Fabrinet
Form 10-K
August 22, 2018
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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 June 29, 2018

Or

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to

Commission file number: 001-34775

FABRINET

(Exact name of registrant as specified in its charter)

Cayman Islands	Not Applicable
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

c/o Intertrust Corporate Services (Cayman) Limited

190 Elgin Avenue

George Town

Grand Cayman

Cayman Islands	KY1-9005
(Address of principal executive offices)	(Zip Code)

+66 2-524-9600

(Registrant s telephone number, including area code)

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

Ordinary Shares, $0.01 par value	New York Stock Exchange
(Title of each class)	(Name of exchange on which registered)

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 (§229.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of large accelerated filer, accelerated filer, smaller reporting company, and

emerging growth company in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer	Accelerated filer
Non-accelerated filer (Do not check if smaller reporting company)	Smaller reporting company
	Emerging growth company

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes No

As of December 29, 2017, the last business day of the registrant s most recently completed second fiscal quarter, shares held by non-affiliates of the registrant had an aggregate market value of approximately $1.1 billion, based on the closing price for the registrant s ordinary shares as reported on the New York Stock Exchange on such date.

As of August 13, 2018, the registrant had 36,454,146 ordinary shares, $0.01 par value, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant s definitive proxy statement relating to its 2018 Annual Meeting of Shareholders are incorporated by reference into Part III of this Annual Report on Form 10-K where indicated. Such proxy statement will be filed with the U.S. Securities and Exchange Commission within 120 days after the end of the fiscal year to which this report relates.

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FABRINET

ANNUAL REPORT ON FORM 10-K

For the Fiscal Year Ended June 29, 2018

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PART I

ITEM 1. BUSINESS.

Overview

We provide advanced optical packaging and precision optical, electro-mechanical and electronic manufacturing services to original equipment manufacturers (OEMs) of complex products such as optical communication components, modules and sub-systems, industrial lasers, medical devices and sensors. We offer a broad range of advanced optical and electro-mechanical capabilities across the entire manufacturing process, including process design and engineering, supply chain management, manufacturing, complex printed circuit board assembly, advanced packaging, integration, final assembly and test. Although we focus primarily on low-volume production of a wide variety of high complexity products, which we refer to as low-volume, high-mix, we also have the capability to accommodate high-volume production. Based on our experience with and positive feedback we have received from our customers, we believe we are a global leader in providing these services to the optical communications, industrial lasers and automotive markets.

Our customer base includes companies in complex industries that require advanced precision manufacturing capabilities, such as optical communications, industrial lasers, automotive and sensors. Our customers in these industries support a growing number of end-markets, including automotive, biotechnology, communications, materials processing, medical devices, metrology and semiconductor processing. Our total revenues for the year ended June 29, 2018 (fiscal year 2018) decreased by $48.6 million, or 3.4%, from $1.42 billion for the year ended June 30, 2017 (fiscal year 2017) to $1.37 billion for fiscal year 2018. Our revenues from lasers, sensors and other markets as a percentage of total revenues increased from 22.0% for fiscal year 2017 to 27.1% for fiscal year 2018, while our revenues from optical communications products as a percentage of total revenues have decreased from 78.0% for fiscal year 2017 to 72.9% for fiscal year 2018.

In many cases, we are the sole outsourced manufacturing partner used by our customers for the products that we produce for them. The products that we manufacture for our OEM customers include:

optical communications devices, such as:

- selective switching products, such as reconfigurable optical add-drop multiplexers (ROADMs), optical amplifiers, modulators and other optical components and modules that collectively enable network managers to route voice, video and data communications traffic through fiber optic cables at various wavelengths, speeds, and over various distances;
- tunable lasers, transceivers, and transponders that eliminate, at a significant cost savings to the service provider, the need to stock individual fixed wavelength optical transceivers and transponders used in voice and data communications networks; and
- active optical cables providing high-speed interconnect capabilities for data centers and computing clusters, as well as Infiniband, Ethernet, fiber channel and optical backplane connectivity;

solid state, diode-pumped, gas and fiber lasers (collectively referred to as industrial lasers) used across a broad array of industries, including semiconductor processing (wafer inspection, wafer dicing, wafer scribing), biotechnology and medical device (DNA sequencing, flow cytometry, hematology, antibody detection), metrology (instrumentation, calibration, inspection), and material processing (metal, polymer, textile drilling and cutting, annealing, marking, engraving, and welding); and

sensors, including differential pressure, micro-gyro, fuel and other sensors that are used in automobiles, and non-contact temperature measurement sensors for the medical industry.

We also design and fabricate application-specific crystals, lenses, prisms, mirrors, laser components and substrates (collectively referred to as customized optics) and other custom and standard borosilicate, clear

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fused quartz, and synthetic fused silica glass products (collectively referred to as customized glass). We incorporate our customized optics and glass into many of the products we manufacture for our OEM customers, and we also sell customized optics and glass in the merchant market.

