

# PmodAMP2™ Reference Manual

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Note: This document applies to REV B of the board.



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## Overview

The PmodAMP2 amplifies low power audio signals to drive a monophonic output. The module features a digital gain select that allows output at 6 dB and 12 dB with pop-and-click suppression. A Digilent 6-pin connector provides the audio input to the module and a 1/8-inch mono jack supplies the speaker output.

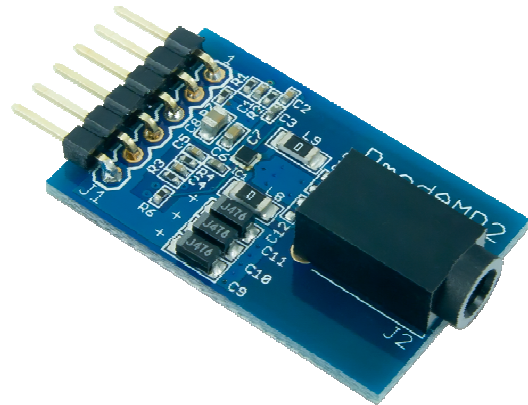
For customer convenience, Digilent has an inexpensive speaker and enclosure available for sale that is suitable for use with the PmodAMP2. Also, unlike most Digilent Pmod modules that accept only digital inputs, the PmodAMP2 accepts analog inputs and pulse width modulated digital inputs.

## Inputs and Outputs (I/O)

The PmodAMP2 accepts either digital or analog inputs at a voltage range of 0-Vcc. Typically a Digilent system board supplies power to the module at 3.3V, though the maximum supply voltage is 5.0V. The connector J1 provides the audio input, gain select, shutdown select, and power. (See figure 1)

There are several suitable inputs for the PmodAMP2. The typical input is a pulse width modulated (PWM) signal produced by a digital output from a Digilent programmable logic system board or microcontroller board. The low pass filter on the input acts as a reconstruction filter to convert the PWM digital signal into an analog voltage on the amplifier input.

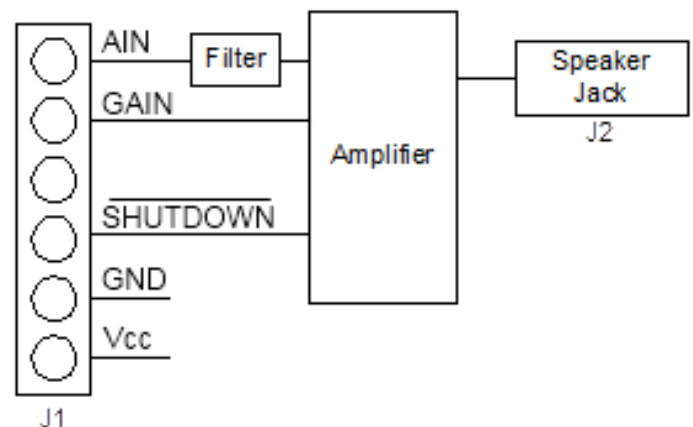
The PmodAMP2 also accepts analog inputs with an input voltage range of 0-Vcc. These inputs will often be from an analog to digital converter module, like the Digilent PmodDA1 or PmodDA2. The output of a digital to analog



Features Include:

- Analog Devices SSM2377: Filterless, High Efficiency, Mono 2.5 Watt Class-D Audio Amplifier
- Digital gain select
- Pop –and-click suppression
- Micropower shutdown mode
- 1/8-inch mono speaker jack
- A 6-pin header for input
- 2.5V – 5V operating voltage

Figure 1



converter module will normally have a voltage range of 0-3.3V and should have a sample rate of at least 16Khz. The low pass filter on the input removes the high frequency artifacts generated during the sampling process.

Additionally, the PmodAMP2 accepts inputs from a variety of line level audio signals. A line level input, like the output of a portable CD player or MP3 player, will typically be a 1V peak-to-peak analog voltage. The input band-pass filter clarifies and amplifies the input voltage from the signal source and then directs the signal to the output jack to drive a speaker. The connector J2 operates as the speaker output. (See figure 1)

## Functional Description

The gain on the PmodAMP2 may be selected by tying the GAIN input to either logic '1' or logic '0'. (See table 1)

**Table 1**

GAIN Input	Gain
1	6 decibels (dB)
0	12 decibels (dB)

The PmodAMP2 features a micropower shutdown mode with a typical shutdown current of 100 nA. Users can enable the shutdown by applying a logic low to the SHUTDOWN pin. A10K-ohm resistor pulls the pin down to ground. To operate the AMP2 users must ensure the SHUTDOWN pin is in the highest position.

Customers will generally use the PmodAMP2 module with a Digilent programmable logic system board or microcontroller board. These boards produce either a pulse width modulated digital signal or an analog signal via a digital to analog converter. Most Digilent system boards have 6-pin connectors that allow the PmodAMP2 to plug directly into the system board or to connect via a Digilent 6-pin cable.

Some older model Digilent boards may need a Digilent Module Interface Board (MIB) and a 6-pin cable to connect to the PmodAMP2. The MIB plugs into the system board and the cable connects the PmodAMP2 to the MIB.

*Note: For more information about the operation and features of the Analog Devices SSM2377 Audio Amplifier integrated circuit please see the datasheet available at [www.analog.com](http://www.analog.com).*

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