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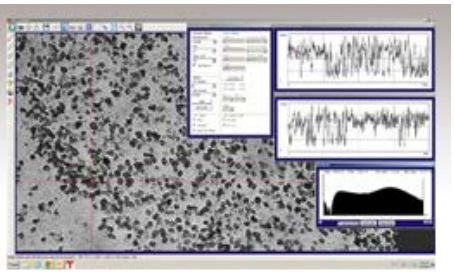
THORLABS

DCC3240C - Oct. 8, 2020

Item # DCC3240C was discontinued on Oct. 8, 2020. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

CMOS CAMERAS: USB 2.0 AND USB 3.0

- **Color, Monochrome, or NIR Sensors**
- **Versions with Global Shutter and Trigger Available**
- **1.3 Megapixel Sensors**
- **USB 2.0 or USB 3.0 for Fast Data Acquisition**



GUI and Software Package Included

DCC1240C
USB 2.0 with Trigger Input

DCC3240M
High-Sensitivity USB 3.0 with Trigger

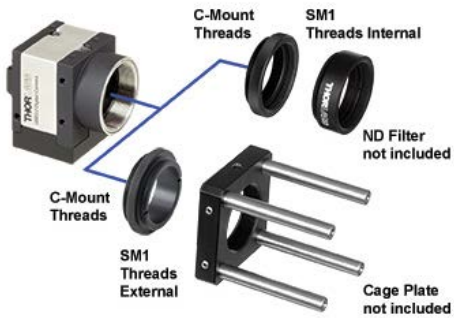
OVERVIEW

Features

- Easy to Use in a Wide Range of Applications from Microscopy to Monitoring
- 1.3 Megapixel (1280 x 1024 Pixels) Monochrome, Color, and NIR CMOS Sensors
- Available with Global Shutter and External Trigger
- ThorCam™ Software for Windows® 7 and 10 Operating Systems
- SDK and Programming Interfaces Provide Support for:
  - C, C++, C#, and Visual Basic .NET APIs
  - LabVIEW, MATLAB, and µManager Third-Party Software

These compact, lightweight CMOS cameras are available with either a monochrome (M models), color (C models), or NIR (N model) sensor. They can be used in a wide range of applications from microscopy to monitoring. Our CMOS cameras offer a full-frame resolution of 1280 x 1024 pixels. All camera series are controlled and powered via a standard 5 V USB 2.0 or 3.0 port.

SM1 Thread Compatibility



Compatibility of the C-Mount CMOS Cameras with Thorlabs' SM1 internal or external threadings. Our CS-Mount Cameras feature the same compatibility.

The DCC1240 and DCC3240 high-sensitivity CMOS cameras include CMOS sensors that allow for switching between rolling and global shutter mode, offer a considerably higher dynamic range, and include an input for an external trigger. A brief comparison of the features available in each model is presented in the table below. For a detailed list of specifications, see the *Specs* tab.

For quantitative applications requiring low noise, high quantum efficiency cameras, consider our Quantalux® sCMOS and Kiralux™ CMOS Cameras.

USB and Trigger Cables
For the DCC1240 cameras, optional CAB-DCU-T1 and CAB-DCU-T2 USB and trigger cables allow one to use the additional trigger input and output ports (T1

and T2) of these cameras together with the USB 2.0 connection. The exposure and readout/transfer events of the camera can be initiated via the input trigger, and external events like strobe lights can be triggered by the camera using the output trigger. The CAB-DCU-T3 GPIO cable can be used with the USB 3.0 cameras as an additional means of connecting and triggering peripheral devices. The trigger configuration (i.e., the source of the input trigger and the timing for the output trigger) can be set via the provided software or the LabVIEW drivers.

Software
Each camera also comes with ThorCam, our Windows-compatible GUI software package. Standard drivers like Direct Show (WDM) and .NET are provided and offer support for LabVIEW. An extensive SDK is available. The C/C++ drivers can additionally be imported to Matlab using MEX files.

