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# Optem<sup>®</sup> FUSION Console Reference Manual

Part No. MAN-350015A



ENGAGE. ENABLE. EXCEL.

APPLIED MICROSCOPY

Part No: MAN-350015A

Status: Released

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# List of Acronyms

COM	Communication
GPIO	General Purpose Input Output
IO	Input Output
LED	Light emitting diode
PWM	Pulse width modulation

## CHAPTER

# 1

# Getting Started

This chapter provides an overview of the Optem® FUSION Console software, including how to install and start using the software.

The following topics are covered:

- [Optem® FUSION Console Software Overview, pg. 8](#)
  - [Computer System Requirements, pg. 8](#)
- [Installing the Software, pg. 9](#)
  - [Uninstalling the Software, pg. 9](#)
- [Setting up the Optem® FUSION Console Software, pg. 10](#)
  - [Starting the Software, pg. 10](#)
- [Technical Support, pg. 11](#)

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## Optem® FUSION Console Software Overview

The Optem® FUSION Console software is used to configure and operate Zoom, Focus, and LED modules.

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**NOTE:** *This user manual provides software instructions to perform a typical Optem Fusion setup procedure, with Zoom, Focus, and LED modules.*

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## Computer System Requirements

The control computer on which the Optem® FUSION Console software is installed must meet the following minimum system requirements:

- Windows 10 operating system or later
- 8 GB of RAM
- At least 50 MB of free hard disk space
- A display with at least 1024 x 768 resolution
- RS-485 compatible interface



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## Installing the Software

The Optem® FUSION Console software must be installed on the control computer before the Optem® FUSION can be used. The software is distributed in .zip format.

The Optem® FUSION Console software installer features a standard Microsoft Windows setup interface, which is simple and easy to use. You can install multiple versions of the software on the same computer, provided that you select different installation folders.

To install the software:

- See the following sections in *Chapter 2 “Installing Optem Fusion Software” in the MAN-350014 Optem® FUSION Controller Software Development Manual*:
  - Performing the Optem Fusion setup,
  - Performing an Optem Fusion Console installation
  - Performing an Optem Fusion JSON Server installation
  - Performing a Software Development Kit installation

## Uninstalling the Software

You can uninstall the Optem® FUSION Console software in one of two ways:

- 1) Using the Optem® FUSION Console Uninstall application that is located in the Optem® FUSION Console software installation folder.
- 2) Using the **Uninstall a program feature** in the Windows Control Panel.

## Setting up the Optem® FUSION Console Software

The first time you use the Optem® FUSION Console software after installing the system you must follow the procedure provided in this section to set up the software for use with Optem® FUSION Console.

### Starting the Software

This section describes how to start the Optem® FUSION Console software and establish a connection with the controller.

**NOTE:** *The Optem FUSION® system must be fully installed and connected before you can use the Optem® FUSION Console software to configure and control the system. For information on how to set up other components in the system (for example, Focus), refer to the component specific user manual.*

To start the Optem® FUSION Console software:

1. On the **Start** menu, click **Optem Fusion Console**.
2. At the top of the main panel, in the **COM** list, select the serial port connection.

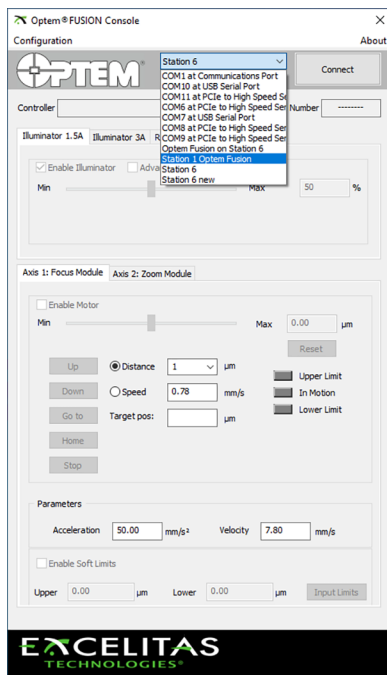


Figure 1 Optem® FUSION Console Main Panel COM Port

3. Click **Connect**. When communication is established, the controls in the main panel become available.
4. If you need to change the current settings of the controller, select the Configuration menu on the top left of the main window (see "[Configuration Parameters](#)" on page 17).

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## Technical Support

For technical support, please contact our Technical Support Team at [Inspection@excelitas.com](mailto:Inspection@excelitas.com).

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## CHAPTER

# 2

# Optem<sup>®</sup> FUSION Console Software

This chapter provides an overview of the Optem<sup>®</sup> FUSION Console software and outlines the procedures required for using the software. The following topics are covered:

- [Main Panel Overview, pg. 14](#)
  - [Software Status Indicators, pg. 16](#)
- [Configuration Parameters, pg. 17](#)
  - [Configuring the Controller, pg. 18](#)
  - [Configuring Remote Controllers, pg. 27](#)
  - [Configuring Server, pg. 28](#)
- [Adjusting the Focus Module Position, pg. 30](#)
  - [Homing, pg. 31](#)
- [Controlling the Illuminator, pg. 31](#)

# Main Panel Overview

When you start the Optem® FUSION Console software console, the main panel is displayed (see [Figure 2](#)). The controls available on the main panel are described in [Table 1](#).

