

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

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

For the fiscal year ended October 31, 2018

OR

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

For the transition period from ___ to ___

Commission file number 0-15451



PHOTRONICS, INC.

(Exact name of registrant as specified in its charter)

Connecticut

(State or other jurisdiction of incorporation or organization)

06-0854886

(IRS Employer Identification No.)

15 Secor Road, Brookfield, Connecticut 06804

(Address of principal executive offices)(Zip Code)

(203) 775-9000

(Registrant's telephone number, including area code)

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

Title of each class	Name of each exchange on which registered
Common Stock, \$.01 par value	NASDAQ Global Select Market

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

None

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

Yes No

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

Yes No

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

Yes No

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

Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

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

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

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

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

Yes No

As of April 29, 2018, which was the last business day of the registrant's most recently completed second fiscal quarter, the aggregate market value of the shares of the registrant's common stock held by non-affiliates was approximately \$534,704,024 (based upon the closing price of \$7.80 per share as reported by the NASDAQ Global Select Market on that date).

As of December 13, 2018, 66,987,737 shares of the registrant's common stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Proxy Statement for the 2019
Annual Meeting of Shareholders
to be held on March 25, 2019

Incorporated into Part III
of this Form 10-K

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

PART I

ITEM 1. BUSINESS

General

Photronics, Inc. (and its subsidiaries, collectively referred to herein as “Photronics”, the “Company”, “we”, “our”, or “us”) is one of the world’s leading manufacturers of photomasks, which are high precision photographic quartz or glass plates containing microscopic images of electronic circuits. Photomasks are a key element in the manufacture of semiconductors and flat panel displays (“FPDs”), and are used as masters to transfer circuit patterns onto semiconductor wafers and flat panel display 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 operate principally from nine manufacturing facilities; two of which are located in Europe, three in Taiwan, one in Korea and three in the United States. We are building two manufacturing facilities in China and anticipate production to begin at these facilities during the first half of 2019.

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

Products and Manufacturing Technology

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

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

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

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

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

Sales and Marketing

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

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

We conduct our sales and marketing activities primarily through a staff of full-time sales personnel and customer service representatives who work closely with the Company's management and technical personnel. We support non-US customers through both our domestic and foreign facilities. We consider our presence in non-US markets to be an important factor in attracting new customers, as it provides global solutions to our customers, minimizes delivery time, and allows us to serve customers that utilize manufacturing foundries outside of the United States, principally in Asia. See Note 13 to our consolidated financial statements for the amount of revenue and long-lived assets attributable to each of our geographic areas of operations.

Customers

We sell our products primarily to leading semiconductor and FPD manufacturers. During fiscal year 2018, we sold our products to approximately 600 customers. Revenue from Samsung Electronics Co. Ltd. accounted for approximately 16%, 16% and 19% of our total revenues, and revenue from United Microelectronics Corp. Co. Ltd. accounted for approximately 15%, 16% and 17% of our total revenues in fiscal years 2018, 2017 and 2016, respectively. Our five largest customers, in the aggregate, accounted for approximately 47%, 43% and 50% of our revenue in fiscal years 2018, 2017 and 2016, respectively. A significant decrease in the amount of revenue from any of these customers could have a material adverse effect on our financial performance and business prospects.

Seasonality

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

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Research and Development

We conduct research and development activities for IC photomasks at our U.S. nanoFab, which is located in Boise, Idaho, as well as at PK, Ltd. (“PKL”), our subsidiary in Korea and Photronics DNP Mask Corporation (“PDMC”), one of our subsidiaries in Taiwan. Research and development for FPD photomasks is conducted at PKL. Additionally, we conduct site-specific research and development programs to support strategic customers. These research and development programs and activities are undertaken to advance our competitiveness in technology and manufacturing efficiency. We also conduct application-oriented research and development activities to support the early adoption of new photomask or supporting data and services technology into our customers’ applications. Currently, research and development photomask activities for ICs are focused on masks with wafer geometrics of 20 nanometer node and below and, for FPDs, on Generations 8 and 10.5+ substrate size mask process enhancements and mask technology for complex FPD masks used in the manufacture of advanced mobile displays, such as AMOLED. We believe these core competencies will continue to be a critical part of semiconductor and FPD manufacturing, as optical lithography continues to scale capabilities on high-end devices. We incurred research and development expenses of \$14.5 million, \$15.9 million, and \$21.7 million in fiscal years 2018, 2017, and 2016, respectively. It is our belief that we own, control, or license the proprietary information, including trade secrets and patents, that is necessary for our business, as it is presently conducted. We also believe that our intellectual property and trade secret know-how will continue to be important to our maintaining technical leadership in the field of photomasks.

On May 5, 2016, we sold our investment in MP Mask to Micron for \$93.1 million and recorded a gain on the sale of \$0.1 million, which is included in interest income and other income (expense) in our 2016 consolidated statements of income. On that same date a supply agreement commenced between Photronics and Micron, which provided that we would be the majority outsourced supplier of Micron’s photomasks and related services. The supply agreement had a one year term, and expired in May 2017. Photronics has unlimited rights to use the technology it acquired under its prior technology license agreement.

Patents and Trademarks

We have ownership interests in approximately 42 issued U.S. patents. The subject matter of these patents, which are registered in various countries, generally relates to the manufacture of IC photomasks or the use of photomasks to manufacture other products. The expiration dates of these patents range from 2019 to 2034. We also have a number of trademarks and trademark registrations in the United States and in other countries.

While we believe that our intellectual property is, and will continue to be, important to our technical leadership in the field of photomasks, our operations are not dependent on any one individual patent. We protect our intellectual property rights and proprietary processes by utilizing patents and non-disclosure agreements with employees, customers and vendors.

Materials, Supplies and Equipment

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

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

Backlog

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

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International Operations

Revenues from our non-U.S. operations were approximately 79%, 77% and 76% of our total revenues in fiscal 2018, 2017 and 2016, respectively. We believe that our ability to serve non-US markets is enhanced by our having, among other things, a local presence in the markets that we serve. This requires significant investments in financial, managerial, operational, and other resources.

Operations outside of the United States are subject to inherent risks, including fluctuations in exchange rates, political and economic conditions in various countries, legal compliance and regulatory requirements, tariffs and other trade barriers, difficulties in staffing and managing international operations, longer accounts receivable collection cycles, potential restrictions on transfers of funds and potentially adverse tax consequences. These factors may have a material adverse effect on our ability to generate revenue outside of the United States and to deploy resources where they could otherwise be used to their greatest advantage and, consequently, may adversely affect our financial condition and results of operations. Note 13 of the notes to our consolidated financial statements presents revenue and long-lived assets by geographic area.

Competition

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

We estimate that, for the types of photomasks we manufacture (IC and FPD), the size of the total market (captive and merchant) is approximately \$4.7 billion. Our competitors include Compugraphics International, Ltd., Dai Nippon Printing Co., Ltd (outside of Taiwan and China), Hoya Corporation, SK-Electronics Co. Ltd., Taiwan Mask Corporation, Toppan Printing Co., Ltd., Supermask Co. Ltd., and Chengdu NeWay Photomask Making Co., Ltd. We also compete with semiconductor and FPD manufacturers' captive photomask manufacturing operations that supply photomasks for internal use and, in some instances, also for external customers and foundries. We expect to face continued competition which, in the past, has led to pressure to reduce prices. We believe the pressure to reduce prices, together with the significant investment required in capital equipment to manufacture high-end photomasks, has contributed to the decrease in the number of independent manufacturers, and we expect such pressure to continue in the future.

Employees

As of October 31, 2018, we had approximately 1,575 employees. We believe we offer competitive compensation and other benefits, and that our employee relations are good.

ITEM 1A. RISK FACTORS

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

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

The General Data Protection Regulation (GDPR), which went into effect in the European Union (EU) on May 25, 2018, applies to the collection, use, retention, security, processing, and transfer of personally identifiable information of residents of EU countries. The GDPR created a range of new compliance obligations, and imposes

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significant fines and sanctions for violations. It is possible that the GDPR may be interpreted or applied in a manner that is adverse to us, unforeseen by us, or otherwise inconsistent with our practices; or that we may otherwise fail to construe its requirements in ways that are satisfactory to the EU authorities.

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

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

Cyber-attacks or security breaches could compromise confidential, business critical information, cause a disruption in the Company's operations or harm the Company's reputation. The Company has important assets, including intellectual property, trade secrets and other sensitive, business critical and/or confidential information. While the Company has a comprehensive cybersecurity program that is continuously reviewed, maintained and upgraded, a significant cyber-attack could result in the loss of critical business or confidential information and/or could negatively impact operations, which could have a negative impact on the Company's financial results.

Our dependency on the microelectronics industry, which as a whole is volatile, could have a negative material impact on our business.

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

We may, in the future, incur net losses.

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

We have a high level of fixed costs.

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

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

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

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

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

The photomask industry has been, and is expected to continue to be, characterized by technological change and evolving industry standards. In order to remain competitive, we will be required to continually anticipate, respond to and utilize changing technologies of increasing complexity in both traditional and emerging markets that we serve. In particular, we believe that, as semiconductor geometries continue to become smaller and FPDs become larger or otherwise more advanced, we will be required to manufacture increasingly complex photomasks. Additionally, the demand for photomasks has been, and could in the future be, adversely affected by changes in semiconductor and high-performance electronics fabrication methods that affect the type or quantity of photomasks utilized, such as changes in semiconductor demand that favor field-programmable gate arrays and other semiconductor designs that replace application-specific ICs. Furthermore, evidence of the viability and the corresponding market acceptance of alternative methods of transferring IC designs onto semiconductor wafers could reduce or eliminate the need for photomasks in the production of semiconductors. As of the end of fiscal 2018, one alternative method, direct-write lithography, has not been proven to be a commercially viable alternative to photomasks, as it is considered to be too slow for high volume semiconductor wafer production. However, should direct-write or any other alternative method of transferring IC or FPD designs without the use of photomasks achieve market acceptance, and if we are unable to anticipate, respond to or utilize these or other technological changes, due to resource, technological or other constraints, our business and results of operations could be materially adversely affected.

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

The manufacture of photomasks requires us to make substantial investments in high-end manufacturing capability. We expect that we will be required to continue to make substantial capital expenditures to meet the technological demands of our customers and to position us for future growth. Our capital expenditure payments for fiscal 2019 are expected to be approximately \$210 million, of which \$30 million was included in accounts payable on our October 31, 2018, consolidated balance sheet. We cannot provide assurance that we will be able to obtain the additional capital required to fund our operations on reasonable terms, if at all, or that any such inability will not have a material adverse effect on our business and results of operations.

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

Historically, we have sold a significant proportion of photomasks to a limited number of IC and FPD manufacturers. During fiscal years 2018, 2017 and 2016 our two largest customers accounted for 31%, 32% and 36%, respectively, of our revenue. Our five largest customers accounted for 47%, 43% and 50% of our revenue in fiscal years 2018, 2017 and 2016 respectively. The loss of a significant customer or a significant reduction or delay in orders from any significant customer, (including reductions or delays due to customer departures from recent buying patterns), or an unfavorable change in competitive conditions in the semiconductor or FPD industries, could have a material adverse effect on our financial performance and business prospects. The consolidation of semiconductor manufacturers or an economic downturn in the semiconductor industry may increase the likelihood of losing a significant customer and could also have an adverse effect on our financial performance and business prospects.

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

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

We use high precision quartz photomask blanks, pellicles, and electronic grade chemicals in our manufacturing processes. There are a limited number of suppliers of these raw materials and we have no long-term contracts with these suppliers. Any delays or quality problems in connection with significant raw materials, particularly photomask blanks, could cause delays in the shipments of photomasks, which could have a material adverse effect on our business and results of operations. The fluctuation of foreign currency exchange rates, with respect to prices of equipment and raw materials used in manufacturing, could also have a material adverse effect on our business and results of operations.

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

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

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

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

Our credit agreements restrict our business activities, limit our ability to obtain additional financing and may obligate us to repay debt before its maturity.

Financial covenants related to our credit facility, which expires in September 2023, include a Total Leverage Ratio, a Minimum Interest Coverage Ratio, and Minimum Unrestricted Cash Balances. Our credit facility may also limit our flexibility in planning for, or reacting to, changes in our business and industry, which may place us at a competitive disadvantage compared with our competitors. We are also subject to covenants that limit our operating flexibility, such as limiting our ability to repurchase shares of our common stock. Existing covenant restrictions limit our ability to obtain additional debt financing and, should we be unable to meet one or more of these covenants, our lenders may require us to repay any outstanding balance prior to the expiration date of the agreements. Our ability to comply with the financial and other covenants in our credit agreements may be affected by worsening economic or business conditions, or other events. We cannot assure that, under such circumstances, additional sources of financing would be available to fund operating requirements or pay off any long-term borrowings, so as to avoid default.

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

The nature of a joint venture requires us to share control in certain areas with unaffiliated third parties. If our joint venture partner does not fulfill its obligations, the affected joint venture may not be able to operate according to its business plan. Should that be the case, our results of operations may be adversely affected and we may be required to increase the level of our commitment to the joint venture. Also, differences in views among joint venture participants may result in delayed decisions or failures to agree on major issues. If these differences cause the joint ventures to deviate from their business plans, our results of operations could be adversely affected.

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

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

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

Our expansion into China entails substantial risks.

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

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

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

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

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

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

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

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

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

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

Revenues from our non-U.S. operations were approximately 79%, 77% and 76% of our total revenues in fiscal years 2018, 2017 and 2016, respectively. We believe that maintaining significant international operations requires us to have, among other things, a local presence in the geographic markets that we supply. This requires significant investments in financial, managerial, operational, and other resources. Since 1996, we have significantly expanded our operations in international markets by acquiring existing businesses in Europe, acquiring majority equity interests in photomask manufacturing operations in Korea and Taiwan and building a manufacturing facility for FPD photomasks in Taiwan. Currently, we are building two manufacturing facilities in China. In order to enable us to optimize our investments and other resources, we closely monitor the semiconductor and FPD manufacturing markets for indications of geographic movement and, in conjunction with these efforts, continue to assess the locations of our manufacturing facilities. These assessments may result in the opening or closing of facilities.

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

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

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

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

Our consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States of America (U.S. GAAP) and are reported in U.S. dollars. Our operations have transactions and balances denominated in currencies other than the U.S. dollar; primarily the Korean won, New Taiwan dollar, Japanese yen, Chinese renminbi, euro, Singapore dollar, and the pound sterling. In fiscal year 2018, we recorded a net gain from changes in foreign currency exchange rates of \$0.4 million in our statement of income, while our net assets were decreased by \$16.7 million as a result of the translation of foreign currency financial statements to U.S. dollars. Significant foreign currency fluctuations may adversely affect our results of operations, financial condition or cash flows.

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

Our success depends, in part, upon key managerial and technical personnel, as well as our ability to continue to attract and retain additional qualified personnel. The loss of certain key personnel could have a material adverse effect on our business and results of operations. There can be no assurance that we can retain our key managerial and technical employees, or that we can attract similar additional employees in the future.

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

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

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

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

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

We are subject to numerous environmental laws and regulations that impose various environmental controls on, among other things, the discharge of pollutants into the air and water and the handling, use, storage, disposal and

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clean-up of solid and hazardous wastes. Changes in these laws and regulations may have a material adverse effect on our financial position and results of operations, and inadequate compliance with their requirements could give rise to significant liabilities.

If we violate environmental, health or safety laws or regulations, in addition to being required to correct such violations, we can be held liable in administrative, civil or criminal proceedings, and substantial fines and other sanctions could be imposed that could disrupt or limit our operations. Liabilities associated with the investigation and cleanup of hazardous substances, as well as personal injury, property damages or natural resource damages arising from the release of, or exposure to, such hazardous substances, may be imposed in many situations without regard to violations of laws or regulations or other fault, and may also be imposed jointly and severally (so that a responsible party may be held liable for more than its share of the losses involved, or even the entire loss). Such liabilities may also be imposed on many different entities with a relationship to the hazardous substances at issue, including, for example, entities that formerly owned or operated the property affected by the hazardous substances and entities that arranged for the disposal of the hazardous substances at the affected property, as well as entities that currently own or operate such property. The nature of our business, including historical operations at our current and former facilities, exposes us to risks of liability under these laws and regulations due to the production, storage, use, transportation and sale of materials that can cause contamination or personal injury if released into the environment. Additional information may arise in the future concerning the nature or extent of our liability with respect to identified sites and additional sites that may be identified for which we are alleged to be liable.

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

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

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

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

Additional taxes could adversely affect our financial results.

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

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

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

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

Our ability to make scheduled payments of debt principal and interest, or to refinance our indebtedness, depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control.

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

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

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

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

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

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

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

Ineffective Internal Controls could impact our Business and Operating Results.

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

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

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ITEM 2. PROPERTIES

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

Location	Type of Interest
Allen, Texas	Owned
Boise, Idaho	Owned
Brookfield, Connecticut	Owned
Bridgend, Wales	Leased
Cheonan, Korea	Owned
Dresden, Germany	Leased
Hsinchu, Taiwan	Owned ⁽¹⁾
Hsinchu, Taiwan	Leased
Taichung, Taiwan	Owned ⁽¹⁾

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

We are currently building two manufacturing facilities on lands that we lease in Xiamen and Hefei, China.

ITEM 3. LEGAL PROCEEDINGS

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

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

The Common Stock of the Company is traded on the NASDAQ Global Select Market (“NASDAQ”) under the symbol PLAB. On December 13, 2018, the closing sale price of our Common Stock, per the NASDAQ Global Select Market, was \$10.02. Based on available information, we estimate that we have approximately 8,000 shareholders.

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

Issuer Purchases of Equity Securities

In July 2018 and October 2018, the Company’s Board of Directors authorized the repurchase of up to \$20 million and \$25 million, respectively, of its common stock, to be 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 authorization does not obligate us to repurchase any dollar amount or number of shares of common stock, and the repurchase program may be suspended or discontinued at any time.

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)
July 10, 2018 – July 29, 2018	0.8	\$ 8.72	0.8	\$ 13.2
July 30, 2018 – August 26, 2018	0.9	\$ 9.05	0.9	\$ 5.0
September 23, 2018 – October 31, 2018	0.9	\$ 9.46	0.9	\$ 21.9
Total	<u>2.6</u>	\$ 9.04	<u>2.6</u>	

Securities authorized for issuance under equity compensation plans

The information regarding our equity compensation required to be disclosed by Item 201(d) of Regulation S-K is incorporated by reference from the Photonics, Inc. 2019 definitive Proxy Statement in Item 12 of Part III of this report. The 2019 Proxy Statement will be filed within 120 days after our fiscal year ended October 31, 2018.

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ITEM 6. SELECTED FINANCIAL DATA

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

	Year Ended				
	October 31, 2018	October 29, 2017	October 30, 2016	November 1, 2015	November 2, 2014
OPERATING DATA:					
Revenue	\$ 535,276	\$ 450,678	\$ 483,456	\$ 524,206	\$ 455,527
Cost of goods sold	(403,773)	(359,363)	(364,750)	(381,070)	(355,181)
Gross profit	131,503	91,315	118,706	143,136	100,346
Selling, general and administrative	(51,395)	(43,585)	(44,577)	(48,983)	(49,638) ^(e)
Research and development	(14,481)	(15,862)	(21,654)	(21,920)	(21,913)
Operating income	65,627	31,868	52,475	72,233	28,795
Other income (expense):					
Interest and other income (expense), net	5,206 ^(a)	(3,068)	2,424	2,797 ^(d)	3,410
Interest expense	(2,262)	(2,235)	(3,365)	(4,990)	(7,247)
Gains on sales of investments	—	—	8,940 ^(b)	—	—
Gain on acquisition	—	—	—	—	16,372 ^(f)
Income before income tax provision	68,571	26,565	60,474	70,040	41,330
Income tax provision	(7,335)	(5,276)	(4,798) ^(c)	(13,181)	(9,295)
Net income	61,236 ^(a)	21,289	55,676	56,859 ^(d)	32,035 ^{(e)(f)}
Net income attributable to noncontrolling interests	(19,181)	(8,159)	(9,476)	(12,234)	(6,039)
Net income attributable to Photronics, Inc. shareholders	<u>\$ 42,055^(a)</u>	<u>\$ 13,130</u>	<u>\$ 46,200^{(b)(c)}</u>	<u>\$ 44,625^(d)</u>	<u>\$ 25,996^{(e)(f)}</u>
Earnings per share:					
Basic	<u>\$ 0.61^(a)</u>	<u>\$ 0.19</u>	<u>\$ 0.68^{(b)(c)}</u>	<u>\$ 0.67^(d)</u>	<u>\$ 0.42^{(e)(f)}</u>
Diluted	<u>\$ 0.59^(a)</u>	<u>\$ 0.19</u>	<u>\$ 0.64^{(b)(c)}</u>	<u>\$ 0.63^(d)</u>	<u>\$ 0.41^{(e)(f)}</u>
Weighted-average number of common shares outstanding:					
Basic	<u>68,829</u>	<u>68,436</u>	<u>67,539</u>	<u>66,331</u>	<u>61,779</u>
Diluted	<u>74,821</u>	<u>69,288</u>	<u>76,354</u>	<u>78,383</u>	<u>66,679</u>

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BALANCE SHEET DATA

	As of				
	October 31, 2018	October 29, 2017	October 30, 2016	November 1, 2015	November 2, 2014
Working capital	\$ 311,655	\$ 367,348	\$ 360,269	\$ 168,237	\$ 190,152
Property, plant and equipment, net	571,781	535,197	506,434	547,284	550,069
Total assets	1,110,009	1,020,794	987,988	1,042,811	1,025,564
Total debt	57,453	61,976	67,288	132,219	141,011
Total Photonics, Inc. shareholders' equity	759,671	744,564	710,363	646,555	628,050

- (a) Includes \$0.6 million gain on sale of assets.
- (b) Includes \$8.8 million gain on sale of investment in a foreign entity and \$0.2 million gain on the sale of the Company's 49.99% interest in the MP Mask joint venture.
- (c) Includes tax benefits in Taiwan of \$4.8 million primarily related to the recognition of prior period tax benefits and other tax positions no longer deemed necessary.
- (d) Includes \$0.9 million of financing expenses related to the exchange of \$57.5 million of 3.25% convertible senior notes.
- (e) Includes \$2.5 million, net of tax, of expenses related to the acquisition of DPTT.
- (f) Includes non-cash gain of \$16.4 million, net of tax, on acquisition of DPTT.

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

Results of Operations for the Years Ended October 31, 2018, October 29, 2017 and October 30, 2016

Overview

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

We are typically required to fulfill customer orders within a short period of time, sometimes within 24 hours. This results in our having a minimal level of backlog orders, typically one to two weeks of backlog for IC photomasks and two to three weeks of backlog for FPD photomasks.

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

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

As of December 2018, state-of-the-art production for semiconductor masks is considered to be 28 nanometer and smaller for ICs and Generation 8 and above and AMOLED display-based process technologies for FPDs. However, 32 nanometer and above geometries for semiconductors and Generation 7 and below, excluding AMOLED, process technologies for FPDs constitute the majority of designs currently being fabricated in volume. At these geometries, we can produce full lines of photomasks, and there is no significant technology employed by our competitors that is not available to us. We expect 28 nanometer and below designs to continue to move to wafer fabrication throughout fiscal 2019, and we believe we are well positioned to service an increasing volume of this business as a result of our investments in manufacturing processes and technology in the regions where our customers are located.

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

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used, such as changes in semiconductor demand that favor field-programmable gate arrays and other semiconductor designs that replace application-specific ICs, or the use of certain chip stacking methodologies that lessen the emphasis on conventional lithography technology. Furthermore, increased market acceptance of alternative methods of transferring circuit designs onto semiconductor wafers could reduce or eliminate the need for photomasks in the production of semiconductors. As of the end of fiscal year 2018, one alternative method, direct-write lithography, has not been proven to be a commercially viable alternative to photomasks, as it is considered to be too slow for high volume semiconductor wafer production, and we have not experienced a significant loss of revenue as a result of this or other alternative semiconductor design methodologies. However, should direct-write lithography or any other alternative method of transferring IC designs to semiconductor wafers without the use of photomasks achieve market acceptance, and we do not anticipate, respond to, or utilize these or other changing technologies due to resource, technological or other constraints, our business and results of operations could be materially adversely affected.

Both our revenues and costs have been affected by the increased demand for high-end technology photomasks that require more advanced manufacturing capabilities, but generally command higher average selling prices (“ASPs”). Our capital expenditure payments aggregated approximately \$235 million for the three fiscal years ended October 31, 2018, which has significantly contributed to our cost of goods sold. We intend to continue to make the required investments to support the technological demands of our customers that we believe will position the Company for future growth. In support of this effort, we expect capital expenditure payments to be approximately \$210 million in fiscal year 2019.

The manufacture of photomasks for use in fabricating ICs, FPDs, and other related products built using comparable photomask-based process technologies has been, and continues to be, capital intensive. Our employees and our integrated global manufacturing network, which will expand to eleven manufacturing sites in 2019, represent a significant portion of our fixed operating cost base. Should our revenue decrease as a result of a decrease in design releases from our customers, we may have excess or underutilized production capacity, which could significantly impact our operating margins, or result in write-offs from asset impairments.

In the first quarter of fiscal 2019, PDMC, the Company’s majority owned subsidiary in Taiwan, paid a dividend of which 49.99%, or approximately \$26.0 million, was paid to noncontrolling interests.

In November FY2019, Xiamen American Japan Photonics Mask Co., Ltd. (“PDMCX”), an indirect majority owned joint venture subsidiary of Photronics, Inc., entered into a commitment letter for an 8-year term loan agreement under which it can borrow up to approximately \$50.0 million (“the Project Loan”). PDMCX will use the Project Loan to finance certain capital expenditures in China. PDMCX will grant a lien on the land, building and equipment owned by PDMCX as collateral for the Project Loan. The interest rate of the Project Loan is based on the benchmark lending rate (as defined in the Project Loan agreement) plus a floating rate spread, of the People’s Bank of China on the date of borrowings. We anticipate that interest incurred on this loan will be reimbursed through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, up to a certain cap.

On November 7, 2018, PDMCX entered into a working capital loan agreement with a maximum borrowing limit of approximately \$25.0 million, (“the Working Capital Loan”). In November 2018, we borrowed \$2.2 million against this loan. PDMCX will use the Working Capital Loan for general financing purposes including for the payment of import and value added taxes. The term of the Working Capital Loan will not exceed three years, and no guarantees were required under the terms of the Working Capital Loan. The interest rate of the Working Capital Loan is based on the benchmark lending rate (as defined in the Working Capital Loan agreement) plus a floating rate spread, of the People’s Bank of China on the date of borrowings. We anticipate that interest incurred on this loan will be reimbursed through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, up to a certain cap.

In the fourth quarter of fiscal 2018, we entered into an amendment to our credit agreement (the “credit agreement”) which allows us to sell, transfer, lease, or otherwise dispose of our assets to a subsidiary guarantor. Subsequently, in that same fiscal quarter, we entered into an amended and restated credit agreement (“the new agreement”) that expires in September 2023, which carried forward the amendment made to the credit agreement. The new agreement, which replaced our prior credit agreement, has a \$50 million borrowing limit, and a \$50 million expansion capacity, which represents a \$25 million increase over the previous credit agreement. The new agreement is secured by substantially all of our assets located in the United States and common stock we own in certain of our foreign subsidiaries, and limits the amount we can pay in cash dividends on Photronics, Inc. stock. The new agreement contains the following financial covenants: minimum interest coverage ratio, total leverage ratio and

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minimum unrestricted cash balance, all of which we were in compliance with at October 31, 2018. We had no outstanding borrowings against the new agreement at October 31, 2018, and \$50 million was available for borrowing. The interest rate on the new agreement (2.30% at October 31, 2018) 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 be 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 10b5-1, on October 22, 2018, and will expire no later than October 21, 2019. As of October 31, 2018, we had repurchased a combined 2.6 million shares at a cost of \$23.1 million (an average of \$9.04 per share) under this and our share repurchase program that commenced in the third quarter of fiscal 2018 (discussed below). The volume of shares repurchased are subject to market conditions, and our continual evaluation of the optimal use of our cash.

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

In the third quarters of fiscal years 2018, 2017, and 2016, our majority owned IC facility in Taiwan paid dividends of \$8.2 million, \$8.3 million, and \$11.9 million, respectively, to its noncontrolling interest.

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

In the fourth quarter of fiscal 2017, we announced that Photronics UK, Ltd., a wholly-owned subsidiary of ours, signed an investment agreement with Hefei State Hi-tech Industry Development Zone to establish a manufacturing facility in Hefei, China. Under the terms of the agreement, through our subsidiary, we will invest a minimum of \$160 million, a portion of which may be funded with local borrowings, to build and operate a research and development and manufacturing facility for high-end and mainstream FPD photomasks. Hefei State Hi-tech Industry Development Zone will provide certain investment incentives and support for this facility, which will have initial capability to produce up to G10.5+ large area masks and AMOLED products. Construction began in late 2017 and production is anticipated to commence in the first half 2019.

In the fourth quarter of 2016, Photronics Singapore Pte, Ltd., a wholly-owned subsidiary, signed an investment agreement with the Administrative Committee of Xiamen Torch Hi-Tech Industrial Development Zone (Xiamen Torch) to establish an IC manufacturing facility in Xiamen, China. Under the terms of the agreement, we will build and operate an IC facility to engage in research and development, manufacture and sale of photomasks, in return for which Xiamen Torch will provide certain investment incentives and support. This expansion is also substantially supported by customer commitments for its output. As discussed above, in the first quarter of fiscal 2018, we entered into a joint venture agreement with DNP, under which they hold a 49.99% ownership interest in this investment. The total investment per the agreement is \$160 million, of which approximately \$62 million remained for Photronics as of October 31, 2018, and will be funded over the next several years with cash and local borrowings. Construction began in 2017 and production is anticipated to start in the first half of 2019.

In the third quarter of fiscal 2016, we sold our investment in MP Mask to Micron for \$93.1 million and recorded a gain of \$0.1 million on the sale. On that same date, a supply agreement commenced between Photronics and Micron, which provided that we would be the majority outsourced supplier of Micron's photomasks and related services. The supply agreement had a one year term and expired in May 2017. We have unlimited rights to use the technology under our prior technology license agreement.

In the second quarter of fiscal 2016, \$57.5 million of our senior convertible notes matured. We repaid \$50.1 million to noteholders, and issued approximately 0.7 million shares to noteholders that elected to convert their notes to common stock. The notes were exchanged at the rate of approximately 96 shares per \$1,000 note principle, equivalent to a conversion rate of \$10.37 per share.

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Results of Operations

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

	Three Months Ended		
	October 31, 2018	July 29, 2018	October 29, 2017
Revenue	100.0%	100.0%	100.0%
Cost of goods sold	(75.5)	(73.9)	(78.1)
Gross profit	24.5	26.1	21.9
Selling, general and administrative expenses	(9.3)	(9.2)	(8.4)
Research and development expenses	(2.7)	(1.9)	(3.2)
Operating income	12.5	15.0	10.3
Other income (expense), net	1.5	1.0	0.4
Income before income tax provision	14.0	16.0	10.7
Income tax provision	(2.4)	(1.5)	(2.0)
Net income	11.6	14.5	8.7
Net income attributable to noncontrolling interests	(3.0)	(5.0)	(4.2)
Net income attributable to Photronics, Inc. shareholders	8.6%	9.5%	4.5%
	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Revenue	100.0%	100.0%	100.0%
Cost of goods sold	(75.4)	(79.7)	(75.4)
Gross profit	24.6	20.3	24.6
Selling, general and administrative expenses	(9.6)	(9.7)	(9.2)
Research and development expenses	(2.7)	(3.5)	(4.5)
Operating income	12.3	7.1	10.9
Interest income and other income (expense)	0.9	(0.7)	0.5
Interest expense	(0.4)	(0.5)	(0.7)
Gains on sales of investments	—	—	1.8
Income before income tax provision	12.8	5.9	12.5
Income tax provision	(1.4)	(1.2)	(1.0)
Net income	11.4	4.7	11.5
Net income attributable to noncontrolling interests	(3.5)	(1.8)	(1.9)
Net income attributable to Photronics, Inc. shareholders	7.9%	2.9%	9.6%

Note: All the following tabular comparisons, unless otherwise indicated, are for the three months ended October 31, 2018 (Q4 FY18), July 29, 2018 (Q3 FY18) and October 29, 2017 (Q4 FY17), and for the fiscal years ended October 31, 2018 (FY18), October 29, 2017 (FY17) and October 30, 2016 (FY16), in millions of dollars.

Revenue

	Q4 FY18 Compared with Q3 FY18			Q4 FY18 Compared with Q4 FY17	
	Revenue in Q4 FY18	Percent Change	Increase (Decrease)	Percent Change	Increase (Decrease)
IC					
High-end	\$ 39.4	(14.4)%	\$ (6.7)	29.5%	\$ 9.0
Mainstream	71.5	16.8%	10.3	8.9%	5.8
Total IC	\$ 110.9	3.4%	\$ 3.6	15.4%	\$ 14.8
FPD					
High-end	\$ 22.0	29.0%	\$ 5.0	28.5%	\$ 4.9
Mainstream	11.8	(2.5)%	(0.3)	51.2%	4.0
Total FPD	\$ 33.8	15.9%	\$ 4.7	35.6%	\$ 8.9
Total Revenue	\$ 144.7	6.1%	\$ 8.3	19.6%	\$ 23.7

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In Q1 FY18, we changed the threshold for the definition of high-end IC, from 45 nanometer or smaller to 28 nanometer or smaller, to reflect the overall advancement of technology in the semiconductor industry. All comparisons to prior period results in this MD&A reflect this modification. Our definition of high-end FPD products remains as G8 and above and active matrix organic light-emitting diode (AMOLED) display screens. High-end photomasks typically have higher ASPs than mainstream products.

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.

The following tables compare revenue in Q4 FY18 with revenue in Q3 FY18 and Q4 FY17 by geographic area:

	Q4 FY18 with Q3 FY18			Q4 FY18 with Q4 FY17	
	Revenue in Q4 FY18	Percent Change	Increase (Decrease)	Percent Change	Increase (Decrease)
Taiwan	\$ 62.3	0.3%	\$ 0.2	13.1%	\$ 7.2
Korea	40.8	9.5%	3.6	40.7%	11.8
United States	30.7	10.8%	3.0	16.0%	4.2
Europe	9.8	14.5%	1.2	0.5%	0.1
Other	1.1	38.9%	0.3	54.2%	0.4
	<u>\$ 144.7</u>	6.1%	<u>\$ 8.3</u>	19.6%	<u>\$ 23.7</u>

Revenue increased 6.1% in Q4 FY18 compared with Q3 FY18, as a result of mainstream IC and high end FPD growth. IC mainstream increased 16.8% from Q3 FY18, due to healthy foundry demand across Asia. High end IC decreased 14.4%, as soft demand for high-end logic offset growth in high-end memory. FPD revenue increased 15.9% from Q3 FY18 due to an increase in high end driven by mobile AMOLED demand, partially offset by a decrease in FPD mainstream. The decrease in FPD mainstream was slightly offset by improved demand from masks used in LTPS LCD mobile displays.

Revenue increased 19.6% in Q4 FY18 compared with Q4 FY17, primarily as a result of high-end and mainstream IC growth. That revenue increased 15.4% from Q4 FY17, due to high-end growth in both logic and memory from the healthy foundry demand across Asia. FPD revenue increased 35.6% from Q4 FY17 due to better demand across our products and markets, particularly in mobile displays.

The following tables compare revenue in FY18 with revenue in FY17, and revenue in FY17 with revenue in FY16:

	FY18 Compared with FY17			FY17 Compared with FY16	
	Revenue in FY18	Percent Change	Increase (Decrease)	Percent Change	Increase (Decrease)
IC					
High-end	\$ 160.4	61.9%	\$ 61.3	16.3%	\$ 13.9
Mainstream	255.7	1.8%	4.5	(10.1)%	(28.2)
Total IC	<u>\$ 416.1</u>	18.8%	<u>\$ 65.8</u>	(3.9)%	<u>\$ (14.3)</u>
FPD					
High-end	\$ 76.1	12.1%	\$ 8.2	(21.6)%	\$ (18.7)
Mainstream	43.1	32.6%	10.6	0.7%	0.2
Total FPD	<u>\$ 119.2</u>	18.7%	<u>\$ 18.8</u>	(15.6)%	<u>\$ (18.5)</u>
Total Revenue	<u>\$ 535.3</u>	18.8%	<u>\$ 84.6</u>	(6.8)%	<u>\$ (32.8)</u>

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	FY18 with FY17			FY17 with FY16		
	Revenue in FY18	Percent Change	Increase (Decrease)	Revenue in FY17	Percent Change	Increase (Decrease)
Taiwan	\$ 237.0	26.2%	\$ 49.2	\$ 187.8	(2.8)%	\$ (5.4)
Korea	147.1	20.4%	24.9	122.2	(13.4)%	(18.9)
United States	112.7	10.4%	10.6	102.0	(10.2)%	(11.6)
Europe	35.5	(1.5)%	(0.5)	36.1	8.1%	2.7
Other	3.0	15.9%	0.4	2.6	18.7%	0.4
	<u>\$ 535.3</u>	<u>18.8%</u>	<u>\$ 84.6</u>	<u>\$ 450.7</u>	<u>(6.8)%</u>	<u>\$ (32.8)</u>

Revenue increased 18.8% in FY18 compared with FY17 primarily due to increased high end IC growth. That revenue increased 61.9% due to growth in both logic and memory from healthy foundry demand across Asia. FPD revenue increased 18.7% from FY17 due to better demand across our products and markets.

Revenue decreased 6.8% in FY17 compared with FY16 primarily due to decreases in both IC and FPD. IC photomask revenue decreased 3.9% as growth in high-end memory was offset by weakness in high-end and mainstream logic. FPD sales decreased 15.6% in FY17 compared with FY16 primarily due to a decline in high-end mobile displays.

As we begin our 2019 fiscal year, we are cautiously optimistic, as we observe favorable signs of demand drivers, but we are aware of certain potential macro challenges. While the photomask market has held up well, there are some sectors in the semiconductor industry that have witnessed slowing demand. If this expands into a more widespread economic slowdown, then it's possible that our markets will also be impacted. In addition to potential demand challenges, there are also geopolitical risks, the outcome of which are uncertain. We currently expect greater than normal seasonal impact in Q1 as the high-end IC market looks to remain soft, and we will have fewer days in our fiscal first quarter. Beyond the first quarter, growth will be dependent on the shape and duration of any potential market downturn. As we approach the second half of the year, we anticipate additional growth from the ramp of our new China facilities. As a result, we anticipate that, our 2019 growth will be dependent on underlying market demand and how effectively we ramp production in China.

Gross Profit

	Q4 FY18	Q3 FY18	Q4 FY17	Percent Change	
				Q4 FY18 from Q3 FY18	Q4 FY18 from Q4 FY17
Gross profit	\$ 35.4	\$ 35.6	\$ 26.4	(0.5)%	34.0%
Gross margin	24.5%	26.1%	21.9%		

Gross profit and gross margin decreased in Q4 FY18, compared with Q3 FY18, primarily due to increased materials and equipment maintenance costs incurred in the current quarter. Gross profit and gross margin increased in Q4 FY18, compared with Q4 FY17, primarily as a result of the increased revenue in the current quarter, which exceeded increased materials, labor, and other overhead costs incurred in Q4 FY18. 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.

	FY18	FY17	FY16	Percent Change	
				FY18 from FY17	FY17 from FY16
Gross profit	\$ 131.5	\$ 91.3	\$ 118.7	44.0%	(23.1)%
Gross margin	24.6%	20.3%	24.6%		

Gross profit and gross margin increased on a full-year basis in FY18, compared with FY17, primarily as a result of the increased revenue in the current year, which exceeded increased materials, labor, and other overhead costs incurred in FY18. Gross profit and gross margin decreased in FY17, compared with FY16, primarily due to a decrease in overall revenue that resulted from lower ASPs and, to a lesser extent, a reduction in units sold.

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Selling, General and Administrative Expenses

Selling, general and administrative expenses increased by \$1.0 million, or 8.0%, to \$13.5 million in Q4 FY18, from \$12.5 million in Q3 FY18, primarily due to increased compensation and freight expenses. Selling, general and administrative expenses increased in Q4 FY18 by \$3.3 million, or 32.6%, to \$13.5 million, from \$10.2 million in Q4 FY17, primarily as a result of increased compensation, professional services, and freight expenses.

On a full year basis, selling, general and administrative expenses increased \$7.8 million, or 17.9% in FY18, to \$51.4 million from \$43.6 million in FY17, primarily due to increases in compensation, freight, and travel expenses, partially as a result of activities related to our expansion into China. In addition, bad debt recoveries were more favorable in FY17 than in the current year. Selling, general and administrative expenses decreased by \$1.0 million in FY17, compared with FY16, primarily due to reduced bad debt expense and professional fees, which were partially offset by increased compensation costs and selling expenses.

Research and Development

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

Research and development expense increased \$1.3 million to 3.9 million in Q4 FY18, or 47.2%, from Q3 FY18, as a result of increased expenditures in both the U.S. and Asia. Research and development expense was up moderately (\$0.1 million, or 1.8%) in Q4 FY18 from Q4 FY17, with increased spending in Taiwan exceeding decreased expenditures and related activities on large area masks in Korea.

On a full year basis, research and development expense decreased \$1.4 million in FY18, or 8.7%, to \$14.5 million, as spending decreases in the U.S. and Taiwan exceeded an increase in Korea, primarily related to large area masks. Research and development expenses decreased by \$5.8 million in FY17 to \$15.9 million, from \$21.7 million in FY16 as a result of lower customer qualification costs for high-end reticles in both Asia and the U.S.

Other Income (Expense), net

	<u>Q4 FY18</u>	<u>Q3 FY18</u>	<u>Q4 FY17</u>
Interest income and other income (expense)	\$ 2.9	\$ 2.0	\$ 1.1
Interest expense	(0.6)	(0.6)	(0.6)
Total other income (expense), net	<u>\$ 2.3</u>	<u>\$ 1.4</u>	<u>\$ 0.5</u>

Interest income and other income (expense) increased by \$0.9 million in Q4 FY18, compared with Q3 FY18, primarily as a result of increased foreign currency transaction gains. Interest income and other income (expense) increased by \$1.8 million in Q4 FY18, compared with Q4 FY17, also primarily as a result of increased foreign currency transaction gains in Q4 FY18 and gains realized on the sales of assets in Q4 FY18. Interest expense, which is principally related to our 3.25% convertible senior notes was essentially unchanged over the comparative quarterly periods.

	<u>FY18</u>	<u>FY17</u>	<u>FY16</u>
Interest income and other income (expense)	\$ 5.2	\$ (3.1)	\$ 2.4
Interest expense	(2.3)	(2.2)	(3.3)
Gains on sales of investments	—	—	8.9
Total other income (expense), net	<u>\$ 2.9</u>	<u>\$ (5.3)</u>	<u>\$ 8.0</u>

Interest income and other income (expense) increased by \$8.3 million on a full-year basis in FY18, compared with FY17, primarily as a result of our experiencing moderate foreign currency transaction gains in FY18, in contrast to significant losses in FY17. In addition, we realized gains on asset sales in FY18, and achieved better investment results on our cash balances than we did in the prior year.

Interest income and other income (expense) decreased by \$5.5 million in FY17, compared with FY16, primarily as a result of increased foreign currency transaction losses in FY17. Interest expense decreased in FY17 compared with FY16 primarily as a result of the maturity of our 3.25% convertible senior notes in April 2016, and lower average outstanding debt balance on our other debt obligations.

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In January 2016, we sold a minority interest investment in a foreign entity and recognized a gain of \$8.8 million. In May 2016, we sold our 49.99% interest in the MP Mask joint venture and recognized a gain of \$0.1 million.

Income Tax Provision

The U.S. Tax Cuts and Jobs Act (the “Act”) that was signed into law on December 22, 2017, included significant changes to the United States Internal Revenue Code of 1986, as amended, which we expect to have a positive impact on our future after-tax earnings. Our FY18 results reflect the corporate rate reduction, alternative minimum tax refund, meals and entertainment and deemed repatriation tax provisions. Other provisions of the Tax Act are effective for tax years beginning on or after January 1, 2018. As a fiscal year U.S. taxpayer, these provisions will apply to our fiscal 2019, including eliminating the domestic manufacturing deduction, creating new taxes on certain foreign sourced income, and introducing new limitations on certain business deductions.

	<u>Q4 FY18</u>	<u>Q3 FY18</u>	<u>Q4 FY17</u>
Income tax provision	\$ 3.6	\$ 2.1	\$ 2.5
Effective income tax rate	17.5%	9.4%	19.0%

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

The effective income tax rate in Q4 FY18, compared with Q3 FY18, increased primarily due to Q3 FY18 nonrecurring tax benefits of \$1.8 million related to tax audit settlements. The difference was somewhat reduced by an increased tax holiday benefit of \$1.1 million in Q4 FY18. The effective income tax rate decreased in Q4 FY18, compared with Q4 FY17, primarily due to a greater percentage of the Q4 FY17 income before taxes being generated in jurisdictions where the Company incurs tax losses that, due to valuation allowances, did not result in the recognition of tax benefits, and an increased benefit of \$0.9 million from the tax holiday in Taiwan.

	<u>FY18</u>	<u>FY17</u>	<u>FY16</u>
Income tax provision	\$ 7.3	\$ 5.3	\$ 4.8
Effective income tax rate	10.7%	19.9%	7.9%

The decrease in effective income tax rate on a full-year basis in FY18, compared with FY17, was primarily due to the recognition of a tax benefit related to \$3.7 million of alternative minimum tax credits that became fully refundable under US tax reform, an increased benefit of \$2.4 million from a tax holiday in Taiwan, and an increase in the recognition of \$1.2 million of previously unrecognized tax benefits, which resulted from audit settlements and expirations of assessment period statutes of limitations, partially offset by a greater percentage of the FY17 income before taxes being generated in jurisdictions where the Company incurs tax losses that, due to valuation allowances, did not result in the recognition of tax benefits.

The increase in effective income tax rate in FY17, compared with FY16, was primarily due to recognition of \$1.0 million of previously unrecognized tax benefits, which arose from audit settlements and expirations of assessment period statutes of limitations. Those effects were partially offset by FY16 benefit factors, including: the recognition of \$2.5 million of previously unrecognized deferred tax assets resulting from improved performance of our FPD operations; the reversal of previously recognized tax expense of \$2.4 million that was eliminated by a distribution of the earnings of a foreign subsidiary to its foreign parent; a higher percentage of income before income taxes, including an \$8.8 million gain on the sale of an investment in the first quarter of FY16, generated in jurisdictions where we previously incurred losses that, due to valuation allowances, did not result in recognition of expense.

We consider all available evidence when evaluating the potential future realization of deferred tax assets, and when, based on the weight of all available evidence, we determine that it is more likely than not that some portion or all of our deferred tax assets will not be realized, we reduce our deferred tax assets by a valuation allowance. We also regularly assess the potential outcomes of ongoing and future tax examinations and, accordingly, have recorded accruals for such contingencies. Included in the balance of unrecognized tax benefits as of October 31, 2018, October 29, 2017 and October 30, 2016, are \$1.9 million, \$3.4 million and \$4.6 million, respectively, recorded in other liabilities in the consolidated balance sheets that, if recognized, would impact the effective tax rate.

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	<u>Q4 FY18</u>	<u>Q3 FY18</u>	<u>Q4 FY17</u>	<u>FY18</u>	<u>FY17</u>	<u>FY16</u>
Net income attributable to noncontrolling interest	\$ 4.3	\$ 6.8	\$ 5.1	\$ 19.2	\$ 8.2	\$ 9.5

Periods subsequent to FY17 include DNP's share of the earnings of our IC subsidiary in Taiwan, as well as their attribution of losses incurred at our IC facility in China, which will commence operations in the first half of fiscal 2019. For all periods prior to FY18, substantially all of the net income attributable to noncontrolling interests reflects DNP's share of the earnings of our IC manufacturing subsidiary in Taiwan.

Liquidity and Capital Resources

	<u>October 31, 2018</u>	<u>October 29, 2017</u>	<u>October 30, 2016</u>
	<i>(in \$ millions)</i>	<i>(in \$ millions)</i>	<i>(in \$ millions)</i>
Cash and cash equivalents	\$ 329.3	\$ 308.0	\$ 314.1
Net cash provided by operating activities	\$ 130.6	\$ 96.8	\$ 122.1
Net cash used in/provided by investing activities	\$ (90.7)	\$ (98.1)	\$ 52.3
Net cash used in financing activities	\$ (13.8)	\$ (10.9)	\$ (67.0)

As of October 31, 2018, we had cash and cash equivalents of \$329.3 million compared with \$308.0 million as of October 29, 2017. Our working capital decreased \$55.7 million to \$311.7 million at October 31, 2018, compared with \$367.3 million at October 29, 2017, primarily due to the reclassification of our 3.25% senior convertible notes, which mature in April 2019 to current status. We may use our available cash on hand for operations, capital expenditures, debt repayments, strategic opportunities, stock repurchases or other corporate uses, any of which may be material.

As of October 29, 2017, we had cash and cash equivalents of \$308.0 million compared with \$314.1 million as of October 30, 2016. Our working capital increased \$7.1 million to \$367.3 million at October 29, 2017, compared with \$360.3 million at October 30, 2016.

As of October 31, 2018 and October 29, 2017, our total cash and cash equivalents included \$244.5 million and \$190.0 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. are, as a result of the U.S. Tax Cut and Jobs Act, generally not subject to U.S. federal income tax, but may be subject to U.S. state income taxes and local country withholding taxes. 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.

Net cash provided by operating activities increased to \$130.6 million in FY18, compared with \$96.8 million in FY17, primarily due to increased net income and an increase in cash from accounts payable and other liabilities exceeding decreases in most operating accounts and non-cash items, partially attributable to beginning operations in China. Net cash provided by operating activities decreased by \$25.3 million to \$96.8 million in FY17, compared with \$122.1 million in FY16, primarily due to the decrease of \$34.4 million of net income. Net cash provided by operating activities decreased to \$122.1 million in FY16, compared with \$133.2 million in fiscal 2015, primarily due to reduced year-over-year operating income, partially offset by net cash favorable changes in accrual accounts.

Net cash used in investing activities in FY18 was \$90.7 million primarily resulting from capital expenditure payments. Cash flows from investing activities decreased from funds provided of \$52.3 million in FY16 to \$98.1 million used in FY17 due to \$101.9 million aggregate proceeds received from the sale of our investments in MP Mask and an interest we held in a foreign entity in FY16, compared to increased capital expenditures of \$41.8 million and the acquisition of a business of \$5.4 million in FY17. Cash flows from investing activities increased to \$52.3 million provided in FY16 from \$104.3 used in fiscal year 2015, primarily due to proceeds of \$101.9 million received from the sale of our investments in the MP Mask joint venture and an interest we held in a foreign entity, as well as decreased expenditures for capital equipment. Capital expenditure payments for the FY18, FY17, and FY16, were \$92.6, \$92.0, and \$50.1 million, respectively. We expect capital expenditure payments in fiscal 2019 to be approximately \$210 million.

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Net cash used in financing activities was \$13.8 million in FY18, primarily comprised of the receipt of \$18.0 million from a noncontrolling interest for their investment in our recently established joint venture in China and \$4.6 million of proceeds received from share-based arrangements, which partially offset the payment of a dividend to the noncontrolling interest of our IC facility in Taiwan of \$8.2 million, \$23.1 million used to acquire our common stock under a share repurchase program, and debt repayments of \$4.6 million. Net cash used in financing activities was \$10.9 million in FY17, which primarily comprised repayments of long-term borrowings and a dividend paid to the noncontrolling interest in a subsidiary, partially offset by proceeds received from employee share-based arrangements. Net cash used in financing activities was \$67.0 million in FY16, primarily comprised of repayments of long-term borrowings (including \$50.1 million to retire our 3.25% convertible senior notes which matured in April FY16) and \$11.9 million dividend paid to the noncontrolling interest in a subsidiary, partially offset by proceeds received from employee share-based arrangements.

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 facilities.

As of October 31, 2018, we had capital commitments outstanding of approximately \$130 million, nearly all of which related to the building and equipping of our China facilities (discussed below). We intend to finance our capital expenditures with our working capital, cash generated from operations, and, if necessary, additional borrowings. We have entered into a joint venture that is constructing an IC facility in China with an estimated total joint investment of \$160 million. Our remaining funding commitment for the joint venture is approximately \$62 million which we will fulfill over the next several quarters. We have also commenced construction of an FPD facility in China in which, as of October 31, 2018, we have invested \$90 million, and will invest an additional \$70 million during the first half of 2019. We believe that our cash on hand, cash generated from operations and amounts available to borrow will be sufficient to meet our cash requirements for the next twelve months. We regularly review the availability and terms at which we might issue additional equity or debt securities in the public or private markets. However, we cannot assure that additional sources of financing would be available to us on commercially favorable terms, should our capital requirements exceed our existing cash, cash generated by operations, and cash available under our credit facilities.

Cash Requirements

Our cash requirements in fiscal 2019 will be primarily to: fund our operations; capital spending, including the completion of constructing and equipping an IC research and development and manufacturing facility in Xiamen, China and an FPD manufacturing facility in Hefei, China; and service our debt. We believe that our cash on hand, cash generated from operations and amounts available to borrow will be sufficient to meet our cash requirements for the next twelve months. We regularly review the availability and terms at which we might issue additional equity or debt securities in the public or private markets. However, we cannot assure that additional sources of financing would be available to us on commercially favorable terms, should our cash requirements exceed our existing cash and cash available under our credit facilities.

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Contractual Obligations

The following table presents our contractual obligations as of October 31, 2018:

Contractual Obligations	Payment due by period				
	Total	Less Than 1 Year	1 - 3 Years	3 - 5 Years	More Than 5 Years
Long-term debt	\$ 57,500	\$ 57,500	\$ —	\$ —	\$ —
Operating leases	7,495	1,943	2,922	1,963	667
Purchase obligations	144,174	137,034	7,042	98	—
Interest	1,234	1,034	200	—	—
Other noncurrent liabilities	11,858	1,038	3,793	2,771	4,256
Total	<u>\$ 222,261</u>	<u>\$ 198,549</u>	<u>\$ 13,957</u>	<u>\$ 4,832</u>	<u>\$ 4,923</u>

Long-term debt of \$57.5 million in the table above represent our obligation under our 3.25% senior convertible notes, which mature on April 1, 2019, and, at the option of the note holders, may be settled either in cash or by conversion into our common stock. See Note 6 to the consolidated financial statements for additional information. As of October 31, 2018, the Company had recorded accruals for uncertain tax positions and related interest and penalties of \$1.9 million which were not included in the above table due to the high degree of uncertainty regarding the timing of future payments related to such liabilities.

In November FY2019, Xiamen American Japan Photronics Mask Co., Ltd. (“PDMCX”), an indirect majority-owned joint venture subsidiary of Photronics, Inc., entered into a commitment letter under which it can borrow up to approximately \$50.0 million (“the Project Loan”). PDMCX will use the Project Loan to finance certain capital expenditures in China. During the eight-year term of the Project Loan, PDMCX will grant a lien on the land, building and equipment owned by PDMCX as collateral for the Project Loan. The interest rate of the Project Loan is based on the benchmark lending rate (as defined in the Project Loan agreement) plus a floating rate spread of the People’s Bank of China on the date of borrowings. We anticipate that interest incurred on this loan will be reimbursed through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, up to a certain cap.

On November 7, 2018, PDMCX entered into a working capital loan agreement with a maximum borrowing limit of approximately \$25.0 million, (“the Working Capital Loan”). In November 2018, we borrowed \$2.2 million against this loan. PDMCX will use the Working Capital Loan for general financing purposes including the payment of import and value added taxes. The term of the Working Capital Loan will not exceed three years, and no guarantees were required under the terms of the Working Capital Loan. The interest rate of the Working Capital Loan is based on the benchmark lending rate (as defined in the Working Capital Loan agreement) plus a floating rate spread of the People’s Bank of China on the date of borrowings. We anticipate that interest incurred on this loan will be reimbursed through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, up to a certain cap.

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 “Photronics DNP Mask Corporation Xiamen” (“PDMCX”), was established to develop and manufacture photomasks for leading edge and advanced generation semiconductors. Under the Joint Venture Operating Agreement of Photronics DNP Mask Corporation Xiamen (“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 that cannot be resolved between the two parties. In addition, both Photronics and DNP have the option to purchase, or put, their interest from, or to, the other party, should their ownership interest fall below 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 the net assets of PDMCX, incur a loss. As of October 31, 2018, Photronics and DNP each had net investments in PDMCX of \$15.9 million.

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We lease certain office facilities and equipment under operating leases that may require us to pay taxes, insurance and maintenance expenses related to the properties. Certain of these leases contain renewal or purchase options exercisable at the end of the lease terms. See Note 7 to the consolidated financial statements for additional information on these operating leases.

Business Outlook

A majority of our revenue growth is expected to continue to come from the Asia region, predominantly in China. In response to this expectation, we have entered into a joint venture that will complete the construction of an IC research and development and manufacturing facility in Xiamen, China, in late 2018. Production is anticipated to begin at this facility during the first half of 2019. In addition, in August 2017, we entered into an investment agreement to construct an FPD manufacturing facility in Hefei, China. Construction of this facility commenced in Q1 FY18, and production is anticipated to begin during the first half of 2019.

We make continual assessments of our global manufacturing strategy and monitor our revenue and related cash flows from operations. This ongoing assessment could result in future facility closures, asset redeployments, impairments of intangible or long-lived assets, workforce reductions, or the addition of manufacturing facilities, all of which would be based on market conditions and customer requirements.

We are cautiously optimistic regarding results of operations in fiscal 2019, as we observe favorable signs of demand drivers, but we are aware of certain potential macro challenges. While the photomask market has held up well, there are some sectors in the semiconductor industry that have seen slowing demand. If this spreads into a more widespread economic slowdown, then it's possible that our markets will also be impacted. In addition to potential demand challenges, there are also geopolitical risks, the outcome of which, are uncertain. Entering 2019, we currently expect higher than normal seasonal impact in Q1 as the high-end IC market looks to remain soft, and we will have fewer days in our first quarter. Beyond the first quarter, growth will be dependent on the shape and duration of any potential market downturn. As we get to the second half of the year, we should see additional growth from the ramp of our new China facilities. Therefore, our 2019 growth will be dependent on underlying market demand and how effectively we ramp production in China.

Our future results of operations and the other forward-looking statements contained in this filing involve a number of risks and uncertainties. While various risks and uncertainties have been discussed, a number of other unforeseen factors could cause actual results to differ materially from our expectations.

Critical Accounting Estimates

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

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

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

Recent Accounting Pronouncements

See "Item 8. Financial Statements and Supplementary Data – Notes to Consolidated Financial Statements – Note 23 Recent Accounting Pronouncements" for recent accounting pronouncements that may affect our financial reporting.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Foreign Currency Exchange Rate Risk

We conduct business in several major currencies throughout our worldwide operations, and our financial performance may be affected by fluctuations in the exchange rates of these currencies. Changes in exchange rates can positively or negatively affect our reported revenue, operating income, assets, liabilities, and equity. The functional currencies of our Asian subsidiaries are the South Korean won, the New Taiwan dollar, the Chinese renminbi and the Singapore dollar. The functional currencies of our European subsidiaries are the British pound and the euro. In addition, we have transactions and balances in 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 manufacturing facility. For example, we are currently shipping a significant quantity of photomasks into China, while our China facilities are under construction. In addition, to the extent practicable, we attempt to reduce our exposure to foreign currency exchange fluctuations by converting cash and cash equivalents into the functional currency of the subsidiary which holds the cash. We may also enter into derivative contracts to mitigate our exposure to foreign currency fluctuations when we have a significant purchase obligation or significant receivable denominated in a currency that differs from the transacting subsidiaries' functional currencies. We do not enter into derivatives for speculative purposes. There can be no assurance that these practices will protect us from the need to recognize significant foreign currency transaction gains and losses, especially in the event of a significant adverse movement in the value of any foreign currency in which we conduct business against any of our functional currencies, including the U.S. dollar.

Our primary net foreign currency exposures as of October 31, 2018, included the South Korean won, the Japanese yen, the New Taiwan dollar, the Chinese renminbi, the Singapore dollar, the British pound, and the euro. As of October 31, 2018, a 10% adverse movement in the value of these currencies against the functional currencies of our subsidiaries would have resulted in a net unrealized pre-tax loss of \$13.2 million, which represents an increase of \$0.2 million from the same result as of October 29, 2017. The increase in foreign currency rate change risk is primarily the result of increased exposure of Korean won against USD. We do not believe that a 10% change in the exchange rates of other non-US dollar currencies would have had a material effect on our October 31, 2018 consolidated financial statements.

Interest Rate Risk

At October 31, 2018, we did not have any variable rate borrowings. Therefore, a 10% change in interest rates would not have had a material effect on our consolidated financial position, results of operations, or cash flows in the year ended October 31, 2018.

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ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

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

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Photronics, Inc. (the “Company”) as of October 31, 2018 and October 29, 2017, and the related consolidated statements of income, consolidated statements of comprehensive income, consolidated statements of equity, and consolidated statements of cash flows for each of the years ended October 31, 2018, October 29, 2017 and October 30, 2016. We also have audited the Company’s internal control over financial reporting as of October 31, 2018, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of October 31, 2018 and October 29, 2017, and the results of its operations and their cash flows for each of the fiscal years ended October 31, 2018, October 29, 2017, and October 30, 2016 in conformity with accounting principles generally accepted in the United States of America. Also, in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of October 31, 2018, based on the criteria established in *Internal Control — Integrated Framework (2013)* issued by COSO.

Basis for Opinions

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

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects.

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

Definition and Limitations of Internal Control over financial Reporting

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

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

/s/ Deloitte & Touche LLP
Hartford, Connecticut
December 21, 2018

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

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

	<u>October 31,</u> <u>2018</u>	<u>October 29,</u> <u>2017</u>
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 329,277	\$ 308,021
Accounts receivable, net of allowance of \$1,526 in 2018 and \$2,319 in 2017	120,515	105,320
Inventories	29,180	23,703
Other current assets	<u>23,759</u>	<u>12,080</u>
Total current assets	502,731	449,124
Property, plant and equipment, net	571,781	535,197
Intangible assets, net	12,368	17,122
Deferred income taxes	18,109	15,481
Other assets	<u>5,020</u>	<u>3,870</u>
Total assets	<u>\$ 1,110,009</u>	<u>\$ 1,020,794</u>
LIABILITIES AND EQUITY		
Current liabilities:		
Current portion of long-term debt	\$ 57,453	\$ 4,639
Accounts payable	89,149	50,834
Accrued liabilities	<u>44,474</u>	<u>26,303</u>
Total current liabilities	191,076	81,776
Long-term debt	—	57,337
Deferred income taxes	643	2,049
Other liabilities	<u>13,721</u>	<u>14,337</u>
Total liabilities	205,440	155,499
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, 69,700 shares issued and 67,142 outstanding at October 31, 2018, and 68,666 shares issued and outstanding at October 29, 2017	697	687
Additional paid-in capital	555,606	547,596
Retained earnings	231,445	189,390
Treasury stock, 2,558 shares at October 31, 2018	(23,111)	—
Accumulated other comprehensive income (loss)	<u>(4,966)</u>	<u>6,891</u>
Total Photronics, Inc. shareholders' equity	759,671	744,564
Noncontrolling interests	<u>144,898</u>	<u>120,731</u>
Total equity	904,569	865,295
Total liabilities and equity	<u>\$ 1,110,009</u>	<u>\$ 1,020,794</u>

See accompanying notes to consolidated financial statements.

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

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Revenue	\$ 535,276	\$ 450,678	\$ 483,456
Cost of goods sold	(403,773)	(359,363)	(364,750)
Gross profit	131,503	91,315	118,706
Operating expenses:			
Selling, general and administrative	(51,395)	(43,585)	(44,577)
Research and development	(14,481)	(15,862)	(21,654)
Total operating expenses	(65,876)	(59,447)	(66,231)
Operating income	65,627	31,868	52,475
Other income (expense):			
Interest income and other income (expense)	5,206	(3,068)	2,424
Interest expense	(2,262)	(2,235)	(3,365)
Gains on sales of investments	—	—	8,940
Income before income tax provision	68,571	26,565	60,474
Income tax provision	(7,335)	(5,276)	(4,798)
Net income	61,236	21,289	55,676
Net income attributable to noncontrolling interests	(19,181)	(8,159)	(9,476)
Net income attributable to Photronics, Inc. shareholders	\$ 42,055	\$ 13,130	\$ 46,200
Earnings per share:			
Basic	\$ 0.61	\$ 0.19	\$ 0.68
Diluted	\$ 0.59	\$ 0.19	\$ 0.64
Weighted-average number of common shares outstanding:			
Basic	68,829	68,436	67,539
Diluted	74,821	69,288	76,354

See accompanying notes to consolidated financial statements.

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

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Net income	\$ 61,236	\$ 21,289	\$ 55,676
Other comprehensive (loss) income, net of tax:			
Foreign currency translation adjustments	(16,672)	19,799	6,334
Amortization of cash flow hedge	48	129	129
Other	101	478	(589)
Net other comprehensive (loss) income	(16,523)	20,406	5,874
Comprehensive income	44,713	41,695	61,550
Less: comprehensive income attributable to noncontrolling interests	14,515	14,003	12,448
Comprehensive income attributable to Photronics, Inc. shareholders	<u>\$ 30,198</u>	<u>\$ 27,692</u>	<u>\$ 49,102</u>

See accompanying notes to consolidated financial statements.

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PHOTRONICS, INC.
Consolidated Statements of Equity
Years Ended October 31, 2018, October 29, 2017 and October 30, 2016
(in thousands)

	Common Stock		Additional Paid-In Capital	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive Income (Loss)	Non- Controlling Interests	Total Equity
	Shares	Amount						
Balance at November 1, 2015	66,602	\$ 666	\$ 526,402	\$130,060	\$ —	\$ (10,573)	\$ 115,511	\$762,066
Net income	—	—	—	46,200	—	—	9,476	55,676
Other comprehensive income	—	—	—	—	—	2,902	2,972	5,874
Sales of common stock through employee stock option and purchase plan	618	6	3,441	—	—	—	—	3,447
Restricted stock awards vesting and expense	143	2	1,190	—	—	—	—	1,192
Share-based compensation expense	—	—	2,637	—	—	—	—	2,637
Conversion of debt to common stock	717	7	7,431	—	—	—	—	7,438
Dividends to noncontrolling interests	—	—	—	—	—	—	(11,901)	(11,901)
Return of capital to noncontrolling interest	—	—	—	—	—	—	(955)	(955)
Repurchase of common stock by subsidiary	—	—	(8)	—	—	—	8	—
Balance at October 30, 2016	68,080	681	541,093	176,260	—	(7,671)	115,111	825,474
Net income	—	—	—	13,130	—	—	8,159	21,289
Other comprehensive income	—	—	—	—	—	14,562	5,844	20,406
Sales of common stock through employee stock option and purchase plan	459	5	2,877	—	—	—	—	2,882
Restricted stock awards vesting and expense	127	1	1,508	—	—	—	—	1,509
Share-based compensation expense	—	—	2,118	—	—	—	—	2,118
Dividends to noncontrolling interests	—	—	—	—	—	—	(8,383)	(8,383)
Balance at October 29, 2017	68,666	687	547,596	189,390	—	6,891	120,731	865,295
Net income	—	—	—	42,055	—	—	19,181	61,236
Other comprehensive income	—	—	—	—	—	(11,857)	(4,666)	(16,523)
Sales of common stock through employee stock option and purchase plan	870	9	4,683	—	—	—	—	4,692
Restricted stock awards vesting and expense	164	1	1,747	—	—	—	—	1,748
Share-based compensation expense	—	—	1,432	—	—	—	—	1,432
Contribution from noncontrolling interests	—	—	148	—	—	—	17,848	17,996
Dividends to noncontrolling interests	—	—	—	—	—	—	(8,196)	(8,196)
Purchase of treasury stock	—	—	—	—	(23,111)	—	—	(23,111)
Balance at October 31, 2018	<u>69,700</u>	<u>\$ 697</u>	<u>\$ 555,606</u>	<u>\$231,445</u>	<u>\$(23,111)</u>	<u>\$ (4,966)</u>	<u>\$ 144,898</u>	<u>\$904,569</u>

See accompanying notes to consolidated financial statements.

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

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Cash flows from operating activities:			
Net income	\$ 61,236	\$ 21,289	\$ 55,676
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization of property, plant and equipment	79,536	81,699	77,613
Amortization of intangible assets	4,797	4,874	5,228
Gains on sales of investments	—	—	(8,940)
Share-based compensation	3,180	3,627	3,827
Deferred income taxes	(273)	1,633	(3,816)
Changes in assets, liabilities, and other:			
Accounts receivable	(18,553)	(9,625)	18,807
Inventories	(6,162)	(602)	2,268
Other current assets	(11,731)	1,127	7,936
Accounts payable, accrued liabilities and other	18,537	(7,189)	(36,462)
Net cash provided by operating activities	<u>130,567</u>	<u>96,833</u>	<u>122,137</u>
Cash flows from investing activities:			
Purchases of property, plant and equipment	(92,585)	(91,965)	(50,147)
Purchases of intangible assets	(218)	(834)	(13)
Acquisition of business	—	(5,400)	—
Proceeds from sales of investments	—	167	101,853
Other	2,074	(34)	597
Net cash (used in) provided by investing activities	<u>(90,729)</u>	<u>(98,066)</u>	<u>52,290</u>
Cash flows from financing activities:			
Purchase of treasury stock	(23,111)	—	—
Dividends paid to noncontrolling interests	(8,166)	(8,298)	(11,890)
Repayments of long-term debt	(4,639)	(5,428)	(57,609)
Contribution from noncontrolling interests	17,996	—	—
Proceeds from share-based arrangements	4,634	2,830	3,463
Return of capital to noncontrolling interests	—	—	(966)
Other	(519)	(32)	(20)
Net cash used in financing activities	<u>(13,805)</u>	<u>(10,928)</u>	<u>(67,022)</u>
Effects of exchange rate changes on cash and cash equivalents	<u>(4,777)</u>	<u>6,108</u>	<u>802</u>
Net increase (decrease) in cash and cash equivalents	21,256	(6,053)	108,207
Cash and cash equivalents at beginning of year	<u>308,021</u>	<u>314,074</u>	<u>205,867</u>
Cash and cash equivalents at end of year	<u>\$ 329,277</u>	<u>\$ 308,021</u>	<u>\$ 314,074</u>
Supplemental disclosure of non-cash information:			
Accrual for property, plant and equipment purchased during year	\$ 29,602	\$ 2,767	\$ 7,866
Conversion of debt to common stock	—	—	7,439

See accompanying notes to consolidated financial statements.

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PHOTRONICS, INC.
Notes to Consolidated Financial Statements
Years Ended October 31, 2018, October 29, 2017 and October 30, 2016
(in thousands, except share amounts)

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Business

Photronics, Inc. and its subsidiaries (“Photronics”, the “Company”, “we”, “our”, or “us”) is one of the world’s leading manufacturers of photomasks, which are high precision photographic quartz plates containing microscopic images of electronic circuits. Photomasks are a key element in the manufacture of semiconductors and flat panel displays (“FPDs”), and are used as masters to transfer circuit patterns onto semiconductor wafers and flat panel display 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. The Company currently operates principally from nine manufacturing facilities, two of which are located in Europe, three in Taiwan, one in Korea, and three in the United States. We have commenced construction of two manufacturing facilities in China.

Consolidation

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

Estimates and Assumptions

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

Fiscal Year

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

Cash and Cash Equivalents

Cash and cash equivalents include cash and highly liquid investments purchased with an original maturity of 3 months or less. The carrying values of cash equivalents approximate their fair values, due to the short-term maturities of these instruments.

Accounts Receivable and Allowance for Doubtful Accounts

We generally record our trade accounts receivable at their billed amounts. All outstanding past due customer invoices are reviewed during and at the end of every reporting period for collectability. When, in the judgment of management, a loss on the collection of a customer invoice is probable, the amount is charged to expense and credited to the allowance for doubtful accounts. When the amount is determined to be uncollectible, the amount is charged to the allowance for doubtful accounts, and the related receivable is eliminated.

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Inventories

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

	<u>October 31</u> <u>2018</u>	<u>October 29</u> <u>2017</u>
Finished goods	\$ 668	\$ 664
Work in process	3,402	2,957
Raw materials	25,110	20,082
	<u>\$ 29,180</u>	<u>\$ 23,703</u>

Property, Plant and Equipment

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

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

Intangible Assets

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

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

Impairment of Long-Lived Assets

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

Business Combinations

When acquiring other businesses, or participating in mergers or joint ventures in which we are deemed to be the acquirer, we generally recognize identifiable assets acquired, liabilities assumed and any noncontrolling interests at

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their acquisition date fair values, separately from any goodwill that may be required to be recognized. Goodwill, when recognizable, would be measured as the excess amount of any consideration transferred, which is generally measured at fair value, over the acquisition date fair values of the identifiable assets acquired and liabilities assumed.

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

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

Investments in Joint Ventures

The financial results of investments in joint ventures in which we have a controlling financial interest are included in our consolidated financial statements. Investments in joint ventures over which we have the ability to exercise significant influence and that, in general, are at least 20 percent-owned are accounted for under the equity method. An impairment loss would be recognized whenever a decrease in the fair value of such an investment below its carrying amount is determined to be other than temporary. In judging “other than temporary,” we would consider the length of time and the extent to which the fair value of the investment has been less than the carrying amount of the investment, the near-term and longer-term operating and financial prospects of the investee, and our longer-term intent of retaining our investment in the investee.

Variable Interest Entities

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

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

We account for investments we make in VIEs in which we have determined that we do not have a controlling financial interest but have a significant influence over, and hold at least a 20 percent ownership interest in, using the equity method. Any such investment not meeting the parameters to be accounted for under the equity method would be accounted for using the cost method, unless the investment had a readily determinable fair value, at which value it would then be reported.

Income Taxes

The income tax provision is computed on the basis of the various tax jurisdictions’ income or loss before income taxes. Deferred income taxes reflect the tax effects of differences between the carrying amounts of assets and liabilities for financial reporting purposes and their amounts used for income tax purposes, as well as the tax effects of net operating losses and tax credit carryforwards. We use judgment and make assumptions to determine if valuation allowances for deferred income tax assets are required, if their realization is not more likely than not, by considering future market growth, operating forecasts, future taxable income, and the mix of earnings among the tax jurisdictions in which we operate. Accordingly, income taxes charged against earnings may have been impacted by changes in the valuation allowances.

We consider income taxes in each of the tax jurisdictions in which we operate in order to determine our effective income tax rate. Our current income tax expense is thus identified, and temporary differences resulting from differing

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treatments of items for tax and financial reporting purposes are assessed. These differences result in deferred tax assets and liabilities, which are included in our consolidated balance sheets.

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

Treasury Stock

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

Earnings Per Share

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

Share-Based Compensation

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

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

Research and Development

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

Foreign Currency Translation

Our non-US subsidiaries maintain their accounts in their respective local currencies. Assets and liabilities of such subsidiaries are translated to U.S. dollars at year-end exchange rates. Income and expenses are translated at average rates of exchange prevailing during the year. Foreign currency translation adjustments are accumulated and reported in accumulated other comprehensive income, a component of equity. The effects of changes in exchange rates on foreign currency transactions, which are included in interest income and other income (expense) were a net gain/(loss) of \$0.4 million, \$(5.2) million and \$(0.3) million in fiscal years 2018, 2017 and 2016, respectively.

Noncontrolling Interests

Substantially all of noncontrolling interests represents the minority shareholders' proportionate share in the equity of two of the Company's majority-owned subsidiaries: Photronics DNP Mask Corporation ("PDMC") in Taiwan, and Photronics DNP Mask Corporation Xiamen ("PDMCX") in China, of which noncontrolling interests owned 49.99% as of October 31, 2018 and October 29, 2017. In addition, noncontrolling shareholders owned approximately 0.2% and 0.3% of PK Ltd. ("PKL") in Korea as of October 31, 2018 and October 29, 2017, respectively.

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Derivative Instruments and Hedging Activities

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

Revenue Recognition

We recognize revenue when there is persuasive evidence that an arrangement exists, delivery has occurred, the sales price of the transaction is fixed or determinable, and collectability is reasonably assured. Delivery is determined by the shipping terms of the individual revenue transactions. For transactions with FOB destination or similar shipping terms, delivery occurs when our product reaches its destination and is received by the customer. For transactions with FOB shipping point terms, delivery occurs when our product is received by the common carrier. We use judgment when estimating the effect on revenue of discounts and sales incentives, both of which are accrued when the related revenue is recognized. Our revenue is reported net of any sales taxes billed to customers.

Product Warranty

We warrant that items sold will conform to customer specifications for a 30-day period. However, our liability generally is limited to the repair, replacement, or refund of the cost of the photomasks at our sole option. We inspect photomasks for conformity to customer specifications prior to shipment. Accordingly, customer claims related to items under warranty have historically been insignificant. Our warranty policy includes accepting returns of products with defects, or products that have not been produced to precise customer specifications.

NOTE 2 - PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment consists of the following:

	October 31, 2018	October 29, 2017
Land	\$ 11,139	\$ 9,959
Buildings and improvements	124,771	125,290
Machinery and equipment	1,566,163	1,547,870
Leasehold improvements	19,577	20,050
Furniture, fixtures and office equipment	12,415	12,989
Construction in progress	128,649	72,045
	<u>1,862,714</u>	<u>1,788,203</u>
Accumulated depreciation and amortization	(1,290,933)	(1,253,006)
	<u>\$ 571,781</u>	<u>\$ 535,197</u>

Equipment under capital leases is included in the property, plant and equipment amount, above, as follows:

	October 31, 2018	October 29, 2017
Machinery and equipment	\$ —	\$ 34,917
Less accumulated amortization	—	13,843
	<u>\$ —</u>	<u>\$ 21,074</u>

In January 2017, we acquired a business comprised of manufacturing assets and certain intellectual property that enabled us to expand our manufacturing capability, primarily in large area masks for IC, for approximately

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\$5.7 million, including \$0.3 million paid one year after the acquisition date. The transaction was accounted for in accordance with ASC 805, “Business Combinations”, with substantially all of the purchase price being allocated to long-lived assets that are being depreciated over five years.

In January 2017, we entered into a noncash transaction with a customer which resulted in the acquisition of equipment with a fair value of approximately \$6.7 million and \$9.0 million in fiscal years 2018 and 2017, respectively.

NOTE 3 - INTANGIBLE ASSETS

Amortization expense of the Company’s finite-lived intangible assets was \$4.8 million, \$4.9 million and \$4.8 million in fiscal years 2018, 2017 and 2016, respectively.

Intangible assets consist of:

	<u>Gross Amount</u>	<u>Accumulated Amortization</u>	<u>Net Amount</u>
As of October 31, 2018			
Technology license agreement	\$ 59,616	\$ (49,349)	\$ 10,267
Customer relationships	9,147	(7,959)	1,188
Software and other	6,519	(5,606)	913
	<u>\$ 75,282</u>	<u>\$ (62,914)</u>	<u>\$ 12,368</u>
As of October 29, 2017			
Technology license agreement	\$ 59,616	\$ (45,374)	\$ 14,242
Customer relationships	9,375	(7,793)	1,582
Software and other	8,195	(6,897)	1,298
	<u>\$ 77,186</u>	<u>\$ (60,064)</u>	<u>\$ 17,122</u>

The weighted-average amortization period of intangible assets acquired in fiscal year 2018, which is comprised of software, is three years. The weighted-average amortization period of intangible assets acquired in fiscal year 2017 was 4.5 years, primarily comprised of acquired customer relationships and technology that has an amortization period of five years, and software that has an amortization period of three years.

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

Fiscal Years:	
2019	\$ 4,588
2020	4,539
2021	2,706
2022	129
2023	126

NOTE 4 - PDMCX JOINT VENTURE

In January 2018, Photronics, through its wholly-owned Singapore subsidiary (hereinafter, within this Note “we”, or “Photronics”), and Dai Nippon Printing Co., Ltd., through its wholly owned subsidiary “DNP Asia Pacific PTE, Ltd.” (hereinafter, within this Note “DNP”) entered into a joint venture under which DNP obtained a 49.99% interest in our recently established IC business in Xiamen, China, which includes the facility currently under construction. The joint venture, known as “Photronics DNP Mask Corporation Xiamen” (hereinafter, “PDMCX”), was established to develop and manufacture photomasks for leading edge and advanced generation semiconductors. We entered into this joint venture to enable us to compete more effectively for the merchant photomask business in China and to benefit from the additional resources and investment that DNP will provide to enable us to offer advanced process technology to our customers. No gain or loss was recorded upon the formation of the joint venture.

As of October 31, 2018, Photronics and DNP have each contributed cash of approximately \$18.0 million to the joint venture. We estimate that, over the next several years and per the PDMCX joint venture operating agreement (“the Agreement”), DNP and Photronics will each contribute an additional \$62 million of cash and additional amounts to be obtained through local borrowings.

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Under the Agreement, DNP is afforded, under certain circumstances, the right to put its interest in PDMCX to Photonics. These circumstances include disputes regarding the strategic direction of PDMCX that may arise after the initial two year term of the Agreement and cannot be resolved between the two parties. In addition, both Photonics 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.

We recorded net losses from the operations of the PDMCX joint venture of approximately \$0.7 million in fiscal 2018. General creditors of PDMCX do not have recourse to the assets of Photonics, Inc., and the maximum exposure to loss for Photonics from PDMCX at October 31, 2018, was \$15.9 million.

As required by the guidance in Topic 810 - "Consolidation" of the Accounting Codification Standards, we evaluated our involvement in PDMCX for the purpose of determining whether we should consolidate its results in our financial statements. The initial step of our evaluation was to determine whether PDMCX was a variable interest entity ("VIE"). Due to its lack of sufficient equity at risk to finance its activities without additional subordinated financial support, we determined that it is a VIE. Having made this determination, we then assessed whether we were the primary beneficiary of the VIE, and concluded that we were the primary beneficiary during the current reporting period; thus, as required, the PDMCX financial results should be consolidated with Photonics, Inc. Our conclusion was based on the fact that we held a controlling financial interest in PDMCX, which resulted from our having the power to direct the activities that most significantly impacted its economic performance, the obligation to absorb losses, and the right to receive benefits that could potentially be significant to PDMCX. Our conclusion that we had the power to direct the activities that most significantly affected the economic performance of PDMCX during the current period 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 period, 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 sheet as of October 31, 2018, are presented in the following table, together with the maximum exposure to loss of Photonics due to its interests in the net assets of this joint venture.

<u>Classification</u>	<u>Carrying Amount</u>	<u>Photonics Interest</u>
Current assets	\$ 9,625	\$ 4,813
Non-current assets	43,415	21,708
Total assets	53,040	26,521
Current liabilities	21,205	10,603
Non-current liabilities	20	10
Total liabilities	21,225	10,613
Net assets	\$ 31,815	\$ 15,908

NOTE 5 - ACCRUED LIABILITIES

Accrued liabilities consist of the following:

	<u>October 31, 2018</u>	<u>October 29, 2017</u>
Compensation related expenses	\$ 15,359	\$ 9,981
Income taxes	10,369	2,305
Unearned revenue	7,834	5,659
Value added and other taxes	3,683	3,064
Professional fees	1,257	1,011
Other	5,972	4,283
	\$ 44,474	\$ 26,303

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NOTE 6 - LONG-TERM DEBT

Long-term debt consists of the following:

	October 31, 2018	October 29, 2017
3.25% convertible senior notes due in April 2019	\$ 57,453	\$ 57,337
2.77% capital lease obligation payable through July 2018	—	4,639
	57,453	61,976
Less: current portion	57,453	4,639
	\$ —	\$ 57,337

In April 2016, \$57.5 million of our senior convertible notes matured. We repaid \$50.1 million to noteholders and issued approximately 0.7 million shares to noteholders that elected to convert their notes to common stock. The notes were exchanged at the rate of approximately 96 shares per \$1,000 note principle, equivalent to a conversion rate of \$10.37 per share.

In January 2015, we privately exchanged \$57.5 million in aggregate principal amount of our 3.25% convertible senior notes with a maturity date of April 1, 2016, for new 3.25% convertible senior notes with an aggregate principal amount of \$57.5 million with a maturity date of April 1, 2019. The conversion rate of the new notes is the same as that of the exchanged notes, which were issued in March 2011 with a conversion rate of approximately 96 shares of common stock per \$1,000 note principal, equivalent to a conversion price of \$10.37 per share of common stock, and is subject to adjustment upon the occurrence of certain events, which are described in the indenture dated January 22, 2015. Note holders may convert each \$1,000 principal amount of notes at any time prior to the close of business on the second scheduled trading day immediately preceding April 1, 2019, and we are not required to redeem the notes prior to their maturity date. Interest on the notes accrues in arrears, and is paid semiannually through the notes' maturity date.

In November FY2019, Xiamen American Japan Photonics Mask Co., Ltd. ("PDMCX"), an indirect majority owned joint venture subsidiary of Photonics, Inc., entered into a commitment letter for an 8-year term loan agreement under which it can borrow up to approximately \$50.0 million ("the Project Loan"). PDMCX will use the Project Loan to finance certain capital expenditures in China. PDMCX will grant a lien on the land, building and equipment owned by PDMCX as collateral for the Project Loan. The interest rate of the Project Loan is based on the benchmark lending rate (as defined in the Project Loan agreement) plus a floating rate spread, of the People's Bank of China on the date of borrowings. We anticipate that interest incurred on this loan will be reimbursed through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, up to a certain cap.

On November 7, 2018, PDMCX entered into a working capital loan agreement with a maximum borrowing limit of approximately \$25.0 million, ("the Working Capital Loan"). In November 2018, we borrowed \$2.2 million against this loan. PDMCX will use the Working Capital Loan for general financing purposes including for the payment of import and value added taxes. The term of the Working Capital Loan will not exceed three years, and no guarantees were required under the terms of the Working Capital Loan. The interest rate of the Working Capital Loan is based on the benchmark lending rate (as defined in the Working Capital Loan agreement) plus a floating rate spread, of the People's Bank of China on the date of borrowings. We anticipate that interest incurred on this loan will be reimbursed through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, up to a certain cap.

In August 2018, we entered into an amendment to our credit facility which allows us to sell, transfer, lease, or otherwise dispose of our assets to a subsidiary guarantor. In September 2018, we entered into an amended and restated credit agreement ("the new agreement") that expires in September 2023. The new agreement, which replaced our prior credit facility, has a \$50 million borrowing limit, with an expansion capacity to \$100 million, and is secured by substantially all of our assets located in the United States and common stock we own in certain of our foreign subsidiaries. The new agreement limits the amount we can pay in cash dividends on Photonics, Inc. stock, and contains the following financial covenants: minimum interest coverage ratio, total leverage ratio and minimum unrestricted cash balance, all of which we were in compliance with at October 31, 2018. We had no outstanding borrowings against the new agreement at October 31, 2018, and \$50 million was available for borrowing. The interest rate on the new agreement (2.3% at October 31, 2018) is based on our total leverage ratio at LIBOR plus a spread, as defined in the credit facility.

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In August 2013, a \$26.4 million principal amount, five year capital lease commenced to fund the purchase of a high-end lithography tool. Payments under the capital lease, which bore interest at 2.77%, were \$0.5 million per month through July 2018.

Interest payments were \$1.9 million, \$2.1 million, and \$3.2 million, in fiscal years 2018, 2017 and 2016, respectively.

NOTE 7 - OPERATING LEASES

We lease various real estate and equipment under non-cancelable operating leases, for which rent expense was \$2.9 million, \$3.0 million, and \$2.8 million in fiscal 2018, 2017, and 2016, respectively.

At October 31, 2018, future minimum lease payments under non-cancelable operating leases with initial terms in excess of one year were as follows:

2019	\$ 1,850
2020	1,547
2021	1,375
2022	1,345
2023	618
Thereafter	667
	<u>\$ 7,402</u>

See Note 6 for disclosures related to capital lease obligations.

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 that are being held in the treasury, or a combination thereof. The maximum number of shares of common stock approved that may be issued under the Plan is four million shares. Awards may be granted to officers, employees, directors, consultants, advisors, and independent contractors of Photronics or its subsidiaries. In the event of a change in control (as defined in the Plan), the vesting of awards may be accelerated. The Plan, aspects of which are more fully described below, prohibits further awards from being issued under prior plans. We incurred total share-based compensation expenses of \$3.2 million, \$3.6 million, and \$3.8 million in fiscal years 2018, 2017, and 2016, respectively. No share-based compensation cost was capitalized as part of an asset and no related income tax benefits were recorded during the fiscal years presented.

Stock Options

Option awards generally vest in one-to-four years, and have a ten year contractual term. All incentive and non-qualified stock option grants must have an exercise price no less than the market value of the underlying common stock on the date of grant. The grant date fair values of options are based on the closing price of our common stock on the date 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 the options granted are expected to remain outstanding. The risk-free rate of return for the estimated term of the option is based on the U.S. Treasury yield curve in effect at the date of grant.

The weighted-average inputs and risk-free rate of return ranges used to calculate the grant date fair values of stock options issued during fiscal years 2018, 2017 and 2016 are presented in the following table:

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Expected volatility	31.7%	32.2%	48.4%
Risk-free rate of return	2.2 – 2.8%	1.9 – 2.0%	1.2 – 1.7%
Dividend yield	0.0%	0.0%	0.0%
Expected term	5.0 years	5.0 years	5.1 years

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The table below presents a summary of stock options activity during fiscal year 2018 and information on stock options outstanding at October 31, 2018.

Options	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life	Aggregate Intrinsic Value
Outstanding at October 29, 2017	3,345,235	\$ 8.01		
Granted	269,000	8.62		
Exercised	(823,311)	5.27		
Cancelled and forfeited	(367,364)	10.19		
Outstanding at October 31, 2018	2,423,560	\$ 8.68	5.8 years	\$ 3,977
Exercisable at October 31, 2018	1,612,945	\$ 7.93	4.8 years	\$ 3,524
Vested and expected to vest as of October 31, 2018	2,315,890	\$ 8.59	5.7 years	\$ 3,930

The weighted-average grant date fair value of options granted during fiscal years 2018, 2017 and 2016 were \$2.76, \$3.59 and \$4.51, respectively. The total intrinsic value of options exercised during fiscal years 2018, 2017 and 2016 was \$2.5 million, \$1.9 million and \$3.5 million, respectively.

