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**THORLABS**

# DC40

## LED Driver

### User Guide



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## Chapter 1      Introduction

### 1.1 Intended Use

The DC40 LED Driver is intended for the control of LEDs and matching LED products in laboratory settings under compliance with the regulations of EN 61326-1:2021.

The DC40 LED Driver may only be used in accordance with the instructions described in this user guide. Any other use will invalidate the warranty.

### 1.2 Explanation of Safety Warnings



Warning indicates a hazard with a medium level of risk that, if not avoided, could result in death or serious injury.



Caution indicates a hazard with a low level of risk that, if not avoided, could result in minor or moderate injury.

#### NOTICE

Indicates information considered important, but not hazard-related, such as possible damage to the product.



LED Radiation Warning



The CE/UKCA markings on the product are the manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety, and environmental protection legislation.



The wheelie bin symbol on the product, the accessories or packaging indicates that this device must not be treated as unsorted municipal waste but must be collected separately.

### 1.3 Description

The DC40 LED Driver is a plug and play device designed for LEDs which can be connected using an M8 x 1 connector and have maximum drive currents from 0.1 A to 4 A.

The EEPROM of the connected Thorlabs LED is read out and the current limit of the DC40 LED Driver is set to this read value.

The DC40 LED Driver has the following key functions:

- Supports Thorlabs and non-Thorlabs LEDs which can be connected using an M8 x 1 connector and have maximum drive currents from 0.1 A to 4 A.<sup>1,2</sup>
- Supports External TTL Input and Analog Modulation from DC to 5 kHz.<sup>2</sup>
- Supports 48 W output power in Continuous Wave Mode at 40 °C ambient temperature with forced cooling from internal fan.
- Supports USB control and has a downloadable software Graphical User Interface (GUI) available for remote control.

Please find all safety information and warnings concerning this product in the chapter [Safety](#).

<sup>1</sup> The DC40 LED Driver cannot drive Thorlabs' High Power Solis LEDs.

<sup>2</sup> The maximum LED current and forward voltage are interdependent; the DC40 LED Driver cannot drive an LED with 14 V forward voltage at 4 A. Please see the [Specifications](#) section for more details.

### 1.3.1 Components

#### Front Panel



**Figure 1** Front Panel of the DC40 LED Driver

Front Panel		
Callout	Feature	Description
1	LED Switch	Push to Switch The LED On/Off
2	Mode Select Switch	Push to Select one of the Three <a href="#">Modes</a> when the DC40 LED Driver is in "Standby"
3	Status LED <sup>a</sup>	LED for Indication of Device Status: <ul style="list-style-type: none"><li>• Red: "Error" State</li><li>• Yellow: "Standby" State</li><li>• Green: "Active" State</li></ul>
4	Mode LEDs	LEDs indicate the Active Mode: CW, TTL or MOD

a. "Blinking" State: The DC40 LED Driver is being [remotely](#) controlled.

**Table 1** Front Panel of the DC40 LED Driver

**Back Panel****Figure 2**      **Back Panel of the DC40 LED Driver**

Back Panel		
Callout	Feature	Description
1	BNC Connector	Modulation Input for TTL and MOD Modes
2	LED Connector	4-Pin, Female, M8 x 1 LED Connector
3	DC Input	Power Supply Connector for Connecting 15 VDC Regulated Power Supply (Labeled DSH15)
4	USB Type C	USB 2.0 Type C for Remote Operation or GUI Software Control
5	Rotary-Push-Knob <sup>a</sup>	Turn: LED Current Adjustment Push: Switch for Output LED On/Off

a. The push function of the rotary-push-knob has the same function as the LED On/Off switch. This makes it possible to switch the output LED On and Off in dark environments.

**Table 2**      **Back Panel of the DC40 LED Driver**

## 1.4 Technical Data

### 1.4.1 Specifications

All technical data are valid at  $23 \pm 5^\circ\text{C}$  and  $45 \pm 15\%$  relative humidity (non-condensing).

<b>Continuous Wave Mode<sup>a</sup></b>	
Maximum LED Current <sup>b</sup>	0.1 A - 4.0 A
Maximum LED Forward Voltage <sup>b</sup>	14.0 V
LED Current Limit Accuracy	$\pm(1.0\% + 25.0 \text{ mA})$
Noise and Ripple (10 Hz to 10 MHz, RMS)	<1 mA (at 1 A over 2 $\Omega$ )
<b>TTL Modulation Mode<sup>c</sup></b>	
Input Impedance	10 k $\Omega$
Modulation Frequency Range	DC - 5 kHz
Duty Cycle Range	0.2% - 99.8% (10 Hz) 2.0% - 98.0% (100 Hz) 25.0% - 75.0% (5 kHz)
Modulation Waveform	Square Wave Pulse Width Modulation (PWM)
TTL Low Voltage Level	0.0 V - 0.8 V
TTL High Voltage Level	2.6 V - 5.0 V
<b>External Modulation Mode<sup>c</sup></b>	
Input Impedance	5 k $\Omega$
Modulation Frequency Range	DC - 5 kHz
Maximum Input Voltage	5.0 V
Modulation Coefficient	800 mA/V
<b>General Specifications</b>	
Power Supply	15.0 VDC
Maximum Power Consumption	65 W
Operating Temperature Range	0 to 40 °C
Storage Temperature Range	-40 to 70 °C
Dimensions (W x H x D)	85.4 mm x 59.0 mm x 103.0 mm (3.36" x 2.32" x 4.06")
Weight without Power Supply	230 g (0.51 lbs)
Weight with Power Supply	505 g (1.12 lbs)

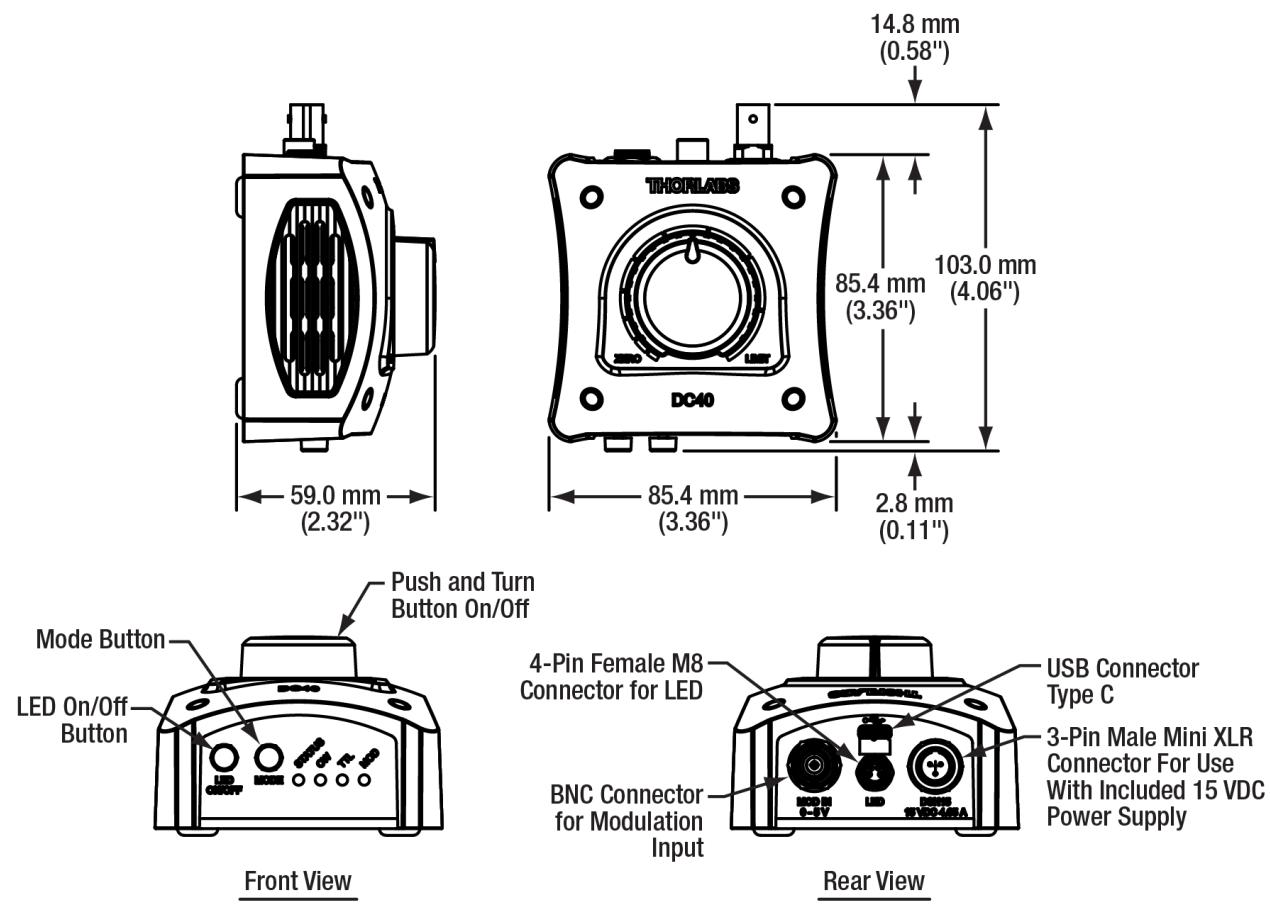
a. The CW mode maintains a constant current.