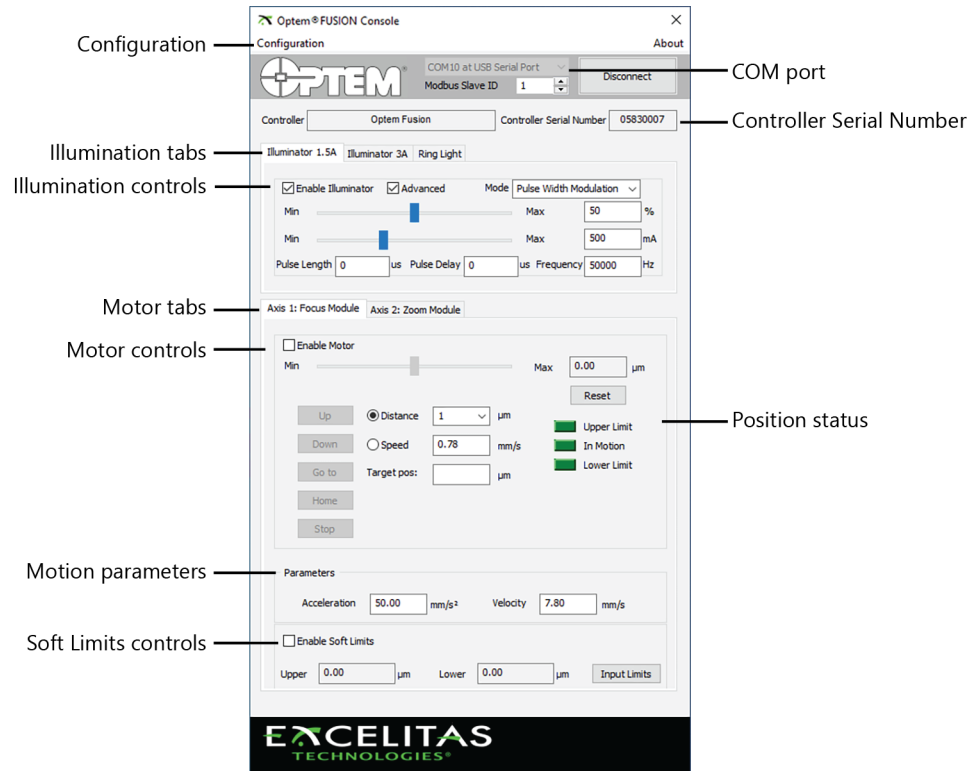


Figure 2 Optem® FUSION Console Main Panel Description

Table 1 Optem® FUSION Console Main Panel Controls

Control	Description
<b>Configuration</b>	Allows you to configure the motion parameters for the Focus module or the Zoom module or the LED module(s). Default parameters for configuring the Focus module or the Zoom module or the LED module(s) are available. For details, see " <a href="#">Configuration Parameters</a> " on page 17.
<b>COM port</b>	Allows you to select a serial port for communication between the control computer and the Optem® FUSION Console. For details, see " <a href="#">Setting up the Optem® FUSION Console Software</a> " on page 10.
<b>Controller Serial Number</b>	Displays the controller’s serial number.
<b>Illuminator tabs</b>	Displays the Illuminator 1.5A, Illuminator 3A, and Ring Light tabs. For details, see " <a href="#">Controlling the Illuminator</a> " on page 31.

**Table 1 Optem® FUSION Console Main Panel Controls (continued)**

Control	Description
<b>Illuminator controls</b>	Allows control of the 1.5A Illuminator, 3A Illuminator (if used), and Ring Light Illuminator (if used). When configured in Parallel mode, only one Illuminator tab is displayed (Illuminator 1). For details, see " <a href="#">LED Tabs</a> " on page 23.
<b>Motor tabs</b>	Displays the Axis 1 and the Axis 2 tabs. For details, see " <a href="#">Axis Tabs</a> " on page 21.
<b>Motor controls</b>	When the Enable Motor checkbox is selected, allows controlling the motion of the selected motor (either Focus or Zoom). The distance to the relative position is displayed in the <b>Distance</b> text box. You can enter the step size manually in the text box or select from the drop-down, and click <b>Up</b> or <b>Down</b> to move to the position. For details, see " <a href="#">Homing</a> " on page 31. The <b>Go to</b> , and <b>Home</b> buttons are used to configure the Focus or Zoom to the home position. For details, see " <a href="#">Homing</a> " on page 31.
<b>Motion parameters</b>	Allows setting the acceleration (mm/s <sup>2</sup> ) and the velocity (mm/s) for the selected motor (either Focus or Zoom). For details, see " <a href="#">Homing</a> " on page 31.
<b>Soft Limit controls</b>	When the Enable Soft Limits checkbox is selected, allows setting of the Upper and Lower Soft Limits for the selected motor (either Focus or Zoom). For details, see " <a href="#">Homing</a> " on page 31.
<b>Position status</b>	Allows resetting of the Current position (µm) for the selected motor (either Focus or Zoom). For details, see " <a href="#">Homing</a> " on page 31.

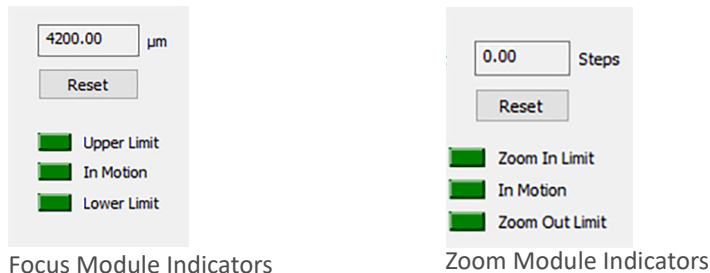
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**NOTE:** The above information is a general reference, and intended for users with Zoom, Focus and Illuminators controlled by the controller. Different combinations will result in a modified GUI layout.

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## Software Status Indicators

The software status indicators on the main panel, display the feedback of the Optem® FUSION Console status. A description of the status indicators are provided in [Table 2](#).



