

# PHOTRONICS



## 2019 ANNUAL REPORT

Shareholder Letter  
Proxy Statement  
Form 10-K

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Photronics is a leading worldwide manufacturer of photomasks. Photomasks are high-precision quartz plates that contain certain microscopic images of electronic circuits. A key element in the manufacture of semiconductors and flat panel displays, photomasks are used to transfer circuit patterns onto semiconductor and flat panel display substrates during the fabrication of integrated circuits and flat panel displays. The photomasks are produced by Photronics at strategically located manufacturing facilities in Asia, Europe and North America in accordance with customer-provided designs. Additional information on the Company can be accessed at [www.photronics.com](http://www.photronics.com).

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### **“Safe Harbor” Statement under the Private Securities Litigation Reform Act of 1995:**

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The Private Securities Litigation Reform Act of 1995 provides a “safe harbor” for forward-looking statements made by or on behalf of Photronics, Inc. (“Photronics”, the “Company”, “we”, or “us”). These statements are based on management’s beliefs, as well as assumptions made by, and information currently available to, management. Forward-looking statements may be identified by words like “expect,” “anticipate,” “believe,” “plan,” “project,” “could,” “estimate,” “intend,” “may,” “will” and similar expressions, or the negative of such terms, or other comparable terminology. All forward-looking statements involve risks and uncertainties that are difficult to predict. In particular, any statement contained in this annual report on Form 10-K or in other documents filed with the Securities and Exchange Commission in press releases or in the Company’s communications and discussions with investors and analysts in the normal course of business through meetings, phone calls, or conference calls regarding, among other things, the consummation and benefits

of transactions, joint ventures, business combinations, divestitures and acquisitions, expectations with respect to future sales, financial performance, operating efficiencies, or product expansion, are subject to known and unknown risks, uncertainties, and contingencies, many of which are beyond the control of the Company. Various factors may cause actual results, performance, or achievements to differ materially from anticipated results, performance, or achievements expressed or implied by forward-looking statements. Any forward-looking statements should be considered in light of these factors. Accordingly, there is no assurance that the Company’s expectations will be realized. The Company does not assume responsibility for the accuracy and completeness of the forward-looking statements and does not assume an obligation to provide revisions to any forward-looking statements, except as otherwise required by securities and other applicable laws.

## Letter to Shareholders

Dear Shareholders:

2019 was one of the best years in our history as we achieved record revenue, introduced new products, began production at two new manufacturing facilities, and delivered against many other strategic objectives. Our performance was underpinned by the work we did in previous years to reposition the company, aided by the additional capacity coming online. We improved the health of our balance sheet by paying off all remaining convertible debt, while also returning value to our equity shareholders through two share repurchase authorizations. It was a tremendous year and we are well positioned to continue our success in 2020.

### **Market Leadership + China Expansion = Record Revenue**

Revenue in 2019 was \$550.7 million, a record for the company and an improvement of 3% compared with 2018. Growth was driven by flat panel display (FPD) photomask sales. FPD revenue was a record for the year, improving 21% from the previous year while being heavily weighted to high-end mask sales. Mask demand for active-matrix organic light-emitting diode (AMOLED) displays led the way, as a rebound in the premium smartphone market increased demand in Korea, and Chinese customers continued to release new designs for domestic smartphone manufacturers. In addition, we are seeing this technology expand beyond standard-format smartphones as innovative companies look to release flexible and foldable devices, and AMOLED displays appeared in larger-format products such as laptops. Our belief is that this is just the beginning of what appears to be a multi-year proliferation of the use of AMOLED displays in new and varied applications.

In addition to AMOLED, the ramp of our new Hefei factory enabled us to build the first G10.5+ photomasks in China. Demand for G10.5+ is being driven by our Chinese customer's aspirations to improve their share of the highly competitive global LCD market. G10.5+ is a new substrate size offering improved efficiency and lower manufacturing costs for 65-inch and larger display sizes. Our Hefei facility was designed and equipped to serve this fast-growing segment of the market and as a result we have established Photronics as a leading supplier of G10.5+ masks in China.

IC revenue was down 2% on the year, but we finished the year with momentum, achieving record quarterly revenue in the fourth quarter. The softness resulted from a semiconductor industry downturn plus ongoing US-China trade dialogue, both of which caused uncertainty for some of our customers, reducing their design activity and therefore their mask demand. While full-year revenue decreased slightly, we were encouraged by the trends at the end of the year, and look for improved end market demand plus additional capacity coming online as we qualify more customers, products, and ramp production in our new Xiamen, China facility.

Net income attributable to Photronics, Inc. shareholders was \$29.8 million, compared with \$42.1 million in 2018. While profitability was lower, it was still an impressive result given the costs associated with ramping two manufacturing facilities and with the macro-environment we faced. More specifically, we added two state-of-the-art manufacturing facilities, growing our global footprint from 9 to 11 sites, and increased our headcount by 200, ending the year with 1,775 total employees. Through all this, operating expenses only increased 4%. We always do a great job of keeping costs under control, and this year was no exception. As a result, earnings per diluted share were \$0.44, compared with \$0.59 in 2018.

Cash balance at year-end was \$206.5 million. We generated \$68.4 million in cash from operations and spent \$178.4 million in capital expenditures nearly completing the first phase of our China investments. Other uses of cash during the year included \$61.3 million to repay debt, primarily attributable to \$57.5 million convertible debt that matured in April, and \$21.7 million to repurchase shares. Since announcing our first share repurchase program in July 2018, we have repurchased 4.7 million shares for \$44.8 million. Our actions to repurchase shares and repay convertible debt have reduced our total diluted share count by 16% since the first quarter of 2016. At the end of 2019, we had \$89 million remaining on our current share repurchase authorization.

## Letter to Shareholders

### Corporate Governance

During 2019, we adopted of a new retirement policy that stipulates each independent, non-employee director cannot be nominated for a term that begins after his or her 75th birthday. Under this new policy, Joseph Fiorita, who has been a director since 1987, will retire from the board of directors at the end of his current term and will not stand for reelection at the 2020 annual meeting. To fill the vacancy created by Joe, we welcomed Mary Paladino to the board in October. Mary is a Certified Public Accountant with over three decades of accounting and auditing experience. Her financial expertise is a welcome addition with Joe's retirement. In addition, after the close of our fiscal year, Dr. Liang-Choo Hsia, a director since 2012, announced his retirement from the board. We are evaluating options to add a new director to fill the vacancy created by his retirement.

In other governance actions, our Board of Directors adopted a shareholder rights plan in September designed to protect the availability of Photronics' net operating loss carryforwards ("NOLs") under the Internal Revenue Code ("Section 382 Rights Plan"). The board considered and adopted the plan as part of its ongoing review of corporate governance best practices and we will seek shareholder approval of the plan at our 2020 annual meeting.

### Celebrating Milestones

Photronics was founded in 1969. Last year we celebrated our 50<sup>th</sup> anniversary. It was a great reminder to reflect on our past, recall the many achievements and people that made them possible, while also considering our future and the many opportunities ahead. Across the world, employees celebrated the occasion with pride and great enthusiasm. We have come a long way since our humble beginnings, yet we still have much left to do.

In April, we celebrated the grand opening of our two new manufacturing sites in China. In Hefei, we have our state-of-the-art FPD facility, while in Xiamen we have an equally impressive IC facility. Combined, these form the latest additions to our global network, eleven strategically located manufacturing facilities to quickly and effectively serve our growing global customer base. Now that these two plants are ramping production, our capacity and capability are greater than they have ever been, and clearly establish us as the leading merchant mask producer in the world.

### Strategic Growth Plan

In early 2018, we laid out our strategic growth plan for investors. At that time, we looked forward to our geographic expansion into China and the financial benefits we expected to achieve. We communicated our financial targets and expectations. We are pleased to report that our performance through the end of 2019 is essentially in line with those expectations. This results from continuous effort from a dedicated global team working together to achieve more. With the solid foundation of 50 years of performance, built on our core competencies as a low-cost producer, providing operational excellence, outstanding customer service, and technology leadership. We have achieved a lot, yet remain convinced that our best days are in front of us.

2019 was a great year for Photronics. We raised the bar on our performance, delivered on many strategic objectives, and moved our capacity and capability to levels never seen before. Thank you to all our employees for your contributions to our success and thank you to all our shareholders for your continued support. We look forward to updating you on our progress throughout 2020.

Sincerely,



Peter S. Kirlin  
Chief Executive Officer



Constantine "Deno" Macricostas  
Chairman of the Board

February 25, 2020

**PHOTRONICS, INC.**  
**15 Secor Road**  
**Brookfield, Connecticut 06804**  
**(203) 775-9000**

**NOTICE OF ANNUAL MEETING OF SHAREHOLDERS**  
**TO BE HELD ON MARCH 16, 2020**

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TO THE SHAREHOLDERS OF PHOTRONICS, INC.:

Notice is hereby given that the Annual Meeting of Shareholders of Photronics, Inc. will be held on March 16, 2020 at 8:30 a.m. Eastern Time at the Rock Harbor conference room in the Reef Tower of the **Playa Largo Resort & Spa**, 97450 Overseas Highway, Key Largo, FL 33037 for the following purposes:

- 1) To elect six members of the Board of Directors;
- 2) To ratify the selection of Deloitte & Touche LLP as independent registered public accounting firm for the fiscal year ending October 31, 2020;
- 3) To approve the entry into a Section 382 Rights Agreement and the distribution of preferred share purchase rights to common shareholders; and
- 4) To approve, by non-binding advisory vote, the compensation of our named executive officers.

The shareholders will also act on any other business as may properly come before the meeting or any adjournments or postponements thereof.

The Board of Directors has fixed February 6, 2020, as the record date for determining the holders of common stock entitled to notice of and to vote at the meeting. A list of those shareholders entitled to vote at the Annual Meeting will be available for inspection by any of our shareholders for any purpose germane to the Annual Meeting, during regular business hours at the principal executive offices of Photronics, Inc. 20 days prior to the Annual Meeting.

YOUR VOTE IS IMPORTANT. ALL SHAREHOLDERS ARE CORDIALLY INVITED TO ATTEND THE MEETING. TO ENSURE YOUR REPRESENTATION AT THE MEETING, WHETHER OR NOT YOU PLAN TO ATTEND, YOU ARE REQUESTED TO COMPLETE, DATE, SIGN AND RETURN THE ENCLOSED PROXY IN THE ENCLOSED ENVELOPE OR AUTHORIZE THE VOTING OF YOUR SHARES BY INTERNET OR TELEPHONE PRIOR TO THE DEADLINE SPECIFIED ON YOUR PROXY CARD. NO POSTAGE IS REQUIRED FOR MAILING IN THE UNITED STATES.

We thank you for your continued support.

Shareholders planning on attending the meeting in person should bring photo identification.

By Order of the Board of Directors,

*/s/ Richelle E. Burr*

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Richelle E. Burr  
Executive Vice President,  
Chief Administrative Officer,  
General Counsel and Secretary

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**PHOTRONICS, INC.**  
**15 Secor Road**  
**Brookfield, Connecticut 06804**  
**(203) 775-9000**

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**PROXY STATEMENT**  
**For the Annual Meeting of Shareholders**  
**to be held on March 16, 2020**

**GENERAL INFORMATION**

The enclosed proxy is solicited by the Board of Directors (the “Board” or “Board of Directors”) of Photronics, Inc. (“Photronics”, the “Company”, “we”, “our” or “us”), to be voted at the Annual Meeting of Shareholders or any adjournments or postponements thereof (the “Annual Meeting”) to be held on March 16, 2020, at 8:30 a.m. Eastern Time at the Rock Harbor conference room in the Reef Tower of the **Playa Largo Resort & Spa**, 97450 Overseas Highway, Key Largo, FL 33037. This proxy statement and the enclosed proxy card are being filed with the Securities and Exchange Commission on February 25, 2020 and on the same day the Company will begin sending the proxy statement and proxy card to all shareholders entitled to vote at the Annual Meeting. Our Annual Report on Form 10-K for the fiscal year ended October 31, 2019 as filed with the Securities and Exchange Commission (“SEC”), is included in the Annual Report to Shareholders being made available to our shareholders with this proxy statement.

The persons named as proxies on the accompanying proxy card have informed the Company of their intention, if no contrary instructions are given, to vote the shares of the Company’s common stock, par value \$0.01 per share, (“Common Stock”) represented by such proxies “FOR” each of the director nominees named herein and “FOR” Proposals 2, 3 and 4, and at their discretion on any other matters which may come before the Annual Meeting. The Board of Directors does not know of any business to be brought before the Annual Meeting other than as set forth in the Notice of Annual Meeting of Shareholders.

Any shareholder who executes and delivers a proxy may revoke it at any time prior to its use. Such revocation would be effective upon: (a) receipt by the Secretary of the Company of written notice of such revocation; (b) receipt by the Secretary of the Company of a properly executed proxy bearing a later date; or (c) appearance by the shareholder at the Annual Meeting and his or her request to revoke the proxy. Any such notice or proxy should be sent to Photronics, Inc., 15 Secor Road, Brookfield, Connecticut 06804, Attention: Secretary. Appearance at the Annual Meeting without a request to revoke a proxy will not revoke a previously executed and delivered proxy.

**QUORUM; REQUIRED VOTES**

Only shareholders of record at the close of business on February 6, 2020 are entitled to notice of and to vote at the Annual Meeting. As of February 6, 2020, there were 66,167,735 shares of Common Stock issued and outstanding, each of which is entitled to one vote. At the Annual Meeting, the presence in person or by proxy of the holders of a majority of the total number of shares of outstanding Common Stock will be necessary to constitute a quorum. Assuming a quorum is present, the matters to come before the Annual Meeting that are listed in the Notice of Annual Meeting of Shareholders require the following votes to be approved:

(1) Proposal 1 (Election of Directors) a plurality of the votes cast by the shareholders entitled to vote at the Annual Meeting is required to elect six members of the Board of Directors subject to the Company’s policy that requires that any nominee that does not receive at least a majority of votes cast by shareholders must tender his resignation; (2) Proposal 2 (Ratification of Selection of Independent Registered Public Accounting Firm for the Fiscal Year Ending October 31, 2020) a majority of the votes cast by the shareholders entitled to vote at the Annual Meeting is required to ratify the selection of Deloitte & Touche LLP; (3) Proposal 3 (Approval of the entry of the Company into a Section 382 Rights Agreement and the distribution of preferred share purchase rights to our common shareholders) a majority of the votes cast by the shareholders entitled to vote at the Annual Meeting is required to approve the Company’s entry into a Section 382 Rights Agreement and distribution of preferred share purchase rights; and (4) Proposal 4 (Executive Compensation) a majority of the votes cast by the shareholders entitled to vote at the Annual Meeting is required to approve the non-binding advisory resolution approving the compensation of the named executive officers, as described in the Compensation Discussion and Analysis and the narrative disclosure included in this proxy statement.

Neither the approval nor the disapproval of Proposal 4 will be binding on the Company or the Board of Directors or will be construed as overruling a decision by the Company or the Board of Directors. Neither the approval nor the disapproval of Proposal 4 will create or imply any change to our fiduciary duties or create or imply any additional fiduciary duties for the Company or the Board of Directors. However, the Company will consider the results of this advisory vote in making future decisions on the Company's compensation policies and the compensation of the Company's named executive officers.

Shareholders who hold their shares through a broker (in "street name"), must provide specific instructions to their brokers as to how to vote their shares, in the manner prescribed by their broker. Pursuant to the rules that govern brokers and nominees who have record ownership of shares that are held in "street name" for account holders (who are the beneficial owners of the shares), brokers and nominees typically have the discretion to vote such shares on routine matters, but not on non-routine matters. If a broker or nominee has not received voting instructions from an account holder and does not have discretionary authority to vote shares on a particular item because it is a non-routine matter, a "broker-non-vote" occurs. Under the rules governing brokers, an uncontested director election is considered a non-routine matter for which brokers do not have discretionary authority to vote shares held by an account holder. Additionally, as required by Section 957 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (the "Dodd-Frank Act"), advisory votes on executive compensation and on the frequency of such votes are also considered non-routine matters for which brokers do not have discretionary authority to vote shares held by account holders. Of the four proposals listed in the Notice of Annual Meeting of Shareholders only the ratification of our independent registered public accounting firm under Proposal 2 is considered a routine matter. Abstentions and broker non-votes will be considered as present but will not be considered as votes cast on any matter.

## **CORPORATE GOVERNANCE AND ETHICS**

Photronics is committed to the values of effective corporate governance and high ethical standards. Our Board believes that these values are conducive to running our business efficiently, to maintaining our integrity in the market place, long-term performance and ensuring that the Company is managed for the long-term benefit of its stockholders. The Board recognizes that maintaining and ensuring good corporate governance is a continuous process. The Board periodically reevaluates our policies to ensure they meet the Company's needs. Set forth below are a few of the corporate governance practices and policies that we have adopted.

- **Related Party Transaction Policy.** Our Audit Committee is responsible for approving or ratifying transactions involving the Company and related parties and determining if such transactions are, or are not, consistent with the best interests of the Company and our shareholders.
- **Executive Sessions.** The Company's Board of Directors' meetings regularly include executive sessions without the presence of management, including the Company's Chief Executive Officer.



## **BOARD OF DIRECTORS' POLICIES, COMMITTEE CHARTERS, AND CODE OF ETHICS**

The Board of Directors has responsibility for establishing broad corporate policies and reviewing overall performance rather than day to day operations of the Company. The Board's primary responsibility is to oversee management and, in doing so, to serve the Company's and its shareholders' best interests. Company management keeps the Board of Directors informed of Company activities through periodic updates when necessary, written reports and presentations at Board and Board Committee meetings.

The Company has adopted a code of ethics and corporate governance policy to assist the Board and its committees in the exercise of their responsibilities. The code of ethics and corporate governance policy apply generally to the Board and the Company's named executive officers. Each of the Board committees has a written charter that sets forth the goals and responsibilities of the committee. The Company's code of ethics and Board Committee charters can be found on the Company's website at [www.photronics.com](http://www.photronics.com). Shareholders may also request a free copy of the Company's code of ethics from: Photronics, Inc., 15 Secor Road, Brookfield, Connecticut 06804, Attention: General Counsel. We will disclose any amendments to, or waivers from, a provision of our code of ethics that applies to the principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions that relate to any element of the code of ethics as defined in Item 406 of Regulation S-K, by posting such information on our website.

The Board of Directors has assessed each of its six nominees for Director against the NASDAQ Global Select Market ("NASDAQ") standards for independence and determined that Messrs. Fiederowicz, Tyson and Ms. Paladino meet the general definition of an independent director as defined by NASDAQ.

The number of directors on the Company's Board is not permitted to be less than three or more than fifteen members under the Company's bylaws. Currently, the Board has fixed the number of directors at eight members. The Board is responsible for nominating members to the Board and for filling vacancies on the Board that may occur between annual meetings of shareholders, in each case upon the recommendation of the Nominating Committee. The Nominating Committee seeks input from other Board members and senior management and may engage a search firm to identify and evaluate potential candidates. The Board and each of the committees of the Board conduct annual self-assessments to determine their effectiveness. Additionally, each committee reviews the adequacy of its charter annually and considers any proposed changes.

### **BOARD LEADERSHIP STRUCTURE**

The Board also has a Lead Independent Director. Mr. Walter Fiederowicz serves as Lead Independent Director. Mr. Fiederowicz's duties include the following: chair any meeting of the independent directors in executive session; facilitate communications between other members of the Board and the Chairman of the Board and Chief Executive Officer (however, each director is free to communicate directly with the Chairman of the Board and the Chief Executive officer); and monitor, with the assistance of the General Counsel, communications from shareholders.

In 2019, the Company announced the adoption of a new retirement policy that stipulates each independent, non-employee director cannot be nominated for a term that begins after his or her 75<sup>th</sup> birthday. Consistent with this policy, Joseph Fiorita will retire from the board of directors at the end of his current term and will not stand for reelection at the 2020 annual meeting.

On December 13, 2019, the Company announced that Dr. Hsia will retire from the Board of Directors effective as of the Company's 2020 Shareholders Meeting.

The Board will continue to reexamine our corporate governance policies and leadership structure on an ongoing basis to ensure that such policies and leadership structure continue to meet the Company's needs.

### **THE BOARD OF DIRECTORS' ROLE IN RISK OVERSIGHT AND ASSESSMENT**

The Company has a risk management program overseen by senior management and approved by the Board of Directors. The Board's risk oversight processes build upon management's regular risk assessment and mitigation processes, which include standardized reviews conducted with members of management across and throughout the Company in areas such as financial and management controls, strategic and operational planning, regulatory compliance, and environmental compliance. The results of these reviews are then discussed and analyzed at the most senior level of management, which assesses both the level of risk posed in these areas and the likelihood of their occurrence, coupled with planning for the mitigation of such risks and occurrences.

Risks are identified and prioritized by senior management and each prioritized risk is assigned to either a Board committee or the full Board for oversight. For example, strategic risks are overseen by the full Board; financial and business conduct risks are overseen by the Audit Committee or the full Board; risks associated with related party transactions are overseen by the Audit Committee; risks related to Cyber Security are overseen by the Cyber Security Committee; and compensation risks are overseen by the Compensation Committee. Management regularly reports these and other various risks to the relevant Board committee or the Board. Additional review or reporting of risks is conducted as needed or as requested by the Board or relevant Board committee.

### **COMPENSATION RELATED RISK**

The Company regularly assesses the risks related to our compensation programs, including our executive compensation programs, and does not believe that the risks arising from our compensation policies and practices are reasonably likely to have a material adverse effect on the Company. Incentive award targets and opportunities are reviewed annually. One of the Compensation Committee's primary objectives is to motivate high achievement while maintaining an appropriate balance between rewarding extraordinary performance without encouraging excessive risk taking.

### **PLURALITY-PLUS VOTING FOR DIRECTORS**

On December 6, 2018, the Company's Board of Directors approved an amendment to its corporate governance guidelines to implement a change in the vote required to elect directors in uncontested elections from a plurality-voting standard to a "plurality plus" voting standard. In uncontested elections, any director who does not receive a majority of the votes cast (which means that the number of shares voted "for" a director must exceed the number of shares voted "against" a director) must tender his resignation to the Board. The Nominating Committee shall consider the resignation and, promptly following the date of the shareholders' meeting at which the election occurred, shall recommend to the Board of Directors whether or not to accept it. The Nominating Committee will make a recommendation to the Board on whether or not to accept the tendered resignation. In considering whether or not to accept the resignation, the Nominating Committee will consider all factors deemed relevant by the Nominating Committee including, without limitation, the stated reason or reasons why shareholders "withheld" votes from the election of the director, if any, the length of service and the qualifications of the director (including, for example, the impact the director's resignation would have on the Company's compliance with the requirements of applicable corporate and securities laws and the rules of any stock exchange on which the Company's securities are listed for trading), such director's contributions to the Company and whether the director's resignation from the Board of Directors would be in the best interests of the Company. The Nominating Committee will also consider a range of possible alternatives concerning the director's tendered resignation as the Committee deems appropriate including, without limitation, acceptance of the resignation, rejection of the resignation, or rejection of the resignation coupled with a commitment to seek to address and cure the underlying reasons reasonably believed by the Nominating Committee to have substantially resulted in the "withheld" votes. The Board of Directors shall act on the Nominating Committee's recommendation within 90 days of the date of the shareholders' meeting at which the election occurred. In considering the Nominating Committee's recommendation, the Board of Directors will consider the information, factors and alternatives evaluated by the Committee and such additional information, factors and alternatives that the Board of Directors may consider to be relevant. Following the Board of Directors' decision on the Nominating Committee's recommendation, the Company shall promptly disclose the decision regarding whether or not to accept the nominee's resignation (or the reasons for rejecting the resignation, if applicable), as well as a summary of the factors considered.

### **EMPLOYEE, OFFICER AND DIRECTOR HEDGING**

The Company has a policy on equity ownership which is further described in the Compensation Discussion and Analysis section of this proxy. Further, as illustrated in the Ownership of Common Stock by Directors, Officers, and Certain Beneficial Owners Table, all directors and named executive officers are beneficial owners of stock of the Company. The Company does not have a hedging policy at this time.

**OWNERSHIP OF COMMON  
STOCK BY DIRECTORS, OFFICERS  
AND CERTAIN BENEFICIAL OWNERS**

The following table sets forth certain information on the beneficial ownership of the Company's Common Stock as of February 6, 2020, by: (i) beneficial owners of more than five percent of the Common Stock; (ii) each director; (iii) each Named Executive Officer in the Summary Compensation Table set forth below; and (iv) all directors and currently employed Named Executive Officers of the Company as a group.

<u>Name and Address of Beneficial Owner<sup>(1)</sup></u>	<u>Amount and Nature of Beneficial Ownership<sup>(2)</sup></u>	<u>Percentage of Class</u>
Black Rock, Inc. . . . . 55 East 52 <sup>nd</sup> Street New York, NY 10022	10,194,364	15.41% <sup>(3)</sup>
Dimensional Fund Advisors . . . . . Palisades West, Building One 6300 Bee Cove Road Austin, TX 78746	5,632,099	8.51% <sup>(4)</sup>
Vanguard Group . . . . . 100 Vanguard Blvd. Malvern, PA 19355	4,579,918	6.92% <sup>(5)</sup>
Barrow, Hanley, Mewhinney & Strauss, LLC . . . . . 2200 Ross Avenue, 31 <sup>st</sup> Floor Dallas, TX 75201-2761	3,387,871	5.12% <sup>(6)</sup>
<b><u>Officers and Directors</u></b>		
Richelle Burr . . . . .	219,128 <sup>(7)</sup>	*
Walter M. Fiederowicz . . . . .	24,000	*
Joseph A. Fiorita, Jr. . . . .	204,600 <sup>(8)</sup>	*
Liang-Choo Hsia . . . . .	102,000 <sup>(7)</sup>	*
John P. Jordan . . . . .	105,780	*
Peter Kirlin . . . . .	596,884 <sup>(7)</sup>	*
Frank Lee . . . . .	330,175 <sup>(7)</sup>	*
Constantine S. Macricostas . . . . .	516,575	*
George Macricostas . . . . .	44,000	*
Mary Paladino . . . . .	15,000	*
Christopher J. Progler . . . . .	277,033 <sup>(7)</sup>	*
Mitchell G. Tyson . . . . .	94,379 <sup>(7)</sup>	*
Directors and Named Executive Officers as a group (12 persons) . . . . .	2,529,554 <sup>(9)</sup>	3.82%

\* Less than 1%

(1) The address for all officers and directors is 15 Secor Road, Brookfield, Connecticut 06804.

(2) Except as otherwise indicated, the named person has the sole voting and investment power with respect to the shares of Common Stock set forth opposite such person's name.

(3) Based on Schedule 13G/A filed February 4, 2020.

(4) Based on Schedule 13G/A filed February 12, 2020.

(5) Based on Schedule 13G/A filed February 12, 2020.

(6) Based on Schedule 13G filed February 12, 2020.

(7) Includes shares of Common Stock subject to stock options exercisable as of February 6, 2020, (or within 60 days thereof), as follows: Ms. Burr: 129,875; Dr. Hsia: 12,000; Dr. Kirlin: 249,062; Dr. Lee: 180,000; Dr. Progler: 148,300; and Mr. Tyson: 9,000.

(8) Includes 300 shares owned by the wife of Mr. Fiorita as to which shares he disclaims beneficial ownership.

(9) Includes the shares listed in notes (7) and (8) above.

**PROPOSAL 1  
ELECTION OF DIRECTORS**

The Board has nominated six directors to be elected at the 2020 Annual Meeting to serve for a one year term. Each of the six directors of the Company that is elected at the Annual Meeting will serve until the 2021 Annual Meeting of Shareholders (unless such director resigns or otherwise leaves the Board). Each nominee is currently a director of the Company and has agreed to serve if elected. The names of, and certain information with respect to, the nominees for election as directors are set forth below.

The Company is open and receptive to shareholder communication. If, for any reason, any of the nominees shall become unable to stand for election, the individuals named in the enclosed proxy may exercise their discretion to vote for any substitutes chosen by the Board of Directors, unless the Board of Directors should decide to reduce the number of directors to be elected at the Annual Meeting. The Company has no reason to believe that any nominee will be unable to serve as a director.

**THE BOARD OF DIRECTORS RECOMMENDS THAT YOU VOTE “FOR” THE ELECTION OF EACH OF THE FOLLOWING NOMINEES:**

**Nominees:**

<u>Name and (Age)</u>	<u>Director Since</u>	<u>Position(s) with the Company</u>
<b>Walter M. Fiederowicz</b> . . . . . (73 years)	1984	Director
<b>Dr. Peter S. Kirlin</b> . . . . . (59 years)	2015	Director/CEO
<b>Constantine S. Macricostas</b> . . . . . (84 years)	1974	Chairman
<b>George Macricostas</b> . . . . . (50 years)	2002	Director
<b>Mary Paladino</b> . . . . . (58 years)	2019	Director
<b>Mitchell G. Tyson</b> . . . . . (65 years)	2004	Director

Messrs. Fiederowicz, Tyson and Ms. Paladino qualify as being independent under applicable NASDAQ rules.

In addition to the information set forth in the table above, the following provides certain information about each nominee for election as director, including his or her principal occupation for at least the past five years. Also set forth below is a brief discussion of the specific experience, qualifications, attributes or skills that led to the conclusion that each nominee and director should serve as a director as of the date of this proxy statement.

Walter M. Fiederowicz has been a private investor and consultant since August 1997. Mr. Fiederowicz is Chairman of the Compensation Committee and Vice Chairman of the Audit Committee. Mr. Fiederowicz brings to the Board of Directors substantial experience in analyzing and forecasting economic conditions both domestically and internationally. Through his service on the boards of other companies, he has gained extensive experience in leadership, risk management, and corporate governance matters. Mr. Fiederowicz brings leadership and extensive business and financial experience to the Board.

Peter S. Kirlin joined Photronics in August 2008 as Senior Vice President, US and Europe. Dr. Kirlin became Chief Executive Officer in May of 2015 after having been named President in 2013. Prior to joining Photronics, Dr. Kirlin, a 25-year veteran of the photomask and semiconductor industries, held several senior leadership positions of increasing responsibility. Dr. Kirlin was Vice President of Business Development at Entegris, a developer, manufacturer, and supplier of liquid and gas delivery systems, components, and consumables used in

the semiconductor manufacturing process; Chairman and Chief Executive Officer of DuPont Photomasks; and Group Vice President of ATMI, a supplier of ultra-high purity materials and services used in the manufacture of semiconductors. Dr. Kirilin also was Executive Chairman of the privately-held firm Akrion, Inc., a provider of surface preparation solutions to the semiconductor and electronics industries. Dr. Kirilin was Executive Chairman of Akrion, Inc. from January 2007 to July 2008. Dr. Kirilin brings leadership, strategic direction, extensive business experience and a wealth of knowledge of the photomask and semiconductor industry to the Board.

Constantine S. Macricostas is Chairman of the Board and founder of the Company. Mr. Macricostas was Executive Chairman of the Company until January 20, 2018. Mr. Macricostas previously served as Chief Executive Officer of the Company on three different occasions from 1974 until August 1997, from February 2004 to June 2005, and from April 2009 until May 2015. Mr. Macricostas is a former director of RagingWire Data Centers, Inc., (“RagingWire”). Mr. Macricostas is the father of George Macricostas. Mr. Macricostas’ knowledge of the Company and its operations, as well as the industry, is invaluable to the Board of Directors in evaluating and directing the Company’s future. Through his long service to the Company and experience in the photomask industry, he has developed extensive knowledge in the areas of leadership, safety, risk oversight, management, and corporate governance, each of which provides great value to the Board of Directors. Mr. Macricostas is a member of the Cyber Security Committee of the Board.

George Macricostas is an investor and entrepreneur. He was Founder, Chairman and CEO of RagingWire Data Centers, Inc. a provider of mission critical data center facilities, which is where the “Cloud” lives. Mr. Macricostas guided the company through an 80% sale to NTT of Japan in 2014 and completed the sale in 2018. Mr. Macricostas has 28 years of technical and business management experience in business operations and information technology. From 2006, Mr. Macricostas has served as a director of the Jane Goodall Institute, a non-profit organization. Previously, he was a senior vice president at Photonics, Inc., where he was responsible for all aspects of the company’s IT infrastructure. Mr. Macricostas also serves as a Board Member of the Macricostas Foundation, a non-profit organization that funds philanthropic, educational and environmental causes. Mr. Macricostas brings industry, risk management, leadership and business experience to the Board. Mr. Macricostas is Chairman of the Cyber Security Committee and is a member of the Strategic Planning and Technology Development Committee.

Mary Paladino is a certified public accountant with over twenty five years of financial accounting and auditing experience. Ms. Paladino is currently a partner for one of the top public accountancy firms located throughout the Northeast. She was the Audit and Attest Services Practice leader for the firm’s White Plains, NY location. Prior to joining this firm in 2008, she held various leadership roles in the auditing group of Deloitte & Touche, LLP and BDO Seidman, LLP. Ms. Paladino brings broad experience in corporate finance, and is highly experienced in the field of public accounting and internal control both of which will contribute to her effective service on the Board of Directors of the Company.

Mitchell G. Tyson is an independent business strategy and clean energy consultant and serves on multiple industry, government and corporate boards of directors. He is also an Adjunct Professor at the Brandeis International Business School, managing partner at the Clean Energy Venture Group, Venture Partner in the Clean Energy Venture Fund, co-founder and former chair of the Northeast Clean Energy Council, Chair of the Venture Café Foundation, Executive-in-Residence and board member at Greentown Labs. He also serves on a number of corporate boards and mentors numerous start-ups. Previously, Mr. Tyson served as the Chief Executive Officer of PRI Automation, a publicly traded corporation that supplied automation systems including hardware, software and services to the semiconductor industry. From 1987 to 2002, he held positions of increasing management responsibility and helped transform PRI Automation from a small robotics manufacturer to the world’s leading supplier of semiconductor fab automation systems. Prior to joining PRI Automation, Mr. Tyson worked at GCA Corporation from 1985 to 1987 as Director of Product Management and served as science advisor and legislative assistant to the late U.S. Senator Paul Tsongas from 1979 to 1985. Mr. Tyson is Chairman of the Nominating Committee and a member of the Audit Committee of the Company. Mr. Tyson brings leadership and extensive business experience as well as finance expertise to the Board.

## **MEETINGS AND COMMITTEES OF THE BOARD**

The Board of Directors met six (6) times during the 2019 fiscal year. During fiscal 2019, each director attended all of the regular meetings of the Board of Directors and 87.5% of committee meetings of the Board on which such director served.



The Company's Board of Directors has Audit, Compensation, Nominating, Strategic Planning and Technology Development and Cyber Security Committees. Members of the Audit, Compensation, and Nominating Committees are comprised of independent, non-employee directors.

The Audit Committee's functions include the appointment of the Company's independent registered public accounting firm, reviewing with such accountants the plan for and results of their auditing engagement, and the independence of such accountants. The Audit Committee pre-approves all audit & non-audit services provided to the Company. Messrs. Fiederowicz, Fiorita, Tyson and Ms. Paladino are the members of the Audit Committee, although Mr. Fiorita will leave the Audit Committee upon his departure from the Board of Directors after the Annual Meeting. All members of this Committee are independent, non-employee directors under applicable NASDAQ rules and Rule 10A-3 under the Exchange Act. Mr. Fiorita qualified as an audit committee financial expert as defined under Item 407 of Regulation S-K in fiscal 2019 and Ms. Paladino will so qualify in fiscal 2020. The Audit Committee held eight (8) meetings during the 2019 fiscal year. Ms. Paladino will become Chair of the Audit Committee following her election to the Board in March.

The Compensation Committee's functions include establishing the compensation levels for our executive officers and overseeing compensation policies and programs for the executive officers of the Company and administration of the Company's equity and stock plans. This includes setting corporate goals and objectives relevant to compensation of our executive officers and evaluating performance against these goals and objectives. The Committee also reviews and makes recommendations to the Board with respect to director compensation. Members of management, including the Chairman, the Chief Executive Officer, the Vice President of Human Resources, and the Executive Vice President, Chief Administrative Officer, General Counsel and Secretary participate in Compensation Committee meetings when requested by the Committee to present and discuss the materials provided, including recommendations considered to be relative to executive pay and competitive market practices. These members of management assist the Committee in understanding the Company's business plan and long-term strategic direction, developing the performance targets for our performance-based compensation and understanding the technical or regulatory considerations, as well as, the motivational factors of the decisions that are intended to drive executive and company performance. Although the Committee solicits input and perspective from management regarding executive compensation, the ultimate decision on executive compensation is made solely by the Compensation Committee, and the decision regarding the Chief Executive Officer's compensation is made by the Compensation Committee without the presence of the Chief Executive Officer. Messrs. Fiederowicz and Fiorita are the members of the Compensation Committee. All members of this Committee are independent, non-employee directors under applicable NASDAQ rules. The Compensation Committee held 5 meetings during the 2019 fiscal year. Ms. Paladino will become a member of the Compensation Committee following her election to the Board in March.

The purpose of the Strategic Planning and Technology Development Committee is to assist the Board of Directors with planning and directing the Company towards its vision and strategic goals. Dr. Hsia and Mr. George Macricostas are the members of the Strategic Planning and Technology Development Committee. The Strategic Planning and Development Committee held 3 meetings during the 2019 fiscal year. The Board of Directors of the Company decided to eliminate the Strategic Planning and Technology Development Committee effective for fiscal 2020.

The Cyber Security Committee was formed in fiscal 2017. The purpose of the Cyber Security Committee is to assist the Board and the Company's management in fulfilling its oversight responsibilities to the shareholders and investment community by reviewing and reporting on technology-based issues as well as cybersecurity risks, protection, and mitigation. Mr. Constantine Macricostas and Mr. George Macricostas are the members of the Cyber Security Committee. The Committee held 2 meetings during the 2019 fiscal year.

The Nominating Committee's functions include the consideration and nomination of candidates for election to the Board. Mr. Tyson and Dr. Hsia were the members of the Nominating Committee for fiscal 2019. All members of this Committee were independent, non-employee directors under applicable NASDAQ rules for fiscal 2019. This Committee held 3 meetings during the 2019 fiscal year.

The minimum qualifications for nominees to be considered by the Nominating Committee are experience as a business or technology leader, the highest ethical standards, the ability to deliver value and leadership to the Company, and the ability to understand, in a comprehensive manner, the technology utilized by the Company and its customers for the production of semiconductors and flat panel displays. If an opening for a Director arises,

the Board will conduct a search for qualified candidates. The Nominating Committee utilizes its network of contacts to compile a list of potential candidates but may also engage, if it deems appropriate, a professional search firm. The Nominating Committee will also consider qualified candidates for Director suggested by shareholders in written submissions sent to Photronics, Inc., 15 Secor Road, Brookfield, Connecticut 06804, Attention: Secretary.

The Nominating Committee also recognizes that diversity of backgrounds, diverse skills and professional experience are important considerations for determination of the Board's composition. In this regard, the Committee's selection of a nominee also gives significant consideration to the backgrounds of the other directors, so that the Board of Directors as a whole has an appropriate mix of backgrounds, professional skills, and breadth of experience. The Nominating Committee reviews its effectiveness in balancing these considerations through its ongoing consideration of directors and nominees, as well as the Nominating Committee's annual self-evaluation process. The Nominating Committee evaluates candidates in the same manner, whether the candidate was recommended by a shareholder or not.

The Nominating Committee did not receive any Director nominations from a shareholder for the Annual Meeting.

The Board provides a process for shareholders to send communications to the Board or to any Director individually. Shareholders may send written communications to the Board or to any Director c/o Photronics, Inc., 15 Secor Road, Brookfield, Connecticut 06804, Attention: Secretary. All communications will be compiled by the Secretary and submitted to the Board or the individual Directors on a periodic basis.

It is the Company's policy that the Directors who stand for election at the Annual Meeting attend the Annual Meeting unless the Director has an irreconcilable conflict and attendance has been excused by the Board. All of the nominees who were Directors during the last fiscal year and who are standing for election at the Annual Meeting attended the 2019 Annual Meeting of Shareholders.

## AUDIT COMMITTEE REPORT

The Audit Committee is composed of three directors, each of whom meets the independence requirements of NASDAQ rules and Rule 10A-3 under the Securities Exchange Act of 1934, as amended. The Audit Committee operates under a written charter adopted by the Board of Directors of the Company. The Audit Committee also prepares a written self-performance evaluation of the Committee's performance on an annual basis.

Company management is responsible for the Company's internal controls and the financial reporting process. For the fiscal year ended October 31, 2019, the Audit Committee reviewed and discussed the audited financial statements with the Company's management and the Company's independent registered public accounting firm. The Audit Committee also reviewed and discussed with Deloitte & Touche LLP the audited Financial Statements and the matters required by PCAOB Auditing Standard No. 1301 Communications with Audit Committees. In addition, the Audit Committee has received the written disclosures and the letter from Deloitte & Touche LLP required by PCAOB Ethics and Independence Rule 3526 (communications with Audit Committee, concerning Independence) and has discussed with Deloitte & Touche LLP that firm's independence from the Company and its management. The Audit Committee reviewed and discussed with management and Deloitte & Touche LLP, as appropriate, (1) the audited financial statements and (2) management's report on internal control over financial reporting and Deloitte & Touche LLP's related opinions. The Committee considered whether the provision of non-audit services by Deloitte & Touche LLP to the Company is compatible with maintaining the independence of Deloitte & Touche LLP, and concluded that the independence of Deloitte & Touche LLP was not compromised by the provision of such services. The Audit Committee met with management periodically during the fiscal year to review the Company's Sarbanes-Oxley Section 404 compliance efforts related to internal controls over financial reporting. Additionally, the Audit Committee pre-approved all audit and non-audit services provided to the Company by Deloitte & Touche LLP. Based on the foregoing meetings, reviews, and discussions, the Audit Committee recommended to the Board of Directors that the audited financial statements for fiscal year 2019 be included in the Company's Annual Report on Form 10-K for filing with the SEC. Further, the Audit Committee has recommended the appointment of Deloitte & Touche LLP as the Company's independent registered public accounting firm for 2020, subject to shareholder approval.

