggle, SPDT 1Pos, TH	7 X 11 X4.5 mm	G12AP	NKK Switches

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
SH1, SH2, SH3, SH4, SH5, SH6, SH7	7	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
TP1, TP2, TP3, TP4, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19	13		Test Point, Miniature, Orange, TH	Orange Miniature Testpoint	5003	Keystone
TP5, TP6	2		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone
TP7, TP8, TP9, TP10	4		Test Point, Compact, Black, TH	Black Compact Testpoint	5006	Keystone
U1, U2	2		Inductor-Less, Digital Input, Stereo, Closed-Loop Class-D Audio Amplifier with 96kHz Enhanced Processing	HTSSOP38	TAS5822MDCPR	Texas Instruments
U3	1		3.5V to 28V Input, 3.5A, 1MHz Step-Down Converter with Eco-mode, DDA0008H (SOIC-8)	DDA0008H	TPS54332DDAR	Texas Instruments
U4	1		Single Output Fast Transient Response LDO, 1 A, Fixed 3.3 V Output, 2.7 to 10 V Input, with Low IQ, 8-pin SOIC (D), -40 to 125 degC, Green (RoHS & no Sb/Br)	D0008A	TPS76833QDR	Texas Instruments
U5	1		Fiber Optic Transmitter, TH	9.7x13.5mm	EAPLTAA4	Everlight
U6	1		Photolink- Fiber Optic Receiver, TH	13.5x10x9.7mm	PLR135/T10	Everlight
U7, U9, U10	3		Single 2-Line to 1-Line Data Selector/ Multiplexer, DCT0008A, LARGE T&R	DCT0008A	SN74LVC2G157DCTR	Texas Instruments
U8	1		216 kHz Digital Audio Interface Transceiver (DIX) with Stereo ADC and Routing, PCM, S / PDIF, ADC, 4.5 - 5.5V for Analog, 2.9 - 3.6V for DIX, -40 to 85 degC, 48-Pin LQFP (PT), Green (RoHS & no Sb/Br)	PT0048A	PCM9211PT	Texas Instruments
U11	1		Single Output LDO, 400mA, Adj.(1.2 to 5.5V), Cap free, Low Noise, Reverse Current Protection, DBV0005A (SOT-23-5)	DBV0005A	TPS73618DBVR	Texas Instruments
U12	1		IC MCU 512KB RAM, 128TQFP	TQFP-128	XEF216-512-TQ128-C20	XMOS semiconductor
U13, U20	2		Single 2-Line to 1-Line Data Selector/ Multiplexer, DCU0008A, LARGE T&R	DCU0008A	SN74LVC2G157DCUR	Texas Instruments
U14	1		Dual-Bit Dual-Supply Bus Transceiver, DQM0008A (X2SON-8)	DQM0008A	SN74AVC2T244DQMR	Texas Instruments
U15	1		Programmable 1-PLL VCXO Clock Synthesizer with 2.5-V or 3.3-V LVCMOS Outputs, PW0014A (TSSOP-14)	PW0014A	CDCE913PWR	Texas Instruments

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
U16	1		Enhanced Product Dual Buffer/Driver with Open-Drain Output, DCK0006A (SOT-SC70-6)	DSF0006A	SN74LVC2G07DSFR	Texas Instruments
U17	1		Single Channel, Ultra Small, Adjustable Supervisory Circuit with Active-High, Open-Drain Output, 1 Supply Monitored, -40 to 125 degC, 6-pin SON (DRY), Green (RoHS & no Sb/Br)	DRY0006A	TPS3897ADRYR	Texas Instruments
U18	1		Low-Voltage 8-Bit I2C and SMBus I/O Expander, 1.65 to 5.5 V, -40 to 85 degC, 16-pin QFN (RGT), Green (RoHS & no Sb/Br)	RGT0016A	TCA6408ARGTR	Texas Instruments
U19	1		3-A Step-Down Converter with DCS-Control and Hiccup Short Circuit Protection in 2x2 HotRod Package, RLT0007A (VSON-HR-7)	RLT0007A	TPS62085RLTR	Texas Instruments
U21	1		Single Schmitt-Trigger Inverter, DCK0005A (SOT-SC70-5)	DCK0005A	SN74LVC1G14DCKR	Texas Instruments
U22	1		4-Bit Dual-Supply Bus Transceiver With Configurable Voltage-Level Shifting and 3-State Outputs, RSV0016A (UQFN-16)	RSV0016A	SN74AVC4T774RSVR	Texas Instruments
U23	1		2-Bit Bidirectional 1-MHz I2C Bus and SMBus Voltage-Level Shifter, DCU0008A (VSSOP-8)	DCU0008A	TCA9406DCUR	Texas Instruments
Y1	1		Crystal, 24.576 MHz, 10pF, SMD	2.5x0.5x2.0mm	ABM10-24.576MHZ-E20-T	Abracon Corporation
Y2	1		Oscillators, 24 MHz, CMOS, 1.8 to 3.3V, SMD	4-Pin SMD, Body 3.2 x 2.5 mm , Height 0.9 mm	ASEMB-24.000MHZ-XY-T	Abracon Corporation
C8, C9, C15, C16, C32, C33, C41, C42	0	1000pF	CAP, CERM, 1000 pF, 50 V, +/- 10%, COG/NP0, 0603	0603	06035A102KAT2A	AVX
FID1, FID2, FID3	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
J21, J22	0		JUMPER TIN SMD	6.85x0.97x2.51 mm	S1911-46R	Harwin
R1, R2, R3, R4, R7, R8, R34, R66	0	68	RES, 68, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW060368R0JNEA	Vishay-Dale

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