

Maskless Photolithography

Maskless photolithography system (SF-100 Xpress, Intelligent Micro Patterning, LLC, USA) consists of three main parts: (a) the stage, (b) the optics and (c) the computer. The main working area of the system is the DMD (Digital Mirror Display) on which the computer projects the image. The light source (mercury lamp) passes the light through filter onto this DMD. The patterned light then falls on the reduction lens which is then made incident onto the beam splitter. Finally, the beam is incident onto the sample and simultaneous image can be viewed in the camera. The stage can move in X, Y, Z and theta modes.

This system works with both positive photoresist (PR) and negative PR. Shipley 1800 series is used as positive PR and SU8 is used as negative PR. The ultraviolet (UV) wavelength 423 nm is passed for positive PR and 365 nm is for negative PR. Maskless photolithography has two lens systems (4 X and 20 X). 4 X lens is used for patterning feature size of $\sim 10 \mu\text{m}$ or more whereas 20 X lens is used for patterning features upto $1 \mu\text{m}$. This system also allows level-to-level lithography.