Evaluation Board User Guide

MAX98415A/MAX98425A

MAX98415A/MAX98425A Evaluation System

General Description

The MAX98415A/MAX98425A evaluation system (EV system) is a fully assembled and tested system that evaluates the MAX98415A/MAX98425A stereo Class-D audio amplifier. The EV system consists of the MAX98415A/MAX98425A Development Board (DEV board), Analog Devices' Audio Interface Board III (AUDINT3), and a USB cable.

It is recommended that the DEV board be evaluated with the AUDINT3 board as an EV system. MAX98415A/MAX98425A supports the standard I²S interface, left-justified, and Time-division multiplexing (TDM) digital audio interfaces.

The AUDINT3 board provides a USB-to-PCM interface in addition to 1.8V AVDD and DVDD supplies needed to evaluate the DEV board. Note that if the AUDINT3 is not used, AVDD and DVDD can be supplied externally or by an on-board LDO with a few 0Ω resistor changes. The MAX98415A/MAX98425A DEV board requires two additional supply inputs, 2.4V to 5.5V (V_{BAT}) and 3V to 22V (PVDD). *Figure 1* and *Figure 2* shows the DEV board and the AUDINT3 board.

Features and Benefits

- Fully Assembled and Tested
- EV System provides a Stand-Alone Evaluation Solution
- Mono or Stereo Operation on a Single Board
- Multiple EV Systems can be connected to Evaluate a Multi-channel Audio Solution
- Extensive Connection Points and Test Posts
- Designed-In Amplifier Output Filter Options

MAX984X5A EV System Software

FILE	DESCRIPTION
MAX984X5EVSwSetupV1_0_0_1.exe	Installs the EV system files onto the computer.

Ordering Information ***appears at end of datasheet***

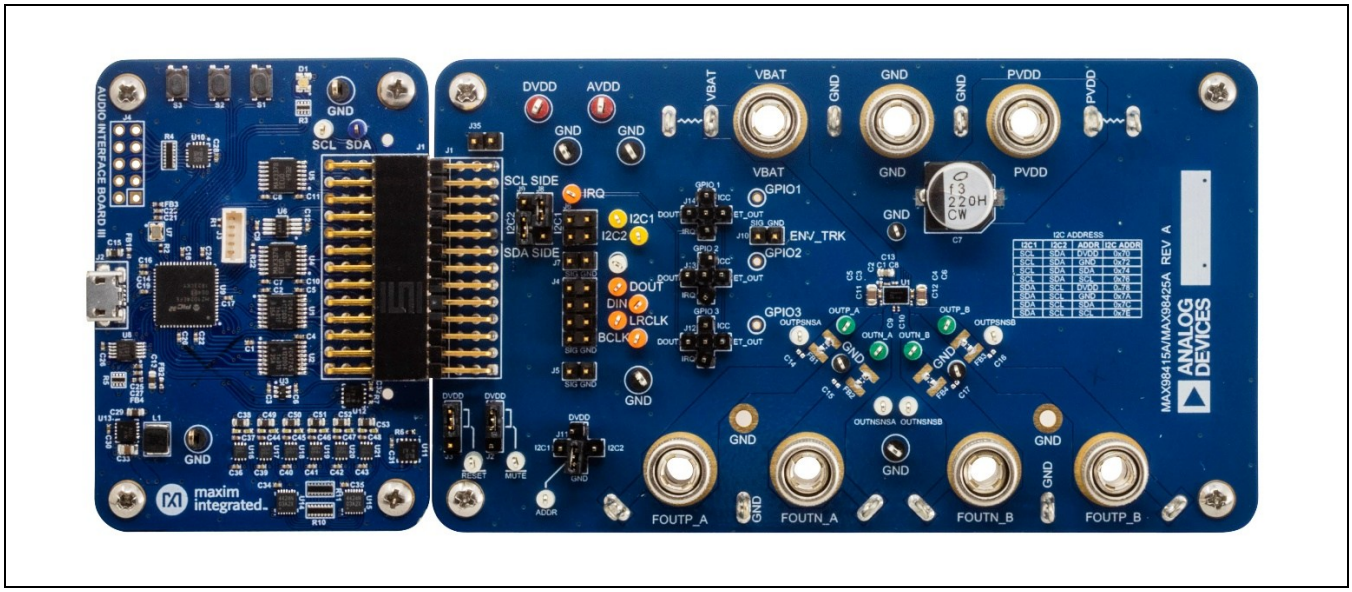


Figure 1. MAX98415A/MAX98425A EV System Photo

One Analog Way, Wilmington, MA 01887-2356, U.S.A. | Tel: 781.329.4700

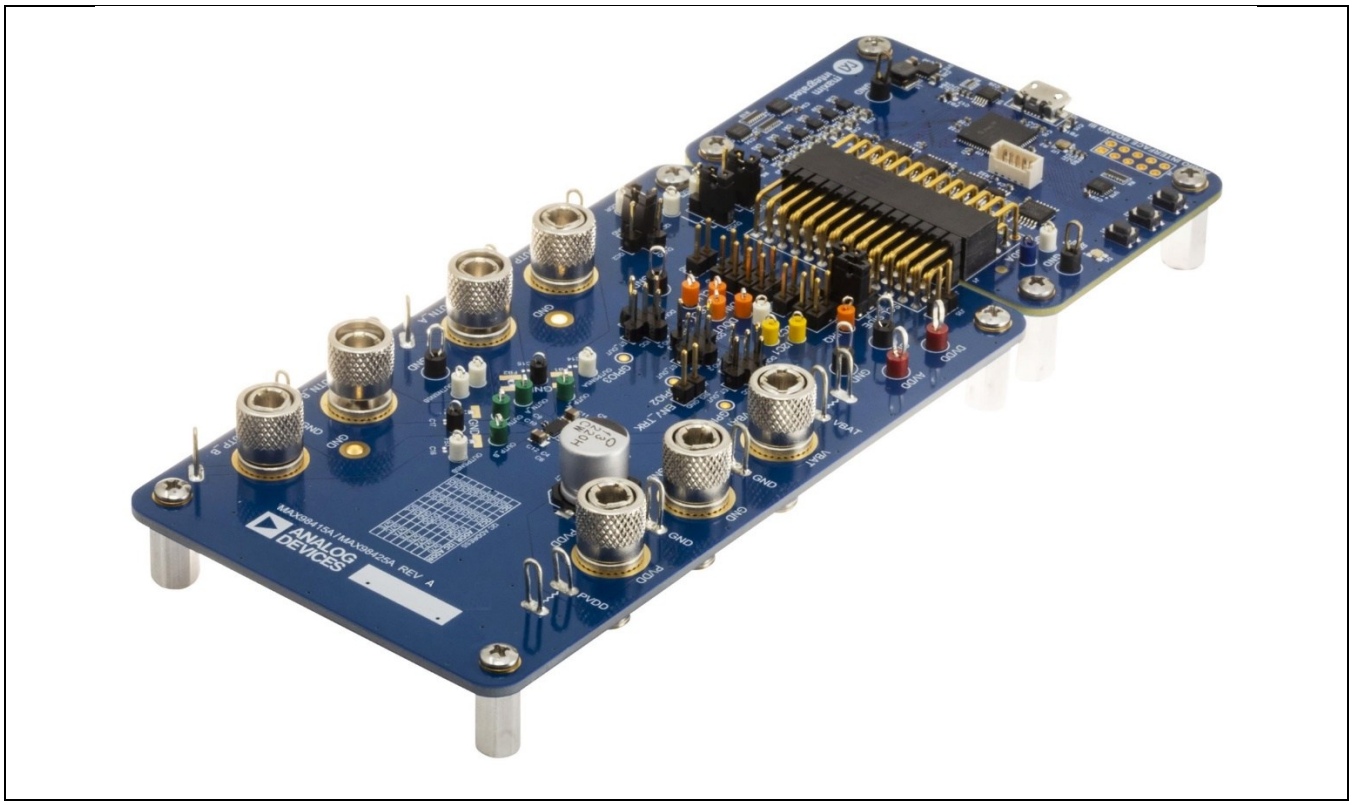


Figure 2. Isometric View of MAX98415A/MAX98425A EV System

Quick Start

Required Equipment

- MAX98415A/MAX98425A EV System
  - MAX98415A/MAX98425A Development Board (DEV board)
  - Audio Interface Board III (AUDINT3 board)
  - Micro-USB Cable
- DC Power Supply (2.1V to 5.5V, 1A)
- DC Power Supply (3V to 22V, 5A)
- 4Ω or 8Ω Speaker (typical)
- PC with Windows® 10 (or similar) with available USB port
- USB audio source (e.g., Windows Media Player® or iTunes®)

Reference Material

- MAX98415A/MAX98425A IC Datasheet

Note: In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV system software. Text in **bold and underlined** refers to items from the Windows operating system.

Procedure

The EV system is fully assembled and tested. Therefore, it is operational out of the box. Use the following steps to install the MAX984X5A EV system software, make hardware connections, and start using the EV system. The evaluation software can be run without hardware attached.

Note: After the communication is established, the MAX98415A/MAX98425A device must still be configured correctly for the desired operation mode. Ensure that the PC is connected to the internet throughout the process so that the USB driver can be automatically installed.

1) Visit *https://www.analog.com/en/products/max98415a.html* under the Design & Development tab to download the latest version of the MAX984X5A EV system software. Save the software to a temporary folder and unpack the zip file.
2) Install the EV system software by running the **MAX984X5EVSwSetupV1_0_0_1.exe** program inside the temporary folder. This copies the program files and creates an icon in the Windows **Start** menu. The software requires the .NET Framework 4.5 or later. If connected to the internet, Windows automatically updates the .NET Framework as needed.
3) The EV system software launches automatically after installation. It can be launched by clicking on its icon in the Windows **Start** menu.

