Evaluating the ADSP1802 SHARC Processor

FEATURES

- Analog Devices, Inc., ADSP1802 SHARC processor
  - Core performance up to 400 MHz
  - 88-lead lead frame chip scale (LFCSP) package
  - 25 MHz CLKIN oscillator/crystal
  - On-chip memory
    - 5 Mb L1 on-chip RAM
    - 8 Mb L2 RAM
- 128 Mb SPI flash memory
- Analog audio interface
  - Analog Devices AD1939 audio codec
  - 8 × 3.5 mm jacks for 8 channels of stereo output
  - 4 × 3.5 mm jacks for 4 channels of stereo input
  - Supports all 8 DACs and 4 ADCs in TDM and I^2S modes at 48 kHz, 96 kHz, and 192 kHz sample rates
- Digital audio interface (S/PDIF)
  - Radio Corporation of America (RCA) phono jack output
  - RCA phono jack input
- Temperature monitor
- UART
- 13 LEDs
- 5 push buttons
- JTAG in-circuit emulator (ICE) 14-pin header

EVALUATION KIT CONTENTS

- EVAL-ADSP1802EBZ evaluation board
- 5 V adapter power supply

DOCUMENTS NEEDED

- ADSP1802 data sheet

GENERAL DESCRIPTION

This user guide explains the design and setup of the EVAL-ADSP1802EBZ evaluation board. This evaluation board provides all digital applications interface (DAI) and digital peripheral interface (DPI) inputs/outputs by using jumpers and switches. The evaluation board is designed to be used in conjunction with the CrossCore Embedded Studio (CCES) environment to test the capabilities of the ADSP1802 processor, which interfaces to the EVAL-ADSP1802EBZ via the ICE-1000/ICE-2000 emulators. The EVAL-ADSP1802EBZ can be powered by an adapter or a 5 V supply. Any of these supplies are regulated to the voltages required on the EVAL-ADSP1802EBZ. The EVAL-ADSP1802EBZ contains four channels of analog-to-digital converter (ADC) input and eight channels of digital-to-analog converter (DAC) output. The core clock can be provided by a 25 MHz oscillator, crystal, or external CLK.

Evaluating the ADSP1802 SHARC Processor

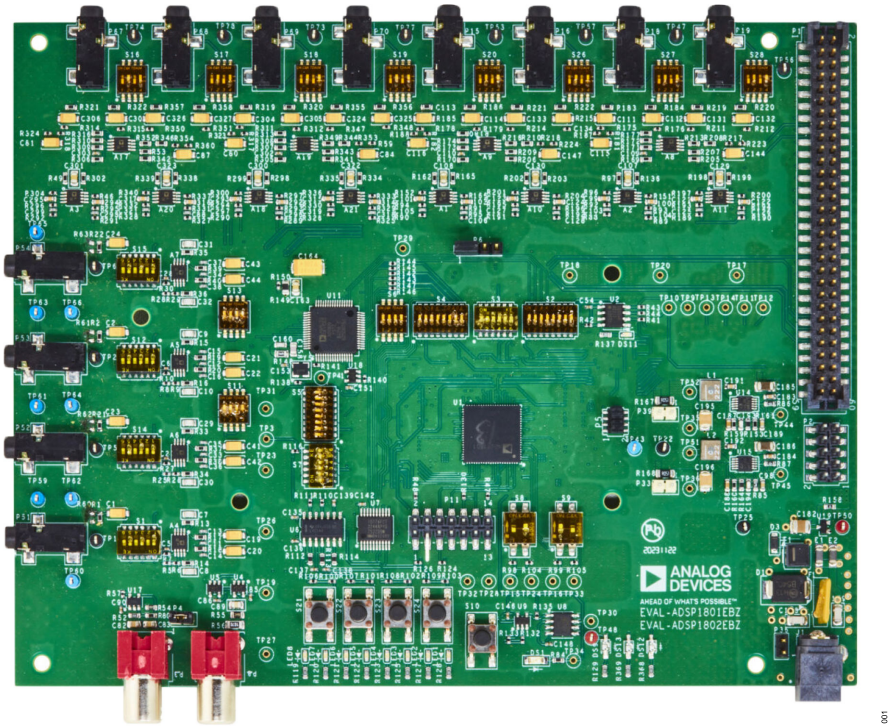

Figure 1. EVAL-ADSP1802EBZ Board Photograph

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REVISION HISTORY

7/2024—Rev. 0 to Rev. A

Changes to User Guide Title.... 1

4/2024—Revision 0: Initial Version

EVALUATION BOARD BLOCK DIAGRAMS

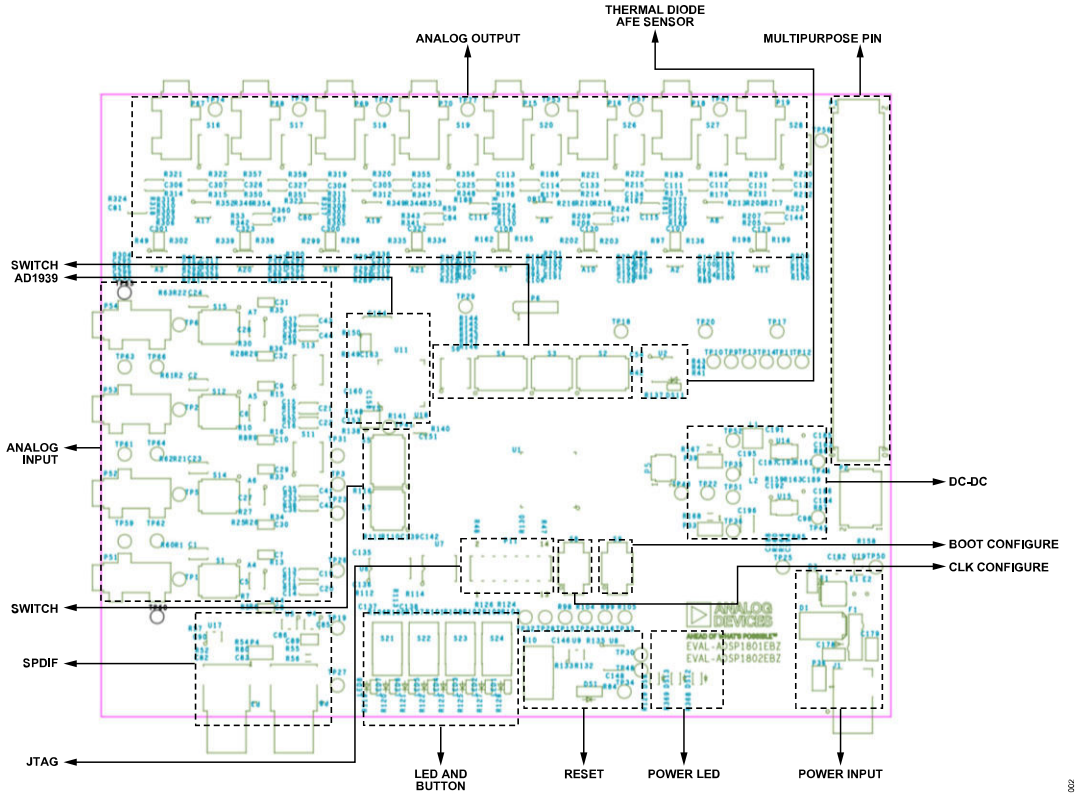

Figure 2. Evaluation Board Block Diagram

SETTING UP THE EVALUATION BOARD

To install the CCES digital signal processor (DSP) development software and configure an example code, take the following steps:

1. Connect the EVAL-ADSP1802EBZ board to a PC running CCES using an Analog Devices emulator.
2. Plug one side of the USB cable into the USB connector of the emulator. Plug the other side into a USB port of the PC running CCES. The enable/power indicator is lit green when power is applied.
3. Attach the emulator to the header of the P11 connector on the EVAL-ADSP1802EBZ board.
4. Attach the provided cord and appropriate plug to the 5 V power adapter.
5. Plug the jack end of the power adapter into the J1 power connector on the EVAL-ADSP1802EBZ board.
6. Plug the other side of the power adapter into a power outlet. The power light emitting diode (LED) (labeled DS12) is lit green when power is applied to the board.

USING THE EVALUATION BOARD

SESSION STARTUP

It is assumed that the CCES software is installed and running on your PC.

Note that if you connect the board or emulator first (before installing CCES) to the PC, the Windows driver wizard may not find the board drivers.

To set up the board using CCES, take the following steps:

1. Navigate to the CCES environment via the **Start** menu in Windows. Note that CCES is not connected to the target board.
2. Use the Windows system configuration utility to connect to the EVAL-ADSP1802EBZ board.
3. If a debug configuration exists already, select the appropriate configuration and click **Apply and Debug** or **Debug**. Go to Step 4. To create a debug configuration, do the following:
   a. Click the down arrow next to the little bug icon, select **Debug Configurations**. The **Debug Configurations** dialog box appears.
   b. Select **Application with CrossCore Debugger** and click the **New** button. The **Select Processor** page of the **Session Wizard** dialog box appears.
   c. Ensure **SHARC** is selected in **Processor family**. In **Processor type**, select ADSP1802. Click the **Next** button. The **Select Connection Type** page of the **Session Wizard** dialog box appears.
   d. For emulator connections, select **Emulator** then click the **Next** button. The **Select Platform** page of the **Session Wizard** dialog box appears.
   e. Choose the type of emulator that is connected to the board.
   f. Click the **Finish** button to close the **Session Wizard** dialog box. The new debug configuration is created and added to the program(s) to load the list.
4. In the **Program(s) to load** section, choose the program to load when connecting to the board. If not loading any program upon connection to the target, do not make any changes. Note that while connected to the target, there is no way to choose a program to download. To load a program once connected, terminate the session.

