

**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, 2016

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 001-36250

Ciena Corporation

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
Incorporation or organization)

23-2725311
(I.R.S. Employer
Identification No.)

7035 Ridge Road, Hanover, MD
(Address of principal executive offices)

21076
(Zip Code)

(410) 694-5700
(Registrant's telephone number, including area code)
Securities registered pursuant to Section 12(b) of the Act:

| Title of Each Class | Name of Each Exchange on Which Registered |
|---------------------------------------|---|
| Common Stock, \$0.01 par value | New York Stock Exchange |

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.4-5 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). YES NO

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

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

Large accelerated filer Accelerated filer Non-accelerated filer Smaller reporting company

(Do not check if a smaller reporting company)

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act) YES NO

The aggregate market value of the Registrant's Common Stock held by non-affiliates of the Registrant was approximately \$2.3 billion based on the closing price of the Common Stock on the New York Stock Exchange on April 29, 2016.

The number of shares of Registrant's Common Stock outstanding as of December 16, 2016 was 140,379,744 .

DOCUMENTS INCORPORATED BY REFERENCE

Part III of the Form 10-K incorporates by reference certain portions of the Registrant's definitive proxy statement for its 2017 Annual Meeting of Stockholders to be filed with the Commission not later than 120 days after the end of the fiscal year covered by this report.

**CIENA CORPORATION
ANNUAL REPORT ON FORM 10-K
FOR FISCAL YEAR ENDED OCTOBER 31, 2016**

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PART I

This annual report contains statements that discuss future events or expectations, projections of results of operations or financial condition, changes in the markets for our products and services, trends in our business, business prospects and strategies and other “forward-looking” information. In some cases, you can identify “forward-looking statements” by words like “may,” “will,” “should,” “expects,” “plans,” “anticipates,” “believes,” “estimates,” “predicts,” “intends,” “potential,” “targets” or “continue” or the negative of those words and other comparable words. These statements may relate to, among other things, adoption of next-generation network technology and software programmability and control of networks; our competitive landscape; factors impacting our industry; factors impacting the businesses of network operators and their network architectures; our corporate strategy, including our research and development, supply chain and go-to-market initiatives; efforts to increase application of our solutions in customer networks and to increase the reach of our business into new or growing customer and geographic markets; our backlog and seasonality in our business; our acquisition of Cyan, Inc. and its impact on our business and results of operations; expectations for our financial results, revenue, gross margin, operating expense and key operating measures in future periods; the adequacy of our sources of liquidity to satisfy our working capital needs, capital expenditures, and other liquidity requirements; business initiatives including real estate and IT transitions or initiatives; and market risks associated with financial instruments and foreign currency exchange rates. These statements are subject to known and unknown risks, uncertainties and other factors, and actual events or results may differ materially due to factors such as:

- *our ability to execute our business and growth strategies;*
- *fluctuations in our revenue and operating results and our financial results generally;*
- *the loss of any of our large customers, a significant reduction in their spending, or a material change in their networking or procurement strategies;*
- *the competitive environment in which we operate;*
- *market acceptance of products and services currently under development and delays in product or software development;*
- *lengthy sales cycles and onerous contract terms with communications service providers, Web-scale providers and other large customers;*
- *product performance problems and undetected errors;*
- *our ability to diversify our customer base beyond our traditional customers and broaden the application for our solutions in communications networks;*
- *the international scale of our operations and fluctuations in currency exchange rates;*
- *our ability to forecast accurately demand for our products for purposes of inventory purchase practices;*
- *the impact of pricing pressure and price erosion that we regularly encounter in our markets;*
- *our ability to enforce our intellectual property rights, and costs we may incur in response to intellectual property right infringement claims made against us;*
- *the continued availability on commercially reasonable terms of software and other technology under third party licenses;*
- *failure to maintain the security of confidential, proprietary or otherwise sensitive business information or systems or to protect against cyber security attacks;*
- *the performance of our third party contract manufacturers;*
- *changes or disruption in components or supplies provided by third parties, including sole and limited source suppliers;*
- *our ability to manage effectively our relationships with third party service partners and distributors;*
- *unanticipated risks and additional obligations in connection with our resale of complementary products or technology of other companies;*
- *our exposure to the credit risks of our customers and our ability to collect receivables;*
- *modification or disruption of our internal business processes and information systems;*
- *the effect of our outstanding indebtedness on our liquidity and business;*
- *fluctuations in our stock price and our ability to access the capital markets to raise capital;*
- *unanticipated expenses or disruptions to our operations caused by facilities transitions or restructuring activities;*
- *inability to attract and retain experienced and qualified personnel;*
- *disruptions to our operations caused by strategic acquisitions and investments or the inability to achieve the expected benefits and synergies of newly-acquired businesses;*
- *our ability to grow our software business and address networking strategies, including software-defined networking and network function virtualization;*
- *changes in, and the impact of, government regulations, including with respect to: the communications industry generally; the business of our customers; the use, import or export of products; and the environment, potential climate change and other social initiatives;*

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- *impairment charges caused by the write-down of goodwill or long-lived assets;*
- *our ability to maintain effective internal controls over financial reporting and liabilities that result from the inability to comply with corporate governance requirements; and*
- *adverse results in litigation matters.*

These are only some of the factors that may affect the forward-looking statements contained in this annual report. For a discussion identifying additional important factors that could cause actual results to vary materially from those anticipated in the forward-looking statements, see “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and “Risk Factors” in this annual report. You should review these risk factors for a more complete understanding of the risks associated with an investment in our securities. However, we operate in a very competitive and rapidly changing environment and new risks and uncertainties emerge, are identified or become apparent from time to time. It is not possible for us to predict all risks and uncertainties that could have an impact on the forward-looking statements contained in this annual report. You should be aware that the forward-looking statements contained in this annual report are based on our current views and assumptions. We undertake no obligation to revise or update any forward-looking statements made in this annual report to reflect events or circumstances after the date hereof or to reflect new information or the occurrence of unanticipated events, except as required by law. The forward-looking statements in this annual report are intended to be subject to protection afforded by the safe harbor for forward-looking statements contained in the Private Securities Litigation Reform Act of 1995.

Item 1. Business

Overview

We are a network strategy and technology company, providing solutions that enable a wide range of network operators to adopt next-generation communication architectures and to deliver a broad array of services relied upon by enterprise and consumer end users. We provide equipment, software and services that support the transport, switching, aggregation, service delivery and management of voice, video and data traffic on communications networks. Our high-capacity hardware and network management and control software solutions enable open, multi-vendor, programmable networks that improve automation, reduce network complexity and flexibly support changing service requirements. Our solutions yield business and operational value for our customers by enabling them to support new applications, introduce new revenue-generating services and reduce network complexity and expense.

Our Converged Packet Optical, Packet Networking and Optical Transport products are used by a diverse set of customers and market segments including communications service providers, cable and multiservice operators, Web-scale providers, submarine network operators, governments, enterprises, research and education (R&E) institutions, and other emerging network operators. These products, which can be applied from the network core to network access points, allow network operators to scale capacity, increase transmission speeds, allocate traffic and adapt dynamically to changing end-user service demands. In addition to our portfolio of high-capacity hardware platforms, we offer network management and control software platforms designed to simplify the creation, automation and delivery of services across multi-vendor and multi-domain network environments. Our software solutions are oriented around our modular Blue Planet software platform for multi-domain service orchestration, network function virtualization, and network management and control. To complement our hardware and software solutions, we offer a broad range of transformation and automation services that help our customers design, optimize, integrate, deploy, manage and maintain their networks.

Certain Financial Information and Segment Data

During the first quarter of fiscal 2016, we reorganized our internal organizational structure, the management of our business, and the reporting of our operating segments. This reorganization resulted in three new operating segments: Networking Platforms, Software and Software-Related Services, and Global Services. Our previous Converged Packet-Optical, Packet Networking and Optical Transport segments were realigned to form the Networking Platforms segment under a single operating segment manager. Our previous Software and Services operating segment was reorganized into two separate operating segments: Software and Software-Related Services, and Global Services. Segment revenue and segment profit for fiscal 2015 and fiscal 2014 have been restated to reflect the new operating segments adopted in fiscal 2016. See Note 22 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

We generated revenue of \$2.6 billion in fiscal 2016, as compared to \$2.4 billion in fiscal 2015. Sales to AT&T were \$479.1 million, or 18.4% of total revenue in fiscal 2016, and \$487.8 million, or 19.9% of total revenue in fiscal 2015. No other customer accounted for greater than 10% of our revenue in fiscal 2016 or fiscal 2015. For more information regarding our

results of operations, see “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in Item 7 of Part II of this annual report.

The matters discussed in this “Business” section should be read in conjunction with the Consolidated Financial Statements found in Item 8 of Part II of this annual report, which include additional financial information about our operating segments, total assets, revenue, measures of profit and loss, and financial information about geographic areas and customers representing greater than 10% of revenue.

Corporate Information and Access to SEC Reports

We were incorporated in Delaware in November 1992 and completed our initial public offering on February 7, 1997. Our principal executive offices are located at 7035 Ridge Road, Hanover, Maryland 21076. Our telephone number is (410) 694-5700, and our website address is www.ciena.com. We make our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports, available free of charge in the “Investors” section of our website as soon as reasonably practicable after we file these reports with the Securities and Exchange Commission (the “SEC”). We routinely post the reports above, recent news and announcements, financial results and other important information about our business on our website at www.ciena.com. Information contained on our website is not a part of this annual report.

Industry Background

Network Traffic Growth and Increased Capacity Requirements

The markets in which we sell our communications networking solutions have been subject to significant changes in recent years. In particular, optical networks — which carry voice, video and data traffic using multiple wavelengths of light across fiber optic cables — have experienced a multi-year period of strong traffic growth. This growth in network traffic, and the resulting requirements for increased network capacity, is being driven by the rapid proliferation and increased reliance upon a diverse set of communications services and applications. These services and applications, including those set forth below, have fundamentally affected and are redefining the bandwidth and service demands placed upon networks, and are challenging the business models of network operators.

- *Cloud-Based Services.* Enterprises and consumers are continuing to adopt a broad array of innovative cloud-based service offerings that host key applications, store data, enable the viewing and downloading of content, and utilize on-demand computing resources. Through cloud-based service models such as Platform as a Service (PaaS), Software as a Service (SaaS) and Infrastructure as a Service (IaaS), smaller enterprises and consumers can subscribe to an expanding range of services to replace locally-housed computing and storage requirements. Larger enterprises and data center operators can use private clouds to consolidate their own resources and public clouds to accommodate peak demand situations, sometimes in combination. Today, infrastructures exist to allocate centralized network storage and computing resources dynamically from the cloud to end users. As a result, networks must be capable of adapting in real time to changing demands, capacity requirements and locations.
- *Over-the-Top (OTT) Services and Video Streaming .* OTT content refers to video, multimedia and other applications provided directly from the content provider to the viewer or end user. Traffic from streaming and OTT services, including high definition and ultra-high definition video, has expanded with the increased availability of and end user demand for video content accessible through a variety of devices and media. The growth in bandwidth-intensive traffic associated with streaming and OTT content, and the required quality of experience for such services, are imposing significant demands upon the infrastructures of communications service providers and multi-service operators.
- *On-Demand Services .* Users of communications services are increasingly requiring an on-demand service level that allows them to be connected to content and bandwidth wherever they desire. Businesses rely upon enterprise services and data center connectivity that facilitate global operations, employee mobility and access to critical business applications and data. Consumers expect broadband technologies, including peer-to-peer internet applications, augmented reality applications and multimedia streaming and downloads, to be available on-demand. The on-demand nature of an application-centric, cloud-driven world is changing user bandwidth consumption patterns, leading to less predictable traffic patterns and usage.
- *Mobile Devices and Applications.* Traffic from mobile applications, including internet, video and data services, has expanded with the proliferation of smartphones, tablets and other wireless devices. Because wireless traffic ultimately travels over a wireline network in order to reach its destination, growth in mobile communications continues to place demands upon wireline networks, including backhaul and fronthaul networks emanating from cell sites.

In addition, emerging services and applications are likely to present further challenges for and place significant service, capacity and automation demands upon network infrastructures. These include:

- *Internet of Things* . As the number of networked connections between devices and servers grows, machine-to-machine-related traffic (M2M) is expected to represent an increasing portion of traffic in what some refer to as the “Internet of Things” (IoT). These connections can provide value-added services and allow sharing of data that can be monitored and analyzed. We expect network traffic relating to the interconnection of devices to grow as internet and cloud-based content delivery, smartgrid applications, health care and safety monitoring, resource and inventory management, home entertainment, consumer appliances, connected transportation, and other M2M data applications become more widely adopted.
- *Fifth-Generation Wireless Broadband Technology (5G)*. Wireless network operators will be required to deliver greater capacity and to adopt next-generation mobile network standards in order to cost-effectively accommodate increased bandwidth and service demands. 5G is expected to enable significant increases in data consumption by a growing number of users and devices, thereby better supporting IoT and other emerging applications. 5G mobile networks will significantly affect both wireless and wireline networks, requiring improvements in mobile backhaul and access networks.
- *Ultra-High Definition TV and Virtual and Augmented Reality*. Ultra-high definition TV and the advent of immersive technologies like 360° video, virtual reality, and augmented reality are likely to place meaningful capacity and capability demands on networks as adoption of these technologies grows. The television, internet and consumer electronics industries are rapidly advancing these innovations and making them more widely available and affordable to consumers. As these services become more prevalent and are connected over networks, network operators will need to accommodate resulting additional bandwidth requirements.

We believe that increased traffic from these services and applications, along with the desire to provide content and service delivery closer to the end user for an improved quality of experience, will require network operators to adopt higher capacity networks with increased transmission speeds, particularly in regional and metropolitan networks.

Network Transition to Open, Programmable Networks

The dynamics discussed above, together with ongoing efforts to reduce network costs and promote flexibility, are causing our customers to evaluate and adopt next-generation infrastructures that are more open, programmable and automated. Network operators are increasingly leveraging information technology strategies that emphasize software capability, virtualization and standardized network solutions where possible. By leveraging software programmability, network operators can adapt more quickly to changing end-user demands, provide network functions virtually and on demand, and more efficiently deliver a wider range of revenue-generating services. We expect network operators increasingly to look to adopt networking strategies that enable more open and programmable networks, including one or more of the following:

- *Software-Defined Networking (SDN)*. Network resources have been traditionally managed on an individual network element basis. SDN seeks to separate or abstract that control from individual elements, enabling them to be directly programmable by standards-based software control. The result of this enhanced programmability provides end-to-end visibility of network flows, enabling the ability to optimize traffic paths and control data flows through a network. SDN seeks to simplify networks, which creates more open environments that ease management, support automation, and more quickly deliver customized services to end users.
- *Network Function Virtualization (NFV)* . Virtualization is the decoupling of physical IT or communications assets from the services or capabilities they can provide. These virtualization principles — previously applied to computing and storage resources — are now being applied to communications networks. Through NFV, network operators can eliminate costly, single-function or dedicated network appliances, such as firewalls and wide area network (WAN) accelerators, enabling their functions via software and general computing hardware and servers. We believe that NFV can decrease power and space requirements, reduce cost, and improve network flexibility and agility.
- *Orchestration and Evolution of Operations Support Systems and Business Support Systems (OSS/BSS)*. Historically, many network operators have relied upon OSS/BSS systems to support network management functions such as inventory, service provisioning, network configuration and fault management. These platforms are often complicated, inflexible, proprietary environments that struggle to keep pace with the change required to meet today’s network demands. We believe that network virtualization and operational transformation may be better achieved through an

orchestration and control platform that is open, extensible, and vendor-agnostic as to the equipment and software it controls. Because orchestration simplifies the end-to-end creation, automation and deployment of services across multiple physical and virtual domains, we believe it presents an opportunity to reduce network complexity and may provide an alternative to elements of traditional OSS/BSS systems.

We believe that network operator adoption of these strategies will require them, and their network solutions vendors, to increasingly look to utilize an ecosystem of physical and virtual network resources provided by multiple third parties. We expect that these network architectural approaches, in turn, will drive increased openness and interoperability of multi-vendor, multi-domain network environments, requiring an increased degree of cooperation, collaboration and interoperability among us and other solutions providers, including our competitors.

Different Approaches to Procurement of Network Infrastructure

These industry dynamics — including increased network traffic, changing services demands, efforts to reduce network costs, and the transition to more open and programmable networks — are causing network operators to consider a diverse range of approaches to the design and procurement of their network infrastructure. We refer to these different approaches as “consumption models.” These consumption models can include: the traditional systems procurement of fully integrated solutions including hardware, software and services from the same vendor; the procurement of a fully integrated hardware solution from one vendor with the separate use of a network operator’s own SDN-based control; the procurement of an integrated photonic line system with open interfaces from one vendor and the separate or “disaggregated” procurement of modem technology from a different vendor; or the use of published reference designs and open source specifications for the procurement of off-the-shelf or commoditized hardware (often referred to as “white box” hardware) to be used with open source software. In parallel, network operators are also exploring procurement alternatives for software solutions, ranging from integrated and proprietary software platforms to fully open source software.

We believe that network operators will continue to consider a variety of different consumption models. Many of these approaches are in their very early stages of development and evaluation, and the types of models and levels of adoption will depend in significant part on the nature of the operator and its particular network and network applications. We also believe that broader adoption of the consumption models involving greater disaggregation in procurement remains uncertain, particularly with those network operators for whom it would result in increased operational complexity, higher operating expense, and additional integration and support obligations. In any case, we expect that the potential for different approaches to procurement of network infrastructure will require network operators and vendors alike to assess, and possibly, broaden their existing commercial models over time. This dynamic will also place a premium on a vendor’s ability to accommodate multiple consumption models and to balance the provision of commercially robust network solutions with the maximum amount of flexibility and choice.

Strategy

Our corporate strategy to capitalize on the evolving market dynamics described above to drive the profitable growth of our business includes the following initiatives:

Promote Choice and Openness through our OPⁿ philosophy. Five years ago, we introduced our OPⁿ Architecture, a focused approach to next-generation networks through scalability, programmability and network level applications. Today, OPⁿ has evolved and expanded from an architecture into our governing philosophy and broader belief system, which is rooted in enabling choice in the market through openness. Choice is an increasingly important element of our customers’ efforts to keep pace with bandwidth demands and emerging service offerings, the shift to more automated and programmable networks, and the need to manage network costs. We believe that the best way to enable choice for our customers is by developing and providing network technologies and strategies that facilitate openness through innovation, virtualization, automation and collaboration, and that we are well-positioned in this regard to offer an expansive range of choice to the market. Our OPⁿ belief system shapes the operation of our business in a number of ways. It guides our research and development strategy and solutions offerings, including our focus on coherent modem leadership, packet-optical convergence, and on multi-vendor network orchestration, management and control through our Blue Planet software platform. By embracing design principles that leverage open application programming interfaces (APIs), including those found in our Waveserver platform, we believe we facilitate openness and choice. By offering collaborative tools and environments, including our Emulation Cloud and DevOps Toolkit, we enable the development, testing and customization of services and applications. Our OPⁿ belief system also influences our go-to-market approach, as we expect to increasingly partner with an ecosystem of solutions vendors and virtual network function providers, and to integrate services and applications across multi-vendor and multi-domain networks. We

intend to offer solutions and pursue opportunities across a range of customer consumption models in order to drive the evolution of next-generation network infrastructures and accelerate the realization of our OPⁿ philosophy.

Extend Technology Leadership and Expand Application of Our Solutions. Our product development strategy is focused on maintaining our leading technology offerings and expanding our role and the application of our solutions in customer networks. Our research and development efforts seek to advance and extend our coherent modem technology leadership, including our WaveLogic coherent optical processor and high-speed indium phosphide and silicon photonics technologies acquired from TeraXion during fiscal 2016, to address network operator requirements for performance, power and cost. We are also focused on introducing terabit per second and greater transmission speeds, and expanding the high-capacity and operationally-efficient service delivery capabilities in our Packet Networking and Converged Packet Optical products for access and metro networks, data center interconnect, submarine networks, and other WAN applications. In addition, we are seeking to increase software programmability of networks and to enable network operators to automate and accelerate the creation and delivery of new, cloud-based services. These efforts include investments in our Blue Planet software platform — which is designed to automate, orchestrate, and manage physical network resources and virtualized services across data centers and the WAN — and its integration across our portfolio and with additional third party network resources.

Increase Diversification of our Business. Another key element of our strategy, which is designed to address the dynamic industry environment, to continue our growth and to better withstand potential slowdowns adversely affecting particular geographies, markets, customer segments and applications, is the continued diversification of our business. We intend to pursue initiatives that broaden sales to existing customers across our solutions portfolio and secure additional relationships with a diverse set of network operators in high-growth customer segments and geographies.

Our sales and marketing efforts seek to promote increased sales to existing customers, particularly through opportunities that expand our role or the application of our solutions within their network and business. We are pursuing opportunities to increase adoption of our packet access and aggregation solutions, and to secure market share of our Blue Planet software platform, including within our existing customer base. We are also focused on opportunities to support metro aggregation, data center interconnect, managed services offerings, cloud-based services, submarine networks, business Ethernet services and mobile backhaul. We intend to leverage our existing customer relationships to increase sales and promote the adoption of our solutions as our customers scale and evolve their networks.

We also intend to target important growth markets, including key customer market segments and geographies. Our go-to-market strategy is focused on further diversifying our customer base by penetrating additional internet content providers, data center operators and other emerging network operators that form the “Web-scale” marketplace. We are also focused on securing additional customers within our traditional base of communications service providers, particularly in higher growth markets, in the Asia-Pacific region, including India. We intend to use our direct and indirect sales channels to target, and to expand our sales with, several other market verticals, including cable and multiservice operators, submarine network operators, enterprise customers and in the government and R&E markets. For example, we intend to gain greater reach providing network solutions to submarine network operators, particularly in the new cable build market, in part through our recently announced supply partnership with TE SubCom. To leverage the geographic reach of our direct sales resources and expand sales into key geographies, we have pursued channel and distribution opportunities, including our strategic relationship with Ericsson, that enable sales through third parties, including service providers, systems integrators and value-added resellers.

Optimize Business to Yield Operating Leverage. We regularly pursue initiatives to improve our operating margin, constrain operating expense and promote efficiency of our business processes and systems. These initiatives include portfolio optimization and engineering efforts to drive improved efficiencies in the design and development of our solutions and supply chain initiatives to ensure that our product cost model remains ahead of the price erosion that we regularly encounter in our markets. We are also focused on ensuring an efficient supply chain, including efforts to vertically integrate where prudent, reduce our material and overhead costs and improve inventory management and logistics. Our initiatives also include the recent upgrade of our company-wide enterprise resource planning platform, as well as contemporaneous efforts to improve automation of key business processes and systems. We seek to leverage these initiatives to promote the profitable growth of our business and to drive additional operating leverage.

Customers and Markets

We sell our product and service solutions through direct and indirect sales channels to network operators in the following customer and market segments:

Communications Service Providers

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Our service provider customers include regional, national and international wireline and wireless carriers. Communications service providers are our historical customer base and represent a majority of our revenue. We provide service providers with products from the wireline network core to its edge, where end users gain access. Our service provider solutions address growing bandwidth demand from multiservice traffic growth and support key service provider offerings, including carrier-managed services, WAN consolidation, data center and inter-site connectivity, wireless backhaul and business Ethernet services.

Web-scale Providers

Our customers include a diverse range of internet content providers focused on applications such as search, social media, video, real-time communications and cloud-based service offerings to consumers and enterprises. Customers within this segment also include data center operators and other emerging network operators that are often focused on virtualized infrastructure and Ethernet exchanges. These customers are sometimes collectively included in a customer segment referred to as “Web-scale” providers or “Web 2.0.” These customers often require massive scale, low latency, reliability and performance to interconnect critical data centers and connect end users to network resources and content. Some of the demand for network capacity from this set of customers continues to be purchased as services from communications service providers.

Cable & Multiservice Operators (MSO)

Our customers include leading cable and multiservice operators in the United States and internationally. Our cable and multiservice operator customers rely upon us for carrier-grade Ethernet transport and switching products, as well as high-capacity coherent optical transport. Our platforms allow cable operators to integrate voice, video and data applications over a converged infrastructure and to scale their networking infrastructure to keep ahead of the bandwidth and application demands of their subscribers. Our products support key cable applications, including business Ethernet services, wireless backhaul, broadcast and digital video, voice over IP, and video on demand.

Submarine Network Operators

Our customers include service providers and consortia operators of submarine communications networks across the globe. Our submarine line terminal equipment (SLTE) helps submarine network operators build new networks and upgrade submarine networks to increase transmission speeds and capacity as they address rapid traffic growth, including from Web-scale providers. In recent years, we have had market success in enabling operators to upgrade terrestrial equipment located at the end of submarine networks, extending the value and life of their existing, submerged plant infrastructure. As traffic growth continues globally, we believe that the same trends impacting the terrestrial market will impact the submarine market, requiring further investment and the adoption of network approaches that improve economies of scale, cost per bit and end-to-end latency.

Enterprises

Our enterprise customers include large, multi-site commercial organizations, including participants in the financial, health care, transportation, utilities, energy and retail industries. Our products enable inter-site connectivity between data centers, sales offices, manufacturing plants, retail stores and research and development centers, using an owned or leased private fiber network or a carrier-managed service. Our products facilitate key enterprise applications including IT virtualization, cloud computing, business Ethernet services, business continuity, online collaboration, video conferencing, low latency networking and WAN encryption. Our products also enable our enterprise customers to prevent unexpected network downtime and ensure the safety, security and availability of their data.

Government, Research and Education (R&E)

Our government customers include federal and state agencies in the United States as well as international government entities. Our R&E customers include research and education institutions in the United States and abroad, as well as communities or consortia including leaders in research, academia, industry and government. Customers in this segment seek to take advantage of technology innovation, improve their information infrastructure and facilitate increased collaboration. Our solutions feature ultra-high capacity required to meet the requirements of supercomputing systems, as well as network assurance and security features required by customers in this space.

Products and Services

Networking Platforms

Our Networking Platforms segment consists of our Converged Packet Optical, Packet Networking and Optical Transport product portfolios.

Converged Packet Optical. Our Converged Packet Optical portfolio includes a range of hardware networking solutions optimized for the convergence of coherent optical transport, optical transport network (OTN) switching and packet switching.

Using our coherent optical transport technology, our 6500 Packet-Optical Platform provides a flexible and scalable dense wavelength division multiplexing (DWDM) solution that adds capacity to core, regional, metro, and submarine networks and enables efficient transport at high transmission speeds. Our 6500 Packet-Optical Platform provides leading 10G, 40G, and 100G coherent and control plane capabilities for scale and service differentiation, and it utilizes hybrid OTN and packet switching technologies for efficient use of network resources, minimizing amplifiers, regenerators and dispersion compensation devices. Our 6500 Packet-Optical Platform also includes certain integrated switching elements, addressing market demand for converged network features, functions and layers to drive more robust and cost-effective network infrastructures. This platform, which includes several chassis sizes and a comprehensive set of line cards optimized for individual services or applications, can be used throughout the network, from customer premises to metropolitan networks, to the regional core, where the need for high capacity and carrier-class performance is essential.

Our Waveserver product is a stackable data center interconnect (DCI) platform that allows network operators, including Web-scale providers and data center operators, to scale bandwidth quickly and to support high-speed data transfer, virtual machine migration and disaster recovery/backup between data centers. Waveserver is a specialized platform, purpose-built for connecting data centers within a single metro area. It combines our leading coherent chipset with an operations model optimized for the capacity, speed, space and power requirements of data center environments. Waveserver is designed to leverage the data server user experience, with open application programming interfaces (APIs) and server-like deployment, provisioning and programmability via smart devices.

Our Converged Packet Optical portfolio also includes products that provide packet switching capability to allocate network capacity efficiently and to enable rapid service delivery. Our 5430 Reconfigurable Switching System includes a family of multi-terabit reconfigurable switching systems that utilize intelligent mesh networking to provide resiliency, and it features an integrated optical control plane to automate the provisioning and bandwidth control of high-capacity services. Our CoreDirector® Multiservice Optical Switch and 5430 Reconfigurable Switching System offer multiservice, multi-protocol switching systems that consolidate the functionality of an add/drop multiplexer, digital cross-connect and packet switch into a single, high-capacity intelligent switching system. These products address both core and metro segments of communications networks and support key managed services, including Ethernet/TDM Private Line and IP services.

Our Converged Packet Optical solutions also include our family of Z-Series high-capacity, multi-layer switching and transport platforms acquired from Cyan. Our Z-Series family is used in regional and metro networks and it is designed to support a variety of use cases including increasing capacity for optical transport, traffic aggregation at the network edge and switching optimized for handoff at the network core.

Packet Networking. Our Packet Networking products allow customers to simplify the deployment and delivery of new, revenue-generating services to consumer and enterprise end users. These products have applications from the edge of metro and core networks, where they aggregate traffic, to the access tiers of networks where they can be deployed to support wireless backhaul infrastructures and to deliver business data services. Our Packet Networking products facilitate network simplicity and cost effectiveness, including reduced costs associated with power and space, as compared to traditional IP routing network designs.

Our Packet Networking portfolio includes our 8700 Packetwave platform, a multi-terabit packet switching platform for high-density metro networks and inter-data center wide area networks. The 8700 combines high-capacity Ethernet switching and optical transport technologies for both data center networks and metro networks, to help network operators rapidly deliver cloud-based services, streaming video, and internet content distribution, efficiently aggregate users, and provide express connections to data centers. By increasing the traffic density while reducing power and space requirements, the 8700 also enables network operators to reduce capital and operating expense associated with their networks and to simplify service management and enablement.

To date, revenue from our Packet Networking segment has been primarily related to our 3000 family of service delivery switches and service aggregation switches, and our 5000 family of service aggregation switches. Our 3000 and 5000 families support the access and aggregation tiers of communications networks and have principally been deployed to support business data services and wireless backhaul infrastructures. Our 3000 family of service delivery switches are purpose-built to fit small, medium, and large customer sites as well as multi-tenant office and residential buildings. Our 5000 family of service aggregation switches provide aggregation to fill higher capacity links efficiently within both the metro access and aggregation tiers of networks, minimizing the number of router assets required in the core.

Optical Transport. Our Optical Transport products include stand-alone WDM and SONET/SDH-based optical transport solutions that add capacity to core, regional, metro, and submarine networks and enable cost-effective and efficient transport of

voice, video and data traffic at high transmission speeds. The products in this segment principally include the 4200 Advanced Services Platform, Corestream® Agility Optical Transport System, 5100/5200 Advanced Services Platform, Common Photonic Layer (CPL) and 6100 Multiservice Optical Platform. Our Optical Transport portfolio includes our traditional SONET/SDH transport and data networking products, as well as certain enterprise-oriented transport solutions that support storage and LAN extension, interconnection of data centers, and virtual private networks. Our Optical Transport products have either been previously discontinued, or are expected to be discontinued, reflecting network operators' transition toward next-generation converged network architectures addressed by solutions within our Converged Packet Optical product line.

Software and Software-Related Services

Our software business has principally consisted of the development and licensing of element and network management software and software-related services that support our hardware offerings. In connection with our acquisition of Cyan during the fourth quarter of fiscal 2015, we unified the software resources and activities of both companies with a focus on providing next-generation, multi-vendor network virtualization, service orchestration and management solutions oriented around our Blue Planet platform. During fiscal 2016, our software revenue was principally derived from our element and network management solutions related to our hardware sales. The market relating to the SDN, NFV and orchestration use cases for our Blue Planet software platform is in the early stages. As such, revenue from our Blue Planet software has been immaterial to date.

Blue Planet Software Platform. Our Blue Planet software platform is a modular, network virtualization, service orchestration and network management software platform that simplifies the creation, automation and delivery of services across multi-vendor and multi-domain network environments. Blue Planet is multi-functional in that it is designed to simplify the management, deployment and orchestration of hardware and software elements and services, from us or third-party vendors, based on the requirements of a network operator. Blue Planet utilizes a container-based, micro-services software architecture that provides flexibility to support the following use cases from a unified software platform:

WAN Automation. Multi-layer WANs have historically operated using vendor-specific management systems, with limited awareness of adjacent layers or network resources, resulting in additional complexity and cost, and challenging network management. Through its automation, management and control of multi-vendor and multi-layer network infrastructures, our SDN-based WAN automation solution eliminates this complexity. Our WAN automation solution enables network operators to visualize and control these disparate network elements through a unified solution that incorporates open APIs and resource adapters to control a range of third-party network elements. We believe this solution can enable network operators to simplify their network environments and accelerate end-to-end service delivery.

Multi-Domain Service Orchestration (MDSO). Network infrastructures are comprised of multiple technology layers and domains — such as the data center, cloud, metro, access and core networks — and it is often complex for network operators to offer services end-to-end in this environment. Blue Planet enables service orchestration across multiple network (physical and virtual) domains and multiple hardware and software vendors. By using open APIs and model-driven templates, Blue Planet integrates with third-party SDN controllers, element and network management systems, and orchestration platforms. We believe our MDSO solution can enable network operators to minimize vendor-specific management silos, reduce network complexity and enhance service management.

NFV Orchestration (NFVO). To reduce their dependence upon single-purpose hardware platforms and accelerate the time to market for new revenue-generating services, network operators are increasingly looking for solutions that enable network functions through software that runs on industry-standard servers, network and storage platforms. Blue Planet provides network operators with carrier-grade, NFV management and orchestration capabilities for instantiating and managing virtualized network functions and data center resources. Blue Planet uses an open, vendor-agnostic approach that allows network operators to select and scale those virtual network functions (VNFs) they wish to offer to their end customers. We believe that our NFVO solution can enable network operators to increase network programmability, reduce complexity and cost, and reduce time-to-market with new, revenue-generating services.

SD-WAN Service Orchestration. This overlay technology allows service providers and enterprises to create low cost, secure virtual connections between branch offices and cloud or corporate data centers. Unlike traditional dedicated IP services, SD-WANs run “over the top” of the public internet, leveraging available broadband access links provided by physical or virtual customer premises equipment (CPE). Our flexible, open orchestration framework helps service providers overcome a number of key challenges and avoid the creation of vendor-specific operational silos. By serving as a vendor-agnostic abstraction layer, our SD-WAN orchestration solution enables integration with an existing OSS platforms and a highly differentiated services offering that combines cloud, NFV, and WAN resources.

Our software portfolio also includes our Navigate path computation engine and network-level software applications that enable WAN services over an open network ecosystem. Our Blue Planet V-WAN application provides service providers the tools to offer enterprise, content, and cloud services to end users in a more automated and self-service oriented manner. We also offer network-level software applications, including Protect and Optimize, that enable network operators to improve reliability, to allow for more rapid network restoration, and to better monetize cloud-based services.

Element and Network Management Solutions and Software. Our software offerings also include our OneControl Unified Management System used by network operators in connection with our networking platforms. This integrated network and service management solution supports our Converged Packet Optical, Packet Networking and Optical Transport product lines from a single platform. OneControl offers end-to-end service creation, activation, and assurance to enable rapid deployment of next-generation wavelength, OTN and packet services. It also provides visualization of fault and performance information for network health status and it enables management functions, including network inventory, network element configuration backup, network element software delivery and security administration.

Our element and network management software offering also includes a number of software solutions that support our installed base of network solutions. These include:

- ON-Center® Network & Service Management Suite, which provides network and service management for our installed base of 4200 Advanced Services Platform and Corestream products;
- Optical Suite Release, which provides network and service management for our installed base of traditional SONET/SDH transport Optical Transport products;
- Ethernet Services Manager, which provides network and service management for our installed base of Packet Networking products; and
- Planet Operate, which provides network and service management for our installed base of Z-Series products acquired from Cyan.

As we seek adoption of our Blue Planet software platform and transition certain existing features, functionality and customers to this platform, including our next-generation network management software to be based on the Blue Planet platform, we expect revenues from our existing element and network management solutions to decline.

Our software suite also includes Ciena OnePlanner, a suite of planning tools for advanced, multi-layer network design. OnePlanner correlates data from different network layers, allowing the network planner to easily see the association between services, facilities, and equipment.

Software-Related Services. Software-related services include software subscription services, consulting, network migration and integration, installation and upgrade support services, and technical support relating to our software offerings.

Global Services

To complement our product portfolio, we offer a broad suite of consulting and support services that help our customers to design, optimize, deploy, integrate, manage and maintain their communications networks. We believe that our broad set of service offerings is a significant differentiator from our competitors. We believe that our services offering and our close collaborative engagement with customers provide us with valued insight into network and business challenges faced by our customers, enabling them to modernize and gain value from their network infrastructures. Our services offerings enable us to work closely with our customers in the assessment, planning, deployment, and transformation of their networks. We believe that our customers place significant value on the strategic, consultative engagements afforded by our services offering and on our ability to partner with them through services-oriented solutions that address their network and business needs on an individualized basis. As we promote our OPⁿ philosophy, we expect to expand our service offering to include services focused on enhancing network automation, multivendor integration and implementation of programmable multi-domain next-generation networks.

Our services and support portfolio includes the following offerings:

- Deployment services, including turn-key installation and turn-up and test services;
- Maintenance and support services, including:
 - helpdesk and technical support assistance;
 - spares and logistics management;
 - engineering dispatch and on-site professional services; and
 - equipment repair and replacement.

- Network management and monitoring through network operations center (NOC) services; and
- Project management services, including staging, site preparation and installation support activities.

We also provide training services to educate our customers and sales channels on the implementation, use, functionality and support of our solutions. We provide the services above using a combination of Ciena technical support engineers and qualified and authorized third party service partners.

Product Development

Our industry is subject to rapid technological developments, emerging service delivery requirements and shifts in customer and end-user network demand. To remain competitive, we must continually enhance our product platforms and add new features and functionality to ensure alignment with these changing dynamics. Our OPⁿ philosophy, which underpins our solutions offering and guides our research and development strategy, emphasizes software-enabled programmability, automation and open interfaces. Our product development initiatives include design and development work intended to address growing opportunities for the application of our solutions, such as metropolitan networks, data center interconnect, enterprise networking, and packet-based infrastructure solutions for high-capacity cloud-based service delivery. To address these opportunities and promote our OPⁿ belief system, our current development efforts are focused upon:

- Developing products that enhance software-based network management and control, service orchestration and network function virtualization, including:
 - Investments in our Blue Planet software platform to integrate across our portfolio and enhance orchestration across multi-vendor and multi-domain network environments;
 - Extension of the NFV capabilities of Blue Planet to enable virtualization of additional network features or functions traditionally supported by hardware elements;
 - SDN multi-layer WAN automation and service orchestration capabilities; and
 - Transitioning network-management, control and planning solutions to our Blue Planet architecture.
- Enhancing and extending our Packet-Optical and Packet Networking solutions, including:
 - Extending our leadership in coherent transport platforms, at 100G, 200G, 400G, and beyond;
 - Extending our coherent modem leadership and continued development of our WaveLogic optical processor to advance transmission speed, spectral efficiency, power usage and reach;
 - Accelerating packet feature development and technology convergence upon our Converged Packet Optical platforms; and
 - Expanding packet networking capabilities and features for our high-capacity Ethernet aggregation switches, for metro and service aggregation applications, data center interconnect, cloud-service delivery, mobile backhaul and business Ethernet services;
- Designing products that enable network operators to achieve improved economics and efficiency, including with respect to power, space and cost per bit.

Our research and development efforts are also geared toward portfolio optimization and engineering changes intended to drive cost reductions across our platforms.

We regularly review our existing solution offering and prospective development of new components, features or products, to determine their fit within our portfolio and broader corporate strategy. We also assess the market demand, technology evolution, prospective return on investment and growth opportunities, as well as the costs and resources necessary to develop and support these products. To ensure that our product development investments and solutions offerings are closely aligned with market demand, we continually seek input from customers and promote collaboration among our product development, marketing and global field organizations. In some cases, where we seek to utilize or gain access to complementary or emerging technologies or solutions, we may obtain such technology through an acquisition or, alternatively, through initiatives with third parties pursuant to technology licenses, original equipment manufacturer (OEM) arrangements and other strategic technology relationships or investments. In addition, we participate in industry and standards organizations, and, where appropriate, incorporate information from these affiliations throughout the product development process.