We received cash from option exercises of \$4.3 million, \$2.4 million and \$3.1 million in fiscal years 2018, 2017 and 2016, respectively. As of October 31, 2018, the total unrecognized compensation cost of unvested option awards was approximately \$1.5 million. That cost is expected to be recognized over a weighted-average amortization period of 1.9 years.

Restricted Stock

We periodically grant restricted stock awards, the restrictions on which typically lapse over a service period of one-to-four years. The fair value of the awards are our closing stock prices on the dates of grant. There were 290,000, 317,750, and 115,225 restricted stock awards granted during fiscal years, 2018, 2017 and 2016. The weighted-average grant date fair values of restricted stock awards issued during fiscal years 2018, 2017 and 2016 were \$8.62, \$10.94 and \$12.13, respectively. The total fair value of awards for which restrictions lapsed was \$1.4 million, \$1.2 million and \$1.7 million during fiscal years 2018, 2017 and 2016, respectively. As of October 31, 2018, the total compensation cost for restricted stock awards not yet recognized was approximately \$2.8 million. That cost is expected to be recognized over a weighted-average amortization period of 2.6 years.

A summary of restricted stock award activity during fiscal year 2018 and the status of our outstanding restricted stock awards as of October 31, 2018, is presented below:

Restricted Stock	Shares	Weighted-Average Fair Value at Grant Date
Outstanding at October 29, 2017	339,181	\$ 10.74
Granted	290,000	8.62
Vested	(163,664)	9.88
Cancelled	(46,220)	11.07
Outstanding at October 31, 2018	419,297	\$ 9.58
Expected to vest as of October 31, 2018	383,413	\$ 9.53

Employee Stock Purchase Plan

Our Employee Stock Purchase Plan ("ESPP") permits employees to purchase Photronics, Inc. common shares at 85% of the lower of the closing market price at the commencement or ending date of the Plan year (which is approximately one year). We recognize the ESPP expense during that same period. As of October 31, 2018, the maximum number of shares of common stock approved by our shareholders to be purchased under the ESPP was 1.5 million shares; approximately 1.4 million shares had been issued through October 31, 2018, and approximately 0.1 million shares were subject to outstanding subscriptions. As of October 31, 2018, the total compensation cost related to the ESPP not yet recognized was \$0.1 million, which is expected to be recognized in fiscal 2019.

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NOTE 9 - EMPLOYEE RETIREMENT PLANS

We maintain a 401(k) Savings and Profit Sharing Plan (“401(k) Plan”) which covers all full and certain part time U.S. employees who have completed three months of service and are 18 years of age or older. Under the terms of the 401(k) Plan, employees may contribute up to 50% of their salary, subject to certain maximum amounts, which will be matched by the Company at 50% of the employee’s contributions that are not in excess of 4% of the employee’s compensation. Employee and employer contributions vest immediately upon contribution. The total employer contributions for all of our defined contribution plans were \$0.7 million, \$0.6 million and \$0.6 million in fiscal years 2018, 2017 and 2016, respectively.

NOTE 10 - INCOME TAXES

On December 22, 2017, the U.S. Tax Cuts and Jobs Act (the “Act”), was signed into law, enacting significant changes to the United States Internal Revenue Code of 1986, as amended. For fiscal 2018, the most significant impacts include: the reduction of the U.S. federal corporate income tax rate; remeasurement of certain net deferred tax assets; phased refund of alternative minimum tax credit carryforward and requirement of a transition tax on the deemed repatriation of certain foreign earnings. The phase-in of the lower corporate income tax rate resulted in a blended income tax rate of 23.42% for fiscal 2018, as compared to the previous rate of 35%. The tax rate has been reduced to 21% for subsequent fiscal years, which impacted the remeasurement of our year end deferred tax balances.

In December 2017, in response to the Act, the Securities and Exchange Commission released Staff Accounting Bulletin No. 118 (“SAB 118”) to address situations in which the accounting under ASC 740 is incomplete for certain income tax effects of the Act. We adopted SAB 118 in our first quarter of fiscal year 2018. SAB 118 summarizes a three-step process to be applied at each reporting period to account for and qualitatively disclose: (1) the effects of the change in tax law for which accounting is complete; (2) provisional amounts (or adjustments to provisional amounts) for the effects of the tax law where accounting is not complete, but for which reasonable estimates have been determined; and (3) reasonable estimates cannot yet be made and, therefore, taxes are reflected in accordance with law prior to the enactment of the Act. The effects of the Act provisions and the application of SAB 118 included in the fiscal 2018 results are summarized as follows:

- The accounting for the net income tax change for the remeasurement of certain deferred taxes is complete, and resulted in an increase of \$1.6 million (provisional estimate of \$2.5 million) reflecting the remeasurement of the final year end deferred taxes to the fiscal 2019 tax rate, all of which was offset by the remeasurement adjustment of \$1.6 million (provisional estimate of \$2.5 million) of the related valuation allowance, resulting in a net zero change in the income tax provision.
- As a result of the Act our determination regarding the realization of the benefit of the alternative minimum tax credit carryforwards changed; accordingly, the related valuation allowance has been reversed, and a \$3.7 million, net of sequestration, tax benefit has been recorded (our original provisional estimate of \$3.9 million, was reduced to \$3.7 million in FY 2018 Q3 to reflect sequestration). The accounting for this item is now complete.
- Additionally, the accounting of the transition tax, for the year ended October 31, 2018 is complete. We recorded income tax expense of \$29.6 million (provisional estimate of \$28.4 million reported in the previous three quarters of FY 2018, changed based on the most current available information). The entire amount of transition tax was offset by the current year loss, current year credits and available credit carryforwards.

Based on our current interpretation of the Act, we have completed the accounting for all items that impact our fiscal 2018 financial statements. Collectively, these items and the changes in measurement did not have a material impact to our consolidated effective tax rate or financial statements.

On January 18, 2018, the Taiwan Legislature Yuan approved amendments to the Income Tax Act, enacting an increase in the corporate tax rate from 17% to 20%. Under generally accepted accounting principles, we are required to revalue our deferred tax assets and liabilities, utilizing the rate applicable to the period, when a temporary difference will reverse. Our analysis indicates that our Taiwan deferred tax asset will be increased and, accordingly, we have recognized a net benefit of \$0.2 million.

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Income before the income tax provisions consists of the following:

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
United States	\$ (9,859)	\$ (11,544)	\$ 6,270
Foreign	78,430	38,109	54,204
	<u>\$ 68,571</u>	<u>\$ 26,565</u>	<u>\$ 60,474</u>

The income tax provisions consist of the following:

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Current:			
Federal	\$ (30)	\$ 173	\$ 492
State	(0)	(4)	(2)
Foreign	11,584	3,474	8,115
Deferred:			
Federal	(3,673)	—	—
State	(24)	15	10
Foreign	(522)	1,618	(3,817)
Total	<u>\$ 7,335</u>	<u>\$ 5,276</u>	<u>\$ 4,798</u>

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

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
U.S. federal income tax at statutory rate	\$ 16,059	\$ 9,298	\$ 21,166
Changes in valuation allowances	4,554	(3,632)	(9,516)
Distributions from foreign subsidiaries	—	6,471	3,438
Foreign tax rate differentials	(2,078)	(5,230)	(9,620)
Tax credits	(1,530)	(1,925)	(944)
Uncertain tax positions, including reserves, settlements and resolutions	(1,791)	(932)	134
Employee stock option	(1,433)	512	452
Income tax holiday	(2,648)	(743)	(507)
Tax reform	(3,736)	—	—
Tax on foreign subsidiary earnings	—	1,712	225
Other, net	(62)	(255)	(30)
	<u>\$ 7,335</u>	<u>\$ 5,276</u>	<u>\$ 4,798</u>

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

The fiscal years 2017 and 2016 effective tax rates differ from the U.S. statutory rate of 35% primarily due to earnings being taxed at lower statutory rates in foreign jurisdictions, changes in deferred tax asset valuation allowances, including the reversals noted below, together with the benefit of various investment credits in a foreign jurisdiction. In addition, the lower rate in fiscal year 2016 was partially driven by a benefit that resulted from the reversal of a previously recorded undistributed earnings tax liability in a foreign jurisdiction for which we are no

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longer liable. We were granted two five-year tax holidays in Taiwan, one that expired unused in 2017 and the other that expires in 2019. The latter tax holiday reduced foreign taxes by \$2.6 million, \$0.7 million and \$0.5 million in fiscal years 2018, 2017 and 2016, respectively, with a \$0.035 cents per share impact in fiscal 2018 and a de minimis per share effect in the fiscal 2017 and 2016 periods.

The net deferred income tax assets consist of the following:

	<u>As of</u>	
	<u>October 31,</u> <u>2018</u>	<u>October 29,</u> <u>2017</u>
Deferred income tax assets:		
Net operating losses	\$ 30,805	\$ 40,942
Reserves not currently deductible	4,703	4,196
Alternative minimum tax credits	3,673	3,946
Tax credit carryforwards	9,159	10,037
Share-based compensation	767	2,335
Other	1,210	1,503
	<u>50,317</u>	<u>62,959</u>
Valuation allowances	<u>(24,383)</u>	<u>(25,590)</u>
	25,934	37,369
Deferred income tax liabilities:		
Undistributed earnings of foreign subsidiaries	(0)	(4,335)
Property, plant and equipment	(8,020)	(19,280)
Other	(448)	(322)
	<u>(8,468)</u>	<u>(23,937)</u>
Net deferred income tax assets	<u>\$ 17,466</u>	<u>\$ 13,432</u>
Reported as:		
Deferred income tax assets	\$ 18,109	\$ 15,481
Deferred income tax liabilities	(643)	(2,049)
	<u>\$ 17,466</u>	<u>\$ 13,432</u>

We have established a valuation allowance for a portion of our deferred tax assets because we believe, based on the weight of all available evidence, that it is more likely than not that a portion of our net operating loss carryforwards will expire prior to utilization. During fiscal year 2018, the valuation allowance decrease primarily resulted from the reversal of the valuation allowance related to alternative minimum tax credits of \$(3.9) million as the result of the Act, prior year additional NOL utilization of \$(1.8) million, credit utilization of \$(1.3) million, other impacts of \$(0.4) million, changes in the deferred tax liability of \$2.8 million, \$1.8 million from the adoption of ASU 2016-09 related to stock compensation, and \$1.6 million from the corporate tax rate reduction. During fiscal year 2016, we determined that sufficient positive evidence existed in certain foreign jurisdictions that it was more likely than not that additional deferred tax assets were realizable and, therefore, we reduced the valuation allowance by \$4.3 million. Fiscal years 2017 and 2016 also changed as a result of loss utilizations and deferred tax liability changes of \$3.7 million and \$5.2 million, respectively.

Due to the Act, as of fiscal year end 2018, U.S. deferred taxes are no longer provided on the undistributed earnings of non-U.S. subsidiaries. Our policy to indefinitely reinvest these earnings in non-U.S. operations remains unchanged for the purpose of determining deferred tax liabilities for U.S. state and foreign withholding taxes. During fiscal year 2017, the permanent reinvestment assertion was partially changed due to changes in circumstances within one of our non-U.S. subsidiary entities, and a U.S. tax liability was recognized for the related undistributed earnings. Outside of the Act, should we elect in the future to repatriate the remaining foreign earnings deemed to be indefinitely reinvested, we may incur additional state and withholding tax expense on those foreign earnings, the amount of which is not practicable to compute.

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The following tables present our available operating loss and credit carryforwards at October 31, 2018, and their related expiration periods:

Operating Loss Carryforwards	Amount	Expiration Periods
Federal	\$ 78,902	2028-2033
State	208,411	2018-2038
Foreign	9,761	2021-2027
Tax Credit Carryforwards	Amount	Expiration Period
Federal research and development	\$ 4,314	2019-2038
Federal alternative minimum	3,673	Refundable
State	5,819	2020-2032
Foreign	246	2019-2020

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

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Balance at beginning of year	\$ 3,384	\$ 4,606	\$ 4,029
Additions (reductions) for tax positions in prior years	(44)	207	744
Additions based on current year tax positions	498	323	268
Settlements	(56)	(922)	(378)
Lapses of statutes of limitations	(2,007)	(830)	(57)
Balance at end of year	<u>\$ 1,775</u>	<u>\$ 3,384</u>	<u>\$ 4,606</u>

As of October 31, 2018, October 29, 2017 and October 30, 2016, the balance of unrecognized tax benefits includes \$1.9 million, \$3.4 million, and \$4.6 million, respectively, recorded in other liabilities in the consolidated balance sheets that, if recognized, would impact the effective tax rate. Included in these amounts in each of fiscal years 2018, 2017 and 2016 were \$0.1 million of interest and penalties. We include any applicable interest and penalties related to uncertain tax positions in our income tax provision. The amounts reflected in the table above for the fiscal years 2018, 2017 and 2016 include settlements of non-U.S. audits.

Although the timing of the expirations of statutes of limitations may be uncertain, as they can be dependent upon the settlement of tax audits, the Company believes that it is reasonably possible that up to \$0.9 million of its uncertain tax positions (including accrued interest and penalties, and net of tax benefits) may be resolved over the next twelve months. Resolution of these uncertain tax positions may result from either or both of the lapses of statutes of limitations and tax settlements. The Company is no longer subject to tax authority examinations in the U.S., major foreign, or state tax jurisdictions for years prior to fiscal year 2014.

Income tax payments were \$6.1 million, \$9.3 million and \$11.4 million in fiscal years 2018, 2017 and 2016, respectively. Cash received as refunds of income taxes paid in prior years amounted to \$1.1 million, \$0.1 million and \$0.2 million in fiscal years 2018, 2017 and 2016, respectively.

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NOTE 11 - EARNINGS PER SHARE

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

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Net income attributable to Photonics, Inc. shareholders	\$ 42,055	\$ 13,130	\$ 46,200
Effect of dilutive securities:			
Interest expense on convertible notes, net of related tax effects	1,999	—	2,938
Earnings for diluted earnings per share	<u>\$ 44,054</u>	<u>\$ 13,130</u>	<u>\$ 49,138</u>
Weighted-average common shares computations:			
Weighted-average common shares used for basic earnings per share	68,829	68,436	67,539
Effect of dilutive securities:			
Convertible notes	5,542	—	7,841
Share-based payment awards	450	852	974
Potentially dilutive common shares	<u>5,992</u>	<u>852</u>	<u>8,815</u>
Weighted-average common shares used for diluted earnings per share	<u>74,821</u>	<u>69,288</u>	<u>76,354</u>
Basic earnings per share	\$ 0.61	\$ 0.19	\$ 0.68
Diluted earnings per share	\$ 0.59	\$ 0.19	\$ 0.64

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

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Share based payment awards	1,627	1,308	1,635
Convertible notes	—	5,542	—
Total potentially dilutive shares excluded	<u>1,627</u>	<u>6,850</u>	<u>1,635</u>

NOTE 12 - COMMITMENTS AND CONTINGENCIES

At October 31, 2018, we had outstanding purchase commitments of \$144 million, \$126 million of which related to the building and equipping of our China facilities, and had recorded liabilities for the purchase of equipment of \$30 million. 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 such claims, individually and in the aggregate, will not have a material effect on our consolidated financial statements.

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We operate as a single operating segment as a manufacturer of photomasks, which are high precision quartz or glass plates containing microscopic images of electronic circuits for use in the fabrication of IC's and FPDs. Geographic revenues (shown below) are based primarily on where our manufacturing facility is located.

Our 2018, 2017 and 2016 revenue by geographic area and by IC and FPD products, and long-lived assets by geographic area were as follows:

	Year Ended		
	October 31, 2018	October 29, 2017	October 30, 2016
Net revenue			
Taiwan	\$ 237,039	\$ 187,818	\$ 193,216
Korea	147,066	122,165	141,017
United States	112,648	102,040	113,670
Europe	35,540	36,081	33,384
All other Asia	2,983	2,574	2,169
	<u>\$ 535,276</u>	<u>\$ 450,678</u>	<u>\$ 483,456</u>
IC	\$ 416,064	\$ 350,260	\$ 364,531
FPD	119,212	100,418	118,925
	<u>\$ 535,276</u>	<u>\$ 450,678</u>	<u>\$ 483,456</u>
		As of	
	October 31, 2018	October 29, 2017	October 30, 2016
Long-lived assets			
Taiwan	\$ 177,626	\$ 186,192	\$ 176,644
United States	156,948	180,095	173,658
Korea	127,764	147,265	146,515
China	102,985	8,273	—
Europe	6,458	13,372	9,617
	<u>\$ 571,781</u>	<u>\$ 535,197</u>	<u>\$ 506,434</u>

One customer accounted for 16%, 16% and 19% of our revenue in fiscal years 2018, 2017 and 2016, respectively, and another customer accounted for 15%, 16% and 17% of our revenue in fiscal years 2018, 2017 and 2016, respectively.

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NOTE 14 - CHANGES IN ACCUMULATED OTHER COMPREHENSIVE INCOME BY COMPONENT

The following tables set forth the changes in our accumulated other comprehensive income by component (net of tax of \$0) for the years ended October 31, 2018 and October 29, 2017:

	Year Ended October 31, 2018			
	Foreign Currency Translation Adjustments	Amortization of Cash Flow Hedge	Other	Total
Balance at October 29, 2017	\$ 7,627	\$ (48)	\$ (688)	\$ 6,891
Other comprehensive income before reclassifications	(16,672)	—	101	(16,571)
Amounts reclassified from other accumulated comprehensive income	—	48	—	48
Net current period other comprehensive income	(16,672)	48	101	(16,523)
Less: other comprehensive loss (income) attributable to noncontrolling interests	4,717	—	(51)	4,666
Balance at October 31, 2018	<u>\$ (4,328)</u>	<u>\$ —</u>	<u>\$ (638)</u>	<u>\$ (4,966)</u>
	Year Ended October 29, 2017			
	Foreign Currency Translation Adjustments	Amortization of Cash Flow Hedge	Other	Total
Balance at October 31, 2016	\$ (6,567)	\$ (177)	\$ (927)	\$ (7,671)
Other comprehensive income before reclassifications	19,799	—	478	20,277
Amounts reclassified from other accumulated comprehensive income	—	129	—	129
Net current period other comprehensive income	19,799	129	478	20,406
Less: other comprehensive income attributable to noncontrolling interests	(5,605)	—	(239)	(5,844)
Balance at October 29, 2017	<u>\$ 7,627</u>	<u>\$ (48)</u>	<u>\$ (688)</u>	<u>\$ 6,891</u>

Amortization of the cash flow hedge is included in cost of goods sold in the consolidated statements of income in all periods presented.

NOTE 15 – CONCENTRATIONS OF CREDIT RISK

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

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

One customer accounted for 20% and 23% of our net accounts receivable in fiscal years 2018 and 2017, respectively, and another customer accounted for 10% of our net accounts receivables in fiscal year 2018 and less than 10% in fiscal year 2017.

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NOTE 16 - RELATED PARTY TRANSACTIONS

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

Our chairman of the board of directors was also a director of an entity that provided secure managed information technology services to Photronics in fiscal year 2016. Another member of our board of directors was the chief executive officer and chairman of the board of this entity. We had contracted with this entity since 2002 for services it provided to all of our facilities. In fiscal year 2016, we incurred expenses for services provided by this entity of \$0.2 million. As of January 30, 2018, no members of our board of directors were executive officers, directors or shareholders of this entity.

In July 2016, we entered into a contract for information technology services with a parent entity for which members of our board of directors served as the executive chairman of the board and a director of a wholly owned subsidiary of that entity. In fiscal year 2018, we incurred expenses for services provided by the parent entity of \$0.1 million during the period in which our board members served on the board of directors of this entity and, in 2017 and 2016, we incurred expenses of \$0.5 million and \$0.3 million respectively, with the parent entity. As of October 29, 2017, we had payables outstanding to the parent entity of \$0.1 million. As of January 30, 2018, no members of our board of directors were executive offices, directors or shareholders of the wholly owned subsidiary.

An officer of one of our foreign subsidiaries is related to an individual in a position of authority at one of our largest customers. We recorded revenue from this customer of \$78.4 million, \$73.6 million and \$80.5 million, in fiscal years 2018, 2017 and 2016, respectively. At October 31, 2018 and October 29, 2017, we had accounts receivable of \$23.5 million and \$24.3 million, respectively, from this customer.

We purchase photomask blanks from an entity of which a former officer of ours is a significant shareholder. The Company purchased \$4.5 million of photomask blanks from this entity during the period in 2017 when the former officer was employed by us, and \$16.3 million in fiscal year 2016. This former officer's employment with the Company ended in February 2017.

We believe that the terms of our transactions with the related parties described above were negotiated at arm's length and were no less favorable to us than terms we could have obtained from unrelated third parties. See Note 19 for additional related party transactions.

NOTE 17 - 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 value due to their short-term maturities. We did not have any assets or liabilities measured at fair value, on a recurring or a nonrecurring basis, at October 31, 2018 and October 29, 2017.

Fair Value of Financial Instruments Not Recorded at Fair Value

The fair value of our convertible senior notes is a Level 2 measurement, as it was determined using inputs that were either observable market data or could be derived from or corroborated with observable market data. These inputs included our stock price and interest rates offered on debt issued by entities with credit ratings similar to ours. The table below presents the fair and carrying values of our convertible senior notes at October 31, 2018 and October 29, 2017.

	October 31, 2018		October 29, 2017	
	Fair Value	Carrying Value	Fair Value	Carrying Value
3.25% convertible senior notes due 2019	\$ 62,094	\$ 57,453	\$ 67,396	\$ 57,337

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NOTE 18 - SHARE REPURCHASE PROGRAM

In October 2018, the Company's Board of Directors authorized the repurchase of up to \$25 million of its common stock, to be 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 will expire no later than October 21, 2019. As of October 31, 2018, we had repurchased a combined 0.3 million shares at a cost of \$3.1 million (an average of \$9.45 per share) under this share repurchase program. The volume of shares repurchased are subject to market conditions and our continual evaluation of the optimal use of our cash.

In July 2018, the Company's Board of Directors authorized the repurchase of up to \$20 million of its common stock, to be executed in open-market transactions or in accordance with a repurchase plan under rule 10b5-1 of the Securities Act of 1933 (as amended). The share repurchase program commenced on July 10, 2018, and expired in October 2018, when the authorized amount was exhausted. Under this program, we repurchased 2.2 million shares at a cost of \$20.0 million (an average of \$8.97 per share).

NOTE 19 - JOINT VENTURE, TECHNOLOGY LICENSE AND OTHER AGREEMENTS WITH MICRON TECHNOLOGY, INC.

In May 2006, Photronics and Micron Technology, Inc. ("Micron") entered into the MP Mask joint venture ("MP Mask"), which developed and produced photomasks for leading-edge and advanced next generation semiconductors. At the time of the formation of the joint venture, we also entered into an agreement to license photomask technology developed by Micron and certain supply agreements. In May 2016, we sold our investment in MP Mask to Micron for \$93.1 million and recorded a gain on the sale of \$0.1 million, which is included in interest income and other income (expense) in our 2016 consolidated statement of income. On that same date, a supply agreement commenced between Photronics and Micron, which provided that we would be the majority outsourced supplier of Micron's photomasks and related services. The supply agreement had a one year term and expired in May 2017. However, we have the unlimited rights to use technology under the prior technology license agreement.

This joint venture was a variable interest entity ("VIE") (as that term is defined in ASC 810), because all costs of the joint venture were passed on to Photronics and Micron through purchase agreements they had entered into with the joint venture, and it was dependent upon Photronics and Micron for any additional cash requirements. On a quarterly basis, we reassessed whether our interest in MP Mask gave us a controlling financial interest in this VIE. The purpose of this quarterly reassessment was to identify the primary beneficiary (which is defined in ASC 810 as the entity that consolidates a VIE) of the VIE. As a result of the reassessments in fiscal year 2016, we determined that Micron remained the primary beneficiary of the VIE, by virtue of its tie-breaking voting rights within MP Mask's Board of Managers, thereby having given it the power to direct the activities of MP Mask that most significantly impacted its economic performance, including its decision making authority in the ordinary course of business and its purchase of the majority of products produced by the VIE.

We utilized MP Mask for both high-end IC photomask production and research and development purposes. MP Mask charged its variable interest holders based on their actual usage of its facility and charged separately for any research and development activities it engaged in at the requests of its owners.

MP Mask was governed by a Board of Managers appointed by Micron and Photronics. Throughout MP Mask's existence, Micron, as a result of its majority ownership, held majority voting power on the Board of Managers. Under the MP Mask joint venture operating agreement, we may have been required to make additional capital contributions to MP Mask. MP Mask did not request, and we did not make, any contributions to MP Mask in fiscal year 2016, and we did not receive any distributions (other than upon the sale of our investment to Micron in fiscal year 2016) from MP Mask during 2016.

We recorded a loss from operations from our investment in MP Mask of \$0.1 million in fiscal year 2016, which is included in Interest income and other income (expense) in our consolidated statements of income.

In fiscal 2016, we recorded \$0.4 million of commission revenue earned under the supply agreements with Micron and MP Mask, and amortization of \$0.1 million of the related supply agreement intangible asset. In 2016, we also recorded cost of goods sold in the amount of \$5.7 million for photomasks produced by MP Mask for Photronics customers, and incurred expenses of \$0.5 million for research and development activities and other goods and services purchased from MP Mask by Photronics.

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Summarized financial information of MP Mask is presented below. The financial results of 2016 represent activities through May 5, 2016, the date of the sale of the joint venture.

	<u>Fiscal Year 2016</u>
Revenue	\$ 49,626
Gross profit	2,736
Net income	—

NOTE 20 - GAINS ON SALE OF INVESTMENTS

We had a minority interest in a foreign entity. In fiscal year 2016, we sold this investment and recognized a gain of \$8.8 million. In addition, as discussed in Note 19, we sold our investment in the MP Mask joint venture in fiscal year 2016.

NOTE 21 - SUBSIDIARY DIVIDEND

In November 2018, PDMC, the Company's majority owned subsidiary in Taiwan, paid a dividend of which 49.99%, or approximately \$26.0 million, was paid to noncontrolling interests.

NOTE 22 - QUARTERLY RESULTS OF OPERATIONS (UNAUDITED)

The following table sets forth certain unaudited quarterly financial data:

	<u>First</u>	<u>Second</u>	<u>Third</u>	<u>Fourth</u>	<u>Year</u>
	(a)				(a)
Fiscal 2018:					
Revenue	\$ 123,446	\$ 130,779	\$ 136,391	\$ 144,660	\$ 535,276
Gross profit	27,662	32,819	35,597	35,425	131,503
Net income	9,481	15,189	19,797	16,769	61,236
Net income attributable to Photronics, Inc. shareholders	5,898	10,665	13,005	12,487	42,055
Earnings per share:					
Basic	\$ 0.09	\$ 0.15	\$ 0.19	\$ 0.18	\$ 0.61
Diluted	\$ 0.09	\$ 0.15	\$ 0.18	\$ 0.18	\$ 0.59
Fiscal 2017:					
Revenue	\$ 109,831	\$ 108,297	\$ 111,579	\$ 120,971	\$ 450,678
Gross profit	22,999	20,157	21,717	26,442	91,315
Net income	4,510	1,484	4,799	10,496	21,289
Net income attributable to Photronics, Inc. shareholders	1,946	1,797	4,001	5,386	13,130
Earnings per share:					
Basic	\$ 0.03	\$ 0.03	\$ 0.06	\$ 0.08	\$ 0.19
Diluted	\$ 0.03	\$ 0.03	\$ 0.06	\$ 0.08	\$ 0.19

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

NOTE 23 - RECENT ACCOUNTING PRONOUNCEMENTS

In December 2017, the Securities and Exchange Commission released Staff Accounting Bulletin No. 118 ("SAB 118") to address situations where the accounting under ASC Topic 740 – "Income Taxes" is incomplete for certain income tax effects of the Tax Cuts and Jobs Act, which was signed into law on December 22, 2017, and changed existing U.S. tax law. We adopted this guidance in our first quarter of fiscal year 2018. Please see Note 10 for a discussion of the effects of adopting this guidance.

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In November 2016, the FASB issued ASU 2016-18 “Restricted Cash”, which requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and amounts generally described as restricted cash or restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. ASU 2016-18 is effective for Photronics, Inc. in its first quarter of fiscal year 2019 and should be applied on a retrospective transition basis. Early adoption is permitted, including adoption in an interim period. We are currently evaluating the effect that this ASU will have on our consolidated financial statements.

In October 2016, the FASB issued ASU 2016-16 “Intra-Entity Transfers of Assets Other Than Inventory”, which eliminates the exception of recognizing, at the time of transfer, current and deferred income taxes for intra-entity asset transfers other than inventory. ASU 2016-16 is effective for Photronics, Inc. in the first quarter of fiscal year 2019 and should be applied on a modified retrospective transition basis. Early adoption is permitted as of the beginning of an annual reporting period for which interim or annual financial statements have not been issued or made available for issuance. We are currently evaluating the effect this ASU will have on our consolidated financial statements.

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.

In March 2016, the FASB issued ASU 2016 – 09 “Improvements to Employee Share-Based Payment Accounting”, which simplifies the accounting for share-based payment transactions including their income tax consequences, classification as either equity or liability awards, classification on the statement of cash flows, and other areas. The method of adoption varies with the different aspects of the Update. Adoption of this guidance in the first quarter of our fiscal year 2018 did not have a material impact on our financial statements.

In February 2016, the FASB issued ASU 2016-02 “Leases (Topic 842)”, which requires lessees to recognize right-of-use assets and corresponding liabilities for all leases with an initial term in excess of twelve months. ASU 2016-02 was required to be adopted using a modified retrospective approach, which includes a number of practical expedients, that requires leases to be measured and recognized under the new guidance at the beginning of the earliest period presented. In July 2018, the FASB issued ASU 2018-11 “Targeted Improvements”, which allows the new leases standard to be initially applied at the adoption date through a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption. These Updates are effective for Photronics, Inc. in the first quarter of fiscal year 2020, with early application permitted. We are currently evaluating the effect that these Updates will have on our consolidated financial statements.

In May 2014, the FASB issued ASU 2014-09 “Revenue from Contracts with Customers”, which will supersede nearly all existing revenue recognition guidance under accounting principles generally accepted in the United States. The core principle of this ASU is that revenue should be recognized for the amount of consideration expected to be received for promised goods or services transferred to customers. This ASU also requires additional disclosure about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments, and assets recognized for costs incurred to obtain or fulfill a contract. In August 2015, the FASB issued ASU 2015-14 which defers the effective date of ASU 2014-09 by one year and allows entities to early adopt, but no earlier than the original effective date. ASU 2014-09 will now be effective for Photronics, Inc. in the first quarter of our fiscal year 2019. This update allows for either full retrospective or modified retrospective adoption. In April 2016, the FASB issued ASU 2016-10 “Identifying Performance Obligations and Licensing” which amends guidance previously issued on these matters in ASU 2014-09. The effective date and transition requirements of ASU 2016-10 are the same as those for ASU 2014-09.

We adopted the new revenue and related guidance on November 1, 2018, using the modified retrospective approach, under which we will increase our accounts receivable by \$0.6 million, record a contract asset of

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\$4.6 million, and reduce our inventories balance by \$3.7 million. The recognition and adjustments to these assets will be reflected in increases to our retained earnings and noncontrolling interest balances of \$1.4 million and \$0.2 million, respectively. The most significant impact of the new guidance is its requirement for us to recognize revenue as we manufacture products for which, in the event that the customer cancels the contract, we are entitled to reasonable compensation for work we have completed prior to cancellation.

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

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

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

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

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

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

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

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

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

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

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

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

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

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

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

Changes in Internal Control over Financial Reporting

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

Management’s Report on Internal Control over Financial Reporting

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

Management assessed the effectiveness of our internal control over financial reporting as of October 31, 2018, based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in its “Internal Control - Integrated Framework” (2013). Management, under the supervision and with the participation of our chief executive officer and chief financial officer, concluded that our internal control over financial reporting was effective as of October 31, 2018.

The Company’s independent registered public accounting firm, Deloitte & Touche LLP, has audited the effectiveness of the Company’s internal control over financial reporting as of October 31, 2018, as stated in their report on page [33](#) of this Form 10-K.

December 21, 2018

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information as to Directors required by Items 401, 405 and 407(c)(3)(d)(4) and (d)(5) of Regulation S-K is set forth in our 2019 definitive Proxy Statement which will be filed with the Securities and Exchange Commission pursuant to Regulation 14A of the Exchange Act within 120 days after the end of the fiscal year covered by this Form 10-K under the caption “PROPOSAL 1 - ELECTION OF DIRECTORS,” “SECTION 16(A) BENEFICIAL OWNERSHIP REPORTING COMPLIANCE” and in the third paragraph under the caption “MEETINGS AND COMMITTEES OF THE BOARD,” and is incorporated in this report by reference. The information as to Executive Officers is included in our 2019 definitive Proxy Statement under the caption “EXECUTIVE OFFICERS” and is incorporated in this report by reference.

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

ITEM 11. EXECUTIVE COMPENSATION

The information required by Item 402 of Regulation S-K and paragraph (e)(4) and (e)(5) of Item 407 is set forth in our 2019 definitive Proxy Statement under the captions “EXECUTIVE COMPENSATION”, “CERTAIN AGREEMENTS”, “DIRECTORS’ COMPENSATION”, “COMPENSATION COMMITTEE INTERLOCKS AND INSIDER PARTICIPATION” and “COMPENSATION COMMITTEE REPORT ON EXECUTIVE COMPENSATION”, respectively, and is incorporated in this report by reference.

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

The information required by Item 201(d) of Regulation S-K is set forth in our 2019 definitive Proxy Statement under the caption “EQUITY COMPENSATION PLAN INFORMATION”, and is incorporated in this report by reference. The information required by Item 403 of Regulation S-K is set forth in our 2019 definitive Proxy Statement under the caption “OWNERSHIP OF COMMON STOCK BY DIRECTORS, OFFICERS AND CERTAIN BENEFICIAL OWNERS”, and is incorporated in this report by reference.

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

The information required by Items 404 and Item 407(a) of Regulation S-K is set forth in our 2019 definitive Proxy Statement under the captions “MEETINGS AND COMMITTEES OF THE BOARD” and “CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS”, respectively, and is incorporated in this report by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by Item 9(e) of Rule 14a-101 of the Exchange Act is set forth in our 2019 definitive Proxy Statement under the captions “Fees Paid to the Independent Registered Public Accounting Firm” and “AUDIT COMMITTEE REPORT”, and is incorporated in this report by reference.

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PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

The following documents are filed as part of this report:

	<u>Page No.</u>
1. Financial Statements: See “INDEX TO CONSOLIDATED FINANCIAL STATEMENTS” in Part II, Item 8 of this Form 10-K.	32
2. Financial Statement Schedule:	
Report of Independent Registered Public Accounting Firm on Financial Statement Schedule	65
Schedule II - Valuation and Qualifying Accounts for the years ended October 31, 2018, October 29, 2017 and October 30, 2016	66
All other schedules are omitted because they are not applicable.	
3. Exhibits	67

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM ON SUPPLEMENTAL SCHEDULE

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

We have audited the consolidated financial statements of Photonics, Inc. (the "Company") as of and for the years ended October 31, 2018 and October 29, 2017 and have issued our report thereon dated December 21, 2018, which contained an unqualified opinion on those consolidated financial statements. The financial statement schedule in Item 15 has been subjected to audit procedures performed in conjunction with the audit of the Company's consolidated financial statements. The supplemental schedule is the responsibility of the Company's management. Our audit procedures included determining whether the supplemental schedule reconciles to the consolidated financial statements or the underlying accounting and other records, as applicable, and performing procedures to test the completeness and accuracy of the information presented in the supplemental schedule. In our opinion, such schedule is fairly stated, in all material respects, in relation to the consolidated financial statements as a whole.

/s/ Deloitte & Touche LLP
Hartford, Connecticut
December 21, 2018

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Schedule II
Valuation and Qualifying Accounts
for the Years Ended October 31, 2018, October 29, 2017
and October 30, 2016
(in \$ thousands)

	<u>Balance at Beginning of Year</u>	<u>Charged to Costs and Expenses</u>	<u>Deductions</u>	<u>Balance at End of Year</u>
Allowance for Doubtful Accounts				
Year-ended October 31, 2018	\$ 2,319	\$ (809)	\$ 16 ^(a)	\$ 1,526
Year-ended October 29, 2017	\$ 3,901	\$(1,600) ^(b)	\$ 18 ^(a)	\$ 2,319
Year ended October 30, 2016	\$ 3,301	\$ 642	\$ (42) ^(a)	\$ 3,901

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

(b) Reversal of valuation allowance.

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EXHIBITS INDEX

Exhibit Number	Description
3.1	Certificate of Incorporation as amended July 9, 1986, April 9, 1990, March 16, 1995, November 13, 1997, April 15, 2002 and June 20, 2005 (incorporated by reference to Exhibit 3.1 to the Company's Annual Report on Form 10-K filed January 3, 2014).
3.2	Amended and Restated By-laws of the Company dated as of September 7, 2016 (incorporated by reference to the Company's Current Report on Form 8-K filed on September 13, 2016).
4.4	Indenture dated January 22, 2015, by and between the Company and the Bank of New York Mellon Trust Company, N.A., as trustee (incorporated by reference to Exhibit 4.2 to the Company's Current Report on Form 8-K filed on January 28, 2015).
10.1	The Company's 1992 Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.1 to the Company's Annual Report on Form 10-K filed on December 20, 2017). ⁺
10.2	Amendment to the Employee Stock Purchase Plan as of March 24, 2004 (incorporated by reference to Exhibit 10.2 to the Company's Annual Report on Form 10-K filed on January 6, 2017). ⁺
10.3	Amendment to the Employee Stock Purchase Plan as of April 8, 2010 (incorporated by reference to Exhibit 10.4 to the Company's Annual Report on Form 10-K filed on January 7, 2016). ⁺
10.4	Amendment to the Employee Stock Purchase Plan as of March 28, 2012. ⁺⁺
10.5	2016 Equity Incentive Compensation Plan (incorporated by reference to the Company's Definitive Proxy Statement filed on February 26, 2016). ⁺
10.6	The Company's 2007 Long-Term Equity Incentive Plan (incorporated by reference to the Company's Definitive Proxy Statement filed on March 3, 2014). ⁺
10.7	Amendment to the 2007 Long-Term Equity Incentive Plan as of April 8, 2010 (incorporated by reference to Exhibit 10.7 to the Company's Annual Report on Form 10-K Filed on January 7, 2016). ⁺
10.8	Amendment to the 2007 Long Term Equity Incentive Plan as of April 11, 2014 (incorporated by reference to Exhibit 10.8 of the Company's Annual Report on Form 10-K filed January 6, 2015). ⁺
10.9	2011 Executive Incentive Compensation Plan effective as of November 1, 2010 (incorporated by reference to Exhibit 10.9 of the Company's Annual Report on Form 10-K filed January 6, 2015). ⁺
10.10	Joint Venture Framework Agreement dated November 20, 2013, between the Company and Dai Nippon Printing Co., Ltd (incorporated by reference to Exhibit 10.19 of the Company's Annual Report on Form 10-K/A filed July 8, 2015). [#]
10.11	Joint Venture Operating Agreement dated November 20, 2013, between the Company and Dai Nippon Printing Co., Ltd. (incorporated by reference to Exhibit 10.20 of the Company's Annual Report on Form 10-K/A filed July 8, 2015). [#]
10.12	Outsourcing Agreement dated November 20, 2013, among the Company, Dai Nippon Printing Co., Ltd and Photronics Semiconductor Mask Corporation (incorporated by reference to Exhibit 10.21 of the Company's Annual Report on Form 10-K/A filed July 8, 2015). [#]
10.13	License Agreement dated November 20, 2013, between the Company and Photronics Semiconductor Mask Corporation (incorporated by reference to Exhibit 10.22 of the Company's Annual Report on Form 10-K/A filed July 8, 2015). [#]
10.14	License Agreement dated November 20, 2013, between Dai Nippon Printing Co., Ltd and Photronics Semiconductor Mask Corporation (incorporated by reference to Exhibit 10.23 of the Company's Annual Report on Form 10-K/A filed July 8, 2015). [#]
10.15	Margin Agreement dated November 20, 2013, among the Company, Dai Nippon Printing Co., Ltd and Photronics Semiconductor Mask Corporation (incorporated by reference to Exhibit 10.24 of the Company's Annual Report on Form 10-K/A filed July 8, 2015). [#]
10.16	Merger Agreement dated January 16, 2014, between Photronics Semiconductor Mask Corporation and DNP Photomask Technology Taiwan Co., Ltd. (incorporated by reference to Exhibit 10.25 of the Company's Annual Report on Form 10-K/A filed July 8, 2015). [#]
10.17	Executive Employment Agreement between the Company and Christopher J. Proglar, Vice President, Chief Technology Officer dated September 10, 2007 (incorporated by reference to Exhibit 10.22 to the Company's Annual Report on Form 10-K filed on January 9, 2013). ⁺

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Exhibit Number	Description
10.18	Executive Employment Agreement between the Company and Peter S. Kirlin dated May 4, 2015 (incorporated by reference to Exhibit 10.28 of the Company's Quarterly Report on Form 10-Q filed on September 9, 2015). ⁺
10.19	Executive Employment Agreement between the Company and Richelle E. Burr dated May 21, 2010 (incorporated by reference to Exhibit 10.30 of the Company's Annual Report on Form 10-K filed on January 7, 2016). ⁺
10.20	Executive Employment Agreement between the Company and John P. Jordan dated September 5, 2017 (incorporated by reference to Exhibit 10.31 to the Company's Annual Report on Form 10-K filed on December 20, 2017). ⁺
10.21	Consulting Agreement between the Company and DEMA Associates, LLC dated January 20, 2018.*
10.22	Form of Amendment to Executive Employment Agreement dated March 16, 2012 (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on March 16, 2012). ⁺
10.23	Amendment No 4 dated as of August 17, 2018 to the Third Amended and Restated Credit Agreement dated as of December 5, 2013.*
10.24	Fourth Amended and Restated Credit Agreement dated as of September 27, 2018 among Photronics, Inc. the Foreign Subsidiary Borrower Party Thereto, the Lender Party Thereto, JPMorgan Chase Bank, N.A. as Administrative and Collateral Agent and Bank of America, N.A. as syndication agent.*
10.25	Third Amended and Restated Security Agreement entered into as of September 27, 2018 by and among Photronics, Inc., the subsidiaries of the Company and JPMorgan Chase Bank N.A.*
10.26	Fixed Asset Loan Agreement between Photronics DNP Mask Corporation Xiamen and Industrial and Commercial Bureau China Limited Xiamen Xiang'an Branch effective as of November 29, 2012.*
10.27	Working Capital Loan Agreement between Industrial and Commercial Bureau China Limited Xiamen Xiang'an Branch and Photronics DNP Mask Corporation Xiamen effective as of November 7, 2018.*
10.28	Investment Agreement between Xiamen Torch Hi-Tech Industrial Development Zone Management Committee and Photronics Singapore Pte. Ltd. dated August 18, 2016 (incorporated by reference to Exhibit 10.35 to the Company's Quarterly Report on Form 10-Q filed on September 2, 2016).
10.29	Contribution Agreement dated May 16, 2017 among Dai Nippon Printing Co., Ltd. ("DNP"), DNP Asia Pacific Pte. Ltd. ("DNP Asia Pacific"), Photronics, Inc. ("Photronics"), Photronics Singapore Pte. Ltd., ("Photronics Singapore"), and Xiamen American Japan Photronics Mask Co., Ltd. ("PDMCX") (incorporated by reference to Exhibit 10.26 to the Company's Quarterly Report on Form 10-Q/A filed on December 19, 2017). [#]
10.30	Joint Venture Operating Agreement dated May 16, 2017 among Photronics, Photronics Singapore, DNP and DNP Asia Pacific (incorporated by reference to Exhibit 10.27 to the Company's Quarterly Report on Form 10-Q/A filed on December 19, 2017). [#]
10.31	Outsourcing Agreement dated May 16, 2017 among Photronics, DNP, Photronics DNP Photomask Corporation ("PDMC"), and PDMCX (incorporated by reference to Exhibit 10.28 to the Company's Quarterly Report on Form 10-Q/A filed on December 19, 2017). [#]
10.32	Amended and Restated License Agreement dated May 16, 2017 between DNP and PDMC. (incorporated by reference to Exhibit 10.29 to the Company's Quarterly Report on Form 10-Q/A filed on December 19, 2017). [#]
10.33	Investment Cooperation Agreement between Hefei State Hi-tech Industry Development Zone and Photronics UK, Ltd. (incorporated by reference to Exhibit 10.42 to the Company's Annual Report on Form 10-K filed on December 20, 2017). [#]
21	List of Subsidiaries of the Company.*
23.1	Consent of Deloitte & Touche LLP, Independent Registered Public Accounting Firm*
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.*
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.*
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.*

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<u>Exhibit Number</u>	<u>Description</u>
<u>32.2</u>	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.*
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

+ Represents a management contract or compensatory plan or arrangement.

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

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

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

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SIGNATURES

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

PHOTRONICS, INC.
(Registrant)

By /s/ JOHN P. JORDAN December 21, 2018
John P. Jordan
Senior Vice President
Chief Financial Officer
(Principal Accounting Officer/
Principal Financial Officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

By /s/ PETER S. KIRLIN December 21, 2018
Peter S. Kirlin
Chief Executive Officer
Director
(Principal Executive Officer)

By /s/ JOHN P. JORDAN December 21, 2018
John P. Jordan
Senior Vice President
Chief Financial Officer
(Principal Accounting Officer/
Principal Financial Officer)

By /s/ CONSTANTINE S. MACRICOSTAS December 21, 2018
Constantine S. Macricostas
Executive Chairman of the Board

By /s/ WALTER M. FIEDEROWICZ December 21, 2018
Walter M. Fiederowicz
Director

By /s/ JOSEPH A. FIORITA, JR. December 21, 2018
Joseph A. Fiorita, Jr.
Director

By /s/ LIANG-CHOO HSIA December 21, 2018
Liang-Choo Hsia
Director

By /s/ GEORGE MACRICOSTAS December 21, 2018
George Macricostas
Director

By /s/ MITCHELL G. TYSON December 21, 2018
Mitchell G. Tyson
Director



EMPLOYEE STOCK PURCHASE PLAN
(Amended and Current as of
March 28, 2012)

ARTICLE I - General

- 1.1 The purpose of Photronics, Inc. Employee Stock Purchase Plan is to provide eligible employees of the Company and its designated subsidiaries (if any) with an opportunity to acquire a proprietary interest in the Company by the purchase of shares of the Common Stock of the Company directly from the Company through payroll deductions. It is felt that employee participation in the ownership of the Company will be to the mutual benefit of both the employees and the Company.
- 1.2 The Plan is intended to qualify as an "employee stock purchase plan" within the meaning of Section 423 of the Internal Revenue Code of 1986, as amended (the "Code"). The provisions of the Plan shall, accordingly, be construed so as to extend and/or limit eligibility and participation in a manner consistent, and so as to otherwise comply, with the requirements of the Code.
- 1.3 Eligibility and participation in the Plan shall give any Employee only such rights as are set forth in the Plan and any amendments hereto and shall in no way affect or in any manner limit the Company's right to discharge the Employee, which right is expressly reserved by the Company, or impair the authority of the Plan Committee to limit the Employee's rights, claims or causes, as provided in the Plan.

ARTICLE II - Definitions

- 2.1 The following words and phrases, when used in the Plan, shall have the following respective meanings, unless the context clearly indicates otherwise:

"Authorized Leave of Absence"

Any leave of absence authorized under the Company's standard personnel practices, provided that all persons under similar circumstances must be treated equally in the granting of such Authorized Leave of Absence and provided further that the person returns to the employ of the Company upon the expiration of an Authorized Leave of Absence.

"Board of Directors"

The Board of Directors of Photronics, Inc.

"Code"

The Internal Revenue Code of 1986, as amended from time to time, and applicable Treasury Department regulations issued thereunder.

"Common Stock"

The Common Stock, par value \$0.01 per share, of the Company, or the securities adjusted or substituted therefor pursuant to Article XIV.

"Company"

Photronics, Inc., a Connecticut corporation, or its successor or successors or any present or future subsidiary of Photronics, Inc., which may be designated to participate in the Plan by the Board of Directors.

"Compensation"

The Compensation of an Eligible Employee shall be determined in accordance with procedures approved by the Plan Committee or the Board of Directors. In the absence of the adoption of specific procedures, Compensation of an Eligible Employee shall be the annualized salary or wages of such Employee based on such Employee's current rate of pay and work schedule, but excluding any discretionary overtime, sick pay, vacation pay or other benefits.

"Disability"

Disability shall have the same meaning set forth in Section 22(e)(3) of the Code or any successor provision thereto. At present, a disability is defined as a physical or mental impairment or incapacity which, in the opinion of a physician selected by the Plan Committee, can be expected to result in death or has lasted or can be expected to last for a continuous period of at least twelve (12) months and renders the Participant unable to engage in any substantial, gainful activity.

"Effective Date of the Plan"

The date on which the Plan shall have become effective pursuant to Article XVII, provided, however, that if the Plan shall not be approved by the stockholders of the Company as provided in Article XVII, the Plan and all rights granted hereunder shall be, and be deemed to have been, null and void.

"Eligible Employee"

An Employee who is eligible to participate in the Plan in accordance with provisions of Articles IV and V.

"Employee"

Any person who, on an Offering Date, is a common law employee of the Company and whose customary employment is for more than twenty (20) hours per week and for more than five (5) months per calendar year, other than any highly compensated employees (within the meaning of Section 414[q] of the Code or any successor provision thereto) of the Company who are excluded from participation hereunder by action of the Board of Directors. A person who is or has been on an Authorized Leave of Absence, and who in the absence of such Authorized Leave of Absence would have been classified as an Employee, shall in the discretion of the Plan Committee be considered to be an Employee, except to the extent that such determination is inconsistent with Section 423 of the Code. Such determination by the Plan Committee shall be final and conclusive.

"Offering"

An Offering in accordance with the provisions of Article V.

"Offering Date"

The date of an Offering as established by the Plan Committee pursuant to Section 5.1 hereof.

"Participant"

An Eligible Employee who subscribes for Shares pursuant to Article VI.

"Plan"

The Photonics, Inc. Employee Stock Purchase Plan set forth herein, as amended from time to time in accordance with the provisions of Article XV.

"Plan Committee"

The committee provided for in Article XII to administer the Plan.

"Purchase Date"

A Purchase Date as provided in Sections 8.1 or 10.3, as appropriate.

"Shares"

Shares of Common Stock offered under the Plan.

The masculine gender, whenever used in the Plan, shall be deemed to include the feminine gender, and whenever the plural is used it shall include the singular, if the context so requires.

ARTICLE III - Shares Subject to the Plan

- 3.1 Subject to the provisions of Article XIV hereof, the aggregate number of shares of Common Stock which may be issued under the Plan shall not exceed 1,500,000. The aggregate number of such shares which may be issued with respect to any Offering shall be determined by the Plan Committee with respect to such Offering. Such shares may be authorized but unissued shares of Common Stock or issued shares of Common Stock which are held by the Company. Any shares subscribed for under the Plan and not purchased as a result of the cancellation in whole or in part of such subscription shall (unless the Plan shall have terminated) be again available for issuance under the Plan.

ARTICLE IV - Eligibility

- 4.1 Each Employee who has been continuously employed by the Company for the one complete calendar month (or such longer period as may be determined by the Plan Committee) ending immediately prior to an Offering Date shall be eligible to participate in the Offering under the Plan made on such Offering Date.

- 4.2 Notwithstanding the provisions of Section 4.1, no Employee shall be offered Shares if, immediately after he would subscribe for such Shares, such Employee would own capital stock (including shares of Common Stock which may be purchased under such subscription and under any other outstanding subscriptions under the Plan or options to purchase shares of Common Stock of the Company held by such Employee, as computed in accordance with Section 423[b][3] of the Code or any successor provision thereto) possessing 5% or more of the total combined voting power or value of all classes of stock of the Company. For purposes of determining the stock ownership of any Employee, the provisions of Section 424[d] of the Code shall apply.

ARTICLE V - *Offering Under the Plan*

- 5.1 Offerings under the Plan shall be made on such Offering Dates as shall be determined by the Plan Committee. Notwithstanding anything to the contrary, no Offering shall be made on any date prior to the date that a required registration statement with respect to such Offering filed under the Securities Act of 1933, as amended, has become effective. Nothing contained herein shall be deemed to require that an Offering be made in any year.
- 5.2 [a] Subject to the limitations set forth in Sections 5.2[b] and 6.3, and to the other terms and conditions of the Plan, in each offering under the Plan, each Eligible Employee on an Offering Date shall be offered the right during the Subscription Period as provided in Section 6.2, to subscribe to purchase such number of Shares as the percentage designated by the Plan Committee for such offering (not to exceed 5%) of his Compensation would buy, at a price equal to the product of (i) the fair market value of a Share on the Offering Date, multiplied by (ii) the Purchase Price percentage utilized under Section 5.3 hereof.
- [b] Notwithstanding anything to the contrary contained in Sub-Section [a] of this Section 5.2, no Eligible Employee shall be eligible to subscribe for Shares in an Offering if, immediately after he would subscribe for such Shares, such subscription would permit his rights to purchase shares of Common Stock under all employee stock purchase plans of the Company to accrue at a rate which exceeds \$25,000 (or such other maximum amounts as may be prescribed from time to time under the Code) of the fair market value of such shares (determined as of the Offering Date for such Offering) for each calendar year in which such subscription would be outstanding at any time. For purposes of this limitation the provisions of Section 423[b][8] of the Code shall be applicable.
- 5.3 The Purchase Price per share subscribed for all Shares in a particular Offering shall be an amount equal to such percentages, not greater than 100% nor less than 85%, as shall be determined by the Plan Committee on or prior to the Offering Date, of the fair market value of a share of Common Stock (determined in accordance with the provisions of Article XIII) on one of the following dates with respect to such Offering, with such date to be determined by the Plan Committee on or prior to the Offering Date: (i) the Offering Date, (ii) the Purchase Date, or (iii) the Offering Date or the Purchase Date (whichever would result in a lower Purchase Price for the Common Stock).

- 5.4 In order to participate in any Offering, an Eligible Employee entitled to subscribe for Shares in such Offering shall comply with the subscription procedures set forth in Article VI.

ARTICLE VI - *Subscriptions for Shares*

- 6.1 As soon as practicable after an Offering Date, the Company shall furnish to each Eligible Employee a Subscription Agreement setting forth the maximum number of Shares to which such Eligible Employee may subscribe in such Offering, the fair market value per share of Common Stock on the Offering Date, the Purchase Price for Shares in such Offering and such other terms and conditions consistent with the Plan as shall be determined by the Plan Committee.
- 6.2 Within fifteen (15) days after receipt of such Subscription Agreement, an Eligible Employee desiring to participate in the Offering shall notify the Plan Committee of the number of Shares for which he desires to subscribe. Such notification shall be effected by the Eligible Employee's completing, executing and returning to the Secretary of the Company the Subscription Agreement. All such subscriptions shall be deemed to have been made as of the Offering Date. No subscription shall be accepted from any person who is not an Eligible Employee on the date his subscription is received by the Company.
- 6.3 The minimum number of Shares for which an Eligible Employee will be permitted to subscribe in any Offering is ten (10) (or the number of Shares offered to him if fewer than ten). If at any time the Shares available for an Offering are oversubscribed, the Number of Shares for which each Eligible Employee is entitled to subscribe pursuant to Section 5.2 shall be reduced, pro rata, to such lower number as may be necessary to eliminate such over-subscription.
- 6.4 If an Eligible Employee fails to subscribe to the Shares within the period and in the manner prescribed in Section 6.2, he shall waive all rights to purchase Shares in that Offering.

ARTICLE VII - *Payment for Shares*

- 7.1 The aggregate Purchase Price for the Shares for which a Participant subscribes in any Offering in accordance with the provisions of Article VI of the Plan shall be paid by means of payroll deductions.
- 7.2 [a] The aggregate Purchase Price for Shares shall be paid by payroll deductions in equal amounts over a period of 24 months (or such shorter period as shall be determined by the Plan Committee in accordance with the Plan) from the Offering Date. The period over which such payroll deductions are to be made in hereinafter referred to as the "Payment Period".

[b] Such payroll deductions with respect to an Offering shall commence as soon as practicable after the receipt of the Company of the executed Subscription Agreement authorizing such payroll deductions, and shall cease upon the earlier of the termination of the Payment Period or payment in full of the Purchase Price for such Shares. A Participant may cancel his subscription to the extent provided for in Article X, but no other change in terms of his Subscription Agreement may be made during the Payment Period and, in particular, in no event may a Participant change the amount of his payroll deductions under such Subscription Agreement. All payroll deductions withheld from a Participant under a Subscription Agreement shall be credited to his account under the Plan. In the event that payroll deductions are simultaneously being made with respect to more than one Subscription Agreement, the aggregate amount of such payroll deductions at any payday shall be credited first toward the payment for Shares subscribed for in the earliest Offering. A Participant may not make any separate cash payment into his account, provided, however, that a Participant who has been deemed to be in the employ of the Company while on an Authorized Leave of Absence without pay during the Payment Period, may upon his return to the actual employ of the Company, make a cash payment into his account in an amount not exceeding the aggregate of the payroll deductions which would have been made during such Authorized Leave of Absence.

[c] All funds representing payroll deductions for the accounts of Participants will, except as provided in Section 7.3, be paid into the general funds of the Company. No interest will be paid or accrued under any circumstances on any funds withheld by the Company as payroll deductions pursuant to this Section 7.2 or on any other funds paid to the Company for purchases of Shares under the Plan.

7.3 Notwithstanding anything in this Article VII to the contrary, with respect to any Offering which is made prior to the approval of the Plan by the stockholders of the Company, all payroll deductions withheld for the accounts of Participants shall, until the Plan is approved by the stockholders, be held by the Company in a special escrow account for the benefit of such Participants. No interest will be paid or accrued under any circumstances on such funds. No Shares will be issued to such Participants until after approval of the Plan by the stockholders. In the event that the Plan is not approved by the stockholders within the period specified in Article XVII, all such funds will thereupon be promptly refunded to the respective Participants.

7.4 Failure to pay for subscribed Shares as provided in this Article VII shall constitute the cancellation of such subscription to the extent that any such Shares shall not have been so paid for.

ARTICLE VIII - *Issuance of Shares*

8.1 At the end of the Payment Period for an Offering, (each of which dates is referred to as a "Purchase Date"), the balance of all amounts then held in the account of a Participant representing payroll deductions pursuant to a Subscription Agreement shall be applied to the purchase by the Participant from the Company of the number of Shares equal to the amount of such balance divided by the Purchase Price per share for such Shares applicable on such Purchase Date up to the number of Shares provided for in the respective Subscription Agreement. Any amount remaining in the Participant's account in excess of the sum required to purchase whole Shares on a Purchase Date shall be promptly refunded to the Participant. As soon as practicable after a Purchase Date, the Company will issue and deliver to the Participant a certificate representing the Shares purchased by him from the Company on such Purchase Date. No fractional shares will be issued at any time.

- 8.2 A Participant who disposes (whether by sale, exchange, gift or otherwise) of any of the Shares acquired by him pursuant to the Plan within two (2) years after the Offering Date for such Shares or within one (1) year after the issuance of Shares to him shall notify the Company in writing of such disposition within thirty (30) days after such disposition.

ARTICLE IX - Rights of Stockholders

- 9.1 A Participant shall not have any rights to dividends or any other rights as a stockholder of the Company with respect to any Shares until such Shares shall have been issued to him as reflected by the books and records maintained by the Company's transfer agent relating to stockholders of the Company.

ARTICLE X - Voluntary Withdrawal/Termination of Employment

- 10.1 A Participant may discontinue his payroll deductions under a Subscription Agreement at any time by giving written notice thereof to the Plan Committee, effective for all payroll periods commencing five (5) days after receipt of such notice by the Plan Committee. The balance in the account of such Participant following such discontinuance shall be promptly refunded to the Participant. Withdrawal from an Offering pursuant to this Section 10.1 shall not affect an Eligible Employee's eligibility to participate in any other Offering under the Plan.
- 10.2 If the Participant's employment with the Company is terminated for any reason other than death while still an Employee, such Participant's rights to purchase Shares under any Subscription Agreement shall immediately terminate. Any balance remaining in his account as of the date of such termination of employment shall be promptly refunded to the Participant.
- 10.3 In the event of the death of an Employee who was a Participant prior to the purchase of the Shares for which he subscribed pursuant to Article VI hereof, the person or persons who acquired by laws of descent and distribution (his "Estate") his rights to purchase Shares under his Subscription Agreement(s), shall have the right within ninety (90) days after the death of the Participant (but in no event later than the termination of the Payment Period) to purchase from the Company that number of Shares subscribed for and not issued to the Participant prior to his death which the balance in the Participant's payroll deduction account is sufficient to purchase. The failure of the person or persons so acquiring his rights to so give notice of intention to purchase shall constitute a forfeiture of all further rights of the Participant or other persons to purchase such Shares and in such event, the balance in the Participant's payroll deduction account will be refunded, without interest. If the Participant dies more than fifty (50) days prior to the termination of the Payment Period and his Estate elects to purchase the Shares subscribed for, the Purchase Price for his Shares shall be the percentage, designated pursuant to Section 5.3, of the fair market value on the Offering Date, irrespective of the Purchase Price for other Participants.

ARTICLE XI - *Non-Transferability of Subscription Rights*

- 11.1 During the lifetime of a Participant, the Shares for which he subscribes may be purchased only by him. No Subscription Agreement of a Participant and no right under or interest in the Plan or any such Subscription Agreement (hereinafter collectively referred to as "Subscription Rights") may be assigned, transferred, pledged, hypothecated or disposed of in any way (whether by operation of law or otherwise), except by the Participant's will or by the applicable laws of descent and distribution, or may be subject to execution, attachment or similar process. Any assignment, transfer, pledge, hypothecation or other disposition of Subscription Rights, or any levy of execution, attachment or other process attempted upon Subscription Rights, shall be null and void and without effect, and in any such event all Subscription Rights shall, in the sole discretion of the Plan Committee (exercised by written notice to the Participant or to the person then entitled to purchase the Shares under the provisions of Sections 10.3 hereof), terminate as of the occurrence of any such event.

ARTICLE XII - *Administration of the Plan*

- 12.1 The Plan shall be administered by a Plan Committee which shall consist of two (2) or more members of the Board of Directors, none of whom shall be eligible to participate in the Plan. The members of the Plan Committee shall be appointed, and may be removed, by the Board of Directors. The Board of Directors shall have the power to remove and substitute for members of the Plan Committee and to fill any vacancy which may occur in the Plan Committee.
- 12.2 Unless otherwise determined by the Board of Directors, the members of the Plan Committee shall serve without additional compensation for their services. All expenses in connection with the administration of the Plan, including, but not limited to, clerical, legal and accounting fees, and other costs of administration, shall be paid by the Company.
- 12.3 The Chairman of the Plan Committee shall be designated by the Board of Directors. The Plan Committee shall select a Secretary who need not be a member of the Plan Committee. The Secretary, or in his absence, any member of the Plan Committee designated by the Chairman, shall keep the minutes of the proceedings of the Plan Committee and all data, records and documents relating to the administration of the Plan by the Plan Committee.

- 12.4 A quorum of the Plan Committee shall be such number as the Committee shall from time to time determine, but shall not be less than a majority of the entire Plan Committee. The acts of a majority of the members of the Plan Committee present at any meeting at which a quorum is present shall be the act of the Plan Committee. Members of the Plan Committee may participate in a meeting by means of telephone conference or similar communications procedure pursuant to which all persons participating in the meeting can hear each other. The Plan Committee may take action without a meeting if such action is evidenced by a writing signed by at least a majority of the entire Plan Committee.
- 12.5 The Plan Committee may, by an instrument in writing, delegate to one or more of its members or to an officer or officers of the Company any of its powers and its authority under the Plan, including the execution and delivery on its behalf of instruments, instructions and other documents.
- 12.6 It shall be the sole and exclusive duty and authority of the Plan Committee to interpret and construe the provisions of the Plan, to decide any disputes which may arise with regard to the status, eligibility and rights of Employees under the terms of the Plan, and any other persons claiming an interest under the terms of the Plan, and, in general, to direct the administration of the Plan.
- 12.7 The Plan Committee may adopt, and from time to time amend, such rules and regulations consistent with the purposes and provisions of the Plan, as it deems necessary or advisable to administer and effectuate the Plan.
- 12.8 The Plan Committee may shorten, lengthen (but not beyond thirty (30) days) or waive the time required by the Plan for the filing of any notice or other form under the Plan.
- 12.9 The discretionary powers granted hereunder to the Plan Committee shall in no event be exercised in any manner that will discriminate against individual employees or a class of employees or discriminate in favor of employees who are shareholders, officers, supervisors or highly compensated employees of the Company.

ARTICLE XIII - Valuation of Shares of Common Stock

- 13.1 For purposes of the Plan, the "fair market value" of a share of Common Stock as of any date shall be determined as follows:
- [a] If the Common Stock is then listed on a national securities exchange, the "fair market value" shall be the closing price of a share of Common Stock on such exchange on such date, or, if there has been no sale of shares of Common Stock on that date, the closing price of a share of Common Stock on such exchange on the last preceding business day on which shares of Common Stock were traded.
 - [b] If the Common Stock is then listed on the National Association of Securities Dealers Automatic Quotation System National Market System, the "fair market value" shall be the average of the high and low sales prices of a share of Common Stock on that date, or if there has been no sale of shares of Common Stock on that date, the average of the high and low sales prices of Common Stock on the last preceding business day on which shares of Common Stock were traded.

ARTICLE XIV - *Adjustments in Certain Events*

- 14.1 If (i) the Company shall at any time be involved in a transaction to which sub-section [a] of Section 424 of the Code is applicable, (ii) the Company shall declare a dividend payable in, or shall sub-divide or combine, its Common Stock, or (iii) any other event shall occur which in the judgment of the Board of Directors necessitates action by way of adjusting the terms of the outstanding Subscription Agreements, the Board of Directors shall take any such action as in its judgment shall be appropriate to preserve Participant rights substantially proportionate to the rights existing prior to such event. To the extent that such action shall include an increase or decrease in the number of shares of Common Stock subject to outstanding Subscription Agreements, the aggregate number of shares available under Article III hereof for issuance under the Plan pursuant to outstanding Subscription Agreements and Subscription Agreements which may be entered into, and the aggregate number of shares available for issuance in any Offering and the number which may be subscribed for, shall be proportionately increased or decreased, as the case may be. No action shall be taken by the Board of Directors under the provisions of this Article XIV which, in its judgment, would constitute a modification, extension or renewal of the Subscription Agreement (within the meaning of Section 424[h] of the Code), or would prevent the Plan from qualifying as an "employee stock purchase plan" (within the meaning of Section 423 of the Code). The determination of the Board of Directors with respect to any matter referred to in this Article XIV shall be conclusive and binding upon each Participant.

ARTICLE XV - *Termination and Amendment of the Plan*

- 15.1 The Board of Directors may, without further approval by the stockholders of the Company, at any time terminate or amend the Plan without notice, or make such modifications of the Plan as it shall deem advisable; provided that the Board of Directors may not, without prior approval by the holders of a majority of the outstanding shares of Common Stock of the Company, amend or modify the Plan so as to (i) increase the maximum number of shares of Common Stock which may be issued under the Plan (except as contemplated in Article XIV hereof), (ii) extend the term during which Offerings may be made under the Plan or (iii) increase the maximum number of Shares which an Eligible Employee is entitled to purchase (except as contemplated in Article XIV hereof); and provided further that the Board of Directors may not amend or modify the Plan in any manner which would prevent the Plan from qualifying as an "employee stock purchase plan" (within the meaning of Section 423 of the Code). No termination, amendment or modification of the Plan may, without the consent of a Participant, adversely affect the rights of such Participant under an outstanding Subscription Agreement.

ARTICLE XVI - *Miscellaneous*

- 16.1 Unless otherwise expressly provided in the Plan, all notices or other communications by a Participant to the Company under or in connection with the Plan shall be deemed to have been duly given when received by the Secretary of the Company or when received in the form specified by the Company at the location and by the persons, designated by the Company for the receipt thereof.
- 16.2 Notwithstanding anything hereunder to the contrary, the offer, sale and delivery by the Company of Shares under the Plan to any Eligible Employee is subject to compliance with all applicable securities regulation and other federal and state laws. The terms of this Plan shall be construed under the laws of the State of Connecticut.

ARTICLE XVII - *Effective Date*

- 17.1 The Plan shall become effective at such time as the Plan has been adopted by the Board of Directors or such later date as shall be designated by the Board of Directors upon its adoption of the Plan; provided, however, that the Plan and all Subscription Agreements entered into thereunder shall be, and be deemed to have been, null and void if the Plan is not approved by the holders of a majority of the outstanding shares of Common Stock of the Company within twelve (12) months after the date on which the Plan is adopted by the Board of Directors.



This Agreement is entered into as of January 20, 2018 by and between Photronics, Inc., a Connecticut corporation (the “Company”) and DEMA Associates, LLC (“Consultant”).

WHEREAS, the Company believes that it will benefit from an ongoing consulting arrangement between Consultant and the Company, pursuant to which Consultant will provide certain services on an independent contractor basis as outlined below and Consultant has agreed to provide certain consulting and advisory services to the Company pursuant to the terms set forth herein.

NOW, THEREFORE, Consultant and the Company hereby agree as follows:

1) Consulting Services

During the term of this Agreement, Consultant agrees to make himself and or associates from DEMA Associates, LLC reasonably available to render at the request of the Company, such consulting services as are reasonably requested by the Company. Consultant will devote a reasonable amount of time, not to exceed forty hours (40) per month, to the provision of the Services. Consultant will provide an invoice to the Company to indicate the forty hours worked per month and the services provided to the Company. The form of invoice is attached hereto as Exhibit A. The Company will provide Consultant with a paid cell phone and a laptop computer.

2) Compensation

As compensation for Consultant’s services during the term of this Agreement, the Company agrees to provide consulting fees and benefits under the terms specified below:

Fees: In consideration for the consulting services, the Company will pay a consulting fee in the amount of three hundred and ninety thousand dollars (\$390,000) per year (“Consulting Fees”). The Company shall pay the Consulting Fees in equal monthly payments of thirty-two thousand five hundred dollars (\$32,500.00) throughout the Consulting Period. The Consulting Fees will be paid at the address set forth above.

In the event that Consultant is required to travel in order to perform the Services under this Agreement, the Company will reimburse Consultant for such reasonable travel expenses incurred upon the presentation by Consultant of a detailed and itemized account of such expenses with proper documentation and such other supporting information as the Company may reasonably request. Except as provided above with respect to travel expenses, the Company will not be responsible for payment or reimbursement of Consultant’s expenses in his performance of the Services, unless such expense is approved in advance by the Company.

3) Term

This Agreement will be effective as of January 20, 2018 and will continue in effect for a period of four (4) years.

4) Non-Competition and Non-Solicitation

Consultant hereby agrees that during the Consulting Period, and for a period of three (3) years after the termination of this Agreement, he will not, without first obtaining the Company's prior written approval, directly or indirectly engage or prepare to engage in any activities in competition with the Company or accept employment, provide services to, or establish a business relationship with a business or individual engaged in or preparing to engage in competition with the Company. Consultant is free to engage in other work or business activities during the Consulting Period as long as they are not competitive with the Company. For purposes of this paragraph, the holding of less than one percent (1%) of the outstanding voting securities of any firm or business organization in competition with the Company shall not constitute activities or services precluded by this paragraph. Consultant also agrees that through the end of the Consulting Period and for a period of one (1) year thereafter, he will not, either directly or through others, solicit or attempt to solicit any employee or other personnel of the Company to terminate his or her relationship with the Company or to become an employee, consultant or independent contractor to or for any other person or entity. Further, Consultant agrees not to disparage the Company in any manner likely to be harmful to the Company's business reputation, or the personal or business reputation of the Company's directors, shareholders or employees. Consultant agrees that the Consulting Fees adequately compensate you for the restrictions of this paragraph.

5) Liquidated Damages/Specific Performance

- a) Consultant agrees that it would be impracticable or extremely difficult to ascertain the amount of actual damages caused by breach of Article (4), Non-Competition and Non-Solicitation, of this Agreement. Therefore, Consultant agrees that, in the event of such a breach, the Company will be entitled to withhold further payments of all Consulting Fees, recover all Consulting Fees already paid to Consultant, and obtain such injunctive and other relief as appropriate. Consultant further agree that this liquidated damage provision represents reasonable compensation for the loss which would be incurred by the Company because of any such breach.
 - b) In the event Consultant claims that the Company is in breach of this Agreement, in addition to any other remedies available to Consultant, Consultant shall be entitled to obtain specific performance of this Agreement.
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6. Independent Contractor Status of Consultant.

Consultant's legal status is as an independent contractor of Company. Nothing in this Agreement makes Consultant the agent, partner, joint venturer, employee or legal representative of Company for any purpose whatsoever; nor shall Consultant hold himself out as such. Consultant will have no authority to bind Company in any manner or for any purpose. Consultant will not be an employee of Company for any purpose, including for purposes of the Fair Labor Standards Act's minimum wage and overtime provisions, nor any other provision of federal, state, or local law applicable to employees. Further, Consultant understands and agrees that he will not be entitled to any employment benefits that may be made available by the Company to its employees, including but not limited to vacation pay, sick leave, retirement benefits, social security, workers' compensation, health or disability benefits, and unemployment insurance benefits. The parties acknowledge that Consultant was an employee of Company immediately prior to the commencement of this Agreement.

Consultant understands that the Company will not be responsible for withholding or paying any federal or state income, social security or other taxes in connection with any compensation paid under this Agreement, and Consultant agrees that he is solely responsible for any tax obligations which may arise from the payment of compensation to Consultant pursuant to this Agreement.

7. Confidential Information.

(a) Consultant acknowledges that during his engagement with Company he may have access to certain confidential and proprietary information belonging to the Company or third parties who may have furnished such information under obligations of confidentiality, relating to and used in the Company's business (collectively, "**Confidential Information**"). Consultant acknowledges that, unless otherwise available to the public, Confidential Information includes, but is not limited to, the following categories of information and material, including all copies, notes, or other reproductions or replicas thereof: financial statements and information; budgets, forecasts, and projections; business and strategic plans; marketing strategies; research and development projects; records relating to any intellectual property developed by, owned by, controlled, licensed, or maintained by the Company; information related to the Company's inventions, research, products, designs, methods, know-how, formulae, techniques, systems, processes; customer lists; non-public information relating to the Company's customers, suppliers, employees, distributors, or investors; the specific terms of the Company's agreements or arrangements, whether oral or written, with any customer, supplier, vendor, or contractor with which the Company may be associated from time to time; and any and all information relating to the operation of the Company's business which the Company may from time to time designate as confidential or proprietary or that Consultant reasonably knows should be, or has been, treated by the Company as confidential or proprietary. Confidential Information encompasses all formats in which information is preserved, whether electronic, print, or any other form, including all originals, copies, notes, or other reproductions or replicas thereof.

(b) Confidential Information does not include any information that: (i) at the time of disclosure is generally known to, or readily ascertainable by, the public; (ii) becomes known to the public through no fault of Consultant or other violation of this Agreement; or (iii) is disclosed to Consultant by a third party under no obligation to maintain the confidentiality of the information.

(c) Consultant agrees that he will maintain the confidentiality of the Confidential Information at all times during and following his engagement by the Company and will not, directly or indirectly, use or disclose any Confidential Information for any purpose other than to the extent necessary to perform the Services.

(d) The restrictions in Section 7(c) above will not apply to any information that Consultant is required to disclose by law, provided that the Consultant (i) notifies the Company of the existence and terms of such obligation, (ii) gives the Company a reasonable opportunity to seek a protective or similar order to prevent or limit such disclosure, and (iii) only discloses that information actually required to be disclosed.

(e) Upon termination of Consultant's engagement with the Company for any reason, or at any time upon request of the Company, Consultant will promptly deliver to the Company all Confidential Information in any form along with all personal property belonging to the Company that is in Consultant's possession, custody, or control, including, without limitation, all files, memoranda, designs, correspondence, manuals, programs, data, records, notes, notebooks, reports, papers, equipment, computer software, proposals, or any other file, material, document or possession (whether in hard copy or any electronic format), however obtained, along with any reproductions or copies.

8. Governing Law; Venue. This Agreement will be governed by and construed in accordance with the laws of the State of Connecticut, without regard to that body of law known as choice of law. Each party (a) consents to the personal jurisdiction of said courts, (b) waives any venue or inconvenient forum defense to any proceeding maintained in such courts, and (c) agrees not to bring any proceeding arising out of or relating to this Agreement in any other court.

PHOTRONICS, INC.

DEMA Associates, LLC

By: /s/ Richelle E. Burr
Title: Vice President

By: /s/ Constantine S. Macricostas
Title: President

AMENDMENT NO. 4

Dated as of August 17, 2018

to

THIRD AMENDED AND RESTATED CREDIT AGREEMENT

Dated as of December 5, 2013

THIS AMENDMENT NO. 4 ("Amendment") is made as of August 17, 2018 by and among Photronics, Inc. (the "Company"), the financial institutions listed on the signature pages hereof and JPMorgan Chase Bank, N.A., as Administrative Agent (in such capacity, the "Administrative Agent") and as Collateral Agent (in such capacity, the "Collateral Agent"), under that certain Third Amended and Restated Credit Agreement dated as of December 5, 2013 by and among the Company, the Foreign Subsidiary Borrowers party thereto from time to time, the Lenders party thereto from time to time, the Collateral Agent and the Administrative Agent (as may be further amended, supplemented or otherwise modified from time to time, the "Credit Agreement"). Capitalized terms used herein and not otherwise defined herein shall have the respective meanings given to them in the Credit Agreement.

WHEREAS, the Company has requested that the Lenders and the Administrative Agent agree to certain amendments to the Credit Agreement;

WHEREAS, the Lenders party hereto and the Administrative Agent have agreed to such amendments on the terms and conditions set forth herein;

NOW, THEREFORE, in consideration of the premises set forth above, the terms and conditions contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company, the Lenders party hereto and the Administrative Agent have agreed to enter into this Amendment.

1. Amendments to Credit Agreement. Effective as of the date of satisfaction of the conditions precedent set forth in Section 2 below, the Credit Agreement is hereby amended as follows:

(a) Section 6.03(a)(iii) of the Credit Agreement is amended and restated in its entirety as follows:

“(iii) (A) any Loan Party (other than the Company) or any Subsidiary may sell, transfer, lease or otherwise dispose of its assets to, or otherwise dissolve into, a Loan Party and (B) the Company may sell, transfer, lease or otherwise dispose of its assets to, a Subsidiary Guarantor;”

2. Conditions of Effectiveness. The effectiveness of this Amendment is subject to the conditions precedent that (a) the Administrative Agent shall have received counterparts of (i) this Amendment duly executed by the Company, the Required Lenders and the Administrative Agent and (ii) the Consent and Reaffirmation attached hereto duly executed by the Subsidiary Guarantors and (b) the Company shall have paid, to the extent invoiced, reasonable attorneys' fees and expenses of the Administrative Agent in connection with this Amendment and the other Loan Documents.

3. Representations and Warranties of the Company and Acknowledgements and Confirmations. The Company hereby represents and warrants as follows:

(a) This Amendment and the Credit Agreement, as amended hereby, constitute legal, valid and binding obligations of the Company and are enforceable against the Company in accordance with their terms, subject to applicable bankruptcy, insolvency, reorganization, moratorium or other laws affecting creditors' rights generally and subject to general principles of equity, regardless of whether considered in a proceeding in equity or at law.

(b) As of the date hereof and giving effect to the terms of this Amendment, (i) no Default shall have occurred and be continuing and (ii) the representations and warranties of the Company set forth in the Credit Agreement, as amended hereby, are true and correct as of the date hereof.

4. Reference to and Effect on the Credit Agreement.

(a) Upon the effectiveness hereof, each reference to the Credit Agreement in the Credit Agreement or any other Loan Document shall mean and be a reference to the Credit Agreement as amended hereby.

(b) Except as specifically amended above, the Credit Agreement and all other documents, instruments and agreements executed and/or delivered in connection therewith shall remain in full force and effect and are hereby ratified and confirmed.

(c) The execution, delivery and effectiveness of this Amendment shall not operate as a waiver of any right, power or remedy of the Administrative Agent or the Lenders, nor constitute a waiver of any provision of the Credit Agreement or any other documents, instruments and agreements executed and/or delivered in connection therewith.

(d) This Amendment shall constitute a Loan Document.

5. Governing Law. This Amendment shall be construed in accordance with and governed by the law of the State of New York.

6. Headings. Section headings in this Amendment are included herein for convenience of reference only and shall not constitute a part of this Amendment for any other purpose.

7. Counterparts. This Amendment may be executed by one or more of the parties hereto on any number of separate counterparts, and all of said counterparts taken together shall be deemed to constitute one and the same instrument. Signatures delivered by facsimile or PDF shall have the same force and effect as manual signatures delivered in person.

[Signature Pages Follow]

IN WITNESS WHEREOF, this Amendment has been duly executed as of the day and year first above written.

PHOTRONICS, INC.,
as the Company

By: _____

Name:

Title:

Signature Page to Amendment No. 4
Photronics, Inc.
Third Amended and Restated Credit Agreement dated as of December 5, 2013

JPMORGAN CHASE BANK, N.A., individually as a Lender and as
Administrative Agent

By: _____

Name:

Title:

Signature Page to Amendment No. 4
Photronics, Inc.
Third Amended and Restated Credit Agreement dated as of December 5, 2013

RBS CITIZENS, NATIONAL ASSOCIATION,
as a Lender

By: _____

Name:

Title:

Signature Page to Amendment No. 4
Photronics, Inc.
Third Amended and Restated Credit Agreement dated as of December 5, 2013

TD BANK, N.A.,
as a Lender

By: _____

Name:

Title:

CONSENT AND REAFFIRMATION

Each of the undersigned hereby acknowledges receipt of a copy of the foregoing Amendment No. 4 to the Third Amended and Restated Credit Agreement dated as of December 5, 2013 (as amended, supplemented or otherwise modified from time to time, the "Credit Agreement") by and among Photronics, Inc. (the "Company"), the Foreign Subsidiary Borrowers from time to time party thereto (together with the Company, the "Borrowers"), the financial institutions from time to time party thereto (the "Lenders") and JPMorgan Chase Bank, N.A., as Administrative Agent (the "Administrative Agent") and Collateral Agent, which Amendment No. 4 is dated as of August 17, 2018 (the "Amendment"). Capitalized terms used in this Consent and Reaffirmation and not defined herein shall have the meanings given to them in the Credit Agreement. Without in any way establishing a course of dealing by the Administrative Agent or any Lender, each of the undersigned consents to the Amendment and reaffirms the terms and conditions of the Subsidiary Guaranty and any other Loan Document executed by it and acknowledges and agrees that such agreements and each and every such Loan Document executed by the undersigned in connection with the Credit Agreement remains in full force and effect and is hereby reaffirmed, ratified and confirmed. All references to the Credit Agreement contained in the above-referenced documents shall be a reference to the Credit Agreement as so modified by the Amendment and as the same may from time to time hereafter be amended, modified or restated.

Dated: August 17, 2018

[Signature Page Follows]

PHOTRONICS IDAHO, INC.

By: _____
Name:
Title:

TRIANJA TECHNOLOGIES, INC.

By: _____
Name:
Title:

PHOTRONICS TEXAS ALLEN, INC.

By: _____
Name:
Title:

PHOTRONICS CALIFORNIA, INC.

By: _____
Name:
Title:

Signature Page to Consent and Reaffirmation to Signature Page to Amendment No. 4
Photronics, Inc.
Third Amended and Restated Credit Agreement dated as of December 5, 2013

J.P.Morgan

FOURTH AMENDED AND RESTATED CREDIT AGREEMENT

dated as of

September 27, 2018

among

PHOTRONICS, INC.

The Foreign Subsidiary Borrowers Party Hereto

The Lenders Party Hereto

JPMORGAN CHASE BANK, N.A.
as Administrative Agent and Collateral Agent
and

BANK OF AMERICA, N.A.
as Syndication Agent

JPMORGAN CHASE BANK, N.A. and
MERRILL LYNCH, PIERCE, FENNER & SMITH INCORPORATED
as Joint Bookrunners and Joint Lead Arrangers

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FOURTH AMENDED AND RESTATED CREDIT AGREEMENT (this "Agreement") dated as of September 27, 2018 among PHOTRONICS, INC., the FOREIGN SUBSIDIARY BORROWERS from time to time party hereto, the LENDERS from time to time party hereto, BANK OF AMERICA, N.A., as Syndication Agent, and JPMORGAN CHASE BANK, N.A., as Administrative Agent and Collateral Agent.

WHEREAS, the Company, the lenders party thereto and JPMorgan Chase Bank, N.A., as administrative agent and collateral agent thereunder, are currently party to the Third Amended and Restated Credit Agreement, dated as of December 5, 2013 (as amended, supplemented or otherwise modified prior to the date hereof, the "Existing Credit Agreement").

WHEREAS, the Company, the Lenders, the Administrative Agent and the Collateral Agent have agreed to enter into this Agreement in order to (i) amend and restate the Existing Credit Agreement in its entirety; (ii) re-evidence the "Obligations" under, and as defined in, the Existing Credit Agreement, which shall be repayable in accordance with the terms of this Agreement; and (iii) set forth the terms and conditions under which the Lenders will, from time to time, make loans and extend other financial accommodations to or for the benefit of the Borrowers.

WHEREAS, it is the intent of the parties hereto that this Agreement not constitute a novation of the obligations and liabilities of the parties under the Existing Credit Agreement or be deemed to evidence or constitute full repayment of such obligations and liabilities, but that this Agreement amend and restate in its entirety the Existing Credit Agreement and re-evidence the obligations and liabilities of the Company and the Subsidiaries outstanding thereunder, which shall be payable in accordance with the terms hereof.

WHEREAS, it is also the intent of the Company and the Subsidiary Guarantors to confirm that all obligations under the applicable "Loan Documents" (as referred to and defined in the Existing Credit Agreement) shall continue in full force and effect as modified or restated by the Loan Documents (as referred to and defined herein) and that, from and after the Effective Date, all references to the "Credit Agreement" contained in any such existing "Loan Documents" shall be deemed to refer to this Agreement.

NOW, THEREFORE, in consideration of the premises and the mutual covenants contained herein, the parties hereto hereby agree that the Existing Credit Agreement is hereby amended and restated as follows:

ARTICLE I

Definitions

SECTION 1.01. Defined Terms. As used in this Agreement, the following terms have the meanings specified below:

"ABR", when used in reference to any Loan or Borrowing, refers to such Loan, or the Loans comprising such Borrowing, bearing interest at a rate determined by reference to the Alternate Base Rate.

"Adjusted LIBO Rate" means, with respect to any Eurocurrency Borrowing for any Interest Period, an interest rate per annum (rounded upwards, if necessary, to the next 1/16 of 1%) equal to (a) the LIBO Rate for such Interest Period multiplied by (b) the Statutory Reserve Rate.

“Administrative Agent” means JPMorgan Chase Bank, N.A. (including its branches and affiliates), in its capacity as administrative agent for the Lenders hereunder.

“Administrative Questionnaire” means an Administrative Questionnaire in a form supplied by the Administrative Agent.

“Affected Foreign Subsidiary” means any Foreign Subsidiary to the extent such Foreign Subsidiary acting as a Subsidiary Guarantor would cause a Deemed Dividend Problem.

“Affiliate” means, with respect to a specified Person, another Person that directly, or indirectly through one or more intermediaries, Controls or is Controlled by or is under common Control with the Person specified.

“Agents” means the Administrative Agent and the Collateral Agent.

“Aggregate Commitment” means the aggregate of the Commitments of all of the Lenders, as reduced or increased from time to time pursuant to the terms and conditions hereof. As of the Effective Date, the Aggregate Commitment is \$50,000,000.

“Agreed Currencies” means (i) Dollars and (ii) any other currency (x) that is a lawful currency (other than Dollars) that is readily available and freely transferable and convertible into Dollars, (y) for which a LIBOR Screen Rate is available in the Administrative Agent’s determination and (z) that is agreed to by the Administrative Agent and each of the Lenders.

“Agreement” has the meaning assigned to such term in the introductory paragraph.

“Alternate Base Rate” means, for any day, a rate per annum equal to the greatest of (a) the Prime Rate in effect on such day, (b) the NYFRB Rate in effect on such day plus ½ of 1% and (c) the Adjusted LIBO Rate for a one month Interest Period in Dollars on such day (or if such day is not a Business Day, the immediately preceding Business Day) plus 1%, provided that for the purpose of this definition, the Adjusted LIBO Rate for any day shall be based on the LIBO Rate (or if the LIBO Rate is not available for such one month Interest Period, the Interpolated Rate) at approximately 11:00 a.m. London time on such day. Any change in the Alternate Base Rate due to a change in the Prime Rate, the NYFRB Rate or the Adjusted LIBO Rate shall be effective from and including the effective date of such change in the Prime Rate, the NYFRB Rate or the Adjusted LIBO Rate, respectively. If the Alternate Base Rate is being used as an alternate rate of interest pursuant to Section 2.14 hereof, then the Alternate Base Rate shall be the greater of clauses (a) and (b) above and shall be determined without reference to clause (c) above. For the avoidance of doubt, if the Alternate Base Rate as so determined would be less than zero, such rate shall be deemed to be zero for purposes of this Agreement.

“Alternative Rate” has the meaning assigned to such term in Section 2.14(a).

“Anti-Corruption Laws” means all laws, rules, and regulations of any jurisdiction applicable to the Company or its Subsidiaries from time to time concerning or relating to bribery or corruption.

“Applicable Party” has the meaning assigned to such term in Section 8.03(c).

“Applicable Percentage” means, with respect to any Lender, the percentage equal to a fraction the numerator of which is such Lender’s Commitment and the denominator of which is the Aggregate Commitment (if the Commitments have terminated or expired, the Applicable Percentages shall be determined based upon the Commitments most recently in effect, giving effect to any assignments); provided that, in the case of Section 2.24 when a Defaulting Lender shall exist, any such Defaulting Lender’s Commitment shall be disregarded in the calculation.

“Applicable Pledge Percentage” means 100% but 65% in the case of a pledge by the Company or any Domestic Subsidiary of its Equity Interests in an Affected Foreign Subsidiary.