Contact Analog Devices for the information about CCES and to download the software.

DEFAULT SWITCH AND JUMPER SETTINGS

Table 1 shows the default jumper and switch settings in installation. Confirm that your board is in the default configuration before using the board.

Table 1. Default Switch and Jumper Settings

Jumper and Switch Connections	Option Selected
Pin 1 to Pin 2 of P4	S/PDIF loopback test
Pin 1 to Pin 2 of P5, Pin 3 to Pin 4 of P5, Pin 5 to Pin 6 of P5, Pin 7 to Pin 8 of P5	The DSP connects to the flash
Pin 1 to Pin 2 of P12	Select the DSP CLK source
Pin 1 of S8 to GND and Pin 2 of S8 to 3.3 V	Configure the CLK
Pin 1 of S9 to GND and Pin 2 of S9 to GND	Configure boot mode

POWER SUPPLY

Power can be supplied to the EVAL-ADSP1802EBZ in one of the following ways:

- Connecting the 5 V adapter cable to the J1 connector.
- Connecting the 5 V DC power to Pin 2 or/and Pin 4 of P1. Pin 1, Pin 3, Pin 5, Pin 7, Pin 9, and Pin 11 are GND pins.
- Connecting the 5 V DC power to P36.

In addition, there are other power conversion circuits on the board including two bucks (LT8609), the U14 output is 3.3 V, which powers the system, and the U15 output is 1.1 V, which powers the DSP 1.1 V only. There is a low dropout regulator (LDO) circuit (ADP1710), which provides an analog 3.3 V for the codec circuit (AD1939). In addition, there are three LEDs to show the state of power supply including 5 V, 3.3 V, and analog 3.3 V.

CLOCK OPTION

The EVAL-ADSP1802EBZ board has three options for providing a target clock to the DSP. The first option is to provide an external MCLK signal directly to the CLKIN pin of the DSP from P12. The second option is to use the on-board 25 MHz oscillator, and the third option is to use the on-board 25 MHz crystal. Refer to Table 2 to check the main clock settings. If you want to produce an audio CLK, there is a 24.576 MHz oscillator, which can be used or EXT_CLK connected to the Pin 2 of P14.

Table 2. Main Clock Jumper Settings

Clock Source	Jumper Setting
Oscillator	Pin 1 to Pin 2 of P12
Crystal	Pin 3 to Pin 2 of P12
External MCLK	External CLK to Pin 2 of P12

BOOT UP OPTION

There are two boot up options for the EVAL-ADSP1802EBZ. Use S9 to select the boot up options, which are main or subordinate boot. When main boot is enabled, the DSP core of the ADSP1802 loads the program from flash through the serial peripheral interface (SPI). When the subordinate boot mode is enabled, the ADSP1802 can be boot from external control unit.

USING THE EVALUATION BOARD

Table 3. Boot Mode Selection

BOOT_CFG1 to BOOT_CFG0	Booting Mode
00	SPI subordinate boot
01	SPI main boot
10	Reserved
11	Reserved

AUDIO INPUTS AND OUTPUTS

The EVAL-ADSP1802EBZ has multiple audio input and output options, including digital and analog. There are four analog inputs, eight analog outputs by AD1939, and P1 as digital audio interfaces.

ANALOG INPUTS

The four analog inputs (P51, P52, P53, and P54) can be configured as microphone, and all the inputs are differential or single-ended. Each analog input can be amplified by amplifier circuits. The switch (S1, S12, S14, and S15) can be used in single-ended or differential input mode through ADC channels.

Refer to Table 4 for the hardware configuration of the analog input signals. Note that the code running in the DSP must be the same as the hardware configured.

Table 4. ADC Mode Switch Settings

ADC No.	Mode	Switch Settings
ADC1	Differential	S1.2, S1.4, S1.6 on; S1.1, S1.3, S1.5 off.
	Single-ended	S1.2, S1.4, S1.6 off; S1.1, S1.3, S1.5 on.
ADC2	Differential	S14.2, S14.4, S14.6 on; S14.1, S14.3, S14.5 off.
	Single-ended	S14.2, S14.4, S14.6 off; S14.1, S14.3, S14.5 on.
ADC3	Differential	S12.2, S12.4, S12.6 on; S12.1, S12.3, S12.5 off.
	Single-ended	S12.2, S12.4, S12.6 off; S12.1, S12.3, S12.5 on.
ADC4	Differential	S15.2, S15.4, S15.6 on; S15.1, S15.3, S15.5 off.
	Single-ended	S15.2, S15.4, S15.6 off; S15.1, S15.3, S15.5 on.

USING THE EVALUATION BOARD

ANALOG OUTPUTS

The DSP communicates with the AD1939 by a digital audio protocol, for example, I^2S or time division multiplexed (TDM). There are many DAI interfaces to connect the two circuits. In addition, the AD1939 only supports differential mode, while the AD8656 is used to convert differential into single-ended. Refer to Table 5 for detailed information.

Table 5. DAC Output Interfaces and Signal

Mode	Function	Switch Settings
Single-Ended	DAC1	S16.2, S16.4 on; S16.1, S16.3 off
	DAC2	S17.2, S17.4 on; S17.1, S17.3 off
	DAC3	S18.2, S18.4 on; S18.1, S18.3 off
	DAC4	S19.2, S19.4 on; S19.1, S19.3 off
	DAC5	S20.2, S20.4 on; S20.1, S20.3 off
	DAC6	S26.2, S26.4 on; S26.1, S26.3 off
	DAC7	S27.2, S27.4 on; S27.1, S27.3 off
	DAC8	S28.2, S28.4 on; S28.1, S28.3 off
Differential	DAC1P DAC1N	S16.1, S16.3 on; S16.2, S16.4 off
	DAC2P DAC2N	S17.1, S17.3 on; S17.2, S17.4 off
	DAC3P DAC3N	S18.1, S18.3 on; S18.2, S18.4 off
	DAC4P DAC4N	S19.1, S19.3 on; S19.2, S19.4 off
	DAC5P DAC5N	S20.1, S20.3 on; S20.2, S20.4 off
	DAC6P DAC6N	S26.1, S26.3 on; S26.2, S26.4 off
	DAC7P DAC7N	S27.1, S27.3 on; S27.2, S27.4 off
	DAC8P DAC8N	S28.1, S28.3 on; S28.2, S28.4 off

USING THE EVALUATION BOARD

DPI

DPI can support two wire interface (TWI), SPI, and universal asynchronous receiver transmitter (UART). These DPI interfaces can connect to many different devices such as SPI flash, thermal diode sensor, and UART communication with PC. Table 6 shows the default DPI connection.

Table 6. DPI

ADSP1802 Pin Name	Function	Switch Settings
DPI_P1	SPI_MOSI	Pin 1 of S2 on
DPI_P2	SPI_MISO	Pin 2 of S2 on
DPI_P3	SPI_CLK	Pin 3 of S2 on
DPI_P4	AD1939_CS	Pin 4 of S2 on
DPI_P5	SPI_CS	Pin 5 of S2 on
DPI_P6	LED1	Pin 6 of S2 on
DPI_P7	TEMP_SDA	Pin 7 of S2 on
DPI_P8	TEMP_SCL	Pin 8 of S2 on
DPI_P9	UART_TX	Pin 1 of S3 on
DPI_P10	UART_RX	Pin 2 of S3 on
DPI_P11	UART_RTS	Pin 3 of S3 on
DPI_P12	UART_CTS	Pin 4 of S3 on
DPI_P13	LED3	Pin 5 of S3 on
DPI_P14	LED4	Pin 6 of S3 on

USING THE EVALUATION BOARD

DAI

Serial audio signals in I²S, left-justified, right-justified, or TDM format are available via the serial audio interface header (P1) or switches (S4, S5, S6) to connect an external I²S- or TDM-compatible device. Table 7 shows the default DAI connection.

Table 7. DAI

ADSP1802 Pin Name	Function	Switch Settings
DAI_P1	SPDIF_OUT	Pin 1 of S4 on
DAI_P2	AD1939_SOFT_RESET	Pin 2 of S4 on
DAI_P3	LED4	Pin 3 of S4 on
DAI_P4	LED5	Pin 4 of S4 on
DAI_P5	ASDATA1	Pin 5 of S4 on
DAI_P6	ASDATA2	Pin 6 of S4 on
DAI_P7	ABCLK	Pin 7 of S4 on
DAI_P8	ALRCLK	Pin 8 of S4 on
DAI_P9	DSDATA4	Pin 1 of S5 on
DAI_P10	DSDATA3	Pin 2 of S5 on
DAI_P11	DSDATA2	Pin 3 of S5 on
DAI_P12	DSDATA1	Pin 4 of S5 on
DAI_P13	DBCLK	Pin 5 of S5 on
DAI_P14	DLRCLK	Pin 6 of S5 on
DAI_P15	LED6	Pin 7 of S5 on
DAI_P16	LED7	Pin 8 of S5 on
DAI_P17	LED8	Pin 1 of S6 on
DAI_P18	SPDIF_IN	Pin 2 of S6 on
DAI_P19	PB3	Pin 3 of S6 on
DAI_P20	PB4	Pin 4 of S6 on

USING THE EVALUATION BOARD

SWITCH CONFIGURATION

These switches on the EVAL-ADSP1802EBZ board must be set according to real applications before running the DSP. All switches information is shown in Table 8.

