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

FORM 10-Q

☒ ***QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15 (d) OF THE SECURITIES EXCHANGE ACT OF 1934***
For the quarterly period ended February 2, 2020
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	**06-0854886**
(State or other jurisdiction of incorporation or organization)	*(IRS Employer Identification No.)*
15 Secor Road, Brookfield, Connecticut	**06804**
(Address of principal executive offices)	*(Zip Code)*
Registrant’s telephone number, including area code	**(203) 775-9000**

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

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 periods 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 and post such files).

Yes ☒ **No** ☐

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

Large Accelerated Filer	☒	Accelerated Filer	☐	Non-Accelerated Filer	☐
Smaller Reporting Company	☐	Emerging growth company	☐		

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 ☒

The registrant had 65,119,738 shares of common stock outstanding as of March 9, 2020.

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” 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 quarterly report on Form 10-Q 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, business, and political conditions in both domestic as well as international markets; pandemics affecting our labor force, customers or suppliers; 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; construction of new facilities and assembly of new equipment; dilutive issuances of the Company’s stock; 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.

PHOTRONICS, INC.

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PART I. FINANCIAL INFORMATION

Item 1. CONDENSED CONSOLIDATED FINANCIAL STATEMENTS

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

	February 2, 2020	October 31, 2019
ASSETS		
Current assets:		
Cash and cash equivalents	$ 218,309	$ 206,530
Accounts receivable, net of allowance of $1,295 in 2020 and $1,334 in 2019	141,720	134,454
Inventories	49,673	48,155
Other current assets	31,202	38,388
Total current assets	440,904	427,527
Property, plant and equipment, net	619,935	632,441
Intangible assets, net	6,847	7,870
Deferred income taxes	17,594	20,779
Other assets	40,180	30,048
Total assets	$ 1,125,460	$ 1,118,665
LIABILITIES AND EQUITY		
Current liabilities:		
Short-term debt	$ 9,975	$ 8,731
Current portion of long-term debt	7,959	2,142
Accounts payable	84,707	91,379
Accrued liabilities	55,013	49,702
Total current liabilities	157,654	151,954
Long-term debt	36,449	41,887
Other liabilities	18,556	13,732
Total liabilities	212,659	207,573
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, 66,144 shares issued and 65,228 outstanding at February 2, 2020 and 65,595 shares issued and outstanding at October 31, 2019	661	656
Additional paid-in capital	528,535	524,319
Retained earnings	264,222	253,922
Treasury stock, 916 shares at February 2, 2020	(11,000)	-
Accumulated other comprehensive loss	(11,742)	(9,005)
Total Photronics, Inc. shareholders' equity	770,676	769,892
Noncontrolling interests	142,125	141,200
Total equity	912,801	911,092
Total liabilities and equity	$ 1,125,460	$ 1,118,665

See accompanying notes to condensed consolidated financial statements.

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

	Three Months Ended	
	February 2, 2020	**January 27, 2019**
Revenue	$ 159,736	$ 124,712
Cost of goods sold	125,134	98,610
Gross profit	34,602	26,102
Operating expenses:		
Selling, general and administrative	14,219	13,792
Research and development	4,080	4,263
Total operating expenses	18,299	18,055
Operating income	16,303	8,047
Other income (expense):		
Interest income and other income (expense), net	5,495	1,639
Interest expense	(1,798)	(531)
Income before income taxes	20,000	9,155
Income tax provision	9,072	1,387
Net income	10,928	7,768
Net income attributable to noncontrolling interests	628	2,501
Net income attributable to Photronics, Inc. shareholders	$ 10,300	$ 5,267
Earnings per share:		
Basic	$ 0.16	$ 0.08
Diluted	$ 0.16	$ 0.08
Weighted-average number of common shares outstanding:		
Basic	65,554	66,583
Diluted	66,449	67,047

See accompanying notes to condensed consolidated financial statements.

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

	Three Months Ended	
	February 2, 2020	January 27, 2019
Net income	$ 10,928	$ 7,768
Other comprehensive (loss) income, net of tax of $:		
Foreign currency translation adjustments	(1,564)	6,572
Other	17	19
Net other comprehensive (loss) income	(1,547)	6,591
Comprehensive income	9,381	14,359
Less: comprehensive income attributable to noncontrolling interests	1,818	3,783
Comprehensive income attributable to Photronics, Inc. shareholders	$ 7,563	$ 10,576

See accompanying notes to condensed consolidated financial statements.

PHOTRONICS, INC.
Condensed Consolidated Statements of Equity
(in thousands)
(unaudited)

	Three Months Ended February 2, 2020							
	Photronics, Inc. Shareholders							
	Common Stock		Additional Paid-in Capital	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive Loss	Non-controlling Interests	Total Equity
	Shares	Amount						
Balance at October 31, 2019	65,595	$ 656	$ 524,319	$ 253,922	$ -	$ (9,005)	$ 141,200	$ 911,092
Net income	-	-	-	10,300	-	-	628	10,928
Other comprehensive (loss) income	-	-	-	-	-	(2,737)	1,190	(1,547)
Sale of common stock through employee stock option and purchase plans	358	3	2,854	-	-	-	-	2,857
Restricted stock awards vesting and expense	191	2	756	-	-	-	-	758
Share-based compensation expense	-	-	351	-	-	-	-	351
Purchase of treasury stock	-	-	-	-	(11,000)	-	-	(11,000)
Repurchase of common stock of subsidiary	-	-	255	-	-	-	(893)	(638)
Balance at February 2, 2020	66,144	$ 661	$ 528,535	$ 264,222	$ (11,000)	$ (11,742)	$ 142,125	$ 912,801

	Three Months Ended January 27, 2019							
	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						
Balance at October 31, 2018	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	-	-	-	5,267	-	-	2,501	7,768
Other comprehensive income	-	-	-	-	-	5,309	1,282	6,591
Sale of common stock through employee stock option and purchase plans	94	1	521	-	-	-	-	522
Restricted stock awards vesting and expense	123	1	567	-	-	-	-	568
Share-based compensation expense	-	-	494	-	-	-	-	494
Contribution from noncontrolling interest	-	-	-	-	-	-	29,394	29,394
Dividends to noncontrolling interests	-	-	-	-	-	-	(26,102)	(26,102)
Repurchase of common stock of subsidiary	-	-	-	-	-	-	(9)	(9)
Purchase of treasury stock	-	-	-	-	(10,696)	-	-	(10,696)
Balance at January 27, 2019	69,917	$ 699	$ 557,188	$ 236,665	$ (33,807)	$ 343	$ 152,082	$ 913,170

See accompanying notes to condensed consolidated financial statements.

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

	Three Months Ended	
	February 2, 2020	January 27, 2019
Cash flows from operating activities:		
Net income	$ 10,928	$ 7,768
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	24,626	18,781
Share-based compensation	1,356	1,062
Changes in assets and liabilities:		
Accounts receivable	(6,699)	(9,333)
Inventories	(1,435)	(2,313)
Other current assets	4,724	(22,082)
Accounts payable, accrued liabilities, and other	(2,715)	(13,169)
Net cash provided by (used in) operating activities	30,785	(19,286)
Cash flows from investing activities:		
Purchases of property, plant and equipment	(13,807)	(106,925)
Government incentives	2,417	5,029
Other	(139)	19
Net cash used in investing activities	(11,529)	(101,877)
Cash flows from financing activities:		
Proceeds from debt	1,140	28,180
Purchase of treasury stock	(11,000)	(10,696)
Repayments of debt	(389)	-
Proceeds from share-based arrangements	2,886	650
Contribution from noncontrolling interest	-	29,394
Dividends paid to noncontrolling interest	-	(26,102)
Other	(248)	(45)
Net cash (used in) provided by financing activities	(7,611)	21,381
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	149	2,961
Net increase (decrease) in cash, cash equivalents, and restricted cash	11,794	(96,821)
Cash, cash equivalents, and restricted cash at beginning of period	209,291	331,989
Cash, cash equivalents, and restricted cash at end of period	$ 221,085	$ 235,168
Supplemental disclosure information:		
Accrual for property, plant and equipment purchased during the period	$ 1,511	$ 30,697
Accrual for property, plant and equipment purchased with funds receivable from government incentives	$ -	$ 11,799

See accompanying notes to condensed consolidated financial statements.

PHOTRONICS, INC.
Notes to Condensed Consolidated Financial Statements
(unaudited)
(in thousands, except share amounts and per share data)

NOTE 1 - BASIS OF FINANCIAL STATEMENT PRESENTATION

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.

The accompanying unaudited condensed consolidated financial statements ("the financial statements") have been prepared in accordance with accounting principles generally accepted in the United States of America for interim financial information, and with the instructions to Form 10-Q and Article 10 of Regulation S-X. Accordingly, they do not include all of the information and footnotes required by accounting principles generally accepted in the United States of America for annual financial statements. In the opinion of management, adjustments, all of which are of a normal recurring nature, considered necessary for a fair presentation have been included. The 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.

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.

Our business is typically impacted during the first, and sometimes the second, quarters 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. Operating results for the interim period are not necessarily indicative of the results that may be expected for the fiscal year ending October 31, 2020. For further information, refer to the consolidated financial statements, and notes thereto, included in our Annual Report on Form 10-K for the year ended October 31, 2019.