Our research and development expense was \$451.8 million, \$414.2 million and \$401.2 million for fiscal 2016, 2015 and 2014, respectively. For more information regarding our research and development expense, see “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in Item 7 of Part II of this annual report.

Sales and Marketing

Within our global field organization, we maintain a direct sales presence that is organized geographically around the following markets: (i) United States and Canada; (ii) Caribbean and Latin America; (iii) Europe, Middle East and Africa; and (iv) Asia-Pacific. Within each geographic area, we maintain specific teams or personnel that focus on a particular region, country, customer or market vertical. These teams include sales management, account salespersons, and systems engineers, as well as services professionals and commercial management personnel, who ensure that we operate closely with and provide a high level of support to our customers.

We also maintain a global channel program that works with resellers, systems integrators, service providers, and other third party distributors who market and sell our products and services. Our third party channel partners include our strategic distribution relationships with Ericsson and TE SubCom. We intend to pursue and foster targeted strategic channel relationships in an effort to enable us to sell our products as a complement to the broader offering of these vendors or integrators, including, in particular, in support of enterprise-oriented applications and cloud-based services. We see opportunities to leverage our strategic channel relationships to address additional customer market segments, additional applications for our solutions and growth geographies. We believe this strategy and our use of third party channels afford us expanded market opportunities and reduce the financial and operational risk of entering these additional markets.

To support our sales efforts, we engage in marketing activities intended to promote our brand, increase customer awareness of our product, software and service offerings and drive demand generation. Our marketing strategy is highly focused on building our brand, promoting our OPⁿ philosophy and increasing customer adoption of our solutions, particularly our Blue Planet software platform. Our marketing team supports our sales efforts through a variety of marketing vehicles, including direct customer interaction, portfolio marketing, industry events, public relations, industry analysts, social media, trade shows, our website and other marketing channels for our customers and channel partners.

Operations and Supply Chain Management

Our operations personnel manage our relationships with our third party manufacturers and global supply chain, addressing component sourcing, manufacturing, product testing and quality, and fulfillment and logistics relating to the distribution and support of our products.

We utilize a global sourcing strategy that emphasizes procurement of materials and product manufacturing in lower cost regions. We rely upon third party contract manufacturers, with facilities in Canada, Mexico, Thailand and the United States, to manufacture, support and ship our products, and therefore are exposed to risks associated with their businesses, financial condition and the geographies in which they operate. We also rely upon these contract manufacturers and other third parties to perform design and prototype development, component procurement, full production, final assembly, testing and customer order fulfillment. Our manufacturers procure components necessary for assembly and manufacture of our products based on our specifications, approved vendor lists, bills of materials and testing and quality standards. Our manufacturers' activity is based on rolling forecasts that we provide to them to estimate demand for our products. This build-to-forecast purchase model exposes us to the risk that our customers will not order those products for which we have forecast sales, or will purchase less than we have forecast. As a result, we may incur carrying charges or obsolete material charges for components purchased by our manufacturers that are not ultimately used. We work closely with our manufacturers to manage material, quality, cost and delivery times, and we continually evaluate their services to ensure performance on a reliable and cost-effective basis.

We are currently using a direct order fulfillment model for the sale of our products. This model allows us to rely on our third party contract manufacturers to perform final system integration and testing prior to shipment of products from their facilities directly to our customers. We believe that our sourcing and manufacturing strategy allows us to conserve capital, lower costs of product sales, adjust quickly to changes in market demand, and operate without dedicating significant resources to manufacturing-related plant and equipment.

Shortages or lack of availability of components that we rely upon have occurred and are possible. Our products include some components that are proprietary in nature and only available from one or a small number of suppliers. Significant time would be required to establish relationships with alternate suppliers or providers of such components. We generally do not have long-term contracts with suppliers or contract manufacturers that guarantee supply of components or manufacturing services. If component supplies become limited, production at a contract manufacturer is disrupted, or if we experience difficulty in our relationship with a key supplier or contract manufacturer, we may encounter manufacturing delays that could adversely affect our business and result of operations.

As part of our effort to optimize our operations, we continue to focus on driving cost reductions through sourcing, rationalizing our supply chain, outsourcing or virtualizing certain activities, and consolidating distribution sites and service

logistics partners. These efforts also include process optimization initiatives, such as vendor-managed inventory, and other operational models and strategies designed to drive improved efficiencies in our sourcing, production, logistics and fulfillment.

Backlog

Generally, we make sales pursuant to purchase orders placed by customers under framework agreements that govern the general commercial terms and conditions of the sale of our products and services. These agreements do not obligate customers to purchase any minimum or guaranteed order quantities. Moreover, we are periodically awarded business for new network opportunities or network upgrades following a selection process. In calculating backlog, we only include (i) customer purchase orders for products that have not been shipped and for services that have not yet been performed; and (ii) customer orders relating to products that have been delivered and services that have been performed, but are awaiting customer acceptance under the applicable contract terms. Generally, our customers may cancel or change their orders with limited advance notice, or they may decide not to accept our products and services, although both cancellation and non-acceptance are infrequent. Backlog may be fulfilled several quarters following receipt of a purchase order, or in the case of certain service obligations, may relate to multi-year support period. As a result, backlog should not necessarily be viewed as an accurate indicator of future revenue for any particular period.

Our backlog increased from \$1.06 billion as of October 31, 2015 to \$1.15 billion as of October 31, 2016. Backlog includes product and service orders from commercial and government customers combined. Backlog at October 31, 2016, includes approximately \$292.6 million primarily related to orders for products and maintenance and support services that are not expected to be filled or performed within fiscal 2017. Because backlog can be defined in different ways by different companies, our presentation of backlog may not be comparable with figures presented by other companies in our industry.

Seasonality

Like other companies in our industry, we have experienced quarterly fluctuations in customer activity due to seasonal considerations. We typically experience reductions in order volume toward the end of the calendar year, as the procurement cycles of some of our customers slow and network deployment activity by service providers is curtailed. This period coincides with the first quarter of our fiscal year. This seasonality in our order flows can result in somewhat weaker revenue results in the first quarter of our fiscal year. These seasonal effects may not apply consistently in future periods and may not be a reliable indicator of our future revenue or results of operations.

Competition

Competition among communications network solution vendors remains intense. The markets in which we compete are characterized by rapidly advancing technologies, frequent introduction of new networking solutions and aggressive selling efforts to displace incumbent vendors and capture market share. Competition for sales of communications networking solutions is dominated by a small number of very large, multi-national companies. Our competitors include Cisco, Fujitsu, Huawei, Juniper Networks, Nokia and ZTE. As compared to us, many of these competitors have substantially greater financial, operational and marketing resources, and significantly broader product offerings. Because of their scale and resources, they may be perceived to be a better fit for the procurement or network strategies of large service providers. We also continue to compete with several smaller, but established, companies that offer one or more products that compete directly or indirectly with our offerings or whose products address specific niches within the markets and customer segments we address. These competitors include ADVA, Coriant, ECI and Infinera. We also compete with a number of smaller companies that provide significant competition for a specific product, application, customer segment or geographic market. Some of the foregoing competitors, both large and small, are not vertically integrated in their packet-optical supply chain and therefore sell a set of networking solutions that rely upon coherent modem technology developed by and procured from third party “merchant” providers. In connection with certain consumption models involving greater disaggregation in the procurement of network infrastructure, the continued use of such third party modem technology by these competitors and/or the availability of such technology in the market may increase overall pricing pressure in this space and may negatively impact our ability to derive higher gross margins for Converged Packet Optical solutions.

The principal competitive factors applicable to our markets include:

- product functionality, speed, capacity, scalability and performance;
- price, cost per bit and total cost of ownership of our solutions;
- incumbency and strength of existing business relationships;
- ability to offer comprehensive networking solutions, consisting of hardware, software and services;
- product development that satisfies customers’ immediate and future network requirements;

- flexibility and openness of platforms, including ease of integration, interoperability and integrated management;
- ability to offer solutions that accommodate a range of different consumption models;
- space and power considerations;
- manufacturing and lead-time capability; and
- services and support capabilities.

As a result of the intense and fragmented environment in which we compete, winning new opportunities can require that we agree to unfavorable commercial terms or pricing, and certain other onerous contractual commitments. These terms can adversely affect our results of operations. These terms can also lengthen our revenue recognition or cash collection cycles, add start-up costs to initial sales or deployment of our solutions, require financial commitments or performance bonds, and place a disproportionate allocation of risk upon us.

We expect the competitive landscape in which we operate to continue to broaden and to increase as network operators pursue a diverse range of network strategies that seek to emphasize unified software management, orchestration and control. Specifically, we expect that our business will overlap more directly with additional networking solution suppliers, including IP router vendors, data center switch providers and other suppliers or integrators of networking technology traditionally geared toward different network applications, layers or functions. In addition, as we seek increased customer adoption of our Blue Planet software platform, and network operator demands for software programmability, management and control increase, we expect to compete more directly with software vendors and information technology vendors or system integrators. We may also face competition from system and component vendors, including those in our supply chain, who develop networking products based on off-the-shelf or commoditized hardware technology, particularly where a customer's network strategy seeks to emphasize deployment of such product offerings or to adopt a disaggregated approach to the procurement of hardware and software.

Patents, Trademarks and Other Intellectual Property Rights

The success of our business and technology leadership is significantly dependent upon our proprietary and internally developed technology. We rely upon the intellectual property protections afforded by patents, copyrights, trademarks, and trade secret laws to establish, maintain and enforce rights in our proprietary technologies and product branding. We maintain an invention-incentive program that seeks to reward innovation and an internal invention review board that selects appropriate protection mechanisms for our technology. We regularly file applications for patents and have a significant number of patents in the United States and other countries where we do business. As of December 1, 2016, we had 1,588 issued U.S. patents, 284 pending U.S. patent applications, 444 issued non-U.S. patents, and 170 pending non-U.S. patent applications.

We also rely on non-disclosure agreements and other contracts and policies regarding confidentiality with employees, contractors and customers to establish proprietary rights and to protect trade secrets and confidential information. Our practice is to require employees and relevant consultants to execute non-disclosure and proprietary rights agreements upon commencement of their employment or consulting arrangements with us. These agreements acknowledge our ownership of intellectual property developed by the individual during the course of his or her work with us. The agreements also require that these persons maintain the confidentiality of all proprietary information disclosed to them.

Enforcing proprietary rights, especially patents, can be costly, and we cannot be certain that the steps that we are taking will detect or prevent all unauthorized use. The industry in which we compete is characterized by rapidly changing technology, a large number of patents, and frequent claims and related litigation regarding patent and other intellectual property rights. We have been subject to several claims related to patent infringement, including by competitors and also by non-practicing patent assertion entities, and we have been requested to indemnify customers pursuant to contractual indemnity obligations relating to infringement claims made by third parties. Intellectual property infringement assertions could cause us to incur substantial costs, including settlement costs and legal fees in the defense of related actions. If we are not successful in defending these claims, our business could be adversely affected. For example, we may be required to enter into a license agreement requiring us to make ongoing royalty payments; we may be required to redesign our products; or we may be prohibited from selling infringing technology in certain jurisdictions.

Our operating system, element management and network virtualization, management, and orchestration software and other solutions incorporate software and components under licenses from third parties, including software subject to various open source software licenses. As network operators seek to adopt network infrastructures with increased software control and programmability and to utilize an open ecosystem of physical and virtual network resources provided by multiple third parties, and as we invest in our Blue Planet software platform, we expect to incorporate into our solutions additional elements of open source software or license additional software or technology from third parties. We expect that these network architectural approaches will require increased openness and interoperability of multi-vendor, multi-domain network environments,

requiring an increased degree of cooperation among solutions providers. Failure to obtain or maintain such licenses or other third party intellectual property rights could affect our development efforts and market opportunities, or could require us to re-engineer our products or to obtain alternate technologies. Moreover, there is a risk that open source and other technology licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to commercialize our products.

Environmental Matters

Our business and operations are subject to environmental laws in various jurisdictions around the world, including the Waste Electrical and Electronic Equipment (WEEE) and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) regulations adopted by the European Union. We are also subject to disclosure and related requirements that apply to the presence of “conflict minerals” in our products or supply chain. We seek to operate our business in compliance with such laws relating to the materials and content of our products and product takeback and recycling. Environmental regulation is increasing, particularly outside of the United States, and we expect that our domestic and international operations may be subject to additional environmental compliance requirements, which could expose us to additional costs. To date, our compliance costs relating to environmental regulations have not resulted in a material cost or effect on our business, results of operations or financial condition.

Employees

As of October 31, 2016, we had a global workforce consisting of 5,555 employees. We have not experienced any work stoppages, and we consider the relationships with our employees to be good. While we have been able to recruit and retain key personnel with the capabilities required by our business and markets, competition for highly skilled technical, engineering and other personnel with experience in our industry is intense. We believe that our future success depends in critical part on our continued ability to recruit, motivate and retain such qualified personnel.

Directors and Executive Officers

The table below sets forth certain information concerning our directors and executive officers:

| Name | Age | Position |
|-----------------------------|-----|--|
| Patrick H. Nettles, Ph.D. | 73 | Executive Chairman of the Board of Directors |
| Gary B. Smith | 56 | President, Chief Executive Officer and Director |
| Stephen B. Alexander | 57 | Senior Vice President and Chief Technology Officer |
| James A. Frodsham | 50 | Senior Vice President and Chief Strategy Officer |
| François Locoh-Donou | 45 | Senior Vice President and Chief Operating Officer |
| James E. Moylan, Jr. | 65 | Senior Vice President and Chief Financial Officer |
| Andrew C. Petrik | 53 | Vice President and Controller |
| David M. Rothenstein | 48 | Senior Vice President, General Counsel and Secretary |
| Marcus Starke | 55 | Senior Vice President and Chief Marketing Officer |
| Harvey B. Cash (1)(3) | 78 | Director |
| Bruce L. Claflin (1)(2) | 65 | Director |
| Lawton W. Fitt (2) | 63 | Director |
| Patrick T. Gallagher (1)(3) | 61 | Director |
| T. Michael Nevens (2) | 67 | Director |
| Judith M. O'Brien (1)(3) | 66 | Director |
| Michael J. Rowny (2) | 66 | Director |

(1) Member of the Compensation Committee

(2) Member of the Audit Committee

(3) Member of the Governance and Nominations Committee

Our Directors hold staggered terms of office, expiring as follows: Ms. O'Brien and Messrs. Cash and Smith in 2017; Messrs. Claflin, Nevens and Gallagher in 2018; and Ms. Fitt, Dr. Nettles and Mr. Rowny in 2019.

Patrick H. Nettles, Ph.D. has served as a Director of Ciena since April 1994 and as Executive Chairman of the Board of Directors since May 2001. From October 2000 to May 2001, Dr. Nettles was Chairman of the Board of Directors and Chief Executive Officer of Ciena, and he was President and Chief Executive Officer from April 1994 to October 2000. Dr. Nettles serves as a Trustee for the California Institute of Technology and the Georgia Tech Foundation, Inc. Dr. Nettles also serves on the board of directors of The Progressive Corporation and Axcelis Technologies, Inc., where he is independent chairman of the board. Dr. Nettles has previously served on the boards of directors of Apptrigger, Inc., formerly known as Carrius Technologies, Inc., and Optiwind Corp, a privately held company.

Gary B. Smith joined Ciena in 1997 and has served as President and Chief Executive Officer since May 2001. Mr. Smith has served on Ciena's Board of Directors since October 2000. Prior to his current role, his positions with Ciena included Chief Operating Officer and Senior Vice President, Worldwide Sales. Mr. Smith previously served as Vice President of Sales and Marketing for INTELSAT and Cray Communications, Inc. Mr. Smith also serves on the boards of directors of Avaya Inc. and CommVault Systems, Inc. Mr. Smith is a member of the President's National Security Telecommunications Advisory Committee, the Global Information Infrastructure Commission and the Center for Corporate Innovation (CCI).

Stephen B. Alexander joined Ciena in 1994 and has served as Chief Technology Officer since September 1998 and as a Senior Vice President since January 2000. Mr. Alexander has previously served as General Manager of Products & Technology and General Manager of Transport and Switching & Data Networking.

James A. Frodsham joined Ciena in May 2004 and has served as Senior Vice President and Chief Strategy Officer since March 2010 with responsibility for our strategic planning and corporate development activities. Mr. Frodsham previously served as General Manager of Ciena's former Broadband Access Group and Metro and Enterprise Solutions Group. Prior to joining Ciena, Mr. Frodsham served as chief operating officer of Innovance Networks. Prior to that, Mr. Frodsham was employed in senior level positions with Nortel Networks in product development and marketing strategy. Mr. Frodsham serves on the board of directors of Innovance Networks.

François Locoh-Donou has served as Ciena's Senior Vice President and Chief Operating Officer since November 2015. In this capacity, Mr. Locoh-Donou leads Ciena's global sales organization and its services and automation functions, as well as Ciena's networking platforms and software business, including responsibility for engineering, supply chain, and product line management on a global basis. Mr. Locoh-Donou previously served as Ciena's Senior Vice President, Global Products Group from August 2011 to October 2015. Mr. Locoh-Donou joined Ciena in August 2002 and served as Ciena's Vice President and General Manager, EMEA from June 2005 to August 2011.

James E. Moylan, Jr. has served as Senior Vice President and Chief Financial Officer since December 2007.

Andrew C. Petrik joined Ciena in 1996 and has served as Vice President, Controller since August 1997 and served as Treasurer from August 1997 to October 2008.

David M. Rothenstein joined Ciena in January 2001 and has served as Senior Vice President, General Counsel and Secretary since November 2008. Mr. Rothenstein served as Vice President and Associate General Counsel from July 2004 to October 2008 and previously as Assistant General Counsel.

Marcus Starke joined Ciena in February 2015, and currently serves as Senior Vice President and Chief Marketing Officer where he oversees all global marketing and external communications activities. Effective in January 2017, Mr. Starke will separate his employment with Ciena. From May 2014 to January 2015, Mr. Starke served as Chief Marketing Officer at MicroStrategy, a leading global provider of enterprise-ready platforms for business analytics and mobile analytics. From November 2009 to April 2014, Mr. Starke was Senior Vice President, Worldwide Marketing and Communications at SAP, the global market leader in enterprise application software. Prior to that, he was President and CEO (Europe, Middle East and Africa) for Wunderman, as well as Chairman and CEO of the German arm of Publicis Worldwide.

Harvey B. Cash has served as a Director of Ciena since April 1994. Mr. Cash is a general partner of InterWest Partners, a venture capital firm in Menlo Park, California, which he joined in 1985. Mr. Cash serves on the boards of directors of First Acceptance Corp., Silicon Laboratories, Inc. and Argonaut Group, Inc. and has previously served on the boards of directors of i2 Technologies, Inc., Voyence, Inc. and Staktek Holdings, Inc.

Bruce L. Claflin has served as a Director of Ciena since August 2006. Mr. Claflin served as President and Chief Executive Officer of 3Com Corporation from January 2001 until his retirement in February 2006. Mr. Claflin joined 3Com as President and Chief Operating Officer in August 1998. Prior to 3Com, Mr. Claflin served as Senior Vice President and General Manager, Sales and Marketing, for Digital Equipment Corporation. Mr. Claflin also worked for 22 years at IBM, where he held various sales, marketing and management positions, including general manager of IBM PC Company's worldwide research and development, product and brand management, as well as president of IBM PC Company Americas. Mr. Claflin serves on the boards of directors of Advanced Micro Devices (AMD) and IDEXX Laboratories, Inc., where he is the Chairman of the Nominating and Governance Committee.

Lawton W. Fitt has served as a Director of Ciena since November 2000. From October 2002 to March 2005, Ms. Fitt served as Director of the Royal Academy of Arts in London. From 1979 to October 2002, Ms. Fitt was an investment banker with Goldman Sachs & Co., where she was a partner from 1994 to October 2002. In addition to her service as a director of non-profit organizations, Ms. Fitt currently serves on the boards of directors of The Carlyle Group LP and The Progressive Corporation, and she has previously served on the boards of directors of ARM Holdings PLC and Thomson Reuters Corporation. She also serves as a director or trustee of several non-profit organizations.

Patrick T. Gallagher has served as a Director of Ciena since May 2009. Mr. Gallagher currently serves as Chairman of Harmonic Inc, a global provider of high-performance video solutions to the broadcast, cable, telecommunications and managed service provider sectors. From March 2008 until April 2012, Mr. Gallagher was Chairman of Ubiquisys Ltd., a leading developer and supplier of femtocells for the global 3G mobile wireless market. From January 2008 until February 2009, Mr. Gallagher was Chairman of Macro 4 plc, a global software solutions company, and from May 2006 until March 2008, served as Vice Chairman of Golden Telecom Inc., a leading facilities-based provider of integrated communications in Russia and the CIS. From 2003 until 2006, Mr. Gallagher was Executive Vice Chairman and served as Chief Executive Officer of FLAG Telecom Group and, prior to that role, held various senior management positions at British Telecom. Mr. Gallagher is also Chairman of Intercloud SAS, a Paris-headquartered provider of global private cloud connectivity services. Mr. Gallagher previously served on the board of directors of Sollers JSC.

T. Michael Nevens has served as a Director of Ciena since February 2014. Since 2006, Mr. Nevens has served as senior adviser to Permira Advisers, LLC, an international private equity fund. From 1980 to 2002, Mr. Nevens held various leadership positions at McKinsey & Co., most recently as a director (senior partner) and as managing partner of the firm's Global Technology Practice. He also served on the board of the McKinsey Global Institute, which conducts research on economic and policy issues. Mr. Nevens has been an adjunct professor of Corporate Governance and Strategy at the Mendoza College of Business at the University of Notre Dame. Mr. Nevens also serves as the Chairman of the board of directors of NetApp, Inc. Mr. Nevens previously served on the board of directors of Altera Corporation.

Judith M. O'Brien has served as a Director of Ciena since July 2000. Since November 2012, Ms. O'Brien has served as a partner and head of the Emerging Company Practice Group at the law firm of King & Spalding. Ms. O'Brien served as Executive Vice President and General Counsel of Obopay, Inc., a provider of mobile payment services, from November 2006 through December 2010. From February 2001 until October 2006, Ms. O'Brien served as a Managing Director at Incubic Venture Fund, a venture capital firm. From August 1980 until February 2001, Ms. O'Brien was a lawyer with Wilson Sonsini Goodrich & Rosati, where, from February 1984 to February 2001, she was a partner specializing in corporate finance, mergers and acquisitions and general corporate matters. Ms. O'Brien serves on the board of directors of privately-held companies, Teatro Labs, Inc. and Inform, Inc., and has previously served on the board of directors of Adaptec, Inc.

Michael J. Rowny has served as a Director of Ciena since August 2004. Mr. Rowny has been Chairman of Rowny Capital, a private equity firm, since 1999. From 1994 to 1999, and previously from 1983 to 1986, Mr. Rowny was with MCI Communications in positions including President and Chief Executive Officer of MCI's International Ventures, Alliances and Correspondent group, acting Chief Financial Officer, Senior Vice President of Finance, and Treasurer. Mr. Rowny's career in business and government has also included positions as Chairman and Chief Executive Officer of the Ransohoff Company, Chief Executive Officer of Hermitage Holding Company, Executive Vice President and Chief Financial Officer of ICF Kaiser International, Inc., Vice President of the Bendix Corporation, and Deputy Staff Director of the White House. Mr. Rowny serves on the board of directors of Neustar, Inc.

Item 1A. Risk Factors

Investing in our securities involves a high degree of risk. In addition to the other information contained in this report, you should consider the following risk factors before investing in our securities.

Our revenue and operating results can fluctuate significantly and unpredictably from quarter to quarter.

Our revenue and results of operations can fluctuate significantly and unpredictably from quarter to quarter. Our budgeted expense levels are based on our visibility into customer spending plans and our projections of future revenue and gross margin. Customer spending levels are uncertain and subject to change, and reductions in our expense levels can take significant time to implement. A significant portion of our quarterly revenue is generated from customer orders received in that same quarter (which we refer to as “book to revenue”). Accordingly, our revenue for a particular quarter is difficult to predict, and a shortfall in expected orders in a given quarter can materially adversely affect our revenue and results of operations for that quarter or future quarterly periods. Additional factors that contribute to fluctuations in our revenue and operating results include:

- broader macroeconomic conditions, including weakness and volatility in global markets, that affect our customers;
- changes in capital spending by customers, in particular our large communications service provider customers;
- changes in networking strategies;
- order timing, volume and cancellations;
- backlog levels;
- the level of competition and pricing pressure in our industry;
- the impact of commercial concessions or unfavorable commercial terms required to maintain incumbency or secure new opportunities with key customers;
- our level of success in achieving cost reductions and improved efficiencies in our supply chain;
- the pace and impact of price erosion that we regularly encounter in our markets;
- our incurrence of start-up costs, including lower margin phases of projects required to support initial deployments, gain new customers or enter new markets;
- the timing of revenue recognition on sales, particularly relating to large orders;
- the mix of revenue by product segment, geography and customer in any particular quarter;
- installation service availability and readiness of customer sites;
- availability of components and manufacturing capacity;
- adverse impact of foreign exchange; and
- seasonal effects in our business.

Quarterly fluctuations from these and other factors may also cause our results of operations to fall short of or to exceed significantly the expectations of securities analysts or investors, which may cause volatility in our stock price.

A small number of customers, including large communications service providers, account for a significant portion of our revenue. The loss of any of these customers or a significant reduction in their spending could have a material adverse effect on our business and results of operations.

While our customer base has diversified in recent years to include network operators in additional customer segments and geographies, a significant portion of our revenue remains concentrated among a small number of customers, including large communications service providers. For example, AT&T accounted for approximately 18.4% of fiscal 2016 revenue, and our ten largest customers contributed 51.1% of fiscal 2016 revenue. Consequently, our financial results are closely correlated with the spending of a relatively small number of customers. Our business and results of operations can be materially adversely impacted by reductions in spending or capital expenditure budgets by our largest customers. A number of our large service provider customers, including AT&T, with whom we experienced a decline in annual revenue during fiscal 2016, have announced various procurement initiatives or efforts to reduce capital expenditures on network infrastructure in future periods. Moreover, because we do not have long-term contracts that obligate AT&T or our other customers to purchase any minimum or guaranteed order volumes, and customers often have the right to modify or cancel orders, there can be no assurance as to customer spending levels, which can be unpredictable, and sales to any customer could cease at any time.

Because a number of our largest customers are communications service providers, our business and results of operations can be significantly affected by market, industry or competitive dynamics adversely affecting this segment. Our communications service provider customers face a rapidly shifting competitive landscape as cloud service operators, OTT providers and other content providers challenge their traditional business models and network infrastructures. Moreover, a number of our communications service provider customers, including AT&T, Verizon and Centurylink, have recently announced significant

acquisition transactions. Such transactions have in the past, and may in the future, result in spending delays or deferrals, or changes in preferred vendors, as the integration of combined network infrastructures proceed and procurement strategies are determined. There can be no assurance that we will be able to maintain the revenue levels we have previously achieved with customers, including our communications service provider customers. The loss of any of our largest customers, or a significant reduction in their spending, could have a material adverse effect on our business and results of operations.

We face intense competition that could hurt our sales and results of operations, and we expect the competitive landscape in which we operate to continue to broaden to include additional solutions providers.

We face an intense competitive market for sales of communications networking equipment, software and services. Competition is intense on a global basis, as we and our competitors aggressively seek to capture market share and displace incumbent equipment vendors. A small number of very large companies have historically dominated our industry, many of which have substantially greater financial and marketing resources, broader product offerings, and more established relationships with service providers and other customer segments than we do. Because of their scale and resources, they may be perceived to be a better fit for the procurement or network operating and management strategies of large service providers. Moreover, there has been a trend toward consolidation in our markets, which we believe may bolster the resources and advantages of certain competitors. We also compete with a number of smaller companies that provide significant competition for a specific product, application, customer segment or geographic market. Due to the narrower focus of their efforts, these competitors may achieve commercial availability of their products more quickly or may be more attractive to customers in a particular product niche.

Generally, competition in our markets is based on any one or a combination of the following factors:

- product functionality, speed, capacity, scalability and performance;
- price and total cost of ownership of our solutions;
- incumbency and strength of existing business relationships;
- ability to offer comprehensive networking solutions, consisting of equipment, software and network consulting services;
- ability to adapt to customer needs and accommodate different consumption models;
- product development plans and the ability to meet customers' immediate and future network requirements;
- flexibility and openness of platforms, including ease of integration, interoperability and integrated software programmability and management;
- space and power considerations;
- manufacturing and lead-time capability; and
- services and support capabilities.

In an effort to maintain our incumbency or secure new customer opportunities, we have in the past, and may in the future, agree to aggressive pricing, commercial concessions and other unfavorable terms that result in low or negative gross margins on a particular order or group of orders. Competition can also result in commercial and legal terms and conditions that place a disproportionate amount of risk on us.

We expect the competitive landscape in which we operate to continue to broaden and to increase, as network operators pursue a diverse range of consumption models and network strategies. As these changes occur, we expect that our business will compete more directly with additional networking solution suppliers, including IP router vendors, data center switch providers and other suppliers or integrators of networking technology. In addition, as we seek increased customer adoption of our Blue Planet software platform, and network operator demands for software programmability, management and control increase, we expect to compete more directly with software vendors and information technology vendors or integrators of these solutions. We may also face competition from system and component vendors, including those in our supply chain, who develop networking products based on off-the-shelf or commoditized hardware technology, referred to as "white box" hardware; particularly where a customer's network strategy seeks to emphasize deployment of such product offerings or adopt a disaggregated approach to the procurement of hardware and software. The expansion of our competitive landscape, and entry of new competitors into our markets and customers, may adversely impact our business and results of operations. If competitive pressures increase, or if we fail to compete successfully in our markets, our business and results of operations could suffer.

Our business and operating results could be adversely affected by unfavorable changes in macroeconomic and market conditions and reductions in the level of spending by customers in response to these conditions.

Our business and operating results, which depend significantly on general economic conditions and demand for our products and services, could be materially adversely affected by unfavorable or uncertain macroeconomic and market conditions, globally or with respect to a particular region or country where we operate. Global financial markets experienced

periods of significant volatility and instability during fiscal 2016. Broad macroeconomic weakness and market volatility have previously resulted in sustained periods of decreased demand for our products and services, which has adversely affected our operating results. Macroeconomic and market conditions could be adversely affected by a variety of political, economic or other factors in the United States and international markets, that could in turn adversely affect spending levels of our customers and their end users, and could create volatility or deteriorating conditions in the markets in which we operate. Macroeconomic uncertainty or weakness could result in:

- reductions in customer spending and delay, deferral or cancellation of network infrastructure initiatives;
- increased competition for fewer network projects and sales opportunities;
- increased pricing pressure that may adversely affect revenue, gross margin and profitability;
- difficulty forecasting operating results and making decisions about budgeting, planning and future investments;
- increased overhead and production costs as a percentage of revenue;
- tightening of credit markets needed to fund capital expenditures by us or our customers;
- customer financial difficulty, including longer collection cycles and difficulties collecting accounts receivable or write-offs of receivables; and
- increased risk of charges relating to excess and obsolete inventories and the write-off of other intangible assets.

Reductions in customer spending in response to unfavorable or uncertain macroeconomic and market conditions, globally or with respect to a particular region where we operate, would adversely affect our business, results of operations and financial condition.

Our reliance upon third party component suppliers, including sole and limited source suppliers, exposes our business to additional risk and could limit our sales, increase our costs and harm our customer relationships.

We maintain a global sourcing strategy and depend on third party suppliers for support in our product design and development, and in the sourcing of key product components and subsystems. Our products include optical and electronic components for which reliable, high-volume supply is often available only from sole or limited sources. Increases in market demand or scarcity of resources or manufacturing capability have resulted, and may in the future result, in shortages in availability of important components for our solutions, product allocation challenges, deployment delays and increased lead times. We are exposed to risks relating to unfavorable economic conditions or other similar challenges affecting the businesses and results of operations of our component providers that can affect their liquidity levels, ability to continue investing in their businesses, ability to meet development commitments and manufacturing capability. These and other challenges affecting our suppliers could expose our business to increased costs, loss or lack of supply, or discontinuation of components that can result in lost revenue, additional product costs, increased lead times and deployment delays that could harm our business and customer relationships. We do not have any guarantees of supply from these third parties, and in certain cases are relying upon temporary commercial arrangements or standard purchase orders. As a result, there is no assurance that we will be able to secure the components or subsystems that we require, in sufficient quantity and quality, and on reasonable terms. Moreover, our access to necessary components could be adversely impacted by competition from component vendors, including those in our supply chain, who develop competing networking products based on off-the-shelf or commoditized hardware technology, referred to as “white box” hardware. The loss of a source of supply, or lack of sufficient availability of key components, could require that we locate an alternate source or redesign our products, either of which could result in business interruption, increased costs and negatively affect our product gross margin and results of operations. Our business and results of operations would be negatively affected if we were to experience any significant disruption or difficulties with key suppliers affecting the price, quality, availability or timely delivery of required components.

Investment of research and development resources in communications networking technologies for which there is not a matching market opportunity, or failure to sufficiently or timely invest in technologies for which there is market demand, would adversely affect our revenue and profitability.

The market for communications networking hardware and software solutions is characterized by rapidly evolving technologies, changes in market demand and increasing adoption of software-based networking solutions. We continually invest in research and development to sustain or enhance our existing hardware and software solutions and to develop or acquire new technologies including new software platforms. There is often a lengthy period between commencing these development initiatives and bringing new or improved solutions to market. During this time, technology preferences, customer demand and the markets for our solutions, or those introduced by our competitors, may move in directions that we had not anticipated. There is no guarantee that our new products, including our Blue Planet software platform, or enhancements to other solutions will achieve market acceptance or that the timing of market adoption will be as predicted. As a result, there is a significant possibility that some of our development decisions, including significant expenditures on acquisitions, research and development

costs, or investments in technologies, will not meet our expectations, and that our investment in some projects will be unprofitable. There is also a possibility that we may miss a market opportunity because we failed to invest, or invested too late, in a technology, product or enhancement sought by our customers. Changes in market demand or investment priorities may also cause us to discontinue existing or planned development for new products or features, which can have a disruptive effect on our relationships with customers. If we fail to make the right investments or fail to make them at the right time, our competitive position may suffer, and our revenue and profitability could be adversely affected.

Network equipment sales to communications service providers, Web-scale providers and other large customers often involve lengthy sales cycles and protracted contract negotiations that may require us to agree to commercial terms or conditions that negatively affect pricing, risk allocation, payment and the timing of revenue recognition.

Our sales initiatives, particularly with communications service providers, Web-scale providers and other large customers, often involve lengthy sales cycles. These selling efforts often involve a significant commitment of time and resources by us and our customers that may include extensive product testing, laboratory or network certification, network or region-specific product certification and homologation requirements for deployment in networks. Even after a customer awards its business to us or decides to purchase our solutions, the length of deployment time can vary depending upon the customer's schedule, site readiness, the size of the network deployment, the degree of custom configuration required and other factors. Additionally, these sales also often involve protracted and sometimes difficult contract negotiations in which we may deem it necessary to agree to unfavorable contractual or commercial terms that adversely affect pricing, expose us to penalties for delays or non-performance, and require us to assume a disproportionate amount of risk. To maintain incumbency with key customers for existing and future business opportunities, we may be required to offer discounted pricing, make commercial concessions or offer less favorable terms as compared to our historical business arrangements with these customers. We may also be requested to provide deferred payment terms, vendor or third-party financing or other alternative purchase structures that extend the timing of payment and revenue recognition. Alternatively, customers may insist upon terms and conditions that we deem too onerous or not in our best interest, and we may be unable to reach a commercial agreement. As a result, we may incur substantial expense and devote time and resources to potential sales opportunities that never materialize or result in lower than anticipated sales.

If the market for software solutions does not evolve in the way we anticipate or if customers do not adopt our Blue Planet solutions, we may not be able to realize a key part of our business strategy and the intended benefits of our acquisition of Cyan.

A key part of our business strategy and ability to derive the anticipated benefits of our acquisition of Cyan will depend on our ability to gain market adoption for our Blue Planet software platform. If the markets relating to software solutions, including SDN, NFV, service orchestration and software management and control, do not develop as we anticipate, or if we are unable to increase market awareness and adoption of our Blue Planet solutions as the preferred solution within those markets, demand for our Blue Planet solutions may not grow. As a result, the success of our Cyan acquisition and our long-term success in the software market will depend to a significant extent on potential customers recognizing the benefits of our next-generation Blue Planet software solutions, and the willingness of service providers and high-performance data center and other network operators to increase their use of SDN and NFV solutions in their networks. The market for these solutions is at an early stage, and it is difficult to predict important trends, including the potential growth, if any, of this market. If the market for these software solutions does not evolve in the way we anticipate or if customers do not adopt our solutions, we may not be able to increase sales of our Blue Planet platform, and our revenue and profitability would be adversely affected. If we are not able to successfully achieve these objectives, certain of the anticipated benefits of the merger may not be realized fully, or may take longer to realize than expected.

Changes in networking or procurement strategies among our customers could adversely affect our business, competitive position and results of operations.

Growing bandwidth demands, network operator efforts to reduce costs and requirements for enhanced network programmability and automation are causing network operators to consider a diverse range of approaches to the design and procurement of network infrastructure. We refer to these different approaches as "consumption models." These consumption models can include: the traditional systems procurement of fully integrated solutions including hardware, software and services from the same vendor; the procurement of a fully integrated hardware solution from one vendor with the separate use of a network operator's own SDN-based control; the procurement of an integrated photonic line system with open interfaces from one vendor and the separate or "disaggregated" procurement of modem technology from a different vendor; or the use of published reference designs and open source specifications for the procurement of off-the-shelf or commoditized hardware (often referred to as "white box" hardware) to be used with open source software. We believe that network operators will continue to consider a variety of different consumption models. Many of these approaches are in their very early stages of development and evaluation, and the types of models and their levels of adoption will depend in significant part on the nature of

the operator and its particular network and network applications. Among our customers, AT&T is pursuing network strategies that emphasize enhanced software programmability, management and control of networks, and deployment of “white box” hardware. Other network operator customers, including Web-scale providers, are playing a leading role in the transition to software-defined networking or the standardization of communications network solutions. The potential for different approaches to the procurement of networking infrastructure will require network operators and vendors to assess and possibly broaden their existing commercial models over time. Adoption of a range of consumption models may alter and broaden our competitive landscape to include other technology vendors, including component vendors and software vendors. If we are unable to offer attractive solutions that accommodate the range of consumption models ultimately adopted by our customers or within our markets, or if we are unable to modify or existing commercial model accordingly, our business, competitive position and results of operations could be adversely affected.

We may experience delays in the development and production of our products that may negatively affect our competitive position and business.

Our hardware and software networking solutions, including our Blue Planet software platform, are based on complex technology, and we can experience unanticipated delays in developing, manufacturing and introducing these solutions to market. Delays in product development efforts by us or our supply chain may affect our reputation with customers, affect our ability to seize market opportunities and impact the timing and level of demand for our products. The development of new technologies may increase the complexity of supply chain management or require the acquisition, licensing or interworking with the technology of third parties. As a result, each step in the development cycle of our products presents serious risks of failure, rework or delay, any one of which could adversely affect the cost-effectiveness and timely development of our products. We may encounter delays relating to engineering development activities and software, design, sourcing and manufacture of critical components, and the development of prototypes. In addition, intellectual property disputes, failure of critical design elements, and other execution risks may delay or even prevent the release of these products. If we do not successfully develop or produce products in a timely manner, our competitive position may suffer, and our business, financial condition and results of operations could be harmed.

Product performance problems and undetected errors affecting the performance, reliability or security of our products could damage our business reputation and negatively affect our results of operations.