Table 8. DAI

Switch Name	Function	Switch Settings
S2	DPI interface	Based on your devices used.
S3	DPI interface	Based on your devices used.
S4	DAI interface	Based on your devices used.
S5	DAI interface	Based on your devices used.
S6	DAI interface	Based on your devices used.
S7	FLAG interface	Based on your devices used.
S8	CLK configure	S8.1 off; S8.2 on (25 MHz CLK source).
S9	Boot configure	Main boot: S9.1 on; S9.2 off. Subordinate boot: S9.1 off; S9.2 off.
S10	Reset button	High.
S11	Analog loopback self test DAC (1 to 4) to ADC (1 to 2)	Off.
S13	Analog loopback self test DAC (5 to 8) to ADC (3 to 4)	Off.
S21 to S24	Buttons are used to set program that run in the DSP	High.

OTHER INTERFACES

Other interfaces include the following:

- Joint Test Action Group (JTAG), the JTAG header is P11.
- UART, the UART interface is P6.
- Multipurpose pins, the multipurpose pins are P1.

Note that all multipurpose pins (P1) are used to configure a variety of other functions. These devices can be audio devices by DAI interfaces or general devices by DPI interfaces, which are used to connect external devices, such as SPI, TWI, and UART.

HARDWARE DESCRIPTION

Table 9 shows the information of connectors.

Table 9. Connectors Description

Reference Designator	Functional Name	Description
P1	DAI and DPI interfaces	DAI, DPI, and 5 V power and communication interfaces
P2	SigmaStudio interface	Sigma interface including TWI and SPI protocol
P3	S/PDIF interface	S/PDIF communication
P4	S/PDIF loopback interface	S/PDIF loopback communication
P5	SPI flash interface	SPI flash communication
P6	UART interface	UART communication
P8	S/PDIF out interface	S/PDIF communication
P11	JTAG interface	JTAG communication
P12	CLK option	Select EXT_CLK, Y1 or Y2 as DSP 25 MHz input
P14	CLK option	Select EXT_CLK, Y3 as DSP audio CLK source
P15	Analog output	DAC OUT5P and OUT5N output 3.5 mm jack
P16	Analog output	DAC OUT6P and OUT6N output 3.5 mm jack
P17	FT4232 reset	Reserved, default floating
P18	Analog output	DAC OUT7P and OUT7N output 3.5 mm jack
P19	Analog output	DAC OUT8P and OUT8N output 3.5 mm jack
P33	V_{DD_INT} power consumption	Used to test V_{DD_INT} power consumption
P36	5 V power supply	External 5 V power supply
P39	V_{DD_EXT} power consumption	Used to test V_{DD_EXT} power consumption
P51	Analog Input 1	ADC 1 input 3.5 mm jack
P52	Analog Input 2	ADC 2 input 3.5 mm jack
P53	Analog Input 3	ADC 3 input 3.5 mm jack
P54	Analog Input 4	ADC 4 input 3.5 mm jack
P67	Analog Output 1	DAC OUT1P and OUT1N output 3.5 mm jack
P68	Analog Output 2	DAC OUT2P and OUT2N output 3.5 mm jack
P69	Analog Output 3	DAC OUT3P and OUT3N output 3.5 mm jack
P70	Analog Output 4	DAC OUT4P and OUT4N output 3.5 mm jack
P15	Analog Output 5	DAC OUT5P and OUT5N output 3.5 mm jack
P16	Analog Output 6	DAC OUT6P and OUT6N output 3.5 mm jack
P18	Analog Output 7	DAC OUT7P and OUT7N output 3.5 mm jack
P19	Analog Output 8	DAC OUT8P and OUT8N output 3.5 mm jack