NOTE 2 - 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:

	February 2, 2020	October 31, 2019
Raw materials	$ 46,090	$ 46,027
Work in process	2,981	2,122
Finished goods	602	6
	$ 49,673	$ 48,155

NOTE 3 - PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment consists of the following:

	February 2, 2020	October 31, 2019
Land	$ 12,055	$ 12,085
Buildings and improvements	173,497	172,340
Machinery and equipment	1,759,785	1,748,483
Leasehold improvements	20,021	19,921
Furniture, fixtures and office equipment	14,304	14,404
Construction in progress	18,521	28,135
	1,998,183	1,995,368
Accumulated depreciation and amortization	(1,378,248)	(1,362,927)
	$ 619,935	$ 632,441

Depreciation and amortization expense for property, plant and equipment was $23.5 million and $17.6 million for the three-month periods ended February 2, 2020 and January 27, 2019, respectively.

NOTE 4 - PDMCX JOINT VENTURE

In January 2018, Photronics, through its wholly owned Singapore subsidiary (hereinafter, within this Note “we”, “Photronics”, or “our”), 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 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 provides 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 February 2, 2020, Photronics and DNP had each contributed cash of approximately $48 million, and PDMCX obtained local financing of approximately $35 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. As discussed in Note 5, liens were granted to a financing entity on assets with a total carrying value of $92.9 million, as collateral for loans.

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. As of the date of issuance of these financial statements, DNP had not indicated its intention to exercise this right. 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 $3.7 million, and $1.3 million during the three-month periods ended February 2, 2020 and January 27, 2019, respectively. General creditors of PDMCX do not have recourse to the assets of Photronics, Inc., and our maximum exposure to loss from PDMCX at February 2, 2020, was $36.6 million.

As required by the guidance in Topic 810 - "Consolidation" of the Accounting Standards Codification, 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 was 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 facts 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 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 reporting periods was 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 condensed consolidated balance sheets are presented in the following table, together with our exposure to loss related to these assets and liabilities.

	February 2, 2020		**October 31, 2019**	
Classification	**Carrying Amount**	**Photronics Interest**	**Carrying Amount**	**Photronics Interest**
Current assets	$ 23,638	$ 11,821	$ 24,142	$ 12,074
Non-current assets	110,296	55,159	114,015	57,019
Total assets	133,934	66,980	138,157	69,093
Current liabilities	24,044	12,024	16,889	8,446
Non-current liabilities	36,716	18,362	42,094	21,051
Total liabilities	60,760	30,386	58,983	29,497
Net assets	$ 73,174	$ 36,594	$ 79,174	$ 39,596

NOTE 5 – LONG-TERM DEBT

Long-term debt consists of the following:

	February 2, 2020	**October 31, 2019**
Project Loans	$ 35,094	$ 34,490
Working Capital Loans (value added tax component)	9,314	9,539
	44,408	44,029
Current portion of long-term debt	(7,959)	(2,142)
Long-term debt	$ 36,449	$ 41,887

At February 2, 2020, maturities of our long-term debt over the next five fiscal years and thereafter were as follows:

2020 (remainder of)	$ 1,788
2021	8,449
2022	12,648
2023	3,501
2024	6,704
Thereafter	11,318
	$44,408

As of February 2, 2020 and October 31, 2019, the weighted-average interest rates of our short-term debt were 3.90% and 3.84%, 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, which had a combined carrying value of $92.9 million as of February 2, 2020, as collateral for the Project Loans. As of February 2, 2020, PDMCX had borrowed 243.4 million RMB ($35.1 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	$ 1,298	$ 6,488	$ 5,785	$ 3,501	$ 6,704	$ 6,416	$ 4,902

The interest rates on the Project Loans are based on the benchmark lending rate of the People’s Bank of China (4.9% at February 2, 2020). 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 February 2, 2020, PDMCX had 64.6 million RMB ($9.3 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 $0.4 million during the three-month period ended February 2, 2020. The table below presents, in U.S. dollars, the timing of future payments against these borrowings.

	Fiscal Year		
	2020	2021	2022
Principal payments	$ 490	$ 1,961	$ 6,863

As of February 2, 2020, PDMCX had borrowed, in several transactions to fund operations, 44.8 million RMB ($6.5 million) against the approval, all of which was outstanding as of that date repayments are due one year from the borrowing dates.

The interest rates on borrowings to fund operations are approximately 4.4 to 4.6% and interest rates on borrowings to pay VAT are approximately 4.8 to 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% (2.67% at February 2, 2020), 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.

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 February 2, 2020), and limits the amount of cash dividends, distributions, and redemptions we can pay on our common stock to an aggregate annual amount of $50 million. We had no outstanding borrowings against the Credit Agreement at February 2, 2020, and $50 million was available for borrowing. The interest rate on the Credit Agreement (2.65% at February 2, 2020) is based on our total leverage ratio at LIBOR plus a spread, as defined in the Credit Agreement.

NOTE 6 - REVENUE

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. 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 uncompleted revenue contracts on which we have performed; for any such contracts under which 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 to customer specifications, in accordance with their proprietary designs; 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 $7.9 million are included in "Other" current assets, and contract liabilities of $11.8 million are included in Accrued liabilities in our February 2, 2020 condensed consolidated balance sheet. Our October 31, 2019 condensed consolidated balance sheet includes contract assets of $7.6 million and contract liabilities of $11.5 million; with like classification to the February 2, 2020, balances. We did not impair any contract assets during the three-month periods ended February 2, 2020 or January 27, 2019, and we recognized $1.2 million and $0.7 million of revenue from the settlement of contract liabilities that existed at the beginning of those respective periods.

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 reporting period. 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 derecognize the related receivable. Credit losses incurred on our accounts receivable during the three-month period ended February 2, 2020, were immaterial, and we did not incur any credit losses on our accounts receivable during the three-month period ended January 27, 2019.

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 modify terms of sale, which may require payment in advance of performance. We have elected the practical expedient allowed under ASC Topic 606 "Revenue from Contracts with Customers" ("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 three-month periods ended February 2, 2020 and January 27, 2019, disaggregated by product type, geographic origin, and timing of recognition. In the three-month period ended February 2, 2020, we changed the threshold for the definition of high-end FPD, from G8 and above and active matrix organic light-emitting diode (AMOLED) display screens, to G10.5 and above, AMOLED, and low-temperature polysilicon display screens (LTPS), to reflect the overall advancement of technology in the FPD industry. Our definition of high-end IC products remains as 28 nanometer or smaller. The revenue by product type for the three-month period ended January 27, 2019, presented below has been reclassified to conform to the current period presentation.

Revenue by Product Type	**Three Months Ended February 2, 2020**	**Three Months Ended January 27, 2019**
IC		
High-end	$ 41,041	$ 34,566
Mainstream	65,937	60,314
Total IC	$ 106,978	$ 94,880
FPD		
High-end	$ 39,770	$ 15,350
Mainstream	12,988	14,482
Total FPD	$ 52,758	$ 29,832
	$ 159,736	$ 124,712

Revenue by Geographic Origin

Taiwan	$ 66,114	$ 57,740
Korea	40,736	35,237
United States	25,067	22,472
Europe	7,543	8,354
China	19,900	263
All other Asia	376	646
	$ 159,736	$ 124,712

Revenue by Timing of Recognition

Over time	$ 137,696	$ 120,845
At a point in time	22,040	3,867
	$ 159,736	$ 124,712

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 for, 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 7 – LEASES

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 elected to apply the guidance at the beginning of the period of adoption and recorded, as of November 1, 2019, right-of-use (ROU) leased assets of $6.5 million. In conjuction with this, we recorded lease liabilities, which had been discounted at our incremental borrowing rates, of $6.5 million.

The guidance allows a number of elections and practical expedients, of which we elected 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.

Our involvement in lease arrangements has typically been as a lessee. We determine if an agreement is or contains a lease on the date of the lease agreement or commitment, if earlier. Our evaluation considers whether the arrangement includes an identified asset and whether it affords us the right to control the asset. Our having the right to control the identified asset is determined by whether we are entitled to substantially all of its economic benefits and can direct its use.

We recognize leases on our consolidated balance sheet when a lessor makes an asset underlying a lease having a term in excess of twelve months available for our use. The present value of lease payments over the term of the lease, which is determined using our incremental borrowing rate for collateralized loans at the commencement date of the lease, provides the basis for the initial measurement of ROU assets and their related lease liabilities. Variable lease payments, other than those that are dependent on an index or on a rate, are not included in the measurement of ROU assets and their related lease liabilities. Lease terms will include extension periods if the lease agreement includes an option to extend the lease that we are reasonably certain to exercise.

ROU assets underlying our leases include the land and facilities of some of our operating facilities, other real property, and machinery and equipment. As of February 2, 2020, we had ROU assets under operating leases of $7.0 million, included in "Other Assets", and $1.9 and $4.4 million of lease liabilities in Accrued liabilities and Other liabilities, respectively, and recognized operating lease and short-term lease costs of $1.2 million and $0.1 million, respectively, in the three-month period then ended; variable lease costs incurred were not material. The following tables present lease payments under non-cancellable leases as of February 2, 2020.

	Fiscal Year								
	2020	2021	2022	2023	2024	Thereafter	Total Lease Payments	Imputed Interest*	Total
Lease payments	$ 1,521	$ 1,767	$ 1,652	$ 770	$ 438	$ 386	$ 6,534	$ (286)	$ 6,248

* Imputed interest represents difference between undiscounted cash flows and discounted cash flows.

Presented below is other information related to our operating leases.

