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### General

#### **Why does this FAQ exist?**

Stark Labs is one guy who does this in his spare time (me). I've got a full-time job (research professor working in the cognitive neuroscience of memory) and a family with a wonderful wife and two little kids. What that means is that resources are limited. I love helping users and answering questions, but let's face it... every time I'm answering an e-mail with the same answer, I'm spending time that I could be spending fixing bugs or adding features.

So, this FAQ is here to help me help the users and to help users help themselves.

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#### **Nothing in here answers my question – where else should I go?**

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There are a number of places to turn if your question isn't answered here:

- The [Stark Labs Yahoo Group](#) is a user-run group with a lot of great folks willing to help out. I'm there occasionally as well.
  - The [Wiki](#) has a FAQs for [PHD Guiding](#) and [Nebulosity](#), a [new user-guide](#) for Nebulosity, and a lot of other great information.
  - There are [tutorials and walk-throughs](#) for PHD Guiding and Nebulosity here on the site.
  - There is a lot of good stuff in the [blog](#)
  - There are [pre-release versions](#) of software that may fix problems you're having.
  - If you think you've got a bug, you can [fill out a bug report](#)
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## Purchasing and Delivery

### Why hasn't my license code arrived?

The license codes are sent out automatically and typically arrive within a few minutes (Note, this is not true for upgrades). If you did not receive your code, this is typically the result of either some form of filter on your end or a mismatch between the address you check and the PayPal address. About two or three times a year, I find that something went wrong in the system and although a payment was made, the license didn't get mailed out. About once a week, a customer never gets the code and yet I've gotten the Cc of the e-mail that went out. If that's the case or if you've lost your code, head to the [Missing Code page](#).

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### Why hasn't my CD arrived?

Delivery is electronic and no CD is ever mailed. Several dealers exist that can provide you with a CD (and I can in a pinch), but the vast majority of sales are electronic. You will receive a license code that will turn the demo version into the full version.

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### Do I have to have a PayPal account to purchase software or make a donation?

No. PayPal handles my credit card transactions, but [you can purchase with a credit card and without ever setting up a PayPal account](#). On the purchase page, you will see a section that says "Don't have a PayPal account? Use your credit card or bank account". Follow the link there. In addition, you can always [pay by mail](#).

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### Can I pay by any other means?

Yes. Personal checks and money orders are accepted as well. It will take longer, but you do not need to do anything by electronic payment. You can send money to:

Craig Stark  
Stark Labs  
9 Pauling Ct.  
Irvine, CA, 92617

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### Do I need two license codes for two copies of Nebulosity?

No, you do not as long as you are only running one at a time. See [here](#) for a bit more info.

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## Nebulosity Issues

### Can I install Nebulosity on more than one machine? How do I transfer my license to another machine?

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Yes, you may. The license stipulates that you may only use it on one machine at a time. It reads (in part):

*You may install and use the software on another computer, but the software should not be in use on more than one computer at a time unless you purchase additional licenses (e.g., a laptop used for image collection and a desktop used for subsequent image processing). You may make back-up copies of the software for archival purposes. You may permanently transfer your license to use the software to another party who will be bound by this agreement, provided you do not retain any copies of the software.*

To do this, simply install Nebulosity on the second machine and enter the license code there. There is no "activation routine", you don't need to be connected to the Internet, and you don't need to talk to a customer support representative and promise your next born child.

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### **Nebulosity 4 acts oddly or is unstable when capturing or my camera is connected**

Try heading to Preferences and uncheck "use separate capture thread"

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### **I have an old Intel Mac with 10.5 and Nebulosity 3 won't run**

Nebulosity has to load a Canon library on startup and their EDSK 2.11, things won't run on Leopard (10.5). The best solution is to run [Nebulosity 3.0.7](#) if you're not ready to upgrade your OS X.

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### **I have an older DIGIC II/III Canon and Nebulosity 3/4 won't connect**

Canon has "deprecated" many of their older DSLRs in their current software development kit (EDSDK). The best option is to use an older version of Nebulosity 3 for capture. 3.0.7 is a good one to try from the [Archive](#). If you're on a Mac and having issues with 10.7.5, 10.8, or 10.9, you may want to try [this special version of 3.0.7](#).

