Transmissive Spatial Light Modulator – Amplitude Modulation

FEATURES

Transmissive liquid-crystal *Spatial Light Modulator* for amplitude (intensity) modulation, with integrated polarizers.

- Full HD resolution, 1920 × 1080 pixels
- Pixel pitch 8.5 µm
- Micro-lens array, one lens per pixel
- Transmission mode, in-line in the beam
- 256 gray levels, contrast 500:1
- Factory-calibrated linear response
- Response time 15 ms
- Dimensions 152 mm × 123 mm × 30 mm
- Mounts for 1″ and 2″ optics
- Designed for optical cascading
- Control software for Linux, Windows, macOS
- Python interface included

DESCRIPTION

The SLM-H06 modulates the intensity of a light beam pixel by pixel: the transmitted intensity follows the gray level of the displayed image, from dark (gray level 0) to bright (gray level 255).

It works in transmission: the beam passes through the liquid-crystal panel, placed between two polarizers, so the modulator is simply inserted in line in the optical path, without any beam splitter or folded geometry. The input light can be unpolarized or linearly polarized; the output light is linearly polarized.

The response is calibrated at the factory: a look-up table stored in the modulator makes the transmitted intensity proportional to the gray level at the calibration wavelength.

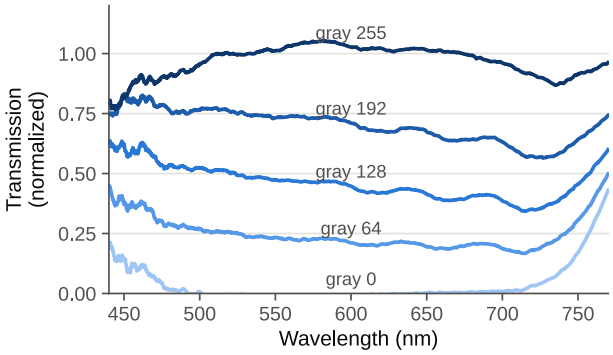
It is mounted in an aluminum housing that includes the driver card; the user does not have to handle any flat cable. Mounts for 1″ or 2″ optics are provided on both the front and the rear side of the housing, and two circular apertures, on either side of the panel, let additional beams pass alongside the modulated beam.

APPLICATIONS

- Reconfigurable intensity masks and apertures
- Beam shaping and apodization
- Structured illumination and microscopy
- Maskless lithography and photopolymerization
- Spatial filtering in the Fourier plane
- Amplitude holography
- Optical computing and optical neural networks
- Education

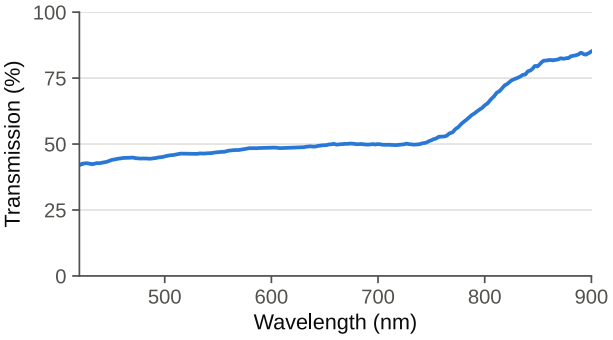
SPECTRAL RESPONSE

Transmission of the SLM-H06 at uniform gray levels, measured with an unpolarized broadband source. The intensity is modulated over the visible range, from 450 nm to 750 nm.



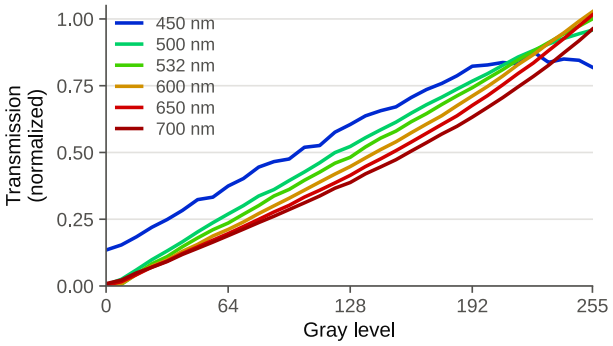
TRANSMISSION

For unpolarized light, the transmission of the complete modulator (panel and two polarizers) is about 20 % at gray level 255. Transmission of one polarizer alone, for unpolarized light:



GRAY-LEVEL RESPONSE

Transmission against gray level at several wavelengths. The response is linear at the calibration wavelength (532 nm as standard, other wavelengths on request).



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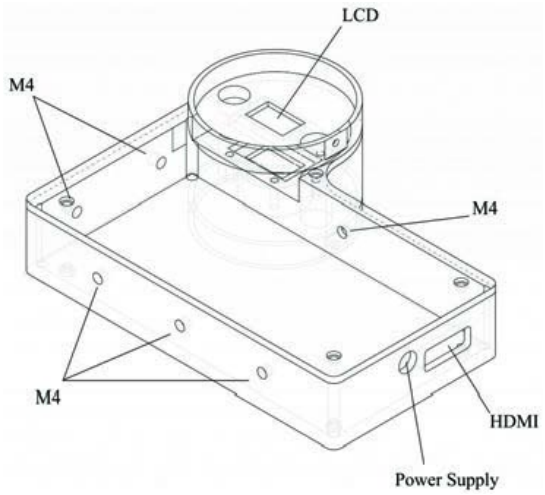
CONTROL SOFTWARE

An HDMI port is used for communication: the computer sees the SLM-H06 as a second monitor. The control software (Linux, Windows, macOS) displays images and videos from a live preview window with a built-in command console (zoom, rotation, shift, gain, regions of interest).

Python client included. The software is also a server for Python: a NumPy array or a Matplotlib figure is displayed on the modulator in real time with a single line of code, `slm.show(image)`.

Ready for AI and machine learning. Since the masks are plain arrays, the SLM-H06 plugs directly into scientific Python workflows: patterns can be generated by machine-learning models (PyTorch, TensorFlow, JAX), optimized in closed loop with a camera or a detector, or used as the programmable layer of an optical neural network. An AI assistant can drive the modulator through the same interface.

MECHANICAL DRAWING



VIEWS







CHARACTERISTICS

Item	SLM-H06
Modulation	Amplitude (intensity)
Operating mode	Transmission, integrated polarizers
Panel resolution	1920 × 1080 (Full HD)
Pixel pitch	8.5 µm
Micro-lens array	One lens per pixel (geometric fill factor 64 %)
Panel active area	16.32 mm × 9.18 mm
Operating wavelength range	450 – 750 nm
Transmission at gray level 255	About 20 % (unpolarized light)
Contrast ratio	500:1
Intensity response	Factory calibrated, linear in gray level at the calibration wavelength
Linearity spectral range	460 – 730 nm (deviation below 15 % of full scale)
Bit depth	8 bit (gray levels 0 – 255)
Frame rate	60 Hz
Response time	15 ms
Output polarization	Linear
PC connection	HDMI
Power supply	19 – 24 V DC
Dimensions	152 mm × 123 mm × 30 mm
Weight	474 g