Supplemental cash flows information:	**Three Months Ended February 2, 2020**
Operating cash flows from operating leases	$ 1,885
ROU assets obtained in exchange for lease obligations	$ 282

	As of February 2, 2020
Weighted-average remaining lease term	3.9 years
Weighted-average discount rate	2.38%

Rent expense, as calculated under guidance in effect prior to our adoption of the new leases guidance, was $3.0 million in fiscal year 2019. At October 31, 2019, future minimum lease payments under non-cancelable operating leases with initial terms in excess of one year were as presented in the table below. The amounts are undiscounted and were calculated in accordance with guidance in effect prior to our adoption of the new leases guidance.

2020	$ 1,885
2021	1,613
2022	1,535
2023	742
2024	424
Thereafter	377
	$ 6,576

NOTE 8 - 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 for issuance 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 $1.4 million and $1.1 million in the three-month periods ended February 2, 2020 and January 27, 2019, and we received cash from option exercises of $2.8 million and $0.5 million during those respective periods. No share-based compensation cost was capitalized as part of an asset and no related income tax benefits were recorded during the periods presented.

Stock Options

Option awards generally vest annually, on a straight-line basis,over four years, and have a ten-year contractual term. All incentive and non-qualified stock option grants 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.

There were no options granted during the three-month period ended February 2, 2020, and there were 132,000 share options granted during the three-month period ended January 27, 2019, with a weighted-average grant date fair value of $3.31 per share. As of February 2, 2020, the total unrecognized compensation cost related to unvested option awards was approximately $0.7 million. That cost is expected to be recognized over a weighted-average amortization period of 2.1 years.

The weighted-average inputs and risk-free rates of return used to calculate the grant-date fair value of options issued during the three-month period ended January 27, 2019, are presented in the following table.

	Three Months Ended
	January 27, 2019
Volatility	33.1%
Risk free rate of return	2.5-2.9%
Dividend yield	0.0%
Expected term	5.1 years

Information on outstanding and exercisable option awards as of February 2, 2020, is presented below.

Options	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life	Aggregate Intrinsic Value
Outstanding at February 2, 2020	1,795,989	$ 9.17	5.4 years	$ 6,492
Exercisable at February 2, 2020	1,487,661	$ 9.07	4.8 years	$ 5,518

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 price of our common stock on the date of grant. There were 522,000 restricted stock awards issued during the three-month period ended February 2, 2020, with a weighted-average grant-date fair value of $15.26 per share, and there were 435,000 restricted stock awards issued during the three-month period ended January 27, 2019, with a weighted-average grant-date fair value of $9.80 per share. As of February 2, 2020, the total compensation cost not yet recognized related to unvested restricted stock awards was approximately $10.6 million. That cost is expected to be recognized over a weighted-average amortization period of 3.2 years. As of February 2, 2020, there were 939,766 shares of restricted stock outstanding.

NOTE 9 - INCOME TAXES

We calculate our provision for income taxes at the end of each interim reporting period on the basis of an estimated annual effective tax rate adjusted for tax items that are discrete to each period.

The effective tax rate of 45.4% exceeds the U.S. statutory rate of 21.0% in the three-month period ended February 2, 2020, primarily due to the non-recognition of the tax benefit of losses that, in certain jurisdictions, have been offset by valuation allowances, and the establishment of a valuation allowance for a loss carryforward in a non-U.S. jurisdiction, which were partially offset by the benefit of tax holidays and investment credits in certain foreign jurisdictions.

Valuation allowances, in jurisdictions with historic losses, eliminate the current tax benefit of losses in these jurisdictions where, based on the weight of information available to us, we determined that it is more likely than not that the tax benefits will not be realized. In the three-month period ended February 2,2020, as a result of the reassessment of the aforementioned available information, we established a valuation allowance of $2.1 million against a non-U.S. based loss carryforward deferred tax asset that is not more likely than not to be realized.

Unrecognized tax benefits related to uncertain tax positions were $1.9 million at February 2, 2020, and October 31, 2019, substantially all of which, if recognized, would favorably impact the Company’s effective tax rate. Accrued interest and penalties related to unrecognized tax benefits was $0.2 million at February 2, 2020 and October 31, 2019. 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 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. and major foreign or state jurisdictions for years prior to fiscal year 2015.

We were granted a five-year tax holiday in Taiwan that expired on December 31, 2019. This tax holiday reduced foreign taxes by $0.1 million, and $0.8 million in the three-month periods ended February 2, 2020 and January 27, 2019, respectively, with an immaterial per share impact in the February 2, 2020 period and a one half-cent per share effect in the January 27, 2019 period.

The effective tax rate of 15.2% differs from the U.S. statutory rate of 21.0% in the three-month period ended January 27, 2019, primarily due to earnings being taxed at lower statutory rates in foreign jurisdictions, the settlement of a tax audit, the benefit of a tax holiday, and investment credits in certain foreign jurisdictions.

NOTE 10 - EARNINGS PER SHARE

The calculation of basic and diluted earnings per share is presented below.

	Three Months Ended	
	February 2, 2020	January 27, 2019
Net income attributable to Photronics, Inc. shareholders	$ 10,300	$ 5,267
Earnings used for diluted earnings per share	$ 10,300	$ 5,267
Weighted-average common shares computations:		
Weighted-average common shares used for basic earnings per share	65,554	66,583
Effect of dilutive securities:		
Share-based payment awards	895	464
Potentially dilutive common shares	895	464
Weighted-average common shares used for diluted earnings per share	66,449	67,047
Basic earnings per share	$ 0.16	$ 0.08
Diluted earnings per share	$ 0.16	$ 0.08

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.

	Three Months Ended	
	February 2, 2020	January 27, 2019
Share-based payment awards	173	1,063
Convertible notes	-	5,542
Total potentially dilutive shares excluded	173	6,605

Subsequent to February 2, 2020, and through March 9, 2020, we repurchased 0.1 million shares of our common stock. See Note 13 for information on our share repurchase programs.

NOTE 11 - 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 three-month periods ended February 2, 2020 and January 27, 2019.

	Three Months Ended February 2, 2020		
	Foreign Currency Translation Adjustments	Other	Total
Balance at November 1, 2019	$ (8,331)	$ (674)	$ (9,005)
Other comprehensive (loss) income	(1,564)	17	(1,547)
Less: other comprehensive income attributable to noncontrolling interests	1,181	9	1,190
Balance at February 2, 2020	$ (11,076)	$ (666)	$ (11,742)

	Three Months Ended January 27, 2019		
	Foreign Currency Translation Adjustments	Other	Total
Balance at November 1, 2018	$ (4,328)	$ (638)	$ (4,966)
Other comprehensive income	6,572	19	6,591
Less: other comprehensive income attributable to noncontrolling interests	1,273	9	1,282
Balance at January 27, 2019	$ 971	$ (628)	$ 343

NOTE 12 - 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. We did not have any assets or liabilities measured at fair value, on a recurring or a nonrecurring basis, at February 2, 2020 or October 31, 2019.

NOTE 13 – 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). All of the 0.9 million shares repurchased under this program prior to the three-month period ended February 2, 2020 were retired in fiscal 2019. The table below presents information on this repurchase program.

	Three Months Ended February 2, 2020	From Inception Date of September 25, 2019
Number of shares repurchased	916	1,911
Cost of shares repurchased	$ 11,000	$ 22,000
Average price paid per share	$ 12.01	$ 11.51

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. All of the shares repurchased under this program were retired in fiscal 2019. The table below presents information on this repurchase program.

	Three Months Ended January 27, 2019	From Inception Date of October 22, 2018
Number of shares repurchased	1,137	1,467
Cost of shares repurchased	$ 10,694	$ 13,807
Average price paid per share	$ 9.40	$ 9.41

NOTE 14 - COMMITMENTS AND CONTINGENCIES

As of February 2, 2020, the Company had commitments outstanding for capital expenditures of approximately $113.6 million, primarily for the purchase of high-end IC equipment. See Note 7 for information on our operating lease commitments.

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

NOTE 15 - RECENT ACCOUNTING PRONOUNCEMENTS

Accounting Standards Updates Adopted

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 elected to apply the guidance at the beginning of the period of adoption and recorded, as of November 1, 2019, right-of-use (ROU) leased assets of $6.5 million. In conjunction with this, we recorded lease liabilities, which had been discounted at our incremental borrowing rates, of $6.5 million. Our adoption of Topic 842 did not affect our cash flows or our ability to comply with covenants under our credit agreement. Please see Note 7 for our leases disclosure.

Accounting Standards Updates to be Adopted

In June 2016, the 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 impairment methodology, found in current GAAP, with a methodology that reflects expected credit losses and 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 beginning in the first quarter of fiscal year 2019. We are currently evaluating the effect that this ASU will have on our consolidated financial statements.

Item 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Overview

Management's discussion and analysis ("MD&A") of the Company's financial condition, results of operations and outlook should be read in conjunction with its condensed consolidated financial statements and related notes. Various segments of this MD&A contain forward-looking statements, all of which are presented based on current expectations, which may be adversely affected by uncertainties and risk factors (presented throughout this filing and in the Company's Annual Report on Form 10-K for the fiscal 2019 year), that may cause actual results to materially differ from these expectations.

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, microelectronic 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 after receipt of an order, 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 and FPD industries are 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.

