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(INVITED)

PRESENT STATUS AND FUTURE ASPECTS OF THE ELECTRON BEAM EXPOSURE DEVICES

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- Electron Beam Pattern Generators (EBPG) are used to draw reticles or masks. They can also be used to draw directly on an active substrate.

- An EBPG is essentially composed of an electron source, some coils for focusing and adjusting the beam current ; and a beam deflection system driven by a computer to draw small image on an electroresist coated substrate.

An XY table moves the substrate in order to cover the whole area of a mask by composition of the electron beam motion and the table motion. When operating on an active substrate, an EBPG incorporates some means for registration.

- The most important properties of the EBPG are :

- . the resolution of the drawing beam ;
- . the speed ;
- . the size of the chip.

- The different EBPG which have been built in the world have some characteristics features and description, adapted to the different purposes of the device.

A brief survey of these machines will be given with some significant results obtained in the microcircuits fabrication field.

- The trends for future aspects of the EBPG are : increased speed and resolution, a best precision of the drawing and a completely automatic control. To achieve these improvements subassemblies of the machine must be improved : Electron gun, Beam Blanking, deflection and focusing systems ; resist sensitivity, electronics input data systems - hardware and software. Total complexity, and cost of these machines are problems to be solved for a general use.

However to days machine have been used with success in Development laboratories to achieve new circuits or conventional circuits with increasing yield.

Theses machines are no longer laboratory prototypes ; they are working machines used more than 9 hours each day. It opens the field of a general usage in all microcircuits fabrication.

