



**THE DATASHEET OF
EVAL-ADAU1777Z**



Evaluating the ADAU1777 Four ADC, Two DAC, Low Power Codec with Audio Processor

EVALUATION KIT CONTENTS

- EVAL-ADAU1777Z evaluation board
- EVAL-ADUSB2EBZ (USBi) communications adapter
- USB cable with mini-B plug
- Evaluation board/software quick start guide

DOCUMENTS NEEDED

- ADAU1777 data sheet
- AN-1006 Application Note

GENERAL DESCRIPTION

This user guide explains the design and setup of the EVAL-ADAU1777Z evaluation board.

This evaluation board provides full access to all analog and digital inputs/outputs on the ADAU1777. The ADAU1777 core is controlled by Analog Devices, Inc., SigmaStudio™ software, which interfaces to the board via a USB connection. The EVAL-ADAU1777Z can be powered by a single AAA battery, by the USB bus, or by a single 3.8 V to 5.5 V supply; any of these supplies are regulated to the voltages required on the board. The printed circuit board (PCB) is a 4-layer design, with a single ground plane and a single power plane on the inner layers. The board contains connectors for external microphones and speakers. The master clock can be provided externally or by the on-board 12.288 MHz passive crystal.

EVALUATION BOARD TOP SIDE

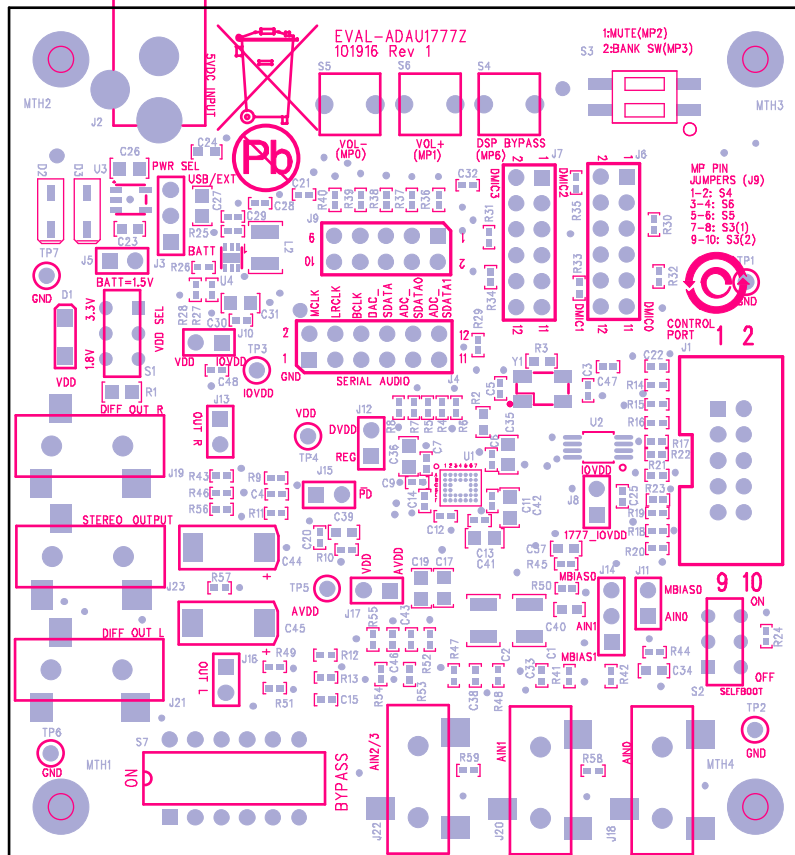


Figure 1. EVAL-ADAU1777Z Top Side Assembly

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REVISION HISTORY

12/2016—Revision 0: Initial Version

EVALUATION BOARD BLOCK DIAGRAMS

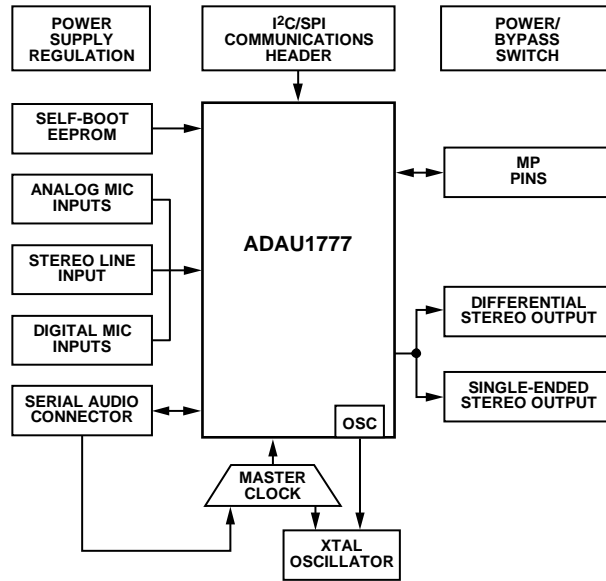


Figure 2. Functional Block Diagram

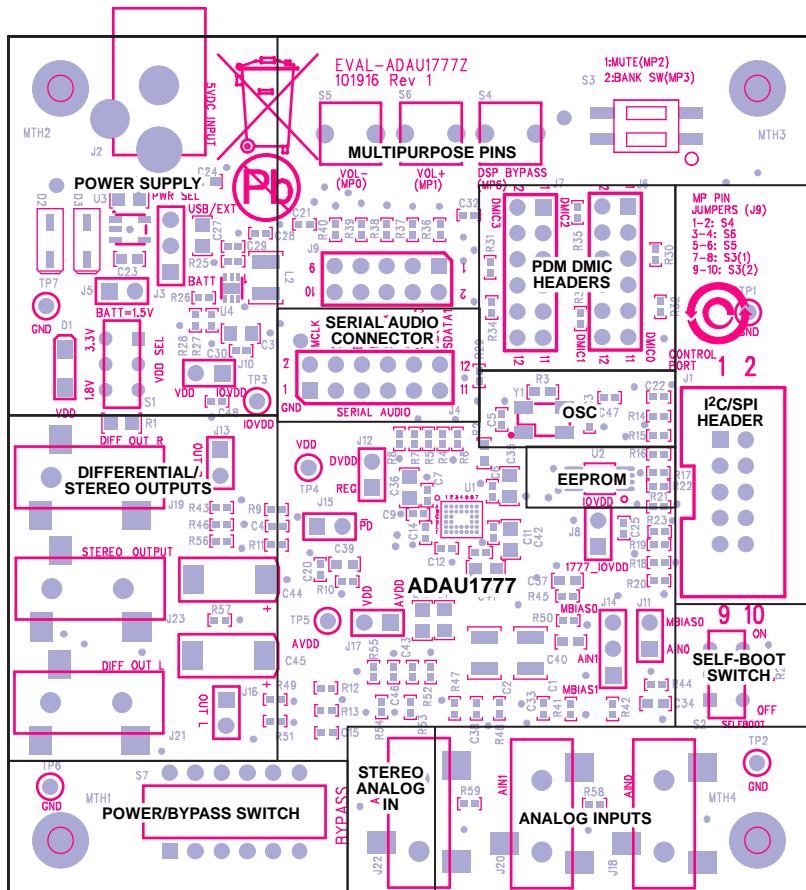
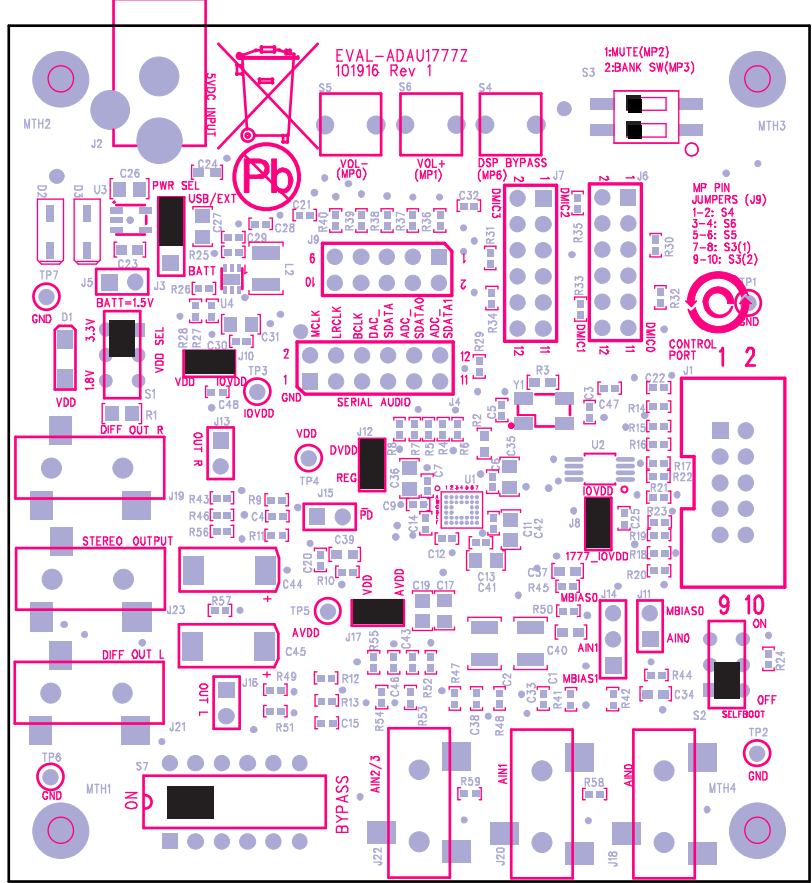


Figure 3. Board Layout Block Diagram



15094-004

Figure 4. Default Jumper and Switch Settings (Solid Black Rectangle Indicates a Switch or Jumper Position)

SETTING UP THE EVALUATION BOARD

INSTALLING THE **SigmaStudio** SOFTWARE

Download and install the latest version of **SigmaStudio** by completing the following steps:

1. Install the latest version of Microsoft® .NET Framework if it is not already installed on the PC. The latest version of the .NET Framework can be downloaded from the Microsoft website.
2. Go to www.analog.com/SigmaStudio and download the latest version of **SigmaStudio** from the **Downloads and Related Products** section.
3. Log in to your myAnalog account. (If you do not have an account, go to www.analog.com/MyAnalog, click **Log In**, and then click **Register** to create a new account.)
4. Fill in the download form and choose **SigmaDSP** as the target hardware.
5. Download the installer and execute the executable. Follow the prompts, including accepting the license agreement, to install the software.

INSTALLING THE USBi (EVAL-ADUSB2EBZ) DRIVERS

SigmaStudio must be installed to use the USB interface (USBi). After the **SigmaStudio** installation is complete,

1. Connect the USBi to an available USB 2.0 port using the USB cable included in the evaluation board kit. (The USBi does not function properly with a USB 3.0 port.)
2. Install the driver software (see the Using Windows XP section or the Using Windows 7 or Windows Vista section for more information).

Using Windows XP

After connecting the USBi to the USB 2.0 port, Windows® XP recognizes the device (see Figure 5) and prompts the user to install the drivers.



Figure 5. **Found New Hardware** Notification

1. From the **Found New Hardware Wizard** window, select the **Install from a list or specific location (Advanced)** option and click **Next** (see Figure 6).



