TLV320AIC3263EVM-U Evaluation Module

User's Guide

![Texas Instruments logo]

Contents

List of Figures

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EVM Overview

This user's guide describes the operation, use, features and characteristics of the TLV320AIC3263EVM-U.

1.1 Features

- Full featured EVM with the TLV320AIC3263 Audio Codec
- USB connection to PC provides power, control and streaming audio for quick evaluation
- Easy-to-use AIC3263 Codec Control (CC) software provides graphical user interface to configure and control AIC3263

1.2 Introduction

This specific evaluation module (EVM) is a programmable USB audio device that features the TLV320AIC3263 Audio Codec with miniDSP.

1.3 Getting Started

1. Download the CC software located in the EVM product folder on the web.
2. Connect the EVM to USB port, LED lights LED1 and LED2 should illuminate once the EVM is detected by Windows® PC. Also, in the Windows Device Manager, the EVM should be recognized as a USB composite device, a USB audio device and an HID-compliant device.
3. Connect the headphones to jack J14.
4. Open CodecControl.exe and click View → Example Configurations…
5. Select HP Playback and click ProgramCodec.
    - The list of I²C™ commands for this configuration is available in the Script tab.
6. Play audio through any media tool. Make sure that the playback (and recording) device is USB-miniEVM in the Windows control panel.
    - To adjust playback volume, open Sound in control panel, select the USB-miniEVM device and click properties.
    - Similarly, the other example configurations can be tried and sound can be recorded using the microphone available on the board.
7. Install jumpers on the EVM as per the requirements to make the right signal connections.

AIC3263 CC Software

This section provides setup instructions for the AIC3262 EVM control software.

2.1 Installation

1. Download the AIC3263 EVM control software located in the TLV320AIC3263 product folder.
2. Open the self-extracting installation file, and extract contents to a known folder.
3. Install the software by double clicking the CodecControl.exe and follow the directions.
4. Connect the EVM to a USB port using a cable and open up the control software. If prompted, select the appropriate EVM name.

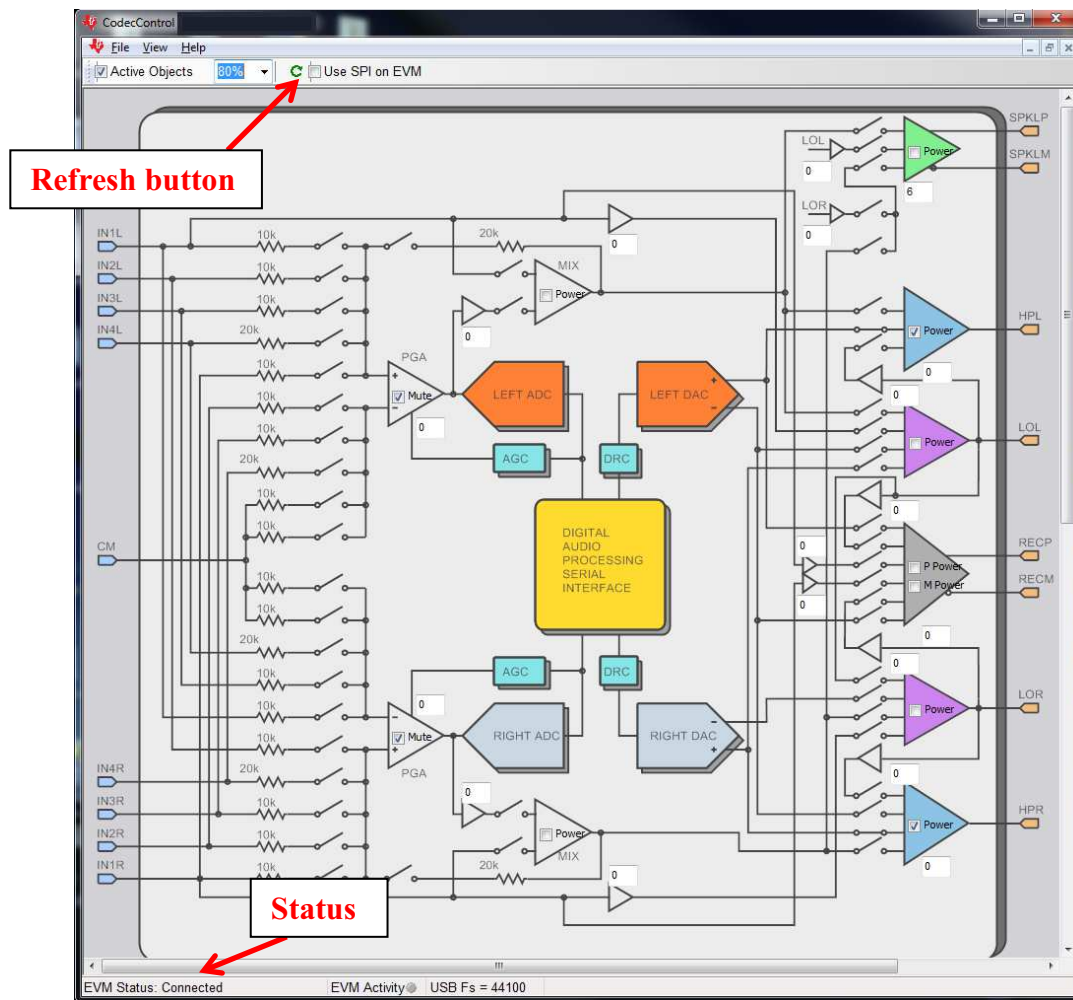## 2.2   Graphical User Interface (GUI)

2.2.1   Main panel window

Figure 2-1. Main Panel

The main panel, shown in Figure 2-1, provides a high-level block diagram of AIC3263. On the main panel, users can configure the analog input and output routings by simply clicking on the switches. The analog setup, digital setup, audio inputs, audio outputs, DRC, AGC, SAR and headset detection provide additional control of many registers and other features of the AIC3263. The user can click on the colored blocks on the main panel to gain access to these categories (intended for advanced users). Left ADC and Right ADC blocks provide the detailed settings for device analog input, whereas Left DAC and Right DAC blocks provide the detailed settings for device analog output. The yellow block in the middle provides settings for the digital interface.

The Refresh button on the top reads the current state of the AIC3263 register settings and reflects it on the user interface. The EVM status, which reflects the hardware connection of the EVM, is shown on the bottom of the main panel. USB Fs reflects the current sample rate of the EVM.

2.2.2   Typical Configuration

The AIC3263 control software provides example scripts for typical playback and record applications. These configurations can be accessed by choosing Example Configurations… under View. Once the typical configuration is selected, click ProgramCodec to download the script into the EVM.
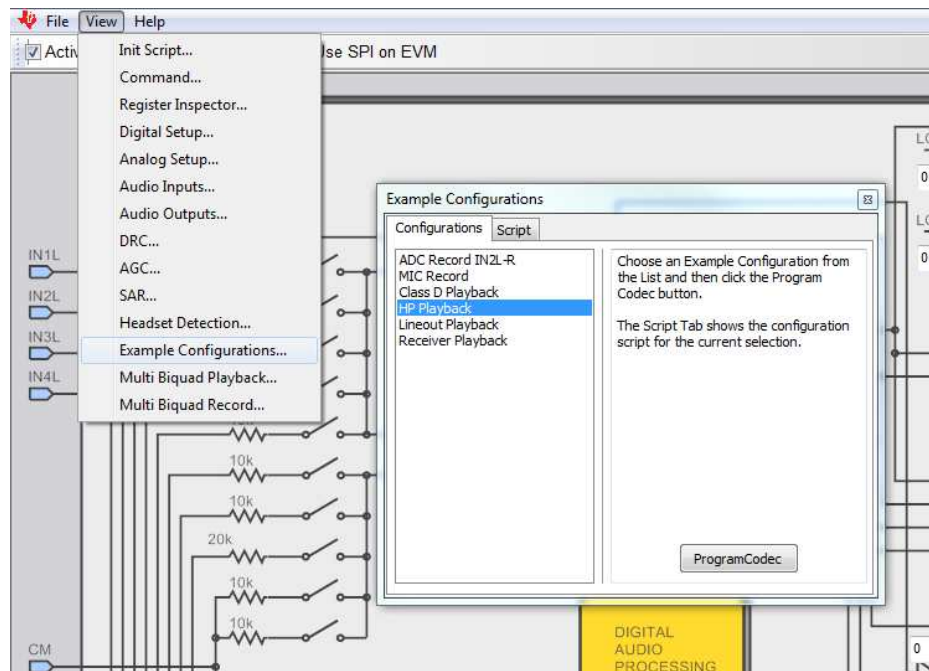
Figure 2-2. Example Configurations Window

In Figure 2-3, the checked boxes show enabled functions after programming the HP Playback from the above example configurations. Similarly, if the device is programmed using PurePath™ Studio (a tool for programming TI miniDSP enabled devices), these window controls can be updated by pressing the Refresh button in the control software.

Figure 2-3. Analog Outputs Window

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2.2.3 Command Line Interface Panel