b. The DC40 LED Driver is designed to automatically select the appropriate current/voltage combination for Thorlabs LEDs. The DC40 LED Driver is compatible with Thorlabs LEDs with an M8 x 1 connector or LEDs designed to be used with an M8 connector. The maximum LED current and forward voltage are interdependent; the DC40 LED Driver cannot drive an LED with a 14 V forward voltage at 4 A. The DC40 LED Driver can supply 4 A at 12 V and 0.5 A at 14 V with the [CAB-LEDD1](#).

c. There may be a small delay in output response depending on the forward voltage and capacitance of the connected LED.

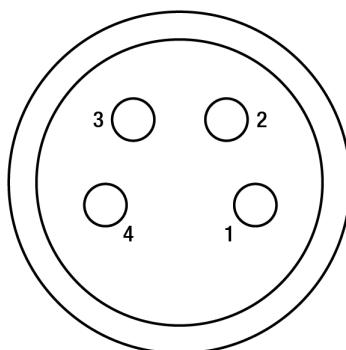
**Table 3      Specifications for the DC40 LED Driver**

### 1.4.2 Mechanical Drawings



**Figure 3**      **Mechanical Drawing for the DC40 LED Driver**

## 1.5 Pin Diagram



**Figure 4** Pin Assignment for the LED Connector

Pin	Description
1	LED Anode
2	LED Cathode
3	LED EEPROM GROUND
4	LED EEPROM

**Table 4** Pin Assignment for the LED Connector

## 1.6 FCC Designation

Users that change or modify the product described in this manual in a way not expressly approved by Thorlabs (party responsible for compliance) could void the user's authority to operate the equipment.

Thorlabs is not responsible for any radio television interference caused by modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Thorlabs GmbH. The correction of interference caused by such unauthorized modification, substitution or attachment will be the responsibility of the user.

The use of shielded I/O cables is required when connecting this equipment to any and all optional peripheral or host devices. Failure to do so may violate FCC and ICES rules.

## Chapter 2 Safety

The safety of any system incorporating the equipment is the responsibility of the assembler of the system.

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.

### **WARNING: Risk of Serious Injury and Even Death Due to Electrical Shock!**

Improper grounding and connecting the power supply to the mains can cause electric shock!

Electric shock results in damage to your health or even death.



Observe the following instructions when applying power to the DC40 LED Driver:

- Make sure that the protective conductor for the 3 conductor mains power cord is correctly connected to the protective earth ground contact of the socket outlet.
- Before connecting the power supply to the mains make sure that the line voltage range marked on the power supply agrees with your local supply.

### **WARNING: Risk of Serious Injury and Even Death Due to Explosion!**



The DC40 LED Driver must not be operated in explosion endangered environments!

### **CAUTION: Risk of Serious Injuries of Incorrect Use!**

Pay attention to the following aspects during use:



- Do not obstruct the air ventilation slots in the housing!
- Do not remove covers or open the device! There are no user-serviceable parts inside!
- Refer servicing to qualified personnel!
- Changes to this DC40 LED Driver cannot be made nor may components not supplied by Thorlabs be used without written consent from Thorlabs.

### **NOTICE: Electrically Sensitive Product!**

Mobile telephones, cellular phones or other radio transmitters are not to be used within the range of three meters of this unit since the electromagnetic field intensity may then exceed the maximum allowed disturbance values according to IEC 61326-1.

#### **NOTICE**

The DC40 LED Driver has been tested and found to comply with the limits according to IEC 61326-1 for using connection cables shorter than 3 meters (9.8 feet)!

- The instrument must only be operated with a duly shielded and low resistance USB cable delivered by Thorlabs.
- All modules must only be operated by duly shielded BNC connection cables.

## Chapter 3 Installation

### 3.1 Warranty and RMA Information

Thorlabs warrants material and production of the DC40 LED Driver for a period of 24 months starting with the date of shipment in accordance with and subject to the terms and conditions set forth in Thorlabs' General Terms and Conditions of Sale which can be found at:

General Terms and Conditions:

[https://www.thorlabs.com/Images/PDF/LG-PO-001\\_Thorlabs\\_terms\\_and\\_%20agreements.pdf](https://www.thorlabs.com/Images/PDF/LG-PO-001_Thorlabs_terms_and_%20agreements.pdf)

and

[https://www.thorlabs.com/images/PDF/Terms%20and%20Conditions%20of%20Sales\\_Thorlabs-GmbH\\_English.pdf](https://www.thorlabs.com/images/PDF/Terms%20and%20Conditions%20of%20Sales_Thorlabs-GmbH_English.pdf)

### 3.2 Packing List

The following items are included in the package:

- DC40 LED Driver
- 15 VDC Regulated Power Supply with Region Specific Power Cord (Labeled DSH15)
- USB Type-A to Type-C Cable (USB 2.0)
- Printed Quick Reference

### 3.3 Unpacking Instructions

Please inspect the shipping container for damage. Please do not cut through the cardboard, as the box might be needed for storage or returns.

If the shipping container appears to be damaged, keep it until you have inspected the contents for completeness and tested the DC40 LED Driver mechanically and electrically.

Verify that you have received the items listed in the chapter [Packing List](#) within the package.

#### 3.3.1 Installing Hardware

1. Connect the power supply to the DC input.
  - The status LED lights up in red.
2. Connect the output LED (not included) to the appropriate LED connector.<sup>3</sup>
  - The status LED lights up in yellow.
  - For output LEDs with Thorlabs EEPROM, the DC40 LED Driver reads out the EEPROM and recognizes the maximum output LED current.
  - For non-Thorlabs LEDs and unmounted Thorlabs LEDs with a maximum current >100 mA, use the cable [CAB-LEDD1](#) for connecting the LED.

<sup>3</sup> The CW mode is selected by default. The CW mode LED lights up in blue.

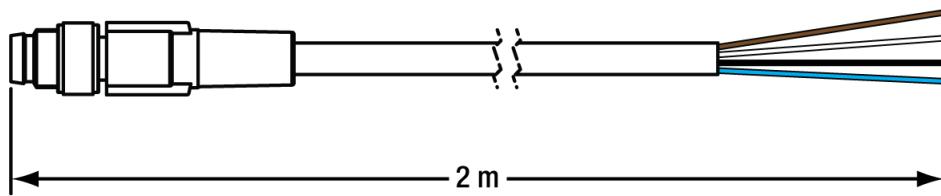
**NOTICE: Risk of Damaging the DC40 LED Driver!**

Incorrect wiring damages the DC40 LED Driver.

