**Beginner's Guide to Setting Up Your
LOSMANDY Equatorial Mount
for use with PHD2 Guiding**

Introduction

If you are reading this because you just purchased a Losmandy Equatorial mount, congratulations! You have one of the best mounts available today, and certainly one of the best values in astrophotography available anywhere.

This is not a complete guide to all possible configurations, but rather the basics on what equipment, software, and procedures are used most often to successfully get great guiding results with your Losmandy mount when using PHD.

These settings generally apply to any Losmandy mount with a Gemini II Goto system, including G8, G11G, G11GT, and Titan. This guide does not apply to the older Gemini I system or non-Losmandy Mounts

Let's Run Through Some Assumptions

1. You want to setup PHD2 because you are doing astrophotography.
If you are using the mount just for visual astronomy then PHD guiding is overkill. Stop now and save yourself the effort.

2. You have a separate guide scope and guide camera. You need a separate camera and telescope to do guiding while imaging, or an off-axis guider to use the same telescope with both your main camera and your guiding camera. If this is unclear to you or you don't have this equipment, stop now and find out more about the requirements for guiding. Check out this page as a starting point...

https://themcdonalds.net/richard/wp/astrophotography-equipment-autoguiding/

3. You are going to be guiding via ASCOM. Note: ASCOM has superseded ST-4 which is older technology and not as precise or reliable. Bite the bullet and use the ASCOM guiding method. It's much better.

4. You will be using Microsoft Windows. You need a computer that is near your mount when you guide, and for better or worse Windows is pretty much the preferred platform for astrophotography. Mac is possible and many of the tips in this guide still apply, but if you have a choice, go with Windows. Currently the two most common versions of Windows are 7 and 10. If you are thinking of resurrecting that Windows XP or Vista laptop, you will regret it. Stick with the latest operating system if possible.

5. You will be using PHD2, also known as open PHD. You can get more info and down load it at https://openphdguiding.org

Do not use the earlier versions PHD or PHD1 which are no longer being developed. PHD2 (based on PHD1) is much improved, more sophisticated, has better community support, it's open source and free to use. A win for everyone.

6. Guiding setup is going to take a few nights to get right, so settle in. You can *and should* do as much of the set up indoors prior to actual guiding.

Here's the secret to setting up PHD correctly

90% of getting PHD working is getting the mount properly configured in ASCOM. If you get that right, you are on the way to success. Be accurate when setting up ASCOM and Gemini.net. It is vital for PHD to properly connect and provide great results.

What You Should Already Have Working

1. Set up your Losmandy mount and telescope and make sure everything is connected and running correctly. For first time setups most people start indoors, and then move outdoors once you've got everything working.

2. Once you are outdoors, your Losmandy mount should be accurately Polar Aligned using the various tools such as polar alignment scope, drift align, etc. The QHY Pole-master is a very popular optional accessory that makes polar alignment fast, easy, and really accurate. Adapters to use it with Losmandy mounts are available from www.Losmandy.com.

3. Your Losmandy mount and computer are connected via Ethernet. You can get more details at...

http://gemini-2.com/crossovernetwork.php

4. ASCOM and Gemini.net driver are installed, properly configured, and working on your laptop. You can get more details at...

http://www.gemini-2.com/Gemini2_drivers/Gemini_Telescope_Net_Installation_and_Op eration.pdf

