

Mid Actuator Count DMs

Mid-actuator count DM systems are high performance wavefront correctors for demanding applications in astronomy, laser communications and long-range imaging and are available in three types: the *Kilo-DM*, *492-DM* and the *648-DM*.

The *Kilo-DM* is an enabling component for precise, high speed, high resolution wavefront control. With up to 1020 actuators controlled to under 1nm of precision and no hysteresis, this system is ideal for demanding applications.

As an alternative to the popular *Kilo-DM*, the *492-DM* and *648-DM* can be used at a lower cost with powerful results. With 492 and 648 actuators respectively controlled to under 1 nm of precision and no hysteresis similar to the *Kilo-DM*, the *492-DM* and *648-DM* system is ideal for applications in astronomy and next-generation imaging.

The high-speed drive electronics for the mid actuator count DMs are capable of 60 kHz frame rate and 14 bit step resolution.

Mid Actuator Count DM Properties

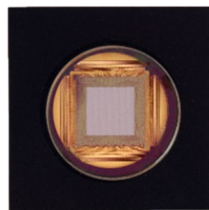
| | |
|------------------------|------------------------------------|
| Mirror Coating: | Aluminum, Gold or Protected Silver |
| Window: | AR coatings available |
| Hysteresis: | None |
| Step size: | Sub-nm (average) |
| Surface Type: | Continuous (DM), Segmented (SLM) |
| Fill Factor: | >99% (DM), 98% (SLM) |
| Surface Figure: | <30nm RMS |

Driver Specifications

| | |
|-----------------------|---|
| DIO Interface: | SFP fiber link connection via PCIe Interface card |
| Input Voltage: | 100-240V AC |
| Resolution: | 14 bit |
| Frame Rate: | 34kHz / 60 kHz (Low Latency)* |
| Response Time: | 22μs / 17μs (Low Latency)* |
| Dimensions: | 5.25" x19" x14" (3U Chassis) |
| Power Draw: | <40W |



Circular aperture



Square aperture



| DM Specifications* | Total Actuator Count | Actuator Count Across Aperture | Stroke (μm) | Aperture (mm) | Pitch (μm) | Mechanical Response (10% - 90%) | Approx. Interactuator Coupling |
|--------------------|----------------------|--------------------------------|-------------|---------------|------------|---------------------------------|--------------------------------|
| 492-1.5 | 492 | 24 | 1.5 | 6.9 | 300 | <20 μs | 15% |
| 492-SLM† | 492 | 24 | 1.5 | 10.2 | 300 | <20 μs | 0% |
| 492-3.5 | 492 | 24 | 3.5 | 9.2 | 400 | <80 μs | 13% |
| 492-5.5 | 492 | 24 | 5.5 | 10.35 | 450 | <100 μs | 22% |
| 648-5.5 | 648 | 28 | 5.5 | 12.15 | 450 | <100 μs | 22% |
| Kilo-C-1.5 | 952 | 34 | 1.5 | 9.9 | 300 | <20 μs | 15% |
| Kilo-SLM† | 1020 | 32 | 1.5 | 9.6 | 300 | <20 μs | 0% |
| Kilo-C-3.5 | 952 | 34 | 3.5 | 13.2 | 400 | <80 μs | 13% |

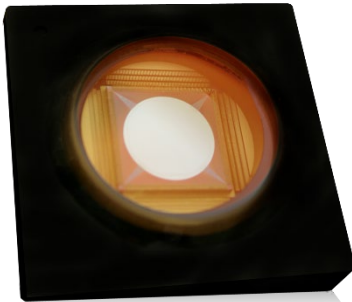
*High speed, low stroke driver options are available.

†Segmented surface mirror. All other configurations listed have continuous surfaces

Mid Actuator Count S-Class DMs

Advanced solutions for high speed correction at a low price. Ideal for increased depth imaging through turbid media.