**NOTICE**

To avoid damage to the DC40 LED Driver, note the following:

- Do not connect anything to the black and blue wires of the cable [CAB-LEDD1](#)!
- Electrically isolate the LED housing from the mounting platform if the LED housing is electrically connected to its anode or cathode pin.



*Figure 5*

*Color of the Wires for CAB-LEDD1*

Color of Wire	Description
Brown	LED Anode
White	LED Cathode
Black	Do <u>not</u> Connect
Blue	Do <u>not</u> Connect

*Table 5*

*Color of the Wires for CAB-LEDD1*

- For non-Thorlabs LEDs, the maximum output LED current must be set via [GUI Software](#).

### 3.4 Return of Devices

This precision device is only serviceable if returned and properly packed into the complete, original packaging including the cardboard insert that holds the enclosed devices.

## Chapter 4 Operation

### 4.1 Operation Principle

You can connect either the output LED or the power supply with the DC40 LED Driver first.

If you disconnect the output LED during operation, the DC40 LED Driver goes to "standby" state.

Each time a Thorlabs output LED is connected, the EEPROM is read-out and the appropriate current limit of the DC40 LED Driver is set.

To drive output LEDs without Thorlabs EEPROM, the current limit must be first set via [GUI Software](#) to avoid damaging the output LED. Once the desired output LED is connected to the LED connector, follow the steps below to manually control the LED.

1. Push the rotary push knob.

- The output LED switches on.
- The status LED changes to green.

2. Turn the rotary push knob clockwise.

- The output LED current increases on.

The DC40 LED Driver will supply drive current corresponding to the position of the rotary knob immediately upon turning on the output LED. However, please note that the last used interface takes precedence (rotary-push-knob or GUI). If the set value was changed through the GUI, then the device will follow the GUI set value. If the set value was changed through the rotary-push-knob, then the device will follow the position of the rotary-push-knob and the GUI will reflect the changes as well.

### 4.2 Status & Mode Indication LEDs

Status LED	
Color	Control Status
Red	<ul style="list-style-type: none"> <li>• Power Supply is Connected</li> <li>• Output LED is not Connected or DC40 LED Driver has an Internal Failure</li> </ul>
Yellow	<ul style="list-style-type: none"> <li>• Output LED is Connected</li> <li>• DC40 LED Driver is in "Standby" State</li> <li>• Modes can be Changed</li> </ul>
Green	<ul style="list-style-type: none"> <li>• DC40 LED Driver is in "Active" State and Output LED is Active</li> </ul>
Mode LEDs <sup>a</sup>	
Blue <sup>b</sup>	<ul style="list-style-type: none"> <li>• Indicates the Selected Mode</li> </ul>

a. See chapter [Modes](#) for details.

b. Only one of the three LEDs will glow blue at a given time indicating the selection of a particular mode.  
None of the LEDs will glow when the DC40 LED Driver is in "error" state.

**Table 6 Status & Mode Indication LEDs of the DC40 LED Driver**

### 4.3 Modes

The DC40 LED Driver has the modes CW, TTL, and MOD.

Changing the mode only works when the DC40 LED Driver is in "standby" state. Push the On/Off switch to change the DC40 LED Driver from "active" state to "standby" state.

#### CW Mode - Continuous Wave

The Continuous Wave (CW) Mode is designed to operate the output LED with constant set current. CW Mode is the most basic and widely used mode.

Push the mode select switch to select the CW Mode. Turn the rotary-push-knob clockwise to increase the output LED brightness. Turn the rotary-push-knob counterclockwise to decrease the output LED brightness.

#### TTL Mode - Trigger Mode

In addition to CW operation, the DC40 LED Driver accepts an external-active high TTL signal via the BNC socket to modulate the current of the output LED. After changing to TTL Mode, the brightness of the output LED can be adjusted by turning the rotary-push-knob. An externally applied TTL signal has to be used to switch the output LED current on and off. A high level (2.6 V - 5.0 V) will enable the output LED current and a low level (0.0 V - 0.8 V) will switch the output LED current off. This mode can, for example, be used to capture images using a CCD camera to collect an image from a microscope.

As long as the TTL input is high, the output LED is activated and is supplied with the current that is set via the rotary function of the rotary push knob. A TTL low level switches off the output LED. The maximum modulation frequency is guaranteed up to 5 kHz.

#### MOD Mode - Modulation

In MOD Mode, the output LED is controlled by an external voltage. After changing to MOD Mode, 0 V corresponds to off and 5 V represents 4 A with the modulation coefficient of 800 mA/V. If the input signal sets a current higher than the output LED current limit, the DC40 LED Driver will limit the current to the maximum current limit. The output LED current can be modulated with any waveform. In the MOD Mode, the rotary push knob serves as a user adjustable current limit setting. To control the LED current by only the external signal, turn the knob to the right most position to set the DC40 LED Driver current limit to the LED maximum current.

## 4.4 Software

The GUI Software is designed for straight forward use with the DC40 LED Driver. The GUI Software accommodates for complex setups up to 10 DC40 LED Driver devices in parallel.

When using the GUI Software the forward current can be precisely set and saved for later applications. Additionally, the GUI Software enables output LEDs without Thorlabs EEPROM to be used with the DC40 LED Driver.

### 4.4.1 Software Requirements

The following PC specifications are required for remote operation of the DC40 LED Driver.

#### Minimum Hardware Requirements:

- CPU : 1 GHz
- RAM : 5012 MB Available RAM
- Graphics Card Resolution : 1280 x 768 (Minimum)
- Hard Drive : 200 MB (Minimum) of Available Disk Space (64-Bit)
- Interface : Free USB 2.0 Port

#### Software Requirements:

The GUI Software which operates the DC40 LED Driver is compatible with the following operating systems:

- Windows® 10 (32-Bit and 64-Bit)
- Windows® 11

For operation of the DC40 LED Driver by the GUI Software interface, Microsoft .NET 6.0 Desktop Runtime V 6.0.11 or later is required. This software (V 6.0.11) is included with the GUI Software installation package.

### 4.4.2 Software Installation

The GUI Software supports the DC40 LED Driver and is available for download from the [website](#).

As a part of our green initiative, Thorlabs no longer ships physical data carriers for installation of the GUI Software for the DC40 LED Driver. The GUI Software can be accessed and installed from the [website](#) instead. The most recent version of the GUI Software will always be available online.

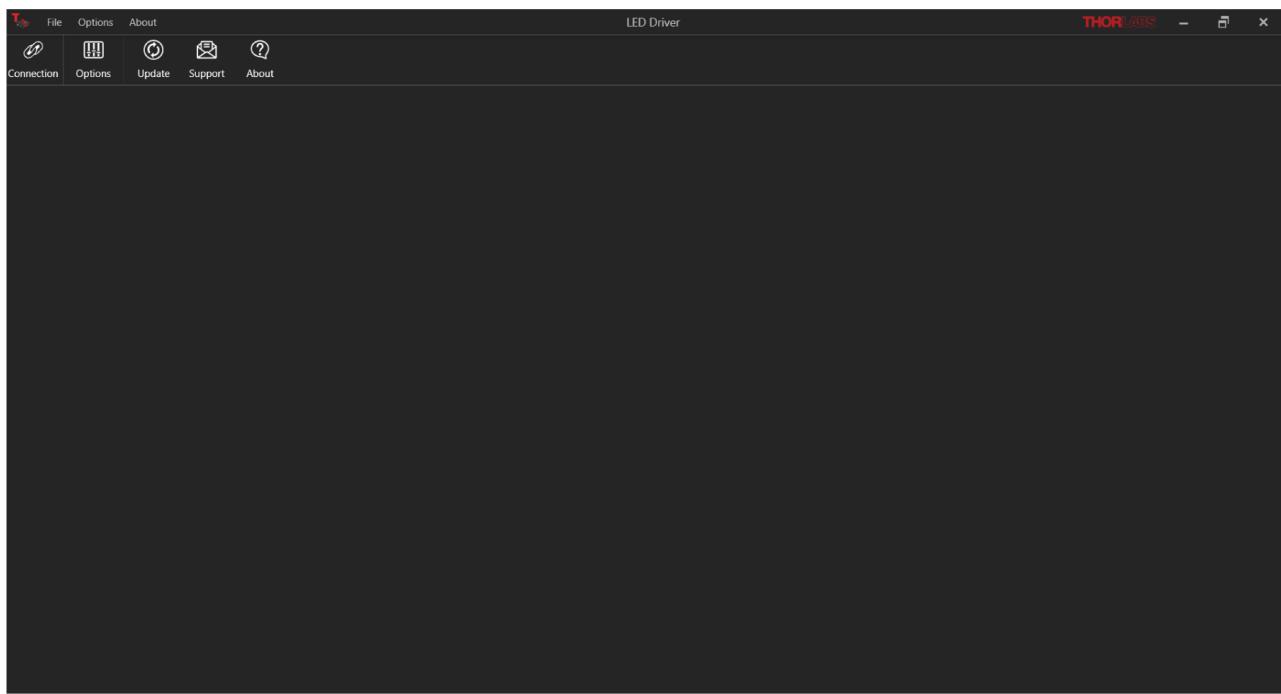
#### NOTICE: Clean Installation!

