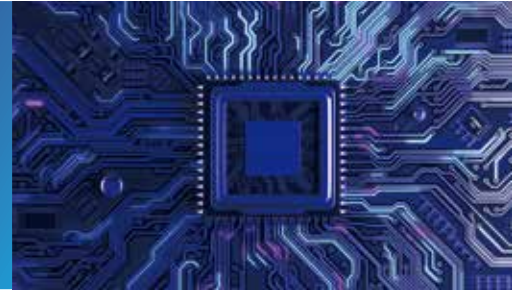
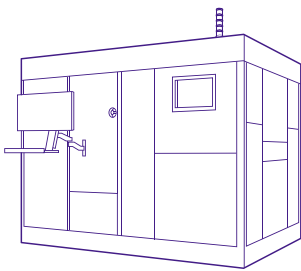


# PCB & ICS Product Overview



## Lumina™ Inspection and Metrology



- Defect inspection and metrology, optimized for advanced ICS, including glass core and through glass via (TGV) and panel redistribution layer (RDL)
- Detection and measurements across a wide range of applications and defect types
- High-sensitivity capture of unique defect types with Omnisphere™ illumination, enhanced area camera and multi-modality scanning capabilities
- Detectability of the most challenging defects
- Full defects of interest detection coverage in a single scan, with low false alarm rate (FAR) and setup flexibility for each modality throughout the product life cycle (PLC) phase
- VRS-less, resource-lean verification
- Support for current and future production needs

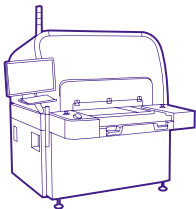
Omnisphere™ Technology

Multi-Modality Imaging™ Technology

**EcoNet™** – In-scan actionable and customizable automatic defect classification (ADC)\*

\*Optional feature

## Orbotech Ultra Dimension™ AOI



- Unique inspection capabilities—powered by Triple Vision™ and Magic™ technologies
- Next generation remote multi-image verification (RMIV Pro)
- Integrated, automated 2D metrology
- Low total cost of ownership (TCO), Industry 4.0-ready

**Orbotech Ultra Dimension™ 900** – ultra fine pattern and laser-via (LV) inspection and operational efficiency for IC substrate AOI-AOS suite

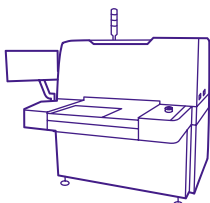
**Orbotech Ultra Dimension™ LV** – inspection and measurement of LV panels in a single scan down to 30µm laser via diameter

**Orbotech Ultra Dimension™ 800/700** – pattern and laser via inspection in a single scan for SLP/mSAP, advanced HDI, flex and ICS down to 10/15µm L/S accordingly

Magic™ Technology

Triple Vision™ Technology

## Orbotech Precise™ AOS

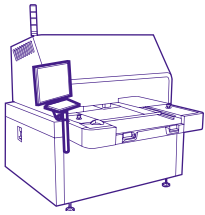


- One-stop automated solution for shaping open and short defects
- Significant yield and savings increase by eliminating scrap PCBs
- High-quality shaping enabled by proprietary 3D shaping (3DS)™ and closed loop shaping (CLS)™ technologies
- For mass production of SLP/mSAP, advanced high-density interconnect (HDI), HDI and multi-layered boards (MLB) down to 30µm L/S for open defects and 25µm L/S for short defects
- All-defect coverage, including inner and outer layers, multiple lines, corners and pads

3DS™ Technology

CLS™ Technology

## Orbotech PerFix™ AOS



CLS™ Technology

- Scrap saving - enables excess copper defect shaping
- High quality with closed loop shaping (CLS)™ technology
- High speed automated shaping

**Orbotech Ultra PerFix™ 500P** – for the most advanced IC substrates and fine line applications down to 5µm L/S

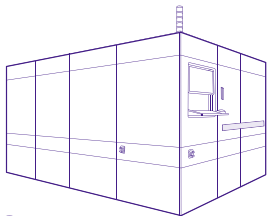
**Orbotech Ultra PerFix™ 170i** – for advanced IC substrates and fine line applications down to 7µm L/S

**Orbotech Ultra PerFix™ 120N** – high throughput for IC substrates, SLP/mSAP and advanced flex down to 10µm L/S

**Orbotech PerFix™ 200S/200S XL** – for mass production of complex HDI and MLB down to 30µm L/S, supporting up to 30" x 36.5" (XL model)

