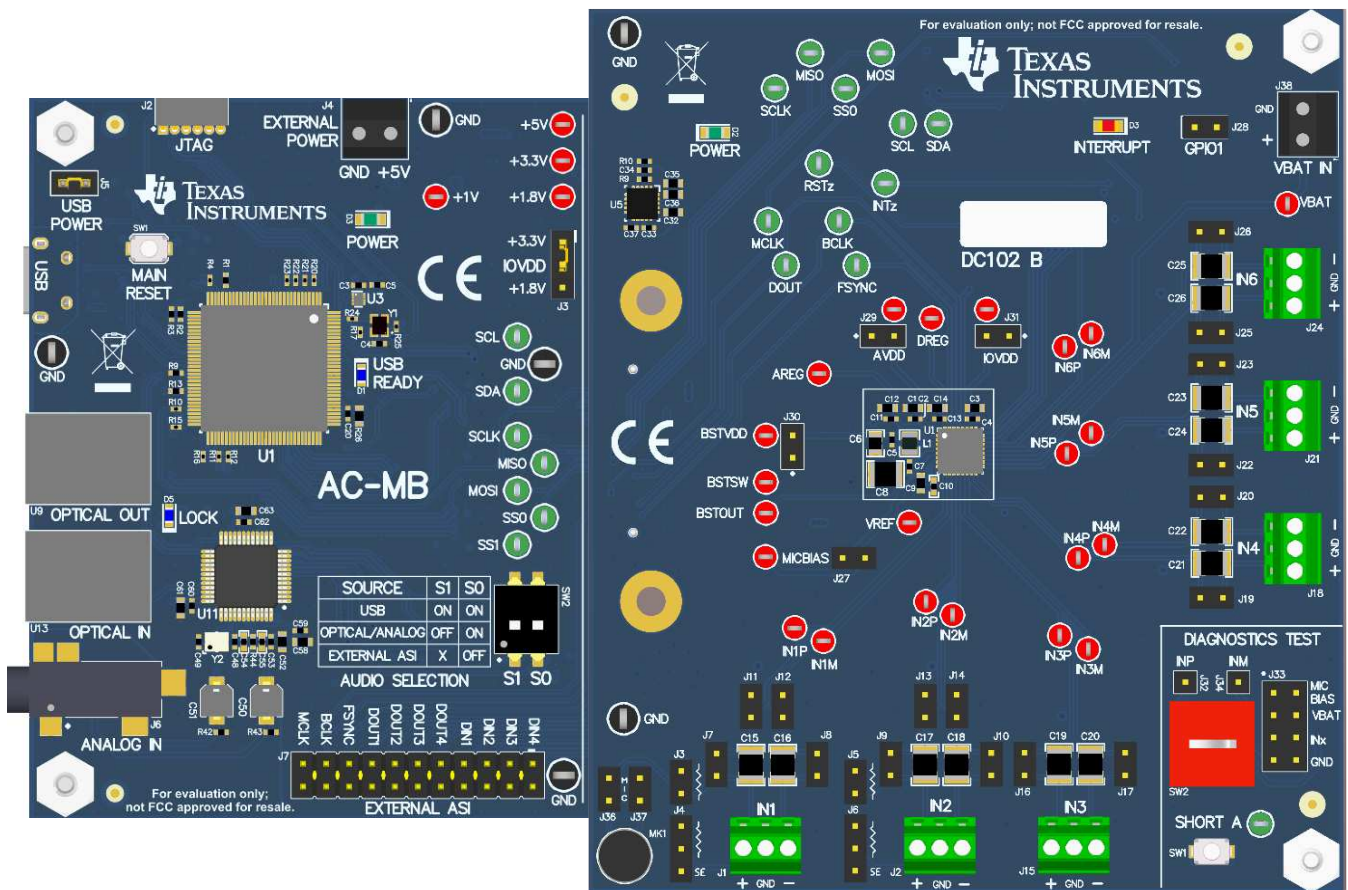


## PCM6xx0Q1EVM-PDK Evaluation Module

This user's guide describes the function and use of the PCM6xx0Q1EVM-PDK. This document includes the hardware configuration instructions, a quick-start guide, jumper and connector descriptions, software description, schematics, and printed circuit board (PCB) layout that demonstrate TI's recommended practices for these devices.



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## 1 Introduction

The PCM6xx0Q1EVM-PDK is an evaluation module (EVM) designed to demonstrate the performance and functionality of the PCM6xx0 family of devices. This family includes the devices shown in [Table 1](#) with differences in performance and function noted. Throughout this document, the abbreviation *EVM* and the term *evaluation module* are synonymous with the PCM6xx0Q1EVM-PDK.

**Table 1. PCM6xx0Q1 Family**

Device	Integrated Boost	Number of Channels
<a href="#">PCM6260Q1</a>	Yes	6
<a href="#">PCM6240Q1</a>	Yes	4
<a href="#">PCM6360Q1</a>	No	6

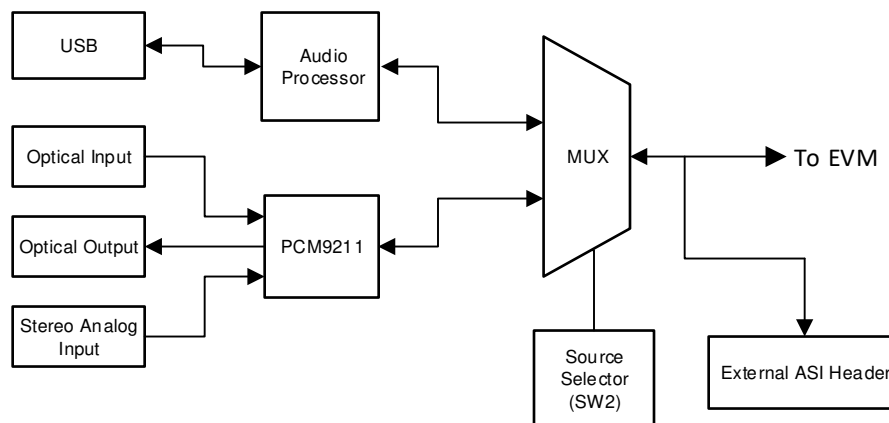
## 2 Hardware Overview

The evaluation kit consists of the PCM6xx0EVM daughterboard and the AC-MB motherboard. The motherboard is used to provide power, control, and digital audio signals to the evaluation module. The daughterboard contains the PCM6xx0Q device and its input connections. A detailed functional overview of the PCM6xx0Q1EVM system is described in [Section 6](#).

### 2.1 AC-MB Settings

#### 2.1.1 Audio Serial Interface Settings

The AC-MB provides the digital audio digital signals to the evaluation module from the universal serial bus (USB), optical, stereo jack, and external audio serial interface (ASI) header. [Figure 1](#) shows a block diagram of the ASI routing on the AC-MB.



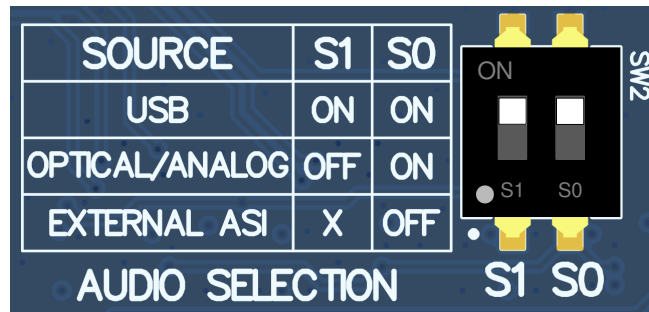
**Figure 1. AC-MB Audio Serial Interface Routing**

Switch SW2 on the AC-MB selects the audio serial bus that interfaces with the PCM6xx0EVM. Next to switch SW2, the AC-MB has a quick reference table to identify the audio serial interface source options and switch settings. The AC-MB acts as the master for the audio serial interface, with three different modes of operation (see [Figure 2](#)): USB, optical or analog, or external ASI.

### 2.1.1.1 USB

The serial interface clocks and data are provided from the USB interface. The sampling rate and format are determined by the USB audio class driver on the operating system. The default settings for the USB audio interface are 32-bit frame size, 48-kHz sampling rate, BCLK and FSYNC ratio is 256, and the format is time-division multiplexing (TDM).

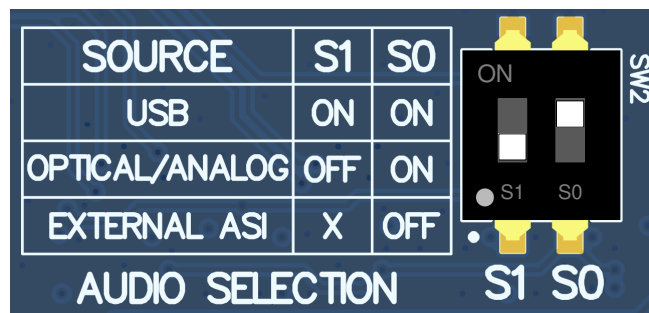
The AC-MB is detected by the OS as an audio device with the name *TI USB Audio UAC2.0*. [Figure 2](#) shows the AC-MB audio setting for the USB mode of operation.



**Figure 2. AC-MB USB Audio Setting**

### 2.1.1.2 Optical or Auxiliary Analog Audio Input

Serial interface signals are provided from the [PCM9211](#) digital transceiver, which is capable of sending digital data to the EVM from an analog input or optical input. Meanwhile, the data from the EVM can be streamed through the optical output. [Figure 3](#) shows the AC-MB audio setting for the optical and analog mode of operation.



**Figure 3. AC-MB Optical or Auxiliary Analog Audio Setting**

The optical output of the AC-MB streams the data captured on the EVM with the format determined by the input source used. When there is an optical input connected, the LOCK LED must be ON, and the PCM9211 streams the audio serial interface clocks with the format determined by the optical input frame. The digital data from the optical input is streamed to the evaluation module. If the optical input is not connected, the PCM9211 captures the input signal provided through the analog input, and streams the signal to the evaluation module. This feature can be useful when a digital input digital-to-analog converter (DAC) is connected to the AC-MB, providing an analog input for quick evaluation. In auxiliary analog audio mode, the audio serial interface format is fixed to a 24-bit, 48-kHz, I<sup>2</sup>S mode.

2.1.1.3 External

In this mode, the audio serial interface clocks for the evaluation board are provided through connector J7 from an external source. This architecture allows an external system to be used for communication with the evaluation board, such as a different host processor or test equipment (for instance, Audio Precision™ PSIA). The clocks generated from the USB interface and PCM9211 are isolated with this setting. Figure 4 shows the AC-MB audio setting for the external mode of operation.

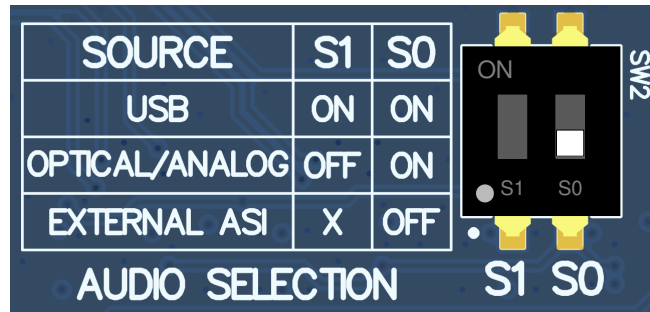


Figure 4. AC-MB External Audio Setting

Figure 5 shows how to connect the external audio interface. Odd numbered pins are signal carrying, and even numbered pins are connected to ground.

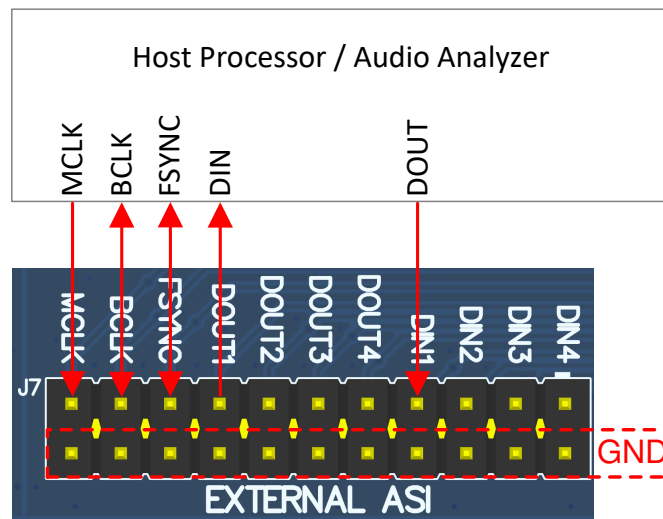
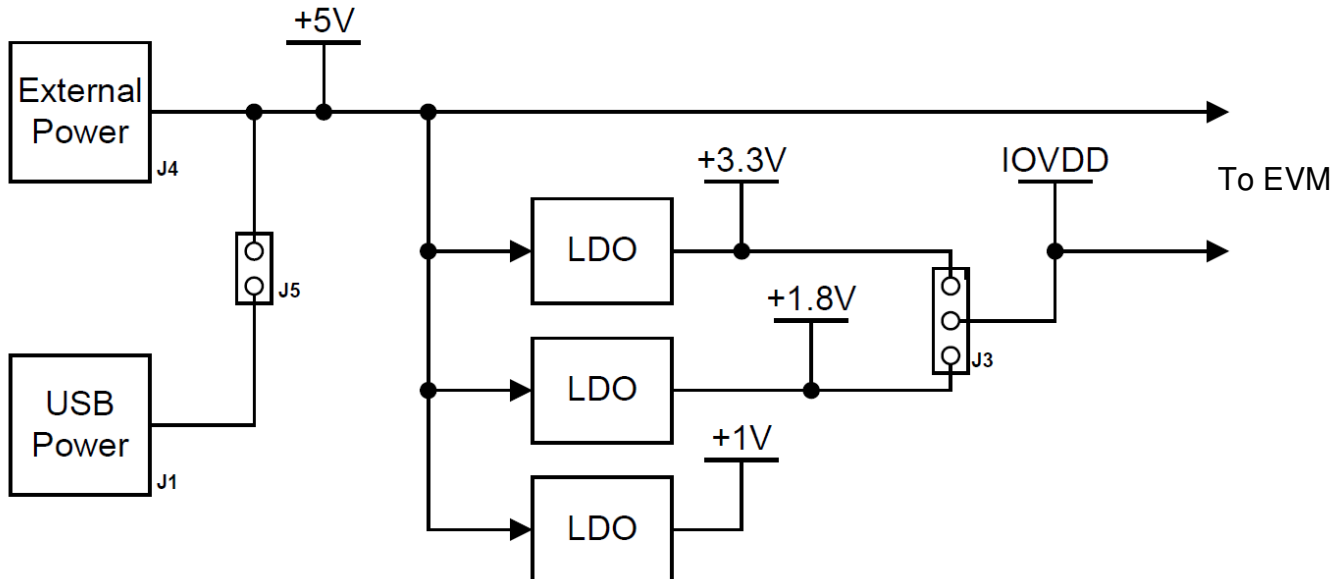


Figure 5. AC-MB Connection With External Audio Serial Interface

### 2.1.2 AC-MB Power Supply

The complete EVM system is powered from a single 5-V power supply. However, the motherboard has different low-dropout regulators (LDOs) integrated that provide the required power supplies to the different blocks of the board. Figure 6 shows a block diagram depicting the power structure of the AC-MB.



**Figure 6. Power-Supply Distribution of the AC-MB**

The AC-MB can be powered from the host computer by using the USB 5-V power supply (VBUS) by shorting header J5, USB POWER. Additionally, the AC-MB can be powered from an external power supply connected to terminal J4, EXTERNAL POWER. Header J5 must be open for external supply operation. The IOVDD voltage for the digital signals that is provided to the evaluation module is generated on the motherboard from the main power supply (USB or external).

The voltage levels available are 1.8 V and 3.3 V, and can be selected via the J3 header IOVDD. For 1.8-V operation, short pins 2 and 3 of header J3; for 3.3-V operation, short pins 1 and 2. When the motherboard is fully powered and the power supplies from the onboard LDOs are correct, the green POWER LED (D3) turns ON. The USB READY LED indicates that a successful USB communication is established between the AC-MB and the host computer.

## 2.2 PCM6xx0Q1EVM-PDK Hardware Settings

The PCM6xx0Q evaluation module has several input configuration options and offers extensive flexibility that allows the user to evaluate the device in multiple operation modes. The different operation modes are highlighted in this section. [Figure 7](#) shows the architecture of the inputs to the evaluation module.

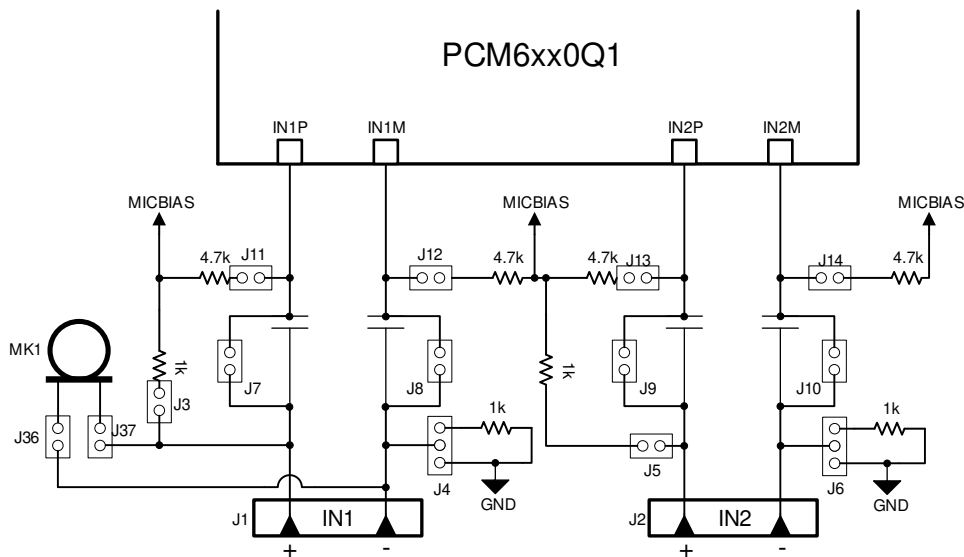


Figure 7. PCM6xx0Q1EVM Input Architecture for Channels 1 and 2

The IN1 and IN2 input architecture allows these two channels to be quickly configured to support any of the supported operation modes. The IN1P and IN1M pins of the PCM6xx0 can optionally connect to an onboard microphone for quick evaluation of a microphone in AC- or DC-coupled modes. Jumper configuration details can be found in [Table 2](#).

As shown in [Figure 8](#), the input architecture for channels 3-6 of the PCM6xx0Q1EVM is streamlined. These channels support only AC-coupled line inputs by default, however DC-coupled line and Mic inputs are supported through the removal or replacement of R34-R45. [Table 2](#) lists the recommended values for bias resistors for AC-coupled inputs across the MICBIAS voltage and input swing.

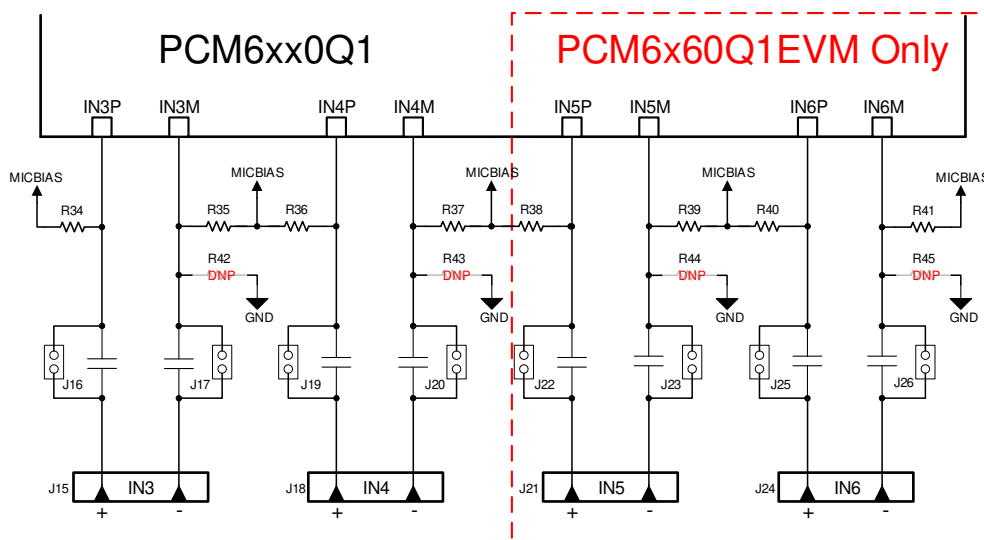


Figure 8. PCM6xx0Q1EVM Input Architecture for Channels 3-6

**Table 2. Input Jumper Configuration**

Input Terminal	Input Mode	Jumpers	Input Swing
IN1	Differential, AC-coupled	J3, J7, J8 uninstalled; J11, J12, and J27 installed	10 V <sub>RMS</sub>
	Single-ended, AC-coupled	J3, J7, J8 uninstalled; J4 (2-3), J11, J12, and J27 installed	5 V <sub>RMS</sub>
	Differential, DC-coupled	J3, J4, J11, and J12 uninstalled; J7 and J8 installed	2 V <sub>RMS</sub> (normal mode) 10 V <sub>RMS</sub> (high swing mode)
	Single-ended, DC-coupled	J3, J11, and J12 uninstalled; J4 (2-3), J7, and J8 installed	1 V <sub>RMS</sub> (normal mode) 5 V <sub>RMS</sub> (high swing mode)
	On-board electret microphone	J11 and J12 uninstalled; J3, J4 (2-1), J7, J8, and J27 installed	
IN2	Differential, AC-coupled	J5, J6, J9, J10, J13, and J14 uninstalled; J12, J14, and J27 installed	10 V <sub>RMS</sub>
	Single-ended, AC-coupled	J5, J9, J10, J13, and J14 uninstalled; J6 (2-3), J12, J14, and J27 installed	5 V <sub>RMS</sub>
	Differential, DC-coupled	J5, J6, J13, and J14 uninstalled; J9 and J10 installed	2 V <sub>RMS</sub> (normal mode) 10 V <sub>RMS</sub> (high swing mode)
	Single-ended, DC-coupled	J5, J13, and J14 uninstalled; J6 (2-3), J9 and J10 installed	1 V <sub>RMS</sub> (normal mode) 5 V <sub>RMS</sub> (high swing mode)
	External electret microphone	J5, J6 (2-1), J9, J10, and J27 installed	
IN3	Differential, AC-coupled	J16 and J17 uninstalled; J27 installed	10 V <sub>RMS</sub>
	Single-ended, AC-coupled		5 V <sub>RMS</sub>
	Differential, DC-coupled	J16 and J17 installed; J27 optional (MICBIAS); R34 and R35 removed	2 V <sub>RMS</sub> (normal mode) 10 V <sub>RMS</sub> (high swing mode)
	Single-ended, DC-coupled		1 V <sub>RMS</sub> (normal mode) 5 V <sub>RMS</sub> (high swing mode)
	External electret microphone		
IN4	Differential, AC-coupled	J19, J20, and J27 uninstalled	10 V <sub>RMS</sub>
	Single-ended, AC-coupled		5 V <sub>RMS</sub>
	Differential, DC-coupled	J19 and J20 installed; J27 optional (MICBIAS); R36 and R37 removed	2 V <sub>RMS</sub> (normal mode) 10 V <sub>RMS</sub> (high swing mode)
	Single-ended, DC-coupled		1 V <sub>RMS</sub> (normal mode) 5 V <sub>RMS</sub> (high swing mode)
	External electret microphone		
IN5	Differential, AC-coupled	J22, J23, and J27 uninstalled	10 V <sub>RMS</sub>
	Single-ended, AC-coupled		5 V <sub>RMS</sub>
	Differential, DC-coupled	J22 and J23 installed; J27 optional (MICBIAS); R38 and R39 removed	2 V <sub>RMS</sub> (normal mode) 10 V <sub>RMS</sub> (high swing mode)
	Single-ended, DC-coupled		1 V <sub>RMS</sub> (normal mode) 5 V <sub>RMS</sub> (high swing mode)
	External electret microphone		
IN6	Differential, AC-coupled	J25, J26, and J27 uninstalled	10 V <sub>RMS</sub>
	Single-ended, AC-coupled		5 V <sub>RMS</sub>
	Differential, DC-coupled	J25 and J26 installed; J27 optional (MICBIAS); R40 and R41 removed	2 V <sub>RMS</sub> (normal mode) 10 V <sub>RMS</sub> (high swing mode)
	Single-ended, DC-coupled		1 V <sub>RMS</sub> (normal mode) 5 V <sub>RMS</sub> (high swing mode)
	External electret microphone		



### 2.2.1 Line Inputs

For the line input configuration (shown in Figure 9), the PCM6xx0Q1 captures the audio signal provided through terminals J2 (IN1), J3 (IN2), J15 (IN3), and J18 (IN4). For six-channel variants, J21 (IN5) and J24 (IN6) are also available. The input accepted in this mode is a differential, 2- $V_{RMS}$ , or 10- $V_{RMS}$  (high swing mode) full-scale audio signal. If a single-ended source is used, the 1- $V_{RMS}$  or 5- $V_{RMS}$  (high swing mode) signal is supported. The input bias resistors have been selected to support line inputs in high swing mode.