Focus Module Indicators

Zoom Module Indicators

**Figure 3** *Software Status Indicators*

There are three status indicators on the Optem® FUSION Console software. The status indicators represent the current position of the Focus or Zoom module. For the Focus module, the current position is displayed in  $\mu\text{m}$ , in the text box. The current position is relative to the “zero” position. For the Zoom module, the current position is displayed in Steps, in the text box. The current position is relative to the “zero” position. The “zero” position is set when Homing is executed. To manually set the “zero” position, click the **Reset** button.

**Table 2** *Software Status Indicators – Focus Module*

Indicator	Description
<b>Upper Limit</b>	Upper limit switch status. If green, the limit switch has not been activated. If yellow, the limit switch has been activated.
<b>In Motion</b>	If green, the Optem® FUSION Console is busy executing a motor motion.
<b>Lower Limit</b>	Lower limit switch status. If green, the limit switch has been activated or the connection to the limit switch is interrupted.

**Table 3** *Software Status Indicators – Zoom Module*

Indicator	Description
<b>Zoom In Limit</b>	Upper limit switch status. If green, the limit switch has not been activated. If yellow, the limit switch has been activated.
<b>In Motion</b>	If green, the Optem® FUSION Console is busy executing a motor motion.
<b>Zoom Out Limit</b>	Lower limit switch status. If green, the limit switch has been activated or the connection to the limit switch is interrupted.

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**NOTE:** *By moving the Focus or Zoom module in the opposite direction, the limit switch is deactivated.*

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## Configuration Parameters

The following section describes how to configure the parameters on the Optem® FUSION Console software. There are three main configuration items in the Configuration menu:

- Controller Configuration (see "Configuring the Controller" on page 18)
- Remote Devices (see "Configuring Remote Controllers" on page 27)
- Server Configuration (see "Configuring Server" on page 28)

Before you can use the Optem® FUSION Console software to control your device, you must configure the parameters for your specific use.

**NOTE:** The configuration parameters are set during initialization. All initialization settings are saved to the Optem® FUSION Console automatically and will be applied with every use.

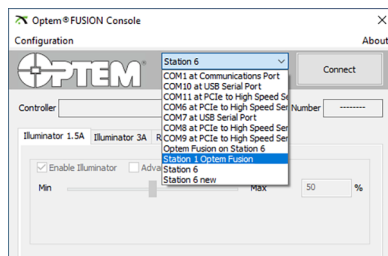
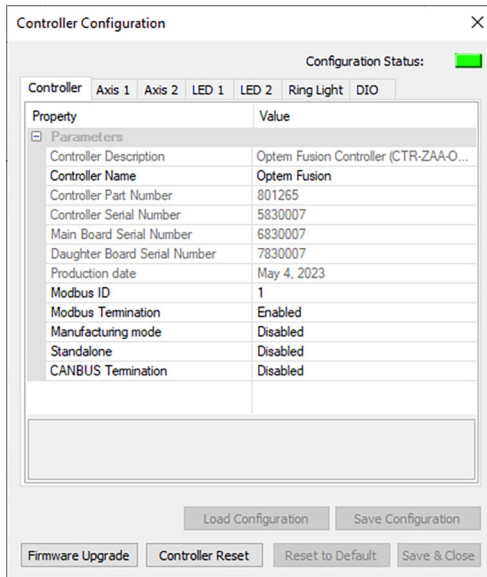


Figure 4 Optem® FUSION Console Configuration Menu

## Configuring the Controller

To configure the controller:

1. On the main panel window, under **Configuration**, select **Controller Configuration** from the list. The Controller Configuration window opens.



**Figure 5** *Controller Configuration Window*

2. Select a device tab to configure that device's parameters:
  - Controller (see "[Controller Tab](#)" on page 20)
  - Axis 1 (see "[Axis Tabs](#)" on page 21)
  - Axis 2 (see "[Axis Tabs](#)" on page 21)
  - LED (see "[LED Tabs](#)" on page 23)
  - Ring Light (see "[Ring Light Tab](#)" on page 25)
  - DIO (see "[DIO Tab](#)" on page 26)
3. If a firmware upgrade is required, click **Firmware Upgrade**.
4. Click **Save & Close**.

**Table 4 Controller Configuration Description**

Menu	Description
<b>Device tabs</b>	Allows the selection of a device tab to configure that device's parameters: <ul style="list-style-type: none"> <li>• Controller</li> <li>• Axis 1</li> <li>• Axis 2</li> <li>• LED 1</li> <li>• LED 2</li> <li>• Ring Light</li> <li>• DIO</li> </ul>
<b>Configuration Status</b>	The indicator shows the status of the EEPROM. If the indicator is green, the values are the same as the EEPROM values with no error. If the indicator is yellow, a value has been changed but not saved. If the indicator is red, there was an error reading from EEPROM.
<b>Load Configuration</b>	Allows the loading of a custom device configuration from a user-supplied file. This only applies to the currently selected tab except for the Controller tab, where it is disabled. Each file is only expected to support one device. If more than one device is included, only the first enumerated device is used.
<b>Save Configuration</b>	Allows the saving of a custom device configuration to a file. This only applies to the currently selected tab except for the Controller tab, where it is disabled.
<b>Firmware Upgrade</b>	Allows to upgrade the controller firmware.
<b>Controller Reset</b>	Allows to send a reset command to the controller to reset itself.
<b>Reset to Default</b>	Allows to reset all the current interface tab parameters to default values.
<b>Save &amp; Close</b>	This button allows to save all changes made to the controller configuration and the controller firmware and closes the Controller Configuration window.

## Controller Tab

The Controller tab in the Controller Configuration window is used to set the parameters values of the controller.

