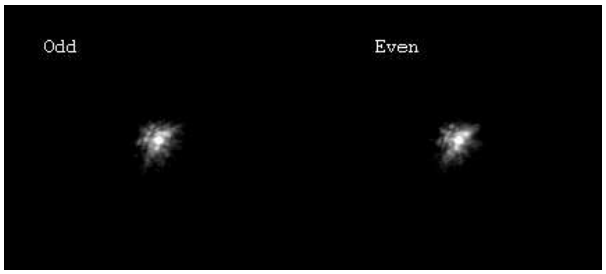

Fig. 1. Odd and even half frames taken with good seeing conditions.

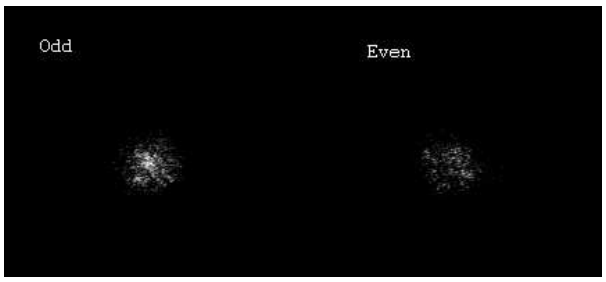

Fig. 2. Odd and even half frames taken with bad seeing conditions.

related to our CCD camera. The Wat-120N is an interline CCD camera where each single frame is a combination of two half-frames. One half-frame contains odd lines while the second one consists of the even lines. One half-frame is taken every 1/50th of a second. As one can see in Figure 1, in the case of good seeing conditions there are no difference between odd and even half frames. So, we can make the data processing for a complete frame 720×480. If the seeing conditions are not so good (Figure 2), the half-frames are very different. In this case we have to perform the data processing for the odd and even half-frames separately. Also we have to note that the Wat-120N does not have square pixels; this has to be taken into account during data processing.

The other disadvantage of Wat-120N is a manual control. We developed a simple Ethernet controller to resolve this problem. The set of our camera controls consists of three parts: gain control, gamma control, and on/off image intensifier switcher. The gain control has 8 values from 0 to 7 (Figure 3, the value 7 corresponds to the maximum gain). The gamma control allows three modes: linear (Off), low (Lo) and high (Hi). Two modes Lo and Hi are not linear and, if one needs measure accurate magnitude differences of components, they are not used during data recording. The last control is a switch on/off for the image intensifier.

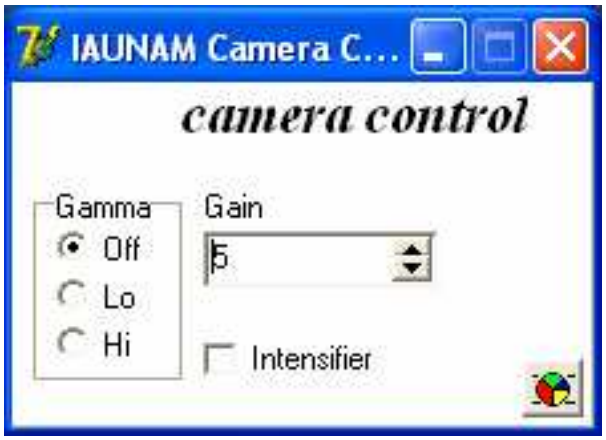

Fig. 3. Ethernet camera control.

3. OBSERVATIONS AND RESULTS

Data were recorded during the two observation campaigns carried out in August and November 2010. In August observations of 105 stars were performed at the OAN-SPM 1.5 m telescope. The atmospheric conditions (seeing and transparency) were excellent. For three nights in November 2010 we observed 120 stars with the 2.1 m telescope of OAN-SPM under poor atmospheric conditions. All the measurements were made through the R filter with a 640/130 nm bandpass window. In these speckle observations we measured 38 new binaries detected by Hipparcos (ESA 1997). For each star, a typical observing procedure involved the accumulation of one set of 998 frames (1996 half-frames). One frame consists of a two-dimensional 440×400 array of 8-bit numbers. After the calibration we determined that the pixel scales are equal to $0.039''$/px and $0.038''$/px for the 2.1 m telescope and for the 1.5 m telescope, respectively. Tables 1 and 2 contain the results of the measurements of binary stars performed at the 1.5 m and 2.1 m telescopes. The format for the presentation of these measurements is the same as in our previous publication (Orlov et al. 2010). The first column contains the epoch-2000 coordinates in the format used in the Washington Double Star (WDS) Catalog (Worley & Douglass 1997). The second column gives the name of the star or the discoverer designation. The third column gives the epoch of the observation in fractional Besselian years. The two following columns contain the measured position angles given in degrees and the angular distances in arcseconds. The last three columns show ephemerides calculated for the date of observation and references to publications in which orbital elements can be found (Hartkopf & Mason 2003).