

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

FORM 10-K

(Mark One)

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

For the fiscal year ended October 31, 2023

OR

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

For the transition period from ___ to ___

Commission file number 0-15451



PHOTRONICS, INC.

(Exact name of registrant as specified in its charter)

Connecticut

(State or other jurisdiction of incorporation or organization)

06-0854886

(IRS Employer Identification No.)

15 Secor Road, Brookfield, Connecticut 06804

(Address of principal executive offices)(Zip Code)

(203) 775-9000

(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
COMMON	PLAB	NASDAQ Global Select Market

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

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

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

Large Accelerated Filer

Accelerated Filer

Non-Accelerated Filer

Smaller Reporting Company

Emerging Growth company

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act ((§15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements.

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b).

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 30, 2023, 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 \$879,109,827 (based upon the closing price of \$14.46 per share as reported by the NASDAQ Global Select Market on that date).

As of December 14, 2023, 62,604,986 shares of the registrant's common stock were outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of our Proxy Statement for the 2024 Annual Meeting of Shareholders to be filed with the U.S. Securities and Exchange Commission pursuant to regulation 14A under the Securities Exchange Act of 1934, as amended are incorporated by reference into Part III of this Annual Report on Form 10-K.

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Glossary of Terms and Acronyms

Definitions of certain terms and acronyms that may appear in this report are provided below.

AMOLED	Active-matrix organic light-emitting diode. A technology used in mobile devices.
Application-specific IC	An integrated circuit customized for a particular use, rather than intended for general-purpose use
ASC	Accounting Standards Codification
ASP	Average Selling Price
ASU	Accounting Standards Update
COVID-19	Covid virus 2019, an infectious disease that was declared a pandemic by the World Health Organization in March 2020
DNP	Dai Nippon Printing Co., Ltd.
EUV	A wafer lithography technology using the industry standard extreme ultraviolet (EUV) wavelength. EUV photomasks function by selectively reflecting or blocking light, in contrast to conventional photomasks which function by selectively transmitting or blocking light
Exchange Act	The Securities Exchange Act of 1934 (as amended)
FASB	Financial Accounting Standards Board
Form 10-K	Annual Report on Form 10-K
Form 10-Q	Quarterly Report on Form 10-Q
FPDs	Flat-panel displays, or “displays”
Generation	In reference to flat panel displays, refers to the size range of the underlying substrate to which a photomask is applied. Higher generation (or “G”) numbers represent larger substrates
High-end (photomasks)	For IC, photomasks that are 28nm or smaller; for FPD, AMOLED, G10.5+, and LTPS photomasks
ICs	Integrated circuits, or semiconductors
LIBOR	London Inter-Bank Offered Rate
LTPS	Low-Temperature Poly Silicon, a polycrystalline silicon synthesized at relatively low temperatures; polycrystalline silicon in thin-film transistors (TFTs) are used in liquid-crystal display (LCD) flat panels and to drive organic light-emitting diode (OLED) displays
MLA	Master Lease Agreement
Optical proximity correction	A photolithography enhancement technique applied to compensate for the limitations of light to maintain the edge placement integrity of an original design, imaged onto a silicon wafer, for further processing to an etched pattern.
PDMCX	Xiamen American Japan Photronics Mask Co., Ltd., a joint venture of Photronics and DNP
Phase-shift photomasks	Photomasks that take advantage of the interference generated by phase differences to improve image resolution in photolithography
Pure-play foundry	A company that does not produce a significant volume of IC products of its own design, but rather operates IC fabrication plants dedicated to producing ICs for other companies
RMB	Chinese renminbi
ROU (assets)	Right-of-use asset
SEC	Securities and Exchange Commission
Securities Act	The Securities Act of 1933 (as amended)
U.S. GAAP	Accounting principles generally accepted in the United States of America
Wafer	A wafer, or silicon wafer, is a thin slice of semiconductor material that, in the fabrication of microelectronics, serves as the substrate for microelectronic devices built in and upon the wafer

All references to “2023”, “2022”, and “2021” are to our fiscal years ended on October 31 of those years, unless otherwise stated.

Forward-Looking Statements

This Form 10-K contains forward-looking statements, as defined by the SEC. The Private Securities Litigation Reform Act of 1995 provides a “safe harbor” for forward-looking statements made by us, or on our behalf. Forward-looking statements are statements other than statements of historical fact, including, without limitation, those statements that include such words as “anticipates”, “believes”, “estimates”, “expects”, “intends”, “may”, “plans”, “predicts”, and similar expressions, and, without limitation, may address our future plans, objectives, goals, strategies, events, or performance, as well as underlying assumptions and other statements that are other than statements of historical facts. On occasion, in other documents filed with the SEC, press releases, conferences, or by other means, we may discuss, publish, disseminate, or otherwise make available, forward-looking statements, including statements contained within Part II, Item 7 – “Management’s Discussion & Analysis of Financial Condition and Results of Operations” of this Form 10-K.

Forward-looking statements involve risks and uncertainties, which could cause actual results or outcomes to differ materially from those expressed. Our expectations, beliefs and projections are expressed in good faith and are believed by us to have a reasonable basis, including, without limitation, management’s examination of historical operating trends, information contained in our records, and information we’ve obtained from other parties. However, we can offer no assurance that our expectations, beliefs, or projections will be realized, accomplished or achieved.

Forward-looking statements within this Form 10-K speak only as of the date of its filing, and we undertake no obligation to update any such statements to reflect changes in events or circumstances that may subsequently occur. Users of this Form 10-K are cautioned that various factors may cause actual results to differ materially from those contained in any forward-looking statements found within this Form 10-K and that they should not place undue reliance on any forward-looking statement. In addition, all forward-looking statements, whether written or oral and whether made by us or on our behalf, are expressly qualified by the risk factors provided in Part I, Item 1A “Risk Factors” of this Form 10-K.

PART I

ITEM 1. BUSINESS

General

Photronics, Inc. (and its subsidiaries, collectively referred to herein as “Photronics”, the “Company”, “we”, “our”, or “us”) is the world's leading manufacturer 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 ICs and FPDs and are used as masters to transfer circuit patterns onto semiconductor wafers and FPD substrates during the fabrication of ICs, a variety of FPDs and, to a lesser extent, other types of electrical and optical components. We have eleven manufacturing facilities, which are located in Taiwan (3), China (2), Korea, the United States (3), and Europe (2).

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 Forms 10-K, Definitive Proxy Statements on Schedule 14A, Forms 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 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.

Sales

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

“High-end” photomasks support 28 nanometer and smaller design nodes for ICs and Generation 10.5+, AMOLED, and LTPS display-based process technologies for FPDs. However, 32 nanometer and above geometries for semiconductors and Generation 8 and below (excluding AMOLED and LTPS) process technologies for displays, which we refer to as “mainstream” photomasks, constitute the majority of designs currently being fabricated in volume. At these geometries and at various high-end nodes, we can produce full lines of photomasks. Moreover, there is no significant technology employed by our competitors that is not available to us. We expect advanced-generation designs to continue to be developed, and we believe we are well positioned to service an increasing volume of this business as a result of our ongoing investments in manufacturing processes and technology in the regions where our customers are located.

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

The first several layers of photomasks are sometimes required to be delivered to customers within twenty-four hours from the time we receive customer design data. Because of the short period between order and shipment dates (typically from one day to three weeks) for a significant amount of our revenue, the dollar amount of our current backlog is not a reliable indicator of future revenue. However, the demand for some IC photomasks can extend over the traditional time period; thus, for some products, our backlog can expand to as long as two to three months.

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, manufacturing capacity, preventive and on-going equipment maintenance programs, manufacturing and data processing systems, and by utilizing statistical process control methods to optimize our manufacturing processes and reduce cycle times.

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

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-U.S. customers through both our domestic and foreign facilities and consider our presence in non-U.S. markets to be an important factor in attracting new customers, as it provides global solutions to our customers, minimizes delivery time, and allows us to serve customers that utilize manufacturing foundries outside of the United States, principally in Asia. See Notes 9 and 17 to our consolidated financial statements in Part II, Item 8 of this report for the amount of revenue and long-lived assets attributable to each of our geographic areas of operations.

Research and Development

We primarily conduct research and development activities for IC photomasks at our Boise, Idaho, facility and, to a lesser degree, Photronics DNP Mask Corporation ("PDMC"), our joint-venture subsidiary in Taiwan. Research and development for FPD photomasks is primarily conducted at Photronics Korea, Ltd., our subsidiary in South Korea. Additionally, we conduct site-specific research and development programs to support local, strategic customer roadmaps. All of 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, including data and service technology to support the integration of photomasks into customer processes. Currently, research and development for IC photomasks are primarily focused on photomasks enabling wafer geometries of 14 nanometer node and smaller, including EUV and, for FPDs, on Generations 8 and 10 substrate size photomasks for new TV technologies, emerging opportunities for micro- and mini-LED displays, and photomask technology for the complex FPD photomasks required 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 wafer and FPD substrate optical lithography continues to enable new high-end ICs and displays. We incurred research and development expenses of \$13.7 million, \$18.3 million, and \$18.5 million in 2023, 2022 and 2021, respectively. It is our belief that we own, control, or license the proprietary information (including trade secrets and patents) that we need to continue to meet our customers' requirements. We also believe that our intellectual property and trade secret know-how will continue to be important to maintaining technical leadership in the field of photomasks.

Markets

The customers for photomasks are primarily semiconductor and FPD manufacturers and to a lesser degree fabless design and equipment companies serving those industries. The size of the photomask market is driven by the number of designs released to support IC and FPD product introductions and manufacturing expansions. The photomasks required for those designs are manufactured by independent merchant manufacturers like Photronics and by semiconductor and FPD manufacturers that produce photomasks for their own use (captive manufacturers). In rare instances, captive manufacturers also sell to other semiconductor or FPD manufacturers.

The value of masks produced by merchant suppliers has transitioned from a period when there was a trend toward the divestiture or closing of captive photomask operations by semiconductor manufacturers, and an increase in the share of the market served by independent merchant 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.

That period was followed by a period during which, in order to reach certain roadmap milestones, some captive mask facilities invested at faster rates than independent manufacturers, and the revenue share of market transitioned to masks being majority captive-supplied. More recently, there has been a tendency of more production being directed to the independent merchant manufacturers, and market share has begun moving toward the independents. Nevertheless, most captive manufacturers maintain business and technology relationships with independent photomask manufacturers for ongoing support.

We support customers across the full spectrum of IC production and FPD technologies by manufacturing photomasks using electron beam or optical (laser-based) lithography systems. For IC photomasks, the predominant writing technology used for advanced photomasks with fine-scale resolution requirements is electron beam writing systems, while FPD mask fabrication utilizes optical writing systems. These systems are capable of producing the most advanced semiconductor and display photomasks for use in an array of products. End markets served with IC photomasks include devices used for microprocessors, memory, telecommunications, the Internet of Things, crypto mining, and other applications. We own a number of both high-end and mature electron beam and laser-based lithography systems.

We sell our products primarily to leading semiconductor and FPD designers and manufacturers. These include integrated device manufacturers, fabless semiconductor companies, and “pure-play” foundries. During 2023, we sold our products to approximately 696 customers. Revenue from United Microelectronics Corp. Co., Ltd. accounted for approximately 14%, 15% and 17% of our total revenues in 2023, 2022 and 2021, respectively, and revenue from Samsung Electronics Co., Ltd. accounted for approximately 10%, 11% and 12% of our total revenues in those respective years. In addition, revenue from Semiconductor Manufacturing International Corporation accounted for approximately 13%, 5% and 3% of our total revenues in 2023, 2022 and 2021, respectively. Our five largest customers, in the aggregate, accounted for approximately 51%, 45% and 43% of our revenue in 2023, 2022 and 2021, 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.

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, sales, marketing, or other resources than Photronics, we believe that we are able to compete effectively because of our dedication to customer service, ongoing 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 \$7.5 billion. Our competitors include Compugraphics International, Ltd., Dai Nippon Printing Co., Ltd (outside of Taiwan and China), Hoya Corporation, LG Innotek Co., Ltd., Shenzhen Newway Photomask Making Co., Ltd., Shenzhen Qingyi Photomask, Ltd., SK-Electronics Co., Ltd., Taiwan Mask Corporation, and Toppan Electronics Products 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 will continue in the future.

International Operations

Revenues from our non-U.S. operations were approximately 86%, 85% and 84% of our total revenues in 2023, 2022 and 2021, respectively. We believe that our ability to serve non-U.S. markets is enhanced by our having, among other things, a local presence in the markets 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 currency 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 may require us to deploy resources where they could otherwise be used to their greatest advantage and, consequently, may adversely affect our financial condition and results of operations. Notes 9 and 17 of our consolidated financial statements, in Part II, Item 8 of this report, respectively, present our revenue and long-lived assets by geographic area.

Resources

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 typically enter into annual pricing agreements with our suppliers, some of which include volume-based incentives that have resulted in substantial cost savings; these agreements do not require us to purchase minimum dollar amounts or quantities of their subject materials.

We rely on a limited number of equipment suppliers to develop and provide 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 or repair equipment when required could have a material adverse effect on our business and results of operations.

Intellectual Property Rights

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

Seasonality

Our business is typically impacted during the first 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.

Government Contracts

We are party to a limited number of fixed-price contracts with the U.S. government. Revenues earned from these contracts do not comprise a significant portion of our total revenue.

Government Regulation

We are subject to government regulations within the U.S. and in other countries in which we produce or market our products. The effects of compliance with these regulations are currently not material to our results of operations, capital expenditures, or competitive position. However, compliance with changes to existing or new regulations may have a material adverse effect on our future results of operations, capital expenditures, or competitive position. We discuss the potential impact of our not adhering to a number of these regulations in Item 1A. "Risk Factors", of this Form 10-K. The following is a list of major subjects of the regulations that pertain to our business:

- Regulations, such as those under the Foreign Corrupt practices Act that prohibit providing remuneration to government officials for the purpose of obtaining or securing business in the jurisdictions in which they serve;
- Regulations that require the minimization and proper disposal of the by-products of our manufacturing processes;
- Regulations that require us to provide a safe working environment for our employees;
- Regulations that restrict our ability to transfer assets between operations not within the same legal jurisdiction;
- Regulations that require us to provide information through the submission of government surveys;
- Regulations that require us to maintain an effective system of internal accounting controls;
- Regulations that prohibit us from engaging in business in specified countries, or with specified customers;
- Regulations that require us to protect the personal information of our customers and employees;
- Regulations that require us to accurately determine our liabilities to taxing authorities, and to settle such liabilities within their statutorily prescribed time periods;
- Regulations that require us to withhold and timely remit taxes on our employees' compensation to government authorities;
- Regulations that require us to contribute to government-sponsored social insurance plans;
- Regulations that require us to contribute to employee severance plans;
- Regulations that prohibit us from disseminating material nonpublic information prior to the public announcement of such information;
- Regulations pertaining to financial reporting, insider transactions, executive compensation, and other areas overseen by the SEC and governing bodies in other countries in which our operations are located.

Human Capital

As of October 31, 2023, we had approximately 1,885 full-time and part-time employees worldwide. Our business results depend in part on our ability to successfully manage our human capital resources, including attracting, identifying, and retaining key talent. Factors that may affect our ability to attract and retain qualified employees include employee morale, our reputation, competition from other employers, and availability of qualified individuals. As of October 31, 2023, none of our employees at any of our worldwide facilities was represented by a union. We consider our employee relations to be good. We believe our commitment to our diverse human capital resources is an important component of our mission to deliver superior photomasks and customer care. We provide all employees with the opportunity to share their opinions in open dialogues with our human resources department and senior management. We provide all employees a wide range of career development opportunities, both formal and informal. Our formal offerings include tuition reimbursement, leadership development experiences and vocational training. The safety of our employees is a paramount value for us.

We provide mandatory safety trainings in our production facilities, which are designed to focus on empowering our employees with the knowledge and tools they need to make safe choices and to minimize risks. Supervisors complete safety management courses as well. The health and wellness of our employees are critical to our success.

We provide our employees with access to a variety of innovative, flexible and convenient health and wellness programs. Such programs are designed to support employees' physical and mental health by providing tools and resources to help them improve or maintain their health status and encourage engagement in healthy behaviors. Additionally, we provide robust compensation and benefits. In addition to salaries, these programs, which vary by country/region, can include annual bonuses, stock-based compensation awards, a 401(k) plan with employee matching opportunities, healthcare and insurance benefits, health savings and flexible spending accounts, paid time off, family leave, family care resources, employee assistance programs, and tuition assistance.

ITEM 1A. RISK FACTORS

Set forth below are discussions of the risk factors we believe can make an investment in our business speculative or risky.

Concentration Related Risk Factors

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

We sell substantially all of our photomasks to semiconductor or FPD designers, manufacturers and foundries, as well as to other high-performance electronics manufacturers. We believe that the demand for photomasks depends primarily on design activity rather than sales volume from products using photomask technologies. Consequently, an increase in semiconductor or FPD sales does not necessarily result in a corresponding increase in photomask sales. In addition, the reduced use of application-specific ICs, reductions in design complexities, other changes in the technology or methods of manufacturing or designing semiconductors or FPDs, or a slowdown in the introduction of new semiconductor or FPD designs could reduce demand for photomasks – even if the demand for semiconductors and FPDs increases. Historically, the microelectronics industry has been volatile, with sharp periodic downturns and slowdowns. These negative trends 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 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, supply, and repair the equipment we use. These equipment manufacturers usually require lead times of twelve months or longer between the order date and the delivery of certain photomask imaging and inspection equipment. The failure of our suppliers to develop, deliver or service such equipment on a timely basis due to internal issues, supply chain constraints or government imposed restrictions could have a material adverse effect on our business and results of operations. In addition, the manufacturing equipment necessary to produce advanced photomasks could become prohibitively expensive, which could similarly affect us.

We use high-precision quartz photomask blanks, pellicles, and electronic grade chemicals in our manufacturing processes. There are a limited number of suppliers of these raw materials, and we do not have long-term contracts with these suppliers. Any delays or quality problems in connection with significant raw materials, particularly photomask blanks, could cause delays in the shipments of photomasks, which could have a material adverse effect on our business and results of operations. The fluctuation of foreign currency exchange rates, with respect to prices of equipment and raw materials used in manufacturing, could also have a material adverse effect on our business and results of operations.

We 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 2023, 2022 and 2021, our two largest customers accounted for an aggregate of 27%, 25% and 29%, respectively, of our revenue. Our five largest customers accounted for an aggregate of 51%, 45% and 43% of our revenue in 2023, 2022 and 2021, respectively. The loss of a significant customer, a significant reduction or delay in orders from any significant customer (including reductions or delays due to customer departures from recent buying patterns), or an unfavorable change in competitive conditions in the semiconductor or FPD industries could have a material adverse effect on our financial performance and business prospects. The consolidation of semiconductor manufacturers, or an economic downturn in the semiconductor industry, may increase the likelihood of losing a significant customer and could also have an adverse effect on our financial performance and business prospects.

Financing Related Risk Factors

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 market, 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, and operating cash flows.

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

The manufacture of leading-edge photomasks requires us to make substantial investments in additional manufacturing capability. We expect that we will be required to continue to make substantial capital expenditures to meet customer requirements and to position us for future growth. Our capital expenditure payments for fiscal 2024 are expected to be approximately \$140 million, of which approximately \$18.7 million was included in *Accounts payable* and *Accrued liabilities* on our October 31, 2023, consolidated balance sheet. We cannot provide assurance that we will be able to obtain the additional capital required to fund our operations or capital expenditures on reasonable terms, if at all, or that any such inability will not have a material adverse effect on our business and results of operations.

Industry and Competitive Related Risk Factors

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 (for example, our chief executive officer, chief financial officer, and chief technology officer) could have a material adverse effect on our business and results of operations. We cannot offer assurance that we can retain our key managerial and technical employees, or that we can attract similar additional employees in the future.

The photomask industry is dependent on the semiconductor and display industries, which are subject to rapid technological change and fluctuations in capacity needs. Consequently, we might fail to adequately time our capabilities to market needs, which could have a material adverse effect on our business and results of operations.

The photomask industry has been, and we expect it to continue to be, characterized by technological change and evolving industry requirements, which recent supply chain regionalization efforts have accelerated. In order to remain competitive, we will be required to continually anticipate, respond to, and scale 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 photomasks of increasingly more challenging complexity. Moreover, the demand for photomasks in non-leading-edge nodes may increase beyond our ability to meet our customers' requirements within adequate response times. 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, or the use of certain chip-stacking methodologies that lessen the emphasis on conventional lithography technology. 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 2023, 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.

The risk of loss of our intellectual property, trade secrets, or other sensitive business or customer confidential information or disruption of operations due to cyberattacks or data breaches could negatively impact our financial results.

Cyberattacks or data breaches could compromise confidential, business-critical information, cause disruptions in our operations, expose us to potential litigation, or harm our reputation. We have important assets, including intellectual property, trade secrets, and other sensitive, business-critical and/or confidential information which may be vulnerable to such incidents. While we have a comprehensive cybersecurity program that is continually reviewed, maintained, and upgraded, we cannot assure that we are invulnerable to cyberattacks and data breaches which, if significant, could negatively impact our business and financial results.

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

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

Investment Related Risk Factors

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

The nature of a joint venture requires us to share control in certain areas with unaffiliated third parties and it is always possible that the alignment that brought us and our joint venture partner together may change over time, whether due to change in business strategy, change in control, change in market conditions or applicable laws, or other events. Differing views among joint venture participants may result in delayed decisions or failures to agree on major issues. If our joint venture partner does not fulfill its obligations or that alignment changes, the affected joint venture may not be able to operate in accordance with its business plan or the parties may seek to exit the joint venture under the terms of the joint venture agreement or otherwise. Under such a scenario, among other possible consequences, our results of operations may be adversely affected, we may be compelled to increase the level of our resources devoted to the joint venture or our company-wide business plan may need to be adjusted. If such differences caused a joint venture to deviate from its business plan, or put, change of control or other exit or termination provisions triggered, our results of operations could be materially adversely affected.

Our operations in China expose us to substantial risks.

In 2019, we commenced operations at our two manufacturing facilities in China. These investments are subject to substantial risks which may include, but are not limited to: the inability to protect our intellectual property rights under Chinese law, which may not offer as high a level of protection as U.S. law; unexpectedly long negotiation periods with Chinese suppliers and customers; quality issues related to materials sourced from local vendors; limited access to electricity; 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 exposed us to a significant additional foreign currency exchange risk, which we had not been subject to in prior years. In addition, as tensions have, from time to time, escalated between the U.S. and China, we believe there is an enhanced risk that our substantial investments in China may be subject to unforeseen restrictions, which may include expropriation of the investments by the Chinese government or restrictions imposed on our operations by the U.S. or other countries. These and other risks may result in our not realizing a return on, or losing some, or all, of our investments in China, which would have a material adverse effect on our financial condition and financial performance.

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

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

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. Our 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; 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 business' standards, processes, procedures and controls with our operations; variability in financial performance arising from the implementation of acquisition accounting; inability to coordinate new product and process development; loss of senior managers and other critical personnel; problems with new labor unions; and challenges arising from the increased scope, geographic diversity, and complexity of our operations.

Operations Related Risk Factors

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 that could be linked to its value. Operating results may fluctuate as a result of many factors, including the size and timing of orders and shipments, the loss of significant customers, changes in product mix, the flow of customer design releases, technological change, fluctuations in manufacturing yields, the actions of our competitors, and general economic conditions. We operate in a high fixed-cost environment and, should our revenues and asset utilization decrease, our operating margins could be negatively impacted.

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

Our substantial non-U.S. operations are subject to additional risks.

Revenues from our non-U.S. operations were approximately 86%, 85% and 84% of our total revenues in 2023, 2022 and 2021, 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 and Asia, and building manufacturing facilities in Taiwan and 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 could result in the opening of additional facilities or closing of our current facilities.

Operations outside of the United States are subject to inherent risks, including: fluctuations in currency exchange rates; unstable political and economic conditions in various countries; changes in economic alliances; unexpected changes in regulatory requirements including import and export regulations; compliance with a variety of burdensome foreign laws and regulations; compliance with anti-bribery and anti-corruption laws (such as the Foreign Corrupt Practices Act); tariffs and other trade barriers; difficulties in staffing and managing international operations; and longer accounts receivable collection cycles. In addition: foreign countries may enact other restrictions on foreign trade or investment, including: currency exchange controls; trade sanctions which result in our losing access to customers and suppliers; legislation which renders agreements to be difficult to enforce; impositions on the movement of funds or other assets; or we may be subject to adverse tax consequences. These factors may have a material adverse effect on our costs or our ability to generate revenues outside of the United States and, consequently, 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 for our customers' products. If a product fails to perform in a manner consistent with quality specifications, or has a shorter useful life than warrantied, 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 guarantee 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.

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

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

We have a high level of fixed costs.

Because 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.

Regulatory Related Risk Factors

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 products and technology could be subject to U.S. export control laws and the export control laws of the foreign jurisdictions where we operate.

We are subject to various laws relating to the export of products we manufacture, and the technology related thereto, and our failure to comply with these laws could subject us to substantial fines, penalties, and even injunctions, the imposition of which could have a material adverse effect on the success of our business.

Certain of our products are or could be subject to the Export Administration Regulations (“EAR”) if they are manufactured in the U.S., or based on U.S. technology, or contain more than a de minimis amount of controlled U.S. content. The EAR could prohibit the export of certain products out of the US or could prohibit our foreign sites from manufacturing or delivering photomasks to certain restricted entities. Additionally, the Company has a large, global business with sales outside the U.S. representing a majority of the Company’s total net sales, and the Company believes that it generally benefits from growth in international trade. However, trade policies and disputes and other international conflicts can result in tariffs, sanctions and other measures that restrict international trade, and can materially adversely affect the Company’s business, particularly if these measures occur in regions where the Company derives a significant portion of its revenues.

Based on the complex relationships between the United States and certain foreign countries including, but not limited to China, there is inherent risk that political, diplomatic and national security influences might lead to trade disputes, impacts and/or disruptions to our operations or our ability to sell our photomasks. The United States and other countries have imposed and may continue to impose trade restrictions and have also levied tariffs and taxes on certain goods and imposed export restrictions. Increases in tariffs, additional taxes or other trade restrictions and retaliatory measures may increasingly impact customer demand and customer investment in manufacturing equipment, increase our manufacturing costs, decrease margins, reduce the competitiveness of our products, or inhibit our ability to sell, export products or purchase necessary equipment and supplies, which could have a material adverse effect on our business, results of operations, or financial condition.

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 cleanup 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.

General Risk Factors

We could be negatively impacted by Environmental, Social and Governance (ESG), climate change and other sustainability-related matters.

In recent years, there has been an increased focus from stakeholders on environmental, social, and governance matters, including greenhouse gas emissions and climate-related risks, sustainability, renewable energy, water stewardship, waste management, diversity, equality and inclusion, responsible sourcing and supply chain, human rights, and social responsibility. Evolving stakeholder expectations and our efforts to manage these issues, report on them, and accomplish our goals present numerous operational, regulatory, reputational, financial, legal, and other risks, any of which could have a material adverse impact, including on our reputation and stock price, reputational harm, including damage to our relationships with customers, suppliers, investors, governments, or other stakeholders, adverse impacts on our ability to manufacture and sell products and maintain our market share, the success of our collaborations with third parties, increased risk of litigation, investigations, or regulatory enforcement action, unfavorable environmental, social, and governance ratings or investor sentiment, diversion of resources and increased costs to control, assess, and report on environmental, social, and governance metrics.

Ineffective internal controls could impact our business and operating results.

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

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

Our business could be materially adversely affected by terrorist acts, widespread outbreaks of infectious diseases (such as COVID-19), government responses enacted to limit the impact of infectious diseases (such as shelter-in-place directives), or the outbreak or escalation of wars including, but not limited to, the invasion of Ukraine by the Russian Federation. Such events in the geographic regions in which we do business, including escalations of political tensions and military conflicts in the U.S., Europe, the Republic of South Korea, the People's Republic of China, or the Republic of China (Taiwan), and any governmental sanctions enacted in reaction thereto, could result in a global energy crisis, economic inflation, supply-chain disruptions, or the confiscation or destruction of our facilities; all and any of these outcomes could have material, adverse impacts on our results of operations, financial condition, and cash flows.

Our production facilities could be damaged or disrupted by natural or manmade 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, flood, fire, or other 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.

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

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

The General Data Protection Regulation (“GDPR”), which went into effect in the European Union (EU) on May 25, 2018, applies to the collection, use, retention, security, processing, and transfer of personally identifiable information of residents of E.U. countries. The GDPR created a range of new compliance obligations and imposes significant fines and sanctions for violations. It is possible that the GDPR may be interpreted or applied in a manner that is adverse to, or unforeseen by us, including requirements that are inconsistent with our practices, or that we may otherwise fail to construe its requirements in ways that are satisfactory to the E.U. authorities. Upon leaving the E.U. on January 31, 2021, the U.K. enacted a new domestic data privacy law called the “U.K. – General Data Protection Regulation” (“UK-GDPR”). Although somewhat less restrictive than the GDPR, the UK-GDPR is similar to the GDPR with respect to both an entity’s obligation to protect personal information and the imposition of significant fines for violations.

Any failure, or perceived failure, by us to comply with the GDPR or the UK-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 E.U., the U.K. 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.

We may, in the future, incur net losses.

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

Market Related Risk Factors

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 U.S. GAAP and are reported in U.S. dollars. Our operations have transactions and balances denominated in currencies other than the U.S. dollar; primarily the South Korean won, New Taiwan dollar, Japanese yen, Chinese renminbi, euro, Singapore dollar, and the British pound sterling. In 2023, we recorded a net gain from changes in foreign currency exchange rates of \$2.5 million in our consolidated statement of income, while our net assets increased by \$5.6 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 hedging activity could negatively impact our results of operations and cash flows.

We may enter into derivatives to manage our exposures 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 exposures to interest rates and currency rates, elect to not apply hedge accounting (when doing so would have mitigated our losses), 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;
- short interest in our 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 or exceed expectations;
- announcements of forecasted earnings or material transactions;
- issuances or repurchases of our common stock;
- intellectual property disputes;
- reputational damage suffered with or without merit;
- industry developments;
- news about or disclosures made by our competitors or customers;
- business combinations, divestitures, or bankruptcies by customers, suppliers, or competitors;
- economic and other external factors including (but not limited to) inflation, recessions, natural disasters, military actions, political instability, or social unrest; 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, the actions of quantitative or algorithmic stock traders and short-sellers, or low trading volume which can magnify the effects of a small number of transactions on the price of a stock.

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, duties, and tariffs. The imposition of additional regulations or controls including export controls, duties, tariffs, or changes to bilateral and regional trade agreements, could negatively impact our results of operations.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 1C. CYBERSECURITY

Not applicable

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
Hefei, China	Owned(1)
Dresden, Germany	Leased
Hsinchu, Taiwan	Owned(1)
Hsinchu, Taiwan	Leased
Taichung, Taiwan	Owned(1)
Xiamen, China	Owned(1)

(1) We own our manufacturing facilities in Hefei, Taichung, Xiamen, and one of our manufacturing facilities in Hsinchu. However, we lease the related land at these sites. We believe our facilities, with planned expansions, are adequate to support our current and near-term requirements.

ITEM 3. LEGAL PROCEEDINGS

Please refer to Note 15 to our consolidated financial statements in Part II, Item 8 of this report for information on legal proceedings involving the Company.

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

Our common stock is traded on the NASDAQ Global Select Market ("NASDAQ") under the symbol PLAB. On December 14, 2023, the closing sale price of our common stock, per the NASDAQ Global Select Market, was \$29.09. Based on available information, we have 229 registered shareholders.

To date, we have not paid any cash dividends on Photronics shares, and, for the foreseeable future, we anticipate that earnings will continue to be retained for use in our business.

In September 2020, the Company's Board of Directors authorized the repurchase of up to \$100 million of its common stock, pursuant to a repurchase plan under Rule 10b5-1 of the Securities Act. The most recent 10b5-1 plan expired on September 15, 2022, and has not been renewed. Share repurchases under this authorization commenced on September 16, 2020. The repurchase authorization by the Board of Directors has no expiration date, does not obligate us to acquire any common stock, and is subject to market conditions. In 2023, we did not repurchase any further shares as part of this program. In 2022, we repurchased 0.2 million shares at a cost of \$2.5 million (an average of \$13.43 per share) and, since the program's inception, we have repurchased 5.8 million shares at a cost of \$68.3 million (an average of \$11.70 per share). There is \$31.7 million remaining under the Board of Director authorization. All shares repurchased under the program have been retired.

Securities authorized for issuance under equity compensation plans

The information regarding our equity compensation required to be disclosed by Item 201(d) of Regulation S-K is incorporated by reference from the Photronics, Inc. 2024 Definitive Proxy Statement in Item 12 of Part III of this report. The 2024 Definitive Proxy Statement will be filed within 120 days after our fiscal year ended October 31, 2023.

Stock Price Performance

The information regarding our stock price performance required to be disclosed by Item 201(e) of Regulation S-K is incorporated by reference from the Photronics, Inc. 2024 Definitive Proxy Statement in Item 12 of Part III of this report. The 2024 Definitive Proxy Statement will be filed within 120 days after our fiscal year ended October 31, 2023.

ITEM 6. [RESERVED]

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

Overview

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

We are typically required to fulfill customer orders within a short period of time, sometimes within twenty-four hours. This results in a minimal level of backlog orders, typically one to two weeks of backlog for IC photomasks and two to three weeks of backlog for FPD photomasks. However, the demand for some IC photomasks can extend longer than the traditional time period; thus, for some products, our backlog can expand to as long as two to three months.

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

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 both the high-end photomask and trailing-edge markets. As we face challenges that require us to make significant improvements in our competitiveness, we continue to evaluate further cost reduction initiatives.

State-of-the-art production for semiconductor masks is considered to be 28 nanometer and smaller for ICs and Generation 10.5+ and AMOLED and LTPS display-based process technologies for FPDs. However, 32 nanometer and above geometries for semiconductors and Generation 8 and below (excluding AMOLED and LTPS) process technologies for displays constitute the majority of designs currently being fabricated in volume. At these geometries and various high-end nodes, 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 advanced-generation designs to continue to move to production throughout fiscal 2024, 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 display designs become larger or otherwise more advanced, we will be required to manufacture even more complex optically-enhanced reticles, including optical proximity correction, phase-shift and EUV photomasks. Additionally, demand for photomasks has been, and could in the future be, adversely affected by changes in high-performance electronics fabrication methods that affect the type or quantity of photomasks used, such as changes in semiconductor demand that favor field-programmable gate arrays and other semiconductor designs that replace application-specific ICs, or the use of certain chip-stacking methodologies that lessen the emphasis on conventional lithography technology. Furthermore, increased market acceptance of alternative methods of transferring circuit designs onto semiconductor wafers could reduce or eliminate the need for photomasks in the production of semiconductors. As of the end of 2023, 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.

Our revenues have benefitted, and our costs, including depreciation, have been affected by the increased demand for high-end-technology photomasks that require more advanced manufacturing capabilities, but generally command higher ASPs. Our capital expenditure payments were \$131.3 million, \$112.3 million and \$109.1 million in 2023, 2022 and 2021, respectively. Nonetheless, we intend to continue to make the required investments to support the technological requirements of our customers that we believe will continue to enable our growth. In support of this effort, we expect capital expenditure payments to be approximately \$140 million in fiscal year 2024.

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

Results of Operations

The following tables present selected operating information expressed as a percentage of revenue. The columns may not foot due to rounding.

	Three Months Ended		
	October 31, 2023	July 30, 2023	October 31, 2022
Revenue	100.0%	100.0%	100.0%
Cost of goods sold	62.7	61.3	61.8
Gross profit	37.3	38.7	38.2
Selling, general and administrative expenses	7.4	8.0	7.5
Research and development expenses	1.5	1.6	1.9
Operating income	28.5%	29.1%	28.8%
Non-operating income (expense), net	8.2	-0.4	5.1
Income before income tax provision	36.7	28.7	33.9
Income tax provision	8.9	7.2	7.6
Net income	27.8	21.5	26.3
Net income attributable to noncontrolling interests	8.2	9.5	8.7
Net income attributable to Photronics, Inc. shareholders	<u>19.6%</u>	<u>12.0%</u>	<u>17.6%</u>
	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Revenue	100.0%	100.0%	100.0%
Cost of goods sold	62.3	64.3	74.8
Gross profit	37.7	35.7	25.2
Selling, general and administrative expenses	7.8	7.8	8.7
Research and development expenses	1.5	2.2	2.8
Other operating income, net	0.0	0.0	0.5
Operating income	28.4%	25.7%	14.2%
Non-operating income (expense), net	1.9	3.3	1.1
Income before income tax provision	30.3	29.0	15.4
Income tax provision	7.9	7.3	3.5
Net income	22.4	21.7	11.9
Net income attributable to noncontrolling interests	8.3	7.3	3.5
Net income attributable to Photronics, Inc. shareholders	<u>14.1%</u>	<u>14.4%</u>	<u>8.4%</u>

Note: All the following tabular comparisons, unless otherwise indicated, are for the three months ended October 31, 2023 (Q4 FY23), July 30, 2023 (Q3 FY23) and October 31, 2022 (Q4 FY22), and for the fiscal years ended October 31, 2023 (YTD FY23) and October 31, 2022 (YTD FY22). Please refer to Part II, Item 7 of our 2022 Form 10-K for comparative discussion of our fiscal years ended October 31, 2022, and October 31, 2021. The tables in this item may not foot due to rounding.

Revenue

Our quarterly revenues can be affected by the seasonal purchasing practices of our customers. As a result, demand for our products is typically reduced during the first quarter 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 present changes in revenue disaggregated by product type and geographic origin, in Q4 FY23 and YTD FY23 from revenue in prior reporting periods.

Quarterly Changes in Revenue by Product Type

	Q4 FY23 compared with Q3 FY23			Q4 FY23 compared with Q4 FY22	
	Revenue in Q4 FY23	Increase (Decrease)	Percent Change	Increase (Decrease)	Percent Change
IC					
High-end *	\$ 57.7	\$ 12.4	27.4%	\$ 13.4	30.2%
Mainstream	106.8	(11.0)	(9.3)%	(5.1)	(4.5)%
Total IC	\$ 164.5	\$ 1.4	0.8%	\$ 8.3	5.3%
FPD					
High-end *	\$ 53.3	\$ 3.3	6.6%	\$ 9.9	22.8%
Mainstream	9.7	(1.4)	(12.5)%	(0.9)	(8.9)%
Total FPD	\$ 63.0	\$ 1.9	3.1%	\$ 9.0	16.5%
Total Revenue	\$ 227.5	\$ 3.3	1.5%	\$ 17.2	8.2%

* High-end photomasks typically have higher ASPs than mainstream products.

Quarterly Changes in Revenue by Geographic Origin**

	Q4 FY23 compared with Q3 FY23			Q4 FY23 compared with Q4 FY22	
	Revenue in Q4 FY23	Increase (Decrease)	Percent Change	Increase (Decrease)	Percent Change
Taiwan	\$ 79.3	\$ (2.3)	(2.8)%	\$ 3.0	3.9%
China	59.2	(2.9)	(4.6)%	6.8	12.9%
Korea	42.2	1.4	3.3%	4.2	11.2%
United States	36.8	7.1	23.9%	2.8	8.2%
Europe	9.3	(0.2)	(2.2)%	0.3	3.0%
Other	0.7	0.2	34.4%	0.1	24.7%
Total revenue	\$ 227.5	\$ 3.3	1.5%	\$ 17.2	8.2%

** This table disaggregates revenue by the location in which it was earned.

Revenue in Q4 FY23 of \$227.5 million represented an increase of 1.5% compared with Q3 FY23, and an increase of 8.2% from Q4 FY22.

Overall IC revenue increased 0.8 % from Q3 FY23, and increased 5.3% from Q4 FY22 due to stronger high-end foundry and logic demand in Asia. IC mainstream decreased in Q4 FY23 by 9.3% from Q3 FY23, and 4.5% from Q4 FY22 primarily the result of reduced mainstream demand in Asia.

FPD revenue increased 3.1% and 16.5% in Q4 FY23, compared, respectively, with Q3 FY23 and Q4 FY22. The increases were caused by continued strong AMOLED demand in mobile display during Q4 FY23. Revenue from mainstream products decreased 12.5% from Q3 FY23 as more production capacity was dedicated to meet strong high-end demand.

Year-over-Year Changes in Revenue by Product Type

	YTD FY23 compared with YTD FY22		
	Revenue in YTD FY23	Increase (Decrease)	Percent Change
IC			
High-end *	\$ 195.0	\$ (0.4)	(0.2)%
Mainstream	456.3	58.6	14.7%
Total IC	651.3	\$ 58.3	9.8%
FPD			
High-end *	200.8	\$ 13.9	7.4%
Mainstream	40.0	(4.6)	(10.3)%
Total FPD	240.8	\$ 9.3	4.0%
Total Revenue	892.1	\$ 67.5	8.2%

* High-end photomasks typically have higher ASPs than mainstream photomasks.

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

	YTD FY23 compared with YTD FY22		
	Revenue in YTD FY23	Increase (Decrease)	Percent Change
Taiwan	\$ 316.9	\$ 25.5	8.8%
China	245.4	32.8	15.4%
Korea	162.2	6.1	3.9%
United States	128.9	2.7	2.1%
Europe	36.6	0.2	0.5%
Other	2.1	0.3	13.5%
	\$ 892.1	\$ 67.5	8.2%

** This table disaggregates revenue by the location in which it was earned.

Revenue in YTD FY23 of \$892.1 million surpassed our prior record revenue set in YTD FY22 by \$67.5 million, or 8.2%. IC revenue increased by 9.8%, due to strong demand for mainstream products earlier in the year. FPD revenue increased by 4.0%, driven by a 7.4% increase in revenue from high-end products due to increased AMOLED demand in mobile displays, which offset decreased mainstream resulting from shifting capacity to meet strong high-end demand. We believe that strong demand for AMOLED photomasks will continue, as expected technology advances drives increasing overall demand for higher-value masks.

Gross Margin

	<u>Q4 FY23</u>	<u>Q3 FY23</u>	<u>Percent Change</u>	<u>Q4 FY22</u>	<u>Percent Change</u>
Gross profit	\$ 84.9	\$ 86.8	(2.2)%	\$ 80.3	5.7%
Gross margin	37.3%	38.7%		38.2%	

Gross margin was 37.3% for Q4 FY23, representing a slight decrease from the Q3 FY23 gross margin of 38.7%, as increase in revenue of 1.5% was offset by increased material costs of 4.2%, or 69 basis points as a percentage of revenue. Labor costs increased 4.5%, or 30 basis points as a percentage of revenue, due to increased costs in some locations. Equipment and other overhead costs increased 3.0%, or 41 basis points as a percentage of revenue, with increased equipment maintenance costs, partially offset by lower outsourced manufacturing costs, most significantly contributing to the net cost increase.

Gross margin decreased by 0.9 percentage points in Q4 FY23, from Q4 FY22, primarily as a result of the increase in material costs as a percentage of revenue from the prior year quarter. Equipment and other overhead costs increased 9.7%, or 37 basis points, as a percentage of revenue. Increased depreciation expense, utilities expenses, and outsourced manufacturing costs, which were partially offset by decreased equipment maintenance costs, were the primary contributors to the overall increase.

	<u>YTD FY23</u>	<u>YTD FY22</u>	<u>Percent Change</u>
Gross profit	\$ 336.2	\$ 294.2	14.3%
Gross margin	37.7%	35.7%	

Gross margin increased by 2.0 percentage points in YTD FY23, from YTD FY22, primarily as a result of the increase in revenue from the prior year period, offset somewhat by the following net cost increases: Material costs increased 2.8% from the prior year period, but decreased 129 basis points as a percentage of revenue. Labor costs increased 10.3% from the prior year, and increased 30 basis points as a percentage of revenue, primarily due to increased labor costs in Asia. Equipment and other overhead costs increased by 4.5% but decreased 95 basis points as a percentage of revenue, with increased utilities, equipment service contract costs, and less transfer of research and development cost from cost of goods sold to research and development expense, as well as increases in computer software costs, offset by decreased importation costs most significantly contributing to the overall cost increase.

Selling, General and Administrative Expenses

Selling, general and administrative expenses were \$16.7 million in Q4 FY23, compared with \$18.0 million in Q3 FY23, and \$15.7 million in Q4 FY22. The decrease from Q3 FY23 was primarily the result of decreased compensation and related expenses of \$1.5 million offset partially by increased insurance expenses and outside services of \$0.1 million and \$0.1 million, respectively. The increase from the prior year quarter was primarily the result of increased compensation and related expenses of \$1.0 million and increased insurance expenses of \$0.2 million. Selling, general and administrative expenses increased \$5.5 million to \$69.5 million in YTD FY23, from \$64.0 million in YTD FY22, primarily due to an increase in compensation and related expenses, professional fees, travel and entertainment and insurance expenses in the respective amounts of \$4.1 million, \$1.2 million, \$0.4 million and \$0.3 million.

Research and Development Expenses

Research and development expenses, which primarily consist of development and qualification efforts related to process technologies for high-end IC and FPD applications, decreased \$0.1 million to \$3.4 million in Q4 FY23, from Q3 FY23; the decrease was primarily caused by a decline in development activities in Asia. Research and development expenses in Q4 FY23 decreased by \$0.7 million from Q4 FY22 as a result of decreased development activities in the U.S. and Asia. On a year-to-date basis, research and development expenses decreased \$4.7 million, to \$13.7 million, primarily due to decreased development activities in the U.S.

Non-Operating Income (Expense)

	<u>Q4 FY23</u>	<u>Q3 FY23</u>	<u>Q4 FY22</u>
Foreign currency transactions impact, net	\$ 13.2	\$ (4.5)	\$ 10.4
Interest expense, net	(0.1)	(0.1)	(0.4)
Interest income and other income, net	5.6	3.7	0.8
Non-operating income (expense), net	<u>\$ 18.7</u>	<u>\$ (0.9)</u>	<u>\$ 10.8</u>

Non-operating income (expense) increased in Q4 FY23 from Q3 FY23 by \$19.6 million, primarily due to foreign currency impacts, driven by favorable movements of the South Korean won, the New Taiwan dollar, RMB dollar against the U.S. dollar offsetting unfavorable movements of the Singapore dollar against the U.S. dollar. Non-operating income (expense) increased from Q4 FY22, by \$7.9 million, primarily due to higher interest and investment income earned on our cash balances, in addition to foreign currency transactions impact.

	<u>YTD FY23</u>	<u>YTD FY22</u>
Foreign currency transactions impact, net	\$ 2.5	\$ 27.3
Interest expense, net	(0.4)	(1.9)
Interest income and other income, net	14.8	1.7
Non-operating income (expense), net	<u>\$ 16.9</u>	<u>\$ 27.2</u>

Non-operating income (expense) decreased \$10.3 million in full year FY23, compared with full year FY22, due to foreign currency transactions, driven by unfavorable movements of the South Korean won, the New Taiwan dollar, and the Singapore dollar offsetting favorable movements of the RMB against the U.S. dollar, partially offset by increased interest income in the current year resulting from higher average cash, cash equivalents and short-term investments balances in FY23, compared with FY22 and lower interest expense, net of subsidies, due to receiving a lower amount of interest subsidies on our China-based debt in FY23, the effect of which was partially mitigated by lower average interest-bearing debt balance in FY23 than in the prior year. The columns presented above may not foot due to rounding.

Income Tax Provision

On December 15, 2022, the European Union (EU) Member States formally adopted the EU's Pillar Two Directive, which generally provides for a minimum effective tax rate of 15%, as established by the Organization for Economic Co-operation and Development (OECD) Pillar Two Framework. The EU effective dates are January 1, 2024, and January 1, 2025, for different aspects of the directive. A significant number of other countries are expected to also implement similar legislation with varying effective dates in the future. The Company is continuing to evaluate the potential impact on future periods of the Pillar Two Framework, pending legislative adoption by additional individual countries.

	<u>Q4 FY23</u>	<u>Q3 FY23</u>	<u>Q4 FY22</u>
Income tax provision	\$ 20.3	\$ 16.1	\$ 16.1
Effective income tax rate	24.3%	25.0%	22.5%

The effective income tax rates are 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 where the tax benefits of losses are not available.

The effective income tax rate decreased slightly in Q4 FY23, compared with Q3 FY23, primarily due to changes in the period-to-period mix of jurisdictional earnings. The effective income tax rate increase in Q4 FY23, as compared with Q4 FY22, is primarily due to changes in the jurisdictional mix of earnings as well as an increase in foreign tax as compared to the prior year.

	<u>FY23</u>	<u>FY22</u>
Income tax provision	\$ 70.3	\$ 59.8
Effective income tax rate	26.0%	25.0%

The increase in the effective income tax rate on a full-year basis in FY23, compared with FY22, is primarily due to an increase of unremitted earnings tax in a non-US jurisdiction, as well as changes in the jurisdictional mix of earnings. 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, 2023 and October 31, 2022, are \$8.9 million and \$5.6 million respectively, recorded in *Other liabilities* in the consolidated balance sheets that, if recognized, would impact the effective tax rates.

Net Income Attributable to Noncontrolling Interests

Net income attributable to noncontrolling interests was \$18.5 million in Q4 FY23, compared with \$21.3 million in Q3 FY23; the decrease was the result of a net decrease in the net incomes of our joint venture operations. Net income attributable to noncontrolling interests increased by \$0.3 million in Q4 FY23 from Q4 FY22, and by \$13.7 million in YTD FY23 from YTD FY22, as a result of increased net income at both our Taiwan-based and China-based IC facilities.

Liquidity and Capital Resources

Cash and cash equivalents was \$499.3 million and \$319.7 million as of October 31, 2023, and October 31, 2022, respectively. As of the most recent balance sheet date, total cash and cash equivalents included \$473.2 million held by foreign subsidiaries. Net Cash, a non-GAAP financial measure as defined and discussed in the Non-GAAP Financial Measures section below, was \$474.7 million and \$277.3 million as of October 31, 2023, and October 31, 2022, respectively. Our primary sources of liquidity are our cash on hand and cash we generate from operations.

We continually evaluate alternatives for efficiently funding our capital expenditures and ongoing operations. These reviews may result in our engagement in a variety of investing and financing transactions, in the transfer of cash among subsidiaries, and/or the repatriation of cash to the U.S. The transfer of funds among subsidiaries could be subject to foreign withholding taxes; in certain jurisdictions, repatriation of these funds to the U.S. may subject them to U.S. state income taxes and/or local country withholding taxes. We believe that our liquidity, including available financing, is sufficient to meet our requirements through the next twelve months and thereafter for the foreseeable future. Through the utilization of our existing liquidity, cash we generate from operations and short-term investments, we plan to continue to invest in our business, with our investments targeted to align with our customers' technology road maps. In addition, we stand ready to invest in mergers, acquisitions, or strategic partnerships, should a suitable opportunity arise.

We estimate capital expenditures for our fiscal year 2024 will be approximately \$140 million; these investments will be targeted towards high-end and mainstream "point" tools that will increase our operating capacity and efficiency, and enable us to support our customers' near-term demands. As of October 31, 2023, we had outstanding capital commitments of approximately \$106.8 million and recognized liabilities related to capital equipment purchases of approximately \$18.7 million. Although payment timing could vary, primarily as a result of the timing of tool delivery, installation and testing, we currently estimate that we will fund \$88.6 million of our total \$125.5 million committed and recognized obligations for capital expenditures over the next twelve months. Please refer to Notes 10 and 15 to our consolidated financial statements for additional information on our lease liabilities and unrecognized commitments, respectively.

In September 2020, the Company's board of directors authorized the repurchase of up to \$100 million of its common stock, pursuant to a repurchase plan under Rule 10b5-1 of the Securities Act. This authorization does not obligate the Company to repurchase any dollar amount or number of shares of common stock. As of October 31, 2023, there was approximately \$31.7 million remaining under that authorization. Depending on market conditions, we may utilize some or the entire remaining approved amount to reacquire additional shares.

As discussed in Note 6 of our consolidated financial statements, DNP, the noncontrolling interest in our China-based joint venture has, under certain circumstances, the right to put its interest in the joint venture to Photronics, or to purchase our interest in the joint venture. Under all such circumstances, the sale of DNP's interest would be at its 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. As of the date of issuance of this report, DNP had not indicated its intention to exercise this right. As of October 31, 2023, Photronics and DNP each had net investments in this joint venture of approximately \$117.1 million.

Cash Flows

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Net cash provided by operating activities	\$ 302.2	\$ 275.2	\$ 150.8
Net cash used in investing activities	\$ (101.5)	\$ (147.8)	\$ (103.5)
Net cash used in financing activities	\$ (18.5)	\$ (38.7)	\$ (53.9)

Operating Activities: Net cash provided by operating activities reflects net income adjusted for certain non-cash items, including depreciation and amortization, share-based compensation, and the effects of changes in operating assets and liabilities. Net cash provided by operating activities increased by \$27.0 million in FY23, compared with FY22, primarily due to increased net income and net cash-favorable changes in working capital, predominantly in Asia.

Free Cash Flow, which is a non-GAAP financial measure as discussed in the "Non-GAAP Financial Measures" section below, increased by \$8.0 million in FY23, compared with FY22, and \$121.2 million in FY22, compared with FY21, primarily due to increases in net cash provided by operating activities.

Investing Activities: In FY23, net cash flows used in investing activities primarily consisted of purchases of \$131.3 million of property, plant and equipment. Net cash flows used in investing activities decreased by \$46.2 million in FY23, compared with FY22, primarily as a result of \$47.5 million in proceeds from the maturity of available-for-sale debt securities.

Financing Activities: In FY23, net cash flows used in financing activities primarily consisted of debt repayments of \$18.5 million. Net cash used in financing activities decreased by \$20.2 million in FY23, compared with FY22, primarily due to decreased repayments of debt of \$47.0 million, offset by decreased contributions from noncontrolling interests of \$25.0 million that occurred in FY22 but did not repeat in FY23.

Our cash, cash equivalents, and restricted cash balances were negatively impacted by changes in foreign currency exchange rates in FY23 by \$2.7 million.

Non-GAAP Financial Measures

Non-GAAP Non-operating (loss) income, Non-GAAP Income tax provision, Non-GAAP Noncontrolling interests, Non-GAAP Net Income attributable to Photronics, Inc. shareholders and non-GAAP earnings per share, Free Cash Flow, and Net Cash are "non-GAAP financial measures" as such term is defined by the Securities and Exchange Commission and may differ from similarly named non-GAAP financial measures used by other companies. The financial tables below reconcile Photronics, Inc. financial results under GAAP to non-GAAP financial information. We believe these non-GAAP financial measures that exclude certain items are useful for analysts and investors to evaluate our future on-going performance because they enable a more meaningful comparison of our projected performance with our historical results. These non-GAAP metrics are not intended to represent funds available for our discretionary use and are not intended to represent, or be used as a substitute for, net income attributable to Photronics, Inc. shareholders, diluted earnings per share, cash and cash equivalents, or cash flows from operations, as measured under GAAP. The items excluded from these non-GAAP metrics but included in the calculation of their closest GAAP equivalent, are significant components of the consolidated statements of income, consolidated balance sheets and statement of cash flows and must be considered in performing a comprehensive assessment of overall financial performance.

The following table reconciles *GAAP to Non-GAAP Income* at the balance sheet dates. The columns may not foot due to rounding.

	Three Months ended			Year ended		
	Oct 31, 2023	July 30, 2023	Oct 31, 2022	Oct 31, 2023	Oct 31, 2022	Oct 31, 2021
Reconciliation of GAAP to Non-GAAP Non-operating (loss) Income:						
GAAP Non-operating (loss) income, net	\$ 18,660	\$ (911)	\$ 10,797	\$ 16,896	\$ 27,167	\$ 7,452
FX (gain) loss	(13,234)	4,543	(10,369)	(2,466)	(27,344)	(7,972)
Non-GAAP Non-operating (loss) income, net	<u>\$ 5,426</u>	<u>\$ 3,632</u>	<u>\$ 428</u>	<u>\$ 14,430</u>	<u>\$ (177)</u>	<u>\$ (520)</u>
Reconciliation of GAAP to Non-GAAP Income tax provision:						
GAAP Income tax provision	\$ 20,288	\$ 16,098	\$ 16,074	\$ 70,312	\$ 59,791	\$ 23,190
Estimated tax effects of FX (gain) loss	3,437	(1,193)	2,522	317	5,933	1,829
Non-GAAP Income tax provision	<u>\$ 16,851</u>	<u>\$ 17,291</u>	<u>\$ 13,552</u>	<u>\$ 69,995</u>	<u>\$ 53,858</u>	<u>\$ 21,361</u>
Reconciliation of GAAP to Non-GAAP Noncontrolling interests:						
GAAP Noncontrolling interests	\$ 18,545	\$ 21,296	\$ 18,204	\$ 74,149	\$ 60,456	\$ 23,367
Estimated noncontrolling interest effects of above	2,431	1,328	1,990	2,676	4,275	(481)
Non-GAAP Noncontrolling interests	<u>\$ 16,114</u>	<u>\$ 19,968</u>	<u>\$ 16,214</u>	<u>\$ 71,473</u>	<u>\$ 56,181</u>	<u>\$ 23,848</u>
Reconciliation of GAAP to Non-GAAP Net Income:						
GAAP Net Income	\$ 44,611	\$ 26,959	\$ 37,060	\$ 125,485	\$ 118,786	\$ 55,449
FX (gain) loss	(13,234)	4,543	(10,369)	(2,466)	(27,344)	(7,972)
Estimated tax effects of above	3,437	(1,193)	2,522	317	5,933	1,829
Estimated noncontrolling interest effects of above	2,431	1,328	1,990	2,676	4,275	(481)
Non-GAAP Net Income	<u>\$ 37,245</u>	<u>\$ 31,637</u>	<u>\$ 31,203</u>	<u>\$ 126,012</u>	<u>\$ 101,650</u>	<u>\$ 48,825</u>
Weighted-average number of common shares outstanding - Diluted	<u>62,067</u>	<u>61,974</u>	<u>61,374</u>	<u>61,755</u>	<u>61,189</u>	<u>61,999</u>
Reconciliation of GAAP to Non-GAAP EPS:						
GAAP diluted earnings per share	\$ 0.72	\$ 0.44	\$ 0.60	\$ 2.03	\$ 1.94	\$ 0.89
Effects of the above adjustments	(0.12)	0.07	(0.10)	0.01	(0.28)	(0.10)
Non-GAAP diluted earnings per share	<u>\$ 0.60</u>	<u>\$ 0.51</u>	<u>\$ 0.51</u>	<u>\$ 2.04</u>	<u>\$ 1.66</u>	<u>\$ 0.79</u>

The following table reconciles *Net cash provided by operating activities* to Free Cash Flow for FY23, FY22, and FY21. The columns may not foot due to rounding. Prior year amounts in the non-GAAP disclosure below have been recast to eliminate government incentives to conform to current year presentation.

	<u>FY23</u>	<u>FY22</u>	<u>FY21</u>
<i>Free Cash Flow</i>			
Net cash provided by operating activities	\$ 302.2	\$ 275.2	\$ 150.8
Purchases of property, plant and equipment	(131.3)	(112.3)	(109.1)
Free cash flow	<u>\$ 170.9</u>	<u>\$ 162.9</u>	<u>\$ 41.7</u>

The following table reconciles Cash and cash equivalents to Net Cash at the balance sheet dates. The increase in Net Cash was primarily driven by an increase in *Net cash provided by operating activities*, as discussed above. The columns may not foot due to rounding.

	<u>As of</u>	
	<u>October 31, 2023</u>	<u>October 31, 2022</u>
<i>Net Cash</i>		
Cash, cash equivalents	\$ 499.3	\$ 319.7
Current portion of Long-term debt	(6.6)	(10.0)
Long-term debt	(18.0)	(32.3)
Net cash	<u>\$ 474.7</u>	<u>\$ 277.4</u>

Business Outlook

Our current business outlook and guidance was provided in our Full Year and Fourth Quarter Fiscal 2023 Results earnings call, and related slide deck. These can be accessed in the investor section of our website - www.photronics.com.

Our future results of operations and the other forward-looking statements contained in this filing and in our “*Full Year and Fourth Quarter Fiscal 2023 Results*” earnings call and presentation involve a number of risks and uncertainties, some of which are discussed in Part I, Item 1A of this report. A number of other unforeseeable factors could cause actual results to differ materially from our expectations.

Critical Accounting Estimates

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

- **Revenue Recognition:** The application of GAAP related to the measurement and recognition of revenue requires us to make judgments and estimates, including the determination of whether we should recognize revenues as we perform or upon the completion of our performance, as these determinations impact the timing and amount of our reported revenues and net income. Other significant judgments include the estimation of the point in the manufacturing process at which we are entitled to recognize revenue, as well as the measurement of our progress towards satisfying our performance obligations, which determine the amount of revenue we are entitled to recognize.

- **Property, Plant and Equipment:** Significant judgment and assumptions are employed when we establish the estimated useful lives of asset classes, and determine when depreciation should commence for individual assets, as these determinations can significantly impact our gross margin and research and development expenses. Significant judgment would also be employed when events or changes in circumstances indicate that the carrying amount of a group of assets may not be recoverable, as the recoverability assessment requires us to forecast future cash flows related to these assets; this evaluation can significantly impact our gross margin and operating expense.
- **Leases:** Significant judgment is applied in the determination of whether an arrangement is, or contains, a lease and, in certain instances, whether the lease should be classified as an operating lease or a finance lease, which can impact the timing and classification of lease costs.
- **Contingencies:** We are subject to the possibility of losses from various contingencies. Significant judgment is necessary to estimate the probability and amount of a loss, if any, from such contingencies. An accrual is made when it is probable that a liability has been incurred or an asset has been impaired and the amount of loss can be reasonably estimated. Changes in estimates related to, and resolutions of, contingencies may have a material impact on our financial performance.
- **Income Taxes:** Our annual tax rate is determined based on our income and the jurisdictions where it is earned, statutory tax rates, and the tax impacts of items treated differently for tax purposes than for financial reporting purposes. Also inherent in determining our annual tax rate are judgments and assumptions regarding the recoverability of certain deferred tax assets, and our ability to uphold certain tax positions. We are subject to complex tax laws, in the U.S. and numerous foreign jurisdictions, and the manner in which they apply can be open to interpretation. Realization of deferred tax assets is dependent upon generating sufficient taxable income in the appropriate jurisdiction in future periods, which involves business plans, planning opportunities, and expectations about future outcomes. Our assessment relies on estimates and assumptions and may involve a series of complex judgments about future events.

There are a number of estimates and assumptions inherent in calculating the various components of our tax provision. Future events such as changes in tax legislation, geographic mix of earnings, findings in tax audits, and earnings repatriation plans could have an impact on those estimates and our effective tax rate.

Please refer to Notes 1, 10, 13, and 15 to our consolidated financial statements for additional information related to these critical accounting estimates.

Effect of Recent Accounting Pronouncements

See Note 22 to our consolidated financial statements of this report 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 RMB, and the Singapore dollar. The functional currencies of our European subsidiaries are the British pound and the euro. In addition, we engage in transactions and have exposures to the Japanese yen.

We attempt to minimize our risk of foreign currency transaction losses by producing products in the same country in which the products are sold (thereby generating revenues and incurring expenses in the same currency), and by managing our working capital. However, in some instances, we sell products in a currency other than the functional currency of the country where it was produced, or purchase products in a currency that differs from the functional currency of the purchasing entity. 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 functional currency of the transacting subsidiary. We do not enter into derivatives for speculative purposes. There can be no assurance that this approach will protect us from the need to recognize significant foreign currency transaction gains and losses, especially in the event of a significant adverse movement in the value of any foreign currency in which we conduct business against any of our functional currencies, including the U.S. dollar.

Our primary net foreign currency exposures as of October 31, 2023, included the South Korean won, the Japanese yen, the New Taiwan dollar, the Chinese renminbi, the Singapore dollar, the British pound sterling, and the euro. As of October 31, 2023, 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 \$52.0 million, which represents an increase of \$17.3 million from the same movement as of October 31, 2022. The increase in foreign currency rate change risk is primarily the result of increased net exposures of the New Taiwan dollar and South Korean won against the U.S. dollar. We do not believe that a 10% change in the exchange rates of other non-U.S. dollar currencies would have had a material effect on our October 31, 2023, consolidated financial statements.

Interest Rate Risk

A 10% adverse movement in the interest rates on our variable rate borrowings would not have had a material effect on our October 31, 2023, consolidated financial statements.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Photronics, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Photronics, Inc. (the “Company”) as of October 31, 2023 and 2022, the related consolidated statements of income, comprehensive income, equity, and cash flows for each of the three years in the period ended October 31, 2023, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of October 31, 2023 and October 31, 2022, and the results of its operations and its cash flows for each of the three years in the period ended October 31, 2023, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company’s internal control over financial reporting as of October 31, 2023, based on criteria established in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated December 22, 2023, expressed an unqualified opinion on the Company’s internal control over financial reporting.

Basis for Opinion

These financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that 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. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

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

Revenue — Contracts with Customers— Refer to Note 1 & 9 of the financial statements

Critical Audit Matter Description

The Company recognizes revenue over time for in-process production orders that have not shipped for contracts with customers for which it has an enforceable right to bill and collect consideration, including a reasonable profit, in the event the in-process orders are cancelled by the customers. In addition, as photomasks are manufactured to customer specifications, they have no alternative use to the Company. This results in the Company recording a corresponding contract asset as of period-end for these contracts. Significant judgment is exercised by the Company in determining the amount of revenue to recognize for these contracts and the corresponding contract asset, specifically in estimating the point within the production cycle at which the production orders stand in relation to the Company’s enforceable right within the contract. Pursuant to these contracts, revenue recognized over time and the associated contract asset as of October 31, 2023 was \$11 million.

We identified the determination of revenue recognized over time for in-process production orders as of October 31, 2023 as a critical auditing matter because of the significant estimates and assumptions management makes in determining the amount of revenue to recognize for these contracts. This required a high degree of audit judgment and an increased extent of effort when performing audit procedures to evaluate the reasonableness of management’s determination of the progress point of in-process orders and the amount of revenue recognized over time and the corresponding contract asset as of October 31, 2023.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to the Company’s determination of the progress point of in-process orders and resulting revenue recognized over time and corresponding contract asset as of October 31, 2023 included the following:

- We tested the operating effectiveness of controls over management’s determination of the point in the production process and correlation to stated contractual rights.
- We tested the mathematical accuracy of management’s calculations of revenue and the associated timing of revenue recognized in the consolidated financial statements.
- We tested the accuracy and completeness of the in-process orders report by performing physical observation.
- We selected a sample of in-process production orders as of October 31, 2023 and performed the following procedures for each selection:
 - Obtained and read the customer agreement/purchase order, invoice, and quote to determine whether the company has an enforceable right to bill and collect consideration.

- Evaluated management's identification of significant contract terms and resulting revenue recognition for the in-process production order.

- Evaluated management estimate of the production point for the in-process order corresponding revenue recognition and contract asset based on the Company's enforceable right within the contract.

