ESS Technology, Inc.

DESCRIPTION

The ES1921 audio codec is a combination codec and audio mixer device that is fully compliant with Revision 2.1 of Intel's Audio Codec '97 (AC'97) Component Specification. When used with the ESS Technology Maestro™ family of peripheral component interconnect (PCI)-based digital audio accelerators, the ES1921 helps complete a superior high-performance PCI audio subsystem solution for both desktop and notebook computers.

The ES1921 audio codec supports full-duplex stereo operation for simultaneous record and playback. Voice, sound, and music are regularly sampled for record and playback at 48 kHz. The playback mixer has four stereo inputs and two mono inputs. The record multiplexer has five stereo inputs and three mono inputs. The mixer includes three outputs. Line_Out can be used for stereo output to multimedia speakers, while Mono_Out can be used to output to a telephony subsystem or downline phone.

The major functions of the ES1921 include stereo 18-bit ADC and DAC audio signal conversion, while also providing the interface and control logic to transfer audio data between its serial I/O terminals and the digital audio accelerator. The ES1921 uses its six line-level inputs, its three outputs, and the time division multiplexed (TDM)-based serial AC-Link to transfer data between itself and a digital audio accelerator, such as the ESS Technology Maestro family of PCI-based digital audio accelerators.

The ES1921 may be used as a primary or secondary codec in multiple-codec configurations conforming to the AC'97 Rev. 2.1 specification. The ES1921's conformance to AC'97 in multiple-codec configurations allows it to be used both in 2- and 4-speaker audio-only solutions and in audio-modem solutions for motherboards, add-on cards, or PCMCIA cards. The ES1921 is available in an industry-standard 48-pin low-profile quad flat pack (LQFP).

FEATURES

- Meets or exceeds Audio Codec '97, Revision 2.1 performance specifications
- Supports dual-codec architecture for configuration with one ES1921 in notebook and one in docking station
- Supports AC-Link digital serial interface
- 4 stereo inputs for line-in, CD, video, and auxiliary line-in
- 2 selectable mono inputs for microphones sharing a single mixer input and 1 mono input for phone
- PC speaker input
- 2 stereo outputs. Line out for multimedia speakers and true line out for consumer audio applications
- Usable in desktop, motherboard, and notebook sound card applications, 3D audio applications, and in audio-modem applications

Record and Playback Features

- Full-duplex stereo operation for simultaneous record and playback
- 18-bit stereo ADC and DAC; 3rd 18-bit ADC for mic input.
- 48-kHz playback and record sample rate

Power

- Advanced Configuration and Power Interface (ACPI) support using an external amplifier power-down control
- 3.3V digital and 5.0V analog power supply (AV_{DD} >= DV_{DD})

Compatibility

- Meets Microsoft PC99/PC2001 and WHQL specifications.

BLOCK DIAGRAM

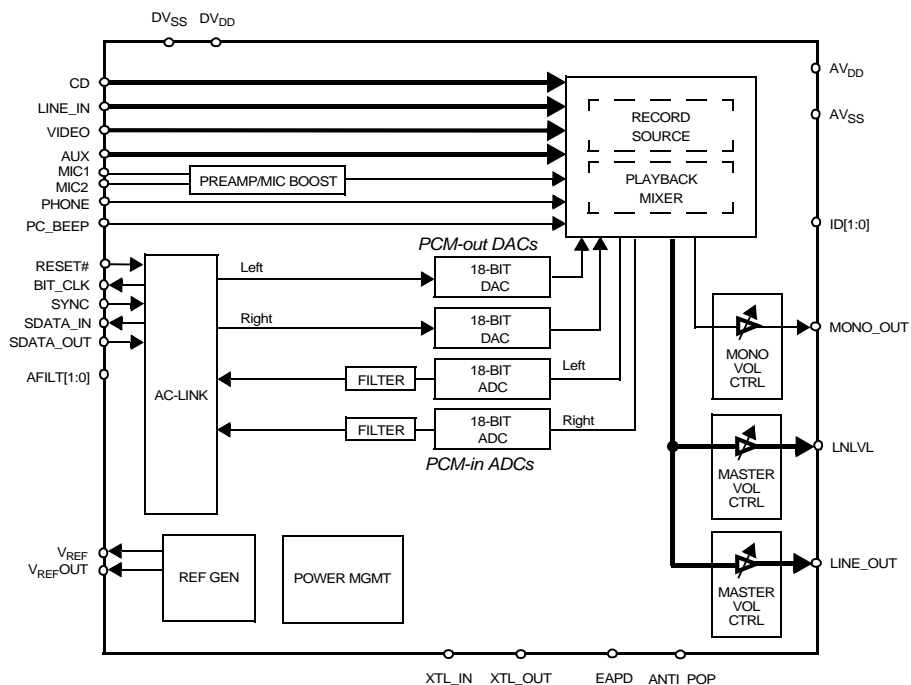Figure 1shows the ES1921 block diagram.