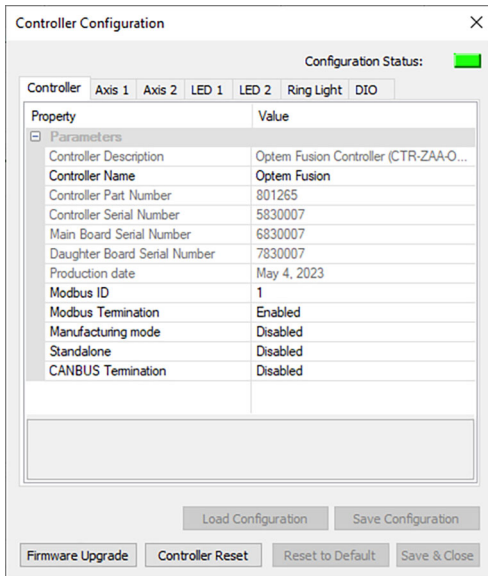


Figure 6 Controller Configuration Window – Controller Tab

Table 5 Controller Tab Description

Parameter	Description
<b>Controller Description</b>	Read only field, giving a brief description of the controller based on the part number.
<b>Controller Name</b>	Allows entering a controller “Friendly” name that can be changed by the user. Useful when more than one controller is used.
<b>Controller Part Number</b>	Not editable.
<b>Controller Serial Number</b>	Not editable.
<b>Main Board Serial Number</b>	Not editable.
<b>Daughter Board Serial Number</b>	Not editable.
<b>Production date</b>	Not editable.
<b>Modbus ID</b>	Allows setting the Modbus node address. Default value is 1.
<b>Modbus Termination</b>	Allows enabling/disabling the Modbus termination resistor. Default is enable.
<b>Manufacturing mode</b>	This mode is not available.
<b>Standalone</b>	This mode is not available.
<b>CANBUS Termination</b>	This mode is not available.

## Axis Tabs

The Axis 1 and Axis 2 tabs in the Controller Configuration window are used to set the parameters values of the Axis 1 device (in this case, the Focus module) and Axis 2 device (in this case, the Zoom module). The parameters for the two motors are the same with the only difference being in some of the values (see Table 6).

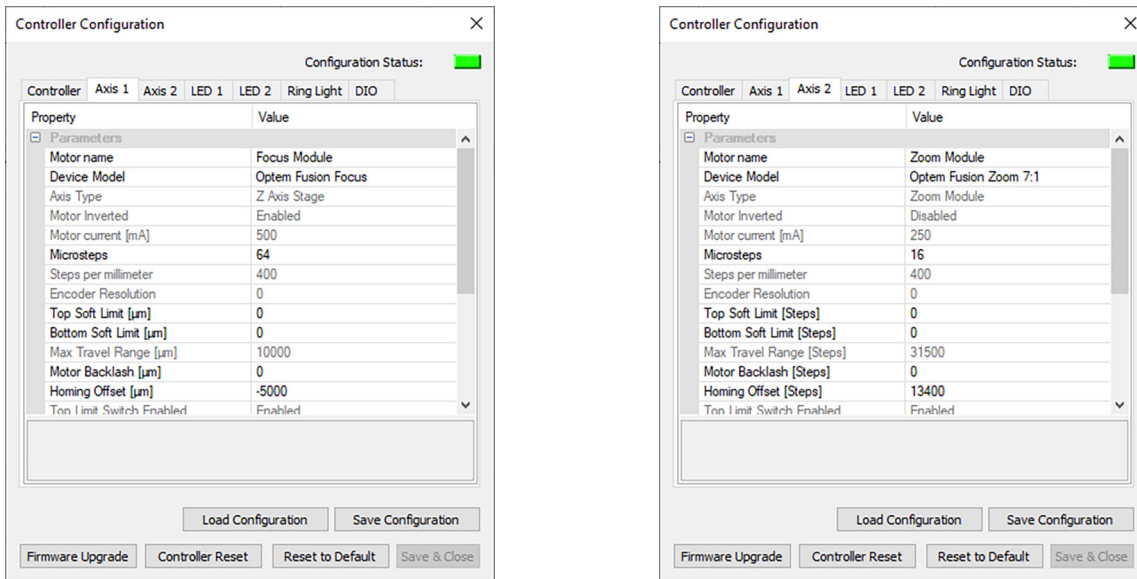


Figure 7 Controller Configuration Window – Axis 1 and Axis 2 Tabs

Table 6 Axis 1 and Axis 2 Tabs Description

Parameter	Description
<b>Motor name</b>	Allows the naming of the type of motor, in this case, Focus module.
<b>Device Model</b>	Displays the device model type.
<b>Axis type</b>	Allows the selection of the axis the motor controls: <ul style="list-style-type: none"> <li>• Z Axis Stage – stage motion is up&lt;--&gt;down (Focus module)</li> <li>• X Axis Stage – stage motion is left&lt;--&gt;right</li> <li>• Y Axis Stage – stage motion is push&lt;--&gt;pull</li> <li>• Zoom Module – stage motion is Zoom In&lt;--&gt;Zoom Out</li> </ul>
<b>Motor Inverted</b>	Allows the motion control of the motor control to be inverted.
<b>Motor current (mA)</b>	Allows setting the motor driver reference current control. Maximum value is 1350 mA.
<b>Microsteps</b>	Allows setting the number of microsteps ( $\mu$ steps) the motor takes for each full step. When the motor is a stepper motor, the available number of microsteps are: 1, 2, 4, 8, 16, 32, 64, and 128.
<b>Steps per millimeter</b>	Allows setting the number of full steps per millimeter the module takes to move.

