The Newbie Corner

Electroluminous Film Light Box

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In this issue of the Newbie Corner I thought I would share with you a project I just completed building for Windy Hill Observatory. I had been looking for a way to have better control over the taking of flat fields ("flats") at my observatory. Flat field images are needed to record the imperfections in a lensing system and optical path for digital photography, and these are then electronically subtracted out of the actual images made in the camera, greatly improving the quality of the images. In order to take good flat fields, you need a uniformly illuminated surface. A screen or a piece of white cardboard which is illuminated evenly by a light source can be used to take flats, and so can the twilight/morning sky or a light box. Each time you change the optical path of your telescope setup you need to take new flats. These changes could result from changing focus, adding filters to the optical path or rotating the camera. Rotation of the camera is common in order to frame the object being imaged or when finding a guide star. I take from 10 to 15 flat exposures of each optical path setup then average them. Using the sky at twilight works, but you have to work quickly because as the sun sets, you lose your light source. If you change your setup during the evening and you use the sky to take flats, then you will have to wait until morning sunrise or the next evening sunset to take flats. For this reason I decided to construct a light box for the 12" telescope I use to image with. I had constructed a light box for my 4" refractor and it worked well (see figures 1 and 2). This light box is constructed of a foam core, drafting vellum, and flashlight bulbs. It is battery operated. The light box is placed over the optical tube of the telescope, and then the flats are taken.

Figure 1

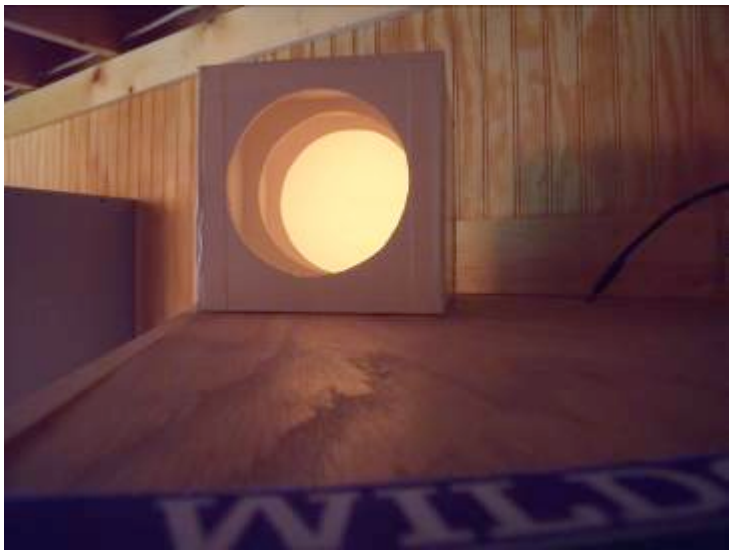

Figure 2

This setup works great for the 4” scope, but a light box of this type for the 12” would be too large to handle and difficult to store. What was I to do? While at my desk at work (taking a break, of course), I thought I would search the ***net*** for light boxes. I was amazed at the number of sites returned. One of them was a site for electroluminous film (ELF). It looked interesting so I did some more investigating of the material and found that it might be exactly what I was looking for. It was lightweight and did not take up any space. I was so excited, I thought I had made a great discovery that would change astronomy forever. When I dug deeper, my bubble burst. Other astronomers had found ELF and were already using it to take flats. ELF material is used for light boxes, backlighting displays, signage and graphic arts. It comes in numerous colors. It can be cut into any shape you want. There two basic types - parallel electrode and split electrode (see figure 3). We want to use the parallel electrode, because the split electrode has a line through it, which would show up in the flat.

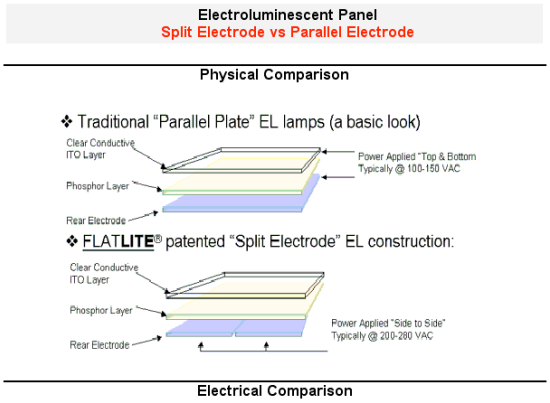

Figure 3

To construct the light box, I purchased a kit from LuminousFilm.com (see figure 4) that included the luminous film (A) and the power supply/inverter (B). I also add a dimmer (C) to control the light output. The ELF in the kit I purchased was 17” x 23”; the film comes in all sizes. From a local hobby store I purchased plastic sheets, matte board and the foam core (D). I also purchased an aluminum photo frame (E).

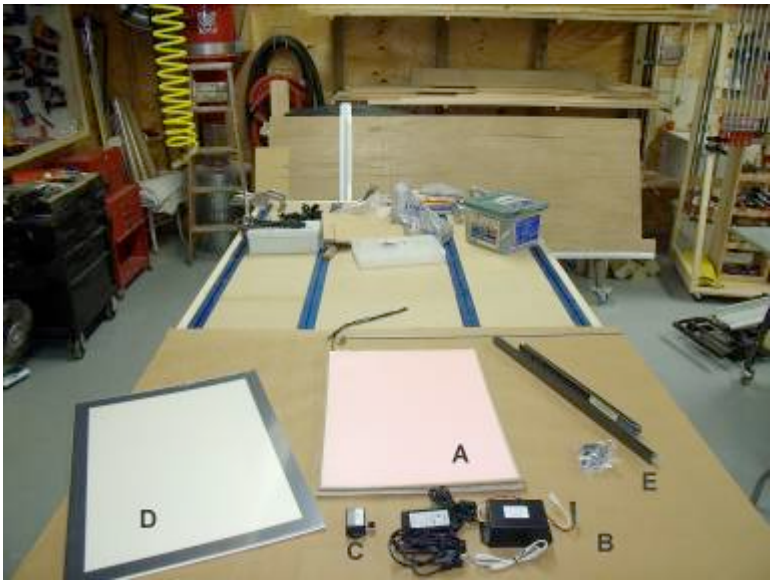

Figure 4

I assembled the frame and mounted the luminous film as if it were a picture. The matte board is used to space the luminous film away from the plastic. I used two plastic sheets, one in front and one on the back; this will protect the light box from humidity. The foam board is used as a backer to stiffen the ELF. Figure 5 shows the finished light box turned off, and figure 6 shows the light box on, fully luminous.

Figure 5

Figure 6

When not in use, the light box hangs on the observatory wall out of the way. When it is needed, I mount the frame in front of the telescope and start taking my flats. I can now take flats at any time, day or night.

As always, till next time, keep your telescope pointing up…and clear skies.

The Newbie