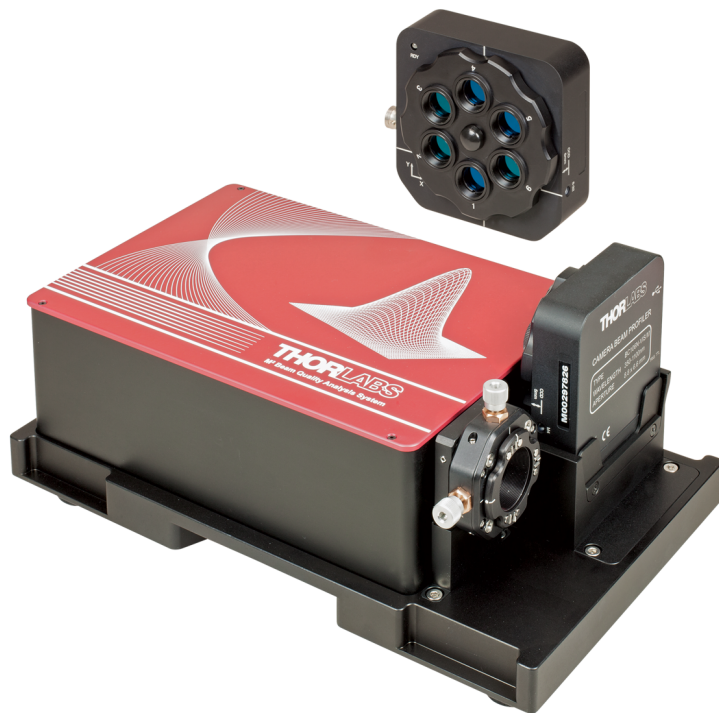




**Thorlabs Beam  
Beam Analyzing Software**

**BC106N  
M2MS-BC106N Series  
Quick Start**



**2016**

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Version: 6.2  
Date: 13-Jul-2016

Item No.: M0009-510-712

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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*

## **Warning**

Sections marked by this symbol explain dangers that might result in personal injury or death. Always read the associated information carefully, before performing the indicated procedure.

## **Attention**

Paragraphs preceded by this symbol explain hazards that could damage the instrument and the connected equipment or may cause loss of data.

## **Note**

This manual also contains "NOTES" and "HINTS" written in this form.

Please read these advices carefully!

# 1 General Information

This Quick Start Manual contains only the most important information about the BC106N. Please read the following pages carefully and pay attention particularly to the section "Software Installation". The complete BC106N User's Manual can be found - after the software has been installed successfully - on the PC (All Programs -> Thorlabs -> Thorlabs BEAM -> Manuals) and on the Thorlabs web site as well.

## 1.1 Safety

### Attention

All statements regarding safety of operation and technical data in this instruction manual will only apply when the unit is operated correctly as it was designed for.

Before applying power to the PC system used to operate the Beam Profiler, make sure that the protective conductor of the 3 conductor mains power cord is correctly connected to the protective earth contact of the socket outlet! Improper grounding can cause electric shock with damages to your health or even death!

The Beam Profiler must not be operated in explosion endangered environments!  
The instrument must only be operated with a duly shielded and low resistance USB cable delivered by Thorlabs.

Do not cover the Beam Profiler in order to prevent heating the instrument.

Only with written consent from Thorlabs may changes to single components be carried out or components not supplied by Thorlabs be used.

This precision device is only transportable if duly packed into the complete original packaging. If necessary, ask for a replacement package.

Be very careful when removing the glass protection of the sensor. Do not stick anything into the aperture, as this might damage the sensor! Prevent any kind of dust entering the entrance aperture!

### Warning

The M2MS M2 Measurement System comes with an alignment laser, that is powered by a M2MS internal driver. Be careful when using this laser!



## 2 Getting Started

### 2.1 Ordering Codes and Accessories

Ordering code	Short description
BC106N-UV	CCD Camera Beam Profiler, 190 - 350 nm*
BC106N-VIS	CCD Camera Beam Profiler, 350 - 1100 nm

\*Design range of Lumigen coating, sensitivity is given throughout 1100 nm but shows increased non-uniformity and noise compared to uncoated BC106N-VIS.

The wavelength range of supplied UV ND filters starts at 220 nm.

For beam quality ( $M^2$ ) measurement, Thorlabs offers hardware extension sets and complete  $M^2$  Measurement Systems:

#### Hardware Extension Sets:

Item Number	Description
M2MS	M2 Measurement System Extension Set
M2MS-AL	M2 Measurement System Extension Set, 250 - 600 nm (aluminum mirrors)

#### $M^2$ Measurement System with Camera Beam Profiler

The M2MS-BC106 comprises the M2MS Extension and a mounted BC106N beam profiler. The following models are available:

Item Number	Description
M2MS-BC106UV-AL	M2 Measurement System with BC106N-UV, 250 - 350 nm
M2MS-BC106UV-AL/M	M2 Measurement System with BC106N-UV, 250 - 350 nm, metric
M2MS-BC106VIS	M2 Measurement System with BC106N-VIS, 400 - 1100 nm
M2MS-BC106VIS/M	M2 Measurement System with BC106N-VIS, 400 - 1100 nm, metric

Please visit our homepage <http://www.thorlabs.com> for further information.

### 2.2 Unpacking

Inspect the packaging for damage. If the shipping container seems to be damaged, keep it until you have inspected the contents and you have inspected the instrument mechanically and electrically.

Verify that you have received the following items:

- 1 BC106N Beam Profiler instrument with mounted filter wheel containing
  - 6 Attenuation filters, see section Filter Wheel in the full manual
  - 6 Filter caps in front of filters
- 1 USB 2.0 Cable A to Mini B, length 1.5 m
- This Quick Reference

---

If you have purchased a M<sup>2</sup> Meter Set M2MS-BC106N:

### 1. M2MS-BC106UV-AL (/M)

- M2MS-BC106UV-AL (/M) Measurement System with mounted BC106N-UV (/M) Camera Beam Profiler
- Power supply 100 to 240 V AC / 15 V 3 A DC
- Cable USB 2.0 A to Mini B, 3 m length
- Cable USB 2.0 A to Mini B, angled, 0.5 m length
- 1 pcs. 0.05" Hex Key
- M2MS Accessory Box UV, that includes:
  - 1 pcs. LA4158-UV Plano Convex Lens, f = 250 mm, UV AR coating
  - 1 pcs. LA1461-A Plano Convex Lens, f = 250 mm, AR coating 350 - 700 nm
  - 4 pcs. CL6 Rail clamps
  - 1 pcs. M2MS Adjustment laser
  - 1 pcs. Ball Driver 3 mm
  - 1 pcs. spare screw M4x10

