
SCD-0017 Firegrab Documentation

Release XI

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SCD-0017 Firegrab is the main Scorpion Camera Driver for Firewire, USB, WebCameras and IP-Cameras cameras.

It is included with [Scorpion Vision Installer](#) and located in the `Scorpion Runtime` folder.

- `Firegrab_x_x_x_x.dll`

The Scorpion Vision Software must be version 3 or higher.

Using Firewire 1394a and 1394b with Scorpion Vision Software

Scorpion Vision Software is compatible with Unibrain Fire-I 1394a and b drivers by using the `firegrab.dll`.

The ubCore SDK is normally recommended for Scorpion 6 and later

The ubCore 6.0 and Fire-I 4.0 SDK is included in the [Scorpion Vision Installer Camera Driver section XI](#).

The latest Unibrain drivers supports more or less all Windows Operating Systems both 32 and 64 bit versions.

Note:

- The ubCore 3.5 and later requires a driver licence from Unibrain.
- We recommend using a licensed adapter.
- With a licensed adapter the licence follows the adapter and no licence installation is required.
- The Unibrain drivers supports more or less all Windows Operating Systems both 32 and 64 bit versions.
- The driver is verified with Windows 7, Windows 8.1 and Windows 10.

The following Microsoft Stack versions are supported:

- 1.21, 2.00, 2.50
- 3.00 - recommended with Scorpion 5.0 or higher

Note: [Release notes](#) provide reference camera driver's version.

More information about [Scorpion Camera Drivers](#).

Contents:

This section provide a simple guide to install Fire-I and Imaging Devices under the Windows OS.

1.1 Fire-i Drivers Installation

In order for Scorpion Vision Software to be able to recognize 1394 digital cameras connected to your system, the Unibrain Fire-i drivers must be installed for each camera.

The Fire-I 4.0 SDK is included in the [Scorpion Vision Installer Camera Driver section XI](#) and must be installed.

This part explains how to install the Fire-i 1394 digital camera drivers in your system under the Windows operating system.

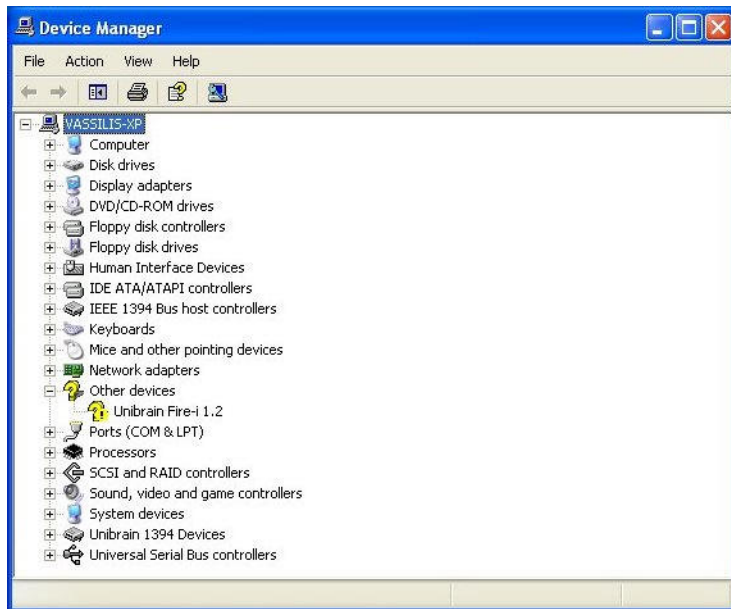
The described procedure must be repeated for each 1394 camera, regardless of manufacturer or model, that you want the Fire-i application or Scorpion Vision Software to recognize.

