#### Polygon400 | Patterned Photostimulation





## INTRODUCTION

The Polygon400 is Mightex's market-leading pattern illuminator. It provides precise spatio-temporal control of light with single-cell or subcellular resolution, making it the perfect illumination tool for life science research. Compatible with any upright or inverted microscope, Polygon400 enables researchers to send light to anywhere on their specimen, and in any shape, size and complexity. In addition, multiple regions of interest can be illuminated simultaneously, and different wavelengths of light can be used with the Polygon400 for different bioscience applications. Furthermore, the Polygon400 can be seamlessly integrated via TTL into a larger system with other equipment such as electrophysiology tools or cameras.

## DMD TECHNOLOGY - BEHIND THE SCENES

The Polygon400 uses digital mirror device (DMD) technology to illuminate multiple regions simultaneously. A DMD is composed of thousands of micro-mirrors that can be individually turned on to let light pass through. Thus, you can control each mirror to control the area(s) of illumination to create any number of different sized shapes.



Figure 1. DMD-based patterned illumination.

#### **FEATURES**

- o Illuminate any Shape or Size
- o Multi-Wavelength Illumination
- Simultaneous Multi-Region Illumination
- Fast Pattern Switching
- o Fits on any Microscope
- External Equipment Synchronization
- Third-Party Camera Compatible

#### **APPLICATIONS**

- Neuroscience: Single-cell Resolution Optogenetics
- Cell Biology: Subcellular Resolution Optogenetics
- Freely-Behaving Optogenetics
- Cortex-Wide Optogenetics
- Photoactivation, Photoconversion & Photoswitching
- Photobleaching
- o Uncaging



## MODELS

The Polygon400 comes in several models, each designed to meet the needs of a wide range of applications:

### POLYGON400-E

- Cost-effective
- Up to 3 built-in LEDs
- Wavelength range: 400-700nm
- Recommended for lower power applications, such as *in vitro* optogenetics



#### POLYGON400-G

- Flexible solution
- Can be used with any light source
- Wavelength range: 400-700nm
- Accepts a 3mm-core liquid lightguide

#### POLYGON400-DP

- Optimized for UV illumination
- Wavelength range: 350-700nm
- Finer resolution within a smaller field of view
- Accepts a 3mm-core liquid lightguide

### POLYGON400-DL

- Designed for large field-of-view or high intensity applications
- Accepts fiber-coupled light sources (SMA connector) including high-power lasers
- Wavelength range: 400-700nm
- Ideal for applications such as photobleaching and *in vivo* optogenetics







## MICROSCOPE INTEGRATION

The Polygon400 can be coupled to most commercially available inverted and upright microscopes (Nikon, Leica, Zeiss, Olympus). It comes in 2 different configurations:

## **INFINITY-PATH CONFIGURATION**

This configuration projects the spatial patterns at infinity, and hence it is mounted directly into the infinity path of a microscope by using a beam-combiner (for upright microscopes) along with an adaptor that matches the exact make/model of the microscope.



\*Microscope adaptors sold separately.

#### PLEASE CONTACT MIGHTEX FOR MULTIPLE POLYGON400s AND ALTERNATIVE MICROSCOPE INTEGRATION SOLUTIONS.

#### **MULTI-PORT ILLUMINATOR | MPI**

Mightex's MPI is designed for simultaneous mounting of a Polygon400 and a lightguide-coupled light source for epifluorescence or other widefield illumination. If you use an inverted microscope where the back port is already occupied by a traditional epi-fluorescent illuminator, with an MPI you can keep the fluorescence imaging capability.



### **C-MOUNT CONFIGURATION**

If the infinity path of your microscope is unavailable, this configuration can be mounted onto one of the standard C-mount camera ports of your microscope. This configuration is only available for Polygon400 models E and G.





# TECHNICAL SPECIFICATIONS

#### **ILLUMINATION PROJECTION AREAS & RESOLUTION**

Model	Projection Area	Commercial Microscope (1X Objective) <sup>a</sup>			
		Leica	Nikon	Olympus	Zeiss
POLYGON400-E & POLYGON400-G	Height   mm	8.7	8.7	7.8	7.2
	Width   mm	15.5	15.5	13.9	12.7
	Diagonal   mm	17.7	17.7	16.0	14.6
	Pixel Size   µm	18.0	18.0	16.2	14.8
POLYGON400-DP	Height   mm	3.7	3.5	3.1	3.1
	Width   mm	6.6	6.1	5.9	5.4
	Diagonal   mm	7.5	7.5	6.8	6.2
	Pixel Size   µm	7.6	7.6	6.9	6.2
POLYGON400-DL <sup>b</sup>	Diameter   mm	9.8	9.8	8.9	8.1
	Pixel Size   µm	20.4	20.4	18.3	16.8

<sup>a</sup> To calculate illumination area and pixel resolution at the specimen, simply divide the above numbers by the magnification of the objective. <sup>b</sup> Polygon400-DL has a circular illumination projection area, whereas the other models project a rectangular area.

#### **CONTROL & TIMING**

Maximum Frame Rate   fps*	4,000
Input Trigger	TTL, BNC connector
Input Trigger Delay   μs	50
Output Trigger	TTL, BNC connector
Output Trigger Delay	User Programmable

\* Values at 1bit depth. For grayscale features please contact Mightex for more information.

### SOFTWARE COMPATIBILITY

Mightex	PolyScan2 software included in every package free of charge		
3rd Party Support	Nikon's NIS Elements (Polygon400-G model only)		
	NeuroPG: Open Source Software for Optical Pattern Generation		
	Micro-Manager Open Source Microscopy Software		

### SYSTEM AND COMMUNICATION

Operating System	Windows XP, Vista, 7, 8, and 10
Interface	USB2.0
Power Supply	5Vdc 3A input power
Screen Resolution	1,366x768 or higher





## ORDER NOW

Our primary goal is to help you find the optimal solution for your research. We have a dedicated technical support and sales team committed to providing guidance on our Polygon400 models and other Mightex products.



Please visit **www.mightexbio.com/contact** to submit an inquiry form today!

## CONTACT US

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