EVALUATION BOARD SCHEMATICS

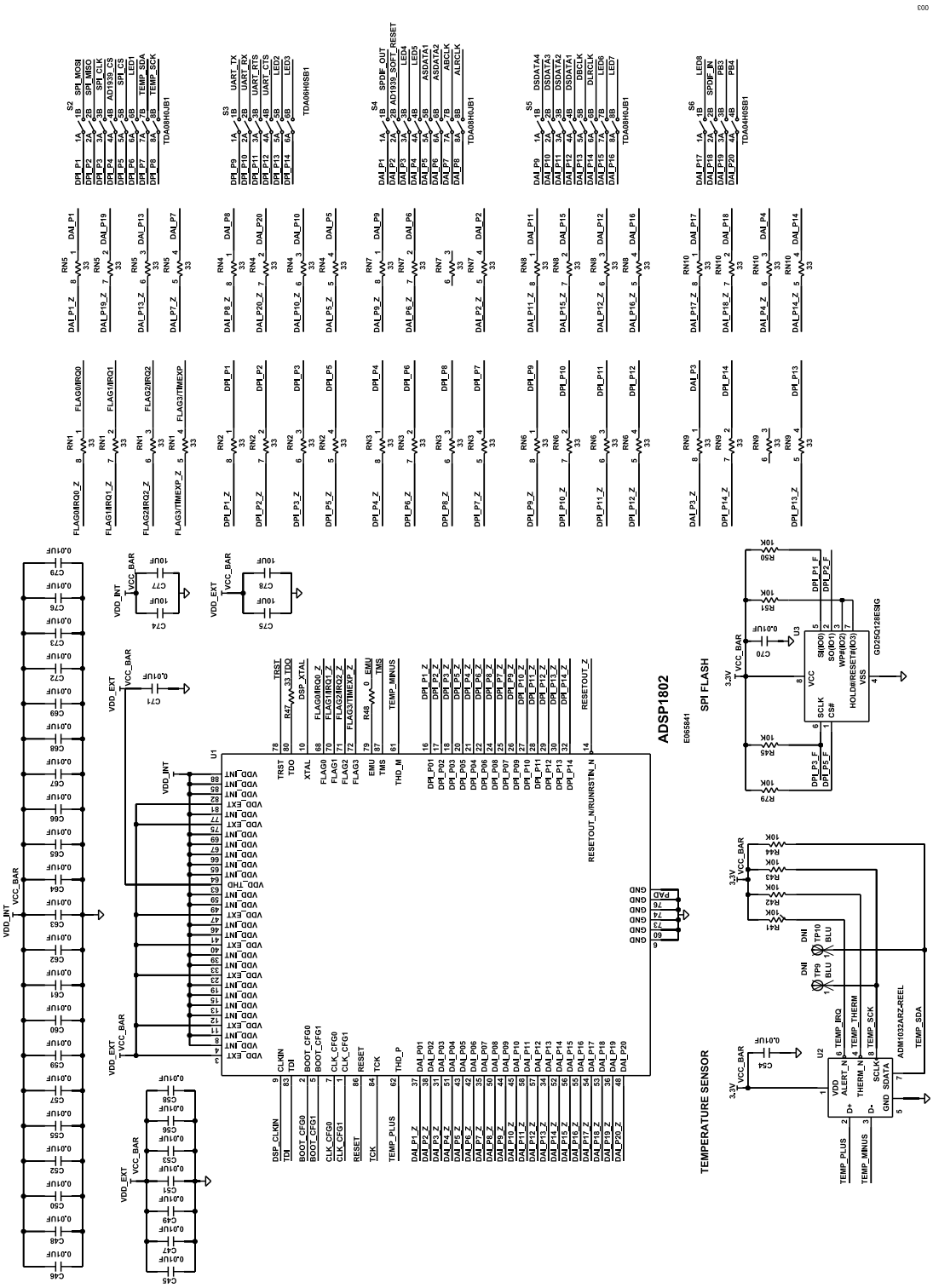

Figure 3. EVAL-ADSP1802EBZ Schematics, Page 1

EVALUATION BOARD SCHEMATICS

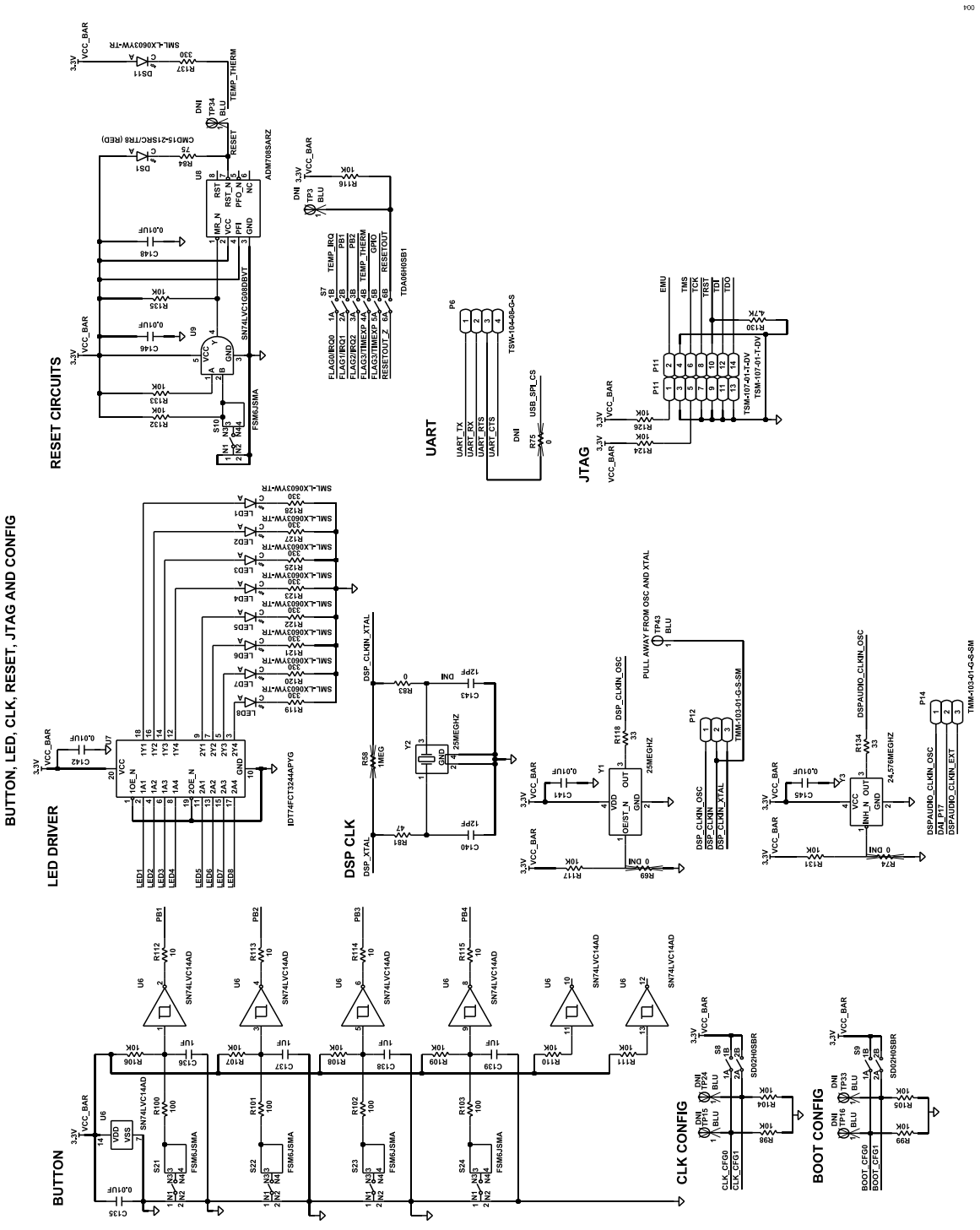

Figure 4. EVAL-ADSP1802EBZ Schematics, Page 2

EVALUATION BOARD SCHEMATICS

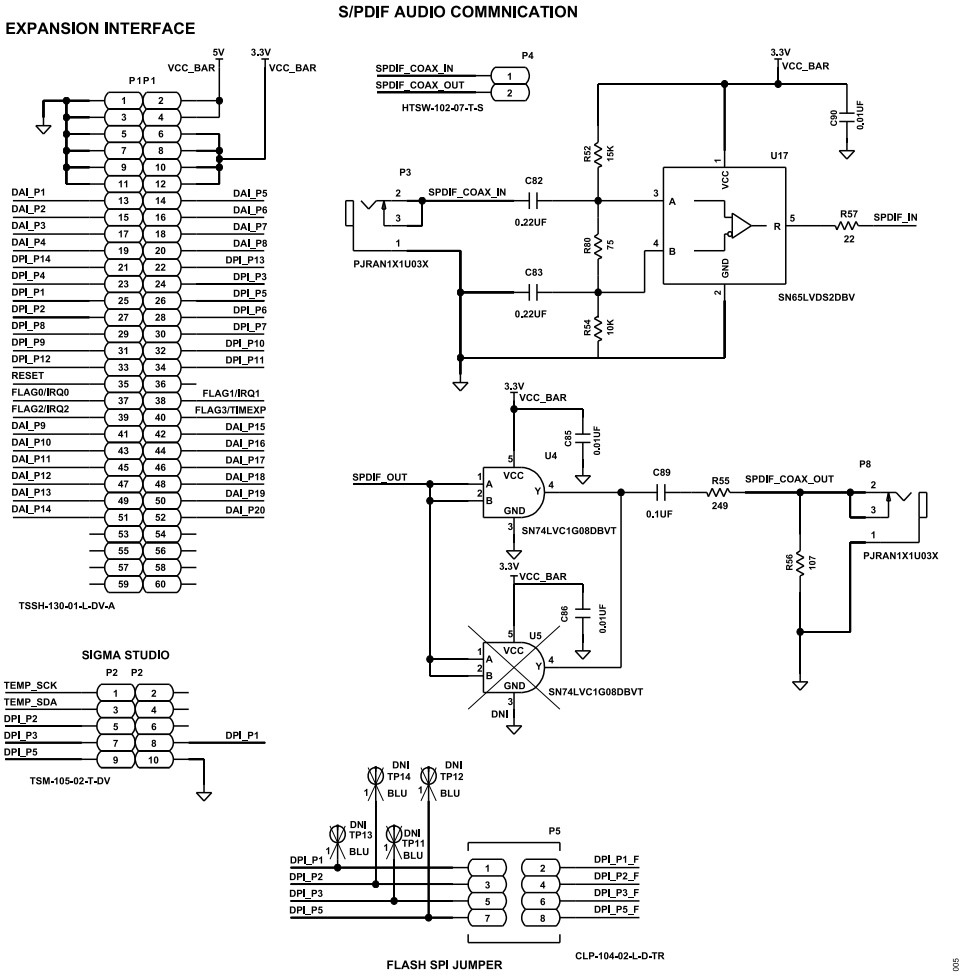

Figure 5. EVAL-ADSP1802EBZ Schematics, Page 3

EVALUATION BOARD SCHEMATICS

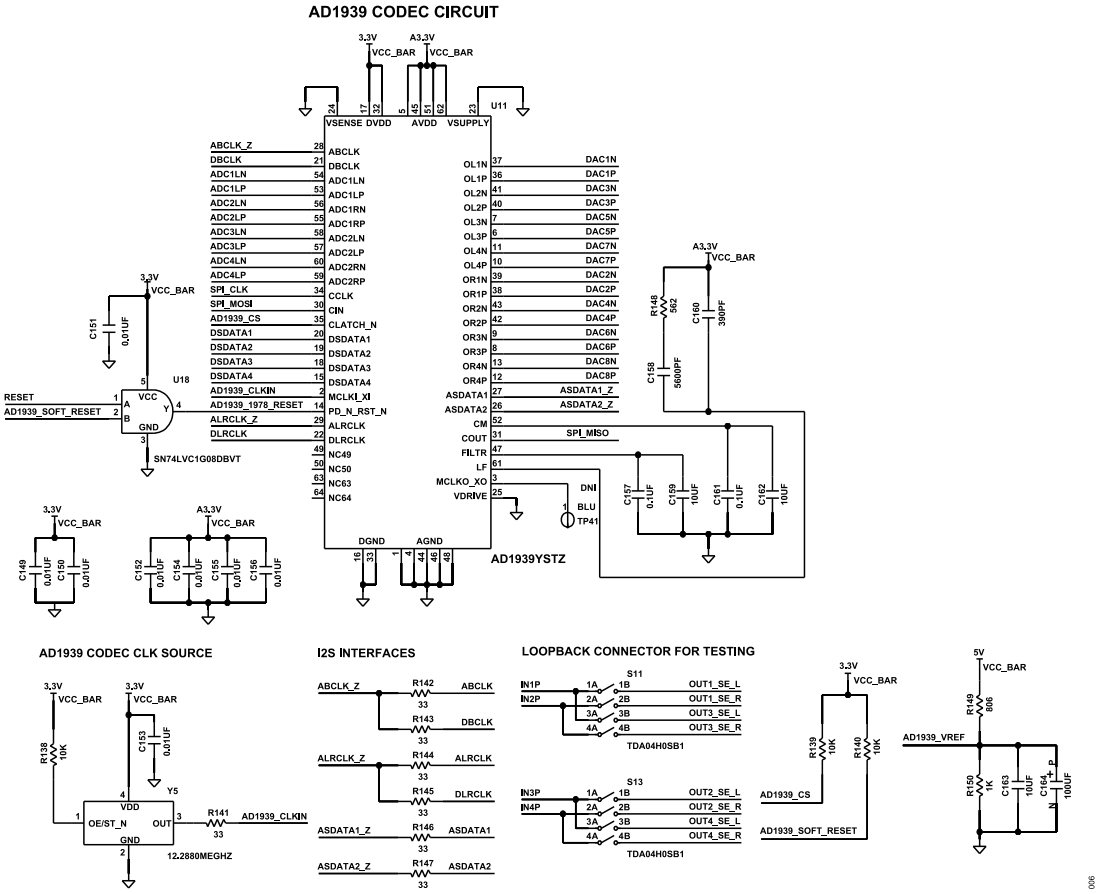

Figure 6. EVAL-ADSP1802EBZ Schematics, Page 4

EVALUATION BOARD SCHEMATICS

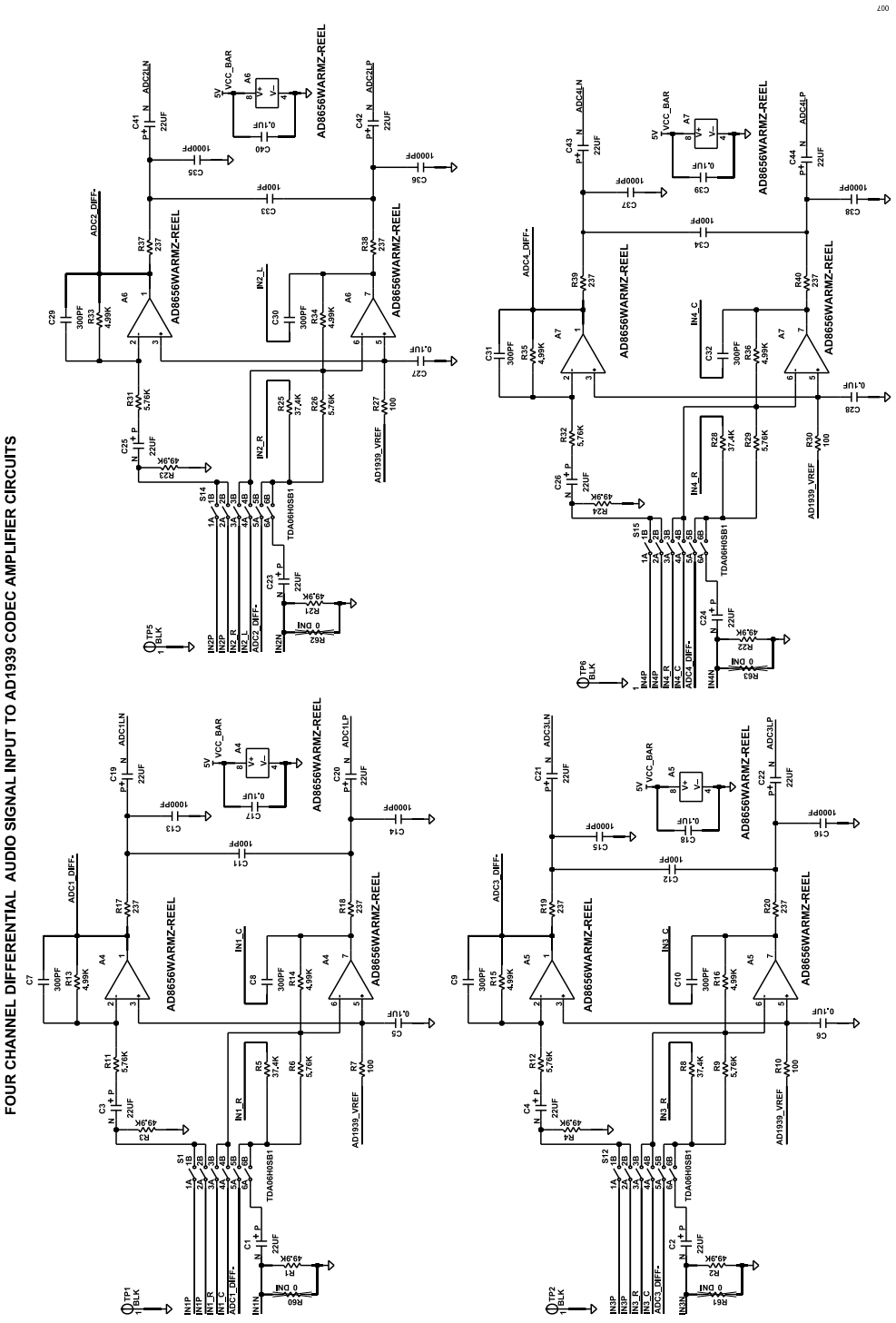

Figure 7. EVAL-ADSP1802EBZ Schematics, Page 5

EVALUATION BOARD SCHEMATICS

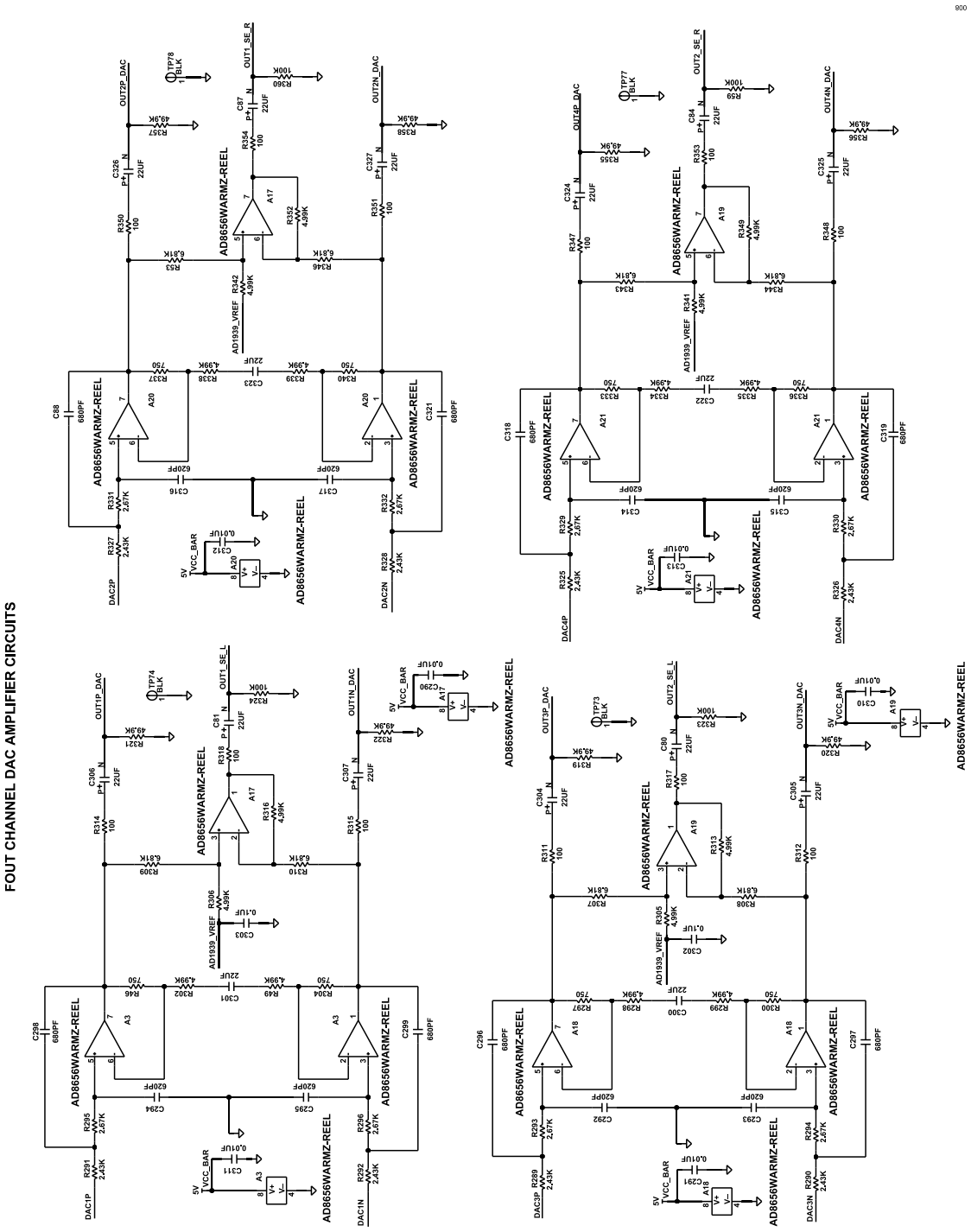

Figure 8. EVAL-ADSP1802EBZ Schematics, Page 6

EVALUATION BOARD SCHEMATICS

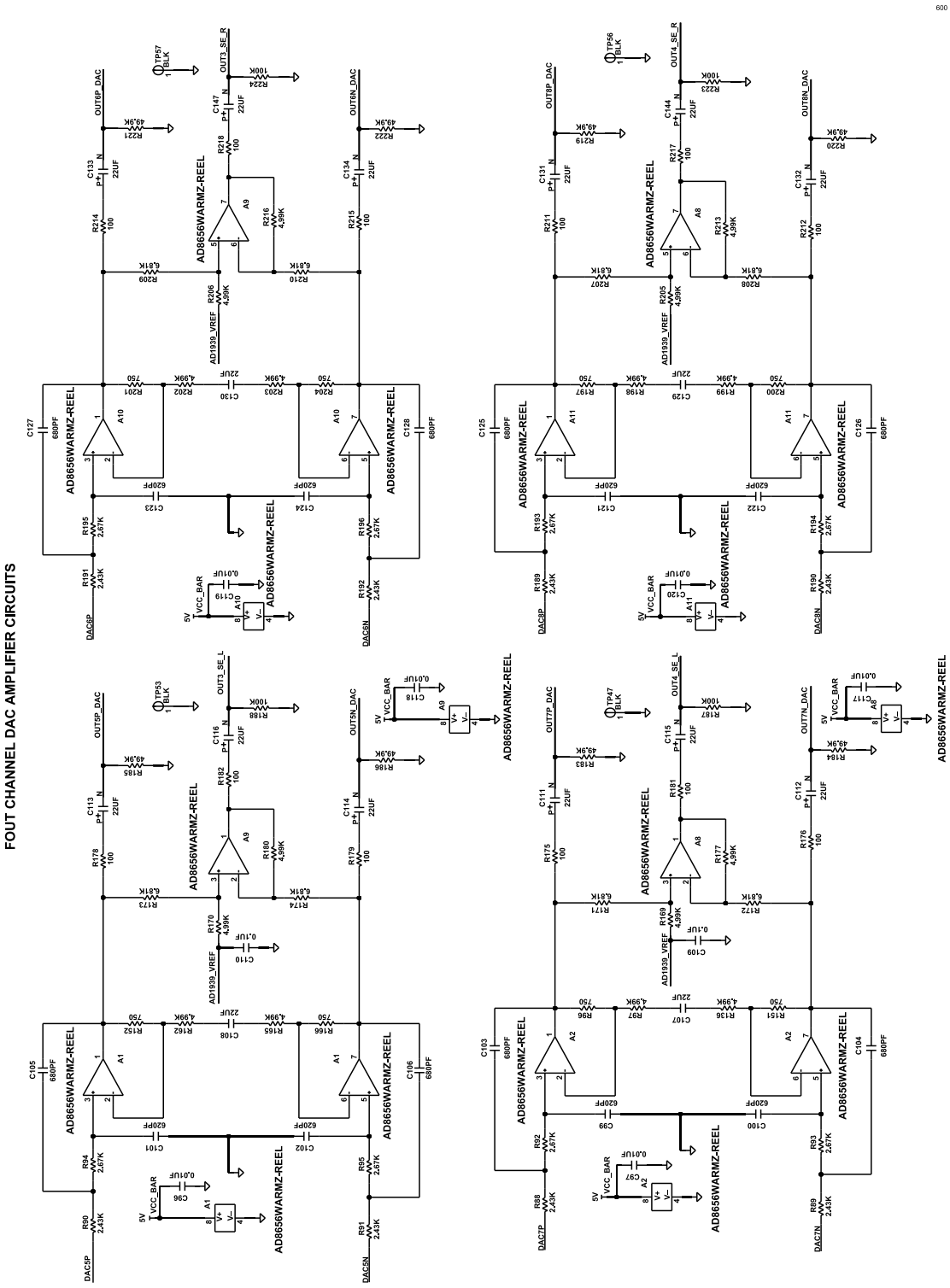

Figure 9. EVAL-ADSP1802EBZ Schematics, Page 7

EVALUATION BOARD SCHEMATICS

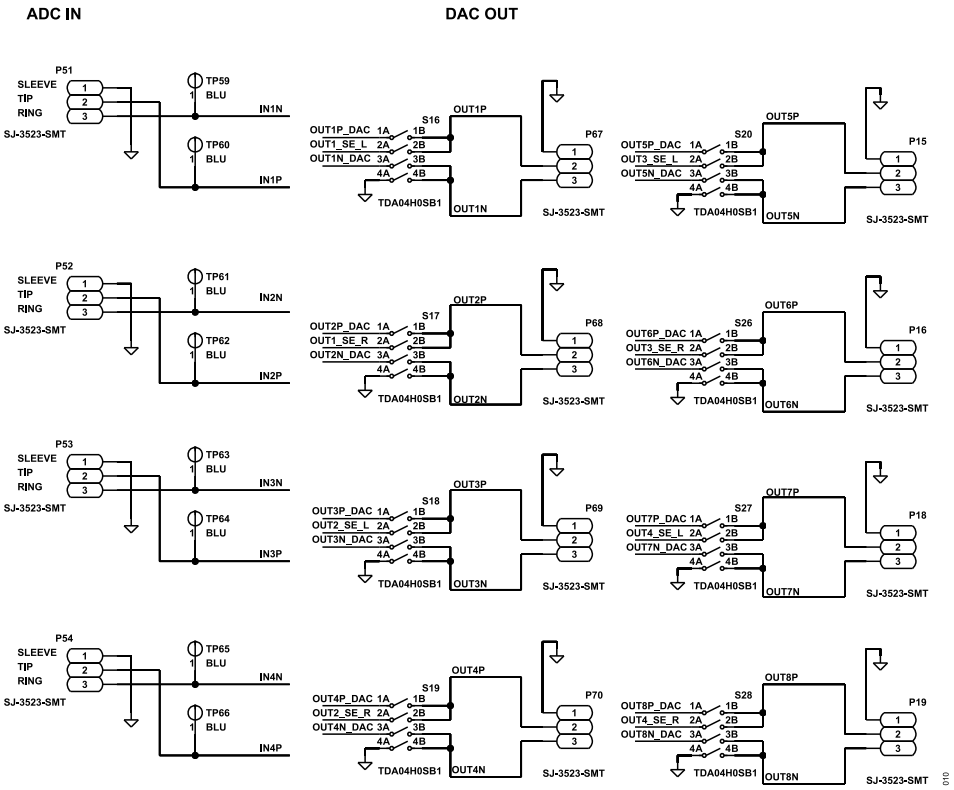

Figure 10. EVAL-ADSP1802EBZ Schematics, Page 8

EVALUATION BOARD SCHEMATICS

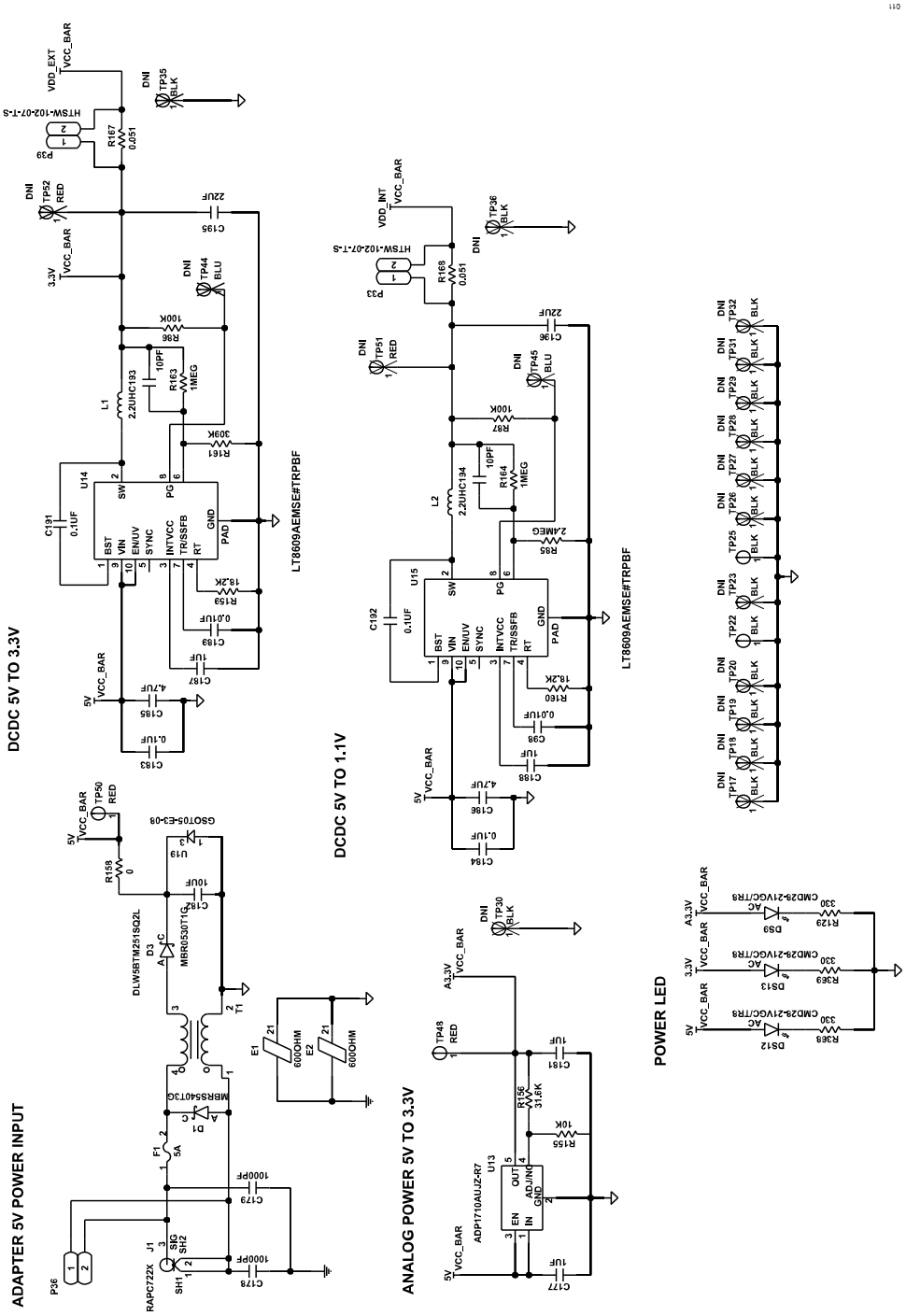

Figure 11. EVAL-ADSP1802EBZ Schematics, Page 9

BILL OF MATERIALS

Table 10. Bill of Materials

Qty.	Location	Description	Value	Manufacturing Part Number
16	A1 to A11, A17 to A21	Analog Devices IC, low noise, precision CMOS, dual op amp		AD8656WARMZ-REEL
40	C1 to C4, C19 to C26, C41 to C44, C80, C81, C84, C87, C111 to C116, C131 to C134, C144, C147, C304 to C307, C324 to C327	Tantalum capacitor, 22 µF, 6.3 V, 10%, 3216-18	22 µF	TAJA226K006RNJ
8	C7 to C10, C29 to C32	Ceramic capacitor, 300 pF, 100 V, 5%, C0G, 0805, extreme low equivalent series resistance (ESR)	300 pF	C0805C301J1GAC
16	C99 to C102, C121 to C124, C292 to C295, C314 to C317	Ceramic capacitor, 620 pF, 50 V, 1%, C0G, 0603, extreme low ESR	620 pF	C0603C621F5GACTU
16	C88, C103 to C106, C125 to C128, C296 to C299, C318, C319, C321	Ceramic capacitor, 680 pF, 50 V, 5%, C0G, 0402	680 pF	GRM1555C1H681JA01D