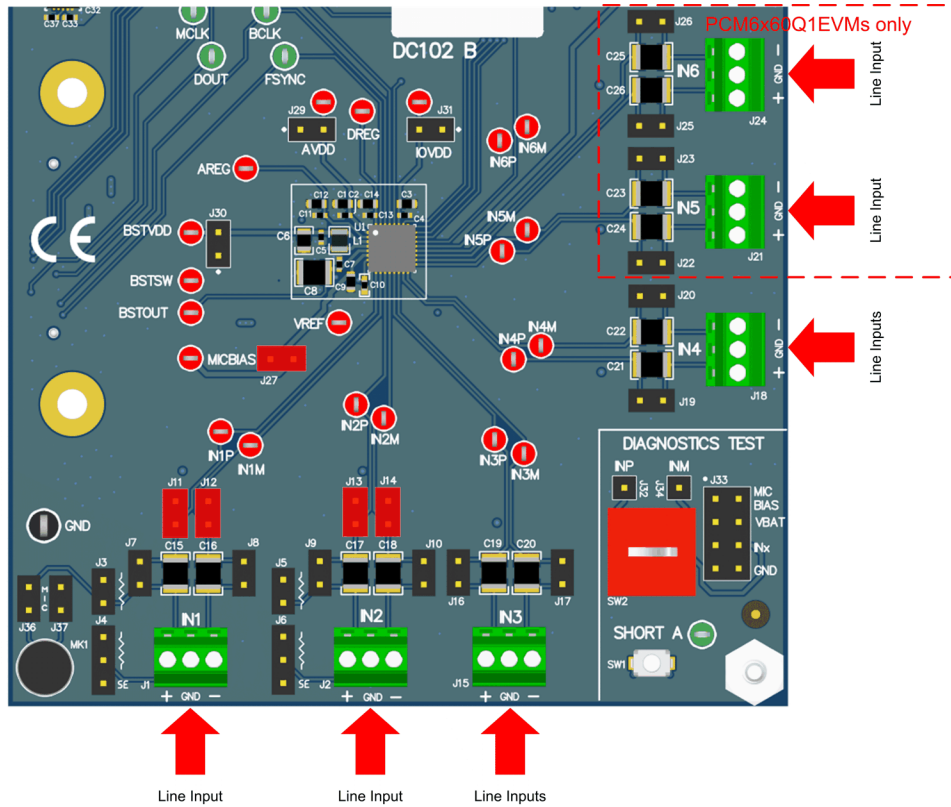


Figure 9. PCM6xx0Q1EVM Connection for Line Input Application

### 2.2.1.1 AC-Coupled Line Input Biasing

The default values for the input bias resistors have been optimized to support full-scale input, however if a lower input swing is used and higher input impedance desired, these bias resistors can be replaced with optimized values. [Table 3](#) lists the recommended values for these resistors. For lower input swing, the PGA is required to reach full-scale input.

**Table 3. Recommended AC-Coupled Line Input Bias Resistor Values**

Input Type	Input Swing	MICBIAS Voltage	Recommended Bias Resistor for AC-Coupled Input
Differential	10 V <sub>RMS</sub>	9 V	4.7 kΩ
		9 V	150 kΩ
	2 V <sub>RMS</sub>	7 V	110 kΩ
		5 V	62 kΩ
Single-ended	5 V <sub>RMS</sub>	9 V	4.3 kΩ
		9 V	47 kΩ
	1 V <sub>RMS</sub>	7 V	30 kΩ
		5 V	15 kΩ

### 2.2.2 Onboard Microphone Input

For the onboard microphone input configuration (shown in Figure 10), the PCM6xx0Q1 records the audio captured from the microphones located on the bottom edge of the board. MICBIAS is used to power the onboard microphone, so header J27 must be shorted. There must not be any connections to J1 while the onboard microphone is used to preserve the performance of the microphone. J2 can be used for an external electret microphone; however this architecture may require the bias resistors R4 and R2 be changed to optimize microphone performance.

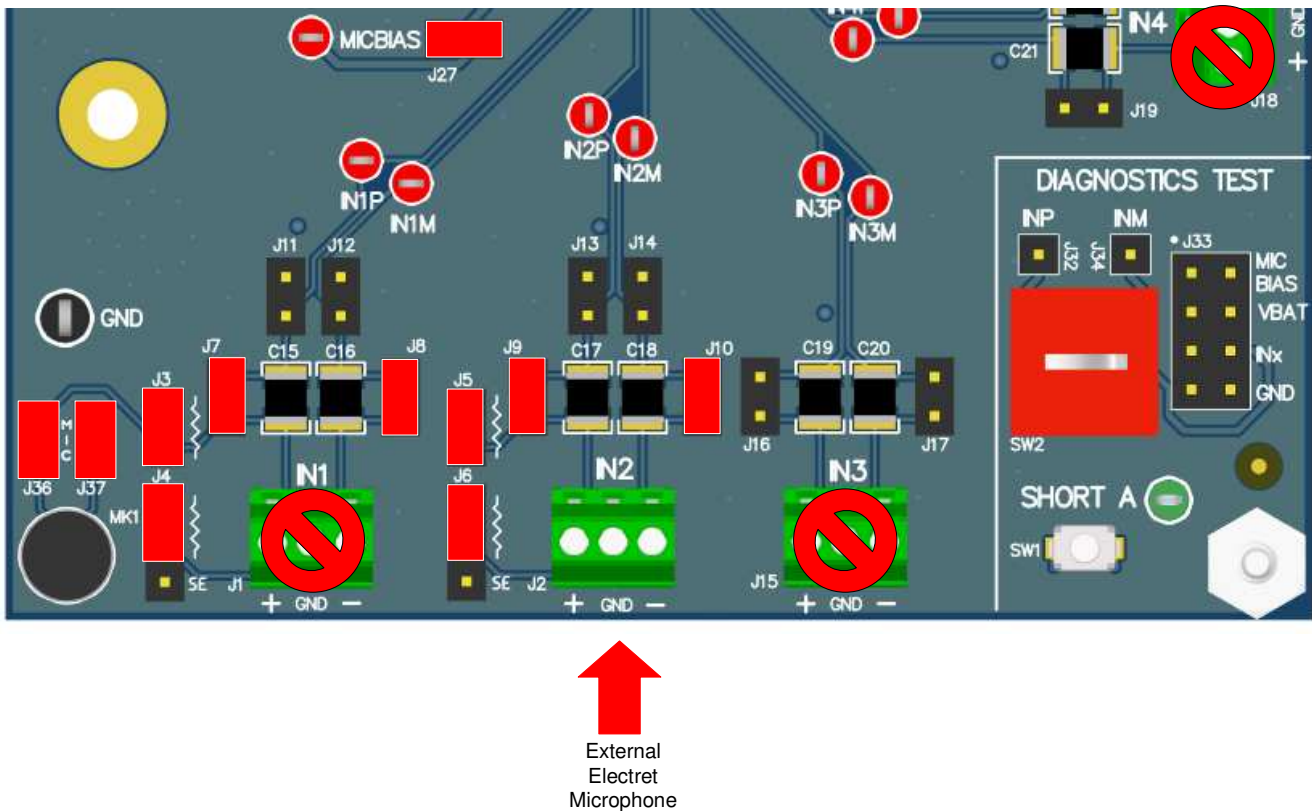


Figure 10. PCM6xx0Q1EVM Connection for the Onboard Microphone Test

### 2.2.3 Diagnostics Hardware Setup

The diagnostics test circuitry, as shown in Figure 11, is not connected to any channel by default. Connect J32 and J34 to the INxP and INxM pins of the channel under test. With the onboard diagnostics test circuitry, only one channel can be tested at a time. A fault is introduced by pressing SW1.

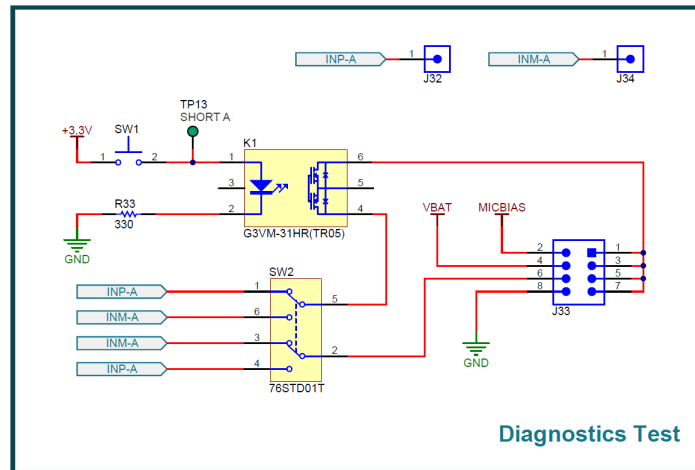


Figure 11. PCM6xx0Q1EVM Diagnostics Circuitry

The diagnostic test selection is done by populating a jumper on the pins of J33, but only install one jumper at any one time. TI's recommended settings for this diagnostics test circuit are discussed in this section.

#### 2.2.3.1 Short to MICBIAS Setup

Figure 12 shows a short to the MICBIAS test. If using a single-ended input for the test channel, only connect INxP.

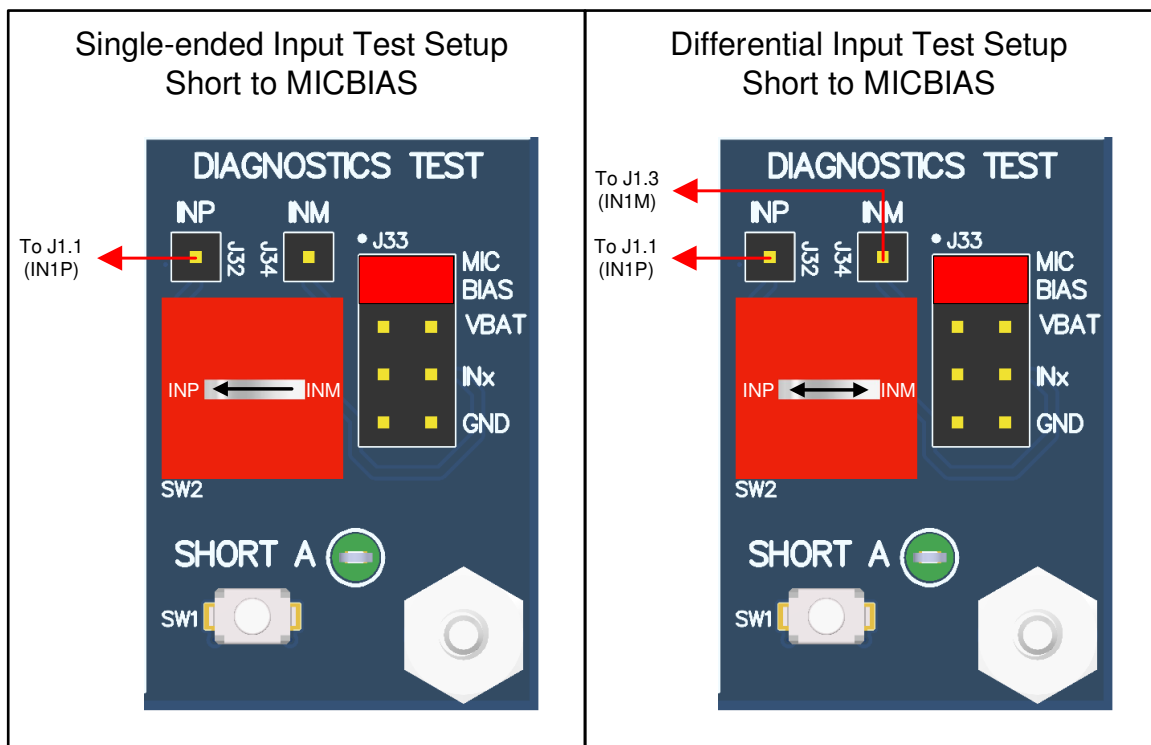


Figure 12. Short to MICBIAS Diagnostic Test Setup

### 2.2.3.2 Short to VBAT Setup

A short to VBAT tests (shown in Figure 13) requires an external voltage source connected to VBAT via J38. If no voltage is provided for VBAT, enable the diagnostic mask for a short to VBAT to prevent false triggers.

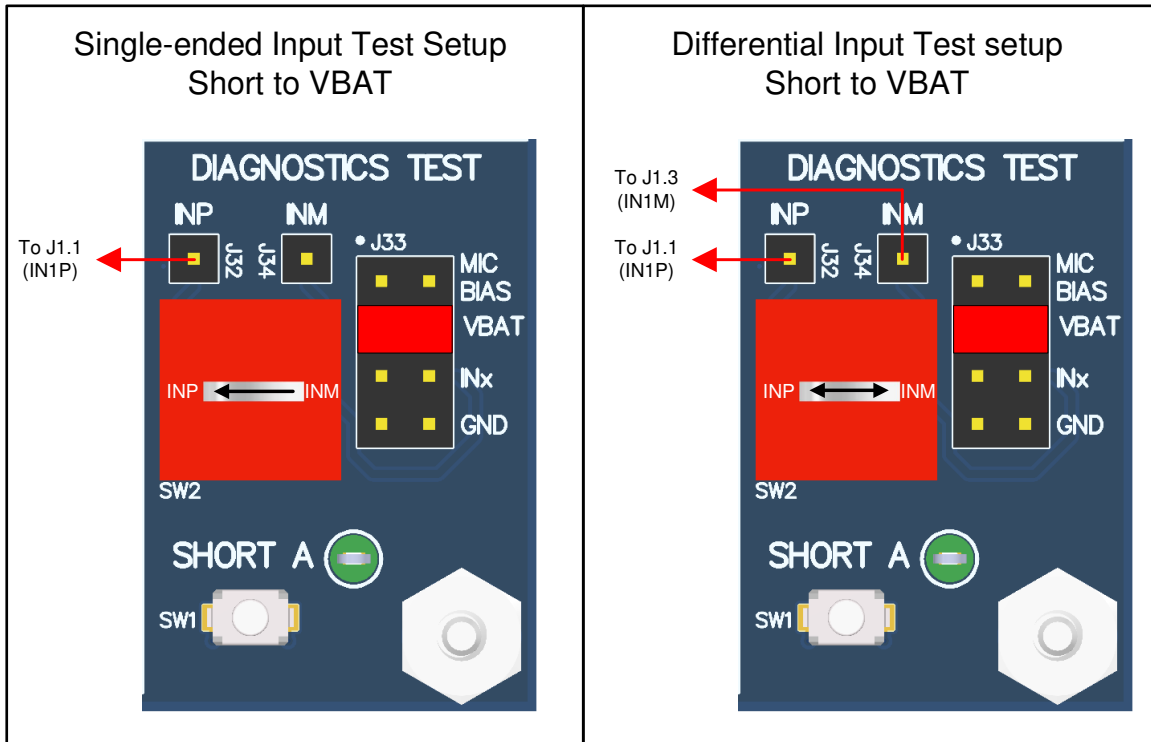


Figure 13. Short to VBAT Diagnostic Test Setup

### 2.2.3.3 Shorted Input Pins Setup

Shorted input testing (Figure 14) can be performed for differential inputs only.

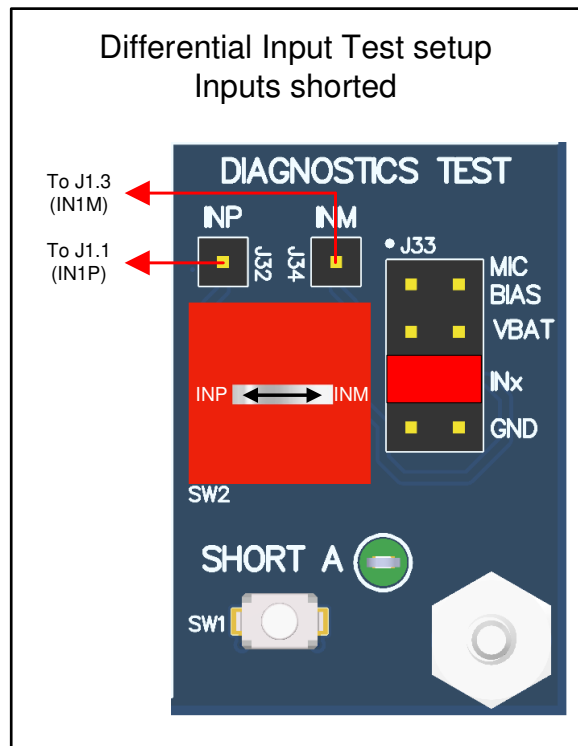


Figure 14. Inputs Shorted Diagnostic Test Setup

2.2.3.4 Short to GND Setup

Figure 15 shows the short to ground testing for the inputs.

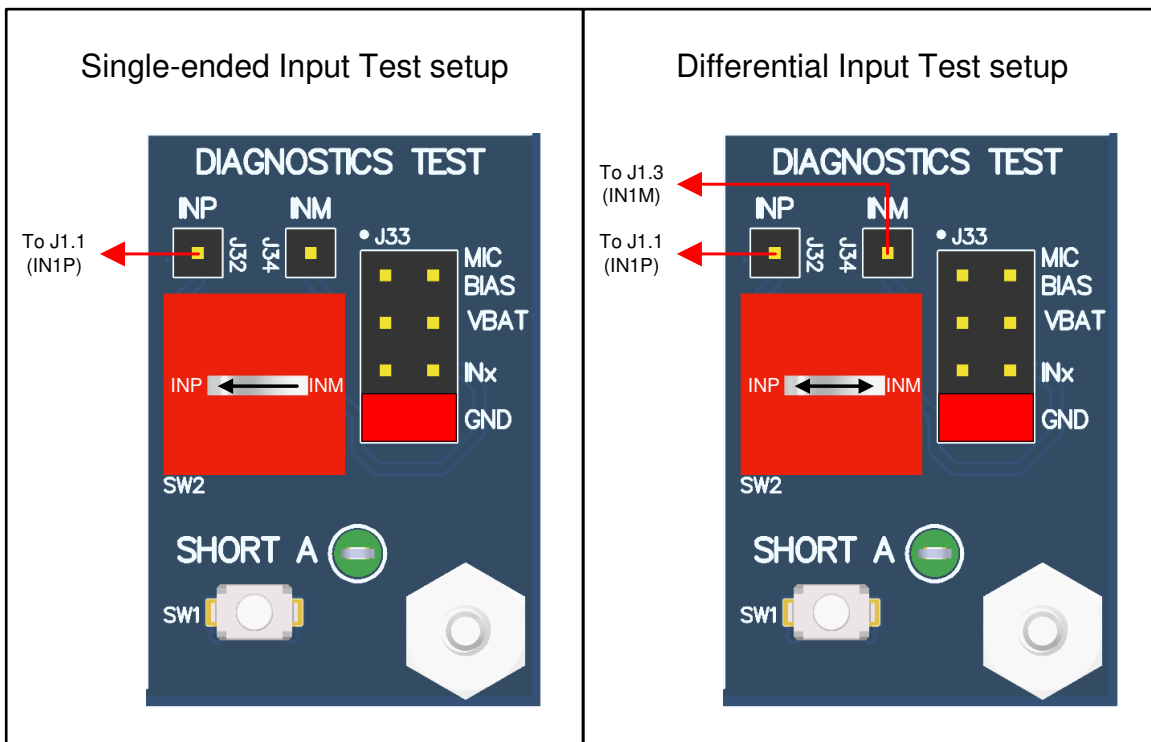
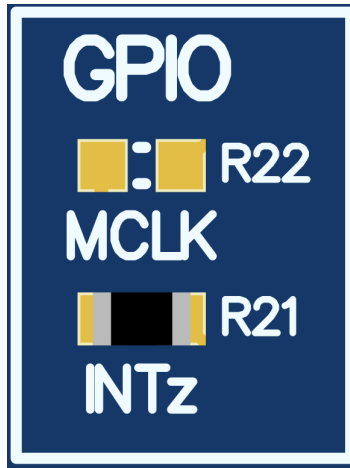


Figure 15. Short to Ground Diagnostic Test Setup

## 2.2.4 GPIO1 Hardware Configurations

GPIO1 has many configuration options, however the EVM supports three modes. These modes are configured, as shown in [Figure 16](#), by the installation or removal of resistors on the bottom of the EVM.