The Audit Committee has a formal procedure for reviewing complaints and inquiries about accounting and auditing matters and violations of Company policy.



### Independent Registered Public Accounting Firm Fees

For the fiscal years ended October 31, 2019 and October 29, 2018, the aggregate fees for professional services rendered by Deloitte & Touche LLP were as follows:

	<b>Fiscal 2019</b>	<b>Fiscal 2018</b>
Audit Fees <sup>(a)</sup> .....	\$1,925,793	\$1,257,728
Audit-Related Fees <sup>(b)</sup> .....	25,340	4,909
Tax Fees <sup>(c)</sup> .....	63,042	34,507
All Other Fees <sup>(d)</sup> .....	1,914	17,040
Total .....	<b>\$2,016,089<sup>(e)</sup></b>	<b>\$1,314,184</b>

- (a) Represents aggregate fees in connection with the audit of the Company’s annual financial statements, internal controls over financial reporting, and review of the Company’s quarterly financial statements or services normally provided by Deloitte & Touche LLP.
- (b) Represents assurance and other activities that are reasonably related to the audit of the Company’s financial statements.
- (c) Represents aggregate fees in connection with tax compliance, tax advice and tax planning.
- (d) Represents aggregate fees for products and services other than audit fees, audit related fees and tax fees.
- (e) 2019 fees increase is due to the timing of billings received in the current fiscal year.

This report is submitted by:

Joseph A. Fiorita, Jr.  
Chairman

Walter M. Fiederowicz

Mitchell G. Tyson

### **EXECUTIVE OFFICERS**

The names of the executive officers (the “Named Executive Officers”) of the Company are set forth below together with the positions held by each person in the Company. All executive officers are elected annually by the Board of Directors and serve until their successors are duly elected and qualified.

<b>Name and Age</b>	<b>Position</b>	<b>Served as an Executive Officer Since</b>
Richelle E. Burr, 55 .....	Executive Vice President, Chief Administrative Officer, General Counsel and Secretary	2010
John P. Jordan, 74 .....	Executive Vice President, Chief Financial Officer	2017
Peter S. Kirlin, 59 .....	Chief Executive Officer	2008
Frank Lee, 67 .....	President of Asia IC Photomask	2018
Constantine S. Macricostas, 84 .....	Chairman	2008
Christopher J. Progler, 56 .....	Executive Vice President, Chief Technology Officer and Strategic Planning	2004

**Richelle E. Burr** joined Photronics in 2003 as Corporate Counsel. Ms. Burr was promoted to Executive Vice President and Chief Administrative Officer in January of 2020. She was promoted to Vice President, Associate General Counsel in 2008 and was appointed Secretary in April of 2009 prior to her appointment as General Counsel in January 2010. Ms. Burr serves on the management board of the Company's subsidiaries in Singapore, Taiwan and the United Kingdom and serves as Representative Director of PK, Ltd.

**John P. Jordan** currently Executive Vice President, Chief Financial Officer, was appointed as Senior Vice President, Chief Financial Officer, effective September 5, 2017. Prior to joining Photronics, Mr. Jordan was most recently Vice President, Chief Financial Officer, Treasurer and Controller of AstroNova, Inc. Before joining AstroNova, Mr. Jordan served as Vice President, Chief Financial Officer, and Treasurer of Zygo Corporation from 2011 to 2014. Prior to that he was Vice President, Chief Financial Officer, and Treasurer of Baldwin Technology Company, Inc.

**Dr. Peter S. Kirlin** was appointed Chief Executive Officer on May 4, 2015. Prior to his appointment as Chief Executive Officer, he served as President of the Company beginning in September of 2013. He joined Photronics in August 2008 as Senior Vice President, US and Europe.

**Dr. Frank Lee** became a Named Executive Officer on January 20, 2018. Dr. Lee has been serving as the President of PDMC (formerly PSMC) since 2006. Prior to that he was CEO, NSMC, Ning-PO from 2004 to 2006 and was Fab Director and Senior Advisor for UMC, Hsin-Chu, Taiwan from 2001 to 2004 and, prior to that, he was Executive Vice President of Grace Semiconductor, Shanghai, China from 2000-2001.

**Constantine S. Macricostas** currently services as Chairman of the Board. He ceased being an employee of the Company effective as of January 20, 2018. Additional biographical information for Mr. Macricostas is set forth in Proposal 1.

**Dr. Christopher J. Progler** became an executive officer on June 21, 2006. Dr. Progler was promoted to Executive Vice President in January 2020. Dr. Progler has been employed by Photronics since 2001 starting with the position of Corporate Chief Scientist. He was promoted to Vice President and Chief Technology Officer in 2004. In 2011, Dr. Progler assumed the added responsibility of Strategic Planning for the Company. His current work includes global R&D, product development and strategic ventures. Dr. Progler serves on the management boards of Asia-based photomask joint venture companies PDMC and PDMCX and EUV photoresist company Inpria and micro LED placement company Uniquota.

## COMPENSATION DISCUSSION AND ANALYSIS

The Compensation Committee of the Board of Directors (the "Compensation Committee") is comprised of two of the independent, non-employee members of the Board of Directors. The Compensation Committee is responsible for setting and administering the policies governing compensation of our executive officers. The Compensation Committee reviews and approves, among other things, overall annual performance for the Named Executive Officers (identified in the Summary Compensation Table), as well as, all participants in the Company's 2011 Executive Incentive Compensation Plan ("2011 EICP").

The purpose of this Compensation Discussion and Analysis is to provide material information about the Company's compensation objectives and policies for its Named Executive Officers and to put into perspective the tabular disclosures and related narratives. The following report provides information about our compensation programs and policies, as well as, the outcomes and achievements that resulted in the determination of compensation to our Named Executive Officers. Specific 2019 compensation information for our Chief Executive Officer and the other Named Executive Officers will be outlined in a series of tables following this report.

### Summary

The Company is one of the world's leading manufacturers of photomasks, which are high precision photographic quartz plates containing microscopic images of electronic circuits. Photomasks are a key element in the manufacture of semiconductors and flat panel displays ("FPDs") and are used as masters to transfer circuit patterns onto semiconductor wafers and flat panel substrates during the fabrication of integrated circuits ("ICs") and a variety of FPDs and, to a lesser extent, other types of electrical and optical components. The Company presently operates principally from eleven manufacturing facilities, two of which are located in Europe, three in Taiwan, one in Korea, two in China and three in the United States. Currently, research and development photomask activities for ICs are focused on 14 nanometer node and below and, for FPDs, on AMOLED

resolution enhancement (display device technology used in smart watches, mobile devices, laptops and televisions) and introduction of photomasks Generation 10.5+ large glass substrates (3370 x 2940mm or greater).

2019 was one of the best years in the Company's history. We achieved record revenue, introduced new products, began production at two new manufacturing facilities, and delivered against many other strategic objectives. We improved the health of our balance sheet by paying off all remaining convertible debt, while also returning cash to our equity shareholders through share repurchase programs.

Revenue in 2019 was \$550.7 million, a record for the Company and an improvement of 3% compared with 2018. Growth was driven by flat panel display (FPD) photomask sales. FPD revenue was a record for the year, improving 21% from the previous year while being heavily weighted to high-end mask sales. Mask demand for active-matrix organic light emitting diode (AMOLED) displays led the way, as a rebound of the premium smartphone market increased demand in Korea, and Chinese customers continued to release new designs for domestic smartphone manufacturers.

In addition to AMOLED, the ramp of our new Hefei factory enabled us to build the first G10.5+ photomasks in China. IC revenue was down 2% on the year, but did finish the year with momentum, achieving record quarterly revenue in the fourth quarter.

Net income attributable to the Company's shareholders was \$29.8 million, compared with \$42.1 million in 2018. While profitability was lower, it was still an impressive result given the significant headwinds inherent in ramping two manufacturing facilities plus the macro environment we faced. We added two state-of-the-art manufacturing facilities, growing our footprint from 9 to 11 sites, and increased our headcount by 200 highly valued employees, ending the year with 1,775.

Our compensation program for our Named Executive Officers received the support of 90% of the votes cast at our 2019 Annual Meeting of Shareholders. Based on the effectiveness of our compensation program and in consideration of this year's and prior year's approval rate of the advisory vote, the Compensation Committee decided to continue the foundation and fundamentals of the compensation structure for fiscal 2020 and decided that no significant change in its compensation policies should be recommended to the Board.

### **Compensation Philosophy**

It is important that the Company be able to attract, motivate and retain highly talented individuals at all levels of the organization who are committed to the Company's values and objectives. Accordingly, the Company's compensation philosophy is based on rewarding the Company's executives for their individual and collective efforts and contributions to the Company in a manner that fosters teamwork and leads to the long-term success of the Company. We feel this is in the best interest of our shareholders. The Company also believes that delivering a substantial portion of such rewards in the form of restricted stock aligns the interests of the Company's executives with the interests of shareholders. The Company's compensation program is designed to attract and retain talented employees by providing adequate incentives to achieve its business objectives while not encouraging excessively risky behavior. The Compensation Committee periodically reviews the Company's approach to executive compensation in light of general economic conditions of the semiconductor industry and the Company's performance and reviews the compensation practices of its peers and makes changes when appropriate. Such periodic reviews include giving consideration to the views of the outside advisors whom we typically meet with on an annual basis, and regularly considering the compensation programs and practices among our closest semiconductor capital equipment peer group companies, as well as compensation practices among a broader group of high technology companies.

### **Compensation Objectives**

Consistent with the Company's philosophy, the Company believes that executive compensation must be competitive with other comparable employers in order for qualified employees to be attracted to, and retained by, the Company and that the Company's compensation practices should provide incentives for driving better business performance and increasing shareholder value. Accordingly, the four primary objectives of the Company's compensation program, as administered by the Compensation Committee are:

- to provide competitive compensation to attract, retain and motivate talented employees and foster teamwork as well as support the Company's achievement of its financial and strategic goals;
- to advance the goals of the Company by aligning executives' interests with shareholder interests;

- to minimize risks associated with compensation; and
- to balance the incentives associated with the program in a way that provides incentives for executives to assess and manage risks associated with the Company's business appropriately, in the context of the Company's business strategy.

### **Elements of Compensation**

The Compensation Committee uses three principal components to achieve the Company's primary objectives: base salary, annual cash incentives and stock-based awards. The Company minimizes its perquisites available to its employees as a whole, including its executives.

The Compensation Committee believes that the three principal components of the Company's compensation result in a compensation program that is competitive and aligns the Named Executive Officers' interests with shareholder value creation.

### **Base Salary**

Base salaries provide each executive with a fixed, minimum level of cash compensation. The Company believes that it is important for retention, stability, and continuity of leadership that base salaries be competitive with the Company's peers. Base salaries may be increased or decreased depending upon changes in duties or economic conditions.

### **Annual Cash Incentives**

Annual cash incentives are used to promote the achievement of specific short-term goals of the Company that correspond to certain goals of the Company set on an annual basis and the underlying metrics relating thereto.

### **Stock-Based Awards**

Stock-based awards are the Company's preferred approach to both align the interests of shareholders with the executives, as well as enhance the Company's retention goals. By virtue of the stock-based awards, the Named Executive Officers are shareholders themselves and participate in the gains in value of the Company's stock.

### **Determination of Total Compensation**

When determining total compensation, the Compensation Committee assesses five primary factors:

- the overall performance of the Company;
- the Named Executive Officer's role in that performance;
- the compensation previously received by the Named Executive Officer;
- the compensation of similarly situated executive officers working for peer group companies; and
- shareholder feedback.

When linking the Company's performance and the total compensation of the Named Executive Officers, the Compensation Committee uses both the objective metrics provided for under the 2011 EICP, as well as, its subjective assessment of the performance of the Company.

The Compensation Committee meets with the Company's Chief Executive Officer and other senior executives to obtain recommendations with respect to the Company's compensation programs and practices for executives and other employees. The Compensation Committee takes management's recommendations into consideration but is not bound by management's recommendations with respect to executive compensation. When the Compensation Committee evaluates the role of each Named Executive Officer in the performance of the Company it considers both the recommendation and evaluation of such Named Executive Officer by the Chief Executive Officer (the Chief Executive Officer does not evaluate his own performance) and the Compensation Committee's assessment of each Named Executive Officer's leadership qualities, paying particular attention to the scope of his or her duties and the collaboration of such Named Executive Officer with other team members.

In establishing compensation levels for the Company's Named Executive Officers, identified in the Summary Compensation Table, the Compensation Committee considers compensation at eight publicly traded companies in the semiconductor/electronics industries with similar levels of sales and capital. These companies are Advanced Energy Industries, Inc., Axcelis Technologies, Inc., Brooks Automation, Inc., Cabot Microelectronics Corp., Entegris, Inc., FormFactor, Inc., Kulicke & Soffa Industries, Inc., and Veeco Instruments, Inc. Information regarding these companies and their compensation practices is drawn from their proxy statements. Generally, the Compensation Committee believes that the compensation of its executive officers should be set near the median compensation of this comparison group; however, it is also important to the Compensation Committee that compensation reflect individual performance and the Company's results which may warrant compensation up to 20% above or below the median.

In addition, while establishing its compensation policies for a given year, the Compensation Committee will evaluate the results from the most recent shareholder advisory vote on compensation to consider the implications of such advisory vote for the compensation policies and determine whether changes are appropriate. At the 2019 Annual Shareholders Meeting, 90% of the votes cast with respect to the advisory vote on executive compensation voted to approve the executive compensation paid in fiscal 2019. In light of this vote, as well as the Compensation Committee's review of the compensation arrangements discussed above, general market pay practices for its executives, and its assessments of individual and corporate performance, the Compensation Committee determined that no significant change in its compensation policies would be made. The Compensation Committee will consider the results from this year's and future shareholder advisory votes regarding future executive compensation decisions.

The Compensation Committee does not use tally sheets.

### **Base Salary**

The Compensation Committee evaluates and establishes base salary levels in light of economic conditions (generally and in the regions where executives work) and in comparison to other similarly situated companies. Base salary is designed to recognize an executive's knowledge, experience level, skill, ability, level of responsibility, and ongoing performance. The Compensation Committee targets base salary for all executives to be at a level consistent with our assessment of their value relative to their peers in the labor market, while also taking into account our need to manage costs. Any recommendations for salary changes to any Named Executive Officers (other than the Chief Executive Officer) are made by the Chief Executive Officer and presented to the Compensation Committee for approval.

In fiscal year 2019, all Named Executive Officers received a 3% salary increase.

In January of fiscal 2020, all Named Executive Officers received a 3% salary increase except that Dr. Christopher Progler was promoted to Executive Vice President and received an 11.5% increase in salary in connection with his promotion. Also in January of fiscal 2020, Ms. Burr was promoted to Executive Vice President and Chief Administrative Officer and she received a 32.3% increase in salary in connection with her promotion.

### **Annual Cash Incentives**

Participation in the 2011 EICP is limited to key employees of the Company as designated by the Compensation Committee. The 2011 EICP is administered by the Compensation Committee, which has full power and authority to determine which key employees of the Company receive awards under the 2011 EICP, set performance goals and bonus targets for each fiscal year, interpret and construe the terms of the 2011 EICP and make all determinations it deems necessary in the administration of the 2011 EICP, including any determination with respect to the achievement of performance goals and the application of such achievement to the bonus targets. The 2011 EICP sets out quantitative and qualitative categories of business criteria upon which performance goals are based. The business criteria measures within each category may be assigned different weightings based upon their relative degree of importance as determined by the Compensation Committee.

In the quantitative category, one or more of the following business criteria may be used as performance measures: (i) net sales, (ii) operating income, (iii) net income, (iv) earnings per share of common stock, (v) net cash flows provided by operating activities, (vi) increase in working capital, (vii) return on invested capital, (viii) return on equity, and/or (ix) debt reduction. In the qualitative category, the business criteria relate to objective individual performance, taking into account individual goals and objectives. The performance goals with respect to each category of business criteria are established by the Compensation Committee within ninety



days of the commencement of each fiscal year. Annual bonus targets are either expressed as a percentage of current salary or a fixed monetary amount with respect to each performance goal. At the end of each fiscal year for which a bonus may be earned, the Compensation Committee determines each participant’s level of achievement of the established performance goals. Consistent with the relevant provisions of the Dodd-Frank Act, the Company will “clawback”, or retroactively adjust, if the relevant performance measures that awards are based upon are later restated or otherwise adjusted in a manner that would reduce the size of the award or payment. The Compensation Committee may amend or terminate the 2011 EICP at any time provided that no amendment will be effective prior to approval of the Company’s shareholders to the extent such approval is required under listing rules or otherwise required by law.

The Compensation Committee met in January 2019 and established 5 metrics for fiscal 2019 that were to be used under the 2011 EICP. The goals established for 2019 were to: achieve net income target; achieve EBITDA target; execute the China business revenue plan, increase market share via specified business model and enter into long term partnership agreements. Below sets forth the targets and the actual performance of the Company against those targets.

Metric	Target	Actual Performance
Achieve EBITDA Target	\$115MM	Achieved
Achieve Net Income Target	\$14.1MM	Achieved
Execute China Revenue Business Plans	Competitively Sensitive	Not Achieved
Develop and Execute Growth via Business Development	Competitively Sensitive	Achieved
Long Term Partnership Agreements	Competitively Sensitive	Achieved

(1) In accordance with Instruction 4 to Item 402 of Regulation S-K, target information has been omitted with criteria involving confidential trade secrets or confidential commercial or financial information, the disclosure of which would result in competitive harm for the Company.

The EBITDA target for fiscal 2019 of \$115 million was based on full year performance (EBITDA as defined in our credit agreement, is GAAP net income plus interest expense, income tax expense, depreciation and amortization, plus (less) special items as defined). The other targets were to achieve net income of \$14.1 million based on full year performance (net income defined as net income attributable to the Company, which is revenues and income less expenses and net income attributable to non-controlling interests); execute the China revenue business plan; increase market share via a specified model and enter into long term partnership agreements. Each of the five metrics was given equal weight. In order for the Named Executive Officers to be eligible for a cash bonus for fiscal year 2019, the Company was required to meet at least three of the metrics. In October and November of 2019, the Compensation Committee met and reviewed the metrics established for fiscal year 2019 and also reviewed the performance of the Company as a whole for fiscal year 2019. The Compensation Committee met again in December of 2019 and decided to award the following bonuses to the Named Executive Officers based on the achievements of the metrics set forth above. When determining the bonuses, the Compensation Committee considered the fact that 2019 was one of the best years in the Company’s history. The Company achieved record revenue, introduced new products, began production at two new manufacturing facilities, and delivered against many other strategic objectives. We improved the health of our balance sheet by paying off all remaining convertible debt, while also returning cash to our equity shareholders through share repurchase programs.

Based on the fact that the Company met 4 out of 5 of the metrics, materially exceeded two of the metrics and greatly achieved two other metrics the Compensation Committee awarded the following bonuses to the Named Executive Officers in December, 2019.

The Bonuses awarded to the Named Executive Officers in December of 2019 were as follows:

Ms. Richelle Burr	\$105,000
Mr. John P. Jordan	\$106,500
Dr. Peter Kirlin	\$300,000
Dr. Frank Lee	\$107,000
Dr. Christopher J. Proglor	\$118,000

In January 2020, the Compensation Committee met and established goals for fiscal 2020 under the 2011 EICP. The goals established for 2020 are: achieve a specified net income target; achieve a specified EBITDA target; execute the IC business plans in China; execute the FPD business plan in China and augment growth by business development.

### **Stock-Based Awards**

The Company's long-term incentive program uses restricted stock and stock options. The Company's equity incentive plan described below allows for the grant of stock options and restricted stock awards to directors and executive officers of the Company, as well as, other employees of the Company.

The Compensation Committee believes that the grant of stock options and restricted stock awards provides a strong link between executive compensation and shareholder return, aligning the long-term interests of its executives with those of the Company's shareholders and thereby promoting strategic planning while minimizing excessive risk.

For the purpose of aiding the Company and its subsidiaries in attracting, retaining, and motivating qualified personnel, the Company adopted a long term equity incentive compensation plan (the "2016 LTEICP") in 2016. We believe that the 2016 LTEICP is essential to the Company's continued success. The awards provided under the 2016 LTEICP are vital to our ability to attract and retain highly skilled individuals to work for the Company and to serve on its Board of Directors.

### **Administration**

The 2016 LTEICP is administered by the Compensation Committee. The Compensation Committee has the authority to determine, subject to the provisions of the 2016 LTEICP, who will be granted awards, the terms and conditions of awards, and the number of shares subject to, or the cash amount payable with respect to, an award. The Compensation Committee may also make factual determinations in connection with the administration or interpretation of the 2016 LTEICP. To the extent not prohibited by applicable laws, rules, and regulations, the Compensation Committee may also, from time to time, delegate some or all of its authority under the 2016 LTEICP to a subcommittee or to other persons or groups of persons as it deems necessary, appropriate, or advisable. Additionally, subject to applicable laws, rules and regulations, any authority or responsibility that, under the terms of the 2016 LTEICP may be exercised by the Compensation Committee, may alternatively be exercised by the Board of Directors of the Company.

The granting of equity awards under the 2016 LTEICP is generally decided every November or December. Such equity awards are generally granted in January. Grants to Named Executive Officers under the 2016 LTEICP are based on job responsibilities and the potential for individual contribution impacting the Company's overall performance. When considering grants, the Compensation Committee exercises judgment and discretion, generally using a sliding scale approach and also considers previous stock award grants to align generally with its overall compensation philosophy. For example, the Compensation Committee may consider reducing grants in a particular year when a Named Executive Officer has large realizable gains from stock award grants in previous years. Other than inducement awards to new officers or other awards permitted to be granted outside of a shareholder approved equity plan under NASDAQ rules, the Company makes all grants of restricted stock and stock options pursuant to the terms of the 2016 LTEICP.

The annual granting process generally begins with the Compensation Committee providing direction to the Chief Executive Officer as to the total number of shares available for grant for the year. The Chief Executive Officer then provides individual grant recommendations to the Compensation Committee (except for his own) for review and approval. The Chief Executive Officer's recommendation is a subjective evaluation of the Named Executive Officers' contributions to the Company's future success, the level of incentive compensation previously received, as well as, the market price of the common stock on the date of grant. The Compensation Committee considers the aggregate number of shares available, the number of shares previously awarded and the number of individuals to whom the Company wishes to grant stock options or restricted stock awards. The Compensation Committee reserves the right to consider any factors it considers relevant under the circumstances then prevailing in reaching its determination regarding the amount of each stock option and/or restricted stock award.

The Chief Executive Officer's grant is determined by the Compensation Committee at its sole discretion, based on the Compensation Committee's evaluation of the Chief Executive Officer's expected contribution to the

Company's future success, the level of incentive compensation previously awarded, the overall performance of the Company, a review of the Chief Executive Officer's peer group compensation, and the market price of the Company's common stock on the date of grant.

When determining the long-term incentive grants that were decided in November of 2019 but awarded in January 2020, the Compensation Committee considered the overall performance of the Company in fiscal 2019. The Compensation Committee also reviewed the options and restricted stock awards that were granted last year, as well as the cost of option grants to the Company and the fact that the trend in compensation is moving toward more restricted stock grants and fewer option grants. The Compensation Committee also reviewed the grant history of the Company's peers and the compensation given to peer company Named Executive Officers and based on the totality of its review and analysis the Compensation Committee decided to grant the awards shown below to the Named Executive Officers.

### **Eligibility**

The Compensation Committee has the authority under the 2016 LTEICP to select the individuals who will be granted awards from among the officers, employees, directors, non-employee directors, consultants, advisors, and independent contractors of the Company or a subsidiary of the Company.

### **Number of Shares Available for Issuance**

A maximum of four million (4,000,000) shares of Common Stock may be issued under the 2016 LTEICP. Such shares may be authorized but unissued shares, shares previously issued and reacquired by the Company, or both. Any shares subject to awards which, for any reason, expire or are terminated or forfeited, become available again for grant under the 2016 LTEICP. Additionally, shares that are tendered or withheld to pay the exercise price of an award or to satisfy tax withholding obligations and exercised shares covered by a stock-settled stock appreciation right will not be available for issuance pursuant to a new award. The Compensation Committee shall have full authority to determine the effect of a change in control, on the vesting, exercisability, settlement, payment or lapse of restrictions applicable to an award under the 2016 LTEICP.

### **Types of Awards; Limits**

The Compensation Committee may grant the following types of awards under the 2016 LTEICP: options; restricted stock; restricted stock units; stock appreciation rights; performance stock; performance units; and other awards based on, or related to, shares of the Company's Common Stock. However, the 2016 LTEICP contains various limits with respect to the types of awards, as follows: no more than 15% of the shares measured as of the date the 2016 LTEICP was adopted by the Board and approved by the shareholders can be granted to any participant in any fiscal year; provided, however, that Non-Employee Directors may not receive more than 30,000 shares in any fiscal year.

### **Stock Options**

Option awards typically vest 25% per year beginning one year after the grant date, with full vesting on the fourth anniversary of the grant date. Stock options expire ten years after the grant date, unless the employee separates earlier from the Company, at which point vested options expire 30 days after separation. The exercise price is equal to the closing price of our common stock on the date of grant.

### **Restricted Stock**

Restricted stock awards typically vest 25% per year beginning one year after the grant date, with full vesting on the fourth anniversary of the grant date. Any shares not fully vested on the date the employee separates from the Company are forfeited. Restricted stock awards granted to the Named Executive Officers vest 25% per year beginning one year after the grant date.



Based on the determination of the Compensation Committee, the following Named Executive Officers were awarded the following grants on January 3, 2020:

	<u>Restricted Stock</u>
Ms. Richelle Burr .....	35,000
Mr. John P. Jordan .....	35,000
Dr. Peter Kirlin .....	85,000
Dr. Frank Lee .....	35,000
Dr. Christopher J. Progler .....	35,000

The shares of restricted stock will vest in four equal increments over the next four years. All stock awards granted are subject to acceptance by the respective recipients of the terms of the stock award agreements.

### **Stock Ownership Guidelines**

In December of 2015, the Compensation Committee adopted stock ownership guidelines effective for the calendar year 2016. The ownership requirements will be determined as a multiple of base salary or a non-management director’s annual cash retainer converted to a fixed number of shares as follows: Chairman 2x annual base salary; Chief Executive Officer 2x annual base salary; 1x annual base salary for the Chief Financial Officer; 1x annual base salary for the Chief Technology Officer; 1x annual base salary for the President of Asia IC Photomask SBU; and 1x annual base salary for the General Counsel. Non-Management Directors 2x annual cash retainer fee. Stock that counts towards satisfaction of guidelines includes shares owned outright by the participant, stock held in Photronics’ Employee Stock Purchase Plan, restricted stock issued or granted, whether or not vested, and shares acquired upon stock option exercises. The stock price used to calculate conversion will be the average stock price over the twenty trading days prior to the given date. Participants have five years to achieve their designated ownership level.

### **Health and Welfare and Retirement Benefits**

The Named Executive Officers participate in a variety of health and welfare and paid time off benefits designed to allow the Company to retain its workforce. The benefits program enjoyed by the Company’s Named Executive Officers is the same as that offered to all other domestic employees.

The Company does not have a defined benefit pension plan or supplemental retirement plan. However, the Company does have a 401K Savings Plan (the “Plan”). The Plan is a 401(k)-compliant plan which enables participating employees to make contributions from their earnings and share in the contributions the Company makes to a trust fund maintained by the trustee. An account in the trust fund is maintained by the trustee for the Plan. All employees are eligible to participate in the Plan, except for nonresident aliens with no United States earned income from the Company and temporary employees or interns. The minimum amount that an employee can contribute is 1% and the maximum amount is 50%. In fiscal year 2019, the Company provided a matching contribution based on the contributions that participating employees made to the Plan. Participating employees received a matching contribution of 50% of the first 4% of their contribution to the Plan.

### **Employment Agreements**

In order to retain the Named Executive Officers and retain continuity of management in the event of an actual or threatened change of control, the Company has entered into employment agreements with each of the Named Executive Officers. Each agreement covers title, duties and responsibilities, and stipulates compensation terms. Each employment agreement also sets forth the severance benefits due in the event of a change in control or termination without cause. These employment agreements are described below under the caption “Certain Agreements.” The estimate of the compensation that would be payable in the event of a change in control or termination without cause is described below under the caption “Potential Payments Upon Termination or Change in Control.” The Compensation Committee believes that these agreements are a competitive requirement to attract and retain highly qualified executive officers. Before authorizing the Company to enter into the employment agreements with the Named Executive Officers, the Compensation Committee analyzed each of the termination and change in control arrangements and determined that each arrangement was advisable and appropriate under the circumstances of the Company and given the circumstances of each of the individual Named Executive Officers. The Compensation Committee will review these arrangements again upon the renewal of each employment agreement.

## **Perquisites**

The Company offers very limited perquisites to its executive officers. The use of a company car or a car allowance to employees is provided to the Named Executive Officers as indicated in the Summary Compensation Table.

## **Tax and Accounting Impact on Compensation**

Financial reporting and income tax consequences to the Company of individual compensation elements are important considerations for the Compensation Committee when it is analyzing the overall level of compensation and the mix of compensation. Overall, the Compensation Committee seeks to balance its objective of ensuring an effective compensation package for the Named Executive Officers while attempting to ensure the deductibility of such compensation – at the same time ensuring an appropriate and transparent impact on reported earnings and other closely followed financial measures.

Section 162(m) of the Internal Revenue Code (“Section 162(m)”) limits the amount of compensation paid to each Named Executive Officer that may be deducted by the Company to \$1 million in any year. Historically, prior to the 2017 Tax Cuts and Jobs Act (“TCJA”) there was an exception to the \$1 million limitation for performance-based compensation that met certain requirements. This exception was repealed as part of the TCJA for tax years beginning after December 31, 2017 and thus remains in force for our fiscal 2019 year. Further, a transition rule continuing the exception, to written binding contracts that were in place as of November 2, 2017, provided that those contracts are not materially modified after November 2, 2017, through any subsequent renewal date.

Historically, the compensation paid to our executive officers has not exceeded this limit due to the performance based exception. Following the changes made by the TCJA, whether compensation paid to executive officers exceeds the Section 162(m) limitation will depend in part on whether such compensation qualifies under the transition rule for performance based compensation available for written binding contracts in place on November 2, 2017, and not materially modified (or subsequently renewed) thereafter. To the extent that it is practicable and consistent with the Company’s executive compensation philosophy, the Company will maintain the contracts qualified under the transition rule or if it is determined not to be in the best interest of shareholders, the Compensation Committee will abide by its compensation philosophy even if it results in a loss of deductibility.

## **CEO Pay Ratio**

As required by the Securities and Exchange Commission rules, we are providing the following information about the ratio of the median annual total compensation of our employees and the annual total compensation of Dr. Kirlin, our CEO. For the year ended October 31, 2019:

- the median of total compensation of all employees of our Company for fiscal 2019 is estimated to be: \$26,210.72;
- the total compensation of Dr. Kirlin for fiscal 2019 was \$1,651,698; and
- based on this information, the ratio of the annual total compensation of our chief executive officer to the median of the annual total compensation of all other employees is estimated to be 63 to 1.

Excluding our CEO, we identified the median employee by examining the 2019 total annual base salary for all individuals who were employed as of October 31, 2019. We included all our employees, whether full-time or part-time, including any interns. For any employee that we paid in currency other than U.S. Dollars, we then applied the applicable foreign currency exchange rate as of October 31, 2019 to convert such employee’s total target compensation into U.S. Dollars.

Once we identified our median employee, we added together all of the elements of such employee’s compensation for 2019 in the same way that we calculate the annual total compensation of our named executive officers in the Summary Compensation Table including overtime, bonus, matching contribution pursuant to the Company 401(k) savings and profit sharing and vacation payout, if applicable. To calculate our ratio, we used Dr. Kirlin’s salary for fiscal 2019 plus his bonus for fiscal 2019 performance plus his stock award granted in fiscal 2019 plus personal use of a Company car and matching contribution pursuant to the Company’s 401(k) Savings and Profit Sharing Plan and divided that amount by the median employee’s annual total compensation.

## **COMPENSATION COMMITTEE REPORT ON EXECUTIVE COMPENSATION**

The Compensation Committee, comprised of independent directors, reviewed and discussed the above Compensation Discussion and Analysis (CD&A) with the Company's management. Based on the review and discussions, the Compensation Committee recommended to the Company's Board of Directors that the CD&A be included in these Proxy Materials.

Respectfully submitted,

Walter M. Fiederowicz, Chairman  
Joseph A. Fiorita, Jr.

## EXECUTIVE COMPENSATION

The following table sets forth certain information regarding compensation paid or accrued by the Company for services rendered for the three-year period ended October 31, 2019, to each of the individuals who served (i) as the Chief Executive Officer; (ii) Chief Financial Officer and (iii) the three other most highly compensated executive officers of the Company whose total salary and bonus exceeded \$100,000 (the “Named Executive Officers”).

### SUMMARY COMPENSATION TABLE

Name and Principal Position	Year	Salary (\$)	Bonus (\$)	Stock Awards (\$) <sup>(1)</sup>	Option Awards (\$) <sup>(2)</sup>	All Other Compensation (\$)	Total (\$)
<b>Richelle Burr</b> Vice President General Counsel and Secretary	2019	275,940	105,000	264,060		17,694 <sup>(3)</sup>	662,694
	2018	266,102	107,000	129,000	41,040	13,649 <sup>(3)</sup>	556,791
	2017	260,000	40,000	170,250	53,940	14,200 <sup>(3)</sup>	538,390
<b>John P. Jordan</b> Senior Vice President, Chief Financial Officer	2019	355,350	106,500	352,080		17,400 <sup>(4)</sup>	831,330
	2018	345,000	138,000			17,931 <sup>(4)</sup>	500,931
	2017	39,808		232,500		2,000 <sup>(4)</sup>	274,308
<b>Peter S. Kirlin</b> Chief Executive Officer	2019	610,018	300,000	733,500		8,180 <sup>(5)</sup>	1,651,698
	2018	591,001	390,000	516,000	41,040	8,132 <sup>(5)</sup>	1,546,173
	2017	575,000	70,000	425,625	103,385	8,137 <sup>(5)</sup>	1,182,147
<b>Frank Lee</b> President, Asia IC Photomask	2019	428,926	107,000	391,200			927,126
	2018	419,027	209,514	154,800	54,720		838,061
<b>Christopher J. Proglor</b> Vice President, Chief Technology Officer, Strategic Planning	2019	358,722	118,000	312,960		17,400 <sup>(6)</sup>	807,082
	2018	345,933	141,000	129,000	41,040	17,400 <sup>(6)</sup>	674,373
	2017	337,365	35,000	170,250	53,940	17,527 <sup>(6)</sup>	614,082

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- (1) The amounts shown in the “Stock Awards” column represents the closing price of the Company’s Common Stock on the date of grant multiplied by the number of shares awarded in accordance with ASC No. 718.
  - (2) The amounts included in this column represent the grant date fair value of the options calculated in accordance with ASC No. 718. The assumptions used in determining the fair value of these options are set forth in Note 8 of the Company’s Annual Report on Form 10-K.
  - (3) Represents car allowance, matching contribution pursuant to the Company’s 401(k) Savings and Profit Sharing Plan, and other Company sponsored benefits.
  - (4) Represents car allowance, matching contribution pursuant to the Company’s 401(k) Savings and Profit Sharing Plan, and other Company sponsored benefits.
  - (5) Represents car allowance for personal use of a Company car and matching contribution pursuant to the Company’s 401(k) Savings, and Profit Sharing Plan and other Company sponsored benefits.
  - (6) Represents car allowance and matching contribution pursuant to the Company’s 401(k) Savings and Profit Sharing Plan, and other Company sponsored benefits.

## GRANT OF PLAN-BASED AWARDS TABLE

During the fiscal year ended October 31, 2019, the following plan-based awards were granted to the Named Executive Officers

<u>Name</u>	<u>Grant Date</u>	<u>Stock Option Awards (#)</u>	<u>Restricted Stock Awards: Number of Shares of Stock<sup>(1)</sup></u>	<u>Exercise Price of Option Awards (\$)</u>	<u>Grant Date Fair Value of Stock and Option Awards \$</u>
Richelle Burr . . . . .	01/02/2019		27,000		\$264,060
John P. Jordan . . . . .	01/02/2019		36,000		\$352,080
Peter S. Kirlin . . . . .	01/02/2019		75,000		\$733,500
Frank Lee . . . . .	01/02/2019		40,000		\$391,200
Christopher J. Progler . . . . .	01/02/2019		32,000		\$312,960

(1) Restricted stock awards typically vest 25% per year beginning one year after the grant date, with full vesting on the fourth anniversary of the grant date

See the Compensation Discussion and Analysis for an explanation of the amount of salary and bonus in proportion to total compensation and a description of the material terms of plan based awards.

**OUTSTANDING EQUITY AWARDS AT FISCAL YEAR-END**

Name	Option Awards					Stock Awards	
	Grant Date	No. of Securities Underlying Unexercised Options (#) Exercisable	No. of Securities Underlying Unexercised Options <sup>(1)</sup> (#) Un-exercisable	Option Exercise Price (\$)	Option Expiration Date	No. of Shares or Units of Stock That Have Not Vested (#)	Market Value of Shares of Units of Stock That Have Not Vested (\$)
Richelle Burr . . . . .	12/10/2010	15,000		6.71	12/10/2020		
	12/9/2011	15,000		6.32	12/09/2021		
	12/7/2012	5,625		5.46	12/7/2022		
	12/13/2013	25,000		8.86	12/13/2023		
	12/19/2014	25,000		8.23	12/19/2024		
	1/4/2016					1,063 <sup>(2)</sup>	12,543
	1/4/2016	19,125	6,375	12.13	1/4/2026		
	1/3/2017					7,500 <sup>(2)</sup>	88,500
	1/3/2017	7,500	7,500	11.35	1/3/2027		
	1/2/2018					11,250 <sup>(2)</sup>	132,750
	1/2/2018	3,750	11,250	8.60	1/2/2028		
	1/2/2019					27,000 <sup>(2)</sup>	318,600
	John P. Jordan . . . . .	9/5/2017					15,000 <sup>(2)</sup>
1/2/2019						36,000 <sup>(2)</sup>	424,800
Peter S. Kirlin . . . . .	12/7/2012	33,000		5.46	12/7/2022		
	12/13/2013	45,000		8.86	12/13/2023		
	12/19/2014	45,000		8.23	12/19/2024		
	5/4/2015	50,000		8.84	5/4/2025		
	1/4/2016					3,125 <sup>(2)</sup>	36,875
	1/4/2016	45,000	15,000	12.13	1/4/2026		
	1/3/2017					18,750 <sup>(2)</sup>	221,250
	1/3/2017	14,375	14,375	11.35	1/3/2027		
	1/2/2018					45,000 <sup>(2)</sup>	531,000
	1/2/2018	3,750	11,250	8.60	1/2/2028		
	1/2/2019					75,000	885,000
Frank Lee . . . . .	7/21/2010	30,000		4.60	7/21/2020		
	2/4/2011	12,000		6.71	2/4/2021		
	12/9/2011	15,000		6.32	12/9/2021		
	12/7/2012	30,000		5.46	12/7/2022		
	12/13/2013	30,000		8.86	12/13/2023		
	12/19/2014	30,000		8.23	12/19/2024		
	1/4/2016					1,325 <sup>(2)</sup>	15,635
	1/4/2016	24,750	8,250	12.13	1/4/2026		
	1/3/2017					9,000 <sup>(2)</sup>	106,200
	1/3/2017	10,000	10,000	11.35	1/3/2027		
	3/7/2017					2,500 <sup>(2)</sup>	29,500
	3/7/2017	5,000	5,000	10.75	3/7/2027		
	1/2/2018					13,500 <sup>(2)</sup>	159,300
	1/2/2018	5,000	15,000	8.60	1/2/2028		
	1/2/2019					40,000	472,000

Name	Option Awards					Stock Awards	
	Grant Date	No. of Securities Underlying Unexercised Options (#) Exercisable	No. of Securities Underlying Unexercised Options <sup>(1)</sup> Un-exercisable	Option Exercise Price (\$)	Option Expiration Date	No. of Shares or Units of Stock That Have Not Vested (#)	Market Value of Shares or Units of Stock That Have Not Vested (\$)
Christopher J. Progler . . . . .	12/10/2010	6,592		6.71	12/10/2020		
	12/9/2011	17,500		6.32	12/9/2021		
	12/7/2012	26,450		5.46	12/7/2022		
	12/13/2013	33,000		8.86	12/13/2023		
	12/19/2014	33,000		8.23	12/19/2024		
	1/4/2016					1,400 <sup>(2)</sup>	16,520
	1/4/2016	24,750	8,250	12.13	1/4/2026		
	1/3/2017					7,500 <sup>(2)</sup>	88,500
	1/3/2017	7,500	7,500	11.35	1/3/2027		
	1/2/2018					11,250 <sup>(2)</sup>	132,750
	1/2/2018	3,750	11,250	8.60	1/2/2028		
	1/2/2019					32,000 <sup>(2)</sup>	377,600

(1) The options vest 25% on each of the first 4 anniversaries of the date of the grant.

(2) Represents restricted stock awards which vest 25% on each of the first 4 anniversaries of the date of the grant.