**Table 6 Axis 1 and Axis 2 Tabs Description (continued)**

Parameter	Description
<b>Encoder Resolution</b>	Currently not supported.
<b>Top Soft Limit (μm)</b>	Allows setting the default Top Soft Limit in μm.
<b>Bottom Soft Limit (μm)</b>	Allows setting the default Bottom Soft Limit in μm.
<b>Max Travel Range (μm)</b>	Allows setting the expected travel range in μm for the Focus module and Steps for the Zoom module.
<b>Motor Backlash (μm)</b>	Allows setting the Backlash adjustment in μm.
<b>Homing Offset (μm)</b>	Allows setting the Home offset in μm for the Focus module and Steps for the Zoom module.
<b>Top Limit Switch Enabled</b>	Allows enabling/disabling the top limit switch.
<b>Top Limit Switch Inverted</b>	Allows inverting the polarity of the top limit switch.
<b>Bottom Limit Switch Enabled</b>	Allows enabling/disabling the bottom limit switch.
<b>Bottom Limit Switch Inverted</b>	Allows inverting the polarity of the bottom limit switch.
<b>Limit Switches Swapped</b>	Allows swapping the limit switches.
<b>Velocity (mm/s)</b>	Allows setting the velocity of the motor in mm/s, or Steps/s for Zoom Module.
<b>Acceleration (mm/s<sup>2</sup>)</b>	Allows setting the maximum possible acceleration of the motor in mm/s <sup>2</sup> , or Steps/s <sup>2</sup> for Zoom Module.

## LED Tabs

The LED tabs in the Controller Configuration window is used to set the parameters values of the LEDs. The parameters for the two LEDs are the same with the only difference being in some of the values (see [Table 7](#)).

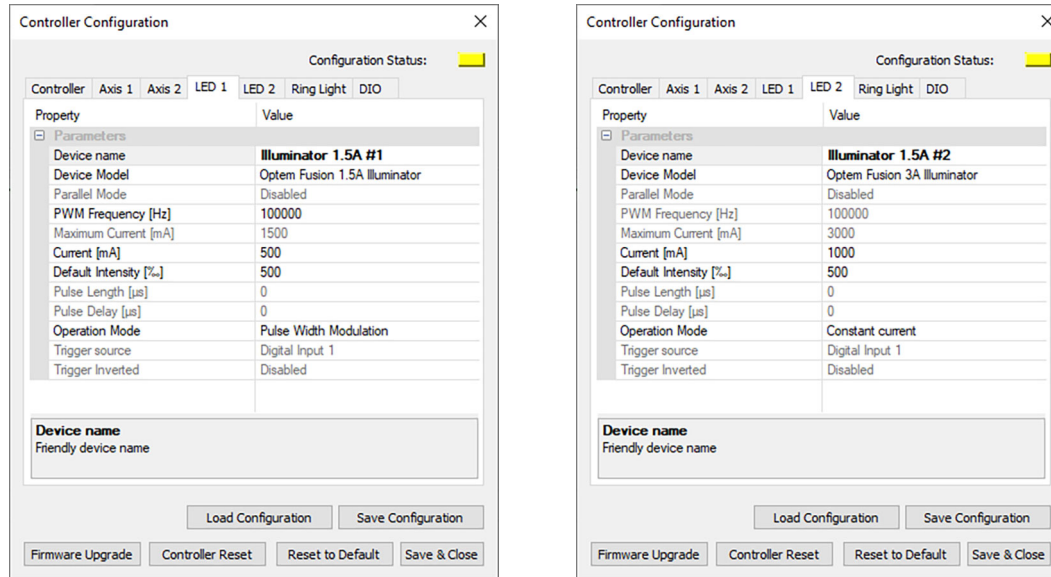


Figure 8 Controller Configuration Window – LED 1 and LED 2 Tabs

Table 7 LED Tabs Description

Parameter	Description
Device Name	Allows the naming of the type of the LED, in this case, Illumination.
Device Model	Displays the device model type.
Parallel Mode	Allows turning on parallel mode. When parallel mode is on there is only one LED displayed in this tab (LED). Parallel mode ties the dual 1.5 A drivers together to provide the ability to drive a single 3.0 A LED.
PWM Frequency (Hz)	Allows setting the PWM frequency. Maximum value is 100,000 Hz.
Maximum Current (mA)	Maximum current that Illuminator supports. Maximum current for single mode is 1500 mA. Maximum current for parallel mode is 3000 mA.
Current (mA)	Current used for PWM mode or the maximum current that can be set in constant current or trigger modes.
Default Intensity	LED default intensity in %.
Pulse Length (µs)	LED pulse length in µs.
Pulse Delay (µs)	LED pulse delay in µs.

**Table 7 LED Tabs Description (continued)**

Parameter	Description
<b>Operation Mode</b>	Allows the selection of the illuminator operation mode: <ul style="list-style-type: none"> <li>• Constant current – controller drives LED with constant current</li> <li>• Pulse Width Modulation<sup>a</sup> – controller drives LED with pulse width modulation</li> <li>• Pulse Trigger<sup>b</sup> – controller drives LED with pulse trigger</li> <li>• Pulse Follow<sup>c</sup> – controller drives LED with pulse follow</li> </ul>
<b>Trigger source</b>	Allows the selection of the illuminator trigger source: <ul style="list-style-type: none"> <li>• Digital Input 1</li> <li>• Digital Input 2</li> <li>• Digital Input 3</li> <li>• Digital Input 5</li> </ul>
<b>Trigger Inverted</b>	Allows the selection of active high trigger or active low trigger.

- a. In this mode, a PWM signal is generated inside the controller. Frequency and duty cycle of the internal oscillator can be adjusted depending on the application. Current dimming can also be adjusted in this mode.
- b. In this mode, the LED pulses are generated when an external triggering signal is applied on the TRIG IN input. Depending on the IO settings, the LED pulse will be generated on the rising or falling edge of the external triggering signal. The delay between the external triggering signal and the controller's output can be adjusted depending on the application. The pulse length of the controller's output signal is set by the controller. The illuminator can be synchronized with an external device and the Camera sync output signal can also be used.
- c. In this mode, the external triggering signal is copied on the controller's output that drives the LED. The only parameter that can be adjusted is the current dimming. Frequency and duty cycle is set by the external triggering signal characteristics.



