An Optical Monitor System (OMS) measures and controls the termination of deposition of material on a substrate by using the reflection off of—or transmission through—a substrate or witness chip.

By measuring light at a known single wavelength and measuring the intensity of the reflection or transmission of light across the chip, the quarter-wave thickness of the layer of material on the substrate may be determined, and the deposition terminated at the desired optical thickness.

Benefits Include:

• Provide direct monitoring of the substrate or indirect monitoring of a separate witness chip or chips
• Reliable, precise step sequencing of all actions required in a process
• Unlike the quartz crystal measurement, the optical monitor measurement is dependent on the refractive index of the substrate, the refractive index of the film material and the phase thickness of the deposited film
• Can directly measure optical performance of the device or part
• Operates at process temperatures
• Excellent for complex, multilayer optical stacks
Denton Vacuum Optical Monitoring System (OMS)

**Specifications**

**Optical Monitor**

- Lambda Pro Automatic Optical Monitor System (400 – 2200)
- Lab View based display / control
- Automatic test glass changer ... chip changer
- Lockin amplifier
- 300 mm monochromator w/ 3 gratings
- Vis-IR fiber optic light guide
- DVI light source with integral chopper feedback and adjustable focusing optics
- SpectraPro monochromator, including (3) Acton gratings
- Order sorting filters ... 4 included (6 capacity)

**Specification**

- 400 – 2200 nm resolution
- 400 – 1100 nm Si detector
- 800 – 1700 nm InGas detector, thermoelectrically cooled
- 1100 – 2900 nm PbS detector
- Reflection or transmission setup
- 50 witness chip capacity
- +/- 0.5% repeatability

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**Transmittance (%)**

**Wavelength (nm)**

![7 layer bandpass - 1.5% random error](typical with quartz crystal termination)

Bandpass filters made with Crystal Control

![7 layer bandpass - 0.3% random error](typical with OMS termination)

Same bandpass using Optical Control