“Applicable Rate” means, for any day, with respect to any Eurocurrency Loan, or any ABR Loan or with respect to the commitment fees payable hereunder, as the case may be, the applicable rate per annum set forth below under the caption “Eurocurrency Spread”, “ABR Spread” or “Commitment Fee Rate”, as the case may be, based upon the Total Leverage Ratio applicable on such date:

	<u>Total Leverage Ratio:</u>	<u>Commitment Fee Rate</u>	<u>Eurocurrency Spread</u>	<u>ABR Spread</u>
<u>Category 1:</u>	<u>< 1.00 to 1.00</u>	0.15%	1.00%	0%
<u>Category 2:</u>	<u>> 1.00 to 1.00 but < 2.00 to 1.00</u>	0.20%	1.25%	0.25%
<u>Category 3:</u>	<u>> 2.00 to 1.00</u>	0.25%	1.50%	0.50%

For purposes of the foregoing,

(i) if at any time the Company fails to deliver the Financials on or before the date the Financials are due pursuant to Section 5.01, Category 3 shall be deemed applicable for the period commencing five (5) Business Days after the required date of delivery and ending on the date which is five (5) Business Days after the Financials are actually delivered, after which the Category shall be determined in accordance with the table above as applicable;

(ii) adjustments, if any, to the Category then in effect shall be effective five (5) Business Days after the Administrative Agent has received the applicable Financials (it being understood and agreed that each change in Category shall apply during the period commencing on the effective date of such change and ending on the date immediately preceding the effective date of the next such change); and

(iii) notwithstanding the foregoing, Category 1 shall be deemed to be applicable until the Administrative Agent’s receipt of the applicable Financials for the Company’s first fiscal quarter ending after the Effective Date (unless such Financials demonstrate that Category 2 or 3 should have been applicable during such period, in which case such other Category shall be deemed to be applicable during such period) and adjustments to the Category then in effect shall thereafter be effected in accordance with the preceding paragraphs.

“Approved Electronic Platform” has the meaning assigned to such term in Section 8.03(a).

“Approved Fund” has the meaning assigned to such term in Section 9.04.

“Arrangers” means each of JPMorgan Chase Bank, N.A. and Merrill, Lynch, Pierce, Fenner & Smith Incorporated (or any other registered broker-dealer wholly-owned by Bank of America Corporation to which all or substantially all of Bank of America Corporation’s or any of its subsidiaries’ investment banking, commercial lending services or related businesses may be transferred following the date of this Agreement) in its capacity as a joint bookrunner and joint lead arranger hereunder.

“Assignment and Assumption” means an assignment and assumption agreement entered into by a Lender and an assignee (with the consent of any party whose consent is required by Section 9.04), and accepted by the Administrative Agent, in the form of Exhibit A or any other form (including electronic records generated by the use of an electronic platform) approved by the Administrative Agent.

“Augmenting Lender” has the meaning assigned to such term in Section 2.20.

“Availability Period” means the period from and including the Effective Date to but excluding the earlier of the Maturity Date and the date of termination of the Commitments.

“Available Revolving Commitment” means, at any time with respect to any Lender, the Commitment of such Lender then in effect *minus* the Revolving Credit Exposure of such Lender at such time (excluding, for the purpose of calculating the commitment fee under Section 2.12, any Lender’s Swingline Exposure).

“Bail-In Action” means the exercise of any Write-Down and Conversion Powers by the applicable EEA Resolution Authority in respect of any liability of an EEA Financial Institution.

“Bail-In Legislation” means, with respect to any EEA Member Country implementing Article 55 of Directive 2014/59/EU of the European Parliament and of the Council of the European Union, the implementing law for such EEA Member Country from time to time which is described in the EU Bail-In Legislation Schedule.

“Banking Services” means each and any of the following bank services provided to the Company or any Subsidiary by any Lender or any of its Affiliates: (a) credit cards for commercial customers (including, without limitation, commercial credit cards and purchasing cards), (b) stored value cards, (c) merchant processing services and (d) treasury management services (including, without limitation, controlled disbursement, automated clearinghouse transactions, return items, any direct debit scheme or arrangement, overdrafts and interstate depository network services).

“Banking Services Agreement” means any agreement entered into by the Company or any Subsidiary in connection with Banking Services.

“Banking Services Obligations” means any and all obligations of the Company or any Subsidiary, whether absolute or contingent and howsoever and whensoever created, arising, evidenced or acquired (including all renewals, extensions and modifications thereof and substitutions therefor) in connection with Banking Services.

“Bankruptcy Code” means Title 11 of the United States Code entitled “Bankruptcy”, as now and hereafter in effect, or any successor statute.

“Bankruptcy Event” means, with respect to any Person, such Person becomes the subject of a voluntary or involuntary bankruptcy or insolvency proceeding, or has had a receiver, conservator, trustee, administrator, custodian, assignee for the benefit of creditors or similar Person charged with the reorganization or liquidation of its business appointed for it, or, in the good faith determination of the Administrative Agent, has taken any action in furtherance of, or indicating its consent to, approval of, or acquiescence in, any such proceeding or appointment or has had any order for relief in such proceeding entered in respect thereof, provided that a Bankruptcy Event shall not result solely by virtue of any ownership interest, or the acquisition of any ownership interest, in such Person by a Governmental Authority or instrumentality thereof, provided, further, that such ownership interest does not result in or provide such Person with immunity from the jurisdiction of courts within the United States or from the enforcement of judgments or writs of attachment on its assets or permit such Person (or such Governmental Authority or instrumentality) to reject, repudiate, disavow or disaffirm any contracts or agreements made by such Person.

“Beneficial Ownership Certification” means a certification regarding beneficial ownership as required by the Beneficial Ownership Regulation.

“Beneficial Ownership Regulation” means 31 C.F.R. § 1010.230.

“Benefit Plan” means any of (a) an “employee benefit plan” (as defined in Section 3(3) of ERISA) that is subject to Title I of ERISA, (b) a “plan” as defined in Section 4975 of the Code to which Section 4975 of the Code applies, and (c) any Person whose assets include (for purposes of the Plan Asset Regulations or otherwise for purposes of Title I of ERISA or Section 4975 of the Code) the assets of any such “employee benefit plan” or “plan”.

“Board” means the Board of Governors of the Federal Reserve System of the United States of America.

“Borrower” means the Company or any Foreign Subsidiary Borrower.

“Borrowing” means (a) Revolving Loans of the same Type, made, converted or continued on the same date and, in the case of Eurocurrency Loans, as to which a single Interest Period is in effect or (b) a Swingline Loan.

“Borrowing Request” means a request by any Borrower for a Revolving Borrowing in accordance with Section 2.03 in the form attached hereto as Exhibit I-1.

“Borrowing Subsidiary Agreement” means a Borrowing Subsidiary Agreement substantially in the form of Exhibit F-1.

“Borrowing Subsidiary Termination” means a Borrowing Subsidiary Termination substantially in the form of Exhibit F-2.

“Business Day” means any day that is not a Saturday, Sunday or other day on which commercial banks in New York City are authorized or required by law to remain closed; provided that, when used in connection with a Eurocurrency Loan, the term “Business Day” shall also exclude any day on which banks are not open for dealings in the relevant Agreed Currency in the London interbank market or the principal financial center of such Agreed Currency (and, if the Borrowings or LC Disbursements which are the subject of a borrowing, drawing, payment, reimbursement or rate selection are denominated in euro, the term “Business Day” shall also exclude any day on which the TARGET2 payment system is not open for the settlement of payments in euro).

“Capital Expenditures” means, without duplication, any cash expenditures for any purchase or other acquisition of any asset which would be classified as a fixed or capital asset on a consolidated balance sheet of the Company and its Subsidiaries prepared in accordance with GAAP.

“Capital Lease Obligations” of any Person means the obligations of such Person to pay rent or other amounts under any lease of (or other arrangement conveying the right to use) real or personal property, or a combination thereof, which obligations are required to be classified and accounted for as capital leases or financing leases on a balance sheet of such Person under GAAP, and the amount of such obligations shall be the capitalized amount thereof determined in accordance with GAAP.

“Change in Control” means (a) the acquisition of ownership, directly or indirectly, beneficially or of record, by any Person or group (within the meaning of the Securities Exchange Act of 1934 and the rules of the SEC thereunder as in effect on the date hereof), of Equity Interests representing more than 40% of the aggregate ordinary voting power represented by the issued and outstanding Equity Interests of the Company; (b) occupation of a majority of the seats (other than vacant seats) on the board of directors of the Company by Persons who were not (i) directors of the Company on the date of this Agreement or (ii) nominated or appointed by the board of directors of the Company; (c) the acquisition of direct or indirect Control of the Company by any Person or group; (d) the occurrence of a change in control, or other similar provision, as defined in any agreement or instrument evidencing any Material Indebtedness (triggering a default or mandatory prepayment, which default or mandatory prepayment has not been waived in writing); or (e) the Company ceases to own, directly or indirectly, and Control 100% (other than directors’ qualifying shares) of the ordinary voting and economic power of any Foreign Subsidiary Borrower, other than, to the extent such Subsidiaries are Foreign Subsidiary Borrowers, PKL, PKLT and the Taiwan JV, in respect of which the Company will continue to own and Control more than 50%.

“Change in Law” means the occurrence, after the date of this Agreement (or with respect to any Lender, if later, the date on which such Lender becomes a Lender), of any of the following: (a) the adoption or taking effect of any law, rule, regulation or treaty, (b) any change in any law, rule, regulation or treaty or in the administration, interpretation, implementation or application thereof by any Governmental Authority, or (c) the making or issuance of any request, rules, guideline, requirement or directive (whether or not having the force of law) by any Governmental Authority; provided however, that notwithstanding anything herein to the contrary, (i) the Dodd-Frank Wall Street Reform and Consumer Protection Act and all requests, rules, guidelines, requirements and directives thereunder, issued in connection therewith or in implementation thereof, and (ii) all requests, rules, guidelines, requirements and directives promulgated by the Bank for International Settlements, the Basel Committee on Banking Supervision (or any successor or similar authority) or the United States or foreign regulatory authorities, in each case pursuant to Basel III, shall in each case be deemed to be a “Change in Law” regardless of the date enacted, adopted, issued or implemented.

“Class”, when used in reference to any Loan or Borrowing, refers to whether such Loan, or the Loans comprising such Borrowing, are Revolving Loans or Swingline Loans.

“Code” means the Internal Revenue Code of 1986, as amended from time to time.

“Collateral” means all Pledged Equity, all “Collateral” as defined in the Security Agreement and all other property pledged in favor of the Collateral Agent, on behalf of itself and the Holders of Secured Obligations, pursuant to the Collateral Documents from time to time. It is hereby understood and agreed that “Collateral” shall not include any real property (including any leasehold interests therein and improvements or fixtures relating thereto) and the Lenders hereby authorize the Collateral Agent to release its Liens on the real estate encumbered by the “Mortgages” pursuant to the Existing Credit Agreement.

“Collateral Agent” means JPMorgan Chase Bank, N.A. in its capacity as Collateral Agent for the Holders of Secured Obligations and any successor Collateral Agent appointed pursuant to the terms of this Agreement.

“Collateral Documents” means, collectively, the Security Agreement, the Pledge Agreements and all other agreements, instruments and documents executed in connection with this Agreement that are intended to create, evidence or perfect Liens to secure the Secured Obligations.

“Commitment” means, with respect to each Lender, the commitment of such Lender to make Revolving Loans and to acquire participations in Letters of Credit and Swingline Loans hereunder, expressed as an amount representing the maximum aggregate amount of such Lender’s Revolving Credit Exposure hereunder, as such commitment may be (a) reduced or terminated from time to time pursuant to Section 2.09, (b) increased from time to time pursuant to Section 2.20 and (c) reduced or increased from time to time pursuant to assignments by or to such Lender pursuant to Section 9.04. The initial amount of each Lender’s Commitment is set forth on Schedule 2.01A, or in the Assignment and Assumption or other documentation or record (as such term is defined in Section 9-102(a)(70) of the New York Uniform Commercial Code) contemplated hereby pursuant to which such Lender shall have assumed its Commitment, as applicable.

“Commodity Exchange Act” means the Commodity Exchange Act (7 U.S.C. § 1 et seq.), as amended from time to time, and any successor statute.

“Communications” means, collectively, any notice, demand, communication, information, document or other material provided by or on behalf of any Borrower pursuant to any Loan Document or the transactions contemplated therein which is distributed by the Administrative Agent, any Lender or the Issuing Bank by means of electronic communications pursuant to Section 8.03(c), including through an Approved Electronic Platform.

“Company” means Photonics, Inc., a Connecticut corporation.

“Computation Date” is defined in Section 2.04.

“Consolidated EBITDA” means, for any period, Consolidated Net Income for such period, minus the aggregate amount of extraordinary, unusual or non-recurring income or gains for such period to the extent required to be separately stated in the Company’s financial statements in accordance with GAAP, minus any unrealized non-cash gains or income attributable to the application of “mark to market” accounting rules in accordance with GAAP for such period, plus, without duplication and to the extent deducted from revenues in determining Consolidated Net Income for such period, the sum of (a) the aggregate amount of Consolidated Interest Expense for such period, plus (b) the aggregate amount of income tax expense for such period, plus (c) the aggregate amount of depreciation and amortization for such period, plus (d) non-cash expenses related to stock-based compensation, plus (e) any extraordinary or non-recurring non-cash expenses, write-downs, write-offs, or losses including impairment or restructuring charges or any unrealized non-cash losses attributable to the application of “mark to market” accounting rules in accordance with GAAP for such period, plus (f) any write-downs, write-offs, or losses incurred in connection with the repayment of the Existing Convertible Notes described in clause (i) of the definition thereof, plus (g) the aggregate amount of fees, costs and expenses paid on the Effective Date to the Administrative Agent and the Lenders, including for reimbursement of costs, fees or expenses of the Administrative Agent or any Lender, in connection with the Loan Documents and/or the transactions contemplated thereby, all as determined on a consolidated basis with respect to the Company and its consolidated Subsidiaries in accordance with GAAP, minus, to the extent included in determining Consolidated Net Income for such period, any cash payments made during such period in respect of items described in clauses (d) and (e) above subsequent to the fiscal quarter in which the relevant non-cash expense or loss was reflected in a statement of Consolidated Net Income. For the purposes of calculating Consolidated EBITDA for any period of four consecutive fiscal quarters (each, a “Reference Period”), (i) if at any time during such Reference Period the Company or any Subsidiary shall have made any Material Disposition, the Consolidated EBITDA for such Reference Period shall be reduced by an amount equal to the Consolidated EBITDA (if positive) attributable to the property that is the subject of such Material Disposition for such Reference Period or increased by an amount equal to the Consolidated EBITDA (if negative) attributable thereto for such Reference Period, and (ii) if during such Reference Period the Company or any Subsidiary shall have made a Material Acquisition, Consolidated EBITDA for such Reference Period shall be calculated after giving pro forma effect thereto as if such Material Acquisition occurred on the first day of such Reference Period. As used in this definition, “Material Acquisition” means any acquisition of property or series of related acquisitions of property (excluding, for the avoidance of doubt, the acquisition of property pursuant to the Taiwan JV Transactions) that (a) constitutes (i) assets comprising all or substantially all or any significant portion of a business or operating unit of a business, or (ii) all or substantially all of the common stock or other Equity Interests of a Person, and (b) involves the payment of consideration by the Company and its Subsidiaries in excess of \$10,000,000; and “Material Disposition” means any sale, transfer or disposition of property or series of related sales, transfers, or dispositions of property that yields gross proceeds to the Company or any of its Subsidiaries in excess of \$10,000,000.

“Consolidated Interest Expense” means, with reference to any period, the interest expense (including without limitation interest expense under Capital Lease Obligations that is treated as interest in accordance with GAAP but excluding the amortization of deferred financing costs or fees) of the Company and its Subsidiaries calculated on a consolidated basis for such period with respect to (a) all outstanding Indebtedness of the Company and its Subsidiaries allocable to such period in accordance with GAAP and (b) Swap Agreements (including, without limitation, all commissions, discounts and other fees and charges owed with respect to letters of credit and bankers acceptance financing and net costs under interest rate Swap Agreements to the extent such net costs are allocable to such period in accordance with GAAP).

“Consolidated Net Income” means, with reference to any period, the net income (or loss) of the Company and its Subsidiaries calculated in accordance with GAAP on a consolidated basis (without duplication) for such period; provided that there shall be excluded (a) the income (or deficit) of any Person (other than a Subsidiary of the Company) in which the Company or any of its Subsidiaries has an ownership interest, except to the extent that any such income is actually received by the Company or such Subsidiary in the form of dividends or similar distributions and (b) the undistributed earnings of any Subsidiary of the Company to the extent that the declaration or payment of dividends or similar distributions by such Subsidiary is not at the time permitted by the terms of any contractual obligation (other than under any Loan Document) or any organizational or governing documents, any law, treaty, rule or regulation or any determination of an arbitrator or other Governmental Authority, in each case applicable to such Subsidiary.

“Consolidated Total Assets” means, as of the date of any determination thereof, total assets of the Company and its Subsidiaries calculated in accordance with GAAP on a consolidated basis as of such date.

“Consolidated Total Indebtedness” means at any time the sum, without duplication, of (a) the aggregate Indebtedness of the Company and its Subsidiaries calculated on a consolidated basis as of such time in accordance with GAAP, (b) the aggregate amount of Indebtedness of the Company and its Subsidiaries relating to the maximum drawing amount of all letters of credit outstanding and bankers acceptances and (c) Indebtedness of the type referred to in clauses (a) or (b) hereof of another Person guaranteed by the Company or any of its Subsidiaries.

“Control” means the possession, directly or indirectly, of the power to direct or cause the direction of the management or policies of a Person, whether through the ability to exercise voting power, by contract or otherwise. “Controlling” and “Controlled” have meanings correlative thereto.

“Country Risk Event” means:

- has the effect of:
- (i) any law, action or failure to act by any Governmental Authority in any Borrower’s or Letter of Credit beneficiary’s country which has the effect of:
 - (a) changing the obligations under the relevant Letter of Credit, this Agreement or any of the other Loan Documents as originally agreed or otherwise creating any additional liability, cost or expense to the Issuing Banks, the Lenders or the Administrative Agent,
 - (b) changing the ownership or control by such Borrower or Letter of Credit beneficiary of its business, or
 - (c) preventing or restricting the conversion into or transfer of the applicable Agreed Currency;
 - (ii) force majeure; or
 - (iii) any similar event

which, in relation to (i), (ii) and (iii), directly or indirectly, prevents or restricts the payment or transfer of any amounts owing under the relevant Letter of Credit or other Loan Documents in the applicable Agreed Currency into an account designated by the Administrative Agent or the relevant Issuing Bank and freely available to the Administrative Agent or the relevant Issuing Bank.

“Credit Event” means a Borrowing, the issuance, amendment, renewal or extension of a Letter of Credit, an LC Disbursement or any of the foregoing.

“Credit Party” means the Administrative Agent, any Issuing Bank, the Swingline Lender or any other Lender.

“Deemed Dividend Problem” means, with respect to any Foreign Subsidiary, such Foreign Subsidiary’s accumulated and undistributed earnings and profits being deemed to be repatriated to the Company or the applicable parent Domestic Subsidiary under Section 956 of the Code or any successor or similar law and the effect of such repatriation causing or expected to cause adverse tax consequences in excess of \$1,000,000 in the aggregate to the Company or such parent Domestic Subsidiary, in each case as determined by the Company in its commercially reasonable judgment acting in good faith and in consultation with its legal and tax advisors.

“Default” means any event or condition which constitutes an Event of Default or which upon notice, lapse of time or both would, unless cured or waived, become an Event of Default.

“Defaulting Lender” means any Lender that (a) has failed, within two (2) Business Days of the date required to be funded or paid, to (i) fund any portion of its Loans, (ii) fund any portion of its participations in Letters of Credit or Swingline Loans or (iii) pay over to any Credit Party any other amount required to be paid by it hereunder, unless, in the case of clause (i) above, such Lender notifies the Administrative Agent in writing that such failure is the result of such Lender’s good faith determination that a condition precedent to funding (specifically identified and including the particular default, if any) has not been satisfied, (b) has notified the Company or any Credit Party in writing, or has made a public statement to the effect, that it does not intend or expect to comply with any of its funding obligations under this Agreement (unless such writing or public statement indicates that such position is based on such Lender’s good faith determination that a condition precedent (specifically identified and including the particular default, if any) to funding a loan under this Agreement cannot be satisfied) or generally under other agreements in which it commits to extend credit, (c) has failed, within three (3) Business Days after request by a Credit Party, acting in good faith, to provide a certification in writing from an authorized officer of such Lender that it will comply with its obligations to fund prospective Loans and participations in then outstanding Letters of Credit and Swingline Loans under this Agreement, provided that such Lender shall cease to be a Defaulting Lender pursuant to this clause (c) upon such Credit Party’s receipt of such certification in form and substance satisfactory to it and the Administrative Agent, or (d) has become the subject of (i) a Bankruptcy Event or (ii) a Bail-In Action.

“Dollar Amount” of any amount of any currency means, at the time of determination thereof, (a) if such amount is expressed in Dollars, such amount, (b) if such amount is expressed in a Foreign Currency, the equivalent of such amount in Dollars determined by using the rate of exchange for the purchase of Dollars with such Foreign Currency in the London foreign exchange market at or about 11:00 a.m. London time (or New York time, as applicable) on a particular day as displayed by ICE Data Services as the “ask price”, or as displayed on such other information service which publishes that rate of exchange from time to time in place of ICE Data Services (or if such service ceases to be available, the equivalent of such amount in Dollars as determined by the Administrative Agent using any method of determination it deems appropriate in its sole discretion) and (c) if such amount is denominated in any other currency, the equivalent of such amount in Dollars as determined by the Administrative Agent using any method of determination it deems appropriate in its sole discretion.

“Dollars” or “\$” refers to lawful money of the United States of America.

“Domestic Subsidiary” means a Subsidiary organized under the laws of a jurisdiction located in the United States of America.

“ECP” means an “eligible contract participant” as defined in Section 1(a)(18) of the Commodity Exchange Act or any regulations promulgated thereunder and the applicable rules issued by the Commodity Futures Trading Commission and/or the SEC.

“EEA Financial Institution” means (a) any institution established in any EEA Member Country which is subject to the supervision of an EEA Resolution Authority, (b) any entity established in an EEA Member Country which is a parent of an institution described in clause (a) of this definition, or (c) any institution established in an EEA Member Country which is a subsidiary of an institution described in clauses (a) or (b) of this definition and is subject to consolidated supervision with its parent.

“EEA Member Country” means any of the member states of the European Union, Iceland, Liechtenstein, and Norway.

“EEA Resolution Authority” means any public administrative authority or any Person entrusted with public administrative authority of any EEA Member Country (including any delegee) having responsibility for the resolution of any EEA Financial Institution.

“Effective Date” means the date on which the conditions specified in Section 4.01 are satisfied (or waived in accordance with Section 9.02).

“Electronic Signature” means an electronic sound, symbol, or process attached to, or associated with, a contract or other record and adopted by a Person with the intent to sign, authenticate or accept such contract or record.

“Eligible Foreign Subsidiary” means any Foreign Subsidiary that is approved from time to time by the Administrative Agent and each of the Lenders.

“Environmental Laws” means all laws, rules, regulations, codes, ordinances, orders, decrees, judgments, injunctions, notices or binding agreements issued, promulgated or entered into by any Governmental Authority, relating in any way to the environment, preservation or reclamation of natural resources, the management, release or threatened release of any Hazardous Material or to health and safety matters.

“Environmental Liability” means any liability, contingent or otherwise (including any liability for damages, costs of environmental remediation, fines, penalties or indemnities), of the Company or any Subsidiary directly or indirectly resulting from or based upon (a) violation of any Environmental Law, (b) the generation, use, handling, transportation, storage, treatment or disposal of any Hazardous Materials, (c) exposure to any Hazardous Materials, (d) the release or threatened release of any Hazardous Materials into the environment or (e) any contract, agreement or other consensual arrangement pursuant to which liability is assumed or imposed with respect to any of the foregoing.

“Equity Interests” means shares of capital stock, partnership interests, membership interests in a limited liability company, beneficial interests in a trust or other equity ownership interests in a Person, and any warrants, options or other rights entitling the holder thereof to purchase or acquire any of the foregoing. Notwithstanding the foregoing, neither Permitted Convertible Notes nor Permitted Call Spread Swap Agreements shall constitute Equity Interests.

“ERISA” means the Employee Retirement Income Security Act of 1974, as amended from time to time.

“ERISA Affiliate” means any trade or business (whether or not incorporated) that, together with the Company, is treated as a single employer under Section 414(b) or (c) of the Code or, solely for purposes of Section 302 of ERISA and Section 412 of the Code, is treated as a single employer under Section 414 of the Code.

“ERISA Event” means (a) any “reportable event”, as defined in Section 4043 of ERISA or the regulations issued thereunder with respect to a Plan (other than an event for which the 30-day notice period is waived); (b) the existence with respect to any Plan of an “accumulated funding deficiency” (as defined in Section 412 of the Code or Section 302 of ERISA), whether or not waived; (c) the filing pursuant to Section 412(d) of the Code or Section 303(d) of ERISA of an application for a waiver of the minimum funding standard with respect to any Plan; (d) the incurrence by the Company or any of its ERISA Affiliates of any liability under Title IV of ERISA with respect to the termination of any Plan; (e) the receipt by the Company or any ERISA Affiliate from the PBGC or a plan administrator of any notice relating to an intention to terminate any Plan or Plans or to appoint a trustee to administer any Plan; (f) the incurrence by the Company or any of its ERISA Affiliates of any liability with respect to the withdrawal or partial withdrawal of the Company or any of its ERISA Affiliates from any Plan or Multiemployer Plan; or (g) the receipt by the Company or any ERISA Affiliate of any notice, or the receipt by any Multiemployer Plan from the Company or any ERISA Affiliate of any notice, concerning the imposition upon the Company or any of its ERISA Affiliates of Withdrawal Liability or a determination that a Multiemployer Plan is, or is expected to be, insolvent or in reorganization, within the meaning of Title IV of ERISA.

“EU” means the European Union.

“EU Bail-In Legislation Schedule” means the EU Bail-In Legislation Schedule published by the Loan Market Association (or any successor Person), as in effect from time to time.

“euro” and/or “EUR” means the single currency of the Participating Member States.

“Eurocurrency”, when used in reference to a currency means an Agreed Currency and when used in reference to any Loan or Borrowing, means that such Loan, or the Loans comprising such Borrowing, bears interest at a rate determined by reference to the Adjusted LIBO Rate.

“Eurocurrency Payment Office” of the Administrative Agent shall mean, for each Foreign Currency, the office, branch, affiliate or correspondent bank of the Administrative Agent for such currency as specified from time to time by the Administrative Agent to the Company and each Lender.

“Event of Default” has the meaning assigned to such term in Article VII.

“Excluded Swap Obligation” means, with respect to any Loan Party, any Specified Swap Obligation if, and to the extent that, all or a portion of the Guarantee of such Loan Party of, or the grant by such Loan Party of a security interest to secure, such Specified Swap Obligation (or any Guarantee thereof) is or becomes illegal under the Commodity Exchange Act or any rule, regulation or order of the Commodity Futures Trading Commission (or the application or official interpretation of any thereof) by virtue of such Loan Party’s failure for any reason to constitute an ECP at the time the Guarantee of such Loan Party or the grant of such security interest becomes or would become effective with respect to such Specified Swap Obligation. If a Specified Swap Obligation arises under a master agreement governing more than one swap, such exclusion shall apply only to the portion of such Specified Swap Obligation that is attributable to swaps for which such Guarantee or security interest is or becomes illegal.

“Excluded Taxes” means, with respect to the Administrative Agent, any Lender, any Issuing Bank or any other recipient of any payment to be made by or on account of any obligation of any Loan Party hereunder, (a) income or franchise taxes imposed on (or measured by) its net income by the United States of America, or by the jurisdiction under the laws of which such recipient is organized or in which its principal office is located or, in the case of any Lender, in which its applicable lending office is located, (b) any branch profits taxes imposed by the United States of America or any similar tax imposed by any other jurisdiction in which the Company is located, (c) in the case of a Foreign Lender (other than an assignee pursuant to a request by the Company under Section 2.19(b)), any U.S. federal withholding tax that is imposed on amounts payable to such Foreign Lender pursuant to a law in effect on the date on which such Foreign Lender becomes a party to this Agreement (or designates a new lending office) or is attributable to such Foreign Lender’s failure to comply with Section 2.17(e), except to the extent that such Foreign Lender (or its assignor, if any) was entitled, at the time of designation of a new lending office (or assignment), to receive additional amounts from the Company with respect to such withholding tax pursuant to Section 2.17(a), and (d) any withholding Taxes imposed under FATCA.

“Existing Convertible Notes” means the 3.25% Convertible Senior Notes due 2019 issued pursuant to the Indenture dated January 22, 2015, by and between the Company and The Bank of New York Mellon Trust Company, N.A., as trustee, as amended, restated, replaced, refinanced, supplemented or otherwise modified from time to time.

“Existing Credit Agreement” is defined in the recitals hereof.

“Existing Letters of Credit” is defined in Section 2.06(a).

“Existing Loans” is defined in Section 2.01.

“FATCA” means Sections 1471 through 1474 of the Code, as of the date of this Agreement (or any amended or successor version that is substantively comparable and not materially more onerous to comply with), any current or future regulations or official interpretations thereof, any agreement entered into pursuant to Section 1471(b)(1) of the Code and any fiscal or regulatory legislation, rules or practices adopted pursuant to any intergovernmental agreement, treaty or convention among Governmental Authorities and implementing such Sections of the Code.

“Federal Funds Effective Rate” means, for any day, the rate calculated by the NYFRB based on such day’s federal funds transactions by depository institutions, as determined in such manner as the NYFRB shall set forth on its public website from time to time, and published on the next succeeding Business Day by the NYFRB as the effective federal funds rate; provided that if the Federal Funds Effective Rate as so determined would be less than zero, such rate shall be deemed to be zero for the purposes of this Agreement.

“Financial Officer” means the chief financial officer, any vice president of finance, principal accounting officer, treasurer or controller of the Company.

“Financials” means the annual or quarterly financial statements, and accompanying certificates and other documents, of the Company and its Subsidiaries required to be delivered pursuant to Section 5.01(a) or 5.01(b).

“First Tier Foreign Subsidiary” means each Foreign Subsidiary and with respect to which any one or more of the Company and its Domestic Subsidiaries directly owns or Controls more than 50% of such Foreign Subsidiary’s Equity Interests.

“Foreign Borrower Sublimit” means \$25,000,000.

“Foreign Currencies” means Agreed Currencies other than Dollars.

“Foreign Currency LC Exposure” means, at any time, the sum of (a) the Dollar Amount of the aggregate undrawn and unexpired amount of all outstanding Foreign Currency Letters of Credit at such time plus (b) the aggregate principal Dollar Amount of all LC Disbursements in respect of Foreign Currency Letters of Credit that have not yet been reimbursed at such time.

“Foreign Currency Letter of Credit” means a Letter of Credit denominated in a Foreign Currency.

“Foreign Currency Sublimit” means \$25,000,000.

“Foreign Lender” means any Lender that is organized under the laws of a jurisdiction other than that in which the Company is located. For purposes of this definition, the United States of America, each State thereof and the District of Columbia shall be deemed to constitute a single jurisdiction.

“Foreign Subsidiary” means any Subsidiary that is not a Domestic Subsidiary.

“Foreign Subsidiary Borrower” means any Eligible Foreign Subsidiary that has been designated as a Foreign Subsidiary Borrower pursuant to Section 2.23 and that has not ceased to be a Foreign Subsidiary Borrower pursuant to such Section.

“GAAP” means generally accepted accounting principles in the United States of America.

“Governmental Authority” means the government of the United States of America, any other nation or any political subdivision thereof, whether state or local, and any agency, authority, instrumentality, regulatory body, court, central bank or other entity exercising executive, legislative, judicial, taxing, regulatory or administrative powers or functions of or pertaining to government.

“Guarantee” of or by any Person (the “guarantor”) means any obligation, contingent or otherwise, of the guarantor guaranteeing or having the economic effect of guaranteeing any Indebtedness or other obligation of any other Person (the “primary obligor”) in any manner, whether directly or indirectly, and including any obligation of the guarantor, direct or indirect, (a) to purchase or pay (or advance or supply funds for the purchase or payment of) such Indebtedness or other obligation or to purchase (or to advance or supply funds for the purchase of) any security for the payment thereof, (b) to purchase or lease property, securities or services for the purpose of assuring the owner of such Indebtedness or other obligation of the payment thereof, (c) to maintain working capital, equity capital or any other financial statement condition or liquidity of the primary obligor so as to enable the primary obligor to pay such Indebtedness or other obligation or (d) as an account party in respect of any letter of credit or letter of guaranty issued to support such Indebtedness or obligation; provided, that the term Guarantee shall not include endorsements for collection or deposit in the ordinary course of business.

“Guaranteed Obligations” has the meaning assigned to such term in Article X.

“Hazardous Materials” means all explosive or radioactive substances or wastes and all hazardous or toxic substances, wastes or other pollutants, including petroleum or petroleum distillates, asbestos or asbestos containing materials, polychlorinated biphenyls, radon gas, infectious or medical wastes and all other substances or wastes of any nature regulated pursuant to any Environmental Law.

“Holders of Secured Obligations” means the Secured Parties.

“Impacted Interest Period” has the meaning assigned to such term in the definition of “LIBO Rate”.

“Increasing Lender” has the meaning assigned to such term in Section 2.20.

“Incremental Term Loan” has the meaning assigned to such term in Section 2.20.

“Incremental Term Loan Amendment” has the meaning assigned to such term in Section 2.20.

“Indebtedness” of any Person means, without duplication, (a) all obligations of such Person for borrowed money or with respect to deposits or advances of any kind, (b) all obligations of such Person evidenced by bonds, debentures, notes or similar instruments, (c) all obligations of such Person upon which interest charges are customarily paid, (d) all obligations of such Person under conditional sale or other title retention agreements relating to property acquired by such Person, (e) all obligations of such Person in respect of the deferred purchase price of property or services (excluding current accounts payable and accrued expenses incurred in the ordinary course of business), (f) all Indebtedness of others secured by (or for which the holder of such Indebtedness has an existing right, contingent or otherwise, to be secured by) any Lien on property owned or acquired by such Person, whether or not the Indebtedness secured thereby has been assumed, (g) all Guarantees by such Person of Indebtedness of others, (h) all Capital Lease Obligations of such Person, (i) all obligations, contingent or otherwise, of such Person as an account party in respect of letters of credit and letters of guaranty, (j) all obligations, contingent or otherwise, of such Person in respect of bankers’ acceptances, (k) all obligations of such Person under any Swap Agreement or under any similar type of agreement and (l) all obligations of such Person under Sale and Leaseback Transactions. The Indebtedness of any Person shall include the Indebtedness of any other entity (including any partnership in which such Person is a general partner) to the extent such Person is liable therefor as a result of such Person’s ownership interest in or other relationship with such entity, except to the extent the terms of such Indebtedness provide that such Person is not liable therefor. Notwithstanding the foregoing and for avoidance of doubt, obligations arising under any Permitted Call Spread Swap Agreement shall not be considered Indebtedness.

“Indemnified Taxes” means Taxes, other than Excluded Taxes, and Other Taxes, imposed on or with respect to any payment made by or on account of any obligation of any Loan Party under any Loan Document.

“Ineligible Institution” has the meaning assigned to such term in Section 9.04(b)

“Interest Election Request” means a request by the applicable Borrower to convert or continue a Revolving Borrowing in accordance with Section 2.08 in the form attached hereto as Exhibit I-2.

“Interest Payment Date” means (a) with respect to any ABR Loan (other than a Swingline Loan), the last day of each March, June, September and December and the Maturity Date, (b) with respect to any Eurocurrency Loan, the last day of each Interest Period applicable to the Borrowing of which such Loan is a part and, in the case of a Eurocurrency Borrowing with an Interest Period of more than three months’ duration, each day prior to the last day of such Interest Period that occurs at intervals of three months’ duration after the first day of such Interest Period and the Maturity Date and (c) with respect to any Swingline Loan, the day that such Loan is required to be repaid and the Maturity Date.

“Interest Period” means with respect to any Eurocurrency Borrowing, the period commencing on the date of such Borrowing and ending on the numerically corresponding day in the calendar month that is one, two, three or six months thereafter, as the applicable Borrower (or the Company on behalf of the applicable Borrower) may elect; provided, that (i) if any Interest Period would end on a day other than a Business Day, such Interest Period shall be extended to the next succeeding Business Day unless such next succeeding Business Day would fall in the next calendar month, in which case such Interest Period shall end on the next preceding Business Day and (ii) any Interest Period pertaining to a Eurocurrency Borrowing that commences on the last Business Day of a calendar month (or on a day for which there is no numerically corresponding day in the last calendar month of such Interest Period) shall end on the last Business Day of the last calendar month of such Interest Period. For purposes hereof, the date of a Borrowing initially shall be the date on which such Borrowing is made and thereafter shall be the effective date of the most recent conversion or continuation of such Borrowing.

“Interpolated Rate” means, at any time, for any Interest Period, the rate *per annum* (rounded to the same number of decimal places as the LIBOR Screen Rate) determined by the Administrative Agent (which determination shall be conclusive and binding absent manifest error) to be equal to the rate that results from interpolating on a linear basis between: (a) the LIBOR Screen Rate for the longest period (for which the LIBOR Screen Rate is available for the applicable currency) that is shorter than the Impacted Interest Period and (b) the LIBOR Screen Rate for the shortest period (for which the LIBOR Screen Rate is available for the applicable currency) that exceeds the Impacted Interest Period, in each case, at such time.

“Issuing Bank” means each of JPMorgan Chase Bank, N.A., Bank of America, N.A., Citizens Bank, N.A. and TD Bank, N.A., in its capacity as the issuer of Letters of Credit hereunder, and its successors in such capacity as provided in Section 2.06(i). Any Issuing Bank may, in its discretion, arrange for one or more Letters of Credit to be issued by Affiliates of such Issuing Bank, in which case the term “Issuing Bank” shall include any such Affiliate with respect to Letters of Credit issued by such Affiliate. Each reference herein to the “Issuing Bank” in connection with a Letter of Credit or other matter shall be deemed to be a reference to the relevant Issuing Bank with respect thereto, and, further, references herein to “the Issuing Bank” shall be deemed to refer to each of the Issuing Banks or the relevant Issuing Bank, as the context requires.

“Joint Venture” means any corporation, partnership, limited liability company or other legal entity or arrangement in which the Company or any Subsidiary has an equity investment and direct or indirect Control.

“LC Collateral Account” has the meaning assigned to such term in Section 2.06(j).

“LC Disbursement” means a payment made by any Issuing Bank pursuant to a Letter of Credit.

“LC Exposure” means, at any time, the sum of (a) the aggregate undrawn Dollar Amount of all outstanding Letters of Credit at such time plus (b) the aggregate Dollar Amount of all LC Disbursements that have not yet been reimbursed by or on behalf of the Company at such time. The LC Exposure of any Lender at any time shall be its Applicable Percentage of the total LC Exposure at such time.

“Lender Parent” means, with respect to any Lender, any Person as to which such Lender is, directly or indirectly, a subsidiary.

“Lenders” means the Persons listed on Schedule 2.01A and any other Person that shall have become a Lender hereunder pursuant to Section 2.20 or pursuant to an Assignment and Assumption or other documentation contemplated hereby, other than any such Person that ceases to be a party hereto pursuant to an Assignment and Assumption or other documentation contemplated hereby. Unless the context otherwise requires, the term “Lenders” includes the Swingline Lender and the Issuing Banks.

“Letter of Credit” means any letter of credit issued pursuant to this Agreement.

“Letter of Credit Commitment” means, with respect to each Issuing Bank, the commitment of such Issuing Bank to issue Letters of Credit hereunder. The initial amount of each Issuing Bank’s Letter of Credit Commitment is set forth on Schedule 2.01B, or if an Issuing Bank has entered into an Assignment and Assumption, the amount set forth for such Issuing Bank as its Letter of Credit Commitment in the Register maintained by the Administrative Agent.

“Letter of Credit Agreement” has the meaning assigned to such term in Section 2.06(b).

“LIBO Rate” means, for any day and time, with respect to any Eurocurrency Borrowing denominated in any Agreed Currency and for any Interest Period, the London interbank offered rate as administered by ICE Benchmark Administration (or any other Person that takes over the administration of such rate) for such Agreed Currency for a period equal in length to such Interest Period as displayed on such day and time on pages LIBOR01 or LIBOR02 of the Reuters screen that displays such rate or, in the event such rate does not appear on a Reuters page or screen, on any successor or substitute page on such screen that displays such rate, or on the appropriate page of such other information service that publishes such rate from time to time as shall be selected by the Administrative Agent in its reasonable discretion (in each case the “LIBOR Screen Rate”) at approximately 11:00 a.m., London time, on the Quotation Day for such Agreed Currency and Interest Period; provided that, if the LIBOR Screen Rate as so determined would be less than zero, such rate shall be deemed to be zero for the purposes of this Agreement; provided, further, that if a LIBOR Screen Rate shall not be available at such time for such Interest Period (the “Impacted Interest Period”), then the LIBO Rate for such Agreed Currency and such Interest Period shall be the Interpolated Rate; provided, that, if any Interpolated Rate shall be less than zero, such rate shall be deemed to be zero for the purposes of this Agreement. It is understood and agreed that all of the terms and conditions of this definition of “LIBO Rate” shall be subject to Section 2.14.

“LIBOR Screen Rate” has the meaning assigned to such term in the definition of “LIBO Rate”.

“Lien” means, with respect to any asset, (a) any mortgage, deed of trust, lien, pledge, hypothecation, encumbrance, charge or security interest in, on or of such asset, (b) the interest of a vendor or a lessor under any conditional sale agreement, capital lease or title retention agreement (or any financing lease having substantially the same economic effect as any of the foregoing) relating to such asset and (c) in the case of securities, any purchase option, call or similar right of a third party with respect to such securities.

“Liquidity” has the meaning assigned to such term in 6.11(c).

“Loan Documents” means this Agreement, each Borrowing Subsidiary Agreement, each Borrowing Subsidiary Termination, the Subsidiary Guaranty, the Collateral Documents (including, without limitation, the Pledge Agreements), any promissory notes executed and delivered pursuant to Section 2.10(e), any Letter of Credit applications and any agreements between the Borrower and an Issuing Bank regarding such Issuing Bank’s Letter of Credit Commitment or the respective rights and obligations between the Borrower and such Issuing Bank in connection with the issuance of Letters of Credit and any and all other instruments and documents executed and delivered in connection with any of the foregoing.

“Loan Parties” means, collectively, the Borrowers and the Subsidiary Guarantors.

“Loans” means the loans made by the Lenders to the Borrowers, or otherwise incurred by the Borrowers, pursuant to this Agreement.

“Local Time” means (i) New York City time in the case of a Loan, Borrowing or LC Disbursement denominated in Dollars and (ii) local time in the case of a Loan, Borrowing or LC Disbursement denominated in a Foreign Currency (it being understood that such local time shall mean London, England time unless otherwise notified by the Administrative Agent).

“Material Adverse Effect” means a material adverse effect on (a) the business, assets, property or condition (financial or otherwise) of the Company and the Subsidiaries taken as a whole or (b) the ability of any Borrower or any other Loan Party to perform any of its obligations under this Agreement or any other Loan Document or (c) the rights of or remedies available to the Lenders under this Agreement or any other Loan Document.

“Material Indebtedness” means any Indebtedness (other than the Loans and Letters of Credit), or obligations in respect of one or more Swap Agreements, of any one or more of the Company and its Subsidiaries in an aggregate principal amount exceeding \$15,000,000. For purposes of determining Material Indebtedness, the “principal amount” of the obligations of the Company or any Subsidiary in respect of any Swap Agreement at any time shall be the maximum aggregate amount (giving effect to any netting agreements) that the Company or such Subsidiary would be required to pay if such Swap Agreement were terminated at such time.

“Material Subsidiary” means each Subsidiary (i) which, as of the most recent fiscal year of the Company, for the period of four consecutive fiscal quarters then ended, for which financial statements have been delivered pursuant to Section 5.01, contributed greater than fifteen percent (15%) of the Company’s Consolidated EBITDA for such period or (ii) which contributed greater than fifteen percent (15%) of the Company’s Consolidated Total Assets as of such date; provided that, if at any time the aggregate amount of the Company’s Consolidated EBITDA or Company’s Consolidated Total Assets attributable to Subsidiaries (other than Affected Foreign Subsidiaries) that are not Subsidiary Guarantors exceeds twenty percent (20%) of the Company’s Consolidated EBITDA for any such period or twenty percent (20%) of the Company’s Consolidated Total Assets as of the end of any such fiscal year, the Company (or, in the event the Company has failed to do so within ten days, the Administrative Agent) shall designate sufficient Subsidiaries (other than Affected Foreign Subsidiaries) as “Material Subsidiaries” to eliminate such excess, and such designated Subsidiaries shall for all purposes of this Agreement constitute Material Subsidiaries; provided, that, in the case of a Person becoming a Subsidiary pursuant to an acquisition, the foregoing financial tests shall be applied on a Pro Forma Basis immediately upon consummation of such acquisition and, assuming such Subsidiary would constitute a Material Subsidiary on a Pro Forma Basis, the Company shall comply with Section 5.09.

“Maturity Date” means September 27, 2023; provided, however, if such date is not a Business Day, the Maturity Date shall be the next preceding Business Day.

“Moody’s” means Moody’s Investors Service, Inc.

“Multiemployer Plan” means a multiemployer plan as defined in Section 4001(a)(3) of ERISA.

“New Money Credit Event” means with respect to any Issuing Bank, any increase (directly or indirectly) in such Issuing Bank’s exposure (whether by way of additional credit or banking facilities or otherwise, including as part of a restructuring) to the Borrower or any Governmental Authority in the Borrower’s or any applicable Letter of Credit beneficiary’s country occurring by reason of (i) any law, action or requirement of any Governmental Authority in the Borrower’s or such Letter of Credit beneficiary’s country, or (ii) any request in respect of external indebtedness of borrowers in the Borrower’s or such Letter of Credit beneficiary’s country applicable to banks generally which conduct business with such borrowers, or (iii) any agreement in relation to clause (i) or (ii), in each case to the extent calculated by reference to the aggregate Revolving Credit Exposures outstanding prior to such increase.

“NYFRB” means the Federal Reserve Bank of New York.

“NYFRB Rate” means, for any day, the greater of (a) the Federal Funds Effective Rate in effect on such day and (b) the Overnight Bank Funding Rate in effect on such day (or for any day that is not a Business Day, for the immediately preceding Business Day); provided that if none of such rates are published for any day that is a Business Day, the term “NYFRB Rate” means the rate for a federal funds transaction quoted at 11:00 a.m., New York City time, on such day received by the Administrative Agent from a federal funds broker of recognized standing selected by it; provided, further, that if any of the aforesaid rates as so determined would be less than zero, such rate shall be deemed to be zero for purposes of this Agreement.

“Obligations” means all unpaid principal of and accrued and unpaid interest on the Loans, all LC Exposure, all accrued and unpaid fees and all expenses, reimbursements, indemnities and other obligations and indebtedness (including interest and fees accruing during the pendency of any bankruptcy, insolvency, receivership or other similar proceeding, regardless of whether allowed or allowable in such proceeding), obligations and liabilities of any of the Company and its Subsidiaries to any of the Lenders, the Administrative Agent, any Issuing Bank or any indemnified party, individually or collectively, existing on the Effective Date or arising thereafter, direct or indirect, joint or several, absolute or contingent, matured or unmatured, liquidated or unliquidated, secured or unsecured, arising by contract, operation of law or otherwise, arising or incurred under this Agreement or any of the other Loan Documents or in respect of any of the Loans made or reimbursement or other obligations incurred or any of the Letters of Credit or other instruments at any time evidencing any thereof.

“OFAC” means the Office of Foreign Assets Control of the U.S. Department of Treasury.

“Other Taxes” means any and all present or future stamp, court or documentary, intangible, recording, filing taxes or any other excise or property or similar taxes, charges or similar levies arising from any payment made hereunder or from the execution, delivery or enforcement of, or otherwise with respect to, this Agreement or any other Loan Document.

“Overnight Bank Funding Rate” means, for any day, the rate comprised of both overnight federal funds and overnight eurodollar borrowings by U.S.-managed banking offices of depository institutions, as such composite rate shall be determined by the NYFRB as set forth on its public website from time to time, and published on the next succeeding Business Day by the NYFRB as an overnight bank funding rate.

“Overnight Foreign Currency Rate” means, for any amount payable in a Foreign Currency, the rate of interest per annum as determined by the Administrative Agent at which overnight or weekend deposits in the relevant currency (or if such amount due remains unpaid for more than three Business Days, then for such other period of time as the Administrative Agent may elect) for delivery in immediately available and freely transferable funds would be offered by the Administrative Agent to major banks in the interbank market upon request of such major banks for the relevant currency as determined above and in an amount comparable to the unpaid principal amount of the related Credit Event, plus any taxes, levies, imposts, duties, deductions, charges or withholdings imposed upon, or charged to, the Administrative Agent by any relevant correspondent bank in respect of such amount in such relevant currency.

“Participant” has the meaning set forth in Section 9.04.

“Participant Register” has the meaning set forth in Section 9.04.

“Participating Member State” means any member state of the European Union that adopts or has adopted the euro as its lawful currency in accordance with legislation of the European Union relating to economic and monetary union.

“Patriot Act” means the USA PATRIOT Act (Title III of Pub. L. 107-56 (signed into law October 26, 2001)).

“PBGC” means the Pension Benefit Guaranty Corporation referred to and defined in ERISA and any successor entity performing similar functions.

“Permitted Acquisition” means any acquisition (whether by purchase, merger, consolidation or otherwise) or series of related acquisitions by the Company or any Subsidiary of all or substantially all the assets of, or more than a majority of the Equity Interests in, a Person or division or line of business of a Person if, at the time of and immediately after giving effect thereto, (a) no Default has occurred and is continuing or would arise after giving effect thereto, (b) such Person or division or line of business is engaged in the same or a similar line of business as the Company and the Subsidiaries or business reasonably related or complimentary thereto, (c) all actions required to be taken with respect to such acquired or newly formed Subsidiary under Sections 5.09 and 5.10 shall have been taken, (d) the Company and the Subsidiaries are in compliance with the covenants contained in Section 6.11 on a Pro Forma Basis after giving effect to such acquisition and recomputed as of the last day of the most recently ended fiscal quarter of the Company for which financial statements are available, as if such acquisition (and any related incurrence or repayment of Indebtedness, with any new Indebtedness being deemed to be amortized over the applicable testing period in accordance with its terms) had occurred on the first day of each relevant period for testing such compliance and, if the aggregate consideration (including the concurrent repayment or assumption of any indebtedness and related investments) paid in respect of such acquisition exceeds \$50,000,000, the Company shall have delivered to the Administrative Agent a certificate of a Financial Officer of the Company to such effect, together with all relevant financial information, statements and projections requested by the Administrative Agent and (e) in the case of an acquisition or merger involving the Company or a Subsidiary, the Company or such Subsidiary is the surviving entity of such merger and/or consolidation.

“Permitted Call Spread Swap Agreements” means (a) any Swap Agreement (including, but not limited to, any bond hedge transaction or capped call transaction) pursuant to which the Company acquires an option requiring the counterparty thereto to deliver to the Company shares of common stock of the Company, the cash value of such shares or a combination thereof from time to time upon exercise of such option and (b) any Swap Agreement pursuant to which the Company issues to the counterparty thereto warrants to acquire common stock of the Company (whether such warrant is settled in shares, cash or a combination thereof), in each case entered into by the Company in connection with the issuance of Convertible Debt Securities; provided that (i) the terms, conditions and covenants of each such Swap Agreement shall be such as are customary for Swap Agreements of such type (as determined by the Board of Directors of the Company in good faith) and (ii) in the case of clause (b) above, such Swap Agreement would be classified as an equity instrument in accordance with GAAP, and the settlement of such Swap Agreement does not require the Company to make any payment in cash or cash equivalents that would disqualify such Swap Agreement from so being classified as an equity instrument.

“Permitted Convertible Notes” means (i) the Existing Convertible Notes and (ii) any unsecured notes issued by the Company or any Subsidiary that are convertible into common stock of the Company or any Subsidiary, cash or any combination thereof and (other than in the case of intercompany Indebtedness) are permitted to be issued pursuant to the definition of Permitted Unsecured Indebtedness.

“Permitted Encumbrances” means:

(a) Liens imposed by law for Taxes that are not yet due or are being contested in compliance with Section 5.04, or as to which the grace period, if any, related thereto has not expired;

(b) carriers’, warehousemen’s, mechanics’, materialmen’s, repairmen’s and other like Liens imposed by law, arising in the ordinary course of business and securing obligations that are not overdue by more than thirty (30) days or are not in excess of \$10,000,000, individually, or in the aggregate, or are being contested in compliance with Section 5.04;

(c) pledges and deposits made in the ordinary course of business in compliance with workers' compensation, unemployment insurance and other social security laws or regulations;

(d) deposits to secure the performance of bids, trade contracts, leases, statutory obligations, surety and appeal bonds, performance bonds and other obligations of a like nature, in each case in the ordinary course of business;

(e) judgment liens in respect of judgments that do not constitute an Event of Default under clause (k) of Article VII; and

(f) easements, zoning restrictions, rights-of-way and similar encumbrances on real property imposed by law or arising in the ordinary course of business that do not secure any monetary obligations and do not materially detract from the value of the affected property or interfere with the ordinary conduct of business of the Company or any Subsidiary;

provided that the term "Permitted Encumbrances" shall not include any Lien securing Indebtedness.

"Permitted Investments" means:

(a) direct obligations of, or obligations the principal of and interest on which are unconditionally guaranteed by, the United States of America (or by any agency thereof to the extent such obligations are backed by the full faith and credit of the United States of America), in each case maturing within one year from the date of acquisition thereof;

(b) investments in commercial paper maturing within one year from the date of acquisition thereof and having, at such date of acquisition, the credit rating of A1 from S&P or P1 from Moody's;

(c) investments in certificates of deposit, banker's acceptances and time deposits maturing within one year from the date of acquisition thereof issued or guaranteed by or placed with, and money market deposit accounts issued or offered by, any domestic office of any commercial bank organized under the laws of the United States of America or any State thereof which has a combined capital and surplus and undivided profits of not less than \$500,000,000;

(d) fully collateralized repurchase agreements with a term of not more than 30 days for securities described in clause (a) above and entered into with a financial institution satisfying the criteria described in clause (c) above;

(e) investments in taxable or tax exempt obligations of any state of the United States of America or any municipality thereof maturing within three years of the date of acquisition thereof and which is rated "A1" or higher by Moody's or "AA" or higher by S&P;

(f) investments in fixed income securities maturing within one year of the date of acquisition thereof and which are rated "A" or higher by Moody's or S&P;

(g) to the extent the aggregate amount of such investments does not exceed 10% of Permitted Investments, investments in fixed income securities maturing within two years of the date of acquisition thereof and which are rated between "BBB-" and "BBB+" by S&P;

(h) investments in money market mutual funds having assets in excess of \$1,000,000,000 whose sole investments are any securities described in clauses (a) through (g) above; and

(i) in the case of any Foreign Subsidiary, investments of comparable tenure and credit quality to those described in the foregoing clauses (a) through (h) or other high quality short term investments, in each case, customarily utilized in countries in which such Foreign Subsidiary operates for short term cash management purposes.

“Permitted Unsecured Indebtedness” means any unsecured Indebtedness of the Company (including (x) any Permitted Convertible Notes and (y) unsecured Subordinated Indebtedness to the extent subordinated to the Secured Obligations on terms reasonably acceptable to the Administrative Agent) so long as (i) the Indebtedness thereunder does not mature, and is otherwise not subject to any mandatory prepayment, redemption, defeasance, scheduled amortization or other scheduled payments of principal, in each case prior to the date that is six (6) months after the Maturity Date (it being understood that neither (x) any provision requiring an offer to purchase such Indebtedness as a result of change of control or asset sale or other fundamental change nor (y) any early conversion of any Permitted Convertible Notes in accordance with the terms thereof shall violate the foregoing restriction), (ii) both immediately prior to and after giving effect (including giving effect on a Pro Forma Basis) thereto, (x) no Default or Event of Default shall exist or would result therefrom and (y) the Company shall be in compliance with the covenants contained in Section 6.11, (iii) such Indebtedness is not guaranteed by any Subsidiary of the Company other than the Subsidiary Guarantors (which guarantees, if such Indebtedness is subordinated, shall be expressly subordinated to the Secured Obligations on terms not less favorable to the Lenders than the subordination terms of such Subordinated Indebtedness) and (iv) the covenants applicable to such Indebtedness are not more onerous or more restrictive in any material respect (taken as a whole) than the applicable covenants set forth in this Agreement.

“Person” means any natural person, corporation, limited liability company, trust, joint venture, association, company, partnership, Governmental Authority or other entity.

“PKL” means PKL, Ltd., a Korean corporation.

“PKLT” means PKLT Co., Ltd., a Taiwanese corporation.

“Plan” means any employee pension benefit plan (other than a Multiemployer Plan) subject to the provisions of Title IV of ERISA or Section 412 of the Code or Section 302 of ERISA, and in respect of which the Company or any ERISA Affiliate is (or, if such plan were terminated, would under Section 4069 of ERISA be deemed to be) an “employer” as defined in Section 3(5) of ERISA.

“Plan Asset Regulations” means 29 CFR § 2510.3-101 *et seq.*, as modified by Section 3(42) of ERISA, as amended from time to time.

“Platform” means Debt Domain, Intralinks, Syndtrak or a substantially similar electronic transmission system.

“Pledge Agreements” means that certain Second Amended and Restated Pledge Agreement substantially in the form of Exhibit H (including any and all supplements thereto) dated as of the Effective Date and executed by the relevant Loan Parties, and, in the case of any pledge of Equity Interests of a Foreign Subsidiary, any other pledge agreements, share mortgages, charges and comparable instruments and documents from time to time executed pursuant to the terms of Section 5.09 in favor of the Collateral Agent for the benefit of the Holder of Secured Obligations as amended, restated, supplemented or otherwise modified from time to time.

“Pledge Subsidiary” means (i) each Domestic Subsidiary and (ii) each First Tier Foreign Subsidiary that is a Material Subsidiary.

“Pledged Equity” means all pledged Equity Interests in or upon which a security interest or Lien is from time to time granted to the Collateral Agent, for the benefit of the Holders of Secured Obligations, under the Pledge Agreements.

“Pounds Sterling” means the lawful currency of the United Kingdom.

“PRC Subsidiary” means any Subsidiary that (i) is organized under the laws of the People’s Republic of China (“PRC”) or (ii) has its principal place of business in PRC.

“PRC Transactions” means the sale of up to 49.99% of the shares of the PRC Subsidiary to a third party in connection with the formation and operation of a joint venture.

“Prime Rate” means the rate of interest last quoted by The Wall Street Journal as the “Prime Rate” in the U.S. or, if The Wall Street Journal ceases to quote such rate, the highest per annum interest rate published by the Board in Federal Reserve Statistical Release H.15 (519) (Selected Interest Rates) as the “bank prime loan” rate or, if such rate is no longer quoted therein, any similar rate quoted therein (as determined by the Administrative Agent) or any similar release by the Board (as determined by the Administrative Agent). Each change in the Prime Rate shall be effective from and including the date such change is publicly announced or quoted as being effective.

“Pro Forma Basis” means on a basis in accordance with GAAP and Regulation S-X and otherwise reasonably satisfactory to the Administrative Agent.

“PTE” means a prohibited transaction class exemption issued by the U.S. Department of Labor, as any such exemption may be amended from time to time.

“Quotation Day” means, with respect to any Eurocurrency Borrowing for any Interest Period, (i) if the currency is Pounds Sterling, the first day of such Interest Period, (ii) if the currency is euro, the day that is two (2) TARGET2 Days before the first day of such Interest Period, and (iii) for any other currency, two Business Days prior to the commencement of such Interest Period (unless, in each case, market practice differs in the relevant market where the LIBO Rate for such currency is to be determined, in which case the Quotation Day will be determined by the Administrative Agent in accordance with market practice in such market (and if quotations would normally be given on more than one day, then the Quotation Day will be the last of those days)).

“Reference Bank Rate” means the arithmetic mean of the rates (rounded upwards to four decimal places) supplied to the Administrative Agent at its request by the Reference Banks (as the case may be) as of the applicable time on the Quotation Day for Loans in the applicable currency and the applicable Interest Period as the rate at which the relevant Reference Bank could borrow funds in the London (or other applicable) interbank market in the relevant currency and for the relevant period, were it to do so by asking for and then accepting interbank offers in reasonable market size in that currency and for that period.

“Reference Banks” means such banks as may be appointed by the Administrative Agent in consultation with the Company. No Lender shall be obligated to be a Reference Bank without its consent.

“Register” has the meaning set forth in Section 9.04.

“Regulation S-X” means Regulation S-X under the Securities Act of 1933, as amended.

“Related Parties” means, with respect to any specified Person, such Person’s Affiliates and the respective directors, officers, employees, agents and advisors of such Person and such Person’s Affiliates.

“Required Lenders” means, subject to Section 2.24, at any time, two (2) or more unaffiliated Lenders having Revolving Credit Exposures and unused Commitments representing more than 50% of the sum of the Total Revolving Credit Exposure and unused Commitments at such time; provided that for purposes of declaring the Loans to be due and payable pursuant to Article VII, and for all purposes after the Loans become due and payable pursuant to Article VII or the Commitments expire or terminate, then, as to each Lender, clause (a) of the definition of Swingline Exposure shall only be applicable for purposes of determining its Revolving Credit Exposure to the extent such Lender shall have funded its participation in the outstanding Swingline Loans to the extent required under Section 2.05(c).

“Restricted Payment” means any dividend or other distribution (whether in cash, securities or other property) with respect to any Equity Interests in the Company or any Subsidiary, or any payment (whether in cash, securities or other property), including any sinking fund or similar deposit, on account of the purchase, redemption, retirement, acquisition, cancellation or termination of any such Equity Interests in the Company or any Subsidiary or any option, warrant or other right to acquire any such Equity Interests in the Company or any Subsidiary. Notwithstanding the foregoing, and for the avoidance of doubt, (i) the conversion of (including any cash payment upon conversion), or payment of any principal or premium on, or payment of any interest with respect to, any Permitted Convertible Notes shall not constitute a Restricted Payment and (ii) any payment with respect to, or early unwind or settlement of, any Permitted Call Spread Swap Agreement shall not constitute a Restricted Payment. Notwithstanding the foregoing, any cash payment made to repurchase any Equity Interests of the Company issued in connection with the conversion of any Permitted Convertible Notes at the maturity thereof shall not be considered a “Restricted Payment” so long as (x) such repurchases are made at then prevailing market prices and (y) the aggregate amount of cash delivered by the Company with respect to such conversions, including the related repurchases, does not exceed the par value of such converted Permitted Convertible Notes plus any accrued and unpaid interest thereon through the date of such conversions plus the net cash proceeds, if any, received by the Company pursuant to the related exercise or early unwind or termination of the related Permitted Call Spread Swap Agreements.

“Revolving Credit Exposure” means, with respect to any Lender at any time, the sum of the outstanding principal amount of such Lender’s Revolving Loans and its LC Exposure and Swingline Exposure at such time.

“Revolving Loan” means a Loan made pursuant to Section 2.01.

“S&P” means Standard & Poor’s Ratings Services, a Standard & Poor’s Financial Services LLC business.

“Sale and Leaseback Transaction” means any sale or other transfer of property by any Person with the intent to lease such property as lessee.

“Sanctioned Country” means, at any time, a country, region or territory which is itself the subject or target of any Sanctions (at the time of this Agreement, Crimea, Cuba, Iran, North Korea and Syria).

“Sanctioned Person” means, at any time, (a) any Person listed in any Sanctions-related list of designated Persons maintained by OFAC, the U.S. Department of State, the United Nations Security Council, the European Union, any EU member state, Her Majesty’s Treasury of the United Kingdom or other relevant sanctions authority, (b) any Person operating, organized or resident in a Sanctioned Country, (c) any Person owned or controlled by any such Person or Persons described in the foregoing clauses (a) or (b), or (d) any Person otherwise the subject of any Sanctions.

“Sanctions” means economic or financial sanctions or trade embargoes imposed, administered or enforced from time to time by (a) the U.S. government, including those administered by OFAC or the U.S. Department of State or (b) the United Nations Security Council, the European Union, any EU member state, Her Majesty’s Treasury of the United Kingdom or other relevant sanctions authority.

“SEC” means the United States Securities and Exchange Commission.

“Secured Obligations” means all Obligations, together with all (i) Banking Services Obligations and (ii) Swap Obligations owing to one or more Secured Parties or their respective Affiliates ; provided that (i) obligations arising under Permitted Call Spread Swap Agreements shall not be considered Secured Obligations and (ii) the definition of “Secured Obligations” shall not create or include any guarantee by any Loan Party of (or grant of security interest by any Loan Party to support, as applicable) any Excluded Swap Obligations of such Loan Party for purposes of determining any obligations of any Loan Party.

“Secured Parties” means the holders of the Secured Obligations from time to time and shall include (i) each Lender and each Issuing Bank in respect of its Loans and LC Exposure respectively, (ii) the Administrative Agent, the Issuing Banks and the Lenders in respect of all other present and future obligations and liabilities of the Company and each Subsidiary of every type and description arising under or in connection with this Agreement or any other Loan Document, (iii) each Lender and affiliate of such Lender in respect of Swap Agreements and Banking Services Agreements entered into with such Person by the Company or any Subsidiary, (iv) each indemnified party under Section 9.03 in respect of the obligations and liabilities of the Borrowers to such Person hereunder and under the other Loan Documents, and (v) their respective successors and (in the case of a Lender, permitted) transferees and assigns.

“Security Agreement” means that certain Third Amended and Restated Security Agreement (including any and all supplements thereto), dated as of the Effective Date, between the Loan Parties and the Collateral Agent, for the benefit of the Collateral Agent and the other Holders of Secured Obligations, as the same may be amended, restated or otherwise modified from time to time.

“Specified Ancillary Obligations” means all obligations and liabilities (including interest and fees accruing during the pendency of any bankruptcy, insolvency, receivership or other similar proceeding, regardless of whether allowed or allowable in such proceeding) of any of the Subsidiaries, existing on the Effective Date or arising thereafter, direct or indirect, joint or several, absolute or contingent, matured or unmatured, liquidated or unliquidated, secured or unsecured, arising by contract, operation of law or otherwise, to the Lenders or any of their Affiliates under any Swap Agreement or any Banking Services Agreement; provided that the definition of “Specified Ancillary Obligations” shall not create or include any guarantee by any Loan Party of (or grant of security interest by any Loan Party to support, as applicable) any Excluded Swap Obligations of such Loan Party for purposes of determining any obligations of any Loan Party.

“Specified Capital Expenditures” means, solely for purposes of calculating the Interest Coverage Ratio for each period of four (4) consecutive fiscal quarters ending October 31, 2018, January 31, 2019 and April 30, 2019, Capital Expenditures made by or on behalf of the PRC Subsidiaries.

“Specified Swap Obligation” means, with respect to any Loan Party, any obligation to pay or perform under any agreement, contract or transaction that constitutes a “swap” within the meaning of Section 1a(47) of the Commodity Exchange Act or any rules or regulations promulgated thereunder.

“Statutory Reserve Rate” means a fraction (expressed as a decimal), the numerator of which is the number one and the denominator of which is the number one minus the aggregate of the maximum reserve, liquid asset, fees or similar requirements (including any marginal, special, emergency or supplemental reserves or other requirements) established by any central bank, monetary authority, the Board, the Financial Conduct Authority, the Prudential Regulation Authority, the European Central Bank or other Governmental Authority for any category of deposits or liabilities customarily used to fund loans in the applicable currency, expressed in the case of each such requirement as a decimal. Such reserve, liquid asset, fees or similar requirements shall include those imposed pursuant to Regulation D of the Board. Eurocurrency Loans shall be deemed to be subject to such reserve, liquid asset, fee or similar requirements without benefit of or credit for proration, exemptions or offsets that may be available from time to time to any Lender under any applicable law, rule or regulation, including Regulation D of the Board. The Statutory Reserve Rate shall be adjusted automatically on and as of the effective date of any change in any reserve, liquid asset or similar requirement.

“Subordinated Indebtedness” of the Company or any Subsidiary means any Indebtedness of such Person the payment of which is subordinated to payment of the obligations under the Loan Documents to the written satisfaction of, and the terms and conditions of which are otherwise satisfactory to, the Administrative Agent.

“Subordinated Indebtedness Documents” means any document, agreement or instrument evidencing any Subordinated Indebtedness or entered into in connection with any Subordinated Indebtedness.

“subsidiary” means, with respect to any Person (the “parent”) at any date, any corporation, limited liability company, partnership, association or other entity the accounts of which would be consolidated with those of the parent in the parent’s consolidated financial statements if such financial statements were prepared in accordance with GAAP as of such date, as well as any other corporation, limited liability company, partnership, association or other entity (a) of which securities or other ownership interests representing more than 50% of the equity or more than 50% of the ordinary voting power or, in the case of a partnership, more than 50% of the general partnership interests are, as of such date, owned, Controlled or held, or (b) that is, as of such date, otherwise Controlled, by the parent or one or more subsidiaries of the parent or by the parent and one or more subsidiaries of the parent.

“Subsidiary” means any subsidiary of the Company.

“Subsidiary Guarantor” means each Subsidiary (other than Affected Foreign Subsidiaries) that is a party to the Subsidiary Guaranty. The Subsidiary Guarantors on the Effective Date are identified as such in Schedule 3.01 hereto.

“Subsidiary Guaranty” means that certain Third Amended and Restated Guaranty, dated as of the Effective Date, in the form of Exhibit G (including any and all supplements thereto) and executed by each Subsidiary Guarantor party thereto, and, in the case of any guaranty by a Foreign Subsidiary, any other guaranty agreements as are requested by the Administrative Agent and its counsel, in each case as amended, restated, supplemented or otherwise modified from time to time.

“Swap Agreement” means any agreement with respect to any swap, forward, future or derivative transaction or option or similar agreement involving, or settled by reference to, one or more rates, currencies, commodities, equity or debt instruments or securities, or economic, financial or pricing indices or measures of economic, financial or pricing risk or value or any similar transaction or any combination of these transactions; provided that no phantom stock or similar plan providing for payments only on account of services provided by current or former directors, officers, employees or consultants of the Company or the Subsidiaries shall be a Swap Agreement.

“Swap Obligations” means any and all obligations of the Company or any Subsidiary, whether absolute or contingent and howsoever and whensoever created, arising, evidenced or acquired (including all renewals, extensions and modifications thereof and substitutions therefor), under (a) any and all Swap Agreements permitted hereunder with a Lender or an Affiliate of a Lender, and (b) any and all cancellations, buy backs, reversals, terminations or assignments of any such Swap Agreement transaction

“Swingline Exposure” means, at any time, the aggregate principal amount of all Swingline Loans outstanding at such time. The Swingline Exposure of any Lender at any time shall be the sum of (a) its Applicable Percentage of the total Swingline Exposure at such time other than with respect to any Swingline Loans made by such Lender in its capacity as a Swingline Lender and (b) the aggregate principal amount of all Swingline Loans made by such Lender as a Swingline Lender outstanding at such time (less the amount of participations funded by the other Lenders in such Swingline Loans).

“Swingline Lender” means JPMorgan Chase Bank, N.A., in its capacity as lender of Swingline Loans hereunder.

“Swingline Loan” means a Loan made pursuant to Section 2.05.

“Swingline Sublimit” means \$10,000,000.

“Syndication Agent” means Bank of America, N.A., in its capacity as syndication agent for the credit facility evidenced by this Agreement.

“Taiwan JV” means the Joint Venture between the Company and Dai Nippon Printing Co., Ltd.

“Taiwan JV Transactions” means the transactions described in Schedule 6.04 hereto related to the creation and operation of the Taiwan JV.

“TARGET2” means the Trans-European Automated Real-time Gross Settlement Express Transfer (TARGET2) payment system (or, if such payment system ceases to be operative, such other payment system (if any) reasonably determined by the Administrative Agent to be a suitable replacement) for the settlement of payments in euro.

“TARGET2 Day” means a day that TARGET2 is open for the settlement of payments in euro.

“Taxes” means all present or future taxes, levies, imposts, duties, deductions, withholdings (including backup withholding), value added taxes, or any other goods and services, use or sales taxes, assessments, fees or other charges imposed by any Governmental Authority, including any interest, additions to tax or penalties applicable thereto.

“Total Leverage Ratio” has the meaning assigned to such term in Section 6.11(b).

“Total Revolving Credit Exposure” means, at any time, the sum of the outstanding principal amount of all Lenders’ Revolving Loans, their LC Exposure and their Swingline Exposure at such time; provided, that clause (a) of the definition of Swingline Exposure shall only be applicable to the extent Lenders shall have funded their respective participations in the outstanding Swingline Loans.

“Transactions” means the execution, delivery and performance by the Loan Parties of this Agreement and the other Loan Documents, the borrowing of Loans and other credit extensions, the use of the proceeds thereof and the issuance of Letters of Credit hereunder.

“Type”, when used in reference to any Loan or Borrowing, refers to whether the rate of interest on such Loan, or on the Loans comprising such Borrowing, is determined by reference to the Adjusted LIBO Rate or the Alternate Base Rate.

“UCC” means the Uniform Commercial Code as in effect from time to time in the State of New York or any other state the laws of which are required to be applied in connection with the issue of perfection of security interests.

“U.S. Person” means a “United States person” within the meaning of Section 7701(a)(30) of the Code.

“U.S. Tax Compliance Certificate” has the meaning assigned to such term in Section 2.17(e)(ii)(B)(3).

“Withdrawal Liability” means liability to a Multiemployer Plan as a result of a complete or partial withdrawal from such Multiemployer Plan, as such terms are defined in Part I of Subtitle E of Title IV of ERISA.

“Write-Down and Conversion Powers” means, with respect to any EEA Resolution Authority, the write-down and conversion powers of such EEA Resolution Authority from time to time under the Bail-In Legislation for the applicable EEA Member Country, which write-down and conversion powers are described in the EU Bail-In Legislation Schedule.

SECTION 1.02. Classification of Loans and Borrowings. For purposes of this Agreement, Loans may be classified and referred to by Class (e.g., a “Revolving Loan”) or by Type (e.g., a “Eurocurrency Loan”) or by Class and Type (e.g., a “Eurocurrency Revolving Loan”). Borrowings also may be classified and referred to by Class (e.g., a “Revolving Borrowing”) or by Type (e.g., a “Eurocurrency Borrowing”) or by Class and Type (e.g., a “Eurocurrency Revolving Borrowing”).

SECTION 1.03. Terms Generally. The definitions of terms herein shall apply equally to the singular and plural forms of the terms defined. Whenever the context may require, any pronoun shall include the corresponding masculine, feminine and neuter forms. The words “include”, “includes” and “including” shall be deemed to be followed by the phrase “without limitation”. The word “will” shall be construed to have the same meaning and effect as the word “shall”. The word “law” shall be construed as referring to all statutes, rules, regulations, codes and other laws (including official rulings and interpretations thereunder having the force of law or with which affected Persons customarily comply), and all judgments, orders and decrees, of all Governmental Authorities. Unless the context requires otherwise (a) any definition of or reference to any agreement, instrument or other document herein shall be construed as referring to such agreement, instrument or other document as from time to time amended, restated, supplemented or otherwise modified (subject to any restrictions on such amendments, restatements, supplements or modifications set forth herein), (b) any definition of or reference to any statute, rule or regulation shall be construed as referring thereto as from time to time amended, supplemented or otherwise modified (including by succession of comparable successor laws), (c) any reference herein to any Person shall be construed to include such Person’s successors and assigns (subject to any restrictions on assignment set forth herein) and, in the case of any Governmental Authority, any other Governmental Authority that shall have succeeded to any or all functions thereof, (d) the words “herein”, “hereof” and “hereunder”, and words of similar import, shall be construed to refer to this Agreement in its entirety and not to any particular provision hereof, (e) all references herein to Articles, Sections, Exhibits and Schedules shall be construed to refer to Articles and Sections of, and Exhibits and Schedules to, this Agreement, (f) any reference to any law, rule or regulation herein shall, unless otherwise specified, refer to such law, rule or regulation as amended, modified or supplemented from time to time and (g) the words “asset” and “property” shall be construed to have the same meaning and effect and to refer to any and all tangible and intangible assets and properties, including cash, securities, accounts and contract rights.

SECTION 1.04. Accounting Terms; GAAP. Except as otherwise expressly provided herein, all terms of an accounting or financial nature shall be construed in accordance with GAAP, as in effect from time to time; provided that, if the Company notifies the Administrative Agent that the Company requests an amendment to any provision hereof to eliminate the effect of any change occurring after the date hereof in GAAP or in the application thereof on the operation of such provision (or if the Administrative Agent notifies the Company that the Required Lenders request an amendment to any provision hereof for such purpose), regardless of whether any such notice is given before or after such change in GAAP or in the application thereof, then such provision shall be interpreted on the basis of GAAP as in effect and applied immediately before such change shall have become effective until such notice shall have been withdrawn or such provision amended in accordance herewith. Notwithstanding any other provision contained herein, all terms of an accounting or financial nature used herein shall be construed, and all computations of amounts and ratios referred to herein shall be made (i) without giving effect to any election under Accounting Standards Codification 825-10-25 (or any other Accounting Standards Codification or Financial Accounting Standard having a similar result or effect) to value any Indebtedness or other liabilities of the Company or any Subsidiary at “fair value”, as defined therein and (ii) without giving effect to any treatment of Indebtedness in respect of convertible debt instruments under Accounting Standards Codification 470-20 (or any other Accounting Standards Codification or Financial Accounting Standard having a similar result or effect) to value any such Indebtedness in a reduced or bifurcated manner as described therein, and such Indebtedness shall at all times be valued at the full stated principal amount thereof. Notwithstanding anything to the contrary contained in this Section 1.04 or in the definition of “Capital Lease Obligations,” in the event of an accounting change requiring all leases to be capitalized, only those leases (assuming for purposes hereof that such leases were in existence on the date hereof) that would constitute capital leases in conformity with GAAP on the date hereof shall be considered capital leases, and all calculations and deliverables under this Agreement or any other Loan Document shall be made or delivered, as applicable, in accordance therewith.

SECTION 1.05. Status of Secured Obligations In the event that the Company or any other Loan Party shall at any time issue or have outstanding any Subordinated Indebtedness, the Company shall take or cause such other Loan Party to take all such actions as shall be necessary to cause the Secured Obligations to constitute senior indebtedness (however denominated) in respect of such Subordinated Indebtedness and to enable the Administrative Agent and the Lenders to have and exercise any payment blockage or other remedies available or potentially available to holders of senior indebtedness under the terms of such Subordinated Indebtedness. Without limiting the foregoing, the Secured Obligations are hereby designated as “senior indebtedness” and as “designated senior indebtedness” and words of similar import under and in respect of any indenture or other agreement or instrument under which such other Subordinated Indebtedness is outstanding and are further given all such other designations as shall be required under the terms of any such Subordinated Indebtedness in order that the Lenders may have and exercise any payment blockage or other remedies available or potentially available to holders of senior indebtedness under the terms of such Subordinated Indebtedness.

SECTION 1.06. Amendment and Restatement of the Existing Credit Agreement. The parties to this Agreement agree that, upon (i) the execution and delivery by each of the parties hereto of this Agreement and (ii) satisfaction of the conditions set forth in Section 4.01, the terms and provisions of the Existing Credit Agreement shall be and hereby are amended, superseded and restated in their entirety by the terms and provisions of this Agreement. This Agreement is not intended to and shall not constitute a novation. All Loans made and Secured Obligations incurred under the Existing Credit Agreement which are outstanding on the Effective Date shall continue as Loans and Secured Obligations under (and shall be governed by the terms of) this Agreement and the other Loan Documents. Without limiting the foregoing, upon the effectiveness hereof: (a) all references in the “Loan Documents” (as defined in the Existing Credit Agreement) to the “Administrative Agent”, the “Credit Agreement” and the “Loan Documents” shall be deemed to refer to the Administrative Agent, this Agreement and the Loan Documents, (b) the Existing Letters of Credit which remain outstanding on the Effective Date shall continue as Letters of Credit under (and shall be governed by the terms of) this Agreement, (c) all obligations constituting “Secured Obligations” with any Lender or any Affiliate of any Lender which are outstanding on the Effective Date shall continue as Secured Obligations under this Agreement and the other Loan Documents, (d) the Administrative Agent shall administer such reallocations, sales, assignments or other relevant actions in respect of each Lender’s credit and loan exposure under the Existing Credit Agreement as are necessary in order that each such Lender’s Revolving Credit Exposure and outstanding Revolving Loans hereunder reflect such Lender’s Applicable Percentage of the outstanding aggregate Revolving Credit Exposures on the Effective Date and (e) the Company hereby agrees to compensate each Lender for any and all losses, costs and expenses incurred by such Lender in connection with the sale and assignment of any Eurocurrency Loans (including the “Eurocurrency Loans” under the Existing Credit Agreement) and such reallocation described above, in each case on the terms and in the manner set forth in Section 2.16 hereof.

SECTION 1.07. Interest Rates. The Administrative Agent does not warrant or accept responsibility for, and shall not have any liability with respect to, the administration, submission or any other matter related to the rates in the definition of “LIBO Rate” or with respect to any comparable or successor rate thereto, or replacement rate therefor.

ARTICLE II

The Credits

SECTION 2.01. Commitments. Prior to the Effective Date, certain revolving loans were previously made to the Company under the Existing Credit Agreement which remain outstanding as of the date of this Agreement (such outstanding revolving loans being hereinafter referred to as the “Existing Loans”). Subject to the terms and conditions set forth in this Agreement, the Borrowers and each of the Lenders agree that on the Effective Date but subject to the satisfaction of the conditions precedent set forth in Section 4.01 and the reallocation and other transactions described in Section 1.05, the Existing Loans shall be reevidenced as Revolving Loans under this Agreement and the terms of the Existing Loans shall be restated in their entirety and shall be evidenced by this Agreement. Subject to the terms and conditions set forth herein, each Lender (severally and not jointly) agrees to make Revolving Loans to any Borrower in Agreed Currencies from time to time during the Availability Period in an aggregate principal amount that will not result (after giving effect to any application of proceeds of such Borrowing to any Swingline Loans outstanding pursuant to Section 2.10(a)) in (i) subject to Sections 2.04 and 2.11(b), the Dollar Amount of such Lender’s Revolving Credit Exposure exceeding such Lender’s Commitment, (ii) subject to Sections 2.04 and 2.11(b), the Dollar Amount of the Total Revolving Credit Exposure exceeding the Aggregate Commitment, (iii) subject to Sections 2.04 and 2.11(b), the Dollar Amount of the total outstanding Revolving Loans and LC Exposure, in each case denominated in Foreign Currencies, exceeding the Foreign Currency Sublimit or (iv) subject to Section 2.04, the Dollar Amount of the total outstanding Revolving Loans made to Foreign Subsidiary Borrowers exceeding the Foreign Borrower Sublimit. Within the foregoing limits and subject to the terms and conditions set forth herein, the Borrowers may borrow, prepay and reborrow Revolving Loans.

SECTION 2.02. Loans and Borrowings. (a) Each Revolving Loan (other than a Swingline Loan) shall be made as part of a Borrowing consisting of Revolving Loans made by the Lenders ratably in accordance with their respective Commitments. The failure of any Lender to make any Loan required to be made by it shall not relieve any other Lender of its obligations hereunder; provided that the Commitments of the Lenders are several and no Lender shall be responsible for any other Lender's failure to make Loans as required. Any Swingline Loan shall be made in accordance with the procedures set forth in Section 2.05.

(b) Subject to Section 2.14, each Revolving Borrowing shall be comprised entirely of ABR Loans or Eurocurrency Loans as the relevant Borrower may request in accordance herewith; provided that each ABR Loan shall only be made in Dollars. Each Swingline Loan shall be an ABR Loan. Each Lender at its option may make any Loan by causing any domestic or foreign branch or Affiliate of such Lender to make such Loan (and in the case of an Affiliate, the provisions of Sections 2.14, 2.15, 2.16 and 2.17 shall apply to such Affiliate to the same extent as to such Lender); provided that any exercise of such option shall not affect the obligation of the relevant Borrower to repay such Loan in accordance with the terms of this Agreement.

(c) At the commencement of each Interest Period for any Eurocurrency Revolving Borrowing, such Borrowing shall be in an aggregate amount that is an integral multiple of \$500,000 (or, if such Borrowing is denominated in a Foreign Currency, 500,000 units of such currency) and not less than \$3,000,000 (or, if such Borrowing is denominated in a Foreign Currency 3,000,000 units of such currency). At the time that each ABR Revolving Borrowing is made, such Borrowing shall be in an aggregate amount that is an integral multiple of \$100,000 and not less than \$1,000,000; provided that an ABR Revolving Borrowing may be in an aggregate amount that is equal to the entire unused balance of the Aggregate Commitment or that is required to finance the reimbursement of an LC Disbursement as contemplated by Section 2.06(e). Each Swingline Loan shall be in an amount that is an integral multiple of \$100,000 and not less than \$1,000,000. Borrowings of more than one Type and Class may be outstanding at the same time; provided that there shall not at any time be more than a total of ten (10) Eurocurrency Revolving Borrowings outstanding.

(d) Notwithstanding any other provision of this Agreement, no Borrower shall be entitled to request, or to elect to convert or continue, any Borrowing if the Interest Period requested with respect thereto would end after the Maturity Date.

SECTION 2.03. Requests for Revolving Borrowings. To request a Revolving Borrowing, the applicable Borrower, or the Company on behalf of the applicable Borrower, shall notify the Administrative Agent of such request (a) by irrevocable written notice (via a written Borrowing Request signed by the Company (on its own behalf or, as applicable, on behalf of a Foreign Subsidiary Borrower)) in the case of a Eurocurrency Borrowing, not later than 11:00 a.m., Local Time, three (3) Business Days (in the case of a Eurocurrency Borrowing denominated in Dollars) or by irrevocable written notice (via a written Borrowing Request signed by the Company (on its own behalf or, as applicable, on behalf of a Foreign Subsidiary Borrower)) not later than 11:00 a.m., Local Time, four (4) Business Days (in the case of a Eurocurrency Borrowing denominated in a Foreign Currency), in each case before the date of the proposed Borrowing or (b) by irrevocable written notice (via a written Borrowing Request signed by the Company (on its own behalf or, as applicable, on behalf of a Foreign Subsidiary Borrower)) in the case of an ABR Borrowing, not later than 11:00 a.m., New York City time, on the date of the proposed Borrowing. Each such Borrowing Request shall specify the following information in compliance with Section 2.02:

- (i) the name of the applicable Borrower;
- (ii) the aggregate principal amount of the requested Borrowing;
- (iii) the date of such Borrowing, which shall be a Business Day;
- (iv) whether such Borrowing is to be an ABR Borrowing or a Eurocurrency Borrowing;
- (v) in the case of a Eurocurrency Borrowing, the Agreed Currency and initial Interest Period to be applicable thereto, which shall be a period contemplated by the definition of the term "Interest Period"; and
- (vi) the location and number of the applicable Borrower's account to which funds are to be disbursed, which shall comply with the requirements of Section 2.07.

If no election as to the Type of Revolving Borrowing is specified, then, in the case of a Borrowing denominated in Dollars, the requested Revolving Borrowing shall be an ABR Borrowing. If no Interest Period is specified with respect to any requested Eurocurrency Revolving Borrowing, then the relevant Borrower shall be deemed to have selected an Interest Period of one month's duration. Promptly following receipt of a Borrowing Request in accordance with this Section, the Administrative Agent shall advise each Lender of the details thereof and of the amount of such Lender's Loan to be made as part of the requested Borrowing.

SECTION 2.04. Determination of Dollar Amounts. The Administrative Agent will determine the Dollar Amount of:

- (a) each Eurocurrency Borrowing as of the date three (3) Business Days prior to the date of such Borrowing or, if applicable, the date of conversion/continuation of any Borrowing as a Eurocurrency Borrowing,
- (b) the LC Exposure as of the date of each request for the issuance, amendment, renewal or extension of any Letter of Credit, and
- (c) all outstanding Credit Events on and as of the last Business Day of each calendar quarter and, during the continuation of an Event of Default, on any other Business Day elected by the Administrative Agent in its discretion or upon instruction by the Required Lenders.

Each day upon or as of which the Administrative Agent determines Dollar Amounts as described in the preceding clauses (a), (b) and (c) is herein described as a "Computation Date" with respect to each Credit Event for which a Dollar Amount is determined on or as of such day.

SECTION 2.05. Swingline Loans. (a) Subject to the terms and conditions set forth herein, the Swingline Lender may in its sole discretion make Swingline Loans in Dollars to the Company from time to time during the Availability Period, in an aggregate principal amount at any time outstanding that will not result in (i) the aggregate principal amount of outstanding Swingline Loans exceeding the Swingline Sublimit, (ii) the Swingline Lender's Revolving Credit Exposure exceeding its Commitment or (iii) the Dollar Amount of the Total Revolving Credit Exposure exceeding the Aggregate Commitment; provided that the Swingline Lender shall not be required to make a Swingline Loan to refinance an outstanding Swingline Loan. Within the foregoing limits and subject to the terms and conditions set forth herein, the Company may borrow, prepay and reborrow Swingline Loans.

(b) To request a Swingline Loan, the Company shall notify the Administrative Agent of such request by irrevocable written notice (via a written Borrowing Request in a form approved by the Administrative Agent and signed by the Company), not later than 12:00 noon, New York City time, on the day of a proposed Swingline Loan. Each such notice shall be irrevocable and shall specify the requested date (which shall be a Business Day) and amount of the requested Swingline Loan. The Administrative Agent will promptly advise the Swingline Lender of any such notice received from the Company. The Swingline Lender shall make each Swingline Loan available to the Company by means of a credit to the general deposit account of the Company with the Administrative Agent designated for such purpose (or, in the case of a Swingline Loan made to finance the reimbursement of an LC Disbursement as provided in Section 2.06(e), by remittance to such Issuing Bank) by 3:00 p.m., New York City time, on the requested date of such Swingline Loan.