### 2. M2MS-BC106VIS (/M)

- M2MS-BC106VIS (/M) Measurement System with mounted BC106N-VIS (/M) Camera Beam Profiler
- Power supply 100 to 240 V AC / 15 V 3 A DC
- Cable USB 2.0 A to Mini B, 3 m length
- Cable USB 2.0 A to Mini B, angled, 0.5 m length
- 1 pcs. 0.05" Hex Key
- M2MS Accessory Box VIS, that includes:
  - 1 pcs. LA1461-A Plano Convex Lens, f = 250 mm, AR coating 350 - 700 nm
  - 1 pcs. LA1461-B Plano Convex Lens, f = 250 mm, AR coating 650 - 1050 nm
  - 1 pcs. LA1461-C Plano Convex Lens, f = 250 mm, AR coating 1050 - 1700 nm
  - 4 pcs. CL6 Rail clamps
  - 1 pcs. M2MS Adjustment laser
  - 1 pcs. Ball Driver 3 mm
  - 1 pcs. spare screw M4x10

## 2.3 Preparation

1. Install the Thorlabs Beam software to your computer as described in [Software Installation](#).
2. Connect the camera using the supplied USB cable to the PC as described in [Connection to the PC](#).
3. Remove the filter caps screwed on the attenuation filters.
4. Rotate the filter wheel to set the highest loss optical ND filter (40 dB for BC106N-UV; 60 dB for BC106N-VIS) in front of the camera aperture which is behind the bottom attenuation filter. This prevents damage to the camera sensor.
5. Mount the Camera Beam Profiler instrument so that its optical aperture is exposed to the optical beam.
6. Switch on your light source but be sure to not exceed the max. allowed optical power to the instrument. See Power Ranges in the full manual for details

### Attention

**Please install the software prior to connecting the instrument to a PC via USB interface. Use only the supplied high speed (USB 2.0) cable, not full speed (USB 1.1) cables or thin profile cables with increased resistance, as this can cause transmission errors and improper instrument operation!**

## 2.4 Requirements

**Recommended for optimal performance** hardware features:

- USB 2.0 high speed port
- Processor: Core 2 Duo E4300 or A64 X2 3800+ AMD, 2.0 GB RAM
- OpenGL (specification GLX 1.3 up) compatible graphics adapter:
  - Radeon HD series  $\geq$  3870
  - Geforce 8 series  $\geq$  8800, 9 series  $\geq$  9800, GTX series  $\geq$  260
  - Quadro FX series  $\geq$  2700M



## 2.5 Installation

### 2.5.1 Software Installation

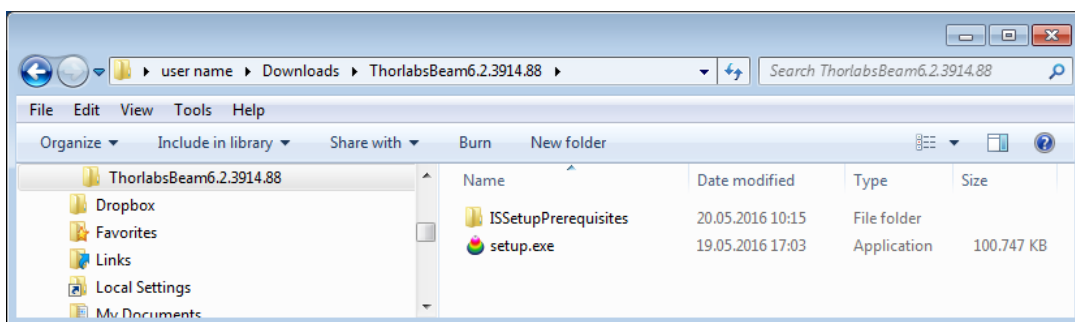
The "Thorlabs Beam" software V6.0 (or higher) can be downloaded from the Thorlabs website:

[http://www.thorlabs.com/software\\_pages/ViewSoftwarePage.cfm?Code=Beam](http://www.thorlabs.com/software_pages/ViewSoftwarePage.cfm?Code=Beam)

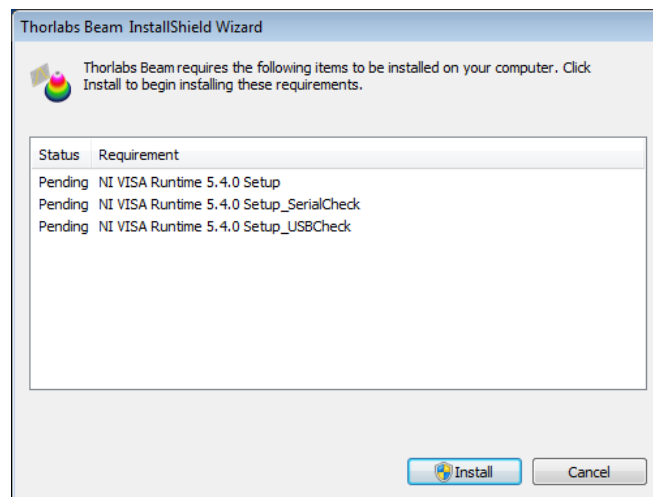
Save the ZIP file to your computer and unpack this archive. The Install Shield Wizards starts by double-clicking the setup.exe, see below.

#### Quick Overview

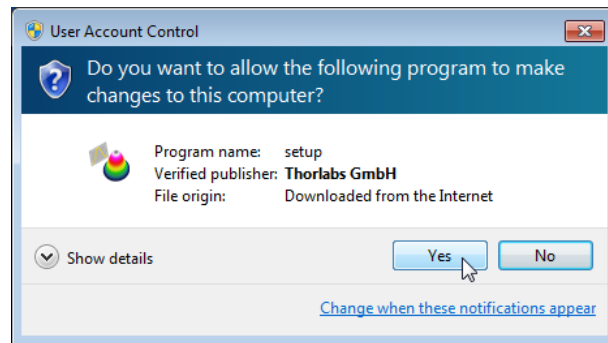
The installation contains 2 main parts - the NI VISA Runtime V5.4.0 and the Beam Software itself, including also drivers and the manual. The following procedure is described for installation to a Windows 7® 32 bit operating system. Installation to a 64 bit operating system requires additional installation steps - first 64 bit components are installed, followed by additional 32 bit components.



