

User's Guide

PCM6xx0Q1EVM-PDK Evaluation Module

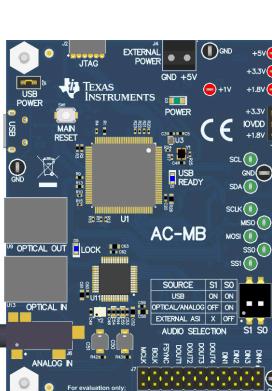


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ABSTRACT

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.

left: AC-MB



right: EVM

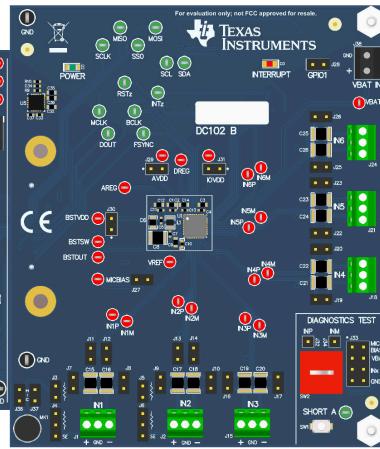


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1 Introduction

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 1-1](#) 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 1-1. PCM6xx0Q1 Family

| Device | Integrated Boost | Number of Channels |
|-----------|------------------|--------------------|
| PCM6260Q1 | Yes | 6 |
| PCM6240Q1 | Yes | 4 |
| PCM6360Q1 | 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 2-1](#) shows a block diagram of the ASI routing on the AC-MB.

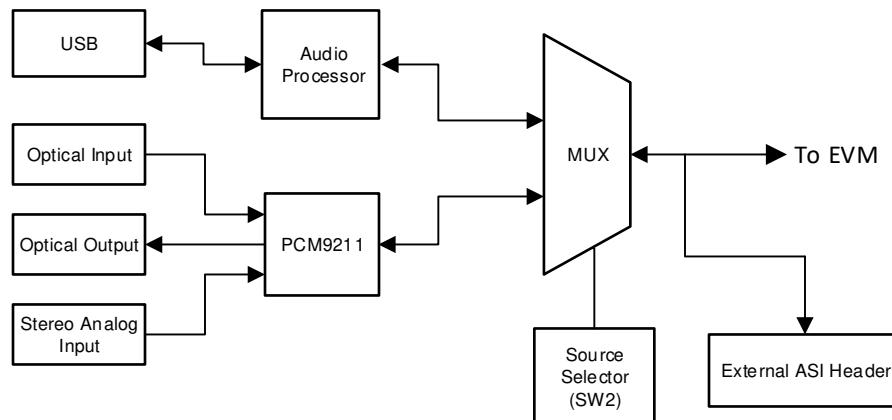


Figure 2-1. AC-MB Audio Serial Interface Routing

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 2-2](#)): 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).

2.1.1.2

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



Figure 2-2. AC-MB USB Audio Setting

2.1.1.3 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 2-3 shows the AC-MB audio setting for the optical and analog mode of operation.



Figure 2-3. 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, I²S mode.

2.1.1.4 External

this is input "clock" source from 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 2-4](#) shows the AC-MB audio setting for the external mode of operation.



Figure 2-4. AC-MB External Audio Setting

[Figure 2-5](#) shows how to connect the external audio interface. Odd numbered pins are signal carrying, and even numbered pins are connected to ground.

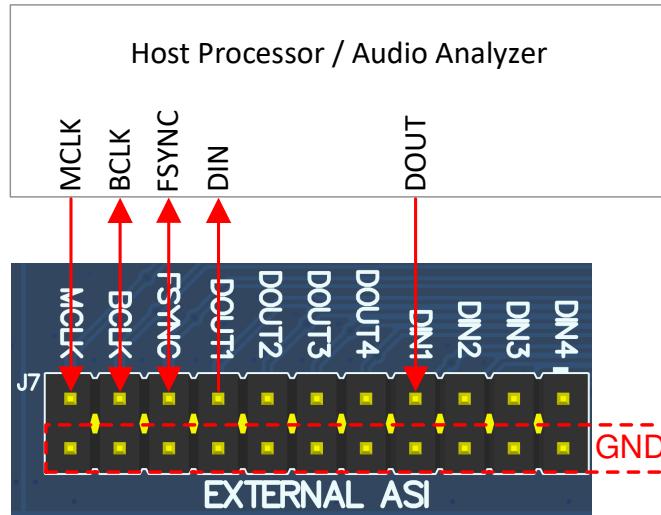


Figure 2-5. AC-MB Connection With External Audio Serial Interface

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 2-6](#) shows a block diagram depicting the power structure of the AC-MB.

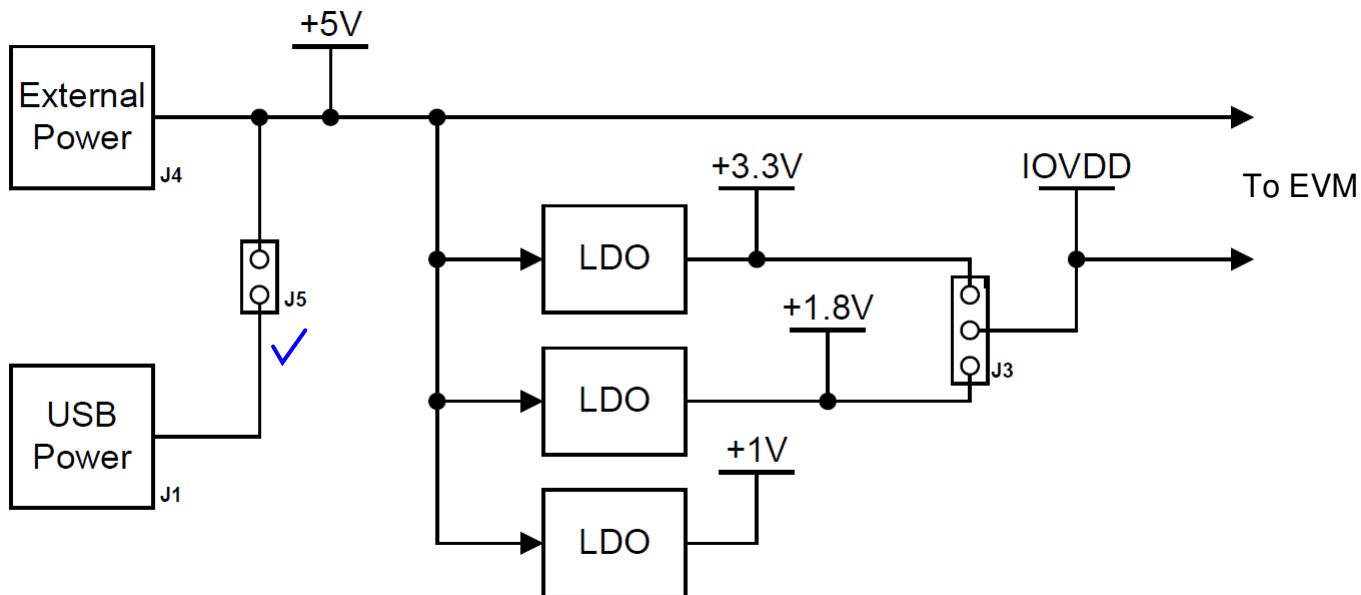


Figure 2-6. Power-Supply Distribution of the AC-MB

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 2-7](#) shows the architecture of the inputs to the evaluation module.

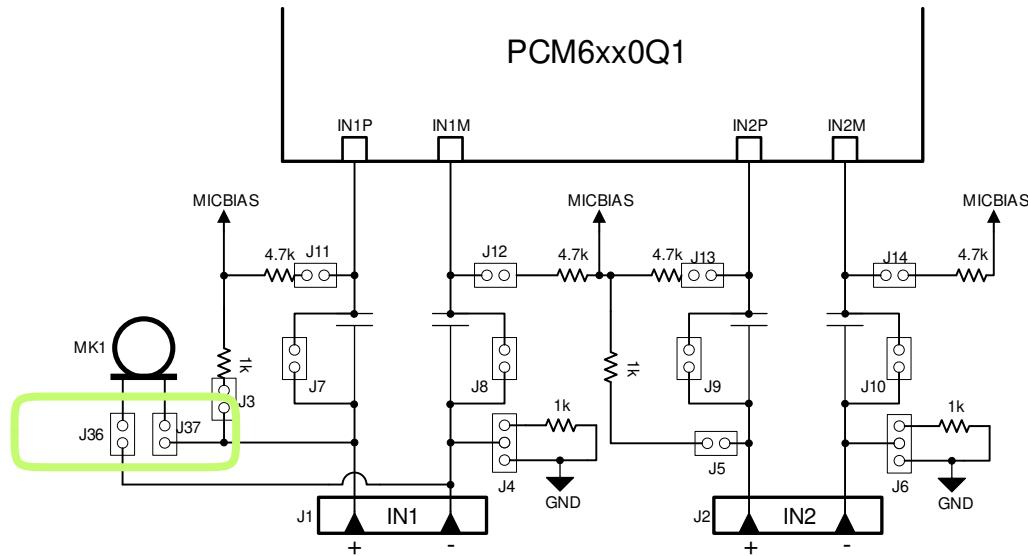


Figure 2-7. PCM6xx0EVM Input Architecture for Channels 1 and 2

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 2-1](#).

As shown in [Figure 2-8](#), 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 though the removal or replacement of R34-R45. [Table 2-1](#) lists the recommended values for bias resistors for AC-coupled inputs across the MICBIAS voltage and input swing.

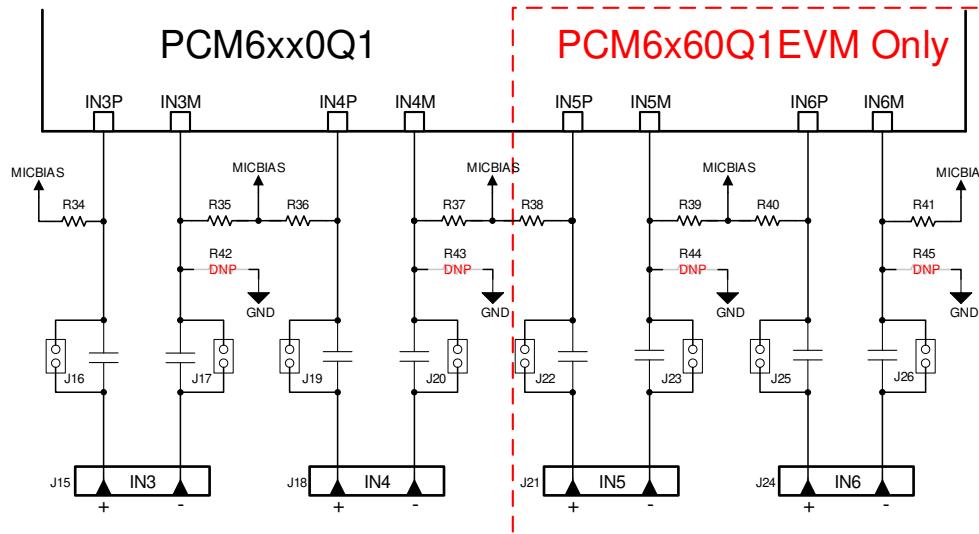


Figure 2-8. PCM6xx0Q1EVM Input Architecture for Channels 3-6

Table 2-1. 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 _{RMS} |
| | Single-ended, AC-coupled | J3, J7, J8 uninstalled; J4 (2-3), J11, J12, and J27 installed | 5 V _{RMS} |
| | Differential, DC-coupled | J3, J4, J11, and J12 uninstalled; J7 and J8 installed | 2 V _{RMS} (normal mode) 10 V _{RMS} (high swing mode) |
| | Single-ended, DC-coupled | J3, J11, and J12 uninstalled; J4 (2-3), J7, and J8 installed | 1 V _{RMS} (normal mode) 5 V _{RMS} (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 uninstalled; J13, J14, and J27 installed | 10 V _{RMS} |
| | Single-ended, AC-coupled | J5, J9, and J10 uninstalled; J6 (2-3), J13, J14, and J27 installed | 5 V _{RMS} |
| | Differential, DC-coupled | J5, J6, J13, and J14 uninstalled; J9 and J10 installed | 2 V _{RMS} (normal mode) 10 V _{RMS} (high swing mode) |
| | Single-ended, DC-coupled | J5, J13, and J14 uninstalled; J6 (2-3), J9 and J10 installed | 1 V _{RMS} (normal mode) 5 V _{RMS} (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 J16 and J17 installed; J27 optional (MICBIAS); R34 and R35 removed | 10 V _{RMS} |
| | Single-ended, AC-coupled | | 5 V _{RMS} |
| | Differential, DC-coupled | | 2 V _{RMS} (normal mode) 10 V _{RMS} (high swing mode) |
| | Single-ended, DC-coupled | | 1 V _{RMS} (normal mode) 5 V _{RMS} (high swing mode) |
| | External electret microphone | | |
| IN4 | Differential, AC-coupled | J19, J20, and J27 uninstalled J19 and J20 installed; J27 optional (MICBIAS); R36 and R37 removed | 10 V _{RMS} |
| | Single-ended, AC-coupled | | 5 V _{RMS} |
| | Differential, DC-coupled | | 2 V _{RMS} (normal mode) 10 V _{RMS} (high swing mode) |
| | Single-ended, DC-coupled | | 1 V _{RMS} (normal mode) 5 V _{RMS} (high swing mode) |
| | External electret microphone | | |
| IN5 | Differential, AC-coupled | J22, J23, and J27 uninstalled J22 and J23 installed; J27 optional (MICBIAS); R38 and R39 removed | 10 V _{RMS} |
| | Single-ended, AC-coupled | | 5 V _{RMS} |
| | Differential, DC-coupled | | 2 V _{RMS} (normal mode) 10 V _{RMS} (high swing mode) |
| | Single-ended, DC-coupled | | 1 V _{RMS} (normal mode) 5 V _{RMS} (high swing mode) |
| | External electret microphone | | |
| IN6 | Differential, AC-coupled | J25, J26, and J27 uninstalled J25 and J26 installed; J27 optional (MICBIAS); R40 and R41 removed | 10 V _{RMS} |
| | Single-ended, AC-coupled | | 5 V _{RMS} |
| | Differential, DC-coupled | | 2 V _{RMS} (normal mode) 10 V _{RMS} (high swing mode) |
| | Single-ended, DC-coupled | | 1 V _{RMS} (normal mode) 5 V _{RMS} (high swing mode) |
| | External electret microphone | | |

2.2.1 Line Inputs

For the line input configuration (shown in [Figure 2-9](#)), 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.

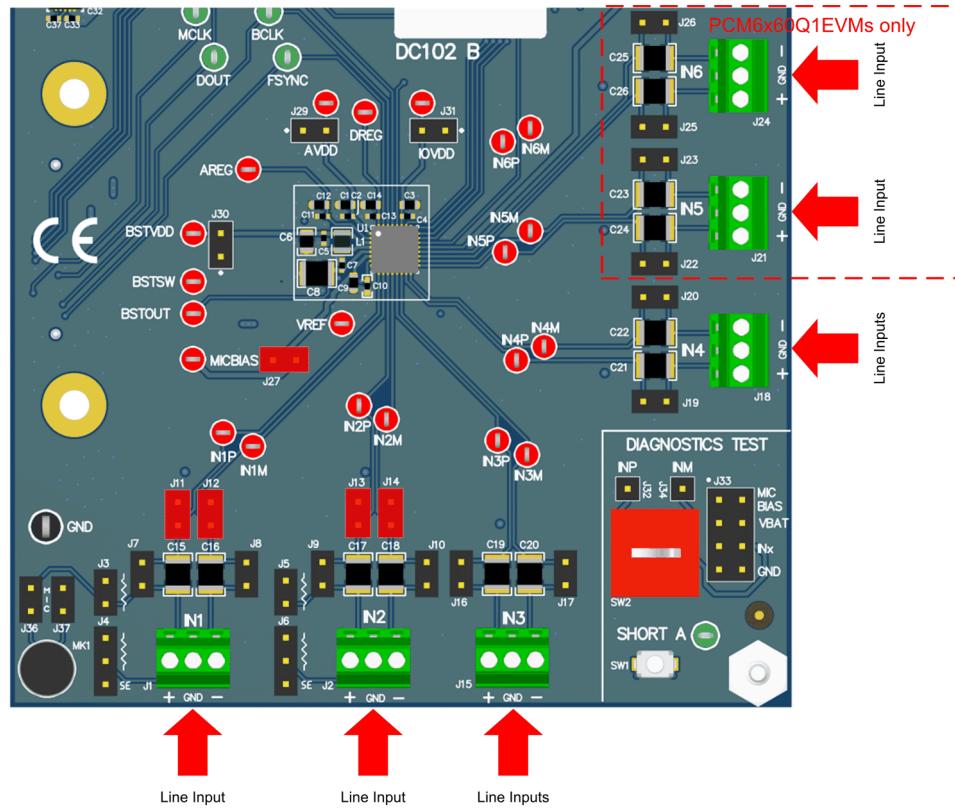


Figure 2-9. PCM6xx0Q1EVM Connection for Line Input Application

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 2-2](#) lists the recommended values for these resistors. For lower input swing, the PGA is required to reach full-scale input.