Figure 6. **Found New Hardware Wizard**—Installation

2. Select **Search for the best driver in these locations**, select **Include this location in the search**, and click **Browse** to find the USB drivers subdirectory within the **SigmaStudio** directory (see Figure 7).

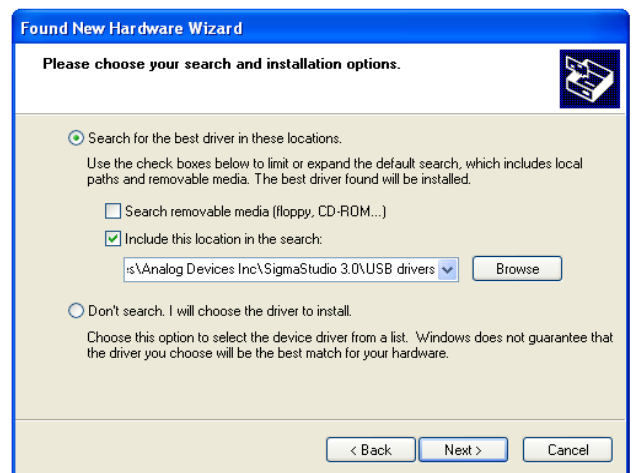


Figure 7. **Found New Hardware Wizard**—Search and Installation Options

- When the **Hardware Installation** warning appears, click **Continue Anyway** (see Figure 8).



Figure 8. Hardware Installation Warning

The USBi drivers are now installed. Leave the USBi connected to the PC.

Using Windows 7 or Windows Vista

After connecting the USBi to the USB 2.0 port, Windows 7 or Windows Vista recognizes the device and installs the drivers automatically (see Figure 9). After the installation is complete, leave the USBi connected to the PC.

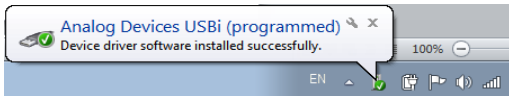


Figure 9. USBi Drivers Installed Correctly

Confirming Proper Installation of the USBi Drivers

To confirm that the USBi drivers have been installed properly,

- With the USBi still connected to the USB 2.0 port of the PC, check that both the yellow I²C LED and the red power indicator LED are illuminated (see Figure 10).

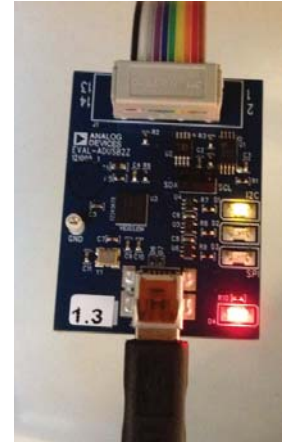


Figure 10. State of USBi Status LEDs After Driver Installation

- In Windows **Device Manager**, under the **Universal Serial Bus controllers** section, check that **Analog Devices USBi (programmed)** appears as shown in Figure 11.

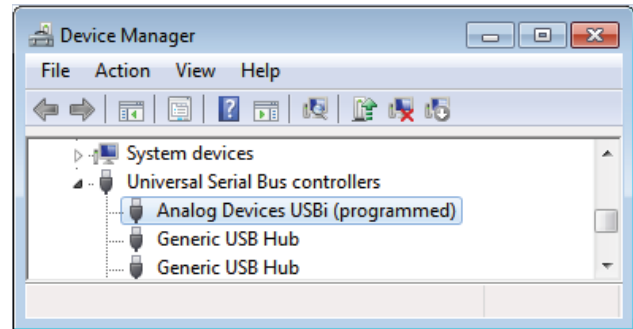


Figure 11. Confirming Driver Installation Using the **Device Manager**

DEFAULT SWITCH AND JUMPER SETTINGS

The J8, J10, J12, and J17 jumpers must be connected to provide power to the ADAU1777, and the J3 jumper must be set to the USB/EXT power setting. The MP pin jumpers (J9) can be connected as desired to use the MP push-buttons or switches. The microphone bias jumpers, J11 and J14, can be connected if microphone bias is needed on the AIN0 and/or AIN1 inputs.

Switch S7 selects whether the board is to be powered up or if audio is to be bypassed from input to output with the board powered down. For normal operation, slide the switch to the left. S1 selects whether the ADAU1777 is powered from 3.3 V or 1.8 V; the default is 3.3 V. If powering the board via the USBi, ensure that the switch on the bottom of the USBi board is set to the correct voltage (1.8 V or 3.3 V). S2 controls the self-boot operation. By default, S2 is slid down to disable self-boot operation.

The following is an example setup for using the EVAL-ADAU1777Z analog stereo in to analog stereo out operation.

POWERING UP THE BOARD

To power up the evaluation board, connect the ribbon cable of the USBi to J1 (control port) of the EVAL-ADAU1777Z.

CONNECTING THE AUDIO CABLES

Connect a stereo audio source to J22 (AIN2/3). Connect headphones or powered speakers to J23 (stereo output).

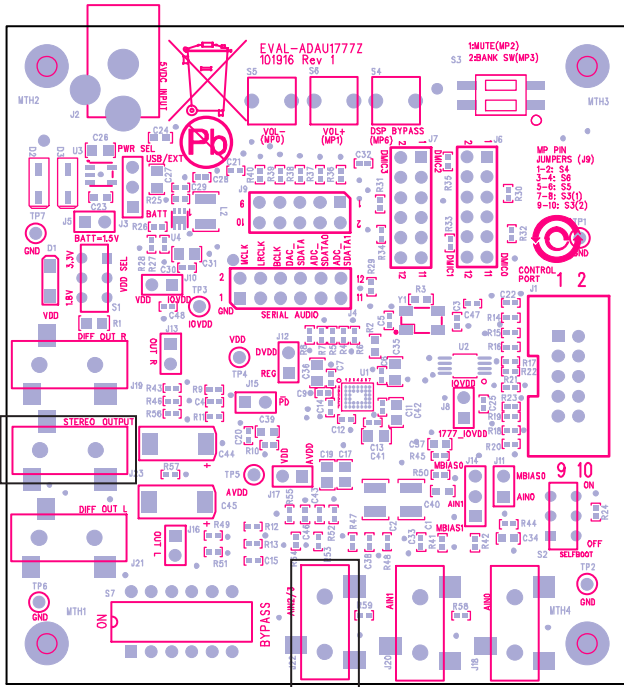


Figure 12. Stereo Out (J23) and Stereo In (J22)

SETTING UP COMMUNICATIONS IN SigmaStudio

Start SigmaStudio by double-clicking the shortcut on the desktop.

Click File...New Project or press Ctrl+N to create a new project. The default view of the new project is the Hardware Configuration tab.

To use the USBi in conjunction with SigmaStudio, go to the Communication Channels subsection of the toolbox on the left side of the Hardware Configuration tab, select USBi, and click and drag it to the right to add it to the project space (see Figure 13).

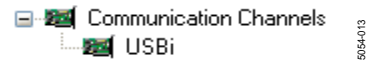


Figure 13. Adding the USBi Communication Channel

If SigmaStudio cannot detect the USBi on the USB port of the PC, the background of the USB label is red (see Figure 14). This can occur when the USBi is not connected or when the drivers are incorrectly installed.

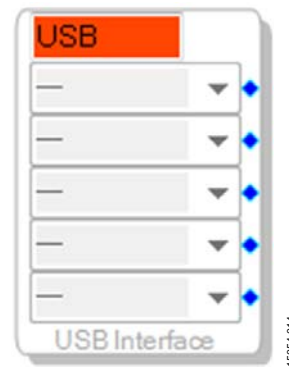


Figure 14. USBi Not Detected by SigmaStudio

If SigmaStudio detects the USBi on the USB port of the PC, the background of the USB label changes to green (see Figure 15).

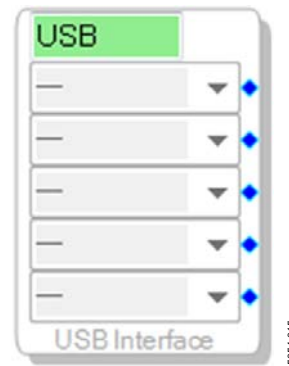


Figure 15. USBi Detected by SigmaStudio

To add an ADAU1777 to the project, select ADAU1777 from the Processors (ICs / DSPs) list, and drag it to the project space (see Figure 16).



Figure 16. Adding an ADAU1777

To use the USB interface to communicate with the target integrated circuit (IC), connect it by clicking and dragging a wire between the blue pin of the USBi and the green pin of the IC (see Figure 17). The corresponding drop-down box of the USBi automatically fills with the default mode and channel for that IC.

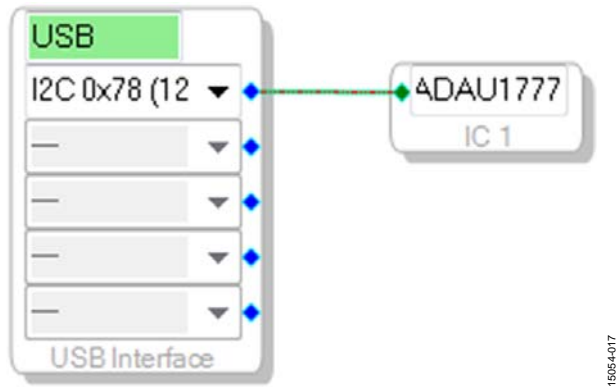


Figure 17. Connecting the USB Interface to an ADAU1777 IC

CREATING A BASIC SIGNAL FLOW

To access the **Schematic** tab, where a signal processing flow can be created, click the **Schematic** tab at the top of the screen (see Figure 18).

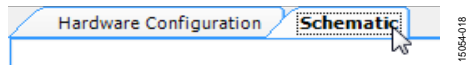


Figure 18. Schematic Tab

The left side of the schematic view includes the **Toolbox**, which contains all of the algorithms that can run in the SigmaDSP. From within the **IO > Audio Input > Pair 2** folder, select the **Input** cell (see Figure 19).

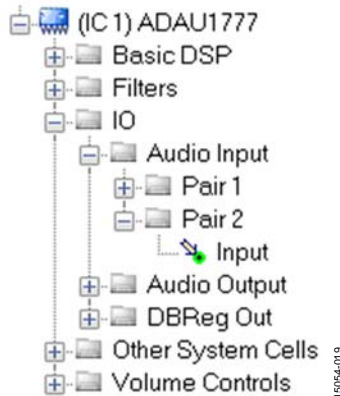


Figure 19. Input Cell Selection

Click and drag the **Input** cell into the blank schematic space to the right of the **Toolbox** (see Figure 20).



Figure 20. Input Cell

Go to the **IO > Audio Output** folder and select the **Output** cell (see Figure 21).

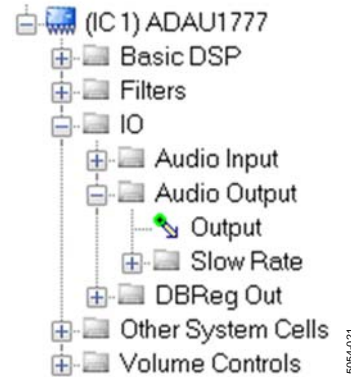


Figure 21. Output Cell Selection

Click and drag an output cell to the schematic. Repeat this step to create two outputs (see Figure 22). Make sure that the output cells are assigned to **OUT0** and **OUT1**, respectively.