/s/ Deloitte & Touche LLP
Boston, Massachusetts
December 22, 2023

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

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

	October 31, 2023	October 31, 2022
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 499,292	\$ 319,680
Short-term investments	12,915	38,820
Accounts receivable, net of allowance of \$1,099 in 2023 and \$1,002 in 2022	194,927	198,147
Inventories	49,963	50,753
Other current assets	28,353	37,252
Total current assets	<u>785,450</u>	<u>644,652</u>
Property, plant and equipment, net	709,244	643,873
Deferred income taxes	21,297	19,816
Other assets	10,230	7,489
Total assets	<u>\$ 1,526,221</u>	<u>\$ 1,315,830</u>
LIABILITIES AND EQUITY		
Current liabilities:		
Current portion of long-term debt	\$ 6,621	\$ 10,024
Accounts payable	84,024	79,566
Accrued liabilities	94,578	104,207
Total current liabilities	<u>185,223</u>	<u>193,797</u>
Long-term debt	17,998	32,310
Other liabilities	47,391	27,634
Total liabilities	<u>250,612</u>	<u>253,741</u>
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, 61,310 shares issued and outstanding at October 31, 2023, and 60,791 shares issued and outstanding at October 31, 2022	613	608
Additional paid-in capital	502,010	493,741
Retained earnings	561,119	435,634
Accumulated other comprehensive loss	(88,734)	(98,456)
Total Photronics, Inc. shareholders' equity	<u>975,008</u>	<u>831,527</u>
Noncontrolling interests	300,601	230,562
Total equity	<u>1,275,609</u>	<u>1,062,089</u>
Total liabilities and equity	<u>\$ 1,526,221</u>	<u>\$ 1,315,830</u>

See accompanying notes to consolidated financial statements.

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

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Revenue	\$ 892,076	\$ 824,549	\$ 663,761
Cost of goods sold	555,914	530,336	496,717
Gross profit	336,162	294,213	167,044
Operating expenses:			
Selling, general and administrative	69,458	63,989	57,525
Research and development	13,654	18,341	18,490
Total operating expenses	83,112	82,330	76,015
Other operating (loss) income, net	-	(17)	3,525
Operating income	253,050	211,866	94,554
Non-operating income (expense):			
Foreign currency transactions impacts, net	2,466	27,344	7,972
Interest income and other income, net	14,863	1,680	1,165
Interest expense, net of subsidiaries	(433)	(1,857)	(1,685)
Income before income tax provision	269,946	239,033	102,006
Income tax provision	70,312	59,791	23,190
Net income	199,634	179,242	78,816
Net income attributable to noncontrolling interests	74,149	60,456	23,367
Net income attributable to Photronics, Inc. shareholders	\$ 125,485	\$ 118,786	\$ 55,449
Earnings per share:			
Basic	\$ 2.05	\$ 1.96	\$ 0.90
Diluted	\$ 2.03	\$ 1.94	\$ 0.89
Weighted-average number of common shares outstanding:			
Basic	61,139	60,559	61,407
Diluted	61,755	61,189	61,999

See accompanying notes to consolidated financial statements.

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

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Net income	\$ 199,634	\$ 179,242	\$ 78,816
Other comprehensive income (loss), net of tax of \$0:			
Foreign currency translation adjustments	5,615	(151,209)	8,478
Other	(3)	423	(69)
Net other comprehensive income (loss)	<u>5,612</u>	<u>(150,786)</u>	<u>8,409</u>
Comprehensive income	205,246	28,456	87,225
Less: comprehensive income attributable to noncontrolling interests	<u>70,039</u>	<u>28,697</u>	<u>29,163</u>
Comprehensive income (loss) attributable to Photronics, Inc. shareholders	<u>\$ 135,207</u>	<u>\$ (241)</u>	<u>\$ 58,062</u>

See accompanying notes to consolidated financial statements.

PHOTRONICS, INC.
Consolidated Statements of Equity
Years Ended October 31, 2023, 2022 and 2021
(in thousands)

	Photronics, Inc. Shareholders							Total Equity
	Common Stock		Additional Paid-In Capital	Retained Earnings	Treasury Stock	Accumulated Other Comprehensive Income (Loss)	Non- Controlling Interests	
	Shares	Amount						
Balance at October 31, 2020	63,138	\$ 631	\$ 507,336	\$ 279,037	\$ —	\$ 17,958	\$ 157,304	\$ 962,266
Net income	-	-	-	55,449	-	-	23,367	78,816
Other comprehensive income	-	-	-	-	-	2,613	5,796	8,409
Shares issued under equity plans	805	8	3,561	-	-	-	-	3,569
Share-based compensation expense	-	-	5,348	-	-	-	-	5,348
Dividends to noncontrolling interest	-	-	-	-	-	-	(9,597)	(9,597)
Purchases of treasury stock	-	-	-	-	(48,249)	-	-	(48,249)
Retirement of treasury stock	(3,919)	(39)	(31,573)	(16,637)	48,249	-	-	-
Balance at October 31, 2021	60,024	600	484,672	317,849	-	20,571	176,870	1,000,562
Net income	-	-	-	118,786	-	-	60,456	179,242
Other comprehensive loss	-	-	-	-	-	(119,027)	(31,759)	(150,786)
Shares issued under equity plans	954	10	4,280	-	-	-	-	4,290
Share-based compensation expense	-	-	6,308	-	-	-	-	6,308
Contribution from noncontrolling interest	-	-	-	-	-	-	24,995	24,995
Purchases of treasury stock	-	-	-	-	(2,522)	-	-	(2,522)
Retirement of treasury stock	(187)	(2)	(1,519)	(1,001)	2,522	-	-	-
Balance at October 31, 2022	60,791	608	493,741	435,634	-	(98,456)	230,562	1,062,089
Net income	-	-	-	125,485	-	-	74,149	199,634
Other comprehensive income (loss)	-	-	-	-	-	9,722	(4,110)	5,612
Shares issued under equity plans	519	5	268	-	-	-	-	273
Share-based compensation expense	-	-	8,001	-	-	-	-	8,001
Balance at October 31, 2023	<u>61,310</u>	<u>\$ 613</u>	<u>\$ 502,010</u>	<u>\$ 561,119</u>	<u>\$ -</u>	<u>\$ (88,734)</u>	<u>\$ 300,601</u>	<u>\$ 1,275,609</u>

See accompanying notes to consolidated financial statements.

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

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Cash flows from operating activities:			
Net income	\$ 199,634	\$ 179,242	\$ 78,816
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization of property, plant and equipment	80,473	79,971	87,535
Amortization of intangible assets	362	359	2,861
Share-based compensation	8,001	6,308	5,348
Deferred income taxes	(927)	809	(2,110)
Changes in assets, liabilities, and other:			
Accounts receivable	4,026	(51,233)	(36,620)
Inventories	1,236	(2,039)	2,987
Other current assets	9,665	1,204	(13,472)
Accounts payable, accrued liabilities and other	(294)	60,566	25,427
Net cash provided by operating activities	<u>302,176</u>	<u>275,187</u>	<u>150,772</u>
Cash flows from investing activities:			
Purchases of property, plant and equipment	(131,295)	(112,338)	(109,099)
Purchases of available-for-sale debt securities	(20,192)	(38,854)	-
Proceeds from maturities of available-for-sale debt securities	47,537	-	-
Government incentives	2,522	3,615	5,775
Purchases of intangible assets	(117)	(205)	(170)
Other	-	25	-
Net cash used in investing activities	<u>(101,545)</u>	<u>(147,757)</u>	<u>(103,494)</u>
Cash flows from financing activities:			
Repayments of debt	(18,439)	(65,440)	(20,352)
Purchases of treasury stock	-	(2,522)	(48,249)
Contributions from noncontrolling interests	-	24,995	-
Dividends paid to noncontrolling interests	-	-	(9,597)
Proceeds from share-based arrangements	1,248	5,749	3,874
Proceeds from long-term debt	-	-	20,858
Net settlements of restricted stock awards	(1,302)	(1,471)	(437)
Net cash used in financing activities	<u>(18,493)</u>	<u>(38,689)</u>	<u>(53,903)</u>
Effects of exchange rate changes on cash, cash equivalents, and restricted cash	<u>(2,680)</u>	<u>(46,012)</u>	<u>4,703</u>
Net increase (decrease) in cash, cash equivalents, and restricted cash	179,458	42,729	(1,922)
Cash, cash equivalents, and restricted cash at beginning of year	<u>322,409</u>	<u>279,680</u>	<u>281,602</u>
Cash, cash equivalents, and restricted cash at end of year	501,867	322,409	279,680
Less: Ending restricted cash	<u>2,575</u>	<u>2,729</u>	<u>3,010</u>
Cash and cash equivalents at end of year	<u>\$ 499,292</u>	<u>\$ 319,680</u>	<u>\$ 276,670</u>
Supplemental disclosure of non-cash information:			
Accruals for property, plant and equipment purchased during year	\$ 18,607	\$ 3,266	\$ 7,794

See accompanying notes to consolidated financial statements.

PHOTRONICS, INC.
Notes to Consolidated Financial Statements
Years Ended October 31, 2023, October 31, 2022 and October 31, 2021
(in thousands, except share amounts)

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

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

Consolidation

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

Estimates and Assumptions

The preparation of financial statements in conformity with U.S.GAAP requires us to make estimates and assumptions that affect amounts reported in them. Our estimates are based on historical experience and on various assumptions that are believed to be reasonable, based on the facts and circumstances available at the time they are made. Subsequent actual results may differ from such estimates. We review these estimates periodically and reflect any effects of revisions in the period in which they are determined.

Cash and Cash Equivalents

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

Investments

Investments consist of U. S. government securities and are classified as available-for-sale. We classify available-for-sale securities on our consolidated balance sheet as follows:

- Maturing within three months or less from the date of purchase *Cash and cash equivalents*
- Maturing, as of the date of purchase, more than three months, but with remaining maturities of less than one year, from the balance sheet date *Short-term investments*
- Maturing one year or more from the balance sheet date *Long-term marketable investments*

As of October 31, 2023, and October 31, 2022, all of our available-for-sale securities had remaining maturities less than one year, and have been classified as *Short-term investments*.

Available-for-sale debt investments are reported at fair value, with unrealized gains or losses (net of tax) reported in *Accumulated other comprehensive (loss) income*. The fair values of our available-for-sale securities are Level 1 measurements, based on quoted prices from active markets for identical assets. In the event of a sale of an available-for-sale debt investment, we would determine the cost of the investment sold at the specific individual security level, and would include any gain or loss in *Interest income and other income, net*, where we also report periodic interest earned and the amortization (accretion) of discounts (premiums) related to these investments. The table below provides information on our available-for-sale debt securities.

	October 31, 2023				October 31, 2022			
	Amortized Cost	Unrealized Gains	Unrealized Losses	Carrying Value	Amortized Cost	Unrealized Gains	Unrealized Losses	Carrying Value
Government securities	\$ 12,913	\$ 4	\$ (2)	\$ 12,915	\$ 38,911	\$ -	\$ (91)	\$ 38,820

Periodically, at the individual security level, we review our investments to determine if they are impaired. An investment would be impaired if its amortized cost exceeds its fair value. In the event that an investment’s amortized cost exceeds its fair value, we would determine whether the impairment is temporary or other than temporary. Factors indicating that an other than temporary impairment had occurred that we would consider in our determination include whether we have decided to sell the security and whether it is more likely than not that we may be required to sell the security before its amortized cost basis is recovered. In addition, for certain types of securities, we would assess whether the discounted cash flows we expect to collect on an investment are less than its amortized cost and, under such a circumstance, recognize the existing credit loss as an impairment.

Accounts Receivable, Unbilled Receivables and Allowance for Credit Losses

We generally record our accounts receivable at their billed amounts. The Company recognizes unbilled receivables when the Company has satisfied its performance obligations, has an unconditional right to consideration, but has not yet issued an invoice. All outstanding past due customer invoices are reviewed for collectability during, and at the end of, every reporting period. To the extent that we believe a loss on the collection of a customer invoice is probable, we record the loss and credit an allowance for credit losses. In the event that an amount is determined to be uncollectible, we charge the allowance for credit losses and derecognize the related receivable. Refer to our revenue recognition policy, below, for additional information on our accounting for accounts receivable.

Inventories

Inventories are stated at the lower of cost, determined under the first-in, first-out (“FIFO”) method, or net realizable value. Please refer to Note 4 of our consolidated financial statements for additional information on our inventories. Inventory reserves are established when conditions indicate that the net realizable value is less than costs due to assigned expiration dates or other causes based on individual facts and circumstances. If net realizable value is less than cost at the balance sheet date, the carrying amount is reduced to the realizable value, and the difference is recognized as a loss on valuation of inventories within cost of sales.

Property, Plant and Equipment

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

Depreciation and amortization, essentially all of which are included in *Cost of goods sold* in our consolidated statements of income, 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 lesser of the life of the lease or the estimated useful life of the improvement. We employ judgment when making assumptions about the estimated useful lives and depreciation periods we assign to property, plant and equipment, and when events or changes in circumstances such as a significant industry downturn, plant closures, technological obsolescence, or other occurrences indicate that their carrying amounts may not be recoverable.

Impairment of Long-Lived Assets

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

Restricted Cash

Restricted cash in the amounts of \$2.6 million and \$2.7 million are included in *Other assets* on our October 31, 2023 and October 31, 2022, consolidated balance sheets, respectively. The restrictions on these amounts are primarily related to land lease agreements and customs requirements.

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. When we retire our treasury stock, any excess of the repurchase price paid over par value is allocated between additional paid-in capital and retained earnings.

Revenue Recognition

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

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

Contract Assets, Contract Liabilities, and Accounts Receivable

We recognize a contract asset when our performance under a contract precedes our receipt of consideration from a customer, or before payment is due, and our receipt of consideration is conditional upon factors other than the passage of time. Contract assets reflect our transfer of control to customers of photomasks that are in process or completed but not yet shipped to customers. A receivable is recognized when we have an unconditional right to payment for our performance, which generally occurs when we ship the photomasks. Our contract assets primarily consist of a significant amount of our in-process production orders and fully manufactured photomasks which have not yet shipped, for which we have an enforceable right to collect consideration (including a reasonable profit) in the event the in-process orders are cancelled by customers. On an individual contract basis, we net contract assets with contract liabilities (deferred revenue) for financial reporting purposes. We did not impair any contract assets or accounts receivable in 2023, 2022, or 2021.

Contract Costs

We pay commissions to third-party sales agents for certain sales that they procure on our behalf. However, the bases of the commissions are the transaction prices of the sales, which are completed in less than one year; thus, no relationship is established with a customer that will result in future business. Therefore, we would not recognize any portion of these sales commissions as costs of obtaining a contract, nor do we currently foresee other circumstances under which we would recognize such assets.

Remaining Performance Obligations

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

Product Warranties

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

Leases

We determine if an agreement is, or contains, a lease on the earlier of the date of the agreement or the date on which we commit to entering the agreement and evaluate at that time whether the lease is an operating lease or a finance lease. We recognize right-of-use assets and lease liabilities for operating and finance leases with terms greater than 12 months. Please refer to Note 10 of our consolidated financial statements for additional information.

Our involvement in lease arrangements has typically been as a lessee. We determine if an agreement is, or contains, a lease on the earlier of the date of the agreement or the date on which we commit to entering the agreement. An arrangement is determined to be a lease when it conveys to us the right to control the use of an identified asset for a period of time in exchange for consideration. Our having the right to control an identified asset is determined by whether we are entitled to substantially all of its economic benefits and can direct its use. We recognize leases on our consolidated balance sheet when a lessor makes an asset underlying a lease having a term in excess of twelve months available for our use. As allowed under ASC Topic 842 – “Leases” (“Topic 842”), we have elected 1) not to apply the recognition requirements to leases that, at their commencement dates, have lease terms of twelve months or less and do not include options to purchase their underlying assets that we are reasonably certain to exercise and 2) for all classes of assets, the practical expedient to not separate lease components of a contract from nonlease components of a contract.

If an arrangement is determined to be, or include, a lease, we then apply the classification criteria in Topic 842 to determine whether the lease is a finance lease or an operating lease. For both types of leases, at their commencement dates (which are the dates on which a lessor makes an underlying asset available for our use), we recognize ROU assets, which represent our rights to use the underlying assets, and lease liabilities which represent our obligation to make payments for such rights. The present value of lease payments over the term of the lease provides the basis for the initial measurement of ROU assets and their related lease liabilities. Variable lease payments, other than those that are dependent on an index or on a rate (at which they are measured on their commencement dates), are not included in the measurement of ROU assets and their related lease liabilities. Lease terms include extension periods if the lease agreement includes an option to extend the lease that we are reasonably certain to exercise.

The initial measurement process for finance leases and operating leases is the same, except that, for operating leases, we generally apply our incremental borrowing rates for collateralized borrowings over terms similar to those of the leases to determine the lease liability while, for finance leases, we use the interest rates implicit in the leases. The initial measurement of ROU assets may require further adjustments for lease prepayments and initial direct costs we incur.

Operating leases are expensed on a straight-line basis over the terms of the leases, and are included in the consolidated statement of income in *Cost of goods sold, Selling, general and administrative, or Research and development* expense in accordance with the use of the underlying asset. Finance lease ROU assets are amortized over the estimated useful life of the underlying asset; the expenses are included in the consolidated statement of income in *Cost of goods sold*. Finance lease liabilities are subsequently remeasured by increasing the liability to reflect interest accrued during a period and decreasing the liability to reflect payments made during the period. Interest expense incurred on finance leases is included in *Interest expense* on the consolidated statements of income.

Cash paid for operating leases and interest paid for finance leases are included in the consolidated statement of cash flows as operating activities in *Accounts payable, accrued liabilities and other*; cash paid for finance lease principal is included in *Repayments of debt* in the financing activities section of the consolidated statement of cash flows.

Share-Based Compensation

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

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

Research and Development

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

Foreign Currency Translation

Our non-U.S. subsidiaries maintain their books of account in their respective local currencies, which are their functional 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 (loss) income*, a component of equity on our consolidated balance sheets.

Government Grants

The Company receives grants from governments in support of certain of the Company's business activities, primarily related to capital expenditures and research and development activities. Grants are generally received in the form of cash as either a recovery for expenses incurred, qualified assets purchased or as an incentive for meeting certain eligibility requirements that may be part of a grant agreement. Grant agreements terms generally extend for a period of up to 4 years. We account for funds we receive from government grants by either reducing the costs of the assets (if the grant relates to capital expenditures) or expenses which could be Cost of goods sold, Selling, general and administrative, and Research and development expenses in the consolidated statements of income once the conditions and restrictions of the grant have been met and payment has been received. If the funds we receive cannot be attributed to specific assets or expenses, they would be recognized as other income, and included in Interest income and other income, net in the consolidated statements of income. Funds we receive from government grants are classified in our consolidated statements of cash flows as either Net cash provided by operating activities or Net cash provided by investing activities, in accordance with how we expend the funds. When a grant is received before conditions of the grant have been met, the grant is recorded in Accrued liabilities or Other liabilities in the Consolidated Balance Sheets. For the year ended October 31, 2023, grants recorded in the Company's Consolidated Financial Statements were not material.

Income Taxes

The income tax provision is computed on the basis of the income or loss before income taxes for each entity in its respective tax jurisdiction. 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 employ judgment and make assumptions when establishing valuation allowances for deferred income tax assets, if their realization is not deemed to be 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 are eligible for investment tax credits in U.S. and non-U.S. tax jurisdictions. We account for investment tax credits under the "flow-through" method of accounting. As permitted in ASC 740 "Income Taxes", under the flow-through method of accounting, the tax benefit from an investment tax credit is recorded as a reduction of income taxes in the period in which the credit is generated.

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

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 were exercised or earned.

Variable Interest Entities

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

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

We would account for investments we make in VIEs in which we have determined that we do not have a controlling financial interest but have a significant influence over, and hold at least a twenty percent ownership interest in, using the equity method. An 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.

NOTE 2 – ACCOUNTS RECEIVABLE

The components of *Accounts Receivable* at the balance sheet dates are presented below.

	October 31, 2023	October 31, 2022
Accounts Receivable	\$ 171,433	\$ 178,303
Unbilled Receivable	24,593	20,846
Allowance for Credit Losses	(1,099)	(1,002)
	<u>\$ 194,927</u>	<u>\$ 198,147</u>

NOTE 3 - OTHER CURRENT ASSETS

Presented below are the components of *Other current assets* at the balance sheet dates.

	October 31, 2023	October 31, 2022
Contract assets	\$ 10,984	\$ 15,752
Prepaid expenses	10,031	8,263
Other	2,537	814
Prepaid and refundable income taxes	2,489	9,709
Recoverable value added taxes	2,312	2,714
	<u>\$ 28,353</u>	<u>\$ 37,252</u>

NOTE 4 - INVENTORIES

The components of *Inventories* at the balance sheet dates are presented below.

	October 31, 2023	October 31, 2022
Raw materials	\$ 48,948	\$ 49,326
Work in process	1,010	1,408
Finished goods	5	19
	<u>\$ 49,963</u>	<u>\$ 50,753</u>

NOTE 5 - PROPERTY, PLANT AND EQUIPMENT, NET

Presented below are the components of *Property, plant and equipment, net* at the balance sheet dates.

	October 31, 2023	October 31, 2022
Land	\$ 11,378	\$ 11,134
Buildings and improvements	185,850	168,024
Machinery and equipment	1,922,041	1,769,478
Leasehold improvements	18,894	18,802
Furniture, fixtures, and office equipment	15,856	14,355
Construction in progress	55,434	90,846
	<u>2,209,453</u>	<u>2,072,639</u>
Accumulated depreciation and amortization	<u>(1,500,209)</u>	<u>(1,428,766)</u>
	<u>\$ 709,244</u>	<u>\$ 643,873</u>

Information on ROU assets resulting from finance leases, at the balance sheet dates, is presented below.

	October 31, 2023	October 31, 2022
Machinery and equipment	\$ 42,820	\$ 42,760
Accumulated amortization	<u>(7,655)</u>	<u>(4,784)</u>
	<u>\$ 35,165</u>	<u>\$ 37,976</u>

The following table presents depreciation expense (including the amortization of ROU assets) related to property, plant and equipment incurred during the reporting periods.

	Years Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Depreciation Expense	\$ 80,472	\$ 79,971	\$ 87,535

In the third quarter of 2021, we recorded a \$3.5 million gain on the trade-in of a lithography tool with a tool vendor as partial compensation for a more advanced tool.

NOTE 6 - PDMCX JOINT VENTURE

In January 2018, Photronics, Inc. through its wholly-owned subsidiary, Photronics Singapore PTE. LTD., (hereinafter, within this Note “we”, “Photronics”, “us”, or “our”), 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, which we refer to as “PDMCX”, was established to develop and manufacture photomasks for semiconductors. We entered into this joint venture to enable us to compete more effectively for the merchant photomask business in China, and to benefit from the additional resources and investment that DNP provides to enable us to offer advanced-process technology to our customers.

In 2020, in combination with local financing obtained by PDMCX, Photronics and DNP fulfilled their investment obligations under the PDMCX operating agreement (“the Agreement”). As discussed in Note 8, liens were granted to the local financing entity on property, plant, and equipment and were paid off during fiscal year 2023. These liens had an October 31, 2022, total carrying value of \$70.7 million, as collateral for the loans.

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

The following table presents net income we recorded from the operations of PDMCX during the reporting periods.

	Years Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Net income from PDMCX	\$ 25,098	\$ 16,714	\$ 6,425

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

commitments, and acquire and dispose of PDMCX's assets. In addition, as a result of the 50.01% variable interest we held during the current and prior year periods, we had the obligation to absorb losses, and the right to receive benefits, that could potentially be significant to PDMCX.

The following table presents the carrying amounts of PDMCX assets and liabilities included in our consolidated balance sheets. General creditors of PDMCX do not have recourse to the assets of Photonics (other than the net assets of PDMCX); therefore, our maximum exposure to loss from PDMCX is our interest in the carrying amount of the net assets of the joint venture.

Classification	October 31, 2023		October 31, 2022	
	Carrying Amount	Photonics Interest	Carrying Amount	Photonics Interest
Current assets	\$ 135,960	\$ 67,994	\$ 127,542	\$ 63,784
Noncurrent assets	136,334	68,181	119,392	59,708
Total assets	272,294	136,175	246,934	123,492
Current liabilities	36,305	18,156	51,274	25,643
Noncurrent liabilities	1,873	937	9,161	4,581
Total liabilities	38,178	19,093	60,435	30,224
Net assets	\$ 234,116	\$ 117,082	\$ 186,499	\$ 93,268

NOTE 7 - ACCRUED LIABILITIES

Presented below are the components of *Accrued liabilities* at the balance sheet dates. Prior year amounts have been reclassified to conform to the current year presentation.

	October 31, 2023	October 31, 2022
Compensation related expenses	\$ 37,218	\$ 33,061
Income taxes	24,080	37,595
Contract liabilities	9,965	18,872
Property, plant, and equipment	6,624	2,989
Value added and other taxes	3,523	2,923
Service Contracts	2,613	762
Operating leases	1,912	1,354
Telecommunications and utilities	1,311	1,111
Other	7,332	5,540
Accrued liabilities	\$ 94,578	\$ 104,207

NOTE 8 - DEBT

Due to the Q2 FY23 payoff of the Xiamen Project loans, as of October 31, 2023, the Current portion of long-term debt and the Long-term debt balances were comprised of finance leases as described below:

<u>As of October 31, 2023</u>	<u>Xiamen Project Loans</u>	<u>Finance Leases</u>	<u>Total</u>
Principal due:			
Next 12 months	\$ -	\$ 6,621	\$ 6,621
Months 13 – 24	\$ -	\$ 17,972	\$ 17,972
Months 25 – 36	-	12	12
Months 37 – 48	-	13	13
Months 49 – 60	-	1	1
Long-term debt	-	17,998	17,998
Total debt	<u>\$ -</u>	<u>\$ 24,619</u>	<u>\$ 24,619</u>
Interest rate at balance sheet date	N/A	%	N/A
Basis spread on interest rates	0.00		N/A
Interest rate reset	Quarterly		N/A
Maturity date	December 2025		N/A
Periodic payment amount	Varies as loans mature ⁽¹⁾		Varies as Lease mature
Periodic payment frequency	Semiannual, on individual loans		Monthly
Loan collateral (carrying amount)	\$ N/A		\$ 35,165 ⁽²⁾

(1) During Q2 FY23, we repaid the entire balance of RMB 26.4 million (approximately \$3.9 million) remaining on the loan, of which, RMB 2.0 million was due to be paid in June 2025 and RMB 24.4 million was due to be paid in December 2025.

(2) Represents the carrying amount at the balance sheet date of the related ROU assets, in which the lessors have secured interests.

The tables below provide information on our long-term debt as of October 31, 2022.

<u>As of October 31, 2022</u>	<u>Xiamen Project Loans</u>	<u>Xiamen Working Capital Loans</u>	<u>Hefei Equipment Loan</u>	<u>Finance Leases</u>	<u>Total</u>
Principal due:					
Next 12 months	\$ -	\$ 3,512	\$ -	\$ 6,512	\$ 10,024
Months 13 – 24	\$ -	-	-	\$ 6,610	\$ 6,610
Months 25 – 36	1,098	-	-	17,961	19,059
Months 37 – 48	6,641	-	-	-	6,641
Long-term debt	<u>\$ 7,739</u>	<u>\$ -</u>	<u>\$ -</u>	<u>\$ 24,571</u>	<u>\$ 32,310</u>
Interest rate at balance sheet date	4.30% - 4.45%	4.46%	N/A		(2)
Basis spread on interest rates	0.00	76.00	N/A		N/A
Interest rate reset	Quarterly	Monthly/Annually	N/A		N/A
Maturity date	December 2025	July 2023	Paid July 2022		(2)
Periodic payment amount	Varies as loans mature ⁽¹⁾	Increases as loans mature	N/A		(2)
Periodic payment frequency	Semiannual, on individual loans	Semiannual, on individual loans	N/A		Monthly
Loan collateral (carrying amount)	\$ 70,705	N/A	N/A	\$ 37,976 ⁽³⁾	

(1) During the three month period ended October 31, 2022, we repaid RMB 81.0 million (approximately \$11.5 million) that had contractual maturity dates ranging from December 2023 through June 2025.

(2) See Note 10 for interest rates on lease liabilities, maturity dates, and periodic payment amounts.

(3) Represents the carrying amount at the balance sheet date of the related ROU assets, in which the lessors have secured interests.

Finance Leases

In February 2021, we entered into a five-year \$7.2 million finance lease for a high-end inspection tool. Monthly payments on the lease, which commenced in February 2021, are \$0.1 million per month. Upon the payment of the fiftieth monthly payment and prior to payment of the fifty-first monthly payment, we may exercise an early buyout option to purchase the tool for \$2.4 million. If we do not exercise the early buyout option, then at the end of the five-year lease term, the lease shall continue to renew on a month-to-month basis at the same rental terms; at our option, after the original term or any renewal periods, we may return the tool, elect to extend the lease, or purchase the tool at its fair market value. Since we are reasonably certain that we will exercise the early buyout option, our lease liability reflects such exercise and we have classified the lease as a finance lease. The interest rate implicit in the lease is 1.08%.

In December 2020, we entered into a five-year \$35.5 million finance lease for a high-end lithography tool. Monthly payments on the lease, which commenced in January 2021, increased from \$0.04 million during the first three months to \$0.6 million for the following nine months, followed by forty-eight monthly payments of \$0.5 million. As of the due date of the forty-eighth monthly payment, we may exercise an early buyout option to purchase the tool for \$14.1 million. If we do not exercise the early buyout option, then at the end of the five-year lease term, at our option, we may return the tool, elect

to extend the lease term for a period and a lease payment to be agreed with lessor at the time, or purchase the tool for its then-fair market value, as determined by the lessor. Since we are reasonably certain that we will exercise the early buyout option, our lease liability reflects such exercise and we have classified the lease as a finance lease. The interest rate implicit in the lease is 1.58%. The lease agreement incorporates the covenants included in our former Corporate Credit Agreement, which are detailed below, and includes a cross-default provision for any agreement or instrument with an outstanding, committed balance greater than \$5.0 million in which we are the indebted party.

Xiamen Project Loans

In November 2018, PDMCX obtained approval to borrow RMB 345.0 million from the Industrial and Commercial Bank of China. From November 2018 through July 2020, PDMCX entered into separate loan agreements (the “Project Loans”) for the entire approved amount. In February 2023, PDMCX repaid the entire outstanding balance of RMB 26.4 million (\$3.9 million). As of October 31, 2023, PDMCX had no amount outstanding and the amounts may not be re-borrowed. The Project Loans were used to finance certain capital expenditures at the PDMCX facility and were collateralized by liens granted on the land use right, building, and certain equipment located at the facility. The interest rates on the Project Loans were variable (based on the RMB Loan Prime Rate of the National Interbank Funding Center), and interest incurred on the loans was eligible for reimbursement through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, which provided for such reimbursements up to a prescribed limit and duration. The Project Loans were subject to covenants and provisions, certain of which related to the assets pledged as security for the loans, all of which we were in compliance with at the time of repayment.

Xiamen Working Capital Loans

In November 2018, PDMCX obtained approval for revolving, unsecured credit of the equivalent of \$25.0 million, pursuant to which PDMCX may enter into separate loan agreements with varying terms to maturity. This facility is subject to annual reviews and extensions, with the most recent extension set to expire in July 2024. In December 2022, we repaid our entire outstanding balance of RMB 25.6 million (\$3.6 million) and the amounts may not be re-borrowed. As of October 31, 2023, PDMCX had no amount outstanding against the approval. The interest rates are variable, based on the RMB Loan Prime Rate of the National Interbank Funding Center. Interest incurred on the loans related to the amount borrowed was eligible for reimbursement through incentives provided by the Xiamen Torch Hi-Tech Industrial Development Zone, which provided for such reimbursements up to a prescribed limit and duration.

Corporate Credit Agreement

In September 2018, we entered into a five-year amended and restated credit agreement (the “Credit Agreement”), which had a \$50 million borrowing limit, with an expansion capacity to \$100 million. The Credit Agreement was secured by substantially all of our assets located in the United States and common stock we own in certain subsidiaries. The Credit Agreement was subject to covenants around minimum interest coverage ratio, total leverage ratio, and minimum unrestricted cash balance (all of which we were in compliance with at the termination of the agreement in September 2023), and limited the amount of cash dividends, distributions, and redemptions we could pay on our common stock to an aggregate annual amount of \$50 million. The Credit Agreement expired, and was not renewed as of October 31, 2023. There were no outstanding borrowings against the Credit Agreement at its expiration.

Hefei Equipment Loan

In October 2020, our Hefei, China, facility was approved to borrow RMB 200 million from the China Construction Bank Corporation. In July 2022, we repaid our entire outstanding balance of RMB 120.7 million (\$18.0 million). This credit facility was subject to annual reviews and extension; the most recent extension expired in August 2022, and we did not apply for an extension. The loan proceeds were used to fund purchases of two lithography tools at the Hefei facility. The interest rate on the loan was variable and based on the RMB Loan Prime Rate of the National Interbank Funding Center. The borrowings were secured by the Hefei facility, its related land use right, and certain manufacturing equipment. The Hefei Equipment Loan was subject to covenants and provisions, certain of which relate to the assets pledged as security for the loan, including covenants for the ratio of total liabilities to total assets and the ratio of current assets to current liabilities, all of which we were in compliance with at the time of repayment.

Interest Paid for Debt

Interest payments, including capitalized interest of \$0.1 million in 2021, were \$0.5 million in 2023, \$2.8 million in 2022, and \$3.8 million in 2021. The weighted-average interest rate on our current portion of long-term debt for the periods ended October 31, 2023 and October 31, 2022 was 1.5% and 2.5%, respectively.

NOTE 9 - REVENUE

The following tables present our revenue for the years ended October 31, 2023, October 31, 2022, and October 31, 2021, disaggregated by product type, geographic origin, and timing of recognition.

Revenue by Product Type	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
IC			
High-end	\$ 194,939	\$ 195,332	\$ 162,973
Mainstream	456,340	397,694	297,198
Total IC	\$ 651,279	\$ 593,026	\$ 460,171
FPD			
High-end	\$ 200,842	\$ 186,988	\$ 155,670
Mainstream	39,955	44,535	47,920
Total FPD	\$ 240,797	\$ 231,523	\$ 203,590
	\$ 892,076	\$ 824,549	\$ 663,761
Revenue by Geographic Origin*	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Taiwan	\$ 316,889	\$ 291,342	\$ 248,597
China	245,378	212,598	115,732
Korea	162,235	156,139	156,391
United States	128,879	126,205	105,023
Europe	36,579	36,402	36,242
Other	2,116	1,863	1,776
	\$ 892,076	\$ 824,549	\$ 663,761

* This table disaggregates revenue by the location in which it was earned.

Revenue by Timing of Recognition	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Over time	\$ 838,628	\$ 758,359	\$ 606,332
At a point in time	53,448	66,190	57,429
	\$ 892,076	\$ 824,549	\$ 663,761

Contract Assets, Contract Liabilities, and Accounts Receivable

The following table provides information about our contract balances at the balance sheet dates.

Classification	October 31, 2023	October 31, 2022
	Contract Assets	
<i>Other current assets</i>	\$ 10,984	\$ 15,752
Contract Liabilities		
<i>Accrued liabilities</i>	\$ 9,965	\$ 18,872
<i>Other liabilities</i>	12,454	4,989
	\$ 22,419	\$ 23,861

The following table presents revenue recognized from contract liabilities that existed at the beginning of the reporting periods.

	October 31, 2023	October 31, 2022	October 31, 2021
Revenue recognized from beginning liability	\$ 13,966	\$ 8,934	\$ 5,300

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

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

NOTE 10 - LEASES

The following table provides information on operating and finance leases included in our consolidated balance sheets.

Classification	October 31, 2023	October 31, 2022
ROU Assets – Operating Leases		
<i>Other assets</i>	\$ 6,189	\$ 3,341
ROU Assets – Finance Leases		
<i>Property, plant and equipment, net</i>	\$ 35,165	\$ 37,976
Lease Liabilities – Operating Leases		
<i>Accrued liabilities</i>	\$ 1,912	\$ 1,354
<i>Other liabilities</i>	4,218	1,928
	\$ 6,130	\$ 3,282
Lease Liabilities – Finance Leases		
<i>Current portion of long-term debt</i>	\$ 6,621	\$ 6,512
<i>Long-term debt</i>	17,998	24,571
	\$ 24,619	\$ 31,083

The following table presents future lease payments under noncancelable operating and finance leases as of October 31, 2023. Imputed interest represents the difference between undiscounted cash flows and discounted cash flows.

Fiscal Year	Operating Leases	Finance Leases
2024	\$ 2,015	\$ 6,951
2025	1,712	18,026
2026	1,327	13
2027	1,088	13
2028	247	1
Total lease payments	\$ 6,389	\$ 25,004
Imputed interest	(259)	(385)
Lease liabilities	\$ 6,130	\$ 24,619

The following table presents lease costs for 2023, 2022, and 2021.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Operating lease costs	\$ 2,278	\$ 2,253	\$ 2,904
Short-term lease costs	\$ 462	\$ 469	\$ 232
Variable lease costs	\$ 656	\$ 603	\$ 498
Interest on finance lease	\$ 426	\$ 522	\$ 510
Amortization of ROU assets	\$ 2,870	\$ 2,917	\$ 1,867

The following table presents statistical information related to our operating and finance leases. The information presented is as of the balance sheet dates.

Classification	October 31, 2023		October 31, 2022	
	Weighted- average remaining lease term (in years)	Weighted- average discount rate	Weighted- average remaining lease term (in years)	Weighted- average discount rate
Operating leases	3.7	2.4%	3.1	2.3%
Finance leases	1.2	1.5%	2.2	1.5%

The following table presents the effects of leases on our 2023, 2022, and 2021 consolidated statements of cash flows, and provides leases-related non-cash information for those years.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Operating cash flows used for operating leases	\$ 2,271	\$ 2,259	\$ 2,442
Operating cash flows used for finance leases	\$ 429	\$ 566	\$ 464
Financing cash flows used for finance leases	\$ 6,521	\$ 7,289	\$ 4,323
ROU assets obtained in exchange for operating lease obligations	\$ 5,116	\$ 513	\$ 457
ROU assets obtained in exchange for finance lease obligations	\$ -	\$ -	\$ 42,672

NOTE 11 - SHARE-BASED COMPENSATION

In March 2016, shareholders approved our current 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), or a combination thereof. The maximum number of shares of common stock approved that may be issued under the Plan is four million shares. On March 16, 2023, at its annual meeting of shareholders, the shareholders of Photronics, Inc., approved amendments to the Plan to increase the number of shares available for issuance by an additional one million shares, thereby increasing the shares available for issuance under the Plan from four million to five million. 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) or at the discretion of the compensation committee; 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. The table below presents information on our share-based compensation expenses for the three most recent fiscal years.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Expense reported in:			
Cost of goods sold	\$ 1,259	\$ 868	\$ 446
Selling, general, and administrative	5,962	4,803	4,446
Research and development	780	637	456
Total expense incurred	<u>\$ 8,001</u>	<u>\$ 6,308</u>	<u>\$ 5,348</u>
Expense by award type:			
Restricted stock awards	\$ 7,909	\$ 5,800	\$ 4,920
Stock options	1	298	218
Employee stock purchase plan	91	210	210
Total expense incurred	<u>\$ 8,001</u>	<u>\$ 6,308</u>	<u>\$ 5,348</u>
Income tax benefits of share-based compensation	\$ 715	\$ 449	\$ 233
Share-based compensation cost capitalized	\$ -	\$ -	\$ -

Restricted Stock Awards

We periodically grant restricted stock awards, the restrictions on which typically lapse over a service period of one to four years. The fair values of the awards are determined on the date of grant, based on the closing stock price of our common stock. A summary of restricted stock award activity during 2023 and the status of our restricted stock awards as of October 31, 2023, is presented below.

Restricted Stock	Shares	Weighted-Average Fair Value at Grant Date
Outstanding at October 31, 2022	893,704	\$ 15.62
Granted	791,925	\$ 16.84
Vested	(417,432)	\$ 14.98
Cancelled	(29,900)	\$ 16.48
Outstanding at October 31, 2023	<u>1,238,297</u>	<u>\$ 16.27</u>
Expected to vest as of October 31, 2023	<u>1,117,128</u>	<u>\$ 16.21</u>

The table below presents additional information on our restricted stock awards for the three most recent fiscal years.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Number of shares granted	791,925	654,224	564,800
Weighted-average grant-date fair value of awards (in dollars per share)	\$ 16.84	\$ 18.73	\$ 11.20
Compensation costs not yet recognized	\$ 12,760	\$ 8,949	\$ 7,300
Weighted-average amortization period (in years)	2.8	2.7	2.6
Fair value of awards for which restrictions lapsed	\$ 6,256	\$ 5,212	\$ 4,491
Shares outstanding at balance sheet date	1,238,297	893,704	929,147

Stock Options

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

The table below presents a summary of stock options activity during 2023 and information on stock options outstanding at October 31, 2023.

	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life	Aggregate Intrinsic Value
Outstanding at October 31, 2022	614,001	\$ 9.74		
Granted	-	\$ -		
Exercised	(137,226)	\$ 8.24		
Cancellations, forfeitures, and adjustments	(4,500)	\$ 10.18		
Outstanding at October 31, 2023	<u>472,275</u>	<u>\$ 10.18</u>	2.5 years	<u>\$ 3,865</u>
Exercisable at October 31, 2023	<u>472,275</u>	<u>\$ 10.18</u>	2.5 years	<u>\$ 3,865</u>
Expected to vest as of October 31, 2023	<u>-</u>	<u>\$ -</u>	- years	<u>\$ -</u>

The table below presents additional information on stock option awards for the three most recent fiscal years.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Number of options granted in period	-	-	-
Total intrinsic value of options exercised	\$ 1,654	\$ 5,108	\$ 1,910
Cash received from option exercises	\$ 1,101	\$ 5,275	\$ 3,441
Compensation cost not yet recognized	\$ -	\$ 13	\$ 109
Weighted-average amortization period for cost not yet recognized (in years)	-	0.2	1.1

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 from the commencement date). We recognize the ESPP expense over that same period. As of October 31, 2023, the maximum number of shares of common stock approved by our shareholders to be purchased under the ESPP was 1.85 million shares, of which approximately 1.6 million shares had been issued through October 31, 2023. As of October 31, 2023, there is no unrecognized compensation cost. As of October 31, 2022, there were less than 0.1 million shares with unrecognized compensation cost of less than \$0.1 million that was recognized in fiscal year 2023.

NOTE 12 - 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 \$0.8 million, \$0.7 million and \$0.8 million in 2023, 2022, and 2021, respectively.

NOTE 13 - INCOME TAXES

On December 15, 2022, the European Union (EU) Member States formally adopted the EU's Pillar Two Directive, which generally provides for a minimum effective tax rate of 15%, as established by the Organization for Economic Co-operation and Development (OECD) Pillar Two Framework. The EU effective dates are January 1, 2024, and January 1, 2025, for different aspects of the directive. A significant number of other countries are expected to also implement similar legislation with varying effective dates in the future. The Company is continuing to evaluate the potential impact on future periods of the Pillar Two Framework, pending legislative adoption by additional individual countries.

Income before the income tax provisions consists of the following:

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
United States	\$ (1,737)	\$ 1,813	\$ (19,447)
Foreign	271,683	237,220	121,453
	<u>\$ 269,946</u>	<u>\$ 239,033</u>	<u>\$ 102,006</u>

Income Tax Provision

The components of our income tax provisions are presented below.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Current:			
Federal	\$ -	\$ -	\$ -
State	14	1	4
Foreign	71,225	58,981	25,296
	<u>71,239</u>	<u>58,982</u>	<u>25,300</u>
Deferred:			
Federal	-	-	-
State	12	10	103
Foreign	(939)	799	(2,213)
	<u>(927)</u>	<u>809</u>	<u>(2,110)</u>
Total	<u>\$ 70,312</u>	<u>\$ 59,791</u>	<u>\$ 23,190</u>

The table below presents a reconciliation of income taxes calculated by applying the statutory U.S. federal income tax rate to our income tax provisions of the reporting periods.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
U.S. federal income tax at statutory rate	\$ 56,689	\$ 50,197	\$ 21,421
Changes in valuation allowances	(256)	(1,462)	364
Foreign tax rate differentials	11,394	7,941	3,244
Tax credits	(2,425)	(1,368)	(3,942)
Uncertain tax positions, including reserves, settlements and resolutions	3,328	3,214	1,037
Other, net	1,582	1,269	1,066
Income tax provision	<u>\$ 70,312</u>	<u>\$ 59,791</u>	<u>\$ 23,190</u>

Reporting Period	U.S. Statutory Tax Rates	Photronics Effective Tax Rates	Primary Reasons for Differences
2023	21.0%	26.0%	Non-U.S. pre-tax income being taxed at higher statutory rates in non-U.S. jurisdictions, the establishment of uncertain tax positions in non-U.S. jurisdiction and loss jurisdiction pre-tax losses not being benefited due to valuation allowances.
2022	21.0%	25.0%	Non-U.S. pre-tax income being taxed at higher statutory rates in non-U.S. jurisdictions; and the establishment of uncertain tax positions in non-U.S. jurisdiction.
2021	21.0%	22.7%	Loss jurisdiction pre-tax losses not being benefited due to valuation allowances, non-U.S. pre-tax income being taxed at higher statutory rates in the non-U.S. jurisdictions, and investment credits in foreign jurisdictions.

Deferred Income Tax Assets and Liabilities

The net deferred income tax assets consist of the following:

	As of	
	October 31, 2023	October 31, 2022
Deferred income tax assets		
Net operating losses	\$ 26,377	\$ 29,410
Reserves not currently deductible	8,776	8,528
Tax credit carryforwards	10,442	9,660
Share-based compensation	1,892	1,560
Property, plant and equipment	9,844	6,591
Lease liabilities	5,743	7,367
	<u>63,074</u>	<u>63,116</u>
Valuation allowances	<u>(32,619)</u>	<u>(32,895)</u>
	30,455	30,221
Deferred income tax liabilities		
ROU assets	(8,193)	(8,930)
Other	(1,200)	(1,722)
	<u>(9,393)</u>	<u>(10,652)</u>
Net deferred income tax assets	<u>\$ 21,062</u>	<u>\$ 19,569</u>
Classification		
<i>Deferred income tax assets</i>	\$ 21,297	\$ 19,816
<i>Other liabilities</i>	(235)	(247)
	<u>\$ 21,062</u>	<u>\$ 19,569</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 deferred tax assets will expire prior to utilization. In 2023 the valuation allowance decreased as a result of management's determination that tax benefits on deferred tax assets would more likely than not be realized and, therefore, decreased the valuation allowance to include these deferred tax assets.

Due to the Tax Cuts and Jobs Act, which was signed into law in December 2017, as of fiscal year end 2018, U.S. deferred taxes were no longer provided on the undistributed earnings of non-U.S. subsidiaries. Our policy to indefinitely reinvest these earnings in non-U.S. operations remains unchanged for the purpose of determining deferred tax liabilities for U.S. state and foreign withholding taxes. Therefore, should we elect in the future to repatriate the remaining foreign earnings deemed to be indefinitely reinvested, we may incur additional state and foreign withholding tax expense on those earnings, the amount of which is not practicable to compute.

Tax Credits and Carryforwards

The following tables present our available operating loss and credit carryforwards as of October 31, 2023, and their related expiration periods.

Operating Loss Carryforwards	Amount	Expiration Period
Federal	\$ 86,765	2029- Indefinite
State	\$ 148,934	2024- Indefinite
Foreign	\$ 435	2024- Indefinite

Tax Credit Carryforwards	Amount	Expiration Period
Federal research and development	\$ 5,806	2024-2043
State	\$ 5,042	2024-2037

Uncertain Tax Positions

We include unrecognized tax benefits in *Other liabilities*, and we include any applicable interest and penalties related to uncertain tax positions in our income tax provision.

A reconciliation of the beginning and ending amounts of unrecognized tax benefits is presented below. The amounts in the table include settlements of non-U.S. audits.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Balance at beginning of year before interest and penalties	\$ 5,204	\$ 3,534	\$ 2,550
(Reductions) additions of tax positions in prior years	209	(355)	181
Additions based on current year tax positions	3,361	2,892	1,313
Settlements	(423)	(848)	(489)
Lapses of statutes of limitations	(19)	(19)	(21)
Balance at end of year before interest and penalties	8,332	5,204	3,534
Interest and penalties	576	395	223
Balance at end of year including interest and penalties	<u>\$ 8,908</u>	<u>\$ 5,599</u>	<u>\$ 3,757</u>

The following table presents additional information on our uncertain tax positions, as of the balance sheet dates.

	October 31, 2023	October 31, 2022
Unrecognized tax benefits that, if recognized, would impact the effective tax rate	\$ 8,908	\$ 5,599
Accrued interest and penalties related to uncertain tax positions	\$ 576	\$ 395

Although the timing of the reversal of uncertain tax positions may be uncertain, as they can be dependent upon the settlement of tax audits or expirations of statutes of limitations, the Company believes that the amount of uncertain tax positions (including accrued interest and penalties, and net of tax benefits) that may be resolved over the next twelve months is \$0.4 million. Resolution of these uncertain tax positions may result from either or both the lapses of statutes of limitations and tax settlements. The Company is no longer subject to tax authority examinations in the U.S., major foreign, or state tax jurisdictions for years prior to fiscal year 2018.

Income Tax Payments and Refunds

The table below presents income taxes paid and refunds of income taxes received during the reporting periods.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Income taxes paid	\$ 70,362	\$ 37,770	\$ 22,684
Income tax refunds received	\$ 485	\$ 388	\$ 713

NOTE 14 - EARNINGS PER SHARE

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

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Net income attributable to Photronics, Inc. shareholders	\$ 125,485	\$ 118,786	\$ 55,449
Effect of dilutive securities	-	-	-
Earnings used for diluted earnings per share	<u>\$ 125,485</u>	<u>\$ 118,786</u>	<u>\$ 55,449</u>
Weighted-average common shares computations:			
Weighted-average common shares used for basic earnings per share	61,139	60,559	61,407
Effect of dilutive securities:			
Share-based payment awards	616	630	592
Potentially dilutive common shares	<u>616</u>	<u>630</u>	<u>592</u>
Weighted-average common shares used for diluted earnings per share	<u>61,755</u>	<u>61,189</u>	<u>61,999</u>
Basic earnings per share	\$ 2.05	\$ 1.96	\$ 0.90
Diluted earnings per share	\$ 2.03	\$ 1.94	\$ 0.89

The table below sets forth 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.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Share based payment awards	136	314	331
Total potentially dilutive shares excluded	<u>136</u>	<u>314</u>	<u>331</u>

NOTE 15 - COMMITMENTS AND CONTINGENCIES

Presented below are our unrecognized commitments, as of October 31, 2023. Included in these amounts are commitments of \$106.8 million for the purchase of capital equipment. The amounts below do not include our commitments under our debt and lease arrangements, which are presented in Notes 8 and 10, respectively.

Fiscal Year	Unrecognized Commitments
2024	\$ 99,779
2025	27,182
2026	10,024
2027	79
2028	65
Thereafter	-
Total	<u>\$ 137,129</u>

We are subject to various claims that arise in the ordinary course of business. We believe that our potential liability under such claims, individually and in the aggregate, will not have a material effect on our consolidated financial statements. As of October 31, 2023, and October 31, 2022, we were not involved in environmental litigation to which a government was a party.

NOTE 16 - CHANGES IN ACCUMULATED OTHER COMPREHENSIVE (LOSS) INCOME BY COMPONENT

The following tables set forth the changes in our accumulated other comprehensive (loss) income by component (net of tax of \$0) for the years ended October 31, 2023, and October 31, 2022.

	Year Ended October 31, 2023		
	Foreign Currency Translation		Total
	Adjustments	Other	
Balance at October 31, 2022	\$ (97,790)	\$ (666)	\$ (98,456)
Other comprehensive income (loss)	5,615	(3)	5,612
Other comprehensive (income) loss attributable to noncontrolling interests	4,131	(21)	4,110
Balance at October 31, 2023	<u>\$ (88,044)</u>	<u>\$ (690)</u>	<u>\$ (88,734)</u>

	Year Ended October 31, 2022		
	Foreign Currency Translation		Total
	Adjustments	Other	
Balance at October 31, 2021	\$ 21,476	\$ (905)	\$ 20,571
Other comprehensive (loss) income	(151,209)	423	(150,786)
Other comprehensive loss (income) attributable to noncontrolling interests	31,943	(184)	31,759
Balance at October 31, 2022	<u>\$ (97,790)</u>	<u>\$ (666)</u>	<u>\$ (98,456)</u>

NOTE 17 - RISKS AND CONCENTRATIONS

Financial instruments that potentially subject us to credit risk principally consist of trade accounts receivable 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 credit losses 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.

The following table presents the percentages of our net accounts receivable attributable to customers that accounted for more than ten percent of the total balance as of the balance sheet dates.

	October 31, 2023	October 31, 2022
Customer A	21%	16%
Customer B	10%	16%

The following table presents the percentages of our revenue attributable to customers that accounted for more than ten percent of the total revenue during the reporting periods.

	Year Ended		
	October 31, 2023	October 31, 2022	October 31, 2021
Customer A	14%	15%	17%
Customer B	13%	5%	3%
Customer C	10%	11%	12%

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.

As of the balance sheet dates, our long-lived assets and net assets were, by geographic area, as presented below.

	October 31, 2023		October 31, 2022	
	Long-lived Assets	Net Assets	Long-lived Assets	Net Assets
China	\$ 249,357	\$ 317,409	\$ 242,712	\$ 257,855
Taiwan	199,313	489,722	155,690	393,795
United States	140,733	188,712	132,915	183,909
Korea	119,438	281,941	109,892	229,501
Europe and Other	7,294	(2,175)	6,758	(2,971)
	<u>\$ 716,135</u>	<u>\$ 1,275,609</u>	<u>\$ 647,967</u>	<u>\$ 1,062,089</u>

NOTE 18 - RELATED PARTY TRANSACTIONS

Our chief executive officer is related to an individual in a position of authority at one of our largest customers. We recorded revenue from this customer of \$126.5 million, \$119.0 million and \$111.0 million, in 2023, 2022, and 2021, respectively. As of October 31, 2023, and October 31, 2022, we had accounts receivable of \$41.5 million and \$32.4 million, respectively, from this customer.

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

NOTE 19 - 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 certain cash equivalents (Level 1 measurements), accounts receivable, accounts payable, and certain other current assets and current liabilities (Level 2 measurements) approximate their carrying values due to their short-term maturities. The fair values of our *Short-term investments* are Level 1 measurements. (Please refer to "Investments" within Note 1 for additional fair value information on our *Short-term investments*.) The fair values of certain cash equivalents are Level 2 measurements that are provided by independent third-party pricing services or other independent entities, which may use matrix pricing, valuation models, or other methods which utilize observable market data. The fair values of our variable-rate debt instruments are Level 2 measurements and approximate their carrying values due to the variable nature of their underlying interest rates. Other than our *Short-term investments*, we did not have any assets or liabilities measured at fair value, on a recurring or a nonrecurring basis, at October 31, 2023, or October 31, 2022.

NOTE 20 - SHARE REPURCHASE PROGRAMS

In September 2020, the Company's Board of Directors authorized the repurchase of up to \$100 million of its common stock, pursuant to a repurchase plan under Rule 10b5-1 of the Securities Act. The most recent 10b5-1 plan expired on September 15, 2022, and has not been renewed. Share repurchases under this authorization commenced on September 16, 2020. The repurchase authorization by the Board of Directors has no expiration date, does not obligate us to acquire any common stock, and is subject to market conditions. In 2023, we did not repurchase any further shares as part of this program. In 2022, we repurchased 0.2 million shares at a cost of \$2.5 million (an average of \$13.43 per share) and, since the program's inception, we have repurchased 5.8 million shares at a cost of \$68.3 million (an average of \$11.70 per share). There is \$31.7 million remaining under the Board of Director authorization. All shares repurchased under the program have been retired.

In August 2019, the Company's board of directors authorized the repurchase of up to \$100 million of its common stock, pursuant to a repurchase plan under Rule 10b5-1 of the Securities Act. The share repurchase program commenced on September 25, 2019, and was terminated on March 20, 2020.

All of the shares purchased under the above repurchase programs were retired prior to the end of the fiscal year in which they were purchased. As of October 31, 2023, \$31.7 million was available under this authorization for the purchase of additional shares. The table below presents information on the repurchase programs for the three most recent fiscal years.

	2023	2022	2021
	Purchases	Purchases	Purchases
Number of shares repurchased	0	187	3,919
Cost of shares repurchased	\$ 0	\$ 2,522	\$ 48,249
Average price paid per share	\$ 0	\$ 13.43	\$ 12.31

NOTE 21 - SUBSIDIARY DIVIDENDS

In 2021, PDMC, the Company's majority owned subsidiary in Taiwan, paid dividends of which 49.99%, or approximately \$9.6 million were paid to noncontrolling interests. Dividends were not paid in the years ended 2022 and 2023.

NOTE 22 - RECENT ACCOUNTING PRONOUNCEMENTS

Accounting Standards Updates Adopted

In November 2021, the FASB issued ASU 2021-10, "Government Assistance (Topic 832): Disclosures by Business Entities about Government Assistance", to increase the transparency of government assistance including the disclosure of the types of assistance an entity receives, an entity's method of accounting for government assistance, and the effect of the assistance on an entity's financial statements. The guidance was effective for annual disclosures beginning our fiscal year 2023, and early adoption was permitted. We adopted the guidance as of the effective date. The guidance did not have a material impact in the consolidated financial statements. Refer to Note 1 of our consolidated financial statements for additional information.

Accounting Standards Updates to be Adopted

In November 2023, the FASB issued ASU 2023-07, "Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures", which improves reportable segment disclosure requirements, primarily through enhanced disclosures about significant segment expenses. The guidance in this Update is effective for all public entities for fiscal years beginning after December 15, 2023, with early adoption permitted. We are currently evaluating the effect the adoption of this ASU may have on our disclosures.

In March 2020, the FASB issued ASU 2020-04, "Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting", which provides optional expedients and exceptions to applying the guidance on contract modifications, hedge accounting, and other transactions, to simplify the accounting for transitioning from LIBOR, and other interbank offered rates expected to be discontinued, to alternative reference rates. The guidance in this Update was effective upon its issuance; if elected, it is to be applied prospectively from December 31, 2022. In December 2022, the FASB issues ASU 2022-06, "Reference Rate Reform (Topic 848): Deferral of the Sunset Date of Topic 848", which extends the period of time entities can utilize the reference rate reform relief guidance under ASU 2020-04 from December 31, 2022 to December 31, 2024. We are currently evaluating the effect the adoption of this ASU may have on our disclosures.

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

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of October 31, 2023. 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 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. Based on an evaluation of our disclosure controls and procedures as of October 31, 2023, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at a reasonable assurance level.

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. Under the supervision and with the participation of our management, including our principal executive officer and principal financial officer, the Company conducted an evaluation of the effectiveness of the internal control over financial reporting based on criteria established in the Internal Control Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

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

Management assessed the effectiveness of our internal control over financial reporting as of October 31, 2023, based on the criteria set forth by the COSO. 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, 2023.

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, 2023, as stated in their report on page 72 of this Form 10-K.

Changes in Internal Control over Financial Reporting

There were no changes to our internal control over financial reporting during 2023 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Photronics, Inc.

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Photronics, Inc. (the “Company”) as of October 31, 2023, 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 Company maintained, in all material respects, effective internal control over financial reporting as of October 31, 2023, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements as of and for the year ended October 31, 2023, of the Company and our report dated December 22, 2023, expressed an unqualified opinion on those financial statements.

Basis for Opinion

The Company’s management is responsible 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.” Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

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

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

/s/ Deloitte & Touche LLP
Boston, Massachusetts
December 22, 2023

ITEM 9B. OTHER INFORMATION

None.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTION

Not applicable.

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 2023 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,” “DELINQUENT SECTION 16(A) REPORTS” 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 2023 Definitive Proxy Statement under the caption “EXECUTIVE OFFICERS” and is incorporated in this report by reference.

We have adopted a code of ethics that applies to our principal executive officer, chief financial officer or principal financial officer and principal accounting officer. A copy of the code of ethics may be obtained, free of charge, by writing to the executive 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 2023 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 2024 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 2024 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 2023 Definitive Proxy Statement under the captions “MEETINGS AND COMMITTEES OF THE BOARD” and “RELATED PARTY TRANSACTIONS”, respectively, and is incorporated in this report by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by Item 9(e) of Rule 14a-101 of the Exchange Act is set forth in our 2024 Definitive Proxy Statement under the captions “Independent Registered Public Accounting Firm Fees” and “AUDIT COMMITTEE REPORT”, and is incorporated in this report by reference.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

The following documents are filed as part of this report:

	Page No.
1. Financial Statements: See "INDEX TO CONSOLIDATED FINANCIAL STATEMENTS" in Part II, Item 8 of this Form 10-K for a list of financial statements filed as part of this report.	36
2. Financial Statement Schedules	
All schedules are omitted because they are immaterial or not applicable.	
3. Exhibit Index	70

EXHIBIT INDEX

Exhibit Number	Description	Incorporated by Reference			Filed or Furnished Herewith
		Form	Exhibit	Filing Date	
3.1	Certificate of Incorporation as amended July 9, 1986, April 9, 1990, March 16, 1995, November 13, 1997, April 15, 2002 and June 20, 2005	10-K	3.1	12/23/2019	
3.2	Amended and Restated By-laws of the Company dated as of September 7, 2016	8-K	3.2	9/13/2016	
4.1	Description of Securities of the Company	10-K	4.1	12/23/2019	
4.2	Certificate of Amendment with Respect to Series A Preferred Stock, dated September 24, 2019	8-K	3.1	9/24/2019	
10.1	The Company's 1992 Employee Stock Purchase Plan	10-K	10.1	12/20/2017	
10.2	Amendment to the Employee Stock Purchase Plan as of March 24, 2004 ⁺	10-K	10.2	1/6/2017	
10.3	Amendment to the Employee Stock Purchase Plan as of April 8, 2010 ⁺	10-K	10.4	1/7/2016	
10.4	Amendment to the Employee Stock Purchase Plan as of March 28, 2012 ⁺	10-K	10.4	12/21/2018	
10.5	Amendment to the Employee Stock Plan as of December 18, 2019 ⁺	10-K	10.5	12/23/2019	
10.6	2016 Equity Incentive Compensation Plan ⁺	DEF 14A		2/29/2016	
10.7	Amendment to the 2016 Equity Incentive Compensation Plan	8-K	10-1	3/21/2023	
10.8	The Company's 2007 Long-Term Equity Incentive Plan ⁺	DEF 14A		2/23/2007	
10.9	Amendment to the 2007 Long-Term Equity Incentive Plan as of April 8, 2010 ⁺	10-K	10.7	1/7/2016	
10.10	Amendment to the 2007 Long Term Equity Incentive Plan as of April 11, 2014 ⁺	10-K	10.7	12/23/2019	
10.11	2011 Executive Incentive Compensation Plan effective as of November 1, 2010 ⁺	10-K	10.9	1/6/2015	
10.12	Form of Restricted Stock Award Agreement				X
10.13	Joint Venture Operating Agreement dated November 20, 2013, between the Company and Dai Nippon Printing Co., Ltd #				X

10.14	Outsourcing Agreement dated November 20, 2013, among the Company, Dai Nippon Printing Co., Ltd and Photronics Semiconductor Mask Corporation				X
10.15	License Agreement dated November 20, 2013, between the Company and Photronics Semiconductor Mask Corporation#				X
10.16	Executive Employment Agreement between the Company and Christopher J. Progler, Vice President, Chief Technology Officer dated September 10, 2007 ⁺	10-K	10.18	12/23/2019	
10.17	Executive Employment Agreement between the Company and Richelle E. Burr dated May 21, 2010 ⁺	10-K	10.30	1/7/2016	
10.18	Executive Employment Agreement between the Company and John P. Jordan dated September 5, 2017 ⁺	10-K	10.31	12/20/2017	
10.19	Employment Agreement dated March 9, 2020, between Photronics Dai Nippon Mask Corporation, Photronics and Frank Lee	10-Q	10.36	3/11/2020	
10.20	Form of Amendment to Executive Employment Agreement dated March 16, 2012 ⁺	10-K	10.23	12/23/2019	
10.21	Fourth Amended and Restated Credit Agreement dated as of September 27, 2018, among Photronics, Inc. the Foreign Subsidiary Borrower Party Thereto, the Lender Party Thereto, JPMorgan Chase Bank, N.A. as Administrative and Collateral Agent and Bank of America, N.A. as syndication agent	10-K	10.24	12/21/2018	
10.22	Third Amended and Restated Security Agreement entered into as of September 27, 2018, by and among Photronics, Inc., the subsidiaries of the Company and JPMorgan Chase Bank N.A	10-K	10.25	12/21/2018	
10.23	Fixed Asset Loan Agreement between Photronics DNP Mask Corporation Xiamen and Industrial and Commercial Bank China Limited Xiamen Xiang'an Branch	10-K	10.26	12/21/2018	
10.24	Working Capital Loan Agreement between Industrial and Commercial Bureau China Limited Xiamen Xiang'an Branch and Photronics DNP Mask Corporation Xiamen effective as of November 7, 2018	10-K	10.27	12/21/2018	
10.26	Investment Agreement between Xiamen Torch Hi-Tech Industrial Development Zone Management Committee and Photronics Singapore Pte. Ltd.	10-Q	10.35	9/2/2016	
10.27	Amendment No. 1 to the Investment Agreement between Xiamen Torch Hi-Tech Industrial Development Zone Management Committee and Photronics Singapore Pte, Ltd. #	10-K	10.29	12/23/2019	
10.28	Amendment No. 2 to the Investment Agreement between Xiamen Torch Hi-Tech Industrial Development Zone, People's Government of Xiang'an Xiamen, Photronics Singapore Pte. Ltd., DNP Asia Pacific Pte and Xiamen American Japan Photronics Mask Co., Ltd. #	10-Q	10.41	3/10/2022	

10.29	Amendment No. 3 to the Investment Agreement between Xiamen Torch Hi-Tech Industrial Development Zone, People’s Government of Xiang’an Xiamen, Photonics Singapore Pte. Ltd., DNP Asia Pacific Pte and Xiamen American Japan Photonics Mask Co., Ltd. #	10-Q	10.42	3/10/2022	
10.30	Joint Venture Operating Agreement dated May 16, 2017, among Photonics, Photonics Singapore, DNP, and DNP Asia Pacific #				X
10.31	Outsourcing Agreement dated May 16, 2017, among Photonics, DNP, Photonics DNP Photomask Corporation (“PDMC”) and PDMCX				X
10.32	Amended and Restated License Agreement dated May 16, 2017 between DNP and PDMC#	10-Q/A	10.29	12/19/2017	
10.33	Investment Cooperation Agreement between Hefei State Hi-tech Industry Development Zone and Photonics UK, Ltd.	10-K	10.42	12/20/2017	
10.34	Master Lease Agreement dated October 12, 2020, between TD Equipment Finance and the Company	10-K	10.38	1/15/2021	
10.35	Master Lease Agreement Dated September 5, 2019 between Bank of America and the Company	10-Q	10.28	9/5/2019	
10.36	Fixed Asset Loan Contract dated October 1, 2020, between Hefei Photonics Mask Corporation and China Construction Bank Corporation	10-K	10.39	1/15/2021	
10.37	Maximum Mortgage Contract dated October 1, 2020 between Photonics Mask Corporation Hefei and China Construction Bank Corporation Hefei Shushan Branch	10-K	10.40	1/15/2021	
19	Insider Trading Policy				X
21	List of Subsidiaries of the Company	10-K	21		X
23.1	Consent of Deloitte & Touche LLP, Independent Registered Public Accounting Firm	10-K	23.1		X
31.1	Certification of Chief Executive Officer pursuant to Rule 13a-14(a)/15d-14(a) of the Exchange Act, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	10-K	31.1		X
31.2	Certification of Chief Financial Officer pursuant to Rule 13a-14(a)/15d-14(a) of the Exchange Act, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	10-K	32.2		X

32.1	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	10-K	32.1	X
32.2	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	10-K	32.2	X
97	Compensation Recovery Policy effective October 2, 2023			X
101.INS	Inline XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document)	10-K	101.INS	X
101.SCH	Inline XBRL Taxonomy Extension Schema Document	10-K	101.SCH	X
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document	10-K	101.CAL	X
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document	10-K	101.DEF	X
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document	10-K	101.LAB	X
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document	10-K	101.PRE	X
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in, Exhibit 101)			X

+ Represents a management contract or compensatory plan or arrangement.

