X2000SM series
LASER DIRECT IMAGING FOR PCB SOLDER MASK APPLICATIONS
WWW.LIMATA.COM
The LIMATA X2000-SM Series is a laser direct imaging system designed for the imaging of sophisticated PCB solder mask applications in large-scale PCB production environments.

The X2000 platform is standardly equipped with a double drawer system including parallel registration. With this feature, the PCB patterning process can be reduced from four process steps (including loading, registration, imaging, unloading) down to only one step (imaging). A fully automated X2000 twin-set option provides further capacity for high-volume PCB production.

Best in class registration of the panel is guaranteed by using a multi-point sub-registration approach without any loss in capacity and non-linear scaling. Up to 4 HD cameras with RGB light can detect the reference marks without influencing production throughput.

The X2000-SM system combines different laser diode wavelengths in one precise laser spot to harden the surface by simultaneously polymerizing the ink on the bottom.

Finest dames and spaces are achieved by using a variable beam shaping optic (HD / HR option) which provides for an automatic laser spot size alignment during the imaging of standard PCB and HDI solder mask applications.

The UV polymerization process is accelerated by a regulated dose of heat. This unique LUVIR Technology (UV/IR) approach (patent applied) is especially suitable for the imaging of standard inks with high energy doses at higher throughput rates.

Availability of complementary automation options for a fully automated single or dual LDI system operation.

Features and Benefits

- UV-laser diode wavelength set-up combined with IR laser (LUVIR Technology) ensures fastest solder mask process speed and higher throughput capacities on all standard solder mask inks
- Multi-wavelength 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 facilitated by a 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 easier fiducial detection on all colors
- Ease of use operator friendly handling and data interface
Applications

- Standard PCB and HDI production
  Consumer electronics, automotive, industrial, military, aerospace, medical

- Custom PCB production
  Thick copper

Solder Mask imaging examples

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<th>System Features</th>
<th>Details</th>
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<td>Market</td>
<td>Medium to high volume PCB production</td>
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<td>Operating table</td>
<td>Dual table</td>
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<td>Vacuum table</td>
<td>Included</td>
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<tr>
<td>Mechanical system</td>
<td>XY Linear drive gantry system</td>
</tr>
<tr>
<td>Base</td>
<td>Full granite</td>
</tr>
<tr>
<td>Weight</td>
<td>ca. 4.500 kg</td>
</tr>
<tr>
<td>Dimensions</td>
<td>1.5m x 3.2m x 1.95m / 59&quot; x 126&quot; x 76&quot;</td>
</tr>
<tr>
<td>Footprint</td>
<td>4.8 m²</td>
</tr>
<tr>
<td>Communication interface</td>
<td>Ethernet</td>
</tr>
<tr>
<td>Power supply</td>
<td>400 VAC / 3+1 Phase</td>
</tr>
<tr>
<td>Upgradeable</td>
<td>Up to 4 heads</td>
</tr>
<tr>
<td>Max. image size</td>
<td>710 x 610 mm² / 28&quot; x 24&quot;</td>
</tr>
<tr>
<td>Max. panel thickness</td>
<td>25µm - 15 mm / 1mil - 0.6&quot;</td>
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Imaging Features

- UV Light engine: Diode lasers
- UV Laser wavelength: 400 - 410nm
- IR Light engine: IR fiber with diode laser
- UV & IR Lifetime laser [typ.]: > 25.000 h
- UV Lasers per head: 4 - 6
- IR Lasers per head: 1
- Number of heads (exposure units): 1 - 4 heads
- Depth of focus: +/- 500µm / 20mil

Resolution Accuracy**

- Min. dams: 50 µm / 2 mil
- Min. S.R.O.: 50 µm / 2 mil
- Max. edge roughness: +/- 10% min. res.
- Max line width tolerance: +/- 10% min. res.

Registration Features:

- Reg. System: up to 4 x HD Cameras
- Camera Lighting: RGB / IR
- Registration accuracy: up to +/- 10 um / 0.4 mil
  Outer layer to solder layer [typ.]:*

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* depending on fiducial and layout quality
** depending on solder mask material and thickness
Solder Mask Module

**LUVIR Technology**

- Unique UV/IR Laser setup for optimized and faster solder mask imaging (on all conventional ink types)
- All common colors can be processed with optimized speed & accuracy

**System Options**

*Multi point registration*

- Detection of multiple fiducials for max. registration quality
- No cycle time loss from registration due to parallel working HD camera systems and double drawer handling approach

**HD-Option**

- Adjustable laser spot size for advanced HDI production
- Improvement of power density-processing of dams and spaces down to 2 mil / 50 µm

**Automation**

- The X2000 platform can be complemented by a robotic set-up for a fully automated and less labor intensive LDI in-line operation

**X2000 SM-modular system configurations**

<table>
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<th>LDI System family</th>
<th>X2200-SM</th>
<th>X2300-SM</th>
<th>X2400-SM</th>
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<tbody>
<tr>
<td>UV laser heads</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>UV diode lasers spots per head</td>
<td>4/6</td>
<td>4/6</td>
<td>4/6</td>
</tr>
<tr>
<td>Total UV lasers</td>
<td>8/12</td>
<td>12/18</td>
<td>16/24</td>
</tr>
<tr>
<td>IR laser sources</td>
<td>2</td>
<td>3</td>
<td>4</td>
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