Photronics, Inc.
Global Leader in the Merchant Photomask Industry

Analyst and Investor Day
May 23, 2018
Agenda

Troy Dewar, Director, IR
Peter Kirlin, CEO
Chris Progler, CTO
High-End Growth Drivers
  HK Park, GM, China & Taiwan FPD
  Frank Lee, GM, Asia IC
  Pete Broadbent, VP, US & Europe
John Jordan, CFO
Q&A
Lunch

Welcome
Overview & Strategy
Technology Development
High-End FPD
High-End IC Logic
High-End IC Memory
Financial Model & Outlook
Safe Harbor Statement

This presentation and some of our comments may contain projections or other forward-looking statements regarding future events, our future financial performance, and/or the future performance of the industry. These statements are predictions, and contain risks and uncertainties. Actual events or results may differ materially from those presented. These statements include words like “anticipate”, “believe”, “estimate”, “expect”, “forecast”, “may”, “should”, “plan”, “project” or the negative thereto. We cannot guarantee the accuracy of any forecasts or estimates, and we are not obligated to update any forward-looking statements if our expectations change. If you would like more information on the risks involved in forward-looking statements, please see the documents we file from time to time with the Securities and Exchange Commission, specifically our most recent Form 10K and Form 10Q.

Non-GAAP Financial Measures
This presentation and some of our comments may reference non-GAAP financial measures. These non-GAAP financial measures exclude certain income or expense items, and are consistent with another way management internally analyzes our results of operations. Non-GAAP information should be considered to be a supplement to, and not a substitute for, financial statements prepared in accordance with GAAP. Please see the “Reconciliation of GAAP to Non-GAAP Financial Information” in this presentation.
What You Will Hear Today

- Q2 Reprise / Repositioning the company
- Sustainable growth strategy
- Conclusion
Q2 2018 Summary

- **Revenue grew to $131M; up 21% Y/Y and 6% Q/Q**
  - High-end IC biggest growth factor (+83% Y/Y)
  - China revenue doubled Y/Y; up 18% Q/Q
- **Gross and operating margins expanded on higher revenue and operating leverage**
- **Net income attributable to Photronics, Inc. shareholders of $10.7M ($0.15/share)**
- **Cash balance of $321M; capex increased to $33M as we invest in growth**
- **China investments on track**
  - Construction to be completed later this year
  - Production to begin first half of 2019

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Investing in long-term, profitable growth to increase shareholder value
Repositioning the Company

Three large customer challenges
- Micron produced more memory masks in-house
- Samsung Display shifts from LCD to AMOLED and brings highest-end masks in-house
- Major IC customer loses 28nm logic market share

We’ve overcome challenges by winning business at other customers
- New business from foundries that are primarily captive
- New IC and FPD business in China
A Compelling Investment Thesis

▸ Global leader in merchant photomask industry
  ▪ Delivering growth by leveraging core competences: Operational Excellence, Low Cost Producer, Technology Leadership, Customer Intimacy

▸ Investing aggressively to exploit secular growth opportunities
  ▪ China industry expansion – Made in China 2025
  ▪ Technology inflection from LCD to AMOLED
  ▪ Explosion of G10.5+ panel capacity

▸ Targeting $630M / $0.80 in revenue / EPS by 2020
  ▪ Strategic investments bring top-line growth
  ▪ Operating leverage creates margin expansion
  ▪ Additional upside from potential M&A
Photronics at a Glance

- Largest merchant photomask manufacturer
- Unmatched global footprint
- Investing to exploit market disruptions with reciprocal customer commitments
- Strong balance sheet to fund growth

Q218 LTM Revenue by Product $487M

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue ($M)</th>
<th>Cash ($M)</th>
</tr>
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<tbody>
<tr>
<td>2015</td>
<td>524</td>
<td>206</td>
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<tr>
<td>2016</td>
<td>483</td>
<td>314</td>
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<tr>
<td>2017</td>
<td>451</td>
<td>308</td>
</tr>
<tr>
<td>Q218 LTM</td>
<td>487</td>
<td>321</td>
</tr>
</tbody>
</table>
Photomasks are Critical to Electronic Manufacturing
Phases of Photronics Revenue Growth