Item #	DCC1240M	DCC1240C	DCC3240M	DCC3240C	DCC3240N
Resolution	1.3 Megapixels (1280 x 1024)				
Sensor	Monochrome	Color	Monochrome	Color	NIR
Exposure Mode	Global and Rolling Shutter				
Interface and Included Cable	USB 2.0		USB 3.0		
Input/Output Trigger	Yes		Yes		

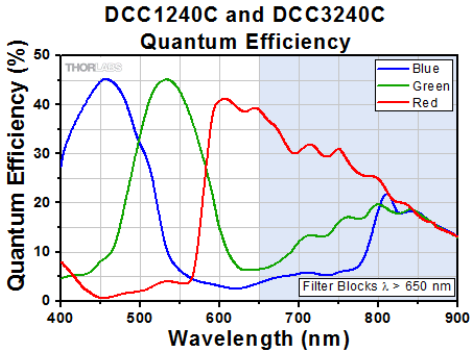
SPECS

Item #[a]	DCC1240M	DCC1240C	DCC3240M	DCC3240N	DCC3240C
Sensor Type	Monochrome	Color	Monochrome	NIR Monochrome	Color
Effective Number of Pixels (Horizontal x Vertical)	1280 x 1024				
Imaging Area (Horizontal x Vertical)	6.78 mm x 5.43 mm		6.78 mm x 5.43 mm		
Pixel Size	5.3 µm, Square		5.3 µm, Square		
Optical Format	1/1.8"		1/1.8"		
Max Frame Rate	25.8 fps (Freerun Mode) 24.7 fps (Trigger Mode)		60.0 fps (Freerun Mode) 56.9 fps (Trigger Mode)		
ADC[a] Resolution	8 Bits		10 Bits (8 Bits if Connected to USB 2.0)		
Sensor Shutter Type	Global and Rolling Shutter		Global and Rolling Shutter		
Peak Quantum Efficiency[b]	62%	45%	62%	65%	45%
Read Noise	<30 e^- RMS		<30 e^- RMS		
Exposure Time	0.009 ms[c] - 2 s[d]		0.009 ms[c] - 2 s[d]		
Pixel Clock Speed	7 - 35 MHz		5 - 85 MHz		
Vertical and Horizontal Hardware Binning	Horizontal, Vertical		Horizontal, Vertical		
Region of Interest (ROI)	4 x 16 Pixels to 1024 x 1280 Pixels, Rectangular		4 x 16 Pixels to 1024 x 1280 Pixels, Rectangular		
Lens Mount	C-Mount		C-Mount		
Mounting Features	8-32 Tap, 5 mm Deep[e] M4 Tap, 5 mm Deep[e]		1/4"-20 Tap, 6 mm Deep[e] 8-32 (M4) Tap, 6.5 mm Deep w/ Included Adapters		
Removable Optic	Uncoated Glass (D263)	IR Filter D263 w/ HQ Coating	Uncoated Glass (D263)	Uncoated Glass (D263)	IR Filter D263 w/ HQ Coating
Interface	USB 2.0		USB 3.0[f]		
Power Consumption	0.3 - 0.7 W		1.3 W[g]		
Ambient Operating Temperature	23 to 122 °F (-5 to 50 °C)				
Storage Temperature	-4 to 140 °F (-20 to 60 °C)				

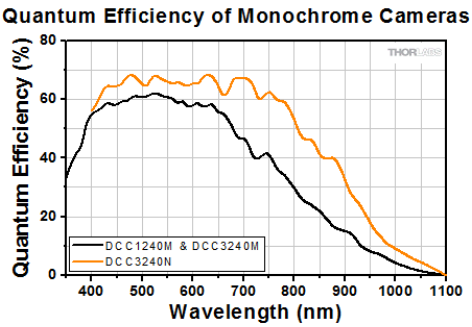
- ADC = Analog-to-Digital Converter
- Please see the *Graphs* tab for more information.
- Requires maximum pixel clock frequency.
- Requires minimum pixel clock frequency.
- Be careful not to thread a screw longer than the depth of the tap into the camera housing, as this could lead to damage.
- A USB 2.0 connection can be used, but will significantly decrease the frame rate and will be limited to 8-bit depth operation.
- The power consumption depends on the sensor model and the pixel clock setting.

GRAPHS

Graphs of the camera response as a function of wavelength are presented here as a comparison between the different camera lines available on this page. Individual sensitivity curves are provided in the tables below.



Click to Enlarge
The shaded blue region above 650 nm represents wavelengths blocked by a built-in IR shortpass filter.