## Ring Light Tab

The Ring Light tab in the Controller Configuration window is used to set the parameter values of the Ring Light.

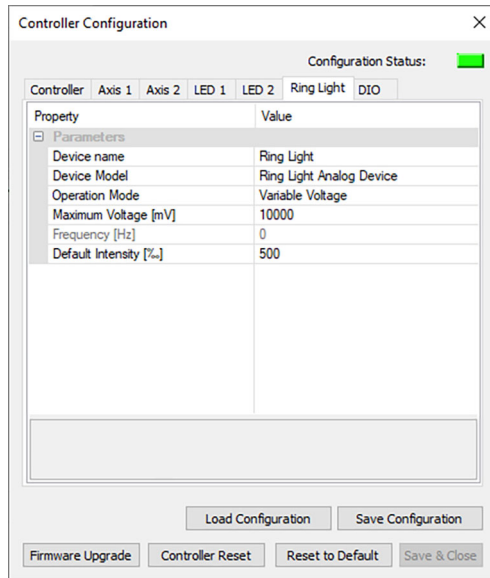


Figure 9 Controller Configuration Window – Ring Light Tab

Table 8 Ring Light Tab Description

Parameter	Description
<b>Device Name</b>	Allows the naming of the type of the LED, in this case, Ring Light.
<b>Device Model</b>	Allows the selection of device model type: <ul style="list-style-type: none"> <li>• Custom Ring Light Device</li> <li>• Ring Light Device</li> <li>• Not Used</li> </ul>
<b>Operation Mode</b>	Allows the selection of the illuminator operation mode: <ul style="list-style-type: none"> <li>• Variable Voltage – controller drives Ring Light with variable voltage</li> <li>• 5V output PWM control – controller drives Ring Light with pulse width modulation</li> </ul>
<b>Maximum Voltage (mV)</b>	Allows setting the Maximum Voltage for Variable Voltage Mode. Maximum value is 10,000 mV.
<b>Frequency (Hz)</b>	Not supported. For 5V PWM Mode the frequency is fixed to 10,000 Hz.
<b>Default Intensity (‰)</b>	Allows setting the default intensity. Maximum value is 1,000 ‰.

## DIO Tab

The DIO tab in the Controller Configuration window is used to set the parameter values of the DIOs.

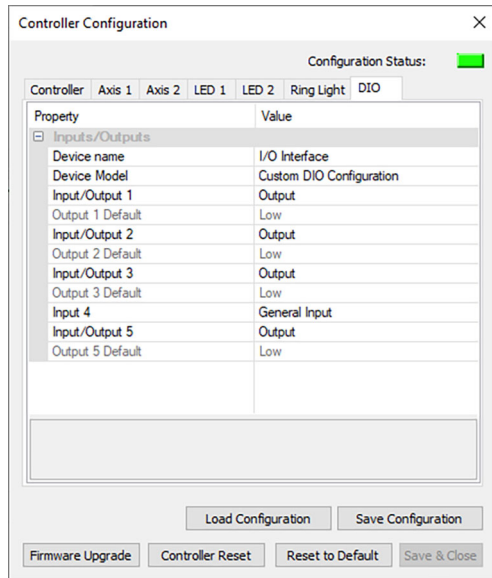


Figure 10 Controller Configuration Window – DIO Tab

Table 9 DIO Tab Description

Parameter	Description
<b>Device Name</b>	Allows the naming of the type of the device, in this case, I/O Interface.
<b>Device Model</b>	Displays the device model type.
<b>Input/Output 1</b>	Allows setting GPIO 1 as Input or Output. Select either Input or Output from the drop-down.
<b>Output 1 Default</b>	Allows configuring GPIO 1 default start up state to either High or Low when configured as an Output. Not applicable when GPIO 1 is set as Input.
<b>Input/Output 2</b>	Allows setting GPIO 2 as Input or Output. Select either Input or Output from the drop-down.
<b>Output 2 Default</b>	Allows configuring GPIO 2 default start up state to either High or Low when configured as an Output. Not applicable when GPIO 2 is set as Input.
<b>Input/Output 3</b>	Allows setting GPIO 3 as Input or Output. Select either Input or Output from the drop-down.
<b>Output 3 Default</b>	Allows configuring GPIO 3 default start up state to either High or Low when configured as an Output. Not applicable when GPIO 3 is set as Input.

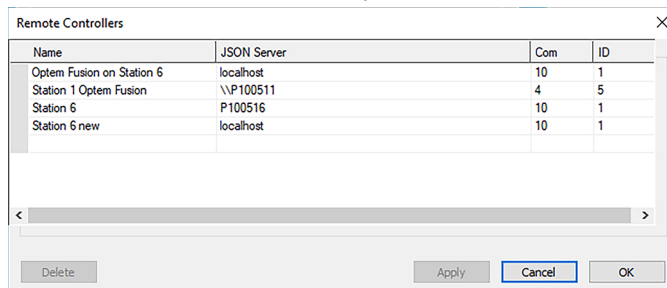
**Table 9 DIO Tab Description (continued)**

Parameter	Description
<b>Input 4</b>	Allows the selection of Input 4 mode: <ul style="list-style-type: none"> <li>• General Input</li> <li>• E-Stop Motion Devices</li> <li>• E-Stop Illumination Devices</li> <li>• E-Stop Motion &amp; Illumination</li> </ul>
<b>Input/Output 5</b>	Allows setting GPIO 5 as Input or Output. Select either Input or Output from the drop-down.
<b>Output 5 Default</b>	Allows configuring GPIO 5 default start up state to either High or Low when configured as an Output. Not applicable when GPIO 5 is set as Input.

