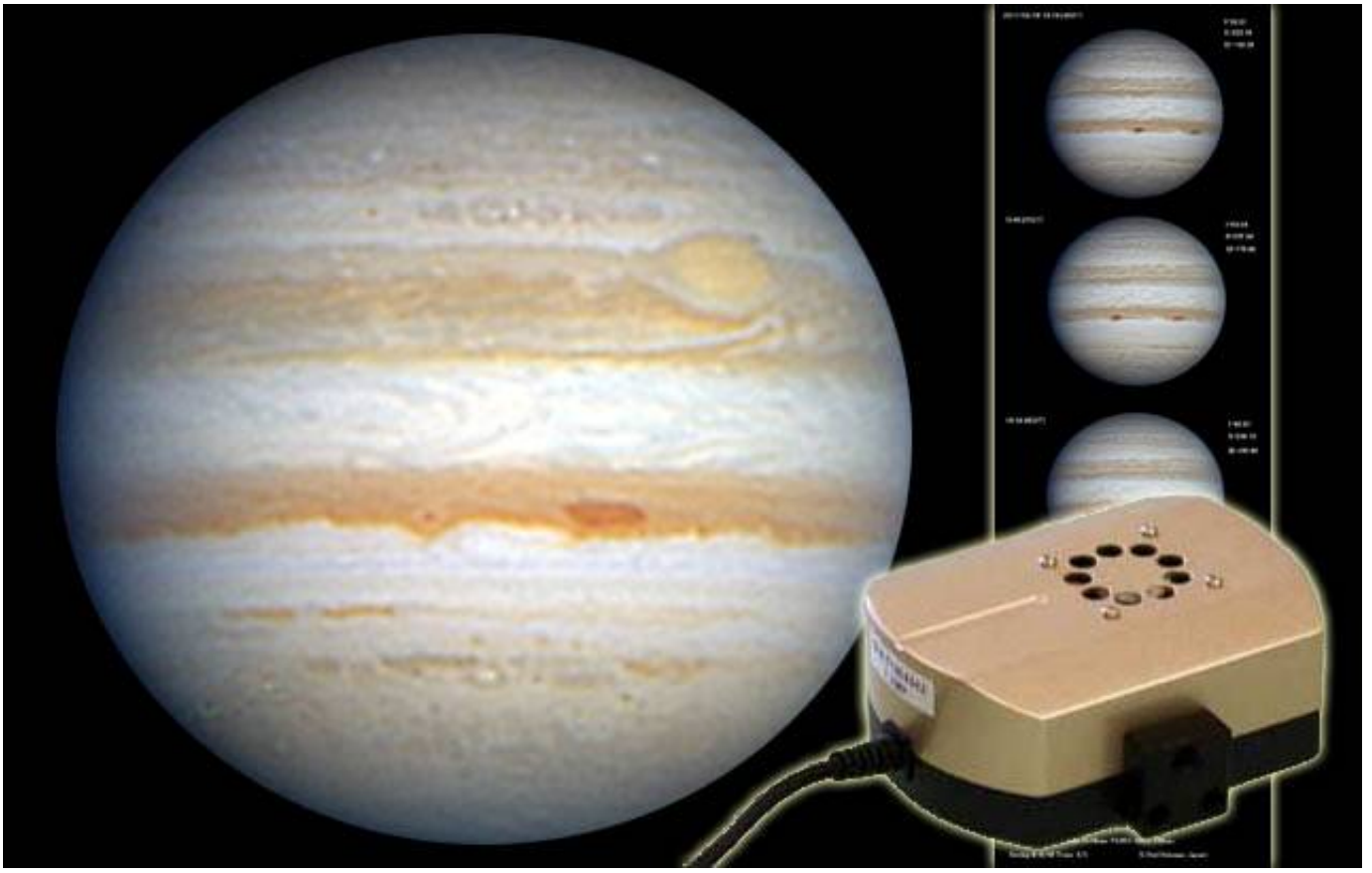
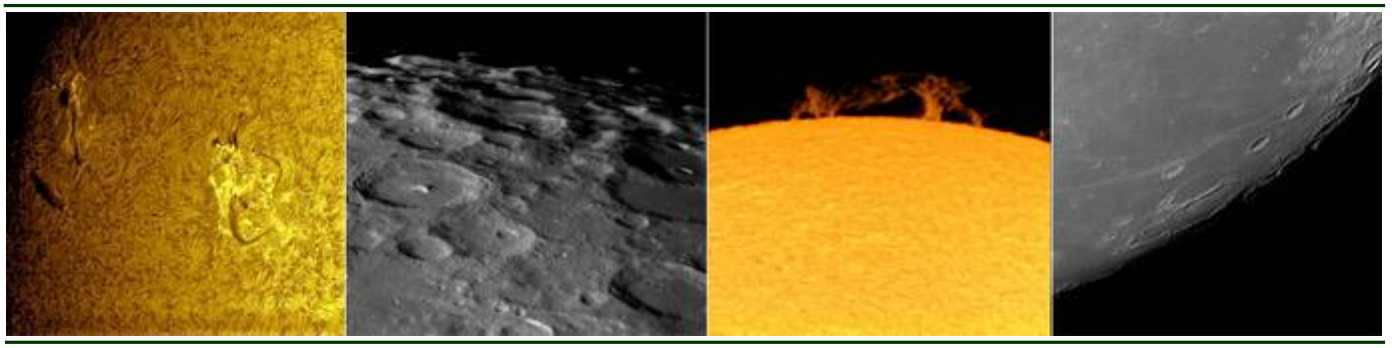
Opticstar PX-137 COOLAIR
Setup Guide



Microsoft Windows (64-bit & 32-bit) 8 / 7 / Vista / XP



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CAUTION

1. Please read and follow the installation instructions on the following pages for a trouble free installation!
2. Do not drop your camera as this can result in serious damage.
3. Only use the supplied power supply unit if you camera comes with one.
4. Do not point the camera to a bright light source like the Sun without the appropriate filters as this will damage the sensor.
5. Disconnect the camera from the computer when not in use.
6. Treat the camera glass window with the same care as you would of a photographic lens.

Manufacturer's Warranty

This product has a 1 year back to base warranty. For after sales support please contact Opticstar at: info@opticstar.com

Introduction

The PX-137C (colour) and PX-137M (monochrome) are advanced astronomy video cameras that excel in planetary, lunar and solar imaging. The camera is also suitable for microscopy when fitted with an appropriate attachment.