Click the "setup.exe". The installer will perform a check for installed NI-VISA Runtime Version. If there is no NI-VISA installed to the target PC or the installed version is before 5.1.1, the installer recognizes that and requests the installation of NI software:



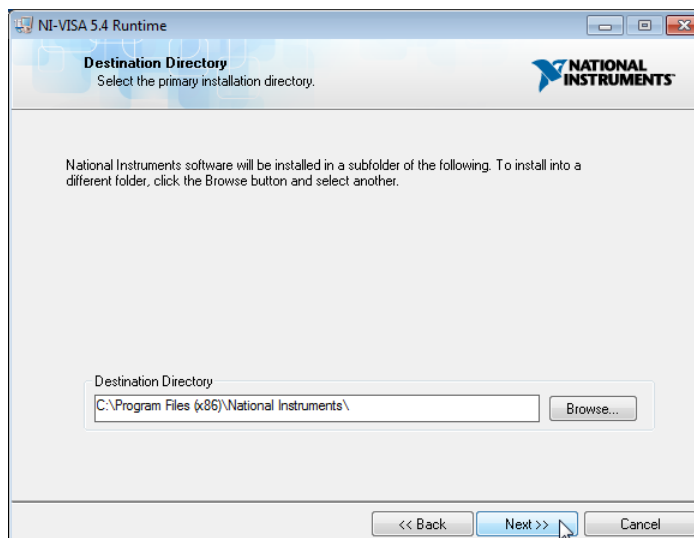
Click to **Install**. Depending on the security settings, Windows User Account Control will ask you to allow installation. Similar alerts will come up several times during installation - please confirm "Yes" in order to proceed with installation:

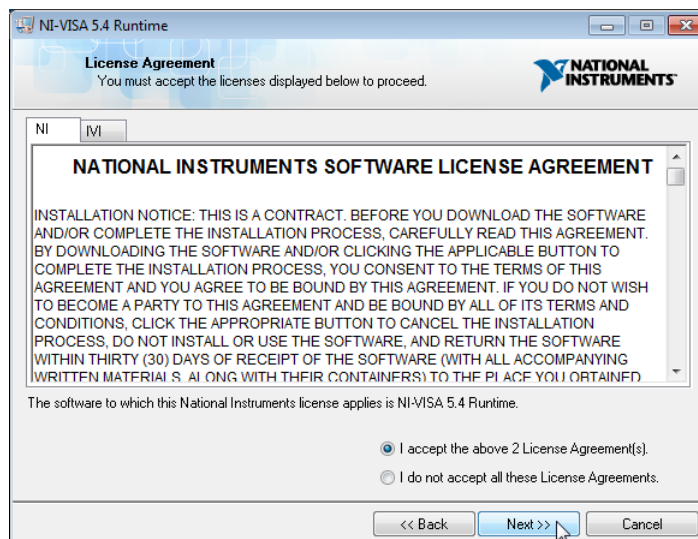
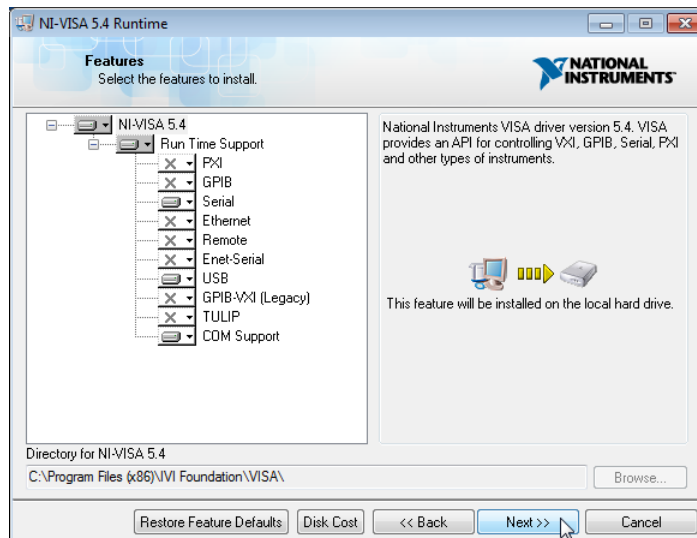


and follow the instructions:

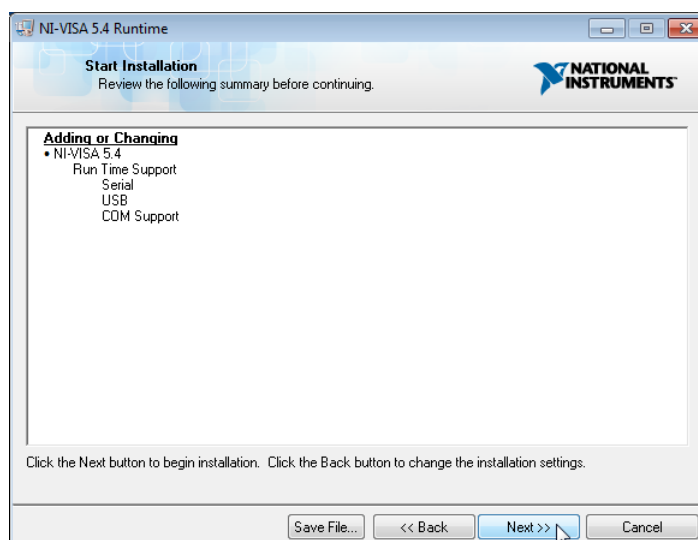


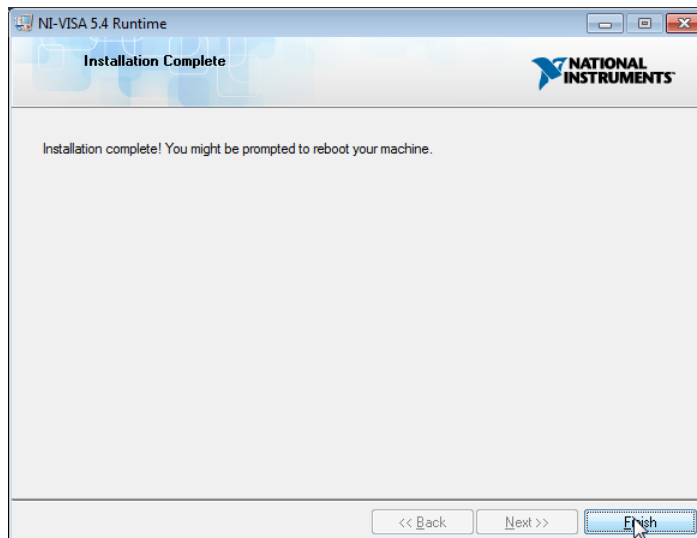
Click Next >> to continue.



