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PICHET PATCHARARUNGRUANG: AN MPEG-1 AUDIO LAYER III CD-ROM PLAYER. THESIS ADVISOR : ASSO. PROF. EKACHAI LEELARASMEE, Ph.D. 82 pp.
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This thesis presents the design and construction of an MPEG-1 Layer III CD-ROM player. The hardware of the player consists of 3 essential parts. The first part is an ATAPI CD-ROM drive controller. This part uses an MCS-51 microcontroller together with some peripheral devices, such as LCD, keyboard, etc., to generate necessary signals for controlling the operation of the CD-ROM drive and to read its raw data stream. The second part is the data flow control. The main functions of this part are to make continuous flow of the raw data from the CD-ROM to the decoding part and to synchronize the already decoded data from the decoding part to a 16-bit serial digital-to-analog converter. It is designed by using VHDL and synthesized on an XC4010E FPGA chip with an equivalent complexity of about 10,000 gates. The last part is the decoding part in which a TMS320c31-60 DSP chip, with a built-in one-cycle 32-bit floating-point multiplication instruction and a 60-MHz clock, is selected as the main processor for performing the complicate decoding of the raw data from the CD-ROM into a PCM bit stream. About software, to achieve the real time decoding, the conventional decoded algorithms are substituted by the fast algorithms to gain the maximum performance of the DSP chip as much as possible. Not only an efficient memory management technique is proposed but the utilization of this technique to those algorithms will also be shown.

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