

First Light With The Campus ST-8 & 16" LX200: M3

By Greg Morgan, John Prigge and Gabe Reyna

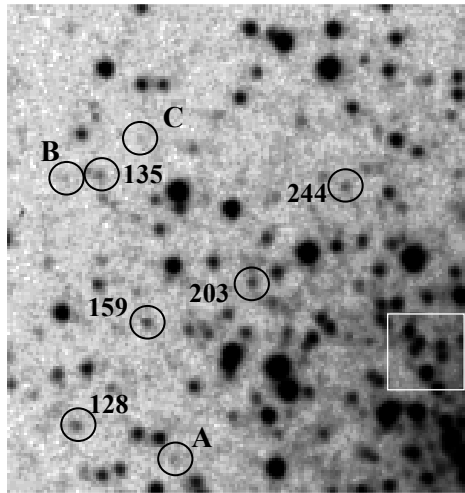


Fig 1: The limiting magnitude test. The image above shows higher contrast details from within the box of Fig 3. The star numbers were taken from a publication by Sandage and Katem. The recorded magnitudes are $m(V)$; 135 = 17.22, 244 = 17.05, 203 = 16.56, 159 = 16.72, and 128 = 16.90. A = 18.14, B = 18.29 and C = 18.57!

On Friday evening June 7th, we set out to capture the first images with the ST-8. The objective of the evening was two fold; to establish the limiting magnitude for the 16" LX200 and to see how well the scope could resolve close double stars at f/10. In order to do so, we utilized the Optec TCF focuser and took advantage of its ability to use software to establish best possible focus. As shown in Fig 1, we were able to confirm that the limiting magnitude for the 16" exceeds 18.5. We matched our CCD image with an image of M3 from the *Astronomical Journal*, vol. 87, Mar. 1982, p. 537-554 by Sandage and Katem. The publication identified photometric data for over 600 stars. The stars were labeled by numbers. Five matched stars are shown in Fig 1. The deepest star that could be positively identified with this publication was star 135 at magnitude 17.22. Deeper stars are labeled A, B and C. These were measured with AIP₄WIN's photometry tool using Sandage and Katem's stars as a reference with magnitude errors of only .02. The resolution test in Fig 2 shows that stars separated by about 2 arcseconds can be well resolved at f/10.

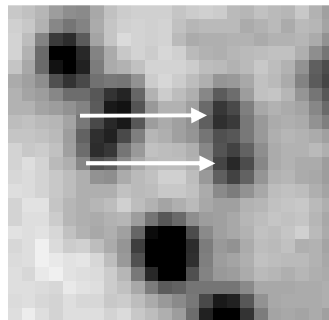


Fig 2: The resolution test. This is an enlargement of the box in Fig 1. The arrows show stars separated by about 2 arcseconds (less than 4 pixels). The ST-8 in the 2x2 binning mode with the 16" at f/10 yields a field scale of 0.6 arcseconds per/pixel. If the 1x1 binning mode were to be used (future images), the field scale would be 0.3 arcseconds/pixel and there would be about 8 pixels separating these two stars!

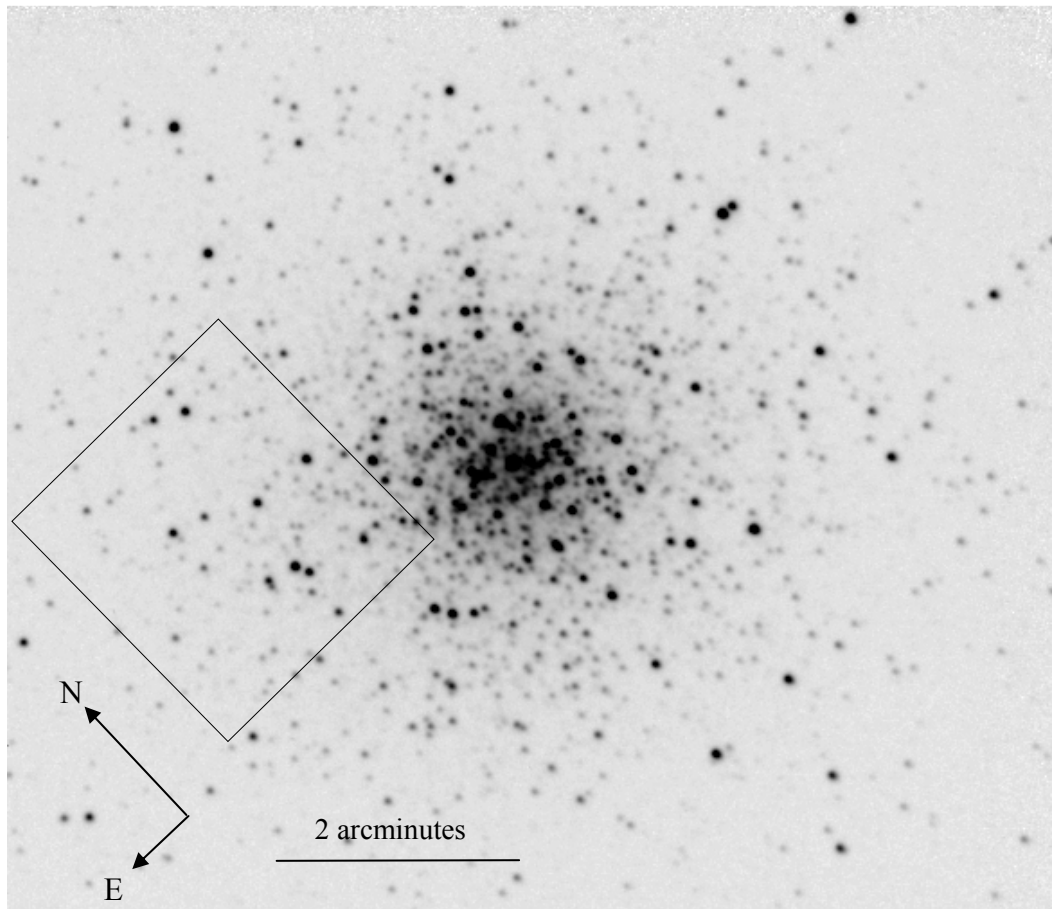


Fig 3: The image of M3 was taken on Friday night 6/7/02 by Greg Morgan, John Prigge and Gabe Reyna. It is a composite of 16 five second exposures for a total of 1 min 20 seconds with the chip equilibrated to -5° C. The image was shot at f/10 with the ST-8 CCD camera in the 2x2 binning mode. Five dark frames were averaged and subtracted from each raw data image prior to stacking. No additional post-processing enhancements were made. The image was cropped to almost square as you see to the left. The brightness and contrast was set to reveal details within the core.

Thanks to Dr. Steve White, Dr. Frederick Ringwald and all others whose efforts have made this first light for the campus Sbig ST-8 CCD camera on the 16" LX200 possible.