Please note that for solar photography, the camera should be used only with an appropriate solar telescope and/or solar filters.

The PX-137 incorporates the advanced Sony IMX035 sCMOS (scientific CMOS) sensor that outperforms CCD sensors such as the Sony ICX618 CCD by a significant margin. The PX-137 achieves frame rates of up to 25 frames per second (FPS) at full resolution: 1280x1038 pixels, or up to 50 FPS at 668x512 pixels.

Software Support

Two software applications are bundled with the camera: **etAMACAP** and **ISCapture**. **EtAMCAP** works under Microsoft's DirectShow model. **ISCapture** supports the camera natively offering image processing and measurement functionality.

Package Contents

The following items are included in the package:

- Opticstar PX-137 video camera with removable C ring.
- In-situ USB 2.0 cable.
- CS to 1.25" telescope adapter.
- Software CD.
- Setup Guide (this document).

System Requirements

The minimum computer system requirements are the following:

- Windows (32-bit or 64-bit) XP/Vista/7/8 with the latest Service Pack.
- USB 2.0 port for the camera.

The camera does not incorporate any optics and therefore it cannot reach focus by itself. A C/CS mounted lens must be used with the camera or it must be attached to a telescope with the nosepiece adapter that is included with the camera. To attach it to a microscope, please use an appropriate attachment.

Camera Installation

There are four sets of software to install in order to add support for the PX-137 camera to Windows. They should be installed in the following order:

1. Windows DirectShow software for the PX-137.
2. Windows software drivers for the PX-137.
3. **EtAMCAP** application software for using the camera.
4. **ISCapture** application software with more advanced functions and better usability.

The first step is to install software that makes the PX-137 compatible with Microsoft's Windows DirectShow model. Such compliance allows the PX-137 to be used with **etAMCAP** and possibly with other third party applications.

Anti-virus software may attempt to block the installation. In such cases the anti-virus software should be temporarily disabled. Otherwise, when prompted, add the installation files to the trusted list.

The installation of the software should be carried out by a user with *Windows administrator permissions.* Otherwise the installation may fail.

Please ensure that the camera is **not** connected to the computer yet.

Power up the computer (or restart Windows) but do not attach the camera to the computer yet. Once on the Windows Desktop, please follow the instructions in the following sections that describe how to install the software starting with DirectShow support.

Installing Software for Windows DirectShow

Please follow these instructions for all versions of Windows (32-bit & 64-bit) XP/Vista/7/8.

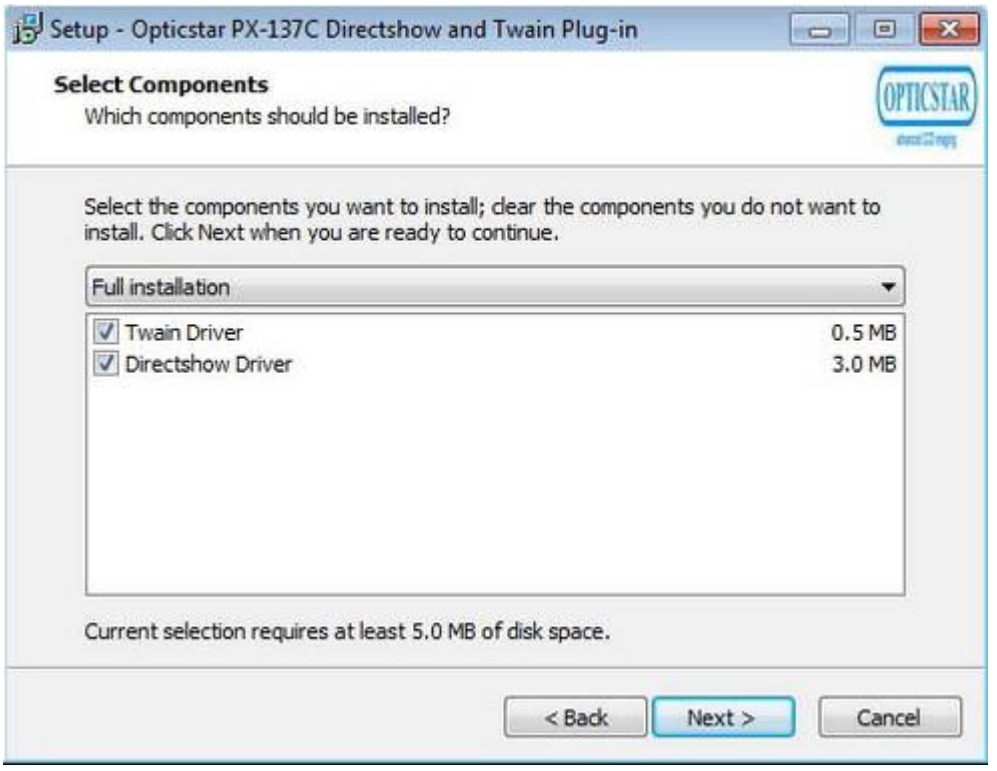
1. Insert the CD that comes with the camera in the CD/DVD drive.

2. Navigate to the **DirectShow** folder on the CD and run **Opticstar_PX-137C_DirectShow.exe** for the PX-137C (colour model) or **Opticstar_PX-137M_DirectShow.exe** for the PX-137M (monochrome model).

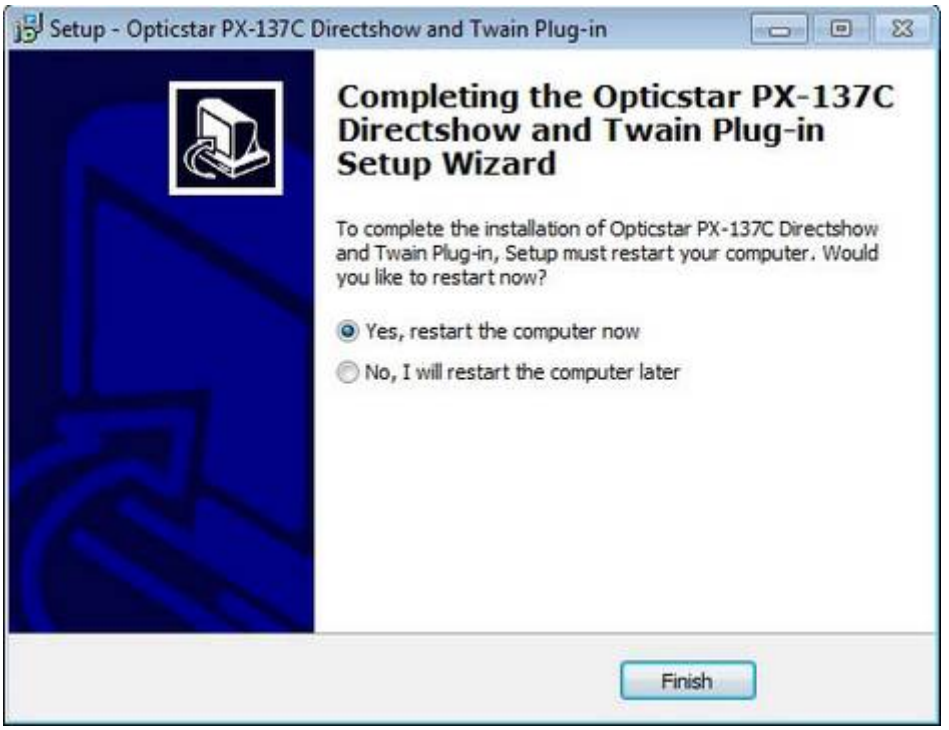
3. A message will appear "**Welcome to the PX-137 Camera Directshow Plug-in Setup Wizard**". Click on the **Next** button to continue.