Table 2-2. Recommended AC-Coupled Line Input Bias Resistor Values

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

2.2.2 Onboard Microphone Input

For the onboard microphone input configuration (shown in [Figure 2-10](#)), 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.

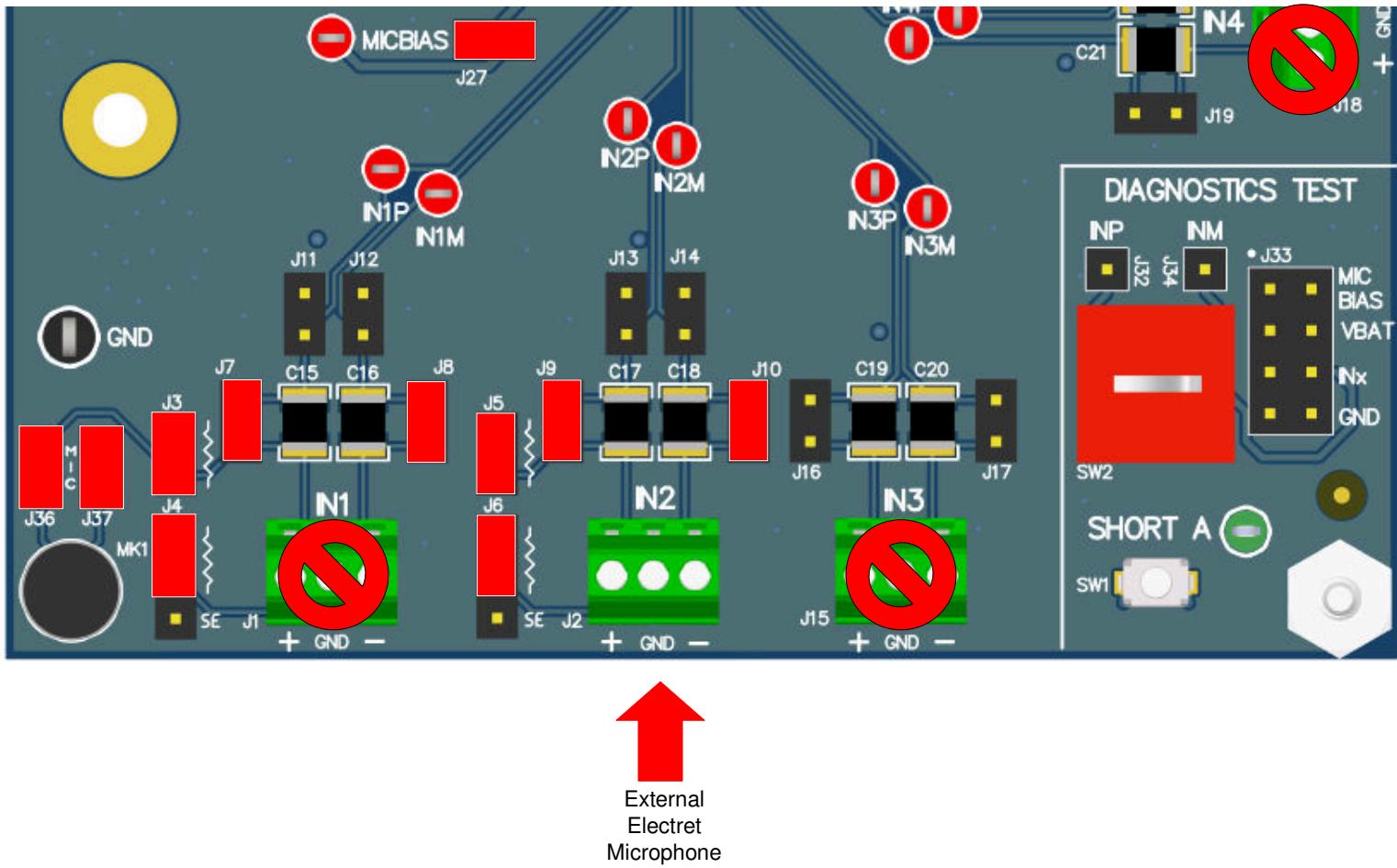


Figure 2-10. PCM6xx0Q1EVM Connection for the Onboard Microphone Test

2.2.3 Diagnostics Hardware Setup

The diagnostics test circuitry, as shown in [Figure 2-11](#), 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.

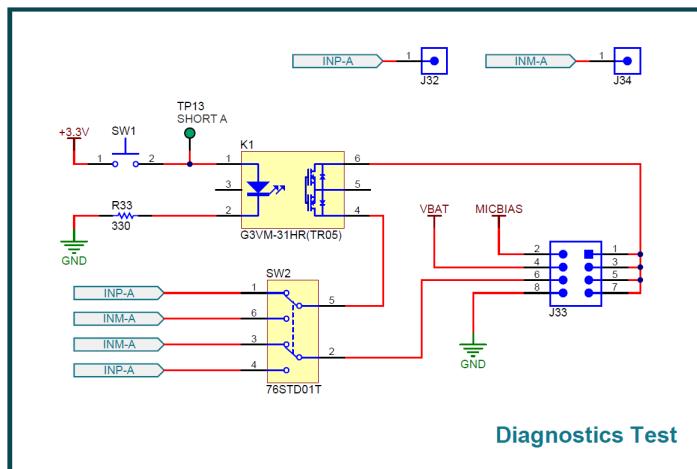


Figure 2-11. PCM6xx0Q1EVM Diagnostics Circuitry

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 2-12](#) shows a short to the MICBIAS test. If using a single-ended input for the test channel, only connect INxP.

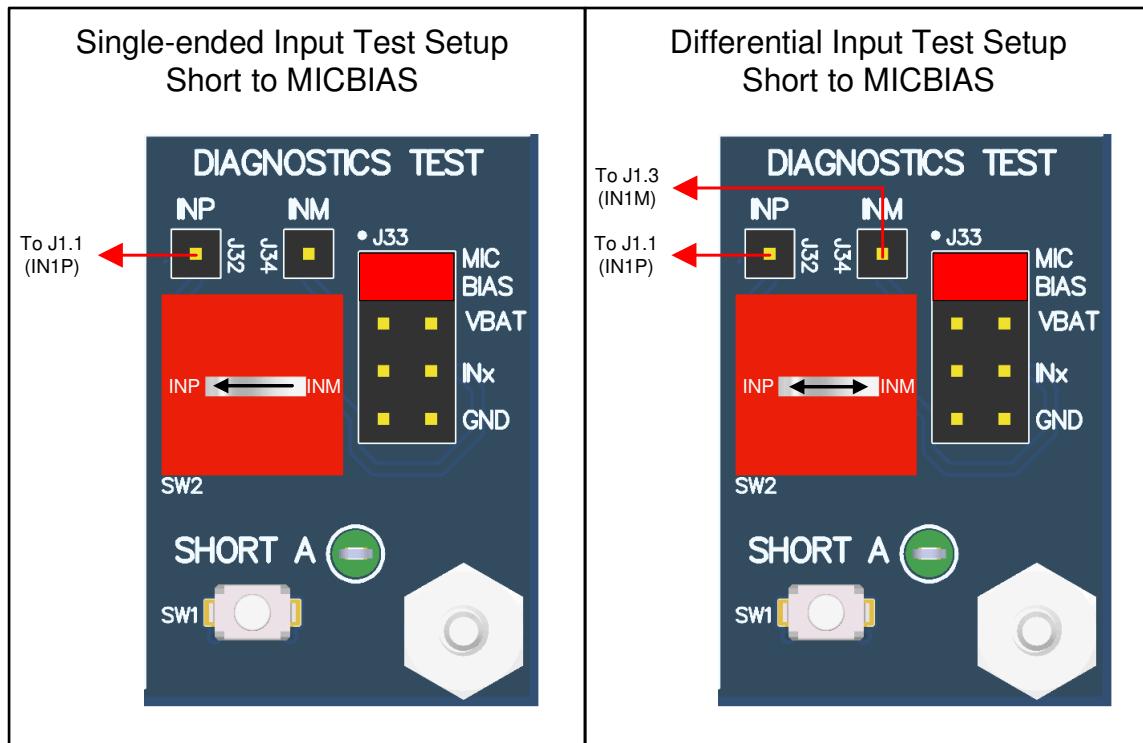


Figure 2-12. Short to MICBIAS Diagnostic Test Setup

2.2.3.2 Short to VBAT Setup

A short to VBAT tests (shown in [Figure 2-13](#)) 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.

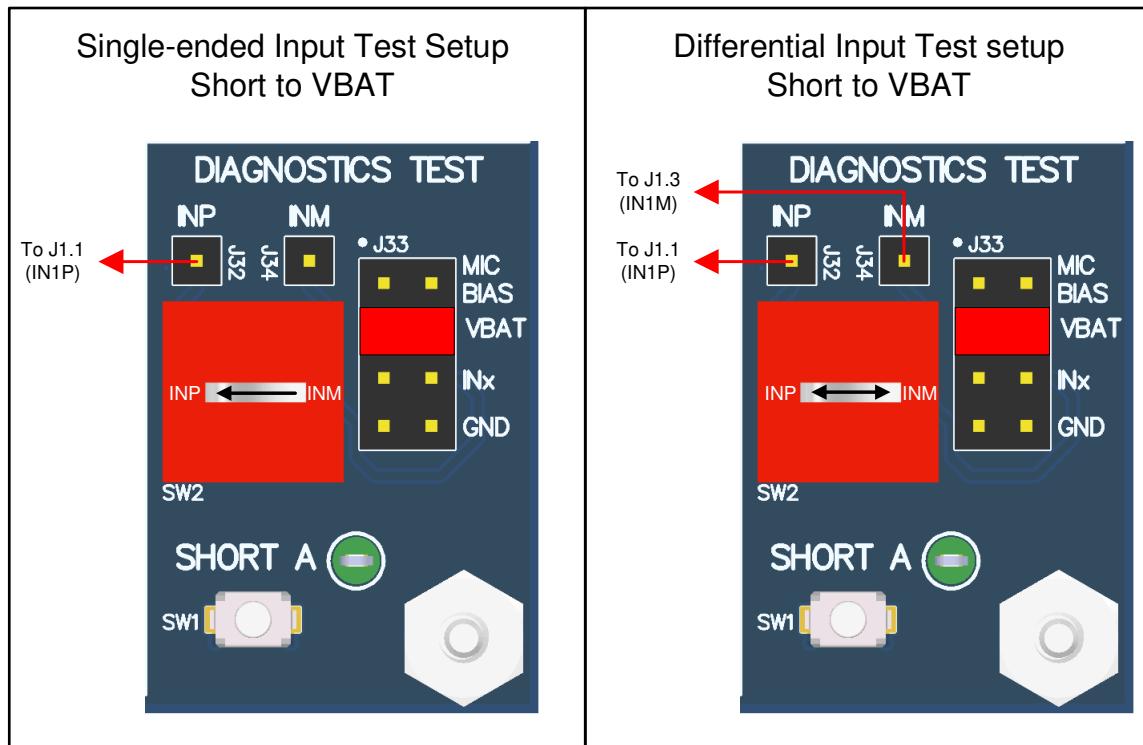


Figure 2-13. Short to VBAT Diagnostic Test Setup

2.2.3.3 Shorted Input Pins Setup

Shorted input testing ([Figure 2-14](#)) can be performed for differential inputs only.

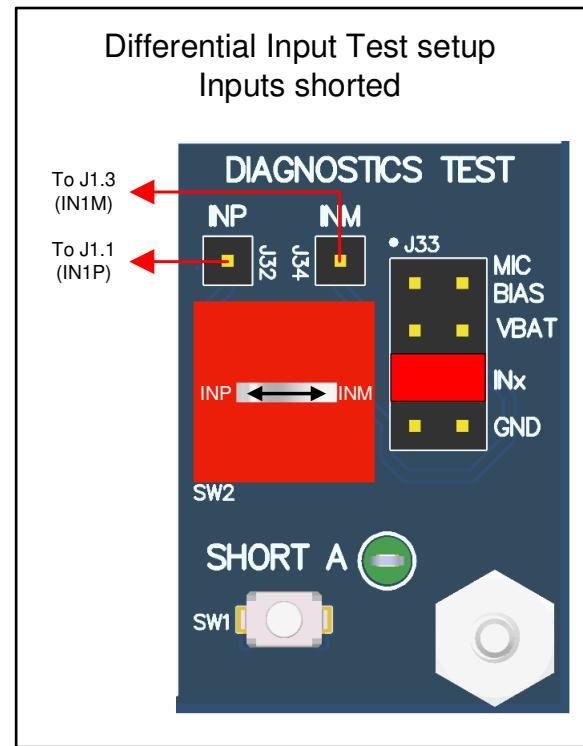


Figure 2-14. Inputs Shorted Diagnostic Test Setup

2.2.3.4 Short to GND Setup

Figure 2-15 shows the short to ground testing for the inputs.

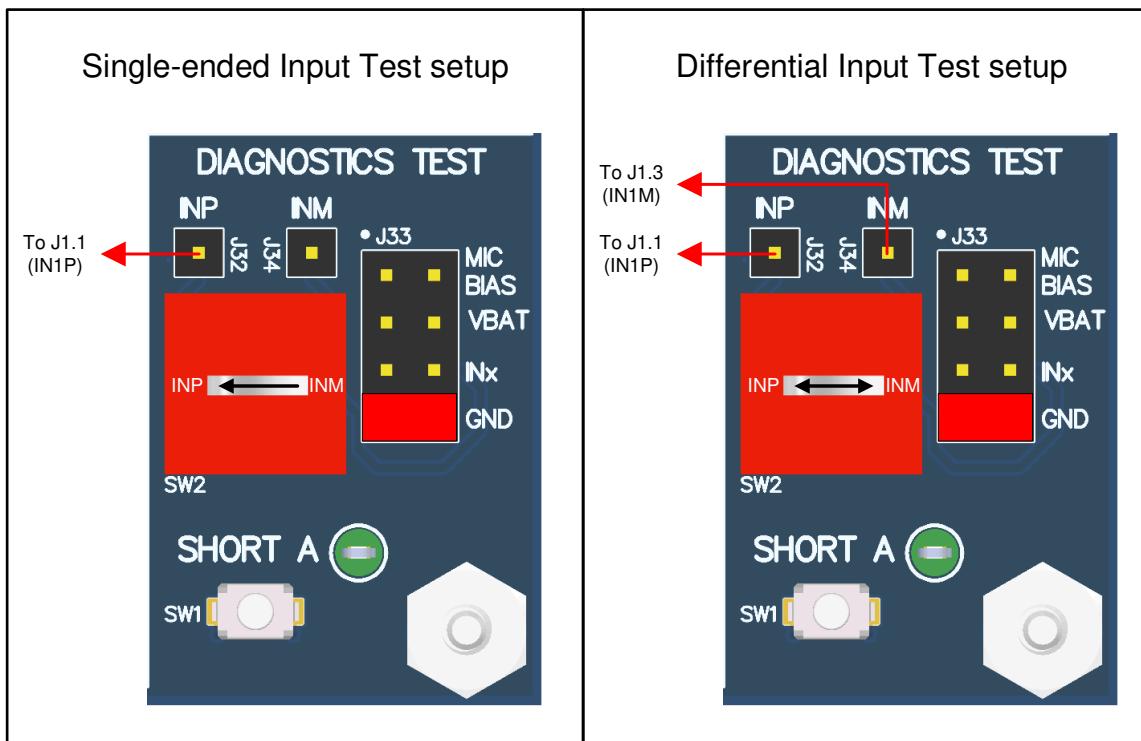


Figure 2-15. Short to Ground Diagnostic Test Setup

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 2-16](#), by the installation or removal of resistors on the bottom of the EVM.