The development and production of sophisticated hardware and software for communications network equipment is highly complex. Some of our products can be fully tested only when deployed in communications networks or when carrying traffic with other equipment, and software products may contain bugs that can interfere with expected performance. As a result, undetected defects or errors, and product quality, interoperability, reliability and performance problems are often more acute for initial deployments of new products and product enhancements. We have recently launched, and are in the process of launching, a number of new hardware and software platforms, including our Blue Planet software platform, and other solutions targeting metro network applications and data center interconnect. Unanticipated product performance problems can relate to the design, manufacturing, installation, operation and interoperability of our products. Undetected errors can also arise as a result of defects in components, software or manufacturing, installation or maintenance services supplied by third parties, and technology acquired from or licensed by third parties. From time to time we have had to replace certain components, provide software remedies or other remediation in response to defects or bugs, and we may have to do so again in the future. There can be no assurance that such remediation would not have a material impact on our business and results of operations. In addition, unanticipated security vulnerabilities relating to our products or the activities of our supply chain, including any actual or perceived exposure of our solutions to malicious software or cyber-attacks, could adversely affect our business and reputation. Product performance, reliability, security and quality problems can negatively affect our business, and may result in some or all of the following effects:

- damage to our reputation, declining sales and order cancellations;
- increased costs to remediate defects or replace products;
- payment of liquidated damages, contractual or similar penalties, or other claims for performance failures or delays;
- increased warranty expense or estimates resulting from higher failure rates, additional field service obligations or other rework costs related to defects;
- increased inventory obsolescence;
- costs and claims that may not be covered by liability insurance coverage or recoverable from third parties; and
- delays in recognizing revenue or collecting accounts receivable.

These and other consequences relating to undetected errors affecting the quality, reliability and security of our products could negatively affect our business and results of operations.

Direct or indirect efforts to increase our sales and market share in targeted international markets and customer segments may be unsuccessful.

Part of our business and growth strategy is to expand our geographic reach and increase market share in international markets. The diversification of our business and customer base, to include additional service provider customers in Asia-Pacific and India, has been a significant component of our growth. Our efforts to continue to increase our sales and market share in international markets may ultimately be unsuccessful, and failure to do so could limit our growth and could harm our results of operations.

In addition, in order to sell our products into new geographic markets, diversify our customer base and broaden the application for our solutions in communications networks, we continue to promote sales initiatives and foster strategic channel sales relationships. Specifically, we are targeting sales opportunities around the world with Web-scale providers, cloud infrastructure providers, communications service providers, enterprises, wireless operators, cable and multiservice operators, submarine network operators, research and education institutions, and federal, state and local governments. To succeed in some of these geographic markets and customer segments, we often need to leverage strategic sales channels and distribution arrangements, and we expect these relationships to be an important part of our business. There can be no assurance we will realize the expected benefits of these third party sales relationships. We compete in certain business areas with our third party channel partners or may have divergent interests. Our efforts to manage and drive the intended benefits of such sales relationships may ultimately be unsuccessful, and difficulties selling through third party channels could limit our growth and could harm our results of operations.

The international scale of our sales and operations exposes us to additional risk and expense that could adversely affect our results of operations.

We market, sell and service our products globally, maintain personnel in numerous countries, and rely upon a global supply chain for sourcing important components and manufacturing our products. Our international sales and operations are subject to inherent risks, including:

- the impact of economic conditions in countries outside the United States;
- effects of adverse changes in currency exchange rates;
- greater difficulty in collecting accounts receivable and longer collection periods;
- difficulty and cost of staffing and managing foreign operations;
- less protection for intellectual property rights in some countries;
- adverse tax and customs consequences, particularly as related to transfer-pricing issues;
- social, political and economic instability;
- compliance with certain testing, homologation or customization of products to conform to local standards;
- higher incidence of corruption or unethical business practices that could expose us to liability or damage our reputation;
- significant changes to free trade agreements, trade protection measures, tariffs, export compliance, domestic preference procurement requirements, qualification to transact business and additional regulatory requirements; and
- natural disasters, epidemics and acts of war or terrorism.

Our international operations are also subject to complex foreign and U.S. laws and regulations, including anti-corruption laws, antitrust or competition laws, environmental regulations, and data privacy laws, among others. Violations of these laws and regulations could result in fines and penalties, criminal sanctions against us or our employees, prohibitions on the conduct of our business and on our ability to offer our products and services in certain geographies, and significant harm to our business reputation. There can be no assurance that any individual employee, contractor, agent or other business partner will not violate these legal requirements or our policies to mitigate these risks. Additionally, the costs of complying with these laws (including the costs of investigations, auditing and monitoring) could also adversely affect our current or future business.

The success of our international sales and operations will depend, in large part, on our ability to anticipate and manage effectively these risks. Our failure to manage any of these risks could harm our international operations, reduce our international sales, and could give rise to liabilities, costs or other business difficulties that could adversely affect our operations and financial results.

We may be required to write off significant amounts of inventory as a result of our inventory purchase practices, the obsolescence of product lines or unfavorable market conditions.

To avoid delays and meet customer demand for shorter delivery terms, we place orders with our contract manufacturers and component suppliers based on forecasts of customer demand. In a number of cases these suppliers may require longer lead times for fulfillment than we have with our customers. Thus, our practice of buying inventory based on forecasted demand exposes us

to the risk that our customers ultimately may not order the products we have forecast or will purchase fewer products than forecast. As a result, we may purchase inventory in anticipation of sales that ultimately do not occur. Market uncertainty can also limit our visibility into customer spending plans and compound the difficulty of forecasting inventory at appropriate levels. Moreover, our customer purchase agreements generally do not include any minimum purchase commitment. Also, customers often have the right to modify, reduce or cancel purchase quantities, and spending levels can be uncertain and subject to significant fluctuation. Our products are highly configurable, and certain new products have overlapping feature sets or application as existing products. Accordingly, it is increasingly possible that customers may forgo purchases of certain products we have inventoried in favor of a similar product. We may also be exposed to the risk of inventory write-offs as a result of certain supply chain initiatives, including consolidation and transfer of key manufacturing activities. If we are required to write off or write down a significant amount of inventory, our results of operations for the applicable period would be materially adversely affected.

Our intellectual property rights may be difficult and costly to enforce.

We generally rely on a combination of patents, copyrights, trademarks and trade secret laws to establish and maintain proprietary rights in our products and technology. Although we have been issued numerous patents and other patent applications are currently pending, there can be no assurance that any of these patents or other proprietary rights will not be challenged, invalidated or circumvented, or that our rights will provide us with any competitive advantage. In addition, there can be no assurance that patents will be issued from pending applications or that claims allowed on any patents will be sufficiently broad to protect our technology. Further, the laws of some foreign countries may not protect our proprietary rights to the same extent as do the laws of the United States.

We are subject to the risk that third parties may attempt to access, divert or use our intellectual property without authorization. Protecting against the unauthorized use of our products, technology and other proprietary rights is difficult, time-consuming and expensive, and we cannot be certain that the steps that we are taking will prevent or minimize the risks of such unauthorized use. In addition, our intellectual property strategy must continually evolve to protect our proprietary rights in new solutions, including our software solutions. Litigation may be necessary to enforce or defend our intellectual property rights or to determine the validity or scope of the proprietary rights of others. Such litigation could result in substantial cost and diversion of management time and resources, and there can be no assurance that we will obtain a successful result. Any inability to protect and enforce our intellectual property rights could harm our ability to compete effectively.

We may incur significant costs in response to claims by others that we infringe their intellectual property rights.

From time to time third parties may assert claims or initiate litigation or other proceedings related to patent, copyright, trademark and other intellectual property rights to technologies and related standards that are relevant to our business. The rate of infringement assertions by patent assertion entities is increasing, particularly in the United States. Generally, these patent owners neither manufacture nor use the patented invention directly, and they seek solely to derive value from their ownership through royalties from patent licensing programs.

We could be adversely affected by litigation, other proceedings or claims against us, as well as claims against our manufacturers, suppliers or customers, alleging infringement of third party proprietary rights by our products and technology, or components thereof. Regardless of the merit of these claims, they can be time-consuming, divert the time and attention of our technical and management personnel, and result in costly litigation. These claims, if successful, could require us to:

- pay substantial damages or royalties;
- comply with an injunction or other court order that could prevent us from offering certain of our products;
- seek a license for the use of certain intellectual property, which may not be available on commercially reasonable terms or at all;
- develop non-infringing technology, which could require significant effort and expense and ultimately may not be successful; and
- indemnify our customers or other third parties pursuant to contractual obligations to hold them harmless or pay expenses or damages on their behalf.

Any of these events could adversely affect our business, results of operations and financial condition. Our exposure to risks associated with the use of intellectual property may increase as a result of acquisitions, as we have a lower level of visibility into the development process with respect to such technology and the steps taken to safeguard against the risks of infringing the rights of third parties.

Our products incorporate software and other technology under license from third parties, and our business would be adversely affected if this technology were no longer available to us on commercially reasonable terms.

We integrate third party software and other technology into our operating system, network management and control platforms and other products. As network operators adopt software management and control and virtualized network functions, we believe that we will be increasingly required to work with third party technology providers. As a result, we may be required to license certain software or technology from third parties, including competitors. Licenses for software or other technology may not be available or may not continue to be available to us on commercially reasonable terms. Third party licensors may insist on unreasonable financial or other terms in connection with our use of such technology. Our failure to comply with the terms of any license may result in our inability to continue to use such license, which may result in significant costs, harm our market opportunities and require us to obtain or develop a substitute technology.

Our solutions, including our Blue Planet software platform, utilize elements of open source or publicly available software. As network operators seek to enhance programmability of networks, we expect that we and other communications networking solutions vendors will increasingly contribute to and use technology or open source software developed by standards settings bodies or other industry forums that seek to promote the integration of network layers and functions. The terms of such licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to commercialize our products. This increases our risks associated with our use of such software and may require us to seek licenses from third parties, to re-engineer our products or to discontinue the sale of such solutions. Difficulty obtaining and maintaining technology licenses with third parties may disrupt development of our products, increase our costs and adversely affect our business.

We rely upon third party contract manufacturers and our business and results of operations may be adversely affected by risks associated with their businesses, financial condition and the geographies in which they operate.

We rely upon third party contract manufacturers with facilities in Canada, Mexico, Thailand and the United States to perform substantially all of the manufacturing of our products. There are a number of risks associated with our dependence on contract manufacturers, including:

- reduced control over delivery schedules and planning;
- reliance on the quality assurance procedures of third parties;
- potential uncertainty regarding manufacturing yields and costs;
- availability of manufacturing capability and capacity, particularly during periods of high demand;
- risks and uncertainties associated with the locations or countries where our products are manufactured, including potential manufacturing disruptions caused by social, geopolitical or environmental factors;
- changes in U.S. law or policy governing foreign trade, manufacturing, development and investment in the countries where we currently manufacture our products, including the World Trade Organization Information Technology Agreement or other free trade agreements;
- limited warranties provided to us; and
- potential misappropriation of our intellectual property.

These and other risks could impair our ability to fulfill orders, harm our sales and impact our reputation with customers. If our contract manufacturers are unable or unwilling to continue manufacturing our products or components of our products, or if our contract manufacturers discontinue operations, we would be required to identify and qualify alternative manufacturers, which could cause us to be unable to meet our supply requirements to our customers and result in the breach of our customer agreements. The process of qualifying a new contract manufacturer and commencing volume production is expensive and time-consuming, and if we are required to change or qualify a new contract manufacturer, we would likely lose sales revenue and damage our existing customer relationships.

Data security breaches and cyber-attacks could compromise our intellectual property or other sensitive information and cause significant damage to our business and reputation.

In the ordinary course of our business, we maintain on our network systems, and the networks of third party providers, certain information that is confidential, proprietary or otherwise sensitive in nature. This information includes intellectual property, financial information and confidential business information relating to us and our customers, suppliers and other business partners. We also produce networking equipment solutions and software used by network operators to ensure security and reliability in their management and transmission of data. Our customers, particularly those in regulated industries, are increasingly focused on the security features of our technology solutions, and maintaining the security of information sensitive to us and our business partners is critical to our business and reputation. Companies in the technology industry have been increasingly subject to a wide variety of security incidents, cyber-attacks and other attempts to gain unauthorized access to networks or sensitive information. Our network systems and storage applications, and those systems and storage applications maintained by our third party providers, may be subject to unauthorized access by hackers or breached due to operator error, malfeasance or other system disruptions. The network solutions we sell to end customers may be exposed to similar risks. In

some cases, it is difficult to anticipate or to detect immediately such incidents and the damage caused thereby. If an actual or perceived breach of network security occurs in our network or in the network of a business partner, the market perception of our products could be harmed. While we continually work to safeguard our products and internal network systems to mitigate these potential risks, there is no assurance that such actions will be sufficient to prevent cyber-attacks or security breaches. Security incidents involving access or improper use of our systems, networks or products could compromise confidential or otherwise protected information, destroy or corrupt data, or otherwise disrupt our operations. These security events could also negatively impact our reputation and our competitive position and could result in litigation with third parties, regulatory action, loss of business, potential liability and increased remediation costs, any of which could have a material adverse effect on our financial condition and results of operations.

Our failure to manage our relationships with third party service partners effectively could adversely impact our financial results and relationship with customers.

We rely on a number of third party service partners, both domestic and international, to complement our global service and support resources. We rely upon these partners for certain installation, maintenance and support functions. In addition, as network operators increasingly seek to rely on vendors to perform additional services relating to the design, construction and operation of their networks, the scope of work performed by our support partners is likely to increase and may include areas where we have less experience providing or managing such services. We must successfully identify, assess, train and certify qualified service partners in order to ensure the proper installation, deployment and maintenance of our products, as well as to ensure the skillful performance of other services associated with expanded solutions offerings, including site assessment and construction-related services. Vetting and certification of these partners can be costly and time-consuming, and certain partners may not have the same operational history, financial resources and scale as us. Moreover, certain service partners may provide similar services for other companies, including our competitors. We may not be able to manage our relationships with our service partners effectively, and we cannot be certain that they will be able to deliver services in the manner or time required or that we will be able to maintain the continuity of their services. We may also be exposed to a number of risks or challenges relating to the performance of our service partners, including:

- delays in recognizing revenue;
- liability for injuries to persons, damage to property or other claims relating to the actions or omissions of our service partners;
- our services revenue and gross margin may be adversely affected; and
- our relationships with customers could suffer.

As our service offering expands and customers look to identify vendors capable of managing, integrating and optimizing multi-domain, multi-vendor networks with unified software, our relationships with third party service partners will become increasingly important. If we do not manage effectively our relationships with third party service partners, or if they fail to perform these services in the manner or time required, our financial results and relationships with customers could be adversely affected.

We may be adversely affected by fluctuations in currency exchange rates.

As a company with global operations, we face exposure to adverse movements in foreign currency exchange rates. For example, the announcement of Brexit and the outcome of the U.S. presidential election each have caused, and may continue to cause, significant volatility in currency exchange rate fluctuations. Due to our global presence, a significant percentage of our revenue, operating expense and assets and liabilities are non-U.S. Dollar denominated and therefore subject to foreign currency fluctuation. We face exposure to currency exchange rates as a result of the growth in our non-U.S. Dollar denominated operating expense in Canada, Europe, Asia and Latin America. An increase in the value of the U.S. Dollar could increase the real cost to our customers of our products in those markets outside the United States where we sell in dollars, and a weakened dollar could increase the cost of local operating expenses and procurement of materials or service that we purchase in foreign currencies. From time to time, we may hedge against currency exposure associated with anticipated foreign currency cash flows or assets and liabilities denominated in foreign currency. Such attempts to offset the impact of currency fluctuations are costly, and no amount of hedging can be effective against all circumstances. Losses associated with these hedging instruments and the adverse effect of foreign currency exchange rate fluctuation may negatively affect our results of operations.

We may be exposed to unanticipated risks and additional obligations in connection with our resale of complementary products or technology of other companies.

We have entered into agreements with strategic supply partners that permit us to distribute their products or technology. We may rely upon these relationships to add complementary products or technologies, diversify our product portfolio, or address a

particular customer or geographic market. We may enter into additional original equipment manufacturer (OEM), resale or similar strategic arrangements in the future. We may incur unanticipated costs or difficulties relating to our resale of third party products. Our third party relationships could expose us to risks associated with the business, financial condition, intellectual property rights and supply chain continuity of such partners, as well as delays in their development, manufacturing or delivery of products or technology. We may also be required by customers to assume warranty, indemnity, service and other commercial obligations, including potential liability to customers, greater than the commitments, if any, made to us by our technology partners. Some of our strategic supply partners are relatively small companies with limited financial resources. If they are unable to satisfy their obligations to us or our customers, we may have to expend our own resources to satisfy these obligations. Exposure to these risks could harm our reputation with key customers and could negatively affect our business and our results of operations.

Our exposure to the credit risks of our customers and resellers may make it difficult to collect receivables and could adversely affect our revenue and operating results.

In the course of our sales to customers and resale channel partners, we may have difficulty collecting receivables, and our business and results of operations could be exposed to risks associated with uncollectible accounts. Lack of liquidity in the capital markets, macroeconomic weakness and market volatility may increase our exposure to these credit risks. Our attempts to monitor customer payment capability and to take appropriate measures to protect ourselves may not be sufficient, and it is possible that we may have to write down or write off accounts receivable. Such write-downs or write-offs could negatively affect our operating results for the period in which they occur, and, if large, could have a material adverse effect on our revenue and operating results.

Our business is dependent upon the proper functioning of our internal business processes and information systems, and modification or interruption of such systems or external factors may disrupt our business, processes and internal controls.

We rely upon a number of internal business processes and information systems to support key business functions, and the efficient operation of these processes and systems is critical to managing our business. Our business processes and information systems must be sufficiently scalable to support the growth of our business and may require modifications or upgrades that expose us to a number of operational risks. During the first quarter of fiscal 2017, we undertook a significant upgrade of our company-wide enterprise resource planning platform that will impact multiple locations, functions and processes. We are also currently pursuing initiatives to transform and optimize our business operations through the reengineering of certain other processes, investment in automation, and engagement of strategic partners or resources to assist with certain business functions. These changes require a significant investment of capital and human resources and may be costly and disruptive to our operations, and they could impose substantial demands on management time. These changes may also require changes in our information systems, modification of internal control procedures and significant training of employees or third party resources. There can be no assurance that our business and operations will not experience disruption in connection with our current system upgrade or other initiatives. Even if we do not encounter these adverse effects or disruption in our business, the design and implementation of these new systems may be more costly than anticipated.

Our information technology systems, and those of third party information technology providers or business partners, may also be vulnerable to damage or disruption caused by circumstances beyond our control, including catastrophic events, power anomalies or outages, natural disasters, viruses or malware, and computer system or network failures. We may also be exposed to cyber-security related incidents, including unauthorized access of information systems and disclosure or diversion of intellectual property or confidential data. There can be no assurance that our business systems or those of our third party business partners would not be subject to similar incidents, exposing us to significant cost, reputational harm and disruption or damage to our business.

Outstanding indebtedness under our convertible notes and senior secured credit facilities may adversely affect our liquidity and results of operations and could limit our business.

As of the date of this report, we had approximately \$752.4 million in indebtedness repayable at maturity under our outstanding convertible notes. In the event that some or all of these notes are converted into common stock, the ownership interests of our existing stockholders will be diluted, and any sales of such shares in the public market following conversion may adversely affect the market price for our common stock. We are also a party to credit agreements relating to a \$250 million senior secured asset-based revolving credit facility and outstanding senior secured term loans with approximately \$493.1 million repayable at maturity. The agreements governing these credit facilities contain certain covenants that limit our ability, among other things, to incur additional debt, create liens and encumbrances, pay cash dividends, redeem or repurchase stock, enter into certain acquisition transactions or transactions with affiliates, repay certain indebtedness, make investments or dispose of

assets. The agreements also include customary remedies, including the right of the lenders to take action with respect to the collateral securing the loans, that would apply should we default or otherwise be unable to satisfy our debt obligations.

Our indebtedness could have important negative consequences, including:

- increasing our vulnerability to adverse economic and industry conditions;
- limiting our ability to obtain additional financing, particularly in unfavorable capital and credit market conditions;
- debt service and repayment obligations that may adversely impact our results of operations and reduce the availability of cash resources for other business purposes;
- limiting our flexibility in planning for, or reacting to, changes in our business and the markets; and
- placing us at a possible competitive disadvantage to competitors that have better access to capital resources.

We may also enter into additional transactions or credit facilities, including equipment loans, working capital lines of credit and other long-term debt, which may increase our indebtedness and result in additional restrictions upon our business. In addition, major debt rating agencies regularly evaluate our debt based on a number of factors. There can be no assurance that we will be able to maintain our existing debt ratings, and failure to do so could adversely affect our cost of funds, liquidity and access to capital markets.

Significant volatility and uncertainty in the capital markets may limit our access to funding on favorable terms or at all.

The operation of our business requires significant capital. We have accessed the capital markets in the past and have successfully raised funds, including through the issuance of equity, convertible notes and other indebtedness, to increase our cash position, support our operations and undertake strategic growth initiatives. We regularly evaluate our liquidity position, debt obligations, and anticipated cash needs to fund our long-term operating plans, and we may consider it necessary or advisable to raise additional capital or incur additional indebtedness in the future. If we raise additional funds through further issuance of equity or securities convertible into equity, or undertake certain transactions intended to address our existing indebtedness, our existing stockholders could suffer dilution in their percentage ownership of our company or our leverage and outstanding indebtedness could increase. Global capital markets have undergone periods of significant volatility and uncertainty in recent years, and there can be no assurance that such financing alternatives would be available to us on favorable terms or at all, should we determine it necessary or advisable to seek additional cash resources.

Facilities transitions could be disruptive to our operations and may result in unanticipated expense and adverse effects to our cash position and cash flows.

We have recently undertaken and expect to undertake in the future the transition of two of our significant research and development facilities, which will affect a large number of our employees. The lease for our Lab 10 building on the Carling Campus in Ottawa, Canada will expire in fiscal 2018, and the leases for our facilities in Gurgaon, India will expire in fiscal 2018 and fiscal 2019. The Ottawa and Gurgaon facilities represent our two largest research and development sites, and they house both significant headcount including key engineering personnel and a large amount of sophisticated lab equipment. In Ottawa, we are in the process of developing a new research and development campus, and we will be transitioning our existing operations and personnel to the new campus during 2017 in anticipation of the expiration of the Lab 10 lease. In Gurgaon, we recently entered into a lease for a new building adjacent to one of our existing facilities, and we will be transitioning certain of our existing operations and personnel to the new building during 2017 and 2018. Relocating our engineering operations may be costly, and there can be no assurance that the transition of key engineering functions to a successor facility will not be disruptive or adversely affect productivity. Significant facilities transitions could be disruptive to our operations and may result in additional or unanticipated expense and adverse effects on our cash position and cash flows.

The potential effects of the referendum on the UK's membership in the European Union remain uncertain.

On June 23, 2016, the United Kingdom (UK) held a referendum in which voters approved an exit from the European Union (EU), commonly referred to as "Brexit." The referendum was advisory, and the terms of any withdrawal are subject to a negotiation period that could last at least two years after the government of the UK formally initiates a withdrawal process. This will be either accompanied or followed by additional negotiations between the EU and the UK concerning the future relations between the parties. Nevertheless, the referendum has created significant uncertainty about the future relationship between the UK and the EU. It is possible that the level of economic activity in this region will be adversely impacted and that there will be increased regulatory and legal complexities, including those relating to tax, trade, security, and employees. Such changes could be costly and potentially disruptive to our operations and business relationships in these markets. In addition, Brexit could lead to economic uncertainty, including significant volatility in global stock markets and currency exchange rates, that may adversely impact our business. While we have adopted certain financial measures to reduce the risks of doing business internationally, we

cannot ensure that such measures will be adequate to allow us to operate without disruption or adverse impact to our business and financial results in the affected regions.

Restructuring activities could disrupt our business and affect our results of operations.

We have previously taken steps, including reductions in force, office closures, and internal reorganizations to reduce the size and cost of our operations, improve efficiencies, or realign our organization and staffing to better match our market opportunities and our technology development initiatives. We may take similar steps in the future as we seek to realize operating synergies, optimize our operations to achieve our target operating model and profitability objectives, or better reflect changes in the strategic direction of our business. These changes could be disruptive to our business, including our research and development efforts, and could result in significant expense, including accounting charges for inventory and technology-related write-offs, workforce reduction costs and charges relating to consolidation of excess facilities. Substantial expense or charges resulting from restructuring activities could adversely affect our results of operations and use of cash in those periods in which we undertake such actions.

If we are unable to attract and retain qualified personnel, we may be unable to manage our business effectively.

Competition to attract and retain highly skilled technical, engineering and other personnel with experience in our industry is intense, and our employees have been the subject of targeted hiring by our competitors. Competition is particularly intense in certain jurisdictions where we have research and development centers, including the Silicon Valley area of northern California, and we may experience difficulty retaining and motivating existing employees and attracting qualified personnel to fill key positions. Because we rely upon equity awards as a significant component of compensation, particularly for our executive team, a lack of positive performance in our stock price, reduced grant levels, or changes to our compensation program may adversely affect our ability to attract and retain key employees. In addition, none of our executive officers is bound by an employment agreement for any specific term. The loss of members of our management team or other key personnel could be disruptive to our business, and, were it necessary, it could be difficult to replace members of our management team or other key personnel. If we are unable to attract and retain qualified personnel, we may be unable to manage our business effectively, and our operations and financial results could suffer.

Strategic acquisitions and investments could disrupt our operations and may expose us to increased costs and unexpected liabilities.

We may acquire or make investments in other technology companies, or enter into other strategic relationships, to expand the markets we address, diversify our customer base or acquire, or accelerate the development of, technology or products. To do so, we may use cash, issue equity that could dilute our current stockholders, or incur debt or assume indebtedness. Strategic transactions, including our acquisition of Cyan in fiscal 2015 and our acquisition of the high-speed photonics components (“HSPC”) assets from TeraXion in fiscal 2016, can involve numerous additional risks, including:

- failure to achieve the anticipated transaction benefits or the projected financial results and operational synergies;
- greater than expected acquisition and integration costs;
- disruption due to the integration and rationalization of operations, products, technologies and personnel;
- diversion of management attention;
- difficulty completing projects of the acquired company and costs related to in-process projects;
- difficulty managing customer transitions or entering into new markets;
- the loss of key employees;
- disruption on termination of business relationships with customers, suppliers, vendors, landlords, licensors and other business partners;
- ineffective internal controls over financial reporting;
- dependence on unfamiliar suppliers or manufacturers;
- assumption of or exposure to unanticipated liabilities, including intellectual property infringement or other legal claims; and
- adverse tax or accounting impact.

As a result of these and other risks, our acquisitions, investments or strategic transactions may not realize the intended benefits and may ultimately have a negative impact on our business, results of operation and financial condition.

Adverse resolution of litigation may harm our operating results or financial condition.

We are a party to claims and litigation in the normal course of our business. Such litigation can be expensive, lengthy, and disruptive to normal business operations. Moreover, the results of complex legal proceedings are difficult to predict and may harm our operating results or financial condition. For additional information regarding certain of the legal proceedings in which we are involved, see Item 3, “Legal Proceedings,” contained in Part I of this annual report.

Changes in government regulation affecting the communications industry and the businesses of our customers could harm our prospects and operating results.

The Federal Communications Commission, or FCC, has jurisdiction over the U.S. communications industry, and similar agencies have jurisdiction over the communication industries in other countries. Many of our largest customers, including service providers and multiservice network operators, are subject to the rules and regulations of these agencies. During 2015, the FCC approved rules that would regulate internet service providers as telecommunications service carriers under Title II of the Telecommunications Act. The impact of these rules is uncertain, and multiple court challenges to these rules are pending in the D.C. Circuit. These and similar changes in regulatory requirements covering access to, management of, or carriage of traffic on the internet in the United States and internationally could serve as a disincentive to certain wireline or wireless network operators, including certain of our customers, to invest in their network infrastructures or introduce new services. Such changes could adversely affect the sale of our products and services. Similarly, changes in regulatory tariff requirements or other regulations relating to pricing or terms of carriage on communications networks could slow the development or expansion of network infrastructures and adversely affect our business, operating results, and financial condition.

Government regulations affecting the use, import or export of products could adversely affect our operations, negatively affect our revenue and increase our costs.

The United States and various foreign governments have imposed controls, license requirements and other restrictions on the usage, import or export of some of the technologies that we sell. Government regulation of usage, import or export of our products, or our technology within our products, or our failure to obtain required approvals for our products, could harm our international and domestic sales and adversely affect our revenue and costs of sales. Failure to comply with such regulations could result in enforcement actions, fines, penalties or restrictions on export privileges. In addition, costly tariffs on our equipment, restrictions on importation, trade protection measures and domestic preference requirements of certain countries could limit our access to these markets and harm our sales. These regulations could adversely affect the sale or use of our products, substantially increase our cost of sales and adversely affect our business and revenue.

Government regulations related to the environment, potential climate change and other social initiatives could adversely affect our business and operating results.

Our operations are regulated under various federal, state, local and international laws relating to the environment and potential climate change. If we were to violate or become liable under these laws or regulations, we could incur fines, costs related to damage to property or personal injury, and costs related to investigation or remediation activities. Our product design efforts and the manufacturing of our products are also subject to evolving requirements relating to the presence of certain materials or substances in our equipment, including regulations that make producers for such products financially responsible for the collection, treatment and recycling of certain products. For example, our operations and financial results may be negatively affected by environmental regulations, such as the Waste Electrical and Electronic Equipment (WEEE) and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) that have been adopted by the European Union. Compliance with these and similar environmental regulations may increase our cost of designing, manufacturing, selling and removing our products. The SEC has adopted disclosure requirements regarding the use of “conflict minerals” mined from the Democratic Republic of Congo and adjoining countries (“DRC”) and procedures regarding a manufacturer’s efforts to prevent the sourcing of such minerals from the DRC. Certain of these minerals are present in our products. SEC rules implementing these requirements may have the effect of reducing the pool of suppliers who can supply DRC “conflict free” components and parts, and we may not be able to obtain conflict free products or supplies in sufficient quantities for our operations. Because our supply chain is complex, we may face reputational challenges with our customers, stockholders and other stakeholders if we are unable to verify sufficiently the origins for the “conflict minerals” used in our products and cannot assert that our products are “conflict free.” Environmental or similar social initiatives may also make it difficult to obtain supply of compliant components or may require us to write off non-compliant inventory, which could have an adverse effect on our business and operating results.

We may be required to write down goodwill or long-lived assets, and these impairment charges would adversely affect our operating results.

As of October 31, 2016, our balance sheet includes \$267.0 million of goodwill. This amount represents the remaining excess of the total purchase price of our acquisitions of Cyan and the HSPC assets from TeraXion over the fair value of the net assets acquired. We test each reporting unit for impairment of goodwill on an annual basis, and between annual tests if an event occurs or circumstances change that would, more likely than not, reduce the fair value of the reporting unit below its carrying value. As of October 31, 2016, our balance sheet also includes \$484.7 million in long-lived assets, which includes \$146.7 million of intangible assets. Valuation of our long-lived assets requires us to make assumptions about future sales prices and sales volumes for our products. These assumptions are used to forecast future, undiscounted cash flows upon which our estimates are based. Periods of significant uncertainty or instability of macroeconomic conditions can make forecasting future business difficult. If actual market conditions differ or our forecasts change for our business or any particular operating segment, we may be required to reassess goodwill or long-lived assets and we could record an impairment charge. Any impairment charge relating to goodwill or long-lived assets would have the effect of decreasing our earnings or increasing our losses in such period. If we are required to take a substantial impairment charge, our operating results would be materially adversely affected in such period.

Failure to maintain effective internal controls over financial reporting could have a material adverse effect on our business, operating results and stock price.

Section 404 of the Sarbanes-Oxley Act of 2002 requires that we include in our annual report a report containing management's assessment of the effectiveness of our internal controls over financial reporting as of the end of our fiscal year and a statement as to whether or not such internal controls are effective. Compliance with these requirements has resulted in, and is likely to continue to result in, significant costs and the commitment of time and operational resources. Certain ongoing initiatives, including the upgrade of our company-wide enterprise resource planning platform during the first quarter of 2017, will necessitate modifications to our internal control systems, processes and related information systems. Similarly, other efforts to transform business processes, including our supply chain operations, or to transition certain functions to third party resources or providers, will require further changes to our control environment as we optimize our business and operations. Our expansion into new regions could pose further challenges to our internal control systems. We cannot be certain that our current design for internal control over financial reporting, or any additional changes to be made, will be sufficient to enable management to determine that our internal controls are effective for any period, or on an ongoing basis. If we are unable to assert that our internal controls over financial reporting are effective, market perception of our financial condition and the trading price of our stock may be adversely affected, and customer perception of our business may suffer.

Our stock price is volatile.

Our common stock price has experienced substantial volatility in the past and may remain volatile in the future. Volatility in our stock price can arise as a result of a number of the factors discussed in this "Risk Factors" section. During fiscal 2016, our closing stock price ranged from a high of \$25.30 per share to a low of \$15.73 per share. The stock market has experienced significant price and volume fluctuation that has affected the market price of many technology companies, with such volatility often unrelated to the operating performance of these companies. Divergence between our actual or anticipated financial results and published expectations of analysts, or the expectations of the market generally, can cause significant swings in our stock price. Our stock price can also be affected by market conditions in our industry as well as announcements that we, our competitors, vendors or our customers may make. These may include announcements of financial results or changes in estimated financial results, technological innovations, the gain or loss of customers or key opportunities. Our common stock is also included in certain market indices, and any change in the composition of these indices to exclude our company would adversely affect our stock price. These and other factors affecting macroeconomic conditions or financial markets may materially adversely affect the market price of our common stock in the future.

Item 1B. Unresolved Staff Comments

Not applicable.

Item 2. Properties

Overview . As of October 31, 2016 , all of our properties are leased, and we do not own any real property. We lease facilities globally related to the ongoing operations of our three business segments and related functions. Our principal executive offices are located in two buildings in Hanover, Maryland.

Our largest facility is our research and development center located at Lab 10 on the former Nortel Carling Campus in Ottawa, Canada. See below for information regarding the lease associated with this engineering facility and our planned future relocation from this facility. We also have engineering and/or service facilities located in San Jose, California; Petaluma, California; Alpharetta, Georgia; Spokane, Washington; Ottawa, Canada; Quebec, Canada and Gurgaon, India. In addition, we lease various smaller offices in the United States, Canada, Mexico, South America, Europe, the Middle East and the Asia-Pacific region to support our sales and services operations. We believe the facilities we are now using are adequate and suitable for our business requirements.

Hanover, Maryland Headquarters Lease . We entered into an agreement dated November 3, 2011, with W2007 RDG Realty, L.L.C. relating to a 15-year lease of office space for its corporate headquarters in Hanover, Maryland, consisting of an agreed-upon rentable area of approximately 154,100 square feet.

Ottawa Lease and Planned Relocation. Ciena Canada, Inc., a subsidiary of Ciena Corporation, and Public Works and Government Services Canada (PWGSC) are parties to a lease agreement relating to our lease of the Lab 10 building on the former Nortel Carling Campus in Ottawa, Canada. Our Lab 10 facility houses sophisticated research and development lab equipment and significant headcount including key engineering personnel. This facility consists of a rentable area of 265,000 square feet. This lease will terminate on December 31, 2017.

In contemplation of the termination of the Lab 10 lease, on October 23, 2014, Ciena Canada, Inc. entered into an agreement to lease the office building located at 5050 Innovation Drive, Ottawa, Canada, consisting of an agreed-upon rentable area of 170,582 square feet. In addition, on April 15, 2015, Ciena Canada, Inc. entered into a work letter and a lease agreement related to the construction and lease of two new office buildings in Ottawa, Canada, consisting of a rentable area of approximately 254,318 square feet, that will be built on the adjacent premises. We expect to occupy these buildings during 2017. These three facilities are expected to be part of a future campus that will replace the Lab 10 building. The October 2014 lease also provides us with a right of first offer to lease additional space in the building adjacent to the premises located at 4000 Innovation Drive, for so long as landlord owns the building and subject to any existing rights of the current tenant. The development of our new facilities and the transition of our operations in Ottawa will require significant effort, time and cost in advance of the expiration of the Lab 10 lease.

For additional information regarding our lease obligations, see Note 24 to the Consolidated Financial Statements in Item 8 of Part II of this annual report.

Item 3. Legal Proceedings

From May 15 through June 3, 2015, five separate putative class action lawsuits in connection with Ciena's then-pending acquisition of Cyan, Inc. ("Cyan") were filed in the Court of Chancery of the State of Delaware. On June 23, 2015, each of these lawsuits was consolidated into a single case captioned *In Re Cyan, Inc. Shareholder Litigation*, Consol. C.A. No. 11027-CB. On July 9, 2015, the plaintiffs filed a verified amended class action complaint, which named as defendants Ciena, a Ciena subsidiary created solely for the purpose of effecting the acquisition ("Merger Sub"), and the members of Cyan's board of directors. On August 5, 2015, the defendants filed motions to dismiss the amended complaint. On October 1, 2015, the plaintiffs filed a second amended complaint which named as defendants the members of Cyan's board of directors. Cyan, Ciena, and Merger Sub were not named as defendants. On July 15, 2016, the plaintiffs filed a third amended complaint, which generally alleges that the Cyan board members breached their fiduciary duties by engaging in a conflicted and unfair sales process, failing to maximize stockholder value in the acquisition, taking steps to preclude competitive bidding, and failing to disclose material information necessary for stockholders to make an informed decision regarding the acquisition. The third amended complaint seeks (i) a declaration that the plaintiffs are entitled to a quasi-appraisal remedy, (ii) rescissory damages, (iii) recovery through an accounting of all damages caused as a result of the alleged breaches of fiduciary duties, (iv) compensatory damages, and (v) costs including attorneys' fees and experts' fees. On August 5, 2016, the defendants filed a motion to dismiss the third amended complaint. We believe that the consolidated lawsuit is without merit and intend to defend it vigorously.

As a result of our acquisition of Cyan in August 2015, we became a defendant in a securities class action lawsuit. On April 1, 2014, a purported stockholder class action lawsuit was filed in the Superior Court of California, County of San Francisco, against Cyan, the members of Cyan's board of directors, Cyan's former Chief Financial Officer, and the underwriters of Cyan's initial public offering. On April 30, 2014, a substantially similar lawsuit was filed in the same court against the same defendants. The two cases have been consolidated as *Beaver County Employees Retirement Fund, et al. v. Cyan, Inc. et al.*, Case No. CGC-14-538355. The consolidated complaint alleges violations of federal securities laws on behalf of a purported class consisting of purchasers of Cyan's common stock pursuant or traceable to the registration statement and prospectus for Cyan's initial public offering in April 2013, and seeks unspecified compensatory damages and other relief. On May 19, 2015, the proposed class was certified. On August 25, 2015, the defendants filed a motion for judgment on the pleadings based on an alleged lack of subject matter jurisdiction over the case, which motion was denied on October 23, 2015. On May 24, 2016, the defendants filed a petition for a writ of certiorari on the jurisdiction issue with the United States Supreme Court, to which the plaintiffs filed a brief in opposition. On November 18, 2016, the parties each filed motions for summary judgment. We believe that the consolidated lawsuit is without merit and intend to defend it vigorously.

