HOASYS

OASLM-VIS

June 2026

Optically Addressed Spatial Light Modulator - VIS

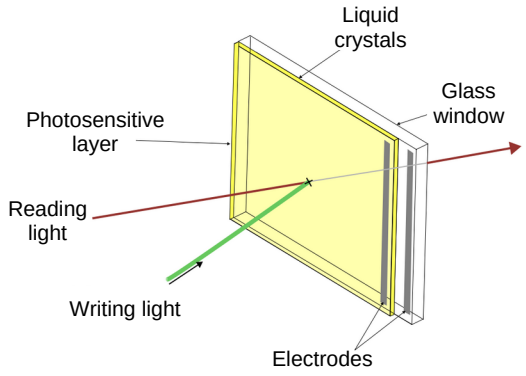
FEATURES

Liquid Crystal *Optically Addressed Spatial Light Modulator* with a continuous photosensitive substrate at the place of pixels.

- Photosensitive substrate in the VIS
- Spatial resolution 15μm
- Transmission-mode
- Phase or amplitude modulation
- Response time 25ms
- Clear aperture 20x20mm^2

DESCRIPTION

The OASLM-VIS, also called a Light-Valve (LV), is a spatial light modulator made with a photoconductive layer (PC) instead of pixels.

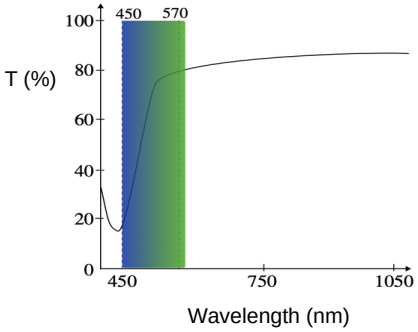


The addressing (writing) is made by shining the PC with visible light, optimally at 450 – 570 nm. “VIS” refers to this writing wavelength: the reading light to be modulated can be different, from 400 nm to 2 μm.

The OASLM-VIS is mounted in a compact aluminum housing, with an SMA connector for electrical driving.

The refractive index of the device is directly related to the intensity profile of the addressing light. In this way the OASLM-VIS can modulate the phase or the intensity (if inserted in between crossed polarizers) of the reading light.

Spectral transmission is shown from 400nm to 1050nm; light is linear polarized along the LC director.



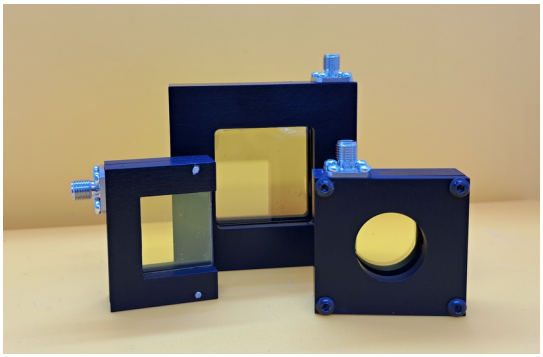
APPLICATIONS

- Wavelength conversion
- Adaptive Holography and Interferometry
- Nonlinear Optics, Optical wave-mixing
- Laser beam shaping
- Optical neural systems and Complex optics
- Education

Complex optical beams, vortex beams, optical waves interaction, can easily be implemented with the OASLM-VIS thanks to its Kerr-like nonlinear optical response. The corresponding nonlinear coefficient is tunable with the applied voltage.

Examples

- Two-wave mixing
- Optical vortex generation
- Beam cleanup
- Vibrometry



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CHARACTERISTICS (at λ=532 nm, T=21 deg)

Item	OASLM -VIS
Operating mode	Transmission
Power consumption (V=15 Vrms, f=1kHz)	<80 mW
AR coating	Under request
Transverse spatial resolution	15 μm
Clear aperture	Square L=20 mm
LC refractive index, max - min	1.77 – 1.51
LC thickness	9 μm
Photoconductive layer refractive index	2.54
BK7 windows refractive index	1.51
Weight	58 gr
Dimensions	50 mm x 50 mm x 14 mm
LIDT	~ 2 J/cm^2 (10 ns, 10 Hz)***

LC alignment can be specified either planar or twisted; planar alignment is generally used to optimize phase modulation, twisted alignment is chosen to optimize amplitude modulation.