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### **My Canon DSLR no longer connects (Nebulosity 3.1 and later)**

Supporting Canon's DSLRs is a bit of a moving target and there are two problems here. First, for DIGIC II cameras like the Rebel XT (350D), Canon doesn't provide system drivers for Windows 7 and there's nothing I can do about that. If that's your issue, run Windows XP, OS X, or look at another camera. If the operating system can't talk to the device, Nebulosity can't.

A second problem exists and hits even some DIGIC III cameras, though, as they have been declared "deprecated" in their software development kit (called the "EDSDK"). Cameras including the EOS-1D Mark II, 20D/Da, 1Ds Mark II, 5D, 30D, 350D, and 400D (Rebel Xti) fall into this group. Even if the operating system supports them, the Canon EDSK may not. In particular, things worked well up to EDSK v 2.10, but stopped working for many users at EDSK v 2.11. In addition, some users with OS X 10.8 (Mountain Lion) have issues with their camera using EDSK v 2.11.

All hope is not lost, however, and there are two solutions. The first is to use Nebulosity 3.0.7 or earlier from the [archive](#). The second is to patch any more recent Nebulosity 3 to use the old EDSK. While it may sound scary, there's nothing you can do of real harm. In the worst-case scenario, just re-install Nebulosity and all will get fixed.

For Mac users, [download this v2.10](#). Double-click on it to extract a folder called "EDSDK.framework" and open a new window to your Applications folder. Right-click on Nebulosity 3 and select "Show Package Contents". The window will now show a single folder called "Contents". Navigate into it and into "Frameworks" and you'll see a folder called

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"EDSDK.framework". Drag the "EDSDK.framework" folder you extracted (hold down "option" if you like to make a copy rather than move it so you'll always have this v2.10 around) here and it will ask you to confirm that you want to replace the newer EDSDK.framework with this older one. Say "Replace" and close the window.

For Windows users, [download this v2.10](#). Double-click on it to have Windows temporarily uncompress the files. In another window, navigate to My Computer, C, Program Files (x86), Nebulosity 3 (for Windows XP, it's just "Program Files" not "Program Files (x86)"). Drag the two files (EDSDK.dll and EdsImage.dll) that you just uncompressed into this folder and tell Windows that yes, you should overwrite them.

That's it! You've replaced the more modern but potentially less useful version of the EDSDK with this older one. Sadly, to support newer hardware, I need to bundle the newer versions of the EDSDK.

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### **Nebulosity 2 keeps asking for my registration code. What the heck?**

For some users (and I wish I knew why), the "preferences" Nebulosity uses get mucked up when they first install a full version. The result is that the dialog keeps appearing asking them to enter their Nebulosity 2 license code. Assuming you're entering the code correctly (complete with dashes), the problem is a known one and the solution for you is a simple one-time affair.

#### **On the Mac:**

Go into your home folder, in Library, Preferences. You'll find a "Nebulosity Preferences" document in there. Double-click on it to open it up with Text Edit. Delete one of the two "Code" entries and save. You should then be all set.

#### **On a PC:**

- 1) Start, Run, enter "regedit"
  - 2) Navigate to: HKEY\_CURRENT\_USER\Software\StarkLabs\Nebulosity
  - 3) Is there an entry there for "Code2"? If so and if there is one in Preferences beneath this, delete it. For grins, delete "Code" if you see it there too (perhaps write that one down - it's your Neb1 code)
  - 4) Fire up Neb2 and it'll ask for the Neb2 code. Enter it and make sure there are no spaces on either side and that you have the dashes in there (I copy/paste it personally).
  - 5) If you exit now and restart, it should work.
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### **What about an iPhone / iPad / Android version of Nebulosity?**

Would it be cool to be able to run your capture off of your phone or iPad? Sure it would! Is it in the cards right now? Unfortunately, no. There are two main reasons why this isn't an option at the moment.

#### **Reason 1: Lack of hardware support**

For Nebulosity to capture, it needs to talk to camera hardware. Typically, this means camera hardware makers need to create at least low-level drivers so that the operating system (and programs) can find the device, know what kind of device it is, send it commands, etc. Ideally, higher level drivers would exist as well that let software like Nebulosity connect to the device, ask it to take exposures, etc. None of this exists for DSO-ready cameras. I saw one project that seemingly recreated the Canon SDK (Software Development Kit) for their own iOS app to allow capture from a DSLR to an iOS device. That was all due to their massive reverse engineering. SBIG, QSI, Starlight Xpress, Meade, QHY, Canon, Nikon, etc. don't provide any of this for iOS. See Reason #2 for perhaps one take on why.