**OPTION EXERCISES AND STOCK VESTED  
FISCAL YEAR ENDED OCTOBER 31, 2019**

Name (a)	Option Awards		Stock Awards	
	No. of Shares Acquired On Exercise (#)(b)	Value Realized on Exercise (\$)(c)	No. of Shares Acquired on Vesting (#)(d)	Value Realized on Vesting (\$)(e)
Richelle Burr . . . . .	0	0	9,604	98,848
John P. Jordan . . . . .	0	0	7,500	58,125
Peter S. Kirlin . . . . .	20,000	134,200	31,875	320,875
Frank Lee . . . . .	6,000	26,520	12,825	132,623
Christopher J. Progler . . . . .	26,193	130,871.03	10,275	106,514

## CERTAIN AGREEMENTS

Ms. Burr and the Company entered into a three-year employment agreement dated May 21, 2010. The agreement provided for a base salary of \$170,000. The Compensation Committee or the Board of Directors reviews Ms. Burr's base salary from time to time in accordance with normal business practices of the Company and as a result of such review may increase her base salary. Ms. Burr's current base salary is \$365,022. Ms. Burr received a bonus of \$105,000 in December 2019 and received a 32.3% salary increase in January of 2020 in connection with a promotion. Ms. Burr's agreement is automatically extended for consecutive one-year periods unless the Company gives at least 30 days' notice of its intent not to renew. Ms. Burr is entitled to participate in employee benefit plans and arrangements as established by the Company for similarly situated executives. Ms. Burr is also entitled to receive an automobile allowance or company car in accordance with the Company's policies and provisions applicable to other similarly situated executives of the Company. If the agreement is terminated by the Company for reasons other than for "cause" or Ms. Burr resigns for "good reason", Ms. Burr will receive a payment equal to 100% of her base salary paid out over 12 months. The agreement also provides severance payments equal to 150% of her base salary payable over 18 months in the event of involuntary termination other than for "cause" (including a resignation for "good reason") following a "change in control" and Ms. Burr's stock options or similar rights will become immediately vested. Ms. Burr has agreed not to engage in any activity that competes with the Company's business during the term of her employment agreement and for twelve months thereafter.

John P. Jordan and the Company entered into a three-year employment agreement dated September 5, 2017. The agreement provided for a base salary of \$345,000 per year. The Compensation Committee or the Board of Directors will review Mr. Jordan's base salary from time to time in accordance with normal business practices of the Company, and as a result of such reviews, may increase his base salary. Mr. Jordan's current salary is \$366,010. Mr. Jordan received a bonus of \$106,500 in December 2019 and a 3% increase was granted in January 2020. The agreement is automatically extended for consecutive one-year periods unless the Company gives at least 30 days' notice of its intent not to renew. Mr. Jordan is entitled to participate in employee benefit plans and arrangements as established by the Company for similarly situated executives. Mr. Jordan is also entitled to receive an automobile allowance in accordance with the Company's policies and provisions applicable to other similarly situated executives of the Company. If the agreement is terminated by the Company for reasons other than for "cause," or Mr. Jordan resigns for "good reason," Mr. Jordan will receive a payment equal to 100% of his base salary paid out over 12 months. The agreement also provides severance payments equal to 150% of his base salary payable over 18 months in the event of involuntary termination other than for "cause" (including a resignation for "good reason") following a "change in control" and Mr. Jordan's stock options or similar rights will become immediately vested. Mr. Jordan has agreed not to engage in any activity that competes with the Company's business during the term of his employment agreement and for twelve months thereafter.

Dr. Kirlin and the Company entered into a three year employment agreement dated May 21, 2010, which was amended May 4, 2015. The agreement provided for a base salary of \$525,000. The Compensation Committee or the Board of Directors reviews Dr. Kirlin's base salary from time to time in accordance with normal business practices of the Company and as a result of such review may increase his base salary. Dr. Kirlin's current base salary is \$628,318. Dr. Kirlin received a bonus of \$300,000 in December 2019 and a 3% increase in January 2020. Dr. Kirlin's agreement is automatically extended for consecutive 1 year periods unless the Company gives at least 30 days' notice of its intent not to renew. Dr. Kirlin is entitled to participate in employee benefit plans and arrangements as established by the Company for similarly situated executives. Dr. Kirlin is also entitled to receive an automobile allowance or company car in accordance with the Company's policies and provisions applicable to other similarly situated executives of the Company. If the agreement is terminated by the Company for reasons other than for "cause," or Dr. Kirlin resigns for "good reason," Dr. Kirlin will receive a payment equal to 100% of his base salary paid out over twelve months. The agreement also provides severance payments equal to 150% of his base salary payable over 18 months in the event of involuntary termination other than for "cause" (including a resignation for "good reason") following a "change in control" and Dr. Kirlin's stock options or similar rights will become immediately vested. Dr. Kirlin has agreed not to engage in any activity that competes with the Company's business during the term of his employment agreement and for twelve months thereafter.

Dr. Lee and the Company entered into a three-year employment agreement dated October 31, 2019. The agreement provided for a base salary of \$428,926 per year. The Compensation Committee or the Board of Directors of Photonics reviews Dr. Lee's base salary from time to time in accordance with normal business



practices of the Company, and as a result of such reviews, may increase his base salary. Dr. Lee's current base salary is \$441,794. Dr. Lee received a bonus of \$107,000 in December 2019 and a 3% salary increase was granted in January 2020. The agreement is automatically extended for consecutive one-year periods unless the Company gives at least 30 days' notice of its intent not to renew. Dr. Lee is entitled to participate in employee benefits plans and arrangements as established by the Company for similarly situated executives. Dr. Lee is also entitled to receive an automobile allowance in accordance with the Company's policies and provisions applicable to other similarly situated executives of the company. If the agreement is terminated by the company for reasons other than for "cause", or Dr. Lee resigns for "good reason", Dr. Lee will receive a payment equal to 100% of his base salary paid out over 12 months. The agreement also provides severance payments equal to 150% of his base salary payable over 18 months in the event of involuntary termination other than for "cause" (including resignation for "good reason") following a "change in control" and Dr. Lee's stock options or similar rights will become immediately vested. Dr. Lee has agreed not to engage in any activity that competes with the Company's business during the term of his employment agreement and for twelve months after.

Dr. Progler and the Company entered into a three-year employment agreement dated September 10, 2007. The agreement provided for a base salary of \$243,000 per year. The Compensation Committee or the Board of Directors reviews Dr. Progler's base salary from time to time in accordance with normal business practices of the Company, and as a result of such reviews may increase his base salary. Dr. Progler's current base salary is \$400,004, which reflects a 11% salary increase in relation to his promotion in January, 2020 to Executive Vice President. Dr. Progler received a bonus of \$118,000 in December 2019. The agreement is automatically extended for consecutive 1 year periods unless the Company gives at least 30 days' notice of its intent not to renew. Dr. Progler is entitled to participate in employee benefit plans and arrangements as established by the Company for similarly situated executives. Dr. Progler is also entitled to receive an automobile allowance or company car in accordance with the Company's policies and provisions applicable to other similarly situated executives of the Company. If the agreement is terminated by the Company for reasons other than for "cause" or Mr. Progler resigns for "good reason", Mr. Progler will receive a payment equal to 100% of his base salary paid out over 12 months. The agreement also provides severance payments equal to 150% of his base salary payable over 18 months in the event of involuntary termination other than for "cause" (including a resignation for "good reason") following a "change in control" and Mr. Progler's stock options or similar rights will become immediately vested. Mr. Progler has agreed not to engage in any activity that competes with the Company's business during the term of his employment agreement and for twelve months thereafter.

For purposes of the foregoing, "good reason" means the relocation of the Company's principal executive offices outside the United States without the employee's consent or any reduction in his salary or health benefits without the employee's consent.

## EQUITY COMPENSATION PLAN INFORMATION

<u>Plan Category</u>	<u>No. of Shares to be issued upon exercise of outstanding options, warrants and rights (a)</u>	<u>Weighted-average exercise price of outstanding options, warrants, and rights (b)</u>	<u>No. of Shares remaining available for future issuance under equity compensation plans (excluding securities reflected in column) (c)</u>
Equity Compensation Plan Approved by Shareholders . . . . .	2,810,880	\$9.16	2,690,092 <sup>(1)</sup>
Equity Compensation Plans Not Approved by Shareholders . . . . .	0	0	0
Total . . . . .	2,810,880	\$9.16	2,690,092

(1) Represents shares of Photonics Common Stock issuable pursuant to future issuance under the Company's 2016 Long Term Equity Incentive Plan (the "LTEIP") and shares available under the Company's Employee Stock Purchase Plan.

## POTENTIAL PAYMENTS UPON TERMINATION OR CHANGE IN CONTROL

Ms. Burr, Dr. Kirlin, Dr. Lee, Dr. Progler, and Mr. Jordan have employment agreements with the Company that provide for severance payments in the event of termination by the Company without cause, termination upon a change of control, or resignation by such Named Executive Officer with good reason. The employment agreements are further described above under the caption “Certain Agreements”.

The table below was prepared as if the Named Executives Officer’s employment was terminated as of October 31, 2019, the last business day of our 2019 fiscal year and, if applicable, a change in control occurred on that date. The table also utilizes the closing share price of Photronics Common Stock on October 31, 2019.

Name	Severance Payment (\$) <sup>(1)</sup>	Benefit Plans (\$) <sup>(2)</sup>	Options (\$) <sup>(3)</sup>	Restricted Stock (\$) <sup>(4)</sup>	Total (\$)
<b>Richelle Burr</b>					
Termination without cause or resignation for good reason.	275,940	18,000			293,940
Termination upon change of control	413,910	18,000	27,375	552,393	1,011,678
<b>John P. Jordan</b>					
Termination without cause or resignation for good reason.	355,350	18,000			373,350
Termination upon change of control	533,025	18,000		601,800	1,152,825
<b>Peter S. Kirlin</b>					
Termination without cause or resignation for good reason.	610,018	18,000			628,018
Termination upon change of control	915,027	18,000	42,469	1,674,125	2,649,621
<b>Frank Lee</b>					
Termination without cause or resignation for good reason.	428,926				428,926
Termination upon change of control	643,389		57,750	782,635	1,483,774
<b>Christopher J. Progler</b>					
Termination without cause or resignation for good reason.	358,722	18,000			376,722
Termination upon change of control	538,083	18,000	39,375	615,370	1,210,828

(1) Assumes no bonus will be paid as part of the severance payment. The calculation was based on base salary for fiscal 2019.

(2) Assumes a payment of \$1,500 per month for COBRA premiums for 12 months.

(3) The value of options assumes all outstanding option awards that are in the money and as of October 31, 2019 were immediately vested upon the change of control, regardless of whether termination of employment, for any reason, has occurred, as provided under the Company’s stock incentive plans. The amount is calculated by multiplying the amount of unvested options granted by the closing price on the date of grant and then deducting that number from the number of unvested options granted multiplied by the closing share price on October 31, 2019. The closing price on the date of grant was \$8.23 for the award granted on December 19, 2014, \$12.13 for the award granted on January 4, 2016, and \$11.35 for the award granted on January 3, 2017 and \$8.60 for the award granted on January 2, 2018. The closing price on October 31, 2019 was \$11.80.

(4) The value of restricted stock assumes all unvested outstanding awards as of October 31, 2019, were immediately vested upon the change of control, regardless of whether termination of employment, for any reason has occurred, as provided under the Company’s stock incentive plans. In the case of restricted stock the value is based on the number of outstanding shares that would not ordinarily have vested as of October 31, 2019, multiplied by \$11.80, the applicable closing share price on October 31, 2019.

## DIRECTORS' COMPENSATION

Directors who are not employees of the Company each received an annual retainer of \$40,000 in addition to a fee of \$4,000 for each Board meeting attended in fiscal 2019.

Grants of stock as part of the Directors' annual compensation are approved at the first Board meeting of the Company's fiscal year and granted in January. For fiscal 2019, each Director received a restricted stock award of 12,000 shares. The restrictions on the awards lapse quarterly over the one-year service period. We believe that providing part of the directors' annual retainer compensation in the form of equity rather than cash serves to align the interest of our directors with our shareholders as they become shareholders themselves.

Directors who are also employees of the Company are not compensated for serving on the Board.

In fiscal 2019, the Chairman of the Audit Committee received an additional annual retainer of \$40,000 and the Vice Chairman received an additional annual retainer of \$20,000. In fiscal 2019, the other member of the Audit Committee received an additional annual retainer of \$15,000. Members of the Audit Committee receive a per diem payment of \$1,250 for travel in connection with the Audit Committee and for Board of Director assignments. The Chairman of the Compensation Committee received an additional annual retainer of \$40,000 and the Vice Chairman of the Compensation Committee receives an additional annual retainer of \$20,000. In fiscal 2019, the Chairman of the Strategic Planning and Development Committee received an additional annual retainer of \$15,000 and the Vice Chairman received an additional annual retainer of \$10,000. In fiscal 2019, the Chairman of the Nominating Committee received an additional annual retainer of \$20,000 and the Vice Chairman received an additional annual retainer of \$10,000. In fiscal 2019, the Chairman of the Cyber Security Committee received an additional annual retainer of \$15,000 and the other member of the Cyber Security Committee received a retainer of \$10,000. From time to time, management may request the involvement of one or more directors outside of board meetings in connection with the development or consideration of strategic initiatives. The directors are paid an additional \$2,500 per diem prorated fee for the time devoted to such matters. Such additional fees shall be paid to the directors in fiscal 2020 if such services are rendered by any director.

At the meeting of the Board of Directors held in December 2019, the Compensation Committee recommended to the Board the compensation to be paid to the Board for fiscal 2020. The Board, after considering this recommendation, then established the annual compensation for the directors. When assessing the directors' compensation, the Compensation Committee reviews the compensation of the directors of its peer group (the peer group is described above in the Compensation Discussion and Analysis), reviewing each element of director compensation including the annual retainer, the committee chair retainer, meeting fees and equity awards to determine whether the amount is competitive and reasonable for the services provided by the directors. We provide higher annual retainers for service as the Chair(s) of the Audit and Compensation Committee. We believe that providing part of the directors' annual retainer compensation in the form of equity rather than cash serves to align the interests of our directors with our shareholders as they become shareholders themselves. The annual retainer for Directors who are not employees for 2020 is \$40,000 and a meeting fee of \$4,000 per meeting. Grants of stock as part of the Directors' annual compensation are generally made in January. For fiscal 2020, each Director received a restricted stock award of 12,000 shares in January 2020. The restrictions on the awards lapse quarterly over the one-year service period.

In fiscal 2020, the Chairman of the Audit Committee will receive an additional annual retainer of \$40,000 and the Vice Chairman will receive an additional annual retainer of \$20,000. In fiscal 2020, the other member of the Audit Committee will receive an additional annual retainer of \$15,000. Members of the Audit Committee will receive a per diem payment of \$2,500 for travel in connection with the Audit Committee and for Board of Director assignments. The Chairman of the Compensation Committee will receive an additional annual retainer of \$40,000 and the Vice Chairman of the Compensation Committee will receive an additional annual retainer of \$20,000. In fiscal 2020, the Chairman of the Nominating Committee will receive an additional annual retainer of \$20,000 and the Vice Chairman will receive an additional annual retainer of \$10,000. In fiscal 2020, the Chairman of the Cyber Security Committee will receive an additional annual retainer of \$15,000 and the other member of the Cyber Security Committee will receive a retainer of \$10,000. From time to time, management may request the involvement of one or more directors outside of board meetings in connection with the development or consideration of strategic initiatives. The directors may earn an additional \$2,500 per diem prorated fee for the time devoted to such matters.

## DIRECTOR COMPENSATION TABLE

Name	Fees Earned or Paid in Cash (\$)	Stock Awards (\$)	Total (\$)
<b>Walter M. Fiederowicz</b> .....	124,000 <sup>(2)</sup>	117,360 <sup>(1)</sup>	241,360
<b>Joseph A. Fiorita</b> .....	124,000 <sup>(3)</sup>	117,360 <sup>(1)</sup>	219,200
<b>Constantine Macricostas</b> .....	74,000 <sup>(4)</sup>	117,360 <sup>(1)</sup>	191,360
<b>George Macricostas</b> .....	89,000 <sup>(5)</sup>	117,360 <sup>(1)</sup>	206,360
<b>Mary Paladino</b> .....	10,000 <sup>(6)</sup>	35,850 <sup>(6)</sup>	45,850
<b>Mitchell G. Tyson</b> .....	99,000 <sup>(7)</sup>	117,360 <sup>(1)</sup>	216,360
<b>Liang-Choo Hsia</b> .....	89,000 <sup>(8)</sup>	117,360 <sup>(1)</sup>	206,360

- (1) The amounts shown represents 12,000 shares of restricted stock granted on January 2, 2019 with a closing stock price of \$9.78. The restricted stock vests quarterly over a year.
- (2) Represents \$40,000 as an annual retainer, \$40,000 as Chairman of the Compensation Committee, \$20,000 as Vice Chairman of the Audit Committee, and \$24,000 for meeting fees (6 meetings at \$4,000 per meeting).
- (3) Represents \$40,000 as an annual retainer, \$40,000 as Chairman of the Audit Committee, \$20,000 as Vice Chairman of the Compensation Committee, and \$24,000 for meeting fees (6 meetings at \$4,000 per meeting).
- (4) Represents \$40,000 as an annual retainer, \$10,000 as a member of the Cyber Security Committee, and \$24,000 for meeting fees (6 meetings at \$4,000 per meeting).
- (5) Represents \$40,000 as an annual retainer, \$15,000 as Chairman of the Cyber Security Committee, \$10,000 as a member of the Strategic Planning and Technology Development Committee, and \$24,000 for meeting fees (6 meetings at \$4,000 per meeting).
- (6) Represents \$10,000 as pro-rated annual retainer, and 3,000 shares of restricted stock granted on November 1, 2019 with a closing stock price of \$11.95.
- (7) Represents \$40,000 as an annual retainer and \$15,000 as a member of the Audit Committee, \$20,000 as Chairman of the Nominating Committee, and \$24,000 for meeting fees (6 meetings at \$4,000 per meeting).
- (8) Represents \$40,000 as an annual retainer, \$15,000 as Chairman of the Strategic Planning and Technology Development Committee, \$10,000 as Member of the Nominating Committee, and \$24,000 for meeting fees (6 meetings at \$4,000 per meeting).

### COMPENSATION COMMITTEE INTERLOCKS AND INSIDER PARTICIPATION

During fiscal 2019, no members of the Compensation Committee were officers or employees of the Company or any of its subsidiaries. During fiscal 2019, no executive officers of the Company served on the Compensation Committee or the Board of Directors of another entity whose executive officers served on the Company's Compensation Committee.

### PROPOSAL 2 RATIFICATION OF THE SELECTION OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Audit Committee has selected Deloitte & Touche LLP (“D&T”), independent registered public accounting firm, to audit the consolidated financial statements of the Company and its subsidiaries for the fiscal year ending October 31, 2020. We are asking you to ratify this selection at the meeting.

A representative of D&T will be available to answer appropriate questions and may make a statement.

Approval of this proposal to ratify the appointment of D&T requires a majority of the votes cast by the shareholders entitled to vote at the Annual Meeting.

**THE BOARD OF DIRECTORS RECOMMENDS THAT YOU VOTE “FOR” RATIFYING THE SELECTION OF D&T AS OUR INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM FOR THE FISCAL YEAR ENDING OCTOBER 31, 2020**

### PROPOSAL 3

#### TO APPROVE THE COMPANY'S ENTRY INTO THE SECTION 382 RIGHTS AGREEMENT AND THE DISTRIBUTION OF THE PREFERRED SHARE PURCHASE RIGHTS

On September 12, 2019, the Board of Directors declared a dividend of one preferred shares purchase right (a "Right"), payable on or about October 1, 2019, for each share of Common Stock outstanding on September 30, 2019 (the "Record Date") to the Company's stockholders of record on that date. In connection with the distribution of the Rights, the Company entered into a Section 382 Rights Agreement (the "Rights Agreement"), dated as of September 23, 2019, between the Company and Computershare Trust Company, N.A., a federally chartered trust company, as rights agent. Each Right entitles the registered holder to purchase from the Company one one-thousandth of a share of Series A preferred stock, par value \$0.01 per share, of the Company (the "Preferred Shares") at a price of \$33.63 per one one-thousandth of a Preferred Share represented by a Right, subject to adjustment. The Rights Agreement is filed as Exhibit 4.1 to the Current Report on Form 8-K filed by the Company with the SEC on September 24, 2019.

The purpose of the Rights Agreement is to protect value by preserving the Company's ability to use its Tax Attributes (as such term is defined in the Rights Agreement) to offset potential future income taxes for federal income tax purposes. The Company's ability to use its Tax Attributes would be substantially limited if it experiences an "ownership change," as such term is defined in Section 382 of the Internal Revenue Code of 1986, as amended (the "Code"). A company generally experiences an ownership change if the percentage of its shares of stock owned by its "5-percent shareholders," as such term is defined in Section 382 of the Code, increases by more than 50 percentage points over a rolling three-year period. The Rights Agreement is intended to reduce the likelihood of an ownership change under Section 382 of the Code by deterring any Person (as such term is defined in the Rights Agreement) or group of affiliated or associated Persons from acquiring Beneficial Ownership (as defined below) of 4.9% or more of the outstanding Common Stock. The Rights are in all respects subject to and governed by the provisions of the Rights Agreement.

The Rights Agreement provides that it will expire if not approved by a majority of the votes cast at our 2020 Annual Meeting or any other meeting of our stockholders held within one year of the Company's entry into the Rights Agreement. Consistent with our recommendation, we note that our entry into the Rights Agreement does not and will not weaken the financial strength of the Company or affect our business plans. Issuance of the Rights:

- has no dilutive effect on the value of the Common Stock;
- will not affect reported earnings per share;
- is not taxable to the Company or to you; and
- will not change how you can trade the Common Stock.

The Rights will be exercisable only if and when a situation arises that the Rights were intended to address.

#### Description of the Rights

Until a Right is exercised, the holder thereof, as such, will have no rights as a stockholder of the Company, including, without limitation, the right to vote or to receive dividends. In connection with the distribution of the Rights, the Company entered into a Section 382 Rights Agreement (the "Rights Agreement"), dated as of September 23, 2019, between the Company and Computershare Trust Company, N.A., a federally chartered trust company, as rights agent. The Rights are in all respects subject to and governed by the provisions of the Rights Agreement.

Initially, the Rights will be attached to all Common Stock certificates (or other evidence of book-entry or other uncertificated ownership) and no separate certificates evidencing the Rights ("Right Certificates") will be issued. Until the Distribution Date (as defined below), the Rights will be transferred with and only with the Common Stock. As long as the Rights are attached to the Common Stock, the Company will issue one (1) Right with each new share of Common Stock so that all such shares of Common Stock will have Rights attached (subject to certain limited exceptions).

The Rights will separate and begin trading separately from the Common Stock, and Right Certificates will be caused to evidence the Rights, on the earlier to occur of (i) the Close of Business (as such term is defined in the Rights Agreement) on the tenth day following a public announcement, or the public disclosure of facts indicating



(or the Company's Board of Directors becoming aware), that a Person or group of affiliated or associated Persons has acquired Beneficial Ownership of 4.9% or more of the outstanding Common Stock (an "Acquiring Person") (or, in the event that the Board of Directors determines to effect an exchange in accordance with Section 24 of the Rights Agreement and the Board of Directors determines that a later date is advisable, then such later date) and (ii) the Close of Business on the tenth (10<sup>th</sup>) Business Day (as such term is defined in the Rights Agreement) (or such later date as may be determined by action of the Board of Directors prior to such time as any Person becomes an Acquiring Person) following the commencement of, or the first public announcement of the intention to commence, a tender offer or exchange offer the consummation of which would result in the Beneficial Ownership by a Person or group of 4.9% or more of the outstanding Common Stock (the earlier of such dates, the "Distribution Date"). As soon as practicable after the Distribution Date, unless the Rights are recorded in book-entry or other uncertificated form, the Company will prepare and cause the Right Certificates to be sent to each record holder of Common Stock as of the Distribution Date.

An "Acquiring Person" will not include (i) the Company, (ii) any Subsidiary (as such term is defined in the Rights Agreement) of the Company, (iii) any employee benefit plan of the Company or of any Subsidiary of the Company, (iv) any entity holding Common Stock for or pursuant to the terms of any such employee benefit plan or (v) any Person who or which, together with all Affiliates and Associates (as such terms are defined in the Rights Agreement) of such Person, at the time of the first public announcement of the Rights Agreement, is a Beneficial Owner of 4.9% or more of the Common Stock then outstanding (a "Grandfathered Stockholder"). However, if a Grandfathered Stockholder becomes, after such time, the Beneficial Owner of any additional shares of Common Stock (regardless of whether, thereafter or as a result thereof, there is an increase, decrease or no change in the percentage of Common Stock then outstanding Beneficially Owned (as such term is defined in the Rights Agreement) by such Grandfathered Stockholder) then such Grandfathered Stockholder shall be deemed to be an Acquiring Person unless, upon such acquisition of Beneficial Ownership of additional shares of Common Stock, such person is not the Beneficial Owner of 4.9% or more of the Common Stock then outstanding. In addition, upon the first decrease of a Grandfathered Stockholder's Beneficial Ownership below 4.9%, such Grandfathered Stockholder will no longer be deemed to be a Grandfathered Stockholder. In the event that after the time of the first public announcement of the Rights Agreement, any agreement, arrangement or understanding pursuant to which any Grandfathered Stockholder is deemed to be the Beneficial Owner of Common Stock expires, is settled in whole or in part, terminates or no longer confers any benefit to or imposes any obligation on the Grandfathered Stockholder, any direct or indirect replacement, extension or substitution of such agreement, arrangement or understanding with respect to the same or different Common Stock that confers Beneficial Ownership of Common Stock shall be considered the acquisition of Beneficial Ownership of additional Common Stock by the Grandfathered Stockholder and render such Grandfathered Stockholder an Acquiring Person for purposes of the Rights Agreement unless, upon such acquisition of Beneficial Ownership of additional shares of Common Stock, such person is not the Beneficial Owner of 4.9% or more of the Common Stock then outstanding.

"Beneficial Ownership" is defined in the Rights Agreement to include any securities (i) which a Person or any of such Person's Affiliates or Associates (a) actually owns (directly or indirectly) or would be deemed to actually or constructively own for purposes of Section 382 of the Code or the Treasury Regulations (as such terms are defined in the Rights Agreement) promulgated thereunder, including any coordinated acquisition of securities by any Persons who have a formal or informal understanding with respect to such acquisition (to the extent ownership of such securities would be attributed to such Persons under Section 382 of the Code and the Treasury Regulations promulgated thereunder), (b) beneficially owns, directly or indirectly, within the meaning of Rules 13d-3 or 13d-5 promulgated under the Exchange Act or (c) has the right or ability to vote, or the right to acquire, pursuant to any agreement, arrangement or understanding (except under limited circumstances), (ii) which are directly or indirectly Beneficially Owned by any other Person with which a Person has any agreement, arrangement or understanding for the purpose of acquiring, holding or voting such securities, or obtaining, changing or influencing control of the Company or (iii) in respect of which a Person or any of such Person's Affiliates or Associates has a derivative position which is capable of being settled, in whole or in part, through delivery of cash or Common Stock (whether on a required or optional basis, and whether such settlement may occur immediately or only after the passage of time, the occurrence of conditions, the satisfaction of regulatory requirements or otherwise). In addition, Persons are not deemed to be part of a group that would constitute an Acquiring Person based on participation in discussions, negotiations or transactions with another Person for the purposes of restructuring the Company's debt.

The Rights are not exercisable until the Distribution Date. The Rights will expire on the earliest to occur of (i) the Close of Business on the day following the certification of the voting results of the Company's 2020 annual meeting of stockholders, if at such stockholder meeting a proposal to approve the Rights Agreement has not been passed by the affirmative vote of the majority of the votes cast at the 2020 annual meeting of stockholders or any other meeting of stockholders of the Company duly held prior to September 22, 2020, (ii) the date on which the Board of Directors determines in its sole discretion that (x) the Rights Agreement is no longer necessary for the preservation of material valuable Tax Attributes or (y) the Tax Attributes have been fully utilized and may no longer be carried forward and (iii) the Close of Business on September 22, 2022 (the "Final Expiration Date").

#### *Exempt Persons and Transactions*

The Board of Directors may, in its sole and absolute discretion, determine that a Person is exempt from the Rights Agreement (an "Exempt Person"), so long as such determination is made prior to such time as such Person becomes an Acquiring Person. Any Person will cease to be an Exempt Person if the Board of Directors makes a contrary determination with respect to such Person regardless of the reason therefor. In addition, the Board of Directors may, in its sole and absolute discretion, exempt any transaction from triggering the Rights Agreement, so long as the determination in respect of such exemption is made prior to such time as any Person becomes an Acquiring Person. Any Person, together with all Affiliates and Associates of such Person, who proposes to acquire 4.9% or more of the outstanding Common Stock may apply to the Board of Directors in advance for an exemption in accordance with and pursuant to the terms of the Rights Agreement.

#### *Flip-in Event*

If a Person or group becomes an Acquiring Person at any time after the date of the Rights Agreement (with certain limited exceptions), the Rights will become exercisable for shares of Common Stock having a value equal to two times the exercise price of the Right. From and after the announcement that any Person has become an Acquiring Person, if the Rights evidenced by a Right Certificate are or were acquired or Beneficially Owned by an Acquiring Person or any Associate or Affiliate of an Acquiring Person, such Rights shall become void, and any holder of such Rights shall thereafter have no right to exercise such Rights. If the Board of Directors so elects, the Company may deliver upon payment of the exercise price of a Right an amount of cash, securities or other property equivalent in value to the Common Stock issuable upon exercise of a Right.

#### *Exchange*

At any time after any Person becomes an Acquiring Person, the Board of Directors may exchange the Rights (other than Rights owned by any Person which have become void), in whole or in part, at an exchange ratio of two shares of Common Stock per Right (subject to adjustment). The Company may issue, transfer or deposit such Common Stock (or other property as permitted under the Rights Agreement) to or into a trust or other entity created upon such terms as the Board of Directors may determine and may direct that all holders of Rights receive such Common Stock or other property only from the trust. In the event the Board of Directors determines, before the Distribution Date, to effect an exchange, the Board of Directors may delay the occurrence of the Distribution Date to such time as it deems advisable.

#### *Flip-over Event*

If, at any time after a Person becomes an Acquiring Person, (i) the Company consolidates with, or merges with, any other Person (or any Person consolidates with, or merges with, the Company) and, in connection with such consolidation or merger, all or part of the Common Stock are or will be changed into or exchanged for stock or other securities of any other Person or cash or any other property, or (ii) 50% or more of the Company's consolidated assets or Earning Power (as defined in the Rights Agreement) is sold, then proper provision will be made so that each holder of a Right will thereafter have the right to receive, upon the exercise thereof at the then current exercise price of the Right, that number of shares of Common Stock of the acquiring company which at the time of such transaction will have a market value of two times the exercise price of the Right.

#### *Redemption*

At any time prior to the earlier to occur of (i) the Close of Business on the tenth (10<sup>th</sup>) day following the Stock Acquisition Date (as defined in the Rights Agreement) (or, if the tenth day following the Stock Acquisition Date occurs before the Record Date, the Close of Business on the Record Date) and (ii) the Final Expiration Date,



the Board of Directors may redeem the Rights in whole, but not in part, at a price of \$0.0001 per Right (the “Redemption Price”). The redemption of the Rights may be made effective at such time, on such basis and with such conditions as the Board of Directors in its sole discretion may establish. Immediately upon any redemption of the Rights, the right to exercise the Rights will terminate and the only right of the holders of Rights will be to receive the Redemption Price.

*Amendment*

The terms of the Rights may be amended by the Board of Directors without the consent of the holders of the Rights, except that from and after such time as any Person becomes an Acquiring Person no such amendment may adversely affect the interests of the holders of the Rights (other than the Acquiring Person and its Affiliates and Associates).

*Preferred Share Rights*

Each one-thousandth of a share of preferred stock will entitle the holder thereof to the same dividends and liquidation rights as if the holder held one share of Common Stock and will be treated the same as Common Stock in the event of a merger, consolidation or other share exchange.

**THE BOARD OF DIRECTORS RECOMMENDS THAT YOU VOTE “FOR” APPROVING THE COMPANY’S ENTRY INTO THE RIGHTS AGREEMENT AND OUR DISTRIBUTION OF THE RIGHTS**

**PROPOSAL 4**  
**TO APPROVE, BY NON-BINDING VOTE, THE COMPENSATION OF OUR NAMED EXECUTIVE OFFICERS**

Pursuant to the Dodd-Frank Act, we are asking our shareholders to provide advisory approval of the compensation of our Named Executive Officers, as we have described it in the “Compensation Discussion and Analysis” section of this proxy statement beginning on page 12. While this vote is advisory, and not binding on the Company, it will provide information to our Compensation Committee regarding investor sentiment about our executive compensation philosophy, policies, and practices which the Compensation Committee will be able to consider when determining executive compensation for future years. For the reasons stated below, we are requesting your approval of the following non-binding resolution:

**“RESOLVED, that the compensation paid to the Company’s Named Executive Officers, as disclosed pursuant to Item 402 of Regulation S-K, including the Compensation Discussion and Analysis, compensation tables and narrative discussion is hereby APPROVED.”**

The compensation of our Named Executive Officers and our compensation philosophy policies are comprehensively described in the Compensation Discussion and Analysis, and its accompanying tables (including all footnotes).

The Compensation Committee designs our compensation policies for our Named Executive Officers to create executive compensation arrangements that are competitive, align pay with creating shareholder value and balance compensation risk appropriately in the context of the Company’s business strategy. Based on its review of the total compensation of our Named Executive Officers for fiscal year 2019, the Compensation Committee believes that the total compensation for each of the Named Executive Officers is reasonable and effectively achieves the designed objectives of driving Company performance, attracting, retaining and motivating our people, aligning our executives with shareholders’ long-term interests, and discouraging excessive risk taking.

Neither the approval nor the disapproval of this resolution will be binding on us or the Board of Directors or will be construed as overruling a decision by us or the Board of Directors. Neither the approval nor the disapproval of this resolution will create or imply any change to our fiduciary duties or create or imply any additional fiduciary duties for us or the Board of Directors.

**THE BOARD OF DIRECTORS RECOMMENDS THAT YOU VOTE “FOR” APPROVING THE COMPENSATION OF OUR NAMED EXECUTIVE OFFICERS**

**RELATED PARTY TRANSACTIONS**

The Company has an operating policy the purpose of which is to ensure that contracts with entities in which any director, officer, or other member of management has a financial interest are competitively priced and commercially reasonable. Under the policy, any such contract must be reviewed and approved in advance by the Audit Committee. To the extent that anyone on the Audit Committee is the person with a financial interest, the Chief Executive Officer and Chief Financial Officer of the Company will obtain independent assessment of the commercial reasonableness of the contract when considered necessary.

On January 20, 2018, the Company entered into a four-year consulting agreement with DEMA Associates, LLC, for \$390,000 per year. In fiscal 2019, we incurred expenses for services provided by this entity of \$400,000.

Dr. Frank Lee is related to an individual in a position of authority at one of our largest customers. We recorded revenue from this customer of \$87 million in fiscal 2019. As of October 31, 2019, we had accounts receivable of \$22.2 million from this customer.

We believe that the terms of our transactions with the related parties described above were negotiated at arm’s length and were no less favorable to us than terms we could have obtained from unrelated third parties.

## **SOLICITATION OF PROXIES AND COSTS THEREOF**

We will bear the costs of solicitation of proxies. We have engaged The Proxy Advisory Group, LLC<sup>®</sup> to assist us with the solicitation of proxies and provide related advice and informational support for a services fee and the reimbursement of customary disbursements both of which are not expected to exceed \$20,000 in the aggregate. In addition to solicitations by mail, The Proxy Advisory Group, LLC and certain of our officers may solicit proxies by telephone, email and personal interviews without additional remuneration. We will request brokers, custodians, and fiduciaries to forward proxy solicitation material to the owners of shares of our common stock that they hold in their names. We will reimburse banks and brokers for their reasonable out-of-pocket expenses incurred in connection with the distribution of our proxy materials.

As of the date of this proxy statement, the Board of Directors knows of no matters which will be presented for consideration at the Annual Meeting of Shareholders other than the proposals set forth in this Proxy Statement. If any other matters properly come before the Annual Meeting of Shareholders the persons named in the proxy will act in respect thereof in accordance with their best judgment.

## **DELINQUENT SECTION 16(A) REPORTS**

Section 16(a) of the Securities Exchange Act of 1934, as amended, requires the Company's executive officers and directors and persons who beneficially own more than ten percent of a registered class of the Company's equity securities to file an initial report of beneficial ownership on Form 3 and changes in beneficial ownership on Form 4 or 5 with the SEC. Executive officers, directors and greater than ten percent shareholders are also required by SEC rules to furnish the Company with copies of all Section 16(a) forms they file. Based solely on its review of the copies of such forms received by it, or written representations from certain reporting persons, the Company believes that during the last fiscal year, all filing requirements applicable to its executive officers, directors, and ten percent shareholders were timely except for one late Form 4 filing for the transaction for Mary Paladino that occurred on November 1, 2019 that was filed on November 7, 2019.

## **FORM 10-K AND ADDITIONAL INFORMATION**

The Company's annual report filed with the SEC on Form 10-K for the year ended October 31, 2019, which includes audited financial statements and financial statement schedules, will be furnished, free of charge, upon written request directed to the Secretary, Photonics, Inc., 15 Secor Road, Brookfield, Connecticut 06804 (203-775-9000). It can also be accessed on our web site at <https://photonicsinc.gcs-web.com/financial-information/annual-reports>.

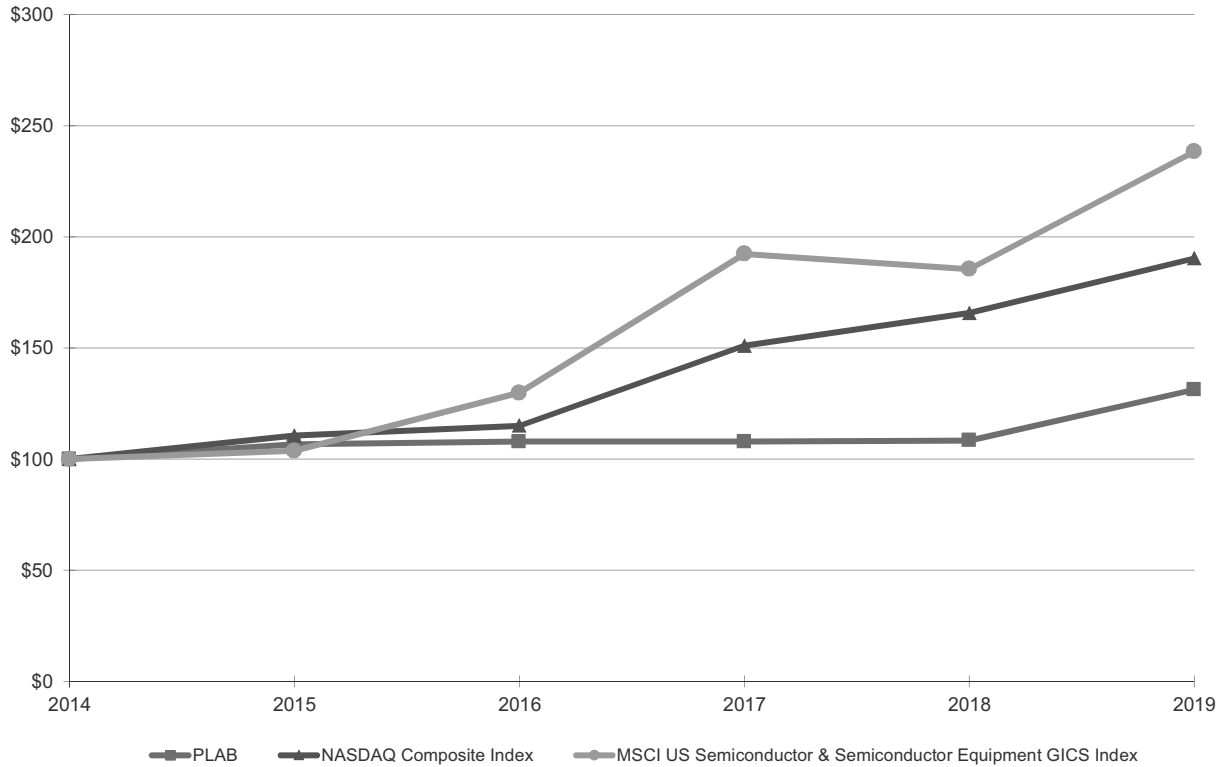
## **MULTIPLE SHAREHOLDERS SHARING THE SAME ADDRESS**

The Company has adopted a procedure approved by the SEC called "householding" which will reduce our printing costs and postage fees. Under this procedure, multiple shareholders residing at the same address will receive a single copy of the annual report and proxy statement unless the shareholder notifies the Company that they wish to receive individual copies. Shareholders may revoke their consent to householding at any time by contacting Broadridge Financial Services, Inc. either by calling toll-free at (800) 542-1061, or by writing to Broadridge, Household Department, 51 Mercedes Way, Edgewood, New York, 11717. The Company will remove you from the householding program within 30 days of receipt of your response, following which you will receive an individual copy of our disclosure document.

## SHAREHOLDER PROPOSALS

Under Rule 14a-8 shareholder proposals intended for inclusion in the Company's proxy statement for the 2021 Annual Meeting of Shareholders must be received by the Company no less than 120 calendar days before the date of the Company's proxy statement released to shareholders in connection with the previous year's annual meeting (March 16, 2020) and must meet certain requirements of applicable laws and regulations in order to be considered for possible inclusion in the proxy statement for that meeting. Proposals may be mailed to Photonics, Inc. to the attention of the Secretary, 15 Secor Road, Brookfield, Connecticut 06804. A nomination by a qualifying shareholder may be made only pursuant to timely notice (in the same time frame as a shareholder proposal) in proper written form to the Secretary.

## PERFORMANCE GRAPH



**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**  
Washington, D.C. 20549

**FORM 10-K**

**ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended October 31, 2019

**OR**

**TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from \_\_\_\_ to \_\_\_\_

**Commission file number 0-15451**



**PHOTRONICS, INC.**

*(Exact name of registrant as specified in its charter)*

**Connecticut**

*(State or other jurisdiction of incorporation or organization)*

**06-0854886**

*(IRS Employer Identification No.)*

**15 Secor Road, Brookfield, Connecticut 06804**

*(Address of principal executive offices)(Zip Code)*

**(203) 775-9000**

*(Registrant's telephone number, including area code)*

*Securities registered pursuant to Section 12(b) of the Act:*

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
COMMON	PLAB	NASDAQ Global Select Market
PREFERRED STOCK PURCHASE RIGHTS	N/A	N/A

*Securities registered pursuant to Section 12(g) of the Act:*

**None**

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes  No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.

Yes  No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes  No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).