The *Kilo-S* architecture is enabling hardware for fast, precise wavefront control. By pairing the *Kilo-SLM* with the high-speed S-Driver, the system can achieve speeds up to 60 kHz. This system is ideal for increased depth imaging and correcting for aberrations caused by scattering media.

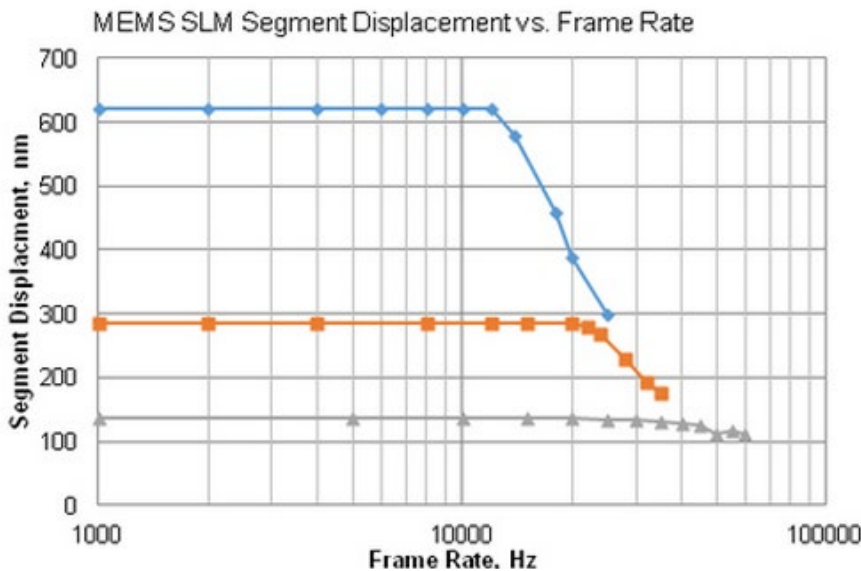


S-Driver Specifications

| | |
|---------------------------|--|
| DIO Interface: | SFP fiber link connection via PCIe Interface card (2.5 Gbps) |
| Latency: | 22.7 μ s |
| Resolution: | 12 bit |
| Frame Rate: | 60 kHz |
| Dimensions: | 3.5" x 19" x 14" (3U Chassis) |
| Voltage Step Size: | 14 mV |

Mid Actuator Count S-Class DM Properties

| | |
|------------------------|------------------------------------|
| Mirror Coating: | Aluminum, Gold or Protected Silver |
| Window: | AR coatings available |
| Hysteresis: | None |
| Step size: | Sub-nm (average) |
| Surface Type: | Continuous (DM), Segmented (SLM) |
| Fill Factor: | >99% (DM), 98% (SLM) |
| Surface Figure: | <30nm RMS |



Kilo-S-SLM Performance Testing

| | |
|---------------------------------|---------|
| Maximum Update Rates | |
| Small displacement: | >50 kHz |
| Mid-range displacement: | >20 kHz |
| Full-range displacement: | >10 kHz |

| DM Specifications | Aperture Shape | Total Actuator Count | Actuator Count Across Aperture | Stroke (nm) | Aperture (mm) | Pitch (μ m) | Mechanical Response (10% - 90%) | Approx. Interactuator Coupling |
|--------------------|----------------|----------------------|--------------------------------|-------------|---------------|------------------|---------------------------------|--------------------------------|
| 492-S-DM | Circular | 492 | 24 | 600 | 6.9 | 300 | <20 μ s | 15% |
| 492-S-SLM† | Circular | 492 | 24 | | 7.2 | | | 0% |
| Kilo-S-DM | Square | 1020 | 32 | | 9.3 | | | 15% |
| Kilo-CS-DM | Circular | 952 | 34 | | 9.9 | | | 15% |
| Kilo-S-SLM† | Square | 1020 | 34 | | 10.2 | | | 0% |

†Segmented surface mirror. All other configurations have continuous surfaces