AUDINT3 Board Setup

1) Connect the MAX98415A/MAX98425A DEV board (3-row J1 connector) to the AUDINT3 board (3-row J1 connector). To avoid damage, it is important to make sure the connectors of the two boards are properly aligned. The bottom row of both J1 connectors should be lined up so that the standoffs on the corners of the AUDINT3 and DEV board are level.
2) With the audio source disabled, connect the included Micro-USB cable from your computer to the USB port (J2) on the AUDINT3 board. The AUDINT3 board will provide the BCLK and LRCLK signals automatically upon power-up, and the power for AVDD and DVDD, sourcing 1.8V to the DEV board through the J1 connector.
3) The multi-color LED D1 initially flashes blue, and then should change to slow flashing magenta when the computer successfully registers the AUDINT3 as a USB audio playback device.

DEV Board Setup

1) Place the $\overline{\text{RESET}}$ jumper J3 to DVDD.
2) Load a default configuration file through the MAX984X5A EV system software (**File→Load Register Settings→ Pre-installed Configuration Files**). A Stereo configuration is available for MAX98415A and MAX98425A in I^2S format using a 48kHz sample rate. The default files select +24dB gain for a 22V maximum PVDD voltage.
3) Connect a speaker or a dummy load. Connect the load leads, one to FOUTP and one to FOUTN binding posts.
4) Connect VBAT. If a DC power supply is not enabled, connect 2.4V to 5.5V power supply at the VBAT and GND binding posts.
5) Connect PVDD. If a DC power supply is not enabled, connect 3V to 22V power supply at the PVDD and GND binding posts.

USB Audio Playback Test

1) Configure the PVDD power supply to 20V and enable the supply.
2) Configure the VBAT power supply to 3.3V and enable the supply.
3) Open the Windows Sound dialog and select the Playback tab. A Speakers item, such as *Figure 3*, should be listed as an available playback device.
4) Verify that the Speakers item is set as the default device. Once this is done, the AUDINT3 board will output PCM data to the DIN pin on the DEV board.
5) Adjust the audio source volume to a low level.
6) Enable the audio source and verify that audio is heard through a connected speaker or that signal is present on a load, if a speaker is not used. Adjust the audio source volume as needed.
7) Quick Start for USB Audio Playback is now complete.
8) For details on connecting in a stand-alone mode to audio test equipment, such as Audio Precision, see the *Detailed Description of Hardware* section.

Figure 3. Windows Audio Playback Device

Detailed Description of Hardware

This MAX98415A/MAX98425A evaluation system should be used with the following documents:

- MAX98415A/MAX98425A Datasheet
- MAX98415A/MAX98425A Evaluation Board User Guide (this document)

These documents, or links to them, are included in the MAX98415A/MAX98425A EV system Package. For the latest versions of the documents listed above, use the following link: *https://www.analog.com/en/products/max98415a.html*.

The MAX98415A/MAX98425A EV system is designed to allow for a thorough evaluation of a MAX98415A or MAX98425A digital input Class-D stereo audio amplifier IC. The EV system includes the MAX98415A/MAX98425A Development Board (DEV board), the Audio Interface Board III (AUDINT3), and a Micro-USB cable.

To simplify evaluation, the MAX98415A/MAX98425A DEV board can be used together with the AUDINT3 board and two external power supplies for PVDD and VBAT. The AUDINT3 supplies 1.8V for AVDD and DVDD. It also provides a plug-and-play USB-to-I^{2}S interface, allowing any computer to become a 48kHz digital audio source. The AUDINT3 board provides a fast and easy-to-use method for exercising the main capabilities of the device with no additional audio equipment.

The AUDINT3 board automatically detects the MAX98415A/MAX98425A DEV board and configures its LDO regulators to power the MAX98415A/MAX98425A DEV board AVDD and DVDD through connector J1. The USB-to-PCM converter accepts a USB audio stream from a USB-connected computer and converts it to an I^{2}S stream, allowing for USB audio playback through the MAX98415A/MAX98425A device. The AUDINT3 board should not be used to deliver audio input when directly driving the DEV board's PCM interface with external audio test equipment. The Digital Audio Interface (DAI) pins on the DEV Board, and AUDINT3 digital audio outputs are connected through the J1 header, creating a signal conflict. Disable all DAI signals using the AUDINT3 software if using external audio stimuli. However, the AUDINT3 can still provide AVDD and DVDD if an external power supply is not available.

For maximum flexibility, the MAX98415A/MAX98425A DEV board can also be evaluated as a stand-alone board, with two external power supplies (PVDD and VBAT). A digital audio signal is then driven directly by specialized audio test equipment (Audio Precision, etc.). AVDD and DVDD supplies can be supplied externally or by using an onboard Low drop-out (LDO) regulator, U2 (located on the bottom side of the DEV board). To enable the regulator and supply 1.8V to AVDD and DVDD, one must populate R33, R34, and R35 with 0Ω resistors.

Power Supplies

When evaluated as a stand-alone board, the MAX98415A/MAX98425A DEV board requires two external power supplies: PVDD, which is the supply voltage for the Class-D power stage, and VBAT, which supplies low-level system power to the IC.

The power supplies and their ranges are listed in *Table 1*. The external supply voltages can be connected at the respective supply test points and/or binding posts.

The AUDINT3 board, when properly connected to the DEV Board, senses and automatically provides 1.8V to AVDD and DVDD of the MAX98415A/MAX98425A DEV board through jumper J1, when active USB power is supplied.

Note: Although the AUDINT3 board provides AVDD and DVDD, PVDD and VBAT must still be supplied from external sources.

Table 1. Power Supplies

POWER SUPPLY	RANGE (V)
VBAT	2.4–5.5
PVDD	3–22
AVDD	1.71–1.89
DVDD	1.71–1.89

Jumper Selection

Shutdown Mode

The MAX98415A/MAX98425A device features an ultra-low power hardware shutdown mode (controlled by $\overline{\text{RESET}}$) that is activated by connecting the jumper at 3x1-pin header J3 to the GND position. This is the lowest power state, where all device registers are returned to their Power-on-Reset (PoR) values, and the I²C control interface is disabled. To exit the hardware shutdown, place jumper J3 in the DVDD position and initialize the device. See *Table 2* for jumper options.

Mute

The DEV Board includes a 3x1-pin header J2 for $\overline{\text{MUTE}}$. MAX98415A/MAX98425A outputs are muted by connecting jumper J2 to the GND position. To unmute, connect jumper J2 to the DVDD position.

GPIO

The DEV board includes three GPIO 5-pin headers used to route one of four digital IO: IRQ, ICC, ET_OUT, or DOUT. By default, these do not have jumpers. When selecting one of the digital IO, the jumper must be connected from the center pin to the digital IO pin (indicated by the silkscreen label on the PCB). In addition, these digital IOs must be manually selected in the EV system software inside the “GPIO” block.

Table 2. Jumper Selection Guide

JUMPER	DEFAULT CONNECTION	FEATURE
J2	DVDD	MUTE
J3	DVDD	RESET
J8	SCL Side (0x70)	I2C1 and I2C2 Assignment Pins
J9	SDA Side (0x70)	I2C1 and I2C2 Assignment Pins
J11	DVDD (0x70)	I²C Address Selector
J12	Open	GPIO1 Output (Programmed through GUI)
J13	Open	GPIO2 Output (Programmed through GUI)
J14	Open	GPIO3 Output (Programmed through GUI)

ADDR

ADDR, a 5-pin header selector (J11), determines the MAX98415A/MAX98425A I²C address. Depending on the I2C1/I2C2 and ADDR pin selections, there are eight possible addresses. See *Table 3* for more details.

I2C1/I2C2

The I2C1/I2C2 pins on 3x1-pin headers J8 and J9 can be connected to SDA or SCL. One pin should be connected to SCL, and the other pin should be connected to SDA.

Table 3. I²C Addressing

I2C1	I2C2	ADDR	I²C ADDR
SCL	SDA	DVDD	0x70
SCL	SDA	GND	0x72
SCL	SDA	SDA	0x74
SCL	SDA	SCL	0x76
SDA	SCL	DVDD	0x78
SDA	SCL	GND	0x7A
SDA	SCL	SDA	0x7C
SDA	SCL	SCL	0x7E

Connectors

I2C1 and I2C2

2x2-pin header J6 provides the signal outputs of I2C1 and I2C2 for probing purposes.

Inter-Chip Communication (ICC)

2x1-pin header J7 provides a probing point and multi-board connection node for the ICC signal. This pin should be connected to other DEV boards in a multi-board ICC configuration.

Envelope Tracker

2x1-pin header J10 is the connection node available for the feedback pin of an external boost converter when it is desired to test the MAX98415A/MAX98425A envelope tracking feature. ET_OUT, which is the MAX98415A/MAX98425A PWM output determined by envelope tracking settings, is routed from a selected GPIO pin through filter components, arriving at header J10.

There are three filter options (not populated) on the DEV board: R31, R32, and C26. These are 0402 footprints.

DAI Header

The Digital Audio Interface (DAI) consists of 4x2-pin header J4 and (optionally) 2x1-pin header J5. They provide access to the MAX98415A/MAX98425A audio input bus: BCLK, LRCLK, DIN, and V_{DDIO} (J5) and audio output: DOUT. The DAI header facilitates evaluation using audio equipment I/O. See *Table 4* for the pinout of the DAI header. Note that V_{DDIO} = DVDD and may be used to set the level of external equipment if needed.