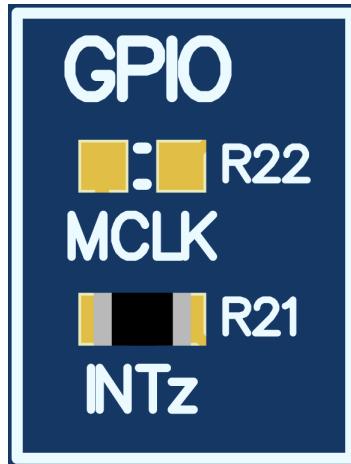


Figure 2-16. GPIO1 Hardware Configuration

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 I²C 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 I²C portion of the control selection area, as shown in [Figure 2-17](#), on the bottom of the EVM.

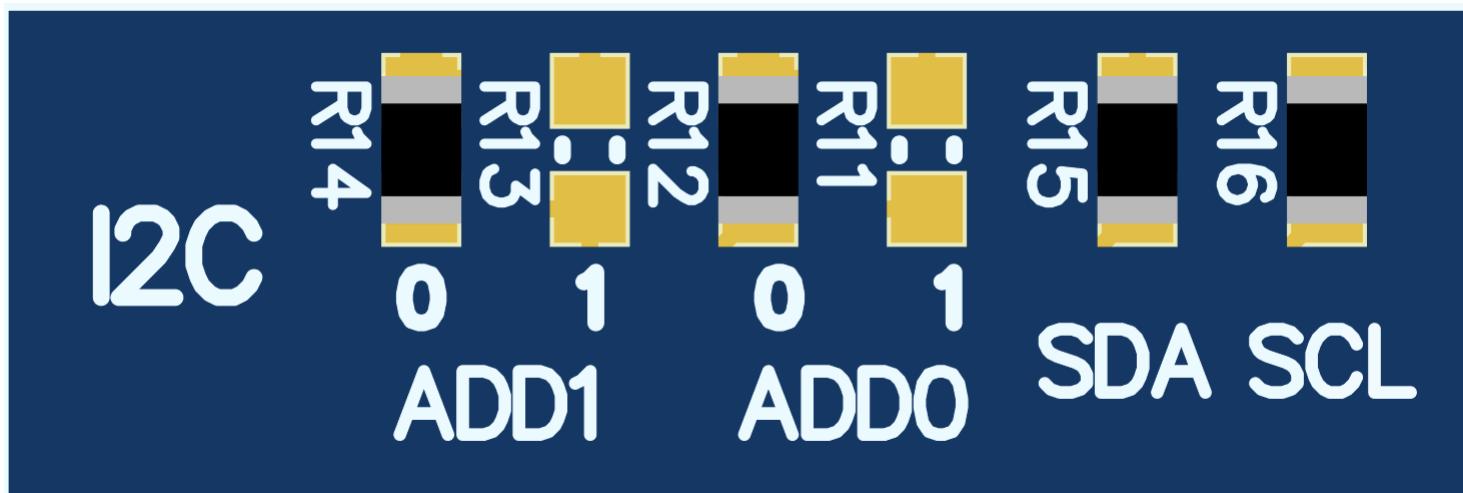


Figure 2-17. I²C Control Selection

A configuration guide is provided in [Table 2-3](#) for the convenience of the user.

Table 2-3. I²C Address Selection

| I ² 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 and request access. If the PPC3 is already installed, proceed to [Section 3.2](#). Figure 3-1 shows the setup directory for the PPC3 installation.

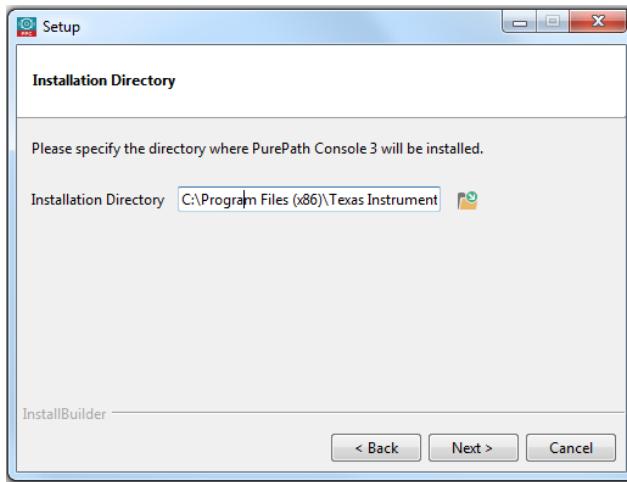


Figure 3-1. PurePath Console 3 Installation

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.

3.2.2 USB Audio Setup

When using the USB audio interface, the Texas Instruments USB audio device control panel, shown in [Figure 3-2](#), 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.

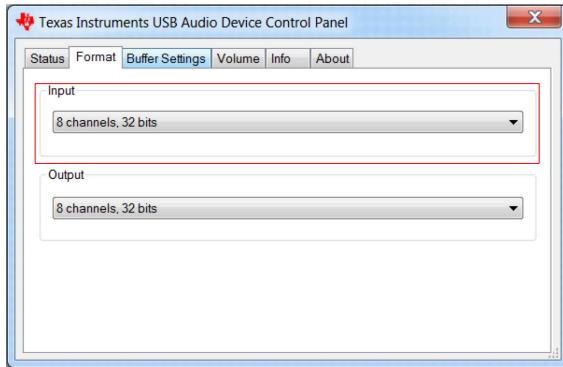


Figure 3-2. Texas Instruments USB Audio Device Control Panel

3.2.3 Software Setup

Open the PPC3 application in the directory chosen for the GUI installation in [Section 3.1](#). [Figure 3-3](#) shows the resulting app center window. Click on the PCM6xx0 app tile.

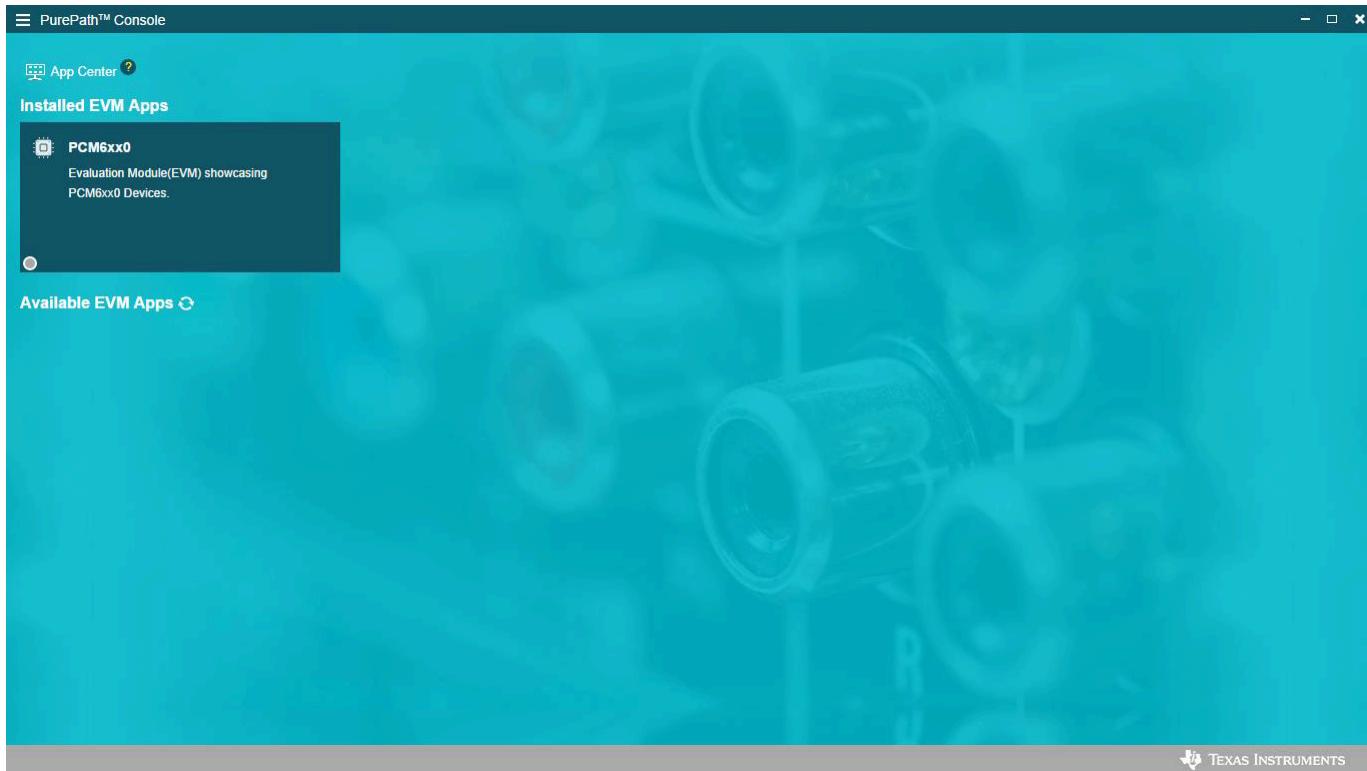


Figure 3-3. PurePath Console 3 App Center

The PCM6xx0 GUI is designed to work with up to four devices at any time. As shown in [Figure 3-4](#), choose the 1 device radial button and click *New*.

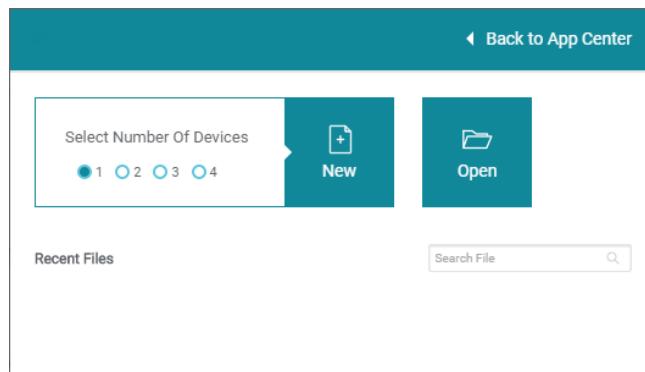


Figure 3-4. Initial GUI Configuration

As shown in [Figure 3-5](#), the GUI opens to the *Audio Config* tab.

The screenshot shows the "Audio Config" tab of the PurePath™ Console for the PCM6xx0 (PCM6260). The interface is divided into several sections:

- Left Sidebar:** Includes icons for Home, Settings, and Help.
- Top Bar:** Shows the title "PurePath™ Console -PCM6xx0 (PCM6260)" and tabs for "Audio Config", "Diagnostics", "Audio Serial Bus", "GPIO/Interrupts", "Programmable Biquads", and "AGC". A "Load preset" button is also present.
- Channel Configuration:** Six channels (Channel 1 to Channel 6) are shown, each with "ENABLED" status. Each channel has settings for Type (Microphone), Source (Differential), Coupling (DC Coupled), and various calibration sliders (Phase Calibration, Gain Calibration). Below these are "Channel Gain" and "Digital Volume" sliders.
- Right Panel:** Contains sections for "ALL CHANNELS" (MIC Bias, High Pass Filter, Channel Summation Mode), "AUDIO CONFIGURATION" (Protocol Format, Word Length, ASI Output Channels), and monitoring tools like "I2C Monitor".
- Bottom:** Includes a footer with the text "PCM6260 (FWIDPCM6260EVMA0)", "I2C Monitor", and the Texas Instruments logo.

Figure 3-5. Audio Config Tab

Before changing any parameters, check the lower left corner of the PPC3 window, as shown in [Figure 3-6](#), 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.

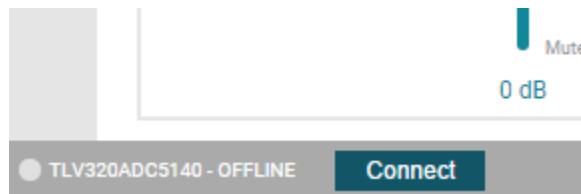


Figure 3-6. Hardware Connect

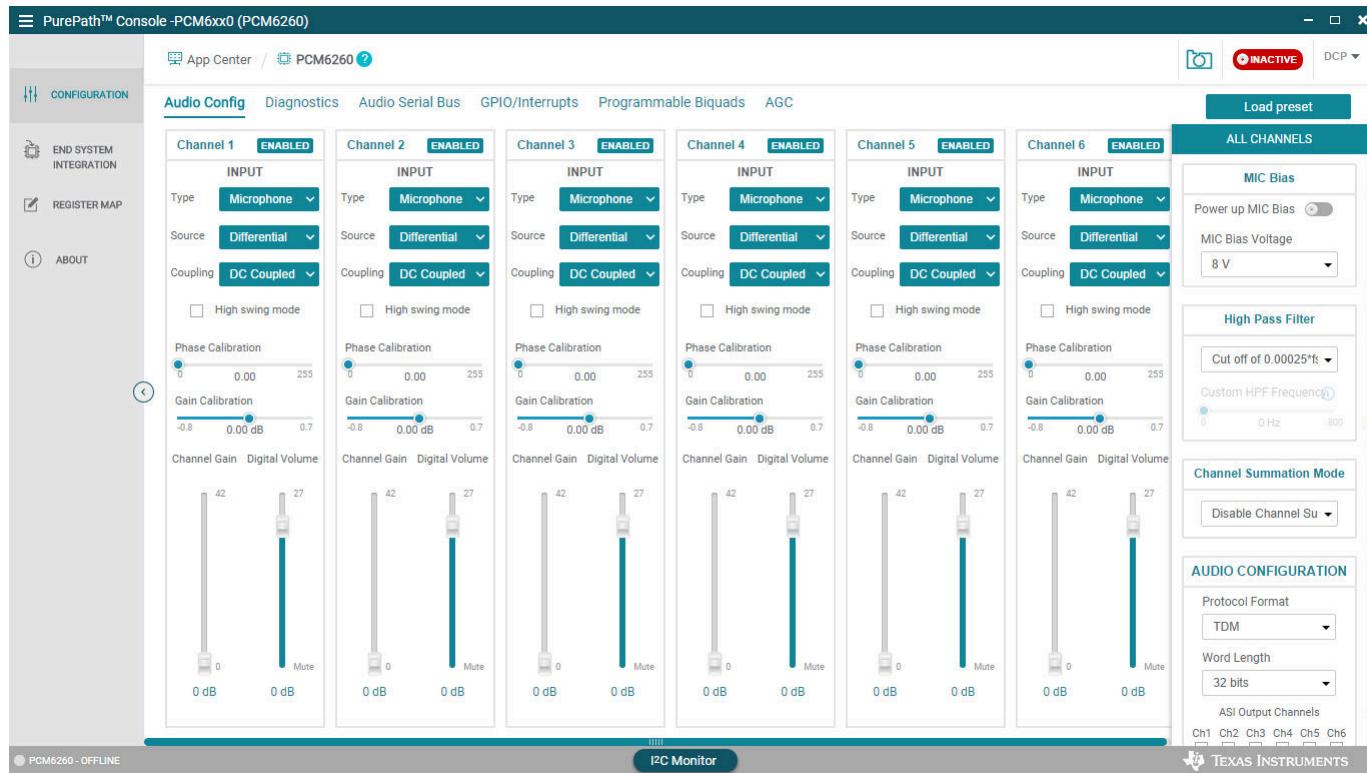
When the hardware is connected, the *Connect* button changes to read *Disconnect*, and the device is ready to be configured.

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 4-1](#), 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.