## Configuring Remote Controllers

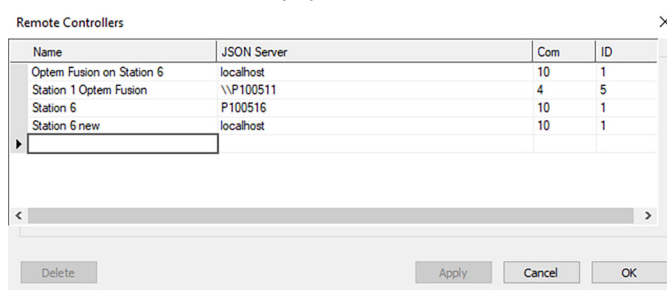
To configure Remote Devices:

1. On the main panel window, under **Configuration**, select **Remote Controllers** from the list. The Remote Controllers window opens.



**Figure 11 Remote Controllers Window**

2. Double click on the empty row below the last row, to add a new connection.



**Figure 12 Create New Connection**

3. Type a new controller name in the **Name** field.

4. Type a new server name in the **JSON Server** field.
5. Type a new COM number in the **COM** field.
6. Type a new ID number in the **ID** field.
7. Click **OK**.

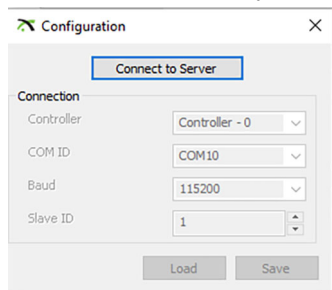
**Table 10 Remote Controllers Description**

Menu	Description
<b>Name</b>	Interface friendly name. Maximum length is 20 characters. Default name is Optem® FUSION.
<b>JSON Server</b>	The server name.
<b>COM</b>	Encoder COM Port. Default value depends on actual device connection. Minimum value is 1, and maximum value is 99.
<b>ID</b>	Modbus Slave/Node Address. Default value is 1 (depends on actual device connection). Minimum value is 1, and maximum value is 63.

## Configuring Server

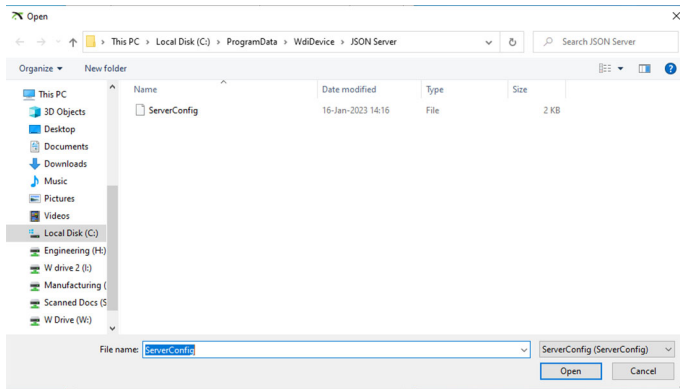
To configure a server:

1. On the main panel window, under **Configuration**, select your **Server Configuration** from the list. The Connection Setup window opens.



**Figure 13** Connection Setup Window

2. Click **Connect to Server**, to connect to a server in your network. The configuration data location folder opens.



**Figure 14** Configuration Data Location Folder

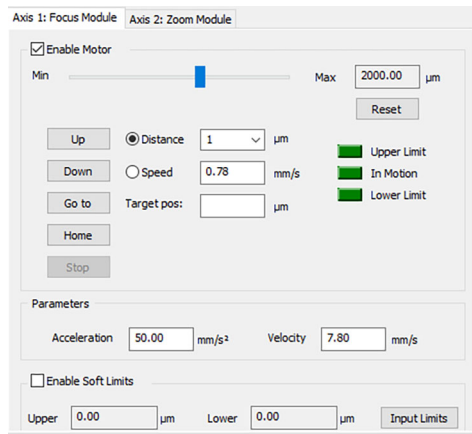
3. Select a configuration file and Click **OK**.

**Table 11** Server Connection Description

Menu	Description
<b>Controller</b>	Lists all the available controllers.
<b>COM ID</b>	Lists all the available COM ports.
<b>Baud</b>	Lists all the available baud rates.
<b>Slave ID</b>	Modbus Slave/Node Address. Default value is 1 (depends on actual device connection). Minimum value is 1, and maximum value is 63.
<b>Load</b>	Loads the last configuration file.
<b>Save</b>	Saves the changes to the configuration file.

## Adjusting the Focus Module Position

**NOTE:** The following controls on the Optem® FUSION Console main panel are used to change the position of the Focus module. Before using these controls, ensure that the Focus module motion parameters in the Controller Configuration dialog box have been set correctly. For details on these parameters, refer to ["Axis Tabs" on page 21](#).



**Figure 15** Focus Module Controls

You can move the Z-stage in the following ways:

- Relative position.
- A specified distance.
- To its home position.

**NOTE:** To use the Home button on this panel, you must first set the home position of the sensor using the Home option on the Config menu. For details, see ["Starting the Software" on page 10](#).

To move the Z-stage in small increments:

1. Move the slider to the desired distance (for example, 1).
2. Click **UP** or **DOWN**.

To move the Z-stage a specified distance:

1. On the main panel, type the move (μm) in the **Target pos** text box.
2. Click, **Go to**.

To move the Z-stage to its home position:

1. Click **Home**.

## Homing

The Home button located at the bottom of the main panel is used to return the Focus module or the Zoom module to the home position, regardless of the starting point.

---

## Adjusting the Zoom Module Position

The process for adjusting the Zoom module position is the same as for the Focus module, refer to ["Adjusting the Focus Module Position" on page 30](#).