Yes  No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or a smaller reporting company. See definition of "accelerated filer," "large accelerated filer," "smaller reporting company", and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large Accelerated Filer	<input checked="" type="checkbox"/>	Accelerated Filer	<input type="checkbox"/>
Non-Accelerated Filer	<input type="checkbox"/>	Smaller Reporting Company	<input type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes  No

As of April 28, 2019, which was the last business day of the registrant's most recently completed second fiscal quarter, the aggregate market value of the shares of the registrant's common stock held by non-affiliates was approximately \$617,084,612 (based upon the closing price of \$9.43 per share as reported by the NASDAQ Global Select Market on that date).

As of December 13, 2019, 65,416,365 shares of the registrant's common stock were outstanding.

**DOCUMENTS INCORPORATED BY REFERENCE**

Proxy Statement for the 2020  
Annual Meeting of Shareholders  
to be held on March 16, 2020

Incorporated into Part III  
of this Form 10-K

## Forward-Looking Statements

The Private Securities Litigation Reform Act of 1995 provides a “safe harbor” for forward-looking statements made by or on behalf of Photronics, Inc. (“Photronics”, the “Company”, “we”, “our”, or “us”). These statements are based on management’s beliefs, as well as assumptions made by, and information currently available to, management. Forward-looking statements may be identified by words like “expect,” “anticipate,” “believe,” “plan,” “project,” “could,” “estimate,” “intend,” “may,” “will” , “in our view” and similar expressions, or the negative of such terms, or other comparable terminology. All forward-looking statements involve risks and uncertainties that are difficult to predict. In particular, any statement contained in this annual report on Form 10-K or in other documents filed with the Securities and Exchange Commission in press releases or in the Company’s communications and discussions with investors and analysts in the normal course of business through meetings, phone calls, or conference calls regarding, among other things, the consummation and benefits of transactions, joint ventures, business combinations, divestitures and acquisitions, expectations with respect to future sales, financial performance, operating efficiencies, or product expansion, are subject to known and unknown risks, uncertainties, and contingencies, many of which are beyond the control of the Company. Various factors may cause actual results, performance, or achievements to differ materially from anticipated results, performance, or achievements expressed or implied by forward-looking statements. Factors that might affect forward-looking statements include, but are not limited to, overall economic and business conditions; economic and political conditions in international markets; the demand for the Company’s products; competitive factors in the industries and geographic markets in which the Company competes; the timing of orders received from customers; the gain or loss of significant customers; competition from other manufacturers; changes in accounting standards; federal, state and international tax requirements (including tax rate changes, new tax laws and revised tax law interpretations); changes in the jurisdictional mix of our earnings and changes in tax laws and rates; interest rate and other capital market conditions, including changes in the market price of the Company’s securities; foreign currency exchange rate fluctuations; changes in technology; technology or intellectual property infringement, including cybersecurity breaches, and other innovation risks; unsuccessful or unproductive research and development or capital expenditures; the timing, impact, and other uncertainties related to transactions and acquisitions, divestitures, business combinations, and joint ventures as well as decisions the Company may make in the future regarding the Company’s business, capital and organizational structures and other matters; the seasonal and cyclical nature of the semiconductor and flat panel display industries; management changes; changes in laws and government regulation impacting our operations or our products, including laws relating to export controls and import laws, rules and tariffs; the occurrence of regulatory proceedings, claims or litigation; damage or destruction to the Company’s facilities, or the facilities of its customers or suppliers, by natural disasters, labor strikes, political unrest, or terrorist activity; the ability of the Company to (i) place new equipment in service on a timely basis; (ii) obtain additional financing; (iii) achieve anticipated synergies and cost savings; (iv) fully utilize its tools; (v) achieve desired yields, pricing, product mix, and market acceptance of its products and (vi) obtain necessary import and export licenses. Any forward-looking statements should be considered in light of these factors. Accordingly, there is no assurance that the Company’s expectations will be realized. The Company does not assume responsibility for the accuracy and completeness of the forward-looking statements and does not assume an obligation to provide revisions to any forward-looking statements, except as otherwise required by securities and other applicable laws.

## PART I

### ITEM 1. BUSINESS

#### General

Photronics, Inc. (and its subsidiaries, collectively referred to herein as “Photronics”, the “Company”, “we”, “our”, or “us”) is one of the world’s leading manufacturers of photomasks, which are high precision photographic quartz or glass plates containing microscopic images of electronic circuits. Photomasks are a key element in the manufacture of semiconductors and flat-panel displays (“FPDs”), and are used as masters to transfer circuit patterns onto semiconductor wafers and FPD substrates during the fabrication of integrated circuits (“ICs” or “semiconductors”), and a variety of FPDs and, to a lesser extent, other types of electrical and optical components. We currently have eleven manufacturing facilities, which are located in Taiwan (3), Korea, the United States (3), Europe (2), and two recently constructed facilities in China. Our FPD Facility in Hefei, China, and our IC facility in Xiamen, China, commenced production in the second and third quarters of our fiscal 2019, respectively.

Photronics is a Connecticut corporation, organized in 1969. Our principal executive offices are located at 15 Secor Road, Brookfield, Connecticut 06804, telephone (203) 775-9000. Our website address is <http://www.photronics.com>. We make available, free of charge through our website, our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and any amendments to these reports as soon as reasonably practicable after such materials are electronically filed with, or furnished to, the Securities and Exchange Commission (“SEC”). The information found on, or incorporated into, our website is not part of this or any other report we file with, or furnish to, the SEC. The SEC also maintains a website at <http://www.sec.gov> that contains reports, proxy statements and other information regarding SEC registrants, including Photronics.

#### Products and Manufacturing Technology

We manufacture photomasks, which are used as masters to transfer circuit patterns onto semiconductor wafers and FPD substrates. Photomasks are manufactured in accordance with circuit designs provided to us on a confidential basis by our customers. IC and FPD photomask sets are manufactured in layers, each having a distinct pattern which is etched onto a different photomask. The resulting series of photomasks is then used to image the circuit patterns onto each successive layer of a semiconductor wafer or FPD substrate. The typical manufacturing process for a photomask involves the receipt and conversion of circuit design data to manufacturing pattern data. A lithography system then exposes the circuit pattern onto the photomask blank. The exposed areas are developed and etched to produce that pattern on the photomask. The photomask is then inspected for defects and conformity to the customer’s design data. After any defects are repaired, the photomask is cleaned, any required pellicles (protective translucent cellulose membranes) are applied and, after final inspection, the photomask is shipped to the customer.

We currently support customers across the full spectrum of IC production and FPD technologies by manufacturing photomasks using electron beam or optical (laser-based) systems, which are the predominant technologies used for photomask manufacturing, and are capable of producing the finer line resolution, tighter overlay, and larger IC chip size for the more complex circuits currently being designed. Electron beam and laser-generated photomasks can be used to produce the most advanced semiconductors and FPD photomasks for use in an array of products. However, in the case of IC production, the large majority of higher-cost critical layer photomasks are fabricated using electron beam technologies, while photomasks produced using laser-based systems are used for all FPD photomasks and less critical IC photomasks. End markets served with IC photomasks include devices used for microprocessors, memory, telecommunications, and related applications. We currently own a number of both high-end and mature electron beam and laser-based systems.

The first several layers of photomasks are sometimes required to be delivered by us within 24 hours from the time we receive the customers’ design data. The ability to manufacture high-quality photomasks within short time periods is dependent upon robust processes, efficient manufacturing methods, high production yield, available manufacturing capacity, and high equipment reliability. We work to meet these requirements by making significant investments in research and development, capital equipment, manufacturing and data processing systems, and by utilizing statistical process control methods to optimize our manufacturing processes and reduce cycle times.



Quality control is an integral part of the photomask manufacturing process. Photomasks are manufactured in temperature, humidity, and particulate-controlled clean rooms because of the high level of precision, quality and manufacturing yield required. Each photomask is inspected several times during the manufacturing process to ensure compliance with customer specifications. We continue to make substantial investments in equipment to produce, inspect and repair photomasks to ensure that customer specifications are met.

The majority of IC photomasks produced for the semiconductor industry employ geometries larger than 28 nanometers. At these geometries, we can produce full lines of photomasks, and there is no significant technology employed by our commercial competitors that is not also available to us. We are also capable of producing full lines of photomasks for high-end IC and FPD applications. In the case of ICs, this includes photomasks at and below the 28 nanometer technology node and, for FPDs, at and above the Generation 8 technology node and active-matrix organic light-emitting diode (AMOLED) display screens. We hold customer-qualified manufacturing capability and own, or have access to, technology that enables us to compete in the high-end markets that serve IC and FPD applications.

## **Sales and Marketing**

The market for photomasks primarily consists of domestic and non-US semiconductor and FPD manufacturers and designers. Photomasks are manufactured by independent merchant manufacturers like Photronics, and by semiconductor and FPD manufacturers that produce photomasks for their own use (captive manufacturers). In some instances, captive manufacturers also sell to other semiconductor or FPD manufacturers. Previously, there was a trend towards the divestiture or closing of captive photomask operations by semiconductor manufacturers, and an increase in the share of the market served by independent manufacturers. This trend was driven by the increased complexity and cost of capital equipment used in manufacturing photomasks and the lack of economy of scale for many semiconductor and FPD manufacturers to effectively utilize the equipment. However, more recently, some captive mask facilities have been investing at faster rates than independent manufacturers to reach certain roadmap milestones, particularly in the foundry logic and memory spaces. Nevertheless, most captive manufacturers maintain business and technology relationships with independent photomask manufacturers for ongoing support.

Generally, Photronics and each of its customers engage in a qualification and correlation process before we become an approved supplier. Thereafter, based on the customer's expectations, we typically negotiate pricing parameters for the customer's order. Some prices may remain in effect for an extended period of time. In many instances, we enter into sales arrangements with an understanding that, as long as our performance is competitive, we will receive a specified percentage of that customer's photomask requirements.

We conduct our sales and marketing activities primarily through a staff of full-time sales personnel and customer service representatives who work closely with the Company's management and technical personnel. We support non-US customers through both our domestic and foreign facilities and consider our presence in non-US markets to be an important factor in attracting new customers, as it provides global solutions to our customers, minimizes delivery time, and allows us to serve customers that utilize manufacturing foundries outside of the United States, principally in Asia. See Notes 7 and 14 to our consolidated financial statements for the amount of revenue and long-lived assets attributable to each of our geographic areas of operations.

## **Customers**

We sell our products primarily to leading semiconductor and FPD manufacturers. During fiscal year 2019, we sold our products to approximately 550 customers. Revenue from Samsung Electronics Co. Ltd. accounted for approximately 16% of our total revenues in fiscal years 2019, 2018 and 2017, and revenue from United Microelectronics Corp. Co. Ltd. accounted for approximately 15%, 15% and 16% of our total revenues in fiscal years 2019, 2018 and 2017, respectively. Our five largest customers, in the aggregate, accounted for approximately 46%, 47% and 43% of our revenue in fiscal years 2019, 2018 and 2017, respectively. A significant decrease in the amount of revenue from any of these customers could have a material adverse effect on our financial performance and business prospects.

## **Seasonality**

Our business is typically impacted during the first, and sometimes the second, quarter of our fiscal year by the North American, European, and Asian holiday periods, as some customers reduce their development and buying activities during those periods.

## **Research and Development**

We primarily conduct research and development activities for IC photomasks at our U.S. nanoFab, which is located in Boise, Idaho, as well as at PK, Ltd. (“PKL”), our subsidiary in Korea and Photronics DNP Mask Corporation (“PDMC”), one of our joint venture subsidiaries in Taiwan. Research and development for FPD photomasks is primarily conducted at PKL. Additionally, we conduct site-specific research and development programs to support strategic customers. These research and development programs and activities are undertaken to advance our competitiveness in technology and manufacturing efficiency. We also conduct application-oriented research and development activities to support the early adoption of new photomask or supporting data and services technology into our customers’ applications. Currently, research and development photomask activities for ICs are primarily focused on photomasks with wafer geometrics of 20 nanometer node and smaller and, for FPDs, on Generations 8 and 10.5+ substrate-size photomask process enhancements and photomask technology for complex FPD photomasks used in the manufacture of advanced mobile displays, such as AMOLED. We believe these core competencies will continue to be a critical part of semiconductor and FPD manufacturing, as optical lithography continues to scale capabilities on high-end devices. We incurred research and development expenses of \$16.4 million, \$14.5 million, and \$15.9 million in fiscal years 2019, 2018, and 2017, respectively. It is our belief that we own, control, or license the proprietary information, including trade secrets and patents that is necessary for our business, as it is presently conducted. We also believe that our intellectual property and trade secret know-how will continue to be important to our maintaining technical leadership in the field of photomasks.

## **Intellectual Property Rights**

We have developed and hold ownership interests in intellectual property (“IP”) rights, in the forms of patents issued in the U.S., and other trademark and trademark registrations in the U.S. and other countries. Patents in which we hold ownership interests generally relate to the manufacture of photomasks or the use of photomasks to manufacture other products. While we believe that our IP rights are, and will continue to be, important to our technical leadership in the field of photomasks, our operations are not dependent on any one individual IP right. In addition to patenting, when practicable, our IP rights, we further protect them, and our other proprietary processes, by utilizing non-disclosure agreements with employees, customers, and vendors.

## **Materials, Supplies and Equipment**

Raw materials used by Photronics generally include: high precision quartz plates (including large area plates), which are used as photomask blanks and are primarily obtained from Japanese and Korean suppliers; pellicles and electronic grade chemicals, which are used in the manufacturing process; and compacts, which are durable plastic containers in which photomasks are shipped. These materials are generally sourced from several suppliers. We believe that our utilization of a select group of strategic suppliers enables us to access the most technologically advanced materials available. On an ongoing basis, we continue to consider additional supply sources.

We rely on a limited number of equipment suppliers to develop and supply the equipment used in the photomask manufacturing process. Although, historically, we have been able to obtain equipment on a timely basis, an inability to obtain equipment when required could adversely affect our business and results of operations.

## **Backlog**

The first several layers of a set of photomasks for a circuit pattern are often required to be shipped within 24 hours of receiving a customer’s designs. Because of the short period between order and shipment dates (typically from 1 day to 2 weeks) for a significant amount of our revenue, the dollar amount of our current backlog is not a reliable indicator of future revenue.

## **International Operations**

Revenues from our non-U.S. operations were approximately 81%, 79% and 77% of our total revenues in fiscal 2019, 2018 and 2017, respectively. We believe that our ability to serve non-US markets is enhanced by our having, among other things, a local presence in the markets that we serve. This requires significant investments in financial, managerial, operational, and other resources.

Operations outside of the United States are subject to inherent risks, including fluctuations in exchange rates, political and economic conditions in various countries, legal compliance and regulatory requirements, tariffs and

other trade barriers, difficulties in staffing and managing international operations, longer accounts receivable collection cycles, potential restrictions on transfers of funds, and potentially adverse tax consequences. These factors may have a material adverse effect on our ability to generate revenue outside of the United States and to deploy resources where they could otherwise be used to their greatest advantage and, consequently, may adversely affect our financial condition and results of operations. Notes 7 and 14 of our consolidated financial statements, respectively, present revenue and long-lived assets by geographic area.

## **Competition**

The photomask industry is highly competitive, and most of our customers utilize multiple photomask suppliers. Our ability to compete depends primarily upon the consistency of our product quality, timeliness of delivery, competitive pricing, technical capability, and service, which we believe are the principal factors considered by customers in selecting their photomask suppliers. An inability to meet these requirements could adversely affect our financial condition, results of operations, and cash flows. We also believe that geographic proximity to customers is an important factor in certain markets where cycle time from order to delivery is critical. While some of our competitors may have greater financial, technical, sales, marketing, or other resources than Photronics, we believe that we are able to compete effectively because of our dedication to customer service, investments in state-of-the-art photomask equipment and facilities, and experienced technical employees.

We estimate that, for the types of photomasks we manufacture (IC and FPD), the size of the total market (captive and merchant) is approximately \$5.0 billion. Our competitors include Compugraphics International, Ltd., Dai Nippon Printing Co., Ltd (outside of Taiwan and China), Hoya Corporation, LG Innotek Co., Ltd., Shenzhen New Way Photomask Making Co., Ltd., SK-Electronics Co. Ltd., Supermask Co. Ltd., Taiwan Mask Corporation, and Toppan Printing Co., Ltd. We also compete with semiconductor and FPD manufacturers' captive photomask manufacturing operations that supply photomasks for internal use and, in some instances, also for external customers and foundries. We expect to face continued competition which, in the past, has led to pressure to reduce prices. We believe the pressure to reduce prices, together with the significant investment required in capital equipment to manufacture high-end photomasks, has contributed to the decrease in the number of independent manufacturers; we expect such pressure to continue in the future.

## **Employees**

As of October 31, 2019, we had approximately 1,775 employees. We believe we offer competitive compensation and other benefits, and that our employee relations are good.

## **ITEM 1A. RISK FACTORS**

### **Technology failures or cyber security breaches could have a material adverse effect on our operations.**

We rely on information technology systems to process, transmit, store, and protect electronic information. For example, a significant portion of the communications between our personnel, customers, and suppliers depends on information technology. Our information technology systems may be vulnerable to a variety of interruptions due to events beyond our control, including, but not limited to, natural disasters, terrorist attacks, telecommunications failures, computer viruses, hackers, and other security issues. Although we have technology and information security processes and disaster recovery plans in place to mitigate our risks to these vulnerabilities, these measures may not be adequate to ensure that our operations will not be disrupted, should such an event occur.

The General Data Protection Regulation (GDPR), which went into effect in the European Union (EU) on May 25, 2018, applies to the collection, use, retention, security, processing, and transfer of personally identifiable information of residents of EU countries. The GDPR created a range of new compliance obligations, and imposes significant fines and sanctions for violations. It is possible that the GDPR may be interpreted or applied in a manner that is adverse to, or unforeseen by us, including requirements that are inconsistent with our practices, or that we may otherwise fail to construe its requirements in ways that are satisfactory to the EU authorities.

Any failure, or perceived failure, by us to comply with the GDPR, or with any applicable regulatory requirements or orders, including but not limited to privacy, data protection, information security, or consumer protection related privacy laws and regulations, in one or more jurisdictions within the EU or elsewhere, could: result in proceedings or actions against us by governmental entities or individuals; subject us to significant fines, penalties, and/or judgments; require us to change our business practices; limit access to our products and services in certain countries, or otherwise adversely affect our business, as we would be at risk to lose both customers and revenue, and incur substantial costs.

**The risk of loss of the Company’s intellectual property, trade secrets or other sensitive business or customer confidential information or disruption of operations due to breaches of cybersecurity could negatively impact the Company’s financial results.**

Cyberattacks or security breaches could compromise confidential, business-critical information, cause disruptions in the Company’s operations, or harm the Company’s reputation. The Company has important assets, including intellectual property, trade secrets, and other sensitive, business-critical and/or confidential information which may be vulnerable to such incidents. While the Company has a comprehensive cybersecurity program that is continuously reviewed, maintained, and upgraded, a significant cyberattack could result in the loss of vital business or confidential information and/or could negatively impact operations, which could have a negative impact on the Company’s financial results.

**Our dependency on the microelectronics industry, which as a whole is volatile, could create volatility in our demand and have a negative material impact on our business.**

We sell substantially all of our photomasks to semiconductor or FPD designers, manufacturers and foundries, as well as to other high performance electronics manufacturers. We believe that the demand for photomasks depends primarily on design activity rather than sales volume from products using photomask technologies. Consequently, an increase in semiconductor or FPD sales does not necessarily result in a corresponding increase in photomask sales. In addition, the reduced use of customized ICs, a reduction in design complexity, other changes in the technology or methods of manufacturing or designing semiconductors or FPDs, or a slowdown in the introduction of new semiconductor or FPD designs could reduce demand for photomasks — even if the demand for semiconductors and FPDs increases. Historically, the microelectronics industry has been volatile, with sharp periodic downturns and slowdowns. These downturns have been characterized by, among other things, diminished product demand, excess production capacity, and accelerated erosion of selling prices with a concomitant effect on revenue and profitability.

**We may, in the future, incur net losses.**

Although we have been profitable since fiscal 2010, we have, in the past, incurred net losses. We cannot provide assurance that we will not incur net losses in the future.

**We have a high level of fixed costs.**

As a consequence of the capital-intensive nature of the photomask manufacturing business, we have a high level of fixed costs and a high degree of operating leverage. Accordingly, should our sales volumes decline as a result of a decrease in design releases from our customers or for any other reason, we may have excess or underutilized production capacity which could significantly impact our operating margins or result in write-offs from asset impairments.

**Our quarterly operating results fluctuate significantly, and may continue to do so in the future.**

We have experienced fluctuations in our quarterly operating results, and we anticipate that such fluctuations will continue and could intensify in the future. Fluctuations in operating results may result in volatility in the prices of our common stock and financial instruments linked to its value. Operating results may fluctuate as a result of many factors, including the size and timing of orders and shipments, the loss of significant customers, changes in product mix, the flow of customer design releases, technological change, fluctuations in manufacturing yields, the actions of our competitors, and general economic conditions. We operate in a high fixed-cost environment and, should our revenues and asset utilization decrease, our operating margins could be negatively impacted.

Our customers generally order photomasks on an as-needed basis; thus our revenue in any quarter is dependent primarily on orders received during that quarter. Since we operate with little backlog, and the rate of new orders may vary significantly from quarter to quarter, our capital expenditures and, to some extent, expense levels are based primarily on sales forecasts and technological advancements in photomask manufacturing equipment. Consequently, if anticipated revenues in any quarter do not occur when expected, capital expenditures could be higher than needed, resulting in underutilized capacity and disproportionately high expense levels, causing operating results to be adversely affected. Due to the foregoing factors, we believe that quarter-to-quarter comparisons of our operating results cannot be relied upon as indicators of future performance. In addition, in future quarters, our operating results could be below guidance we may provide or the expectations of public market analysts and investors, which could have a material adverse effect on the market price of our common stock.

**The photomask industry is subject to rapid technological change, and we might fail to remain competitive, which could have a material adverse effect on our business and results of operations.**

The photomask industry has been, and is expected to continue to be, characterized by technological change and evolving industry standards. In order to remain competitive, we will be required to continually anticipate, respond to, and utilize changing technologies of increasing complexity in both traditional and emerging markets that we serve. In particular, we believe that, as semiconductor geometries continue to become smaller and FPDs become larger or otherwise more advanced, we will be required to manufacture increasingly complex photomasks. Additionally, the demand for photomasks has been, and could in the future be, adversely affected by changes in semiconductor and high-performance electronics fabrication methods that affect the type or quantity of photomasks utilized, such as changes in semiconductor demand that favor field-programmable gate arrays and other semiconductor designs that replace application-specific ICs. Furthermore, evidence of the viability and the corresponding market acceptance of alternative methods of transferring IC designs onto semiconductor wafers could reduce or eliminate the need for photomasks in the production of semiconductors. As of the end of fiscal 2019, one alternative method, direct-write lithography, has not been proven to be a commercially-viable alternative to photomasks, as it is considered to be too slow for high-volume semiconductor wafer production. However, should direct-write or any other alternative method of transferring IC or FPD designs without the use of photomasks achieve market acceptance, and if we are unable to anticipate, respond to, or utilize these or other technological changes, due to resource, technological, or other constraints, our business and results of operations could be materially adversely affected.

**Our operations will continue to require substantial capital expenditures, for which we may be unable to provide or obtain funding.**

The manufacture of leading-edge photomasks requires us to make substantial investments in high-end manufacturing capability. We expect that we will be required to continue to make substantial capital expenditures to meet the technological demands of our customers and to position us for future growth. Our capital expenditure payments for fiscal 2020 are expected to be approximately \$100 million, of which approximately \$14 million was included in accounts payable on our October 31, 2019 consolidated balance sheet. We cannot provide assurance that we will be able to obtain the additional capital required to fund our operations or capital expenditures on reasonable terms, if at all, or that any such inability will not have a material adverse effect on our business and results of operations.

**We have been dependent on sales to a limited number of large customers; the loss of any of these customers or a significant reduction in orders from these customers could have a material adverse effect on our revenues and results of operations.**

Historically, we have sold a significant proportion of photomasks to a limited number of IC and FPD manufacturers. During fiscal years 2019, 2018 and 2017, our two largest customers accounted for 31%, 31% and 32%, respectively, of our revenue. Our five largest customers accounted for 46%, 47% and 43% of our revenue in fiscal years 2019, 2018 and 2017, respectively. The loss of a significant customer, a significant reduction or delay in orders from any significant customer (including reductions or delays due to customer departures from recent buying patterns), or an unfavorable change in competitive conditions in the semiconductor or FPD industries could have a material adverse effect on our financial performance and business prospects. The consolidation of semiconductor manufacturers, or an economic downturn in the semiconductor industry, may increase the likelihood of losing a significant customer and could also have an adverse effect on our financial performance and business prospects.

**We depend on a limited number of suppliers for equipment and raw materials and, if those suppliers fail to timely deliver their products to us, we may be unable to fulfill orders from our customers, which could adversely affect our business and results of operations.**

We rely on a limited number of photomask equipment manufacturers to develop and supply the equipment we use. These equipment manufacturers currently require lead times of twelve months or longer between the order date and the delivery of certain photomask imaging and inspection equipment. The failure of our suppliers to develop or deliver such equipment on a timely basis could have a material adverse effect on our business and results of operations. In addition, the manufacturing equipment necessary to produce advanced photomasks could become prohibitively expensive, which could similarly affect us.

We use high-precision quartz photomask blanks, pellicles, and electronic grade chemicals in our manufacturing processes. There are a limited number of suppliers of these raw materials, and we do not have long-term contracts



with these suppliers. Any delays or quality problems in connection with significant raw materials, particularly photomask blanks, could cause delays in the shipments of photomasks, which could have a material adverse effect on our business and results of operations. The fluctuation of foreign currency exchange rates, with respect to prices of equipment and raw materials used in manufacturing, could also have a material adverse effect on our business and results of operations.

**We face risks associated with the use of sophisticated equipment and complex manufacturing processes and technologies. Our inability to effectively utilize such equipment and technologies and perform such processes could have a material adverse effect on our business and results of operations.**

Our complex manufacturing processes require the use of expensive and technologically sophisticated equipment and materials, and are continually modified in an effort to improve manufacturing yields and product quality. Minute impurities, defects, or other difficulties in the manufacturing process can lower manufacturing yields and render products unmarketable. Moreover, the manufacture of leading-edge photomasks is more complex and time consuming than manufacturing less advanced photomasks, and their fabrication may result in delays in the manufacture of all levels of photomasks. We have, on occasion, experienced manufacturing difficulties and capacity limitations that have delayed our ability to deliver products within the time frames contracted for by our customers. We cannot provide assurance that we will not experience these or other manufacturing difficulties, or be subject to increased costs, which could result in a loss of customers or otherwise have a material adverse effect on our business and results of operations.

**We could be subject to damages based on claims brought against us by our customers, or lose customers as a result of the failure of our products to meet certain quality specifications.**

Our products provide important performance attributes to our customers' products. If a product fails to perform in a manner consistent with quality specifications, or has a shorter useful life than warranted, a customer could seek replacement of the product or damages for costs incurred as a result of the product failing to perform, particularly if such products are sold under agreements that contain limited performance and life cycle warranties. Our customers often require us to represent that our products conform to certain product specifications that they provide. Any failure to comply with such specifications could result in claims or legal action. A successful claim, or series of claims, against us could have a material adverse effect on our financial condition and results of operations, and could result in a loss of one or more customers.

**Our credit facility restricts our business activities, limits our ability to obtain additional financing, pay cash dividends, and may obligate us to repay debt before its maturity.**

Financial covenants related to our credit facility, which expires in September 2023, include a total leverage ratio, a minimum interest coverage ratio, and minimum unrestricted cash balances. Our credit facility may also limit our flexibility in planning for, or reacting to, changes in our business and industry, which may place us at a competitive disadvantage compared with our competitors. We are also subject to covenants that limit our operating flexibility, such as a limit on the amount of shares we can repurchase of our common stock. Existing covenant restrictions limit our ability to obtain additional debt financing, and limit the amount of dividends, distributions, and redemptions we can pay on our common stock in 2019 to an aggregate amount of \$100 million and \$50 million annually thereafter. Should we be unable to meet one or more of these covenants, our lenders may require us to repay any outstanding balance prior to the expiration date of the agreement. Our ability to comply with the financial and other covenants in our credit agreement may be affected by deteriorating economic or business conditions, or other events. We cannot assure that, under such circumstances, additional sources of financing would be available to fund operating requirements or repay any long-term borrowings, so as to avoid default.

**Joint ventures may not operate according to their business plans if our partners fail to fulfill their obligations, which may adversely affect our results of operations and compel us to dedicate additional resources to these joint ventures.**

The nature of a joint venture requires us to share control in certain areas with unaffiliated third parties. If our joint venture partner does not fulfill its obligations, the affected joint venture may not be able to operate in accordance with its business plan. Under such a scenario, our results of operations may be adversely affected and we may be compelled to increase the level of our resources devoted to the joint venture. Also, differing views among joint venture participants may result in delayed decisions, or failures to agree on major issues. If such differences caused a joint venture to deviate from its business plan, our results of operations could be adversely affected.



**We may not be able to consummate future acquisitions or joint ventures or integrate acquisitions into our business, which could result in unanticipated expenses and losses.**

As part of our business growth strategy, we have acquired businesses and entered into joint ventures in the past, and we may pursue acquisitions and joint venture opportunities in the future. Future efforts to grow the Company may include expanding into new or related markets or industries. Our ability to implement this component of our growth strategy may be limited by both our ability to identify appropriate acquisition or joint venture candidates and our financial resources, including our available cash and borrowing capacity. The expense incurred in consummating acquisitions or entering into joint ventures, the time it takes to integrate an acquisition, or our failure to integrate businesses successfully, could result in unanticipated expenses and losses. Furthermore, we may not be able to realize any of the anticipated benefits from acquisitions or joint ventures.

The process of integrating acquired operations into our existing operations may result in unforeseen operating difficulties, and may require significant financial resources that would otherwise be available for the ongoing development or expansion of existing operations. Some of the risks associated with the integration of acquisitions include: potential disruption of our ongoing business and distraction of management; unforeseen claims and liabilities, including unexpected environmental exposures; unforeseen adjustments, taxes, charges and write-offs; problems enforcing the indemnification obligations of sellers of businesses or joint venture partners for claims and liabilities; unexpected losses of customers of, or suppliers to, the acquired business; difficulty in conforming the acquired businesses' standards, processes, procedures and controls with our operations; variability in financial information arising from the implementation of purchase price accounting; inability to coordinate new product and process development; loss of senior managers and other critical personnel and problems with new labor unions; and challenges arising from the increased scope, geographic diversity and complexity of our operations.

**Our expansion into China entails substantial risks.**

We have recently commenced operations at our two newly-constructed manufacturing facilities in China. These investments are subject to substantial risks which may include, but are not limited to: the inability to protect our intellectual property rights under Chinese law, which may not offer as high a level of protection as U.S. law; unexpectedly long negotiation periods with Chinese suppliers and customers; quality issues related to materials sourced from local vendors; unexpectedly high labor costs due to a tight labor supply; and difficulty in repatriating funds and selling or transferring assets. Our investments in China also expose us to a significant additional foreign currency exchange risk, which we had not been subject to in recent years. These and other risks may result in our not realizing a return on, or losing some, or all, of our planned investments in China, which would have a material adverse effect on our financial condition and financial performance.

**Our cash flows from operations and current holdings of cash may not be adequate for our current and long-term needs.**

Our liquidity, as we operate in a high fixed-cost environment, is highly dependent on our revenue volume and the timing of our capital expenditures, which can vary significantly from period to period. Depending on conditions in the semiconductor and FPD markets, our cash flows from operations and current holdings of cash may not be adequate to meet our current and long-term needs for capital expenditures, operations and debt repayments. Historically, in certain years, we have used external financing to fund these needs. Due to conditions in the credit markets and covenant restrictions on our existing debt, some financing instruments used by us in the past may not be available. Therefore, we cannot provide assurance that additional sources of financing would be available to us on commercially favorable terms, if at all, should our cash requirements exceed our existing cash, operating cash flows, and cash available under our credit agreements.

**We may incur unforeseen charges related to possible future facility closures or restructurings.**

We cannot provide assurance that there will not be facility closures or restructurings in the near or long term, nor can we assure that we will not incur significant charges should there be any future facility closures or restructurings.

**We operate in a highly competitive environment, and, should we be unable to meet our customers' requirements for product quality, timeliness of delivery or technical capabilities, our revenue could be adversely affected.**

The photomask industry is highly competitive, and most of our customers utilize more than one photomask supplier. Our competitors include Compugraphics International, Ltd., Dai Nippon Printing Co., Ltd (outside of

Taiwan and China), Hoya Corporation, LG Innotek Co., Ltd., Supermask Co., Ltd., SK-Electronics Co. Ltd., Shenzhen New Way Photomask Making Co., Ltd., Taiwan Mask Corporation, and Toppan Printing Co., Ltd. We also compete with semiconductor and FPD manufacturers' captive photomask manufacturing operations, some of which market their photomask manufacturing services to outside customers. We expect to face continued competition from these and other suppliers in the future. Some of our competitors have substantially greater financial, technical, sales, marketing, or other resources than we do. Also, when producing smaller geometry photomasks, some of our competitors may be able to more rapidly develop and produce such masks, and achieve higher manufacturing yields than we can. We believe that consistency of product quality, timeliness of delivery, competitive pricing, technical capability, and service are the principal factors considered by customers when selecting their photomask suppliers. Our inability to meet these competitive requirements could have a material adverse effect on our business and results of operations. In the past, competition has led to pressure to reduce prices and the need to invest in advanced manufacturing technology, which we believe contributed to the decrease in the number of independent photomask suppliers. These pressures may continue in the future.

**We operate in a global, competitive environment which gives rise to operating and market risk exposure.**

We sell our products in a competitive, global environment, and compete worldwide for sales on the basis of product quality, price, technology, and customer service. Sales of our products are also subject to federal, state, local, and foreign taxes, laws and regulations, trade agreements, import and export controls, and duties and tariffs. The imposition of additional regulations or controls including export controls and duties and tariffs or changes to bilateral and regional trade agreements, could negatively impact our results of operations.

**Our substantial non-US operations are subject to additional risks.**

Revenues from our non-U.S. operations were approximately 81%, 79% and 77% of our total revenues in fiscal years 2019, 2018 and 2017, respectively. We believe that maintaining significant international operations requires us to have, among other things, a local presence in the geographic markets that we supply. This requires significant investments in financial, managerial, operational, and other resources. Since 1996, we have significantly expanded our operations in international markets by acquiring existing businesses in Europe, acquiring majority equity interests in photomask manufacturing operations in Korea and Taiwan, building a manufacturing facility for FPD photomasks in Taiwan, and two manufacturing facilities in China. In order to enable us to optimize our investments and other resources, we closely monitor the semiconductor and FPD manufacturing markets for indications of geographic movement and, in conjunction with these efforts, continue to assess the locations of our manufacturing facilities. These assessments may result in the opening or closing of facilities.

Operations outside of the United States are subject to inherent risks, including: fluctuations in exchange rates; unstable political and economic conditions in various countries; changes in economic alliances; unexpected changes in regulatory requirements; compliance with a variety of burdensome foreign laws and regulations; compliance with anti-bribery and anti-corruption laws (such as the Foreign Corrupt Practices Act); tariffs and other trade barriers; difficulties in staffing and managing international operations; and longer accounts receivable payment cycles. In addition: foreign countries may enact other restrictions on foreign trade or investment, including currency exchange controls; trade sanctions could result in our losing access to customers and suppliers; legislation may cause agreements to be difficult to enforce; accounts receivable may be difficult to collect, or we may be subject to adverse tax consequences. These factors may have a material adverse effect on our ability to generate revenues outside of the United States and, consequently, on our business and results of operations.

**Our business could suffer as a result of the United Kingdom's decision to end its membership in the European Union.**

The decision of the United Kingdom to exit from the European Union (generally referred to as "BREXIT") could cause disruptions to, and create uncertainty surrounding, our business, including affecting our relationships with existing and potential customers, suppliers, and employees. The effects of BREXIT will depend on any agreements the United Kingdom makes to retain access to European Union markets either during a transitional period or more permanently. The measures could potentially disrupt some of our target markets and jurisdictions in which we operate, and adversely change tax benefits or liabilities in these or other jurisdictions. In addition, BREXIT could lead to legal uncertainty and potentially divergent national laws and regulations, as the United Kingdom determines which European Union laws to replace or replicate. BREXIT also may create global economic uncertainty, which may cause our customers and potential customers to monitor their costs and reduce their budgets for either our

products or other products that incorporate our products. Any of these effects of BREXIT, among others, could materially adversely affect our business, business opportunities, results of operations, financial condition, and cash flows. The United Kingdom's deadline to leave the European Union has twice been extended, from its original date of March 31, 2019, to its current date of January 31, 2020. In light of the recent UK elections, BREXIT is now a virtual certainty.

**Changes in foreign currency exchange rates could have a material adverse effect on our results of operations, financial condition, or cash flows.**

Our consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP) and are reported in U.S. dollars. Our operations have transactions and balances denominated in currencies other than the U.S. dollar; primarily the South Korean won, New Taiwan dollar, Japanese yen, Chinese renminbi, euro, Singapore dollar, and the British pound sterling. In fiscal year 2019, we recorded a net loss from changes in foreign currency exchange rates of \$1.3 million in our statement of income, while our net assets decreased by \$2.9 million as a result of the translation of foreign currency financial statements to U.S. dollars. Significant foreign currency fluctuations may adversely affect our results of operations, financial condition, or cash flows.

**Our business depends on managerial and technical personnel, who are in great demand, and our inability to attract and retain qualified employees could adversely affect our business and results of operations.**

Our success depends, in part, upon key managerial and technical personnel, as well as our ability to continue to attract and retain additional qualified personnel. The loss of certain key personnel (i.e. CEO, CTO, etc.) could have a material adverse effect on our business and results of operations. We cannot offer assurance that we can retain our key managerial and technical employees, or that we can attract similar additional employees in the future.

**We may be unable to enforce or defend our ownership and use of proprietary technology, and the utilization of unprotected company developed technology by our competitors could adversely affect our business, results of operations, and financial position.**

We believe that the success of our business depends more on proprietary technology, information and processes, and know-how than on our patents or trademarks. Much of our proprietary information and technology related to manufacturing processes is not patented and may not be patentable. We cannot offer assurance that:

- we will be able to adequately protect our technology;
- competitors will not independently develop similar technology; or
- international intellectual property laws will adequately protect our intellectual property rights.

We may become the subject of infringement claims or legal proceedings by third parties with respect to current or future products or processes. Any such claims, with or without merit, or litigation to enforce or protect our intellectual property rights that require us to defend against claimed infringements of the rights of others, could result in substantial costs, diversion of resources, and product shipment delays or could force us to enter into royalty or license agreements, rather than dispute the merits of these claims. Any of the foregoing could have a material adverse effect on our business, results of operations, and financial position.

**We may be unprepared for changes to environmental laws and regulations and may incur liabilities arising from environmental matters.**

We are subject to numerous environmental laws and regulations that impose various environmental controls on, among other things, the discharge of pollutants into the air and water and the handling, use, storage, disposal, and clean-up of solid and hazardous wastes. Changes in these laws and regulations may have a material adverse effect on our financial position and results of operations, and inadequate compliance with their requirements could give rise to significant liabilities.

If we violate environmental, health or safety laws or regulations, in addition to being required to correct such violations, we can be held liable in administrative, civil, or criminal proceedings, and substantial fines and other sanctions could be imposed that could disrupt or limit our operations. Liabilities associated with the investigation and cleanup of hazardous substances, as well as personal injury, property damages or natural resource damages arising from the release of, or exposure to, such hazardous substances, may be imposed in many situations without regard

to violations of laws or regulations or other fault, and may also be imposed jointly and severally (so that a responsible party may be held liable for more than its share of the losses involved, or even the entire loss). Such liabilities may also be imposed on many different entities with a relationship to the hazardous substances at issue, including, for example, entities that formerly owned or operated the property affected by the hazardous substances and entities that arranged for the disposal of the hazardous substances at the affected property, as well as entities that currently own or operate such property. The nature of our business, including historical operations at our current and former facilities, exposes us to risks of liability under these laws and regulations due to the production, storage, use, transportation and sale of materials that can cause contamination or personal injury if released into the environment. Additional information may arise in the future concerning the nature or extent of our liability with respect to identified sites and additional sites that may be identified, for which we are alleged to be liable.

**Our production facilities could be damaged or disrupted by natural disasters or labor strikes, either of which could adversely affect our financial position, results of operations, and cash flows.**

A major catastrophe, such as an earthquake or other natural disaster, labor strike, or work stoppage at any of our manufacturing facilities, or a manufacturing facility of our suppliers or customers, could result in a prolonged interruption of our business. A disruption resulting from any one of these events could cause significant delays in shipments of our products and the loss of revenue and customers, which could have a material adverse effect on our financial position, results of operations, and cash flows. Our facilities in Taiwan are located in a seismically-active area.

**Our sales can be impacted by the health and stability of the general economy, which could adversely affect our results of operations and cash flows.**

Unfavorable general economic conditions in the U.S. or other countries in which we or our customers conduct business may have the effect of reducing the demand for photomasks. Economic downturns may lead to a decrease in demand for end products whose manufacturing processes involve the use of photomasks, which may result in a reduction in new product design and development by semiconductor or FPD manufacturers, and adversely affect our results of operations and cash flows.

**Additional taxes could adversely affect our financial results.**

Our tax filings are subject to audits by tax authorities in the various jurisdictions in which we do business. These audits may result in assessments of additional taxes that are subsequently resolved with the taxing authorities or through the courts. Currently, we believe there are no outstanding assessments whose resolution would result in a material adverse financial result. However, we cannot offer assurances that unasserted or potential future assessments would not have a material adverse effect on our financial condition or results of operations.

**Our business could be adversely impacted by global or regional catastrophic events.**

Our business could be adversely affected by terrorist acts, widespread outbreaks of infectious diseases, or the outbreak or escalation of wars, especially in the Asian markets in which we generate a significant portion of our sales and in Japan where we purchase raw materials and capital equipment. Such events in the geographic regions in which we do business, including escalations of political tensions and military operations within the Korean Peninsula, where a significant portion of our foreign operations are located, could have material adverse impacts on our revenue, cost and availability of raw materials, results of operations, cash flows, and financial condition.