Table 4. DAI Headers J4 and J5

JUMPER	PIN	SIGNAL	PIN	SIGNAL
J4	1	GND	2	BCLK
J4	3	GND	4	LRCLK
J4	5	GND	6	DIN
J4	7	GND	8	DOUT
J5	1	GND	2	V_{DDIO} (DVDD)

Amplifier Outputs

MAX98415A/MAX98425A amplifier outputs are routed to FOUTP and FOUTN binding posts, one pair for each amplifier A and B. The DEV board is, by default, assembled to allow the MAX98415A/MAX98425A outputs to connect directly to a speaker load without the need for on-board filter components.

EMI Filter

When long speaker cables are used with the MAX98415A/MAX98425A output, such as those exceeding ≈12 inches (30.5cm), a ferrite bead plus a capacitor filter can be installed to prevent excessive EMI radiation. Although it is best to choose filter components based on EMI test results, the combination of 330pF capacitors C14–C17 and ferrite beads FB1–FB4 generally works well. Before adding the filters to the design, the PCB traces shorting the pads of FB1–FB4 must be cut (see the *MAX98415A/MAX98425A DEV Board Schematic Diagrams* and *MAX98415A/MAX98425A DEV Board PCB Layout Diagrams*). Then 0Ω resistors R3, R5, R8, and R10 must be removed.

Class-D Filter

Although MAX98415A/MAX98425A has filter-less operation by design, an optional Class-D filter may be installed using the SMD footprints of C18–C21 and R11–R14 (not populated) when a commercially available Class-D filter is not available. This option is intended for signal observation, such as using an oscilloscope, and is not intended or needed for any production solution. Installing this Class-D filter option does not enhance the audio delivered to the speaker in any way or provide any other benefits. In fact, there is a corresponding power dissipation when those components are installed.

See the *MAX98415A/MAX98425A DEV Board Schematic Diagrams* and *MAX98415A/MAX98425A DEV Board PCB Layout Diagrams* for component locations of C18, C19, C20, C21 and R11, R12, R13, and R14. Note that 0Ω resistors R4, R6, R7, and R9 must be removed if an LC Class-D filter is installed.

Detailed Description of Software

The MAX984X5A EV system software is designed to be used only with the MAX98415A/MAX98425A EV system. The software provides an intuitive graphical user interface (GUI) for programming the device's I2C registers. It also includes an assortment of features intended to aid product evaluation.

The MAX984X5A EV system software main window (See *Figure 4*) is composed of four main sections: **Menu Bar** (File, Device, Options, View, Help), **Communication Tool Bar** (located below **Menu Bar**), Tabs, and **Status Bar** (bottom of the window). The **Menu Bar** provides additional features to aid evaluation, the **Comm Tool Bar** provides basic functionality for communicating with the device, and the **Status Bar** provides information about hardware connectivity and communication status.

The **Tabs** make up most of the GUI and provide the graphical controls for programming MAX98415A/MAX98425A registers, which are displayed on the **Block Diagram** tab. All device registers can be accessed there by clicking blocks and making selections on the corresponding dialog windows.

The adjacent tab is **Control Registers**. It provides access to the same registers that are programmable by the **Block Diagram** (ranging from 0x1000 through 0x29FF). However, they are displayed and interacted with in a less graphical manner.

The MAX984X5A EV system software is compatible with Windows 10, or similar versions. It can be downloaded from https://www.analog.com/en/products/max98415a.html. Refer to the MAX98415A/MAX98425A IC datasheet for detailed device register information.

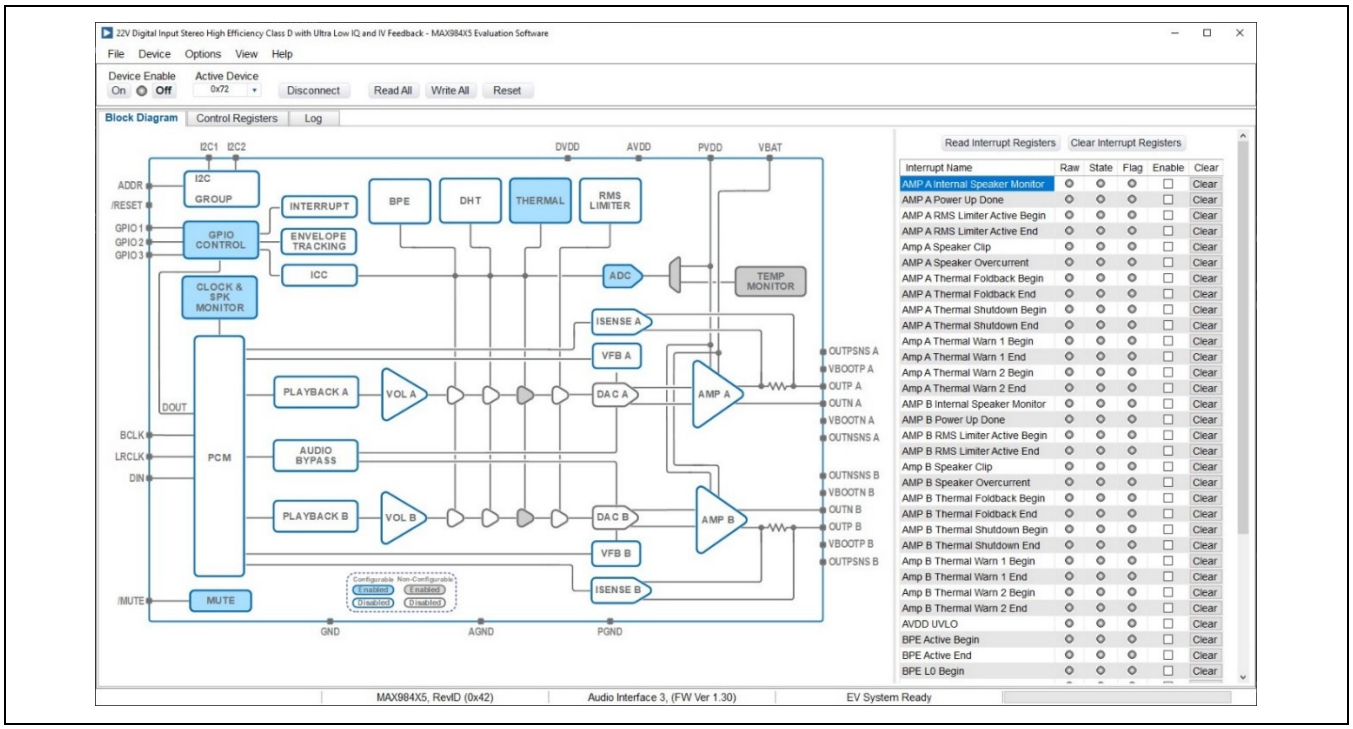


Figure 4. MAX984X5A EV System Software – Main Window

Communication Tool Bar

The **Communication Tool Bar** consists of six buttons and a drop-down combo box. These controls are always accessible, regardless of the active tabbed page. The **Comm Tool Bar** is shown in *Figure 5*. *Table 5* provides details about each control.

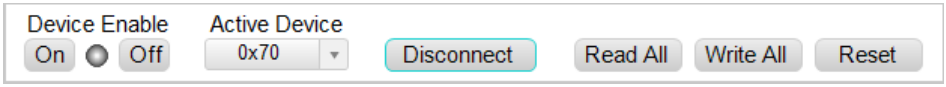


Figure 5. Communication Tool Bar

Table 5. Communication Tool Bar details

CONTROL	FUNCTION
On	Click to set the **Global Enable bit (EN)**. This exits software shutdown and enables the device.
Off	Click to clear the **Global Enable bit (EN)**. This enters software shutdown and disables the device. Note: The software can communicate with a disabled device because the I²C interface remains active.
Active Device	Provides a list of detected I²C addresses. The displayed address is the active device.
Connect/Disconnect	Connect or disconnect I²C communication from the **Active device**. See the *Hardware and Software Connection Sequence* section for more details.
Read All	Click to read all device registers. The **Control Registers** and **Block Diagram** are updated to reflect the read data.
Write All	Click to write to all device registers, using the settings selected and displayed in the **Control Registers** tab.
Reset	Click to reset device registers to their Power-on-Reset (PoR) state.

Hardware and Software Connection Sequence

When the evaluation software starts for the first time, the program will attempt to automatically connect to the EV system. It will first attempt to connect to the USB Control (USB1) interface on the AUDINT3 board. Once that connection is established, it will search for all the I²C addresses associated with the MAX98415A/MAX98425A device and populate all detected device addresses in the Active Device drop-down list. During this sequence, the text on the Connect To button will automatically change from USB to Device to Disconnect, and the status bar will also be updated to reflect the current state of the hardware connection.

Once the EV system is fully connected, the button will display **Disconnect**, and when clicked, it will disconnect the software from the hardware. The software can also be disconnected from the hardware by selecting Options → Disconnect from the menu bar.

There are two methods to re-establish a connection with the hardware. The first is by selecting **Options → Auto Connect** from the **Menu Bar**. This will instruct the program to automatically connect to the EV system, as done when the software first opened. The second method is to manually click the **Connect To** button until it displays **Disconnect**, which signifies that the EV system is fully connected.

Status Bar

The **Status Bar** is located at the bottom of the software interface. It is divided into three sections. From left to right, the sections are Activity, Device Part Number and Revision ID, AUDINT3 Firmware Version, and EV system Status. Note that the Revision ID will read 0x42.

Status Panel

The **Status Panel** (not to be confused with the **Status Bar**) displays the values of the device's status registers, read from registers 0x2001 through 0x204E.