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## Controlling the Illuminator

The Illuminator area on the main panel is used to access the controls for the illuminators.

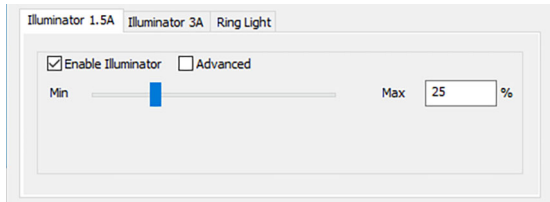
Using the software, you set the Illuminator current to a constant value, and the intensity of the current is controlled by pulse width modulation (PWM), or constant current. The PWM technique preserves the color spectrum, while adjusting the intensity. The PWM frequency is factory set at a sufficient level, and can be set up using the parameters in ["LED Tabs" on page 23](#) or ["Ring Light Tab" on page 25](#).

To set up an LED:

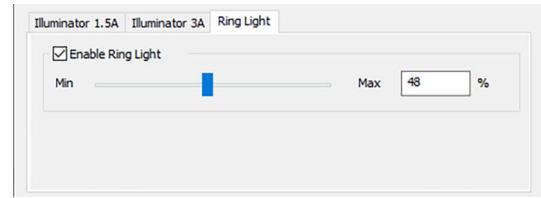
1. On the main panel window, select **Illuminator 1.5A**, or **Illuminator 3A**, or **Ring Light (if used) tab**.
2. Click the **Enable Illuminator** or **Enable Ring Light** check box, to enable the illuminator controls.
3. In the Illuminator 1.5A, or Illuminator 3A tab, or Ring Light tab, drag the cursor to the desired illumination percentage.

OR

Type the specified percentage in the **text box**.



Illuminator 1.5A tab basic controls



Ring Light tab controls

**Figure 16** *Illuminator Basic Controls*

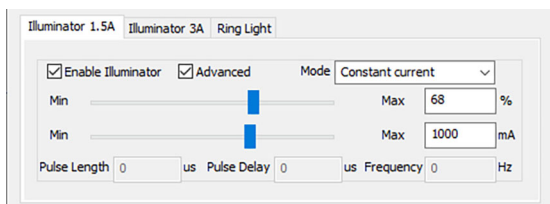
To set up an LED using the advanced controls:

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**NOTE:** *This only applies to LED1 and LED2 modules.*

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1. In the Illuminator 1.5A or Illuminator 3A tab, click the Advanced check box.

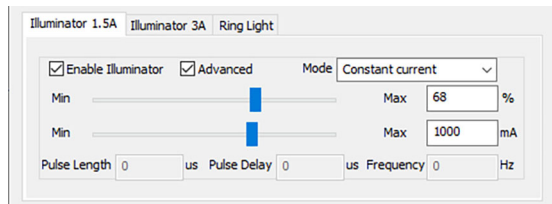


**Figure 17** *Illuminator Advanced Controls*

2. Select an operational mode from the Mode drop-down list. The illuminator can be configured to operate in four modes:
  - Constant current
  - Pulse Width Modulation
  - Pulse Trigger
  - Pulse Follow



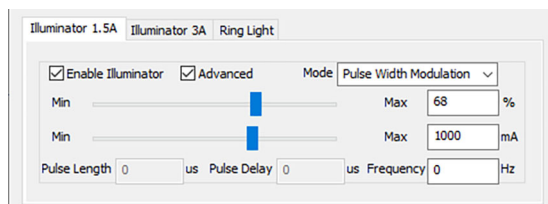
The Constant current mode controls are:



**Figure 18** Constant Current Mode

- The first slider allows changing the current in percent between 0 and “Current” (not a maximum current) that is set in the LED configuration panels (see ["LED Tabs" on page 23](#)) as user current or maximum useful current. This works the same as in normal mode.
- The second slider allows changing the current between 0 and “Maximum Current” that is set in the LED configuration panels (see ["LED Tabs" on page 23](#)). This allows the setting of the maximum useful current controlled by the first slider as a percentage.

The Pulse Width Modulation (PWM) mode controls are:



**Figure 19** PWM Mode

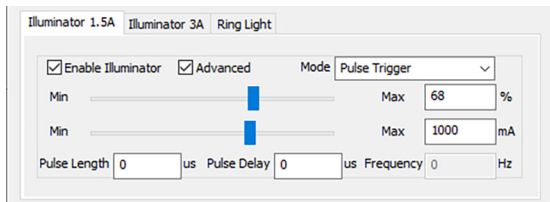
- The first slider allows changing the PWM duty cycle from 0 to 100 % as it does in normal operation.
- The second slider operation is the same as the Constant current mode.
- The **Frequency** text box allows changing the PWM frequency by entering a numeric value.

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**NOTE:** Please note that frequency is shared between LEDs and it can be changed only for the first LED, the second LED will be grayed out.

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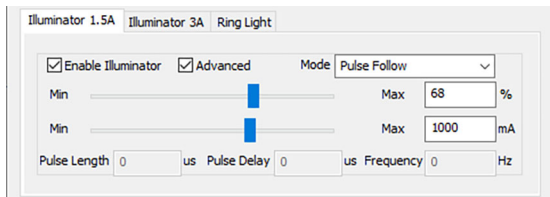
The Pulse Trigger mode controls are:



**Figure 20** *Pulse Trigger Mode*

- The first and second sliders operation is the same as the Constant current mode.
- The **Pulse Length** text box allows changing the duration of the trigger pulse by entering a numeric value.
- The **Pulse Delay** text box allows changing the start of the trigger pulse by entering a numeric value.

The Pulse Follow mode controls are:



**Figure 21** *Pulse Follow mode*

- The first and second sliders operation is the same as the Constant current mode. No other controls are enabled in this mode.

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