Spatial Light Modulator – 1920 x 1152

Meadowlark Optics Liquid Crystal on Silicon (LCoS) Spatial Light Modulators (SLMs) are uniquely designed for pure phase applications and incorporate analog data addressing with high refresh rates. This combination provides user's with the fastest response times and highest phase stabilities commercially available. Meadowlark offers both transmissive and reflective SLMs in either one- or two dimensions. Phase-only SLMs can also be used for amplitude-only or a combination of both.

The 1920 x 1152 SLM is good for applications requiring high speed, high diffraction efficiency, low phase ripple and high power lasers.

Diffraction Efficiency (1st-order) – This is the percentage of light measured in the 1st-order when writing a linear repeating phase ramp to the SLM as compared to the light in the 0th order when no pattern is written to the SLM. Diffraction efficiency varies as a function of the number of phase levels in the phase ramp. An example measurement, taken at 1064 nm is shown below left, for phase ramps with 4 to 32 phase levels between 0 and 2π. The plot below right shows sample 1st order diffraction efficiency measurements, as a function of the phase ramp period, taken at various wavelengths.

Unique Features:

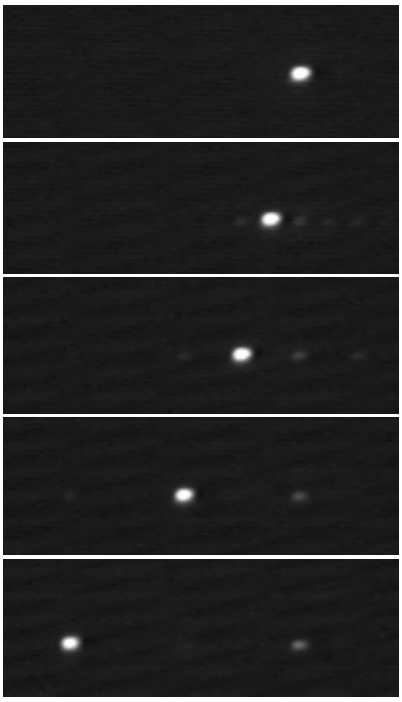
- High resolution
- High speed
- Pure analog phase control
- High first order efficiency
- High reflectivity
- High power handling
- Compact design
- Wavelengths from 400 – 1650 nm

HDMI Controller

NEW

PCIe Controller to support high frame rates (up to 714 Hz)

