KLA’s Automotive Opportunities

Oreste Donzella, Executive Vice President

September 21, 2021
Forward-Looking Statements

Statements in this presentation other than historical facts, such as statements pertaining to: (i) industry trends; (ii) customer demand and investment strategy; (iii) anticipated synergies from acquisitions; (iv) hiring by KLA; (v) anticipated dividends and share repurchases; (vi) WFE and KLA cyclicality; (vii) projected end-demand uses for semiconductors; (viii) growth of KLA’s service business; (ix) sales, revenue growth rate, operating margin, EPS, capital allocation, semiconductor industry CAGR, capital intensity, memory and foundry/logic mix, process control market growth rate and growth in new markets through 2023; are forward-looking statements and subject to the Safe Harbor provisions created by the Private Securities Litigation Reform Act of 1995. These forward-looking statements are based on current information and expectations and involve a number of risks and uncertainties. Actual results may differ materially from those projected in such statements due to various factors, including but not limited to: the future impacts of the COVID-19 pandemic; the demand for semiconductors; the financial condition of the global capital markets and the general macroeconomic environment; new and enhanced product and technology offerings by competitors; push-out of deliveries or cancellation of orders by customers; the ability of KLA’s research and development teams to successfully innovate and develop technologies and products that are responsive to customer demands; KLA’s ability to successfully manage its costs; market acceptance of KLA’s existing and newly issued products; changing customer demands; and industry transitions. For other factors that may cause actual results to differ materially from those projected and anticipated in forward-looking statements in this letter, please refer to KLA Corporation’s Annual Report on Form 10-K for the year ended June 30, 2020, and other subsequent filings with the Securities and Exchange Commission (including, but not limited to, the risk factors described therein). KLA Corporation assumes no obligation to, and does not currently intend to, update these forward-looking statements.
KLA by Numbers

- Founded: 1976
- Installed Base (tools): ~60,000
- Employees: ~11,000
- Revenue: $6.1B\(^1\)
- R&D % of revenue: 15%

Revenue Type

- Service
- Systems

Revenue Mix by Geography

- Japan
- Europe/Israel
- South Korea
- Taiwan
- Americas
- China

\(^1\) Revenue from CY 2020
KLA systems find the defects and variations that affect chip performance.

*Semiconductor Process Control*

*KLA Core Business Since 1976*
Market Expansion Via Acquisitions and Integration

2008  2019  2020

ICOS  Orbotech  KLA

Electronics, Packaging and Components (EPC)

Rick Wallace
President and Chief Executive Officer

Oreste Donzella
Executive Vice President, Electronics, Packaging and Components

Ahmad Khan
President, Semiconductor Process Control

Brian Lorig
Executive Vice President, Global Support and Services

EPC  SEMI PC  GSS
Diversified Global Leader in Electronics Value Chain

**Business Units**
- GLOBAL SERVICE SUPPORT (GSS)
- SEMICONDUCTOR PROCESS CONTROL (Semi PC)
- ELECTRONICS PACKAGING AND COMPONENTS (EPC)

**End Products**
- **AUTOMOTIVE**
  - Vehicles
- **CONNECTED DEVICES**
  - Laptops, watches, smart speakers, VR/AR, security cameras, smart everything
- **MOBILE DEVICES**
  - Phones
- **5G INFRASTRUCTURE**
  - Towers
- **DATA**
  - Data servers, Data centers/cloud
The Evolution of Automotive Industry

Data Leverage, Semiconductor Dependent, Zero-Defect Methodology
Data and Connectivity will Change Automotive Industry Forever

- Higher RF/Modem content
- Linked to 5G mega trend
- Introduction of new and unproven materials such as SiC and GaN
- Shift to more advanced technologies

Broad Range of Semiconductor Devices in Modern Vehicles

- Power
- Processor
- Memory
- RF
- MEMS
Trends are now Accelerating after the Pandemic and...

Safety and Security

- Zero in-process defects
- Zero market failures
- Zero disability accident rates

Electrification: Zero Emissions

- Car weight reduction
- More miles on battery
- SiC/GaN power semi devices

Networking: Connected Car

- 5G capable
- Big data processing in the cloud
- Precise, exact location

Autonomous Drive & ADAS

- Increase in sensors
- Leading-edge CPU/GPU
- Proliferation of in-car networking
- Increased car data storage
Automotive Industry Has Become Highly Dependent on Semiconductors

- Chip shortage expected to cost auto industry $110 billion in revenue in 2021
- >100 connected electronics control units (ECU)
- 6,000-10,000 semiconductors per vehicle
- Development: 2 years vs 7 years
- Innovations: >80% enabled by semiconductors
Automotive Zero-Defect Leadership

Growing semiconductor content
- ADAS, autonomy, connectivity
- 8-10K devices per premium vehicle

Advanced design rule parts needed
- Complex use cases
- Less mature processes
- Harsh environment

Quality is top auto buying factor
- Semiconductors are leading failure item

Part-per-billion quality requirement
Quality and Reliability Challenges

Test Escapes

- Hard killer defects in a test coverage gap
- Function of yield and test coverage

Latent Reliability Defects

- Become activated some time after test
- Usually requires statistical approach
KLA I-PAT®: New Inline Screening Standard

Inline Parts Average Testing
Existing Methods for Quality and Reliability

Process Control

Identifies sources of manufacturing defects by sub-sampling a percentage of inline wafers

Not all wafers or die are measured

Electrical Test

Identifies devices that don't function or are outside parametric limits

Test coverage gaps, ambiguity and latent defects
Zero-Defect Requires New Screening Methodology

