

论文

面向HDTV应用的音频解码软硬件协同设计

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摘要

该文以Dolby实验室的音频AC3算法为基础, 研究了在RISC核Virgo上HDTV音频解码的软硬件协同设计方法, 提出了通过对程序关键子函数建模来实现软硬件划分的软硬件协同设计方法。即在软件实现AC3解码的基础上, 通过建立模型分析音频程序的关键操作的方法来扩展RISC的指令集, 从而加快了音频解码速度, 减少了存储空间, 并在总体上减少了硬件开销。其次, 该文给出了部分扩展指令的具体硬件结构。最后, 通过软硬件协同评估的方法进行硬件改进后的软硬件代价分析。

关键词 [软/硬件协同设计](#) [音频](#) [AC3](#) [HDTV](#) [RISC](#) [MPEG-2](#)

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The Hardware/Software Co-design of Audio Decoding Used in HDTV

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Abstract

In this paper, Dolby AC3 standard is used as the audio decoding standard to research the hardware/software co-design method of HDTV audio decoding based on Virgo-IP-Core and a new method is present to realize the hardware/software partition by setting models for the key sub-functions of AC3 decoding program. That is, after decoding AC3 bit stream by software, the models are set up for the key sub-functions to get the extended instructions of RISC core. Through this extension, the speed of AC3 decoding is fastened, the memory space is reduced and the gates of the whole system are lessened. Next, the detail hardware of extended instruction is given. Finally, the performance of the whole system is analyzed by using the hardware/software co-evaluation method.

Key words [Hardware/software co-design](#) [Audio](#) [AC3](#) [HDTV](#) [RISC](#) [MPEG-2](#)

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