(c) The Swingline Lender may by written notice given to the Administrative Agent require the Lenders to acquire participations in all or a portion of the Swingline Loans outstanding. Such notice shall specify the aggregate amount of Swingline Loans in which Lenders will participate. Promptly upon receipt of such notice, the Administrative Agent will give notice thereof to each Lender, specifying in such notice such Lender's Applicable Percentage of such Swingline Loan or Loans. Each Lender hereby absolutely and unconditionally agrees, promptly upon receipt of such notice from the Administrative Agent (and in any event, if such notice is received by 12:00 noon, New York City time, on a Business Day, no later than 5:00 p.m., New York City time, on such Business Day and if received after 12:00 noon, New York City time, on a Business Day, no later than 10:00 a.m., New York City time, on the immediately succeeding Business Day), to pay to the Administrative Agent, for the account of the Swingline Lender, such Lender's Applicable Percentage of such Swingline Loan or Loans. Each Lender hereby absolutely and unconditionally agrees, upon receipt of notice as provided above, to pay to the Administrative Agent, for the account of the Swingline Lender, such Lender's Applicable Percentage of such Swingline Loan or Loans. Notwithstanding the foregoing, upon the occurrence of (i) the Maturity Date, (ii) any Event of Default described in clause (h), (i) or (j) of Article VII, (iii) the date on which the Loans are accelerated, or (iv) the termination of the Commitments, each Lender shall be deemed to absolutely and unconditionally acquire participations in all of the Swingline Loans outstanding at such time in an amount equal to its Applicable Percentage of such Swingline Loans in each case without notice or any further action from the Swingline Lender, any Lender or the Administrative Agent (such occurrence an "Automatic Participation Event"). Upon the occurrence of an Automatic Participation Event, the Administrative Agent will give notice thereof to each Lender, specifying in such notice such Lender's Applicable Percentage of such Swingline Loan or Loans. Each Lender hereby absolutely and unconditionally agrees, promptly upon receipt of such notice from the Administrative Agent (and in any event, if such notice is received by 12:00 noon, New York City time, on a Business Day, no later than 5:00 p.m., New York City time, on such Business Day and if received after 12:00 noon, New York City time, on a Business Day, no later than 10:00 a.m., New York City time, on the immediately succeeding Business Day), to pay to the Administrative Agent, for the account of the Swingline Lender, such Lender's Applicable Percentage of such Swingline Loan or Loans. Each Lender acknowledges and agrees that its obligation to acquire participations in Swingline Loans pursuant to this paragraph is absolute and unconditional and shall not be affected by any circumstance whatsoever, including the occurrence and continuance of a Default or reduction or termination of the Commitments, and that each such payment shall be made without any offset, abatement, withholding or reduction whatsoever. Each Lender shall comply with its obligation under this paragraph by wire transfer of immediately available funds, in the same manner as provided in Section 2.07 with respect to Loans made by such Lender (and Section 2.07 shall apply, mutatis mutandis, to the payment obligations of the Lenders), and the Administrative Agent shall promptly pay to the Swingline Lender the amounts so received by it from the Lenders. The Administrative Agent shall notify the Company of any participations in any Swingline Loan acquired pursuant to this paragraph, and thereafter payments in respect of such Swingline Loan shall be made to the Administrative Agent and not to the Swingline Lender. Any amounts received by the Swingline Lender from the Company (or other party on behalf of the Company) in respect of a Swingline Loan after receipt by the Swingline Lender of the proceeds of a sale of participations therein shall be promptly remitted to the Administrative Agent; any such amounts received by the Administrative Agent shall be promptly remitted by the Administrative Agent to the Lenders that shall have made their payments pursuant to this paragraph and to the Swingline Lender, as their interests may appear; provided that any such payment so remitted shall be repaid to the Swingline Lender or to the Administrative Agent, as applicable, if and to the extent such payment is required to be refunded to the Company for any reason. The purchase of participations in a Swingline Loan pursuant to this paragraph shall not relieve the Company of any default in the payment thereof.

(d) The Swingline Lender may be replaced at any time by written agreement among the Company, the Administrative Agent, the replaced Swingline Lender and the successor Swingline Lender. The Administrative Agent shall notify the Lenders of any such replacement of the Swingline Lender. At the time any such replacement shall become effective, the Company shall pay all unpaid interest accrued for the account of the replaced Swingline Lender pursuant to Section 2.13(a). From and after the effective date of any such replacement, (i) the successor Swingline Lender shall have all the rights and obligations of the replaced Swingline Lender under this Agreement with respect to Swingline Loans made thereafter and (ii) references herein to the term "Swingline Lender" shall be deemed to refer to such successor or to any previous Swingline Lender, or to such successor and all previous Swingline Lenders, as the context shall require. After the replacement of a Swingline Lender hereunder, the replaced Swingline Lender shall remain a party hereto and shall continue to have all the rights and obligations of a Swingline Lender under this Agreement with respect to Swingline Loans made by it prior to its replacement, but shall not be required to make additional Swingline Loans.

(e) Subject to the appointment and acceptance of a successor Swingline Lender, the Swingline Lender may resign as a Swingline Lender at any time upon thirty (30) days' prior written notice to the Administrative Agent, the Company and the Lenders, in which case, such Swingline Lender shall be replaced in accordance with Section 2.05(d) above.

SECTION 2.06. Letters of Credit. (a) General. Subject to the terms and conditions set forth herein, the Company may request the issuance of Letters of Credit denominated in Agreed Currencies for the support of its or its Subsidiaries' obligations, in a form reasonably acceptable to the Administrative Agent and the relevant Issuing Bank, at any time and from time to time during the Availability Period, and such Issuing Bank may agree, but shall have no obligation, to issue such Letters of Credit. In the event of any inconsistency between the terms and conditions of this Agreement and the terms and conditions of any Letter of Credit Agreement, the terms and conditions of this Agreement shall control; provided, however, if such Issuing Bank is requested to issue Letters of Credit with respect to a jurisdiction the relevant Issuing Bank deems, in its reasonable judgment, may at any time subject it to a New Money Credit Event or a Country Risk Event, the Company shall, at the request of an Issuing Bank, guaranty and indemnify the requesting Issuing Bank against any and all costs, liabilities and losses resulting from such New Money Credit Event or Country Risk Event, in each case in a form and substance reasonably satisfactory to the relevant Issuing Bank. The letters of credit identified on Schedule 2.06 (the "Existing Letters of Credit") shall be deemed to be "Letters of Credit" issued on the Effective Date for all purposes of the Loan Documents. Notwithstanding anything herein to the contrary, no Issuing Bank shall have any obligation hereunder to issue, and shall not issue, any Letter of Credit the proceeds of which would be made available to any Person (i) to fund any activity or business of or with any Sanctioned Person, or in any country or territory that, at the time of such funding, is the subject of any Sanctions, (ii) in any manner that would result in a violation of any Sanctions by any party to this Agreement or (iii) in any manner that would result in a violation of one or more policies of such Issuing Bank applicable to letters of credit generally. The Company unconditionally and irrevocably agrees that, in connection with any Letter of Credit issued for the support of any Subsidiary's obligations as provided in the first sentence of this paragraph, the Company will be fully responsible for the reimbursement of LC Disbursements in accordance with the terms hereof, the payment of interest thereon and the payment of fees due under Section 2.12(b) to the same extent as if it were the sole account party in respect of such Letter of Credit (the Company hereby irrevocably waiving any defenses that might otherwise be available to it as a guarantor or surety of the obligations of such a Subsidiary that is an account party in respect of any such Letter of Credit).

(b) Notice of Issuance, Amendment, Renewal, Extension; Certain Conditions. To request the issuance of a Letter of Credit (or the amendment, renewal or extension of an outstanding Letter of Credit), the Company shall hand deliver or telecopy (or transmit by electronic communication, if arrangements for doing so have been approved by the relevant Issuing Bank) to an Issuing Bank and the Administrative Agent (reasonably in advance of the requested date of issuance, amendment, renewal or extension, but in any event no less than three (3) Business Days) a notice requesting the issuance of a Letter of Credit, or identifying the Letter of Credit to be amended, renewed or extended, and specifying the date of issuance, amendment, renewal or extension (which shall be a Business Day), the date on which such Letter of Credit is to expire (which shall comply with paragraph (c) of this Section), the amount of such Letter of Credit, the Agreed Currency applicable thereto, the name and address of the beneficiary thereof and such other information as shall be necessary to prepare, amend, renew or extend such Letter of Credit. In addition, as a condition to any such Letter of Credit issuance, the Company shall have entered into a continuing agreement (or other letter of credit agreement) for the issuance of letters of credit and/or shall submit a letter of credit application, in each case, as required by the relevant Issuing Bank and using such Issuing Bank's standard form (each, a "Letter of Credit Agreement"). A Letter of Credit shall be issued, amended, renewed or extended only if (and upon issuance, amendment, renewal or extension of each Letter of Credit the Company shall be deemed to represent and warrant that), after giving effect to such issuance, amendment, renewal or extension, subject to Sections 2.04 and 2.11(b), (i) the Dollar Amount of the LC Exposure shall not exceed \$15,000,000, (ii) the sum of (x) the aggregate undrawn amount of all outstanding Letters of Credit issued by any Issuing Bank at such time plus (y) the aggregate amount of all LC Disbursements made by such Issuing Bank that have not yet been reimbursed by or on behalf of the Company at such time shall not exceed such Issuing Bank's Letter of Credit Commitment, (iii) the Dollar Amount of the Total Revolving Credit Exposure shall not exceed the Aggregate Commitment, (iv) the Dollar Amount of each Lender's Revolving Credit Exposure shall not exceed such Lender's Commitment and (v) the Dollar Amount of the total outstanding Revolving Loans and LC Exposure, in each case denominated in Foreign Currencies, shall not exceed the Foreign Currency Sublimit. The Company may, at any time and from time to time, reduce the Letter of Credit Commitment of any Issuing Bank with the consent of such Issuing Bank; provided that the Company shall not reduce the Letter of Credit Commitment of any Issuing Bank if, after giving effect of such reduction, the conditions set forth in the immediately preceding clauses (i) through (v) shall not be satisfied.

(c) Expiration Date. Each Letter of Credit shall expire (or be subject to termination by notice from the relevant Issuing Bank to the beneficiary thereof) at or prior to the close of business on the earlier of (i) the date one year after the date of the issuance of such Letter of Credit (or, in the case of any renewal or extension thereof, one year after such renewal or extension) and (ii) the date that is five (5) Business Days prior to the Maturity Date.

(d) Participations. By the issuance of a Letter of Credit (or an amendment to a Letter of Credit increasing the amount thereof) and without any further action on the part of any Issuing Bank or the Lenders, each Issuing Bank hereby grants to each Lender, and each Lender hereby acquires from each Issuing Bank, a participation in such Letter of Credit equal to such Lender's Applicable Percentage of the aggregate amount available to be drawn under such Letter of Credit. In consideration and in furtherance of the foregoing, each Lender hereby absolutely and unconditionally agrees to pay to the Administrative Agent, for the account of the relevant Issuing Bank, such Lender's Applicable Percentage of each LC Disbursement made by such Issuing Bank and not reimbursed by the Company on the date due as provided in paragraph (e) of this Section, or of any reimbursement payment required to be refunded to the Company for any reason. Each Lender acknowledges and agrees that its obligation to acquire participations pursuant to this paragraph in respect of Letters of Credit is absolute and unconditional and shall not be affected by any circumstance whatsoever, including any amendment, renewal or extension of any Letter of Credit or the occurrence and continuance of a Default or reduction or termination of the Commitments, and that each such payment shall be made without any offset, abatement, withholding or reduction whatsoever.

(e) Reimbursement. If any Issuing Bank shall make any LC Disbursement in respect of a Letter of Credit, the Company shall reimburse such LC Disbursement by paying to the Administrative Agent in Dollars the Dollar Amount equal to such LC Disbursement, calculated as of the date such Issuing Bank made such LC Disbursement (or if an Issuing Bank shall so elect in its sole discretion by notice to the Company, in such other Agreed Currency which was paid by such Issuing Bank pursuant to such LC Disbursement in an amount equal to such LC Disbursement) not later than 12:00 noon, Local Time, on the date that such LC Disbursement is made, if the Company shall have received notice of such LC Disbursement prior to 10:00 a.m., Local Time, on such date, or, if such notice has not been received by the Company prior to such time on such date, then not later than 12:00 noon, Local Time, on (i) the Business Day that the Company receives such notice, if such notice is received prior to 10:00 a.m., Local Time, on the day of receipt, or (ii) the Business Day immediately following the day that the Company receives such notice, if such notice is not received prior to such time on the day of receipt; provided that the Company may, subject to the conditions to borrowing set forth herein, request in accordance with Section 2.03 or 2.05 that such payment be financed with (i) to the extent such LC Disbursement was made in Dollars, an ABR Revolving Borrowing, Eurocurrency Revolving Borrowing or Swingline Loan in Dollars in an amount equal to such LC Disbursement or (ii) to the extent that such LC Disbursement was made in a Foreign Currency, a Eurocurrency Revolving Borrowing in such Foreign Currency in an amount equal to such LC Disbursement and, in each case, to the extent so financed, the Company's obligation to make such payment shall be discharged and replaced by the resulting ABR Revolving Borrowing, Eurocurrency Revolving Borrowing or Swingline Loan, as applicable. If the Company fails to make such payment when due, the Administrative Agent shall notify each Lender of the applicable LC Disbursement, the payment then due from the Company in respect thereof and such Lender's Applicable Percentage thereof. Promptly following receipt of such notice, each Lender shall pay to the Administrative Agent its Applicable Percentage of the payment then due from the Company, in the same manner as provided in Section 2.07 with respect to Loans made by such Lender (and Section 2.07 shall apply, mutatis mutandis, to the payment obligations of the Lenders), and the Administrative Agent shall promptly pay to the relevant Issuing Bank the amounts so received by it from the Lenders. Promptly following receipt by the Administrative Agent of any payment from the Company pursuant to this paragraph, the Administrative Agent shall distribute such payment to the relevant Issuing Bank or, to the extent that Lenders have made payments pursuant to this paragraph to reimburse such Issuing Bank, then to such Lenders and such Issuing Bank as their interests may appear. Any payment made by a Lender pursuant to this paragraph to reimburse an Issuing Bank for any LC Disbursement (other than the funding of ABR Revolving Loans or a Swingline Loan as contemplated above) shall not constitute a Loan and shall not relieve the Company of its obligation to reimburse such LC Disbursement. If the Company's reimbursement of, or obligation to reimburse, any amounts in any Foreign Currency would subject the Administrative Agent, any Issuing Bank or any Lender to any stamp duty, ad valorem charge or similar tax that would not be payable if such reimbursement were made or required to be made in Dollars, the Company shall, at its option, either (x) pay the amount of any such tax requested by the Administrative Agent, the relevant Issuing Bank or the relevant Lender or (y) reimburse each LC Disbursement made in such Foreign Currency in Dollars, in an amount equal to the Dollar Amount thereof calculated on the date such LC Disbursement is made.

(f) Obligations Absolute. The Company's obligation to reimburse LC Disbursements as provided in paragraph (e) of this Section shall be absolute, unconditional and irrevocable, and shall be performed strictly in accordance with the terms of this Agreement under any and all circumstances whatsoever and irrespective of (i) any lack of validity or enforceability of any Letter of Credit, any Letter of Credit Agreement or this Agreement, or any term or provision therein or herein, (ii) any draft or other document presented under a Letter of Credit proving to be forged, fraudulent or invalid in any respect or any statement therein being untrue or inaccurate in any respect, (iii) any payment by an Issuing Bank under a Letter of Credit against presentation of a draft or other document that does not comply with the terms of such Letter of Credit, or (iv) any other event or circumstance whatsoever, whether or not similar to any of the foregoing, that might, but for the provisions of this Section, constitute a legal or equitable discharge of, or provide a right of setoff against, the Company's obligations hereunder. Neither the Administrative Agent, the Lenders nor any Issuing Bank, nor any of their Related Parties, shall have any liability or responsibility by reason of or in connection with the issuance or transfer of any Letter of Credit or any payment or failure to make any payment thereunder (irrespective of any of the circumstances referred to in the preceding sentence), or any error, omission, interruption, loss or delay in transmission or delivery of any draft, notice or other communication under or relating to any Letter of Credit (including any document required to make a drawing thereunder), any error in interpretation of technical terms or any consequence arising from causes beyond the control of the relevant Issuing Bank; provided that the foregoing shall not be construed to excuse any Issuing Bank from liability to the Company to the extent of any direct damages (as opposed to special, indirect, consequential or punitive damages, claims in respect of which are hereby waived by the Company to the extent permitted by applicable law) suffered by the Company that are caused by such Issuing Bank's failure to exercise care when determining whether drafts and other documents presented under a Letter of Credit comply with the terms thereof. The parties hereto expressly agree that, in the absence of gross negligence or willful misconduct on the part of any Issuing Bank (as finally determined by a court of competent jurisdiction), such Issuing Bank shall be deemed to have exercised care in each such determination. In furtherance of the foregoing and without limiting the generality thereof, the parties agree that, with respect to documents presented which appear on their face to be in substantial compliance with the terms of a Letter of Credit, each Issuing Bank may, in its sole discretion, either accept and make payment upon such documents without responsibility for further investigation, regardless of any notice or information to the contrary, or refuse to accept and make payment upon such documents if such documents are not in strict compliance with the terms of such Letter of Credit.

(g) Disbursement Procedures. Each Issuing Bank shall, promptly following its receipt thereof, examine all documents purporting to represent a demand for payment under a Letter of Credit. Each Issuing Bank shall promptly notify the Administrative Agent and the Company by telephone (confirmed by teletype) of such demand for payment and whether such Issuing Bank has made or will make an LC Disbursement thereunder; provided that any failure to give or delay in giving such notice shall not relieve the Company of its obligation to reimburse such Issuing Bank and the Lenders with respect to any such LC Disbursement.

(h) Interim Interest. If any Issuing Bank shall make any LC Disbursement, then, unless the Company shall reimburse such LC Disbursement in full on the date such LC Disbursement is made, the unpaid amount thereof shall bear interest, for each day from and including the date such LC Disbursement is made to but excluding the date that the Company reimburses such LC Disbursement, at the rate per annum then applicable to ABR Revolving Loans (or in the case such LC Disbursement is denominated in a Foreign Currency, at the Overnight Foreign Currency Rate for such Agreed Currency plus the then effective Applicable Rate with respect to Eurocurrency Loans); provided that, if the Company fails to reimburse such LC Disbursement when due pursuant to paragraph (e) of this Section, then Section 2.13(c) shall apply. Interest accrued pursuant to this paragraph shall be for the account of such Issuing Bank, except that interest accrued on and after the date of payment by any Lender pursuant to paragraph (e) of this Section to reimburse such Issuing Bank shall be for the account of such Lender to the extent of such payment.

(i) Replacement of an Issuing Bank. (A) Any Issuing Bank may be replaced at any time by written agreement among the Company, the Administrative Agent, the replaced Issuing Bank and the successor Issuing Bank. The Administrative Agent shall notify the Lenders of any such replacement of an Issuing Bank. At the time any such replacement shall become effective, the Company shall pay all unpaid fees accrued for the account of the replaced Issuing Bank pursuant to Section 2.12(b). From and after the effective date of any such replacement, (i) the successor Issuing Bank shall have all the rights and obligations of an Issuing Bank under this Agreement with respect to Letters of Credit to be issued thereafter and (ii) references herein to the term "Issuing Bank" shall be deemed to refer to such successor or to any previous Issuing Bank, or to such successor and all previous Issuing Banks, as the context shall require. After the replacement of an Issuing Bank hereunder, the replaced Issuing Bank shall remain a party hereto and shall continue to have all the rights and obligations of an Issuing Bank under this Agreement with respect to Letters of Credit then outstanding and issued by it prior to such replacement, but shall not be required to issue additional Letters of Credit.

(B) Subject to the appointment and acceptance of a successor Issuing Bank, any Issuing Bank may resign as an Issuing Bank at any time upon thirty days' prior written notice to the Administrative Agent, the Company and the Lenders, in which case, such Issuing Bank shall be replaced in accordance with Section 2.06(i)(A) above.

(j) Cash Collateralization. If any Event of Default shall occur and be continuing, on the Business Day that the Company receives notice from the Administrative Agent or the Required Lenders (or, if the maturity of the Loans has been accelerated, from two (2) or more Lenders with LC Exposure representing greater than 50% of the total LC Exposure) demanding the deposit of cash collateral pursuant to this paragraph, the Company shall deposit in an account with the Administrative Agent, in the name of the Administrative Agent and for the benefit of the Lenders (the "LC Collateral Account"), an amount in cash equal to the Dollar Amount of the LC Exposure as of such date plus any accrued and unpaid interest thereon; provided that (i) the portions of such amount attributable to undrawn Foreign Currency Letters of Credit or LC Disbursements in a Foreign Currency that the Company is not late in reimbursing shall be deposited in the applicable Foreign Currencies in the actual amounts of such undrawn Letters of Credit and LC Disbursements and (ii) the obligation to deposit such cash collateral shall become effective immediately, and such deposit shall become immediately due and payable, without demand or other notice of any kind, upon the occurrence of any Event of Default with respect to the Company described in clause (h) or (i) of Article VII. For the purposes of this paragraph, the Dollar Amount of the Foreign Currency LC Exposure shall be calculated on the date notice demanding cash collateralization is delivered to the Company. The Company also shall deposit cash collateral pursuant to this paragraph as and to the extent required by Section 2.11(b). Such deposit shall be held by the Administrative Agent as collateral for the payment and performance of the Secured Obligations. The Administrative Agent shall have exclusive dominion and control, including the exclusive right of withdrawal, over such account. Other than any interest earned on the investment of such deposits, which investments shall be made at the option and sole discretion of the Administrative Agent and at the Company's risk and expense, such deposits shall not bear interest. Interest or profits, if any, on such investments shall accumulate in such account. Moneys in such account shall be applied by the Administrative Agent to reimburse the relevant Issuing Bank for LC Disbursements for which it has not been reimbursed and, to the extent not so applied, shall be held for the satisfaction of the reimbursement obligations of the Company for the LC Exposure at such time or, if the maturity of the Loans has been accelerated (but subject to the consent of Lenders with LC Exposure representing greater than 50% of the total LC Exposure), be applied to satisfy other Secured Obligations. If the Company is required to provide an amount of cash collateral hereunder as a result of the occurrence of an Event of Default, such amount (to the extent not applied as aforesaid) shall be returned to the Company within three Business Days after all Events of Default have been cured or waived.

(k) Conversion. In the event that the Loans become immediately due and payable on any date pursuant to Article VII, all amounts (i) that the Company is at the time or thereafter becomes required to reimburse or otherwise pay to the Administrative Agent in respect of LC Disbursements made under any Foreign Currency Letter of Credit (other than amounts in respect of which the Company has deposited cash collateral pursuant to paragraph (j) above, if such cash collateral was deposited in the applicable Foreign Currency to the extent so deposited or applied), (ii) that the Lenders are at the time or thereafter become required to pay to the Administrative Agent and the Administrative Agent is at the time or thereafter becomes required to distribute to an Issuing Bank pursuant to paragraph (e) of this Section in respect of unreimbursed LC Disbursements made under any Foreign Currency Letter of Credit and (iii) of each Lender's participation in any Foreign Currency Letter of Credit under which an LC Disbursement has been made shall, automatically and with no further action required, be converted into the Dollar Amount, calculated using the Administrative Agent's currency exchange rates on such date (or in the case of any LC Disbursement made after such date, on the date such LC Disbursement is made), of such amounts. On and after such conversion, all amounts accruing and owed to the Administrative Agent, any Issuing Bank or any Lender in respect of the obligations described in this paragraph shall accrue and be payable in Dollars at the rates otherwise applicable hereunder.

(l) Issuing Bank Agreements. Each Issuing Bank agrees that, unless otherwise requested by the Administrative Agent, such Issuing Bank shall report in writing to the Administrative Agent (i) on the first Business Day of each week, the daily activity (set forth by day) in respect of its Letters of Credit during the immediately preceding week, including all issuances, extensions, amendments and renewals, all expirations and cancellations and all disbursements and reimbursements (it being understood and agreed that no such reports shall be required at any time during which such Issuing Bank does not have Letters of Credit outstanding hereunder), (ii) on or prior to each Business Day on which such Issuing Bank expects to issue, amend, renew or extend any Letter of Credit, the date of such issuance, amendment, renewal or extension, and the aggregate face amount of the Letters of Credit to be issued, amended, renewed or extended by it and outstanding after giving effect to such issuance, amendment, renewal or extension occurred (and whether the amount thereof changed), (iii) on each Business Day on which such Issuing Bank makes any LC Disbursement, the date of such LC Disbursement and the amount of such LC Disbursement, (iv) on any Business Day on which the Borrower fails to reimburse an LC Disbursement required to be reimbursed to such Issuing Bank on such day, the date of such failure and the amount and currency of such LC Disbursement and (v) on any other Business Day, such other information as the Administrative Agent shall reasonably request.

SECTION 2.07. Funding of Borrowings. (a) Each Lender shall make each Loan to be made by it hereunder on the proposed date thereof by wire transfer of immediately available funds (i) in the case of Loans denominated in Dollars, by 12:00 noon, New York City time, to the account of the Administrative Agent most recently designated by it for such purpose by notice to the Lenders and (ii) in the case of each Loan denominated in a Foreign Currency, by 12:00 noon, Local Time, in the city of the Administrative Agent's Eurocurrency Payment Office for such currency and at such Eurocurrency Payment Office for such currency; provided that Swingline Loans shall be made as provided in Section 2.05. Except in respect of the provisions of this Agreement covering the reimbursement of Letters of Credit, the Administrative Agent will make such Loans available to the relevant Borrower by promptly crediting the funds so received in the aforesaid account of the Administrative Agent to (x) an account of such Borrower maintained with the Administrative Agent in New York City and designated by the relevant Borrower in the applicable Borrowing Request, in the case of Loans denominated in Dollars and (y) an account of such Borrower maintained with the Administrative Agent in the relevant jurisdiction and designated by such Borrower in the applicable Borrowing Request, in the case of Loans denominated in a Foreign Currency; provided that ABR Revolving Loans made to finance the reimbursement of an LC Disbursement as provided in Section 2.06(e) shall be remitted by the Administrative Agent to the relevant Issuing Bank.

(b) Unless the Administrative Agent shall have received notice from a Lender prior to the proposed date of any Borrowing (or in the case of an ABR Borrowing, prior to 12:00 noon, New York City time, on the date of such Borrowing) that such Lender will not make available to the Administrative Agent such Lender's share of such Borrowing, the Administrative Agent may assume that such Lender has made such share available on such date in accordance with paragraph (a) of this Section and may, in reliance upon such assumption, make available to the relevant Borrower a corresponding amount. In such event, if a Lender has not in fact made its share of the applicable Borrowing available to the Administrative Agent, then the applicable Lender and such Borrower severally agree to pay to the Administrative Agent forthwith on demand such corresponding amount with interest thereon, for each day from and including the date such amount is made available to such Borrower to but excluding the date of payment to the Administrative Agent, at (i) in the case of such Lender, the greater of the NYFRB Rate and a rate determined by the Administrative Agent in accordance with banking industry rules on interbank compensation (including without limitation the Overnight Foreign Currency Rate in the case of Loans denominated in a Foreign Currency) or (ii) in the case of such Borrower, the interest rate applicable to ABR Loans. If such Lender pays such amount to the Administrative Agent, then such amount shall constitute such Lender's Loan included in such Borrowing.

SECTION 2.08. Interest Elections. (a) Each Borrowing initially shall be of the Type specified in the applicable Borrowing Request and, in the case of a Eurocurrency Borrowing, shall have an initial Interest Period as specified in such Borrowing Request. Thereafter, the relevant Borrower may elect to convert such Borrowing to a different Type or to continue such Borrowing and, in the case of a Eurocurrency Borrowing, may elect Interest Periods therefor, all as provided in this Section. A Borrower may elect different options with respect to different portions of the affected Borrowing, in which case each such portion shall be allocated ratably among the Lenders holding the Loans comprising such Borrowing, and the Loans comprising each such portion shall be considered a separate Borrowing. This Section shall not apply to Swingline Borrowings, which may not be converted or continued.

(b) To make an election pursuant to this Section, a Borrower, or the Company on its behalf, shall notify the Administrative Agent of such election (by irrevocable written notice (via an Interest Election Request signed by such Borrower or the Company, as applicable)) by the time that a Borrowing Request would be required under Section 2.03 if such Borrower were requesting a Revolving Borrowing of the Type resulting from such election to be made on the effective date of such election. Notwithstanding any contrary provision herein, this Section shall not be construed to permit any Borrower to (i) change the currency of any Borrowing, (ii) elect an Interest Period for Eurocurrency Loans that does not comply with Section 2.02(d) or (iii) convert any Borrowing to a Borrowing of a Type not available under such Borrowing.

(c) Each Interest Election Request shall specify the following information in compliance with Section 2.02:

(i) the name of the applicable Borrower and the Borrowing to which such Interest Election Request applies and, if different options are being elected with respect to different portions thereof, the portions thereof to be allocated to each resulting Borrowing (in which case the information to be specified pursuant to clauses (iii) and (iv) below shall be specified for each resulting Borrowing);

(ii) the effective date of the election made pursuant to such Interest Election Request, which shall be a Business Day;

(iii) whether the resulting Borrowing is to be an ABR Borrowing or a Eurocurrency Borrowing; and

(iv) if the resulting Borrowing is a Eurocurrency Borrowing, the Interest Period and Agreed Currency to be applicable thereto after giving effect to such election, which Interest Period shall be a period contemplated by the definition of the term "Interest Period".

If any such Interest Election Request requests a Eurocurrency Borrowing but does not specify an Interest Period, then the applicable Borrower shall be deemed to have selected an Interest Period of one month's duration.

(d) Promptly following receipt of an Interest Election Request, the Administrative Agent shall advise each Lender of the details thereof and of such Lender's portion of each resulting Borrowing.

(e) If the relevant Borrower fails to deliver a timely Interest Election Request with respect to a Eurocurrency Borrowing prior to the end of the Interest Period applicable thereto, then, unless such Borrowing is repaid as provided herein, at the end of such Interest Period (i) in the case of a Borrowing denominated in Dollars, such Borrowing shall be converted to an ABR Borrowing and (ii) in the case of a Borrowing denominated in a Foreign Currency, such Borrowing shall automatically continue as a Eurocurrency Borrowing in the same Agreed Currency with an Interest Period of one month unless (x) such Eurocurrency Borrowing is or was repaid in accordance with Section 2.11 or (y) such Borrower shall have given the Administrative Agent an Interest Election Request requesting that, at the end of such Interest Period, such Eurocurrency Borrowing continue as a Eurocurrency Borrowing for the same or another Interest Period. Notwithstanding any contrary provision hereof, if an Event of Default has occurred and is continuing and the Administrative Agent, at the request of the Required Lenders, so notifies the Company, then, so long as an Event of Default is continuing (i) no outstanding Borrowing denominated in Dollars may be converted to or continued as a Eurocurrency Borrowing, (ii) unless repaid, each Eurocurrency Borrowing denominated in Dollars shall be converted to an ABR Borrowing at the end of the Interest Period applicable thereto and (iii) unless repaid, each Eurocurrency Borrowing denominated in a Foreign Currency shall automatically be continued as a Eurocurrency Borrowing with an Interest Period of one month.

SECTION 2.09. Termination and Reduction of Commitments. (a) Unless previously terminated, the Commitments shall terminate on the Maturity Date.

(b) The Company may at any time terminate, or from time to time reduce, the Commitments; provided that (i) each reduction of the Commitments shall be in an amount that is an integral multiple of \$1,000,000 and not less than \$1,000,000 and (ii) the Company shall not terminate or reduce the Commitments if, after giving effect to any concurrent prepayment of the Loans in accordance with Section 2.11, the Dollar Amount of the Total Revolving Credit Exposure would exceed the Aggregate Commitment.

(c) The Company shall notify the Administrative Agent of any election to terminate or reduce the Commitments under paragraph (b) of this Section at least three Business Days prior to the effective date of such termination or reduction, specifying such election and the effective date thereof. Promptly following receipt of any notice, the Administrative Agent shall advise the Lenders of the contents thereof. Each notice delivered by the Company pursuant to this Section shall be irrevocable; provided that a notice of termination of the Commitments delivered by the Company may state that such notice is conditioned upon the effectiveness of other credit facilities or other transactions specified therein, in which case such notice may be revoked by the Company (by notice to the Administrative Agent on or prior to the specified effective date) if such condition is not satisfied. Any termination or reduction of the Commitments shall be permanent. Each reduction of the Commitments shall be made ratably among the Lenders in accordance with their respective Commitments.

SECTION 2.10. Repayment of Loans; Evidence of Debt. (a) Each Borrower hereby unconditionally promises to pay (i) to the Administrative Agent for the account of each Lender the then unpaid principal amount of each Revolving Loan made to such Borrower on the Maturity Date in the currency of such Loan and (ii) in the case of the Company, to the Administrative Agent for the account of the Swingline Lender the then unpaid principal amount of each Swingline Loan on the earlier of the Maturity Date and the first date after such Swingline Loan is made that is the 15th or last day of a calendar month and is at least two Business Days after such Swingline Loan is made; provided that on each date that a Revolving Borrowing is made, the Company shall repay all Swingline Loans then outstanding and the proceeds of any such Borrowing shall be applied by the Administrative Agent to repay any Swingline Loans outstanding.

(b) Each Lender shall maintain in accordance with its usual practice an account or accounts evidencing the indebtedness of each Borrower to such Lender resulting from each Loan made by such Lender, including the amounts of principal and interest payable and paid to such Lender from time to time hereunder.

(c) The Administrative Agent shall maintain accounts in which it shall record (i) the amount of each Loan made hereunder, the Class, Agreed Currency and Type thereof and the Interest Period applicable thereto, (ii) the amount of any principal or interest due and payable or to become due and payable from each Borrower to each Lender hereunder and (iii) the amount of any sum received by the Administrative Agent hereunder for the account of the Lenders and each Lender's share thereof.

(d) The entries made in the accounts maintained pursuant to paragraph (b) or (c) of this Section shall be prima facie evidence of the existence and amounts of the obligations recorded therein; provided that the failure of any Lender or the Administrative Agent to maintain such accounts or any error therein shall not in any manner affect the Obligations.

(e) Any Lender may request that Loans made by it to any Borrower be evidenced by a promissory note. In such event, the relevant Borrower shall prepare, execute and deliver to such Lender a promissory note payable to such Lender (or, if requested by such Lender, to such Lender and its registered assigns) and in the form attached hereto as Exhibit J. Thereafter, the Loans evidenced by such promissory note and interest thereon shall at all times (including after assignment pursuant to Section 9.04) be represented by one or more promissory notes in such form.

SECTION 2.11. Prepayment of Loans.

(a) Any Borrower shall have the right at any time and from time to time to prepay any Borrowing in whole or in part, subject to prior notice in accordance with the provisions of this Section 2.11(a). The applicable Borrower, or the Company on behalf of the applicable Borrower, shall notify the Administrative Agent (and, in the case of prepayment of a Swingline Loan, the Swingline Lender) by written notice (promptly followed by telephonic confirmation of such request) of any prepayment hereunder (i) in the case of prepayment of a Eurocurrency Revolving Borrowing, not later than 11:00 a.m., Local Time, three (3) Business Days (in the case of a Eurocurrency Borrowing denominated in Dollars) or four (4) Business Days (in the case of a Eurocurrency Borrowing denominated in a Foreign Currency), in each case, before the date of prepayment, (ii) in the case of prepayment of an ABR Borrowing, not later than 11:00 a.m., New York City time, one Business Day before the date of prepayment or (iii) in the case of prepayment of a Swingline Loan, not later than 12:00 noon, New York City time, on the date of prepayment. Each such notice shall be irrevocable and shall specify the prepayment date and the principal amount of each Borrowing or portion thereof to be prepaid; provided that, if a notice of prepayment is given in connection with a conditional notice of termination of the Commitments as contemplated by Section 2.09, then such notice of prepayment may be revoked if such notice of termination is revoked in accordance with Section 2.09. Promptly following receipt of any such notice relating to a Revolving Borrowing, the Administrative Agent shall advise the Lenders of the contents thereof. Each partial prepayment of any Revolving Borrowing shall be in an amount that would be permitted in the case of an advance of a Revolving Borrowing of the same Type as provided in Section 2.02. Each prepayment of a Revolving Borrowing shall be applied ratably to the Loans included in the prepaid Revolving Borrowing. Prepayments shall be accompanied by (i) accrued interest to the extent required by Section 2.13 and (ii) break funding payments pursuant to Section 2.16.

(b) If at any time, (i) other than as a result of fluctuations in currency exchange rates, (A) the aggregate principal Dollar Amount of the Total Revolving Credit Exposure (calculated, with respect to those Credit Events denominated in Foreign Currencies, as of the most recent Computation Date with respect to each such Credit Event) exceeds the Aggregate Commitment, (B) the aggregate principal Dollar Amount of the Total Revolving Credit Exposure denominated in Foreign Currencies (the "Foreign Currency Exposure") (so calculated), as of the most recent Computation Date with respect to each such Credit Event, exceeds the Foreign Currency Sublimit or (C) the sum of the aggregate principal Dollar Amount of all Loans (so calculated) outstanding to the Foreign Subsidiary Borrowers exceeds the Foreign Borrower Sublimit or (ii) solely as a result of fluctuations in currency exchange rates, (A) the aggregate principal Dollar Amount of the Total Revolving Credit Exposure (so calculated) exceeds 105% of the Aggregate Commitment, (B) the Foreign Currency Exposure, as of the most recent Computation Date with respect to each such Credit Event, exceeds 105% of the Foreign Currency Sublimit or (C) the sum of the aggregate principal Dollar Amount of all Loans (so calculated) outstanding to the Foreign Subsidiary Borrowers exceeds 105% of the Foreign Borrower Sublimit, the Borrowers shall in each case immediately repay Borrowings or cash collateralize LC Exposure in an account with the Administrative Agent pursuant to Section 2.06(j), as applicable, in an aggregate principal amount sufficient to eliminate any such excess.

SECTION 2.12. Fees. (a) The Company agrees to pay to the Administrative Agent for the account of each Lender a commitment fee, which shall accrue at the Applicable Rate on the average daily amount of the Available Revolving Commitment of such Lender during the period from and including the Effective Date to but excluding the date on which such Commitment terminates; provided that, if such Lender continues to have any Revolving Credit Exposure after its Commitment terminates, then such commitment fee shall continue to accrue on the amount of such Lender's Revolving Credit Exposure from and including the date on which its Commitment terminates to but excluding the date on which such Lender ceases to have any Revolving Credit Exposure. Commitment fees accrued through and including the last day of March, June, September and December of each year shall be payable in arrears on the fifteenth (15th) day following such last day and on the date on which the Commitments terminate, commencing on the first such date to occur after the date hereof; provided that any commitment fees accruing after the date on which the Commitments terminate shall be payable on demand. All commitment fees shall be computed on the basis of a year of 360 days and shall be payable for the actual number of days elapsed (including the first day but excluding the last day).

(b) The Company agrees to pay (i) to the Administrative Agent for the account of each Lender a participation fee with respect to its participations in Letters of Credit, which shall accrue at the same Applicable Rate used to determine the interest rate applicable to Eurocurrency Loans on the average daily Dollar Amount of such Lender's LC Exposure (excluding any portion thereof attributable to unreimbursed LC Disbursements) during the period from and including the Effective Date to but excluding the later of the date on which such Lender's Commitment terminates and the date on which such Lender ceases to have any LC Exposure, and (ii) to the relevant Issuing Bank for its own account a fronting fee, which shall accrue at a rate per annum separately agreed upon between the Company and the relevant Issuing Bank on the average daily Dollar Amount of the LC Exposure (excluding any portion thereof attributable to unreimbursed LC Disbursements) attributable to Letters of Credit issued by such Issuing Bank during the period from and including the Effective Date to but excluding the later of the date of termination of the Commitments and the date on which there ceases to be any LC Exposure, as well as such Issuing Bank's standard fees and commissions with respect to the issuance, amendment, cancellation, negotiation, transfer, presentment, renewal or extension of any Letter of Credit or processing of drawings thereunder. Participation fees and fronting fees accrued through and including the last day of March, June, September and December of each year shall be payable on the fifteenth (15th) day following such last day, commencing on the first such date to occur after the Effective Date; provided that all such fees shall be payable on the date on which the Commitments terminate and any such fees accruing after the date on which the Commitments terminate shall be payable on demand. Any other fees payable to any Issuing Bank pursuant to this paragraph shall be payable within ten (10) days after demand. All participation fees and fronting fees shall be computed on the basis of a year of 360 days and shall be payable for the actual number of days elapsed (including the first day but excluding the last day). Participation fees and fronting fees in respect of Letters of Credit denominated in Dollars shall be paid in Dollars, and participation fees and fronting fees in respect of Letters of Credit denominated in a Foreign Currency shall be paid in such Foreign Currency.

(c) The Company agrees to pay to the Administrative Agent, for its own account, fees payable in the amounts and at the times separately agreed upon between the Company and the Administrative Agent.

(d) All fees payable hereunder shall be paid on the dates due, in Dollars (except as otherwise expressly provided in this Section) and immediately available funds, to the Administrative Agent (or to the relevant Issuing Bank, in the case of fees payable to it) for distribution, in the case of commitment fees and participation fees, to the Lenders. Fees paid shall not be refundable under any circumstances.

SECTION 2.13. Interest. (a) The Loans comprising each ABR Borrowing (including each Swingline Loan) shall bear interest at the Alternate Base Rate plus the Applicable Rate.

(b) The Loans comprising each Eurocurrency Borrowing shall bear interest at the Adjusted LIBO Rate for the Interest Period in effect for such Borrowing plus the Applicable Rate.

(c) Notwithstanding the foregoing, if any principal of or interest on any Loan or any fee or other amount payable by any Borrower hereunder is not paid when due, whether at stated maturity, upon acceleration or otherwise, such overdue amount shall bear interest, after as well as before judgment, at a rate per annum equal to (i) in the case of overdue principal of any Loan, 2% plus the rate otherwise applicable to such Loan as provided in the preceding paragraphs of this Section or (ii) in the case of any other amount, 2% plus the rate applicable to ABR Loans as provided in paragraph (a) of this Section.

(d) Accrued interest on each Loan shall be payable in arrears on each Interest Payment Date for such Loan and upon termination of the Commitments; provided that (i) interest accrued pursuant to paragraph (c) of this Section shall be payable on demand, (ii) in the event of any repayment or prepayment of any Loan (other than a prepayment of an ABR Revolving Loan prior to the end of the Availability Period), accrued interest on the principal amount repaid or prepaid shall be payable on the date of such repayment or prepayment and (iii) in the event of any conversion of any Eurocurrency Loan prior to the end of the current Interest Period therefor, accrued interest on such Loan shall be payable on the effective date of such conversion.

(e) All interest hereunder shall be computed on the basis of a year of 360 days, except that interest (i) computed by reference to the Alternate Base Rate at times when the Alternate Base Rate is based on the Prime Rate shall be computed on the basis of a year of 365 days (or 366 days in a leap year) and (ii) for Borrowings denominated in Pounds Sterling shall be computed on the basis of a year of 365 days, and in each case shall be payable for the actual number of days elapsed (including the first day but excluding the last day). The applicable Alternate Base Rate, Adjusted LIBO Rate or LIBO Rate shall be determined by the Administrative Agent, and such determination shall be conclusive absent manifest error.

SECTION 2.14. Alternate Rate of Interest.

(a) If at the time that the Administrative Agent shall seek to determine the LIBOR Screen Rate on the Quotation Day for any Interest Period for a Eurocurrency Borrowing, the LIBOR Screen Rate shall not be available for such Interest Period and/or for the applicable currency with respect to such Eurocurrency Borrowing for any reason, and the Administrative Agent shall reasonably determine that it is not possible to determine the Interpolated Rate (which conclusion shall be conclusive and binding absent manifest error), then the Reference Bank Rate shall be the LIBO Rate for such Interest Period for such Eurocurrency Borrowing; provided that if the Reference Bank Rate shall be less than zero, such rate shall be deemed to be zero for purposes of this Agreement; provided, further, however, that if less than two (2) Reference Banks shall supply a rate to the Administrative Agent for purposes of determining the LIBO Rate for such Eurocurrency Borrowing, (i) if such Borrowing shall be requested in Dollars, then such Borrowing shall be made as an ABR Borrowing at the Alternate Base Rate and (ii) if such Borrowing shall be requested in any Foreign Currency, the LIBO Rate shall be equal to the rate determined by the Administrative Agent in its reasonable discretion after consultation with the Company and consented to in writing by the Required Lenders (the "Alternative Rate"); provided, however, that until such time as the Alternative Rate shall be determined and so consented to by the Required Lenders, Borrowings shall not be available in such Foreign Currency. It is hereby understood and agreed that, notwithstanding anything to the foregoing set forth in this Section 2.14(a), if at any time the conditions set forth in Section 2.14(c)(i) or (ii) are in effect, the provisions of this Section 2.14(a) shall no longer be applicable for any purpose of determining any alternative rate of interest under this Agreement and Section 2.14(c) shall instead be applicable for all purposes of determining any alternative rate of interest under this Agreement.

(b) If prior to the commencement of any Interest Period for a Eurocurrency Borrowing:

(i) the Administrative Agent determines (which determination shall be conclusive and binding absent manifest error) that adequate and reasonable means do not exist for ascertaining the Adjusted LIBO Rate or the LIBO Rate, as applicable (including because the LIBOR Screen Rate is not available or published on a current basis), for the applicable currency and such Interest Period; or

(ii) the Administrative Agent is advised by the Required Lenders that the Adjusted LIBO Rate or the LIBO Rate, as applicable, for the applicable currency and such Interest Period will not adequately and fairly reflect the cost to such Lenders of making or maintaining their Loans included in such Borrowing for the applicable currency and such Interest Period;

then the Administrative Agent shall give notice thereof to the applicable Borrower and the Lenders by telephone or telecopy as promptly as practicable thereafter and, until the Administrative Agent notifies the applicable Borrower and the Lenders that the circumstances giving rise to such notice no longer exist, (i) any Interest Election Request that requests the conversion of any Borrowing to, or continuation of any Borrowing as, a Eurocurrency Borrowing shall be ineffective and, unless repaid (A) in the case of a Eurocurrency Borrowing denominated in Dollars, such Borrowing shall be made as an ABR Borrowing and (B) in the case of a Eurocurrency Borrowing denominated in a Foreign Currency, such Eurocurrency Borrowing shall be repaid on the last day of the then current Interest Period applicable thereto and (ii) if any Borrowing Request requests a Eurocurrency Borrowing in Dollars, such Borrowing shall be made as an ABR Borrowing (and if such Borrowing Request requests a Eurocurrency Revolving Borrowing denominated in a Foreign Currency, such Borrowing Request shall be ineffective); provided that if the circumstances giving rise to such notice affect only one Type of Borrowings, then the other Type of Borrowings shall be permitted.

(c) Notwithstanding the foregoing, if at any time the Administrative Agent determines (which determination shall be conclusive absent manifest error) that (i) the circumstances set forth in Section 2.14(b)(i) have arisen and such circumstances are unlikely to be temporary or (ii) the circumstances set forth in Section 2.14(b)(i) have not arisen but (w) the supervisor for the administrator of the LIBOR Screen Rate has made a public statement that the administrator of the LIBOR Screen Rate is insolvent (and there is no successor administrator that will continue publication of the LIBOR Screen Rate), (x) the administrator of the LIBOR Screen Rate has made a public statement identifying a specific date after which the LIBOR Screen Rate will permanently or indefinitely cease to be published by it (and there is no successor administrator that will continue publication of the LIBOR Screen Rate), (y) the supervisor for the administrator of the LIBOR Screen Rate has made a public statement identifying a specific date after which the LIBOR Screen Rate will permanently or indefinitely cease to be published or (z) the supervisor for the administrator of the LIBOR Screen Rate or a Governmental Authority having jurisdiction over the Administrative Agent has made a public statement identifying a specific date after which the LIBOR Screen Rate may no longer be used for determining interest rates for loans, then the Administrative Agent and the Company shall endeavor to establish an alternate rate of interest to the LIBOR Rate that gives due consideration to the then prevailing market convention for determining a rate of interest for syndicated loans in the United States at such time, and shall enter into an amendment to this Agreement to reflect such alternate rate of interest and such other related changes to this Agreement as may be applicable (but for the avoidance of doubt, such related changes shall not include a reduction of the Applicable Rate); provided that, if such alternate rate of interest as so determined would be less than zero, such rate shall be deemed to be zero for the purposes of this Agreement. Notwithstanding anything to the contrary in Section 9.02, such amendment shall become effective without any further action or consent of any other party to this Agreement so long as the Administrative Agent shall not have received, within five (5) Business Days of the date notice of such alternate rate of interest is provided to the Lenders, a written notice from the Required Lenders stating that such Required Lenders object to such amendment. Until an alternate rate of interest shall be determined in accordance with this Section 2.14(c) (but, in the case of the circumstances described in clause (ii) of the first sentence of this Section 2.14(c), only to the extent the LIBOR Screen Rate for the applicable currency and such Interest Period is not available or published at such time on a current basis), (x) any Interest Election Request that requests the conversion of any Borrowing to, or continuation of any Borrowing as, a Eurocurrency Borrowing in the applicable currency or for the applicable Interest Period, as the case may be, shall be ineffective, (y) if any Borrowing Request requests a Eurocurrency Borrowing in Dollars, such Borrowing shall be made as an ABR Borrowing and (z) if any Borrowing Request requests a Eurocurrency Borrowing in a Foreign Currency, then such request shall be ineffective.

SECTION 2.15. Increased Costs. (a) If any Change in Law shall:

(i) impose, modify or deem applicable any reserve, special deposit, liquidity or similar requirement (including any compulsory loan requirement, insurance charge or other assessment) against assets of, deposits with or for the account of, or credit extended by, any Lender (except any such reserve requirement reflected in the Adjusted LIBO Rate) or any Issuing Bank;

(ii) impose on any Lender or any Issuing Bank or the London interbank market any other condition, cost or expense affecting this Agreement or Loans made by such Lender or any Letter of Credit or participation therein; or

(iii) subject the Administrative Agent, any Lender or any Issuing Bank to any Taxes (other than (A) Indemnified Taxes, (B) Excluded Taxes and (C) Other Taxes) on its loans, loan principal, letters of credit, commitments, or other obligations, or its deposits, reserves, other liabilities or capital attributable thereto;

and the result of any of the foregoing shall be to increase the cost to the Administrative Agent or such Lender of making, continuing, converting into or maintaining any Loan or of maintaining its obligation to make any such Loan or to increase the cost to the Administrative Agent, such Lender or such Issuing Bank of participating in, issuing or maintaining any Letter of Credit or to reduce the amount of any sum received or receivable by the Administrative Agent, such Lender or such Issuing Bank hereunder, whether of principal, interest or otherwise, then the applicable Borrower will pay to the Administrative Agent, such Lender or such Issuing Bank, as the case may be, such additional amount or amounts as will compensate the Administrative Agent, such Lender or such Issuing Bank, as the case may be, for such additional costs incurred or reduction suffered.

(b) If any Lender or any Issuing Bank determines that any Change in Law regarding capital or liquidity requirements has or would have the effect of reducing the rate of return on such Lender's or such Issuing Bank's capital or on the capital of such Lender's or such Issuing Bank's holding company, if any, as a consequence of this Agreement or the Loans made by, or participations in Letters of Credit held by, such Lender, or the Letters of Credit issued by such Issuing Bank, to a level below that which such Lender or such Issuing Bank or such Lender's or such Issuing Bank's holding company could have achieved but for such Change in Law (taking into consideration such Lender's or such Issuing Bank's policies and the policies of such Lender's or such Issuing Bank's holding company with respect to capital adequacy and liquidity), then from time to time the applicable Borrower will pay to such Lender or such Issuing Bank, as the case may be, such additional amount or amounts as will compensate such Lender or such Issuing Bank or such Lender's or such Issuing Bank's holding company for any such reduction suffered.

(c) A certificate of a Lender or an Issuing Bank setting forth the amount or amounts necessary to compensate such Lender or such Issuing Bank or its holding company, as the case may be, as specified in paragraph (a) or (b) of this Section shall be delivered to the Company and shall be conclusive absent manifest error. The Company shall pay, or cause the other Borrowers to pay, such Lender or such Issuing Bank, as the case may be, the amount shown as due on any such certificate within 10 days after receipt thereof.

(d) Failure or delay on the part of any Lender or any Issuing Bank to demand compensation pursuant to this Section shall not constitute a waiver of such Lender's or such Issuing Bank's right to demand such compensation; provided that the Company shall not be required to compensate a Lender or an Issuing Bank pursuant to this Section for any increased costs or reductions incurred more than 270 days prior to the date that such Lender or such Issuing Bank, as the case may be, notifies the Company of the Change in Law giving rise to such increased costs or reductions and of such Lender's or such Issuing Bank's intention to claim compensation therefor; provided further that, if the Change in Law giving rise to such increased costs or reductions is retroactive, then the 270-day period referred to above shall be extended to include the period of retroactive effect thereof.

SECTION 2.16. Break Funding Payments. In the event of (a) the payment of any principal of any Eurocurrency Loan other than on the last day of an Interest Period applicable thereto (including as a result of an Event of Default or as a result of any prepayment pursuant to Section 2.11), (b) the conversion of any Eurocurrency Loan other than on the last day of the Interest Period applicable thereto, (c) the failure to borrow, convert, continue or prepay any Eurocurrency Loan on the date specified in any notice delivered pursuant hereto (regardless of whether such notice may be revoked under Section 2.11(a) and is revoked in accordance therewith) or (d) the assignment of any Eurocurrency Loan other than on the last day of the Interest Period applicable thereto as a result of a request by the Company pursuant to Section 2.19 or 9.02(e), then, in any such event, the Borrowers shall compensate each Lender for the loss, cost and expense attributable to such event. Such loss, cost or expense to any Lender shall be deemed to include an amount determined by such Lender to be the excess, if any, of (i) the amount of interest which would have accrued on the principal amount of such Loan had such event not occurred, at the Adjusted LIBO Rate that would have been applicable to such Loan, for the period from the date of such event to the last day of the then current Interest Period therefor (or, in the case of a failure to borrow, convert or continue, for the period that would have been the Interest Period for such Loan), over (ii) the amount of interest which would accrue on such principal amount for such period at the interest rate which such Lender would bid were it to bid, at the commencement of such period, for deposits in the relevant currency of a comparable amount and period from other banks in the eurocurrency market. A certificate of any Lender setting forth any amount or amounts that such Lender is entitled to receive pursuant to this Section shall be delivered to the applicable Borrower and shall be conclusive absent manifest error. The applicable Borrower shall pay such Lender the amount shown as due on any such certificate within thirty (30) days after receipt thereof.

SECTION 2.17. Taxes. (a) Any and all payments by or on account of any obligation of each Borrower hereunder or any other Loan Documents shall be made free and clear of and without deduction for any Taxes, except as required by applicable law. If any applicable law (as determined in the good faith discretion of an applicable withholding agent) requires the deduction or withholding of any Tax from any such payment by a withholding agent, then the applicable withholding agent shall (i) make such deductions and (ii) pay the full amount deducted to the relevant Governmental Authority in accordance with applicable law and, if such Tax is an Indemnified Tax, then the sum payable by the applicable Borrower shall be increased as necessary so that after making all required deductions (including deductions applicable to additional sums payable under this Section) the Administrative Agent, relevant Lender receives an amount equal to the sum it would have received had no such deductions been made.

(b) In addition, each Borrower shall pay any Other Taxes related to such Borrower and imposed on or incurred by the Administrative Agent or a Lender to the relevant Governmental Authority in accordance with applicable law.

(c) The relevant Borrower shall indemnify the Administrative Agent and each Lender, within ten (10) days after written demand therefor, for the full amount of any Indemnified Taxes or Other Taxes paid by the Administrative Agent or such Lender on or with respect to any payment by or on account of any obligation of such Borrower hereunder or any other Loan Documents (including Indemnified Taxes or Other Taxes imposed or asserted on or attributable to amounts payable under this Section) and any penalties, interest and reasonable expenses arising therefrom or with respect thereto, whether or not such Indemnified Taxes or Other Taxes were correctly or legally imposed or asserted by the relevant Governmental Authority. A certificate as to the amount of such payment or liability delivered to the Company by a Lender or by the Administrative Agent on its own behalf or on behalf of a Lender, shall be conclusive absent manifest error.

(d) As soon as practicable after any payment of Taxes by any Borrower to a Governmental Authority, such Borrower shall deliver to the Administrative Agent the original or a certified copy of a receipt issued by such Governmental Authority evidencing such payment, a copy of the return reporting such payment or other evidence of such payment reasonably satisfactory to the Administrative Agent.

(e) (i) Any Lender that is entitled to an exemption from or reduction of withholding Tax with respect to payments made under any Loan Document shall deliver to the Borrowers and the Administrative Agent, at the time or times reasonably requested by the Borrowers or the Administrative Agent, such properly completed and executed documentation reasonably requested by the Borrowers or the Administrative Agent as will permit such payments to be made without withholding or at a reduced rate of withholding. In addition, any Lender, if reasonably requested by the Borrowers or the Administrative Agent, shall deliver such other documentation prescribed by applicable law or reasonably requested by the Borrowers or the Administrative Agent as will enable the Borrowers or the Administrative Agent to determine whether or not such Lender is subject to backup withholding or information reporting requirements. Notwithstanding anything to the contrary in the preceding two sentences, the completion, execution and submission of such documentation (other than such documentation set forth in Section 2.17(e)(ii)(A), (ii)(B) and (ii)(D) below) shall not be required if in the Lender's reasonable judgment such completion, execution or submission would subject such Lender to any material unreimbursed cost or expense or would materially prejudice the legal or commercial position of such Lender.

(ii) Without limiting the generality of the foregoing:

(A) any Lender that is a U.S. Person shall deliver to such Borrower and the Administrative Agent on or prior to the date on which such Lender becomes a Lender under this Agreement (and from time to time thereafter upon the reasonable request of such Borrower or the Administrative Agent), an executed copy of IRS Form W-9 certifying that such Lender is exempt from U.S. Federal backup withholding tax;

(B) any Foreign Lender shall, to the extent it is legally entitled to do so, deliver to such Borrower and the Administrative Agent (in such number of copies as shall be requested by the recipient) on or prior to the date on which such Foreign Lender becomes a Lender under this Agreement (and from time to time thereafter upon the reasonable request of such Borrower or the Administrative Agent), whichever of the following is applicable:

(1) in the case of a Foreign Lender claiming the benefits of an income tax treaty to which the United States is a party (x) with respect to payments of interest under any Loan Document, an executed copy of IRS Form W-8BEN or IRS Form W-8BEN-E establishing an exemption from, or reduction of, U.S. Federal withholding Tax pursuant to the "interest" article of such tax treaty and (y) with respect to any other applicable payments under any Loan Document, IRS Form W-8BEN or IRS Form W-8BEN-E establishing an exemption from, or reduction of, U.S. Federal withholding Tax pursuant to the "business profits" or "other income" article of such tax treaty;

(2) in the case of a Foreign Lender claiming that its extension of credit will generate U.S. effectively connected income, an executed copy of IRS Form W-8ECI;

(3) in the case of a Foreign Lender claiming the benefits of the exemption for portfolio interest under Section 881(c) of the Code, (x) a certificate substantially in the form of Exhibit K-1 to the effect that such Foreign Lender is not a “bank” within the meaning of Section 881(c)(3)(A) of the Code, a “10 percent shareholder” of such Borrower within the meaning of Section 881(c)(3)(B) of the Code, or a “controlled foreign corporation” described in Section 881(c)(3)(C) of the Code (a “U.S. Tax Compliance Certificate”) and (y) an executed copy of IRS Form W-8BEN or IRS Form W-8BEN-E; or

(4) to the extent a Foreign Lender is not the beneficial owner, an executed IRS Form W-8IMY, accompanied by IRS Form W-8ECI, IRS Form W-8BEN or IRS Form W-8BEN-E, a U.S. Tax Compliance Certificate substantially in the form of Exhibit K-2 or Exhibit K-3, IRS Form W-9, and/or other certification documents from each beneficial owner, as applicable; provided that if the Foreign Lender is a partnership and one or more direct or indirect partners of such Foreign Lender are claiming the portfolio interest exemption, such Foreign Lender may provide a U.S. Tax Compliance Certificate substantially in the form of Exhibit K-4 on behalf of each such direct and indirect partner;

(C) any Foreign Lender shall, to the extent it is legally entitled to do so, deliver to such Borrower and the Administrative Agent (in such number of copies as shall be requested by the recipient) on or prior to the date on which such Foreign Lender becomes a Lender under this Agreement (and from time to time thereafter upon the reasonable request of such Borrower or the Administrative Agent), executed copies of any other form prescribed by applicable law as a basis for claiming exemption from or a reduction in U.S. Federal withholding Tax, duly completed, together with such supplementary documentation as may be prescribed by applicable law to permit such Borrower or the Administrative Agent to determine the withholding or deduction required to be made; and

(D) if a payment made to a Lender under any Loan Document would be subject to U.S. Federal withholding Tax imposed by FATCA if such Lender were to fail to comply with the applicable reporting requirements of FATCA (including those contained in Section 1471(b) or 1472(b) of the Code, as applicable), such Lender shall deliver to such Borrower and the Administrative Agent at the time or times prescribed by law and at such time or times reasonably requested by such Borrower or the Administrative Agent such documentation prescribed by applicable law (including as prescribed by Section 1471(b)(3)(C)(i) of the Code) and such additional documentation reasonably requested by such Borrower or the Administrative Agent as may be necessary for such Borrower and the Administrative Agent to comply with their obligations under FATCA and to determine that such Lender has complied with such Lender’s obligations under FATCA or to determine the amount to deduct and withhold from such payment. Solely for purposes of this clause (D), “FATCA” shall include any amendments made to FATCA after the date of this Agreement.

Each Lender agrees that if any form or certification it previously delivered expires or becomes obsolete or inaccurate in any respect, it shall update such form or certification or promptly notify the Company and the Administrative Agent in writing of its legal inability to do so.

(f) If the Administrative Agent or a Lender determines, in its sole discretion, that it has received a refund of any Taxes or Other Taxes as to which it has been indemnified by the Borrowers or with respect to which a Borrower has paid additional amounts pursuant to this Section 2.17, it shall pay over such refund to such Borrower (but only to the extent of indemnity payments made, or additional amounts paid, by such Borrower under this Section 2.17 with respect to the Taxes or Other Taxes giving rise to such refund), net of all out-of-pocket expenses (including Taxes) of the Administrative Agent or such Lender and without interest (other than any interest paid by the relevant Governmental Authority with respect to such refund); provided, that such Borrower, upon the request of the Administrative Agent or such Lender, agrees to repay the amount paid over to such Borrower (plus any penalties, interest or other charges imposed by the relevant Governmental Authority) to the Administrative Agent or such Lender in the event the Administrative Agent or such Lender is required to repay such refund to such Governmental Authority. Notwithstanding anything to the contrary in this paragraph (f), in no event will the Administrative Agent or a Lender be required to pay any amount to a Borrower pursuant to this paragraph (f) the payment of which would place the Administrative Agent or such Lender, as applicable, in a less favorable net after-Tax position than it would have been in if the Tax subject to indemnification and giving rise to such refund had not been deducted, withheld or otherwise imposed and the indemnification payments or additional amounts with respect to such Tax had never been paid. This Section shall not be construed to require the Administrative Agent or any Lender to make available its tax returns (or any other information relating to its taxes which it deems confidential) to any Borrower or any other Person.

(g) Each Lender shall severally indemnify the Administrative Agent, within ten (10) days after demand therefor, for (i) any Indemnified Taxes or Other Taxes attributable to such Lender (but only to the extent that the Borrowers have not already indemnified the Administrative Agent for such Indemnified Taxes or Other Taxes and without limiting the obligation of the Borrowers to do so), (ii) any Taxes attributable to such Lender's failure to comply with the provisions of Section 9.04(c) relating to the maintenance of a Participant Register and (iii) any Excluded Taxes attributable to such Lender, in each case, that are payable or paid by the Administrative Agent in connection with any Loan Document, and any reasonable expenses arising therefrom or with respect thereto, whether or not such Taxes were correctly or legally imposed or asserted by the relevant Governmental Authority. A certificate as to the amount of such payment or liability delivered to any Lender by the Administrative Agent shall be conclusive absent manifest error. Each Lender hereby authorizes the Administrative Agent to set off and apply any and all amounts at any time owing to such Lender under any Loan Document or otherwise payable by the Administrative Agent to the Lender from any other source against any amount due to the Administrative Agent under this paragraph (g).

(h) For purposes of determining withholding Taxes imposed under FATCA, the Loan Parties and the Administrative Agent shall treat (and the Lenders hereby authorize the Administrative Agent to treat) this Agreement and the Loans as not qualifying as "grandfathered obligations" within the meaning of Treasury Regulation Section 1.1471-2(b)(2)(i).

(i) For purposes of this Section 2.17, the term "Lender" includes any Issuing Bank.

SECTION 2.18. Payments Generally; Pro Rata Treatment; Sharing of Set-offs.

(a) Each Borrower shall make each payment required to be made by it hereunder (whether of principal, interest, fees or reimbursement of LC Disbursements, or of amounts payable under Section 2.15, 2.16 or 2.17, or otherwise) prior to (i) in the case of payments denominated in Dollars, 12:00 noon, New York City time and (ii) in the case of payments denominated in a Foreign Currency, 12:00 noon, Local Time, in the city of the Administrative Agent's Eurocurrency Payment Office for such currency, in each case on the date when due, in immediately available funds, without set-off, recoupment or counterclaim. Any amounts received after such time on any date may, in the discretion of the Administrative Agent, be deemed to have been received on the next succeeding Business Day for purposes of calculating interest thereon. All such payments shall be made (i) in the same currency in which the applicable Credit Event was made (or where such currency has been converted to euro, in euro) and (ii) to the Administrative Agent at its offices at 10 South Dearborn Street, Chicago, Illinois 60603 or, in the case of a Credit Event denominated in a Foreign Currency, the Administrative Agent's Eurocurrency Payment Office for such currency, except payments to be made directly to an Issuing Bank or Swingline Lender as expressly provided herein and except that payments pursuant to Sections 2.15, 2.16, 2.17 and 9.03 shall be made directly to the Persons entitled thereto. The Administrative Agent shall distribute any such payments denominated in the same currency received by it for the account of any other Person to the appropriate recipient promptly following receipt thereof. If any payment hereunder shall be due on a day that is not a Business Day, the date for payment shall be extended to the next succeeding Business Day, and, in the case of any payment accruing interest, interest thereon shall be payable for the period of such extension. Notwithstanding the foregoing provisions of this Section, if, after the making of any Credit Event in any Foreign Currency, currency control or exchange regulations are imposed in the country which issues such currency with the result that the type of currency in which the Credit Event was made (the "Original Currency") no longer exists or any Borrower is not able to make payment to the Administrative Agent for the account of the Lenders in such Original Currency, then all payments to be made by such Borrower hereunder in such currency shall instead be made when due in Dollars in an amount equal to the Dollar Amount (as of the date of repayment) of such payment due, it being the intention of the parties hereto that the Borrowers take all risks of the imposition of any such currency control or exchange regulations.

(b) Subject at all times to the terms and conditions of the final paragraph of Article VII, if at any time insufficient funds are received by and available to the Administrative Agent to pay fully all amounts of principal, unreimbursed LC Disbursements, interest and fees then due hereunder, such funds shall be applied (i) first, towards payment of interest and fees then due hereunder, ratably among the parties entitled thereto in accordance with the amounts of interest and fees then due to such parties, and (ii) second, towards payment of principal and unreimbursed LC Disbursements then due hereunder, ratably among the parties entitled thereto in accordance with the amounts of principal and unreimbursed LC Disbursements then due to such parties.

(c) If any Lender shall, by exercising any right of set-off or counterclaim or otherwise, obtain payment in respect of any principal of or interest on any of its Loans or participations in LC Disbursements or Swingline Loans resulting in such Lender receiving payment of a greater proportion of the aggregate amount of its Loans and participations in LC Disbursements and Swingline Loans and accrued interest thereon than the proportion received by any other Lender, then the Lender receiving such greater proportion shall purchase (for cash at face value) participations in the Loans and participations in LC Disbursements and Swingline Loans of other Lenders to the extent necessary so that the benefit of all such payments shall be shared by the Lenders ratably in accordance with the aggregate amount of principal of and accrued interest on their respective Loans and participations in LC Disbursements and Swingline Loans; provided that (i) if any such participations are purchased and all or any portion of the payment giving rise thereto is recovered, such participations shall be rescinded and the purchase price restored to the extent of such recovery, without interest, and (ii) the provisions of this paragraph shall not be construed to apply to any payment made by any Borrower pursuant to and in accordance with the express terms of this Agreement or any payment obtained by a Lender as consideration for the assignment of or sale of a participation in any of its Loans or participations in LC Disbursements and Swingline Loans to any assignee or participant, other than to the Company or any Subsidiary or Affiliate thereof (as to which the provisions of this paragraph shall apply). Each Borrower consents to the foregoing and agrees, to the extent it may effectively do so under applicable law, that any Lender acquiring a participation pursuant to the foregoing arrangements may exercise against such Borrower rights of set-off and counterclaim with respect to such participation as fully as if such Lender were a direct creditor of such Borrower in the amount of such participation.

(d) Unless the Administrative Agent shall have received notice from the relevant Borrower prior to the date on which any payment is due to the Administrative Agent for the account of the Lenders or the Issuing Banks hereunder that such Borrower will not make such payment, the Administrative Agent may assume that such Borrower has made such payment on such date in accordance herewith and may, in reliance upon such assumption, distribute to the Lenders or the Issuing Banks, as the case may be, the amount due. In such event, if such Borrower has not in fact made such payment, then each of the Lenders or each of the Issuing Banks, as the case may be, severally agrees to repay to the Administrative Agent forthwith on demand the amount so distributed to such Lender or such Issuing Bank with interest thereon, for each day from and including the date such amount is distributed to it to but excluding the date of payment to the Administrative Agent, at the greater of the NYFRB Rate and a rate determined by the Administrative Agent in accordance with banking industry rules on interbank compensation (including without limitation the Overnight Foreign Currency Rate in the case of Loans denominated in a Foreign Currency).

(e) If any Lender shall fail to make any payment required to be made by it pursuant to Section 2.05(c), 2.06(d) or (e), 2.07(b), 2.18(d) or 9.03(c), then the Administrative Agent may, in its discretion (notwithstanding any contrary provision hereof), (i) apply any amounts thereafter received by the Administrative Agent for the account of such Lender and for the benefit of the Administrative Agent, the Swingline Lender or the Issuing Banks to satisfy such Lender's obligations to it under such Section until all such unsatisfied obligations are fully paid and/or (ii) hold any such amounts in a segregated account as cash collateral for, and application to, any future funding obligations of such Lender under any such Section; in the case of each of clauses (i) and (ii) above, in any order as determined by the Administrative Agent in its discretion.

SECTION 2.19. Mitigation Obligations; Replacement of Lenders. (a) If any Lender requests compensation under Section 2.15, or if any Borrower is required to pay any Indemnified Taxes or additional amounts to any Lender or any Governmental Authority for the account of any Lender pursuant to Section 2.17, then such Lender shall use reasonable efforts to designate a different lending office for funding or booking its Loans hereunder or to assign its rights and obligations hereunder to another of its offices, branches or affiliates, if, in the judgment of such Lender, such designation or assignment (i) would eliminate or reduce amounts payable pursuant to Section 2.15 or 2.17, as the case may be, in the future and (ii) would not subject such Lender to any unreimbursed cost or expense and would not otherwise be disadvantageous to such Lender. The Company hereby agrees to pay all reasonable costs and expenses incurred by any Lender in connection with any such designation or assignment.

(b) If (i) any Lender requests compensation under Section 2.15, (ii) any Borrower is required to pay any Indemnified Taxes or additional amounts to any Lender or any Governmental Authority for the account of any Lender pursuant to Section 2.17 or (iii) any Lender becomes a Defaulting Lender, then the Company may, at its sole expense and effort, upon notice to such Lender and the Administrative Agent, require such Lender to assign and delegate, without recourse (in accordance with and subject to the restrictions contained in Section 9.04), all its interests, rights (other than its existing rights to payments pursuant to Sections 2.15 or 2.17) and obligations under the Loan Documents to an assignee that shall assume such obligations (which assignee may be another Lender, if a Lender accepts such assignment); provided that (i) the Company shall have received the prior written consent of the Administrative Agent (and if a Commitment is being assigned, the Issuing Banks and the Swingline Lender), which consent shall not unreasonably be withheld, (ii) such Lender shall have received payment of an amount equal to the outstanding principal of its Loans and participations in LC Disbursements and Swingline Loans, accrued interest thereon, accrued fees and all other amounts payable to it hereunder, from the assignee (to the extent of such outstanding principal and accrued interest and fees) or the Company (in the case of all other amounts) and (iii) in the case of any such assignment resulting from a claim for compensation under Section 2.15 or payments required to be made pursuant to Section 2.17, such assignment will result in a reduction in such compensation or payments. A Lender shall not be required to make any such assignment and delegation if, prior thereto, as a result of a waiver by such Lender or otherwise, the circumstances entitling the Company to require such assignment and delegation cease to apply. Each party hereto agrees that (a) an assignment required pursuant to this paragraph may be effected pursuant to an Assignment and Assumption executed by the Company, the Administrative Agent and the assignee (or, to the extent applicable, an agreement incorporating an Assignment and Assumption by reference pursuant to an Approved Electronic Platform as to which the Administrative Agent and such parties are participants), and (b) the Lender required to make such assignment need not be a party thereto in order for such assignment to be effective and shall be deemed to have consented to and be bound by the terms thereof; provided that, following the effectiveness of any such assignment, the other parties to such assignment agree to execute and deliver such documents necessary to evidence such assignment as reasonably requested by the applicable Lender, provided that any such documents shall be without recourse to or warranty by the parties thereto.

SECTION 2.20. Expansion Option. The Company may from time to time elect to increase the Commitments or enter into one or more tranches of term loans (each an "Incremental Term Loan"), in each case, in minimum increments of \$5,000,000 so long as, after giving effect thereto, the aggregate amount of such increases and all such Incremental Term Loans does not exceed \$50,000,000. The Company may arrange for any such increase or tranche to be provided by one or more Lenders (each Lender so agreeing to an increase in its Commitment or to participate in such Incremental Term Loans, an "Increasing Lender"), or by one or more new banks, financial institutions or other entities (each such new bank, financial institution or other entity, an "Augmenting Lender"; provided that no Ineligible Institution may be an Augmenting Lender), to increase their existing Commitments, or to participate in such Incremental Term Loans, or extend Commitments, as the case may be; provided that (i) each Augmenting Lender, shall be subject to the approval of the Company and the Administrative Agent and (ii) (x) in the case of an Increasing Lender, the Company and such Increasing Lender execute an agreement substantially in the form of Exhibit C hereto, and (y) in the case of an Augmenting Lender, the Company and such Augmenting Lender execute an agreement substantially in the form of Exhibit D hereto. No consent of any Lender (other than the Lenders participating in the increase or any Incremental Term Loan) shall be required for any increase in Commitments and/or Incremental Term Loan pursuant to this Section 2.20. Increases and new Commitments and Incremental Term Loans created pursuant to this Section 2.20 shall become effective on the date agreed by the Company, the Administrative Agent and the relevant Increasing Lenders or Augmenting Lenders, and the Administrative Agent shall notify each Lender thereof. Notwithstanding the foregoing, no increase in the Commitments (or in the Commitment of any Lender) or tranche of Incremental Term Loans shall become effective under this paragraph unless, (i) on the proposed date of the effectiveness of such increase or Incremental Term Loans, (A) the conditions set forth in paragraphs (a) and (b) of Section 4.02 shall be satisfied or waived by the Required Lenders and the Administrative Agent shall have received a certificate to that effect dated such date and executed by a Financial Officer of the Company and (B) the Company shall be in compliance (on a Pro Forma Basis reasonably acceptable to the Administrative Agent) with the covenants contained in Section 6.11 and (ii) the Administrative Agent shall have received documents and opinions consistent with those delivered on the Effective Date as to the organizational power and authority of the Borrowers to borrow hereunder after giving effect to such increase or Incremental Term Loan. On the effective date of any increase in the Commitments or any Incremental Term Loans being made, (i) each relevant Increasing Lender and Augmenting Lender shall make available to the Administrative Agent such amounts in immediately available funds as the Administrative Agent shall determine, for the benefit of the other Lenders, as being required in order to cause, after giving effect to such increase and the use of such amounts to make payments to such other Lenders, each Lender's portion of the outstanding Revolving Loans of all the Lenders to equal its Applicable Percentage of such outstanding Revolving Loans, and (ii) except in the case of any Incremental Term Loans, the Borrowers shall be deemed to have repaid and reborrowed all outstanding Revolving Loans as of the date of any increase in the Commitments (with such reborrowing to consist of the Types of Revolving Loans, with related Interest Periods if applicable, specified in a notice delivered by the applicable Borrower, or the Company on behalf of the applicable Borrower, in accordance with the requirements of Section 2.03). The deemed payments made pursuant to clause (ii) of the immediately preceding sentence shall be accompanied by payment of all accrued interest on the amount prepaid and, in respect of each Eurocurrency Loan, shall be subject to indemnification by the Borrowers pursuant to the provisions of Section 2.16 if the deemed payment occurs other than on the last day of the related Interest Periods. The Incremental Term Loans (a) shall rank pari passu in right of payment with the Revolving Loans, (b) shall not mature earlier than the Maturity Date (but may have amortization prior to such date) and (c) shall be treated substantially the same as (and in any event no more favorably than) the Revolving Loans; provided that (i) the terms and conditions applicable to any tranche of Incremental Term Loans maturing after the Maturity Date may provide for material additional or different financial or other covenants or prepayment requirements applicable only during periods after the Maturity Date and (ii) the Incremental Term Loans may be priced differently than the Revolving Loans. Incremental Term Loans may be made hereunder pursuant to an amendment or restatement (an "Incremental Term Loan Amendment") of this Agreement and, as appropriate, the other Loan Documents, executed by the Borrowers, each Increasing Lender participating in such tranche, each Augmenting Lender participating in such tranche, if any, and the Administrative Agent. The Incremental Term Loan Amendment may, without the consent of any other Lenders, effect such amendments to this Agreement and the other Loan Documents as may be necessary or appropriate in the reasonable opinion of the Administrative Agent, to effect the provisions of this Section 2.20. Nothing contained in this Section 2.20 shall constitute, or otherwise be deemed to be, a commitment on the part of any Lender to increase its Commitment hereunder, or provide Incremental Term Loans, at any time.

SECTION 2.21. Market Disruption. Notwithstanding the satisfaction of all conditions referred to in Article II and Article IV with respect to any Credit Event to be effected in any Foreign Currency, if (i) there shall occur on or prior to the date of such Credit Event any change in national or international financial, political or economic conditions or currency exchange rates or exchange controls which would in the reasonable opinion of the Administrative Agent, the Issuing Banks (if such Credit Event is a Letter of Credit) or the Required Lenders make it impracticable for the Eurocurrency Borrowings or Letters of Credit comprising such Credit Event to be denominated in the Agreed Currency specified by the applicable Borrower or (ii) an Equivalent Amount of such currency is not readily calculable, then the Administrative Agent shall forthwith give notice thereof to such Borrower, the Lenders and, if such Credit Event is a Letter of Credit, the Issuing Banks, and such Credit Events shall not be denominated in such Agreed Currency but shall, except as otherwise set forth in Section 2.07, be made on the date of such Credit Event in Dollars, (a) if such Credit Event is a Borrowing, in an aggregate principal amount equal to the Dollar Amount of the aggregate principal amount specified in the related Credit Event Request or Interest Election Request, as the case may be, as ABR Loans, unless such Borrower notifies the Administrative Agent at least one Business Day before such date that (i) it elects not to borrow on such date or (ii) it elects to borrow on such date in a different Agreed Currency, as the case may be, in which the denomination of such Loans would in the reasonable opinion of the Administrative Agent and the Required Lenders be practicable and in an aggregate principal amount equal to the Dollar Amount of the aggregate principal amount specified in the related Credit Event Request or Interest Election Request, as the case may be or (b) if such Credit Event is a Letter of Credit, in a face amount equal to the Dollar Amount of the face amount specified in the related request or application for such Letter of Credit, unless such Borrower notifies the Administrative Agent at least one (1) Business Day before such date that (i) it elects not to request the issuance of such Letter of Credit on such date or (ii) it elects to have such Letter of Credit issued on such date in a different Agreed Currency, as the case may be, in which the denomination of such Letter of Credit would in the reasonable opinion of the Issuing Banks, the Administrative Agent and the Required Lenders be practicable and in face amount equal to the Dollar Amount of the face amount specified in the related request or application for such Letter of Credit, as the case may be.

SECTION 2.22. Judgment Currency. If for the purposes of obtaining judgment in any court it is necessary to convert a sum due from any Borrower hereunder in the currency expressed to be payable herein (the "specified currency") into another currency, the parties hereto agree, to the fullest extent that they may effectively do so, that the rate of exchange used shall be that at which in accordance with normal banking procedures the Administrative Agent could purchase the specified currency with such other currency at the Administrative Agent's main New York City office on the Business Day preceding that on which final, non-appealable judgment is given. The obligations of each Borrower in respect of any sum due to any Lender or the Administrative Agent hereunder shall, notwithstanding any judgment in a currency other than the specified currency, be discharged only to the extent that on the Business Day following receipt by such Lender or the Administrative Agent (as the case may be) of any sum adjudged to be so due in such other currency such Lender or the Administrative Agent (as the case may be) may in accordance with normal, reasonable banking procedures purchase the specified currency with such other currency. If the amount of the specified currency so purchased is less than the sum originally due to such Lender or the Administrative Agent, as the case may be, in the specified currency, each Borrower agrees, to the fullest extent that it may effectively do so, as a separate obligation and notwithstanding any such judgment, to indemnify such Lender or the Administrative Agent, as the case may be, against such loss, and if the amount of the specified currency so purchased exceeds (a) the sum originally due to any Lender or the Administrative Agent, as the case may be, in the specified currency and (b) any amounts shared with other Lenders as a result of allocations of such excess as a disproportionate payment to such Lender under Section 2.18, such Lender or the Administrative Agent, as the case may be, agrees to remit such excess to such Borrower.

SECTION 2.23. Designation of Foreign Subsidiary Borrowers. The Company may at any time and from time to time designate any Eligible Foreign Subsidiary as a Foreign Subsidiary Borrower by delivery to the Administrative Agent of a Borrowing Subsidiary Agreement executed by such Subsidiary and the Company and the satisfaction of the other conditions precedent set forth in Section 4.03, and upon such delivery and satisfaction such Subsidiary shall for all purposes of this Agreement be a Foreign Subsidiary Borrower and a party to this Agreement until the Company shall have executed and delivered to the Administrative Agent a Borrowing Subsidiary Termination with respect to such Subsidiary, whereupon such Subsidiary shall cease to be a Foreign Subsidiary Borrower and a party to this Agreement. Notwithstanding the preceding sentence, no Borrowing Subsidiary Termination will become effective as to any Foreign Subsidiary Borrower at a time when any principal of or interest on any Loan to such Borrower shall be outstanding hereunder, provided that such Borrowing Subsidiary Termination shall be effective to terminate the right of such Foreign Subsidiary Borrower to make further Borrowings under this Agreement. As soon as practicable upon receipt of a Borrowing Subsidiary Agreement, the Administrative Agent shall furnish a copy thereof to each Lender.

SECTION 2.24. Defaulting Lenders. Notwithstanding any provision of this Agreement to the contrary, if any Lender becomes a Defaulting Lender, then the following provisions shall apply for so long as such Lender is a Defaulting Lender:

(a) fees shall cease to accrue on the unfunded portion of the Commitment of such Defaulting Lender pursuant to Section 2.12(a);

(b) the Commitment and Revolving Credit Exposure of such Defaulting Lender shall not be included in determining whether all Lenders or the Required Lenders have taken or may take any action hereunder (including any consent to any amendment, waiver or other modification pursuant to Section 9.02); provided that, except as otherwise provided in Section 9.02, this clause (b) shall not apply to the vote of a Defaulting Lender in the case of an amendment, waiver or other modification requiring the consent of such Lender or each Lender directly affected thereby;

(c) if any Swingline Exposure or LC Exposure exists at the time such Lender becomes a Defaulting Lender then:

(i) all or any part of the Swingline Exposure and LC Exposure of such Defaulting Lender (other than the portion of such Swingline Exposure referred to in clause (b) of the definition of such term) shall be reallocated among the non-Defaulting Lenders in accordance with their respective Applicable Percentages but only to the extent (A) the sum of all non-Defaulting Lenders' Revolving Credit Exposures plus such Defaulting Lender's Swingline Exposure and LC Exposure does not exceed the total of all non-Defaulting Lenders' Commitments, (B) each non-Defaulting Lender's Revolving Credit Exposure does not exceed such non-Defaulting Lender's Commitment and (C) no Event of Default has occurred and is continuing;

(ii) if the reallocation described in clause (i) above cannot, or can only partially, be effected, the Company shall within one (1) Business Day following notice by the Administrative Agent (x) first, prepay such Swingline Exposure and (y) second, cash collateralize for the benefit of the Issuing Banks only the Company's obligations corresponding to such Defaulting Lender's LC Exposure (after giving effect to any partial reallocation pursuant to clause (i) above) in accordance with the procedures set forth in Section 2.06(j) for so long as such LC Exposure is outstanding;

(iii) if the Company cash collateralizes any portion of such Defaulting Lender's LC Exposure pursuant to clause (ii) above, the Company shall not be required to pay any fees to such Defaulting Lender pursuant to Section 2.12(b) with respect to such Defaulting Lender's LC Exposure during the period such Defaulting Lender's LC Exposure is cash collateralized;

(iv) if the LC Exposure of the non-Defaulting Lenders is reallocated pursuant to clause (i) above, then the fees payable to the Lenders pursuant to Section 2.12(a) and Section 2.12(b) shall be adjusted in accordance with such non-Defaulting Lenders' Applicable Percentages; and

(v) if all or any portion of such Defaulting Lender's LC Exposure is neither reallocated nor cash collateralized pursuant to clause (i) or (ii) above, then, without prejudice to any rights or remedies of the Issuing Banks or any other Lender hereunder, all letter of credit fees payable under Section 2.12(b) with respect to such Defaulting Lender's LC Exposure shall be payable to the Issuing Banks until and to the extent that such LC Exposure is reallocated and/or cash collateralized; and

(d) so long as such Lender is a Defaulting Lender, the Swingline Lender shall not be required to fund any Swingline Loan and no Issuing Bank shall be required to issue, amend or increase any Letter of Credit, unless it is satisfied that the related exposure and the Defaulting Lender's then outstanding LC Exposure will be 100% covered by the Commitments of the non-Defaulting Lenders and/or cash collateral will be provided by the Company in accordance with Section 2.24(c), and participating interests in any such newly made Swingline Loan or any newly issued or increased Letter of Credit shall be allocated among non-Defaulting Lenders in a manner consistent with Section 2.24(c)(i) (and such Defaulting Lender shall not participate therein).

If (i) a Bankruptcy Event or a Bail-In Action with respect to a Lender Parent shall occur following the date hereof and for so long as such event shall continue or (ii) the Swingline Lender or any Issuing Bank has a good faith belief that any Lender has defaulted in fulfilling its obligations under one or more other agreements in which such Lender commits to extend credit, the Swingline Lender shall not be required to fund any Swingline Loan and such Issuing Bank shall not be required to issue, amend or increase any Letter of Credit, unless the Swingline Lender or such Issuing Bank, as the case may be, shall have entered into arrangements with the Company or such Lender, satisfactory to the Swingline Lender or such Issuing Bank, as the case may be, to defease any risk to it in respect of such Lender hereunder.

In the event that the Administrative Agent, the Company, the Swingline Lender and the Issuing Banks each agrees that a Defaulting Lender has adequately remedied all matters that caused such Lender to be a Defaulting Lender, then the Swingline Exposure and LC Exposure of the Lenders shall be readjusted to reflect the inclusion of such Lender's Commitment and on such date such Lender shall purchase at par such of the Loans of the other Lenders (other than Swingline Loans) as the Administrative Agent shall determine may be necessary in order for such Lender to hold such Loans in accordance with its Applicable Percentage.

ARTICLE III

Representations and Warranties

Each Borrower represents and warrants to the Lenders that:

SECTION 3.01. Organization; Powers; Subsidiaries. Each of the Company and its Subsidiaries is duly organized, validly existing and in good standing (to the extent such concept is applicable in the relevant jurisdiction) under the laws of the jurisdiction of its organization, has all requisite power and authority to carry on its business as now conducted and, except where the failure to do so, individually or in the aggregate, could not reasonably be expected to result in a Material Adverse Effect, is qualified to do business in, and is in good standing (to the extent such concept is applicable) in, every jurisdiction where such qualification is required. Schedule 3.01 hereto (as supplemented from time to time) identifies each Subsidiary, if such Subsidiary is a Material Subsidiary, the jurisdiction of its incorporation or organization, as the case may be, the percentage of issued and outstanding shares of each class of its capital stock or other equity interests owned by the Company and the other Subsidiaries and, if such percentage is not 100% (excluding directors' qualifying shares as required by law), a description of each class issued and outstanding. All of the outstanding shares of capital stock and other equity interests of each Subsidiary are validly issued and outstanding and fully paid and nonassessable and all such shares and other equity interests indicated on Schedule 3.01 (as supplemented from time to time but, in the case of any Subsidiary, as permitted by Section 6.09) as owned by the Company or another Subsidiary are owned, beneficially and of record, by the Company or any Subsidiary free and clear of all Liens, other than Liens created under the Loan Documents. Except as set forth in Schedule 3.01 (as supplemented from time to time but, in the case of any Subsidiary, as permitted by Section 6.09), there are no outstanding commitments or other obligations of the Company or any Subsidiary to issue, and no options, warrants or other rights of any Person to acquire, any shares of any class of capital stock or other equity interests of the Company or any Subsidiary.

SECTION 3.02. Authorization; Enforceability. The Transactions are within each Loan Party's organizational powers and have been duly authorized by all necessary organizational actions and, if required, shareholder action. The Loan Documents to which each Loan Party is a party have been duly executed and delivered by such Loan Party and constitute a legal, valid and binding obligation of such Loan Party, enforceable in accordance with their terms, subject to applicable bankruptcy, insolvency, reorganization, moratorium or other laws affecting creditors' rights generally and subject to general principles of equity, regardless of whether considered in a proceeding in equity or at law.