1.2 How to install/update Fire-i drivers for a 1394 digital camera?

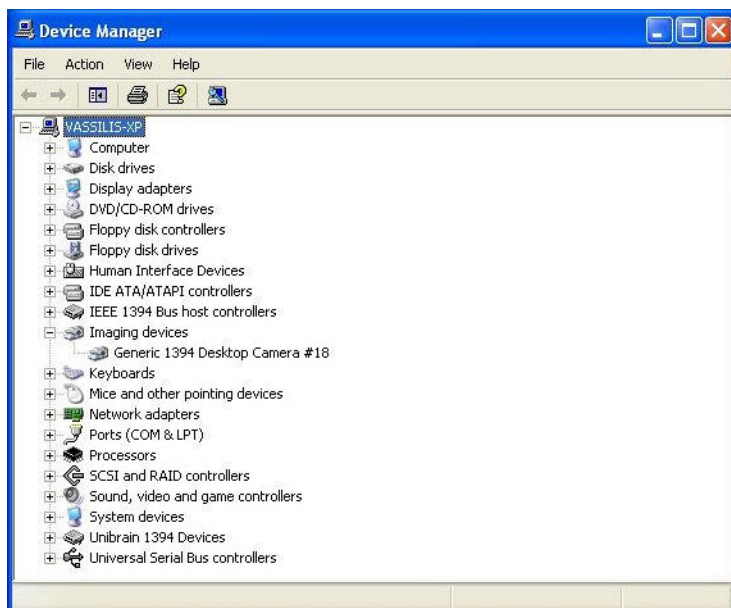
1. First connect your camera to the 1394 connector on your PC.
2. Right click on My Computer and select Properties.
3. Select the Hardware tab and click Device Manager.
4. Your camera should appear on the bus in one of the following ways:

1a. If there is no compatible driver installed, your camera will appear under other Devices:

Right Click the device to install the Fire-I driver.

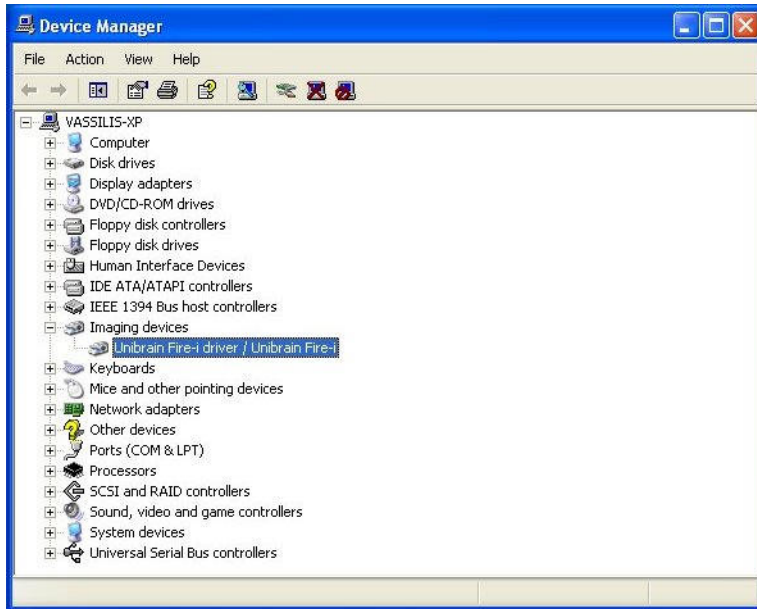


1b. If the system has already a compatible driver installed, the camera will appear under Imaging Devices:



Note: The Generic Driver is provided by Microsoft and normally not suited for machine vision applications

1c. If the system has already a (maybe older) version of the Fire-i camera driver installed for the camera, it will appear under Imaging Devices as Unibrain Fire-i driver/<Camera Model>:



In order for the camera to work properly with the Fire-i software, it must be updated to the latest version of the Unibrain Fire-i camera drivers.