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 $6.5 million and corresponding lease liabilities which were discounted at our incremental borrowing rates, on our November 1, 2019 condensed consolidated balance sheet to reflect our adoption of the guidance. Our adoption of Topic 842 did not 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 Code 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% (2.67% at February 2, 2020), 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 February 2, 2020, we had repurchased 1.9 million shares, at a cost of $22.0 million (an average price of $11.51 per share), under this authorization. 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 February 2, 2020, PDMCX had borrowed 243.4 million RMB ($35.1 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 5 of the condensed consolidated 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 February 2, 2020, PDMCX had outstanding 44.8 million RMB ($6.5 million) to fund operations, with repayments due one year from the borrowing dates of the separate loan agreements. As of February 2, 2020, PDMCX had outstanding 64.6 million RMB ($9.3 million) borrowed to pay VAT. Payments on these borrowings are due semiannually, at an increasing rate, through January 2022. See Note 5 of the condensed 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"), 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 February 2, 2020), and limits the amount of dividends, distributions, and redemptions we can pay on our stock to an aggregate amount of $50 million. We had no outstanding borrowings against the credit agreement at February 2, 2020, and $50 million was available for borrowing. The interest rate on the credit agreement (2.65% at February 2, 2020) 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.

Results of Operations
Three Months ended February 2, 2020

The following table presents selected operating information expressed as a percent of revenue.

	Three Months Ended		
	February 2, 2020	October 31, 2019	January 27, 2019
Revenue	100.0%	100.0%	100.0%
Cost of goods sold	78.3	75.6	79.1
Gross margin	21.7	24.4	20.9
Selling, general and administrative expenses	8.9	7.8	11.0
Research and development expenses	2.6	2.9	3.4
Operating income	10.2	13.7	6.5
Other income (expense), net	2.3	(3.9)	0.8
Income before income taxes	12.5	9.8	7.3
Income tax provision	5.7	1.5	1.1
Net income	6.8	8.3	6.2
Net income attributable to noncontrolling interests	0.4	2.1	2.0
Net income attributable to Photronics, Inc. shareholders	6.4%	6.2%	4.2%

Note: All the following tabular comparisons, unless otherwise indicated, are for the three-months ended February 2, 2020 (Q1 FY20), October 31, 2019 (Q4 FY19), and January 27, 2019 (Q1 FY19).

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.

In Q1 FY20, we changed the threshold for the definition of high-end FPD, from G8 and above and active matrix organic light-emitting diode (AMOLED) display screens, to G10.5 and above, AMOLED, and low-temperature polysilicon display screens (LTPS), to reflect the overall advancement of technology in the FPD industry. Our definition of high-end IC products remains as 28 nanometer or smaller. Quarterly changes in revenue by product type for the three-month periods ended October 31, 2019 and January 27, 2019, have been modified to reflect this change. High-end photomasks typically have higher selling prices (ASPs) than mainstream products.

The following tables present changes in disaggregated revenue in Q1 FY20 from revenue in prior reporting periods. Columns may not total due to rounding.

Quarterly Changes in Revenue by Product Type

	Q1 FY20 from Q4 FY19			Q1 FY20 from Q1 FY19	
	Revenue in Q1 FY20	**Increase (Decrease)**	**Percent Change**	**Increase (Decrease)**	**Percent Change**
IC					
High-end	$ 41.0	$ (3.9)	(8.7)%	$ 6.5	18.7%
Mainstream	65.9	(1.6)	(2.4)%	5.6	9.3%
Total IC	$ 107.0	$ (5.6)	(4.9)%	$ 12.1	12.8%
FPD					
High-end	$ 39.8	$ 14.3	56.4%	$ 24.4	159.1%
Mainstream	13.0	(5.3)	(29.0)%	(1.5)	(10.3)%
Total FPD	$ 52.8	$ 9.0	20.7%	$ 22.9	76.9%
Total Revenue	$ 159.7	$ 3.5	2.2%	$ 35.0	28.1%

Quarterly Changes in Revenue by Geographic Origin

	Q1 FY20 from Q4 FY19			Q1 FY20 from Q1 FY19	
	Revenue in Q1 FY20	**Increase (Decrease)**	**Percent Change**	**Increase (Decrease)**	**Percent Change**
Taiwan	$ 66.1	$ (2.8)	(4.0)%	$ 8.4	14.5%
Korea	40.7	3.4	9.1%	5.5	15.6%
United States	25.1	(5.4)	(17.7)%	2.6	11.5%
Europe	7.5	(0.3)	(4.0)%	(0.8)	(9.7)%
China	19.9	8.6	75.8%	19.6	7,467.7%
Other	0.4	0.0	(1.1)%	(0.3)	(41.8)%
	$ 159.7	$ 3.5	2.2%	$ 35.0	28.1%

Revenue increased 2.2% in Q1 FY20, compared with Q4 FY19, primarily due to increased high-end FPD; the increase in high-end FPD was largely offset by mainstream FPD and both high-end and mainstream IC. High-end FPD increased 56.4% as demand grew for AMOLED and LTPS mobile displays, as well as G10.5+ for large-format televisions. Mainstream FPD decreased 29.0% due to a decline in demand for G8.5 and smaller masks used for LCD displays. High-end and mainstream IC photomasks decreased 8.7%, and 2.4%, respectively as demand was softer, in line with seasonal trends.

Revenue increased 28.1% in Q1 FY20, compared with Q1FY19, primarily due to increased high-end FPD and increased high-end and mainstream IC, partially offset by decreased mainstream FPD. High-end FPD increased 159.1% as the current quarter reflects revenues from our fully ramped FPD facility in China, and an overall increased demand for AMOLED, LTPS, and G10.5+ photomasks. High-end IC increased due to stronger end-market demand. Mainstream IC increased due to stronger demand in the current quarter, a portion of which was met by our new IC facility in China. Mainstream FPD revenues decreased due to a decline in demand for G8.5 and below photomasks

Uncertainty due to Coronavirus Outbreak

We have implemented policies to keep our employees safe while complying with all governmental regulations. We are actively working with our suppliers to minimize any impact to our operations. While we have limited visibility of the impact the virus is having on our customers’ operations, we have seen some design releases delayed in both our Asia IC and FPD businesses, and we believe our second quarter results may reflect the effect of these delays.

Gross Margin

	Three Months Ended				
	Q1 FY20	Q4 FY19	Percent Change	Q1 FY19	Percent Change
Gross profit	$ 34.6	$ 38.2	(9.3)%	$ 26.1	32.6%
Gross margin	21.7%	24.4%		20.9%	

Gross margin decreased in Q1 FY20 from Q4 FY19 primarily as a result of a 5.1% increase in material costs, which were caused by higher glass blank and pellicle costs, and an 11.8% increase in compensation and related expenses. Gross margin increased in Q1 FY20, compared with Q1 FY19, primarily due to the 28% increase in revenue from the prior year. As we operate in a high fixed cost environment, increases or decreases in our revenues and capacity utilization will generally positively or negatively impact our gross margin.

Selling, General and Administrative Expenses

Selling, general and administrative expenses increased by $2.1 million, or 17.1%, to $14.2 million in Q1 FY20, from $12.1 million in Q4 FY19, primarily due to increased compensation and related expenses. Selling, general and administrative expenses increased in Q1 FY20 by $0.4 million, or 3.1%, from $13.8 million in Q1 FY19, primarily as a result of increased compensation and related benefits, primarily resulting from increased share-based compensation expense.

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 technology nodes, applications are also under development for G10.5 and above, AMOLED, and LTPS FPD.

Research and development expense decreased $0.4 million, to $4.1 million, or 10.2%, in Q1 FY20 from Q4 FY19, primarily as a result of decreased IC development activities in Taiwan and China. Research and development expense decreased $ 0.2 million, or 4.3% in Q1 FY20 from Q1 FY19, due to decreased spending in the U.S. exceeding increased combined expenditures at the two China-based facilities.

Other Income (Expense)

	Three Months Ended		
	Q1 FY20	Q4 FY19	Q1 FY19
Interest income and other income (expense), net	$ 5.5	$ (5.9)	$ 1.6
Interest expense	(1.8)	(0.2)	(0.5)
Other income (expense)	$ 3.7	$ (6.1)	$ 1.1

Interest income and other income (expense), net increased in Q1 FY20 by $11.4 million from Q4 FY19, primarily as a result of foreign currency gains of $4.7 million experienced in Q1 FY20, in contrast to losses of $6.2 million recognized in Q4 FY19.

Interest income and other income (expense), net increased in Q1 FY20 by $3.9 million from Q1 FY19, primarily due to $3.6 million greater foreign currency gains experienced in the current quarter than in the prior year quarter.

Income Tax Provision

	Three Months Ended		
	Q1 FY20	Q4 FY19	Q1 FY19
Income tax provision	$ 9.1	$ 2.3	$ (1.4)
Effective income tax rate	45.4%	15.1%	15.2%

The effective income tax rate is sensitive to the jurisdictional mix of earnings, due, in part, to the non-recognition of tax benefits on losses in jurisdictions with valuation allowances. The effective income tax rate increase in Q1 FY20, compared with Q4 FY19, is primarily attributable to the non-recognition of tax benefits on losses in jurisdictions with valuation allowances, the establishment of a valuation allowance for a non-U.S. based loss carryforward, the expiration of a tax holiday in Q1 FY20, and a net decrease in tax accruals no longer required as a result of the settlement of a non-U.S. income tax audit and statute of limitations expiration in Q4 FY19. The effective income tax rate increase in Q1 FY20, compared with Q1 FY19, is primarily attributable to the aforementioned factors that occurred in Q1 FY20, and the benefit of an alternative minimum tax credit in Q1 FY19.

Net Income Attributable to Noncontrolling Interests

Net income attributable to noncontrolling interests was $0.6 million in Q1 FY20, which represented a decrease of $2.7 million and $1.9 million from Q4 FY19 and Q1 FY19, respectively. The change from Q4 FY19 was due to decreased net income at our Taiwan-based IC facility and an increased loss at our China-based IC facility; we hold 50.01% ownership interests in each of these facilities. The change from Q1 FY19 resulted from an increased loss at our China-based IC facility, which was partially offset by increased net income at our Taiwan-based IC facility.