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

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.

ITEM 16. FORM 10-K SUMMARY

Not applicable.

SIGNATURES

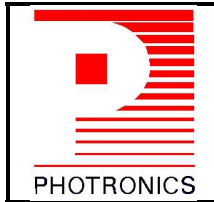
Pursuant to the requirements of Section 13 or 15(d) of the Exchange Act, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

PHOTRONICS, INC.
(Registrant)

By <u>/s/ John P. Jordan</u> John P. Jordan Executive Vice President, Chief Financial Officer (Principal Financial Officer) December 22, 2023	By <u>/s/ Eric Rivera</u> Eric Rivera Vice President, Corporate Controller (Principal Accounting Officer) December 22, 2023
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Pursuant to the requirements of the Exchange Act, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

By <u>/s/ Frank Lee</u> Frank Lee Chief Executive Officer Director (Principal Executive Officer)	December 22, 2023
By <u>/s/ John P. Jordan</u> John P. Jordan Executive Vice President, Chief Financial Officer (Principal Financial Officer)	December 22, 2023
By <u>/s/ Eric Rivera</u> Eric Rivera Vice President, Corporate Controller (Principal Accounting Officer)	December 22, 2023
By <u>/s/ Constantine S. Macricostas</u> Constantine S. Macricostas Chairman of the Board	December 22, 2023
By <u>/s/ Walter M. Fiederowicz</u> Walter M. Fiederowicz Director	December 22, 2023
By <u>/s/ Adam Lewis</u> Adam Lewis Director	December 22, 2023
By <u>/s/ Daniel Liao</u> Daniel Liao Director	December 22, 2023
By <u>/s/ George Macricostas</u> George Macricostas Director	December 22, 2023
By <u>/s/ Mary Paladino</u> Mary Paladino Director	December 22, 2023
By <u>/s/ Mitchell G. Tyson</u> Mitchell G. Tyson Director	December 22, 2023



**RESTRICTED STOCK AWARD
AGREEMENT**

THIS AWARD OF RESTRICTED STOCK (this "Award") made as of the ___ day of _____ 20__ by Photronics, Inc., a Connecticut corporation (the "Company"), to **#ParticipantName#** (the "Recipient").

WITNESSETH:

- 1) **Award**. The Company, in accordance with the approval of the Compensation Committee of the Board of Directors (the "Committee"), and subject to the terms and conditions of the Company's 2016 Equity Incentive Compensation Plan (the "Plan") has granted on the date hereof to Recipient a restricted stock award (the "Award") of **#QuantityGranted#** shares of the Company's common stock, par value \$0.01 per share ("Common Stock"), conditioned upon the achievement of all of the terms and conditions set forth on ***Exhibit "A"*** hereto and subject to all of the specific terms and conditions set forth in this Award. Recipient acknowledges receipt of a copy of the Plan, which is incorporated herein by reference.
- 2) **Forfeiture**. The shares subject to the Award shall be forfeited unless all of the terms and conditions set forth in this Award (including the terms and conditions set forth on ***Exhibit "A"*** hereto) have been satisfied and complied with, or, to the extent permitted by the Plan, have been waived by the Committee. Until all risk of forfeiture of the shares subject to the Award shall have lapsed, the certificates representing such shares shall be held by the Company.
- 3) **Voting and Other Rights of Stockholder**. Upon issuance in accordance with the Plan of the shares subject to the Award, Recipient shall, subject to the provisions of this Award and the Plan, have the rights of a stockholder with respect to such shares, including the right to vote such shares, but all dividends and distributions paid or made with respect to such shares shall be held by the Company subject to the restrictions, terms and conditions of this Award (including the terms and conditions set forth on ***Exhibit "A"*** hereto) and the Plan.
- 4) **Certificates**. The Company will hold the restricted stock subject to this stock award agreement until the stock is released upon achievement of and compliance with all of the terms of this Award (including the terms and conditions set forth on ***Exhibit "A"*** hereto) and the Plan. Upon satisfaction of the terms of this Award and proper vesting of the stock, the stock will be released to a broker account registered in the name of Recipient, and, if deemed necessary by counsel to the Company, legended to evidence any commitments given or restrictions imposed pursuant to this instrument or otherwise.

- 5) No Right of Employment. Nothing in the Plan or this Award shall confer upon Recipient any right to continue in the employ of the Company or any of its present or future Subsidiaries (as "Subsidiary" is defined in the Plan) or interfere in any way with the right of the Company or the Subsidiaries to terminate such employment at any time without liability to the Company or the Subsidiaries.
- 6) Representations. Recipient, in accepting the Award, represents and agrees that, in the event of receipt of any shares subject to the Award:
- (a) The shares of Common Stock acquired will be acquired for investment and not with a view to the sale or distribution thereof; provided, however, that such restrictions shall be deemed removed and inoperative upon the registration under the Securities Act of 1933, as amended, of the shares of Common Stock subject to the Award; and,
 - (b) The 2016 Equity Incentive Compensation Plan allows satisfaction of withholding taxes by "net settling" an equivalent value of shares. The Company will net settle the shares awarded hereunder. Please note that you still may owe additional taxes to the Federal government or your local State government depending on your tax bracket; however, if you participate in net settlement you will not owe any additional taxes to the Company.

The fair market value of the number of shares of Common Stock that vest, from this stock award grant, will be treated as compensation, reported by the Company on IRS Form W-2, and subject to withholding for applicable income and employment taxes. The Company will determine the amount of your withholding in accordance with the applicable IRS regulations and satisfy this obligation by "netting" from your award shares of Common Stock with a fair market value equal to your obligation. The Company calculates withholding at the supplemental wage rate or the maximum withholding rate, as applicable, imposed by law where required.

Net settlement is not available for non-US tax payers.

When the restricted stock vests the tax basis in the shares relating to the vesting will equal the total pre-tax income included in your W-2.

An example of how net settlement works is set forth below:

If an employee has a restricted stock grant of 100 shares that vested, 27 will be withheld by the Company immediately to cover for taxes and the remaining 73 shares delivered to the employee brokerage account.

- W-2 income reported will include the total value of 100 shares as income.

- 7) Transferability; Successors and Assigns. Until the shares subject to the Award are no longer subject to forfeiture, such shares shall not be transferable (except as permitted under the Plan, including without limitation Section 13(a) thereof) and may not be pledged or otherwise hypothecated. Subject to Section 8 below, if at any time Recipient is no longer employed by the Company or a Subsidiary for any reason, all shares subject to the Award which then remain subject to forfeiture, and all dividends and distributions with respect to such shares, shall thereupon be forfeited and automatically transferred to and re-acquired by the Company at no cost to the Company. The Award shall not be affected by any change of employment so long as Recipient continues to be an employee of the Company or any Subsidiary thereof or of a corporation or its parent or subsidiary issuing or assuming stock options of the Company in a transaction to which Section 424(a) of the Internal Revenue Code of 1986, as amended, applies. If Recipient is employed by a Subsidiary which, for any reason, ceases to be a Subsidiary, Recipient's employment with such Subsidiary shall be deemed to be terminated on the date that such Subsidiary ceases to be a Subsidiary. This Award shall be binding upon and enure to the benefits of any successor or assignee of the Company.
- 8) Exceptions on Certain Terminations. Notwithstanding anything to the contrary contained herein, if Recipient's employment is terminated with the consent of the Company or by reason of death, disability, or normal retirement, the Committee may, in its sole discretion, deem that the restrictions, terms, and conditions of this Award have been met for all or part of the shares subject hereto, subject to further terms and conditions, if any, as the Committee may determine.
- 9) Competitive Activities. If, while an employee or director of the Company or a Subsidiary thereof or at any time within one (1) year after Recipient ceases to be an employee or non-employee director of the Company or a Subsidiary thereof, Recipient engages in any activity in competition with any activity of the Company or a Subsidiary thereof, including, but not limited to:
- (a) conduct related to the Recipient's employment for which either criminal or civil penalties against the Recipient may be sought;
 - (b) violation of Company policies, including, without limitation, the Company's insider trading policy;
 - (c) accepting employment with or serving as a consultant, advisor or in any other capacity to an employer that is in competition with or acting against the interests of the Company or a Subsidiary thereof, including employing or recruiting any present, former or future employee of the Company or a Subsidiary thereof;
 - (d) disclosing or misusing any confidential information or material concerning the Company; or

(e) participating in a hostile takeover attempt, then:

- i) the Award and any stock options and other restricted stock awards from the Company (collectively "Grants") shall terminate effective the date on which Recipient enters into such activity, unless terminated sooner by operation of another term or condition of the Plan or the plan under which such Grants were granted;
- iii) the aggregate of the closing market value on the date the forfeiture provision expired for all shares subject to the restricted stock awards included in the Grants as to which the forfeiture provision expired within one (1) year prior to the date (the "Termination Date") that Recipient ceased to be a director, employee, consultant, advisor, or independent contractor, or within one (1) year after the Termination Date, shall be paid by the Recipient to the Company.

By accepting this Award, Recipient consents to a deduction from any amounts the Company owes the Recipient from time to time (including amounts owed as wages or other compensation, fringe benefits or vacation pay, as well as any other amounts owed by the Company), to the extent of the amounts the Recipient owes the Company under the foregoing provisions of this Section 9. Whether or not the Company elects to make any set-off in whole or in part, if the Company does not recover by means of set-off the full amount the Recipient owes it, calculated as set forth above, the Recipient agrees to pay immediately the unpaid balance to the Company. Recipient may be released from his/her obligations under this Section 9 only by the Board of Directors or the Compensation Committee of the Company.

- 10) Plan Governs. The Award and Recipient shall be subject to and bound by the terms and conditions of the Plan, including relating to exercise thereof.
- 11) Entire Agreement. This Award (together with the Plan) constitutes the entire obligation of the Company as to the subject matter hereof, superseding any and all prior written and prior or contemporaneous oral agreements or understandings.
- 12) Governing Law. All questions concerning the construction, validity and interpretation of this agreement shall be governed by, and construed in accordance with, the laws of the State of Connecticut, without regard to the choice of law principles thereof.

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IN WITNESS WHEREOF, the undersigned have hereunto set their hands as of the day and year first above written.

PHOTRONICS, INC.

By: _____
EVP, Chief Administrative Officer &
General Counsel and Secretary

Recipient:

#Signature#

Date: #AcceptanceDate#

EXHIBIT "A"

The vesting of the Shares shall be subject to the following conditions:

- ONE-QUARTER*** of the shares shall vest on the first anniversary after the date of this Award so long as Recipient is still an employee of the Company or a Subsidiary thereof.
- ONE-QUARTER*** of the shares shall vest on the second anniversary after the date of this Award so long as Recipient is still an employee of the Company or a Subsidiary thereof.
- ONE-QUARTER*** of the shares shall vest on the third anniversary after the date of this Award so long as Recipient is still an employee of the Company or a Subsidiary thereof.
- ONE-QUARTER*** of the shares shall vest on the fourth anniversary after the date of this Award so long as Recipient is still an employee of the Company or a Subsidiary thereof.

JOINT VENTURE OPERATING AGREEMENT

OF

PHOTRONICS DNP MASK CORPORATION

between

PHOTRONICS, INC.

and

DAI NIPPON PRINTING CO., LTD.

Dated as of November 20, 2013

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**JOINT VENTURE OPERATING AGREEMENT
OF
PHOTRONICS DNP MASK CORPORATION**

This **JOINT VENTURE OPERATING AGREEMENT** (together with the Schedules, as amended or otherwise modified from time to time, this “**Agreement**”) is made and entered into as of the 20th day of November, 2013, by and between Photronics, Inc., a corporation organized under the laws of the state of Connecticut, U.S.A, with its principal place of business at 15 Sector Road, Brookfield, Connecticut, U.S.A. (“**Photronics**”) and Dai Nippon Printing Co., Ltd., a corporation organized under the laws of Japan with its principal place of business at 1-1, Ichigaya Kagacho 1-chome, Shinjuku-ku, Tokyo, Japan (“**DNP**”), with respect to Photronics DNP Mask Corporation, whose name as of the date of this Agreement is Photronics Semiconductor Mask Corporation (the “**Company**”), a company limited by shares organized and formed under the Company Act of the Republic of China (the “**Act**”) with its principal place of business at 1F, No. 2, Lising Road, Hsinchu City, Hsinchu Science Park, Taiwan.

**ARTICLE 1.
ORGANIZATIONAL MATTERS**

1.1 Background

The Company was formed on October 6, 1997 under the Act and will become the joint venture entity contemplated by the Merger Agreement (the “**Merger Agreement**”) to be executed between the Company and DNP Photomask Technology Taiwan Co., Ltd., a corporation organized under the laws of the R.O.C., with its principal place of business at No. 6, Lising 7th Rd., East District, Hsinchu City, Hsinchu Science Park, Taiwan, R.O.C. Upon execution of the Merger Agreement, Photronics will be the sole Shareholder of the Company directly or indirectly, and upon the contributions contemplated under such Merger Agreement, DNP will also become a Shareholder of the Company. The rights and liabilities of the Shareholders shall be as provided in the Act, except as otherwise expressly provided herein. In the event of any inconsistency between any terms and conditions contained in this Agreement and any non-mandatory provisions of the Act, the terms and conditions contained in this Agreement shall govern. If any provision of this Agreement is prohibited or ineffective under the Act, this Agreement will be considered amended to the smallest degree possible in order to make such provision effective under the Act. The Shareholders and the Board of Directors shall also cause the Company to take corporate actions and make filings and recordings that are necessary or advisable to effectuate the aforesaid amendment.

1.2 Name

The name of the Company after the completion of the Merger contemplated under the Merger Agreement shall be 台灣美日先進光罩股份有限公司 (Photronics DNP Mask Corporation). The Board of Directors may change the name of the Company from time to time, in accordance with this Agreement and Applicable Law.

1.3 Principal Place of Business

The principal place of business of the Company will be located in IF, No. 2, Lising Road, Hsinchu City, Hsinchu Science Park, Taiwan.

1.4 Business Purpose

The purpose of the Company shall be the (a) development, fabrication and sale of integrated circuit photomasks and related services to (i) Taiwan based wafer fabrication manufacturers, (ii) wafer production facilities operating in Taiwan under the control of foreign companies and (iii) Overseas Customers (notwithstanding the above, if a Shareholder's Percentage Interest is above eighty percent (80%), then such Shareholder may direct the Company to sell integrated circuit photomasks or other products or services to a customer based outside of Taiwan); (b) development, fabrication and sale of integrated circuit photomasks and related services for Overseas Customers or new customers (including overseas customers) other than specified in above (a) that are specifically set forth in the Business Plan as approved by the Board of Directors of the Company and in compliance with the other provisions of this Agreement; (c) entry into any other lawful business, purpose or activity in which a company limited by shares may be engaged under Applicable Law (including, without limitation, the Act) as the Shareholders may determine from time to time, subject to and in accordance with the terms of this Agreement; and (d) entry into any lawful transaction and engagement in any lawful activity in furtherance of the foregoing purposes and as may be necessary, incidental or convenient to carry out the business of the Company as contemplated by this Agreement.

1.5 Term

The Company shall continue until the Company is terminated, dissolved or liquidated in accordance with this Agreement and the Act. Notwithstanding the dissolution of the Company, the existence of the Company shall continue until termination pursuant to, and as provided in, Article 10 of this Agreement.

1.6 Accounting Consolidation

1.6.1 The Shareholders confirm and agree that, for as long as Photronics and/or an Affiliate of Photronics holds more than fifty percent (50%) of Percentage Interest in the Company in the aggregate, the Company is intended to, and shall be treated as, a consolidated subsidiary of Photronics under United States and Taiwan GAAP. In the event that any term of this Agreement or any relationship, understanding or other agreement, including any Transaction Document, between or among, the Company, Photronics and DNP shall be inconsistent with any existing or future rule, principle or standard governing accounting consolidation of the Company's financial results by Photronics under GAAP, then this Agreement or such relationship, understanding or other agreement shall be modified, terminated or waived (as the case may be) (each an "**Accounting Amendment**") to the minimum extent necessary to grant, allow or permit accounting consolidation of the Company's financial results by Photronics in accordance with Section 1.6.2.

1.6.2 Where Photronics believes that an Accounting Amendment may be necessary due to any existing or future rule, principle or standard under GAAP,

- (a) Photronics shall promptly notify DNP of the reasons for, and content of, any proposed Accounting Amendment in writing;
- (b) after Photronics' above notification, Photronics and DNP shall use all reasonable efforts to negotiate with each other with a view to reaching a written agreement for the Accounting Amendment or other mutually acceptable solution, provided however, that, if no such agreement or solution is reached by Photronics and DNP within thirty (30) calendar days after Photronics' above notification, (i) Photronics may, in its discretion, retroactively and/or prospectively, make the Accounting Amendment to the minimum extent reasonably deemed necessary by Photronics, and shall promptly notify the Company and DNP of the content of such Accounting Amendment in writing; and (ii) after Photronics exercises its discretionary power set forth in (i) above, if the Accounting Amendment concerned involves any change in the definition of and/or any of the actions requiring a Supermajority Vote of Directors as set forth in Schedule G hereof, the definition of and/or any of the actions requiring a Supermajority Vote of Shareholders as set forth in Schedule F hereof, and/or the number of board seats of DNP in the Company hereunder, DNP shall have a put option to sell all of its Shares to Photronics (the "**Accounting Amendment Option**") at the price (the "**Accounting Amendment Closing Price**") set forth below. DNP may, after the Accounting Amendment takes effect, exercise the Accounting Amendment Option by giving a twelve-month prior written notice to Photronics (the "**Accounting Amendment Option Notice**") before the Accounting Amendment Closing (as defined below). The closing (the "**Accounting Amendment Closing**") of the sale and purchase of DNP's Interest shall take place as soon as commercially practicable (taking into account the necessary funds raising arrangement by Photronics) without any undue delay and shall be within three (3) Business Days from all prior regulatory approvals or clearance have been obtained. The Accounting Amendment Closing Price shall be equal to the product of (X) the difference of (I) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the date of the Accounting Amendment Option Notice, minus (II) the Net Book Value of the Company Liabilities as of the last day of the Fiscal Month immediately prior to the date of the Accounting Amendment Option Notice, divided by the number of issued and outstanding shares of the Company as of the date of the Accounting Amendment Option Notice, multiplied by the number of shares held by DNP as of the date of the Accounting Amendment Closing. The Accounting Amendment Closing Price shall be paid by, at Photronics option, (i) cash or (ii) a combination of cash and publicly traded shares of Photronics and/or loans from DNP to Photronics; provided that (x) in case of a payment via a combination of cash and publicly traded shares of Photronics and/or loans from DNP to Photronics, at least thirty percent (30%) of the Accounting Amendment Closing Price shall be paid by cash (for the avoidance of doubt, Photronics will not be required to pay more than thirty percent (30%) of the Accounting Amendment Closing Price in cash); (y) in case part of the Accounting Amendment Closing Price will be paid by publicly traded shares, the value of such share shall be determined on the basis of the closing price of such shares on the trading day immediately prior to the date of the Accounting Amendment Closing; and (z) in case part of the Accounting Amendment Closing Price will be paid in the form of loans from DNP to Photronics, the detailed terms and conditions of loans (including loan period, currency and applicable interests) will be discussed and agreed upon in writing between Photronics and DNP. In the event that Photronics desires to make a payment of the Accounting Amendment Closing Price via a combination of cash and publicly traded shares of Photronics and/or loans from DNP to Photronics, Photronics shall, within thirty (30) calendar days from the Accounting Amendment Option Notice, notify DNP of a proposal of payment conditions (including the ratio of each payment option), and the parties will discuss and determine the details for payment of the Accounting Amendment Closing Price. If Photronics fails to notify DNP of any proposal within the above- mentioned period, the payment for all the Accounting Amendment Closing Price shall be made via cash. At the Accounting Amendment Closing, DNP shall transfer all of its Interests in the Company to Photronics, free and clear of any liens or encumbrances, and Photronics shall pay the Accounting Amendment Closing Price to DNP by wire transfer of cash, loans from DNP to Photronics, and/or delivering publicly traded shares of Photronics, as applicable. At the Accounting Amendment Closing, DNP shall deliver to Photronics such instrument or instruments of conveyance as Photronics reasonably requests.

1.6.3 For the avoidance of doubt, for as long as Photronics and/or an Affiliate of Photronics holds more than fifty percent (50%) of Percentage Interest in the Company in aggregate, nothing contained herein is intended or shall allow DNP to (a) control the operations or assets of the Company in its sole discretion and (b) have the discretionary power to govern the financial, operating and personnel policies of the Company unless such actions as set forth in (a) and (b) immediately above are permitted under GAAP and agreed to between the parties hereto.

1.7 Transaction Documents

Contemporaneous with the execution of this Agreement, Photronics, DNP, their respective subsidiaries and the Company have entered into the agreements listed on Schedule A-1 hereto and will have agreed to the final form and substance of the exhibits attached as Schedule A-2, as applicable (collectively, the “**Transaction Documents**”). The timing and execution of the Transaction Documents is governed by the Framework Agreement.

1.8 Ratification of Organizational Actions

When necessary, the Shareholders will, by a resolution adopted by the Shareholders' meeting of the Company, authorize the Company, and ratify all action having been taken by or on behalf of the Company (including by its Officers) prior to the date hereof, to execute and deliver the Transaction Documents to which it is a party, including all certificates, agreements and other documents required in connection therewith.

1.9 Articles of Incorporation

The Shareholders agree that as of the completion of the Merger contemplated under the Merger Agreement, the Articles of Incorporation of the Company shall substantially be in the form attached hereto as Schedule I.

1.10 Compliance

For as long as Photonics and/or an Affiliate of Photonics hold more than fifty percent (50%) of Percentage Interest in the Company, the Company will comply with Photonics health and safety and environmental and corporate compliance policies, procedures, programs and standards. In the event the Company has any concerns about any compliance matters including but not limited to antitrust concerns the Company will consult with counsel for the Company.

1.11 Pre-Closing Liabilities

DNP agrees to be responsible for any and all DPTT Pre-Closing Liability, and Photonics agrees to be responsible for any and all PSMC Pre-Closing Liability.

ARTICLE 2. DEFINITIONS

Capitalized words and phrases used and not otherwise defined elsewhere in this Agreement shall have the following meanings:

“**Accounting Amendment**” is defined in Section 1.6.1.

“**Accounting Amendment Closing**” is defined in Section 1.6.2(b).

“**Accounting Amendment Closing Price**” is defined in Section 1.6.2(b).

“**Accounting Amendment Option**” is defined in Section 1.6.2(b).

“**Accounting Amendment Option Notice**” is defined in Section 1.6.2(b).

“**Act**” is defined in the preamble.

“**Additional Contributions**” is defined in Section 4.1.2(a).

“Affiliate” of a Person means any other Person which, directly or indirectly, controls, is controlled by, or is under common control with, such Person. The term “control” (including, with correlative meaning, the terms “controlled by” and “under common control with”), as used with respect to any Person, means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities, by contract or otherwise. A Person shall be deemed an Affiliate of another Person only so long as such control relationship exists. The parties acknowledge and agree that neither DNP nor Photonics is presently controlled by any other Person. Notwithstanding the foregoing, a Company Entity shall not be deemed to be an Affiliate of either DNP or Photonics, except where expressly provided in this Agreement.

“Agreement” is defined in the preamble.

“Annual Budget” is defined in Section 6.2.

“Applicable Law” means, with respect to a Person, any domestic or foreign, national, federal, territorial, state or local constitution, statute, law (including principles of common law), treaty, ordinance, rule, administrative interpretation, regulation, order, writ, injunction, legally binding directive, judgment, decree or other requirement or restriction of any arbitrator or Governmental Authority applicable to such Person or its properties, assets, officers, directors, employees, consultants or agents (in connection with such officer’s, director’s, employee’s, consultant’s or agent’s activities on behalf of such Person).

“Articles of Incorporation” means the Articles of Incorporation of the Company, as amended from time to time.

“Board of Directors” means, at any time, the Board of Directors of the Company.

“Business” shall mean all activities related to or reasonably required in connection with the design, development fabrication and sale of integrated circuit photomasks.

“Business Day” means a full banking business day in the State of Connecticut, Japan and Taiwan.

“Business Plan” is defined in Section 6.2.

“Capital Contributions” means, with respect to any Shareholder, the total amount of cash and the initial agreed upon asset value of property (other than cash) contributed to the capital of the Company by such Shareholder.

“Cash” means cash and cash equivalents determined by the Board of Directors in good faith consistent with GAAP.

“Chairman of the Board” is defined in Section 5.5.

“**Change in Control**” shall be deemed to have occurred, with respect to Photronics or DNP, when:

(1) Any “Person” or “group” (as defined below) is or becomes the “beneficial owner” (as defined below) of shares representing more than fifty percent (50%) of the combined voting power of the then outstanding securities entitled to vote generally in elections of directors of Photronics or DNP, as the case may be (the “**Voting Stock**”); or

(2) Photronics or DNP (A) consolidates with or merges into any other Person or any other Person merges into Photronics or DNP, and in the case of any such transaction, the outstanding common stock of Photronics or DNP, as the case may be, is changed or exchanged into other assets or securities as a result, unless the stockholders of Photronics or DNP, as the case may be, immediately before such transaction own, directly or indirectly immediately following such transaction, more than fifty percent (50%) of the combined voting power of the outstanding voting securities of the corporation resulting from such transaction in substantially the same proportion as their ownership of the Voting Stock immediately before such transaction, or (B) conveys, transfers or leases all or substantially all of its assets to any Person.

For the avoidance of doubt, the delisting of Photronics from the NASDAQ Stock Market standing alone, if occurs, does not constitute a Change in Control with respect to Photronics.

For the purpose of this definition, a “group” means two or more Persons who, acting for a common purpose, which act based on their mutual consent in the form of a contract, an agreement or others; and a “beneficial owner” means any Person who owns the shares or other assets under his/her/its own name or under the name of a third party (i.e. a nominee) where: (i) such Person (a) provides said shares or assets or (b) provides the funds to acquire such shares or assets to the nominee directly or indirectly; or (ii) the principal has the right to manage, utilize or dispose of the shares or assets held by the nominee; or (iii) entire or partial profits or losses of the shares or assets held under the name of the nominee are assumed by the principal.

“**Change in Control Closing**” is defined in Section 7.4.2.

“**Change in Control Closing Price**” is defined in Section 7.4.3.

“**Change in Control Notice**” is defined in Section 7.4.1.

“**Company**” is defined in the preamble.

“**Company Accountant**” shall mean initially Deloitte Touche LLP or such other independent accounting firm as appointed from time to time by the Board of Directors.

“**Company Assets**” means all direct and indirect rights and interests in real and personal property owned by the Company and its subsidiaries from time to time, and shall include both tangible and intangible property (including Cash). For the sake of clarity, “Company Assets” shall not be deemed to include any right or interest owned by Photronics or DNP or their respective Affiliates, including, without limitation, any rights licensed from third parties to Photronics or DNP unless authorized by such third parties.

“Company Entity” means the Company, or any of its directly or indirectly majority owned subsidiaries (whether organized as corporations, limited liability companies or other legal entities).

“Company Liabilities” means all direct and indirect liabilities and obligations of the Company and its subsidiaries from time to time including the aggregate undistributed amounts due to Shareholders to pay Taiwanese taxes on any income allocated to them. In determining the amount of such liabilities, any contingent liabilities, guarantees or other amounts that are not recorded on the Company’s consolidated balance sheet shall be included and reserved against at the fair probable value thereof as reasonably determined by the Board of Directors in accordance with GAAP.

“Directors” is defined in Section 5.1.3.

“DNP” is defined in the preamble.

“DNP Director” means any of the Directors designated by DNP to serve on the Board of Directors in accordance with Section 5.1.3.

“DPTT” means DNP Photomask Technology Taiwan Co., Ltd., a company limited by shares incorporated under the Act.

“DPTT Pre-Closing Liability” means any and all liabilities and claims arising against DPTT (whether or not made against DPTT or against the Company after the completion of the Merger as contemplated in the Merger Agreement) by any third party which are attributable to events occurred prior to the completion of the Merger as contemplated in the Merger Agreement and are not: (i) reflected in the latest financial statements of DPTT which were made available to Photonics prior to the execution of this Agreement; (ii) taken into consideration and reflected by the relevant adjustment(s) made under Exhibit 5-3 (NWC Proposal) of the Framework Agreement (excluding those that are not required to be taken into consideration thereunder); and (iii) otherwise indemnified by DNP pursuant to Section 12 of the Framework Agreement or recovered from third parties.

“Economic Interest” means a Person’s right to share in allocations of Net Profits, Net Losses and other items of income, gains, losses, deductions and credits hereunder and to receive distributions from the Company as set forth in this Agreement, but does not include any other rights of a Shareholder including, without limitation, the right to vote or to participate in the management of the Company, or, except as specifically provided in this Agreement or required under the Act, any right to information concerning the business and affairs of the Company.

“Effective Date” means the date of the Closing (as defined in the Merger Agreement).

“Exchange Act” means the Securities Exchange Act of 1934 of the United States, as amended.

“Fiscal Months” is defined in Section 5.12.1.

“**Fiscal Quarters**” is defined in Section 5.12.1.

“**Fiscal Year**” is defined in Section 5.12.1.

“**Force Majeure**” means any cause or causes beyond the reasonable control of the Company, including, but not limited to, acts of God, industrial disturbances, wars, terrorism, epidemics, blockages, embargoes, insurrections, riots, explosions, fires, earthquake, floods, perils of the sea.

“**Framework Agreement**” means the Joint Venture Framework Agreement of even date herewith executed by and between Photonics and DNP.

“**GAAP**” means generally accepted accounting principles in Taiwan and/or United States, as applicable, as in effect from time to time.

“**GAAS**” means generally accepted auditing standards in Taiwan and/or United States, as applicable, as in effect from time to time.

“**General Manager**” is defined in Section 5.14.1.

“**Governmental Authority**” means any foreign, domestic, national, federal, territorial, state or local governmental authority, quasi-governmental authority, instrumentality, court, government, stock exchange or self-regulatory organization, commission, tribunal or organization or any regulatory, administrative or other agency, or any political or other subdivision, department or branch of any of the foregoing.

“**Increasing Shareholder**” is defined in Section 5.4

“**Indemnified Loss**” is defined in Section 5.13.1.

“**Indemnitee**” is defined in Section 5.13.1.

“**Interest**” means the entire ownership interest of a Shareholder in the Company at any particular time, including without limitation, the Shareholder’s Shares and Economic Interest, any and all rights to vote and otherwise participate in the Company’s affairs, and the rights to any and all benefits to which a Shareholder may be entitled as provided in this Agreement, together with the obligations of such Shareholder to comply with all of the terms and provisions of this Agreement. An Interest may be expressed as a number of Shares.

“**Liquidating Event**” is defined in Section 10.2.

“**Liquidators**” is defined in Section 10.5.1.

“**Majority Shareholder**” is defined in Section 7.3.1.

“**Management Advisory Committee**” is defined in Section 5.15.

“**Minority Closing**” is defined in Section 7.3.2.

“**Minority Closing Price**” is defined in Section 7.3.3.

“**Minority Shareholder**” is defined in Section 7.3.1.

“**Net Book Value**” means, with respect to (i) any assets, the value thereof, net of accumulated depreciation, amortization and other adjustments, as would be included in a consolidated balance sheet of the entity owning such assets prepared in accordance with GAAP, (ii) any liabilities, the amount thereof as would be included in a consolidated balance sheet of the entity having the liabilities prepared in accordance with GAAP and (iii) any equity security of a Company Entity or other entity, the product of (x) the value of the assets of such entity, net of accumulated depreciation, amortization or other adjustments, as would be included in a consolidated balance sheet of the entity prepared in accordance with GAAP, minus the amount of the liabilities of such entity, as would be included in a consolidated balance sheet of such entity prepared in accordance with GAAP, multiplied by (y) a percentage equal to the percentage of the equity of such entity represented by such equity security. Any determination of Net Book Value shall be consistent with the historic GAAP methods, procedures and election used by the Company.

“**Net Profits**” or “**Net Losses**” means, for each Fiscal Year or other period, an amount equal to the Company’s taxable income or loss for such year or period.

“**Officer**” is defined in Section 5.14.3.

“**Overseas Customers**” shall mean those existing customers of PSMC and DPPT designated on Schedule B.

“**Percentage Interest**” means, with respect to a Shareholder holding one or more Shares, its Interest in the Company as determined by dividing the number of Shares owned by such Shareholder by the total number of Shares of the Company then outstanding. For the purposes of this Agreement, the aggregate Percentage Interest of all entities directly or indirectly wholly owned by Photronics or DNP, as the case may be, shall be the basis for calculating the Percentage Interest of Photronics and DNP.

“**Person**” means any person or entity, whether an individual, trustee, corporation, partnership, limited partnership, limited liability company, trust, unincorporated organization, business association, firm, joint venture, other legal entity or Governmental Authority.

“**Photronics**” is defined in the preamble.

“**Photronics Director**” means any of the Directors designated by Photronics to serve on the Board of Directors in accordance with Section 5.1.3.

“**PSMC**” means Photronics Semiconductor Mask Corporation, a company limited by shares incorporated under the Act.

“**PSMC Pre-Closing Liability**” means any and all liabilities and claims arising against the Company by any third party which are attributable to events occurred prior to the completion of the Merger as contemplated in the Merger Agreement and are not: (i) reflected in the latest financial statements of the Company which were made available to DNP prior to the execution of this Agreement; (ii) taken into consideration and reflected by the relevant adjustment(s) made under Exhibit 5-3 (NWC Proposal) of the Framework Agreement (excluding those that are not required to be taken into consideration thereunder); and (iii) otherwise indemnified by Photronics pursuant to Section 12 of the Framework Agreement or recovered from third parties.

“**Reducing Shareholder**” is defined in Section 5.4.

“**Related Party Agreement**” is defined in Section 5.18.

“**Representative**” is defined in Section 5.13.6(d).

“**Required Funding Date**” is defined in Section 4.1.2(a).

“**Seconded Employees**” is defined in Section 6.4.

“**Service Provider Documents**” is defined in Section 6.5.1

“**Share**” means equity interest of the Company issued pursuant to Article 3 of this Agreement. Shares may be issued in whole numbers of a fractional interest. As of the completion of the Merger contemplated under the Merger Agreement, the Shares are to be held by the Shareholders in accordance with Schedule C.

“**Shareholder**” means a Person owning Shares.

“**Shortfall**” means the dollar difference between a requested Additional Contribution and the actual amount a Shareholder pays of such Additional Contribution.

“**Tax**” or “**Taxes**” means all taxes, levies, imposts and fees imposed by any Governmental Authority (domestic or foreign) of any nature including but not limited to federal, state, local or foreign net income tax, alternative or add-on minimum tax, profits or excess profits tax, franchise tax, gross income, adjusted gross income or gross receipts tax, employment related tax (including employee withholding or employer payroll tax), real or personal property tax or ad valorem tax, sales or use tax, excise tax, stamp tax or duty, any withholding or back up withholding tax, value added tax, severance tax, prohibited transaction tax, premiums tax, occupation tax, together with any interest or any penalty, addition to tax or additional amount imposed by any Governmental Authority (domestic or foreign) responsible for the imposition of any such tax.

“**Territory**” means Taiwan.

“**Transaction Documents**” is defined in Section 1.7.

“**Transfer**” (including, with correlative meaning, the term “**Transferred**”) means, with respect to any Share or Economic Interest or portion thereof, a sale, conveyance, exchange, assignment, pledge, encumbrance, gift, bequest, hypothecation or other transfer or disposition by any other means, whether for value or no value and whether voluntary or involuntary (including, without limitation, by operation of law), or an agreement to do any of the foregoing.

“**Supermajority Vote of Directors**” means the unanimous affirmative vote or consent of all Directors of the Company present at a meeting of the Board of Directors, provided that the Percentage Interest of Photronics and DNP shall be at least twenty percent (20%) each.

“**Supermajority Vote of Shareholders**” means the unanimous affirmative vote or consent of all Shareholders of the Company present at a meeting of the Shareholders, provided that the Percentage Interest of Photronics and DNP shall be at least twenty percent (20%) each.

“**Vice General Manager**” is defined in Section 5.14.1.

“**Voting Stock**” is defined in the definition of “Change in Control.”

ARTICLE 3. SHARES AND CAPITAL CONTRIBUTIONS

3.1 Authorized Shares

The Company is authorized to issue equity interests (which should be common shares with the par value at NT\$10 per share) in the Company designated as “Shares”. The total number of authorized Shares and issued Shares of the Company as of the completion of the Merger contemplated under the Merger Agreement shall be set forth in the Merger Agreement.

3.2 Initial Capital Contributions and Share Issuance

The Shareholders acknowledge and agree that the names and address of each Shareholder, Percentage Interests of, and number of Shares owned by, the Shareholders as of the completion of the Merger contemplated under the Merger Agreement are as set forth on Schedule C.

3.3 Return or Redemption of Capital Contribution

Except as otherwise provided in this Agreement or approved by a Supermajority Vote of Shareholders: (a) no Shareholder shall demand or be entitled to receive a return of or interest on any portion of its Capital Contributions; and (b) no Shareholder shall withdraw any portion of its Capital Contributions or receive any distributions from the Company as a return of capital on account of such Capital Contributions. Except as otherwise provided in this Agreement or approved by a Supermajority Vote of Board, the Company shall not redeem or repurchase the Shares of any Shareholder. Provided in all three cases that any such return, distribution or redemption that is permitted hereunder shall be *pro rata* based upon the Shareholders’ respective Percentage Interests and in compliance with Applicable Law.

3.4 Liability of Shareholders

Except as otherwise required by any non-waivable provision of the Act or other Applicable Law and except as provided in this Agreement or other agreements between the Company and one or more Shareholders or their Affiliates, no Shareholder shall be liable in any manner whatsoever for any debt, liability or other obligation of the Company, whether such debt, liability or other obligation arises in contract, tort, or otherwise solely by reason of being a Shareholder.

3.5 Revenue

The Shareholders hereby agree that the Company shall be the exclusive distribution mechanism and exclusive interface (interface includes but is not limited to communicating with the customer whether in person or via e-mail or phone, order entry, shipping product and product invoicing) with respect to all Products sold, services provided including but not limited to consulting services and product development agreements sold or implemented in the Territory for all customers of the Company and the Shareholders (provided however in the case of Photronics, Micron Technology, Inc. and its Affiliates shall be excluded from such exclusive distribution). The Shareholders further agree that neither Shareholder will meet with a customer of the Company in the Territory without at least one employee from the Company being present at such meeting.

ARTICLE 4. FINANCING OF THE COMPANY

4.1 Types of Financing

4.1.1 General. The Shareholders expect the Company to be self funding. The Shareholders shall not be obliged to make any kind of additional investment (including the Additional Contributions, loan to the Company and guaranteeing a loan of the Company) into the Company upon or after the completion of the Merger contemplated under the Merger Agreement. Nevertheless, the Board of Directors shall be responsible for determining the type of financing required to fund the operations of the Company and will evaluate Capital Contributions from the Shareholders or incurring debt from the Shareholders or from public, private or bank markets, in each case as permitted under this Agreement; the Board of Directors will then decide on the type of funding that is in the best interests of the Company at the time of the decision.

4.1.2 Shareholder Contributions.

(a) If the Board of Directors determines that the Company requires additional funding via a Capital Contribution from the Shareholders to the Company, the Shareholders shall have the right to make such Capital Contributions to the Company pro-rata based on such Shareholder's Percentage Interest (the "**Additional Contributions**") of up to NT\$3,000,000,000 in aggregate during the four year period following the date of the completion of the Merger contemplated under the Merger Agreement, and up to NT\$1,200,000,000 in any one year period during such four year period. Request for Additional Contributions shall be made by written notice by the Board of Directors, provided that if any of the Shareholders intends to cause the Board of Directors to approve an Additional Contributions, it shall notify the other Shareholder in writing and any such written notice shall include the amount of required Capital Contribution and the required funding date ("**Required Funding Date**") to be approved by the Board of Directors and shall be sent to the other Shareholder at least ninety (90) calendar days prior to the relevant meeting of the Board of Directors. Such Required Funding Date shall correspond to the end of a Fiscal Month. All Additional Contributions shall be made in New Taiwan Dollars or equivalent in US Dollars. Where the Applicable Law grants employees of the Company any subscription rights and no exception in the Applicable Law is available to the Company, the Shareholders agree to use their best efforts to cause the employees of the Company to waive any rights they may have under the Applicable Law to subscribe to any additional Shares to be issued in connection with any Additional Contributions.

(b) In the event that any Shareholder determines to contribute less than its Percentage Interest of any requested Additional Contribution, such Shareholder shall provide notice of such determination specifying the amount of such Additional Contribution it intends to make, if any. Such notice shall be provided to the Company and to the other Shareholder as soon as practicable after such determination is made, but in any event not less than twenty (20) Business Days prior to the Required Funding Date. Any failure or delay in providing such notice shall not affect the right of any Shareholder to refrain from providing such Additional Contribution, nor shall it result in any liability for damages. If a Shareholder fails to make the full amount of a requested Additional Contribution by the Required Funding Date set forth pursuant to Section 4.1.2(a), then the funding Shareholder may elect, in its discretion and to the fullest extent permitted by Applicable Law, to do any or a combination of the following (without duplication): (i) to fund all or part of the Shortfall and receive additional Shares under Section 4.1.2(c); (ii) to fund all or part of the Shortfall as a loan on market terms and conditions; (iii) to reduce the amount of the funding Shareholder's Additional Contribution by an amount equal to the Shortfall and, if such amount was previously advanced to the Company, have the Company pay back such amount to the funding Shareholder; or (iv) to require the Company to return to each Shareholder the full amount of the then requested Additional Contribution previously funded, provided that in no event shall any third party become a Shareholder of the Company as a result of an Additional Contribution without prior written consent of all existing Shareholders prior to such Additional Contribution.

(c) In connection with any requested Additional Contribution, the Board of Directors shall determine the subscription price of the additional Shares equal to the Net Book Value of the Company's Assets less the Company's Liabilities, as of the date immediately prior to the date of the meeting of the Board of Directors approving the Additional Contributions, divided by the number of Shares outstanding immediately prior to the date of the meeting of the Board of Directors approving the Additional Contributions.

**ARTICLE 5.
MANAGEMENT**

5.1 Board of Directors

5.1.1 Powers. Except as otherwise required by any non-waivable provision of the Act or other Applicable Law or expressly provided in this Agreement, all management powers over the business, property and affairs of the Company are exclusively vested in a board of directors (the “**Board of Directors**”), and no Shareholder shall have any right to participate in or exercise control or management power over the business and affairs of the Company or otherwise to bind, act or purport to act on behalf of the Company in any manner. Subject to any non-waivable provision of Applicable Law and the limitations set forth in this Agreement, the Board of Directors shall have all the rights and powers that may be possessed by the Board of Directors under the Act, which shall include, without limitation, the power to incur indebtedness, the power to enter into agreements and commitments of all kinds, the power to manage, acquire and dispose of Company Assets, and all ancillary powers necessary or convenient to the foregoing. Without limiting the general authority granted by the immediately preceding sentence, the majority of the Board of Directors shall have the authority set forth on Schedule D hereto. The Board of Directors may also designate one or more persons to open bank accounts and conduct other banking business on behalf of the Company. The Directors shall devote such time to the business and affairs of the Company as is reasonably necessary for the performance of their duties, but shall not be required to devote full time to the performance of such duties.

5.1.2 Evaluation of General Manager. The Board of Directors will be responsible for supervision and evaluation of the Company’s General Manager on an ongoing basis, including at least an annual review of his or her performance to ensure he or she is acting in accordance with prudent business practices.

5.1.3 Number of Directors; Appointment of Directors. Both parties shall cause the Company to hold an extraordinary general shareholders’ meeting not later than on the 15th calendar day (or a later day agreed by both parties) after the completion of the Merger contemplated under the Merger Agreement to elect some or all Directors and supervisors of the Company and such members shall have the same term of office as provided below. The Board of Directors shall consist of seven (7) individuals (each such individual, a “**Director**”) and the term of their office shall be three (3) years. Subject to Sections 5.2 and 5.3 below, in the aforesaid extraordinary general shareholders’ meeting and subsequent general shareholders’ meetings of the Company in which the Directors are to be re-elected, four (4) of the representatives appointed by Photronics and three (3) of the representatives appointed by DNP shall be elected as the Directors. If a Director resigns (including by death or retirement) or is removed either by the Shareholder who appointed such Director as provided for under the Act or in accordance with Section 5.2 or 5.3, each newly appointed Director shall hold office for the remaining term of the replaced Director. Each Shareholder having the right to nominate a Director pursuant to this Section 5.1.3 shall have the right, in its sole discretion, to remove such Director at any time, by delivery of written notice to the Company with a copy to each of the other Shareholder and the Director(s) to be removed. In the case of a vacancy in the office of a Director for any reason (including by reason of death, resignation, retirement, expiration of such Director’s term or removal pursuant to the preceding sentence), the vacancy shall be filled by the Shareholder that nominated the Director in question; *provided, however*, that in the case of a vacancy created due to a change in a Shareholder’s Percentage Interest as described in Section 5.2 or 5.3, such vacancy shall be filled in accordance with Section 5.2 or 5.3. Each Shareholder shall notify the other Shareholder and the Company of the name, business address and business telephone, e-mail address and facsimile numbers of each Director that such Shareholder has nominated. Each Shareholder shall promptly notify the other Shareholder and the Company of any change in such Shareholder’s nominated Director or of any change in their Director’s address or other contact information.

5.2 Effect of Reduction in Photonics' Percentage Interest on Photonics Directors

Subject to Section 5.4 below, the number of Directors that Photonics can appoint to or maintain on the Board of Directors shall depend on Photonics Percentage Interest as follows:

Photonics's Percentage Interest	Number of Photonics Directors
> 80%	7
> 50% and \leq 80%	4
\geq 20% and \leq 50%	3
> 0% and < 20%	0

5.3 Effect of Reduction in DNP's Percentage Interest on DNP Directors

Subject to Section 5.4 below, the number of Directors that DNP can appoint to or maintain on the Board of Directors shall depend on DNP Percentage Interest as follows:

DNP's Percentage Interest	Number of DNP Directors
> 80%	7
> 50% and \leq 80%	4
\geq 20% and \leq 50%	3
> 0% and < 20%	0

5.4 Procedure.

If either Shareholder's Percentage Interest should be below any of the threshold levels set forth in Sections 5.2 or 5.3 above more than three (3) months and if such Shareholder (the "**Reducing Shareholder**") then has more designees serving on the Board of Directors than the number to which it is entitled, such Reducing Shareholder shall immediately identify by written notice to the Company with a copy to the other Shareholder (the "**Increasing Shareholder**") the designee or designees on the Board of Directors that will cease serving on the Board of Directors, and each such designee shall thereupon cease to be a Director or member of the Board of Directors. If such Reducing Shareholder fails to make such designation within five (5) Business Days after written demand by the Increasing Shareholder, the Increasing Shareholder may for and on behalf of the Reducing Shareholder and its designee(s) (and the Reducing Shareholder hereby, and shall cause its designee(s) to, irrevocably authorize the Increasing Shareholder to) designate by written notice to the Company with a copy to the Reducing Shareholder one or more (as appropriate) of the Reducing Shareholder's designees on the Board of Directors that will cease serving on the Board of Directors and each such designee shall thereupon cease to be a Director or member of the Board of Directors. Upon the written notice described in either of the immediately preceding two sentences, the Shareholders agree to collaborate to cause the Board of Directors to convene a meeting of the Shareholders as soon as practicable to fill the vacancies created by such removals in accordance with the provisions of Sections 5.2 and 5.3. Similarly, if a Shareholder whose Percentage Interest fell below any threshold level set forth in Section 5.2 or 5.3 subsequently increases its Percentage Interest above any such level, the process shall be reversed.

5.5 Chairman and Vice-Chairman

A Chairman of the Board of Directors (the “**Chairman of the Board**”) shall preside at all meetings of the Board of Directors. The Chairman of the Board shall be selected from and among the Directors appointed by Photronics; *provided, however*, that if the Percentage Interest of Photronics falls below fifty percent (50%) more than three (3) months, then the Chairman of the Board shall be selected from and among the Directors appointed by DNP if DNP’s Percentage Interest is above fifty percent (50%) or otherwise by the Board of Directors. If a Shareholder whose Percentage Interest fell below fifty percent (50%) subsequently increases its Percentage Interest above fifty percent (50%), such Shareholder shall have the right to appoint the Chairman of the Board again. A Vice-Chairman of the Board of Directors (the “**Vice- Chairman of the Board**”) shall be selected from and among the Directors appointed by DNP provided that DNP’s Percentage Interest shall not fall below twenty percent (20%); *provided, however*, that in the case where the Chairman of the Board is selected by DNP in accordance with the foregoing, then the Vice-Chairman of the Board shall be selected from and among the Directors appointed by Photronics provided that Photronics’ Percentage Interest shall not fall below twenty percent (20%).

5.6 Meetings of Shareholders and of the Board of Directors; Quorum

5.6.1 Shareholder Meetings. At any time, and from time to time, the Board of Directors may call meetings of the Shareholders. Special meetings of the Shareholders for any proper purpose or purposes may be called at any time by the Board of Directors. Written notice of any such meeting shall be given to all Shareholders. No less than twenty (20) calendar days’ written notice shall be given for an annual meeting of the Shareholders and no less than ten (10) calendar days’ written notice shall be given for any special meetings of the Shareholders. Each meeting of the Shareholders shall be conducted by the Chairman of the Board of Directors. Where the Chairman of the Board is on leave or cannot exercise his power and authority for any cause, the meeting of the Shareholders shall be conducted by the Vice-Chairman of the Board, or any designee appointed in accordance with the Act. Each Shareholder may authorize any Person by written proxy to act for it or on its behalf on all matters in which the Shareholder is entitled to participate. Each proxy must be signed by a duly authorized officer of the Shareholder. All other provisions governing or otherwise relating to the convening of meetings of the Shareholders shall from time to time be established in the sole discretion of the Board of Directors (acting reasonably). Each of the Shareholders shall have the obligation to attend the meeting of the Shareholders, whether in person or by proxy, for the purpose of the quorum, provided that nothing in the foregoing shall be construed to restrict any Shareholder on how to exercise its voting rights (including abstaining from voting). In the event that any of the Shareholders fails to attend a meeting of the Shareholders due to reasons other than those that are unattributable to such Shareholder or its representative(s) (including, without limitation, Force Majeure, accident and illness) and taking into account that such Shareholder should use its best efforts to issue a proxy for such meeting, resulting in a failure of reaching a quorum, it shall be deemed as a material breach of this Agreement and bad faith of such Shareholder in performing its obligations hereunder.

5.6.2 Board Meetings. The Board of Directors shall hold meetings at least once every Fiscal Quarter. Unless a higher quorum is required by Applicable Law, the presence of four (4) Directors, in each case, in person or by video conference, shall be necessary and sufficient to constitute a quorum for the purpose of taking action by the Board of Directors at any meeting of the Board of Directors. Each Director may authorize any other Director by written proxy to act for or on behalf of such Director on all matters in which such Director is entitled to participate. Each Shareholder shall be responsible for the expenses of the Director(s) appointed by such Shareholder in connection with all meetings of the Board of Directors. The Chairman of the Board shall preside at all meetings of the Board of Directors and shall have such other duties and responsibilities as may be assigned to him or her by the Board of Directors. The Chairman of the Board must include any item submitted by a Shareholder or General Manager for consideration at a meeting of the Board of Directors, may not cut off debate on any matter being considered by the Board of Directors and shall call for a vote on any matter at the request of any Director or General Manager. Each of the Directors shall have the obligation to attend each of the meetings of the Board of Directors, whether in person or by proxy, for the purpose of the quorum, provided that nothing in the foregoing shall be construed to restrict any Director on how to exercise his/her voting rights (including abstaining from voting). In the event that any of the Directors fails to attend two meetings of the Board of Directors consecutively due to reasons other than those that are unattributable to such Director or its proxy (including, without limitation, Force Majeure, accident and illness) and taking into account that such Director should use his/her best efforts to issue a proxy for such meeting, resulting in failure of reaching a quorum, it shall be deemed as a material breach and bad faith of the Shareholder who nominates such Director in performing such Shareholder's obligations hereunder.

5.6.3 Notice; Waiver. Except in the case of emergency as provided under the Act, the regular quarterly meetings of the Board of Directors described in Section 5.6.2 shall in principle be held upon not less than seven (7) Business Days' written notice. Additional meetings of the Board of Directors may be held upon the request of any Director to the Chairman of the Board, upon not less than seven (7) Business Days' written notice (which may be given, to the extent permitted by Applicable Law, via confirmed facsimile, confirmed e-mail or other manner provided for in Section 12.5). No action taken by the Directors at any meeting shall be valid unless the requisite quorum is present.

5.6.4 Voting of Directors. Except as otherwise expressly provided in this Agreement and/or Applicable Law, all actions, determinations or resolutions of the Board of Directors shall require the affirmative vote or consent of a majority of the Board of Directors present at any meeting at which a quorum is present. Each Director shall be entitled to one (1) vote, and Directors shall be entitled to cast their vote through proxies.

5.6.5 Meetings. All meetings of the Board of Directors or the Shareholders shall be conducted in English. Directors and their proxies shall have the right to participate in all meetings of the Board of Directors by means of a video conference or similar communications equipment by means of which all persons participating in the meeting can see and hear each other at the same time and participation by such means shall constitute presence in person at a meeting.

5.6.6 Reliance by Third Parties. For convenience and subject to Applicable Laws, each party agrees that any Person dealing with the Company, Photronics Director, DNP Director, or any Officer may rely upon a certificate signed by any one Photronics Director and one DNP Director as to: (a) the identity of any Director or Officer; (b) the existence or non-existence of any fact or facts which constitute a condition precedent to acts by the Directors or Officers or in any other manner germane to the affairs of the Company; (c) the Persons who are authorized to execute and deliver any instrument or document for or on behalf of the Company; or (d) any act or failure to act by the Company or as to any other matter whatsoever involving the Company, Photronics, DNP, any Director or any Officer.

5.7 Supervisors

The Company shall have two (2) supervisors. Each of Photronics and DNP shall be entitled to designate one (1) representative to be elected as the supervisor.

5.8 Actions Requiring a Supermajority Vote of Shareholders

Notwithstanding the provisions of Section 5.6.4 or any other provisions of this Agreement, the Company may not, and no Shareholder or Director may cause the Company to, take any of the actions specified in Schedule F (or any other action specified in this Agreement as requiring a Supermajority Vote of Shareholders) without obtaining the Supermajority Vote of Shareholders.

5.9 Actions Requiring a Supermajority Vote of Directors

Notwithstanding the provisions of Section 5.6.4 or any other provisions of this Agreement, the Company may not, and no Shareholder or Director may cause the Company to, take any of the actions specified in Schedule G (or any other action specified in this Agreement as requiring a Supermajority Vote of Directors) without obtaining the Supermajority Vote of Directors.

5.10 Compensation of Directors and Supervisors

The Directors and supervisors shall not be entitled to any compensation in their capacities as Directors and supervisors unless otherwise agreed upon in writing by all of the Shareholders.

5.11 Other Activities

Subject to Applicable Law and the provisions of the Transaction Documents, the Shareholders, their respective Affiliates and the Directors may engage or invest in, and devote their time to, any other business venture or activity of any nature and description (independently or with others), whether or not such other activity may be deemed or construed to be in competition with the Company. Neither the Company nor any Shareholder, Affiliate of a Shareholder, or Director shall have any right by virtue of this Agreement or the relationship created hereby in or to such other venture or activity of any Shareholder or its Affiliates (or to the income or proceeds derived therefrom), and the pursuit thereof, even if competitive with the business of the Company, shall not be deemed wrongful or improper.

5.12 Accounting; Records and Reports

5.12.1 Accounting and Fiscal Year. The books, records and accounts of the Company, including for all applicable tax purposes, will be maintained in accordance with such methods of accounting as shall be reasonably determined by the Board of Directors. The fiscal year of the Company (“**Fiscal Year**”), including each of the fiscal quarters (the “**Fiscal Quarters**”) and each of the fiscal months (“**Fiscal Months**”) thereof, shall correspond to that of Photonics for as long as Photonics and/or an Affiliate of Photonics hold more than fifty percent (50%) of Percentage Interest in the Company in the aggregate.

5.12.2 Books and Records. The Board of Directors shall cause to be kept, at such location as the Board of Directors shall reasonably deem appropriate, full and proper ledgers, other books of account, and records of all receipts and disbursements and other financial activities of the Company in accordance with Photonics' record retention policies for as long as Photonics and/or an Affiliate of Photonics hold more than fifty percent (50%) of Percentage Interest in the Company in the aggregate. The Board of Directors shall also cause to be kept at such location copies of each of the following:

- (a) a current list of the full name and last known address of each Shareholder, and the capital account, number of Shares and Percentage Interest held by each Shareholder;
- (b) a current list of the full name and last known address of each Director;
- (c) the Articles of Incorporation of the Company, including any amendments to the Articles of Incorporation;
- (d) the Company's federal, state and local income tax returns and reports, if any, for the seven (7) most recent Fiscal Years;
- (e) this Agreement and any amendments to this Agreement;
- (f) financial statements of the Company for the five (5) most recent Fiscal Years; and
- (g) minutes of all meetings of the Board of Directors and the Shareholders.

5.12.3 Reports. The Board of Directors shall also cause to be sent to each Shareholder of the Company, the following:

- (a) within forty-five (45) days after the Effective Date, the Company shall provide each Shareholder with an unaudited balance sheet of the Company as of the Effective Date;
- (b) within one hundred eighty (180) days following the end of each Fiscal Year, such information as may be reasonably required by the Shareholders for preparation of their respective federal, state and local income or franchise tax returns;
- (c) a copy of the Company's federal, state and local income tax or information returns for each Fiscal Year, concurrent with the filing of such returns;
- (d) within seventy five (75) days after the end of each Fiscal Year, the Company shall provide each Shareholder with an audited balance sheet, income statement and statement of cash flows for and as of the last day of the Fiscal Year then ended, prepared in accordance with GAAP and audited in accordance with GAAS as well as such other financial information as any Shareholder may reasonably request to enable such Shareholder and its Affiliates to prepare their consolidated quarterly and annual financial statements;

(e) within forty five (45) days after the end of each Fiscal Quarter or Fiscal Year, the Company shall provide each Shareholder with an unaudited balance sheet, income statement and statement of cash flows for and as of the last day of the year or quarter (as appropriate) then ended, prepared in accordance with GAAP, as well as such other financial information as any Shareholder may reasonably request to enable such Shareholder and its Affiliates to prepare their consolidated quarterly and annual financial statements; and

(f) within a reasonable period of time, notice of any material litigation filed against the Company or any written claim by a Governmental Authority of any material violation of any state, federal or foreign law, statute, rule or regulation.

If Japanese generally accepted accounting principles have been amended, both parties agree that; (a) the time limit set forth in this Section 5.12.3 shall be amended accordingly, and to the extent DNP deems reasonably necessary, by the notice from DNP to the Company, and (b) both parties shall cause the Company to use all reasonable efforts to send all necessary financial information as DNP may reasonably request to enable DNP and its Affiliates to prepare their consolidated quarterly and annual financial statements.

5.12.4 Access to Company Books and Records.

(a) To the extent not in violation of Applicable Law, the terms of the Transaction Documents and the Company's confidential obligations (statutory or contractual) to third parties, Shareholders (personally or through an authorized representative) may, for purposes reasonably related to their interests in the Company, during reasonable business hours (i) examine and copy (at their own cost and expense) the books and records of the Company, including the records listed in Section 5.12.2, and (ii) have access to the Company's management, internal and external accountants and attorneys, plans, properties and other assets to conduct investigations regarding the Business and assets of the Company at such Shareholder's sole expense, and the Company shall reasonably cooperate with such Shareholder in such investigations. Any information obtained as a result of this Section 5.12.4 shall be used by a Shareholder solely for purposes reasonably related to such Shareholder's participation in the Company and shall be subject to Section 5.16 of this Agreement.

(b) Any Shareholder's request for documents or request to inspect or copy documents or have access to the Company's management, plans, properties and other assets under this Section 5.12.4 (i) may be made by that Shareholder or that Shareholder's authorized representative and (ii) shall be made in writing to the General Manager and shall state the purpose of such demand. If a Shareholder is not satisfied with the response of the General Manager, the Shareholder may make such request to the Management Advisory Committee and/or the Board of Directors.

5.13 Indemnification and Liability of the Directors

5.13.1 Indemnification. The Company shall indemnify and hold harmless each Director, the General Manager and all other Officers (individually, an “**Indemnitee**”) to the fullest extent permitted by Applicable Law from and against any and all losses, claims, demands, costs, damages, liabilities, whether joint or several, expenses of any nature (including reasonable attorneys’ fees and disbursements), judgments, fines, settlements and other amounts (each an “**Indemnified Loss**”) arising from any and all claims, demands, actions, suits or proceedings, civil, criminal, administrative or investigative, in which the Indemnitee may be involved as a defendant, or threatened to be involved as a defendant (other than all claims, demands, actions, suits or proceedings brought by the Shareholder who nominated such Director, if applicable), relating to the performance or nonperformance of any act concerning the activities of the Company or by reason of the Indemnitee’s status as a Director, General Manager or Officer, as applicable, regardless of whether the Indemnitee retains such status at the time any such Indemnified Loss is paid or incurred, if (a) the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interests of the Company and, in the case of a criminal proceeding, had no reasonable cause to believe that his or her conduct was unlawful, and (b) the Indemnitee’s conduct did not constitute an act or omission which involved intentional misconduct or a knowing violation of the law or gross negligence. The termination of an action, suit or proceeding by judgment, order, or settlement shall not, in and of itself, create a presumption or otherwise constitute evidence that the Indemnitee acted in a manner contrary to that specified in clauses (a) or (b) above.

5.13.2 Expenses. Expenses incurred by an Indemnitee in defending any claim, demand, action, suit or proceeding subject to this Section 5.13 shall be advanced by the Company prior to the final disposition of such claim, demand, action, suit, or proceeding.

5.13.3 Company Expenses. Any indemnification provided hereunder shall be satisfied solely out of the Company Assets, as an expense of the Company. No Shareholder shall be subject to liability by reason of these indemnification provisions.

5.13.4 No Other Rights. The provisions of this Section 5.13 are for the benefit of the Indemnitees and shall not be deemed to create any rights for the benefit of any other Person; *provided, however*, that the indemnification rights provided in this Section 5.13 will inure to the benefit of the heirs, legal representatives, successors, assigns and administrators of the Indemnitee.

5.13.5 No Liability. No Indemnitee shall be liable to the Company or to any Shareholder for any losses sustained or liabilities incurred as a result of any act or omission of any Indemnitee if (a) the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interests of the Company and, in the case of a criminal proceeding, had no reasonable cause to believe that his or her conduct was unlawful, and (b) the Indemnitee's conduct did not constitute an act or omission which involved intentional misconduct or a knowing violation of the law or gross negligence.

5.13.6 No Fiduciary Duties.

(a) In connection with the determination of any and all matters presented for action to the Shareholders, the Board of Directors or the Management Advisory Committee, as applicable, the Shareholders acknowledge and agree that each Shareholder will be acting on its own behalf and each Representative serving on the Board of Directors or the Management Advisory Committee will be acting on behalf of the Shareholder that appointed such Representative, to the fullest extent permitted by Applicable Law.

(b) Each Shareholder may act, and, to the fullest extent permitted by Applicable Law, will be protected for acting, in its own interest (subject to the express terms of any contract entered into by such Shareholder) without regard to the interest of the other Shareholder, and, subject to Section 5.13.6(c), each Representative may act, and, to the fullest extent permitted by Applicable Law, will be protected for acting, at the direction or control of, or in a manner that such Representative believes is in the best interest of, the Shareholder that appointed the Representative without regard to the interest of the other Shareholder.

(c) Each of the Shareholders hereby waives, and shall cause the Company to waive, on its own behalf and on behalf of each of its subsidiaries, to the fullest extent permitted by Applicable Law, any claim or cause of action against any Shareholder or Director or member of the Management Advisory Committee appointed by a Shareholder based on the determination of any and all matters presented for action to the Shareholders, the Board of Directors or the Management Advisory Committee, as applicable; *provided, however*, the foregoing will not limit any Shareholder's obligation under, or liability for, breach of the express terms of this Agreement, other Transaction Documents or any other agreement that they have entered into with the Company or any of its subsidiaries or the other Shareholder. Each of the Shareholders acknowledges that no Shareholder shall negotiate or enter into or request or otherwise cause the Company to negotiate or enter into any agreement or transaction that would result in such Shareholder or any of its Affiliates receiving any financial consideration or other tangible property incentive, payment or other form of financial consideration or other tangible property consideration from any Governmental Authority or Person based upon the Company's taking an action (including hiring any employees, undertaking any construction or purchasing any equipment) or entering into such agreement or transaction other than as a Shareholder of the Company pursuant to this Agreement, and any Shareholder who receives any such consideration or other tangible property incentive, payment or other form of financial consideration or other tangible property consideration from any Governmental Authority or Person in respect of the Company's activities, shall promptly convey such consideration or other tangible property incentive, payment or other form of financial consideration or other tangible property consideration from any Governmental Authority or Person to the Company as a supplemental Capital Contribution without consideration including any adjustment in the Shares or Economic Interest of, or balance of requested Additional Contribution owed by, such Shareholder.

(d) The term “**Representative**” shall mean, with respect to a Shareholder, the Directors and members of the Management Advisory Committee appointed by such Shareholder.