We believe we offer differentiated manufacturing services through our optical and electro-mechanical process technologies and our strategic alignment with our customers. Our dedicated process and design engineers, who have a deep knowledge in materials sciences and physics, are able to tailor our service offerings to accommodate our customers complex engineering assignments. Our range of capabilities, from the design of customized optics and glass through process engineering and testing of finished assemblies, provides us with a knowledge base that we believe often leads to improvements in our customers product development cycles, manufacturing cycle times, quality and reliability, manufacturing yields and end product costs. We offer an efficient, technologically advanced and flexible manufacturing infrastructure designed to enable the scale production of low-volume, high-mix products, as well as high-volume products. We specialize in complex prototype and new product introduction services, with specialized resources to meet customers quick-turn printed circuit board assembly (PCBA) and early stage manufacturing requirements. We have a dedicated engineering team to support the advanced optical packaging needs of our customers cutting edge products, which allows them to accelerate development and time-to-market for such products. We often provide a factory-within-a-factory manufacturing environment to safeguard our customers intellectual property by physically segregating certain key employees and manufacturing space from the resources we use for other customers. We also provide our customers with a customized software platform to monitor all aspects of the manufacturing process, enabling our customers to remotely access our databases to monitor yields, inventory positions, work-in-progress status and vendor quality data in real time. We believe there is no other manufacturing services provider with a similar breadth and depth of optical and electro-mechanical engineering and process technology capabilities that does not directly compete with its customers in their end-markets. As a result, we believe we are more closely aligned and better able to develop long-term relationships with our customers than our competitors.

We are organized and operate in a single segment. See Note 20, Business segments and geographic information of Notes to Consolidated Financial Statements in Part II, Item 8 of this Annual Report on Form 10-K, which is incorporated herein by reference.

As of June 29, 2018, our facilities comprised approximately 2.0 million total square feet, including approximately 0.2 million square feet of office space and approximately 1.8 million square feet devoted to manufacturing and related activities, of which approximately 0.8 million square feet are clean room facilities. Of the aggregate square footage of our facilities, approximately 1.5 million square feet are located in Thailand and the remaining balance is located in the People s Republic of China (PRC or China), the United Kingdom, the United States and the Cayman Islands. See Part I, Item 2. Properties of this Annual Report on Form 10-K.

Industry Background

Optical Communications

Many optical communications OEMs have reduced internal manufacturing capacity and transitioned to a low-cost and more efficient manufacturing base. By outsourcing production to third parties, OEMs are better able to concentrate their efforts and resources on what they believe are their core strengths, such as research and development, and sales and marketing. Additionally, outsourcing production often allows OEMs to reduce product costs, improve quality, access advanced process design and manufacturing technologies and achieve accelerated time-to-market and time-to-volume production. The principal barrier to the trend towards outsourcing in the optics industry has been the shortage of third-party manufacturing partners with the necessary optical process capabilities and robust intellectual property protection.

Demand for optical communications components and modules is influenced by the level and rate of development of optical communications infrastructure and carrier and enterprise network expansion, as well as

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rapid expansion of data center infrastructures. Carrier demand for optical communications network equipment has increased as a direct result of higher network utilization and increased demand for bandwidth capacity. The increase in network traffic volumes has been driven by increasing demand for voice, data and video services delivered over wired and wireless Internet protocol, or IP, networks. The bandwidth demands for data center access have been largely driven by social media applications and cloud services, and continue to increase very rapidly.

Industrial Lasers, Sensors and Others

The optical and electro-mechanical process technologies used in the optical communications market also have applications in other similarly complex end-markets that require advanced precision manufacturing capabilities, such as automotive, industrial lasers, medical devices, and sensors. These markets are substantially larger than the optical communications components and modules market. Growth in the industrial lasers, medical, and sensors markets is expected to be driven by demand for:

- industrial laser applications across a growing number of end-markets, particularly in semiconductor processing, biotechnology, metrology and materials processing;
- precision, non-contact and low power requirement sensors, particularly in automotive, medical and industrial end-markets; and
- lower cost products used on both enterprise and consumer levels.

Outsourcing of production by industrial laser and sensor OEMs has historically been limited. We believe industrial laser and sensor OEMs are increasingly recognizing the benefits of outsourcing that OEMs in other industries, such as optical communications, have been able to achieve.

Our Competitive Strengths

We believe we have succeeded in providing differentiated services to the optical communications, industrial lasers, medical, and sensors industries due to our long-term focus on optical and electro-mechanical process technologies, strategic alignment with our customers and our commitment to total customer satisfaction. More specifically, our key competitive strengths include:

Advanced Optical and Electro-Mechanical Manufacturing Technologies: We believe that our optical and electro-mechanical process technologies and capabilities, coupled with our customized optics and glass technologies, provide us with a key competitive advantage. These technologies include:

- advanced optical and precision packaging;
- reliability and environmental testing;
- optical and mechanical material and process analysis;
- precision optical fiber and electro-mechanical assembly;
- complex printed circuit board assembly;

customized software tools for low-volume, high-mix manufacturing;

turn-key manufacturing systems;

fiber metallization and lensing;

fiber handling and fiber alignment;

crystal growth and processing;

precision lapping and polishing;

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precision glass drawing; and

optical coating.

