Introduction to the PA4201 PUNK

The purpose of this application brief is to provide information on the operation and applications of the PA4201 Pop-Up-Noise-Killer (PUNK).

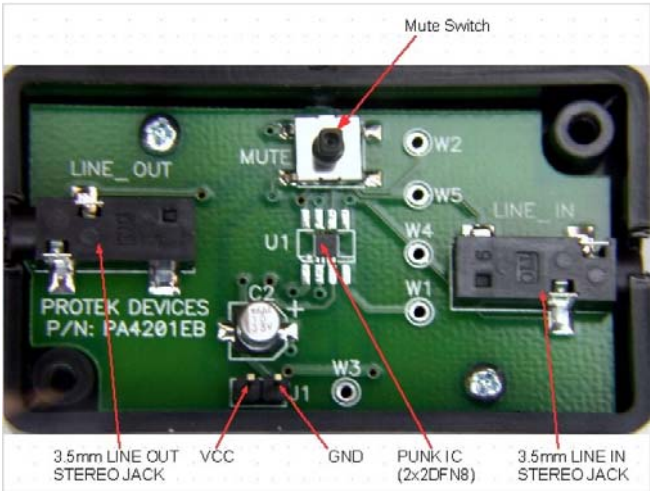


Fig.1. PUNK Evaluation board

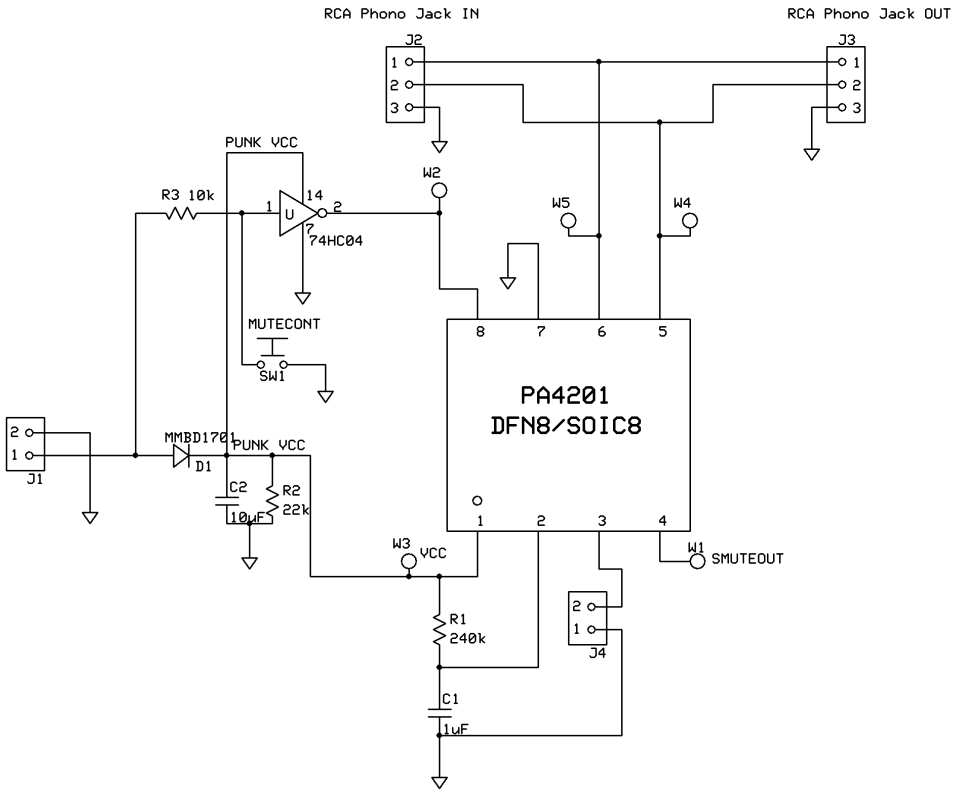
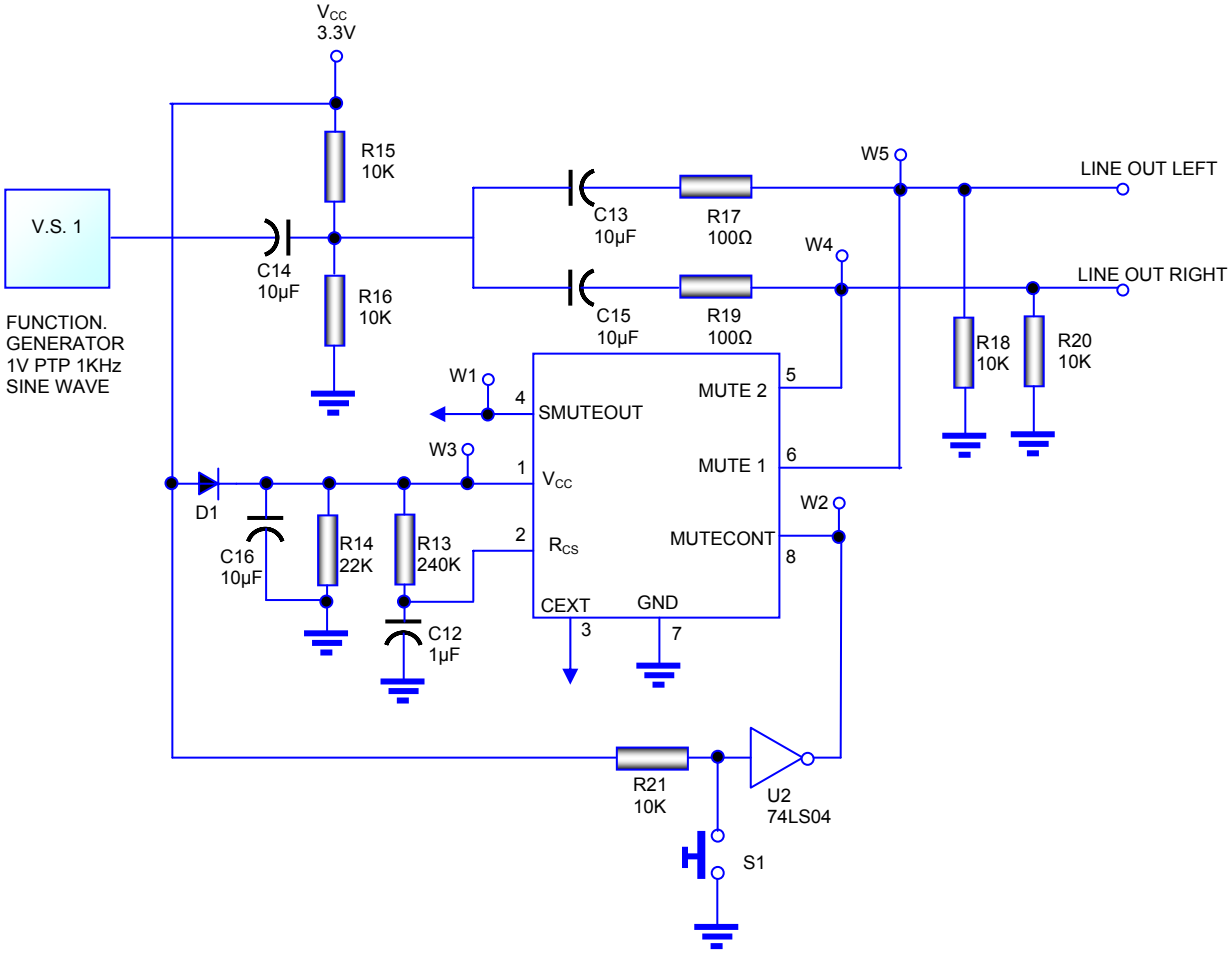