On May 29, 2008, Graywire, LLC filed a complaint in the United States District Court for the Northern District of Georgia against Ciena and four other defendants, alleging, among other things, that certain of the parties' products infringe U.S. Patent 6,542,673 (the "'673 Patent'"), relating to an identifier system and components for optical assemblies. The complaint seeks injunctive relief and damages. In July 2009, upon request of Ciena and certain other defendants, the U.S. Patent and Trademark Office ("PTO") granted the defendants' inter partes application for reexamination with respect to certain claims of the '673 Patent, and the district court granted the defendants' motion to stay the case pending reexamination of all of the patents-in-suit. In December 2010, the PTO confirmed the validity of some claims and rejected the validity of other claims of the '673 Patent, to which Ciena and other defendants filed an appeal. On March 16, 2012, the PTO on appeal rejected multiple claims of the '673 Patent, including the two claims on which Ciena is alleged to infringe. Subsequently, the plaintiff requested a reopening of the prosecution of the '673 Patent, which request was denied by the PTO on April 29, 2013. Thereafter, on May 28, 2013, the plaintiff filed an amendment with the PTO in which it canceled the claims of the '673 Patent on which Ciena is alleged to infringe. The case currently remains stayed, and there can be no assurance as to whether or when the stay will be lifted.

In addition to the matters described above, we are subject to various legal proceedings and claims arising in the ordinary course of business, including claims against third parties that may involve contractual indemnification obligations on the part of Ciena. We do not expect that the ultimate costs to resolve these matters will have a material effect on our results of operations, financial position or cash flows.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for Registrant’s Common Stock, Related Stockholder Matters and Issuer Purchases of Equity Securities

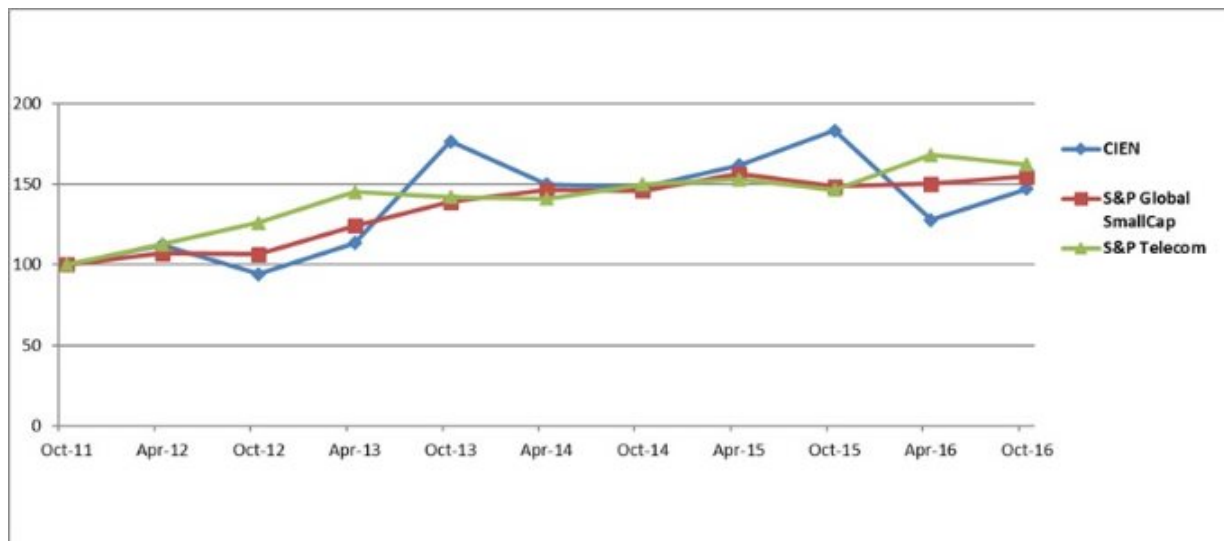
(a) Our common stock is traded on the New York Stock Exchange under the stock symbol “CIEN.”

The following table sets forth the high and low sales prices of our common stock, as reported on the New York Stock Exchange for the fiscal periods indicated.

| | High | Low |
|---------------------------------|----------|----------|
| Fiscal Year 2015 | | |
| First Quarter ended January 31 | \$ 20.32 | \$ 14.69 |
| Second Quarter ended April 30 | \$ 22.50 | \$ 17.86 |
| Third Quarter ended July 31 | \$ 26.50 | \$ 20.67 |
| Fourth Quarter ended October 31 | \$ 25.49 | \$ 17.97 |
| Fiscal Year 2016 | | |
| First Quarter ended January 31 | \$ 25.46 | \$ 16.63 |
| Second Quarter ended April 30 | \$ 21.14 | \$ 16.32 |
| Third Quarter ended July 31 | \$ 21.87 | \$ 15.62 |
| Fourth Quarter ended October 31 | \$ 23.60 | \$ 18.72 |

As of December 16, 2016, there were approximately 753 holders of record of our common stock and 140,379,744 shares of common stock outstanding. We have never paid cash dividends on our capital stock. We currently intend to retain earnings for use in our business, and we do not anticipate paying any cash dividends in the foreseeable future.

The following graph shows a comparison of cumulative total returns for an investment in our common stock, the S&P Telecom Select Index and the S&P Global SmallCap Index from October 31, 2011 to October 31, 2016. The S&P Telecom Select Industry Index comprises stocks in the S&P Total Market Index that are classified in the Global Industry Classification Standard as alternative carriers, communications equipment, integrated telecom services, and wireless telecom services sub-industries. The S&P Global SmallCap Index comprises the stocks representing the lowest 15% of float-adjusted market cap in each developed and emerging country. This graph is not deemed to be “filed” with the SEC or subject to the liabilities of Section 18 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), and the graph shall not be deemed to be incorporated by reference into any prior or subsequent filing by us under the Securities Act of 1933, as amended, or the Exchange Act.



Assumes \$100 invested in Ciena Corporation, the S&P Telecom Select Index and the S&P Global SmallCap Index, respectively, on October 31, 2011 with all dividends reinvested at month-end.

(b) Not applicable.

(c) Not applicable.

Item 6. Selected Consolidated Financial Data

The following selected consolidated financial data should be read in conjunction with Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the Consolidated Financial Statements and the notes thereto included in Item 8, “Financial Statements and Supplementary Data” in Part II of this annual report. We have a 52 or 53-week fiscal year, which ends on the Saturday nearest to the last day of October in each year. For purposes of financial statement presentation, each fiscal year is described as having ended on October 31. Fiscal 2016, 2015, 2014 and 2013 consisted of 52 weeks, and fiscal 2012 consisted of 53 weeks.

| | Year Ended October 31, (in thousands) | | | | |
|--------------------------------|--|--------------|--------------|--------------|--------------|
| | 2016 | 2015 | 2014 | 2013 | 2012 |
| Cash and cash equivalents | \$ 777,615 | \$ 790,971 | \$ 586,720 | \$ 346,487 | \$ 642,444 |
| Short-term investments | \$ 275,248 | \$ 135,107 | \$ 140,205 | \$ 124,979 | \$ 50,057 |
| Long-term investments | \$ 90,172 | \$ 95,105 | \$ 50,057 | \$ 15,031 | \$ — |
| Total assets | \$ 2,882,442 | \$ 2,695,051 | \$ 2,072,632 | \$ 1,802,770 | \$ 1,881,143 |
| Short-term debt | \$ 236,558 | \$ 2,500 | \$ 190,063 | \$ — | \$ 216,210 |
| Long-term debt | \$ 1,025,991 | \$ 1,271,639 | \$ 1,274,791 | \$ 1,212,019 | \$ 1,225,806 |
| Total liabilities | \$ 2,116,101 | \$ 2,074,175 | \$ 2,142,247 | \$ 1,885,447 | \$ 1,970,115 |
| Stockholders’ equity (deficit) | \$ 766,341 | \$ 620,876 | \$ (69,615) | \$ (82,677) | \$ (88,972) |

Statement of Operations Data:

| | Year Ended October 31, (in thousands, except per share data) | | | | |
|--|---|--------------|--------------|--------------|--------------|
| | 2016 | 2015 | 2014 | 2013 | 2012 |
| Revenue | \$ 2,600,573 | \$ 2,445,669 | \$ 2,288,289 | \$ 2,082,546 | \$ 1,833,923 |
| Cost of goods sold | 1,438,997 | 1,370,106 | 1,339,937 | 1,217,371 | 1,109,699 |
| Gross profit | 1,161,576 | 1,075,563 | 948,352 | 865,175 | 724,224 |
| Operating expenses: | | | | | |
| Research and development | 451,794 | 414,201 | 401,180 | 383,408 | 364,179 |
| Selling and marketing | 349,731 | 333,836 | 328,325 | 304,170 | 266,338 |
| General and administrative | 132,828 | 123,402 | 126,824 | 122,432 | 114,002 |
| Amortization of intangible assets | 61,508 | 69,511 | 45,970 | 49,771 | 51,697 |
| Acquisition and integration costs | 4,613 | 25,539 | — | — | — |
| Restructuring costs | 4,933 | 8,626 | 349 | 7,169 | 7,854 |
| Total operating expenses | 1,005,407 | 975,115 | 902,648 | 866,950 | 804,070 |
| Income (loss) from operations | 156,169 | 100,448 | 45,704 | (1,775) | (79,846) |
| Interest and other income (loss), net | (12,795) | (25,505) | (25,262) | (5,744) | (15,200) |
| Interest expense | (56,656) | (51,179) | (47,115) | (44,042) | (39,653) |
| Loss on extinguishment of debt | — | — | — | (28,630) | — |
| Income (loss) before income taxes | 86,718 | 23,764 | (26,673) | (80,191) | (134,699) |
| Provision for income taxes | 14,134 | 12,097 | 13,964 | 5,240 | 9,322 |
| Net income (loss) | \$ 72,584 | \$ 11,667 | \$ (40,637) | \$ (85,431) | \$ (144,021) |
| Basic net income (loss) per common share | \$ 0.52 | \$ 0.10 | \$ (0.38) | \$ (0.83) | \$ (1.45) |
| Diluted net income (loss) per potential common share | \$ 0.51 | \$ 0.10 | \$ (0.38) | \$ (0.83) | \$ (1.45) |
| Weighted average basic common shares outstanding | 138,312 | 118,416 | 105,783 | 102,350 | 99,341 |
| Weighted average diluted potential common shares outstanding | 150,704 | 120,101 | 105,783 | 102,350 | 99,341 |

Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations

The following discussion and analysis should be read in conjunction with our “Selected Consolidated Financial Data” and consolidated financial statements and notes thereto included elsewhere in this annual report.

Overview

We are a network strategy and technology company, providing solutions that enable a wide range of network operators to adopt next-generation communication architectures and to deliver a broad array of services relied upon by enterprise and consumer end users. We provide equipment, software and services that support the transport, switching, aggregation, service delivery and management of voice, video and data traffic on communications networks. Our high-capacity hardware and network management and control software solutions enable open, multi-vendor, programmable networks that improve automation, reduce network complexity and flexibly support changing service requirements. Our solutions yield business and operational value for our customers by enabling them to support new applications, introduce new revenue-generating services and reduce network complexity and expense.

Our Converged Packet Optical, Packet Networking and Optical Transport products are used by a diverse set of customers and market segments, including communications service providers, cable and multiservice operators, Web-scale providers, submarine network operators, governments, enterprises, research and education (R&E) institutions and other emerging network operators. These products, which can be applied from the network core to network access points, allow network operators to scale capacity, increase transmission speeds, allocate traffic and adapt dynamically to changing end-user service demands. In addition to our portfolio of high-capacity hardware platforms, we offer network management and control software platforms designed to simplify the creation, automation and delivery of services across multi-vendor and multi-domain network environments. Our software solutions are oriented around our modular Blue Planet software platform for multi-domain service orchestration, network function virtualization, and network management and control. To complement our hardware and software solutions, we offer a broad range of transformation and automation services that help our customers design, optimize, integrate, deploy, manage and maintain their networks.

Our quarterly reports on Form 10-Q, annual reports on Form 10-K, and current reports on Form 8-K filed with the SEC are available through the SEC’s website at www.sec.gov or free of charge on our website as soon as reasonably practicable after we file these documents. We routinely post the reports above, recent news and announcements, financial results and other information about Ciena that is important to investors in the “Investors” section of our website at www.ciena.com. Investors are encouraged to review the “Investors” section of our website because, as with the other disclosure channels that we use, from time to time we may post material information on that site that is not otherwise disseminated by us.

Market Opportunity

The markets in which we sell our communications networking solutions have been subject to significant changes in recent years, including rapid growth in network traffic, evolving cloud-based service offerings, and heightened end-user service demands. These conditions have placed significant demands on networks, challenged the business models of network operators, and altered the overall competitive landscape of network operators. Existing and emerging network operators are competing to distinguish their service offerings and rapidly introduce differentiated, revenue-generating services, while managing the costs of their networks and seeking to ensure a profitable business model. These dynamics are driving convergence of network features, functions and layers, virtualization of certain network functions, and solutions that leverage increased software-based network control and programmability. We believe that these dynamics, and the need to adapt to rapidly changing business and network demands, will cause network operators to adopt or evolve their networks to be more open, programmable and automated.

While drivers of bandwidth growth and network evolution remain strong, in recent periods certain of our customers, including several of our larger communications service provider customers in North America and Europe, Middle East and Africa (EMEA), have taken steps to constrain their capital expenditure budgets. As a result of the measured spending environment and efforts to manage network costs, growth rates in some of our markets have slowed. Some of our market segments have been adversely impacted and we have experienced lower spending levels on networking equipment from some existing customers as compared to prior periods. Notwithstanding these market dynamics, during fiscal 2016 we continued to improve our financial results and increased our revenue. Revenue growth during fiscal 2016 benefited meaningfully from our continued efforts to diversify our business to include additional customer and geographic markets, and to take market share from or displace competitors. Specifically, we continue to diversify our customer base to include additional customer segments, such as Web-scale providers, cable and multiservice operators, data center operators and enterprise customers, which

contributed to our growth in North America during fiscal 2016. We benefited from geographic diversification and growth of our business in Asia-Pacific during fiscal 2016, including sales to additional service provider customers and submarine consortia and network operators. Our diversification efforts also include the broadening of our solutions portfolio, focusing on certain higher growth applications for our network infrastructure products, including metro networking, data center interconnect and submarine networks, and the adoption of our Blue Planet software platform. We believe that continued diversification of our business is an important part of our strategy and necessary for continued revenue growth.

Our corporate strategy to capitalize on these market dynamics, promote openness and drive the profitable growth of our business includes the initiatives set forth in the “Strategy” section of the description of our business in Item 1 of Part 1 of this annual report.

Competitive Landscape

The markets in which we compete are characterized by rapidly advancing technologies, frequent introduction of new networking solutions and aggressive selling and pricing efforts to displace incumbent vendors and to capture market share. The markets for our solutions are both highly competitive and fragmented. Our sales of Converged Packet Optical solutions face an intense competitive environment as we and our competitors introduce new, higher-capacity, higher-speed network solutions with improved reach, spectral efficiency, automation, power consumption and cost per bit. We expect the competitive landscape in which we operate to continue to broaden and to remain challenging and dynamic. As we have expanded our solutions offerings to include our 8700 Packetwave Platform and Waveserver DCI platform, our solutions have become increasingly competitive with IP router vendors, data center switch providers, and other IT suppliers or integrators. In addition, as we seek increased customer adoption of our Blue Planet software platform, we expect to compete more directly with additional software vendors and information technology vendors or integrators of these solutions. As network operators' consumption models evolve towards a disaggregated approach to the procurement of hardware and software, we may also face competition from alternative system vendors or component vendors, including those in our supply chain, who develop networking products based on off-the-shelf or commoditized hardware technology, referred to as “white box” hardware.

Given this dynamic competitive landscape and the market-based price erosion for our products that we regularly encounter, we expect that, in order to achieve sustained revenue growth, we will be required to continue to increase our volume of product shipments, continue to diversify our business and customer base, and introduce new solutions that address evolving service and network demands. In addition, in order to maintain incumbency with key customers and to secure new opportunities, we are often required to agree to aggressive pricing, incur significant costs early in network deployment, or make significant commercial concessions. These terms have previously, and may in the future, adversely affect our results of operations and contribute to fluctuations in our financial results.

See the “Industry Background” and “Competition” sections of the description of our business in Item 1 of Part 1 of this annual report for more information related to the competitive landscape of our markets.

Repurchase of Convertible Notes

During fiscal 2016, we repurchased approximately \$262.5 million of the outstanding aggregate principal amount of our 0.875% convertible senior notes due June 15, 2017 (the “2017 Notes”) in private transactions, for cash purchase prices slightly below par. As of the end of fiscal 2016, \$231.6 million in aggregate principal amount of the 2017 Notes remained outstanding. See Note 25 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for information regarding our repurchase of \$46.3 million in aggregate principal amount of our 2017 Notes following the end of fiscal 2016. We regularly evaluate alternatives to manage our capital structure and reduce our debt and may continue to opportunistically repurchase our outstanding convertible notes.

See Note 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for more information relating to our outstanding convertible notes.

Term Loan due April 25, 2021

On April 25, 2016, we entered into an Incremental Joinder and Amendment Agreement (the “Incremental Term Loan Credit Agreement”) that amends the Credit Agreement (the “Term Loan Credit Agreement”), dated July 15, 2014. As more fully described in Note 17 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report, the Incremental Term Loan Credit Agreement provides for a new tranche of senior secured term loans under the Term Loan Credit Agreement in an aggregate principal amount of \$250 million maturing on April 25, 2021 (the “2021 Term Loan”). The proceeds of approximately \$246.1 million, net of fees and expenses, initially supplemented cash on the balance sheet and are

expected to provide additional liquidity to contribute, in part, to the repayment of the remaining outstanding principal amount owing under our 0.875% senior convertible notes due June 15, 2017.

See Note 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for more information relating to our term loans.

Purchase of High-Speed Photonic Component Assets of TeraXion, Inc.

On January 19, 2016, Ciena Canada, Inc., a wholly-owned subsidiary of Ciena Corporation, entered into a definitive agreement with TeraXion, Inc. (“TeraXion”) and its wholly-owned subsidiary to acquire certain high-speed photonics components (“HSPC”) assets for approximately \$32 million in cash. The assets purchased included, among other things, TeraXion’s high-speed indium phosphide and silicon photonics technologies, as well as certain underlying intellectual property, that support development of our WaveLogic coherent optical chipsets. This transaction has been accounted for as an acquisition of a business. As a result of this transaction, we also gained key research and development personnel in Ottawa and Quebec City, Canada. We believe that this acquisition affords us greater control over important component technologies used in our business and provides us opportunities to accelerate the further development of our coherent packet-optical solutions. We completed our acquisition of these assets on February 1, 2016, and the acquisition of these assets and related expense are reflected in our financial results for the second fiscal quarter of 2016.

Financial Results for Fourth Quarter of Fiscal 2016 and Sequential Comparison

Revenue for the fourth quarter of fiscal 2016 was \$716.2 million, representing a sequential increase of 6.8% from \$670.6 million in the third quarter of fiscal 2016. Revenues for the fourth and third quarters of fiscal 2016 includes \$34.9 million and \$32.9 million, respectively, from products and services relating to the Cyan business acquired on August 3, 2015. Revenue-related details reflecting sequential changes from the third quarter of fiscal 2016 include the following:

- Product revenue for the fourth quarter of fiscal 2016 increased by \$29.0 million, primarily reflecting increases of \$25.3 million in Networking Platforms and \$3.7 million in Software and Software-Related Services.
- Services revenue for the fourth quarter of fiscal 2016 increased by \$16.6 million.
- Revenue from North America for the fourth quarter of fiscal 2016 was \$463.1 million, an increase from \$438.0 million in the third quarter of fiscal 2016. This reflects increases of \$12.1 million in Networking Platforms, \$7.6 million in Global Services and \$5.3 million in Software and Software-Related Services.
- Revenue from EMEA for the fourth quarter of fiscal 2016 was \$112.5 million, an increase from \$104.3 million in the third quarter of fiscal 2016. This primarily reflects increases of \$7.6 million in Global Services and \$1.5 million in Networking Platforms.
- Caribbean and Latin America (“CALA”) revenue for the fourth quarter of fiscal 2016 was \$46.8 million, a slight increase from \$46.6 million in the third quarter of fiscal 2016.
- Asia Pacific (“APAC”) revenue for the fourth quarter of fiscal 2016 was \$93.8 million, an increase from \$81.7 million in the third quarter of fiscal 2016. This reflects increases of \$9.4 million in Networking Platforms, \$1.5 million in Global Services and \$1.2 million in Software and Software-Related Services.
- For the fourth quarter and third quarter of fiscal 2016, AT&T accounted for 18.3% and 15.7% of total revenue, respectively.

Gross margin for the fourth quarter of fiscal 2016 was 44.5%, a decrease from 46.0% in the third quarter of fiscal 2016. The reduced gross margin reflects unfavorable product mix and higher deployment and installation services costs from early stages of network deployments.

Operating expense was \$258.9 million for the fourth quarter of fiscal 2016, a \$7.4 million increase from \$251.5 million in the third quarter of fiscal 2016. This reflects increases of \$13.1 million in selling and marketing expense, primarily due to increased incentive sales compensation, partially offset by decreases of \$4.3 million in research and development expense and \$2.2 million for general and administrative expense.

Income from operations for the fourth quarter of fiscal 2016 was \$59.7 million, as compared to \$57.0 million during the third quarter of fiscal 2016. Our net income for the fourth quarter of fiscal 2016 was \$36.6 million, or \$0.25 per diluted common share. This compares to a net income of \$33.5 million or \$0.23 per diluted common share, for the third quarter of fiscal 2016.

We generated \$136.7 million of cash from operations during the fourth quarter of fiscal 2016 . This compares with \$77.1 million in cash generated from operations during the third quarter of fiscal 2016 . As of October 31, 2016 , we had \$777.6 million in cash and cash equivalents, \$275.2 million of short-term investments in U.S. treasury securities and commercial paper and \$90.2 million of long-term investments in U.S. treasury securities. This compares to \$854.9 million in cash and cash equivalents, \$295.3 million of short-term investments in U.S. treasury securities and commercial paper, and \$115.4 million of long-term investments in U.S. treasury securities at July 31, 2016 .

As of October 31, 2016 , we had 5,555 employees, a decrease from 5,559 as of July 31, 2016 and an increase from 5,345 and 5,161 at October 31, 2015 and 2014 , respectively.

Consolidated Results of Operations

Operating Segments

During the first quarter of fiscal 2016, we reorganized our internal organizational structure, the management of our business, and the reporting of our operating segments. This resulted in three new operating segments: Networking Platforms, Software and Software-Related Services, and Global Services. Ciena's previous Converged Packet-Optical, Packet Networking and Optical Transport segments were realigned to form the Networking Platforms segment under a single operating segment manager. Our previous Software and Services operating segment was reorganized into two separate operating segments: (i) Software and Software-Related Services, and (ii) Global Services. Segment revenue and segment profit for fiscal 2015 and fiscal 2014 have been restated to reflect the new operating segments adopted in fiscal 2016. For the periods covered by this report, our internal organizational structure and the management of its business were grouped into the following operating segments: (i) Networking Platforms, (ii) Software and Software-Related Services, and (iii) Global Services, each of which is more fully described in the "Products and Services" section of the description of our business in Item 1 of Part I of this annual report.

- *Networking Platforms* reflects sales of our Converged Packet Optical, Packet Networking and Optical Transport product lines .
 - Converged Packet Optical — includes the 6500 Packet-Optical Platform and the 5430 Reconfigurable Switching System, which feature our WaveLogic coherent optical processors. Products also include the Waveserver stackable interconnect system, the family of CoreDirector® Multiservice Optical Switches and the OTN configuration for the 5410 Reconfigurable Switching System. This product line also includes sales of the Z-Series Packet-Optical Platform acquired from Cyan.
 - Packet Networking — includes the 3000 family of service delivery switches and service aggregation switches and the 5000 family of service aggregation switches. This product line also includes the 8700 Packetwave Platform and the Ethernet packet configuration for the 5410 Service Aggregation Switch.
 - Optical Transport — includes the 4200 Advanced Services Platform, 5100/5200 Advanced Services Platform, Common Photonic Layer (CPL) and 6100 Multiservice Optical Platform. Our Optical Transport products have either been previously discontinued, or are expected to be discontinued, reflecting network operators' transition toward next-generation converged network architectures addressed by solutions within our Converged Packet Optical product line.

The Networking Platforms segment also includes sales of operating system software and enhanced software features embedded in each of the product lines above. Revenue from this segment is included in product revenue on the Consolidated Statement of Operations.

- *Software and Software-Related Services* reflects sales of our network virtualization, management, control and orchestration software solutions and software-related services, including subscription, installation, support, and consulting services.
 - This segment includes our element and network management solutions and planning tools, including the OneControl Unified Management System, ON-Center® Network & Service Management Suite, Ethernet Services Manager, Optical Suite Release and Planet Operate. As we transition features, functionality and customers from our element and network management solutions to our Blue Planet software platform, we expect revenue declines for our existing element and network management solutions.
 - This segment also includes our Blue Planet network virtualization, service orchestration and network management software platform, including the multi-domain service orchestration (MDSO), network function virtualization orchestration (NFVO), and our SDN Multilayer WAN Controller and related applications.

Revenue from the software platforms is included in product revenue on the Consolidated Statement of Operations. Revenue from software-related services is included in services revenue on the Consolidated Statement of Operations.

- *Global Services* reflects sales of a broad range of our services offering for consulting and network design, installation and deployment, maintenance support and training activities. Revenue from this segment is included in services revenue on the Consolidated Statement of Operations.

Fiscal 2016 compared to Fiscal 2015

Revenue

Our total revenue in fiscal 2016 was slightly impacted by the strengthening of the U.S. Dollar. During fiscal 2016, as compared to fiscal 2015, the U.S. Dollar strengthened against a number of foreign currencies, including the Canadian Dollar

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and Brazilian Real, in which we have our most significant foreign currency revenue exposure. As a result, our total revenue reported in U.S. Dollars during fiscal 2016 was adversely impacted by approximately \$16.7 million or 0.6% as compared to fiscal 2015. The table below (in thousands, except percentage data) sets forth the changes in our operating segment revenue for the periods indicated:

| | Fiscal Year | | | | Increase (decrease) | %** |
|---|--------------|-------|--------------|-------|------------------------|--------|
| | 2016 | %* | 2015 | %* | | |
| Revenue: | | | | | | |
| Networking Platforms | | | | | | |
| Converged Packet Optical | \$ 1,779,932 | 68.5 | \$ 1,661,702 | 67.9 | \$ 118,230 | 7.1 |
| Packet Networking | 252,862 | 9.7 | 229,223 | 9.4 | 23,639 | 10.3 |
| Optical Transport | 35,989 | 1.4 | 73,004 | 3.0 | (37,015) | (50.7) |
| Total Networking Platforms | 2,068,783 | 79.6 | \$ 1,963,929 | 80.3 | 104,854 | 5.3 |
| Software and Software-Related Services | | | | | | |
| Software Platforms | 48,689 | 1.9 | 38,466 | 1.6 | 10,223 | 26.6 |
| Software-Related Services | 76,380 | 2.9 | 61,821 | 2.5 | 14,559 | 23.6 |
| Total Software and Software-Related Services | 125,069 | 4.8 | 100,287 | 4.1 | 24,782 | 24.7 |
| Global Services | | | | | | |
| Maintenance Support and Training | 228,982 | 8.8 | 224,079 | 9.2 | 4,903 | 2.2 |
| Installation and Deployment | 130,916 | 5.0 | 115,531 | 4.7 | 15,385 | 13.3 |
| Consulting and Network Design | 46,823 | 1.8 | 41,843 | 1.7 | 4,980 | 11.9 |
| Total Global Services | 406,721 | 15.6 | \$ 381,453 | 15.6 | 25,268 | 6.6 |
| Consolidated revenue | \$ 2,600,573 | 100.0 | \$ 2,445,669 | 100.0 | \$ 154,904 | 6.3 |

* Denotes % of total revenue

** Denotes % change from 2015 to 2016

- **Networking Platforms revenue** increased, primarily reflecting product line sales increases of \$118.2 million of our Converged Packet Optical products and \$23.6 million of our Packet Networking products, partially offset by a decrease of \$37.0 million in sales of our Optical Transport products.
 - Converged Packet Optical sales primarily reflect increases of \$107.7 million of our 6500 Packet-Optical Platform, \$33.7 million in sales relating to the Z-Series Packet-Optical Platform, acquired from Cyan in the fourth quarter of fiscal 2015, and \$8.2 million in sales of our Waveserver stackable data center interconnect system. Increased 6500 Packet-Optical Platform revenue reflects increased sales to a diverse set of customers including communications service providers, Web-scale providers and enterprise customers, partially offset by a decrease in sales to AT&T. These increases were also partially offset by decreases of \$23.7 million in sales of our OTN configuration for the 5410 Reconfigurable Switching System and \$7.9 million in sales of our CoreDirector® Multiservice Optical Switches.
 - Packet Networking sales reflect increases of \$16.2 million in sales of our 3000 and 5000 family of service delivery and aggregation switches and \$9.3 million in sales of our 8700 Packetwave Platform, partially offset by a decrease of \$1.4 million in sales of Ethernet packet configuration for our 5410 Service Aggregation Switch.
 - Optical Transport sales have continued to experience significant declines, as expected. Our Optical Transport products have either been previously discontinued, or are expected to be discontinued, reflecting network operators' transition toward next-generation converged network architectures addressed by solutions within our Converged Packet Optical product line.

- **Software and Software-Related Services revenue** increased , primarily reflecting increases of \$14.6 million in software-related services sales and \$10.2 million in sales of our software platforms. The increase in software-related services revenue primarily reflects increased sales of software subscription services. The increase in software platform revenue reflects \$6.7 million in initial sales of our Blue Planet software platform and advanced software applications and a \$1.4 million increase in sales of our OneControl Unified Management System. Segment revenue also includes \$2.1 million in sales of Planet Operate software acquired from Cyan.
- **Global Services revenue** increased , primarily reflecting increases of \$15.4 million in sales of our installation and deployment services, \$5.0 million in sales of our consulting and network design services and \$4.9 million in sales of our maintenance and support services. Global Services segment revenue includes \$16.1 million and \$3.4 million of services revenue acquired from Cyan for fiscal 2016 and fiscal 2015 , respectively.

Our operating segments each engage in business and operations across four geographic regions: North America; EMEA; CALA; and APAC. Results for North America include only activities in the United States and Canada. The table below (in thousands, except percentage data) sets forth the changes in geographic distribution of revenue for the periods indicated principally based on the relevant location for our delivery of products and performance of services:

| | Fiscal Year | | | | | |
|---------------|--------------|-------|--------------|-------|---------------------|-------|
| | 2016 | %* | 2015 | %* | Increase (decrease) | %** |
| North America | \$ 1,689,263 | 65.0 | \$ 1,598,328 | 65.4 | \$ 90,935 | 5.7 |
| EMEA | 393,705 | 15.1 | 400,294 | 16.4 | (6,589) | (1.6) |
| CALA | 195,085 | 7.5 | 201,499 | 8.2 | (6,414) | (3.2) |
| APAC | 322,520 | 12.4 | 245,548 | 10.0 | 76,972 | 31.3 |
| Total | \$ 2,600,573 | 100.0 | \$ 2,445,669 | 100.0 | \$ 154,904 | 6.3 |

* Denotes % of total revenue

** Denotes % change from 2015 to 2016

- **North America revenue** primarily reflects increases of \$54.8 million within our Networking Platforms segment, \$22.8 million within our Software and Software-Related Services segment and \$13.3 million within our Global Services segment. Increased Networking Platforms segment revenue primarily reflects product line increases of \$63.1 million of Converged Packet Optical sales and \$11.0 million of Packet Networking sales, partially offset by a decrease of \$19.3 million in Optical Transport sales. Converged Packet Optical sales reflect a \$42.3 million increase in sales of our 6500 Packet-Optical Platform, reflecting increased sales to a diverse set of customers including communications service providers, Web-scale providers and enterprise customers, partially offset by a decrease in sales to AT&T and cable and multiservice operators. Converged Packet Optical sales also reflect an increase of \$24.6 million of sales for our Z-Series Packet-Optical Platform acquired from Cyan.
- **EMEA revenue** primarily reflects a decrease of \$9.6 million within our Networking Platforms segment, partially offset by an increase of \$3.8 million within our Global Services segment. Networking Platforms segment revenue reflects product line decreases of \$10.8 million in Optical Transport sales and \$1.6 million in Converged Packet Optical sales, partially offset by a product line increase of \$2.8 million in Packet Networking sales. In recent periods, we have seen certain of our large service provider customers in EMEA take steps to constrain their capital expenditure budgets. This measured spending environment, together with macroeconomic conditions, has adversely impacted the spending levels we have experienced from certain customers in this region as compared to prior periods.
- **CALA revenue** primarily reflects a decrease of \$11.1 million within our Networking Platform segment, partially offset by an increase of \$4.5 million within our Global Services segment. CALA revenue reflects decreased sales to certain communication service providers, primarily in Brazil, partially offset by increased sales to AT&T in Mexico.
- **APAC revenue** reflects increases of \$70.8 million within our Networking Platform segment, \$3.6 million within our Global Services segment and \$2.5 million within our Software and Software-Related Services segment. The revenue increase within our Networking Platforms segment primarily reflects an increase of our 6500 Packet-Optical Platform sales to certain communications service providers, particularly in India, enterprise customers, submarine network operators and sales through our strategic partnership with Ericsson. The timing of revenue recognition for large network projects in this region can result in significant variations in revenue results in any particular quarter.

We have benefited from the diversification of our business and customer base, and the concentration of revenue among our largest customers has decreased over time. In fiscal 2016 and fiscal 2015, our top ten customers contributed 51.1% of and 52.5% revenue, respectively. A sizable portion of our revenue continues to be derived from sales to large service provider customers. Consequently, our financial results are closely correlated with the spending of a relatively small number of customers and can be significantly affected by market, industry or competitive dynamics affecting their businesses. Our reliance upon a relatively small number of customers also increases our exposure to changes in their spending levels, network priorities and purchasing strategies. The loss of a significant customer could have a material adverse effect on our business and results of operations, and our results of operations can fluctuate quarterly depending upon sales volumes and purchasing priorities with these large customers.

Sales to AT&T were \$479.1 million, or 18.4% of total revenue, in fiscal 2016 and \$487.8 million, or 19.9% of total revenue, in fiscal 2015. AT&T and other service provider customers have announced initiatives to reduce capital expenditures in future periods, including on network infrastructure, and there can be no assurance that we will be able to maintain the revenue levels we achieved during fiscal 2016. Moreover, some customers, including AT&T, are pursuing network strategies that seek to utilize enhanced software programmability, management and control of networks and to deploy off-the-shelf or commoditized hardware technology, referred to as “white box” hardware, in lieu of existing solutions. These strategies may present challenges and opportunities for our business, particularly where we are an incumbent equipment vendor. No other customer accounted for greater than 10% of our revenue in fiscal 2016 or fiscal 2015.

As our business has diversified, we have taken a number of steps to increase the velocity of our business and improve our operating efficiency, including through inventory management and lead time reduction. As a result, the percentage of quarterly product revenue that we generate from customer orders placed during that particular quarter has increased meaningfully, as compared to our historical periods. Our increased reliance upon orders placed during a particular quarter may make it harder to predict our revenue and results of operations, and may further increase the likelihood of fluctuations in our results.

Cost of Goods Sold and Gross Profit

Product cost of goods sold consists primarily of amounts paid to third party contract manufacturers, component costs, employee-related costs and overhead, shipping and logistics costs associated with manufacturing-related operations, warranty and other contractual obligations, royalties, license fees, amortization of intangible assets, cost of excess and obsolete inventory and, when applicable, estimated losses on committed customer contracts.

Services cost of goods sold consists primarily of direct and third party costs, including employee-related costs, associated with our provision of services including installation, deployment, maintenance support, consulting and training activities and, when applicable, estimated losses on committed customer contracts. The majority of these costs relate to personnel, including employee and third party contractor-related costs.

Although we have seen improvements in recent fiscal years, our gross profit as a percentage of revenue, or “gross margin,” remains susceptible to fluctuations due to a number of factors. In any given period, gross margin can vary significantly depending upon the mix and concentration of revenue by segment, product line within a particular segment, geography, and customers. Gross margin can also be affected by costs associated with the early stages of network deployments, the mix of lower margin “common” equipment sales as compared higher margin products including channel cards and software, and the mix of lower margin installation services. Gross margin can also be impacted by changes in expense for excess and obsolete inventory and warranty obligations. We regularly encounter pricing pressure and market-based price erosion that can impact our results of operations. We expect that our gross margins will be subject to fluctuation and significantly dependent upon our level of success in driving product cost reductions relative to the price erosion that we encounter or forward pricing that we offer. In an effort to retain or secure customers, enter new markets or capture market share, we may agree to pricing or other unfavorable commercial terms that result in lower or negative gross margins on a particular order or group of orders. Gross margin can also be affected as a result of our degree of success in implementing certain optimization initiatives focused on rationalizing our supply chain and operations. These factors and market dynamics may result in fluctuation in our results of operations and can adversely affect our gross margin and results of operations in certain periods, and there can be no guarantee that our gross margin will continue to improve or remain at current levels.

Service gross margin can be affected by the mix of customers and services, particularly the mix between deployment and maintenance services, geographic mix and the timing and extent of any investments in internal resources to support this business.

The tables below (in thousands, except percentage data) set forth the changes in revenue, cost of goods sold and gross profit for the periods indicated:

| | Fiscal Year | | | | Increase (decrease) | %** |
|--------------------------|--------------|-------|--------------|-------|------------------------|-----|
| | 2016 | %* | 2015 | %* | | |
| Total revenue | \$ 2,600,573 | 100.0 | \$ 2,445,669 | 100.0 | \$ 154,904 | 6.3 |
| Total cost of goods sold | 1,438,997 | 55.3 | 1,370,106 | 56.0 | 68,891 | 5.0 |
| Gross profit | \$ 1,161,576 | 44.7 | \$ 1,075,563 | 44.0 | \$ 86,013 | 8.0 |

* Denotes % of total revenue

** Denotes % change from 2015 to 2016

| | Fiscal Year | | | | Increase (decrease) | %** |
|----------------------------|--------------|-------|--------------|-------|------------------------|-----|
| | 2016 | %* | 2015 | %* | | |
| Product revenue | \$ 2,117,472 | 100.0 | \$ 2,002,395 | 100.0 | \$ 115,077 | 5.7 |
| Product cost of goods sold | 1,176,304 | 55.6 | 1,120,373 | 56.0 | 55,931 | 5.0 |
| Product gross profit | \$ 941,168 | 44.4 | \$ 882,022 | 44.0 | \$ 59,146 | 6.7 |

* Denotes % of product revenue

** Denotes % change from 2015 to 2016

| | Fiscal Year | | | | Increase (decrease) | %** |
|----------------------------|-------------|-------|------------|-------|------------------------|------|
| | 2016 | %* | 2015 | %* | | |
| Service revenue | \$ 483,101 | 100.0 | \$ 443,274 | 100.0 | \$ 39,827 | 9.0 |
| Service cost of goods sold | 262,693 | 54.4 | 249,733 | 56.3 | 12,960 | 5.2 |
| Service gross profit | \$ 220,408 | 45.6 | \$ 193,541 | 43.7 | \$ 26,867 | 13.9 |

* Denotes % of service revenue

** Denotes % change from 2015 to 2016

- **Gross profit as a percentage of revenue, or gross margin**, increased as a result of the factors described below.
- **Gross profit on products as a percentage of product revenue, or product gross margin**, increased as a result of our success in driving product cost reductions as compared to the market-based price erosion we encountered during the period, and increased software revenue.
- **Gross profit on services as a percentage of services revenue, or services gross margin**, increased, primarily due to increased sales of higher margin software subscription services, reduced repair costs to support maintenance service contracts and increased sales and improved margins on consulting services.

Operating Expense

Operating expense increased in fiscal 2016 from the level reported for fiscal 2015, in part due to the additional personnel and operations related to our acquisition of Cyan during the fourth quarter of fiscal 2015 and our acquisition of the HSPC assets of TeraXion on February 1, 2016. In addition, operating expense increased due to our research and development initiatives, investments in the upgrade of company-wide enterprise resource planning platforms, and the transition into new buildings at several locations where we maintain a large employee population. We expect operating expense to increase in fiscal 2017 from the level reported for fiscal 2016. In particular, the development of our new facilities and the transition of our operations in

Ottawa, Canada and Gurgaon, India have and will continue to require significant effort, time and cost. For additional information regarding this lease and the facility transition, see Item 2 of Part I of this annual report.