Efficient, Flexible and Low Cost Process Engineering and Manufacturing Platform: We enable our customers to transition their production to an efficient and flexible manufacturing platform that is specialized for the production of optics and similarly complex products and is located in a low-cost geography. We believe our advanced manufacturing technologies, coupled with our broad engineering capabilities, give us the ability to identify opportunities to improve our customers manufacturing processes and provide meaningful production cost benefits. We have also developed a series of customized software tools that we believe provide us with a specialized ability to manage the unique aspects of low-volume, high-mix production.

Customizable Factory-Within-a-Factory Production Environment: We offer our customers exclusive engineering teams and manufacturing space for production. We call this concept of segregating production by customer a factory-within-a-factory. We believe our approach maximizes intellectual property protection and provides greater opportunities to reduce cost and improve time to market for our customers products.

Vertical Integration Targeting Customized Optics and Glass: We believe our capabilities in the design and fabrication of high-value customized optics and glass are complementary to our manufacturing services. Specifically, these capabilities enable us to strategically align our business to our customers needs by streamlining our customers product development process and reducing the number of suppliers in our customers manufacturing supply chains. Also, we use these customized optics and glass products in certain of the components, modules and subsystems we manufacture, which enables us to shorten time to market and reduce the cost for our customers. We believe this level of vertical integration positions us to capitalize on further opportunities to cross-sell our design and fabrication capabilities.

Turn-Key Supply Chain Management: We have created a proprietary set of automated manufacturing resource planning tools designed specifically to address the unique inventory management demands of low-volume, high-mix manufacturing. Over the years, we have developed strong relationships with thousands of suppliers and implemented inventory management strategies with many of them, which enables us to obtain inventory on an as-needed basis and provide on-site stocking programs. We believe our deep expertise, relationships and capabilities in supply chain and materials management often allows us to further reduce costs and cycle times for our customers.

Our Growth Strategy

The key elements of our growth strategy are to:

Strengthen Our Presence in the Optical Communications Market: We believe we are a leader in manufacturing products for the optical communications market. The optical communications market is growing rapidly, driven by the growth in demand for increased network bandwidth and penetration from core to metro networks and data center infrastructures. We believe this trend will continue to increase the demand for the products that we manufacture and the services we provide. We continue to invest resources in advanced manufacturing process and optical packaging technologies to support the manufacture of the next generation of complex optical products.

Leverage Our Technology and Manufacturing Capabilities to Continue to Diversify Our End-Markets: We intend to use our technological strengths in precision optical and electro-mechanical manufacturing, advanced packaging and process design engineering to continue our diversification into industrial lasers, medical, sensors, and other select markets that require similar capabilities.

Continue to Extend Our Customized Optics and Glass Vertical Integration: We will continue to extend our vertical integration into customized optics and glass in order to gain greater access to key

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components used in the complex products we manufacture as well as to continue our diversification into new markets. We believe our customized optics and glass capabilities are highly complementary to our optical and electro-mechanical manufacturing services, and we intend to continue to market these products to our existing manufacturing services customers. In addition, we intend to continue our focus on customized optics and glass through further investment into research and development, as well as through potential acquisitions in what remains a highly fragmented market.

Evaluate Potential Strategic Alternatives such as Acquisitions and Joint Ventures: We will continue to evaluate opportunities to further expand our manufacturing capabilities and diversify our end-markets through the evaluation of various acquisition and joint venture opportunities around the globe. For example, in September 2016 we acquired Global CEM Solutions Ltd. and all of its subsidiaries (collectively, Fabrinet UK) to diversify our markets and customer base and accelerate our entrance into the European EMS market.

Broaden Our Client Base Geographically: Our manufacturing services are incorporated into products that are distributed in markets worldwide, but we intend to further build out our client base in strategic regions. We intend to focus on expanding our client base in Europe, Asia-Pacific, the Middle East and the United States. We believe these regions have a large and robust optics market, as well as a need for advanced manufacturing services in other growth markets, and would benefit from our precision optical and electromechanical manufacturing services.

Establish New Product Introduction (NPI) Centers to Generate and Transfer New Business to Thailand: We established Fabrinet West, Inc. as an NPI center in the heart of Silicon Valley. Fabrinet West, Inc. serves as our business development arm with emphasis on new business generation and eventual transfer to Thailand after NPI. Equipped with state-of-the-art surface mount and advanced optical packaging technologies and infrastructure, and with close proximity to a large portion of our customer base, this center helps to accelerate customer NPI and provides seamless access and future transfer to the low-cost manufacturing base in Thailand.

In March 2018, we began laying the groundwork for a new facility in Israel, where we expect to continue our proven model of providing local NPI services, helping our customers with design for manufacturability, and then transferring those programs to Thailand for volume manufacturing.

Service Offerings

We offer integrated precision optical, electro-mechanical, and electronic manufacturing services and customized optics and glass fabrication services for our OEM customers.