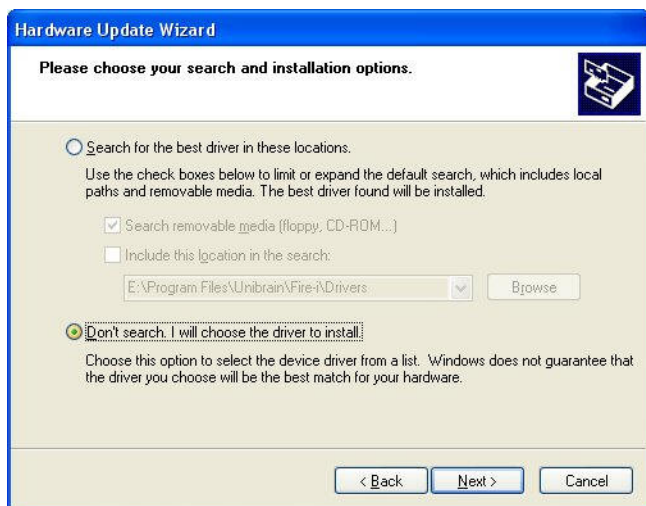
2. Right click on your device and select Properties. Choose the Driver tab and click the Update Driver button:



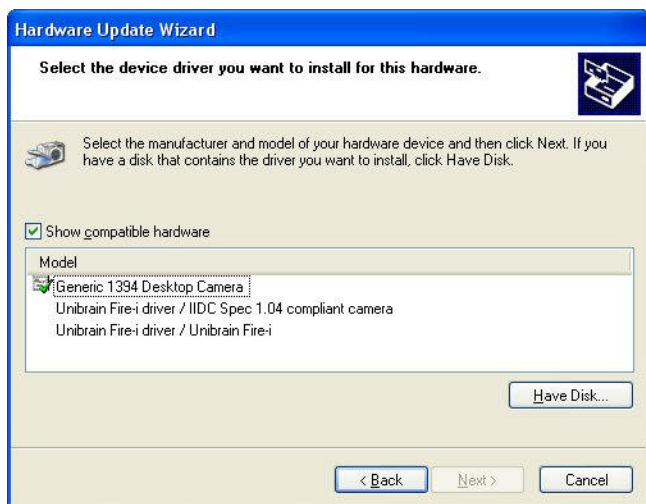
3a. Select either “Display a list of the known drivers for this device so that I can choose a specific driver” or “Install from a list or specific location” and click Next:



3b. Select “Don’t search. I will choose the driver to install” and click Next:



4. On the next dialog, click “Have disk”:



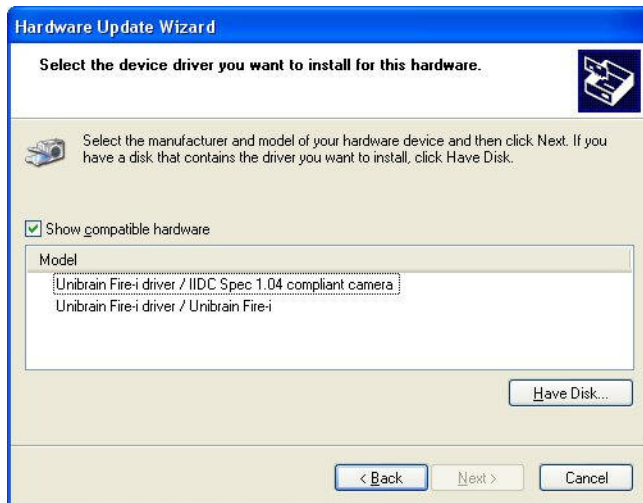
Note: The IIDC Spec 1.xx compliant driver is normally selected when no specific driver exists.

This driver is suitable for machine vision.

5. Provide the path where the Unibrain Fire-i digital camera drivers are located (e.g. “C:\Program Files\Unibrain\Fire-i\Drivers”).Click OK:



6. Choose the camera model from the driver list and click Next.



7. Click Finish in order for the Unibrain Fire-i Digital Camera drivers to be successfully installed in your system:

- The driver installation is now complete.
- A restart may be necessary.

CHAPTER 2

Fire-I Camera Properties

The Camera Property Pages dialog is displayed when the Camera Properties item is selected.