#### **Reason 2: Power of the devices**

It's completely true that the phones we have now are amazing devices that pack an astounding

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amount of power into such a small space. But, they're still no match for even basic laptops. Take the iPad 2 / new iPad for example. The iPad 2 has 512MB of RAM and the new one has 1G. Several Android devices are at 1GB of RAM too. No app can have all that (or the OS wouldn't run), so let's figure 512MB a clear max even for the biggest devices, 256MB for the next tier down (like the iPhone 4S I have). Open a 20 megapixel image in Nebulosity and you'll find it takes 240 MB of RAM just for that one image. Why? Each pixel as R, G, and B values (20\*3) and each of these is stored as 4 bytes (32-bit floating point numbers). Sure, we could do it as normal 8-bit images and just have it be 60 MB of RAM, but you don't want to stack images from your 16-bit camera using 8-bit integers do you? The CPUs inside have gotten a lot faster. I just saw the new iPad getting a GeekBench score of 756 (same as the iPad 2). For perspective, I have a little 11" MacBook Air, Apple's smallest laptop. It gets a score there of 4600-5700 depending on the CPU. I just did a search here looking for the cheapest netbooks that come in at around ~\$230 for the whole machine. They come with Windows-7, 1G of RAM, a 250G HD, and in Intel Atom N550 (1.5 GHz) processor and clock in with GeekBench scores of 1100 and you can upgrade the RAM for just a few bucks. Which would you rather leave out in a field collecting dew overnight?

To me, there's a more interesting solution in something like the [Raspberry Pi](#) or other small Linux box. You're looking at \$25-\$50 for a machine that could run stripped-down versions for capture and guiding and you could talk to it from a web interface ... from your iPhone / iPad / Android, etc. Now that would be slick! But no, I'm not working on that right now...

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### **Is my Canon 300D or 10D supported?**

These (and several others) are "DIGIC I" cameras. Canon's "EDSDK" is what application developers (e.g., me) use to support the cameras. Unfortunately, the EDSDK does not support DIGIC I cameras and only supports DIGIC II, III, and 4 (yes, they call it "4" and not "IV") cameras. The SDK (Software Development Kit) that supports the older DIGIC I cameras is out of date, unsupported, etc. and no, I'm not going to code up for it.

What that means is that Nebulosity will not control the cameras for image capture. You can use something like DSLR Shutter for capture (or whatever you like) and process the images in Nebulosity (it will read the CRW files), but Nebulosity won't do image capture. Sorry!

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### **When is Nikon support coming?**

I honestly don't know, but don't hold your breath. There's still some chance it will get in, but Nikon has made it more difficult than most. To give you an idea, I got a good bit of the way into supporting the D40/D40x. The code was already about 20x as long as supporting something like an SBIG or QSI camera and all it managed to do was to connect and tell the camera to take a basic picture. It didn't even download the picture. I've had to use my limited resources on other things, making this on indefinite hold.

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### **My Meade DSI isn't working properly**

If you're on a USB2 port, head on over to the Meade support site and download the current driver (you'll likely need to install the upgrade to Envisage). The version on the CD Meade shipped has issues. Updating has fixed this for every user I've seen hit this.

If you're on a USB1 port, somehow find and use a USB2 port.

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### **Does Nebulosity do X with camera Y in mode Z?**

If you're not a registered user, the demo is fully functional (it just adds diagonal black lines on your image). If you are a registered user, keep in mind Nebulosity won't break if you try something new. So try it! Give it a shot... have a scan through the manual (the PDF is search-able) and check

out the [Yahoo group](#).

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### **What Atik and Artemis cameras are supported?**

Pretty much all of them are supported on Windows. Way back when, Atik cameras were long-exposure webcams. Then came the 16 series cameras which have their own entries in the camera list as support for each one was slightly different. After that, came the 3xx, 4000, and others. All of these newer cameras use the same unified driver (much like all the SBIG, QSI, Starlight Xpress, etc. all use the same unified driver). This makes support for new cameras almost always automatic. Just plug it in, install their USB drivers and you're all set!