Operating expense consists of the component elements described below.

Research and development expense primarily consists of salaries and related employee expense (including share-based compensation expense), prototype costs relating to design, development, and testing of our products, depreciation expense and third party consulting costs.

Selling and marketing expense primarily consists of salaries, incentive-based sales commissions and related employee expense (including share-based compensation expense), and sales and marketing support expense, including travel, demonstration units, trade show expense and third party consulting costs.

General and administrative expense primarily consists of salaries and related employee expense (including share-based compensation expense), and costs for third party consulting and other services.

Amortization of intangible assets primarily reflects the amortization of purchased technology and the value of customer relationships derived from our acquisitions.

Acquisition and integration costs consist of expenses for financial, legal and accounting advisors and severance and other employee-related costs, associated with our acquisition of Cyan on August 3, 2015 and our acquisition of the HSPC assets from TeraXion and its wholly-owned subsidiary on February 1, 2016.

Restructuring costs primarily reflect actions we have taken to better align our workforce, facilities and operating costs with perceived market opportunities, business strategies and changes in market and business conditions.

The table below (in thousands, except percentage data) sets forth the changes in operating expense for the periods indicated:

| | Fiscal Year | | | | Increase (decrease) | %** |
|-----------------------------------|---------------------|-------------|-------------------|-------------|------------------------|------------|
| | 2016 | %* | 2015 | %* | | |
| Research and development | \$ 451,794 | 17.4 | \$ 414,201 | 16.9 | \$ 37,593 | 9.1 |
| Selling and marketing | 349,731 | 13.4 | 333,836 | 13.7 | 15,895 | 4.8 |
| General and administrative | 132,828 | 5.1 | 123,402 | 5.0 | 9,426 | 7.6 |
| Amortization of intangible assets | 61,508 | 2.4 | 69,511 | 2.8 | (8,003) | (11.5) |
| Acquisition and integration costs | 4,613 | 0.2 | 25,539 | 1.0 | (20,926) | (81.9) |
| Restructuring costs | 4,933 | 0.2 | 8,626 | 0.4 | (3,693) | (42.8) |
| Total operating expenses | \$ 1,005,407 | 38.7 | \$ 975,115 | 39.8 | \$ 30,292 | 3.1 |

* Denotes % of total revenue

** Denotes % change from 2015 to 2016

- **Research and development expense** benefited by \$16.4 million as a result of foreign exchange rates, net of hedging, primarily due to a stronger U.S. Dollar in relation to the Canadian Dollar. Including the effect of foreign exchange rates, research and development expenses increased by \$37.6 million, primarily reflecting increases of \$16.7 million in employee compensation and related costs, \$11.0 million in facilities and information systems expense, \$7.4 million in professional services and \$4.0 million in depreciation expense. These increases were partially offset by a decrease of \$4.8 million in prototype expense.
- **Selling and marketing expense** benefited by \$4.9 million as a result of foreign exchange rates, primarily due to a stronger U.S. Dollar in relation to the Euro and the Canadian Dollar. Including the effect of foreign exchange rates, selling and marketing expenses increased by \$15.9 million, primarily reflecting increases of \$7.2 million in employee compensation and related costs, \$3.6 million in facilities and information systems expense, \$3.5 million in professional services and \$1.5 million in travel and related costs. These increases were partially offset by a decrease of \$1.8 million in trade show and related costs.

- **General and administrative expense** benefited by \$1.7 million as a result of foreign exchange rates, primarily due to a stronger U.S. Dollar in relation to the Canadian Dollar and Brazilian Real. Including the effect of foreign exchange rates, general and administrative expense increased by \$9.4 million, primarily reflecting increases of \$5.0 million in employee compensation and related costs, \$2.3 million in facilities and information systems expense and \$1.6 million in professional services.
- **Amortization of intangible assets** decreased due to certain intangible assets having reached the end of their economic lives.
- **Acquisition and integration costs** reflect expense for financial, legal and accounting advisors and severance and other employee compensation costs, related to our acquisition of Cyan on August 3, 2015 and our acquisition of certain HSPC assets of TeraXion and its wholly-owned subsidiary on February 1, 2016.
- **Restructuring costs** primarily reflect certain severance and related expense associated with headcount reductions and initiatives to improve efficiency. As we look to manage operating expense and drive further efficiency and leverage from our operations, we will continue to assess allocation of headcount, facilities and other resources to ensure that they are optimized toward key growth opportunities. See Note 3 to our Consolidated Financial Statements included in in Item 8 of Part II of this annual report for more information.

Other items

The table below (in thousands, except percentage data) sets forth the changes in other items for the periods indicated:

| | Fiscal Year | | | | Increase (decrease) | %** |
|---------------------------------------|-------------|-------|-------------|-------|------------------------|------|
| | 2016 | %* | 2015 | %* | | |
| Interest and other income (loss), net | \$ (12,795) | (0.5) | \$ (25,505) | (1.0) | \$ 12,710 | 49.8 |
| Interest expense | \$ 56,656 | 2.2 | \$ 51,179 | 2.1 | \$ 5,477 | 10.7 |
| Provision for income taxes | \$ 14,134 | 0.5 | \$ 12,097 | 0.5 | \$ 2,037 | 16.8 |

* Denotes % of total revenue

** Denotes % change from 2015 to 2016

- **Interest and other income (loss), net** reflects a beneficial impact, as compared to the prior period, of foreign exchange rates on assets and liabilities denominated in a currency other than the relevant functional currency, net of hedging activity. Interest and other income (loss), net also reflects an increase in investment interest income.
- **Interest expense** increased, primarily due to additional outstanding indebtedness, including our \$250 million 2021 Term Loan that was entered into in the second quarter of fiscal 2016, as compared to fiscal 2015. See Note 16 to our Consolidated Financial Statements included in in Item 8 of Part II of this annual report for more information.
- **Provision for income taxes** increased primarily due to state taxes.

Fiscal 2015 compared to Fiscal 2014

Revenue

During fiscal 2015, the U.S. Dollar strengthened against a number of foreign currencies, including the Canadian Dollar and the Euro, in which we have our most significant foreign currency revenue exposure. Consequently, our total revenue reported in U.S. Dollars during fiscal 2015 was adversely impacted by approximately \$48.4 million, or 1.9%, as compared to fiscal 2014. The table below (in thousands, except percentage data) sets forth the changes in our operating segment revenue for the periods indicated:

| | Fiscal Year | | | | Increase (decrease) | %** |
|---|---------------------|--------------|---------------------|--------------|------------------------|------------|
| | 2015 | %* | 2014 | %* | | |
| Revenue: | | | | | | |
| Networking Platforms | | | | | | |
| Converged Packet Optical | \$ 1,661,702 | 67.9 | \$ 1,455,501 | 63.6 | \$ 206,201 | 14.2 |
| Packet Networking | 229,223 | 9.4 | 244,116 | 10.7 | (14,893) | (6.1) |
| Optical Transport | 73,004 | 3.0 | 127,215 | 5.6 | (54,211) | (42.6) |
| Total Networking Platforms | 1,963,929 | 80.3 | 1,826,832 | 79.9 | 137,097 | 7.5 |
| Software and Software-Related Services | | | | | | |
| Software Platforms | 38,466 | 1.6 | 38,994 | 1.7 | (528) | (1.4) |
| Software-Related Services | 61,821 | 2.5 | 49,070 | 2.1 | 12,751 | 26.0 |
| Total Software and Software-Related Services | 100,287 | 4.1 | 88,064 | 3.8 | 12,223 | 13.9 |
| Global Services | | | | | | |
| Maintenance Support and Training | 224,079 | 9.2 | 217,032 | 9.5 | 7,047 | 3.2 |
| Installation and Deployment | 115,531 | 4.7 | 112,417 | 4.9 | 3,114 | 2.8 |
| Consulting and Network Design | 41,843 | 1.7 | 43,944 | 1.9 | (2,101) | (4.8) |
| Total Global Services | 381,453 | 15.6 | 373,393 | 16.3 | 8,060 | 2.2 |
| Consolidated revenue | \$ 2,445,669 | 100.0 | \$ 2,288,289 | 100.0 | \$ 157,380 | 6.9 |

* Denotes % of total revenue

** Denotes % change from 2014 to 2015

- Networking Platforms revenue** increased , primarily reflecting increases of \$206.2 million in sales of our Converged Packet Optical products, offset by a decrease of \$54.2 million in sales of our Optical Transport products and \$14.9 million in sales of our Packet Networking products.
 - Converged Packet Optical sales reflect a \$139.7 million increase in sales of our 6500 Packet-Optical Platform, largely driven by service provider demand for high-capacity, optical transport for coherent 40G and 100G network infrastructures, and a \$19.1 million increase in sales of the OTN configuration for the 5410 Reconfigurable Switching System. Increased revenue also reflects the addition of \$81.0 million relating to the Z-Series Packet-Optical Platform acquired from Cyan. These increases were partially offset by decreases of \$16.8 million in sales of our CoreDirector® Multiservice Optical Switches and \$16.8 million in sales of our 5430 Reconfigurable Switching System.
 - Packet Networking sales reflect decreases of \$15.8 million in sales of our 3000 and 5000 families of service delivery and aggregation switches and \$2.6 million in sales of our legacy broadband products. These decreases were offset by a \$3.8 million increase in sales of our 8700 Packetwave Platform, which became available for sale in the fourth quarter of fiscal 2014.
 - Optical Transport sales have continued to experience significant declines, as expected. Our Optical Transport products have either been previously discontinued, or are expected to be discontinued, reflecting network operators' transition toward next-generation converged network architectures addressed by solutions within our Converged Packet Optical product line.
- Software and Software-Related Services revenue** increased , primarily reflecting increases of \$12.8 million in software-related services sales, primarily due to increased sales of software subscription services.

- **Global Services revenue** increased, primarily reflecting increases of \$7.0 million in sales of our maintenance support and training and \$3.1 million in sales of our installation and deployment services. These increases were partially offset by a decrease of \$2.1 million in sales of our consulting and network design services.

The table below (in thousands, except percentage data) sets forth the changes in geographic distribution of revenue for the periods indicated:

| | Fiscal Year | | | | Increase (decrease) | %** |
|---------------|---------------------|--------------|---------------------|--------------|------------------------|------------|
| | 2015 | %* | 2014 | %* | | |
| North America | \$ 1,598,328 | 65.4 | \$ 1,477,329 | 64.6 | \$ 120,999 | 8.2 |
| EMEA | 400,294 | 16.4 | 417,399 | 18.2 | (17,105) | (4.1) |
| CALA | 201,499 | 8.2 | 212,018 | 9.3 | (10,519) | (5.0) |
| APAC | 245,548 | 10.0 | 181,543 | 7.9 | 64,005 | 35.3 |
| Total | \$ 2,445,669 | 100.0 | \$ 2,288,289 | 100.0 | \$ 157,380 | 6.9 |

* Denotes % of total revenue

** Denotes % change from 2014 to 2015

- **North America revenue** includes sales to AT&T for fiscal 2015 and fiscal 2014 of \$487.8 million and \$423.5 million, respectively. Revenue reflects increases of \$114.8 million within our Networking Platform segment and \$5.7 million within our Software and Software-Related Services segment. The revenue increase within our Networking Platforms segment reflects an increase of \$184.0 million in Converged Packet Optical sales, partially offset by decreases of \$38.2 million in Optical Transport sales and \$31.0 million in sales of Packet Networking. Converged Packet Optical sales principally reflect a \$106.8 million increase in sales of our 6500 Packet-Optical Platform due to increased sales to AT&T, cable and multiservice operators, and Web-scale providers, and a \$76.3 million increase due to sales of our Z-Series Packet-Optical Platform.
- **EMEA revenue** reflects decreases of \$10.6 million within our Networking Platforms segment and \$8.9 million within our Global Services segment, partially offset by an increase of \$2.4 million within our Software and Software-Related Services segment. The revenue decrease within our Networking Platforms segment reflects a decrease of \$13.2 million in Optical Transport sales partially offset by an increase of \$2.2 million in sales of Converged Packet Optical sales.
- **CALA revenue** reflects a decrease of \$20.2 million within our Networking Platforms segment, partially offset by increases of \$8.3 million within our Global Services segment and \$1.4 million within our Software and Software-Related Services segment. The revenue decrease within our Networking Platforms segment primarily reflects a \$20.6 million decrease in Converged Packet Optical sales. Converged Packet Optical sales reflect a \$41.3 million decrease in sales of our 5430 Reconfigurable Switching System, partially offset primarily by a \$15.5 million increase in sales of our 6500 Packet-Optical Platform primarily to certain communications service providers. Global Services sales reflect increases of \$5.7 million in installation and deployment services sales, \$1.4 million of maintenance support and training and \$1.2 million in our consulting services sales.
- **APAC revenue** reflects increases of \$53.2 million within our Networking Platforms segment, \$8.1 million within our Global Services segment and \$2.7 million in Software and Software-Related Services segment. The revenue increase within our Networking Platforms segment reflects product line increases of \$40.6 million in Converged Packet Optical sales and \$16.0 million in Packet Networking sales, partially offset by a decrease of \$3.4 million in sales of Optical Transport. Converged Packet Optical sales reflect increases of \$18.7 million of sales of our 6500 Packet-Optical Platform, \$18.6 million of sales of our 5430 Reconfigurable Switching System, principally to communication service providers and submarine network operators, and \$1.3 million of the Z-Series Packet-Optical Platform. Sales of our 6500 Packet-Optical Platform reflect increased sales to communication service providers, sales through our strategic relationship with Ericsson and sales to submarine network providers.

Cost of Goods Sold and Gross Profit

The tables below (in thousands, except percentage data) set forth the changes in revenue, cost of goods sold and gross profit for the periods indicated:

| | Fiscal Year | | | | Increase (decrease) | %** |
|--------------------------|--------------|-------|--------------|-------|------------------------|------|
| | 2015 | %* | 2014 | %* | | |
| Total revenue | \$ 2,445,669 | 100.0 | \$ 2,288,289 | 100.0 | \$ 157,380 | 6.9 |
| Total cost of goods sold | 1,370,106 | 56.0 | 1,339,937 | 58.6 | 30,169 | 2.3 |
| Gross profit | \$ 1,075,563 | 44.0 | \$ 948,352 | 41.4 | \$ 127,211 | 13.4 |

* Denotes % of total revenue

** Denotes % change from 2014 to 2015

| | Fiscal Year | | | | Increase (decrease) | %** |
|----------------------------|--------------|-------|--------------|-------|------------------------|------|
| | 2015 | %* | 2014 | %* | | |
| Product revenue | \$ 2,002,395 | 100.0 | \$ 1,865,826 | 100.0 | \$ 136,569 | 7.3 |
| Product cost of goods sold | 1,120,373 | 56.0 | 1,083,022 | 58.0 | 37,351 | 3.4 |
| Product gross profit | \$ 882,022 | 44.0 | \$ 782,804 | 42.0 | \$ 99,218 | 12.7 |

* Denotes % of product revenue

** Denotes % change from 2014 to 2015

| | Fiscal Year | | | | Increase (decrease) | %** |
|----------------------------|-------------|-------|------------|-------|------------------------|-------|
| | 2015 | %* | 2014 | %* | | |
| Service revenue | \$ 443,274 | 100.0 | \$ 422,463 | 100.0 | \$ 20,811 | 4.9 |
| Service cost of goods sold | 249,733 | 56.3 | 256,915 | 60.8 | (7,182) | (2.8) |
| Service gross profit | \$ 193,541 | 43.7 | \$ 165,548 | 39.2 | \$ 27,993 | 16.9 |

* Denotes % of service revenue

** Denotes % change from 2014 to 2015

- **Gross profit as a percentage of revenue, or gross margin**, increased as a result of the factors described below.
- **Gross profit on products as a percentage of product revenue, or product gross margin**, increased as a result of our success in driving product cost reductions and realizing improved manufacturing efficiencies as compared to the market-based price erosion we encountered during the period.
- **Gross profit on services as a percentage of services revenue, or services gross margin**, increased, primarily due to increased sales of higher margin software subscription services and reduced repair costs to support maintenance service contracts.

Operating expense

The table below (in thousands, except percentage data) sets forth the changes in operating expense for the periods indicated:

| | Fiscal Year | | | | | |
|-----------------------------------|-------------------|-------------|-------------------|-------------|------------------------|------------|
| | 2015 | %* | 2014 | %* | Increase (decrease) | %** |
| Research and development | \$ 414,201 | 16.9 | \$ 401,180 | 17.5 | \$ 13,021 | 3.2 |
| Selling and marketing | 333,836 | 13.7 | 328,325 | 14.3 | 5,511 | 1.7 |
| General and administrative | 123,402 | 5.0 | 126,824 | 5.5 | (3,422) | (2.7) |
| Amortization of intangible assets | 69,511 | 2.8 | 45,970 | 2.0 | 23,541 | 51.2 |
| Acquisition and integration costs | 25,539 | 1.0 | — | — | 25,539 | — |
| Restructuring costs | 8,626 | 0.4 | 349 | — | 8,277 | 2,371.6 |
| Total operating expenses | \$ 975,115 | 39.8 | \$ 902,648 | 39.3 | \$ 72,467 | 8.0 |

* Denotes % of total revenue

** Denotes % change from 2014 to 2015

- **Research and development expense** benefited by \$28.0 million as a result of foreign exchange rates, net of hedging, primarily due to a stronger U.S. Dollar in relation to the Canadian Dollar. Including the effect of foreign exchange rates, research and development expenses increased by \$13.0 million, primarily reflecting increases of \$8.6 million in facilities and information systems expense, \$6.3 million in employee compensation and related costs, \$1.2 million in technology and related expense and \$1.1 million in depreciation expense. These increases were partially offset by decreases of \$7.0 million in professional services and \$2.3 million in prototype expense. Research and development expense also reflects a \$4.5 million reduction in reimbursements from our strategic jobs investment fund grant from the province of Ontario as the maximum funding limit under this grant was met in the second quarter of fiscal 2015.
- **Selling and marketing expense** benefited by \$16.9 million as a result of foreign exchange rates, primarily due to a stronger U.S. Dollar in relation to the Euro and the Canadian Dollar. Including the effect of foreign exchange rates, selling and marketing expenses increased by \$5.5 million, primarily reflecting increases of \$10.4 million in employee compensation and related costs and \$1.2 million in customer demonstration equipment. These increases were partially offset by decreases of \$2.2 million in trade show and related costs, \$2.2 million in travel and related costs, and \$1.5 million in professional services.
- **General and administrative expense** benefited by \$4.4 million as a result of foreign exchange rates, primarily due to a stronger U.S. Dollar in relation to the Euro and the Canadian Dollar. Including the effect of foreign exchange rates, general and administrative expense decreased by \$3.4 million, reflecting an \$8.5 million decrease in legal fees, primarily due to certain patent litigation costs incurred during fiscal 2014. This decrease was partially offset by increases of \$4.5 million in employee compensation and related costs and \$1.0 million in facilities and information systems expense.
- **Amortization of intangible assets** increased due to expense related to acquired intangible assets from our acquisition of Cyan during the fourth quarter of fiscal 2015.
- **Acquisition and integration costs** increased, reflecting financial, legal and accounting advisors, facilities and systems consolidation costs, and severance and other employment-related costs related to our acquisition of Cyan during fiscal 2015.
- **Restructuring costs** primarily reflect certain severance and related expense associated with headcount reductions and initiatives to improve efficiency. During fiscal 2015, we incurred approximately \$8.6 million in restructuring costs, primarily reflecting a workforce reduction of approximately 125 employees in the first quarter of fiscal 2015 as part of our business optimization strategy to improve our gross margin, constrain operating expense and redesign certain business processes, systems, and resources. As we look to manage operating expense and drive further efficiency and leverage from our operations, we will continue to assess allocation of headcount, facilities and other resources to ensure that they are optimized toward key growth opportunities.

Other items

The table below (in thousands, except percentage data) sets forth the changes in other items for the periods indicated:

| | Fiscal Year | | | | Increase (decrease) | %** |
|---------------------------------------|-------------|-------|-------------|-------|------------------------|--------|
| | 2015 | %* | 2014 | %* | | |
| Interest and other income (loss), net | \$ (25,505) | (1.0) | \$ (25,262) | (1.1) | \$ (243) | (1.0) |
| Interest expense | \$ 51,179 | 2.1 | \$ 47,115 | 2.1 | \$ 4,064 | 8.6 |
| Provision for income taxes | \$ 12,097 | 0.5 | \$ 13,964 | 0.6 | \$ (1,867) | (13.4) |

* Denotes % of total revenue

** Denotes % change from 2014 to 2015

- **Interest and other income (loss), net** reflects a \$2.9 million increase in losses related to foreign exchange rates on assets and liabilities denominated in a currency other than the relevant functional currency, net of hedging activity, offset by a \$2.7 million non-cash gain related to the change in fair value of the embedded redemption feature associated with our 4.0% convertible senior notes due March 15, 2015, which matured during the second quarter of fiscal 2015.
- **Interest expense** increased, primarily due to a higher level of outstanding debt in fiscal 2015 as compared to fiscal 2014. See Note 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for more information.
- **Provision for income taxes** was primarily due to foreign and state taxes.

Segment Profit

The table below (in thousands, except percentage data) sets forth the changes in our segment profit for the respective periods:

| | Fiscal Year | | | |
|--|-------------|------------|------------------------|------|
| | 2016 | 2015 | Increase (decrease) | %* |
| Segment profit: | | | | |
| Networking Platforms | \$ 544,744 | \$ 515,550 | \$ 29,194 | 5.7 |
| Software and Software-Related Services | \$ 7,123 | \$ 4,174 | \$ 2,949 | 70.7 |
| Global Services | \$ 157,915 | \$ 141,638 | \$ 16,277 | 11.5 |

* Denotes % change from 2015 to 2016

- **Networking Platforms segment profit** increased, primarily due to higher sales volume, as described above, and improved gross margin, partially offset by higher research and development costs. The improved gross margin was the result of product cost reductions, including on our WaveLogic coherent optical processor for 100G and 200G optical transport, partially offset by market-based price erosion
- **Software and Software-Related Services segment profit** increased, primarily reflecting higher sales volume, partially offset by higher research and development costs and reduced gross margin from increased amortization of intangibles expense. Higher research and development costs reflect the addition of expenses relating to the development of our Blue Planet software platform.
- **Global Services segment profit** increased, primarily due to higher sales volume, as described above, and improved gross margin. The improved gross margin was the result of improved efficiencies for consulting and network design services.

The table below (in thousands, except percentage data) sets forth the changes in our segment profit for the respective periods:

| | Fiscal Year | | | %* |
|--|-------------|------------|------------------------|--------|
| | 2015 | 2014 | Increase (decrease) | |
| Segment profit: | | | | |
| Networking Platforms | \$ 515,550 | \$ 412,383 | \$ 103,167 | 25.0 |
| Software and Software-Related Services | \$ 4,174 | \$ 9,498 | \$ (5,324) | (56.1) |
| Global Services | \$ 141,638 | \$ 125,291 | \$ 16,347 | 13.0 |

* Denotes % change from 2014 to 2015

- **Networking Platforms segment profit** increased , due to increased sales volume, improved gross margin and reduced research and development expense. Increased sales volume is largely driven by service provider demand for convergence of high-capacity, coherent 40G and 100G network infrastructures with integrated OTN switching and control plane functionality.
- **Software and Software-Related Services segment profit** decreased due to increased research and development expense. Decreased segment profit was partially offset by increased sales volume, primarily due to increased sales of software subscription services.
- **Global Services segment profit** increased , primarily due to improved gross margin and increased sales volume. The improved gross margin was primarily due to reduced repair costs to support maintenance service contracts.

Liquidity and Capital Resources

For the fiscal year ended October 31, 2016 , we generated \$289.5 million in cash from operations. This amount was sufficient to fund our capital expenditures of \$107.2 million for the purchase of equipment, furniture and fixtures and intellectual property, and our settlement of certain foreign currency forward contracts of \$18.5 million . We further invested \$4.0 million from cash on hand to fund an investment in securities of a privately-held company and \$32.0 million to acquire the high-speed photonics components (“HSPC”) assets of TeraXion Inc. (“TeraXion”). For additional detail, see the discussion below entitled “Cash from Operations.”

As more fully described in Note 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report, during the second quarter of fiscal 2016 we entered into an Incremental Term Loan Credit Agreement that provided for a new tranche of senior secured term loans (under our existing Credit Agreement dated July 15, 2014) in an aggregate principal amount of \$250 million maturing on April 25, 2021 (“2021 Term Loan”). The net proceeds of approximately \$246.1 million, plus existing cash and investments on hand, supported the repurchase during fiscal 2016 of approximately \$262.5 million in face value of our 0.875% Convertible Senior Notes due June 15, 2017 (“2017 Notes”). We expect to repay the balance of this issuance with additional cash and investments on hand.

Our total cash, cash equivalents, and investments increased by \$121.9 million during fiscal 2016 as our net cash from operations exceeded our investment activity, as well as the excess of our debt repurchases over the net proceeds of our 2021 Term Loan, and capital lease payments of \$6.0 million , term loan installment payments of \$3.6 million and debt issuance costs of \$1.4 million related to our senior secured asset-based revolving credit facility (the “ABL Credit Facility”). Proceeds from the issuance of equity under our employee stock purchase plans also provided approximately \$23.1 million in cash. The effect of exchange rate changes resulted in a \$2.4 million decrease in cash and cash equivalents. The following table sets forth changes in our cash and cash equivalents and investments in marketable debt securities (in thousands):

| | October 31, | | Increase (decrease) |
|---|--------------|--------------|------------------------|
| | 2016 | 2015 | |
| Cash and cash equivalents | \$ 777,615 | \$ 790,971 | \$ (13,356) |
| Short-term investments in marketable debt securities | 275,248 | 135,107 | 140,141 |
| Long-term investments in marketable debt securities | 90,172 | 95,105 | (4,933) |
| Total cash and cash equivalents and investments in marketable debt securities | \$ 1,143,035 | \$ 1,021,183 | \$ 121,852 |

Our principal sources of liquidity on hand include our cash and investments, which as of October 31, 2016 totaled \$1.1 billion , as well as our ABL credit facility. Ciena and certain of its subsidiaries are parties to a senior secured asset-based

revolving credit facility (the “ABL Credit Facility”) providing for a total commitment of \$250 million with a maturity date of December 31, 2020. We principally use the ABL Credit Facility to support the issuance of letters of credit that arise in the ordinary course of our business and thereby to reduce our use of cash required to collateralize these instruments. As of October 31, 2016, letters of credit totaling \$ 65.1 million were collateralized by our ABL Credit Facility. There were no borrowings outstanding under the ABL Credit Facility as of October 31, 2016. Based on past performance and current expectations, we believe that cash from operations, cash and investments and other sources of liquidity, including our ABL Credit Facility, will satisfy the working capital needs, capital expenditures, and debt repayment obligations associated with our operations through at least the next 12 months.

The amount of cash, cash equivalents and short-term investments held by our foreign subsidiaries was \$44.4 million as of October 31, 2016. Given this amount, we do not believe that there are significant amounts held by foreign subsidiaries in which we consider earnings to be permanently reinvested, that may not be available for U.S. operations. In the event such funds held by our foreign subsidiaries were repatriated, we believe that any resulting tax implications would not be material.

We regularly evaluate our liquidity position, debt obligations, and anticipated cash needs to fund our operating or investment plans and may consider capital raising and other market opportunities that may be available to us. During fiscal 2016 we have repurchased approximately \$262.5 million in aggregate principal amount of our outstanding 2017 Notes. For additional information about our convertible notes, including certain repurchases during fiscal 2015 and 2016, see Note 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report. We regularly evaluate alternatives to manage our capital structure and reduce our debt and may continue to opportunistically repurchase our outstanding convertible notes.

Cash from Operations

The following sections set forth the components of our \$289.5 million of cash provided by operating activities for fiscal 2016 :

Net income adjusted for non-cash charges

The following tables set forth (in thousands) our net income adjusted for non-cash charges during fiscal 2016 :

| | Year ended October 31, 2016 |
|---|--------------------------------|
| Net income | \$ 72,584 |
| Adjustments for non-cash charges: | |
| Depreciation of equipment, building, furniture and fixtures, and amortization of leasehold improvements | 63,394 |
| Share-based compensation costs | 51,993 |
| Amortization of intangible assets | 78,298 |
| Provision for inventory excess and obsolescence | 33,713 |
| Provision for warranty | 15,483 |
| Other | 25,514 |
| Net income adjusted for non-cash charges | \$ 340,979 |

Working Capital

Our working capital used \$51.5 million of cash during fiscal 2016. The following tables set forth (in thousands) the major components of the reduction in working capital:

| | Year ended October 31, 2016 |
|---|--------------------------------|
| Cash used in accounts receivable | \$ (26,074) |
| Cash used in inventories | (53,000) |
| Cash provided by prepaid expenses and other | 30,047 |
| Cash provided by accounts payable, accruals and other obligations | 7,153 |
| Cash used in deferred revenue | (9,585) |
| Cash used in working capital | <u>\$ (51,459)</u> |

As compared to the end of fiscal 2015 :

- The \$26.1 million of cash used in accounts receivable during fiscal 2016 reflects the higher sales volume in the fourth quarter of fiscal 2016 compared to the fourth quarter of fiscal 2015;
- The \$53.0 million in cash used in inventory during fiscal 2016 primarily reflects increases in finished goods to meet expected customer deliveries for the beginning of the first quarter of fiscal 2017;
- Cash provided by prepaid expenses and other during fiscal 2016 was \$30.0 million , primarily reflecting payment of a financing receivable;
- The \$7.2 million of cash provided by accounts payable, accruals and other obligations during fiscal 2016 reflects increased inventory purchases at the end of fiscal 2016; and
- The \$9.6 million of cash used in deferred revenue represents an increase in the recognition of revenue for which we received advanced payments from customers.

Our days sales outstanding (DSOs) improved slightly to 80 days for fiscal 2016 compared to 81 days for fiscal 2015 . Our inventory turns decreased slightly from 5.9 turns during fiscal 2015 to 5.6 turns during fiscal 2016 .

Cash paid for interest

The following tables set forth (in thousands) our interest paid during fiscal 2016 :

| | Year ended October 31, 2016 |
|---|--------------------------------|
| 0.875% Convertible Senior Notes due June 15, 2017 ⁽¹⁾ | \$ 4,262 |
| 3.75% Convertible Senior Notes, due October 15, 2018 ⁽²⁾ | 13,125 |
| 4.0% Convertible Senior Notes, due December 15, 2020 ⁽³⁾ | 7,500 |
| Term Loan Payable due July 15, 2019 ⁽⁴⁾ | 9,354 |
| Term Loan Payable due April 25, 2021 ⁽⁵⁾ | 5,363 |
| Interest rate swaps ⁽⁶⁾ | 3,656 |
| ABL Credit Facility ⁽⁷⁾ | 1,762 |
| Capital leases | 1,875 |
| Total | <u>\$ 46,897</u> |

- (1) Interest on our outstanding 0.875% convertible senior notes, due June 15, 2017, is payable on June 15 and December 15 of each year.
- (2) Interest on our outstanding 3.75% convertible senior notes, due October 15, 2018, is payable on April 15 and October 15 of each year.
- (3) Interest on our outstanding 4.0% convertible senior notes, due December 15, 2020, is payable on June 15 and December 15 of each year.
- (4) Interest on our outstanding Term Loan, due July 15, 2019 (the "2019 Term Loan), is payable periodically based on the underlying market index rate selected for borrowing. The 2019 Term Loan bears interest at LIBOR plus a spread of 3.00% subject to a minimum LIBOR rate of 0.75%. At the end of fiscal 2016, the interest rate on the 2019 Term Loan was 3.75%.

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- (5) Interest on our outstanding 2021 Term Loan is payable periodically based on the underlying market index rate selected for borrowing. The 2021 Term Loan bears interest at LIBOR plus a spread of 3.25% to 3.50% subject to a minimum LIBOR rate of 0.75%. At the end of fiscal 2016, the interest rate on the 2021 Term Loan was 4.25%.
- (6) Payments on our interest rate swaps are variable and effectively fix the total interest rate under the 2019 Term Loan at 5.00% from July 20, 2015 through July 19, 2018 and the 2021 Term Loan at 4.62% to 4.87%, depending on applicable margin, from June 20, 2016 through June 22, 2020.
- (7) During fiscal 2016, we utilized the ABL Credit Facility to collateralize certain standby letters of credit and paid \$1.8 million in commitment fees, interest expense and other administrative charges relating to our ABL Credit Facility.

For additional information about our convertible notes, term loans, ABL Credit Facility and interest rate swaps see Note 16 and 17 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report and Item 7A of Part II of this annual report.

Contractual Obligations

The following is a summary of our future minimum payments under contractual obligations as of October 31, 2016 (in thousands):

| | Total | Less than one year | One to three years | Three to five years | Thereafter |
|--|--------------|-----------------------|-----------------------|------------------------|------------|
| Principal due at maturity on convertible notes (1) | \$ 798,685 | \$ 231,558 | \$ 350,000 | \$ 217,127 | \$ — |
| Principal due on term loans | 493,125 | 5,000 | 246,875 | 241,250 | — |
| Interest due on convertible notes | 62,026 | 22,651 | 28,125 | 11,250 | — |
| Interest due on term loans (2) | 72,486 | 19,942 | 36,976 | 15,568 | — |
| Payments due under interest rate swaps (2) | 10,989 | 4,640 | 5,342 | 1,007 | — |
| Operating leases (3) | 141,573 | 36,133 | 40,457 | 27,171 | 37,812 |
| Purchase obligations (4) | 247,119 | 247,119 | — | — | — |
| Capital leases - equipment | 5,145 | 2,034 | 2,973 | 138 | — |
| Capital leases - buildings (5) | 122,843 | 2,950 | 14,389 | 14,739 | 90,765 |
| Other obligations | 3,090 | 1,252 | 1,804 | 34 | — |
| Total (6) | \$ 1,957,081 | \$ 573,279 | \$ 726,941 | \$ 528,284 | \$ 128,577 |

- (1) Includes the accretion of the principal amount on the 2020 Notes payable at maturity at a rate of 1.85% per year compounded semi-annually, commencing December 27, 2012.
- (2) Interest on the term loans and payments under the interest rate swaps are variable and were calculated using the rate and applicable margin in effect on the balance sheet date. For additional information about our term loans and the interest rate swaps, see Note 16 to our Consolidated Financial Statements included in in Item 8 of Part II of this annual report and Item 7A of Part II of this annual report.
- (3) Does not include variable insurance, taxes, maintenance and other costs that may be required by the applicable operating lease. These costs are not expected to have a material future impact.
- (4) Purchase obligations relate to purchase order commitments to our contract manufacturers and component suppliers for inventory. In certain instances, we are permitted to cancel, reschedule or adjust these orders. Consequently, only a portion of the amount reported above relates to firm, non-cancelable and unconditional obligations.
- (5) This represents the total minimum lease payments due for all buildings that are subject to capital lease accounting, as well as buildings that are expected to be recorded as capital leases upon the commencement of the lease term. Payment timing is based on the expected commencement of the lease term. Does not include variable insurance, taxes, maintenance and other costs required by the applicable capital lease. These costs are not expected to have a material future impact.
- (6) As of October 31, 2016, we also had approximately \$14.1 million of other long-term obligations on our Consolidated Balance Sheet for unrecognized tax positions that are not included in this table because the timing or amount of any cash settlement with the respective tax authority cannot be reasonably estimated.

Some of our commercial commitments, including some of the future minimum payments in operating leases set forth above and certain commitments to customers, are secured by standby letters of credit collateralized under our ABL Credit

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Facility or restricted cash. Restricted cash balances are included in other current assets or other long-term assets depending upon the duration of the underlying letter of credit obligation. The following is a summary of our commercial commitments secured by standby letters of credit by commitment expiration date as of October 31, 2016 (in thousands):

| | Total | Less than one year | One to three years | Three to five years | Thereafter |
|---------------------------|-----------|-----------------------|-----------------------|------------------------|------------|
| Standby letters of credit | \$ 70,403 | \$ 27,732 | \$ 16,310 | \$ 12,617 | \$ 13,744 |

Off-Balance Sheet Arrangements

We do not engage in any off-balance sheet financing arrangements. In particular, we do not have any equity interests in so-called limited purpose entities, which include special purpose entities (SPEs) and structured finance entities.

Critical Accounting Policies and Estimates

The preparation of our consolidated financial statements requires that we make estimates and judgments that affect the reported amounts of assets, liabilities, revenue and expense, and related disclosure of contingent assets and liabilities. By their nature, these estimates and judgments are subject to an inherent degree of uncertainty. On an ongoing basis, we reevaluate our estimates, including those related to share-based compensation, bad debts, inventories, intangible and other long-lived assets, goodwill, income taxes, warranty obligations, restructuring, derivatives and hedging, and contingencies and litigation. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances. Among other things, these estimates form the basis for judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions. To the extent that there are material differences between our estimates and actual results, our consolidated financial statements will be affected.

We believe that the following critical accounting policies reflect those areas where significant judgments and estimates are used in the preparation of our consolidated financial statements.

Revenue Recognition

We recognize revenue when all of the following criteria are met: persuasive evidence of an arrangement exists; delivery has occurred or services have been rendered; the price to the buyer is fixed or determinable; and collectibility is reasonably assured. Customer purchase agreements and customer purchase orders are generally used to determine the existence of an arrangement. Shipping documents and evidence of customer acceptance, when applicable, are used to verify delivery or services rendered. We assess whether the price is fixed or determinable based on the payment terms associated with the transaction and whether the sales price is subject to refund or adjustment. We assess collectibility based primarily on the creditworthiness of the customer as determined by credit checks and analysis, as well as the customer's payment history. Revenue for maintenance services is deferred and recognized ratably over the period during which the services are to be performed. Shipping and handling fees billed to customers are included in revenue, with the associated expenses included in product cost of goods sold.

We apply the percentage-of-completion method to long-term arrangements where we are required to undertake significant production, customization or modification engineering, and reasonable and reliable estimates of revenue and cost are available. Utilizing the percentage-of-completion method, we recognize revenue based on the ratio of "actual costs incurred to date" to "total estimated costs expected to be incurred." In instances that do not meet the percentage-of-completion method criteria, recognition of revenue is deferred until there are no uncertainties regarding customer acceptance. Unbilled percentage-of-completion revenues recognized are included in accounts receivable, net. Billings in excess of revenues recognized on these contracts are recorded within deferred revenue. The percentage of total revenue recognized using the percentage-of-completion method for the fiscal years ended October 31, 2016, October 31, 2015 and October 31, 2014 were 0.3%, 1.8% and 4.0%, respectively.

Software revenue is recognized when persuasive evidence of an arrangement exists, delivery has occurred, the fee is fixed or determinable, and collectibility is probable. In instances where final acceptance criteria of the software are specified by the customer, revenue is deferred until there are no uncertainties regarding customer acceptance.

We limit the amount of revenue recognition for delivered elements to the amount that is not contingent on the future delivery of products or services, future performance obligations or subject to customer-specified return or refund privileges.

Revenue for multiple element arrangements is allocated to each unit of accounting based on the relative selling price of each delivered element, with revenue recognized for each delivered element when the revenue recognition criteria are met. We determine the selling price for each deliverable based upon the selling price hierarchy for multiple-deliverable arrangements. Under this hierarchy, we use vendor-specific objective evidence (“VSOE”) of selling price, if it exists, or third party evidence (“TPE”) of selling price if VSOE does not exist. If neither VSOE nor TPE of selling price exists for a deliverable, we use our best estimate of selling price (“BESP”) for that deliverable. For multiple element software arrangements where VSOE of undelivered maintenance does not exist, revenue for the entire arrangement is recognized over the maintenance term.