5. You have downloaded and installed the latest version of PHD2 (aka OpenPHD). PHD2 is free and you can download it at...
https://openphdguiding.org/
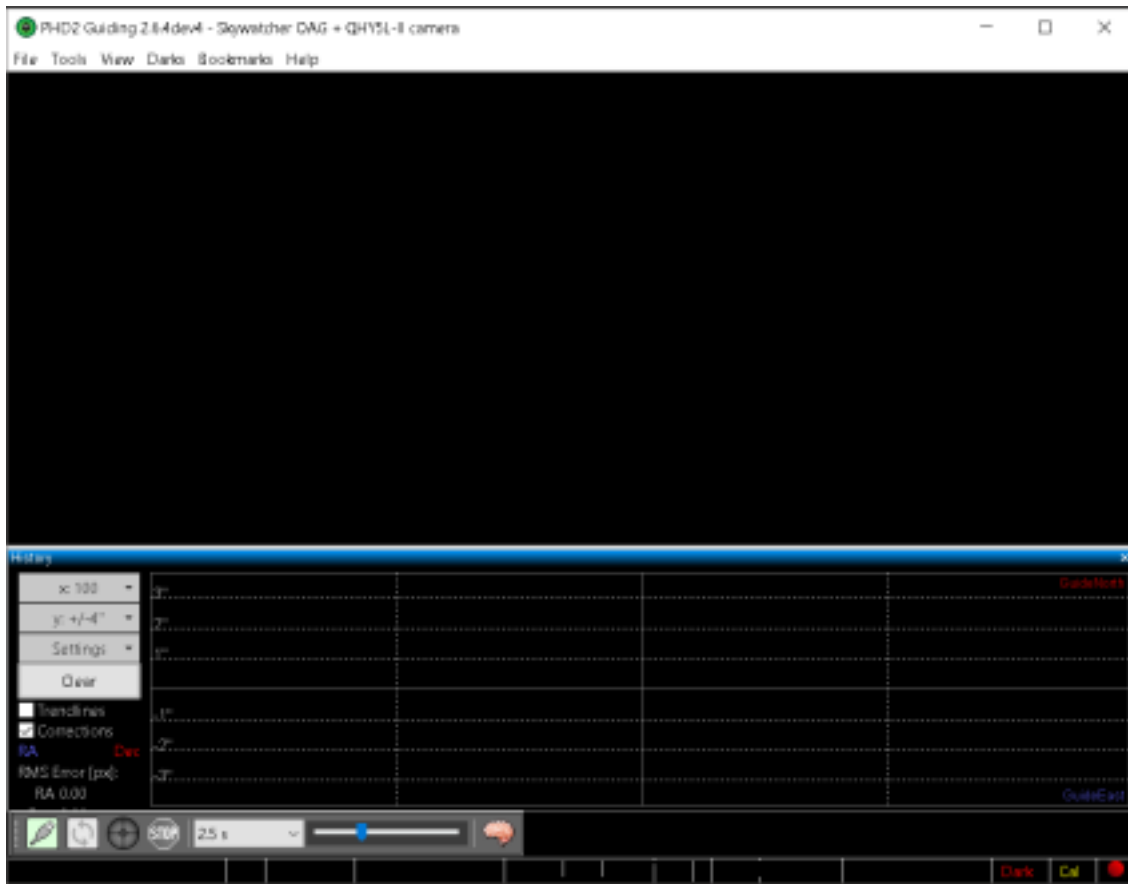

Basic Gemini II Settings for PHD2 guiding

You will need to confirm and update a few settings on your Gemini II mount. For this you will want to use your hand controller.

1.Confirm your guiding rate is set to the default 0.5x sidereal. On the hand controller click on MENU, then SPEED, and you will see the available speeds. *Important* – The guide speed here should be "5" which translates to 0.50x sidereal, specifically 10x the guide speed; 0.50x 10 = 5.

2. On the hand controller click on MENU, then onTVC, and set this value to 0. SAVE the value. When using PHD to do your guiding, you want only PHD to handle backlash. Turn off all backlash compensation in the mount, which is the TVC setting, by setting TVC to 0 (zero).