4. Windows may display a warning message such as **Windows can't verify the publisher of this driver software**. Select "**Install this driver anyway**" to continue.

5. The install program will ask if any additional video software should also be installed. Since the camera will typically be used in video mode, the response to this should be yes. Select all the options and click the **Next** button to continue.

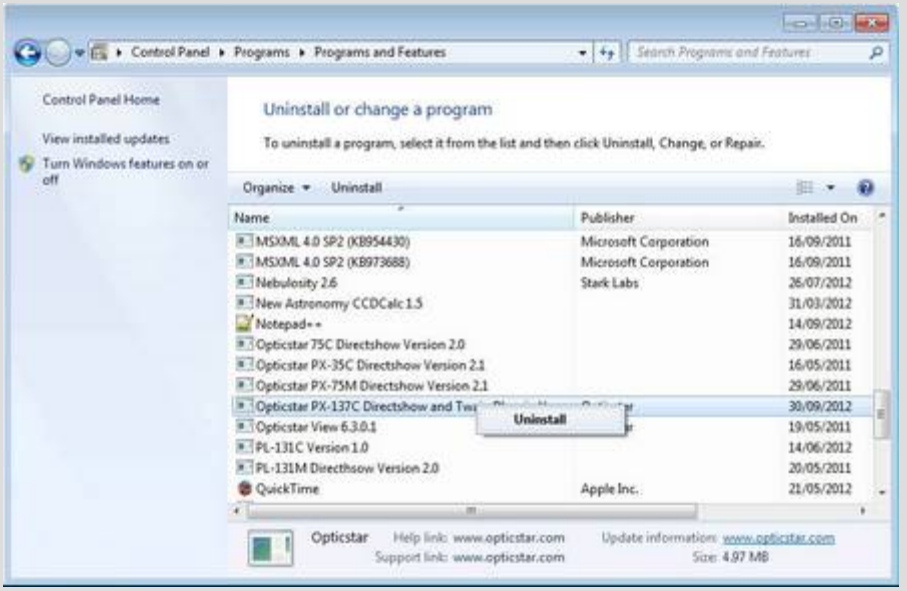


6. Eventually, Windows will display "**Completing the Opticstar PX-137…**". Click **Finish** to continue.



7. Finally, if Windows asks to restart the computer, select "Yes".

If at any stage you wish to remove DirectShow support, you can do so from the Windows Control Panel independently of the camera's Windows software drivers. Click the **Add / Remove Programs** icon (on XP) or **Programs and Features** (on Vista/7) and remove the entry headed **"PX-137 DirectShow…"**.



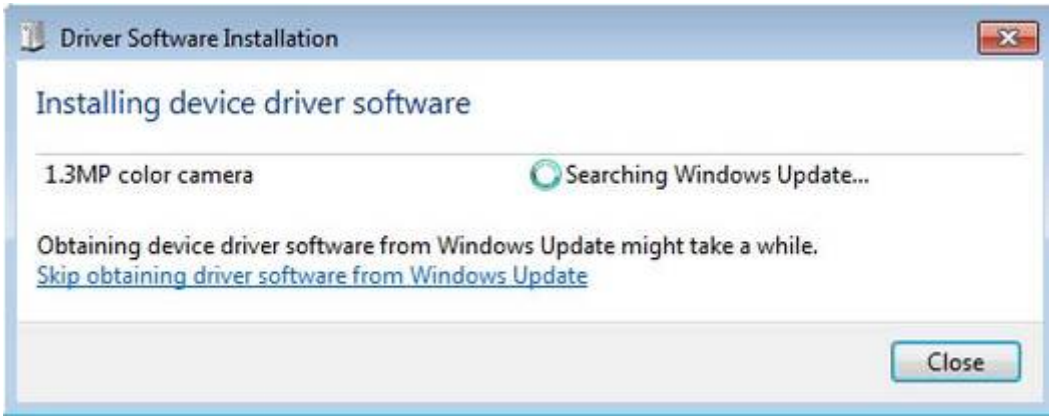
Installing Software Drivers for Windows

Desktop computers have USB 2.0 ports on the front and the back. Sometimes, the ports at the front are not fully USB 2.0 compliant in terms of bandwidth and power. Please use one of the ports connected directly to the motherboard if possible. Such USB 2.0 ports are typically situated at the back of the computer.

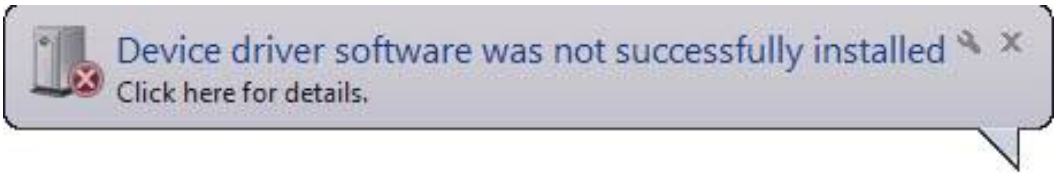
1. Insert the CD in the drive.

2. Connect the camera to a USB 2.0 port on your computer.

3. Windows may try to locate drivers for the camera automatically. Click "**Skip obtaining driver software from Windows Update**". The drivers should be installed manually.

