FEATURES

- Daughter Board with external capacitors
- More than 3Vrms signal capability on the o/p lines.
- Ability to try out both package options.
- Vary the timing and performance characteristics by changing C1 and C3.

APPLICATIONS

- Cell phones
- PDA's
- Portable DVD players
- Portable MP3 players
- Notebook Audio
- Set-top boxes
- Digital Video Recorders
- LCD TVs
- Home Theater systems

GENERAL DESCRIPTION

The PA4220DB is a PCB that demonstrates the working of the PA4220 IC. The PA4220 suppresses pop-click noise at startup and shutdown. The PA4220 is a shunt device connected as shown in the typical application figure 3. The click-pop noise is generated at the coupling capacitors while the device is starting up as well as shutting down. The PA4220 detects the ramping of DC voltage and pulls the o/p lines in a low impedance start hence suppressing the pop noise. Capacitor C1 determines the time for which the o/p line is pulled to low impedance state during startup. Capacitor C3 holds the charge to provide drive to the internal switches during shutdown.

The Daughter Board is designed to provide connections to the system board so that the system designer can test the system with the PA4220.

DAUGHTER BOARD LAYOUT

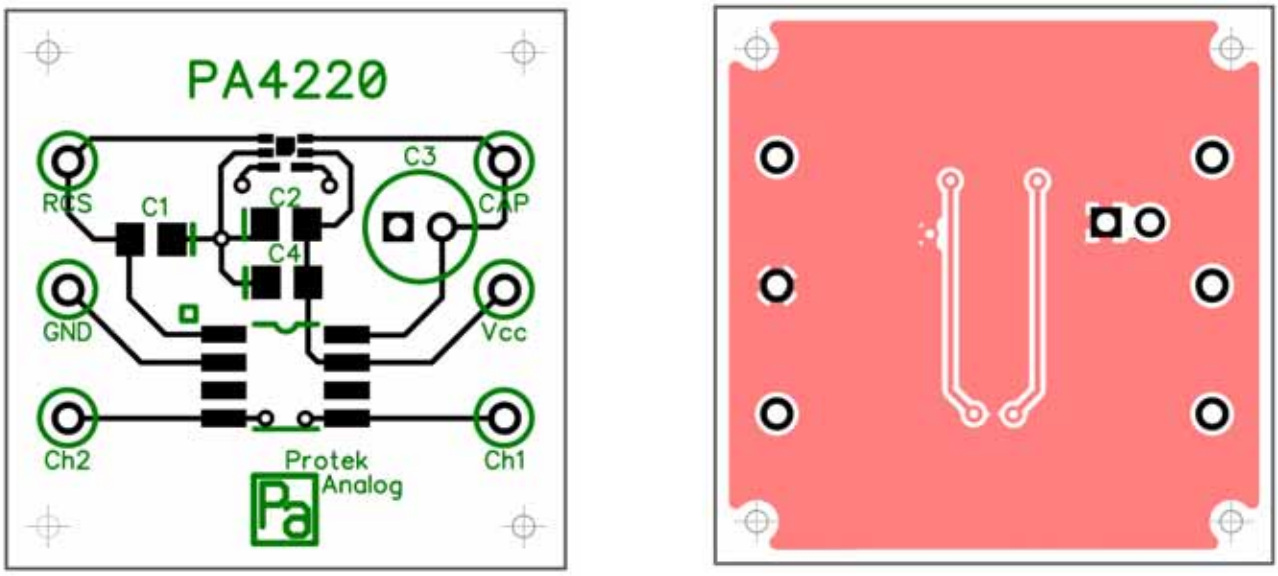

Figure 1: PA4220 Daughter Board Top Trace and Bottom Copper Layers

ORDERING INFORMATION

Part Number	Description
PA4220QDB	Daughter Board evaluating PA4220DQ (SOIC-8 package)
PA4220NDB	Daughter Board evaluating PA4220DN (DFN-6 package)

