

CS4222

20-Bit Stereo Audio Codec with Volume Control

The following information is based on
technical datasheet:

CS4222 DS236PP3 JAN '97

Please contact Cirrus Logic:
Crystal Semiconductor Products Division
for further product information.

CRYSTAL SEMICONDUCTOR PRODUCTS DIVISION PRODUCT INFORMATION

Copyright © Cirrus Logic, Inc. 1998
(All Rights Reserved)

PI236PP1 JAN '98

20-Bit Stereo Audio Codec with Volume Control

Features

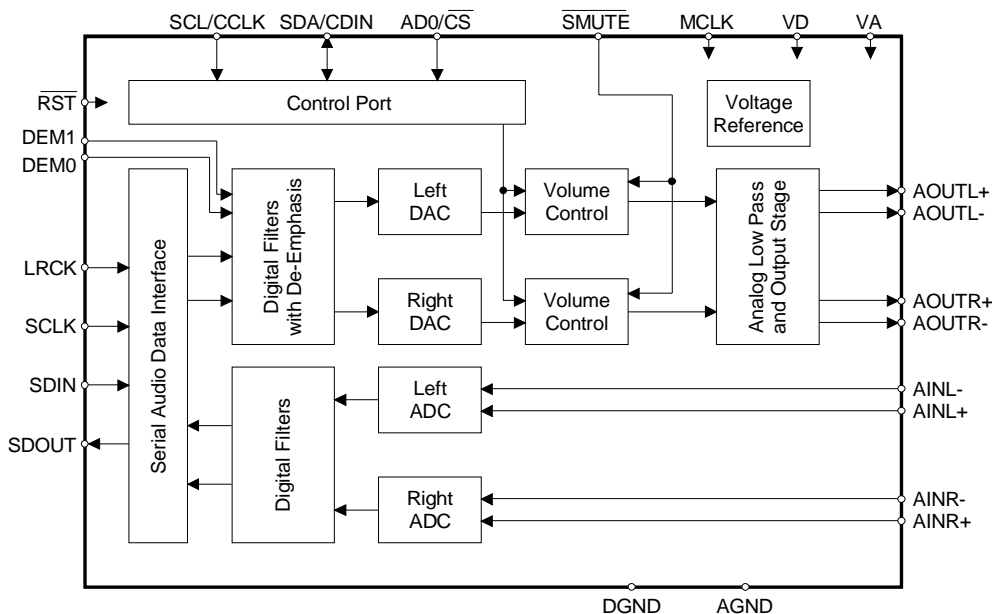
- 99 dB 20-bit A/D Converters
- 99 dB 20-bit D/A Converters
- 110 dB DAC Signal-to-Noise Ratio (EIAJ)
- Analog Volume Control
 - 0.5 dB Step Resolution
 - 113.5 dB Attenuation
- Soft Mute Capability
- Differential Inputs/Outputs
- On-chip Anti-aliasing and Output Smoothing Filters
- De-emphasis for 32, 44.1 and 48kHz
- Stand-Alone or Control Port Mode
- Single +5V power supply

Description

The CS4222 is a highly integrated, high performance, 20-bit, audio codec providing stereo analog-to-digital and stereo digital-to-analog converters using delta-sigma conversion techniques. The device operates from a single +5V power supply, and features low power consumption. Selectable de-emphasis filter for 32, 44.1, and 48 kHz sample rates is also included.

The CS4222 also includes an analog volume control capable of 113.5 dB attenuation in 0.5 dB resolution. The analog volume control architecture preserves dynamic range during attenuation. Volume control changes are implemented using a "soft" ramping or zero crossing technique.

Applications include reverb processors, musical instruments, DAT, and multi-track recorders.



Overview

The CS4222 has 2 channels of 20-bit analog-to-digital conversion and 2 channels of 20-bit digital-to-analog conversion. All ADCs and DACs are delta-sigma converters. The DAC outputs have adjustable output attenuation implemented in 0.5 dB step resolution. The device also includes a soft mute function and digital de-emphasis for 32, 44.1, and 48 kHz.

Digital audio data for the DACs and from the ADCs is communicated over separate serial ports. This allows concurrent writing to and reading from the device. Control for the functions available on the CS4222 are communicated over a serial microcontroller interface.

FAQs

- 1) Why does the CS4222 implement analog volume control instead of digital volume control?
- A: Analog volume control allows one to preserve system dynamic range. As the audio signal is attenuated, the noise floor is also attenuated by the same amount. Thus, dynamic range is preserved during attenuation.
- 2) Does the CS4222 have to be used with a microcontroller?
- A: No, the CS4222 may be operated in stand-alone mode or microcontroller mode. When using the device with a microcontroller, additional features can be accessed through the control port, such as volume control, ADC input level monitoring, volume control ramp rate, etc... De-emphasis and soft mute are offered in stand-alone mode.
- 3) What does the term "soft volume control" mean?
- A: When the user writes a new volume control setting, the CS4222 ramps from the old volume setting to the new volume setting in 0.5 dB steps. This approach is audibly superior to a single large volume control change which can result in an audible "click" or "pop". The rate at which this ramp occurs can be set to 4 different settings through a register in the control port. This same approach is used when muting the DAC outputs.