##### NOTICE

- Do not connect the DC40 LED Driver to the PC prior to GUI Software installation.
- Exit all running applications on your PC as the installer may require a reboot of your PC during installation.

1. Download the the GUI Software form the [website](#).
2. Save the ZIP-file to your PC.
3. Unpack the ZIP-file.
4. Select the setup.exe file and double click to install the GUI Software.
5. Read and accept the End-User License Agreement and the GNU Lesser General Public License.
6. After installing the GUI Software, connect the DC40 LED Driver to the PC.
7. Start the GUI Software from the desktop icon.

#### 4.4.3 Software Operation



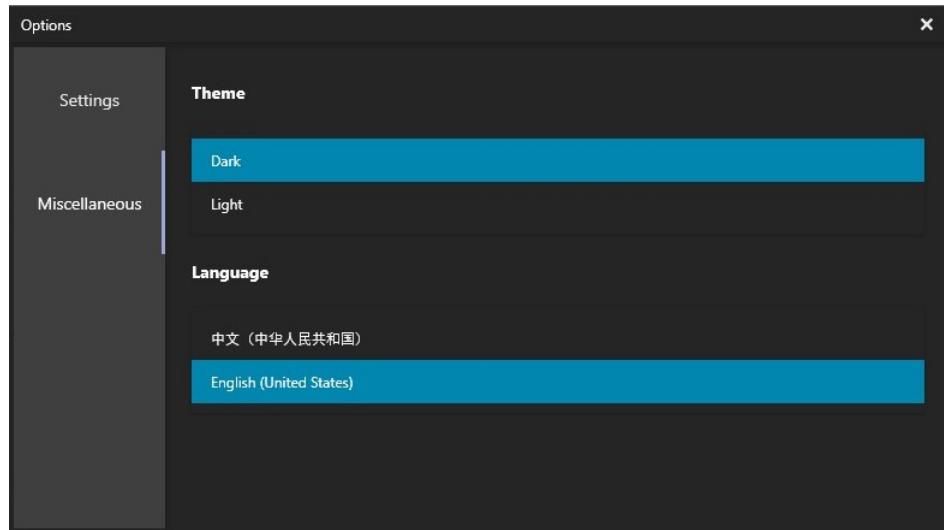
**Figure 6** Screenshot of the Initial Start Screen

If no DC40 LED Driver is connected, the GUI Software starts with the screen above.

Use this main menu bar in the upper left to select and connect the DC40 LED Driver, to choose GUI Software options like themes and display language, to update the GUI Software, and to find support information and help.

##### 4.4.3.1 Main Menu Bar

###### Options



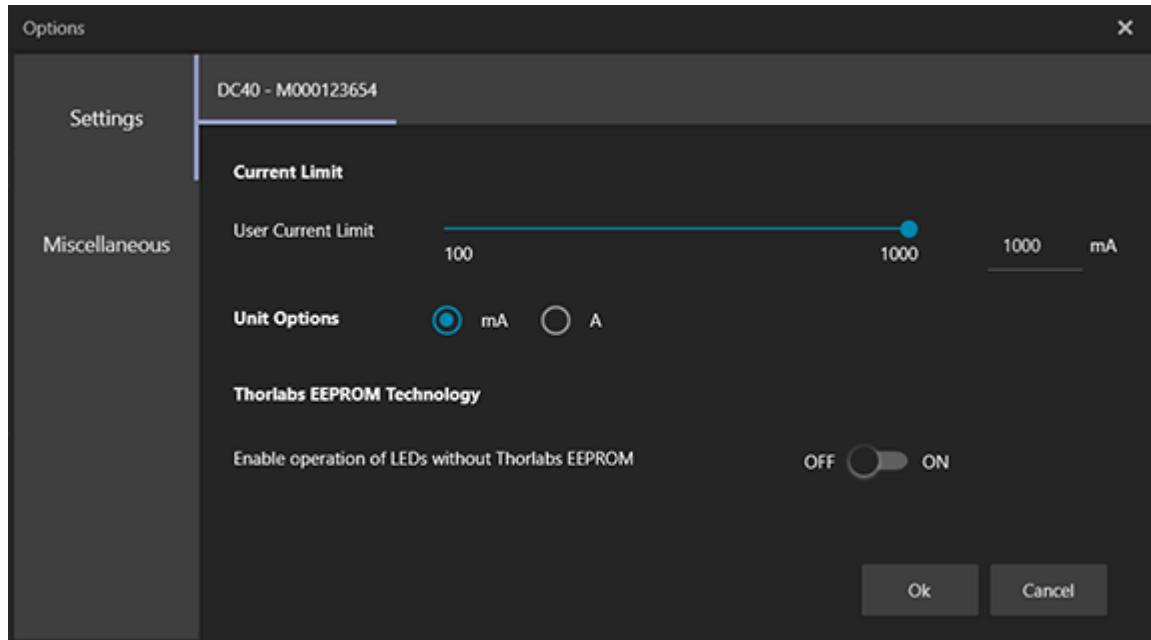
**Figure 7** Screenshot of the Miscellaneous Options

1. Click the icon "Options" in the main menu bar.
  - The window "Options" shows "Settings" and "Miscellaneous".

2. Choose "Miscellaneous".

- Choose between Dark and Light for the GUI Software theme.
- Choose between English and Chinese for the GUI Software language.

In contrast to "Settings", "Miscellaneous" can also be configured without a DC40 LED Driver connected.



**Figure 8**      Screenshot of the *Settings Options*

3. Choose "Settings".

- Use the slide control or the box next to it to adjust the user current Limit.
- Choose between mA and A for the current unit.<sup>4</sup>
- Thorlabs EEPROM Technology: Use this switch to enable or disable operation of LEDs without Thorlabs EEPROM.<sup>5,6</sup>
- Confirm with OK.