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SHIPPING LIST

Components Included with CMOS Cameras				
Item #	**Cable**	**Lens Mounting Adapters**	**Post Mounting Adapters**	**Other Accessories**
DCC1240M	USB 2.0	C-Mount to External SM1 C-Mount to Internal SM1	-	Software CD with ManualQuick Start Guide
DCC1240C				
DCC3240M	USB 3.0	-	8-32 and M4 Thread Adapters	
DCC3240C				
DCC3240N				

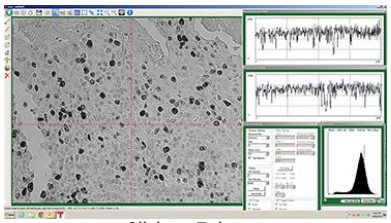
SOFTWARE

ThorCam™

Software

Version 3.5.1

Click the button below to visit the ThorCam software page.



Click to Enlarge
ThorCam Graphical User Interface (GUI)

Software

ThorCam is a powerful image acquisition software package that is designed for use with our cameras on 32- and 64-bit Windows® 7 or 10 systems. This intuitive, easy-to-use graphical interface provides camera control as well as the ability to acquire and play back images. Single image capture and image sequences are supported. Application programming interfaces (APIs) and a software development kit (SDK) are included for the development of custom applications by OEMs and developers. The SDK provides easy integration with a wide variety of programming languages, such as C, C++, C#, and Visual Basic .NET. Support for third-party software packages, such as LabVIEW, MATLAB, and µManager* is available.

*µManager control of Zelux and 1.3 MP Kiralux cameras is not currently supported. When controlling the Kiralux Polarization-Sensitive Camera using µManager, only intensity images can be taken; the ThorCam software is required to produce images with polarization information.

High-Sensitivity CMOS USB 2.0 Cameras with Global Shutter

Click to Enlarge
Back of Camera with Input for External Trigger

- Color and Monochrome Versions Available
- Global and Rolling Shutter Mode
- USB 2.0 Port Provides Power and Computer Interface
- 25.8 fps in Freerun Mode and up to 98 fps with Limited Area of Interest
- Trigger Input
- Ships with USB 2.0 Cable

Item #	DCC1240M	DCC1240C
CMOS Sensor Type	Monochrome	Color
Sensitivity Graph		
Exposure Mode	Global and Rolling Shutter	
Read Out Mode	Progressive Scan	
Resolution	1280 x 1024 Pixels	
Optical Sensor Format	1/1.8"	
Pixel Clock Range[a]	7 - 35 MHz	
Frame Rate, Freerun Mode[b]	25.8 fps	
Trigger Input	9-Pin, D-Sub Connector	
Lens Mounting Thread	C-Mount (1.00"-32)[c]	
Post Mounting Threads	8-32 and M4 Taps, 5 mm Deep[d]	
Dimensions (H x W x D)	40.4 mm x 32.0 mm x 41.5 mm (1.59" x 1.26" x 1.63")	
Weight	0.16 lbs (74 g)	
Included Adapters	C-Mount to External SM1 and C-Mount to Internal SM1	

The DCC1240M monochrome and DCC1240C color high-sensitivity USB 2.0 CMOS cameras include CMOS sensors that allow for switching between rolling and global shutter mode, offer a high dynamic range and include an input for an external trigger. The cameras are controlled and powered via a USB 2.0 connection. These cameras can achieve frame rates up to 98 fps (reduced ROI).

Each camera is shipped with C-mount to internal SM1 and C-mount to external SM1 adapters (also sold separately below). Taps in the bottom of the camera allow for post mounting with 8-32 or M4 screws.

Our color CMOS cameras have an IR shortpass filter that cuts off transmission above 650 nm. Removing the filter will expose the CMOS sensor to the environment, which could result in dust entering the camera and causing the performance to deteriorate. For those who are very familiar with cameras and sensors, it is possible to change the filter yourself in a cleanroom environment. If you are not comfortable performing this procedure, please send the camera to Thorlabs where our skilled technicians have the tools to safely remove the filter without damaging the camera. Contact technical support for assistance.

- Depends on the PC hardware used.
- Requires maximum pixel clock frequency.
- Please note that CS-Mount and C-Mount lens mounts both use 1.00"-32 threads but feature different flange-to-sensor distances.
- Be careful not to thread a screw longer than the depth of the tap into the camera housing, as this could lead to damage.

These cameras are fully compatible with our C-Mount Camera Lenses and High-Magnification Zoom Lenses that are sold separately. Our standard lenses include fixed focal lengths from 3.5 mm to 75 mm with maximum apertures of up to f/0.95, as well as an 18 - 108 mm focal length, f/2.5 zoom lens. Our high-magnification zoom lenses are a modular system that features magnifications from 0.07 to 28.