Figure 22. Output Cells

Connect the cells together by clicking a blue output dot and dragging to the green output dot of the next cell, connecting the Input 2 to **OUT0** and Input 3 to **OUT1** (see Figure 23).

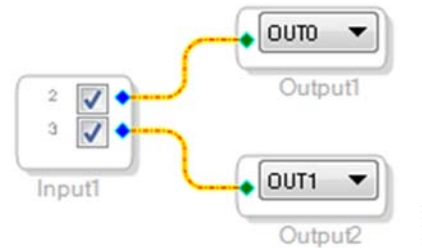


Figure 23. Connected Signal Flow

The basic signal flow is now complete with the stereo input/output.

Add Volume Control

To add volume control via the VOL- and VOL+ buttons, add jumpers to S6 and S4 on J9 (see Figure 24).

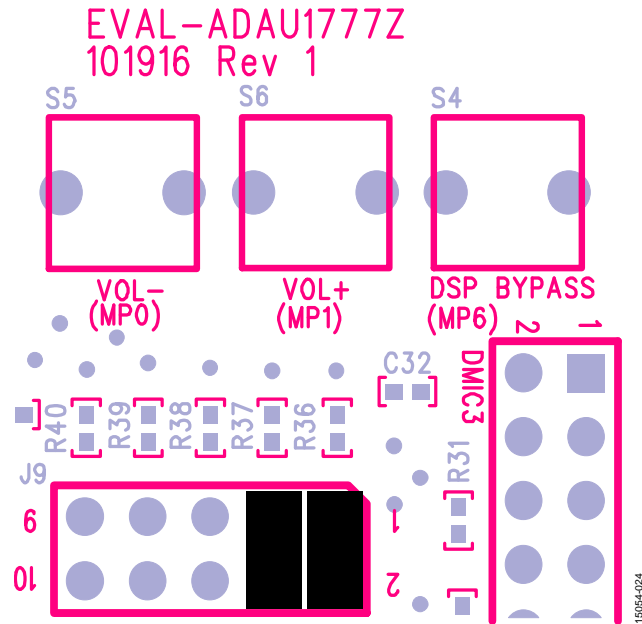


Figure 24. Jumpers for Volume Push-Buttons

Go to the **Hardware Configuration** tab. In the bottom left corner, click the **IC 1 – ADAU1777 Register Control** tab (see Figure 25).



Figure 25. IC 1 - ADAU1777 Register Control Tab

Find the **Output/Serial Port** tab in the top right corner. In the bottom left corner of the **Output/Serial Port** tab, the **Push Button Vol** section is located. Locate the drop-down box for **Converters Controlled by PushButton Volume:** and change its value to **All ADCs** (see Figure 26).

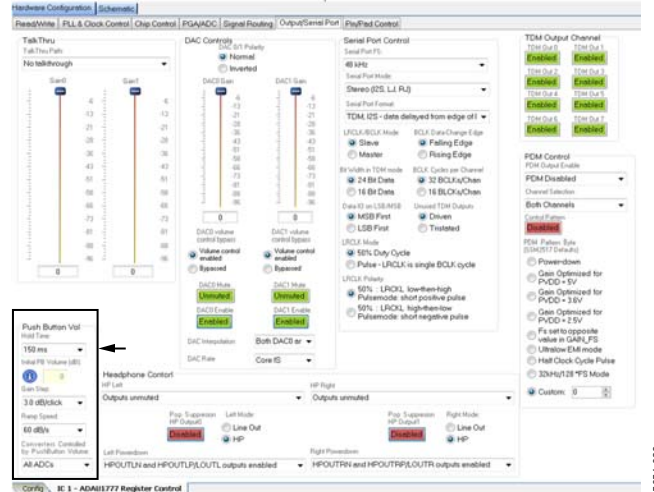


Figure 26. Output/Serial Port Tab

Go to the **Pin/Pad Control** tab. In the **Pin Modes** section, change the value of **DAC_SDATA/MP0** to **Push-button volume down**, and change the value of **ADC_SDATA0/PDMOUT/MP1** to **Push-button volume up** (see Figure 27).

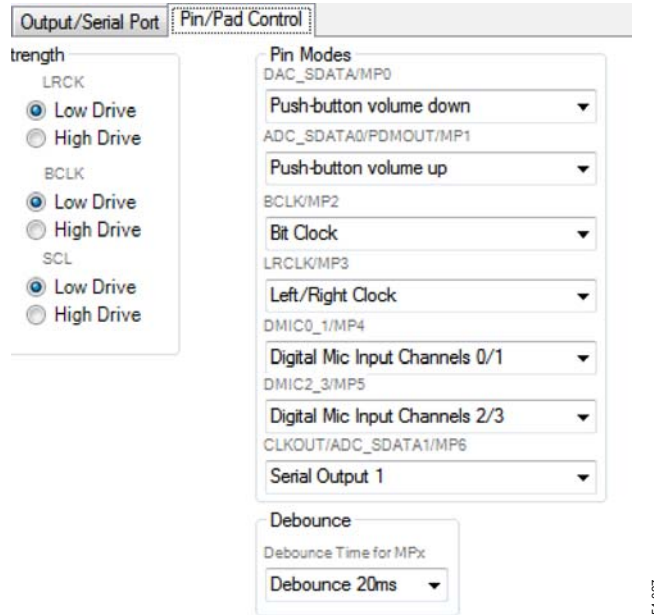


Figure 27. Pin/Pad Control Tab

The schematic is ready to be compiled and downloaded to the evaluation board.

DOWNLOADING THE PROGRAM TO THE DSP

To compile and download the code to the DSP, click **Link-Compile-Download** in the main toolbar of **SigmaStudio** (see Figure 28). Alternately, press the F7 key.



Figure 28. **Link-Compile-Download**

If the project does not compile correctly, an error displays (see Figure 29). If an error displays, return to **SigmaStudio** and check the configuration for mistakes.

When the project compiles, the signal flow runs on the evaluation board, and the audio passes from the input to the output. The volume can be changed in real time by using the buttons on the board.

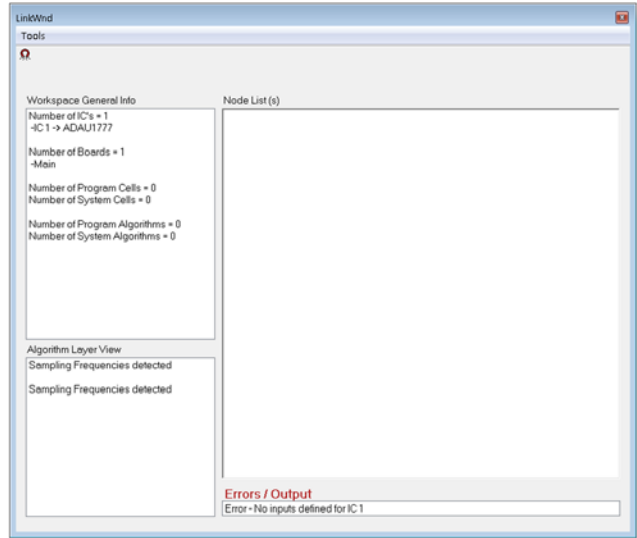


Figure 29. **Compile Error**

USING THE EVALUATION BOARD

POWER

Power can be supplied to the [EVAL-ADAU1777Z](#) in one of three ways. When Jumper J3 is in the USB/EXT position, power can be supplied by connecting the [EVAL-ADUSB2EBZ](#) (USBi) board to J1 (see Figure 30) or by connecting a 3.8 V dc to 5.5 V dc power supply to J2 (tip positive).

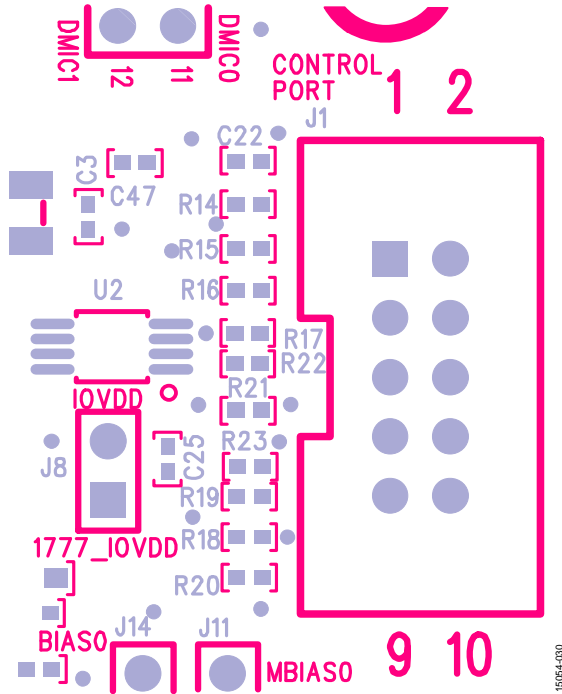


Figure 30. Header J1, Control Port

To supply power via a 1.5 V battery, J3 must be set to the BATT position, and the battery must be connected to J5. The on-board regulator generates the 3.3 V dc or 1.8 V dc supply, determined by S1, for the on-board circuitry. LED D1 lights up when power is supplied to the board. To connect power to the [ADAU1777](#), connect the J8, J10, J12, and J17 jumpers (see Figure 31).

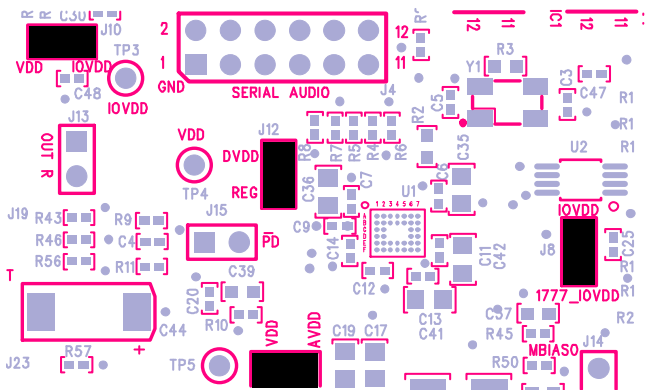


Figure 31. Power Jumpers

INPUTS AND OUTPUTS

The [EVAL-ADAU1777Z](#) has multiple audio input and output options, including digital and analog. There are four single-ended analog inputs that are configurable as microphone or line inputs, dual stereo digital microphone inputs, and two differential outputs that can also be used in a single-ended configuration.

Analog Microphone Inputs

For microphone signals, the [ADAU1777](#) analog inputs can be configured as single-ended inputs with optional programmable gain amplifier (PGA) mode.

Microphone Bias

To add MBIAS0 to AIN0, connect a jumper to the J11 header. Similarly, MBIAS1 or MBIAS0 can be added to AIN1 by connecting a jumper to the J14 header (see Figure 32).

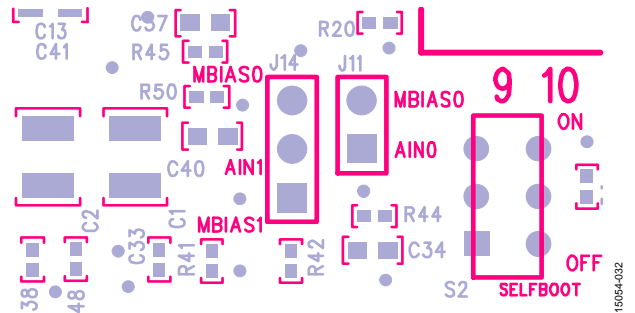


Figure 32. Microphone Bias Headers

Enable the microphone bias circuitry in the **PGA/ADC** tab of [SigmaStudio](#). The appropriate gain settings can also be chosen via this tab (see Figure 33).