Liquidity and Capital Resources

We had cash and cash equivalents of $218.3 million at the end of Q1 FY20, compared with $206.5 million at the end of fiscal 2019. The net increase is primarily attributable to:

- $30.8 million provided by operating activities;
- $2.9 million received from exercises of employee stock options;
- $2.4 million received from government incentives in China;
- $1.1 million received from borrowings in China;
- $13.8 million paid for property, plant, and equipment;
- $11.0 million used to repurchase our common stock.

Our working capital at the end of Q1 FY20 was $283.3 million, compared with $275.6 million at the end of fiscal 2019. The $7.7 million net increase is primarily attributable to the below increases (decreases) in working capital:

- Increased cash and cash equivalents of $11.8 million;
- Increased accounts receivable of $7.3 million, the predominance of which were in China reflecting their increased revenue in Q1 FY20;
- Decreased receivables for investment subsidies in China of $(3.2);
- Increased current portion of long-term debt of $(5.8) million;
- Decreased accounts payable of $6.7 million, $4.9 million of which was the result of a reduction in payables for capital assets;
- Increased value added taxes payable of $(3.1) million;
- Increased income taxes payable of $(2.7) million;
- Increased lease liabilities of $(1.7) million, which resulted from our adoption of ASC 842 in Q1 FY20.

The net cash provided by operating activities of $30.8 million in Q1 FY20 was a $50.1 million increase from $19.3 million used in Q1 FY19. The net increase was due primarily to:

- Increased net income of $3.2 million in Q1 FY20;
- Increased non-cash add backs to net income, including depreciation, share-based compensation and deferred income taxes of $10.8 million;
- A comparative decrease in government subsidies receivable in China of $15.2 million;
- A comparative decrease in value added tax prepayments related to our China facilities of $19.9 million in Q1 FY20. These prepayments are recoverable through future sales transactions of the facilities.

Net cash used in investing activities was $11.5 million in Q1 FY20, a decrease of $90.3 million from the $101.9 million used in Q1 FY19. The net decrease was primarily attributable to decreased capital expenditures of $93.1 million; this was the result of a reduction in payments to equip our China-based facilities, which were in the start-up phase in Q1 FY19.

Net cash flows from financing activities decreased from funds provided of $21.4 million in Q1 FY19 to $7.6 million used in Q1 FY20. Significant components of the $29.0 million net decrease were:

- $26.1 million used to pay dividends to DNP (related to their 49.99% interest in our IC facility in Taiwan) in Q1 FY19;
- $(27.0) million less received from borrowings in China in Q1 FY20 than in the prior year quarter;
- $(29.4) million contributed in Q1 FY19 by DNP to maintain their proportionate ownership interest in our IC joint venture in China.

As of February 2, 2020 and October 31, 2019, our total cash and cash equivalents included $163.2 million and $147.2 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 facility.

As of February 2, 2020, we had outstanding capital commitments of approximately $113.6 million. We intend to finance our capital expenditures with our working capital, contributions from our joint venture partners, borrowings under the Master Lease Agreement we entered into in fiscal 2019 (as discussed in Note 5 to the condensed consolidated financial statements), 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 February 2, 2020; we will fulfill this commitment over the next several quarters.

Off-Balance Sheet Arrangements

In January 2018, Photronics, 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’s operating 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 that cannot be resolved between the two parties. As of the date of issuance of this report, DNP had not indicated its intention to exercise this right. 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 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 February 2, 2020, Photronics and DNP each had net investments in PDMCX of $36.6 million.

Business Outlook

A majority of growth in the IC and FPD markets is expected to continue to come from the Asia region, predominantly in China. We expect to meet these demands both through the utilization of our new facilities in China, and by importing photomasks into China from our other facilities. 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, additional 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, some of which are discussed in Part1, Item 1A in our Annual Report on Form 10-K for the year ended October 31, 2019; a number of other unforeseen factors could cause actual results to differ materially from our expectations.

Effect of Recent Accounting Pronouncements

See “Item 1. Condensed Consolidated Financial Statements– Notes to Condensed Consolidated Financial Statements – Note 15 – Recent Accounting Pronouncements” for recent accounting pronouncements that may affect the Company’s financial reporting.

Item 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Foreign Currency Exchange Rate Risk

We conduct business in several major international 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 in, 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 a significant receivable denominated in a currency that differs from the functional currency of the transacting subsidiary. We do not enter into derivatives for speculative purposes. There can be no assurance that this approach 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 February 2, 2020, 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 that date, a 10% adverse movement in the value of currencies different than the functional currencies of our subsidiaries would have resulted in a net unrealized pre-tax loss of $33.9 million, which represents an increase of $0.8 million from our exposure at October 31, 2019. The increase in foreign currency rate change risk is primarily the result of increased exposures of the Chinese renminbi against the U.S. dollar. We do not believe that a 10% change in the exchange rates of non-US dollar currencies, other than the aforementioned currencies and the Japanese Yen, would have had a material effect on our February 2, 2020, condensed 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 February 2, 2020, condensed consolidated financial statements.

Item 4. 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 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 first fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

Item 1A. RISK FACTORS

The following risk factors update risk factors from our Annual Report on Form 10-K for the fiscal year ended October 31, 2019. There have been no other material changes to risks relating to our business as disclosed in Part 1, Item 1A of our Annual Report on Form 10-K for the year ended October 31, 2019.

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.

The eventual impact the coronavirus outbreak will have on our business is uncertain at this time. However, as we now have substantial investments and generate significant revenues in China, and have significant operations in Korea and Taiwan, our business may be adversely affected by the bearing of the epidemic on the general economies of these countries and our customers and suppliers. Our FPD and IC facilities in China are located within two hundred and five hundred miles, respectively, of Wuhan, Hubei Province, China, the epicenter of the outbreak. Although all of our manufacturing facilities have remained in operation, we cannot offer assurance that they will not be temporarily idled if: our workforce is directly or indirectly impacted, our means of obtaining supplies are obstructed, or the production or development activities of our customers are impacted by the virus.

Item 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS

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 authorization does not obligate us to repurchase any dollar amount or number of shares of common stock, and the repurchases program may be suspended or discontinued at any time. All of the 0.9 million shares repurchased under this program prior to the three-month period ended February 2, 2020 were retired in fiscal 2019.

Period	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)
September 19, 2019 – October 31, 2019	1.0	$ 11.05	1.0	$ 89.0
November 1, 2019 – December 2, 2019	0.9	$ 12.01	0.9	$ 78.0
Total	1.9	$ 11.51	1.9	

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 repurchase program was terminated on February 1, 2019, and all of the shares repurchased under this program were retired in fiscal 2019.

Period	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)
October 12, 2018 – October 31, 2018	0.3	$ 9.45	0.3	$ 21.9
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	0.2	$ 9.41	0.2	$ 11.2*
Total	1.4	$ 9.41	1.4	

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

Item 5. OTHER INFORMATION

On March 9, 2020 Photronics Dai Nippon Mask Corporation ("PDMC") and Frank Lee entered into an Employment Agreement effective as of October 31, 2019. The agreement provides for a salary of $428,926 and is automatically extended for consecutive one-year periods unless PDMC gives at least 30 days' notice of its intent not to renew. Dr. Lee is entitled to participate in employee benefit plans and arrangements as established by PDMC for similarly situated executives. If the agreement is terminated by PDMC 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 business of PDMC or its parent entity during the term of his employment agreement and for twelve months after. Dr. Lee is President of PDMC and a Named Executive Officer of Photronics, Inc. The employment agreement is included as Exhibit 10.36 of this report.

On March 9, 2020, the Consulting Agreement (the "Agreement") between DEMA Associates, LLC and Photronics, Inc. dated January 20, 2018 was amended. The compensation paid under Article 2 of the Agreement was amended to reduce the amount to $9,000 per month or $108,000 per year. Furthermore, Mr. George Macricostas is no longer a member of DEMA Associates, LLC. The revised agreement is attached as Exhibit 10.37 of this report.

Item 6. EXHIBITS

		Incorporated by Reference				
Exhibit Number	**Description**	**Form**	**File Number**	**Exhibit**	**Filing Date**	**Filed or Furnished Herewith**
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
10.36	Employment Agreement dated March 9, 2020, between Photronics Dai Nippon Mask Corporation and Frank Lee.					X
10.37	Amendment dated March 9, 2020, between DEMA Associates, LLC and Photronics, Inc.					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

SIGNATURES

Pursuant to the requirements 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: /s/ JOHN P. JORDAN
JOHN P. JORDAN
Senior Vice President
Chief Financial Officer
(Principal Financial Officer)

Date: March 11, 2020

By: /s/ ERIC RIVERA
ERIC RIVERA
Vice President, Corporate Controller
(Principal Accounting Officer)

Date: March 11, 2020

Exhibit 10.36

EMPLOYMENT AGREEMENT

THIS EMPLOYMENT AGREEMENT (this "Agreement") is entered into as of October 31, 2019 by and between Photronics Dai Nippon Mask Corporation having a principal place of business located at 1F, No.2 Li-Hsin Road, Science Park, Hsin Chu City, Taiwan, ROC (the Company") and Kang Jyh Lee ("Executive") residing at 13F, #202, Chi-Yu Road, Sec #1, Taipei, Taiwan. The Company and Executive are collectively referred to as the "Parties".

