



Apogee Filter Wheel Installation Guide

Version 2.0

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Welcome

Thank you for purchasing an Alta USB Filter Wheel. This installation guide is provided as a resource to make your integration as straight forward as possible. If you have any questions regarding this product please visit our website or call our customer support so we can better serve you.

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1 Introduction and Setup

The USB Filter Wheel was designed and tested using Windows XP, Windows Vista, and Windows 7. Apogee USB Filter Wheels are optimized for the high speed USB 2.0 interface, while also supporting backward compatibility with older USB 1.1 connections.

We recommend the following steps for getting your new Filter Wheel up and running as quickly as possible:

- 1) Install the MaxIm application software
- 2) Install the latest Apogee Drivers
- 3) Connect to the Filter Wheel using MaxIm
- 4) Integrate filters into the Filter Wheel and integrate into your system
- 5) Begin using your new Apogee Filter Wheel!

1.1 Install MaxIm DL/CCD

The Apogee Filter Wheel is easily used with the MaxIm DL/CCD image capture and processing software, developed by Diffraction Limited. If you will be using the MaxIm software, we recommend that you install it prior to setting up your Filter Wheel. If you already have MaxIm installed make sure that it is the latest update. Please see the MaxIm documentation for specific instructions related to installation of this software.

Apogee Filter Wheels are supported by MaxIm DL/CCD 4.61 and higher.

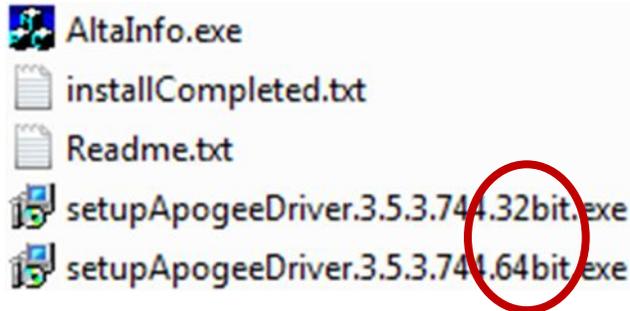
1.2 Update Apogee Driver (Apogee.DLL)

If you already have Apogee drivers installed on your system, be sure to update to the latest version before proceeding. The disk included with your Filter Wheel has the latest driver at the time of shipping. For the most up-to-date version of the Apogee.DLL you can visit our website, <http://www.ccd.com/downloads.html>. This manual provides detailed instructions for driver installation.