**Orbotech PerFix™ R2R** – for flex PCB production with roll-to-roll automation and sheet-by-sheet mode down to 25µm L/S

## Corus™ DI



DSI™ Technology



LSO™ Technology



MultiWave Laser™ Technology

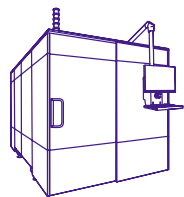
- Innovative fully automated, double-sided imaging solution that replaces a complete DI line
- Super-fine line; high depth-of-focus for best line quality on varying surface topographies
- High-speed, multi-target acquisition for any layout, ensuring high productivity
- Exceptional positioning accuracy enabled by high precision design and scaling algorithms
- Closed and compact solution for maximum cleanliness and efficiency (capacity per m<sup>2</sup>)

**COMING SOON** Fine-line (down to 6 µm) mass production DI for flip-chip chip scale package (FC-CSP) and advanced HDI

**NEW Corus™ 8M/8R** – fine-line (down to 8 µm) mass production DI for advanced HDI and IC substrates

**Corus™ 15M** – mass production DI (down to 10µm) for HDI and advanced MLB

## Orbotech Infinitum™ DI



DDI™ Technology



LSO™ Technology

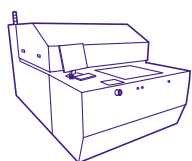


MultiWave Laser™ Technology

- Groundbreaking roll-to-roll direct imaging solution for mass production of flex PCBs
- Unique drum-based R2R DI driven by KLA's drum direct imaging (DDI)™ technology for optimal material handling and high yield
- High throughput enabled by high-speed, continuous imaging and on-the-fly registration
- Superior line quality and uniformity achieved by KLA's field-proven large scan optics (LSO)™ and MultiWave Laser™ technologies
- All-in-one – compact, clean, closed and eco-friendly for extreme efficiency and cleanliness

**Orbotech Infinitum™ 10XT** – up to 520mm roll width

## Orbotech Nuvogo™ DI



LSO™ Technology



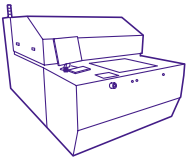
MultiWave Laser™ Technology

- High imaging quality with large scan optics (LSO)™ technology - fine feature imaging, high uniformity and high depth of focus
- MultiWave Laser™ technology for high resist flexibility
- High throughput enabled by dual table mechanism and high-speed target acquisition
- Advanced scaling modes for high registration accuracy

**Orbotech Nuvogo™ Fine Series** – fine resolution mass production for SLP/mSAP, advanced HDI and flex applications with high imaging quality and throughput

**Orbotech Nuvogo™ Series** – high power mass production for HDI, flex, rigid-flex, MLB and QTA PCBs

## Orbotech Diamond™ DI for SM



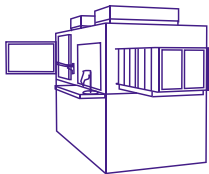
- High-capacity, high-throughput solder mask DI solution
- SolderFast™ technology for high throughput and excellent imaging quality
- Sophisticated optical mechanism enabling high depth of focus for image quality for the most challenging surface topographies
- Low total cost of ownership – long lifetime LEDs to reduce operational costs

**Orbotech Diamond™ 10/10XL** – mass production solder mask DI with 3-wavelength light source

**Orbotech Diamond™ 10W** – high-capacity, high-quality solution dedicated to white solder mask and optimized for miniLED production

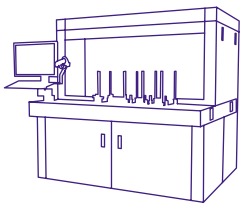
**Orbotech Diamond™ 10M/10MXL** – high-capacity, high-quality solution for both white and non-white solder masks

## Zeta™-6xx Panel 2D/3D Metrology



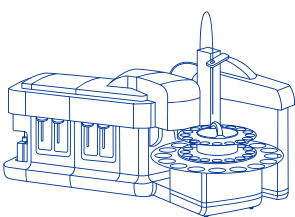
- Automated, fast and non-contact metrology
- True color 2D and 3D profiling with robust ZDot™ technology
- Direct thickness measurement of ABF and other non-transparent layers with ZIR technology
- High warpage panel handling by customizable advanced chuck

