THORLABS   P32.20

CDD and CMOS Cameras

DCU223x, DCU224x
DCC1240x
DCC1545M, DCC1645C
DCC3240X

Quick Start

2013

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Contents

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We aim to develop and produce the best solution for your application in the field of optical measurement technique. To help us to live up to your expectations and improve our products permanently we need your ideas and suggestions. Therefore, please let us know about possible criticism or ideas. We and our international partners are looking forward to hearing from you.

Thorlabs GmbH

2 Installation and Connection

2.1 System Requirements

For operating the DCx cameras, the following system requirements must be met:

	Minimum[*1]	Recommended
CPU speed	600 MHz	2 x 2.4 GHz
Memory (RAM)	256 MB	2048 MByte
USB host controller	USB 2.0 high speed (480 Mbps) USB 3.0 (4000 Mbps) for DC3240x cameras	USB 2.0 high speed (480 Mbps) USB 3.0 (4000 Mbps) for DC3240x cameras Intel® or NVIDIA® nForce mainboard chipset
Graphics card	Onboard graphics chip	AGP/PCIe graphics card Latest version of Microsoft DirectX Runtime 9.0c
Operating system	Windows 7 32 or 64 bit Windows XP 32 bit (Service Pack 2) Linux (Kernel 2.6)	Windows 7 32 or 64 bit Windows Vista 32 or 64 bit (Service Pack 1)[*3] Windows XP 32 bit (Service Pack 3) Linux (Kernel 2.6)

[*1] With the minimum system requirements the camera performance may be limited.

[*3] DCC3240x USB 3.0 cameras are not supported under Windows Vista.

USB interface

- Onboard USB 2.0 ports usually provide significantly better performance than PCI and PCMCIA USB adapters.
- Current generation CPUs with energy saving technologies can cause bandwidth problems on the USB bus. See section

    6.1.1 PCs with energy saving CPU technology in the "**DCx Camera Operation Manual and SDK**" document for hints and possible solutions.

Large multi camera systems

Connecting a large number of cameras to a single PC may require a large working memory (RAM). This is especially the case when many cameras with high sensor resolution are used.

If you want to set up such a system we recommend to use PCs with 64 bit operating systems and more than 4 GB of RAM.

Note

For DCx color cameras, the color conversion is done by software in the PC. When you use a color camera with a high frame rate, the conversion might lead to a high CPU load. Depending on the PC hardware used you might not be able to reach the camera's maximum frame rate.

Direct3D graphics functions

The uc480 driver can use Direct3D to display the camera image with overlay information (Microsoft DirectX Runtime had to be installed). On Windows systems, you can use the supplied "DXDiag" diagnostic tool to check whether your graphics card supports Direct3D functions. To start the diagnostic tool, click "Run..." on the Windows start menu (shortcut: Windows+R) and enter "DXDiag" in the input box.

On the "Display" page of the diagnostic tool, click the button for testing the Direct3D functions.

OpenGL graphics functions

For OpenGL version 1.4 or higher must be installed. The OpenGL graphics functions do not work with QT under Linux.

Software Requirements under Linux

For operating the DCx camera under Linux the following components must be installed:

Component	Version
Linux-Kernel	2.6.9 up to 2.6.24
The standard C library `libc/glibc`	2.0 or higher
GNU Compiler Collection `gcc`	3.4 or higher
POSIX Thread Library (POSIX Threads Enabled `libc`)	-
`bash` or `sh` shell (for running the installation script)	-
Qt (for compiling the demo program)	-

2.2 DCx Driver Compatibility

Attention

Support of older DCC1545M cameras by driver versions 3.10 and higher

From driver version 3.10 onwards, only USB board revision 2.0 or higher are supported. To operate a camera with an earlier USB board revision, you will need the *uc480* driver version 2.40. Please contact Thorlabs [10]

The LED on the back of the camera housing also indicates the USB board version . In addition, the *uc480 Camera Manager* version 3.10 or higher provides information about the compatibility. An incompatible camera will be displayed as *free* and *not available*.

