

## ***Application Note***

# MIGRATING FROM THE CS3302 TO THE CS3302A SEISMIC DIFFERENTIAL AMPLIFIER

### **1. SUMMARY**

This document outlines the differences in operation of the CS3302A when compared to the CS3302 and explains how to use the CS3302A device in a system designed for the CS3302. In particular, the need for external anti-alias filter resistors is addressed.

### **2. DESCRIPTION OF CHANGES BETWEEN CS3302 AND CS3302A**

The CS3302A seismic differential amplifier is a pin-compatible upgrade for the original CS3302 device.

The main purpose of the CS3302A revision is to provide a fix for the two CS3302 errata listed in errata ER596A3 (items 1 and 2 in Table 1). In addition to this fix, further upgrades were implemented in the CS3302A. Table 1 outlines the differences between the CS3302 and CS3302A.

**Table 1: Differences Between CS3302 and CS3302A**

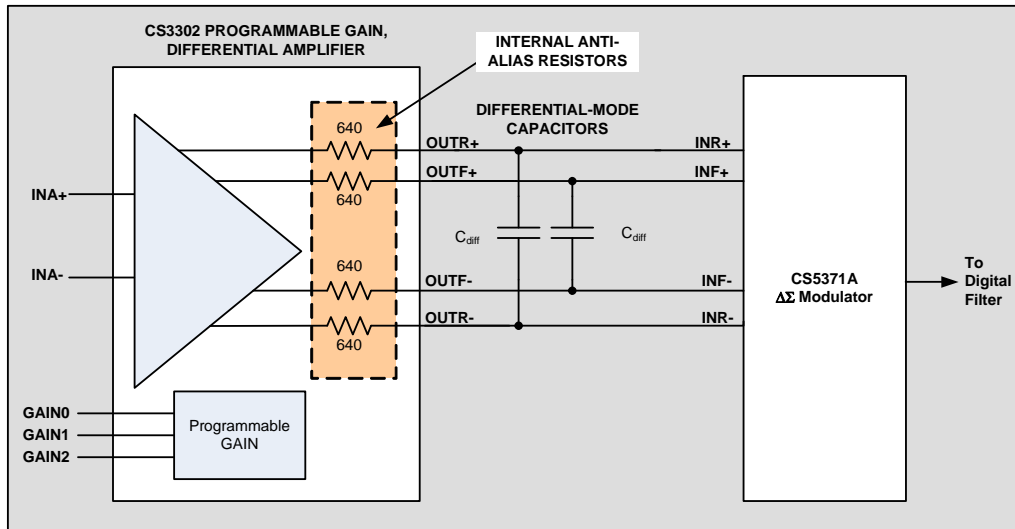
Item	Description																		
1	To achieve tighter anti-alias filter resistor tolerance, CS3302A eliminates internal anti-alias filter resistors that exist in CS3302 (specified in the CS3302 data sheet as 640 ohm $\pm 10\%$ depending on process parameters). This change requires the CS3302A to use external anti-alias resistors.																		
2	Improved relative gain accuracy production test limits. CS3302A relative gain accuracy production test limits tightened to $\pm 0.2\%$ maximum for all gain settings.																		
3	Removed unipolar power supply mode. CS3302A specified for bipolar power supply mode only.																		
4	Removed low power operating mode. CS3302A specified for normal power operating mode only.																		
5	CS3302A power supply specified operating limits tightened from $\pm 5\%$ to $\pm 2\%$ .																		
10	<p>Improved typical THD performance by 1.0 dB, for gain ranges x2, x4, and x8.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Gain</th> <th style="text-align: center;">THD CS3302</th> <th style="text-align: center;">THD CS3302A</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td rowspan="7" style="text-align: center; vertical-align: middle;">-118</td> <td style="text-align: center;">-118</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">-119</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">-119</td> </tr> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">-119</td> </tr> <tr> <td style="text-align: center;">16</td> <td style="text-align: center;">-118</td> </tr> <tr> <td style="text-align: center;">32</td> <td style="text-align: center;">-115</td> </tr> <tr> <td style="text-align: center;">64</td> <td style="text-align: center;">-112</td> </tr> </tbody> </table>	Gain	THD CS3302	THD CS3302A	1	-118	-118	2	-119	4	-119	8	-119	16	-118	32	-115	64	-112
Gain	THD CS3302	THD CS3302A																	
1	-118	-118																	
2		-119																	
4		-119																	
8		-119																	
16		-118																	
32		-115																	
64		-112																	

Although the CS3302 and CS3302A are pin-compatible devices, **the CS3302A is not a drop-in replacement for the CS3302**. Due to the removal of internal anti-alias filters, the CS3302A requires external anti-alias filter resistors to achieve optimum performance.