Figure 1 ES1921 Block Diagram
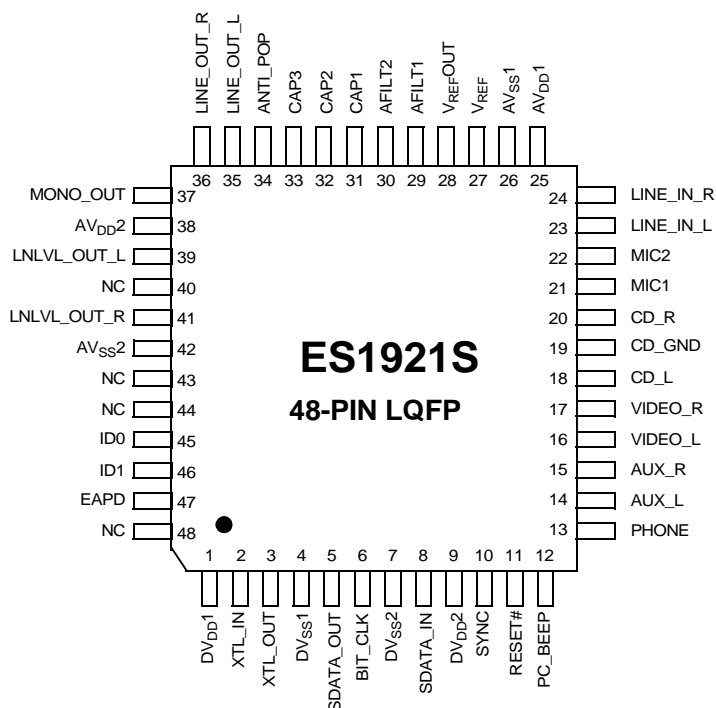
PINOUT

Figure 2 shows the ES1921 pinout diagram.

Figure 2 ES1921 48-Pin Pinout Diagram

ES1921 PIN DESCRIPTIONS

Table 1lists the ES1921pin descriptions.

Table 1   ES1921 Pin Descriptions

Names	Pin Numbers	I/O	Descriptions
$DV_{DD}1$	1	P	Digital VDD.
XTL_IN	2	I	Oscillator input (24.576 MHz).
XTL_OUT	3	I	Oscillator output.
$DV_{SS}1$	4	G	Digital ground.
SDATA_OUT	5	I	AC'97 Serial data in.
BIT_CLK	6	O	Serial data clock (12.288 MHz).
$DV_{SS}2$	7	G	Digital ground.
SDATA_IN	8	O	AC'97 Serial data ou.t
$DV_{DD}2$	9	P	Digital VDD.
SYNC	10	I	Fixed-rate sample sync (48 kHz).
RESET #	11	I	Hardware reset.
PC_BEEP	12	I	PC speaker out.
PHONE	13	I	Telephone speaker input.
AUX_L	14	I	Aux left channel input.
AUX_R	15	I	Aux right channel input.
VIDEO_L	16	I	Video left channel input.
VIDEO_R	17	I	Video right channel input.
CD_L	18	I	CD left channel input.
CD_GND	19	I	CD ground.
CD_R	20	I	CD right channel input.
MIC1	21	I	First microphone input.
MIC2	22	I	Second microphone input.
LINE_IN_L	23	I	Line-in left channel input.
LINE_IN_R	24	I	Line-in right channel input.
$AV_{DD}1$	25	P	Analog VDD.
$AV_{SS}1$	26	G	Analog ground.
V_{REF}	27	I	DAC reference voltage filter capacitor.
$V_{REF}OUT$	28	O	Mic reference voltage output (2.5V, 1.25 mA).
AFILT1	29	O	Anti-Aliasing filter cap (ADC channel).
AFILT2	30	O	Anti-Aliasing filter cap (ADC channel).
CAP1	31	O	Analog output holdoff delay.
CAP2	32	O	ADC reference capacitor.

Table 1   ES1921 Pin Descriptions (Continued)

Names	Pin Numbers	I/O	Descriptions
CAP3	33	O	Antipop power sustain delay.
ANTI_POP	34	O	Antipop output ground shunt control.
LINE_OUT_L	35	O	Line out left channel.
LINE_OUT_R	36	O	Line out right channel.
MONO_OUT	37	O	Mono out.
$AV_{DD}2$	38	P	Analog VDD.
LNLVL_OUT_L	39	O	True-line level-output left channel.
NC	40	NC	No connect.
LNLVL_OUT_R	41	O	True-line level-output right channel.
$AV_{SS}2$	42	G	Analog ground.
NC	43, 44, 48	NC	No connect.
ID0	45	I	Multi-Codec ID select (bit 0).
ID1	46	I	Multi-Codec ID select (bit 1).
EAPD	47	O	External amplifier power down.

ORDERING INFORMATION

Part Number	Description	Package
ES1921S	Audio Codec	48-pin LQFP