

图像处理

用基于DSP的线阵CCD实现二维图像信号采集的系统设计

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摘要 对光电转换系统, 尤其是采集信号的后处理进行了研究。介绍了在光电精密数据采集处理中通过DSP用硬件实现对CCD信号的采集和处理过程。给出了对CCD信号进行边缘识别的微分算法和将线阵CCD信号进行组合, 恢复出二维图像信号的算法。同时还给出了详细的硬件处理电路。重点介绍了DSP与FIFO的数据传输、

DSP与USB的接口电路。解决了一般情况下系统无法做到的用线阵CCD实现二维图像信号复原的问题。通过实验, 证明了该方法的有效性。线阵CCD信号是以若干线段的形式存在的, 特别适用于激光雕刻机图像采集系统, 应用前景广阔。

关键词 [线阵CCD](#) [二维图像信号采集](#) [数字信号处理](#) [FIFO](#)

分类号

Realization of 2 D image signal acquisition with DSP-based linear array CCD

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Abstract The optical to electrical conversion systems, especially the post processing for the acquisition signal are investigated. The process of CCD signal acquisition and processing realized by a certain DSP based hardware during the optoelectronic data acquisition processing is introduced. The differential algorithm for edge recognition of CCD signal and the algorithm for combining the linear array CCD signals to restore the 2 D image signals are given. And the detailed hardware processing circuit is provided. The data transmission between DSP and FIFO, and the interface circuit between DSP and USB are emphatically introduced. The problem of the 2 D image signal restoration, which is impossible for the system to solve with ordinary technology, was solved with this technology. Finally, the validity of the method is proved by the experiments. Since the linear array CCD signal is stored in the form of several lines, the method is especially suitable for image acquisition system of laser carver.

Key words [linear array CCD](#) [2-D image signal acquisition](#) [DSP](#) [FIFO](#)

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