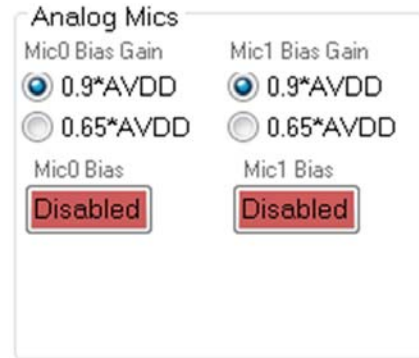


Figure 33. Microphone Bias Enable and Gain

Stereo Line Input

The J22 stereo input jack accepts a standard stereo TRS 3.5 mm mini plug (tip is left, ring is right) with two channels of audio.

Digital Microphones

Pulse density modulation (PDM) digital microphones can be connected to standard 0.100” headers (J6 and J7). To use the digital microphone headers on the EVAL-ADAU1777Z, ensure that the proper settings have been chosen in SigmaStudio. Go to the **Pin/Pad Control** tab (found in the **Hardware Configuration/ ADAU1777 Register Control** section). In the **CLKOUT/ ADC_SDATA1/MP6** drop-down box, select **Clock Output** (see Figure 34).

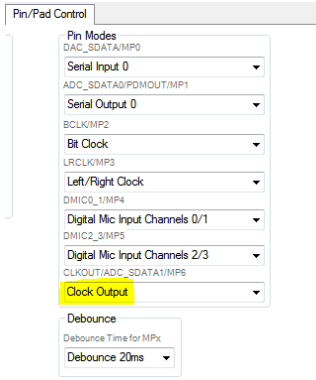


Figure 34. MP6, Clock Output

To set the value of BCLK, go to the **PLL & Clock Control** tab and change the value of the **Output Clock Frequency** drop-down box to the desired division on MCLK (see Figure 35).

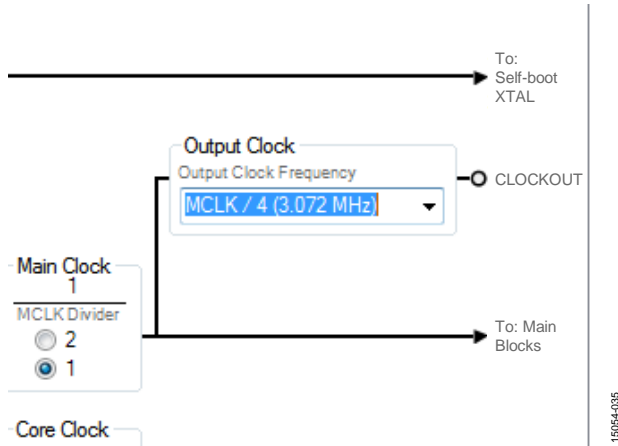


Figure 35. Clock Output Enabled/Divided

Set the input of the ADAU1777 to be the digital microphones instead of the ADCs by toggling the appropriate **Decimator Source** settings. Go to the **PGA/ADC** tab to find and set the following switches (see Figure 36).

The digital microphones can now be routed via the appropriate inputs on the **Audio Input** cell.

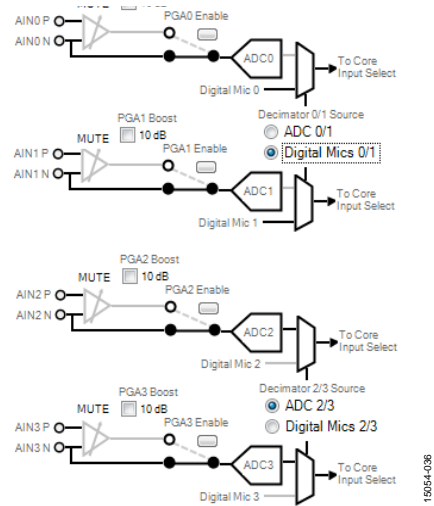


Figure 36. Decimator Source

Headphone Output

The headphone output, J23, connects to any standard 3.5 mm mini plug stereo headphones. By setting the HP_EN_L and HP_EN_R bits in the headphone line output select register (Address 0x0043), the output pins can be driven either by a line output driver or by a headphone driver. Headphones can be driven either single-ended or differentially, and bits are available to disable the LN and RN pins if using single-ended.

Line Outputs

The J19 and J21 analog output pins can drive differential loads. In their default settings, these pins can drive line loads of 10 kΩ or greater.

To use an external speaker, solder wires to the unpopulated header pads, J13 and J16 (see Figure 37).

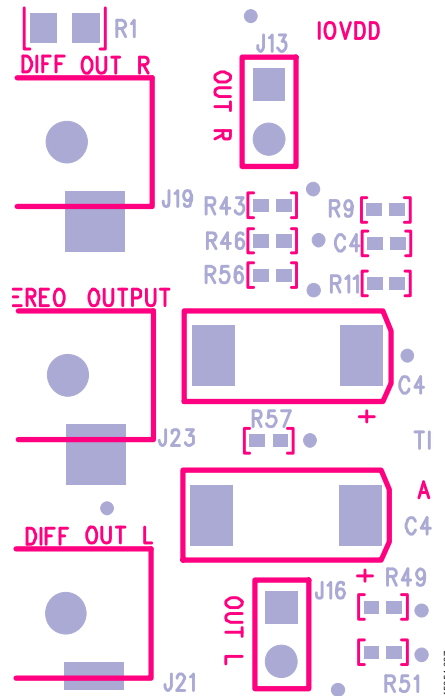


Figure 37. Unpopulated J13 and J16 Headers

PDM Modulator Output

The ADAU1777 has a 2-channel PDM modulator. The PDM output and clock source are both located on the MP pins. To use this functionality, set ADC_SDATA0/PDMOUT/MP1 to **PDM Modulator Output** and set CLKOUT/ADC_SDATA1/MP6 to **Clock Output**. These settings can be found in the **Pin/Pad Control** tab (see Figure 38).

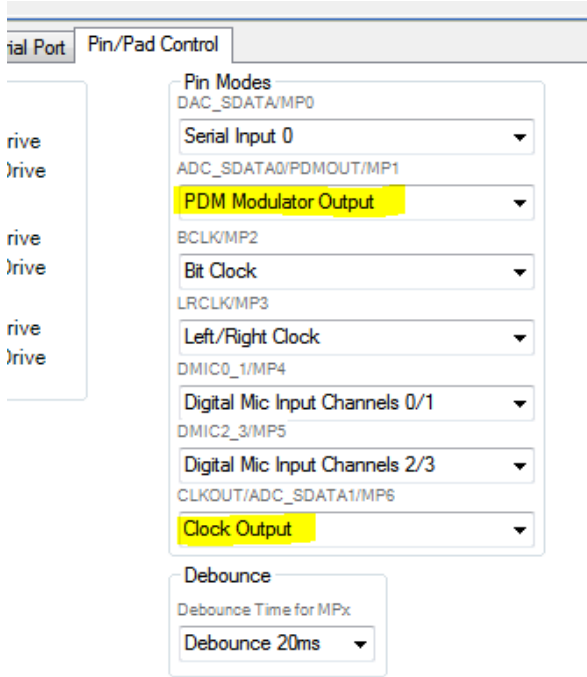


Figure 38. PDM Modulator Output and Clock Output

The clock output is located on the J4 header, Pin 12. The PDM output is located on the J4 header, Pin 10 (see Figure 39).

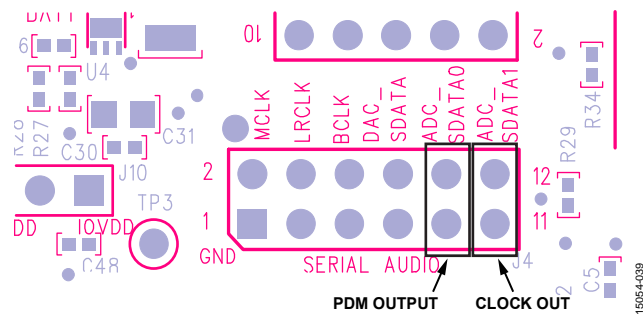


Figure 39. PDM Output and Clock Output Pins

MP PINS

The MP pin jumpers, Header J9, provide access to the MP pins (MP0, MP1, MP2, MP3, and MP6) of the ADAU1777, as well as facilitate the use of the push-buttons on the EVAL-ADAU1777Z board. See Figure 53 for the pinout of the header. These jumpers enable the use of the volume control, mute, and other capabilities of the ADAU1777.

To use the full functionality of the MP pins on the ADAU1777, change the selections in the drop-down boxes under the **Pin/Pad Control** tab, which is located in the **Hardware**

Configuration/ADAU1777 Register Control tab of **SigmaStudio** (see Figure 40).

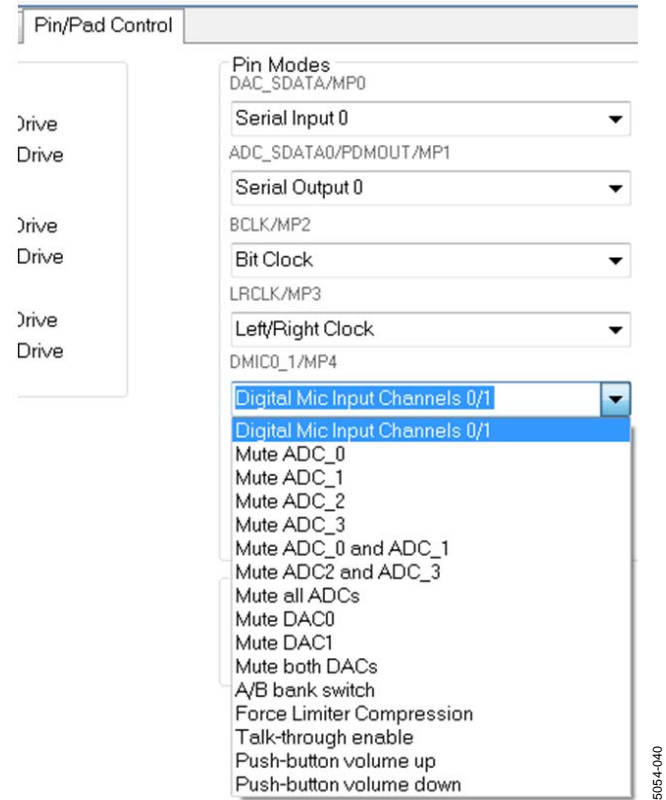


Figure 40. MP Pins Drop-Down Boxes

The MP pins, MP4 and MP5, are connected to the digital microphone headers, J6 and J7.

SERIAL AUDIO INTERFACE

Serial audio signals in I²S, left justified, right justified, or TDM format are available via the Serial Audio Interface Header J4. This header also includes master clock input and output connection pins. To use MCLK on the J4 header, first install a resistor across the R2 pads. The R2 resistor is not populated from the factory. To use an external MCLK, remove the R3 resistor from the board to eliminate contention from the XTAL oscillator on the MCLK line (see Figure 41).

