LIMATA - core competencies and assets

Headquartered in Germany (Ismaning near Munich) with sales partnerships and support functions in all key PCB manufacturing regions complemented by an operational assembly footprint in Asia (Singapore)

Entrepreneurial, R&D, customer and application driven organization with a "time-to-market" development and solutions provider approach

IP ownership of all key in-house developed direct imaging technologies

Solder-mask imaging demo lab and application center in Ismaning (Munich) with complete test-panel processing capabilities (coating, imaging, developing, backing) for LUVIR quality and capacity demonstrations

Financial and operational ability to scale production and to provide shortest possible equipment lead-times for standardized and customized LDI system solutions

LIMATA’s further growth plan is backed by a long-term orientated institutional investor base

Unique imaging technology approach and modular system concepts for high-performance direct imaging

Modular product platform design (X-Series) featuring tailored system solutions for high-mix to high-volume PCB manufacturing environments and a wide range of standard, advanced and emerging/niche PCB applications

Unique LUVIR Technology® for solder mask direct imaging provides unrivaled imaging speed and accuracy on all conventional ink types (no DI or LDI ink material needed) at lower process costs

Technological ability, proven imaging concepts and system configurations to support cost-efficient high-resolution 10µm line/space and large panel format imaging up to 48” x 110”

Shorter ROI and lower costs of ownership over the entire equipment lifecycle backed by longer life-time of imaging unit components

Our core message

We are an innovative supplier of Laser Direct Imaging (LDI) system solutions for various PCB manufacturing environments and adjacent markets. Our system product portfolio ranges from LDI system configurations for high-mix and emerging PCB niche applications up to fully automated LDI system solutions for mass production environments.

We are an entrepreneurial, innovation and customer driven organization with staff, operations and/or value adding sales partnerships in all key PCB manufacturing regions. The core of our operation is Ismaning near Munich (Germany) which is also home to our R&D/development, engineering and applications team.

Your solutions provider for direct imaging

Based on our in-house developed direct imaging technology combined with an advanced and modular configureable hardware system platform (X-Series), LIMATA laser direct imaging solutions enable PCB manufacturers to achieve higher production yields and to increase image quality and output for standard and advanced PCB applications at lower cost of ownership over the LDI equipment lifecycle. We are committed to closely working and partner with our customers and stretch ourselves in order to deliver the best LDI solution for their PCB process (or to solve their problem).

Your application is our key driver

Your individual PCB product and process requirements are key. The customization of our LDI system products with innovative imaging concepts, optimized hardware and automation features, IoT data processing interfaces and technological advancements are one of our core expertises. This approach allows us to align to your individual imaging needs and to continuously adapt to new market requirements (‘time-to-market’).

Unique LUVIR Technology® for solder mask direct imaging provides unrivaled imaging speed and accuracy on all conventional ink types (no DI or LDI ink material needed) at lower process costs
Introducing the LIMATA X-series

**Cost-efficient and flexible LDI system platform**
- High-mix PCB production
- Support of panel sizes up to 24" x 32" or 24" x endless
- Optimized footprint

**Flexible LDI system platform for high-speed solder mask imaging**
- Dual-table system as standard hardware feature for high-volume production
- Multipoint precision alignment capability without affecting imaging speed
- Availability of three modular imaging set-ups

**Direct imaging of oversized (XXL) panels**
- Flatbed print up to 48" x 110" board sizes
- 48" x endless imaging capability with LIMATA automated data stitching
- Simultaneous imaging of multiple 24" x 18" panels (12ea)

**LIMATA – laser direct imaging solutions**

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LUVIR Technology® delivers the most efficient solder mask direct imaging for all conventional ink types and colors (LPI masks).

Now available on all LIMATA X-Series models

X1000
X2000
X3000

Contact us to learn more: luvir@limata.de
LIMATA LDI system solutions for solder mask direct imaging are powered by LIMATA’s LUVIR Technology ® which delivers consistent image quality at significantly improved imaging speed on all conventional ink types.

**Customer Value Proposition (PCB solder mask departments)**

- **Imaging speed and accuracy**
  - Higher panel processing capacity (prints/h) on all conventional ink types from use of unrivalled LUVIR imaging efficiency.
  - High resolution capability (down to 2mil dams) and registration accuracy.