The leftmost column, under the heading Interrupt Name, is a list of device interrupts. Next to each are circular indicators associated with the Raw, State, and Flag interrupt bits. When the indicator is red, it denotes that the associated state bit has been set (= 1). The next column to the right, with the header Enable, is a column of checkboxes. Each allows the selected interrupt to be mapped to a GPIO1/2/3 block with IRQ selected. The right-most column, with the header Clear, consists of a column of buttons. When clicked, that row's State and Flag interrupt bits are cleared (and IRQ is usually released).

Block Diagram Tab

The evaluation software uses a graphical block diagram interface to facilitate the programming of the MAX98415A/MAX98425A. The block diagram also provides a visual representation of the device's functions and present configuration. For example, MAX98425A does not feature voltage and current reporting; therefore, the associated blocks will have a grey border rather than blue.

The fill color of a diagram block will change to white or blue depending on the active state of the device function(s) associated with that block. A disabled block is filled white (with a blue border), while an enabled block is filled blue. *Figure 6* shows the block diagram with the MAX98415A/MAX98425A configured for DAI (USB audio) input and speaker output.

Grey-filled blocks (such as the TEMP MONITOR) are enabled by default and cannot be disabled.

Dialog Windows

Dialog windows are associated with specific blocks in the block diagram, containing controls for configuring the registers associated with that functional block. A dialog window is opened by clicking on a dialog block. *Figure 7* shows the typical GUI controls found on a dialog window.

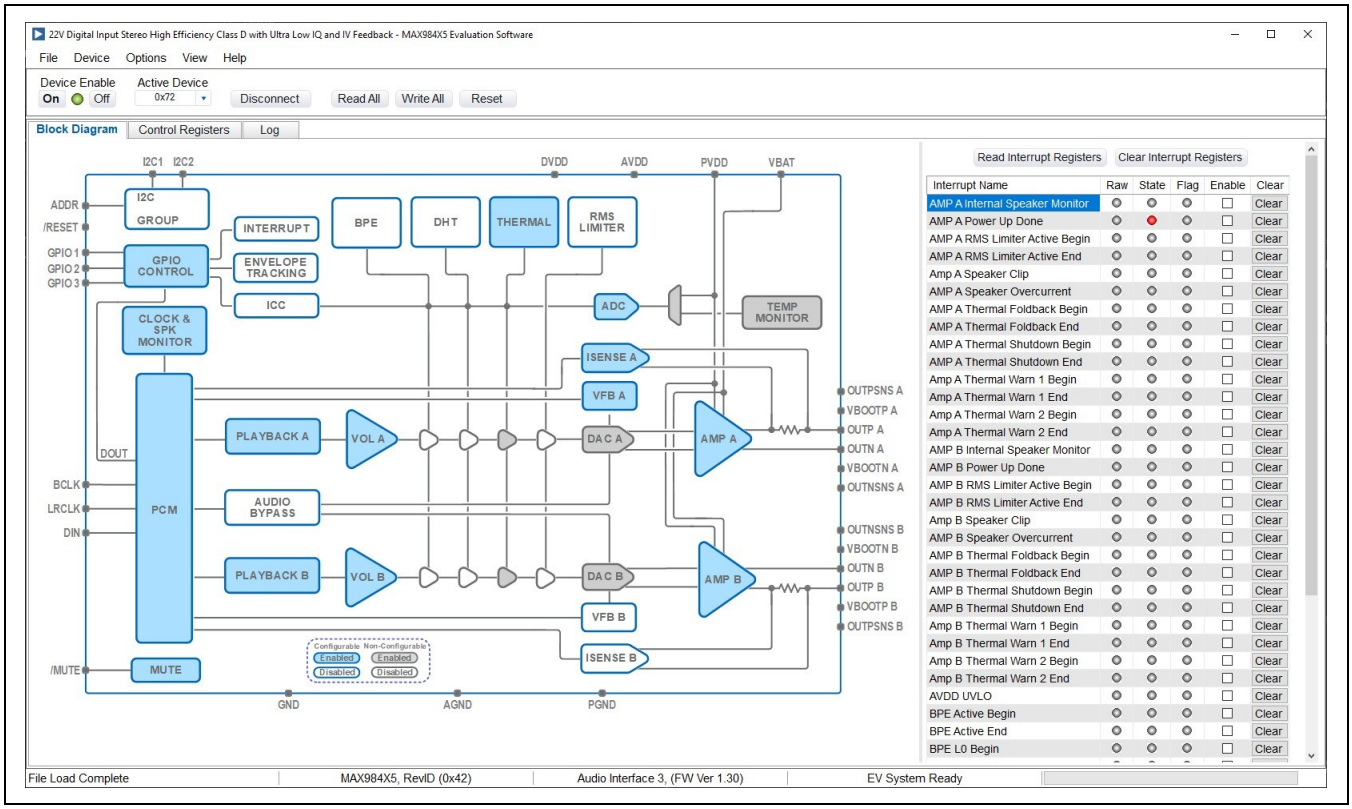


Figure 6. MAX98415A Block Diagram – USB Audio Input to Speaker Output

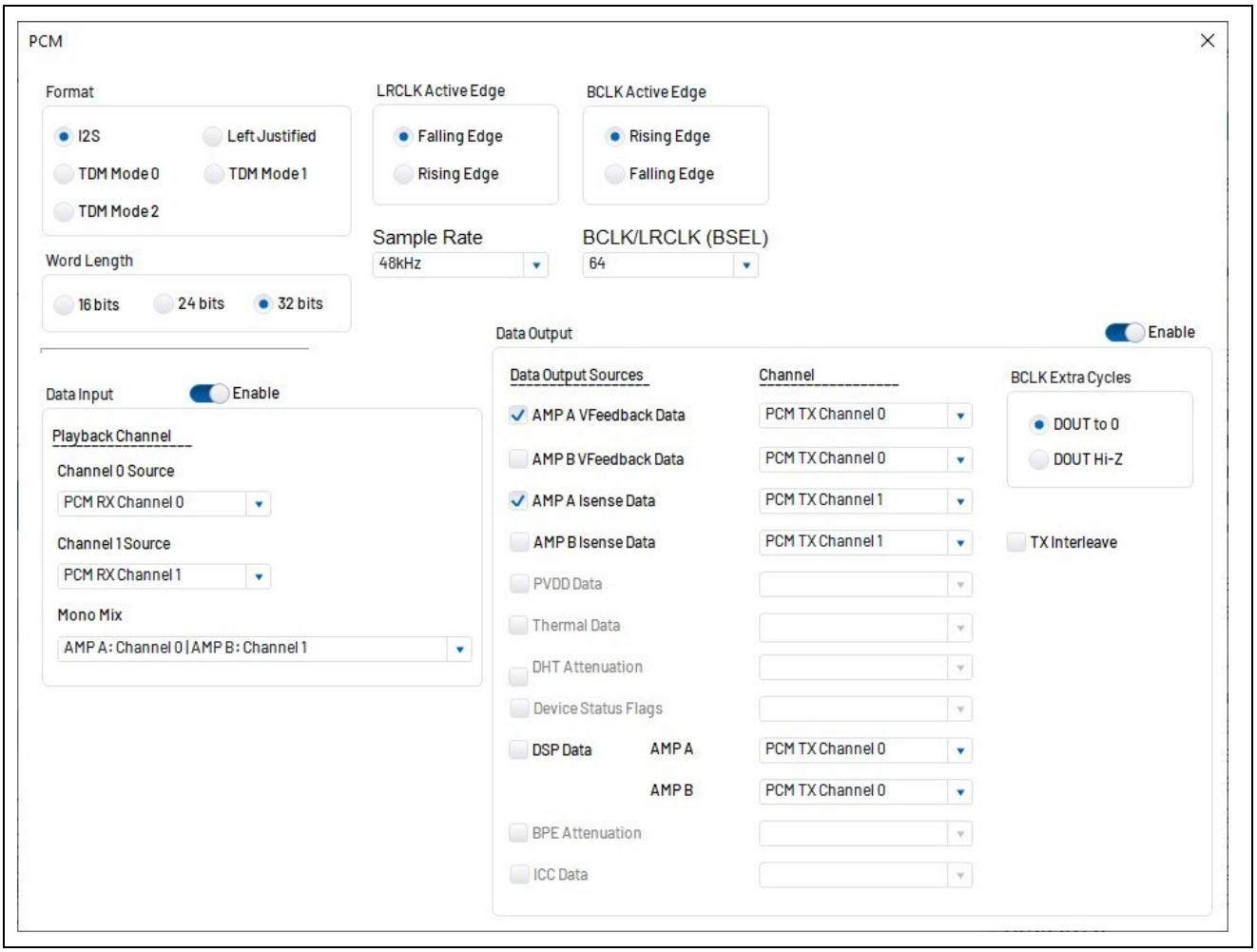


Figure 7. Example of Block Diagram Dialog Window (PCM Block)

Control Registers Tab

The **Control Registers** tab provides two methods for configuring the device. See *Figure 8* for a screen capture of a portion of the **Control Registers** tab.

The first configuration method involves clicking a register's bit name. A grey typeface bit name indicates that the bit is currently cleared (= 0). A bold typeface bit name indicates that the bit is currently set (= 1). Clicking on a bit name will toggle its logic and write that value to the register.

The second configuration method involves entering a hexadecimal value into the Hex field, left of bit [7] for a given register, and then pressing the PC's **Enter** key. The software will automatically configure each bit name in the corresponding device register once the **Enter** key is pressed. The bit name's typeface will also be updated to reflect the value shown in the Hex field.

All changes made on the **Control Registers** tab are reflected on the **Block Diagram** tab and on any open dialog windows.

Note: Trying to write to a read-only bit, by clicking and toggling its label or entering a hex value in its Hex field will update the GUI, but it will not affect the bit's value in the device. All read-only bits are updated to reflect their current value in the device by performing a Read All command.