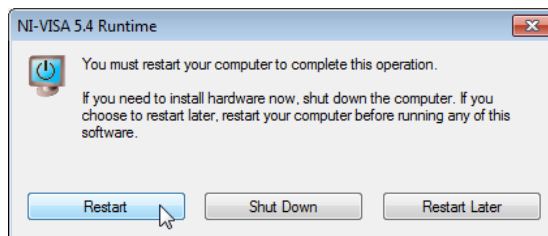


Click "I accept..." if you do so, then Next >> to continue installation.

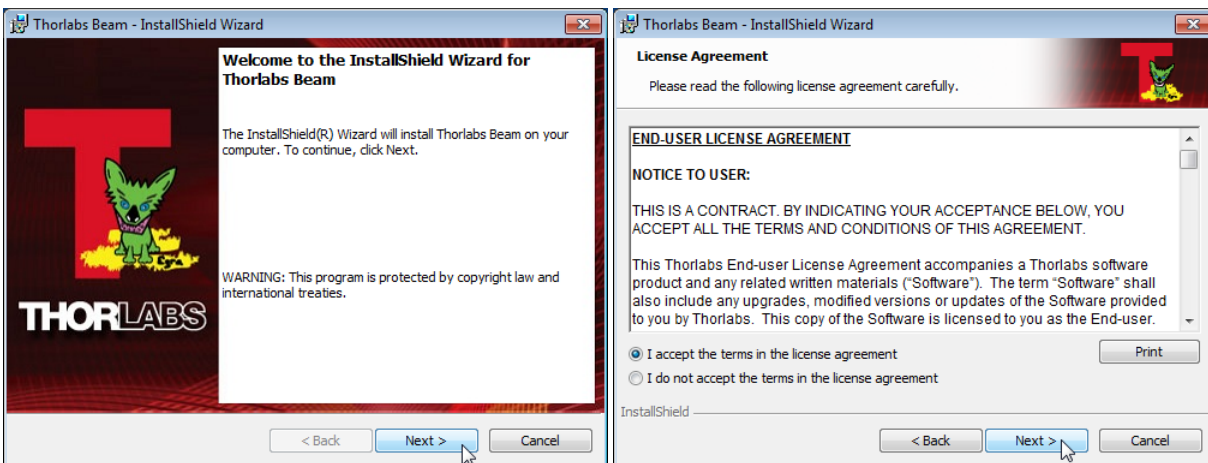


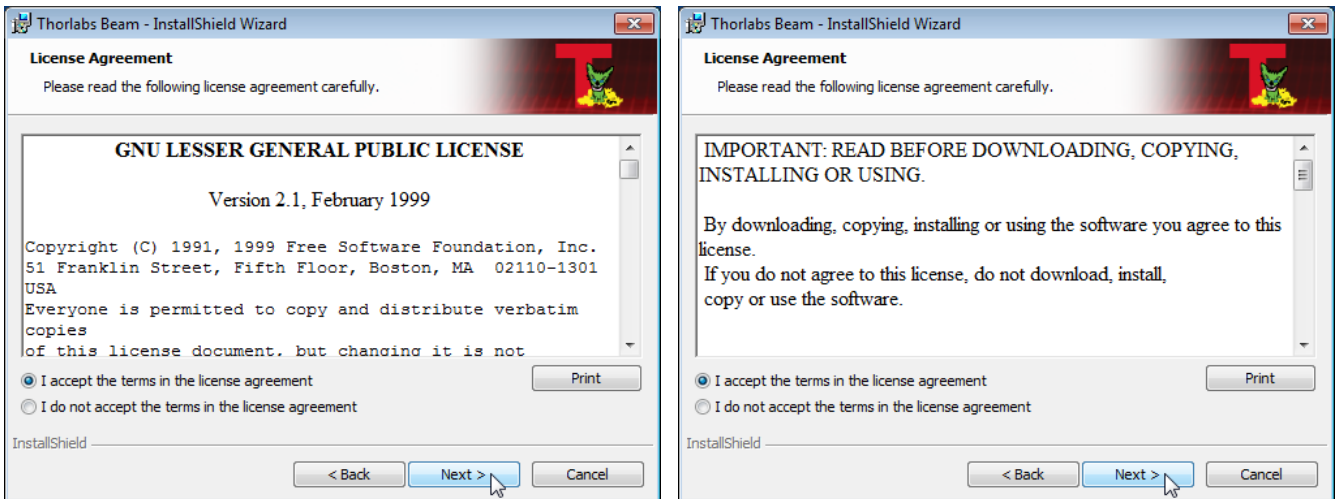


Click Finish.

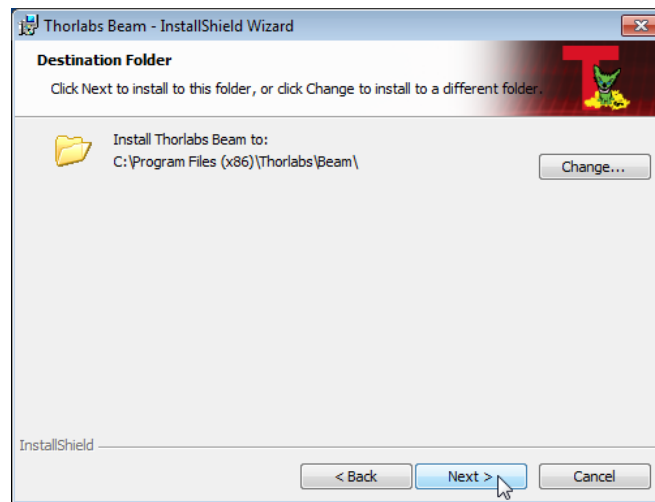


Please reboot the PC when this message appears. After restarting the PC, the installer continues to install the software. If not, please execute the "setup.exe" again.