8	C107, C108, C129, C130, C300, C301, C322, C323	Ceramic capacitor, 22 µF, 6.3 V, 20%, X5R, 0805	22 µF	GRM21BR60J226ME39L
12	C5, C6, C17, C18, C27, C28, C39, C40, C109, C110, C302, C303	Ceramic capacitor, 0.1 µF, 10 V, 10%, X5R, 0402	0.1 µF	0402ZD104KAT2A
4	C11, C12, C33, C34	Ceramic capacitor, 100 pF, 50 V, 5%, C0G, 0402, AEC-Q200	100 pF	GCM1555C1H101JA16D
60	C45 to C73, C76, C79, C85, C86, C90, C96, C97, C117 to C120, C135, C141, C142, C145, C146, C148 to C156, C290, C291, C310 to C313	Ceramic capacitor, 0.01 µF, 25 V, 10%, X7R, 0402, AEC-Q200	0.01 µF	GCM155R71E103KA37D
8	C13, C14, C15, C16, C35, C36, C37, C38	Ceramic capacitor, 1000 pF, 50 V, 5%, C0G, 0402	1000 pF	GRM1555C1H102JA01
4	C136, C137, C138, C139	Ceramic capacitor, 1 µF, 6.3 V, 10%, X7R, 0402, AEC-Q200	1 µF	GRT155R70J105KE01D
2	C157, C161	Ceramic capacitor, 0.1 µF, 16 V, 10%, X7R, 0603	0.1 µF	0603YC104KAT2A
1	C158	Ceramic capacitor, 5600 pF, 100 V, 5%, NP0, 0805	5600 pF	C2012NP02A562J125AA
7	C74, C75, C77, C78, C159, C162, C163	Ceramic capacitor, 10 µF, 16 V, 10%, X5R, 0805	10 µF	GRM21BR61C106KE15L
1	C160	Ceramic capacitor, 390 pF, 100 V, 5%, C0G, 0603, AEC-Q200	390 pF	GCM1885C2A391JA16D
1	C164	Tantalum capacitor, 100 µF, 10 V, 10%, 6032-28	100 µF	TPSC107K010R0100
2	C177, C181	Ceramic capacitor, 1 µF, 16 V, 10%, X7R, 0603	1 µF	EMK107B7105KA-T
2	C178, C179	Ceramic capacitor, 1000 pF, 50 V, 5%, C0G, 1206	1000 pF	12065A102JAT2A
1	C182	Ceramic capacitor, 10 µF, 16 V, 10%, X5R, 1210	10 µF	1210YD106KAT2A
4	C183, C184, C191, C192	Ceramic capacitor, 0.1 µF, 50 V, 10%, X7R, 0603	0.1 µF	CC0603KRX7R9BB104
2	C185, C186	Ceramic capacitor, 4.7 µF, 50 V, 10%, X7R, 1206	4.7 µF	GRM31CR71H475KA12L
2	C187, C188	Ceramic capacitor, 1 µF, 25 V, 10%, X7R, 0603, AEC-Q200	1 µF	GRT188R71E105KE13D