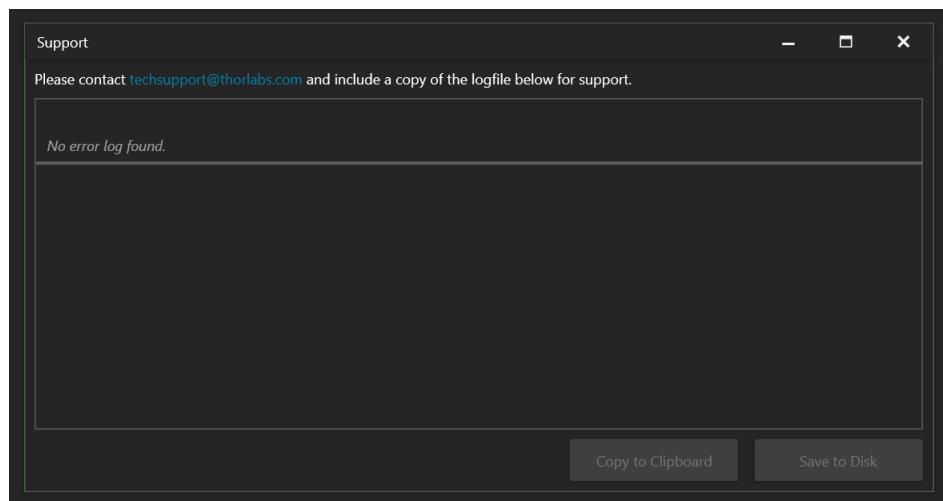
<sup>4</sup> The set point and current limit resolutions are 10 mA within the GUI.

<sup>5</sup> The user needs to select the appropriate user current limit using the slider according to the rated current of the used non-Thorlabs LEDs.

<sup>6</sup> Thorlabs LEDs are recognized regardless of the position of the slide switch.

## Support

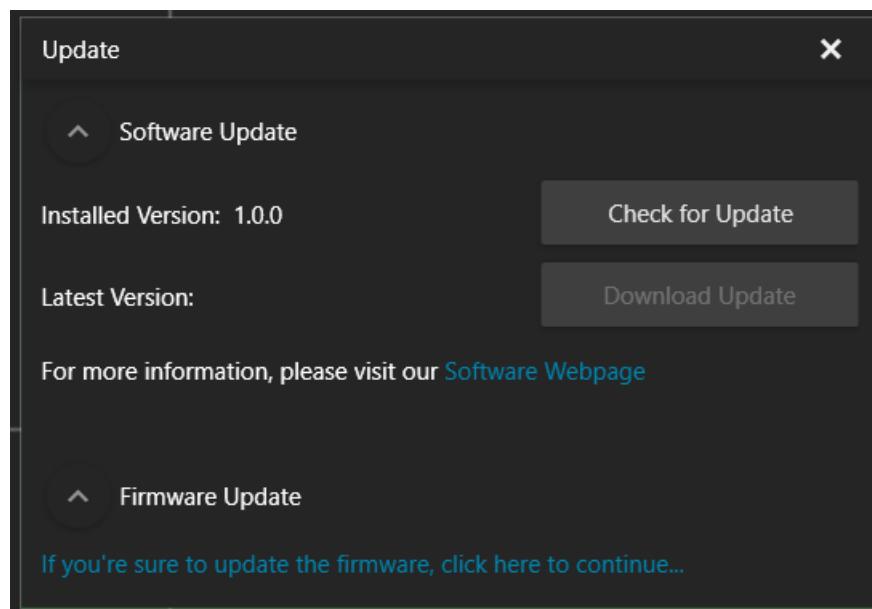
The support panel shows the logged information on GUI Software performance and errors. Please provide this information to the Thorlabs support engineers in the case they are contacted for assistance.



**Figure 9**      *Screenshot of the Support Screen*

## Update

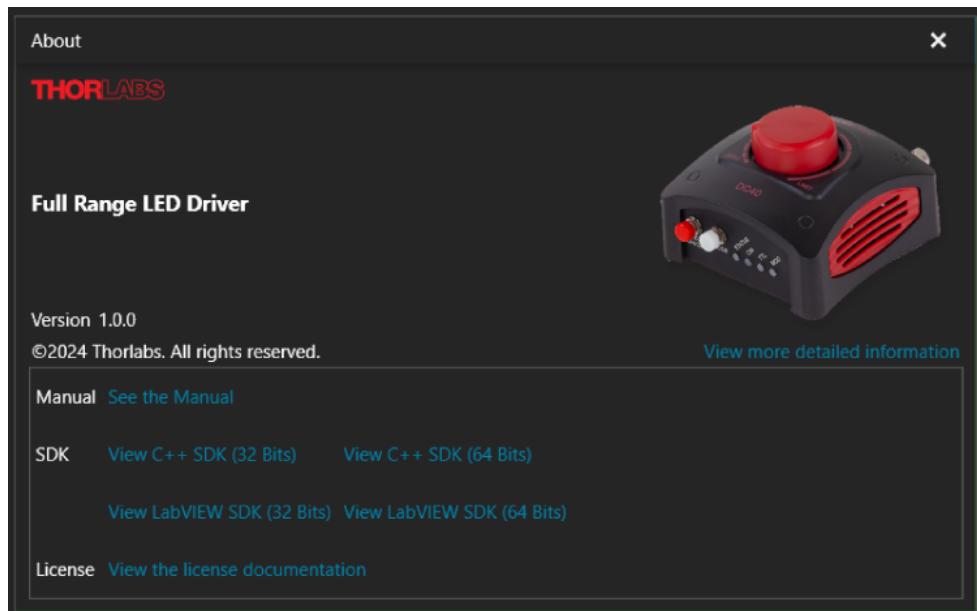
The GUI Software as well as the DC40 LED Driver's firmware can be updated via the panel shown below.



**Figure 10**      *Screenshot of Software and Firmware Updates*

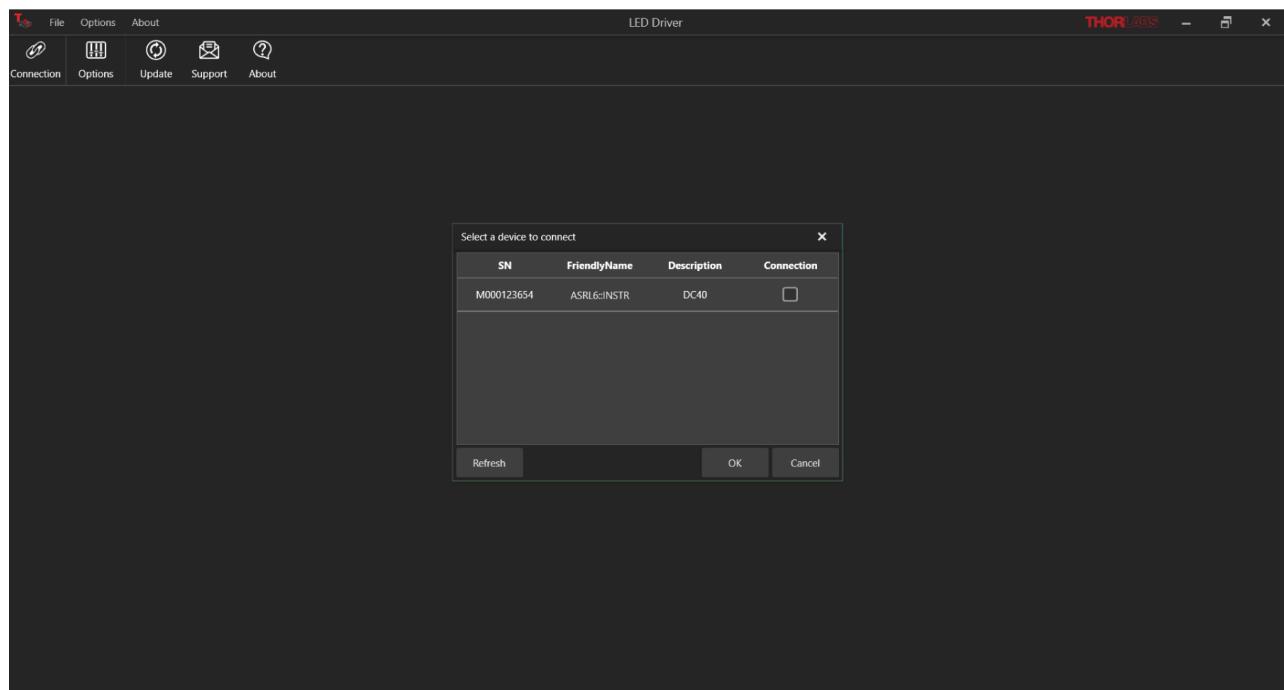
## About

In this panel, you can find the DC40 LED Driver manual, information on SDKs, and license documentation.