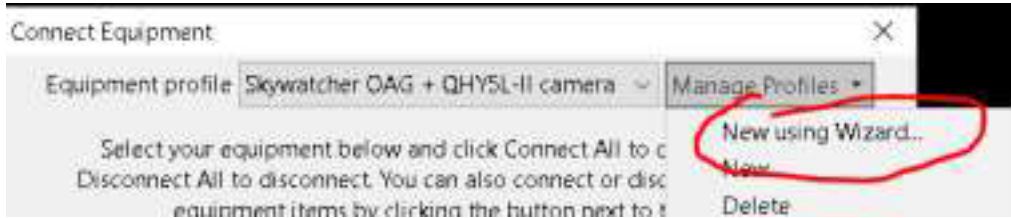**Getting up and running with PHD2:**

1. Start the PHD2 program. You will see a screen something like this:

2. Click on the "connect to equipment" green plug button in the lower left. It will open the Connect Equipment manager.

3. Click "Manage Profiles" pull down menu and choose "New using Wizard…"
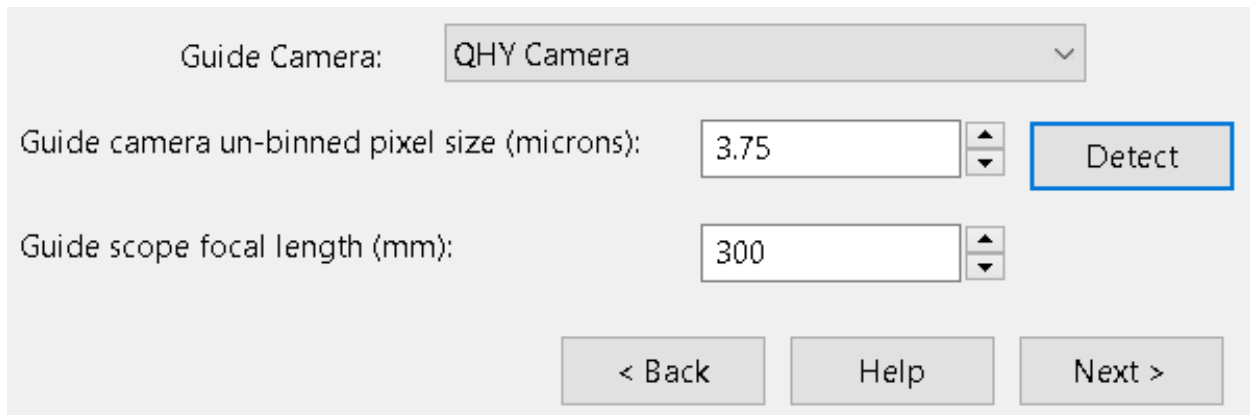

4.

This will walk you through the steps necessary to create a new PHD2 profile for your camera, guide scope, and Losmandy mount.

4. Set up your guide camera. Choose your guide camera from the pulldown menu. If it's not listed, you probably don't have the guide camera's ASCOM drivers installed. Get the drivers, install them, and restart PHD2 to continue. The driver should then be there.

Click "Detect" to automatically determine your guide camera's pixel size

Enter your guide scope's focal length. **It's important this is accurate.** It can not be automatically determined for you.

Here's an example setup:

Click Next

5. Set up your mount. Choose Gemini Telescope.NET(ASCOM) from the pull down. Click "detect"to automatically get the mount's guide speed from your Losmandy Mount. **Do not change this setting from what is automatically gathered.** The default guide rate is 0.50 and you should not need to change this to get good guiding results

