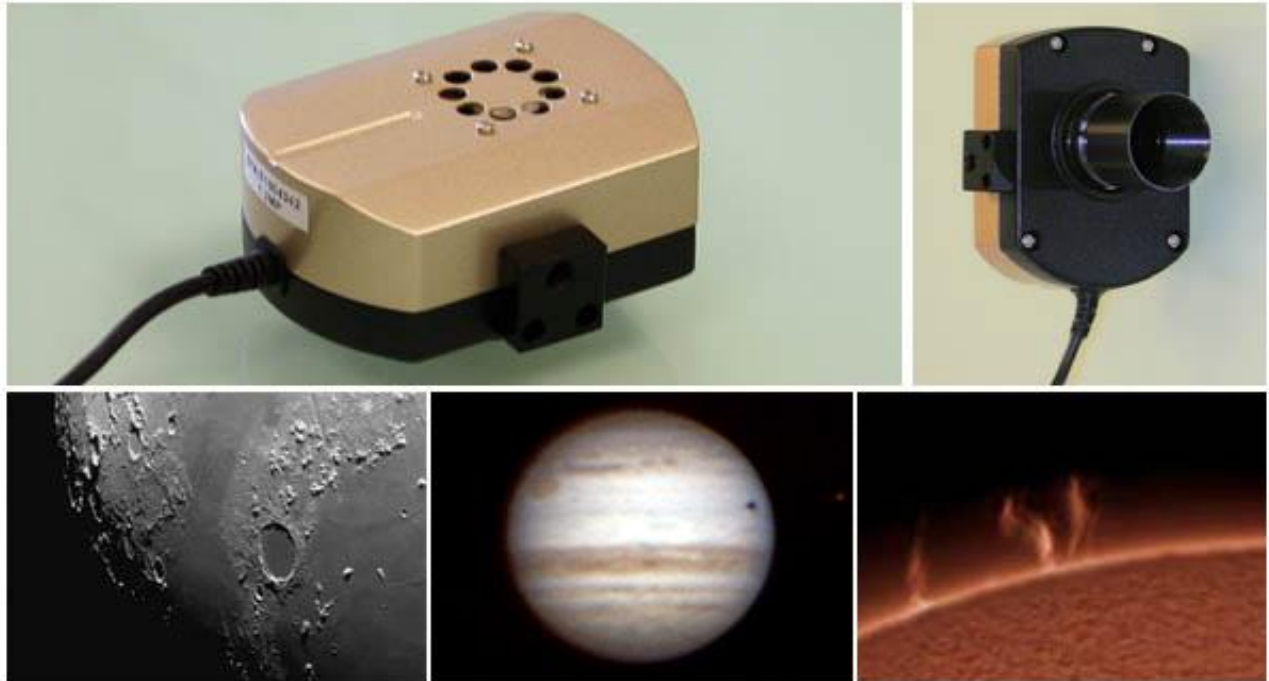


Opticstar PX-35C COOLAIR

Colour CCD Video Camera



Set-up Guide



**Microsoft Windows
(64-bit & 32-bit)
7/8/10**

OPTICSTAR

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 your 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 12 month back to base warranty. For after sales support, please contact Opticstar at: info@opticstar.com

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Introduction

The PX-35C COOLAIR is an astronomy video camera. It is well suited for imaging the planets, the Moon and the Sun. 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-35C achieves frame rates of up to 30 frames per second (FPS) at full resolution: 640x480 pixels, or at 320x240 pixels in Region of Interest (ROI) mode. The exposure time can be set automatically or manually from 1 millisecond to 4.6 minutes.

Software Support

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

Package Contents

The following items are included in the package:

- Opticstar PX-35C COOLAIR 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) 7/8/10 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-35C camera to Windows. They should be installed in the following order:

1. Windows DirectShow software for the PX-35C.
2. Windows software drivers for the PX-35C.
3. **EtAMCAP** application software for using the camera.
4. **Opticstar View** application software with more advanced functions and usability.

The first step is to install software that makes the PX-35C compatible with Microsoft's Windows DirectShow model. Such compliance allows the PX-35C 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) 7/8/10.

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-35C_DirectShow.exe**
3. A message will appear “**Welcome to the Opticstar PX-35C Camera Directshow Plug-in Setup Wizard**”. Click on the **Next** button to continue.

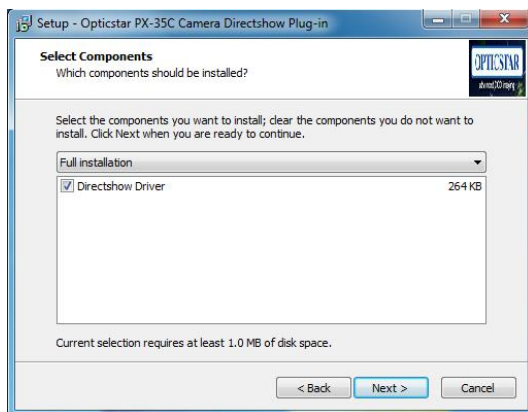


Step 3: Open the appropriate installation program.

