MEADOWLARK OPTICS

SPATIAL LIGHT MODULATOR

— SELECTION GUIDE —

1920 x 1200 Analog Spatial Light Modulator

Resolution: 1920 x 1200
Array Size: 15.36 x 9.60 mm
Pixel Pitch: 8.0 x 8.0 µm
Backplane Refresh: 1.35 kHz

Fill Factor: 95.6%
0th Order Diffraction Efficiency: 76 - 91% (λ dependent)
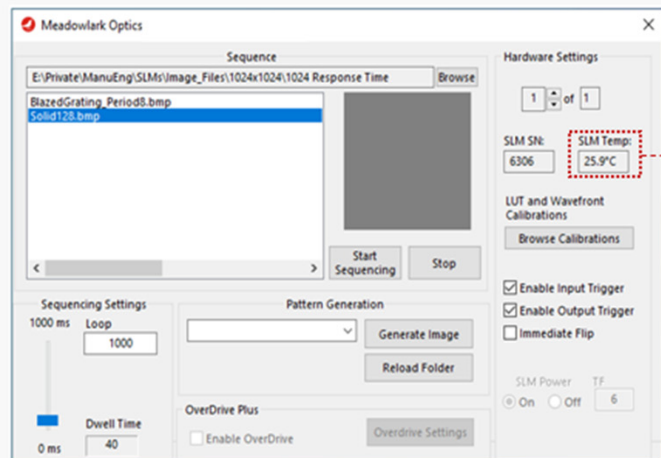**0th Order Diffraction Efficiency:** 87 – 98% (dielectric mirror)
Controller: HDMI

Standard Calibration Wavelengths	STANDARD SPEED Liquid Crystal Response Time			Calibrated Wavefront Distortion
	AR Coating Range 400 − 800 nm	AR Coating Range 500 − 1200 nm	AR Coating Range 850 − 1650 nm	
405 nm	≤ 14.0 ms	–	–	λ/5
532 nm	≤ 15.0 ms	≤ 19.0 ms	–	λ/7
635 nm	≤ 15.0 ms	≤ 20.0 ms	–	λ/8
785 nm	≤ 16.0 ms	≤ 23.0 ms	–	λ/10
1064 nm	–	≤ 33.0 ms	≤ 40.0 ms	λ/10
1550 nm	–	–	≤ 55.0 ms	λ/12

1920 x 1200 SLM with HDMI Controller

1024 x 1024 SLM with PCIe Controller

Temperature control is available on both the 1920 x 1200 and the 1024 x 1024 models. Cooling options for high power lasers and phase stability or heating options to increase switching speed. On chip temperature sensors allow the user to monitor the SLM temperature either through the example program or the software developer kits.

1024 x 1024 Analog Spatial Light Modulator

Resolution: 1024 x 1024
Array Size: 17.4 x 17.4 mm
Pixel Pitch: 17 x 17 µm
Backplane Refresh: 1.436 kHz

Fill Factor: 97.2%
0ᵗʰ Order Diffraction Efficiency: 75 - 87% (λ dependent)
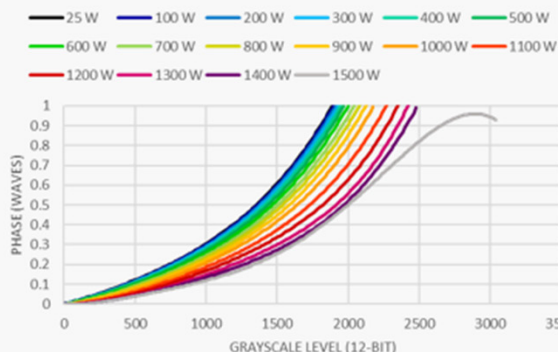**0ᵗʰ Order Diffraction Efficiency**: 90 - 98% (dielectric mirror)
Controller: PCIe with 752 Frames of On-Board Memory

Standard Calibration Wavelengths	HIGH SPEED Liquid Crystal Response Time			Calibrated Wavefront Distortion
	AR Coating Range 488 − 850 nm	AR Coating Range 500 − 1200 nm	AR Coating Range 850 − 1650 nm	
532 nm	≤ 1.0 ms	≤ 1.4 ms	−	$\lambda/5$
635 nm	≤ 1.3 ms	≤ 1.8 ms	−	$\lambda/6$
785 nm	≤ 1.8 ms	≤ 2.4 ms	−	$\lambda/7$
1064 nm	−	≤ 3.4 ms	≤ 6.0 ms	$\lambda/10$
1550 nm	−	−	≤ 9.0 ms	$\lambda/12$

