SigmaTel Inc
Integrating Mixed-Signal Solutions

Product Brief

## Audio Codec Capacitor Decoupling Performance Comparison

Introduction

SigmaTel has consistently provided the industry's highest performance AC'97 audio codecs for applications in PCs, settop boxes, DVD players, PDAs, and other audio enabled equipment. Recent improvements in the designs from SigmaTel now offer the option of significantly reducing the size and number of external decoupling capacitors used to filter internal voltages. Audio subsystem costs are now even lower with this option for fewer and smaller external components. The charts below indicate the expected performance levels expected for a typical PCI sound card design. These results can also be applied to the increasingly popular motherboard designs with AC'97 audio on-board. It should be noted that motherboards can have additional noise sources not present on sound cards. In the case of a high noise environment, the decoupling capacitor values can be slightly increased typical sound card values to improve performance.

CAP2 Reduction Effect

The CAP2 input on SigmaTel codecs is used to decouple the ADC reference voltage. The standard value for CAP2 is listed as +10uF in most SigmaTel documentation. As is apparent from the chart, values down to 0.01uF have no appreciable effect on ADC performance.
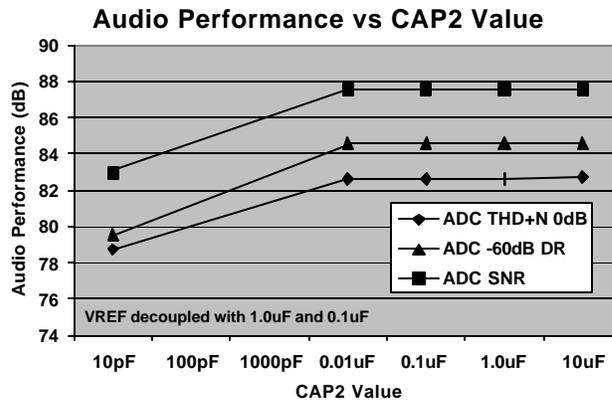
CAP2 and VREFcap Combined Reduction Effect

The CAP2 input on SigmaTel codecs is used to decouple the ADC reference voltage, while the VREFcap decouples the primary internal reference voltage. The standard value for CAP2 and VREFcap is listed as +10uF in most SigmaTel documentation. As is apparent from the chart, both capacitors can be reduced to values as small as 0.01uF with only a minor effect on ADC performance.