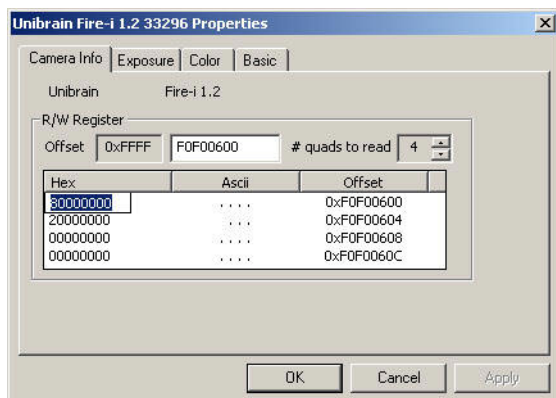
It is part of the Unibrain Fire-i Camera Driver and lets you manipulate the exposure, color and basic controls of the camera as well as read and write from arbitrary camera registers.

Camera Info

The Camera Info page lets you perform 1394 asynchronous reads and writes to an arbitrary offset in the camera 1394 address space.

- In order to perform a **read operation** you can specify the 1394 offset you want to perform a read from and the number of quadlets to read. Pressing enter will perform the operation and display the results on a list box below.
- In order to perform a **write operation** you can directly change the hex value of the respective offset, pressing the F2 button over the value. In the following example we are about to change the value of offset 0xF0F00600.

Below is a screenshot of the Camera Info page:



Exposure Properties

The Exposure Properties page lets you control the exposure features of your camera:

- **Exposure** Automatic control of the camera sensitivity.

- Also called AE. Higher exposure increases the difference between dark and bright parts of the picture.
- Exposure control is a combined effect of iris and gain controls using an internal law.
- It supersedes the manually gain and iris controls to achieve automatically an average picture level according to the cursor position.
- There is no influence on color.
- **Shutter** Manual reduction of the sensor integration time to a sub-value of the frame period.
 - Used to reduce camera sensitivity in high light conditions, to reduce picture blur for fast moving subjects, and to match camera integration time to pulsed light sources (fluo) in order to avoid flickering.
- **Gain** Manual exposure control by action on the video signal electronic amplification.
 - It cancels automatic exposure operation and works combined with iris control. Increasing exposure by gain adds noise to the picture. There is no influence on color.
- **Iris** Manual exposure control by action on the lens diaphragm.
 - It cancels automatic exposure operation and works combined with gain control. Increasing exposure by iris reduces the depth of field of the picture. There is no influence on colour.

Below is a screenshot of the Exposure Properties page:



Procedure

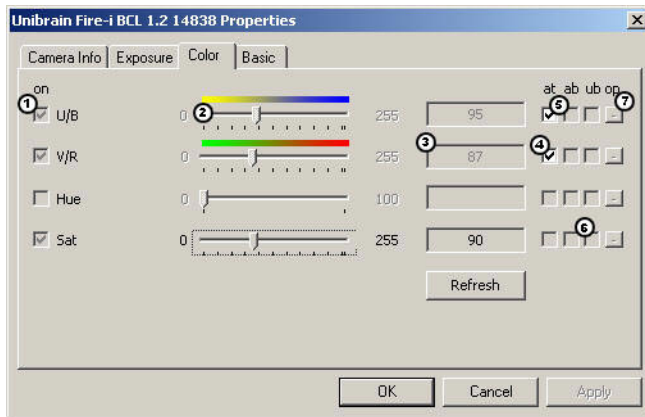
1. Use this check box in order to turn a feature on or off.
2. Use this slider in order to change the current value of a feature when it is in relative control mode.
3. Use this edit box in order to type in value when the feature is in absolute value control mode.
 - The value should be entered in the units described right next to the edit control.
 - Use a . for decimal numbers and hit enter in order for the value to be written to the camera.
 - For example the shutter value is usually in seconds so if you would like to set the shutter to 100 ms you should type 0.1 and hit enter.
 - The edit box will then write the value to the camera and it will update its description to 100 ms which is more readable by the user.
4. Use this check box to set the feature in auto or manual mode.
 - When checked the feature is on auto mode.
5. Use this check box to set the feature in absolute or relative mode.
 - When checked the feature is on absolute value control mode.
6. Use this check box to set the feature in software absolute conversion mode.
 - When checked the Fire-i software will convert the relative values read by the camera to more meaningful and user readable absolute values.
7. Use this push button in order to trigger a one push calibration of the feature.