The DCC1240M and DCC1240C CMOS Cameras will be retired and replaced by our new Zelux™ Compact Scientific Cameras when stock is depleted.

If you require a DCC camera for line production, please contact our OEM Team.

Part Number	Description	Price	Availability
DCC1240M	**Customer Inspired! High-Sensitivity USB 2.0 CMOS Camera, 1280 x 1024, Global Shutter, Monochrome Sensor**	**$1,267.56**	**Today**
DCC1240C	**High-Sensitivity USB 2.0 CMOS Camera, 1280 x 1024, Global Shutter, Color Sensor**	**$1,267.56**	**Today**

High-Sensitivity USB 3.0 CMOS Cameras with Global Shutter

Click to Enlarge

- Color, Monochrome, and NIR Versions Available
- Global and Rolling Shutter Modes
- USB 3.0 and GPIO Ports
- 60 fps in Freerun Mode and Capable

Item #	DCC3240M	DCC3240C	DCC3240N
CMOS Sensor Type	Monochrome	Color	NIR Monochrome
Sensitivity Graph			
Exposure Mode	Global and Rolling Shutter		

of 229 fps with Limited Area of Interest
- Trigger Input
- Ships with USB 3.0 Cable

The DCC3240M monochrome, DCC3240C color, and DCC3240N NIR cameras have a USB 3.0 connection for improved performance. Compared to the DCC1240, the DCC3240 cameras are capable of faster frame rates (25.8 fps vs. 60.0 fps in Free Run Mode) and lower trigger delays (as low as 3 µs vs 20 µs). Each camera is powered via the USB port and also has two GPIOs (General Purpose I/O) that allow the camera to serve as a trigger for peripheral devices. Faster than the DCC1240 cameras, they can achieve a maximum frame rate of 229 fps (limited ROI).

The front apertures of these cameras feature an internal C-mount thread. The bottom of the housing has a 6 mm deep 1/4"-20 tap, so adapters are included for easy post mounting using either the 8-32 or M4 standard. These cameras can also be connected to SM1-Threaded Lens Tubes using the adapters sold at the bottom of this page.

Read Out Mode	Progressive Scan
Resolution	1280 x 1024 Pixels
Optical Sensor Format	1/1.8"
Pixel Clock Range[a]	5 - 85 MHz
Frame Rate, Freerun Mode[b]	60.0 fps
Trigger Input	8-Pin, Hirose Connector
Lens Mounting Thread	C-Mount (1.00"-32)[c]
Post Mounting Thread	1/4"-20 Tap, 6 mm Deep[d]
Dimensions w/ Adapter Plate (H x W x D)	35.0 mm x 29.0 mm x 46.4 mm (1.38" x 1.14" x 1.83")
Weight	60 g (0.13 lbs) w/ Adapter Plate 43 g (0.09 lbs) w/o Adapter Plate
Included Adapters	1/4"-20 to 8-32 and 1/4"-20 to M4

- Depends on the PC hardware used.
- Requires maximum pixel clock frequency.
- Please note that CS-Mount and C-Mount lens mounts both use 1.00"-32 threads but feature different flange-to-sensor distances.
- Be careful not to thread a screw longer than the depth of the tap into the camera housing, as this could lead to damage.

Our color CMOS cameras have an IR shortpass filter that cuts off transmission above 650 nm. Removing the filter will expose the CMOS sensor to the environment, which could result in dust entering the camera and causing the performance to deteriorate. For those who are very familiar with cameras and sensors, it is possible to change the filter yourself in a cleanroom environment. If you are not comfortable performing this procedure, please send the camera to Thorlabs where our skilled technicians have the tools to safely remove the filter without damaging the camera. Contact technical support for assistance.

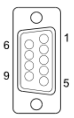
These cameras are fully compatible with our C-Mount Camera Lenses and High-Magnification Zoom Lenses that are sold separately. Our standard lenses include fixed focal lengths from 3.5 mm to 75 mm with maximum apertures of up to f/0.95, as well as an 18 - 108 mm focal length, f/2.5 zoom lens. Our high-magnification zoom lenses are a modular system that features magnifications from 0.07 to 28.

The DCC3240M, DCC3240C, and DCC3240N CMOS Cameras will be retired and replaced by our new 1.3 MP Kiralux® Compact Scientific Cameras (including an NIR-enhanced option) when stock is depleted.

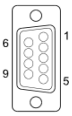
If you require a DCC camera for line production, please contact our OEM Team.