Phase I: 1969 – 1986
Technology Startup
Organic Growth
Mostly US
Pre-IPO

Phase II: 1986 – 2002
M&A Growth
Merchant Consolidation
Global Expansion

Phase III: 2003 – 2017
Enter High-End Market
Form Strategic Partnerships
Invest in High-End Capability
Establish FPD Presence
Improve Balance Sheet

Phase IV: 2018 and Beyond
Leverage 1st Mover Advantage in China
Extend Technology Leadership
Increase Market Share
Strategic Capital Allocation

Revenue ($M)
Core Competencies Underpin Sustainable Growth

- **Low Cost Producer**: Cost control, Supply chain optimization
- **Operational Excellence**: Flexible delivery, High yields
- **Customer Intimacy**: Trusted partner, Wafer yield enhancement
- **Technology Leader**: Process know-how, Advanced PoR
Exploiting/Creating Disruptions Drives Revenue Growth

The Right Technology … in the Right Place … at the Right Time
Successfully Developing China Business

We already have growing business in China
- $39M YTD 2018 (15% of total revenue)
- Growing strong since 2015 (IC +31% CAGR; FPD +62% CAGR)
- 13% of Q2 2018 LTM revenue (8% of IC; 33% of FPD)

Manufacturing presence in China should accelerate growth
- Customer contracts will help quickly ramp facilities
- Investment incentives reduce risk and improve returns
- IC JV enables us to compete more effectively
Investing in China Operations

<table>
<thead>
<tr>
<th></th>
<th>IC</th>
<th>FPD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location</strong></td>
<td>Xiamen</td>
<td>Hefei</td>
</tr>
<tr>
<td><strong>Investment Amount</strong></td>
<td>$160M</td>
<td>$160M</td>
</tr>
<tr>
<td><strong>Cleanroom Size</strong></td>
<td>~2,500 m²</td>
<td>~4,500 m²</td>
</tr>
<tr>
<td><strong>Ownership Structure</strong></td>
<td>Majority-owned (50.01%) JV</td>
<td>Wholly-owned</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>High-end, mainstream, logic, memory</td>
<td>Up to G10.5+, AMOLED</td>
</tr>
<tr>
<td><strong>Production Start</strong></td>
<td>First half of 2019</td>
<td>First half of 2019</td>
</tr>
<tr>
<td><strong>Incremental Revenue</strong></td>
<td>$150M (total for both operations)</td>
<td></td>
</tr>
</tbody>
</table>

Customer commitments totaling ~$300M over next three years
Enables Hefei facility to operate profitably
Enables Xiamen facility to achieve breakeven

PLAB well positioned for these investments
Global merchant market and technology leader
Strong footprint in Asia
Balance sheet to support investment
Driving Sustainable, Profitable Growth

- **Short term (6-12 months)**
  - Repositioning the company
  - Improving high-end revenue

- **Medium term (12-36 months)**
  - China investments
  - FPD technology inflections

- **Long term (36+ months)**
  - Strategic photomask partnerships
  - Adjacent market M&A
M&A Criteria

► Photomask industry
  ▪ Significant market share
  ▪ Advanced technology
  ▪ Valuable manufacturing assets

► Adjacent markets
  ▪ Revenue diversification
  ▪ Synergies to business model

► Financial benchmarks
  ▪ Meets ROIC hurdles
  ▪ Accretive to earnings and cash flow
## World Class Management Team

### Significant Industry Experience

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Years with Photronics</th>
<th>Years in Industry</th>
<th>Experience</th>
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</thead>
<tbody>
<tr>
<td>Peter Kirlin, Ph.D.</td>
<td>CEO</td>
<td>10</td>
<td>33</td>
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<tr>
<td>Chris Progler, Ph.D.</td>
<td>VP, CTO, and Strategic Planning</td>
<td>18</td>
<td>30</td>
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<tr>
<td>HK Park</td>
<td>GM, China and Taiwan, FPD</td>
<td>13</td>
<td>23</td>
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<tr>
<td>Frank Lee, Ph.D.</td>
<td>GM, Asia IC</td>
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<tr>
<td>Peter Broadbent</td>
<td>VP, US &amp; Europe</td>
<td>5</td>
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<td></td>
</tr>
<tr>
<td>John Jordan</td>
<td>SVP, CFO</td>
<td>1</td>
<td>5</td>
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</tbody>
</table>
A Compelling Investment Thesis

