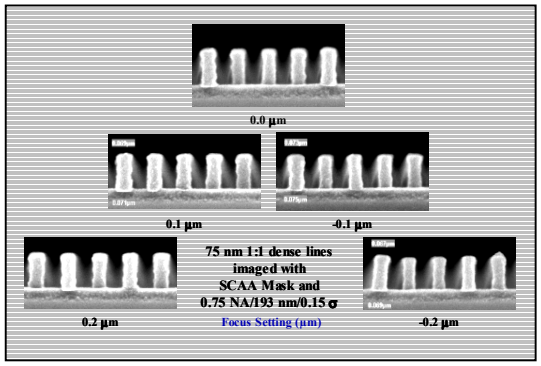
# ProLE Image Designer
# ProLE Image Factory

Product Information




The **Pro**grammable **L**ithography **E**ngine (**ProLE**™) Workbench offers the advanced image designer a comprehensive set of photomask and final silicon image design and analysis capabilities. Use ProLE for computationally intensive tasks like:

- Image Primitive Design
- OPC Optimization
- Source Design
- Aberration Analysis
- Mask Defect Disposition
- Systematic Defect Sensitivity Analysis
- Across-Pitch Process Development

The ProLE Workbench uses the PROLITH™ lithography simulator to power two different product configurations depending on your image design needs. **ProLE Image Designer** provides the single user a platform to better organize, plan, and analyze PROLITH simulations. The **ProLE Image Factory** configuration improves upon the Image Designer capability by adding support for scaleable high performance distributive computing, source design using a DoF response, advanced Monte Carlo Analysis, and an open Automatic SimProcess Control (ASPC) interface to third party tools and equipment.

ProLE Image Factory offers an easy to use interface for quickly, efficiently and accurately setting up and performing the millions of lithography and electromagnetic-field (EMF) simulations required to validate and optimize optical-proximity-correction, account for mask topography effects and real mask fabrication process windows, and to characterize and solve systematic defect yield loss problems. And **it's fast**; our current **Image Factory** is more than **90X faster** than a single simulator; it is capable of running **200 million simulations in a single month, each starting with 2D mask EMF and continuing through advanced resist imaging, metrology & analysis.**

ProLE Image Factory's Automatic SimProcess Control (ASPC) module provides tight integration for third party tools and equipment. A variety of sources of input parameters can be sourced from inspection tools, PEB temperature sensors, OPC engines or other computational tools and equipment. Fully automatic image design flow using data derived from a variety of sources are easy to create.

ProLE Image Factory enables you to automate millions of PROLITH simulations in minutes instead of hours. Its easy-to-use interface enables the image designer to:

- Optimize source shape, intensity and polarization for multiple feature sizes and types using PAL's SourceMaker™ or other tool.
- Simulate combinations of up to 137 Zernike terms using PAL's advanced aberration package.
- Emulate real imaging processes and develop simulation parameters using PAL's distributable optimization function.
- Find dose-to-size from bracketed focus-exposure matrices.
- Easily perform sensitivity studies using design-of-experiments and Monte Carlo methods.
- Graph simulation results.
- Customize and automate the output of data files for ProDATA or Excel.
- Automatically build batch job case tables.
- Run PROLITH v.8.1 EMF1 and EMF2 simulation sets more effectively.



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# ProLE Product Features

| Programmable Lithography Engine Products | ProLE Image Designer | ProLE Image Factory |
|---|---|---|
| Distributive Computing | Not Available | Yes |
| Available Licensing | Single/LAN/WAN | Cluster/Timeshare |
| ProLE Workbench Key Features | | |
| PROLITH™ Version 7.2.2 And 8+ Support | Yes | Yes |
| PROLITH PL2-File Support | Yes | Yes |
| Display And Select PL2 File Parameter Inputs and Outputs | Yes | Yes |
| User Selectable Simulation Parameter | Yes | Yes |
| Input Simulation Start, Finish And Increment Numerical Values or select number of increments | Yes | Yes |
| Automatic Dose To Size Setting Support | Yes | Yes |
| Select Multiple PROLITH Input Files | Yes | Yes |
| User Selectable Metrology Plane + Sim. Region File Inputs | ProLE Exclusive | ProLE Exclusive |
| Advanced Input Control: | Yes | Yes |
| Select Up To Five Numerical Inputs As A "Key" Inputs | Yes | Yes |
| Use "Link Groups" To Select Up To Five Key-Inputs To Vary | Yes | Yes |
| Advanced Aberrations Module: | Yes | Yes |
| Select & Vary Any Zernike Term Up To Z135 (15th-Order) | Yes | Yes |
| Reference Images Of All 136 Zernike Terms Included | Yes | Yes |
| Zernike/Fringe Term, Aberration Name& Formula Information | Yes | Yes |
| Full-Factorial Of Up To Twenty Zernike Coefficients | Yes | Yes |
| Monte Carlo Support | Adv. Aberrations Only | Yes |
| Gaussian Distribution Weighting Support | Adv. Aberrations Only | Yes |
| Un-Weighted Sampling Support | Adv. Aberrations Only | Yes |
| User-Defined Distribution Weighting Support (numeric & file) | Aberrations Only | Yes |
| Advanced Process Emulator Module with Monte Carlo Capability | Not Available | Yes |
| Sourcemaker™ For Source Design, Emulation & Mapping | Outputs *.src files | Outputs *.src files |
| Create, Direct And Manage Batch Job Setup And Execution | Yes | Yes |
| Custom Simulation Output Support | Yes | Yes |
| Single Simulations Output Support | Yes | Yes |
| Customize ProLE Data Output | Yes | Yes |
| User Defined ProLE Results Table Definition | Yes | Yes |
| PROLITH User-Interface | Yes | Yes |
| Launch ProDATA™ Version 1.4.1+ User-Interface | Yes | Yes |
| Launch Automatic ProDATA Version 1.4.1+ User-Interface | Yes | Yes |
| Launch ProLE Client | Yes | Yes |
| ProLE Data Analysis and Graphics Package | Yes | Yes |
| Focus-Exposure Matrix (PFE) Sorter | Yes | Yes |
| Automatic-ProDATA Interface For Advanced Analysis with step-wise regression of all ProDATA fitting functions | Requires Automatic ProDATA option | Requires Automatic ProDATA option |
| Automatic Simprocess Control (ASPC) Interface: | Not Available | Optional |
| ProLE Complex Simulation Loop Support | Not Available | Yes |
| Master Job Matrix (MJM) Definition Support | Not Available | Yes |
| Input/Output Paths For Source & Post-Processing Support | Not Available | Yes |
| Third Party Source Tool Data Output/Feedback Support | Not Available | Custom |
| Automatic Source Tool MJM Input Insertion, Job Spawning/Submission | Not Available | Yes |
| ProLE Outputs Results From The Spawned Jobs For Subsequent Post-Processing Of The Results | Not Available | Yes |