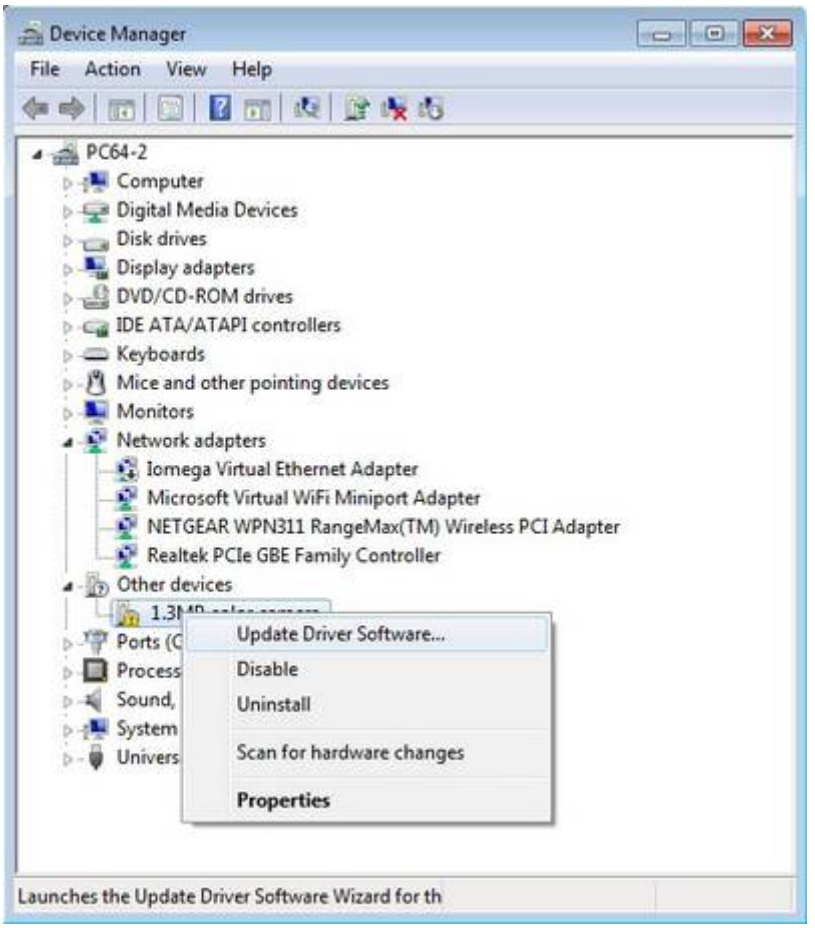


4. The following message will appear. Ignore the message and open the **Windows Device Manager** to install the drivers manually.



If you are not sure how to access the Device Manager on your computer, press **F1** on the keyboard while on the Windows desktop to access the **Help and Support Center**. Once there, search for "Device Manager".

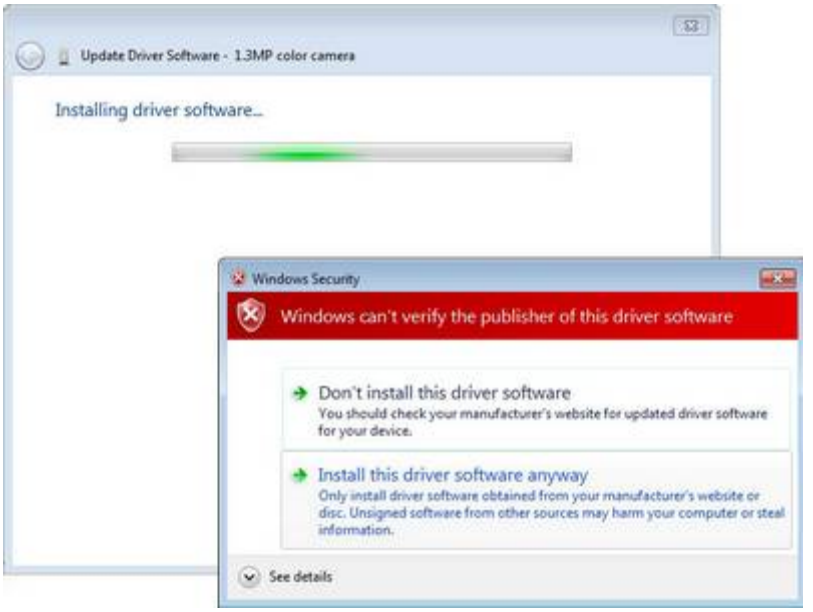
5. The camera will be identified as "**1.3mp camera**" in Device Manager. Select this entry by right-clicking on the mouse and select the "**Update Driver Software**" option.



6. A message will appear, giving two options. Select "**Browse my computer for driver software**". In the following step direct Windows to the **Drivers** folder on the CD.

7. Navigate to the appropriate **Drivers** folder and click **Next** to proceed. For the PX-137C (colour) the drivers are situated on the CD in "**\Drivers\PX-137C\64-bit**" for 64-bit operating systems and in "**\Drivers\PX-137C\32-bit**" for 32-bit operating systems. For the PX-137M (monochrome) the drivers are situated on the CD in "**\Drivers\PX-137M\64-bit**" for 64-bit operating systems and in "**\Drivers\PX-137M\32-bit**" for 32-bit operating systems.

8. Windows may display a warning message. Simply select **"Install this driver software anyway"** to continue.



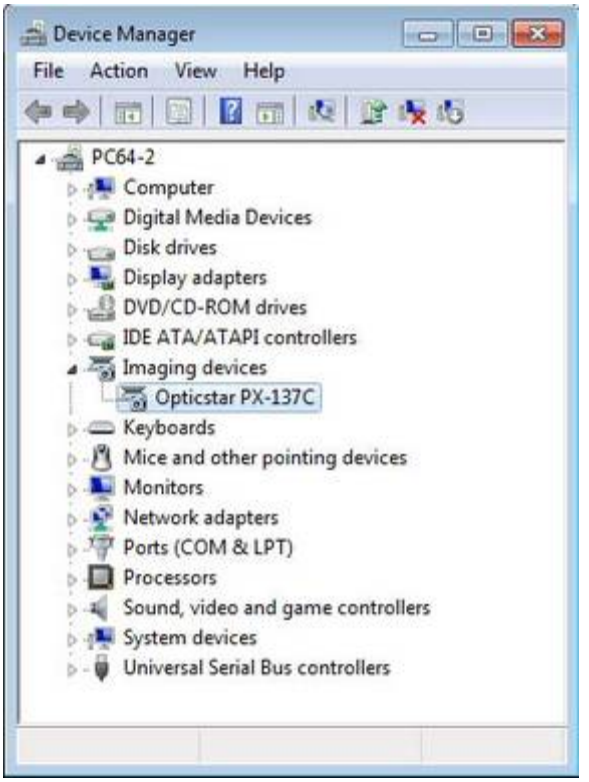
9. Windows will display **"Installing driver software..."** and will proceed with the installation.