### 3. Converting a CS3302 design to use CS3302A

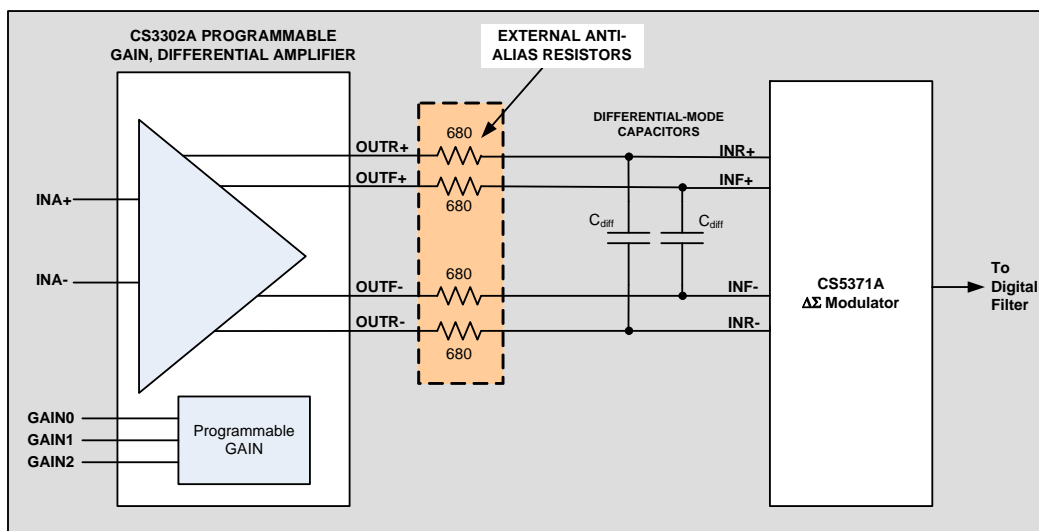
Systems originally designed using the CS3302 device can not use CS3302A transparently. To use the CS3302A, the system designer needs to modify the system hardware by adding external 680  $\Omega$  anti-alias filter resistors to replace the removed internal anti-alias filter resistors. Alternative resistor values may be chosen to support other anti-alias RC filter configurations.

Figure 1 highlights an existing CS3302 design with a simple first-order anti-alias filter circuit constructed between the CS3302 amplifier and the CS5371A modulator using internal CS3302 resistors.



**Figure 1. CS3302 with a First-order Anti-alias Filter Using Internal Resistors**

To use CS3302A, the simple addition of external 680  $\Omega$  anti-alias filter resistors is required to replace the internal anti-alias filter resistors removed, as shown in Figure 2.



**Figure 2. CS3302A with External Anti-alias Using External Resistors**

**NOTES**

---

## Contacting Cirrus Logic Support

For all product questions and inquiries, contact a Cirrus Logic Sales Representative.

To find the one nearest to you, go to <http://www.cirrus.com>

---

### IMPORTANT NOTICE

Cirrus Logic, Inc. and its subsidiaries ("Cirrus") believe that the information contained in this document is accurate and reliable. However, the information is subject to change without notice and is provided "AS IS" without warranty of any kind (express or implied). Customers are advised to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgment, including those pertaining to warranty, indemnification, and limitation of liability. No responsibility is assumed by Cirrus for the use of this information, including use of this information as the basis for manufacture or sale of any items, or for infringement of patents or other rights of third parties. This document is the property of Cirrus and by furnishing this information, Cirrus grants no license, express or implied under any patents, mask work rights, copyrights, trademarks, trade secrets or other intellectual property rights. Cirrus owns the copyrights associated with the information contained herein and gives consent for copies to be made of the information only for use within your organization with respect to Cirrus integrated circuits or other products of Cirrus. This consent does not extend to other copying such as copying for general distribution, advertising or promotional purposes, or for creating any work for resale.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). CIRRUS PRODUCTS ARE NOT DESIGNED, AUTHORIZED OR WARRANTED FOR USE IN PRODUCTS SURGICALLY IMPLANTED INTO THE BODY, AUTOMOTIVE SAFETY OR SECURITY DEVICES, LIFE SUPPORT PRODUCTS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF CIRRUS PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK AND CIRRUS DISCLAIMS AND MAKES NO WARRANTY, EXPRESS, STATUTORY OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, WITH REGARD TO ANY CIRRUS PRODUCT THAT IS USED IN SUCH A MANNER. IF THE CUSTOMER OR CUSTOMER'S CUSTOMER USES OR PERMITS THE USE OF CIRRUS PRODUCTS IN CRITICAL APPLICATIONS, CUSTOMER AGREES, BY SUCH USE, TO FULLY INDEMNIFY CIRRUS, ITS OFFICERS, DIRECTORS, EMPLOYEES, DISTRIBUTORS AND OTHER AGENTS FROM ANY AND ALL LIABILITY, INCLUDING ATTORNEYS' FEES AND COSTS, THAT MAY RESULT FROM OR ARISE IN CONNECTION WITH THESE USES.

Cirrus Logic, Cirrus, and the Cirrus Logic logo designs are trademarks of Cirrus Logic, Inc. All other brand and product names in this document may be trademarks or service marks of their respective owners.