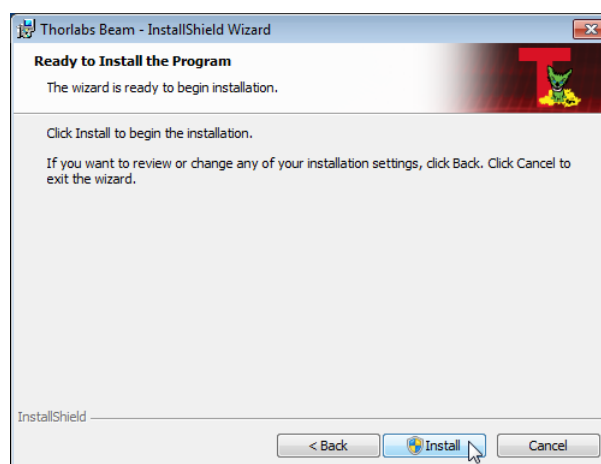


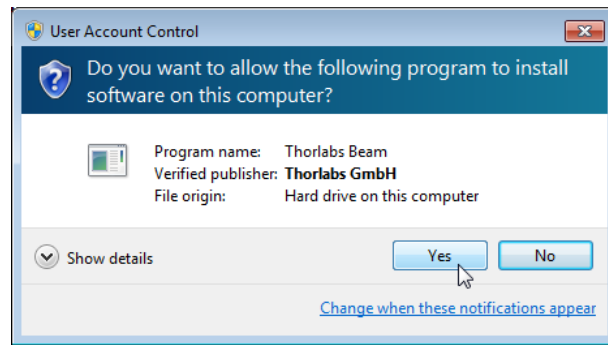


Please read this license agreements carefully, choose "I agree" and click 'Next'.

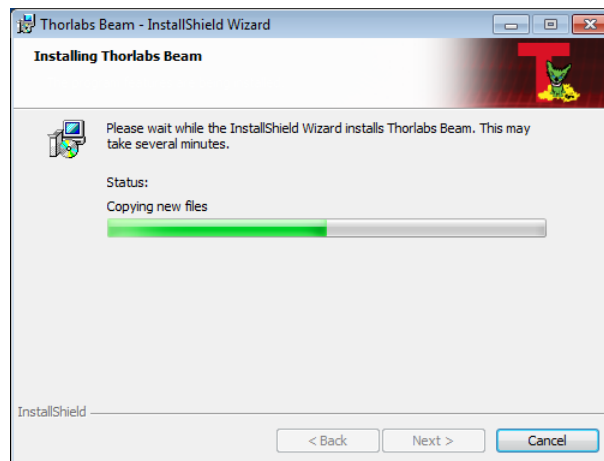


It is recommended to follow the recommended path, click "Next" and then "Install" to proceed.

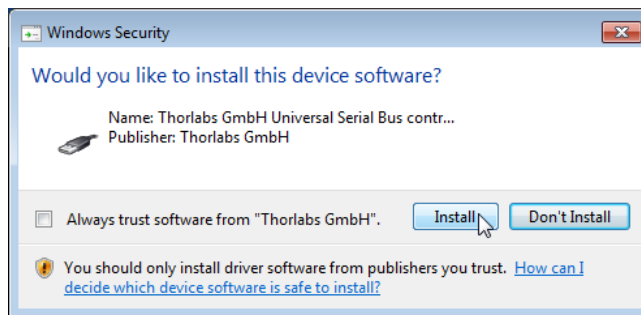




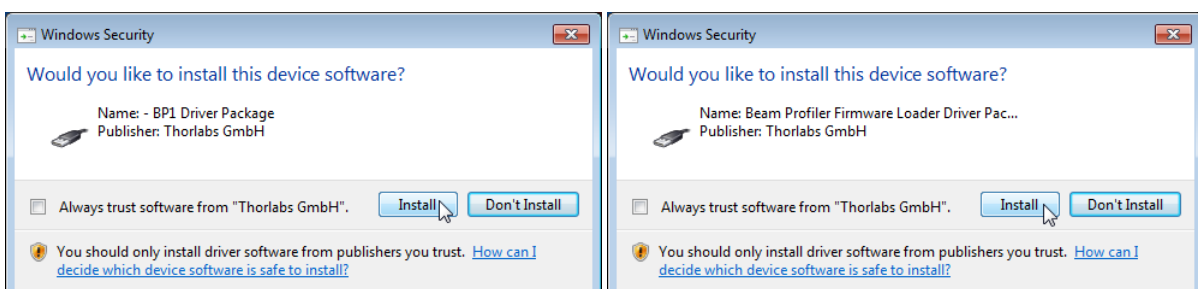
Click "Yes" to allow Beam Software installation.

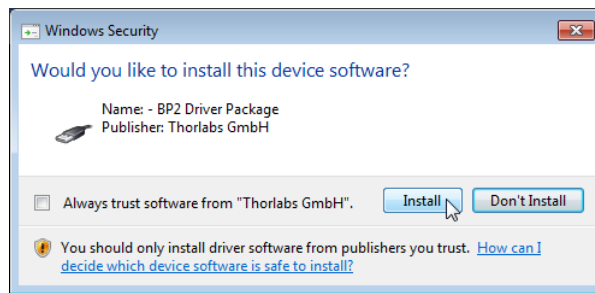


A new window appears, click "Next" to continue. Windows Security will ask your confirmation to install the Thorlabs USB driver.

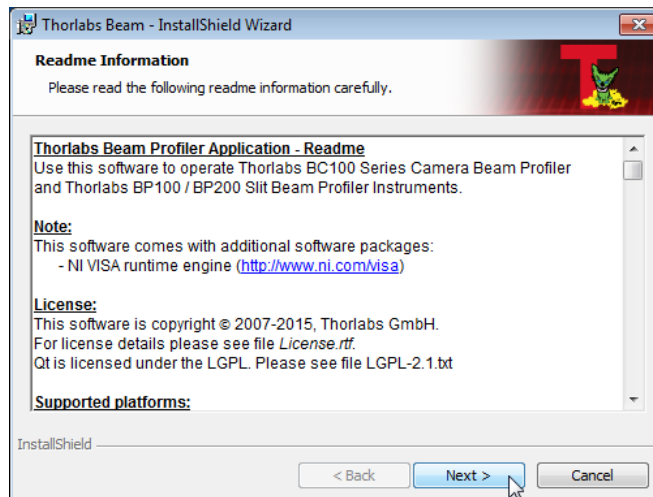


You may check the box "Always trust software from "Thorlabs GmbH", this will shorten the installation. However, if you do not want to do that, please click the "Install" button. Further, you will be asked to confirm the installation of further Thorlabs software components. Please proceed as described above:

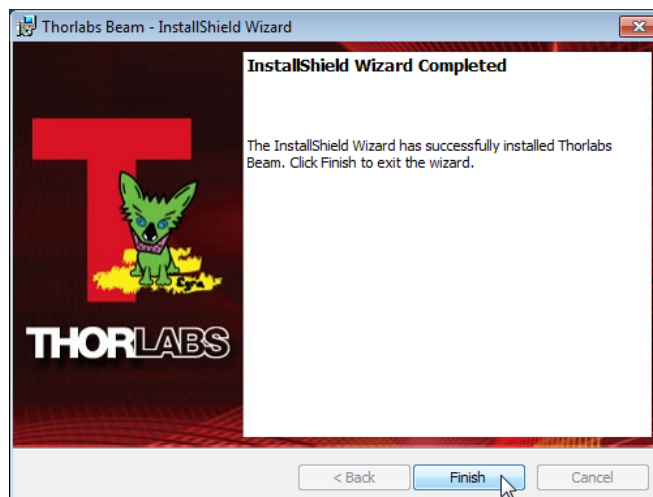




Now, all drivers are installed and the "Read Me" comes up:



Click "Next", then "Finish" to complete the software installation.



## 2.5.2 Connection to the PC

Connect the Beam Profiler to a USB 2.0 high speed port of your computer. Use only the cable that comes with the Beam Profiler or a cable qualified for high speed USB2.0 standard.

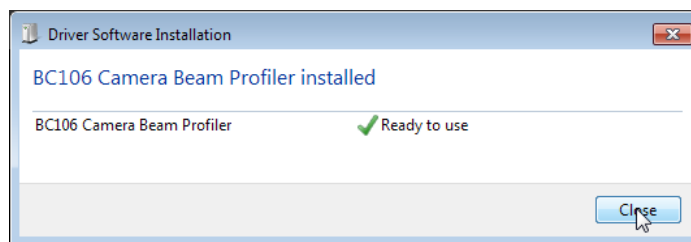
### Attention

**Do not use low speed USB cables as this can cause transmission errors and improper instrument operation!**

**Also, it is strongly recommended to use a PC USB port for connection. Avoid use of USB hubs as some models may not be able to deliver the specified max. current (500mA).**

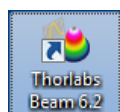
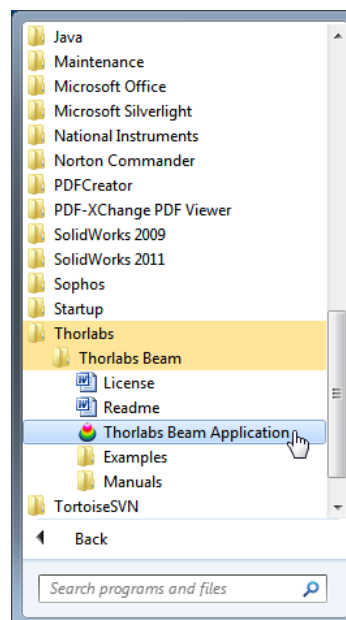
After connecting the instrument to the PC the Windows 7® operating system will load the appropriate USB drivers for the Beam Profiler instrument.

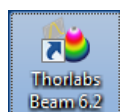
Once connected, an icon will appear in the task bar indicating that the driver installation is in progress. If you click on this icon, the window below appears:



## 2.5.3 Start the Application

Access the Application Programs from the START button. Click the "Programs" → "Thorlabs" → "Thorlabs Beam Application" entry.



Or simply click the appropriate  symbol added to your desktop.

Please see the full manual, that can be found in the "Manuals" folder (see above screenshot).



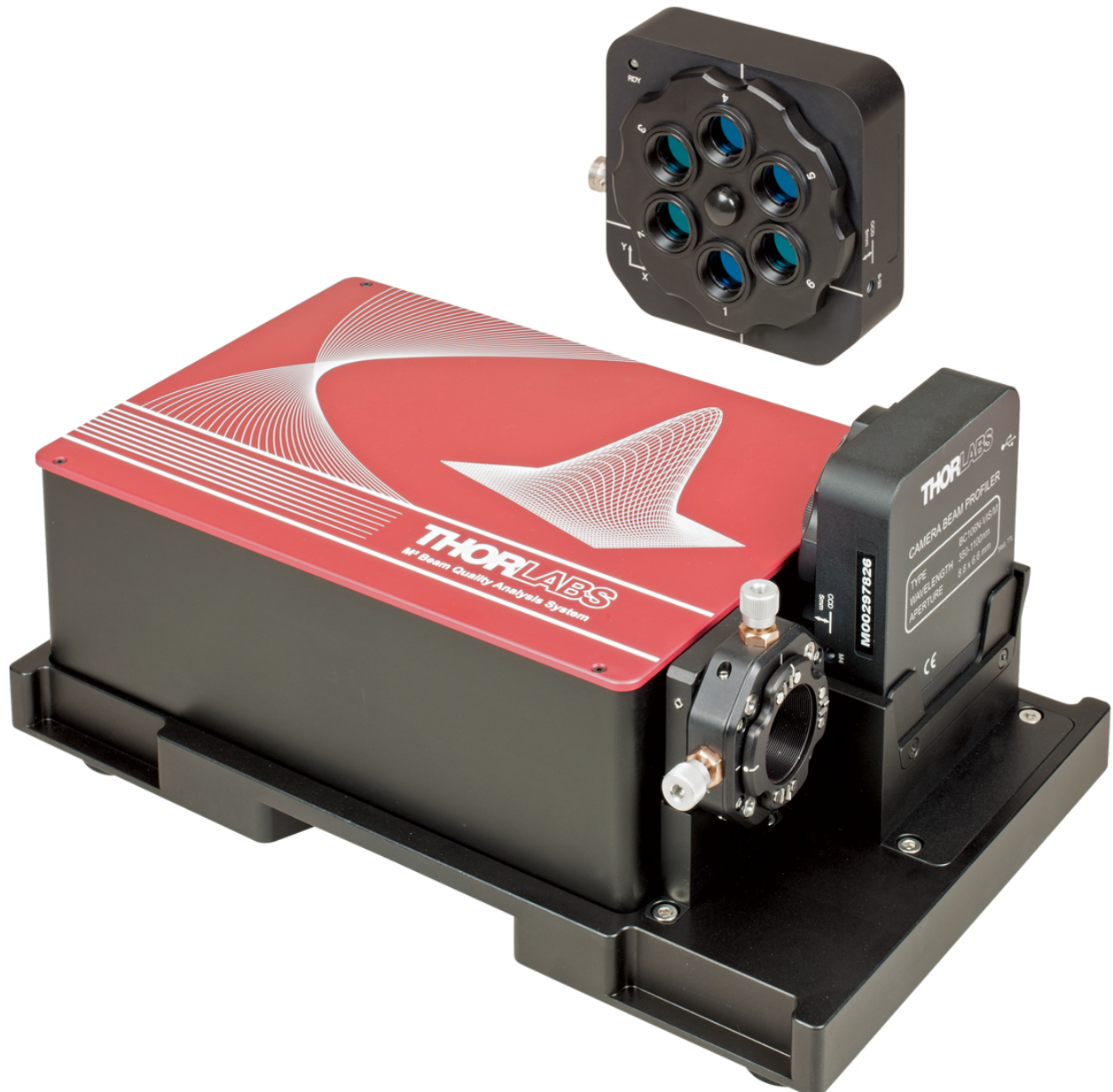
### 3 Beam Quality ( $M^2$ ) Measurement