The screenshot shows the PurePath™ Console interface for the PCM6xx0 (PCM6260). The top navigation bar includes tabs for App Center, PCM6260, and various system status indicators. The main area is divided into several sections:

- Configuration Tab:** Contains sections for END SYSTEM INTEGRATION, REGISTER MAP, and ABOUT.
- Audio Config Tab:** Shows six channels (Channel 1 to Channel 6) for configuration. Each channel panel includes settings for Type (Microphone), Source (Differential), Coupling (DC Coupled), High swing mode, Phase Calibration, Gain Calibration, Channel Gain, Digital Volume, and Mute controls.
- Diagnostics Tab:** Includes an I2C Monitor section.
- Programmable Biquads Tab:** Contains a section for ALL CHANNELS with settings for MIC Bias (Power up MIC Bias, MIC Bias Voltage 8 V), High Pass Filter (Cut off of 0.00025f, Custom HPF Frequency 0 Hz to 800 Hz), and Channel Summation Mode (Disable Channel Sum).
- AGC Tab:** Contains an AUDIO CONFIGURATION section with Protocol Format (TDM), Word Length (32 bits), and ASI Output Channels (Ch1, Ch2, Ch3, Ch4, Ch5, Ch6).

Figure 4-1. Configuration View

4.1.1 Audio Config

The audio config tab ([Figure 4-2](#)) contains the controls for the analog inputs and the associated input channels.

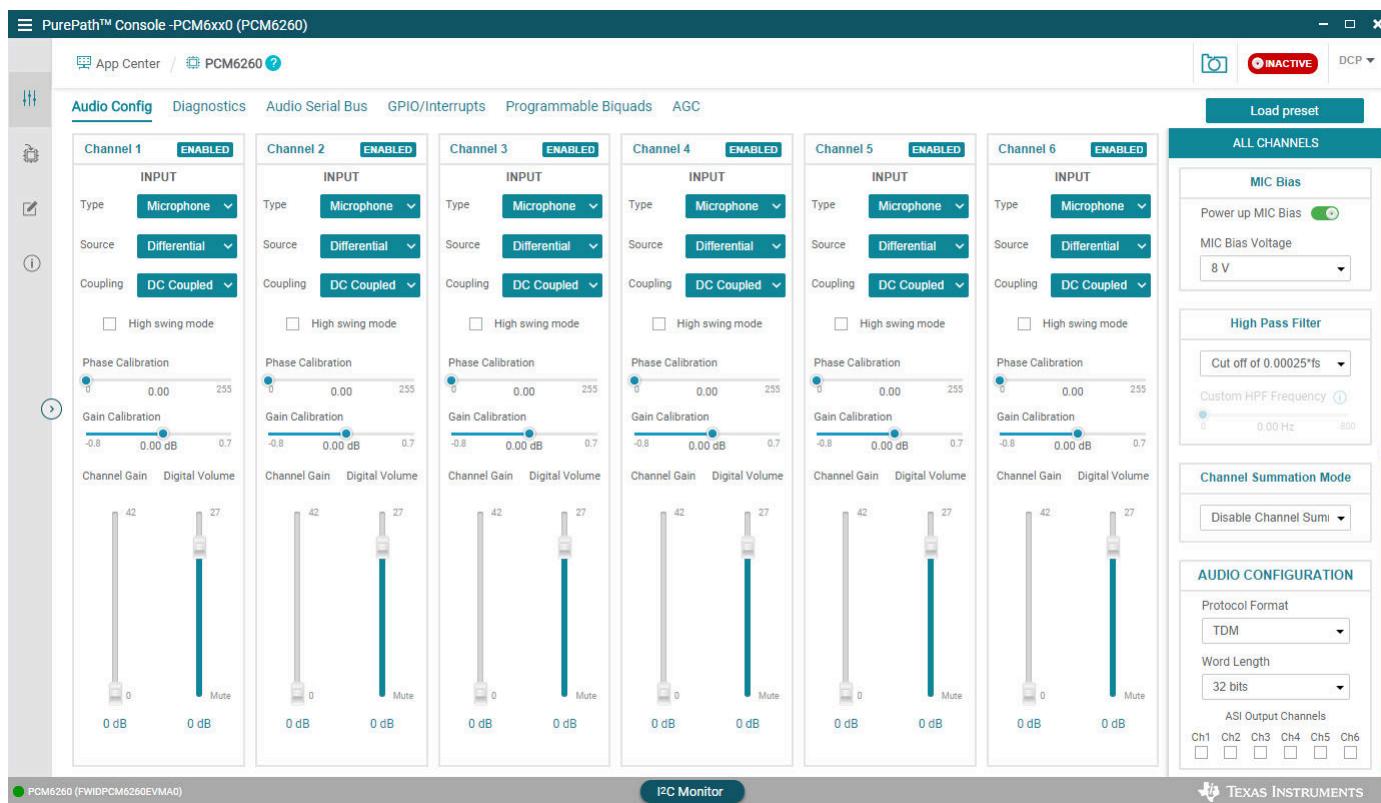
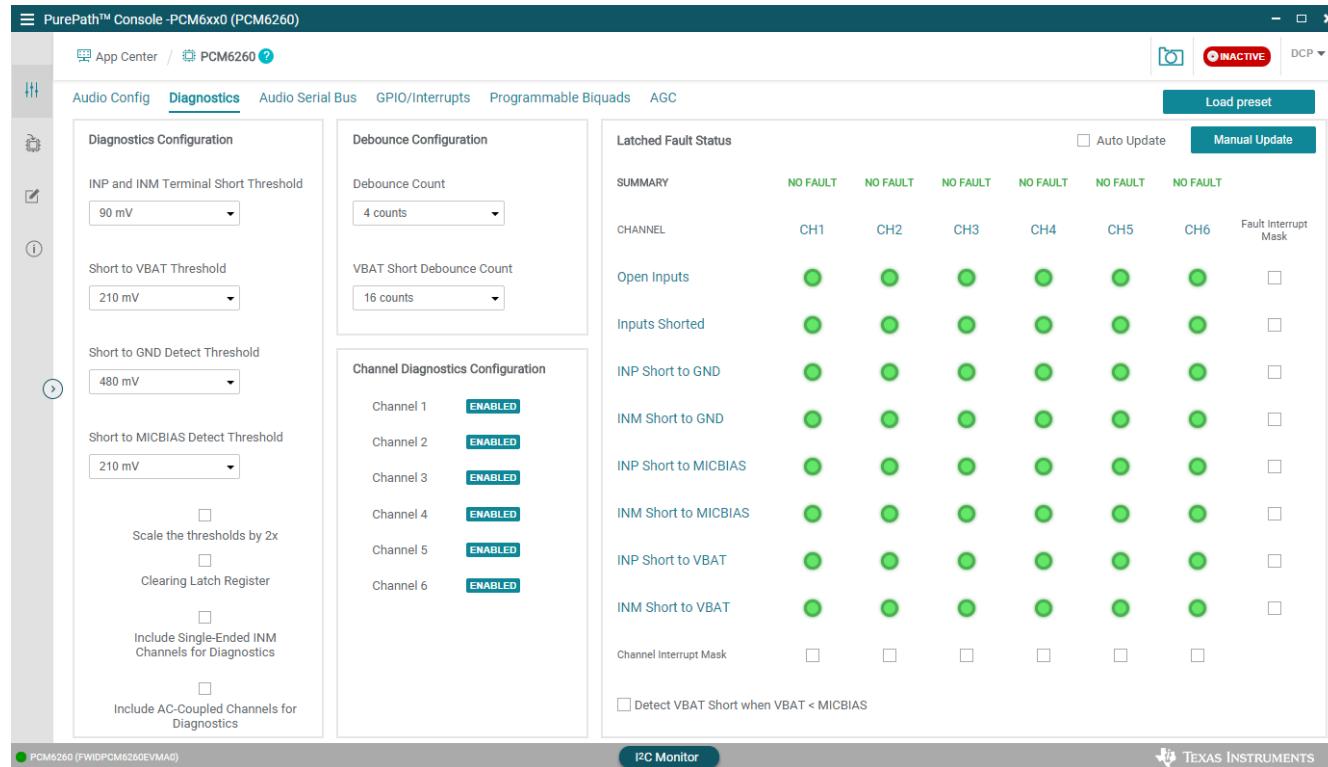


Figure 4-2. Audio Config Tab

4.1.2 Diagnostics

The diagnostics tab ([Figure 4-3](#)) 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.



| Latched Fault Status | | | | | | | |
|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|
| SUMMARY | NO FAULT | |
| CHANNEL | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | Fault Interrupt Mask |
| Open Inputs | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Inputs Shorted | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| INP Short to GND | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| INM Short to GND | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| INP Short to MICBIAS | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| INM Short to MICBIAS | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| INP Short to VBAT | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| INM Short to VBAT | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Channel Interrupt Mask | <input type="checkbox"/> | |
| <input type="checkbox"/> Detect VBAT Short when VBAT < MICBIAS | | | | | | | |

Figure 4-3. 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 4-4) 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.

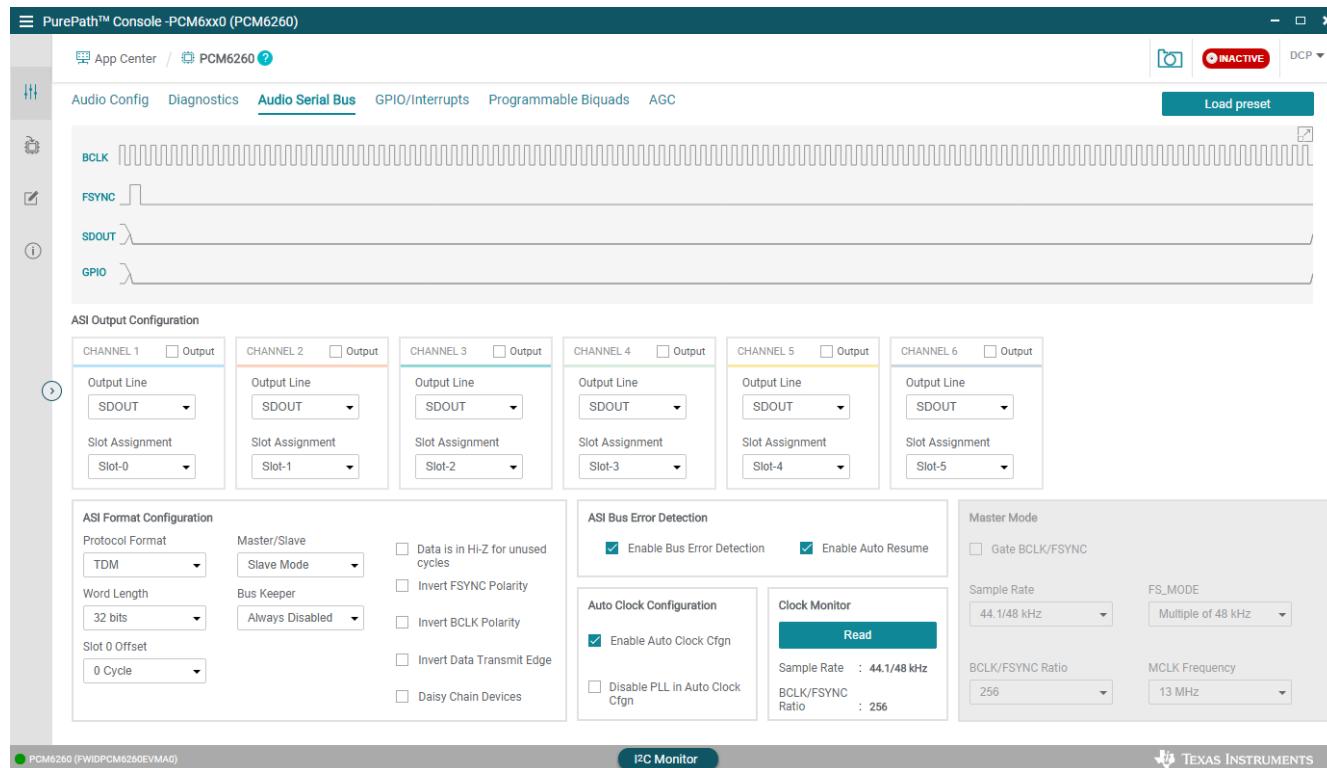


Figure 4-4. Audio Serial Bus Tab

4.1.3.1 Configuring the Audio Serial Bus for the I²S 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 I²S. This section describes how to configure the PCM6xx0Q1EVM for a 2-channel I²S 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 4-5](#), select the audio serial bus tab.

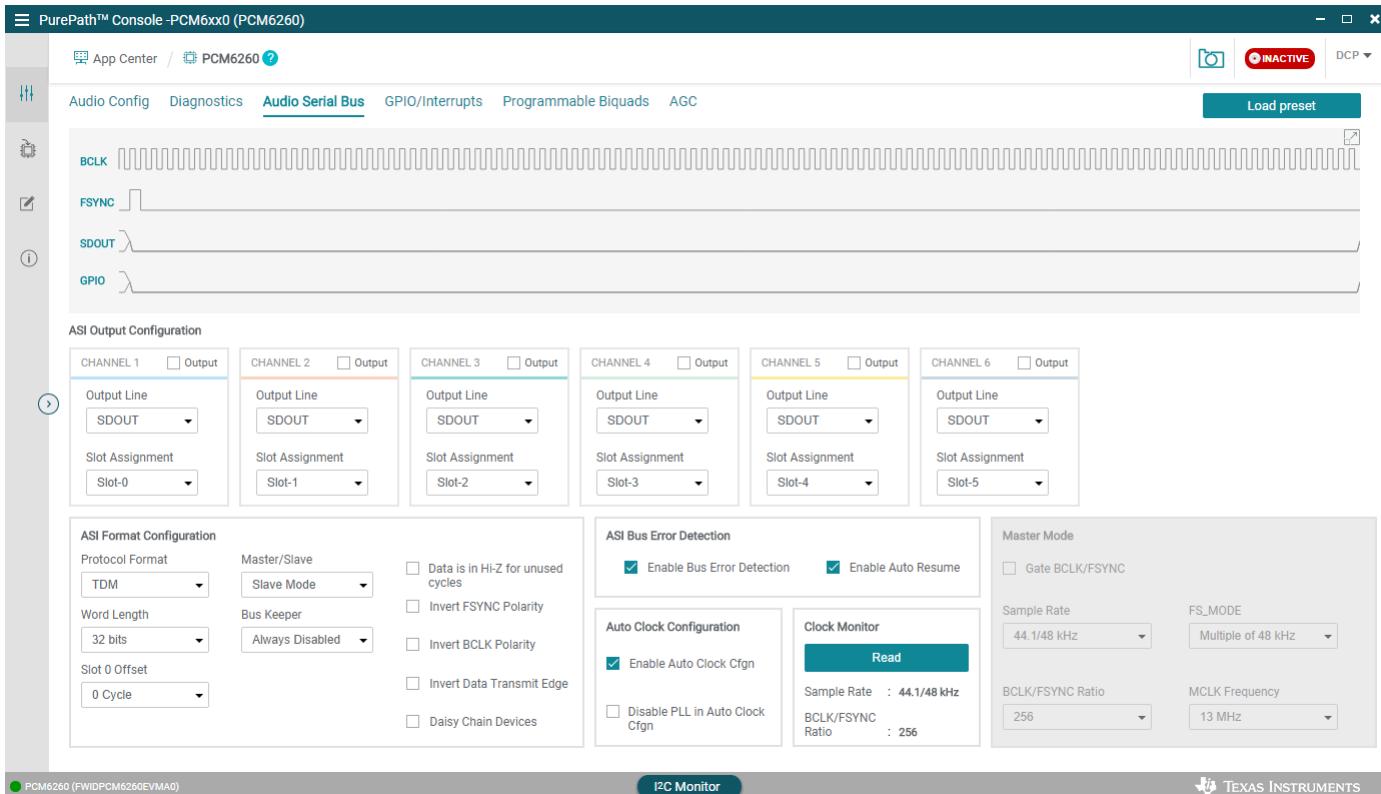


Figure 4-5. Audio Serial Bus Tab

In the ASI format configuration pane (shown in [Figure 4-6](#)), change the protocol format to I²S, and the word length to 16 bits.

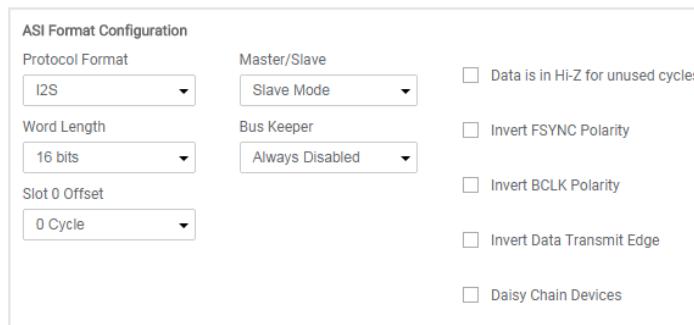


Figure 4-6. ASI Format Configuration

When the protocol format is changed to I²S in the GUI, the USB audio processor on the AC-MB also changes the audio format to I²S. 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 4-7](#), in the clock monitor pane.