- **Modular and cost efficient LDI system platform (X-Series with LUVIR inside)**
  - Availability of modular imaging capacity concepts on all three X-series system platforms (X1000/ X2000/ X3000) with capacity options ranging from 1-4 LUVIR imaging units.
  - Each system configured to each PCB factory’s real imaging processing requirement (no need to buy imaging capacity which is not needed).
  - Initial hardware set-up provides for future imaging capacity upgrades (field-upgrade capability).
  - “Ease-of-use” and operator friendly handling.

- **Reliability and lower Cost of Ownership**
  - Reliable and robust galvo-scanning + UV/IR laser imaging set-up supports longer equipment uptime at lower maintenance and replacement costs over the equipment life-cycle.

- **No DI / LDI ink material requirement**
  - Higher capacity levels with LUVIR direct imaging on all conventional solder mask ink types enable PCB manufacturers to further use and expose their end customer approved conventional inks at lower ink material costs (vs. converting to DI inks).
**Key characteristics**

Flexible and cost-efficient LDI system platform available in two modular imaging capacity set-ups (X1100 / X1200)

Direct imaging applications: PCB dry-film patterning (standard and high-resolution), solder-mask

Small and compact operational machine footprint ensures fast placement and deployment to all PCB manufacturing environments

Availability of R2R automation option for Flex PCB applications

Endless board option in step & repeat mode

**Features**

**LUVIR ® solder mask imaging technology** for enhanced imaging performance and speed on all standard solder mask ink-materials (no DI or LDI ink material needed)

Multi-point partial registration / RGB & IR camera lightning for easier fiducial detection on all colors

Highest optical depth of focus for uniform power distribution on copper and base material

No water cooling / power limitation due to use of a laser mirror-system with perfect power/energy dissipation

Longer lifetime of imaging unit and lower cost of ownership backed by use of UV-diode lasers (ca. 25,000 operating hours MTBF) in combination with maintenance-free galvo-scanning mirror technology

Ease of use operator friendly handling and data interface

QR and barcode scanning for full product traceability

**Standard configurations and models**

**X1000 SM** version powered by LUVIR Technology ® for efficient solder mask direct imaging and optional dry-film imaging on one hardware platform

**X1000 DF** for dry-film imaging (inner- and outer layer)

**X1000 HR** version with high-resolution imaging capability down to 8 um line / 12 um space on dry-film resist

**X1000 R2R** Reel to Reel automation (option) for automated solder mask and dry-film imaging of Flex-PCB applications
**X2000**

**Key characteristics**

- Flexible and modular configurable LDI system platform for PCB mass production available in three imaging capacity set-ups (X2200 / X2300 / X2400).
- Direct imaging applications: solder mask, dry-film patterning of standard PCB and thick-copper/DCB panels.
- High throughput and highly accurate LDI solution for solder mask mass production powered by LIMATA’s LUVIR Technology®.
- Integrated dual-table system with full pre-registration set-up as standard X2000 hardware feature for higher production efficiency and panel throughput (processing of two panels in parallel).
- Field-upgrade capability – “plug-in concept” for additional imaging units and capacity (up to 4 exposure units).
- Availability of customized automation options (“Island of Automation” or “In-Line”).

**Features**

- **LUVIR ® solder mask imaging technology** for significantly improved imaging performance and speed on all standard solder mask ink-materials (no DI or LDI ink material needed).
- Multi-point partial registration / RGB & IR camera lightning for easier fiducial detection on all colors.
- Highest optical depth of focus for uniform power distribution on copper and base material.
- No water cooling / power limitation - due to use of a laser mirror-system with perfect power/energy dissipation.
- Longer lifetime of imaging unit and lower cost of ownership backed by use of UV-diode lasers (ca. 25,000 operating hours MTBF) in combination with maintenance-free galvo-scanning mirror technology.
- QR and barcode scanning for full product traceability.
- Customized MES-Interface programming options (mass production).