10. Windows will copy the installation files and display the following message "**Windows has successfully updated your driver software**".

11. If Windows asks to restart the computer, please do so.

Verifying Successful Installation

The camera will now be visible in Windows Device Manager and can be identified as "**Opticstar PX-137**".



You can access the Device Manager by clicking the **Start** button on the Windows desktop and from **Settings > Control Panel**, select **Device Manager**.

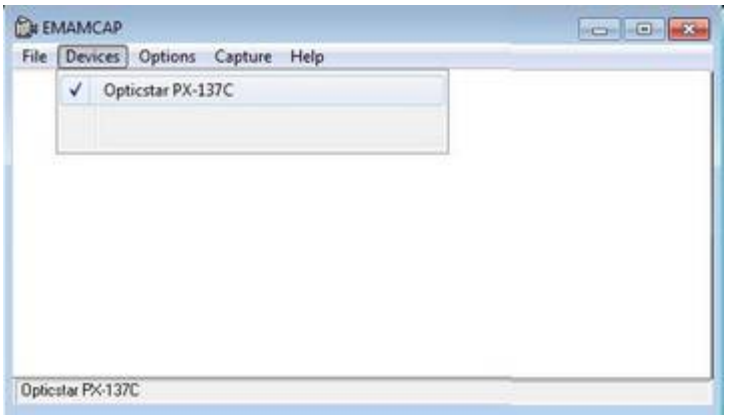
Alternatively, press **F1** on the keyboard while on the Windows desktop to access the **Help and Support Center**. Once there, search for "Device Manager"

If the drivers have not been installed properly, please refer to the **Troubleshooting** section in this guide.

Installing etAMCAP

You can test that the camera has been installed successfully by running the **etAMCAP** program.

The **etAMCAP.EXE** can be found on the accompanying CD inside the **etAMCAP** folder. Copy this to your computer's desktop by dragging it from the CD folder. Double-click the **etAMCAP** icon on the Windows desktop to run the program.



Running etAMCAP

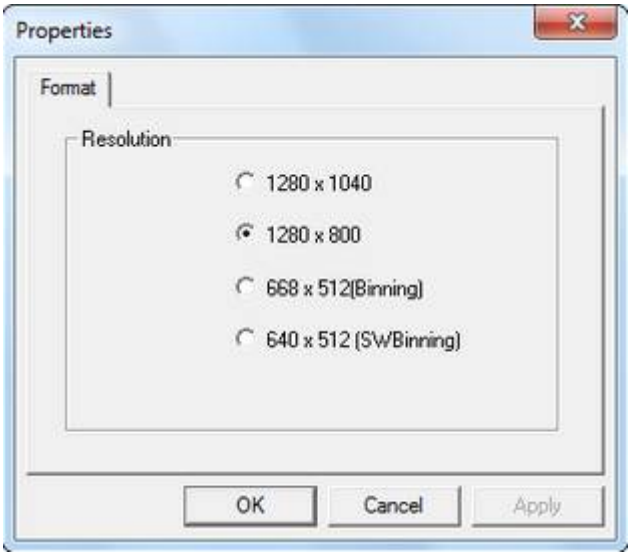
The camera will be identified as "**Opticstar PX-137C**" or "**Opticstar PX-137M**". Select the camera from the **Devices** menu. **EtAMCAP** can be used as a general purpose program to capture video in AVI format.

EtAMCAP can be used to capture video in AVI format. It cannot capture single frames. In order to capture single frames as well as video please use **ISCapture**.

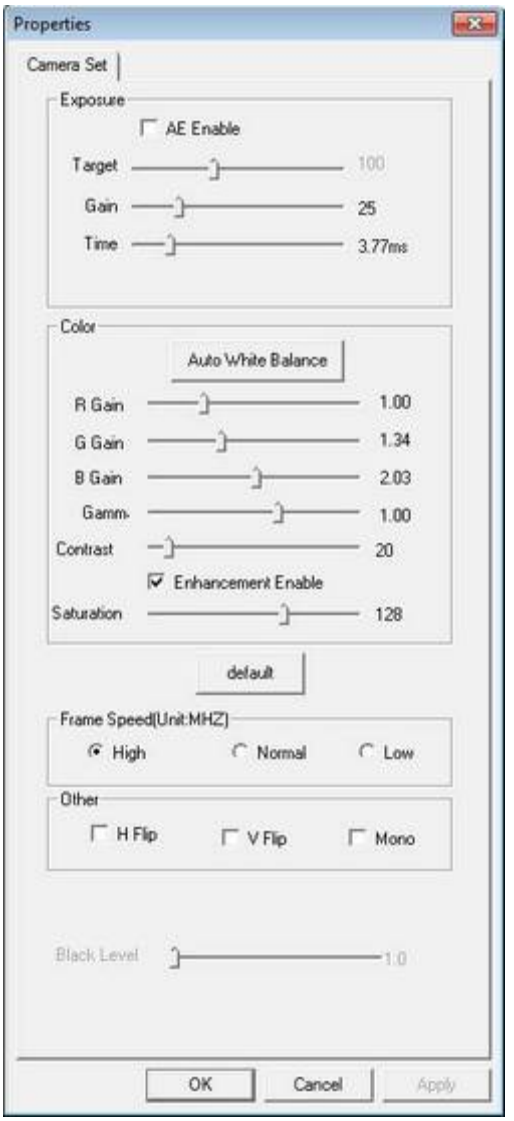
Image Resolution

The camera can operate in a number of image resolutions. From the **Options > Video Capture Pin** menu, select the camera resolution:

- 1280 x 1040
- 1280 x 800
- 668 x 512 (Binning)
- 640 x 512 (SWBinning).



The camera can be configured from the **Options > Video Capture Filter** menu.



Automatic Exposure Time

AE Enable stands for Automatic Exposure. When auto-exposure is used, the user cannot specify the exposure time. However it is still possible to add a "bias" by increasing or decreasing the **Target** value. Likewise, the **Gain** value is not user definable in auto-exposure mode.