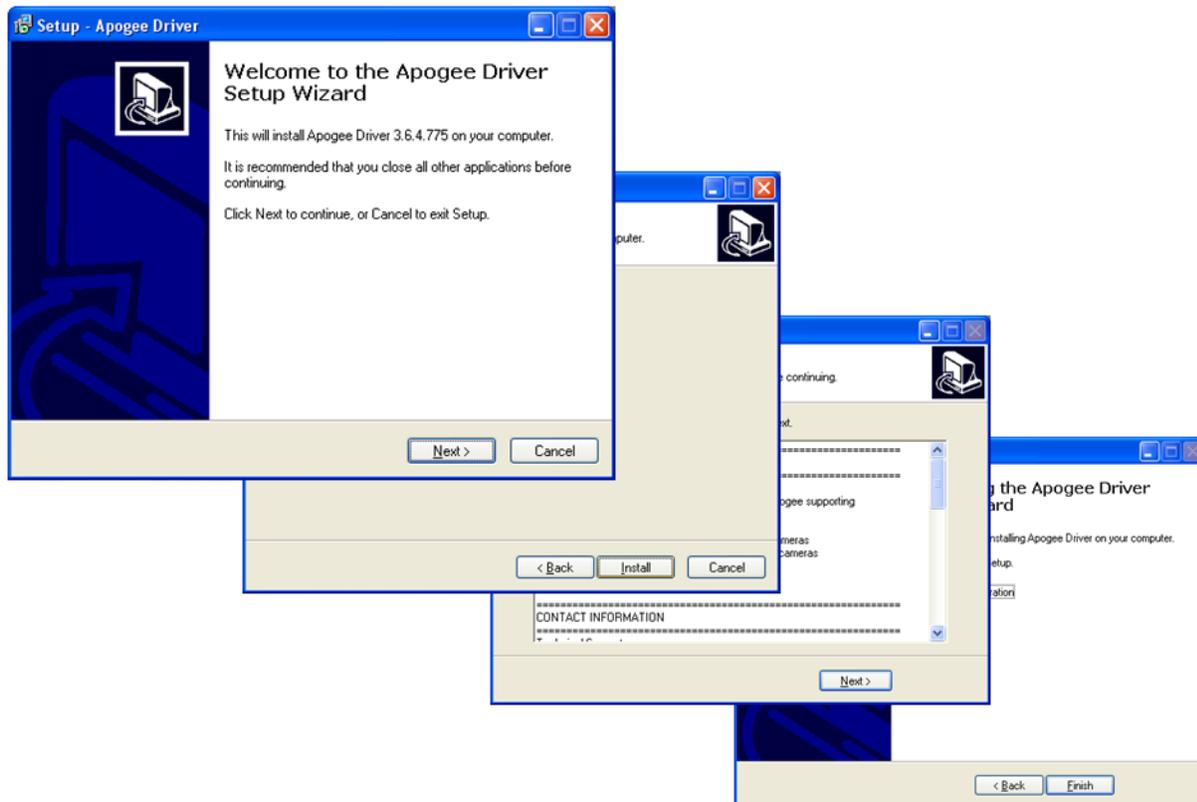
2 Windows XP Driver Installation

WARNING: Do not connect your Apogee device to a PC before installing the drivers. If you do and the "Add New Hardware Wizard" appears, please select the Cancel button.

Make sure your Windows user account has administrator privileges. Double click on the setupApogeeDriver for your operating system type, 32 or 64 bit.



Follow the installation wizard instructions.



Upon successful driver installation connect the Filter Wheel to your PC. The "New Hardware Wizard" window will appear. On the dialog select the "No, not a this time" radio button. Press the "Next" button.



Make sure the "Install software automatically (recommended)" radio button is selected and press "Next".



The New Hardware Wizard states it has completed installing software for the Apogee Alta USB Camera and USB Filter Wheel. Press the "Finish" button.

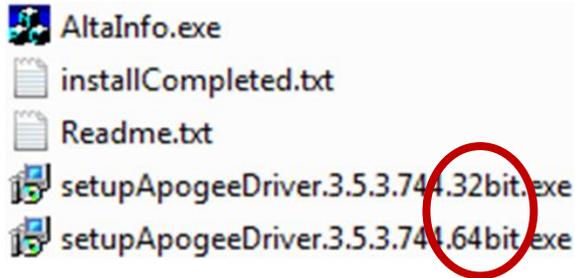


The drivers for your USB Filter Wheel are now installed on your PC.

