



kSA RateRat Pro - Product Specifications



The kSA RateRat *Pro* is a turnkey, real-time, *in-situ* optical reflectance probe designed for deposition monitoring of semi-absorbent thin films. The RateRat *Pro* measures deposition rate, layer thickness, and optical constants (n and k) in real-time using a diode laser and a high-speed photodetector. The RateRat *Pro* can be used in most thin-film deposition applications, provided that optical access is available. Typical deposition processes include MBE, CVD, MOCVD, sputtering, and evaporation.



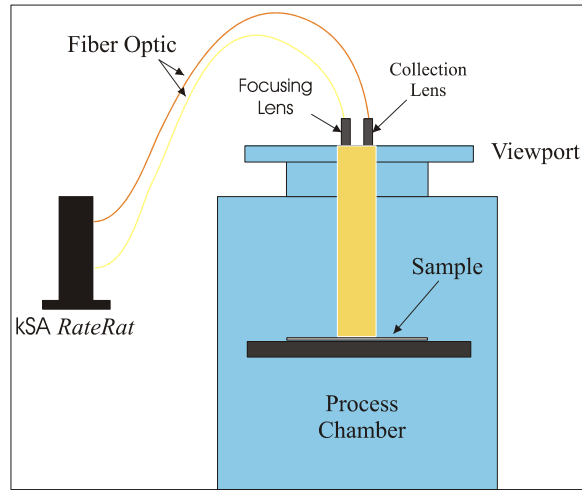


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HARDWARE

Laser Specifications:

Fiber-coupled laser diode, temperature-stabilized, single mode fiber, 2m length standard with FC termination.



<i>Laser Wavelength:</i>	<i>658nm nominal (other wavelengths available upon request.)</i>
<i>Laser Output Power:</i>	<i>15 mW nominal max. measured directly at laser output; software controllable</i>
<i>Beam Geometry:</i>	<i>Gaussian output with integrated collimating lens cell 1.6mm 1/e² beam diameter</i>
<i>Operation Mode</i>	<i>Constant current output</i>
<i>Modulation:</i>	<i>Software controlled, DC to 100 kHz</i>

Detector Specifications:

Amplified Silicon photodetector

<i>Bandwidth:</i>	<i>DC to 10MHz</i>
<i>Gain:</i>	<i>5 position with 10dB increments</i>
<i>Input:</i>	<i>Selection of lens cell receivers available</i>
<i>Broadband Noise:</i>	<i>0.3mV RMS (measured 0-10V full scale)</i>

Analog I/O Board Specifications:

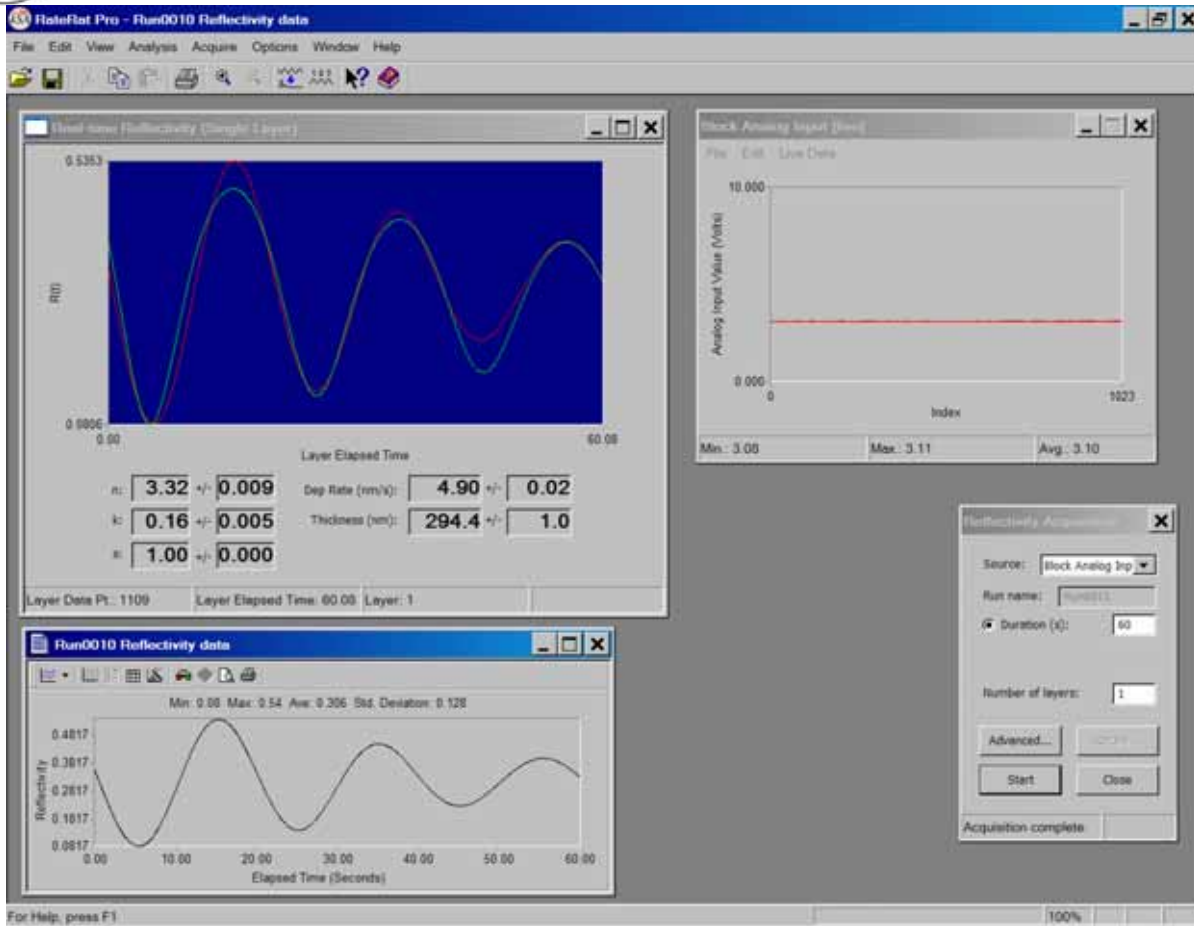
User selectable DC or modulated detection up to 160 kHz.

<i>Computer Interface</i>	<i>PCI</i>
<i>Input</i>	<i>8-Channel Differential Input, 16-bit A/D, 160 kHz</i>
<i>Output:</i>	<i>2-Channel, 12-Bit Output, 100 kHz</i>
<i>Digital I/O:¹</i>	<i>24 channels available</i>

¹No user available generic I/O is supported with the standard system. Generic analog I/O support is available as an option as listed below.



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SOFTWARE:

- Real-time update of current n, k, and deposition rate values and standard deviation of these values.
- (Optional) ability to generate a thin-film deposition recipe, so multiple layers can be properly fit in real-time. Each layer in the recipe will have a user-estimated n, k, and G value. Each layer can be triggered via an external trigger signal or can be time-based.
- Optional ability to output deposition rate, thickness, n, and k to analog output channels for input into process control system.
- External triggering can be used to time data acquisition with external events or substrate rotation if required.
- User-friendly Windows 2000/XP-standard environment with extensive error checking and file handling. Data storage in ASCII and binary file formats facilitate alternative data analysis by user. Direct printing of graphics using currently loaded Windows printer drivers. Cut-and-paste directly to clipboard, or into other applications such as MS Word. Transport of graphics directly to Windows clipboard or exported to Windows Metafile or Tiff format.



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Optional Hardware and Software Features:

● **RAT-CONTROL**

Deposition Control (Optional)

Full deposition and shutter control via high-current digital output lines. User-programmable recipe software module for layer thickness and repetition.

● **KDEL**

Dell™ Desktop Computer (Optional)

Current configuration is a Dell™ Workstation 380 Desktop Computer, 3.4 GHz with 19" flat panel monitor.

Note: When kSA systems are ordered with a computer, all the required hardware and software is installed, tested, and calibrated.

● **RAT-RACK**

8-Channel differential input rack-mount enclosure and cable (Optional)

Minimum System Requirements:

Processor: Pentium IV
Speed: 3.0 GHz
Memory: 1 GB
Video: 1024 x 768, 16-bit depth
Hard Disk: 250 MB
Bus: 1 PCI expansion slot and 1 available L-Bracket position
OS: Windows™ 2000 or Windows™ XP ONLY