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Abstract
In the solar power branch, determination of Sun position is necessary for effective usage of solar power. In addition, CMOS image sensor is used in many fields such as astronomical telescopes, scanners and video camcorders. It is a low cost device with accuracy and reliability.
In this study, microcontroller PIC18LF4520 communicates with CMOS image sensor, Kodak KAC-9647, through I2C compatible serial control interface. Depending on register addresses microcontroller adjusts integration time, image size, gain, frame rate…etc. The data received from image sensor is stored in static RAM. During receiving data, counters count and SRAM stores data continuously. A pixel clock from image sensor controls the sequence. After a frame is finished, processor reads data from SRAM and transmits these data to computer by RS-232 port. User interface receives data and stores them in excel format file or text format file. Afterwards it reads back data and shows the captured picture in computer. In an image captured from the sensor, a Visual Basic program analyzes them to calculate the position and angle of the Sun.
The study uses cheap components without a digital image processor and supportive card in computer. Image sensor includes a noise prevention unit inside so the circuit is highly reliable.
Advisory Committee Minh-Kuang Wu - advisor

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