Figure 2-4. Command Line Window

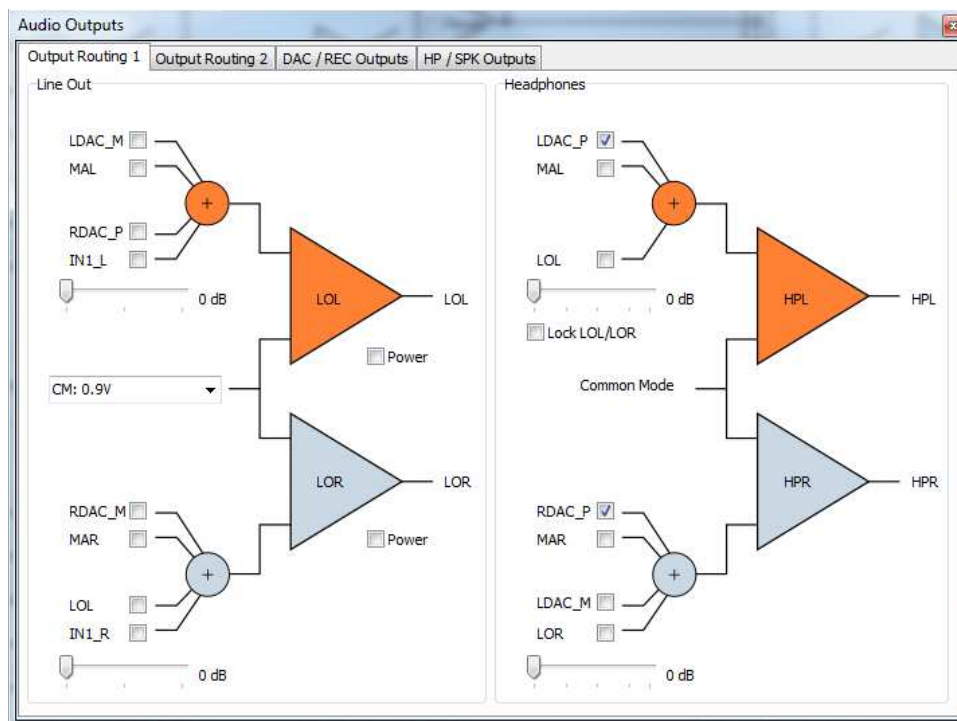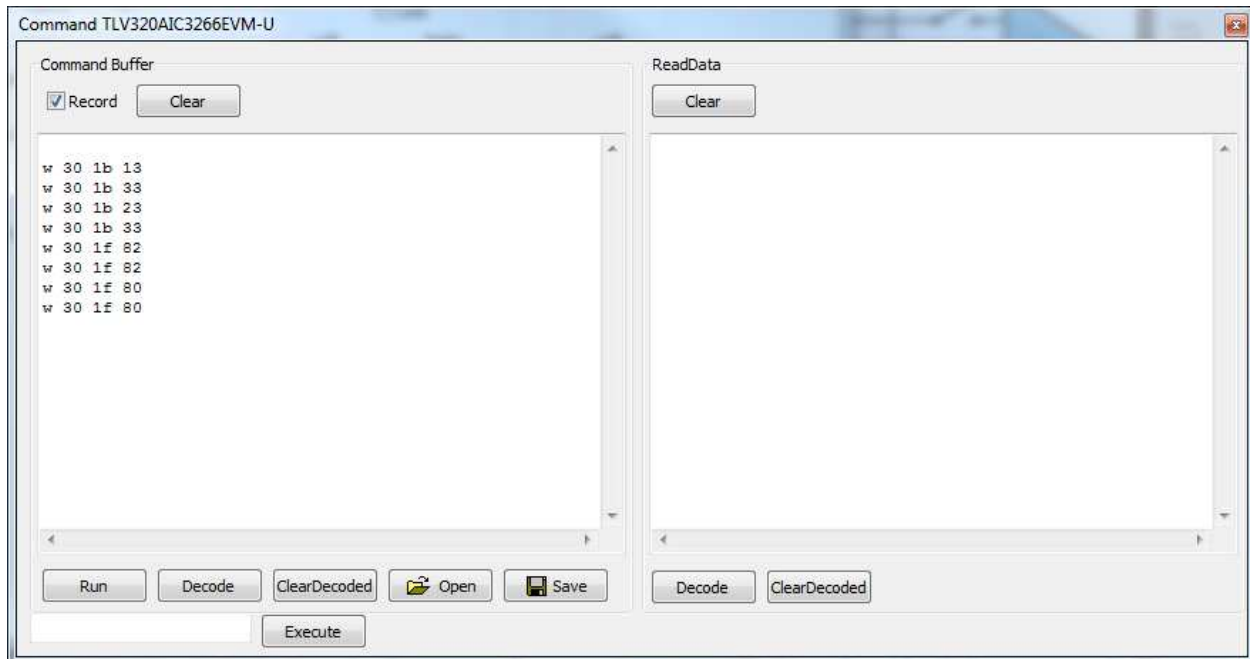The command-line interface allows users to communicate with the TLV320AIC3263 using a simple scripting language (described in Appendix E). The TAS1020B USB controller handles all communication between the PC and the codec. A script is loaded into the command buffer, either by loading a script file using the Open button or by pasting text from the clipboard. Click Run to execute the command buffer.

All controls update their status with respect to the register contents in the following conditions:

- Whenever a panel is open by selecting from View menu
- The Run button in the command-line interface is pressed
- The Refresh button on the main panel window is pressed

The Decode function is a feature in the command-line interface. When the Decode button is clicked, the script is decoded line by line, and the decoded content can be cleared by clicking ClearDecoded. This decode feature provides users an easy method of understanding the script without referring to the register map.

The Record function is another feature in the command-line interface. The command window records all register writes sent to the codec when the Record box is checked. The recorded register values along with their page numbers are displayed in the command buffer. The recorded register values can also be decoded by clicking the Decode button on the command-line interface window. Pressing the Clear button clears the content of the command buffer.
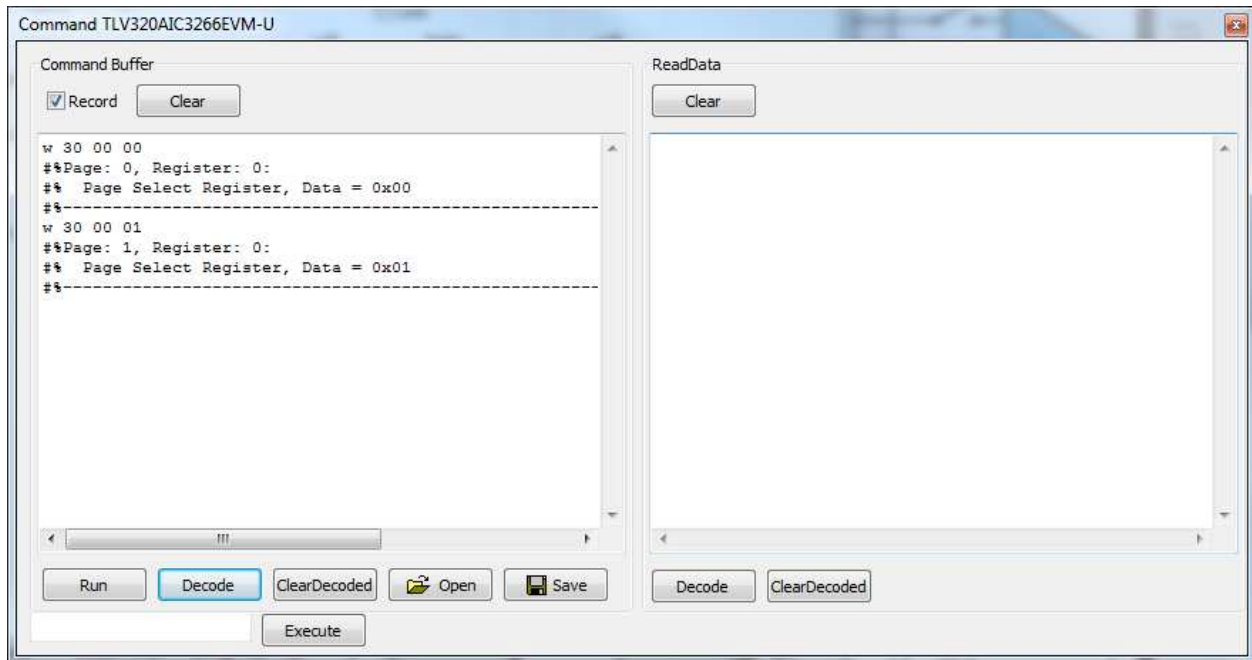
Figure 2-5. Command Line Window

2.2.4 Register Inspector
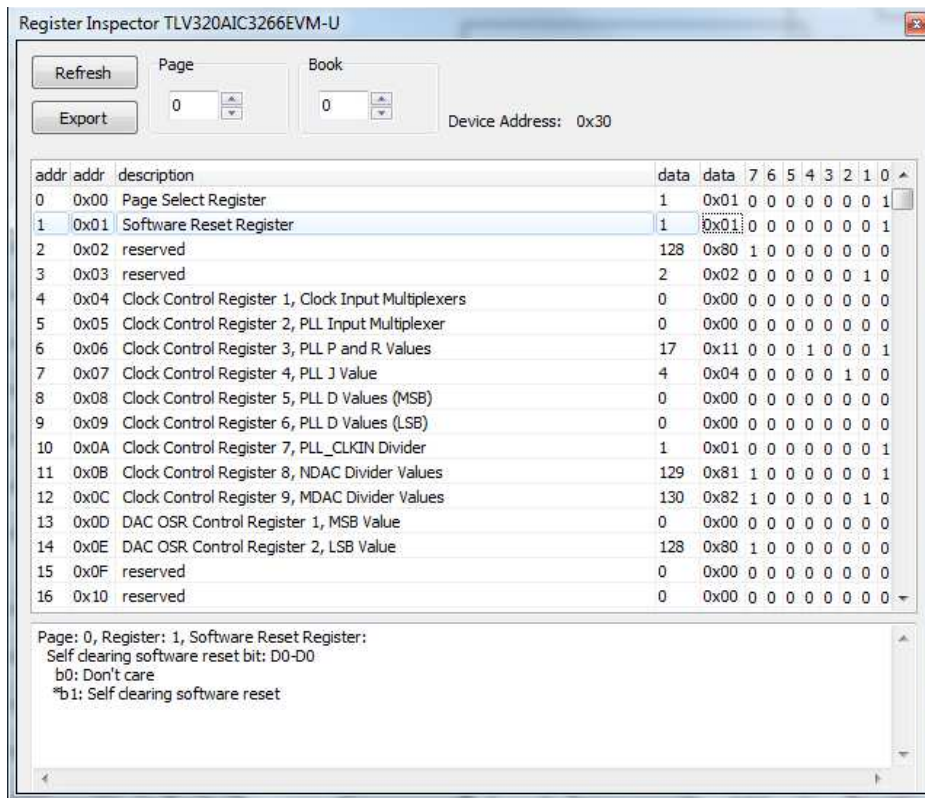
Figure 2-6. Register Inspector Window

The contents of the TLV320AIC3263 register map can be accessed through the Register Inspector. The Page number control selects the page to be displayed in the register table. The register table contains information such as register name, current register value and the bit field of the current register value. Specify the page number when using the register inspector table. Once the page is specified, the register value can then be inspected or changed by either entering the hex value of the register or changing the corresponding bits for that register.