2	C98, C189	Ceramic capacitor, 0.01 µF, 16 V, 10%, X7R, 0603	0.01 µF	0603YC103KAT2A
2	C193, C194	Ceramic capacitor, 10 pF, 25 V, 5%, C0G, 0603	10 pF	06033U100JAT2A
2	C195, C196	Ceramic capacitor, 22 µF, 25 V, 10%, X7R, 1210	22 µF	GRM32ER71E226KE15K
2	C82, C83	Ceramic capacitor, 0.22 µF, 25 V, 10%, X5R, 0805	0.22 µF	08053D224KAT2A
1	C89	Ceramic capacitor, 0.1 µF, 50 V, 10%, X7R, 0805, AEC-Q200	0.1 µF	08055C104K4T4A
1	D1	Schottky diode, power rectifier, surface mount device (SMD)		MBRS540T3G
1	D3	Schottky diode, power rectifier, 0.5 A		MBR0530T1G
1	DS1	LED, super red clear, 1206, SMD		CMD15-21SRC/TR8
9	DS11, LED1 to LED8	LED, unicolor yellow, 585 nm wavelength peak		SML-LX0603YW-TR
3	DS9, DS12, DS13	LED, unicolor green, 570 nm		CMD28-21VGC/TR8
2	E1, E2	Inductor, ferrite chip bead	600 Ω	HZ1206E601R-10

BILL OF MATERIALS

Table 10. Bill of Materials (Continued)

Qty.	Location	Description	Value	Manufacturing Part Number
1	F1	Fuse, resettable, polymeric positive temperature coefficient (PPTC) device	5 A	RGEF500
1	J1	PCB connector, power jack mini, 0.08 in, right angle, through hole		RAPC722X
2	L1, L2	Inductor, shielded power	2.2 µH	XFL4020-222MEB
1	P1	PCB connector, 60 positions, male shrouded header, dual row strip, 2.54 mm pitch		TSSH-130-01-L-DV-A
1	P11	PCB connector, header, 25 mil, square post, 2.54 mm pitch		TSM-107-01-T-DV
2	P12, P14	PCB connector, three positions, unshrouded header, low profile, 2 mm pitch, 3.2 mm post height		TMM-103-01-G-S-SM
12	P15, P16, P18, P19, P51 to P54, P67 to P70	PCB connector, 3.5 mm, surface mount, audio jack stereo		SJ-3523-SMT
3	P4, P33, P39	PCB connector, two positions, unshrouded, 0.635 mm, square post, header, 5.84 mm post height, 2.54 mm solder tail, 2.54 mm pitch		HTSW-102-07-T-S
1	P2	PCB connector, header, unshrouded, square post, dual row, gull wing, 2.54 mm pitch		TSM-105-02-T-DV