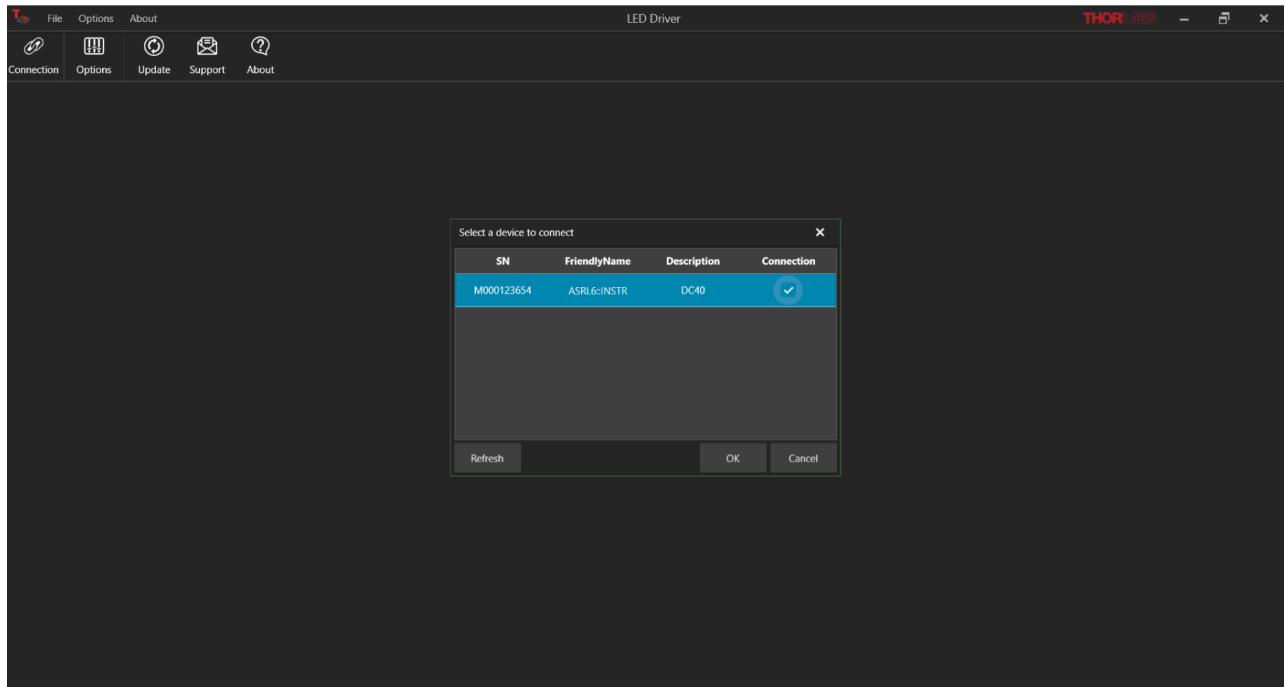
**Figure 11** Screenshot of the Help Screen

### 4.4.3.2 Connection



**Figure 12** Screenshot of Connecting the DC40 LED Driver

1. Make sure the DC40 LED Driver is connected to the PC.
2. Click the icon "Connection" in the main menu bar.
  - The window "Select a device to connect" appears and shows the connected DC40 LED Driver.