COMPONENT LIST

Designation	Qty	Description
U1	1	PA4220 (SOIC-8 or DFN-6 package)
C1	1	1uF Capacitor SMT (Power ON delay capacitor)
C2	1	1uF Power Supply Bypass Capacitor SMT
C3	1	220uF Capacitor Through-hole (Holding capacitor)
C4	1	10nF Power Supply Bypass Capacitor SMT
R1	1	50Ω resistance

REQUIRED EQUIPMENT

- PA4220 Daughter Board (PA4220NDB or PA4220QDB)
- 2.5V-5V DC power supply
- Set-top Box or MP3 audio output stage with a single ended power supply
- Speakers

CONNECTION SCHEME

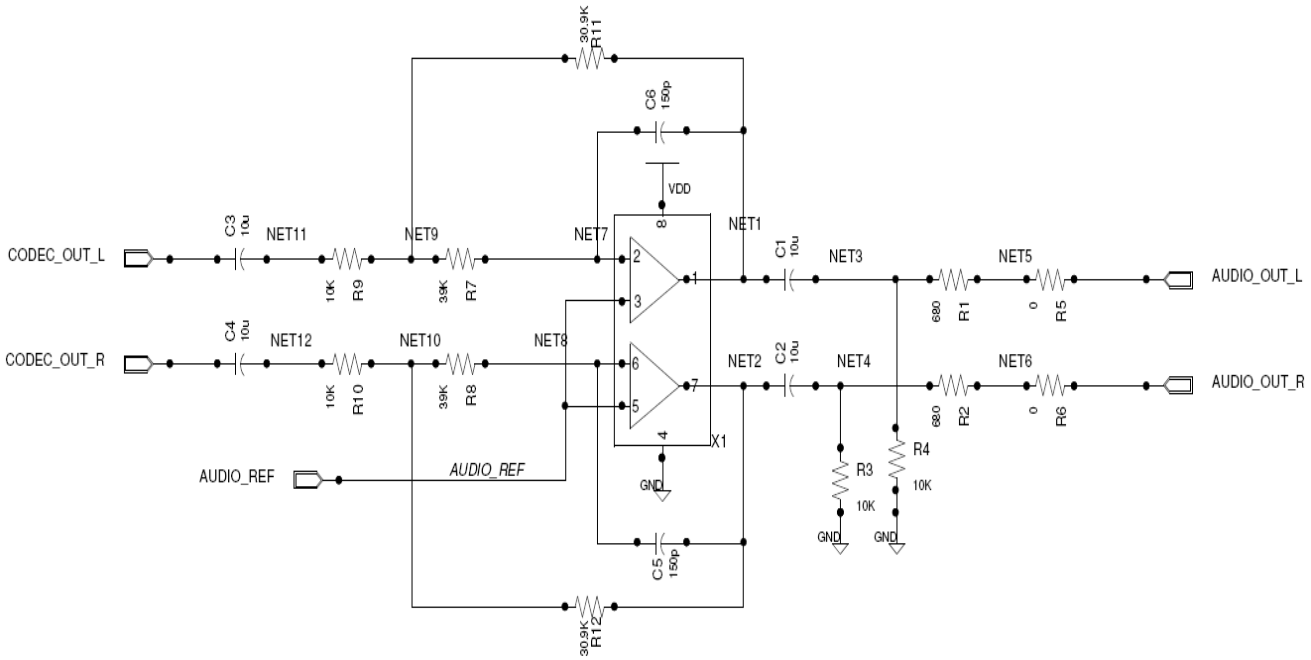

Figure 2: Typical output stage of a set-top box

The PA4220DB can be used to demonstrate the functioning of the PA4220 by inserting this board as shown in Figure 3.