2	P3, P8	PCB connector, phono jack, right angle		PJRAN1X1U03X
3	P4, P33, P39	PCB connector, two positions, unshrouded, 0.635 mm, square post		HTSW-102-07-T-S
1	P36	PCB connector, two positions, male header, unshrouded, single row strip, 2.54 mm pitch, 3.05 mm solder tail		PBC02SAAN
1	P5	PCB connector, eight positions, header, socket, vertical, 1.27 mm pitch		PZ127-2-04-S
1	P6	PCB connector, Berg header, strip, male, four positions		TSW-104-08-G-S
24	R1 to R4, R21 to R24, R183 to R186, R219 to R222, R319 to R322, R355 to R358	Resistor, SMD, 49.9 kΩ, 1%, 1/10 W, 0603, AEC-Q200	49.9 kΩ	ERJ-3EKF4992V
28	R7, R10, R27, R30, R175, R176, R178, R179, R181, R182, R211, R212, R214, R215, R217, R218, R311, R312, R314, R315, R317, R318, R347, R348, R350, R351, R353, R354	Resistor, SMD, 100 Ω, 1%, 1/16 W, 0402	100 Ω	CR0402-16W-1000FPT
4	R100 to R103	Resistor, SMD, 100 Ω, 0.1%, 1/16 W, 0402	100 Ω	RT0402BRE07100RL
29	R41 to R45, R50, R51, R79, R98, R99, R104 to R111, R116, R117, R124, R126, R131 to R133, R135, R138 to R140	Resistor, SMD, 10 kΩ, 5%, 1/16 W, 0402, AEC-Q200	10 kΩ	CRCW040210K0JNED
8	R6, R9, R11, R12, R26, R29, R31, R32	Resistor, SMD, 5.76 kΩ, 1%, 1/10 W, 0402, AEC-Q200	5.76 kΩ	ERJ-2RKF5761X
4	R112 to R115	Resistor, SMD, 10 Ω, 5%, 1/10 W, 0603, AEC-Q200	10 Ω	CRCW060310R0JNEA
10	R47, R118, R134, R141 to R147	Resistor, SMD, 33 Ω, 1%, 1/5 W, 0402, AEC-Q200	33 Ω	CRCW040233R0FKEDHP
12	R119 to R123, R125, R127 to R129, R137, R368, R369	Resistor, SMD, 330 Ω, 5%, 1/10 W, 0603, AEC-Q200	330 Ω	ERJ-3GEYJ331V
40	R13 to R16, R33 to R36, R49, R97, R136, R162, R165, R169, R170, R177, R180, R198, R199, R202, R203, R205, R206, R213, R216, R298, R299, R302, R305, R306, R313, R316, R334, R335,	Resistor, SMD, 4.99 kΩ, 1%, 1/10 W, 0603, AEC-Q200	4.99 kΩ	ERJ-3EKF4991V

BILL OF MATERIALS

Table 10. Bill of Materials (Continued)