Click Next

6. If you are using Adaptive Optics (AO) enter the information on the next screen and click Next

7. Name your profile. You can use anything but it's practical to include the mount name, camera name, and guide scope, like this:
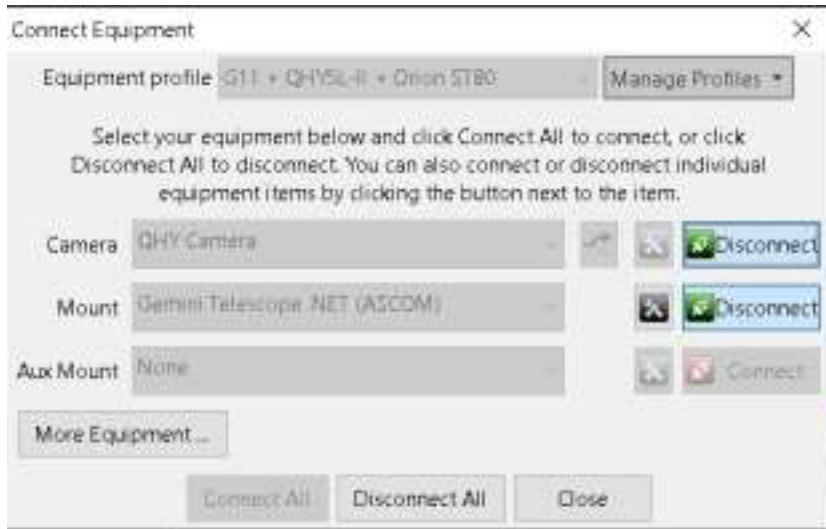

Leave the "Build dark library" check box checked and click "Finish"

8. If all goes well, you should see the camera and Losmandy mount connected on the next screen

9. Click Close. PHD will automatically take you to the "Build Dark Libraries" (It might also automatically close the Connect Equipment dialog and take you directly to the Build Dark Libraries)

10. Dark libraries are important so PHD does not lock on to hot pixels in your guide camera. Click Start and follow the instructions. You should build your dark library away from direct bright lights or daylight to avoid light leaking in to the camera during this process.

11. Set your exposure time at 3 seconds as a good starting point.
Usually guide camera exposures are in the 2-5 second range for most setups and typical sky conditions.
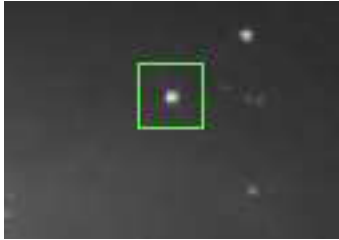

12.When you are done, click the looping button to start taking images.

If you see only a blank screen at this point, make sure the capon your guide scope is off, and check to make sure your guide camera is focused.

When everything is working properly, you will see stars in the preview screen.

It's best to have the software automatically choose a guide star by press alt/option-S or choose Auto-Select Star from the Tools menu.It may seem like it is picking a dim or unusual star, but it knows what it's doing. You will see a box around the selection

13. Click the Guide button. The first time this is pushed, it will take a few minutes to go through a calibration procedure. You will see messages about West/East/North/South Step, XX pixels. That is normal.

14. Once it is successfully completed it will start guiding.

15. ***You immediately want to go to the Guiding Assistant*** from Tools menu. This will stop guiding and measure your setup without any guiding assistance. It is important you let this run for at least 6 minutes. Click Stop after 6 or more minutes.

Guiding Assistant will perform some additional measurements and may make recommendations based on what it finds. Typically the Guiding Assistant recommends adjusting the minimum move amount on DEC and RA. Accept these recommendations.

If all goes as planned, you should be guiding again and everything should be working great!

Where to go from here

Now that you have basic guiding up and running, it's worth learning a little more about how to use PHD most effectively. One of the authors of PHD conducted a live video conference walking through the software and answering questions which you can view here:

https://www.youtube.com/watch?v=LXFGRta98rs

You can (and should) also read the Best Practices document they assembled, available at...

https://openphdguiding.org/phd2-best-practices/

If you run into problems, the **OpenPHD Guiding Google Group** is a great place to post your questions and get answers directly from the authors of PHD2 and the community.

https://groups.google.com/forum/?fromgroups=#!forum/open-phd-guiding

TIP: Make sure to read the 'how to ask for help' section on the link above before posting. They will ask you to post your guide logs and debug logs, so get ahead of the curve and know what to post the first time out.

Other sources of useful information...

http://www.losmandy.com/support.html

http://www.gemini-2.com/

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