Fig.2. Evaluation Board Schematic

Simulation of Set Top Box Audio Muting Application

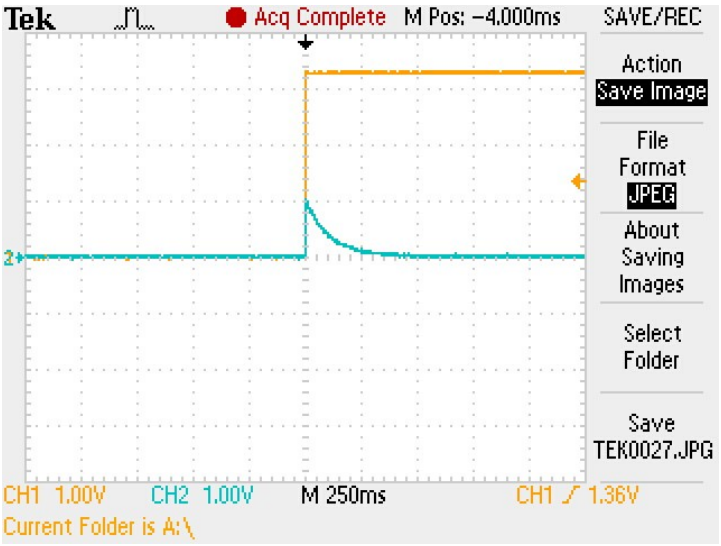


Notes:

1. A set top box audio output is “simulated” using C14, R15, R16 and VS1.
2. VS1 is a signal generator having an output impedance of 50 Ohm.
3. U2 is the IC 74LS04.
4. U2 runs off of PUNK Vcc (Output of D1, C16 and R14).
5. Input to U2 is the set top box Vcc
6. Switch S1 serves as a manual “Audio Mute” to enable the muting function.
7. Scope probes were attached to set top box power supply and line out.