**Figure 16. GPIO1 Hardware Configuration**

### 2.2.4.1 GPIO1 as INTz (Default Configuration)

The default configuration for GPIO1 on the PCM6xx0Q1EVM is as an interrupt indicator. When configured in this state, and when the onboard diagnostics detect a fault, an interrupt request is sent on GPIO1, which causes LED D3 on the EVM to illuminate, indicating to the user that a fault is detected. The user can then use the EVM software to provide diagnostic feedback.

### 2.2.4.2 GPIO1 as an MCLK Input

When the PCM6xx0Q1 device must be configured as the audio serial bus master, an external MCLK is required. To support an external MCLK, remove R21 and install a R22. This process connects the GPIO to the MCLK pin of the external ASI header. Master mode is only supported with an external ASI.

### 2.2.4.3 Other Supported GPIO1 Functionality

Other GPIO functionality can also be supported by using the GPIO1 header (J28). This approach requires the removal of both R21 and R22. In this configuration the GPIO1 can be connected using J28.

### 2.2.5 I<sup>2</sup>C Address Configuration

Configuring the address of the PCM6xx0Q1 device on the EVM is typically not required for evaluation use, however configuring the address is supported by populating pullup or pulldown resistors on the I<sup>2</sup>C portion of the control selection area, as shown in [Figure 17](#), on the bottom of the EVM.

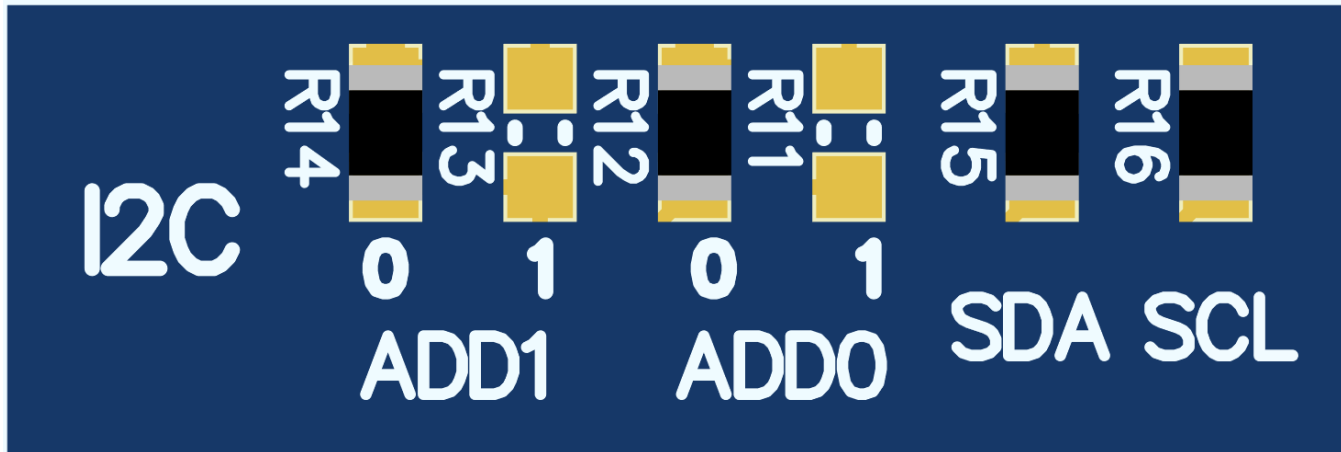


Figure 17. I<sup>2</sup>C Control Selection

A configuration guide is provided in [Table 4](#) for the convenience of the user.

Table 4. I<sup>2</sup>C Address Selection

I <sup>2</sup> C Address	Installed	Uninstalled
1001 000	R12, R14	R11, R13
1001 001	R11, R14	R12, R13
1001 010	R12, R13	R11, R14
1001 011	R11, R13	R12,R14



### 3 Software Overview

Texas Instrument's PurePath™ console 3 (PPC3) graphical development suite is a program that serves as a platform for many of TI's audio products. PPC3 is designed to simplify the evaluation, configuration, and debug process associated with the development of audio products.

#### 3.1 PurePath Console 3 Installation

The PCM6xx0Q1EVM-PDK GUI is an application that installs into the PPC3 framework. PPC3 must be installed prior to downloading the PCM6xx0Q1EVM-PDK GUI. To download the PPC3, visit [www.ti.com/tool/PUREPATHCONSOLE](http://www.ti.com/tool/PUREPATHCONSOLE) and request access. If the PPC3 is already installed, proceed to Section 3.2. Figure 18 shows the setup directory for the PPC3 installation.



**Figure 18. PurePath Console 3 Installation**

Open the PPC3 installer and follow the instructions in the setup wizard.

### 3.2 PCM6xx0Q1EVM GUI Installation and Setup

#### 3.2.1 Requesting Access to the PCM6260Q1EVM-SW

Access to the PCM6260Q1EVM-SW can be requested from the [www.ti.com/tool/PCM6260Q1EVM](http://www.ti.com/tool/PCM6260Q1EVM).

#### 3.2.2 USB Audio Setup

When using the USB audio interface, the Texas Instruments USB audio device control panel, shown in [Figure 19](#), opens with the input setting configured for 8 channel, 32 bits. For USB audio, 32-bit mode must be used on the EVM as well.

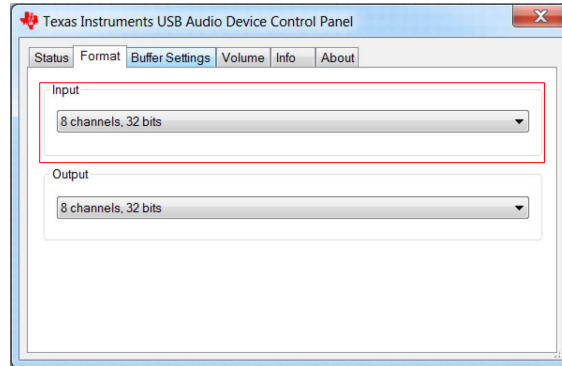


Figure 19. Texas Instruments USB Audio Device Control Panel

#### 3.2.3 Software Setup

Open the PPC3 application in the directory chosen for the GUI installation in [Section 3.1](#). [Figure 20](#) shows the resulting app center window. Click on the PCM6xx0 app tile.

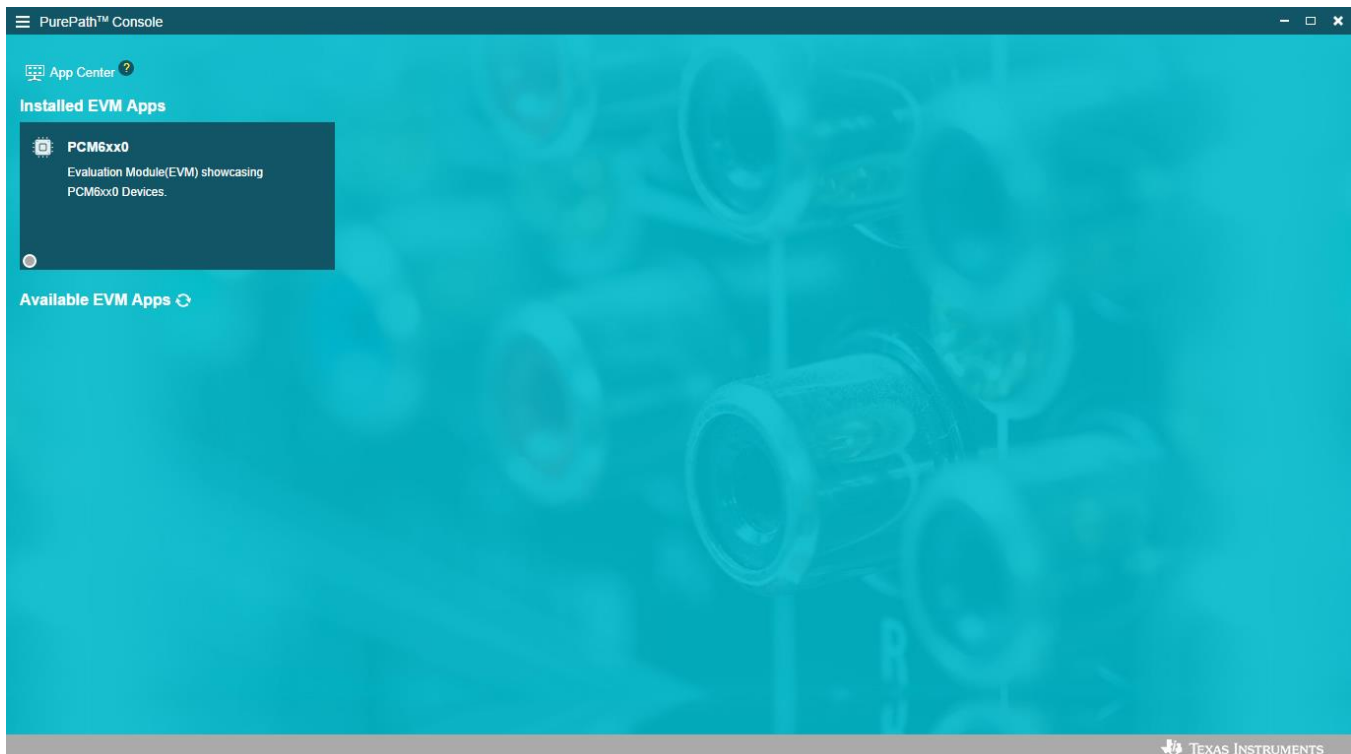
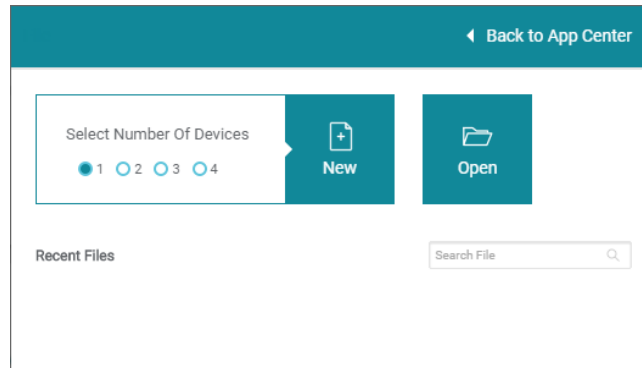


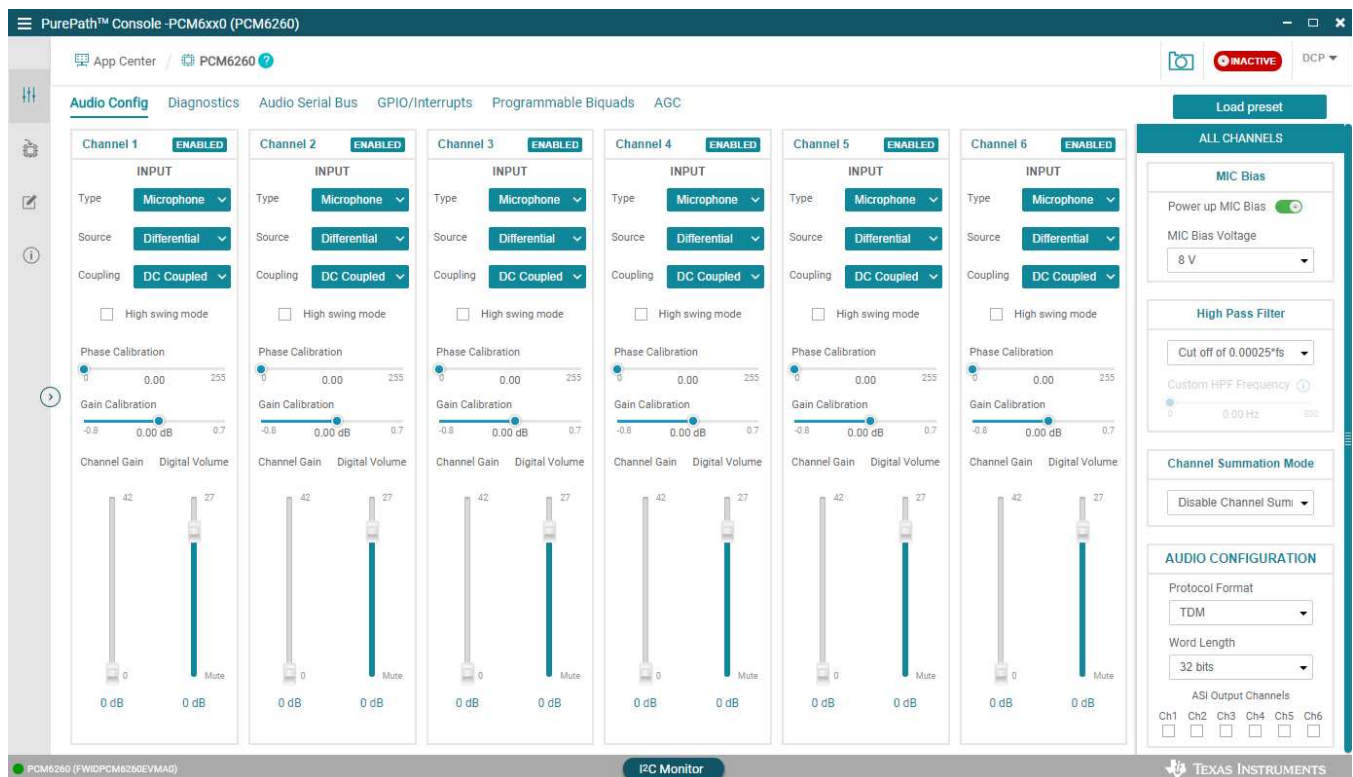
Figure 20. PurePath Console 3 App Center

The PCM6xx0 GUI is designed to work with up to four devices at any time. As shown in [Figure 21](#), choose the 1 device radial button and click *New*.



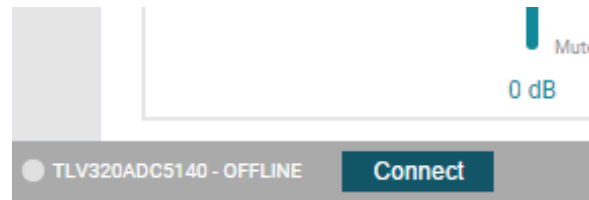
**Figure 21. Initial GUI Configuration**

As shown in [Figure 22](#), the GUI opens to the *Audio Config* tab.



**Figure 22. Audio Config Tab**

Before changing any parameters, check the lower left corner of the PPC3 window, as shown in [Figure 23](#), to verify that the EVM is connected. If no EVM is detected, the text reads *PCM6260 - offline*. If the EVM is detected but does not connect automatically, a *Connect* button appears. Clicking this button connects the hardware.



**Figure 23. Hardware Connect**

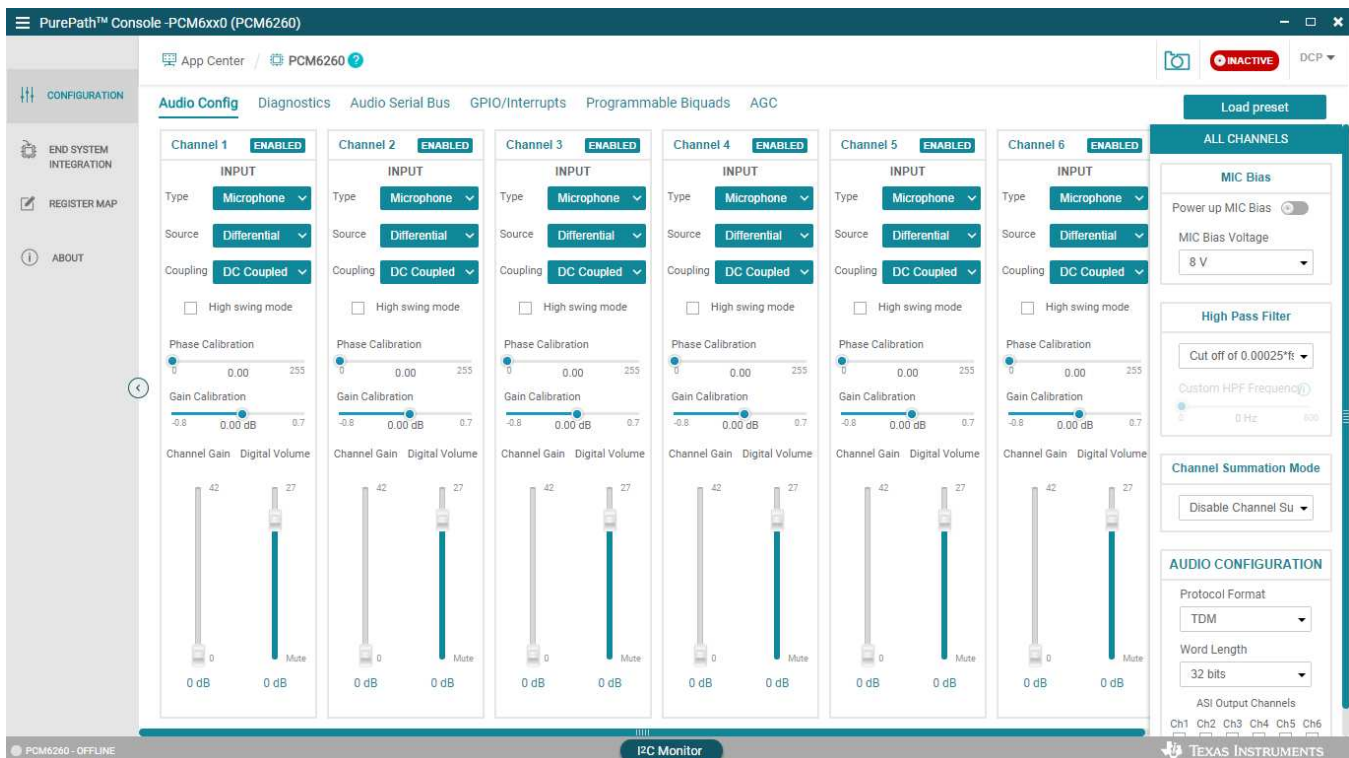
When the hardware is connected, the *Connect* button changes to read *Disconnect*, and the device is ready to be configured.

## 4 Software Overview

The PCM6260Q1EVM control software allows for the configuration of the PCM6xx0Q1EVM-PDK. The application is organized into three main views: configuration, end system integration, and register map. These modes are detailed in this section.

### 4.1 Configuration View

The configuration view, shown in [Figure 24](#), contains all of the tools used to configure and program the PCM6xx0Q1EVM. This view features tabbed navigation for each of the device configuration panels. These different tabs are detailed in this section.



**Figure 24. Configuration View**

### 4.1.1 Audio Config

The audio config tab (Figure 25) contains the controls for the analog inputs and the associated input channels.

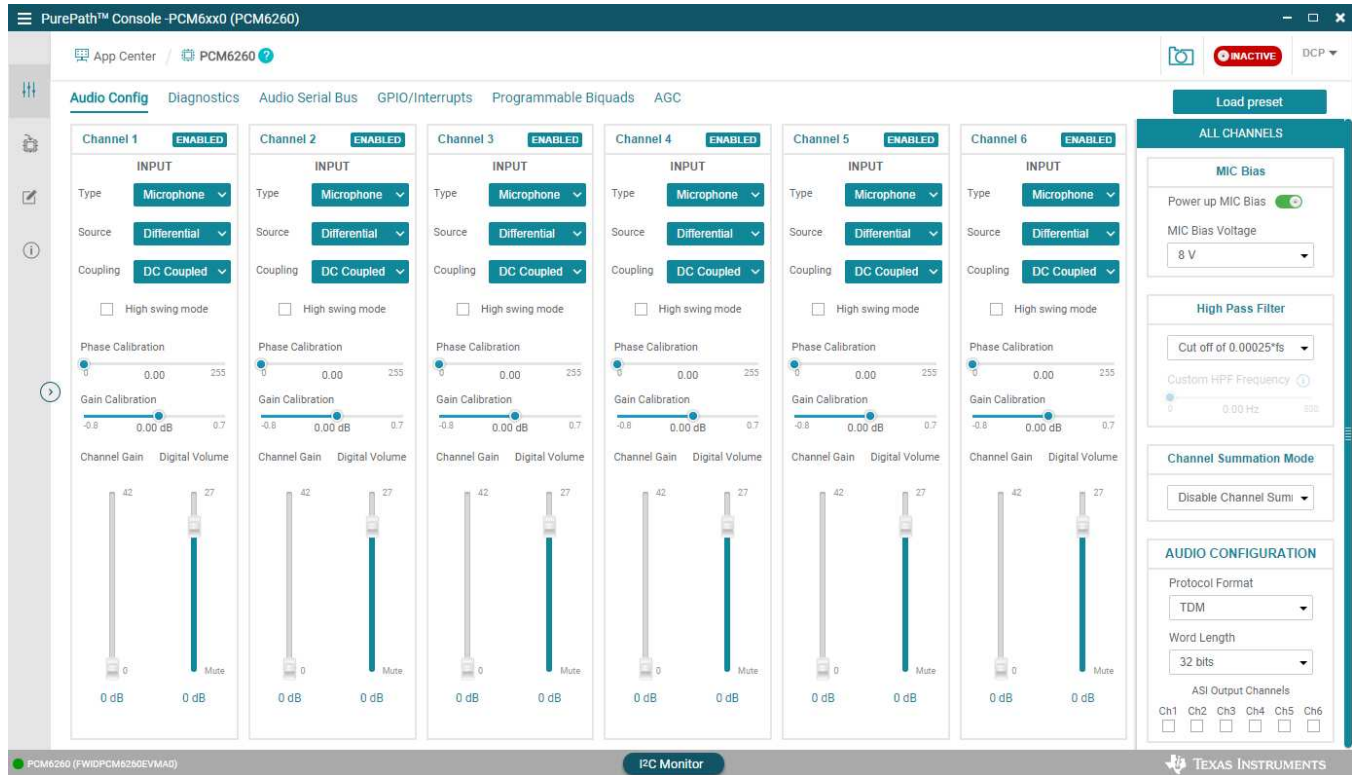


Figure 25. Audio Config Tab

### 4.1.2 Diagnostics

The diagnostics tab (Figure 26) allows for the configuration and monitoring of the integrated diagnostics features of the PCM6xx0Q1 devices. The latched fault status window also includes controls for interrupt masks. When a mask is enabled any masked faults still display, however these masks do not trigger an interrupt.