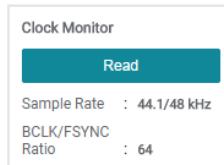


Figure 4-7. Clock Monitor Pane

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 4-8](#), 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.

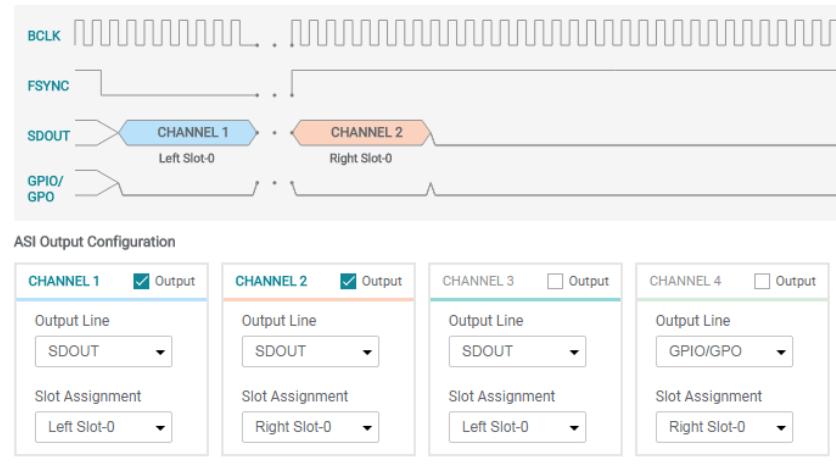


Figure 4-8. Channel Output Configuration and Diagram

The AC-MB motherboard currently supports only two channels per data line when in I²S 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 4-9](#), 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.

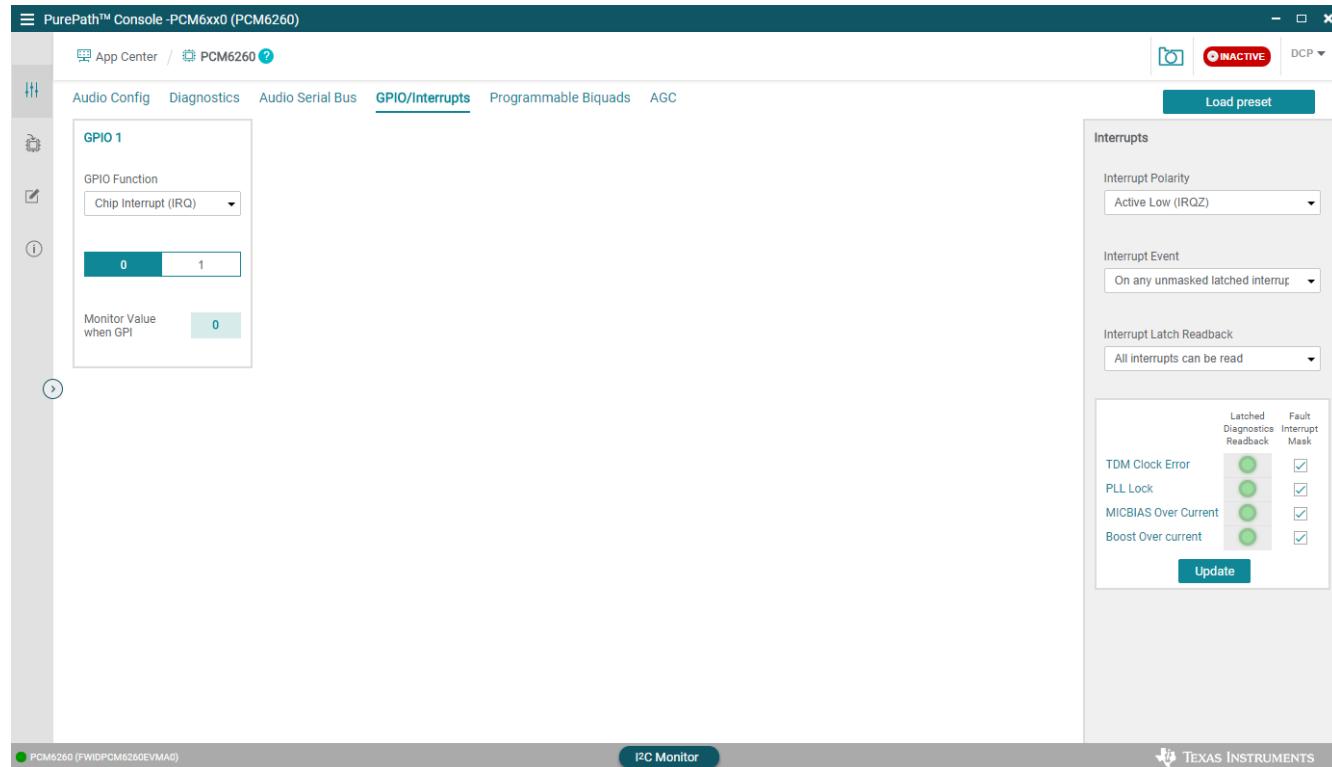


Figure 4-9. GPIO and Interrupts Tab

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 4-10), and other methods for generating filter coefficients, see the [PCM6xx0 Programmable Biquad Filter Configuration and Applications application report](#).

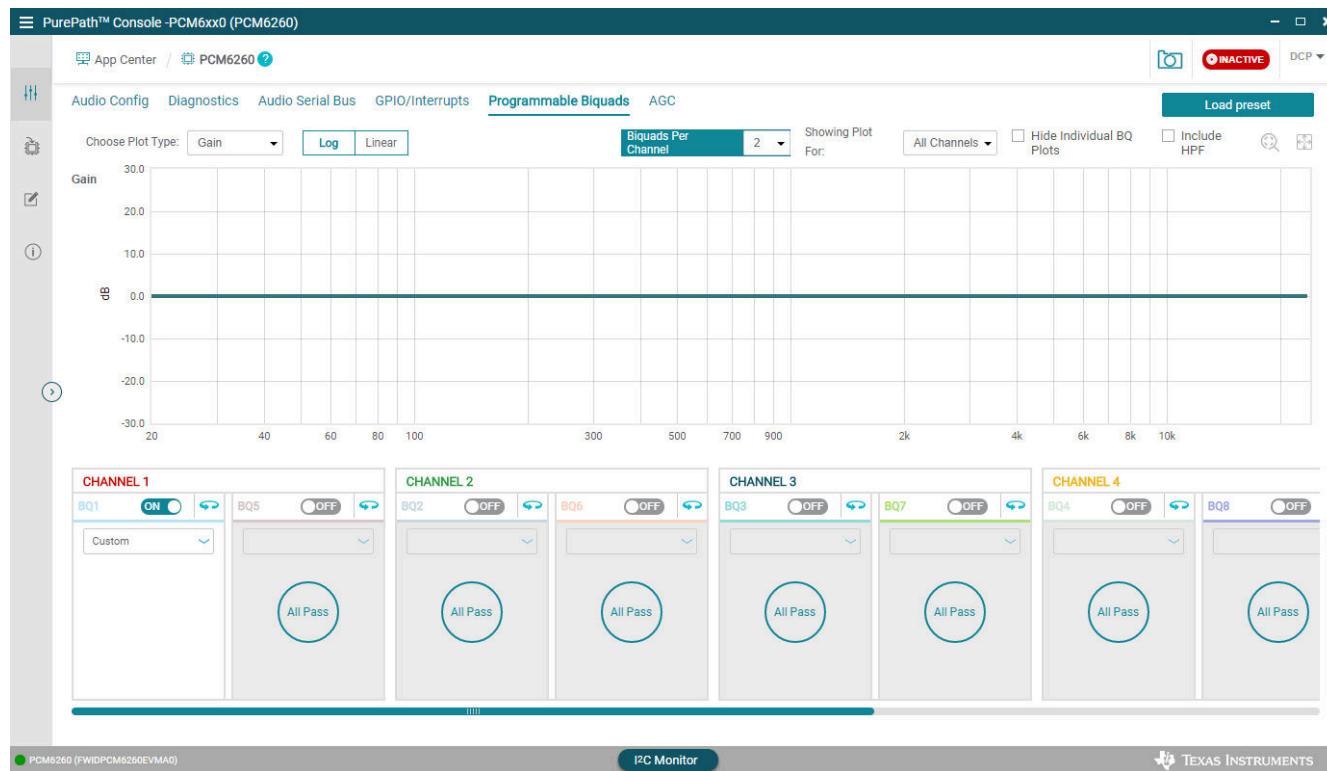


Figure 4-10. Programmable BiQuads Tab

4.1.6 Automatic Gain Control (AGC)

The AGC parameters are global and can be configured in the AGC tab (Figure 4-11). 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.

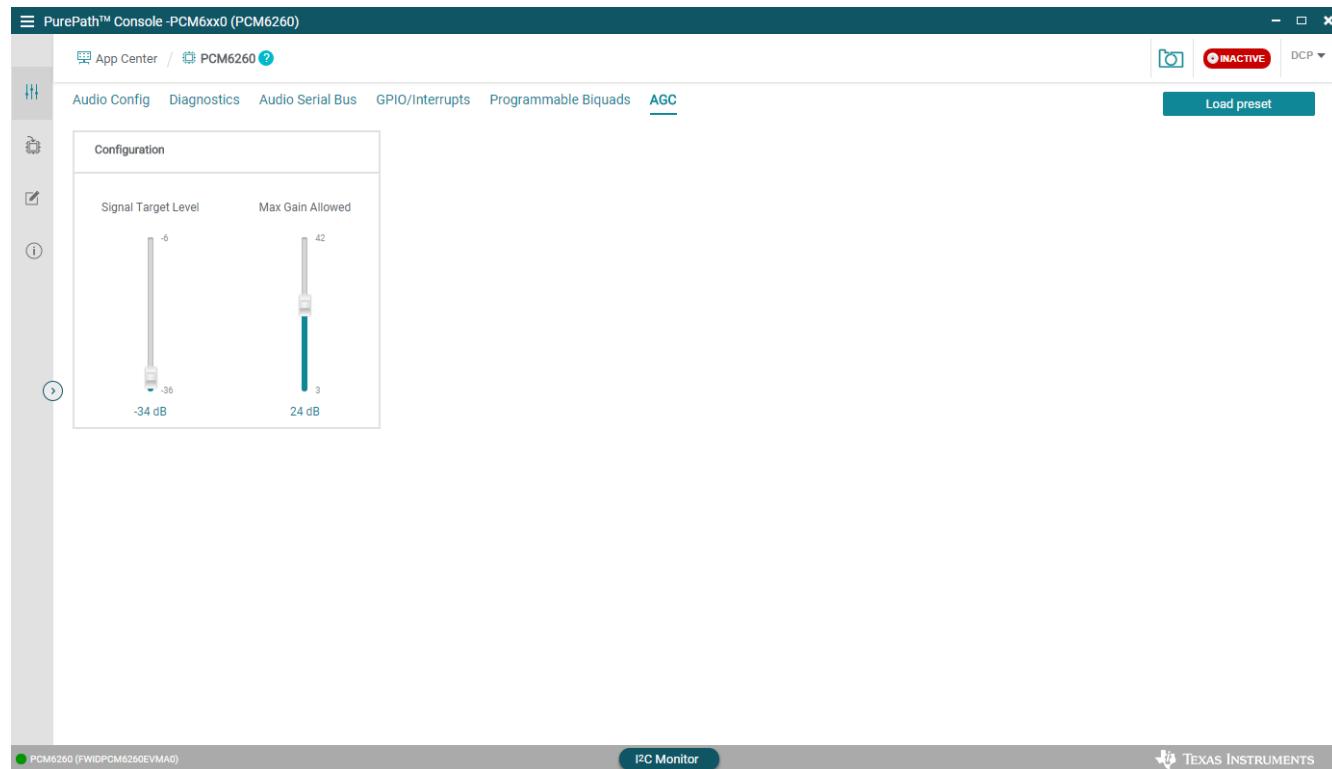


Figure 4-11. AGC Tab

4.2 End System Integration

The end system integration view (Figure 4-12) 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.

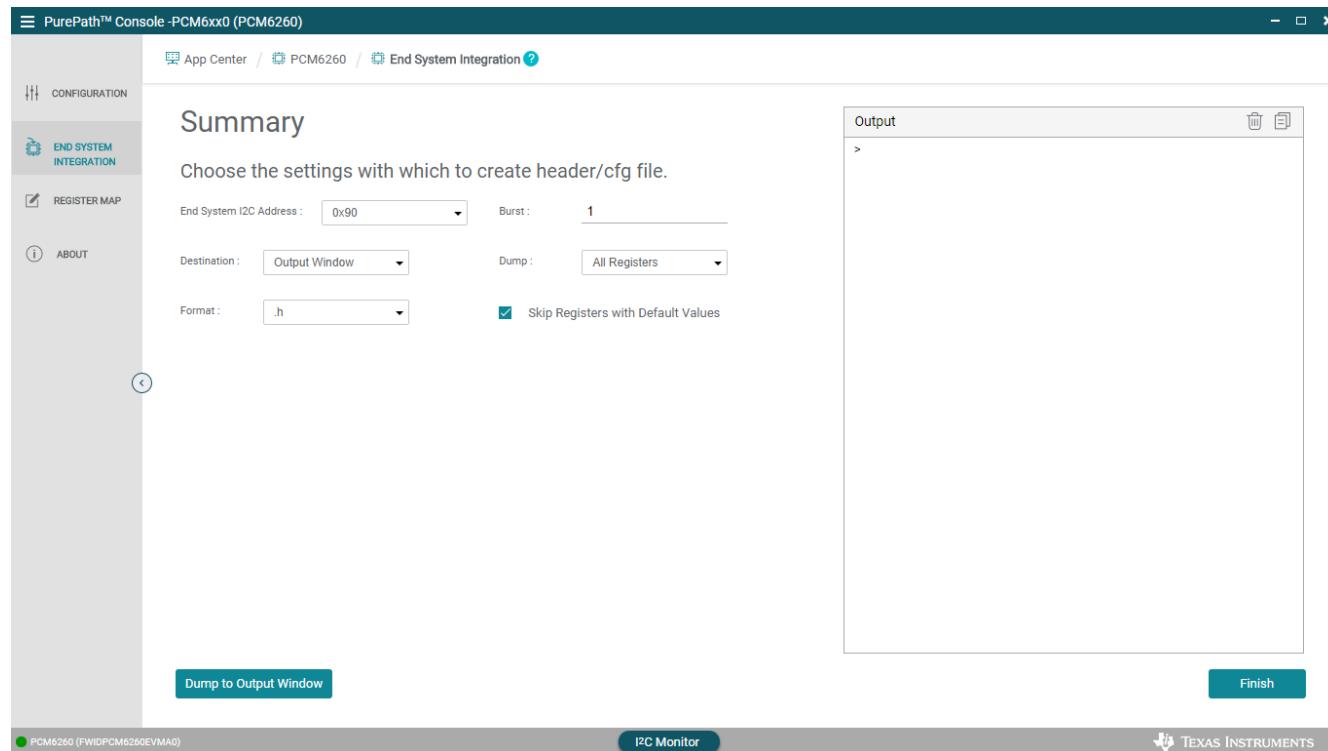
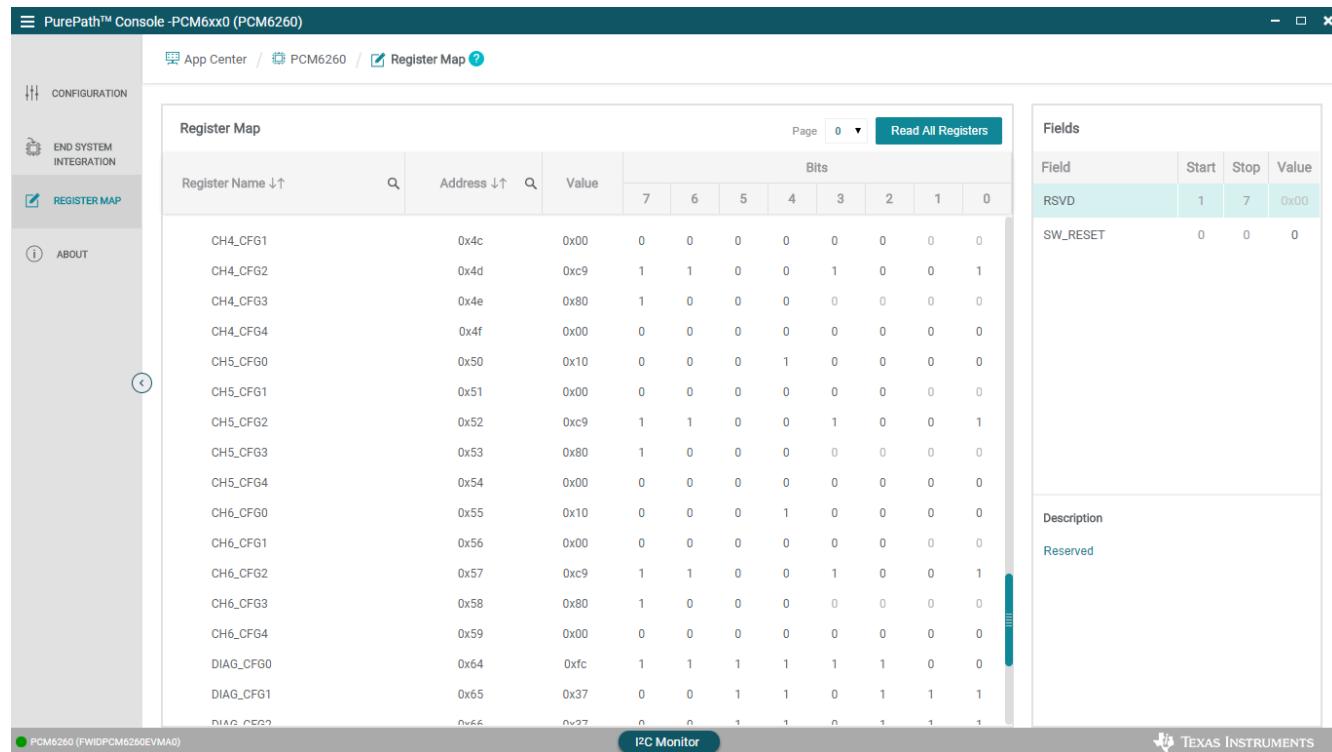


