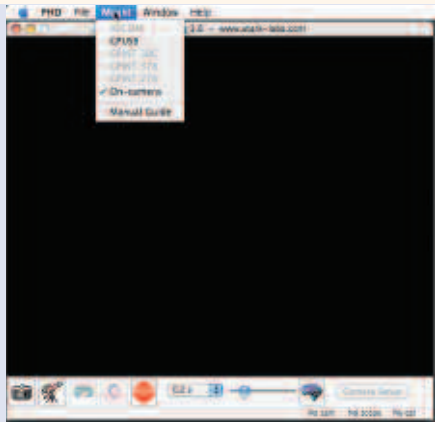


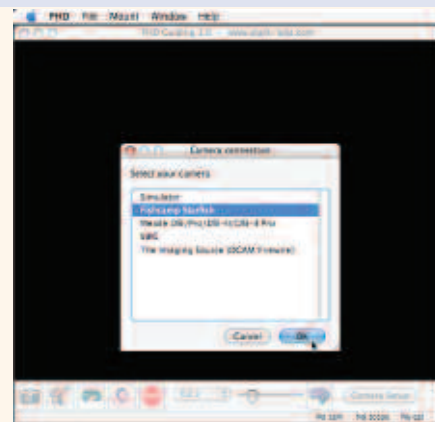
## PHD Guiding: How-To

PHD Guiding is designed to be as close to “Push Here Dummy” as possible. When you start it up, you are presented with a single screen. Getting guiding up and going is a matter of a few simple steps.



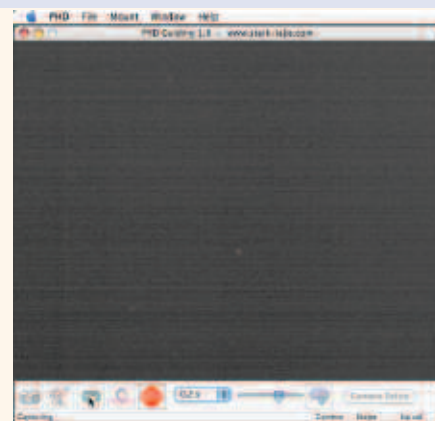
**1)** Tell PHD what kind of mount interface you will be using. From the Mount menu, select the appropriate item. PHD will remember this choice, so odds are you only need to do this once. The default is ASCOM on Windows and if you're on a Mac, you'll notice the only available choices are for the Shoestring GPUSB and for your camera's onboard ST-4.

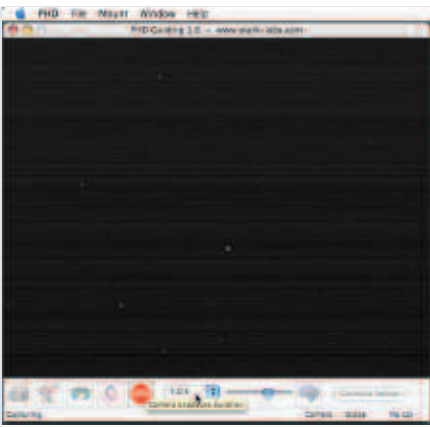
**2)** Connect to the camera. Press the icon that looks like a camera (far left) and a dialog will appear asking you what kind of camera you have. Select the appropriate camera (many more are available in Windows than in the OS X dialog shown here) and hit OK. If all goes well, the Status Bar on the bottom should tell you the camera was connected. In addition, on the right side of the Status Bar, the “No cam” indicator will change to “Camera.”



**3)** Connect to the mount. Press the icon that looks like a telescope (second from the left). If you're using ASCOM, a dialog will appear and ask you to choose which mount you're using. At times, the correct choice isn't entirely obvious. For example, if you're using a Meade LX200-75, you'd select “Meade LX200 and Autostar” since the LX200-75 uses the Autostar system (which uses the LX200 protocol). If you're using an ST-4 adaptor, no dialog will appear and it will connect directly to the adapter you'd indicated in Step 1. The “No scope” in the right-hand portion of the Status Bar will become “Scope” and on the left, it will tell you that the mount has been connected.

