

光电工程

科学级CCD并联过采样低噪声模拟信号通道

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摘要 根据CCD相机模拟通道噪声的非相关性,提出通过并联多个相同的模拟通道来降低模拟通道噪声的方法,并对此进行实验研究。通过实验测定实验装置中噪声的分布情况,得出并联双通道和并联三通道时噪声的改善因子为1.354和1.65,符合理论值。实验还显示,改善因子随模拟通道中可编程增益放大器增益的增加而减小,并对此现象进行分析。通过对改善因子与理论值的偏差进行分析,指出电源噪声、较高的转换速度及温升是造成偏差的主要原因。

关键词 [科学级CCD](#) [模拟通道](#) [读出噪声](#) [并联](#) [过采样](#)

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Parallel analog channels for oversampling scientific CCD camera signal

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Abstract A noise reduction method of using multiple identical analog channels to oversample the CCD signal is investigated experimentally. This method is based on the irrelevant noise characters in each part of the CCD camera's analog channel. The noise distribution in the circuit is tested and the noise improving factors are 1.354 and 1.65 for the two parallel connections and three parallel connections respectively. The improving factor agrees with the theory value. Experiment shows that the improving factor decreases with the increase of the gain of the programmer gain amplifier in the analog channel. This phenomenon and the difference between the experiment value and the theory value of improving factor are analyzed. The power supply noise, higher AD conversion rate and temperature rising are the major factors of the difference.

Key words [scientific CCD](#) [analog channel](#) [noise](#) [parallel connection](#) [oversample](#)

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