Figure 4-12. End System Integration View

4.3 Register Map

The register map view (Figure 4-13) provides a view of the first two pages of the register map.



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

Figure 4-13. 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 5-1](#), to open the preset selection window ([Figure 5-2](#)).

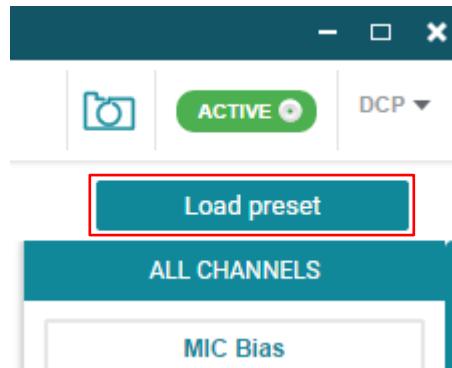


Figure 5-1. Load Preset Button

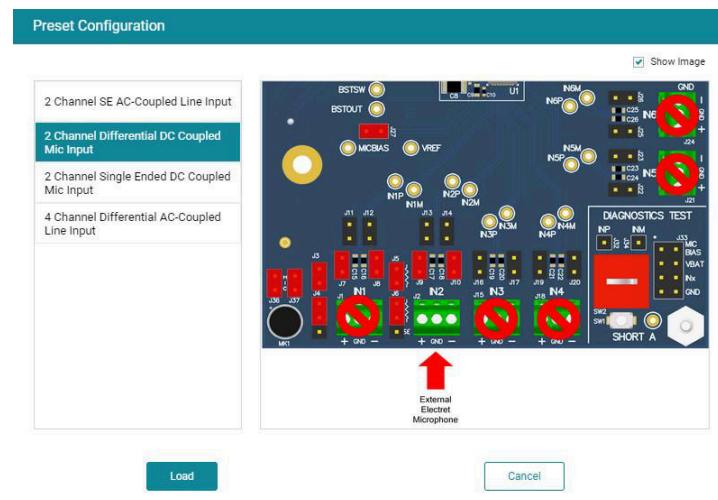


Figure 5-2. Preset Configuration Window

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 5-3](#) shows how to change the mode from standby to active.



Figure 5-3. 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 5-4](#) shows which controls are disabled.

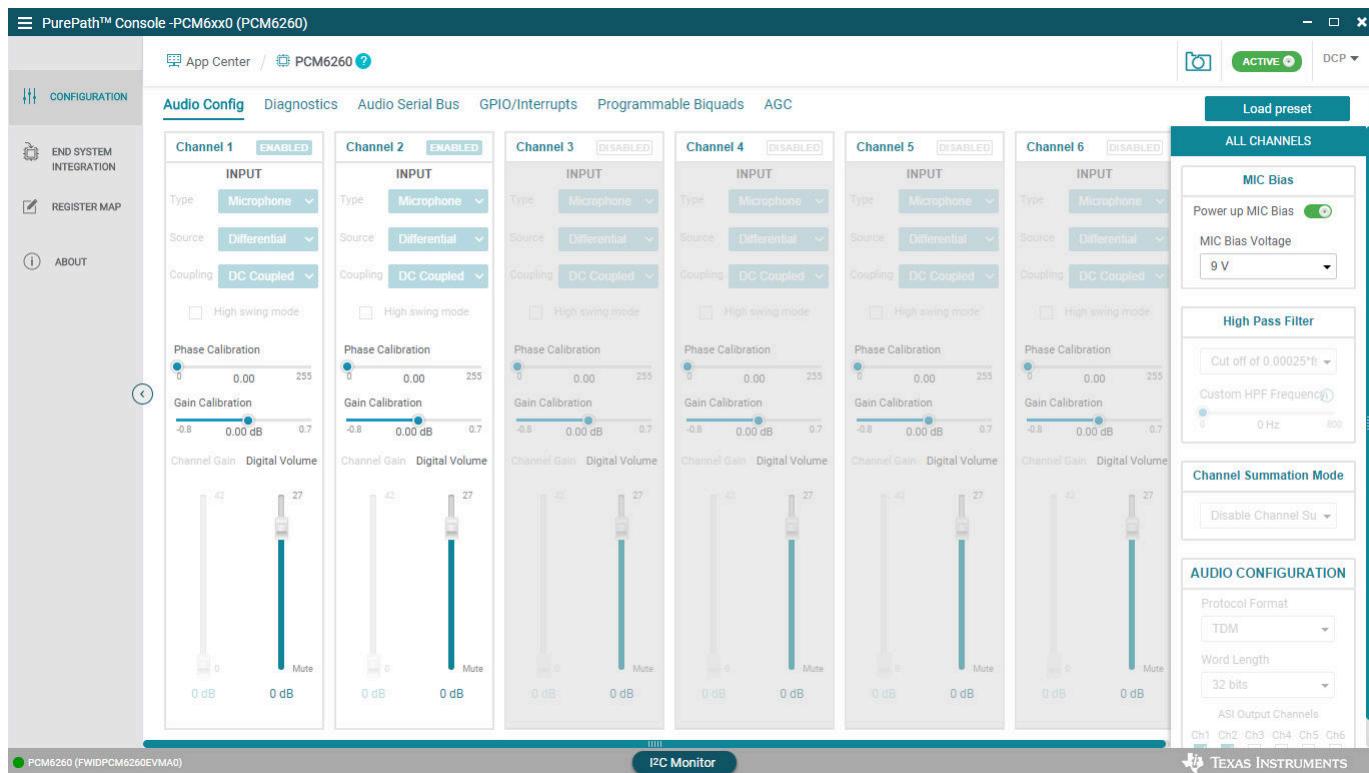


Figure 5-4. Disabled Controls in Active Mode

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 5-5](#), 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*.

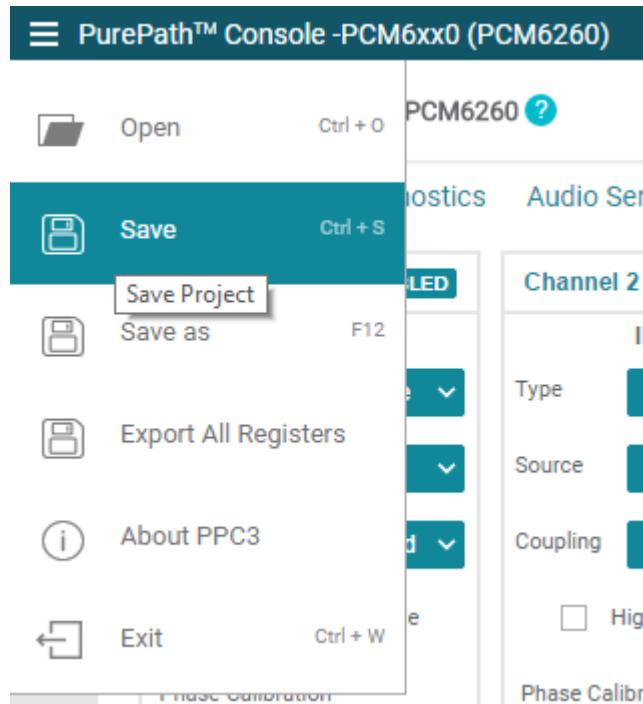


Figure 5-5. Saving a Configuration in PPC3

6 System Overview

Figure 6-1 shows an overview of the system.

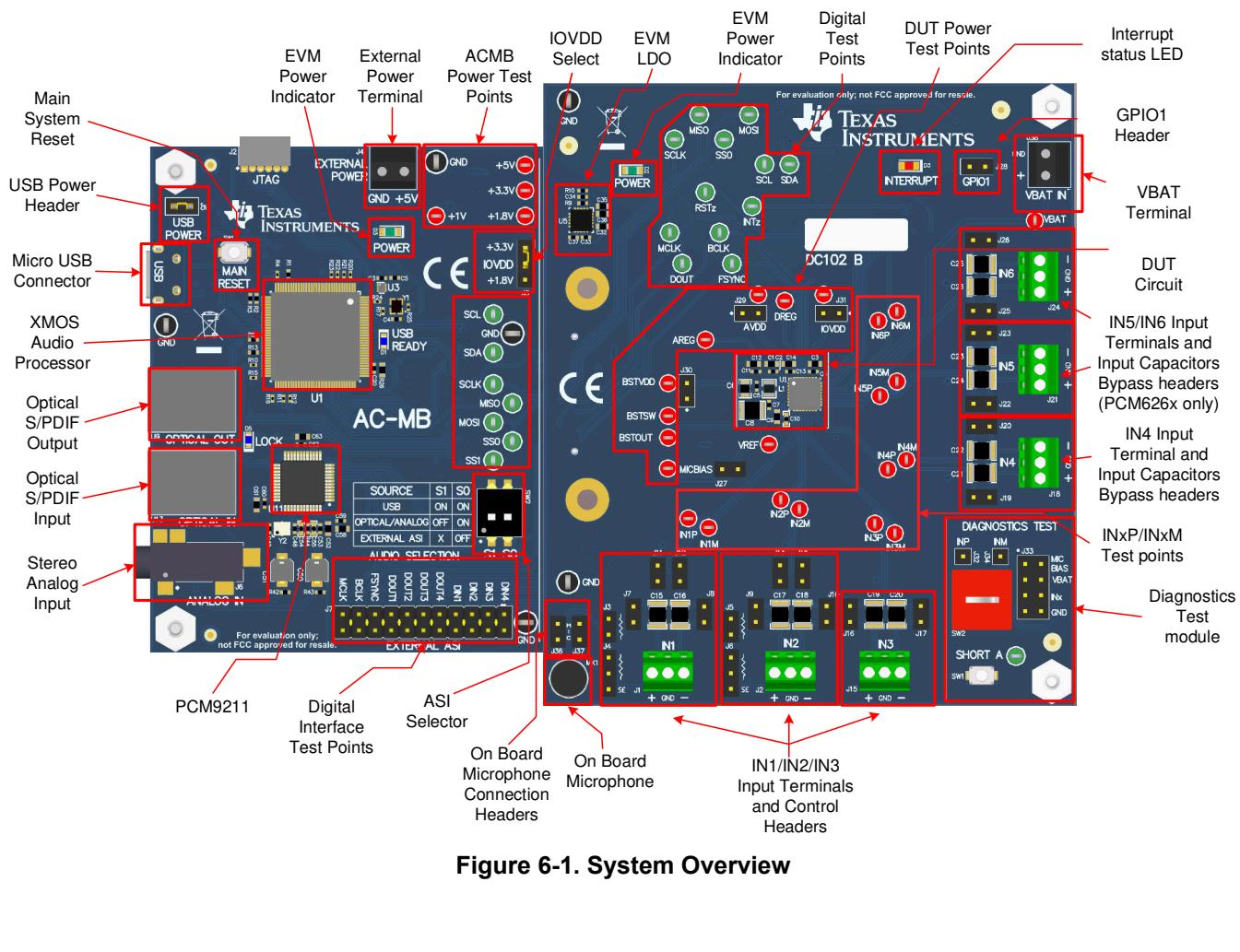


Figure 6-1. System Overview

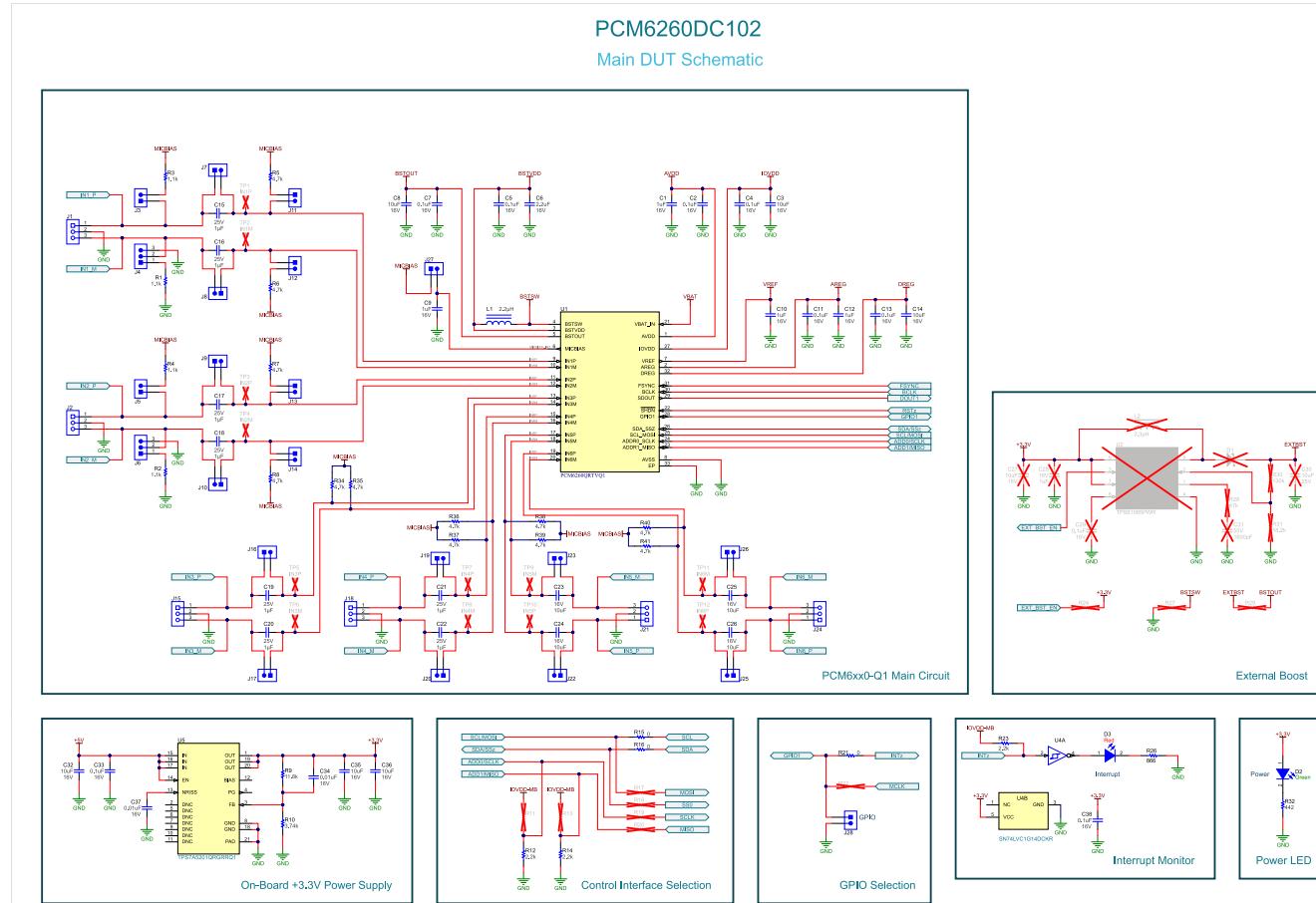
7 Schematic and Bill of Materials

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 7-1 and Figure 7-2 illustrate the schematics for the PCM6240Q1EVM.