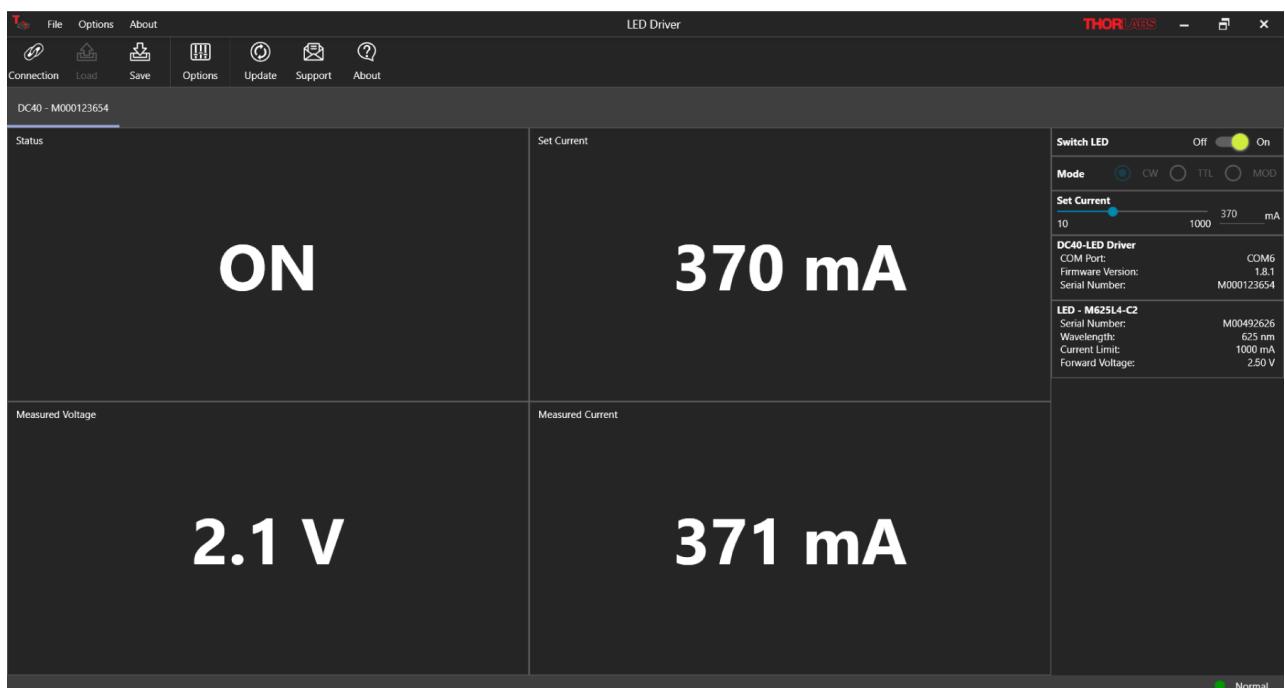


**Figure 13** Screenshot of the Connected DC40 LED Driver

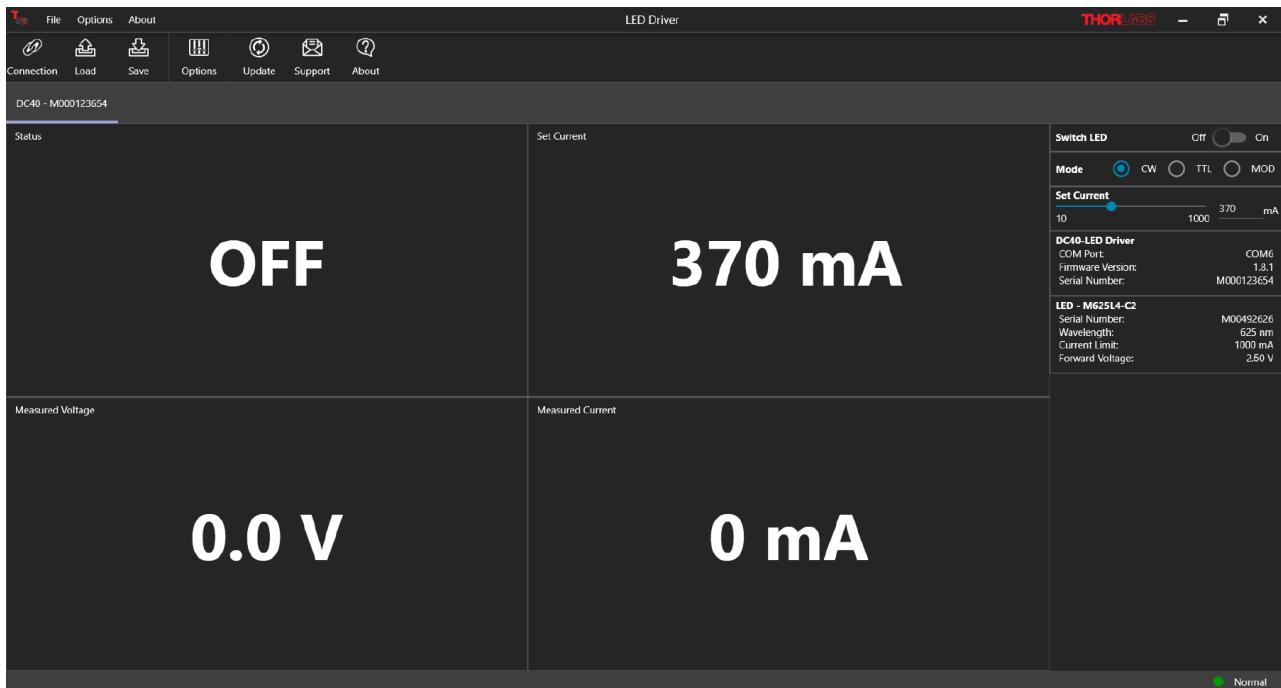
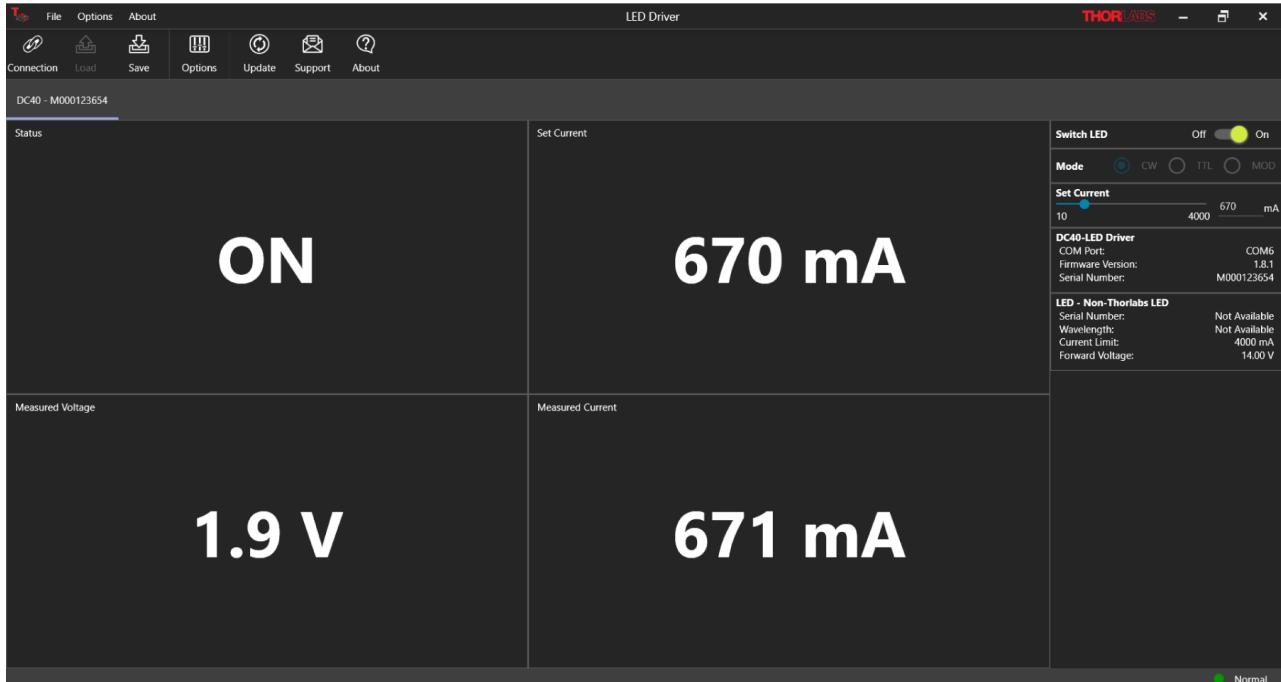
3. Check the box under "Connection" in the line of your selected DC40 LED Driver.
  - The window "Device Connection" shows the connected device type with its serial number (SN).
4. Confirm with OK.
  - The selected Thorlabs LED is connected.

#### 4.4.3.3 Thorlabs LEDs Operation

##### Normal Operation (On)



**Figure 14** Screenshot of the Normal Operation (On)

**Normal Operation (Off)****Figure 15** Screenshot of the Normal Operation (Off)**4.4.3.4 Non-Thorlabs LEDs Operation****Operation (On)****Figure 16** Screenshot of the Operation (On)

**Operation (Off)**

**Figure 17**      *Screenshot of the Operation (Off)*

## Chapter 5      Custom Software

In order to write your own application, you need specific instrument driver(s) and some tools for use in different programming environments. The driver and tools are included in the installer package on the website.

In this section the location of drivers and files, required for programming in different environments, are given for installation under Windows® 10 (32-Bit and 64-Bit) and Windows® 11.

GUI Software and drivers contains 32-Bit and 64-Bit applications.

In 32-Bit systems, only the 32-Bit components are installed to:

**C:\Program Files\...**

In 64-Bit systems the 64-Bit components are being installed to:

**C:\Program Files\...**

while 32-Bit components can be found at:

**C:\Program Files (x86)\...**

In the table below you will find a summary of what files you need for particular programming environments.

Programming environment	Necessary files
C, C++, CVI	*.fp (Function Panel File; CVI IDE only) *.h (Header File) *.lib (Static Library) *.dll (Dynamic Linked Library)
C#	*.net wrapper dll
Visual Studio	*.h (Header File) *.lib (Static Library) or *.net wrapper dll
LabVIEW™	*.fp (Function Panel) and NI-VISA™ Instrument Driver Beside that, LabVIEW™ driver vi's are provided with the *.llb container file.

**Table 7            Files for Programming Environments**

All above environments require also the NI-VISA™ instrument driver dll.

During NI-VISA™ Runtime installation, a system environment variable VXIPNPPATH for including files is created. It contains the information where the drivers are installed to, usually to C:\Program Files\IVI Foundation\VISA\WinNT\.

After installation of a NI-VISA™ Runtime, a system reboot is required: This environment variable is necessary for installation of the instrument driver GUI Software components.

In the next sections the location of above files is described in detail.

## 5.1 32-Bit Operating System

According to the VPP6 (Rev 6.1) Standard the installation of the 32-Bit VXIpnnp driver includes both the WINNT and GWINNT frameworks.

### VXIpnnp Instrument Driver:

```
C:\Program Files\IVI Foundation\VISA\WinNT\Bin\TLDC_32.dll  
C:\Program Files\Thorlabs\TLDC\Drivers\Instr\bin\TLDC_32.dll
```

**This instrument driver is required for all development environments!**

### Header File

```
C:\Program Files\IVI Foundation\VISA\WinNT\Include\TLDC.h  
or  
C:\Program Files\Thorlabs\TLDC\Drivers\Instr\incl\TLDC.h
```

### Static Library

```
C:\Program Files\IVI Foundation\VISA\WinNT\lib\msc\TLDC_32.lib  
C:\Program Files\IVI Foundation\VISA\WinNT\Lib_x64\msc\TLDC_64.lib  
or  
C:\Program Files\Thorlabs\TLDC\Drivers\Instr\msvc\TLDC_32.lib  
C:\Program Files\Thorlabs\TLDC\Drivers\Instr\msvc64\TLDC_64.lib
```

### Function Panel

```
C:\Program Files\IVI Foundation\VISA\WinNT\TLDC\TLDC.fp  
or  
C:\Program Files\Thorlabs\TLDC\Drivers\Instr\CVI\TLDC.fp
```

### Online Help for VXIpnnp Instrument Driver:

```
C:\Program Files\IVI Foundation\VISA\WinNT\TLDC\Manual\TLDC.html  
or  
C:\Program Files\Thorlabs\TLDC\Drivers\Manual\TLDC.html
```

### NI LabVIEW™ Driver and Example

The LabVIEW™ Driver is a 32-Bit driver and compatible with 32-Bit NI-LabVIEW™ versions 8.5 and higher only.

```
C:\Program Files\National Instruments\LabVIEW™ xxxx\instr.lib\TLDC\...  
...TLDC.llb
```

LabVIEW™ container file with driver VI's and an example. "LabVIEW™ xxxx" stands for actual LabVIEW™ installation folder.