Precision Optical, Electro-Mechanical, and Electronic Manufacturing Services

Process Design and Engineering

We continuously analyze our customers product designs for cost and manufacturability improvements. We perform detailed design for manufacturability studies and design of experiments to assist in optimizing a product s design for the lowest cost possible without compromising the quality specifications of form, fit and function. In the case of a new product design, we may assist in assembling one or more prototype products using the same production line and the same engineering and manufacturing teams that would be used for product qualification and volume production. We often transfer production from a customer s internal prototype or production lines to our own facilities, requiring a copy-exact: the setup of a production process identical to the one used by our customer to minimize the number of variables and expedite qualification.

Advanced Optical Packaging

We have a dedicated team of experienced engineers supporting our advanced optical packaging development capabilities. These highly qualified engineers work closely with our customers to understand the

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development requirements of their new products and assist them to build prototypes, as well as source materials, optimize manufacturing processes and develop schedules to bring these products to volume production. We maintain a real-time roadmap for the packaging requirements of our customers and the industry in general. Our advanced packaging team develops and maintains generic recipes that are readily available to be tailored and refined for the specific new applications of our customers, which helps to further accelerate prototype development and product delivery time.

Printed Circuit Board Assembly and Test

Printed circuit board assembly involves attaching electronic components, such as integrated circuits, capacitors, receivers, transceivers and other components and modules to printed circuit boards. We employ a variety of mounting and assembly technologies, including SMT, PTH and ACT, press-fit, and other connection processes that are focused on miniaturization and increasing the density of component placement on printed circuit boards. These technologies, which support the needs of our customers to provide greater functionality in smaller products, include chip-scale packaging, ball grid array, direct chip attach and high density interconnect. We perform in-circuit, functional and environmental testing of printed circuit board assemblies to verify all components are properly inserted, attached and the electrical circuits are complete, and that the board or assembly operates in accordance with its final design and manufacturing specifications.

Dedicated New Product Introduction

We are committed to providing NPI capabilities designed to ensure that our customers products get to market as quickly as possible. Co-locating strong engineering services in process design, prototyping, design for manufacturability (DFM) and test at these locations gives customers as full suite of NPI services for quick-turn PCBA to box-build to full system assembly. Stringent IP protection protocols are strictly enforced throughout the entire process, safeguarding our customers intellectual property. Our NPI sites are outfitted with state-of-the-art production equipment that mirrors the equipment used in our low-cost manufacturing facilities, ensuring a fast, smooth transition to a low-cost production environment once the product is qualified.

Qualifications

Production line and environmental qualifications require a variety of process engineering and technical skills, and the use of specialized equipment. Many of the products that we produce for our customers require extensive environmental and reliability qualification involving, in some cases, a three to six months or longer duration prior to volume production. The qualification phase may include a customer s certification of a production line or process and one or a series of qualification tests for mechanical integrity and environmental endurance as specified by an industry standards organization, such as Telcordia for telecommunication equipment. We have extensive expertise in the planning, executing, troubleshooting and ultimate success of these qualifications and testing environments, which provides our customers a higher likelihood of completing these qualifications in a timely fashion.

Continuous Improvement and Optimization

Once we have completed the qualification phase and stabilized production yields, we shift our focus to cost and quality optimization. This requires a close working relationship with our customer to optimize processes and identify alternative sources for materials to improve efficiency, yields and cost. Design and process improvements may include reducing the number of parts, simplifying the assembly process, eliminating non-value add operations, using standard materials and optimizing manufacturing lines.

Supply Chain and Inventory Management

Our expertise in supply chain and materials management often allows us to further reduce costs and cycle times for our customers. Our procurement and materials management services include planning, purchasing,

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expediting, warehousing and financing materials from thousands of suppliers. We have created a proprietary set of automated manufacturing resource planning tools to manage our inventory. We have also implemented inventory management strategies with certain suppliers that enable us to use inventory on an as-needed basis and provide on-site stocking programs.

Quality Control

We believe the integration of our manufacturing and test controls, quality systems, and software platforms contribute significantly to our ability to deliver high-quality products on a consistent basis and reduce the risk that we will be required to repair or replace defective products. Our manufacturing execution system (MES) is directly integrated with our test system and enterprise resource planning (ERP) database allowing us to respond to any process deviations in real time. We work with customers to develop product-specific test strategies. We also provide a variety of test management services, including material and process testing and reliability testing. In addition to providing yield, manufacturing data tracking and other information, our data tracking system also performs process route checking to ensure that the products follow correct process steps, and the test results meet all specified criteria. Our test capabilities include traditional PCBA testing, mechanical testing and optical testing, which includes parametric testing, such as insertion loss, return loss and extinction ratio, and functional testing (e.g., bit error ratio).

Customized Glass and Crystal Optics Fabrication

We design and fabricate our own customized glass and crystal optics, which are core components of the higher level assemblies that we manufacture for our customers. Our fabrication facilities are located in Fuzhou, China and Mountain Lakes, New Jersey. Our customized glass and crystal optics products include the following:

Fiber Optic Ferrules and Alignment Sleeves; Fiber Optic Substrates; Precision Glass Tubing, Precision Capillaries and Rods: These single bore and multi-bore products, in various shapes and dimensions, are used principally in optical communications, medical and industrial applications.