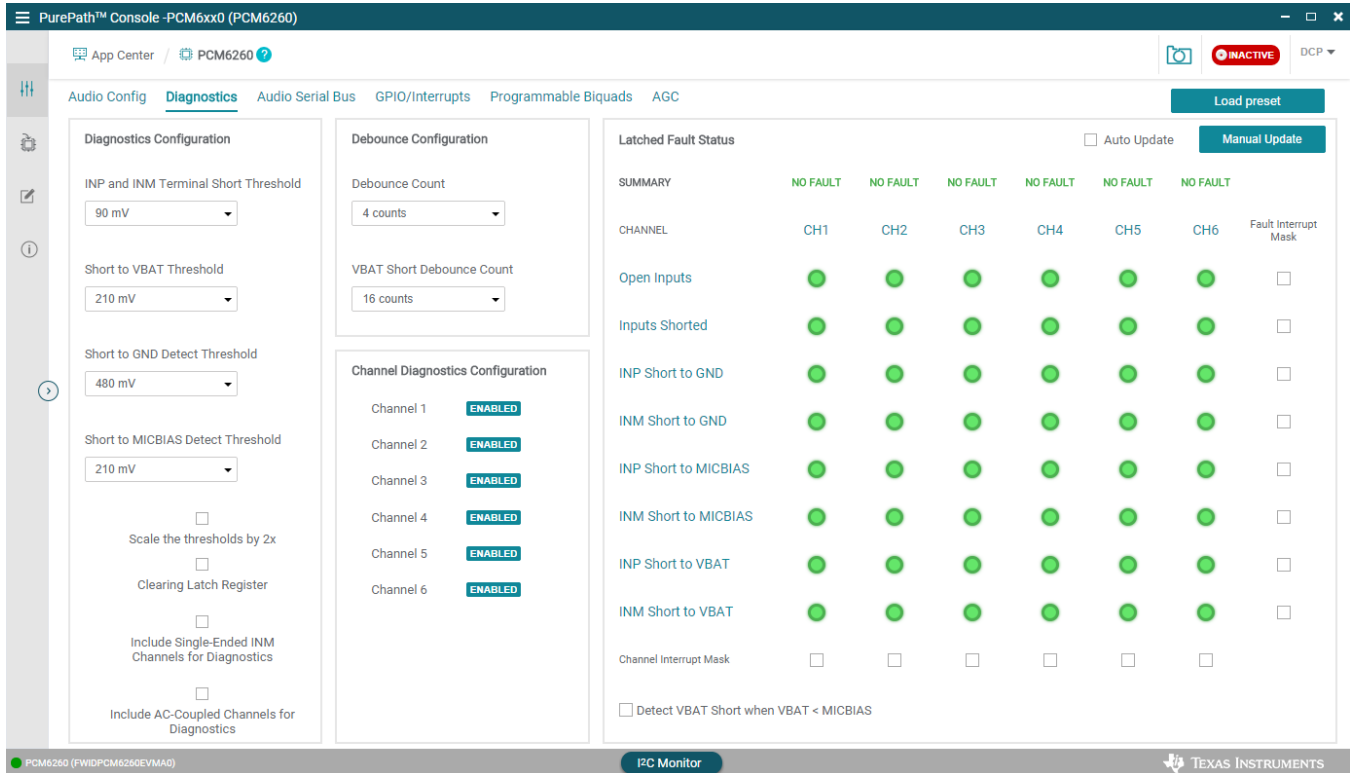


Figure 26. Diagnostics Tab

### 4.1.3 Audio Serial Bus

The PCM6xx0Q1 family of devices feature a very flexible audio serial bus. Allowing these devices to function seamlessly with a wide range of DSPs, SoCs, or other audio devices. The audio serial bus tab (Figure 27) provides controls to configure the EVM to the required format. The PCM62xx0 devices are configured for auto clock configuration by default. The clock monitor reports the clocks detected, see the *Phase-Locked Loop (PLL) and Clock Generation* section in the [TLV320ADCx140 family of devices](#) for details on supported formats.

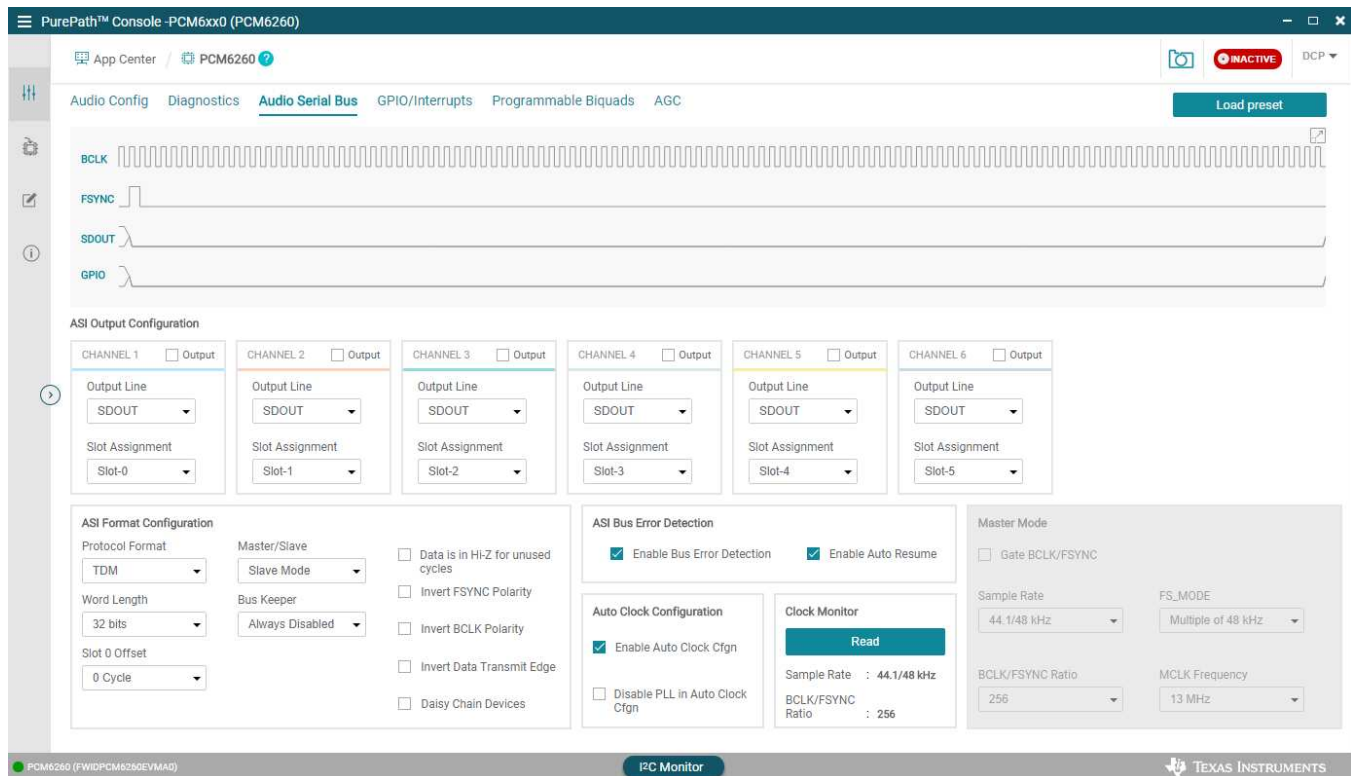


Figure 27. Audio Serial Bus Tab

### 4.1.3.1 Configuring the Audio Serial Bus for the I<sup>2</sup>S Output

The PCM6xx0Q1 features a highly flexible audio serial bus that can be configured to implement a wide range of data formats. The default format is TDM, however the GUI can be used to change the data format to I<sup>2</sup>S. This section describes how to configure the PCM6xx0Q1EVM for a 2-channel I<sup>2</sup>S output to a USB audio at 16 bits and 48 kHz. Configure the AC-MB for USB audio as described in [Section 5](#). As shown in [Figure 28](#), select the audio serial bus tab.

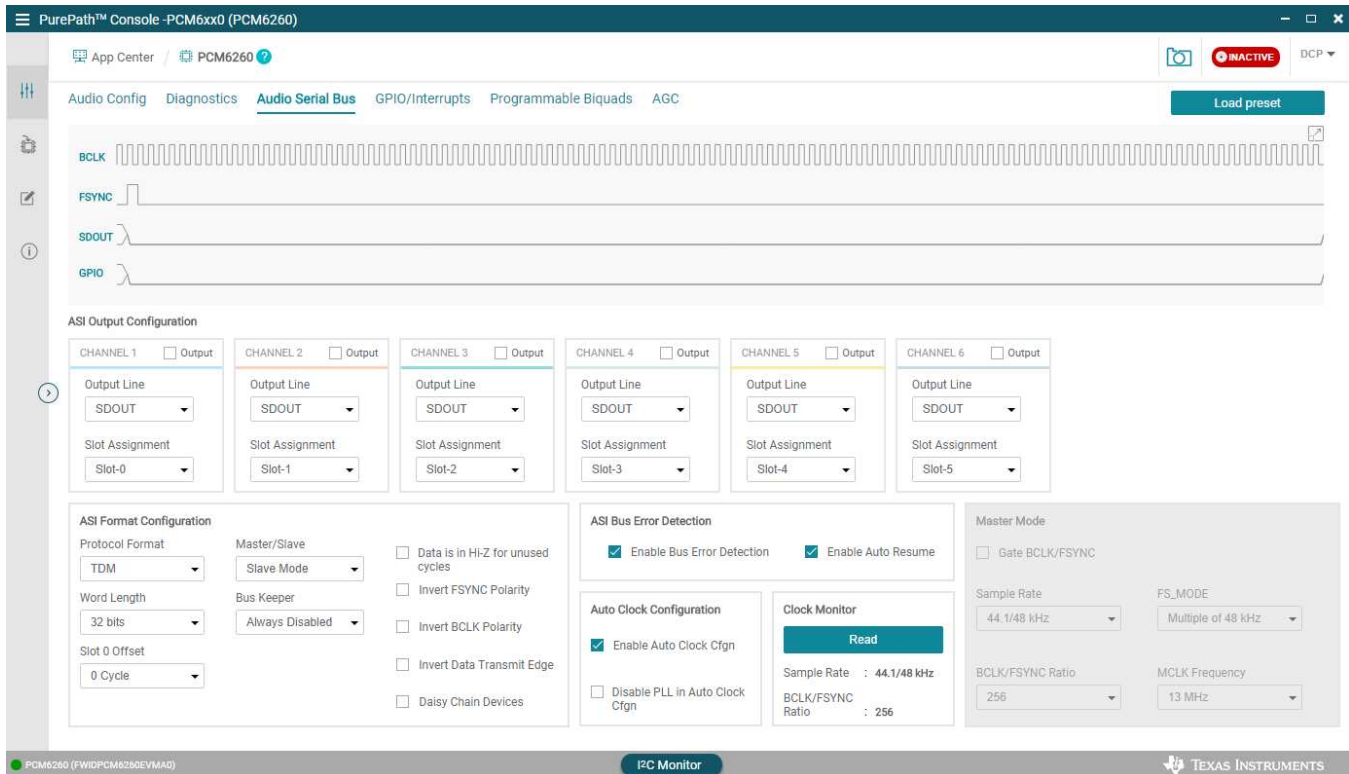


Figure 28. Audio Serial Bus Tab

In the ASI format configuration pane (shown in [Figure 29](#)), change the protocol format to I<sup>2</sup>S, and the word length to 16 bits.

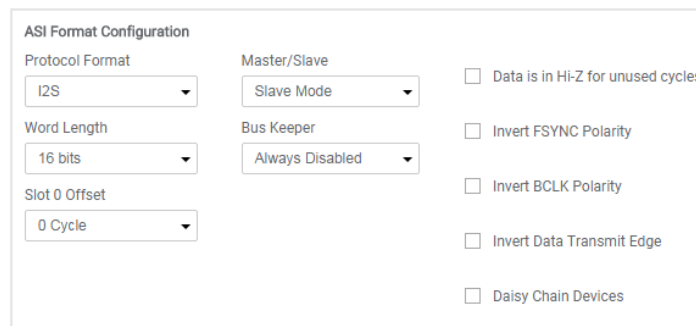


Figure 29. ASI Format Configuration



When the protocol format is changed to I<sup>2</sup>S in the GUI, the USB audio processor on the AC-MB also changes the audio format to I<sup>2</sup>S. The GUI reads the ASI status register (page 0 register 0x15), providing the detected sampling rate and BCLK and FSYNC ratio. The ASI status register can also be read manually in the audio serial bus tab by clicking the *Read* button, as shown in Figure 30, in the clock monitor pane.

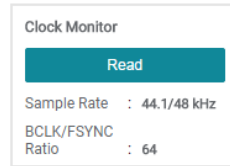


Figure 30. Clock Monitor Pane

The default slot assignment for channel 1 is left slot 0 and the default slot assignment for channel 2 is left slot 1. As shown in Figure 31, change the channel 2 slot assignment to right slot 0. The diagram at the top of the window updates to display the data format and slots selected.

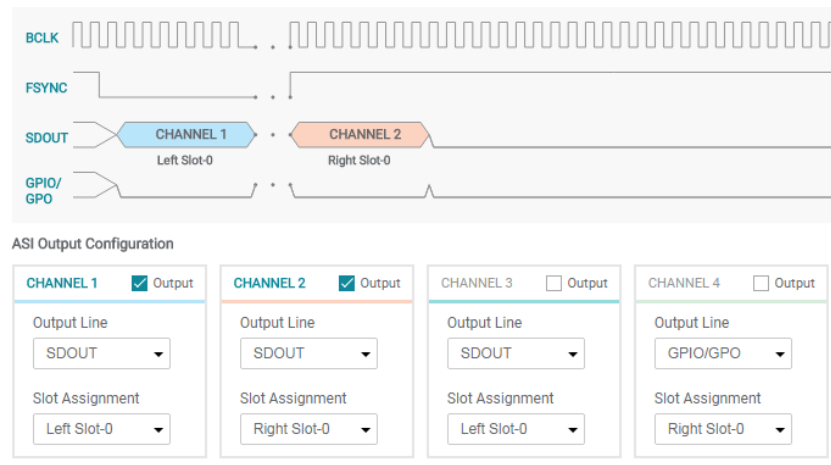


Figure 31. Channel Output Configuration and Diagram

The AC-MB motherboard currently supports only two channels per data line when in I<sup>2</sup>S mode and the BCLK and FSYNC ratio is fixed at 64. The EVM is now ready for use with the audio recording program of your choice.

### 4.1.4 GPIO Interrupts

The GPIO function and interrupt behavior, as shown in [Figure 32](#), can be configured in this tab. The default configuration for GPIO1 is always chip interrupt (IRQ). If alternate settings are required, see to ensure the proper hardware setup is followed.

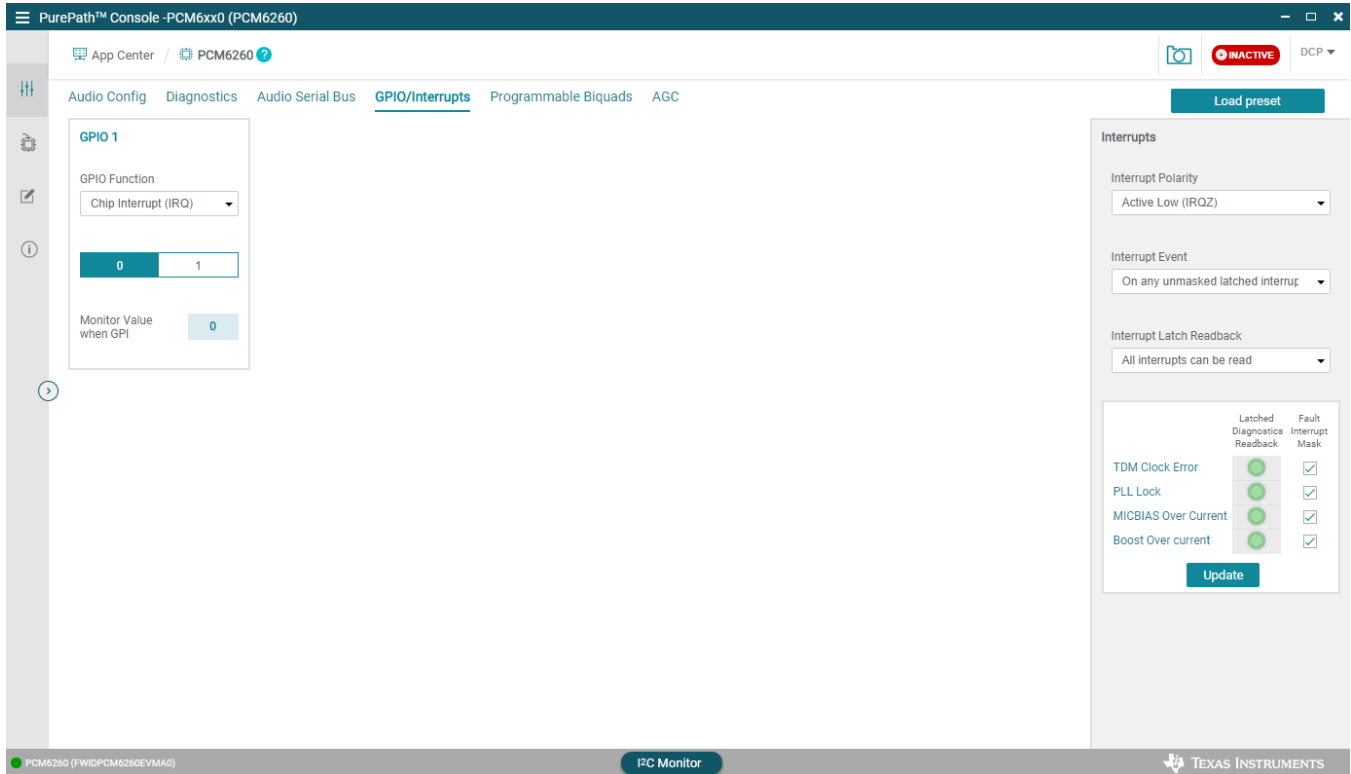


Figure 32. GPIO and Interrupts Tab

### 4.1.5 Programmable BiQuads

Configuration of the biquad filters is made easy with the GUI in the programmable biquads tab. Biquad coefficients can be generated using the filter designers within PPC3, or coefficients from an external filter design tool can be manually entered. Each biquad can be configured individually and then the gain and phase responses can be shown for individual channels or for all channels.

**NOTE:** PPC3 uses the detected sampling rate from the audio serial bus tab to determine the biquad coefficients. The PCM6xx0Q1 device must be receiving the desired sampling rate when the audio serial bus tab is opened, and the clock monitor must be updated by clicking on the *Read* button. If no EVM is connected, PPC3 assumes an  $f_s$  of 48 kHz for all biquad calculations.

For more information on the filter design tools included in the programmable biquads tab (Figure 33), and other methods for generating filter coefficients, see the [PCM6xx0 Programmable Biquad Filter Configuration and Applications application report](#).

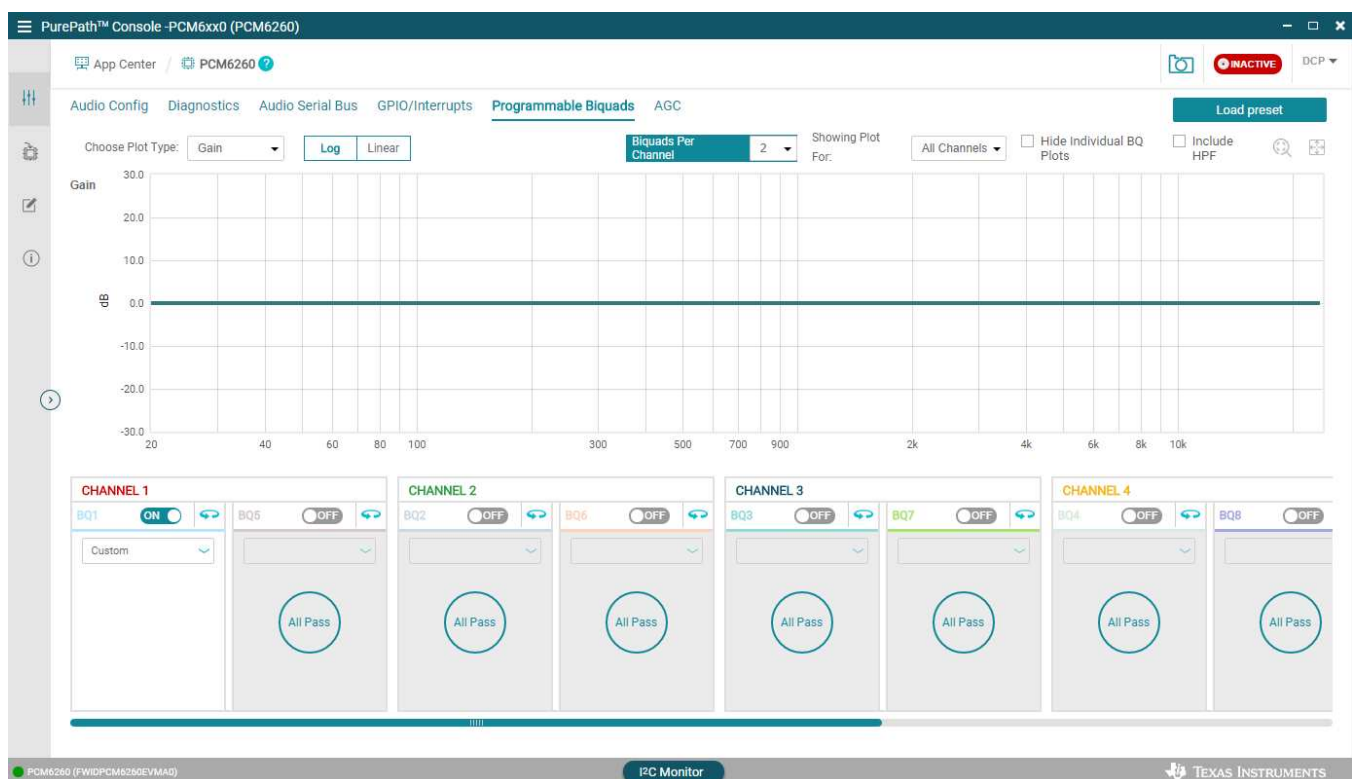


Figure 33. Programmable Biquads Tab

### 4.1.6 Automatic Gain Control (AGC)

The AGC parameters are global and can be configured in the AGC tab (Figure 34). Each channel must have the AGC enabled in the audio config tab for the AGC configuration to become active. These software controls are greyed out and inactive while the device is in active mode.