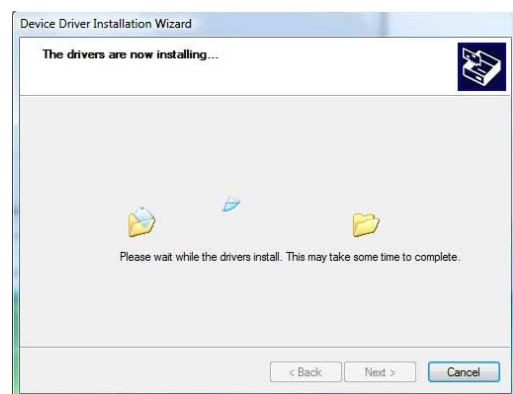


Step 4: Ignore the Windows warning.

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 next option will be to select the components to install. Simply click the **Next** button to select all the default components.



Step 5: Install all the default components.

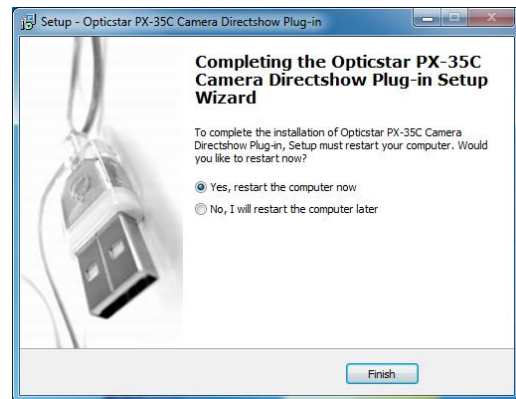


Step 6: Installation in progress.

6. The next message will confirm that “**The drivers are now installing...**”.

7. Windows will confirm that the “**Drivers were successfully installed on your computer**”. Click **Finish** to continue.

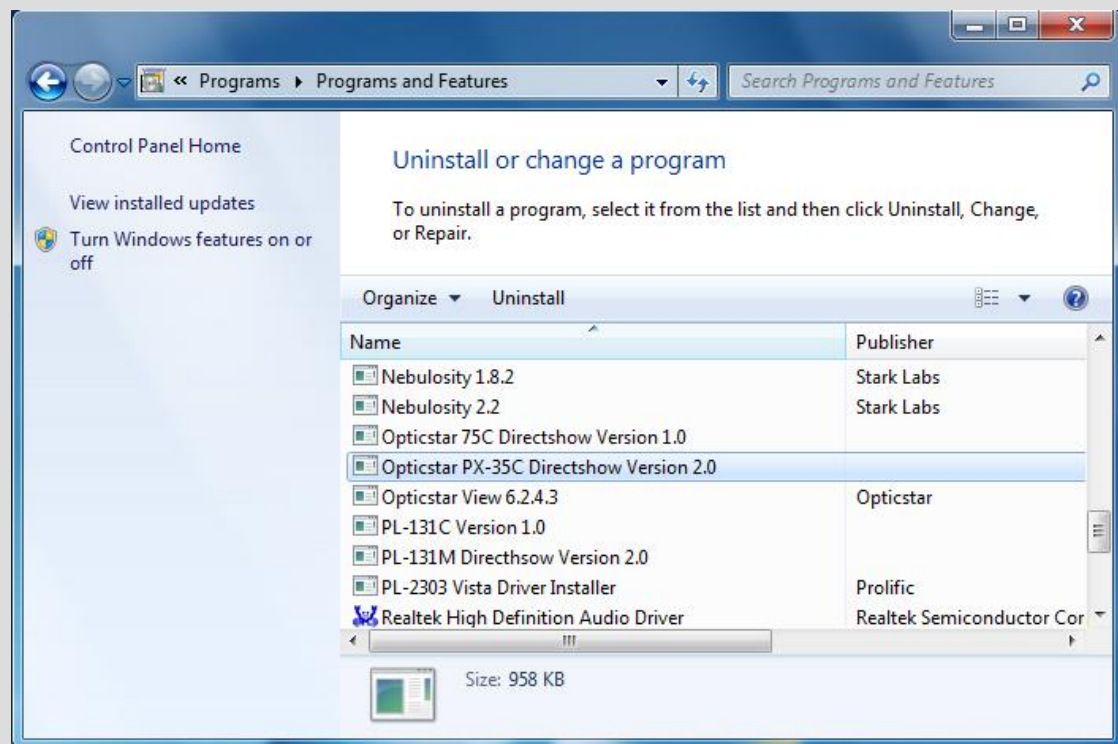
8. Finally, if Windows asks to restart the computer, select “Yes”.



Step 8: Restart the computer.



DirectShow support can be removed 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 7/8/10) and remove the entry headed “**Opticstar PX-35C DirectShow...**”.