Part Number	Description	Price	Availability
DCC3240M	**High-Sensitivity USB 3.0 CMOS Camera, 1280 x 1024, Global Shutter, Monochrome Sensor**	**$1,376.83**	**Today**
DCC3240C	**High-Sensitivity USB 3.0 CMOS Camera, 1280 x 1024, Global Shutter, Color Sensor**	**$1,376.83**	**Lead Time**
DCC3240N	**High-Sensitivity USB 3.0 CMOS Camera, 1280 x 1024, Global Shutter, NIR Sensor**	**$1,715.58**	**5-8 Days**

USB and Trigger Cables for DCC Series Cameras

Item #	CAB-DCU-T1			Pin	Assignment
 Click to Enlarge	**Connector Device Side**	Micro Sub-D, 90° Angled		2	Trigger Input +
	Connector PC Side	USB 2.0 A Male		3	Shield
	USB Standard	Hi-Speed USB2.0		4	USB +5 V
	Trigger In (Bare Wire)	x		5	USB GND
	Flash & Digital Out (Bare Wire)	x		6	Flash Strobe Output +
	Wire Gauge USB	24AWG/2C and 28AWG/1PR		7	Trigger Input -
	Shielding	Double Shielded 80 °C 30 V		8	USB D+
	Length	3 m		9	USB D-

Item #	CAB-DCU-T2			Pin	Assignment

 Click to Enlarge	**Connector Device Side**	Micro Sub-D, Straight		2	Trigger Input +
	Connector PC Side	USB 2.0 A Male		3	Shield
	USB Standard	Hi-Speed USB2.0		4	USB +5 V
	Trigger In (Bare Wire)	x		5	USB GND
	Flash & Digital Out (Bare Wire)	-		6	Not Connected
	Wire Gauge USB	24AWG/2C and 28AWG/1PR		7	Trigger Input -
	Shielding	Double Shielded 80 °C 30 V		8	USB D+
	Length	3 m		9	USB D-

Item #	CAB-DCU-T3			Pin	Assignment
 Click to Enlarge	**Connector Device Side**	Hirose HR25-7TP-8S		2	Flash Output[a]
	End Opposite Connectors	Tinned End of Wires		3	GPIO 1, 3.3 V LVCMOS
	Function	GPIO		4	Trigger Input[a] -
	Trigger In (Bare Wire)	yes		5	Flash Output[a] +
	Flash & Digital Out (Bare Wire)	yes		6	GPIO 2, 3.3 V LVCMOS
	Cable Type	Shielded High-Flexible Control Cable 8 x 0.1 mm, Ø4.9 mm		7	Trigger Input[a] +
	Shielding	Single Shielded		8	Output Supply Voltage, 5 V (100 mA)
	Length	2 m		9	N/A

- These pins are opto-decoupled inside the camera to protect against high or incorrect voltages.

Part Number	Description	Price	Availability
CAB-DCU-T1	Customer Inspired! USB and Trigger Cable (In/Out) for DCU Series and DCC1240 Cameras, 3 m	$145.33	Today
CAB-DCU-T2	Customer Inspired! USB and Trigger Cable (In Only) for DCU Series and DCC1240 Cameras, 3 m	$85.23	Today
CAB-DCU-T3	Trigger and I/O Cable, Hirose 25, for DCC3240, DCC3260, WFS30 and WFS40, 2 m	$103.81	Today

Camera Thread Adapters

Item #	SM1A9	SM1A9TS[a]	SM1A39
Image (Click To Enlarge)			
Thread 1	External C-Mount (1.00"-32)		
Thread 2	Internal SM1 (1.035"-40)		External SM1 (1.035"-40)
Material	Anodized Aluminum	Black Delrin®[b]	Anodized Aluminum
Typical Application	Mount a C-Mount Camera to an Externally Threaded SM1 Lens Tube	Mount a C-Mount Camera to an Externally Threaded SM1 Lens Tube	Mount a C-Mount Camera to an Internally Threaded SM1 Lens Tube

- Thermally Insulating Adapter
- Delrin® is a registered trademark of DuPont Polymers, Inc.

Part Number	Description	Price	Availability
SM1A9	Adapter with External C-Mount Threads and Internal SM1 Threads	$19.96	Today
SM1A9TS	Customer Inspired! Thermally Insulating Adapter with External C-Mount Threads and Internal SM1 Threads	$23.61	Today
SM1A39	Customer Inspired! Adapter with External C-Mount Threads and External SM1 Threads	$21.21	Today