VSOE, when determinable, is established based on our pricing and discounting practices for the specific product or service when sold separately. In determining whether VSOE exists, we require that a substantial majority of the selling prices for a product or service fall within a reasonably narrow pricing range. We have generally been unable to establish TPE of selling price because our go-to-market strategy differs from that of others in our markets, and the extent of customization and differentiated features and functions varies among comparable products or services from our peers. We determine BESP based upon management-approved pricing guidelines, which consider multiple factors including the type of product or service, gross margin objectives, competitive and market conditions, and the go-to-market strategy, all of which can affect pricing practices.

Our total deferred revenue for products was \$45.2 million and \$66.5 million as of October 31, 2016 and October 31, 2015, respectively. Our services revenue is deferred and recognized ratably over the period during which the services are to be performed. Our total deferred revenue for services was \$137.7 million and \$122.5 million as of October 31, 2016 and October 31, 2015, respectively.

Business Combinations

We record acquisitions using the purchase method of accounting. All of the assets acquired, liabilities assumed, contractual contingencies and contingent consideration are recognized at their fair value as of the acquisition date. The excess of the purchase price over the estimated fair values of the net tangible and net intangible assets acquired is recorded as goodwill. The application of the purchase method of accounting for business combinations requires management to make significant estimates and assumptions in the determination of the fair value of assets acquired and liabilities assumed in order to allocate purchase price consideration properly between assets that are depreciated and amortized from goodwill. These assumptions and estimates include a market participant’s use of the asset and the appropriate discount rates for a market participant. Our estimates are based on historical experience, information obtained from the management of the acquired companies and, when appropriate, includes assistance from independent third-party appraisal firms. Our significant assumptions and estimates can include, but are not limited to, the cash flows that an asset is expected to generate in the future, the appropriate weighted-average cost of capital, and the cost savings expected to be derived from acquiring an asset. These estimates are inherently uncertain and unpredictable. In addition, unanticipated events and circumstances may occur which may affect the accuracy or validity of such estimates. During fiscal 2015, we completed the Cyan acquisition for a purchase price of \$335.7 million. During fiscal 2016, we completed the acquisition of TeraXion’s HSPC assets for a purchase price of \$32.0 million. See Note 2 to the Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Share-Based Compensation

We estimate the fair value of our restricted stock unit awards based on the fair value of our common stock on the date of grant. Our outstanding restricted stock unit awards are subject to service-based vesting conditions and/or performance-based vesting conditions. We recognize the estimated fair value of service-based awards, net of estimated forfeitures, as share-based expense ratably over the vesting period on a straight-line basis. Awards with performance-based vesting conditions require the achievement of certain financial or other performance criteria or targets as a condition to the vesting, or acceleration of vesting. We recognize the estimated fair value of performance-based awards, net of estimated forfeitures, as share-based expense over the performance period, using graded vesting, which considers each performance period or tranche separately, based upon our determination of whether it is probable that the performance targets will be achieved. At the end of each reporting period, we reassess the probability of achieving the performance targets and the performance period required to meet those targets, and the expense is adjusted accordingly. Determining whether the performance targets will be achieved involves judgment, and the estimate of expense may be revised periodically based on changes in the probability of achieving the performance targets. Revisions are reflected in the period in which the estimate is changed. If any performance goals are not met, no compensation cost is ultimately recognized against that goal and, to the extent previously recognized, compensation cost is reversed.

Because share-based compensation expense is based on awards that are ultimately expected to vest, the amount of expense takes into account estimated forfeitures. We estimate forfeitures at the time of grant and revise these estimates, if necessary, in subsequent periods if actual forfeitures differ from those estimates. Changes in these estimates and assumptions can materially affect the measurement of estimated fair value of our share-based compensation. See Note 21 to our Consolidated Financial Statements in Item 8 of Part II of this annual report for information regarding our assumptions related to share-based compensation and the amount of share-based compensation expense we incurred for the periods covered in this report. As of October 31, 2016, total unrecognized compensation expense was \$70.2 million : (i) \$0.6 million, which relates to unvested stock options and is expected to be recognized over a weighted-average period of 1.5 years ; and (ii) \$69.6 million, which relates to unvested restricted stock units and is expected to be recognized over a weighted-average period of 1.4 years.

We recognize windfall tax benefits associated with the exercise of stock options or release of restricted stock units directly to stockholders' equity only when realized. A windfall tax benefit occurs when the actual tax benefit realized by us upon an employee's disposition of a share-based award exceeds the deferred tax asset, if any, associated with the award that we had recorded. When assessing whether a tax benefit relating to share-based compensation has been realized, we follow the "with-and-without" method. Under the with-and-without method, the windfall is considered realized and recognized for financial statement purposes only when an incremental benefit is provided after considering all other tax benefits including our net operating losses. The with-and-without method results in the windfall from share-based compensation awards always being effectively the last tax benefit to be considered. Consequently, the windfall attributable to share-based compensation will not be considered realized in instances where our net operating loss carryover (that is unrelated to windfalls) is sufficient to offset the current year's taxable income before considering the effects of current-year windfalls.

Reserve for Inventory Obsolescence

We make estimates about future customer demand for our products when establishing the appropriate reserve for excess and obsolete inventory. We write down inventory that has become obsolete or unmarketable by an amount equal to the difference between the cost of inventory and the estimated market value based on assumptions about future demand and market conditions. Inventory write downs are a component of our product cost of goods sold. Upon recognition of the write down, a new lower cost basis for that inventory is established, and subsequent changes in facts and circumstances do not result in the restoration or increase in that newly established cost basis. In an effort to limit our exposure to delivery delays and to satisfy customer needs, we purchase inventory based on forecasted sales across our product lines. In addition, part of our research and development strategy is to promote the convergence of similar features and functionalities across our product lines. Each of these practices exposes us to the risk that our customers will not order products for which we have forecasted sales, or will purchase less than we have forecasted. Historically, we have experienced write downs due to changes in our strategic direction, discontinuance of a product and declines in the sales of certain products, and general market conditions. We recorded charges for excess and obsolete inventory of \$33.7 million, \$26.8 million and \$32.3 million in fiscal 2016, 2015 and 2014, respectively. The charges in fiscal 2016 were primarily related to a decrease in the forecasted demand for certain Converged Packet Optical and Optical Transport products. The charges in fiscal 2015 were primarily related to the discontinuance of certain parts and components used in the manufacture of our Converged Packet Optical products and a decrease in the forecasted demand for both our Optical Transport platforms and our 5410 Service Aggregation Switch. The charges in fiscal 2014 were primarily related to engineering design changes and the discontinuance of certain parts and components used in the manufacture of our Optical Transport products, including our Corestream® Agility Optical Transport platform, and Converged Packet Optical products. Our inventory net of allowance for excess and obsolescence was \$211.3 million and \$191.2 million as of October 31, 2016 and October 31, 2015, respectively.

Allowance for Doubtful Accounts Receivable

Our allowance for doubtful accounts receivable is based on management's assessment, on a specific identification basis, of the collectibility of customer accounts. We perform ongoing credit evaluations of our customers and generally have not required collateral or other forms of security from customers. In determining the appropriate balance for our allowance for doubtful accounts receivable, management considers each individual customer account receivable in order to determine collectibility. In doing so, we consider creditworthiness, payment history, account activity and communication with such customer. If a customer's financial condition changes, or if actual defaults are higher than our historical experience, we may be required to take a charge for an allowance for doubtful accounts receivable which could have an adverse impact on our results of operations. Our accounts receivable, net of allowance for doubtful accounts, was \$576.2 million and \$550.8 million as of October 31, 2016 and October 31, 2015, respectively. Our allowance for doubtful accounts was \$4.0 million and \$3.0 million as of October 31, 2016 and October 31, 2015, respectively.

Goodwill

Our goodwill was generated from the acquisition of Cyan during fiscal 2015 and the acquisition of the HSPC assets from TeraXion during the second quarter of fiscal 2016, and is primarily related to expected synergies. Goodwill is the excess of the purchase price over the fair values assigned to the net assets acquired in a business combination. We test goodwill for impairment on an annual basis, which we have determined to be the last business day of fiscal September each year. We also test goodwill for impairment between annual tests if an event occurs or circumstances change that would, more likely than not, reduce the fair value of the reporting unit below its carrying value.

The first step in the process of assessing goodwill impairment is to compare the fair value of the reporting unit with the unit's carrying amount, including goodwill. If this test indicates that the fair value is less than the carrying value, then step two is required to compare the implied fair value of the reporting unit's goodwill with the carrying amount of the reporting unit's goodwill. A non-cash goodwill impairment charge would have the effect of decreasing our earnings or increasing our losses in such period. If we are required to take a substantial impairment charge, our operating results would be materially adversely affected in such period. At the end of fiscal 2016 and 2015, the goodwill balance was \$267.0 million and \$256.4 million, respectively. There were no goodwill impairments resulting from fiscal 2016 and 2015 impairment tests and no reporting unit was determined to be at risk of failing step one of the goodwill impairment test. See Note 2 to the Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Long-lived Assets

Our long-lived assets include: equipment, building, furniture and fixtures, finite-lived intangible assets, in-process research and development, and maintenance spares. As of October 31, 2016 and October 31, 2015 these assets totaled \$484.7 million and \$449.9 million, net, respectively. We test long-lived assets for impairment whenever events or changes in circumstances indicate that the assets' carrying amount is not recoverable from its undiscounted cash flows. Our long-lived assets are assigned to asset groups which represent the lowest level for which we identify cash flows. We measure impairment loss as the amount by which the carrying amount of the asset or asset group exceeds its fair value.

Deferred Tax Valuation Allowance

We provide a valuation allowance for our deferred tax assets in excess of deferred tax liabilities because we have concluded that it is more likely than not that such deferred tax assets will ultimately not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income (including the reversals of deferred tax liabilities) during the periods in which those deferred tax assets will become deductible. We assess available positive and negative evidence regarding our ability to realize our deferred tax assets and record a valuation allowance when it is more likely than not that deferred tax assets will not be realized. To form a conclusion, management considers our recent financial results and trends and makes judgments and estimates related to projections of profitability, the timing and extent of the use of net operating loss carryforwards, and tax planning strategies. At October 31, 2016, we were not in a three-year cumulative loss position. However, management determined that a valuation allowance is still necessary, due to, among other things, the relatively low level of cumulative pre-tax income during this period — which was only initially achieved in the second half of fiscal 2016 — and our history of operating losses. We will continue to evaluate future financial performance to determine whether such profitability is both sustainable and significant enough to provide sufficient evidence to support reversal of all or a portion of the valuation allowance. Any future release of valuation allowance may be recorded as a tax benefit increasing net income or as an adjustment to paid-in capital, based on tax ordering requirements. The valuation allowance balance at October 31, 2016 was \$1.5 billion.

Warranty

Our liability for product warranties, included in other accrued liabilities, was \$52.3 million and \$56.7 million as of October 31, 2016 and October 31, 2015, respectively. Our products are generally covered by a warranty for periods ranging from one to five years. We accrue for warranty costs as part of our cost of goods sold based on associated material costs, technical support labor costs and associated overhead. Material cost is estimated based primarily upon historical trends in the volume of product returns within the warranty period and the cost to repair or replace the equipment. Technical support labor cost is estimated based primarily upon historical trends and the cost to support the customer cases within the warranty period. The provision for product warranties was \$15.5 million, \$17.9 million and \$22.1 million for fiscal 2016, 2015 and 2014 respectively. See Note 13 to the Consolidated Financial Statements included in Item 8 of Part II of this annual report. The provision for warranty claims may fluctuate on a quarterly basis depending upon the mix of products and customers in that period. If actual product failure rates, material replacement costs, service or labor costs differ from our estimates, revisions to the estimated warranty provision would be required. An increase in warranty claims or the related costs associated with satisfying our warranty obligations could increase our cost of sales and negatively affect our gross margin.

Effects of Recent Accounting Pronouncements

See Note 1 to our Consolidated Financial Statements in Item 8 of Part II of this annual report for information relating to our discussion of the effects of recent accounting pronouncements.

Unaudited Quarterly Results of Operations

The tables below (in thousands, except per share data) set forth the operating results in our consolidated statements of operations for each of the eight quarters in the period ended October 31, 2016 . Our revenue can fluctuate from quarter to quarter as a result of a number of factors, including changes in customer spending levels or networking strategies, order timing and volume, backlog levels, timing of revenue recognition and other competitive dynamics. As our business has evolved, including the sales of our solutions to meet the “on-demand” service requirements of both our customers and their end-users, the amount of quarterly revenue that we recognize in a quarter from customer orders received in that same quarter (which we refer to as “book to revenue”) has increased as compared to our historical periods. Increased reliance on book to revenue introduces a number of risks, including the inherent difficulty in forecasting the amount and timing of book to revenue in any given quarter, and may increase the likelihood of fluctuations in our results. This information is unaudited, but in our opinion reflects all adjustments (consisting only of normal recurring adjustments) that we consider necessary for a fair statement of such information in accordance with generally accepted accounting principles. The results for any quarter are not necessarily indicative of results for any future period.

| | Oct. 31, 2016 | Jul. 31, 2016 | Apr. 30, 2016 | Jan. 31, 2016 | Oct. 31, 2015 | Jul. 31, 2015 | Apr. 30, 2015 | Jan. 31, 2015 |
|---|------------------|------------------|------------------|--------------------|--------------------|------------------|------------------|--------------------|
| Revenue: | | | | | | | | |
| Products | \$ 582,455 | \$ 553,450 | \$ 523,978 | \$ 457,589 | \$ 574,281 | \$ 493,919 | \$ 511,880 | \$ 422,315 |
| Services | 133,736 | 117,100 | 116,739 | 115,526 | 117,692 | 109,013 | 109,722 | 106,847 |
| Total Revenue | 716,191 | 670,550 | 640,717 | 573,115 | 691,973 | 602,932 | 621,602 | 529,162 |
| Cost of goods sold: | | | | | | | | |
| Products | 324,663 | 299,381 | 291,778 | 260,482 | 323,090 | 273,837 | 286,898 | 236,548 |
| Services | 72,980 | 62,684 | 65,846 | 61,183 | 65,895 | 59,226 | 62,293 | 62,319 |
| Total costs of goods sold | 397,643 | 362,065 | 357,624 | 321,665 | 388,985 | 333,063 | 349,191 | 298,867 |
| Gross profit | 318,548 | 308,485 | 283,093 | 251,450 | 302,988 | 269,869 | 272,411 | 230,295 |
| Operating expenses: | | | | | | | | |
| Research and development | 112,448 | 116,697 | 114,603 | 108,046 | 107,859 | 100,379 | 105,202 | 100,761 |
| Selling and marketing | 96,853 | 83,732 | 86,668 | 82,478 | 93,003 | 81,650 | 82,471 | 76,712 |
| General and administrative | 32,147 | 34,336 | 35,203 | 31,142 | 33,804 | 29,743 | 30,302 | 29,553 |
| Amortization of intangible assets | 14,551 | 14,529 | 15,566 | 16,862 | 36,454 | 11,019 | 11,019 | 11,019 |
| Acquisition and integration costs | — | 1,029 | 2,285 | 1,299 | 22,084 | 2,435 | 1,020 | — |
| Restructuring costs | 2,876 | 1,138 | 535 | 384 | 366 | 192 | (17) | 8,085 |
| Total operating expenses | 258,875 | 251,461 | 254,860 | 240,211 | 293,570 | 225,418 | 229,997 | 226,130 |
| Income from operations | 59,673 | 57,024 | 28,233 | 11,239 | 9,418 | 44,451 | 42,414 | 4,165 |
| Interest and other income (loss), net | (1,339) | (3,647) | 967 | (8,776) | (6,232) | (5,491) | (5,549) | (8,233) |
| Interest expense | (15,371) | (15,967) | (12,608) | (12,710) | (12,688) | (11,883) | (12,947) | (13,661) |
| Income (loss) before income taxes | 42,963 | 37,410 | 16,592 | (10,247) | (9,502) | 27,077 | 23,918 | (17,729) |
| Provision for income tax | 6,376 | 3,864 | 2,595 | 1,299 | 4,330 | 3,452 | 3,265 | 1,050 |
| Net income (loss) | \$ 36,587 | \$ 33,546 | \$ 13,997 | \$ (11,546) | \$ (13,832) | \$ 23,625 | \$ 20,653 | \$ (18,779) |
| Basic net income (loss) per common share | \$ 0.26 | \$ 0.24 | \$ 0.10 | \$ (0.08) | \$ (0.10) | \$ 0.20 | \$ 0.18 | \$ (0.17) |
| Diluted net income (loss) per potential common share | \$ 0.25 | \$ 0.23 | \$ 0.10 | \$ (0.08) | \$ (0.10) | \$ 0.19 | \$ 0.17 | \$ (0.17) |
| Weighted average basic common shares outstanding | 139,741 | 138,881 | 137,950 | 136,675 | 134,097 | 118,413 | 113,555 | 107,773 |
| Weighted average diluted potential common shares outstanding | 165,298 | 169,349 | 138,889 | 136,675 | 134,097 | 133,233 | 128,017 | 107,773 |

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The following discussion about our market risk disclosures includes forward-looking statements. Actual results could differ materially from those projected in these forward-looking statements. We are exposed to market risk related to changes in interest rates and foreign currency exchange rates.

Interest Rate Sensitivity. We currently hold investments in U.S. Government obligations and commercial paper with varying maturities. See Notes 5 and 6 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for information relating to investments and fair value. These investments are sensitive to interest rate movements, and their fair value will decline as interest rates rise and increase as interest rates decline. The estimated impact on these investments of a 100 basis point (1.0%) increase in interest rates across the yield curve from rates in effect as of the balance sheet date would be a \$2.3 million decline in value.

Our earnings and cash flows from operations may be exposed to changes in interest rates because of the floating rate of interest in the 2019 Term Loan and the 2021 Term Loan. See Note 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for information relating to the term loans.

The 2019 Term Loan bears interest at LIBOR plus a spread of 3.00% subject to a minimum LIBOR rate of 0.75%. As of October 31, 2016, the interest rate in effect on the 2019 Term Loan was 3.75%. During fiscal 2014, we entered into interest rate swap arrangements (“interest rate swaps”) that fix the total interest rate under the 2019 Term Loan at 5.004%, for the period commencing on July 20, 2015 through July 19, 2018.

The 2021 Term Loan bears interest at LIBOR plus a spread ranging from 3.25% to 3.50% subject to a minimum LIBOR rate of 0.75%, with the actual spread determined according to our total net leverage ratio. In the third quarter of fiscal 2016, we entered into interest rate swaps that fix the total interest rate under the 2021 Term Loan at 4.62% to 4.87%, depending on the applicable spread, for the period commencing on June 20, 2016 through June 22, 2020.

As such, a 100 basis point (1%) increase in the LIBOR rate as of our most recent LIBOR rate setting would have an immaterial impact in annualized interest expense on the 2019 Term Loan and the 2021 Term Loan as recognized in our Consolidated Financial Statements.

Foreign Currency Exchange Risk. As a global concern, our business and results of operations are exposed to and can be impacted by movements in foreign currency exchange rates. For example, the announcement of the United Kingdom (UK) referendum, in which voters approved an exit from the European Union (EU), commonly referred to as “Brexit,” has previously caused, and may continue to cause, significant currency exchange rate fluctuations. Due to our global sales presence, some of our sales transactions and revenue are non-U.S. Dollar denominated, with the Canadian Dollar, Euro and Brazilian Real being our most significant foreign currency revenue exposures. If the U.S. Dollar strengthens against these currencies, our revenue for these transactions reported in U.S. Dollars would decline. For our U.S. Dollar denominated sales, an increase in the value of the U.S. Dollar would increase the real costs of our products to customers in markets outside the United States, which could impact our competitive position. During fiscal 2016, approximately 18.2% of revenue was non-U.S. Dollar denominated. During fiscal 2016 as compared to fiscal 2015, the U.S. Dollar strengthened against a number of foreign currencies, including the Canadian Dollar, Euro and Brazilian Real, and, consequently, our revenue reported in U.S. Dollars was adversely impacted by approximately \$16.7 million or 0.6%. As it relates to costs of goods sold, employee-related and facilities costs associated with certain manufacturing-related operations in Canada represent our primary exposure to foreign currency exchange risk.

With regard to operating expense, our primary exposure to foreign currency exchange risk relates to the Canadian Dollar, British Pound, Euro, Indian Rupee and Brazilian Real. During fiscal 2016, approximately 46.6% of our operating expense was non-U.S. Dollar denominated. If these currencies strengthen, costs reported in U.S. Dollars will increase. During fiscal 2016, research and development expense benefited by approximately \$16.4 million, net of hedging losses of \$0.6 million, primarily due to the strengthening of the U.S. Dollar in relation to the Canadian Dollar in comparison to fiscal 2015. Also in fiscal 2016, sales and marketing expense and general and administrative expense benefited by approximately \$4.9 million and \$1.7 million, respectively, due to foreign exchange rates, primarily due to the strengthening of the U.S. Dollar in relation to the Euro, Canadian Dollar and Brazilian Real in comparison to fiscal 2015.

From time to time, we use foreign currency forward contracts to reduce variability in certain forecasted non-U.S. Dollar denominated cash flows. Generally, these derivatives have maturities of 12 months or less and are designated as cash flow hedges. At the inception of the cash flow hedge, and on an ongoing basis, we assess whether the forward contract has been effective in offsetting changes in cash flows attributable to the hedged risk during the hedging period. The effective portion of

the derivative's net gain or loss is initially reported as a component of accumulated other comprehensive income (loss) and, upon the occurrence of the forecasted transaction, is subsequently reclassified to the line item in the Consolidated Statement of Operations to which the hedged transaction relates. Any net gain or loss associated with the ineffectiveness of the hedging instrument is reported in interest and other income (loss), net.

Ciena Corporation, as the U.S. parent entity, uses the U.S. Dollar as its functional currency, however some of our foreign branch offices and subsidiaries use the local currency as their functional currency. During fiscal 2016, we recorded \$5.9 million in foreign currency exchange gains, as a result of monetary assets and liabilities that were transacted in a currency other than the entity's functional currency, and the re-measurement adjustments were recorded in interest and other income (loss), net on the Consolidated Statement of Operations. From time to time, we use foreign currency forwards to hedge these balance sheet exposures. These forwards are not designated as hedges for accounting purposes, and any net gain or loss associated with these derivatives is reported in interest and other income (loss), net. During fiscal 2016, we recorded losses of \$23.4 million from these derivatives. See Note 1, Note 4 and Note 14 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Convertible Notes Outstanding. The fair market value of each of our outstanding issues of convertible notes is subject to interest rate and market price risk due to the convertible feature of the notes and other factors. Generally the fair market value of fixed interest rate debt will increase as interest rates fall and decrease as interest rates rise. The fair market value of the notes may also increase as the market price of our stock rises and decrease as the market price of our stock falls. Interest rate and market value changes affect the fair market value of the notes and may affect the prices at which we would be able to repurchase such notes were we to do so. These changes do not impact our financial position, cash flows or results of operations. For additional information on the fair value of our outstanding notes, see Note 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

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Item 8. Financial Statements and Supplementary Data

The following is an index to the consolidated financial statements:

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Ciena Corporation:

In our opinion, the accompanying consolidated financial statements listed in the accompanying index present fairly, in all material respects, the financial position of Ciena Corporation and its subsidiaries (the "Company") at October 31, 2016 and 2015, and the results of their operations and their cash flows for each of the three years in the period ended October 31, 2016 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of October 31, 2016, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The Company's management is responsible for these financial statements, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Report of Management on Internal Control Over Financial Reporting under Item 9A. Our responsibility is to express opinions on these financial statements and on the Company's internal control over financial reporting based on our integrated audits. We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

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 (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) 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 (iii) 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/ PricewaterhouseCoopers LLP
Baltimore, Maryland

December 21, 2016

CIENA CORPORATION
CONSOLIDATED BALANCE SHEETS
(in thousands, except share data)

| | October 31, | |
|---|---------------------|---------------------|
| | 2016 | 2015 |
| ASSETS | | |
| Current assets: | | |
| Cash and cash equivalents | \$ 777,615 | \$ 790,971 |
| Short-term investments | 275,248 | 135,107 |
| Accounts receivable, net | 576,235 | 550,792 |
| Inventories | 211,251 | 191,162 |
| Prepaid expenses and other | 172,843 | 196,178 |
| Total current assets | <u>2,013,192</u> | <u>1,864,210</u> |
| Long-term investments | 90,172 | 95,105 |
| Equipment, building, furniture and fixtures, net | 288,406 | 191,973 |
| Goodwill | 266,974 | 256,434 |
| Other intangible assets, net | 146,711 | 202,673 |
| Other long-term assets | 76,987 | 84,656 |
| Total assets | <u>\$ 2,882,442</u> | <u>\$ 2,695,051</u> |
| LIABILITIES AND STOCKHOLDERS' EQUITY (DEFICIT) | | |
| Current liabilities: | | |
| Accounts payable | \$ 235,942 | \$ 222,140 |
| Accrued liabilities and other short-term obligations | 310,353 | 316,283 |
| Deferred revenue | 109,009 | 126,111 |
| Current portion of long-term debt | 236,558 | 2,500 |
| Total current liabilities | <u>891,862</u> | <u>667,034</u> |
| Long-term deferred revenue | 73,854 | 62,962 |
| Other long-term obligations | 124,394 | 72,540 |
| Long-term debt, net | 1,025,991 | 1,271,639 |
| Total liabilities | <u>\$ 2,116,101</u> | <u>\$ 2,074,175</u> |
| Commitments and contingencies (Note 24) | | |
| Stockholders' equity: | | |
| Preferred stock — par value \$0.01; 20,000,000 shares authorized; zero shares issued and outstanding | — | — |
| Common stock — par value \$0.01; 290,000,000 shares authorized; 139,767,627 and 135,612,217 shares issued and outstanding | 1,398 | 1,356 |
| Additional paid-in capital | 6,715,478 | 6,640,436 |
| Accumulated other comprehensive loss | (24,329) | (22,126) |
| Accumulated deficit | (5,926,206) | (5,998,790) |
| Total stockholders' equity | <u>766,341</u> | <u>620,876</u> |
| Total liabilities and stockholders' equity | <u>\$ 2,882,442</u> | <u>\$ 2,695,051</u> |

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except per share data)

| | Year Ended October 31, | | |
|---|------------------------|------------------|--------------------|
| | 2016 | 2015 | 2014 |
| Revenue: | | | |
| Products | \$ 2,117,472 | \$ 2,002,395 | \$ 1,865,826 |
| Services | 483,101 | 443,274 | 422,463 |
| Total revenue | 2,600,573 | 2,445,669 | 2,288,289 |
| Cost of goods sold: | | | |
| Products | 1,176,304 | 1,120,373 | 1,083,022 |
| Services | 262,693 | 249,733 | 256,915 |
| Total cost of goods sold | 1,438,997 | 1,370,106 | 1,339,937 |
| Gross profit | 1,161,576 | 1,075,563 | 948,352 |
| Operating expenses: | | | |
| Research and development | 451,794 | 414,201 | 401,180 |
| Selling and marketing | 349,731 | 333,836 | 328,325 |
| General and administrative | 132,828 | 123,402 | 126,824 |
| Amortization of intangible assets | 61,508 | 69,511 | 45,970 |
| Acquisition and integration costs | 4,613 | 25,539 | — |
| Restructuring costs | 4,933 | 8,626 | 349 |
| Total operating expenses | 1,005,407 | 975,115 | 902,648 |
| Income from operations | 156,169 | 100,448 | 45,704 |
| Interest and other income (loss), net | (12,795) | (25,505) | (25,262) |
| Interest expense | (56,656) | (51,179) | (47,115) |
| Income (loss) before income taxes | 86,718 | 23,764 | (26,673) |
| Provision for income taxes | 14,134 | 12,097 | 13,964 |
| Net income (loss) | \$ 72,584 | \$ 11,667 | \$ (40,637) |
| Basic net income (loss) per common share | \$ 0.52 | \$ 0.10 | \$ (0.38) |
| Diluted net income (loss) per potential common share | \$ 0.51 | \$ 0.10 | \$ (0.38) |
| Weighted average basic common shares outstanding | 138,312 | 118,416 | 105,783 |
| Weighted average diluted potential common shares outstanding | 150,704 | 120,101 | 105,783 |

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(in thousands)

| | Year ended October 31, | | |
|--|------------------------|-----------------|--------------------|
| | 2016 | 2015 | 2014 |
| Net income (loss) | \$ 72,584 | \$ 11,667 | \$ (40,637) |
| Change in unrealized gain (loss) on available-for-sale securities, net of tax | 217 | (149) | 41 |
| Change in unrealized gain (loss) on foreign currency forward contracts, net of tax | (823) | (95) | 114 |
| Change in unrealized loss on forward starting interest rate swaps, net of tax | (445) | (3,439) | (2,109) |
| Change in accumulated translation adjustments | (1,152) | (3,775) | (4,940) |
| Other comprehensive loss | (2,203) | (7,458) | (6,894) |
| Total comprehensive income (loss) | <u>\$ 70,381</u> | <u>\$ 4,209</u> | <u>\$ (47,531)</u> |

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY (DEFICIT)
(in thousands, except share data)

| | Common Stock Shares | Par Value | Additional Paid-in- Capital | Accumulated Other Comprehensive Income (Loss) | Accumulated Deficit | Total Stockholders' Equity (Deficit) |
|--|------------------------|-----------|-----------------------------------|--|------------------------|---|
| Balance at October 31, 2013 | 103,705,709 | \$ 1,037 | \$ 5,893,880 | \$ (7,774) | \$ (5,969,820) | \$ (82,677) |
| Net loss | — | — | — | — | (40,637) | (40,637) |
| Other comprehensive loss | — | — | — | (6,894) | — | (6,894) |
| Issuance of shares from employee equity plans | 3,274,251 | 33 | 17,630 | — | — | 17,663 |
| Share-based compensation expense | — | — | 42,930 | — | — | 42,930 |
| Balance at October 31, 2014 | 106,979,960 | 1,070 | 5,954,440 | (14,668) | (6,010,457) | (69,615) |
| Net income | — | — | — | — | 11,667 | 11,667 |
| Other comprehensive loss | — | — | — | (7,458) | — | (7,458) |
| Issuance of shares from Cyan acquisition | 10,638,553 | 106 | 302,008 | — | — | 302,114 |
| Equity component of convertible note acquired | — | — | 82,164 | — | — | 82,164 |
| Conversion of convertible notes into common shares | 13,488,013 | 135 | 216,254 | — | — | 216,389 |
| Issuance of shares from employee equity plans | 4,505,691 | 45 | 30,230 | — | — | 30,275 |
| Share-based compensation expense | — | — | 55,340 | — | — | 55,340 |
| Balance at October 31, 2015 | 135,612,217 | 1,356 | 6,640,436 | (22,126) | (5,998,790) | 620,876 |
| Net income | — | — | — | — | 72,584 | 72,584 |
| Other comprehensive loss | — | — | — | (2,203) | — | (2,203) |
| Issuance of shares from employee equity plans | 4,155,410 | 42 | 23,049 | — | — | 23,091 |
| Share-based compensation expense | — | — | 51,993 | — | — | 51,993 |
| Balance at October 31, 2016 | 139,767,627 | \$ 1,398 | \$ 6,715,478 | \$ (24,329) | \$ (5,926,206) | \$ 766,341 |

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

| | Year Ended October 31, | | |
|---|------------------------|------------|-------------|
| | 2016 | 2015 | 2014 |
| Cash flows from operating activities: | | | |
| Net income (loss) | \$ 72,584 | \$ 11,667 | \$ (40,637) |
| Adjustments to reconcile net income (loss) to net cash provided by operating activities: | | | |
| Depreciation of equipment, building, furniture and fixtures, and amortization of leasehold improvements | 63,394 | 55,901 | 55,616 |
| Share-based compensation costs | 51,993 | 55,340 | 42,930 |
| Amortization of intangible assets | 78,298 | 79,866 | 57,151 |
| Provision for inventory excess and obsolescence | 33,713 | 26,846 | 32,332 |
| Provision for warranty | 15,483 | 17,881 | 22,129 |
| Other | 25,514 | 27,373 | 25,668 |
| Changes in assets and liabilities: | | | |
| Accounts receivable | (26,074) | (37,297) | (33,164) |
| Inventories | (53,000) | 46,898 | (37,889) |
| Prepaid expenses and other | 30,047 | (46,383) | (7,931) |
| Accounts payable, accruals and other obligations | 7,153 | (10,505) | (59,837) |
| Deferred revenue | (9,585) | 34,525 | 33,448 |
| Net cash provided by operating activities | 289,520 | 262,112 | 89,816 |
| Cash flows used in investing activities: | | | |
| Payments for equipment, furniture, fixtures and intellectual property | (107,185) | (62,109) | (48,216) |
| Restricted cash | 11 | (40) | 2,060 |
| Purchase of available for sale securities | (365,191) | (245,323) | (245,196) |
| Proceeds from maturities of available for sale securities | 230,612 | 205,000 | 195,000 |
| Purchase of cost method investment | (4,000) | (2,000) | — |
| Settlement of foreign currency forward contracts, net | (18,506) | 24,133 | (10,041) |
| Acquisition of business, net of cash acquired | (32,000) | 37,212 | — |
| Net cash used in investing activities | (296,259) | (43,127) | (106,393) |
| Cash flows from financing activities: | | | |
| Proceeds from issuance of long-term debt, net | 248,750 | — | 248,750 |
| Payment of long-term debt | (266,116) | (29,867) | (625) |
| Payment of debt and equity issuance costs | (3,987) | (421) | (4,227) |
| Payment of capital lease obligations | (5,966) | (8,038) | (3,034) |
| Proceeds from issuance of common stock | 23,091 | 30,275 | 17,663 |
| Net cash provided by (used in) financing activities | (4,228) | (8,051) | 258,527 |
| Effect of exchange rate changes on cash and cash equivalents | (2,389) | (6,683) | (1,717) |
| Net increase (decrease) in cash and cash equivalents | (13,356) | 204,251 | 240,233 |
| Cash and cash equivalents at beginning of fiscal year | 790,971 | 586,720 | 346,487 |
| Cash and cash equivalents at end of fiscal year | \$ 777,615 | \$ 790,971 | \$ 586,720 |
| Supplemental disclosure of cash flow information | | | |
| Cash paid during the fiscal year for interest | \$ 46,897 | \$ 40,772 | \$ 36,276 |
| Cash paid during the fiscal year for income taxes, net | \$ 15,268 | \$ 10,668 | \$ 11,396 |
| Non-cash investing activities | | | |
| Purchase of equipment in accounts payable | \$ 15,030 | \$ 20,922 | \$ 4,961 |
| Equipment acquired under capital leases | \$ 5,322 | \$ 464 | \$ 10,424 |
| Building subject to capital lease | \$ 8,993 | \$ 14,939 | \$ — |
| Construction in progress subject to build-to-suit lease | \$ 39,914 | \$ 18,663 | \$ — |
| Non-cash financing activities | | | |
| Conversion of 4.0% convertible senior notes, due March 15, 2015 into 8,898,387 shares of common stock | \$ — | \$ 180,645 | \$ — |
| Conversion of 8.0% convertible senior notes, due December 15, 2019, assumed from the Cyan | | | |

| | | | | | | |
|--|----|---|----|---------|----|---|
| acquisition, into 4,589,626 shares of common stock | \$ | — | \$ | 117,140 | \$ | — |
| Fair value of shares issued related to acquisition of business | \$ | — | \$ | 302,114 | \$ | — |

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

(1) CIENA CORPORATION AND SIGNIFICANT ACCOUNTING POLICIES AND ESTIMATES

Description of Business

Ciena Corporation (“Ciena” or the “Company”) is a network strategy and technology company, providing solutions that enable a wide range of network operators to adopt next-generation communication architectures and to deliver a broad array of services relied upon by enterprise and consumer end users. Ciena provides equipment, software and services that support the transport, switching, aggregation, service delivery and management of voice, video and data traffic on communications networks. Ciena’s high-capacity hardware and network management and control software solutions enable open, multi-vendor, programmable networks that improve automation, reduce network complexity, and flexibly support changing service requirements. Ciena’s solutions yield business and operational value for customers by enabling them to support new applications, introduce new revenue-generating services and to reduce network complexity and expense.

Ciena’s Converged Packet Optical, Packet Networking and Optical Transport products are used by a diverse set of customers and market segments including communications service providers, cable and multiservice operators, Web-scale providers, submarine network operators, governments, enterprises, research and education (R&E) institutions, and other emerging network operators. These products, which can be applied from the network core to network access points, allow network operators to scale capacity, increase transmission speeds, allocate traffic and adapt dynamically to changing end-user service demands. In addition to its portfolio of high-capacity hardware platforms, Ciena offers network management and control software platforms designed to simplify the creation, automation and delivery of services across multi-vendor and multi-domain network environments. Ciena’s software solutions are oriented around its modular Blue Planet software platform for multi-domain service orchestration, network function virtualization, and network management and control. To complement its hardware and software solutions, Ciena offers a broad range of transformation and automation services that help customers to design, optimize, integrate, deploy, manage and maintain their networks. Ciena’s principal executive offices are located at 7035 Ridge Road, Hanover, Maryland 21076.

Basis of Presentation

The accompanying consolidated financial statements include the accounts of Ciena and its wholly owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Ciena has a 52 or 53 week fiscal year, which ends on the Saturday nearest to the last day of October in each year (November 1, 2014, October 31, 2015 and October 29, 2016 for the periods reported). Fiscal 2016, fiscal 2015 and fiscal 2014 each consisted of a 52-week fiscal year. For purposes of financial statement presentation, each fiscal year is described as having ended on October 31.

Business Combinations

Ciena records acquisitions using the purchase method of accounting. All of the assets acquired, liabilities assumed, contractual contingencies and contingent consideration are recognized at their fair value as of the acquisition date. The excess of the purchase price over the estimated fair values of the net tangible and net intangible assets acquired is recorded as goodwill. The application of the purchase method of accounting for business combinations requires management to make significant estimates and assumptions in the determination of the fair value of assets acquired and liabilities assumed, in order to properly allocate purchase price consideration between assets that are depreciated and amortized from goodwill. These assumptions and estimates include a market participant’s use of the asset and the appropriate discount rates for a market participant. Ciena’s estimates are based on historical experience, information obtained from the management of the acquired companies and, when appropriate, includes assistance from independent third-party appraisal firms. Significant assumptions and estimates can include, but are not limited to, the cash flows that an asset is expected to generate in the future, the appropriate weighted-average cost of capital, and the cost savings expected to be derived from acquiring an asset. These estimates are inherently uncertain and unpredictable. In addition, unanticipated events and circumstances may occur which may affect the accuracy or validity of such estimates.

Use of Estimates

The preparation of the financial statements and related disclosures in conformity with Generally Accepted Accounting Principles (“GAAP”) requires management to make estimates and judgments that affect the amounts reported in the consolidated financial statements and accompanying notes. Estimates are used for selling prices for multiple element arrangements, shared-based compensation, convertible notes payable valuations, bad debts, valuation of inventories and

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investments, recoverability of intangible assets, other long-lived assets and goodwill, income taxes, warranty obligations, restructuring liabilities, derivatives, contingencies and litigation. Ciena bases its estimates on historical experience and assumptions that it believes are reasonable. Actual results may differ materially from management's estimates.

Cash and Cash Equivalents

Ciena considers all highly liquid investments purchased with original maturities of three months or less to be cash equivalents. Any restricted cash collateralizing letters of credit is included in other current assets and other long-term assets depending upon the duration of the restriction.