Process Control

- Coat
-Expose
- Etch
- Clean
- Fill
- CMP

Inspect and Measure

Not all wafers or die are measured

Electrical Test

- wafer probe
- final test

Test coverage gaps, ambiguity and latent defects

Inline Defect Screening

100% of lots, 100% of die on critical layers

- High speed
- Low cost
- Unique data
- Low overkill

Augment existing methods. Reduce escapes
Low yields and incomplete test coverage allow escapes
Inline Defect Screening Adds Another Layer of Protection

Screening augments disposition decisions and reduces escape pressure on test
I-PAT®: Inline Defect Part Average Testing

Each die receives a score based on cumulative defectivity. Statistical methods are used to identify outliers.
I-PAT® Integrated Solution for High Volume Manufacturing

High throughput at needed sensitivity for die screening use case

Runtime extraction of information about each defect on wafer

Machine Learning prediction in production-proven workflow

Die aggregation and statistical outlier analysis

Fully automated die-level screening solution to reduce escapes from automotive fabs

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1 SPOT™ (Sample Plan Optimization Toolkit) is a production machine learning platform used in chip manufacturing fabs. It improves the capture rate of critical defects of interest (DOI) by using a combination of customizable machine learning techniques and statistical algorithms.
I-PAT® Can Detect Latent Reliability Defects

Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Layer 7

89xx Defect Inspection

Wafer Sort (EWS)

Packaging

Unit Probe / Final Test

Burn-in

Post Burn-in Final Test

5.3% of I-PAT die pass electrical wafer sort, but fail final test

1.5% of I-PAT die pass final test, but fail burn-in

Remaining 22% of I-PAT die pass all electrical test

Latent Reliability Defects
Automotive Standards Now Recommend Inline Screening

"Optical screening by high-speed inspection on 100% of wafers and 100% of die on a few known quality-sensitive layers to identify and disposition individual at-risk wafers or product die." [5.4.7]

"Using statistical methods, like part Average Testing techniques (PAT), allow for identification of dies with outlier defectivity that have a greater likelihood of containing latent defects. The outlier die can be used to reject dies or to merge with traditional PAT techniques for electrical test data to further reduce reliability escapes.” [7.4.3]
KLA Automotive Product Solutions

Process Control Products Launch for Automotive, SPTS Leadership in Power
New Automotive Inspection Products Launched in June 2021

C205
- Broadband plasma optical patterned wafer inspection system discovers defects that affect the yield and reliability of semiconductor chips

Surfscan® SP A2/A3
- Unpatterned wafer inspection systems detect a wide range of critical defects and surface quality issues that affect the yield and reliability of semiconductor chips

8935
- High productivity patterned wafer inspection system detects a wide variety of critical defects that affect the yield and reliability of semiconductor chips

I-PAT®
- Innovative, automated inline screening solution
SPTS Process Solutions for Automotive Power Semiconductors

Enabling Beyond Silicon

<table>
<thead>
<tr>
<th>Device Technology</th>
<th>Substrate</th>
<th>Wafer description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Si Power</td>
<td>Si</td>
<td>8-12” Si</td>
</tr>
<tr>
<td>SiC Power</td>
<td>SiC</td>
<td>6-8” SiC</td>
</tr>
</tbody>
</table>

SPTS SiC Power Revenue Trend

Omega Plasma Etch
Are we on Track with our Growth Plan?
Progress vs. Plan (Sep 2019 Investor Day)
Our Targeted, Strategic Initiatives within Automotive Electronics

Extract from Sep 2019 Investor Day Presentation

2010+

Initial Entry into Industry

- Provide process control systems and services to Semiconductor Wafer Fabs (i.e., ICs)

2018+

Strengthen Industry Position

- Development of internal capabilities: I-PAT in-line quality screening methodology
- Formal industry outreach: host workshops and build awareness

2019+

Fortify Industry Leadership

- Define industry standards
- Expand Automotive Semiconductor solutions through the acquisition of Orbotech (Feb 2019)

2020+

Capitalize on Secular Trends

- Leverage strengths of KLA portfolio of differentiated solutions

Ahead of revenue plan outlined on Sep 17th, 2019
In Summary
Reliability and New Materials are Critical for Automotive Electronics

Automotive Zero-Defect Policy
KLA partners with the automotive industry to eliminate latent reliability defects

Latent Reliability Defects:
- Same sources as yield-killer defects
- Activated by the environment
- Escape at electrical test

Power SiC

Power GaN

KLA is in Unique Position to Enable the New Automotive Industry

Identify Challenges

- Latent Reliability Defect

Define Standards

- Automotive Electronics Council
- Industry Standard

Develop Innovative Solutions

- I-PAT (Inline Defect Parts Average Testing)

- SiC Etching for EV Power Inverters

KLA Launches New Portfolio of Automotive Products to Improve Chip Yield and Reliability

New Inspection Systems and Innovative Inline Screening Solution Help Fabs Improve Quality

MILLPITAS, Calif., June 22, 2021—Today, KLA Corporation (NASDAQ: KLAC) announced the launch of four new products for automotive chip manufacturing: the 8935 high productivity patterned wafer inspection system, the C205 broadband plasma patterned wafer inspection system, the Surfscan® SP A2/A3 unpatterned wafer inspection systems and I-PAT® inline defect part average testing screening solution. The automotive industry is focused on innovations in electrification, connectivity, advanced driver assistance and autonomous driving. This means vehicles require more electronics, which drives the demand for semiconductor chips. With chips at the core of vehicle operations and safety applications, reliability is critical and automotive chips must meet strict quality standards.

KLA’s new Surfscan® SP A2/A3, 8935 and C205 inspection systems and innovative I-PAT® Inline screening solution improve automotive chip yield and reliability.
Thank You

Oreste Donzella, Executive Vice President

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