5.14 Officer

5.14.1 General Manager and Vice General Manager. The Company will have a general manager (the “**General Manager**”) to be selected by Photronics with input from the Board of Directors and DNP; provided, however, that if the Percentage Interest of Photronics falls below fifty percent (50%) for more than one (1) month, then the General Manager will be selected by DNP with input from the Board of Directors and Photronics if DNP’s Percentage Interest is above fifty percent (50%) or otherwise by the Board of Directors. If a Shareholder whose Percentage Interest fell below fifty percent (50%) subsequently increases its Percentage Interest above fifty percent (50%), such Shareholder shall have the right to appoint the General Manager again. The Company shall have a vice general manager (the “**Vice General Manager**”) to be selected by DNP with input from the Board of Directors and Photronics; *provided, however*, that in the case where the General Manager is selected by DNP in accordance with the foregoing, then the Vice General Manager shall be selected by Photronics with input from the Board of Directors and DNP. In the event the General Manager is unable to fulfill his duties as General Manager for any reason (including by reason of serious injury, illness or death), the Vice General Manager will take over the duties of the General Manager but will only do so until the next Board meeting at which time the General Manager will be appointed by Photronics or DNP, as the case may be, in accordance with the foregoing in this Section 5.14.1.

5.14.2 Duties and Powers of the General Manager. The General Manager shall, subject to the control of the Board of Directors, have general supervision, direction and control of the day-to-day affairs of the Company and shall report directly to the Board of Directors. Unless limited by the Board of Directors or this Agreement, he or she shall have the general powers and duties of management usually vested in the office of chief executive officer of corporations and shall have such other powers and duties as may be prescribed by the Board of Directors.

5.14.3 Other Officers; Employment; Removal. The Company may also have a chief financial officer, a secretary and such other officers as determined by the Board of Directors after input from the General Manager and the Vice General Manager, each of whom will be accountable to the General Manager (the General Manager, the Vice General Manager and any other officers elected in accordance with this Section 5.14.3, each, an “Officer” and collectively, the “Officers”). Subject to Section 5.14.1, the General Manager, the Vice General Manager and any other Officer may be removed at any time upon an affirmative vote of the majority of the Board of Directors and the consent of the Shareholder who appoints such Officer in question.

5.14.4 Duties and Powers of Chief Financial Officer. Any chief financial officer of the Company shall keep and maintain, or cause to be kept and maintained, books and records of accounts of the properties and business transactions of the Company, including accounts of its assets, liabilities, receipts, disbursements, gains, losses and capital. He or she shall disburse the funds of the Company as may be ordered by the Board of Directors and shall render to the Board of Directors at their request an account of all his or her transactions as chief financial officer and of the financial condition of the Company. Authorizations with respect to the Company's depositories, disbursement of funds and related banking matters shall be as set forth in resolutions of the Board of Directors.

5.14.5 Duties and Powers of Vice General Manager. The Vice General Manager shall assist the General Manager and shall have such other powers and duties as may be prescribed by the Board of Directors from time to time after consultation with the General Manager and DNP or Photronics, who is entitled to appoint the Vice General Manager at that time. For the avoidance of doubt, the Vice General Manager, if selected by DNP in accordance with Section 5.14.1 above, shall be counted as one of the Two DNP Appointed Seconded Employees (as defined in Section 6.4 below).

5.14.6 Duties and Powers of Secretary.

(a) Any secretary of the Company shall attend all meetings of the Board of Directors and all meetings of the Shareholders and record all votes and the minutes of all proceedings in a book to be kept for that purpose, and shall perform like duties for any standing committees when requested by such committee.

(b) Any secretary of the Company shall keep, or cause to be kept, at the principal executive office or at the office of the Company's transfer agent or registrar, as determined by resolution of the Board of Directors, a register, or a duplicate register, showing the names of all Shareholders and their addresses, Percentage Interests, the number and date of certificates issued for the same (if any), and the number and date of cancellation of every certificate surrendered for cancellation (if any).

5.14.7 General Provisions Regarding Officers.

(a) The Board of Directors may, from time to time, designate Officers of the Company and delegate to such Officers such authority and duties as the Board of Directors may deem advisable and may assign titles (including, without limitation, president, vice-president and/or treasurer) to any such Officer. Unless the Board of Directors otherwise determines, if the title assigned to an Officer of the Company is one commonly used for Officers of a business corporation, then, subject to the terms of this Agreement, the assignment of such title shall constitute the delegation to such Officer of the authority and duties that are customarily associated with such office. Any number of titles may be held by the same Officer.

(b) Any Officer to whom a delegation is made pursuant to the foregoing shall serve in the capacity delegated unless and until such delegation is revoked by the Board of Directors for any reason or no reason whatsoever, with or without cause, or such Officer resigns.

5.15 Management Advisory Committee

The Shareholders will establish a management advisory committee (the “**Management Advisory Committee**”) relating to the following matters:

(a) development of photomask technology roadmap, and establishment and prioritization of goals in the development of photomask technology for future process nodes;

(b) advice to the Board of Directors on matters of strategic importance relative to the Company and those matters requiring formal resolution at the board level, including but not limited to the Company roadmap, Business Plan, Annual Budget, the Additional Contributions (which, in particular, shall be carefully discussed in the Management Advisory Committee), equipment strategy, product strategy and assessment, basic policies on employment, and inputs on the overall health and direction of the Company; and

(c) review and discussion on the relevant matters that require a Supermajority Vote of Shareholders or Directors in accordance with Sections 5.8 and 5.9.

The composition of the Management Advisory Committee shall consist of six (6) members, three (3) members appointed by Photonics and three (3) members appointed by DNP, and such six (6) members may include the General Manager of the Company at the discretion of the appointed Shareholder. The Management Advisory Committee shall convene regular meetings consistent with the number of meetings of the Board of Director provided however the Management Advisory Committee shall generally meet one to three days in advance of the Board of Directors meeting. The Management Advisory Committee shall discuss the matters listed above. The Management Advisory Committee may at its own discretion put forth resolutions and vote on specific matters to be discussed at the subsequent meeting of the Board of Directors, and may also publish minutes of its meetings and submit such minutes to the Board of Directors, provided however that the Management Advisory Committee shall be an advisory capacity only and shall have no power to vote on or make any decisions with respect to any matters reserved to the Board of Directors; though not obligated to act on any input from the Management Advisory Committee, the Board of Directors will in good faith take inputs raised by the Management Advisory Committee into full consideration.

5.16 Non-Disclosure

The parties acknowledge and agree that Section 9 of the Framework Agreement shall be applied for the proprietary or nonpublic information disclosed by one party to another party in connection with this Agreement.

5.17 Maintenance of Insurance

The Company shall at all times be covered by insurance of the types and in the amounts set forth on Schedule E. Such insurance coverage may be provided through the coverage under one or more insurance policies maintained by the Company or by either Shareholder. A certificate of insurance will be provided by the Company to the Shareholders annually evidencing coverage.

5.18 Related Party Agreements

Photronics and DNP agree that (i) any contract, agreement, amendment, arrangement or understanding entered into after the date hereof between any Company Entity on the one hand, and either Shareholder (or any of their respective Affiliates) on the other hand (the “**Related Party Agreement**”), shall be on an arms-length basis; and (ii) Directors appointed by a Shareholder who or whose Affiliate is a party to a Related Party Agreement shall be deemed having a personal interest in such Related Party Agreement and shall refrain from voting on such Related Party Agreement at the relevant board meeting in accordance with the Act.

ARTICLE 6. OPERATIONS

6.1 Headquarters

The Company’s world headquarters shall be in Taiwan.

6.2 Operations Plan; Annual Budget

The initial business plan of the Company will be a combined business plan including synergies and is attached hereto as Schedule H. From time to time, but in no event less frequently than annually, the Board of Directors may amend or update a business plan of the Company (collectively with the initial business plan referred to as the “**Business Plan**”). The Board of Directors will also be responsible for approving an annual budget (the “**Annual Budget**”) on at least an annual basis at the beginning of each fiscal year.

6.3 DPTT Employees

Unless otherwise agreed by Photronics and DNP, on or before thirty (30) calendar days before the completion of the Merger contemplated under the Merger Agreement, all employees of DPTT (other than Seconded Employees) shall be provided with an offer to become employees of the Company from and after the completion of the Merger contemplated under the Merger Agreement, which contain terms consistent with the following: (1) base monthly salary to be at least the same as each employee’s current base monthly salary at DPTT as reported to local authorities, (2) benefits to be substantially similar to benefits adopted by PSMC as of the date hereof, and (3) tenure to be the same as their tenure at DPTT. Before the offers to employees of DPTT are provided in accordance with this Section 6.3, DNP and DPTT shall have an opportunity to review the detailed terms and conditions of the offers to be provided to all of employees of DPTT, so that DNP/DPTT can confirm if such terms and conditions are made consistent with this Section and the Merger Agreement. Other than the employees who expressly deny acceptance of the offer in writing within ten (10) calendar days upon receipt of the offer, all the employees of DPTT (other than Seconded Employees) including their tenure at DPTT as of the date of completion of the Merger contemplated under the Merger Agreement shall be transferred to, and assumed by, the Company upon the completion of the Merger contemplated under the Merger Agreement.

6.4 Company Employees; Seconded Employees

The Company shall employ its own personnel and shall be their exclusive employer. In addition, certain other persons who are employed by a Shareholder or its Affiliates may be assigned by such Shareholder, to work for the Company (“**Seconded Employees**”). During the period of six (6) months from the Effective Date, the Company will pay all remuneration for the Seconded Employee. After the initial six month period from the Effective Date, if the Company decides to retain Seconded Employees, the Company will pay remuneration substantially equal to local pay grade customarily remunerated for their respective positions and DNP shall be responsible for all other remuneration and costs. During the term of this Agreement from the Effective Date, DNP shall have the right to appoint two Seconded Employees to be assigned for the Company (“**Two DNP Appointed Seconded Employees**”), one of the Two DNP Appointed Seconded Employees will be the Vice General Manager selected by DNP in accordance with Section 5.14.1. The Company will pay the Two DNP Appointed Seconded Employees all remuneration for the period of six months from the Effective Date. After the initial six month period, the Company will pay the Two DNP Seconded Employees substantially equal to local pay grade customarily remunerated for their respective positions and DNP shall be responsible for any remuneration and costs in excess of such local pay grade. If the Company does not desire but DNP desires to assign any Seconded Employees (other than the Two DNP Appointed Seconded Employees) to the Company, DNP shall seek the Company’s consent for assigning such Seconded Employees to the Company and the costs for such Seconded Employees shall be solely borne by DNP. Seconded Employees will not be considered employees of the Company but rather will be considered subcontractors of the Company. All Seconded Employees will be subject to stringent confidentiality obligations including executing a confidentiality agreement with the Company. All Seconded Employees will report directly to the General Manager and the Vice General Manager.

6.5 Service Provider Documents

6.5.1 The Company shall have policies applicable to, and ensure that all of its officers, employees and third-party independent contractors, third-party consultants, and other third-party service providers enter into appropriate agreements with respect to, (1) protection of confidential information of the Company, (2) compliance with Applicable Law, and (3) other matters related to the delivery of services to, or employment of such Person by, the Company or its Affiliates. The Company shall have policies applicable to, and ensure that all of its officers and employees enter into appropriate agreements with respect to intellectual property assignment, including invention disclosures, pursuant to which ownership to any intellectual property created in the course of employment with the Company or any of its Affiliates shall be assigned to the Company. The Company shall have policies applicable to, and ensure that all of its third-party independent contractors, third-party consultants, and other third-party service providers that create intellectual property in the course of performing services for the Company, enter into appropriate agreements with the Company with respect to the Company’s ownership of or the Company’s right to use such intellectual property. The forms referred to in this Section 6.5.1 are collectively referred to as the “**Service Provider Documents.**”

6.5.2 Notwithstanding any preceding provisions in this Section 6.5 or elsewhere, no Seconded Employee shall be required to sign any Service Provider Documents, except with respect to acknowledgement of and agreement regarding policies of the Company addressing conduct while performing services at the premises of the Company, such as workplace safety, but excluding matters relating to protection of confidential information of the Company and intellectual property assignment, which issues have been addressed in special Service Provider Documents. The Company shall be responsible for providing such Service Provider Documents, prepared by the Company for each Seconded Employees to the appropriate Seconded Employees, following up to make sure they are signed and for properly storing such forms; and each Shareholder shall cooperate with the Company to require their Seconded Employees to sign such special Service Provider Document when requested to do so by the Company.

6.6 Compensation and Benefits

The Company shall have compensation and benefits programs (including incentive compensation programs) for the employees of the Company (excluding, for this purpose, Seconded Employees) at its locations consistent with local practices, as determined by the Board of Directors or the General Manager, as applicable, and, to the extent required by law or this Agreement, approved by the Board of Directors.

ARTICLE 7. DISPOSITION AND TRANSFERS OF INTERESTS

7.1 Holding of Shares

For so long as Photronics or DNP, directly or indirectly, owns Shares in the Company, Photronics or DNP, as applicable, must own and hold such Shares either (a) by itself or (b) through one or more wholly owned (including indirect wholly owned) subsidiaries.

7.2 Transfer Moratorium

7.2.1 Other than as specifically provided in this Section 7.2, no Shareholder may Transfer all or any portion of its Shares to any other Person without the prior written consent of the other Shareholder, nor shall Photronics or DNP without the prior written consent of the other, directly or indirectly, Transfer its ownership interest in any wholly owned subsidiary (including any indirect wholly owned subsidiary) that owns, directly or indirectly, the Shares held by Photronics or DNP, respectively, in each case other than (i) to a wholly owned (including indirect wholly owned) subsidiary, or (ii) in a Transfer by Photronics in connection with a Change in Control of Photronics, or in a Transfer by DNP in connection with a Change in Control of DNP, as the case may be, in compliance with the terms of Section 7.4 of this Agreement. For the avoidance of doubt, the parties agree that Photronics' or its Affiliate(s)' pledge of the Company's Shares for Photronics' or its Affiliate(s)' loans existing as of the date hereof (including the revolving or renewal of the same or the new loans substitutive therefor) up to 163,969,000 Shares, in aggregate, is not subject to the restrictions under this Section 7.2.1, provided that a change in the ownership of any of such pledged shares as a result of the foreclosure by the pledgor shall constitute a material breach of this Agreement. The parties agree that the Transfer of Shares by a Shareholder in contravention of this Agreement shall be void and, among other matters, constitute a material breach of this Agreement. In the event of any purchase and sale of Shares as permitted under this Section 7.2, the parties thereto shall agree to amend this Agreement accordingly.

7.2.2 Transfer Notice. If any Shareholder proposes to Transfer any of its Shares, whether directly or indirectly (the "Selling Shareholder"), such Selling Shareholder shall promptly provide written notice (the "Transfer Notice") to the other Shareholder (the "Non-Selling Shareholder") describing in reasonable detail the proposed Transfer, including, without limitation, the number of Shares subject to the Transfer, the nature of the Transfer, the identity of the purchaser(s) and transferee(s), the amount and form of consideration to be paid, and the anticipated closing date of the Transfer. The Transfer Notice may be updated from time to time by the Selling Shareholder by a further written notice to the Non-Selling Shareholder. The Non-Selling Shareholder shall also receive any updates to the terms of the proposed Transfer and shall have the right to obtain any information it reasonably requests from time to time in connection with the proposed Transfer.

7.2.3 Right of First Refusal. The Non-Selling Shareholder shall have a right to purchase all of the Shares subject to the proposed Transfer at the same price and upon the terms and conditions specified in the Transfer Notice, by giving a written response notice to the Selling Shareholder within thirty (30) days from the date of receipt of the Transfer Notice (or, if applicable, the date of receipt of the final update to the Transfer Notice). A failure by the Non-Selling Shareholder to provide a response notice within such thirty (30) day period shall be deemed to constitute a decision by such Shareholder not to exercise its right to purchase the Shares subject to the proposed Transfer.

7.2.4 Co-Sale Right. In the event that the Non-Selling Shareholder does not wish to exercise its right of first refusal, the Non-Selling Shareholder shall have the right to participate in the proposed Transfer by selling any or all of its Shares to the proposed purchaser(s) or transferee(s), on the same terms and conditions as specified in the Transfer Notice. Such right to participate shall be exercised by the Non-Selling Shareholder in a written response to the Selling Shareholder within (30) days from the date of receipt of the Transfer Notice (or, if applicable, the date of receipt of the final update to the Transfer Notice), stating the number of Shares of the Non-Selling Shareholder that such Non-Selling Shareholder wishes to sell to the proposed purchaser(s) or transferee(s) (the "Response Shares"). In the event that the proposed purchaser(s) or transferee(s) do not wish to acquire all of the Response Shares, then the Non-Selling Shareholder shall be entitled to sell such number of Shares equal to the Percentage Interest of the Non-Selling Shareholder times the total number of Shares subject to the proposed Transfer.

7.2.5 The sale of all Response Shares and, if applicable, remaining Shares subject to the Transfer Notice, and full payment therefor, shall be completed within thirty (30) days after the anticipated closing date specified in the Transfer Notice (or as updated pursuant to Section 7.2.2 above). In the event that such purchase and sale is not completed within such thirty (30) day period, the Selling Shareholder shall not thereafter sell any Shares without first offering such Shares to the Non-Selling Shareholder in accordance with this Section 7.2.

7.2.6 In the event that the Non-Selling Shareholder does not exercise any right under Section 7.2.3 or 7.2.4 above, the Selling Shareholder may Transfer any of its Shares subject to the Transfer Notice at the same price and upon the terms and conditions specified in the Transfer Notice, provided that the proposed Transfer shall be completed within thirty (30) days after the anticipated closing date specified in the Transfer Notice (or as updated pursuant to Section 7.2.2 above).

7.2.7 The restrictions set forth in this Section 7.2 shall not apply to any Transfers by a Selling Shareholder to one or more of its wholly owned (including indirectly wholly owned) subsidiaries as permitted under Section 7.1.

7.2.8 Notwithstanding anything to the contrary set forth herein, no Transfer shall take place between a Shareholder and any competitor as identified on Schedule J.

7.3 Purchase and Sale of Remaining Interest

7.3.1 If the Percentage Interest of a Shareholder (the “**Minority Shareholder**”) is twenty percent (20%) or less, and remains at or below twenty percent (20%) for more than six (6) consecutive months., the other Shareholder or a wholly owned subsidiary thereof (such other Shareholder or Affiliate thereof, the “**Majority Shareholder**”) shall have the option to purchase all of the remaining Interest of the Minority Shareholder at a purchase price equal to the Minority Closing Price, subject to the terms and conditions set forth below. The Majority Shareholder may exercise this purchase option by delivering a written notice of its intent to exercise to the Minority Shareholder. In addition, the Minority Shareholder shall have the option to sell all of the remaining Interest of the Minority Shareholder to the Majority Shareholder at a purchase price equal to the Minority Closing Price, subject to the terms and conditions set forth below. The Minority Shareholder may exercise this put option by delivering a written notice of its intent to exercise to the Majority Shareholder.

7.3.2 The closing of the purchase and sale of the Minority Shareholder's remaining Interest (the "**Minority Closing**") shall take place as of the last day of the Fiscal Month in which all prior regulatory approvals or clearance have been obtained (unless the last regulatory approvals or clearance is obtained within the last ten (10) days of the end of a Fiscal Month, in which case the Minority Closing shall take place on the last day of the first full Fiscal Month thereafter). Such Minority Closing shall take place at the principal office of the Company or at such other location as the Majority Shareholder and the Minority Shareholder may mutually determine. At the Minority Closing, (i) the Minority Shareholder shall transfer its remaining Interest in the Company to the Majority Shareholder, free and clear of any liens or encumbrances, (ii) the Majority Shareholder shall pay the Minority Shareholder the Minority Closing Price by, at the Majority Shareholder's option, (a) cash, or (b) a combination of cash and publicly traded shares of the Majority Shareholder and/or loans from the Minority Shareholder to the Majority Shareholder; provided that (x) in case of a payment via a combination of cash and publicly traded shares of the Majority Shareholder and/or loans from the Minority Shareholder to the Majority Shareholder, at least thirty percent (30%) of the Minority Closing Price shall be paid by cash (for the avoidance of doubt, the Majority Shareholder will not be required to pay more than thirty percent (30%) of the Minority Closing Price in cash); (y) in case part of the Minority Closing Price will be paid by publicly traded shares of the Majority Shareholder, the value of such share shall be determined on the basis of the closing price of such shares on the trading day immediately prior to the date of the Minority Closing; and (z) in case part of the Minority Closing Price will be paid in the form of loans from the Minority Shareholder to the Majority Shareholder, the detailed terms and conditions of loans (including loan period, currency and applicable interests) will be discussed and agreed upon in writing between the Minority Shareholder and the Majority Shareholder. In the event that the Majority Shareholder desires to make a payment of the Minority Closing Price via a combination of cash and publicly traded shares of the Majority Shareholder and/or loans from the Minority Shareholder to the Majority Shareholder, the Majority Shareholder shall notify the Minority Shareholder of a proposal of payment conditions (including the ratio of each payment option) in its purchase option notice or within thirty (30) calendar days from its receipt of the put option notice from the Minority Shareholder, as applicable, and the parties will discuss and determine the details for payment of the Minority Closing Price. If the Majority Shareholder fails to notify the Minority Shareholder of any proposal within the above-mentioned period, the payment for all the Minority Closing Price shall be made via cash; and (iii) the Minority Shareholder shall deliver to the Majority Shareholder such instrument or instruments of conveyance as the Majority Shareholder reasonably requests. The Majority Shareholder agrees to apply for all applicable regulatory approvals or clearance within thirty (30) days after receipt of such notice of put option from the Minority Shareholder.

7.3.3 Upon the Minority Closing, the Majority Shareholder shall pay to the Minority Shareholder a sum (the “**Minority Closing Price**”) equal to the product of (i) the difference of (a) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the Minority Closing, minus (b) the Net Book Value of all Company Liabilities as of the last day of the Fiscal Month immediately prior to the Minority Closing, and (ii) the Percentage Interest of the Minority Shareholder at the time the option provided for in Section 7.3.1 is exercised. The Minority Closing Price shall be paid by wire transfer of cash, loans from the Minority Shareholder to the Majority Shareholder, and/or delivering publicly traded shares of the Majority Shareholder, as applicable.

7.4 Change in Control

7.4.1 The parties will provide at least sixty (60) days but no more than one hundred eighty (180) days notice (the “**Change in Control Notice**”) to the other Party of such proposed Change in Control; *provided*, that if such Change in Control is in connection with an unsolicited tender offer or proxy contest, then the parties will provide notice to the other party of such proposed Change in Control as promptly as practicable but in no event less than two (2) Business Days following the commencement of such tender offer or the notice to the Change in Control Party (defined in Section 7.4.2 below) of such proxy contest.

7.4.2 If Change in Control occurs to Photonics or DNP (respectively, the “**Change in Control Party**”), the other Shareholder (the “**Change in Control Purchaser**”) will have the right to purchase all of Shares of Change in Control Party at a cash purchase price equal to the Change in Control Closing Price, subject to the terms and conditions set forth below. The Change in Control Purchaser may exercise this purchase option by delivering a written notice of its intent to exercise to the Change in Control Party. This notice shall be provided no later than twenty-one (21) days following the Change in Control Purchaser’s receipt of the Change in Control Notice. The closing of the Change in Control Purchaser’s acquisition of the Shares of the Change in Control Party (the “**Change in Control Closing**”) shall take place on the later of: (i) on the date of Change in Control simultaneously with such Change in Control, or (ii) within three (3) Business Days from all necessary approval from Governmental Authority for Change in Control Closing has been obtained. Such Change in Control Closing shall take place at the principal office of the Company or at such other location as the Shareholders may mutually determine. At the Change in Control Closing, the Change in Control Party shall transfer its Shares in the Company to the Change in Control Purchaser, free and clear of any liens or encumbrances, and the Change in Control Purchaser shall pay the Change in Control Closing Price by wire transfer of cash to the Change in Control Party. At the Change in Control Closing, the Change in Control Party shall deliver to the Change in Control Purchaser such instrument or instruments of conveyance as the Change in Control Purchaser reasonably requests.

7.4.3 Upon the Change in Control Closing, the Change in Control Purchaser shall pay to the Change in Control Party, a sum equal to the product of (i) the difference of (a) the Net Book Value of the Company Assets recorded in the latest available financial statement of the Company of the Fiscal Month prior to the Change in Control Closing, minus (b) the Net Book Value of the Company Liabilities recorded in the latest available financial statement of the Company of the Fiscal Month immediately prior to the Change in Control Closing, and (ii) the Percentage Interest of the Change in Control Party at the time the option provided for in Section 7.4.2 is exercised. The price paid to the Change in Control Purchaser shall be referred to herein as the “**Change in Control Closing Price**”.

7.5 Purchase and Sale Agreement

In the event of any purchase and sale of Shares under Section 7.3 or 7.4, the parties thereto shall enter into a commercially reasonable agreement to implement such purchase and sale. The parties thereto shall also make the necessary amendments to this Agreement.

ARTICLE 8. [INTENTIONALLY DELETED]

ARTICLE 9.

TERM AND TERMINATION OF THIS AGREEMENT

9.1 Term of this Agreement

9.1.1 This Agreement shall enter into force as of the Effective Date, and remain in force throughout the duration of the Company if not terminated earlier as provided for in Section 9.1.2 or 9.2.1.

9.1.2 In the event that one of the Parties ceases to be Shareholder of the Company for any reason, this Agreement is automatically terminated.

9.2 Termination and Cross-termination

9.2.1 Notwithstanding Section 9.1, this Agreement may be terminated by either party at any time, upon notice given to the other party:

(a) in the event of a material breach of this Agreement by such other party, which such other party has failed to effectively remedy within sixty (60) days of the notice issued by the non-breaching party;

(b) in the event of the liquidation or winding up (whether voluntary or involuntary), bankruptcy, insolvency, moratorium, composition or subjection to other insolvency or quasi-insolvency procedure (whether or not judicially supervised), of or with respect to such other party, or the filing by such other party of an application with a view to being admitted or subjected to any such or other similar procedure or status, or the entering by such other party into voluntary negotiations with its creditors, or the conclusion between such other party and its creditors of voluntarily rescheduling or composition arrangements, in any jurisdiction;

(c) in the event of the acquisition by the Government of control, requisitioning or commandeering in any jurisdiction of such other party, or of all or substantially all of such other party's business or assets; or

(d) in the event of such other party discontinuing, or being permanently or durably prevented or prohibited from continuing, its business or activities in any jurisdiction.

9.2.2 The parties agree that:

(a) the termination of this Agreement shall not (unless otherwise specified in the Transaction Documents concerned) produce the automatic cross-termination of any of the Transaction Documents;

(b) the termination of any of the Transaction Documents shall not produce the automatic cross-termination of this Agreement;

(c) the party who terminates this Agreement in accordance with Section 9.2.1 above shall have the right to terminate any or all of the Transaction Documents, to which it is a party without any liability;

(d) the termination of this Agreement shall not affect the respective rights and obligations of the parties having accrued prior thereto, under this Agreement; and

(e) the termination rights, remedies and provisions arising from Applicable Laws shall, to the extent not waived or excluded hereby, cumulate with those specified under this Section 9.2.1.

9.3 Right of Terminating Party

The parties agree that the party who terminates this Agreement in accordance with Section 9.2.1 (the "**Terminating Party**") shall have the right:

(a) to claim against the other party (i) compensation for losses of the Terminating Party arising from the event listed in Section 9.2.1 and/or the termination in accordance with Section 9.2.1; and (ii) reimbursement in the amount equal to the Company's loss arising from the event listed in Section 9.2.1 and/or the termination in accordance with Section 9.2.1 multiplied by the Terminating Party's Percentage Interest; and

(b) by giving the notice to the other party within thirty (30) days of termination of this Agreement, to (i) sell all of its Shares to the other Party at the price of (x) a sum equal to the product of (i) the difference of (a) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the termination, minus (b) the Net Book Value of the Company Liabilities as of the last day of the Fiscal Month immediately prior to the termination, and (ii) the Percentage Interest of the Terminating Party at the time the termination or (y) the Terminating Party's book value of the Shares, whichever is higher, or (ii) purchase all of the other party's Shares, at the price of (x) a sum equal to the product of (i) the difference of (a) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the termination, minus (b) the Net Book Value of the Company Liabilities as of the last day of the Fiscal Month immediately prior to the termination, and (ii) the Percentage Interest of the other party at the time the termination or (y) the other party's book value of the Shares, whichever is lower. At the closing of the purchase of the Shares under this Section 9.3(b), (i) the selling Shareholder shall transfer its remaining Interest in the Company to the purchasing Shareholder, free and clear of any liens or encumbrances, (ii) the purchasing Shareholder shall pay the price calculated in accordance with the above by wire transfer of cash and (iii) the selling Shareholder shall deliver to the purchasing Shareholder such instrument or instruments of conveyance as the purchasing Shareholder reasonably requests. The purchasing Shareholder agrees to apply for all applicable regulatory approvals or clearance within thirty (30) days after receipt of such notice from the Terminating Party. - The closing of the purchase of the Shares under this Section 9.3(b) shall take place on the date specified by the Terminating Party after all applicable regulatory approvals and clearances have been obtained.

ARTICLE 10.
DISSOLUTION, LIQUIDATION, AND TERMINATION OF THE COMPANY

10.1 Limitations

The Company may be dissolved, liquidated, and terminated only pursuant to the provisions of this Article 10, and the parties hereto do hereby irrevocably waive, to the extent permitted by Applicable Law, any and all other rights they may have to cause a dissolution, liquidation or termination of the Company or a sale or partition of any or all of the Company Assets in connection with such dissolution or liquidation.

10.2 Exclusive Causes

Notwithstanding the Act, the following and only the following events shall cause the Company to be dissolved, liquidated, and terminated (each a "**Liquidating Event**"), unless otherwise set forth in this Agreement:

- (a) the election of all of the Shareholders;
- (b) the order or judgment of competent Governmental Authority in accordance with the Act or other Applicable Law;
- (c) any Shareholder's election, if the Company ceases operation for more than six (6) months due to Force Majeure;

(d) the occurrence of any other event that, under the Act or other Applicable Law, makes it unlawful, impossible or impractical to carry on the Business of the Company;

(e) the election by either Shareholder to dissolve and wind up the affairs of the Company upon (a) the occurrence of a bankruptcy of the Company, *provided* that the Shareholder making such election is not in default of any payment obligation to the Company or (b) the bankruptcy, dissolution or liquidation of a Shareholder, and *further provided* that, in either event, such election shall be made only after entry by the court presiding over the bankruptcy of an order granting relief from the automatic stay to make such election to the Shareholder making such election; or

(f) the election by a Shareholder to dissolve and wind up the affairs of the Company if the other undergoes a Change in Control, which election such electing Shareholder shall make in the event it purchases the Shares of Change in Control Party pursuant to Section 7.4.

To the fullest extent permitted by law, any dissolution of the Company other than as provided in this Section 10.2 shall be a dissolution in contravention of this Agreement.

10.3 Effect of Dissolution

The dissolution of the Company shall be effective on the day on which the event occurs giving rise to the dissolution (or, if a corporate action of the Company is required by the Act, on the day such corporate action is duly taken), but the Company shall not terminate until it has been wound up and its assets have been distributed as provided in Section 10.5.1 or 11.1 of this Agreement. Notwithstanding the dissolution of the Company, prior to the termination of the Company, the business of the Company and the affairs of the Shareholders, as such, shall continue to be governed by this Agreement.

10.4 Loss of the Company

In the event that the accumulated losses of the Company exceed one-third (1/3) of its net equity immediately after the completion of the Merger contemplated under the Merger Agreement, the amount of which is expected to be approximately NT\$7,000,000,000, for a period of nine (9) months, the Shareholders shall discuss in good faith a plan to recover such losses (the “**Recovery Plan**”). If the Shareholders agree on the Recovery Plan, the Shareholders shall cooperate to carry out such measure(s). If the Shareholders do not agree on the Recovery Plan within ninety (90) days from the end of the aforementioned nine-month period (the “**Recovery Discussion Period**”), or, if applicable, the accumulated losses of the Company do not fall below one-third (1/3) of its net equity set forth above for a period of twelve (12) months after commencement of carrying out the agreed Recovery Plan (the “**Recovery Plan Period**”), a Shareholder whose Percentage Interests are less than fifty percent (50%) (the “**Requesting Shareholder**”) may request, by giving a written notice (the “**Dissolution Notice**”) within thirty (30) days (“**Dissolution Notice Period**”) after the expiration of the Recovery Discussion Period or the Recovery Plan Period, as applicable, the other party to agree to dissolve and liquidate the Company via a shareholder meeting conducted within ninety (90) days after receipt of such written notice. In the event that the other party (the “**Remaining Shareholder**”) does not agree to dissolve and liquidate the Company for any reason, the Requesting Shareholder may exercise a put option to sell all of its Shares to the Remaining Shareholder at the price equal to the Minority Closing Price by delivering a six-month prior written notice before the closing of such sale in accordance with the option procedures set forth in Sections 7.3.2 and 7.3.3.

10.5 Liquidation

10.5.1 Upon dissolution of the Company, the Board of Directors (or other Person(s) designated by a decree of court) shall act as the “**Liquidators**” of the Company. The Liquidators shall liquidate the Company Assets, and shall apply and distribute the proceeds thereof as follows unless otherwise provided by the Applicable Law:

(a) first, to (i) the payment of the obligations of the Company to third parties, including, but not limited to and on a *pari passu* basis, taxes, debts, lease and other payments to Persons other than Shareholders or their Affiliates; (ii) the expenses of liquidation; and (iii) the setting up of any reserves for contingencies, debts or liabilities to Persons other than the Shareholders or their Affiliates, whether the whereabouts of the creditor is known or unknown, which the Board of Directors may consider necessary;

(b) thereafter, amounts due to either Shareholder or their respective Affiliates (other than a Company Entity) pursuant to the relevant agreements entered into by them with the Company; and

(c) thereafter, to the Shareholders in proportion to their Percentage Interests.

10.5.2 Notwithstanding Section 10.5.1 of this Agreement, in the event that the Board of Directors determines that an immediate sale of all or any portion of the Company Assets would cause undue loss to the Shareholders, the Board of Directors, in order to avoid such loss to the extent not then prohibited by the Act, may either defer liquidation of and withhold from distribution for a reasonable time any Company Assets except those necessary to satisfy the Company’s debts and obligations, or, subject to Section 11.4, distribute the Company Assets to the Shareholders in kind (in accordance with the Applicable Law).

10.6 Dissolution

Where the Requesting Shareholder is entitled to give the Dissolution Notice according to Section 10.4 but it does not give the Dissolution Notice within the Dissolution Notice Period, and the Remaining Shareholder thereafter desires to dissolve and liquidate the Company and notifies the Requesting Shareholder of the same within ninety (90) days from the expiration of the Dissolution Notice Period, the Requesting Shareholder shall agree to the Remaining Shareholder’s proposal to dissolve and liquidate the Company in accordance with Section 10.5 and shall take all relevant actions to achieve such purpose.

**ARTICLE 11.
DISTRIBUTIONS**

11.1 Use of Cash

Subject to applicable legal and contractual restrictions and to Section 11.2 and Article 10, Company cash will be treated as follows (in the following order of priority):

(a) *First*, cash will be retained in the Company in an amount sufficient to fund the Company's operations. Such amount will take into consideration other payments to third parties and payments of amounts due to either Shareholder or their respective Affiliates pursuant to the relevant agreements entered into by them with the Company; and

(b) *Second*, subject to the approval of the Board of Directors any excess cash remaining will be distributed to Shareholders *pro rata* based on their Percentage Interests at the time of such distribution in accordance with the Articles of Incorporation of the Company and the Act or any distribution of the legal reserve or capital reserve under the Act.

11.2 Distributions Upon Liquidation

Distributions made in conjunction with the final liquidation of the Company shall be applied or distributed as provided in Article 10 hereof.

11.3 Withholding

The Company may withhold amounts in respect of allocations or distributions if it is required to do so by any Applicable Law, and each Shareholder hereby authorizes the Company to withhold from or pay on behalf of or with respect to such Shareholder such amount of federal, state, local or foreign taxes that the chief finance officer of the Company determines the Company is required to withhold or pay with respect to any amount distributable or allocable to such Shareholder pursuant to this Agreement, *provided* that the Company shall provide a Shareholder with ten (10) Business Days advance written notice of the amount of any withholding to be made in respect of allocations or distributions to such Shareholder (or any Affiliate of such Shareholder) which notice shall demonstrate the calculation thereof. Any amounts withheld pursuant to this Section 11.3 shall be treated as having been distributed to such Shareholder. Each Shareholder will from time to time provide such other forms or documents as may reasonably be required in order to establish the status of such Shareholder for purposes of the tax laws of any applicable jurisdiction. Each Shareholder agrees to indemnify and hold harmless the Company from any liability imposed on the Company for any action taken by the Company in reliance upon such representation of tax withholding status. A Shareholder's obligations hereunder shall survive the dissolution, liquidation or winding up of the Company. If a Governmental Authority asserts in writing to any Person that the Company failed to withhold Tax at the time and/or in the amounts required by Applicable Laws in respect of a Shareholder and/or its Affiliates, then such Shareholder and/or its Affiliates, as applicable, shall promptly upon receipt of a copy of such writing accompanied by a written notice from the Company specifying that a payment is required pursuant to this Section 11.3 pay to such Governmental Authority an amount in full satisfaction of the amount of Taxes so asserted by such Governmental Authority. If such Shareholder and its Affiliates do not promptly pay such amount to such Governmental Authority, then, unless such Shareholder provides satisfactory written evidence of settlement in full of the matter asserted by the Governmental Authority, the Company shall withhold such amount from the next distribution(s) to such Shareholder, shall promptly pay such withheld amounts over to such Governmental Authority in payment of such asserted liability for Taxes and shall treat the amounts so withheld and paid over as actually distributed to such Shareholder.

11.4 Distributions in Kind

Subject to Section 11.1, no right is given to any Shareholder to demand or receive any distribution of property other than cash as provided in this Agreement. Upon a vote of the Board of Directors and a Supermajority Vote of Shareholders, the Board of Directors may determine (subject to the approval of the Supermajority Vote of Shareholders) to make a distribution in kind of Company Assets to the Shareholders, and such Company Assets shall be distributed in such fashion as to ensure that the fair market value thereof (as determined by the Board of Directors and approved by the Supermajority Vote of Shareholders) is distributed, and any items of gain or loss resulting from such distribution are allocated, in accordance with this Article 11 and Applicable Laws .

11.5 Limitations on Distributions

Notwithstanding any provision to the contrary contained in this Agreement, neither the Company nor the Board of Directors, on behalf of the Company, shall be required to or shall knowingly make a distribution to any Shareholder or the holder of any Economic Interest on account of its Shares in the Company (as applicable) in violation of the Act or other Applicable Law.

ARTICLE 12. MISCELLANEOUS

12.1 Amendments

Any provision of this Agreement may be amended if, and only if, such amendment is in writing and is duly executed by each Shareholder, provided however this Agreement will be amended to allow Photronics to implement an Accounting Amendment in accordance with Section 1.6. Upon the making of any amendment to this Agreement in accordance with the previous sentence, the Board of Directors shall prepare and file such documents and certificates as may be required under the Act and under any other Applicable Law.

12.2 No Waiver

Any provision of this Agreement may be waived if, and only if, such waiver is in writing and is duly executed by the party against whom the waiver is to be enforced. No failure or delay by any party in exercising any right, power or privilege under this Agreement shall operate as a waiver thereof nor shall any single or partial waiver or exercise thereof preclude the enforcement of any other right, power or privilege nor deemed to extend to any prior or subsequent default, breach or occurrence or affect, in any way, any rights arising by such prior or subsequent default, breach or occurrence.

12.3 Entire Agreement

This Agreement, together with the Schedules and other documents referred to herein and therein, constitute the entire agreement between the parties hereto pertaining to the subject matter hereof, and supersede any and all prior oral and written, and all contemporaneous oral, agreements or understandings pertaining thereto including the Memorandum of Understanding dated April 2, 2013 between Photonics and DNP. There are no agreements, understandings, restrictions, warranties or representations relating to such subject matter among the parties other than those set forth herein and in the Schedules and other documents referred to herein and therein.

12.4 Further Assurances

Each of the parties hereto does hereby covenant and agree on behalf of itself, its successors and its assigns, without further consideration, to prepare, execute, acknowledge, file, record, publish, and deliver such other instruments, documents and statements, and to take such other action as may be required by law or reasonably necessary or advisable to effectively carry out the purposes of this Agreement.

12.5 Notices

Unless otherwise provided herein, all notices, requests, instructions or consents required or permitted under this Agreement shall be in writing and will be deemed given: (a) when delivered personally; (b) when sent by confirmed facsimile and followed up by delivery by overnight carrier under Clause (d) below; (c) ten (10) Business Days after having been sent by registered or certified mail, return receipt requested, postage prepaid; or (d) three (3) Business Days after deposit with an internationally recognized commercial overnight carrier specifying next-day delivery, with written verification of receipt. All communications will be sent to the addresses, email account or facsimile number listed on Schedule C (or to such other address, email account or facsimile number as may be designated by a party giving written notice to the other parties pursuant to this Section 12.5).

12.6 Governing Law

All questions concerning the construction, interpretation and validity of this Agreement and all claims or causes of action (whether in contract or tort) that may be based upon, arise out of or relate to this Agreement or the negotiation, execution or performance of this Agreement will be governed by and construed in accordance with the laws of Taiwan (without reference to any choice or conflicts of laws rules or principles that would require the application of the laws of any other jurisdiction).

12.7 Construction; Interpretation

12.7.1 Certain Terms. The words “hereof,” “herein,” “hereto,” “hereunder” and similar words refer to this Agreement as a whole and not to any particular provision of this Agreement. The term “including” or “includes” is not limited and means “including, or includes, without limitation.”

12.7.2 Section References; Titles and Subtitles. Unless otherwise noted, all references to Sections and Schedules herein are to Sections and Schedules of this Agreement. The titles, captions and headings of this Agreement are inserted for convenience of reference only and are not intended to be a part of or to affect the meaning or interpretation of this Agreement.

12.7.3 Reference to Persons, Agreements, Statutes. Unless otherwise expressly provided herein, (i) references to a Person include its successors and permitted assigns, (ii) references to agreements (including this Agreement) and other contractual instruments shall be deemed to include all subsequent amendments, restatements and other modifications thereto or supplements thereof and (iii) references to any statute or regulation are to be construed as including all statutory and regulatory provisions consolidating, amending, replacing, supplementing or interpreting such statute or regulation.

12.7.4. Presumptions. No party, nor its counsel, shall be deemed the drafter of this Agreement for purposes of construing the provisions of this Agreement, and all provisions of this Agreement shall be construed in accordance with their fair meaning, and not strictly for or against any party.

12.8 Rights and Remedies Cumulative

The rights and remedies provided by this Agreement are cumulative and the use of any one right or remedy by any party shall not preclude or waive its right to use any or all other remedies. Said rights and remedies are given in addition to any other rights the parties may have by law, statute, ordinance or otherwise.

12.9 No Assignment; Binding Effect

Except as otherwise expressly provided herein, no party may assign, delegate or otherwise transfer any of its rights or obligations hereunder to any third party, whether by assignment, transfer, Change in Control or other means, without the prior written consent of each other party. Any attempted assignment in violation of the foregoing shall be null and void. Subject to the foregoing, this Agreement shall be binding on and inure to the benefit of the Shareholders, their heirs, executors, administrators, successors and all other Persons hereafter holding, having or receiving an interest in the Company.

12.10 Severability

If any provision in this Agreement will be found or be held to be invalid or unenforceable, then the meaning of said provision will be construed, to the extent feasible, so as to render the provision enforceable, and if no feasible interpretation would save such provision, it will be severed from the remainder of this Agreement which will remain in full force and effect unless the severed provision is essential and material to the rights or benefits received by any party. In such event, the parties will use their respective best efforts to negotiate, in good faith, a substitute, valid and enforceable provision or agreement which most nearly reflects the parties’ intent in entering into this Agreement.

12.11 Counterparts

This Agreement may be executed in counterparts, each of which so executed will be deemed to be an original and such counterparts together will constitute one and the same agreement. Execution and delivery of this Agreement by exchange of facsimile copies or PDF file bearing the facsimile signature of a party shall constitute a valid and binding execution and delivery of this Agreement by such party.

12.12 Dispute Resolution; Arbitration

The parties hereby agree that any and all claims, disputes or controversies of whatever nature, arising out of, in connection with, or in relation to the interpretation, performance, enforcement, breach, termination or validity of this Agreement, shall be first raised in writing to the senior executive officers of each of the parties for discussion and attempt at resolution in good faith among such senior executive officers. If within thirty (30) days (or such shorter time if emergency or exigent circumstances exist) of first raising the issue to the senior executive officers, the parties are unable to reach a mutually agreed resolution, then the parties hereby agree that such claims, disputes or controversies shall be resolved by a binding arbitration, to be held in Taipei at the ROC Arbitration Association (“Association”), under the ROC Arbitration Law and the Arbitration Rules of the ROC Arbitration Association. Each party shall bear its own expenses incurred in connection with arbitration and the fees and expenses of the arbitrator shall be shared equally by the parties involved in the dispute and advanced by them from time to time as required. The arbitrator shall render its final award within six (6) months, subject to extension by the arbitrator upon substantial justification shown of extraordinary circumstances, following conclusion of the hearing and any required post-hearing briefing or other proceedings ordered by the arbitrator. Any discovery in connection with such arbitration hereunder shall be limited to information directly relevant to the controversy or claim in arbitration. The arbitrator will state the factual and legal basis for the award. To the extent not amended or overturned by appeal to a court of competent jurisdiction pursuant to the Arbitration Law of Taiwan, the decision of the arbitrator in any such proceeding will be final and binding and not subject to judicial review and final judgment may be entered upon such an award in any court of competent jurisdiction, but entry of such judgment will not be required to make such award effective. The parties agree that the arbitration proceedings and decisions shall be kept confidential and that any information or documents, including any pleadings or submissions exchanged or produced in such arbitration (including, but not limited to briefs, or other documents submitted or exchanged, any testimony or other oral submissions, and any awards) shall not be disclosed beyond the arbitrator, the Association, the parties, their counsel and any Person necessary to conduct the arbitration, except as may be required in recognition and enforcement proceedings or otherwise permitted under Section 9.1 of Framework Agreement. The parties hereby irrevocably waive, to the fullest extent permitted by Applicable Law, any objection which they may now or hereafter have to the laying of venue of any action brought for enforcement of such arbitration clause or any award resulting from arbitration pursuant to this Section 12.12 or any defense of inconvenient forum for the maintenance of any such action. Each of the parties hereto agrees that an arbitration award in any such action may be enforced in other jurisdictions by suit on the arbitration award or in any other manner provided by Applicable Law. The parties agree that the arbitration proceeding described in this Section 12.12 is the sole and exclusive manner in which the parties may resolve disputes arising out of or in connection with this Agreement; provided that the parties expressly agree that nothing in this Agreement shall prevent the parties from applying to a court having jurisdiction over any of the parties to this Agreement for the limited purpose of obtaining temporary and provisional or injunctive relief necessary solely to preserve the status quo or otherwise to prevent irreparable harm to a party pending the outcome of arbitration. The parties agree that all arbitration proceeding described in this Section 12.12 shall be conducted in English with English speaking lawyer(s) and arbitrator(s), and that the number of arbitrator(s) required at such proceeding shall be: (a) one (1) arbitrator in the event that the disputed amount is less than NT\$100,000,000, or (b) three (3) arbitrators in the event that the disputed amount is equal to or greater than NT\$100,000,000.

12.13 Third-Party Beneficiaries

None of the provisions of this Agreement shall be for the benefit of or be enforceable by any creditor of the Company or by any third-party creditor of any Shareholder. This Agreement is- not intended to confer any rights or remedies hereunder upon, and shall--not be enforceable by, any Person other than the parties hereto, their respective successors and permitted assigns and, solely with respect to the provision of Section 5.13, each Indemnitee and each other indemnified Person addressed therein.

12.14 Specific Performance

The parties agree that irreparable damage will result if this Agreement is not performed in accordance with its terms, and the parties agree that any damages available at law for a breach of this Agreement would not be an adequate remedy. Therefore, the provisions hereof and the obligations of the parties hereunder shall be enforceable in a court or other tribunal with jurisdiction, by a decree of specific performance, and appropriate injunctive relief may be applied for an granted in connection therewith. Such remedies and all other remedies provided for in this Agreement shall, however, be cumulative and not exclusive and shall be in addition to any other remedies that a party may have under this Agreement in accordance with Applicable Laws.

12.15 Consequential Damages

No party shall be liable to any other party under any legal theory for indirect, special, incidental, consequential or punitive damages, or any damages for loss of profits, revenue or business or damage to reputation or goodwill, even if such party has been advised of the possibility of such damages (it being understood that consequential damages arising from the breach of the confidentiality restrictions set forth in Section 5.16 shall not be considered to fall within any such category of damages).

12.16 Fees and Expenses

Except as otherwise expressly provided in this Agreement and to the extent that the Company pay fees and expenses of the Shareholders, each party hereto shall bear its own fees and expenses incurred in connection with this Agreement, the Transaction Documents and the transactions contemplated hereby and thereby, including the legal, accounting and due diligence fees, costs and expenses incurred by such party.

(Signature Page Follows)

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

SHAREHOLDERS

PHOTRONICS, INC.

By: /s/ Constantine Macricostas
Name: Constantine Macricostas
Title: Chairman and Chief Executive Officer
11/20/13

DAI NIPPON PRINTING CO., LTD.

By: /s/ Koichi Takanami
Name: Koichi Takanami
Title: Executive Vice President
11/20/2013

SCHEDULES A-1 and A-2

List of Transaction Documents

SCHEDULE A-1

Framework Agreement
Outsourcing Agreement
License Agreement by and between Photonics and the Company
License Agreement by and between DNP and the Company

SCHEDULE A-2

Merger Agreement

SCHEDULE B

Overseas Customers

Overseas Customers of DPTT

United Microelectronics Corporation (Singapore Branch)
Global Foundries Singapore Pte. Ltd.
Hejian Technology (Suzhou) Co., Ltd.
Shanghai Hua Hong Grace Semiconductor Manufacturing Corp.
Wuhan Xinxin Semiconductor Manufacturing Corporation
Texas Instruments Semiconductor Manufacturing (Chengdu) Co., Ltd.
Semiconductor Manufacturing International (Beijing) Corporation
Semiconductor Manufacturing International (Shanghai) Corporation
Sinochip Semiconductors Co., Ltd
Dai Nippon Printing Co., Ltd.
DNP America, LLC

Overseas Customers of PSMC

PHOTRONICS - NEUCHATEL

ABB SWITZERLAND LTD

ARK PIONEER MICROELECTRONICS(SHENZH

VeriSilicon (Hong Kong) Limited

CHIPMOS TECHNOLOGY (SHANG HAI) LTD

NEW VISION MICROELECTRONICS

SHANGHAI SICOMM RF TECHNOLOGY INC HANGZHOU GUOXIN SCIENCE AND TECHNOL

HE JIAN TECHNOLOGY (SUZHOU) CO LTD.

SHANGHAI MICROELECTRONICS EQUIPMENT CHIPMORE TECHNOLOGY CORPORATION LIM

ON BRIGHT ELECTRONICS

WALES TECHNOLOGY INTERNATIONAL LTD

EUREKA

JINGCHENG MICROELECTRONICS CO

ERALANE SEMICONDUCTOR

SONIX TECHNOLOGY CO LTD

Hangzhou Silergy Semiconductor Tech

APPOTECH LIMITED

MAINLAND TECHNOLOGY CO LTD

HUAYA MICROELECTRONICS

Skysilicon Co., Ltd.

CITRUS COM

XINTONG

FocalTech Systems

XIAN INNUOVO MICROELECTRONIC CO LTD

JINTEK

Shanghai Hua Hong Grace Semiconduct

MICROCOMP LIMITED

GENITOP RESEARCH CO LTD

Shanghai Hua Hong Grace Semiconduct

XIAN NATIONAL IC DESIGN

GO2SILICON (SHANGHAI) C LTD

BEKEN CORPORATION

BYD MICROELECTRONICS CO LTD

REAL CHIP MICROELECTRONICS (HK) CO

SHANGHAI MICROELECTRONICS EQUIPMENT

GREENASIA SEMICONDUCTOR CORP LTD

EIFFEL INTERNATIONAL COMPANY LIMITE

HANGZHOU LION MICROELECTRONICS CO L

JILIN FOSPIX TECHNOLOGIES LTD INC

XI'AN TOLL MICROELECTRONICS CO LTD

CSMC TECHNOLOGIES CORPORATION

SOUTHIC

Power Mos Microelectronics Limited

XUAN YAN ELECTRONICS LTD

SHENZHEN CYT OPTO ELECTRONIC TECHNOL

SHENZHEN XIANGONG INTEGRATED CIRCUI

Wuxi Nengzhi Technology Co Ltd

SHENZHEN INDREAMCHIP ELECTRONIC TEC

TITAN MICRO ELECTRONICS CO LTD

DALIAN PINSEMI TECHNOLOGY CO LTD

SHENZHEN CHIPSEA TECHNOLOGIES CO LT

SHANGHAI HUAHONG ELECTRONICS IMPORT

TSMC CHINA COMPANY LIMITED

XD SEMICONDUCTOR INT'L GROUP (HK) L

GUANGZHOU ON-BRIGHT ELECTRONICS CO

ADVANCED SEMICONDUCTOR MFG CORP OF

SHENZHEN LXMICRO TECHNOLOGY CO LTD

SEMICONDUCTOR MANUFACTURING INTERNA

FOUNDER MICROELECTRONICS INTERNATIO

SHENZHEN LII SEMICONDUCTOR DEVICES

YSPRING TECHNOLOGY CO LTD

ETA SOLUTIONS INC LIMITED

INTERNATIONAL ONIZUKA ELECTRONICS L

CHILINK SEMI

OPICORE TECHNOLOGY CO LIMITED

HANGZHOU SILAN MICROELECTRONICS CO

CHIPWING

VISA SEMICONDUCTOR LIMITED

HENG CHANG TONG

SUZHOU WINSEE MEDICAL ELECTRONICS C

CRMICRO

HONGKONG SOLIDIC TECHNOLOGY LIMITED

HOLTEK SEMICONDUCTORS (CHINA) INC

SEAWARD ELECTRONICS INC

CHINA RESOURCES MICROELECTRONICS LT

MESTAR TECHNOLOGY LIMITED

SHANGHAI HUAHONG ZEALCORE ELECTRONI

ABM INC ASIA PSCIFIC LIMITED

UNION SEMICONDUCTOR CORPORATION

NEWFIELD TECHNOLOGY CO LTD

WEL-TRY TECHNOLOGY CORP

GENESIS SYSTECH LIMITED

REHANDER TECHNOLOGY LIMITED

BEIJING SEMICOAST SCIENCE & TECHNOL

ADMTEK

PHOTRONICS MZD GMBH

PHOTRONICS UK LTD

PHOTRONICS WALES

EXCEL POWER TECHNOLOGY LIMITED

SINO WEALTH

SOLOMON SYSTECH LIMITED

PARADE TECHNOLOGIES INC

TOWER SEMICONDUCTOR LTD

SAIFUN SEMICONDUCTORS LTD.

APTINA IMAGING

UNITED MICROELECTRONICS CORP. (JAPA

RICOH COMPANY LTD

TOSHIBA CORPORATION

PHOTRONICS - JAPAN

TEXAS INSTRUMENTS JAPAN LTD

LAPIS SEMICONDUCTOR MIYAZAKI CO LTD

STEADY DESIGN LTD

ROHM CO LTD

SANYO SEMICONDUCTOR CO LTD

HYNIX SEMICONDUCTOR

TERACHIPS INC

PHOTRONICS PKL

AIMS

SILICONHARMONY

FORTEMEDIA, INC

SILTERRA MALAYSIA SDN BHD

M-MOS SEMICONDUCTOR SDN BHD

SPIREA

UNITED MICROELECTRONICS CORP. (UMC-

MEDIA TEK SINGAPORE PTE LTD

PHOTRONICS SINGAPORE PTE LTD

AFPD PTE LTD

Silicon Craft Technology Co., Ltd.

HAN WEN TECHNOLOGY CO LTD

SENSOR PLATFORMS

UNAXIS USA, INC.

ATMEL CORPORATION

ALTIERRE CORPORATION

INTELLON CORPORATION

ERIDE INC

LEADIS TECH

ON SEMICONDUCTOR

XILINX

CIRRUS LOGIC, INC.

MAXPOWER SEMICONDUCTOR

PHOTRONICS NCO

MOSYS INC

ADVANCED ANALOGIC TECHNOLOGIES, INC

PHOTRONICS BROOKFIELD

PHOTRONICS - ALLEN

ZILOG, INC.

PHOTRONICS - AUSTIN

PARAMA NETWORKS, INC.

ACCOUSTIC TECHNOLOGIES, INC.

PROGRAMMABLE SILICON SOLUTIONS

TRIDENT TECHNOLOGIES

SILICON WAVE, INC.

RISE TECHNOLOGY COMPANY

NEXFLASH TECHNOLOGIES, INC.

COMTECH AHA CORPORATION

MEDIA Q, INC.

TRIPATH TECHNOLOGY INC.

TRISCEND

JAALAA, INC.

GLOBALCAD INCORPORATED

MARVELL SEMICONDUCTOR, INC.

NVIDIA CORPORATION

MAXLINEAR, INC.

MEDIAWORKS INTEGRATED SYSTEMS, INC.

PHOTRONICS BOISE

INTERSIL CORP

SHOESTRING INTEGRATED CIRCUITS INC

SCHEDULE C

Shareholders and Percentage Interest
(as of completion of Merger)

Shareholder	Percentage Interest
Photronics	50.01%
DNP	49.99%

Addresses for Notices Purposes

Photronics, Inc.
15 Secor Road
Brookfield, CT 06804
Attn: General Counsel
Tel: 203-775-9000
Fax: 203-775-5601

Dai Nippon Printing Company, Ltd
1-1, Ichigaya Kagacho 1-chome
Shinjuku-ku, Tokyo, Japan
Attn: General Manager of
Fine Electronics Operations
Tel:+81-3-5225-8833
Fax:+81-3-5225-8899

SCHEDULE D

Majority Board Control Items

1. Appoint Chairman
 2. Appoint General Manager
 3. Select, terminate or set compensation of Company management and employees
 4. Approve Annual Budget
 5. Approve budget for capital expenditures
 6. Change the operating policies of the Company
 7. Dispositions or acquisitions in the ordinary course of business
-

SCHEDULE E

Insurance Policies At Closing

1. **Property Insurance:** Coverage for “all risk” property insurance, insuring against physical damage on a replacement basis for assets, and insuring against resultant business interruption from insured physical damage on an actual-loss sustained basis. The property insurance limit must equal full replacement value of all physical property and one year business interruption insurance.
 2. **Property Insurance for Fixed Assets during installation (unique to Taiwan):** Coverage for repair or replacement of capital equipment from the JV dock until installed
 3. **Transit Insurance (Cargo Insurance):** Coverage for repair or replacement of capital equipment purchased by the JV during transit up to the invoiced amount for the equipment.
 4. **Liability Insurance:**
 - Commercial general liability insurance, including but not limited to contractual liability, personal injury, completed operations, product liability and host liquor liability, coverage for bodily injury and property damage liability, with a limit of not less than \$1 million for each loss occurrence and not less than \$2 million in annual aggregate coverage.
 - Automobile liability coverage for bodily injury and property damage liability with a limit of not less than \$1 million for each loss occurrence and not less than \$1 million in annual aggregate coverage, for owned, hired, and non-owned automobiles.
 - Umbrella insurance - Company will be included in Photronics Inc. global policy; current amount of \$20 million per occurrence or in the aggregate.
 3. **Workers Compensation & Employers Liability:** As required by the Country of Taiwan
 4. **Directors & Officers Liability Coverage:** the Company’s Board of Directors will be included in Photronics Inc. global policy.
 5. **Fiduciary Liability Coverage:** Company will be included in Photronics Inc. global policy.
 6. **Employers Practices Liability Coverage:** Company will be included in Photronics Inc. global policy.
 7. **Crime Coverage:** Company will be included in Photronics Inc. global policy.
-

SCHEDULE F

List of Actions Requiring A Supermajority Vote of Shareholders

The following actions of the Company also require a Supermajority Vote of Shareholders:

- (a) make any alteration or amendment of the Articles of Incorporation of the Company, other than in respect of an amendment to increase the authorized capital of the Company by an aggregate amount up to the Capex Threshold as defined in Schedule G;
 - (b) effect a change of the business scope of the Company;
 - (c) sell, license or otherwise dispose of all or substantially all of the undertaking, goodwill or the assets of the Company, or sell, license or otherwise dispose of 50% or more of the undertaking, goodwill or the assets of the Company in any given year;
 - (d) approve any actions by Director(s) which competes with the Company;
 - (e) pass any resolution for the winding up or dissolution or liquidation of the Company or apply for the appointment of a receiver, manager or judicial manager or like officer; and
 - (f) subject to the exception set forth in clause (a) above, any other matters requiring resolution at the meetings of the Shareholders of the Company under the Applicable Law in Taiwan other than an ordinary resolution of the Shareholders set forth in Article 174 of the Act.
-

SCHEDULE G

List of Actions Requiring A Supermajority Vote of Directors

The following actions of the Company also require a Supermajority Vote of Directors:

- (a) make any alteration or amendment to the Articles of Incorporation of the Company, other than in respect of an amendment to increase the authorized capital of the Company by an aggregate amount up to the Capex Threshold as defined below;
 - (b) effect a change of the business scope of the Company;
 - (c) sell, license or otherwise dispose of all or substantially all of the undertaking, goodwill or the assets of the Company, or sell, license or otherwise dispose of 50% or more of the undertaking, goodwill or the assets of the Company in any given year;
 - (d) an annual cash investment greater than the higher of fifty percent (50%) of the Company's net assets or NT\$3,000,000,000 (the **“Capex Threshold”**);
 - (e) approve any action(s) by Director(s) which competes with the Company;
 - (f) pass any resolution for the winding up or dissolution or liquidation of the Company or apply for the appointment of a receiver, manager or judicial manager or like officer; and
 - (g) Subject to the exception set forth in clause (a) above, and other than (1) capital increases and (2) the election of the Chairman of the Board, any other matters requiring resolution at the meetings of the Board of Directors of the Company under the Applicable Law in Taiwan other than an ordinary resolution of the board of directors set forth in Article 206 of the Act.
-

SCHEDULE H

Initial Business Plan

PHOTRONICS, INC
 FORECASTED INCOME STATEMENTS (UNAUDITED)
 (in thousands NT\$)
 JV Consolidated

Oct 23, 2013 7:41 PM EST

Description	Q2-14	Q3-14	Q4-14	2014	Q1-15	Q2-15	Q3-15	Q4-15	2015
Sales Manufactured in Japan	274,750	194,750	50,000	519,500	50,000	45,744	45,744	45,744	187,231
Other Sales	1,045,270	1,205,612	1,433,782	3,684,663	1,427,478	1,374,954	1,404,554	1,434,154	5,641,139
Net Sales	1,320,020	1,400,362	1,483,782	4,204,163	1,477,478	1,420,698	1,450,298	1,479,898	5,828,370
Materials \$	309,254	332,240	390,476	1,031,969	355,340	324,061	328,885	348,421	1,356,708
COGS Sal & Benefits \$	100,565	100,873	91,060	292,498	90,660	89,440	90,537	86,431	357,069
Equipment Costs \$	333,118	360,029	381,243	1,074,390	386,493	412,252	412,322	423,188	1,634,255
Other COGS \$	257,827	215,861	128,873	602,561	114,902	120,414	116,131	115,135	466,582
Cost of goods sold	1,000,764	1,009,003	991,651	3,001,418	947,396	946,166	947,876	973,175	3,814,614
Gross margin (loss)	319,256	391,359	492,131	1,202,745	530,082	474,531	502,422	506,722	2,013,757
Selling, general & administrative	61,651	50,949	51,379	163,979	49,896	47,406	47,675	46,702	191,679
R&D expenses	37,006	37,090	37,175	111,271	37,259	29,116	26,152	26,150	118,677
Operating Income	220,599	303,319	403,577	927,494	442,926	398,009	428,594	433,871	1,703,401
Int. exp.	(4,611)	(6,646)	(6,320)	(17,577)	(5,990)	(5,659)	(5,325)	(4,988)	(21,962)
Int. inc. and other inc. (exp.)	1,332	1,332	1,332	3,996	1,332	1,332	1,332	1,332	5,328
Intercompany inc (exp)	(10,745)	(10,745)	(10,745)	(32,234)	(10,745)	(10,745)	(10,745)	(10,745)	(42,979)
Inc. before taxes and minority int.	206,575	287,260	387,844	881,679	427,523	382,938	413,857	419,470	1,643,787
Provision for income taxes	52,263	72,677	98,125	223,065	108,163	96,883	104,706	106,126	415,878
Income before minority int.	154,311	214,583	289,720	658,614	319,359	286,055	309,151	313,344	1,227,909
Minority interest	-	-	-	-	-	-	-	-	-
Net Income	154,311	214,583	289,720	658,614	319,359	286,055	309,151	313,344	1,227,909
Deprn & Amort	230,656	247,430	275,294	753,380	264,075	275,915	276,655	278,964	1,095,610
Total Technology License Charge Above	1,767	3,367	6,702	11,837	7,156	7,368	7,368	7,368	29,261
Total Labor and Benefits	131,229	131,621	132,016	394,866	132,412	130,571	130,971	131,373	525,327
All other non-material operating expenses	426,515	382,384	275,718	1,084,616	275,568	284,774	277,824	279,900	1,118,065
EBITDA	440,510	540,004	668,125	1,648,640	696,256	663,180	694,505	702,090	2,756,031
<i>Benchmarks Calculated from Information Above</i>									
Gross margin %	24.2%	27.9%	33.2%	24.5%	35.9%	33.4%	34.6%	34.2%	34.6%
SG&A %	4.7%	3.6%	3.5%	4.1%	3.4%	3.3%	3.3%	3.2%	3.3%
R&D%	2.8%	2.6%	2.5%	2.6%	2.5%	2.0%	1.8%	1.8%	2.0%
Operating Income %	16.7%	21.7%	27.2%	17.7%	30.0%	28.0%	29.6%	29.3%	29.2%
Pretax income %	15.6%	20.5%	26.1%	16.6%	28.9%	27.0%	28.5%	28.3%	28.2%
Tax rate	25.3%	25.3%	25.3%	26.8%	25.3%	25.3%	25.3%	25.3%	25.3%
Net Income %	11.7%	15.3%	19.5%	12.2%	21.6%	20.1%	21.3%	21.2%	21.1%
Materials %	29.6%	27.6%	27.2%	28.7%	24.9%	23.6%	23.4%	24.3%	24.1%
Deprn & Amort. %	17.5%	17.7%	18.6%	18.8%	17.9%	19.4%	19.1%	18.9%	18.8%
Total Technology License Charge Above %	0.1%	0.2%	0.5%	0.2%	0.5%	0.5%	0.5%	0.5%	0.5%
Total Labor and Benefits %	9.9%	9.4%	8.9%	9.5%	9.0%	9.2%	9.0%	8.9%	9.0%
All other operating expenses %	32.3%	27.3%	18.6%	29.2%	18.7%	20.0%	19.2%	18.9%	19.2%

PHOTRONICS, INC
FORECASTED BALANCE SHEETS (UNAUDITED)
(in thousands NT\$)
JV Consolidated
Oct 23, 2013 7:41 PM EST

Description	Q1-14	Q2-14	Q3-14	Q4-14	2014	Q1-15	Q2-15	Q3-15	Q4-15	2015
Cash and cash equivalents	863,107	939,191	596,104	754,328	754,328	513,774	992,633	1,192,886	1,596,309	1,596,309
Short-term investments	-	-	-	-	-	-	-	-	-	-
Accounts receivable	1,516,093	1,481,355	1,557,339	1,581,783	1,581,783	1,718,997	1,626,735	1,706,491	1,770,295	1,770,295
Inventories	152,423	129,131	148,290	166,363	166,363	169,394	151,717	153,578	155,212	155,212
Other current assets	363,276	331,095	281,760	196,297	196,297	155,484	156,632	157,795	158,972	158,972
Total current assets	2,894,899	2,880,772	2,583,492	2,698,772	2,698,772	2,557,649	2,927,717	3,210,750	3,680,788	3,680,788
PP&E, net	4,996,640	6,168,313	6,872,217	6,778,163	6,778,163	7,260,674	7,010,008	6,743,053	6,511,627	6,511,627
Intangible assets, net	5,890	5,062	4,233	3,404	3,404	2,575	1,746	918	-	-
Investments	-	-	-	-	-	-	-	-	-	-
Other assets	75,483	75,483	75,483	75,483	75,483	63,407	25,785	46,239	86,672	86,672
Intercompany	(41,063)	(41,063)	(41,063)	(41,063)	(41,063)	(41,063)	(41,063)	(41,063)	(41,063)	(41,063)
	<u>7,931,850</u>	<u>9,088,567</u>	<u>9,494,362</u>	<u>9,514,760</u>	<u>9,514,760</u>	<u>9,843,242</u>	<u>9,924,193</u>	<u>9,959,896</u>	<u>10,238,024</u>	<u>10,238,024</u>
Liabilities and Equity										
Current liabilities:										
Current portion LTD	-	160,943	162,153	163,372	163,372	164,601	165,838	167,085	168,341	168,341
Accounts payable	837,914	803,664	775,685	673,523	673,523	672,765	649,338	653,967	659,188	659,188
Accrued Cap ex	27,587	169,490	427,306	324,150	324,150	374,322	245,118	6,681	6,681	6,681
Other current liabilities	274,366	268,472	273,303	253,082	253,082	256,903	248,874	254,011	258,688	258,688
Total current liabilities	1,139,868	1,402,569	1,638,446	1,414,127	1,414,127	1,468,590	1,309,168	1,081,745	1,092,899	1,092,899
Long-term debt	-	739,707	695,041	650,039	650,039	604,698	559,017	512,992	466,622	466,622
Other debt	-	-	-	-	-	-	-	-	-	-
Deferred income taxes	9	9	9	9	9	9	9	9	9	9
Other liabilities	47,547	47,547	47,547	47,547	47,547	47,547	47,547	47,547	47,547	47,547
Total liabilities	1,187,423	2,189,831	2,381,043	2,111,721	2,111,721	2,120,844	1,915,740	1,642,293	1,607,076	1,607,076
Minority interest	-	-	-	-	-	-	-	-	-	-
Shareholders' equity:										
Common stock	6,744,420	6,744,427	6,744,427	6,744,427	6,744,427	6,744,427	6,744,427	6,744,427	6,744,427	6,744,427
Additional paid-in capital	-	-	-	-	-	-	-	-	-	-
Retained earnings, begin	-	-	-	-	-	631,176	631,176	631,176	631,176	631,176
Current year net income	-	154,311	368,894	658,614	658,614	346,797	632,852	942,003	1,255,347	1,255,347
Other comprehensive loss	-	-	-	-	-	-	-	-	-	-
Total shareholders' equity	6,744,420	6,898,738	7,113,321	7,403,040	7,403,040	7,722,400	8,008,454	8,317,605	8,630,950	8,630,950
	<u>7,931,844</u>	<u>9,088,569</u>	<u>9,494,364</u>	<u>9,514,762</u>	<u>9,514,762</u>	<u>9,843,244</u>	<u>9,924,195</u>	<u>9,959,898</u>	<u>10,238,025</u>	<u>10,238,025</u>
<i>Other Information- Formula Driven</i>										
DSO	97	101	100	96	96	105	103	106	108	108
Turns	32	31	27	24	24	22	25	25	25	25
A/P as% of total costs	16%	18%	18%	16%	16%	16%	16%	16%	16%	16%
Accrued expenses as a% of all costs	5%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Working Capital (Current Assets-Current Liabilities+-Intercompany)	1,713,969	1,437,140	903,982	1,243,582	1,243,582	1,047,996	1,577,486	2,087,942	2,546,826	2,546,826

PHOTRONICS, INC
FORE CASTED CASH FLOWS (UNAUDITED)
(in thousands NT\$)
JV Consolidated

Oct 23, 2023 7:41 PM EST

Description	Q2-14	Q3-14	Q4-14	2014	Q1-15	Q2-15	Q3-15	Q4-15	2015
Cash from operations:	-	-	-	-	-	-	-	-	-
Net Income	154,311	214,583	289,720	658,614	319,359	286,055	309,151	313,344	1,227,909
Depreciation	229,827	246,601	274,465	750,893	263,246	275,086	275,826	278,046	1,092,206
Intangible amort	829	829	829	2,483	829	829	829	918	3,404
Deferred taxes	33,330	50,498	86,639	170,466	49,402	37,622	(20,454)	(40,434)	26,137
Gain on sale of invest.	-	-	-	-	-	-	-	-	-
Other non cash income items	-	-	-	-	-	-	-	-	-
Accounts receivable	34,738	(75,984)	(24,444)	(65,690)	(137,213)	92,262	(79,756)	(63,804)	(188,512)
Inventories	23,292	(19,159)	(18,073)	(13,940)	(3,031)	17,678	(1,861)	(1,634)	11,151
Other current assets	(1,148)	(1,163)	(1,177)	(3,488)	3,488	(1,148)	(1,163)	(1,177)	(0)
Intercompany	-	-	-	-	-	-	-	-	-
A/P & accrued liabilities	(40,144)	(23,148)	(122,383)	(185,675)	3,063	(31,456)	9,766	9,898	(8,729)
Net cash provided by operations	<u>435,035</u>	<u>393,058</u>	<u>485,575</u>	<u>1,313,667</u>	<u>499,143</u>	<u>676,926</u>	<u>492,339</u>	<u>495,157</u>	<u>2,163,565</u>
Acquisitions	-	-	-	-	-	-	-	-	-
Cap-ex	(330,158)	(692,689)	(283,567)	(1,306,415)	(695,585)	(153,624)	(247,308)	(46,620)	(1,143,137)
Change in short-term investments	-	-	-	-	-	-	-	-	-
Proceeds from sale of investments	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-
Net Cash used in investing activities	<u>(330,158)</u>	<u>(692,689)</u>	<u>(283,567)</u>	<u>(1,306,415)</u>	<u>(695,585)</u>	<u>(153,624)</u>	<u>(247,308)</u>	<u>(463,620)</u>	<u>(1,143,137)</u>
Convertible debt	-	-	-	-	-	-	-	-	-
Other debt borrowings	-	-	-	-	-	-	-	-	-
Repayment of long-term debt	-	-	-	-	-	-	-	-	-
Intercompany net borrowings	(28,790)	(43,456)	(43,783)	(116,029)	(44,112)	(44,444)	(44,778)	(45,114)	(178,448)
Contributed Capital	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-
Cash provided (used) by financing	<u>(28,790)</u>	<u>(43,456)</u>	<u>(43,783)</u>	<u>(116,029)</u>	<u>(44,112)</u>	<u>(44,444)</u>	<u>(44,778)</u>	<u>(45,114)</u>	<u>(178,448)</u>
Effect of FX changes on cash flows	-	-	-	-	-	-	-	-	-
Net incr (decr) in cash and investments	76,086	(343,087)	158,224	(108,777)	(240,554)	478,859	200,253	403,422	841,980
Cash beginning balance	<u>863,107</u>	<u>939,193</u>	<u>596,106</u>	<u>863,107</u>	<u>754,330</u>	<u>513,776</u>	<u>992,635</u>	<u>1,192,888</u>	<u>754,330</u>
Cash ending balance	<u>939,193</u>	<u>596,106</u>	<u>754,330</u>	<u>754,330</u>	<u>513,776</u>	<u>992,635</u>	<u>1,192,888</u>	<u>1,596,310</u>	<u>1,596,310</u>

SCHEDULE I

Form of Articles of Incorporation

English Translation

ARTICLES OF INCORPORATION

Chapter I. General provisions

Article 1. The Company shall be named 台灣美日先進光罩股份有限公司 (Photronics DNP Mask Corporation) and be incorporated as a Company Limited by Shares in accordance with the Company Act of the Republic of China (the "Act").