TLV320AIC3263EVM-U Default Jumper Locations

Jumper	Color	Position
W1	Red	Shorted
W2	Red	Shorted
W4	Red	Shorted
W5	Red	Shorted
W6	Red	Shorted
W7	Red	Shorted
W8	Red	Not_Installed
W9	Red	Shorted
JP1	Black	Not_Shorted
JP2	Black	Not_Shorted
JP7	Black	Not_Shorted
JP8	Black	Not_Shorted
JP9	Black	Not_Shorted
W10	Red	Shorted
W12	Red	Shorted
W13	Red	Shorted
JP10	Blue	Shorted
JP15	Blue	Not_Shorted
JP19	Black	Not_Shorted
JP20	Black	Shorted
JP24	Black	Not_Shorted
JP25	Black	Not_Shorted
JP26	Black	Not_Shorted
JP27	Black	Shorted
JP39	Black	Shorted
JP40	Black	Shorted
JP51	Black	Shorted
JP52	Black	Not_Shorted
JP60	Black	Shorted
JP61	Blue	Shorted
JP62	Blue	Not_Shorted
J1	Black	1-2
J2	Black	1-2
J17	Blue	2-3
J18	Blue	2-3
J19	Blue	2-3
J20	Blue	2-3
JP28	Blue	2-3
JP29	Blue	2-3
JP30	Blue	2-3
JP31	Blue	2-3

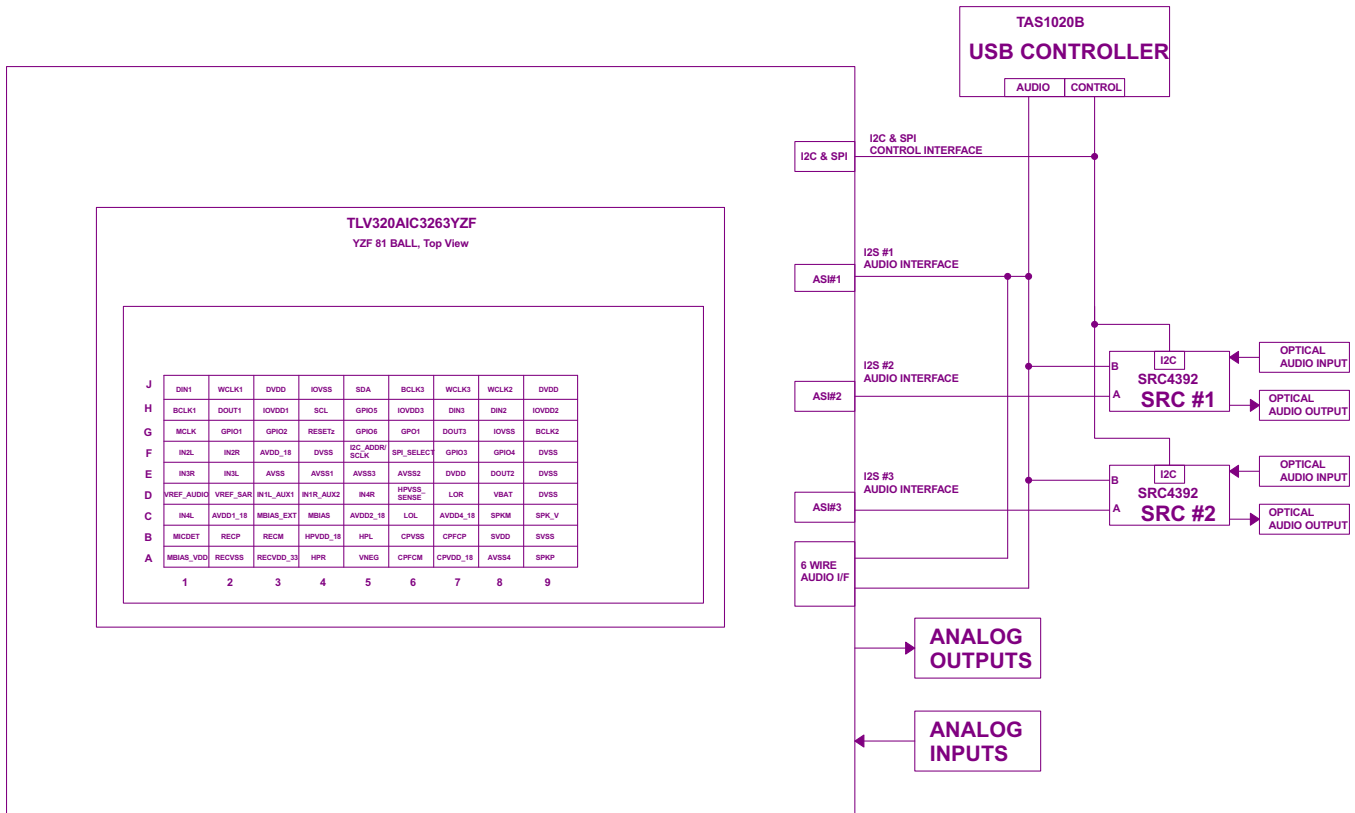| Jumper	Color	Position
JP32	Red	1-2
JP33	Black	Not_Shorted
JP34	Black	Not_Shorted
JP35	Blue	1-2
JP36	Blue	1-2
JP37	Red	1-2
JP38	Red	2-3
JP41	Blue	2-3
JP42	Blue	2-3
JP43	Blue	2-3
JP44	Blue	2-3
JP45	Blue	2-3
JP46	Blue	2-3
JP47	Blue	2-3
JP49	Blue	2-3
JP50	Red	1-2
JP53	Black	1-2
JP54	Black	1-2
JP55	Red	2-3
JP57	Red	1-2
JP58	Red	2-3

TLV320AIC3263EVM-U EVM Schematics

Figure B-1. TLV320AIC3263YZF

Figure B-2. TAS1020B USB Controller
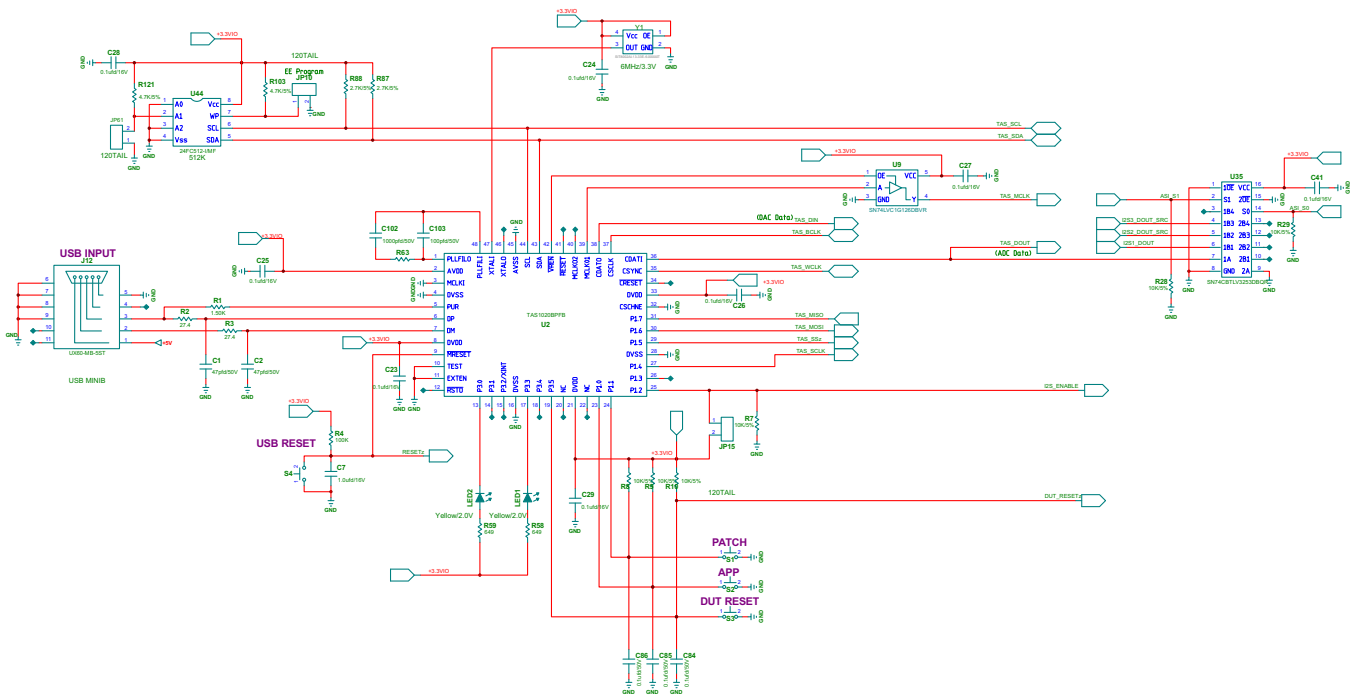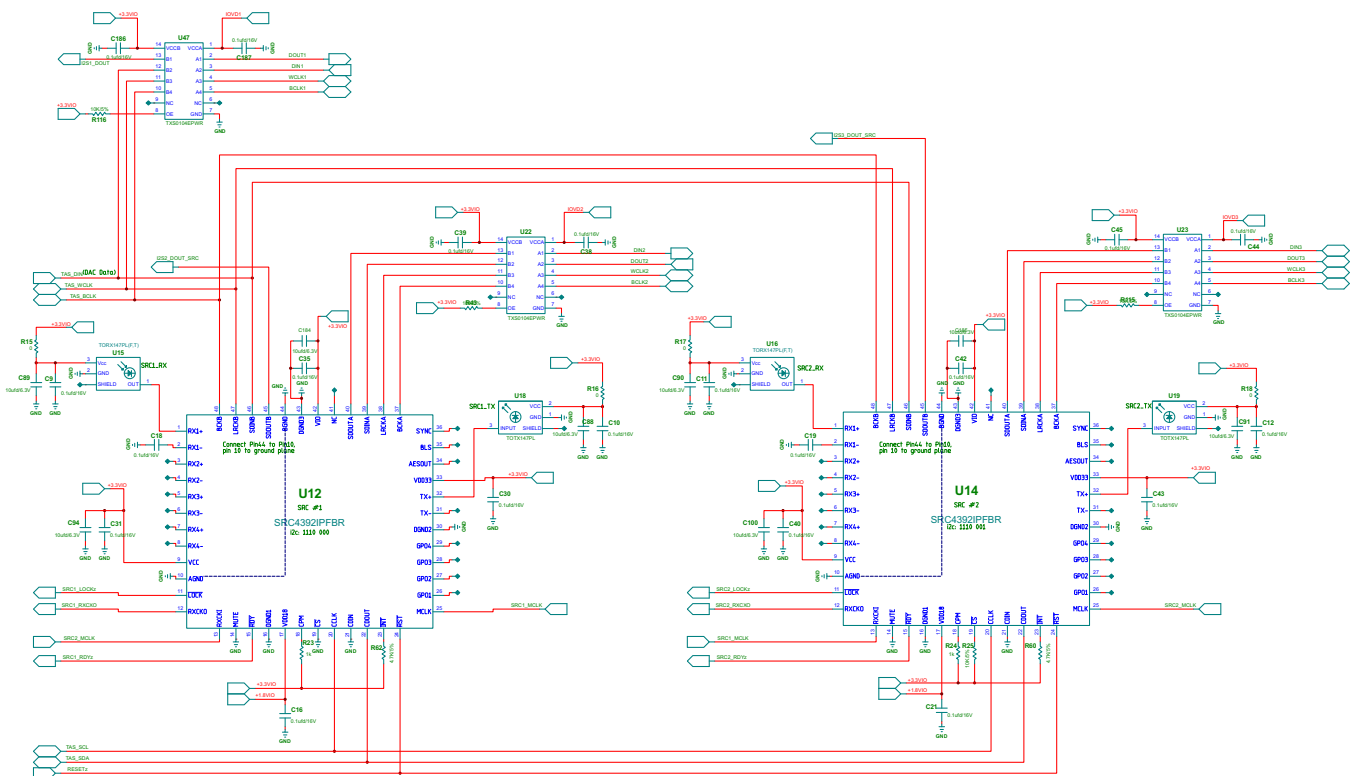