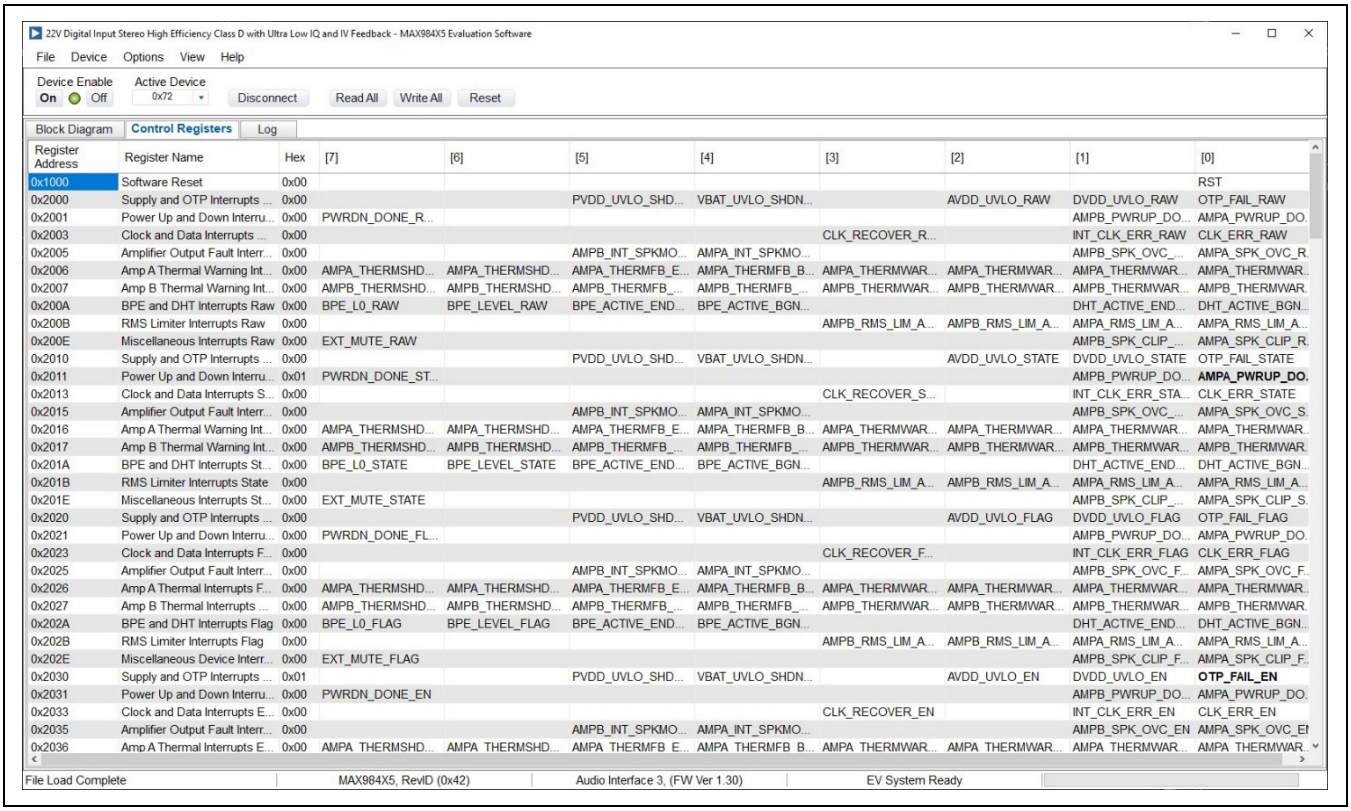


Figure 8. Control Registers Tab

Menu Bar

All the **Menu Bar** items are described in *Table 6*. Additional information for some menu items is provided in the following sections.

Table 6. Menu Bar Options and Descriptions

MENU BAR OPTION	DESCRIPTION
FILE	
Load Register Settings	Loads a configuration file (a default or one saved using Save Register Settings).
Save Register Settings	Saves a configuration file containing the present device settings.
Exit	Closes the MAX984X5A EV system software.
DEVICE	
Connect	Select to have the software automatically connected to the EV system.
Disconnect	Disconnects the PC from the EV system.
Reset	Resets register 0x2000 through 0x29FF to their Power-On-Reset (PoR) states.
Read All	Performs a read from all registers and then updates the GUI.
Write All	Performs a write to all writeable registers, using the values shown on the **Control Registers** tab, and then updates the GUI.
Read Rev ID	Reads the Revision ID register and updates the status bar.
Read Dev ID	Reads the Device ID registers, returning either 0x8415 or 0x8425, indicating the device version.

MENU BAR OPTION	DESCRIPTION
OPTIONS	
Interface Selection	Selects the I^2C hardware interface such as AUDINT3.
Group Write Mode	Opens the Group Write feature's dialog box and available connected device addresses.
VIEW	
Communication Log	Shows/hides the command log tab. If checked, the Log tab is displayed to the right of the Control Registers tab.
Search Bar	Shows/hides the search bar in the Control Registers tab. The search bar allows the user to enter registers by name and search the Control Registers space for them.
HELP	
Release Notes	Provides details on where to find help.
About	Provides release information, such as software version for the MAX984X5A EV system software.

Configuration File Loading and Saving

As described in *Table 6*, device configuration files are loaded or saved using selections in the File drop-down menu. The **Save Register Settings** option will save the data presently displayed on the **Block Diagram** and **Control Registers** tab.

A configuration file's main purpose is to capture the present state of the MAX98415A/MAX98425A registers. This makes it easy to program a device to a saved and known state, such as stereo or mono modes, and enables sharing of configuration files between the users. To facilitate usage, use descriptive file names when saving a configuration file.

The load and save features are functional even when the hardware is not connected. This allows configuration files to be created and opened when hardware is unavailable. Note that because a configuration file is automatically generated by the software, it is not meant to be manually formatted. Doing so may cause file-loading errors. To open a configuration file for viewing purposes, use a plain text editor.

Select File → Save Register Settings Ctrl + S to save a configuration file. The register address and its data are saved as tab-delimited values, and the file is saved with a .984X5 extension.

As discussed above, a pre-installed configuration file is available using **File → Load Register Settings**. Typical 48kHz 32-bit I^2S operation in stereo mode is provided.

USB Audio Input

As described earlier, the AUDINT3 (together with a computer) can be used to supply audio over a USB interface. Several DAI formats are selectable and can be found under the **DAI Mode** drop-down menu of the AUDINT3 Interface software **Audio Controls** panel, as shown in *Figure 9*. The AUDINT3 can also generate test signals of various types, frequencies, and amplitudes, as shown in *Figure 10*.