▶ **Global leader in merchant photomask industry**
  - Delivering high-end growth by leveraging core competences: Operational Excellence, Low Cost Producer, Technology Leadership, Customer Intimacy

▶ **Investing aggressively to exploit secular growth opportunities**
  - China industry expansion – Made in China 2025
  - Technology inflection from LCD to AMOLED
  - Explosion of G10.5+ panel capacity

▶ **Targeting $630M / $0.80 in revenue / EPS by 2020**
  - Strategic investments bring top-line growth
  - Operating leverage creates margin expansion
  - Additional upside from potential M&A
Chris Progler, CTO
Technology Development
Trends Guiding our Technology Portfolio

► China’s IC and display aspirations and investments

► Diversification in mid to high-end IC applications – the 4th Industrial Revolution

► New lithography intensive display form factors and enhancements

► Increased focus on process of record and integrated solutions

► Complexity, cost and scale drive consolidation and partnerships

► New innovations in manufacturing
Photronics Patterning Leadership

► IC: (Data, IoT, AI)
  ■ Introduce EUV production
  ■ Innovate to extend previous nodes

► FPD: (AMOLED, G10.5+, VR)
  ■ Accelerate IC type mask tech
  ■ Larger substrate, finer dimension

► AP: (Fan Out, Panel)
  ■ Introduce FPD type mask tech
  ■ Substrate and resolution roadmap

Pattern Correction Phases →

Tech Adoption in Lithographic Applications

- Advanced Packaging
- Display
- IC

Adoption (%)
IC: Investing in Technology Opportunities

- Entered 14nm logic, 20nm DRAM, 3D-NAND production (2014)
- First with advanced EBM 9000 writing tool (2016)
- First qualified for 1x DRAM (2016) and 1y DRAM (2017)
- First to deliver yielding 7nm class logic EUV masks (2017)

### LVIP to Mass Production

<table>
<thead>
<tr>
<th>Type</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
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</thead>
<tbody>
<tr>
<td>Logic</td>
<td>10nm</td>
<td>7nm</td>
<td>5nm (EUV)</td>
<td></td>
</tr>
<tr>
<td>DRAM</td>
<td>1x</td>
<td>1y</td>
<td>1z + new architectures</td>
<td></td>
</tr>
<tr>
<td>3D-NAND</td>
<td>Gen 2</td>
<td>Gen 3</td>
<td>Gen 4 + new architectures</td>
<td></td>
</tr>
</tbody>
</table>

### Optical Mask Scaling on Existing Equipment

- L14
- L10
- L8
- L7
- L5

### EUV Device Masks

- Single Expose Metal
FPD: Widening Tech Lead

- Entered FPD phase shift mask technology for AMOLED (2013)
- Delivered Quad HD masks for OLED (2014)
- Qualified slit type (2010) and half-tone type (2016) efficiency solutions
- First to market P-800 (2018) and P-80 (2015) writing systems
- Plan first to G10.5 in China

<table>
<thead>
<tr>
<th>Type</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
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<tbody>
<tr>
<td>TV</td>
<td>UHD(4K) QD LCD</td>
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<td>UHD(8K) QD OLED</td>
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<tr>
<td>Mobile(OLED)</td>
<td>QHD (6xx ppi)</td>
<td>UHD1 (8xx ppi)</td>
<td></td>
<td>UHD2 (12xx ppi)</td>
</tr>
<tr>
<td>Mask Size</td>
<td>8.5G</td>
<td></td>
<td>10.5G</td>
<td></td>
</tr>
</tbody>
</table>

Multi-Dose Mask

Contact Hole Resolution

Phase Shift Mask
AP: Establishing New Products and PoR

- Sampling custom mask solutions for AP litho challenges
- Preparing resolution enhancement infrastructure (mask, software, design)
- Evolve capability and lead as lithography importance grows