Figure B-3. Data, Sample Rate Converter
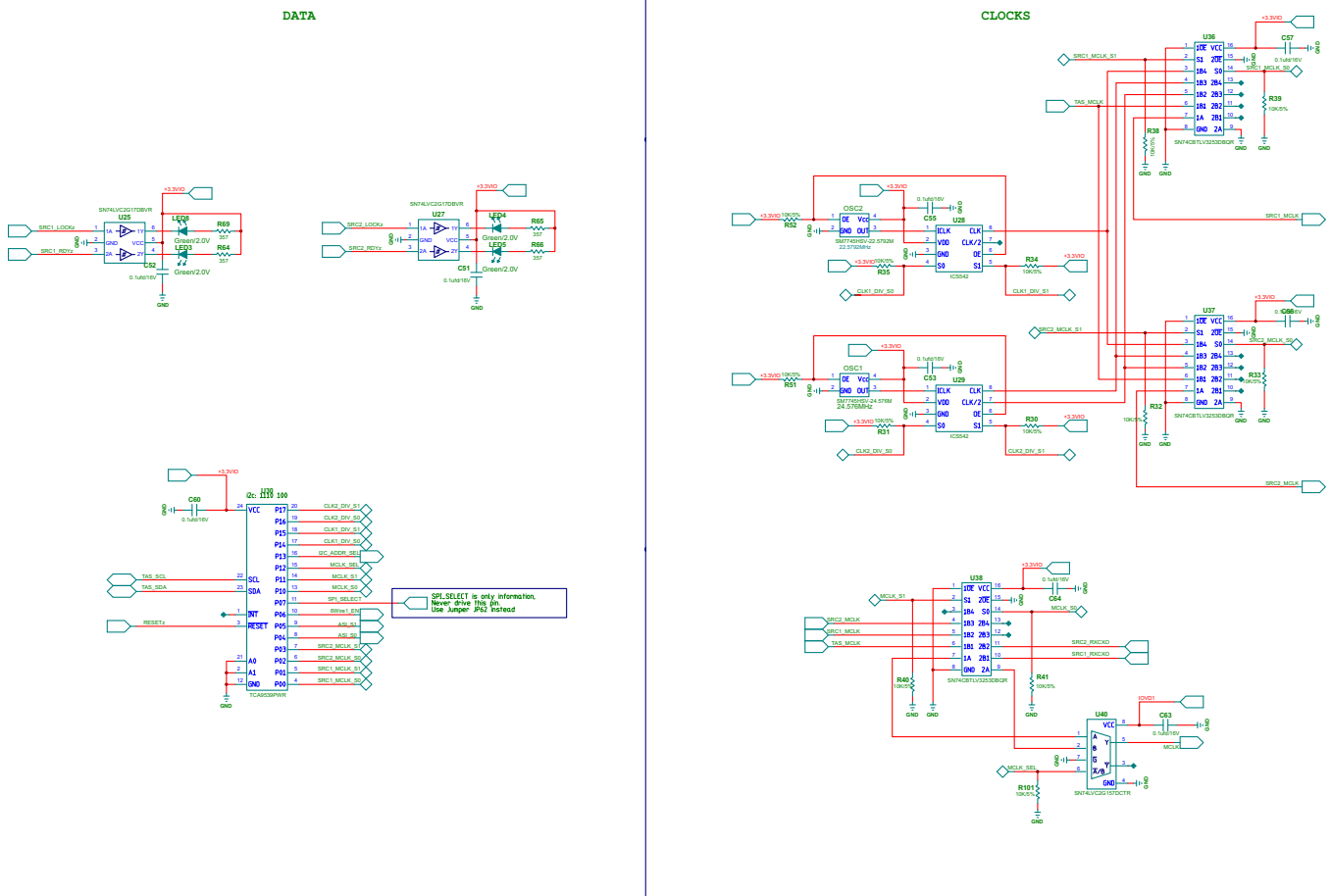
Figure B-4. Data and Clocks

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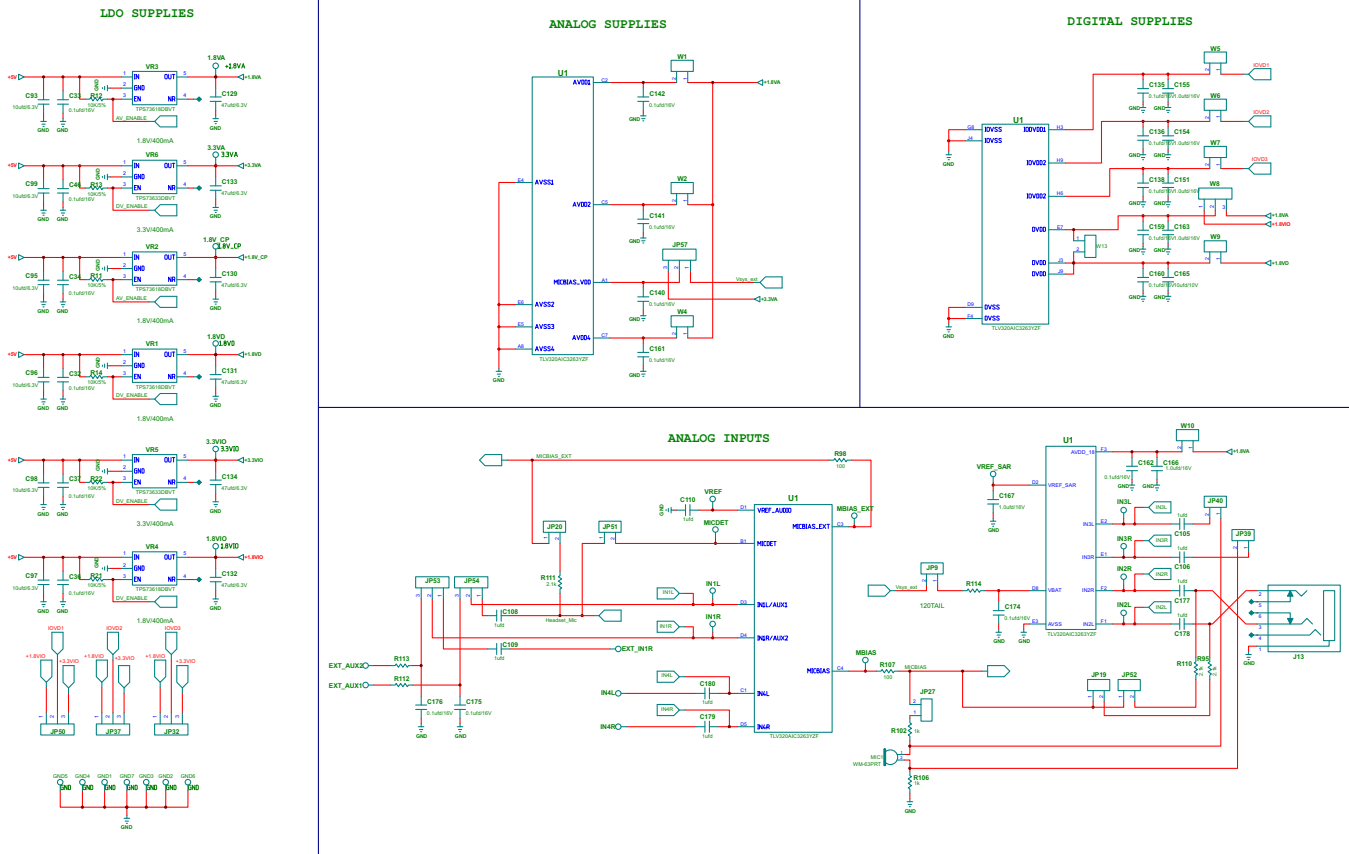
Figure B-5. LDO Supplies, Analog Supplies, Digital Supplies, and Analog Inputs
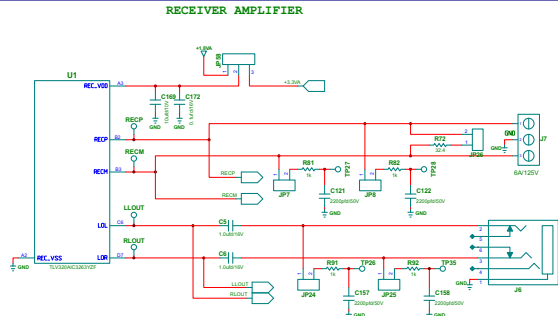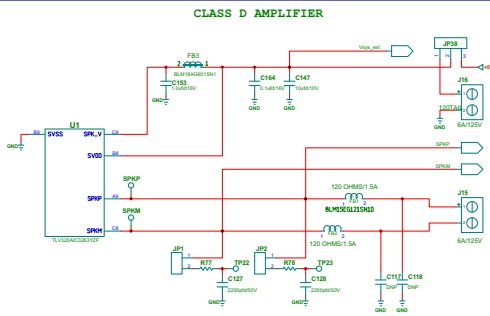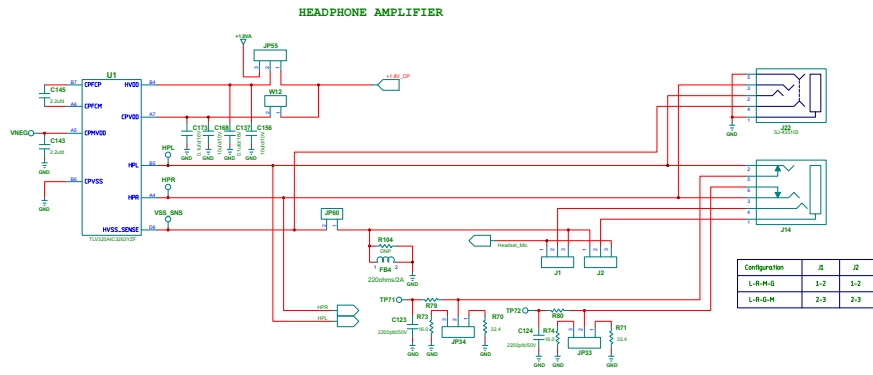
Figure B-6. Headphone Amplifier, Class D Amplifier, and Receiver Amplifier