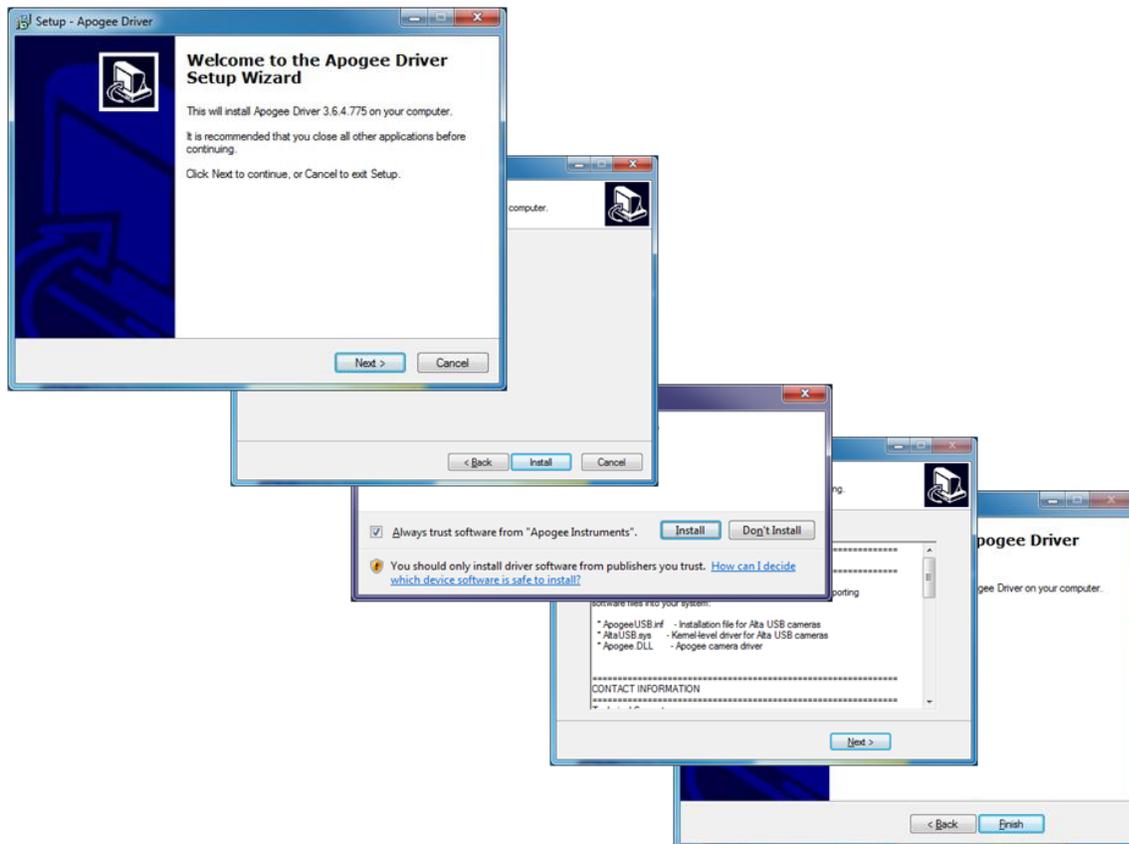
3 Windows 7 Driver Installation

WARNING: Do not connect your Apogee device to a PC before installing the drivers. If you do and the "Add New Hardware Wizard" appears, please select the Cancel button.

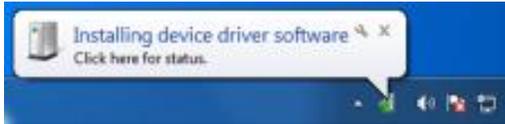
Make sure your Windows user account has administrator privileges. Double click on the setupApogeeDriver for your operating system type, 32 or 64 bit.



Follow the installation wizard instructions.



Upon successful driver installation connect your Filter Wheel to the PC. Watch the message balloon in the lower right corner state the OS, search for and successfully install the drivers for the Apogee USB camera.



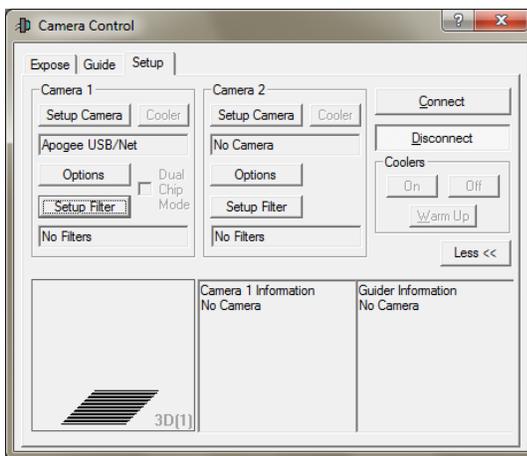
The drivers for your USB Filter Wheel are now installed on your PC.

4 Using MaxIm DL/CCD

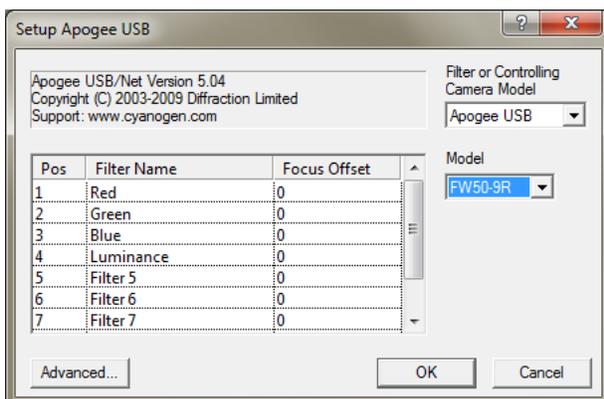
MaxIm DL/CCD is a powerful camera control and image processing package. The MaxIm software package has an extensive user's guide, which provides detailed instructions for setting up the software and getting started. This section covers a quick reference of how to connect to your Alta Filter Wheel using MaxIm.

The information in this section contains specific MaxIm screenshots. These screenshots were accurate as of MaxIm v5.06, it is possible that users with other versions of MaxIm may notice slight layout changes from what is described below.