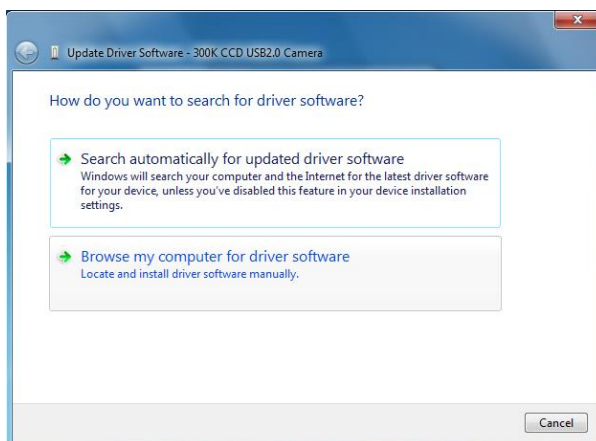


Installing Software Drivers for Windows

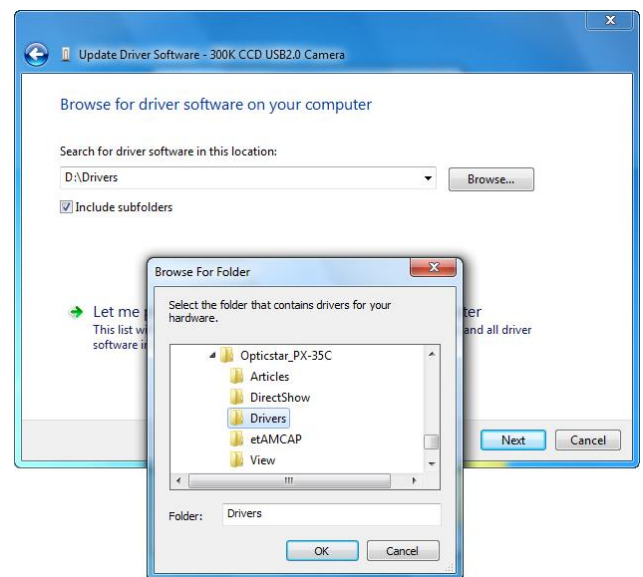


Desktop computers have USB 2.0 ports on the front and the back. Sometimes, the ports at the front are not fully USB 2.0 compliant in terms of bandwidth and power. Please use one of the ports connected directly to the motherboard if possible. Such USB 2.0 ports are typically situated at the back of the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

1. Insert the CD in the drive.
2. Connect the camera to a USB 2.0 port on your computer.
3. A window will appear with the heading **Found New Hardware**, giving two options. Select “**Browse my computer for driver software**”. In the following step direct Windows to the **Drivers** folder on the CD.

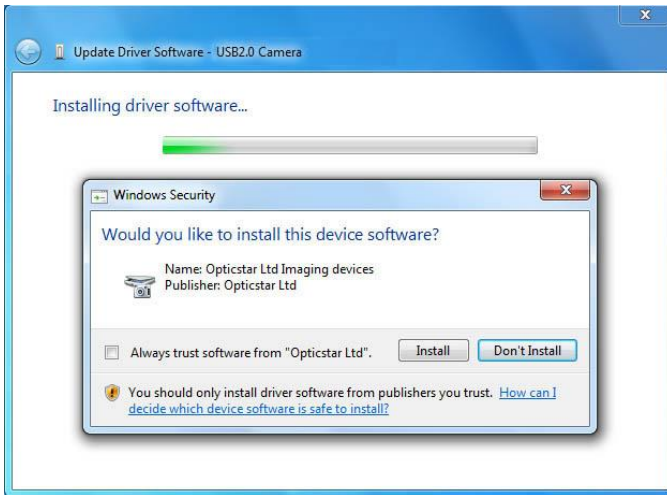


Step 3: Install driver software.

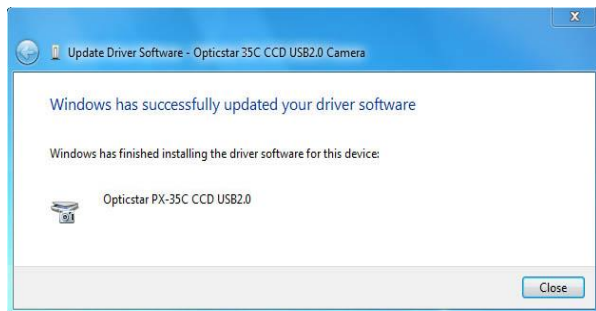


Step 3: Locating the **Drivers** folder on the CD.

4. Select the **Drivers** folder and click **OK** to proceed.
5. Windows will ask “**Would you like to install this device software?**”. Click the **Install** button to continue.
6. Windows will display “**Installing driver software...**” and will proceed with the installation.



Step 5: Install driver software.



Step 7: Install driver software

7. Windows will copy the installation files and display the following message
“Windows has successfully updated your driver software”.
8. If Windows asks to restart the computer, please do so.

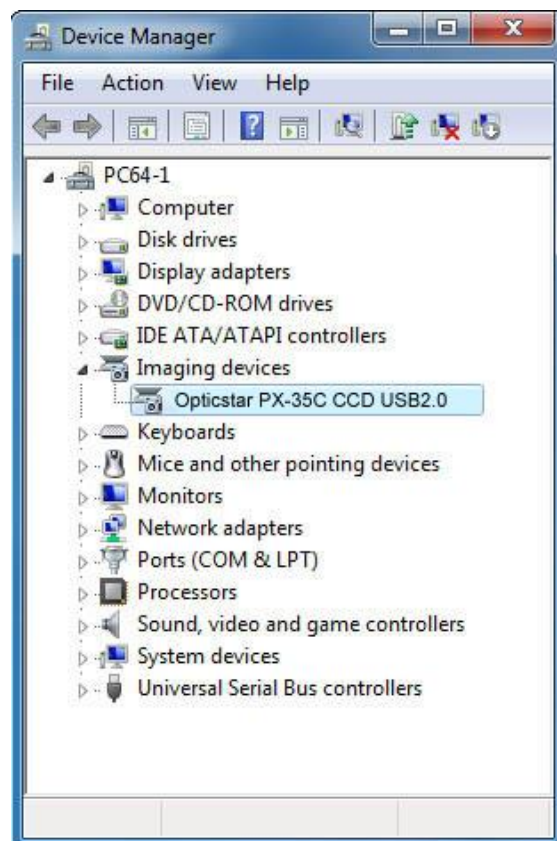
Verifying Successful Installation

The camera will now be visible in Windows Device Manager and can be identified as **“Opticstar PX-35C CCD USB2.0”**.