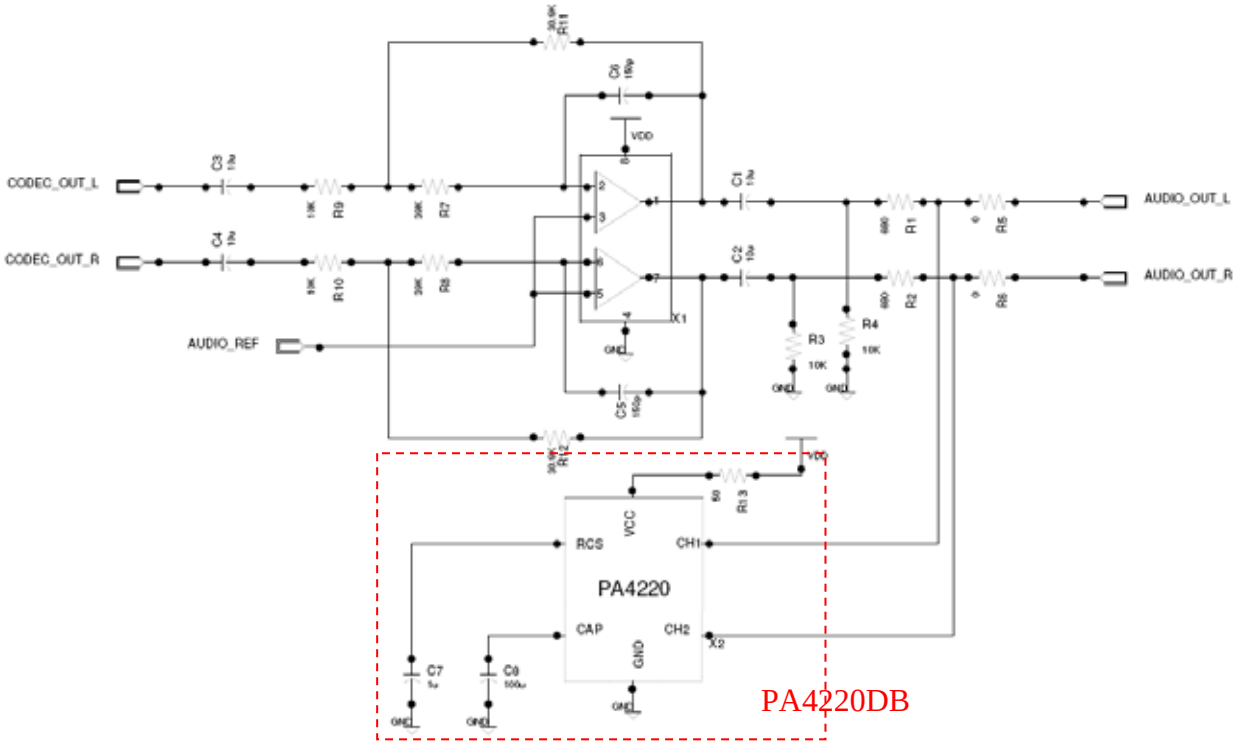

Figure 3: Output stage of a set-top box showing the connection scheme with PA4220DB

PROCEDURE

1. Connect the PA4220DB as shown in figure 3 (Ch1 and Ch2 o/p connected after the series resistors R1 and R2).
2. Make sure the PA4220DB VCC is connected to first ramping Vdd (2.5V to 5V). This will help to improve performance due to power supply sequencing.
3. Connect speakers at the output. Minimum load should be 600Ω.
4. Turn system power ON and OFF. You will notice that the pop noise is suppressed.

CHOICE OF EXTERNAL CAPACITOR (C1, C3 figure 1)

The external capacitor connected to RCS pin of the PA4220 determines the time for which the o/p stage is pulled to a low impedance state. Using a 1uF capacitor will provide a low impedance state time of approximately 220ms. Ideally, this should be good enough to suppress the popup noise. Capacitor C3 is used as a holding capacitor to provide drive to the internal switches during shutdown. Typical values for this capacitor should be around 100uF-470uF.

A NOTE ABOUT SYSTEM ARCHITECTURE

ProTek understands that the customer has the choice to select the system architecture appropriate for their systems. There is a definite relationship between the power supply turn-on and turn-off characteristics and the pop noise heard at the output. A rise and fall time of 50ms is the most desirable power supply characteristics for PA4220. Other components in the circuit also add to the pop noise generated. These include the Operational Amplifiers, By-pass capacitors and load resistors. Care must be taken in choosing the components to provide optimal pop noise reduction in the system design. Proper layout techniques should be employed to assure optimum performance and minimal distortion.

The output stage shown in this example is one that is seen in many set-top boxes. The amplifier set to a gain of 3V/V was used to verify the line driver circuit.