

A Sensitive CCD Camera with Timing Accuracy in the LOW Millisecond Range

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Based on a CCD camera from a large commercial camera company, a complete camera package has been developed and tested.

Because high accuracy of timing is required in occultation observations, only a LINUX system is appropriate. The time is read in from a GPS clock with a 1 pulse per second output. This output is fed into the computer by a RS232 to USB converter, controlling an NTP protocol. The time difference of the system clock and the GPS clock is generally better than 0.01 msec.

Using a commercial software developing kit, a GUI has been programmed, which integrates all necessary parameters, input and outputs, and other human interactions.

By direct comparison between the GPS 1 pps output and the camera images an accuracy of the time stamps written into the FITS headers of better than +/- 5 msec could easily be achieved. The system is ready to be used and can be set up together without large mechanical work. Only the GPS receiver, a RS232 to USB converter, the camera, an electric fan and a notebook are needed.

The camera can operate with up to 30 images per second generating single FITS files. The read-out noise is around 7 electrons and the maximum quantum efficiency is around 70%.

The details of camera, hardware and software, are presented.