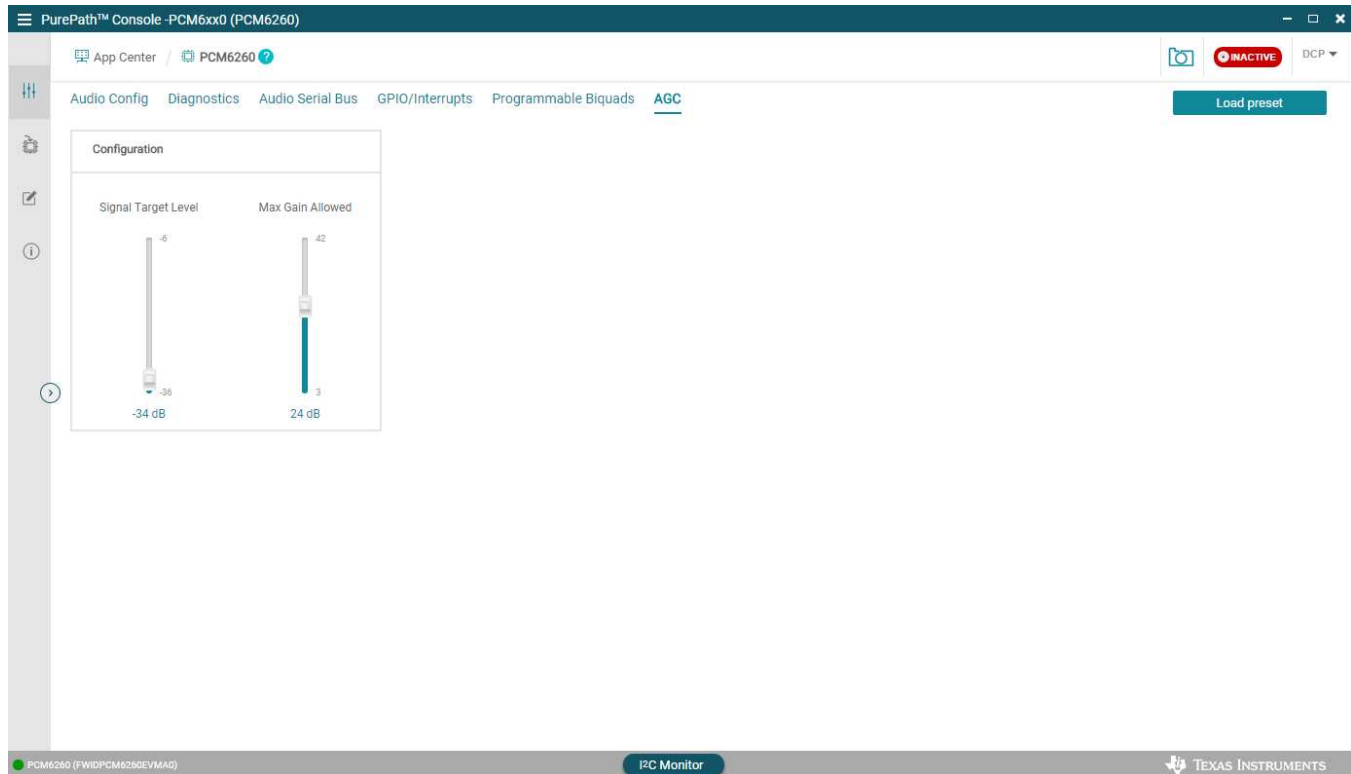


Figure 34. AGC Tab

## 4.2 End System Integration

The end system integration view (Figure 35) provides methods for exporting the current configuration to a header or .cfg file. The header file can be used for quick integration with a simple microcontroller.

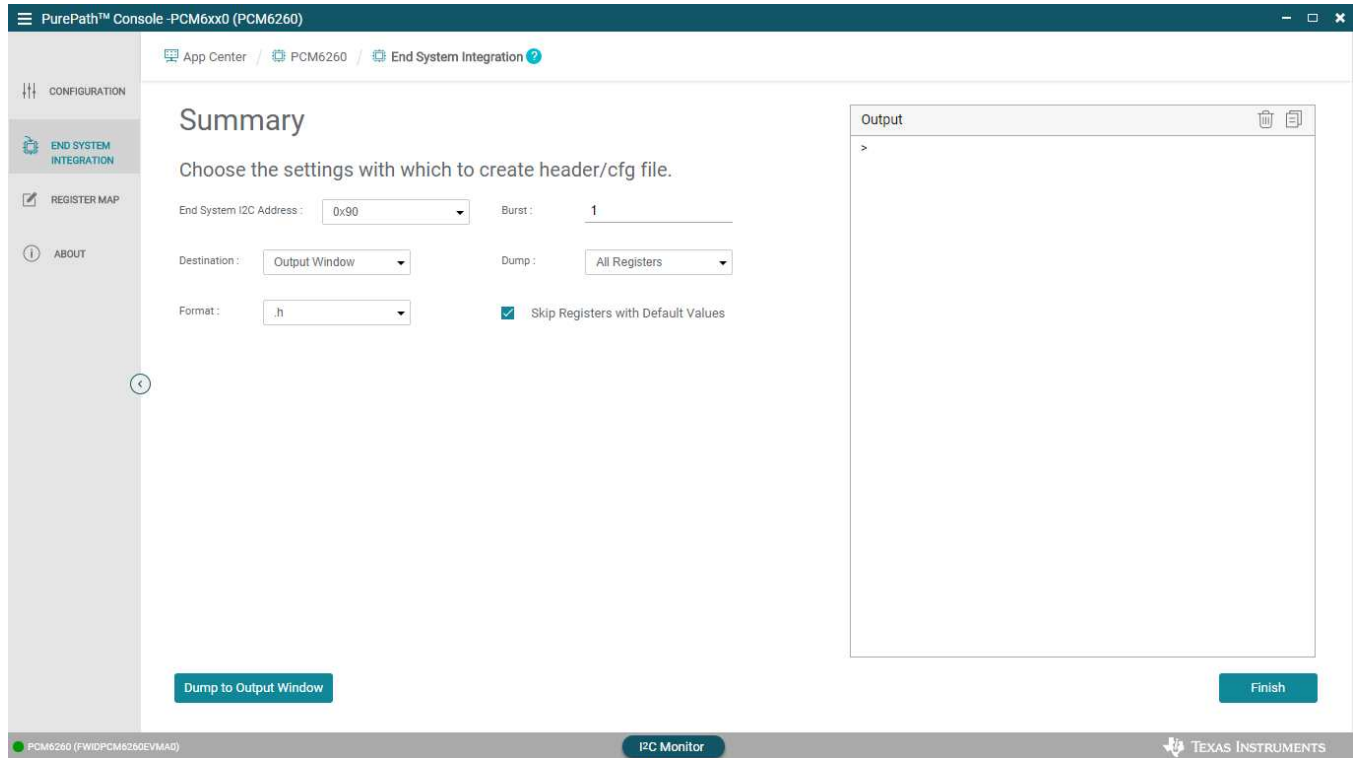
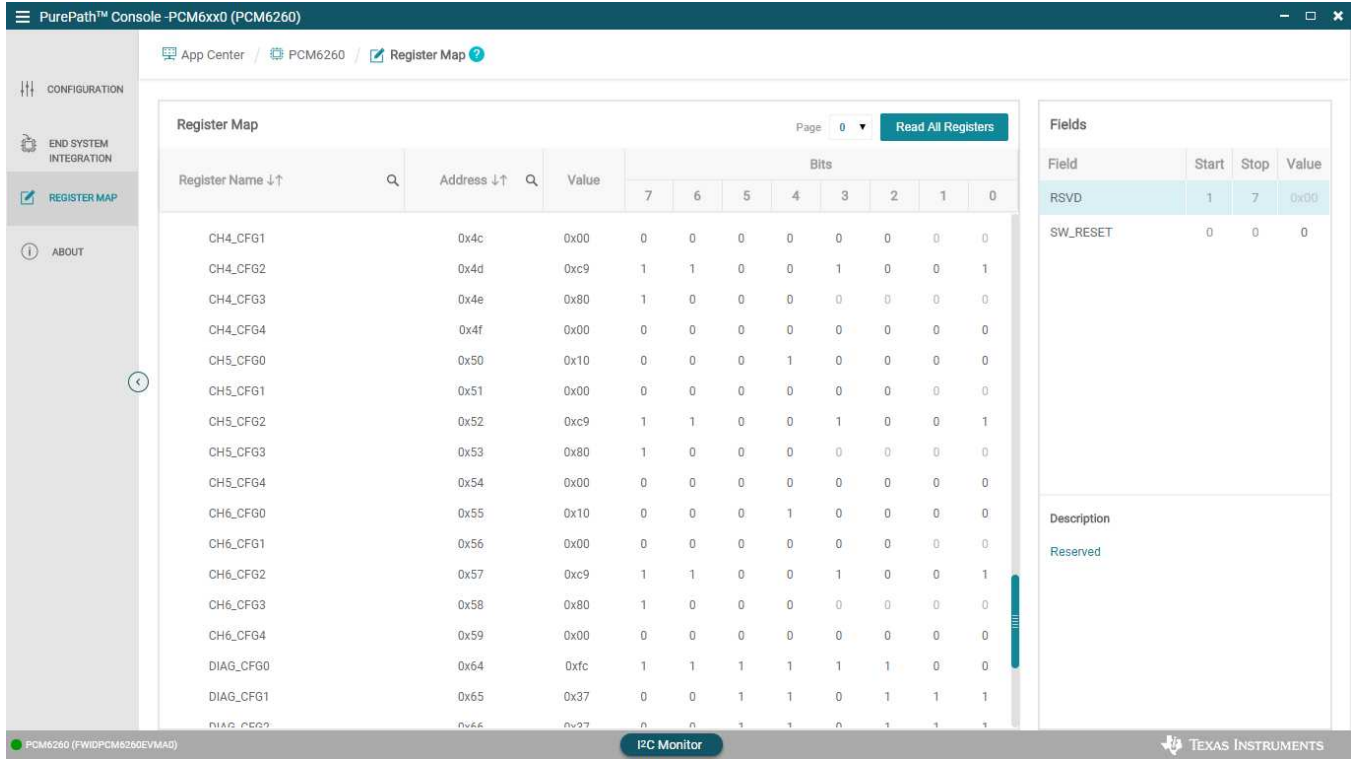


Figure 35. End System Integration View

### 4.3 Register Map

The register map view (Figure 36) provides a view of the first two pages of the register map.



The screenshot displays the Register Map view in the PurePath™ Console. The main area contains a table of registers with the following columns: Register Name, Address, Value, and Bits (7, 6, 5, 4, 3, 2, 1, 0). The registers listed include CH4\_CFG1 through CH6\_CFG4, CH5\_CFG0 through CH5\_CFG4, CH6\_CFG0 through CH6\_CFG4, and DIAG\_CFG0 through DIAG\_CFG4. The right sidebar shows a 'Fields' table with columns for Field, Start, Stop, and Value. The fields listed are RSVD and SW\_RESET. Below the fields table is a 'Description' section with the text 'Reserved'.

Register Name	Address	Value	7	6	5	4	3	2	1	0
CH4_CFG1	0x4c	0x00	0	0	0	0	0	0	0	0
CH4_CFG2	0x4d	0xc9	1	1	0	0	1	0	0	1
CH4_CFG3	0x4e	0x80	1	0	0	0	0	0	0	0
CH4_CFG4	0x4f	0x00	0	0	0	0	0	0	0	0
CH5_CFG0	0x50	0x10	0	0	0	1	0	0	0	0
CH5_CFG1	0x51	0x00	0	0	0	0	0	0	0	0
CH5_CFG2	0x52	0xc9	1	1	0	0	1	0	0	1
CH5_CFG3	0x53	0x80	1	0	0	0	0	0	0	0
CH5_CFG4	0x54	0x00	0	0	0	0	0	0	0	0
CH6_CFG0	0x55	0x10	0	0	0	1	0	0	0	0
CH6_CFG1	0x56	0x00	0	0	0	0	0	0	0	0
CH6_CFG2	0x57	0xc9	1	1	0	0	1	0	0	1
CH6_CFG3	0x58	0x80	1	0	0	0	0	0	0	0
CH6_CFG4	0x59	0x00	0	0	0	0	0	0	0	0
DIAG_CFG0	0x64	0xfc	1	1	1	1	1	1	0	0
DIAG_CFG1	0x65	0x37	0	0	1	1	0	1	1	1
DIAG_CFG2	0x66	0x27	0	0	1	1	0	1	1	1

Figure 36. Register Map View

## 5 Quick Start

Preset configurations are provided for common use cases. The following quick start procedure uses the onboard microphone preset.

Click on *load preset* in the configuration view, as shown in Figure 37, to open the preset selection window (Figure 38).

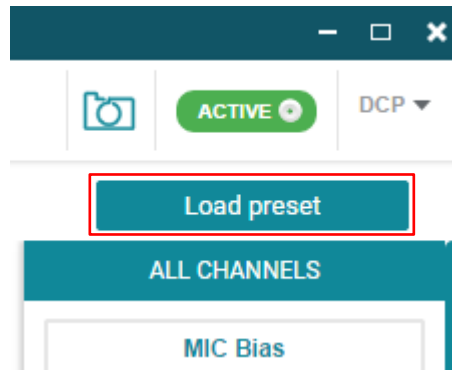


Figure 37. Load Preset Button

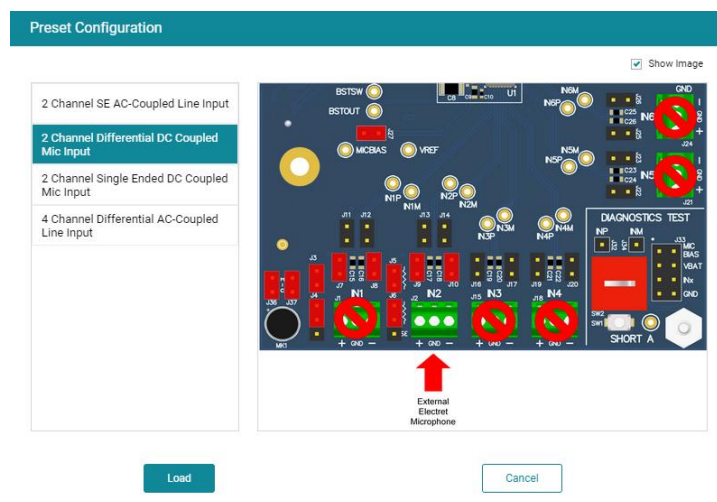


Figure 38. Preset Configuration Window

Select the two-channel differential DC-coupled Mic input from the preset options. Click *Show Image* to view the board configuration. Jumpers highlighted in red must be populated, all other jumpers must be removed. IN1 is connected to the onboard microphone, while IN2 can be connected to an external electret microphone. The preset configuration opens with the ADCs inactive, allowing for modification of the preset before activating the ADCs.

The default state for the PCM6xx0Q1 is inactive mode and, with the exception of the channel digital volume, all device configurations must be done when the device is inactive. The PCM6xx0Q1 does not provide a digital audio output in standby mode. Figure 39 shows how to change the mode from standby to active.



Figure 39. Inactive to Active Mode

When active mode is enabled, any controls not configurable in active mode are grayed out. These controls can be changed again when the device is brought out of active mode. Figure 40 shows which controls are disabled.

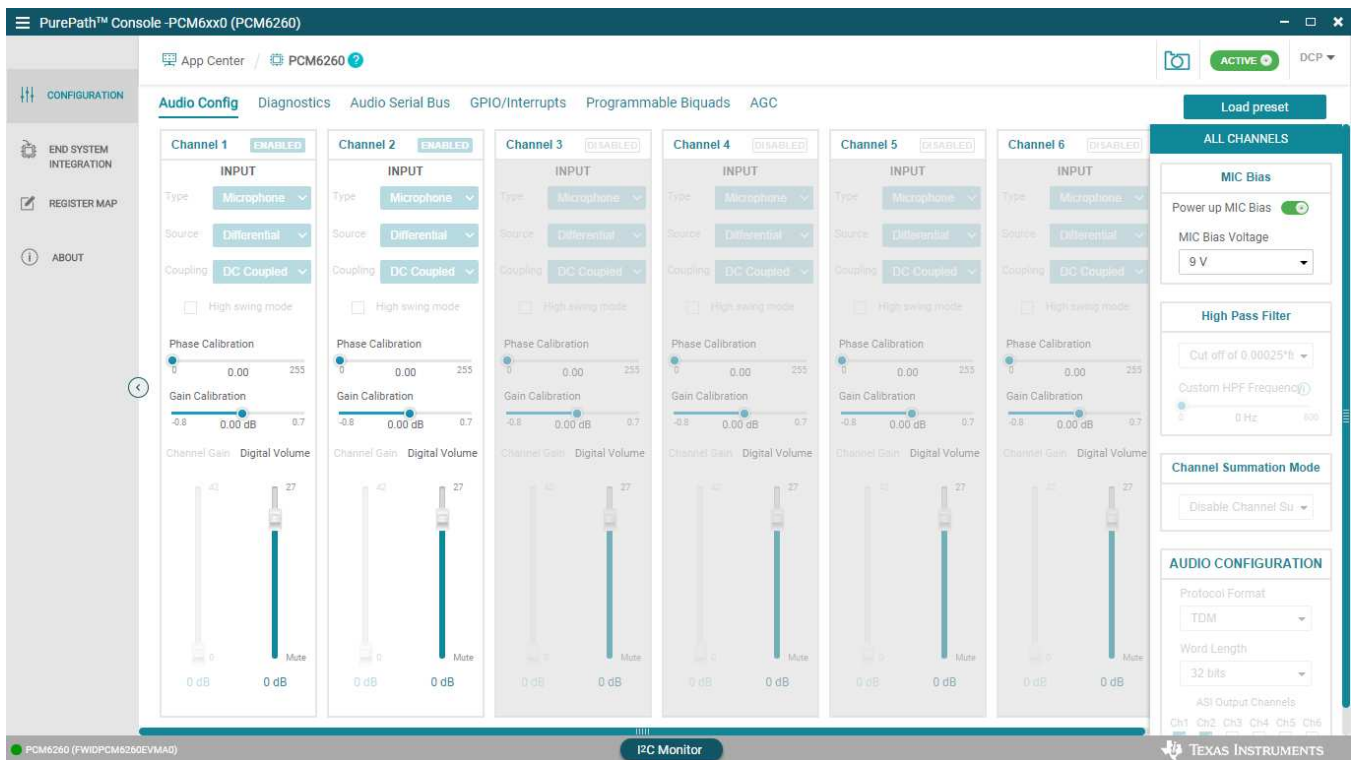


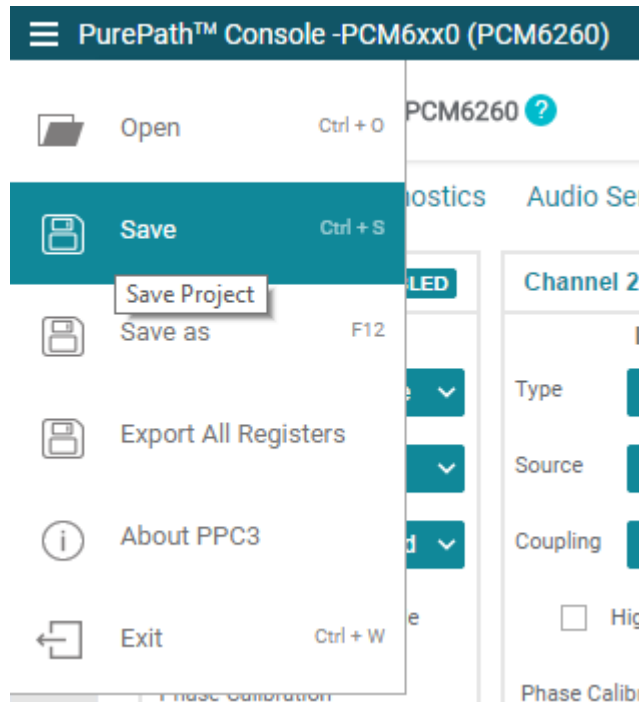
Figure 40. Disabled Controls in Active Mode

Audio can now be captured on your PC using the audio program of your choice.



### 5.1 Saving a Configuration

To save a configuration, as shown in [Figure 41](#), click the upper left corner of the PPC3 window and select *Save*. The configuration is saved as a .ppc3 file. To load a saved configuration, click the upper left corner of the PPC3 window and select *Open*. Navigate to the location of the saved .ppc3 file, and click *Open*.



**Figure 41. Saving a Configuration in PPC3**

## 6 System Overview

Figure 42 shows an overview of the system.