**Servicing our debt requires a significant amount of cash, and we may not generate sufficient cash flows from our operations to pay our indebtedness.**

Our ability to make scheduled payments of debt principal and interest, or to refinance our indebtedness, depends on our future performance, which is subject to economic, financial, competitive, and other factors beyond our control. Our business may not continue to generate sufficient cash flows from operations to fund operations, service our debt and make necessary capital expenditures. If we are unable to generate such cash flows, we may be required to adopt one or more alternatives, such as selling assets, restructuring debt, or obtaining additional equity capital on terms that may be onerous or highly dilutive. Our ability to refinance our indebtedness would depend upon the conditions in the capital markets and our financial condition at such time. We may not be able to engage in any of these activities or engage in these activities on desirable terms, which could result in a default on our debt obligations.

**Our hedging activity could negatively impact our results of operations and cash flows.**

We may enter into derivatives to manage our exposure to interest rate and currency movements. If we do not accurately forecast our results of operations, execute contracts that do not effectively mitigate our economic exposure to interest rates and currency rates, elect to not apply hedge accounting, or fail to comply with the complex accounting requirements for hedging transactions, our results of operations and cash flows could be volatile, as well as negatively impacted.

**The market price of our common stock is subject to volatility and could fluctuate widely in response to various factors, many of which are beyond our control.**

Factors that may influence the price of our common stock include, but are not limited to, the following:

- loss of any of our key customers or suppliers;
- additions or departures of key personnel;
- third party sales of common stock;
- our ability to execute our business plan, including but not limited to, our expansion into China;
- announcements and consummations of business acquisitions;
- operating results that fall below expectations;
- issuances or repurchases of our common stock;
- intellectual property disputes;
- industry developments;
- news or disclosures by competitors or customers;
- business combinations, divestitures, or bankruptcies by customers, suppliers, or competitors;
- economic and other external factors; and
- period-to-period fluctuations in our financial results.

In addition, securities markets have from time to time experienced significant price and volume fluctuations that are unrelated to the operating performance of particular companies. These market fluctuations may also materially and adversely affect the market price of our common stock. Such fluctuations may be the result of imbalances between buy and sell offers, or low trading volume which can magnify the effects of a small number of transactions on the price of a stock.

**Ineffective internal controls could impact our business and operating results.**

Our internal controls over financial reporting may not prevent or detect misstatements because of their inherent limitations in detecting human errors, the circumvention or overriding of controls, or fraud; even effective internal controls can provide only reasonable assurance with respect to the preparation and fair presentation of financial statements. If we: fail to maintain the adequacy of our internal controls, including any failure to implement required new or improved controls; otherwise fail to prevent financial reporting misstatements; or if we experience difficulties in implementing internal controls, our business and operating results could be harmed, and we could fail to meet our financial reporting obligations.

**ITEM 1B. UNRESOLVED STAFF COMMENTS**

None.

## ITEM 2. PROPERTIES

The following table presents certain information about the Company's photomask manufacturing facilities:

<u>Location</u>	<u>Type of Interest</u>
Allen, Texas	Owned
Boise, Idaho	Owned
Brookfield, Connecticut	Owned
Bridgend, Wales	Leased
Cheonan, Korea	Owned
Hefei, China	Owned <sup>(1)</sup>
Dresden, Germany	Leased
Hsinchu, Taiwan	Owned <sup>(1)</sup>
Hsinchu, Taiwan	Leased
Taichung, Taiwan	Owned <sup>(1)</sup>
Xiamen, China	Owned <sup>(1)</sup>

- (1) The Company owns its manufacturing facility in Hefei, Taichung, Xiamen, and one of its manufacturing facilities in Hsinchu. However, it leases the related land.

## ITEM 3. LEGAL PROCEEDINGS

We are subject to various claims that arise in the ordinary course of business. We believe such claims, individually or in the aggregate, will not have a material adverse effect on our business.

## ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.



## PART II

### ITEM 5. MARKET FOR REGISTRANT’S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES

The common stock of the Company is traded on the NASDAQ Global Select Market (“NASDAQ”) under the symbol PLAB. On December 13, 2019, the closing sale price of our Common Stock, per the NASDAQ Global Select Market, was \$15.94. Based on available information, we estimate that we have approximately 9,400 shareholders.

To date, we have not paid any cash dividends on Photronics shares, and, for the foreseeable future, we anticipate that earnings will continue to be retained for use in our business. Further, our credit agreement limits the amount that can be paid as cash dividends on Photronics stock.

#### Issuer Purchases of Equity Securities

In August 2019, the Company’s board of directors authorized the repurchase of up to \$100 million of its common stock, pursuant to a repurchase plan under Rule 10b5-1 of the Securities Act of 1933 (as amended). The repurchase program may be suspended or discontinued at any time.

In July 2018 and October 2018, the Company’s board of directors authorized the repurchase of up to \$20 million and \$25 million, respectively, of its common stock, to have been executed in open-market transactions or in accordance with a repurchase plan under Rule 10b5-1 of the Securities Act of 1933 (as amended). The July 2018 repurchase program was completed in October 2018, and the October 2018 repurchase program was terminated on February 1, 2019.

#### August 2019 Authorization

	Total Number of Shares Purchased (in millions)	Average Price Paid Per share	Total Number of Shares Purchased as Part of Publicly Announced Program (in millions)	Dollar Value of Shares That May Yet Be Purchased (in millions)
<b><u>Fiscal year 2019 repurchases</u></b>				
September 23, 2019 – October 31, 2019 . . . .	<u>1.0</u>	\$11.05	<u>1.0</u>	\$89.0
Total . . . . .	<u>1.0</u>		<u>1.0</u>	

#### 2018 Authorizations

	Total Number of Shares Purchased (in millions)	Average Price Paid Per share	Total Number of Shares Purchased as Part of Publicly Announced Program (in millions)	Dollar Value of Shares That May Yet Be Purchased (in millions)
<b><u>Fiscal year 2019 repurchases</u></b>				
November 1, 2018 – November 25, 2018 . . .	0.2	\$9.49	0.2	\$20.1
November 26, 2018 – December 23, 2018 . .	0.7	\$9.38	0.7	\$13.4
December 24, 2018 – January 27, 2019 . . . . .	<u>0.2</u>	\$9.41	<u>0.2</u>	\$11.2*
Total . . . . .	<u>1.1</u>	\$9.40	<u>1.1</u>	

	<u>Total Number of Shares Purchased (in millions)</u>	<u>Average Price Paid Per share</u>	<u>Total Number of Shares Purchased as Part of Publicly Announced Program (in millions)</u>	<u>Dollar Value of Shares That May Yet Be Purchased (in millions)</u>
<b><u>Fiscal year 2018 repurchases</u></b>				
July 10, 2018 – July 29, 2018 . . . . .	0.8	\$8.72	0.8	\$13.2
July 30, 2018 – August 26, 2018 . . . . .	0.9	\$9.05	0.9	\$ 5.0
September 23, 2018 – October 31, 2018 . . . .	<u>0.9</u>	\$9.46	<u>0.9</u>	\$21.9
Total . . . . .	<u>2.6</u>	\$9.04	<u>2.6</u>	

\* The share repurchase program was terminated on February 1, 2019, with no additional shares being purchased subsequent to January 27, 2019.

*Securities authorized for issuance under equity compensation plans*

The information regarding our equity compensation required to be disclosed by Item 201(d) of Regulation S-K is incorporated by reference from the Photronics, Inc. 2020 Definitive Proxy Statement in Item 12 of Part III of this report. The 2020 Definitive Proxy Statement will be filed within 120 days after our fiscal year ended October 31, 2019.

## ITEM 6. SELECTED FINANCIAL DATA

The following selected financial data (in thousands, except per share amounts and employees) is derived from our audited consolidated financial statements. The data should be read in conjunction with the audited consolidated financial statements and notes thereto, and other financial information included elsewhere in this Annual Report on Form 10-K.

	Year Ended				
	October 31, 2019	October 31, 2018	October 29, 2017	October 30, 2016	November 1, 2015
<b>OPERATING DATA:</b>					
Revenue	\$550,660	\$535,276	\$450,678	\$483,456	\$524,206
Gross profit	\$120,841	\$131,503	\$ 91,315	\$118,706	\$143,136
Gross margin	21.9%	24.6%	20.3%	24.6%	27.3%
Operating income	\$ 52,121	\$ 65,627	\$ 31,868	\$ 52,475	\$ 72,233
Operating margin	9.5%	12.3%	7.1%	10.9%	13.8%
Effective tax rate <sup>(a)</sup>	20.1%	10.7%	19.9%	7.9%	18.8%
Net income <sup>(a), (b), (c), (d)</sup>	\$ 40,491	\$ 61,236	\$ 21,289	\$ 55,676	\$ 56,859
Net income attributable to Photronics, Inc. shareholders <sup>(a), (b), (c), (d)</sup>	\$ 29,793	\$ 42,055	\$ 13,130	\$ 46,200	\$ 44,625
Earnings per share:					
Basic <sup>(a), (b), (c), (d)</sup>	\$ 0.45	\$ 0.61	\$ 0.19	\$ 0.68	\$ 0.67
Diluted <sup>(a), (b), (c), (d)</sup>	\$ 0.44	\$ 0.59	\$ 0.19	\$ 0.64	\$ 0.63
Weighted-average diluted number of common shares outstanding:	69,155	74,821	69,288	76,354	78,383
Net cash provided by operating activities	\$ 68,386	\$130,567	\$ 96,833	\$122,137	\$133,195
Purchase of property, plant and equipment	\$178,375	\$ 92,585	\$ 91,965	\$ 50,147	\$104,033
Purchase of treasury stock	\$ 21,696	\$ 23,111	\$ —	\$ —	\$ —
Employees	1,775	1,575	1,475	1,530	1,550

## BALANCE SHEET DATA

	As of				
	October 31, 2019	October 31, 2018	October 29, 2017	October 30, 2016	November 1, 2015
Working capital	\$ 275,573	\$ 311,655	\$ 367,348	\$360,269	\$ 168,237
Property, plant and equipment, net	\$ 632,441	\$ 571,781	\$ 535,197	\$506,434	\$ 547,284
Total assets	\$1,118,665	\$1,110,009	\$1,020,794	\$987,988	\$1,042,811
Long-term debt	\$ 41,887	\$ —	\$ 57,337	\$ 61,860	\$ 67,120
Total Photronics, Inc. shareholders' equity	\$ 769,892	\$ 759,671	\$ 744,564	\$710,363	\$ 646,555
Noncontrolling interests	\$ 141,200	\$ 144,898	\$ 120,731	\$115,111	\$ 115,511

(a) In 2016, includes tax benefits in Taiwan of \$4.8 million primarily related to the recognition of prior period tax benefits and other tax positions no longer deemed necessary.

(b) In 2018, includes \$0.6 million gain on sale of assets.

(c) In 2016, includes \$8.8 million gain on sale of investment in a foreign entity and \$0.2 million gain on the sale of the Company's 49.99% interest in the MP Mask joint venture.

(d) In 2015, includes \$0.9 million of financing expenses related to the exchange of \$57.5 million of 3.25% convertible senior notes.

## **ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS**

### **Overview**

We sell substantially all of our photomasks to semiconductor designers and manufacturers, and manufacturers of FPDs. Photomask technology is also being applied to the fabrication of other higher performance electronic products such as photonics, micro-electronic mechanical systems, and certain nanotechnology applications. Our selling cycle is tightly interwoven with the development and release of new semiconductor and FPD designs and applications, particularly as they relate to the semiconductor industry's migration to more advanced product innovation, design methodologies, and fabrication processes. We believe that the demand for photomasks primarily depends on design activity rather than sales volumes from products manufactured using photomask technologies. Consequently, an increase in semiconductor or FPD sales does not necessarily result in a corresponding increase in photomask sales. However, the reduced use of customized ICs, reductions in design complexity, other changes in the technology or methods of manufacturing or designing semiconductors, or a slowdown in the introduction of new semiconductor or FPD designs could reduce demand for photomasks – even if the demand for semiconductors and FPDs increases. Advances in semiconductor, FPD, and photomask design and semiconductor and FPD production methods that shift the burden of achieving device performance away from lithography could also reduce the demand for photomasks. Historically, the microelectronic industry has been volatile, experiencing periodic downturns and slowdowns in design activity. These downturns have been characterized by, among other things, diminished product demand, excess production capacity, and accelerated erosion of selling prices with a concomitant effect on revenue and profitability.

We are typically required to fulfill customer orders within a short period of time, sometimes within twenty-four hours. This results in a minimal level of backlog orders, typically one to two weeks of backlog for IC photomasks and two to three weeks of backlog for FPD photomasks.

The global semiconductor industry is driven by end markets which have been closely tied to consumer-driven applications of high-performance devices, including, but not limited to, mobile display devices, mobile communications, and computing solutions. While we cannot predict the timing of the industry's transition to volume production of next-generation technology nodes, or the timing of up and down cycles with precise accuracy, we believe that such transitions and cycles will continue into the future, beneficially and adversely affecting our business, financial condition, and operating results as they occur. We believe our ability to remain successful in these environments is dependent upon the achievement of our goals of being a service and technology leader and efficient solutions supplier, which we believe should enable us to continually reinvest in our global infrastructure.

We are focused on improving our competitiveness by advancing our technology and reducing costs and, in connection therewith, have invested and plan to continue to invest in manufacturing equipment to serve the high-end markets. As we face challenges in the current and near term that require us to make significant improvements in our competitiveness, we continue to evaluate further cost reduction initiatives.

State-of-the-art production for semiconductor masks is considered to be 28 nanometer and smaller for ICs and Generation 8 and above and AMOLED display-based process technologies for FPDs. However, 32 nanometer and above geometries for semiconductors and Generation 7 and below, excluding AMOLED, process technologies for FPDs constitute the majority of designs currently being fabricated in volume. At these geometries, we can produce full lines of photomasks, and there is no significant technology employed by our competitors that is not available to us. We expect 28 nanometer and below designs to continue to move to wafer fabrication throughout fiscal 2020, and we believe we are well positioned to service an increasing volume of this business as a result of our investments in manufacturing processes and technology in the regions where our customers are located.

The photomask industry has been, and is expected to continue to be, characterized by technological change and evolving industry standards. In order to remain competitive, we will be required to continually anticipate, respond to, and utilize changing technologies. In particular, we believe that, as semiconductor geometries continue to become smaller, and FPD designs become larger or otherwise more advanced, we will be required to manufacture even more complex optically-enhanced reticles, including optical proximity correction and phase-shift photomasks. Additionally, demand for photomasks has been, and could in the future be, adversely affected by changes in semiconductor and high-performance electronics fabrication methods that affect the type or quantity of photomasks used, such as changes in semiconductor demand that favor field-programmable gate arrays and other semiconductor designs that replace application-specific ICs, or the use of certain chip-stacking methodologies that lessen the

emphasis on conventional lithography technology. Furthermore, increased market acceptance of alternative methods of transferring circuit designs onto semiconductor wafers could reduce or eliminate the need for photomasks in the production of semiconductors. As of the end of fiscal year 2019, one alternative method, direct-write lithography, has not been proven to be a commercially viable alternative to photomasks, as it is considered to be too slow for high-volume semiconductor wafer production, and we have not experienced a significant loss of revenue as a result of this or other alternative semiconductor design methodologies. However, should direct-write lithography or any other alternative method of transferring IC designs to semiconductor wafers without the use of photomasks achieve market acceptance, and we do not anticipate, respond to, or utilize these or other changing technologies due to resource, technological, or other constraints, our business and results of operations could be materially adversely affected.

Both our revenues and costs have been affected by the increased demand for high-end-technology photomasks that require more advanced manufacturing capabilities, but generally command higher average selling prices (“ASPs”). Our capital expenditure payments aggregated approximately \$363 million for the three fiscal years ended October 31, 2019, which has significantly contributed to our cost of goods sold. We intend to continue to make the required investments to support the technological demands of our customers that we believe will position the Company for future growth. In support of this effort, we expect capital expenditure payments to be approximately \$100 million in fiscal year 2020.

The manufacture of photomasks for use in fabricating ICs, FPDs, and other related products built using comparable photomask-based process technologies has been, and continues to be, capital intensive. Our employees and our integrated global manufacturing network represent a significant portion of our fixed operating cost base. Should our revenue decrease as a result of a decrease in design releases from our customers, we may have excess or underutilized production capacity, which could significantly impact our operating margins, or result in write-offs from asset impairments.

## **Recent Developments**

In the first quarter of fiscal 2020, we acquired the remaining 0.2% of noncontrolling interests in PK, Ltd. for \$0.6 million.

In the first quarter of fiscal 2020, we adopted ASU 2016-02 and all subsequent amendments, collectively codified in Accounting Standards Codification Topic 842 - “Leases” (“Topic 842”). This guidance requires modified retrospective adoption, either at the beginning of the earliest period presented or at the beginning of the period of adoption; we elected to apply the guidance at the beginning of the period of adoption, and recognized right-of-use leased assets of approximately \$6.7 million, and corresponding lease liabilities, which were discounted at our incremental borrowing rates, on our November 1, 2019, consolidated balance sheet to reflect our adoption of the guidance. We do not expect our adoption of Topic 842 to affect our cash flows or our ability to comply with covenants under our credit agreements.

In the fourth quarter of fiscal 2019, our board of directors declared a dividend of one preferred stock purchase right (a “Right”), payable on or about October 1, 2019, for each share of common stock, par value \$0.01 per share, of the Company outstanding on September 30, 2019, to the stockholders of record on that date. In connection with the distribution of the Rights, we entered into a Section 382 Rights Agreement (the “Rights Agreement”), dated as of September 23, 2019, between the Company and Computershare Trust Company, N.A., a federally chartered trust company, as rights agent. The purpose of the Rights Agreement is to deter trading of our common stock that would result in a change in control (as defined in Internal Revenue Control Section 382), thereby preserving our future ability to use our historical federal net operating losses and other Tax Attributes (as defined in the Rights Agreement). Each Right entitles the registered holder to purchase from the Company one one-thousandth of a share of Series A Preferred Stock, par value \$0.01 per share, at a price of \$33.63, subject to adjustment. The Rights, which are described in the Company’s Current Report on Form 8-K filed on September 24, 2019, are in all respects subject to and governed by the provisions of the Rights Agreement. The Rights will expire at the earliest to occur of (i) the close of business on the day following the certification of the voting results of the Company’s 2020 annual meeting of stockholders, if at that meeting, or any other meeting of stockholders of the Company duly held prior to September 22, 2020, a proposal to approve this Rights Agreement is not passed by the affirmative vote of the majority of the voting interests; (ii) the date on which our board of directors determines, in its sole discretion, that the Rights Agreement is no longer necessary for the preservation of material valuable tax attributes, or the tax attributes have been fully utilized and may no longer be carried forward, and (iii) the close of business on September 22, 2022.

In the fourth quarter of fiscal 2019, PDMC, the Company's majority-owned IC subsidiary in Taiwan, paid a dividend of which 49.99%, or approximately \$18.9 million, was paid to noncontrolling interests.

In the fourth quarter of fiscal 2019, upon our request, a financing entity made an advance payment of \$3.5 million to an equipment vendor. We entered into a Master Lease Agreement ("MLA") with this financing entity, which became effective in July 2019. The MLA enables us to request advance payments or other funds to finance equipment to be leased or purchased in the U.S. In connection with this MLA, we have been approved for financing of \$35 million for the purchase of a high-end lithography tool. Interest on this borrowing is payable monthly at thirty-day LIBOR plus 1% (2.76% at October 31, 2019), and will continue to accrue until the borrowing is repaid or, as allowed under the MLA, we enter into a lease for the equipment. We intend to enter into a lease agreement for the related equipment in fiscal year 2020.

In the fourth quarter of fiscal 2019, the Company's board of directors authorized the repurchase of up to \$100 million of its common stock, pursuant to a repurchase plan under Rule 10b5-1 of the Securities Act of 1933 (as amended). As of October 31, 2019, we had repurchased 1.0 million shares at a cost of \$11.0 million (an average price of \$11.05 per share). The repurchase program may be suspended or discontinued at any time.

In the second quarter of fiscal 2019, we repaid, upon maturity, the entire \$57.5 million principal amount of the convertible senior notes we issued in April 2016.

In the first quarter of fiscal 2019, PDMC paid a dividend, of which 49.99%, or approximately \$26.1 million, was paid to noncontrolling interests.

In the first quarter of fiscal 2019, PDMCX was approved for credit of \$50 million, subject to certain limitations related to PDMCX registered capital at the time of the initial approval, pursuant to which PDMCX has and will enter into separate loan agreements ("the Project Loans") for intermittent borrowings. The Project Loans, which are denominated in Chinese renminbi (RMB), are being used to finance certain capital expenditures in China. PDMCX granted liens on its land, building, and certain equipment as collateral for the Project Loans. As of October 31, 2019, PDMCX had borrowed 243.4 million RMB (\$34.5 million) against this approval. Payments on these borrowings are due semi-annually through December 2025; the initial payment is scheduled for June 2020. See Note 6 of the financial statements for additional information on these loans.

In the first quarter of fiscal 2019, PDMCX received approval for unsecured credit of \$25.0 million, pursuant to which PDMCX may enter into separate loan agreements. Under this credit agreement (the "Working Capital Loans"), PDMCX can borrow up to 140.0 million RMB to pay value-added taxes ("VAT") and up to 60.0 million RMB to fund operations; combined total borrowings are limited to \$25.0 million. As of October 31, 2019, PDMCX had outstanding 36.8 million RMB (\$5.2 million) to fund operations, with repayments due one year from the borrowing dates of the separate loan agreements. As of October 31, 2019, PDMCX had outstanding 67.3 million RMB (\$9.5 million) borrowed to pay VAT. Payments on these borrowings are due semiannually, at an increasing rate, through January 2022. See Note 6 of the consolidated financial statements for additional information on these loans.

In the fourth quarter of fiscal 2018, we entered into a five-year amended and restated credit agreement (the "Credit Agreement"), with JPMorgan Chase Bank, N.A., as Administrative Agent and Collateral Agent, Bank of America, N.A., as Syndication Agent, each of JPMorgan Chase Bank, N.A. and Merrill, Lynch, Pierce, Fenner & Smith Incorporated as joint bookrunners and joint lead arrangers, and each of JPMorgan Chase Bank, N.A., Bank of America, N.A., Citizens Bank, N.A., and TD Bank, N.A. as lenders from time to time party thereto. The Credit Agreement has a \$50 million borrowing limit, with an expansion capacity to \$100 million, and is secured by substantially all of our assets located in the United States and common stock we own in certain foreign subsidiaries. The Credit Agreement includes minimum interest coverage ratio, total leverage ratio, and minimum unrestricted cash balance covenants (all of which we were in compliance with at October 31, 2019), and limits the amount of dividends, distributions, and redemptions we can pay on our common stock to an aggregate amount in 2019 of \$100 million and \$50 million annually thereafter. We had no outstanding borrowings against the Credit Agreement at October 31, 2019, and \$50 million was available for borrowing. The interest rate on the Credit Agreement (2.78% at October 31, 2019) is based on our total leverage ratio at LIBOR plus a spread, as defined in the Credit Agreement.

In the fourth quarter of fiscal 2018, the Company's board of directors authorized the repurchase of up to \$25 million of its common stock, to have been executed in open-market transactions or in accordance with a



repurchase plan under Rule 10b5-1 of the Securities Act of 1933 (as amended). The share repurchase program commenced, under Rule 10b5-1, on October 22, 2018, and was terminated on February 1, 2019. In total, we repurchased 1.5 million shares at a cost of \$13.8 million (an average of \$9.41 per share) under this authorization.

In the third quarter of fiscal 2018, the Company's board of directors authorized the repurchase of up to \$20 million of its common stock, which was effectuated in open-market transactions or in accordance with a repurchase plan under Rule 10b5-1 of the Securities Act of 1933 (as amended). The share repurchase program commenced on July 10, 2018, and ended in October 2018. In total, under this authorization, we repurchased 2.2 million shares at a cost of \$20.0 million (an average of \$8.97 per share).

In the third quarter of fiscal 2018, PDMC paid a dividend, of which 49.99%, or approximately \$8.2 million, was paid to noncontrolling interests.

In the first quarter of fiscal 2018, we announced the successful closing of the China joint venture agreement with Dai Nippon Printing Co., Ltd. ("DNP"), which we had agreed to enter into and announced in the third quarter of fiscal 2017. Under the agreement, our wholly-owned Singapore subsidiary owns 50.01% of the joint venture, which is named Xiamen American Japan Photronics Mask Co., Ltd. (PDMCX), and a subsidiary of DNP owns the remaining 49.99%. The financial results of the joint venture, which commenced production in the third quarter of 2019, are included in the Photronics, Inc. consolidated financial statements. See Note 4 of the consolidated financial statements for additional information on the joint venture.

## Results of Operations

The following tables present selected operating information expressed as a percentage of revenue:

	<u>Three Months Ended</u>		
	<u>October 31,</u> <u>2019</u>	<u>July 28,</u> <u>2019</u>	<u>October 31,</u> <u>2018</u>
Revenue . . . . .	100.0%	100.0%	100.0%
Cost of goods sold . . . . .	<u>75.6</u>	<u>77.9</u>	<u>75.5</u>
Gross profit . . . . .	24.4	22.1	24.5
Selling, general and administrative expenses . . . . .	7.8	9.5	9.3
Research and development expenses . . . . .	<u>2.9</u>	<u>2.9</u>	<u>2.7</u>
Operating income . . . . .	13.7	9.7	12.5
Other income (expense), net . . . . .	<u>(3.9)</u>	<u>(0.2)</u>	<u>1.5</u>
Income before income tax provision . . . . .	9.8	9.5	14.0
Income tax provision . . . . .	<u>1.5</u>	<u>2.4</u>	<u>2.4</u>
Net income . . . . .	8.3	7.1	11.6
Net income attributable to noncontrolling interests . . . . .	<u>2.1</u>	<u>2.5</u>	<u>3.0</u>
Net income attributable to Photronics, Inc. shareholders . . . . .	<u>6.2%</u>	<u>4.6%</u>	<u>8.6%</u>



	Year Ended		
	October 31, 2019	October 31, 2018	October 29, 2017
Revenue .....	100.0%	100.0%	100.0%
Cost of goods sold .....	<u>78.1</u>	<u>75.4</u>	<u>79.7</u>
Gross profit .....	21.9	24.6	20.3
Selling, general and administrative expenses .....	9.5	9.6	9.7
Research and development expenses .....	<u>2.9</u>	<u>2.7</u>	<u>3.5</u>
Operating income .....	9.5	12.3	7.1
Other income (expense), net .....	<u>(0.3)</u>	<u>0.5</u>	<u>(1.2)</u>
Income before income tax provision .....	9.2	12.8	5.9
Income tax provision .....	<u>1.9</u>	<u>1.4</u>	<u>1.2</u>
Net income .....	7.3	11.4	4.7
Net income attributable to noncontrolling interests .....	<u>1.9</u>	<u>3.5</u>	<u>1.8</u>
Net income attributable to Photronics, Inc. shareholders .....	<u>5.4%</u>	<u>7.9%</u>	<u>2.9%</u>

Note: All the following tabular comparisons, unless otherwise indicated, are for the three months ended October 31, 2019 (Q4 FY19), July 28, 2019 (Q3 FY19) and October 31, 2018 (Q4 FY18), and for the fiscal years ended October 31, 2019 (FY19) and October 31, 2018 (FY18). Please refer to the MD&A in our 2018 Annual Report on Form 10-K for comparative discussion of our fiscal years ended October 31, 2018 and October 29, 2017.

### Revenue

Our quarterly revenues can be affected by the seasonal purchasing tendencies of our customers. As a result, demand for our products is typically negatively impacted during the first, and sometimes the second, quarters of our fiscal year, by the North American, European, and Asian holiday periods, as some of our customers reduce their development and, consequently, their buying activities during those periods. High-end photomask applications include mask sets for 28 nanometer and smaller products for IC, and G8 and above and active matrix organic light-emitting diode (AMOLED) display technologies for FPD products. High-end photomasks typically have higher selling prices (ASPs) than mainstream products.

The following tables present changes in disaggregated revenue in Q4 FY19 and FY 19 from revenue in prior reporting periods. Columns may not total due to rounding.

#### Quarterly Changes in Revenue by Product Type

	Q4 FY19 from Q3 FY19			Q4 FY19 from Q4 FY18	
	Revenue in Q4 FY19	Increase (Decrease)	Percent Change	Increase (Decrease)	Percent Change
<u>IC</u>					
High-end .....	\$ 45.0	\$ 6.5	16.9%	\$ 5.5	14.0%
Mainstream .....	<u>67.6</u>	<u>5.9</u>	9.5%	<u>(3.9)</u>	<u>(5.4)%</u>
Total IC .....	<u>\$112.5</u>	<u>\$12.4</u>	12.3%	<u>\$ 1.7</u>	1.5%
<u>FPD</u>					
High-end .....	\$ 28.5	\$ 2.5	9.8%	\$ 6.5	29.4%
Mainstream .....	<u>15.2</u>	<u>3.3</u>	27.2%	<u>3.5</u>	29.5%
Total FPD .....	<u>\$ 43.7</u>	<u>\$ 5.8</u>	15.3%	<u>\$ 9.9</u>	29.4%
Total Revenue .....	<u>\$156.3</u>	<u>\$18.1</u>	13.1%	<u>\$11.6</u>	8.0%

*Quarterly Changes in Revenue by Geographic Origin*

	<u>Q4 FY19 from Q3 FY19</u>			<u>Q4 FY19 from Q4 FY18</u>	
	<u>Revenue in Q4 FY19</u>	<u>Increase (Decrease)</u>	<u>Percent Change</u>	<u>Increase (Decrease)</u>	<u>Percent Change</u>
Taiwan . . . . .	\$ 68.9	\$ 7.6	12.4%	\$ 6.6	10.6%
Korea . . . . .	37.3	0.2	0.6%	(3.4)	(8.4)%
United States . . . . .	30.5	5.1	20.1%	(0.2)	(0.8)%
Europe . . . . .	7.9	(0.1)	(1.0)%	(1.9)	(19.6)%
China . . . . .	11.3	5.4	89.8%	10.7	1,692.9%
Other . . . . .	0.4	(0.1)	(16.6)%	(0.1)	(22.6)%
Total revenue . . . . .	<u>\$156.3</u>	<u>\$18.1</u>	13.1%	<u>\$11.6</u>	8.0%

Revenue increased 13.1% in Q4 FY19, compared with Q3 FY19, as both mainstream and high-end revenue increased. The largest increases in percentages were in FPD mainstream and IC high-end masks, which increased 27.2% and 16.9%, respectively. Revenues from China-based customers represented 33% of our total revenues in Q4 FY19. While some of the China-based revenue reflected a 77.5% increase in revenue at our FPD plant in China, much of the increase was due to increased shipments into China from IC facilities in Taiwan and Korea, both of which operated at full capacity during Q4 FY19. Our IC facility in China was, and is expected to be for a significant part of fiscal 2020, in the qualification stage with many of its customers; however, revenues increased significantly from Q3 FY19.

Revenue increased 8.0% in Q4 FY19, compared with Q4 FY18, primarily as a result of increased mainstream and high-end FPD growth, both of which increased over twenty-nine percent from the prior year quarter. High-end IC revenue also contributed to the increase, growing at 14.0%. Our expansion into China, as a ship-to destination from our Taiwan and Korea facilities, and from local production was a significant driver of the increase.

*Year-over-Year Changes in Revenue by Product Type.*

	<u>FY19 from FY18</u>		
	<u>Revenue in FY19</u>	<u>Increase (Decrease)</u>	<u>Percent Change</u>
<u>IC</u>			
High-end . . . . .	\$156.4	\$ (3.9)	(2.5)%
Mainstream . . . . .	<u>249.8</u>	<u>(5.9)</u>	(2.3)%
Total IC . . . . .	<u>\$406.2</u>	<u>\$ (9.9)</u>	(2.4)%
<u>FPD</u>			
High-end . . . . .	\$ 98.8	\$22.7	29.9%
Mainstream . . . . .	<u>45.6</u>	<u>2.5</u>	5.8%
Total FPD . . . . .	<u>\$144.5</u>	<u>\$25.3</u>	21.2%
Total Revenue . . . . .	<u>\$550.7</u>	<u>\$15.4</u>	2.9%

*Year-over-Year Changes in Revenue by Geographic Origin*

	<u>FY19 from FY18</u>		
	<u>Revenue in FY19</u>	<u>Increase (Decrease)</u>	<u>Percent Change</u>
Taiwan . . . . .	\$244.4	\$ 7.3	3.1%
Korea . . . . .	147.7	0.7	0.5%
United States . . . . .	105.0	(7.6)	(6.7)%
Europe . . . . .	32.6	(3.0)	(8.3)%
China . . . . .	19.0	17.9	1,543.0%
Other . . . . .	1.9	0.1	4.5%
Total Revenue . . . . .	<u>\$550.7</u>	<u>\$15.4</u>	2.9%

Revenue increased 2.9% in FY19, compared with FY18, to a record high of \$550.7 million. A 29.9% increase in high-end FPD sales was primarily responsible for the increase, with strong demand for mobile displays driving much of the increase. Our China FPD facility, which commenced production late in the second quarter, contributed 11.4% of our total FPD revenue. Overall IC revenues decreased from FY18 by 2.4%, as both mainstream and high-end IC revenues fell between 2 to 3%. The decrease was geographically broad-based, with our Taiwan IC facility being a notable exception, as its revenue grew 3.8%.

We anticipate a softening of the demand for G10.5+ FPD photomasks, which we expect to be offset to some extent by a strengthening of the demand for AMOLED photomasks. We expect our customers to continue to focus on improving mobile displays, including the development of foldable smartphones. Should demand increase sufficiently, we will be ready to increase our capacity to meet customer demands by expanding the production capacity of our FPD facility in China. We currently have two lithography tools on order that will enable us to expand our Asian capacity for mainstream photomasks, which are often used for certain layers of high-end applications. We anticipate that IC demand will be stable to improving. As ASPs for high-end masks are high, a relatively small shift in the timing of their demand can have an out-sized effect on the timing of our revenues.

The impact, if any, on our business of changing geopolitical conditions, such as U.S.-China trade relations, tensions between the Republic of South Korea and Japan, and the effects of the United Kingdom potentially exiting the European Union cannot be predicted.

### **Gross Margin**

	<u>Q4 FY19</u>	<u>Q3 FY19</u>	<u>Q4 FY18</u>	<u>Percent Change</u>	
				<u>Q4 FY19</u>	<u>Q4 FY19</u>
				<u>from Q3</u>	<u>from Q4</u>
				<u>FY19</u>	<u>FY18</u>
Gross profit . . . . .	\$38.2	\$30.6	\$35.4	24.8%	7.7%
Gross margin . . . . .	24.4%	22.1%	24.5%		

Gross margin increased 2.3% from Q3 FY19 to 24.4%, primarily as a result of the \$18.2 million increase in revenue discussed above. Contribution margin from our high operating leverage, 1.9% decrease in compensation and related expenses as a percent of revenue, offset increased overhead costs which were primarily driven by increased equipment costs of \$2.4 million and outside processing costs of \$0.5 million. Material costs, as a percent of revenue, decreased by 0.4% from the prior quarter.

Gross margin decreased by 0.1% from Q4 FY18, primarily due to a 11.3% increase in overhead costs as a percent of revenue. Significant increases from the prior year quarter included depreciation expense of \$3.6 million and service contract expense of \$1.2 million, both of which resulted from our increased installed tool base in China. Increases in other non-equipment related overhead costs of \$1.4 million were incurred at our two China-based manufacturing facilities, in which production commenced, but had not yet reached capacity, in fiscal 2019. On a consolidated basis, both material and compensation-related expenses, as a percentage of revenue, did not change significantly from the prior year quarter.

	<u>FY19</u>	<u>FY18</u>	<u>Percent Change</u>
			<u>FY19 from FY18</u>
Gross profit . . . . .	\$120.8	\$131.5	(8.1)%
Gross margin . . . . .	21.9%	24.6%	

On a year-to-date basis, gross margin decreased 2.7%; increased losses at our two China-based facilities constituting the most significant causes. Our FPD facility in China commenced production late in Q2 FY19, and our IC facility commenced production in Q3 FY19.

### **Selling, General and Administrative Expenses**

Selling, general and administrative expenses decreased by \$1.0 million, or 7.5%, to \$12.1 million in Q4 FY19, from \$13.1 million in Q3 FY19, and by \$1.4 million, or 10.1%, from \$13.5 million in Q4 FY18, primarily due to decreased compensation and related expenses of \$1.0 and \$1.3 million from the respective comparative periods. On a full-year basis, selling, general and administrative expenses increased \$0.9 million, or 1.8%, in FY19 to \$52.3 million, from \$51.4 million in FY18, primarily due to a reduction in bad debt recoveries of \$0.8 million in FY19, as compared with FY18.

## Research and Development Expenses

Research and development expenses consist of development efforts related to high-end process technologies for 28nm and smaller IC nodes. In Asia, in addition to the focus on high-end IC process technology nodes, G8 and above FPDs and AMOLED applications are also under development.

Research and development expenses increased \$0.5 million to \$4.5 million in Q4 FY19, or 12.2%, from Q3 FY19, primarily as a result of increased development costs of \$0.9 million at our China facilities. A decrease from the prior quarter in research and development expense of \$0.8 million in the U.S. was somewhat offset by increased expenses of \$0.4 million at our other Asia-based facilities. Research and development expenses increased \$0.6 million, or 16.3%, in Q4 FY19 over Q4 FY18. The increase was due to \$1.1 million of expense incurred at our China-based facilities, both of which commenced operations in FY19; decreased expense in the U.S. of \$0.8 million was partially offset by increased spending of \$0.3 million at our other Asia-based facilities.

On a full-year basis, research and development expenses increased \$1.9 million in FY19, or 13.2%, to \$16.4 million. The increase is largely attributable to spending of \$1.6 million at our China-based facilities, which commenced operations in FY19. The remainder of the increase is primarily attributable to increased development spending at our IC facility in Taiwan.

## Other Income (Expense), net

	<u>Q4 FY19</u>	<u>Q3 FY19</u>	<u>Q4 FY18</u>
Interest income and other income (expense), net . . . . .	\$(5.9)	\$ —	\$ 2.9
Interest expense . . . . .	<u>(0.2)</u>	<u>(0.4)</u>	<u>(0.6)</u>
Total other income (expense) . . . . .	<u>\$(6.1)</u>	<u>\$(0.4)</u>	<u>\$ 2.3</u>

Interest income and other income (expense), net decreased by \$5.9 million in Q4 FY19, compared with Q3 FY19, primarily as a result of increased foreign currency transaction losses of \$6.2 million. Interest expense, which is related to our China-based debt, decreased \$0.2 million in Q4 FY19 from Q3 FY19; interest on our China-based debt is partially subsidized by a local authority.

Interest income and other income (expense), net decreased by \$8.9 million in Q4 FY19, compared with Q4 FY18, primarily as a result of unrealized foreign currency remeasurement effect of \$7.9 million. Also contributing to the decrease was a reduction in interest income of \$0.5 million, which resulted from our lower average cash balances during the current year quarter, and the absence, in Q4 FY19, of \$0.4 million of gains realized on the sales of assets in Q4 FY18. Interest expense decreased \$0.4 million in Q4 FY19 from Q4 FY18. The decrease is attributable to the repayment of our \$57.5 million of 3.25% convertible senior notes in April 2019, the impact of which was somewhat offset by interest incurred on our China-based loans.

	<u>FY19</u>	<u>FY18</u>
Interest income and other income (expense), net . . . . .	\$ —	\$ 5.2
Interest expense . . . . .	<u>(1.4)</u>	<u>(2.3)</u>
Total other income (expense) . . . . .	<u>\$(1.4)</u>	<u>\$ 2.9</u>

Interest income and other income (expense), net decreased by \$5.2 million on a full-year basis in FY19, compared with FY18, primarily as a result of: unrealized foreign currency remeasurement effects of \$1.6 million; decreased interest income of \$1.5 million (due to our lower average cash balances); a reduction, in the current year, of \$1.0 million of gains realized on the sales of assets; and a decrease in subsidy income in China of \$0.7 million. Interest expense decreased \$0.9 million in FY19 from FY18. The decrease is attributable to the repayment of our \$57.5 million of 3.25% convertible senior notes in April 2019, the impact of which was somewhat offset by interest incurred on our China-based loans.

## Income Tax Provision

Certain provisions of the U.S. Tax Cuts and Jobs Act, which was signed into law on December 22, 2017, were effective for tax years beginning on or after January 1, 2018. As a fiscal year U.S. taxpayer, these provisions were applied to our fiscal year 2019, including the elimination of the domestic manufacturing deduction, which created new taxes on certain foreign sourced income, and introduced new limitations on certain business deductions.

	<u>Q4 FY19</u>	<u>Q3 FY19</u>	<u>Q4 FY18</u>
Income tax provision . . . . .	\$ 2.3	\$ 3.2	\$ 3.6
Effective income tax rate . . . . .	15.1%	24.7%	17.5%

The effective income tax rate is sensitive to the jurisdictional mix of our earnings, due, in part, to the non-recognition of tax provisions and benefits on losses in jurisdictions with valuation allowances.

The effective income tax rate decreased in Q4 FY19, compared with Q3 FY19, primarily due to the non-recognition of tax provisions in Q4 FY19 on U.S. quarterly income, compared with the non-recognition of tax benefits in Q3 FY19 on losses in the U.S.; the non-recognition of tax provisions and benefits in both quarters was a result of valuation allowances applying to those provisions and benefits. The effective income tax rate decreased in Q4 FY19 from Q4 FY18, for the same reasons; however, the effective income tax rate decrease was somewhat reduced by a decrease in the benefit of \$0.9 million from a tax holiday in Taiwan.

