Analog Reinvented

ES9102C

SABRE32 Reference Stereo ADC

Product Brief

Device	Description	DNR (dB-A)	THD+N (dB)	32-bit Digital Filter	8-band Biquad Filter	I²S / SPDIF Output	Sample Rate
ES9102C	*SABRE32 Reference* 32-bit Audio ADC	127 (Mono) 124 (Stereo)	−120 (Mono) −118 (Stereo)	Programmable	Programmable	Yes	Up to 384kHz

The ***SABRE32 Reference ADC*** is a two-channel 32-bit analog-to-digital (A/D) converter targeted for consumer applications such as audio pre-amplifier, audio processor, A/V receiver and professional audio applications such as recording systems, mixer consoles and digital audio workstations.

Using the ESS proprietary 32-bit Hyperstream™ ADC architecture, the ***SABRE32 Reference ADC*** delivers an unprecedented DNR of 127dB and THD+N of −120dB in mono mode (or DNR of 124dB and THD+N of −118dB in stereo mode), a performance level that will satisfy the most demanding audio enthusiasts.

For highest performance, the ***SABRE32 Reference ADC*** implements a 32-bit programmable decimation filter and outputs the full 32-bit resolution in I²S mode, or 24-bit resolution in SPDIF mode. A digital high-pass filter is available for DC removal. Additionally, a programmable 8-band biquad filter is implemented for RIAA or custom equalization. The ***SABRE32 Reference ADC*** supports synchronous SPDIF or I²S master/slave output, or asynchronous I²S slave output relative to the master clock for up to 384kHz sample rate and consumes less than 200mW.

FEATURE	BENEFIT
32-bit Hyperstream™ ADC architecture o 127dB dynamic range (mono mode) o −120dB THD+N (mono mode)	Unprecedented dynamic range and ultra low distortion
32-bit Programmable decimation (FIR) filter o Built–in sharp or low-group delay filters, or o User customizable characteristics	Customizable FIR decimation filters for any application
Programmable 8-band biquad filter o Built-in RIAA filter o User customizable characteristics	Customizable equalization for any application
Programmable Digital High-pass filter	Eliminates input DC offset
Up to 384kHz sampling rate	Compatible with DVD-audio and professional applications
I²C or hardware based control	Configured by microcontroller or used standalone
Flexible digital output modes	Synchronous SPDIF or I²S master/slave output, or asynchronous I²S slave output relative to master clock
Low power in a small package o < 200mW power consumption o 48-LQFP package	Simplifies PCB layout and power supply design

APPLICATIONS

- Professional recording systems
- Studio mixing console
- Digital audio workstations
- Audio/Video receivers
- Audio preamplifiers
- Audio processor

FUNCTIONAL BLOCK DIAGRAM AND DESCRIPTION

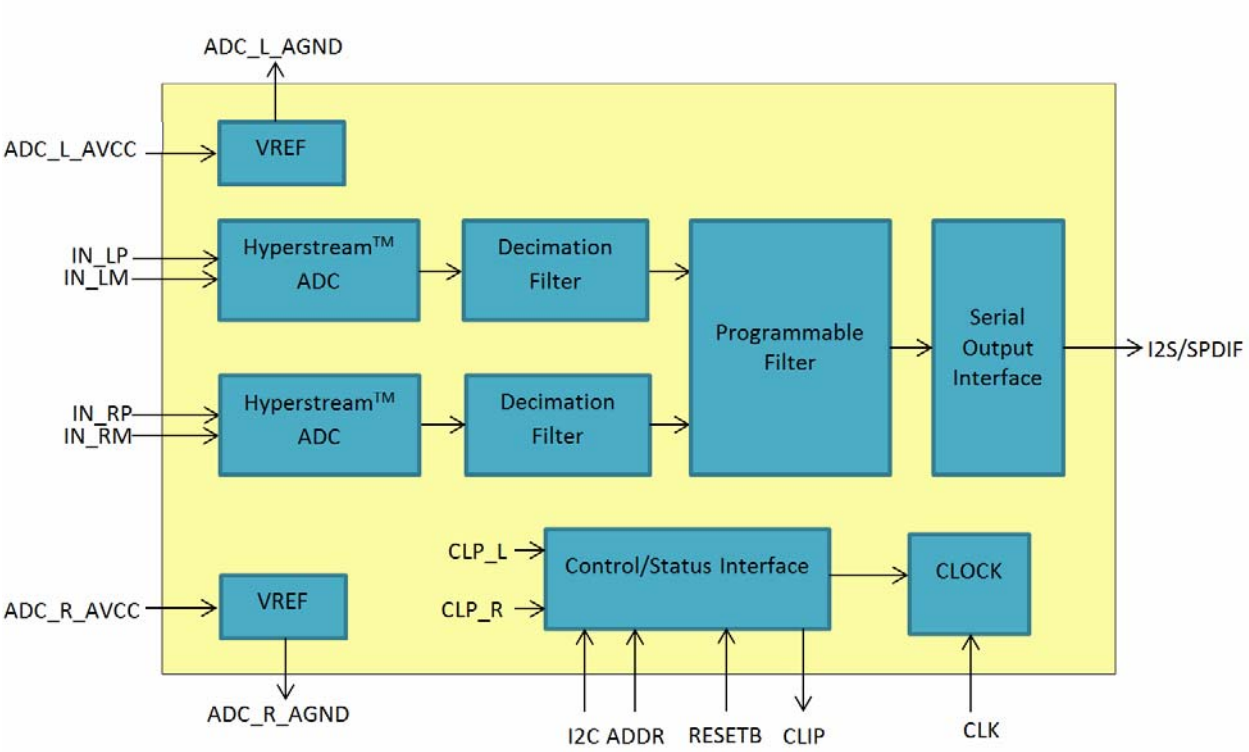

Figure 1: Functional Block Diagram

HyperStream ADC

The Sabre ADC uses ESS' patented Hyperstream architecture for performing super accurate analog-to-digital conversion. The HyperStream ADC uses a hybrid combination of high-speed digital and precision analog circuits to sample and convert the analog input signal. The oversampled signal is then passed to the digital core of the Sabre ADC for further processing.

Decimation Filter

A decimation filter structure is used to perform downsampling of the digital output from the HyperStream ADC. The purpose of the decimation filter is to remove any high frequency data before downsampling the data to a lower sampling rate. The decimation filter is a two stage FIR structure, and is fully programmable.

Programmable Filter

A fully programmable biquad filter is available after the decimation filter. The biquad filter structure contains eight full biquads per channel, and is completely customizable, with up to 20dB of headroom in each biquad. The programmable filter uses the RIAA filter by default, and can be reprogrammed using I^2C.

Serial Output Interface

Output data can be formatted to use either the SPDIF or the I^2S digital interface formats. Several types of I2S output formats are available (including LJ, RJ and I^2S).

Control/Status Interface

The Sabre ADC is fully programmable using I^2C. The Sabre ADC also supports interrupt outputs, which can be serviced by an external microcontroller.