WITNESSETH:

WHEREAS, the Company and Executive desire to enter into this Agreement to assure the Company of the continuing service of Executive and to set forth the terms and conditions of Executive's employment with the Company.

NOW, THEREFORE, in consideration of the mutual promises and covenants set forth herein, the Parties agree as follows:

1. Term. The Company agrees to employ Executive and Executive hereby accepts such employment, in accordance with the terms of this Agreement. Subject to Section 5, the term of Executive's employment shall commence on the date hereof and continue for three (3) years thereafter unless this Agreement is earlier terminated as provided herein (the "Term"); provided, however, that unless the Company gives written notice to Executive at least thirty (30) days prior to the end of the Term of this Agreement (as the Term may be extended pursuant to this Section 1), on each anniversary of the date hereof, the Term of this Agreement shall automatically be extended for an additional one (1) year period.

2. Services. So long as this Agreement shall continue in effect, Executive shall devote Executive's full business time, energy and ability to the business, affairs and interests of the Company and its subsidiaries and matters related thereto. Executive shall use his best efforts and abilities to promote the Company's interests and shall perform faithfully the services contemplated by this Agreement in accordance with the Company's policies as established by the Board of Directors of the Company.

3. Duties and Responsibilities.

(a) Executive shall serve as the President of the Company. In the performance of Executive's duties, Executive shall report to the CEO of Photronics. Photronics is the controlling shareholder of the Company. Executive shall have such duties, responsibilities and authority as may from time to time be assigned to the Executive by the CEO of Photronics. Executive also acknowledges that he is a Named Executive Officer of Photronics and agrees to abide by the requirements of such position as well as the rules and regulations of the Company and Photronics.

4. Compensation.

(a) Base Compensation. During the Term, the Company agrees to pay Executive a base salary at the rate of $428,926 per year payable in accordance with the Company's customary payroll practices generally applicable to similarly situated employees as may be in effect from time to time (the "Base Salary").

(b) Periodic Review. The Compensation Committee or the Board of Directors of Photronics shall review Executive's Base Salary and Benefits (as defined below) from time to time in accordance with the normal business practices of Photronics. Photronics may in its sole discretion increase the Base Salary during the Term. The amount of any increase combined with the previous year's Base Salary shall then constitute Executive's Base Salary for purposes of this Agreement.

(c) Additional Benefits. During the Term, the Executive shall be entitled to participate in the employee benefit plans and compensation arrangements as Photronics or the Company may establish from time to time in which other employees similarly situated are entitled to participate (which may include, without limitation, the 2011 Executive Incentive Plan or any similar or subsequent plan, medical plan, dental plan, disability plan, basic life insurance and business travel accident insurance plan, stock option or stock purchase plans or any successor plans thereto (collectively referred to as the "Benefits")). Photronics or the Company shall have the right to terminate or change any such plans or programs at any time.

(d) Automobile Allowance. During the Term of this Agreement, the Company shall provide the Executive with an automobile.

(e) Vacation. During the Term of this Agreement, Executive shall be entitled to four (4) weeks' paid vacation per calendar year, which shall not be transferable to any subsequent year.

5. Termination. This Agreement and all rights and obligations hereunder, except the rights and obligations contained in this Section 5, Section 7 (Confidential Information), Section 8 (Non-Competition), Section 9 (Intellectual Property) and Section 10 (Remedies), which shall survive any termination hereunder, shall terminate upon the earliest to occur of any of the following:

(a) Resignation without Good Reason; Retirement. Upon the resignation by Executive without Good Reason (as defined below) following at least thirty (30) days written notice to the Company or retirement from the Company in accordance with the normal retirement policies of the Company, Executive shall be entitled to receive a payment in the amount of the sum of (A) Executive's Base Salary through the date of termination to the extent not theretofore paid, (B) any compensation previously deferred by Executive (together with any accrued interest or earnings thereon), and (C) any accrued vacation pay, in each case to the extent not theretofore paid (the sum of the amounts described in clauses (A), (B) and (C) shall be hereinafter referred to as the "Accrued Obligations"), in a lump sum, subject to statutory deductions and withholdings, in cash within ten (10) business days after the date of termination or any earlier time required by applicable law.

(b) Death or Disability of Executive.

(i) If Executive's employment is terminated by reason of Executive's death or disability, this Agreement shall terminate without further obligations to Executive (or Executive's heirs or legal representatives) under this Agreement, other than for:

(1) Payment of any Accrued Obligations, which shall be paid to Executive or Executive's estate or beneficiary, as applicable, in a lump sum, subject to statutory deductions and withholdings, in cash within ten (10) business days after the date of termination or any earlier time required by applicable law.

(2) Payment to Executive or Executive's estate or beneficiary, as applicable, of any amount accrued pursuant to the terms of any other applicable benefit plan.

(ii) If Executive shall become disabled, Executive's employment may be terminated only by written notice from the Company to Executive.

(iii) For the purposes of this Agreement, "disability" or "disabled" shall mean a mental or physical incapacity which prevents Executive from performing Executive's duties with the Company for a period of three hundred sixty (360) consecutive calendar days, as certified by a physician selected by the Company or its insurers.

(c) Termination for Cause.

(i) The Company may terminate Executive's employment and all of Executive's rights to receive Base Salary, and any Benefits hereunder for Cause.

(ii) Upon such termination for Cause, Executive shall be entitled to receive any Accrued Obligations, which shall be paid to Executive in a lump sum, subject to statutory deductions and withholdings, in cash within ten (10) business days after the date of termination or any earlier time required by applicable law.

(iii) For purposes of this Agreement, the term "Cause" shall be defined as any of the following

(1) Executive's material breach of any of any obligations under this Agreement (other than by reason of physical or mental illness, injury, or condition);

(2) Executive's conviction by, or entry of a plea of "guilty" or "nolo contendere" in a court of competent and final jurisdiction for any felony that impairs his ability to perform his duties to the Company or any crime of moral turpitude;

(3) Executive's commission of an act of fraud upon the Company;

(4) Executive's engaging in willful or reckless misconduct or gross negligence in connection with any property or activity of the Company or its Affiliates;

(5) Executive's repeated and intemperate use of alcohol or illegal drugs after written notice from the CEO or the Board of Directors;

(6) Executive's material breach of any other material obligation to the Company (other than by reason of physical or mental illness, injury, or condition) that is or could reasonably be expected to result in material harm to the Company;

(7) Executive's becoming insolvent or filing for bankruptcy;

(8) Executive's becoming barred or prohibited by the SEC from holding my position with the Company; or

(9) Executive's violation of any duty of loyalty (i.e., engaging in self-interested transactions, misappropriation of business opportunities that belong to the Company, or a breach of Executive's fiduciary duties to the Company).

(d) Termination Without Cause; Resignation For Good Reason.

(i) Notwithstanding any other provision of this Section 5, (i) the Company, upon thirty (30) days advance notice to Executive, shall have the right to terminate Executive's employment with the Company without Cause at any time, including, without limitation, in connection expiration of the Term and (ii) Executive, upon thirty (30) days advance notice to the Company, shall have the right to resign for Good Reason.

(ii) If Executive is so terminated without Cause or resigns for Good Reason, Executive shall receive from the Company:

(1) Any Accrued Obligations through the date of termination, which shall be paid to Executive in a lump sum, subject to statutory deductions and withholdings, in cash within ten (10) business days after the date of termination or any earlier time required by applicable law.

(2) A payment ("Severance Payment") equal to twelve (12) months of Executive's current Base Salary. The Severance Payment shall be paid by the Company to Executive in equal installments in accordance with the Company's customary payroll practices generally applicable to similarly situated employees as may be in effect from time and shall be subject to statutory deductions and withholdings.

(3) To the extent permitted by applicable law and the terms of the plans, the continuation of medical and dental plan benefits for a period of three hundred sixty (360) days ("Benefit Period"), provided that Executive shall be required to make all required contributions to such plans as Executive did prior to the date of termination date. Subsequent to the Benefit Period, Executive will be eligible to continue medical insurance coverage for any remaining period required under COBRA.

(iii) As used in this Agreement, the term "Good Reason" shall mean (i) (except as set forth in Section 5(e)) the relocation of the Company's principal executive offices to a location outside the contiguous 48 United States without the consent of Executive or (ii) any reduction in salary or benefits contrary to this Agreement, without the consent of Executive.

(iv) As a condition to receiving the payment and benefits extension contemplated by this Section 5(d), Executive agrees to execute and deliver to the Company the Release substantially in the form attached to this Agreement as Exhibit A.

(e) Change of Control.

(i) For purposes of the Agreement, a "change of control" means, and shall be deemed to have taken place, if;

(1) any individual, partnership, firm, corporation, association, trust, unincorporated organization or other entity or person, or any syndicate or group deemed to be a person under Section 14 (d) (2) of the Exchange Act, is or becomes the "beneficial owner" (as defined in Rule 13d-3 of the General Rules and Regulations under the Exchange Act), directly or indirectly, of securities of the Photronics, Inc. representing 50% or more of the combined voting power of Photronics then outstanding securities entitled to vote in the election of directors of the Photronics, Inc.

(2) during any period of two (2) consecutive years (not including any period prior to the execution of this Agreement) individuals who at the beginning of such period constituted the Board and any new directors, whose election by the Board or nomination for election by the Photronics' shareholders was approved by a vote of at least three-fourths (3/4ths) of the directors then still in office who either were directors at the beginning of the period or whose election or nomination for election was previously so approved, cease for any reason to constitute a majority of the Board;

(3) there occurs a reorganization, merger, consolidation or other corporate transaction involving the Photronics, Inc. (a "Transaction"), and shareholders of the Company immediately prior to such Transaction do not, immediately after the Transaction, own more than 50% of the combined voting power of the Photronics, Inc. or other corporation resulting from such Transaction; or

(4) there is a "change in control" of Photronics within the meaning of Section 280G of the U.S. Federal internal revenue code of 1986.