Laser Optics: Includes crystals (such as YVO4, Nd: YVO4, Cr: YAG, and BBO), optics, high reflectivity mirrors, lenses, prisms and windows used in laser applications.

Medical Optics: Includes mirrors, lenses, filters, waveplates, windows, and prisms incorporated into various medical equipment products.

Storage Optics: Includes mirrors, polarizing beam splitters or PBS, and waveplates incorporated into optical storage products.

Surveying Optics: Includes penta prisms, corner cubes, and T-Windows incorporated into precision surveying products.

Telecom Optics: Includes lenses (such as spherical, a-spherical, C-lens, and cylindrical), waveplates, mirrors, prisms, filters and YVO4 crystals used for telecommunications applications.

Telecommunication Subassemblies: Includes fiber pigtails (both single and dual), assemblies and collimators used in many fiber optic components such as isolators, circulators, optical switches and three-port filters.

Technology

Based on our experience with customers and our qualitative assessment of our capabilities, we believe we provide a broader array of process technologies to the optics industry than any other manufacturing services provider. We also continue to invest in customized optics and glass technology including in the areas of crystal growth, crystal and glass processing, optical coating, polishing and lapping, optical assemblies and precision glass drawing. We intend to continue to increase our process engineering capabilities and manufacturing

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technologies to extend our product portfolio and continue to gain market share in the optics industry. Our internally developed and licensed technologies include the following:

Advanced Optical Packaging: We have extensive experience in developing manufacturing processes and performing value engineering to improve our customers product performance, quality, reliability and manufacturing yields. In many cases, we partner with our customers to develop custom manufacturing solutions for their optics products.

Reliability Testing: Our reliability laboratory enables us to test the degree to which our results and specifications conform to our customers requirements. Through the reliability laboratory, we are able to perform most of the tests required by industry standards, including damp heat, thermal aging, thermal shock, temperature cycling, shock and vibration, accelerated life testing and stress screening. The reliability laboratory is critical to verification of root cause failure analysis.

Optical and Mechanical Material and Process Analysis: Our in-house material and process laboratory analyzes materials to support incoming inspection, process development, process monitoring, failure analysis and verification of compliance with the applicable environmental standards.

Precision Optical Fiber and Electro-Mechanical Assembly: We have extensive experience in precision optical and electro-mechanical assemblies in clean room environments, clean room control discipline, cleaning technologies and electro-static discharge (ESD) protection.

Fiber Metallization and Lensing: We use our fiber metallization and fiber lensing capabilities to assist our customers in packaging their products. Many optical component package designs require metallized fiber and some designs also require lensing at the tip of the fiber. We have in-house capabilities that enable us to produce these products at a low cost, with short lead times and high quality.

Fiber Handling and Fiber Alignment: The technique with which optical fiber is handled can have a significant impact on the functionality and reliability of optics products due to the risk of damage or flaws introduced to the fiber surface or micro-cracks to the core of the fiber, which may impact alignment or signal quality, among other things. We have implemented a number of processes, techniques, and best practices to avoid stressing or otherwise damaging fiber during stripping, cleaving and connectorization. Such techniques are also designed to achieve optimal alignment of fiber in the shortest period of time during these processes.

Optical Testing: We have the capability to perform parametric and functional tests for a wide variety of optical devices. In many cases, we are also able to help our customers develop their own proprietary software and test fixtures.

Crystal Growth and Processing: Our crystal growth technology produces non-linear optical crystals and crystals used in laser applications. Our processing capabilities include dicing, grinding, polishing and inspection with high dimension, tolerance and surface quality.

Precision Glass Drawing: We have developed the specialized capabilities necessary to draw precision structures within tight tolerances using borosilicate, clear fused quartz and synthetic fused silica glass. Using these processes, we produce customized rectangular and circular glass tubes and rods in various configurations and with multiple bores that are accurately drawn in precise locations within the tubing. These tubes can be sliced into thin wafers for use in various applications, such as ultra-filtration of bacteria, micro-organism counting, and identification of organisms and substances. These tubes can also be cut into larger lengths to produce ferrules and sleeves for use in fiber optic communications components.

Optical Coating: We provide a wide variety of coating from simple single layer anti-reflection coatings to complex multi-layer stacks. The types of coating we provide include anti-reflection, partial reflection and high reflection.

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We continuously invest in new and optimized processes to accommodate the next generation of optical devices, such as optical packaging, anti-reflective coating and complex printed circuit board technologies. We believe many of these manufacturing processes and technologies will be key to developing and commercializing the next generation of optical devices, which may include multi-function passive optics and photonic integrated circuits (which are devices that incorporate various optical components and modules into a packaged chip), receivers integrated with an optical amplifier, and active optical cabling. We also anticipate our customers will continue to desire our vertically integrated capabilities, designing customized optics and glass to be incorporated into optical components, modules and complete network or laser systems.

Customers, Sales and Marketing

The optical communications market we serve is highly concentrated. Therefore, we expect a significant percentage of our total revenues will continue to come from a small number of customers. During fiscal year 2018 and fiscal year 2017, we had one customer, Lumentum Operations LLC, that contributed 10% or more of our total revenues. This customer accounted for 16% and 17% of our total revenues during the respective fiscal years.