PCM6260DC102

Connectors and EEPROM

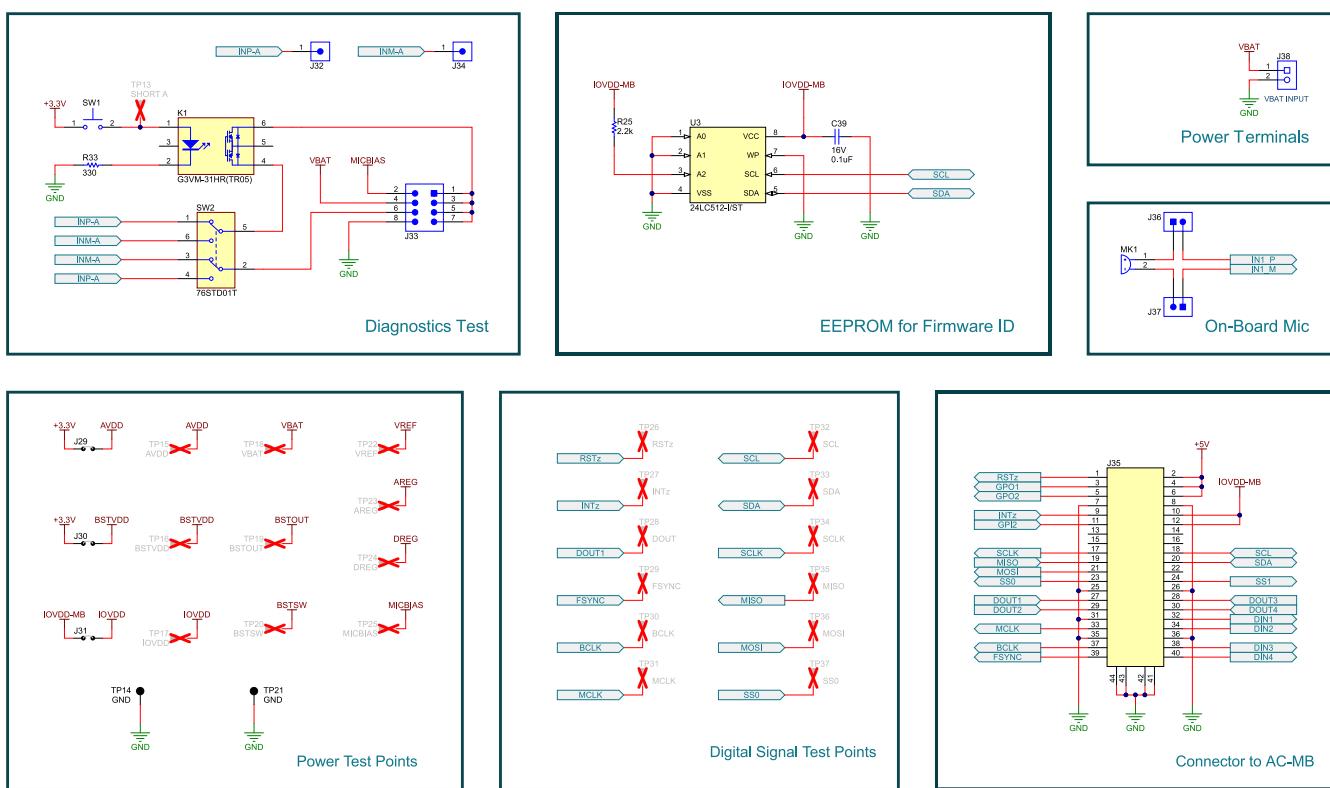


Figure 7-2. PCM6260Q1EVM-PDK Connectors and Test Points Schematics

7.1.2 PCM6260Q1EVM Bill of Materials

Table 7-1 lists the BOM for the PCM6260Q1EVM.

Table 7-1. 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 | Wurth 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 7-1. PCM6260Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|--|----------|-------|--|------------------------------|------------------|-----------------------------|
| 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 μ 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 |
| R26 | 1 | 866 | RES, 866, 1%, 0.1 W, AEC-Q200 Grade 0, 0603 | 0603 | CRCW0603866RFKEA | Vishay-Dale |

Table 7-1. PCM6260Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|---|----------|-------|--|------------------------------|---------------------|-------------------|
| 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 |
| C29 | 0 | 0.1uF | CAP, CERM, 0.1 uF, 16 V, +/- 10%, X7R, 0402 | 0402 | 885012205037 | Wurth Elektronik |
| C30 | 0 | 10uF | CAP, CERM, 10 uF, 25 V, +/- 20%, X5R, 0603 | 0603 | C1608X5R1E106M080AC | TDK |

Table 7-1. PCM6260Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|---|----------|--------|---|---------------------------|--------------------|---------------------------|
| 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 μ H, 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 |
| 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 |

7.2 PCM6240Q1EVM Schematic and Bill of Materials (BOM)

7.2.1 PCM6240Q1EVM Schematic

Figure 7-3 and Figure 7-4 illustrate the schematics for the PCM6240Q1EVM.

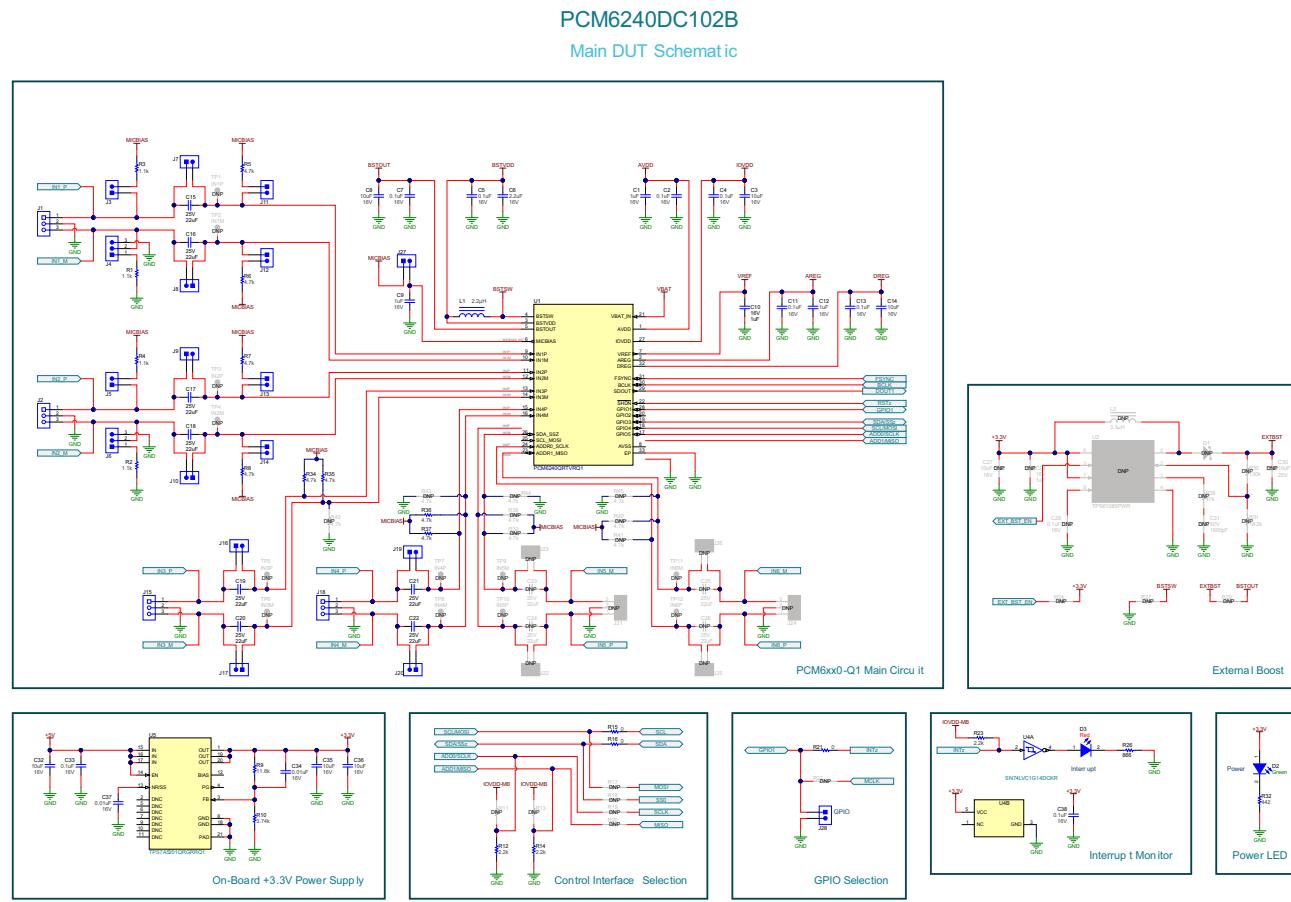


Figure 7-3. PCM6240Q1EVM Main DUT Schematics

PCM6260-Q1 Evaluation BoardB

Connectors and EEPROM

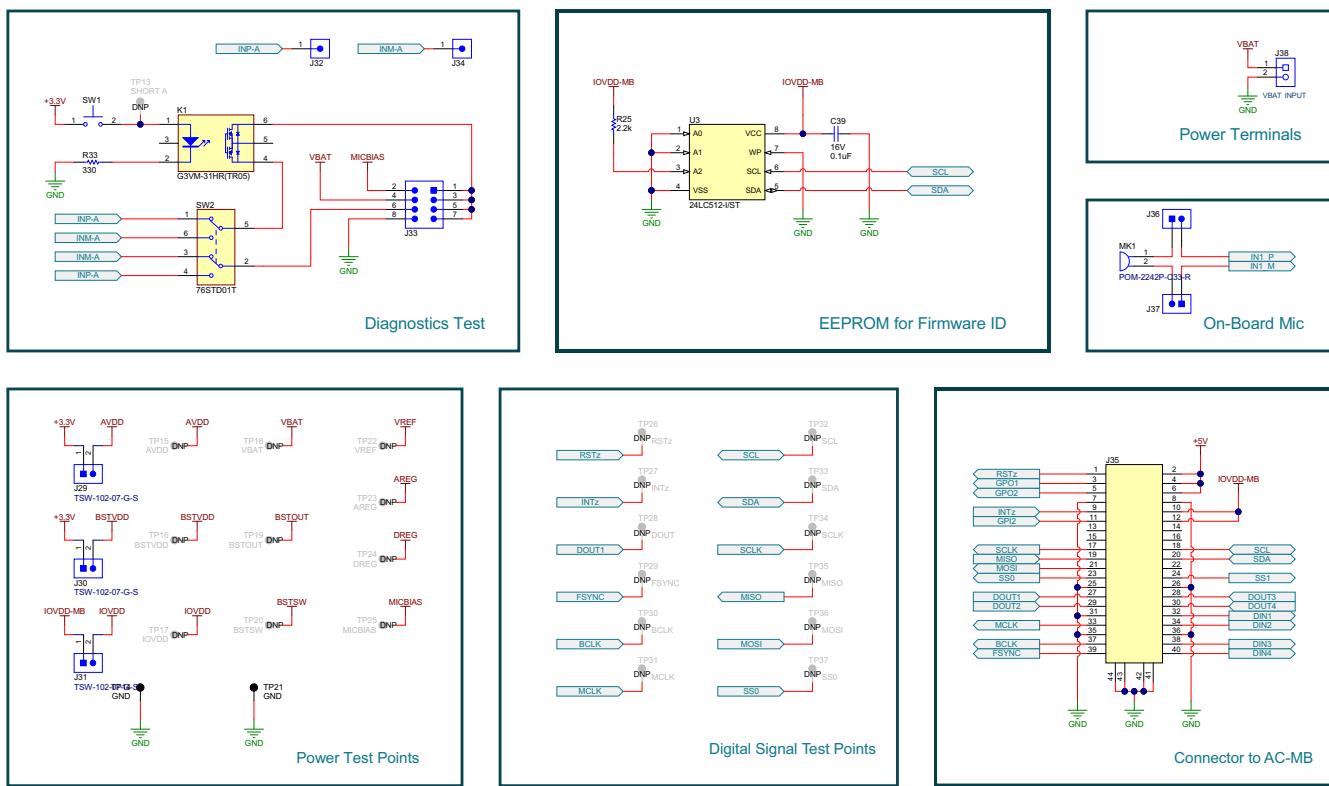


Figure 7-4. PCM6xx0Q1EVM-PDK Connectors and Test Points Schematics

7.2.2 PCM6240Q1EVM Bill of Materials

Table 7-2 lists the BOM for the PCM6240Q1EVM.

Table 7-2. 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 | Wurth 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 7-2. PCM6240Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|------------------------------------|----------|-------|--|------------------------------|------------------|-----------------------------|
| 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 μ 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 |
| R32 | 1 | 442 | RES, 442, 1%, 0.1 W, AEC-Q200 Grade 0, 0603 | 0603 | CRCW0603442RFKEA | Vishay-Dale |

Table 7-2. PCM6240Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|---|----------|-------|--|------------------------------|---------------------|-------------------|
| 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 | Wurth Elektronik |
| C30 | 0 | 10uF | CAP, CERM, 10 uF, 25 V, +/- 20%, X5R, 0603 | 0603 | C1608X5R1E106M080AC | TDK |

Table 7-2. PCM6240Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|---|----------|--------|---|---------------------------|--------------------|---------------------------|
| 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 |
| 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 μ H, 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 |
| 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 7-2. PCM6240Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|------------|----------|-------|---|------------------|-------------|-------------------|
| 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 PCM6360Q1EVM Schematic and Bill of Materials (BOM)

7.3.1 PCM6360Q1EVM Schematic

Figure 7-5 and Figure 7-6 illustrate the schematics for the PCM6360Q1EVM.

