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ABSTRACT**HIGH PRECISION THREE-DIMENSIONAL ALIGNMENT SYSTEM
FOR LITHOGRAPHY, FABRICATION AND INSPECTION**

The present invention provides a high precision three-dimensional alignment system using SPM techniques and method of using the same. The system comprises a fine distance control unit for the effective three-dimensional micromovement in the nanometer range of a planar object, and proximity detection unit to monitor the alignment process. In the preferred embodiment, the fine distance control unit comprises a set of at least three strategically positioned fine distance control elements which are capable of controlled expansion and contraction in the nanometer range. The most preferred embodiment of the fine distance control element comprises a piezoelectric tube, which crystal size may be varied by varying an applied voltage. This system may be applied to microlithography, in which case the planar object is a scribing tool having a planar base with multiple tips fabricated on one surface.

FIGURE 1

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