Re-Establishing Fine Pointing on the Hiltner 2.4m Telescope
(Thorstensen)

When one instrument is changed for another, it may be necessary to tweak fine pointing. This procedure should walk you through the process:

1)   Get on-sky, tracking, and slew to a target not too far from the zenith -- not critical to be dead-straight-up, just don't be way over.

If you don't have a target there, just set the JSkyCalc coordinates to somewhere near the zenith using the center mouse button in the sky display, hit 'read guide stars' in the guide star window, coords->TCS next object, and then slew using the TCS. That will point to the arbitrary position you selected.

2)   In the JSkyCalc guide star window, select the CENTER slit, and "read guide stars". If it had been "inner" or "outer", the second set of coordinates in the upper right of the window should disappear.

The reason for this is that center slit is on-axis, whereas the inner and outer are displaced by about 6 arcmin, so if you're using inner or outer, the axis and slit coordinates are different. JSkyCalc assumes that the telescope coordinates are the coordinates of the AXIS, not the slit, and handles all the bookkeeping automatically, provided you select the slit correctly.

3)   Now, in the main JSkyCalc window, push the "Nearest Bright" button. The little blue box in the sky display will likely jump a little. The guide star display should update; if it doesn't, force it with "read guide stars'. You'll see a fat orange star right in the middle of the display. Your job is to align on this star.

4)   Slew to set on the bright star's nominal coordinates, in the usual way:
            a) In JSkyCalc, hit Coords -> TCS Next Object
            b) In the TCS, hit "Slew"
            c) When done, be sure the telescope coordinates are the
            same as the bright stars's coordinates.

5)   In the xmis control window, in the "Preset" menu, send the XY probe to "CENTER". While you're there, be sure the [Finder] mirror is OUT. The "center" position puts the pickoff mirror on the telescope axis.

6)   In the Maxim DL window, set the TAB to "expose" (NOT the radio button), and hit "Start". The MaximDL image should update every second or two.

7)   If the pointing is in fact way off, all you'll see are some random stars. If the pointing isn't too terrible, you may see light from a bright star leaking in from one side or the other.

8)   Now, your job is to somehow find the bright star. You may be able to do this by scanning back and forth with the paddle randomly; watch the screen to see the effect of the paddle stabs. Or, if you see a distinctive pattern on the image, you might try to match it in the guide star window, which is rotated 90 degrees from the Maxim DL image. The field of view of the guider corresponds to about an inch (?) on the JSkyCalc window.

9)   The bright star should be MUCH brighter than most of the stars you see. When you do find it, put it near the middle of the screen and (optionally) draw a box around it to mark its position.

10)   As a check, go to the JSkycalc guide star window, click on another brightish star, and "move guide probe" (and say "yes" to the dialogue box). The bright star should move out of the field, and the brightish star should come in exactly where the bright star was. If you're really paranoid, try it with another star.

11)   If the last check is satisfactory, you can be reasonably certain that the telescope axis is aimed exactly at the bright star. So, reset the telescope coordinates to the bright star's coordinates. I think that's in the "initialization" menu of the TCS.

       Before you go off the star, double-check that the TCS telescope coordinates correspond with those of the bright star; acceptable tolerance is 10-20 arcseconds in dec, and 1-2 seconds of time in RA.

12)   You're done! But before returning to science observations, be sure you have your desired slit selected in the guide star window.

One possible sticking point -- the guide star generally appears near the bottom of the guide field, and can actually be off the bottom at large rotator angles (I forget whether + or -). In that case, simply jump the guide probe by delta-X = 500 or 1000 to bring the guide star into view, and run the osctrtask procedure. The pixel offsets don't care just where the physical guide probe is, as long as the star is visible in the field.