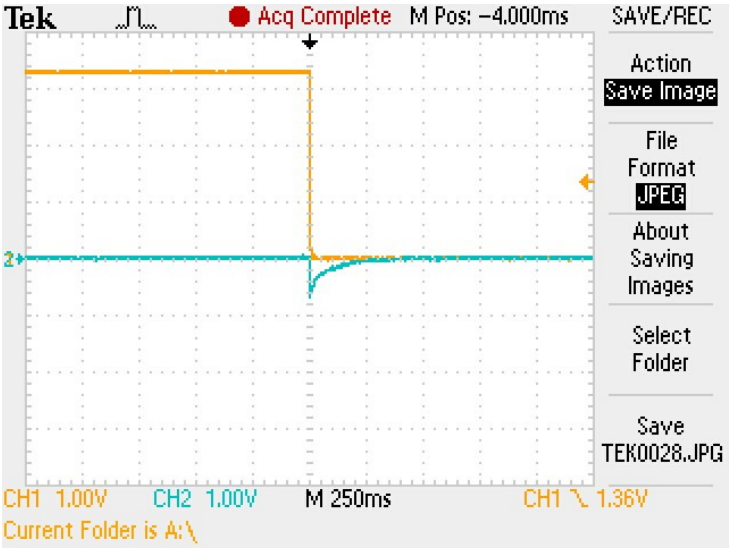
Startup and Shutdown without PUNK:

The PUNK circuit was disabled, i.e., the connection between VS1 and D1 was removed and the connection to U2 was removed. The STB power supply was turned ON using a DIP switch connected to the board. The results are as follows:



1. CH1 is STB Vcc: It rises in less than 20ms to 3.3V DC.
2. CH2 is Line Out: There is a startup spike observed around 1V for approximately 300ms in duration.
3. The popping noise could be heard through a speaker system with a built-in amplifier.

Fig 3: Startup Pop Noise observed at Line Out

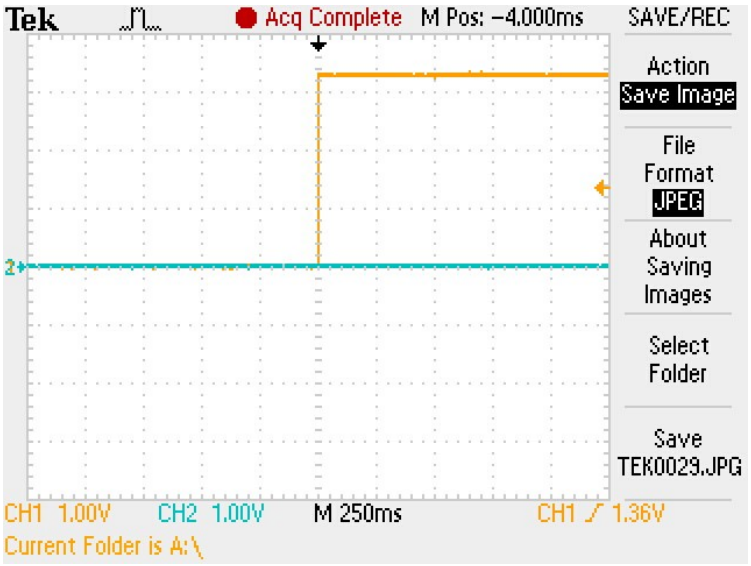


1. CH1 is STB Vcc: It falls to 0V in less than 20ms.
2. CH2 is Line Out: There is a spike observed of around -700mV for approximately 300ms in duration.
3. The popping noise could be heard through a speaker system with a built-in amplifier.