Figure B-7. Digital

Figure B-8. Analog and Digital Interface Connectors

TLV320AIC3263EVM-U EVM Layout Views
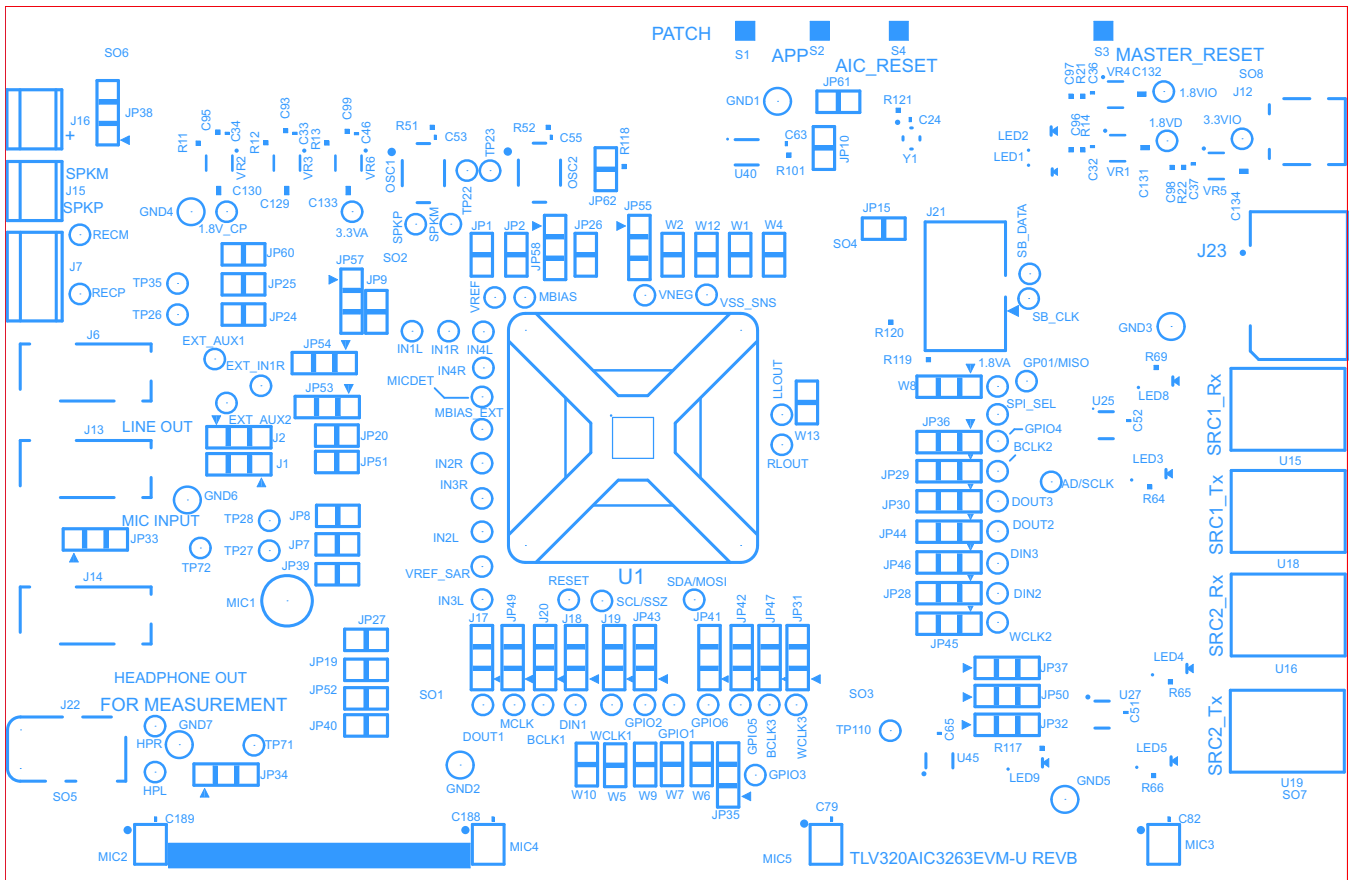
Figure C-1. Silkscreen Top
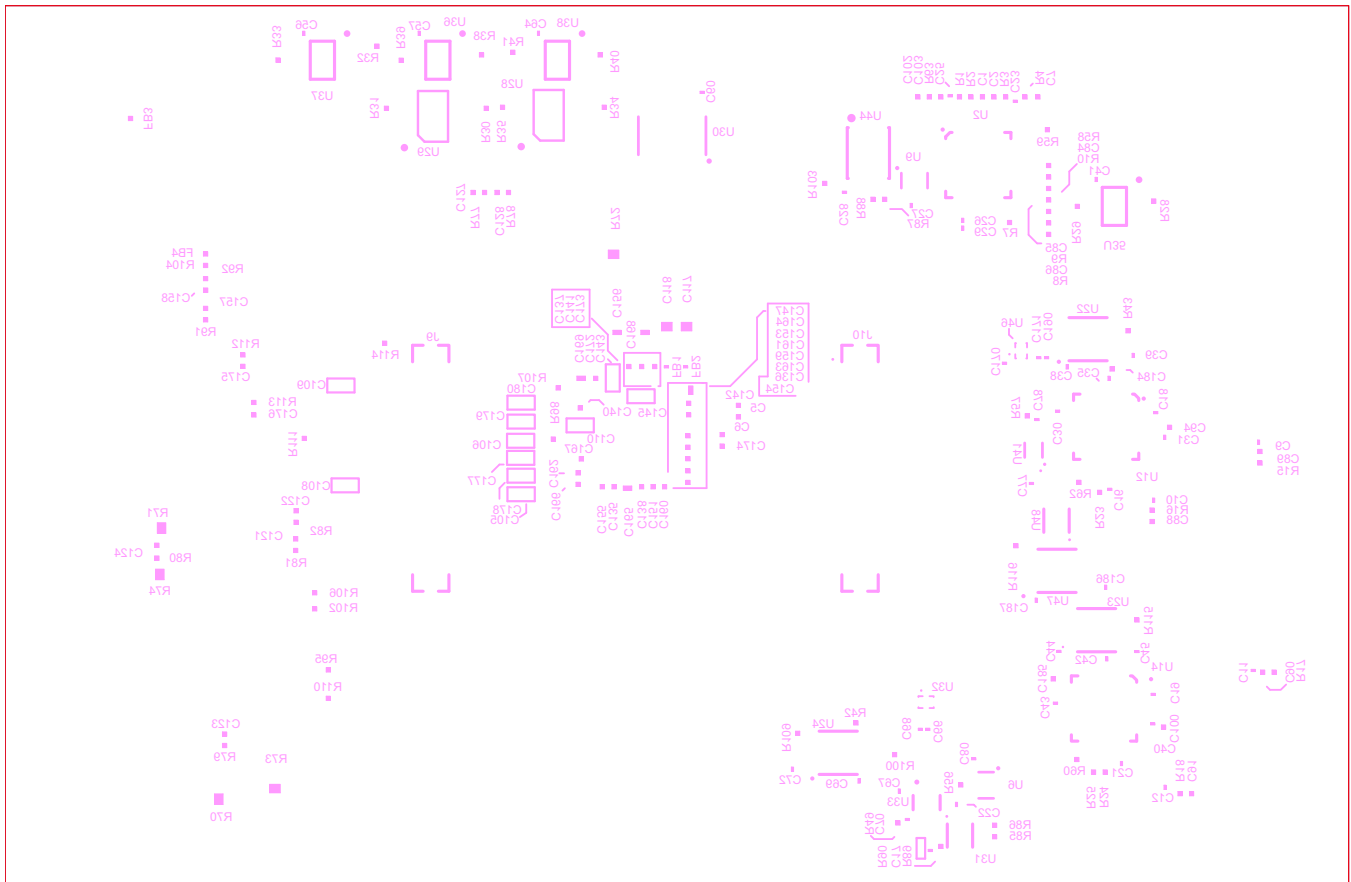
Figure C-2. Silkscreen Bottom

TOP COPPER
INNER LAYER#1
INNER LAYER #2
BOTTOM COPPER
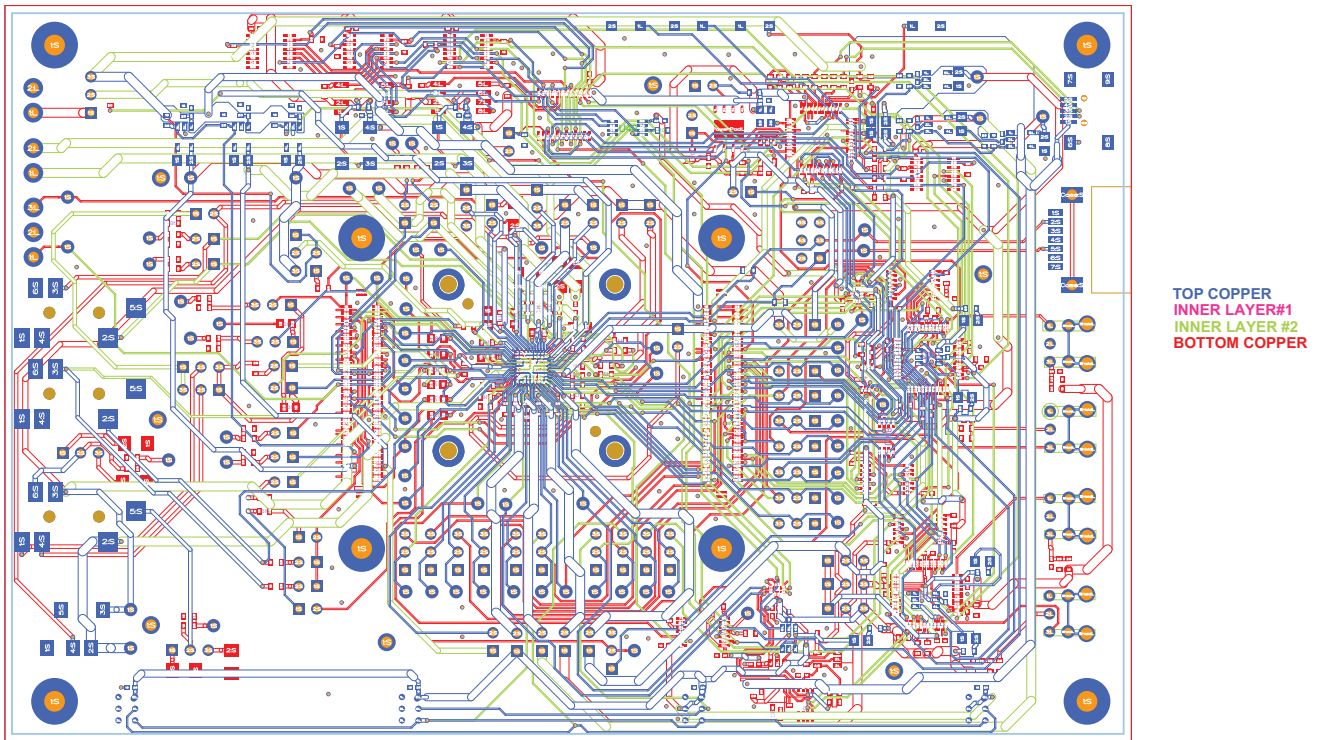
Figure C-3. Routing