Article 2. The scope of business of the Company shall be as follows:

- (1) Research, development, design, production and distribution of (a) the photomasks used in the manufacturing process of semiconductors, including PSM, OPC masks and general photomasks; and (b) photomasks used for LCD and photoelectronic products using conventional 6 inch mask substrates and smaller and are pre-existing products of the Company.
- (2) Technical consulting service in the fields of data conversion of integrated circuits design and production process.
- (3) International Trade.

Article 3. The head office of the Company shall be located in Hsinchu Science-based Industrial Park. The Board of Directors may decide on the establishment of branch offices within or outside the territory of the Republic of China.

Article 4. Public notices to be given by the Company pursuant to Article 28 of the Act shall be made in conspicuous sections of local daily newspapers circulated in the location of the Company's head office.

Chapter II. Shares

Article 5. The authorized capital of the Company is NT\$[●] [Note: this amount would be the same as the *amount set forth in Article 1.2(c) and Item 1 of Schedule II of the Merger Agreement*, which should be the aggregate of the paid-in capital of the Company immediately after the Closing] which is divided into [●] shares with a par value of NT\$10 per share. The Board of Directors is authorized to issue the shares in installments.

Article 6. Deleted.

SCHEDULE J

Competitors

HOYA CORPORATION

TOPPAN PRINTING CO., LTD.

The Advanced Mask Technology Center GmbH Co. KG

Taiwan Mask Corp.

Compugraphics USA, Inc.

and their respective Affiliates

OUTSOURCING AGREEMENT

This **OUTSOURCING AGREEMENT** (this “**Agreement**”) is made and entered into as of the 20th day of November, 2013, by and among Photronics, Inc., a Connecticut corporation (“**Photronics**”), Dai Nippon Printing Co., Ltd., a Japanese corporation (“**DNP**”), and Photronics Semiconductor Mask Corp. (the “**Company**”), a company limited by shares organized and formed under the Company Act of the Republic of China. Each of Photronics and DNP is hereinafter referred to as a “**Supplier**” and collectively as the “**Suppliers**” and each of the Suppliers and the Company is hereinafter referred to as a “**Party**” and collectively as the “**Parties.**”

ARTICLE 1. BACKGROUND

Photronics and DNP wish to participate in a joint venture either directly or indirectly through their respective Affiliates as Shareholders in the Company, and to carry on the Business (as defined below) through the Company. The Parties are engaged, among other things, in the design, development, fabrication and sale of advanced photomasks (the “**Business**”). In connection with the formation of the joint venture, Photronics and DNP have entered into a Joint Venture Operating Agreement (the “**JV Operating Agreement**”) dated as of the 20th day of November, 2013. In connection with the JV Operating Agreement and in order to support the business objective of the Company, including but not limited in order to allow the Company access to products it may be unable to manufacture on its own and also to provide backup capacity to the Company in the event the Company operations are disrupted or the Company has a capacity shortfall, the Company desires to outsource or issue to the Suppliers, and the Suppliers agree to accept, certain purchase orders of the Company in connection with its Business pursuant to the terms and conditions set forth herein.

ARTICLE 2. INTERPRETATION

2.1 Defined Terms

Unless otherwise defined in this Agreement, terms defined in the JV Operating Agreement shall have the same meanings when used in this Agreement.

2.2 Incorporation by Reference

The following Articles and Sections of the JV Operating Agreement shall be incorporated by reference into and form an integral part of this Agreement, *mutatis mutandis*: Section 5.16 (Non-Disclosure) and Section 12 (Miscellaneous).

ARTICLE 3. PURCHASE ORDERS

3.1 Outsource and Issuance of Purchase Orders

The Company may at its own discretion outsource or issue Purchase Orders to either of the Suppliers on the terms and conditions of this Agreement. The Parties agree that they may add additional Products to this Agreement through additional Purchase Orders signed by the Company and the relevant Supplier.

3.2 Purchase Orders

Suppliers will make good faith efforts to accept all Purchase Orders from the Company for Products that comply with this Agreement including adhering to all relevant specifications of the Product as set forth in the Purchase Order entered into between the Company and the Supplier (including the Product Lead Time (as defined below)). Suppliers shall notify the Company of acceptance or rejection of a Purchase Order within twenty four hours of receipt of a Purchase Order (“**Product PO Confirmation**”). Failure of Suppliers to accept or reject a Purchase Order within twenty four hours shall constitute acceptance of such Purchase Order. The lead time for the Products will be as set forth in the applicable Purchase Order (“**Product Lead Time**”). Each Purchase Order shall include the following: (a) the Company’s Purchase Order number; (b) identification of the quantity and type of the Product ordered by the Company; (c) the price of each Product ordered per Schedule 2 attached hereto; (d) the requested delivery date (subject to the applicable Product Lead Time); (e) any shipping instructions, including preferred carrier and shipping destination; and (f) the specifications for the Product.

3.3 Purchase Order Terms

All outsourced orders agreed to between the Company and a Supplier shall be governed by this Agreement unless otherwise agreed by the Company and the Suppliers in writing; the Parties agree that the Purchase Order submitted by the Company to any of the Suppliers will mirror the terms and conditions of the Purchase Order with respect to specification for the Product and the end customer’s requirement submitted to the Company by the Company’s customer. Those terms and conditions of the Purchase Order may be discussed and agreed between the Company and any of the Suppliers prior to issuance of such Purchase Order to any of the Suppliers.

3.4 Rescheduling and Cancellation

The Company may not adjust or cancel or reschedule any portion of an accepted Purchase Order unless the Supplier fails to fulfill any material term of such accepted Purchase Order. Suppliers shall at all times use prudent material planning practices, including by way of example, reducing manufacturing and lead-times for Products . The Company forecast for each Supplier will be provided on a weekly basis covering a rolling one (1) month period. The Company will provide the Suppliers with such short range forecast which will be updated weekly and long range forecast which will be updated quarterly and will be used for planning purposes only. If a Supplier’s ability to supply any Product is constrained for any reason, such Supplier shall immediately notify the Company of such supply constraint for the purpose of resolving the same.

3.5 End of Life

Each of the Suppliers may terminate its obligations to supply a particular Product under this Agreement by giving written notice of the end of life of such Product to the Company at least twelve (12) months before the effective date of such termination (a “**Product EOL Notice**”), provided that (a) the relevant Supplier shall supply, and the Company shall purchase, such Product ordered pursuant to this Agreement until the effective date of such termination and including any accepted Purchase Orders outstanding on the effective date of termination, (b) the relevant Supplier is perpetually and irrevocably terminating its obligations to its other customers with respect to such Product. When the Company becomes aware that any of its customers will finish purchasing any type of the Products, the Company shall promptly notify the Supplier(s) thereof. Notwithstanding the above, if the Company has a long term supply agreement with a customer and the Suppliers (i) has confirmed in writing its intention to support the performance of such supply agreement by the Company through the outsourcing arrangement hereunder and (ii) are actually providing Product in support of such supply agreement, neither Supplier can, to the extent of its confirmation, terminate its obligation to supply the Company until such supply agreement between the Company and the customer is terminated.

3.6 Certain Claims

Notwithstanding any other provisions in this Agreement, either Supplier may discontinue sales of any Product after Suppliers' receipt of a written products liability or the Intellectual Property Rights infringement claim that is deemed credible by written opinion of the relevant Supplier's outside counsel, provided that the relevant Supplier also discontinues sales and supplies to its other customers with respect to such Product; provided further that (i) Suppliers shall give the Company at least 30 calendar days prior written notice of its intent to discontinue sales of such Product, and (ii) at the Company's request, if the Company will continue to manufacture and sell commercial products using the Product, Suppliers will provide the Company with all reasonable information and assistance necessary, and any necessary licenses to the relevant Supplier's Intellectual Property Rights in accordance with the terms and conditions to be agreed by the relevant Supplier and the Company, to enable the Company to manufacture or have the Product manufactured.

Any such granted licenses shall terminate and provided information shall be destroyed or returned in the event the relevant Supplier resumes providing the Product to the Company. The Company shall defend, indemnify and hold harmless the relevant Supplier from and against any claims, expenses and costs (including but not limited to attorney and other professional fees and expenses), settlement of third party claims (if negotiated and approved by the Company), damages and liability arising from or related to products liability or the violation of the Intellectual Property Rights of any third party solely with respect to the Company's manufacture, use, sale, offering for sale, importation or distribution of any Products purchased by the Company during the 30 calendar days period specified in this Section 3.6 or manufactured by or on behalf of the Company under the license granted in this Section 3.6.

3.7 Priority for New Products

During the development by either of the Suppliers of any new Product (including any modification or improvement of an existing Product) as set forth in the Company's Business Plan as defined and attached in the JV Operating Agreement, the Supplier who develops the new Product or modification or improvement of an existing Product shall provide the Company sufficient opportunity to test such new Product and determine whether to purchase such new Product under the terms and conditions including the timing agreed between such Supplier and the Company, provided however the Company will not be obligated to pay for any additional costs for modification or improvement made by any of the Suppliers in order to continue to be qualified. This Section 3.7 shall not applied to any products developed by the Suppliers (or a third party subcontracted by Suppliers) for or with any third party where such development is subject to non-disclosure obligations.

3.8 Qualification

Photronics will make all reasonable efforts to qualify the Company for the products for Micron Technology, Inc. ("**Micron**") and its Affiliates, and the Company with Photronics support will make all reasonable efforts to qualify DNP but only for the purpose of being an outsource supplier for the Company for the products for Micron and its Affiliates.

Furthermore, DNP will make all reasonable efforts to qualify the Company for Powerchip Technology Corporation (“**Powerchip**”) so that the Company will be able to manufacture the products for Powerchip.

**ARTICLE 4.
PURCHASE ORDER ALLOCATION**

Notwithstanding any other provisions in this Agreement, the Parties agree that the outsourcing or issuance of any Purchase Orders hereunder by the Company to any of the Suppliers shall be at the Company’s discretion pursuant to the best interest of the Company taking into account the preference of the Company’s customer and the qualification for the production of the Products; provided however that the Company will attempt to allocate the value of orders with each Supplier equally. The Parties will review the allocation of orders between Suppliers on a quarterly basis. If at the end of each quarter the value of orders to one of the Suppliers is higher than that of the other, the Company will attempt to allocate orders to the Suppliers with lower valued orders for the previous quarter until such Supplier has received orders with value approximately equal to the other Supplier. Notwithstanding the above, each of the Parties agrees and acknowledges that if a Supplier cannot provide Product to the Company because of capacity restraints or failure to meet specifications of the Company, then the Company will be free to seek the Product from the other Supplier without regard to the allocation of Product orders between the Suppliers. Additionally it is understood by the parties that any outsourcing for Micron and its Affiliates ,or subsidiaries, joint ventures, or partnerships whether or not controlled by Micron or under any contract, agreement or arrangement including, but not limited to licensing arrangements whether existing on the date hereof or entered into or existing after the date hereof will not count towards Photronics’s allocation and any outsourcing for Powerchip and its Affiliates will not count towards DNP’s allocation (i.e. Micron and its Affiliates, or subsidiaries, joint ventures, or partnerships whether or not controlled by Micron or under any contract, agreement or arrangement including, but not limited to Micron licensing arrangements whether existing on the date hereof or entered into or existing after the date hereof will be excluded for Photronics and Powerchip and its Affiliates will be excluded for DNP when the Company attempts to allocate the value of orders with each Supplier equally).

**ARTICLE 5.
PRODUCT PRICES AND PAYMENT**

5.1 Prices

The purchase price for the Product shall be as set forth in Schedule 2.

5.2 Invoices; Payments

Suppliers shall issue invoices to the Company for any amounts payable to Suppliers pursuant to this Agreement upon shipment of the applicable Products to the Company. Payments for Products delivered in accordance with Purchase Orders, and any other to be made by the Company to Suppliers hereunder, shall be made in the Applicable Currency within 180 days from the shipment of the applicable Products delivered.

5.3 Taxes

All amounts payable for Product sold by Suppliers to the Company hereunder are exclusive of any taxes. The Company shall be responsible for and shall pay any applicable sales, use,excise or similar taxes, including value added taxes and customs duties due on the importation of Products and arising from purchases made by the Company under this Agreement, excluding any taxes based on Suppliers’ income and any applicable withholding taxes. All such taxes shall be determined based upon the final shipment designation of the items identified on the invoice.

**ARTICLE 6.
DELIVERY**

6.1 Risk of Loss and Title

Delivery of all Products shall be made pursuant to the Delivery Term. Risk of loss for the Products and title to the Products shall pass to the Company in accordance with the Delivery Term.

6.2 Delivery

Suppliers shall deliver the Product to the Company in accordance with the Delivery Term, shipping instructions in the Purchase Order issued by the Company with regard to the requested delivery date (subject to the Product Lead Time), ship-to address, and carrier. If the Company does not provide shipping instructions, Suppliers will select the carrier on a commercially reasonable basis. Suppliers shall be responsible for paying freight, handling, shipping and/or insurance charges to the delivery point in accordance with the Delivery Term.

**ARTICLE 7.
LIMITED WARRANTIES**

7.1 Suppliers Limited Warranty

Each of the Suppliers warrants that the Products shall comply with the specifications and documentation agreed by the relevant Supplier and the Company in writing that is applicable to such Products for the Warranty Period. This warranty does not apply to any Product failures resulting from misuse, storage in or exposure to environmental conditions inconsistent with those specified in the applicable specifications or documentation, modification of the Product by anyone other than the relevant Supplier. If a Product fails to comply with the foregoing warranty, the relevant Supplier shall, at its option, either repair or replace such Product, or, in the event the foregoing options are not commercially practicable, refund to the Company any amounts paid for the applicable Product. Without limiting the remedies specified in Article 9 and Section I 0.2, this Section 7.1 states the exclusive remedy of the Company for failure of a Product to conform to the warranty provisions set forth in this Section 7.1.

7.2 Disclaimer

EXCEPT AS EXPRESSLY SET FORTH IN ARTICLE 7, THE PARTIES MAKE NO WARRANTIES OR REPRESENTATIONS TO THE OTHER PARTIES AND EACH PARTY HEREBY DISCLAIMS ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE.

**ARTICLE 8.
TERM AND TERMINATION**

8.1 Term

This Agreement shall become effective on the completion of the merger contemplated under the Merger Agreement and shall continue to be in full force and effect for so long as Photonics and DNP, or any of their Affiliates, each remains a Shareholder of the Company.

8.2 Termination for Cause

A Party shall have the right to terminate its obligations under this Agreement if the other Party materially breaches this Agreement and fails to cure such breach within thirty (30) days after its receipt of written notice of the breach specifying such default.

8.3 Survival

Article 7 (for the duration of the applicable warranty period), Article 8, Article 9 and Article 10 shall survive any termination or expiration of this Agreement.

**ARTICLE 9.
INDEMNIFICATION**

9.1 Indemnification by Suppliers

Each of the Suppliers shall, with respect to Products supplied by such Supplier, defend, indemnify and hold harmless the Company from and against any third party claims, expenses and costs (including but not limited to attorney and other professional fees and expenses), settlement (if negotiated and approved by the relevant Supplier), damages and liability to the extent arising from a claim (a) alleging that a Product infringes or misappropriates any Intellectual Property Rights, or (b) arising under products liability theory from a manufacturing defect, and shall pay any judgments finally awarded by a court or any amounts contained in a settlement agreed to by the relevant Supplier arising from such claims. The foregoing indemnity does not cover claims that solely arise from (i) the modification of the Product by any party other than the relevant Supplier, (ii) the combination or use of the Product with other products, processes, methods, materials or devices except as approved by the relevant Supplier, or (iii) the fault of the Company.

9.2 Indemnification by Company

Other than claims for which the Suppliers are obligated to indemnify the Company under Section 9.1, the Company shall defend, indemnify and hold harmless the Suppliers from and against any third party claims, expenses and costs (including but not limited to attorney and other professional fees and expenses), settlement (if negotiated and approved by the Company), damages and liability to the extent arising from a claim (a) alleging that a Product supplied by such Supplier infringes or misappropriates any Intellectual Property Rights, or (b) arising under products liability theory from a manufacturing defect, and shall pay any judgments finally awarded by a court or any amounts contained in a settlement agreed to by the Company arising from such claims. The foregoing indemnity does not cover claims that solely arise from (i) the modification of the Product by any party other than the Company, or (ii) the combination or use of the Product with other products, processes, methods, materials or devices except as approved by the Company.

9.3 Procedure

The Party seeking indemnification hereunder (the “**Indemnified Party**”) agrees to promptly inform the other Party in writing of such claim and furnish a copy of each communication, notice or other action relating to the claim and the alleged infringement. The Indemnified Party shall permit the other Party (the “**Indemnifying Party**”) to have sole control over the defense and negotiations for a settlement or compromise, provided that the Indemnifying Party may not settle or compromise a claim in a manner that imposes or purports to impose any liability or obligations on the Indemnified Party without obtaining the Indemnified Party’s prior written consent. The Indemnified Party agrees to give all reasonable authority, information and assistance necessary to defend or settle such suit or proceeding at the Indemnifying Party’s reasonable request and at the Indemnifying Party’s expense.

ARTICLE 10. LIABILITY AND REMEDY

10.1 Limited Liability

EXCEPT FOR LIABILITY ARISING FROM BREACHES OF A PARTY’S CONFIDENTIALITY OBLIGATIONS CONTAINED IN THE NON-DISCLOSURE CLAUSE IN SECTION 9 OF THE FRAMEWORK AGREEMENT, BREACHES OF LICENSE GRANTS CONTAINED HEREIN, AND EXCEPT FOR AMOUNTS PAYABLE TO THIRD PARTIES TO FULFILL INDEMNITY OBLIGATIONS DESCRIBED IN ARTICLE 9, (A) IN NO EVENT SHALL ANY PARTY HAVE ANY LIABILITY TO THE OTHERS, OR TO ANY PARTY CLAIMING THROUGH OR UNDER THE OTHER, FOR ANY LOST PROFITS, ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND IN ANYWAY ARISING OUT OF OR RELATED TO THIS AGREEMENT, HOWEVER CAUSED AND UNDER ANY THEORY OF LIABILITY, EVEN IF SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES; AND (B) IN NO EVENT SHALL A PARTY’S CUMULATIVE LIABILITY ARISING OUT OF THIS AGREEMENT EXCEED THE AMOUNTS ACTUALLY PAID, PAYABLE, RECEIVED OR RECEIVABLE BY SUCH PARTY FOR THE PRODUCTS CONCERNED THEREWITH HEREUNDER PURSUANT TO THIS AGREEMENT DURING THE TWELVE (12) MONTHS PRIOR TO THE OCCURRENCE OF THE INITIAL EVENT FOR WHICH A PARTY RECOVERS DAMAGES HEREUNDER. THESE LIMITATIONS SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY REMEDY. THE PARTIES ACKNOWLEDGE AND AGREE THAT THIS ARTICLE 10 IS AN ESSENTIAL ELEMENT OF THE BARGAIN AND ABSENT THIS ARTICLE 10 THE ECONOMIC AND OTHER TERMS OF THIS AGREEMENT WOULD BE SUBSTANTIALLY DIFFERENT.

10.2 Remedies

Notwithstanding anything stated to the contrary in this Agreement, the Parties acknowledge that any breach of Section 3.5 (End of Life) of this Agreement and/or the non-disclosure clause in Section 9 of the Framework Agreement by a Party would cause irreparable harm to the other Parties, and that the damages arising from any such breach would be difficult or impossible to ascertain. As such, the Parties agree that a Party shall be entitled to injunctive relief and other equitable remedies in the event of any breach or threatened breach of Section 3.5 of this Agreement and/or the non-disclosure clause in Section 9 of the Framework Agreement by another Party. Such injunctive or other equitable relief shall be in addition to, and not in lieu of, any other remedies that may be available to that Party. The Parties shall be entitled reasonable attorney fees and costs of enforcement of this Agreement.

ARTICLE 11. OTHER ARRANGEMENT

11.1 Exclusive Distribution Mechanism

The Suppliers hereby agree that the Company shall be the exclusive distribution mechanism and exclusive interface (interface includes but is not limited to communicating with the customer whether in person or via e-mail or phone, order entry, shipping product and product invoicing) with respect to all products sold, services provided including but not limited to consulting services and product development agreements sold or implemented in Taiwan for all customers of the Company and the Suppliers (provided however in the case of Photronics, Micron and its Affiliates or subsidiaries, joint ventures, or partnerships whether or not controlled by Micron or under any contract, agreement or arrangement including, but not limited to Micron licensing arrangements whether existing on the date hereof or entered into or existing after the date hereof shall be excluded from such exclusive distribution). The Suppliers further agree that neither Supplier will meet with a customer of the Company in Taiwan without at least one employee from the Company being present at such meeting.

11.2 Non-competition

Notwithstanding Article 5.11 of the *N* Operating Agreement, Suppliers agree that, each of Suppliers:

- (a) during the term of the JV Operating Agreement and one (1) year after the expiration or termination of the *N* Operating Agreement, shall not and shall ensure that its Affiliates do not, whether solely or jointly with any other Person, and whether as principal, agent, director, executive officer, employee, shareholder, partner, member, joint venture partner, adviser, consultant or otherwise, carry on or engage or be or become involved in, or assist others in engaging or being involved in, any trade, business, activity or undertaking within Taiwan which is or could reasonably be expected to be competitive with the Business of the Company provided, however, that nothing herein shall prohibit or otherwise restrict Photronics from selling to, engaging in or otherwise being involved in any trade, business, activity or undertaking within Taiwan which is conducted with Micron or any of its Affiliates or subsidiaries, joint ventures, or partnerships whether or not controlled by Micron or under any contract, agreement or arrangement including, but not limited to Micron licensing arrangements whether existing on the date hereof or entered into or existing after the date hereof In the event that the Company, directly or through outsourcing to the Suppliers under this Agreement, cannot supply or satisfy local customer(s) within Taiwan, the Parties will discuss other options to satisfy the needs of such customer(s); and
- (b) during the term of this Agreement and one (1) year after the expiration or termination of this Agreement, shall not and shall ensure that its Affiliates do not (either personally or through an agent or otherwise) (i) induce or attempt to induce any supplier of the Company or any of its Affiliates to cease to supply, or to restrict or vary the terms of supply to, any of them; or (ii) solicit for employment or hire any employee, officer or director of the Company or any of its Affiliates, without the written approval of the other party

(Signature Page Follows)

IN WITNESS WHEREOF, the Parties hereto have duly executed this Agreement as of the day and year first above written.

PHOTRONICS, INC.

By: /s/ Constantine Macricostas
Name: Constantine Macricostas
Title: Chairman an Chief Executive Officer
11/20/13

DAI NIPPON PRINTING CO., LTD.

By: /s/ Koichi Takanami
Name: Koichi Takanami
Title: Executive Vice President
11/20/2013

Photronics Semiconductor Mask Corp.

By: /s/ Frank Lee
Name: Frank Lee 11/20/2013
Title: President

Outsourcing Agreement Signature Page

Schedule 1

Definitions

Capitalized words and phrases used and not otherwise defined elsewhere in this Agreement shall have the following meanings:

1. **“Affiliate”** means any other Person which, directly or indirectly, controls, is controlled by, or is under common control with, such Person. The term “control” (including, with correlative meaning, the terms “controlled by” and “under common control with”), as used with respect to any Person, means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities, by contract or otherwise. A Person shall be deemed an Affiliate of another Person only so long as such control relationship exists.
 2. **“Applicable Currency”** means for payments in relation to Photonics, U.S. Dollars and for payments in relation to DNP, U.S. Dollars.
 3. **“Delivery Term”** means DDP (Incoterms 2010) at delivery point in Taiwan. The Delivery Term may be otherwise determined by the Company and the Supplier in the purchase Order where delivery point is other place than Taiwan.
 4. **“Intellectual Property Rights”** means all rights in and to (a) U.S. and foreign patents and patent applications, including all divisions, substitutions, continuations, continuations-in-part, and any reissues, re-examinations and extensions thereof, (b) copyrights and other rights in works of authorship, (c) unpatented inventions, trade secrets, data, processes, or materials, (d) mask work rights, and (e) other intellectual property or proprietary rights of any kind now known or hereafter recognized in any jurisdiction, but excluding trademarks, service marks, trade names, trade dress, domain names, logos and similar rights, and the goodwill associated therewith.
 5. **“Product”** means integrated circuit photomasks and related services.
 6. **“Purchase Order”** means any of the following (a) a written purchase order issued to the Company by third party buyers for the purchase of certain products; (b) a written purchase order issued by the Company to a Supplier for a quantity of Product.
 7. **“Warranty Period”** means a period of twelve 12 months from the relevant Supplier’s shipment of the Product.
-

Schedule 2

Product Prices

The prices for each Product outsourced to Suppliers shall be substantially consistent with the price ordered by the Company's customer (the "**Customer Order Price**") less ten percent (10%), except the case that the mask data preparation will be conducted by the Supplier, the prices of which shall be the Customer Order Price less five percent (5%).

LICENSE AGREEMENT

This LICENSE AGREEMENT (“Agreement”) is entered into, as of this 20th day of November, 2013, by and between Dai Nippon Printing Co., Ltd., a corporation organized under the laws of Japan, with its principal place of business at 1-1-1, Ichigaya-Kagacho, Shinjuku-ku, Tokyo 162-8001, Japan (“DNP”) and Photronics Semiconductor Mask Corporation, a corporation organized under the laws of the Republic of China (hereinafter “ROC” or “Taiwan”), with its registered office at 1F, No. 2, Lising Road, Hsinchu City, Hsinchu Science Park, Taiwan, R.O.C (“Company”). Each of DNP and the Company is hereafter referred to as a “Party” and collectively the “Parties”.

RECITALS

WHEREAS, in order to integrate resources, reduce operating costs and expand the economic scale of each of DNP Photomask Technology Taiwan Co. Ltd. (DPTT) and Photronics Semiconductor Mask Corp. which is the predecessor of the Company, DPTT agreed to enter into a Merger Agreement (“Merger Agreement”) with the Company as the surviving company;

WHEREAS, after the merger of DPTT into the Company, the Company will (a) become a joint venture entity directly or indirectly owned by Photronics, Inc., a corporation organized under the laws of the State of Connecticut, U.S.A. with its principal place of business at 15 Secor Road, Brookfield, Connecticut, U.S.A. (“Photronics”) and DNP as its shareholders; and (b) assume all rights and obligations of DPTT by operation of the Business Mergers and Acquisitions Act of Taiwan, including, amongst others, the rights and obligations under the technology license agreement entered into by and between DNP and DPTT as of June 23, 2008, as amended as of June 23, 2011 and an agreed date prior to the Effective Date (collectively, the “Technology License Agreement”);

WHEREAS, in connection with the merger of DPTT into the Company, Photronics and DNP have entered into a Joint Venture Operating Agreement (“JV Operating Agreement”) dated as of 20th day of November, 2013 and Joint Venture Framework Agreement (“JV Framework Agreement”) dated as of 20th day of November, 2013.

WHEREAS, DNP who owns certain patents, patent applications, know how and invention disclosures with respect to the Licensed Products (defined below) desires to enter into this Agreement, pursuant to which DNP agrees to continue granting a fully paid-up, non-exclusive, non-sublicensable, non-transferable and non-assignable license to the Company under such patents, patent applications know how and invention disclosures subject to the terms and conditions herein;

WHEREAS, the Company wishes to continue using such license to make, use, distribute or otherwise dispose of Photomasks (as defined below) ;

NOW, THEREFORE, in consideration of the mutual covenants and conditions contained herein and intending to be legally bound, the Parties hereby agree as follows:

**ARTICLE I.
DEFINITIONS**

Section 1.1. Certain Defined Terms. The following terms shall have the meanings set forth below:

“Affiliate” means, with respect to any Person (as hereinafter defined), any other Person that directly, or indirectly through one or more intermediaries, controls or is controlled by, or is under common control with, such Person. For the purposes of this definition, “control,” when used with respect to any specified Person, means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of equity interests in such Person, by contract or otherwise; and the terms “controlling” and “controlled” have correlative meanings to the foregoing.

“Agreement” has the meaning set forth in the introductory paragraph hereof.

“Business Day” means any day other than a Saturday, Sunday or any other day on which banks are authorized or required by law or other governmental action to close in Japan, Taiwan and the United States of America.

“Control”, “Controlled” or “Controlling”, when used in reference to Know-how or Patent Rights, means the legal authority or right of a Party hereto (or any of its Affiliates) to grant a license or sublicense of Know-how or Patent Rights to the other Party, or to otherwise disclose proprietary or trade secret information to such other Party, without breaching the terms of any agreement with a third party, or misappropriating the proprietary or trade secret information of a third party.

“Effective Date” means the completion date of the merger contemplated under the Merger Agreement.

“Governmental Authority” means any nation, state, territory, province, county, city or other unit or subdivision thereof or any entity, authority, agency, department, board, commission, instrumentality, court or other judicial body authorized on behalf of any of the foregoing to exercise legislative, judicial, regulatory or administrative functions of or pertaining to government, and any governmental or non-governmental self-regulatory organization.

“Know-how” means any and all technical, scientific, trade, quality assurance, quality control, financial and business information, know-how, trade secrets, materials, manuals, flow sheets, software, including without limitation all methods, protocol, results, analyses, conclusions and other information, data, discoveries, inventions, improvements, processes, regulatory documentation, information and submissions and formulae, whether patentable or unpatentable, provided, however, those which are of general public knowledge and/or those subject to the Patent Rights shall be excluded .

“Improvements” shall mean all enhancements, modifications, and improvements to the Licensed Patents and Licensed Know-how including, but not limited to, enhancements, modifications, and improvements in the form of equipment and devices, software, methods and methodology whether or not patented or patentable.

“License” has the meaning set forth in Section 2.1 herein.

“Licensed Know-how” means the Know-how set forth on Exhibit A attached hereto that are owned or Controlled during the Term of this Agreement by DNP, and other Know-how provided to DPTT by DNP under the Technology License Agreement.

“Licensed Patents” means the Patent Rights set forth on Exhibit B attached hereto that are owned or Controlled during the Term of this Agreement by DNP as well as any Patent Rights claiming priority in whole or part to any Patent Rights set forth on Exhibit B.

“Licensed Products” means Photomasks, to be made, used, distributed or otherwise disposed of by the Company under the License set forth herein, which node is 28 nm or greater.

“Order” means any judicial, administrative or arbitral judgment, order, award, writ, decree, injunction, lawsuit, proceeding or stipulation of any Governmental Authority.

“Party” and “Parties” have the meaning set forth in the introductory paragraph hereof.

“Patent Rights” means patents and patent applications, utility models, industrial design and model applications, integrated circuit layout applications, divisionals, provisional filings and any proceeding regarding the same, as well as any application or proceeding in the Territory that is similar to U.S. practice in regard to reissues, divisions, renewals, reexaminations, extensions, post-grant issuance proceedings, inter partes review, provisionals, continuations, continuing prosecution applications and continuations-in-part thereof.

“Person” means any natural person, corporation, company, limited liability company, partnership (limited or general), joint venture, association, trust, unincorporated organization or other entity.

“Photomasks” means photomasks, repels, repel recertification and associated services (mask cleaning) and modules (writing and inspection support) used in the manufacture of photomasks used singularly, or in combination, in the manufacturing process of semiconductor integrated circuits.

“Term” means the period commencing upon the completion of the merger contemplated under the Merger Agreement and concluding upon termination of this Agreement pursuant to Article VII herein.

“Territory” means Taiwan.

Section 1.2. Rules of Construction and Interpretation.

(a) The definitions of the 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 “any” shall mean “any and all” unless otherwise clearly indicated by context. Where either Party’s consent is required hereunder, except as otherwise specified herein, such Party’s consent may be granted or withheld in such Party’s sole discretion.

(b) Unless the context requires otherwise, (i) 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, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein or therein), (ii) any reference to any laws herein shall be construed as referring to such laws as from time to time enacted, repealed or amended, (iii) any reference herein to any person shall be construed to include the person’s successors and assigns, (iv) 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, and (v) all references herein to Articles, Sections or Exhibits, unless otherwise specifically provided, shall be construed to refer to Articles, Sections and Exhibits of this Agreement.

**ARTICLE II.
GRANT OF LICENSE**

Section 2.1. License. In consideration for the royalty payments that have been made pursuant to the Technology License Agreement and other good and valuable consideration, (i) DNP hereby agrees to continue granting, and the Company hereby accepts, a fully paid-up, non-exclusive, non-sublicensable, non-transferable and non-assignable right and license under and to the Licensed Know-how and Licensed Patents to manufacture (excluding have made) within the Territory, use, distribute, lease, sell, offer for sale, import and export the Licensed Products within or outside the Territory (“License”) in accordance with the terms and conditions hereof, effective from the completion of the merger contemplated under the Merger Agreement; and (ii) the parties to the agreement agree that the Technology License Agreement shall be superseded and replaced by this Agreement upon the completion of the merger contemplated under the Merger Agreement.

Section 2.2. Technical Documents. DNP shall furnish the Company with the technical documents containing the Licensed Know-how by the method separately agreed between the Parties.

Section 2.3. Improvements. If the Company wishes to obtain a license for any Improvements and developments relating to the Licensed Know-how or Licensed Patents which DNP obtains or comes into possession of during the Term of this Agreement in order to manufacture (excluding have made) within the Territory, use, distribute, lease, sell, offer for sale, import and export the Licensed Products within or outside the Territory, the Company shall notify to DNP in writing of its request for the license of particular Improvements, and DNP will grant the Company a non-exclusive license to use such Improvements subject to the terms and conditions of this Agreement by adding such Improvements to the Licensed Know-how or Licensed Patents. For the avoidance of doubt, the terms and conditions of any license of Know-how and Patent Rights owned by DNP which are necessary to make, use, distribute, lease, sell, offer for sale, import and export Photomasks which node is smaller than 28 nm, shall be separately agreed between the Parties in writing. However it is herein agreed between the Parties that DNP will license to the Company necessary Know-how and Patent Rights owned by DNP for Photomasks with node of 14nm and greater but less than 28nm supplied to United Microelectronics Corporation (UMC), in accordance with the terms and conditions (including but not limited to the royalty amount) separately agreed between the Parties in writing in accordance with the term sheet attached herein as Exhibit C.

Section 2.4. Subcontracting. If the Company wishes to subcontract the manufacture of the Licensed Products to any third party, the Company shall provide the information of such subcontractor third party ("Subcontractor") to DNP, and obtain DNP's prior written approval. The Company shall enter into a subcontract agreement with each Subcontractor so as to impose upon them the same obligations as the Company shall assume under this Agreement. The breach of the obligations hereunder by any Subcontractors (other than DNP) shall be deemed as the breach by the Company, and the Company shall be fully responsible for the breach by any Subcontractors (other than DNP).

Section 2.5. Further License to Third Parties. The Company acknowledges that DNP has the right to grant or not grant other licenses to the Licensed Know-how and Licensed Patents to its Affiliates and/or any third parties without the consent or knowledge of the Company; provided however, during the term of the JV Operating Agreement and one (1) year after the expiration or termination of the JV Operating Agreement ("Non-competition Period"), such Affiliate or third party located either within the Territory or outside the Territory cannot manufacture, use, distribute, lease, sell, offer for sale, import or export the Photomasks using the Licensed Know-how within the Territory. During the Non-competition Period, DNP shall be barred from granting to any third party a license to the Licensed Know-how and Licensed Patents, in settlement of any dispute, claim, suit or demand made by DNP in respect of the alleged infringement or other violation by such third party of any rights in the Licensed Know-how and Licensed Patents (it being the agreement of the Parties hereto that no litigation need be brought by DNP against a third party prior to such a license being granted by DNP) if such license will enable the third party to compete against the Company in the Territory. Notwithstanding the foregoing, DNP may license to any third party to manufacture, use, distribute, lease, sell, offer for sale, import and export the Photomasks using the Licensed Know-how in the Territory in case of joint development consortiums .

Section 2.6. Marking. In connection with the Company's exercise of its rights under the License during the Term hereof, the Company shall comply with applicable patent marking laws with respect to the Licensed Patents, and as otherwise reasonably instructed by DNP.

Section 2.7. Restrictions. The Company hereby agrees that the Licensed Know-how that is licensed by DNP hereunder shall remain solely at the Company and will not be transferred to Photonics, any other Photonics' Affiliates and Person. The Company will maintain all necessary confidentiality procedures at its sites to ensure no Licensed Know-how is transferred in violation of this Agreement. Nothing in the foregoing should restrict the Company from developing its own technology, provided that such development shall not be in breach of any obligations of the Company hereunder.

Section 2.8. No Analysis. Without written permission from DNP, no compositional, structural or reverse analysis shall be made of any Licensed Know-how including but not limited to any materials or samples provided by DNP hereunder. If such permission is granted, the results of any analysis will promptly be disclosed only to DNP, and will only be used for the permitted purpose.

ARTICLE III. ROYALTIES

Section 3.1. The Parties acknowledge and agree that the royalties in consideration for the use of Licensed Know-how and Licensed Patents as well as Improvements related thereto requested by the Company in order to cure the defects in the Licensed Know-how in accordance with DNP's representation and warranties under Section 5.1 and have the Company continue to be qualified under the process of record for the customer to the extent the qualified specification is not changed (and the definition of such specification change to be separately agreed between the Parties), will be furnished by DNP to the Company hereunder, are fully paid-up under the Technology License Agreement, and therefore no further royalty payment is required under this Agreement. Any other Improvements other than as set forth above requested by the Company will be granted pursuant to terms and condition negotiated by the Parties at the time of the request.

ARTICLE IV. CONFIDENTIALITY

Section 4.1. The Company agrees that during the Term hereof and thereafter, it shall keep the Licensed Know-how strictly confidential by employing appropriate measures and shall not, without prior written consent of DNP, (i) disclose, sell, assign, or divulge such Licensed Know-how in any manner to anyone, with the exception of disclosure on a strictly need-to-know basis to its employees, and (ii) use the Licensed Know-how for any purpose other than this Agreement.

Section 4.2. Upon expiration or termination of this Agreement, the Company shall forthwith return or destroy in an appropriate manner, as requested by DNP, all documents and electronic data (including all copies, summaries, excerpts thereof) containing, or derived or produced partly or wholly from the Licensed Know-how.

Section 4.3. The Company agrees to take all appropriate measures to comply with Article 4.1 above, including but not limited to the following: the Company shall procure the personnel of the Company who have access to the Licensed Know-how under this Agreement to execute a confidentiality agreement in which the terms and conditions are identical to those of Section 4.1 above.

Section 4.4. The Company agrees that in the event the Company has been conclusively proven to have breached any of the terms of this Article 4 hereof and such breach causes direct damages to DNP, the Company will pay to pay DNP as liquidated damages an amount of US \$15,000,000 per breach with a cumulative maximum amount payable by the Company hereunder of US \$30,000,000.

**ARTICLE V.
REPRESENTATIONS, WARRANTIES AND LIMITATION OF LIABILITY**

Section 5.1. Title and Contest. DNP represents and warrants for a period of three (3) years from the Effective Date that, to the knowledge of DNP, (i) DNP owns all right, title, and interest in and to the Licensed Know-how and Licensed Patents, and has the right and ability to grant the License, in each case free and clear of any liens or encumbrances, and (ii) the License granted to the Company hereunder will provide and contain everything that is reasonably necessary or advisable for the Company to continue to manufacture what DPTT currently manufactures. Furthermore DNP hereby covenants and agrees that during such three (3) years, if such License does not contain everything that is reasonably necessary including software for the Company to continue to manufacture what DPTT currently manufactures, DNP will use reasonable efforts to try to obtain the rights for the Company to continue to manufacture what DPTT currently manufactures.

Section 5.2. Disclaimer. EXCEPT FOR THE EXPRESS LIMITED WARRANTY SET FORTH IN SECTION 5.1 ABOVE, THE LICENSED KNOW-HOW AND LICENSED PATENTS ARE PROVIDED “AS-IS” AND WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE. DNP SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES OF NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE LICENSED KNOW-HOW AND LICENSED PATENTS LICENSED BY DNP HEREUNDER.

Section 5.3. Non-contravention. Each Party represents and warrants that the execution of this Agreement and the grant of the License hereunder will not conflict with, or result in any breach of or constitute a default under any contract by which that Party is bound, or violate or conflict with any Order.

Section 5.4. No Challenge. The Company agrees that at no time shall it challenge directly or indirectly or assist anyone else in challenging directly or indirectly the validity and/or enforceability of any claim of any of the Licensed Patents at any time.

Section 5.5. Use of Licensed Patents; No Permitted Sublicensing. The Company represents and warrants that it shall only use the Licensed Know-how and Licensed Patents for its own account, and the Company is not permitted hereunder to sublicense the Licensed Know-how and Licensed Patents for use by any other third party or Person.

Section 5.6. Limitation of Liability. IN NO EVENT WILL DNP HAVE ANY LIABILITY FOR ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES, HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER FOR BREACH OF CONTRACT, TORT OR OTHERWISE, ARISING OUT OF OR RELATED TO THIS AGREEMENT, INCLUDING BUT NOT LIMITED TO, LOSS OF ANTICIPATED PROFITS, LOSS OF DATA, OR LOSS OF USE, EVEN IF DNP HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE CUMULATIVE LIABILITY OF DNP FOR DAMAGES HEREUNDER WILL BE SUBJECT TO THE INDEMNIFICATION BASKET AND CAP ON LIABILITY AS SET FORTH IN THE JV FRAMEWORK AGREEMENT.

Section 5.7 Additional Information. Resist coating process for blanks is excluded from the Licensed Know-how and shall not be transferred, however, basic information of the material and thickness of resist (not the coating process) will be provided by DNP upon Company's request, provided that the Company will not disclose such basic information of the material and thickness of resist to any blanks manufacturer.

ARTICLE VI. PROSECUTION AND MAINTENANCE AND ENFORCEMENT

Section 6.1. Prosecution and Maintenance. DNP shall have sole responsibility and discretion with respect to prosecution, issuance and maintenance of the Licensed Patents.

Section 6.2. Enforcement. During the Term, the Company shall promptly provide written notice to DNP of any infringement of any Licensed Patents of which it becomes aware, including in such notice a reasonable level of detail regarding such infringement.

Section 6.3. Cost of Action. Unless the Parties otherwise agree, the total cost of any such action commenced by DNP, shall be borne by DNP (but excluding fees and expenses charged by separate counsel, if any, engaged by the Company). Except as the Parties may otherwise agree in writing, any damages or settlement payments resulting from any such action commenced as set forth above, whether in an out-of-court settlement or through legal adjudication of such action, and at any time, shall be retained by DNP.

Section 6.4. Cooperation. In any infringement action that DNP may institute pursuant to this Article 6 during the Term of this Agreement, the Company hereto shall, at the request of DNP and at DNP's sole cost, cooperate reasonably in the prosecution of such action.

ARTICLE VII. TERM; TERMINATION

Section 7.1. Term. The term of this Agreement shall commence on the Effective Date and, shall continue unless terminated in accordance with the provisions of Section 7.2.

Section 7.2. Termination.

(a) DNP shall have the right to forthwith terminate this Agreement in the event of: (i) the voluntary or involuntary filing of a petition, order or other decree in bankruptcy by or against the Company, or the commencement of any proceedings, under court supervision or otherwise, for the liquidation of, reorganization of, or composition, extension, arrangement or readjustment of the obligations of the Company, or filing of any petition therefore; (ii) breach of Section 4.1 of this Agreement; (iii) the Company, directly or indirectly, commences or attempts to commence any legal proceeding (including, without limitation, any lawsuit in court, administrative proceeding, and petition, claim, filing or other action for administrative act) to contest or dispute, or cause or assist others in any legal proceeding to contest or dispute, the title, patentability, or validity of any Licensed Patent or any claim therein; or (iv) any share in the Company is directly or indirectly owned by any competitor of DNP other than Photronics (which are Hoya Corporation, Toppan Printing Co., Ltd., The Advanced Mask Technology Center GmbH Co. KG, Taiwan Mask Corp., Compugraphics USA, Inc. and their respective Affiliates). Upon such termination the Company will not be able to manufacture Photomasks using the Licensed Know-how licensed hereunder. Such termination will be effective immediately by DNP giving written notice of termination to the Company.

(b) Subject to Section 7.2(a), DNP shall have the right to terminate this Agreement by giving thirty (30) days' written notice to the Company if the Company becomes in default of any obligation hereunder and cannot cure such breach within forty-five (45) days of receiving written notice of such breach. Further, DNP will be entitled to terminate this Agreement if (i) the Company's board meeting passes a resolution for its merger, spin-off, corporate division, or any other similar corporate reorganization; (ii) the whole or substantial part of the Company's Photomask business or property, or majority part of the Company's share or other right representing the right to vote for the election of directors, is transferred to or otherwise in possession of an entity or entities other than the entity having them at the time of Effective Date and such transfer is not to a competitor of DNP other than Photronics (which are Hoya Corporation, Toppan Printing Co., Ltd., The Advanced Mask Technology Center GmbH Co. KG, Taiwan Mask Corp., Compugraphics USA, Inc. and their respective Affiliates); (iv) the Merger Agreement is terminated or otherwise ceases to be in effect; or (v) the JV Operating Agreement entered into by and between DNP and Photronics dated as of 20th day of November, 2013 and/or any Transaction Documents (excluding the Outsourcing Agreement) defined therein is expired, terminated, or otherwise ceases to be in effect.

Subject to Section 7.2 (a), upon the termination under this Section 7.2(b), the Company will have a perpetual, non-exclusive, non-sublicensable, non-assignable and non-transferable license to use in compliance with the provisions of this Agreement, the Licensed Know-how transferred to the Company before such termination and the Licensed Patent.

**ARTICLE VIII.
MISCELLANEOUS**

Section 8.1. Publicity. Except as otherwise required by law, legal process or stock exchange rules, neither Party shall issue any press release or make any public announcement or disclosure related to the Agreement or the transactions contemplated hereunder without the prior agreement of the other Party, including with respect to the content of such release, announcement or disclosure (and, with respect in any legally required announcement, DNP and the Company shall use all reasonable efforts to consult and agree with each other with respect to the content of any such required press release or other publicity).

Section 8.2. Notices. All notices and other communications hereunder shall be in writing and shall be deemed given and effective (a) when delivered, if delivered in person, (b) when transmitted by telecopy (with confirmation of transmission received), (c) three (3) Business Days after mailing, if mailed by certified or registered mail (return receipt requested and obtained) or (d) one (1) Business Day after transmitted, if transmitted by a nationally recognized overnight courier to the parties at the following addresses (or at such other address for a party as shall be specified by like notice):

If to the Company

Photronics Semiconductor Mask Corporation
1F, No. 2, Lising Road, Hsinchu City, Hsinchu Science Park,
Taiwan, R.O.C
Attention: President
Facsimile: 886-3-5678158

With a copy (which shall not constitute notice) to:

Photronics, Inc.
15 Secor Rd.
Brookfield, CT 06804 USA
Attention: Richelle Burr
Facsimile: (203)775-5601

If to DNP

Dai Nippon Printing Co., Ltd.
1-1-1, Ichigaya-Kagacho, Shinjuku-ku, Tokyo 162-8001, Japan
Telephone: +81-3-5225-8833
Fax: +81-3-5225-8899
Attention: General Manager of Fine Electronics Operations

With a copy (which shall not constitute notice) to:

Lee and Li, Attorneys-at-Law
7F, 201 Tun Hua No. Road
Taipei, Taiwan 10508, the Republic of China
Telephone: +886-2-27153300 ext. 2707/2157
Fax: 886-2-25149841
Attention : Arthur Li/James Huang
Email: arthurli@leeandli.com/jameshuang@leeandli.com

and/or to such other respective addresses and/or addressees as may be designated by notice given in accordance with the provisions of this Section 8.2.

Section 8.3. Expenses. Except as otherwise expressly set forth in this Agreement, each Party hereto shall bear all fees and expenses incurred by such Party in connection with, relating to or arising out of the execution, delivery and performance of this Agreement and the consummation of the transactions contemplated hereby and thereby, including financial advisors', attorneys', accountants' and other professional fees and expenses.

Section 8.4. Entire Agreement. This Agreement constitutes the entire agreement between the Parties with respect to the subject matter hereof and supersedes any previous agreements, arrangements or understandings between them relating to the subject matter hereof. For the avoidance of doubt, the Technology License Agreement shall be superseded and replaced by this Agreement upon the completion of the merger contemplated under the Merger Agreement in accordance with Section 2.1 above. Each exhibit hereto shall be considered incorporated into this Agreement.

Section 8.5. Non-Waiver. The failure in any one or more instances of a Party to insist upon performance of any of the terms, covenants or conditions of this Agreement, to exercise any right or privilege in this Agreement conferred, or the waiver by said Party of any breach of any of the terms, covenants or conditions of this Agreement, shall not be construed as a subsequent waiver of any such terms, covenants, conditions, rights or privileges, but the same shall continue and remain in full force and effect as if no such forbearance or waiver had occurred. No waiver shall be effective unless it is in writing and signed by an authorized representative of the waiving Party.

Section 8.6. Severability. Any term or provision of this Agreement which is invalid or unenforceable in any jurisdiction shall, as to that jurisdiction, be ineffective to the extent of such invalidity or unenforceability without rendering invalid or unenforceable the remaining terms and provisions of this Agreement or affecting the validity or enforceability of any of the terms or provisions of this Agreement in any other jurisdiction. If any provision of this Agreement is so broad as to be unenforceable, the provision shall be interpreted to be only as broad as is enforceable.

Section 8.7. Binding Effect; Benefit. This Agreement shall inure to the benefit of and be binding upon the Parties, and their successors and permitted assigns. Nothing in this Agreement, express or implied, is intended to confer on any Person other than the Parties, and their respective successors and permitted assigns any rights, remedies, obligations or liabilities under or by reason of this Agreement, including third party beneficiary rights.

Section 8.8. Assignability. The Company shall not assign, pledge or otherwise dispose of its rights or delegate its obligations under this Agreement in whole or in part without the prior written consent of DNP.

Section 8.9. Amendments. This Agreement shall not be modified or amended except pursuant to an instrument in writing executed and delivered on behalf of each of the Parties.

Section 8.10. Headings. The headings contained in this Agreement are for convenience of reference only and shall not affect the meaning or interpretation of this Agreement.

Section 8.11. Governmental Reporting. Anything to the contrary in this Agreement notwithstanding, nothing in this Agreement shall be construed to mean that a Party or other Person must make or file, or cooperate in the making or filing of, any return or report to any Governmental Authority in any manner that such Person or such Party reasonably believes or reasonably is advised is not in accordance with applicable laws.

Section 8.12. Survival. The terms and conditions of Article I (to the extent necessary to give effect to this Section 8.12), Section 2.7, 2.8, Article III, Article IV, Article V and Sections 7.2, 8.2, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.12, 8.14, 8.15, 8.16 and 8.17 of this Agreement shall survive any termination hereof.

Section 8.13. Relationship of Parties. Neither Party has any express or implied authority to assume or create any obligations on behalf of the other or to bind the other to any contract, agreement or undertaking with any third party.

Section 8.14. Applicable Law. This Agreement shall be governed by and construed in accordance with the laws of Taiwan without reference to the choice of law principles thereof.

Section 8.15. Arbitration. In the event of any dispute, controversy or claim arising out of or in connection with this Agreement (each, a “Dispute”), the Parties shall use their reasonable efforts to resolve such Dispute within a period of ninety (90) days commencing from either Party’s receipt of a notice from the other Party stating the existence of a Dispute. In the event any such Dispute is not resolved, either Party may refer such Dispute to arbitration in Taipei, Taiwan before one (1) arbitrator appointed in accordance with the ROC Arbitration Law and the Arbitration Rules of the ROC Arbitration Association. The arbitration proceeding shall be conducted in English. The award thereof shall be final and binding upon the Parties hereto. Judgment upon such award may be entered in any court having jurisdiction thereof.

Section 8.16. Equitable Relief. The Company acknowledges and agrees that damages alone would be insufficient to compensate DNP for a breach by the Company of this Agreement and that irreparable harm would result from a breach of this Agreement. The Company hereby consents to the entering of an order for injunctive relief to prevent a breach or further breach, and the entering of an order for specific performance to compel performance of any obligations under this Agreement.

Section 8.17. Language. The official language of this Agreement exclusively shall be, and all communications and agreements between the Parties exclusively shall be made in, the English language. The Parties hereto waive any rights they may have under any other law to have this Agreement written in another language, and any translation of this Agreement will be solely for the convenience of the Parties.

Section 8.18. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which taken together shall constitute one and the same agreement.

IN WITNESS WHEREOF, intending to be legally bound, the Parties have executed this Agreement as of the Effective Date.

Dai Nippon Printing Co., Ltd.

By: _____
Name: Koichi Takanami
Title: Executive Vice President

Photronics Semiconductor Mask Corporation

By: _____
Name: Frank Lee
Title: President

License Agreement (DNP – PSMC) Signature Page

LICENSED KNOW-HOW

1. Licensed Know-how Provided by Document

No	Document Title	Publisher	Serial	Ver	Transferred
A1	EB writer (EBM6000)-Technical transfer document	Niicka	T2008-A01	1	Done
A2	EB writer (EBM4000)-Technical transfer document	Niicka	T2008-A02	1	Done
A3	Laser writer (ALTA3900)-Technical transfer document (1st-writing)	Baba	T2008-A03	1	Done
A4	Laser writer (ALTA3900)-Technical transfer document (2nd-PSM alignment writing)	Baba	T2008-A04	1	Done
A5	Resist coating tool(Crimson4003).process for 2nd PSM alignment writing-Technical docum	Watanabe	T2008-A05	1	Done
A6	Post exposure bake tool(APB5000).process-Technical transfer document	Miyazaki	T2008-A06	1	Done
A7	Development tool(SFD3000).process-Technical transfer document	Sasaki/Nakayama	T2008-A07	1	Done
A8	Dry etching tool(VLR700-GIII).process-Technical transfer document	Yasukawa/Mastumoto	T2008-A08	1	Done
A9	Wet etching tool(SFG3000).process-Technical transfer document	Cyuo	T2008-A09	1	Done
A10	Resist remove tool(MRC3000).process-Technical transfer document	Miyazaki	T2008-A10	1	Done
A11	Resist ashing tool(SFU2000).process-Technical transfer document	Mutou	T2008-A11	1	Done
A12	Cleaning tool(tomco).process-Technical transfer document	Suwa	T2008-A12	1	Done
A13	CD measurement tool (LWM9000)-Technical transfer document	N.Fujii	T2008-A13	1	Done
A14	CD measurement tool (LWM250UV)-Technical transfer document	N.Fujii	T2008-A14	1	Done
A15	Phase/Trans. Inspection tool(MPM193)-Technical transfer document	N.Fujii	T2008-A15	1	Done
A16	Phase/Trans. Inspection tool(MPM248)-Technical transfer document	N.Fujii	T2008-A16	1	Done
A17	Metrology inspection tool(IPRO-IV)-Technical transfer document	N.Fujii	T2008-A17	1	Done
A18	Defect inspection tool(SL586)-Technical transfer document	Hirota	T2008-A18	1	Done
A19	Defect inspection tool(SLF87)-Technical transfer document	Hirota	T2008-A19	1	Done
A20	Defect inspection tool(SL365UV)-Technical transfer document	Hirota	T2008-A20	1	Done
A21	Defect inspection tool(SL351)-Technical transfer document	Hirota	T2008-A21	1	Done
A22	Repair tool.process(Merit)-Technical transfer document	Yoshikawa	T2008-A22	1	Done
A23	Repair tool.process(SPR6300)-Technical transfer document	Ogawa	T2008-A23	1	Done
A24	Repair tool.process(SL453X)-Technical transfer document	Ogawa	T2008-A24	1	Done
A25	Aerial Imaging Measurement System(AIMS193)-Technical transfer document	Ogawa	T2008-A25	1	Done
A26	Aerial Imaging Measurement System(AIMS248)-Technical transfer document	Ogawa	T2008-A26	1	Done
A27	Pellicle mounter tool(M515KA)-Technical transfer document	Mutou	T2008-A27	1	Done
A28	Pellicle remover tool(M777)-Technical transfer document	Mutou	T2008-A28	1	Done
A29	Particle inspection tool(PR-PD3)-Technical transfer document	Ogawa	T2008-A29	1	Done
A30	Process particle monitoring tool(Magics2351)-Technical transfer document	Konishi	T2008-A30	1	Done
A31	Photomask case cleaning tool-Technical transfer document	Hotta	T2008-A31	1	Done
A32	Coated blanks stocker-Technical transfer document	Watanabe	T2008-A32	1	Done
A33	Gas monitor system for clean room-Technical transfer document	Mutou	T2008-A33	1	Done
A34	Ion chromatograph(ICS2000)-Technical transfer document	Mutou	T2008-A34	1	Done
A35	N2 blanks stocker-Technical transfer document	Watanabe	T2008-A35	1	Done
No	Document Title	Publisher	Serial	Ver	Transferred
B1	EB Posi resist process (AR8-Binary blanks) for 130nm design rule	Komada	T2008-B01	1	Done
B2	EB Posi resist process (K63A-KrF blanks) for 130nm design rule	Takayama	T2008-B02	1	Done
B3	EB Posi resist process (A61A5-ArF blanks) for 65nm design rule	Ookawa	T2008-B03	1	Done
B4	EB Posi resist process (A61TF11-ArF blanks) for 65nm design rule	Tanabe	T2008-B04	1	Done
B5	EB Nega resist process (AR8-Binary blanks) for 130nm design rule	Miyata	T2008-B05	1	Done
B6	EB Nega resist process (A61A5-ArF blanks) for 65nm design rule	Hiratsuka	T2008-B06	1	Done
B7	EB Nega resist process (A61TF11-ArF blanks) for 65nm design rule	Hatakeyama	T2008-B07	1	Done
B8	Laser Posi resist process (Dry etching-IP3500-Binary blanks)	Kobayashi	T2008-B08	1	Done
B9	Laser Posi resist process (Wet etching-IP3500-Binary blanks)	Hikichi	T2008-B09	1	Done
D1	Technical transfer procedure	Tominaga	T2008-D01	1	Done
D2	Building specification	Tominaga	T2008-D02	1	Done
D3	Facility specification	Tominaga	T2008-D03	1	Done
D4	Clean room specification	Tominaga	T2008-D04	1	Done
D5	Photomask production flow	Tominaga	T2008-D05	1	Done
D6	Photomask inspection flow	Tominaga	T2008-D06	1	Done
D7	Customer specification,qualification procedure	Tominaga	T2008-D07	1	Done
D8	Correlation procedure of each inspection tool to Kamifukuoka plant	Tominaga	T2008-D08	1	Done
D9	Correlation procedure of each evaluation tool to Kamifukuoka plant (Magics/Ion Cromato/	Tominaga	T2008-D09	1	Done
D10	Material specification (Blanks/Resist/developer/Remover/Gas/Case/Pellicle/Filter)	Tominaga	T2008-D10	1	Done
D11	Phase shift photomask theory	Tominaga	T2008-D11	1	Done
D12	SPC procedure	Tominaga	T2008-D12	1	Done
D13	CD control & matching procedure to Kamifukuoka plant	Tominaga	T2008-D13	1	Done
D14	Position accuracy control & matching procedure to Kamifukuoka plant	Tominaga	T2008-D14	1	Done
D15	Defect,Particle control procedure	Tominaga	T2008-D15	1	Done
D16	Definition of internal yield, First pass yield	Tominaga	T2008-D16	1	Done
D17	Scheme to be achieved to Kamifukuoka production quality(yield/first pass yield)&productivi	Tominaga	T2008-D17	1	Done
D18	Maintenance contract, Warranty term of each tool	Tominaga	T2008-D18	1	Done
D19	Overall production plan(project)	Tominaga	T2008-D19	1	Done
D20	Corporate Quality guidelines	Tominaga	T2008-D20	1	Done
No	Document Title	Publisher	Serial	Ver	Transferred
B10	EB Posi resist (FEP) process (K63A-NTAR7-KrF blanks) Recipe: VLR Gen3-42X	Yamada	T2011-B10	1	Done
B11	EB Nega resist (NEB) process (K63A-NTAR7-KrF blanks) Recipe: VLR Gen3-178	Yamada	T2011-B11	1	Done
B12	EB Posi resist (FEP) process (NTAR7-Binary blanks) Recipe: VLR Gen3-670	Yamada	T2011-B12	1	Done
B13	EB Nega resist(NEB) process(NTAR7-Binary blanks) Recipe: VLR Gen3-178	Yamada	T2011-B13	1	Done
B14	EB Posi resist(FEP) process (AR8-Binary blanks) Recipe: VLR Gen3-610	Komada	T2011-B14	1	Done
B15	EB Posi resist(FEP) process (K63A-KrF blanks) Recipe: VLR Gen3-81X	Takayama	T2011-B15	1	Done
No	Document Title	Publisher	Serial	Ver	Transferred
A36	Dry etching tool(TETRA II).process-Technical transfer document	Masatsugu Matsumoto	T2011-A36	1	Done
A37	Defect inspection tool(KLA597XR)-Technical transfer document	Honda	T2011-A37	1	Done
A38	Aerial Imaging Measurement System(AIMS45)-Technical transfer document	Yoshikawa	T2011-A38	1	Done
B16	EB Nega resist(NEB) process (A61TF11-ArF blanks) Recipe: Tetra2-102	Yamada	T2011-B16	1	Done
B17	Repair tool process, condition (Merit)-Technical transfer document	Yoshikawa	T2011-B17	1	Done
B18	HAZE control process	kanke	T2011-B18	1	Done

No	Document Title	Publisher	Serial	Ver	Transferred	
A39	Tool Installation	EB writer (EBM8000)-Technical transfer document	Ozawa	T2013-A39	1	Completed by the end of Feb, 2014
B19	Process optimization	EB Posi resist (PRL) process (A61TC-ArF blanks) Recipe: VLR Gen3-320	Ookawa	T2011-B19	1	Done
B20		EB Posi resist (FET) process (NTAR7-Binary blanks) Recipe: VLR Gen3-E50X	Fujimura	T2011-B20	1	Done
B21		EB Posi resist (FET) process (K63A5-ArF blanks) Recipe: VLR Gen3-91X	Fujimura	T2011-B21	1	Done
B22		EB Posi resist (EP3) process (A61TF11-ArF blanks) Recipe: Tetra2-E227_E228	Fujimura	T2011-B22	1	Done
B23		EB Nega resist (SEBN) process (A61TC-ArF blanks) Recipe: Tetra2-T106	Sekine	T2011-B23	1	Done
B24		EB Nega resist (NEB) process (A61TF11-ArF blanks) Recipe: Tetra2-102	Sekine	T2011-B24	1	Done
B25		EB Nega resist (NEB) process (TF21-Binary blanks) Recipe: Tetra2-E229	Fujimura	T2011-B25	1	Done
B26		A-Bar missing free cleaning process for 28/32nm NEGA mask	kanke	T2011-B26	1	Done
B27		Low Cr damage cleaning process for A61TF11 blanks	kanke	T2011-B27	1	Done
B28		Defect inspection tool(KLA597XR)-Technical transfer document	Honda	T2011-B28	1	Done
B29		Aerial Imaging Measurement System(AIMS45)-Technical transfer document	Yoshikawa	T2011-B29	1	Done
B30		Repair tool process, condition (Merit)-Technical transfer document	Yoshikawa	T2011-B30	1	Done
B31	EB Posi resist (SEBP) process (MoSi-Binary blanks) Recipe: VLR Gen3-TC375	Fujimura	T2011-B31	1	Completed by the end of Feb, 2014	

2. Licensed Know-how Other Than Document

No.	Item	Description	Transfer Status	Transfer Method
1	Improvement of dry etcher parts	Technology for improvement of the dry etcher parts which is the generation source of foreign materials	Done	Incorporated into tools (VLRGIII)
2	Improvement of development machine	Development high-efficiency, Prevention technology for development-induced appearance defect	Done	Incorporated into tools(SFD)
3	Cleaning condition optimization	Cleaning method which prevents causing change in optical property of phase shift mask in mask cleaning	Done	Incorporated into tools (WULF)
4	Blank storage technology	Technology maintaining the quality of resist-coated blank	Done	Incorporated into tools (N2-Storage)
5	Software for EB writing correction	Technology controlling process variation error and enabling manufacture of high-resolution products	EBM6000:Done EBM8000:Will complete after EBM8000 Installation	Software installation

* Resist coating process for blanks is excluded from the Licensed Know-how and shall not be transferred, however, basic information of the material and thickness of resist (not the coating process) will be provided by DNP upon Company's request, provided that the Company will not disclose such basic information of the material and thickness of resist to any blanks manufacturer.