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.



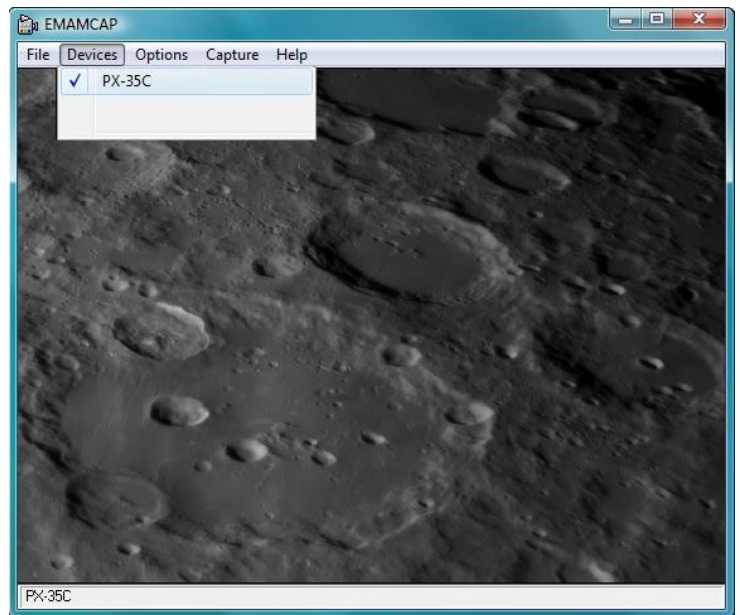
Installing etAMCAP



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 “**PX-35C**”. Select the camera from the **Devices** menu. **EtAMCAP** can be used as a general-purpose program to capture video in AVI format.



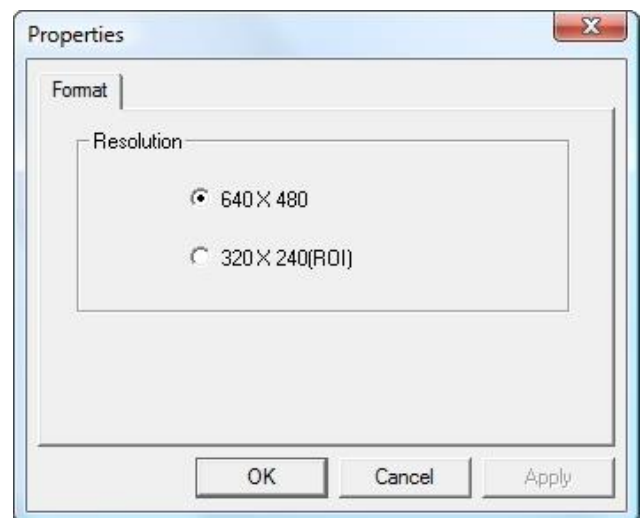
EtAMCAP can be used to capture video in AVI format. It cannot capture single frames. In order to capture single frames as well as video please use **Opticstar View**.

Image Resolution

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

- 640 x 480
- 320 x 240 (ROI).

The 320 x 240 (ROI) graphics mode retains the same definition and clarity of the 640 x 480 mode but only a region of the full image is downloaded to the computer. This way there is less data to store on the computer's hard disk.



Typically, when imaging a planet, most of the area around the planet is remains black and unused. In such cases, the region of interest (ROI) can be selected so that only the image area of the planet is downloaded on the computer.

