

Mercurex by Dainippon Screen Mfg. Co., Ltd

Introduction

Generally, printed circuit board photolithography was achieved by imprinting the circuit pattern on a photomask film using a plotter, based on CAD data. And then it was forming that pattern on the circuit board by transferring the pattern from the film with a one-shot exposure system.

One-shot exposure system is still the primary type of system used for this process. The maskless lithography Direct Imaging System, however, prints the circuit pattern directly onto the circuit board from the CAD data without using a photomask, dramatically reducing both cost and turnaround time. Naturally, defects originating from the mask are completely eliminated, so accuracy increases at the same time. For these reasons, the introduction of this system for printed circuit board exposure has recently become more common.

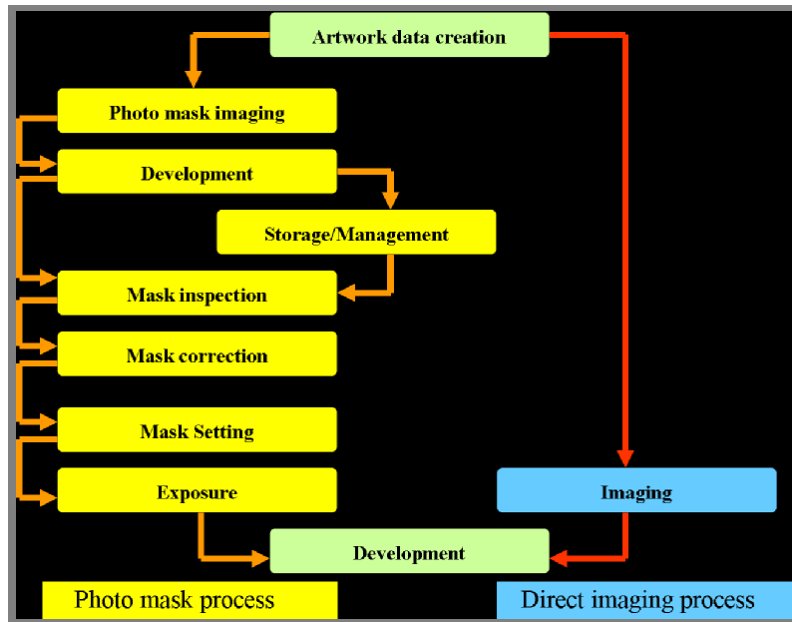


Figure 1: Comparison of photo mask vs. direct imaging process flow

Equipment

Mercurex, developed by Dainippon Screen Mfg. Co., Ltd., is a multi-purpose direct imaging system designed for various exposure processes of a printed circuit boards, such as inner layer, outer layer, and solder resist patterns.

The combination of DLP® technology from Texas Instruments and Screen's exclusive optical technology enables the use of an ultra-high-pressure mercury lamp as the light source. Conventional resists used for one-shot exposures can even be used with the new unit.

Light from the lamp is collected and made uniform with the light control. The digital micromirror device (DMD) – found at the heart of DLP® technology – is then exposed to this light, which has the desired strength and a uniform distribution. Light reflected from the DMD mirror is projected onto the circuit board above the imaging stage via an



Figure 2: Mercurex

optical projection system. The movement of the imaging stage is synchronized, so the desired circuit pattern is displayed on the DMD at high speed based on the imaging stage position. In this way, the circuit pattern can be accurately projected on the imaging stage.

SCREEN

The Dainippon screen Group has expanded its operations based on core technologies developed over the years. These technologies include image recognition, processing, transfer and exposure. Using these core technologies, the Group is developing its business in the following areas. The semiconductor, flat panel display (FPD) and printed circuit board (PCB) production equipment businesses that form the core of information technology (IT) societies. The media technology business, which offers prepress equipment and accelerates the printing industry's adoption of digitization by providing the necessary digital printing equipment and digital fonts. These businesses are contributing to the creation of an information-based society by expanding modes of communication.