Ordering Information

CS4222-KS 28 pin SSOP, -10 to +70 °C
CDB4222 Evaluation Board

For further information on Crystal products, please visit our website "www.crystal.com" or call our literature department (800) 888-5016 ext. 3594 or (512) 912-3594 for data sheets and application notes.

Schematic & Layout Review Service

Confirm Optimum
Schematic & Layout
Before Building Your Board.



For Our Free Review Service
Call Applications Engineering.

C a l l : (5 1 2) 4 4 5 - 7 2 2 2

Sales Office and Applications Support

UNITED STATES

Sales Office and Applications Support:

WESTERN AREA

Cirrus Logic
Crystal Semiconductor Div.
50 Airport Pkwy.
San Jose, CA 95110
Ph: 408-437-7743
FAX: 408-437-4943

Cirrus Logic
Crystal Semiconductor Div.
6 Venture,
Ste. 100
Irvine, CA 92718
Ph: 714-453-5910
FAX: 714-453-5914

CENTRAL AREA

Cirrus Logic
Crystal Semiconductor Div.
14205 Burnet Rd.,
Ste. 400
Austin, TX 78728
Ph: 512-255-8893
FAX: 512-255-0733

EASTERN AREA

Cirrus Logic
Crystal Semiconductor Div.
5511 Capital Center Dr.,
Ste. 103
Raleigh, NC 27606
Ph: 919-859-5393
FAX: 919-859-5334

Cirrus Logic
10 New England Business Center,
Ste. 100
Andover, MA 01810
Ph: 978-794-9138
FAX: 978-794-9998

Cirrus Logic
Crystal Semiconductor Div.
10440 Little Patuxent Pkwy.,
Ste. 300
Columbia, MD 21044-3559
Ph: 410-740-5654
FAX: 410-740-6961

EUROPE

Sales Office and Applications Support:

Cirrus Logic France
Immeuble Andre Malraux
93561 Rosny s/s Bois CEDEX,
France
Ph: +33(148)122812
FAX: +33(148)122810

Cirrus Logic
Crystal Semiconductor (UK) Ltd.
Spectrum Point,
279 Farnborough Rd.,
Farnborough,
Hampshire GU14 7LS,
United Kingdom
Ph: +44(0)1252372762
FAX: +44(0)1252372763

Cirrus Logic GmbH
Muehlfelder-Strasse 2
D-82211 Herrsching, Germany
Ph: +49(08152)92460
FAX: +49(08152)924699

FAR EAST

Sales Office and Applications Support:

CHINA

Cirrus Logic International Ltd.
A-1403, Qiancun Commercial
Mansion
Beijing, China 100029
Ph: (8610)6443-0783
Ph: (8610)6443-0784
Ph: (8610)6443-0785
FAX: (8610)6443-0786

HONG KONG

Cirrus Logic International Ltd.
1203 Park Tower
15 Austin Rd., Tsimshatsui
Kowloon, Hong Kong
Ph: (852)2376-0801
FAX: (852)2375-1202

KOREA

Cirrus Logic, Korea Co., Ltd.
Rm 1302 SangKyung Bldg., 824-
21 YeokSam-Dong,
KangNam-Ku,
Seoul, Korea
Ph: +82(2)565-8561
FAX: +82(2)565-8565

SINGAPORE

Cirrus Logic
Crystal International
6 Kaki Bukit Ave. 1,
Ste. 03-03
Singapore 417940
Ph: +65-743-4111
FAX: +65-742-4111

TAIWAN

Cirrus Logic International Ltd.
Taiwan Branch
10F, No.214 Tun Hwa North Rd.
Taipei, Taiwan R.O.C.
Ph: +886(2)2718-4533
FAX: +886(2)2718-4526

JAPAN

Sales Office and Applications Support:

Cirrus Logic K.K.
Shinjuku Green Tower, Bldg. 26F
6-14-1 Nishi-Shinjuku,
Shinjuku-ku,
Tokyo, 160
Japan
Ph: +81(03)3340-9111
FAX: +81(03)3340-9120



**CRYSTAL SEMICONDUCTOR
PRODUCTS DIVISION**

**PO BOX 17847
4210 S. INDUSTRIAL DRIVE
AUSTIN, TEXAS 78744
512.445.7222 / 800.888.5016
FAX: 512.445.7581**

**WORLDWIDE WEB:
<http://www.crystal.com>**