	<u>FY19</u>	<u>FY18</u>
Income tax provision . . . . .	\$10.2	\$ 7.3
Effective income tax rate . . . . .	20.1%	10.7%

The increase in the effective income tax rate on a full-year basis in FY19, compared with FY18, was primarily due to FY18 recognition of a tax benefit related to \$3.7 million of alternative minimum tax credits that became fully refundable under U.S. tax reform, and an FY19 decrease of \$1.1 million in the recognition of previously unrecognized tax benefits; the change in unrecognized tax benefits resulted from the differences in audit settlements and expirations of assessment period statutes of limitations between the two periods.

We consider all available evidence when evaluating the potential future realization of deferred tax assets, and when, based on the weight of all available evidence, we determine that it is more likely than not that some portion or all of our deferred tax assets will not be realized, we reduce our deferred tax assets by a valuation allowance. We also regularly assess the potential outcomes of ongoing and future tax examinations and, accordingly, have recorded accruals for such contingencies. Included in the balance of unrecognized tax benefits as of both October 31, 2019 and October 31, 2018, are \$1.9 million, recorded in Other liabilities in the consolidated balance sheets that, if recognized, would impact the effective tax rates.

## Net Income Attributable to Noncontrolling Interests

	<u>Q4 FY19</u>	<u>Q3 FY19</u>	<u>Q4 FY18</u>	<u>FY19</u>	<u>FY18</u>
Net income attributable to noncontrolling interest . . . . .	\$3.3	\$3.5	\$4.3	\$10.7	\$19.2

The changes, for all comparative periods, in net income attributable to noncontrolling interests were due to changes in net income at our IC manufacturing facilities in Taiwan and China, in which noncontrolling interests hold 49.99% ownership interests.

## Liquidity and Capital Resources

	<u>October 31, 2019</u>	<u>October 31, 2018</u>
	<i>(in \$ millions)</i>	<i>(in \$ millions)</i>
Cash and cash equivalents . . . . .	<u>\$ 206.5</u>	<u>\$329.3</u>
Net cash provided by operating activities . . . . .	\$ 68.4	\$130.6
Net cash used in investing activities . . . . .	\$(151.4)	\$(90.9)
Net cash used in financing activities . . . . .	\$ (42.1)	\$(13.8)

We had cash and cash equivalents of \$206.5 million at the end of FY19, compared with \$329.3 million at the end of fiscal 2018. The net decrease is primarily attributable to:

- \$57.5 million used to repay our convertible senior notes;
- \$178.4 million used to purchase capital assets (the preponderance of which related to equipping our China-based facilities);
- \$21.7 million used to repurchase our common stock;
- \$15.7 million dividends, net of contributions, paid to noncontrolling interests;
- \$54.6 million received from borrowings in China;
- \$27.0 million received from government incentives in China and the U.S.; and
- \$68.4 million provided by operating activities.

As of October 31, 2019, our working capital was \$275.6 million, compared with \$311.7 million at the end of fiscal 2018. The \$36.1 million net decrease is primarily attributable to:

- Decreased cash and cash equivalents of \$65.2 million (net of \$57.5 million used to repay our convertible senior notes, which had no impact on working capital);
- Increased inventories of \$19.0 million, the predominance of which was to supply our China FPD facility;
- Receivables for investment subsidies in China of \$3.2 million at the end of FY19; and
- Increased value added tax prepayments at our China-based facilities of \$3.7 million.

The net cash provided by operating activities of \$68.4 million in FY19 decreased \$62.2 million, from \$130.6 million provided in FY18. The net decrease was due primarily to:

- Lower net income of \$20.7 million in YTD FY19;
- Increased trade accounts receivable of \$13.7 million, primarily attributable to our \$11.6 million increase in revenue in Q4 FY19, compared with Q4 FY18;
- A greater increase in the change in inventories balances of \$11.4 million in FY19 (primarily attributable to the stocking of our FPD facility in China); and
- An increase in value added tax prepayments related to our China facilities of \$15.7 million in FY19. These prepayments are recoverable through future sales transactions of the facilities.

Net cash used in investing activities was \$151.4 million in FY19, an increase of \$60.5 million from \$90.9 million used in FY18. The net increase was primarily attributable to increased capital expenditures of \$85.8 million, the predominance of which related to the building and equipping of our China facilities. The increased capital expenditures were partially offset by \$27.0 million received in China and the U.S. from investment incentives in FY19.

Net cash flows from financing activities increased from funds used of \$13.8 million in FY18 to \$42.1 million of funds used in FY19. Significant components of the net decrease were:

- \$57.5 million used to repay (upon their maturity) our convertible senior notes;
- \$45.1 million used to pay dividends to DNP (related to their 49.99% interest in our IC facility in Taiwan);
- \$21.7 million used to acquire our common stock under share repurchase programs;
- \$54.6 million received from borrowings in China; and
- \$29.4 million contributed by DNP for their investment in our IC joint venture in China.

Foreign currency exchange rates contributed \$2.4 million to our reported cash balance at October 31, 2019.

As of October 31, 2019, and October 31, 2018, our total cash and cash equivalents included \$147.2 million and \$244.5 million, respectively, held by our foreign subsidiaries. The majority of earnings of our foreign subsidiaries are



considered to be indefinitely reinvested. Repatriation of these funds to the U.S. may subject them to U.S. state income taxes and local country withholding taxes in certain jurisdictions. Furthermore, our foreign subsidiaries continue to grow through the reinvestment of earnings in additional manufacturing capacity and capability, particularly in the high-end IC and FPD areas.

Our liquidity, as we operate in a high fixed-cost environment, is highly dependent on our revenue, cash conversion cycle, and the timing of our capital expenditures (which can vary significantly from period to period). Depending on conditions in the semiconductor and FPD markets, our cash flows from operations and current holdings of cash may not be adequate to meet our current and long-term needs for capital expenditures, operations, and debt repayments. Historically, in certain years, we have used external financing to fund these needs. Due to conditions in the credit markets and covenant restrictions on our existing debt, some financing instruments we have used in the past may not be available to us when required. Consequently, we cannot assure that additional sources of financing would be available to us on commercially favorable terms, should our long-term cash requirements exceed our existing cash and cash available under our credit agreements.

As of October 31, 2019, we had outstanding capital commitments of approximately \$112 million. We intend to finance our capital expenditures with our working capital, contributions from our joint venture partners, cash generated from operations and, if necessary, additional borrowings. Our remaining funding commitment for our IC facility in China, which commenced production in the third quarter of fiscal 2019, was approximately \$7 million as of October 31, 2019; we will fulfill this commitment over the next several quarters.

### Cash Requirements

Our cash requirements in fiscal 2020 will primarily be for funding our operations, capital spending, (including the completion of our two facilities in China, and the acquisition of additional high-end equipment at other sites), and debt repayments. At our option, should we deem it to be an optimal use of our cash, we may repurchase some of our common stock. We believe that our cash on hand, cash generated from operations and amounts available to borrow will be sufficient to meet our cash requirements for the next twelve months. We regularly review the availability and terms at which we might issue additional equity or debt securities in the public or private markets. However, we cannot assure that additional sources of financing would be available to us on commercially favorable terms, should our cash requirements exceed our existing cash and cash available under our credit agreements.

### Contractual Obligations

The following table presents our contractual obligations as of October 31, 2019:

Contractual Obligations	Payment due by period				
	Total	Less Than 1 Year	1 - 3 Years	3 - 5 Years	More Than 5 Years
Debt <sup>(1)</sup>	\$ 52,760	\$ 10,873	\$20,735	\$10,029	\$11,123
Operating leases	6,701	2,010	3,148	1,166	377
Purchase obligations <sup>(1)</sup>	130,270	105,579	24,691	—	—
Interest	7,385	2,433	3,034	1,609	309
Other noncurrent liabilities	11,436	1,046	2,656	2,658	5,076
Total	<u>\$208,552</u>	<u>\$121,941</u>	<u>\$54,264</u>	<u>\$15,462</u>	<u>\$16,885</u>

(1) Included above, in the less-than-one-year amounts of Debt and Purchase Obligations, are \$3.5 million and \$30.8 million, respectively, which we intend to finance under a multi-year capital lease in fiscal 2020. As discussed in Note 6 of the consolidated financial statements, we have been approved for a lease to finance the purchase of a high-end lithography tool under an agreement entered into in fiscal 2019.

As of October 31, 2019, the Company had recorded accruals for uncertain tax positions and related interest and penalties of \$1.9 million; these accruals were not included in the above table due to the high degree of uncertainty regarding the timing of future payments related to such liabilities.

## Off-Balance Sheet Arrangements

In January 2018, the Company, through its wholly owned Singapore subsidiary, and DNP, through its wholly owned subsidiary “DNP Asia Pacific PTE, Ltd.” entered into a joint venture under which DNP obtained a 49.99% interest in our IC business in Xiamen, China. The joint venture, known as “Xiamen American Japan Photronics Mask Co., Ltd.” (“PDMCX”), was established to develop and manufacture photomasks for leading-edge and advanced-generation semiconductors. Under the Joint Venture Operating Agreement of PDMCX (“the Agreement”), DNP is afforded, under certain circumstances, the right to “put” its interest in PDMCX to the Company. These circumstances include disputes regarding the strategic direction of PDMCX that may arise after the initial two-year term of the Agreement that cannot be resolved between the two parties. In addition, both the Company and DNP have the option to purchase, or put, their interest from, or to, the other party, should their ownership interest fall below 20% for a period of more than six consecutive months. Under all such circumstances, the sales of ownership interests would be at the exiting party’s ownership percentage of the joint venture’s net book value, with closing to take place within three business days of obtaining required approvals and clearance. Should DNP exercise an option to put their, or purchase our, interest in PDMCX we may, depending on the relationship of the fair and book value of PDMCX’s net assets, incur a loss. As of October 31, 2019, the Company and DNP each had net investments in PDMCX of approximately \$39.6 million.

We lease certain office facilities and equipment under operating leases that may require us to pay taxes, insurance and maintenance expenses related to the properties. Certain of these leases contain renewal or purchase options exercisable at the end of the lease terms. See Note 8 to the consolidated financial statements for additional information on these operating leases. In concurrence with our November 1, 2019, adoption of Accounting Standards Codification Topic 842 – “Leases”, we recognized right-of-use leased assets of approximately \$6.7 million and corresponding lease liabilities, which were discounted at our incremental borrowing rates. As a result, most of our lease agreements ceased to be off-balance sheet arrangements on that date.

## Business Outlook

The majority of our revenue growth is expected to continue to come from the Asia region, with significant portion in China – in the forms of both shipments into China and masks produced in China. We are anticipating short-term seasonal softness, with growth in FPD potentially alleviating some portion of the seasonality. We are in the process of expanding our tool base to allow us to meet increased demand across all technology nodes, and, if warranted by market demand, are prepared to expand our production. Production at our China-based IC facility should begin to significantly increase during fiscal 2020. However, the timing of the increase is dependent on customer qualifications. Overall, in terms of IC business, we see opportunities for growth, either through the ramp-up of the China facility, or through a recovery in the memory market, which we believe to not be an unlikely scenario, sometime during the calendar year 2020.

We make continual assessments of our global manufacturing strategy and monitor our revenue and related cash flows from operations. These ongoing assessments could result in future facility closures, asset redeployments, impairments of intangible or long-lived assets, workforce reductions, or the addition of manufacturing facilities, all of which would be based on market conditions and customer requirements. Our future results of operations and the other forward-looking statements contained in this filing involve a number of risks and uncertainties. While various risks and uncertainties have been discussed, a number of other unforeseen factors could cause actual results to differ materially from our expectations.

## Critical Accounting Estimates

Our consolidated financial statements are based on the selection and application of accounting policies, which require management to make significant estimates and assumptions. We believe the following to be the more critical areas that require judgment when applying our accounting policies:

- the determination of whether revenues related to our revenue contracts should be recognized over time or at a point in time, as these determinations impact the timing of our reported revenues and net income;
- the estimation of the point in the manufacturing process at which we are entitled to receive payment as we perform;

- the determination of the useful lives of our property, plant, and equipment and the timing of when depreciation should begin on such assets, as these determinations can significantly impact our gross margin and research and development expenses;
- the evaluation of the recoverability of our long-lived assets and definite-lived intangible assets, which requires us to forecast the future cash flows related to these assets; this evaluation can significantly impact our gross margin and operating expense;
- the estimation of the collectability of our accounts receivable which impacts our gross margin and operating expenses; and
- the recognition and measurement of current and deferred income taxes, including the measurement of uncertain tax positions, which impacts our provision for income taxes and our tax-related asset and liability balances.

Please refer to Notes 1,7, and 11 to our consolidated financial statements for additional information related to these critical accounting estimates and our other significant accounting policies.

### **Recent Accounting Pronouncements**

See “Item 8. Financial Statements and Supplementary Data – Notes to Consolidated Financial Statements – Note 22 Recent Accounting Pronouncements” for recent accounting pronouncements that may affect our financial reporting.

## **ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK**

### **Foreign Currency Exchange Rate Risk**

We conduct business in several major currencies throughout our worldwide operations, and our financial performance may be affected by fluctuations in the exchange rates of these currencies. Changes in exchange rates can positively or negatively affect our reported revenue, operating income, assets, liabilities, and equity. The functional currencies of our Asian subsidiaries are the South Korean won, the New Taiwan dollar, the Chinese renminbi and the Singapore dollar. The functional currencies of our European subsidiaries are the British pound and the euro. In addition, we engage in transactions and have exposures to the Japanese yen.

We attempt to minimize our risk of foreign currency transaction losses by producing products in the same country in which the products are sold (thereby generating revenues and incurring expenses in the same currency), and by managing our working capital. However, in some instances, we sell products in a currency other than the functional currency of the country where it was produced, or purchase products in a currency that differs from the functional currency of the purchasing entity. In addition, to the extent practicable, we attempt to reduce our exposure to foreign currency exchange fluctuations by converting cash and cash equivalents into the functional currency of the subsidiary which holds the cash. We may also enter into derivative contracts to mitigate our exposure to foreign currency fluctuations when we have a significant purchase obligation or significant receivable denominated in a currency that differs from the transacting subsidiaries' functional currencies. We do not enter into derivatives for speculative purposes. There can be no assurance that these practices will protect us from the need to recognize significant foreign currency transaction gains and losses, especially in the event of a significant adverse movement in the value of any foreign currency in which we conduct business against any of our functional currencies, including the U.S. dollar.

Our primary net foreign currency exposures as of October 31, 2019, included the South Korean won, the Japanese yen, the New Taiwan dollar, the Chinese renminbi, the Singapore dollar, the British pound sterling, and the euro. As of October 31, 2019, a 10% adverse movement in the value of these currencies against the functional currencies of our subsidiaries would have resulted in a net unrealized pre-tax loss of \$33.1 million, which represents an increase of \$19.9 million from the same movement as of October 31, 2018. The increase in foreign currency rate change risk is primarily the result of increased exposures of the Chinese renminbi and the South Korean won against the U.S. dollar. We do not believe that a 10% change in the exchange rates of other non-U.S. dollar currencies would have had a material effect on our October 31, 2019 consolidated financial statements.

### **Interest Rate Risk**

A 10% adverse movement in the interest rates on our variable rate borrowings would not have had a material effect on our October 31, 2019, consolidated financial statements.

**ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA**

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## **REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

To Shareholders and the Board of Directors  
of Photronics, Inc.  
Brookfield, Connecticut

### **Opinions on the Financial Statements and Internal Control over Financial Reporting**

We have audited the accompanying consolidated balance sheets of Photronics, Inc. and subsidiaries (the “Company”) as of October 31, 2019 and 2018, the related consolidated statements of income, consolidated statements of comprehensive income, consolidated statements of equity, and consolidated statements of cash flows, for each of the three years in the period ended October 31, 2019, the related notes and the schedule listed in the Index at Item 15 (collectively referred to as the “financial statements”). We also have audited the Company’s internal control over financial reporting as of October 31, 2019, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Company as of October 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended October 31, 2019, in conformity with accounting principles generally accepted in the United States of America. Also, in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of October 31, 2019, based on the criteria established in *Internal Control — Integrated Framework (2013)* issued by COSO.

### **Basis for Opinions**

The Company’s management is responsible for these financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management’s Report on Internal Control over Financial Reporting in Item 9A. Our responsibility is to express an opinion on these financial statements and an opinion on the Company’s internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the financial statements included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures to respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

### **Definition and Limitations of Internal Control over Financial Reporting**

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.



Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

### **Critical Audit Matter**

The critical audit matter communicated below is a matter arising from the current-period audit of the financial statements that was communicated or required to be communicated to the Company's Audit Committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgment. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

### **Revenue Recognition on In-Process Production Orders — Refer to Note 7 to the consolidated financial statements**

#### *Critical Audit Matter Description*

The Company recognizes revenue over time for in-process production orders that have not shipped for contracts with customers for which it has an enforceable right to bill and collect consideration, inclusive of a reasonable profit, in the event the in-process orders are cancelled by the customers. This results in the Company recording a corresponding contract asset as of period end for these contracts. Significant judgment is exercised by the Company in determining the amount of revenue to recognize for these contracts and the corresponding contract asset, specifically in estimating the point within the production cycle at which the production orders stand in relation to the Company's enforceable right within the contract. Pursuant to these contracts, revenue recognized over time and the associated contract asset as of October 31, 2019 was \$7.6 million.

We identified the determination of revenue recognized over time for in-process production orders as of October 31, 2019 a critical auditing matter because of the significant estimates and assumptions management makes in determining the amount of revenue to recognize for these contracts. This required a high degree of audit judgment and an increased extent of effort when performing audit procedures to evaluate the reasonableness of management's determination of the progress point of in-process orders and the amount of revenue recognized over time and the corresponding contract asset as of October 31, 2019.

#### *How the Critical Audit Matter Was Addressed in the Audit*

Our audit procedures related to the Company's determination of the progress point of in-process orders and resulting revenue recognized over time and corresponding contract asset as of October 31, 2019 included the following:

- We tested the operating effectiveness of controls over management's determination of the point in the production process and correlation to stated contractual rights.
- We tested the mathematical accuracy of management's calculations of revenue and the associated timing of revenue recognized in the consolidated financial statements.
- We selected a sample of in-process production orders as of October 31, 2019 and performed the following procedures for each selection:
  - Obtained and read the contract.
  - Physically observed existence of the in-process production order.
  - Tested management's identification of significant contract terms and resulting revenue recognition for the in-process production order.
  - Tested management estimate of the production point for the in-process order and corresponding revenue recognition and contract asset based on the Company's enforceable right within the contract.

/s/ Deloitte & Touche LLP  
Hartford, Connecticut  
December 20, 2019

We have served as the Company's auditor since 1991.

**PHOTRONICS, INC.**  
**Consolidated Balance Sheets**  
*(in thousands, except per share amounts)*

	<u>October 31, 2019</u>	<u>October 31, 2018</u>
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents .....	\$ 206,530	\$ 329,277
Accounts receivable, net of allowance of \$1,334 in 2019 and \$1,526 in 2018 .....	134,454	120,515
Inventories .....	48,155	29,180
Other current assets .....	<u>38,388</u>	<u>23,759</u>
Total current assets .....	427,527	502,731
Property, plant and equipment, net .....	632,441	571,781
Intangible assets, net .....	7,870	12,368
Deferred income taxes .....	20,779	18,109
Other assets .....	<u>30,048</u>	<u>5,020</u>
Total assets .....	<u>\$1,118,665</u>	<u>\$1,110,009</u>
<b>LIABILITIES AND EQUITY</b>		
Current liabilities:		
Short-term debt .....	\$ 8,731	\$ —
Current portion of long-term debt .....	2,142	57,453
Accounts payable .....	91,379	89,149
Accrued liabilities .....	<u>49,702</u>	<u>44,474</u>
Total current liabilities .....	151,954	191,076
Long-term debt .....	41,887	—
Other liabilities .....	<u>13,732</u>	<u>14,364</u>
Total liabilities .....	207,573	205,440
Commitments and contingencies		
Equity:		
Preferred stock, \$0.01 par value, 2,000 shares authorized, none issued and outstanding .....	—	—
Common stock, \$0.01 par value, 150,000 shares authorized, 65,595 shares issued and outstanding at October 31, 2019, and 69,700 shares issued and 67,142 outstanding at October 31, 2018 .....	656	697
Additional paid-in capital .....	524,319	555,606
Retained earnings .....	253,922	231,445
Treasury stock, 0 shares at October 31, 2019 and 2,558 shares at October 31, 2018 .....	—	(23,111)
Accumulated other comprehensive loss .....	<u>(9,005)</u>	<u>(4,966)</u>
Total Photronics, Inc. shareholders' equity .....	769,892	759,671
Noncontrolling interests .....	<u>141,200</u>	<u>144,898</u>
Total equity .....	<u>911,092</u>	<u>904,569</u>
Total liabilities and equity .....	<u>\$1,118,665</u>	<u>\$1,110,009</u>

See accompanying notes to consolidated financial statements.

**PHOTRONICS, INC.**  
**Consolidated Statements of Income**  
*(in thousands, except per share amounts)*

	<u>Year Ended</u>		
	<u>October 31,</u> <u>2019</u>	<u>October 31,</u> <u>2018</u>	<u>October 29,</u> <u>2017</u>
Revenue .....	\$550,660	\$535,276	\$450,678
Cost of goods sold .....	<u>429,819</u>	<u>403,773</u>	<u>359,363</u>
Gross profit.....	120,841	131,503	91,315
Operating expenses:			
Selling, general and administrative .....	52,326	51,395	43,585
Research and development.....	<u>16,394</u>	<u>14,481</u>	<u>15,862</u>
Total operating expenses .....	<u>68,720</u>	<u>65,876</u>	<u>59,447</u>
Operating income.....	52,121	65,627	31,868
Other income (expense):			
Interest income and other income (expense), net .....	5	5,206	(3,068)
Interest expense .....	(1,425)	(2,262)	(2,235)
Income before income tax provision.....	50,701	68,571	26,565
Income tax provision .....	<u>10,210</u>	<u>7,335</u>	<u>5,276</u>
Net income .....	40,491	61,236	21,289
Net income attributable to noncontrolling interests .....	<u>10,698</u>	<u>19,181</u>	<u>8,159</u>
Net income attributable to Photronics, Inc. shareholders.....	<u>\$ 29,793</u>	<u>\$ 42,055</u>	<u>\$ 13,130</u>
Earnings per share:			
Basic .....	<u>\$ 0.45</u>	<u>\$ 0.61</u>	<u>\$ 0.19</u>
Diluted .....	<u>\$ 0.44</u>	<u>\$ 0.59</u>	<u>\$ 0.19</u>
Weighted-average number of common shares outstanding:			
Basic .....	<u>66,347</u>	<u>68,829</u>	<u>68,436</u>
Diluted .....	<u>69,155</u>	<u>74,821</u>	<u>69,288</u>

See accompanying notes to consolidated financial statements.

**PHOTRONICS, INC.**  
**Consolidated Statements of Comprehensive Income**  
*(in thousands)*

	<u>Year Ended</u>		
	<u>October 31, 2019</u>	<u>October 31, 2018</u>	<u>October 29, 2017</u>
Net income . . . . .	\$40,491	\$ 61,236	\$21,289
Other comprehensive (loss) income, net of tax:			
Foreign currency translation adjustments . . . . .	(2,877)	(16,672)	19,799
Amortization of cash flow hedge . . . . .	—	48	129
Other . . . . .	<u>(74)</u>	<u>101</u>	<u>478</u>
Net other comprehensive (loss) income . . . . .	<u>(2,951)</u>	<u>(16,523)</u>	<u>20,406</u>
Comprehensive income . . . . .	37,540	44,713	41,695
Less: comprehensive income attributable to noncontrolling interests . . . . .	<u>11,786</u>	<u>14,515</u>	<u>14,003</u>
Comprehensive income attributable to Photronics, Inc. shareholders . . . . .	<u>\$25,754</u>	<u>\$ 30,198</u>	<u>\$27,692</u>

See accompanying notes to consolidated financial statements.

**PHOTRONICS, INC.**  
**Consolidated Statements of Equity**  
**Years Ended October 31, 2019, October 31, 2018 and October 29, 2017**  
*(in thousands)*

	Photronics, Inc. Shareholders							
	Common Stock		Additional Paid-In Capital	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive (Loss) Income	Non- Controlling Interests	Total Equity
	Shares	Amount						
<b>Balance at October 30, 2016</b> . . .	68,080	\$681	\$541,093	\$176,260	\$ —	\$ (7,671)	\$115,111	\$825,474
Net income . . . . .	—	—	—	13,130	—	—	8,159	21,289
Other comprehensive income . . . . .	—	—	—	—	—	14,562	5,844	20,406
Sales of common stock through employee stock option and purchase plan . . . . .	459	5	2,877	—	—	—	—	2,882
Restricted stock awards vesting and expense . . . . .	127	1	1,508	—	—	—	—	1,509
Share-based compensation expense . . . . .	—	—	2,118	—	—	—	—	2,118
Dividends to noncontrolling interests . . . . .	—	—	—	—	—	—	(8,383)	(8,383)
<b>Balance at October 29, 2017</b> . . .	68,666	687	547,596	189,390	—	6,891	120,731	865,295
Net income . . . . .	—	—	—	42,055	—	—	19,181	61,236
Other comprehensive income . . . . .	—	—	—	—	—	(11,857)	(4,666)	(16,523)
Sales of common stock through employee stock option and purchase plan . . . . .	870	9	4,683	—	—	—	—	4,692
Restricted stock awards vesting and expense . . . . .	164	1	1,747	—	—	—	—	1,748
Share-based compensation expense . . . . .	—	—	1,432	—	—	—	—	1,432
Contribution from noncontrolling interests . . . . .	—	—	148	—	—	—	17,848	17,996
Dividends to noncontrolling interests . . . . .	—	—	—	—	—	—	(8,196)	(8,196)
Purchases of treasury stock . . . . .	—	—	—	—	(23,111)	—	—	(23,111)
<b>Balance at October 31, 2018</b> . . .	69,700	697	555,606	231,445	(23,111)	(4,966)	144,898	904,569
Adoption of ASU 2014-09 . . . . .	—	—	—	1,083	—	—	121	1,204
Adoption of ASU 2016-16 . . . . .	—	—	—	(1,130)	—	—	(3)	(1,133)
Net income . . . . .	—	—	—	29,793	—	—	10,698	40,491
Other comprehensive (loss) income . . . . .	—	—	—	—	—	(4,039)	1,088	(2,951)
Sale of common stock through employee stock option and purchase plans . . . . .	390	4	2,524	—	—	—	—	2,528
Restricted stock awards vesting and expense . . . . .	196	2	2,497	—	—	—	—	2,499
Share-based compensation expense . . . . .	—	—	1,183	—	—	—	—	1,183
Contribution from noncontrolling interest . . . . .	—	—	—	—	—	—	29,394	29,394
Dividends to noncontrolling interest . . . . .	—	—	—	—	—	—	(44,939)	(44,939)
Repurchase of common stock of subsidiary . . . . .	—	—	—	—	—	—	(57)	(57)
Purchases of treasury stock . . . . .	—	—	—	—	(21,696)	—	—	(21,696)
Retirement of treasury stock . . . . .	(4,691)	(47)	(37,491)	(7,269)	44,807	—	—	—
<b>Balance at October 31, 2019</b> . . .	<u>65,595</u>	<u>\$656</u>	<u>\$524,319</u>	<u>\$253,922</u>	<u>\$ —</u>	<u>\$ (9,005)</u>	<u>\$141,200</u>	<u>\$911,092</u>

See accompanying notes to consolidated financial statements.

**PHOTRONICS, INC.**  
**Consolidated Statements of Cash Flows**  
*(in thousands)*

	Year Ended		
	October 31, 2019	October 31, 2018	October 29, 2017
Cash flows from operating activities:			
Net income . . . . .	\$ 40,491	\$ 61,236	\$ 21,289
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization of property, plant and equipment . . . . .	79,238	79,536	81,699
Amortization of intangible assets . . . . .	4,641	4,797	4,874
Share-based compensation . . . . .	3,680	3,180	3,627
Deferred income taxes . . . . .	(3,662)	(273)	1,633
Changes in assets, liabilities, and other:			
Accounts receivable . . . . .	(12,321)	(18,553)	(9,625)
Inventories . . . . .	(23,088)	(6,162)	(602)
Other current assets . . . . .	(8,631)	(11,731)	1,127
Accounts payable, accrued liabilities and other . . . . .	<u>(11,962)</u>	<u>18,537</u>	<u>(7,189)</u>
Net cash provided by operating activities . . . . .	<u>68,386</u>	<u>130,567</u>	<u>96,833</u>
Cash flows from investing activities:			
Purchases of property, plant and equipment . . . . .	(178,375)	(92,585)	(91,965)
Government incentives . . . . .	27,003	1,005	—
Purchases of intangible assets . . . . .	(95)	(218)	(834)
Proceeds from sales of investments . . . . .	—	—	167
Acquisition of business . . . . .	—	—	(5,400)
Other . . . . .	<u>61</u>	<u>929*</u>	<u>17*</u>
Net cash used in investing activities . . . . .	<u>(151,406)</u>	<u>(90,869)</u>	<u>(98,015)*</u>
Cash flows from financing activities:			
Proceeds from debt . . . . .	54,633	—	—
Contribution from noncontrolling interests . . . . .	29,394	17,996	—
Repayments of debt . . . . .	(61,319)	(4,639)	(5,428)
Dividends paid to noncontrolling interests . . . . .	(45,050)	(8,166)	(8,298)
Purchases of treasury stock . . . . .	(21,696)	(23,111)	—
Proceeds from share-based arrangements . . . . .	2,071	4,634	2,830
Other . . . . .	<u>(92)</u>	<u>(519)</u>	<u>(32)</u>
Net cash used in financing activities . . . . .	<u>(42,059)</u>	<u>(13,805)</u>	<u>(10,928)</u>
Effects of exchange rate changes on cash, cash equivalents, and restricted cash . . . . .	<u>2,381</u>	<u>(4,840)*</u>	<u>6,247*</u>
Net (decrease) increase in cash, cash equivalents, and restricted cash . . . . .	(122,698)	21,053*	(5,863)*
Cash, cash equivalents, and restricted cash at beginning of year . . . . .	<u>331,989</u>	<u>310,936*</u>	<u>316,799</u>
Cash, cash equivalents, and restricted cash at end of year . . . . .	<u>\$ 209,291</u>	<u>\$331,989*</u>	<u>\$310,936*</u>
Supplemental disclosure of non-cash information:			
Accrual for property, plant and equipment purchased during year . . . . .	\$ 13,671	\$ 29,602	\$ 2,767

\* Amount has been modified to reflect the adoption of ASU 2016-18 (see Note 22).

See accompanying notes to consolidated financial statements.



**PHOTRONICS, INC.**  
**Notes to Consolidated Financial Statements**  
**Years Ended October 31, 2019, October 31, 2018 and October 29, 2017**  
*(in thousands, except share amounts)*

**NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

**Business**

Photronics, Inc. (“Photronics”, “the Company”, “we”, “our”, or “us”) is one of the world’s leading manufacturers of photomasks, which are high-precision photographic quartz or glass plates containing microscopic images of electronic circuits. Photomasks are a key element in the manufacture of semiconductors and flat-panel displays (“FPDs”), and are used as masters to transfer circuit patterns onto semiconductor wafers and FPD substrates during the fabrication of integrated circuits (“ICs” or “semiconductors”) and a variety of FPDs and, to a lesser extent, other types of electrical and optical components. We currently have eleven manufacturing facilities, which are located in Taiwan (3), Korea, the United States (3), Europe (2), and two recently constructed facilities in China. Our FPD Facility in Hefei, China, commenced production in the second quarter of fiscal 2019 and our IC facility in Xiamen, China, commenced production in the third quarter of fiscal 2019.

**Consolidation**

The accompanying consolidated financial statements include the accounts of Photronics, Inc., its wholly owned subsidiaries, and the majority-owned subsidiaries which it controls. All intercompany balances and transactions have been eliminated in consolidation.

**Estimates and Assumptions**

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires us to make estimates and assumptions that affect amounts reported in them. Estimates are based on historical experience and on various assumptions that are believed to be reasonable under the circumstances. Our estimates are based on the facts and circumstances available at the time they are made. Actual results we report may differ from such estimates. We review these estimates periodically and reflect any effects of revisions in the period in which they are determined.

**Fiscal Year**

Commencing with our 2018 fiscal year, our fiscal year ends on October 31. In prior years, our fiscal years ended on the Sunday closest to October 31. Prior year results in this Form 10-K have not been restated to reflect year-end dates of October 31.

**Cash and Cash Equivalents**

Cash and cash equivalents include cash and highly liquid investments with an original maturity of three months or less, readily convertible to known amounts of cash, and so near to their maturity that they present insignificant risk of changes in value because of changes in interest rates. The carrying values of cash equivalents approximate their fair values, due to the short-term maturities of these instruments.

**Accounts Receivable and Allowance for Doubtful Accounts**

We generally record our accounts receivable at their billed amounts. All outstanding past due customer invoices are reviewed for collectibility during, and at the end of, every period. To the extent that we believe a loss on the collection of a customer invoice is probable, we record the loss and credit the allowance for doubtful accounts. In the event that an amount is determined to be uncollectible, we charge the allowance for doubtful accounts and eliminate the related receivable.

## Inventories

Inventories are stated at the lower of cost, determined under the first-in, first-out (“FIFO”) method, or net realizable value. Presented below are the components of inventory at the balance sheet dates:

	<u>October 31</u> <u>2019</u>	<u>October 31</u> <u>2018</u>
Raw materials . . . . .	\$46,027	\$25,110
Work in process . . . . .	2,122	3,402
Finished goods . . . . .	<u>6</u>	<u>668</u>
	<u>\$48,155</u>	<u>\$29,180</u>

## Property, Plant and Equipment

Property, plant and equipment, except as explained below under “Impairment of Long-Lived Assets,” is stated at cost less accumulated depreciation and amortization. Repairs and maintenance, as well as renewals and replacements of a routine nature, are charged to operations as incurred, while those that improve, or extend the lives of, existing assets are capitalized. Upon sale or other disposition, the cost of the asset and its related accumulated depreciation are removed from the accounts, and any resulting gain or loss is reflected in earnings.

Depreciation and amortization, essentially all of which are included in cost of goods sold, are computed using the straight-line method over the estimated useful lives of the related assets. Buildings and improvements are depreciated over 10 to 39 years, machinery and equipment over 5 to 15 years, and furniture, fixtures and office equipment over 3 to 5 years. Leasehold improvements are amortized over the life of the lease or the estimated useful life of the improvement, whichever is less. We employ judgment and assumptions when we establish estimated useful lives and depreciation periods, as well as when we periodically review property, plant and equipment for any potential impairment in carrying values, whenever events such as a significant industry downturn, plant closures, technological obsolescence, or other change in circumstances indicate that their carrying amounts may not be recoverable.

## Intangible Assets

Intangible assets consist primarily of a technology license agreement and acquisition-related intangibles. These assets, except as explained below, are stated at fair value as of the date acquired, less accumulated amortization. Amortization is calculated based on the estimated useful lives of the assets, which range from 3 to 15 years, using the straight-line method or another method that more fairly represents the utilization of the assets.

We periodically evaluate the remaining useful lives of our intangible assets to determine whether events or circumstances warrant a revision to the remaining periods of amortization. In the event that the estimate of an intangible asset’s remaining useful life has changed, the remaining carrying amount of the intangible asset is amortized prospectively over that revised remaining useful life. If it is determined that an intangible asset has an indefinite useful life, that intangible asset would be subject to impairment testing annually or whenever events or circumstances indicate that its carrying value may not, based on future undiscounted cash flows or market factors, be recoverable. An impairment loss, the recorded amount of which would be based on the fair value of the intangible asset at the measurement date, would be recorded in the period in which the impairment determination was made.

## Impairment of Long-Lived Assets

Long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets may not be recoverable. Determinations of recoverability are based upon our judgment and estimates of undiscounted future cash flows resulting from the use of the assets and their eventual disposition. Measurement of an impairment loss for long-lived assets that we expect to hold and use is based on the fair value of the assets determined using a market or income approach compared with the carrying value of the asset. The carrying values of assets determined to be impaired would be reduced to their estimated fair values.

## Restricted Cash

Restricted cash in the amounts of \$2.8 million and \$2.7 million are included in “Other assets” on our October 31, 2019 and October 31, 2018, consolidated balance sheets, respectively. The restrictions on these amounts are primarily related to land lease agreements and customs requirements.

## **Business Combinations**

When acquiring other businesses, or participating in mergers or joint ventures in which we are deemed to be the acquirer, we generally recognize identifiable assets acquired, liabilities assumed and any noncontrolling interests at their acquisition date fair values, separately from any goodwill that may be required to be recognized. Goodwill, when recognizable, would be measured as the excess amount of any consideration transferred, which is generally measured at fair value, over the acquisition date fair values of the identifiable assets acquired and liabilities assumed.

Accounting for such transactions requires us to make significant assumptions and estimates and, although we believe any estimates and assumptions we make to be reasonable and appropriate at the time they are made, unanticipated events and circumstances may arise that affect their accuracy, which may cause actual results to differ from those we estimated. When required, we will adjust the values of the assets acquired and liabilities assumed against the acquisition gain or goodwill, as initially recorded, for a period of up to one year after the transaction.

Costs incurred to effect a merger or acquisition, such as legal, accounting, valuation and other third-party costs, as well as internal general and administrative costs incurred are charged to expense in the periods incurred. Costs incurred to issue any debt and equity securities are recognized in accordance with other applicable generally accepted accounting principles.

## **Investments in Joint Ventures**

The financial results of investments in joint ventures in which we have a controlling financial interest are included in our consolidated financial statements. Investments in joint ventures over which we have the ability to exercise significant influence and that, in general, are at least twenty percent owned are accounted for under the equity method. An impairment loss would be recognized whenever a decrease in the fair value of such an investment below its carrying amount is determined to be other than temporary. In judging “other than temporary,” we would consider the length of time and the extent to which the fair value of the investment has been less than its carrying amount, the near-term and longer-term operating and financial prospects of the investee, and our longer-term intent of retaining our investment in the investee.

## **Variable Interest Entities**

We account for the investments we make in certain legal entities in which equity investors do not have 1) sufficient equity at risk for the legal entity to finance its activities without additional subordinated financial support or, 2) as a group, the holders of the equity investment at risk do not have either the power, through voting or similar rights, to direct the activities of the legal entity that most significantly impact the entity’s economic performance or, 3) the obligation to absorb the expected losses of the legal entity or the right to receive expected residual returns of the legal entity as “variable interest entities”, or “VIEs”.

We consolidate the results of any such entity in which we have determined that we have a controlling financial interest. We would have a “controlling financial interest” (and thus be considered the “primary beneficiary” of the entity) in such an entity when we have both the power to direct the activities that most significantly affect the VIE’s economic performance and the obligation to absorb the losses of, or right to receive the benefits from, the VIE that could be potentially significant to the VIE. On a quarterly basis, we reassess whether we have a controlling financial interest in any investments we have in these entities.

We account for investments we make in VIEs in which we have determined that we do not have a controlling financial interest but have a significant influence over, and hold at least a twenty percent ownership interest in, using the equity method. Any such investment not meeting the parameters to be accounted for under the equity method would be accounted for using the cost method, unless the investment had a readily determinable fair value, at which value it would then be reported.

## **Income Taxes**

The income tax provision is computed on the basis of the various tax jurisdictions’ income or loss before income taxes. Deferred income taxes reflect the tax effects of differences between the carrying amounts of assets and liabilities for financial reporting purposes and their amounts used for income tax purposes, as well as the tax effects of net operating losses and tax credit carryforwards. We use judgment and make assumptions to determine if

valuation allowances for deferred income tax assets are required, if their realization is not more likely than not, by considering future market growth, operating forecasts, future taxable income, and the mix of earnings among the tax jurisdictions in which we operate. Accordingly, income taxes charged against earnings may have been impacted by changes in the valuation allowances.

We consider income taxes in each of the tax jurisdictions in which we operate in order to determine our effective income tax rate. Our current income tax expense is thus identified, and temporary differences resulting from differing treatments of items for tax and financial reporting purposes are assessed. These differences result in deferred tax assets and liabilities, which are included in our consolidated balance sheets.

We account for uncertain tax positions by recording a liability for unrecognized tax benefits resulting from uncertain tax positions taken, or expected to be taken, in our tax returns. We include any applicable interest and penalties related to uncertain tax positions in our income tax provision.

### **Treasury Stock**

We record treasury stock purchases under the cost method, recording the entire cost of the acquired stock as treasury stock. Gains and losses on subsequent reissuances would be credited or charged to additional paid-in capital, and we would employ the average cost method (with average cost being determined separately for each share repurchase program), in the event that we subsequently reissue shares.

### **Earnings Per Share**

Basic earnings per share ("EPS") is based on the weighted-average number of common shares outstanding for the period, excluding any dilutive common share equivalents. Diluted EPS reflects the potential dilution that could occur if certain share-based payment awards or financial instruments were exercised, earned or converted.

### **Share-Based Compensation**

We recognize share-based compensation expense over the service period that the awards are expected to vest. Share-based compensation expense includes the estimated effects of forfeitures, which are adjusted over the requisite service period to the extent actual forfeitures differ, or are expected to differ, from such estimates. Changes in estimated forfeitures are recognized in the period of change, and will impact the amount of expense to be recognized in future periods. Determining the appropriate option pricing model, calculating the grant date fair value of share-based awards and estimating forfeiture rates requires considerable judgment, including estimations of stock price volatility and the expected term of options granted.

We use the Black-Scholes option pricing model to value employee stock options. We estimate stock price volatility based on daily averages of our common stock's historical volatility over a term approximately equal to the estimated time period the grant will remain outstanding. The expected term of options and forfeiture rate assumptions are derived from historical data.

### **Research and Development**

Research and development costs are expensed as incurred, and consist primarily of development efforts related to high-end process technologies for advanced subwavelength reticle solutions for IC and FPD photomask technologies.

### **Foreign Currency Translation**

Our non-US subsidiaries maintain their accounts in their respective local currencies. Assets and liabilities of such subsidiaries are translated to U.S. dollars at year-end exchange rates. Income and expenses are translated at average rates of exchange prevailing during the year. Foreign currency translation adjustments are accumulated and reported in accumulated other comprehensive income, a component of equity. The effects of changes in exchange rates on foreign currency transactions, which are included in Interest income and other income (expense) net, were a net (loss)/gain of \$(1.3) million, \$0.4 million and \$(5.2) million in fiscal years 2019, 2018 and 2017, respectively.