**.net wrapper dll**

```
C:\Program Files\Microsoft.NET\Primary Interop Assemblies\...
...Thorlabs.TLDC_32.Interop.dll
...Thorlabs.TLDC_64.Interop.dll
```

**or**

```
C:\Program Files\IVI Foundation\VISA\VisaCom\...
...Primary Interop Assemblies\Thorlabs.TLDC_32.Interop.dll
```

**.net wrapper dll - NuGet Package**

```
C:\Users\Public\Documents\Thorlabs\NuGet\...
...Thorlabs.TLDC_32.Interop.x.x.x.x.nupkg
...Thorlabs.TLDC_64.Interop.x.x.x.x.nupkg
```

"x.x.x.x" stands for the driver version.

**Example for CVI C**

```
C:\Program Files\IVI Foundation\VISA\WinNT\TLDC\Examples\CVI C Sample\
```

**5.2 64-Bit Operating System**

According to the VPP6 (Rev 6.1) Standard, the installation of the 64-Bit VXIpnp driver includes the WINNT, WIN64, GWINNT and GWIN64 frameworks. This means, that the 64-Bit driver includes the 32-Bit driver as well.

In case of a 64-Bit operating system, 64-Bit drivers and applications are installed to:

**"C:\Program Files"**

while the 32-Bit files - to

**"C:\Program Files (x86)"**

Below are listed both installation locations, so far applicable.

**VXIpnp Instrument Driver:**

```
C:\Program Files (x86)\IVI Foundation\VISA\WinNT\Bin\TLDC_32.dll
C:\Program Files\IVI Foundation\VISA\Win64\Bin\TLDC_64.dll
```

**or**

```
C:\Program Files (x86)\Thorlabs\TLDC\Drivers\Instr\bin\TLDC_32.dll
C:\Program Files (x86)\Thorlabs\TLDC\Drivers\Instr\bin\TLDC_64.dll
```

**This instrument driver is required for all development environments!****Header File**

```
C:\Program Files\IVI Foundation\VISA\Win64\Include\TLDC.h
```

**or**

```
C:\Program Files (x86)\Thorlabs\TLDC\Drivers\Instr\incl\TLDC.h
```

**or**

```
C:\Program Files (x86)\IVI Foundation\VISA\WinNT\include\TLDC.h
```

**Static Library**

```
C:\Program Files (x86)\IVI.Foundation\VISA\WinNT\lib\msc\...
...TLDC_32.lib  
C:\Program Files\IVI Foundation\VISA\Win64\Lib_x64\msc\TLDC_64.lib  
or  
C:\Program Files (x86)\Thorlabs\TLDC\Drivers\Instr\msvc\TLDC_32.lib  
C:\Program Files (x86)\Thorlabs\TLDC\Drivers\Instr\msvc64\TLDC_64.lib
```

**Function Panel**

```
C:\Program Files\IVI Foundation\VISA\Win64\TLDC\TLDC.fp  
or  
C:\Program Files (x86)\Thorlabs\TLDC\Drivers\Instr\CVI\TLDC.fp  
or  
C:\Program Files (x86)\IVI Foundation\VISA\WinNT\TLDC\TLDC.fp
```

**Online Help for VXIpnp Instrument Driver:**

```
C:\Program Files\IVI Foundation\VISA\Win64\TLDC\Manual\TLDC.html  
or  
C:\Program Files (x86)\Thorlabs\TLDC\Drivers\Manual\TLDC.html  
or  
C:\Program Files (x86)\IVI Foundation\VISA\WinNT\TLDC\Manual\TLDC.html
```

**NI LabVIEW™ Driver**

The LabVIEW™ Driver supports 32-Bit and 64-Bit NI-LabVIEW™ version 2009 and higher.

```
C:\Program Files\National Instruments\LabVIEW™ xxxx\Instr.lib\TLDC\...
...TLDC.llb  
or  
C:\Program Files (x86)\National Instruments\LabVIEW™
xxxx\Instr.lib\DC40\... ...TLDC.llb
```

LabVIEW™ container file with driver vi's and an example. "LabVIEW™ xxxx" stands for actual LabVIEW™ installation folder.

**.net wrapper dll**

```
C:\Program Files (x86)\Microsoft.NET\Primary Interop Assemblies\...
...Thorlabs.TLDC_32.Interop.dll
...Thorlabs.TLDC_64.Interop.dll  
C:\Program Files\IVI Foundation\VISA\VisaCom64\...
...Primary Interop Assemblies\Thorlabs.TLDC_64.Interop.dll
```

**.net wrapper dll - NuGet Package**

C:\Users\Public\Documents\Thorlabs\NuGet\...  
...Thorlabs.TLDC\_32.Interop.x.x.x.x.nupkg  
...Thorlabs.TLDC\_64.Interop.x.x.x.x.nupkg  
"x.x.x.x" stands for the driver version.

**Example for LabVIEW™**

C:\Program Files\National Instruments\LabVIEW™ xxxx\Instr.lib\TLDC\...  
...TLDC.llb

LabVIEW™ container file with driver vi's and an example. "LabVIEW™ xxxx" stands for actual LabVIEW™ installation folder.

**Example for CVI C**

C:\Program Files\IVI Foundation\VISA\WinNT\TLDC\Examples\CVI C Sample\

## Chapter 6 Maintenance and Cleaning

**NOTICE: Risk of Damaging the DC40 LED Driver!**

The DC40 LED Driver is not water resistant. If the DC40 LED Driver gets into contact with fluids, the DC40 LED Driver can be damaged.

To avoid damaging, do not expose the DC40 LED Driver to:

**NOTICE**

- Spray
- Liquids
- Solvents
- Adverse weather conditions

The unit does not need regular maintenance by the user. It does not contain any modules and/or components that could be repaired by the user himself. If a malfunction occurs, please see the [Return of Devices](#) section and contact [Thorlabs](#) for return instructions.

Do not remove covers!

## Chapter 7 Troubleshooting and Repair

With the DC40 LED Driver, troubleshooting is carried out using the GUI Software.

The errors and warnings notifications are shown at the bottom of the GUI screen.



**Figure 18** Screenshot of Errors and Warnings (at the Bottom of the Screen)

Below are a few checks to help in troubleshooting problems that may arise.

If the unit does not appear to turn on correctly, please check the following items:

- Ensure that the main AC receptacle is powered.
- Ensure that main power cable is fully seated at both ends.

Please contact your local Thorlabs Technical Support office with any questions.

## Chapter 8 Disposal

Thorlabs verifies our compliance with the WEEE (Waste Electrical and Electronic Equipment) directive of the European Community and the corresponding national laws. Accordingly, all end users in the EC may return “end of life” Annex I category electrical and electronic equipment sold after August 13, 2005 to Thorlabs, without incurring disposal charges. Eligible units are marked with the crossed out “wheelie bin” logo (see right), were sold to and are currently owned by a company or institute within the EC, and are not dissembled or contaminated. Contact Thorlabs for more information. Waste treatment is your own responsibility. “End of life” units must be returned to Thorlabs or handed to a company specializing in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site. It is the user's responsibility to delete all private data stored on the device prior to disposal.



## Chapter 9 Thorlabs Worldwide Contacts

For technical support or sales inquiries, please visit us at [www.thorlabs.com/contact](http://www.thorlabs.com/contact) for our most up-to-date contact information.



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