<table>
<thead>
<tr>
<th>Type</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLP/Panel Fan Out</td>
<td>Mask resolution and registration</td>
<td>Application specific lithography extensions</td>
<td>9” and 14” to panel size</td>
</tr>
<tr>
<td>Heterogeneous Integration</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Co-designing new AP mask technology to increase substrate warp tolerance

Depth of Focus Solutions

40%

20%

Baseline
Partnering with Our Customers for Success

7 high-end PoR* relationships across IC and FPD
- Critical for ROI on capability investments

Custom design tools to strengthen connections
- Delivering measurable end product yield enhancements

Striving for virtual captive model
- Customized, flexible, interlocked, fast

* Process of record
Why PoR Partners Trust a Photronics Built Mask

Successful mask for high yield on complex device has many factors
- Process Capability – right specs, pattern quality, no critical defect
- Mask to Substrate (wafer, panel) Know-How – simulate, characterize, improve
- Reproducibility – matching, transfer, ramp and volume experience
- Protection – IP, systems, mask lifetime management
Technology Matching and Moving: A Competitive Strength

► Powerful know-how for inter-mask matching
  ▪ Site to site transfers for expanding production
  ▪ Captive process signatures for backup
  ▪ Within site ramp, reproducibility and yield
  ▪ Hybrid inter-site process support

► Recent success stories
  ▪ 25nm DRAM, 3D-NAND, 14nm logic: US to Taiwan
  ▪ 22nm to 7nm logic: captive mask and module matching
  ▪ FPD enhancement module: Korea to Taiwan
Technology as a Tool to Support Business Growth

Growth Investment Cycle

- Increase Profitability and Cash Flow
- Develop High-End Technology and Capability
- Capture Share of High-Growth, High-End Business

Q2 2018 LTM FPD Revenue $107.6M

- High-End 66%
- Mainstream 34%

Q2 2018 LTM IC Revenue $379.1M

- High-End 34%
- Mainstream 66%
Technology Summary

► Tech and innovation keys to ROIC, even as Moore’s Law slows

► Proven leadership roadmap across all key lithographic applications
  ▪ IC extensions, FPD rising complexity, AP stage setting

► Partnerships and PoR bring differentiated technology to products
  ▪ Results, trust, know-how and consistency
  ▪ Delivering integrated solutions and measurable user yield impact

► Technology portability as a competitive advantage
  ▪ Matching in and transferring technology
  ▪ Verified and cost effective multi-site solutions
HK Park, GM, China and Taiwan, FPD
High-End FPD
FPD Recent Performance

- Aligning with market drivers
  - Mobile transition to AMOLED
  - Larger TV screens
  - Higher resolution
- Extending technology leadership
  - Leading portfolio of advanced mask writers
  - Leveraging IC know-how for FPD process development
- Growing presence in China
  - 33% of revenue Q2 2018 LTM
  - Should accelerate with Hefei production
Strategic Priorities

► Align global footprint with dominant geographic panel technologies
  ▪ Most advanced AMOLED technology in Korea
  ▪ Large format (G10.5+) LCD TV in China
  ▪ Established mainstream producers in Taiwan

► Successfully establish China operating presence
  ▪ Hefei manufacturing facility
  ▪ G10.5+ masks for large screen TV
  ▪ Integrate into global network to optimize customer service

► Extend technology leadership
  ▪ Higher resolution AMOLED displays
  ▪ Technology transfer from IC to FPD

► Grow to be global, merchant market share leader
Leveraging Technology Leadership for Mobile Display AMOLED Adoption

► Mobile devices moving from LCD to AMOLED
  - Superior visual characteristics
  - Lower power consumption
  - Enables flexible format
  - Preferred for VR/AR devices

► Increases mask complexity
  - More mask layers per set
  - Tighter specs on each layer

► Qualifying P-800 in Korea
  - 1st to qualify this advanced mask writer
  - Produces highest resolution AMOLED masks
  - Competitive advantage vs. all merchants and captives

