VLSI Technology, Inc.

VL82C801 Parallel/Serial Interface Multimedia Audio Codec

Overview

VLSI's VL82C801 provides a high quality audio subsystem for record and playback in a PC or other microprocessor environment.

The VL82C801 features16-bit stereo A/D and D/A converters with on-chip filtering. An MPC level 2 compatible mixer provides independent gain settings for four stereo sources and one mono source. The record function supports four stereo sources including the mixer output. The VL82C801 supports full duplex record and playback with 16-sample FIFOs for uninterrupted operation. A two channel DMA interface connects easily to the ISA bus. It provides pin and register compatibility with most popular multimedia codecs such as the CS4231A and AD1848.

Enhanced Performance

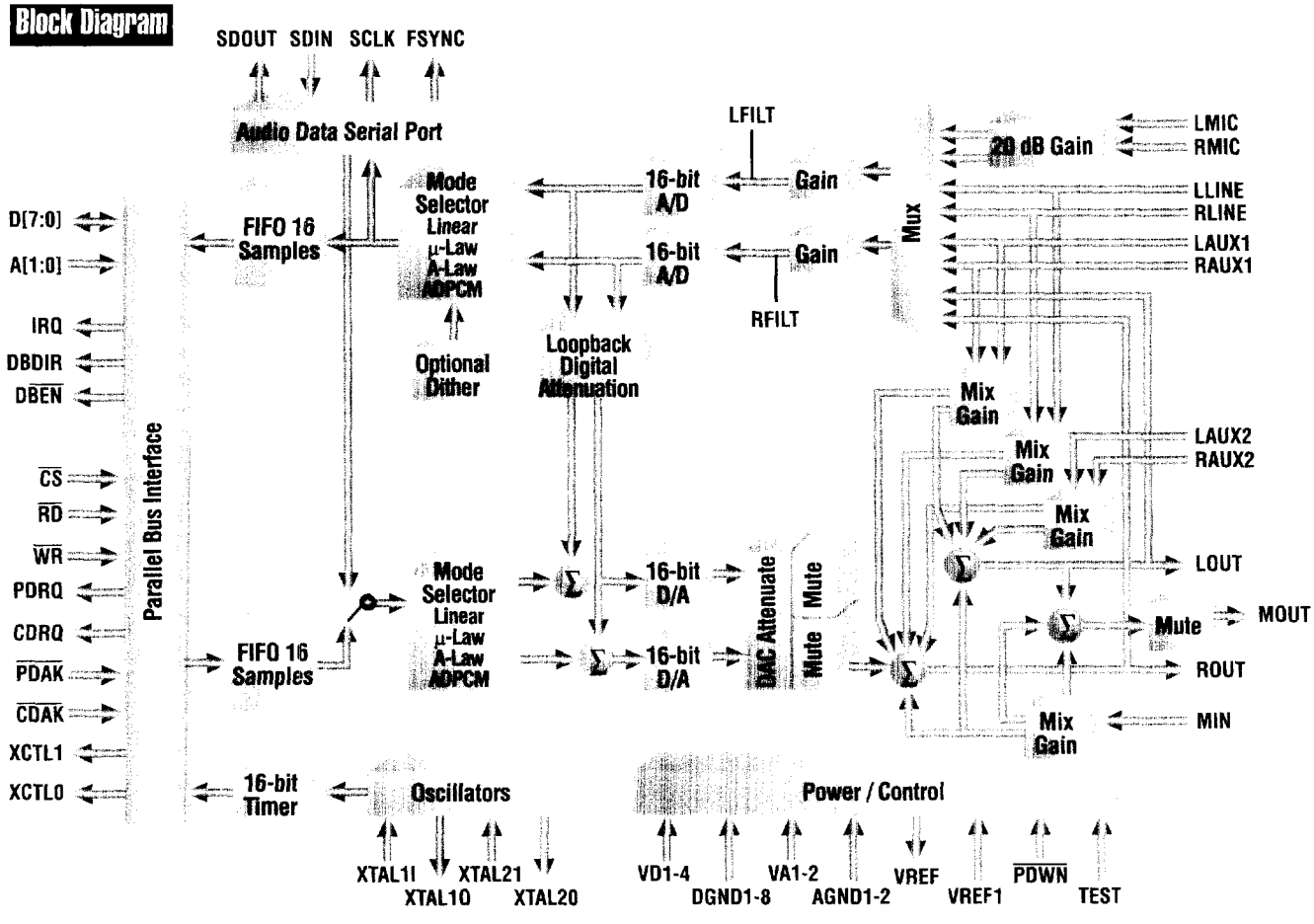
The VL82C801 offers the following improvements:

- Superior sound quality with the use of Finite Impulse Response (FIR) filters while others use IIR filters with phase error
- Excellent power consumption with 3V operation; maximum total power is 88 mA while others are up to 145 mA
- Simplified design and lower cost using either 3V or 5V supply; others require 5V or dual supplies
- Higher over-sampling rates provide superior sound quality
  - A-to-D 128X and D-to-A 96X; others are typically 64X

Features

- High performance Sigma-Delta technology
- Full 16-bit duplex stereo A/D, D/A
- Two channel DMA interface
- Dual 16-sample FIFOs for uninterrupted sound
- MPC level 2 compatible mixer
- ADPCM, A-law, μ-law filtering
- Energy saving power down mode
- Windows Sound System™ Compatible
- Pin & register compatible with CS4231A & AD1848
- Operates from either 3V or 5V source
- Instantaneous Dynamic Range greater than 80 dB
- Available in 68-pin PLCC or 100-pin TQFP

Block Diagram



VLSI Technology, Inc.
8375 S. River Parkway
Tempe, AZ 85284
Tel: 602 752-8574
Fax: 602 752-6014

computing
communications
entertainment

The VL82C801 provides high performance stereo sound to PCs and other microprocessor based systems. It provides a complete solution for recording and playing back sound using a variety of data formats. This allows one codec to support multimedia, communication, and business audio applications. Data formats include 16-bit linear, 8-bit linear, companded in both μ-Law and A-Law, and ADPCM.

A variety of sources can be recorded, as well as mixed into the playback. The stereo A/D converter has four sources including the analog mixer output. The other sources include a microphone input and two line level stereo signals.

The analog outputs are derived from a stereo D/A converter with a complete mixer. The D/A output can be mixed with three stereo sources and one mono source. Stereo sources include two of the A/D inputs as well as one dedicated mixer input. The mono output is commonly a standard PC speaker signal. This allows the PC sound to be combined with enhanced stereo sounds from other sources.

The parallel bus interface is easily adapted to the ISA bus. One optional transceiver and address decoding is all that is needed. All controls are performed via the parallel interface. Audio data is also transferred by either parallel I/O or DMA access. Counters are provided to support the DMA requirements of the ISA configuration. The audio data is supported by dual 16-sample FIFOs allowing uninterrupted sound when the host is busy.

The VL82C801 is intended for parallel interface applications. It does support a serial port for audio data, though all controls are still via the parallel interface.

Enhanced Functions (Mode 2)

To maintain compatibility with other parts, the VL82C801 organizes its functions into Mode 1 and Mode 2. The default state is Mode 1, which emulates an AD1848. Enhanced functions can be accessed when the MODE2 bit is set to a logic 1. Clearing the MODE2 bit restores the Mode 1 operation.

Mode 2 provides 16 extra control registers with feature enhancements not found in Mode 1 or the AD1848. These features are summarized as follows:

- MPC Level 2 mixer including gain control for the line input, 32 volume adjustments in 1.5 dB steps and a mute control
- Full duplex DMA
- Programmable Timer
- Mono output w/ mute
- Mono input with mixer volume control
- ADPCM and Big Endian audio data formats
- Independent selection of playback and capture audio data formats
- Serial port for audio data

Compatibility

The VL82C801 is designed for direct compatibility with the CS4231A. Industry standard software written for this part should perform properly. The VL82C801 has several performance improvements which are transparent to software. These differences are as follows.

Calibration

The VL82C801 provides the best performance as shipped from the factory. It requires no calibration. The calibration register bits are present for compatibility with existing software but have no function.

Data Bus Drivers

Full 24 mA sink/source at 5V capability on the data bus is provided. No drivers are required. Existing designs that use drivers will function as expected.

APAR bits

The APAR bit resides in index register 17, bit 3. This is the same location as the CS4231A. However, the original CS4231A documentation specified bit 2. For convenience the VL82C801 will treat bits 2 and 3 as the same.

OLB Bit

The Output Level Bit (OLB) causes the analog outputs to be attenuated by a more dramatic 5 dB instead of the 3 dB on the CS4231A.

8350-051596-001