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### **Will Nebulosity support my camera?**

Nebulosity provides access to a very large array of cameras. If you don't see your specific camera listed and you're on Windows, check to see if your camera has an ASCOM camera driver for it. For example, most of the Orion StarShoot series have ASCOM camera drivers. Nebulosity can talk to a generic ASCOM camera interface and your ASCOM camera driver can convert this into the specifics needed for your camera. Thus, Nebulosity can talk to any ASCOM-compliant camera without buiding in direct support (and you won't see the camera listed in Nebulosity's pull-down). The ASCOM camera spec currently limits the features available, but the spec is undergoing some revision to address these limitations. On the Mac, [the situation isn't as nice](#).

When in doubt, try something that looks like your camera. No harm in trying!

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### **Feature X and/or camera Y isn't working right**

Please [have a look at the Pre-release page](#) before going any further. Odds are pretty decent the problem has already been fixed. If not, [file a bug report](#). Don't worry about using pre-releases. If it's been up there for more than a week, odds are there's nothing too horrible about it. You can always "downgrade". FWIW, I always use pre-releases.

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## PHD Issues

### **Will PHD work with my camera?**

PHD provides access to a very large array of cameras. If you don't see your specific camera listed and you're on Windows, check to see if your camera has an ASCOM camera driver for it. For example, most of the Orion StarShoot series have ASCOM camera drivers. PHD can talk to a generic ASCOM camera interface and your ASCOM camera driver can convert this into the specifics needed for your camera. Thus, PHD can talk to any ASCOM-compliant camera without buiding in direct support.

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### **Will PHD work with my mount?**

Almost certainly, it will. There are two basic ways of getting guide commands to your mount. One uses the serial or USB link to your mount and the other uses your mount's autoguide input (ST-4) port. [This article I wrote for Astronomy Technology Today explains it all](#). In addition, on the Mac, keep in mind that PHD can talk to whatever mount is connected to [Equinox](#) (links to other planetarium packages are in the works).

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### **Calibration is failing, why?**

**Please note**

- 1) The crosshairs are the lock position. They don't move.
- 2) The box is where PHD thinks the star is
- 3) If it bleeps / flashes, etc. PHD has lost the lock on the star. It thinks it might be a hot pixel, the SNR is low, etc.
- 4) Better alignment is always better. Never intentionally misalign. If you have appreciable drift, PHD can mistake this for its attempts to move the mount during calibration. I've had RA calibrations "succeed" when really no signals were getting to the mount. PHD has no way of knowing if star drift from misalignment or its turning of the motors actually moved the star.
- 5) Exposure duration has nothing to do with calibration. The calibration step size (Advanced panel) does. The exposure duration controls how long the camera exposes and the step size controls how long a guide pulse is sent out on each calibration "step" (there are up to 60 steps).

**Given this, we have a few things to consider about calibration:**

- When you've clicked on a star, you get a green box around it. If it's not green but yellow/orange, you don't have a star (find another one). Once you hit the PHD / Guide button you should get green crosshairs to appear (these show the "lock" position).
- Once calibration has begun, the star should start to move. Does it? If so, maybe it's just not moving enough. Increase the calibration step size (Advanced panel) to send longer pulses. If not, you may not be getting any signals to the mount. The star should move one way and then back during RA calibration. After that, it should move perpendicular to this (and then back) during Dec. If it's not moving like this, your signals are probably not getting through.
- You've connected to the right mount / driver, right?
- Once (in theory) connected to the mount, hit Ctrl-T (or go into Tools, Manual Guide). This will pop up a series of dialogs saying it will engage the motor in each direction. Once you hit OK, you get a 1 second pulse to that motor. Look and/or listen closely to your mount to determine if any change in position and/or motor noise happens when you hit OK. One person at least attached a long stick to the telescope so that the small guide motions could be magnified and he could see them. If you get some activity here - any activity - PHD is sending commands to the mount. If you don't, it's not. Start looking at your cables, your choice in the Mount menu or ASCOM dialog, etc.
- When just looping, do you see the star move much? If so, you're not aligned to the pole well and we've got a lot of drift from that misalignment. Fix this.
- If calibration has succeeded in the past, about how many steps did it take? If it's taken just a few, decrease the calibration step size to send shorter guide pulses during calibration. If it's taken 30-60, increase the step size (Advanced panel).
- Are you trying to guide near the pole? If so, you're going to need to boost the calibration step size a good bit. See [here for more](#)
- Does RA calibrate just fine but not DEC? PHD tries to clear out the backlash in DEC before calibrating, but it may not succeed if there is a lot of it. Have PHD running in the loop mode, you can see how long it takes to take up the DEC

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backlash using your mount's normal controller. Go N until you move, then switch to S and count how many seconds it takes. PHD tries to take up the DEC backlash before calibration but if there's a lot and/or the calibration step size is too short, it may not work. To get around this, you can manually take out the backlash prior to calibration. N is calibrated first. Figure out the arrow on your handbox that does the same motion as this. Before entering the calibration, hit this until the star starts to move. Then calibrate and you should get the DEC done just fine.