Source: Internal Estimates
G10.5+ → Improved Glass Efficiency for Ultra-Large Screen TV

G6
1500 mm x 1850 mm

G7.5
1950 mm x 2250 mm

G8.5
2200 mm x 2500 mm

G10.5+
2940 mm x 3370 mm

65” 75” 75”
94%

65” 75” 75”
95%

65” 65” 65”
95%

65” 65” 65”
95%

88% 73% 74%

64% 64% 64%

65” 65” 65”
88%
“Made in China 2025” Driving Growth in FPD Market

光源: 内部估计

- 中国是增长最快的显示区域
  - 64座工厂在生产，正在建设或规划中
  - 最大显示屏生产商（韩国第二）

- 光刻掩模在中国具有吸引力
  - 包括AMOLED和G10.5+在内的广泛显示技术
  - 没有具有高端经验的商业光刻掩模生产商
  - 没有G10.5+光刻掩模生产商

图: 中国FPD光罩生产（亿美元）

- 2017年：168亿美元
- 2023年：441亿美元
- CAGR +17%
- CAGR +62%

- G10.5+
- G8
- G6 LTPS/AMOLED
- G5

中国FPD Mask Production ($M)

- G10.5+ CAGR +62%
- G8
- G6 LTPS/AMOLED
- G5

- 64座工厂在生产，正在建设或规划中
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  - 没有G10.5+光刻掩模生产商
We are qualified at all existing fabs.
30 New China Display Fabs in Production by 2022

Image from https://commons.wikimedia.org/wiki/File:China-equirect.png

Photronics Locations
FPD Korea
FPD Hefei
FPD Taiwan
New Hefei Facility

Construction complete by end of fiscal year 2018.
Tool move in during fiscal Q119.
New Hefei Facility
How We Win

► Become G10.5+ market share leader
► Extend AMOLED technology leadership
► Establish China market share leadership
► Integrated global manufacturing facilities with outstanding customer service
FPD Outlook

Key Success Factors

► Hefei ramp
  - G10.5+ launch
  - Will be our largest FPD facility

► AMOLED mobile display technology inflection

► Diversify customer concentration

► FPD revenue expected to double over next 3 years
FPD Summary

- Repositioned the business
- China investment on track
- Investing to exploit industry trends
- Business expected to double over next 3 years
Frank Lee, GM, Asia IC
High-End IC Logic
High-End IC Logic Recent Performance

- Repositioning the business
- Strong demand from Asia logic foundries
  - Korea IC revenue up 24% YTD
  - Revenue to Taiwan foundries up 58% YTD
- Expanding penetration at captive manufacturers
- Increasingly seen as trusted technology partner
  - High-end capacity and capability
  - Close proximity to customer
Successful Partnership with DNP

► Two JV’s serving Asia
  ■ Taiwan JV, PDMC, formed in 2014
  ■ China JV, PDMCX, formed in 2018

► Combines technology, know-how and customer relationships of two leading merchant mask producers

► Reduces risk of Xiamen investment
  ■ Facility should ramp more quickly due to complimentary sales organizations
  ■ Allows us to compete more effectively

► Photronics owns 50.01% of both JVs
  ■ Photronics management team
  ■ Consolidate financial results
Shanghai Technology Forum

► Large group of customers, suppliers, partners, and local officials in attendance
► JV seen as technology partner for advanced IC manufacturing
► China producers eager to have local source of high-end photomasks
Leverage JV’s in Taiwan and China to win market share
- Maintain and extend market leadership in Taiwan
- Build China market share into leadership position
- Draw on combined technology, experience, and customer relationships

Increase business globally with large foundries and IDMs

Prevent formation of additional captive manufacturing in China

Successfully ramp China manufacturing facility
“Made in China 2025” Driving Growth in IC Market

► China represents fastest growing semiconductor region
  ■ Growing domestic producers
  ■ Investments by multi-nationals

► More investment needed to meet national targets
  ■ 2022 forecast is 17%
  ■ China government target is 40% by 2020, 70% by 2025

► Photomask opportunities in China are attractive
  ■ Wide range of nodes in logic and memory
  ■ No strong domestic merchant mask producer
23 New China 12” IC Fabs