TLV320AIC3263EVM-U EVM Layout Views

TLV320AIC3263EVM-U Bill of Materials

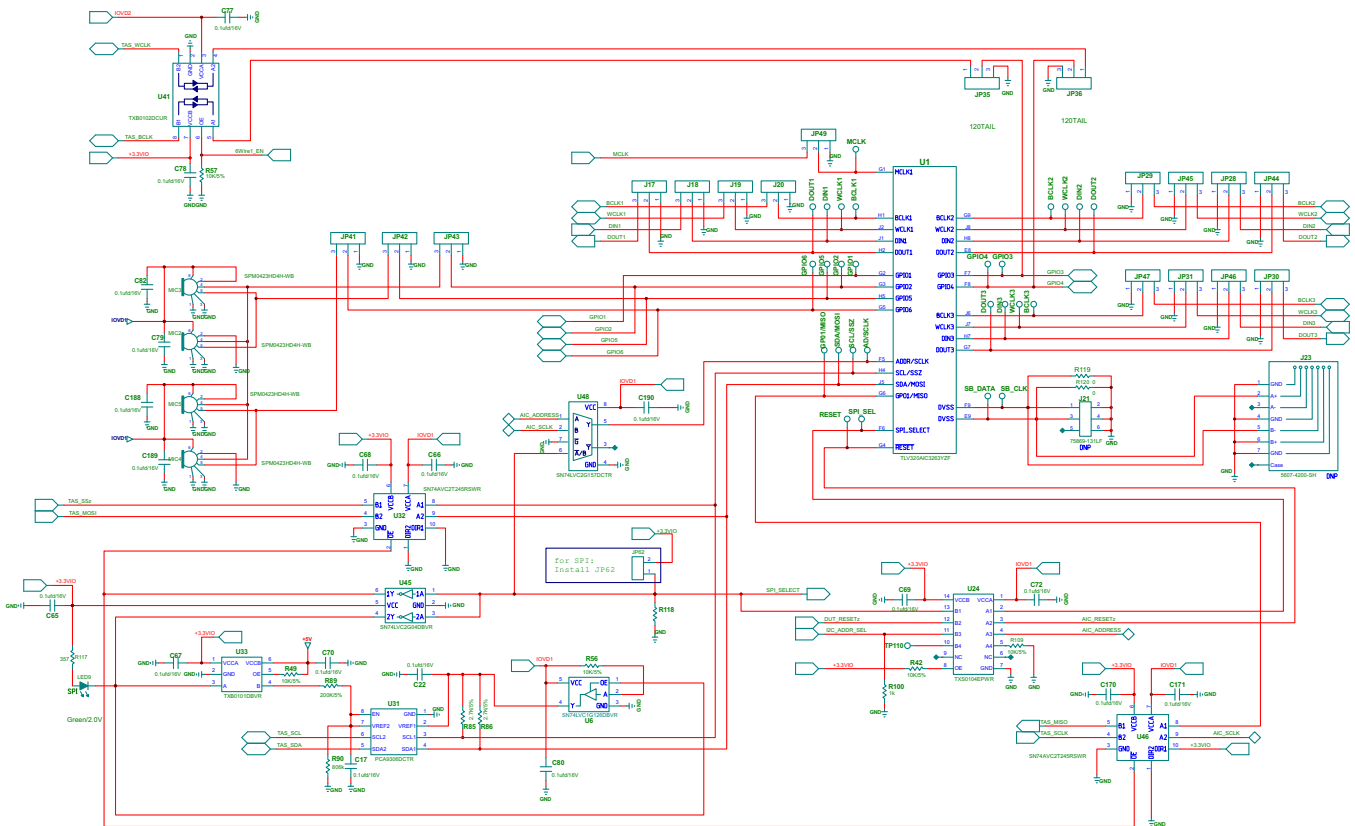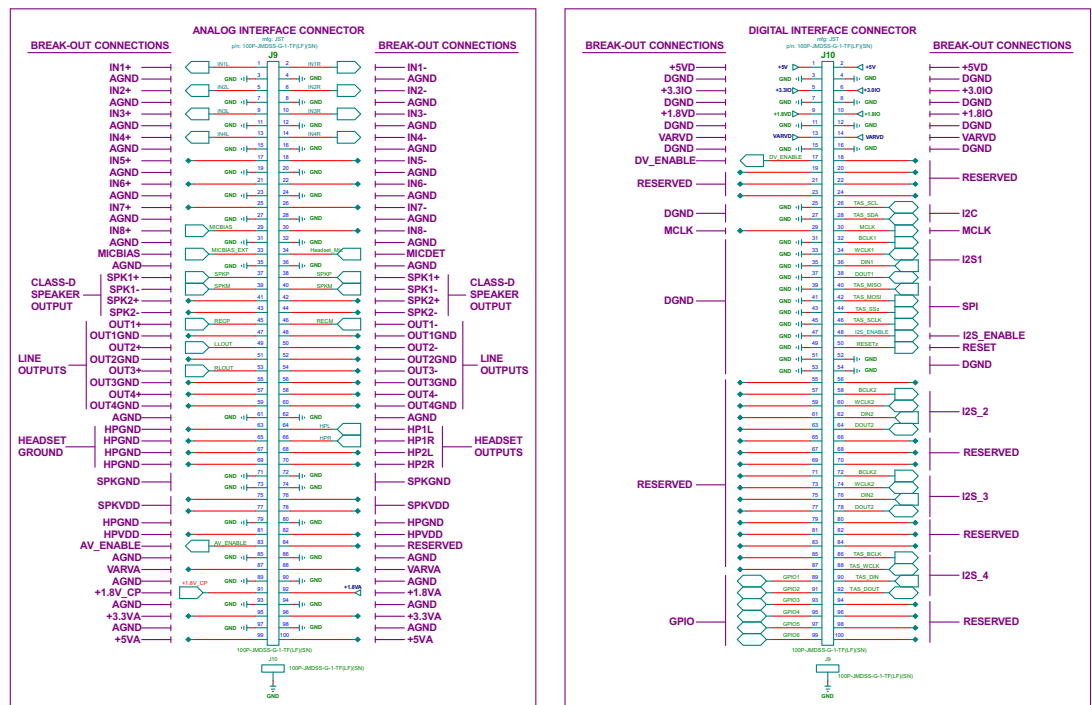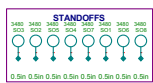| ITEM	QTY	REFERENCES	VALUE	PART NUMBER	DESCRIPTION	COMPANY	BAUFORM
1	2	C1, C2	47 pF	GRM1885C1H470JA01D	CAP, SMD, 0603, CERM, 47 PFD, 50 V, 5%, COG, ROHS	MURATA	0603 COG
2	3	C5, C6, C7	1 µF	C1608X7R1C105K	CAP, SMD, 0603, CERM, 1 UFD, 16 V, 10%, X7R, ROHS	TDK	0603 X7R
3	62	C9, C10, C11, C12, C16, C17, C18, C19, C21, C22, C23, C24,C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C51, C52, C53, C55, C56, C57, C60, C63, C64, C65, C66, C67, C68, C69, C70, C72, C77, C78, C79, C80, C82, C170, C171, C186, C187, C188, C189, C190	0.1 µF	GRM155R71C104KA88D	CAP, SMD, 0402, CERM, 0.1 UFD, 16 V, X7R, 10%, ROHS	MURATA	0402 X7R
4	3	C84, C85, C86	0.1 µF	C1608X7R1H104K	CAP, SMD, 0603, CERM, 0.1 UFD, 50 V, 10%, X7R, ROHS	TDK	0603 X7R
5	14	C88, C89, C90, C91, C93, C94, C95, C96, C97, C98, C99, C100, C184, C185	10 µF	GRM188R60J106ME47D	CAP, SMD, 0603, CERM, 10 UFD, 6.3 V, 20%, X5R, ROHS	MURATA	0603 X5R
6	1	C102	0.001 µF	C1608C0G1H102J	CAP, SMD, 0603, CERM, 1000 PFD, 50 V, 5%, COG, ROHS	TDK CORP.	0603 COG
7	1	C103	100 pF	GRM1885C1H101JA01D	CAP, SMD, 0603, CERM, 100 PFD, 50 V, 5%, COG, ROHS	MURATA	0603 COG
8	9	C105, C106, C108, C109, C110, C177, C178, C179, C180	1 µF	GRM188R60J105KA01D	CAPACITOR, SMT, 0603, CERAMIC, 1 µF, 10 V, 10%, X5R		CAP, SMT, 0603
9	2	C117, C118		C1206_DNP	C1206_DNP	DNI	1206
10	8	C121, C122, C123, C124, C127, C128, C157, C158	0.0022 µF	GRM188R71H222KA01D	CAP, SMD, 0603, CERM, 2200 PFD, 50 V, 10%, X7R, ROHS	MURATA	0603 X7R
11	6	C129, C130, C131, C132, C133, C134	47 µF	JMK212BJ476MG-T	CAP, SMD, 0805, CERM, 47 UFD, 6.3 V, 20%, X5R, ROHS	TAIYO YUDEN	0805 X5R

