

# FireWire cameras

## Adjusting the parameters

We are used to adjusting analog cameras with DIP switches and volumes. This is anachronistic from the point of view of the modern digital image processing. In the following text, we offer some general advice on how to adjust the parameters of FireWire cameras. Please find further information in the white paper [Camera parameters - Maximizing the image quality](#).

Please note:

- It is the responsibility of an on-site engineer to correctly integrate FireWire cameras in the context of real applications.

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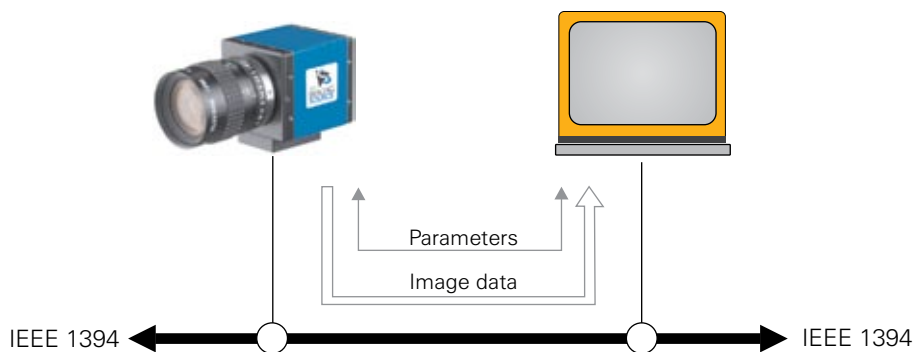
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All weights and dimensions are approximate.

## The protocol DCAM / IIDC

FireWire camera are controlled by computers via the FireWire bus. In the case of digital image processing, two types of computers dominate:

- (1) Computers with a standard operating system as Windows, Linux, Mac OS, etc
- (2) Proprietary image processing systems of various manufacturers.



The communication between the computer and the FireWire cameras is based on protocols. The majority of FireWire cameras uses the standard protocol DCAM. It was specified by the working group IIDC of the 1394 Trade Association and is being constantly refined. IIDC stands for "Instrumentation & Industrial Digital Camera".

DCAM defines the structure of image data stream as well as the camera's parametrization (for instance brightness, shutter, white balance, etc.). In this context, we have two typical tasks - namely:

- how the camera "tells us" **which** parameters it is equipped with (for instance not every camera offers automatic gain control) and
- how the parameters provided are **adjusted**.

### Please note:

- Not all FireWire cameras are DCAM cameras
- DCAM (or any equivalent protocol) is not available for USB cameras. Therefore, they only provide proprietary protocols.

## Accessing DCAM cameras

There are two modes for application software to access DCAM cameras. The advocates of the "classic method" write their own DCAM driver (see the figure's right part). In this way the application "talks" - figuratively speaking - DCAM.

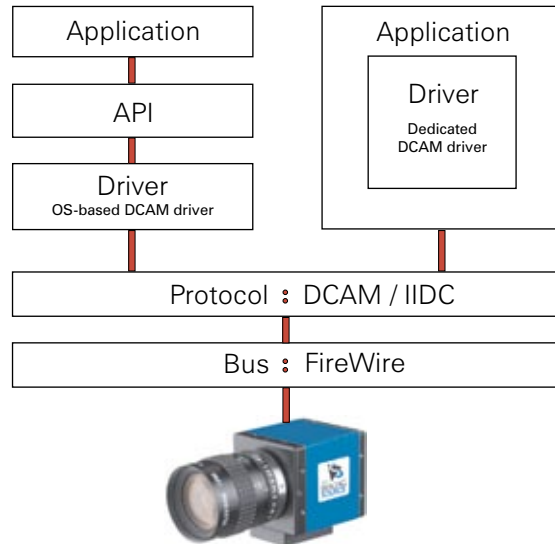
The advocates of the "operating system method" develop hardware independent application software. Such software is only allowed to access an API of the operating systems, and this API in turn is allowed to access the driver.

The Imaging Source follows the "operating system method"; offering these Windows® components for this purpose:

**Application:** IC Capture

**API:** IC Imaging Control / DirectX®

**Driver:** WDM Stream Class driver "talking" DCAM.



## Applications for Windows®

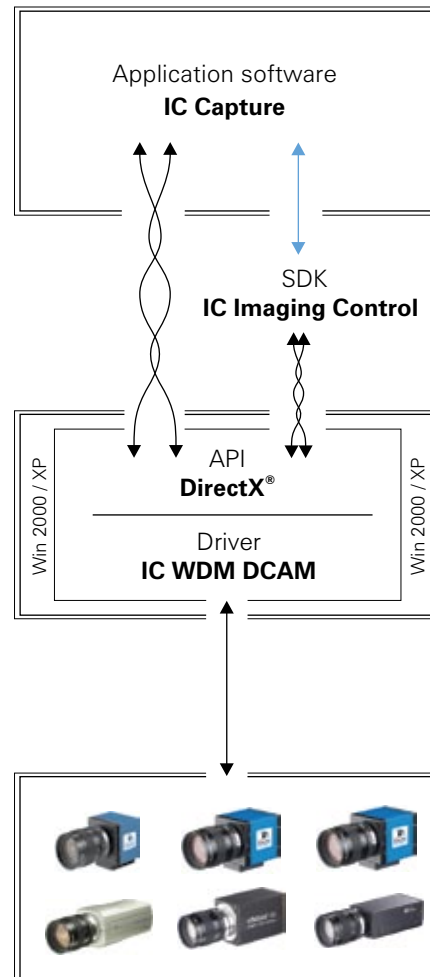
Users do not like to agonize over protocols or drivers. They want to adjust their FireWire camera's parameters with a simple application software viewing the results in live mode. The Imaging Source offers the software **IC Capture** for this purpose.

Please find details as well as a trial version at [www.1394imaging.com/en/products/software/windows\\_apps/iccapture/overview/](http://www.1394imaging.com/en/products/software/windows_apps/iccapture/overview/).

## SDKs for Windows®

Programmers access operating system APIs to write hardware independent software (please see [Accessing DCAM cameras](#)). Windows® provides the API DirectX® for image data streams. The Imaging Source offer the SDK **IC Imaging Control** to simplify the access to DirectX®. This SDK offer programming tools as .NET component, ActiveX and C++ Class Library.

Please find details as well as a trial version at [www.1394imaging.com/en/products/software/windows\\_sdks/icimagingcontrol/overview/](http://www.1394imaging.com/en/products/software/windows_sdks/icimagingcontrol/overview/).



## DCAM drivers for Windows®

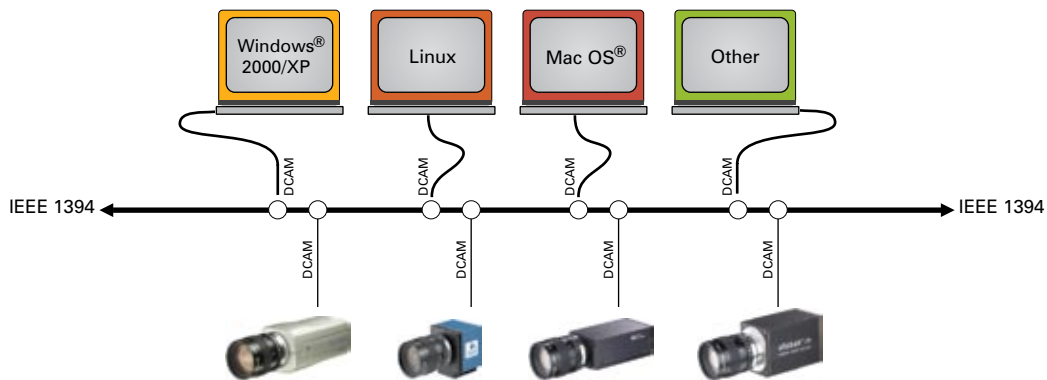
Obviously a computer has to "talk" DCAM to communicate with DCAM cameras. Thus, its operating system needs a DCAM driver.

Such a driver comes with Windows® 2000 and XP. However, it support only few camera parameters. Therefore, The Imaging Source offers the driver **IC WDM DCAM** for Windows® 2000 and XP that supports all basic camera parameters. Following Microsofts® specification, it is a WDM Stream Class driver.

Please find details as well as a trial version at [www.1394imaging.com/en/products/software/windows\\_drivers/icwdmdcamtis/overview/](http://www.1394imaging.com/en/products/software/windows_drivers/icwdmdcamtis/overview/).

## How are Linux, Mac OS and other systems supported?

DCAM cameras do not "prefer" a special operating system. Although the previous pages focussed on Windows also other systems support DCAM:



For **Linux** there are various Open Source projects:

- [sourceforge.net/projects/unicap](http://sourceforge.net/projects/unicap)
- [sourceforge.net/projects/libdc1394](http://sourceforge.net/projects/libdc1394)
- [sourceforge.net/projects/coriander](http://sourceforge.net/projects/coriander)

**Apple**, as a FireWire pionier, obviously supports DCAM:

- [www.ioexperts.com/products/industrial.html](http://www.ioexperts.com/products/industrial.html)

Probably the best-known "DCAM advocat" in the **Embedded Systems** world is National Instruments CVS-145x. The Imaging Source FireWire cameras have been tested by National Instruments and were found to be compatible (Vers. 1.52 or higher).