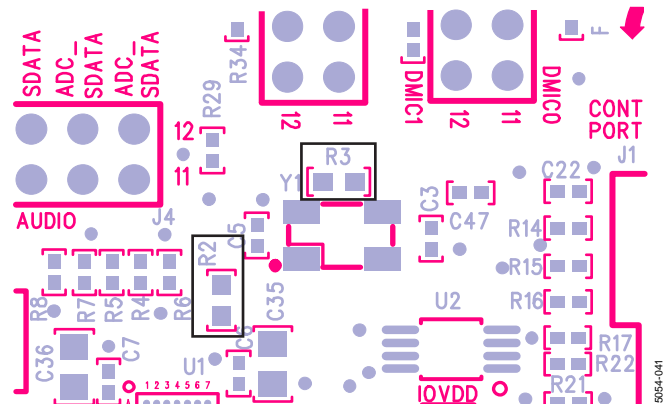


Figure 41. R2 and R3

TDM/I²S Stream

To use the serial audio outputs, connect the LRCLK, BCLK, and SDATA lines to the appropriate MP pins on the evaluation board. The connections are located on the J4 header. The silk screen above the header helps to identify where to connect the clocks and data (see Figure 42).

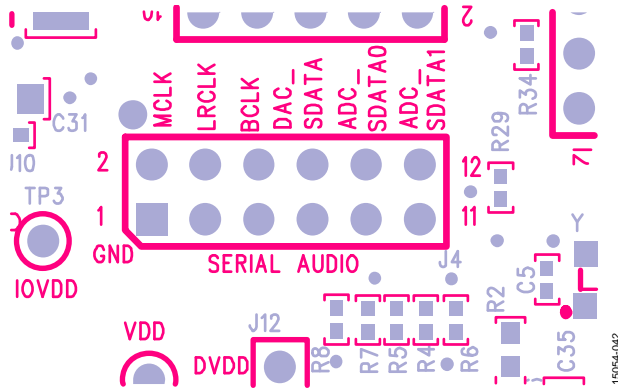


Figure 42. Serial Audio Port

When the MP pins are connected, use **SigmaStudio** to set the registers for the desired operation. In the **Output/Serial Port** tab, the **Serial Port Control** section contains settings that can be changed to create the specific data stream desired. These settings include **Serial Port FS** (sample rate), **Serial Port Mode**, **Serial Port Format**, **LRCLK/BCLK Mode** (slave or master), **BCLK Data-Change Edge**, **Bit Width in TDM mode**, **BCLK Cycles per Channel**, **Data IO on LSB/MSB**, **Unused TDM Outputs**, **LRCLK Mode** (as pulse or 50% duty cycle), and **LRCLK Polarity** (see Figure 43).

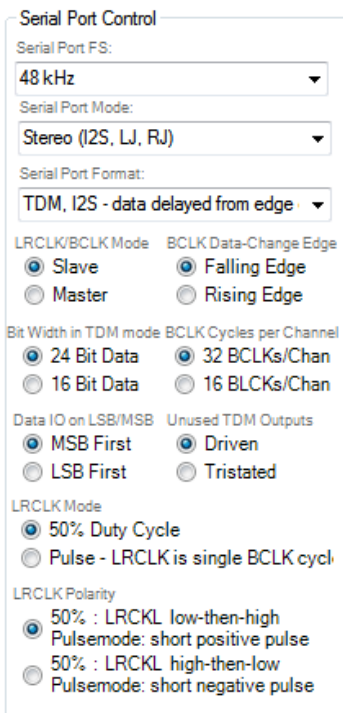


Figure 43. Serial Port Control

If using TDM mode, ensure that the appropriate TDM output channels have been enabled in the **TDM Output Channel** section (see Figure 44).

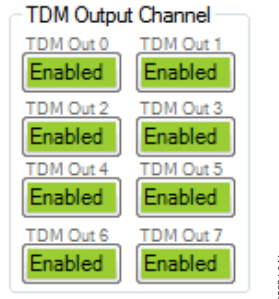


Figure 44. TDM Output Channel

Use the **Signal Routing** tab to route the core outputs, ADCs, or serial inputs to the either of the two available serial output lines. Ensure that **Output ASRC** is set to **Enabled** (see Figure 45).

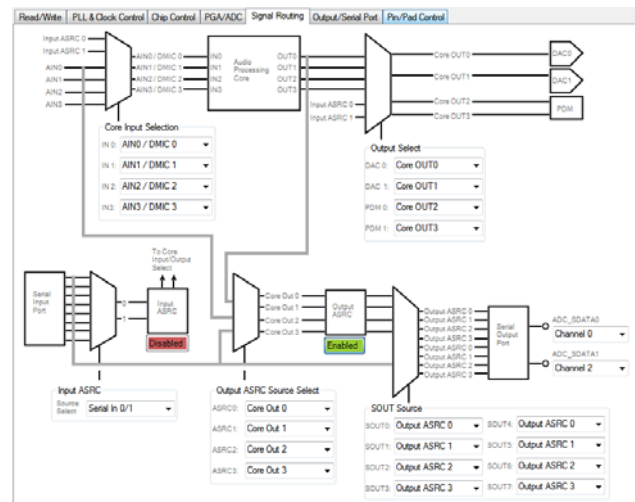


Figure 45. Signal Routing

COMMUNICATIONS HEADER (J1)

J1 connects to the **EVAL-ADUSB2EBZ** USBi. More information about the USBi can be found in the **AN-1006** application note.

The IC defaults to I²C mode; however, it can be put into SPI control mode by pulling the **CLATCH** pin low three times.

SELF-BOOT

To use the **ADAU1777** self-boot function, go to the **Hardware Configuration** tab and add an **E2Prom** IC to the USBi interface from the **Tree Toolbox** (see Figure 46).

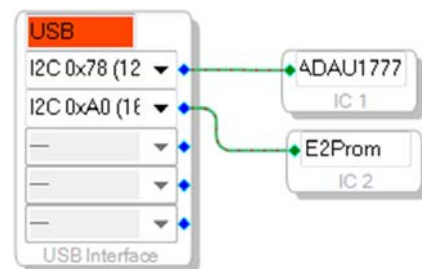


Figure 46. E2Prom

Before writing to the E2PROM, ensure that it has been erased by clearing it from [SigmaStudio](#). To erase the E2PROM, right-click **E2Prom**, open the **Read/Write** window, and click **Clear E2Pro** to clear the memory (see Figure 47).

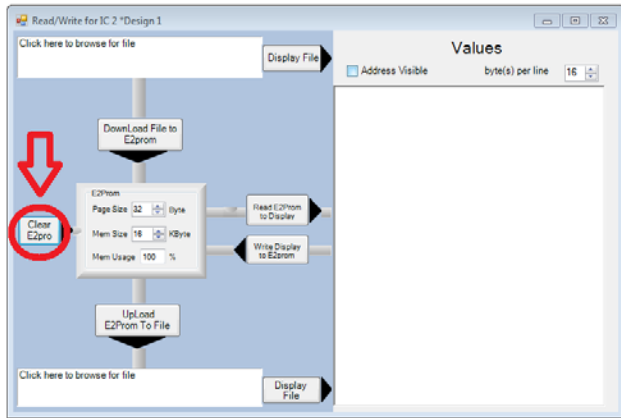


Figure 47. Clear E2pro

To **Link-Compile-Download** the project (see Figure 28), right-click **ADAU1777** and click **Write Latest Compilation to E2PROM** (see Figure 48).

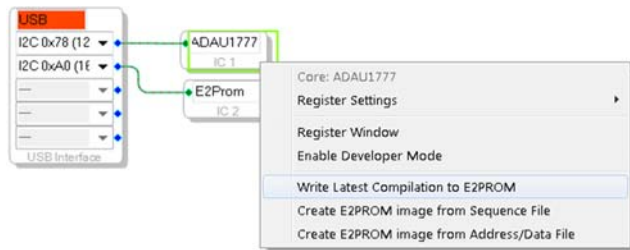


Figure 48. Write to E2PROM

When the project has been written to the E2PROM, move the self-boot switch, S2, to the on position (see Figure 49) to ensure that the **ADAU1777** boots from the E2PROM when it powers up.

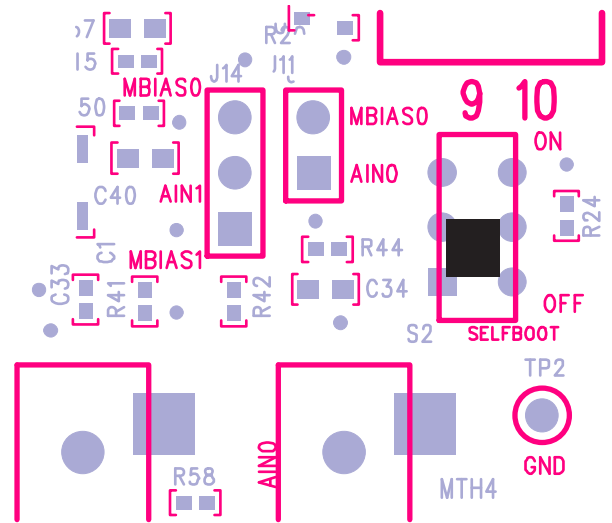


Figure 49. Self-Boot Switch On

POWER-DOWN

The power-down header, J15 (\overline{PD}) on the silkscreen of the board provides access to the power-down pin on the **ADAU1777**. Place a jumper on the header to power down all analog and digital circuits. Before enabling \overline{PD} , be sure to mute the outputs to avoid any pops or clicks when the IC is powered down.

HARDWARE DESCRIPTION

JUMPERS

Table 1. Connector and Jack Descriptions

Reference	Functional Name	Description
J1	Control port	Header that facilitates communication between the evaluation board and USBi board.
J2	5 V dc input	Barrel jack that provides external power to the board. It accepts 3.8 V dc to 6 V dc input.
J3	Power select	Jumper used to select power source for the evaluation board. Selectable between USB/external and battery.
J4	Serial audio	Input and output header for serial audio signals in I ² S, left justified, right justified, or TDM format.
J5	Battery 1.5 V	Jumper used to power the board via a 1.5 V battery.
J6, J7	Digital microphone inputs	Headers that allow digital microphones to be connected to the evaluation board.
J8	IOVDD 1777_IOVDD	Jumper connects power to the IOVDD supply of the ADAU1777 from the power supply section.
J9	MP pin jumpers	Jumpers used to connect push-buttons on the board to MP pins on the ADAU1777 .
J10	IOVDD_VDD	Jumper connects IOVDD on the ADAU1777 to VDD (3.3 V board supply) on the evaluation board.
J11, J14	Microphone bias	Jumpers used to add a microphone bias to the analog microphone inputs, AIN0 and AIN1.
J12	DVDD regulator (REG)	Jumper connects DVDD on the ADAU1777 to its internal regulator.
J13	Out R	Jumper provides access to the mono differential output right.
J15	Power down	Jumper used to power down the ADAU1777 analog and digital circuits.
J16	Out L	Jumper provides access to the mono differential output left.
J17	VDD AVDD	Jumper connects AVDD on the ADAU1777 to VDD (3.3 V board supply) on the evaluation board.