Manual Exposure Time

To set the exposure time manually, simply un-tick the **AE Enable** option. In this mode, the time can be set in milliseconds and **Gain** can also be set. The **Target** value cannot be set in manual exposure mode.

Colour Settings

For colour cameras the colour settings of the captured images can be modified by the slider bars. Additionally, the values for **Gamma**, **Contrast** and **Saturation** can be specified.

Camera Speed

The camera speed can be set to **High**, **Normal** or **Low**. This refers to the speed at which the camera sends the data to the computer. At lower speeds, the image quality is better but at higher speeds the camera downloads the data quicker.

Other Settings

The orientation of the captured images can be inverted or reflected by the **H Flip** and **V Flip** options. The **Mono** option produces monochrome images rather than colour.

ISCapture

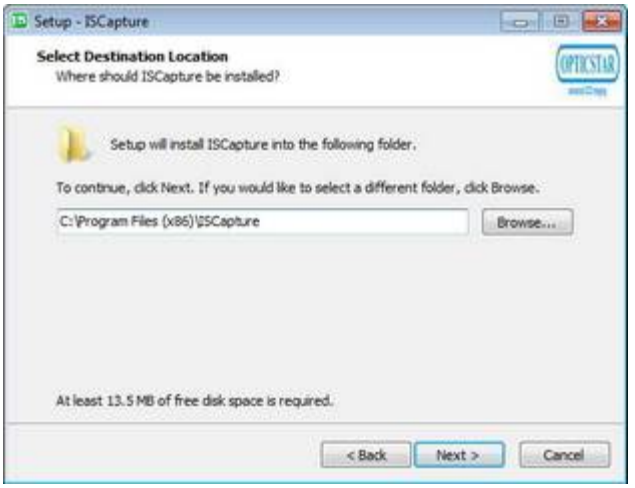
ISCapture is a more advanced software application that can be used to control the camera, capture single frames or video, perform image processing and take image measurements. It can also be used for a wide range of applications including microscopy.

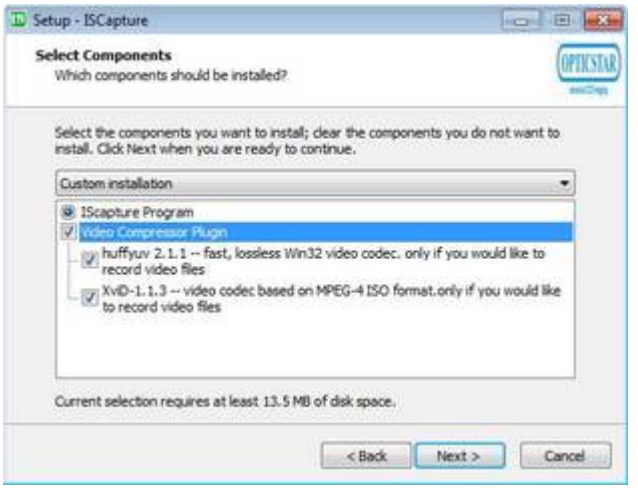
Installing ISCapture

1. To install **ISCapture**, navigate to the **ISCapture** folder on the CD and open the **ISCapture_setup.exe** file.

2. Windows will display "**Welcome to the ISCapture Setup Wizard**". Click the **Next** button to continue.

3. During installation, you will be asked to select the location where the program will be installed and whether to install video processing software. Please select all the additional software video components by ticking the appropriate options.

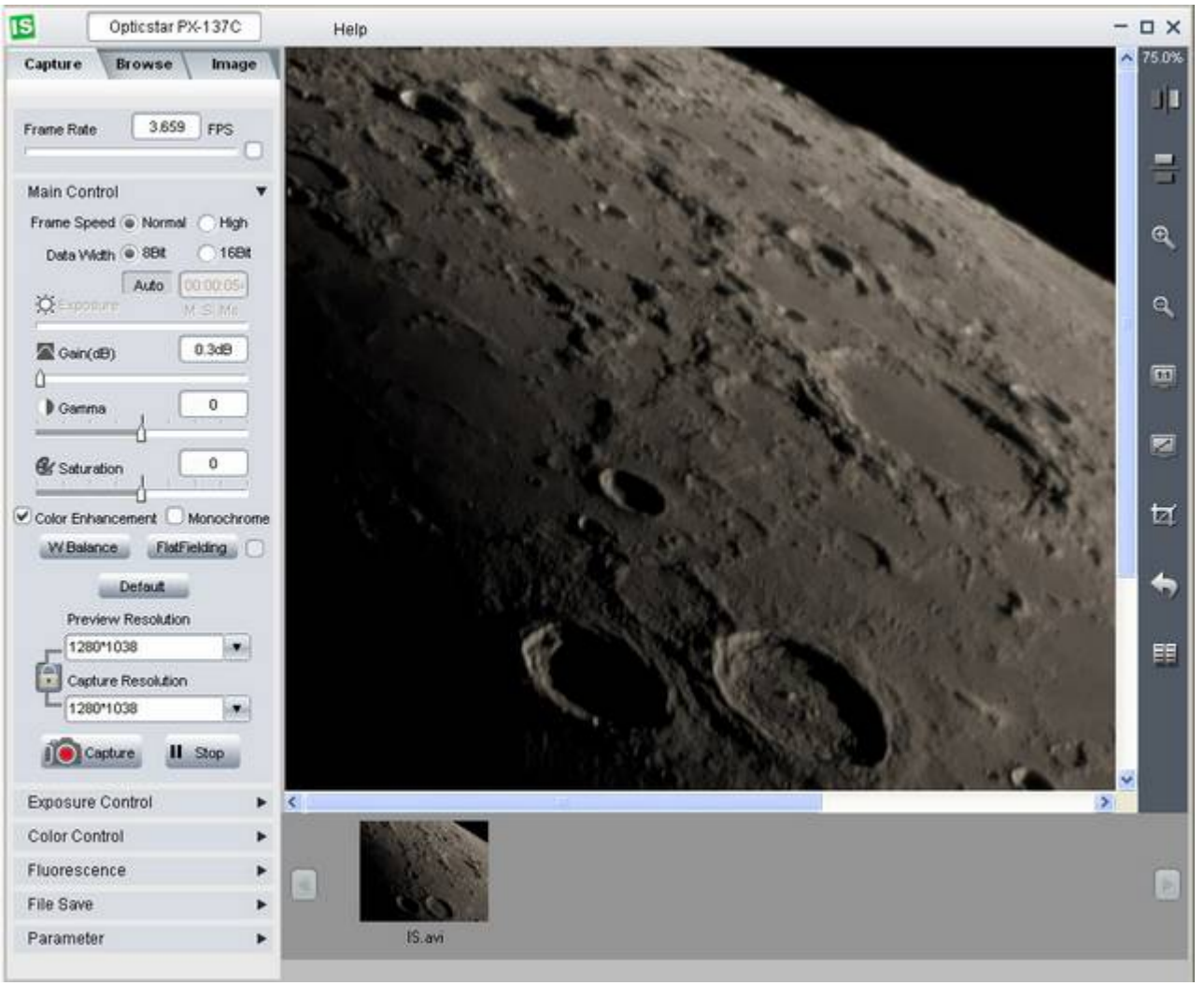




Once the installation is complete, **ISCapture** can be run by clicking on the Windows **Start** button and selecting **ISCapture** from the programs list. Alternatively click the appropriate icon.