SECTION 3.03. Governmental Approvals; No Conflicts. The Transactions (a) do not require any consent or approval of, registration or filing with, or any other action by, any Governmental Authority, except such as have been obtained or made and are in full force and effect, and except where the failure to do so, individually or in the aggregate, could not reasonably be expected to result in a Material Adverse Effect, (b) will not violate any applicable law or regulation or the charter, by-laws or other organizational documents of the Company or any of its Subsidiaries or any order of any Governmental Authority, except for violations, individually or in the aggregate, which could not reasonably be expected to result in a Material Adverse Effect, (c) will not violate or result in a default under any indenture, agreement or other instrument binding upon the Company or any of its Subsidiaries or its assets, or give rise to a right thereunder to require any payment to be made by the Company or any of its Subsidiaries, except for violations or defaults, individually or in the aggregate, which could not reasonably be expected to result in a Material Adverse Effect, and (d) will not result in the creation or imposition of any Lien on any asset of the Company or any of its Subsidiaries, other than Liens created under the Loan Documents.

SECTION 3.04. Financial Condition; No Material Adverse Change. (a) The Company has heretofore furnished to the Lenders its consolidated balance sheet and statements of income, stockholders equity and cash flows (i) as of and for the fiscal year ended October 29, 2017 reported on by Deloitte & Touche LLP, independent public accountants and (ii) as of and for the fiscal quarter and the portion of the fiscal year ended January 28, 2018 and April 29, 2018, in each case certified by its chief financial officer. Such financial statements present fairly, in all material respects, the financial position and results of operations and cash flows of the Company and its consolidated Subsidiaries as of such dates and for such periods in accordance with GAAP, subject to year-end audit adjustments and the absence of footnotes in the case of the statements referred to in clause (ii) above.

(b) Since October 29, 2017, there has been no material adverse change in the business, assets, operations or condition, financial or otherwise, of the Company and its Subsidiaries, taken as a whole.

SECTION 3.05. Properties (a) Each of the Company and its Subsidiaries has good title to, or valid leasehold interests in, all its real and personal property material to its business, except for minor defects in title that do not interfere with its ability to conduct its business as currently conducted or to utilize such properties for their intended purposes. There are no Liens on any of the real or personal properties of the Company or any Subsidiary except for Liens permitted by Section 6.02.

(b) Each of the Company and its Subsidiaries owns, or is licensed to use, all trademarks, tradenames, copyrights, patents and other intellectual property material to its business, and the use thereof by the Company and its Subsidiaries does not infringe upon the rights of any other Person, except for any such infringements that, individually or in the aggregate, could not reasonably be expected to result in a Material Adverse Effect.

SECTION 3.06. Litigation and Environmental Matters. (a) There are no actions, suits, proceedings or investigations by or before any arbitrator or Governmental Authority pending against or, to the knowledge of any Borrower, threatened against or affecting the Company or any of its Subsidiaries (i) as to which there is a reasonable possibility of an adverse determination and that, if adversely determined, could reasonably be expected, individually or in the aggregate, to result in a Material Adverse Effect or (ii) that involve this Agreement or the Transactions. There are no labor controversies pending against or, to the knowledge of the Company, threatened against or affecting the Company or any of its Subsidiaries (i) which could reasonably be expected, individually or in the aggregate, to result in a Material Adverse Effect, or (ii) that involve this Agreement or the Transactions.

(b) Except with respect to any other matters that, individually or in the aggregate, could not reasonably be expected to result in a Material Adverse Effect, neither the Company nor any of its Subsidiaries (i) has failed to comply with any Environmental Law or to obtain, maintain or comply with any permit, license or other approval required under any Environmental Law, (ii) has become subject to any Environmental Liability, (iii) has received notice of any claim with respect to any Environmental Liability or (iv) knows of any basis for any Environmental Liability.

(c) Neither the Company nor any Subsidiary is party or subject to any law, regulation, rule or order, or any obligation under any agreement or instrument, that has a Material Adverse Effect.

SECTION 3.07. Compliance with Laws and Agreements. Each of the Company and its Subsidiaries is in compliance with all laws, regulations and orders of any Governmental Authority applicable to it or its property and all indentures, agreements and other instruments binding upon it or its property, except where the failure to do so, individually or in the aggregate, could not reasonably be expected to result in a Material Adverse Effect.

SECTION 3.08. Investment Company Status. Neither the Company nor any of its Subsidiaries is an “investment company” as defined in, or subject to regulation under, the Investment Company Act of 1940.

SECTION 3.09. Taxes. Each of the Company and its Subsidiaries has timely filed or caused to be filed all Tax returns and reports required to have been filed and has paid or caused to be paid all Taxes required to have been paid by it, except (a) Taxes that are being contested in good faith by appropriate proceedings and for which the Company or such Subsidiary, as applicable, has set aside on its books adequate reserves or (b) to the extent that the failure to do so could not reasonably be expected to result in a Material Adverse Effect.

SECTION 3.10. ERISA. No ERISA Event has occurred or is reasonably expected to occur that, when taken together with all other such ERISA Events for which liability is reasonably expected to occur, could reasonably be expected to result in a Material Adverse Effect.

SECTION 3.11. Disclosure. The Company has disclosed to the Lenders all agreements, instruments and corporate or other restrictions to which it or any of its Subsidiaries is subject, and all other matters known to it, that, individually or in the aggregate, could reasonably be expected to result in a Material Adverse Effect. None of the reports, financial statements, certificates or other information furnished by or on behalf of the Company or any Subsidiary to the Administrative Agent or any Lender in connection with the negotiation of this Agreement or delivered hereunder (as modified or supplemented by other information so furnished) contains any material misstatement of fact or omits to state any material fact necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided that, with respect to projected financial information, the Borrowers represent only that such information was prepared in good faith based upon assumptions believed to be reasonable at the time. As of the Effective Date, to the knowledge of the Company, the information included in the Beneficial Ownership Certification provided on or prior to the Effective Date to any Lender in connection with this Agreement is true and correct in all material respects.

SECTION 3.12. Federal Reserve Regulations. No part of the proceeds of any Loan have been used or will be used, whether directly or indirectly, for any purpose that entails a violation of any of the Regulations of the Board, including Regulations T, U and X.

SECTION 3.13. Liens. There are no Liens on any of the real or personal properties of the Company or any Subsidiary except for Liens permitted by Section 6.02.

SECTION 3.14. No Default Each Borrower is in full compliance with this Agreement and no Default or Event of Default has occurred and is continuing.

SECTION 3.15. Security Interest in Collateral. The provisions of this Agreement and the other Loan Documents create legal and valid Liens on all the Collateral covered thereby in favor of the Collateral Agent, for the benefit of the Holders of Secured Obligations, and (i) when all appropriate filings, recordings, registrations, stampings or notifications are made and (ii) upon the taking of possession or control by the Collateral Agent of such Collateral with respect to which a security interest may be perfected only by possession or control, such Liens shall constitute perfected and continuing Liens on the Collateral, securing the Secured Obligations, and having priority over all other Liens on the Collateral except in the case of (a) Permitted Encumbrances, to the extent any such Permitted Encumbrances would have priority over the Liens in favor of the Collateral Agent pursuant to any applicable law and (b) Liens perfected only by possession (including possession of any certificate of title) to the extent the Collateral Agent has not obtained or does not maintain possession of such Collateral.

SECTION 3.16. Anti-Corruption Laws and Sanctions. The Company has implemented and maintains in effect policies and procedures designed to ensure compliance in all material respects by the Company, its Subsidiaries and their respective directors, officers, employees and agents with Anti-Corruption Laws and applicable Sanctions, and the Company, its Subsidiaries and their respective officers and directors and to the knowledge of the Company its employees and agents, are in compliance with Anti-Corruption Laws and applicable Sanctions in all material respects. None of (a) the Company, any Subsidiary or to the knowledge of the Company or such Subsidiary any of their respective directors, officers or employees, or (b) to the knowledge of the Company, any agent of the Company or any Subsidiary that will act in any capacity in connection with or benefit from the credit facility established hereby, is a Sanctioned Person. No Borrowing or Letter of Credit, use of proceeds or other Transactions will violate Anti-Corruption Laws or applicable Sanctions.

SECTION 3.17. EEA Financial Institutions. No Loan Party is an EEA Financial Institution.

ARTICLE IV

Conditions

SECTION 4.01. Effective Date. The obligations of the Lenders to make Loans and of the Issuing Banks to issue Letters of Credit hereunder shall not become effective until the date on which each of the following conditions is satisfied (or waived in accordance with Section 9.02):

(a) The Administrative Agent (or its counsel) shall have received from each party hereto either (i) a counterpart of this Agreement signed on behalf of such party or (ii) written evidence satisfactory to the Administrative Agent (which may include telecopy or electronic transmission of a signed signature page of this Agreement) that such party has signed a counterpart of this Agreement.

(b) The Administrative Agent shall have received favorable written opinions (addressed to the Administrative Agent and the Lenders and dated the Effective Date) of (i) Richelle Burr, General Counsel of the Company, and (ii) Withers Bergman LLP, outside counsel for the initial Loan Parties, in each case substantially in the form of Exhibit B, and covering such other matters relating to the Loan Parties, the Loan Documents or the Transactions as the Administrative Agent shall reasonably request. The Company hereby requests such counsel to deliver such opinion.

(c) The Administrative Agent shall have received such documents and certificates as the Administrative Agent or its counsel may reasonably request relating to the organization, existence and good standing of the initial Loan Parties, the authorization of the Transactions and any other legal matters relating to such Loan Parties, the Loan Documents or the Transactions, all in form and substance satisfactory to the Administrative Agent and its counsel and as further described in the list of closing documents attached as Exhibit E.

(d) The Administrative Agent shall have received a certificate, dated the Effective Date and signed by the President, a Vice President or a Financial Officer of the Company, confirming compliance with the conditions set forth in paragraphs (a) and (b) of Section 4.02.

(e) (i) The Administrative Agent shall have received, at least five (5) days prior to the Effective Date, all documentation and other information regarding the Borrower requested in connection with applicable "know your customer" and anti-money laundering rules and regulations, including the Patriot Act, to the extent requested in writing of the Company at least ten (10) days prior to the Effective Date and (ii) to the extent the Company qualifies as a "legal entity customer" under the Beneficial Ownership Regulation, at least five (5) days prior to the Effective Date, any Lender that has requested, in a written notice to the Company at least ten (10) days prior to the Effective Date, a Beneficial Ownership Certification in relation to the Company shall have received such Beneficial Ownership Certification (provided that, upon the execution and delivery by such Lender of its signature page to this Agreement, the condition set forth in this clause (e) shall be deemed to be satisfied).

(f) The Administrative Agent shall have received all fees and other amounts due and payable on or prior to the Effective Date, including, to the extent invoiced, reimbursement or payment of all out-of-pocket expenses required to be reimbursed or paid by the Company hereunder.

The Administrative Agent shall notify the Company and the Lenders of the Effective Date, and such notice shall be conclusive and binding.

SECTION 4.02. Each Credit Event. The obligation of each Lender to make a Loan on the occasion of any Borrowing, and of the Issuing Banks to issue, amend, renew or extend any Letter of Credit, is subject to the satisfaction of the following conditions:

(a) The representations and warranties of the Borrowers set forth in this Agreement shall be true and correct on and as of the date of such Borrowing or the date of issuance, amendment, renewal or extension of such Letter of Credit, as applicable.

(b) At the time of and immediately after giving effect to such Borrowing or the issuance, amendment, renewal or extension of such Letter of Credit, as applicable, no Default shall have occurred and be continuing.

(c) No law or regulation shall prohibit, and no order, judgment or decree of any Governmental Authority shall enjoin, prohibit or restrain, any Lender from making the requested Loan or any Issuing Bank or any Lender from issuing, renewing, extending or increasing the face amount of or participating in the Letter of Credit requested to be issued, renewed, extended or increased.

Each Borrowing and each issuance, amendment, renewal or extension of a Letter of Credit shall be deemed to constitute a representation and warranty by the Borrowers on the date thereof as to the matters specified in paragraphs (a) and (b) of this Section.

SECTION 4.03. Designation of a Foreign Subsidiary Borrower. The designation of a Foreign Subsidiary Borrower pursuant to Section 2.23 is subject to the condition precedent that the Company or such proposed Foreign Subsidiary Borrower shall have furnished or caused to be furnished to the Administrative Agent:

(a) Copies, certified by the Secretary or Assistant Secretary of such Subsidiary, of its Board of Directors' resolutions (and resolutions of other bodies, if any are deemed necessary by counsel for the Administrative Agent) approving the Borrowing Subsidiary Agreement and any other Loan Documents to which such Subsidiary is becoming a party and such documents and certificates as the Administrative Agent or its counsel may reasonably request relating to the organization, existence and, if applicable, good standing of such Subsidiary;

(b) An incumbency certificate, executed by the Secretary or Assistant Secretary of such Subsidiary, which shall identify by name and title and bear the signature of the officers of such Subsidiary authorized to request Borrowings hereunder and sign the Borrowing Subsidiary Agreement and the other Loan Documents to which such Subsidiary is becoming a party, upon which certificate the Administrative Agent and the Lenders shall be entitled to rely until informed of any change in writing by the Company or such Subsidiary;

(c) Opinions of counsel to such Subsidiary, in form and substance reasonably satisfactory to the Administrative Agent and its counsel, with respect to the laws of its jurisdiction of organization and such other matters as are reasonably requested by counsel to the Administrative Agent and addressed to the Administrative Agent and the Lenders;

(d) Any promissory notes requested by any Lender, and any other instruments and documents reasonably requested by the Administrative Agent;

(e) Any documentation and other information that is reasonably requested by the Administrative Agent or any of the Lenders and that is required by regulatory authorities under applicable "know-your-customer" and Anti-Money Laundering Laws, including the Patriot Act and the Beneficial Ownership Regulation.

ARTICLE V

Affirmative Covenants

Until the Commitments have expired or been terminated and the principal of and interest on each Loan and all fees payable hereunder shall have been paid in full and all Letters of Credit shall have expired or terminated, in each case, without any pending draw, and all LC Disbursements shall have been reimbursed, the Company covenants and agrees with the Lenders that:

SECTION 5.01. Financial Statements and Other Information. The Company will furnish to the Administrative Agent for distribution to each Lender:

(a) as soon as the same is available but in any event within ninety (90) days after the end of each fiscal year of the Company, its audited consolidated balance sheet and related statements of operations, stockholders' equity and cash flows as of the end of and for such year, setting forth in each case in comparative form the figures for the previous fiscal year, all reported on by Deloitte & Touche LLP or other independent public accountants of recognized national standing (without a "going concern" or like qualification or exception and without any qualification or exception as to the scope of such audit) to the effect that such consolidated financial statements present fairly in all material respects the financial condition and results of operations of the Company and its consolidated Subsidiaries on a consolidated basis in accordance with GAAP consistently applied;

(b) as soon as the same is available but in any event within forty five (45) days after the end of each of the first three fiscal quarters of each fiscal year of the Company, its consolidated balance sheet and related statements of operations, stockholders' equity and cash flows as of the end of and for such fiscal quarter and the then elapsed portion of the fiscal year, setting forth in each case in comparative form the figures for the corresponding period or periods of (or, in the case of the balance sheet, as of the end of) the previous fiscal year, all certified by one of its Financial Officers as presenting fairly in all material respects the financial condition and results of operations of the Company and its consolidated Subsidiaries on a consolidated basis in accordance with GAAP consistently applied, subject to normal year-end audit adjustments and the absence of footnotes;

(c) concurrently with any delivery of financial statements under clause (a) or (b) above, a certificate of a Financial Officer of the Company (i) certifying as to whether a Default has occurred and, if a Default has occurred, specifying the details thereof and any action taken or proposed to be taken with respect thereto, (ii) setting forth reasonably detailed calculations demonstrating compliance with Section 6.11 and (iii) stating whether any change in GAAP or in the application thereof has occurred since the date of the audited financial statements referred to in Section 3.04 and, if any such change has occurred, specifying the effect of such change on the financial statements accompanying such certificate;

(d) within 75 days of the commencement of each fiscal year of the Company, projected consolidated balance sheets, income statements and cash flow statements of the Company and its consolidated Subsidiaries for such fiscal year;

(e) promptly after the same become publicly available, copies of all 10-Ks, 10-Qs and 8-Ks filed by the Company or any Subsidiary with the SEC, or any Governmental Authority succeeding to any or all of the functions of the SEC, or with any national securities exchange, or distributed by the Company to its shareholders generally, as the case may be; and

(f) promptly following any request therefor, (x) such other information regarding the operations, business affairs and financial condition of the Company or any Subsidiary, or compliance with the terms of this Agreement, as the Administrative Agent or any Lender may reasonably request and (y) information and documentation reasonably requested by the Administrative Agent or any Lender for purposes of compliance with applicable "know your customer" and anti-money laundering rules and regulations, including the Patriot Act and the Beneficial Ownership Regulation.

Documents required to be delivered pursuant to clauses (a), (b) or (e) of this Section 5.01 may be delivered electronically and if so delivered, shall be deemed to have been delivered on the date (i) on which the Company posts such documents, or provides a link thereto on the Company's website on the Internet at the website address <www.photonics.com>; (ii) on which such documents are posted on the Company's behalf on IntraLinks™ or a substantially similar electronic platform, if any, to which each Lender and the Administrative Agent have access (whether a commercial, third-party website or whether sponsored by the Administrative Agent); or (iii) on which such documents are filed for public availability on the SEC's Electronic Data Gathering and Retrieval System; provided that the Company shall notify (which may be by facsimile or electronic mail) the Administrative Agent of the posting of any such documents and provide to the Administrative Agent by electronic mail electronic versions (i.e., soft copies) of such documents. Notwithstanding anything contained herein, in every instance the Company shall be required to provide paper or electronic copies of the compliance certificates required by clause (c) of this Section 5.01 to the Administrative Agent.

SECTION 5.02. Notices of Material Events. The Company will furnish to the Administrative Agent prompt written notice of the following:

- (a) the occurrence of any Default;
- (b) the filing or commencement of any action, suit or proceeding by or before any arbitrator or Governmental Authority against or affecting the Company or any Affiliate thereof that, if adversely determined, could reasonably be expected to result in a Material Adverse Effect;
- (c) the occurrence of any ERISA Event that, alone or together with any other ERISA Events that have occurred, could reasonably be expected to result in a Material Adverse Effect; and
- (d) any other development that results in, or could reasonably be expected to result in, a Material Adverse Effect.

Each notice delivered under this Section shall be accompanied by a statement of a Financial Officer or other executive officer of the Company setting forth the details of the event or development requiring such notice and any action taken or proposed to be taken with respect thereto.

SECTION 5.03. Existence; Conduct of Business. The Company will, and will cause each of its Subsidiaries to, do or cause to be done all things necessary to preserve, renew and keep in full force and effect its legal existence and the rights, licenses, permits, privileges and franchises material to the conduct of its business; provided that the foregoing shall not prohibit any merger, consolidation, liquidation or dissolution permitted under Section 6.03.

SECTION 5.04. Payment of Obligations. The Company will, and will cause each of its Subsidiaries to, pay its obligations, including Tax liabilities, that, if not paid, could result in a Material Adverse Effect before the same shall become delinquent or in default, except where (a) the validity or amount thereof is being contested in good faith by appropriate proceedings, (b) the Company or such Subsidiary has set aside on its books adequate reserves with respect thereto in accordance with GAAP and (c) the failure to make payment pending such contest could not reasonably be expected to result in a Material Adverse Effect.

SECTION 5.05. Maintenance of Properties; Insurance.

(a) The Company will, and will cause each of its Subsidiaries to, (i) keep and maintain all property material to the conduct of its business in good working order and condition, ordinary wear and tear excepted, and (ii) maintain with financially sound and reputable carriers (1) insurance in such amounts (with no greater risk retention) and against such risks (including loss or damage by fire and loss in transit; theft, burglary, pilferage, larceny, embezzlement, and other criminal activities; business interruption; and general liability) and such other hazards, as is customarily maintained by companies of established repute engaged in the same or similar businesses operating in the same or similar locations and (2) all insurance required pursuant to the Collateral Documents. The Company will furnish to the Lenders, upon request of the Collateral Agent, information in reasonable detail as to the insurance so maintained.

(b) The Company shall deliver to the Collateral Agent endorsements (x) to all "All Risk" physical damage insurance policies on the Loan Parties' tangible personal property and assets located in the United States of America and business interruption insurance policies naming the Collateral Agent as lender loss payee, and (y) to all general liability and other liability policies naming the Collateral Agent an additional insured. Each policy for liability insurance shall provide for all losses to be paid on behalf of the Collateral Agent and the Company or its Subsidiaries as their interests may appear. In the event the Company or any of its Subsidiaries at any time or times hereafter shall fail to obtain or maintain any of the policies or insurance required herein or to pay any premium in whole or in part relating thereto, then the Collateral Agent, without waiving or releasing any obligations or resulting Default hereunder, may at any time or times thereafter (but shall be under no obligation to do so) obtain and maintain such policies of insurance and pay such premiums and take any other action with respect thereto which the Collateral Agent deems advisable. All sums so disbursed by the Collateral Agent shall constitute part of the Secured Obligations, payable as provided in this Agreement. The Company will furnish to the Collateral Agent prompt written notice of any casualty or other insured damage to any material portion of the Collateral or the commencement of any action or proceeding for the taking of any material portion of the Collateral or interest therein under power of eminent domain or by condemnation or similar proceeding.

(c) So long as no Event of Default shall have occurred and be continuing, all insurance payments received by the Collateral Agent in connection with any loss, damage or destruction of any property of the Company or any of its Subsidiaries will be released by the Collateral Agent to the applicable Company or such Subsidiary for the repair, replacement or restoration thereof.

SECTION 5.06. Books and Records; Inspection Rights. The Company will, and will cause each of its Subsidiaries to, keep proper books of record and account in which entries that are full, true and correct in all material respects are made of all dealings and transactions in relation to its business and activities. The Company will, and will cause each of its Subsidiaries to, permit any representatives designated by the Administrative Agent or any Lender, upon reasonable prior notice, to visit and inspect its properties, to examine and make extracts from its relevant books and records, including environmental assessment reports and Phase I or Phase II studies, and to discuss its affairs, finances and condition with its officers and independent accountants, all at such reasonable times and as often as reasonably requested. The Company acknowledges that the Administrative Agent, after exercising its rights of inspection, may prepare and distribute to the Lenders certain reports pertaining to the Company and its Subsidiaries' assets for internal use by the Administrative Agent and the Lenders.

SECTION 5.07. Compliance with Laws and Material Contractual Obligations. The Company will, and will cause each of its Subsidiaries to, (i) comply with all laws, rules, regulations and orders of any Governmental Authority applicable to it or its property (including without limitation Environmental Laws) and (ii) perform in all material respects its obligations under material agreements to which it is a party, in each case except where the failure to do so, individually or in the aggregate, could not reasonably be expected to result in a Material Adverse Effect. The Company will maintain in effect and enforce policies and procedures designed to ensure compliance in all material respects by the Company, its Subsidiaries and their respective directors, officers, employees and agents with Anti-Corruption Laws and applicable Sanctions.

SECTION 5.08. Use of Proceeds. The proceeds of the Loans will be used only to repay certain existing Indebtedness, finance the working capital needs, and for general corporate purposes, of the Company and its Subsidiaries in the ordinary course of business. No part of the proceeds of any Loan will be used, whether directly or indirectly, for any purpose that entails a violation of any of the Regulations of the Board, including Regulations T, U and X.

SECTION 5.09. Subsidiary Guarantors; Pledges; Additional Collateral; Further Assurances.

(a) As promptly as possible but in any event within forty-five (45) days (or such later date as may be agreed upon by the Administrative Agent) after any Person becomes a Subsidiary or any Subsidiary qualifies independently as, or is designated by the Company or the Administrative Agent as, a Material Subsidiary pursuant to the definition of "Material Subsidiary", the Company shall provide the Administrative Agent with written notice thereof setting forth information in reasonable detail describing the earnings and material assets of such Person and shall cause each such Subsidiary which also qualifies as a Material Subsidiary to deliver to the Administrative Agent a joinder to the Subsidiary Guaranty and the Security Agreement (in each case in the form contemplated thereby) pursuant to which such Subsidiary agrees to be bound by the terms and provisions thereof, such joinders to the Subsidiary Guaranty and the Security Agreement to be accompanied by appropriate corporate resolutions, other corporate documentation and legal and joinder opinions in form and substance reasonably satisfactory to the Administrative Agent and its counsel.

(b) The Company will cause, and will cause each other Subsidiary qualifying as a Loan Party to cause all of its owned property (whether personal, tangible, intangible, or mixed, but excluding real property) to be subject at all times to first priority and perfected (subject in each case to the qualifications specified in Section 3.15 with respect to priority and perfection) Liens in favor of the Collateral Agent for the benefit of the Holders of Secured Obligations to secure the Secured Obligations in accordance with the terms and conditions of the Collateral Documents (including amendments, restatements, supplements or other modifications to the Collateral Documents in effect prior to the Effective Date, in each case to the extent, and within such time period, as is reasonably requested by the Collateral Agent), subject in any case to Liens permitted by Section 6.02. Without limiting the generality of the foregoing, the Company (i) will cause the Applicable Pledge Percentage of the issued and outstanding Equity Interests of each Pledge Subsidiary directly owned by the Company or any other Subsidiary qualifying as a Loan Party to be subject at all times to a first priority and perfected (subject in each case to the qualifications specified in Section 3.15 with respect to priority and perfection) Lien in favor of the Collateral Agent to secure the Secured Obligations in accordance with the terms and conditions of the Collateral Documents; provided that no such pledge of the Equity Interests of, or provision of Collateral by, a Foreign Subsidiary shall be required hereunder to the extent such pledge or Collateral would create a Deemed Dividend Problem, is prohibited by applicable law or the Collateral Agent and its counsel reasonably determine that, in light of the cost and expense associated therewith, such pledge or Collateral would be unduly burdensome or not provide material Pledged Equity or Collateral for the benefit of the Holders of Secured Obligations pursuant to legally binding, valid and enforceable Pledge Agreements, and (ii) will, and will cause each other Subsidiary qualifying as a Loan Party to, deliver amendments, restatements, supplements or other modifications to foreign law governed Pledge Agreements existing on the Effective Date, in each case to the extent, and within such time period as is, reasonably required by the Collateral Agent. Notwithstanding the foregoing, no new foreign law governed Pledge Agreements and no amendments, restatements, supplements or other modifications to foreign law governed Pledge Agreements existing on the Effective Date, in each case are required to be delivered hereunder until the date that is sixty (60) days after the Effective Date or such later date as the Collateral Agent may agree in the exercise of its reasonable discretion with respect thereto.

(c) Without limiting the foregoing, the Company will, and will cause each Subsidiary to, execute and deliver, or cause to be executed and delivered, to the Collateral Agent such documents, agreements and instruments, and will take or cause to be taken such further actions (including the filing and recording of financing statements and other documents and such other actions or deliveries of the type required by Section 4.01, as applicable), which may be required by law or which the Collateral Agent may, from time to time, reasonably request to carry out the terms and conditions of this Agreement and the other Loan Documents and to ensure perfection and priority of the Liens created or intended to be created by the Collateral Documents, all at the expense of the Company.

(d) Effective as of the Effective Date, all of the parties hereto acknowledge and agree that each of the "Mortgages" entered into prior to the Effective Date pursuant to (and as defined in) the Existing Credit Agreement, shall be terminated and of no further force or effect (other than any provisions thereof which expressly survive such termination in accordance with the terms thereof), and the Collateral Agent's Liens under such Mortgages shall be released, in each case as of the Effective Date. Each of the Lenders agree that the Agents may execute and deliver all such documents and take all such actions as may be reasonably necessary or appropriate in order to more effectively confirm or carry out such release of the Collateral Agent's Liens under such Mortgages, and the Agents agree to so execute such documents, without recourse or warranty and to take such actions, all at the Company's expense.

SECTION 5.10. Post-Closing Matters. As promptly as practicable, and in any event by no later than the applicable date set forth in Schedule 5.10 (or such later date as the Administrative Agent may agree to in its reasonable discretion), deliver all documents and take all actions set forth on Schedule 5.10.

ARTICLE VI

Negative Covenants

Until the Commitments have expired or terminated and the principal of and interest on each Loan and all fees payable hereunder have been paid in full and all Letters of Credit have expired or terminated, in each case, without any pending draw, and all LC Disbursements shall have been reimbursed, the Company covenants and agrees with the Lenders that:

SECTION 6.01. Indebtedness. The Company will not, and will not permit any Subsidiary to, create, incur, assume or permit to exist any Indebtedness, except:

- (a) the Secured Obligations and any other Indebtedness created under the Loan Documents;
- (b) subject to the limitations applicable to Purchase Money Indebtedness set forth in clause (e) below, Indebtedness existing on the date hereof and set forth in Schedule 6.01 and extensions, renewals and replacements of any such Indebtedness with Indebtedness of a similar type that does not increase the outstanding principal amount thereof;
- (c) intercompany Indebtedness permitted by Section 6.04(d) or Section 6.04(m);

(d) Guarantees by the Company of Indebtedness of any Subsidiary and by any Subsidiary of Indebtedness of the Company or any other Subsidiary;

(e) Indebtedness of the Company or any Subsidiary incurred to finance the acquisition, construction or improvement of any fixed or capital assets, including Capital Lease Obligations and any Indebtedness assumed in connection with the acquisition of any such assets or secured by a Lien on any such assets prior to the acquisition thereof, and extensions, renewals and replacements of any such Indebtedness that do not increase the outstanding principal amount thereof (collectively, "Purchase Money Indebtedness"); provided that (i) such Purchase Money Indebtedness is (or, in the case of any extension, renewal or replacement, originally was) incurred prior to or within 90 days after such acquisition or the completion of such construction or improvement and (ii) the aggregate outstanding principal amount of Purchase Money Indebtedness permitted by this clause (e), when aggregated with the aggregate outstanding principal amount of Purchase Money Indebtedness permitted under Section 6.01(b) and other Purchase Money Indebtedness outstanding on the Effective Date, shall not exceed \$150,000,000 at any time outstanding;

(f) Subordinated Indebtedness so long as, after giving effect to the incurrence thereof, no Default shall have occurred and be continuing and the Borrowers shall be in compliance, on a pro forma basis after giving effect to such incurrence, with the covenants contained in Section 6.11 recomputed as if such incurrence had occurred on the first day of the period for testing such compliance;

(g) Indebtedness of the Company or any Subsidiary as an account party in respect of trade letters of credit;

(h) (i) Indebtedness of the Company or any Subsidiary under any Swap Agreement otherwise permitted under Section 6.05, (ii) the Guarantee of any Loan Party of any such Indebtedness and (iii) the Guarantee of any Loan Party of the obligations of the Taiwan JV, PKL or any of their respective subsidiaries under any Swap Agreement entered into in the ordinary course of business;

(i) [intentionally omitted];

(j) obligations of the Company or any Subsidiary arising out of interest rate, foreign currency, and commodity hedging agreements entered into with financial institutions in connection with bona fide hedging activities in the ordinary course of business and not for speculative purposes;

(k) unsecured Indebtedness in an aggregate principal amount not exceeding \$20,000,000 at any time outstanding;

(l) Permitted Unsecured Indebtedness of the Company;

(m) Indebtedness securing a Lien permitted under Section 6.02(c);

(n) unsecured or secured Indebtedness of PRC Subsidiaries in an aggregate principal amount not exceeding \$125,000,000 at any time outstanding so long as any Liens securing such Indebtedness are only permitted by Section 6.02(g); and

(o) Indebtedness of the Company or any Subsidiary incurred to finance the acquisition of minority interests in Joint Ventures in an aggregate principal amount not exceeding \$25,000,000, so long as the Borrowers are in compliance, on a pro forma basis after giving effect to such incurrence, with the covenants contained in Section 6.11 recomputed as if such incurrence had occurred on the first day of the period for testing such compliance.

SECTION 6.02. Liens. The Company will not, and will not permit any Subsidiary to, create, incur, assume or permit to exist any Lien on any property or asset now owned or hereafter acquired by it, or assign or sell any income or revenues (including accounts receivable) or rights in respect of any thereof, except:

(a) (i) Permitted Encumbrances, (ii) Liens created under any Loan Document and (iii) Liens granted by any Foreign Subsidiary (including the Taiwan JV and any PRC Subsidiary) to the Company or any other Subsidiary;

(b) any Lien on any property or asset of the Company or any Subsidiary existing on the date hereof and set forth in Schedule 6.02; provided that (i) such Lien shall not apply to any other property or asset of the Company or any Subsidiary and (ii) such Lien shall secure only those obligations which it secures on the date hereof and extensions, renewals and replacements thereof that do not increase the outstanding principal amount thereof;

(c) any Lien existing on any property or asset prior to the acquisition thereof by the Company or any Subsidiary or existing on any property or asset of any Person that becomes a Subsidiary after the date hereof prior to the time such Person becomes a Subsidiary; provided that (i) such Lien is not created in contemplation of or in connection with such acquisition or such Person becoming a Subsidiary, as the case may be, (ii) such Lien shall not apply to any other property or assets of the Company or any Subsidiary and (iii) such Lien shall secure only those obligations which it secures on the date of such acquisition or the date such Person becomes a Subsidiary, as the case may be and extensions, renewals and replacements thereof that do not increase the outstanding principal amount thereof;

(d) Liens on fixed or capital assets acquired, constructed or improved by the Company or any Subsidiary; provided that (i) such security interests secure Indebtedness permitted by clause (e) of Section 6.01, (ii) such security interests and the Indebtedness secured thereby are incurred prior to or within ninety (90) days after such acquisition or the completion of such construction or improvement, (iii) the Indebtedness secured thereby does not exceed 100% of the cost of acquiring, constructing, installing or improving such fixed or capital assets and (iv) such security interests shall not apply to any other property or assets of the Company or any Subsidiary; and

(e) customary bankers' Liens and rights of setoff arising by operation of law and incurred on deposits made in the ordinary course of business;

(f) attachments, appeal bonds, judgments and other similar Liens, for sums not exceeding \$1,000,000 in the aggregate arising in connection with court proceedings; provided, that the execution or other enforcement of such Liens is effectively stayed and the claims secured thereby are being contested in good faith and by appropriate proceedings and adequate reserves in respect thereof have been established on the books of the Company to the extent required by GAAP;

(g) Liens on assets of PRC Subsidiaries securing Indebtedness permitted by Section 6.01(n); and

(h) Liens on assets (not constituting Collateral) of the Company and its Subsidiaries not otherwise permitted above so long as the aggregate principal amount of the Indebtedness and other obligations subject to such Liens does not at any time exceed \$2,500,000.

SECTION 6.03. Fundamental Changes and Asset Sales. (a) The Company will not, and will not permit any Subsidiary to, merge into or consolidate with any other Person, or permit any other Person to merge into or consolidate with it, or sell, transfer, lease or otherwise dispose of (in one transaction or in a series of transactions) any of its assets, (including pursuant to a Sale and Leaseback Transaction), or all or any of the Equity Interests of any of its Subsidiaries (in each case, whether now owned or hereafter acquired), or liquidate or dissolve, except that, if at the time thereof and immediately after giving effect thereto no Default shall have occurred and be continuing (i) any Person may merge into the Company in a transaction in which the Company is the surviving corporation, (ii) any Subsidiary may merge into a Loan Party in a transaction in which the surviving entity is such Loan Party (provided that any such merger involving the Company must result in the Company as the surviving entity), (iii) (A) any Loan Party (other than the Company) or any Subsidiary may sell, transfer, lease or otherwise dispose of its assets to, or otherwise dissolve into, a Loan Party and (B) the Company may sell, transfer, lease or otherwise dispose of its assets to, a Subsidiary Guarantor, and (iv) the Company and its Subsidiaries may (A) sell inventory, used or surplus equipment and Permitted Investments in the ordinary course of business and real estate located in Dresden, Germany not currently used in the operation of the Company's business, (B) effect sales, trade-ins or dispositions of used equipment for value in the ordinary course of business consistent with past practice, (C) enter into licenses of technology in the ordinary course of business and (D) make any other sales, transfers, leases or dispositions of assets with an aggregate book value that, together with the aggregate book value of all other assets of the Company and its Subsidiaries previously leased, sold or disposed of as permitted by this clause (D) (1) during any fiscal year of the Company, does not exceed 10% of Consolidated Total Assets and (2) during the term of this Agreement, does not exceed 25% of Consolidated Total Assets (in the case of each of the foregoing clauses (1) and (2), as reflected in the most recent consolidated balance sheet of the Company delivered to the Lenders) and (v) any Subsidiary (other than a Foreign Subsidiary Borrower or a Material Subsidiary) may liquidate or dissolve if the Company determines in good faith that such liquidation or dissolution is in the best interests of the Company and is not materially disadvantageous to the Lenders; provided that any such merger involving a Person that is not a wholly owned Subsidiary immediately prior to such merger shall not be permitted unless also permitted by Section 6.04.

(b) The Company will not, and will not permit any of its Subsidiaries to, engage to any material extent in any business other than businesses of the type conducted by the Company and its Subsidiaries on the date of execution of this Agreement and businesses reasonably related thereto, including semi-conductor application processes.

(c) The Company will not change its fiscal year from the annual period which ends on October 31 or its first three fiscal quarters which, during the term of this Agreement, consist of equal 13 week periods.

SECTION 6.04. Investments, Loans, Advances, Guarantees and Acquisitions. The Company will not, and will not permit any of its Subsidiaries to, purchase, hold or acquire (including pursuant to any merger with any Person that was not a wholly owned Subsidiary prior to such merger) any capital stock, evidences of indebtedness or other securities (including any option, warrant or other right to acquire any of the foregoing) of, make or permit to exist any loans or advances to, Guarantee any obligations of, or make or permit to exist any investment or any other interest in, any other Person, or purchase or otherwise acquire (in one transaction or a series of transactions) any Person or any assets of any other Person constituting a business unit, except:

(a) Permitted Investments;

(b) [intentionally omitted];

(c) loans, advances or investments existing on the date hereof by the Company and the Subsidiaries to or in their respective subsidiaries;

(d) investments, loans or advances made (i) by the Company in or to any Subsidiary Guarantor and made by any Subsidiary Guarantor in or to the Company or any other Subsidiary Guarantor, (ii) by any Subsidiary that is not a Subsidiary Guarantor in or to any other Subsidiary that is not a Subsidiary Guarantor and (iii) by any Subsidiary to the Company or any Subsidiary Guarantor;

(e) Guarantees constituting Indebtedness permitted by Section 6.01 and Guarantees by the Company of rental obligations or accounts payable of any Subsidiary;

(f) investments received in connection with the bankruptcy or reorganization of, or settlement of delinquent accounts and disputes with, customers and suppliers, in each case in the ordinary course of business;

(g) investments made in connection with a sale of assets permitted by Section 6.03 to the extent of the non-cash consideration received by the Company or a Subsidiary;

(h) Permitted Acquisitions;

(i) Investments, loans and advances existing on the date hereof and set forth in Schedule 6.04 and extensions, renewals and replacements of any such investments, loans or advances with investments, loans or advances of a similar type that do not increase the outstanding amount thereof;

(j) investments by the Company or any Subsidiary made solely in the form of Equity Interests of the Company or any Subsidiary (including the investment by the Company in the form of Equity Interests in the Taiwan JV);

(k) investments, loans and advances by the Company or any Subsidiary in the Taiwan JV or any other Joint Venture in an aggregate outstanding amount not to exceed \$100,000,000 (provided that the outstanding amount of any investment, loan or advance made in reliance on this clause (k) shall be reduced by any amount paid, repaid, returned, distributed or otherwise received in cash by the Company or such Subsidiary in respect of such investment, loan or advance) so long as immediately prior to and after giving effect (including giving effect on a Pro Forma Basis) to any such investment, loan or advance, the Company shall be in compliance with the covenants contained in Section 6.11;

(l) the Taiwan JV Transactions; and

(m) any other investment (other than acquisitions), loan or advance (including intercompany investments, loans and advances and investments made to meet minimum capital requirements of foreign jurisdictions) so long as the aggregate amount of all such investments, loans and advances during any fiscal year of the Company does not exceed \$50,000,000; provided that such Dollar limitation shall not be applicable if at the time of the making of such investment, loan or advance and immediately after giving effect (including giving effect on a Pro Forma Basis) thereto, the Total Leverage Ratio is less than 2.25 to 1.00.

SECTION 6.05. Swap Agreements. The Company will not, and will not permit any of its Subsidiaries to, enter into any Swap Agreement, except (a) Swap Agreements entered into to hedge or mitigate risks to which the Company or any Subsidiary has actual exposure (other than those in respect of Equity Interests of the Company or any of its Subsidiaries), (b) Swap Agreements entered into in order to effectively cap, collar or exchange interest rates (from fixed to floating rates, from one floating rate to another floating rate or otherwise) with respect to any interest-bearing liability or investment of the Company or any Subsidiary and (c) the Company may enter into, and perform its obligations under, Permitted Call Spread Swap Agreements.

SECTION 6.06. Restricted Payments. (a) The Company will not, and will not permit any of its Subsidiaries to, declare or make, or agree to pay or make, directly or indirectly, any Restricted Payment, except (i) the Company may declare and pay dividends with respect to its Equity Interests payable solely in additional shares of its common stock, (ii) Subsidiaries may declare and pay dividends ratably with respect to their Equity Interests, (iii) the Company may make Restricted Payments pursuant to and in accordance with stock option plans or other benefit plans for management or employees of the Company and its Subsidiaries, (iv) the Company or any Subsidiary may repurchase Equity Interests in any PRC Subsidiary from the applicable joint venture partner with respect to such PRC Subsidiary so long as, at the time of making such repurchase and immediately after giving effect (including giving effect on a Pro Forma Basis) thereto, the Total Leverage Ratio is less than 2.25 to 1.00, (v) the Company or any other Subsidiary may make any other Restricted Payment (including, for the avoidance of doubt, dividends made in cash) so long as (1) no Default or Event of Default has occurred and is continuing prior to making such Restricted Payment or would arise after giving effect (including pro forma effect) thereto and (2) the aggregate amount of such Restricted Payments made by the Company or any Subsidiary does not exceed (A) \$50,000,000 during the fiscal year of the Company ending October 31, 2018, (B) \$100,000,000 during the fiscal year of the Company ending October 31, 2019 and (C) \$50,000,000 during any fiscal year of the Company ending on or after October 31, 2020 and (vi) the Company may enter into, exercise its rights and perform its obligations under Permitted Call Spread Swap Agreements.

(b) The Company will not, and will not permit any Subsidiary to, make or agree to pay or make, directly or indirectly, any payment or other distribution (whether in cash, securities or other property) of or in respect of principal of or interest on any Indebtedness, or any payment or other distribution (whether in cash, securities or other property), including any sinking fund or similar deposit, on account of the purchase, redemption, retirement, acquisition, cancellation or termination of any Indebtedness, except: (i) payment of Indebtedness created under the Loan Documents; (ii) payment of regularly scheduled interest and principal payments as and when due in respect of any Indebtedness (subject to any subordination provisions thereof); (iii) payment of secured Indebtedness that becomes due as a result of the voluntary sale or transfer of the property or assets securing such Indebtedness; (iv) prepayment of any Permitted Unsecured Indebtedness from the proceeds of any other Permitted Unsecured Indebtedness (including premiums and fees associated therewith); (v) prepayment, purchase, redemption, retirement or other acquisition of any Permitted Unsecured Indebtedness by exchange for or out of the proceeds received from a substantially concurrent issue of (1) new shares of its non-mandatorily redeemable Equity Interests pursuant to the conversion terms (if any) described in the agreements related to such Permitted Unsecured Indebtedness or (2) Subordinated Indebtedness or other Permitted Unsecured Indebtedness; (vi) the Company may issue Equity Interests or make cash payments in connection with or as part of the conversion, redemption, retirement, prepayment or cancellation of any Permitted Convertible Notes; and (vii) prepayment, purchase, redemption, retirement or other acquisitions of the Existing Convertible Notes so long as, at the time thereof and after giving effect thereto (including on a Pro Forma Basis), Liquidity shall not be less than \$50,000,000.

SECTION 6.07. Transactions with Affiliates. The Company will not, and will not permit any of its Subsidiaries to, sell, lease or otherwise transfer any property or assets to, or purchase, lease or otherwise acquire any property or assets from, or otherwise engage in any other transactions with, any of its Affiliates, except (a) in the ordinary course of business at prices and on terms and conditions not less favorable to the Company or such Subsidiary than could be obtained on an arm's-length basis from unrelated third parties, (b) transactions between or among the Company and its wholly owned Subsidiaries not involving any other Affiliate, (c) Indebtedness permitted by Sections 6.01(b) and 6.01(c), investments permitted by Section 6.04 and fundamental changes permitted by Section 6.03 so long as each such transaction is at a price and on terms and conditions not less favorable to the Company or such Subsidiary than could be obtained on an arm's-length basis from unrelated third parties, (d) any Restricted Payment permitted by Section 6.06, (e) transactions existing on the date hereof and set forth in Schedule 6.07 and (f) any Affiliate who is an individual may serve as a director, officer or employee of the Company or such Subsidiary and receive compensation (including stock options) for his or her services in such capacity.

SECTION 6.08. Restrictive Agreements. The Company will not, and will not permit any of its Subsidiaries to, directly or indirectly, enter into, incur or permit to exist any agreement or other arrangement that prohibits, restricts or imposes any condition upon (a) the ability of the Company or any Subsidiary to create, incur or permit to exist any Lien upon any of its property or assets, or (b) the ability of any Subsidiary to pay dividends or other distributions with respect to holders of its Equity Interests or to make or repay loans or advances to the Company or any other Subsidiary or to Guarantee Indebtedness of the Company or any other Subsidiary; provided that (i) the foregoing shall not apply to restrictions and conditions imposed by law or by this Agreement, (ii) the foregoing shall not apply to restrictions and conditions existing on the date hereof identified on Schedule 6.08 (but shall apply to any extension or renewal of, or any amendment or modification expanding the scope of, any such restriction or condition), (iii) the foregoing shall not apply to customary restrictions and conditions contained in agreements relating to the sale of a Subsidiary pending such sale, provided such restrictions and conditions apply only to the Subsidiary that is to be sold and such sale is permitted hereunder, (iv) the foregoing shall not apply to restrictions and conditions contained in agreements relating to Permitted Unsecured Indebtedness, (v) clause (a) of the foregoing shall not apply to restrictions or conditions imposed by any agreement relating to secured Indebtedness permitted by this Agreement if such restrictions or conditions apply only to the property or assets securing such Indebtedness, (vi) clause (a) of the foregoing shall not apply to customary provisions in leases and other contracts restricting the assignment thereof and (vii) clause (b) of the foregoing shall not apply to restrictions or conditions imposed by the organizational documents of the Taiwan JV or imposed by any formation agreement related to a Joint Venture, including but not limited to the operating agreement or shareholders agreement of any Joint Venture, to the extent that an investment in such Joint Venture is not prohibited by Section 6.04.

SECTION 6.09. Issuances of Equity Interests by Subsidiaries. The Company will not permit any Subsidiary to issue any additional shares of its Equity Interests other than (a) to the Company or a wholly-owned Subsidiary, (b) any such issuance that does not change the Company's direct or indirect percentage ownership interest in such Subsidiary, (c) any such issuance that is permitted pursuant to Section 6.03 or 6.04 and (d) any such issuance by PKL, PKLT, the Taiwan JV or any PRC Subsidiary, so long as the Company or any wholly-owned Subsidiary continues to own and control more than 50% of the voting and economic power of such Subsidiary.

SECTION 6.10. Amendment of Material Documents. The Company will not, and will not permit any Subsidiary to, amend, modify or waive (a) any of its rights under its certificate of incorporation, by-laws or other organizational documents, in each case in any respect adverse to the Lenders or (b) any of the terms of any Subordinated Indebtedness, in each case in any respect adverse to the Lenders (for the purposes of this Section 6.10(b) and without limitation of the scope of the definition of "adverse", any amendment to increase the principal amount, the interest rate or fees or other amounts payable, to advance the dates upon which payments are made or to alter any subordination provision (or any definition related thereto) shall be deemed to be "adverse").

SECTION 6.11. Financial Covenants.

(a) Minimum Interest Coverage Ratio. The Company will not permit the ratio (the "Interest Coverage Ratio"), determined as of the end of each of its fiscal quarters, of (i) Consolidated EBITDA less (with respect to the fiscal quarters ending October 31, 2018, January 31, 2019 and April 30, 2019) that portion of Consolidated EBITDA that is attributable to the PRC Subsidiaries less Capital Expenditures (other than, if applicable, any Specified Capital Expenditures) to (ii) Consolidated Interest Expense, in each case for the period of 4 consecutive fiscal quarters ending with the end of such fiscal quarter, all calculated for the Company and its Subsidiaries on a consolidated basis, to be less than 2.50 to 1.00.

(b) Total Leverage Ratio. The Company will not permit the ratio (the "Total Leverage Ratio"), determined as of the end of each of its fiscal quarters, of (i) Consolidated Total Indebtedness to (ii) Consolidated EBITDA, in each case for the period of 4 consecutive fiscal quarters ending with the end of such fiscal quarter, all calculated for the Company and its Subsidiaries on a consolidated basis, to be greater than 2.50 to 1.00.

(c) Minimum Unrestricted Cash Balances. The Company will not permit the aggregate amount of unrestricted and unencumbered cash balances and Permitted Investments maintained by the Company and its Subsidiaries (collectively, "Liquidity") to be less than \$50,000,000. Furthermore, and in addition to the foregoing, at all times during any six-month period immediately prior to (x) any date on which the holders of any Permitted Unsecured Indebtedness have the option to require the Company to repurchase such securities and (y) the maturity date of any Permitted Unsecured Indebtedness, in each case the Company will not permit Liquidity to be less than \$50,000,000 on a Pro Forma Basis after giving effect to the repayment or conversion of such Permitted Unsecured Indebtedness. For the avoidance of doubt, any cash deposited with the Collateral Agent pursuant to the terms of the Collateral Documents shall be deemed to be unrestricted or unencumbered cash.

SECTION 6.12. Anti-Corruption Laws and Sanctions. No Borrower will request any Borrowing or Letter of Credit, and no Borrower shall use, and the Company shall procure that its Subsidiaries and its or their respective directors, officers, employees and agents shall not use, the proceeds of any Borrowing or Letter of Credit (i) in furtherance of an offer, payment, promise to pay, or authorization of the payment or giving of money, or anything else of value, to any Person in violation of any Anti-Corruption Laws, (ii) for the purpose of funding, financing or facilitating any activities, business or transaction of or with any Sanctioned Person, or in any Sanctioned Country or (iii) in any manner that would result in the violation of any Sanctions applicable to any party hereto.

ARTICLE VII

Events of Default

If any of the following events ("Events of Default") shall occur:

(a) any Borrower shall fail to pay any principal of any Loan or any reimbursement obligation in respect of any LC Disbursement when and as the same shall become due and payable, whether at the due date thereof or at a date fixed for prepayment thereof or otherwise;

(b) any Borrower shall fail to pay any interest on any Loan or any fee or any other amount (other than an amount referred to in clause (a) of this Article) payable under this Agreement, when and as the same shall become due and payable, and such failure shall continue unremedied for a period of three (3) Business Days;

(c) any representation or warranty made or deemed made by or on behalf of any Borrower or any Subsidiary in or in connection with this Agreement or any other Loan Document or any amendment or modification thereof or waiver thereunder, or in any report, certificate, financial statement or other document furnished pursuant to or in connection with this Agreement or any other Loan Document or any amendment or modification thereof or waiver thereunder, shall prove to have been incorrect in any material respect when made or deemed made;

(d) (i) the Company shall fail to observe or perform any covenant, condition or agreement contained in Section 5.02, 5.03 (with respect to any Borrower's existence), 5.08, 5.09 or 5.10, in Article VI or in Article X or (ii) any Loan Document shall for any reason not be or shall cease to be in full force and effect or is declared to be null and void, or the Company or any Subsidiary takes any action for the purpose of terminating, repudiating or rescinding any Loan Document or any of its obligations thereunder;

(e) any Borrower or any Subsidiary Guarantor, as applicable, shall fail to observe or perform any covenant, condition or agreement contained in this Agreement (other than those specified in clause (a), (b) or (d) of this Article) or any other Loan Document, and such failure shall continue unremedied for a period of thirty (30) days after notice thereof from the Administrative Agent to the Company (which notice will be given at the request of any Lender);

(f) the Company or any Subsidiary shall fail to make any payment (whether of principal or interest and regardless of amount) in respect of any Material Indebtedness, when and as the same shall become due and payable;

(g) any event or condition occurs that results in any Material Indebtedness becoming due prior to its scheduled maturity or that enables or permits (with or without the giving of notice, the lapse of time or both) the holder or holders of any Material Indebtedness or any trustee or agent on its or their behalf to cause any Material Indebtedness to become due, or to require the prepayment, repurchase, redemption or defeasance thereof, prior to its scheduled maturity; provided that this clause (g) shall not apply to (x) secured Indebtedness that becomes due as a result of the voluntary sale or transfer of the property or assets securing such Indebtedness, (y) any redemption, repurchase, conversion or settlement with respect to any Permitted Convertible Notes pursuant to their terms unless such redemption, repurchase, conversion or settlement results from a default thereunder or an event of the type that constitutes an Event of Default or (z) any early payment requirement or unwinding or termination with respect to any Permitted Call Spread Swap Agreement;

(h) an involuntary proceeding shall be commenced or an involuntary petition shall be filed seeking (i) liquidation, reorganization or other relief in respect of the Company or any Subsidiary or its debts, or of a substantial part of its assets, under any Federal, state or foreign bankruptcy, insolvency, receivership or similar law now or hereafter in effect or (ii) the appointment of a receiver, trustee, custodian, sequestrator, conservator or similar official for the Company or any Subsidiary or for a substantial part of its assets, and, in any such case, such proceeding or petition shall continue undismissed for sixty (60) days or an order or decree approving or ordering any of the foregoing shall be entered;

(i) the Company or any Subsidiary shall (i) voluntarily commence any proceeding or file any petition seeking liquidation, reorganization or other relief under any Federal, state or foreign bankruptcy, insolvency, receivership or similar law now or hereafter in effect, (ii) consent to the institution of, or fail to contest in a timely and appropriate manner, any proceeding or petition described in clause (h) of this Article, (iii) apply for or consent to the appointment of a receiver, trustee, custodian, sequestrator, conservator or similar official for the Company or any Subsidiary or for a substantial part of its assets, (iv) file an answer admitting the material allegations of a petition filed against it in any such proceeding, (v) make a general assignment for the benefit of creditors or (vi) take any action for the purpose of effecting any of the foregoing;

(j) the Company or any Subsidiary shall become unable, admit in writing its inability or fail generally to pay its debts as they become due;

(k) one or more judgments for the payment of money in an aggregate amount in excess of \$15,000,000 shall be rendered against the Company, any Subsidiary or any combination thereof and the same shall remain undischarged for a period of thirty (30) consecutive days during which execution shall not be effectively stayed, or any action shall be legally taken by a judgment creditor to attach or levy upon any assets of the Company or any Subsidiary to enforce any such judgment;

(l) an ERISA Event shall have occurred that, in the opinion of the Required Lenders, when taken together with all other ERISA Events that have occurred, could reasonably be expected to result in a Material Adverse Effect;

(m) a Change in Control shall occur; or

(n) any Collateral Document shall for any reason fail to create a valid and perfected first priority security interest in any material portion of the Collateral purported to be covered thereby, except as permitted by the terms of any Loan Document;

then, and in every such event (other than an event with respect to the Company described in clause (h) or (i) of this Article), and at any time thereafter during the continuance of such event, the Administrative Agent may, and at the request of the Required Lenders shall, by notice to the Company, take any or all of the following actions, at the same or different times: (i) terminate the Commitments, and thereupon the Commitments shall terminate immediately, (ii) declare the Loans then outstanding to be due and payable in whole (or in part, in which case any principal not so declared to be due and payable may thereafter be declared to be due and payable), and thereupon the principal of the Loans so declared to be due and payable, together with accrued interest thereon and all fees and other Secured Obligations of the Borrowers accrued hereunder and under the other Loan Documents, shall become due and payable immediately, without presentment, demand, protest or other notice of any kind, all of which are hereby waived by the Borrowers, (iii) require cash collateral for the LC Exposure in accordance with Section 2.06(j), and (iv) exercise on behalf of itself, the Lenders and the Issuing Banks all rights and remedies available to it, the Lenders and the Issuing Banks under the Loan Documents and applicable law; and in case of any event with respect to any Borrower described in clause (h) or (i) of this Article, the Commitments shall automatically terminate and the principal of the Loans then outstanding and cash collateral for the LC Exposure, together with accrued interest thereon and all fees and other Secured Obligations accrued hereunder and under the other Loan Documents, shall automatically become due and payable, and the obligation of the Borrower to cash collateralize the LC Exposure as provided in clause (iii) above shall automatically become effective, in each case, without presentment, demand, protest or other notice of any kind, all of which are hereby waived by the Borrowers. Upon the occurrence and during the continuance of an Event of Default, any Agent may exercise any rights and remedies provided to such Agent under the Loan Documents or at law or equity, including all remedies provided under the UCC.

In addition to any other rights and remedies granted to the Administrative Agent and the Lenders in the Loan Documents, the Administrative Agent on behalf of the Lenders may exercise all rights and remedies of a secured party under the New York Uniform Commercial Code or any other applicable law. Without limiting the generality of the foregoing, the Administrative Agent, without demand of performance or other demand, presentment, protest, advertisement or notice of any kind (except any notice required by law referred to below) to or upon any Loan Party or any other Person (all and each of which demands, defenses, advertisements and notices are hereby waived by the Company on behalf of itself and its Subsidiaries), may in such circumstances forthwith collect, receive, appropriate and realize upon the Collateral, or any part thereof, or consent to the use by any Loan Party of any cash collateral arising in respect of the Collateral on such terms as the Administrative Agent deems reasonable, and/or may forthwith sell, lease, assign give an option or options to purchase or otherwise dispose of and deliver, or acquire by credit bid on behalf of the Secured Parties, the Collateral or any part thereof (or contract to do any of the foregoing), in one or more parcels at public or private sale or sales, at any exchange, broker's board or office of the Administrative Agent or any Lender or elsewhere, upon such terms and conditions as it may deem advisable and at such prices as it may deem best, for cash or on credit or for future delivery, all without assumption of any credit risk. The Administrative Agent or any Lender shall have the right upon any such public sale or sales, and, to the extent permitted by law, upon any such private sale or sales, to purchase the whole or any part of the Collateral so sold, free of any right or equity of redemption in any Loan Party, which right or equity is hereby waived and released by the Company on behalf of itself and its Subsidiaries. The Company further agrees on behalf of itself and its Subsidiaries, at the Administrative Agent's request, to assemble the Collateral and make it available to the Administrative Agent at places which the Administrative Agent shall reasonably select, whether at the premises of the Company, another Loan Party or elsewhere. The Administrative Agent shall apply the net proceeds of any action taken by it pursuant to this Article VII, after deducting all reasonable costs and expenses of every kind incurred in connection therewith or incidental to the care or safekeeping of any of the Collateral or in any other way relating to the Collateral or the rights of the Administrative Agent and the Lenders hereunder, including reasonable attorneys' fees and disbursements, to the payment in whole or in part of the Secured Obligations, in such order as the Administrative Agent may elect, and only after such application and after the payment by the Administrative Agent of any other amount required by any provision of law, including Section 9-615(a)(3) of the New York Uniform Commercial Code, need the Administrative Agent account for the surplus, if any, to any Loan Party. To the extent permitted by applicable law, the Company on behalf of itself and its Subsidiaries waives all claims, damages and demands it may acquire against the Administrative Agent or any Lender arising out of the exercise by them of any rights hereunder. If any notice of a proposed sale or other disposition of Collateral shall be required by law, such notice shall be deemed reasonable and proper if given at least 10 days before such sale or other disposition.

Notwithstanding anything herein to the contrary, following the occurrence and during the continuance of an Event of Default, and notice thereof to the Administrative Agent by the Company or the Required Lenders, all payments received on account of the Secured Obligations shall, subject to Section 2.24, be applied by the Administrative Agent ratably first, to pay any reasonable out-of-pocket fees, indemnities, or expense reimbursements including amounts then due to the Administrative Agent and the Issuing Banks from the Loan Parties, second, to pay any fees or expense reimbursements then due to the Lenders from the Loan Parties, third, to pay interest then due and payable on the Loans ratably, fourth, to prepay principal on the Loans and unreimbursed LC Disbursements, to pay an amount to the Administrative Agent equal to one hundred five percent (105%) of the aggregate undrawn face amount of all outstanding Letters of Credit and the aggregate amount of any unpaid LC Disbursements to be held as cash collateral for such Secured Obligations, to payment of any amounts owing with respect to Banking Services Obligations and Swap Obligations, and fifth, to the payment of any other Secured Obligations due to the Administrative Agent or any Lender by the Loan Parties. Notwithstanding the foregoing, amounts received from any Loan Party shall not be applied to any Excluded Swap Obligation of such Loan Party. The Administrative Agent and the Lenders shall have the continuing and exclusive right to apply and reverse and reapply any and all such proceeds and payments to any portion of the Secured Obligations.

ARTICLE VIII

The Administrative Agent and the Collateral Agent

SECTION 8.01. Authorization and Action.

(a) Each Lender and Issuing Bank hereby irrevocably appoints the entity named as Administrative Agent and Collateral Agent in the heading of this Agreement and its successors and assigns to serve as the administrative agent and collateral agent under the Loan Documents and each Lender and Issuing Bank authorizes each Agent to take such actions as agent on its behalf and to exercise such powers under this Agreement and the other Loan Documents as are delegated to such Agent under such agreements and to exercise such powers as are reasonably incidental thereto. In addition, to the extent required under the laws of any jurisdiction other than within the United States, each Lender and Issuing Bank hereby grants to each Agent any required powers of attorney to execute and enforce any Collateral Document governed by the laws of such jurisdiction on such Lender's or such Issuing Bank's behalf. Without limiting the foregoing, each Lender and Issuing Bank hereby authorizes each Agent to execute and deliver, and to perform its obligations under, each of the Loan Documents to which such Agent is a party, to exercise all rights, powers and remedies that such Agent may have under such Loan Documents.

(b) As to any matters not expressly provided for herein and in the other Loan Documents (including enforcement or collection), no Agent shall be required to exercise any discretion or take any action, but shall be required to act or to refrain from acting (and shall be fully protected in so acting or refraining from acting) upon the written instructions of the Required Lenders (or such other number or percentage of the Lenders as shall be necessary, pursuant to the terms in the Loan Documents), and, unless and until revoked in writing, such instructions shall be binding upon each Lender and Issuing Bank; provided, however, that no Agent shall be required to take any action that (i) such Agent in good faith believes exposes it to liability unless such Agent receives an indemnification satisfactory to it from the Lenders and the Issuing Banks with respect to such action or (ii) is contrary to this Agreement or any other Loan Document or applicable law, including any action that may be in violation of the automatic stay under any requirement of law relating to bankruptcy, insolvency or reorganization or relief of debtors or that may effect a forfeiture, modification or termination of property of a Defaulting Lender in violation of any requirement of law relating to bankruptcy, insolvency or reorganization or relief of debtors; provided, further, that such Agent may seek clarification or direction from the Required Lenders prior to the exercise of any such instructed action and may refrain from acting until such clarification or direction has been provided. Except as expressly set forth in the Loan Documents, no Agent shall have any duty to disclose, and shall not be liable for the failure to disclose, any information relating to the Company, any Subsidiary or any Affiliate of any of the foregoing that is communicated to or obtained by the Person serving as an Agent or any of its Affiliates in any capacity. Nothing in this Agreement shall require any Agent to expend or risk its own funds or otherwise incur any financial liability in the performance of any of its duties hereunder or in the exercise of any of its rights or powers if it shall have reasonable grounds for believing that repayment of such funds or adequate indemnity against such risk or liability is not reasonably assured to it.

(c) In performing its functions and duties hereunder and under the other Loan Documents, each Agent is acting solely on behalf of the Lenders and the Issuing Banks (except in limited circumstances expressly provided for herein relating to the maintenance of the Register), and its duties are entirely mechanical and administrative in nature. Without limiting the generality of the foregoing:

(i) no Agent assumes and shall not be deemed to have assumed any obligation or duty or any other relationship as the agent, fiduciary or trustee of or for any Lender, any Issuing Bank or any Secured Party other than as expressly set forth herein and in the other Loan Documents, regardless of whether a Default or an Event of Default has occurred and is continuing (and it is understood and agreed that the use of the term "agent" (or any similar term) herein or in any other Loan Document with reference to any Agent is not intended to connote any fiduciary duty or other implied (or express) obligations arising under agency doctrine of any applicable law, and that such term is used as a matter of market custom and is intended to create or reflect only an administrative relationship between contracting parties); additionally, each Lender agrees that it will not assert any claim against any Agent based on an alleged breach of fiduciary duty by such Agent in connection with this Agreement and the transactions contemplated hereby;

(ii) where any Agent is required or deemed to act as a trustee in respect of any Collateral over which a security interest has been created pursuant to a Loan Document expressed to be governed by the laws of any jurisdiction other than the United States of America, the obligations and liabilities of such Agent to the Secured Parties in its capacity as trustee shall be excluded to the fullest extent permitted by applicable law; and

(iii) nothing in this Agreement or any Loan Document shall require any Agent to account to any Lender for any sum or the profit element of any sum received by such Agent for its own account.

(d) Each Agent may perform any of its duties and exercise its rights and powers hereunder or under any other Loan Document by or through any one or more sub-agents appointed by such Agent. Each Agent and any such sub-agent may perform any of their respective duties and exercise their respective rights and powers through their respective Related Parties. The exculpatory provisions of this Article shall apply to any such sub-agent and to the Related Parties of such Agent and any such sub-agent, and shall apply to their respective activities pursuant to this Agreement. No Agent shall be responsible for the negligence or misconduct of any sub-agent except to the extent that a court of competent jurisdiction determines in a final and nonappealable judgment that such Agent acted with gross negligence or willful misconduct in the selection of such sub-agent.

(e) None of any Syndication Agent, any Documentation Agent or any Arranger shall have obligations or duties whatsoever in such capacity under this Agreement or any other Loan Document and shall incur no liability hereunder or thereunder in such capacity, but all such persons shall have the benefit of the indemnities provided for hereunder.

(f) In case of the pendency of any proceeding with respect to any Loan Party under any federal, state or foreign bankruptcy, insolvency, receivership or similar law now or hereafter in effect, each Agent (irrespective of whether the principal of any Loan or any reimbursement obligation in respect of any LC Disbursement shall then be due and payable as herein expressed or by declaration or otherwise and irrespective of whether such Agent shall have made any demand on any Loan Party) shall be entitled and empowered (but not obligated) by intervention in such proceeding or otherwise:

(i) to file and prove a claim for the whole amount of the principal and interest owing and unpaid in respect of the Loans, LC Disbursements and all other Obligations that are owing and unpaid and to file such other documents as may be necessary or advisable in order to have the claims of the Lenders, the Issuing Banks and such Agent (including any claim under Sections 2.12, 2.13, 2.15, 2.17 and 9.03) allowed in such judicial proceeding; and

(ii) to collect and receive any monies or other property payable or deliverable on any such claims and to distribute the same;

and any custodian, receiver, assignee, trustee, liquidator, sequestrator or other similar official in any such proceeding is hereby authorized by each Lender, each Issuing Bank and each other Secured Party to make such payments to such Agent and, in the event that such Agent shall consent to the making of such payments directly to the Lenders, the Issuing Banks or the other Secured Parties, to pay to such Agent any amount due to it, in its capacity as such Agent, under the Loan Documents (including under Section 9.03). Nothing contained herein shall be deemed to authorize such Agent to authorize or consent to or accept or adopt on behalf of any Lender or Issuing Bank any plan of reorganization, arrangement, adjustment or composition affecting the Obligations or the rights of any Lender or Issuing Bank or to authorize such Agent to vote in respect of the claim of any Lender or Issuing Bank in any such proceeding.

(g) The provisions of this Article VIII are solely for the benefit of the Agents, the Lenders and the Issuing Banks, and, except solely to the extent of the Company's rights to consent pursuant to and subject to the conditions set forth in this Article VIII, none of the Company or any Subsidiary, or any of their respective Affiliates, shall have any rights as a third party beneficiary under any such provisions. Each Secured Party, whether or not a party hereto, will be deemed, by its acceptance of the benefits of the Collateral and of the Guarantees of the Obligations provided under the Loan Documents, to have agreed to the provisions of this Article VIII.

SECTION 8.02. Agents' Reliance, Indemnification, Etc.

(a) No Agent nor any of its Related Parties shall be (i) liable for any action taken or omitted to be taken by it under or in connection with this Agreement or the other Loan Documents (x) with the consent of or at the request of the Required Lenders (or such other number or percentage of the Lenders as shall be necessary, or as such Agent shall believe in good faith to be necessary, under the circumstances as provided in the Loan Documents) or (y) in the absence of its own gross negligence or willful misconduct (such absence to be presumed unless otherwise determined by a court of competent jurisdiction by a final and nonappealable judgment) or (ii) responsible in any manner to any of the Lenders for any recitals, statements, representations or warranties made by any Loan Party or any officer thereof contained in this Agreement or any other Loan Document or in any certificate, report, statement or other document referred to or provided for in, or received by such Agent under or in connection with, this Agreement or any other Loan Document or for the value, validity, effectiveness, genuineness, enforceability or sufficiency of this Agreement or any other Loan Document or for any failure of any Loan Party to perform its obligations hereunder or thereunder.

(b) No Agent shall be deemed to have knowledge of any Default unless and until written notice thereof (stating that it is a "notice of default") is given to such Agent by the Company, a Lender or an Issuing Bank, and such Agent shall not be responsible for or have any duty to ascertain or inquire into (i) any statement, warranty or representation made in or in connection with any Loan Document, (ii) the contents of any certificate, report or other document delivered thereunder or in connection therewith, (iii) the performance or observance of any of the covenants, agreements or other terms or conditions set forth in any Loan Document or the occurrence of any Default, (iv) the sufficiency, validity, enforceability, effectiveness or genuineness of any Loan Document or any other agreement, instrument or document, (v) the satisfaction of any condition set forth in Article IV or elsewhere in any Loan Document, other than to confirm receipt of items expressly required to be delivered to such Agent or satisfaction of any condition that expressly refers to the matters described therein being acceptable or satisfactory to such Agent or (vi) the creation, perfection or priority of Liens on the Collateral. Notwithstanding anything herein to the contrary, such Agent shall not be liable for, or be responsible for any loss, cost or expense suffered by the Company, any Subsidiary, any Lender or Issuing Bank as a result of, any determination of the Credit Exposure, any of the component amounts thereof or any portion thereof attributable to each Lender or Issuing Bank or any Dollar Amount thereof.

(c) Without limiting the foregoing, each Agent (i) may treat the payee of any promissory note as its holder until such promissory note has been assigned in accordance with Section 9.04, (ii) may rely on the Register to the extent set forth in Section 9.04(b), (iii) may consult with legal counsel (including counsel to the Company), independent public accountants and other experts selected by it, and shall not be liable for any action taken or omitted to be taken in good faith by it in accordance with the advice of such counsel, accountants or experts, (iv) makes no warranty or representation to any Lender or Issuing Bank and shall not be responsible to any Lender or Issuing Bank for any statements, warranties or representations made by or on behalf of any Loan Party in connection with this Agreement or any other Loan Document, (v) in determining compliance with any condition hereunder to the making of a Loan, or the issuance of a Letter of Credit, that by its terms must be fulfilled to the satisfaction of a Lender or an Issuing Bank, may presume that such condition is satisfactory to such Lender or such Issuing Bank unless such Agent shall have received notice to the contrary from such Lender or such Issuing Bank sufficiently in advance of the making of such Loan or the issuance of such Letter of Credit and (vi) shall be entitled to rely on, and shall incur no liability under or in respect of this Agreement or any other Loan Document by acting upon, any notice, consent, certificate or other instrument or writing (which writing may be a fax, any electronic message, Internet or intranet website posting or other distribution) or any statement made to it orally or by telephone and believed by it to be genuine and signed or sent or otherwise authenticated by the proper party or parties (whether or not such Person in fact meets the requirements set forth in the Loan Documents for being the maker thereof).

SECTION 8.03. Posting of Communications.

(a) The Company agrees that the Administrative Agent may, but shall not be obligated to, make any Communications available to the Lenders and the Issuing Banks by posting the Communications on IntraLinks™, DebtDomain, SyndTrak, ClearPar or any other electronic platform chosen by the Administrative Agent to be its electronic transmission system (the "Approved Electronic Platform").

(b) Although the Approved Electronic Platform and its primary web portal are secured with generally-applicable security procedures and policies implemented or modified by the Administrative Agent from time to time (including, as of the Effective Date, a user ID/password authorization system) and the Approved Electronic Platform is secured through a per-deal authorization method whereby each user may access the Approved Electronic Platform only on a deal-by-deal basis, each of the Lenders, the Issuing Banks and the Company acknowledges and agrees that the distribution of material through an electronic medium is not necessarily secure, that the Administrative Agent is not responsible for approving or vetting the representatives or contacts of any Lender that are added to the Approved Electronic Platform, and that there are confidentiality and other risks associated with such distribution. Each of the Lenders, the Issuing Banks and the Company hereby approves distribution of the Communications through the Approved Electronic Platform and understands and assumes the risks of such distribution.

(c) THE APPROVED ELECTRONIC PLATFORM AND THE COMMUNICATIONS ARE PROVIDED “AS IS” AND “AS AVAILABLE”. THE APPLICABLE PARTIES (AS DEFINED BELOW) DO NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE COMMUNICATIONS, OR THE ADEQUACY OF THE APPROVED ELECTRONIC PLATFORM AND EXPRESSLY DISCLAIM LIABILITY FOR ERRORS OR OMISSIONS IN THE APPROVED ELECTRONIC PLATFORM AND THE COMMUNICATIONS. NO WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT OF THIRD PARTY RIGHTS OR FREEDOM FROM VIRUSES OR OTHER CODE DEFECTS, IS MADE BY THE APPLICABLE PARTIES IN CONNECTION WITH THE COMMUNICATIONS OR THE APPROVED ELECTRONIC PLATFORM. IN NO EVENT SHALL THE ADMINISTRATIVE AGENT, ANY ARRANGER, ANY SYNDICATION AGENT, ANY DOCUMENTATION AGENT OR ANY OF THEIR RESPECTIVE RELATED PARTIES (COLLECTIVELY, “APPLICABLE PARTIES”) HAVE ANY LIABILITY TO ANY LOAN PARTY, ANY LENDER, ANY ISSUING BANK OR ANY OTHER PERSON OR ENTITY FOR DAMAGES OF ANY KIND, INCLUDING DIRECT OR INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES OR EXPENSES (WHETHER IN TORT, CONTRACT OR OTHERWISE) ARISING OUT OF ANY LOAN PARTY’S OR THE ADMINISTRATIVE AGENT’S TRANSMISSION OF COMMUNICATIONS THROUGH THE INTERNET OR THE APPROVED ELECTRONIC PLATFORM.

(d) Each Lender and each Issuing Bank agrees that notice to it (as provided in the next sentence) specifying that Communications have been posted to the Approved Electronic Platform shall constitute effective delivery of the Communications to such Lender for purposes of the Loan Documents. Each Lender and each Issuing Bank agrees (i) to notify the Administrative Agent in writing (which could be in the form of electronic communication) from time to time of such Lender’s or such Issuing Bank’s (as applicable) email address to which the foregoing notice may be sent by electronic transmission and (ii) that the foregoing notice may be sent to such email address.

(e) Each of the Lenders, each of the Issuing Banks and the Company agrees that the Administrative Agent may, but (except as may be required by applicable law) shall not be obligated to, store the Communications on the Approved Electronic Platform in accordance with the Administrative Agent’s generally applicable document retention procedures and policies.

(f) Nothing herein shall prejudice the right of the Administrative Agent, any Lender or any Issuing Bank to give any notice or other communication pursuant to any Loan Document in any other manner specified in such Loan Document.

SECTION 8.04. The Agents Individually. With respect to its Commitment, Loans and Letters of Credit, the Person serving as the Administrative Agent or the Collateral Agent, as applicable, shall have and may exercise the same rights and powers hereunder and is subject to the same obligations and liabilities as and to the extent set forth herein for any other Lender or Issuing Bank, as the case may be. The terms “Issuing Bank”, “Lenders”, “Required Lenders” and any similar terms shall, unless the context clearly otherwise indicates, include the Administrative Agent or the Collateral Agent, as applicable, in its individual capacity as a Lender, an Issuing Bank or as one of the Required Lenders, as applicable. The Person serving as the Administrative Agent or the Collateral Agent, as applicable, and its Affiliates may accept deposits from, lend money to, own securities of, act as the financial advisor or in any other advisory capacity for and generally engage in any kind of banking, trust or other business with, the Company, any Subsidiary or any Affiliate of any of the foregoing as if such Person was not acting as the Administrative Agent or the Collateral Agent, as applicable, and without any duty to account therefor to the Lenders or the Issuing Banks.

SECTION 8.05. Successor Agents.

(a) Either Agent may resign at any time by giving 30 days' prior written notice thereof to the Lenders, the Issuing Banks and the Company, whether or not a successor Agent has been appointed. Upon any such resignation, the Required Lenders shall have the right to appoint a successor Agent. If no successor Agent shall have been so appointed by the Required Lenders, and shall have accepted such appointment, within 30 days after the retiring Agent's giving of notice of resignation, then the retiring Agent may, on behalf of the Lenders and the Issuing Banks, appoint a successor Agent, which shall be a bank with an office in New York, New York or an Affiliate of any such bank. In either case, such appointment shall be subject to the prior written approval of the Company (which approval may not be unreasonably withheld and shall not be required while an Event of Default has occurred and is continuing). Upon the acceptance of any appointment as Administrative Agent or as Collateral Agent, as applicable, by a successor Agent, such successor Agent shall succeed to, and become vested with, all the rights, powers, privileges and duties of the retiring Agent. Upon the acceptance of appointment as Administrative Agent or Collateral Agent, as applicable, by a successor Agent, the retiring Agent shall be discharged from its duties and obligations under this Agreement and the other Loan Documents. Prior to any retiring Agent's resignation hereunder as Agent, the retiring Agent shall take such action as may be reasonably necessary to assign to the successor Agent its rights as Agent under the Loan Documents.

(b) Notwithstanding paragraph (a) of this Section, in the event no successor Agent shall have been so appointed and shall have accepted such appointment within 30 days after the retiring Agent gives notice of its intent to resign, the retiring Agent may give notice of the effectiveness of its resignation to the Lenders, the Issuing Banks and the Company, whereupon, on the date of effectiveness of such resignation stated in such notice, (i) the retiring Agent shall be discharged from its duties and obligations hereunder and under the other Loan Documents; provided that, solely for purposes of maintaining any security interest granted to the Agent under any Collateral Document for the benefit of the Secured Parties, the retiring Agent shall continue to be vested with such security interest as collateral agent for the benefit of the Secured Parties, and continue to be entitled to the rights set forth in such Collateral Document and Loan Document, and, in the case of any Collateral in the possession of the Agent, shall continue to hold such Collateral, in each case until such time as a successor Agent is appointed and accepts such appointment in accordance with this Section (it being understood and agreed that the retiring Agent shall have no duty or obligation to take any further action under any Collateral Document, including any action required to maintain the perfection of any such security interest) and (ii) the Required Lenders shall succeed to and become vested with all the rights, powers, privileges and duties of the retiring Agent; provided that (A) all payments required to be made hereunder or under any other Loan Document to the Agent for the account of any Person other than the Agent shall be made directly to such Person and (B) all notices and other communications required or contemplated to be given or made to the applicable Agent shall directly be given or made to each Lender and each Issuing Bank. Following the effectiveness of such Agent's resignation from its capacity as such, the provisions of this Article VIII and Section 9.03, as well as any exculpatory, reimbursement and indemnification provisions set forth in any other Loan Document, shall continue in effect for the benefit of such retiring Agent, its sub-agents and their respective Related Parties in respect of any actions taken or omitted to be taken by any of them while the retiring Agent was acting as Administrative Agent or Collateral Agent, as applicable, and in respect of the matters referred to in the proviso under clause (i) above.

SECTION 8.06. Acknowledgments of Lenders and Issuing Banks.

(a) Each Lender represents that it is engaged in making, acquiring or holding commercial loans in the ordinary course of its business and that it has, independently and without reliance upon any Agent, any Arranger or any other Lender, or any of the Related Parties of any of the foregoing, and based on such documents and information as it has deemed appropriate, made its own credit analysis and decision to enter into this Agreement as a Lender, and to make, acquire or hold Loans hereunder. Each Lender also acknowledges that it will, independently and without reliance upon any Agent, any Arranger or any other Lender, or any of the Related Parties of any of the foregoing, and based on such documents and information (which may contain material, non-public information within the meaning of the United States securities laws concerning the Company and its Affiliates) as it shall from time to time deem appropriate, continue to make its own decisions in taking or not taking action under or based upon this Agreement, any other Loan Document or any related agreement or any document furnished hereunder or thereunder.

(b) Each Lender, by delivering its signature page to this Agreement on the Effective Date, or delivering its signature page to an Assignment and Assumption or any other Loan Document pursuant to which it shall become a Lender hereunder, shall be deemed to have acknowledged receipt of, and consented to and approved, each Loan Document and each other document required to be delivered to, or be approved by or satisfactory to, the Agents or the Lenders on the Effective Date.

SECTION 8.07. Collateral Matters.

(a) Except with respect to the exercise of setoff rights in accordance with Section 9.08 or with respect to a Secured Party's right to file a proof of claim in an insolvency proceeding, no Secured Party shall have any right individually to realize upon any of the Collateral or to enforce any Guarantee of the Obligations, it being understood and agreed that all powers, rights and remedies under the Loan Documents may be exercised solely by the Collateral Agent on behalf of the Secured Parties in accordance with the terms thereof. In its capacity, the Collateral Agent is a "representative" of the Secured Parties within the meaning of the term "secured party" as defined in the UCC. In the event that any Collateral is hereafter pledged by any Person as collateral security for the Secured Obligations, the Collateral Agent is hereby authorized, and hereby granted a power of attorney, to execute and deliver on behalf of the Secured Parties any Loan Documents necessary or appropriate to grant and perfect a Lien on such Collateral in favor of the Collateral Agent on behalf of the Secured Parties.

(b) In furtherance of the foregoing and not in limitation thereof, no Banking Services Agreement or Swap Agreement will create (or be deemed to create) in favor of any Secured Party that is a party thereto any rights in connection with the management or release of any Collateral or of the obligations of any Loan Party under any Loan Document. By accepting the benefits of the Collateral, each Secured Party that is a party to any such Banking Services Agreement or Swap Agreement, as applicable, shall be deemed to have appointed the Agents to serve as administrative agent and collateral agent, as applicable, under the Loan Documents and agreed to be bound by the Loan Documents as a Secured Party thereunder, subject to the limitations set forth in this paragraph.

(c) The Secured Parties irrevocably authorize the Collateral Agent, at its option and in its discretion, to subordinate any Lien on any property granted to or held by the Collateral Agent under any Loan Document to the holder of any Lien on such property that is permitted by Section 6.02(b) (i). The Collateral Agent shall not be responsible for or have a duty to ascertain or inquire into any representation or warranty regarding the existence, value or collectability of the Collateral, the existence, priority or perfection of the Collateral Agent's Lien thereon or any certificate prepared by any Loan Party in connection therewith, nor shall the Collateral Agent be responsible or liable to the Lenders or any other Secured Party for any failure to monitor or maintain any portion of the Collateral.

(d) Each Borrower, on its behalf and on behalf of its Subsidiaries, and each Lender, on its behalf and on the behalf of its affiliated Holders of Secured Obligations, hereby irrevocably constitute the Collateral Agent as the holder of an irrevocable power of attorney (*fondé de pouvoir* within the meaning of Article 2692 of the Civil Code of Québec) in order to hold hypothecs and security granted by each Borrower or any Subsidiary on property pursuant to the laws of the Province of Quebec to secure obligations of any Borrower or any Subsidiary under any bond, debenture or similar title of indebtedness issued by any Borrower or any Subsidiary in connection with this Agreement, and agree that the Collateral Agent may act as the bondholder and mandatary with respect to any bond, debenture or similar title of indebtedness that may be issued by any Borrower or any Subsidiary and pledged in favor of the Holder of Secured Obligations in connection with this Agreement. Notwithstanding the provisions of Section 32 of the An Act respecting the special powers of legal persons (Quebec), JPMorgan Chase Bank, N.A. as Collateral Agent may acquire and be the holder of any bond issued by any Borrower or any Subsidiary in connection with this Agreement (i.e., the *fondé de pouvoir* may acquire and hold the first bond issued under any deed of hypothec by any Borrower or any Subsidiary).

(e) The Collateral Agent is hereby authorized to execute and deliver any documents necessary or appropriate to create and perfect the rights of pledge for the benefit of the Holders of Secured Obligations including a right of pledge with respect to the entitlements to profits, the balance left after winding up and the voting rights of the Company as ultimate parent of any subsidiary of the Company which is organized under the laws of the Netherlands and the Equity Interests of which are pledged in connection herewith (a "Dutch Pledge"). Without prejudice to the provisions of this Agreement and the other Loan Documents, the parties hereto acknowledge and agree with the creation of parallel debt obligations of the Company or any relevant Subsidiary as will be described in any Dutch Pledge (the "Parallel Debt"), including that any payment received by the Collateral Agent in respect of the Parallel Debt will - conditionally upon such payment not subsequently being avoided or reduced by virtue of any provisions or enactments relating to bankruptcy, insolvency, preference, liquidation or similar laws of general application - be deemed a satisfaction of a pro rata portion of the corresponding amounts of the Secured Obligations, and any payment to the Holders of Secured Obligations in satisfaction of the Secured Obligations shall - conditionally upon such payment not subsequently being avoided or reduced by virtue of any provisions or enactments relating to bankruptcy, insolvency, preference, liquidation or similar laws of general application - be deemed as satisfaction of the corresponding amount of the Parallel Debt. The parties hereto acknowledge and agree that, for purposes of a Dutch Pledge, any resignation by the Collateral Agent is not effective until its rights under the Parallel Debt are assigned to the successor Collateral Agent.

(f) The parties hereto acknowledge and agree for the purposes of taking and ensuring the continuing validity of German law governed pledges (*Pfandrechte*) with the creation of parallel debt obligations of the Borrowers as will be further described in a separate German law governed parallel debt undertaking. The Collateral Agent shall (i) hold such parallel debt undertaking as fiduciary agent (*Treuhaender*) and (ii) administer and hold as fiduciary agent (*Treuhaender*) any pledge created under a German law governed Collateral Document which is created in favor of any Holder of the Secured Obligations or transferred to any Holder of the Secured Obligations due to its accessory nature (*Akzessorietaet*), in each case in its own name and for the account of the Holders of the Secured Obligations. Each Lender, on its own behalf and on behalf of its affiliated Holders of Secured Obligations, hereby authorizes the Collateral Agent to enter as its agent in its name and on its behalf into any German law governed Collateral Document, to accept as its agent in its name and on its behalf any pledge under such Collateral Document and to agree to and execute as agent in its name and on its behalf any amendments, supplements and other alterations to any such Collateral Document and to release any such Collateral Document and any pledge created under any such Collateral Document in accordance with the provisions herein and/or the provisions in any such Collateral Document.

SECTION 8.08. Credit Bidding. The Secured Parties hereby irrevocably authorize the Collateral Agent, at the direction of the Required Lenders, to credit bid all or any portion of the Secured Obligations (including by accepting some or all of the Collateral in satisfaction of some or all of the Secured Obligations pursuant to a deed in lieu of foreclosure or otherwise) and in such manner purchase (either directly or through one or more acquisition vehicles) all or any portion of the Collateral (a) at any sale thereof conducted under the provisions of the Bankruptcy Code, including under Sections 363, 1123 or 1129 of the Bankruptcy Code, or any similar laws in any other jurisdictions to which a Loan Party is subject, or (b) at any other sale, foreclosure or acceptance of collateral in lieu of debt conducted by (or with the consent or at the direction of) the Collateral Agent (whether by judicial action or otherwise) in accordance with any applicable law. In connection with any such credit bid and purchase, the Secured Obligations owed to the Secured Parties shall be entitled to be, and shall be, credit bid by the Collateral Agent at the direction of the Required Lenders on a ratable basis (with Secured Obligations with respect to contingent or unliquidated claims receiving contingent interests in the acquired assets on a ratable basis that shall vest upon the liquidation of such claims in an amount proportional to the liquidated portion of the contingent claim amount used in allocating the contingent interests) for the asset or assets so purchased (or for the equity interests or debt instruments of the acquisition vehicle or vehicles that are issued in connection with such purchase). In connection with any such bid (i) the Collateral Agent shall be authorized to form one or more acquisition vehicles and to assign any successful credit bid to such acquisition vehicle or vehicles, (ii) each of the Secured Parties' ratable interests in the Secured Obligations which were credit bid shall be deemed without any further action under this Agreement to be assigned to such vehicle or vehicles for the purpose of closing such sale, (iii) the Collateral Agent shall be authorized to adopt documents providing for the governance of the acquisition vehicle or vehicles (provided that any actions by the Collateral Agent with respect to such acquisition vehicle or vehicles, including any disposition of the assets or equity interests thereof, shall be governed, directly or indirectly, by, and the governing documents shall provide for, control by the vote of the Required Lenders or their permitted assignees under the terms of this Agreement or the governing documents of the applicable acquisition vehicle or vehicles, as the case may be, irrespective of the termination of this Agreement and without giving effect to the limitations on actions by the Required Lenders contained in Section 9.02 of this Agreement), (iv) the Collateral Agent on behalf of such acquisition vehicle or vehicles shall be authorized to issue to each of the Secured Parties, ratably on account of the relevant Secured Obligations which were credit bid, interests, whether as equity, partnership, limited partnership interests or membership interests, in any such acquisition vehicle and/or debt instruments issued by such acquisition vehicle, all without the need for any Secured Party or acquisition vehicle to take any further action, and (v) to the extent that Secured Obligations that are assigned to an acquisition vehicle are not used to acquire Collateral for any reason (as a result of another bid being higher or better, because the amount of Secured Obligations assigned to the acquisition vehicle exceeds the amount of Secured Obligations credit bid by the acquisition vehicle or otherwise), such Secured Obligations shall automatically be reassigned to the Secured Parties pro rata with their original interest in such Secured Obligations and the equity interests and/or debt instruments issued by any acquisition vehicle on account of such Secured Obligations shall automatically be cancelled, without the need for any Secured Party or any acquisition vehicle to take any further action. Notwithstanding that the ratable portion of the Secured Obligations of each Secured Party are deemed assigned to the acquisition vehicle or vehicles as set forth in clause (ii) above, each Secured Party shall execute such documents and provide such information regarding the Secured Party (and/or any designee of the Secured Party which will receive interests in or debt instruments issued by such acquisition vehicle) as the Collateral Agent may reasonably request in connection with the formation of any acquisition vehicle, the formulation or submission of any credit bid or the consummation of the transactions contemplated by such credit bid.