INTEGRATED CIRCUITS (ICs)

Table 2. IC Descriptions

Reference	Functional Name	Description
U1	ADAU1777 SigmaDSP	Digital audio signal processor
U2	M24C32-F serial EEPROM	Self-boot memory
U3	ADP1712 low dropout voltage regulator	Linear regulator that generates 1.5 V from an off-board power supply
U4	ADP1607 boost regulator	Boost regulator that generates 1.8 V or 3.3 V for the board supply from a 1.5 V input

LED

Table 3. LED Description

Reference	Functional Name	Description
D1	VDD power LED	LED that illuminates when the evaluation board is powered up

EVALUATION BOARD SCHEMATICS AND ARTWORK

05045051

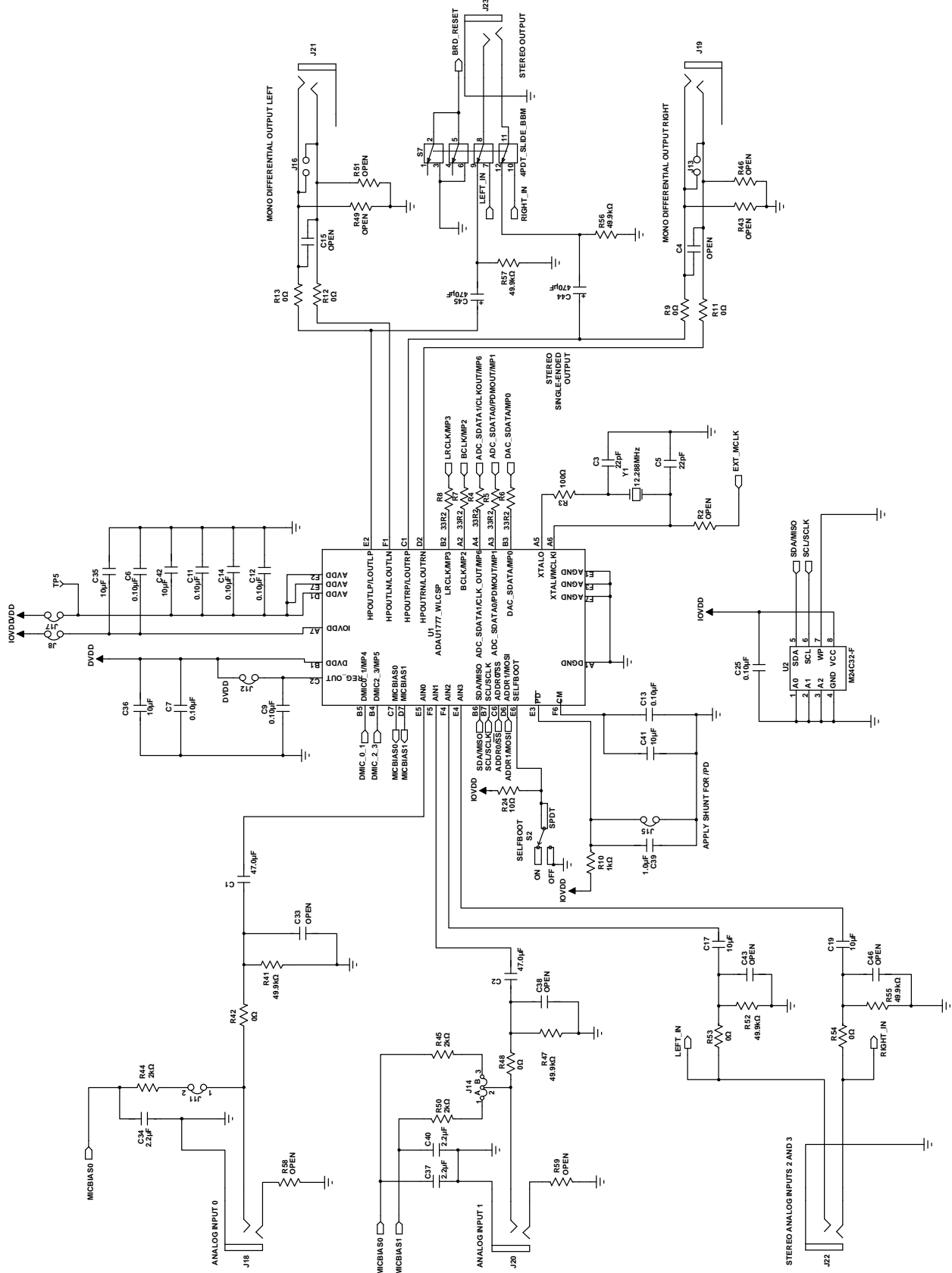


Figure 50. EVAL-ADAU1777Z Evaluation Board Schematic—Digital and Analog Input/Output, Master Clock Generation

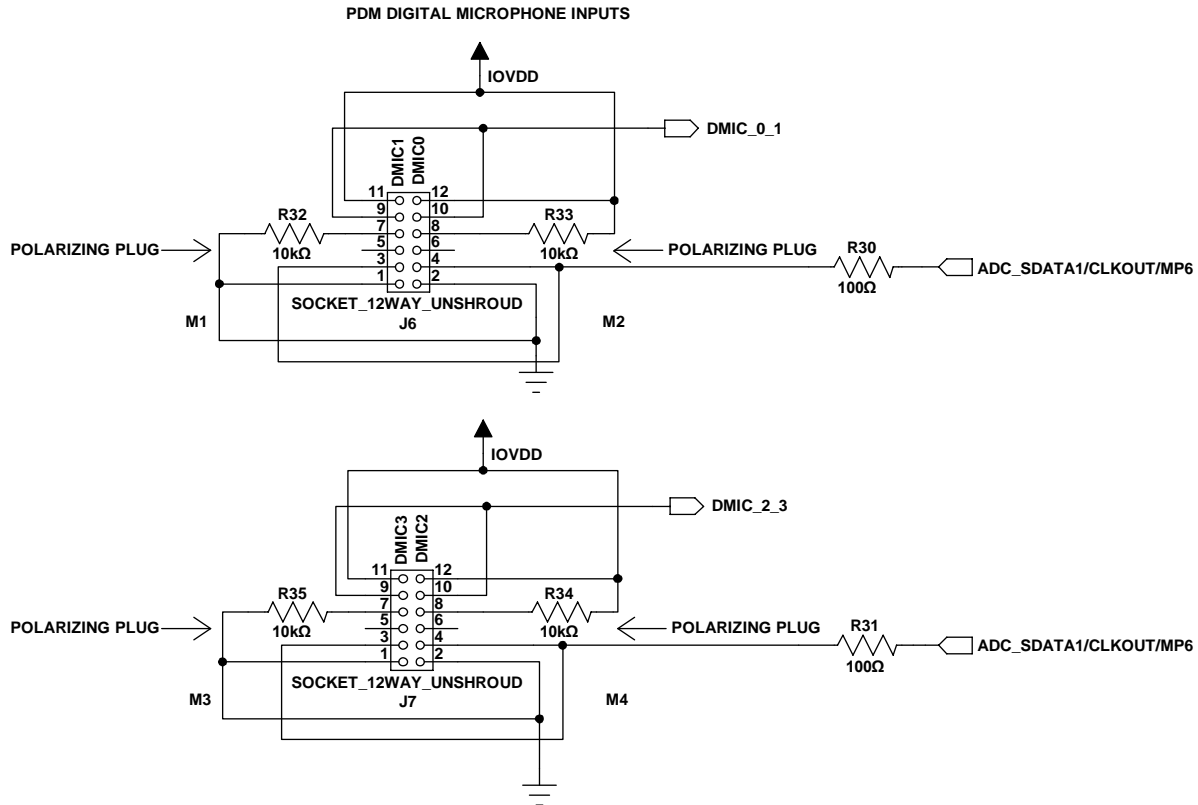


Figure 51. EVAL-ADAU1777Z Evaluation Board Schematic—PDM Digital Microphone Interface