## **Noncontrolling Interests**

Substantially all of Noncontrolling interests represents the minority shareholders' proportionate share in the equity of two of the Company's majority-owned subsidiaries: Photronics DNP Mask Corporation ("PDMC") in Taiwan, and Xiamen American Japan Photronics Mask Co., Ltd ("PDMCX") in China, of which noncontrolling interests owned 49.99% as of October 31, 2019 and October 31, 2018. In addition, noncontrolling shareholders owned approximately 0.2% of PK Ltd. ("PKL") in Korea as of October 31, 2019 and October 31, 2018. In November 2019, we acquired the remaining noncontrolling interests' shares of PKL for approximately \$0.6 million.

## **Derivative Instruments and Hedging Activities**

We record derivatives in the consolidated balance sheets as assets or liabilities, measured at fair value. We do not engage in derivative instruments for speculative purposes. Gains or losses resulting from changes in the values of derivatives are reflected in earnings, or as accumulated other comprehensive income or loss, a separate component of equity, depending on the use of the derivatives and whether they qualify for hedge accounting. In order to qualify for hedge accounting, among other criteria, a derivative must be a hedge of an interest rate, price, foreign currency exchange rate, or credit risk that is expected to be highly effective at the inception of the hedge, be highly effective in achieving offsetting changes in the fair value or cash flows of the hedged item during the term of the hedge and formally documented at the inception of the hedge. In general, the types of risks we would hedge are those related to the variability of future cash flows caused by movements in foreign currency exchange and interest rates. We would document our risk management strategy and hedge effectiveness at the inception of, and during the term of, each hedge.

## **Revenue Recognition**

We adopted Accounting Standards Update 2014-09 and all subsequent amendments which are collectively codified in Accounting Standards Codification Topic 606 – "Revenue from Contracts with Customers" ("Topic 606") – on November 1, 2018, under the modified retrospective transition method, only with respect to contracts that were not complete as of the date of adoption. This approach required prospective application of the guidance with a cumulative effect adjustment to retained earnings to reflect the impact of the adoption on contracts that were not complete as of the date of the adoption. In accordance with the modified retrospective transition method, the results of the prior year period presented have not been adjusted for the effects of Topic 606. Please see Note 7 for a detailed discussion of our revenue recognition and related accounting policies.

## **Product Warranty**

Our photomasks are sold under warranties that generally range from one to twenty-four months. We warrant that our photomasks conform to customer specifications, and will typically repair, replace, or issue a refund, at our option, any photomasks that fail to do so. The warranties do not represent separate performance obligations in our revenue contracts. Historically, customer claims under warranty have been immaterial.

## **Government Grants**

We account for funds we receive from government grants by reducing the costs of the assets or expenses to which we apply the funds. Funds we receive that cannot be attributed to specific assets or expenses would be recognized as other income, and included in Interest income and other income (expense), net in the Consolidated Statements of Income. Funds we receive from government grants are classified in our Consolidated Statement of Cash Flows as either cash flows from operating activities or cash flows from investing activities, in accordance with how we expend the funds.

## NOTE 2 - PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment consists of the following:

	<u>October 31, 2019</u>	<u>October 31, 2018</u>
Land .....	\$ 12,085	\$ 11,139
Buildings and improvements .....	172,340	124,771
Machinery and equipment .....	1,748,483	1,566,163
Leasehold improvements .....	19,921	19,577
Furniture, fixtures and office equipment .....	14,404	12,415
Construction in progress .....	<u>28,135</u>	<u>128,649</u>
	1,995,368	1,862,714
Accumulated depreciation and amortization .....	<u>(1,362,927)</u>	<u>(1,290,933)</u>
	<u>\$ 632,441</u>	<u>\$ 571,781</u>

In January 2017, we entered into a noncash transaction with a customer which resulted in the acquisition of equipment with a fair value of approximately \$6.7 million in fiscal year 2018.

## NOTE 3 - INTANGIBLE ASSETS

Amortization expense of the Company's finite-lived intangible assets was \$4.6 million, \$4.8 million and \$4.9 million in fiscal years 2019 2018 and 2017, respectively.

Intangible assets consist of:

	<u>Gross Amount</u>	<u>Accumulated Amortization</u>	<u>Net Amount</u>
<b>As of October 31, 2019</b>			
Technology license agreement .....	\$59,616	\$(53,323)	\$ 6,293
Customer relationships .....	9,174	(8,186)	988
Software and other .....	<u>6,537</u>	<u>(5,948)</u>	<u>589</u>
	<u>\$75,327</u>	<u>\$(67,457)</u>	<u>\$ 7,870</u>
<b>As of October 31, 2018</b>			
Technology license agreement .....	\$59,616	\$(49,349)	\$10,267
Customer relationships .....	9,147	(7,959)	1,188
Software and other .....	<u>6,519</u>	<u>(5,606)</u>	<u>913</u>
	<u>\$75,282</u>	<u>\$(62,914)</u>	<u>\$12,368</u>

The weighted-average amortization period of intangible assets acquired in fiscal year 2019, which is comprised of software, is three years. The weighted-average amortization period of intangible assets acquired in fiscal year 2018 was three years; these intangible assets were comprised of software.

Intangible asset amortization over the next five years is estimated to be as follows:

<b>Fiscal Years:</b>	
2020 .....	\$4,589
2021 .....	\$2,721
2022 .....	\$ 125
2023 .....	\$ 123
2024 .....	\$ 123

## NOTE 4 - PDMCX JOINT VENTURE

In January 2018, Photronics, through its wholly-owned Singapore subsidiary (hereinafter, within this Note "we", or "Photronics"), and Dai Nippon Printing Co., Ltd., through its wholly owned subsidiary "DNP Asia Pacific PTE, Ltd." (hereinafter, within this Note "DNP") entered into a joint venture under which DNP obtained a 49.99% interest in our recently established IC business in Xiamen, China. The joint venture, known as "Xiamen American



Japan Photronics Mask Co., Ltd.” (hereinafter, “PDMCX”), was established to develop and manufacture photomasks for leading edge and advanced generation semiconductors. We entered into this joint venture to enable us to compete more effectively for the merchant photomask business in China, and to benefit from the additional resources and investment that DNP will provide to enable us to offer advanced-process technology to our customers. No gain or loss was recorded upon the formation of this joint venture.

The total investment per the PDMCX operating agreement (“the Agreement”) is \$160 million. As of October 31, 2019, Photronics and DNP had each contributed cash of approximately \$48 million, and PDMCX obtained local financing of \$34.5 million. The remaining \$29 million investment will be funded, over the next several quarters, with additional local financing of \$15 million and approximately \$14 million of cash contributions from Photronics and DNP.

Under the Agreement, DNP is afforded, under certain circumstances, the right to put its interest in PDMCX to Photronics. These circumstances include disputes regarding the strategic direction of PDMCX that may arise after the initial two-year term of the Agreement and cannot be resolved between the two parties. In addition, both Photronics and DNP have the option to purchase, or put, their interest from, or to, the other party, should their ownership interest fall below twenty percent for a period of more than six consecutive months. Under all such circumstances, the sales of ownership interests would be at the exiting party’s ownership percentage of the joint venture’s net book value, with closing to take place within three business days of obtaining required approvals and clearance.

We recorded net losses from the operations of PDMCX of approximately \$4.9 million and \$0.7 million in fiscal 2019 and 2018, respectively. General creditors of PDMCX do not have recourse to the assets of Photronics, Inc., and our maximum exposure to loss respectively from PDMCX at October 31, 2019, was \$39.6 million.

As required by the guidance in Topic 810 - “Consolidation” of the Accounting Codification Standards, we evaluated our involvement in PDMCX for the purpose of determining whether we should consolidate its results in our financial statements. The initial step of our evaluation was to determine whether PDMCX was a variable interest entity (“VIE”). Due to its lack of sufficient equity at risk to finance its activities without additional subordinated financial support, we determined that it is a VIE. Having made this determination, we then assessed whether we were the primary beneficiary of the VIE, and concluded that we were the primary beneficiary during the current and prior year reporting periods; thus, as required, the PDMCX financial results have been consolidated with Photronics, Inc. Our conclusion was based on the fact that we held a controlling financial interest in PDMCX (which resulted from our having the power to direct the activities that most significantly impacted its economic performance) and had both the obligation to absorb losses and the right to receive benefits that could potentially be significant to PDMCX. Our conclusions that we had the power to direct the activities that most significantly affected the economic performance of PDMCX during the current and prior year periods were based on our right to appoint the majority of its board of directors, which has, among others, the powers to manage the business (through its rights to appoint and evaluate PDMCX’s management), incur indebtedness, enter into agreements and commitments, and acquire and dispose of PDMCX’s assets. In addition, as a result of the 50.01% variable interest we held during the current and prior year periods, we had the obligation to absorb losses, and the right to receive benefits, that could potentially be significant to PDMCX.

The carrying amounts of PDMCX assets and liabilities included in our consolidated balance sheets are presented in the following table, together with our maximum exposures to loss related to these assets and liabilities.

<b>Classification</b>	<b>October 31, 2019</b>		<b>October 31, 2018</b>	
	<b>Carrying Amount</b>	<b>Photronics Interest</b>	<b>Carrying Amount</b>	<b>Photronics Interest</b>
Current assets . . . . .	\$ 24,142	\$12,074	\$ 9,625	\$ 4,813
Non-current assets . . . . .	114,015	57,019	43,415	21,708
Total assets . . . . .	<u>138,157</u>	<u>69,093</u>	<u>53,040</u>	<u>26,521</u>
Current liabilities . . . . .	16,889	8,446	21,205	10,603
Non-current liabilities . . . . .	42,094	21,051	20	10
Total liabilities . . . . .	<u>58,983</u>	<u>29,497</u>	<u>21,225</u>	<u>10,613</u>
Net assets . . . . .	<u>\$ 79,174</u>	<u>\$39,596</u>	<u>\$31,815</u>	<u>\$15,908</u>



## NOTE 5 - ACCRUED LIABILITIES

Accrued liabilities consist of the following:

	October 31, 2019	October 31, 2018
Compensation related expenses . . . . .	\$14,011	\$15,359
Income taxes . . . . .	13,227	10,369
Contract liabilities . . . . .	11,542	7,834
Value added and other taxes . . . . .	3,761	3,683
Professional fees . . . . .	537	1,257
Other . . . . .	<u>6,624</u>	<u>5,972</u>
	<u>\$49,702</u>	<u>\$44,474</u>

## NOTE 6 - LONG-TERM DEBT

Long-term debt consists of the following:

	October 31, 2019	October 31, 2018
Project Loans . . . . .	\$34,490	\$ —
Working Capital Loans (value added tax component) . . . . .	9,539	—
3.25% convertible senior notes matured April 2019 . . . . .	<u>—</u>	<u>57,453</u>
	44,029	57,453
Current portion of long-term debt . . . . .	<u>(2,142)</u>	<u>(57,453)</u>
Long-term debt . . . . .	<u>\$41,887</u>	<u>\$ —</u>

At October 31, 2019, maturities of our long-term debt over the next five years and thereafter were as follows:

2020 . . . . .	\$ 2,142
2021 . . . . .	8,304
2022 . . . . .	12,430
2023 . . . . .	3,441
2024 . . . . .	6,589
Thereafter . . . . .	<u>11,123</u>
	<u>\$44,029</u>

As of October 31, 2019, the weighted-average interest rate of our short-term debt was 3.84%. Interest payments were \$2.6 million, \$1.9 million, and \$2.1 million, in fiscal years 2019, 2018 and 2017, respectively.

### *Project Loans*

In November 2018, PDMCX was approved for credit of \$50 million, subject to certain limitations related to PDMCX registered capital at the time of the initial approval, pursuant to which PDMCX has and will enter into separate loan agreements (“the Project Loans”) for intermittent borrowings. The Project Loans, which are denominated in Chinese renminbi (RMB), are being used to finance certain capital expenditures in China. PDMCX granted liens on its land, building, and certain equipment as collateral for the Project Loans. As of October 31, 2019, PDMCX had borrowed 243.4 million RMB (\$34.5 million) against this approval. Payments on these borrowings are due semi-annually through December 2025; the initial payment is scheduled for June 2020. The table below presents, in U.S. dollars, the timing of future payments against the borrowings.

	Fiscal Year						
	2020	2021	2022	2023	2024	2025	2026
Principal payments . . . . .	<u>\$1,275</u>	<u>\$6,377</u>	<u>\$5,685</u>	<u>\$3,441</u>	<u>\$6,589</u>	<u>\$6,305</u>	<u>\$4,818</u>

The interest rates on the Project Loans are based on the benchmark lending rate of the People’s Bank of China (4.9% at October 31, 2019). Interest incurred on the loans will be reimbursed through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, which provide for such reimbursements up to a prescribed limit.

**Working Capital Loans**

In November 2018, PDMCX received approval for unsecured credit of \$25.0 million, pursuant to which PDMCX may enter into separate loan agreements. Under this credit agreement (the “Working Capital Loans”), PDMCX can borrow up to 140.0 million RMB to pay value-added taxes (“VAT”), and up to 60.0 million RMB to fund operations; combined total borrowings are limited to \$25.0 million. As of October 31, 2019, PDMCX had 67.3 million RMB (\$9.5 million) outstanding against the approval to pay VAT. Payments on these borrowings are due semiannually, at an increasing rate, through January 2022; PDMCX made installment payments totaling \$0.1 million during the year ended October 31, 2019. The table below presents, in U.S. dollars, the timing of future payments against these borrowings.

	Fiscal Year		
	<u>2020</u>	<u>2021</u>	<u>2022</u>
Principal payments. . . . .	<u>\$867</u>	<u>\$1,927</u>	<u>\$6,745</u>

As of October 31, 2019, PDMCX had borrowed, in several transactions, 36.8 million RMB (\$5.2 million) against the approval to fund operations, all of which was outstanding as of that date; repayments are due one year from the borrowing dates. In November 2019, PDMCX borrowed an additional 8.0 million RMB (\$1.1 million) against this approval.

The interest rates on borrowings to fund operations are approximately 4.6% and interest rates on borrowings to pay VAT are approximately 4.9%; both rates are based on the RMB Loan Prime Rate of the National Interbank Funding Center, plus spreads that range from 25.75 to 67.75 basis points. Interest incurred on the loans will be reimbursed through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, which provide for such reimbursements up to a prescribed limit.

**Equipment Loan**

Effective July 2019, the Company entered into a Master Lease Agreement (“MLA”) which enables us to request advance payments or other funds to finance equipment to be leased or purchased in the U.S. In connection with this MLA, we were approved for financing of \$35 million for the purchase of a high-end lithography tool. In the fourth quarter of fiscal 2019, the financing entity, upon our request, made an advance payment of \$3.5 million to the equipment vendor on our behalf. Interest on this borrowing is payable monthly at thirty-day LIBOR plus 1% (2.76% at October 31, 2019), and will continue to accrue until the borrowing is repaid or, as allowed under the MLA, we enter into a lease for the equipment. We intend to enter into a lease agreement for the related equipment in fiscal year 2020; as such, we have classified this borrowing as current debt. All borrowings under the MLA are secured by the equipment to be leased or purchased.

**3.25% Convertible Senior Notes**

In January 2015, we privately exchanged \$57.5 million in aggregate principal amount of our 3.25% convertible senior notes with a maturity date of April 1, 2016, for new 3.25% convertible senior notes with an aggregate principal amount of \$57.5 million with a maturity date of April 1, 2019. The conversion rate of the new notes was the same as that of the exchanged notes, which were issued in March 2011 with a conversion rate of approximately 96 shares of common stock per \$1,000 note principal, equivalent to a conversion price of \$10.37 per share of common stock. In April 2019, the entire \$57.5 million principal amount was repaid upon maturity.

**Credit Agreement**

In September 2018, we entered into a five-year amended and restated credit agreement (the “Credit Agreement”), which has a \$50 million borrowing limit, with an expansion capacity to \$100 million. The Credit Agreement is secured by substantially all of our assets located in the United States and common stock we own in certain foreign subsidiaries. The Credit Agreement includes minimum interest coverage ratio, total leverage ratio, and

minimum unrestricted cash balance covenants (all of which we were in compliance with at October 31, 2019), and limits the amount of cash dividends, distributions, and redemptions we can pay on our common stock to an aggregate amount of \$100 million in 2019 and \$50 million annually thereafter. We had no outstanding borrowings against the Credit Agreement at October 31, 2019, and \$50 million was available for borrowing. The interest rate on the Credit Agreement (2.78% at October 31, 2019) is based on our total leverage ratio at LIBOR plus a spread, as defined in the Credit Agreement.

#### NOTE 7 - REVENUE

We adopted Accounting Standards Update 2014-09 and all subsequent amendments which are collectively codified in Accounting Standards Codification Topic 606 – “Revenue from Contracts with Customers” (“Topic 606”) – on November 1, 2018, under the modified retrospective transition method, only with respect to contracts that were not complete as of the date of adoption. This approach required prospective application of the guidance with a cumulative effect adjustment to retained earnings to reflect the impact of the adoption on contracts that were not complete as of the date of the adoption. In accordance with the modified retrospective transition method, the results of the prior year period presented have not been adjusted for the effects of Topic 606.

Under Topic 606, we recognize revenue when, or as, control of a good or service transfers to a customer, in an amount that reflects the consideration to which we expect to be entitled in exchange for transferring those goods or services, whereas, prior to our adoption of Topic 606, we recognized revenue when we shipped to customers or, under some arrangements, when the customers received the goods. The following tables present the impacts of our adoption of Topic 606 on our consolidated balance sheet, and consolidated statements of income and cash flows for the year ended October 31, 2019.

#### **Consolidated Balance Sheet October 31, 2019**

	<u>As Reported</u>	<u>Adjustments</u>	<u>Balance without Adoption of Topic 606</u>
<b><u>Assets</u></b>			
Accounts receivable . . . . .	\$134,454	\$(1,559)	\$132,895
Inventory . . . . .	48,155	6,093	54,248
Other current assets . . . . .	38,388	(7,595)	30,793
Deferred income taxes . . . . .	20,779	90	20,869
<b><u>Liabilities</u></b>			
Accrued liabilities . . . . .	\$ 49,702	\$ (110)	49,592
<b><u>Equity</u></b>			
Photronics, Inc. shareholders’ equity . . . . .	\$769,892	\$(1,976)	\$767,916
Noncontrolling interests . . . . .	141,200	(885)	140,315

#### **Consolidated Statement of Income Year Ended October 31, 2019**

	<u>As Reported</u>	<u>Adjustments</u>	<u>Balance without Adoption of Topic 606</u>
Revenue . . . . .	\$550,660	\$(4,365)	\$546,295
Cost of goods sold . . . . .	429,819	(2,256)	427,563
Gross profit . . . . .	120,841	(2,109)	118,732
Provision for taxes . . . . .	10,210	(379)	9,831
Net income . . . . .	40,491	(1,730)	38,761
Noncontrolling interests . . . . .	10,698	(749)	9,949
Income attributable to Photronics, Inc. shareholders . . . . .	<u>\$ 29,793</u>	<u>\$ (981)</u>	<u>\$ 28,812</u>

**Consolidated Statement of Cash Flows**  
**Year Ended October 31, 2019**

	<u>As Reported</u>	<u>Adjustments</u>	<u>Balance without Adoption of Topic 606</u>
Net Income.....	\$ 40,491	\$(1,730)	\$ 38,761
Changes in operating accounts:			
Accounts receivable.....	\$(12,321)	\$ 993	\$(11,328)
Inventories .....	(23,088)	(2,503)	(25,591)
Other current assets .....	(8,631)	3,166	(5,465)
Accounts payable, accrued liabilities, and other .....	(11,962)	74	(11,888)

We account for an arrangement as a revenue contract when each party has approved and is committed to perform under the contract, the rights of the contracting parties regarding the goods or services to be transferred and the payment terms are identifiable, the arrangement has commercial substance, and collection of consideration is probable. Substantially all of our revenue comes from the sales of photomasks. We typically contract with our customers to sell sets of photomasks (referred to as “mask sets”), which are comprised of multiple layers, the predominance of which we invoice as they ship to customers. As the photomasks are manufactured to customer specifications, they have no alternative use to us and, as our contracts generally provide us with the right to payment for work completed to date, we recognize revenue as we perform, or “over time” on most of our contracts. We measure our performance to date using an input method, which is based on our estimated costs to complete the various manufacturing phases of a photomask. At the end of a reporting period, there will be a number of revenue contracts on which we have performed; for any such contracts that we are entitled to be compensated for our costs incurred plus a reasonable profit, we recognize revenue and a corresponding contract asset for such performance. We account for shipping and handling activities that we perform after a customer obtains control of a good as being activities to fulfill our promise to transfer the good to the customer, rather than as promised services, or performance obligations, under the contract.

As stated above, photomasks are manufactured in accordance with proprietary designs provided by our customers; thus, they are individually unique. Due to their uniqueness and other factors, their transaction prices are individually established through negotiations with customers; consequently, our photomasks do not have standard or “list” prices. The transaction prices of the vast majority of our revenue contracts include only fixed amounts of consideration. In certain instances, such as when we offer a customer an early payment discount, an estimate of variable consideration would be included in the transaction price, but only to the extent that a significant reversal of revenue would not occur when the uncertainty related to the variability is resolved.

***Contract Assets, Contract Liabilities, and Accounts Receivable***

We recognize a contract asset when our performance under a contract precedes our receipt of consideration from a customer, or before payment is due, and our receipt of consideration is conditional upon factors other than the passage of time. Contract assets reflect our transfer of control to customers of photomasks that are in process or completed but not yet shipped. A receivable is recognized when we have an unconditional right to payment for our performance, which generally occurs when we ship the photomasks. Our contract assets primarily consist of a significant amount of our in-process production orders and fully manufactured photomasks which have not yet shipped, for which we have an enforceable right to collect consideration (including a reasonable profit) in the event the in-process orders are cancelled by customers. On an individual contract basis, we net contract assets with contract liabilities (deferred revenue) for financial reporting purposes. Our contract assets and liabilities are typically classified as current, as our production cycle and our lead times are both under one year. Contract assets of \$7.6 million are included in “Other” current assets, and contract liabilities of \$11.5 million are included in Accrued liabilities in our October 31, 2019 consolidated balance sheet. At November 1, 2018, our date of adoption of Topic 606, we had contract assets of \$4.6 million and contract liabilities of \$7.8 million. We did not impair any contract assets during the year period ended October 31, 2019, and we recognized \$1.3 million of revenue from the settlement of contract liabilities that existed at the beginning of the year.

We generally record our accounts receivable at their billed amounts. All outstanding past due customer invoices are reviewed during, and at the end of, every period for collectibility. To the extent we believe a loss on the collection

of a customer invoice is probable, we record the loss and credit the allowance for doubtful accounts. In the event that an amount is determined to be uncollectible, we charge the allowance for doubtful accounts and eliminate the related receivable. Credit losses incurred on our accounts receivable during the year ended October 31, 2019, were immaterial.

Our invoice terms generally range from net thirty to ninety days, depending on both the geographic market in which the transaction occurs and our payment agreements with specific customers. In the event that our evaluation of a customer's business prospects and financial condition indicate that the customer presents a collectibility risk, we require payment in advance of performance. We have elected the practical expedient allowed under Topic 606 that permits us not to adjust a contract's promised amount of consideration to reflect a financing component when the period between when we transfer control of goods or services to customers and when we are paid is one year or less.

In instances when we are paid in advance of our performance, we record a contract liability and, as allowed under the practical expedient in Topic 606, recognize interest expense only if the period between when we receive payment from the customer and the date when we expect to be entitled to the payment is greater than one year. Historically, advance payments we've received from customers have not preceded the completion of our performance obligations by more than one year.

***Disaggregation of Revenue***

The following tables present our revenue for the year ended October 31, 2019, disaggregated by product type, geographic origin, and timing of recognition.

	<u>Year Ended October 31, 2019</u>
<b><u>Revenue by Product Type</u></b>	
<u>IC</u>	
High-end .....	\$156,418
Mainstream .....	<u>249,773</u>
Total IC .....	<u>\$406,191</u>
<u>FPD</u>	
High-end .....	\$ 98,832
Mainstream .....	<u>45,637</u>
Total FPD .....	<u>\$144,469</u>
	<u>\$550,660</u>
<b><u>Revenue by Geographic Origin</u></b>	
Taiwan .....	\$244,377
Korea .....	147,734
United States .....	105,045
Europe .....	32,585
China .....	19,010
All other Asia .....	<u>1,909</u>
	<u>\$550,660</u>
<b><u>Revenue by Timing of Recognition</u></b>	
Over time .....	\$497,942
At a point in time .....	<u>52,718</u>
	<u>\$550,660</u>

***Contract Costs***

We pay commissions to third party sales agents for certain sales that they obtain for us. However, the bases of the commissions are the transaction prices of the sales, which are completed in less than one year; thus, no

relationship is established with a customer that will result in future business. Therefore, we would not recognize any portion of these sales commissions as costs of obtaining a contract, nor do we currently foresee other circumstances under which we would recognize such assets.

***Remaining Performance Obligations***

As we are typically required to fulfill customer orders within a short time period, our backlog of orders is generally not in excess of one to two weeks for IC photomasks and two to three weeks for FPD photomasks. As allowed under Topic 606, we have elected not to disclose our remaining performance obligations, which represent the costs associated with the completion of the manufacturing process of in-process photomasks related to contracts that have an original duration of one year or less.

***Sales and Similar Taxes***

We report our revenue net of any sales or similar taxes we collect on behalf of governmental entities.

***Product Warranty***

Our photomasks are sold under warranties that generally range from one to twenty-four months. We warrant that our photomasks conform to customer specifications, and will typically repair, replace, or issue a refund, at our option, any photomasks that fail to do so. The warranties do not represent separate performance obligations in our revenue contracts. Historically, customer claims under warranty have been immaterial.

**NOTE 8 - OPERATING LEASES**

We lease various real estate and equipment under non-cancelable operating leases, for which rent expense was \$3.0 million, \$2.9 million, and \$3.0 million in fiscal 2019, 2018, and 2017, respectively.

At October 31, 2019, future minimum lease payments under non-cancelable operating leases with initial terms in excess of one year were as follows:

2020 .....	\$1,885
2021 .....	1,613
2022 .....	1,535
2023 .....	742
2024 .....	424
Thereafter .....	<u>377</u>
	<u>\$6,576</u>

We adopted ASU 2016-02 and all subsequent amendments, collectively codified in ASC Topic 842 “Leases” (“Topic 842”), on November 1, 2019. The guidance requires modified retrospective adoption, either at the beginning of the earliest period presented or at the beginning of the period of adoption; we have elected to apply the guidance at the beginning of the period of adoption. See Note 22 for further information on our adoption of Topic 842.

**NOTE 9 - SHARE-BASED COMPENSATION**

In March 2016, shareholders approved a new equity incentive compensation plan (“the Plan”), under which incentive stock options, non-qualified stock options, stock grants, stock-based awards, restricted stock, restricted stock units, stock appreciation rights, performance units, performance stock, and other stock or cash awards may be granted. Shares to be issued under the Plan may be authorized and unissued shares, issued shares that have been reacquired by us (in the open-market or in private transactions), shares held in the treasury, or a combination thereof. The maximum number of shares of common stock approved that may be issued under the Plan is four million shares. Awards may be granted to officers, employees, directors, consultants, advisors, and independent contractors of Photronics or its subsidiaries. In the event of a change in control (as defined in the Plan), the vesting of awards may be accelerated. The Plan, aspects of which are more fully described below, prohibits further awards from being issued under prior plans. We incurred total share-based compensation expenses of \$3.7 million, \$3.2 million, and \$3.6 million in fiscal years 2019, 2018, and 2017, respectively. No share-based compensation cost was capitalized as part of an asset and no related income tax benefits were recorded during the fiscal years presented.



## Stock Options

Option awards generally vest in one to four years, and have a ten-year contractual term. All incentive and non-qualified stock option grants must have an exercise price no less than the market value of the underlying common stock on the date of grant. The grant-date fair values of options are based on closing prices of our common stock on the dates of grant and are calculated using the Black-Scholes option pricing model. Expected volatility is based on the historical volatility of our common stock. We use historical option exercise behavior and employee termination data to estimate expected term, which represents the period of time that options granted are expected to remain outstanding. The risk-free rate of return for the estimated term of an option is based on the U.S. Treasury yield curve in effect at the date of grant.

The weighted-average inputs and risk-free rate of return ranges used to calculate the grant date fair value of options issued during fiscal years 2019, 2018 and 2017 are presented in the following table:

	Year Ended		
	October 31, 2019	October 31, 2018	October 29, 2017
Expected volatility . . . . .	33.1%	31.7%	32.2%
Risk-free rate of return. . . . .	2.5 - 2.9%	2.2 - 2.8%	1.9 - 2.0%
Dividend yield . . . . .	0.0%	0.0%	0.0%
Expected term. . . . .	5.1 years	5.0 years	5.0 years

The table below presents a summary of stock options activity during fiscal year 2019 and information on stock options outstanding at October 31, 2019.

Options	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life	Aggregate Intrinsic Value
Outstanding at October 31, 2018 . . . . .	2,423,560	\$ 8.68		
Granted. . . . .	132,000	\$ 9.77		
Exercised . . . . .	(322,010)	\$ 6.43		
Cancelled and forfeited . . . . .	(62,783)	\$11.47		
Outstanding at October 31, 2019 . . . . .	<u>2,170,767</u>	<u>\$ 9.00</u>	5.4 years	<u>\$6,206</u>
Exercisable at October 31, 2019. . . . .	<u>1,615,225</u>	<u>\$ 8.61</u>	4.6 years	<u>\$5,242</u>
Vested and expected to vest as of October 31, 2019. . . . .	<u>2,095,804</u>	<u>\$ 8.95</u>	5.3 years	<u>\$6,096</u>

The weighted-average grant date fair value of options granted during fiscal years 2019, 2018 and 2017 were \$3.31, \$2.76 and \$3.59, respectively. The total intrinsic value of options exercised during fiscal years 2019, 2018 and 2017 was \$1.3 million, \$2.5 million and \$1.9 million, respectively.

We received cash from option exercises of \$2.1 million, \$4.3 million and \$2.4 million in fiscal years 2019, 2018 and 2017, respectively. As of October 31, 2019, the total unrecognized compensation cost of unvested option awards was approximately \$0.9 million. That cost is expected to be recognized over a weighted-average amortization period of 2.1 years.

## Restricted Stock

We periodically grant restricted stock awards, the restrictions on which typically lapse over a service period of one to four years. The fair value of an award is the closing stock price of our common stock on the date of grant. There were 435,000, 290,000, and 317,750 restricted stock awards granted during fiscal years, 2019, 2018 and 2017, respectively. The weighted-average grant date fair values of those awards were \$9.80, \$8.62 and \$10.94. The total fair value of awards for which restrictions lapsed was \$1.9 million, \$1.4 million and \$1.2 million during fiscal years 2019, 2018 and 2017, respectively. As of October 31, 2019, the total compensation cost for restricted stock awards not yet recognized was approximately \$4.3 million. That cost is expected to be recognized over a weighted-average amortization period of 2.6 years.



A summary of restricted stock award activity during fiscal year 2019 and the status of our outstanding restricted stock awards as of October 31, 2019, is presented below:

Restricted Stock	Shares	Weighted-Average Fair Value at Grant Date
Outstanding at October 31, 2018.....	419,297	\$9.58
Granted .....	435,000	\$9.80
Vested .....	(195,684)	\$9.65
Cancelled.....	<u>(18,500)</u>	<u>\$9.82</u>
Outstanding at October 31, 2019.....	<u>640,113</u>	<u>\$9.70</u>
Expected to vest as of October 31, 2019 .....	<u>594,771</u>	<u>\$9.69</u>

#### *Employee Stock Purchase Plan*

Our Employee Stock Purchase Plan (“ESPP”) permits employees to purchase Photronics, Inc. common shares at 85% of the lower of the closing market price at the commencement or ending date of the Plan year (which is approximately one year). We recognize the ESPP expense during that same period. As of October 31, 2019, the maximum number of shares of common stock approved by our shareholders to be purchased under the ESPP was 1.85 million shares, of which approximately 1.5 million shares had been issued through October 31, 2019; No shares were subject to outstanding subscriptions as of October 31, 2019.

#### **NOTE 10 - EMPLOYEE RETIREMENT PLANS**

We maintain a 401(k) Savings and Profit Sharing Plan (“401(k) Plan”) which covers all full and certain part time U.S. employees who have completed three months of service and are 18 years of age or older. Under the terms of the 401(k) Plan, employees may contribute up to 50% of their salary, subject to certain maximum amounts, which will be matched by the Company at 50% of the employee’s contributions that are not in excess of 4% of the employee’s compensation. Employee and employer contributions vest immediately upon contribution. The total employer contributions for all of our defined contribution plans were \$0.7 million, \$0.7 million and \$0.6 million in fiscal years 2019, 2018 and 2017, respectively.

#### **NOTE 11 - INCOME TAXES**

Income before the income tax provisions consists of the following:

	Year Ended		
	October 31, 2019	October 31, 2018	October 29, 2017
United States .....	\$ (8,379)	\$ (9,859)	\$ (11,544)
Foreign .....	59,080	78,430	38,109
	<u>\$50,701</u>	<u>\$68,571</u>	<u>\$ 26,565</u>

The income tax provisions consist of the following:

	Year Ended		
	October 31, 2019	October 31, 2018	October 29, 2017
Current:			
Federal .....	\$ (3,916)	\$ (30)	\$ 173
State .....	11	—	(4)
Foreign .....	17,777	11,584	3,474
Deferred:			
Federal .....	3,673	(3,673)	—
State .....	10	(24)	15
Foreign .....	<u>(7,345)</u>	<u>(522)</u>	<u>1,618</u>
Total .....	<u>\$10,210</u>	<u>\$ 7,335</u>	<u>\$5,276</u>

The income tax provisions differ from the amount computed by applying the statutory U.S. federal income tax rate to income before income taxes as a result of the following:

	Year Ended		
	October 31, 2019	October 31, 2018	October 29, 2017
U.S. federal income tax at statutory rate . . . . .	\$10,647	\$16,059	\$ 9,298
Changes in valuation allowances . . . . .	2,673	4,554	(3,632)
Foreign tax rate differentials . . . . .	218	(2,078)	(5,230)
Tax credits . . . . .	(1,268)	(1,530)	(1,925)
Uncertain tax positions, including reserves, settlements and resolutions . .	134	(1,791)	(932)
Employee stock option . . . . .	232	(1,433)	512
Income tax holiday . . . . .	(2,234)	(2,648)	(743)
Tax reform . . . . .	—	(3,736)	—
Distributions from foreign subsidiaries . . . . .	—	—	6,471
Tax on foreign subsidiary earnings . . . . .	—	—	1,712
Other, net . . . . .	(192)	(62)	(255)
	<u>\$10,210</u>	<u>\$ 7,335</u>	<u>\$ 5,276</u>
Effective tax rate . . . . .	<u>20.1%</u>	<u>10.7%</u>	<u>19.8%</u>

The fiscal year 2019 effective tax rate differs from the U.S. statutory rate of 21% due to the recognition of a benefit related to previously unrecognized tax positions, loss jurisdiction pre-tax losses being benefited at higher statutory rates than pre-tax income in income jurisdictions was taxed, changes in deferred tax asset valuation allowance, the benefits of a tax holiday, and investment credits in foreign jurisdictions.

The fiscal year 2018 effective tax rate differs from the U.S. federal blended rate of 23.42% primarily due to the impact of the U.S. Tax Cuts and Jobs Act (discussed below) allowing for the refund of AMT credits that caused a corresponding reversal of the related valuation allowance, the recognition of a benefit related to previously unrecognized tax positions, earnings being taxed at lower statutory rates in foreign jurisdictions, the benefits of a tax holiday, and investment credits in foreign jurisdictions.

The fiscal year 2017 effective tax rate differs from the U.S. statutory rate of 35% primarily due to earnings being taxed at lower statutory rates in foreign jurisdictions, changes in deferred tax asset valuation allowances, including the reversals noted below, together with the benefit of various investment credits in a foreign jurisdiction.

We were granted two five-year tax holidays in Taiwan, one that expired unused in 2017 and the other that expires at the end of calendar year 2019. The latter tax holiday reduced foreign taxes by \$2.2 million, \$2.6 million and \$0.7 million in fiscal years 2019, 2018 and 2017, respectively, with an \$0.02 and \$0.035 cents per share impact in fiscal 2019 and 2018, respectively, and a de minimis per share effect in the fiscal 2017.

On December 22, 2017, the U.S. Tax Cuts and Jobs Act (the “Act”), was signed into law, enacting significant changes to the United States Internal Revenue Code of 1986, as amended. Based on the enactment date, we accounted for the Act in our interim period ended January 28, 2018. In December 2017, the Securities and Exchange Commission released Staff Accounting Bulletin No. 118 (“SAB 118”) to address situations in which the accounting under Accounting Standards Codification Topic 740 – “Income Taxes” is incomplete for certain income tax effects of the Act. We adopted SAB 118 in our first quarter of fiscal year 2018, and finalized its effects in our fourth quarter of fiscal 2018. In the period ended January 28, 2018, we recognized the following effects in our provision for income taxes:

- The Act repealed the corporate alternative minimum tax (“AMT”) for tax years beginning after December 31, 2017, and provided that existing AMT credit carryforwards are fully refundable. We recognized a \$3.9 million benefit on AMT credit carryforwards that we previously determined were not more likely than not going to be realized and reversed the previously recorded valuation allowance.

- As of January 1, 2018, the Act reduced the corporate income tax rate from a maximum 35% to a flat 21%, requiring us to revalue our deferred tax assets and liabilities utilizing the rate applicable to the period when a temporary difference will reverse. Our net deferred tax asset is fully offset by a valuation allowance, and the revaluation of the deferred tax assets and liabilities resulted in a net-zero impact for the period.
- The Act imposed a transition tax for a one-time deemed repatriation of the accumulated earnings of foreign subsidiaries. The entire amount of transition tax was fully offset by tax credits (including carryforwards) that resulted in a provisional net-zero impact on the period.

On January 18, 2018, the Taiwan Legislature Yuan approved amendments to the Income Tax Act, enacting an increase in the corporate tax rate from 17% to 20%, which required us to revalue our deferred tax assets and liabilities utilizing the rate applicable to the period when a temporary difference will reverse. Accordingly, a net benefit of \$0.2 million is reflected in our tax provision in fiscal year 2018.

The net deferred income tax assets consist of the following:

	As of	
	October 31, 2019	October 31, 2018
<b>Deferred income tax assets:</b>		
Net operating losses . . . . .	\$ 32,229	\$ 30,805
Reserves not currently deductible . . . . .	5,013	4,703
Tax credit carryforwards . . . . .	9,164	9,159
Share-based compensation . . . . .	860	767
Alternative minimum tax credits . . . . .	—	3,673
Other . . . . .	434	1,210
	<u>47,700</u>	<u>50,317</u>
Valuation allowances . . . . .	<u>(27,032)</u>	<u>(24,383)</u>
	20,668	25,934
<b>Deferred income tax liabilities:</b>		
Property, plant and equipment . . . . .	(251)	(8,020)
Other . . . . .	—	(448)
	<u>(251)</u>	<u>(8,468)</u>
<b>Net deferred income tax assets</b> . . . . .	<u>\$ 20,417</u>	<u>\$ 17,466</u>
 <b>Reported as:</b>		
Deferred income tax assets . . . . .	\$ 20,779	\$ 18,109
Deferred income tax liabilities . . . . .	<u>(362)</u>	<u>(643)</u>
	<u>\$ 20,417</u>	<u>\$ 17,466</u>

We have established a valuation allowance for a portion of our deferred tax assets because we believe, based on the weight of all available evidence, that it is more likely than not that a portion of our net operating loss carryforwards will expire prior to utilization. In fiscal year 2019, the valuation allowance increased as a result of increase in fully valued net operating losses. During fiscal year 2018, the valuation allowance decrease primarily resulted from the reversal of the valuation allowance related to alternative minimum tax credits of \$(3.9) million (as a consequence of the Act), prior year additional NOL utilization of \$(1.8) million, credit utilizations of \$(1.3) million, changes in the deferred tax liability of \$2.8 million, \$1.8 million from the adoption of ASU 2016-09 related to stock compensation, \$1.6 million from the corporate tax rate reduction, and other impacts of \$(0.4) million.

Due to the Act, as of fiscal year end 2018, U.S. deferred taxes were no longer provided on the undistributed earnings of non-U.S. subsidiaries. Our policy to indefinitely reinvest these earnings in non-U.S. operations remains unchanged for the purpose of determining deferred tax liabilities for U.S. state and foreign withholding taxes. Therefore, should we elect in the future to repatriate the remaining foreign earnings deemed to be indefinitely reinvested, we may incur additional state and withholding tax expense on those foreign earnings, the amount of which is not practicable to compute.

The following tables present our available operating loss and credit carryforwards as of October 31, 2019, and their related expiration periods:

<u>Operating Loss Carryforwards</u>	<u>Amount</u>	<u>Expiration Periods</u>
Federal.....	\$ 85,949	2028-Indefinite
State.....	206,513	2019-2039
Foreign.....	9,177	2022-2029

<u>Tax Credit Carryforwards</u>	<u>Amount</u>	<u>Expiration Period</u>
Federal research and development.....	\$4,522	2019-2039
State.....	5,870	2020-2029

In September 2019, we entered into a Section 382 Rights Agreement with Computershare Trust Company, N.A., a federally chartered trust company, as rights agent. The purpose of the Rights Agreement is to deter trading of our common stock that would result in a change in control (as defined in Internal Revenue Control Section 382), thereby preserving our future ability to use our historical federal net operating losses and other Tax Attributes (as defined in the Rights Agreement). In connection with our entry into the Rights Agreement, our board of directors declared a dividend of one preferred stock purchase right, payable on or about October 1, 2019, for each share of common stock, par value \$0.01 per share, of the Company's outstanding on September 30, 2019, to the stockholders of record on that date.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits, excluding interest and penalties, is as follows:

	<u>Year Ended</u>		
	<u>October 31, 2019</u>	<u>October 31, 2018</u>	<u>October 29, 2017</u>
Balance at beginning of year.....	\$1,775	\$ 3,384	\$4,606
Additions (reductions) for tax positions in prior years.....	(466)	(44)	207
Additions based on current year tax positions.....	1,286	498	323
Settlements.....	(204)	(56)	(922)
Lapses of statutes of limitations.....	<u>(633)</u>	<u>(2,007)</u>	<u>(830)</u>
Balance at end of year.....	<u>\$1,758</u>	<u>\$ 1,775</u>	<u>\$3,384</u>

As of October 31, 2019, October 31, 2018 and October 29, 2017, the balance of unrecognized tax benefits, which are included in Other liabilities, includes \$1.9 million, \$1.9 million, and \$3.4 million, respectively, that, if recognized, would impact the effective tax rates. Included in each of these amounts were interest and penalties of \$0.2 million, \$0.1 million, and \$0.1 million, at the end of fiscal year 2019, 2018, and 2017, respectively. We include any applicable interest and penalties related to uncertain tax positions in our income tax provision. The amounts reflected in the table above include settlements of non-U.S. audits.