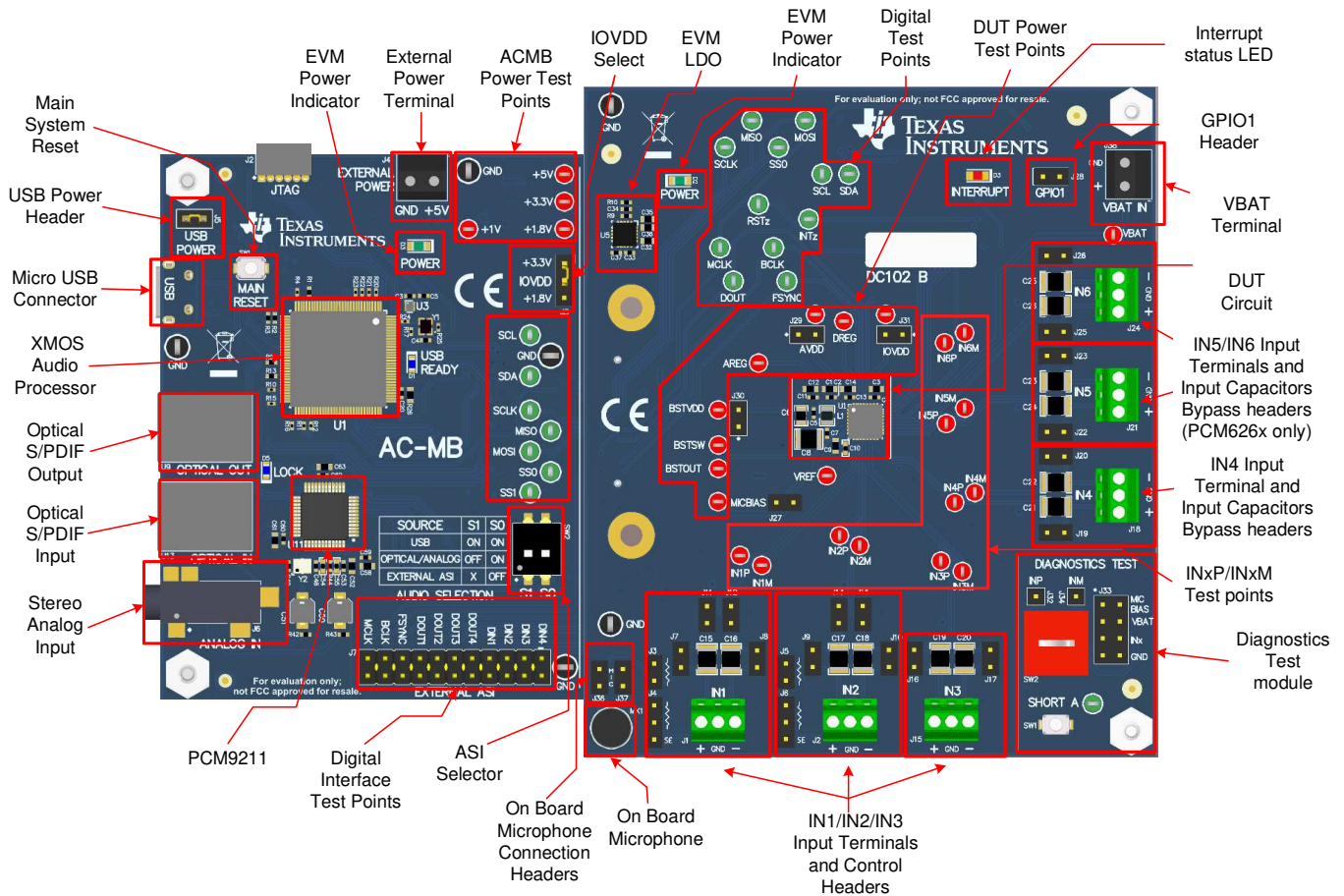


Figure 42. System Overview

## 7 Schematic and Bill of Materials

This section provides the schematics and bill of materials (BOM) for each PCM6xx0Q1EVM variant.

### 7.1 PCM6260Q1EVM Schematic and Bill of Materials

#### 7.1.1 PCM6260Q1EVM Schematic

Figure 43 and Figure 44 illustrate the schematics for the PCM6240Q1EVM.

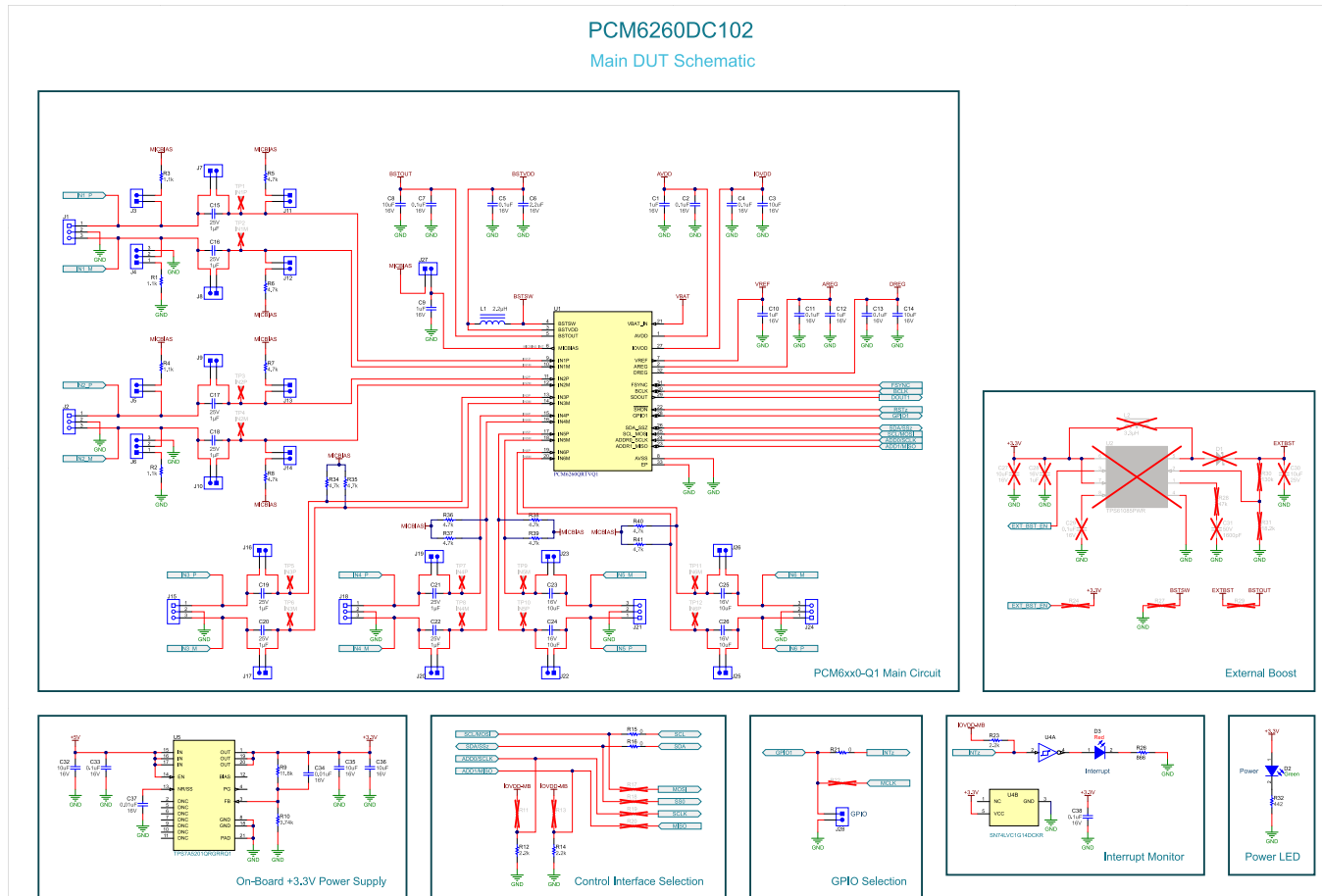


Figure 43. PCM6260Q1EVM-PDK Main DUT Schematics

## PCM6260DC102 Connectors and EEPROM

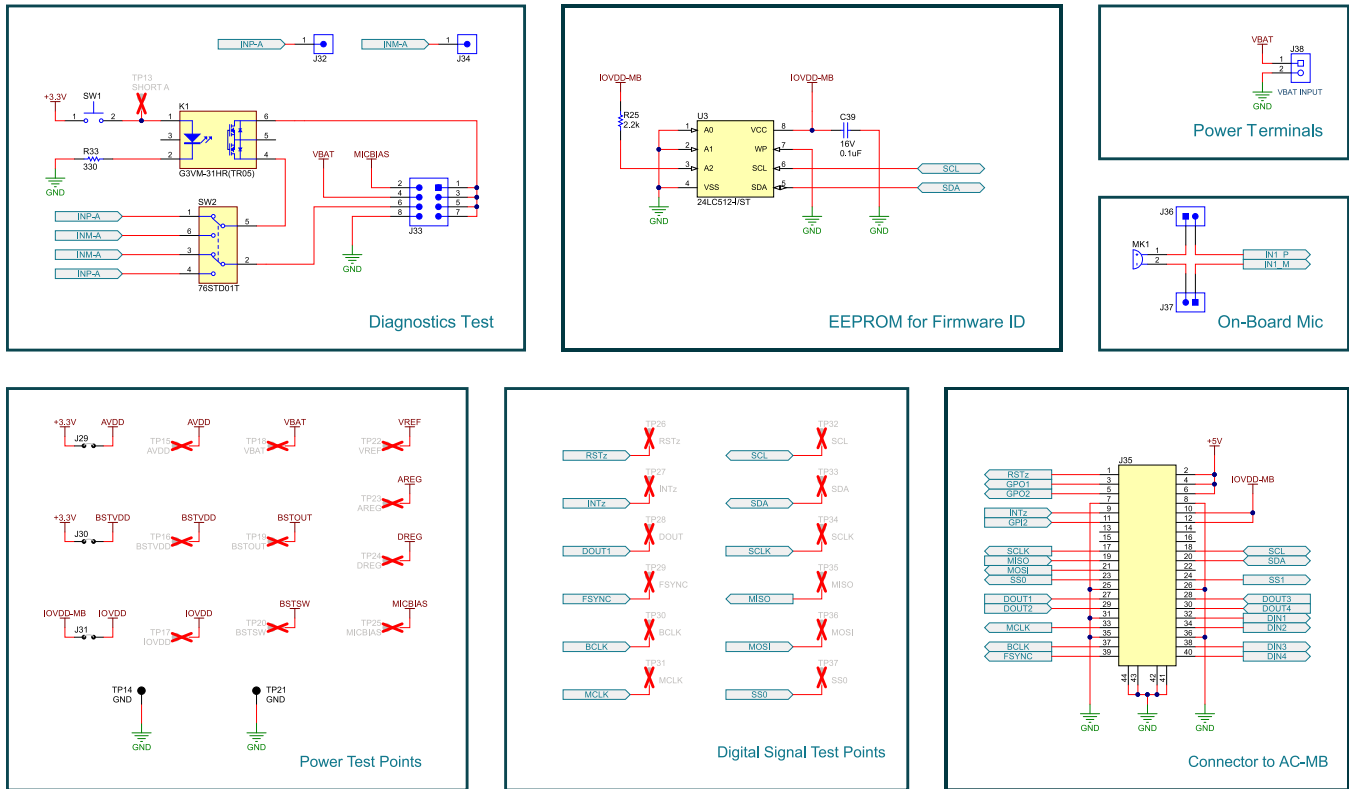


Figure 44. PCM6260Q1EVM-PDK Connectors and Test Points Schematics

**7.1.2 PCM6260Q1EVM Bill of Materials**

Table 5 lists the BOM for the PCM6260Q1EVM.

**Table 5. PCM6260Q1EVM Bill of Materials**

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
!PCB1	1		Printed Circuit Board		DC102	Any
!PCB2	1		DC058 - AC-MB Circuit Board, Kitting item 6628863		AC-MB	Texas Instruments
C1, C9, C12	3	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X7R, 0603	0603	EMK107B7105KA-T	Taiyo Yuden
C2, C4, C5, C7, C11, C13, C33, C38, C39	9	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	885012205037	Würth Elektronik
C3, C14, C32, C35, C36	5	10uF	CAP, CERM, 10 uF, 16 V, +/- 20%, X5R, 0603	0603	EMK107BBJ106MA-T	Taiyo Yuden
C6	1	2.2uF	CAP, CERM, 2.2 uF, 16 V, +/- 10%, X7R, 0805	0805	GRM21BR71C225KA12L	MuRata
C8	1	10uF	CAP, CERM, 10 uF, 16 V, +/- 10%, X7R, AEC-Q200 Grade 1, 1206	1206	GCM31CR71C106KA64L	MuRata
C10	1	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X5R, 0402	0402	EMK105BJ105KVHF	Taiyo Yuden
C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26	12	22uF	CAP, CERM, 22 uF, 25 V, +/- 20%, X7R, 1210	1210	TMK325B7226MM-TR	Taiyo Yuden
C34, C37	2	0.01uF	CAP, CERM, 0.01 uF, 16 V, +/- 10%, X7R, 0402	0402	520L103KT16T	AT Ceramics
D2	1	Green	LED, Green, SMD	LED_0805	LTST-C170KGKT	Lite-On
D3	1	Red	LED, Red, SMD	Red 0805 LED	LTST-C170KRKT	Lite-On
H1, H2	2		Small nylon hex nut, 0.10 thick with a 0.250 outside diameter and a 4-40 threading	Hex Nut,4-40 Thread, 250" Head Dia	9605	Keystone
H3, H4	2		HEX STANDOFF 4-40 NYLON 3/4"	HEX STANDOFF 4-40 NYLON 3/4"	4804	Keystone
J1, J2, J15, J18, J21, J24	6		CONN TERM BLOCK 2.54MM 3POS PCB	HDR3	OSTVN03A150	On Shore Technology
J3, J5, J7, J8, J9, J10, J11, J12, J13, J14, J16, J17, J19, J20, J22, J23, J25, J26, J27, J28, J29, J30, J31, J36, J37	25		Header, 100mil, 2x1, Gold, TH	2x1 Header	TSW-102-07-G-S	Samtec

**Table 5. PCM6260Q1EVM Bill of Materials (continued)**

J4, J6	2		Header, 100mil, 3x1, Gold, TH	3x1 Header	TSW-103-07-G-S	Samtec
J32, J34	2		Header, 100mil, 1pos, Gold, TH	Testpoint	TSW-101-07-G-S	Samtec
J33	1		Header, 100mil, 4x2, Gold, TH	4x2 Header	TSW-104-07-G-D	Samtec
J35	1		Connector, Header, High Speed, 20 pairs, SMT	QTE-020-01-X-D-A	QTE-020-01-L-D-A	Samtec
J38	1		Terminal Block, 3.5mm Pitch, 2x1, TH	7.0x8.2x6.5mm	ED555/2DS	On-Shore Technology
K1	1		Relay, SPST-NO (1 Form A), 4 A, SMD	6.3x4.4mm	G3VM-31HR(TR05)	Omron Electronic Components
L1	1	2.2uH	Inductor, Shielded, Metal Composite, 2.2 $\mu$ H, 2.2 A, 0.1 ohm, SMD	2x1.6mm	LPWI201610H2R2T	Littelfuse
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady
MK1	1		Microphone, Condenser, Analog, Omnidirectional, -42DB, TH	6mm DIA	POM-2242P-C33-R	PUI Audio
R1, R2, R3, R4	4	1.1k	RES, 1.1 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06031K10JNEA	Vishay-Dale
R5, R6, R7, R8, R34, R35, R36, R37, R38, R39, R40, R41	12	4.7k	RES, 4.7 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ472V	Panasonic
R9	1	11.8k	RES, 11.8 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040211K8FKED	Vishay-Dale
R10	1	3.74k	RES, 3.74 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04023K74FKED	Vishay-Dale
R12, R14, R23	3	2.2k	RES, 2.2 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ222V	Panasonic
R15, R16, R21	3	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R25	1	2.2k	RES, 2.2 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04022K20JNED	Vishay-Dale

Table 5. PCM6260Q1EVM Bill of Materials (continued)

R26	1	866	RES, 866, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603866RFKEA	Vishay-Dale
R32	1	442	RES, 442, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603442RFKEA	Vishay-Dale
R33	1	330	RES, 330, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402330RJNED	Vishay-Dale
SH1, SH2, SH3, SH4, SH5, SH6, SH7, SH8, SH9, SH10, SH11, SH12, SH13, SH14, SH15, SH16, SH17, SH18, SH19, SH20, SH21, SH22, SH23, SH24, SH25, SH26	26	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SW1	1		Switch, Tactile, SPST-NO, 0.05A, 12V, SMT	Switch, 4.4x2x2.9 mm	TL1015AF160QG	E-Switch
SW2	1		Switch, DPDT, 0.15 A, 30 VDC, TH	9.65x9.65mm	76STD01T	Grayhill
TP14, TP21	2		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone
U1	1		Automotive, 4-Channel and 6-Channel Audio ADCs with Integrated Microphone Bias and Input Diagnostics, RTV0032T (WQFN-32)	RTV0032T	PCM6260QRTVQ1	Texas Instruments
U3	1		EEPROM, 512KBIT, 400KHZ, 8TSSOP	TSSOP-8	24LC512-I/ST	Microchip
U4	1		Single Schmitt-Trigger Inverter, DCK0005A (SOT-SC70-5)	DCK0005A	SN74LVC1G14DCKR	Texas Instruments
U5	1		Automotive-Grade 2-A, High-Accuracy, Low-Noise, LDO Voltage Regulator, RGR0020A (VQFN-20)	RGR0020A	TPS7A5201QRGRRQ1	Texas Instruments
C27	0	10uF	CAP, CERM, 10 uF, 16 V, +/- 20%, X5R, 0603	0603	EMK107BBJ106MA-T	Taiyo Yuden
C28	0	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X5R, 0402	0402	EMK105BJ105KVHF	Taiyo Yuden

**Table 5. PCM6260Q1EVM Bill of Materials (continued)**

C29	0	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	885012205037	Würth Elektronik
C30	0	10uF	CAP, CERM, 10 uF, 25 V, +/- 20%, X5R, 0603	0603	C1608X5R1E106M080A C	TDK
C31	0	1600pF	CAP, CERM, 1600 pF, 50 V, +/- 5%, C0G/NP0, 0603	0603	GRM1885C1H162JA01D	MuRata
D1	0	20V	Diode, Schottky, 20 V, 1 A, SOD-123F	SOD-123F	PMEG2010AEH,115	Nexperia
FID1, FID2, FID3, FID4, FID5, FID6	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
L2	0	3.3uH	Inductor, Shielded Drum Core, Ferrite, 3.3 uH, 1.3 A, 0.145 ohm, SMD	LPS3314	LPS3314-332MRB	Coilcraft
R11, R13	0	2.2k	RES, 2.2 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ222V	Panasonic
R17, R18, R19, R20, R22, R24, R27, R29	0	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R28	0	47k	RES, 47 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040247K0JNED	Vishay-Dale
R30	0	130k	RES, 130 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402130KFKED	Vishay-Dale
R31	0	18.2k	RES, 18.2 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040218K2FKED	Vishay-Dale
R42, R43, R44, R45	0	4.7k	RES, 4.7 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ472V	Panasonic
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP15, TP16, TP17, TP18, TP19, TP20, TP22, TP23, TP24, TP25	0		Test Point, Miniature, Red, TH	Red Miniature Testpoint	5000	Keystone
TP13, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37	0		Test Point, Miniature, Green, TH	Green Miniature Testpoint	5116	Keystone



**Table 5. PCM6260Q1EVM Bill of Materials (continued)**

U2	0		18.5 V, 2 A, 650 KHz / 1.2 MHz Step-Up DC-DC Converter with Forced PWM Mode, 2.3 to 6 V, -40 to 85 degC, 8-pin SOP (PW8), Green (RoHS & no Sb/Br)	PW0008A	TPS61085PWR	Texas Instruments
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## 7.2 PCM6240Q1EVM Schematic and Bill of Materials (BOM)

### 7.2.1 PCM6240Q1EVM Schematic

Figure 45 and Figure 46 illustrate the schematics for the PCM6240Q1EVM.

PCM6240DC102B  
Main DUT Schematic

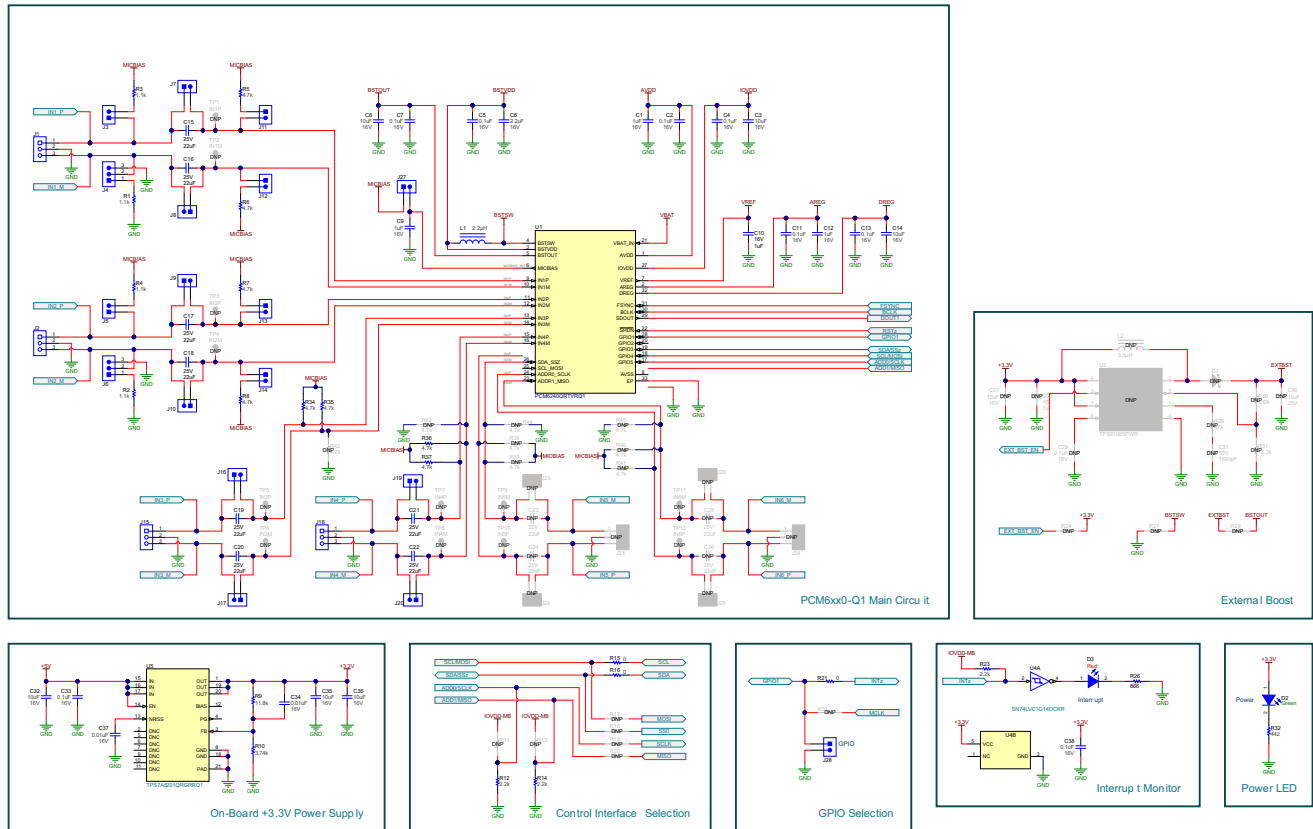


Figure 45. PCM6240Q1EVM-PDK Main DUT Schematics



## 7.2.2 PCM6240Q1EVM Bill of Materials

Table 6 lists the BOM for the PCM6240Q1EVM.