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

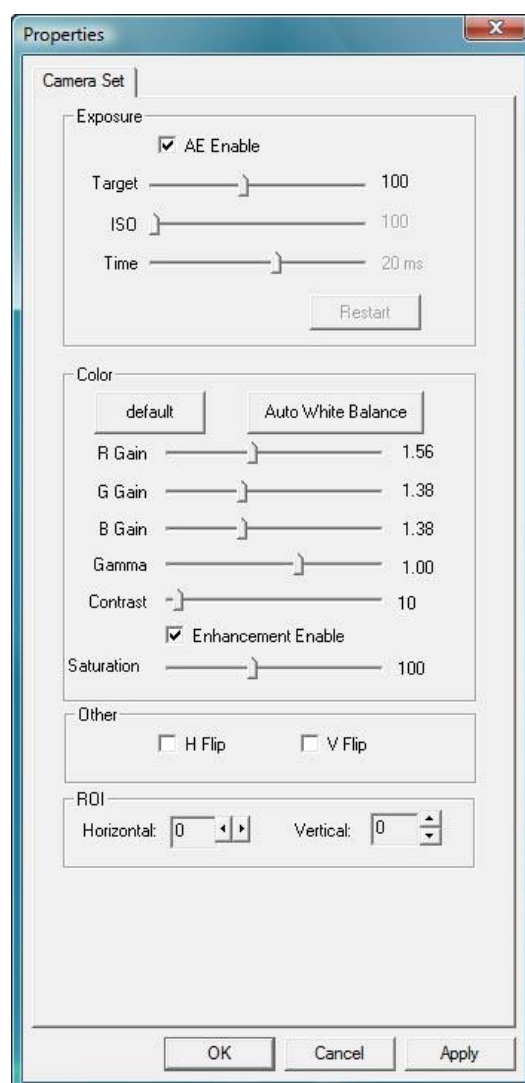
Automatic Exposure Time

AE Enable stands for Automatic Exposure. When auto-exposure is used, the user cannot specify the exposure time. Likewise, the **ISO** (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 the sensitivity gain can be set as an **ISO** value. The **ISO** (Gain) value controls the camera's onboard electronic sub system. High gain increases the light sensitivity but it also introduces some image "noise" to the image.

Resolution	Frame Rate (max)
640 x 480	30 frames per second
320 x 240 ROI	30 frames per second



Colour Settings

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

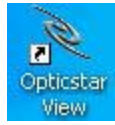
Other Settings

The orientation of the captured images can be inverted or reflected by the **H Flip** and **V Flip** options.

Region of Interest

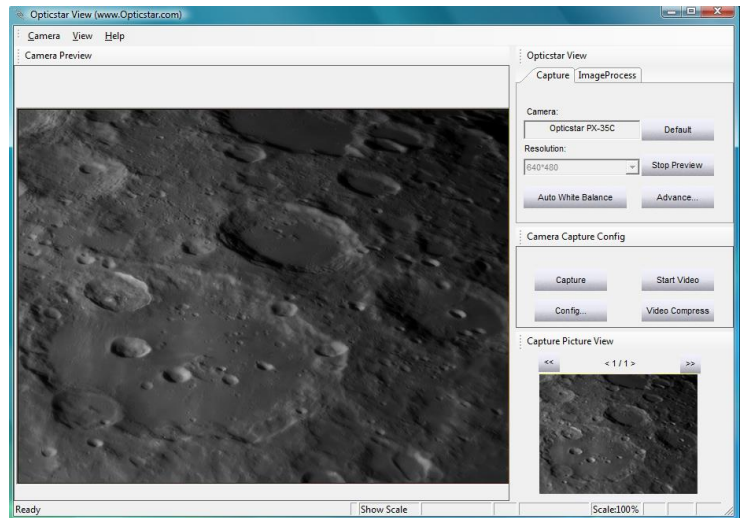
The region of interest can be positioned by using the arrow buttons in the **ROI** group of controls.

Installing Opticstar View

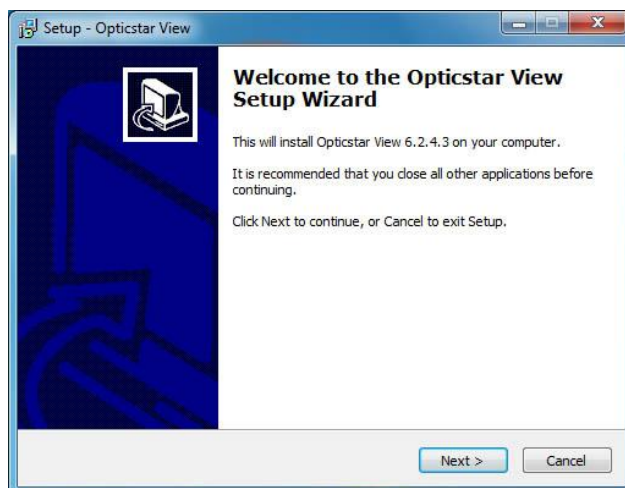


Opticstar View is a more advanced software application that can be used to control the camera, capture single frames or video, perform image processing and image measurements.

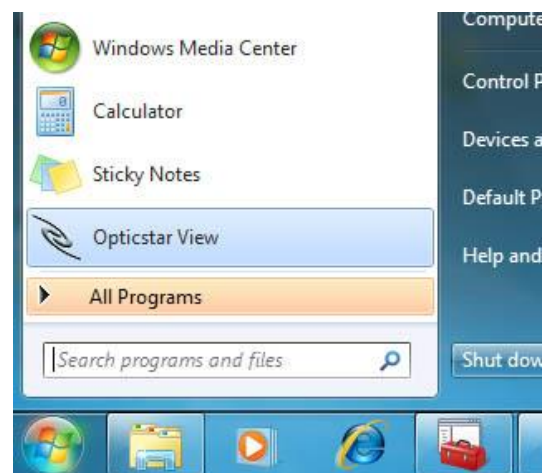
View can be used for a wide range of applications outside astronomy including microscopy.



1. To install **View**, navigate to the **View** folder on the CD and open the **View_setup.exe** file.
2. Windows will display “**Welcome to the Opticstar View Setup Wizard**”. Click the **Next** button to continue.



Installing Opticstar View.



