Nanometer Pattern Generation System (NPGS) & DesignCAD Express

Overview

The NPGS software can be run in an 'Office Installation" mode that can be used for pattern design away from the Nabity. Included with the NPGS software is DesignCAD Express which is a commercial computer-aided-design program.

There are three basic steps to the pattern generation process: pattern design, parameter run file creation, and pattern writing with alignment for multilevel lithography

Patterns are created using DesignCAD. The many powerful construction and editing features of DesignCAD simplify all aspects of pattern design. Several enhancements have also been added to DesignCAD specifically to facilitate the design of lithography patterns. All of the following drawing elements may be used in pattern design: lines of arbitrary slope, circles, circular arcs, and arbitrary filled polygons. Text, Bezier curves, cubic spline curves, and elliptical arcs can also be easily generated and written as series of short lines. Pattern elements that are to have different exposure parameters (such as dose, exposure point spacing, microscope beam current, microscope magnification, etc.) are designed in different drawing layers and/or different colors. This gives an almost unlimited number of exposure conditions within a single pattern. Patterns can also be imported from DWG, DXF, GDSII, CIF, and IGES file formats.

Once a pattern is designed, the exposure conditions for the different drawing elements in the pattern are entered into a "Run File". This approach offers the advantage that the details of the exposure are separated from the pattern design, therefore, to vary the exposure conditions only the run file needs to be changed. Parameter entry and modification are also extremely easy. For example, a dose may be entered as an area dose (uC/cm2), a line dose (nC/cm), or a point dose (fC) and the correct point exposure time will be calculated automatically. A single run file may contain parameters for a nearly unlimited number of different patterns that will be written sequentially and each pattern may be repeated an almost unlimited number of times. In addition, advanced features include Global Stage Corrections, Pattern Arrays, X-Y-Focus, External Commands, and Fracturing of large patterns. A single run file may instruct NPGS to control the SEM in an automated mode over many hours as it aligns and writes thousands of exposures on a wafer.

Once a run file has been created, the pattern(s) it descibes may be written using the program NPGS on the computer controlling the tool itself.

After the samples are processed, it is convenient to use the digital imaging feature of NPGS to save images of the devices. These images may then be examined and exported using the "office" installation of NPGS.

Invoking

The offline office installation of the NPGS software may be run via RemoteApp from any CNF Windows workstation with the "NPGS" icon on your desktop.

The offline office installation of the NPGS software may be run via RemoteApp from any CNF Thinstation with the following command:

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npgs
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Troubleshooting

NPGS Menu is already running

Please note that **only one user may run the RemoteApp version of NPGS at a time**. The same is true for DesignCAD. Please remember to properly exit both programs.

NPGS Menu window (or all windows) disappear after invoking DesignCAD Express

DesignCAD Express v21 is invoked via the button in the NPGS Menu program. On CNF Thin, invoking DesignCAD will cause the NPGS Menu program to disappear. To get the menu program to come back you will disconnect from the RemoteApp session without quitting the programs. And then you will reconnect.

1. After the DesignCAD Express window appears, press the "control" and 'c' keys at the same time (control-c) in the window in which you typed "npgs" .
2. Re-type "npgs" in that window.
3. Re-enter your password when prompted.
4. All windows will now be there.