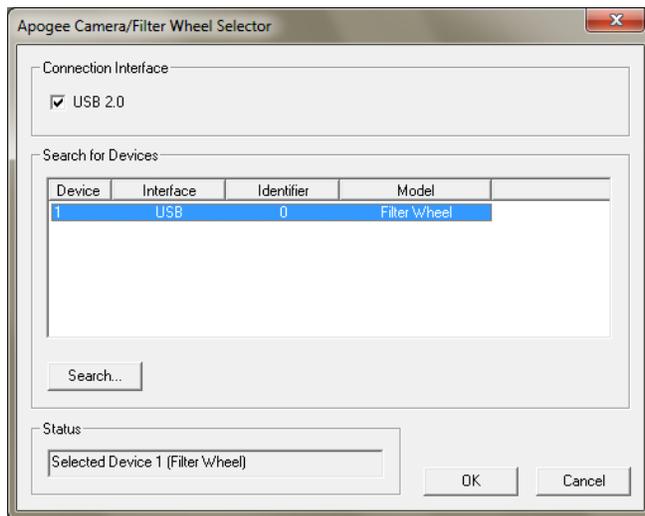
To begin, launch the MaxIm CCD camera control window. Under "Camera 1" click the **Setup Filter** button.



A dialog box will appear for setting up the filter positions. Select **Apogee USB/Net** from the "Filter or Controlling Camera Model" pull down list. This driver works with all Apogee Filter Wheels controlled via USB or Ethernet, as well as wheels controlled through the camera. The user can assign names for each of the color filter slots, under **Filter Name**. If your Filter Wheel has fewer slots than available, simply leave the Filter Name in the extra slots blank; they will not appear in the drop-list filter selectors.



If your filters vary in thickness a **Focus Offset** can be entered for each filter. Consult the MaxIm user's guide for details on this feature. The **Model** should be set to the type of wheel you are controlling. Click the **Advanced** button and press Search to find the device. Choose the Filter Wheel from the list and verify that the "Connection Interface" is set to **USB 2.0** and click **OK**.



Press **OK** in the "Setup Apogee USB/Net" window and then click **Connect** in the "Camera Control" window. The Alta Filter Wheel is now setup in MaxIm.

5 Filter Wheel Installation

5.1 Installing Filters

Set Filter Wheel on clean flat surface and remove the two #10-32 x 7/16 buttonhead screws from mounting flange using the 1/8" Alan wrench provided. Flip Filter Wheel upside down and remove the three buttonhead screws from the back of the mounting flange. Set aside the mounting flange and five buttonhead screws for now.



Flip Filter Wheel right side up and set on the edge of a table. The motor should hang off the side so the housing does not rock back and forth. Remove the ten #6-32 x 5/16 flathead screws from the perimeter of the lid using the 5/64 Alan wrench provided.



Remove the lid, making sure not to damage the light guard sticker of the connector face. Set aside the lid and ten flathead screws for now. Take a moment to inspect for any packing materials or dust inside the wheel, remove using compressed air or wipe.



Carefully install filters into openings of carousel. Only touch filters at the outer edges and never touch the center of a filter. When holding filters always use some kind of protection such as gloves or the glass packing material. It is ok to rotate the carousel by hand to make it easier to install filters. Some filters will be tighter than others when resting in the carousel openings, do not force into place. Center filters in carousel openings (use four tooth picks around the edges of each filter if needed). Fasten filters using the screw and nylon washer combinations described on the next page.



Install filters using the below screws and nylon washers provided using the 1/16" Allen wrench provided. **DO NOT OVER TIGHTEN**; this may physically distort your filters which will optically distort your image. Make sure filters do not move after tightening. Rotate the carousel by hand to verify clearance under the circuit board.

3mm Thick Filters:

- 1X #4-40 x 3/16, Buttonhead Screw
- 1X #4 Nylon Washer



5mm Thick Filters:

- 1X #4-40 x 1/4, Buttonhead Screw
- 1X #4 Nylon Washer
- 1X #4 Nylon Spacer



7mm Thick Filters:

- 1X #4-40 x 5/16, Buttonhead Screw
- 1X #4 Nylon Washer
- 3X #4 Nylon Spacer



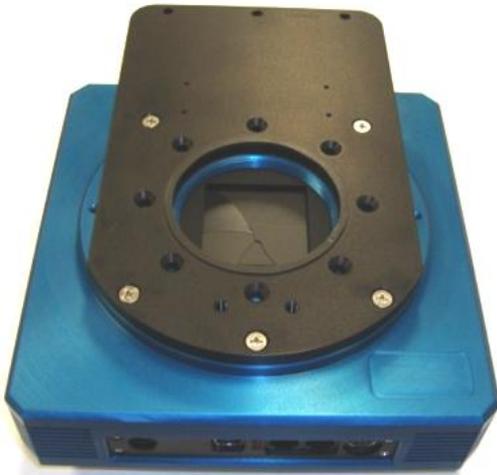
Now that all the filters have been installed take a moment to blow out the housing in case of any dust or debris. Place lid back on Filter Wheel housing making sure not to damage the light guard sticker of the connector face. Fasten the lid using ten #6-32 x 5/16 flathead screws.



Verify that the filter wheel operates correctly before proceeding. If not, refer to the trouble shooting section of this manual.

5.2 Mounting to Alta Camera

Mount the adapter flange to the front of your Alta camera using M4-.7 x 10mm flathead screws. Make sure counter sunk features are facing up so screws mount flush with adapter surface. There are two hole patterns machined into the flange to accommodate different Alta camera sizes.

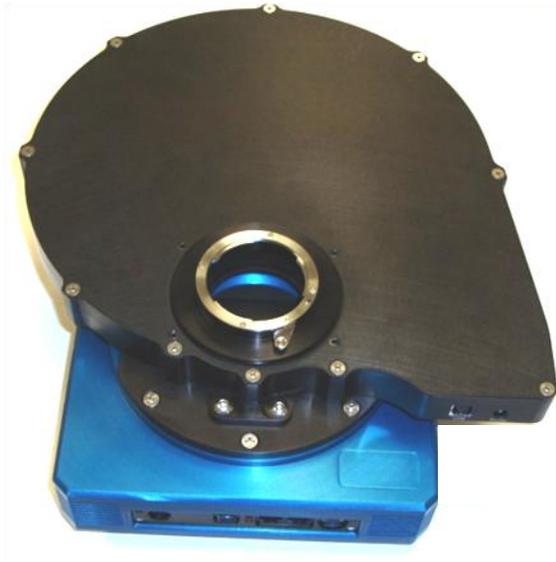


Line up the Filter Wheel with the adapter flange in the configuration shown below so the two mounting holes line up with the threaded holes of the flange. Lightly screw in two #10-32 x 7/16 buttonhead screws and flip assembly upside down to mount three buttonhead screws in the rear of the plate. Fasten all five screws using Allen wrench.



5.3 Installing Adapter

Attach your adapter using the center threaded 3-24 TPI center hole or the 4x #10-32 UNF-2B x .250 deep threaded holes.



Integrate the Filter Wheel and camera into your system and start imaging!

5.4 Setup Suggestions

The Filter Wheel and Alta Camera connect to the computer using separate USB cables. It is possible to reduce the number of cables coming off the telescope by connecting multiple USB plugs to a micro USB hub mounted to the telescope so only one USB cable connects to the computer.

USB is unstable if the cable is greater than 16 feet. For longer runs you can purchase a USB powered hub or our Icron USB extender. Icron is the only brand certified by Apogee to work with our cameras. Each powered USB hub will increase the signal by around 15 feet, the Icron hub will extend the signal by around 165 feet.

Apogee sells a variety of telescope adapters for the Alta Filter Wheel which can be found at our website, www.ccd.com. Also, if you require a custom adapter we have partnered with Precise Parts to serve you better, www.preciseparts.com.

6 Trouble Shooting

Problem	Solution
The motor is turning but the wheel is not.	<ul style="list-style-type: none"> ● Check to make sure the belt is on the motor pulley correctly. If the motor is turning but the pulley is not, tighten the motor pulley set screw, being careful not to strip the set screw. ● Verify that the screws you used to mount the filters are not too long and colliding with the housing underneath the carousel.
The wheel turns but does not stop.	Make sure the lid is fastened and the Filter Wheel is not operating in a brightly lit room.
The Filter Wheel won't connect	<ul style="list-style-type: none"> ● Verify that the USB and power connectors are securely plugged in. ● Verify the <i>Apogee Driver</i> and <i>Apogee USB 32/64Bit Driver</i> are installed. Open <i>Add or Remove Programs</i> dialog and confirm both appear in the <i>Currently installed programs</i> list. ● The USB cable is more than 15 feet long without a powered hub.