Investments

Ciena's investments are classified as available-for-sale and are reported at fair value, with unrealized gains and losses recorded in accumulated other comprehensive income (loss). Ciena recognizes losses in the income statement when it determines that declines in the fair value of its investments below their cost basis are other-than-temporary. In determining whether a decline in fair value is other-than-temporary, Ciena considers various factors, including market price (when available), investment ratings, the financial condition and near-term prospects of the investee, the length of time and the extent to which the fair value has been less than Ciena's cost basis, and Ciena's intent and ability to hold the investment until maturity or for a period of time sufficient to allow for any anticipated recovery in market value. Ciena considers all marketable debt securities that it expects to convert to cash within one year or less to be short-term investments, with all others considered to be long-term investments.

Ciena has minority equity investments in privately held technology companies that are classified in other long-term assets. These investments are carried at cost because Ciena owns less than 20% of the voting equity and does not have the ability to exercise significant influence over the company. Ciena monitors these investments for impairment and makes appropriate reductions to the carrying value when necessary. As of October 31, 2016, the combined carrying value of these investments was \$6.0 million. Ciena has not estimated the fair value of these cost method investments because determining the fair value is not practicable. Ciena has not evaluated these investments for impairment as there have not been any events or changes in circumstances that Ciena believes would have had a significant adverse effect on the fair value of these investments.

Inventories

Inventories are stated at the lower of cost or market, with cost computed using standard cost, which approximates actual cost, on a first-in, first-out basis. Ciena records a provision for excess and obsolete inventory when an impairment has been identified.

Segment Reporting

Ciena's chief operating decision maker, its chief executive officer, evaluates the company's performance and allocates resources based on multiple factors, including measures of segment profit (loss). Operating segments are defined as components of an enterprise that engage in business activities that may earn revenue and incur expense, for which discrete financial information is available, and for which such information is evaluated regularly by the chief operating decision maker for purposes of allocating resources and assessing performance. Ciena has the following operating segments for reporting purposes: (i) Networking Platforms, (ii) Software and Software-Related Services, and (iii) Global Services. See Note 22 below.

Goodwill

Goodwill is the excess of the purchase price over the fair values assigned to the net assets acquired in a business combination. Ciena tests goodwill for impairment on an annual basis, which it has determined to be the last business day of fiscal September each year. Ciena also tests goodwill for impairment between annual tests if an event occurs or circumstances change that would, more likely than not, reduce the fair value of the reporting unit below its carrying value.

The first step in the process of assessing goodwill impairment is to compare the fair value of the reporting unit with the unit's carrying amount, including goodwill. If this test indicates that the fair value is less than the carrying value, then step two is required to compare the implied fair value of the reporting unit's goodwill with the carrying amount of the reporting unit's goodwill. A non-cash goodwill impairment charge would have the effect of decreasing earnings or increasing losses in such period. If Ciena is required to take a substantial impairment charge, its operating results would be materially adversely affected in such period.

Long-lived Assets

Long-lived assets include: equipment, building, furniture and fixtures; intangible assets; and maintenance spares. Ciena tests long-lived assets for impairment whenever triggering events or changes in circumstances indicate that the asset's carrying amount is not recoverable from its undiscounted cash flows. An impairment loss is measured as the amount by which the carrying amount of the asset or asset group exceeds its fair value. Ciena's long-lived assets are assigned to asset groups that represent the lowest level for which cash flows can be identified.

Equipment, Building, Furniture and Fixtures and Internal Use Software

Equipment, building, furniture and fixtures are recorded at cost. Depreciation and amortization are computed using the straight-line method over useful lives of two to five years for equipment and furniture and fixtures and the shorter of useful life or lease term for leasehold improvements. During fiscal 2015 and fiscal 2016, Ciena gained access to portions of an office building in Ottawa, Canada pursuant to a lease arrangement accounted for as a capital lease, which is depreciated over the lease term. The leased building is part of Ciena's new campus facility that will replace the "Lab 10" research and development center on the former Nortel Carling campus. See Note 10 below.

Ciena establishes assets and liabilities for the estimated construction costs incurred under build-to-suit lease arrangements to the extent that Ciena is involved in the construction of structural improvements or takes construction risk prior to commencement of a lease. See Notes 10 and 13 below.

Qualifying internal use software and website development costs incurred during the application development stage, which consist primarily of outside services and purchased software license costs, are capitalized and amortized straight-line over the estimated useful lives of two to five years.

Intangible Assets

Ciena has recorded finite-lived intangible assets as a result of several acquisitions. Finite-lived intangible assets are carried at cost less accumulated amortization. Amortization is computed using the straight-line method over the expected economic lives of the respective assets, up to seven years, which approximates the use of intangible assets.

Ciena has recorded in-process research and development projects acquired as the result of an acquisition as indefinite-lived intangible assets. Upon completion of the projects, the assets will be amortized on a straight-line basis over the expected economic life of the asset, which will be determined on that date. Should the project be determined to be abandoned and the asset developed has no alternative use, the full value of the asset will be charged to expense.

Maintenance Spares

Maintenance spares are recorded at cost. Spares usage cost is expensed ratably over four years.

Concentrations

Substantially all of Ciena's cash and cash equivalents are maintained at a small number of major U.S. financial institutions. The majority of Ciena's cash equivalents consist of money market funds. Deposits held with banks may exceed the amount of insurance provided on such deposits. Because these deposits generally may be redeemed upon demand, management believes that they bear minimal risk.

Historically, a significant percentage of Ciena's revenue has been concentrated among sales to a small number of large communications service providers. Consolidation among Ciena's customers has increased this concentration. Consequently, Ciena's accounts receivable are concentrated among these customers. See Note 22 below.

Additionally, Ciena's access to certain materials or components is dependent upon sole or limited source suppliers. The inability of any of these suppliers to fulfill Ciena's supply requirements, or significant changes in supply cost, could affect future results. Ciena relies on a small number of contract manufacturers to perform the majority of the manufacturing for its products. If Ciena cannot effectively manage these manufacturers or forecast future demand, or if these manufacturers fail to deliver products or components on time, Ciena's business and results of operations may suffer.

Revenue Recognition

Ciena recognizes revenue when all of the following criteria are met: persuasive evidence of an arrangement exists; delivery has occurred or services have been rendered; the price to the buyer is fixed or determinable; and collectibility is reasonably assured. Customer purchase agreements and customer purchase orders are generally used to determine the existence of an arrangement. Shipping documents and evidence of customer acceptance, when applicable, are used to verify delivery or services rendered. Ciena assesses whether the price is fixed or determinable based on the payment terms associated with the transaction and whether the sales price is subject to refund or adjustment. Ciena assesses collectibility based primarily on the creditworthiness of the customer as determined by credit checks and analysis, as well as the customer's payment history. Revenue for maintenance services is deferred and recognized ratably over the period during which the services are performed. Shipping and handling fees billed to customers are included in revenue, with the associated expenses included in product cost of goods sold.

Ciena applies the percentage-of-completion method to long-term arrangements where Ciena is required to undertake significant production, customization or modification engineering, and reasonable and reliable estimates of revenue and cost are available. Utilizing the percentage-of-completion method, Ciena recognizes revenue based on the ratio of "actual costs incurred to date" to "total estimated costs expected to be incurred". In instances that do not meet the percentage-of-completion method criteria, recognition of revenue is deferred until there are no uncertainties regarding customer acceptance. Unbilled percentage-of-completion revenues recognized are included in accounts receivable, net. Billings in excess of revenues recognized on these contracts are recorded within deferred revenue. The percentage of total revenue recognized using the percentage-of-completion method for the fiscal years ended October 31, 2016, October 31, 2015 and October 31, 2014 were 0.3%, 1.8% and 4.0%, respectively.

Software revenue is recognized when persuasive evidence of an arrangement exists, delivery has occurred, the fee is fixed or determinable, and collectibility is probable. In instances where final acceptance criteria of the software are specified by the customer, revenue is deferred until there are no uncertainties regarding customer acceptance.

Ciena limits the amount of revenue recognition for delivered elements to the amount that is not contingent on the future delivery of products or services, future performance obligations or subject to customer-specified return or refund privileges.

Revenue for multiple element arrangements is allocated to each unit of accounting based on the relative selling price of each delivered element, with revenue recognized for each delivered element when the revenue recognition criteria are met. Ciena determines the selling price for each deliverable based upon the selling price hierarchy for multiple-deliverable arrangements. Under this hierarchy, Ciena uses vendor-specific objective evidence ("VSOE") of selling price, if it exists, or third party evidence ("TPE") of selling price if VSOE does not exist. If neither VSOE nor TPE of selling price exists for a deliverable, Ciena uses its best estimate of selling price ("BESP") for that deliverable. For multiple element software arrangements where VSOE of undelivered maintenance does not exist, revenue for the entire arrangement is recognized over the maintenance term.

VSOE, when determinable, is established based on Ciena's pricing and discounting practices for the specific product or service when sold separately. In determining whether VSOE exists, Ciena requires that a substantial majority of the selling prices for a product or service fall within a reasonably narrow pricing range. Ciena has been unable to establish TPE of selling price because its go-to-market strategy differs from that of others in its markets, and the extent of customization and differentiated features and functions varies among comparable products or services from its peers. Ciena determines BESP based upon management-approved pricing guidelines, which consider multiple factors including the type of product or service, gross margin objectives, competitive and market conditions, and the go-to-market strategy, all of which can affect pricing practices.

Warranty Accruals

Ciena provides for the estimated costs to fulfill customer warranty obligations upon recognition of the related revenue. Estimated warranty costs include estimates for material costs, technical support labor costs and associated overhead. Warranty is included in cost of goods sold and is determined based upon actual warranty cost experience, estimates of component failure rates and management's industry experience. Ciena's sales contracts do not permit the right of return of the product by the customer after the product has been accepted.

Accounts Receivable, Net

Ciena's allowance for doubtful accounts is based on its assessment, on a specific identification basis, of the collectibility of customer accounts. Ciena performs ongoing credit evaluations of its customers and generally has not required collateral or other forms of security from them. In determining the appropriate balance for Ciena's allowance for doubtful accounts,

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management considers each individual customer account receivable in order to determine collectibility. In doing so, management considers creditworthiness, payment history, account activity and communication with the customer. If a customer's financial condition changes, Ciena may be required to record an allowance for doubtful accounts for that customer, which could negatively affect its results of operations.

Research and Development

Ciena charges all research and development costs to expense as incurred. Types of expense incurred in research and development include employee compensation, prototype equipment, consulting and third party services, depreciation, facility costs and information technology.

Government Grants

Ciena accounts for proceeds from government grants as a reduction of operating expense when there is reasonable assurance that Ciena has complied with the conditions attached to the grant and that the grant proceeds will be received. Grant benefits are recorded to the line item in the Consolidated Statement of Operations to which the grant activity relates.

Advertising Costs

Ciena expenses all advertising costs as incurred.

Legal Costs

Ciena expenses legal costs associated with litigation defense as incurred.

Share-Based Compensation Expense

Ciena measures and recognizes compensation expense for share-based awards based on estimated fair values on the date of grant. Ciena estimates the fair value of each option-based award on the date of grant using the Black-Scholes option-pricing model. This model is affected by Ciena's stock price as well as estimates regarding a number of variables, including expected stock price volatility over the expected term of the award and projected employee stock option exercise behaviors. Ciena estimates the fair value of each restricted stock unit award based on the fair value of the underlying common stock on the date of grant. In each case, Ciena only recognizes expense in its Consolidated Statement of Operations for those stock options or restricted stock units that are expected ultimately to vest. Ciena recognizes the estimated fair value of performance-based awards, net of estimated forfeitures, as share-based expense over the performance period, using graded vesting, which considers each performance period or tranche separately, based upon Ciena's determination of whether it is probable that the performance targets will be achieved. At the end of each reporting period, Ciena reassesses the probability of achieving the performance targets and the performance period required to meet those targets and the expense is adjusted accordingly. Ciena uses the straight-line method to record expense for share-based awards with only service-based vesting. See Note 21 below.

Income Taxes

Ciena accounts for income taxes using an asset and liability approach that recognizes deferred tax assets and liabilities for the expected future tax consequences attributable to differences between the carrying amounts of assets and liabilities for financial reporting purposes and their respective tax bases, and for operating loss and tax credit carryforwards. In estimating future tax consequences, Ciena considers all expected future events other than the enactment of changes in tax laws or rates. Valuation allowances are provided if, based upon the weight of the available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

In the ordinary course of business, transactions occur for which the ultimate outcome may be uncertain. In addition, tax authorities periodically audit Ciena's income tax returns. These audits examine significant tax filing positions, including the timing and amounts of deductions and the allocation of income tax expenses among tax jurisdictions. Ciena is currently under audit in India for 2010 and 2012 through 2014 and in Canada for 2011 through 2013. Management does not expect the outcome of these audits to have a material adverse effect on Ciena's consolidated financial position, results of operations or cash flows. Ciena's major tax jurisdictions and the earliest open tax years are as follows: United States (2013), United Kingdom (2013), Canada (2011) and India (2010). Limited adjustments can be made to Federal U.S. tax returns in earlier years in order to reduce net operating loss carryforwards. Ciena classifies interest and penalties related to uncertain tax positions as a component of income tax expense.

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Ciena has not provided for U.S. deferred income taxes on the cumulative unremitted earnings of its non-U.S. affiliates, as it plans to indefinitely reinvest cumulative unremitted foreign earnings outside the U.S., and it is not practicable to determine the unrecognized deferred income taxes. These cumulative unremitted foreign earnings relate to ongoing operations in foreign jurisdictions and are required to fund foreign operations, capital expenditures and future expansion requirements. See Note 20 below.

Ciena recognizes windfall tax benefits associated with the exercise of stock options or release of restricted stock units directly to stockholders' equity only when realized. A windfall tax benefit occurs when the actual tax benefit realized by Ciena upon an employee's disposition of a share-based award exceeds the deferred tax asset, if any, associated with the award that Ciena had recorded. When assessing whether a tax benefit relating to share-based compensation has been realized, Ciena follows the "with-and-without" method. Under the with-and-without method, the windfall is considered realized and recognized for financial statement purposes only when an incremental benefit is provided after considering all other tax benefits including Ciena's net operating losses. The with-and-without method results in the windfall from share-based compensation awards always being effectively the last tax benefit to be considered. Consequently, the windfall attributable to share-based compensation will not be considered realized in instances where Ciena's net operating loss carryover (that is unrelated to windfalls) is sufficient to offset the current year's taxable income before considering the effects of current-year windfalls.

Loss Contingencies

Ciena is subject to the possibility of various losses arising in the ordinary course of business. These may relate to disputes, litigation and other legal actions. Ciena considers the likelihood of loss or the incurrence of a liability, as well as Ciena's ability to reasonably estimate the amount of loss, in determining loss contingencies. An estimated loss contingency is accrued when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. Ciena regularly evaluates current information available to it in order to determine whether any accruals should be adjusted and whether new accruals are required.

Fair Value of Financial Instruments

The carrying value of Ciena's cash and cash equivalents, accounts receivable, accounts payable and accrued liabilities approximates fair market value due to the relatively short period of time to maturity. For information related to the fair value of Ciena's convertible notes and term loans, see Note 16 below.

Fair value for the measurement of financial assets and liabilities is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or liability. Ciena utilizes a valuation hierarchy for disclosure of the inputs for fair value measurement. This hierarchy prioritizes the inputs into three broad levels as follows:

- Level 1 inputs are unadjusted quoted prices in active markets for identical assets or liabilities;
- Level 2 inputs are quoted prices for identical or similar assets or liabilities in less active markets or model-derived valuations in which significant inputs are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the financial instrument; and
- Level 3 inputs are unobservable inputs based on Ciena's assumptions used to measure assets and liabilities at fair value.

By distinguishing between inputs that are observable in the marketplace, and therefore more objective, and those that are unobservable, and therefore more subjective, the hierarchy is designed to indicate the relative reliability of the fair value measurements. A financial asset's or liability's classification within the hierarchy is determined based on the lowest level input that is significant to the fair value measurement.

Restructuring

From time to time, Ciena takes actions to better align its workforce, facilities and operating costs with perceived market opportunities, business strategies and changes in market and business conditions. Ciena recognizes a liability for the cost associated with an exit or disposal activity in the period in which the liability is incurred, except for one-time employee termination benefits related to a service period, typically of more than 60 days, which are accrued over the service period. See Note 3 below.

Foreign Currency

Certain of Ciena's foreign branch offices and subsidiaries use the U.S. Dollar as their functional currency because Ciena Corporation, as the U.S. parent entity, exclusively funds the operations of these branch offices and subsidiaries. For those subsidiaries using the local currency as their functional currency, assets and liabilities are translated at exchange rates in effect at the balance sheet date, and the statement of operations is translated at a monthly average rate. Resulting translation adjustments are recorded directly to a separate component of stockholders' equity. Where the monetary assets and liabilities are transacted in a currency other than the entity's functional currency, re-measurement adjustments are recorded in interest and other income (loss), net on the Consolidated Statement of Operations. See Note 4 below.

Derivatives

Ciena's 4.0% convertible senior notes due March 15, 2015 (the "2015 Notes") matured during the second quarter of fiscal 2015. The 2015 Notes included a redemption feature accounted for as a separate embedded derivative that expired when the 2015 notes matured. Until maturity of the 2015 Notes, the embedded redemption feature was recorded at fair value on a recurring basis, and these changes were included in interest and other income (loss), net on the Consolidated Statement of Operations. See Note 4 below.

From time to time, Ciena uses foreign currency forward contracts to reduce variability in certain forecasted non-U.S. Dollar denominated cash flows. Generally, these derivatives have maturities of 12 months or less. Ciena also has interest rate hedge arrangements to reduce variability in certain forecasted interest expense associated with its term loans. All of these derivatives are designated as cash flow hedges. At the inception of the cash flow hedge, and on an ongoing basis, Ciena assesses whether the derivative has been effective in offsetting changes in cash flows attributable to the hedged risk during the hedging period. The effective portion of the derivative's net gain or loss is initially reported as a component of accumulated other comprehensive income (loss), and, upon occurrence of the forecasted transaction, is subsequently reclassified to the line item in the Consolidated Statement of Operations to which the hedged transaction relates. Any net gain or loss associated with the ineffectiveness of the hedging instrument is reported in interest and other income (loss), net. To date, no ineffectiveness has occurred.

From time to time, Ciena uses foreign currency forward contracts to hedge certain balance sheet exposures. These forward contracts are not designated as hedges for accounting purposes, and any net gain or loss associated with these derivatives is reported in interest and other income (loss), net on the Consolidated Statement of Operations.

Ciena records derivative instruments in the Consolidated Statements of Cash Flows within operating, investing, or financing activities consistent with the cash flows of the hedged items.

See Notes 6 and 14 below.

Computation of Net Income (Loss) per Share

Ciena calculates basic earnings per share ("EPS") by dividing earnings attributable to common stock by the weighted average number of common shares outstanding for the period. Diluted EPS includes other potential dilutive shares that would be outstanding if securities or other contracts to issue common stock were exercised or converted into common stock. Ciena uses a dual presentation of basic and diluted EPS on the face of its income statement. A reconciliation of the numerator and denominator used for the basic and diluted EPS computations is set forth in Note 18 below.

Software Development Costs

Ciena develops software for sale to its customers. GAAP requires the capitalization of certain software development costs that are incurred subsequent to the date technological feasibility is established and prior to the date the product is generally available for sale. The capitalized cost is then amortized straight-line over the estimated life of the product. Ciena defines technological feasibility as being attained at the time a working model is completed. To date, the period between Ciena achieving technological feasibility and the general availability of such software has been short, and software development costs qualifying for capitalization have been insignificant. Accordingly, Ciena has not capitalized any software development costs.

Newly Issued Accounting Standards - Not Yet Effective

In May 2014, Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) No. 2014-09, *Revenue from Contracts with Customers* (Topic 606), which provides guidance for revenue recognition. This ASU affects any entity that either enters into contracts with customers to transfer goods or services or enters into contracts for the transfer of non-financial assets. This ASU will supersede the revenue recognition requirements in Topic 605, Revenue Recognition, and most industry-specific guidance. This ASU also supersedes some cost guidance included in Subtopic 605-35, Revenue Recognition-Construction-Type and Production-Type Contracts. The standard will be effective for Ciena beginning in the first quarter of fiscal 2019. For multiple element software arrangements where VSOE of undelivered maintenance does not exist, Ciena currently recognizes revenue for the entire arrangement over the maintenance term. Ciena expects that the adoption of this ASU will require Ciena to determine the stand alone selling price for each of the elements at the contract inception and consequently Ciena expects certain software deliverables will be recognized at a point in time rather than over a period of time. Ciena is continuing to evaluate other possible impacts of the adoption of this ASU on its Consolidated Financial Statements and disclosures.

In April 2015, FASB issued ASU No. 2015-03, *Simplifying the Presentation of Debt Issuance Costs*. ASU 2015-03 requires debt issuance costs related to a recognized debt liability to be presented in the balance sheet as a direct deduction from the carrying value of that debt liability, consistent with debt discounts. The guidance is effective retrospectively for fiscal years, and interim periods within those years, and will be effective for Ciena beginning in the first quarter of fiscal 2017. Ciena does not expect that the impact of the adoption of this ASU will be material to its Consolidated Financial Statements or disclosures.

In February 2016, FASB issued ASU No. 2016-02, *Leases*, which requires an entity to recognize assets and liabilities on the balance sheet for the rights and obligations created by leased assets and to provide additional disclosures. ASU 2016-02 is effective for Ciena beginning in the first quarter of fiscal 2020. Under current GAAP, the majority of Ciena’s leases for its properties are considered operating leases and Ciena expects that the adoption of this ASU will require these leases to be classified as financing leases and to be recognized as assets and liabilities on Ciena’s balance sheet. Ciena is continuing to evaluate other possible impacts of the adoption of this ASU on its Consolidated Financial Statements and disclosures.

In March 2016, the FASB issued ASU No. 2016-09, *Improvements to Employee Share-Based Payment Accounting*, which provides guidance on several aspects of accounting for share-based payment transactions, including the accounting for income taxes, forfeitures, and statutory tax withholding requirements, as well as classification on the statement of cash flows. ASU 2016-09 is effective for Ciena beginning in the first quarter of fiscal 2018. Under the new guidance, Ciena would recognize all excess tax benefits previously unrecognized, along with any valuation allowance, on a modified retrospective basis as a cumulative-effect adjustment to retained earnings as of the date of adoption of this updated standard.

(2) BUSINESS COMBINATIONS

Cyan Acquisition

On August 3, 2015, Ciena acquired Cyan, Inc. (“Cyan”), a leading provider of SDN, NFV and metro packet-optical solutions, in a cash and stock transaction. Subject to the terms and conditions of the merger agreement, at the closing of the transaction, each outstanding Cyan share was exchanged for 0.19936 shares of Ciena common stock and \$0.63 in cash, resulting in an exchange of all of the outstanding shares of Cyan common stock for approximately \$33.6 million in cash and 10.6 million shares of Ciena common stock. Ciena assumed all the then-outstanding Cyan unvested restricted stock unit awards and stock options and substituted for them approximately 1.0 million Ciena restricted stock unit awards and stock options exercisable for approximately 2.4 million shares of Ciena common stock.

Upon the closing of the acquisition, Ciena assumed Cyan’s \$50.0 million in outstanding principal amount of 8.0% Convertible Senior Secured Notes due 2019 (the “2019 Notes”). Under the terms of the indenture governing the 2019 Notes, following the closing of the acquisition, the note holders were given the right to convert the 2019 Notes at an increased conversion rate of approximately 91.79 shares of Ciena common stock and \$290.08 in cash for each \$1,000 principal amount of 2019 Notes surrendered for conversion. Subsequently, during the fourth quarter of fiscal 2015, holders representing all of the outstanding aggregate principal amount of the 2019 Notes surrendered their 2019 Notes for conversion and, accordingly, there are no remaining 2019 Notes outstanding. In satisfaction of such conversions, Ciena issued approximately 4.6 million shares of Ciena common stock and paid \$14.5 million in cash.

During fiscal 2015, Ciena incurred approximately \$25.5 million of acquisition-related costs associated with this transaction. These costs and expenses include fees associated with financial, legal and accounting advisors, facilities and systems consolidation costs, and severance and other employment-related costs, including payments to certain former Cyan executives, and approximately \$7.6 million of non-cash share-based compensation expense.

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The following table summarizes the purchase price for the acquisition (in thousands):

| | Amount |
|-----------------------------------|------------|
| Cash | \$ 33,621 |
| Value of common stock issued | 270,113 |
| Fair value of vested stock awards | 32,001 |
| Total purchase price | \$ 335,735 |

The fair value of Ciena's common stock issued in the acquisition was based on Ciena's opening stock price on August 3, 2015, the closing date. The fair value of replacement vested stock options was determined using the Black-Scholes option-pricing model.

The following table summarizes the final allocation related to Cyan based on the estimated fair value of the acquired assets and assumed liabilities (in thousands):

| | Amount |
|--|------------|
| Cash and cash equivalents | \$ 60,831 |
| Restricted cash | 10,001 |
| Accounts receivable | 23,891 |
| Inventory | 12,849 |
| Prepaid expenses and other | 3,502 |
| Equipment, furniture and fixtures | 7,962 |
| Goodwill | 256,434 |
| Customer relationships | 36,323 |
| Trademarks | 3,432 |
| Developed technology | 88,814 |
| Order backlog | 25,293 |
| Other long-term assets | 789 |
| Accounts payable | (30,856) |
| Accrued liabilities | (15,887) |
| Deferred revenue | (16,643) |
| Long-term debt | (48,836) |
| Additional paid-in capital related to equity component of long-term debt | (82,164) |
| Total purchase consideration | \$ 335,735 |

Under purchase accounting rules, Ciena valued the acquired finished goods inventory to fair value, which is defined as the estimated selling price less the sum of (a) costs of disposal, and (b) a reasonable profit allowance for Ciena's selling effort. This valuation resulted in an increase in inventory carrying value of approximately \$3.1 million for marketable inventory.

Customer relationships and contracts represent agreements with existing Cyan customers and have estimated useful lives of 4 years to 7 years. The majority of the order backlog, which is amortized over the fulfillment period, was fulfilled during the fourth quarter of fiscal 2015.

Developed technology represents purchased technology that had reached technological feasibility and for which Cyan had substantially completed development as of the date of acquisition. Fair value was determined using future discounted cash flows related to the projected income stream of the developed technology for a discrete projection period. Cash flows were discounted to their present value as of the closing date. Developed technology is amortized on a straight line basis over its estimated useful lives of 5 years to 7 years.

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The goodwill generated from the acquisition of Cyan was primarily related to expected synergies. The amount of goodwill allocated to the Networking Platforms segment and to the Software and Software-Related Services segment was \$55.0 million and \$201.4 million, respectively. The goodwill is not deductible for income tax purposes.

The following unaudited pro forma financial information summarizes the results of operations for the periods indicated as if Ciena's acquisition of Cyan had been completed as of the beginning of the earliest period. Revenue attributable to Cyan from the August 3, 2015 acquisition date through the end of Ciena's fiscal 2015 was \$84.4 million. As Ciena has begun to integrate the combined operations, eliminating overlapping processes and expenses and integrating its products and sales efforts with those of Cyan, it is impractical to determine the earnings specific to Cyan since the acquisition date. These unaudited pro forma amounts (in thousands) do not purport to be indicative of the results that would have actually been obtained if the acquisition occurred as of the beginning of the periods presented, or that may be obtained in the future.

| | Year Ended October 31, | |
|-----------------------------|------------------------|--------------|
| | 2015 | 2014 |
| Pro forma revenue | \$ 2,565,081 | \$ 2,388,772 |
| Pro forma net income (loss) | \$ 16,286 | \$ (168,041) |

The pro forma earnings were adjusted to exclude \$25.5 million in acquisition-related costs and \$3.1 million of nonrecurring expense related to the fair value adjustment to acquisition-date inventory incurred in fiscal 2015. Fiscal 2014 pro forma earnings were adjusted to include these amounts.

Additionally, pro forma earnings were adjusted to (i) exclude the mark to market changes in the fair value of Cyan's warrants, as they were automatically exercised on a cashless basis immediately prior to the effective time of the merger and (ii) exclude the fair value of bifurcated conversion features in Cyan's convertible notes, as these features were no longer bifurcated upon the consummation of the merger. The total amounts of these adjustments were \$60.6 million and \$4.7 million in fiscal 2015 and 2014, respectively.

TeraXion Acquisition

On February 1, 2016, Ciena, through a Canadian subsidiary, acquired certain high-speed photonics components ("HSPC") assets of TeraXion Inc. ("TeraXion") and its wholly-owned subsidiary for approximately \$32 million in cash. The assets purchased include TeraXion's high-speed indium phosphide and silicon photonics technologies, as well as the underlying intellectual property. These technologies support the development of Ciena's WaveLogic coherent optical chipsets. This transaction has been accounted for as the acquisition of a business.

The following table summarizes the final purchase price allocation related to the acquisition of the HSPC assets based on the estimated fair value of the acquired assets and assumed liabilities (in thousands):

| | Amount |
|------------------------------|-----------|
| Inventory | \$ 119 |
| Fixed assets | 1,381 |
| Developed technology | 16,468 |
| In-process technology | 3,949 |
| Goodwill | 10,083 |
| Total purchase consideration | \$ 32,000 |

Developed technology represents purchased technology that had reached technological feasibility and for which TeraXion had substantially completed development as of the date of acquisition. Fair value was determined using future discounted cash flows related to the projected income stream of the developed technology for a discrete projection period. Cash flows were discounted to their present value as of the closing date. Developed technology is amortized on a straight line basis over its estimated useful life of five years.

In-process technology represents purchased technology that had not reached technological feasibility as of the date of acquisition. Fair value was determined using future discounted cash flows related to the projected income stream of the in-

process technology for a discrete projection period. Cash flows were discounted to their present value as of the closing date. Upon completion of the in-process technology, it will be amortized on a straight line basis over its estimated useful life, which will be determined on that date.

The goodwill generated from the acquisition of the HSPC assets was primarily related to expected synergies and has been allocated to the Networking Platforms segment. The goodwill is not deductible for income tax purposes.

Pro forma disclosures have not been included due to immateriality.

(3) RESTRUCTURING COSTS

Ciena has undertaken a number of restructuring activities intended to reduce expense and better align its workforce and costs with market opportunities, product development and business strategies. The following table sets forth the restructuring activity and balance of the restructuring liability accounts for the fiscal years indicated (in thousands):

| | Workforce reduction | Consolidation of excess facilities | Total |
|---------------------------------------|------------------------|--|----------|
| Balance at October 31, 2013 | \$ 80 | \$ 1,936 | \$ 2,016 |
| Additional liability recorded | 685 (a) | 9 | 694 |
| Adjustment to previous estimates | — | (345) | (345) |
| Cash payments | (584) | (466) | (1,050) |
| Balance at October 31, 2014 | 181 | 1,134 | 1,315 |
| Additional liability recorded | 8,631 (b) | (5) | 8,626 |
| Cash payments | (8,221) | (441) | (8,662) |
| Balance at October 31, 2015 | 591 | 688 | 1,279 |
| Additional liability recorded | 2,844 (c) | 2,089 | 4,933 |
| Cash payments | (2,567) | (807) | (3,374) |
| Balance at October 31, 2016 | \$ 868 | \$ 1,970 | \$ 2,838 |
| Current restructuring liabilities | \$ 868 | \$ 1,287 | \$ 2,155 |
| Non-current restructuring liabilities | \$ — | \$ 683 | \$ 683 |

- (a) During fiscal 2014, Ciena recorded a charge of \$0.7 million of severance and other employee-related costs associated with a workforce reduction of approximately 25 employees.
- (b) During fiscal 2015, Ciena recorded a charge of \$8.6 million of severance and other employee-related costs associated with a workforce reduction of approximately 125 employees.
- (c) During fiscal 2016, Ciena recorded a charge of \$2.8 million of severance and other employee-related costs associated with a workforce reduction of approximately 75 employees.

(4) INTEREST AND OTHER INCOME (LOSS), NET

The components of interest and other income (loss), net, were as follow (in thousands):

| | Year Ended October 31, | | |
|--|------------------------|-------------|-------------|
| | 2016 | 2015 | 2014 |
| Interest income | \$ 4,058 | \$ 1,178 | \$ 407 |
| Change in fair value of embedded derivative | — | — | (2,740) |
| Gain (loss) on non-hedge designated foreign currency forward contracts | (23,355) | 23,243 | (5,757) |
| Foreign currency exchange gains (losses) | 5,870 | (47,607) | (15,663) |
| Other | 632 | (2,319) | (1,509) |
| Interest and other income (loss), net | \$ (12,795) | \$ (25,505) | \$ (25,262) |

Ciena Corporation, as the U.S. parent entity, uses the U.S. Dollar as its functional currency; however, some of its foreign branch offices and subsidiaries use the local currency as their functional currency. During fiscal 2016, Ciena recorded \$5.9 million in exchange rate gains, as a result of monetary assets and liabilities that were transacted in a currency other than the entity's functional currency, and the re-measurement adjustments were recorded in interest and other income (loss), net. In fiscal 2015 and fiscal 2014, Ciena recorded \$47.6 million and \$15.7 million in foreign currency exchange losses, respectively. From time to time, Ciena uses foreign currency forwards to hedge these balance sheet exposures. These forwards are not designated as hedges for accounting purposes and any net gain or loss associated with these derivatives is reported in interest and other income (loss), net. During fiscal 2016 and fiscal 2014, Ciena recorded losses of \$23.4 million and \$5.8 million, respectively, from non-hedge designated foreign currency forward contracts. During fiscal 2015, Ciena recorded gains of \$23.2 million from non-hedge designated foreign currency forward contracts.

(5) SHORT-TERM AND LONG-TERM INVESTMENTS

As of October 31, 2016, investments are comprised of the following (in thousands):

| | October 31, 2016 | | | |
|-------------------------------------|-------------------|------------------------|-------------------------|----------------------|
| | Amortized Cost | Gross Unrealized Gains | Gross Unrealized Losses | Estimated Fair Value |
| U.S. government obligations: | | | | |
| Included in short-term investments | \$ 260,125 | \$ 140 | \$ (6) | \$ 260,259 |
| Included in long-term investments | 90,145 | 57 | (30) | 90,172 |
| | <u>\$ 350,270</u> | <u>\$ 197</u> | <u>\$ (36)</u> | <u>\$ 350,431</u> |
| Commercial paper: | | | | |
| Included in short-term investments | \$ 14,989 | \$ — | \$ — | \$ 14,989 |
| | <u>\$ 14,989</u> | <u>\$ —</u> | <u>\$ —</u> | <u>\$ 14,989</u> |

As of October 31, 2015, investments are comprised of the following (in thousands):

| | October 31, 2015 | | | |
|-------------------------------------|-------------------|------------------------|-------------------------|----------------------|
| | Amortized Cost | Gross Unrealized Gains | Gross Unrealized Losses | Estimated Fair Value |
| U.S. government obligations: | | | | |
| Included in short-term investments | \$ 110,108 | \$ 10 | \$ — | \$ 110,118 |
| Included in long-term investments | 95,171 | — | (66) | 95,105 |
| | <u>\$ 205,279</u> | <u>\$ 10</u> | <u>\$ (66)</u> | <u>\$ 205,223</u> |
| Commercial paper: | | | | |
| Included in short-term investments | \$ 24,989 | \$ — | \$ — | \$ 24,989 |
| | <u>\$ 24,989</u> | <u>\$ —</u> | <u>\$ —</u> | <u>\$ 24,989</u> |

The following table summarizes the legal maturities of debt investments at October 31, 2016:

| | October 31, 2016 | |
|--------------------|-------------------|----------------------|
| | Amortized Cost | Estimated Fair Value |
| Less than one year | \$ 275,114 | \$ 275,248 |
| Due in 1-2 years | 90,145 | 90,172 |
| | <u>\$ 365,259</u> | <u>\$ 365,420</u> |

(6) FAIR VALUE MEASUREMENTS

As of the dates indicated, the following tables summarizes the fair value of assets and liabilities that were recorded at fair value on a recurring basis (in thousands):

| | October 31, 2016 | | | |
|---|-------------------|-------------------|-------------|---------------------|
| | Level 1 | Level 2 | Level 3 | Total |
| Assets: | | | | |
| Money market funds | \$ 625,277 | \$ — | \$ — | \$ 625,277 |
| U.S. government obligations | — | 350,431 | — | 350,431 |
| Commercial paper | — | 69,959 | — | 69,959 |
| Foreign currency forward contracts | — | 175 | — | 175 |
| Total assets measured at fair value | \$ 625,277 | \$ 420,565 | \$ — | \$ 1,045,842 |
| Liabilities: | | | | |
| Foreign currency forward contracts | \$ — | \$ 1,396 | \$ — | \$ 1,396 |
| Forward starting interest rate swaps | — | 5,967 | — | 5,967 |
| Total liabilities measured at fair value | \$ — | \$ 7,363 | \$ — | \$ 7,363 |

| | October 31, 2015 | | | |
|---|-------------------|-------------------|-------------|-------------------|
| | Level 1 | Level 2 | Level 3 | Total |
| Assets: | | | | |
| Money market funds | \$ 642,073 | \$ — | \$ — | \$ 642,073 |
| U.S. government obligations | — | 205,223 | — | 205,223 |
| Commercial paper | — | 74,983 | — | 74,983 |
| Foreign currency forward contracts | — | 89 | — | 89 |
| Total assets measured at fair value | \$ 642,073 | \$ 280,295 | \$ — | \$ 922,368 |
| Liabilities: | | | | |
| Foreign currency forward contracts | \$ — | \$ 512 | \$ — | \$ 512 |
| Forward starting interest rate swap | — | 5,522 | — | 5,522 |
| Total liabilities measured at fair value | \$ — | \$ 6,034 | \$ — | \$ 6,034 |

As of the dates indicated, the assets and liabilities above were presented on Ciena's Consolidated Balance Sheet as follows (in thousands):

| | October 31, 2016 | | | |
|---|-------------------|-------------------|-------------|---------------------|
| | Level 1 | Level 2 | Level 3 | Total |
| Assets: | | | | |
| Cash equivalents | \$ 625,277 | \$ 54,970 | \$ — | \$ 680,247 |
| Short-term investments | — | 275,248 | — | 275,248 |
| Prepaid expenses and other | — | 175 | — | 175 |
| Long-term investments | — | 90,172 | — | 90,172 |
| Total assets measured at fair value | \$ 625,277 | \$ 420,565 | \$ — | \$ 1,045,842 |
| Liabilities: | | | | |
| Accrued liabilities | \$ — | \$ 1,396 | \$ — | \$ 1,396 |
| Other long-term obligations | — | 5,967 | — | 5,967 |
| Total liabilities measured at fair value | \$ — | \$ 7,363 | \$ — | \$ 7,363 |

| | October 31, 2015 | | | |
|--|------------------|------------|---------|------------|
| | Level 1 | Level 2 | Level 3 | Total |
| Assets: | | | | |
| Cash equivalents | \$ 642,073 | \$ 49,994 | \$ — | \$ 692,067 |
| Short-term investments | — | 135,107 | — | 135,107 |
| Prepaid expenses and other | — | 89 | — | 89 |
| Long-term investments | — | 95,105 | — | 95,105 |
| Total assets measured at fair value | \$ 642,073 | \$ 280,295 | \$ — | \$ 922,368 |
| Liabilities: | | | | |
| Accrued liabilities | \$ — | \$ 512 | \$ — | \$ 512 |
| Other long-term obligations | — | 5,522 | — | 5,522 |
| Total liabilities measured at fair value | \$ — | \$ 6,034 | \$ — | \$ 6,034 |

Ciena did not have any transfers between Level 1 and Level 2 fair value measurements during the periods presented.