Although the timing of the expirations of statutes of limitations may be uncertain, as they can be dependent upon the settlement of tax audits, the Company believes that the amount of uncertain tax positions (including accrued interest and penalties, and net of tax benefits) that may be resolved over the next twelve months is immaterial. Resolution of these uncertain tax positions may result from either or both the lapses of statutes of limitations and tax settlements. The Company is no longer subject to tax authority examinations in the U.S., major foreign, or state tax jurisdictions for years prior to fiscal year 2014.

Income tax payments were \$15.9 million, \$6.1 million and \$9.3 million in fiscal years 2019, 2018 and 2017, respectively. Cash received as refunds of income taxes paid in prior years amounted to \$1.1 million and \$0.1 million in fiscal years 2018 and 2017, respectively, with an immaterial amount being received in fiscal year 2019.

## Adoption of New Accounting Standard

In the first quarter of 2019, the Company adopted Accounting Standards Update No. 2016-16 – “Intra-Entity Transfers Other Than Inventory”, which requires an entity to recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs. In connection therewith, we recorded a transition adjustment of \$1.1 million that reduced prepaid income taxes (included in Other current assets in the consolidated balance sheets) against beginning retained earnings.

## NOTE 12 - EARNINGS PER SHARE

The calculation of basic and diluted earnings per share is presented as follows:

	Year Ended		
	October 31, 2019	October 31, 2018	October 29, 2017
Net income attributable to Photronics, Inc. shareholders . . . . .	\$29,793	\$42,055	\$13,130
Effect of dilutive securities:			
Interest expense on convertible notes, net of related tax effects. . . . .	<u>845</u>	<u>1,999</u>	<u>—</u>
Earnings for diluted earnings per share . . . . .	<u>\$30,638</u>	<u>\$44,054</u>	<u>\$13,130</u>
Weighted-average common shares computations:			
Weighted-average common shares used for basic earnings per share. . .	66,347	68,829	68,436
Effect of dilutive securities:			
Convertible notes. . . . .	2,360	5,542	—
Share-based payment awards . . . . .	<u>448</u>	<u>450</u>	<u>852</u>
Potentially dilutive common shares . . . . .	<u>2,808</u>	<u>5,992</u>	<u>852</u>
Weighted-average common shares used for diluted earnings per share . . .	<u>69,155</u>	<u>74,821</u>	<u>69,288</u>
Basic earnings per share . . . . .	\$ 0.45	\$ 0.61	\$ 0.19
Diluted earnings per share . . . . .	\$ 0.44	\$ 0.59	\$ 0.19

The table below shows the outstanding weighted-average share-based payment awards that were excluded from the calculation of diluted earnings per share because their exercise price exceeded the average market value of the common shares for the period or, under application of the treasury stock method, they were otherwise determined to be antidilutive. The table also shows convertible notes that, if converted, would have been antidilutive.

	Year Ended		
	October 31, 2019	October 31, 2018	October 29, 2017
Share based payment awards . . . . .	1,250	1,627	1,308
Convertible notes. . . . .	<u>—</u>	<u>—</u>	<u>5,542</u>
Total potentially dilutive shares excluded . . . . .	<u>1,250</u>	<u>1,627</u>	<u>6,850</u>

Subsequent to October 31, 2019, we repurchased 0.9 million shares of our common stock. See Note 19 for information on our share repurchase programs.

## NOTE 13 - COMMITMENTS AND CONTINGENCIES

As of October 31, 2019, we had outstanding purchase commitments of \$130.3 million, \$111.8 million of which was for capital equipment. Included in the latter amount is \$30.8 million which we intend to finance under a capital lease. As discussed in Note 6, we’ve been approved for a lease to finance the purchase of a high-end lithography tool under an agreement entered into in fiscal 2019. See Note 8 for information on our operating lease commitments.

As of October 31, 2019, we had recorded liabilities for the purchase of equipment of \$17.2 million.

We are subject to various claims that arise in the ordinary course of business. We believe such claims, individually and in the aggregate, will not have a material effect on our consolidated financial statements.

## NOTE 14 - GEOGRAPHIC AND SIGNIFICANT CUSTOMER INFORMATION

We operate as a single operating segment as a manufacturer of photomasks, which are high precision quartz or glass plates containing microscopic images of electronic circuits for use in the fabrication of IC's and FPDs.

Our 2019, 2018 and 2017 revenue by geographic origin and by IC and FPD products are presented below.

	Year Ended		
	October 31, 2019	October 31, 2018	October 29, 2017
<b>Net revenue</b>			
Taiwan .....	\$244,377	\$237,039	\$187,818
Korea .....	147,734	147,066	122,165
United States .....	105,045	112,648	102,040
Europe .....	32,585	35,540	36,081
China .....	19,010	1,157	168
All other Asia .....	1,909	1,826	2,406
	<u>\$550,660</u>	<u>\$535,276</u>	<u>\$450,678</u>
 IC .....	 \$406,191	 \$416,064	 \$350,260
FPD .....	144,469	119,212	100,418
	<u>\$550,660</u>	<u>\$535,276</u>	<u>\$450,678</u>

Our 2019, 2018, and 2017 long-lived assets by geographic area are presented below.

	As of		
	October 31, 2019	October 31, 2018	October 29, 2017
<b>Long-lived assets</b>			
China .....	\$232,394	\$102,985	\$ 8,273
Taiwan .....	146,467	177,626	186,192
United States .....	130,935	156,948	180,095
Korea .....	117,755	127,764	147,265
Europe .....	4,890	6,458	13,372
	<u>\$632,441</u>	<u>\$571,781</u>	<u>\$535,197</u>

One customer accounted for 16% of our revenue in fiscal years 2019, 2018 and 2017, respectively, and another customer accounted for 15%, 15% and 16% of our revenue in fiscal years 2019, 2018 and 2017, respectively.

## NOTE 15 - CHANGES IN ACCUMULATED OTHER COMPREHENSIVE INCOME BY COMPONENT

The following tables set forth the changes in our accumulated other comprehensive income by component (net of tax of \$0) for the years ended October 31, 2019 and October 31, 2018:

	Year Ended October 31, 2019		
	Foreign Currency Translation Adjustments	Other	Total
Balance at October 31, 2018.....	\$(4,328)	\$(638)	\$(4,966)
Other comprehensive loss .....	(2,877)	(74)	(2,951)
Less: other comprehensive income (loss) attributable to noncontrolling interests .....	<u>1,126</u>	<u>(38)</u>	<u>1,088</u>
Balance at October 31, 2019.....	<u>\$(8,331)</u>	<u>\$(674)</u>	<u>\$(9,005)</u>

	Year Ended October 31, 2018			
	Foreign Currency Translation Adjustments	Amortization of Cash Flow Hedge	Other	Total
Balance at October 29, 2017.....	\$ 7,627	\$(48)	\$(688)	\$ 6,891
Other comprehensive income before reclassifications.....	(16,672)	—	101	(16,571)
Amounts reclassified from other accumulated comprehensive income.....	—	48	—	48
Net current period other comprehensive income.....	(16,672)	48	101	(16,523)
Less: other comprehensive (loss) income attributable to noncontrolling interests.....	(4,717)	—	51	(4,666)
Balance at October 31, 2018.....	<u>\$ (4,328)</u>	<u>\$ —</u>	<u>\$(638)</u>	<u>\$ (4,966)</u>

Amortization of the cash flow hedge is included in cost of goods sold in the 2018 and 2017 consolidated statements of income.

#### NOTE 16 – CONCENTRATIONS OF CREDIT RISK

Financial instruments that potentially subject us to credit risk principally consist of trade accounts receivables and short-term cash investments. We sell our products primarily to semiconductor and FPD manufacturers in Asia, North America, and Europe. We believe that the concentration of credit risk in our trade receivables is substantially mitigated by our ongoing credit evaluation process and relatively short collection terms. We do not generally require collateral from customers. We establish an allowance for doubtful accounts based upon factors surrounding the credit risk of specific customers, historical trends and other information.

Our cash and cash equivalents are deposited in several financial institutions, including institutions located within all of the countries in which we manufacture photomasks. Portions of deposits in some of these institutions may exceed the amount of insurance available for such deposits at these institutions. As these deposits are generally redeemable upon demand and are held by high quality, reputable institutions, we consider them to bear minimal credit risk. We further mitigate credit risks related to our cash and cash equivalents by spreading such risk among a number of institutions.

As of October 31, 2019, one of our customers accounted for 17% of our net accounts receivable. As of October 31, 2018, two of our customers individually accounted for 20% and 10% of our net accounts receivable.

#### NOTE 17 - RELATED PARTY TRANSACTIONS

On January 20, 2018, Photonics, Inc. entered into a four-year consulting agreement with DEMA Associates, LLC, for \$0.4 million per year. Two members of our board of directors, including the chairman, and a member of the chairman's immediate family, are members of DEMA Associates, LLC. We incurred expenses for services provided by this entity of \$0.4 million and \$0.3 million in fiscal years 2019 and 2018, respectively.

In July 2016, we entered into a contract for information technology services with a parent entity for which members of our board of directors served as the executive chairman of the board and a director of a wholly owned subsidiary of that entity. In fiscal year 2018, we incurred expenses for services provided by the parent entity of \$0.1 million during the period in which our board members served on the board of directors of this entity and, in fiscal year 2017, we incurred expenses of \$0.5 million with the parent entity.

An officer of our company is related to an individual in a position of authority at one of our largest customers. We recorded revenue from this customer of \$87.0 million, \$78.4 million and \$73.6 million, in fiscal years 2019, 2018 and 2017, respectively. As of October 31, 2019 and October 31, 2018, we had accounts receivable of \$22.2 million and \$23.5 million, respectively, from this customer.

We purchase photomask blanks from an entity of which a former officer of ours is a significant shareholder. The Company purchased \$4.5 million of photomask blanks from this entity during the period in 2017 when the former officer was employed by us.

We believe that the terms of our transactions with the related parties described above were negotiated at arm's length and were no less favorable to us than terms we could have obtained from unrelated third parties.



## NOTE 18 - FAIR VALUE MEASUREMENTS

The accounting framework for determining fair value includes a hierarchy for ranking the quality and reliability of the information used to measure fair value, which enables the reader of the financial statements to assess the inputs used to develop those measurements. The fair value hierarchy consists of three tiers as follows: Level 1, defined as quoted market prices (unadjusted) in active markets for identical securities; Level 2, defined as inputs other than Level 1 that are observable, either directly or indirectly; and Level 3, defined as unobservable inputs that are not corroborated by market data.

The fair values of our cash and cash equivalents (Level 1 measurements), accounts receivable, accounts payable, and certain other current assets and current liabilities (Level 2 measurements) approximate their carrying values due to their short-term maturities. The fair values of our variable rate debt instruments are a Level 2 measurement and approximates their carrying values due to the variable nature of the underlying interest rates. The fair values of our convertible senior notes is a Level 2 measurement, as it was determined using inputs that were either observable market data, or could be derived from, or corroborated with, observable market data. These inputs included our stock price and interest rates offered on debt issued by entities with credit ratings similar to ours. We did not have any assets or liabilities measured at fair value, on a recurring or a nonrecurring basis, at October 31, 2019 or October 31, 2018.

### *Fair Value of Financial Instruments Not Recorded at Fair Value*

The fair value of our convertible senior notes was a Level 2 measurement, as it was determined using inputs that were either observable market data or could be derived from or corroborated with observable market data. These inputs included our stock price and interest rates offered on debt issued by entities with credit ratings similar to ours. The table below presents the fair and carrying values of our convertible senior notes at October 31, 2018.

	<u>October 31, 2018</u>	
	<u>Fair Value</u>	<u>Carrying Value</u>
3.25% convertible senior notes matured 2019 . . . . .	\$62,094	\$57,453

## NOTE 19 – SHARE REPURCHASE PROGRAMS

In August 2019, the Company's board of directors authorized the repurchase of up to \$100 million of its common stock, pursuant to a repurchase plan under Rule 10b5-1 of the Securities Act of 1933 (as amended).

In October 2018, the Company's board of directors authorized the repurchase of up to \$25 million of its common stock, to have been executed in open-market transactions or in accordance with a repurchase plan under Rule 10b5-1 of the Securities Act of 1933 (as amended). The share repurchase program commenced on October 22, 2018, and was terminated on February 1, 2019.

In July 2018, the Company's Board of Directors authorized the repurchase of up to \$20 million of its common stock, to have been executed in open-market transactions or in accordance with a repurchase plan under Rule 10b5-1 of the Securities Act of 1933 (as amended). The share repurchase program commenced on July 10, 2018, and was completed in October 2018, when the authorized amount was exhausted.

All of the shares purchased under the above repurchase programs were retired in fiscal year 2019. The Table below presents information on the repurchase programs.

	<u>Fiscal Year 2019</u> <u>Purchases</u>	<u>Fiscal Year 2018</u> <u>Purchases</u>	<u>Total Purchases</u> <u>Under Programs</u>
Number of shares repurchased . . . . .	2,133	2,558	4,691
Cost of shares repurchased . . . . .	\$21,696	\$23,111	\$44,807
Average price paid per share . . . . .	\$ 10.17	\$ 9.04	\$ 9.55

## NOTE 20 – SUBSIDIARY DIVIDEND

In fiscal years 2019 and 2018, PDMC, the Company's majority owned subsidiary in Taiwan, paid dividends of which 49.99%, or approximately \$45.1 and \$8.2 million, respectively, were paid to noncontrolling interests.

## NOTE 21 – QUARTERLY RESULTS OF OPERATIONS (UNAUDITED)

The following table sets forth certain unaudited quarterly financial data:

	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Fourth</u>	<u>Year</u>
<b>Fiscal 2019:</b>					
Revenue . . . . .	\$124,712	\$131,580	\$138,112	\$156,256	\$550,660
Gross profit . . . . .	26,102	26,010	30,570	38,159	120,841
Net income . . . . .	7,768	9,852	9,834	13,037	40,491
Net income attributable to Photronics, Inc. shareholders . . . . .	5,267	8,479	6,347	9,700	29,793
Earnings per share:					
Basic . . . . .	\$ 0.08	\$ 0.13	\$ 0.10	\$ 0.15	\$ 0.45
Diluted . . . . .	\$ 0.08	\$ 0.13	\$ 0.10	\$ 0.15	\$ 0.44
	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Fourth</u>	<u>Year</u>
		(a)			(a)
<b>Fiscal 2018:</b>					
Revenue . . . . .	\$123,446	\$130,779	\$136,391	\$144,660	\$535,276
Gross profit . . . . .	27,662	32,819	35,597	35,425	131,503
Net income . . . . .	9,481	15,189	19,797	16,769	61,236
Net income attributable to Photronics, Inc. shareholders . . . . .	5,898	10,665	13,005	12,487	42,055
Earnings per share:					
Basic . . . . .	\$ 0.09	\$ 0.15	\$ 0.19	\$ 0.18	\$ 0.61
Diluted . . . . .	\$ 0.09	\$ 0.15	\$ 0.18	\$ 0.18	\$ 0.59

(a) Includes \$0.6 million gain on sale of assets.

## NOTE 22 - RECENT ACCOUNTING PRONOUNCEMENTS

### Accounting Standards Updates to be Implemented

In June 2016, the Financial Accounting Standards Board (“FASB”) issued ASU 2016-13 “Measurement of Credit Losses”, the main objective of which is to provide more useful information about expected credit losses on financial instruments and other commitments of an entity to extend credit. In support of this objective, the ASU replaces the incurred loss model, found in current GAAP, with an expected credit loss model; the new model requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. This ASU requires a cumulative-effect adjustment as of the beginning of the first reporting period in which the guidance is adopted. ASU 2016-13 is effective for Photronics, Inc. in its first quarter of fiscal year 2021, with early adoption permitted. We are currently evaluating the effect that this ASU will have on our consolidated financial statements.

In February 2016, the FASB issued ASU 2016-02 “Leases (Topic 842)”, which requires lessees to recognize right-of-use assets and corresponding liabilities for all leases with an initial term in excess of twelve months. We adopted ASU 2016-02 and all subsequent amendments, collectively codified in Topic 842, on November 1, 2019. The guidance requires modified retrospective adoption, either at the beginning of the earliest period presented or at the beginning of the period of adoption. We elected to apply the guidance at the beginning of the period of adoption, and recorded right-of-use (ROU) leased assets of approximately \$6.7 million, and corresponding lease liabilities, which were discounted at our incremental borrowing rates.

The guidance allows a number of elections and practical expedients, of which we have elected to employ the following:

- Election not to recognize short-term leases on the balance sheet.
- Practical expedient to not separate lease and non-lease components in a contract.

- Practical expedient “package” for transitioning to the new guidance:
  - \* Not reassessing whether any expired or existing contracts are or contain leases.
  - \* Not reassessing lease classification for any existing or expired leases.
  - \* Not reassessing initial direct costs for any existing leases.

We do not expect our adoption of Topic 842 to affect our cash flows or our ability to comply with covenants under our credit agreements.

### **Accounting Standards Updates Implemented**

In November 2016, the FASB issued ASU 2016-18 “Restricted Cash”, which requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and amounts generally described as restricted cash or restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. ASU 2016-18 was effective for Photronics, Inc. in its first quarter of fiscal year 2019 and was applied on a retrospective transition basis. Our adoption of this Update did not materially impact our cash flows statement.

In October 2016, the FASB issued ASU 2016-16 “Intra-Entity Transfers of Assets Other Than Inventory”, which eliminates the exception of recognizing, at the time of transfer, current and deferred income taxes for intra-entity asset transfers other than inventory. ASU 2016-16 was effective for us in our first quarter of fiscal year 2019 and applied on a modified retrospective transition basis. Please see Note 11 for a discussion of the effects of adopting this guidance.

In May 2014, the FASB issued ASU 2014-09 “Revenue from Contracts with Customers”, which superseded nearly all then existing revenue recognition guidance under accounting principles generally accepted in the United States. The core principle of this ASU is that revenue should be recognized for the amount of consideration expected to be received for promised goods or services transferred to customers. This ASU also requires additional disclosure about the nature, amount, timing, and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments, and assets recognized for costs incurred to obtain or fulfill a contract. In August 2015, the FASB issued ASU 2015-14 which deferred the effective date of ASU 2014-09 by one year and allowed entities to early adopt, but no earlier than the original effective date. This update allowed for either full retrospective or modified retrospective adoption. In April 2016, the FASB issued ASU 2016-10 “Identifying Performance Obligations and Licensing” which amended guidance previously issued on these matters in ASU 2014-09. The effective date and transition requirements of ASU 2016-10 were the same as those for ASU 2014-09.

We adopted the new revenue and related guidance on November 1, 2018, using the modified retrospective approach, under which we increased our accounts receivable by \$0.6 million, recognized contract assets of \$4.6 million, reduced our inventories balance by \$3.7 million, and recorded an accrual for income taxes of \$0.3 million. The recognition of, and adjustments to, these items were reflected in increases to our retained earnings and noncontrolling interest balances of \$1.1 million and \$0.1 million, respectively. The most significant impact of the new guidance on our financial statements is its requirement for us to recognize revenue as we manufacture products for which, in the event that the customer cancels the contract, we are entitled to reasonable compensation for work we have completed prior to cancellation. Prior to our adoption of Topic 606, we recognized revenue when we shipped to customers or, under some arrangements, when the customers received the goods. The impact of the adoption of this guidance on our October 31, 2019 financial statements is presented in Note 7.

The guidance allows for a number of accounting policy elections and practical expedients. In addition to our above-mentioned election to use the modified retrospective application method for adopting the guidance, those we have employed that are most significant to us are summarized below.

#### *Shipping and handling activities performed after control of a good is transferred to a customer*

We have elected to treat shipping and handling activities that occur after control of a good is transferred to a customer as activities to fulfill our promise to transfer goods to the customer. Thus, such activities will not be considered to be separate performance obligations under contracts with our customers.

Non-recognition of financing component when we transfer goods to a customer and the period between when we transfer and when we are paid will be less than one year

We have elected the practical expedient that allows for the non-recognition, as a component of a customer contract, of a financing component when the period between when we transfer a good and when we are paid will be less than one year.

Exclusion of sales and similar taxes collected from customers in the transaction price

Consistent with our practice before adoption of the new guidance, we will not recognize sales and similar taxes we collect from customers as revenue.

Use of an “input method” to measure our progress towards the transfer of control of performance obligations to customers

As, in our judgment, an input method based on our efforts to satisfy our performance obligations will best serve to depict the transfer of control of our performance obligations to our customers, we have adopted an accounting policy to employ that method. Our decision was based primarily on the facts that our photomasks are not physically transferred to customers until they are complete, and that we can employ our input-based cost accumulation systems and methods to measure our progress towards the transfer of control of our performance obligations to customers.

Non-disclosure of the transaction prices of unsatisfied or partially satisfied performance obligations

For contracts that have an original expected duration of one year or less, we have elected the practical expedient that allows us not to disclose the aggregate transaction prices of unsatisfied or partially satisfied performance obligations that exist at the end of a reporting period.

## **ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE**

None.

## **ITEM 9A. CONTROLS AND PROCEDURES**

### **Evaluation of Disclosure Controls and Procedures**

We have established and currently maintain disclosure controls and procedures, as such term is defined in Rules 13a-15(e) and 15d-15(e) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), designed to provide reasonable assurance that information required to be disclosed in our reports filed under the Exchange Act, is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission’s rules and forms, and that such information is accumulated and communicated to management, including our chief executive officer and chief financial officer, as appropriate, to allow for timely decisions regarding required disclosure. In designing and evaluating disclosure controls and procedures, management recognized that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and management necessarily was required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Our management, under the supervision and with the participation of our chief executive officer and chief financial officer, evaluated the effectiveness of the design and operation of our disclosure controls and procedures as of the end of the period covered by this report. Based upon that evaluation, our chief executive officer and chief financial officer concluded that our disclosure controls and procedures were effective at a reasonable assurance level as of the end of the period covered by this report.

### **Changes in Internal Control over Financial Reporting**

There was no change in our internal control over financial reporting during the fourth fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

### **Management’s Report on Internal Control over Financial Reporting**

Management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles.

Management assessed the effectiveness of our internal control over financial reporting as of October 31, 2019, based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in its “Internal Control - Integrated Framework” (2013). Management, under the supervision and with the participation of our chief executive officer and chief financial officer, concluded that our internal control over financial reporting was effective as of October 31, 2019.

The Company’s independent registered public accounting firm, Deloitte & Touche LLP, has audited the effectiveness of the Company’s internal control over financial reporting as of October 31, 2019, as stated in their report on page 34 of this Form 10-K.

December 20, 2019

## **ITEM 9B. OTHER INFORMATION**

None.

## **PART III**

### **ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE**

The information as to Directors required by Items 401, 405 and 407(c)(3)(d)(4) and (d)(5) of Regulation S-K is set forth in our 2020 Definitive Proxy Statement which will be filed with the Securities and Exchange Commission pursuant to Regulation 14A of the Exchange Act within 120 days after the end of the fiscal year covered by this Form 10-K under the caption “PROPOSAL 1 - ELECTION OF DIRECTORS,” “SECTION 16(A) BENEFICIAL OWNERSHIP REPORTING COMPLIANCE” and in the third paragraph under the caption “MEETINGS AND COMMITTEES OF THE BOARD,” and is incorporated in this report by reference. The information as to Executive Officers is included in our 2020 Definitive Proxy Statement under the caption “EXECUTIVE OFFICERS” and is incorporated in this report by reference.

We have adopted a code of ethics that applies to our principal executive officer, chief financial officer or principal financial officer and principal accounting officer. A copy of the code of ethics may be obtained, free of charge, by writing to the vice president, general counsel of Photronics, Inc. at 15 Secor Road, Brookfield, Connecticut 06804.

### **ITEM 11. EXECUTIVE COMPENSATION**

The information required by Item 402 of Regulation S-K and paragraph (e)(4) and (e)(5) of Item 407 is set forth in our 2020 Definitive Proxy Statement under the captions “EXECUTIVE COMPENSATION”, “CERTAIN AGREEMENTS”, “DIRECTORS’ COMPENSATION”, “COMPENSATION COMMITTEE INTERLOCKS AND INSIDER PARTICIPATION” and “COMPENSATION COMMITTEE REPORT ON EXECUTIVE COMPENSATION”, respectively, and is incorporated in this report by reference.

### **ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS**

The information required by Item 201(d) of Regulation S-K is set forth in our 2020 Definitive Proxy Statement under the caption “EQUITY COMPENSATION PLAN INFORMATION”, and is incorporated in this report by reference. The information required by Item 403 of Regulation S-K is set forth in our 2020 Definitive Proxy Statement under the caption “OWNERSHIP OF COMMON STOCK BY DIRECTORS, OFFICERS AND CERTAIN BENEFICIAL OWNERS”, and is incorporated in this report by reference.

### **ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE**

The information required by Items 404 and Item 407(a) of Regulation S-K is set forth in our 2020 Definitive Proxy Statement under the captions “MEETINGS AND COMMITTEES OF THE BOARD” and “RELATED PARTY TRANSACTIONS”, respectively, and is incorporated in this report by reference.

### **ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES**

The information required by Item 9(e) of Rule 14a-101 of the Exchange Act is set forth in our 2020 Definitive Proxy Statement under the captions “Fees Paid to the Independent Registered Public Accounting Firm” and “AUDIT COMMITTEE REPORT”, and is incorporated in this report by reference.

## PART IV

### ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

The following documents are filed as part of this report:

	<u>Page No.</u>
1. Financial Statements: See “INDEX TO CONSOLIDATED FINANCIAL STATEMENTS” in Part II, Item 8 of this Form 10-K.	33
2. Financial Statement Schedule:	
Schedule II - Valuation and Qualifying Accounts for the years ended October 31, 2019, October 31, 2018 and October 29, 2017	69
All other schedules are omitted because they are not applicable.	
3. Exhibits	70



**Schedule II**  
**Valuation and Qualifying Accounts**  
**for the Years Ended October 31, 2019, October 31, 2018**  
**and October 29, 2017**  
**(in \$ thousands)**

	<u>Balance at Beginning of Year</u>	<u>Charged to Costs and Expenses</u>	<u>Deductions</u>	<u>Balance at End of Year</u>
<b>Allowance for Doubtful Accounts</b>				
Year-ended October 31, 2019 .....	\$1,526	\$ (18)	\$(174) <sup>(a)</sup>	\$1,334
Year-ended October 31, 2018 .....	\$2,319	\$ (809)	\$ 16 <sup>(a)</sup>	\$1,526
Year ended October 29, 2017 .....	\$3,901	\$(1,600) <sup>(b)</sup>	\$ 18 <sup>(a)</sup>	\$2,319

(a) Uncollectible accounts written off, net, and impact of foreign currency translation.

(b) Reversal of valuation allowance.

## ITEM 16. FORM 10-K SUMMARY

Not applicable.

### EXHIBITS INDEX

Exhibit Number	Description	Incorporated by Reference			Filed or Furnished Herewith
		Form	Exhibit	Filing Date	
3.1	Certificate of Incorporation as amended July 9, 1986, April 9, 1990, March 16, 1995, November 13, 1997, April 15, 2002 and June 20, 2005.				X
3.2	Amended and Restated By-laws of the Company dated as of September 7, 2016.	8-K	3.2	9/13/2016	
4.1	Description of Securities of the Company.				X
4.2	Certificate of Amendment with Respect to Series A Preferred Stock, dated September 24, 2019.	8-K	3.1	9/24/2019	
4.4	Indenture dated January 22, 2015, by and between the Company and the Bank of New York Mellon Trust Company, N.A., as trustee.	8-K	4.2	1/28/2015	
10.1	The Company's 1992 Employee Stock Purchase Plan.	10-K	10.1	12/20/2017	
10.2	Amendment to the Employee Stock Purchase Plan as of March 24, 2004. <sup>+</sup>	10-K	10.2	1/6/2017	
10.3	Amendment to the Employee Stock Purchase Plan as of April 8, 2010. <sup>+</sup>	10-K	10.4	1/7/2016	
10.4	Amendment to the Employee Stock Purchase Plan as of March 28, 2012. <sup>+</sup>	10-K	10.4	12/21/2018	
10.5	Amendment to the Employee Stock Plan as of December 18, 2019.*				X
10.6	2016 Equity Incentive Compensation Plan. <sup>+</sup>	DEF 14A		2/29/2016	
10.7	The Company's 2007 Long-Term Equity Incentive Plan. <sup>+</sup>				X
10.8	Amendment to the 2007 Long-Term Equity Incentive Plan as of April 8, 2010. <sup>+</sup>	10-K	10.7	1/7/2016	
10.9	Amendment to the 2007 Long Term Equity Incentive Plan as of April 11, 2014. <sup>+</sup>	10-K	10.8	1/6/2015	
10.10	2011 Executive Incentive Compensation Plan effective as of November 1, 2010. <sup>+</sup>	10-K	10.9	1/6/2015	
10.11	Joint Venture Framework Agreement dated November 20, 2013, between the Company and Dai Nippon Printing Co., Ltd. <sup>#</sup>	10-K/A	10.19	7/8/2015	
10.12	Joint Venture Operating Agreement dated November 20, 2013, between the Company and Dai Nippon Printing Co., Ltd. <sup>#</sup>	10-K/A	10.20	7/8/2015	
10.13	Outsourcing Agreement dated November 20, 2013, among the Company, Dai Nippon Printing Co., Ltd and Photronics Semiconductor Mask Corporation. <sup>#</sup>	10-K/A	10.21	7/8/2015	
10.14	License Agreement dated November 20, 2013, between the Company and Photronics Semiconductor Mask Corporation. <sup>#</sup>	10-K/A	10.22	7/8/2015	
10.15	License Agreement dated November 20, 2013, between Dai Nippon Printing Co., Ltd and Photronics Semiconductor Mask Corporation. <sup>#</sup>	10-K/A	10.23	7/8/2015	
10.16	Margin Agreement dated November 20, 2013, among the Company, Dai Nippon Printing Co., Ltd and Photronics Semiconductor Mask Corporation. <sup>#</sup>	10-K/A	10.24	7/8/2015	

Exhibit Number	Description	Incorporated by Reference			Filed or Furnished Herewith
		Form	Exhibit	Filing Date	
10.17	Merger Agreement dated January 16, 2014, between Photronics Semiconductor Mask Corporation and DNP Photomask Technology Taiwan Co., Ltd.#	10-K/A	10.25	7/8/2015	
10.18	Executive Employment Agreement between the Company and Christopher J. Proglar, Vice President, Chief Technology Officer dated September 10, 2007.+				X
10.19	Executive Employment Agreement between the Company and Peter S. Kirilin dated May 4, 2015.+	10-Q	10.28	9/9/2015	
10.20	Executive Employment Agreement between the Company and Richelle E. Burr dated May 21, 2010.+	10-K	10.30	1/7/2016	
10.21	Executive Employment Agreement between the Company and John P. Jordan dated September 5, 2017.+	10-K	10.31	12/20/2017	
10.22	Consulting Agreement between the Company and DEMA Associates, LLC dated January 20, 2018.	10-K	10.21	12/21/2018	
10.23	Form of Amendment to Executive Employment Agreement dated March 16, 2012.+				X
10.24	Fourth Amended and Restated Credit Agreement dated as of September 27, 2018 among Photronics, Inc. the Foreign Subsidiary Borrower Party Thereto, the Lender Party Thereto, JPMorgan Chase Bank, N.A. as Administrative and Collateral Agent and Bank of America, N.A. as syndication agent.	10-K	10.24	12/21/2018	
10.25	Third Amended and Restated Security Agreement entered into as of September 27, 2018 by and among Photronics, Inc., the subsidiaries of the Company and JPMorgan Chase Bank N.A.	10-K	10.25	12/21/2018	
10.26	Fixed Asset Loan Agreement between Photronics DNP Mask Corporation Xiamen and Industrial and Commercial Bureau China Limited Xiamen Xiang'an Branch effective as of November 29, 2012.	10-K	10.26	12/21/2018	
10.27	Working Capital Loan Agreement between Industrial and Commercial Bureau China Limited Xiamen Xiang'an Branch and Photronics DNP Mask Corporation Xiamen effective as of November 7, 2018.	10-K	10.27	12/21/2018	
10.28	Investment Agreement between Xiamen Torch Hi-Tech Industrial Development Zone Management Committee and Photronics Singapore Pte. Ltd.	10-Q	10.35	9/2/2016	
10.29	Amendment No. 1 to the Investment Agreement between Xiamen Torch Hi-Tech Industrial Development Zone Management Committee and Photronics Singapore Pte, Ltd.#*				X
10.30	Contribution Agreement dated May 16, 2017 among Dai Nippon Printing Co., Ltd. ("DNP"), DNP Asia Pacific Pte. Ltd. ("DNP Asia Pacific"), Photronics, Inc. ("Photronics"), Photronics Singapore Pte. Ltd., ("Photronics Singapore"), and Xiamen American Japan Photronics Mask Co., Ltd. ("PDMCX").#	10-Q/A	10.26	12/19/2017	
10.31	Joint Venture Operating Agreement dated May 16, 2017 among Photronics, Photronics Singapore, DNP and DNP Asia Pacific.#	10-Q/A	10.27	12/19/2017	

Exhibit Number	Description	Incorporated by Reference			Filed or Furnished Herewith
		Form	Exhibit	Filing Date	
10.32	Outsourcing Agreement dated May 16, 2017 among Photronics, DNP, Photronics DNP Photomask Corporation (“PDMC”), and PDMCX.#	10-Q/A	10.28	12/19/2017	
10.33	Amended and Restated License Agreement dated May 16, 2017 between DNP and PDMC.#	10-Q/A	10.29	12/19/2017	
10.34	Investment Cooperation Agreement between Hefei State Hi-tech Industry Development Zone and Photronics UK, Ltd.	10-K	10.42	12/20/2017	
10.35	Section 382 Rights Agreement, dated as September 23, 2019, between Photronics, Inc. and Computershare Trust Company, N.A. as rights agent.	8-K	4.1	9/24/2019	
21	List of Subsidiaries of the Company.*				X
23.1	Consent of Deloitte & Touche LLP, Independent Registered Public Accounting Firm.*				X
31.1	Certification of Chief Executive Officer pursuant to Rule 13a-14(a)/15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.*				X
31.2	Certification of Chief Financial Officer pursuant to Rule 13a-14(a)/15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.*				X
32.1	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.*				X
32.2	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.*				X
101.INS	XBRL Instance Document				X
101.SCH	XBRL Taxonomy Extension Schema Document				X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document				X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document				X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document				X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document				X

+ Represents a management contract or compensatory plan or arrangement.

# Portions of this exhibit have been omitted pursuant to a request for confidential treatment filed with the Securities and Exchange Commission.

\* Represents an exhibit that is filed with this Annual Report on Form 10-K.

The Company will provide a copy of any exhibit upon receipt of a written request for the particular exhibit or exhibits desired. All requests should be addressed to the Company’s general counsel at the address of the Company’s principal executive offices.

## SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

PHOTRONICS, INC.  
(Registrant)

By	<u>/s/ John P. Jordan</u> John P. Jordan Senior Vice President, Chief Financial Officer (Principal Financial Officer) December 20, 2019	By	<u>/s/ Eric Rivera</u> Eric Rivera Vice President, Corporate Controller (Principal Accounting Officer) December 20, 2019
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Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

By	<u>/s/ Peter S. Kirlin</u> Peter S. Kirlin Chief Executive Officer Director (Principal Executive Officer)	December 20, 2019
By	<u>/s/ John P. Jordan</u> John P. Jordan Senior Vice President, Chief Financial Officer (Principal Financial Officer)	December 20, 2019
By	<u>/s/ Eric Rivera</u> Eric Rivera Vice President, Corporate Controller (Principal Accounting Officer)	December 20, 2019
By	<u>/s/ Constantine S. Macricosta</u> Constantine S. Macricostas Chairman of the Board	December 20, 2019
By	<u>/s/ Walter M. Fiederowicz</u> Walter M. Fiederowicz Director	December 20, 2019
By	<u>/s/ Joseph A. Fiorita, Jr.</u> Joseph A. Fiorita, Jr. Director	December 20, 2019
By	<u>/s/ Liang-Choo Hsia</u> Liang-Choo Hsia Director	December 20, 2019
By	<u>/s/ George Macricostas</u> George Macricostas Director	December 20, 2019
By	<u>/s/ Mary Paladino</u> Mary Paladino Director	December 20, 2019
By	<u>/s/ Mitchell G. Tyson</u> Mitchell G. Tyson Director	December 20, 2019

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I, Peter S. Kirlin, certify that:

1. I have reviewed this Annual Report on Form 10-K of Photronics, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
  - a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
  - b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
  - c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this annual report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this annual report based on such evaluation; and
  - d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
  - a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
  - b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ Peter S. Kirlin

Peter S. Kirlin  
Chief Executive Officer  
December 20, 2019



I, John P. Jordan, certify that:

1. I have reviewed this Annual Report on Form 10-K of Photronics, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
  - a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
  - b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
  - c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this annual report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this annual report based on such evaluation; and
  - d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
  - a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
  - b) any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ John P. Jordan

John P. Jordan

Senior Vice President

Chief Financial Officer

(Principal Financial Officer)

December 20, 2019

**EXHIBIT 32.1**

I, Peter S. Kirlin, Chief Executive Officer of Photronics, Inc. (the “Company”), certify, pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, 18 U.S.C. Section 1350, that:

1. the Annual Report on Form 10-K of the Company for the year ended October 31, 2019 (the “Report”) fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Peter S. Kirlin

Peter S. Kirlin  
Chief Executive Officer  
December 20, 2019

**EXHIBIT 32.2**

I, John P. Jordan, Chief Financial Officer of Photonics, Inc. (the “Company”), certify, pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, 18 U.S.C. Section 1350, that:

1. the Annual Report on Form 10-K of the Company for the year ended October 31, 2019 (the “Report”) fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ John P. Jordan

John P. Jordan

Senior Vice President

Chief Financial Officer

(Principal Financial Officer)

December 20, 2019

# CORPORATE INFORMATION

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## Independent Registered Public Accounting Firm

Deloitte & Touche LLP  
185 Asylum Street  
City Place I-33<sup>rd</sup> Floor  
Hartford, CT 06103

## Registrar and Transfer Agent

Computershare  
P.O. Box 43069  
Providence, RI 02940-3069

## Investor Contact and General Information

For answers to general questions about Photronics, Inc., please call (203) 775-9000. You may also forward your inquiries via e-mail to [irinformation@photronics.com](mailto:irinformation@photronics.com)

## Notice of Annual Meeting

The Company's Annual Meeting will be held on March 16, 2020 at 8:30 AM Eastern Time at The Rock Harbor Conference Room Reef Tower Playa Largo Resort + Spa 97450 Overseas Highway Key Largo, FL 33037

## NASDAQ Symbol

PLAB

## Manufacturing Network

### Asian Division

Cheonan, Choongnam, Korea  
Hefei, China  
Hsin-Chu City, Taiwan (2)  
Taichung, Taiwan  
Xiamen, China

### European Division

Dresden, Germany  
Wales, United Kingdom

### North American Division

Allen, Texas  
Boise, Idaho  
Brookfield, Connecticut

## Board of Directors

### Constantine S. Macricostas

Chairman of the Board, Photronics, Inc.

### Walter M. Fiederowicz, Esq.

Private Investor & Consultant

### Joseph A. Fiorita, Jr., CPA

Partner, Fiorita, Kornhaas & Company, P.C.

### Liang-Choo Hsia, PhD

Consultant

### Peter S. Kirlin, PhD

Chief Executive Officer, Photronics, Inc.

### George C. Macricostas

Independent Investor

### Mary Paladino

Partner, Certified Public Accountant

### Mitchell G. Tyson

Independent Business Strategy and Clean Energy Consultant

## Executive Officers

### Peter S. Kirlin, PhD

Chief Executive Officer

### Frank Lee, PhD

President, Asia IC Photomask

### John P. Jordan

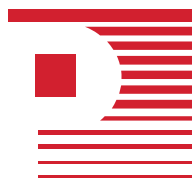
Executive Vice President, Chief Financial Officer

### Christopher J. Progler, PhD

Executive Vice President, Chief Technology Officer and Strategic Planning

### Richelle E. Burr, Esq.

Executive Vice President, Chief Administrative Officer, General Counsel and Secretary



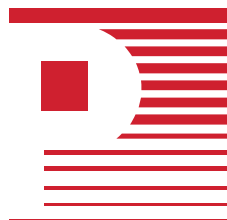
## PHOTRONICS, INC.

15 SECOR ROAD  
BROOKFIELD, CT 06804  
[WWW.PHOTRONICS.COM](http://WWW.PHOTRONICS.COM)

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MANUFACTURING FACILITIES:

- ◆ ALLEN, TX ◆ BOISE, ID ◆ BROOKFIELD, CT
- ◆ DRESDEN, GERMANY ◆ WALES, U.K.
- ◆ HEFEI, CHINA ◆ XIAMEN, CHINA
- ◆ CHEONAN, CHOONGNAM, KOREA
- ◆ HSIN-CHU CITY, TAIWAN (2) ◆ TAICHUNG, TAIWAN



PHOTRONICS

Service + Technology + Global

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