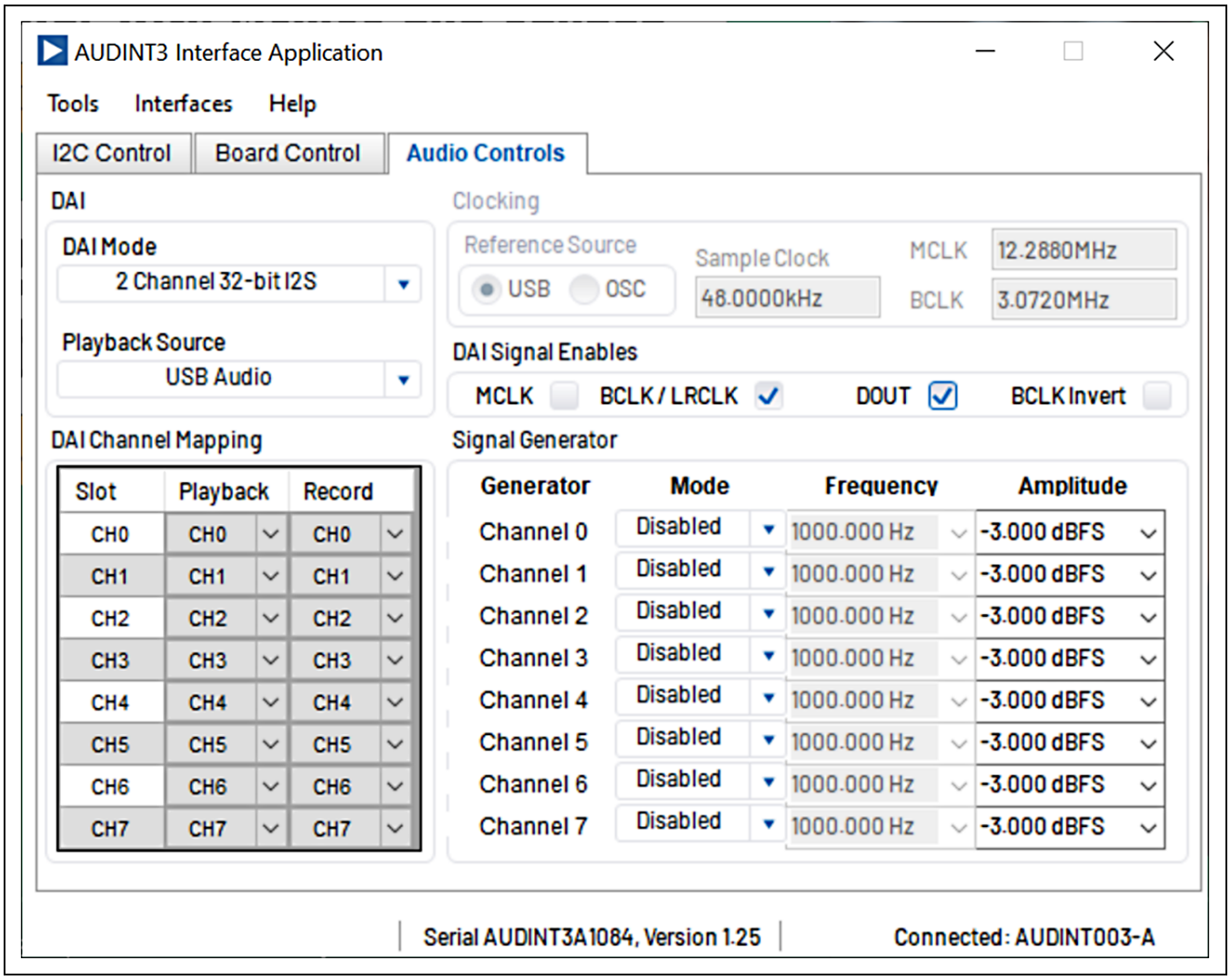


Figure 9. AUDINT3 Configured for Computer Audio Input over USB

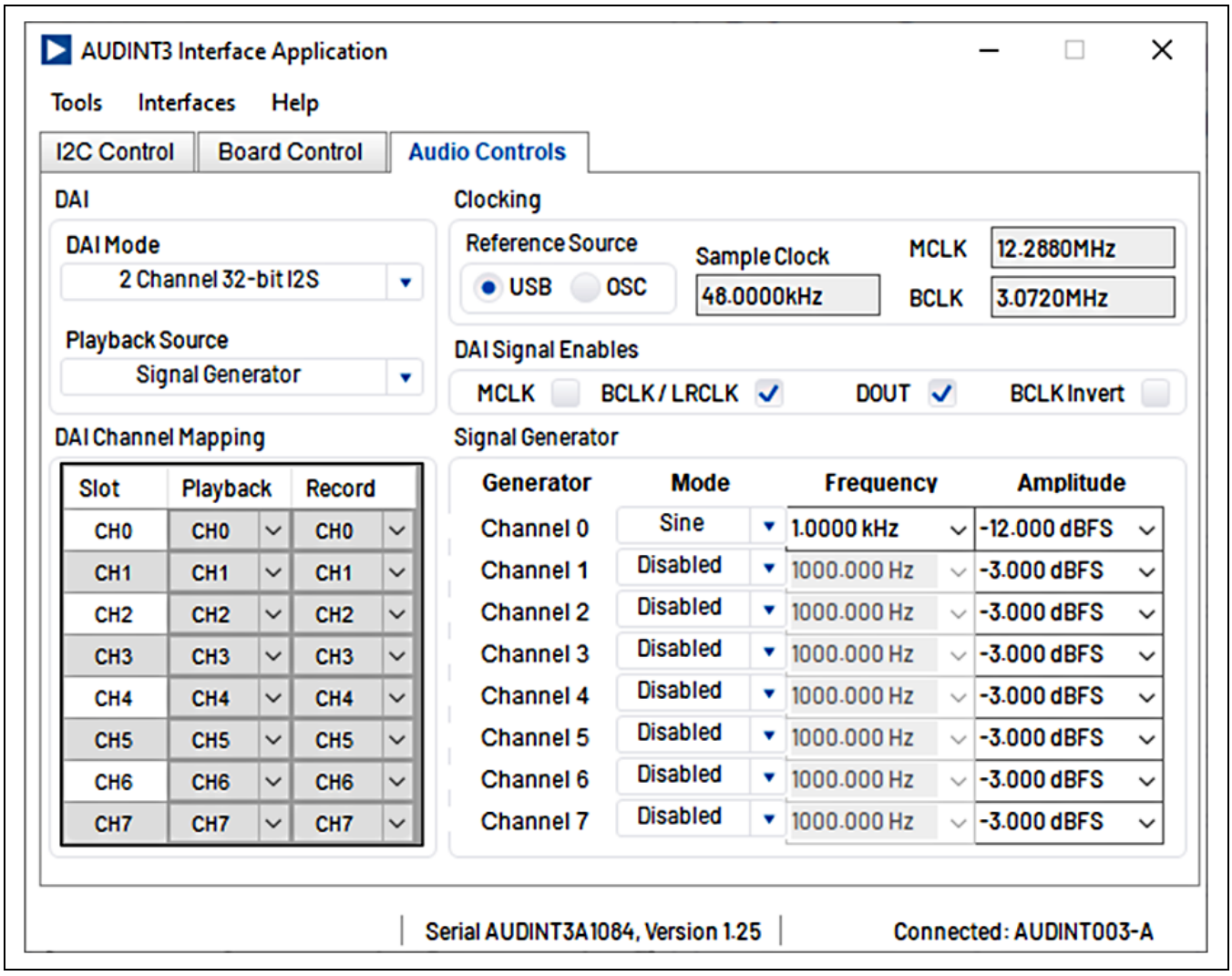


Figure 10. AUDINT3 Configured for a -12dBFS 1kHz Sine Input using Signal Generator Playback Source

Ordering Information

PART	TYPE
MAX98415AEVSYS#	MAX98415A Evaluation System (with Voltage Feedback and Current Monitoring).
MAX98425AEVSYS#	MAX98425A Evaluation System (without Voltage Feedback and Current Monitoring).

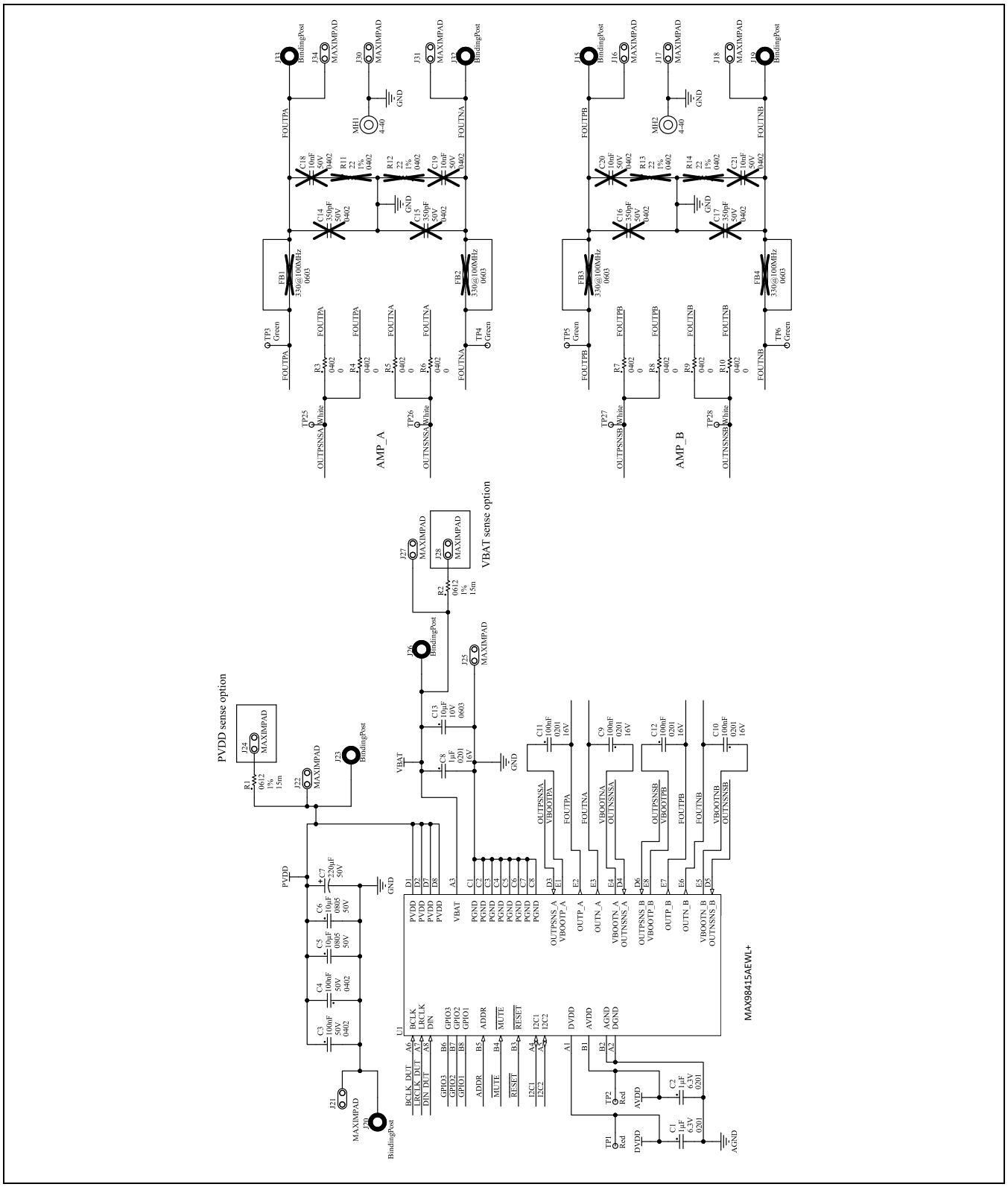
#Denotes RoHS-compliant.