SECTION 8.09. Certain ERISA Matters.

(a) Each Lender (x) represents and warrants, as of the date such Person became a Lender party hereto, to, and (y) covenants, from the date such Person became a Lender party hereto to the date such Person ceases being a Lender party hereto, for the benefit of, the Agents, and each Arranger and their respective Affiliates, and not, for the avoidance of doubt, to or for the benefit of the Company or any other Loan Party, that at least one of the following is and will be true:

(i) such Lender is not using “plan assets” (within the meaning of the Plan Asset Regulations) of one or more Benefit Plans in connection with the Loans, the Letters of Credit or the Commitments,

(ii) the transaction exemption set forth in one or more PTEs, such as PTE 84-14 (a class exemption for certain transactions determined by independent qualified professional asset managers), PTE 95-60 (a class exemption for certain transactions involving insurance company general accounts), PTE 90-1 (a class exemption for certain transactions involving insurance company pooled separate accounts), PTE 91-38 (a class exemption for certain transactions involving bank collective investment funds) or PTE 96-23 (a class exemption for certain transactions determined by in-house asset managers), is applicable with respect to such Lender’s entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Commitments and this Agreement, and the conditions for exemptive relief thereunder are and will continue to be satisfied in connection therewith,

(iii) (A) such Lender is an investment fund managed by a “Qualified Professional Asset Manager” (within the meaning of Part VI of PTE 84-14), (B) such Qualified Professional Asset Manager made the investment decision on behalf of such Lender to enter into, participate in, administer and perform the Loans, the Letters of Credit, the Commitments and this Agreement, (C) the entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Commitments and this Agreement satisfies the requirements of sub-sections (b) through (g) of Part I of PTE 84-14 and (D) to the best knowledge of such Lender, the requirements of subsection (a) of Part I of PTE 84-14 are satisfied with respect to such Lender’s entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Commitments and this Agreement, or

(iv) such other representation, warranty and covenant as may be agreed in writing between the Administrative Agent, in its sole discretion, and such Lender.

(b) In addition, unless sub-clause (i) in the immediately preceding clause (a) is true with respect to a Lender or such Lender has not provided another representation, warranty and covenant as provided in sub-clause (iv) in the immediately preceding clause (a), such Lender further (x) represents and warrants, as of the date such Person became a Lender party hereto, to, and (y) covenants, from the date such Person became a Lender party hereto to the date such Person ceases being a Lender party hereto, for the benefit of, the Agents, and each Arranger and their respective Affiliates, and not, for the avoidance of doubt, to or for the benefit of the Company or any other Loan Party, that:

(i) none of the Agents, or any Arranger or any of their respective Affiliates is a fiduciary with respect to the assets of such Lender (including in connection with the reservation or exercise of any rights by any Agent under this Agreement, any Loan Document or any documents related hereto or thereto).

(ii) the Person making the investment decision on behalf of such Lender with respect to the entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Commitments and this Agreement is independent (within the meaning of 29 CFR § 2510.3-21, as amended from time to time) and is a bank, an insurance carrier, an investment adviser, a broker-dealer or other person that holds, or has under management or control, total assets of at least \$50,000,000, in each case as described in 29 CFR § 2510.3-21(c)(1)(i)(A)-(E),

(iii) the Person making the investment decision on behalf of such Lender with respect to the entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Commitments and this Agreement is capable of evaluating investment risks independently, both in general and with regard to particular transactions and investment strategies (including in respect of the Obligations),

(iv) the Person making the investment decision on behalf of such Lender with respect to the entrance into, participation in, administration of and performance of the Loans, the Letters of Credit, the Commitments and this Agreement is a fiduciary under ERISA or the Code, or both, with respect to the Loans, the Letters of Credit, the Commitments and this Agreement and is responsible for exercising independent judgment in evaluating the transactions hereunder, and

(v) no fee or other compensation is being paid directly to any Agent, or any Arranger or any their respective Affiliates for investment advice (as opposed to other services) in connection with the Loans, the Letters of Credit, the Commitments or this Agreement.

The Agents and each Arranger hereby informs the Lenders that each such Person is not undertaking to provide impartial investment advice, or to give advice in a fiduciary capacity, in connection with the transactions contemplated hereby, and that such Person has a financial interest in the transactions contemplated hereby in that such Person or an Affiliate thereof (i) may receive interest or other payments with respect to the Loans, the Letters of Credit, the Commitments and this Agreement, (ii) may recognize a gain if it extended the Loans, the Letters of Credit or the Commitments for an amount less than the amount being paid for an interest in the Loans, the Letters of Credit or the Commitments by such Lender or (iii) may receive fees or other payments in connection with the transactions contemplated hereby, the Loan Documents or otherwise, including structuring fees, commitment fees, arrangement fees, facility fees, commitment fees, upfront fees, underwriting fees, ticking fees, agency fees, administrative agent fees or collateral agent fees, utilization fees, minimum usage fees, letter of credit fees, fronting fees, deal-away or alternate transaction fees, amendment fees, processing fees, term out premiums, banker's acceptance fees, breakage or other early termination fees or fees similar to the foregoing.

ARTICLE IX

Miscellaneous

SECTION 9.01. Notices. (a) Except in the case of notices and other communications expressly permitted to be given by telephone (and subject to paragraph (b) below), all notices and other communications provided for herein shall be in writing and shall be delivered by hand or overnight courier service, mailed by certified or registered mail or sent by telecopy, as follows:

(i) if to any Borrower, to it c/o Photronics, Inc., 15 Secor Road, Brookfield, Connecticut 06804, Attention of John P. Jordan (Telecopy No. (203) 775-5601; Telephone No. (203) 740-5671), with a copy (in the case of notices of Default) to Attention of Richelle Burr, Esq. (Telecopy No. (203) 775-5601; Telephone No. (203) 740-5285);

(ii) if to the Administrative Agent or Collateral Agent, (A) in the case of Borrowings denominated in Dollars, to JPMorgan Chase Bank, N.A., 10 South Dearborn Street, 7th Floor, Chicago, Illinois 60603, Attention of Darren Cunningham (Telecopy No. (888) 292-9533) and (B) in the case of Borrowings denominated in Foreign Currencies, to J.P. Morgan Europe Limited, 25 Bank Street, Canary Wharf, London E14 5JP, Attention of The Manager, Loan & Agency Services (Telecopy No. 44 207 777 2360), and in each case with a copy to JPMorgan Chase Bank, N.A., 270 Park Avenue, 43rd Floor, New York, New York 10017, Attention of Daglas Panchal (Telecopy No. (917) 464-8969);

(iii) if to JPMorgan in its capacity as an Issuing Bank, to it at JPMorgan Chase Bank N.A., Sarjapur Outer Ring Rd, Vathur Hobli, Floor 04, Bangalore, 560 087, India, Attention Ajay Prabhu (Telecopy No. (+91-80) 66762387), or in the case of any other Issuing Bank, to it at the address and telecopy number specified from time to time by such Issuing Bank to the Company and the Administrative Agent;

(iv) if to the Swingline Lender, to it at JPMorgan Chase Bank, N.A., 10 South Dearborn Street, 7th Floor, Chicago, Illinois 60603, Attention of Darren Cunningham (Telecopy No. (888) 292-9533); and

(v) if to any other Lender, to it at its address (or telecopy number) set forth in its Administrative Questionnaire.

Notices sent by hand or overnight courier service, or mailed by certified or registered mail, shall be deemed to have been given when received; notices sent by facsimile shall be deemed to have been given when sent (except that, if not given during normal business hours for the recipient, shall be deemed to have been given at the opening of business on the next business day for the recipient). Notices delivered through Approved Electronic Platforms, to the extent provided in paragraph (b) below, shall be effective as provided in said paragraph (b).

(b) Notices and other communications to the Lenders and the Issuing Banks hereunder may be delivered or furnished by using Approved Electronic Platforms pursuant to procedures approved by the Administrative Agent; provided that the foregoing shall not apply to notices pursuant to Article II unless otherwise agreed by the Administrative Agent and the applicable Lender. The Administrative Agent or the Company may, in its discretion, agree to accept notices and other communications to it hereunder by electronic communications pursuant to procedures approved by it; provided that approval of such procedures may be limited to particular notices or communications.

(c) Unless any Agent otherwise prescribes, (i) notices and other communications sent to an e-mail address shall be deemed received upon the sender's receipt of an acknowledgement from the intended recipient (such as by the "return receipt requested" function, as available, return e-mail or other written acknowledgement), and (ii) notices or communications posted to an Internet or intranet website shall be deemed received upon the deemed receipt by the intended recipient, at its e-mail address as described in the foregoing clause (i), of notification that such notice or communication is available and identifying the website address therefor; provided that, for both clauses (i) and (ii) above, if such notice, email or other communication is not sent during the normal business hours of the recipient, such notice or communication shall be deemed to have been sent at the opening of business on the next business day for the recipient.

(d) Any party hereto may change its address or telecopy number for notices and other communications hereunder by notice to the other parties hereto.

SECTION 9.02. Waivers; Amendments. (a) No failure or delay by the Administrative Agent, any Issuing Bank or any Lender in exercising any right or power hereunder or under any other Loan Document shall operate as a waiver thereof, nor shall any single or partial exercise of any such right or power, or any abandonment or discontinuance of steps to enforce such a right or power, preclude any other or further exercise thereof or the exercise of any other right or power. The rights and remedies of the Administrative Agent, the Issuing Banks and the Lenders hereunder and under the other Loan Documents are cumulative and are not exclusive of any rights or remedies that they would otherwise have. No waiver of any provision of this Agreement or consent to any departure by any Borrower therefrom shall in any event be effective unless the same shall be permitted by paragraph (b) of this Section, and then such waiver or consent shall be effective only in the specific instance and for the purpose for which given. Without limiting the generality of the foregoing, the making of a Loan or issuance of a Letter of Credit shall not be construed as a waiver of any Default, regardless of whether the Administrative Agent, any Lender or any Issuing Bank may have had notice or knowledge of such Default at the time.

(b) Except as provided in Section 2.20 with respect to an Incremental Term Loan Amendment or as provided in Section 2.14(c), neither this Agreement nor any provision hereof may be waived, amended or modified except pursuant to an agreement or agreements in writing entered into by the Borrowers and the Required Lenders or by the Borrowers and the Administrative Agent with the consent of the Required Lenders; provided that no such agreement shall (i) increase the Commitment of any Lender without the written consent of such Lender, (ii) reduce the principal amount of any Loan or LC Disbursement or reduce the rate of interest thereon, or reduce any fees payable hereunder, without the written consent of each Lender directly affected thereby (except that neither (A) any amendment or modification of the financial covenants in this Agreement (or defined terms used in the financial covenants in this Agreement) or (B) any amendment entered into pursuant to the terms of Section 2.14(c) shall constitute a reduction in the rate of interest or fees for purposes of this clause (ii)), (iii) postpone the scheduled date of payment of the principal amount of any Loan or LC Disbursement, or any interest thereon, or any fees payable hereunder, or reduce the amount of, waive or excuse any such payment, or postpone the scheduled date of expiration of any Commitment, without the written consent of each Lender directly affected thereby, (iv) change Section 2.09(c) or 2.18(b) or (c) in a manner that would alter the ratable reduction of Commitments or the pro rata sharing of payments required thereby, without the written consent of each Lender, (v) change the payment waterfall provisions of the last paragraph of Article VII without the written consent of each Lender, (vi) change any of the provisions of this Section or the definition of "Required Lenders" or any other provision hereof specifying the number or percentage of Lenders required to waive, amend or modify any rights hereunder or make any determination or grant any consent hereunder, without the written consent of each Lender (it being understood that, solely with the consent of the parties prescribed by Section 2.20 to be parties to an Incremental Term Loan Amendment, Incremental Term Loans may be included in the determination of Required Lenders on substantially the same basis as the Commitments and the Revolving Loans are included on the Effective Date), or (vii) release the Company or all or substantially all of the Subsidiary Guarantors from their obligations under Article X or the Subsidiary Guaranty or release all or substantially all of the Collateral, as applicable, without the written consent of each Lender; provided further that no such agreement shall amend, modify or otherwise affect the rights or duties of the Administrative Agent, the Collateral Agent, any Issuing Bank or the Swingline Lender hereunder without the prior written consent of the Administrative Agent, the Collateral Agent, such Issuing Bank or the Swingline Lender, as the case may be (it being understood that any change to Section 2.24 shall require the consent of the Administrative Agent, the Issuing Banks and the Swingline Lender). Notwithstanding the foregoing, no consent with respect to any amendment, waiver or other modification of this Agreement shall be required of any Defaulting Lender, except with respect to any amendment, waiver or other modification referred to in clause (i), (ii) or (iii) of the first proviso of this paragraph and then only in the event such Defaulting Lender shall be directly affected by such amendment, waiver or other modification.

(c) Notwithstanding the foregoing, this Agreement and any other Loan Document may be amended (or amended and restated) with the written consent of the Required Lenders, the Administrative Agent and the Borrowers (x) to add one or more credit facilities (in addition to the Incremental Term Loans pursuant to an Incremental Term Loan Amendment) to this Agreement and to permit extensions of credit from time to time outstanding thereunder and the accrued interest and fees in respect thereof to share ratably in the benefits of this Agreement and the other Loan Documents with the Revolving Loans, Incremental Term Loans and the accrued interest and fees in respect thereof and (y) to include appropriately the Lenders holding such credit facilities in any determination of the Required Lenders and Lenders.

(d) The Lenders hereby irrevocably authorize the Collateral Agent, at its option and in its sole discretion, to release any Liens granted to the Collateral Agent by the Loan Parties on any Collateral (i) upon the termination of all the Commitments, payment and satisfaction in full in cash of all Secured Obligations (other than Banking Services Obligations not yet due and payable, Swap Obligations not yet due and payable, and other Obligations expressly stated to survive such payment and termination), and the cash collateralization of all LC Exposure in a manner satisfactory to the Administrative Agent, (ii) constituting property being sold or disposed of if the Company certifies to the Administrative Agent that the sale or disposition is made in compliance with the terms of this Agreement (and the Administrative Agent may rely conclusively on any such certificate, without further inquiry), (iii) constituting property leased to the Company or any Subsidiary under a lease which has expired or been terminated in a transaction permitted under this Agreement, or (iv) as required to effect any sale or other disposition of such Collateral in connection with any exercise of remedies of the Agents and the Lenders pursuant to Article VII. Any such release shall not in any manner discharge, affect, or impair the Secured Obligations or any Liens (other than those expressly being released) upon (or obligations of the Loan Parties in respect of) all interests retained by the Loan Parties, including the proceeds of any sale, all of which shall continue to constitute part of the Collateral.

(e) If, in connection with any proposed amendment, waiver or consent requiring the consent of “each Lender” or “each Lender directly affected thereby,” the consent of the Required Lenders is obtained, but the consent of other necessary Lenders is not obtained (any such Lender whose consent is necessary but not obtained being referred to herein as a “Non-Consenting Lender”), then the Company may elect to replace a Non-Consenting Lender as a Lender party to this Agreement, provided that, concurrently with such replacement, (i) another bank or other entity which is reasonably satisfactory to the Company and the Administrative Agent shall agree, as of such date, to purchase for cash the Loans and other Obligations due to the Non-Consenting Lender pursuant to an Assignment and Assumption and to become a Lender for all purposes under this Agreement and to assume all obligations of the Non-Consenting Lender to be terminated as of such date and to comply with the requirements of clause (b) of Section 9.04, (ii) the Company shall pay to such Non-Consenting Lender in same day funds on the day of such replacement (1) all interest, fees and other amounts then accrued but unpaid to such Non-Consenting Lender by the Company hereunder to and including the date of termination, including without limitation payments due to such Non-Consenting Lender under Sections 2.15 and 2.17, and (2) an amount, if any, equal to the payment which would have been due to such Lender on the day of such replacement under Section 2.16 had the Loans of such Non-Consenting Lender been prepaid on such date rather than sold to the replacement Lender and (iii) such Non-Consenting Lender shall have received the outstanding principal amount of its Loans and participations in LC Disbursements. Each party hereto agrees that (a) an assignment required pursuant to this paragraph may be effected pursuant to an Assignment and Assumption executed by the Company, the Administrative Agent and the assignee (or, to the extent applicable, an agreement incorporating an Assignment and Assumption by reference pursuant to an Approved Electronic Platform as to which the Administrative Agent and such parties are participants), and (b) the Lender required to make such assignment need not be a party thereto in order for such assignment to be effective and shall be deemed to have consented to and be bound by the terms thereof; provided that, following the effectiveness of any such assignment, the other parties to such assignment agree to execute and deliver such documents necessary to evidence such assignment as reasonably requested by the applicable Lender, provided that any such documents shall be without recourse to or warranty by the parties thereto.

(f) Notwithstanding anything to the contrary herein the Administrative Agent may, with the consent of the Company only, amend, modify or supplement this Agreement or any of the other Loan Documents to cure any ambiguity, omission, mistake, defect or inconsistency.

SECTION 9.03. Expenses; Indemnity; Damage Waiver. (a) The Company shall pay (i) all reasonable out-of-pocket expenses incurred by the Agents and their Affiliates, including the reasonable fees, charges and disbursements of counsel for each Agent, in connection with the syndication of the credit facilities provided for herein, the preparation and administration of this Agreement and the other Loan Documents or any amendments, modifications or waivers of the provisions hereof or thereof (whether or not the transactions contemplated hereby or thereby shall be consummated), (ii) all reasonable out-of-pocket expenses incurred by any Issuing Bank in connection with the issuance, amendment, renewal or extension of any Letter of Credit or any demand for payment thereunder and (iii) all reasonable out-of-pocket expenses incurred by the Agents, any Issuing Bank or any Lender, including the fees, charges and disbursements of any counsel for either Agent, any Issuing Bank or any Lender, in connection with the enforcement or protection of its rights in connection with the Loan Documents, including its rights under this Section, or in connection with the Loans made or Letters of Credit issued hereunder, including all such out-of-pocket expenses incurred during any workout, restructuring or negotiations in respect of such Loans or Letters of Credit.

(b) The Company shall indemnify the Agents, each Issuing Bank and each Lender, and each Related Party of any of the foregoing Persons (each such Person being called an "Indemnitee") against, and hold each Indemnitee harmless from, any and all losses, claims, damages, liabilities and related expenses, including the fees, charges and disbursements of any counsel for any Indemnitee, incurred by or asserted against any Indemnitee arising out of, in connection with, or as a result of (i) the execution or delivery of the Loan Documents or any agreement or instrument contemplated hereby or thereby, the performance by the parties hereto of their respective obligations hereunder or the consummation of the Transactions or any other transactions contemplated hereby, (ii) any Loan or Letter of Credit or the use of the proceeds therefrom (including any refusal by any Issuing Bank to honor a demand for payment under a Letter of Credit if the documents presented in connection with such demand do not strictly comply with the terms of such Letter of Credit), (iii) any actual or alleged presence or release of Hazardous Materials on or from any property owned or operated by the Company or any of its Subsidiaries, or any Environmental Liability related in any way to the Company or any of its Subsidiaries, or (iv) any actual or prospective claim, litigation, investigation or proceeding relating to any of the foregoing, whether or not such claim, litigation, investigation or proceeding is brought by the Company or any other Loan Party or its or their respective equity holders, Affiliates, creditors or any other third Person and whether based on contract, tort or any other theory and regardless of whether any Indemnitee is a party thereto; provided that such indemnity shall not, as to any Indemnitee, be available to the extent that such losses, claims, damages, liabilities or related expenses are determined by a court of competent jurisdiction by final and nonappealable judgment to have resulted from the gross negligence or willful misconduct of such Indemnitee or from the material breach of such Indemnitee's obligations under the Loan Documents pursuant to a claim initiated by the Company.

(c) To the extent that the Company fails to pay any amount required to be paid by it to the Agents, any Issuing Bank or the Swingline Lender under paragraph (a) or (b) of this Section, each Lender severally agrees to pay to the relevant Agent, any Issuing Bank or the Swingline Lender, as the case may be, such Lender's Applicable Percentage (determined as of the time that the applicable unreimbursed expense or indemnity payment is sought) of such unpaid amount (it being understood that the Company's failure to pay any such amount shall not relieve the Company of any default in the payment thereof); provided that the unreimbursed expense or indemnified loss, claim, damage, liability or related expense, as the case may be, was incurred by or asserted against the relevant Agent, any Issuing Bank or the Swingline Lender in its capacity as such.

(d) To the extent permitted by applicable law, no Borrower shall assert, and each Borrower hereby waives, any claim against any Indemnitee (i) for any damages arising from the use by others of information or other materials obtained through telecommunications, electronic or other information transmission systems (including the Internet), or (ii) on any theory of liability, for special, indirect, consequential or punitive damages (as opposed to direct or actual damages) arising out of, in connection with, or as a result of, this Agreement, any other Loan Document or any agreement or instrument contemplated hereby or thereby, the Transactions, any Loan or Letter of Credit or the use of the proceeds thereof.

(e) All amounts due under this Section shall be payable not later than fifteen (15) days after written demand therefor.

SECTION 9.04. Successors and Assigns. (a) The provisions of this Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns permitted hereby (including any Affiliate of the relevant Issuing Bank that issues any Letter of Credit), except that (i) no Borrower may assign or otherwise transfer any of its rights or obligations hereunder without the prior written consent of each Lender (and any attempted assignment or transfer by any Borrower without such consent shall be null and void) and (ii) no Lender may assign or otherwise transfer its rights or obligations hereunder except in accordance with this Section. Nothing in this Agreement, expressed or implied, shall be construed to confer upon any Person (other than the parties hereto, their respective successors and assigns permitted hereby (including any Affiliate of the relevant Issuing Bank that issues any Letter of Credit), Participants (to the extent provided in paragraph (c) of this Section) and, to the extent expressly contemplated hereby, the Related Parties of each of the Administrative Agent, the Issuing Banks and the Lenders) any legal or equitable right, remedy or claim under or by reason of this Agreement.

(b)(i) Subject to the conditions set forth in paragraph (b)(ii) below, any Lender may assign to one or more Persons (other than an Ineligible Institution) all or a portion of its rights and obligations under this Agreement (including all or a portion of its Commitment and the Loans at the time owing to it) with the prior written consent (such consent not to be unreasonably withheld, conditioned or delayed) of:

(A) the Company (provided that the Company shall be deemed to have consented to any such assignment unless it shall object thereto by written notice to the Administrative Agent within five (5) Business Days after having received notice thereof), provided that no consent of the Company shall be required for an assignment to a Lender, an Affiliate of a Lender, an Approved Fund or, if an Event of Default under clause (a), (b), (h), (i) or (j) of Article VII has occurred and is continuing, any other assignee;

(B) the Administrative Agent;

(C) the Issuing Banks; and

(D) the Swingline Lender.

(ii) Assignments shall be subject to the following additional conditions:

(A) except in the case of an assignment to a Lender or an Affiliate of a Lender or an Approved Fund or an assignment of the entire remaining amount of the assigning Lender's Commitment or Loans of any Class, the amount of the Commitment or Loans of the assigning Lender subject to each such assignment (determined as of the date the Assignment and Assumption with respect to such assignment is delivered to the Administrative Agent) shall not be less than \$5,000,000 unless each of the Company and the Administrative Agent otherwise consent, provided that no such consent of the Company shall be required if an Event of Default under clause (a), (b), (h), (i) or (j) of Article VII has occurred and is continuing;

(B) each partial assignment shall be made as an assignment of a proportionate part of all the assigning Lender's rights and obligations under this Agreement, provided that this clause shall not be construed to prohibit the assignment of a proportionate part of all the assigning Lender's rights and obligations in respect of one Class of Commitments or Loans;

(C) the parties to each assignment shall execute and deliver to the Administrative Agent (x) an Assignment and Assumption or (y) to the extent applicable, an agreement incorporating an Assignment and Assumption by reference pursuant to an Approved Electronic Platform as to which the Administrative Agent and the parties to the Assignment and Assumption are participants, together with a processing and recordation fee of \$3,500, such fee to be paid by either the assigning Lender or the assignee Lender or shared between such Lenders; and

(D) the assignee, if it shall not be a Lender, shall deliver to the Administrative Agent an Administrative Questionnaire in which the assignee designates one or more credit contacts to whom all syndicate-level information (which may contain material non-public information about the Company and its affiliates and their Related Parties or their respective securities) will be made available and who may receive such information in accordance with the assignee's compliance procedures and applicable laws, including Federal and state securities laws.

For the purposes of this Section 9.04(b), the terms "Approved Fund" and "Ineligible Institution" have the following meanings:

"Approved Fund" means any Person (other than a natural person) that is engaged in making, purchasing, holding or investing in bank loans and similar extensions of credit in the ordinary course of its business and that is administered or managed by (a) a Lender, (b) an Affiliate of a Lender or (c) an entity or an Affiliate of an entity that administers or manages a Lender.

"Ineligible Institution" means (a) a natural person, (b) a Defaulting Lender or its Lender Parent, (c) the Company, any of its Subsidiaries or any of its Affiliates, or (d) a company, investment vehicle or trust for, or owned and operated for the primary benefit of, a natural person or relative(s) thereof.

(iii) Subject to acceptance and recording thereof pursuant to paragraph (b)(iv) of this Section, from and after the effective date specified in each Assignment and Assumption the assignee thereunder shall be a party hereto and, to the extent of the interest assigned by such Assignment and Assumption, have the rights and obligations of a Lender under this Agreement, and the assigning Lender thereunder shall, to the extent of the interest assigned by such Assignment and Assumption, be released from its obligations under this Agreement (and, in the case of an Assignment and Assumption covering all of the assigning Lender's rights and obligations under this Agreement, such Lender shall cease to be a party hereto but shall continue to be entitled to the benefits of Sections 2.15, 2.16, 2.17 and 9.03). Any assignment or transfer by a Lender of rights or obligations under this Agreement that does not comply with this Section 9.04 shall be treated for purposes of this Agreement as a sale by such Lender of a participation in such rights and obligations in accordance with paragraph (c) of this Section.

(iv) The Administrative Agent, acting for this purpose as a non-fiduciary agent of each Borrower, shall maintain at one of its offices a copy of each Assignment and Assumption delivered to it and a register for the recordation of the names and addresses of the Lenders, and the Commitment of, and principal amount (and stated interest) of the Loans and LC Disbursements owing to, each Lender pursuant to the terms hereof from time to time (the “Register”). The entries in the Register shall be conclusive, and the Borrowers, the Administrative Agent, the Issuing Banks and the Lenders may treat each Person whose name is recorded in the Register pursuant to the terms hereof as a Lender hereunder for all purposes of this Agreement, notwithstanding notice to the contrary. The Register shall be available for inspection by the Company, any Issuing Bank and any Lender, at any reasonable time and from time to time upon reasonable prior notice.

(v) Upon its receipt of (x) a duly completed Assignment and Assumption executed by an assigning Lender and an assignee or (y) to the extent applicable, an agreement incorporating an Assignment and Assumption by reference pursuant to an Approved Electronic Platform as to which the Administrative Agent and the parties to the Assignment and Assumption are participants, the assignee’s completed Administrative Questionnaire (unless the assignee shall already be a Lender hereunder), the processing and recordation fee referred to in paragraph (b) of this Section and any written consent to such assignment required by paragraph (b) of this Section, the Administrative Agent shall accept such Assignment and Assumption and record the information contained therein in the Register; provided that if either the assigning Lender or the assignee shall have failed to make any payment required to be made by it pursuant to Section 2.05(c), 2.06(d) or (e), 2.07(b), 2.18(d) or 9.03(c), the Administrative Agent shall have no obligation to accept such Assignment and Assumption and record the information therein in the Register unless and until such payment shall have been made in full, together with all accrued interest thereon. No assignment shall be effective for purposes of this Agreement unless it has been recorded in the Register as provided in this paragraph.

(c) (i) Any Lender may, without the consent of the Company, the Administrative Agent, the Issuing Banks or the Swingline Lender, sell participations to one or more banks or other entities (a “Participant”), other than an Ineligible Institution, in all or a portion of such Lender’s rights and/or obligations under this Agreement (including all or a portion of its Commitment and/or the Loans owing to it); provided that (A) such Lender’s obligations under this Agreement shall remain unchanged, (B) such Lender shall remain solely responsible to the other parties hereto for the performance of such obligations and (C) the Borrowers, the Administrative Agent, the Issuing Banks and the other Lenders shall continue to deal solely and directly with such Lender in connection with such Lender’s rights and obligations under this Agreement. Any agreement or instrument pursuant to which a Lender sells such a participation shall provide that such Lender shall retain the sole right to enforce this Agreement and to approve any amendment, modification or waiver of any provision of this Agreement; provided that such agreement or instrument may provide that such Lender will not, without the consent of the Participant, agree to any amendment, modification or waiver described in the first proviso to Section 9.02(b) that affects such Participant. Subject to paragraph (c)(ii) of this Section, each Borrower agrees that each Participant shall be entitled to the benefits of Sections 2.15, 2.16 and 2.17 (subject to the requirements and limitations therein, including the requirements under Sections 2.17(e) (it being understood that the documentation required under Section 2.17(e) shall be delivered to the participating Lender)) to the same extent as if it were a Lender and had acquired its interest by assignment pursuant to paragraph (b) of this Section. To the extent permitted by law, each Participant also shall be entitled to the benefits of Section 9.08 as though it were a Lender, provided such Participant agrees to be subject to Section 2.18(c) as though it were a Lender.

(ii) A Participant (x) agrees to be subject to the provisions of Sections 2.18 and 2.19 as if it were an assignee under paragraph (b) of this Section and (y) shall not be entitled to receive any greater payment under Section 2.15 or 2.17 than the applicable Lender would have been entitled to receive with respect to the participation sold to such Participant, unless the sale of the participation to such Participant is made with the Company's prior written consent. A Participant that would be a Foreign Lender if it were a Lender shall not be entitled to the benefits of Section 2.17 unless the Company is notified of the participation sold to such Participant and such Participant agrees, for the benefit of the Company, to comply with Section 2.17(e) as though it were a Lender (it being understood that the documentation required under Section 2.17(e) shall be delivered to the participating Lender).

Each Lender that sells a participation shall, acting solely for this purpose as a non-fiduciary agent of each Borrower, maintain a register on which it enters the name and address of each Participant and the principal amounts (and stated interest) of each Participant's interest in the Loans or other obligations under the Loan Documents (the "Participant Register"); provided that no Lender shall have any obligation to disclose all or any portion of the Participant Register (including the identity of any Participant or any information relating to a Participant's interest in any Commitments, Loans, Letters of Credit or its other obligations under any Loan Document) to any Person except to the extent that such disclosure is necessary to establish that such Commitment, Loan, Letter of Credit or other obligation is in registered form under Treasury Regulations Section 5f.103-1(c) and Proposed Treasury Regulations Section 1.163-5(b) (or any amended or successor version). The entries in the Participant Register shall be conclusive absent manifest error, and such Lender shall treat each Person whose name is recorded in the Participant Register as the owner of such participation for all purposes of this Agreement notwithstanding any notice to the contrary. For the avoidance of doubt, the Administrative Agent (in its capacity as Administrative Agent) shall have no responsibility for maintaining a Participant Register.

(d) Any Lender may at any time pledge or assign a security interest in all or any portion of its rights under this Agreement to secure obligations of such Lender, including without limitation any pledge or assignment to secure obligations to a Federal Reserve Bank, and this Section shall not apply to any such pledge or assignment of a security interest; provided that no such pledge or assignment of a security interest shall release a Lender from any of its obligations hereunder or substitute any such pledgee or assignee for such Lender as a party hereto.

SECTION 9.05. Survival. All covenants, agreements, representations and warranties made by the Loan Parties in the Loan Documents and in the certificates or other instruments delivered in connection with or pursuant to this Agreement or any other Loan Document shall be considered to have been relied upon by the other parties hereto and shall survive the execution and delivery of the Loan Documents and the making of any Loans and issuance of any Letters of Credit, regardless of any investigation made by any such other party or on its behalf and notwithstanding that the Administrative Agent, any Issuing Bank or any Lender may have had notice or knowledge of any Default or incorrect representation or warranty at the time any credit is extended hereunder, and shall continue in full force and effect as long as the principal of or any accrued interest on any Loan or any fee or any other amount payable under this Agreement or any other Loan Document is outstanding and unpaid or any Letter of Credit is outstanding and so long as the Commitments have not expired or terminated. The provisions of Sections 2.15, 2.16, 2.17 and 9.03 and Article VIII shall survive and remain in full force and effect regardless of the consummation of the transactions contemplated hereby, the repayment of the Loans, the expiration or termination of the Letters of Credit and the Commitments or the termination of this Agreement or any other Loan Document or any provision hereof or thereof.

SECTION 9.06. Counterparts; Integration; Effectiveness; Electronic Execution. This Agreement may be executed in counterparts (and by different parties hereto on different counterparts), each of which shall constitute an original, but all of which when taken together shall constitute a single contract. This Agreement, the other Loan Documents and any separate letter agreements with respect to (i) fees payable to the Administrative Agent and (ii) the reduction of the Letter of Credit Commitment of any Issuing Bank constitute the entire contract among the parties relating to the subject matter hereof and supersede any and all previous agreements and understandings, oral or written, relating to the subject matter hereof. Except as provided in Section 4.01, this Agreement shall become effective when it shall have been executed by the Administrative Agent and when the Administrative Agent shall have received counterparts hereof which, when taken together, bear the signatures of each of the other parties hereto, and thereafter shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns. Delivery of an executed counterpart of a signature page of this Agreement by telecopy, e-mailed .pdf or any other electronic means that reproduces an image of the actual executed signature page shall be effective as delivery of a manually executed counterpart of this Agreement. The words "execution," "signed," "signature," "delivery," and words of like import in or relating to any document to be signed in connection with this Agreement and the transactions contemplated hereby shall be deemed to include Electronic Signatures, deliveries or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature, physical delivery thereof or the use of a paper-based recordkeeping system, as the case may be, to the extent and as provided for in any applicable law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act, or any other similar state laws based on the Uniform Electronic Transactions Act.

SECTION 9.07. Severability. Any provision of this Agreement held to be invalid, illegal or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such invalidity, illegality or unenforceability without affecting the validity, legality and enforceability of the remaining provisions hereof; and the invalidity of a particular provision in a particular jurisdiction shall not invalidate such provision in any other jurisdiction.

SECTION 9.08. Right of Setoff. If an Event of Default shall have occurred and be continuing, each Lender and each of its Affiliates is hereby authorized at any time and from time to time, to the fullest extent permitted by law, to set off and apply any and all deposits (general or special, time or demand, provisional or final and in whatever currency denominated) at any time held and other obligations at any time owing by such Lender or Affiliate to or for the credit or the account of any Borrower or any Subsidiary Guarantor against any of and all of the Secured Obligations held by such Lender, irrespective of whether or not such Lender shall have made any demand under the Loan Documents and although such obligations may be unmaturing. The rights of each Lender under this Section are in addition to other rights and remedies (including other rights of setoff) which such Lender may have. Each Lender and each Issuing Bank agrees to notify the Company and the Administrative Agent promptly after any such setoff and application; provided that the failure to give such notice shall not affect the validity of such setoff and application.

SECTION 9.09. Governing Law; Jurisdiction; Consent to Service of Process. (a) This Agreement shall be construed in accordance with and governed by the law of the State of New York.

(b) Each Borrower hereby irrevocably and unconditionally submits, for itself and its property, to the exclusive jurisdiction of the United States District Court for the Southern District of New York sitting in the Borough of Manhattan (or if such court lacks subject matter jurisdiction, the Supreme Court of the State of New York sitting in the Borough of Manhattan), and any appellate court from any thereof, in any action or proceeding arising out of or relating to this Agreement or any other Loan Document or the transactions relating hereto or thereto, or for recognition or enforcement of any judgment, and each of the parties hereto hereby irrevocably and unconditionally agrees that all claims in respect of any such action or proceeding may (and any such claims, cross-claims or third party claims brought against the Administrative Agent or any of its Related Parties may only) be heard and determined in such Federal (to the extent permitted by law) or New York State court. Each of the parties hereto agrees that a final judgment in any such action or proceeding shall be conclusive and may be enforced in other jurisdictions by suit on the judgment or in any other manner provided by law. Nothing in this Agreement or any other Loan Document shall affect any right that the Administrative Agent, any Issuing Bank or any Lender may otherwise have to bring any action or proceeding relating to this Agreement or any other Loan Document against any Borrower or its properties in the courts of any jurisdiction.

(c) Each Borrower hereby irrevocably and unconditionally waives, to the fullest extent it may legally and effectively do so, any objection which it may now or hereafter have to the laying of venue of any suit, action or proceeding arising out of or relating to this Agreement or any other Loan Document in any court referred to in paragraph (b) of this Section. Each of the parties hereto hereby irrevocably waives, to the fullest extent permitted by law, the defense of an inconvenient forum to the maintenance of such action or proceeding in any such court.

(d) Each party to this Agreement irrevocably consents to service of process in the manner provided for notices in Section 9.01. Each Foreign Subsidiary Borrower irrevocably designates and appoints the Company, as its authorized agent, to accept and acknowledge on its behalf, service of any and all process which may be served in any suit, action or proceeding of the nature referred to in Section 9.09(b) in any federal or New York State court sitting in New York City. The Company hereby represents, warrants and confirms that the Company has agreed to accept such appointment (and any similar appointment by a Subsidiary Guarantor which is a Foreign Subsidiary). Said designation and appointment shall be irrevocable by each such Foreign Subsidiary Borrower until all Loans, all reimbursement obligations, interest thereon and all other amounts payable by such Foreign Subsidiary Borrower hereunder and under the other Loan Documents shall have been paid in full in accordance with the provisions hereof and thereof and such Foreign Subsidiary Borrower shall have been terminated as a Borrower hereunder pursuant to Section 2.23. Each Foreign Subsidiary Borrower hereby consents to process being served in any suit, action or proceeding of the nature referred to in Section 9.09(b) in any federal or New York State court sitting in New York City by service of process upon the Company as provided in this Section 9.09(d); provided that, to the extent lawful and possible, notice of said service upon such agent shall be mailed by registered or certified air mail, postage prepaid, return receipt requested, to the Company and (if applicable to) such Foreign Subsidiary Borrower at its address set forth in the Borrowing Subsidiary Agreement to which it is a party or to any other address of which such Foreign Subsidiary Borrower shall have given written notice to the Administrative Agent (with a copy thereof to the Company). Each Foreign Subsidiary Borrower irrevocably waives, to the fullest extent permitted by law, all claim of error by reason of any such service in such manner and agrees that such service shall be deemed in every respect effective service of process upon such Foreign Subsidiary Borrower in any such suit, action or proceeding and shall, to the fullest extent permitted by law, be taken and held to be valid and personal service upon and personal delivery to such Foreign Subsidiary Borrower. To the extent any Foreign Subsidiary Borrower has or hereafter may acquire any immunity from jurisdiction of any court or from any legal process (whether from service or notice, attachment prior to judgment, attachment in aid of execution of a judgment, execution or otherwise), each Foreign Subsidiary Borrower hereby irrevocably waives such immunity in respect of its obligations under the Loan Documents. Nothing in this Agreement or any other Loan Document will affect the right of any party to this Agreement to serve process in any other manner permitted by law.

SECTION 9.10. WAIVER OF JURY TRIAL. EACH PARTY HERETO HEREBY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN ANY LEGAL PROCEEDING DIRECTLY OR INDIRECTLY ARISING OUT OF OR RELATING TO THIS AGREEMENT, ANY OTHER LOAN DOCUMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY (WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY). EACH PARTY HERETO (A) CERTIFIES THAT NO REPRESENTATIVE, AGENT OR ATTORNEY OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT, IN THE EVENT OF LITIGATION, SEEK TO ENFORCE THE FOREGOING WAIVER AND (B) ACKNOWLEDGES THAT IT AND THE OTHER PARTIES HERETO HAVE BEEN INDUCED TO ENTER INTO THIS AGREEMENT BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS IN THIS SECTION.

SECTION 9.11. Headings. Article and Section headings and the Table of Contents used herein are for convenience of reference only, are not part of this Agreement and shall not affect the construction of, or be taken into consideration in interpreting, this Agreement.

SECTION 9.12. Confidentiality. Each of the Administrative Agent, the Issuing Banks and the Lenders agrees to maintain the confidentiality of the Information (as defined below), except that Information may be disclosed (a) to its and its Affiliates' directors, officers, employees and agents, including accountants, legal counsel and other advisors (it being understood that the Persons to whom such disclosure is made will be informed of the confidential nature of such Information and instructed to keep such Information confidential), (b) to the extent requested by any Governmental Authority (including any self-regulatory authority, such as the National Association of Insurance Commissioners), (c) to the extent required by applicable laws or regulations or by any subpoena or similar legal process, (d) to any other party to this Agreement, (e) in connection with the exercise of any remedies under this Agreement or any other Loan Document or any suit, action or proceeding relating to this Agreement or any other Loan Document or the enforcement of rights hereunder or thereunder, (f) subject to an agreement containing provisions substantially the same as those of this Section, to (1) any assignee of or Participant in, or any prospective assignee of or Participant in, any of its rights or obligations under this Agreement or (2) any actual or prospective counterparty (or its advisors) to any swap or derivative transaction relating to any Borrower and its obligations, (g) on a confidential basis to (1) any rating agency in connection with rating the Company or its Subsidiaries or the credit facilities provided for herein or (2) the CUSIP Service Bureau or any similar agency in connection with the issuance and monitoring of identification numbers with respect to the credit facilities provided for herein, (h) with the consent of the Company or (i) to the extent such Information (1) becomes publicly available other than as a result of a breach of this Section or (2) becomes available to the Administrative Agent, any Issuing Bank or any Lender on a nonconfidential basis from a source other than the Company or any of its Subsidiaries. For the purposes of this Section, "Information" means all information received from the Company relating to the Company or its business, other than any such information that is available to the Administrative Agent, any Issuing Bank or any Lender on a nonconfidential basis prior to disclosure by the Company and other than information pertaining to this Agreement routinely provided by arrangers to data service providers, including league table providers, that serve the lending industry; provided that, in the case of information received from the Company after the date hereof, such information is clearly identified at the time of delivery as confidential. Any Person required to maintain the confidentiality of Information as provided in this Section shall be considered to have complied with its obligation to do so if such Person has exercised the same degree of care to maintain the confidentiality of such Information as such Person would accord to its own confidential information.

EACH LENDER ACKNOWLEDGES THAT INFORMATION AS DEFINED IN THE IMMEDIATELY PRECEDING PARAGRAPH FURNISHED TO IT PURSUANT TO THIS AGREEMENT MAY INCLUDE MATERIAL NON-PUBLIC INFORMATION CONCERNING THE COMPANY AND ITS RELATED PARTIES OR THEIR RESPECTIVE SECURITIES, AND CONFIRMS THAT IT HAS DEVELOPED COMPLIANCE PROCEDURES REGARDING THE USE OF MATERIAL NON-PUBLIC INFORMATION AND THAT IT WILL HANDLE SUCH MATERIAL NON-PUBLIC INFORMATION IN ACCORDANCE WITH THOSE PROCEDURES AND APPLICABLE LAW, INCLUDING FEDERAL AND STATE SECURITIES LAWS.

ALL INFORMATION, INCLUDING REQUESTS FOR WAIVERS AND AMENDMENTS, FURNISHED BY THE COMPANY OR THE ADMINISTRATIVE AGENT PURSUANT TO, OR IN THE COURSE OF ADMINISTERING, THIS AGREEMENT WILL BE SYNDICATE-LEVEL INFORMATION, WHICH MAY CONTAIN MATERIAL NON-PUBLIC INFORMATION ABOUT THE COMPANY, THE OTHER LOAN PARTIES AND THEIR RELATED PARTIES OR THEIR RESPECTIVE SECURITIES. ACCORDINGLY, EACH LENDER REPRESENTS TO THE COMPANY AND THE ADMINISTRATIVE AGENT THAT IT HAS IDENTIFIED IN ITS ADMINISTRATIVE QUESTIONNAIRE A CREDIT CONTACT WHO MAY RECEIVE INFORMATION THAT MAY CONTAIN MATERIAL NON-PUBLIC INFORMATION IN ACCORDANCE WITH ITS COMPLIANCE PROCEDURES AND APPLICABLE LAW.

SECTION 9.13. USA PATRIOT Act. Each Lender that is subject to the requirements of the Patriot Act hereby notifies each Loan Party that pursuant to the requirements of the Patriot Act, it is required to obtain, verify and record information that identifies such Loan Party, which information includes the name and address of such Loan Party and other information that will allow such Lender to identify such Loan Party in accordance with the Patriot Act.

SECTION 9.14. Appointment for Perfection. Each Lender hereby appoints each other Lender as its agent for the purpose of perfecting Liens, for the benefit of the Collateral Agent and the Holders of Secured Obligations, in assets which, in accordance with Article 9 of the UCC or any other applicable law can be perfected only by possession. Should any Lender (other than the Collateral Agent) obtain possession of any such Collateral, such Lender shall notify the Collateral Agent thereof, and, promptly upon the Collateral Agent's request therefor shall deliver such Collateral to the Collateral Agent or otherwise deal with such Collateral in accordance with the Collateral Agent's instructions.

SECTION 9.15. Interest Rate Limitation. Notwithstanding anything herein to the contrary, if at any time the interest rate applicable to any Loan, together with all fees, charges and other amounts which are treated as interest on such Loan under applicable law (collectively the "Charges"), shall exceed the maximum lawful rate (the "Maximum Rate") which may be contracted for, charged, taken, received or reserved by the Lender holding such Loan in accordance with applicable law, the rate of interest payable in respect of such Loan hereunder, together with all Charges payable in respect thereof, shall be limited to the Maximum Rate and, to the extent lawful, the interest and Charges that would have been payable in respect of such Loan but were not payable as a result of the operation of this Section shall be cumulated and the interest and Charges payable to such Lender in respect of other Loans or periods shall be increased (but not above the Maximum Rate therefor) until such cumulated amount, together with interest thereon at the Federal Funds Effective Rate to the date of repayment, shall have been received by such Lender.

SECTION 9.16. No Advisory or Fiduciary Responsibility. Each Borrower acknowledges and agrees, and acknowledges its Subsidiaries' understanding, that no Credit Party will have any obligations except those obligations expressly set forth herein and in the other Loan Documents and each Credit Party is acting solely in the capacity of an arm's length contractual counterparty to such Borrower with respect to the Loan Documents and the transaction contemplated therein and not as a financial advisor or a fiduciary to, or an agent of, such Borrower or any other person. Each Borrower agrees that it will not assert any claim against any Credit Party based on an alleged breach of fiduciary duty by such Credit Party in connection with this Agreement and the transactions contemplated hereby. Additionally, each Borrower acknowledges and agrees that no Credit Party is advising such Borrower as to any legal, tax, investment, accounting, regulatory or any other matters in any jurisdiction. Each Borrower shall consult with its own advisors concerning such matters and shall be responsible for making its own independent investigation and appraisal of the transactions contemplated hereby, and the Credit Parties shall have no responsibility or liability to any Borrower with respect thereto.

Each Borrower further acknowledges and agrees, and acknowledges its Subsidiaries' understanding, that each Credit Party, together with its Affiliates, is a full service securities or banking firm engaged in securities trading and brokerage activities as well as providing investment banking and other financial services. In the ordinary course of business, any Credit Party may provide investment banking and other financial services to, and/or acquire, hold or sell, for its own accounts and the accounts of customers, equity, debt and other securities and financial instruments (including bank loans and other obligations) of, such Borrower, its Subsidiaries and other companies with which such Borrower or any of its Subsidiaries may have commercial or other relationships. With respect to any securities and/or financial instruments so held by any Credit Party or any of its customers, all rights in respect of such securities and financial instruments, including any voting rights, will be exercised by the holder of the rights, in its sole discretion.

In addition, each Borrower acknowledges and agrees, and acknowledges its Subsidiaries' understanding, that each Credit Party and its Affiliates may be providing debt financing, equity capital or other services (including financial advisory services) to other companies in respect of which such Borrower or any of its Subsidiaries may have conflicting interests regarding the transactions described herein and otherwise. No Credit Party will use confidential information obtained from the Borrower by virtue of the transactions contemplated by the Loan Documents or its other relationships with the Borrower in connection with the performance by such Credit Party of services for other companies, and no Credit Party will furnish any such information to other companies. Each Borrower also acknowledges that no Credit Party has any obligation to use in connection with the transactions contemplated by the Loan Documents, or to furnish to such Borrower or any of its Subsidiaries, confidential information obtained from other companies.

SECTION 9.17. Releases of Subsidiary Guarantors.

(a) A Subsidiary Guarantor shall automatically be released from its obligations under the Subsidiary Guaranty upon the consummation of any transaction permitted by this Agreement as a result of which such Subsidiary Guarantor ceases to be a Subsidiary; provided that, if so required by this Agreement, the Required Lenders shall have consented to such transaction and the terms of such consent shall not have provided otherwise. In connection with any termination or release pursuant to this Section, the Administrative Agent shall (and is hereby irrevocably authorized by each Lender to) execute and deliver to any Loan Party, at such Loan Party's expense, all documents that such Loan Party shall reasonably request to evidence such termination or release. Upon any sale or other disposition (other than any lease or license) by any Loan Party (other than to any other Loan Party) of any Collateral in a transaction permitted under this Agreement, or upon the effectiveness of any written consent to the release of the security interest created under any Collateral Document in any Collateral pursuant to Section 9.02, the security interests in such Collateral created by the Collateral Documents shall be automatically released and terminated. Any execution and delivery of documents pursuant to this Section shall be without recourse to or warranty by the Administrative Agent.

(b) At such time as the principal and interest on the Loans, all LC Disbursements, the fees, expenses and other amounts payable under the Loan Documents and the other Secured Obligations (other than Banking Services Obligations not yet due and payable, Swap Obligations not yet due and payable, and other Obligations expressly stated to survive such payment and termination) shall have been paid in full in cash, the Commitments shall have been terminated and no Letters of Credit shall be outstanding, the Subsidiary Guaranty and all obligations (other than those expressly stated to survive such termination) of each Subsidiary Guarantor thereunder shall automatically terminate, all without delivery of any instrument or performance of any act by any Person.

SECTION 9.18. Acknowledgement and Consent to Bail-In of EEA Financial Institutions. Notwithstanding anything to the contrary in any Loan Document or in any other agreement, arrangement or understanding among any such parties, each party hereto acknowledges that any liability of any EEA Financial Institution arising under any Loan Document may be subject to the Write-Down and Conversion Powers of an EEA Resolution Authority and agrees and consents to, and acknowledges and agrees to be bound by:

(a) the application of any Write-Down and Conversion Powers by an EEA Resolution Authority to any such liabilities arising hereunder which may be payable to it by any party hereto that is an EEA Financial Institution; and

(b) the effects of any Bail-In Action on any such liability, including, if applicable:

(i) a reduction in full or in part or cancellation of any such liability;

(ii) a conversion of all, or a portion of, such liability into shares or other instruments of ownership in such EEA Financial Institution, its parent entity, or a bridge institution that may be issued to it or otherwise conferred on it, and that such shares or other instruments of ownership will be accepted by it in lieu of any rights with respect to any such liability under this Agreement or any other Loan Document; or

(iii) the variation of the terms of such liability in connection with the exercise of the Write-Down and Conversion Powers of any EEA Resolution Authority.

ARTICLE X

Company Guarantee

In order to induce the Lenders to extend credit to the other Borrowers hereunder, the Company hereby irrevocably and unconditionally guarantees, as a primary obligor and not merely as a surety, the payment when and as due of the Secured Obligations of such other Borrowers and the Specified Ancillary Obligations (collectively, the "Guaranteed Obligations"). The Company further agrees that the due and punctual payment of such Guaranteed Obligations may be extended or renewed, in whole or in part, without notice to or further assent from it, and that it will remain bound upon its guarantee hereunder notwithstanding any such extension or renewal of any such Guaranteed Obligation.

The Company waives presentment to, demand of payment from and protest to any Subsidiary of any of the Guaranteed Obligations, and also waives notice of acceptance of its obligations and notice of protest for nonpayment. The obligations of the Company hereunder shall not be affected by (a) the failure of either Agent, any Issuing Bank or any Lender (or any of its Affiliates) to assert any claim or demand or to enforce any right or remedy against any Subsidiary under the provisions of this Agreement, any Swap Agreement, any Banking Services Agreement, any other Loan Document or otherwise; (b) any extension or renewal of any of the Guaranteed Obligations; (c) any rescission, waiver, amendment or modification of, or release from, any of the terms or provisions of this Agreement, any Swap Agreement, any Banking Services Agreement or any other Loan Document or agreement; (d) any default, failure or delay, willful or otherwise, in the performance of any of the Guaranteed Obligations; (e) the failure of either Agent (or any applicable Lender (or any of its Affiliates)) to take any steps to perfect and maintain any security interest in, or to preserve any rights to, any security or collateral for the Guaranteed Obligations, if any; (f) any change in the corporate, partnership or other existence, structure or ownership of any Subsidiary or any other guarantor of any of the Guaranteed Obligations; (g) the enforceability or validity of the Guaranteed Obligations or any part thereof or the genuineness, enforceability or validity of any agreement relating thereto or with respect to any collateral securing the Guaranteed Obligations or any part thereof, or any other invalidity or unenforceability relating to or against any Subsidiary or any other guarantor of any of the Guaranteed Obligations, for any reason related to this Agreement, any Swap Agreement, any Banking Services Agreement, any other Loan Document, or any provision of applicable law, decree, order or regulation of any jurisdiction purporting to prohibit the payment by such Subsidiary or any other guarantor of the Guaranteed Obligations, of any of the Guaranteed Obligations or otherwise affecting any term of any of the Guaranteed Obligations; or (h) any other act, omission or delay to do any other act which may or might in any manner or to any extent vary the risk of the Company or otherwise operate as a discharge of a guarantor as a matter of law or equity or which would impair or eliminate any right of the Company to subrogation.

The Company further agrees that its agreement hereunder constitutes a guarantee of payment when due (whether or not any bankruptcy or similar proceeding shall have stayed the accrual or collection of any of the Guaranteed Obligations or operated as a discharge thereof) and not merely of collection, and waives any right to require that any resort be had by either Agent, any Issuing Bank or any Lender (or any of its Affiliates) to any balance of any deposit account or credit on the books of either Agent, any Issuing Bank or any Lender in favor of any Subsidiary or any other Person.

The obligations of the Company hereunder shall not be subject to any reduction, limitation, impairment or termination for any reason, and shall not be subject to any defense or set-off, counterclaim, recoupment or termination whatsoever, by reason of the invalidity, illegality or unenforceability of any of the Guaranteed Obligations, any impossibility in the performance of any of the Guaranteed Obligations or otherwise, except for the prior indefeasible payment in full in cash of all the Guaranteed Obligations. Nothing contained in this Article X is intended to, or shall limit, restrict or preclude the Company from pursuing and maintaining a separate legal action based on the acts or omissions of any Agent or any Lender in connection with any such Person's gross negligence or willful misconduct.

The Company further agrees that its obligations hereunder shall constitute a continuing and irrevocable guarantee of all Guaranteed Obligations now or hereafter existing and shall continue to be effective or be reinstated, as the case may be, if at any time payment, or any part thereof, of any Guaranteed Obligation (including a payment effected through exercise of a right of setoff) is rescinded, or is or must otherwise be restored or returned by either Agent, any Issuing Bank or any Lender (or any of its Affiliates) upon the insolvency, bankruptcy or reorganization of any Subsidiary or otherwise (including pursuant to any settlement entered into by a Secured Party in its discretion).

In furtherance of the foregoing and not in limitation of any other right which either Agent, any Issuing Bank or any Lender (or any of its Affiliates) may have at law or in equity against the Company by virtue hereof, upon the failure of any other Subsidiary to pay any Guaranteed Obligation when and as the same shall become due, whether at maturity, by acceleration, after notice of prepayment or otherwise, the Company hereby promises to and will, upon receipt of written demand by any Agent, any Issuing Bank or any Lender (or any of its Affiliates), forthwith pay, or cause to be paid, to the relevant Agent, the relevant Issuing Bank or any Lender (or any of such Lender's Affiliates) in cash an amount equal to the unpaid principal amount of such Guaranteed Obligations then due, together with accrued and unpaid interest thereon. The Company further agrees that if payment in respect of any Guaranteed Obligation shall be due in a currency other than Dollars and/or at a place of payment other than New York or any other Eurocurrency Payment Office and if, by reason of any Change in Law, disruption of currency or foreign exchange markets, war or civil disturbance or other event, payment of such Guaranteed Obligation in such currency or at such place of payment shall be impossible or, in the reasonable judgment of either Agent, any Issuing Bank or any Lender (or any of its Affiliates), disadvantageous to the relevant Agent, the relevant Issuing Bank or such Lender (or any of such Lender's Affiliates) in any material respect, then, at the election of the relevant Agent or such Lender, the Company shall make payment of such Guaranteed Obligation in Dollars (based upon the applicable Equivalent Amount in effect on the date of payment) and/or in New York or such other Eurocurrency Payment Office as is designated by the Administrative Agent or such Lender and, as a separate and independent obligation, shall indemnify the Agents, any Issuing Bank and such Lender (and such Lender's Affiliates), as applicable, against any losses or reasonable out-of-pocket expenses that it shall sustain as a result of such alternative payment.

Upon payment by the Company of any sums as provided above, all rights of the Company against any Subsidiary arising as a result thereof by way of right of subrogation or otherwise shall in all respects be subordinated and junior in right of payment to the prior indefeasible payment in full in cash of all the Guaranteed Obligations owed by such Subsidiary.

Nothing shall discharge or satisfy the liability of the Company hereunder except the full performance and payment in cash of the Guaranteed Obligations.

The Company hereby absolutely, unconditionally and irrevocably undertakes to provide such funds or other support as may be needed from time to time by each Subsidiary Guarantor to honor all of its obligations under the Subsidiary Guaranty in respect of Specified Swap Obligations (provided, however, that the Company shall only be liable under this paragraph for the maximum amount of such liability that can be hereby incurred without rendering its obligations under this paragraph or otherwise under this Article X voidable under applicable law relating to fraudulent conveyance or fraudulent transfer, and not for any greater amount). The Company intends that this paragraph constitute, and this paragraph shall be deemed to constitute, a "keepwell, support, or other agreement" for the benefit of each Subsidiary Guarantor for all purposes of Section 1a(18)(A)(v)(II) of the Commodity Exchange Act.

For the avoidance of doubt, Section 2.17 of this Agreement shall be applicable, *mutatis mutandis*, to all payments required to be made by the Company under this Article X.

[Signature Pages Follow]

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed by their respective authorized officers as of the day and year first above written.

PHOTRONICS, INC., as the Company

By

Name:

Title:

Signature Page to Fourth Amended and Restated Credit Agreement
Photronics, Inc.

JPMORGAN CHASE BANK, N.A., individually as a Lender, as Swingline Lender, as an Issuing Bank, as Collateral Agent and as Administrative Agent

By

Name:

Title:

Signature Page to Fourth Amended and Restated Credit Agreement
Photonics, Inc.

BANK OF AMERICA, N.A., individually as a Lender, as an Issuing Bank and
as Syndication Agent

By

Name:

Title:

CITIZENS BANK, N.A., individually as a Lender and as an Issuing Bank

By _____

Name:

Title:

TD BANK, N.A., individually as a Lender and as an Issuing Bank

By _____

Name:

Title:

Signature Page to Fourth Amended and Restated Credit Agreement
Photonics, Inc.

SCHEDULE 2.01A

COMMITMENTS

<u>LENDER</u>	<u>COMMITMENT</u>
JPMORGAN CHASE BANK, N.A.	\$14,000,000
BANK OF AMERICA, N.A.	\$14,000,000
CITIZENS BANK, N.A.	\$11,000,000
TD BANK, N.A.	\$11,000,000
AGGREGATE COMMITMENT	\$50,000,000

SCHEDULE 2.01B

LETTER OF CREDIT COMMITMENTS

LENDER

LETTER OF CREDIT COMMITMENT

JPMORGAN CHASE BANK, N.A.

\$3,750,000

BANK OF AMERICA, N.A.

\$3,750,000

CITIZENS BANK, N.A.

\$3,750,000

TD BANK, N.A.

\$3,750,000

TOTAL LETTER OF CREDIT COMMITMENTS

\$15,000,000

SCHEDULE 2.06

EXISTING LETTERS OF CREDIT

None.

SCHEDULE 5.10

POST-CLOSING MATTERS

1. Delivery to the Administrative Agent of certificates of insurance listing the Collateral Agent as (x) lender loss payee for the property casualty insurance policies of the Company and its Subsidiaries, together with separate lender loss payable endorsements in respect thereof and (y) additional insured with respect to the liability insurance policies of the Company and its Subsidiaries, together with separate additional insured endorsements in respect thereof, in form and substance reasonably acceptable to the Administrative Agent, on or prior to the date that is thirty (30) days after the Effective Date.
-

THIRD AMENDED AND RESTATED SECURITY AGREEMENT

THIS THIRD AMENDED AND RESTATED SECURITY AGREEMENT (as the same may be amended, restated, supplemented or otherwise modified from time to time, this "Security Agreement") is entered into as of September 27, 2018 by and among PHOTRONICS, INC., a Connecticut corporation (the "Company"), the Subsidiaries of the Company listed on the signature pages hereto (together with the Company, the "Initial Grantors," and together with any additional Subsidiaries, whether now existing or hereafter formed or acquired which become parties to this Security Agreement from time to time by executing a Supplement hereto in substantially the form of Annex I, the "Grantors"), and JPMORGAN CHASE BANK, N.A., a national banking association, in its capacity as contractual representative (the "Collateral Agent") for itself and for the Holders of Secured Obligations (as defined in the Credit Agreement identified below). Capitalized terms used herein (including, without limitation, Article I hereof) and not otherwise defined herein shall have the respective meanings ascribed to such terms in the Credit Agreement.

PRELIMINARY STATEMENT

WHEREAS, the Company, certain Subsidiaries of the Company from time to time parties thereto as borrowers (together with the Company, the "Borrowers"), the financial institutions from time to time party thereto as lenders (collectively, the "Lenders"), and JPMorgan Chase Bank, N.A., as administrative agent thereunder (the "Administrative Agent") have entered into that certain Fourth Amended and Restated Credit Agreement of even date herewith (as the same may be amended, restated, supplemented or otherwise modified from time to time, the "Credit Agreement" and the agreements, documents and instruments executed and/or delivered pursuant thereto or in connection therewith, including, without limitation, any guaranty delivered in connection therewith, the "Loan Documents"), which Credit Agreement amends and restates in its entirety the Existing Credit Agreement (as defined in the Credit Agreement), providing, subject to the terms and conditions thereof, for extensions of credit and other financial accommodations to be made by the Lenders to or for the benefit of the Borrowers;

WHEREAS, the Credit Agreement, among other things, re-evidences the Borrowers' outstanding obligations under the Existing Credit Agreement and provides, subject to the terms thereof, for future extensions from time to time of credit and other financial accommodations by the Lenders to the Borrowers;

WHEREAS, as a condition precedent to the effectiveness of an amendment to the Existing Credit Agreement, the Initial Grantors entered into the Second Amended and Restated Security Agreement, dated as of December 5, 2013, with the Collateral Agent (the "Existing Security Agreement");

WHEREAS, each Initial Grantor party to the Existing Security Agreement wishes to affirm its obligations under the terms of the Existing Security Agreement and wishes to amend and restate the terms of the Existing Security Agreement;

WHEREAS, the Grantors wish to secure their obligations to the Holders of Secured Obligations pursuant to the terms of this Security Agreement; and

WHEREAS, it is the intent of the parties hereto that this Agreement not constitute a novation of the obligations and liabilities of the parties under the Existing Security Agreement, but that this Agreement amend and restate in its entirety the Existing Security Agreement and re-evidence the obligations and liabilities of each Grantor outstanding thereunder, which shall be set forth in accordance with the terms hereof;

ACCORDINGLY, the Grantors and the Collateral Agent, on behalf of the Holders of Secured Obligations, hereby agree as follows:

ARTICLE I

DEFINITIONS

1.1. Terms Defined in the Credit Agreement. All capitalized terms used herein and not otherwise defined shall have the meanings assigned to such terms in the Credit Agreement.

1.2. Terms Defined in New York UCC. Terms defined in the New York UCC which are not otherwise defined in this Security Agreement are used herein as defined in the New York UCC.

1.3. Definitions of Certain Terms Used Herein. As used in this Security Agreement, in addition to the terms defined in the Preliminary Statement, the following terms shall have the following meanings:

“Accounts” shall have the meaning set forth in Article 9 of the New York UCC.

“Article” means a numbered article of this Security Agreement, unless another document is specifically referenced.

“Chattel Paper” shall have the meaning set forth in Article 9 of the New York UCC.

“Collateral” means all Accounts, Chattel Paper, Commercial Tort Claims, Deposit Accounts, Documents, Equipment, Farm Products, General Intangibles, Goods, Instruments, Intellectual Property Collateral, Inventory, Investment Property, letters of credit, Letter-of-Credit Rights, Pledged Deposits, Supporting Obligations and Other Collateral, wherever located, in which any Grantor now has or hereafter acquires any right or interest, and the proceeds (including Stock Rights), insurance proceeds and products thereof, together with all books and records, customer lists, credit files, computer files, programs, printouts and other computer materials and records related thereto; provided that in no event shall “Collateral” include or the security interest granted under Article II hereof attach to (a) any lease, license, permit, contract, property rights or agreement to which any Grantor is a party, any of its rights or interests thereunder or any Trademark or other Intellectual Property, if and for so long as the grant of such security interest shall (i) give any other Person party to such lease, license, permit, contract, property rights or agreement the right to terminate its obligations thereunder, (ii) constitute or result in the abandonment, cancellation, invalidation or unenforceability of any material right, title or interest of any Grantor therein or (iii) result in a breach or termination pursuant to the terms of, or a default under, any such lease, license, contract property rights or agreement (other than, in the case of each of the foregoing clauses (i), (ii) and (iii), to the extent that any such right or term would be rendered ineffective pursuant to Sections 9-406, 9-407, 9-408 or 9-409 of the Uniform Commercial Code of any relevant jurisdiction or any other applicable law (including the U.S. Bankruptcy Code) or principles of equity), provided, however, that the Collateral shall include and such security interest shall attach immediately at such time as the condition causing such abandonment, cancellation, invalidation or unenforceability shall be remedied and to the extent severable, shall attach immediately to any portion of such lease, license, contract, property rights, agreement or Trademark that does not result in any of the consequences specified in (i), (ii) or (iii) above; (b) any license, permit or other governmental authorization that, under the terms and conditions of such governmental authorization or under applicable law, cannot be subjected to a Lien in favor of the Collateral Agent for the benefit of the Holders of Secured Obligations without the consent of the relevant governmental authority and such consent has not been obtained; (c) any of the capital stock of a Foreign Subsidiary; (d) those assets as to which the Collateral Agent reasonably determines (in consultation with, and with written notice to, the Company) that the cost of obtaining such a security interest or perfection thereof (including tax consequences) are excessive in relation to the benefit to the Holders of Secured Obligations of the security to be afforded thereby; (e) any item of personal property, tangible or intangible, to the extent the grant by any Grantor of a security interest pursuant to this Security Agreement in its right, title and interest in such item of property is prohibited by any law or governmental rule or regulation or by effective and enforceable contractual provisions (including license restrictions) in any agreement to which the Grantor is a party (so long as no such agreement shall be entered into for the purposes of circumventing the security interest granted herein and excluding any such provision to the extent such provision would be rendered ineffective pursuant to Sections 9-406, 9-407, 9-408 or 9-409 of the Uniform Commercial Code of any relevant jurisdiction or any other applicable law (including the U.S. Bankruptcy Code) or principles of equity); (f) intellectual property in relation to which any law or governmental rule or regulation, or any agreement with a domain name registrar or any other Person entered into by the Grantor in the ordinary course of business and existing on the date hereof, prohibits the creation of a security interest therein or would otherwise invalidate such Grantor’s right, title or interest therein (other than to the extent any such agreement would be rendered ineffective pursuant to Sections 9-406, 9-407, 9-408 or 9-409 of the Uniform Commercial Code of any relevant jurisdiction or any other applicable law (including the U.S. Bankruptcy Code) or principles of equity); (g) any Equipment owned by any Grantor that is subject to a purchase money Lien or a capital lease permitted by the Credit Agreement if the agreement in which such Lien is granted (or in the document providing for such capital lease) validly prohibits or requires the consent of any Person other than any Grantor as a condition to the creation of any other Lien on such equipment (other than to the extent any such agreement would be rendered ineffective pursuant to Sections 9-406, 9-407, 9-408 or 9-409 of the Uniform Commercial Code of any relevant jurisdiction or any other applicable law (including the U.S. Bankruptcy Code) or principles of equity), but only, in each case, to the extent, and for so long as, the Indebtedness secured by the applicable Lien or capital lease has not been repaid in full or the applicable prohibition (or consent required) has not been otherwise removed or terminated; (h) motor vehicles and other assets subject to certificates of title or ownership; or (i) any real property held by a Grantor as a lessee under a lease; provided that the parties hereby agree, for the avoidance of doubt (without limitation with respect to any assets not so listed), that the assets listed in Schedule 1 to this Agreement are prohibited by contractual restrictions with third parties from being included as “Collateral” hereunder except to the extent such restrictions would be rendered ineffective pursuant to Sections 9-406, 9-407, 9-408 or 9-409 of the Uniform Commercial Code of any relevant jurisdiction.

“Commercial Tort Claims” means commercial tort claims, as defined in the New York UCC of any Grantor, including each commercial tort claim specifically described in Exhibit “E”.

“Confirmatory Grant of Security Interest” means, with respect to any Grantor and its Patents, Trademarks, or Copyrights, an agreement with a list of such Patents, Trademarks or Copyrights attached as an exhibit thereto, in form and substance satisfactory to the Collateral Agent, duly executed by such Grantor, to be filed in the United States Patent and Trademark Office or the United States Copyright Office, as applicable, evidencing the Collateral Agent’s Lien on such Patents, Trademarks or Copyrights, as applicable.

“Control” shall have the meaning set forth in Article 8 or, if applicable, in Section 9-104, 9-105, 9-106 or 9-107 of Article 9 of the New York UCC.

“Copyrights” means, with respect to any Person, all of such Person’s right, title, and interest in and to the following: (a) all copyrights, rights and interests in copyrights, works protectable by copyright, copyright registrations, and copyright applications; (b) all extensions of any of the foregoing; (c) all income, royalties, damages, and payments now or hereafter due and/or payable under any of the foregoing, including, without limitation, damages or payments for past or future infringements for any of the foregoing; (d) the right to sue for past, present, and future infringements of any of the foregoing; and (e) all rights corresponding to any of the foregoing throughout the world.

“Deposit Accounts” shall have the meaning set forth in Article 9 of the New York UCC.

“Documents” shall have the meaning set forth in Article 9 of the New York UCC.

“Equipment” shall have the meaning set forth in Article 9 of the New York UCC.

“Event of Default” shall have the meaning set forth in the Credit Agreement.

“Exhibit” refers to a specific exhibit to this Security Agreement, unless another document is specifically referenced.

“Farm Products” shall have the meaning set forth in Article 9 of the New York UCC.

“General Intangibles” shall have the meaning set forth in Article 9 of the New York UCC and, in any event, includes payment intangibles, contract rights, rights to payment, rights arising under common law, statutes, or regulations, choses or things in action, goodwill (including the goodwill associated with any Grantor owned Trademark), Intellectual Property, URLs and domain names, other industrial or intellectual property or rights therein or applications therefor, whether under license or otherwise, programs, programming materials, blueprints, drawings, purchase orders, customer lists, monies due or recoverable from pension funds, route lists, rights to payment and other rights under any royalty or licensing agreements, including Licenses, infringement claims, computer programs, information contained on computer disks or tapes, software, literature, reports, catalogs, pension plan refunds, pension plan refund claims, insurance premium rebates, tax refunds, and tax refund claims, interests in a partnership or limited liability company which do not constitute a security under Article 8 of the Code, and any other personal property other than Commercial Tort Claims, money, Accounts, Chattel Paper, Deposit Accounts, Goods, Investment Property, negotiable Collateral, and oil, gas, or other minerals before extraction.

“Goods” shall have the meaning set forth in Article 9 of the New York UCC.

“Instruments” shall have the meaning set forth in Article 9 of the New York UCC.

“Intellectual Property” means all Patents, Trademarks and Copyrights as defined herein.

“Intellectual Property Collateral” means all domain names, Intellectual Property and Licenses.

“Inventory” shall have the meaning set forth in Article 9 of the New York UCC.

“Investment Property” shall have the meaning set forth in Article 9 of the New York UCC.

“Letter of Credit Rights” shall have the meaning set forth in Article 9 of the New York UCC.

“Licenses” means, with respect to any Person, all of such Person’s right, title, and interest in and to (a) any and all licensing agreements or similar arrangements in and to its Patents, Copyrights, or Trademarks, (b) all income, royalties, damages, claims, and payments now or hereafter due or payable under and with respect thereto, including, without limitation, damages and payments for past and future breaches thereof, and (c) all rights to sue for past, present, and future breaches thereof.

“New York UCC” means the New York Uniform Commercial Code as in effect from time to time.

“Other Collateral” means any property of the Grantors, not included within the defined terms Accounts, Chattel Paper, Commercial Tort Claims, Deposit Accounts, Documents, Equipment, Farm Products, General Intangibles, Goods, Instruments, Intellectual Property Collateral, Inventory, Investment Property, Letter-of-Credit Rights, Pledged Deposits and Supporting Obligations, including, without limitation, all cash on hand, letters of credit, Stock Rights or any other deposits (general or special, time or demand, provisional or final) with any bank or other financial institution, it being intended that the Collateral include all personal property of the Grantors.

“Patents” means, with respect to any Person, all of such Person’s right, title, and interest in and to: (a) any and all patents and patent applications; (b) all inventions and improvements described and claimed therein; (c) all reissues, divisions, continuations, extensions, and continuations-in-part thereof; (d) all income, royalties, damages, claims, and payments now or hereafter due or payable under and with respect thereto, including, without limitation, damages and payments for past and future infringements thereof; (e) all rights to sue for past, present, and future infringements thereof; and (f) all rights corresponding to any of the foregoing throughout the world.

“Pledged Deposits” means all time deposits of money (other than Deposit Accounts and Instruments), whether or not evidenced by certificates, which a Grantor may from time to time designate as pledged to the Collateral Agent or to any Holder of Secured Obligations as security for any Secured Obligations, and all rights to receive interest on said deposits.

“Receivables” means the Accounts, Chattel Paper, Documents, Investment Property, Instruments or Pledged Deposits, and any other rights or claims to receive money which are General Intangibles or which are otherwise included as Collateral.

“Registered” means issued by, registered with, renewed by or the subject of a pending application before any governmental authority or internet domain name registrar.

“Section” means a numbered section of this Security Agreement, unless another document is specifically referenced.

“Security” shall have the meaning set forth in Article 8 of the New York UCC.

“Stock Rights” means any securities, dividends or other distributions and any other right or property which any Grantor shall receive or shall become entitled to receive for any reason whatsoever with respect to, in substitution for or in exchange for any securities or other ownership interests in a corporation, partnership, joint venture or limited liability company constituting Collateral and any securities, any right to receive securities and any right to receive earnings, in which any Grantor now has or hereafter acquires any right, issued by an issuer of such securities.

“Supporting Obligation” shall have the meaning set forth in Article 9 of the New York UCC.

“Trademarks” means, with respect to any Person, all of such Person’s right, title, and interest in and to the following: (a) all trademarks (including service marks), trade names, trade dress, and trade styles and the registrations and applications for registration thereof and the goodwill of the business symbolized by the foregoing; (b) all licenses of the foregoing, whether as licensee or licensor; (c) all renewals of the foregoing; (d) all income, royalties, damages, and payments now or hereafter due or payable with respect thereto, including, without limitation, damages, claims, and payments for past and future infringements thereof; (e) all rights to sue for past, present, and future infringements of the foregoing, including the right to settle suits involving claims and demands for royalties owing; and (f) all rights corresponding to any of the foregoing throughout the world.

The foregoing definitions shall be equally applicable to both the singular and plural forms of the defined terms.

ARTICLE II

REAFFIRMATION AND GRANT OF SECURITY INTEREST

Each Initial Grantor party to the Existing Security Agreement reaffirms the security interest granted under the terms and conditions of the Existing Security Agreement and agrees that such security interest remains in full force and effect and is hereby ratified, reaffirmed and confirmed. Each Initial Grantor party to the Existing Security Agreement acknowledges and agrees with the Collateral Agent that the Existing Security Agreement is amended, restated, and superseded in its entirety pursuant to the terms hereof.

Each of the Grantors hereby pledges, assigns and grants to the Collateral Agent, on behalf of and for the benefit of the Holders of Secured Obligations, a security interest in all of such Grantor’s right, title and interest, whether now owned or hereafter acquired, in and to the Collateral to secure the prompt and complete payment and performance of the Secured Obligations. For the avoidance of doubt, the grant of a security interest herein shall not be deemed to be an assignment of intellectual property rights owned by the Grantors.

ARTICLE III

REPRESENTATIONS AND WARRANTIES

Each of the Initial Grantors represents and warrants to the Collateral Agent and the Holders of Secured Obligations, and each Grantor that becomes a party to this Security Agreement pursuant to the execution of a Security Agreement Supplement in substantially the form of Annex I represents and warrants (after giving effect to supplements to each of the Exhibits hereto with respect to such subsequent Grantor as attached to such Security Agreement Supplement), that, as of the date hereof or as of the date any additional Grantor becomes party to this Security Agreement pursuant to a Security Agreement Supplement:

3.1. Title, Authorization, Validity and Enforceability. Such Grantor has (other than the Intellectual Property Collateral, with respect to which Section 3.11 shall apply) (a) good and valid rights in or the power to transfer the Collateral owned by it and (b) title to the Collateral with respect to which it has purported to grant a security interest hereunder, free and clear of all Liens except for Liens permitted under Section 4.1.6 hereof. Such Grantor has full corporate, limited liability company or partnership, as applicable, power and authority to grant to the Collateral Agent the security interest in the Collateral pursuant hereto. The execution and delivery by such Grantor of this Security Agreement have been duly authorized by proper corporate, limited liability company, limited partnership or partnership, as applicable, proceedings, and this Security Agreement constitutes a legal, valid and binding obligation of such Grantor and creates a security interest which is enforceable against such Grantor in all Collateral it now owns or hereafter acquires, except as enforceability may be limited by (i) bankruptcy, insolvency, fraudulent conveyance, reorganization or similar laws relating to or affecting the enforcement of creditors’ rights generally, (ii) general equitable principles (whether considered in a proceeding in equity or at law), and (iii) requirements of reasonableness, good faith and fair dealing. When financing statements have been filed in the appropriate offices against such Grantor in the locations listed in Exhibit “D”, the Collateral Agent will have a perfected first priority security interest in the Collateral owned by such Grantor in which a security interest may be perfected by filing of a financing statement under the New York UCC, subject only to Liens permitted under Section 4.1.6 hereof.

3.2. Conflicting Laws and Contracts. Neither the execution and delivery by such Grantor of this Security Agreement, the creation and perfection of the security interest in the Collateral granted hereunder, nor compliance with the terms and provisions hereof will violate (i) any law, rule, regulation, order, writ, judgment, injunction, decree or award binding on such Grantor, or (ii) such Grantor's charter, articles or certificate of incorporation, partnership agreement or by-laws (or similar constitutive documents), or (iii) the provisions of any indenture, instrument or agreement to which such Grantor is a party or is subject, or by which it, or its property may be bound or affected, or conflict with or constitute a default thereunder, or result in or require the creation or imposition of any Lien in, of or on the property of such Grantor pursuant to the terms of any such indenture, instrument or agreement (other than any Lien of the Collateral Agent on behalf of the Holders of Secured Obligations) except, in each case, which could not reasonably be expected to result in a Material Adverse Effect.

3.3. Principal Location. Such Grantor's mailing address and the location of its place of business (if it has only one) or its chief executive office (if it has more than one place of business), is disclosed in Exhibit "A".

3.4. Property Locations. The Inventory and Equipment of each Grantor are located solely at the locations of such Grantor described in Exhibit "A". All of said locations are owned by such Grantor except for locations (i) which are leased by such Grantor as lessee and designated in Part B of Exhibit "A" and (ii) at which Inventory is held in a public warehouse or is otherwise held by a bailee or on consignment by such Grantor as designated in Part C of Exhibit "A".

3.5. No Other Names; Etc. Within the five-year period ending as of the date such Person becomes a Grantor hereunder, such Grantor has not conducted business under any name, changed its jurisdiction of formation, merged with or into or consolidated with any other Person, except as disclosed in Exhibit "A". The name in which such Grantor has executed this Security Agreement is the exact name as it appears in such Grantor's organizational documents, as amended, as filed with such Grantor's jurisdiction of organization as of the date such Person becomes a Grantor hereunder.

3.6. Accounts and Chattel Paper. The names of the obligors, amounts owing, due dates and other information with respect to the Accounts and Chattel Paper owned by such Grantor are and will be correctly stated in all material respects in all material records of such Grantor relating thereto and in all material invoices and reports with respect thereto furnished to the Collateral Agent by such Grantor from time to time.

3.7. Filing Requirements. None of the Equipment owned by such Grantor is covered by any certificate of title. None of the Collateral owned by such Grantor is of a type for which security interests or liens may be perfected by filing under any federal statute except for Patents, Trademarks and Copyrights held by such Grantor and described in Exhibit "B".

3.8. No Financing Statements. No financing statement describing all or any portion of the Collateral which has not lapsed or been terminated naming such Grantor as debtor has been filed in any jurisdiction except financing statements (i) naming the Collateral Agent on behalf of the Holders of Secured Obligations as the secured party and (ii) in respect of Liens permitted by Section 6.02 of the Credit Agreement; provided, that nothing herein shall be deemed to constitute an agreement to subordinate any of the Liens of the Collateral Agent under the Loan Documents to any Liens otherwise permitted under Section 6.02 of the Credit Agreement.

3.9. Federal Employer Identification Number; State Organization Number; Jurisdiction of Organization. Such Grantor's federal employer identification number is, and if such Grantor is a registered organization, such Grantor's State of organization, type of organization and State of organization identification number are, listed in Exhibit "F".

3.10. Pledged Securities and Other Investment Property. Exhibit "C" sets forth a complete and accurate list of the Instruments, Securities and other Investment Property constituting Collateral and delivered to the Collateral Agent. Each Grantor is the direct and beneficial owner of each Instrument, Security and other type of Investment Property listed in Exhibit "C" as being owned by it, free and clear of any Liens, except for the security interest granted to the Collateral Agent for the benefit of the Holders of Secured Obligations hereunder or as permitted by Section 6.02 of the Credit Agreement.

3.11. Intellectual Property.

3.11.1 Exhibit "B" contains a complete and accurate listing as of the date hereof of all Registered U.S. Intellectual Property Collateral (other than intellectual property excluded from the definition of Collateral), including: (i) U.S. trademark registrations and U.S. applications for trademark registration, (ii) U.S. patents and U.S. patents applications, together with all U.S. reissuances, continuations, continuations in part, revisions, extensions and reexaminations thereof, (iii) U.S. copyright registrations and applications for registration and (iv) U.S. domain names. Grantor has all right, title and interest to the Intellectual Property Collateral listed in Exhibit "B". When Confirmatory Grants of Security Interest have been filed with the United States Patent and Trademark Office and the United States Copyright Office, as applicable, the Collateral Agent will have a perfected first priority security interest in the Registered U.S. Intellectual Property Collateral owned by such Grantor in which a security interest may be perfected by making such filings, subject only to Liens permitted under Section 4.1.6 hereof.

3.11.2 Except as set forth on Exhibit "B", no Person other than the respective Grantor has any right or interest of any kind or nature in or to the Intellectual Property Collateral, including any right to sell, license, lease, transfer, distribute, use or otherwise exploit the Intellectual Property or any portion thereof outside of the ordinary course of the respective Grantor's business.

3.11.3 No Grantor has received any written notice that remains outstanding challenging the validity, enforceability, or ownership of any Intellectual Property Collateral except where those challenges could not reasonably be expected to result in a Material Adverse Effect.

3.11.4 Each Grantor has enforced and currently enforces reasonable quality control measures in connection with such Grantor's licensing of the trademarks listed on Exhibit "B" to third parties, except (i) with respect to trademarks not currently in use and (ii) where the failure to use such reasonable quality control measures could not reasonably be expected to result in a Material Adverse Effect.

3.11.5 The consummation of the transactions contemplated by the Loan Documents will not result in the termination or material impairment of any of the material Intellectual Property.

ARTICLE IV

COVENANTS

From the date of this Security Agreement and thereafter until this Security Agreement is terminated, each of the Initial Grantors agrees, and from and after the effective date of any Security Agreement Supplement applicable to any Grantor (and after giving effect to supplements to each of the Exhibits hereto with respect to such subsequent Grantor as attached to such Security Agreement Supplement) and thereafter until this Security Agreement is terminated each such subsequent Grantor agrees:

4.1. General.

4.1.1 Inspection. Each Grantor will permit the Collateral Agent or any Holder of Secured Obligations, by its representatives and agents (upon reasonable prior notice so long as no Event of Default has occurred and is continuing) (i) to inspect the Collateral, (ii) to examine and make copies of the records of such Grantor relating to the Collateral and (iii) to discuss the Collateral and the related records of such Grantor with such Grantor's officers and employees (so long as an Event of Default has occurred and is continuing, in the case of any Receivable, with any person or entity which is or may be obligated thereon), all at such reasonable times and intervals as the Collateral Agent or such Holder of Secured Obligations may determine, and all at such Grantor's expense.

4.1.2 Taxes. Such Grantor will timely file or cause to be filed all tax returns and reports required to be filed and will pay or cause to be paid all taxes required to be paid by it with respect to the Collateral, except (i) those that are being contested in good faith by appropriate proceedings and for which such Grantor has set aside on its books adequate reserves or (ii) to the extent that failure to do so could not reasonably be expected to result in a Material Adverse Effect.

4.1.3 Records and Reports; Notification of Default. Each Grantor shall keep and maintain complete, accurate and proper books and records with respect to the Collateral owned by such Grantor, and furnish to the Collateral Agent, with sufficient copies for each of the Holders of Secured Obligations, such reports relating to the Collateral as the Collateral Agent shall from time to time reasonably request. Each Grantor will give prompt notice in writing to the Collateral Agent of the occurrence of any development which could reasonably be expected to materially and adversely affect the Collateral, taken as a whole.

4.1.4 Financing Statements and Other Actions; Defense of Title. Each Grantor hereby authorizes the Collateral Agent to file, and if requested will execute and deliver to the Collateral Agent, all financing statements describing the Collateral owned by such Grantor and other documents and take such other actions as may from time to time reasonably be requested by the Collateral Agent in order to maintain a first priority, perfected security interest in and, if applicable, Control of, the Collateral owned by such Grantor, subject to Liens permitted under Section 6.02 of the Credit Agreement, provided that nothing herein shall be deemed to constitute an agreement to subordinate any of the Liens of the Collateral Agent under the Loan Documents to any Liens otherwise permitted under Section 6.02 of the Credit Agreement. Such financing statements may describe the Collateral in the same manner as described herein or may contain an indication or description of collateral that describes such property in any other manner as the Collateral Agent may determine, in its reasonable discretion, is necessary, advisable or prudent to ensure that the perfection of the security interest in the Collateral granted to the Collateral Agent herein, including, without limitation, describing such property as “all assets” or “all personal property, whether now owned or hereafter acquired.” Each Grantor will use commercially reasonable efforts to defend title to the Collateral owned by such Grantor against all persons in a manner materially consistent with past practices and to defend the security interest of the Collateral Agent in such Collateral and the priority thereof against any Lien not expressly permitted hereunder, unless (i) such Collateral has a book value of less than \$500,000 or (ii) the Collateral Agent shall have provided its written consent with respect thereto.

4.1.5 Disposition of Collateral. No Grantor will sell, lease or otherwise dispose of the Collateral owned by such Grantor except (i) dispositions specifically permitted pursuant to Section 6.03 of the Credit Agreement and (ii) until such time as such Grantor receives a notice from the Collateral Agent pursuant to Article VII, proceeds of Inventory and Accounts collected in the ordinary course of business.

4.1.6 Liens. No Grantor will create, incur, or suffer to exist any Lien on the Collateral owned by such Grantor except Liens permitted pursuant to Section 6.02 of the Credit Agreement, provided, that nothing herein shall be deemed to constitute an agreement to subordinate any of the Liens of the Collateral Agent under the Loan Documents to any Liens otherwise permitted under Section 6.02 of the Credit Agreement.

4.1.7 Change in Corporate Existence, Type or Jurisdiction of Organization, Location, Name. Each Grantor will:

- (i) preserve its existence and corporate structure as in effect on the date hereof, except as otherwise permitted under Section 6.03 of the Credit Agreement;
- (ii) not change its jurisdiction of organization;
- (iii) not maintain its place of business (if it has only one) or its chief executive office (if it has more than one place of business) at a location other than a location specified in Exhibit “A”; and
- (iv) not (i) have any Inventory or Equipment or proceeds or products thereof (other than Inventory and proceeds thereof disposed of as permitted by Section 4.1.5) at a location other than a location specified in Exhibit “A” or (ii) change its name or taxpayer identification number, unless, in each such case, such Grantor shall have given the Collateral Agent not less than thirty (30) days’ prior written notice of such event or occurrence and the Collateral Agent shall have either (x) determined that such event or occurrence will not adversely affect the validity, perfection or priority of the Collateral Agent’s security interest in the Collateral, or (y) taken such steps (with the cooperation of such Grantor to the extent necessary or advisable) as are necessary or advisable to properly maintain the validity, perfection and priority of the Collateral Agent’s security interest in the Collateral owned by such Grantor.