*** Estimated at 1064 nm for single nanosecond pulses at low repetition rate (no heat accumulation). At higher average power and without a cooling system, thermal effects, with a reversible loss of modulation, appear first and limit the usable intensity.

RECOMMENDED OPERATING CONDITIONS*

	Minimum	Typical	Maximum	Units
Supply AC** voltage	7	20	80	Vrms
Driving voltage frequency	20	600	2k	Hz
Driving voltage waveform		Sinusoidal		
Writing light optical wavelength	450		570	nm
Writing light intensity	0.05	2	18	mW/cm^2
Working temperature	4	20-30	80	°C

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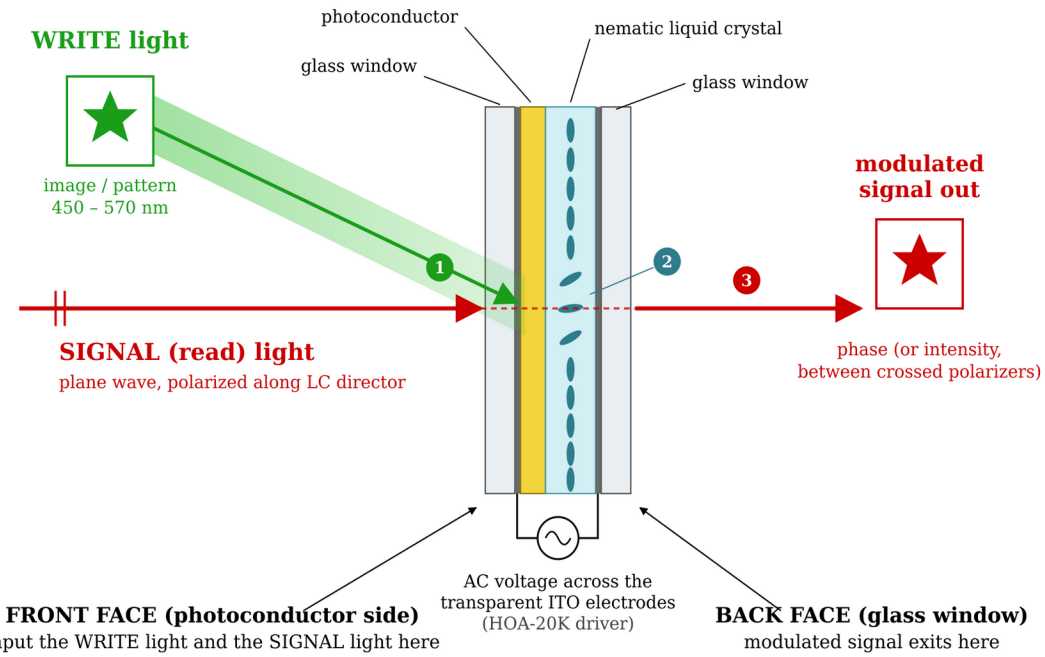
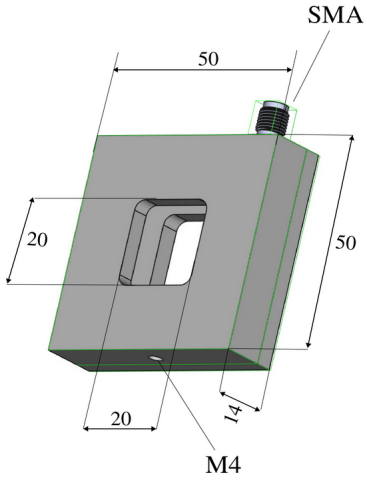
WORKING PRINCIPLE



1 The write image makes the photoconductor locally conductive.
2 There, the AC voltage drops across the liquid crystal: the molecules reorient and the refractive index changes.
3 The signal beam crossing that region picks up the image as a phase / intensity pattern.



** Optimized response of the device is obtained for an applied AC Voltage with no DC component.
Electrostatic or DC Voltage applied for several hours could damage permanently the device.
All voltages are RMS values. The HOA-20K driver delivers up to 28 Vrms.