ITEM	QTY	REFERENCES	VALUE	PART NUMBER	DESCRIPTION	COMPANY	BAUFORM
12	17	C135, C136, C137, C138, C140, C141, C142, C159, C160, C161, C162, C164, C172, C173, C174, C175, C176	0.1 µF	GRM188R71C104KA01D	CAP, SMD, 0603, CERM, 0.1 UFD, 16 V, 10%, X7R, ROHS	MURATA	0603 X7R
13	2	C143, C145	2.2 µF	GRM188C81A225KE34D	CAPACITOR, SMT, 0603, CERAMIC, 2.2 µF, 10 V, 10%, X6S		CAP, SMT, 0603
14	5	C147, C156, C165, C168, C169	10 µF	GRM21BR71A106KE51L	CAP, SMD, 0805, CERM, 10 UFD, 10 V, 10%, X7R, ROHS	MURATA	0805 X7R
15	7	C151, C153, C154, C155, C163, C166, C167	1 µF	EMK107B7105KA-T	CAP, SMD, 0603, CERM, 1 UFD, 16 V, 10%, X7R, ROHS	TAIYO YUDEN	0603 X7R
16	27	DIN1, DIN2, DIN3, BCLK1, BCLK2, BCLK3, DOUT1, DOUT2, DOUT3, GPIO1, GPIO2, GPIO3, GPIO4, GPIO5, GPIO6, TP123, TP124, WCLK1, WCLK2, WCLK3, SB_CLK, AD/SCLK, SB_DATA, SCL/SSZ, SPI_SEL, SDA/MOSI, GP01/MISO		5004	PC TESTPOINT, YELLOW, ROHS	KEYSTONE ELECTRONICS	Yellow
17	2	FB1, FB2		BLM15EG121SN1D	FERRITE BEAD, SMD, 0402, 120 Ω, 1.5 A, ROHS	MURATA	402
18	1	FB3	600 Ω	BLM18AG601SN1	FERRITE BEAD, SMT, 0603, 600 Ω @ 100 MHz, 25%, 200 mA		FERRITE BEAD, SMT, 0603
19	1	FB4	220 Ω	MPZ1608S221A	FERRITE CHIP, 220 Ω, 2 A ,100 MHZ, SMD. 0603, ROHS	TDK	603
20	7	GND1, GND2, GND3, GND4, GND5, GND6, GND7		5011	PC TESTPOINT, BLACK, 063, HOLE, ROHS	KEYSTONE ELECTRONICS	Black
21	30	IN1L, IN1R, IN2L, IN2R, IN3L, IN3R, IN4L, IN4R, TP22, TP23, TP26, TP27, TP28, TP35, TP71, TP72, TP110, TP111, TP112, TP113, TP114, TP115, TP116, TP117, TP118, TP119, VSS_SNS, EXT_AUX1, EXT_AUX2, EXT_IN1R		5002	PC TESTPOINT, WHITE, ROHS	KEYSTONE ELECTRONICS	White
22	32	J1, J2, W8, J17, J18, J19, J20, JP28, JP29, JP30, JP31, JP32, JP33, JP34, JP35, JP36, JP37, JP38, JP41, JP42, JP43, JP44, JP45, JP46, JP47, JP49, JP50, JP53, JP54, JP55, JP57, JP58		PBC03SAAN	HEADER THRU MALE, 3 PIN, 100LS, 120 TAIL, GOLD, ROHS	SULLINS	100LS

ITEM	QTY	REFERENCES	VALUE	PART NUMBER	DESCRIPTION	COMPANY	BAUFORM
23	3	J6, J13, J14		SJ-43516-SMT	JACK AUDIO-STEREO MINI (3.5 mm, 4-COND SMT-RA ROHS)	CUI STACK	3.5 mm
24	1	J7		ED555/3DS	TERMINAL BLOCK, 3 PIN, 6 A / 125 V, GRAY, 3.5 mm PITCH, 16-28 AWG, ROHS	ON SHORE TECHNOLOGY	GRAY
25	2	J9, J10		100P-JMDSS-G-1-TF(LF)(SN)	PLUG, SMD, 2x50, FEMALE, JMDSERIES, 0.5 mm LS, GOLD, ROHS	JST	SMD - 0.5 mm
26	1	J12		UX60-MB-5ST	JACK USB, MINIB SMT-RA, 5 PIN, ROHS	HIROSE	
27	2	J15, J16		ED555/2DS	TERMINAL BLOCK, 2 PIN, 6 A / 125 V, GRAY, 3.5 mm PITCH, 16-28 AWG, ROHS	ON SHORE TECHNOLOGY	GRAY
28	1	J21 Config build forTLV320AIC3263 YZF	DNI	75869-131LF	HEADER SHROUDED, 100LS, MALE, GOLD, 2x3 PINS, ROHS	FCI	
29	1	J22		SJ-435105	JACK AUDIO MINI (3.5 mm, 4-COND SMT-RA ROHS)	CUI STACK	3.5 mm
30	1	J23, Config build for TLV320AIC3263YZF	DNI	5607-4200-SH	CONNECTOR-SATA, 7 PIN, SMT-RA SERIES, 5607, ROHS	3M	SATA
31	2	LED1, LED2		SML-LXT0805YW-TR	LED, YELLOW, 2 V, SMD, 0805, ROHS	LUMEX OPTO	805
32	5	LED3, LED4, LED5, LED8, LED9		SML-LXT0805GW-TR	LED, GREEN, 2 V, SMD, 0805, ROHS	LUMEX OPTO	805
33	1	MIC1		WM-63PRT	MICROPHONE ELECTRET, OMNIDIRECTIONAL DUAL BAND, 2 PIN, ROHS	PANASONIC	ELECTRET
34	4	MIC2, MIC3, MIC4, MIC5		SPM0423HD4H-WB	MIC DIGITAL, MIMI-SISONIC, HALOGEN FREE, 6 PIN, ROHS	KNOWLES	Mini SiSonic
35	1	OSC1	24.576M	SM7745HSV-24.576M	OSCILLATOR, SMT, 3.3 V, SM77H SERIES, 24.576 MHz, ROHS	PLETRONICS	SM77H
36	1	OSC2	22.5792M	SM7745HSV-22.5792M	OSCILLATOR, SMT, 3.3 V, SM77H SERIES, 22.5792 MHz, ROHS	PLETRONICS	SM77H
37	1	R1	1.5 kΩ	ERJ-3EKF1501V	RESISTOR, SMD, 0603, 1.50 kΩ, 1%, THICK FILM, 1/10 W, ROHS	PANASONIC	603
38	2	R2, R3	27.4 Ω	ERJ-3EKF27R4V	RESISTOR, SMD, 0603, 27.4 Ω, 1%, 1/10 W, ROHS	PANASONIC	603
39	1	R4	100 kΩ	ERJ-3EKF1003V	RESISTOR, SMD, 0603, 100 kΩ, 1%, THICK FILM, 1/10 W, ROHS	PANASONIC	603
40	34	R7, R8, R9, R10, R11, R12, R13, R14, R21, R22, R25, R28, R29, R30, R31, R32, R33, R34, R35, R38, R39, R40, R41, R42, R43, R49, R51, R52, R56, R57, R101, R109, R115, R116	10 kΩ	ERJ-3GEYJ103V	RESISTOR, SMD, 0603, 10K, 5%, 1/10 W, ROHS	PANASONIC	603

ITEM	QTY	REFERENCES	VALUE	PART NUMBER	DESCRIPTION	COMPANY	BAUFORM
41	4	R15, R16, R17, R18	0 Ω	ERJ-3GEY0R00V	RESISTOR, 0 Ω, 1/10 W, JUMP, 0603, SMD	PANASONIC	603
42	13	R23, R24, R77, R78, R79, R80, R81, R82, R91, R92, R100, R102, R118	1 kΩ	ERJ-3GSYJ102	RESISTOR, SMT, 0603, 5%, 1/10 W, 1K		RES, SMT, 0603
43	2	R58, R59	649 Ω	RC0603FR-07649RL	RESISTOR, SMD, 0603, THICK FILM, 649 Ω, 1%, 1/10 W, ROHS	YAGEO	603
44	4	R60, R62, R103, R121	4.7 kΩ	ERJ-3GEYJ472V	RESISTOR, SMD, 0603, 4.7 kΩ, 5%, 1/10 W, ROHS	PANASONIC	603
45	1	R63	3.09 kΩ	CRCW06033091F	RESISTOR, SMT, 0603, 1%, 1/10 W,3.09K		RES, SMT, 0603
46	5	R64, R65, R66, R69, R117	357 Ω	ERJ-3EKF3570V	RESISTOR, SMD, 0603, 357 Ω, 1%, THICK FILM, 1/10 W, ROHS	PANASONIC	603
47	3	R70, R71, R72	32.4 Ω	RC1206FR-0732R4L	RESISTOR, SMD, 1206, 32.4 Ω, 1%, 1/4 W, ROHS	YAGEO	1206 1/4 W
48	2	R73, R74	16 Ω	CRCW120616R0JNEA	RESISTOR, SMT, 1206, 16 Ω, 5%, 1/4 W,ROHS	VISHAY	1206
49	4	R85, R86, R87, R88	2.7 kΩ	ERJ-3GEYJ272V	RESISTOR, SMD, 0603, 2.7 kΩ, 5%, 1/10 W, ROHS	PANASONIC	603
50	1	R89	200 kΩ	ERJ-3GEYJ204V	RESISTOR, SMD, 0603, 200 kΩ, 5%, 1/10 W, ROHS	PANASONIC	603
51	1	R90	806 kΩ	ERJ-2RKF8063X	RESISTOR, SMT, 0402, 806K, 1%, 1/16 W		RES, SMT, 0402
52	3	R95, R110, R111	2.1 kΩ	CRCW06032101F	RESISTOR, SMT, 0603, 1%, 1/10 W, 2.10K		RES, SMT, 0603
53	2	R98, R107	100 Ω	ERJ-3EKF1000V	RESISTOR, SMD, 0603, 100, 1%, THICK FILM, 1/10 W, ROHS	PANASONIC	603
54	1	R104		R0603_DNP	R0603_DNP		603
54A	2	R119, R120, Config build for TLV320AIC3263YZF	0 Ω	ERJ-3GSYJ000	RESISTOR, SMT, 0603, 5%, 1/10 W, 0 Ω	PANASONIC	603
55	1	R106	1.1 kΩ	ERJ-3GSYJ112	RESISTOR, SMT, 0603, 5%, 1/10 W, 1.1K		RES, SMT, 0603
56	3	R112, R113, R114	200 Ω	ERJ-3GSYJ201	RESISTOR, SMT, 0603, 5%, 1/10 W, 200		RES, SMT, 0603
57	8	SO1, SO2, SO3, SO4, SO5, SO6, SO7, SO8		3480 & PMS 440 0025 PH	STANDOFF, 4-40, 0.5 in, 0.25 dia, ALUM RND, F-F, ROHS, & 4-40 PHILLIPS MACHINE SCREW	KEYSTONE ELECTRONICS	
58	4	S1, S2, S3, S4		TL1015AF160QG	SWITCH, MOM, 160G, SMT, 4X3 mm, ROHS	E-SWITCH	
59	1	U1		TLV320AIC3263YZF	CODEC WCSP81-YZF ROHS	TEXAS INSTRUMENTS	WCSP81-YZF
60	1	U2		TAS1020BPFB	USB STREAMING CONTROLLER, TQFP48-PFB, ROHS	TEXAS INSTRUMENTS	TQFP48-PFB
61	2	U6, U9		SN74LVC1G126DBVR	SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT, SOT23-DBV5, ROHS	TEXAS INSTRUMENTS	SOT23-DBV5
62	2	U12, U14		SRC4392IPFBR	2 CHAN, ASYNC, SAMPLE RATE CONV W/DIG AUDIO REC/XMTR, ROHS	BURR-BROWN	TQFP48-PFB