4.1.8 Other Financing Statements. No Grantor will suffer to exist or authorize the filing of any financing statement naming it as debtor covering all or any portion of the Collateral owned by such Grantor, except any financing statement authorized under Section 4.1.4 hereof. Each Grantor acknowledges that it is not authorized to file any financing statement or amendment or termination statement with respect to any financing statement filed in connection herewith without the prior written consent of the Collateral Agent, subject to such Grantor's rights under Section 9-509(d)(2) of the New York UCC.

4.2. Receivables.

4.2.1 Certain Agreements on Receivables. After written notice from the Collateral Agent during the occurrence and continuation of an Event of Default, no Grantor will make or agree to make any discount, credit, rebate or other reduction in the original amount owing on a Receivable or accept in satisfaction of a Receivable less than the original amount thereof (other than discounting of receivables owing from distressed customers in a manner consistent with prudent business practices).

4.2.2 Collection of Receivables. Except as otherwise provided in this Security Agreement, each Grantor will collect and enforce, at such Grantor's sole expense, all amounts due or hereafter due to such Grantor under the Receivables owned by such Grantor; provided that each Grantor may adjust, settle, compromise or release the amount or payment of any Receivable or amount due on any contract relating thereto, or allow any credit or discount thereon, in the ordinary course of its business and consistent with its normal business practices.

4.2.3 Delivery of Invoices. Each Grantor will deliver to the Collateral Agent immediately upon its request after the occurrence of an Event of Default duplicate invoices with respect to each Account owned by such Grantor bearing such language of assignment as the Collateral Agent shall specify.

4.3. Maintenance of Goods. Each Grantor will do all things necessary to maintain, preserve, protect and keep the Inventory and the Equipment owned by such Grantor in good repair, working order and saleable condition (ordinary wear and tear excepted) and make all necessary and proper repairs, renewals and replacements so that its business carried on in connection therewith may be properly conducted at all times, except where the failure to do so, individually or in the aggregate, could not reasonably be expected to have a Material Adverse Effect.

4.4. Instruments, Securities, Chattel Paper, Documents and Pledged Deposits. Each Grantor will (i) deliver to the Collateral Agent immediately upon execution of this Security Agreement, or upon acquisition by the Grantor thereafter, the originals of all Chattel Paper, Securities (to the extent certificated) and Instruments constituting Collateral (if any then exist), (ii) hold in trust for the Collateral Agent upon receipt and immediately thereafter deliver to the Collateral Agent any Chattel Paper, Securities and Instruments constituting Collateral, (iii) upon the designation of any Pledged Deposits (as set forth in the definition thereof), deliver to the Collateral Agent such Pledged Deposits which are evidenced by certificates included in the Collateral endorsed in blank, marked with such legends and assigned as the Collateral Agent shall specify, and (iv) upon the Collateral Agent's request, after the occurrence and during the continuance of an Event of Default, deliver to the Collateral Agent (and thereafter hold in trust for the Collateral Agent upon receipt and immediately deliver to the Collateral Agent) any Document evidencing or constituting Collateral.

4.5. Uncertificated Securities and Certain Other Investment Property. Each Grantor will permit the Collateral Agent from time to time to cause the appropriate issuers (and, if held with a securities intermediary, such securities intermediary) of uncertificated securities or other types of Investment Property not represented by certificates which are Collateral owned by such Grantor to mark their books and records with the numbers and face amounts of all such uncertificated securities or other types of Investment Property not represented by certificates and all rollovers and replacements therefor to reflect the Lien of the Collateral Agent granted pursuant to this Security Agreement. Each Grantor will use all commercially reasonable efforts, with respect to Investment Property constituting Collateral owned by such Grantor held with a financial intermediary, to cause such financial intermediary to enter into a control agreement with the Collateral Agent in form and substance reasonably satisfactory to the Collateral Agent.

4.6. Stock and Other Ownership Interests.

4.6.1 Changes in Capital Structure of Issuers. Except as permitted in the Credit Agreement, no Grantor will (i) permit or suffer any issuer of privately held corporate securities or other ownership interests in a corporation, partnership, joint venture or limited liability company constituting Collateral owned by such Grantor to dissolve, liquidate, retire any of its capital stock or other Instruments or Securities evidencing ownership, reduce its capital or merge or consolidate with any other entity, or (ii) vote any of the Instruments, Securities or other Investment Property in favor of any of the foregoing except to the extent permitted under Section 6.03 of the Credit Agreement.

4.6.2 Issuance of Additional Securities. No Grantor will permit or suffer any Domestic Subsidiary to issue any such securities or other ownership interests, any right to receive the same or any right to receive earnings, except to such Grantor or another Grantor.

4.6.3 Registration of Pledged Securities and other Investment Property. Each Grantor will permit any registrable Collateral owned by such Grantor to be registered in the name of the Collateral Agent or its nominee at any time at the option of the Required Lenders following the occurrence and during the continuance of an Event of Default and without any further consent of such Grantor.

4.6.4 Exercise of Rights in Pledged Securities and other Investment Property. Each Grantor will permit the Collateral Agent or its nominee at any time during the continuance of an Event of Default, without notice, to exercise or refrain from exercising any and all voting and other consensual rights pertaining to the Collateral owned by such Grantor or any part thereof, and to receive all dividends and interest in respect of such Collateral.

4.7. Deposit Accounts. Each Grantor will (i) upon the Collateral Agent's reasonable request, use commercially reasonable efforts to cause each bank or other financial institution in which it maintains (a) a Deposit Account to enter into a control agreement with the Collateral Agent, in form and substance reasonably satisfactory to the Collateral Agent in order to give the Collateral Agent Control of the Deposit Account or (b) other deposits (general or special, time or demand, provisional or final) to be notified of the security interest granted to the Collateral Agent hereunder and cause each such bank or other financial institution to acknowledge such notification in writing and (ii) upon the Collateral Agent's request after the occurrence and during the continuance of an Event of Default, deliver to each such bank or other financial institution a letter, in form and substance reasonably acceptable to the Collateral Agent, transferring ownership of the Deposit Account to the Collateral Agent or transferring dominion and control over each such other deposit to the Collateral Agent until such time as no Event of Default exists. In the case of deposits maintained with Lenders, the terms of such letter shall be subject to the provisions of the Credit Agreement regarding setoffs.

4.8. Letter-of-Credit Rights. Each Grantor will, upon the Collateral Agent's request, use commercially reasonable efforts to cause each issuer of a letter of credit, to consent to the assignment of proceeds of any letter of credit with respect to which such Grantor is the beneficiary in an amount in excess of \$1,000,000 in order to give the Collateral Agent Control of the letter-of-credit rights to such letter of credit.

4.9. Federal, State or Municipal Claims. Each Grantor will notify the Collateral Agent of any Collateral owned by such Grantor which constitutes a claim against the United States government or any state or local government or any instrumentality or agency thereof in excess of \$1,000,000, the assignment of which claim is restricted by federal, state or municipal law. Furthermore, each Grantor will execute and deliver to the Collateral Agent such documents, agreements and instruments, and will take such further actions (including, without limitation, the taking of necessary actions under the Federal Assignment of Claims Act of 1940, as amended (31 U.S.C. § 3727 et seq. and 41 U.S.C. § 15 et seq.)), which the Collateral Agent may, from time to time, reasonably request, to ensure perfection and priority of the Liens hereunder in respect of Accounts and General Intangibles owing by any government or instrumentality or agency thereof, all at the expense of the Company.

4.10. Intellectual Property.

4.10.1 If, after the date hereof, any Grantor obtains rights to, including, but not limited to filing and acceptance of a statement of use or an amendment to allege use with the United States Patent and Trademark Office, or applies for or seeks registration of, any new patentable invention, Trademark or Copyright in addition to the Intellectual Property described in Exhibit "B", which are all of such Grantor's Intellectual Property as of the date hereof, then such Grantor shall give the Collateral Agent notice thereof concurrently with any delivery of financial statements under Section 5.01(a) or 5.01(b) of the Credit Agreement. Each Grantor agrees promptly upon request by the Collateral Agent to execute and deliver to the Collateral Agent any supplement to this Security Agreement, Confirmatory Grants of Security Interest or any other document reasonably requested by the Collateral Agent to evidence such security interest in a form appropriate for recording in the applicable federal office. Each Grantor also hereby authorizes the Collateral Agent to modify this Security Agreement unilaterally (i) by amending Exhibit "B" to include any future Intellectual Property of which the Collateral Agent receives notification from such Grantor pursuant hereto and (ii) by recording with the United States Patent and Trademark Office and/or the United States Copyright Office, in addition to and not in substitution for this Security Agreement, Confirmatory Grants of Security Interest containing a schedule of such future Patents, Trademarks and/or Copyrights.

4.11. Commercial Tort Claims. If, after the date hereof, any Grantor identifies the existence of a commercial tort claim in excess of \$1,000,000 belonging to such Grantor that has arisen in the course of such Grantor's business in addition to the commercial tort claims described in Exhibit "E", which are all of such Grantor's commercial tort claims in excess of \$1,000,000 as of the date hereof, then such Grantor shall give the Collateral Agent prompt notice thereof, but in any event not less frequently than quarterly. Each Grantor agrees promptly upon request by the Collateral Agent to execute and deliver to the Collateral Agent any supplement to this Security Agreement or any other document reasonably requested by the Collateral Agent to evidence the grant of a security interest therein in favor of the Collateral Agent.

4.12. Updating of Exhibits to Security Agreement. The Company will provide to the Collateral Agent, concurrently with the delivery of the financial statements required by Section 5.01(a) of the Credit Agreement, updated versions of the Exhibits to this Security Agreement (provided that if there have been no changes to any such Exhibits since the previous updating thereof required hereby, the Company shall indicate that there has been "no change" to the applicable Exhibit(s)).

ARTICLE V

REMEDIES

5.1. **Remedies.** Upon the occurrence and continuance of an Event of Default, the Collateral Agent may, in accordance with the terms of the Loan Documents, exercise any or all of the following rights and remedies:

5.1.1 Those rights and remedies provided in this Security Agreement, the Credit Agreement or any other Loan Document, provided that this Section 5.1.1 shall not be understood to limit any rights or remedies available to the Collateral Agent and the Holders of Secured Obligations prior to an Event of Default.

5.1.2 Those rights and remedies available to a secured party under the New York UCC (whether or not the New York UCC applies to the affected Collateral) or under any other applicable law (including, without limitation, any law governing the exercise of a bank's right of setoff or bankers' lien).

5.1.3 Without notice except as specifically provided in Section 8.1 hereof or elsewhere herein, sell, lease, assign, grant an option or options to purchase or otherwise dispose of the Collateral or any part thereof in one or more parcels at public or private sale, for cash, on credit or for future delivery, and upon such other terms as the Collateral Agent may deem commercially reasonable.

The Collateral Agent, on behalf of the Holders of Secured Obligations, may comply with any applicable state or federal law requirements in connection with a disposition of the Collateral, and such compliance will not be considered to adversely affect the commercial reasonableness of any sale of the Collateral.

If, after the Credit Agreement has terminated by its terms and all of the Secured Obligations have been paid in full, there remain outstanding Swap Obligations or Banking Services Obligations, the Required Lenders may exercise the remedies provided in this Section 5.1 upon the occurrence of any event which would allow or require the termination or acceleration of any Swap Obligations or Banking Services Obligations.

Notwithstanding the foregoing, neither the Collateral Agent nor any other Holder of Secured Obligations shall be required to (i) make any demand upon, or pursue or exhaust any of their rights or remedies against, any Grantor, any other obligor, guarantor, pledgor or any other Person with respect to the payment of the Secured Obligations or to pursue or exhaust any of their rights or remedies with respect to any Collateral therefor or any direct or indirect guarantee thereof, (ii) marshal the Collateral or any guarantee of the Secured Obligations or to resort to the Collateral or any such guarantee in any particular order, or (iii) effect a public sale of any Collateral.

5.2. **Grantors' Obligations Upon an Event of Default.** Upon the request of the Collateral Agent after the occurrence of an Event of Default, each Grantor will:

5.2.1 **Assembly of Collateral.** Assemble and make available to the Collateral Agent the Collateral and all records relating thereto at any place or places reasonably specified by the Collateral Agent.

5.2.2 **Secured Party Access.** Permit the Collateral Agent, by the Collateral Agent's representatives and agents, to enter any premises where all or any part of the Collateral, or the books and records relating thereto, or both, are located, to take possession of all or any part of the Collateral and to remove all or any part of the Collateral.

5.3. **License.** The Collateral Agent is hereby granted a license or other right to use, following the occurrence and during the continuance of an Event of Default, without charge, each Grantor's labels, patents, copyrights, rights of use of any name, trade secrets, trade names, trademarks, service marks, customer lists and advertising matter, or any property of a similar nature, as it pertains to the Collateral, in completing production of, advertising for sale, and selling any Collateral, and, following the occurrence and during the continuance of an Event of Default, such Grantor's rights under all licenses and all franchise agreements shall inure to the Collateral Agent's benefit for such purpose. In addition, each Grantor hereby irrevocably agrees that the Collateral Agent may, following the occurrence and during the continuance of an Event of Default, sell any of such Grantor's Inventory directly to any person, including without limitation persons who have previously purchased such Grantor's Inventory from such Grantor and in connection with any such sale or other enforcement of the Collateral Agent's rights under this Security Agreement, may sell Inventory which bears any trademark owned by or licensed to such Grantor and any Inventory that is covered by any copyright owned by or licensed to such Grantor and the Collateral Agent may finish any work in process and affix any trademark owned by or licensed to such Grantor and sell such Inventory as provided herein.

ARTICLE VI

WAIVERS, AMENDMENTS AND REMEDIES

No delay or omission of the Collateral Agent or any Holder of Secured Obligations to exercise any right or remedy granted under this Security Agreement shall impair such right or remedy or be construed to be a waiver of any Event of Default or an acquiescence therein, and any single or partial exercise of any such right or remedy shall not preclude any other or further exercise thereof or the exercise of any other right or remedy. No waiver, amendment or other variation of the terms, conditions or provisions of this Security Agreement whatsoever shall be valid unless in writing signed by (a) the Collateral Agent and (b) each Grantor, and then only to the extent in such writing specifically set forth, provided that the addition of any Subsidiary as a Grantor hereunder by execution of a Security Agreement Supplement in the form of Annex I (with such modifications as shall be reasonably acceptable to the Collateral Agent) shall not require receipt of any consent from or execution of any documentation by any other Grantor party hereto. All rights and remedies contained in this Security Agreement or by law afforded shall be cumulative and all shall be available to the Collateral Agent and the Holders of Secured Obligations until the Secured Obligations have been paid in full.

ARTICLE VII

PROCEEDS; COLLECTION OF RECEIVABLES

7.1. Lockboxes. Upon request of the Collateral Agent after the occurrence of an Event of Default, each Grantor shall execute and deliver to the Collateral Agent irrevocable lockbox agreements in the form provided by or otherwise reasonably acceptable to the Collateral Agent, which agreements shall be accompanied by an acknowledgment by the bank where the lockbox is located of the Lien of the Collateral Agent granted hereunder and of irrevocable instructions to wire all amounts collected therein to a special collateral account at the Collateral Agent.

7.2. Collection of Receivables. The Collateral Agent may at any time after the occurrence of an Event of Default, by giving each Grantor written notice, elect to require that the Receivables be paid directly to the Collateral Agent for the benefit of the Holders of Secured Obligations. In such event, each Grantor shall, and shall permit the Collateral Agent to, promptly notify the account debtors or obligors under the Receivables owned by such Grantor of the Collateral Agent's interest therein and direct such account debtors or obligors to make payment of all amounts then or thereafter due under such Receivables directly to the Collateral Agent. Upon receipt of any such notice from the Collateral Agent, each Grantor shall thereafter hold in trust for the Collateral Agent, on behalf of the Holders of Secured Obligations, all amounts and proceeds received by it with respect to the Receivables and Other Collateral and immediately and at all times thereafter deliver to the Collateral Agent all such amounts and proceeds in the same form as so received, whether by cash, check, draft or otherwise, with any necessary endorsements. The Collateral Agent shall hold and apply funds so received as provided by the terms of Section 7.3 hereof.

7.3. Application of Proceeds. The proceeds of the Collateral received by the Collateral Agent hereunder shall be applied by the Collateral Agent to payment of the Secured Obligations pursuant to the terms of the Credit Agreement.

ARTICLE VIII

GENERAL PROVISIONS

8.1. Notice of Disposition of Collateral; Condition of Collateral. Each Grantor hereby waives notice of the time and place of any public sale or the time after which any private sale or other disposition of all or any part of the Collateral may be made. To the extent such notice may not be waived under applicable law, any notice made shall be deemed reasonable if sent to the Company, addressed as set forth in Article IX, at least ten (10) days prior to (i) the date of any such public sale or (ii) the time after which any such private sale or other disposition may be made. The Collateral Agent shall have no obligation to clean-up or otherwise prepare the Collateral for sale. To the maximum extent permitted by applicable law, each Grantor waives all claims, damages, and demands against the Collateral Agent or any other Holder of Secured Obligations arising out of the repossession, retention or sale of the Collateral, except such as arise solely out of the gross negligence or willful misconduct of the Collateral Agent or such other Holder of Secured Obligations as finally determined by a court of competent jurisdiction. To the extent it may lawfully do so, each Grantor absolutely and irrevocably waives and relinquishes the benefit and advantage of, and covenants not to assert against the Collateral Agent or any other Holder of Secured Obligations, any valuation, stay, appraisal, extension, moratorium, redemption or similar laws and any and all rights or defenses it may have as a surety now or hereafter existing which, but for this provision, might be applicable to the sale of any Collateral made under the judgment, order or decree of any court, or privately under the power of sale conferred by this Security Agreement, or otherwise. Except as otherwise specifically provided herein, each Grantor hereby waives presentment, demand, protest or any notice (to the maximum extent permitted by applicable law) of any kind in connection with this Security Agreement or any Collateral.

8.2. Compromises and Collection of Collateral. Each Grantor and the Collateral Agent recognize that setoffs, counterclaims, defenses and other claims may be asserted by obligors with respect to certain of the Receivables, that certain of the Receivables may be or become uncollectible in whole or in part and that the expense and probability of success in litigating a disputed Receivable may exceed the amount that reasonably may be expected to be recovered with respect to a Receivable. In view of the foregoing, each Grantor agrees that the Collateral Agent may at any time and from time to time, if an Event of Default has occurred and is continuing, compromise with the obligor on any Receivable, accept in full payment of any Receivable such amount as the Collateral Agent in its reasonable discretion shall determine or abandon any Receivable, and any such action by the Collateral Agent shall be commercially reasonable so long as the Collateral Agent acts in good faith based on information known to it at the time it takes any such action.

8.3. Secured Party Performance of Grantor's Obligations. Without having any obligation to do so, the Collateral Agent may perform or pay any obligation which any Grantor has agreed to perform or pay in this Security Agreement if any Grantor fails to perform or pay such obligation and such Grantor shall reimburse the Collateral Agent for any reasonable amounts paid by the Collateral Agent pursuant to this Section 8.3. Each Grantor's obligation to reimburse the Collateral Agent pursuant to the preceding sentence shall be a Secured Obligation payable on demand.

8.4. Authorization for Secured Party to Take Certain Action. Each Grantor irrevocably authorizes the Collateral Agent at any time and from time to time in the reasonable discretion of the Collateral Agent and appoints the Collateral Agent as its attorney in fact (i) to execute on behalf of such Grantor as debtor and to file financing statements necessary or desirable in the Collateral Agent's reasonable discretion to perfect and to maintain the perfection and priority of the Collateral Agent's security interest in the Collateral, (ii) to indorse and collect any cash proceeds of the Collateral during the continuance of an Event of Default, (iii) to file a carbon, photographic or other reproduction of this Security Agreement or any financing statement with respect to the Collateral as a financing statement and to file any other financing statement or amendment of a financing statement (which does not add new collateral or add a debtor) in such offices as the Collateral Agent in its reasonable discretion deems necessary or desirable to perfect and to maintain the perfection and priority of the Collateral Agent's security interest in the Collateral, (iv) during the continuance of an Event of Default, to contact and enter into one or more agreements with the issuers of uncertificated securities which are Collateral owned by such Grantor and which are Securities or with financial intermediaries holding other Investment Property as may be necessary or advisable to give the Collateral Agent Control over such Securities or other Investment Property, (v) during the continuance of an Event of Default, to enforce payment of the Instruments, Accounts and Receivables in the name of the Collateral Agent or such Grantor, (vi) to apply the proceeds of any Collateral received by the Collateral Agent to the Secured Obligations as provided in Article VII and (vii) to discharge past due taxes, assessments, charges, fees or Liens on the Collateral (except for such Liens as are specifically permitted hereunder or under any other Loan Document), and each Grantor agrees to reimburse the Collateral Agent on demand for any reasonable payment made or any reasonable expense incurred by the Collateral Agent in connection therewith, provided that this authorization shall not relieve any Grantor of any of its obligations under this Security Agreement or under the Credit Agreement.

8.5. Specific Performance of Certain Covenants. Each Grantor acknowledges and agrees that a breach of any of the covenants contained in Sections 4.1.5, 4.1.6, 4.4, 5.2, or 8.7 or in Article VII hereof will cause irreparable injury to the Collateral Agent and the Holders of Secured Obligations, that the Collateral Agent and Holders of Secured Obligations have no adequate remedy at law in respect of such breaches and therefore agrees, without limiting the right of the Collateral Agent or the Holders of Secured Obligations to seek and obtain specific performance of other obligations of the Grantors contained in this Security Agreement, that the covenants of the Grantors contained in the Sections referred to in this Section 8.5 shall be specifically enforceable against the Grantors.

8.6. Use and Possession of Certain Premises. Upon the occurrence of an Event of Default, the Collateral Agent shall be entitled to occupy and use any premises owned or leased by the Grantors where any of the Collateral or any records relating to the Collateral are located until the Secured Obligations are paid or the Collateral is removed therefrom, whichever first occurs, without any obligation to pay any Grantor for such use and occupancy.

8.7. Dispositions Not Authorized. No Grantor is authorized to sell or otherwise dispose of the Collateral except as set forth in Section 4.1.5 hereof and notwithstanding any course of dealing between any Grantor and the Collateral Agent or other conduct of the Collateral Agent, no authorization to sell or otherwise dispose of the Collateral (except as set forth in Section 4.1.5 hereof) shall be binding upon the Collateral Agent or the Holders of Secured Obligations unless such authorization is in writing signed by the Collateral Agent.

8.8. Benefit of Agreement. The terms and provisions of this Security Agreement shall be binding upon and inure to the benefit of the Grantors, the Collateral Agent and the Holders of Secured Obligations and their respective successors and assigns (including all persons who become bound as a debtor to this Security Agreement), except that the Grantors shall not have the right to assign their rights or delegate their obligations under this Security Agreement or any interest herein, without the prior written consent of the Collateral Agent. No sales of participations, assignments, transfers, or other dispositions of any agreement governing the Secured Obligations or any portion thereof or interest therein shall in any manner impair the Lien granted to the Collateral Agent, for the benefit of the Collateral Agent and the other Holders of Secured Obligations, hereunder.

8.9. Survival of Representations. All representations and warranties of the Grantors contained in this Security Agreement shall survive the execution and delivery of this Security Agreement.

8.10. Taxes and Expenses. Any taxes (including income taxes) payable or ruled payable by a Federal or State authority in respect of this Security Agreement shall be paid by the Grantors, together with interest and penalties, if any. The Grantors shall reimburse the Collateral Agent for any and all reasonable out-of-pocket expenses and internal charges (including reasonable attorneys', auditors' and accountants' fees and reasonable time charges of attorneys, paralegals, auditors and accountants who may be employees of the Collateral Agent) paid or incurred by the Collateral Agent in connection with the preparation, execution, delivery, administration, collection and enforcement of this Security Agreement and in the audit, analysis, administration, collection, preservation or sale of the Collateral (including the expenses and charges associated with any periodic or special audit of the Collateral). Any and all costs and expenses incurred by the Grantors in the performance of actions required pursuant to the terms hereof shall be borne solely by the Grantors.

8.11. Headings. The title of and section headings in this Security Agreement are for convenience of reference only, and shall not govern the interpretation of any of the terms and provisions of this Security Agreement.

8.12. Termination. This Security Agreement shall continue in effect (notwithstanding the fact that from time to time there may be no Secured Obligations outstanding) until (i) any and all commitments to extend credit under the Loan Documents have terminated and (ii) all of the Secured Obligations (other than contingent indemnity obligations) have been indefeasibly paid in cash and performed in full and no commitments of the Collateral Agent or the Holders of Secured Obligations which would give rise to any Secured Obligations are outstanding.

8.13. Entire Agreement. This Security Agreement and the other Loan Documents embody the entire agreement and understanding between the Grantors and the Collateral Agent relating to the Collateral.

8.14. Governing Law; Jurisdiction; Waiver of Jury Trial.

8.14.1 **THIS SECURITY AGREEMENT SHALL BE CONSTRUED IN ACCORDANCE WITH AND GOVERNED BY THE LAW OF THE STATE OF NEW YORK.**

8.14.2 Each Grantor hereby irrevocably and unconditionally submits, for itself and its property, to the exclusive jurisdiction of the Supreme Court of the State of New York sitting in New York County, Borough of Manhattan and of the United States District Court for the Southern District of New York, and any appellate court from any thereof, in any action or proceeding arising out of or relating to this Security Agreement or any other Loan Document, or for recognition or enforcement of any judgment, and each Grantor hereby irrevocably and unconditionally agrees that all claims in respect of any such action or proceeding may be heard and determined in such New York State or, to the extent permitted by law, in such Federal court. Each Grantor agrees that a final judgment in any such action or proceeding shall be conclusive and may be enforced in other jurisdictions by suit on the judgment or in any other manner provided by law. Nothing in this Security Agreement or any other Loan Document shall affect any right that the Collateral Agent may otherwise have to bring any action or proceeding relating to this Security Agreement or any other Loan Document against any Grantor or its properties in the courts of any jurisdiction.

8.14.3 Each Grantor hereby irrevocably and unconditionally waives, to the fullest extent it may legally and effectively do so, any objection which it may now or hereafter have to the laying of venue of any suit, action or proceeding arising out of or relating to this Security Agreement in any court referred to in Section 8.14.2. Each Grantor hereby irrevocably waives, to the fullest extent permitted by law, the defense of an inconvenient forum to the maintenance of such action or proceeding in any such court.

8.14.4 Each party to this Security Agreement irrevocably consents to service of process in the manner provided for notices in Article IX of this Security Agreement, and each of the Grantors hereby appoints the Company as its agent for service of process. Nothing in this Security Agreement will affect the right of any party to this Security Agreement to serve process in any other manner permitted by law.

8.14.5 **WAIVER OF JURY TRIAL. EACH PARTY HERETO HEREBY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN ANY LEGAL PROCEEDING DIRECTLY OR INDIRECTLY ARISING OUT OF OR RELATING TO THIS SECURITY AGREEMENT OR ANY OTHER LOAN DOCUMENT (WHETHER BASED ON CONTRACT, TORT OR ANY OTHER THEORY). EACH PARTY HERETO (A) CERTIFIES THAT NO REPRESENTATIVE, AGENT OR ATTORNEY OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT, IN THE EVENT OF LITIGATION, SEEK TO ENFORCE THE FOREGOING WAIVER AND (B) ACKNOWLEDGES THAT IT AND THE OTHER PARTIES HAVE BEEN INDUCED TO ENTER INTO THIS SECURITY AGREEMENT AND THE OTHER LOAN DOCUMENTS BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS IN THIS SECTION.**

8.15. Indemnity. Each Grantor hereby agrees, jointly with the other Grantors and severally, to indemnify the Collateral Agent and the Holders of Secured Obligations (collectively, the “Indemnitees”), and their respective successors, assigns, agents and employees, from and against any and all liabilities, damages, penalties, suits, costs and related expenses (including, without limitation, all reasonable expenses of litigation or preparation therefor whether or not the Collateral Agent or any Holder of Secured Obligations is a party thereto) imposed on, incurred by or asserted against the Collateral Agent or the Holders of Secured Obligations, or their respective successors, assigns, agents and employees, in any way relating to or arising out of this Security Agreement or any other Loan Document, or the manufacture, purchase, acceptance, rejection, ownership, delivery, lease, possession, use, operation, condition, sale, return or other disposition of any Collateral (including, without limitation, latent and other defects, whether or not discoverable by the Collateral Agent or the Holders of Secured Obligations or any Grantor, and any claim for patent, trademark or copyright infringement); provided that such indemnity shall not, as to any Indemnitee, and its successors, assigns, agents and employees, be available to the extent that such liabilities, damages, penalties, suits, costs, and related expenses are determined by a court of competent jurisdiction by final and nonappealable judgment to have resulted from the gross negligence or willful misconduct of such Indemnitee and its successors, assigns, agents and employees or from the material breach of such Indemnitee’s obligations under the Loan Documents.

8.16. Subordination of Intercompany Indebtedness. Each Grantor agrees that any and all claims of such Grantor against any other Grantor (each an “Obligor”) with respect to any “Intercompany Indebtedness” (as hereinafter defined), any endorser, obligor or any other guarantor of all or any part of the Secured Obligations, or against any of its properties shall be subordinate and subject in right of payment to the prior payment, in full and in cash, of all Secured Obligations, provided that, and not in contravention of the foregoing, so long as no Event of Default has occurred and is continuing, such Grantor may make loans to and receive payments in the ordinary course of business with respect to such Intercompany Indebtedness from each such Obligor to the extent not prohibited by the terms of this Security Agreement and the other Loan Documents. Notwithstanding any right of any Grantor to ask, demand, sue for, take or receive any payment from any Obligor, all rights, liens and security interests of such Grantor, whether now or hereafter arising and howsoever existing, in any assets of any other Obligor shall be and are subordinated to the rights of the Holders of Secured Obligations and the Collateral Agent in those assets. No Grantor shall have any right to possession of any such asset or to foreclose upon any such asset, whether by judicial action or otherwise, unless and until this Security Agreement has terminated in accordance with Section 8.12 hereof. If all or any part of the assets of any Obligor, or the proceeds thereof, are subject to any distribution, division or application to the creditors of such Obligor, whether partial or complete, voluntary or involuntary, and whether by reason of liquidation, bankruptcy, arrangement, receivership, assignment for the benefit of creditors or any other action or proceeding, or if the business of any such Obligor is dissolved or if substantially all of the assets of any such Obligor are sold, then, and in any such event (such events being herein referred to as an “Insolvency Event”), any payment or distribution of any kind or character, either in cash, securities or other property, which shall be payable or deliverable upon or with respect to any indebtedness of any Obligor to any Grantor (“Intercompany Indebtedness”) shall be paid or delivered directly to the Collateral Agent for application on any of the Secured Obligations, due or to become due, until such Secured Obligations (other than contingent indemnity obligations) shall have first been fully paid and satisfied (in cash). Should any payment, distribution, security or instrument or proceeds thereof be received by the applicable Grantor upon or with respect to the Intercompany Indebtedness after any Insolvency Event and prior to the termination of this Security Agreement in accordance with Section 8.12 hereof, such Grantor shall receive and hold the same in trust, as trustee, for the benefit of the Holders of Secured Obligations and shall forthwith deliver the same to the Collateral Agent, for the benefit of the Holders of Secured Obligations, in precisely the form received (except for the endorsement or assignment of the Grantor where necessary), for application to any of the Secured Obligations, due or not due, and, until so delivered, the same shall be held in trust by the Grantor as the property of the Holders of Secured Obligations. If any such Grantor fails to make any such endorsement or assignment to the Collateral Agent, the Collateral Agent or any of its officers or employees is irrevocably authorized to make the same. Each Grantor agrees that until the termination of this Security Agreement in accordance with Section 8.12 hereof, no Grantor will assign or transfer to any Person (other than the Collateral Agent or the Company or another Grantor) any claim any such Grantor has or may have against any Obligor.

8.17. Severability. Any provision in this Security Agreement that is held to be inoperative, unenforceable, or invalid in any jurisdiction shall, as to that jurisdiction, be inoperative, unenforceable, or invalid without affecting the remaining provisions in that jurisdiction or the operation, enforceability, or validity of that provision in any other jurisdiction, and to this end the provisions of this Security Agreement are declared to be severable.

8.18. Counterparts. This Security Agreement may be executed in counterparts (and by different parties hereto in different counterparts), each of which shall constitute an original, but all of which when taken together shall constitute a single contract. Delivery of an executed counterpart of a signature page of this Security Agreement by telecopy, e-mailed .pdf or any other electronic means that reproduces an image of the actual executed signature page shall be effective as delivery of a manually executed counterpart of this Security Agreement. The words “execution,” “signed,” “signature,” “delivery,” and words of like import in or relating to any document to be signed in connection with this Security Agreement and the transactions contemplated hereby shall be deemed to include Electronic Signatures, deliveries or the keeping of records in electronic form, each of which shall be of the same legal effect, validity or enforceability as a manually executed signature, physical delivery thereof or the use of a paper-based recordkeeping system, as the case may be, to the extent and as provided for in any applicable law, including the Federal Electronic Signatures in Global and National Commerce Act, the New York State Electronic Signatures and Records Act, or any other similar state laws based on the Uniform Electronic Transactions Act.

8.19. Limitation on Collateral Agent's and other Holders of Secured Obligations' Duty with Respect to the Collateral. The Collateral Agent shall have no obligation to clean-up or otherwise prepare the Collateral for sale. The Collateral Agent and each other Holder of Secured Obligations shall use reasonable care with respect to the Collateral in its possession or under its control. Neither the Collateral Agent nor any other Holder of Secured Obligations shall have any other duty as to any Collateral in its possession or control or in the possession or control of any agent or nominee of the Collateral Agent or such other Holder of Secured Obligations, or any income thereon or as to the preservation of rights against prior parties or any other rights pertaining thereto. To the extent that applicable law imposes duties on the Collateral Agent to exercise remedies in a commercially reasonable manner, each Grantor acknowledges and agrees that it is commercially reasonable for the Collateral Agent (i) to fail to incur expenses deemed significant by the Collateral Agent to prepare Collateral for disposition or otherwise to transform raw material or work in process into finished goods or other finished products for disposition, (ii) to fail to obtain third party consents for access to Collateral to be disposed of, or to obtain or, if not required by other law, to fail to obtain governmental or third party consents for the collection or disposition of Collateral to be collected or disposed of, (iii) to fail to exercise collection remedies against account debtors or other Persons obligated on Collateral or to remove Liens on or any adverse claims against Collateral, (iv) to exercise collection remedies against account debtors and other Persons obligated on Collateral directly or through the use of collection agencies and other collection specialists, (v) to advertise dispositions of Collateral through publications or media of general circulation, whether or not the Collateral is of a specialized nature, (vi) to contact other Persons, whether or not in the same business as such Grantor, for expressions of interest in acquiring all or any portion of such Collateral, (vii) to hire one or more professional auctioneers to assist in the disposition of Collateral, whether or not the Collateral is of a specialized nature, (viii) to dispose of Collateral by utilizing internet sites that provide for the auction of assets of the types included in the Collateral or that have the reasonable capacity of doing so, or that match buyers and sellers of assets, (ix) to dispose of assets in wholesale rather than retail markets, (x) to disclaim disposition warranties, such as title, possession or quiet enjoyment, (xi) to purchase insurance or credit enhancements to insure the Collateral Agent against risks of loss, collection or disposition of Collateral or to provide to the Collateral Agent a guaranteed return from the collection or disposition of Collateral, or (xii) to the extent deemed appropriate by the Collateral Agent, to obtain the services of other brokers, investment bankers, consultants and other professionals to assist the Collateral Agent in the collection or disposition of any of the Collateral. Each Grantor acknowledges that the purpose of this Section 8.19 is to provide non-exhaustive indications of what actions or omissions by the Collateral Agent would be commercially reasonable in the Collateral Agent's exercise of remedies against the Collateral and that other actions or omissions by the Collateral Agent shall not be deemed commercially unreasonable solely on account of not being indicated in this Section 8.19. Without limitation upon the foregoing, nothing contained in this Section 8.19 shall be construed to grant any rights to any Grantor or to impose any duties on the Collateral Agent that would not have been granted or imposed by this Security Agreement or by applicable law in the absence of this Section 8.19.

8.20. Reinstatement. This Security Agreement shall remain in full force and effect and continue to be effective should any petition be filed by or against any Grantor for liquidation or reorganization, should any Grantor become insolvent or make an assignment for the benefit of any creditor or creditors or should a receiver or trustee be appointed for all or any significant part of any Grantor's assets, and shall continue to be effective or be reinstated, as the case may be, if at any time payment and performance of the Secured Obligations, or any part thereof, is, pursuant to applicable law, rescinded or reduced in amount, or must otherwise be restored or returned by any obligee of the Secured Obligations, whether as a "voidable preference," "fraudulent conveyance," or otherwise, all as though such payment or performance had not been made. In the event that any payment, or any part thereof, is rescinded, reduced, restored or returned, the Secured Obligations shall be reinstated and deemed reduced only by such amount paid and not so rescinded, reduced, restored or returned.

ARTICLE IX

NOTICES

9.1. Sending Notices. Any notice required or permitted to be given under this Security Agreement shall be sent (and deemed received) in the manner and to the addresses set forth in Section 9.01 of the Credit Agreement. Any notice delivered to the Company shall be deemed to have been delivered to all of the Grantors.

9.2. Change in Address for Notices. Each of the Grantors, the Collateral Agent and the Lenders may change the address for service of notice upon it by a notice in writing to the other parties in accordance with Section 9.01 of the Credit Agreement.

ARTICLE X

THE COLLATERAL AGENT

JPMorgan Chase Bank, N.A. has been appointed Collateral Agent for the Holders of Secured Obligations hereunder pursuant to Article VIII of the Credit Agreement. It is expressly understood and agreed by the parties to this Security Agreement that any authority conferred upon the Collateral Agent hereunder is subject to the terms of the delegation of authority made by the Holders of Secured Obligations to the Collateral Agent pursuant to the Credit Agreement, and that the Collateral Agent has agreed to act (and any successor Collateral Agent shall act) as such hereunder only on the express conditions contained in such Article VIII. Any successor Collateral Agent appointed pursuant to Article VIII of the Credit Agreement shall be entitled to all the rights, interests and benefits of the Collateral Agent hereunder.

[Signature Pages Follow]

IN WITNESS WHEREOF, each of the Grantors and the Collateral Agent have executed this Third Amended and Restated Security Agreement as of the date first above written.

PHOTRONICS, INC.,
as a Grantor

By: _____
Name:
Title:

PHOTRONICS IDAHO, INC.,
as a Grantor

By: _____
Name:
Title:

PHOTRONICS TEXAS ALLEN, INC.,
as a Grantor

By: _____
Name:
Title:

PHOTRONICS CALIFORNIA, INC.,
as a Grantor

By: _____
Name:
Title:

Signature Page to
Third Amended and Restated Security Agreement

Acknowledged and Agreed
as of the date first written above:

JPMORGAN CHASE BANK, N.A., as Collateral Agent

By: _____
Name:
Title:

Signature Page to
Third Amended and Restated Security Agreement

SCHEDULE 1
(See defined term "Collateral" in the Security Agreement)

All documents related to the Taiwan Joint Venture if inclusion would create a breach or default under such agreements.

All documents related to the PRC subsidiary joint venture in Xiamen with DNP if inclusion would create a breach or default under such agreements.

All documents related to the Photonics Hefei subsidiary including the Investment Agreement if inclusion would create a breach or default under such agreements.

Photronics Idaho, Inc.

Fed ID: 61-1602099

Principal Place of Business & Chief Executive Office: 15 Secor Road, Brookfield, CT 06804

Incorporated: Idaho

Date of Formation: July 17, 2009

Idaho ID Number: C183842

Locations of Inventory and Equipment:

A. Owned Locations of Inventory and Equipment of the Grantors:

Connecticut

Building # 1 and #2
15 Secor Road
Brookfield, CT 06804

Idaho

10136 South Federal Way (Nanofab)
Boise, ID 83716

Texas

601 Millennium Drive
Allen, TX 75013

B. Leased Locations of Inventory, Equipment and Fixtures of the Grantors (Include Landlord's Name):

California

830 Hillview Court, Suite 280
Milpitas, CA 95035

Florida

4630 Lipscomb Street, NE
Suite #10 and #12
Palm Bay, FL 32906

C. Public Warehouses or other Locations pursuant to Bailment or Consignment Arrangements (include name of warehouse operator or other bailee or consignee of Inventory and Equipment of the Grantors):

Ulcoat/Inabata hold photomask blanks stock for Brookfield and Allen at their SFO warehouse:

Kintetsu World Express, Inc. (U.S.A.)
251 Lawrence Ave.
South San Francisco, CA 94080

Hoya holds photomask blanks stock for the Nanofab at their SFO warehouse:

Nippon Express USA, Inc.
Import Division
250 Utah Avenue
South San Francisco, CA 94080

A small quantity of chemistry (value ~ \$6K) is held for Nanofab at:

Univar USA Inc.
1804 North 20th Street
Nampa, ID 83687

3rd party warehouse in Dallas:

Imlach & Collins Brothers, LLC - Atlas Van Lines
4653 Leston St #706
Dallas, TX 75247
(800) 777-9835

3rd party warehouses in California:

R.B. High Tech Transport, Inc.
38503 Cherry St Unit A
Newark, CA 94560

S&M Moving Systems North, Inc.
48551 Warm Springs Blvd
Fremont, CA 94539

EXHIBIT "B"
(See Sections 3.8 and 3.12 of Security Agreement)

Patents, copyrights and trademarks protected under federal law and industrial designs:

I. FEDERAL TRADEMARKS – U.S.

A. Registered Trademarks

Mark	Reg. Date	Reg. Number	Owner
CYBERMASK	5/25/2004	2,845,577	Photronics, Inc.
MASKLINK	6/1/2004	2,848,038	Photronics, Inc.
MASKPILOT	6/1/2004	2,847,311	Photronics, Inc.
MASKTRAC	9/17/2002	2,621,660	Photronics, Inc.
	11/6/2007	3,331,421	Photronics, Inc.
	7/25/1995	1,907,169	Photronics, Inc.
PHOTRONICS	6/20/1995	1,900,475	Photronics, Inc.
PHOTRONICS	2/19/2008	3,386,407	Photronics, Inc.
	6/20/1995	1,900,474	Photronics, Inc.

B. Pending Trademarks

NONE

II. U.S. Patents

A. Pending U.S. Patent Applications

	Application Number	Filing Date	Title	Owner
1	15/960,963	4/24/2018	PELLICLE REMOVAL TOOL	Photronics, Inc.

B. U.S. Issued Patents

	Patent Number	Application Number	Title	Filing Date/ Issue Date	Owner
1	6,933,084	10/391,001	ALTERNATING APERTURE PHASE SHIFT PHOTOMASK HAVING LIGHT ABSORPTION LAYER	3/18/2003 8/23/2005	Photronics, Inc.
2	7,344,824	11/024,268	ALTERNATING APERTURE PHASE SHIFT PHOTOMASK HAVING LIGHT ABSORPTION LAYER	12/28/2004 3/18/2008	Photronics, Inc.
3	6,760,640	10/099,622	AUTOMATED MANUFACTURING SYSTEM AND METHOD FOR PROCESSING PHOTOMASKS	3/14/2002 7/6/2004	Photronics, Inc.
4	6,996,450	10/852,532	AUTOMATED MANUFACTURING SYSTEM AND METHOD FOR PROCESSING PHOTOMASKS	5/24/2004 2/7/2006	Photronics, Inc.
5	7,480,539	11/177,459	AUTOMATED MANUFACTURING SYSTEM AND METHOD FOR PROCESSING PHOTOMASKS	7/8/2005 1/20/2009	Photronics, Inc.
6	6,828,068	10/349,629	BINARY HALF TONE PHOTOMASKS AND MICROSCOPIC THREE-DIMENSIONAL DEVICES AND METHOD OF FABRICATING THE SAME	1/23/2003 12/7/2004	Photronics, Inc.

	Patent Number	Application Number	Title	Filing Date/ Issue Date	Owner
7	7,074,530	10/975,293	BINARY HALF TONE PHOTOMASKS AND MICROSCOPIC THREE-DIMENSIONAL DEVICES AND METHOD OF FABRICATING THE SAME	10/28/2004 7/11/2006	Photronics, Inc
8	7,473,500	11/439,757	BINARY HALF TONE PHOTOMASKS AND MICROSCOPIC THREE-DIMENSIONAL DEVICES AND METHOD OF FABRICATING THE SAME	5/24/2006 1/6/2009	Photronics, Inc.
9	7,356,374	11/140,004	COMPREHENSIVE FRONT END METHOD AND SYSTEM FOR AUTOMATICALLY GENERATING AND PROCESSING A PHOTOMASK ORDERS	5/27/2005 4/8/2008	Photronics, Inc.
10	6,682,861	10/370,408	DISPOSABLE HARD MASK FOR PHASE SHIFT PHOTOMASK PLASMA ETCHING	2/19/2003 1/27/2004	Photronics, Inc.
11	6,472,107	09/409,454	DISPOSABLE HARD MASK FOR PHOTOMASK PLASMA ETCHING	9/30/1999 10/29/2002	Photronics, Inc.
12	6,749,974	10/234,790	DISPOSABLE HARD MASK FOR PHOTOMASK PLASMA ETCHING	9/3/2002 6/15/2004	Photronics, Inc.
13	6,908,716	10/839,025	DISPOSABLE HARD MASK FOR PHOTOMASK PLASMA ETCHING	5/4/2004 6/21/2005	Photronics, Inc.
14	6,537,708	09/773,122	ELECTRICAL CRITICAL DIMENSION MEASUREMENTS ON PHOTOMASK	1/31/2001 3/25/2003	Photronics, Inc.
15	7,312,004	10/803,847	EMBEDDED ATTENUATED PHASE SHIFT MASK WITH TUNABLE TRANSMISSION	3/18/2004 12/25/2007	Photronics, Inc.
16	6,524,754	09/766,907	FUSED SILICA PELLICLE	1/22/2001 2/25/2003	Photronics, Inc.
17	6,686,103	10/322,858	FUSED SILICA PELLICLE	12/18/2002 2/3/2004	Photronics, Inc.
18	7,351,503	10/733,723	FUSED SILICA PELLICLE IN INTIMATE CONTACT WITH THE SURFACE OF A PHOTOMASK	12/11/2003 4/1/2008	Photronics, Inc.

	Patent Number	Application Number	Title	Filing Date/ Issue Date	Owner
19	6,567,588	09/940,947	METHOD FOR FABRICATING CHIRPED FIBER BRAGG GRATINGS	8/28/2001 5/20/2003	Photronics, Inc.
20	6,868,209	10/369,262	METHOD FOR FABRICATING CHIRPED FIBER BRAGG GRATINGS	2/19/2003 3/15/2005	Photronics, Inc.
21	6,534,221	09/277,497	METHOD FOR FABRICATING CONTINUOUS SPACE VARIANT ATTENUATING LITHOGRAPHY MASK FOR FABRICATION OF DEVICES WITH THREE-DIMENSIONAL STRUCTURES AND MICROELECTRONICS	3/26/1999 3/18/2003	Photronics, Inc.
22	7,435,533	10/920,475	METHOD OF FORMING A SEMICONDUCTOR LAYER USING A PHOTOMASK RETICLE HAVING MULTIPLE VERSIONS OF THE SAME MASK PATTERN WITH DIFFERENT BIASES	8/18/2004 10/14/2008	Photronics, Inc.
23	6,406,818	09/283,087	METHOD OF MANUFACTURING PHOTOMASKS BY PLASMA ETCHING WITH RESIST STRIPPED	3/31/1999 6/18/2002	Photronics, Inc.
24	6,562,549	10/136,251	METHOD OF MANUFACTURING PHOTOMASKS BY PLASMA ETCHING WITH RESIST STRIPPED	4/29/2002 5/13/2003	Photronics, Inc.
25	9,304,334	14/160,142	MICROFLUIDIC THERMOPTIC ENERGY PROCESSOR	1/21/2014 4/5/2016	Photronics, Inc.
26	9,933,611	15/085,828	MICROFLUIDIC THERMOPTIC ENERGY PROCESSOR	3/30/2016 4/3/2018	Photronics, Inc.
27	9,005,848	12/486,564	PHOTOMASK HAVING A REDUCED FIELD SIZE AND METHOD OF USING THE SAME	6/17/2009 4/14/2015	Photronics, Inc.
28	9,005,849	12/820,905	PHOTOMASK HAVING A REDUCED FIELD SIZE AND METHOD OF USING THE SAME	6/22/2010 4/14/2015	Photronics, Inc.
29	6,855,463	10/229,830	PHOTOMASK HAVING AN INTERMEDIATE INSPECTION FILM LAYER	8/27/2002 2/15/2005	Photronics, Inc.
30	7,049,034	10/658,039	PHOTOMASK HAVING AN INTERNAL SUBSTANTIALLY TRANSPARENT ETCH STOP LAYER	9/9/2003 5/23/2006	Photronics, Inc.

	Patent Number	Application Number	Title	Filing Date/ Issue Date	Owner
31	7,396,617	10/866,976	PHOTOMASK RETICLE HAVING MULTIPLE VERSIONS OF THE SAME MASK PATTERN WITH DIFFERENT BIASES	6/14/2004 7/8/2008	Photronics, Inc.
32	7,790,340	11/788,473	PHOTOMASK WITH DETECTOR FOR OPTIMIZING AN INTEGRATED CIRCUIT PRODUCTION PROCESS AND METHOD OF MANUFACTURING AN INTEGRATED CIRCUIT USING THE SAME	4/20/2007 9/7/2010	Photronics, Inc.
33	7,943,273	12/106,014	PHOTOMASK WITH DETECTOR FOR OPTIMIZING AN INTEGRATED CIRCUIT PRODUCTION PROCESS AND METHOD OF MANUFACTURING AN INTEGRATED CIRCUIT USING THE SAME	4/18/2008 5/17/2011	Photronics, Inc.
34	7,910,269	12/727,342	PHOTOMASK WITH DETECTOR FOR OPTIMIZING AN INTEGRATED CIRCUIT PRODUCTION PROCESS AND METHOD OF MANUFACTURING AN INTEGRATED CIRCUIT USING THE SAME	3/19/2010 3/22/2011	Photronics, Inc.
35	6,842,881	10/209,254	RULE BASED SYSTEM AND METHOD FOR AUTOMATICALLY GENERATING PHOTOMASK ORDERS IN A SPECIFIED ORDER FORMAT	7/30/2002 1/11/2005	Photronics, Inc.
36	7,669,167	10/877,001	RULE BASED SYSTEM AND METHOD FOR AUTOMATICALLY GENERATING PHOTOMASK ORDERS BY CONDITIONING INFORMATION FROM A CUSTOMER'S COMPUTER SYSTEM	6/25/2004 2/23/2010	Photronics, Inc.
37	7,851,110	12/105,992	SECURE PHOTOMASK WITH BLOCKING APERTURE	4/18/2008 12/14/2010	Photronics, Inc.

	Patent Number	Application Number	Title	Filing Date/ Issue Date	Owner
38	8,102,031	12/106,033	SECURITY ELEMENT FOR AN INTEGRATED CIRCUIT, INTEGRATED CIRCUIT INCLUDING THE SAME, AND METHOD FOR SECURING AN INTEGRATED CIRCUIT	4/18/2008 1/24/2012	Photronics, Inc.
39	6,472,766	09/755,438	STEP MASK	1/5/2001 10/29/2002	Photronics, Inc.
40	6,139,994	09/344,251	USE OF INTERSECTING SUBRESOLUTION FEATURES FOR MICROLITHOGRAPHY	6/25/1999 10/31/2000	Photronics, Inc.
41	7,640,529	10/981,201	USER-FRIENDLY RULE-BASED SYSTEM AND METHOD FOR AUTOMATICALLY GENERATING PHOTOMASK ORDERS	11/3/2004 12/29/2009	Photronics, Inc.

1

- Does not include patents owned by Photronics jointly with a third party

C. Copyrights

Copyright	Reg. Date	Copyright Number	Owner
Template	9/7/1993	TXu000597428	Photronics, Inc.

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D. Domain Names

Domain Name	Account No.	Expiration Date
cybermask.com	23023992	6/18/2012
cybermask.info	23023992	
cybermask.net	23023992	11/15/2009
cybermask.org	23023992	
maskpilot.com	23023992	9/23/2009
mymaskshop.com	23023992	1/21/2012
phototronics.biz	23023992	11/18/2011
photronics.com	23023992	11/18/2012
photronics.info	23023992	12/20/2009
photronics.us	23023992	4/18/2011
yourvirtualmaskfab.com	23023992	4/5/2010
photronics.net.cn		
pkl.co.kr		

EXHIBIT "C"

List of Pledged Securities
(See Section 3.10 of Security Agreement)

A. STOCKS:

<u>Issuer</u>	<u>Certificate Number</u>	<u>Number of Shares</u>
Photronics California, Inc.	1	1,000
Photronics Texas Allen, Inc.	1	1,000
Photronics Idaho, Inc.	3	1,000

B. BONDS:

<u>Issuer</u>	<u>Number</u>	<u>Face Amount</u>	<u>Coupon Rate</u>	<u>Maturity</u>
NONE.				

C. GOVERNMENT SECURITIES:

<u>Issuer</u>	<u>Number</u>	<u>Type</u>	<u>Face Amount</u>	<u>Coupon Rate</u>	<u>Maturity</u>
NONE.					

D. OTHER SECURITIES OR OTHER INVESTMENT PROPERTY
(CERTIFICATED AND UNCERTIFICATED):

<u>Issuer</u>	<u>Description of Collateral</u>	<u>Percentage Ownership Interest</u>
NONE.		

EXHIBIT "D"
(See Section 3.1 of Security Agreement)

OFFICES IN WHICH FINANCING STATEMENTS HAVE BEEN FILED

Photronics, Inc.	Connecticut
Photronics California, Inc.	California
Photronics Texas Allen, Inc.	Texas
Photronics Idaho, Inc.	Idaho

EXHIBIT "E"
(See Definition of "Commercial Tort Claims")

COMMERCIAL TORT CLAIMS

[Describe parties, case number (if applicable), nature of dispute]

NONE.

EXHIBIT "F"
(See Section 3.9 of Security Agreement")

FEDERAL EMPLOYER IDENTIFICATION NUMBER;
STATE ORGANIZATION NUMBER; JURISDICTION OF INCORPORATION

<u>GRANTOR</u>	<u>Federal Employer Identification Number</u>	<u>Type of Organization</u>	<u>State of Organization or Incorporation</u>	<u>State Organization Number</u>
Photronics, Inc.	06-0854886	Corporation	Connecticut	0036597
Photronics Texas Allen, Inc.	75-2502950	Corporation	Texas	0128294000
Photronics California, Inc.	75-2502950	Corporation	California	C1802687
Photronics Idaho, Inc.	75-2502950	Corporation	Idaho	C183842

ANNEX I

to

SECURITY AGREEMENT

Reference is hereby made to the Third Amended and Restated Security Agreement (as amended, restated, supplemented or otherwise modified from time to time, the "Agreement"), dated as of September 27, 2018, made by each of PHOTRONICS, INC., a Connecticut corporation (the "Company") and the other Subsidiaries of the Company listed on the signature pages thereto (together with the Company, the "Initial Grantors", and together with any additional Subsidiaries, including the undersigned, which become parties thereto by executing a Supplement in substantially the form hereof, the "Grantors"), in favor of the Collateral Agent. Capitalized terms used herein and not defined herein shall have the meanings given to them in the Agreement.

By its execution below, the undersigned, [NAME OF NEW GRANTOR], a [_____] [corporation/limited liability company/limited partnership] (the "New Grantor") agrees to become, and does hereby become, a Grantor under the Agreement and agrees to be bound by the Agreement as if originally a party thereto. The New Grantor hereby collaterally assigns and pledges to the Collateral Agent for the benefit of the Holders of Secured Obligations, and grants to the Collateral Agent for the benefit of the Holders of Secured Obligations, a security interest in all of the New Grantor's right, title and interest in and to the Collateral, whether now owned or hereafter acquired, to secure the prompt and complete payment and performance of the Secured Obligations. For the avoidance of doubt, the grant of a security interest herein shall not be deemed to be an assignment of intellectual property rights owned by the New Grantor.

By its execution below, the undersigned represents and warrants as to itself that all of the representations and warranties contained in the Agreement are true and correct in all respects as of the date hereof. New Grantor represents and warrants that the supplements to the Exhibits to the Agreement attached hereto are true and correct in all respects and such supplements set forth all information required to be scheduled under the Agreement. New Grantor shall take all steps necessary and required under the Agreement to perfect, in favor of the Collateral Agent, a first-priority security interest in and lien against New Grantor's Collateral.

THIS AGREEMENT SHALL BE CONSTRUED IN ACCORDANCE WITH AND GOVERNED BY THE LAW OF THE STATE OF NEW YORK.

IN WITNESS WHEREOF, the New Grantor has executed and delivered this Annex I counterpart to the Agreement as of this _____ day of _____, 20__.

[NAME OF NEW GRANTOR]

By: _____
Title: _____

No.:

**Fixed Assets Loan Contract
(2016 Edition)**

Special note: The Contract is negotiated by the lender and the borrower on an equal and voluntary basis. All contract terms are true representations of the parties' intentions. To protect the legitimate rights and interests of the Borrower, the Lender specifically invites the Borrower to take full notice of the full terms and conditions of the parties, in particular, the contents in bold.

Lender: Industrial and Commercial Bank of China Limited Xiamen Xiang'an Branch
Principal: Zhuang Youjie Contact: /
Domicile (Address): 13 Xiangxi Fifth Lane, Maxiang Township, Xiang'an District, Xiamen Postal Code: 36101
Telephone: 0592-7065287 Fax: / Email: /

Borrower: Photronics DNP Mask Corporation Xiamen
Legal Representative: PETER SCOTT KIRLIN Contact: _____ Mobile No.: _____
Domicile (Address): _____ Postal Code: _____
Telephone: _____ Fax: _____ Email: _____

[Please ensure that the Borrower fills in the above information accurately and completely to ensure the timely delivery of relevant notices and legal documents.]

Through equal negotiations, a consensus has been reached and the Contract has been entered into on the matters of the Lender's issuance of lending to the Borrower.

Section 1 General Stipulations

Article 1 Loan Purpose

The purpose of loans under the Contract is: Project construction for the "Photronics DNP Mask Corporation Xiamen "New Project (X2017G07-G Plot Phase I Construction)". Without the written consent of the Lender, the Borrower shall not use lending for other purposes. The Lender is entitled to supervision of the use of funds.

Article 2 Lending Amount and Term

2.1 The lending currency under the Contract is the RMB RMB, and the amount is the actual lending amount (in words: the actual withdrawal amount) (where the figure and the amount in words is not the same, the amount in the words shall prevail).

2.2 The lending term under the Contract is no longer than eight years, from the actual withdrawal date (for multiple withdrawals, from the first withdrawal date); the actual withdrawal date shall be based on the loan receipt.

Article 3 Interest Rate, Interest, and Fees

3.1 [Method for determining the RMB lending rate]

The RMB lending rate is determined according to the following method (3) below:

(1) Fixed interest rate, at an annual interest rate of /%, with the interest rate remaining unchanged for the duration of the Contract.

(2) The lending rate is determined by the benchmark interest rate plus a floating range, wherein the benchmark interest rate is the benchmark lending rate of the People's Bank of China on (withdrawal date/contract effective date) that corresponds to the lending term stipulated in Article 2.2, and the floating range is (**upward/downward/zero**) %. After the Borrower makes a withdrawal, the lending rate will remain the same for a period of (1/3/6/12) month(s), to be adjusted once a period, with interest accounted for in segments. The date for determining the interest rate for the second period shall be the date that corresponds to the withdrawal date at the end of the first period; should the given month not have the given date that corresponds to the withdrawal date, the corresponding date shall be the last day of the given month, and the same shall hold true for other periods. Should the Borrower make withdrawals in installments, the lending rate shall be adjusted according to method listed below:

A. Regardless of the number of withdrawals during a single period, the current lending rate determined on the date on which the interest rate for the current period shall be used, to be adjusted at the next period.

B. The lending rate shall be determined and adjusted for each withdrawal.

(3) The lending rate for each withdrawal shall be determined based on the benchmark interest rate plus the floating range, wherein the benchmark interest rate shall be the annual (annual/monthly) loan promotion rate (LPR) by the National Interbank Funding Center published on the business day prior to the withdrawal date (withdrawal date/effective date of the contract) for the current withdrawal, and the floating range shall be (upward/downward/zero) % or plus (plus/less/zero) 83.5 base points (with one base point being 0.01%). The lending rate after each withdrawal shall be adjusted according to method listed below:

A. For a period of (1/3/6/12) month(s), to be adjusted once a period, with interest accounted for in segments. The benchmark interest rate adjustment date for the second period shall be the date that corresponds to the withdrawal date at the end of the first period; should the given month not have the given date that corresponds to the withdrawal date, the corresponding date shall be the last day of the given month. Should the National Interbank Funding Center not have published a loan benchmark interest rate for the corresponding term on the previous business day, the loan benchmark interest for the corresponding term published on the last business day shall prevail, and so on and so forth.

B. The lending rate shall not be adjusted for the entire lending term.

(4) Other:

3.2 [Method for determining the foreign exchange lending rate]

The foreign exchange lending rate shall be determined according to method below:

(1) Fixed interest rate, at an annual interest rate of %, with the interest rate remaining unchanged for the duration of the Contract.

(2) Floating interest rate, with the lending rate determined by the spread of the -month (LIBOR/HIBOR) as the benchmark interest rate plus base points (i.e., 0.01%). The spread will remain unchanged during the Contract term. After the Borrower makes a withdrawal, the benchmark interest rate shall be adjusted according to method listed below, with interest accounted for in segments:

A. For a period of (1/3/6/12) month(s), to be adjusted once a period. The benchmark interest rate adjustment date for the second period shall be the date that corresponds to the withdrawal date at the end of the first period; should the given month not have the given date that corresponds to the withdrawal date, the corresponding date shall be the last day of the given month, and the same shall hold true for other periods.

B. The benchmark interest rate shall be adjusted on the first day of each interest-bearing period.

(3) Other:

3.3 Interest shall be calculated on lending under the Contract on a daily basis from the withdrawal date and settled every month (month/quarter/six months/year). Interest shall be settled with principal when loans are due, and the daily interest rate = annual interest rate/360.

3.4 The penalty interest rate for overdue payments under the Contract shall be determined at 30% of the original lending rate, and the penalty interest rate for misuse of loans shall be determined at 50% of the original lending rate.

3.5 In addition to interest, the Borrower shall also pay a commitment fee to the Lender. The commitment fee shall be the difference between the amount of lending stipulated in Article 2 and the Borrower's withdrawals (the daily average balance during the billing period) and an annual rate of %, to be paid according to method below:

(1) A single payment shall be made to the Lender on the last day of the billing period.

(2) After the Contract enters into force, payments shall be made in installments to the Lender on the 20th day of every (month/quarter/six months) up until the last day of the billing period.

The billing period refers to the period between the signing date of the Contract and the withdrawal date of the last loan as stipulated in Article 4.

The commitment fee is paid in installments; should the Borrower fail to pay the commitment fee on time, the Lender is entitled to the suspension of the issuance of loans or to cancel all amounts that the Borrower has not withdrawn.

Article 4 Withdrawals

The Borrower shall make withdrawals according to method listed below according to actual funding needs:[x1]

(1) One-time loan request prior to ;

(2) One or more loan requests after the Contract's effective date and before ;

(3) Withdrawals in installments on the dates below; the Borrower may, with the Lender's consent, make changes to withdrawal dates or amounts based on funding needs, though the Borrower must make loan requests no later than .

Withdrawal Date	Withdrawal Amount

4.2 Should the Borrower fail to make withdrawals as agreed, the Lender is entitled to cancel, in part or in full, lending that the Borrower has not yet withdrawn.

Article 5 Repayment

5.1 The Borrower shall repay lending according to the following repayment plan (when there is additional content, additional pages can be attached):

Planned Repayment Date	Planned Repayment Amount

For lending under the Contract under the following circumstances, the Borrower shall not be required to pay the early repayment penalty in case the loan is returned immediately after the corresponding funds are in place, thus resulting in early repayment:

_____/_____
 _____/_____

Apart from the circumstances stipulated in Article 5.2, should loans be repaid early, the Borrower shall pay an early repayment penalty to the Lender, with the early repayment penalty calculated according to the following criteria: early repayment amount × remaining lending term (months) × %; if the remaining lending term is less than one month, the period shall be calculated as one month.

Special Agreements on Revolving Loans (Optional clause; this Article is applicable is not applicable)

The Borrower may use lending under the Contract on a revolving basis every / (six months/one year/two years/three years/four years/five years) (hereinafter referred to as the unit lending period). After necessary procedures are performed, the outstanding principal of the loan during the previous unit borrowing period may continue to be used during the next unit borrowing period, but the maturity date of any withdrawal shall not exceed the expiration date of the borrowing period mentioned in the preceding Article 2.

Article 7 Guarantee[x2]

The loan guarantee under the Contract is the maximum guarantee, and the corresponding maximum guarantee contract is as follows:

Name of the maximum guarantee contract: Maximum Mortgage Contract (No.:)

Guarantor: Photronics DNP Mask Corporation Xiamen

Article 8 Financial Agreement (Optional clause; this Article is applicable is not applicable)

For the duration of the Contract, the Borrower shall be subject to the following financial metrics:

_____/_____
 _____/_____

Article 9 Dispute Resolution

The dispute resolution method under the Contract is (1):

(1) The dispute shall be submitted to the Xiamen Arbitration Commission, subject to the arbitration rules effective at the time in which the application for arbitration is submitted for arbitration in Xiamen (arbitral place). The arbitral award is final and binding upon the parties.

(2) The dispute shall be resolved through litigation in the court of the Lender's location.

Article 10 Miscellaneous

The Contract is in duplicate, with the Borrower, Lender, and / /, each holding one original, each of equal legal effect.

10.2 The following attachments and other attachments mutually agreed upon by the parties shall constitute an integral part of the Contract and have the same legal effect as the Contract:

Attachment 1: Withdrawal Notice (Format)

Attachment 2: Entrusted Payment Agreement

Attachment 3: /

Article 11 Other Matters of Agreement

11.1 The arbitral ruling is final and binding on both parties. The parties agree that the arbitration shall be conducted after the arbitration has been filed; the relevant legal documents (including the arbitration documents) shall be deemed to have been served on the day following mailing to the mailing addresses of the parties as recorded in the Contract.

11.2 The Borrower shall disclose related party relationships and related party transactions to the Lender in a timely, comprehensive, and accurate manner; the total amount of financing that the Borrower applies to the Lender for shall not exceed the actual funding needs of Party B. Should the Borrower violate any of the stipulations in the two foregoing paragraphs, the Lender is entitled to take the breach of contract remedy measures as stipulated in this agreement.

11.3 Without the consent of the Lender, the Borrower shall not provide any guarantees or warranties to others or be deemed as in breach of contract, wherein the Lender is entitled to withdraw financing in advance.

11.4 Without the written consent of the Lender, the Borrower shall not set up mortgages (pledges) on or provide guarantees or warranties for assets that it effectively operates.

11.5 The Borrower shall regularly submit reports to the Lender on external guarantees and promise that such information on external guarantee amounts is complete, true, and accurate.

11.6 When the Borrower's financial metrics during the existence of lending are inferior to those previously agreed to by the Lender (if any), the Lender is entitled to declare that the loan expire in advance, to suspend the issuance of unissued funds, to require that the Borrower repay some or all of the loans already issued, or to require that the Borrower provide a legal and valid guarantee as recognized by the Lender.

11.7 The Borrower's operating income shall be collected in an account overseen by the Bank at a ratio no lower than the Bank's interbank ratio, subject to the Bank's supervision, whereby such income is first used to repay loan principal and interest;

11.8 During the existence of loans, without the written consent of the lending bank, the Borrower shall not use this project and the associated rights to add financing, provide guarantees, or invest in others;

11.9 Prior to settling all debts with the Bank, should the Borrower adjust its planning for project operations or otherwise cause significant matters that may adversely affect the interests of the Bank, the Borrower shall first notice the lending bank in advance and obtain their written consent.

Section 2 Specific Stipulations

Article 1 Interest Rate and Interest

1.1 For foreign currency borrowing, LIBOR is the interbank interest rate for the lending currency under the Contract displayed on the Reuters financial telecommunications terminal "LIBO=" page two banking days (11: 00 am London time) prior to the withdrawal date or benchmark interest rate adjustment date; HIBOR is the interbank interest rate for the lending currency under the Contract displayed on the Reuters financial telecommunications terminal "HIBO=" page two banking days (11: 15 am Hong Kong time) prior to the withdrawal date or benchmark interest rate adjustment date.

1.2 Should loan interest be settled on a monthly basis, the settlement date shall be the 20th of each month; should interest be settled quarterly, the settlement date shall be the 20th day of the last month of each quarter; should interest be settled semi-annually, the settlement date shall be June 20 or December 20 of each year.

1.3 The first interest-bearing period shall be from the actual date of withdrawal to the first settlement date; the last interest-bearing period shall be from the day after the end of the previous interest-bearing period to the final payment date; all other interest-bearing periods shall be from the date after the end of the previous interest-bearing period to the next settlement date.

1.4 Loan Interest = Loan Principal × Daily Interest Rate × Actual Days of Use. Should the equal principal and interest repayment method be adopted, the formula for calculating the principal and interest shall be as follows:

$$\text{Total Principal and Interest Per Period} = \frac{\text{Loan Principle} \times \text{Period Profit} \times (1 + \text{Period Profit})^{\text{Number of Repayment Installments}}}{(1 + \text{Period Profit})^{\text{Number of Repayment Installments}} - 1}$$

1.5 For lending under the Contract that adopts a floating interest rate, after a loan is overdue, the rules for interest rate adjustments shall remain unchanged.

1.6 Should the People's Bank of China adjust its measures for determining loan interest rates applicable to lending under the Contract, the relevant rules of the People's Bank of China shall be adopted, and the Lender shall not provide separate notice thereof to the Borrower.

1.7 The lending rate determined at the signing of the Contract may float downward to a certain degree from the relevant loan benchmark interest rate published by the People's Bank of China or the loan prime rate (LPR) published by the National Interbank Funding Center. The Lender is entitled to re-evaluate the Borrower's interest rate concessions each year and determine whether to cancel, in part or in full, the interest rate concessions granted to the Borrower, based on national policies, the Borrower's credit standing, lending guarantee changes, and other such circumstances, and promptly notify the Borrower of such a cancellation.

Article 2 Loan Issuance and Payments

2.1 The Borrower must meet the withdrawal preconditions stipulated under the Contract in order to withdraw loans, otherwise the Lender is not obligated to issue any funds to the Borrower, unless the Lender has agreed to such an issuance in advance;

2.2 Preconditions for initial withdrawal:

(1) The loan project has been approved, accepted, or filed by state authorities; (unless, pursuant to relevant regulations, relevant approval, acceptance, or filing is required prior to issuance of the loan);

(2) Project capital or other funds to be raised have been fully paid at the prescribed times and proportions;

(3) Apart from credit loans, the Borrower has provided corresponding guarantees as required by the Lender and has completed relevant guarantee procedures;

(4) A withdrawal notice has been submitted to the Lender as stipulated under the Contract.

(5) Other materials required by the Lender have been submitted.

2.3 Prior to each withdrawal, in addition to meeting the preconditions for the initial withdrawal, the Borrower shall also meet the following preconditions:

(1) Project capital is allocated, and the current capital has been sufficiently allocated for at the given ratio;

(2) No cost overruns have occurred or cost overruns have been self-financed;

(3) The progress of the project has been completed as planned, and the actual progress of the project matches the invested amount;

(4) There has been no breach of contract under the Contract or other contracts with the Lender;

(5) The proof of loan usage provided is consistent with the intended use.

2.4 Written documents provided to the Lender by the Borrower at the time of withdrawal must be originals; if originals cannot be provided, with the Lender's consent, photocopies affixed with the Borrower's corporate seal may be provided.

2.5 The Borrower must provide the Lender with a withdrawal notice at least five banking days in advance of a withdrawal. Once the withdrawal notice has been submitted, it cannot be revoked without the written consent of the Lender. Once the withdrawal notice has been submitted, it cannot be revoked without the written consent of the Lender.

2.6 Once the Lender has approved of and agreed to the Borrower's withdrawal, the Lender shall transfer the loan to the Borrower's designated account, meaning that the Lender has issued the loan to the Borrower as stipulated under the Contract.

2.7 Pursuant to relevant regulatory requirements and the Lender's administrative requirements, lending exceeding a certain amount or meeting certain conditions shall be made with a Lender's entrusted payment, whereby the Lender pays the loan amount to payment objects that comply with the usage stipulated under the Contract based on the Borrower's withdrawal application and payment entrustment. To this end, the Borrower shall enter into a separate entrusted payment agreement with the Lender as an attachment to the Contract and open or designate an account at the Lender for entrusted payments.

Article 3 Repayments

3.1 The Borrower shall repay the principal, interest and other payables in full and on time as stipulated under the Contract. One banking day prior to the repayment date and each settlement date, the Borrower shall deposit enough in its repayment account opened at the Lender for the current interest, principal, and other payables, and the Lender is entitled to actively collect payment there from on the repayment date or settlement date, or ask that the Borrower comply with relevant transfer procedures. Should the amount in the repayment account be insufficient to pay all payables due, the Lender has the right to determine the order of payment.

3.2 Should the Borrower apply to repay loans early, in part or in full, the Borrower shall submit a written application to the Lender 10 banking days in advance and pay the early repayment penalty to the Lender according to the standards stipulated under the Contract.

3.3 Should the Lender agree to an early repayment, on the early repayment date, the Borrower shall also settle loan principal, interest, and other payments due as of the early repayment date, as stipulated under the Contract.

3.4 Should the actual loan period be shortened because of the Borrower's early repayment or because the Lender withdraws the loan in advance as stipulated under the Contract, the corresponding interest rate grade shall not be adjusted, and the original lending rate shall still be used.

Article 4 Revolving Loans

4.1 Loans under the Contract may be used on a revolving basis, with the first unit lending period being the initial withdrawal date, and the starting date of the second unit lending period being the date that corresponds to the withdrawal date at the end of the first period. Should the starting month of a certain unit lending period not have the date that corresponds to the initial withdrawal date, the last day of the given month shall be the corresponding date, and so on and so forth. Once the unit lending period is determined, it shall not be adjusted without the Lender's consent.

4.2 The lending balance of each unit lending period after the initial unit lending period shall be less than the loan balance of the previous unit lending period, and at the end of each unit lending period, the Borrower shall repay lending according to the stipulated repayment plan. Lending cannot be used on a revolving basis within a single unit lending period.

4.3 If a floating interest rate is used for RMB revolving loans, the benchmark interest rate shall be determined based on the benchmark lending rate of the People's Bank of China for the lending grade that corresponds to the unit lending period.

Article 5 Guarantees

5.1 Apart from credit loans, the Borrower shall provide legal and valid guarantees recognized by the Lender for its performance of obligations under the Contract. A guarantee contract shall be separately signed. A guarantee contract shall be separately signed.

5.2 Should the collateral under the Contract be damaged, devalued, subject to an ownership dispute, seized or withheld, or should the mortgager dispose of the collateral without authorization, or should the financial situation of the guarantor adversely change or change in a way that is not conducive to the Lender's claims, the Borrower shall promptly notify the Lender and provide additional guarantees as recognized by the Lender.

5.3 The Lender is entitled to periodically or irregularly reassess the value of the collateral and the guarantor's ability to guarantee. Should the assessment hold that the value of the collateral has declined or that the guarantor's ability to guarantee has declined, the Borrower shall provide additional guarantees equal to the reduced value or the reduced ability to guarantee and may provide other guarantees as recognized by the Lender.

5.4 Should pledge guarantees for receivables be provided for loans under the Contract, for the duration of the Contract, in any one of the following circumstances, the Lender has the right to declare the early expiration of lending, require that the Borrower immediately repay loan principal and interest, in part or in full, or add additional legal, valid, and sufficient guarantees recognized by the Lender:

- (1) The accounts receivable pledgor's bad debt rate on the payer's accounts receivable has increased for two consecutive months;
- (2) The accounts receivable pledgor's accounts receivable for the payer that are overdue and have yet to be received account for over 5% of the payer's balance of accounts receivable;
- (3) The accounts receivable pledgor has entered into a trade dispute (including but not limited to quality, technology, or service disputes) or claims dispute with the payer or another third party, such that the accounts receivable may not be payable on time.

Article 6 Insurance

6.1 At the Lender's request, the Borrower shall purchase insurance from an insurance company recognized by the Lender for project equipment, project construction, and shipment of goods associated with the borrowing, as well as project construction and operations risks. The type of insurance and period of insurance shall meet the Lender's requirements, and the amount of insurance shall cover the risk of the loan.

6.2 For the duration of the Contract, the Borrower shall not interrupt insurance for any reason. Should insurance be interrupted, the Lender has the right to renew the insurance or purchase insurance on its behalf, and the Borrower shall bear expenses. Should the Borrower and related parties make substantial changes to the policy or terminate it in advance, the Lender shall be notified 30 days in advance, and the Lender's consent must be obtained; otherwise, the Borrower shall be liable for compensation for losses suffered by the Lender from the interruption or termination of insurance or policy changes.

6.3 The insurance policy shall indicate that the Lender is the priority recipient (primary beneficiary) at the time of insurance, and the insurer should directly pay insurance payouts to the Lender. There shall be no restrictions on the Lender's interests in the insurance policy.

6.4 The Borrower shall notify the Lender in writing within three days from the date on which it becomes aware or should be aware of an insured event and shall make a timely claim with the insurance company in accordance with the relevant provisions of the insurance contract. **Insurance compensation or payouts shall be used to repay the loan in advance or to restore the value of the project with the Lender's approval or shall be deposited into the Lender's designated account, as a margin to guarantee the Borrower's performance of debt under the Contract.**

Article 7 Representations and Warranties

The Borrower makes the following representations and warranties to the Lender, which shall be valid for the duration of the Contract:

7.1 Borrowing and related matters comply with legal and regulatory requirements;

7.2 The Borrower has the qualifications for borrowing and the qualifications and ability to sign and perform the Contract.

7.3 All necessary authorizations or approvals have been obtained for signing the contract, and the signing and performance of the contract do not violate the provisions of the company's articles of incorporation or relevant laws and regulations and do not conflict with obligations under other contracts.

7.4 Other debts payable have been paid on time, with no malicious defaults on bank loans or interest.

7.5 There are sound organizations and financial management systems in place. In the past one year, there have been no major disciplinary violations or unlawful conduct, and current senior management have no significantly negative records.

7.6 All documents and materials provided to the Lender are true, accurate, complete, and valid, and they are free of false records, material omissions, or misleading statements.

7.7 Financial accounting reports provided to the Lender have been prepared in accordance with PRC accounting standards, reflecting the Borrower's operating conditions and liabilities in a true, fair, and complete manner. Since the latest financial accounting report, the Borrower's financial position has not experienced any significantly adverse changes.

7.8 No litigation, arbitration, or claims have been concealed from the Lender.

Article 8 Borrower Commitments

8.1 To withdraw and use loans according to the terms and purposes stipulated under the Contract and to ensure that borrowings, in any form, do not flow into the securities market, futures market, or other uses prohibited or restricted by relevant laws and regulations.

8.2 To settle loan principal, interest, and other payables as stipulated under the Contract.

8.3 To accept and actively cooperate with the Lender's accounts analysis inspection and supervision of the use of loan funds, including by means of account analysis, document inspection, and on-site investigations, and to regularly report the use of loan funds as required by the Lender.

8.4 To accept the Lender's credit checks, to provide financial accounting materials, such as balance sheets and income and loss statements, and other materials reflecting the Borrower's solvency, as required by the Lender, and to assist and cooperate with the Lender's investigations, inquiries, and supervision of its productions, operations, and financial standing.

8.5 To not distribute dividends or bonuses, in any form, when there are outstanding loan principal, interest, or other payables (including amounts that are announced as due immediately) under the Contract.

8.6 To first obtain the Lender's written consent or to make arrangements that satisfy the Lender prior to Mergers, divisions, capital reductions, equity changes, equity pledges, transfers of major assets and claims, major foreign investments, substantial increases in debt financing, and other actions that may adversely affect the Lender's equity.

8.7 In any one of the following events, to promptly notify the Lender:

- (1) changes to the company's articles of incorporation, business scope, registered capital, or legal representative;
- (2) closure, dissolution, liquidation, suspension of business, business license suspended or revoked for rectification, or the company applies (is subject to) bankruptcy;
- (3) involvement or possible involvement in major economic disputes, litigation, or arbitration, or property is seized, detained or under supervision by law;
- (4) shareholder(s), director(s), and current senior management are suspect of major cases or economic disputes.

8.8 To promptly, comprehensively, and accurately disclose of related party relationships and related party transactions to the Lender.

8.9 To mail or otherwise send to the Lender and promptly receive various notices.

8.10 To not dispose of its own assets in a manner that reduces solvency; to not use assets formed under the Contract, without obtaining the Lender's consent, to provide guarantees to third parties.

8.11 If borrowing under the Contract is issued as credit, to completely, truthfully, and accurately report routinely to the Lender on external guarantees and, as required by the Lender, sign an account supervision agreement; when external guarantees may affect performance of obligations under the contract, the Lender's written consent must be obtained. when external guarantees may affect performance of obligations under the contract, the Lender's written consent must be obtained.

8.12 To support the Lender's participation in matters such as borrowing calculation (estimates, budgeting, and final accounts) reviews, project bidding, and project completion inspections.

8.13 To bear expenses generated by the Lender to realize claims under the Contract, including but not limited to attorneys' fees and auction fees.

8.14 To give priority to the Borrower's debts to its shareholders in terms of the priority for settling debts under the Contract and to at least give such debts an equal footing as other similar debts of the Borrower's other creditors.

8.15 To strengthen environmental and social risk management and accept the Lender's supervision and inspections in this regard. If required by the Lender, to submit environmental and social risk reports to the Lender.

Article 9 Lender Commitments

9.1 To issue loans to the Borrower as stipulated under the Contract.

9.2 To keep confidential non-public materials and information provided by the Borrower, unless laws and regulations require otherwise or the Contract stipulates otherwise.

Article 10 Breach of Contract

10.1 Any one of the following events shall constitute breach of contract by the Borrower:

(1) the Borrower fails to repay loan principal, interest, or other payables under the Contract according to stipulations under the Contract or acts contrary to representations, warranties, or commitments under the Contract;

(2) changes occur to guarantees under the Contract that are not conducive to the Lender's claims, and the Borrower fails to provide other guarantees recognized by the Lender;

(3) the Borrower is unable to settle any other debts due (including debts declared due early) or fails to perform or violates obligations under other agreements, such that it has affected or may affect its performance of obligations under the Contract;

(4) the Borrower's financial metrics, such as profitability, solvency, operating capacity, and cash flow, fail to meet agreed standards, or the deterioration thereof has affected or may affect the performance of its obligations under the Contract;

(5) the Borrower's equity structure, production, operations, and foreign investments have undergone significantly adverse changes that have affected or may affect the performance of its obligations under the Contract;

(6) the Borrower is involved in or may be involved in major economic disputes, litigation, arbitration, or assets have been seized, detained or enforced, or is being investigated or dealt with by judicial or administrative organs in accordance with the law or subject to penalties in accordance with the law, or is exposed by the media for violating relevant state regulations or policies, such that it has affected or may affect the performance of its obligations under the Contract;

(7) the Borrower's main investors and key management personnel make abnormal changes, go missing, or are investigated or restricted by judicial authorities in accordance with the law, such that it has affected or may affect the performance of its obligations under the Contract;

(8) the Borrower utilizes false contracts with related parties, utilizes transactions without actual trading to obtain funding or credit from the Lender, or intentionally evades the Lender's claims through related transactions;

(9) the Borrower has or may be closed, dissolved, liquidated, have its business suspended, have its business license rectified or revoked, or apply for (or be subject to) bankruptcy;

(10) the Borrower has a liability incident or a major environmental or social risk incident for food safety, safety production, or environmental protection violations or violation other environmental or social risk management laws, regulations, or industry standards, such that it has affected or may affect the performance of its obligations under the Contract;

(11) project capital is not allocated as planned or at the stipulated ratio or is not paid up within the time prescribed by the Lender;

(12) the project is not completed as scheduled or the project construction or the operating environment and conditions undergo significantly adverse changes;

(13) if borrowing under the Contract is issued as credit, the Borrower's credit rating, profitability, asset-liability ratio, cash flow from operating activities, or other metrics do not meet the Lender's conditions for credit lending; or the Borrower sets up pledge/mortgage guarantees for others or provides guarantees using its validly operated assets without the written consent of the Lender, such that it has affected or may affect the performance of its obligations under the Contract;

(14) Other circumstances that may adversely affect the Lender's realization of claims under the Contract.

10.2 Should the Borrower breach the Contract, the Lender is entitled to take one or more of the following remedies:

(1) to require that the Borrower rectify the breach of contract within a period of time;

(2) to suspend the issuance of loans or other financing to the Borrower based on the Contract or other contracts between the Lender and the Borrower and cancel, in part or in full, loans or other financing that the Borrower has yet to withdraw;

(3) to announce immediate expiration of lending or other financing under the Contract and other contracts between the Lender and the Borrower and to immediately recover unpaid amounts;

(4) to require that the Borrower compensate for losses suffered by the Lender from the breach of contract;

(5) other remedies provided by laws or regulations, as stipulated under the Contract, or as deemed necessary by the Lender.

10.3 For loans due yet unrepaid by the Borrower as agreed (including debts that are announced as due immediately), the Lender is entitled to charge penalty interest from the date at the overdue penalty interest rate stipulated under the Contract from the date on which the amount was overdue. For interest that the Borrower fails to pay on time (including penalty interest), compound interest shall be charged based on the overdue penalty interest rate. Penalty interest / compound interest shall be settled according to the interest settlement rules stipulated under the Contract.

10.4 Should the Borrower fail to use loans according to the usage stipulated under the Contract, the Lender is entitled to charge penalty interest for misuse of funds according to the penalty interest rate stipulated in the Contract from the date in which funds are misused, and compound interest shall be charged according to the penalty interest rate for misuse of funds for interest (including penalty interest) not paid on time during the misuse of funds. Penalty interest / compound interest shall be settled according to the interest settlement rules stipulated under the Contract.

10.5 Should the Borrower simultaneously encounter the circumstances of **Article 10.3 and Article 10.4**, the greater penalty interest rate shall be charged and cannot be combined.

10.6 Should the Borrower fail to repay loan principal, interest (including penalty interest and compound interest), or other payables on time, the Lender is entitled to make an announcement through the media.

10.7 Should the Borrower's related parties' controlling relationship with the Borrower change or should the Borrower's related party encounter the circumstances in **Article 10.1** other than items **(1) or (2)**, such that it has affected or may affect the Borrower's performance of its obligations under the Contract, the Lender is entitled to take various measures as stipulated under the Contract.

Article 11 Withholding

11.1 Should the Borrower fail to repay debts due under the Contract as agreed (including debts announced as due immediately), the Borrower agrees that the Lender may withhold corresponding amounts from all foreign exchange and RMB accounts that the Borrower has opened at ICBC to settle debts owed, until the Borrower's debts under the Contract have been settled in full.

11.2 Should the withheld amount be in a currency other than that of the Contract, the currency shall be exchanged at the Lender's applicable exchange rate on the withholding date. The Borrower shall bear interest and other expenses incurred from the withholding date to the settlement date (the date on which the Lender converts the withheld amount into the currency of the Contract according to national foreign exchange management policies and actually pays of the debts under the Contract), as well as differences from exchange rate volatility during this period.

11.3 Should the amount withheld by the Lender be insufficient to settle all debts owed by the Borrower, the Lender has the right to decide on the order of settlement.

Article 12 Transfer of Rights and Obligations

12.1 The Lender is entitled to transfer its rights under the Contract, in part or in full, to a third party, and the Lender's transfer thereof does not require the Borrower's consent. Without the written consent of the Lender, the Borrower shall not transfer any of its rights or obligations under the Contract. Without the written consent of the Lender, the Borrower shall not transfer any of its rights or obligations under the Contract.

12.2 The Lender or Industrial and Commercial Bank of China Limited ("ICBC") may, based on its business management needs, authorize or entrust other ICBC branch agencies to perform rights and obligations under the Contract, or place loan claims under the Contract under the management of other ICBC branch agencies. The Borrower agrees that the such actions shall no longer require the consent of the Borrower. The Borrower agrees that the such actions shall no longer require the consent of the Borrower. Other ICBC branch agencies that undertake the rights and obligations of the Lender are entitled to exercise all rights under the Contract and are entitled to file lawsuits, submit for arbitration, or apply for enforcement in the name of the given agency.

Article 13 Entry into Force, Changes, and Release of Contract

13.1 The Contract enters into force on the signing date and shall be terminated on the date on which the Borrower fully performs all obligations under the Contract.

13.2 Any changes to the Contract shall be agreed to the parties and made in writing. Changed clauses or agreements constitute a part of the Contract and shall have the same legal effect of the Contract. Apart from the changed sections, other parts of the Contract shall remain in effect, and the original terms shall remain in effect until the change is effective.

13.3 Changes to and release of the Contract shall not affect the rights of the contracting parties to claim damages. The release of the Contract does not affect the validity of the dispute resolution clause.

Article 14 Applicable Law and Dispute Resolution

The conclusion, validity, interpretation, performance of the Contract and settlement of disputes under the Contract shall be governed by the laws of the People's Republic of China. Any disputes or issues arising from or related to the Contract shall be settled through negotiations by the borrower and the lender; where negotiations fail, disputes shall be resolved through methods as stipulated under the Contract.

Article 15 Address Confirmation for Serving Litigation/Arbitration Instruments

15.1 The Borrower confirms that the address listed on the first page of the Contract is the address for serving litigation/arbitration instruments for disputes under the Contract. Litigation/arbitration instruments include but are not limited to subpoenas, notices of hearings, judgments, rulings, mediations, and time-limit notices.

15.2 The Borrower agrees that arbitration institutions or the courts may use the fax or email address listed on the first page of the Contract to serve arbitration/litigation instruments, except for judgments, rulings, and mediations.