2.3   Installing the uc480 Software under Windows

Attention

1. You need administrator privileges to install the software.

2. Please install the software prior to connect a DCx Cameras!

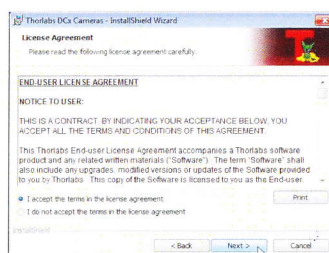The software for DCx Cameras is delivered on a CD. Alternatively, or if the CD is lost, the software can be downloaded from Thorlabs' website. Please insert the delivered with the DCx Cameras CD to the drive of your PC and start the software installation:

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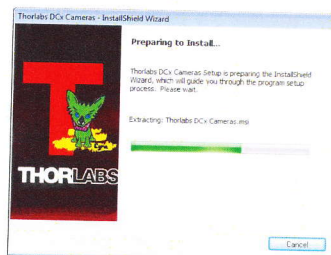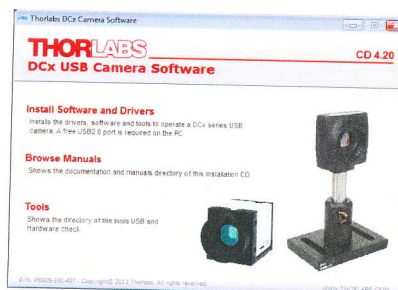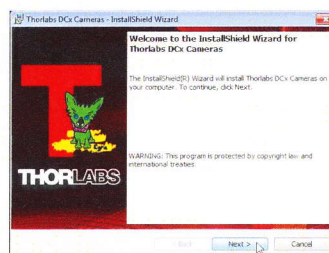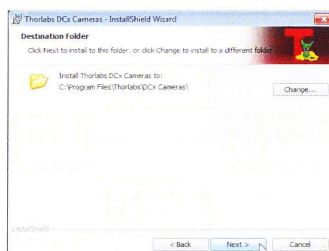
Click 'Next >' to continue.

Click 'I accept...' if you do so, then 'Next >' to continue.

Click 'Next >' to continue.
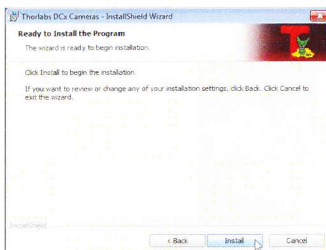
Click 'Install' to start the software installation.
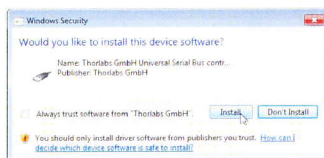
Click 'Install' to allow the installation of the USB driver software.
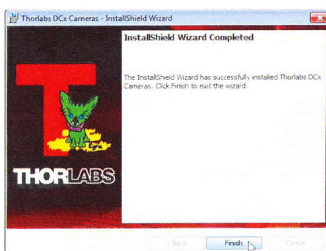
Click 'Finish'. The uc480 camera software is now installed and ready for use. For detailed description of the installed uc480 software components please see section **3.4 Installed uc480 programs** of the **DCx Camera Operation Manual and SDK.**

2.4 Installing the uc480 Software under Linux

The installation of the uc480 software on Linux systems is described in the `Readme.txt` file contained in the uc480 driver download (tab "Drivers") for Linux.

2.5 Connecting a DCx Camera

Please install the software first as described in the <u>Installing the uc480 software</u> 6 section. Connect the DCx camera to the PC, using the USB cable. The camera will be recognized automatically and the necessary driver software is being installed:

When the camera has been correctly installed, the LED on the back of the camera lights up green.

Note

The first time you connect a USB DCx camera to a USB port under Windows, two driver files will be registered. The first file (uc480 boot) contains the generic driver, the second file the model-specific driver.

The model will be immediately recognized whenever you connect the camera to this port again. If you use a different port, the registration will be repeated. Under Windows the camera will show up in the uc480 Camera Manager's camera list.
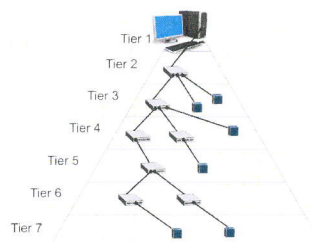
The DCx Cameras can be connected to a USB port either directly or via hubs and repeaters. A wide range of different hubs and repeaters are available commercially. The USB 2.0 hubs being used must be "full powered" hubs that are able to provide 500 mA per USB port. "Low Powered" hubs, in comparison, only supply 100 mA per port, which is not sufficient for DCx Cameras.

Note

To use maximum bandwidth, we recommend connecting the cameras directly to the USB ports on the mainboard. Many USB ports on PCI/PCIe cards and the USB ports on the front of the PC often supply lower bandwidth.

Attention

USB cables with non-standard connectors must be connected to the camera first and then to the PC. Otherwise the camera might not be recognized correctly.