Color Properties

The Color Properties page lets you control the color features of your camera:

- **U/B** Yellow and Blue Color adjustment.
- **V/R** Red and Green Color adjustment.
- **Hue** Manual adjustment of the global shift of the colors tints. There is no influence on white balance, saturation, or sensitivity.
- **Saturation** Manual adjustment of the color/black & white ratio. There is no influence on white balance, hue, or sensitivity.

Below is a screenshot of the Color Properties page:



Procedure

1. Use this check box in order to turn a feature on or off.
2. Use this slider in order to change the current value of a feature when it is in relative control mode.
3. Use this edit box in order to type in value when the feature is in absolute value control mode.
4. Use this check box to set the feature in auto or manual mode.
5. Use this check box to set the feature in absolute or relative mode.
6. Use this check box to set the feature in software absolute conversion mode.
7. Use this push button in order to trigger a one push calibration of the feature.

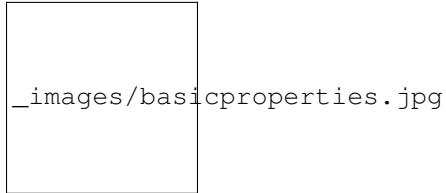
Basic Properties

The Basic Properties page lets you control the basic features of your camera:

- **Focus** Adjustment of the lens to the subject distance.
 - The distance interval where the picture is still in focus, before and after the subject is called «depth of field».
 - Depth of field is increased by closing the lens iris.
- **Zoom** Optical magnification control of the lens.
- **Brightness** Constant amount of luminance electronically added to each pixel.
 - Increasing brightness makes dark and bright parts of the picture become brighter, but luminance difference between dark and bright parts stay identical.
 - Used mostly to achieve good rendering of the dark parts of the picture: black must be as dark as possible, but they should be a visible difference between black and dark grey.

- There is no influence on color.
- **Sharpness** Control of the image sharpness.
- **Gamma** Manual adjustment of the camera internal correction law for monitor display.
 - Law is $y = x^{\gamma}$; choose $\gamma = 0.45$ for normal visual use, or adjust it according to your monitor.
 - Choice of $\gamma = 1$, also called «gamma OFF» is intended for linear camera output.
 - Gamma is used to extend the image dynamic range

Below is a screenshot of the Basic Properties page:



Procedure

1. Use this check box in order to turn a feature on or off.
2. Use this slider in order to change the current value of a feature when it is in relative control mode.
3. Use this edit box in order to type in value when the feature is in absolute value control mode. The value should be entered in the units described right next to the edit control. Use a . for decimal numbers and hit enter in order for the value to be written to the camera. For example the shutter value is usually in seconds so if you would like to set the shutter to 100 ms you should type 0.1 and hit enter. The edit box will then write the value to the camera and it will update its description to 100 ms which is more readable by the user.
4. Use this check box to set the feature in auto or manual mode. When checked the feature is on auto mode.
5. Use this check box to set the feature in absolute or relative mode. When checked the feature is on absolute value control mode.
6. Use this check box to set the feature in software absolute conversion mode.
7. Use this push button in order to trigger a one push calibration of the feature.

CHAPTER 3

Raw Color Mode

Many recent camera models feature RAW color coding. Scorpion Vision Software supports these models.

A camera sensor can only deliver one piece of information per pixel. This is perfect for a monochrome camera, where every pixel reacts to all the wavelengths of the spectrum at the same time and outputs a unique result being . the total luminous information (called “luminance” or Y).

For color imaging, 3 pieces of information per pixel are needed. Depending of the use of the picture, it can be (YUV), (RGB) or other triplets.

- YUV is often preferred when the picture is intended to human vision,
- where RGB fits better computer vision and scientific use, but anyway a triplet is needed.