Fig 4: Shutdown Pop Noise observed at Line Out

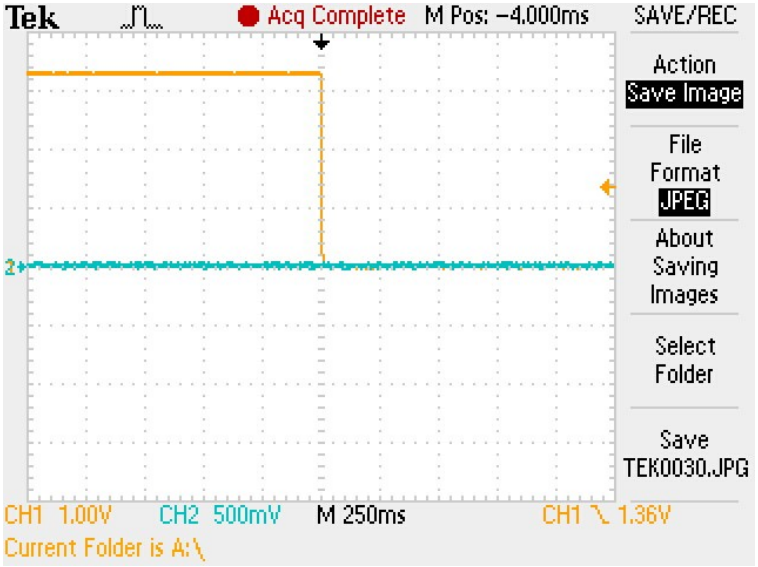
Startup and Shutdown with PUNK:

The PUNK circuit was connected, i.e., the connection between VS1 and D1 was made and the connection to U2 was restored. The STB power supply was turned ON using a DIP switch connected to the board. The results are as follows:



1. CH1 is STB V_{CC}: It rises in less than 20ms to 3.3V DC.
2. CH2 is Line Out: There is NO startup spike observed.
3. No Pop Noise could be heard through the speakers.
4. Successful reduction of startup pop noise achieved.

Fig 5: Startup Pop Noise absent using PA4201



1. CH1 is STB V_{CC}: It falls to 0V in less than 20ms.
2. CH2 is Line Out: There is NO shutdown spike observed.
3. No Pop Noise could be heard through the speakers.
4. Successful reduction of shutdown pop noise achieved.

Fig 6: Shutdown Pop Noise absent using PA4201

Audio Muting using PUNK:

During NORMAL operation, the PUNK circuit is “inactive”. An audio mute can be achieved by pushing switch S1. This will assert MUTECONT and the output FET’s will hold the signal low until the switch S1 is released. This is demonstrated as follows:

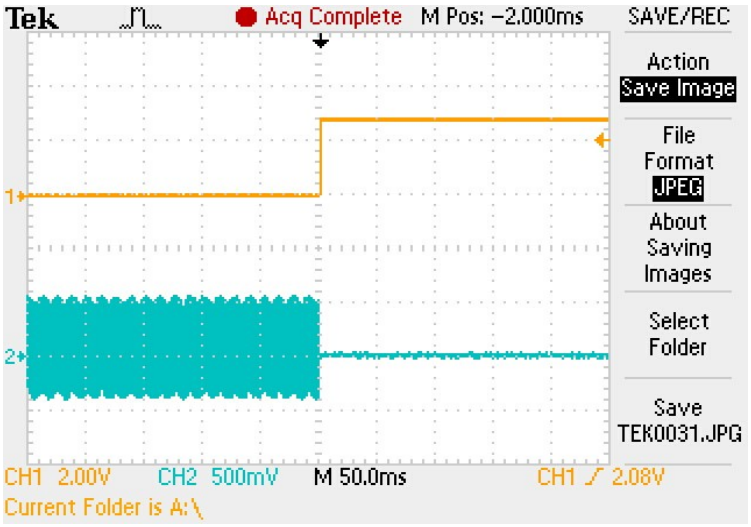


Fig 7: Audio Mute Enable

1. CH1 is the input to the MUTECONT.
2. CH2 is the Audio output (line out) showing muting while S1 is held.

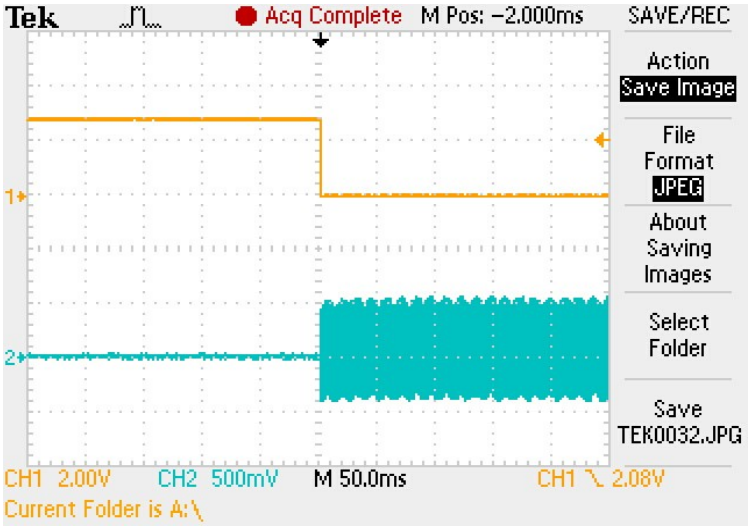


Fig 8: Audio Mute Disable

3. CH1 is the input to the MUTECONT.
4. CH2 is the Audio output (line out) showing restoration of when S1 is released.

This feature can be used to mute Audio using logic on the MUTECONT when it is required in specific applications.