(ii) In the event Executive is terminated by Photronics or the Company for any reason (other than for Cause as defined in Section 5(c) thereof, during the period three (3) months before or two (2) years following a "change in control" of the Photronics, Inc. (or any successor), Executive shall be entitled to receive a cash payment equal to eighteen (18) months of Executive's current Base Salary and the benefits described in Section 5(d)(iii) of the Agreement. Upon such "change of control" during the Term, the Term of this Agreement shall automatically be the period equal to the longer of (i) two (2) years from the date of the "change of control" or (ii) the remaining period of the initial three (3) year Term after the "change of control". In no event shall Executive be entitled to receive both the Severance Payment described in Section 5(d) hereof and the "change of control" payment described in this Section 5(e).

(iii) Any payments to be made to Executive in connection with this Section 5(e) shall be made in a lump sum, subject to statutory deductions and withholdings, in cash within ten (10) business days after the date of termination or any earlier time required by applicable law.

(f) Treatment of Stock Upon a Termination.

(i) If this Agreement is terminated pursuant to clause (e) of this Section 5, all stock options or similar rights granted to Executive pursuant to the Company's stock compensation plans shall immediately vest as of the date of termination and Executive may exercise any such vested stock options for a period of 390 days following such termination, but in no event later than ten (10) years after grant.

(ii) If this Agreement is terminated pursuant to clause (c) of this Section 5, all stock options granted to Executive pursuant to the Company's stock plans shall terminate immediately.

To the extent that the Executive has been granted stock options intended to be incentive stock options under Section 422 of the Internal Revenue Code, such stock options shall cease to be incentive stock options and shall be treated as nonqualified stock options if the options are exercised by the Employee more than three 3 months (one year in case of death or disability as defined in Section 422 of the Internal Revenue Code) following termination of employment.

Except as expressly modified by this clause (g) of this Section 5, all stock options and similar rights granted under the Photronics's stock plans shall remain subject to all of the terms and conditions of the applicable stock plans and agreements evidencing the grants thereof.

(h) Status of Executive During Exclusivity Period. If this Agreement is terminated pursuant to clauses (a), (b), or (d) of this Section 5, during Executive's Exclusivity Period the Executive shall be deemed and treated as an employee of the Company for the purposes of all payroll, benefits, welfare and stock option plans.

(i) Exclusive Remedy. Executive agrees that the payments other benefits provided and contemplated by this Agreement shall constitute the sole and exclusive obligation of the Company in respect of Executive's employment with and relationship to the Company and that the full payment thereof shall be the sole and exclusive remedy for any termination of Executive's employment. Executive covenants not to assert or pursue any other remedies, at law or in equity, with respect to any termination of employment.

6. Business Expenses. During the Term of this Agreement, to the extent that such expenditures satisfy the criteria under the Internal Revenue Code or other applicable laws for deductibility by the Company (whether or not fully deductible by the Company) for federal income tax purposes as ordinary and necessary business expenses, the Company shall provide the Executive with reimbursement of reasonable business expenses incurred by the Executive while conducting Company business in a manner consistent with the Company's policies and provisions applicable to the Executives of the Company.

7. Confidential Information.

(a) Executive acknowledges that the nature of Executive's employment by the Company is such that Executive shall have access to information of a confidential and/or trade secret nature which has great value to Photronics and the Company and which constitutes a substantial basis and foundation upon which the business of the Company is based. Such information includes (A) trade secrets, inventions, mask works, ideas, processes, manufacturing, formulas, source and object codes, data, programs, other works of authorship, know-how, improvements, discoveries, developments or experimental work, designs, and techniques; (B) information regarding plans for research, development, new products, marketing and selling, business plans, budgets and unpublished financial statements, licenses, prices and costs, suppliers and customers; (C) information regarding the skills and compensation of other employees the Company or its affiliates, including but not limited to, their respective business plans or clients (including, without limitation, customer lists and lists of customer sources), or information relating to the products, services, customers, sales or business affairs of the Company or its Affiliates (the "Confidential Information").

(b) Executive shall keep all such Confidential Information in confidence during the Term of this Agreement and at any time thereafter and shall not disclose any of such Confidential Information to any other person, except to the extent such disclosure is (i) necessary to the performance of this Agreement and in furtherance of the Company's best interests, (ii) required by applicable law, (iii) lawfully obtainable from other sources, or (iv) authorized in writing by the Board. Upon termination of Executive's employment with the Company, Executive shall deliver to the Company all documents, records, notebooks, work papers, and all similar material containing any of the foregoing information, whether prepared by Executive, the Company or anyone else.

8. Non-Competition. Executive covenants and agrees that commencing on the date hereof and continuing for the entire Term of Executive's employment and for period of twelve (12) months thereafter (the "Exclusivity Period"), Executive shall not:

(a) Acquire any controlling ownership interest in or engage, directly or indirectly, for themselves or as agent, consultant, employee or otherwise, in any business which is competitive with or damaging to the business of the Company or any subsidiary of the Company or the parent entity of the Company, whether such business is now owned or hereafter organized or acquired;

(b) Undertake the planning for or organization of, directly or indirectly, alone or in combination with any person or entity any business activity which is competitive with or damaging to the business of the Company or any subsidiary of the Company or parent entity of the Company;

(c) Solicit, attempt to solicit, **or assist others in soliciting or attempting to solicit,** directly or indirectly, any business related to the business of the Company or Photronics, Inc. from any customers or prospective customers of the Company or Photronics, Inc.; for the purposes of this Section 8, the term "customer" means any entity or person who is or has been a client or customer of the Company during the time which Executive was employed with the Company, and the term "prospective customer" means a person or entity who became known to the Company during the time which Executive was employed with the Company as a result of that person's or entity's interest in obtaining the services or products of the Company; and

(d) Solicit, attempt to solicit**, or assist others in soliciting or attempting to solicit, directly or indirectly, for employment or any similar capacity,** any person who is an employee of, or an independent contractor for, the Company or its direct or indirect subsidiaries, parents or Affiliates or who was such an employee within twelve (12) months prior to the date of such solicitation or attempted solicitation.

(e) Executive acknowledges that in the event of his employment with the Company terminates for any reason, Executive will be able to earn a livelihood without violating the foregoing restrictions.

(f) If any provision or clause, or portion thereof, within this Section 8 shall be held by any court or other tribunal of competent jurisdiction to be illegal, invalid, or unenforceable in such jurisdiction, the remainder of such provision shall not be thereby affected and shall be given full effect, without regard to the invalid portion. It is the intention of the parties that, if any court construes any provision or clause within this Section 8, or any portion thereof, to be illegal, void or unenforceable because of the duration of such provision or the geographic area or matter covered thereby, such court shall reduce the duration, area, or matter of such provision, and, in its reduced form, such provision shall then be enforceable and shall be enforced.

9. Intellectual Property.

(a) Executive has no interest (except as disclosed to the Company) in any inventions, designs, improvements, patents, copyrights and discoveries which are useful in or directly or indirectly related to the business of the Company or Photronics, Inc. or to any experimental work carried on by the Company or Photronics, Inc. Except as may be limited by applicable law, all inventions, designs, improvements, patents, copyrights and discoveries conceived by Executive during the Term of this Agreement which are useful in or directly or indirectly related to the business of the Company or Photronics, Inc. or to any experimental work carried on by the Company or Photronics, Inc., shall be the property of the Company and/or Photronics, Inc.. Executive will promptly and fully disclose to the Company all such inventions, designs, improvements, patents, copyrights and discoveries (whether developed individually or with other persons) and will take all steps necessary and reasonably required to assure the Company's or Photronics, Inc. ownership thereof and to assist the Company and/or Photronics in protecting or defending the Company's or Photronics’ proprietary rights therein.

(b) Executive also agrees to assist the Company in obtaining United States or foreign letters patent and copyright registrations covering inventions assigned hereunder to the Company and that Executive's obligation to assist the Company shall continue beyond the termination of Executive's employment but the Company shall compensate Executive at a reasonable rate for time actually spent by Executive at the Company's request with respect to such assistance. If the Company is unable because of Executive's mental or physical incapacity or for any other reason to secure Executive's signature to apply for or to pursue any application for any United States or foreign letters patent or copyright registrations covering inventions assigned to the Company, then Executive hereby irrevocably designates and appoints the Company, each of its duly authorized officers and agents as Executive's agent and attorney-in-fact to act for and in Executive's behalf and stead to execute and file any such applications and to do all other lawfully permitted acts to further the prosecution and issuance of letters patent or copyright registrations thereon with the same legal force and effect as if executed by Executive. Executive will further assist the Company in every way to enforce any copyrights or patents obtained including, without limitation, testifying in any suit or proceeding involving any of the copyrights or patents or executing any documents deemed necessary by the Company, all without further consideration but at the expense of the Company. If Executive is called upon to render such assistance after the termination of Executive's employment, then Executive shall be entitled to a fair and reasonable per diem fee in addition to reimbursement of any expenses incurred at the request of the Company.