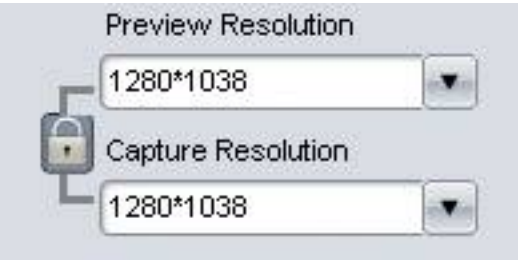
Camera Control

Run **ISCapture** with the camera connected to the computer. On the top panel of the application, the camera will be identified as "**Opticstar PX-137C**" or "**Opticstar PX-137M**". The camera will start running as soon as **ISCapture** opens.



Some of the frequently used camera controls are visible on the left hand side panel of the program. Such controls include data-width and camera speed. Selecting 16-bit data width will capture higher quality images at a slower frame rate. It will also result in larger video files. Selecting high speed will result in larger video files.

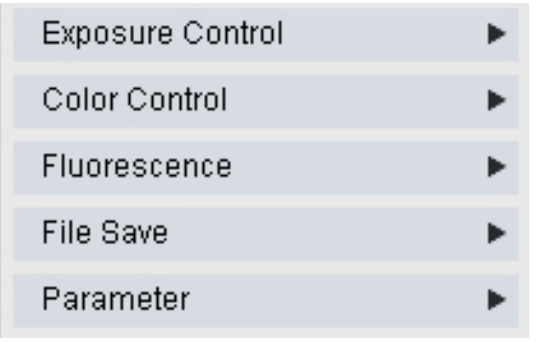
The image resolution can also be set in the **Preview Resolution** and **Capture Resolution** fields. By default they are both set at 1280 x 1038 pixels.



Selecting the **Stop** button will cause the camera to stop capturing data. The button will change to **Play**. Clicking the **Play** button will start playing video again. The **Capture** button will write the video data directly to the computer's hard disk as an AVI file.

The number of frames captured can be set in the **File Save** menu. The file name and the folder can also be specified there.

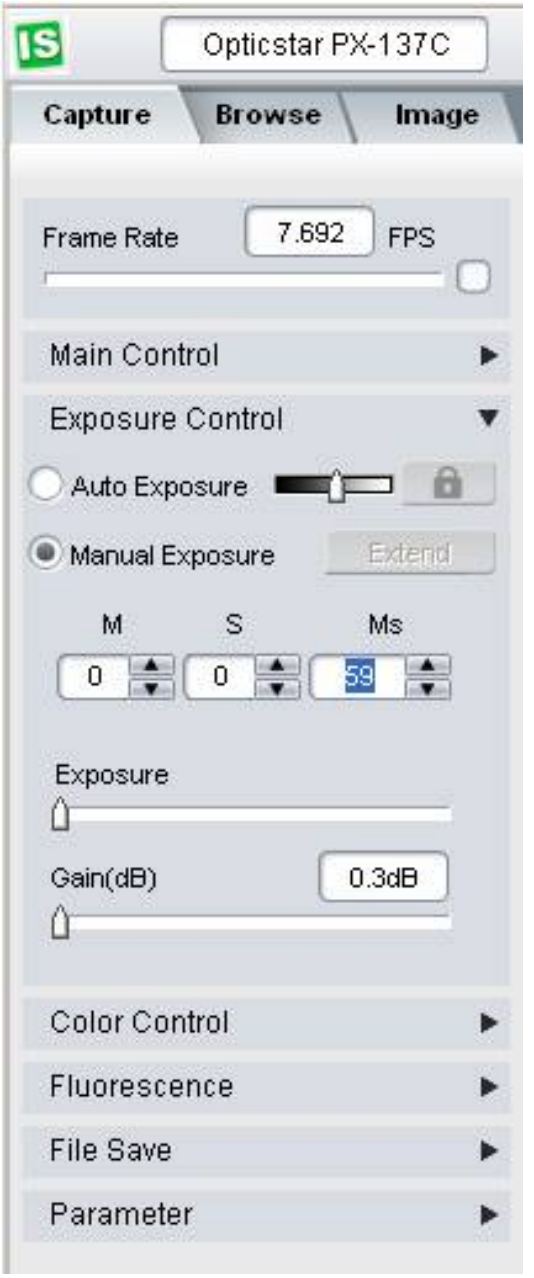
Similarly, the exposure time can be set in the **Exposure Control** menu.



When used in astronomy, the exposure time should be set manually. The time must be specified in milliseconds (ms), seconds (s) and minutes (m). The appropriate length of the exposure time depends on the brightness of the target to capture, the size of the telescope and the focal ratio of the telescope.

The **Gain** function boosts the sensitivity of the camera. It is an electronic amplifier that increases the strength of the captured image. It is possible to reduce the required exposure time by increasing the **Gain** value.

For full instructions regarding **ISCapture** please refer to the **OS_ISCapture.pdf** user manual on the CD. It is situated inside the "**\ISCapture**" folder.



Troubleshooting

If you experience difficulty in installing the camera software and drivers this may be due to a number of reasons related to your computer, operating system and other devices already connected to it. The following sections outline the most common problems and suggest ways in which you should be able to solve them. Please also refer to the documents in the **Articles** folder on the CD.

USB Requirements

Please ensure that your computer runs Windows XP/Vista/7/8 or later, has the latest updates from Microsoft and also has USB 2.0 ports. The PX-137 camera will not work with USB1.1. If your computer has USB1.1 ports you will need to obtain a PCI USB2.0 type card if you have a desktop, or an Express USB2.0 card if you have a laptop. The ExpressCard will need to be fully supported by your computer, in some entry level laptops full ExpressCard and PCI USB2.0 support in not fully implemented.