MAX98415A/MAX98425A DEV Board Bill of Materials

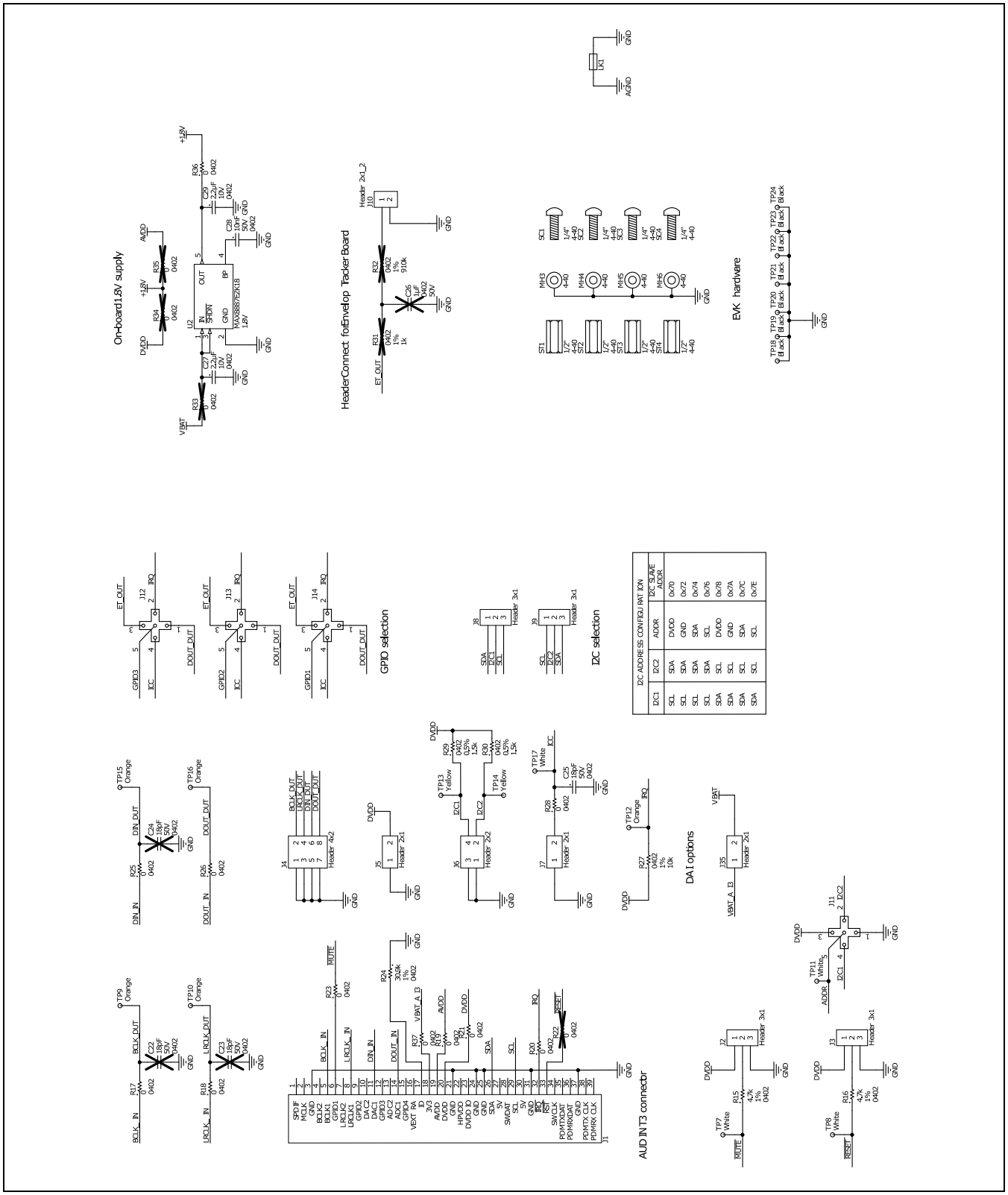
ITEM	QTY	REF DES	MFG PART #	MANUFACTURER	DESCRIPTION
1	2	C1, C2	GRM033R60J105MEA2D	Murata	Capacitor/1µF/6.3 /20%/ X5R/ 0201
2	2	C3, C4	GRM155R71H104KE14D	Murata	Capacitor/100nF/50V/10%/X7R/ 0402
3	2	C5, C6	GRM21BR61H106KE43L	Murata Electronics	Capacitor/10µF/50V/10%/X5R/ 0805
4	1	C7	UCW1H221MNL1GS	Nichicon	Capacitor/220µF/50V/20%/ Electrolytic/10mm x 10mm
5	1	C8	CL03A105MO3NRNH	Samsung	Capacitor/1µF/16V/20%/X5R/ 0201
6	4	C9, C10, C11, C12	GRM033C71C104KE14D	Murata	Capacitor/100nF/16V/10%/X7S/ 0201
7	1	C13	GRM188R61A106KE69D	Murata	Capacitor/10µF/10V/10%/X5R/ 0603
8	1	C25	CC0402JRNPO9BN180	Yageo	Capacitor/18pF/50V/5%/C0G/ 0402
9	2	C27, C29	LMK105BJ225KV-F	Taiyo Yuden	Capacitor/2.2µF/10V/10%/X5R/ 0402
10	1	C28	GCM155R71H103KA55D	Murata	Capacitor/10nF/50V/10%/X7R/ 0402
11	1	J1	TSW-113-08-G-T-RA	Samtec	Updated EVK Daughter Card Header
12	4	J2, J3, J8, J9	TSW-103-07-G-S	Samtec	Header, 3x1 Position, 0.1" Pitch
13	1	J4	TSW-104-07-G-D	Samtec	Header, 4x2 Position, 0.1" Pitch
14	4	J5, J7, J10, J35	TSW-102-07-G-S	Samtec	Header, 2x1 Position, 0.1" Pitch
15	1	J6	TSW-102-07-G-D	Samtec	Header, 2x2 Position, 0.1" Pitch
16	4	J11, J12, J13, J14	22-28-4055	Molex	Header/0.1" Pitch/Unshrouded/ 5-pin/Breakaway/Cross Pattern
17	7	J15, J19, J20, J23, J26, J32, J33	111-2223-001	Johnson	Binding Post
18	12	J16, J17, J18, J21, J22, J24, J25, J27, J28, J30, J31, J34	20TCW	Not Applicable	Wire Loop/20AWG/Tinned Copper/25mm Length
19	2	R1, R2	LTR18EZPFSR015	Rohm	Resistor/15mOhm/1%/1W/0612
20	19	R3, R4, R5, R6, R7, R8, R9, R10, R17, R18, R19, R20, R21, R23, R25, R26, R28, R36, R37	RC0402FR-070RL	Yageo	Resistor / 0Ohm / 1% / 1/16W / 0402
21	2	R15, R16	RC0402FR-074K7L	Yageo	Resistor/4.7kOhm/1%/1/16W/0402
22	1	R24	RC0402FR-0730K9L	Yageo	Resistor/30.9kOhm/1%/1/16W/0402
23	1	R27	RC0402FR-0710KL	Yageo	Resistor/10kOhm/1%/1/16W/0402
24	2	R29, R30	RR0510P-152-D	Susumu	Resistor/1.5kOhm/0.5%/1/16W/0402/ Thin Film

ITEM	QTY	REF DES	MFG PART #	MANUFACTURER	DESCRIPTION
25	4	SC1, SC2, SC3, SC4	NY PMS 440 0025 PH	B&F Fastener Supply	Nylon Screw/4-40 x 1/4"/Phillips/Pan Head
26	4	ST1, ST2, ST3, ST4	1902C	Keystone Electronics	Nylon Standoff/4-40 x 1/2"/Female-Female/ 1/4" Hex
27	2	TP1, TP2	5010	Keystone Electronics	Test Point/Multi-Purpose/Red
28	4	TP3, TP4, TP5, TP6	5116	Keystone Electronics	Test Point/Miniature/Green
29	8	TP7, TP8, TP11, TP17, TP25, TP26, TP27, TP28	5002	Keystone Electronics	Test Point/Miniature/White
30	5	TP9, TP10, TP12, TP15, TP16	5003	Keystone Electronics	Test Point/Miniature/Orange
31	2	TP13, TP14	5004	Keystone Electronics	Test Point/Miniature/Yellow
32	4	TP18, TP19, TP20, TP24	5011	Keystone Electronics	Test Point/Multi-Purpose/Black
33	3	TP21, TP22, TP23	5001	Keystone Electronics	Test Point/Miniature/Black
34	1	U1	MAX98415AEWL+ or MAX98425AEWL+	Analog Devices	22V Digital Input Stereo High-Efficiency Class D Amplifier with Ultra Low I_Q
35	1	U2	MAX8887EZK18+	Analog Devices	Low-Dropout, 300mA Linear Regulators in SOT23 - 1.8V
TOTAL	**116**				

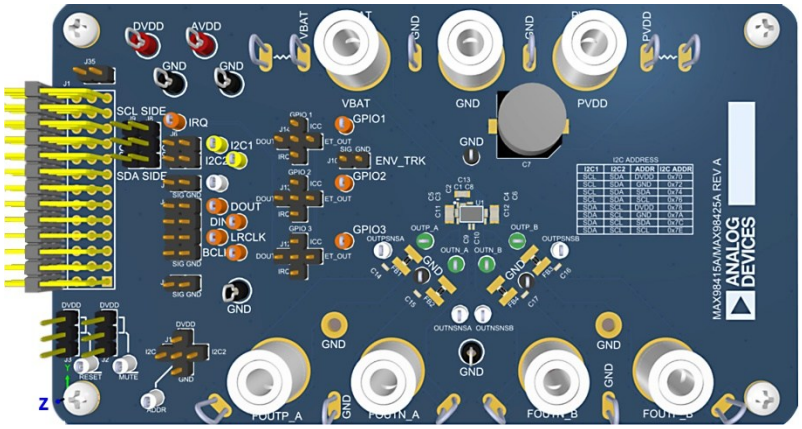
MAX98415A/MAX98425A DEV Board Schematic Diagrams