Standard Calibration Wavelengths	ULTRA HIGH SPEED Liquid Crystal Response Time			Calibrated Wavefront Distortion
	AR Coating Range 488 − 850 nm	AR Coating Range 500 − 1200 nm	AR Coating Range 850 − 1650 nm	
532 nm	≤ 0.6 ms	≤ 0.7 ms	−	$\lambda/5$
635 nm	≤ 0.7 ms	≤ 0.9 ms	−	$\lambda/6$
785 nm	≤ 0.9 ms	≤ 1.2 ms	−	$\lambda/7$
1064 nm	−	≤ 1.7 ms	≤ 2.0 ms	$\lambda/10$
1550 nm	−	−	≤ 3.9 ms	$\lambda/12$

ULTRA HIGH POWER 1024 x 1024
≥ 1 kW at 1070 nm

Maintaining full phase modulation under high power loads

Measured phase-voltage response at 1070 nm showing the SLM's ability to maintain a full wave of calibrated phase control. Tools are available so the SLM can be calibrated for well-controlled performance at every operating power level in range.

1536 x 1536 Analog Spatial Light Modulator

Resolution: 1536 x 1536
Array Size: 30.7 x 30.7 mm
Pixel Pitch: 20.0 x 20.0 µm
Pixel Voltage: 12 V

Fill Factor: 96.0%
Max Hologram Frame Rate at 1064: >600 fps
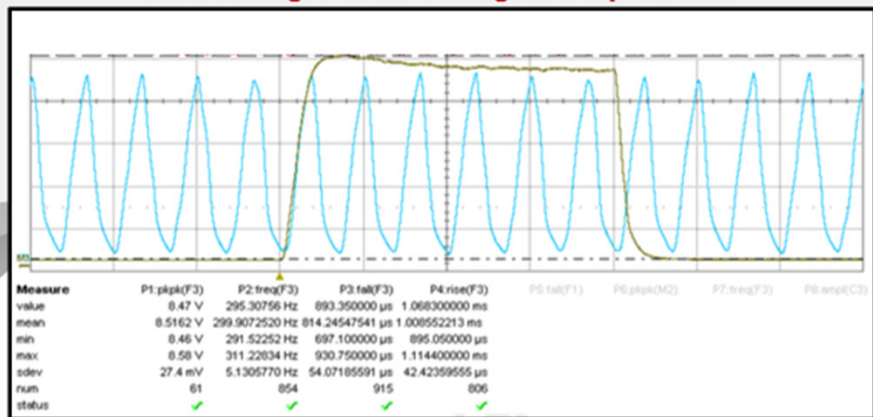**Response for On-Board Holograms:** 6 µs ± 3 µs
Controller: PCIe (up to 2,045 frames of On-Board Memory)

Remove the computer bottleneck. The SLM drive electronics can store a library of up to 2,045 user specified phase masks on the driver board. These masks can be selected in any sequence using on-board OverdrivePlus transition calculation for high-speed switching and extremely precise timing, without being limited by computer computation and data transfer speeds.

High power handling. The 1536 SLM combines a large 3 cm x 3 cm active array with liquid cooling to support high laser powers. Delivering more power on target for applications that need it, from multi-spot photostimulation to laser welding.

Fast Hologram-to-Hologram Operation

Measure	P1:pkpk(F3)	P2:freq(F3)	P3:fall(F3)	P4:rise(F3)	P5:fall(F1)	P6:pkpk(M2)	P7:freq(F3)	P8:ampl(C3)
value	8.47 V	295.30756 Hz	893.350000 µs	1.068300000 ms				
mean	8.5162 V	299.9072520 Hz	814.24547541 µs	1.008552213 ms				
min	8.46 V	291.52252 Hz	697.100000 µs	895.050000 µs				
max	8.58 V	311.22834 Hz	930.750000 µs	1.114400000 ms				
sdev	27.4 mV	5.1305770 Hz	54.07185591 µs	42.42359555 µs				
num	61	854	915	806				
status	✓	✓	✓	✓				

High Resolution Holography at 600 fps! Oscilloscope traces show diffracted spots generated by 1536 SLM at 600 Hz vs 100 Hz.

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