10. Remedies. The parties hereto agree that the services to be rendered by Executive pursuant to this Agreement, and the rights and privileges granted to the Company pursuant to this Agreement, are of a special, unique, extraordinary and intellectual character, which gives them a peculiar value, the loss of which cannot be reasonably or adequately compensated in damages in any action at law, and that a breach by Executive of any of the terms of this Agreement will cause the Company great and irreparable injury and damage. Executive hereby expressly agrees that the Company shall be entitled to the remedies of injunction, specific performance and other equitable relief to prevent a breach of this Agreement by Executive. This Section 10 shall not be construed as a waiver of any other rights or remedies which the Company may have for damages or otherwise.

11. Return of Property. Executive agrees to return, on or before the termination date, all property belonging to the Company, including but not limited to computers, PDA, telephone and other credit cards, Company business records, Company automobile (if applicable), etc.

12. Severability. If any provision of this Agreement is held to be unenforceable for any reason, it shall be adjusted rather than voided, if possible, to achieve the intent of the parties to the extent possible. In any event, all other provisions of this Agreement shall be deemed valid and enforceable to the extent possible.

13. Succession. This Agreement shall inure to the benefit of and be binding upon the Company and its successors and assigns and any such successor or assignee shall be deemed substituted for the Company under the terms of this Agreement for all purposes. As used herein, "successor" and "assignee" shall include any person, firm, corporation or other business entity which at any time, whether by purchase, merger or otherwise, directly or indirectly acquires the stock of the Company or to which the Company assigns this Agreement by operation of law or otherwise. The obligations and duties of Executive hereunder are personal and otherwise not assignable. Executive's obligations and representations under this Agreement will survive the termination of Executive's employment, regardless of the manner of such termination.

14. Notices. Any notice or other communication provided for in this Agreement shall be in writing and sent if to the Company to its principal office at:

Photronics, Inc.
15 Secor Road, PO Box 5226
Brookfield, Connecticut 06804
Attention: General Counsel

or at such other address as the Company may from time to time in writing designate, and if to Executive at the address set forth above or at such address as Executive may from time to time in writing designate. Each such notice or other communication shall be effective (I) if given by written telecommunication, three (3) days after its transmission to the applicable number so specified in (or pursuant to) this Section 14 and a verification of receipt is received, (ii) if given by certified mail, once verification of receipt is received, or (iii) if given by any other means, when actually delivered to the addressee at such address and verification of receipt is received.

15. Adequate Consideration. Executive acknowledges that the cash severance and other benefits to be provided by the Company to Executive are not available under any current plan or policies of the Company. Accordingly, Executive further acknowledges that the payments and benefits under this Agreement provide adequate consideration for Executive's obligations to the Company contained in Section 7 (Confidential Information), Section 8 (Non-Competition), Section 10 (Remedies) and Exhibit A (Release).

16. Entire Agreement. This Agreement contains the entire agreement of the parties relating to the subject matter hereof and supersedes any prior agreements, undertakings, commitments and practices relating to Executive's employment by the Company.

17. Amendments. No amendment or modification of the terms of this Agreement shall be valid unless made in writing, duly executed by both parties.

18. Waiver. No failure on the part of any party to exercise or delay in exercising any right hereunder shall be deemed a waiver thereof or of any other right, nor shall any single or partial exercise preclude any further or other exercise of such right or any other right.

19. Governing Law. This Agreement, and the legal relations between the parties, shall be governed by and construed in accordance with the laws of the State of Connecticut without regard to conflicts of law doctrines and any court action arising out of this Agreement shall be brought in any court of competent jurisdiction within the State of Connecticut.

20. Attorneys' Fees. If any litigation shall occur between Executive and the Company which litigation arises out of or as a result of this Agreement or the acts of the parties hereto pursuant to this Agreement, or which seeks an interpretation of this Agreement, the prevailing party shall be entitled to recover all costs and expenses of such litigation, including reasonable attorneys' fees and costs.

21. Withholding. All compensation payable hereunder, including salary and other benefits, shall be subject to applicable taxes, withholding and other required, normal or elected employee deductions.

22. Counterparts. This Agreement and any amendment hereto may be executed in one or more counterparts. All of such counterparts shall constitute one and the same agreement and shall become effective when a copy signed by each party has been delivered to the other party.

23. Headings. Section and other headings contained in this Agreement are for convenience of reference only and shall not affect in any way the meaning or interpretation of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date and year first above written.

THE COMPANY

By: /s/ Peter Kirlin
Name: Peter Kirlin

EXECUTIVE

/s/ Frank Lee
Name: Frank Lee

<u>EXHIBIT A</u>

RELEASE

1. I signed an Employment Agreement with Photronics, Inc. (the "Company"), dated October 31, 2019 (the "Agreement"), wherein I agreed to the terms applicable to certain terminations of employment with the Company. Pursuant to the terms of the Agreement, I am entitled to certain severance payments and benefits, described in the Agreement, provided that I sign this Release.

2. In consideration of the severance payments described in the Agreement, I, on behalf of myself, my heirs, agents, representatives, predecessors, successors and assigns, hereby irrevocably release, acquit and forever discharge the Company and each of its respective agents, employees, representatives, parents, subsidiaries, divisions, affiliates, officers, directors, shareholders, investors, employees, attorneys, transferors, transferees, predecessors, successors and assigns, jointly and severally (the "<u>Released Parties</u>") of and from any and all debts, suits, claims, actions, causes of action, controversies, demands, rights, damages, losses, expenses, costs, attorneys' fees, compensation, liabilities and obligations whatsoever, suspected or unsuspected, known or unknown, foreseen or unforeseen, arising at any time up to and including the date of this Release, save and except for the parties' obligations and rights under the Agreement. In recognition of the consideration set forth in the Agreement, I hereby release and forever discharge the Released Parties from any and all claims, actions and causes of action, I have or may have as of the date of this Release arising under any state or federal civil rights or human rights law, or under the Federal Age Discrimination in Employment Act of 1967, as amended, and the applicable rules and regulations promulgated thereunder ("ADEA"). By signing this Release, I hereby acknowledge and confirm the following: (a) I was advised in writing by the Company in connection with my termination to consult with an attorney of my choice prior to signing this Agreement, including without limitation, the terms relating to my release of claims arising under ADEA and any other law, rule or regulation referred to above; (b) I was given a period of not fewer than 21 days to consider the terms of this Agreement and to consult with an attorney of my choosing with respect hereto; and (c) I am providing the release and discharge set forth in this paragraph only in exchange for consideration in addition to anything of value to which I was already entitled.

3. The Agreement and this Release may be revoked by me within the 7-day period commencing on the date I sign this Release (the "Revocation Period"). In the event of any such revocation, all obligations of the Company under the Agreement will terminate and be of no further force and effect as of the date of such revocation and both the Company and I will have and be entitled to exercise all rights that would have existed had the Agreement and Release not been entered into. No such revocation will be effective unless it is in writing and signed by me and received by the Company prior to the expiration of the Revocation Period.

____

Name Date

____

Witness Date

Exhibit 10.37

First Amendment to Agreement

This First Amendment (“Amendment”) amends the Agreement between DEMA Associates, LLC ("Consultant") and Photronics, Inc. (the “Company”) effective as of January 20, 2018 ("Agreement").

Now, therefore, Consultant and the Company (collectively the "Parties") hereby agree that the Agreement shall be amended as follows:

Article 2, Paragraph two shall be deleted in its entirety and replaced with the following:

Fees: In consideration for the consulting services, the Company will pay the Consultant a consulting fee in the amount of one hundred and eight thousand dollars ($108,000) per year (“Consulting Fees”). The Company shall pay the Consulting Fees in equal monthly payments of nine thousand dollars ($9,000.00) throughout the Consulting Period. The Consulting Fees will be paid at the address set forth above.

This Amendment shall be effective as of March 9, 2020.

The signatures of the Parties below acknowledge the acceptance and ratification of this Amendment to the Agreement.

Except as set forth above all other terms of the Agreement remain effective.

PHOTRONICS, INC.	DEMA ASSOCIATES, LLC
By: /s/ Richelle E. Burr	By: /s/ Constantine S. Macricostas
Richelle E. Burr	Constantine S. Macricostas
EVP, Chief Administrative Officer & General Counsel	President

EXHIBIT 31.1

I, Peter S. Kirlin, certify that:

1. I have reviewed this quarterly report on Form 10-Q 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 report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this 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
March 11, 2020

EXHIBIT 31.2

I, John P. Jordan, certify that:

1. I have reviewed this quarterly report on Form 10-Q 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 report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this 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
Chief Financial Officer
March 11, 2020

EXHIBIT 32.1

Section 1350 Certification of the Chief Executive Officer

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

(1) The Quarterly Report on Form 10-Q of the Company for the quarter ended February 2, 2020 (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.

The foregoing certification is being furnished pursuant to 18 U.S.C. § 1350 and will not be deemed "filed" for purposes of Section 18 of the Exchange Act, or otherwise subject to the liability of that section. Such certification will not be deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act, except to the extent that the registrant specifically incorporates it by reference.

/s/ PETER S. KIRLIN

Peter S. Kirlin
Chief Executive Officer
March 11, 2020

EXHIBIT 32.2

Section 1350 Certification of the Chief Financial Officer

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

(1) The Quarterly Report on Form 10-Q of the Company for the quarter ended February 2, 2020 (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.

The foregoing certification is being furnished pursuant to 18 U.S.C. § 1350 and will not be deemed "filed" for purposes of Section 18 of the Exchange Act, or otherwise subject to the liability of that section. Such certification will not be deemed to be incorporated by reference into any filing under the Securities Act or the Exchange Act, except to the extent that the registrant specifically incorporates it by reference.

/s/ JOHN P. JORDAN

John P. Jordan
Chief Financial Officer
March 11, 2020