The **Beam Quality** panel can be opened from the menu bar (Menu **Windows**) or by clicking the  $M^2$  icon in the tool bar.

#### 3.1 $M^2$ Meter Set with BC106N Camera Beam Profiler

**M2MS-BC106 set features:**

- Accurate  $M^2$  measurements
- Measures divergence, waist diameter, Rayleigh range and astigmatism
- Compatible with CW and Quasi-CW pulsed laser sources
- Short measurement cycles
- Fully ISO11146 compliant



## 3.2 Setting up

The M2MS Measurement System is a complete system that is factory aligned. The mounting adapter for the beam profiler provides a secure and reproducible positioning of the beam profiler's input aperture to the M2MS. This eases the mechanical setup.

### Note

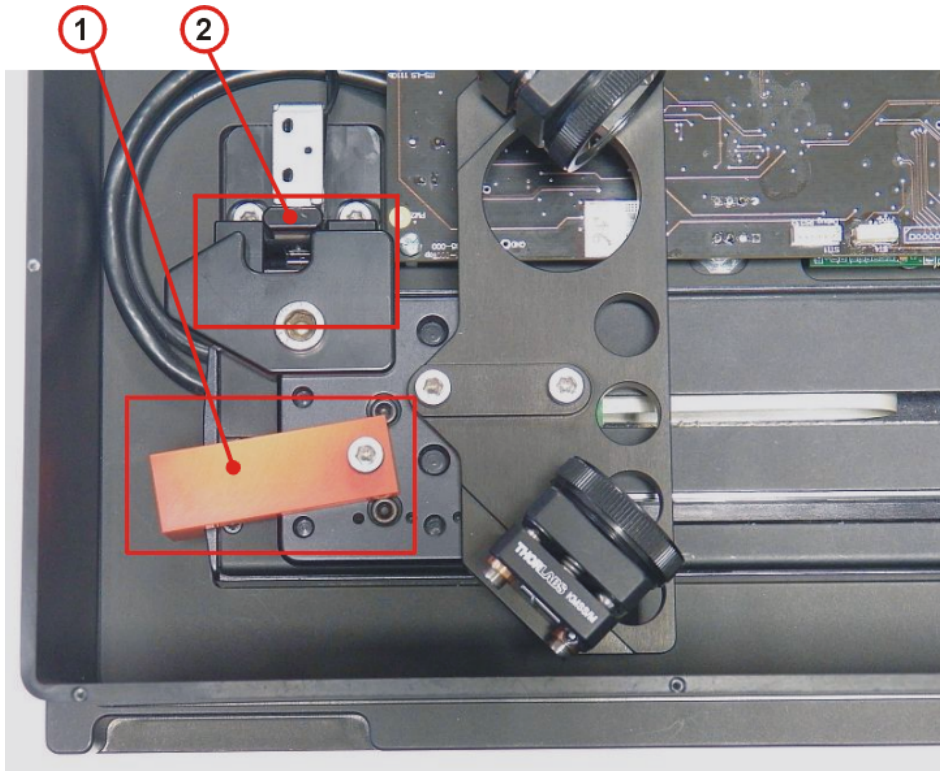
It is strongly recommended to fix the M2MS properly to the optical table using the four rail clamps, included in the M2MS Accessory Box. Therefore remove the rubber feet from the M2MS base plate, this ensures the proper mounting.

### Transportation Lock and Stop Position Latch

In order to avoid transportation damages to the translation stage, it is locked when delivered. This lock must be removed prior to power-up the stage, and it must be re-installed for transportation! Additionally, the DDSM100 stage is fixed at its initial position - in the photo below that is the left stop - by a latch that is controlled by a solenoid. This latch fixes the stage when the power supply is switched off and releases with power-on.

### Removal of the Transportation Lock

1. Remove the 4 screws fixing the top cover using a 0.05" hex key (supplied with M2MS) and remove the cover.
2. Remove the M4 screw that fixes the red stopper, and remove the stopper (3 mm ball driver included with the accessory box). Keep the stopper and the fixing screw in a safe place.

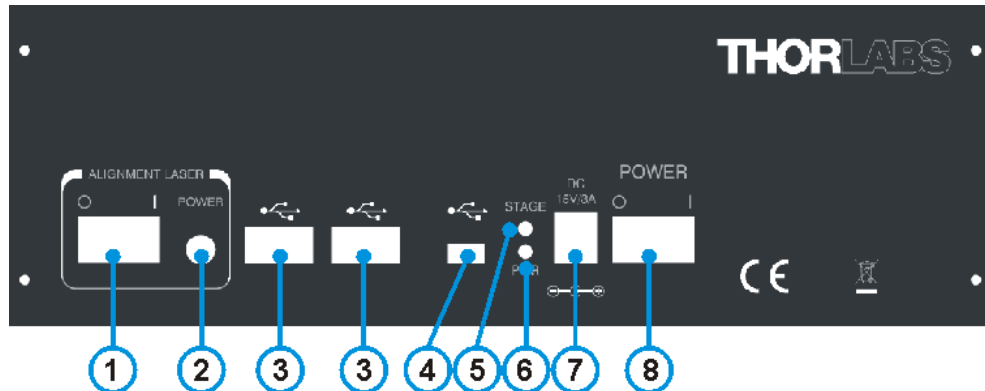


1 - Transportation Lock  
2 - Electromagnetic Endpoint Latch

3. Close the M2MS.

### 3.2.1 Connection to the PC

The M2MS comprises an integrated control electronics with translation stage controller, USB 2.0 hub and a current source for the alignment laser.