ITEM	QTY	REFERENCES	VALUE	PART NUMBER	DESCRIPTION	COMPANY	BAUFORM
63	2	U15, U16		TORX147PL(F,T)	TOSLINK RECEIVER, 3.3 V, 15MB SHUTTER, ROHS	TOSHIBA	
64	2	U18, U19		TOTX147PL	TOSLINK TRANSMITTER, 3.3 V, 15MB SHUTTER, ROHS	TOSHIBA	
65	4	U22, U23, U24, U47		TXS0104EPWR	4-BIT BIDIR LEVEL TRANSLATOR, TSSOP14-PW, ROHS	TEXAS INSTRUMENTS	TSSOP14-PW
66	2	U25, U27		SN74LVC2G17DBVR	DUAL SCHMITT-TRIGGER BUFFER, SOT23-DBV6, ROHS	TEXAS INSTRUMENTS	SOT23-DBV6
67	2	U28, U29		ICS542	CLOCK DIVIDER, SOP8-D, ROHS	IDT	SOP8-D
68	1	U30		TCA9539PWR	REMOTE, 16B, I^{2}C SMBUS, LO PWR, IO EXPNDR, INT, OUT, TSSOP24-PW, ROHS	TEXAS INSTRUMENTS	TSSOP24-PW
69	1	U31		PCA9306DCTR	DUAL BIDIR, I^{2}C BUS AND SMBUS VOLT LEVEL TRANS, SSOP8-DCT, ROHS	TEXAS INSTRUMENTS	SSOP8-DCT
70	2	U32, U46		SN74AVC2T245RSWR	2BIT, XCVR, CONFIGURABLE TRANSLATION, 3-STATE OUTS, QFN10-RSW, ROHS	TEXAS INSTRUMENTS	QFN10-RSW
71	1	U33		TXB0101DBVR	1-BIT, BIDIR, LEVEL TRANSLATOR, SOT23-DBV6, ROHS	TEXAS INSTRUMENTS	SOT23-DBV6
72	4	U35, U36, U37, U38		SN74CBTLV3253DBQR	LO VOLT, DUAL 1OF4 FET, MUX/DEMUX, SSOP16-DB, ROHS	TEXAS INSTRUMENTS	SSOP16-DB
73	2	U40, U48		SN74LVC2G157DCTR	MUX/DATA SELECTOR, 2 TO 1, SSOP8-DCT, ROHS	TEXAS INSTRUMENTS	SSOP8-DCT
74	1	U41		TXB0102DCUR	2-BIT, BIDIR, LEVEL TRANSLATOR, VSSOP8-DCU, ROHS	TEXAS INSTRUMENTS	VSSOP8-DCU
75	1	U44		24FC512-I/MF	512K, I^{2}C SERIAL EEPROM, DFN8-MF, ROHS	MICROCHIP	DFN8-MF
76	1	U45		SN74LVC2G04DBVR	DUAL INVERTER GATE, SOT23-DBV6, ROHS	TEXAS INSTRUMENTS	SOT23-DBV6
77	4	VR1, VR2, VR3, VR4		TPS73618DBVT	VOLT REG, 1.8 V, 400 mA, LDO CAP, FREE NMOS, SOT23-DBV5, ROHS	TEXAS INSTRUMENTS	SOT230DBV5
78	2	VR5, VR6		TPS73633DBVT	VOLT REG, 3.3 V, 400 mA, LDO CAP, FREE NMOS, SOT23-DBV5, ROHS	TEXAS INSTRUMENTS	SOT230DBV5
79	30	W1, W2, W4, W5, W6, W7, W9, JP1, JP2, JP7, JP8, JP9, W10, W12, W13, JP10, JP15, JP19,JP20, JP24, JP25, JP26, JP27, JP39, JP40, JP51, JP52, JP60, JP61, JP62		PBC02SAAN	HEADER THRU MALE, 2 PIN, 100LS, 120 TAIL, GOLD, ROHS	SULLINS	100LS
80	1	Y1		SIT8002AI-13-33E-6.00000T	OSCILLATOR, SMT, 6 MHz, 3.3 V, OUT-ENABLE, ROHS	SITIME	SMT-8002

ITEM	QTY	REFERENCES	VALUE	PART NUMBER	DESCRIPTION	COMPANY	BAUFORM
81	11	1.8VA, 1.8VD, 3.3VA, TP120, TP121, TP122, 1.8VIO, 3.3VIO, 1.8V_CP, VREF_SAR, MBIAS_EXT		5000	PC TESTPOINT, RED, ROHS	KEYSTONE ELECTRONICS	Red
82	18	See the list for locations		382811-9	RED No. 382811-9 Shunt		
83	22	See the list for locations		382811-6	BLACK No. 382811-6 Shunt		
84	22	See the list for locations		382811-2	BLUE No. 382811-2 Shunt		

Writing Scripts

A script is simply a text file that contains data to send to the serial control buses.

Each line in a script file is one command. No provision is made for extending lines beyond one line, except for the > command. A line is terminated by a carriage return.

The first character of a line is the command. Commands are:

l—   Set interface bus to use

r—   Read from the serial control bus

w—   Write to the serial control bus

>—   Extend repeated write commands to lines below a **w**

#—   Comment

b—   Break

d—   Delay

f—   Wait for Flag

The first command, **l**, sets the interface to use for the commands to follow. This command must be followed by one of the following parameters:

i2cstd— Standard mode I^{2}C bus

i2cfast— Fast mode I^{2}C bus

spi8— SPI bus with 8-bit register addressing

spi16— SPI bus with 16-bit register addressing

For example, if a fast mode I^{2}C bus is to be used, the script begins with:

l i2cfast— A double-quoted string of characters following the **b** command can be added to provide information to the user about each breakpoint. When the script is executed, the software's command handler halts as soon as a breakpoint is detected and displays the string of characters within the double quotes.

The Wait for Flag command, **f**, reads a specified register and verifies if the bitmap provided with the command matches the data being read. If the data does not match, the command handler retries for up to 200 times. This feature is useful when switching buffers in parts that support the adaptive filtering mode. The command f syntax follows:

```
f [i2c address] [register] [D7][D6][D5][D4][D3][D2][D1][D0]

where 'i2c address' and 'register' are in hexadecimal format

and 'D7' through 'D0' are in binary format with values of 0,

1 or X for don't care.8
```

Anything following a comment command **#** is ignored by the parser, provided that it is on the same line.

The delay command **d** allows the user to specify a time, in milliseconds, that the script pauses before proceeding. Note: The delay time is entered in decimal format.

A series of byte values follows either a read or write command. Each byte value is expressed in hexadecimal, and each byte must be separated by a space. Commands are interpreted and sent to the TAS1020B by the program.

The first byte following an **r** (read) or **w** (write) command is the I²C slave address of the device (if I²C is used) or the first data byte to write. (If SPI is used, note that SPI interfaces are not standardized on protocols, so the meaning of this byte varies with the device being addressed on the SPI bus.) The second byte is the starting register address that data will be written to (again, with I²C; SPI varies). Following these two bytes are data, if writing; if reading, the third byte value is the number of bytes to read, (expressed in hexadecimal).

For example, to write the values 0xAA 0x55 to an I²C device with a slave address of 0x30, starting at a register address of 0x03, the user writes:

```
#example script

I i2cfast

w 30 03 AA 55

r 30 03 02e
```

This script begins with a comment, specifies that a fast I²C bus is used, then writes *0xAA 0x55* to the I²C slave device at address 0x30, writing the values into registers 0x03 and 0x04. The script then reads back two bytes from the same device starting at register address 0x03. Note that the slave device value does not change. It is unnecessary to set the R/$\overline{W}$ bit for I²C devices in the script; the read or write commands does that.

If extensive repeated write commands are sent and commenting is desired for a group of bytes, the > command can be used to extend the bytes to other lines that follow. A usage example for the > command follows:

```
#example script for '>' command

I i2cfast

# Write AA and BB to registers 3 and 4, respectively

w 30 03 AA BB

# Write CC, DD, EE and FF to registers 5, 6, 7 and 8, respectively

> CC DD EE FF

# Place a commented breakpoint

b "AA BB CC DD EE FF was written, starting at register 3"

# Read back all six registers, starting at register 3

r 30 03 06b
```

The following example demonstrates usage of the Wait for Flag command, **f**:

```
#example script for 'wait for flag' command

I i2cfast

# Switch to Page 44

w 30 00 2C

# Switch buffer

w 30 01 05

# Wait for bit D0 to clear. 'x' denotes a don't care.
```

```
f 30 01 xxxxxxx0
```

Any text editor can be used to write these scripts; jEdit is an editor that is highly recommended for general usage. For more information, go to: www.jedit.org.

Once the script is written, it can be used in the command window by running the program, and then selecting *Open Script File...* from the File menu. Locate the script and open it. The script then is displayed in the command buffer. The user also can edit the script once it is in the buffer and save it by selecting *Save Script File...* from the File menu.

Once the script is in the command buffer, it can be executed by pressing the *Execute Command Buffer* button. If breakpoints are in the script, the script executes to that point, and the user is presented with a dialog box with a button to press to continue executing the script. When ready to proceed, the user pushes that button and the script continues.

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.

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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.

   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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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.

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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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