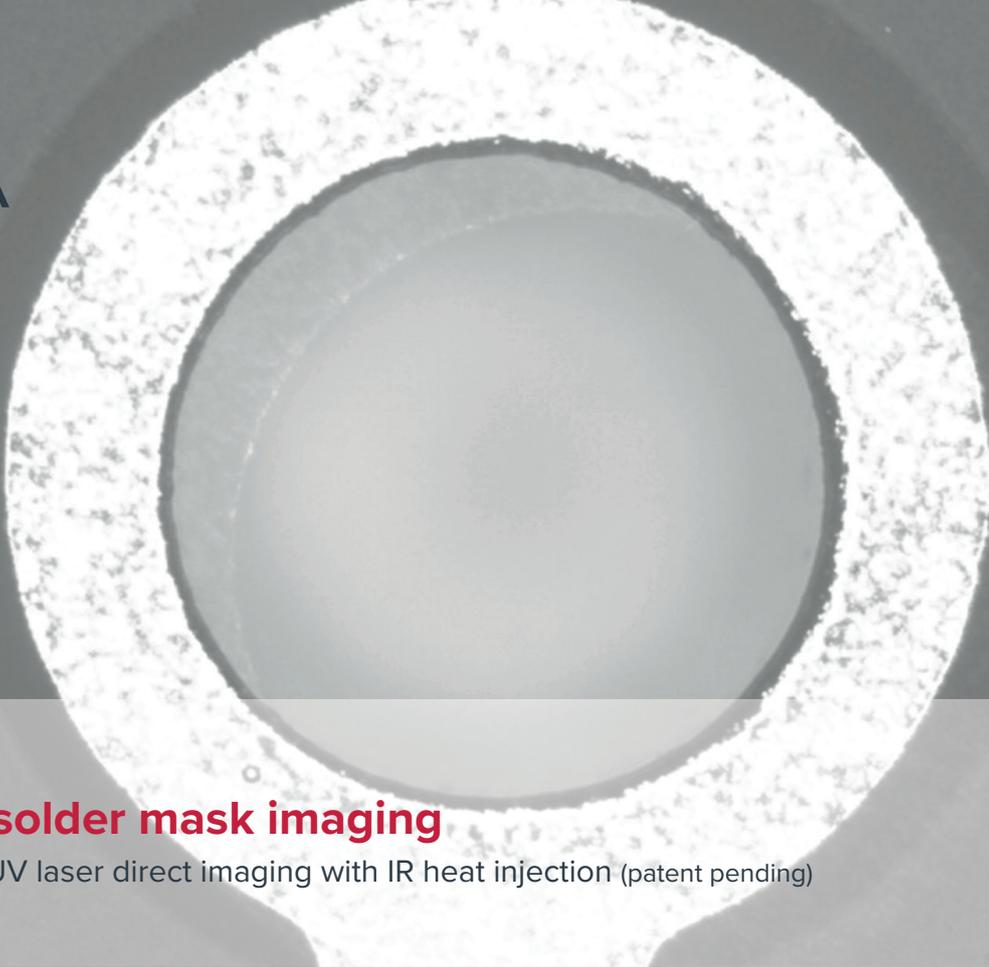




LIMATA



UV / IR solder mask imaging

Multi wave UV laser direct imaging with IR heat injection (patent pending)

The solder mask process step is located on the backend of the production process. The number of imaged sides per day is significant less in compared to the inner- and outer layer patterning process. But the high needed dose of energy to polymerize the standard solder mask inks on the market increases the imaging time per print. This could become a bottle neck in the PCB production especially if the yield drops down e.g. like on advanced HDI boards.

Direct imaging of solder mask has become more and more important over the last 3 years based on the further investigations of solder mask ink suppliers and machine vendors. Surely the most important benefit of DI in this application is the optimized registration accuracy from layout (solder layer) to layout (outer layer). Like on standard patterning the resolution can be optimized too.

Limata, as one of the first direct imaging machine suppliers in Europe, has begun very early with R&D in the solder mask area. A combination of different wavelength in the laser was necessary to harden the surface by simultaneously polymerize the ink on the bottom. In a second step, Limata investigated based on the Arrhenius Equation that the UV polymerization process could be accelerated by a regulated dose of heat. This UV / IR imaging setup made it possible to image especially standard inks with high energy dose in satisfying production speed.