The production of optical devices is characterized by a lengthy qualification process. In particular, the qualification and field testing of the products that we produce for our customers may take three to six months or longer to complete. Generally, we must qualify our production process with our customers, and the products that we manufacture must also meet the product quality requirements of our customers customers. While most of our customers do not purchase our services until they qualify the services and satisfactorily complete factory audits and vendor evaluations, we typically produce a test run of their products to demonstrate that the products we produce will meet their qualification standards in advance of receiving an order. As part of this process, our engineers work closely with the customer s design and procurement teams. We believe that the rigorous product transfer and qualification processes, and the close relationships that we develop with our customers during those processes, results in greater visibility into product life cycles and longer-term customer engagements.

Backlog

We are substantially dependent on orders we receive and fill on a short-term basis. Although we often receive a 12-month forecast from our customers, our customer contracts do not provide any assurance of future sales, and sales are typically made pursuant to individual purchase orders that have short lead times and are subject to revision or cancellation. Because of the possibility of changes in delivery or acceptance schedules, cancellations of orders, returns or price reductions, we do not believe that backlog is a reliable indicator of our future revenues.

Suppliers of Raw Materials

Our manufacturing operations use a wide variety of optical, semiconductor, mechanical and electronic components, assemblies and raw materials. We generally purchase materials from our suppliers through standard purchase orders, as opposed to long-term supply agreements. We rely on sole-source suppliers for a number of critical materials. Some of these sole-source suppliers are small businesses, which presents risks to us based on their financial health and reliability, which we continually monitor. We have historically experienced supply shortages resulting from various causes, including reduced yields by our suppliers, which have prevented us from manufacturing products for our customers in a timely manner. While we continually undertake programs to strengthen our supply chain, we are experiencing, and expect for the foreseeable future to continue to experience, strain on our supply chain, as well as periodic supplier problems. We have incurred, and expect to continue to incur for the foreseeable future, costs to address these problems.

Quality

We have an extensive quality management system that focuses on continual process improvement and achieving high levels of customer satisfaction. We employ a variety of enhanced statistical engineering

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techniques and other tools to improve product and service quality. In addition, we generally offer a warranty ranging from one to five years on the products that we assemble. Generally, this warranty is limited to our workmanship and our liability is capped at the price of the product.

Our quality management systems help to ensure that the products we provide to our customers meet or exceed industry standards. We maintain the following certifications: ISO9001 for Manufacturing Quality Management Systems; ISO14001 for Environmental Management Systems; TL9000 for Telecommunications Industry Quality Certification; IATF16949 for Automotive Industry Quality Certification; ISO13485 for Medical Devices Industry Quality Certification; AS9100 for Aerospace Industry Quality Certification; NADCAP (National Aerospace and Defense Contractors Accreditation Program) for Quality Assurance throughout the Aerospace and Defense Industries; and OHSAS18001 for Occupational Health and Safety Management Systems. We also maintain compliance with various additional standards imposed by the U.S. Food and Drug Administration, or FDA, with respect to the manufacture of medical devices.

Additionally, we are required to register with the FDA and other regulatory bodies and are subject to continual review and periodic inspection for compliance with various regulations, including testing, quality control and documentation procedures. We hold the following additional certifications: ANSI ESD S20.20 for facilities and manufacturing process control, in compliance with ESD standard; Transported Asset Protection Association, or TAPA, for Logistic Security Management System; and CSR-DIW for Corporate Social Responsibility in Thailand. In the European Union, we are required to maintain certain ISO certifications in order to sell our precision optical, electro-mechanical and electronic manufacturing services and we must undergo periodic inspections by regulatory bodies to obtain and maintain these certifications.

In addition to these standards, we are committed to the deployment of sustainable manufacturing, lean initiatives, and continuous improvement throughout our operations. The implementation of lean manufacturing initiatives helps improve efficiency and reduce waste in the manufacturing process in areas such as inventory on hand, set up times, and floor space and the number of people required for production, while Kaizen and Six Sigma ensures continuous improvement by reducing process variation.

Competition

Although the manufacturing services market is highly competitive, we believe that there are significant barriers to entry in our existing and target markets, including lengthy sales cycles, the need to demonstrate complex precision optical and electro-mechanical engineering and manufacturing capabilities to a prospective customer and the ability to protect a customer s intellectual property.

Our overall competitive position depends upon a number of factors, including:

- our manufacturing technologies and capacity;
- the quality of our manufacturing processes and products;
- our supply chain tools and data management systems;
- our ability to safeguard and protect our customers intellectual property;
- our engineering and prototyping capabilities;
- our ability to strengthen and broaden our engineering services and know-how to participate in the growth of emerging technologies;
- our ability to deliver on-time;

our ability to deliver continuous cost improvements; and

our responsiveness and flexibility.

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Competitors in the market for optical manufacturing services include Benchmark Electronics, Inc., Celestica Inc., Sanmina-SCI Corporation, Jabil Circuit, Inc. and Venture Corporation Limited, as well as the internal manufacturing capabilities of our customers. Our customized optics and glass operations face competition from companies such as Browave Corporation, Fujian Castech Crystals, Inc., Photop Technologies, Inc. and Research Electro-Optic, Inc. Our UK competitors for printed circuit board assemblies include STI Limited and Axiom Manufacturing Services Limited.