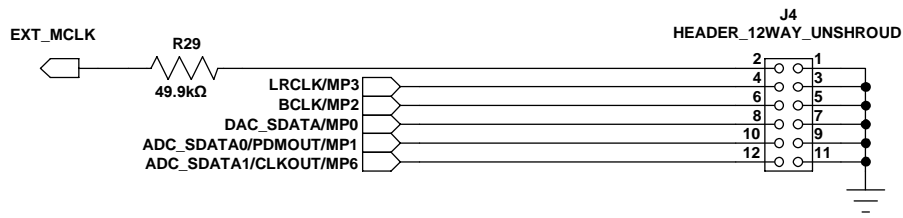


Figure 52. EVAL-ADAU1777Z Evaluation Board Schematic—Serial Audio Interface

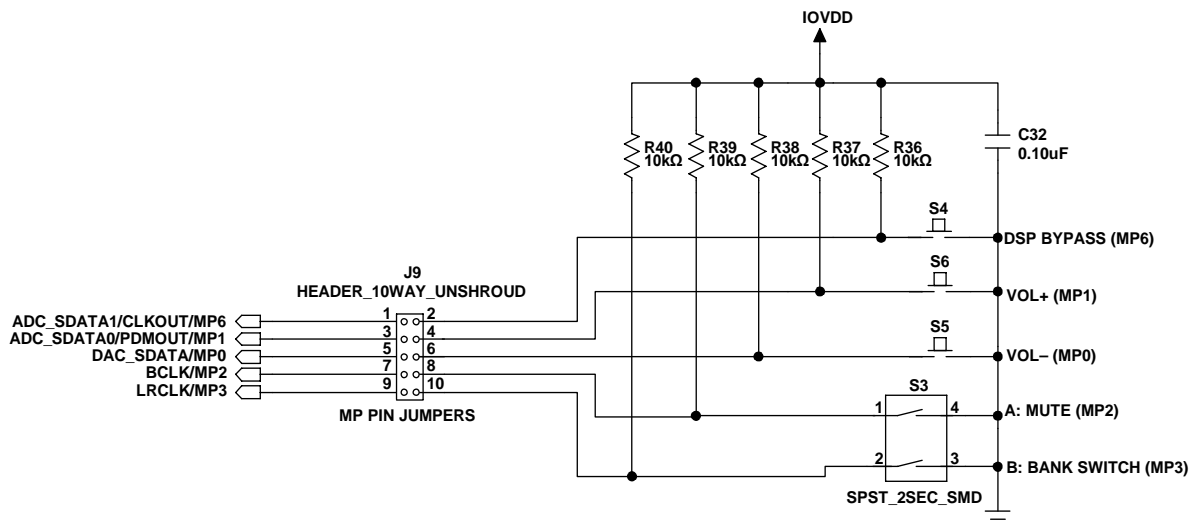


Figure 53. EVAL-ADAU1777Z Evaluation Board Schematic—MP Pin Jumpers

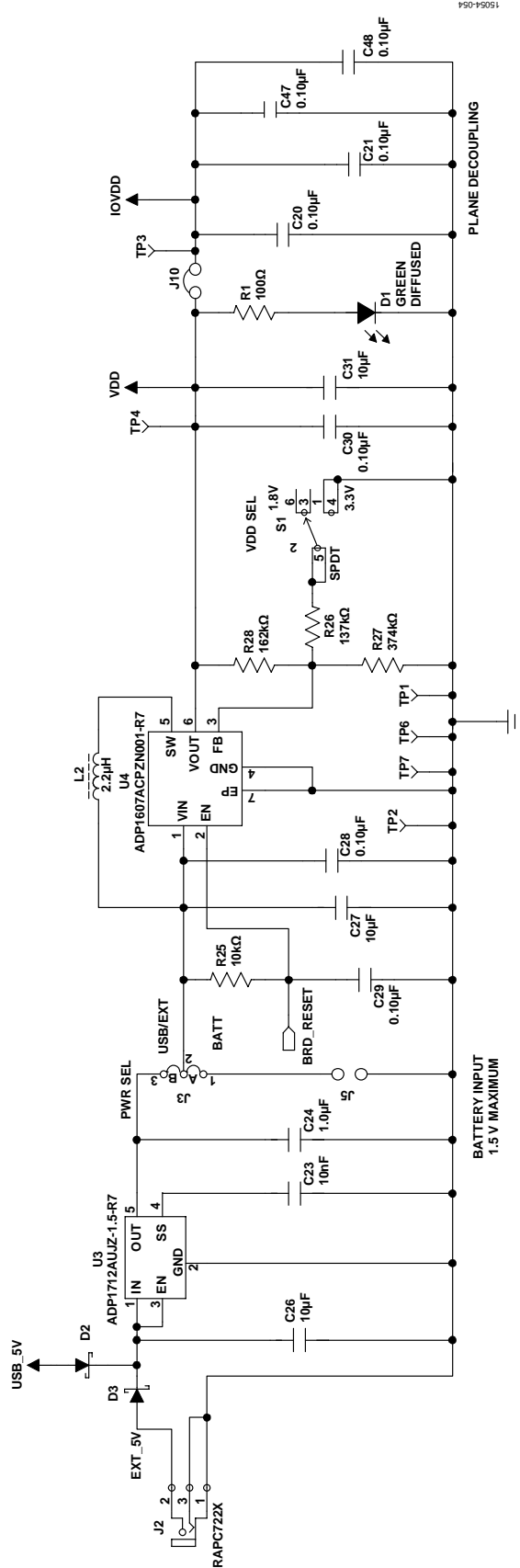


Figure 54. EVAL-ADAU1777Z Evaluation Board Schematic—Power Supply

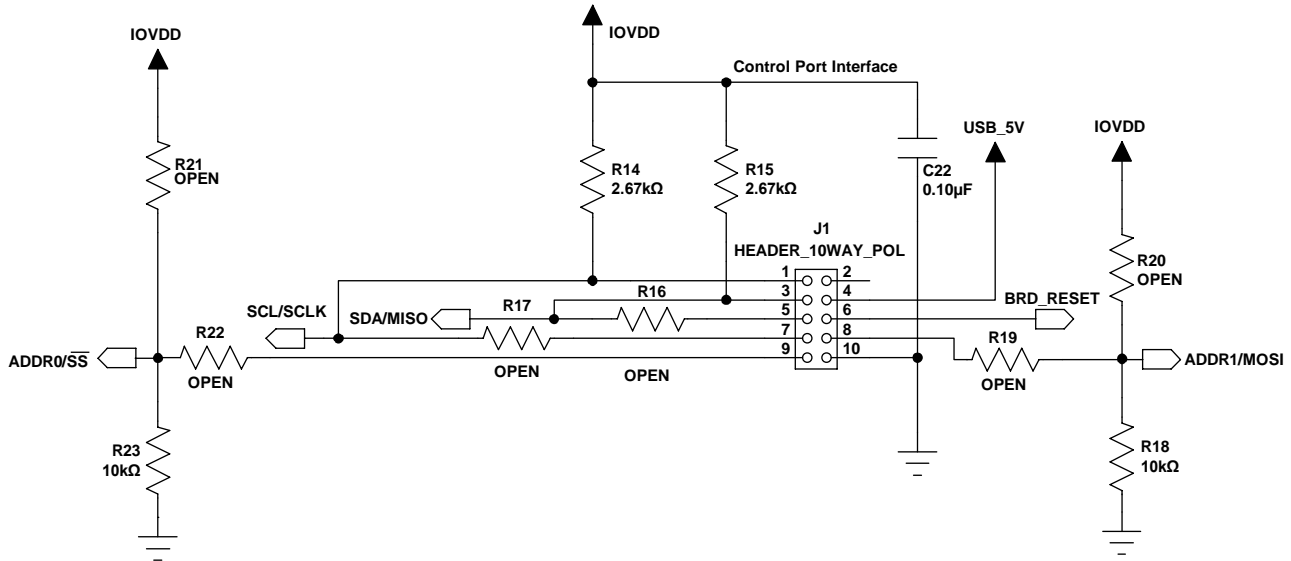


Figure 55. EVAL-ADAU1777Z Evaluation Board Schematic—Control Port Interface

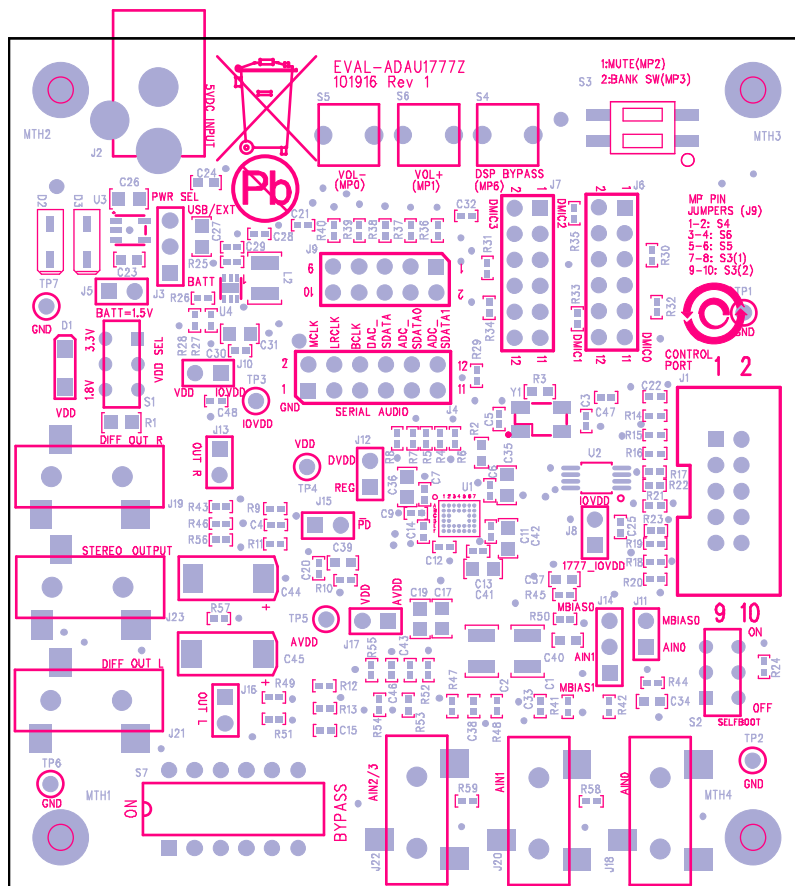
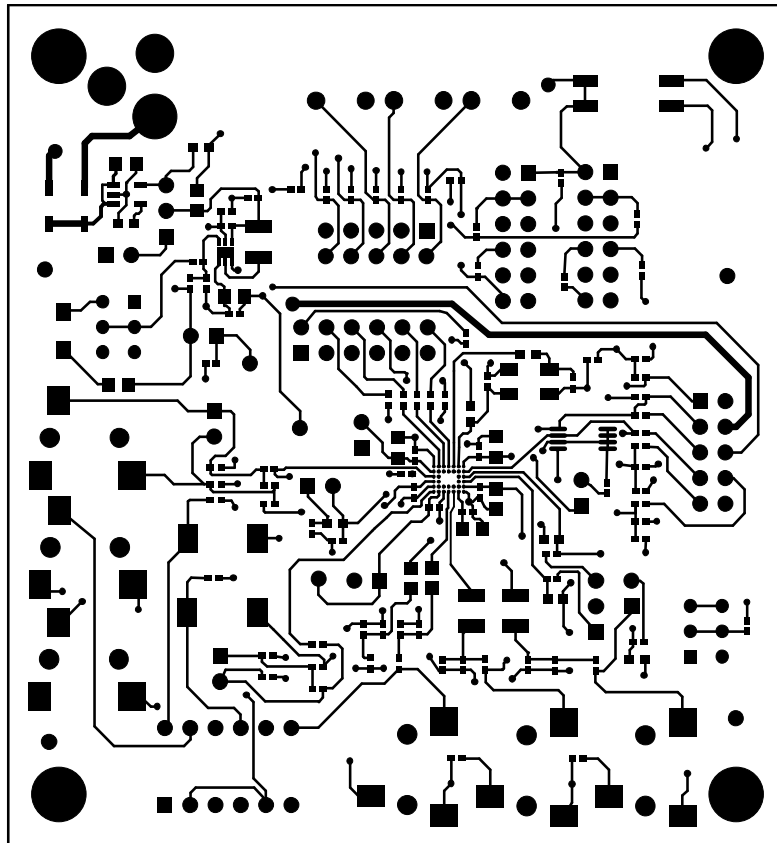


