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Abstract
Tone and speed adjustment of playback audio signal is a kind of special audio signal processing, which can be applied for hidden speaker's identity, voice change on telephone, special sound effect, speech synthesis, foreign language learning, signal compressing and for film personages. Most realization of the algorithms will be processed by software; in this thesis the pitch and speed of sound adjustment will be carried out by an embedded processor in FPGA with auxiliary hardware circuits. This system was realized in way of software and hardware co-design methodology. This system includes input and output audio interfaces, USB interface, embedded Nios II processor with the embedded μClinux operating system, etc… The audio signal can input through external microphone directly, or access from music files on USB storage device to SDRAM via the Avalon bus in FPGA, and then processed by the NIOS II CPU for sound tuning. The results will be stored back to the USB device or play to the loudspeaker directly through an audio codec.
This system uses an Altera’s DE2 development board as the hardware platform, and the μClinux operating system with an embedded NIOS II processor to realize the special audio player. Due to the enormous flexibility of FPGA chips, a stable, small size, low cost, and low power consumption system can be developed rapidly.
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