Intellectual Property

Our success depends, in part, on our ability to protect our customers intellectual property. We license various technologies from our customers on a non-exclusive, royalty-free, non-transferable basis for the sole purpose of allowing us to manufacture products for those customers in accordance with their specifications. We have no rights to disclose, use, sublicense or sell this licensed technology for any other purpose. The duration of these licenses is limited to the duration of the underlying supply or manufacturing agreement. To meet the demands of certain customers, we created a factory-within-a-factory manufacturing environment that physically separates the manufacturing sites from one another. Some customers, for example, demand anonymity at our facilities while other customers require additional security measures such as biometric devices to safeguard their segregated manufacturing areas.

We regard our own manufacturing process technologies and customized optics and glass designs as proprietary intellectual property. We own any process engineering technology independently developed in-house by our technical staff. As part of our manufacturing services, to the extent we utilize our own manufacturing process technologies in the manufacture of our customers products, we grant our customers a royalty-free license to these process engineering technologies for the purpose of allowing our customers to make their products. Any process engineering or other improvements that we develop in connection with the improvement or optimization of a process for the manufacturing of a customer s products are immediately assigned to that customer. To protect our proprietary rights, we rely largely upon a combination of trade secrets, non-disclosure agreements and internal security systems. Historically, patents have not played a significant role in the protection of our proprietary rights. Nevertheless, we currently have a relatively small number of solely-owned and jointly-held PRC patents in various customized optic technologies with expiration dates between 2022 and 2034. We believe that both our evolving business practices and industry trends may result in the continued growth of our patent portfolio and its importance to us, particularly as we expand our business.

Environmental Regulation

We are subject to a variety of international and U.S. laws and other legal requirements relating to the use, disposal, cleanup of and human exposure to hazardous materials. To date, such laws and regulations have not materially affected our business. We do not anticipate any material capital expenditures for environmental control facilities for the foreseeable future. While to date we are not aware of any material exposures, there can ief, I certify that the information set forth in this statement is true, complete and correct.

Dated: December 7, 2007

Franklin Resources, Inc.

Charles B. Johnson

Rupert H. Johnson, Jr.

By: /s/MARIA GRAY

Maria Gray
Secretary of Franklin Resources, Inc.

Attorney-in-Fact for Charles B. Johnson pursuant to Power of Attorney attached to this Schedule 13G

Attorney-in-Fact for Rupert H. Johnson, Jr. pursuant to Power of Attorney attached to this Schedule 13G

Franklin Templeton Portfolio Advisors, Inc.

By: /s/ALISON E. BAUR

Alison E. Baur
Secretary of Franklin Templeton Portfolio Advisors, Inc.

EXHIBIT A

JOINT FILING AGREEMENT

In accordance with Rule 13d-1(k) under the Securities Exchange Act of 1934, as amended, the undersigned hereby agree to the joint filing with each other of the attached statement on Schedule 13G and to all amendments to such statement and that such statement and all amendments to such statement are made on behalf of each of them.

IN WITNESS WHEREOF, the undersigned have executed this agreement on

December 7, 2007.

Franklin Resources, Inc.

Charles B. Johnson

Rupert H. Johnson, Jr.

By: /s/MARIA GRAY

Maria Gray
Secretary of Franklin Resources, Inc.

Attorney-in-Fact for Charles B. Johnson pursuant to Power of Attorney attached to this Schedule 13G

Attorney-in-Fact for Rupert H. Johnson, Jr. pursuant to Power of Attorney attached to this Schedule 13G

Franklin Templeton Portfolio Advisors, Inc.

By: /s/ALISON E. BAUR

Alison E. Baur
Secretary of Franklin Templeton Portfolio Advisors, Inc.

EXHIBIT B

LIMITED POWER OF ATTORNEY

FOR

SECTION 13 REPORTING OBLIGATIONS

Know all by these presents, that the undersigned hereby makes, constitutes and appoints each of Robert Rosselot and Maria Gray, each acting individually, as the undersigned s true and lawful attorney-in-fact, with full power and authority as hereinafter described on behalf of and in the name, place and stead of the undersigned to:

(1) prepare, execute, acknowledge, deliver and file Schedules 13D and 13G (including any amendments thereto or any related documentation) with the United States Securities and Exchange Commission, any national securities exchanges and Franklin Resources, Inc., a Delaware corporation (the Reporting Entity), as considered necessary or advisable under Section 13 of the Securities Exchange Act of 1934 and the rules and regulations promulgated thereunder, as amended from time to time (the Exchange Act); and

(2) perform any and all other acts which in the discretion of such attorney-in-fact are necessary or desirable for and on behalf of the undersigned in connection with the foregoing.