EXHIBIT B

LICENSED PATENTS

Country	Patent No.
Taiwan	200405121

EXHIBIT C

Technology Node Greater than or Equal to 14nm and Less than 28nm Transfer Term Sheet

1. Basic license provisions of technology node greater than or equal to 14nm but less than 28nm (hereinafter defined as "14<28nm Technology") are same as 28nm license agreement, unless otherwise provided in this Term Sheet.
2. Transfer of 14<28nm Technology for UMC to Company will be initiated no later than the second half of calendar 2014. The Parties acknowledge that 28nm critical manufacture transfer may take priority over 14 nm <28nm Technology during the second half of calendar 2014.
3. Transfer of 14<28 nm Technology for UMC will be completed within twelve (12) months from date of commencement of transfer (the "Transfer Period"), subject to Clause 5 of this Term Sheet. The Parties expect that the 14nm<28nm Technology will be evolving during the Transfer Period. Therefore, the goal of the technology transfer will be to enable the Company to produce photomasks for UMC 14<28nm node meeting the same technical specifications as those made in DNP Japan and to shift all further development of the 14nm<28nm) Technology for UMC to the Company.
4. 14 nm technology (or 14<28 nm Technology) for UMC will be transferred in the following two (2) phases.
Phase 1 will be complete when the Company is capable of producing UMC 14nm class photomasks meeting the same specifications as those made by DNP in Japan.
Phase 2 will be complete when development masks are being shipped to UMC by the Company, UMC accepts 14nm node development reticle supply from the Company .
5. Compensation amount for the transfer of 14<28 nm Technology will be reviewed and approved by Company Board of Directors prior to issuance of purchase order to DNP. Company Board of Directors will use good faith efforts to resolve compensation amount owed to DNP for transfer. If transfer of 14<28 nm Technology for UMC is not completed within the original twelve (12) month Transfer Period, the Parties will mutually agree upon whether to : (i) have the Company cancel the remaining 14<28 nm Technology transfer and re-issue the purchase order in accordance with such cancellation, or (ii) extend the Transfer Period . If additional work beyond the Transfer Period for the 14<28 nm Technology is requested by the Company, then a separate purchase order will be created and approved by the Company Board of Directors prior to issuance to DNP.
6. DNP will use good faith efforts to ensure that royalty amount DNP will be compensated for the transfer of 14<28 nm Technology only includes costs incurred in developing 14 <28 nm Technology. Compensation for such costs will be for customers in Taiwan only.

7. Compensation for the 14<28 nm Technology development will be paid to DNP on a sales/use based or other royalty payment structure to be agreed between the Parties, provided that such structure shall compensate DNP for the relevant 14<28 nm Technology development within a three (3) year period of time.

8. DNP will provide the Company with an estimate of the development costs for the relevant 14<28 nm Technology, and the transfer for such technology is initiated after the Company issues a purchase order to DNP.

Improvements to 14<28nm Technology licensed to the Company will be negotiated between DNP and the Company at time the Company needs Improvements.

9. Blanks : DNP will supply Company with coated blanks to make 14<28 nm Technology product for indefinite period of time, unless the resist coating process is transferred to Company or alternative product (including third party product) is available. DNP will charge Company the best commercial competitive market price or DNP's sales price of blanks to DPTT, whichever is lower. DNP will make its best efforts to supply alternative product in the event DNP is not capable of supplying due to act of God or Force Majeure.

JOINT VENTURE OPERATING AGREEMENT

OF

PHOTRONICS DNP MASK CORPORATION XIAMEN

among

PHOTRONICS, INC.,

PHOTRONICS SINGAPORE PTE, LTD

AND

DAI NIPPON PRINTING CO., LTD.

DNP ASIA PACIFIC PTE. LTD.

Dated as of May 16, 2017

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**JOINT VENTURE OPERATING AGREEMENT
OF
PHOTRONICS DNP MASK CORPORATION XIAMEN**

This **JOINT VENTURE OPERATING AGREEMENT** (together with the Schedules, as amended or otherwise modified from time to time, this **“Agreement”**) is made and entered into as of the 16th day of May, 2017, by and between Photronics, Inc., a corporation organized under the laws of the State of Connecticut, with its principal place of business at 15 Secor Road, Brookfield, Connecticut, U.S.A. (**“Photronics”**), Photronics Singapore Pte, Ltd., a corporation organized under the laws of Singapore with its principal place of business at No. 33, Ubi Avenue 3 #03-09, Vertex Building Singapore 408868 (**“Photronics Singapore”**) and Dai Nippon Printing Co., Ltd., a corporation organized under the laws of Japan with its principal place of business at 1-1, Ichigaya Kagacho 1-chome, Shinjuku-ku, Tokyo, Japan (**“DNP”**), and DNP Asia Pacific Pte. Ltd., a corporation organized under the laws of Singapore with its principal place of business at 4 Pandan Crescent, Singapore 128475 (**“DNP Asia Pacific”**), with respect to Xiamen American Japan Photronics Mask Co., Ltd. (the **“Company”**), a wholly owned foreign entity formed under the Company Act of the People’s Republic of China (the **“Company Act”**) and the Laws of the People’s Republic of China on Wholly Foreign-Owned Enterprises (the **“WFOE Act”**), together with the Company Act, the **“Acts”**) and its implementing regulations, with its principal place of business at R203-95, South Building of Torch Square, No. 56-58 Torch Road, Gaoxin District, Xiamen, Fujian Province, China.

**ARTICLE 1.
ORGANIZATIONAL MATTERS**

1.1 Background

The Company was formed in October of 2016 as a wholly owned foreign entity in Xiamen, China, and Photronics Singapore is the sole Shareholder of the Company. Upon the closing of the Initial Capital Contribution (the **“Closing”**) contemplated by the Contribution Agreement (the **“Contribution Agreement”**) to be executed between the Company, Photronics, Photronics Singapore, DNP and DNP Asia Pacific in the form attached hereto as Schedule A-2, the Company will be a joint venture entity in which Photronics Singapore will own a 50.01% Interests and DNP Asia Pacific will own a 49.99% Interests. The rights and liabilities of the Shareholders shall be as provided in the Acts, except as otherwise expressly provided herein. In the event of any inconsistency between any terms and conditions contained in this Agreement and any non-mandatory provisions of the Acts, the terms and conditions contained in this Agreement shall govern. If any provision of this Agreement is prohibited or ineffective under the Acts, this Agreement will be considered amended to the smallest degree possible in order to make such provision effective under the Acts. The Shareholders and the Board of Directors shall also cause the Company to take corporate actions and make filings and recordings that are necessary or advisable to effectuate the aforesaid amendment.

1.2 Name

The name of the Company after the completion of the Closing shall be as follows:

Chinese Name of the Company: 厦门美日丰创光罩有限公司

English Name of the Company: Photronics DNP Mask Co, Ltd. Xiamen or PDMCX

The Board of Directors may change the name of the Company from time to time, in accordance with this Agreement and Applicable Law.

1.3 Principal Place of Business

The principal place of business of the Company will be located in Xiamen, China.

1.4 Business Purpose

The purpose of the Company shall be, either singly or in cooperation with Photronics and DNP along with their Affiliates and PDMC, the (a) development, fabrication and sale of photolithographic integrated circuit photomasks for wafer scanner, wafer stepper and mask aligner, using g-line (436nm), i-line (365nm wavelength), krypton-fluoride (KrF) excimer lasers, argon-fluoride (ArF) excimer lasers, and extreme ultraviolet (EUV) wavelength light source (provided that photomasks for IC lithographic methods not considered above that may arise in the future after execution of this Agreement, the parties may refer to the Steering Committee for inclusion in the definition of the Business), except master templates and/or replica templates used for manufacturing integrated circuits by nanoimprint lithography technologies, to (i) all integrated circuit wafer fabrication facilities or other business entities including those for logic and memory production applications located in the Territory and (ii) Foreign Customers in accordance with Article 8 of this Agreement (notwithstanding the above, if a Shareholder's Percentage Interest is above eighty percent (80%), then such Shareholder may direct the Company to sell integrated circuit photomasks or other products or services to a customer based outside of the Territory); (b) development, fabrication and sale of integrated circuit photomasks and related services, for which the Company is or has been first qualified to manufacture and supply in the Territory, for customers outside of the Territory who thereafter place orders for the same already-qualified photomasks; provided that such sales would not be subject to the noncompete obligations set forth in Section 8.1; (c) development, fabrication and sale of integrated circuit photomasks and related services for customers outside of the Territory, other than specified in (a) or (b) above, that are specifically set forth in the Business Plan after the parties refer to the Steering Committee; (d) entry into any other lawful business, purpose or activity in which a company limited by shares may be engaged under Applicable Law (including, without limitation, the Act) as the Shareholders may determine from time to time, subject to and in accordance with the terms of this Agreement; and (e) entry into any lawful transaction and engagement in any lawful activity in furtherance of the foregoing purposes and as may be necessary, incidental or convenient to carry out the business of the Company as contemplated by this Agreement. All pre-existing joint development agreement(s) and joint engineering agreement(s), which were executed by and between a customer in the Territory and Photronics or DNP before execution of this Agreement (the "**Pre-closing Agreement**"), will be disclosed to the Company. The Pre-closing Agreements must be referred to the Steering Committee at such time when the Pre-closing Agreements are reasonably expected to result in (i) an order of new photomasks by such customer to be delivered by Photronics or DNP to the customer in the Territory using a new process of record or (ii) direct photomask sales for commercial benefit to Photronics or DNP within the business scope of the Company. Each Shareholder is expected to keep the Steering Committee informed of the progress of such Pre-Closing Agreements on a regular basis to the extent that such customer consents to disclose to the other Shareholder. For the avoidance of doubt, all photomask sales derived from the Pre-closing Agreements within the business scope of the Company will be sold through the channel of the Company for the customers in the Territory after the completion of the joint development or joint engineering expected in the Pre-closing Agreements. For the purpose of further clarification, in no event shall this Section 1.4 be construed to amend or supersede the terms and conditions of the Pre-closing Agreements, and therefore, Photronics, DNP and the Steering Committee shall respect those terms and conditions therein, the relative parties' intentions therein, and the determination of the customers.

1.5 Term

The term of the Company (the “**Term**”) is twenty (20) years, commencing from October 21, 2016 until October 20, 2036. Notwithstanding the dissolution of the Company, the existence of the Company shall continue until termination pursuant to, and as provided in, Article 10 of this Agreement.

1.6 Accounting Consolidation

1.6.1 The Shareholders confirm and agree that, for as long as Photronics Singapore and/or an direct or indirect Affiliate of Photronics holds more than fifty percent (50%) of Percentage Interest in the Company in the aggregate, the Company is intended to be, and shall be treated as, a consolidated subsidiary of Photronics under GAAP. In the event that any term of this Agreement or any relationship, understanding or other agreement, including any Transaction Document, between or among, the Company, Photronics and DNP shall be inconsistent with any existing or future rule, principle or standard governing accounting consolidation of the Company’s financial results by Photronics and/or Photronics Singapore under GAAP, then this Agreement or such relationship, understanding or other agreement shall be modified, terminated or waived (as the case may be) (each an “**Accounting Amendment**”) to the minimum extent necessary to grant, allow or permit accounting consolidation of the Company’s financial results by Photronics in accordance with Section 1.6.2.

1.6.2 Where Photronics believes that an Accounting Amendment may be necessary due to any existing or future rule, principle or standard under US GAAP,

- (a) Photronics shall promptly notify DNP of the reasons for, and content of, any proposed Accounting Amendment in writing;

(b) after Photronics' above notification, Photronics and DNP shall use all reasonable efforts to negotiate with each other with a view to reaching a written agreement for the Accounting Amendment or other mutually acceptable solution, provided however, that, if no such agreement or solution is reached by Photronics and DNP within thirty (30) calendar days after Photronics' above notification, (i) Photronics may, in its discretion, retroactively and/or prospectively, make the Accounting Amendment to the minimum extent reasonably deemed necessary by Photronics, and shall promptly notify the Company and DNP of the content of such Accounting Amendment in writing; and (ii) after Photronics exercises its discretionary power set forth in (i) above, if the Accounting Amendment concerned involves any change in the definition of and/or any of the actions requiring a Supermajority Vote of Directors as set forth in Schedule G hereof, the definition of and/or any of the actions requiring a Supermajority Vote of Shareholders as set forth in Schedule F hereof, and/or the number of board seats of DNP in the Company hereunder, DNP shall have a put option to sell all of its Shares to Photronics (the "**Accounting Amendment Option**") at the price (the "**Accounting Amendment Closing Price**") set forth below. DNP may, at any time after the Accounting Amendment takes effect but only after the expiration of the Initial Two-Year Term, exercise the Accounting Amendment Option by giving a written notice to Photronics (the "**Accounting Amendment Option Notice**"). Photronics agrees to use all reasonable efforts to apply for all applicable regulatory approvals or clearance within thirty (30) days after receipt of the Accounting Amendment Option Notice. The closing of the sale and purchase of DNP's Interest (the "**Accounting Amendment Closing**") shall take place as soon as commercially practicable (taking into account the necessary funds raising arrangement by Photronics) without any undue delay and shall be within three (3) Business Days after all prior regulatory approvals or clearance have been obtained. The Accounting Amendment Closing Price shall be equal to the product of the difference of (I) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the date of the Accounting Amendment Option Notice, minus (II) the Net Book Value of the Company Liabilities as of the last day of the Fiscal Month immediately prior to the date of the Accounting Amendment Option Notice, divided by the number of Issued and outstanding Shares of the Company as of the date of the last day of the Fiscal Month immediately prior to the date of the Accounting Amendment Option Notice, multiplied by the number of the Shares held by DNP as of the date of the Accounting Amendment Closing. The Accounting Amendment Closing Price shall be paid by Photronics pursuant to the terms and conditions agreed to upon the exercise of the Accounting Amendment Option, but the Accounting Amendment Closing Price shall be fully paid within seven (7) years from the exercise of the Accounting Amendment Option. At the Accounting Amendment Closing, DNP shall transfer all of its Interests in the Company to Photronics, free and clear of any liens or encumbrances, and Photronics shall pay the amount of all or part of the Accounting Amendment Closing Price that Photronics will be required to pay upon the Accounting Amendment Closing to DNP by wire transfer of cash. At the Accounting Amendment Closing, DNP shall deliver to Photronics such instrument or instruments of conveyance as Photronics reasonably requests.

DNP will not be able to exercise the Accounting Amendment Option for the Initial Two-Year Term.

DNP will continue to be bound by the non-compete obligations set forth in Section 8.1 for a period of twelve (12) months following the date of the Accounting Amendment Option Notice (in which case, the one-year period surviving after the termination set forth in Section 8.1 does not apply). In the event the Accounting Amendment Closing (i.e., receipt of all necessary regulatory approvals and completion of the transfer of DNP's Interest to Photronics but not including full payment of the Accounting Amendment Closing Price) takes longer than sixty (60) days from the exercise of the Accounting Amendment Option, DNP and Photronics will agree to a delay of the commencement date of the twelve-month period of the non-compete obligations set forth in this Section, but in no event shall such commencement date be delayed for more than sixty (60) days from the date of the Accounting Amendment Option Notice.

1.6.3 For the avoidance of doubt, for as long as Photronics Singapore and/or an Affiliate of Photronics holds more than fifty percent (50%) of Percentage Interest in the Company in aggregate, nothing contained herein is intended or shall allow DNP to (a) control the operations or assets of the Company in its sole discretion and (b) have the discretionary power to govern the financial, operating and personnel policies of the Company unless such actions as set forth in (a) and (b) immediately above are permitted under GAAP and agreed to between the parties hereto.

1.7 Transaction Documents

Contemporaneous with the execution of this Agreement, Photronics, Photronics Singapore, DNP, DNP Asia Pacific, PDMC and the Company have entered into the agreements listed on Schedules A-1 and A-2 hereto (collectively, the Transaction Documents”).

1.8 Ratification of Organizational Actions

When necessary, the Shareholders will, by a resolution adopted by the Shareholders' meeting of the Company, authorize the Company, and ratify all action having been taken by or on behalf of the Company (including by its Officers) prior to the date hereof, to execute and deliver the Transaction Documents to which it is a party, including all certificates, agreements and other documents required in connection therewith.

1.9 Articles of Incorporation

The Shareholders agree that, prior to or at the Closing, the Articles of Incorporation of the Company shall be amended from the current form attached hereto as Schedule I to be in the form consistent with the terms and conditions of this Agreement and the Contribution Agreement.

1.10 Compliance

For as long as Photronics, Photronics Singapore and/or a direct or indirect Affiliate of Photronics holds more than fifty percent (50%) of Percentage Interest in the Company, the Company will comply with Photronics Singapore health and safety and environmental and corporate compliance policies, procedures, programs and standards, provided that such policies, procedures, programs and standards do not violate any mandatory laws or regulations of the PRC. In the event the Company has any concerns about any compliance matters including but not limited to antitrust concerns the Company will consult with counsel for the Company.

1.11 Pre-Closing Liabilities

Photronics agrees to be responsible for any and all liabilities and claims arising against the Company by any third party which are attributable to events occurred prior to the Effective Date; provided however that such liabilities and claims must arise out of and be directly related to the negligent acts or lack of due care by Photronics or Photronics Singapore; and provided further that the representations and warranties of Photronics and Photronics Singapore set forth in the Contribution Agreement are true and correct in all material aspects at and as of the Effective Date. Neither Photronics nor Photronics Singapore will be liable for any and all loss or damage of the Company arising out of or in connection with (i) the design, construction, and piling agreements for an initial manufacturing facility located in Xiamen, China, (ii) the investment agreement between Xiamen Torch Hi-Tech Industrial Development Zone Management Committee and Photronics Singapore and (iii) the land purchase agreement between Xiamen Torch Hi-Tech Industrial Development Zone Management Committee and Photronics Singapore, all of which will be assumed by the Company at the Closing, provided however that such losses and damages does not arise out of and are not directly related to the negligent acts or lack of due care by Photronics or Photronics Singapore prior to the Closing.

1.12 Affiliates

Photronics and DNP hereby ensure that their respective Affiliates shall comply with the terms and conditions of this Agreement and Transaction Documents to the extent applicable to such Affiliates. Photronics and DNP hereby confirm and agree that the Shares of the Company shall be always held by either DNP or Photronics directly or by a direct or indirect wholly owned subsidiary of Photronics or DNP, as the case may be, and accordingly, Photronics and DNP may hold the Shares directly or transfer the Shares of the Company to a direct or indirect wholly owned subsidiary of Photronics or DNP, as the case may be, without the prior written consent of, but only with the prior notice to, the other party. Upon such notice, each of Photronics and DNP shall cause the Shareholders and the Company to take corporate actions and make filings and recordings that are necessary or advisable to effectuate the aforesaid transfer under Applicable Law. Any other transfers of the Shares of the Company will be subject to the terms and conditions of this Agreement.

ARTICLE 2. DEFINITIONS

Capitalized words and phrases used and not otherwise defined elsewhere in this Agreement shall have the following meanings:

“**Accounting Amendment**” is defined in Section 1.6.1.

“**Accounting Amendment Closing**” is defined in Section 1.6.2(b).

“**Accounting Amendment Closing Price**” is defined in Section 1.6.2(b).

“**Accounting Amendment Option**” is defined in Section 1.6.2(b).

“**Accounting Amendment Option Notice**” is defined in Section 1.6.2(b).

“**Acts**” is defined in the preamble.

“**Additional Contributions**” is defined in Section 4.1.2(a).

“**Affiliate**” of a Person means any other Person which, directly or indirectly, controls, is controlled by, or is under common control with, such Person. The term “control” (including, with correlative meaning, the terms “controlled by” and “under common control with”), as used with respect to any Person, means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities, by contract or otherwise. A Person shall be deemed an Affiliate of another Person only so long as such control relationship exists. Notwithstanding the foregoing, a Company Entity shall not be deemed to be an Affiliate of either DNP or Photonics, except where expressly provided in this Agreement.

“**Agreement**” is defined in the preamble.

“**Annual Budget**” is defined in Section 6.2.

“**Applicable Law**” means, with respect to a Person, any domestic or foreign, national, federal, territorial, state or local constitution, statute, law (including principles of common law), treaty, ordinance, rule, administrative interpretation, regulation, order, writ, injunction, legally binding directive, judgment, decree or other requirement or restriction of any arbitrator or Governmental Authority applicable to such Person or its properties, assets, officers, directors, employees, consultants or agents (in connection with such officer’s, director’s, employee’s, consultant’s or agent’s activities on behalf of such Person).

“**Articles of Incorporation**” means the Articles of Incorporation of the Company, as amended from time to time.

“**Board of Directors**” means, at any time, the Board of Directors of the Company,

“**Business**” means such business activities as described in Section 1.4.

“**Business Day**” means a full banking business day in the State of Connecticut, Japan and China.

“**Business Plan**” is defined in Section 6.2.

“**Capital Contributions**” means, with respect to any Shareholder, the total amount of cash and the initial agreed upon asset value of property and equipment (other than cash) and technology contributed to the capital of the Company by such Shareholder. “**Cash**” means cash and cash equivalents determined by the Board of Directors in good faith consistent with GAAP.

“Chairman of the Board” is defined in Section 5.5.

“Change in Control” shall be deemed to have occurred, with respect to a party, when:

(1) Any “Person” or “group” (as defined below) is or becomes the “beneficial owner” (as defined below) of shares representing more than fifty percent (50%) of the combined voting power of the then outstanding securities entitled to vote generally in elections of directors of a party, as the case may be (the **“Voting Stock”**); or

(2) A party (A) consolidates with or merges into any other Person or any other Person merges into a party, and in the case of any such transaction, the outstanding common stock of a party, as the case may be, is changed or exchanged into other assets or securities as a result, unless the stockholders of a party, as the case may be, immediately before such transaction own, directly or indirectly immediately following such transaction, more than fifty percent (50%) of the combined voting power of the outstanding voting securities of the corporation resulting from such transaction in substantially the same proportion as their ownership of the Voting Stock immediately before such transaction, or (B) conveys, transfers or leases all or substantially all of its assets to any Person.

For the avoidance of doubt, the delisting of Photronics from the NASDAQ Stock Market standing alone, if occurs, does not constitute a Change in Control with respect to Photronics.

For the purpose of this definition, a “group” means two or more Persons who, acting for a common purpose, which act based on their mutual consent in the form of a contract, an agreement or others; and a “beneficial owner” means any Person who owns the shares or other assets under his/her/its own name or under the name of a third party (i.e. a nominee) where: (i) such Person (a) provides said shares or assets or (b) provides the funds to acquire such shares or assets to the nominee directly or indirectly; or (ii) the principal has the right to manage, utilize or dispose of the shares or assets held by the nominee; or (iii) entire or partial profits or losses of the shares or assets held under the name of the nominee are assumed by the principal.

“Change in Control Closing” is defined in Section 7.4.2.

“Change in Control Closing Price” is defined in Section 7.4.3.

“Change in Control Notice” is defined in Section 7.4.1.

“Company” is defined in the preamble.

“Company Accountant” shall mean initially Deloitte Touche LLP or such other independent accounting firm as appointed from time to time by the Board of Directors.

“Company Act” is defined in the preamble.

“Company Assets” means all direct and indirect rights and interests in real and personal property owned by the Company and its subsidiaries from time to time, and shall include both tangible and intangible property (including Cash). For the sake of clarity, “Company Assets” shall not be deemed to include any right or interest owned by Photonics or DNP or their respective Affiliates, including, without limitation, any rights licensed from third parties to Photonics or DNP unless authorized by such third parties.

“Company Entity” means the Company, or any of its directly or indirectly majority owned subsidiaries (whether organized as corporations, limited liability companies or other legal entities).

“Company Liabilities” means all direct and indirect liabilities and obligations of the Company and its subsidiaries from time to time including the aggregate undistributed amounts due to Shareholders to pay Chinese taxes on any income allocated to them. In determining the amount of such liabilities, any contingent liabilities, guarantees or other amounts that are not recorded on the Company’s consolidated balance sheet shall be included and reserved against at the fair probable value thereof as reasonably determined by the Board of Directors in accordance with GAAP.

“Directors” is defined in Section 5.1.3.

“DNP” is defined in the preamble.

“DNP Director” means any of the Directors nominated by DNP to serve on the Board of Directors in accordance with Section 5.1.3.

“Economic Interest” means a Person’s right to share in the pro-rata allocation of Net Profits, Net Losses and other items of income, gains, losses, deductions and credits hereunder and to receive distributions from the Company as set forth in this Agreement, but does not include any other rights of a Shareholder including, without limitation, the right to vote or to participate in the management of the Company, or, except as specifically provided in this Agreement or required under the Acts, any right to information concerning the business and affairs of the Company.

“Effective Date” means the date of the completion of the Closing by which the Company becomes a joint venture entity between Photonics Singapore and DNP Asia Pacific.

“Exchange Act” means the Securities Exchange Act of 1934 of the United States, as amended.

“Fiscal Months” is defined in Section 5.12.1.

“Fiscal Quarters” is defined in Section 5.12.1.

“Fiscal Year” is defined in Section 5.12.1.

“Force Majeure” means any cause or causes beyond the reasonable control of either party or the Company, including, but not limited to, acts of God, industrial disturbances, wars, terrorism, epidemics, blockages, embargoes, insurrections, riots, explosions, fires, earthquake, floods, perils of the sea.

“**GAAP**” means generally accepted accounting principles in the United States, as applicable, as in effect from time to time.

“**GAAS**” means generally accepted auditing standards in the United States, as applicable, as in effect from time to time.

“**General Manager**” is defined in Section 5.14.1.

“**Governmental Authority**” means any foreign, domestic, national, federal, territorial, state or local governmental authority, quasi-governmental authority, instrumentality, court, government, stock exchange or self-regulatory organization, commission, tribunal or organization or any regulatory, administrative or other agency, or any political or other subdivision, department or branch of any of the foregoing.

“**Increasing Shareholder**” is defined in Section 5.4

“**Indemnified Loss**” is defined in Section 5.13.1.

“**Indemnitee**” is defined in Section 5.13.1.

“**Initial Capital Contribution**” has the same meaning as defined in the Contribution Agreement.

“**Initial Seven-Year Term**” means a period of the initial seven (7) years from the Effective Date.

“**Initial Two-Year Term**” means a period of the initial two (2) years from the Effective Date.

“**Interest**” means the entire ownership interest of a Shareholder in the Company at any particular time, including without limitation, the Shareholder’s Shares and Economic Interest, any and all rights to vote and otherwise participate in the Company’s affairs, and the rights to any and all benefits to which a Shareholder may be entitled as provided in this Agreement, together with the obligations of such Shareholder to comply with all of the terms and provisions of this Agreement. An Interest may be expressed as a number of Shares.

“**Issue**” means, for the purpose of this Agreement, the corporate actions that are necessary or advisable to have Shareholders of the Company to subscribe the Shares when the registered capital of the Company is set or increased. The total Shares Issued shall amount to the 100% equity interest of the Company during any time.

“**Liquidating Event**” is defined in Section 10.2.

“**Liquidated Committee**” is defined in Section 10.5.1.

“**Majority Shareholder**” is defined in Section 7.3.1.

“**Minority Closing**” is defined in Section 7.3.2.

“**Minority Closing Price**” is defined in Section 7.3.3.

“**Minority Shareholder**” is defined in Section 7.3.1.

“**Net Book Value**” means, with respect to (i) any assets, the value thereof, net of accumulated depreciation, amortization and other adjustments, as would be included in a consolidated balance sheet of the entity owning such assets prepared in accordance with GAAP, (ii) any liabilities, the amount thereof as would be included in a consolidated balance sheet of the entity having the liabilities prepared in accordance with GAAP and (iii) any equity security of a Company Entity or other entity, the product of (x) the value of the assets of such entity, net of accumulated depreciation, amortization or other adjustments, as would be included in a consolidated balance sheet of the entity prepared in accordance with GAAP, minus the amount of the liabilities of such entity, as would be included in a consolidated balance sheet of such entity prepared in accordance with GAAP, multiplied by (y) a percentage equal to the percentage of the equity of such entity represented by such equity security. Any determination of Net Book Value shall be consistent with the historic GAAP methods, procedures and election used by the Company.

“**Net Profits**” or “**Net Losses**” means, for each Fiscal Year or other period, an amount equal to the Company’s taxable income or loss for such year or period.

“**Officer**” is defined in Section 5.14.3.

“**PDMC**” is Photronics DNP Mask Corporation, a joint venture company of Photronics and DNP and a corporation organized under the laws of the Taiwan region with its principal place of business at 4f, #2, Li-Hsin Road, Science Park, Hsinchu, Taiwan.

“**Percentage Interest**” means, with respect to a Shareholder holding one or more Shares, its Interest in the Company as determined by dividing the number of Shares owned by such Shareholder by the total number of Shares of the Company then outstanding. For the purposes of this Agreement, the aggregate Percentage Interest of all entities directly or indirectly wholly owned by Photronics Singapore or DNP Asia Pacific, as the case may be, shall be the basis for calculating the Percentage Interest of Photronics Singapore and DNP Asia Pacific.

“**Person**” means any person or entity, whether an individual, trustee, corporation, partnership, limited partnership, limited liability company, trust, unincorporated organization, business association, firm, joint venture, other legal entity or Governmental Authority.

“**Photronics Singapore**” means Photronics Singapore Pte, Ltd., a wholly owned subsidiary company of Photronics and a corporation organized under the laws of Singapore with its principal place of business at No. 33, Ubi Avenue 3 #03-09, Vertex Building Singapore 408868.

“Photronics Director” means any of the Directors nominated by Photronics Singapore to serve on the Board of Directors in accordance with Section 5.1.3.

“Reducing Shareholder” is defined in Section 5.4.

“Related Party Agreement” is defined in Section 5.18.

“Representative” is defined in Section 5.13.6(d).

“Required Funding Date” is defined in Section 4.1.2(a).

“Seconded Employees” is defined in Section 6.4.

“Service Provider Documents” is defined in Section 6.5.1

“Share” means equity interest of the Company Issued pursuant to Article 3 of this Agreement. As of the completion of the transactions contemplated under the Contribution Agreement, the Shares of the Company are to be held at the Closing by the Shareholders in accordance with Schedule C.

“Shareholder” means Photronics Singapore and DNP Asia Pacific, Photronics, DNP or any direct or indirect wholly owned subsidiary of Photronics or DNP who at any time hold the Shares of the Company.

“Shortfall” means the dollar difference between a requested Additional Contribution and the actual amount a Shareholder pays of such Additional Contribution.

“Tax” or **“Taxes”** means all goods and services taxes, levies, imposts and fees imposed by any Governmental Authority (domestic or foreign) of any nature including but not limited to federal, state, local or foreign net income tax, alternative or add-on minimum tax, profits or excess profits tax, franchise tax, gross income, adjusted gross income or gross receipts tax, employment related tax (including employee withholding or employer payroll tax), real or personal property tax or ad valorem tax, sales or use tax, excise tax, stamp tax or duty, any withholding or back up withholding tax, value added tax, severance tax, prohibited transaction tax, premiums tax, occupation tax, together with any interest or any penalty, addition to tax or additional amount imposed by any Governmental Authority (domestic or foreign) responsible for the imposition of any such tax.

“Term” is defined in Section 1.5.

“Territory” means the territory of the People’s Republic of China, solely for the purpose of this Agreement, excluding Hong Kong, Taiwan, and Macau.

“Transaction Documents” is defined in Section 1.7.

“Transfer” (including, with correlative meaning, the term **“Transferred”**) means, with respect to any Share or Economic Interest or portion thereof, a sale, conveyance, exchange, assignment, pledge, encumbrance, gift, bequest, hypothecation or a transfer or disposition by any other means, whether for value or no value and whether voluntary or involuntary (including, without limitation, by operation of law), or an agreement to do any of the foregoing.

“**Steering Committee**” is defined in Section 5.15

“**Supermajority Vote of Directors**” means the unanimous affirmative vote or consent of all Directors of the Company present at a meeting of the Board of Directors, provided that the Percentage Interest of Photonics Singapore and DNP Asia Pacific shall be at least twenty percent (20%) each.

“**Supermajority Vote of Shareholders**” means the unanimous affirmative vote or consent of all Shareholders of the Company present at a meeting of the Shareholders, provided that the Percentage Interest of Photonics Singapore and DNP Asia Pacific shall be at least twenty percent (20%) each.

“**Vice General Manager**” is defined in Section 5.14.1.

“**Voting Stock**” is defined in the definition of “Change in Control.”

“**WFOE Act**” is defined in the preamble.

ARTICLE 3. SHARES AND CAPITAL CONTRIBUTIONS

3.1 Authorized Shares

The Company is authorized to Issue the Shares. The total number of the Shares of the Company to be Issued as of the completion of the Closing shall be set forth in the Contribution Agreement.

3.2 Initial Capital Contributions and Share Issuance

The Shareholders acknowledge and agree that the names and address of each Shareholder and Percentage Interests of the Shareholders as of the completion of the Closing contemplated under the Contribution Agreement are as set forth on Schedule C.

3.3 Return or Redemption of Capital Contribution

Except as otherwise provided in this Agreement or approved by a Supermajority Vote of Shareholders: (a) no Shareholder shall demand or be entitled to receive a return of or interest on any portion of its Capital Contributions; and (b) no Shareholder shall withdraw any portion of its Capital Contributions or receive any distributions from the Company as a return of capital on account of such Capital Contributions. Except as otherwise provided in this Agreement or approved by a Supermajority Vote of Directors, the Company shall not redeem or repurchase the Shares of any Shareholder. Provided in all these cases that any such return, distribution or redemption that is permitted hereunder shall be *pro rata* based upon the Shareholders’ respective Percentage Interests and in compliance with Applicable Law. Provided further, in all these cases that any such return, distribution or redemption that is permitted hereunder do not violate any mandatory laws or regulations of the PRC.

3.4 Liability of Shareholders

Except as otherwise required by any non-waivable provision of the Acts or other Applicable Law and except as otherwise provided in this Agreement or other agreements between the Company and one or more Shareholders or their Affiliates, no Shareholder shall be liable in any manner whatsoever for any debt, liability or other obligation of the Company, whether such debt, liability or other obligation arises in contract, tort, or otherwise solely by reason of being a Shareholder.

3.5 Revenue

The Shareholders hereby agree that the Company shall be the exclusive distribution mechanism and exclusive interface (interface includes but is not limited to communicating with the customer whether in person or via e-mail or phone, order entry, shipping product and product invoicing) with respect to the Business in the Territory for all customers of the Company and the Shareholders in the Territory. The Shareholders further agree that neither Shareholder will meet with a customer of the Company in the Territory without at least one employee from the Company being present at such meeting except where indicated in Article 8.

ARTICLE 4. FINANCING OF THE COMPANY

4.1 Types of Financing

4.1.1 General. Photronics and DNP anticipate that the total investment to be made in the Company for the initial period of five (5) years from the Effective Date will be US\$160,000,000, which consists of US\$110,000,000 by Shareholders' equity or convertible shareholder loan as set forth in Section 4.1.2 (the "**Scheduled Contribution**") and US\$50,000,000 by loan from a bank. The initial registered capital of the Company immediately after the Closing will be as set forth in the Contribution Agreement, and the total registered capital through the initial period of five years from the Effective Date will be no more than US\$110,000,000. The total investment and registered capital will be contributed in several increments over a period of five (5) years from the Effective Date by the Shareholders. It is the intention of the Shareholders to fund the Company primarily with cash distributed from PDMC through dividends and/or capital reductions with a representative funding plan indicated in Schedule J. The Shareholders will make the Initial Capital Contribution to the Company such that the Percentage Interests initially will be 50.01% and 49.99% respectively pursuant to the Contribution Agreement. In no event shall Photronics or DNP be obliged to make any kind of additional investment (including the Additional Contributions, loan to the Company and guaranteeing a loan of the Company) more than their respective Percentage Interests (i.e., 50.01% for Photronics Singapore and 49.99% for DNP Asia Pacific) of the Scheduled Contribution. The Board of Directors shall be responsible for determining the type and timing of financing required to fund the operations of the Company and will evaluate Capital Contributions from the Shareholders or incurring debt from the Shareholders or from public, private or bank markets, in each case as permitted under this Agreement; the Board of Directors will then decide on the type of funding that is in the best interests of the Company at the time of the decision. The Board of Directors of the Company will have the sole authority for deciding when a capital contribution can be made by the Shareholders.

(a) Photronics Singapore and DNP Asia Pacific shall make the Initial Capital Contribution in accordance with the Contribution Agreement for the initial 50.01% and 49.99% ownership, respectively, and the Board of Director of the Company will have authority, from time to time and when necessary, for requesting capital calls in case of any capital shortfalls that the Company may experience, and the parties agree and acknowledge that it is the intent of the parties that Photronics through Photronics Singapore will consolidate the Company and will own a minimum of 50.01%; provided, however, that DNP has the right to (i) refrain from subscribing any or all of the new Shares subsequently Issued by the Company; except that DNP shall be required to use any and all royalties payments received under the Amended and Restated License Agreement as capital contribution once all royalty payments have been paid to DNP and (ii) if it refrains from subscribing any or all of the new Shares subsequently Issued by the Company, recover its Percentage Interest up to 49.99% by way of purchase of the Shares held by Photronics Singapore and/or subscription for new Shares to be Issued by the Company (such right being collectively referred to as the **“Recovery Call”**). DNP may exercise the Recovery Call by giving a written notice to Photronics (the **“Recovery Call Notice”**). It is intention of DNP to exercise the Recovery Call by using cash distributed from PDMC or the Company through dividends and/or capital reductions made to the date of the exercise of the Recovery Call. For the avoidance of doubt, the cash that DNP intends to, or is required to, use for exercising the Recovery Call pursuant to this Section 4.1.2(a) is the net after-tax amount (including any amount of tax that has been claimed as a credit or refunded in any jurisdictions) that DNP receives as, or in exchange for, royalties, dividends or capital reductions. In the event that PDMC submits the proposal of dividend payments or capital reduction, by the board meeting or shareholders meeting of PDMC, as the case may be, DNP shall notify Photronics whether DNP will exercise the Recovery Call by using cash distributed therefrom within ninety (90) days after receiving the proposal of such dividends or capital reductions; provided that, upon receipt of DNP’s request, the Company provides the then-current Business Plan to DNP in determining whether it exercises the Recovery Call. In the event that PDMC distributes cash through dividends and/or capital reductions after DNP notifies its intention to exercise the Recovery Call, DNP shall pay the Recovery Call Price within thirty (30) days after the receipt of cash distributed by PDMC. Notwithstanding the above, during the term of this Agreement in the event PDMC declares dividend(s) and DNP does not use the dividend(s) to exercise its Recovery Call, then DNP will forever forfeit its ability to exercise the Recovery Call for the amount of the dividend(s) received and not used by DNP. If the amount of cash from such dividend or capital reduction from PDMC is not sufficient for DNP to exercise the Recovery Call, then DNP has the right to request a capital reduction of excess cash of PDMC for the amount that would allow DNP to exercise the Recovery Call; provided that such capital reduction shall be in compliance with Applicable Law and shall not have a material adverse effect on the financial conditions of PDMC, and further that such request of capital reduction shall be made within the Initial Seven-Year Term. The price of the Shares to be purchased or subscribed by DNP to exercise the Recovery Call shall be equal to the price of the Shares that have been Issued to Photronics (the **“Recovery Call Price”**), whether by subscription for new Shares or conversion from the convertible loan. The Recovery Call Price will apply for every capital contribution even if Photronics makes more than one capital contribution prior to DNP exercising its Recovery Call Option. In the event that Photronics contributes the amount greater than 50.01% of the Scheduled Contribution, Photronics, at its sole discretion, shall have the choice to make such Scheduled Contribution as equity or as an interest bearing convertible loan whereby at Photronics sole choice Photronics can convert the convertible loan to equity at any time prior to the Recovery Call by DNP; provided that the terms and conditions of the convertible loan from Photronics to the Company shall not be less favorable to the Company than those of a loan available to the Company from banks or other financial institutions on an arms’ length basis.

(b) If the Board of Directors determines that the Company requires additional funding exceeding the Scheduled Contribution via a Capital Contribution from the Shareholders to the Company and such resolution is approved by the Shareholders' meeting, the Shareholders shall have the right to make such Capital Contributions to the Company pro-rata based on such Shareholder's Percentage Interest (the "**Additional Contributions**"). Request for Additional Contributions shall be made by written notice by the Board of Directors, provided that if any of the Shareholders intends to cause the Board of Directors to approve an Additional Contributions, it shall notify the other Shareholder in writing and any such written notice shall include the amount of required Capital Contribution and the required funding date ("**Required Funding Date**") to be approved by the Board of Directors and shall be sent to the other Shareholder at least one hundred and fifty (150) calendar days prior to the relevant meeting of the Board of Directors. Such Required Funding Date shall correspond to the end of a Fiscal Month. All Additional Contributions shall be made in Renminbi or equivalent in US Dollars. Where the Applicable Law grants employees of the Company any subscription rights and no exception in the Applicable Law is available to the Company, the Shareholders agree to use their best efforts to cause the employees of the Company to waive any rights they may have under the Applicable Law to subscribe to any additional Shares to be Issued in connection with any Additional Contributions.

(c) In the event that any Shareholder determines to contribute less than its Percentage Interest of any requested Additional Contribution, such Shareholder shall provide notice of such determination specifying the amount of such Additional Contribution it intends to make, if any. Such notice shall be provided to the Company and to the other Shareholder as soon as practicable after such determination is made, but in any event not less than ninety (90) calendar days prior to the Required Funding Date. Any failure or delay in providing such notice shall not affect the right of any Shareholder to refrain from providing such Additional Contribution, nor shall it result in any liability for damages. If a Shareholder fails to make the full amount of a requested Additional Contribution by the Required Funding Date set forth pursuant to Section 4.1.2(a), then the full funding Shareholder may elect, in its discretion and to the fullest extent permitted by Applicable Law, to do any or a combination of the following without duplication: (i) to fund all or part of the Shortfall and receive additional Shares under Section 4.1.2(c); (ii) to fund all or part of the Shortfall as a convertible loan on market terms and conditions; (iii) to reduce the amount of the funding Shareholder's Additional Contribution by an amount equal to the Shortfall and, if such amount was previously advanced to the Company, have the Company return such amount to the funding Shareholder; or (iv) to the extent permitted by Applicable Law, to require the Company to return to each Shareholder the full amount of the then requested Additional Contribution previously funded, provided that in no event shall any third party become a Shareholder of the Company as a result of an Additional Contribution without prior written consent of all existing Shareholders prior to such Additional Contribution.

(d) In connection with any requested Additional Contribution, the Board of Directors shall determine the subscription price of the additional Shares equal to the Net Book Value of the Company's Assets less the Company's Liabilities, as of the date immediately prior to the date of the meeting of the Board of Directors approving the Additional Contributions, divided by the number of Shares outstanding immediately prior to the date of the meeting of the Board of Directors approving the Additional Contributions.

ARTICLE 5. MANAGEMENT

5.1 Board of Directors

5.1.1 Powers. Except as otherwise required by any non-waivable provision of the Acts or other Applicable Law or expressly provided in this Agreement, all management powers over the business, property and affairs of the Company are exclusively vested in a board of directors (the "**Board of Directors**"), and no Shareholder shall have any right to participate in or exercise control or management power over the business and affairs of the Company or otherwise to bind, act or purport to act on behalf of the Company in any manner. Except as otherwise required by any non-waivable provision of the Acts or other Applicable Law, the Parties hereby agree that the majority shareholder of the Company will control all such decisions that the Acts or other Applicable Law do not allow to be controlled by the Board, and all the corporate governance powers agreed to herein by the Board are also agreed to at the level of Shareholders and will be controlled by Photronics Singapore as long as it is the majority shareholder of the Company. The Parties further agree that, in the event that the Acts or Applicable Law do not allow the majority of the Board of Directors or the majority shareholder to control any increase or decrease of registered capital in its sole discretion and as long as Photronics Singapore is the majority shareholder of the Company, DNP Asia Pacific will provide Photronics Singapore with a proxy to exercise voting rights for sixteen and two thirds percent (16 2/3%) (or, depending on Photronics Singapore's ownership interest at the time of the shareholders meeting, a proxy in the amount required to allow Photronics Singapore to exercise voting rights for sixty six and two thirds percent (66 2/3%) of the outstanding Shares of the Company or the then-current percentage required by the Acts or Applicable Law at the time of the Board of Directors or shareholders meeting) in favor of the increase or decrease in the registered capital proposed by Photronics Singapore and whatever corresponding changes need to be made to the Company's Articles of Incorporation, provided that DNP reserves its right under section 4.1.2(a)(i) to refrain from subscribing any or all of such increased registered capital. In the event DNP Asia Pacific fails to provide Photronics Singapore with such proxy, DNP Asia shall be deemed in breach of this Agreement. Except with respect to voting for an increase or decrease in the Company's registered capital, the above will not affect DNP's a Supermajority Vote of Shareholders set forth in Schedule F and provided further that such proxy from DNP Asia Pacific to Photronics Singapore will not be required after the initial investment of US \$160,000,000 has been reached and an annual cash investment of greater than \$100,000,000 US Dollars is being proposed at the shareholder meeting. Subject to any non-waivable provision of Applicable Law and the limitations set forth in this Agreement, the Board of Directors shall have all the rights and powers that may be possessed by the Board of Directors under the Acts, which shall include, without limitation, the power to incur indebtedness, the power to enter into agreements and commitments of all kinds, the power to manage, acquire and dispose of Company Assets, and all ancillary powers necessary or convenient to the foregoing. Without limiting the general authority granted by the immediately preceding sentence, the majority of the Board of Directors shall have the authority set forth on Schedule D hereto. The Board of Directors may also designate one or more persons to open bank accounts and conduct other banking business on behalf of the Company. The Directors shall devote such time to the business and affairs of the Company as is reasonably necessary for the performance of their duties, but shall not be required to devote full time to the performance of such duties.

5.1.2 Evaluation of General Manager. The Board of Directors will be responsible for supervision and evaluation of the Company's General Manager on an ongoing basis, including at least an annual review of his or her performance to ensure he or she is acting in accordance with prudent business practices.

5.1.3 Number of Directors; Appointment of Directors. Both parties shall cause the Company to hold an extraordinary general shareholders' meeting not later than on the 15th calendar day (or a later day agreed by both parties) after the Effective Date to elect some or all Directors and supervisors of the Company and such members shall have the same term of office as provided below. The Board of Directors shall consist of seven (7) individuals (each such individual, a "**Director**") and the term of their office shall be three (3) years. Subject to Sections 5.2 and 5.3 below, in the aforesaid extraordinary general shareholders' meeting and subsequent general shareholders' meetings of the Company in which the Directors are to be re-elected, four (4) of the representatives nominated by Photronics Singapore and three (3) of the representatives nominated by DNP Asia Pacific shall be elected as the Directors. For as long as Photronics Singapore and/or a direct or indirect Affiliate of Photronics holds more than fifty percent (50%) of Percentage Interest in the Company in the aggregate, the number of Directors to be nominated by each Shareholder and elected by the Shareholders' meeting shall remain fixed for the Initial Seven-Year Term, and Sections 5.2, 5.3 and 5.4 shall only apply thereafter. For the avoidance doubt, Sections 5.2, 5.3 and 5.4 shall still apply even within the Initial Seven-Year Term if the Percentage Interest of Photronics Singapore and/or an Affiliate of Photronics falls below fifty percent (50%) for more than three (3) months. If a Director resigns (including by death or retirement) or is removed either by the Shareholder who nominated such Director as provided for under the Acts or in accordance with Section 5.2 or 5.3, each newly elected Director shall hold office for the remaining term of the replaced Director. Each Shareholder having the right to nominate a Director pursuant to this Section 5.1.3 shall have the right, in its sole discretion, to propose the removal of such Director at any time, by delivery of written notice to the Company with a copy to each of the other Shareholder and the Director(s) to be removed. All Shareholders are obligated to vote in the affirmative for such removal resolution during the Shareholders' meeting. In the case of a vacancy in the office of a Director for any reason (including by reason of death, resignation, retirement, expiration of such Director's term or removal pursuant to the preceding sentence), the vacancy shall be filled by a candidate nominated by the Shareholder that nominated the Director in question; *provided, however*, that in the case of a vacancy created due to a change in a Shareholder's Percentage Interest as described in Section 5.2 or 5.3, such vacancy shall be filled in accordance with Section 5.2 or 5.3. Each Shareholder shall notify the other Shareholder and the Company of the name, business address and business telephone, e-mail address and facsimile numbers of each Director that such Shareholder has nominated. Each Shareholder shall promptly notify the other Shareholder and the Company of any change in such Shareholder's nominated Director or of any change in their Director's address or other contact information.

5.2 Effect of Reduction in Photonics Singapore's Percentage Interest on Photonics Directors

Following the Initial Seven-Year Term and subject to Sections 5.1 and 5.4, the number of Directors that Photonics Singapore can nominate to or maintain on the Board of Directors shall depend on Photonics Percentage Interest as follows:

Photonics Singapore's Percentage Interest	Number of Photonics Directors
> 80%	7
> 50% and \leq 80%	4
\geq 20% and \leq 50%	3
> 0% and < 20%	0

5.3 Effect of Reduction in DNP Asia Pacific's Percentage Interest on DNP Directors

Following the Initial Seven-Year Term and subject to Sections 5.1 and 5.4, the number of Directors that DNP Asia Pacific can nominate to or maintain on the Board of Directors shall depend on DNP Percentage Interest as follows:

DNP Asia Pacific's Percentage Interest	Number of DNP Directors
> 80%	7
> 50% and \leq 80%	4
\geq 20% and \leq 50%	3
> 0% and < 20%	0

5.4 Procedure.

Following the Initial Seven-Year Term and subject to Section 5.1 above, if either Shareholder's Percentage Interest should be below any of the threshold levels set forth in Sections 5.2 or 5.3 above more than three (3) months and if such Shareholder (the **"Reducing Shareholder"**) then has more nominees serving on the Board of Directors than the number to which it is entitled, such Reducing Shareholder shall immediately identify by written notice to the Company with a copy to the other Shareholder (the **"Increasing Shareholder"**) the nominee or nominees on the Board of Directors that will cease serving on the Board of Directors, and each such nominee shall thereupon cease to be a Director or member of the Board of Directors. If such Reducing Shareholder fails to make such designation within five (5) Business Days after written demand by the Increasing Shareholder, the Increasing Shareholder may for and on behalf of the Reducing Shareholder and its nominee(s) (and the Reducing Shareholder hereby, and shall cause its nominee(s) to, irrevocably authorize the Increasing Shareholder to) designate by written notice to the Company with a copy to the Reducing Shareholder one or more (as appropriate) of the Reducing Shareholder's nominees on the Board of Directors that will cease serving on the Board of Directors and each such nominee shall thereupon cease to be a Director or member of the Board of Directors. Upon the written notice described in either of the immediately preceding two sentences, the Shareholders agree to collaborate to cause the Board of Directors to convene a meeting of the Shareholders as soon as practicable to fill the vacancies created by such removals in accordance with the provisions of Sections 5.2 and 5.3. Similarly, if a Shareholder whose Percentage Interest fell below any threshold level set forth in Section 5.2 or 5.3 subsequently increases its Percentage Interest above any such level, the process shall be reversed.

5.5 Chairman and Vice-Chairman

A Chairman of the Board of Directors (the **"Chairman of the Board"**) shall preside at all meetings of the Board of Directors. The Chairman of the Board shall be selected from and among the Directors nominated by Photronics Singapore. A Vice-Chairman of the Board of Directors (the **"Vice-Chairman of the Board"**) shall be selected from and among the Directors nominated by DNP provided that DNP's Percentage Interest shall not fall below twenty percent (20%). If the Percentage Interest of Photronics Singapore falls below fifty percent (50%) more than three (3) months, then the Chairman of the Board shall be selected from and among the Directors nominated by DNP if DNP's Percentage Interest is above fifty percent (50%) or otherwise by the Board of Directors. If a Shareholder whose Percentage Interest fell below fifty percent (50%) subsequently increases its Percentage Interest above fifty percent (50%), such Shareholder shall have the right to nominate the Chairman of the Board again. In the case where the Chairman of the Board is selected by DNP in accordance with the foregoing, then the Vice-Chairman of the Board shall be selected from and among the Directors nominated by Photronics Singapore provided that Photronics Singapore's Percentage Interest shall not fall below twenty percent (20%). If either Shareholder's Percentage Interest falls below twenty percent (20%), then it no longer has the right to nominate the Vice Chairman until such Shareholder's Percentage Interest increases to twenty percent (20%) or more again.

5.6.1 Shareholder Meetings. At any time, and from time to time, the Board of Directors may call meetings of the Shareholders. Special meetings of the Shareholders for any proper purpose or purposes may be called at any time by the Board of Directors. Written notice of any such meeting shall be given to all Shareholders. No less than twenty (20) calendar days' written notice shall be given for an annual meeting of the Shareholders and no less than ten (10) calendar days' written notice shall be given for any special meetings of the Shareholders. Each meeting of the Shareholders shall be conducted by the Chairman of the Board of Directors. Where the Chairman of the Board is on leave or cannot exercise his power and authority for any cause, the meeting of the Shareholders shall be conducted by the Vice-Chairman of the Board, or any designee appointed in accordance with the Acts. Each Shareholder may authorize any Person by written proxy to act for it or on its behalf on all matters in which the Shareholder is entitled to participate. Each proxy must be signed by a duly authorized officer of the Shareholder. All other provisions governing or otherwise relating to the convening of meetings of the Shareholders shall from time to time be established in the sole discretion of the Board of Directors (acting reasonably). Each of the Shareholders shall have the obligation to attend the meeting of the Shareholders, whether in person or by proxy, for the purpose of the quorum, provided that nothing in the foregoing shall be construed to restrict any Shareholder on how to exercise its voting rights (including abstaining from voting). In the event that any of the Shareholders fails to attend a meeting of the Shareholders due to reasons other than those that are unattributable to such Shareholder or its representative(s) (including, without limitation, Force Majeure, accident and illness) and taking into account that such Shareholder should use its best efforts to issue a proxy for such meeting, resulting in a failure of reaching a quorum, it shall be deemed as a material breach of this Agreement and bad faith of such Shareholder in performing its obligations hereunder.

5.6.2 Board Meetings. The Board of Directors shall hold meetings at least once every Fiscal Quarter. Unless a higher quorum is required by Applicable Law, the presence of four (4) Directors, in each case, in person or by video conference, shall be necessary and sufficient to constitute a quorum for the purpose of taking action by the Board of Directors at any meeting of the Board of Directors. Each Director may authorize any other Director by written proxy to act for or on behalf of such Director on all matters in which such Director is entitled to participate. Each Shareholder shall be responsible for the expenses of the Director(s) nominated by such Shareholder in connection with all meetings of the Board of Directors. The Chairman of the Board shall preside at all meetings of the Board of Directors and shall have such other duties and responsibilities as may be assigned to him or her by the Board of Directors. The Chairman of the Board must include any item submitted by a Shareholder or General Manager for consideration at a meeting of the Board of Directors, may not cut off debate on any matter being considered by the Board of Directors and shall call for a vote on any matter at the request of any Director or General Manager. Each of the Directors shall have the obligation to attend each of the meetings of the Board of Directors, whether in person or by proxy, for the purpose of the quorum, provided that nothing in the foregoing shall be construed to restrict any Director on how to exercise his/her voting rights (including abstaining from voting). In the event that any of the Directors fails to attend two meetings of the Board of Directors consecutively due to reasons other than those that are unattributable to such Director or its proxy (including, without limitation, Force Majeure, accident and illness) and taking into account that such Director should use his/her best efforts to issue a proxy for such meeting, resulting in failure of reaching a quorum, it shall be deemed as a material breach and bad faith of the Shareholder who nominates such Director in performing such Shareholder's obligations hereunder.

5.6.3 Notice; Waiver. Except in the case of emergency as provided under the Acts, the regular quarterly meetings of the Board of Directors described in Section 5.6.2 shall in principle be held upon not less than seven (7) Business Days' written notice. Additional meetings of the Board of Directors may be held upon the request of any Director to the Chairman of the Board, upon not less than seven (7) Business Days' written notice (which may be given, to the extent permitted by Applicable Law, via confirmed facsimile, confirmed e-mail or other manner provided for in Section 12.5). No action taken by the Directors at any meeting shall be valid unless the requisite quorum is present.

5.6.4 Voting of Directors. Except as otherwise expressly provided in this Agreement and/or Applicable Law, all actions, determinations or resolutions of the Board of Directors shall require the affirmative vote or consent of a majority of the Board of Directors present at any meeting at which a quorum is present. Each Director shall be entitled to one (1) vote, and Directors shall be entitled to cast their vote through proxies.

5.6.5 Meetings. All meetings of the Board of Directors or the Shareholders shall be conducted in English. Directors and their proxies shall have the right to participate in all meetings of the Board of Directors by means of a video conference or similar communications equipment by means of which all persons participating in the meeting can see and hear each other at the same time and participation by such means shall constitute presence in person at a meeting.

5.6.6 Reliance by Third Parties. For convenience and subject to Applicable Laws, each party agrees that any Person dealing with the Company, Photonics Director, DNP Director, or any Officer may rely upon a certificate signed by any one Photonics Director and one DNP Director as to: (a) the identity of any Director or Officer; (b) the existence or non-existence of any fact or facts which constitute a condition precedent to acts by the Directors or Officers or in any other manner germane to the affairs of the Company; (c) the Persons who are authorized to execute and deliver any instrument or document for or on behalf of the Company; or (d) any act or failure to act by the Company or as to any other matter whatsoever involving the Company, Photonics Singapore, DNP, any Director or any Officer.

5.7 Supervisors

The Company shall have two (2) supervisors. Each of Photonics Singapore and DNP shall be entitled to nominate one (1) representative to be elected as the supervisors.

5.8 Actions Requiring a Supermajority Vote of Shareholders

Notwithstanding the provisions of Section 5.6.4 or any other provisions of this Agreement, the Company may not, and no Shareholder or Director may cause the Company to, take any of the actions specified in Schedule F (or any other action specified in this Agreement as requiring a Supermajority Vote of Shareholders) without obtaining the Supermajority Vote of Shareholders.

5.9 Actions Requiring a Supermajority Vote of Directors

Notwithstanding the provisions of Section 5.6.4 or any other provisions of this Agreement, the Company may not, and no Shareholder or Director may cause the Company to, take any of the actions specified in Schedule G (or any other action specified in this Agreement as requiring a Supermajority Vote of Directors) without obtaining the Supermajority Vote of Directors.

5.10 Compensation of Directors and Supervisors

The Directors and supervisors shall not be entitled to any compensation in their capacities as Directors and supervisors unless otherwise agreed upon in writing by all of the Shareholders.

5.11 Other Activities

Subject to Applicable Law, Article 8 hereof and the provisions of the Transaction Documents, the Shareholders, their respective Affiliates and the Directors may engage or invest in, and devote their time to, any other business venture or activity of any nature and description (independently or with others), whether or not such other activity may be deemed or construed to be in competition with the Company. Neither the Company nor any Shareholder, Affiliate of a Shareholder, or Director shall have any right by virtue of this Agreement or the relationship created hereby in or to such other venture or activity of any Shareholder or its Affiliates (or to the income or proceeds derived therefrom), and the pursuit thereof, even if competitive with the business of the Company, shall not be deemed wrongful or improper.

5.12 Accounting; Records and Reports

5.12.1 Accounting and Fiscal Year. The books, records and accounts of the Company, including for all applicable tax purposes, will be maintained in accordance with such methods of accounting as shall be reasonably determined by the Board of Directors. The fiscal year of the Company (“**Fiscal Year**”), including each of the fiscal quarters (the “**Fiscal Quarters**”) and each of the fiscal months (“**Fiscal Months**”) thereof, shall correspond to that of calendar year, calendar quarters and calendar months, respectively.

5.12.2 Books and Records. The Board of Directors shall cause to be kept, at such location as the Board of Directors shall reasonably deem appropriate, full and proper ledgers, other books of account, and records of all receipts and disbursements and other financial activities of the Company in accordance with Photonics' record retention policies for as long as Photonics Singapore and/or an Affiliate of Photonics Singapore hold more than fifty percent (50%) of Percentage Interest in the Company in the aggregate. The Board of Directors shall also cause to be kept at such location copies of each of the following:

- (a) a current list of the full name and last known address of each Shareholder, and the capital account, number of Shares and Percentage Interest held by each Shareholder;
- (b) a current list of the full name and last known address of each Director;
- (c) the Articles of Incorporation of the Company, including any amendments to the Articles of Incorporation;
- (d) the Company's federal, state and local income tax returns and reports, if any, for the seven (7) most recent Fiscal Years;
- (e) this Agreement and any amendments to this Agreement;
- (f) financial statements of the Company for the five (5) most recent Fiscal Years; and
- (g) minutes of all meetings of the Board of Directors and the Shareholders.