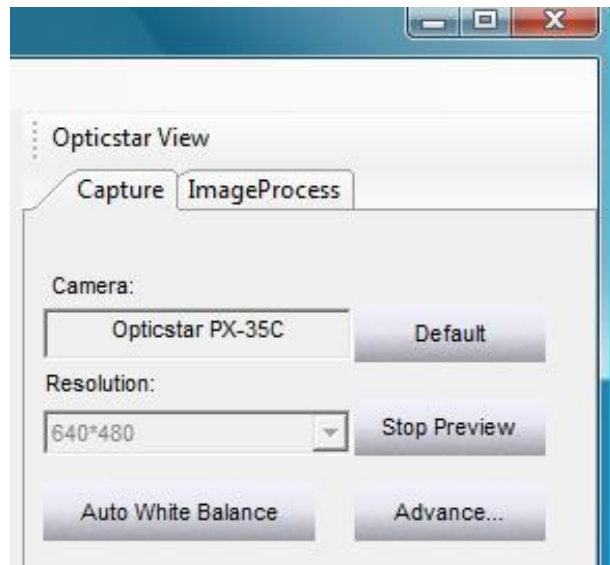
Running Opticstar View.

After the installation has finished, **View** can be run by clicking on the Windows **Start** button and selecting **Opticstar View** from the programs list.

Camera Control

Run **View** with the camera connected to the computer. On the right-hand side panel of the application, under the **Capture** tab, the camera will be identified as “**Opticstar PX-35C**”.

By default, the camera will be running as soon as **View** opens. Typically, to change the image resolution, the preview must be stopped by clicking the **Stop Preview** button. This button toggles between **Start Preview** and **Stop Preview** modes.



However, only the full image resolution is supported for the PX-35C. The region of interest mode is not possible.

The **Default** button resets the camera settings to the default values.

Frame Rate

In **View**, the maximum camera speed is 25 frames per second (fps). This speed can vary from one computer to another depending on the computer's specification.

Resolution	Frame Rate (max)
640 x 480	25 frames per second
320 x 240 ROI	Not supported

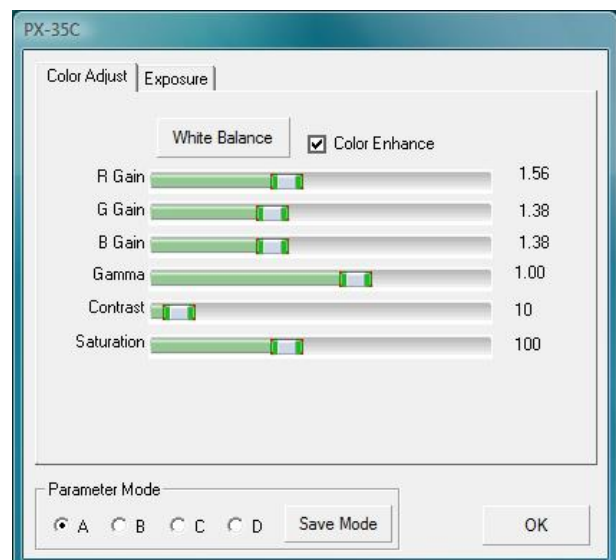
Camera Configuration

The exposure time as well all other camera parameters can be configured by clicking the **Advanced** button. This button is situated below the **Start Preview / Stop Preview** button.

A window will appear with two tabs:

- Color Adjust
- Exposure

The options under each tab are outlined in the following sections.



Colour Adjustment Tab

The first three slider bars labelled: **R Gain**, **G Gain** and **B Gain**, can be used to manually adjust the red, green and blue colour reproduction of the camera. Alternatively, the camera can automatically set these values by pressing the **White Balance** button. Automatic values may not be appropriate in certain circumstances depending on the light conditions, luminosity of the target, etc. Other values that are user selectable include **Gamma** and **Contrast**.

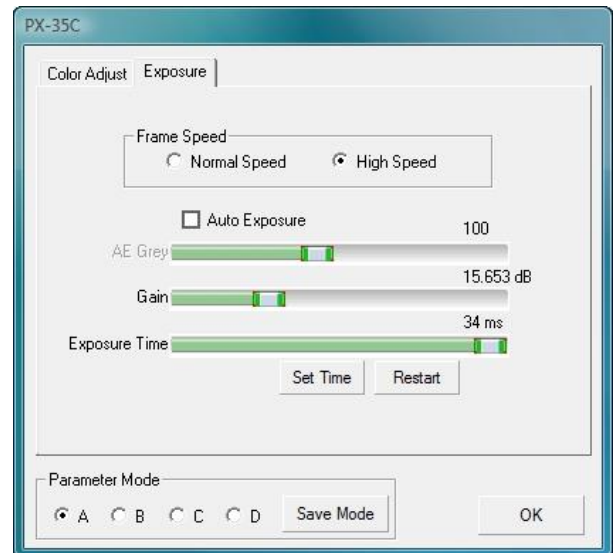
User defined settings can be stored for future use. There are four sets of parameters that can be stored for future use. They are labelled **A**, **B**, **C** and **D**. Simply select one of them and click the **Save** button.

Exposure Tab

When auto-exposure is used, the user cannot specify the **Gain** value. It is not user definable in auto-exposure mode.

The **Gain** value corresponds to the camera's on board electronic sub-system that amplifies the sensitivity of the camera.

To set the exposure time manually, simply un-tick the **Auto Exposure** option. In this mode, the time can be set in milliseconds and the **Gain** value can be set manually.