The undersigned acknowledges that:

(1) this Limited Power of Attorney authorizes, but does not require, each such attorney-in-fact to act in their discretion on information provided to such attorney-in-fact without independent verification of such information;

(2) any documents prepared and/or executed by either such attorney-in-fact on behalf of the undersigned pursuant to this Limited Power of Attorney will be in such form and will contain such information and disclosure as such attorney-in-fact, in his or her discretion, deems necessary or desirable;

(3) neither the Reporting Entity nor either of such attorneys-in-fact assumes (i) any liability for the undersigned s responsibility to comply with the requirements of the Exchange Act or (ii) any liability of the undersigned for any failure to comply with such requirements; and

(4) this Limited Power of Attorney does not relieve the undersigned from responsibility for compliance with the undersigned s obligations under the Exchange Act, including without limitation the reporting requirements under Section 13 of the Exchange Act.

The undersigned hereby gives and grants each of the foregoing attorneys-in-fact full power and authority to do and perform all and every act and thing whatsoever requisite, necessary or appropriate to be done in and about the foregoing matters as fully to all intents and purposes as the undersigned might or could do if present, hereby ratifying all that each such attorney-in-fact of, for and on behalf of the undersigned, shall lawfully do or cause to be done by virtue of this Limited Power of Attorney.

This Limited Power of Attorney shall remain in full force and effect until revoked by the undersigned in a signed writing delivered to each such attorney-in-fact.

IN WITNESS WHEREOF, the undersigned has caused this Limited Power of Attorney to be executed as of this 30th day of April , 2007.

/s/ Charles B. Johnson

Signature

Charles B. Johnson

Print Name

LIMITED POWER OF ATTORNEY

FOR

SECTION 13 REPORTING OBLIGATIONS

Know all by these presents, that the undersigned hereby makes, constitutes and appoints each of Robert Rosselot and Maria Gray, each acting individually, as the undersigned s true and lawful attorney-in-fact, with full power and authority as hereinafter described on behalf of and in the name, place and stead of the undersigned to:

(1) prepare, execute, acknowledge, deliver and file Schedules 13D and 13G (including any amendments thereto or any related documentation) with the United States Securities and Exchange Commission, any national securities exchanges and Franklin Resources, Inc., a Delaware corporation (the Reporting Entity), as considered necessary or advisable under Section 13 of the Securities Exchange Act of 1934 and the rules and regulations promulgated thereunder, as amended from time to time (the Exchange Act); and

(2) perform any and all other acts which in the discretion of such attorney-in-fact are necessary or desirable for and on behalf of the undersigned in connection with the foregoing.

The undersigned acknowledges that:

(1) this Limited Power of Attorney authorizes, but does not require, each such attorney-in-fact to act in their discretion on information provided to such attorney-in-fact without independent verification of such information;

(2) any documents prepared and/or executed by either such attorney-in-fact on behalf of the undersigned pursuant to this Limited Power of Attorney will be in such form and will contain such information and disclosure as such attorney-in-fact, in his or her discretion, deems necessary or desirable;

(3) neither the Reporting Entity nor either of such attorneys-in-fact assumes (i) any liability for the undersigned s responsibility to comply with the requirements of the Exchange Act or (ii) any liability of the undersigned for any failure to comply with such requirements; and

(4) this Limited Power of Attorney does not relieve the undersigned from responsibility for compliance with the undersigned s obligations under the Exchange Act, including without limitation the reporting requirements under Section 13 of the Exchange Act.

The undersigned hereby gives and grants each of the foregoing attorneys-in-fact full power and authority to do and perform all and every act and thing whatsoever requisite, necessary or appropriate to be done in and about the foregoing matters as fully to all intents and purposes as the undersigned might or could do if present, hereby ratifying all that each such attorney-in-fact of, for and on behalf of the undersigned, shall lawfully do or cause to be done by virtue of this Limited Power of Attorney.

This Limited Power of Attorney shall remain in full force and effect until revoked by the undersigned in a signed writing delivered to each such attorney-in-fact.

IN WITNESS WHEREOF, the undersigned has caused this Limited Power of Attorney to be executed as of this 25th day of April , 2007.

/s/ Rupert H. Johnson, Jr.

Signature

Rupert H. Johnson, Jr.

Print Name

REVOCATION OF

LIMITED POWER OF ATTORNEY

FOR

SECTION 13 REPORTING OBLIGATIONS

The undersigned hereby revokes as of May 7, 2007 the limited power of attorney for Securities Exchange Act of 1934 Section 13 reporting purposes granted to Barbara J. Green on September 11, 2003.

Date: 4/30/07

Signature: /s/ Charles B. Johnson

Charles B. Johnson

REVOCATION OF

LIMITED POWER OF ATTORNEY

FOR

SECTION 13 REPORTING OBLIGATIONS

The undersigned hereby revokes as of May 7, 2007 the limited power of attorney for Securities Exchange Act of 1934 Section 13 reporting purposes granted to Barbara J. Green on September 4, 2003.

Date: 4/25/07

Signature: /s/ Rupert H. Johnson, Jr.

Rupert H. Johnson, Jr.

Exhibit C

Franklin Templeton Portfolio Advisors, Inc.	Item 3 Classification: 3(e)
Franklin Advisers, Inc.	Item 3 Classification: 3(e)