Photronics Locations
IC Korea
IC Xiamen
IC Taiwan
IC Boise (not shown)

Logic (17)
Memory (6)
New Xiamen IC Facility

Construction complete by end of fiscal year 2018. Tool move in during fiscal Q119.
New Xiamen IC Facility

Facility Building

FAB

Supporting Building

Office Building
How We Win

► **Technology leadership in both logic & memory**
  - Develop high-end capacity and capability
  - Obtain PoR for new nodes (28nm, 14nm)

► **Customer relationships that lead to business partnerships**
  - Proximity to large customers (fast delivery, comprehensive customer support)
  - Act as virtual captive, providing joint development programs and technology support
  - Cross-site collaboration and integration

► **Grow market share**
  - Win majority of merchant opportunities
  - Grow by serving captive customers
Key Success Factors
► “Made in China 2025” expansion
► Node migration (14nm, 10nm, 7nm)
► Captive business penetration
► Leverage JV & partnership to compete more effectively
► Win majority market share of growing foundry demand
► Cross-site collaboration to serve global customers
High-End IC Logic Summary

► Repositioned the business to grow high-end market share

► China investment on track

► Growing business globally with logic foundries and IDMs

► JV’s in China and Taiwan allow us to compete more effectively

► Increasingly seen as business and technology partner
Pete Broadbent, VP US & Europe
High-End IC Memory
High-End IC Memory Recent Performance

- Repositioning the customer base
- Extremely strong memory demand – revenue to top memory customers up 78% YTD vs. 2017
- High market share with specialty and emerging memory foundries
- Benefitting from Micron technology foundation
- Trusted technology partner
  - High-end capacity and capability
  - Technology, global engineering support

High-End IC Revenue ($M)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>Q2 2018 LTM</th>
</tr>
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<tbody>
<tr>
<td>2015</td>
<td>107</td>
<td></td>
<td></td>
<td></td>
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<td>85</td>
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</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>Q2 2018 LTM</td>
<td></td>
<td></td>
<td>129</td>
<td></td>
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</tbody>
</table>
We have replaced nearly all of the revenue lost from Micron insourcing

Strong diversity of high-end customers

Cost structure improved during downturn – more profitable at same revenue level

Robust qualification pipeline – PoR development with key memory customers
Strategic Priorities

► Maintain and grow market leadership in Asia memory (DRAM & 3D-NAND)

► Provide virtual captive technology, capability and customer service

► Increase high-end business with foundries (China, U.S.)

► Integrate global high-end manufacturing locations to better serve customers
Memory Market Dynamics

- Strong memory growth trend
- Diversity of technology, applications
- Currently dominated by large, captive producers
- Merchant opportunity with emerging memory producers, foundries
- Most emerging memory production in Asia (Taiwan and China)

### China New Fabs - $70B+ Investments

<table>
<thead>
<tr>
<th>Company</th>
<th>$B</th>
<th>Memory</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tsinghua Unigroup</td>
<td>30</td>
<td>DRAM</td>
<td>Nanjing</td>
</tr>
<tr>
<td>Yangtze Memory Technologies (YMTC)</td>
<td>24</td>
<td>3D-NAND</td>
<td>Wuhan</td>
</tr>
<tr>
<td>Innotron</td>
<td>8</td>
<td>DRAM</td>
<td>Hefei</td>
</tr>
<tr>
<td>Fujian Jin Hua IC (JHICC)</td>
<td>8</td>
<td>DRAM</td>
<td>Fujian</td>
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</table>

### China Existing Fabs

<table>
<thead>
<tr>
<th>Company</th>
<th>Memory</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel</td>
<td>3D-NAND</td>
<td>Dalian</td>
</tr>
<tr>
<td>Samsung</td>
<td>3D-NAND</td>
<td>Xi-An</td>
</tr>
<tr>
<td>SK Hynix</td>
<td>DRAM</td>
<td>Wu-Xi</td>
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<td>JHICC/UMC</td>
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<td>Xiamen</td>
</tr>
<tr>
<td>Nexchip</td>
<td>DRAM</td>
<td>Hefei</td>
</tr>
<tr>
<td>YMTC</td>
<td>DRAM</td>
<td>Wuhan</td>
</tr>
</tbody>
</table>