3   Appendix

3.1   Thorlabs Worldwide Contacts

USA, Canada, and South America
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Email: chinasales@thorlabs.com

3.2 Certifications and Compliances

Compliance with the directives is demonstrated by meeting the following standards:

Product type	EMC immunity	EMC emission	UL certification
DCC1240x*1	EN 61000-6-2:2005	EN 61000-6-3:2001 + A11:2004	UL 60950-1, 2nd Edition, 2011-12-19 CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12
DCU223x *1 DCU224x *1	EN 61000-6-2:2001	EN 61000-6-4:2001	UL 60950-1, 2nd Edition, 2011-12-19 CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12
DCC1545M *1 DCC1645C *1	EN 61000-6-2:2005	EN 61000-6-3:2001 + A11:2004	UL 60950-1, 2nd Edition, 2011-12-19 CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12
DC3240x *1	EN 61000-6-2:2005	EN 61000-6-3:2007	UL 60950-1, 2nd Edition, 2011-12-19 CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12

*1 This equipment has been tested and found to comply with part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Modifications not expressly approved by the manufacturer could void the user's authority to operated the equipment under FCC rules.

3.3 Thorlabs 'End of Life' Policy (WEEE)

As required by the WEEE (Waste Electrical and Electronic Equipment Directive) of the European Community and the corresponding national laws, Thorlabs offers all end users in the EC the possibility to return "end of life" units without incurring disposal charges.

This offer is valid for Thorlabs electrical and electronic equipment

- sold after August 13th 2005
- marked correspondingly with the crossed out "wheelie bin" logo (see Figure 58)
- sold to a company or institute within the EC
- currently owned by a company or institute within the EC
- still complete, not disassembled and not contaminated

As the WEEE directive applies to self contained operational electrical and electronic products, this "end of life" take back service does not refer to other Thorlabs products, such as

- pure OEM products, that means assemblies to be built into a unit by the user (e. g. OEM laser driver cards)
- components
- mechanics and optics
- left over parts of units disassembled by the user (PCB's, housings etc.).

Waste treatment on your own responsibility

If you do not return an "end of life" unit to Thorlabs, you must hand it to a company specialized in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site.

WEEE Number (Germany) : DE97581288

Ecological background

It is well known that waste treatment pollutes the environment by releasing toxic products during decomposition. The aim of the European RoHS Directive is to reduce the content of toxic substances in electronic products in the future.

The intent of the WEEE Directive is to enforce the recycling of WEEE. A controlled recycling of end-of-life products will thereby avoid negative impacts on the environment.

Crossed out
"Wheelie Bin" symbol

3.4 Warranty

Thorlabs warrants material and production of the DCx Cameras for a period of 24 months starting with the date of shipment. During this warranty period *Thorlabs* will see to defaults by repair or by exchange if these are entitled to warranty.

For warranty repairs or service the unit must be sent back to *Thorlabs*. The customer will carry the shipping costs to *Thorlabs*, in case of warranty repairs *Thorlabs* will carry the shipping costs back to the customer.

If no warranty repair is applicable the customer also has to carry the costs for back shipment.

In case of shipment from outside EU duties, taxes etc. which should arise have to be carried by the customer.

Thorlabs warrants the hard- and software determined by *Thorlabs* for this unit to operate fault-free provided that they are handled according to our requirements. However, *Thorlabs* does not warrant a fault free and uninterrupted operation of the unit, of the software or firmware for special applications nor this instruction manual to be error free. *Thorlabs* is not liable for consequential damages.

Restriction of warranty

The warranty mentioned before does not cover errors and defects being the result of improper treatment, software or interface not supplied by us, modification, misuse or operation outside the defined ambient stated by us or unauthorized maintenance.

Further claims will not be consented to and will not be acknowledged. *Thorlabs* does explicitly not warrant the usability or the economical use for certain cases of application.

Thorlabs reserves the right to change this instruction manual or the technical data of the described unit at any time.

3.5 Exclusion of Liability and Copyright

Thorlabs GmbH has taken every possible care in preparing this Operation Manual. We however assume no liability for the content, completeness or quality of the information contained therein. The content of this manual is regularly updated and adapted to reflect the current status of the software. We furthermore do not guarantee that this product will function without errors, even if the stated specifications are adhered to.

Under no circumstances can we guarantee that a particular objective can be achieved with the purchase of this product.

Insofar as permitted under statutory regulations, we assume no liability for direct damage, indirect damage or damages suffered by third parties resulting from the purchase of this product. In no event shall any liability exceed the purchase price of the product.

Please note that the content of this User Manual is neither part of any previous or existing agreement, promise, representation or legal relationship, nor an alteration or amendment thereof. All obligations of *Thorlabs GmbH* result from the respective contract of sale, which also includes the complete and exclusively applicable warranty regulations. These contractual warranty regulations are neither extended nor limited by the information contained in this User Manual. Should you require further information on this product, or encounter specific problems that are not discussed in sufficient detail in the User Manual, please contact your local *Thorlabs* dealer or system installer.

Status: 2013