**Standard configurations and models**

- **X2000 SM** version powered by LUVIR Technology ® for efficient solder mask direct imaging (mass production).
- **X2000 TC** customized LDI system solution for the direct imaging of thick copper and DCB applications (i.e. automotive / IGBT) including in-line automation.
**Features**

**LUVIR ® solder mask imaging technology** for enhanced imaging performance and speed on all standard solder mask ink-materials (no DI or LDI ink material needed)

Multi-point partial registration

Highest optical depth of focus for uniform power distribution on copper and base material

RGB & IR camera lightning for easier fiducial detection on all colors

No water cooling / power limitation due to use of a laser mirror-system with perfect power/energy dissipation

Longer lifetime of imaging unit and lower cost of ownership backed by use of UV-diode lasers (ca. 25,000 operating hours MTBF) in combination with maintenance-free galvo-scanning mirror technology

Ease of use operator friendly handling and data interface

**Key characteristics**

Unique LDI system platform for the direct imaging of oversized PCB panels

Customized working area enables manufacturing of oversized XXL panels up to 110” x 48” panel sizes at a stretch or the imaging of multiple 24”x18” panels with a loading and processing capability of up to 12 panels in parallel

Front-, back-, and side-panel loading capability

Available in four modular imaging capacity set-ups (X3100 - X3400) for dry-film patterning and solder mask direct imaging of oversized XXL panels

Field-upgrade capability – “plug-in concept” for additional imaging units and capacity (up to 4 exposure units)

**Standard configurations and models**

**X3000 DF** version for dry-film imaging of oversized panels or multiple 24”x18” boards (12ea)

**X3000 SM** version powered by LUVIR Technology ® for efficient solder mask direct imaging and dry-film imaging capability (hybrid)
The LIMATA X-Series imaging set-up

- Modular configurable imaging capacity options for each PCB imaging application (solder mask / dry-film)
- Dry-film imaging set-up’s upgradeable with LUVIR technology (IR laser and software)
- Laser and imaging unit “field-upgrade* options up to a maximum of four imaging exposure units on the X2000 / X3000 platform (capacity expansions)

Key laser and imaging technologies

- High-speed Galvo-Mirror Scan Laser Technology
- Highly telecentrical optical system
- UV-diode laser set-up with 4/6 lasers per exposure unit (Light-Hub)
- IR-Module for solder mask applications / LUVIR Technology®

Key laser and imaging technologies

- High-speed Galvo-Mirror Scan Laser Technology
- Highly telecentrical optical system
- UV-diode laser set-up with 4/6 lasers per exposure unit (Light-Hub)

Key laser and imaging technologies

- High-speed Galvo-Mirror scan Laser Technology
- Highly telecentrical optical system
- UV-diode laser set-up (1 exposure unit)

Solder mask imaging (LUVIR Technology®)

- all conventional ink types
- no DI / LDI material needed

Dry-film imaging

- Inner- / outer layer (standard)
- Thick-copper / DCB

High-resolution imaging

- (8/12µm L/S on dry-film resist)

**LIMATA imaging technologies and modular capacity options**
R2R automation
(“Reel to Reel”)

The X1000 platform is available with a Reel-2-Reel automation set-up (winder/unwinder) for a fully automated and efficient production of Flex PCB’s.

The labor-free automation of the loading / unloading process increases capacity and reduces overall process costs and costs per panel.

- **Panel Size**: Max. 610 mm
  - Min. 100 mm
- **Panel Thickness**: 0.02 mm – 0.5 mm
- **Dimensions**: 5.0 m x 1.5 m x 2.1 m (incl. LDI system)
- **Options**: SMC ionisation (optional)
  - Ultrasonic edge sensor for transparent foils

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Single automation
(“Island of Automation”)

The X2000 platform can be complemented by a Single or In-line dual system robot automation for an automated handling of inner and outer layer PCB and solder mask panels at lower process costs.

- **Panel Size**: Max. 610 ± 2 x 711 ± 2 mm
  - Min. 229 ± 2 x 305 ± 2 mm
- **Panel Thickness**: > 0.05 mm
- **Dimensions**: 3.1 m x 3.0 m x 2.1 m
- **Options**: Cleaning module
  - Optional drawer for rejected panels
  - Optional automatic size change
  - Optional Bernoulli gripper
  - Alt. Trolley for the transport
  - Solder mask option
**Global sales and support contacts**

**EUROPE**

**LIMATA Germany**
- Headquarter
- R&D/engineering/sales and support
- LDI demo office / Solder mask lab
- Production / final assembly

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- **United States**
  - Sales and service

- **China**
  - Sales and service

- **Singapore**
  - Machine assembly
  - Platform (CM)

- **Limata Germany**
  - Sales and service
  - R&D/Sales
  - Demo center / lab
  - Production