Source: company reports
23 New China 12” IC Fabs

Image from https://commons.wikimedia.org/wiki/File:China-equirect.png

- Logic (17)
- Memory (6)

Photronics Locations
IC Korea
IC Xiamen
IC Taiwan
IC Boise (not shown)
How We Win

► Technology leadership in both logic & memory
  ▪ Develop high-end capacity and capability
  ▪ Establish PoR for new nodes (DRAM, 3D-NAND)
  ▪ Joint development for next generation nodes

► Customer relationships that lead to business partnerships
  ▪ Act as virtual captive provider
  ▪ Cross-site collaboration and integration

► Grow market share
  ▪ Win majority of merchant opportunities
  ▪ Grow merchant market by serving captive customers
Mainstream – Steady IC Contributor

► Stable demand – less cyclical
► Good margins and cash flow
► Low consumer of capital
► Very competitive – more like a commodity market
► Auto and IoT driving analog growth

Market CAGRs of Major Product Categories (2017-2022F)

- Analog: 6.6%
- Logic: 5.4%
- Memory: 5.2%
- Total ICs: 5.1%
- Microcomponents: 3.9%

Source: IC Insights

IC End-Use Markets ($B) and Growth Rates

- Cellphones: $89.7
- Standard PCs: $69.0

2016-2021 CAGR

* Covers only the internet connection portion of systems.
Source: IC Insights

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Key Success Factors

► “Made in China 2025” expansion
► Node migration (DRAM, 3D-NAND)
► Strong market drivers
► Maintain leading market share with specialty foundry producers
► Cross-site collaboration to serve global customers
► Mainstream stability, growth of auto, IoT

High-End IC Memory Outlook

IC Revenue ($M)

2017-2020 CAGR: 7%

350 379

2017 Q2 2018 LTM 2020 Estimate

2017 Q2 2018 LTM 2020 Estimate
High-End IC Memory Summary

► Repositioned the business

► Boise performance back to JV levels

► Growing business with Asia specialty memory foundries

► Extending technology leadership, developing partnerships
John Jordan, CFO
Financial Model & Outlook
Early Observations

► My observations coming from outside
  ▪ Lean, no-frills well-organized business
    • Transparent across boundaries
    • Devoid of unnecessary redundancies
  ▪ All key players are respected industry experts with years in the industry
  ▪ Insistence on operational excellence and maintaining a death grip on cost
  ▪ Passionate respect for customers and relationships
  ▪ A passion to win and a passion to improve the value equation for shareholders

► Finance observations:
  ▪ Excellent controls environment
    • Appropriate competence levels in all positions
    • Tone at the top to do the right thing
  ▪ Opportunity to automate and improve processes to achieve best practice
  ▪ Desire to support the drive to improve ROIC
Performance Improved During 2\textsuperscript{nd} Quarter

<table>
<thead>
<tr>
<th>Revenue ($M)</th>
<th>Gross Margin</th>
<th>Operating Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q117: 109.8</td>
<td>Q117: 20.9%</td>
<td>Q117: 9.6%</td>
</tr>
<tr>
<td>Q217: 108.3</td>
<td>Q217: 18.6%</td>
<td>Q217: 11.7%</td>
</tr>
<tr>
<td>Q118: 123.4</td>
<td>Q118: 22.4%</td>
<td>Q118: 5.1%</td>
</tr>
<tr>
<td>Q218: 130.8</td>
<td>Q218: 25.1%</td>
<td>Q218: 5.1%</td>
</tr>
</tbody>
</table>

- Net income attributable to Photronics, Inc. shareholders:
  - Q/Q: +6\% +210 bps
  - Y/Y: +21\% +660 bps

- Gross margin:
  - Q/Q: +270 bps
  - Y/Y: +650 bps

- Operating margin:
  - Q/Q: +60\% +80\% +67\% +5\%
  - Y/Y: +10X +6X +5X +5X

*Net income attributable to Photronics, Inc. shareholders
Performance Improved During 1st Half