Setting the **Gain** value too highly may result in some image noise. Typically, the light sensitivity of the camera increases much faster than the image noise as the **Gain** increases.

When the camera operates in manual exposure mode, the **Set Time** button must be pressed in order to activate a new exposure time. Setting the exposure length using the **Exposure Time** sliding bar on its own is not enough.

The camera's frame speed can be set to **Normal** (better image quality) or **High** (higher frame rate).

Image Capture

There is a second group of user controls on the right-hand side panel, headed **Camera Capture Config**. The **Capture** button can be used to capture a single frame or a series of frames in **BMP** format. The location of the captured files and the number of frames can be specified by clicking the **Config** button.

By adjusting these options, it is possible to specify how many frames to capture and a time lapse between the frames. The captured frames are also displayed as thumbnails on the bottom right hand side corner.

Video can be captured in AVI format by clicking the **Start Video** button. This button toggles between **Start Video** and **Stop Video**. Once the **Start Video** button has been pressed, the camera will capture and store the data on the hard disk until **Stop Video** is clicked by the user.



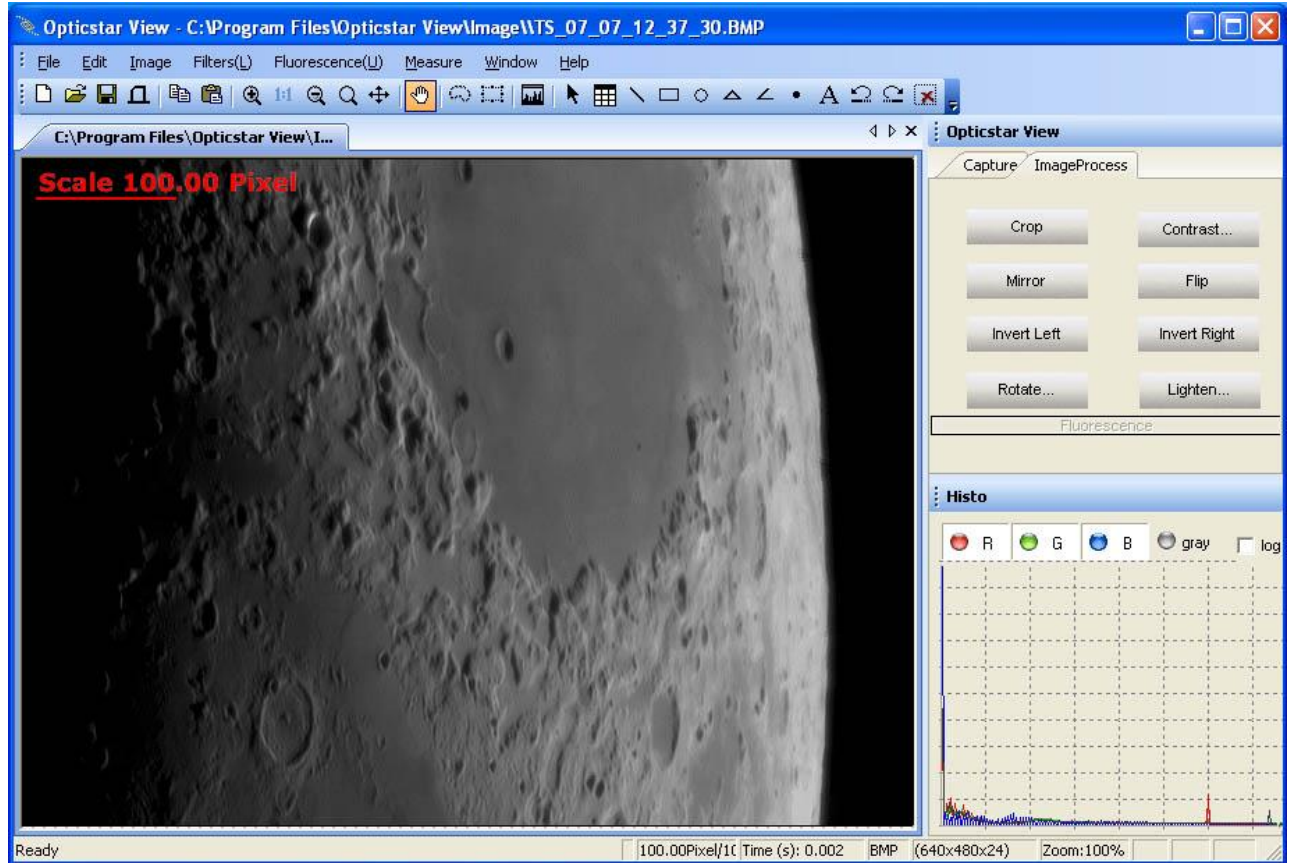
The location of the stored file(s) can be specified by clicking the **Config** button. By default, video data is stored uncompressed in order to preserve high image quality. Optionally, it is possible to compress the AVI files by clicking the **Video Compress** button.

Captured images can be processed in **View** by clicking the **Open And Edit** button underneath the captured image.

The image to be processed should be present in the folder in which the image was stored. This folder can be specified by pressing the **Config** button.

Image Processing

View can be used to perform measurements on the captured image(s). It is also possible to apply various filters and perform image processing operations.