15.3 The abovementioned stipulations on service are applicable to first hearings, second hearings, retrials, and enforcement under arbitration and litigation proceedings. As for service to the above address, arbitration institutions or the courts may serve instruments directly by mail.

15.4 The Borrower shall ensure the truthfulness and validity of the address, contact, fax, email address, and other information listed in the Contract, and if related information changes, the Borrower shall promptly notify the Lender in writing; otherwise, service to the original mailing address shall still be valid, and the Borrower shall bear all resulting legal consequences.

Article 16 Complete Contract

Section 1: Basic Stipulations and Section 2: Specific Stipulations of the Contract together constitute a single complete fixed assets loan contract, and the same terms in the two sections shall have the same meanings. The Borrower's borrowing is subject to the above two sections. The Borrower's borrowing is subject to the above two sections.

Article 17 Notifications

17.1 All notices from the parties to the Contract shall be sent in writing. Unless stipulated otherwise, the parties designate the domiciles listed in the Contract as their mailing address and contact address. Unless stipulated otherwise, the parties designate the domiciles listed in the Contract as their mailing address and contact address. Should either party's mailing address or other contact information change, the other party shall be promptly notified in writing.

17.2 Should either party to the Contract refuse to accept mail or should otherwise be unable to be served, the notifying party may serve mail by notarization or an announcement.

Article 18 Special Value-Added Tax Stipulations

18.1 Interest and expenses under the Contract paid by the Borrower to the Lender shall all include taxes.

18.2 Should the Borrower request that the Lender issue a value-added tax receipt, relevant information shall first be registered with the Lender. Information for registration includes the Borrower's full name, the taxpayer's identification number or social credit code, address, telephone, bank of account, and account number. The Borrower shall ensure that relevant information provided to the Lender is true, accurate, and complete and shall provide relevant proof as required by the Lender; for specific requirements, the Lender may send online notices or make online announcements.

18.3 Should the Borrower collect its own value-added tax invoices, it shall provide the Lender with a stamped power of attorney, designating the collector and specifying such information as the collector's identification number; thereafter, the collector shall present the original of his or her identification card to collect value-added tax invoices. If the designated collector changes, the Borrower shall need to issue to the Lender a new stamped power of attorney. Should the Borrower choose to receive value-added tax invoices by mail, the Borrower shall still provide accurate, error-free, and servable mailing information; if the mailing information changes, the Lender shall be promptly notified in writing.

18.4 Should the Lender be unable to promptly issue value-added tax invoices due to natural disasters, government actions, social anomalies, and other circumstances of force majeure or because of tax authorities, the Lender is entitled to delay invoicing and shall not assume any responsibility.

18.5 Should a value-added tax invoice be lost, damaged, or overdue after it is collected by the Borrower or delivery by the Lender to a third party, or for other reasons unrelated to the Lender, such that the Borrower cannot receive the value-added tax invoice or cannot deduct the tax on time, the Lender shall not be liable for compensating the Borrower for related economic losses.

18.6 Should the Borrower need to have a special red-text value-added tax invoice issued because of sales returns, the suspension of taxable services, or invoicing errors, deductions, or the inability to certify invoices and the Borrower is required, under relevant laws, regulations, and policy documents, to submit a Special Red-Text Value-Added Tax Invoice Issuance Information Form, the Borrower shall submit a Special Red-Text Value-Added Tax Invoice Issuance Information Form to tax authorities; once approved by tax authorities and once notified, the Lender shall issue a special red-text value-added tax invoice.

18.7 During the performance of the Contract, should national tax rates be adjusted, the Lender is entitled to adjust pricing under the Contract based on changes and adjustments to national tax rates.

Article 19 Miscellaneous

19.1 Lender's failure to exercise or partially exercise or delay the exercise of any right under the Contract does not constitute a waiver or change of that right or other rights, nor does it affect its further exercise of that right or other rights.

19.2 Should any term of the Contract be invalid or unenforceable, it shall not affect the validity and enforceability of other terms and shall not affect the validity of the entire contract.

19.3 The Lender is entitled to, pursuant to relevant legal and regulatory provisions and the requirements of financial regulators, to provide information related to the Contract or the Borrower's other information to the People's Bank of China Credit System and other lawfully established credit information databases to be queried and used by qualified institutions or individuals. The Lender is also entitled, for the purposes of entering into and performing the Contract, to query the Borrower's related information on the People's Bank of China Credit System and other lawfully established credit information databases.

19.4 The terms “related party”, “related party relationships”, “related party transactions”, “main investors”, “key management personnel”, and other such terms shall have the same meanings as the same terms in the Accounting Standards for Business Enterprises No. 36 - Related Party Disclosures (C.H. [2006] 3) issued by the Ministry of Finance, as well as subsequent amendments to the Standards.

19.5 The environmental and social risks mentioned in the Contract refer to the environmental and social hazards and risks associated with the Borrower and its important related parties in construction, production, and operation activities, including environmental and social issues related to energy consumption, pollution, land, health, safety, resettlement, ecological protection, and climate change.

19.6 The documents and vouchers for loans under the Contract prepared and retained by the Lender according to its business rules constitute valid evidence for the credit relationship between the Borrower and the Lender and are binding on the Borrower.

19.7 In the Contract, (1) all mention of the Contract shall include revisions to or supplementation of the Contract; (2) article titles are for reference only and do not constitute any interpretation of the Contract, nor do they impose any restrictions on the content of the titles or their scope; and (3) should withdrawal dates or repayment dates fall on non-banking days, they shall be postponed to the next banking day.

The parties acknowledge that: both the Borrower and the Lender have fully negotiated on all of the terms of the Contract. Lender has drawn the Borrower’s attention to all terms related to the parties’ rights and obligations, so that the Borrower full and accurately understands them, and at the request of the Borrower, the Lender has provided explanations for relevant provisions. The Borrower has carefully read and fully understands all terms of the Contract (including Section 1: General Stipulations and Section 2: Specific Stipulations), and both the Borrower and the Lender have reached full consensus on the understanding of the terms of the Contract with no objections to the contractual contents.

Lender (Seal):
Principal/Attorney:_____

Borrower (Seal):
Legal Representative/Attorney:_____

Contract Signing Date:_____

Attachment 1:

Withdrawal Notice

Industrial and Commercial Bank of China _____:

Pursuant to the _Contract, number_, signed by our company and your bank on (hereinafter referred to as the “Lending Contract”), we have fully implemented the preconditions for withdrawal as stipulated in the Lending Contract, and we hereby issue the following withdrawal notice to your bank:

I. We intend to withdrawal lending from your bank for the amount of ____(currency) __on .

II. The lending term is _, ending on .

III. Please transfer this loan to our designated account below:

Account Name: _____

Account Number: _____

Bank of Account: _____

IV. Pursuant to the stipulations of the Lending Contract and the entrusted payment agreement, for this loan, the entrusted payment is _____; the company itself shall pay _____.

Under the Lender’s entrusted payment method, we authorize and entrust your bank to transfer the loan to our account and make payment to the accounts of the following payment objects for the purposes agreed upon under the Lending Contract:

Account Name: _____

Account Number: _____

Bank of Account: _____

[This loan must be paid to multiple payment objects at the same time. See the attachment for the list of payment objects and accounts.]

V. We provide confirmation to your bank that:

1. This loan shall be used for the purposes as stipulated in the Lending Contract;

2. All statements, warranties, and commitments that we make are true, accurate, complete, and valid at the date of issuance of this notice and the withdrawal date.

3. As of the date of issuance of this notice, there have been no significantly adverse changes to our production operations or our financial credit standing.

4. As of the date of issuance of this notice, there are no defaults or expected defaults under the Lending Contract or in relation to the Lending Contract. We further confirm that no default events shall occur or be present on the withdrawal date.

5. This notification is irrevocable once issued.

Borrower (Seal):

Legal Representative/Attorney:

Date:

List of Objects of Payment and Accounts

Payment Object 1:

Account Name: _____
Account Number: _____
Bank of Account: _____
Payment Amount: _____

Payment Object 2:

Account Name: _____
Account Number: _____
Bank of Account: _____
Payment Amount: _____

Payment Object 3:

Account Name: _____
Account Number: _____
Bank of Account: _____
Payment Amount: _____

Payment Object 4:

Account Name: _____
Account Number: _____
Bank of Account: _____
Payment Amount: _____

Borrower: (Seal)

No.:0410000286-2018 (Xiang'an) No. 00287_____

[seal:]

**Working Capital Loan Contract
(2016 Edition)**

[seal:]

Special Note: The Contract is negotiated by the lender and the borrower on an equal and voluntary basis. All contract terms are true representations of the parties' intentions. To protect the legitimate rights and interests of the Borrower, the Lender specifically invites the Borrower to take full notice of the full terms and conditions of the parties, in particular, the contents in bold.

Contract Main Body Page 1 of 17

Contract Serial #201811220410001245216760
Document 1 of 2

ICBC Mobile Bank "Scan It" to verify
contract contents [QR Code]

Lender: Industrial and Commercial Bank of China Limited Xiamen Xiang'an Branch

Principal: _____

Domicile (Address): _____ **Postal Code:** _____

Borrower: _____

Legal Representative: _____ **Contact:** _____ **Mobile No.:** _____

Domicile (Address): _____ **Postal Code:** _____

Telephone: _____ **Fax:** _____ **Email:** _____

[Please ensure that the Borrower fills in the above information accurately and completely to ensure the timely delivery of relevant notices and legal documents.]

Through equal negotiations, a consensus has been reached and the Contract has been entered into on the matters of the Lender's issuance of lending to the Borrower.

Section 1 General Stipulations

Article 1 Loan Purpose

Loans under the Contract shall be used for the following purpose; without the written consent of the Lender, the Borrower shall not misuse any loans. The Lender is entitled to supervision of the use of funds.

Loan Purpose: VAT Payment

Article 2 Lending Amount and Term

2.1 The currency of the contract is the RMB, and the amount is 1600000.00 (in words: One million and six hundred thousand yuan) (where the figure and the amount in words is not the same, the amount in words shall prevail).

2.2 The lending term under the Contract is 36 months, from the actual withdrawal date (for multiple withdrawals, from the first withdrawal date); the actual withdrawal date shall be based on the loan receipt.

Article 3 Interest Rates, Interest, and Fees

3.1 [Method for determining the RMB lending rate]

Contract Main Body Page 2 of 17

Contract Serial #201811220410001245216760
Document 1 of 2

ICBC Mobile Bank "Scan It" to verify
contract contents [QR Code]

The RMB lending rate is determined according to the following method (3)(1/2/3/4) below:

(1) Fixed interest rate, at an annual interest rate of %, with the interest rate remaining unchanged for the duration of the Contract.

(2) The lending rate is determined by the benchmark interest rate plus a floating range, wherein the benchmark interest rate is the benchmark lending rate of the People's Bank of China on (withdrawal date/ effective date of the Contract) that corresponds to the lending term stipulated in Article 2.2, and the floating range is (upward/downward/zero) %. After the Borrower makes a withdrawal, the lending rate will remain the same for a period of (1/3/6/12) month(s), to be adjusted once a period, with interest accounted for in segments. The date for determining the interest rate for the second period shall be the date that corresponds to the withdrawal date at the end of the first period; should the given month not have the given date that corresponds to the withdrawal date, the corresponding date shall be the last day of the given month, and the same shall hold true for other periods. Should the Borrower make withdrawals in installments, the lending rate shall be adjusted according to method (A/B) listed below:

A. Regardless of the number of withdrawals during a single period, the current lending rate determined on the date on which the interest rate for the current period shall be used, to be adjusted at the next period.

B. The lending rate shall be determined and adjusted for each withdrawal.

(3) The lending rate for each withdrawal shall be determined based on the benchmark interest rate plus the floating range, wherein the benchmark interest rate shall be the (annual/monthly) loan promotion rate (LPR) by the National Interbank Funding Center published on the business day prior to the withdrawal date (withdrawal date/effective date of the contract) for the current withdrawal, and the floating range shall be (upward/downward/zero) % or plus (plus/less/zero) 67.75 base points (with one base point being 0.01%). The lending rate after each withdrawal shall be adjusted according to method (A/B) listed below:

A. For a period of (1/3/6/12) month(s), to be adjusted once a period, with interest accounted for in segments. The benchmark interest rate adjustment date for the second period shall be the date that corresponds to the withdrawal date at the end of the first period; should the given month not have the given date that corresponds to the withdrawal date, the corresponding date shall be the last day of the given month. Should the National Interbank Funding Center not have published a loan benchmark interest rate for the corresponding term on the previous business day, the loan benchmark interest for the corresponding term published on the last business day shall prevail, and so on and so forth.

B. The lending rate shall not be adjusted for the entire lending term.

(4) Other:

3.2 [Method for determining the foreign exchange lending rate]

The foreign exchange lending rate shall be determined according to method listed below:

(1) Fixed interest rate, at an annual interest rate of %, with the interest rate remaining unchanged for the duration of the Contract.

(2) Floating interest rate, with the lending rate a floating interest rate composed of the spread of the -month (LIBOR/HIBOR) as the benchmark interest rate plus base points (one base point is 0.01%). The spread will remain unchanged during the Contract term. Should withdrawals be made in installments, the interest rate shall be calculated for each withdrawal. After the Borrower makes a withdrawal, the benchmark interest rate shall be adjusted according to method listed below, with interest accounted for in segments:

A. For a period of (1/3/6/12) month(s), to be adjusted once a period. The benchmark interest rate adjustment date for the second period shall be the date that corresponds to the withdrawal date at the end of the first period; should the given month not have the given date that corresponds to the withdrawal date, the corresponding date shall be the last day of the given month, and the same shall hold true for other periods.

B. The benchmark interest rate shall be adjusted on the first day of each interest-bearing period.

(3)Other: /

3.3 Interest shall be calculated on lending under the Contract on a daily basis from the withdrawal date and settled every month (month/quarter/six months). Interest shall be settled with principal when loans are due, and the daily interest rate = annual interest rate/360.

3.4 The penalty interest rate for overdue payments under the Contract shall be determined at 30 % of the original lending rate, and the penalty interest rate for misuse of loans shall be determined at 50 % of the original lending rate.

3.5 In addition to interest, the Borrower shall also pay a commitment fee to the Lender. The commitment fee shall be the difference between the amount of lending stipulated in Article 2 and the Borrower's withdrawals (the daily average balance during the billing period) and an annual rate of %, to be paid according to method below:

(1) A single payment shall be made to the Lender on the last day of the billing period.

(2) After the Contract enters into force, payments shall be made in installments to the Lender on the 20th day of every (month/quarter/six months) up until the last day of the billing period.

Should loans under the Contract be on a revolving basis, the billing period refers to the time limit on the use of credit for revolving loans; should loans under the Contract not be on a revolving basis, the billing period refers to the period between the signing date of the Contract and the withdrawal date of the last loan as stipulated in Article 4.

The commitment fee is paid in installments; should the Borrower fail to pay the commitment fee on time, the Lender is entitled to the suspension of the issuance of loans or to cancel all amounts that the Borrower has not withdrawn.

Article 4 Withdrawals(Revolving Loans are Not Applicable)

4.1 The Borrower shall make withdrawals according to method (1) (1/2/3) listed below according to actual funding needs:

(1) **One-time loan request prior to 12/14/2018;**

(2) **One or more loan requests after the Contract's effective date and before ;**

(3) **Withdrawals in installments on the dates below; the Borrower may, with the Lender's consent, make changes to withdrawal dates or amounts based on funding needs, though the Borrower must make loan requests no later than .**

Withdrawal Date	Withdrawal Amount
/	/
/	/
/	/

4.2 Should the Borrower fail to make withdrawals as agreed, the Lender is entitled to cancel, in part or in full, lending that the Borrower has not yet withdrawn.

Article 5 Repayments

5.15.1 The Borrower shall repay loans under the Contract according to method (2)(1/2) listed below:

(1) One-time loan repayment upon expiration.

(2) According to the following repayment plan (when there is additional content, additional pages can be attached):

Planned Repayment Date	Planned Repayment Amount
05-20-2019	16000.00 yuan
11-20-2019	64000.00 yuan
05-20-2020	80000.00 yuan
11-20-2020	160000.00 yuan
05-20-2021	160000.00 yuan
11-05-2021	1120000.00 yuan

5.2 For lending under the Contract under the following circumstances, the Borrower shall not be required to pay the early repayment penalty in case the loan is returned immediately after the corresponding funds are in place, thus resulting in early repayment:

∟

∟

5.3 Apart from the circumstances stipulated in Article 5.2, should loans be repaid early, the Borrower shall pay an early repayment penalty to the Lender, with the early repayment penalty calculated according to the following criteria: early repayment amount × remaining lending term (months) × ∟%; if the remaining lending term is less than one month, the period shall be calculated as one month.

Article 6 Special Agreements on Revolving Loans (Optional clause; this Article is applicable is not applicable)

6.1 Loans under the Contract may be used on a revolving basis, and the lending amount and lending periods in Article 2 above shall be the revolving loan credit line and revolving loan credit term, wherein the revolving loan credit term is calculated from the effective date of the Contract.

6.2 RMB revolving loans are determined using the benchmark lending rate published by the People’s Bank of China plus the floating range, and the benchmark lending rate is determined based on the benchmark lending rate of the People’s Bank of China that corresponds to the grade of each lending term.

Article 7 Guarantees

The loan guarantee under the Contract is the maximum guarantee, and the corresponding maximum guarantee contract is as follows ____/____(1/2/3, select as many as applicable):

(1) Maximum Guarantee Contract Name: ∟(No.: ∟)

Guarantor: /

(2) Maximum Mortgage Contract Name: / (No.: /)

Mortgager: /

(3) Maximum Pledge Contract Name: / (No.: /)

Pledger: /

Article 8 Financial Agreement (Optional clause; this Article is applicable is not applicable)

For the duration of the Contract, the Borrower shall be subject to the following financial metrics:

/

/

Article 9 Dispute Resolution

The dispute resolution method under the Contract is (1) (1/2):

(1) The dispute shall be submitted to the Xiamen Arbitration Commission, subject to the arbitration rules effective at the time in which the application for arbitration is submitted for arbitration in Xiamen (arbitral place). The arbitral award is final and binding upon the parties.

(2) The dispute shall be resolved through litigation in the court of the Lender's location.

Article 10 Miscellaneous

10.1 The Contract is in 2 duplicates, with the Borrower, Lender, and /, each holding one original, each of equal legal effect.

10.2 The following attachments and other attachments mutually agreed upon by the parties shall constitute an integral part of the Contract and have the same legal effect as the Contract:

Attachment 1: Withdrawal Notice (Format)

Attachment 2: Entrusted Payment Agreement

Attachment 3: /

Article 11 Other Matters of Agreement

11.1 The arbitral ruling is final and binding on both parties. The parties agree that the arbitration shall be conducted after the arbitration has been filed; the relevant legal documents (including the arbitration documents) shall be deemed to have been served on the day following mailing to the mailing addresses of the parties as recorded in the Contract.

11.2 The Borrower shall disclose related party relationships and related party transactions to the Lender in a timely, comprehensive, and accurate manner; the total amount of financing that the Borrower applies to the Lender for shall not exceed the actual funding needs of Party B. Should the Borrower violate any of the stipulations in the two foregoing paragraphs, the Lender is entitled to take the breach of contract remedy measures as stipulated in this agreement.

11.3 Without the consent of the Lender, the Borrower shall not provide any guarantees or warranties to others or be deemed as in breach of contract, wherein the Lender is entitled to withdraw financing in advance.

11.4 Without the written consent of the Lender, the Borrower shall not set up mortgages (pledges) on or provide guarantees or warranties for assets that it effectively operates.

11.5 The Borrower shall regularly submit reports to the Lender on external guarantees and promise that such information on external guarantee amounts is complete, true, and accurate.

11.6 When the Borrower's financial metrics during the existence of lending are inferior to those previously agreed to by the Lender (if any), the Lender is entitled to declare that the loan expire in advance, to suspend the issuance of unissued funds, to require that the Borrower repay some or all of the loans already issued, or to require that the Borrower provide a legal and valid guarantee as recognized by the Lender.

Section 2 Specific Stipulations

Article 1 Interest Rate and Interest

1.1 For foreign currency borrowing, LIBOR is the interbank interest rate for the lending currency under the Contract displayed on the Reuters financial telecommunications terminal "LIBO=" page two banking days (11: 00 am London time) prior to the withdrawal date or benchmark interest rate adjustment date; HIBOR is the interbank interest rate for the lending currency under the Contract displayed on the Reuters financial telecommunications terminal "HIBO=" page two banking days (11: 15 am Hong Kong time) prior to the withdrawal date or benchmark interest rate adjustment date.

1.2 Should a floating interest rate be used for loans under the Contract, the original interest rate shall still be used for interest on overdue loans.

1.3 Should loan interest be settled on a monthly basis, the settlement date shall be the 20th of each month; should interest be settled quarterly, the settlement date shall be the 20th day of the last month of each quarter; should interest be settled semi-annually, the settlement date shall be June 20 or December 20 of each year.

1.4 The first interest-bearing period shall be from the actual date of withdrawal to the first settlement date; the last interest-bearing period shall be from the day after the end of the previous interest-bearing period to the final payment date; all other interest-bearing periods shall be from the date after the end of the previous interest-bearing period to the next settlement date.

1.5 **Loan Interest = Loan Principal × Daily Interest Rate × Actual Days of Use. Should the equal principal and interest repayment method be adopted, the formula for calculating the principal and interest shall be as follows:**

Total Principal and Interest Per Period =
$$\frac{\text{Loan Principle} \times \text{Period Profit} \times (1 + \text{Period Profit})^{\text{Number of Repayment Installments}}}{(1 + \text{Period Profit})^{\text{Number of Repayment Installments}} - 1}$$

1.6 **Should the People's Bank of China adjust its measures for determining loan interest rates applicable to lending under the Contract, the relevant rules of the People's Bank of China shall be adopted, and the Lender shall not provide separate notice thereof to the Borrower.**

1.7 **The lending rate determined at the signing of the Contract may float downward to a certain degree from the relevant loan benchmark interest rate published by the People's Bank of China or the loan prime rate (LPR) published by the National Interbank Funding Center. The Lender is entitled to re-evaluate the Borrower's interest rate concessions each year and determine whether to cancel, in part or in full, the interest rate concessions granted to the Borrower, based on national policies, the Borrower's credit standing, lending guarantee changes, and other such circumstances, and promptly notify the Borrower of such a cancellation.**

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Article 2 Loan Issuances and Payments

2.1 The Borrower must meet the following withdrawal preconditions in order to withdraw loans, otherwise the Lender is not obligated to issue any funds to the Borrower, unless the Lender has agreed to such an issuance in advance:

(1) Apart from credit loans, the Borrower has provided corresponding guarantees as required by the Lender and has completed relevant guarantee procedures;

(2) There has been no breach of contract under the Contract or other contracts with the Lender;

(3) The proof of loan usage provided is consistent with the intended use.

(4) Other materials are submitted as required by the Lender.

2.2 Written documents provided to the Lender by the Borrower at the time of withdrawal must be originals; if originals cannot be provided, with the Lender's consent, photocopies affixed with the Borrower's corporate seal may be provided.

2.3 The Borrower must provide the Lender with a withdrawal notice at least five banking days in advance of a withdrawal. Once the withdrawal notice has been submitted, it cannot be revoked without the written consent of the Lender.

2.4 Once the Borrower has met the withdrawal preconditions or the Lender has agreed to issuance in advance, the Lender shall transfer the loan to the Borrower's designated account, meaning that the Lender has issued the loan to the Borrower as stipulated under the Contract.

2.5 Pursuant to relevant regulatory requirements and the Lender's administrative requirements, lending exceeding a certain amount or meeting certain conditions shall be made with a Lender's entrusted payment, whereby the Lender pays the loan amount to payment objects that comply with the usage stipulated under the Contract based on the Borrower's withdrawal application and payment entrustment. To this end, the Borrower shall enter into a separate entrusted payment agreement with the Lender as an attachment to the Contract and open or designate an account at the Lender for entrusted payments.

Article 3 Repayments

3.1 The Borrower shall repay the principal, interest and other payables in full and on time as stipulated under the Contract. One banking day prior to the repayment date and each settlement date, the Borrower shall deposit enough in its repayment account opened at the Lender for the current interest, principal, and other payables, and the Lender is entitled to actively collect payment there from on the repayment date or settlement date, or ask that the Borrower comply with relevant transfer procedures. Should the amount in the repayment account be insufficient to pay all payables due, the Lender has the right to determine the order of payment.

3.2 Should the Borrower apply to repay loans early, in part or in full, the Borrower shall submit a written application to the Lender 10 banking days in advance and pay the early repayment penalty to the Lender according to the standards stipulated under the Contract.

3.3 Should the Lender agree to an early repayment, on the early repayment date, the Borrower shall also settle loan principal, interest, and other payments due as of the early repayment date, as stipulated under the Contract.

3.4 The Lender is entitled to withdraw lending in advance based on the Borrower's capital returns.

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3.5 Should the actual loan period be shortened because of the Borrower's early repayment or because the Lender withdraws the loan in advance as stipulated under the Contract, the corresponding interest rate grade shall not be adjusted, and the original lending rate shall still be used.

Article 4 Revolving Loans

4.1 Should loans under the Contract be used on a revolving basis, during the revolving credit term, the sum of the Borrower's loan balance at any time should not exceed the revolving line of credit; the lending term for each of the Borrower's withdrawals shall be from the actual withdrawal date to the stipulated repayment date, as recorded on the lending receipt. The repayment date of any single withdrawal shall not exceed the revolving credit term.

4.2 Should loans under the Contract be used on a revolving basis, from the signing date of the Contract, should the Borrower make no withdrawals for three consecutive months, the Lender has the right to cancel the revolving line of credit.

Article 5 Guarantees

5.1 Apart from credit loans, the Borrower shall provide legal and valid guarantees recognized by the Lender for its performance of obligations under the Contract. A guarantee contract shall be separately signed.

5.2 Should the collateral under the Contract be damaged, devalued, subject to an ownership dispute, seized or withheld, or should the mortgager dispose of the collateral without authorization, or should the financial situation of the guarantor adversely change or change in a way that is not conducive to the Lender's claims, the Borrower shall promptly notify the Lender and provide additional guarantees as recognized by the Lender.

5.3 The Lender is entitled to periodically or irregularly reassess the value of the collateral and the guarantor's ability to guarantee. Should the assessment hold that the value of the collateral has declined or that the guarantor's ability to guarantee has declined, the Borrower shall provide additional guarantees equal to the reduced value or the reduced ability to guarantee and may provide other guarantees as recognized by the Lender.

5.4 Should pledge guarantees for receivables be provided for loans under the Contract, for the duration of the Contract, in any one of the following circumstances, the Lender has the right to declare the early expiration of lending, require that the Borrower immediately repay loan principal and interest, in part or in full, or add additional legal, valid, and sufficient guarantees recognized by the Lender:

(1) The accounts receivable pledger's bad debt rate on the payer's accounts receivable has increased for two consecutive months;

(2) The accounts receivable pledger's accounts receivable for the payer that are overdue and have yet to be received account for over 5% of the payer's balance of accounts receivable;

(3) The accounts receivable pledger has entered into a trade dispute (including but not limited to quality, technology, or service disputes) or claims dispute with the payer or another third party, such that the accounts receivable may not be payable on time.

Article 6 Account Management

6.1 The Borrower shall use a special designated capital returns account with the Lender to collect corresponding sales income or planned repayment funds. Should corresponding sales income be settled in a non-cash manner, the Borrower shall ensure that the funds are returned to the account promptly after payment is received.

6.2 The Lender is entitled to the supervision of the capital returns account, including but not limited to inquiries and supervision of the account's capital debits and credits, and the Borrower shall cooperate. If required by the Lender, the Borrower shall sign a special account supervision agreement with the Lender.

Article 7 Representations and Warranties

The Borrower makes the following representations and warranties to the Lender, which shall be valid for the duration of the Contract:

7.1 The Borrower has the qualifications for borrowing and the qualifications and ability to sign and perform the Contract.

7.2 All necessary authorizations or approvals have been obtained for signing the contract, and the signing and performance of the contract do not violate the provisions of the company's articles of incorporation or relevant laws and regulations and do not conflict with obligations under other contracts.

7.3 Other debts payable have been paid on time, with no malicious defaults on bank loans or interest.

7.4 There are sound organizations and financial management systems in place. In the past one year, there have been no major disciplinary violations or unlawful conduct, and current senior management have no significantly negative records.

7.5 All documents and materials provided to the Lender are true, accurate, complete, and valid, and they are free of false records, material omissions, or misleading statements.

7.6 Financial accounting reports provided to the Lender have been prepared in accordance with PRC accounting standards, reflecting the Borrower's operating conditions and liabilities in a true, fair, and complete manner. Since the latest financial accounting report, the Borrower's financial position has not experienced any significantly adverse changes.

7.7 No litigation, arbitration, or claims have been concealed from the Lender.

Article 8 Borrower Commitments

8.1 To withdraw and use loans according to the terms and purposes stipulated under the Contract and to not use the borrowings for fixed assets, equity, and other investments and to ensure that borrowings, in any form, do not flow into the securities market, futures market, or other uses prohibited or restricted by relevant laws and regulations.

8.2 To settle loan principal, interest, and other payables as stipulated under the Contract.

To accept and actively cooperate with the Lender's accounts analysis inspection and supervision of the use of loan funds, including by means of account analysis, document inspection, and on-site investigations, and to regularly report the use of loan funds as required by the Lender.

8.4 To accept the Lender's credit checks, to provide financial accounting materials, such as balance sheets and income and loss statements, and other materials reflecting the Borrower's solvency, as required by the Lender, and to assist and cooperate with the Lender's investigations, inquiries, and supervision of its productions, operations, and financial standing.

8.5 To not distribute dividends or bonuses, in any form, when there are outstanding loan principal, interest, or other payables (including amounts that are announced as due immediately) under the Contract.

8.6 To first obtain the Lender's written consent or to make arrangements that satisfy the Lender prior to Mergers, divisions, capital reductions, equity changes, equity pledges, transfers of major assets and claims, major foreign investments, substantial increases in debt financing, and other actions that may adversely affect the Lender's equity.

8.7 In any one of the following events, to promptly notify the Lender:

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- (1) changes to the company's articles of incorporation, business scope, registered capital, or legal representative;
 - (2) closure, dissolution, liquidation, suspension of business, business license suspended or revoked for rectification, or the company applies (is subject to) bankruptcy;
 - (3) involvement or possible involvement in major economic disputes, litigation, or arbitration, or property is seized, detained or under supervision by law;
 - (4) shareholder(s), director(s), and current senior management are suspect of major cases or economic disputes.
- 8.8** To promptly, comprehensively, and accurately disclose of related party relationships and related party transactions to the Lender.
- 8.9** To mail or otherwise send to the Lender and promptly receive various notices.
- 8.10** To not dispose of its own assets in a manner that reduces solvency; to not use assets formed under the Contract, without obtaining the Lender's consent, to provide guarantees to third parties.
- 8.11** If borrowing under the Contract is issued as credit, to completely, truthfully, and accurately report routinely to the Lender on external guarantees and, as required by the Lender, sign an account supervision agreement; when external guarantees may affect performance of obligations under the contract, the Lender's written consent must be obtained.
- 8.12** To bear expenses generated by the Lender to realize claims under the Contract, including but not limited to attorneys' fees and auction fees.
- 8.13** To give priority to the Borrower's debts to its shareholders in terms of the priority for settling debts under the Contract and to at least give such debts an equal footing as other similar debts of the Borrower's other creditors.
- 8.14** To strengthen environmental and social risk management and accept the Lender's supervision and inspections in this regard. If required by the Lender, to submit environmental and social risk reports to the Lender.

Article 9 Lender Commitments

- 9.1** To issue loans to the Borrower as stipulated under the Contract.
- 9.2** To keep confidential non-public materials and information provided by the Borrower, unless laws and regulations require otherwise or the Contract stipulates otherwise.

Article 10 Breach of Contract

- 10.1** Any one of the following events shall constitute breach of contract by the Borrower:
- (1) the Borrower fails to repay loan principal, interest, or other payables under the Contract according to stipulations under the Contract or acts contrary to representations, warranties, or commitments under the Contract;
 - (2) changes occur to guarantees under the Contract that are not conducive to the Lender's claims, and the Borrower fails to provide other guarantees recognized by the Lender;
 - (3) the Borrower is unable to settle any other debts due (including debts declared due early) or fails to perform or violates obligations under other agreements, such that it has affected or may affect its performance of obligations under the Contract;
 - (4) the Borrower's financial metrics, such as profitability, solvency, operating capacity, and cash flow, fail to meet agreed standards, or the deterioration thereof has affected or may affect the performance of its obligations under the Contract;
 - (5) the Borrower's equity structure, production, operations, and foreign investments have undergone significantly adverse changes that have affected or may affect the performance of its obligations under the Contract;

(6) the Borrower is involved in or may be involved in major economic disputes, litigation, arbitration, or assets have been seized, detained or enforced, or is being investigated or dealt with by judicial or administrative organs in accordance with the law or subject to penalties in accordance with the law, or is exposed by the media for violating relevant state regulations or policies, such that it has affected or may affect the performance of its obligations under the Contract;

(7) the Borrower's main investors and key management personnel make abnormal changes, go missing, or are investigated or restricted by judicial authorities in accordance with the law, such that it has affected or may affect the performance of its obligations under the Contract;

(8) the Borrower utilizes false contracts with related parties, utilizes transactions without actual trading to obtain funding or credit from the Lender, or intentionally evades the Lender's claims through related transactions;

(9) the Borrower has or may be closed, dissolved, liquidated, have its business suspended, have its business license rectified or revoked, or apply for (or be subject to) bankruptcy;

(10) the Borrower has a liability incident or a major environmental or social risk incident for food safety, safety production, or environmental protection violations or violation other environmental or social risk management laws, regulations, or industry standards, such that it has affected or may affect the performance of its obligations under the Contract;

(11) if borrowing under the Contract is issued as credit, the Borrower's credit rating, profitability, asset-liability ratio, cash flow from operating activities, or other metrics do not meet the Lender's conditions for credit lending; or the Borrower sets up pledge/mortgage guarantees for others or provides guarantees using its validly operated assets without the written consent of the Lender, such that it has affected or may affect the performance of its obligations under the Contract;

(12) Other circumstances that may adversely affect the Lender's realization of claims under the Contract.

10.2 Should the Borrower breach the Contract, the Lender is entitled to take one or more of the following remedies:

(1) to require that the Borrower rectify the breach of contract within a period of time;

(2) to suspend the issuance of loans or other financing to the Borrower based on the Contract or other contracts between the Lender and the Borrower and cancel, in part or in full, loans or other financing that the Borrower has yet to withdraw;

(3) to announce immediate expiration of lending or other financing under the Contract and other contracts between the Lender and the Borrower and to immediately recover unpaid amounts;

(4) to require that the Borrower compensate for losses suffered by the Lender from the breach of contract;

(5) other remedies provided by laws or regulations, as stipulated under the Contract, or as deemed necessary by the Lender.

10.3 For loans due yet unpaid by the Borrower as agreed (including debts that are announced as due immediately), the Lender is entitled to charge penalty interest from the date at the overdue penalty interest rate stipulated under the Contract from the date on which the amount was overdue. For interest that the Borrower fails to pay on time (including penalty interest), compound interest shall be charged based on the overdue penalty interest rate. Penalty interest / compound interest shall be settled according to the interest settlement rules stipulated under the Contract.

10.4 Should the Borrower fail to use loans according to the usage stipulated under the Contract, the Lender is entitled to charge penalty interest for misuse of funds according to the penalty interest rate stipulated in the Contract from the date in which funds are misused, and compound interest shall be charged according to the penalty interest rate for misuse of funds for interest (including penalty interest) not paid on time during the misuse of funds. Penalty interest / compound interest shall be settled according to the interest settlement rules stipulated under the Contract.

10.5 Should the Borrower simultaneously encounter the circumstances of **Article 10.3 and Article 10.4**, the greater penalty interest rate shall be charged and cannot be combined.

10.6 Should the Borrower fail to repay loan principal, interest (including penalty interest and compound interest), or other payables on time, the Lender is entitled to make an announcement through the media.

10.7 Should the Borrower's related parties' controlling relationship with the Borrower change or should the Borrower's related party encounter the circumstances in **Article 10.1** above, other than items **(1) or (2)**, such that it has affected or may affect the Borrower's performance of its obligations under the Contract, the Lender is entitled to take various measures as stipulated under the Contract.

Article 11 Auto-termination of Lender Commitment

11.1 Should the credit status of the Borrower worsen, the Lender may cancel all loan commitments not yet withdrawn by the Borrower without prior notice.

11.2 In the event as described in **10.1 and 10.7**, it constitutes the worsening of Borrower credit status.

Article 12 Withholding

12.1 Should the Borrower fail to repay debts due under the Contract as agreed (including debts announced as due immediately), the Borrower agrees that the Lender may withhold corresponding amounts from all foreign exchange and RMB accounts that the Borrower has opened at ICBC to settle debts owed, until the Borrower's debts under the Contract have been settled in full.

12.2 Should the withheld amount be in a currency other than that of the Contract, the currency shall be exchanged at the Lender's applicable exchange rate on the withholding date. The Borrower shall bear interest and other expenses incurred from the withholding date to the settlement date (the date on which the Lender converts the withheld amount into the currency of the Contract according to national foreign exchange management policies and actually pays of the debts under the Contract), as well as differences from exchange rate volatility during this period.

12.3 Should the amount withheld by the Lender be insufficient to settle all debts owed by the Borrower, the Lender has the right to decide on the order of settlement.

Article 13 Transfer of Rights and Obligations

13.1 The Lender is entitled to transfer its rights under the Contract, in part or in full, to a third party, and the Lender's transfer thereof does not require the Borrower's consent. Without the written consent of the Lender, the Borrower shall not transfer any of its rights or obligations under the Contract.

13.2 The Lender or Industrial and Commercial Bank of China Limited ("ICBC") may, based on its business management needs, authorize or entrust other ICBC branch agencies to perform rights and obligations under the Contract, or place loan claims under the Contract under the management of other ICBC branch agencies. The Borrower agrees that such actions shall no longer require the consent of the Borrower. Other ICBC branch agencies that undertake the rights and obligations of the Lender are entitled to exercise all rights under the Contract and are entitled to file lawsuits, submit for arbitration, or apply for enforcement in the name of the given agency.

Article 14 Entry into Force, Changes, and Release of Contract

14.1 The Contract enters into force on the signing date and shall be terminated on the date on which the Borrower fully performs all obligations under the Contract.

14.2 Any changes to the Contract shall be agreed to the parties and made in writing. Changed clauses or agreements constitute a part of the Contract and shall have the same legal effect of the Contract. Apart from the changed sections, other parts of the Contract shall remain in effect, and the original terms shall remain in effect until the change is effective.

14.3 Changes to and release of the Contract shall not affect the rights of the contracting parties to claim damages. The release of the Contract does not affect the validity of the dispute resolution clause.

Article 15 Applicable Law and Dispute Resolution

The conclusion, validity, interpretation, performance of the Contract and settlement of disputes under the Contract shall be governed by the laws of the People's Republic of China. Any disputes or issues arising from or related to the Contract shall be settled through negotiations by the borrower and the lender; where negotiations fail, disputes shall be resolved through methods as stipulated under the Contract.

Article 16 Address Confirmation for Serving Litigation/Arbitration Instruments

16.1 The Borrower confirms that the address listed on the first page of the Contract is the address for serving litigation/arbitration instruments for disputes under the Contract. Litigation/arbitration instruments include but are not limited to subpoenas, notices of hearings, judgments, rulings, mediations, and time-limit notices.

16.2 The Borrower agrees that arbitration institutions or the courts may use the fax or email address listed on the first page of the Contract to serve arbitration/litigation instruments, except for judgments, rulings, and mediations.

16.3 The abovementioned stipulations on service are applicable to first hearings, second hearings, retrials, and enforcement under arbitration and litigation proceedings. As for service to the above address, arbitration institutions or the courts may serve instruments directly by mail.

16.4 The Borrower shall ensure the truthfulness and validity of the address, contact, fax, email address, and other information listed in the Contract, and if related information changes, the Borrower shall promptly notify the Lender in writing; otherwise, service to the original mailing address shall still be valid, and the Borrower shall bear all resulting legal consequences.

Article 17 Complete Contract

Section 1: Basic Stipulations and Section 2: Specific Stipulations of the Contract together constitute a single complete working capital loan contract, and the same terms in the two sections shall have the same meanings. The Borrower's borrowing is subject to the above two sections.

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Article 18 Notifications

18.1 All notices from the parties to the Contract shall be sent in writing. Unless stipulated otherwise, the parties designate the domiciles listed in the Contract as their mailing address and contact address. Should either party's mailing address or other contact information change, the other party shall be promptly notified in writing.

18.2 Should either party to the Contract refuse to accept mail or should otherwise be unable to be served, the notifying party may serve mail by notarization or an announcement.

Article 19 Special Value-Added Tax Stipulations

19.1 Interest and expenses under the Contract paid by the Borrower to the Lender shall all include taxes.

19.2 Should the Borrower request that the Lender issue a value-added tax receipt, relevant information shall first be registered with the Lender. Information for registration includes the Borrower's full name, the taxpayer's identification number or social credit code, address, telephone, bank of account, and account number. The Borrower shall ensure that relevant information provided to the Lender is true, accurate, and complete and shall provide relevant proof as required by the Lender; for specific requirements, the Lender may send online notices or make online announcements.

19.3 Should the Borrower collect its own value-added tax invoices, it shall provide the Lender with a stamped power of attorney, designating the collector and specifying such information as the collector's identification number; thereafter, the collector shall present the original of his or her identification card to collect value-added tax invoices. If the designated collector changes, the Borrower shall need to issue to the Lender a new stamped power of attorney. Should the Borrower choose to receive value-added tax invoices by mail, the Borrower shall still provide accurate, error-free, and servable mailing information; if the mailing information changes, the Lender shall be promptly notified in writing.

19.4 Should the Lender be unable to promptly issue value-added tax invoices due to natural disasters, government actions, social anomalies, and other circumstances of force majeure or because of tax authorities, the Lender is entitled to delay invoicing and shall not assume any responsibility.

19.5 **Should a value-added tax invoice be lost, damaged, or overdue after it is collected by the Borrower or delivery by the Lender to a third party, or for other reasons unrelated to the Lender, such that the Borrower cannot receive the value-added tax invoice or cannot deduct the tax on time, the Lender shall not be liable for compensating the Borrower for related economic losses.**

19.6 Should the Borrower need to have a special red-text value-added tax invoice issued because of sales returns, the suspension of taxable services, or invoicing errors, deductions, or the inability to certify invoices and the Borrower is required, under relevant laws, regulations, and policy documents, to submit a Special Red-Text Value-Added Tax Invoice Issuance Information Form, the Borrower shall submit a Special Red-Text Value-Added Tax Invoice Issuance Information Form to tax authorities; once approved by tax authorities and once notified, the Lender shall issue a special red-text value-added tax invoice.

19.7 During the performance of the Contract, should national tax rates be adjusted, the Lender is entitled to adjust pricing under the Contract based on changes and adjustments to national tax rates.

Article 20 Miscellaneous

20.1 Lender's failure to exercise or partially exercise or delay the exercise of any right under the Contract does not constitute a waiver or change of that right or other rights, nor does it affect its further exercise of that right or other rights.

20.2 Should any term of the Contract be invalid or unenforceable, it shall not affect the validity and enforceability of other terms and shall not affect the validity of the entire contract.

20.3 The Lender is entitled to, pursuant to relevant legal and regulatory provisions and the requirements of financial regulators, to provide information related to the Contract or the Borrower's other information to the People's Bank of China Credit System and other lawfully established credit information databases to be queried and used by qualified institutions or individuals. The Lender is also entitled, for the purposes of entering into and performing the Contract, to query the Borrower's related information on the People's Bank of China Credit System and other lawfully established credit information databases.

20.4 The terms "related party," "related party relationships," "related party transactions," "main investors," "key management personnel," and other such terms shall have the same meanings as the same terms in the Accounting Standards for Business Enterprises No. 36 - Related Party Disclosures (C.H. [2006] 3) issued by the Ministry of Finance, as well as subsequent amendments to the Standards.

20.5 The environmental and social risks mentioned in the Contract refer to the environmental and social hazards and risks associated with the Borrower and its important related parties in construction, production, and operation activities, including environmental and social issues related to energy consumption, pollution, land, health, safety, resettlement, ecological protection, and climate change.

20.6 The documents and vouchers for loans under the Contract prepared and retained by the Lender according to its business rules constitute valid evidence for the credit relationship between the Borrower and the Lender and are binding on the Borrower.

20.7 In the Contract, (1) all mention of the Contract shall include revisions to or supplementation of the Contract; (2) article titles are for reference only and do not constitute any interpretation of the Contract, nor do they impose any restrictions on the content of the titles or their scope; and (3) should withdrawal dates or repayment dates fall on non-banking days, they shall be postponed to the next banking day.

The parties acknowledge that: both the Borrower and the Lender have fully negotiated on all of the terms of the Contract. Lender has drawn the Borrower's attention to all terms related to the parties' rights and obligations, so that the Borrower full and accurately understands them, and at the request of the Borrower, the Lender has provided explanations for relevant provisions. The Borrower has carefully read and fully understands all terms of the Contract (including Section 1: General Stipulations and Section 2: Specific Stipulations), and both the Borrower and the Lender have reached full consensus on the understanding of the terms of the Contract with no objections to the contractual contents.

**Borrower (Seal): Phontronics DNP Mask Corporation Xiamen [seal]
Date: _____**

As the legal representative/authorized representative of the Borrower, I certify that the Borrower borrows from the Lender as per the contract terms, the fact that the seals used in this contract are authentic and valid, as well as that the Borrower has completed each required procedure for the loan.

Borrower Legal Representative / Authorized Representative (Signature): ____ [seal:] Peter Scott Kirlin _____

Contract Main Body Page 17 of 17

Contract Serial #201811220410001245216760
Document 1 of 2

ICBC Mobile Bank "Scan It" to verify
contract contents [QR Code]

This page is the Lender signature page of the Working Capital Loan Contract (Contract #: 0410000286-2018 (Xiang'an) No. 00287) entered into by Photronics DNP Mask Corporation Xiamen and ICBC Xiang'an Branch.

We agree to proceed with the working capital loan with the business information below:

1. Borrower: Photronics DNP Mask Corporation Xiamen
2. Loans under the Contract shall be used for the following purpose; without the written consent of the Lender, the Borrower shall not misuse any loans. The Lender is entitled to supervision of the use of funds. Purpose: VAT Payment
3. In accordance to Article 2.1 in the main body of this Contract, the currency of the loan in this Contract is RMB, and the amount is 1600000.00 (In WORDS: One million and six hundred thousand) yuan (In case of inconsistency amounts in numbers and words, the amount in words shall prevail)
4. In accordance to Article 2.2 in the main body of this Contract, the term of the loan in this contract is 36 months with the starting date from the date of withdrawal (for multiple withdrawals, starting date is the day of the first withdrawal), and the loan document determines the actual withdrawal date.
5. The interest rate of RMB loan is determined by the method (3) of Article 3.1 in the main body of this Contract.
6. The interest rate of foreign currency loan is determined by the method / of Article 3.2 in the main body of this Contract.
7. Interest shall be calculated on lending under the Contract on a daily basis from the withdrawal date and settled every month (month/quarter/six months). Interest shall be settled with principal when loans are due, and the daily interest rate = annual interest rate/360.
8. The penalty interest rate for overdue payments under the Contract shall be determined at 30% of the original lending rate, and the penalty interest rate for misuse of loans shall be determined at 50% of the original lending rate.
9. In accordance to Article 5.1 of the main body of this Contract, the Borrower shall repay the loan under this Contract according to method (2) (1/2).

(1) One-time loan repayment upon expiration.

(2) According to the following repayment plan:

Lender: ICBC Xiang'an Branch [seal]
(seal)

Date: November 22, 2018

Signature Page

Contract Serial #201811220410001245216760
Document 1 of 2

ICBC Mobile Bank "Scan It" to verify
contract contents [QR Code]

No.:0410000286-2018 (Xiang'an) No. 00275_____

**Working Capital Loan Contract
(2016 Edition)**

Special Note: The Contract is negotiated by the lender and the borrower on an equal and voluntary basis. All contract terms are true representations of the parties' intentions. To protect the legitimate rights and interests of the Borrower, the Lender specifically invites the Borrower to take full notice of the full terms and conditions of the parties, in particular, the contents in bold.

Contract Main Body Page 1 of 16

Contract Serial #201811060410001245534942
Document 2 of 2

ICBC Mobile Bank "Scan It" to verify
contract contents [QR Code]

Lender: Industrial and Commercial Bank of China Limited Xiamen Xiang'an Branch

Principal:_____

Domicile (Address):_____ **Postal Code:**_____

Borrower:_____

Legal Representative:_____ **Contact:**_____ **Mobile No.:** 17859729311

Domicile (Address):_____ **Postal Code:**_____

Telephone:_____ **Fax:**_____ **Email:**_____

[Please ensure that the Borrower fills in the above information accurately and completely to ensure the timely delivery of relevant notices and legal documents.]

Through equal negotiations, a consensus has been reached and the Contract has been entered into on the matters of the Lender's issuance of lending to the Borrower.

Section 1 General Stipulations

Article 1 Loan Purpose

Loans under the Contract shall be used for the following purpose; without the written consent of the Lender, the Borrower shall not misuse any loans. The Lender is entitled to supervision of the use of funds.

Loan Purpose: VAT Payment

Article 2 Lending Amount and Term

2.1 The currency of the contract is the RMB, and the amount is 13,500,000.00 (in words: Thirteen million and five hundred thousand yuan) (where the figure and the amount in words is not the same, the amount in words shall prevail).

2.2 The lending term under the Contract is 36 months, from the actual withdrawal date (for multiple withdrawals, from the first withdrawal date); the actual withdrawal date shall be based on the loan receipt.

Article 3 Interest Rates, Interest, and Fees

3.1 [Method for determining the RMB lending rate]

The RMB lending rate is determined according to the following method (3) below:

(1) Fixed interest rate, at an annual interest rate of _/%, with the interest rate remaining unchanged for the duration of the Contract.

Contract Main Body Page 2 of 16

Contract Serial #201811060410001245534942
Document 2 of 2

ICBC Mobile Bank "Scan It" to verify
contract contents [QR Code]

(2) The lending rate is determined by the benchmark interest rate plus a floating range, wherein the benchmark interest rate is the benchmark lending rate of the People's Bank of China on (withdrawal date/ effective date of the Contract) that corresponds to the lending term stipulated in Article 2.2, and the floating range is (upward/downward/zero) %. After the Borrower makes a withdrawal, the lending rate will remain the same for a period of (1/3/6/12) month(s), to be adjusted once a period, with interest accounted for in segments. The date for determining the interest rate for the second period shall be the date that corresponds to the withdrawal date at the end of the first period; should the given month not have the given date that corresponds to the withdrawal date, the corresponding date shall be the last day of the given month, and the same shall hold true for other periods. Should the Borrower make withdrawals in installments, the lending rate shall be adjusted according to method (A/B) listed below:

A. Regardless of the number of withdrawals during a single period, the current lending rate determined on the date on which the interest rate for the current period shall be used, to be adjusted at the next period.

B. The lending rate shall be determined and adjusted for each withdrawal.

(3) The lending rate for each withdrawal shall be determined based on the benchmark interest rate plus the floating range, wherein the benchmark interest rate shall be the (annual/monthly) loan promotion rate (LPR) by the National Interbank Funding Center published on the business day prior to the withdrawal date (withdrawal date/effective date of the contract) for the current withdrawal, and the floating range shall be (upward/downward/zero) % or plus (plus/less/zero) 67.75 base points (with one base point being 0.01%). The lending rate after each withdrawal shall be adjusted according to method (A/B) listed below:

A. For a period of (1/3/6/12) month(s), to be adjusted once a period, with interest accounted for in segments. The benchmark interest rate adjustment date for the second period shall be the date that corresponds to the withdrawal date at the end of the first period; should the given month not have the given date that corresponds to the withdrawal date, the corresponding date shall be the last day of the given month. Should the National Interbank Funding Center not have published a loan benchmark interest rate for the corresponding term on the previous business day, the loan benchmark interest for the corresponding term published on the last business day shall prevail, and so on and so forth.

B. The lending rate shall not be adjusted for the entire lending term.

(4) Other:

3.2 [Method for determining the foreign exchange lending rate]

The foreign exchange lending rate shall be determined according to method listed below:

(1) Fixed interest rate, at an annual interest rate of %, with the interest rate remaining unchanged for the duration of the Contract.

(2) Floating interest rate, with the lending rate a floating interest rate composed of the spread of the -month (LIBOR/HIBOR) as the benchmark interest rate plus base points (one base point is 0.01%). The spread will remain unchanged during the Contract term. Should withdrawals be made in installments, the interest rate shall be calculated for each withdrawal. After the Borrower makes a withdrawal, the benchmark interest rate shall be adjusted according to method listed below, with interest accounted for in segments:

A. For a period of (1/3/6/12) month(s), to be adjusted once a period. The benchmark interest rate adjustment date for the second period shall be the date that corresponds to the withdrawal date at the end of the first period; should the given month not have the given date that corresponds to the withdrawal date, the corresponding date shall be the last day of the given month, and the same shall hold true for other periods.

B. The benchmark interest rate shall be adjusted on the first day of each interest-bearing period.

(3) Other:

3.3 Interest shall be calculated on lending under the Contract on a daily basis from the withdrawal date and settled every month (month/quarter/six months). Interest shall be settled with principal when loans are due, and the daily interest rate = annual interest rate/360.

3.4 The penalty interest rate for overdue payments under the Contract shall be determined at 30% of the original lending rate, and the penalty interest rate for misuse of loans shall be determined at 50% of the original lending rate.

3.5 In addition to interest, the Borrower shall also pay a commitment fee to the Lender. The commitment fee shall be the difference between the amount of lending stipulated in Article 2 and the Borrower's withdrawals (the daily average balance during the billing period) and an annual rate of %, to be paid according to method below:

(1) A single payment shall be made to the Lender on the last day of the billing period.

(2) After the Contract enters into force, payments shall be made in installments to the Lender on the 20th day of every (month/quarter/six months) up until the last day of the billing period.

Should loans under the Contract be on a revolving basis, the billing period refers to the time limit on the use of credit for revolving loans; should loans under the Contract not be on a revolving basis, the billing period refers to the period between the signing date of the Contract and the withdrawal date of the last loan as stipulated in Article 4.

The commitment fee is paid in installments; should the Borrower fail to pay the commitment fee on time, the Lender is entitled to the suspension of the issuance of loans or to cancel all amounts that the Borrower has not withdrawn.

Article 4 Withdrawals (Revolving Loans are Not Applicable)

4.1 The Borrower shall make withdrawals according to method (1) (1/2/3) listed below according to actual funding needs:

(1) One-time loan request prior to 11/30/2018;

(2) One or more loan requests after the Contract's effective date and before ;

(3) Withdrawals in installments on the dates below; the Borrower may, with the Lender's consent, make changes to withdrawal dates or amounts based on funding needs, though the Borrower must make loan requests no later than .

Withdrawal Date	Withdrawal Amount

4.2 Should the Borrower fail to make withdrawals as agreed, the Lender is entitled to cancel, in part or in full, lending that the Borrower has not yet withdrawn.

Article 5 Repayments

5.15.1 The Borrower shall repay loans under the Contract according to method (2) (1/2) listed below:

(1) One-time loan repayment upon expiration.

(2) According to the following repayment plan (when there is additional content, additional pages can be attached):

Planned Repayment Date	Planned Repayment Amount
05-20-2019	135000.00 yuan
11-20-2019	540000.00 yuan
05-20-2020	675000.00 yuan
11-20-2020	1350000.00 yuan
05-20-2021	1350000.00 yuan
11-05-2021	9450000.00 yuan

5.2 For lending under the Contract under the following circumstances, the Borrower shall not be required to pay the early repayment penalty in case the loan is returned immediately after the corresponding funds are in place, thus resulting in early repayment:

_____ / _____
 _____ / _____

5.3 Apart from the circumstances stipulated in Article 5.2, should loans be repaid early, the Borrower shall pay an early repayment penalty to the Lender, with the early repayment penalty calculated according to the following criteria: early repayment amount × remaining lending term (months) × %; if the remaining lending term is less than one month, the period shall be calculated as one month.

Article 6 Special Agreements on Revolving Loans (Optional clause; this Article is applicable is not applicable)

6.1 Loans under the Contract may be used on a revolving basis, and the lending amount and lending periods in Article 2 above shall be the revolving loan credit line and revolving loan credit term, wherein the revolving loan credit term is calculated from the effective date of the Contract.

6.2 RMB revolving loans are determined using the benchmark lending rate published by the People's Bank of China plus the floating range, and the benchmark lending rate is determined based on the benchmark lending rate of the People's Bank of China that corresponds to the grade of each lending term.

Article 7 Guarantees

The loan guarantee under the Contract is the maximum guarantee, and the corresponding maximum guarantee contract is as follows / (1/2/3, select as many as applicable):

(1) Maximum Guarantee Contract Name: / (No.:)

Guarantor:

(2) Maximum Mortgage Contract Name: / (No.:)

Mortgager:

(3) Maximum Pledge Contract Name: / (No.:)

Pledger:

Article 8 Financial Agreement (Optional clause; this Article is applicable is not applicable)

For the duration of the Contract, the Borrower shall be subject to the following financial metrics:

Article 9 Dispute Resolution

The dispute resolution method under the Contract is (1) (1/2):

(1) The dispute shall be submitted to the Xiamen Arbitration Commission, subject to the arbitration rules effective at the time in which the application for arbitration is submitted for arbitration in Xiamen (arbitral place). The arbitral award is final and binding upon the parties.

(2) The dispute shall be resolved through litigation in the court of the Lender's location.

Article 10 Miscellaneous

10.1 The Contract is in 2 duplicates, with the Borrower, Lender, and /, each holding one original, each of equal legal effect.

10.2 The following attachments and other attachments mutually agreed upon by the parties shall constitute an integral part of the Contract and have the same legal effect as the Contract:

Attachment 1: Withdrawal Notice (Format)

Attachment 2: Entrusted Payment Agreement

Attachment 3: /

Article 11 Other Matters of Agreement

11.1 The arbitral ruling is final and binding on both parties. The parties agree that the arbitration shall be conducted after the arbitration has been filed; the relevant legal documents (including the arbitration documents) shall be deemed to have been served on the day following mailing to the mailing addresses of the parties as recorded in the Contract.

11.2 The Borrower shall disclose related party relationships and related party transactions to the Lender in a timely, comprehensive, and accurate manner; the total amount of financing that the Borrower applies to the Lender for shall not exceed the actual funding needs of Party B. Should the Borrower violate any of the stipulations in the two foregoing paragraphs, the Lender is entitled to take the breach of contract remedy measures as stipulated in this agreement.

11.3 Without the consent of the Lender, the Borrower shall not provide any guarantees or warranties to others or be deemed as in breach of contract, wherein the Lender is entitled to withdraw financing in advance.

11.4 Without the written consent of the Lender, the Borrower shall not set up mortgages (pledges) on or provide guarantees or warranties for assets that it effectively operates.

11.5 The Borrower shall regularly submit reports to the Lender on external guarantees and promise that such information on external guarantee amounts is complete, true, and accurate.

11.6 When the Borrower's financial metrics during the existence of lending are inferior to those previously agreed to by the Lender (if any), the Lender is entitled to declare that the loan expire in advance, to suspend the issuance of unissued funds, to require that the Borrower repay some or all of the loans already issued, or to require that the Borrower provide a legal and valid guarantee as recognized by the Lender.

Section 2 Specific Stipulations

Article 1 Interest Rate and Interest

1.1 For foreign currency borrowing, LIBOR is the interbank interest rate for the lending currency under the Contract displayed on the Reuters financial telecommunications terminal "LIBO=" page two banking days (11: 00 am London time) prior to the withdrawal date or benchmark interest rate adjustment date; HIBOR is the interbank interest rate for the lending currency under the Contract displayed on the Reuters financial telecommunications terminal "HIBO=" page two banking days (11: 15 am Hong Kong time) prior to the withdrawal date or benchmark interest rate adjustment date.

1.2 Should a floating interest rate be used for loans under the Contract, the original interest rate shall still be used for interest on overdue loans.

1.3 Should loan interest be settled on a monthly basis, the settlement date shall be the 20th of each month; should interest be settled quarterly, the settlement date shall be the 20th day of the last month of each quarter; should interest be settled semi-annually, the settlement date shall be June 20 or December 20 of each year.

1.4 The first interest-bearing period shall be from the actual date of withdrawal to the first settlement date; the last interest-bearing period shall be from the day after the end of the previous interest-bearing period to the final payment date; all other interest-bearing periods shall be from the date after the end of the previous interest-bearing period to the next settlement date.

1.5 **Loan Interest = Loan Principal × Daily Interest Rate × Actual Days of Use. Should the equal principal and interest repayment method be adopted, the formula for calculating the principal and interest shall be as follows:**

$$\text{Total Principal and Interest Per Period} = \frac{\text{Loan Principle} \times \text{Period Profit} \times (1 + \text{Period Profit}) \times \text{Number of Repayment Installments}}{(1 + \text{Period Profit}) \times \text{Number of Repayment Installments} - 1}$$

1.6 Should the People's Bank of China adjust its measures for determining loan interest rates applicable to lending under the Contract, the relevant rules of the People's Bank of China shall be adopted, and the Lender shall not provide separate notice thereof to the Borrower.

1.7 The lending rate determined at the signing of the Contract may float downward to a certain degree from the relevant loan benchmark interest rate published by the People's Bank of China or the loan prime rate (LPR) published by the National Interbank Funding Center. The Lender is entitled to re-evaluate the Borrower's interest rate concessions each year and determine whether to cancel, in part or in full, the interest rate concessions granted to the Borrower, based on national policies, the Borrower's credit standing, lending guarantee changes, and other such circumstances, and promptly notify the Borrower of such a cancellation.

Article 2 Loan Issuances and Payments

2.1 The Borrower must meet the following withdrawal preconditions in order to withdraw loans, otherwise the Lender is not obligated to issue any funds to the Borrower, unless the Lender has agreed to such an issuance in advance:

Contract Main Body Page 7 of 16

(1) Apart from credit loans, the Borrower has provided corresponding guarantees as required by the Lender and has completed relevant guarantee procedures;

(2) There has been no breach of contract under the Contract or other contracts with the Lender;

(3) The proof of loan usage provided is consistent with the intended use.

(4) Other materials are submitted as required by the Lender.

2.2 Written documents provided to the Lender by the Borrower at the time of withdrawal must be originals; if originals cannot be provided, with the Lender's consent, photocopies affixed with the Borrower's corporate seal may be provided.

2.3 The Borrower must provide the Lender with a withdrawal notice at least five banking days in advance of a withdrawal. Once the withdrawal notice has been submitted, it cannot be revoked without the written consent of the Lender.

2.4 Once the Borrower has met the withdrawal preconditions or the Lender has agreed to issuance in advance, the Lender shall transfer the loan to the Borrower's designated account, meaning that the Lender has issued the loan to the Borrower as stipulated under the Contract.

2.5 Pursuant to relevant regulatory requirements and the Lender's administrative requirements, lending exceeding a certain amount or meeting certain conditions shall be made with a Lender's entrusted payment, whereby the Lender pays the loan amount to payment objects that comply with the usage stipulated under the Contract based on the Borrower's withdrawal application and payment entrustment. To this end, the Borrower shall enter into a separate entrusted payment agreement with the Lender as an attachment to the Contract and open or designate an account at the Lender for entrusted payments.

Article 3 Repayments

3.1 The Borrower shall repay the principal, interest and other payables in full and on time as stipulated under the Contract. One banking day prior to the repayment date and each settlement date, the Borrower shall deposit enough in its repayment account opened at the Lender for the current interest, principal, and other payables, and the Lender is entitled to actively collect payment there from on the repayment date or settlement date, or ask that the Borrower comply with relevant transfer procedures. Should the amount in the repayment account be insufficient to pay all payables due, the Lender has the right to determine the order of payment.

3.2 Should the Borrower apply to repay loans early, in part or in full, the Borrower shall submit a written application to the Lender 10 banking days in advance and pay the early repayment penalty to the Lender according to the standards stipulated under the Contract.

3.3 Should the Lender agree to an early repayment, on the early repayment date, the Borrower shall also settle loan principal, interest, and other payments due as of the early repayment date, as stipulated under the Contract.

3.4 The Lender is entitled to withdraw lending in advance based on the Borrower's capital returns.

3.5 Should the actual loan period be shortened because of the Borrower's early repayment or because the Lender withdraws the loan in advance as stipulated under the Contract, the corresponding interest rate grade shall not be adjusted, and the original lending rate shall still be used.

Article 4 Revolving Loans

4.1 Should loans under the Contract be used on a revolving basis, during the revolving credit term, the sum of the Borrower's loan balance at any time should not exceed the revolving line of credit; the lending term for each of the Borrower's withdrawals shall be from the actual withdrawal date to the stipulated repayment date, as recorded on the lending receipt. The repayment date of any single withdrawal shall not exceed the revolving credit term.

4.2 Should loans under the Contract be used on a revolving basis, from the signing date of the Contract, should the Borrower make no withdrawals for three consecutive months, the Lender has the right to cancel the revolving line of credit.

Article 5 Guarantees

5.1 Apart from credit loans, the Borrower shall provide legal and valid guarantees recognized by the Lender for its performance of obligations under the Contract. A guarantee contract shall be separately signed.

5.2 Should the collateral under the Contract be damaged, devalued, subject to an ownership dispute, seized or withheld, or should the mortgager dispose of the collateral without authorization, or should the financial situation of the guarantor adversely change or change in a way that is not conducive to the Lender's claims, the Borrower shall promptly notify the Lender and provide additional guarantees as recognized by the Lender.

5.3 The Lender is entitled to periodically or irregularly reassess the value of the collateral and the guarantor's ability to guarantee. Should the assessment hold that the value of the collateral has declined or that the guarantor's ability to guarantee has declined, the Borrower shall provide additional guarantees equal to the reduced value or the reduced ability to guarantee and may provide other guarantees as recognized by the Lender.

5.4 Should pledge guarantees for receivables be provided for loans under the Contract, for the duration of the Contract, in any one of the following circumstances, the Lender has the right to declare the early expiration of lending, require that the Borrower immediately repay loan principal and interest, in part or in full, or add additional legal, valid, and sufficient guarantees recognized by the Lender:

(1) The accounts receivable pledger's bad debt rate on the payer's accounts receivable has increased for two consecutive months;

(2) The accounts receivable pledger's accounts receivable for the payer that are overdue and have yet to be received account for over 5% of the payer's balance of accounts receivable;

(3) The accounts receivable pledger has entered into a trade dispute (including but not limited to quality, technology, or service disputes) or claims dispute with the payer or another third party, such that the accounts receivable may not be payable on time.

Article 6 Account Management

6.1 The Borrower shall use a special designated capital returns account with the Lender to collect corresponding sales income or planned repayment funds. Should corresponding sales income be settled in a non-cash manner, the Borrower shall ensure that the funds are returned to the account promptly after payment is received.

6.2 The Lender is entitled to the supervision of the capital returns account, including but not limited to inquiries and supervision of the account's capital debits and credits, and the Borrower shall cooperate. If required by the Lender, the Borrower shall sign a special account supervision agreement with the Lender.

Article 7 Representations and Warranties

The Borrower makes the following representations and warranties to the Lender, which shall be valid for the duration of the Contract:

7.1 The Borrower has the qualifications for borrowing and the qualifications and ability to sign and perform the Contract.

7.2 All necessary authorizations or approvals have been obtained for signing the contract, and the signing and performance of the contract do not violate the provisions of the company's articles of incorporation or relevant laws and regulations and do not conflict with obligations under other contracts.

7.3 Other debts payable have been paid on time, with no malicious defaults on bank loans or interest.

7.4 There are sound organizations and financial management systems in place. In the past one year, there have been no major disciplinary violations or unlawful conduct, and current senior management have no significantly negative records.

7.5 All documents and materials provided to the Lender are true, accurate, complete, and valid, and they are free of false records, material omissions, or misleading statements.

7.6 Financial accounting reports provided to the Lender have been prepared in accordance with PRC accounting standards, reflecting the Borrower's operating conditions and liabilities in a true, fair, and complete manner. Since the latest financial accounting report, the Borrower's financial position has not experienced any significantly adverse changes.

7.7 No litigation, arbitration, or claims have been concealed from the Lender.

Article 8 Borrower Commitments

8.1 To withdraw and use loans according to the terms and purposes stipulated under the Contract and to not use the borrowings for fixed assets, equity, and other investments and to ensure that borrowings, in any form, do not flow into the securities market, futures market, or other uses prohibited or restricted by relevant laws and regulations.

8.2 To settle loan principal, interest, and other payables as stipulated under the Contract.

To accept and actively cooperate with the Lender's accounts analysis inspection and supervision of the use of loan funds, including by means of account analysis, document inspection, and on-site investigations, and to regularly report the use of loan funds as required by the Lender.

8.4 To accept the Lender's credit checks, to provide financial accounting materials, such as balance sheets and income and loss statements, and other materials reflecting the Borrower's solvency, as required by the Lender, and to assist and cooperate with the Lender's investigations, inquiries, and supervision of its productions, operations, and financial standing.

8.5 To not distribute dividends or bonuses, in any form, when there are outstanding loan principal, interest, or other payables (including amounts that are announced as due immediately) under the Contract.

8.6 To first obtain the Lender's written consent or to make arrangements that satisfy the Lender prior to Mergers, divisions, capital reductions, equity changes, equity pledges, transfers of major assets and claims, major foreign investments, substantial increases in debt financing, and other actions that may adversely affect the Lender's equity.

8.7 In any one of the following events, to promptly notify the Lender:

- (1) changes to the company's articles of incorporation, business scope, registered capital, or legal representative;
- (2) closure, dissolution, liquidation, suspension of business, business license suspended or revoked for rectification, or the company applies (is subject to) bankruptcy;
- (3) involvement or possible involvement in major economic disputes, litigation, or arbitration, or property is seized, detained or under supervision by law;
- (4) shareholder(s), director(s), and current senior management are suspect of major cases or economic disputes.

8.8 To promptly, comprehensively, and accurately disclose of related party relationships and related party transactions to the Lender.

8.9 To mail or otherwise send to the Lender and promptly receive various notices.

8.10 To not dispose of its own assets in a manner that reduces solvency; to not use assets formed under the Contract, without obtaining the Lender's consent, to provide guarantees to third parties.

8.11 If borrowing under the Contract is issued as credit, to completely, truthfully, and accurately report routinely to the Lender on external guarantees and, as required by the Lender, sign an account supervision agreement; when external guarantees may affect performance of obligations under the contract, the Lender's written consent must be obtained.

8.12 To bear expenses generated by the Lender to realize claims under the Contract, including but not limited to attorneys' fees and auction fees.

8.13 To give priority to the Borrower's debts to its shareholders in terms of the priority for settling debts under the Contract and to at least give such debts an equal footing as other similar debts of the Borrower's other creditors.

8.14 To strengthen environmental and social risk management and accept the Lender's supervision and inspections in this regard. If required by the Lender, to submit environmental and social risk reports to the Lender.

Article 9 Lender Commitments

9.1 To issue loans to the Borrower as stipulated under the Contract.

9.2 To keep confidential non-public materials and information provided by the Borrower, unless laws and regulations require otherwise or the Contract stipulates otherwise.

Article 10 Breach of Contract

10.1 Any one of the following events shall constitute breach of contract by the Borrower:

(1) the Borrower fails to repay loan principal, interest, or other payables under the Contract according to stipulations under the Contract or acts contrary to representations, warranties, or commitments under the Contract;

(2) changes occur to guarantees under the Contract that are not conducive to the Lender's claims, and the Borrower fails to provide other guarantees recognized by the Lender;

(3) the Borrower is unable to settle any other debts due (including debts declared due early) or fails to perform or violates obligations under other agreements, such that it has affected or may affect its performance of obligations under the Contract;

(4) the Borrower's financial metrics, such as profitability, solvency, operating capacity, and cash flow, fail to meet agreed standards, or the deterioration thereof has affected or may affect the performance of its obligations under the Contract;

(5) the Borrower's equity structure, production, operations, and foreign investments have undergone significantly adverse changes that have affected or may affect the performance of its obligations under the Contract;

(6) the Borrower is involved in or may be involved in major economic disputes, litigation, arbitration, or assets have been seized, detained or enforced, or is being investigated or dealt with by judicial or administrative organs in accordance with the law or subject to penalties in accordance with the law, or is exposed by the media for violating relevant state regulations or policies, such that it has affected or may affect the performance of its obligations under the Contract;

(7) the Borrower's main investors and key management personnel make abnormal changes, go missing, or are investigated or restricted by judicial authorities in accordance with the law, such that it has affected or may affect the performance of its obligations under the Contract;

(8) the Borrower utilizes false contracts with related parties, utilizes transactions without actual trading to obtain funding or credit from the Lender, or intentionally evades the Lender's claims through related transactions;

(9) the Borrower has or may be closed, dissolved, liquidated, have its business suspended, have its business license rectified or revoked, or apply for (or be subject to) bankruptcy;

(10) the Borrower has a liability incident or a major environmental or social risk incident for food safety, safety production, or environmental protection violations or violation other environmental or social risk management laws, regulations, or industry standards, such that it has affected or may affect the performance of its obligations under the Contract;

(11) if borrowing under the Contract is issued as credit, the Borrower's credit rating, profitability, asset-liability ratio, cash flow from operating activities, or other metrics do not meet the Lender's conditions for credit lending; or the Borrower sets up pledge/mortgage guarantees for others or provides guarantees using its validly operated assets without the written consent of the Lender, such that it has affected or may affect the performance of its obligations under the Contract;

(12) Other circumstances that may adversely affect the Lender's realization of claims under the Contract.

10.2 Should the Borrower breach the Contract, the Lender is entitled to take one or more of the following remedies:

(1) to require that the Borrower rectify the breach of contract within a period of time;

(2) to suspend the issuance of loans or other financing to the Borrower based on the Contract or other contracts between the Lender and the Borrower and cancel, in part or in full, loans or other financing that the Borrower has yet to withdraw;

(3) to announce immediate expiration of lending or other financing under the Contract and other contracts between the Lender and the Borrower and to immediately recover unpaid amounts;

(4) to require that the Borrower compensate for losses suffered by the Lender from the breach of contract;

(5) other remedies provided by laws or regulations, as stipulated under the Contract, or as deemed necessary by the Lender.

10.3 For loans due yet unrepaid by the Borrower as agreed (including debts that are announced as due immediately), the Lender is entitled to charge penalty interest from the date at the overdue penalty interest rate stipulated under the Contract from the date on which the amount was overdue. For interest that the Borrower fails to pay on time (including penalty interest), compound interest shall be charged based on the overdue penalty interest rate. Penalty interest / compound interest shall be settled according to the interest settlement rules stipulated under the Contract.

10.4 Should the Borrower fail to use loans according to the usage stipulated under the Contract, the Lender is entitled to charge penalty interest for misuse of funds according to the penalty interest rate stipulated in the Contract from the date in which funds are misused, and compound interest shall be charged according to the penalty interest rate for misuse of funds for interest (including penalty interest) not paid on time during the misuse of funds. Penalty interest / compound interest shall be settled according to the interest settlement rules stipulated under the Contract. Penalty interest / compound interest shall be settled according to the interest settlement rules stipulated under the Contract.

10.5 Should the Borrower simultaneously encounter the circumstances of **Article 10.3 and Article 10.4**, the greater penalty interest rate shall be charged and cannot be combined.

10.6 Should the Borrower fail to repay loan principal, interest (including penalty interest and compound interest), or other payables on time, the Lender is entitled to make an announcement through the media.

10.7 Should the Borrower's related parties' controlling relationship with the Borrower change or should the Borrower's related party encounter the circumstances in **Article 10.1** above, other than items **(1) or (2)**, such that it has affected or may affect the Borrower's performance of its obligations under the Contract, the Lender is entitled to take various measures as stipulated under the Contract.

Article 11 Auto-termination of Lender Commitment

11.1 Should the credit status of the Borrower worsen, the Lender may cancel all loan commitments not yet withdrawn by the Borrower without prior notice.

11.2 In the event as described in 10.1 and 10.7, it constitutes the worsening of Borrower credit status.

Article 12 Withholding

12.1 Should the Borrower fail to repay debts due under the Contract as agreed (including debts announced as due immediately), the Borrower agrees that the Lender may withhold corresponding amounts from all foreign exchange and RMB accounts that the Borrower has opened at ICBC to settle debts owed, until the Borrower's debts under the Contract have been settled in full.

12.2 Should the withheld amount be in a currency other than that of the Contract, the currency shall be exchanged at the Lender's applicable exchange rate on the withholding date. The Borrower shall bear interest and other expenses incurred from the withholding date to the settlement date (the date on which the Lender converts the withheld amount into the currency of the Contract according to national foreign exchange management policies and actually pays of the debts under the Contract), as well as differences from exchange rate volatility during this period.

12.3 Should the amount withheld by the Lender be insufficient to settle all debts owed by the Borrower, the Lender has the right to decide on the order of settlement.

Article 13 Transfer of Rights and Obligations

13.1 The Lender is entitled to transfer its rights under the Contract, in part or in full, to a third party, and the Lender's transfer thereof does not require the Borrower's consent. Without the written consent of the Lender, the Borrower shall not transfer any of its rights or obligations under the Contract.

13.2 The Lender or Industrial and Commercial Bank of China Limited ("ICBC") may, based on its business management needs, authorize or entrust other ICBC branch agencies to perform rights and obligations under the Contract, or place loan claims under the Contract under the management of other ICBC branch agencies. The Borrower agrees that the such actions shall no longer require the consent of the Borrower. Other ICBC branch agencies that undertake the rights and obligations of the Lender are entitled to exercise all rights under the Contract and are entitled to file lawsuits, submit for arbitration, or apply for enforcement in the name of the given agency.

Article 14 Entry into Force, Changes, and Release of Contract

14.1 The Contract enters into force on the signing date and shall be terminated on the date on which the Borrower fully performs all obligations under the Contract.

14.2 Any changes to the Contract shall be agreed to the parties and made in writing. Changed clauses or agreements constitute a part of the Contract and shall have the same legal effect of the Contract. Apart from the changed sections, other parts of the Contract shall remain in effect, and the original terms shall remain in effect until the change is effective.

14.3 Changes to and release of the Contract shall not affect the rights of the contracting parties to claim damages. The release of the Contract does not affect the validity of the dispute resolution clause.

Article 15 Applicable Law and Dispute Resolution

The conclusion, validity, interpretation, performance of the Contract and settlement of disputes under the Contract shall be governed by the laws of the People's Republic of China. Any disputes or issues arising from or related to the Contract shall be settled through negotiations by the borrower and the lender; where negotiations fail, disputes shall be resolved through methods as stipulated under the Contract.

Article 16 Address Confirmation for Serving Litigation/Arbitration Instruments

16.1 The Borrower confirms that the address listed on the first page of the Contract is the address for serving litigation/arbitration instruments for disputes under the Contract. Litigation/arbitration instruments include but are not limited to subpoenas, notices of hearings, judgments, rulings, mediations, and time-limit notices.

16.2 The Borrower agrees that arbitration institutions or the courts may use the fax or email address listed on the first page of the Contract to serve arbitration/litigation instruments, except for judgments, rulings, and mediations.

16.3 The abovementioned stipulations on service are applicable to first hearings, second hearings, retrials, and enforcement under arbitration and litigation proceedings. As for service to the above address, arbitration institutions or the courts may serve instruments directly by mail.

16.4 The Borrower shall ensure the truthfulness and validity of the address, contact, fax, email address, and other information listed in the Contract, and if related information changes, the Borrower shall promptly notify the Lender in writing; otherwise, service to the original mailing address shall still be valid, and the Borrower shall bear all resulting legal consequences.

Article 17 Complete Contract

Section 1: Basic Stipulations and Section 2: Specific Stipulations of the Contract together constitute a single complete working capital loan contract, and the same terms in the two sections shall have the same meanings. The Borrower's borrowing is subject to the above two sections.

Article 18 Notifications

18.1 All notices from the parties to the Contract shall be sent in writing. Unless stipulated otherwise, the parties designate the domiciles listed in the Contract as their mailing address and contact address. Should either party's mailing address or other contact information change, the other party shall be promptly notified in writing.

18.2 Should either party to the Contract refuse to accept mail or should otherwise be unable to be served, the notifying party may serve mail by notarization or an announcement.

Article 19 Special Value-Added Tax Stipulations

19.1 Interest and expenses under the Contract paid by the Borrower to the Lender shall all include taxes.

19.2 Should the Borrower request that the Lender issue a value-added tax receipt, relevant information shall first be registered with the Lender. Information for registration includes the Borrower's full name, the taxpayer's identification number or social credit code, address, telephone, bank of account, and account number. The Borrower shall ensure that relevant information provided to the Lender is true, accurate, and complete and shall provide relevant proof as required by the Lender; for specific requirements, the Lender may send online notices or make online announcements.

19.3 Should the Borrower collect its own value-added tax invoices, it shall provide the Lender with a stamped power of attorney, designating the collector and specifying such information as the collector's identification number; thereafter, the collector shall present the original of his or her identification card to collect value-added tax invoices. If the designated collector changes, the Borrower shall need to issue to the Lender a new stamped power of attorney. Should the Borrower choose to receive value-added tax invoices by mail, the Borrower shall still provide accurate, error-free, and servable mailing information; if the mailing information changes, the Lender shall be promptly notified in writing.

19.4 Should the Lender be unable to promptly issue value-added tax invoices due to natural disasters, government actions, social anomalies, and other circumstances of force majeure or because of tax authorities, the Lender is entitled to delay invoicing and shall not assume any responsibility.

19.5 Should a value-added tax invoice be lost, damaged, or overdue after it is collected by the Borrower or delivery by the Lender to a third party, or for other reasons unrelated to the Lender, such that the Borrower cannot receive the value-added tax invoice or cannot deduct the tax on time, the Lender shall not be liable for compensating the Borrower for related economic losses.

19.6 Should the Borrower need to have a special red-text value-added tax invoice issued because of sales returns, the suspension of taxable services, or invoicing errors, deductions, or the inability to certify invoices and the Borrower is required, under relevant laws, regulations, and policy documents, to submit a Special Red-Text Value-Added Tax Invoice Issuance Information Form, the Borrower shall submit a Special Red-Text Value-Added Tax Invoice Issuance Information Form to tax authorities; once approved by tax authorities and once notified, the Lender shall issue a special red-text value-added tax invoice.

19.7 During the performance of the Contract, should national tax rates be adjusted, the Lender is entitled to adjust pricing under the Contract based on changes and adjustments to national tax rates.

Article 20 Miscellaneous

20.1 Lender's failure to exercise or partially exercise or delay the exercise of any right under the Contract does not constitute a waiver or change of that right or other rights, nor does it affect its further exercise of that right or other rights.

20.2 Should any term of the Contract be invalid or unenforceable, it shall not affect the validity and enforceability of other terms and shall not affect the validity of the entire contract.

20.3 The Lender is entitled to, pursuant to relevant legal and regulatory provisions and the requirements of financial regulators, to provide information related to the Contract or the Borrower's other information to the People's Bank of China Credit System and other lawfully established credit information databases to be queried and used by qualified institutions or individuals. The Lender is also entitled, for the purposes of entering into and performing the Contract, to query the Borrower's related information on the People's Bank of China Credit System and other lawfully established credit information databases.

20.4 The terms "related party", "related party relationships", "related party transactions", "main investors", "key management personnel", and other such terms shall have the same meanings as the same terms in the Accounting Standards for Business Enterprises No. 36 - Related Party Disclosures (C.H. [2006] 3) issued by the Ministry of Finance, as well as subsequent amendments to the Standards.

20.5 The environmental and social risks mentioned in the Contract refer to the environmental and social hazards and risks associated with the Borrower and its important related parties in construction, production, and operation activities, including environmental and social issues related to energy consumption, pollution, land, health, safety, resettlement, ecological protection, and climate change.

20.6 The documents and vouchers for loans under the Contract prepared and retained by the Lender according to its business rules constitute valid evidence for the credit relationship between the Borrower and the Lender and are binding on the Borrower.

20.7 In the Contract, (1) all mention of the Contract shall include revisions to or supplementation of the Contract; (2) article titles are for reference only and do not constitute any interpretation of the Contract, nor do they impose any restrictions on the content of the titles or their scope; and (3) should withdrawal dates or repayment dates fall on non-banking days, they shall be postponed to the next banking day.

The parties acknowledge that: both the Borrower and the Lender have fully negotiated on all of the terms of the Contract. Lender has drawn the Borrower's attention to all terms related to the parties' rights and obligations, so that the Borrower full and accurately understands them, and at the request of the Borrower, the Lender has provided explanations for relevant provisions. The Borrower has carefully read and fully understands all terms of the Contract (including Section 1: General Stipulations and Section 2: Specific Stipulations), and both the Borrower and the Lender have reached full consensus on the understanding of the terms of the Contract with no objections to the contractual contents.

Borrower (Seal): Photronics DNP Mask Corporation Xiamen [seal]

Date: November 7, 2018

As the legal representative/authorized representative of the Borrower, I certify that the Borrower borrows from the Lender as per the contract terms, the fact that the seals used in this contract are authentic and valid, as well as that the Borrower has completed each required procedure for the loan.

Borrower Legal Representative / Authorized Representative (Signature): _____ [seal: Peter Scott Kirlin] _____

This page is the Lender signature page of the Working Capital Loan Contract (Contract #: 0410000286-2018 (Xiang'an) No. 00275) entered into by Photronics DNP Mask Corporation Xiamen and ICBC Xiang'an Branch.

We agree to proceed with the working capital loan with the business information below:

1. Borrower: Photronics DNP Mask Corporation Xiamen
2. Loans under the Contract shall be used for the following purpose; without the written consent of the Lender, the Borrower shall not misuse any loans. The Lender is entitled to supervision of the use of funds. Purpose: VAT Payment
3. In accordance to Article 2.1 in the main body of this Contract, the currency of the loan in this Contract is RMB, and the amount is 13,500,000.00 (In WORDS: Thirteen million and five hundred thousand) yuan (In case of inconsistency amounts in numbers and words, the amount in words shall prevail)
4. In accordance to Article 2.2 in the main body of this Contract, the term of the loan in this contract is 36 months with the starting date from the date of withdrawal (for multiple withdrawals, starting date is the day of the first withdrawal), and the loan document determines the actual withdrawal date.
5. The interest rate of RMB loan is determined by the method (3) of Article 3.1 in the main body of this Contract.
6. The interest rate of foreign currency loan is determined by the method / of Article 3.2 in the main body of this Contract.
7. Interest shall be calculated on lending under the Contract on a daily basis from the withdrawal date and settled every month (month/quarter/six months). Interest shall be settled with principal when loans are due, and the daily interest rate = annual interest rate/360.
8. The penalty interest rate for overdue payments under the Contract shall be determined at 30% of the original lending rate, and the penalty interest rate for misuse of loans shall be determined at 50% of the original lending rate.
9. In accordance to Article 5.1 of the main body of this Contract, the Borrower shall repay the loan under this Contract according to method (2) (1/2).

(1) One-time loan repayment upon expiration.

(2) According to the following repayment plan:

Lender: ICBC Xiang'an Branch [seal]

(seal)

Date: November 7, 2018

Signature Page

Contract Serial #201811060410001245534942
Document 2 of 2

ICBC Mobile Bank "Scan It" to verify
contract contents [QR Code]

SUBSIDIARIES OF PHOTRONICS, INC.

	State or Jurisdiction of Incorporation or Organization
Align-Rite International, Ltd.	(United Kingdom)
Photronics (Wales) Limited	(United Kingdom)
Photronics California, Inc.	(California, USA)
Photronics Idaho, Inc.	(Idaho, USA)
Photronics Texas Allen, Inc.	(Texas, USA)
Photronics MZD, GmbH	(Germany)
Photronics Advanced Mask Corporation	(Taiwan, R.O.C.)
Photronics DNP Mask Corporation ⁽¹⁾	(Taiwan, R.O.C.)
PDMC Shanghai, Ltd.	(Shanghai, P.R.C.)
Photronics Singapore Pte, Ltd.	(Singapore)
Xiamen American Japan Photronics Mask Co., Ltd.	(Xiamen, P.R.C.)
Photronics UK, Ltd.	(United Kingdom)
PMCH	(Hefei, P.R.C.)
PK, Ltd. ⁽²⁾	(Republic of Korea)
PKLT Co., Ltd.	(Taiwan, R.O.C.)
Trianja Technologies, Inc.	(Texas, USA)

Note: Entities directly owned by subsidiaries of Photronics, Inc. are indented and listed below their immediate parent. Ownership is 100% unless otherwise indicated.

- (1) 50.01% owned by Photronics, Inc. and 49.99% owned by DNPJ
- (2) 99.75% owned by Photronics, Inc., and 0.25% owned by minority shareholders

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statement Nos. 333-160235 and 333-161857 on Form S-3 and Registration Statement Nos. 333-169296, 333-169295, 333-151763, 333-197890 and 333-217676 on Form S-8 of our reports dated December 21, 2018, relating to the consolidated financial statements and financial statement schedule of Photonics, Inc. and the effectiveness of Photonics, Inc. internal control over financial reporting, appearing in this Annual Report on Form 10-K of Photonics, Inc. for the year ended October 31, 2018.

/s/ Deloitte & Touche LLP
Hartford, Connecticut
December 21, 2018

I, Peter S. Kirlin, certify that:

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

/s/ PETER S. KIRLIN

Peter S. Kirlin
Chief Executive Officer
December 21, 2018

I, John P. Jordan, certify that:

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

/s/ JOHN P. JORDAN

John P. Jordan
Senior Vice President
Chief Financial Officer
(Principal Accounting Officer/
Principal Financial Officer)
December 21, 2018

EXHIBIT 32.1

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

1. the Annual Report on Form 10-K of the Company for the year ended October 31, 2018 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ PETER S. KIRLIN

Peter S. Kirlin
Chief Executive Officer
December 21, 2018

EXHIBIT 32.2

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

1. the Annual Report on Form 10-K of the Company for the year ended October 31, 2018 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ JOHN P. JORDAN

John P. Jordan
Senior Vice President
Chief Financial Officer
(Principal Accounting Officer/
Principal Financial Officer)
December 21, 2018