<table>
<thead>
<tr>
<th></th>
<th>Revenue ($M)</th>
<th>Gross Margin</th>
<th>Operating Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>H17</td>
<td>218.1</td>
<td>19.8%</td>
<td>6.5%</td>
</tr>
<tr>
<td>H218</td>
<td>254.2</td>
<td>23.8%</td>
<td>10.7%</td>
</tr>
<tr>
<td>+17% Y/Y</td>
<td>+400 bps Y/Y</td>
<td>+420 bps Y/Y</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Income Before Minority Interest ($M)</th>
<th>Net Income* ($M)</th>
<th>Earnings per Share*</th>
</tr>
</thead>
<tbody>
<tr>
<td>H17</td>
<td>6.0</td>
<td>0.05</td>
<td>0.24</td>
</tr>
<tr>
<td>H218</td>
<td>24.7</td>
<td>16.6</td>
<td>+4X Y/Y</td>
</tr>
<tr>
<td>+4X Y/Y</td>
<td>+4X Y/Y</td>
<td>+4X Y/Y</td>
<td></td>
</tr>
</tbody>
</table>

*Net income attributable to Photronics, Inc. shareholders
Positive Growth Outlook

Key Success Factors
► “Made in China 2025” – new facilities
► FPD technology inflections
► Repositioning the company
► Node migration (logic & memory)
► Growing business with captive producers
► IC JV’s in China and Taiwan
► Stable mainstream business
► Cross-site collaboration to serve global customers

Revenue ($M)

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>451</td>
</tr>
<tr>
<td>Q2 2018 LTM</td>
<td>487</td>
</tr>
<tr>
<td>2020 Estimate</td>
<td>710</td>
</tr>
</tbody>
</table>

2017-2020 CAGR: 12%
Strategic Priorities to Improve Shareholder Value

► Disciplined focus on investments to improve ROIC

► Maintain strong balance sheet through China investment period
   ▪ Financial stability through economic downturn
   ▪ Flexibility to invest in other growth opportunities (organic or M&A)

► Continue to drive cost out to improve customer value proposition and improve shareholder return
Solid Financial Fundamentals

► Strong operating cash flow generator

► Powerful operating leverage: target 50%

► Positive free cash flow every fiscal year since 2009

► Solid balance sheet
Free Cash Flow Much Stronger Post China Investments

Free cash flow equals operating cash flow less capex.
Reducing Risk of China Investment

China Investment ($M)

- Total China Investment: 320
- Redeployed Tools; JV Partner Contribution; Investment Incentives: ~[VALUE]
- Net Cash Deployed: <15[VALUE]
Clear Capital Deployment Priorities

► Fund organic growth
   ■ Geographic expansion into China
   ■ Technical investments to maintain leadership position

► Explore strategic M&A
   ■ Photomask industry – IC & FPD
   ■ Adjacencies to increase revenue diversification

► Debt repayment
   ■ Converts mature in 2019
   ■ Incurring local debt in China

*Net cash defined as cash and cash equivalents less long-term borrowings (including current portion)
Financial Summary

► Clear path to profitable growth

► Prudent stewardship of balance sheet

► Financial model to grow income faster than revenue

► Financial targets
  ▪ Revenue $630M & EPS $0.80 by 2020
  ▪ Operating margin > 15%
  ▪ Minimum $100M net cash
  ▪ Improve ROIC – no projects accepted below hurdle rate
A Compelling Investment Thesis

► Global leader in merchant photomask industry
  - Delivering high-end growth by leveraging core competences: Operational Excellence, Low Cost Producer, Technology Leadership, Customer Intimacy

► Investing aggressively to exploit secular growth opportunities
  - China industry expansion – Made in China 2025
  - Technology inflection from LCD to AMOLED
  - Explosion of G10.5+ panel capacity

► Targeting $630M / $0.80 in revenue / EPS by 2020
  - Strategic investments bring top-line growth
  - Operating leverage creates margin expansion
  - Additional upside from potential M&A
Questions?
Thank you for your interest!

For Additional Information:

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tdewar@photronics.com