General Description

The KLA 8100 CD SEM can perform automated CD measurements on sub-micron IC features reliably, accurately and rapidly. It can load 100, 125, 150, and 200mm SEMI-standard wafers from three cassette platforms located at the front of the instrument. No hardware modifications are required to switch between wafer sizes because the cassette platforms can accommodate 100, 125, 150, and 200mm SEMI-standard wafer cassettes. The KLA 8100's advanced automation capability allows it to operate completely unattended at speeds in excess of 40 wafers per hour.

The KLA 8100 CD SEM is controlled via software that utilizes a state-of-the-art, graphical user interface (GUI). Manual operation, automatic operation, and automated job defining are all accomplished simply by using the trackball to select items on the computer screen. An optional remote workstation, which communicates with the instrument's computer via a network connection, can be used to do off-line operations such as data analysis, job setup, and job editing. The KLA 8100 CD SEM can also be connected to an existing network (or can be networked with other KLA 8100s) via AppleTalk™ or EtherTalk™. A modem, or a central network server can be used to provide access to remote facilities, and the optional SECSII/GEM software can provide communication with a host computer.

Instrument Features

The KLA 8100 CD SEM incorporates the following features, which ensure that it can be fully integrated into the wafer fab environment:

- Fully automatic, hands-off operation
- Complete instrument control through software; no knobs, dials, etc.
- Simple to learn, intuitive job setup and editing
- Simple calibration and intuitive measurement optimization
- Data base for jobs and measurement statistics
- Connectivity with other systems and mainframes
- Optional host communication and file transfer capability via SECS/GEM.
- Optional remote workstation for off-line job setup and data analysis

Imaging

The KLA 8100 CD SEM produces SEM images of IC features by using a TFE (Thermal Field Emission) electron source and a micro-channel plate detector. The detector is capable of creating an image from back-scattered and/or secondary electrons. An adjustable energy filter, which is part of the detector assembly, provides control over the ratio of secondary to backscattered electrons that are

detected. The ability to control the type of electrons being detected ensures that the image can be optimized for each feature being measured.

The KLA 8100 CD SEM generates high-magnification images (from about 2000X to 400,000X) of integrated circuit features. The instrument combines its advanced imaging capabilities with the following features to provide accurate and repeatable CD measurements:

- The hardware uses a, hysteresis-free electron beam scanning system, which allows freedom in specifying scan orientation, direction, and density.
- The KLA 8100 CD SEM uses a unique structured scan technology which scans only the areas of interest during measurement. The KLA 8100's scanning method provides a significant measurement speed increase when compared to measurement methods that scan across the entire image area.
- Most of the user-definable SEM settings are automatically stored with jobs, therefore beam settings can be optimized and automated for each layer if necessary. Because jobs include the SEM settings, they are portable from instrument to instrument, which can save a significant amount of setup time.

Software Features

Graphic-Oriented User Interface (GUI)

The main screen consists of a menu bar, dynamic status display windows, interactive control windows, and two tool bars that provide immediate access to key system functions. The menu bar, located along the top of the main screen, displays a set of pull-down menus, which provide access to interactive dialog boxes and other system functions.