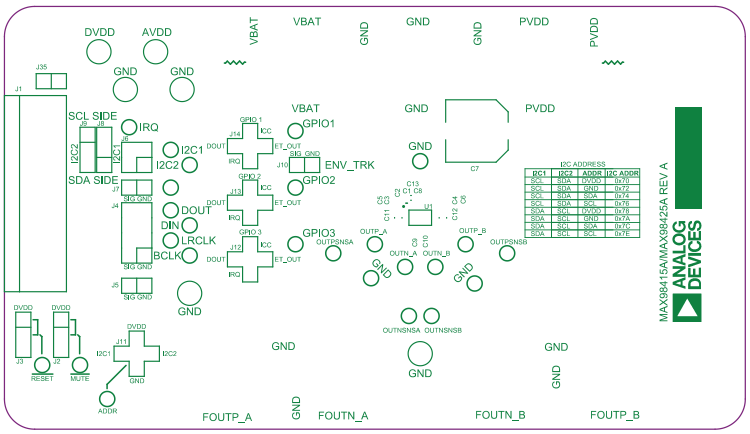
MAX98415A/MAX98425A DEV Board Schematic (Continued)



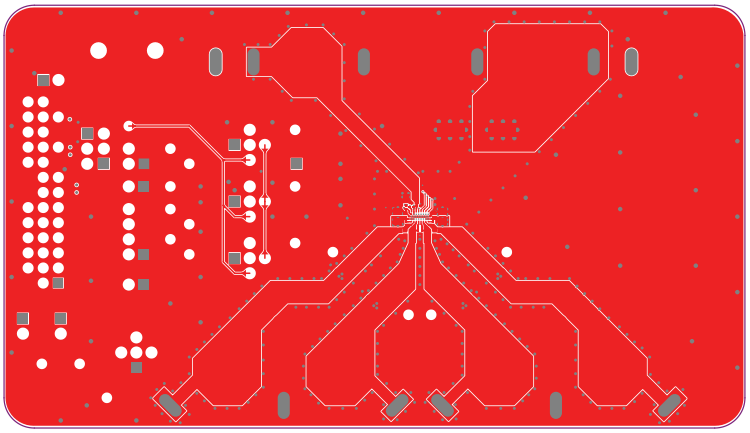
MAX98415A/MAX98425A DEV Board PCB Layout Diagrams



MAX98415A/MAX98425A DEV Board—Top Side

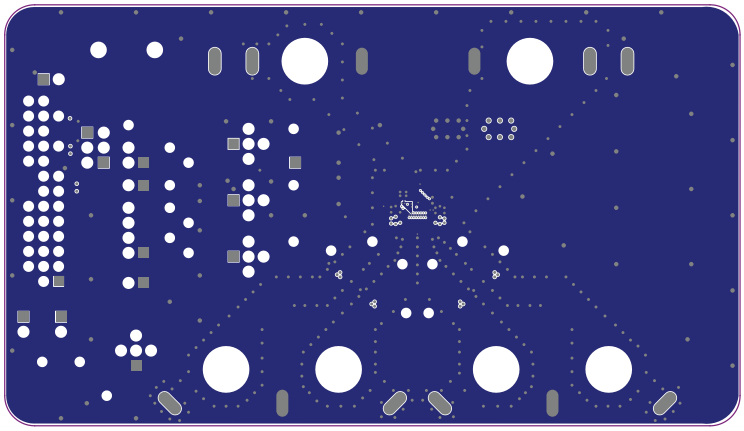


MAX98415A/MAX98425A DEV Board PCB Layout—Top Silkscreen

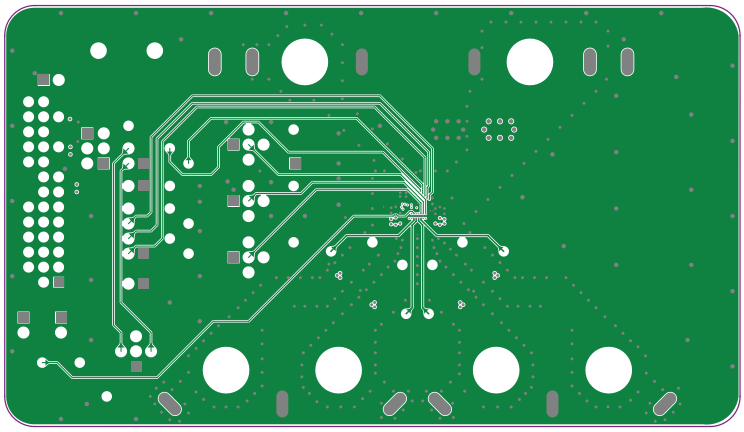


MAX98415A/MAX98425A DEV Board PCB Layout—Top Layer

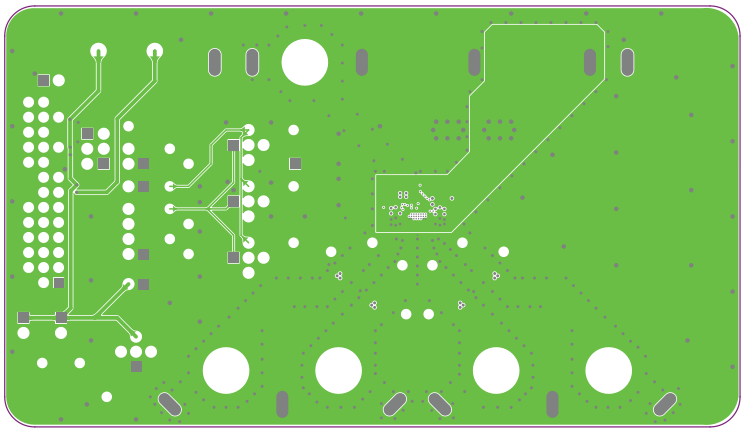
MAX98415A/MAX98425A DEV Board PCB Layout Diagrams (continued)



MAX98415A/MAX98425A DEV Board PCB Layout—Inner Layer 1

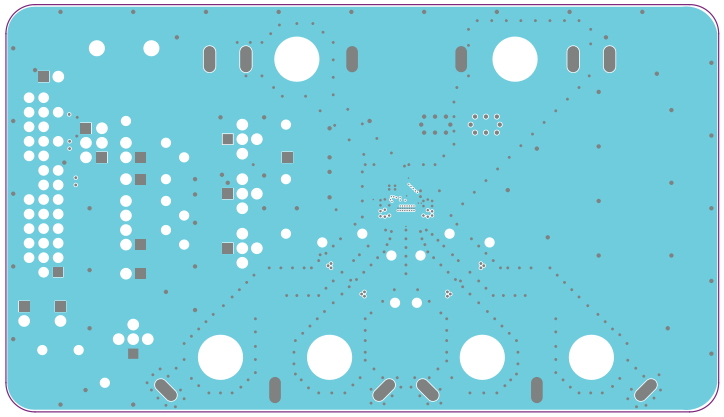


MAX98415A/MAX98425A DEV Board PCB Layout—Inner Layer 2

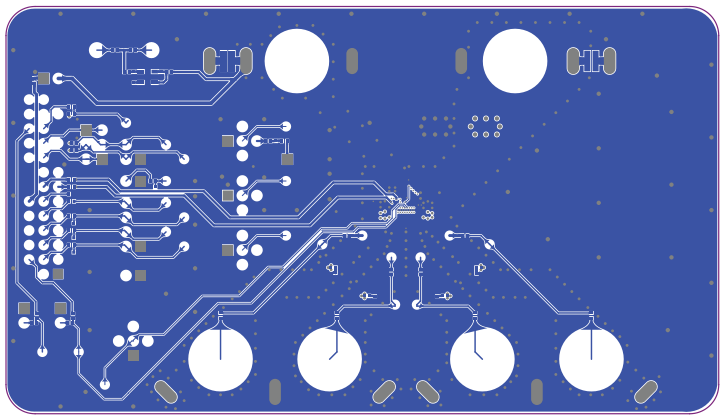


MAX98415A/MAX98425A DEV Board PCB Layout—Inner Layer 3

MAX98415A/MAX98425A DEV Board PCB Layout Diagrams (continued)



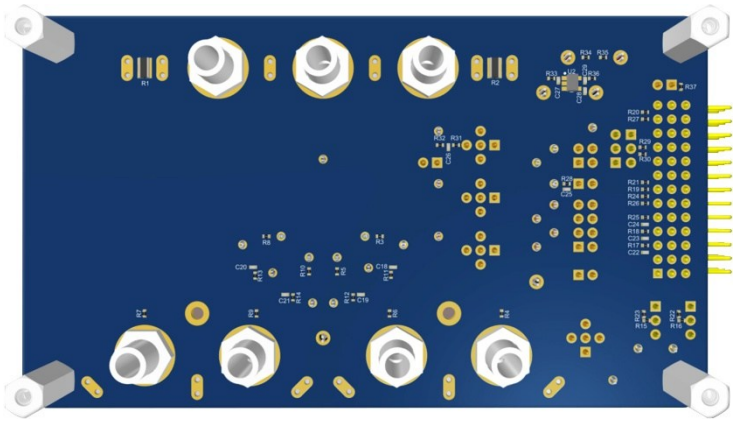
MAX98415A/MAX98425A DEV Board PCB Layout—Inner Layer 4



MAX98415A/MAX98425A DEV Board PCB Layout—Bottom Layer

MAX98415A/MAX98425A DEV Board PCB Layout Diagrams (continued)

MAX98415A/MAX98425A DEV Board PCB Layout—Bottom Silkscreen



MAX98415A/MAX98425A DEV Board—Bottom Side

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	2/25	Initial Release	—
1	3/25	Updated *Features and Benefits*, *MAX984X5A EV System Software* table, *Procedure*, *Configuration File Loading and Saving* section, and *MAX98415A/MAX98425A DEV Board Schematic Diagram*	1, 3, 7, 12, 17
2	7/25	Updated *MAX98415A/MAX98425A DEV Board Bill of Materials* and *MAX98415A/MAX98425A DEV Board Schematic Diagram*	15, 16, 18
3	12/25	Updated *MAX98415A/MAX98425A DEV Board Schematic Diagram*	17

Notes