

Knights CAMELOT CAD navigation software for Carl Zeiss CrossBeam® series integration

The state-of-the-art semiconductor technology creates extreme demands on process control and failure analysis at 45 nm and below. This requires highly accurate and high resolution inspection tools with very precise navigation. The combined use of Knights CAMELOT CAD navigation and CrossBeam® technology provides easy access to hidden Integrated Circuit (IC) layers or microstructures which are not visible at the surface. The on-line CAD layout overlay allows precisely positioning of very site-specific micro cross-sections or milling boxes

for exposing sub-micrometer structures, while the CrossBeam® high resolution live imaging capabilities gives full control on the complete Focused Ion Beam (FIB) operation.

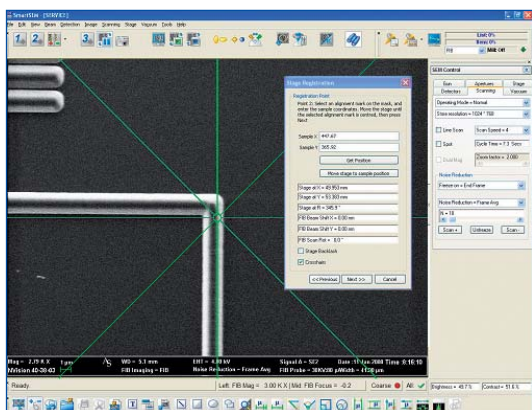
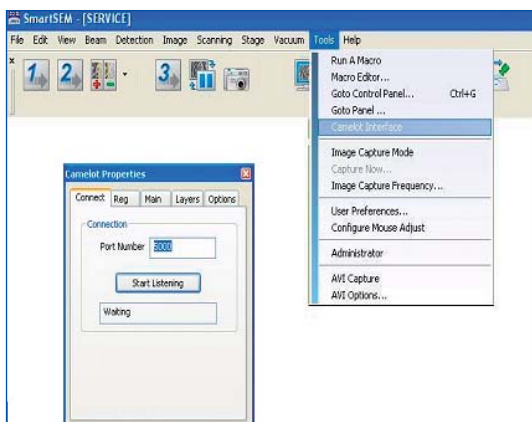
Used in conjunction, the Carl Zeiss CrossBeam® microscopes provide these benefits:

- On-line CAD layout to SEM- or FIB-image overlay for CAD navigation
- Three-point layout alignment and stage registration
- Easy access to hidden IC layers or microstructures not visible in the FIB/SEM image
- Bidirectional link between SmartSEM® FIB/SEM microscopes and CAMELOT CAD navigation system
- Network interface allows the CAD navigation system to run on powerful remote computers while displaying the CAD image overlay on a local display

This Knights CAMELOT interface adds precise and user-friendly CAD navigation to CrossBeam® systems. The Knights CAMELOT CAD navigation system is fully integrated into the SmartSEM® GUI. The bidirectional link is activated by clicking on the Start Listening button.

The stage registration and three-point alignment is achieved by selecting an alignment mark on the mask and by entering the CAD sample coordinates in the stage registration window. The stage coordinates are registered by moving the stage until the selected alignment point is centred in the SEM- or FIB-image and by subsequently pressing next.

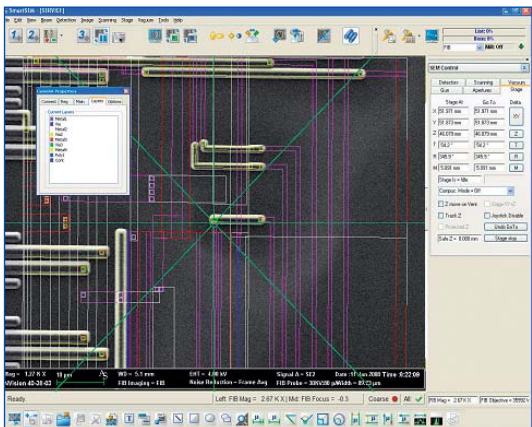
The online CAD layout for image overlays allows navigation to hidden Integrated Circuit layers not visible in the SEM/FIB image but are displayed in the CAD layout.



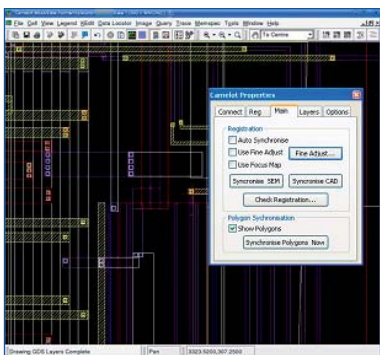
Sample and GDS-File courtesy of Peter Jacob, EMPA, Dübendorf, Switzerland.



We make it visible.



There is a bidirectional link between Carl Zeiss CrossBeam® microscopes and the Knights CAMELOT CAD navigation system. As soon as the point of interest is identified in the CAD layout, the microscope can be synchronized. Once synchronization is complete, the stage is driven to the point of interest. The magnification is automatically selected showing the corresponding display window as presented in the CAD display.



In the same manner the CAD navigation system can be synchronized to the currently displayed SEM- or FIB-image at any time. As another option, auto-synchronization may be chosen. In this case any navigation on either the CAD system or on the microscope will be retraced simultaneously by the other display.

The Knights Camelot to Carl Zeiss CrossBeam® series interface enables easy access to all layers of advanced nanometer Integrated Circuits for fast and highly precise failure analysis which is key to increasing semiconductor yield and to reducing manufacturing costs. The usage of the CAMELOT navigation system optimizes the equipment and personnel resources of design and semiconductor failure analysis labs by providing application tools and features for fast and efficient navigation. These add-on features are critical for tracking down potential failures and determining the origin of killer defects. This reduces design cycle times and improves time-to-market for Application Specific Integrated Circuits (ASIC) and new products.

Maximum Information – Maximum Insight

More than 160 years of experience in optics has laid the foundation for pioneering electron and ion beam microscopes from Carl Zeiss. Superior integration of imaging and analytical capabilities provides information beyond resolution, unlocking the best kept secrets of your sample.

With a broad technology portfolio Carl Zeiss provides instruments both tailored to your requirements and adaptable to your evolving needs. With our highly versatile application solutions we endeavor to be your partner of choice.

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