

Figure 1: SSM2211 Evaluation Board Schematic

The voltage gain of the SSM2211 is given by Equation (1) below:

$$A_{\rm V} = 2 \, \mathbf{x} \frac{R_f}{R_{IN}} \,. \tag{Eq. 1}$$

The factor 2 derives from the bridge output configuration. If desired, the input signal may be attenuated by turning the 10 k Ω potentiometer in the CW direction. C_{IN} isolates the input common mode voltage (V+/2) present at Pin 2 & 3. With V+ = 5 V, there is +2.5 V common-mode voltage present at both output terminals V_{O1} & V_{O2} as well.

CAUTION: The ground lead of the oscilloscope probe, or any other instrument used to measure the output signal, must not be connected to either output, as this would short out one of the amplifier's outputs and possibly damage the device.

A safe method of displaying the differential output signal using a grounded scope is shown in the Figure 2. Simply connect the Channel A probe to V_{02} terminal post, connect the Channel B probe to V_{01} post, invert Channel B and add the two channels together. Most multi-channel oscilloscopes have this feature built-in. If you must connect the ground lead of the test instrument to either output signal pins, a power line isolation transformer must be used to isolate the instrument ground from power supply ground.

Recall that $V = \sqrt{PxR}$ so for $P_0 = 1$ W and $R_L = 8$ Ω , V = 2.8 Vrms, or 8 V_{P-P} . If the available input signal is 1.4 Vrms or more, use the board as-is, with $R_f = R_i = 20$ k Ω . If more gain is needed, increase the value of R_f to obtain the desired gain.

When you have determined the closed-loop gain required by your source level, and can develop 1 watt across the 8 Ω load resistor with the normal input signal level, replace the resistor with your speaker. Your speaker may be connected across the V₀₁ and V₀₂ posts for bridged mode operation only after the 8 Ω load resistor is removed. For no phase inversion, V₀₂ should be connected to the (+) terminal of the speaker normally, or for operation in the power conserving shutdown mode.



Figure 2: Using an Oscilloscope to Display the Bridged Output Voltage

The two amplifiers in the SSM2211 are most efficient when operated in the bridged mode. They may also be operated in the single ended mode. To do so, replace J1 and J2 jumpers with electrolytic capacitors of a suitable value, with the NEGATIVE terminals to the output terminals V_{01} and V_{02} . The single ended loads may then be returned to ground. Note that the maximum output power is reduced to 250 mW, one quarter of the rated maximum, due to the maximum swing in the non-bridged mode being one-half, and power being proportional to the square of the voltage. Thus, each amplifier can only deliver 250 mW. For the most efficient operation, or full output, the bridge mode should be used. For frequency response down 6 dB at 100 Hz, a 20,000 μ F capacitor is required with 8 Ω speakers. The SHUTDOWN switch allows the user to switch between ON (normal operation) and the power conserving shutdown mode.