Cameras equipped with a single sensor chip can only see color if a matrix of colored filters is added in front of the sensor’s pixels. The most used matrix for industrial cameras is called “RGB Bayer array”.

The sensor itself can still deliver only one piece of information per pixel, Red, Green or Blue, but 3 are needed in order to display it in full color. A computation must therefore take place, using the information of the adjacent pixels (which are filtered in different colors, to simulate the 2 missing pieces of information per pixel.

This computation creates of course additional data:

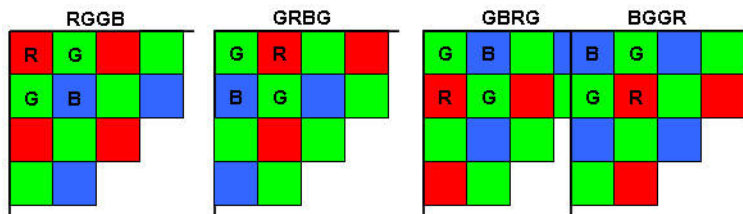
- that are not related fully to the reality, because the information of adjacent pixels is used.
- that will depend on the computation algorithm used, and none is perfect.

that will increase the total amount of data to transfer, although no more information is coming from the sensor compared to a monochrome camera.

By default, a RAW color mode camera will appear as a monochrome.

It will display a black and white image showing a “grid” effect. This is the result of the modulation of the light level introduced by the Bayer color filter. A portion of such an image is shown here.

Please note that a correct display of the colors may only be achieved knowing the geometrical offset of the Bayer filter above the first pixel of the sensor. The corresponding option for conversion must be selected accordingly (RGGB, GRBG, GBRG, BGGR).



CHAPTER 4

Examples

Example 1: Start Continuous grabbing:

```
cam = GetCamera('0')  
cam.SetProperty('continuous', 1)
```

Example 2: Stop Continuous grabbing:

```
cam = GetCamera('0')  
cam.setProperty('continuous', 0)
```


CHAPTER 5

Release notes

Documentation release notes - click version # to manually download Scorpion Camera Driver.

- [3.0.0.50](#) - 11oct2018: Windows 8.1 and Windows 10 compability - DirectX 7.0
- fixed logaritmic14 lut crash
- improved framerate setting for cameras using unibrain driver
- [3.0.0.49](#) - 09oct2018: Windows 8.1 and Windows 10 compability - DirectX 7.0
 - fixed video format persistence on Windows 8.1 and Windows 10
 - supports MEDIASUBTYPE_Y160 - 16 bit mono format
 - fixed initial camera lock on opening camera
 - observed on hw triggered cameras
 - related to timeout=0 in inifile
 - fixed General - Capabilities - console report
 - console messages was overwritten
- [3.0.0.47](#) - 23jun2014: DirectX 7.0
- added support for RAW16 format
- added selectable Bayer decoding method
- added 10-16 bit LUT
- min Scorpion Vision Software version: 7.x.x.x
- [3.0.0.46](#) - 21may2014: DirectX 7.0
- added support for RAW8 format (equals Y800)
- min Scorpion Vision Software version: 7.x.x.x
- [3.0.0.45](#) - 27jun2012: DirectX 7.0
- improved hwtrigger support

- for cameras with unibrain driver, Windows x32 and x64
- added writeonly property 'hwtrigger'
- fixed config reload in camera open
- min Scorpion Vision Software version: 7.x.x.x
- 3.0.0.44 - 27jun2012: DirectX 7.0
- improved driver initialization
- some GigE cameras caused application lock
- min Scorpion Vision Software version: 7.x.x.x
- 3.0.0.43 - 07jun2012: DirectX 7.0
- added configurable timeout on camera opening (configurable in inifile)
- suited for IP camera drivers
- min Scorpion Vision Software version: 7.x.x.x
- 3.0.0.42 - 18nov2011: DirectX 7.0
- added R/W access to property flags
- ex. Brightness.flags
- 3.0.0.41 - 26may2011: DirectX 7.0
- prepared for Serialno licensing of cameras