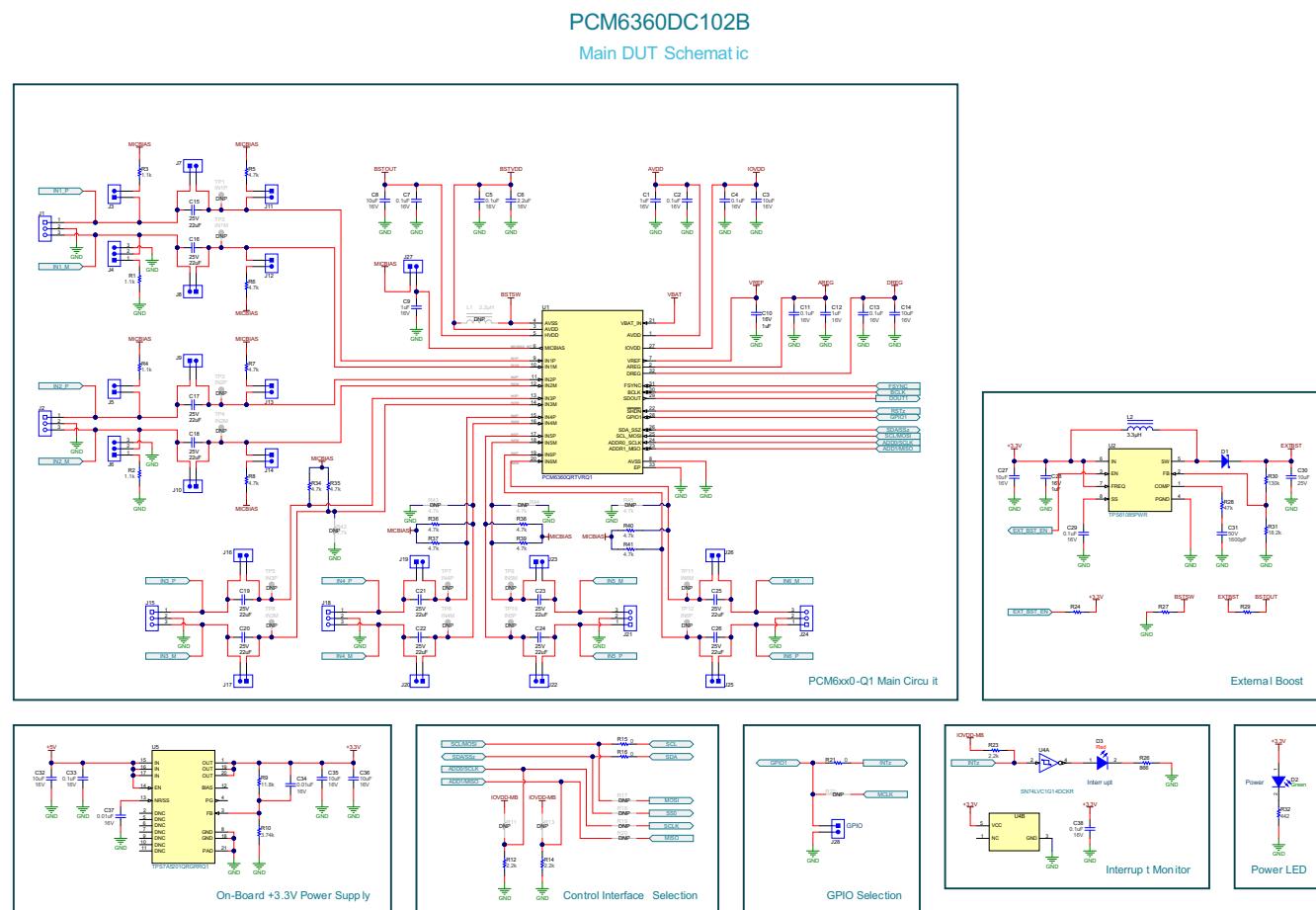


Figure 7-5. PCM6360Q1EVM-PDK Main DUT Schematics

PCM6260-Q1 Evaluation BoardB

Connectors and EEPROM

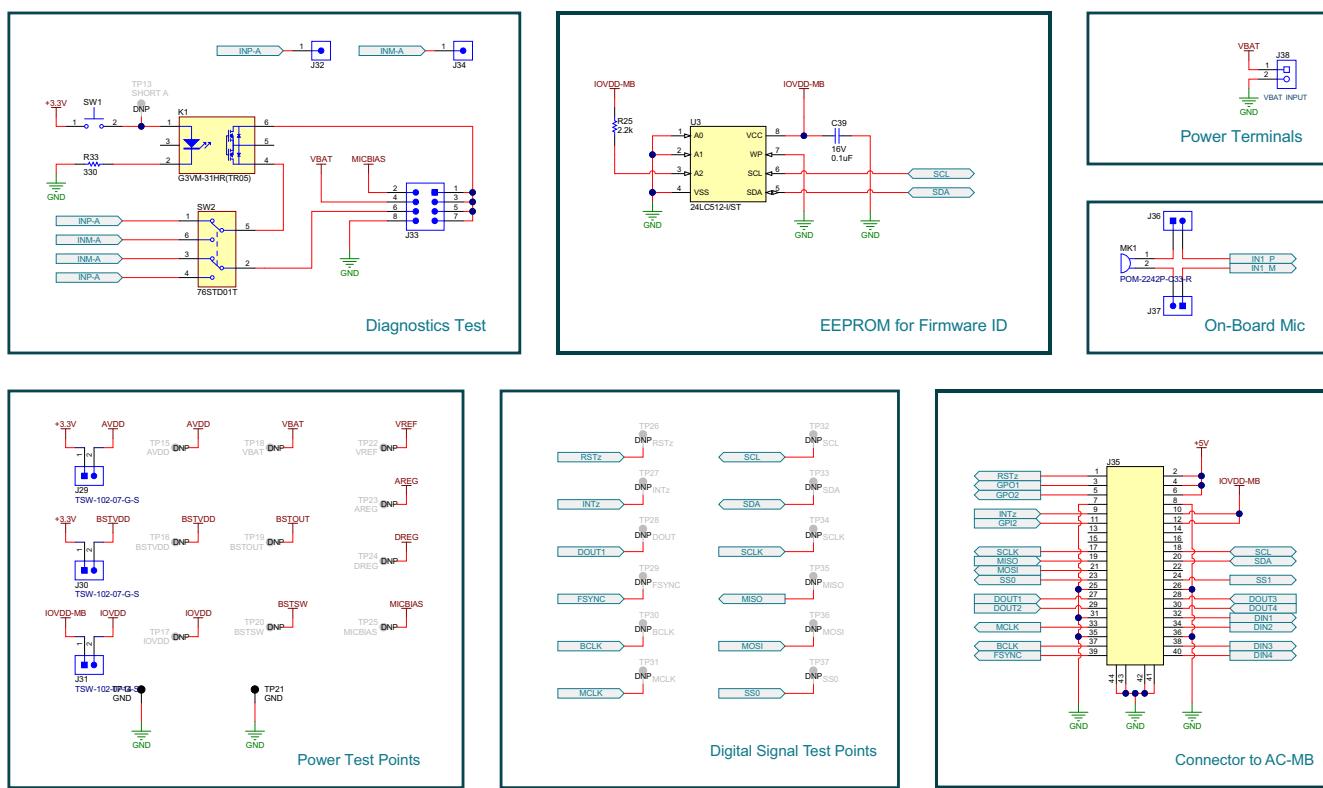


Figure 7-6. PCM6360Q1EVM-PDK Connectors and Test Points Schematics

7.3.2 PCM6360Q1EVM Bill of Materials

Table 7-3 lists the BOM for the PCM6360Q1EVM.

Table 7-3. 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 | Wurth 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/NP0, 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 7-3. PCM6360Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|--|----------|-------|---|------------------------------|------------------|-----------------------------|
| 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 μ 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 7-3. PCM6360Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|--|----------|-------|--|------------------------------|------------------|---------------------------|
| 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 7-3. PCM6360Q1EVM Bill of Materials (continued)

| Designator | Quantity | Value | Description | PackageReference | PartNumber | Manufacturer |
|---|----------|-------|---|---------------------------|------------------|---------------------------|
| 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 μ 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 7-7](#) and [Figure 7-8](#) illustrate the schematics for the AC-MB mother board included in the PCM6xx0Q1EVM-PDK.

Audio Converters Motherboard DC058 Rev A
Xmos, USB and Power

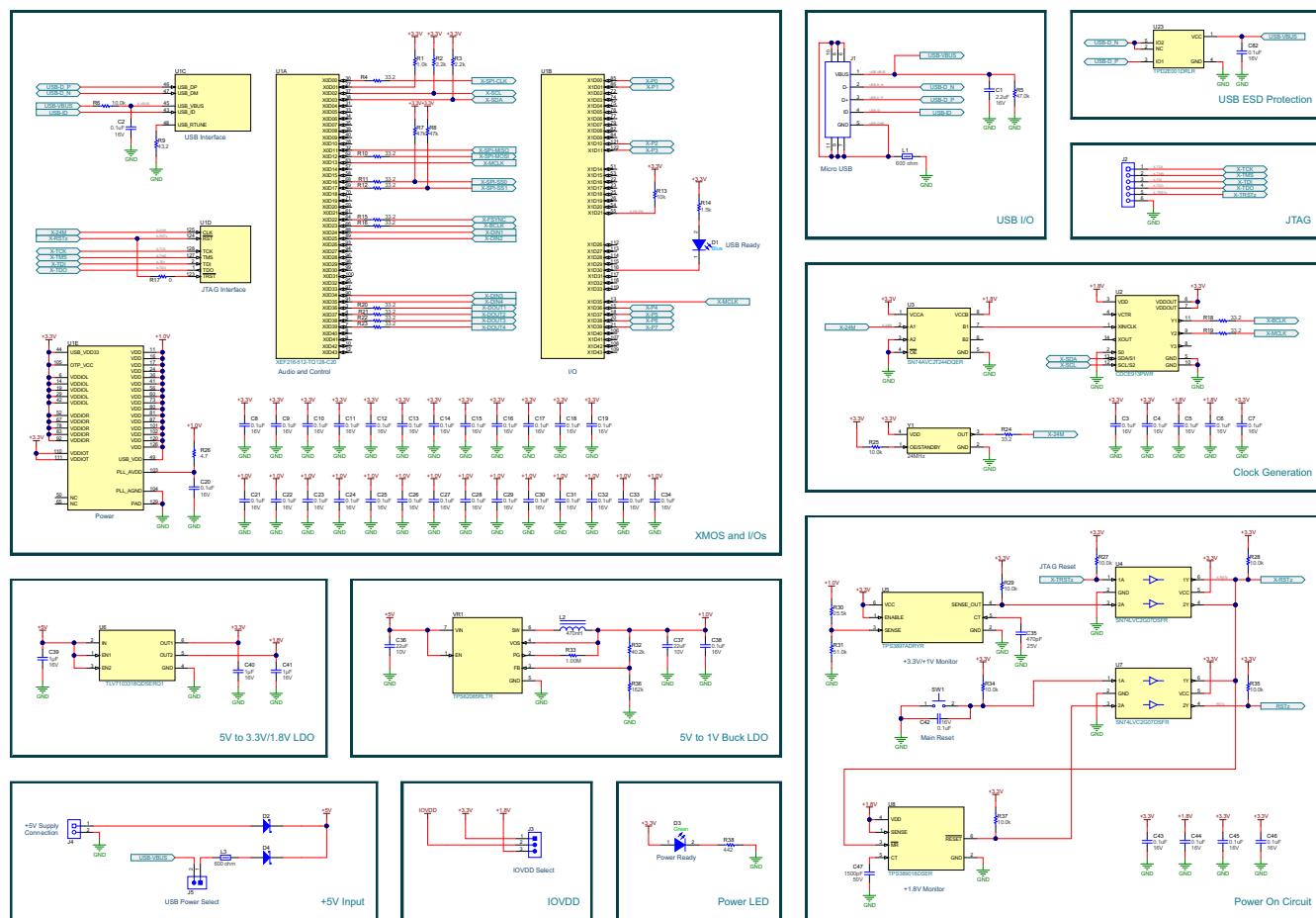


Figure 7-7. AC-MB Schematics Page 1

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

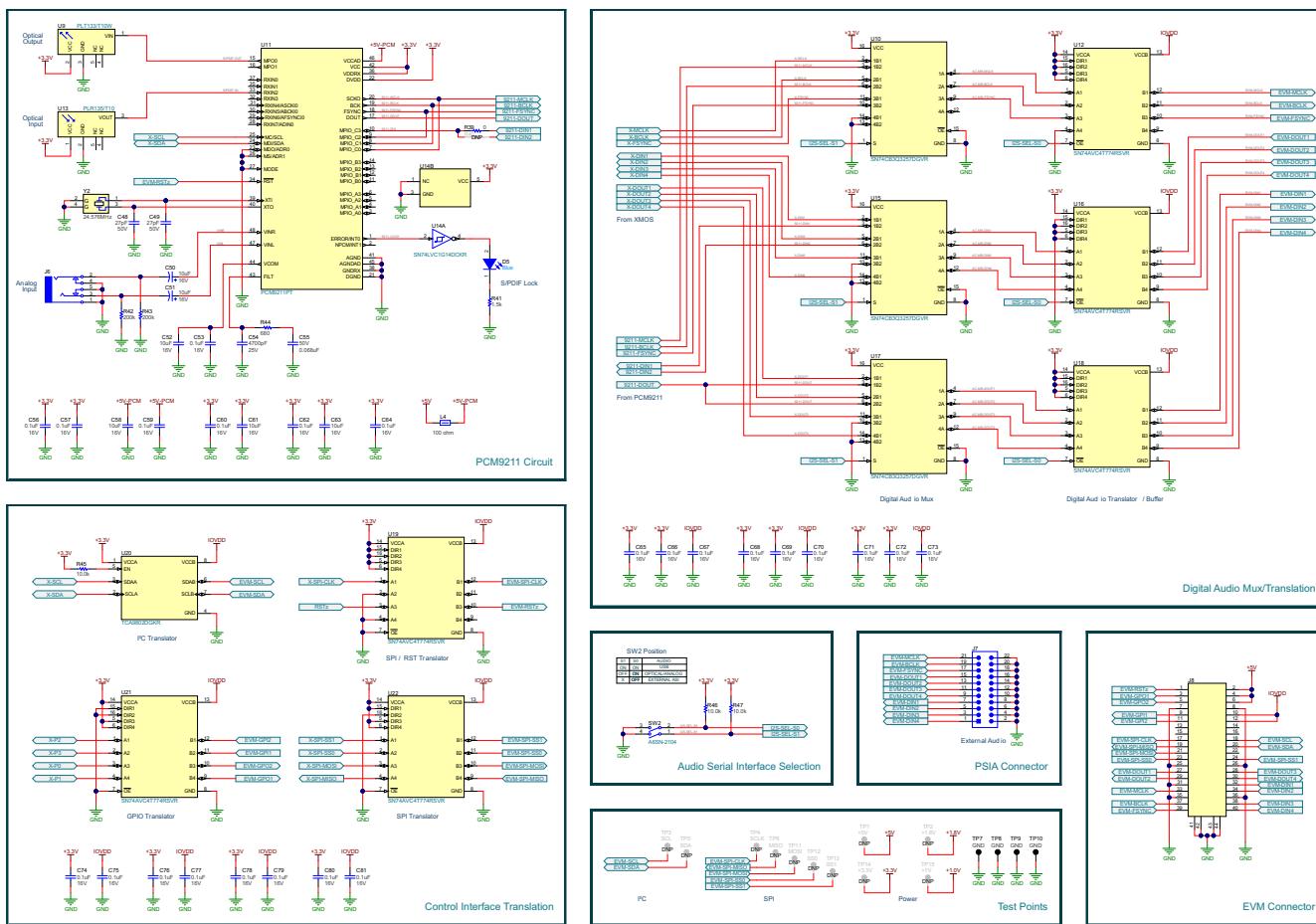


Figure 7-8. AC-MB Schematics Page 2

7.4.2 AC-MB Bill of Materials

Table 7-4 lists the BOM for the AC-MB.

Table 7-4. 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 | Wurth 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 μF, 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 | Wurth 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 | Wurth 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 |
| J5 | 1 | | Header, 2.54 mm, 2x1, Tin, TH | Header, 2.54 mm, 2x1, TH | TSW-102-07-T-S | Samtec |

Table 7-4. AC-MB Bill of Materials (continued)

| Designator | Quantity | Value | Description | Package Reference | Part Number | Manufacturer |
|--|----------|---------|--|------------------------------|----------------------|-----------------------------|
| 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 | XEF216-512-TQ128-C20 | XMOS semiconductor |
| 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 |

Table 7-4. AC-MB Bill of Materials (continued)

| Designator | Quantity | Value | Description | Package Reference | Part Number | Manufacturer |
|--------------------------------------|----------|-------|---|---------------------------|--------------------------|---------------------------|
| 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 (TWSOP-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 | Abraco Corporation |
| Y2 | 1 | | Crystal, 24.576 MHz, 10pF, SMD | 2.5x0.5x2.0mm | ABM10-24.576MHZ-E20-T | Abraco 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);

```

9 Revision History

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

| Changes from Revision B (June 2020) to Revision C (July 2022) | Page |
|--|-------------------|
| • Updated <i>Input Jumper Configuration</i> table..... | 7 |

| Changes from Revision A (January 2020) to Revision B (June 2020) | Page |
|--|-------------|
| • 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 |

| Changes from Revision * (January 2020) to Revision A (January 2020) | Page |
|---|-------------|
| • 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..... | 7 |
| • Changed <i>AC-Coupled Line Input Biasing</i> section for clarity..... | 10 |

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