## ICOS™ T3/T8 Component Inspection and Metrology for Singulated IC Substrates



- Single platform for warpage measurement (pad coplanarity) and AVI (top and bottom)
- High resolution color imaging for optimal defect detection (cracks, particles, discoloration, dents, bulges)
- High accuracy and repeatability for pad coplanarity measurements
- Optimal yield with AI-enabled automatic sorting

## QualiLab Elite® Plating Bath Analyzer



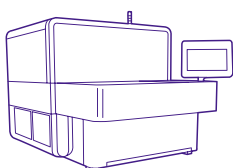
- Combines CVS, Titration and Spectroscopy in a single lab analyzer
- Ideal for electrolytic and electro-less plating baths
- Provides accurate analysis for easy replenishment and improved yield from your plating solutions.
- “Get Me Expert” feature provides easily accessible factory support and remote troubleshooting
- Three modular design configurations ranging from a compact, manual analyzer to a fully automated closed-cell system

**QualiLab Elite® V10** – single sample analyzer

**QualiLab Elite® V20** – semi-automatic analyzer for up to 10 samples

**QualiLab Elite® V30** – automatic CVS-analyzer for up to 48 samples

## Orbotech Neos™ 800 Inkjet for Solder Mask



- An innovative eco-friendly additive printing (AP) solution for solder mask (SM)
- Simplifies SM process and drastically cuts time to market
- Powered by KLA's groundbreaking Structural Printing™ technology and field-proven DotStream Pro™ technology
- Ensures consistent quality and reliability of the SM layer, while enabling a decreased total cost of ownership (TCO)



## Orbotech Magna™ Additive Printing



- Advanced inkjet printing for IC Packaging, dams, insulation layers and more
- Down to 75µm line width and high aspect ratio (>1:4) for multiple processes and applications
- Low Cost of Ownership - saving more than 30% vs traditional process
- Compact system supporting strip, panel, JEDEC tray, wafer



**DotStream Pro™** Technology

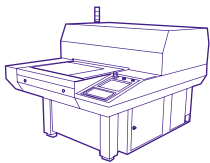


**MultiPrinting™** Technology



**Structural Printing™** Technology

## Orbotech Sprint™ Inkjet



- DotStream Pro™ technology for maximum performance and low total cost of operation
- Eco-friendly production tool, from QTA to mass production with top quality and accuracy
- Advanced traceability and fine 2D barcode printing (replacing laser marking)
- Field proven low cost per print for better yield and savings compared to other technologies

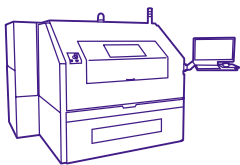


**DotStream Pro™** Technology



**MultiPrinting™** Technology

## Orbotech Apeiron™ UV Laser Drilling



- High-speed drilling powered by KLA's field-proven Multi-Path™ technology
- Fully integrated, internal R2R solution enabled by KLA's proprietary Roll Inside™ technology
- High capacity of flex sheet drilling of 2 side-by-side panels simultaneously
- Superior quality and accuracy - minimal spot size down to 15µm with high accuracy down to 12µm (3σ)
- Support of TH and BV drilling through copper, polyimide, liquid crystal polymer (LCP), adhesive and cover layers



**Multi-Path™** Technology



**Roll Inside™** Technology

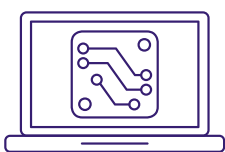


**CBU™** Technology

**Orbotech Apeiron™ 800/800XT** – up to 260mm/520mm roll width

**Orbotech Apeiron™ 800SBS** – up to 1 sheet of 520mm x 520mm size or 2 sheets of 520mm x 260mm size

## Frontline CAM, Engineering and Data Analytics Software Solutions



**Frontline InShop®** – Design-Based, AI-driven Data Analytics solution, with cross-domain analytics engine. Frontline InShop is targeting yield optimization for mass production and enabling development of new IC substrate and PLP technologies.

**Frontline InCAM®Pro** – High-precision and high-throughput CAM solution for PCB and IC substrate manufacturers to improve yields and stay on top of fast-changing market conditions. Accelerated analysis and optimization workflow via a cloud-based solution.

**Frontline InFlow®** – All-in-one engineering automation, supports highest design complexity and accelerates time-to-market.

**Frontline InSight PCB®** – Fast and accurate web-based pre-CAM solution for sales and engineering

### KLA SERVICES

From tool installation and system optimization to productivity enhancements and global supply chain management, KLA Services is a trusted partner to customers around the world — delivering an unrivaled experience focused on maximizing tool performance and availability.

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