A brief outline of View's image processing functions is listed below:

- Basic operations including Crop, Mirror, Flip, Invert, Rotate, Bright, etc.
- Copy and paste user defined regions.
- Distances can be measured between user defined points, circles, etc.
- Angles can be calculated by defining three points on the image.
- Operations can be performed on any user defined region.
- Colour operations can be performed on individual R, G, B channels.
- Data combine of two images.
- Data calibration.
- Image-zoom as a per cent of the original image.
- Linear filters to soften, sharpen, emboss, blur and Gaussian.
- Non-linear filters for median, erode, dilate, contour, edge and jitter.
- Transform filters for pinch, punch, twirl and cylinder.
- Fluorescence filters for gamma, colorize, mix and combine.

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/7/8/10 or later, has the latest updates from Microsoft (inc. Direct X) and also has USB 2.0 ports. The PX-35C 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 is 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-35C camera.

Express Card

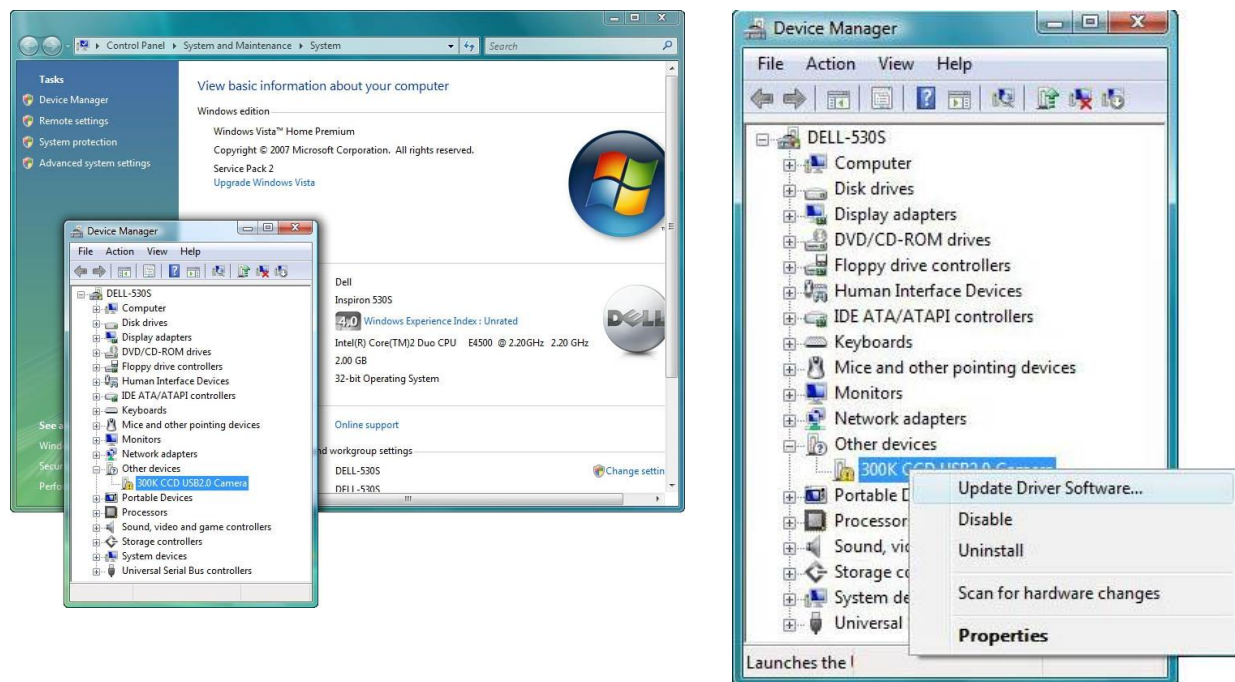
To resolve such issues an ExpressCard (with USB2.0 ports) should be used instead of a PCMCIA/CardBus card due to the ExpressCard's superior speed of 2.5Gbit/s (480 Mbit/s through USB 2.0) per slot, for comparison PCMCIA/CardBus devices connected to a computer would share a total 1.06 Gbit/s bandwidth. 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.

Re-Installing DirectShow Support

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 camera. 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-35C CCD 2.0** 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-35C 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 **View**. They can stack, align and enhance multiple AVI frames into a single high quality “master” image.

Camera Specification

Specification	PX-35C COOLAIR
Sensor Format	1/4" CCD
Sensor Model	Sony ICX098BQ
Pixel size	5.6µm x 5.6µm
Max. Resolution	640 x 480 pixels
Speed	30fps at 640x480 30fps at 320x240 (ROI)
Data Readout	RGB colour 24-bit
Gain	In hardware
Region of Interest (ROI)	320x240
Exposure time	1 millisecond to 4.6 minutes
Auto-Exposure	Automatic/Manual
Shutter type	Rolling shutter
ADC Resolution	8-bit
Window glass	Clear, no Infra Red cut-off
Image Output	USB 2.0, 480 Mb/s
Power Supply	USB 2.0
Lens Mount	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, C to 30mm, C to 30.5mm
USB Cable	1.8-meter long
Weight	250g
Operation temperature	0°C to 60°C
Computer requirements	Microsoft Windows (32-bit or 64-bit) 7/8/10 USB 2.0 / USB 3.0
Bundled software	Opticstar View, etAMCAP, Windows drivers & DirectShow

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 camera.





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