- ① Switch to enable Alignment Laser
- ② Output connector for Alignment Laser
- ③ USB 2.0 hub outputs (to Beam Profiler)
- ④ USB 2.0 input (from PC)
- ⑤ Yellow indicator "Stage active"
- ⑥ Green indicator "Power On"
- ⑦ DC power supply input
- ⑧ M2MS power switch

#### Attention!

It is strongly recommended to use only the supplied USB cables for connection of the beam profiler and the control PC to the M2MS. These cables were selected and tested under point of fulfilling the entire USB 2.0 specifications. The operation systems Windows<sup>®</sup> 7 and 8 are less tolerant to deviation from this specification than former operating systems.

The use of other than the supplied USB 2.0 cables may lead to USB connection instabilities.

#### Attention

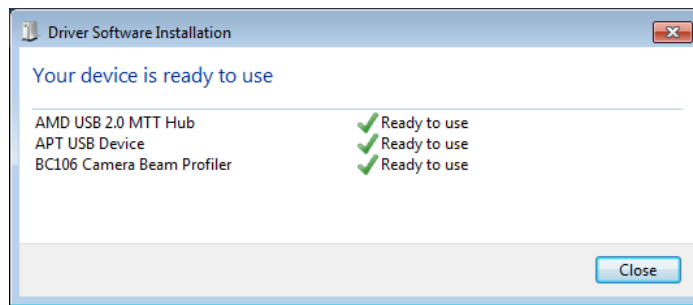
**Do NOT connect the M2MS** to a computer prior to install the Beam Software! The Beam Software version must be 6.0 or higher.

#### Attention!

Prior to connect the M2MS to the power supply, make sure the [transportation lock is removed](#)! Otherwise the stage drive may be damaged!

1. Connect AC power to the power supply and it's output to the DC jack (7).
2. Connect the beam profiler using the supplied angled USB 2.0 cable to one of the USB hub outputs (3).
3. Switch the M2MS on (8). The green **Power On** indicator lights up.
4. Connect the M2MS to the PC using the supplied 3 m long USB 2.0 cable; do not start the BEAM software yet.

5. The PC's operating system recognizes the connected new hardware and performs the driver installation:



**Note**

The "USB Test and Measurement Device (IVI)" and the "APT USB Device" are hardware components of the M2MS extension.

6. Start the Beam Software.

## 4 Appendix

### 4.1 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 13<sup>th</sup> 2005
- marked correspondingly with the crossed out “wheelie bin” logo (see figure below)
- 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

## 4.2 Warranty

Thorlabs warrants material and production of the BC106N 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.

### 4.3 Exclusion of Reliability and Copyright

*Thorlabs* 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* 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.

All rights reserved. This manual may not be reproduced, transmitted or translated to another language, either as a whole or in parts, without the prior written permission of *Thorlabs*.

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## 4.4 Thorlabs Worldwide Contacts

### USA, Canada, and South America

Thorlabs, Inc.  
56 Sparta Avenue  
Newton, NJ 07860  
USA  
Tel: 973-579-7227  
Fax: 973-300-3600  
[www.thorlabs.com](http://www.thorlabs.com)  
[www.thorlabs.us](http://www.thorlabs.us) (West Coast)  
Email: [sales@thorlabs.com](mailto:sales@thorlabs.com)  
Support: [techsupport@thorlabs.com](mailto:techsupport@thorlabs.com)

### UK and Ireland

Thorlabs Ltd.  
1 Saint Thomas Place, Ely  
Cambridgeshire CB7 4EX  
United Kingdom  
Tel: +44-1353-654440  
Fax: +44-1353-654444  
[www.thorlabs.com](http://www.thorlabs.com)  
Email: [sales.uk@thorlabs.com](mailto:sales.uk@thorlabs.com)  
Support: [techsupport.uk@thorlabs.com](mailto:techsupport.uk@thorlabs.com)

### Europe

Thorlabs GmbH  
Hans-Böckler-Str. 6  
85221 Dachau  
Germany  
Tel: +49-8131-5956-0  
Fax: +49-8131-5956-99  
[www.thorlabs.de](http://www.thorlabs.de)  
Email: [europe@thorlabs.com](mailto:europe@thorlabs.com)

### Scandinavia

Thorlabs Sweden AB  
Mölnålsvägen 3  
412 63 Göteborg  
Sweden  
Tel: +46-31-733-30-00  
Fax: +46-31-703-40-45  
[www.thorlabs.com](http://www.thorlabs.com)  
Email: [scandinavia@thorlabs.com](mailto:scandinavia@thorlabs.com)

### France

Thorlabs SAS  
109, rue des Côtes  
78600 Maisons-Laffitte  
France  
Tel: +33-970 444 844  
Fax: +33-811 38 17 48  
[www.thorlabs.com](http://www.thorlabs.com)  
Email: [sales.fr@thorlabs.com](mailto:sales.fr@thorlabs.com)

### Brazil

Thorlabs Vendas de Fotônicos Ltda.  
Rua Riachuelo, 171  
São Carlos, SP 13560-110  
Brazil  
Tel: +55-16-3413 7062  
Fax: +55-16-3413 7064  
[www.thorlabs.com](http://www.thorlabs.com)  
Email: [brasil@thorlabs.com](mailto:brasil@thorlabs.com)

### Japan

Thorlabs Japan, Inc.  
Higashi Ikebukuro  
Q Building 2nd Floor 2-23-2  
Toshima-ku, Tokyo 170-0013  
Japan  
Tel: +81-3-5979-8889  
Fax: +81-3-5979-7285  
[www.thorlabs.jp](http://www.thorlabs.jp)  
Email: [sales@thorlabs.jp](mailto:sales@thorlabs.jp)

### China

Thorlabs China  
Room A101, No. 100  
Lane 2891, South Qilianshan Road  
Putuo District  
Shanghai 200331  
China  
Tel: +86-21-60561122  
Fax: +86-21-32513480  
[www.thorlabs.com](http://www.thorlabs.com)  
Email: [chinasales@thorlabs.com](mailto:chinasales@thorlabs.com)