## RHEED Image Analysis Software

#### Engines for Thin Film Innovation



### Description

RHEED (Reflection High-Energy Electron Diffraction) is an essential tool for thin film deposition processes. SVT Associates developed a state-of-the art RHEED Image Analysis Hardware/Software package that gives the user the necessary tools to gain insight into the thin film growth process and optimize material quality. The RHEED software is a multi-purpose program for analyzing RHEED patterns. The powerful software features tracking of RHEED intensity changes and measuring the rate of oscillations for quantitative determination of growth rate. It also has image analysis capabilities such as capturing and profiling.

The software program takes input from a high sensitivity CCD digital camera. All components are outside the thin film deposition system, hence retrofitting this package to existing machines is very simple.

The FFT analysis of RHEED oscillations can accurately determine rates even from very noisy signals. These factors make RHEED Image Analysis an indispensable tool in the day-to-day operation of a MBE system.

Camera Specifications	
Sensitivity	QE up to 37%
Lens Focus	From 4 cm to infinity
Frame Resolution	658 w x 492 h
Color Resolution	16 bit
Refresh Rate	Up to 65 times a second
Trigger	Software, Hardware synchronization TTL
Lens Mount	CS-Mount
Electronic Shutter	Microsecond Resolution

#### **Features**

- Hi-Sensitivity Progressive Scan CCD Digital Camera
- Graphical User Interface Image and Video Capture
- Intensity Tracking and Profiling
- Real-Time Oscillation Measurement and Growth Rate
- Lattice Constant Measurement/Strain
- Substrate Rotation Triggering and E-Beam Synchronization Capabilities



<sup>1</sup>/<sub>3</sub>" CCD Color Hi-Resolution and Hi-Sensitivity Camera with 4.5", 6", or 8" CF Camera Mounting Hardware.



Profile analysis allows the user to get an intensity profile along any line drawn on the video image. It also locks onto and tracks up to eight peaks, gives peak positions or separations and can save that data in a trend file. This feature is used

to measure lattice constant spacing and can be used for strain analysis.

Substrate rotation and electron beam sweep triggering allows precise capturing of RHEED data for further analysis.

Model	Description
RH-IAS	Image Analysis Software
RH-CM-4.5	Camera Mount, 4.5" CFF View-Port
RH-CM-6	Camera Mount, 6" CFF View-Port
RH-CM-8	Camera Mount, 8" CFF View-Port



# **RHEED Optional Components**

Engines for Thin Film Innovation



## Description

RHEED screens are available in 6" or 8" CF flanges. The phosphor screens are designed to show high spatial resolution by using very fine grain powder, ensuring sharp and high brilliance diffraction patterns. The special design of the screen frame provides mounting a RHEED screen on an UHV viewport without any modifications. The RHEED screen holder is designed for easy and fast exchange of RHEED screen plates. A complete RHEED screen includes a phosphor screen with mounting hardware which fits inside a 6" or 8" view-port. Custom screens with leaded screen layers are available on request.



Phosphor Screens 6" or 8" Aluminum Frames (Also Available in Stainless Steel Frames)

### Features

Beam Rocking (RH-BR) allows precise angle alignment and variation of the incidence angle without moving the substrate. This advanced feature is most useful for analysis performed on a fixed sample. The incidence angle can be controlled manually up to +/- 5°.

Beam Blanking (RH-BB) option controls the electron beam On and Off mode operation. The beam can be electronically switched on and off.

Differential Pumping (RH-DP) optional component designed for RHEED operation at higher pressures (10<sup>-4</sup> torr range). A single differential pumping module is integrated with the RHEED electron source. Efficient pumping of the cathode section ensures long lifetime of the cathode.

Remote Control Pad (RH-RC) is designed to remote control the RHEED operation.

Model	Description
RH-RC	Remote Control Pad
RH-BB	Beam Blanking
RH-BR	Beam Rocking
RH-DP	Differential Pumping
RH-RS-6	6" RHEED Screen with Mounting Hardware
RH-RS-8	8" RHEED Screen with Mounting Hardware
RH-VPS-6	RHEED Screen Mounts in 6" Viewport
RH-VPS-8	RHEED Screen Mounts in 8" Viewport



Remote Control