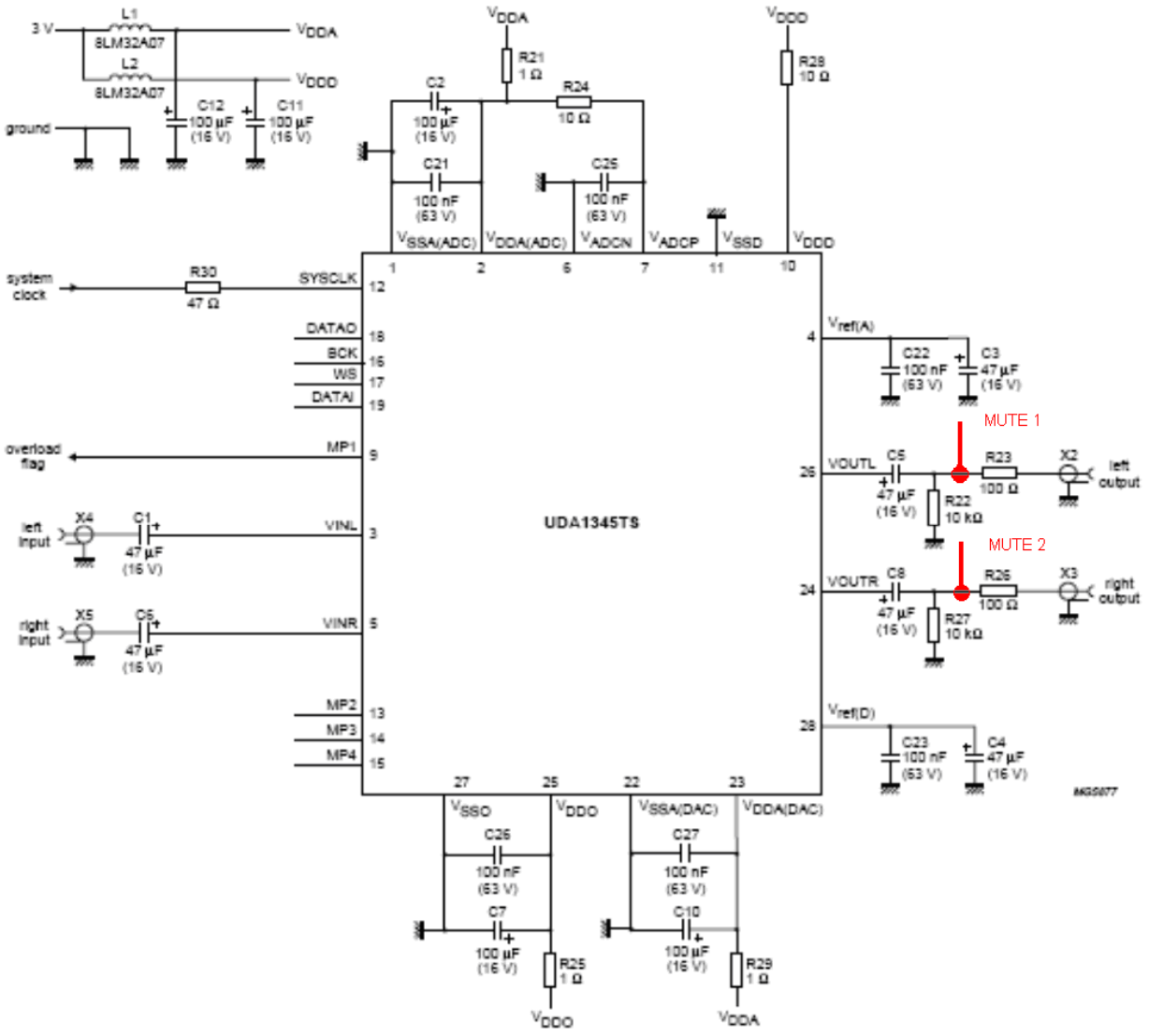


Fig.9. UDA1345TS Audio CODEC showing where PA4201 will be connected

Every audio system is different in design. The PA4201EB is designed with an audio codec output in mind - specifically the UDA1345TS. The PA4201 evaluation board was designed assuming that the output of the codec will be configured as shown in figure 9. In order for ProTek Analog to better help you with your system integration, please contact the Applications Team.