5.12.3 Reports. The Board of Directors shall also cause to be sent to each Shareholder of the Company, the following:

- (a) within forty-five (45) days after the Effective Date, the Company shall provide each Shareholder with an unaudited balance sheet of the Company as of the Effective Date;
- (b) within one hundred eighty (180) days following the end of each Fiscal Year, such information as may be reasonably required by the Shareholders for preparation of their respective federal, state and local income or franchise tax returns;

(c) a copy of the Company's federal, state and local income tax or information returns for each Fiscal Year, concurrent with the filing of such returns;

(d) within seventy five (75) days after the end of each Fiscal Year, the Company shall provide each Shareholder with an audited balance sheet, income statement and statement of cash flows for and as of the last day of the Fiscal Year then ended, prepared in accordance with GAAP and audited in accordance with GAAS as well as such other financial information as any Shareholder may reasonably request to enable such Shareholder and its Affiliates to prepare their consolidated quarterly and annual financial statements;

(e) within forty five (45) days after the end of each Fiscal Quarter or Fiscal Year, the Company shall provide each Shareholder with an unaudited balance sheet, income statement and statement of cash flows for and as of the last day of the year or quarter (as appropriate) then ended, prepared in accordance with GAAP, as well as such other financial information as any Shareholder may reasonably request to enable such Shareholder and its Affiliates to prepare their consolidated quarterly and annual financial statements; and

(f) within a reasonable period of time, notice of any material litigation filed against the Company or any written claim by a Governmental Authority of any material violation of any state, federal or foreign law, statute, rule or regulation.

If Japanese generally accepted accounting principles have been amended, both parties agree that; (a) the time limit set forth in this Section 5.12.3 shall be amended accordingly, and to the extent DNP deems reasonably necessary, by the notice from DNP to the Company, and (b) both parties shall cause the Company to use all reasonable efforts to send all necessary financial information as DNP may reasonably request to enable DNP and its Affiliates to prepare their consolidated quarterly and annual financial statements.

5.12.4 Access to Company Books and Records.

(a) To the extent not in violation of Applicable Law, the terms of the Transaction Documents and the Company's confidential obligations (statutory or contractual) to third parties, Shareholders (personally or through an authorized representative) may, for purposes reasonably related to their interests in the Company, during reasonable business hours (i) examine and copy (at their own cost and expense) the books and records of the Company, including the records listed in Section 5.12.2, and (ii) have access to the Company's management, internal and external accountants and attorneys, plans, properties and other assets to conduct investigations regarding the Business and assets of the Company at such Shareholder's sole expense, and the Company shall reasonably cooperate with such Shareholder in such investigations. Any information obtained as a result of this Section 5.12.4 shall be used by a Shareholder solely for purposes reasonably related to such Shareholder's participation in the Company and shall be subject to the confidentiality restrictions set forth in Section 12.17 of this Agreement.

(b) Any Shareholder's request for documents or request to inspect or copy documents or have access to the Company's management, plans, properties and other assets under this Section 5.12.4 (i) may be made by that Shareholder or that Shareholder's authorized representative and (ii) shall be made in writing to the General Manager and shall state the purpose of such demand. If a Shareholder is not satisfied with the response of the General Manager, the Shareholder may make such request to the Board of Directors.

5.13 Indemnification and Liability of the Directors

5.13.1 Indemnification. The Company shall indemnify and hold harmless each Director, the General Manager and all other Officers (individually, an "**Indemnitee**") to the fullest extent permitted by Applicable Law from and against any and all losses, claims, demands, costs, damages, liabilities, whether joint or several, expenses of any nature (including reasonable attorneys' fees and disbursements), judgments, fines, settlements and other amounts (each an "**Indemnified Loss**") arising from any and all claims, demands, actions, suits or proceedings, civil, criminal, administrative or investigative, in which the Indemnitee may be involved as a defendant, or threatened to be involved as a defendant (other than all claims, demands, actions, suits or proceedings brought by the Shareholder who nominated such Director, if applicable), relating to the performance or nonperformance of any act concerning the activities of the Company or by reason of the Indemnitee's status as a Director, General Manager or Officer, as applicable, regardless of whether the Indemnitee retains such status at the time any such Indemnified Loss is paid or incurred, if (a) the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interests of the Company and, in the case of a criminal proceeding, had no reasonable cause to believe that his or her conduct was unlawful, and (b) the Indemnitee's conduct did not constitute an act or omission which involved intentional misconduct or a knowing violation of the law or gross negligence. The termination of an action, suit or proceeding by judgment, order, or settlement shall not, in and of itself, create a presumption or otherwise constitute evidence that the Indemnitee acted in a manner contrary to that specified in clauses (a) or (b) above.

5.13.2 Expenses. Expenses incurred by an Indemnitee in defending any claim, demand, action, suit or proceeding subject to this Section 5.13 shall be advanced by the Company prior to the final disposition of such claim, demand, action, suit, or proceeding.

5.13.3 Company Expenses. Any indemnification provided hereunder shall be satisfied solely out of the Company Assets, as an expense of the Company. No Shareholder shall be subject to liability by reason of these indemnification provisions.

5.13.4 No Other Rights. The provisions of this Section 5.13 are for the benefit of the Indemnitees and shall not be deemed to create any rights for the benefit of any other Person; *provided, however*, that the indemnification rights provided in this Section 5.13 will inure to the benefit of the heirs, legal representatives, successors, assigns and administrators of the Indemnitee.

5.13.5 No Liability. No Indemnitee shall be liable to the Company or to any Shareholder for any losses sustained or liabilities incurred as a result of any act or omission of any Indemnitee if (a) the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interests of the Company and, in the case of a criminal proceeding, had no reasonable cause to believe that his or her conduct was unlawful, and (b) the Indemnitee's conduct did not constitute an act or omission which involved intentional misconduct or a knowing violation of the law or gross negligence.

5.13.6 No Fiduciary Duties.

(a) In connection with the determination of any and all matters presented for action to the Shareholders, the Board of Directors or the Steering Committee, as applicable, the Shareholders acknowledge and agree that each Shareholder will be acting on its own behalf and each Representative serving on the Board of Directors or the Steering Committee will be acting on behalf of the Shareholder that appointed such Representative, to the fullest extent permitted by Applicable Law and subject to the fiduciary duties of the Representatives under the Company Act.

(b) Each Shareholder may act, and, to the fullest extent permitted by Applicable Law, will be protected for acting, in its own interest (subject to the express terms of any contract entered into by such Shareholder) without regard to the interest of the other Shareholder, and, subject to Section 5.13.6(c), each Representative may act, and, to the fullest extent permitted by Applicable Law, will be protected for acting, at the direction or control of or in a manner that such Representative believes is in the best interest of, the Shareholder that appointed the Representative without regard to the interest of the other Shareholder.

(c) Each of the Shareholders hereby waives, and shall cause the Company to waive, on its own behalf and on behalf of each of its subsidiaries, to the fullest extent permitted by Applicable Law, any claim or cause of action against any Shareholder or Director or member of the Steering Committee appointed by a Shareholder based on the determination of any and all matters presented for action to the Shareholders, the Board of Directors or the Steering Committee, as applicable; *provided, however*, the foregoing will not limit any Shareholder's obligation under, or liability for, breach of the express terms of this Agreement, other Transaction Documents or any other agreement that they have entered into with the Company or any of its subsidiaries or the other Shareholder. Each of the Shareholders acknowledges that no Shareholder shall negotiate or enter into or request or otherwise cause the Company to negotiate or enter into any agreement or transaction that would result in such Shareholder or any of its Affiliates receiving any financial consideration or other tangible property incentive, payment or other form of financial consideration or other tangible property consideration from any Governmental Authority or Person based upon the Company's taking an action (including hiring any employees, undertaking any construction or purchasing any equipment) or entering into such agreement or transaction other than as a Shareholder of the Company pursuant to this Agreement, and any Shareholder who receives any such consideration or other tangible property incentive, payment or other form of financial consideration or other tangible property consideration from any Governmental Authority or Person in respect of the Company's activities, shall promptly convey such consideration or other tangible property incentive, payment or other form of financial consideration or other tangible property consideration from any Governmental Authority or Person to the Company as a supplemental Capital Contribution without consideration including any adjustment in the Shares or Economic Interest of, or balance of requested Additional Contribution owed by, such Shareholder.

(d) The term “**Representative**” shall mean, with respect to a Shareholder, the Directors and members of the Steering Committee appointed by such Shareholder.

5.14 Officer

5.14.1 General Manager and Vice General Manager. The Company will have a general manager (the “**General Manager**”) to be nominated by Photonics Singapore with input from the Board of Directors and DNP Asia Pacific, and appointed by the Board of Directors; provided, however, that if the Percentage Interest of Photonics Singapore falls below fifty percent (50%) for more than one (1) month, then the General Manager will be nominated by DNP Asia Pacific with input from the Board of Directors and Photonics Singapore and appointed by the Board of Directors, if DNP’s Percentage Interest is above fifty percent (50%) or otherwise by the Board of Directors. If a Shareholder whose Percentage Interest fell below fifty percent (50%) subsequently increases its Percentage Interest above fifty percent (50%), such Shareholder shall have the right to nominate the General Manager again. The Company shall have a vice general manager (the “**Vice General Manager**”) to be selected by DNP Asia Pacific with input from the Board of Directors and Photonics Singapore; *provided, however*, that in the case where the General Manager is nominated by DNP Asia Pacific in accordance with the foregoing, then the Vice General Manager shall be selected by Photonics Singapore with input from the Board of Directors and DNP Asia Pacific. In the event the General Manager is unable to fulfill his duties as General Manager for any reason (including by reason of serious injury, illness or death), the Vice General Manager will take over the duties of the General Manager but will only do so until the next Board meeting at which time the General Manager will be appointed as Photonics Singapore or DNP Asia Pacific so nominated, as the case may be, in accordance with the foregoing in this Section 5.14.1.

5.14.2 Duties and Powers of the General Manager. The General Manager shall, subject to the control of the Board of Directors, have general supervision, direction and control of the day-to-day affairs of the Company and shall report directly to the Board of Directors. Unless limited by the Board of Directors or this Agreement, he or she shall have the general powers and duties of management usually vested in the office of chief executive officer of corporations and shall have such other powers and duties as may be prescribed by the Board of Directors.

5.14.3 Other Officers; Employment; Removal. The Company may also have a chief financial officer, a secretary and such other officers as determined by the Board of Directors after input from the General Manager and the Vice General Manager, each of whom will be accountable to the General Manager (the General Manager, the Vice General Manager and any other officers elected in accordance with this Section 5.14.3, each, an “**Officer**” and collectively, the “**Officers**”). Subject to Section 5.14.1, the General Manager, the Vice General Manager and any other Officer may be removed at any time upon an affirmative vote of the majority of the Board of Directors and the consent of the Shareholder who appoints/nominates such Officer in question.

5.14.4 Duties and Powers of Chief Financial Officer. Any chief financial officer of the Company shall keep and maintain, or cause to be kept and maintained, books and records of accounts of the properties and business transactions of the Company, including accounts of its assets, liabilities, receipts, disbursements, gains, losses and capital. He or she shall disburse the funds of the Company as may be ordered by the Board of Directors and shall render to the Board of Directors at their request an account of all his or her transactions as chief financial officer and of the financial condition of the Company. Authorizations with respect to the Company’s depositories, disbursement of funds and related banking matters shall be as set forth in resolutions of the Board of Directors.

5.14.5 Duties and Powers of Vice General Manager. The Vice General Manager shall assist the General Manager and shall have such other powers and duties as may be prescribed by the Board of Directors from time to time after consultation with the General Manager and DNP Asia Pacific or Photonics Singapore, who is entitled to appoint the Vice General Manager at that time.

5.14.6 Duties and Powers of Secretary.

(a) Any secretary of the Company shall attend all meetings of the Board of Directors and all meetings of the Shareholders and record all votes and the minutes of all proceedings in a book to be kept for that purpose, and shall perform like duties for any standing committees when requested by such committee.

(b) Any secretary of the Company shall keep, or cause to be kept, at the principal executive office or at the office of the Company’s transfer agent or registrar, as determined by resolution of the Board of Directors, a register, or a duplicate register, showing the names of all Shareholders and their addresses, Percentage Interests, the number and date of certificates issued for the same (if any), and the number and date of cancellation of every certificate surrendered for cancellation (if any).

5.14.7 General Provisions Regarding Officers.

(a) The Board of Directors may, from time to time, designate Officers of the Company and delegate to such Officers such authority and duties as the Board of Directors may deem advisable and may assign titles (including, without limitation, president, vice-president and/or treasurer) to any such Officer. Unless the Board of Directors otherwise determines, if the title assigned to an Officer of the Company is one commonly used for Officers of a business corporation, then, subject to the terms of this Agreement, the assignment of such title shall constitute the delegation to such Officer of the authority and duties that are customarily associated with such office. Any number of titles may be held by the same Officer.

(b) Any Officer to whom a delegation is made pursuant to the foregoing shall serve in the capacity delegated unless and until such delegation is revoked by the Board of Directors for any reason or no reason whatsoever, with or without cause, or such Officer resigns.

5.15 **Steering Committee**

5.15.1 Scope of the Steering Committee. Immediately after the Effective Date, the Shareholders will establish a steering committee (the “**Steering Committee**”) to review and discuss the following matters in relation to the Company: development of photomask technology roadmap, and establishment and prioritization of goals in the development of photomask technology for future process nodes; product development partner alignment, customer partnerships, captive mask operation engagement, the R&D model for the Company. One of the key responsibilities of the Steering Committee will be to evaluate technology and business development initiatives for the Company and decide on proposals brought forth to support such technology and business development objectives using a pre-agreed evaluation criteria including criteria indicated in Schedule K.

5.15.2 Composition of the Steering Committee. The Steering Committee shall consist of four (4) members, two (2) members appointed by Photronics Singapore and two (2) members appointed by DNP Asia Pacific, and such four (4) members may include the General Manager of the Company at the discretion of the appointed Shareholder. The term of a chairman who is appointed from and among the members of the Steering Committee (the “Steering Committee Chairman”) shall be one year from its election. The Steering Committee Chairman will be initially appointed by Photronics Singapore, and thereafter the position of the Steering Committee Chairman will rotate annually between the members appointed by Photronics Singapore and those appointed by DNP Asia Pacific.

5.15.3. Procedures of the Steering Committee. The items listed in Section 5.15.1 above shall be reviewed and determined between the parties in accordance with the following procedure:

(i) The Steering Committee shall convene regular meetings on a monthly basis for the first three months after the Effective Date; thereafter the Steering Committee will determine how often it will meet. The Steering Committee shall discuss the matters listed in Section 5.15.1 above. The Steering Committee will prepare a meeting agenda for each meeting and will keep minutes of its meetings. Agenda items will include formal review of proposals brought forth by DNP Asia Pacific, Photonics Singapore or PDMC and the sales and management functions of the Company. The Steering Committee will vote on specific matters within the charter of the committee and render decisions on specific proposals brought forth within the scope of the committee. The Steering Committee will use all reasonable efforts to amicably resolve all matters brought before the Steering Committee with a goal of resolving all matters prior to raising such matters with the Board of Directors.

(ii) In the event a proposal is brought to the Steering Committee and the Steering Committee cannot reach a unanimous decision in a timely matter, then, either Photonics Singapore or DNP Asia Pacific may declare the disagreement to the other Shareholder. If the disagreement continues to be unresolved within two (2) weeks from the date of declaration, either Shareholder may refer the unresolved proposal to the Chief Executive Officer of Photonics and the General Manager of DNP's Fine Optronics Operations. The meeting between these executive members shall be convened within two (2) weeks after submission of either Shareholder's request made after the lapse of the two-week period mentioned in the previous sentence, and they will meet together with the goal of trying to resolve obstacles causing the disagreement and decide the proposal.

(iii) In the event the proposal cannot be resolved at the meeting between the Chief Executive Officer of Photonics and the General Manager of DNP's Fine Optronics Operations, then either Photonics Singapore or DNP may refer the unresolved proposal to the Board of Directors of the Company for consideration and final voting. The meeting of Board of Directors of the Company shall be convened within two (2) weeks after submission of either Shareholder's request.

(iv) If the vote by the Board of Directors cannot be accepted by DNP, DNP will have the right, subject to Section 5.15.4 below, to exercise a put option whereby Photonics will have the obligation to purchase all of DNP Asia Pacific's Shares in the Company pursuant to the terms and conditions set forth in Section 5.15.4 (such put option being referred to as the "**DNP Exit Option**") and terminate this Agreement and the Transaction Documents to which DNP or DNP Asia Pacific is a party without any liability; provided however that the License Agreement from DNP to PDMC will continue to be in full force and effect notwithstanding the fact that the Company ceases to be a joint venture between Photonics Singapore and DNP Asia Pacific.

5.15.4 **DNP Exit Option.** DNP may exercise the DNP Exit Option by giving a written notice to Photronics (the “**DNP Exit Option Notice**”) at any time after the expiration of the Initial Two-Year Term. Photronics agrees to use all reasonable efforts to apply for all applicable regulatory approvals or clearance within thirty (30) days after receipt of the DNP Exit Option Notice. The closing of the sale and purchase of DNP Asia Pacific’s Shares as a result of the DNP Exit Option (the “**DNP Exit Closing**”) shall take place as soon as commercially practicable (taking into account the necessary funds raising arrangement by Photronics Singapore) without any undue delay and shall be within three (3) Business Days after all prior regulatory approvals or clearance have been obtained. The DNP Exit Closing Price shall be equal to the product of the difference of (I) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the date of the DNP Exit Option Notice, minus (II) the Net Book Value of the Company Liabilities as of the last day of the Fiscal Month immediately prior to the date of the DNP Exit Option Notice, divided by the number of Issued and outstanding Shares of the Company as of the date of the DNP Exit Option Notice, multiplied by the number of Shares held by DNP Asia Pacific as of the date of the DNP Exit Closing. The DNP Exit Closing Price shall be paid by Photronics pursuant to the terms and conditions agreed to upon the exercise of the DNP Exit Option, but the DNP Exit Closing Price shall be fully paid within seven (7) years from the exercise of the DNP Exit Option.

At the DNP Exit Closing, DNP shall transfer all of its Interests in the Company to Photronics, free and clear of any liens or encumbrances, and Photronics shall pay the amount of all or part of the DNP Exit Closing Price that Photronics will be required to pay upon the DNP Exit Closing to DNP. At the DNP Exit Closing, DNP shall deliver to Photronics such instrument or instruments of conveyance as Photronics Singapore reasonably requests.

DNP will not be able to exercise the DNP Exit Option for the Initial Two-Year Term.

DNP will continue to be bound by the non-compete obligations set forth in Section 8.1 for a period of twelve (12) months following the date of the DNP Exit Option Notice (in which case, the one-year period surviving after the termination set forth in Section 8.1 does not apply). In the event the DNP Exit Closing (i.e., receipt of all necessary regulatory approvals and completion of the transfer of DNP’s Interest to Photronics but not including full payment of the DNP Exit Closing Price) takes longer than sixty (60) days from the exercise of the DNP Exit Option, DNP and Photronics will agree on a delay of the commencement date of the twelve-month period of the non-compete obligations set forth in this Section, but in no event shall such commencement date be delayed for more than sixty (60) days from the date of the DNP Exit Option Notice.

5.16 Business Development Team

The Company’s sales organization will have a consolidated structure reporting to a single lead who is employed by the Company, and the sales organization will have one group focused on day to day sales realization (the “**Sales Function**”) and a second group focused on new business development (the “**Business Development Team**”). The Business Development Team will be initially organized outside the Company, and will consist of one employee from PDMC, one employee from Photronics or one of its Affiliates and one employee from DNP. The initial period for assignment to the Business Development Team of members from each PDMC, Photronics and DNP appointee will be one (1) year. The Shareholders will mutually decide on the period of assignment after the initial period. The Business Development Team will report to the employee who has overall responsibility for the Company’s sales organization. The Business Development Team will also report to the Steering Committee on each Steering Committee session or upon the request of each Shareholder. The employee who will have overall responsibility for the Company’s sales organization does not have to be a resident of the Territory at the Effective Date, but it is expected that such employee may eventually reside in the Territory. All expenses (such as salary, travel, living, etc.) of members of the Business Development Team from Photronics or its Affiliates or DNP will be paid by the party appointing the member. The Company will have a sales manager who is in charge of the Sales Function based in either Xiamen or Shanghai.

For the purpose of clarification, the employees working for the Sales Function (including those assigned from either party or its Affiliates) and the members of the Business Development Team may meet with a customer in the Territory to the extent necessary for performing such duties and functions as permitted by the Company, and may not be subject to the restrictions set forth in Section 8.3; provided however the Business Development Team will report on any such meetings and the status of any such meetings to the Steering Committee, and the Steering Committee will approve all such projects or engagements as have been developed by the Business Development Team, in accordance with the procedures of the Steering Committee set forth in Article 5.15, before the commencement of carrying out such projects or engagements.

From time to time, the engineering resources of one or both parties may be required to assist in the resolution of a customer issue and if such request is made by the Business Development Team or the Sales Function of the Company, then Photonics, DNP and/or their Affiliates will make all reasonable effort to support the request. In this case, each of Photonics and DNP may, at its discretion, have its engineers attend or participate in the visit to such customer.

5.17 Maintenance of Insurance

The Company shall at all times be covered by insurance of the types and in the amounts set forth on Schedule E. Such insurance coverage may be provided through the coverage under one or more insurance policies maintained by the Company, Photonics or Photonics Singapore. A certificate of insurance will be provided by the Company to the Shareholders annually evidencing coverage.

5.18 Related Party Agreements

Photonics Singapore and DNP agree that (i) any contract, agreement, amendment, arrangement or understanding entered into after the date hereof between any Company Entity on the one hand, and either Shareholder (or any of their respective Affiliates) on the other hand (the “**Related Party Agreement**”), shall be on an arm’s-length basis; and (ii) Directors nominated by a Shareholder who or whose Affiliate is a party to a Related Party Agreement shall be deemed having a personal interest in such Related Party Agreement and shall refrain from voting on such Related Party Agreement at the relevant board meeting in accordance with the Acts.

**ARTICLE 6.
OPERATIONS**

6.1 Headquarters

The Company's headquarters shall be in Xiamen, the People's Republic of China.

6.2 Operations Plan; Annual Budget

The initial business plan of the Company is attached hereto as Schedule H that covers the business scope and the startup plan of the Company from execution of the Transaction Documents until commencement of full operation of the Company's facilities. The initial business plan will not be substantially modified without the prior written consent of both Shareholders. After commencement of full operation of the Company's facilities, from time to time, but in no event less frequently than annually, the Board of Directors may amend or update the business plan of the Company (collectively with the initial business plan, referred to as the "**Business Plan**"). The Board of Directors will also be responsible for approving an annual budget (the "**Annual Budget**") on at least an annual basis at the beginning of each fiscal year.

6.3 Reserved [RESERVED]

6.4 Company Employees; Seconded Employees

The Company shall employ its own personnel and shall be their exclusive employer. In addition, certain other persons who are employed by a Shareholder or its Affiliates may be assigned by such Shareholder, to work for the Company ("**Seconded Employees**"). After the Effective Date, the Company will pay remuneration substantially equal to local pay grade customarily remunerated for their respective positions and the assigning Shareholder shall be responsible for all other remuneration and costs. During the term of this Agreement from the Effective Date, DNP shall have the right to appoint three Seconded Employees to be assigned for the Company ("**Three DNP Appointed Seconded Employees**"), one of the Three DNP Appointed Seconded Employees will be the Vice General Manager selected by DNP in accordance with Section 5.14.1, one (1) employee will work in the Sales Function and one (1) employee will work in the manufacturing department. DNP will pay all remuneration expenses related to such employees. If the Company does not desire but DNP desires to assign any Seconded Employees (other than the Three DNP Appointed Seconded Employees) to the Company, DNP shall seek the Company's consent for assigning such Seconded Employees to the Company and the costs for such Seconded Employees shall be solely borne by DNP. Seconded Employees will not be considered employees of the Company but rather will be considered subcontractors of the Company. All Seconded Employees will be subject to stringent confidentiality obligations including executing a confidentiality agreement with the Company. All Seconded Employees will report directly to the General Manager and the Vice General Manager.

6.5 Service Provider Documents

6.5.1 The Company shall have policies applicable to, and ensure that all of its officers, employees and third-party independent contractors, third-party consultants, and other third-party service providers enter into appropriate agreements with respect to, (1) protection of confidential information of the Company, (2) compliance with Applicable Law, and (3) other matters related to the delivery of services to, or employment of such Person by, the Company or its Affiliates. The Company shall have policies applicable to, and ensure that all of its officers and employees enter into appropriate agreements with respect to intellectual property assignment, including invention disclosures, pursuant to which ownership to any intellectual property created in the course of employment with the Company or any of its Affiliates shall be assigned to the Company. The Company shall have policies applicable to, and ensure that all of its third-party independent contractors, third-party consultants, and other third-party service providers that create intellectual property in the course of performing services for the Company, enter into appropriate agreements with the Company with respect to the Company's ownership of or the Company's right to use such intellectual property. The forms referred to in this Section 6.5.1 are collectively referred to as the "**Service Provider Documents.**"

6.5.2 Notwithstanding any preceding provisions in this Section 6.5 or elsewhere, no Seconded Employee shall be required to sign any Service Provider Documents, except with respect to acknowledgement of an agreement regarding policies of the Company addressing conduct while performing services at the premises of the Company, such as workplace safety, but excluding matters relating to protection of confidential information of the Company and intellectual property assignment, which issues have been addressed in special Service Provider Documents. The Company shall be responsible for providing such Service Provider Documents, prepared by the Company for each Seconded Employees to the appropriate Seconded Employees, following up to make sure they are signed and for properly storing such forms; and each Shareholder shall cooperate with the Company to require their Seconded Employees to sign such special Service Provider Document when requested to do so by the Company.

6.6 Compensation and Benefits

The Company shall have compensation and benefits programs (including incentive compensation programs) for the employees of the Company (excluding, for this purpose, Seconded Employees) at its locations consistent with local practices, as determined by the Board of Directors or the General Manager, as applicable, and, to the extent required by Applicable Law or this Agreement, approved by the Board of Directors.

ARTICLE 7.
DISPOSITION AND TRANSFERS OF INTERESTS

7.1 Holding of Shares

For so long as Photronics Singapore or DNP, directly or indirectly, owns Shares in the Company, Photronics Singapore or DNP, as applicable, must own and hold such Shares either (a) by itself or (b) through one or more wholly owned (including indirect wholly owned) subsidiaries.

7.2 Transfer Moratorium

7.2.1 Other than as specifically provided in this Agreement, no Shareholder may Transfer all or any portion of its Shares to any other Person without the prior written consent of the other Shareholder, nor shall Photronics Singapore or DNP without the prior written consent of the other, directly or indirectly, Transfer its ownership interest in any wholly owned subsidiary (including any indirect wholly owned subsidiary) that owns, directly or indirectly, the Shares held by Photronics Singapore or DNP, respectively, in each case other than (i) to a wholly owned (including indirect wholly owned) subsidiary, or (ii) in a Transfer by Photronics Singapore in connection with a Change in Control of Photronics, or in a Transfer by DNP in connection with a Change in Control of DNP, as the case may be, in compliance with the terms of Section 7.4 of this Agreement. The parties agree that the Transfer of Shares by a Shareholder in contravention of this Agreement shall be void and, among other matters, constitute a material breach of this Agreement. In the event of any purchase and sale of Shares as permitted under this Section 7.2, the parties thereto shall agree to amend this Agreement accordingly.

7.2.2 Transfer Notice. If any Shareholder proposes to Transfer any of its Shares, whether directly or indirectly (the “**Selling Shareholder**”), such Selling Shareholder shall promptly provide written notice (the “**Transfer Notice**”) to the other Shareholder (the “**Non-Selling Shareholder**”) describing in reasonable detail the proposed Transfer, including, without limitation, the number of Shares subject to the Transfer, the nature of the Transfer, the identity of the purchaser(s) and transferee(s), the amount and form of consideration to be paid, and the anticipated closing date of the Transfer. The Transfer Notice may be updated from time to time by the Selling Shareholder by a further written notice to the Non-Selling Shareholder. The Non-Selling Shareholder shall also receive any updates to the terms of the proposed Transfer and shall have the right to obtain any information it reasonably requests from time to time in connection with the proposed Transfer.

7.2.3 Right of First Refusal. The Non-Selling Shareholder shall have a right to purchase all of the Shares subject to the proposed Transfer at the same price and upon the terms and conditions specified in the Transfer Notice, by giving a written response notice to the Selling Shareholder within thirty (30) days from the date of receipt of the Transfer Notice (or, if applicable, the date of receipt of the final update to the Transfer Notice). A failure by the Non-Selling Shareholder to provide a response notice within such thirty (30) day period shall be deemed to constitute a decision by such Shareholder not to exercise its right to purchase the Shares subject to the proposed Transfer.

7.2.4 **Co-Sale Right.** In the event that the Non-Selling Shareholder does not wish to exercise its right of first refusal, the Non-Selling Shareholder shall have the right to participate in the proposed Transfer by selling any or all of its Shares to the proposed purchaser(s) or transferee(s), on the same terms and conditions as specified in the Transfer Notice. Such right to participate shall be exercised by the Non-Selling Shareholder in a written response to the Selling Shareholder within (30) days from the date of receipt of the Transfer Notice (or, if applicable, the date of receipt of the final update to the Transfer Notice), stating the number of Shares of the Non-Selling Shareholder that such Non-Selling Shareholder wishes to sell to the proposed purchaser(s) or transferee(s) (the “**Response Shares**”). In the event that the proposed purchaser(s) or transferee(s) do not wish to acquire all of the Response Shares, then the Non-Selling Shareholder shall be entitled to sell such number of Shares equal to the Percentage Interest of the Non-Selling Shareholder times the total number of Shares subject to the proposed Transfer.

7.2.5 The sale of all Response Shares and, if applicable, remaining Shares subject to the Transfer Notice, and full payment therefor, shall be completed within thirty (30) days after the anticipated closing date specified in the Transfer Notice (or as updated pursuant to Section 7.2.2 above). In the event that such purchase and sale is not completed within such thirty (30) day period, the Selling Shareholder shall not thereafter sell any Shares without first offering such Shares to the Non-Selling Shareholder in accordance with this Section 7.2.

7.2.6 In the event that the Non-Selling Shareholder does not exercise any right under Section 7.2.3 or 7.2.4 above, the Selling Shareholder may Transfer any of its Shares subject to the Transfer Notice at the same price and upon the terms and conditions specified in the Transfer Notice, provided that the proposed Transfer shall be completed within thirty (30) days after the anticipated closing date specified in the Transfer Notice (or as updated pursuant to Section 7.2.2 above).

7.2.7 The restrictions set forth in this Section 7.2 shall not apply to any Transfers by a Selling Shareholder to one or more of its wholly owned (including indirectly wholly owned) subsidiaries as permitted under Section 7.1.

7.2.8 Notwithstanding anything to the contrary set forth herein, no Transfer shall take place between a Shareholder and any competitor as identified on Schedule L.

7.3 Purchase and Sale of Remaining Interest

7.3.1 If the Percentage Interest of a Shareholder (the “**Minority Shareholder**”) is twenty percent (20%) or less after the Initial Seven-Year Term, and remains at or below twenty percent (20%) for more than six (6) consecutive months the other Shareholder or a wholly owned subsidiary thereof (such other Shareholder or Affiliate thereof, the “**Majority Shareholder**”) shall have the option to purchase all of the remaining Interest of the Minority Shareholder at a purchase price equal to the Minority Closing Price, subject to the terms and conditions set forth below. The Majority Shareholder may exercise this purchase option by delivering a written notice of its intent to exercise to the Minority Shareholder. In addition, the Minority Shareholder shall have the option to sell all of the remaining Interest of the Minority Shareholder to the Majority Shareholder at a purchase price equal to the Minority Closing Price, subject to the terms and conditions set forth below. The Minority Shareholder may exercise this put option by delivering a written notice of its intent to exercise to the Majority Shareholder. The notice delivered by the Majority Shareholder or the notice delivered by the Minority Shareholder pursuant to this Section 7.3.1 is hereinafter referred to as the “**Minority Option Notice.**”

7.3.2 The closing of the purchase and sale of the Minority Shareholder's remaining Interest (the "**Minority Closing**") shall take place as soon as commercially practicable without any undue delay and shall be within three (3) Business Days after all prior regulatory approvals or clearance have been obtained. Such Minority Closing shall take place at the principal office of the Company or at such other location as the Majority Shareholder and the Minority Shareholder may mutually determine. At the Minority Closing, (i) the Minority Shareholder shall transfer its remaining Interest in the Company to the Majority Shareholder, free and clear of any liens or encumbrances, (ii) the Majority Shareholder shall pay the Minority Shareholder the amount of all or any part of the Minority Closing Price that the Majority Shareholder will be required to pay upon the Minority Closing; and (iii) the Minority Shareholder shall deliver to the Majority Shareholder such instrument or instruments of conveyance as the Majority Shareholder reasonably requests. The Majority Shareholder agrees to apply for all applicable regulatory approvals or clearance within thirty (30) days after receipt of such notice of put option from the Minority Shareholder.

7.3.3 The price for the Interests that the Majority Shareholder shall pay to the Minority Shareholder (the "**Minority Closing Price**") shall be equal to the product of (i) the difference of (a) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the date of the Minority Option Notice, minus (b) the Net Book Value of all Company Liabilities as of the last day of the Fiscal Month immediately prior to the date of the Minority Option Notice, divided by the number of Issued and outstanding Shares of the Company as of the date of the last day of the Fiscal Month immediately prior to the date of the Minority Option Notice, multiplied by the number of the Shares held by the Minority Shareholder as of the date of the Minority Closing. The Minority Closing Price shall be paid by the Majority Shareholder pursuant to the terms and conditions agreed to upon the exercise of the option set forth in Section 7.3.1, but the Minority Closing Price shall be fully paid within seven (7) years from the exercise of such option.

7.3.4 The Minority Shareholder will continue to be bound by the non-compete obligations set forth in Section 8.1 for a period of twelve (12) months following the date of the Minority Option Notice (in which case, the one-year period surviving after the termination set forth in Section 8.1 does not apply). In the event the Minority Closing (i.e., receipt of all necessary regulatory approvals and completion of the transfer of the Minority Shareholder's Interest to the Majority Shareholder but not including full payment of the Minority Closing Price) takes longer than sixty (60) days from the date of the Minority Option Notice, DNP and Photronics will agree on a delay of the commencement date of the twelve-month period of the non-compete obligations set forth in this Section, but in no event shall such commencement date be delayed for more than sixty (60) days from the date of the Minority Option Notice.

7.4 Change in Control

7.4.1 The parties will provide at least sixty (60) days but no more than one hundred eighty (180) days' notice (the "**Change in Control Notice**") to the other party of such proposed Change in Control; *provided*, that if such Change in Control is in connection with an unsolicited tender offer or proxy contest, then the parties will provide notice to the other party of such proposed Change in Control as promptly as practicable but in no event less than two (2) Business Days following the commencement of such tender offer or the notice to the Change in Control Party (defined in Section 7.4.2 below) of such proxy contest.

7.4.2 If Change in Control occurs to Photronics, Photronics Singapore, DNP or DNP Asia Pacific (respectively, the "**Change in Control Party**"), the other party (the "**Change in Control Purchaser**" which is either Photronics if the Change in Control Party is DNP or DNP Asia Pacific, or DNP if the Change in Control Party is Photronics or Photronics Singapore) will have the right to purchase all of Shares of Change in Control Party at a cash purchase price equal to the Change in Control Closing Price, subject to the terms and conditions set forth below. The Change in Control Purchaser may exercise this purchase option by delivering a written notice of its intent to exercise to the Change in Control Party. This notice shall be provided no later than twenty-one (21) days following the Change in Control Purchaser's receipt of the Change in Control Notice. The Change in Control Purchaser agrees to apply for all applicable regulatory approvals or clearance within thirty (30) days after receipt of the Change in Control Notice. The closing of the Change in Control Purchaser's acquisition of the Shares of the Change in Control Party (the "**Change in Control Closing**") shall take place on the later of: (i) on the date of Change in Control simultaneously with such Change in Control, or (ii) within three (3) Business Days from all necessary approval from Governmental Authority for Change in Control Closing has been obtained. Such Change in Control Closing shall take place at the principal office of the Company or at such other location as the Shareholders may mutually determine. At the Change in Control Closing, the Change in Control Party shall transfer its Shares in the Company to the Change in Control Purchaser, free and clear of any liens or encumbrances, and the Change in Control Purchaser shall pay the Change in Control Closing Price by wire transfer of cash to the Change in Control Party. At the Change in Control Closing, the Change in Control Party shall deliver to the Change in Control Purchaser such instrument or instruments of conveyance as the Change in Control Purchaser reasonably requests.

7.4.3 The price for the Interests that the Change in Control Purchaser shall pay to the Change in Control Party (the “**Change in Control Closing Price**”) shall be equal to the product of (i) the difference of (a) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the Change in Control Notice, minus (b) the Net Book Value of the Company Liabilities as of the last day of the Fiscal Month immediately prior to the date of the Change in Control Notice, divided by the number of Issued and outstanding Shares of the Company as of the date of the last day’ of the Fiscal Month immediately prior to the date of the Change in Control Notice, multiplied by the number of the Shares held by the Change in Control Party as of the date of the Change in Control Closing. The Change in Control Closing Price shall be paid by the Change in Control Purchaser pursuant to the terms and conditions agreed to upon the exercise of the option set forth in Section 7.4.2, but the Change in Control Closing Price shall be fully paid within seven (7) years from the exercise of such option.

7.4.4 The Change in Control Party will continue to be bound by the non-compete obligations set forth in Section 8.1 for a period of twelve (12) months following the date of the Change in Control Notice (in which case, the one-year period surviving after the termination set forth in Section 8.1 does not apply). In the event the Change in Control Closing (i.e., receipt of all necessary regulatory approvals and completion of the transfer of the Change in Control Party’s Interest to the Change in Control Purchaser but not including full payment of the Change in Control Closing Price) takes longer than sixty (60) days from the date of the Change in Control Notice, DNP and Photronics will agree on a delay of the commencement date of the twelve-month period of the non-compete obligations set forth in this Section, but in no event shall such commencement date be delayed for more than sixty (60) days from the date of the Change in Control Notice.

7.5 Purchase and Sale Agreement

In the event of any purchase and sale of Shares under Section 7.3 or 7.4, the parties thereto shall enter into a commercially reasonable agreement to implement such purchase and sale. The parties thereto shall also make the necessary amendments to this Agreement.

ARTICLE 8. NON COMPETE

8.1 Non-Competition

8.1.1 During the term of this Agreement and one (1) year after the expiration or termination of this Agreement (unless otherwise set forth in this Agreement), the parties shall not and shall ensure that its or their Affiliates, directly or indirectly, do not, whether solely or jointly with any other Person, and whether as principal, agent, director, executive officer, employee, shareholder, partner, member, joint venture partner, adviser, consultant or otherwise, carry on or engage or be or become involved in, or assist others in engaging or being involved in, any trade, business, activity or undertaking within the Territory which is or could reasonably be expected to be competitive with the Business of the Company. In the event that the Company, directly or through outsourcing to the suppliers under this Agreement, cannot supply or satisfy local customer(s) within the Territory, the parties will discuss other options to satisfy the needs of such customer(s).

For the purpose of clarification, (i) the design, development, fabrication, and sale of master templates and/or replica templates used for manufacturing integrated circuits by nanoimprint lithography technologies, and (ii) the design, development, fabrication, sale, distribution of material, equipment, or software, and the provision of data preparation service, even if these products or services are related to photomask production, are not regarded as competitive with the Business of the Company, and neither parties nor their Affiliates will be restricted from engaging in any such business in or outside of the Territory. For activities related to (i) and (ii) above, (a) the parties will keep the Company informed of these activities through the Steering Committee, if they may lead to manufacturing of finished photomasks within the definition of the Business, (b) the manufacture and shipment of processed test masks, qualification masks or production masks directly from the parties to a customer within the Territory and within the definition of the Business under these activities will be considered a violation of the non compete obligations set forth in Section 8.1, and (c) for the purpose of this (a) and (b) and if necessary, the Company and the party(ies) who is carrying out such activities may collaborate to develop finished mask processes within the definition of the Business and such collaboration proposals will be reviewed and approved by the Steering Committee before starting. To materialize such collaboration, for activities related to (ii) above, the party(ies) who is carrying out such activities will make such materials etc. available for the Company to manufacture and ship photomasks to the customer under such collaboration.

8.1.2 During the term of this Agreement and one (1) year after the expiration or termination of this Agreement, the parties shall not and shall ensure that its or their Affiliates do not (either personally or through an agent or otherwise) (i) induce or attempt to induce any supplier of the Company or any of its Affiliates to cease to supply, or to restrict or vary the terms of supply to, any of them; or (ii) solicit for employment or hire any employee, officer or director of the Company or any of its Affiliates, without the written approval of the other party; provided, however, that nothing herein shall restrict a party or its respective Affiliates from employing any employee, officer or director of the Company or any of its Affiliates who voluntarily respond to an advertisement addressed to general public for employment that is placed by or on behalf of the employing party.

8.2 Business Scope of the Company

8.2.1. A purchase order placed by a company with headquarters or substantial operations in the Territory is considered to be within the business scope of the Company and therefore subject to the non-compete obligations set forth in Section 8.1, irrespective of whether photomasks manufactured under such purchase order are delivered in or outside the Territory.

8.2.2 A purchase order placed by a company with headquarters or substantial operations outside the Territory (the “**Foreign Customer**”) will be classified into the following two primary categories and interpreted as follows:

(i) In the first category, if the Foreign Customer owns or controls (defined herein as having greater than fifty percent (50%) of the outstanding Shares of the entity, or ability to nominate a majority of the Board of Directors of the entity) a wafer manufacturing operation in the Territory, then a purchase order for photomasks to be used in the Territory placed outside the Territory by such Foreign Customer will be considered part of the business scope of the Company and subject to the non-compete obligations set forth in Section 8.1. Notwithstanding the above, if such Foreign Customer refuses to place purchase order with the Company, the Shareholders shall refer the issue to the Steering Committee to find mutually acceptable solution so that business opportunities of the Company, the Shareholders or its Affiliates will not be lost; and

(ii) In the second category, if the Foreign Customer places the purchase order outside the Territory and pays directly for the photomasks manufactured thereunder outside of the Territory and moreover the Foreign Customer does not own or control a wafer manufacturing operation in the Territory, then this Foreign Customer will not be subject to the non-compete obligations set forth in Section 8.1. Notwithstanding the above, the Shareholders and/or their Affiliates may have photomasks under the purchase order placed by the Foreign Customer in the second category manufactured by the Company for fulfillment under terms and conditions consistent with the original purchase order and mask manufacturing strategy, subject to approval of such Foreign Customer and further subject to the Company’s payment of a commission at the rate of five percent (5%) of the price of such photomasks to any of the Shareholders or their Affiliates who receives the original purchase order.

8.3 Contact with Customers

8.3.1 The Company will be the sole interface with all customers in the Territory within the business scope of the Company, and all customer proposals involving Photronics and DNP and its or their Affiliates and within the purpose of the Steering Committee described in Section 5.1 of this Agreement will go through the Steering Committee for timely review.

8.3.2 No employees from either Photronics or DNP (including their Affiliates) can directly or indirectly contact or meet with a customer or potential customer of the Company in the Territory within the business scope of the Company unless such contact is pursuant to an overall project that has been previously approved by the Steering Committee and, is within a project under the day to day planning and management of the Company. If either party desires to have contact with a customer or potential customer of the Company in the Territory within the business scope of the Company but not pursuant to the previously approved project, such party will inform the Steering Committee of its request to have contact and the purpose thereof, and will seek approval from the Steering Committee prior to any such contact. A project coordinator will be appointed by the Steering Committee for each such approved project, contact or attendance hereunder. The project coordinator must coordinate and attend any visit to or contact with such customer or potential customer, and it is the responsibility of the project coordinator to report the project updates and progress to the Steering Committee.

Notwithstanding the foregoing, (a) the Chief Executive Officer or Chief Technology Officer of Photronics or other positions of equivalent corporate and executive level and of a non-sales function that might be requested from time to time by Photronics to DNP or another equivalent member of Photronics's executive management team, and (b) the Director of DNP, or General Manager or Vice General Manager of DNP's Fine Optronics Operations or other positions of equivalent corporate and executive level and of a non-sales function that might be requested from time to time by DNP to Photronics or another equivalent member of DNP's executive management team, and any director, officer or employee who is engaged with any business of DNP or its Affiliates which are not related to photomasks, are free to meet with a customer or potential customer in the Territory, subject to the non-compete obligations set forth in Section 8.1.

ARTICLE 9.
TERM AND TERMINATION OF THIS AGREEMENT

9.1 Term of this Agreement

9.1.1 This Agreement shall enter into force as of the Effective Date, and remain in force throughout the duration of the Company if not terminated earlier as provided for in Section 9.1.2 or 9.2.

9.1.2 In the event that one of the Shareholders (or its Affiliates) ceases to be a shareholder of the Company for any reason, this Agreement is automatically terminated, except that the twelve (12)-months-non-compete obligations of the Shareholders after such Shareholder cease to hold Shares in the Company, as mentioned under Section 1.6.2, Section 5.15.4, Section 7.3.4 and Section 7.4.4, and the post-termination/expiration-non-compete obligation mentioned under Section 8.1 shall survive the termination of this Agreement..

9.2 Termination and Cross-termination

9.2.1 Notwithstanding Section 9.1, this Agreement may be terminated by either party at any time, upon notice given to the other party:

(a) in the event of a material breach of this Agreement by such other party, which such other party has failed to effectively remedy within sixty (60) days of the notice issued by the non-breaching party;

(b) in the event of the liquidation or winding up (whether voluntary or involuntary), bankruptcy, insolvency, moratorium, composition or subjection to other insolvency or quasi-insolvency procedure (whether or not judicially supervised), of or with respect to such other party, or the filing by such other party of an application with a view to being admitted or subjected to any such or other similar procedure or status, or the entering by such other party into voluntary negotiations with its creditors, or the conclusion between such other party and its creditors of voluntarily rescheduling or composition arrangements, in any jurisdiction;

(c) in the event of the acquisition by the Government of control, requisitioning or commandeering in any jurisdiction of such other party, or of all or substantially all of such other party's business or assets; or

(d) in the event of such other party discontinuing, or being permanently or durably prevented or prohibited from continuing, its business or activities in any jurisdiction.

In the case of termination pursuant to this Section 9.2.1(a) the one-year period surviving after the termination set forth in Section 8.1 does not apply to the Terminating Party (defined in Section 9.3), and the Terminating Party will be immediately released from the non-compete obligations set forth therein upon the termination hereunder.

9.2.2 In addition to Section 9.2.1, this Agreement may be terminated by DNP in the event that the Company cannot achieve the status of "being operational" defined in the Outsourcing Agreement within five (5) years from the Effective Date, in which case, DNP may exercise the same option as that given to the Requesting Shareholder set forth in Section 10.4; provided that, prior to DNP exercising such option, both parties will discuss dissolution and liquidation of the Company in accordance with Section 10.4. In the case of termination pursuant to this Section 9.2.2, the one-year period surviving after the termination set forth in Section 8.1 does not apply, and the parties will be immediately released from the non-compete obligations set forth therein upon the termination hereunder.

9.2.3 The parties agree that:

(a) the termination of this Agreement shall not (unless otherwise specified in the Transaction Documents concerned) produce the automatic cross termination of any of the Transaction Documents, unless a Transaction Document is terminated in accordance with Section 9.2.3 (c);

(b) the termination of any of the Transaction Documents shall not produce the automatic cross-termination of this Agreement;

(c) the party who terminates this Agreement in accordance with Section 9.2.1 or 9.2.2 above shall have the right to terminate any or all of the Transaction Documents, to which it is a party without any liability; provided, however, that, in the event that this Agreement is terminated by DNP in accordance with Section 9.2.2, DNP is not entitled to terminate the Amended and Restated License Agreement or other agreement that requires DNP to supply, or grant a license to use, technology to the Company that is in effect at the time of termination will continue after such termination as long as any counterparty to the applicable agreement (the Company or PDMC) is not in breach of any of the terms and conditions thereof;

(d) the termination of this Agreement shall not affect the respective rights and obligations of the parties having accrued prior thereto, under this Agreement; and

(e) the termination rights, remedies and provisions arising from Applicable Laws shall, to the extent not waived or excluded hereby, cumulate with those specified under this Section 9.2.3.

9.3 Right of Terminating Party

The parties agree that the party who terminates this Agreement in accordance with Section 9.2.1 (the “**Terminating Party**”) shall have the right:

(a) to claim against the other party (i) compensation for losses of the Terminating Party arising from the event listed in Section 9.2.1 and/or the termination in accordance with Section 9.2.1; and (ii) reimbursement in the amount equal to the Company’s loss arising from the event listed in Section 9.2.1 and/or the termination in accordance with Section 9.2.1 multiplied by the Terminating Party’s Percentage Interest; and

(b) by giving the notice to the other party within thirty (30) days of termination of this Agreement, to (i) sell all of its Shares to the other Party at the price of (x) a sum equal to the product of (i) the difference of (a) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the termination, minus (b) the Net Book Value of the Company Liabilities as of the last day of the Fiscal Month immediately prior to the termination, and (ii) the Percentage Interest of the Terminating Party at the time the termination or (y) the Terminating Party’s book value of the Shares, whichever is higher, or (ii) purchase all of the other party’s Shares, at the price of (x) a sum equal to the product of (i) the difference of (a) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the termination, minus (b) the Net Book Value of the Company Liabilities as of the last day of the Fiscal Month immediately prior to the termination, and (ii) the Percentage Interest of the other party at the time the termination or (y) the other party’s book value of the Shares, whichever is lower. At the closing of the purchase of the Shares under this Section 9.3(b), (i) the selling Shareholder shall transfer its remaining Interest in the Company to the purchasing Shareholder, free and clear of any liens or encumbrances, (ii) the purchasing Shareholder shall pay the price calculated in accordance with the above by wire transfer of cash and (iii) the selling Shareholder shall deliver to the purchasing Shareholder such instrument or instruments of conveyance as the purchasing Shareholder reasonably requests. The purchasing Shareholder agrees to apply for all applicable regulatory approvals or clearance within thirty (30) days after receipt of such notice from the Terminating Party. The closing of the purchase of the Shares under this Section 9.3(b) shall take place as soon as commercially practicable without any undue delay and shall be within three (3) Business Days after all applicable regulatory approvals and clearances have been obtained.

9.4 Exceptional Exit

9.4.1 Photronics and DNP may terminate this Agreement by giving a thirty-day prior written notice to the other party if any of the following events occurs after the expiration of the Initial Two-Year Term (the “**Exit Notice**”, and such party giving the Exit Notice being referred to as the “**Exiting Party**”):

- (a) In the event that the occurrence of Force Majeure (including the issue(s) between the homeland of the Exiting Party and the Territory) prevents the Exiting Party from fulfilling its obligations hereunder, and the situation continues for more than six (6) months; or
- (b) In the event that the Exiting Party decides to exit the photomaks business.

9.4.2 The Exiting Party may propose a dissolution of the Company to the other party (the “**Non-Exiting Party**”), and:

- (a) If the Non-Exiting Party agrees to the proposal of dissolution, the Company will be liquidated pursuant to Section 10.5; or
- (b) If the Non-Exiting Party does not accept the proposal of dissolution, the Exiting Party shall have a put option to sell the Shares of the Company held by it to the Non-Exiting Party, and the Non-Exiting Party shall purchase such Shares from the Exiting Party. The price of the Shares to be sold by the Exiting Party hereunder (the “**Exceptional Exit Price**”) shall be equal to the product of the difference of (I) the Net Book Value of the Company Assets as of the last day of the Fiscal Month immediately prior to the date of the Exit Notice, minus (II) the Net Book Value of the Company Liabilities as of the last day of the Fiscal Month immediately prior to the date of the Exit Notice, divided by the number of Issued and outstanding Shares of the Company as of the last day of the Fiscal Month immediately prior to the date of the Exit Notice, multiplied by the number of Shares held by the Exiting Party as of the date of the closing of the purchase of the Shares under this Section 9.4.2(b) (the “**Exceptional Exit Closing**”). At the Exceptional Exit Closing, (i) the Exiting Party shall transfer its remaining Interest in the Company to the Non-Exiting Party, free and clear of any liens or encumbrances, (ii) the Non-Exiting Party shall pay the amount of all or part of the Exceptional Exit Price that the Non-Exiting Party will be required to pay upon the Exceptional Exit Closing to the Exiting Party by wire transfer of cash and (iii) the Exiting Party shall deliver to the Non-Exiting Party such instrument or instruments of conveyance as the Non-Exiting Party reasonably requests. The Non-Exiting Party agrees to apply for all applicable regulatory approvals or clearance within thirty (30) days after receipt of the Exit Notice from the Exiting Party. The Exceptional Exit Closing shall take place as soon as commercially practicable without any undue delay and shall be within three (3) Business Days after all applicable regulatory approvals and clearances have been obtained. The Exceptional Exit Price shall be paid by the Non-Exiting Party pursuant to the terms and conditions agreed to upon the exercise of the option set forth in this Section 9.4.2(b), but the Exceptional Exit Price shall be fully paid within seven (7) years from the exercise of such option. The Exiting Party will continue to be bound by the non-compete obligations set forth in Section 8.1 for a period of twelve (12) months following the date of the Exit Notice (in which case, the one-year period surviving after the termination set forth in Section 8.1 does not apply). In the event the Exceptional Exit Closing (i.e., receipt of all necessary regulatory approvals and completion of the transfer of the Exiting Party’s Interest to the Non-Exiting Party but not including full payment of the Exceptional Exit Price) takes longer than sixty (60) days from the date of the Exit Notice, DNP and Photronics will agree on a delay of the commencement date of the twelve-month period of the non-compete obligations set forth in this Section, but in no event shall such commencement date be delayed for more than sixty (60) days from the date of the Exit Notice.

ARTICLE 10.
DISSOLUTION, LIQUIDATION, AND TERMINATION OF THE COMPANY

10.1 Limitations

The Company may be dissolved, liquidated, and terminated only pursuant to the provisions of this Article 10, and the parties hereto do hereby irrevocably waive, to the extent permitted by Applicable Law, any and all other rights they may have to cause a dissolution, liquidation or termination of the Company or a sale or partition of any or all of the Company Assets in connection with such dissolution or liquidation.

10.2 Exclusive Causes

Notwithstanding the Acts, the following and only the following events shall cause the Company to be dissolved, liquidated, and terminated (each a **“Liquidating Event”**), unless otherwise set forth in this Agreement:

- (a) the election of all of the Shareholders;
- (b) the order or judgment of competent Governmental Authority in accordance with the Acts or other Applicable Law;
- (c) any Shareholder’s election, if the Company ceases operation for more than six (6) months due to Force Majeure;

(d) the occurrence of any other event that, under the Acts or other Applicable Law, makes it unlawful, impossible or impractical to carry on the Business of the Company;

(e) the election by either Shareholder to dissolve and wind up the affairs of the Company upon (a) the occurrence of a bankruptcy of the Company, *provided* that the Shareholder making such election is not in default of any payment obligation to the Company or (b) the bankruptcy, dissolution or liquidation of a Shareholder, and *further provided* that, in either event, such election shall be made only after entry by the court presiding over the bankruptcy of an order granting relief from the automatic stay to make such election to the Shareholder making such election; or

(f) the election by a Shareholder to dissolve and wind up the affairs of the Company if the other undergoes a Change in Control, which election such electing Shareholder shall make in the event it purchases the Shares of Change in Control Party pursuant to Section 7.4.

To the fullest extent permitted by law, any dissolution of the Company other than as provided in this Section 10.2 shall be a dissolution in contravention of this Agreement.

10.3 Effect of Dissolution

The dissolution of the Company shall be effective on the day on which the event occurs giving rise to the dissolution (or, if a corporate action of the Company is required by the Acts, on the day such corporate action is duly taken), but the Company shall not terminate until it has been wound up and its assets have been distributed as provided in Section 10.5.1 or 11.1 of this Agreement. Notwithstanding the dissolution of the Company, prior to the termination of the Company, the business of the Company and the affairs of the Shareholders, as such, shall continue to be governed by this Agreement.

10.4 Loss of the Company

10.4.1 In the event that the accumulated losses of the Company exceed one-third (1/3) of the amount of the Scheduled Contribution, measured for a period of nine (9) consecutive months during the term of this Agreement (the “**Measuring Period**”), Photronics and DNP shall discuss in good faith and develop a plan (the “**Recovery Plan**”) by which certain measure(s) shall be carried out so as to recover such losses within a maximum period of twelve (12) months (the “**Recovery Plan Period**”), and thereafter:

(a) If Photronics and DNP agree on the Recovery Plan within ninety (90) days from the end of the Measuring Period (the “**Recovery Discussion Period**”), the parties shall cooperate to carry out such measure(s) as determined in the Recovery Plan, or

(b) If the Photronics and DNP do not agree on the Recovery Plan within the Recovery Discussion Period, a Shareholder whose Percentage Interests are more than fifty percent (50%) (the “**Planning Party**”) may carry out such measure(s) as determined in the Recovery Plan developed by the Planning Party.

10.4.2 In the event that the accumulated losses of the Company are still exceeding one-third (1/3) of the amount of the Scheduled Contribution at the time of the expiration of the Recovery Plan Period from commencement of carrying out the Recovery Plan which is either agreed by the parties or developed by the Planning Party, Photonics and DNP shall repeat the procedure set forth in Section 10.4.1.

10.4.3 After the expiration of the initial five (5) year period from the Effective Date, if the accumulated losses of the Company exceed or are still exceeding one-third (1/3) of the amount of the Scheduled Contribution, a Shareholder whose Percentage Interests are less than fifty percent (50%) (the **“Requesting Shareholder”**) may request, by giving a not less than ninety (90) day written notice (the **“Dissolution Notice”**), the other party to agree to dissolve and liquidate the Company via a shareholder meeting conducted within ninety (90) days after receipt of such written notice, unless the Recovery Plan agreed by the parties is being carried out at the time of such request. Notwithstanding the above, the Requesting Shareholder is not entitled to give the Dissolution Notice during the period while the Recovery Plan agreed to between Photonics and DNP is being carried out. In the event that the other party (the **“Remaining Shareholder”**) does not agree to dissolve and liquidate the Company for any reason, the Requesting Shareholder may exercise a put option to sell all of its Shares to the Remaining Shareholder at the price equal to the Minority Closing Price by delivering a written notice, and the closing of such sale shall take place in accordance with the option procedures set forth in Sections 7.3.2 and 7.3.3. In the case of the closing of the purchase and sale of the Requesting Shareholder’s remaining Interest pursuant to this Section 10.4.3 (i.e., receipt of all necessary regulatory approvals and completion of the transfer of the Requesting Shareholder’s Interests to the Remaining Shareholder but not including full payment of the price therefor), the one-year period surviving after the termination set forth in Section 8.1 does not apply, and the parties will be immediately released from the non-compete obligations set forth therein upon the closing hereunder.

10.5 Liquidation

10.5.1 Upon dissolution of the Company, the Liquidation Committee composed of the Shareholders shall be set up. The Liquidation Committee shall liquidate the Company Assets, and shall apply and distribute the proceeds thereof as follows unless otherwise provided by the Applicable Law:

(a) first, to (i) the payment of the obligations of the Company to third parties, including, but not limited to and on a *pari passu* basis, taxes, debts, lease and other payments to Persons other than Shareholders or their Affiliates; (ii) the expenses of liquidation; and (iii) the setting up of any reserves for contingencies, debts or liabilities to Persons other than the Shareholders or their Affiliates, whether the whereabouts of the creditor is known or unknown, which the Board of Directors may consider necessary;

(b) thereafter, amounts due to either Shareholder or their respective Affiliates (other than a Company Entity) pursuant to the relevant agreements entered into by them with the Company; and

(c) thereafter, to the Shareholders in proportion to their Percentage Interests.

10.5.2 Notwithstanding Section 10.5.1 of this Agreement, in the event that the Board of Directors determines that an immediate sale of all or any portion of the Company Assets would cause undue loss to the Shareholders, the Board of Directors, in order to avoid such loss to the extent not then prohibited by the Acts, may either defer liquidation of and withhold from distribution for a reasonable time any Company Assets except those necessary to satisfy the Company's debts and obligations, or, subject to Section 11.4, distribute the Company Assets to the Shareholders in kind (in accordance with the Applicable Law).

10.6 Dissolution

Where the Requesting Shareholder is entitled to give the Dissolution Notice according to Section 10.4 but it does not give the Dissolution Notice within the Dissolution Notice Period, and the Remaining Shareholder thereafter desires to dissolve and liquidate the Company and notifies the Requesting Shareholder of the same within ninety (90) days from the expiration of the Dissolution Notice Period, the Requesting Shareholder shall agree to the Remaining Shareholder's proposal to dissolve and liquidate the Company in accordance with Section 10.5 and shall take all relevant actions to achieve such purpose.

ARTICLE 11. DISTRIBUTIONS

11.1 Use of Cash

Subject to applicable legal and contractual restrictions and to Section 11.2 and Article 10, Company cash will be treated as follows (in the following order of priority):

(a) *First*, cash will be retained in the Company in an amount sufficient to fund the Company's operations. Such amount will take into consideration other payments to third parties and payments of amounts due to either Shareholder or their respective Affiliates pursuant to the relevant agreements entered into by them with the Company; and

(b) *Second*, subject to the approval of the Board of Directors any excess cash remaining will be distributed to Shareholders *pro rata* based on their Percentage Interests at the time of such distribution in accordance with the Articles of Incorporation of the Company and the Acts or any distribution of the legal reserve or capital reserve under the Acts.

11.2 Distributions Upon Liquidation

Distributions made in conjunction with the final liquidation of the Company shall be applied or distributed as provided in Article 10 hereof.

11.3 Withholding

The Company may withhold amounts in respect of allocations or distributions if it is required to do so by any Applicable Law, and each Shareholder hereby authorizes the Company to withhold from or pay on behalf of or with respect to such Shareholder such amount of federal, state, local or foreign taxes that the chief finance officer of the Company determines the Company is required to withhold or pay with respect to any amount distributable or allocable to such Shareholder pursuant to this Agreement, *provided* that the Company shall provide a Shareholder with ten (10) Business Days advance written notice of the amount of any withholding to be made in respect of allocations or distributions to such Shareholder (or any Affiliate of such Shareholder) which notice shall demonstrate the calculation thereof. Any amounts withheld pursuant to this Section 11.3 shall be treated as having been distributed to such Shareholder. Each Shareholder will from time to time provide such other forms or documents as may reasonably be required in order to establish the status of such Shareholder for purposes of the tax laws of any applicable jurisdiction. Each Shareholder agrees to indemnify and hold harmless the Company from any liability imposed on the Company for any action taken by the Company in reliance upon such representation of tax withholding status. A Shareholder's obligations hereunder shall survive the dissolution, liquidation or winding up of the Company. If a Governmental Authority asserts in writing to any Person that the Company failed to withhold Tax at the time and/or in the amounts required by Applicable Laws in respect of a Shareholder and/or its Affiliates, then such Shareholder and/or its Affiliates, as applicable, shall promptly upon receipt of a copy of such writing accompanied by a written notice from the Company specifying that a payment is required pursuant to this Section 11.3 pay to such Governmental Authority an amount in full satisfaction of the amount of Taxes so asserted by such Governmental Authority. If such Shareholder and its Affiliates do not promptly pay such amount to such Governmental Authority, then, unless such Shareholder provides satisfactory written evidence of settlement in full of the matter asserted by the Governmental Authority, the Company shall withhold such amount from the next distribution(s) to such Shareholder, shall promptly pay such withheld amounts over to such Governmental Authority in payment of such asserted liability for Taxes and shall treat the amounts so withheld and paid over as actually distributed to such Shareholder.

11.4 Distributions in Kind

Subject to Section 11.1, no right is given to any Shareholder to demand or receive any distribution of property other than cash as provided in this Agreement. Upon a vote of the Board of Directors and a Supermajority Vote of Shareholders, the Board of Directors may determine (subject to the approval of the Supermajority Vote of Shareholders) to make a distribution in kind of Company Assets to the Shareholders, and such Company Assets shall be distributed in such fashion as to ensure that the fair market value thereof (as determined by the Board of Directors and approved by the Supermajority Vote of Shareholders) is distributed, and any items of gain or loss resulting from such distribution are allocated, in accordance with this Article 11 and Applicable Laws .

11.5 Limitations on Distributions

Notwithstanding any provision to the contrary contained in this Agreement, neither the Company nor the Board of Directors, on behalf of the Company, shall be required to or shall knowingly make a distribution to any Shareholder or the holder of any Economic Interest on account of its Shares in the Company (as applicable) in violation of the Acts or other Applicable Law.

ARTICLE 12. MISCELLANEOUS

12.1 Amendments

Any provision of this Agreement may be amended if, and only if, such amendment is in writing and is duly executed by each Shareholder, provided however this Agreement will be amended to allow Photonics Singapore to implement an Accounting Amendment in accordance with Section 1.6. Upon the making of any amendment to this Agreement in accordance with the previous sentence, the Board of Directors shall prepare and file such documents and certificates as may be required under the Acts and under any other Applicable Law.

12.2 No Waiver

Any provision of this Agreement may be waived if, and only if, such waiver is in writing and is duly executed by the party against whom the waiver is to be enforced. No failure or delay by any party in exercising any right, power or privilege under this Agreement shall operate as a waiver thereof nor shall any single or partial waiver or exercise thereof preclude the enforcement of any other right, power or privilege nor deemed to extend to any prior or subsequent default, breach or occurrence or affect, in any way, any rights arising by such prior or subsequent default, breach or occurrence.

12.3 Entire Agreement

This Agreement, together with the Schedules and other documents referred to herein and therein, constitute the entire agreement between the parties hereto pertaining to the subject matter hereof, and supersede any and all prior oral and written, and all contemporaneous oral, agreements or understandings pertaining thereto including the Memorandum of Understanding dated November 19, 2016, between Photonics and DNP. There are no agreements, understandings, restrictions, warranties or representations relating to such subject matter among the parties other than those set forth herein and in the Schedules and other documents referred to herein and therein.

12.4 Further Assurances

Each of the parties hereto does hereby covenant and agree on behalf of itself, its successors and its assigns, without further consideration, to prepare, execute, acknowledge, file, record, publish, and deliver such other instruments, documents and statements, and to take such other action as may be required by law or reasonably necessary or advisable to effectively carry out the purposes of this Agreement.

12.5 Notices

Unless otherwise provided herein, all notices, requests, instructions or consents required or permitted under this Agreement shall be in writing and will be deemed given: (a) when delivered personally; (b) when sent by confirmed facsimile and followed up by delivery by overnight carrier under Clause (d) below; (c) ten (10) Business Days after having been sent by registered or certified mail, return receipt requested, postage prepaid; or (d) three (3) Business Days after deposit with an internationally recognized commercial overnight carrier specifying next-day delivery, with written verification of receipt. All communications will be sent to the addresses, email account or facsimile number listed on Schedule C (or to such other address, email account or facsimile number as may be designated by a party giving written notice to the other parties pursuant to this Section 12.5).

12.6 Governing Law

All questions concerning the construction, interpretation and validity of this Agreement and all claims or causes of action (whether in contract or tort) that may be based upon, arise out of or relate to this Agreement or the negotiation, execution or performance of this Agreement will be governed by and construed in accordance with the laws of the People's Republic of China (without reference to any choice or conflicts of laws rules or principles that would require the application of the laws of any other jurisdiction).