Solder mask imaging

Features and Benefits

UV / IR solder mask imaging

technology leads to enhanced performance on standard solder mask materials

Multi-wave length laser diodes

combined within one precise laser spot

Highest optical depth of focus

for similar power distribution on copper and base material

No power limitation

ensured by laser mirror system with perfect power dissipation

Long lifetime of imaging unit

through use of laser diodes and galvo scanning mirror

RGB & IR camera lightning

for easy fiducial detection on all colors



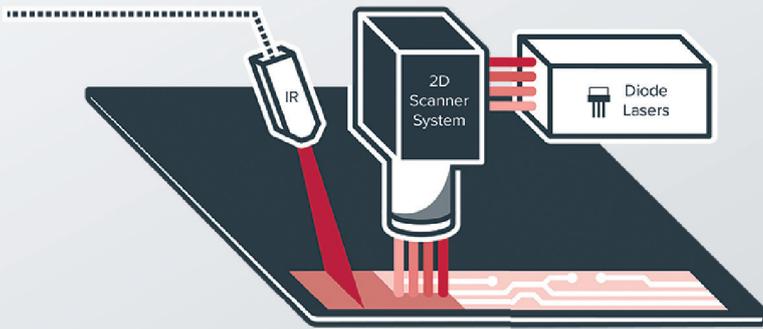
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UV/IR Technology overview

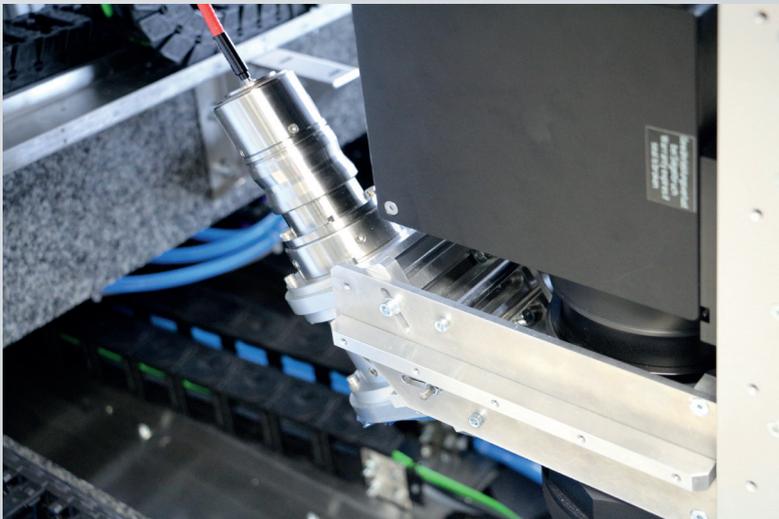
The solution from Limata is based on:

The photochemical process of polymerization at liquid materials works better / faster with increased temperature

(Arrhenius Equation)



A special **high-power IR-Laser module** increases the temperature locally at the point of imaging for a few milliseconds by some degrees.

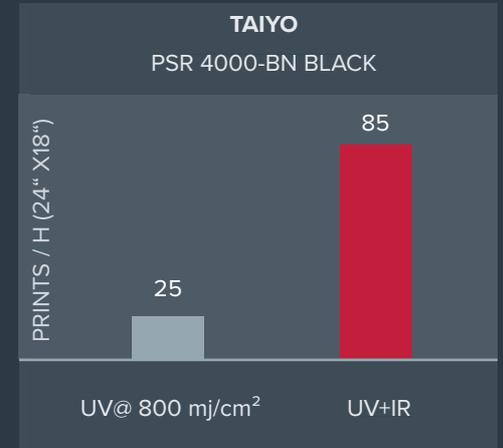


This IR-system activates the polymers in the solder resist and provides a better environment for the UV-Laser to polymerize the mask.

This **UV / IR Laser-Direct-Imaging Technology** provides an outstanding optimization on polymerization and capacity, especially at conventional green, white or black solder resists.

Solder mask production speed enhancement

Conventional solder mask material with dose values above 250 mj/cm² will be affected very positively by the UV/ IR imaging method.



Additionally, a positive absorption ability of heat comes with many colors. It was able to measure optimization factor up to 400 % in speed on colors like black, green and blue.



The UV / IR Technology was tested with conventional and LDI solder mask inks from different suppliers:

Taiyo America, Peters Lackwerke, Electra Polymers, Sun Chemicals, Huntsman,

These and more features are available on: X2000 and X3000 platform