Measured 1st Order Diffraction Efficiency



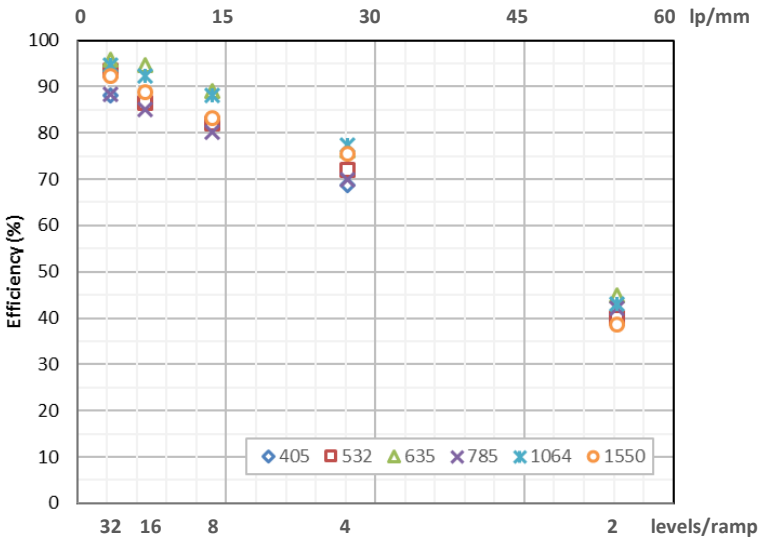
0th Order

32 phase levels, 0.2°
1st Order Diffraction Efficiency: 94.6%

16 phase levels, 0.4°
1st Order Diffraction Efficiency: 92.4%

8 phase levels, 0.8°
1st Order Diffraction Efficiency: 88.0%

4 phase levels, 1.6°
1st Order Diffraction Efficiency: 77.4%



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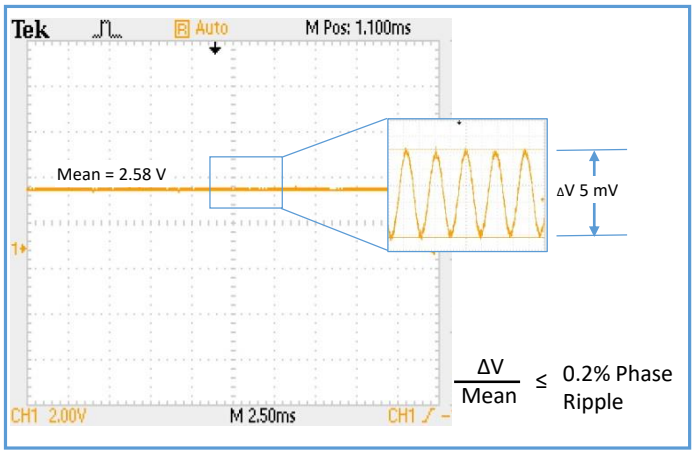
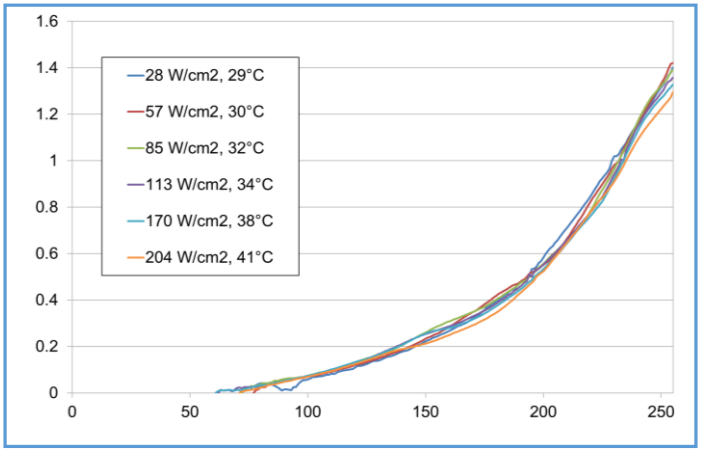
High Phase Stability - Meadowlark Optics' SLMs are known for having the highest phase stability on the market. Our backplanes are custom designed with high refresh rates and direct analog drive schemes resulting in phase ripple as low as 0.2% (0.002 π radians) for standard speed, and as low as 2% (0.02 π radians) for high-speed. Phase ripple is quantified by measuring the 1st order ripple as compared to the mean intensity while writing a repeating linear phase ramp to the SLM.

High Power Capability- Meadowlark Optics' Spatial Light Modulators have been tested for compatibility with high power pulsed and CW lasers. In the graph below, the optical response of the 1920 x 1152 pixel SLM was measured as the incident power was incremented up to 15 GW/cm^2 peak power or 204 W/cm^2 average power. A liquid cooling system is available to reduce thermal effects.

1st order intensity when writing a phase ramp to the SLM



1920 x 1152 SLM tested at 1064 nm



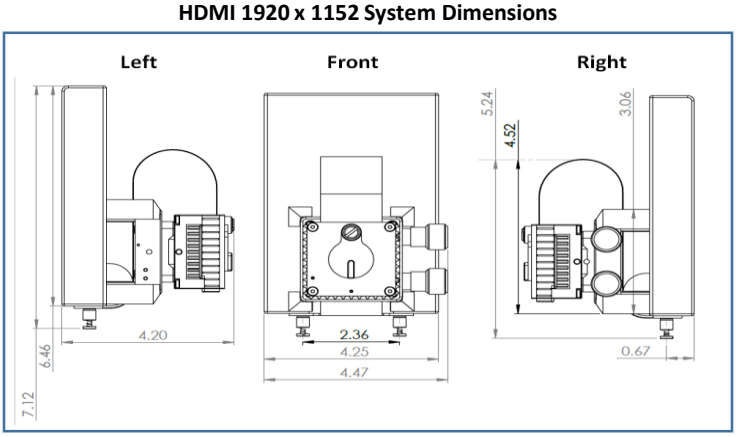
1920 x 1152 Analog Spatial Light Modulator

Resolution: 1920 x 1152
Fill Factor: 95.7%
Array Size: 17.6 x 10.7 mm
Pixel Pitch: 9.2 x 9.2 µm
Zero-Order Diffraction Efficiency*: 88%
Controller: HDMI 8/12-bit, PCIe 8/12-bit

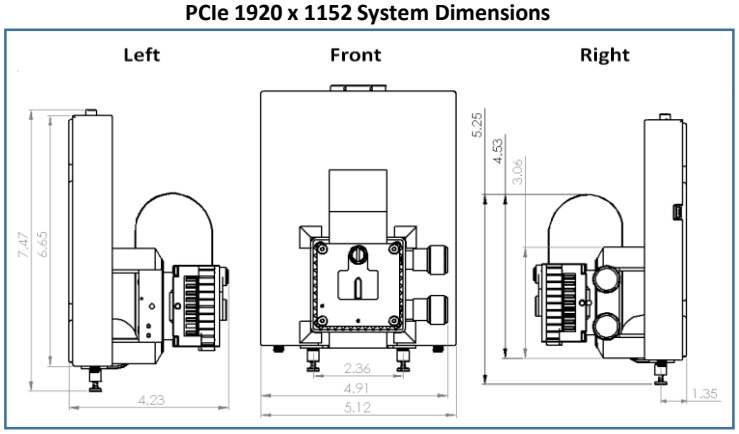
Wavelength	Wavefront Distortion	Standard Liquid Crystal Response Time	High Speed Liquid Crystal Response Time	AR Coatings (Ravg <1%)
405 nm	λ/3	6 ms	N/A	400 – 800 nm
532 nm	λ/5	9 ms	1.4 ms	400 – 800 nm
635 nm	λ/6	12 ms	1.8 ms	400 – 800 nm
785 nm	λ/7	19 ms	2.5 ms	600 – 1300 nm
1064 nm	λ/10	25 ms	3.3 ms	600 – 1300 nm
1550 nm	λ/12	33 ms	5.0 ms	850 – 1650 nm

*Silicon backplane, performance varies as a function of wavelength.

HDMI 1920 x 1152 System Dimensions



PCIe 1920 x 1152 System Dimensions



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