12.7 Construction; Interpretation

12.7.1 Certain Terms. The words "hereof," "herein," "hereto," "hereunder" and similar words refer to this Agreement as a whole and not to any particular provision of this Agreement. The term "including" or "includes" is not limited and means "including, or includes, without limitation."

12.7.2 Section References: Titles and Subtitles. Unless otherwise noted, all references to Sections and Schedules herein are to Sections and Schedules of this Agreement. The titles, captions and headings of this Agreement are inserted for convenience of reference only and are not intended to be a part of or to affect the meaning or interpretation of this Agreement.

12.7.3 Reference to Persons, Agreements, Statutes. Unless otherwise expressly provided herein, (i) references to a Person include its successors and permitted assigns, (ii) references to agreements (including this Agreement) and other contractual instruments shall be deemed to include all subsequent amendments, restatements and other modifications thereto or supplements thereof and (iii) references to any statute or regulation are to be construed as including all statutory and regulatory provisions consolidating, amending, replacing, supplementing or interpreting such statute or regulation.

12.7.4 Presumptions. No party, nor its counsel, shall be deemed the drafter of this Agreement for purposes of construing the provisions of this Agreement, and all provisions of this Agreement shall be construed in accordance with their fair meaning, and not strictly for or against any party.

12.7.5 A Party and the Other Party. If any provision of this Agreement (including any of Sections 9.2, 9.3, 12.9, 12.15, 12.17) mentions a party, on one hand, and the other party as a counterparty to such a party, on the other hand, Photronics and Photronics Singapore are regarded as one and the same party, and DNP and DNP Asia Pacific are regarded as one and the same party, unless the context of such provision otherwise requires.

12.8 Rights and Remedies Cumulative

The rights and remedies provided by this Agreement are cumulative and the use of any one right or remedy by any party shall not preclude or waive its right to use any or all other remedies. Said rights and remedies are given in addition to any other rights the parties may have by law, statute, ordinance or otherwise.

12.9 No Assignment; Binding Effect

Except as otherwise expressly provided herein, no party may assign, delegate or otherwise transfer any of its rights or obligations hereunder to any third party, whether by assignment, transfer, Change in Control or other means, without the prior written consent of each other party. Any attempted assignment in violation of the foregoing shall be null and void. Subject to the foregoing, this Agreement shall be binding on and inure to the benefit of the Shareholders, their heirs, executors, administrators, successors and all other Persons hereafter holding, having or receiving an interest in the Company.

12.10 Severability

If any provision in this Agreement will be found or be held to be invalid or unenforceable, then the meaning of said provision will be construed, to the extent feasible, so as to render the provision enforceable, and if no feasible interpretation would save such provision, it will be severed from the remainder of this Agreement which will remain in full force and effect unless the severed provision is essential and material to the rights or benefits received by any party. In such event, the parties will use their respective best efforts to negotiate, in good faith, a substitute, valid and enforceable provision or agreement which most nearly reflects the parties' intent in entering into this Agreement.

12.11 Counterparts

This Agreement may be executed in counterparts, each of which so executed will be deemed to be an original and such counterparts together will constitute one and the same agreement. Execution and delivery of this Agreement by exchange of facsimile copies or PDF file bearing the facsimile signature of a party shall constitute a valid and binding execution and delivery of this Agreement by such party.

12.12 Dispute Resolution; Arbitration

The parties hereby agree that any and all claims, disputes or controversies of whatever nature (the “**Dispute**”), arising out of, in connection with, or in relation to the interpretation, performance, enforcement, breach, termination or validity of this Agreement, shall be first raised in writing to the senior executive officers of each of the parties for discussion and attempt at resolution in good faith among such senior executive officers. If within thirty (30) days (or such shorter time if emergency or exigent circumstances exist) of first raising the issue to the senior executive officers, the parties are unable to reach a mutually agreed resolution, then the parties hereby agree that such Dispute shall be submitted to China International Economic and Trade Arbitration Commission (“**CIETAC**”) for arbitration which shall be conducted in accordance with the CIETAC’s arbitration rules in effect at the time of applying for arbitration. The arbitral award is final and binding upon the Parties. Each party shall bear its own expenses incurred in connection with arbitration and the fees and expenses of the arbitrator shall be shared equally by the parties involved in the dispute and advanced by them from time to time as required. Any discovery in connection with such arbitration hereunder shall be limited to information directly relevant to the controversy or claim in arbitration. The arbitrator will state the factual and legal basis for the award. To the extent not amended or overturned by appeal to a court of competent jurisdiction pursuant to the Arbitration Law of the People’s Republic of China, the decision of the arbitrator in any such proceeding will be final and binding and not subject to judicial review and final judgment may be entered upon such an award in any court of competent jurisdiction, but entry of such judgment will not be required to make such award effective. The parties agree that the arbitration proceedings and decisions shall be kept confidential and that any information or documents, including any pleadings or submissions exchanged or produced in such arbitration (including, but not limited to briefs, or other documents submitted or exchanged, any testimony or other oral submissions, and any awards) shall not be disclosed beyond the arbitrator, the CIETAC, the parties, their counsel and any Person necessary to conduct the arbitration. The parties hereby irrevocably waive, to the fullest extent permitted by Applicable Law, any objection which they may now or hereafter have to the laying of venue of any action brought for enforcement of such arbitration clause or any award resulting from arbitration pursuant to this Section 12.12 or any defense of inconvenient forum for the maintenance of any such action. Each of the parties hereto agrees that an arbitration award in any such action may be enforced in other jurisdictions by suit on the arbitration award or in any other manner provided by Applicable Law. The parties agree that the arbitration proceeding described in this Section 12.12 is the sole and exclusive manner in which the parties may resolve disputes arising out of or in connection with this Agreement; provided that the parties expressly agree that nothing in this Agreement shall prevent the parties from applying to a court having jurisdiction over any of the parties to this Agreement for the limited purpose of obtaining temporary and provisional or injunctive relief necessary solely to preserve the status quo or otherwise to prevent irreparable harm to a party pending the outcome of arbitration. The parties agree that all arbitration proceeding described in this Section 12.12 shall be conducted in English with English speaking lawyer(s) and arbitrator(s), and that the number of arbitrator(s) required at such proceeding shall be: (a) one (1) arbitrator in the event that the disputed amount is less than 1,500,000 US Dollars, or (b) three (3) arbitrators in the event that the disputed amount is equal to or greater than 1,500,000 US Dollars.

12.13 Third-Party Beneficiaries

None of the provisions of this Agreement shall be for the benefit of or be enforceable by any creditor of the Company or by any third-party creditor of any Shareholder. This Agreement is not intended to confer any rights or remedies hereunder upon, and shall not be enforceable by, any Person other than the parties hereto, their respective successors and permitted assigns and, solely with respect to the provision of Section 5.13, each Indemnitee and each other indemnified Person addressed therein.

12.14 Specific Performance

The parties agree that irreparable damage will result if this Agreement is not performed in accordance with its terms, and the parties agree that any damages available at law for a breach of this Agreement would not be an adequate remedy. Therefore, the provisions hereof and the obligations of the parties hereunder shall be enforceable in a court or other tribunal with jurisdiction, by a decree of specific performance, and appropriate injunctive relief may be applied for and granted in connection therewith. Such remedies and all other remedies provided for in this Agreement shall, however, be cumulative and not exclusive and shall be in addition to any other remedies that a party may have under this Agreement in accordance with Applicable Laws.

12.15 Consequential Damages

No party shall be liable to any other party under any legal theory for indirect, special, incidental, consequential or punitive damages, or any damages for loss of profits, revenue or business or damage to reputation or goodwill, even if such party has been advised of the possibility of such damages (it being understood that consequential damages arising from the breach of the confidentiality restrictions set forth in Section 12.17 shall not be considered to fall within any such category of damages).

12.16 Fees and Expenses

Except as otherwise expressly provided in this Agreement and to the extent that the Company pay fees and expenses of the Shareholders, each party hereto shall bear its own fees and expenses incurred in connection with this Agreement, the Transaction Documents and the transactions contemplated hereby and thereby, including the legal, accounting and due diligence fees, costs and expenses incurred by such party.

12.17 Confidentiality

12.17.1 Each party shall not disclose, divulge, provide, publish or provide access to third parties, and will use reasonable efforts to cause its respective Affiliates, officers, directors, members, employees, agents, representatives and advisors (collectively, such party's "Covered Persons") not to disclose, divulge, provide, publish or provide access to third parties, unless and solely to the extent (i) compelled to disclose by judicial or administrative process or by other requirements of Applicable Law or the applicable rules of any national securities exchange or (ii) necessary to enforce claims in a judicial or administrative proceeding, (a) the existence and content of the this Agreement and Transaction Documents and any information arising from or in connection with this Agreement and the Transaction Documents and/or the transactions contemplated hereby and (b) all documents and information concerning the this Agreement and the Transaction Documents and the transactions contemplated hereby or furnished by one party and its Covered Persons (the "**Disclosing Party**"), to any other party and its Covered Persons (the "**Receiving Party**"), except to the extent that such information can be shown by written evidence to have been (A) previously known on a non-confidential basis by the Receiving Party, (B) publicly available through no fault of the Receiving Party, (C) rightfully received from a third party without a duty of confidentiality, (D) disclosed by the Disclosing Party of such information to a third party without a duty of confidentiality on such third party, (E) independently developed by the Receiving Party prior to or without reference to any such documents or information, or (F) disclosed with the prior approval of the Disclosing Party of such documents or information. If this Agreement is terminated for any reason, the confidentiality obligations required by this Section 12.17 shall survive and be maintained as set forth below, and the Receiving Party shall return to the Disclosing Party, all documents and other materials, and all copies thereof, obtained by the Receiving Party from the Disclosing Party in connection herewith that are subject to this Section 12.17. The Receiving Party shall use any information obtained herewith that are subject to this Section 12.17 only in relation to the performance of its obligations under this Agreement and the Transaction Documents and/or the transactions contemplated hereby. The confidentiality obligations required by this Section 12.17 shall not apply to disclosures permitted pursuant to Section 12.17.2 hereof, and all confidentiality obligations required by this Section 12.17 shall be terminated upon the fifth anniversary of the termination of this Agreement.

12.17.2 Except as agreed by the parties, each of the parties agrees that it shall not, directly or indirectly, make or cause any public announcement in respect of this Agreement and the Transaction Documents or the transactions contemplated hereby without the prior written consent of the other party. Notwithstanding the foregoing, each party shall be permitted to issue any public announcements or press releases solely to the extent as required by Applicable Law or the applicable rules of any national securities exchange, provided that a draft of any such public announcement or press release be first provided by the party who issues such public disclosure to the other party no later than three (3) Business Days prior to such required public disclosure.

(Signature Page Follows)

PHOTRONICS INC.

By: _____
Name:
Title:

PHOTRONICS SINGAPORE PTE, LTD.

By: _____
Name:
Title:

DAI NIPPON PRINTING CO., LTD.

By: _____
Name:
Title:

DNP ASIA PACIFIC PTE. LTD.

By: _____
Name:
Title:

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

PHOTRONICS INC.

By: _____
Name: Peter Kirlin
Title: Chief Executive Officer

PHOTRONICS SINGAPORE PTE, LTD.

By: _____
Name: Richelle Burr
Title: Authorized Representative

DAI NIPPON PRINTING CO., LTD.

By: /s/ Mitsuru Tsuchiya
Name: Mitsuru Tsuchiya
Title: Corporate Officer & General Manager of Fine Optronics Operations

DNP ASIA PACIFIC PTE. LTD.

By: /s/ Tsuneaki Miwa
Name: Tsuneaki Miwa
Title: President

SCHEDULES A-1 and A-2

List of Transaction Documents

SCHEDULE A-1

Outsourcing Agreement
Amended and Restated License Agreement among DNP and PDMC

SCHEDULE A-2

Contribution Agreement

SCHEDULE C

Shareholders and Percentage Interest
(as of completion of the Closing)

Shareholder	Percentage Interest
Photronics Singapore	50.01%
DNP Asia Pacific	49.99%

Addresses for Notices Purposes

Photronics, Inc.
15 Secor Road
Brookfield, CT 06804
Attn: General Counsel
Tel: 203-775-9000
Fax: 203-775-5601

Dai Nippon Printing Company, Ltd
1-1, Ichigaya Kagacho 1-chome
Shinjuku-ku, Tokyo, Japan
Attn: General Manager of
Fine Electronics Operations
Tel: +81-3-5225-8833
Fax: +81-3-5225-8899

Photronics Singapore Pte. Ltd.
No. 33, Ubi Avenue 3 #03-09,
Vertex Building Singapore 408868
Attn: Representative Director
Tel: 203-775-5285
Fax: 203-775-5601

DNP Asia Pacific Pte. Ltd.
4 Pandan Crescent, Singapore 128475

Attn: President
Tel: +65-6361-2951
Fax: +65-6361-2979

SCHEDULE D

Majority Board Control Items

1. Appoint Chairman
2. Appoint General Manager
3. Select, terminate or set compensation of Company management and employees
4. Approve Annual Budget
5. Approve budget for capital expenditures
6. Change the operating policies of the Company
7. Dispositions or acquisitions in the ordinary course of business

Insurance Policies At Closing

1. **Property Insurance:** Coverage for “all risk” property insurance, insuring against physical damage on a replacement basis for assets, and insuring against resultant business interruption from insured physical damage on an actual-loss sustained basis. The property insurance limit must equal full replacement value of all physical property and one year business interruption insurance. Construction & Erection All Risks including Third Party Liability Insurance; Coverage for repair or replacement of PDMCX construction, installation of tolls from Company dock through installation (erection insurance) and liability limits of \$10 million for the construction project.
2. **Transit Insurance (Cargo Insurance):** Company will be included in Photronics Inc. global policy; Coverage for repair or replacement of capital equipment purchased by the JV during transit up to the invoiced amount for the equipment.
3. **Liability Insurance:**
 - Local China Commercial general liability insurance, including but not limited to contractual liability, personal injury, completed operations, product liability and host liquor liability, coverage for bodily injury and property damage liability, with a limit of not less than CNY\$6.9M (approx. US\$ 1 million) for each loss occurrence and in the aggregate.
 - Automobile liability coverage for bodily injury and property damage liability with a limit of not less than US\$1 million for any one accident, for owned, hired, and non-owned automobiles. (Currently covered under Photronics Inc. DIC Automobile Liability policy – a local China policy will be purchased after Closing when greater exposure exists).
 - Umbrella insurance – Company will be included in Photronics Inc. global policy; current amount of US\$20 million per occurrence or in the aggregate.
4. **Workers Compensation & Employers Liability:** As required by China.
5. **Directors & Officers Liability Coverage:** Board of Directors will be included in Photronics Inc. global policy.
6. **Fiduciary Liability Coverage:** Company will be included in Photronics Inc. global policy.
7. **Employers Practices Liability Coverage:** Company will be included in Photronics Inc. global policy.
8. **Crime Coverage:** Company will be included in Photronics Inc. global policy.

SCHEDULE F

List of Actions Requiring A Supermajority Vote of Shareholders

The following actions of the Company also require a Supermajority Vote of Shareholders:

- (a) make any alteration or amendment of the Articles of Incorporation of the Company, other than in respect of an amendment to increase the authorized capital of the Company by an aggregate amount up to the Capex Threshold as defined in Schedule G;
- (b) effect a change of the business scope of the Company;
- (c) sell, license or otherwise dispose of all or substantially all of the undertaking, or the assets of the Company, or sell, license or otherwise dispose of 50% or more of the undertaking, or the assets of the Company in any given year. It is understood that upon formation of the Company there will be no goodwill however if at anytime there exists goodwill in the Company as defined by GAAP then the sale, license, or disposal of all or substantially all of the goodwill in connection with the sale, license or disposal of the assets of the Company or the sale, license or disposal of 50% or more of the undertaking, goodwill or assets of the Company will require a Supermajority Vote of the Shareholders;
- (d) approve any actions by Director(s) which competes with the Company;
- (e) pass any resolution for the winding up or dissolution or liquidation of the Company or apply for the appointment of a receiver, manager or judicial manager or like officer; and
- (f) subject to the exception set forth in clause (a) above, any other matters requiring resolution at the meetings of the Shareholders of the Company under the Applicable Law in the People's Republic of China.

SCHEDULE G

List of Actions Requiring A Supermajority Vote of Directors

The following actions of the Company also require a Supermajority Vote of Directors:

- (a) make any alteration or amendment to the Articles of Incorporation of the Company, other than in respect of an amendment to increase the authorized capital of the Company by an aggregate amount up to the Capex Threshold as defined below;
- (b) effect a change of the business scope of the Company;
- (c) sell, license or otherwise dispose of all or substantially all of the undertaking, goodwill or the assets of the Company, or sell, license or otherwise dispose of 50% or more of the undertaking, goodwill or the assets of the Company in any given year;
- (d) after the initial US\$160,000,00 investment, an annual cash investment greater than \$100,000,000 US Dollars (the **“Capex Threshold”**);
- (e) approve any action(s) by Director(s) which competes with the Company;
- (f) pass any resolution for the winding up or dissolution or liquidation of the Company or apply for the appointment of a receiver, manager or judicial manager or like officer; and
- (g) Subject to the exception set forth in clause (a) above, and other than (1) capital increases and (2) the election of the Chairman of the Board, any other matters requiring resolution at the meetings of the Board of Directors of the Company under the Applicable Law in the People’s Republic of China.

SCHEDULE H

Initial Business Plan

SCHEDULE I

Form of Articles of Incorporation

SCHEDULE J

Representative Funding Plan

SCHEDULE K

Scoring Items for PDMCX Technology Partnership Proposals

1. Pre-existing PoR and/or development status
 - Identify specific case relevant to customer opportunity
2. Technology acquisition cost, readiness and completeness
 - Quote in US dollars through transfer and validation
 - Specific status of proposed technology package for CJV and PDMC as needed
 - Identification of missing components preventing CJV/PDMC from turnkey solution
3. Technology implementation schedule and usage constraints
 - Schedule by quarter for full transfer and validation
4. Technology warranty, maintenance, CIP
 - Obligation in event technology does not perform as specified after installation
 - Ongoing maintenance cost
 - Ongoing upgrade cost
5. Special customer constraints
 - Identification of tangible customer conditions favoring one partner

SCHEDULE L

Competitors

Hoya Corporation

Toppan Printing

The Advanced Mask Tech Center GmbH Co KG

Taiwan Mask Corporation

Compugraphics USA

CRmicro Mask

ZWmask

OUTSOURCING AGREEMENT

This **OUTSOURCING AGREEMENT** (this “**Agreement**”) is made and entered into as of the 16th day of May, 2017, by and among

Photronics, Inc., a Connecticut corporation with its principal place of business at 15 Secor Road, Brookfield, Connecticut, U.S.A (“**Photronics**”),

Dai Nippon Printing Co., Ltd., a Japanese corporation with its principal place of business at 1-1, Ichigaya Kagacho 1-chome, Shinjuku-ku, Tokyo, Japan (“**DNP**”),

Photronics DNP Photomask Corporation, a company limited by shares organized and formed under the Company Act of the Republic of China with its principal place of business at 4f, #2, Li- Hsin Road, Science Park, Hsinchu, Taiwan, ROC (“**PDMC**”), and

Xiamen American Japan Photronics Mask Co., Ltd., a limited liability company organized and formed under the People’s Republic of China with its principal place of business at R203-95, South Building of Torch Square, No. 56-58 Torch Road, Gaoxin District, Xiamen, Fujian Province, Peoples Republic of China (the “**Company**”).

Each of Photronics and DNP is hereinafter referred to as a “**Shareholder**” and collectively as the “**Shareholders**”, each of the Shareholders and PDMC is hereinafter referred to as a “**Supplier**” and collectively as the “**Suppliers**”, and each of the Suppliers and the Company is hereinafter referred to as a “**Party**” and collectively as the “**Parties**.”

**ARTICLE 1.
BACKGROUND**

Photronics and DNP wish to participate in a joint venture, either directly or indirectly through their respective Affiliates, as equity interest owners in the Company, and to carry on the Business through the Company. The Parties are engaged, among other things, in the design, development, fabrication and sale of advanced photomasks. Photronics and DNP, directly or indirectly, are the shareholders of and own PDMC, a joint venture of Photronics and DNP in Taiwan. In connection with the formation of the Company, Photronics and DNP have entered into “Joint Venture Operating Agreement” (the “**China JV Operating Agreement**”) dated as of the 16th day of May, 2017. In connection with the China JV Operating Agreement and in order to support the business objective of the Company, including but not limited in order to (i) allow the Company access to products which the Company does not have capacity and/or capability to manufacture and also (ii) provide backup capacity to the Company in the event the Company operations are disrupted or the Company has a capacity shortfall, the Company desires to outsource or issue to the Suppliers, and the Suppliers agree to accept, certain purchase orders of the Company in connection with Business of the Company pursuant to the terms and conditions set forth herein.

The Parties hereby agree and confirm the exclusive distribution mechanism set forth in Section 10.1 hereof. All terms and conditions for outsourcing to the Suppliers will be governed by this Agreement. Any and all purchase orders (i) from new customers or (ii) for new Products from existing customers, for which the Parties are not qualified to manufacture by such customers, (for the avoidance of doubt, the Product for which all Parties do not have necessary qualification to manufacture as of the Effective Date shall be deemed the “new Product”, even if such Product falls into the technology category stipulated in Section 2.1.A) shall be referred to the Steering Committee pursuant to the procedure set forth in Section 5.15 of the China JV Operating Agreement.

1.1 Defined Terms

Unless otherwise defined in this Agreement and Schedule 1 hereof, terms defined in the China JV Operating Agreement shall have the same meanings when used in this Agreement.

1.2 Incorporation by Reference

Section 12 (Miscellaneous) of the China JV Operating Agreement shall be incorporated by reference into and form an integral part of this Agreement, *mutatis mutandis*.

ARTICLE 2. PURCHASE ORDERS

2.1 Outsource and Issuance of Purchase Orders

Subject to the terms and conditions mentioned hereunder, the Parties agree to the outsource model based on two phases as follows, and the Parties also agree that they may add additional Products to this Agreement through additional Purchase Orders signed by the Company and the relevant Supplier.

For the avoidance of doubt, the outsource model is purely made based on the manufacturing qualifications of a Product required by customers and subject to the customers' determination, and before the outsource arrangement set forth below is implemented, the Company will notify the implicated customer of the applicable arrangement in advance, and shall make adjustment if the customer makes any further requirement. In order to ensure and maintain reliable and consistent supply of special previously and solely qualified process of record Products for certain customers of each Shareholder during the Outsource Transition Period certain Purchase Orders received by the Company during the Outsource Transition Period will be directed to each individual Shareholder in accordance with subparagraphs (a) to (d) of Section 2.1 A below. The Shareholder receiving such Purchase Orders will be expected to continue to supply, without artificial constraint, such special Products using the qualified processes and pricing consistent with or lower than similar Products available prior to the Closing.

Moreover, it is acknowledged by the Parties that during the Outsource Transition Period, new qualifications for each Shareholder and PDMC for the special Products referred in subparagraphs (a) to (d) along with others within the scope of Business of the Company may initiate or continue under the direction of the Steering Committee and such new qualifications typically take eighteen (18) months or longer depending on the complexity of such qualifications. Therefore, subject to the prior notification to, and the instruction and the express approval of the customers, the Steering Committee could reasonably decide or change the outsource model at its own discretion in accordance with the China JV Operating Agreement.

In any case, none of the Parties shall unreasonably raise prices of the Products to take advantage of the outsource relationship or divide the sales regions, sales targets, or the varieties or quantity of the Products. The Parties hereby agree and confirm that they have no intention to reach any monopoly agreement as a result of this outsource agreement.

A. Outsource Transition Period

During the Outsource Transition Period, as for the Purchase Orders received by the Company from:

- (a) Semiconductor Manufacturing International Corporation (with its Affiliate, “SMIC”) for 28nm technology node, 100% of such Purchase Orders will be outsourced to DNP,
- (b) Dalian site of Intel Corporation for 100s Gen 1 and 110s Gen 2 3D NAND Flash memory, 100% of such Purchase Orders will be outsourced to Photronics,
- (c) SMIC for 40nm technology node, 100% of such Purchase Orders will be outsourced to DNP,
- (d) Wuhan Xinxin Semiconductor Manufacturing Corporation (with its Affiliates, “XMC”) for 32L Gen 1 and 64L Gen 2 3D NAND Flash memory, 100% of such Purchase Orders will be outsourced to Photronics, and
- (e) all other customers other than those set forth above will be outsourced to the Suppliers pro rata to the revenue of each Supplier from each Product during the Measurement Period.

B. Post Outsource Transition Period

- (a) During the Post Outsource Transition Period, the following rules for outsourcing the Purchase Orders to the Suppliers (the “**Outsource Stepdown Rules**”) will apply:
 - Year 1: 25% of the Outsourced Purchase Orders will be outsourced to PDMC, and the remaining 75% will continue to be outsourced to the Shareholder(s), to which the Outsourced Purchase Orders are outsourced during the Outsource Transition Period (the “**Original Manufacturer(s)**”).
 - Year 2: 50% of the Outsourced Purchase Orders will be outsourced to PDMC, and the remaining 50% will continue to be outsourced to the Original Manufacturer(s).
 - Year 3: 75% of the Outsourced Purchase Orders will be outsourced to PDMC, and the remaining 25% will continue to be outsourced to the Original Manufacturer(s).
 - Year 4 and thereafter: 100% of the Outsourced Purchase Orders will be outsourced to PDMC, provided that, if PDMC does not have enough manufacturing capacity for or are not qualified for the Products ordered by certain Outsourced Purchase Orders, such Outsourced Purchase Orders will be outsourced in accordance with Section 2.1.B.(b).

For the sake of clarity and by way of example, as for the above calculation;

- X: If certain Purchase Orders have been outsourced to Photronics 40% and to DNP 60% during the Outsource Transition Period, such Purchase Orders shall be outsourced (i) during Year 1, to PDMC 25% ($= 100\% \times 25\%$), to Photronics 30% ($= 40\% \times 75\%$) and to DNP 45% ($= 60\% \times 75\%$), (ii) during Year 2, to PDMC 50% ($= 100\% \times 50\%$), to Photronics 20% ($= 40\% \times 50\%$) and to DNP 30% ($= 60\% \times 50\%$) and (iii) during Year 3, to PDMC 75% ($= 100\% \times 75\%$), to Photronics 10% ($= 40\% \times 25\%$) and to DNP 15% ($= 60\% \times 25\%$)
- Y: If certain Purchase Orders have been outsourced to PDMC 20% and to DNP 80% during the Outsource Transition Period, such Purchase Orders shall be outsourced (i) during Year 1, to PDMC 40% ($= 20\% + 80\% \times 25\%$) and to DNP 60% ($= 80\% \times 75\%$), (ii) during Year 2, to PDMC 60% ($= 20\% + 80\% \times 50\%$) and to DNP 40% ($= 80\% \times 50\%$) and (iii) during Year 3, to PDMC 80% ($= 20\% + 80\% \times 75\%$) and to DNP 20% ($= 80\% \times 25\%$)
- Z: If certain Purchase Orders have been outsourced to PDMC 20%, to Photronics 60% and to DNP 20% during the Outsource Transition Period, such Purchase Orders shall be outsourced (i) during Year 1, to PDMC 40% ($= 20\% + 80\% \times 25\%$), to Photronics 45% ($= 60\% \times 75\%$) and to DNP 15% ($= 20\% \times 75\%$), (ii) during Year 2, to PDMC 60% ($= 20\% + 80\% \times 50\%$), to Photronics 30% ($= 60\% \times 50\%$) and to DNP 10% ($= 20\% \times 50\%$) and (iii) during Year 3, to PDMC 80% ($= 20\% + 80\% \times 75\%$), to Photronics 15% ($= 60\% \times 25\%$) and to DNP 5% ($= 20\% \times 25\%$)

- (b) If PDMC and the Company do not have enough manufacturing capacity for or are not qualified for the Products, and
- (i) if only one (1) Shareholder are qualified for such Products, such Purchase Orders will be outsourced from the Company to such Shareholder 100%, or
 - (ii) if both Shareholders are qualified for such Products, such Purchase Orders shall be outsourced from the Company to the Shareholders on a 50/50 allocation between the Shareholders calculated by aggregated revenue basis. This percentage shall be reviewed quarterly by the Steering Committee.

C. General

(a) The Purchase Orders for the New Qualified Products will be outsourced to the Initial Qualified Supplier. As for the New Qualified Products for which PDMC is not the Initial Qualified Supplier, once PDMC obtains the necessary qualification to manufacture and PDMC meets the criteria set by the Steering Committee, the Outsource Stepdown Rules will also apply *mutatis mutandis*. PDMC will be given the priority for outsourcing of such New Qualified Products over the Initial Qualified Supplier in or after Year 4 from the start of such outsourcing to PDMC in accordance with the Outsource Stepdown Rules.

(b) PDMC and the Company will make best efforts to be qualified to follow the Outsource Stepdown Rules using the technology transfer from the Initial Qualified Supplier. The terms and conditions of such technology transfer from Initial Qualified Supplier to follow the Outsource Stepdown Rules will be decided between relevant Parties, referring to the Steering Committee if necessary. The sequence of the step-down process will substantially follow the non-critical, semi-critical and critical layers. Once PDMC obtains the necessary qualification for certain Products, the Outsource Stepdown Rules shall apply in accordance with Section 2.1.C.(a) above.

(c) For the avoidance of doubt, the Parties agree and confirm that, during the Outsource Transition Period and aside from the Outsource Stepdown Rules in effect during the Post Outsource Transition Period, as long as the Company has enough manufacturing capacity and qualification for the Products ordered by the customers to the Company, it will manufacture such Products by itself without outsourcing to the Suppliers.

(d) The Parties acknowledge and agree that PDMC will always give priority to the Purchase Orders from United Microelectronics Corporation and United Semiconductor (Xiamen) Co., Ltd. over those from any other customers in utilizing its manufacturing capacity.

2.2 Purchase Orders

The Suppliers will make good faith efforts to accept all Purchase Orders from the Company that comply with this Agreement including adhering to all relevant specifications of the Product as set forth in the Purchase Order entered into between the Company and the Supplier (including the Product Lead Time (as defined below)). The Suppliers shall notify the Company of acceptance or rejection of a Purchase Order within twenty four (24) hours of receipt of a Purchase Order. Failure of the Suppliers to accept or reject a Purchase Order within twenty four (24) hours shall constitute acceptance of such Purchase Order. The lead time for the Products will be as set forth in the applicable Purchase Order (“**Product Lead Time**”). Each Purchase Order shall include the following: (a) the Company’s Purchase Order number; (b) identification of the quantity and type of the Product ordered by the Company; (c) the price of each Product ordered per Schedule 2 attached hereto; (d) the requested delivery date (subject to the applicable Product Lead Time); (e) any shipping instructions, including preferred carrier and shipping destination; and (f) the specifications for the Product.

Notwithstanding anything contained in this Agreement and the China JV Operating Agreement to the contrary, and for the sake of clarity, no purchase orders which have been issued to Photonics or DNP by any customer (including customers in the Territory) prior to the Effective Date shall be transferred from either Photonics or DNP to the Company.

2.3 Purchase Order Terms

All Purchase Orders agreed to between the Company and a Supplier shall be governed by this Agreement unless otherwise agreed by the Company and the Supplier which receives such Purchase Order in writing; the Parties agree that the Purchase Order submitted by the Company to any of the Suppliers will mirror the terms and conditions of the Purchase Order with respect to specification for the Product and the end customer's requirement submitted to the Company by the Company's customer. Those terms and conditions of the Purchase Order may be discussed and agreed between the Company and any of the Suppliers prior to issuance of such Purchase Order to any of the Suppliers.

2.4 Rescheduling and Cancellation

The Company may not adjust or cancel or reschedule any portion of an accepted Purchase Order unless the Supplier fails to fulfill any material term of such accepted Purchase Order. The Suppliers shall at all times use prudent material planning practices, including by way of example, reducing manufacturing and lead-times for the Products. The Company forecast for each Supplier will be provided on a weekly basis covering a rolling one (1) month period. The Company will provide the Suppliers with such short range forecast which will be updated weekly and long range forecast which will be updated quarterly and will be used for planning purposes only. If a Supplier's ability to supply any Product is constrained for any reason, such Supplier shall immediately notify the Company of such supply constraint for the purpose of resolving the same.

2.5 End of Life

Each of the Suppliers may terminate its obligations to supply a particular Product under this Agreement by giving written notice of the end of life of such Product to the Company at least twelve (12) months before the effective date of such termination (a "**Product EOL Notice**"), provided that (a) the relevant Supplier shall supply, and the Company shall purchase, such Product ordered pursuant to this Agreement until the effective date of such termination and including any accepted Purchase Orders outstanding on the effective date of termination, and (b) the relevant Supplier is perpetually and irrevocably terminating its obligations to its other customers with respect to such Product. When the Company becomes aware that any of its customers will finish purchasing any type of the Products, the Company shall promptly notify the Supplier(s) thereof. Notwithstanding the above, if the Company has a long term supply agreement with a customer and the Suppliers (i) has confirmed in writing its intention to support the performance of such supply agreement by the Company through the outsourcing arrangement hereunder and (ii) are actually providing Product in support of such supply agreement, neither Supplier can, to the extent of its confirmation, terminate its obligation to supply the Company until such supply agreement between the Company and the customer is terminated; provided however that, if a Shareholder terminates the China JV Operating Agreement in accordance with Section 9.4 thereof, such Shareholder can immediately terminate its obligations to supply the Products under this Agreement by giving a Product EOL Notice.

2.6 Certain Claims

Notwithstanding any other provisions in this Agreement, either Supplier may discontinue sales of any Product after Suppliers' receipt of a written products liability or the Intellectual Property Rights infringement claim that is deemed credible by written opinion of the relevant Supplier's outside counsel, provided that the relevant Supplier also discontinues sales and supplies to its other customers with respect to such Product; provided further that (i) relevant Supplier shall give the Company at least thirty (30) calendar days prior written notice of its intent to discontinue sales of such Product, and (ii) at the Company's request, if the Company will continue to manufacture and sell commercial products using the Product, Suppliers will provide the Company with all reasonable information and assistance necessary, and any necessary licenses to the relevant Supplier's Intellectual Property Rights in accordance with the terms and conditions to be agreed by the relevant Supplier and the Company, to enable the Company to manufacture or have the Product manufactured.

Any such granted licenses shall terminate and provided information shall be destroyed or returned in the event the relevant Supplier resumes providing the Product to the Company. The Company shall defend, indemnify and hold harmless the relevant Supplier from and against any claims, expenses and costs (including but not limited to attorney and other professional fees and expenses), settlement of third party claims (if negotiated and approved by the Company), damages and liability arising from or related to products liability or the violation of the Intellectual Property Rights of any third party solely with respect to the Company's manufacture, use, sale, offering for sale, importation or distribution of any Products purchased by the Company during the thirty (30) calendar days period specified in this Section 2.6 or manufactured by or on behalf of the Company under the license granted in this Section 2.6.

2.7 Priority for New Products

Development of photomask technology, and establishment and prioritization of goals in the development of photomask technology for future process nodes, product development partner alignment, customer partnerships, captive mask operation engagement, the research and development model for the Company will be reviewed and discussed by the Steering Committee. The Steering Committee role will be as defined in Section 5.15 of the China JV Operating Agreement.

ARTICLE 3. PURCHASE ORDER ALLOCATION

Notwithstanding any other provisions in this Agreement, the Parties agree that, outsourcing or issuance of any Purchase Orders hereunder by the Company to any of the Suppliers shall be at the Company's discretion pursuant to the best interest of the Company taking into account the preference of the Company's customer and the qualification for the production of the Products; provided however that the Company will attempt to allocate the value of orders with each Supplier pursuant to the criteria and percentages set forth in Section 2.1 above. The Parties will review the allocation of orders between Suppliers on a quarterly basis. If at the end of each quarter the value of orders to one of the Suppliers is not consistent with the allocation set forth in Section 2.1 above, the Company will attempt to allocate orders to the Suppliers with lower valued orders for the previous quarter until such Supplier has received orders with value approximately equal to the percentages set forth in Section 2.1 above. Notwithstanding the above, each of the Parties agrees and acknowledges that if a Supplier cannot provide Product to the Company because of capacity restraints or failure to meet specifications of the Company, then the Company will be free to seek the Product from the other Supplier without regard to the allocation of Product orders between the Suppliers.

ARTICLE 4. PRODUCT PRICES AND PAYMENT

4.1 Prices

The purchase price for the Product shall be as set forth in Schedule 2.

4.2 Invoices; Payments

The Suppliers shall issue invoices to the Company for any amounts payable to the Suppliers pursuant to this Agreement upon shipment of the applicable Products to the Company. Payments for Products delivered in accordance with the Purchase Orders, and any other to be made by the Company to Suppliers hereunder, shall be made in the Applicable Currency within one-hundred and eighty (180) days from the shipment of the applicable Products delivered.

4.3 Taxes

All amounts payable for Product sold by the Suppliers to the Company hereunder are exclusive of any taxes. The Company shall be responsible for and shall pay any applicable sales, use, excise or similar taxes, including value added taxes and customs duties due on the importation of the Products and arising from purchases made by the Company under this Agreement, excluding any taxes based on the Suppliers' income and any applicable withholding taxes. All such taxes shall be determined based upon the final shipment designation of the items identified on the invoice.

ARTICLE 5. DELIVERY

5.1 Risk of Loss and Title

Delivery of all Products shall be made pursuant to the Delivery Term. Risk of loss for the Products and title to the Products shall pass to the Company in accordance with the Delivery Term.

5.2 Delivery

Suppliers shall deliver the Product to the Company in accordance with the Delivery Term, shipping instructions in the Purchase Order issued by the Company with regard to the requested delivery date (subject to the Product Lead Time), ship-to address, and carrier. If the Company does not provide shipping instructions, the Suppliers will select the carrier on a commercially reasonable basis. Suppliers shall be responsible for paying freight, handling, shipping and/or insurance charges to the delivery point in accordance with the Delivery Term.

ARTICLE 6. LIMITED WARRANTIES

6.1 Suppliers Limited Warranty

Each of the Suppliers warrants that the Products shall comply with the specifications and documentation agreed by the relevant Supplier and the Company in writing that is applicable to such Products for the Warranty Period. This warranty does not apply to any Product failures resulting from misuse, storage in or exposure to environmental conditions inconsistent with those specified in the applicable specifications or documentation, modification of the Product by anyone other than the relevant Supplier. If a Product fails to comply with the foregoing warranty, the relevant Supplier shall, at its option, either repair or replace such Product, or, in the event the foregoing options are not commercially practicable, refund to the Company any amounts paid for the applicable Product. Without limiting the remedies specified in Article 8 and Section 9.2, this Section 6.1 states the exclusive remedy of the Company for failure of a Product to conform to the warranty provisions set forth in this Section 6.1.

6.2 Disclaimer

EXCEPT AS EXPRESSLY SET FORTH IN THIS ARTICLE 6, THE PARTIES MAKE NO WARRANTIES OR REPRESENTATIONS TO THE OTHER PARTIES AND EACH PARTY HEREBY DISCLAIMS ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE.

ARTICLE 7. TERM AND TERMINATION

7.1 Term

This Agreement shall become effective as of the Effective Date and shall continue to be in full force and effect for so long as Photonics and DNP, or any of their Affiliates, each remains a Shareholder of the Company.

7.2 Termination for Cause

A Party shall have the right to terminate its obligations under this Agreement if the other Party materially breaches this Agreement and fails to cure such breach within thirty (30) days after its receipt of written notice of the breach specifying such default.

7.3 Survival

Article 6 (for the duration of the applicable warranty period), Article 7, Article 8 and Article 9 shall survive any termination or expiration of this Agreement.

ARTICLE 8. INDEMNIFICATION

8.1 Indemnification by the Suppliers

Each of the Suppliers shall, with respect to Products supplied by such Supplier, defend, indemnify and hold harmless the Company from and against any third party claims, expenses and costs (including but not limited to attorney and other professional fees and expenses), settlement (if negotiated and approved by the relevant Supplier), damages and liability to the extent arising from a claim (a) alleging that a Product infringes or misappropriates any Intellectual Property Rights, or (b) arising under products liability theory from a manufacturing defect, and shall pay any judgments finally awarded by a court or any amounts contained in a settlement agreed to by the relevant Supplier arising from such claims. The foregoing indemnity does not cover claims that solely arise from (i) the modification of the Product by any party other than the relevant Supplier, (ii) the combination or use of the Product with other products, processes, methods, materials or devices except as approved by the relevant Supplier, or (iii) the fault of the Company.

8.2 Indemnification by the Company

Other than claims for which the Suppliers are obligated to indemnify the Company under Section 8.1, the Company shall defend, indemnify and hold harmless the Suppliers from and against any third party claims, expenses and costs (including but not limited to attorney and other professional fees and expenses), settlement (if negotiated and approved by the Company), damages and liability to the extent arising from a claim (a) alleging that a Product supplied by such Supplier infringes or misappropriates any Intellectual Property Rights, or (b) arising under products liability theory from a manufacturing defect, and shall pay any judgments finally awarded by a court or any amounts contained in a settlement agreed to by the Company arising from such claims. The foregoing indemnity does not cover claims that solely arise from (i) the modification of the Product by any party other than the Company, or (ii) the combination or use of the Product with other products, processes, methods, materials or devices except as approved by the Company.

8.3 Procedure

The Party seeking indemnification hereunder (the “**Indemnified Party**”) agrees to promptly inform the other Party (the “**Indemnifying Party**”) in writing of such claim and furnish a copy of each communication, notice or other action relating to the claim and the alleged infringement. The Indemnified Party shall permit the Indemnifying Party to have sole control over the defense and negotiations for a settlement or compromise, provided that the Indemnifying Party may not settle or compromise a claim in a manner that imposes or purports to impose any liability or obligations on the Indemnified Party without obtaining the Indemnified Party’s prior written consent. The Indemnified Party agrees to give all reasonable authority, information and assistance necessary to defend or settle such suit or proceeding at the Indemnifying Party’s reasonable request and at the Indemnifying Party’s expense.

ARTICLE 9. LIABILITY AND REMEDY

9.1 Limited Liability

EXCEPT FOR LIABILITY ARISING FROM BREACHES OF A PARTY’S CONFIDENTIALITY OBLIGATIONS CONTAINED IN THE NON-DISCLOSURE CLAUSE IN SECTION 12.17 OF THE CHINA JV OPERATING AGREEMENT, BREACHES OF LICENSE GRANTS CONTAINED HEREIN, AND EXCEPT FOR AMOUNTS PAYABLE TO THIRD PARTIES TO FULFILL INDEMNITY OBLIGATIONS DESCRIBED IN ARTICLE 8, (A) IN NO EVENT SHALL ANY PARTY HAVE ANY LIABILITY TO THE OTHERS, OR TO ANY PARTY CLAIMING THROUGH OR UNDER THE OTHER, FOR ANY LOST PROFITS, ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND IN ANY WAY ARISING OUT OF OR RELATED TO THIS AGREEMENT, HOWEVER CAUSED AND UNDER ANY THEORY OF LIABILITY, EVEN IF SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES; AND (B) IN NO EVENT SHALL A PARTY’S CUMULATIVE LIABILITY ARISING OUT OF THIS AGREEMENT EXCEED THE AMOUNTS ACTUALLY PAID, PAYABLE, RECEIVED OR RECEIVABLE BY SUCH PARTY FOR THE PRODUCTS CONCERNED THEREWITH HEREUNDER PURSUANT TO THIS AGREEMENT DURING THE TWELVE (12) MONTHS PRIOR TO THE OCCURRENCE OF THE INITIAL EVENT FOR WHICH A PARTY RECOVERS DAMAGES HEREUNDER. THESE LIMITATIONS SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY REMEDY. THE PARTIES ACKNOWLEDGE AND AGREE THAT THIS ARTICLE 9 IS AN ESSENTIAL ELEMENT OF THE BARGAIN AND ABSENT THIS ARTICLE 9 THE ECONOMIC AND OTHER TERMS OF THIS AGREEMENT WOULD BE SUBSTANTIALLY DIFFERENT.

9.2 Remedies

Notwithstanding anything stated to the contrary in this Agreement, the Parties acknowledge that any breach of Section 2.5 (End of Life) of this Agreement and/or the non-disclosure clause in Section 12.17 of the China JV Operating Agreement by a Party would cause irreparable harm to the other Parties, and that the damages arising from any such breach would be difficult or impossible to ascertain. As such, the Parties agree that a Party shall be entitled to injunctive relief and other equitable remedies in the event of any breach or threatened breach of Section 2.5 of this Agreement and/or the non-disclosure clause in Section 12.17 of the China JV Operating Agreement. Such injunctive or other equitable relief shall be in addition to, and not in lieu of, any other remedies that may be available to that Party. The Parties shall be entitled reasonable attorney fees and costs of enforcement of this Agreement.

ARTICLE 10.
OTHER ARRANGEMENT

10.1 Exclusive Distribution Mechanism

The Suppliers hereby agree that the Company will be the sole interface with all customers in the Territory as set forth in Article 8 of the China JV Operating Agreement. All customer proposals involving Photonics and DNP and its or their Affiliates in the Territory and within the purpose of the Steering Committee described in Section 5.15.1 of the China JV Operating Agreement will go through the Steering Committee for timely review. The Suppliers further agree to comply with Section 8.3.2 of the China JV Operating Agreement.

(Signature Page Follows)

IN WITNESS WHEREOF, the Parties hereto have duly executed this Agreement as of the day and year first above written.

PHOTRONICS, INC.

By: _____
Name: Peter S Kirlin
Title: Chief Executive Officer

DAI NIPPON PRINTING CO., LTD.

By: _____
Name: Mitsuru Tsuchiya
Title: Corporate Officer & General Manager of Fine Optonics Operations

Photronics DNP Mask Corporation

By: _____
Name: _____
Title: _____

Xiamen American Japan Photronics Mask Co., Ltd.

By: _____
Name: _____
Title: _____

Schedule 1

Definitions

Capitalized words and phrases used and not otherwise defined elsewhere in this Agreement shall have the following meanings:

1. “**Affiliate**” of a Person means any other Person which, directly or indirectly, controls, is controlled by, or is under common control with, such Person. The term “control” (including, with correlative meaning, the terms “controlled by” and “under common control with”), as used with respect to any Person, means the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities, by contract or otherwise. A Person shall be deemed an Affiliate of another Person only so long as such control relationship exists.
 2. “**Applicable Currency**” means (i) for payments in relation to Photonics, U.S. Dollars, (ii) for payments in relation to DNP, U.S. Dollars, and (iii) for payments in relation to PDMC, US Dollars.
 3. “**Delivery Term**” means DDP (Incoterms 2010) at delivery point in China. The Delivery Term may be otherwise determined by the Company and the Supplier in the Purchase Order where delivery point is other place than China.
 4. “**Initial Qualified Supplier**” means the Supplier who first obtains the qualification to manufacture for certain Products prior to or after the Effective Date.
 5. “**Intellectual Property Rights**” means all rights in and to (a) U.S. and foreign patents and patent applications, including all divisions, substitutions, continuations, continuations-in-part, and any reissues, re-examinations and extensions thereof, (b) copyrights and other rights in works of authorship, (c) unpatented inventions, trade secrets, data, processes, or materials, (d) mask work rights, and (e) other intellectual property or proprietary rights of any kind now known or hereafter recognized in any jurisdiction, but excluding trademarks, service marks, trade names, trade dress, domain names, logos and similar rights, and the goodwill associated therewith.
 6. “**Measurement Period**” means the six (6) months period prior to the execution of the China JV Operating Agreement.
 7. “**New Qualified Products**” means the Products for which no Supplier has the qualification to manufacture as of the Effective Date.
 8. “**Outsourced Purchase Orders**” means the Purchase Orders which was outsourced to the Shareholders during the Outsource Transition Period in accordance with Section 2.1.A.
 9. “**Outsource Transition Period**” means the period of time from the Effective Date until the Company becomes operational: For the purpose hereof, “being operational” is defined as shipment by the Company of the first complete three (3) photomask sets or substantial number of layers in certain three (3) photomask sets (for the sake of clarity, photomasks for back-end layer is always deemed as “substantial number”) to a customer in the Territory.
 10. “**Post Outsource Transition Period**” means the period after the Company becomes operational.
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11. **“Product”** means photolithographic integrated circuit photomasks for wafer scanner, wafer stepper and mask aligner, using g-line (436nm), i-line (365nm wavelength), krypton-fluoride (KrF) excimer lasers, argon-fluoride (ArF) excimer lasers, and extreme ultraviolet (EUV) wavelength light source (except master templates and/or replica templates used for manufacturing integrated circuits by nanoimprint lithography technologies) and related services.
 12. **“Purchase Order”** means any of the following (a) a written purchase order issued to the Company by third party buyers for the purchase of certain Products; (b) a written purchase order issued by the Company to a Supplier for a quantity of the Product.
 13. **“Warranty Period”** means a period of twelve (12) months from the relevant Supplier’s shipment of the Product.
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Schedule 2

Product Prices

The prices for each Product outsourced to the Suppliers shall be substantially consistent with the price ordered by the Company's customer (the "**Customer Order Price**") less ten percent (10%), except the case that the mask data preparation will be conducted by the Supplier, the prices of which shall be the Customer Order Price less five percent (5%).

PHOTRONICS, INC.
INSIDER TRADING POLICY

In order to take an active role in the prevention of insider trading violations by officers, directors, employees and other related individuals of Photronics, Inc. (the "Company") and its subsidiaries, the Company has adopted this Insider Trading Policy (the "Policy").

Statement of Intent

The Company opposes the misuse of material nonpublic information in the trading of securities and it is the intent of this Policy to implement procedures designed to prevent trading based on material nonpublic information regarding the Company, including any of its subsidiaries.

Covered Parties

The Policy covers officers, directors and all other employees of, or consultants or contractors to, the Company or its subsidiaries, as well as their immediate families, and members of their households (each, an "Insider").

Covered Transactions

This Policy applies to all transactions in the Company's securities, including common stock, options for common stock and any other securities the Company may issue from time to time, such as preferred stock, warrants and convertible debentures, as well as to derivative securities relating to the Company's stock, whether or not issued by the Company, such as publicly-traded options.

Prohibited Transactions

No Insider shall engage in any transaction involving a purchase or sale of the Company's securities, including any offer to purchase or offer to sell, during any period commencing with the date that the Insider possesses material nonpublic information concerning the Company or its subsidiaries, and ending at the beginning of the trading day following the date of public disclosure of that information, or at such time as such nonpublic information is no longer material.

No Insider shall disclose ("tip") material nonpublic information about the Company or its subsidiaries to any other person where such information may be used by such person to his or her profit by trading in the securities of companies to which such information relates, nor shall such Insider or related person make recommendations or express opinions on the basis of material nonpublic information as to trading in the Company's securities.

No Insider shall engage in any transaction involving the purchase or sale of another company's securities while in possession of material nonpublic information about such company when that information is obtained in the course of employment with, or the performance of services on behalf of, the Company and for which there is a relationship of trust and confidence concerning the information.

Problematic Transactions

While employees are not prohibited by law from using Company securities as collateral for loans or in margin accounts or from engaging in transactions involving publicly-traded options, such as puts and calls, or other derivatives securities with respect to the Company's securities, the Company discourages employees from such activity because, among other problems, these types of transactions (i) may result in transactions in Company securities occurring outside the Open Window (defined below) and (ii), in the case of publicly-traded options, create an appearance of impropriety in that these types of transactions often focus on short-term and speculative interest in the Company's securities or otherwise result in individual profit arising from poor Company performance. Limit orders with brokers should not extend beyond any Open Window and be cancellable upon an imposition of a black-out period. Employees interested in trading outside of the Open Window should look into adopting a 10b5-1 trading plan, as described below. Exercising stock options issued pursuant to the Company's stock option plan, as otherwise permitted under this Policy, are not considered problematic.

The Company's Trading Window

The Company has determined that all officers, directors, and those other persons identified on Attachment 1 (as may be amended from time to time by the General Counsel), shall be prohibited from buying, selling or otherwise effecting transactions in any stock or other securities of the Company or derivative securities thereof EXCEPT during the following trading window:

Beginning at the open of market on the second trading day following the date of public disclosure of the Company's financial results for a preceding calendar quarter or year and ending at the close of market on the date that is two weeks prior to the end of a quarter or fiscal year end (the "Open Window").

Similarly, the Company, through the General Counsel, may impose special black-out periods during which certain persons will be prohibited from buying, selling or otherwise effecting transactions in any stock or other securities of the Company or derivative securities thereof, even though the trading window would otherwise be open. If a special black-out period is imposed, the Company will notify affected individuals, who should thereafter not engage in any transaction involving the purchase or sale of the Company's securities and should not disclose to others the fact of such suspension of trading.

It should be noted that even during the Open Window, any person possessing material nonpublic information should not engage in any transactions in the Company's securities until the beginning of the trading day following the date of public disclosure of such information, whether or not the Company has recommended a suspension of trading to that person.

Pre-clearance of Trades by Executive Officers and Directors

All executive officers and directors of the Company must refrain from trading in the Company's securities, even during the Open Window, without first contacting the Company's General Counsel and obtaining pre-clearance to commence trading in the Company's securities. In addition, all executive officers and directors are required to comply with Section 16 of the Securities and Exchange Act of 1934, and related rules and regulations which set forth reporting obligations as well as limitations on "short swing" transactions. The Company is available to assist in filing Section 16 reporting, however, the obligation to comply with Section 16 is personal. Please direct any inquiries concerning compliance to the General Counsel.

Adoption and Effect of 10b5-1 Trading Plans

The Company permits and encourages all directors, officers and other employees to adopt trading plans in accordance with Securities and Exchange Commission Rule 10b5-1(c) (17 C.F.R. § 240.10b5-1(c)) and otherwise pursuant to the Company's procedure for adopting such a trading plan (a "10b5-1 trading plan"). Entry into a 10b5-1 plan is only permitted during an Open Window. The restrictions on trading set forth in this Policy shall not apply to trades made pursuant to a 10b5-1 trading plan. More information concerning trading plans is available from the General Counsel.

Exemptions from this Policy

The exercise of stock options under the Company's stock option plan with a cash payment of the exercise price is exempt from this Policy, since the other party to these transactions is the Company itself and the price does not vary with the market, but is fixed by the terms of the option agreement. This exemption does not apply to the sale of any shares issued upon such exercise and it does not apply to a cashless exercise of options, which is accomplished by a sale of a portion of the shares issued upon exercise of an option. In addition, bona fide gifts of the securities of the Company are exempt from this Policy.

Consequences for Violation

Employees who violate this Policy may also be subject to disciplinary action by the Company, which may include ineligibility for future participation in the Company's equity stock and other incentive plans or termination of employment.

Pursuant to U.S. federal and state securities laws, Insiders may be subject to criminal and civil fines and penalties as well as imprisonment for engaging in transactions in the Company's securities at a time when they have knowledge of material nonpublic information regarding the Company or its subsidiaries. In addition, Insiders may be liable for improper transactions by any person (commonly referred to as a "tippee") to whom they have disclosed material nonpublic information regarding the Company or its subsidiaries or to whom they have made recommendations or expressed opinions on the basis of such information as to trading in the Company's securities.

Individual Responsibility

Every officer, director and other employee, consultant and contractor has the individual responsibility to comply with this Policy, and the applicable laws of their jurisdiction. An Insider may, from time to time, have to forego a proposed transaction in the Company's securities even if he or she planned to make the transaction before learning of the material nonpublic information and even though the Insider believes he or she may suffer an economic loss or forego anticipated profit by waiting. **Trading in the Company's securities during the trading window should not be considered a "safe harbor," and all directors, officers and other persons should use good judgment at all times.**

General Counsel

The duties of the General Counsel under this Policy shall include, but not be limited to, the following:

- Pre-clearing transactions as required under this Policy.
- Assisting, as requested, in the preparation and filing of Section 16 reports (Forms 3, 4 and 5) for Section 16 reporting persons.
- Serving as the designated recipient at the Company of copies of reports filed with the Securities and Exchange Commission by Section 16 reporting persons under Section 16 of the Exchange Act.

- Periodically reminding all Section 16 reporting persons regarding their obligations to report and quarterly reminders of the dates that the trading window described above begins and ends.
- Circulating the Policy (and/or a summary thereof) to all employees, including Section 16 reporting persons, on an annual basis.
- Assisting the Company in implementation of the Policy.
- Assisting with compliance activities with respect to Rule 144 requirements and regarding changing requirements and recommendations for compliance with Section 16 of the Exchange Act and insider trading laws to ensure that the Policy is amended as necessary to comply with such requirements.

Definition of Material Nonpublic Information

It is not possible to define all categories of material information. However, information should be regarded as material if there is a substantial likelihood that it would be considered important to a reasonable investor in making an investment decision regarding the purchase or sale of the Company's securities. Put another way, there must be a substantial likelihood that the information would be viewed by the reasonable investor as having significantly altered the total mix of information available in the market concerning the Company.

Either positive or negative information may be material. Questions concerning whether nonpublic information is material can be directed to the General Counsel.

* * * * *

Attachment 1

Persons subject to trading window restrictions

All officers, directors and employees of the Company and its subsidiaries, as well as contractors and consultants.

SUBSIDIARIES OF PHOTRONICS, INC.

	State or Jurisdiction of Incorporation or Organization
Align-Rite International, Ltd.	(United Kingdom)
Photronics (Wales) Limited	(United Kingdom)
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. ⁽¹⁾	(Xiamen, P.R.C.)
Photronics UK, Ltd.	(United Kingdom)
Photronics Mask Corporation Hefei ⁽²⁾	(Hefei, P.R.C.)
Photronics Korea, Ltd.	(Republic of Korea)
Photronics Mask Corporation Hefei ⁽²⁾	(Hefei, P.R.C.)
Taichung Photronics Photomask Co., Ltd.	(Taiwan, R.O.C.)

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 Dai Nippon Printing Co., Ltd.

(2) 64.00% owned by Photronics UK, Ltd. and 36.00% owned by Photronics Cheonan Co., Ltd.

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statement Nos. 333-252486 and 333-217676 on Form S-8 of our report dated December 22, 2023, relating to the consolidated financial statements of Photonics, Inc., and the effectiveness of Photonics, Inc.'s internal control over financial reporting appearing in this Annual Report on Form 10-K for the year ended October 31, 2023.

/s/ Deloitte & Touche LLP
Boston, Massachusetts
December 22, 2023

EXHIBIT 31.1

I, Frank Lee, certify that:

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

/s/ Frank Lee

Frank Lee
Chief Executive Officer
December 22, 2023

EXHIBIT 31.2

I, John P. Jordan, certify that:

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

/s/ JOHN P. JORDAN

John P. Jordan
Chief Financial Officer
December 22, 2023

EXHIBIT 32.1**Section 1350 Certification of the Chief Executive Officer**

I, Frank Lee, Chief Executive Officer of Photonics, Inc. (the "Company"), certify, to my knowledge, pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, 18 U.S.C. Section 1350, that:

- (1) The Annual Report on Form 10-K of the Company for the year ended October 31, 2023 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

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

/s/ Frank Lee

Frank Lee
Chief Executive Officer
December 22, 2023

EXHIBIT 32.2**Section 1350 Certification of the Chief Financial Officer**

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

- (1) The Annual Report on Form 10-K of the Company for the year ended October 31, 2023 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

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

/s/John P. Jordan

John P. Jordan
Chief Financial Officer
December 22, 2023

Compensation Recovery Policy

1. **Purpose.** The purpose of this Compensation Recovery Policy (this “Policy”) is to describe the circumstances under which Photronics, Inc. (the “Company”) is required to recover certain compensation paid to certain employees. Any references in compensation plans, agreements, equity awards or other policies to the Company’s “recoupment,” “clawback” or similarly named policy shall mean this Policy.
2. **Requirement to Recover Compensation.** In the event that the Company is required to prepare an Accounting Restatement, the Company shall recover reasonably promptly the amount of Erroneously Awarded Compensation.
3. **Definitions.** For purposes of this Policy, the following terms, when capitalized, shall have the meanings set forth below:
 - (a) “*Accounting Restatement*” shall mean any accounting restatement required due to the Company’s material noncompliance with any financial reporting requirement under the securities law, including any required accounting restatement to correct an error in previously issued financial statements that is material to the previously issued financial statements, or that would result in a material misstatement if the error were corrected in the current period or left uncorrected in the current period.
 - (b) “*Covered Officer*” shall mean the Company’s principal executive officer; president; principal financial officer; principal accounting officer (or if there is no such accounting officer, the controller); any vice-president of the Company in charge of a principal business unit, division, or function (such as sales, administration, or finance); any other officer who performs a significant policy-making function; or any other person who performs similar significant policy-making functions for the Company. Executive officers of the Company’s parent(s) or subsidiaries, if any, shall be deemed “Covered Officers” if they perform such policy-making functions for the Company. Identification of an executive officer for purposes of this Policy shall include at a minimum executive officers identified pursuant to Item 401(b) of Regulation S-K.
 - (c) “*Effective Date*” shall mean October 2, 2023.
 - (d) “*Erroneously Awarded Compensation*” shall mean the excess of (i) the amount of Incentive-Based Compensation Received by a person (A) after beginning service as a Covered Officer, (B) who served as a Covered Officer at any time during the performance period for that Incentive-Based Compensation, (C) while the Company has a class of securities listed on a national securities exchange or a national securities association and (D) during the Recovery Period; over (ii) the Recalculated Compensation.

- (e) “*Incentive-Based Compensation*” shall mean any compensation that is granted, earned, or vested based wholly or in part upon the attainment of a financial reporting measure. A financial reporting measure is a measure that is determined and presented in accordance with the accounting principles used in preparing the Company’s financial statements, and any measures that are derived wholly or in part from such measures, regardless of whether such measure is presented within the financial statements or included in a filing with the Securities and Exchange Commission. Each of stock price and total shareholder return is always considered a financial reporting measure. For the avoidance of doubt, incentive-based compensation subject to this Policy does not include stock options, restricted stock, restricted stock units or similar equity-based awards for which the grant is not contingent upon achieving any financial reporting measure performance goal and vesting is contingent solely upon completion of a specified employment period or attaining one or more non-financial reporting measures.
- (f) “*Recalculated Compensation*” shall mean the amount of Incentive-Based Compensation that otherwise would have been Received had it been determined based on the restated amounts in the Accounting Restatement, computed without regard to any taxes paid. For Incentive-Based Compensation based on stock price or total shareholder return, where the amount of the Erroneously Awarded Compensation is not subject to mathematical recalculation directly from the information in an Accounting Restatement, the amount of the Recalculated Compensation must be based on a reasonable estimate of the effect of the Accounting Restatement on the stock price or total shareholder return, as the case may be, upon which the compensation was Received. The Company must maintain documentation of the determination of that reasonable estimate and provide such documentation to the national securities exchange or association on which its securities are listed.
- (g) Incentive-Based Compensation is deemed “*Received*” in the Company’s fiscal period during which the financial reporting measure specified in the award of such Incentive-Based Compensation is attained, even if the payment or grant of the Incentive-Based Compensation occurs after the end of that period.
- (h) “*Recovery Period*” shall mean the three completed fiscal years of the Company immediately preceding the date the Company is required to prepare an Accounting Restatement; provided that the Recovery Period shall not begin before the Effective Date. For purposes of determining the Recovery Period, the Company is considered to be “required to prepare an Accounting Restatement” on the earlier to occur of: (i) the date the Company’s Board of Directors, a committee thereof, or the Company’s officer or officers authorized to take such action if Board action is not required, concludes, or reasonably should have concluded, that the Company is required to prepare an Accounting Restatement, or (ii) the date a court, regulator, or other legally authorized body directs the Company to prepare an Accounting Restatement. If the Company changes its fiscal year, then the transition period within or immediately following such three completed fiscal years also shall be included in the Recovery Period, provided that if the transition period between the last day of the Company’s prior fiscal year end and the first day of its new fiscal year comprises a period of nine to 12 months, then such transition period shall instead be deemed one of the three completed fiscal years and shall not extend the length of the Recovery Period.

4. Exceptions. Notwithstanding anything to the contrary in this Policy, recovery of Erroneously Awarded Compensation will not be required to the extent the Company's committee of independent directors responsible for executive compensation decisions (or a majority of the independent directors serving on the Company's board of directors in the absence of such a committee) has made a determination that such recovery would be impracticable and one of the following conditions have been satisfied:
- (a) The direct expense paid to a third party to assist in enforcing this Policy would exceed the amount to be recovered; provided that, before concluding that it would be impracticable to recover any amount of Erroneously Awarded Compensation that was Incentive-Based Compensation based on the expense of enforcement, the Company must make a reasonable attempt to recover such Erroneously Awarded Compensation, document such reasonable attempt(s) to recover, and provide that documentation to NYSE American.
 - (b) Recovery would violate home country law where, with respect to Incentive-Based Compensation, that law was adopted prior to November 28, 2022 before concluding that it would be impracticable to recover any amount of Erroneously Awarded Compensation that was Incentive-Based Compensation based on violation of home country law, the Company must obtain an opinion of home country counsel, acceptable to the national securities exchange or association on which its securities are listed, that recovery would result in such a violation, and must provide such opinion to the exchange or association.
 - (c) Recovery would likely cause an otherwise tax-qualified retirement plan, under which benefits are broadly available to employees of the Company, to fail to meet the requirements of 26 U.S.C. 401(a)(13) or 26 U.S.C. 411(a) and regulations thereunder.
5. Manner of Recovery. In addition to any other actions permitted by law or contract, the Company may take actions including but not limited to to recover any Erroneously Awarded Compensation: (a) require the Covered Officer to repay such amount; (b) offset such amount from any other compensation owed by the Company or any of its affiliates to the Covered Officer, regardless of whether the contract or other documentation governing such other compensation specifically permits or specifically prohibits such offsets; and/or (c) subject to Section 4(c), to the extent the Erroneously Awarded Compensation was deferred into a plan of deferred compensation, whether or not qualified, forfeit such amount (as well as the earnings on such amounts) from the Covered Officer's balance in such plan, regardless of whether the plan specifically permits or specifically prohibits such forfeiture. If the Erroneously Awarded Compensation consists of shares of the Company's common stock, and the Covered Officer still owns such shares, then the Company may satisfy its recovery obligations by requiring the Covered Officer to transfer such shares back to the Company.

6. Other.

- (a) This Policy shall be administered and interpreted, and may be amended from time to time, by the Company's board of directors or any committee to which the board may delegate its authority in its sole discretion in compliance with the applicable listing standards of the national securities exchange or association on which the Company's securities are listed, and the determinations of the board or such committee shall be binding on all Covered Officers; provided however that certain actions may only be taken by the compensation committee of the board of directors as provide for under the applicable listings standard of the national securities exchange or association on which the Company's securities are listed and the board of directors may not delegate any such applicable actions in any manner or to any other committee of the board of directors that would violate the requirements of the applicable listings standards of the national securities exchange or association on which the Company's securities are listed.
- (b) The Company shall not indemnify any Covered Officer against the loss of Erroneously Awarded Compensation.
- (c) The Company shall file all disclosures with respect to this Policy in accordance with the requirements of the federal securities laws, including the disclosure required by the applicable Securities and Exchange Commission filings.
- (d) Any right to recovery under this Policy shall be in addition to, and not in lieu of, any other rights of recovery that may be available to the Company.