**Table 6. PCM6240Q1EVM Bill of Materials**

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
!PCB1	1		Printed Circuit Board		DC102	Any
!PCB2	1		DC058 - AC-MB Circuit Board, Kitting item 6628863		AC-MB	Texas Instruments
C1, C9, C12	3	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X7R, 0603	0603	EMK107B7105KA-T	Taiyo Yuden
C2, C4, C5, C7, C11, C13, C33, C38, C39	9	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	885012205037	Würth Elektronik
C3, C14, C32, C35, C36	5	10uF	CAP, CERM, 10 uF, 16 V, +/- 20%, X5R, 0603	0603	EMK107BBJ106MA-T	Taiyo Yuden
C6	1	2.2uF	CAP, CERM, 2.2 uF, 16 V, +/- 10%, X7R, 0805	0805	GRM21BR71C225KA12L	MuRata
C8	1	10uF	CAP, CERM, 10 uF, 16 V, +/- 10%, X7R, AEC-Q200 Grade 1, 1206	1206	GCM31CR71C106KA64L	MuRata
C10	1	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X5R, 0402	0402	EMK105BJ105KVHF	Taiyo Yuden
C15, C16, C17, C18, C19, C20, C21, C22	8	22uF	CAP, CERM, 22 uF, 25 V, +/- 20%, X7R, 1210	1210	TMK325B7226MM-TR	Taiyo Yuden
C34, C37	2	0.01uF	CAP, CERM, 0.01 uF, 16 V, +/- 10%, X7R, 0402	0402	520L103KT16T	AT Ceramics
D2	1	Green	LED, Green, SMD	LED_0805	LTST-C170KGKT	Lite-On
D3	1	Red	LED, Red, SMD	Red 0805 LED	LTST-C170KRKT	Lite-On
H1, H2	2		Small nylon hex nut, 0.10 thick with a 0.250 outside diameter and a 4-40 threading	Hex Nut, 4-40 Thread, 250" Head Dia	9605	Keystone
H3, H4	2		HEX STANDOFF 4-40 NYLON 3/4"	HEX STANDOFF 4-40 NYLON 3/4"	4804	Keystone
J1, J2, J15, J18	4		CONN TERM BLOCK 2.54MM 3POS PCB	HDR3	OSTVN03A150	On Shore Technology
J3, J5, J7, J8, J9, J10, J11, J12, J13, J14, J16, J17, J19, J20, J27, J28, J29, J30, J31, J36, J37	21		Header, 100mil, 2x1, Gold, TH	2x1 Header	TSW-102-07-G-S	Samtec
J4, J6	2		Header, 100mil, 3x1, Gold, TH	3x1 Header	TSW-103-07-G-S	Samtec

**Table 6. PCM6240Q1EVM Bill of Materials (continued)**

J32, J34	2		Header, 100mil, 1pos, Gold, TH	Testpoint	TSW-101-07-G-S	Samtec
J33	1		Header, 100mil, 4x2, Gold, TH	4x2 Header	TSW-104-07-G-D	Samtec
J35	1		Connector, Header, High Speed, 20 pairs, SMT	QTE-020-01-X-D-A	QTE-020-01-L-D-A	Samtec
J38	1		Terminal Block, 3.5mm Pitch, 2x1, TH	7.0x8.2x6.5mm	ED555/2DS	On-Shore Technology
K1	1		Relay, SPST-NO (1 Form A), 4 A, SMD	6.3x4.4mm	G3VM-31HR(TR05)	Omron Electronic Components
L1	1	2.2uH	Inductor, Shielded, Metal Composite, 2.2 $\mu$ H, 2.2 A, 0.1 ohm, SMD	2x1.6mm	LPWI201610H2R2T	Littelfuse
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady
MK1	1		Microphone, Condenser, Analog, Omnidirectional, -42DB, TH	6mm DIA	POM-2242P-C33-R	PUI Audio
R1, R2, R3, R4	4	1.1k	RES, 1.1 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06031K10JNEA	Vishay-Dale
R5, R6, R7, R8, R34, R35, R36, R37	8	4.7k	RES, 4.7 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ472V	Panasonic
R9	1	11.8k	RES, 11.8 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040211K8FKED	Vishay-Dale
R10	1	3.74k	RES, 3.74 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04023K74FKED	Vishay-Dale
R12, R14, R23	3	2.2k	RES, 2.2 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ222V	Panasonic
R15, R16, R21	3	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R25	1	2.2k	RES, 2.2 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04022K20JNED	Vishay-Dale
R26	1	866	RES, 866, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603866RFKEA	Vishay-Dale

**Table 6. PCM6240Q1EVM Bill of Materials (continued)**

R32	1	442	RES, 442, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603442RFKEA	Vishay-Dale
R33	1	330	RES, 330, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402330RJNED	Vishay-Dale
SH1, SH2, SH3, SH4, SH5, SH6, SH7, SH8, SH9, SH10, SH11, SH12, SH13, SH14, SH15, SH16, SH17, SH18, SH23, SH24, SH25, SH26	22	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SW1	1		Switch, Tactile, SPST-NO, 0.05A, 12V, SMT	Switch, 4.4x2x2.9 mm	TL1015AF160QG	E-Switch
SW2	1		Switch, DPDT, 0.15 A, 30 VDC, TH	9.65x9.65mm	76STD01T	Grayhill
TP14, TP21	2		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone
U1	1		Automotive, 4-Channel Audio ADCs With Integrated Microphone Bias and Input Diagnostics, RTV0032T (WQFN-32)	RTV0032T	PCM6240QRTVRQ1	Texas Instruments
U3	1		EEPROM, 512KBIT, 400KHZ, 8TSSOP	TSSOP-8	24LC512-I/ST	Microchip
U4	1		Single Schmitt-Trigger Inverter, DCK0005A (SOT-SC70-5)	DCK0005A	SN74LVC1G14DCKR	Texas Instruments
U5	1		Automotive-Grade 2-A, High-Accuracy, Low-Noise, LDO Voltage Regulator, RGR0020A (VQFN-20)	RGR0020A	TPS7A5201QRGRRQ1	Texas Instruments
C23, C24, C25, C26	0	22uF	CAP, CERM, 22 uF, 25 V, +/- 20%, X7R, 1210	1210	TMK325B7226MM-TR	Taiyo Yuden
C27	0	10uF	CAP, CERM, 10 uF, 16 V, +/- 20%, X5R, 0603	0603	EMK107BBJ106MA-T	Taiyo Yuden
C28	0	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X5R, 0402	0402	EMK105BJ105KVHF	Taiyo Yuden
C29	0	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	885012205037	Würth Elektronik

Table 6. PCM6240Q1EVM Bill of Materials (continued)

C30	0	10uF	CAP, CERM, 10 uF, 25 V, +/- 20%, X5R, 0603	0603	C1608X5R1E106M080A C	TDK
C31	0	1600pF	CAP, CERM, 1600 pF, 50 V, +/- 5%, COG/NPO, 0603	0603	GRM1885C1H162JA01D	MuRata
D1	0	20V	Diode, Schottky, 20 V, 1 A, SOD-123F	SOD-123F	PMEG2010AEH,115	Nexperia
FID1, FID2, FID3, FID4, FID5, FID6	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
J21, J24	0		CONN TERM BLOCK 2.54MM 3POS PCB	HDR3	OSTVN03A150	On Shore Technology
J22, J23, J25, J26	0		Header, 100mil, 2x1, Gold, TH	2x1 Header	TSW-102-07-G-S	Samtec
L2	0	3.3uH	Inductor, Shielded Drum Core, Ferrite, 3.3 uH, 1.3 A, 0.145 ohm, SMD	LPS3314	LPS3314-332MRB	Coilcraft
R11, R13	0	2.2k	RES, 2.2 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ222V	Panasonic
R17, R18, R19, R20, R22, R24, R27, R29	0	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R28	0	47k	RES, 47 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040247K0JNED	Vishay-Dale
R30	0	130k	RES, 130 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402130KFKED	Vishay-Dale
R31	0	18.2k	RES, 18.2 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040218K2FKED	Vishay-Dale
R38, R39, R40, R41, R42, R43, R44, R45	0	4.7k	RES, 4.7 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ472V	Panasonic
SH19, SH20, SH21, SH22	0	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP15, TP16, TP17, TP18, TP19, TP20, TP22, TP23, TP24, TP25	0		Test Point, Miniature, Red, TH	Red Miniature Testpoint	5000	Keystone

**Table 6. PCM6240Q1EVM Bill of Materials (continued)**

TP13, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37	0		Test Point, Miniature, Green, TH	Green Miniature Testpoint	5116	Keystone
U2	0		18.5 V, 2 A, 650 KHz / 1.2 MHz Step-Up DC-DC Converter with Forced PWM Mode, 2.3 to 6 V, -40 to 85 degC, 8-pin SOP (PW8), Green (RoHS & no Sb/Br)	PW0008A	TPS61085PWR	Texas Instruments







### 7.3.2 PCM6360Q1EVM Bill of Materials

Table 7 lists the BOM for the PCM6360Q1EVM.

**Table 7. PCM6360Q1EVM Bill of Materials**

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
!PCB1	1		Printed Circuit Board		DC102	Any
!PCB2	1		DC058 - AC-MB Circuit Board, Kitting item 6628863		AC-MB	Texas Instruments
C1, C9, C12	3	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X7R, 0603	0603	EMK107B7105KA-T	Taiyo Yuden
C2, C4, C5, C7, C11, C13, C29, C33, C38, C39	10	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	885012205037	Würth Elektronik
C3, C14, C27, C32, C35, C36	6	10uF	CAP, CERM, 10 uF, 16 V, +/- 20%, X5R, 0603	0603	EMK107BBJ106MA-T	Taiyo Yuden
C6	1	2.2uF	CAP, CERM, 2.2 uF, 16 V, +/- 10%, X7R, 0805	0805	GRM21BR71C225KA12L	MuRata
C8	1	10uF	CAP, CERM, 10 uF, 16 V, +/- 10%, X7R, AEC-Q200 Grade 1, 1206	1206	GCM31CR71C106KA64L	MuRata
C10, C28	2	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X5R, 0402	0402	EMK105BJ105KVHF	Taiyo Yuden
C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26	12	22uF	CAP, CERM, 22 uF, 25 V, +/- 20%, X7R, 1210	1210	TMK325B7226MM-TR	Taiyo Yuden
C30	1	10uF	CAP, CERM, 10 uF, 25 V, +/- 20%, X5R, 0603	0603	C1608X5R1E106M080A C	TDK
C31	1	1600pF	CAP, CERM, 1600 pF, 50 V, +/- 5%, C0G/NPO, 0603	0603	GRM1885C1H162JA01D	MuRata
C34, C37	2	0.01uF	CAP, CERM, 0.01 uF, 16 V, +/- 10%, X7R, 0402	0402	520L103KT16T	AT Ceramics
D1	1	20V	Diode, Schottky, 20 V, 1 A, SOD-123F	SOD-123F	PMEG2010AEH,115	Nexperia
D2	1	Green	LED, Green, SMD	LED_0805	LTST-C170KGKT	Lite-On
D3	1	Red	LED, Red, SMD	Red 0805 LED	LTST-C170KRKT	Lite-On
H1, H2	2		Small nylon hex nut, 0.10 thick with a 0.250 outside diameter and a 4-40 threading	Hex Nut, 4-40 Thread, 250" Head Dia	9605	Keystone
H3, H4	2		HEX STANDOFF 4-40 NYLON 3/4"	HEX STANDOFF 4-40 NYLON 3/4"	4804	Keystone

**Table 7. PCM6360Q1EVM Bill of Materials (continued)**

J1, J2, J15, J18, J21, J24	6		CONN TERM BLOCK 2.54MM 3POS PCB	HDR3	OSTVN03A150	On Shore Technology
J3, J5, J7, J8, J9, J10, J11, J12, J13, J14, J16, J17, J19, J20, J22, J23, J25, J26, J27, J28, J29, J30, J31, J36, J37	25		Header, 100mil, 2x1, Gold, TH	2x1 Header	TSW-102-07-G-S	Samtec
J4, J6	2		Header, 100mil, 3x1, Gold, TH	3x1 Header	TSW-103-07-G-S	Samtec
J32, J34	2		Header, 100mil, 1pos, Gold, TH	Testpoint	TSW-101-07-G-S	Samtec
J33	1		Header, 100mil, 4x2, Gold, TH	4x2 Header	TSW-104-07-G-D	Samtec
J35	1		Connector, Header, High Speed, 20 pairs, SMT	QTE-020-01-X-D-A	QTE-020-01-L-D-A	Samtec
J38	1		Terminal Block, 3.5mm Pitch, 2x1, TH	7.0x8.2x6.5mm	ED555/2DS	On-Shore Technology
K1	1		Relay, SPST-NO (1 Form A), 4 A, SMD	6.3x4.4mm	G3VM-31HR(TR05)	Omron Electronic Components
L2	1	3.3uH	Inductor, Shielded Drum Core, Ferrite, 3.3 $\mu$ H, 1.3 A, 0.145 ohm, SMD	LPS3314	LPS3314-332MRB	Coilcraft
LBL1	1		Thermal Transfer Printable Labels, 0.650" W x 0.200" H - 10,000 per roll	PCB Label 0.650 x 0.200 inch	THT-14-423-10	Brady
MK1	1		Microphone, Condenser, Analog, Omnidirectional, -42DB, TH	6mm DIA	POM-2242P-C33-R	PUI Audio
R1, R2, R3, R4	4	1.1k	RES, 1.1 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06031K10JNEA	Vishay-Dale
R5, R6, R7, R8, R34, R35, R36, R37, R38, R39, R40, R41	12	4.7k	RES, 4.7 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ472V	Panasonic
R9	1	11.8k	RES, 11.8 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040211K8FKED	Vishay-Dale
R10	1	3.74k	RES, 3.74 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04023K74FKED	Vishay-Dale
R12, R14, R23	3	2.2k	RES, 2.2 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ222V	Panasonic

**Table 7. PCM6360Q1EVM Bill of Materials (continued)**

R15, R16, R21, R24, R27, R29	6	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R25	1	2.2k	RES, 2.2 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04022K20JNED	Vishay-Dale
R26	1	866	RES, 866, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603866RFKEA	Vishay-Dale
R28	1	47k	RES, 47 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040247K0JNED	Vishay-Dale
R30	1	130k	RES, 130 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402130KFKED	Vishay-Dale
R31	1	18.2k	RES, 18.2 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040218K2FKED	Vishay-Dale
R32	1	442	RES, 442, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603442RFKEA	Vishay-Dale
R33	1	330	RES, 330, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402330RJNED	Vishay-Dale
SH1, SH2, SH3, SH4, SH5, SH6, SH7, SH8, SH9, SH10, SH11, SH12, SH13, SH14, SH15, SH16, SH17, SH18, SH19, SH20, SH21, SH22, SH23, SH24, SH25, SH26	26	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SW1	1		Switch, Tactile, SPST-NO, 0.05A, 12V, SMT	Switch, 4.4x2x2.9 mm	TL1015AF160QG	E-Switch
SW2	1		Switch, DPDT, 0.15 A, 30 VDC, TH	9.65x9.65mm	76STD01T	Grayhill
TP14, TP21	2		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone
U1	1		Automotive, 4-Channel and 6-Channel Audio ADCs with Integrated Microphone Bias and Input Diagnostics, RTV0032T (WQFN-32)	RTV0032T	PCM6360QRTVRQ1	Texas Instruments

**Table 7. PCM6360Q1EVM Bill of Materials (continued)**

U2	1		18.5 V, 2 A, 650 KHz / 1.2 MHz Step-Up DC-DC Converter with Forced PWM Mode, 2.3 to 6 V, -40 to 85 degC, 8-pin SOP (PW8), Green (RoHS & no Sb/Br)	PW0008A	TPS61085PWR	Texas Instruments
U3	1		EEPROM, 512KBIT, 400KHZ, 8TSSOP	TSSOP-8	24LC512-I/ST	Microchip
U4	1		Single Schmitt-Trigger Inverter, DCK0005A (SOT-SC70-5)	DCK0005A	SN74LVC1G14DCKR	Texas Instruments
U5	1		Automotive-Grade 2-A, High-Accuracy, Low-Noise, LDO Voltage Regulator, RGR0020A (VQFN-20)	RGR0020A	TPS7A5201QRGRRQ1	Texas Instruments
FID1, FID2, FID3, FID4, FID5, FID6	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
L1	0	2.2uH	Inductor, Shielded, Metal Composite, 2.2 $\mu$ H, 2.2 A, 0.1 ohm, SMD	2x1.6mm	LPWI201610H2R2T	Littelfuse
R11, R13	0	2.2k	RES, 2.2 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ222V	Panasonic
R17, R18, R19, R20, R22	0	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R42, R43, R44, R45	0	4.7k	RES, 4.7 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	ERJ-3GEYJ472V	Panasonic
TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP15, TP16, TP17, TP18, TP19, TP20, TP22, TP23, TP24, TP25	0		Test Point, Miniature, Red, TH	Red Miniature Testpoint	5000	Keystone
TP13, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37	0		Test Point, Miniature, Green, TH	Green Miniature Testpoint	5116	Keystone

## 7.4 AC-MB Schematic and Bill of Materials

This section provides the schematics and BOM for the AC-MB.

### 7.4.1 AC-MB Schematic

Figure 49 and Figure 50 illustrate the schematics for the AC-MB mother board included in the PCM6xx0Q1EVM-PDK.

Audio Converters Motherboard DC058 Rev A  
XAMOS, USB and Power

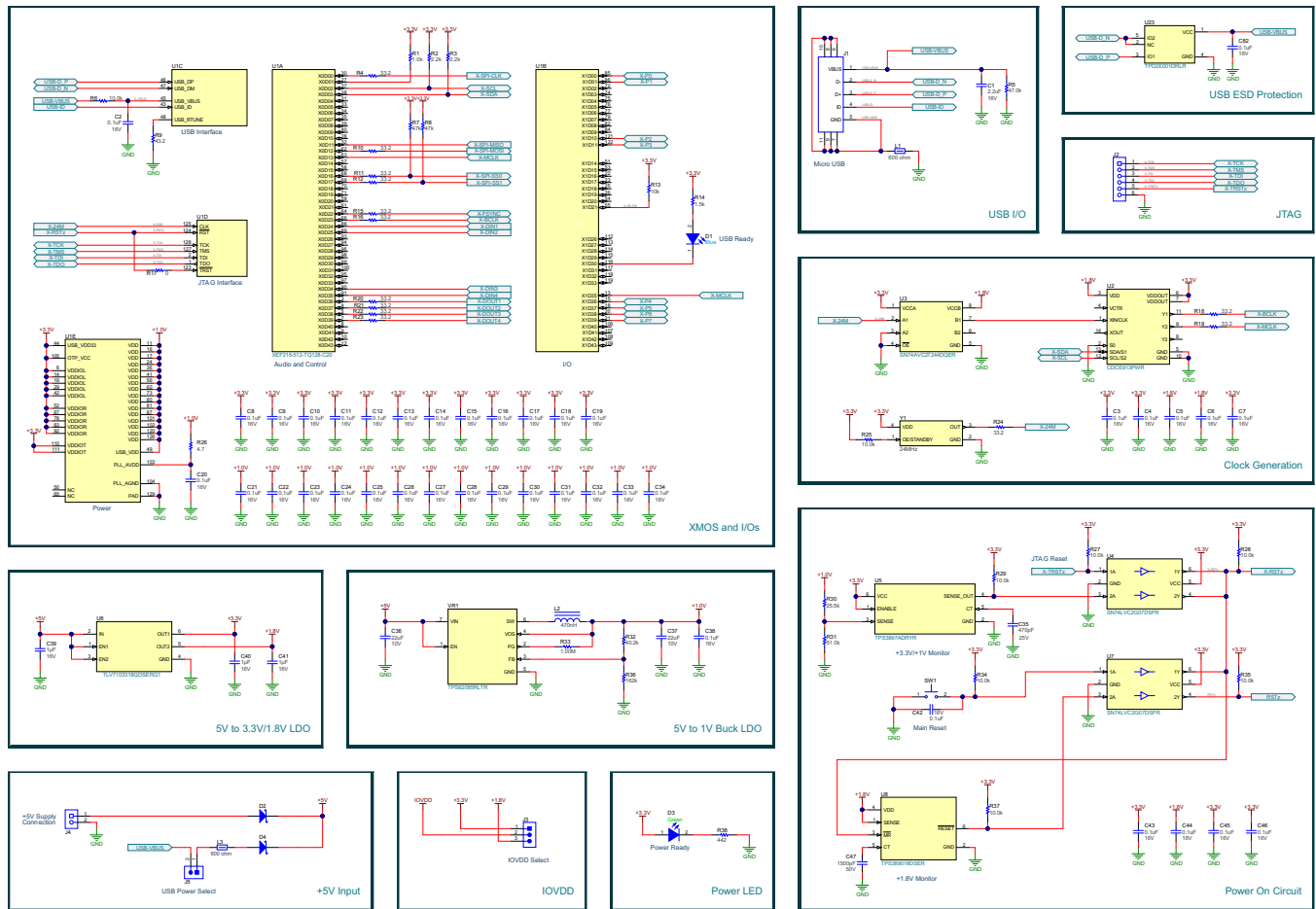


Figure 49. AC-MB Schematics Page 1

Audio Converters Motherboard DC058 Rev A  
PCM9211, Audio Interface and Test Points

