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# AN-8031

## Utilizing the FSA2000 MUTE Function to Reduce Audio “Click” and “Pop”

### Introduction

The FSA2000 was designed with special control pins to allow system designers to eliminate click and pop during situations when the FSA2000 audio amplifier is in use. This application note discusses the proper use and timing of the control pins to ensure that clicks and pops do not occur.

### Power-Up and Power-Down

A common issue with headphone amplifiers is click and pop when the amplifier is powering-up or powering-down. There are sharp transients on the audio outputs that can cause audible click and pop noises through the headset. The

FSA2000 prevents these transients during power-up by muting the outputs until the internal charge pumps are stable. This ensures that any transients caused by the charge pump are not propagated to the outputs. In the cases where the application needs a longer startup time for mute, the FSA2000 has the MUTE pin to allow applications control over the behavior of the amplifier during both startup and power-down. The MUTE pin forces the audio outputs into a known and controlled state so that any transients of the amplifier are not propagated to the headphones. Figure 1 shows the correct timing of the MUTE pin in relation to the /SHDN pin for optimal click and pop performance.

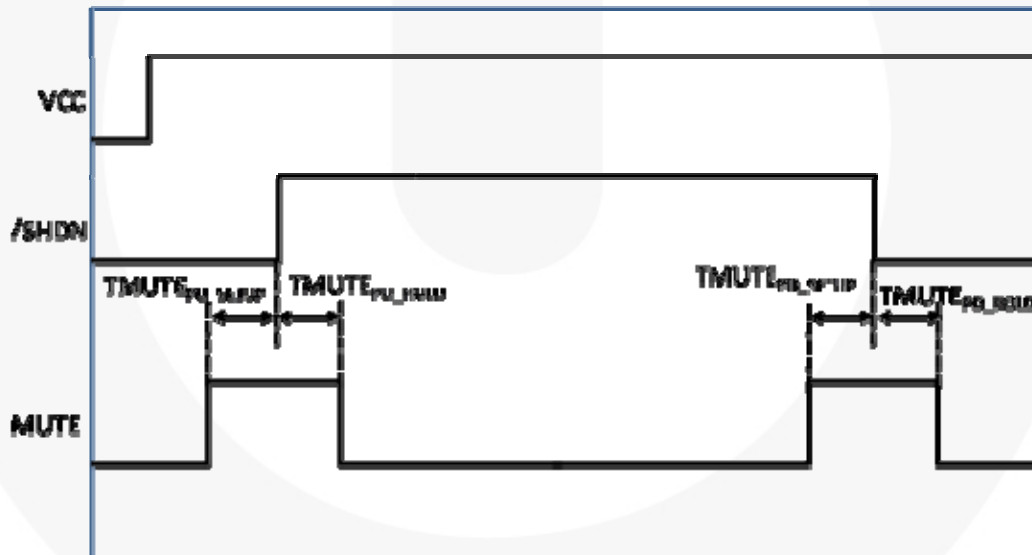


Figure 1. Power-Up and Power-Down Timing

Table 1. Recommended MUTE Timing

Parameter	Description	Recommended Timing
$TMUTE_{PU\_SETUP}$	MUTE Setup Time to /SHDN Rising Edge	500ns
$TMUTE_{PU\_HOLD}$	MUTE Hold Time to /SHDN Rising Edge	500ns
$TMUTE_{PD\_SETUP}$	MUTE Setup Time to /SHDN Falling Edge	500ns
$TMUTE_{PD\_HOLD}$	MUTE Hold Time to /SHDN Falling Edge	500ns

## Related Resources

[FSA2000 — Auto Selecting HS-USB Switch with Cap-Free Headphone Audio Amplifier](#)

[FDB323 — Fairchild Demonstration Board Kit & User Guide](#)

[FEB322 — FSA2000 Evaluation Board User Guide](#)

[AN-8032 — FSA2000 Quick Start Guide](#)

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