Qty.	Location	Description	Value	Manufacturing Part Number
	R338, R339, R341, R342, R349, R352			
1	R130	Resistor, SMD, 4.7 kΩ, 5%, 1/16 W, 0402	4.7 kΩ	RC0402JR-074K7L
1	R148	Resistor, SMD, 562 Ω, 1%, 1/8 W, 0805, AEC-Q200	562 Ω	ERJ-6ENF5620V
1	R149	Resistor, SMD, 806 Ω, 1%, 1/10 W, 0402, AEC-Q200	806 Ω	ERJ-2RKF8060X
1	R150	Resistor, SMD, 1 kΩ, 1%, 1/2 W, 0805, AEC-Q200	1 kΩ	CRCW08051K00FKEAHP
16	R46, R96, R151, R152, R166, R197, R200, R201, R204, R297, R300, R304, R333, R336, R337, R340	Resistor, SMD, 750 Ω, 5%, 1/10 W, 0402, AEC-Q200	750 Ω	ERJ-2GEJ751X
1	R155	Resistor, SMD, 10 kΩ, 1%, 1/16 W, 0402, AEC-Q200	10 kΩ	CRCW040210K0FKED
1	R156	Resistor, SMD, 31.6 kΩ, 1%, 1/10 W, 0603, AEC-Q200	31.6 kΩ	ERJ-3EKF3162V
1	R158	Resistor, SMD, 0 Ω, jumper, 1/10 W, 0603, AEC-Q200	0 Ω	ERJ-3GEY0R00V
2	R159, R160	Resistor, SMD, 18.2 kΩ, 1%, 1/10 W, 0603, AEC-Q200	18.2 kΩ	ERJ-3EKF1822V
1	R161	Resistor, SMD, 309 kΩ, 0.1%, 1/10 W, 0603, AEC-Q200	309 kΩ	ERA-3AEB3093V
2	R163, R164	Resistor, SMD, 1 MΩ, 1%, 1/10 W, 0603, AEC-Q200	1 MΩ	CRCW06031M00FKEA
2	R167, R168	Resistor, SMD, 0.051 Ω, 1%, 1/2 W, 1206, AEC-Q200	0.051 Ω	RL1206FR-7W0R051L
8	R17 to R20, R37 to R40	Resistor, SMD, 237 Ω, 1%, 1/10 W, 0603, AEC-Q200	237 Ω	ERJ-3EKF2370V
16	R53, R171 to R174, R207 to R210, R307 to R310, R343, R344, R346	Resistor, SMD, 6.81k kΩ, 1%, 1/10 W, 0603, AEC-Q200	6.81 kΩ	ERJ-3EKF6811V
8	R59, R187, R188, R223, R224, R323, R324, R360	Resistor, SMD, 100 kΩ, 5%, 1/10 W, 0402, AEC-Q200	100 kΩ	ERJ-2GEJ104X
16	R88 to R91, R189 to R192, R289 to R292, R325 to R328	Resistor, SMD, 2.43 kΩ, 1%, 1/10 W, 0402, AEC-Q200	2.43 kΩ	ERJ-2RKF2431X
16	R92 to R95, R193 to R196, R293 to R296, R329 to R332	Resistor, SMD, 2.67 kΩ, 1%, 1/16 W, 0402	2.67 kΩ	RC0402FR-072K67L
4	R5, R8, R25, R28	Resistor, SMD, 37.4 kΩ, 1%, 1/10 W, 0402, AEC-Q200	37.4 kΩ	ERJ-2RKF3742X
2	R48, R83	Resistor, SMD, 0 Ω, jumper, 1/10 W, 0402, AEC-Q200	0 Ω	ERJ-2GE0R00X
1	R52	Resistor, SMD 15 kΩ, 0.1%, 1/10 W, 0603, AEC-Q200 high reliability	15 kΩ	ERA-3AEB153V
1	R54	Resistor, SMD, 10 kΩ, 1%, 1/10 W, 0603	10 kΩ	CRCW060310K0FKECC
1	R55	Resistor, SMD, 249 Ω, 0.1%, 1/10 W, 0805	249 Ω	CPF0805B249RE1
1	R56	Resistor, SMD, 107 Ω, 1%, 1/4 W, 1206, AEC-Q200	107 Ω	ERJ-8ENF1070V
1	R57	Resistor, SMD, 22 Ω, 5%, 1/10 W, 0402, AEC-Q200	22 Ω	ERJ-2GEJ220X
2	R80, R84	Resistor, SMD, 75 Ω, 1%, 1/10 W, 0603, AEC-Q200	75 Ω	ERJ-3EKF75R0V
1	R81	Resistor, SMD, 47 Ω, 5%, 1/10 W, 0402, AEC-Q200	47 Ω	ERJ-2GEJ470X
1	R85	Resistor, SMD, 2.4 MΩ, 5%, 1/10 W, 0603	2.4 MΩ	RC0603JR-072M4L
2	R86, R87	Resistor, SMD, 100 kΩ, 0.1%, 1/10 W, 0603, AEC-Q200 high reliability	100 kΩ	ERA-3ARB104V
10	RN1 to RN10	Resistor, SMD, network, 33 Ω, 5%, 0.063 W, 1206, eight pins, four resistors AEC-Q200 isolated	33 Ω	EXB-38V330JV
6	S1, S3, S7, S12, S14, S15	Switch, six positions, ultra miniature, dual inline package (DIP), single pole single throw (SPST)		DSHP06TJGER
5	S10, S21 to S24	Switch, tactile, 6 mm, gull wing, SMD		FSM6JSMA
11	S6, S11, S13, S16 to S20, S26 to S28	Switch, SPST, ultra miniature		TDA04H0SB1
3	S2, S4, S5	Switch, ultra miniature DIP, SPST		TDA08H0JB1
2	S8, S9	Switch, low profile, SPST, slide, two positions		SD02H0SBR
1	T1	XFMR common-mode choke coil , 250 Ω at 100 MHz		DLW5BTM251SQ2L

BILL OF MATERIALS

Table 10. Bill of Materials (Continued)

Qty.	Location	Description	Value	Manufacturing Part Number
14	TP1, TP2, TP5, TP6, TP22, TP25, TP47, TP53, TP56, TP57, TP73, TP74, TP77, TP78	Connector, PCB test point, black		5001
9	TP43, TP59 to TP66	Connector, PCB test point, blue		5117
2	TP48, TP50	Connector, PCB test point, red		5000
1	U1	Analog Devices IC, ADSP1802 preliminary		ADSP1802
1	U11	Analog Devices IC, four ADCs, eight DACs with phase-locked loop (PLL), 192 kHz, 24-bit codec		AD1939YSTZ
1	U13	Analog Devices IC, low dropout, complementary metal-oxide semiconductor (CMOS) linear regulator		ADP1710AUJZ-R7
2	U14, U15	Analog Devices IC, 42 V, 3 A, synchronous step-down regulator with 2.5 µA quiescent current		LT8609AEMSE#TRPBF
1	U17	IC, low-voltage differential signalling (LVDS) driver/receiver, 400 Mbps		SN65LVDS2DBV
3	U4, U9, U18	IC, transistor-transistor logic (TTL), single two input positive and gate		SN74LVC1G08DBVT
1	U19	Diode, single line electrostatic discharge (ESD) protection		GSOT05-E3-08
1	U2	IC, remote and local system temperature monitor		ADM1032ARZ-REEL
1	U3	IC, SPI NOR flash, 128 Mb		GD25Q128ESIG
1	U6	IC, TTL, Hex Schmitt-Trigger inverter		SN74LVC14AD
1	U7	IC, TTL, 3.3 V, CMOS octal buffer/line driver		IDT74FCT3244APYG
1	U8	Analog Devices, IC, low supervisory circuit		ADM708SARZ
1	Y1	IC, crystal oscillator, low-power, standard frequency	25 MHz	SIT1602AI-11-33E25.000000
1	Y2	Crystal, 25 MHz, 10 ppm, 10 pF, 80 Ω	25 MHz	FA-128 25.0000MF20XK0
1	Y3	Crystal oscillator, CMOS, 24.576 MHz, 30 ppm, 15pF, 1.8 V/2.5 V/3.3 V	24.576 MHz	KC2520Z24.5760C15XXK
1	Y5	IC, crystal oscillator, microelectromechanical system (MEMS), 12.2880 MHz	12.2880 MHz	SIT8208AI-2F-33E-12.288000
2	C140, C143	Ceramic capacitor, 12 pF, 50 V, 5%, C0G, 0402	12 pF	GJM1555C1H120JB01D
7[1]	R60 to R63, R69, R74, R75	Resistor, SMD, 0 Ω, jumper, 1/10 W, 0603, AEC-Q200	0 Ω	ERJ-3GEY0R00V
1[1]	U5	IC, TTL, single two input positive and gate		SN74LVC1G08DBVT
14[1]	TP17 to TP20, TP23, TP26 to TP32, TP35, TP36	Connector, PCB test point, black		5001
15[1]	TP3, TP9 to TP16, TP24, TP33, TP34, TP41, TP44, TP45	Connector, PCB test point, blue		5117
2[1]	TP51, TP52	Connector, PCB test point, red		5000
1[1]	R58	Resistor, SM-10K, E019640, 1/16 W, 5, R0402-R0402	1 MΩ	ERJ-2RKF1004X

[1] Do not install.

BILL OF MATERIALS

NOTES

ESD Caution
ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.