Figure 56. EVAL-ADAU1777Z Evaluation Board Layout—Top Assembly

15054-053

15054-056



15054-057

Figure 57. EVAL-ADAU1777Z Evaluation Board Layout—Top Copper

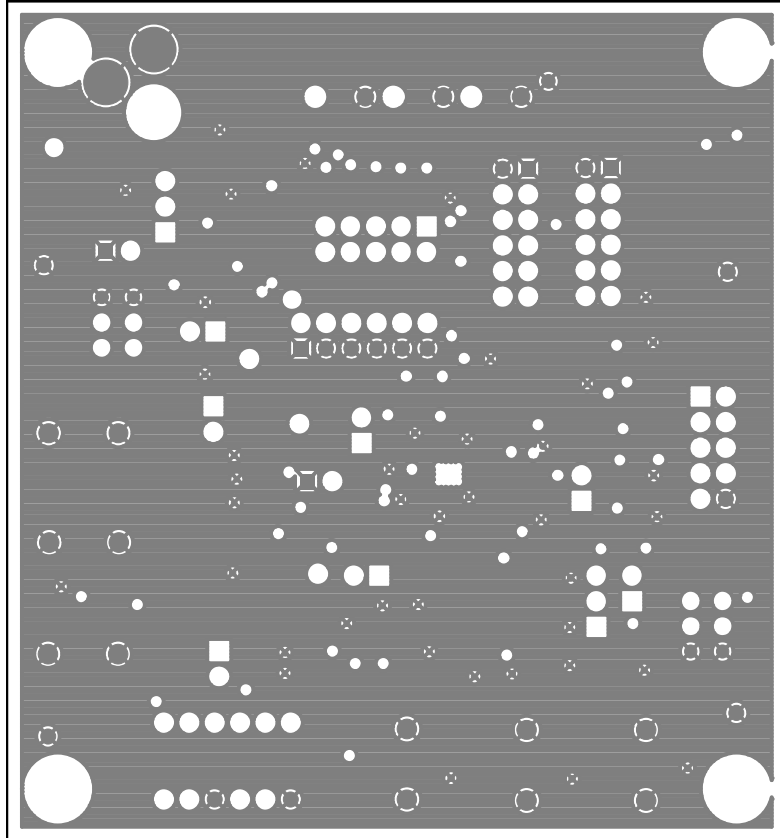


Figure 58. EVAL-ADAU1777Z Evaluation Board Layout—Ground Plane

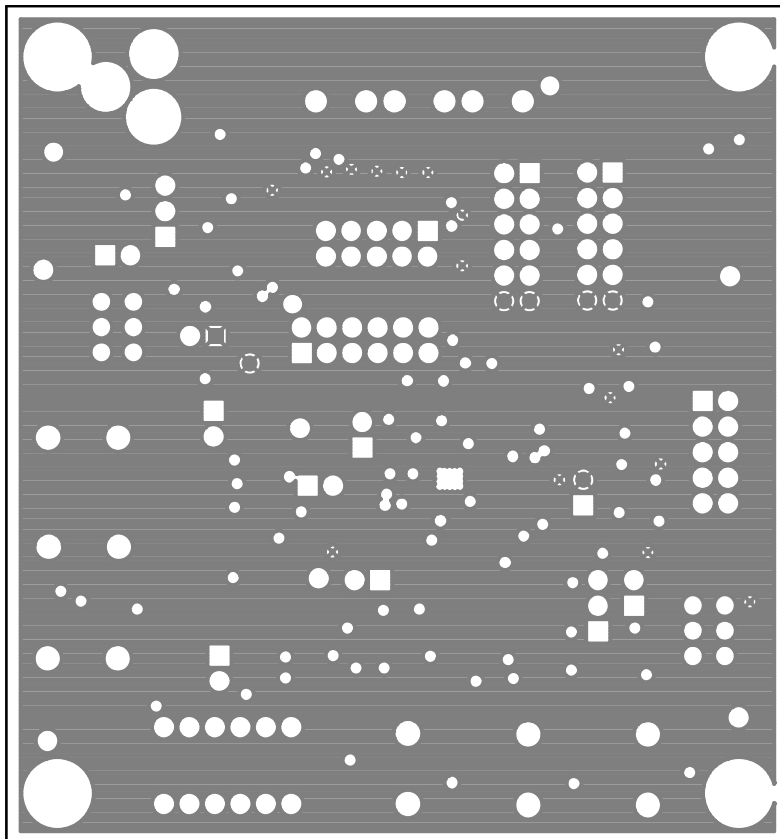
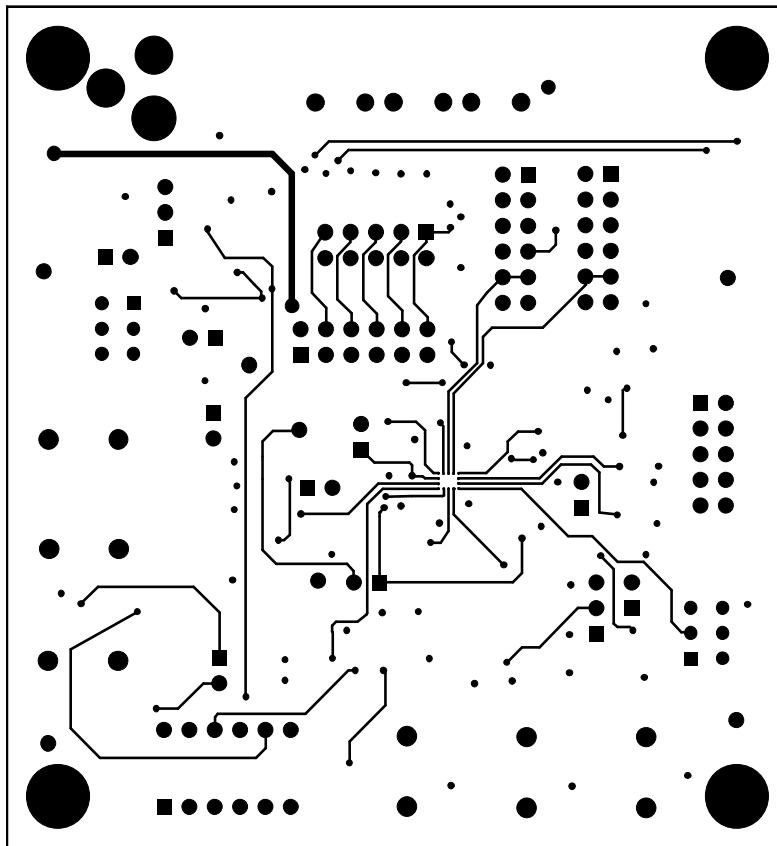


Figure 59. EVAL-ADAU1777Z Evaluation Board Layout—Power Plane



15064-060

Figure 60. EVAL-ADAU1777Z Evaluation Board Layout—Bottom Copper

ORDERING INFORMATION

BILL OF MATERIALS

Table 4.

Qty	Designator	Description	Part Number	Manufacturer
2	C1, C2	Capacitor, ceramic, 47 μ F, 6.3 V, X7R, 1210	GCM32ER70J476KE19L	Murata
9	C17, C19, C26, C27, C31, C35, C36, C41, C42	Multilayer, ceramic, 10 V, X7R (0805)	GRM21BR71A106KE51L	Murata ENA
1	C23	Multilayer, ceramic, 25 V, NP0 (0603)	C1608C0G1E103J	TDK Corp
1	C24	Multilayer, ceramic, 16 V, X7R (0603)	GRM188R71C105KA12D	Murata ENA
2	C3 C5	Multilayer, ceramic, 50 V, NP0 (0402)	GRM1555C1H220GA01D	Murata ENC
3	C34, C37, C40	Multilayer, ceramic, 10 V, X7R (0603)	GRM188R71A225KE15D	Murata ENA
1	C39	Multilayer, ceramic, 16 V, X7R (0603)	EMK107BJ105KA-TR	Taiyo Yuden
6	C4, C15, C33, C38, C43, C46	Do not stuff	Do Not Stuff	Do Not Stuff
2	C44, C45	SMD tantalum capacitor, SMD, D, 6.3 V	TR3D477M6R3C0200	Vishay/Sprague
17	C6, C7, C9, C11 to C14, C20 to C22, C25, C28 to C30, C32, C47, C48	0.10 μ F, 16 V, ceramic capacitor, X7R, 0402 (1005 metric), 0.039" L x 0.020" W (1.00 mm x 0.50 mm)	GRM155R71C104KA88J	Murata
1	D1	Green diffused, 10 millicandela, 565 nm, 1206	SML-LX1206GW-TR	Lumex Opto
2	D2, D3	Schottky, 30 V, 0.5 A, SOD123, diode	MBR0530T1G	On Semiconductor
1	J1	10-way, shroud, polarized, header	N2510-6002RB	3M
2	J13, J16	2-pin header, unshrouded, jumper, 0.10"	PBC02SAAN; or cut PBC36SAAN	Sullins Electronics Corp
6	J18 to J23	Stereo mini jack, SMT	SJ-3523-SMT	CUI Inc.
1	J2	Mini power jack, 0.08", R/A, TH	RAPC722X	Switchcraft, Inc.
2	J3, J14	3-pos, SIP, header	PBC03SAAN; or cut PBC36SAAN	Sullins
1	J4	12-way, unshrouded	PBC06DAAN, or cut PBC36DAAN	3M
1	J5	2-pin header, unshrouded, jumper, 0.10"	PBC02SAAN; or cut PBC36SAAN	Sullins Electronics Corp
2	J6 to J7	12-way socket, unshrouded	PPPC062LFBN-RC	3M
6	J8, J10 to J12, J15, J17	2-pin header, unshrouded, jumper 0.10"; use shunt Tyco 881545-2	PBC02SAAN; or cut PBC36SAAN	Sullins Electronics Corp
1	J9	10-way, unshrouded	PBC05DAAN, or cut PBC36DAAN	3M
1	L2	2.2 μ H inductor	LQH32PN2R2NN0L	Murata Electronics
4	MTH1 to MTH4	Nylon screw pan, Phillips 4-40 and hex standoff 4-40 nylon, 1/2" standoff RND, 4-40THR, 0.500" L, alim	NY PMS 632 0025 PH and 1903C	Keystone Electronics and B&F Fastener
1	R1	Chip resistor, 1%, 125 mW, thick film, 0805	ERJ-6ENF1000V	Panasonic EC
1	R10	Chip resistor, 1%, 63 mW, thick film, 0402	ERJ-2RKF1001X	Panasonic EC
2	R14, R15	Chip resistor, 1%, 63 mW, thick film, 0402	CRCW04022K67FKED	Vishay/Dale
12	R16, R17, R19 to R22, R43, R46, R49, R51, R58, R59	Do not stuff	OPEN	Do Not Stuff
13	R18, R23 to R25, R32 to R40	Chip resistor, 1%, 63 mW, thick film, 0402	MCR01MZPF1002	Rohm
1	R2	Do not stuff	OPEN	Do Not Stuff
1	R26	Chip resistor, 1%, 63 mW, thick film, 0402	ERJ-2RKF1373X	Panasonic ECG
1	R27	Chip resistor, 1%, 63 mW, thick film, 0402	ERJ-2RKF3743X	Panasonic ECG
1	R28	Chip resistor, 1%, 63 mW, thick film, 0402	ERJ-2RKF1623X	Panasonic ECG
1	R29	Resistor, SMD, 49.9 Ω , 1%, 1/16 W, 0402	MCR01MRTF49R9	Rohm
1	R3	Chip resistor, 1%, 100 mW, thick film, 0603	ERJ-3EKF1000V	Panasonic EC
2	R30, R31	Chip resistor, 1%, 63 mW, thick film, 0402	MCR01MZPF1000	Rohm
6	R41, R47, R52, R55 to R57	Chip resistor, 1%, 63 mW, thick film, 0402	CRCW040249K9FKED	Vishay/Dale
3	R44, R45, R50	Chip resistor, 1%, 63 mW, thick film, 0402	ERJ-2RKF2001X	Panasonic EC
5	R4 to R8	Chip resistor, 1%, 63 mW, thick film, 0402	RMCF0402FT33R2	Stackpole

Qty	Designator	Description	Part Number	Manufacturer
8	R9, R11 to R13, R42, R48, R53, R54	Chip resistor, 5%, 63 mW, thick film, 0402	ERJ-2GE0R00X	Panasonic EC
2	S1, S2	SPDT, slide switch, PC mount	EG1271	E-Switch
1	S3	2-section, SPST, SMD, switch, raised act	219-2LPST	CTS Corp
3	S4 to S6	Tact switch long stroke (normally open)	B3M-6009	Omron Electronics
1	S7	4PDT, slide switch, vertical, break-before-make	ASE4204	Tyco
7	TP1 to TP7	Mini test point, white, 0.1", OD	5002	Keystone Electronics
1	U1	Low latency audio codec	ADAU1777	Analog Devices, Inc.
1	U2	32k I ² C, CMOS, serial EEPROM	M24C32-F	ST
1	U3	Fixed low dropout voltage regulator	ADP1712AUJZ-1.5-R7	Analog Devices, Inc.
1	U4	Synchronous boost dc-to-dc converter	ADP1607ACPZN001-R7	Analog Devices, Inc.
1	Y1	Crystal, 12.288 MHZ, SMT, 18PF	ABM3B-12.288MHZ-10-1-U-T	Abracon Corp

I²C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).



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