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### **My Meade DSI isn't working properly**

If you're on a USB2 port, head on over to the Meade support site and download the current driver (you'll likely need to install the upgrade to Envisage). The version on the CD Meade shipped has issues. Updating has fixed this for every user I've seen hit this.

If you're on a USB1 port, somehow find and use a USB2 port.

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### **My Orion StarShoot Autoguider no longer works (1.12 or later)**

Orion updated their drivers to support 32 and 64-bit Windows 7. In the process, this broke backwards compatibility. From 1.12 on, PHD now installs the 32/64-bit version of SSAGIF.dll for the Orion Autoguider by default (Orion's request). Users should either update the driver (<http://www.telescope.com/rsc/img/catalog/lc/articles/ssag64bit.html>) or rename SSAGIF\_orig.dll (the previous version, still bundled with PHD) to SSAGIF.dll in \Program Files\PHD Guiding if they wish to use the old one.

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### **Just what are those #'s in the log file?**

PHD deals in pixels (distance), seconds or milliseconds (time), and radians (angles). It never needs to know things like how long your focal length is because it only works in units that can be directly observed – how far the star moved in pixels in a given amount of time. Thus, we have:

Frame: Counter telling you what image it was, starting at 1

Time: Time since the start of the run, in seconds

dx: Distance the star was from the lock position along the camera's X-axis, in pixels

dy: Distance the star was from the lock position along the camera's Y-axis, in pixels

Theta: Angle formed by creating a line from the lock position to the star position, in radians

RA\_Dist: Projection of the vector from lock to star position onto the RA axis (as determined in the calibration stage) as distance in pixels

RA\_Dur: Duration of the RA pulse sent (in msec)

Dec\_Dist: Projection of that vector along the Dec axis (as determined in the calibration stage)

Dec\_Dur: Duration of the Dec pulse sent (in msec).

Star\_Mass: "Mass" of the star (sum of the star's intensity)

ErrorCode

0 = OK

1 = Star is saturated

2 = Star has low SNR

3 = Star has low "mass" (brightness)

4 = Star has changed "mass" considerably

5 = Star seems to have moved a lot

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### **Are there any programs that let me analyze log files?**

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Yes, there are. Apart from doing things like using a spreadsheet (and consulting the "[What to do when PHD Guiding isn't Push Here Dummy](#)" page), you can look at log file analyzers. [PHDLab](#) and [PECPrep](#) are both good options.

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### Mac Specific

#### **My Microtouch focuser stopped working**

The Starizona Microtouch uses a SiLabs USB to serial chip inside it. With 10.10, the stock / bundled versions have stopped working, but the fix comes via an update from SiLabs. Just [download](#) and install it and you're set.

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#### **Do you / when will you support Camera X on the Mac?**

Support for a camera (or any other bit of hardware) needs a driver and an "API" (Application Program Interface) for me to talk to. Without that, I might as well just stare at the camera and think happy thoughts. It'd be as effective...

It's a lot like this. Suppose you just bought a FooMatic 1000 printer that works on Windows just fine, but there's no Mac driver for it. So, you're there on your Mac in Word or OpenOffice or whatever, and you can't print. It'd be nice if someone wrote a driver but my guess is the weight of the blame for its absence would fall on FooMatic and not on the folks who wrote your favorite word processor.

Yes, it is true that I've reverse engineered or ported drivers over to the Mac for other cameras. I helped in the Meade DSI port (and now maintain that driver), I've done the ShoeString gear, and I've gotten the QHY8 and QSI cameras going, for example. The latter two had Linux drivers that could be ported without much fuss. The ShoeString gear are simple "HID" devices that didn't take too much, etc. At the very least, I've had the support of the camera maker and things have come at a time when I've had time. In general, these things take a lot of time and it's really more up to the hardware maker than the application writer to get that basic level of support up and going on the platform.

A number of companies either give Mac support on their own or have supported the development of drivers (e.g., by posting Linux code freely to their site). Support those companies and / or talk to the other companies about the need for Mac support. The customer's voice is the loudest.

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