If you have a desktop try both the USB ports on the front and back of your PC if the camera is not recognised on a particular USB port. USB ports attached directly to the motherboard are more efficient. Please note that PCMCIA USB2.0 cards typically do not provide the full USB2.0 bandwidth and will not work with the PX-137 camera.

Express Card

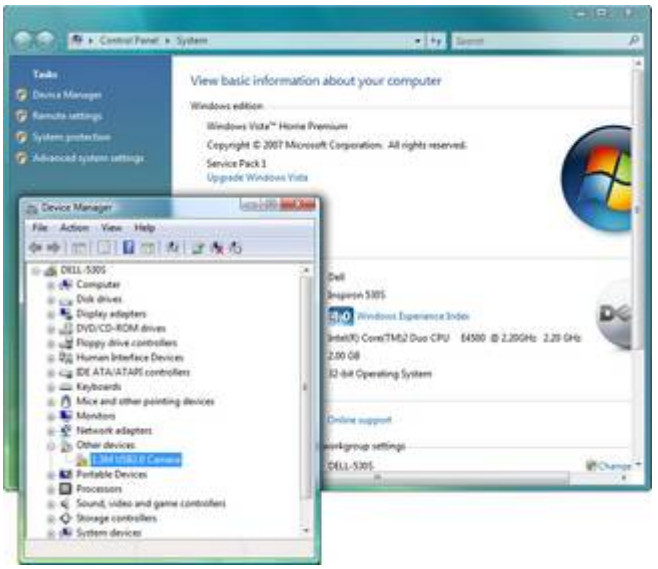
In some cases it may be possible to resolve such issues by fitting an ExpressCard (with USB2.0 ports) to your computer. ExpressCards run faster than PCMCIA/CardBus cards due to the ExpressCard's superior speed of 2.5Gbit/s (480 Mbit/s through USB 2.0) per slot, for comparison PCMCIA/CardBus devices connected to a computer would share a total 1.06 Gbit/s bandwidth. Express type cards use a 34mm slot where PCMCIA/CardBus cards use 54mm slots. An ExpressCard should be connected directly to the computer and not via a PCMCIA/CardBus card. Please note that using an ExpressCard may still not solve any data bandwidth bottlenecks that are inherent in old computers.

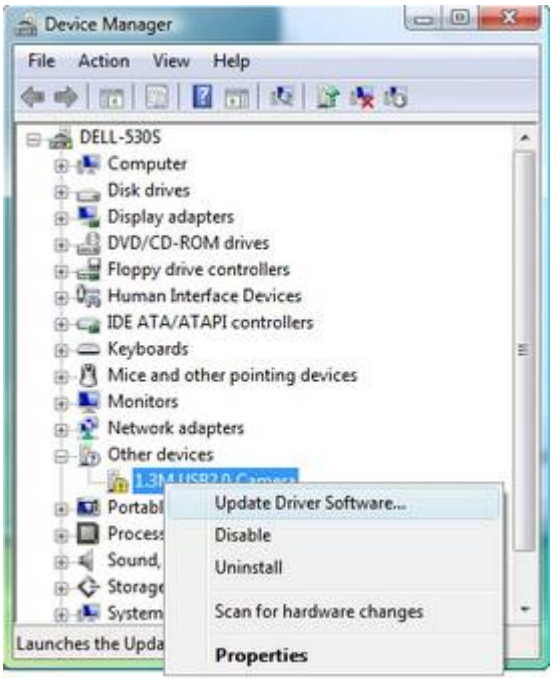
Re-Installing the Software Drivers

DirectShow support can be removed or installed independently from the camera's software drivers. Please refer to the section **Installing Software for Windows DirectShow** in this guide for details.

Re-Installing the Software Drivers

If the camera cannot be identified by Windows then it is possible that the software drivers have not been installed correctly or they have been corrupted. In such cases, it is best to uninstall the drivers. This can be done from the **Device Manager** in Windows.





Click on the **Start** button on the Windows desktop and from **Settings > Control Panel**, select **Device Manager**. The camera should appear in the list under **Imaging devices**.

1. Right-click on the **Opticstar PX-137** entry.

2. On the pop-up menu and select **Uninstall**.

3. If Windows asks to restart the computer, select **"Yes"** and continue. When the computer restarts, please re-install the software as normal.

To re-install the drivers please follow the instructions in the **Installing Software Drivers for Windows** section in this guide.

Support

For support regarding the PX-137 please email Opticstar at: **info@opticstar.com**.

Other Software

There is some freely available third party software that may be of interest to some users. Please note that Opticstar cannot guarantee the suitability the software.

- Deep Sky Stacker. (http://deepskystacker.free.fr).
- RegiStax. (http://www.astronomie.be/registax/)

These programs can be used to post-process video files captured in **EtAMCAP** and **ISCapture**. They can stack, align and enhance multiple AVI frames into a single high quality "master" image.

Microscope Attachments

In order to use the camera with a microscope one or more attachments must be used. The attachments shown from left to right are: C/CS to 23mm (x0.5), C/CS to 23mm (x1), C/CS to 30mm and C/CS to 30.5mm. These attachments are not bundled with the

Specification	Opticstar PX-137 COOLAIR
Image sensor	Sony IMX035 1/3” Exmor CMOS
Quantum Efficiency	76% @ 500nm
Sensor type	Progressive scan
Pixel size	3.63µm x 3.63µm
Max. Resolution	1280 x 1038 pixels
Speed	25fps @ 1280x1038 50fps @ 668x512
Analogue to Digital Converter	12-bit ADC, full 4096 range
Full well capacity	15000e-
Read-out noise	3e- (RMS)
Gain	In hardware
Exposure Range	1ms to 60 seconds
Exposure	Automatic or Manual
Shutter Type	Global shutter
Dynamic Range	4500:1 (Gain 1X)
Window glass	Clear, no Infra Red cut-off
Image Output	USB 2.0, 480 Mb/s
Power Supply	USB 2.0 powered
Physical interface	C/CS Mount
Mounting to telescope	C/CS to 1.25” (included)
Mounting to lens	C to T-thread (M42 x 0.75)
Mounting to microscope	C to 23mm/30mm/30.5mm
USB Cable	1.8 meter long
Weight	250g
Computer requirements	Microsoft Windows (32-bit or 64-bit) XP/Vista/7/8; USB 2.0
Bundled software	ISCapture, etAMCAP, Windows drivers

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