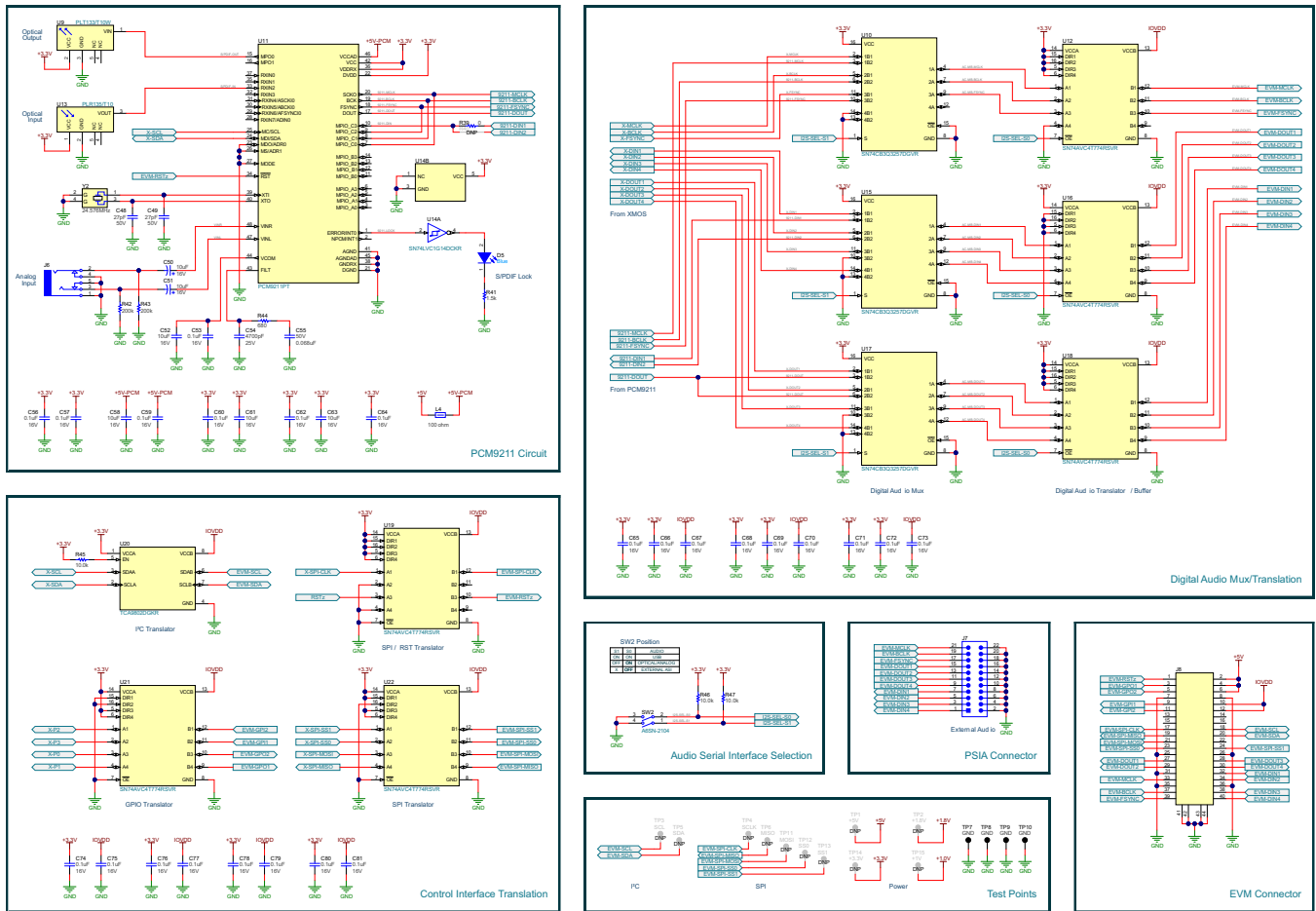


Figure 50. AC-MB Schematics Page 2



### 7.4.2 AC-MB Bill of Materials

Table 8 lists the BOM for the AC-MB.

**Table 8. AC-MB Bill of Materials**

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
!PCB1	1		Printed Circuit Board		DC058	Any
C1	1	2.2uF	CAP, CERM, 2.2 uF, 16 V, +/- 10%, X7R, 0603	0603	EMK107BB7225KA-T	Taiyo Yuden
C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, C29, C30, C31, C32, C33, C34, C38, C42, C43, C44, C45, C46, C53, C56, C57, C59, C60, C62, C64, C65, C66, C67, C68, C69, C70, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82	64	0.1uF	CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402	0402	885012205037	Würth Elektronik
C35	1	470pF	CAP, CERM, 470 pF, 50 V, +/- 5%, C0G/NP0, 0603	0603	06035A471JAT2A	AVX
C36, C37	2	22uF	CAP, CERM, 22 uF, 10 V, +/- 10%, X7R, 1206	1206	LMK316AB7226KL-TR	Taiyo Yuden
C39, C40, C41	3	1uF	CAP, CERM, 1 uF, 16 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	0603	CGA3E1X7R1C105K080AC	TDK
C47	1	1500pF	CAP, CERM, 1500 pF, 16 V, +/- 10%, X7R, 0603	0603	CGA1A2X7R1C152K030BA	TDK
C48, C49	2	27pF	CAP, CERM, 27 pF, 50 V, +/- 5%, C0G/NP0, 0402	0402	GJM1555C1H270JB01	MuRata
C50, C51	2	10uF	CAP, AL, 10 uF, 16 V, +/- 20%, SMD	D3xL5.4mm	UWX1C100MCL2GB	Nichicon
C52, C58, C61, C63	4	10uF	CAP, CERM, 10 uF, 16 V, +/- 20%, X5R, 0603	0603	EMK107BBJ106MA-T	Taiyo Yuden
C54	1	4700pF	CAP, CERM, 4700 pF, 16 V, +/- 10%, X7R, 0402	0402	885012205029	Würth Elektronik
C55	1	0.068uF	CAP, CERM, 0.068 uF, 50 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0402	0402	CGA2B3X7R1H683K050BB	TDK
D1, D5	2	Blue	LED, Blue, SMD	LED_0603	150060BS75000	Würth Elektronik
D2, D4	2	20V	Diode, Schottky, 20 V, 1 A, SOD-123FL	SOD-123FL	MBR120LSFT1G	ON Semiconductor
D3	1	Green	LED, Green, SMD	LED_0805	LTST-C170KGKT	Lite-On
H1, H2, H3, H4	4		Small nylon hex nut, 0.10 thick with a 0.250 outside diameter and a 4-40 threading	Hex Nut, 4-40 Thread, 250" Head Dia	9605	Keystone
H5, H6	2		Thumb Nut, M3 x 0.5 Thread, 8mm Head Dia		96115A420	McMaster Carr
H7, H8, H9, H10	4		Standoff, Hex, Male/Female, 4-40, Nylon, 1/2"	Standoff, Hex, Male/Female, 4-40, Nylon, 1/2"	4802	Keystone
H11, H12	2		Standoff, Male/Male Thread, 5.15 mm, M3 x 0.5	Standoff	SO-0515-02-02-01	Samtec
J1	1		Connector, Receptacle, Micro-USB Type AB, R/A, Bottom Mount SMT	Connector, USB Micro AB	DX4R205JJAR1800	JAE Electronics
J2	1		Receptacle, 50mil, 6x1, Gold, R/A, TH	6x1 Receptacle	LPPB061NGCN-RC	Sullins Connector Solutions
J3	1		Header, 100mil, 3x1, Gold, TH	3x1 Header	TSW-103-07-G-S	Samtec
J4	1		Terminal Block, 3.5mm Pitch, 2x1, TH	7.0x8.2x6.5mm	ED555/2DS	On-Shore Technology

**Table 8. AC-MB Bill of Materials (continued)**

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
J5	1		Header, 2.54 mm, 2x1, Tin, TH	Header, 2.54 mm, 2x1, TH	TSW-102-07-T-S	Samtec
J6	1		Audio Jack, 3.5mm, Stereo, R/A, SMT	Phone Jack, 6x5x17mm	35RASMT4BHNTRX	Switchcraft
J7	1		Header, 2.54 mm, 11x2, Gold, TH	Header, 11x2, 2.54mm, TH	TSW-111-07-G-D	Samtec
J8	1		Connector, SMT, Receptacle, High Speed, 20 pairs	QSE-020-01-X-D-A	QSE-020-01-L-D-A	Samtec
L1, L3	2	600 ohm	Ferrite Bead, 600 ohm @ 100 MHz, 2 A, 0805	0805	MPZ2012S601AT000	TDK
L2	1	470nH	Inductor, Shielded, Ferrite, 470 nH, 2.35 A, 0.0528 ohm, AEC-Q200 Grade 1, SMD	2.0x1.6x1.0mm	SRN2010TA-R47Y	Bourns
L4	1	100 ohm	Ferrite Bead, 100 ohm @ 100 MHz, 1 A, 0603	0603	MPZ1608D101BTD25	TDK
R1	1	1.0k	RES, 1.0 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04021K00JNED	Vishay-Dale
R2, R3	2	2.2k	RES, 2.2 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW04022K20JNED	Vishay-Dale
R4, R10, R11, R12, R15, R16, R18, R19, R20, R21, R22, R23, R24	13	33.2	RES, 33.2, 1%, 0.05 W, 0201	0201	RC0201FR-0733R2L	Yageo America
R5	1	47.0k	RES, 47.0 k, 1%, 0.0625 W, 0402	0402	RC0402FR-0747KL	Yageo America
R6	1	10.0k	RES, 10.0 k, 1%, 0.1 W, 0402	0402	ERJ-2RKF1002X	Panasonic
R7, R8	2	47k	RES, 47 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040247K0JNED	Vishay-Dale
R9	1	43.2	RES, 43.2, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040243R2FKED	Vishay-Dale
R13	1	10k	RES, 10 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040210K0JNED	Vishay-Dale
R14, R41	2	1.5k	RES, 1.5 k, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06031K50JNEA	Vishay-Dale
R17	1	0	RES, 0, 5%, 0.05 W, AEC-Q200 Grade 1, 0201	0201	ERJ-1GE0R00C	Panasonic
R25, R27, R28, R29, R34, R35, R37, R45, R46, R47	10	10.0k	RES, 10.0 k, 1%, 0.05 W, 0201	0201	CRCW020110K0FKED	Vishay-Dale
R26	1	4.7	RES, 4.7, 5%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW06034R70JNEA	Vishay-Dale
R30	1	25.5k	RES, 25.5 k, 1%, 0.05 W, 0201	0201	RC0201FR-0725K5L	Yageo America
R31	1	51.0k	RES, 51.0 k, 1%, 0.05 W, 0201	0201	RC0201FR-0751KL	Yageo America
R32	1	40.2k	RES, 40.2 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW040240K2FKED	Vishay-Dale
R33	1	1.00Meg	RES, 1.00 M, 1%, 0.125 W, AEC-Q200 Grade 0, 0805	0805	CRCW08051M00FKEA	Vishay-Dale
R36	1	162k	RES, 162 k, 1%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402162KFKED	Vishay-Dale
R38	1	442	RES, 442, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	CRCW0603442RFKEA	Vishay-Dale
R39	1	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
R42, R43	2	200k	RES, 200 k, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402200KJNED	Vishay-Dale
R44	1	680	RES, 680, 5%, 0.063 W, AEC-Q200 Grade 0, 0402	0402	CRCW0402680RJNED	Vishay-Dale
SH1, SH2	2	1x2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SW1	1		Switch, Tactile, SPST-NO, 0.05A, 12V, SMT	Switch, 4.4x2x2.9 mm	TL1015AF160QG	E-Switch
SW2	1		Switch, Slide, 2 SPST, Off-On, 0.025 A, 24 VDC, SMT	7x7.5mm	A6SN-2104	Omron Electronic Components
TP7, TP8, TP9, TP10	4		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone
U1	1		IC MCU 512KB RAM, 128TQFP	TQFP-128	XE216-512-TQ128-C20	XMOS semiconductor

**Table 8. AC-MB Bill of Materials (continued)**

Designator	Quantity	Value	Description	Package Reference	Part Number	Manufacturer
U2	1		Programmable 1-PLL VCXO Clock Synthesizer with 2.5-V or 3.3-V LVCMOS Outputs, PW0014A (TSSOP-14)	PW0014A	CDCE913PWR	Texas Instruments
U3	1		Dual-Bit Dual-Supply Bus Transceiver, DQE0008A, LARGE T&R	DQE0008A	SN74AVC2T244DQER	Texas Instruments
U4, U7	2		Enhanced Product Dual Buffer/Driver with Open-Drain Output, DCK0006A (SOT-SC70-6)	DSF0006A	SN74LVC2G07DSFR	Texas Instruments
U5	1		Single-Channel Ultra-Small Adjustable Supervisory Circuit With Active-High Open-Drain Output, DRY0006A (USON-6)	DRY0006A	TPS3897ADRYR	Texas Instruments
U6	1		Automotive Catalog, Dual, 200mA, Low-IQ Low-Dropout Regulator for Portable Devices, DSE0006A (WSON-6)	DSE0006A	TLV7103318QDSERQ1	Texas Instruments
U8	1		Low-Quiescent-Current 1% Accurate Supervisor With Programmable Delay, DSE0006A (WSON-6)	DSE0006A	TPS389018DSER	Texas Instruments
U9	1		Photolink- Fiber Optic Transmitter, TH	13.5x10x9.7mm	PLT133/T10W	Everlight
U10, U15, U17	3		4-Bit One-of-2 FET Multiplexer/Demultiplexer 2.5-V/3.3-V Low-Voltage, High-Bandwidth Bus Switch, DGV0016A (TVSOP-16)	DGV0016A	SN74CB3Q3257DGVR	Texas Instruments
U11	1		216 kHz Digital Audio Interface Transceiver (DIX) with Stereo ADC and Routing, PCM, S / PDIF, ADC, 4.5 - 5.5V for Analog, 2.9 - 3.6V for DIX, -40 to 85 degC, 48-Pin LQFP (PT), Green (RoHS & no Sb/Br)	PT0048A	PCM9211PT	Texas Instruments
U12, U16, U18, U19, U21, U22	6		4-Bit Dual-Supply Bus Transceiver With Configurable Voltage-Level Shifting and 3-State Outputs, RSV0016A (UQFN-16)	RSV0016A	SN74AVC4T774RSVR	Texas Instruments
U13	1		Photolink- Fiber Optic Receiver, TH	13.5x10x9.7mm	PLR135/T10	Everlight
U14	1		Single Schmitt-Trigger Inverter, DCK0005A (SOT-SC70-5)	DCK0005A	SN74LVC1G14DCKR	Texas Instruments
U20	1		Level-Translating I2C Bus Buffer/Repeater, DGK0008A (VSSOP-8)	DGK0008A	TCA9802DGKR	Texas Instruments
U23	1		Low-Capacitance + / - 15 kV ESD-Protection Array for High-Speed Data Interfaces, 2 Channels, -40 to +85 degC, 5-pin SOT (DRL), Green (RoHS & no Sb/Br)	DRL0005A	TPD2E001DRLR	Texas Instruments
VR1	1		3-A Step-Down Converter with DCS-Control and Hiccup Short Circuit Protection in 2x2 HotRod Package, RLT0007A (VSON-HR-7)	RLT0007A	TPS62085RLTR	Texas Instruments
Y1	1		OSC, 24 MHz, 2.25 - 3.63 V, SMD	2x1.6mm	ASTMLPA-24.000MHZ-EJ-E-T	Abracon Corporation
Y2	1		Crystal, 24.576 MHz, 10pF, SMD	2.5x0.5x2.0mm	ABM10-24.576MHZ-E20-T	Abracon Corporation
FID1, FID2, FID3, FID4, FID5, FID6	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
R40	0	0	RES, 0, 1%, 0.1 W, AEC-Q200 Grade 0, 0603	0603	RMCF0603ZT0R00	Stackpole Electronics Inc
TP1, TP2, TP14, TP15	0		Test Point, Miniature, Red, TH	Red Miniature Testpoint	5000	Keystone
TP3, TP4, TP5, TP6, TP11, TP12, TP13	0		Test Point, Miniature, Green, TH	Green Miniature Testpoint	5116	Keystone

## 8 Matlab Audio Capture Example

The driver for the AC-MB can be controlled with Matlab, allowing for some automated testing. The following code demonstrates capturing audio from the AC-MB with Matlab. This example requires the Audio Toolbox™.

```

if ismac % macOS driver
    deviceReader = audioDeviceReader( 'Device', 'TI USB Audio 2.0',...
        'SampleRate', 48000, ...
        'NumChannels', 8 ,...
        'BitDepth', '32-bit float',...
        'OutputDataType','double');
elseif ispc % windows driver
    deviceReader = audioDeviceReader( 'Driver','ASIO', 'Device', 'Texas Instruments USB
Audio ...',...
        'SampleRate', 48000, ...
        'NumChannels', 8 ,...
        'BitDepth', '32-bit float',...
        'OutputDataType','double');
end
setup(deviceReader); % Setup the device reader

% Play out a file through PC and capture in the EVM
info = audioinfo( infile_name ); % Read audiophile infile_name
fileReader = dsp.AudioFileReader( infile_name ); % Create fileReader object
fileInfo = audioinfo(infile_name); % Copy info from infile_name
fileWriter = dsp.AudioFileWriter( outfile_name, 'SampleRate', deviceReader.SampleRate,
'DataType', 'int32'); % Create fileWriter object

audioOut = audioDeviceWriter('SampleRate', fileInfo.SampleRate); % Setup audio playback
setup( audioOut, zeros(deviceReader.SamplesPerFrame, fileInfo.NumChannels) );

while ~isDone(fileReader) % For each block played out, record the
block from EVM
    audioToPlay = fileReader(); % Read a chunk of audio from
infile_name
    audioOut(audioToPlay); % Play a chance of audio
    [audioRead, numOverrun] = deviceReader(); % Grab a chunk of audio from EVM
    fileWriter(audioRead); % Write the chunk of audio from EVM to a
file
end

release(audioOut); % Close all objects
release(fileReader);
release(fileWriter);
release(deviceReader);

```

## Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

<b>Changes from A Revision (January 2020) to B Revision</b>	<b>Page</b>
• Changed front page EVM photo.....	1
• Changed <i>PCM6xx0Q1EVM Connection for Line Input Application</i> figure .....	9
• Changed <i>PCM6xx0Q1EVM Connection for the Onboard Microphone Test</i> figure.....	11
• Changed <i>System Overview</i> figure .....	34
• Changed schematics and BOM tables in <i>Schematic and Bill of Materials</i> section.....	35

<b>Changes from Original (January 2020) to A Revision</b>	<b>Page</b>
• Changed PCM6xx0Q to PCM6xx0Q1, PCM6260Q to PCM6260Q1, PCM6240Q to PCM6240Q1, PCM6360Q to PCM6360Q1 throughout document.....	1
• Changed <i>Device</i> column of <i>PCM6xx0Q1 Family</i> table.....	3
• Deleted 2 $V_{RMS}$ ( <i>normal mode</i> ) rows from <i>Input Jumper Configuration</i> table .....	8
• Changed <i>AC-Coupled Line Input Biasing</i> section for clarity .....	10

## STANDARD TERMS FOR EVALUATION MODULES

1. *Delivery:* TI delivers TI evaluation boards, kits, or modules, including any accompanying demonstration software, components, and/or documentation which may be provided together or separately (collectively, an "EVM" or "EVMs") to the User ("User") in accordance with the terms set forth herein. User's acceptance of the EVM is expressly subject to the following terms.
  - 1.1 EVMs are intended solely for product or software developers for use in a research and development setting to facilitate feasibility evaluation, experimentation, or scientific analysis of TI semiconductor products. EVMs have no direct function and are not finished products. EVMs shall not be directly or indirectly assembled as a part or subassembly in any finished product. For clarification, any software or software tools provided with the EVM ("Software") shall not be subject to the terms and conditions set forth herein but rather shall be subject to the applicable terms that accompany such Software
  - 1.2 EVMs are not intended for consumer or household use. EVMs may not be sold, sublicensed, leased, rented, loaned, assigned, or otherwise distributed for commercial purposes by Users, in whole or in part, or used in any finished product or production system.
2. *Limited Warranty and Related Remedies/Disclaimers:*
  - 2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.
  - 2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.
  - 2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

### **WARNING**

**Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.**

**User shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.**

**NOTE:**

**EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.**

### 3 Regulatory Notices:

#### 3.1 United States

##### 3.1.1 Notice applicable to EVMs not FCC-Approved:

**FCC NOTICE:** This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

##### 3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

#### **CAUTION**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### **FCC Interference Statement for Class A EVM devices**

*NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*

#### **FCC Interference Statement for Class B EVM devices**

*NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:*

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

#### 3.2 Canada

##### 3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

#### **Concerning EVMs Including Radio Transmitters:**

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

#### **Concernant les EVMs avec appareils radio:**

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

#### **Concerning EVMs Including Detachable Antennas:**

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

### Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

#### 3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see [http://www.tij.co.jp/lstds/ti\\_ja/general/eStore/notice\\_01.page](http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page) 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。  
[http://www.tij.co.jp/lstds/ti\\_ja/general/eStore/notice\\_01.page](http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page)

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

【無線電波を送信する製品の開発キットをお使いになる際の注意事項】 開発キットの中には技術基準適合証明を受けていないものがあります。技術適合証明を受けていないものご使用に際しては、電波法遵守のため、以下のいずれかの措置を取っていただく必要がありますのでご注意ください。

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2. 実験局の免許を取得後ご使用いただく。
3. 技術基準適合証明を取得後ご使用いただく。

なお、本製品は、上記の「ご使用にあたっての注意」を譲渡先、移転先に通知しない限り、譲渡、移転できないものとします。

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電力線搬送波通信についての開発キットをお使いになる際の注意事項については、次のところをご覧ください。[http://www.tij.co.jp/lstds/ti\\_ja/general/eStore/notice\\_02.page](http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_02.page)

#### 3.4 European Union

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive):*

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.



- 
- 4 *EVM Use Restrictions and Warnings:*
    - 4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.
    - 4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.
    - 4.3 *Safety-Related Warnings and Restrictions:*
      - 4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative. During normal operation, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.
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