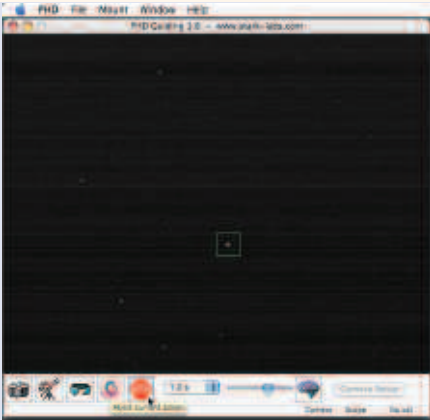
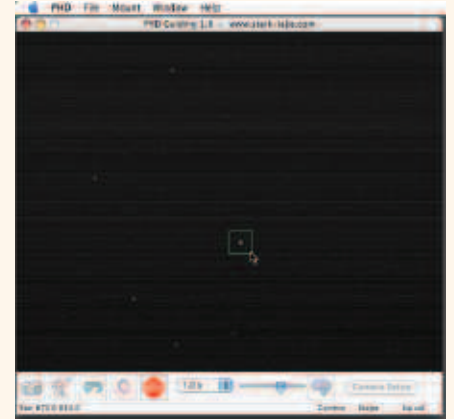
**4)** Press the “Loop” button (third from the left, looking like a green looping arrow). This will start capturing images from your camera and displaying them on screen. The default exposure duration is 200 ms (0.2 s) and if you're near a bright star and close to focus, this should let you see something. PHD will automatically stretch the image for display purposes (the slider next to the buttons controls the gamma - a mix of brightness and contrast) so that you can see your stars. If you can't see any (and you're pretty sure some should be there), odds are you're out of focus. I find it useful to increase the exposure duration (pull-down next to the buttons) until I can see the large, faint, out of focus star and to adjust focus from there. I may drop the exposure duration back down to make fine focusing easier, but don't fret too much about focus. If you still can't see something, put an eyepiece in place of your guide camera and make sure you're on something and then rack the focuser around with the camera on until you can see stars.





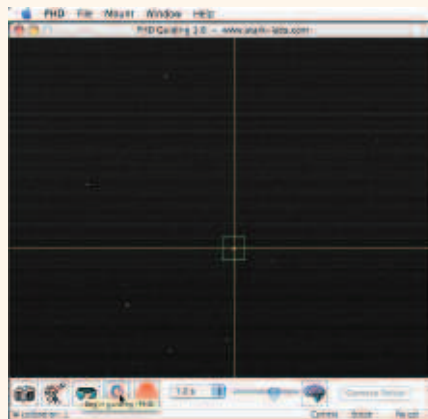
**5)** Set the exposure duration to somewhere between one and three seconds. This is a nice range for exposure durations while actually guiding as it is long enough to let atmospheric turbulence (seeing) blur the star to a nice average position and yet short enough to fix the mount's errors and not let it get too far astray. Don't be tempted to use very short exposures here as you're more likely to end up "chasing the seeing" and trying to fix errors due to turbulence rather than errors due to your mount. Seeing changes faster than you can move the mount, so that's a race you'll never win.

**6)** Click on a star. This will be your guide star. If the star is too bright, PHD will tell you so in the Status Bar. Too bright is as bad as too dim. A box will appear on the star that should turn green. If it is orange, PHD can't locate the star. If it is green, PHD has locked onto the star.

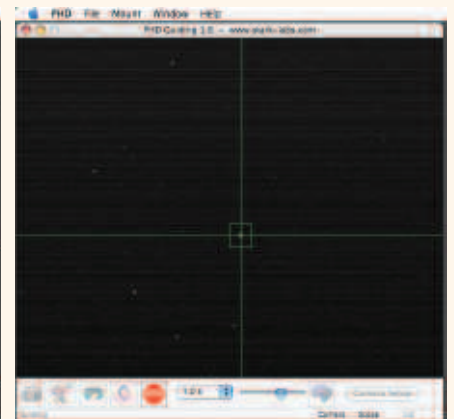


**7)** Press the Stop button (fifth button). If you forgot to select a star, you can do so now. But once you have pressed Stop, the image will no longer loop and update in real time.

**8)** Press the PHD button (fourth button, target with an arrow in the bulls-eye and labeled "PHD"). Orange crosshairs will now appear on the original lock position and PHD will enter its calibration phase. During calibration, PHD tries to move the star first in RA and then in Dec as it watches where the star moves. It needs to get it to move a bit in each direction to get a good estimate of how it moves when guide commands are sent. So, you should see the box remain on the star and move during calibration (the crosshairs will stay fixed). Once calibration is done, the crosshairs will turn green (they may move a bit from the original location), the status bar will say "Cal" and it will begin guiding automatically. Start taking images in your main camera.



**Step 8 Start**



**Step 8 End**