(7) ACCOUNTS RECEIVABLE

As of October 31, 2016 and October 31, 2015, there was one customer that accounted for 10.4% of net accounts receivable. Ciena has not historically experienced a significant amount of bad debt expense. The following table summarizes the activity in Ciena's allowance for doubtful accounts for the fiscal years indicated (in thousands):

| Year ended October 31, | Beginning Balance | Provisions | Net Deductions | Ending Balance |
|---------------------------|----------------------|------------|-------------------|-------------------|
| 2014 | \$ 1,955 | \$ 2,761 | \$ 2,633 | \$ 2,083 |
| 2015 | \$ 2,083 | \$ 1,576 | \$ 696 | \$ 2,963 |
| 2016 | \$ 2,963 | \$ 1,701 | \$ 701 | \$ 3,963 |

(8) INVENTORIES

As of the dates indicated, inventories are comprised of the following (in thousands):

| | October 31, | |
|---------------------------------------|-------------|------------|
| | 2016 | 2015 |
| Raw materials | \$ 44,644 | \$ 53,082 |
| Work-in-process | 12,852 | 9,120 |
| Finished goods | 156,402 | 125,966 |
| Deferred cost of goods sold | 59,856 | 55,995 |
| | 273,754 | 244,163 |
| Provision for excess and obsolescence | (62,503) | (53,001) |
| | \$ 211,251 | \$ 191,162 |

Ciena writes down its inventory for estimated obsolescence or unmarketable inventory by an amount equal to the difference between the cost of inventory and the estimated net realizable value based on assumptions about future demand and market conditions. During fiscal 2016, Ciena recorded a provision for excess and obsolescence of \$33.7 million, primarily related to a decrease in the forecasted demand for certain Converged Packet Optical and Optical Transport products. During fiscal 2015, Ciena recorded a provision for excess and obsolescence of \$26.8 million, primarily related to the discontinuance of certain parts and components used in the manufacture of its Converged Packet Optical products and a decrease in the forecasted

demand for both its legacy, stand-alone WDM and SONET/SDH-based transport platforms and its 5410 Service Aggregation Switch. During fiscal 2014, Ciena recorded a provision for excess and obsolescence of \$32.3 million, primarily related to engineering design changes and the discontinuance of certain parts and components used in the manufacture of its Converged Packet Optical and Optical Transport products, including its Corestream® Agility Optical Transport platform. Deductions from the provision for excess and obsolete inventory relate to disposal activities.

The following table summarizes the activity in Ciena's reserve for excess and obsolete inventory for the fiscal years indicated (in thousands):

| Year ended October 31, | Beginning Balance | Provisions | Disposals | Ending Balance |
|---------------------------|----------------------|------------|-----------|-------------------|
| 2014 | \$ 41,563 | \$ 32,332 | \$ 13,769 | \$ 60,126 |
| 2015 | \$ 60,126 | \$ 26,846 | \$ 33,971 | \$ 53,001 |
| 2016 | \$ 53,001 | \$ 33,713 | \$ 24,211 | \$ 62,503 |

(9) PREPAID EXPENSES AND OTHER

As of the dates indicated, prepaid expenses and other are comprised of the following (in thousands):

| | October 31, | |
|--------------------------------------|-------------------|-------------------|
| | 2016 | 2015 |
| Prepaid VAT and other taxes | \$ 77,474 | \$ 74,754 |
| Product demonstration equipment, net | 42,259 | 41,611 |
| Deferred deployment expense | 19,138 | 26,193 |
| Prepaid expenses | 25,659 | 25,074 |
| Financing receivable | 3,740 | 19,869 |
| Other non-trade receivables | 4,398 | 8,588 |
| Derivative assets | 175 | 89 |
| | <u>\$ 172,843</u> | <u>\$ 196,178</u> |

Depreciation of product demonstration equipment was \$10.7 million, \$9.8 million and \$9.0 million for fiscal 2016, 2015 and 2014, respectively.

(10) EQUIPMENT, BUILDING, FURNITURE AND FIXTURES

As of the dates indicated, equipment, building, furniture and fixtures is comprised of the following (in thousands):

| | October 31, | |
|--|-------------------|-------------------|
| | 2016 | 2015 |
| Equipment, furniture and fixtures | \$ 451,029 | \$ 404,935 |
| Building subject to capital lease | 22,529 | 13,459 |
| Construction in progress, subject to build-to-suit lease | 57,602 | 18,663 |
| Leasehold improvements | 60,011 | 49,196 |
| | <u>591,171</u> | <u>486,253</u> |
| Accumulated depreciation and amortization | (302,765) | (294,280) |
| | <u>\$ 288,406</u> | <u>\$ 191,973</u> |

On October 23, 2014, Ciena entered into a lease agreement to lease an office building located in Ottawa, Canada. During fiscal 2015 and fiscal 2016, Ciena gained access to portions of the building and recorded a capital lease asset and liability.

Ciena capitalizes construction in progress and records a corresponding long-term liability for build-to-suit lease agreements where Ciena is considered the owner, for accounting purposes, during the construction period. On April 15, 2015, Ciena entered

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into a build-to-suit lease arrangement pursuant to which the landlord will construct, and Ciena will subsequently lease, two new office buildings at its new Ottawa, Canada campus. The landlord will construct the buildings and contribute up to a maximum of CAD \$290.00 per rentable square foot in total construction costs, plus certain allowances for tenant improvements, and Ciena will be responsible for any additional construction costs. As of October 31, 2016, there were \$57.6 million in cumulative costs incurred under this build-to-suit arrangement. Upon occupancy of the facilities, Ciena expects this arrangement to qualify as a capital lease. As a result, the facilities will be depreciated over the lease term.

During fiscal 2016, fiscal 2015 and fiscal 2014, Ciena recorded depreciation of equipment, furniture and fixtures, and amortization of leasehold improvements of \$52.7 million, \$46.1 million and \$46.6 million, respectively.

(11) INTANGIBLE ASSETS

As of the dates indicated, intangible assets are comprised of the following (in thousands):

| | October 31, | | | | | |
|---|-------------------|--------------------------|-------------------|-------------------|--------------------------|-------------------|
| | 2016 | | | 2015 | | |
| | Gross Intangible | Accumulated Amortization | Net Intangible | Gross Intangible | Accumulated Amortization | Net Intangible |
| Developed technology | \$ 347,727 | \$ (248,128) | \$ 99,599 | \$ 506,647 | \$ (382,130) | \$ 124,517 |
| In-process research and development | 4,200 | — | 4,200 | — | — | — |
| Patents and licenses | 7,165 | (6,285) | 880 | 46,538 | (46,072) | 466 |
| Customer relationships, covenants not to compete, outstanding purchase orders and contracts | 358,647 | (316,615) | 42,032 | 388,621 | (310,931) | 77,690 |
| Total intangible assets | \$ 717,739 | \$ (571,028) | \$ 146,711 | \$ 941,806 | \$ (739,133) | \$ 202,673 |

In the second quarter of fiscal 2016, certain fully amortized intangible assets of approximately \$246.4 million have been eliminated from gross intangible assets and accumulated amortization during the period, with no corresponding impact to the income statement. These assets were primarily technology for products no longer being sold by Ciena. The aggregate amortization expense of intangible assets was \$78.3 million, \$79.9 million and \$57.2 million for fiscal 2016, fiscal 2015 and fiscal 2014, respectively. Expected future amortization of intangible assets for the fiscal years indicated is as follows (in thousands):

| Year Ended October 31, | |
|------------------------|----------------------------------|
| 2017 | \$ 45,361 |
| 2018 | 22,680 |
| 2019 | 22,133 |
| 2020 | 21,106 |
| 2021 | 18,173 |
| Thereafter | 13,058 |
| | \$ 142,511 ⁽¹⁾ |

(1) Does not include amortization of in-process research and development, as estimation of the timing of future amortization expense would be impractical.

(12) GOODWILL

Ciena's goodwill was generated from its acquisition of Cyan during fiscal 2015 and its acquisition of the HSPC assets of TeraXion during the second quarter of fiscal 2016, and it is primarily related to expected synergies. The following table presents the goodwill allocated to Ciena's reportable segments as of the dates indicated (in thousands):

| | Balance at October 31, 2015 | Acquisitions | Impairments | Translation | Balance at October 31, 2016 |
|--|--------------------------------|---------------|-------------|-------------|--------------------------------|
| Software and Software-Related Services | 201,428 | — | — | — | 201,428 |
| Networking Platforms | 55,006 | 10,083 | — | 457 | 65,546 |
| Total | 256,434 | 10,083 | — | 457 | 266,974 |

(13) OTHER BALANCE SHEET DETAILS

As of the dates indicated, other long-term assets are comprised of the following (in thousands):

| | October 31, | |
|-----------------------------------|------------------|------------------|
| | 2016 | 2015 |
| Maintenance spares inventory, net | \$ 49,535 | \$ 55,259 |
| Deferred debt issuance costs, net | 10,230 | 10,820 |
| Financing receivable | 1,870 | 10,107 |
| Other | 15,352 | 8,470 |
| | \$ 76,987 | \$ 84,656 |

Deferred debt issuance costs relate to Ciena's convertible notes payable (described in Note 16 below), term loans (described in Note 16 below) and ABL Credit Facility (described in Note 17 below). Deferred debt issuance costs are amortized using the straight-line method, which approximates the effect of the effective interest rate method, through the maturity of the related debt. The amortization of deferred debt issuance costs is included in interest expense, and was \$4.2 million, \$4.7 million and \$4.8 million for fiscal 2016, fiscal 2015 and fiscal 2014, respectively.

As of the dates indicated, accrued liabilities and other short-term obligations are comprised of the following (in thousands):

| | October 31, | |
|--|-------------------|-------------------|
| | 2016 | 2015 |
| Compensation, payroll related tax and benefits | \$ 106,687 | \$ 109,466 |
| Warranty | 52,324 | 56,654 |
| Vacation | 36,112 | 34,189 |
| Capital lease obligations | 2,321 | 4,923 |
| Interest payable | 4,649 | 5,389 |
| Other | 108,260 | 105,662 |
| | \$ 310,353 | \$ 316,283 |

The following table summarizes the activity in Ciena's accrued warranty for the fiscal years indicated (in thousands):

| Year ended October 31, | Beginning Balance | Acquired | Provisions | Settlements | Ending Balance |
|---------------------------|----------------------|----------|------------|-------------|-------------------|
| 2014 | \$ 56,303 | \$ — | \$ 22,129 | \$ 22,435 | \$ 55,997 |
| 2015 | \$ 55,997 | \$ 2,996 | \$ 17,881 | \$ 20,220 | \$ 56,654 |
| 2016 | \$ 56,654 | \$ — | \$ 15,483 | \$ 19,813 | \$ 52,324 |

The decreases in warranty provisions during fiscal 2016, fiscal 2015 and fiscal 2014 were primarily due to lower failure rates and reduced costs due to efficiencies.

As of the dates indicated, deferred revenue is comprised of the following (in thousands):

| | October 31, | |
|----------------------------|------------------|------------------|
| | 2016 | 2015 |
| Products | \$ 45,216 | \$ 66,527 |
| Services | 137,647 | 122,546 |
| | 182,863 | 189,073 |
| Less current portion | (109,009) | (126,111) |
| Long-term deferred revenue | <u>\$ 73,854</u> | <u>\$ 62,962</u> |

As of the dates indicated, other long-term obligations are comprised of the following (in thousands):

| | October 31, | |
|--------------------------------------|-------------------|------------------|
| | 2016 | 2015 |
| Construction liability | \$ 57,602 | \$ 18,663 |
| Capital lease obligations | 24,298 | 13,794 |
| Income tax liability | 14,122 | 13,308 |
| Deferred tenant allowance | 9,164 | 9,807 |
| Straight-line rent | 6,406 | 6,237 |
| Forward starting interest rate swaps | 5,967 | 5,522 |
| Other | 6,835 | 5,209 |
| | <u>\$ 124,394</u> | <u>\$ 72,540</u> |

Ciena capitalizes construction in progress and records a corresponding long-term liability for build-to-suit lease agreements where Ciena is considered to be the owner during the construction period for accounting purposes.

The following is a schedule by fiscal years of future minimum lease payments under capital leases and the present value of minimum lease payments as of October 31, 2016 (in thousands):

| Year Ending October 31, | Amount |
|--|------------------|
| 2017 | \$ 4,135 |
| 2018 | 3,798 |
| 2019 | 3,377 |
| 2020 | 2,398 |
| 2021 | 2,292 |
| Thereafter | 27,696 |
| Net minimum capital lease payments | 43,696 |
| Less: Amount representing interest | (17,077) |
| Present value of minimum lease payments | 26,619 |
| Less: Current portion of present value of minimum lease payments | (2,321) |
| Long-term portion of present value of minimum lease payments | <u>\$ 24,298</u> |

(14) DERIVATIVE INSTRUMENTS

Foreign Currency Derivatives

As of October 31, 2016 and 2015, Ciena had forward contracts to hedge its foreign exchange exposure in order to reduce the variability in its Canadian Dollar and Indian Rupee denominated expense, which principally relates to research and

development activities. The notional amount of these contracts was approximately \$107.6 million and \$68.1 million as of October 31, 2016 and October 31, 2015, respectively. These foreign exchange contracts have maturities of 12 months or less and have been designated as cash flow hedges.

During fiscal 2016 and fiscal 2015, in order to hedge certain balance sheet exposures, Ciena entered into forward contracts to mitigate risk due to volatility in the Brazilian Real, Canadian Dollar and Mexican Peso. The notional amount of these contracts was approximately \$59.6 million and \$146.5 million as of October 31, 2016 and October 31, 2015. These foreign exchange contracts have maturities of 12 months or less and have not been designated as hedges for accounting purposes.

Interest Rate Derivatives

During fiscal 2014, Ciena entered into floating interest rate to fixed interest rate swap arrangements (“interest rate swaps”) that fix the interest rate under the 2019 Term Loan (as defined in Note 16) at 5.004%, for the period commencing on July 20, 2015 through July 19, 2018. The total notional amount of these derivatives as of October 31, 2016 and October 31, 2015 was \$244.4 million and \$246.9 million, respectively.

In May 2016, Ciena entered into interest rate swaps that fix the total interest rate under the 2021 Term Loan (as defined in Note 16) at 4.62% to 4.87%, depending on the applicable margin, for the period commencing on June 20, 2016 through June 22, 2020. The total notional amount of these derivatives as of October 31, 2016 was \$248.8 million.

Ciena expects the variable rate payments to be received under the terms of the interest rate swaps to exactly offset the forecasted variable rate payments on the equivalent notional amounts of the term loans. These derivative contracts have been designated as cash flow hedges.

Other information regarding Ciena’s derivatives is immaterial for separate financial statement presentation. See Note 4 and Note 6 above.

(15) ACCUMULATED OTHER COMPREHENSIVE INCOME

The following table summarizes the changes in accumulated balances of other comprehensive income (“AOCI”):

| | Unrealized Gain/(Loss) on Marketable Securities | Unrealized Gain/(Loss) on Foreign Currency Forward Contracts | Unrealized Gain/(Loss) on Forward Starting Interest Rate Swaps | Cumulative Foreign Currency Translation Adjustment | Total |
|---|---|---|---|--|-------------|
| Balance at October 31, 2013 | \$ 30 | \$ (261) | \$ — | \$ (7,543) | \$ (7,774) |
| Other comprehensive loss before reclassifications | 41 | (1,265) | (2,083) | (4,940) | (8,247) |
| Amounts reclassified from AOCI | — | 1,353 | — | — | 1,353 |
| Balance at October 31, 2014 | 71 | (173) | (2,083) | (12,483) | (14,668) |
| Other comprehensive loss before reclassifications | (149) | (5,547) | (4,232) | (3,775) | (13,703) |
| Amounts reclassified from AOCI | — | 5,452 | 793 | — | 6,245 |
| Balance at October 31, 2015 | (78) | (268) | (5,522) | (16,258) | (22,126) |
| Other comprehensive loss before reclassifications | 217 | (1,453) | (4,101) | (1,152) | (6,489) |
| Amounts reclassified from AOCI | — | 630 | 3,656 | — | 4,286 |
| Balance at October 31, 2016 | \$ 139 | \$ (1,091) | \$ (5,967) | \$ (17,410) | \$ (24,329) |

All amounts reclassified from accumulated other comprehensive income related to settlement (gains) losses on foreign currency forward contracts designated as cash flow hedges impacted “research and development” on the Consolidated Statements of Operations. All amounts reclassified from accumulated other comprehensive income related to settlement (gains)

losses on forward starting interest swaps designated as cash flow hedges impacted “interest and other income (loss), net” on the Consolidated Statements of Operations.

(16) SHORT-TERM AND LONG-TERM DEBT

Term Loan due 2021

On April 25, 2016, Ciena entered into an Incremental Joinder and Amendment Agreement (the “Incremental Term Loan Credit Agreement”) that amends the Credit Agreement (the “Term Loan Credit Agreement”) dated July 15, 2014. The Incremental Term Loan Credit Agreement provides for a new tranche of senior secured term loans under the Term Loan Credit Agreement in an aggregate principal amount of \$250 million with a maturity date of April 25, 2021 (the “2021 Term Loan”).

The 2021 Term Loan bears interest at a rate equal to LIBOR (subject to a floor of 0.75%) plus an applicable margin ranging from 3.25% to 3.50% , with the actual margin determined according to Ciena’s total net leverage ratio, as defined in the Incremental Term Loan Credit Agreement. The Incremental Term Loan Credit Agreement requires Ciena to make quarterly installment payments in aggregate annual amounts equal to 0.25% of the original principal amount of the 2021 Term Loan, or approximately \$0.6 million , with the balance of the 2021 Term Loan payable at maturity.

Except as described above or otherwise set forth in the Incremental Term Loan Credit Agreement, the 2021 Term Loan has substantially the same terms as the 2019 Term Loan described below, and the remaining terms of the Term Loan Credit Agreement remain in full force and effect.

Term Loan due 2019

On July 15, 2014, Ciena entered into a Credit Agreement providing for a senior secured term loan in an aggregate principal amount of \$250 million (the “2019 Term Loan”), which bears interest at a rate equal to LIBOR (subject to a floor of 0.75%) plus an applicable margin of 3.00% , and matures on July 15, 2019. The Term Loan Credit Agreement requires Ciena to make quarterly installment payments in aggregate amounts equal to 0.25% of the original principal amount of the 2019 Term Loan, or approximately \$0.6 million , with the balance of the 2019 Term Loan payable at maturity. The Term Loan Credit Agreement requires mandatory prepayments on the occurrence of certain customary events and, when the total secured net leverage ratio (as defined in the Term Loan Credit Agreement) is in excess of 2.50 to 1.00 , the Term Loan Credit Agreement requires a mandatory prepayment of 50% of excess annual cash flow (as defined in the Term Loan Credit Agreement).

The Term Loan Credit Agreement contains customary covenants that limit, absent lender approval, the ability of Ciena to, among other things, incur additional debt, create liens and encumbrances, pay cash dividends, enter into certain acquisition transactions or transactions with affiliates, merge, dissolve, repay certain indebtedness, change the nature of Ciena’s business, make investments or dispose of assets.

The Term Loan Credit Agreement contains customary events of default including, among other things, failure to pay obligations when due, initiation of bankruptcy or insolvency proceedings, defaults on certain other indebtedness, change of control, incurrence of certain material judgments, violation of affirmative and negative covenants, and breaches of representations and warranties set forth in the Term Loan Credit Agreement. Upon an event of default, the administrative agent may, subject to various customary cure rights, require the immediate payment of all amounts outstanding and foreclose on collateral.

In connection with Ciena entering into the Term Loan Credit Agreement, Ciena and certain of its subsidiaries entered into a guaranty, a security agreement and a pledge agreement, each on customary terms. Borrowings are secured by (i) second-priority security interests in certain ABL Credit Facility collateral, and (ii) first-priority security interests in substantially all other tangible and intangible assets including equipment, intercompany notes, intellectual property and material owned real property.

The principal balance, unamortized discount and net carrying amount of our term loans were as follows as of October 31, 2016 (in thousands):

| | Principal Balance | Unamortized Discount | Net Carrying Amount |
|--------------------------------------|-------------------|----------------------|---------------------|
| Term Loan Payable due July 15, 2019 | \$ 244,375 | \$ (783) | \$ 243,592 |
| Term Loan Payable due April 25, 2021 | 248,750 | (1,119) | 247,631 |
| | <u>\$ 493,125</u> | <u>\$ (1,902)</u> | <u>\$ 491,223</u> |

The following table sets forth the carrying values and the estimated fair values of our term loans (in thousands):

| | October 31, 2016 | |
|---|-------------------|---------------------------|
| | Carrying Value | Fair Value ⁽²⁾ |
| Term Loan Payable due July 15, 2019 ⁽¹⁾ | \$ 243,592 | \$ 245,597 |
| Term Loan Payable due April 25, 2021 ⁽¹⁾ | 247,631 | 249,994 |
| | <u>\$ 491,223</u> | <u>\$ 495,591</u> |

(1) Includes unamortized bond discount

(2) Ciena's term loans are categorized as Level 2 in the fair value hierarchy. Ciena estimated the fair values of its term loans using a market approach based upon observable inputs, such as current market transactions involving comparable securities.

Outstanding Convertible Notes Payable

Ciena has three issuances of convertible notes payable outstanding. The notes are senior unsecured obligations of Ciena and rank equally with all of Ciena's other existing and future senior unsecured debt. The indentures governing Ciena's notes provide for customary events of default which include (subject in certain cases to customary grace and cure periods), among others, the following: nonpayment of principal or interest; breach of covenants or other agreements in the indenture; defaults in or failure to pay certain other indebtedness; and certain events of bankruptcy or insolvency. Generally, if an event of default occurs and is continuing, the trustee or the holders of at least 25% in aggregate principal amount of the notes may declare the principal of, accrued interest on, and premium, if any, on all the notes immediately due and payable. Under the indentures, if Ciena undergoes a "fundamental change" (as that term is defined in the indenture governing the notes to include certain change in control transactions), holders of notes will have the right, subject to certain exemptions, to require Ciena to purchase for cash any or all of their notes at a price equal to the principal amount, plus accrued interest. If the holder elects to convert his or her notes in connection with a specified fundamental change Ciena will be required, in certain circumstances, to increase the applicable conversion rate, depending on the price paid per share for Ciena common stock and the effective date of the fundamental change.

4.0% Convertible Senior Notes, due March 15, 2015

On March 15, 2015, Ciena's outstanding 4.0% Convertible Senior Notes due 2015 (the "2015 Notes") matured. As a result of conversion elections made by holders of a substantial majority of the outstanding 2015 Notes under the terms of the indenture, together with certain private exchange transactions conducted by Ciena prior to maturity, approximately \$180.6 million in aggregate principal amount of 2015 Notes, representing 96.3% of the outstanding aggregate principal amount of 2015 Notes, was settled through the issuance of Ciena common stock at or prior to maturity. In total, Ciena issued approximately 8.9 million shares of Ciena common stock as a result of the conversion elections and private exchange transactions in respect of the 2015 Notes. Ciena repaid in cash approximately \$6.9 million in aggregate principal amount of 2015 Notes at maturity.

0.875% Convertible Senior Notes due June 15, 2017

On June 11, 2007, Ciena completed a public offering of 0.875% convertible senior notes due June 15, 2017 (the "2017 Notes"), in aggregate principal amount of \$500.0 million. Interest is payable on June 15 and December 15 of each year, beginning on December 15, 2007.

At the election of the holder, the 2017 Notes may be converted prior to maturity into shares of Ciena common stock at the initial conversion rate of 26.2154 shares per \$1,000 in principal amount, which is equivalent to an initial conversion price of approximately \$38.15 per share. The 2017 Notes are not redeemable by Ciena prior to maturity.

Ciena used approximately \$42.5 million of the net proceeds of this offering to purchase a call spread option on its common stock that is intended to limit exposure to potential dilution from conversion of the 2017 Notes. See Note 19 below for a description of this call spread option.

During fiscal 2015 and fiscal 2016, Ciena entered into certain private transactions to repurchase \$5.9 million and \$262.5 million of the 2017 Notes, respectively, in cash for purchase prices slightly below par.

3.75% Convertible Senior Notes, due October 15, 2018

On October 18, 2010, Ciena completed a private placement of 3.75% convertible senior notes due October 15, 2018 (the “2018 Notes”), in aggregate principal amount of \$350.0 million. Interest is payable on the 2018 Notes on April 15 and October 15 of each year, beginning on April 15, 2011.

At the election of the holder, the 2018 Notes may be converted prior to maturity into shares of Ciena common stock at the initial conversion rate of 49.5872 shares per \$1,000 in principal amount, which is equivalent to an initial conversion price of approximately \$20.17 per share. The net proceeds from the offering were approximately \$340.4 million after deducting the placement agents’ fees and other fees and expenses.

4.0% Convertible Senior Notes due December 15, 2020

On December 27, 2012, Ciena issued \$187.5 million in aggregate principal amount of 4.0% Convertible Senior Notes due December 15, 2020 (the “2020 Notes”) in separate private offerings in exchange for \$187.5 million in aggregate principal amount of 2015 Notes above.

The 2020 Notes are senior unsecured obligations and rank equally with all of Ciena’s other existing and future senior unsecured debt. The 2020 Notes pay interest from the date of issuance at a rate of 4.0% per year. The interest is payable semi-annually on June 15 and December 15, commencing on June 15, 2013. The principal amount of the 2020 Notes will also accrete at a rate of 1.85% per year commencing December 27, 2012, compounding on a semi-annual basis. The accreted portion of the principal payable at maturity does not bear interest and is not convertible into shares of Ciena’s common stock. The 2020 Notes will mature on December 15, 2020. Consequently, in the event the 2020 Notes are converted, the accreted liability will extinguish without payment.

The 2020 Notes may be converted prior to maturity, at the option of the holder, into shares of Ciena’s common stock at an initial conversion rate of 49.0557 shares of common stock per \$1,000 in original principal amount, which is equal to an initial conversion price of \$20.39 per share. In addition, Ciena may elect to convert the 2020 Notes, in whole or in part, at any time on or prior to December 15, 2020, if the daily volume weighted average price of the common stock equals or exceeds 130% of the conversion price then in effect for at least 20 trading days in any 30 consecutive trading day period. If Ciena elects to convert the 2020 Notes on or before maturity, the conversion rate will be adjusted to include an amount of additional shares, determined by reference to a make-whole table, payable in Ciena common stock, or its cash equivalent, at Ciena’s election. An aggregate of 9,197,944 shares of Ciena common stock issuable upon conversion of the 2020 Notes has been reserved for issuance.

Upon certain fundamental changes, holders of the 2020 Notes have the option to require Ciena to purchase the 2020 Notes at a price equal to the accreted principal amount of the notes delivered for repurchase plus any accrued and unpaid interest on the original principal amount. Upon a holder’s election to convert the 2020 Notes in connection with certain fundamental changes, the conversion rate will be adjusted to include an amount of additional shares, determined by reference to a make-whole table, payable in Ciena common stock, or its cash equivalent, at Ciena’s election.

Accounting guidance issued by the FASB requires the issuer of convertible debt instruments with cash settlement features, including partial cash settlement, to account separately for the liability and equity components of the instrument. Under this guidance, the debt is recognized at the present value of its cash flows discounted using the issuer’s nonconvertible debt borrowing rate at the time of issuance and the equity component is recognized as the difference between the proceeds from the issuance of the note and the fair value of the liability. The reduced carrying value on the convertible debt results in a debt discount that is accreted back to the convertible debt’s principal amount through the recognition of non-cash interest expense over the expected life of the debt, which results in recognizing the interest expense on these borrowings at effective rates approximating what Ciena would have incurred had nonconvertible debt with otherwise similar terms been issued.

Because the additional make-whole shares can be settled in cash or common stock at Ciena’s option, the debt and equity components were accounted for separately. Ciena measured the fair value of the debt component of the 2020 Notes using an effective interest rate of 7.0%. As a result, Ciena attributed \$170.4 million of the fair value of the 2020 Notes to the debt component. The debt component was netted against the face value of the 2020 Notes to determine the debt discount. The debt discount will be accreted over the period from the date of issuance to the contractual maturity date, resulting in the recognition of non-cash interest expense. In addition, Ciena recorded \$43.1 million within additional paid-in capital representing the equity component of the 2020 Notes. There was no net tax expense recorded due to Ciena’s full valuation allowance against its deferred tax assets.

The 2020 Notes were issued pursuant to an Indenture entered into as of December 27, 2012 (the “Indenture”) with The Bank of New York Mellon Trust Company, N.A., as trustee. The Indenture provides for customary events of default which include (subject in certain cases to customary grace and cure periods), among others, the following: nonpayment of principal

(including accreted portion) or interest; breach of covenants or other agreements in the Indenture; defaults in failure to pay certain other indebtedness; and certain events of bankruptcy or insolvency. Generally, if an event of default occurs and is continuing under the Indenture, the trustee or the holders of at least 25% in aggregate original principal amount of the 2020 Notes then outstanding may declare the principal (including accreted portion), premium, if any, and accrued interest on all the 2020 Notes immediately due and payable.

The principal balance, unamortized discount and net carrying value of the liability and equity components of our 2020 notes were as follows as of October 31, 2016

| | Liability Component | | | Equity Component |
|---|---------------------|----------------------|---------------------|---------------------|
| | Principal Balance | Unamortized Discount | Net Carrying Amount | Net Carrying Amount |
| 4.0% Convertible Senior Notes due December 15, 2020 | \$ 201,234 | \$ (11,466) | \$ 189,768 | \$ 43,131 |

The following table sets forth, in thousands, the carrying value and the estimated current fair value of Ciena’s outstanding convertible notes:

| Description | October 31, 2016 | |
|---|-------------------|---------------------------|
| | Carrying Value | Fair Value ⁽¹⁾ |
| 0.875% Convertible Senior Notes due June 15, 2017 | \$ 231,558 | \$ 230,400 |
| 3.75% Convertible Senior Notes, due October 15, 2018 | 350,000 | 417,156 |
| 4.0% Convertible Senior Notes, due December 15, 2020 ⁽²⁾ | 189,768 | 238,978 |
| | <u>\$ 771,326</u> | <u>\$ 886,534</u> |

- (1) The convertible notes were categorized as Level 2 in the fair value hierarchy. Ciena estimates the fair value of its outstanding convertible notes using a market approach based on observable inputs, such as current market transactions involving comparable securities.
- (2) Includes unamortized discount and accretion of principal.

(17) ABL CREDIT FACILITY

Ciena Corporation and certain of its subsidiaries are parties to a senior secured asset-based revolving credit facility (the “ABL Credit Facility”). Ciena principally uses the ABL Credit Facility to support the issuance of letters of credit that arise in the ordinary course of its business and thereby to reduce its use of cash required to collateralize these instruments.

On January 8, 2016, Ciena amended the ABL Credit Facility to, among other things:

- increase the total commitment from \$200 million to \$250 million, of which \$200 million is available for issuances of letters of credit;
- extend the maturity date from December 31, 2016 to December 31, 2020, provided an earlier maturity date would apply in the event that Ciena and its subsidiaries are unable to satisfy a minimum liquidity test 90 days prior to the maturity date of any debt equal to \$100 million or greater;
- reduce the minimum aggregate amount of unrestricted cash and cash equivalents that Ciena and its domestic subsidiaries are required to maintain at all times from \$150 million to \$100 million; and
- reduce the interest rate by 0.25% on borrowings to either (a) LIBOR plus a margin ranging from 1.25% to 1.75% (instead of the previous 1.50% to 2.0%) or (b) a base rate plus a margin ranging from 0.25% to 0.75% (instead of the previous 0.50% to 1.0%), in each case with the actual margin determined according to the Ciena’s utilization of the facility.

As of October 31, 2016, letters of credit totaling \$65.1 million were collateralized by the ABL Credit Facility. There were no borrowings outstanding under the ABL Credit Facility as of October 31, 2016.

(18) EARNINGS (LOSS) PER SHARE CALCULATION

The following table (in thousands except per share amounts) is a reconciliation of the numerator and denominator of the basic net income (loss) per common share (“Basic EPS”) and the diluted net income (loss) per potential common share (“Diluted EPS”). Basic EPS is computed using the weighted average number of common shares outstanding. Diluted EPS is computed using the weighted average number of the following, in each case, to the extent the effect is not anti-dilutive: (i) common shares outstanding, (ii) shares issuable upon vesting of restricted stock units, (iii) shares issuable under Ciena’s employee stock purchase plan and upon exercise of outstanding stock options, using the treasury stock method, and (iv) shares underlying Ciena’s outstanding convertible notes.

| | Year Ended October 31, | | |
|--|------------------------|-----------|-------------|
| | 2016 | 2015 | 2014 |
| Net income (loss) | \$ 72,584 | \$ 11,667 | \$ (40,637) |
| Add: Interest expense associated with 0.875% Convertible Senior Notes due 2017 | 4,801 | — | — |
| Net income (loss) used to calculate Diluted EPS | \$ 77,385 | \$ 11,667 | \$ (40,637) |

Denominator

| | Year Ended October 31, | | |
|---|------------------------|---------|---------|
| | 2016 | 2015 | 2014 |
| Basic weighted average shares outstanding | 138,312 | 118,416 | 105,783 |
| Add: Shares underlying outstanding stock options, employee stock purchase plan and restricted stock units | 1,311 | 1,685 | — |
| Add: Shares underlying 0.875% Convertible Senior Notes due 2017 | 11,081 | — | — |
| Diluted weighted average shares outstanding | 150,704 | 120,101 | 105,783 |

EPS

| | Year Ended October 31, | | |
|-------------|------------------------|---------|-----------|
| | 2016 | 2015 | 2014 |
| Basic EPS | \$ 0.52 | \$ 0.10 | \$ (0.38) |
| Diluted EPS | \$ 0.51 | \$ 0.10 | \$ (0.38) |

The following table summarizes the weighted average shares excluded from the calculation of the denominator for Diluted EPS due to their anti-dilutive effect for the fiscal years indicated (in thousands):

| | Year Ended October 31, | | |
|--|------------------------|--------|--------|
| | 2016 | 2015 | 2014 |
| Shares underlying stock options and restricted stock units | 1,882 | 1,562 | 3,176 |
| 4.0% Convertible Senior Notes due March 15, 2015 | — | 3,386 | 9,198 |
| 0.875% Convertible Senior Notes due June 15, 2017 | — | 13,080 | 13,108 |
| 3.75% Convertible Senior Notes due October 15, 2018 | 17,355 | 17,355 | 17,355 |
| 8.0% Cyan Convertible Senior Notes due 2019 | — | 187 | — |
| 4.0% Convertible Senior Notes due December 15, 2020 | 9,198 | 9,198 | 9,198 |
| Total excluded due to anti-dilutive effect | 28,435 | 44,768 | 52,035 |

(19) STOCKHOLDERS’ EQUITY
Call Spread Option

Ciena purchased a call spread option relating to the 2017 Notes for \$42.5 million during the third quarter of fiscal 2007. The call spread option is designed to mitigate exposure to potential dilution from the conversion of the notes. The call spread

option was purchased at the time of the notes offering from an affiliate of the underwriter. The cost of the call spread option was recorded as a reduction in paid-in capital.

The call spread option is exercisable, upon maturity of the relevant issue of convertible note, for such number of shares of Ciena common stock issuable upon conversion of that series of notes in full. The call spread option has a “lower strike price” equal to the conversion price for the notes and a “higher strike price” that serves to cap the amount of dilution protection provided. At its election, Ciena can exercise the call spread option on a net cash basis or a net share basis. The value of the consideration of a net share settlement will be equal to the value upon a net cash settlement and can range from \$0, if the market price per share of Ciena common stock upon exercise is equal to or below the lower strike price, or approximately \$76.1 million, if the market price per share of Ciena common stock upon exercise is at or above the higher strike price. If the market price on the date of exercise is between the lower strike price and the higher strike price, in lieu of a net settlement, Ciena may elect to receive the full number of shares underlying the call spread option by paying the aggregate option exercise price, which is equal to the original principal outstanding on that series of notes. Should there be an early unwind of the call spread option, the amount of cash or shares to be received by Ciena will depend upon the existing overall market conditions, and on Ciena’s stock price, the volatility of Ciena’s stock and the remaining term of the call spread option. The number of shares subject to the call spread option, and the lower and higher strike prices, are subject to customary adjustments.

(20) INCOME TAXES

For the periods indicated, the provision for income taxes consists of the following (in thousands):

| | Year Ended October 31, | | |
|-----------------------------|------------------------|-----------|-----------|
| | 2016 | 2015 | 2014 |
| Provision for income taxes: | | | |
| Current: | | | |
| Federal | \$ — | \$ — | \$ — |
| State | 5,281 | 1,435 | 1,831 |
| Foreign | 9,969 | 10,662 | 12,133 |
| Total current | 15,250 | 12,097 | 13,964 |
| Deferred: | | | |
| Federal | — | — | — |
| State | — | — | — |
| Foreign | (1,116) | — | — |
| Total deferred | (1,116) | — | — |
| Provision for income taxes | \$ 14,134 | \$ 12,097 | \$ 13,964 |

For the periods indicated, income (loss) before provision for income taxes consists of the following (in thousands):

| | Year Ended October 31, | | |
|---------------|------------------------|------------|-------------|
| | 2016 | 2015 | 2014 |
| United States | \$ 58,237 | \$ (1,029) | \$ (42,742) |
| Foreign | 28,481 | 24,793 | 16,069 |
| Total | \$ 86,718 | \$ 23,764 | \$ (26,673) |

Ciena’s foreign income tax as a percentage of foreign income is dependent upon the mix of earnings in foreign jurisdictions. Depending upon the mix of earnings in these jurisdictions, including those jurisdictions which are loss making, the tax on total foreign income may appear disproportionate compared to the expected tax based on the U.S. federal statutory rate. Ciena expects that this result may continue until earnings from foreign operations mature and maintain a more consistent contribution.

For the periods indicated, the tax provision reconciles to the amount computed by multiplying income or loss before income taxes by the U.S. federal statutory rate of 35% as follows:

| | Year Ended October 31, | | |
|---------------------------------------|------------------------|----------|----------|
| | 2016 | 2015 | 2014 |
| Provision at statutory rate | 35.00 % | 35.00 % | 35.00 % |
| State taxes | 4.00 % | 6.04 % | (6.87)% |
| Foreign taxes | 3.11 % | 28.98 % | (70.25)% |
| Research and development credit | (22.61)% | (25.55)% | 32.07 % |
| Non-deductible compensation and other | 4.13 % | 30.16 % | (29.59)% |
| Valuation allowance | (7.33)% | (23.73)% | (12.71)% |
| Effective income tax rate | 16.30 % | 50.90 % | (52.35)% |

As a result of prospective application of Accounting Standards Update No. 2015-17, *Income Taxes (Topic 740): Balance Sheet Classification of Deferred Taxes*, Ciena offset all deferred tax liabilities and assets, as well as any related valuation allowance, and is presenting them as a single non-current amount as of October 31, 2016 and 2015. Ciena has not retrospectively adjusted prior periods.

The significant components of deferred tax assets and liabilities are as follows (in thousands):

| | October 31, | |
|----------------------------------|-------------|-------------|
| | 2016 | 2015 |
| Deferred tax assets: | | |
| Reserves and accrued liabilities | \$ 59,791 | \$ 63,290 |
| Depreciation and amortization | 298,497 | 203,991 |
| NOL and credit carry forward | 1,109,304 | 1,202,641 |
| Other | 23,304 | 25,750 |
| Gross deferred tax assets | 1,490,896 | 1,495,672 |
| Valuation allowance | (1,489,780) | (1,495,672) |
| Net deferred tax asset | \$ 1,116 | \$ — |

A reconciliation of the beginning and ending amount of unrecognized tax benefits, excluding interest and penalties, is as follows (in thousands):

| | Amount |
|--|-----------|
| Unrecognized tax benefits at October 31, 2013 | \$ 8,279 |
| Increase related to positions taken in prior period | 2,479 |
| Increase related to positions taken in current period | 5,241 |
| Reductions related to expiration of statute of limitations | (899) |
| Unrecognized tax benefits at October 31, 2014 | 15,100 |
| Increase related to positions taken in prior period | 3,658 |
| Increase related to positions taken in current period | 9,138 |
| Reductions related to expiration of statute of limitations | (360) |
| Unrecognized tax benefits at October 31, 2015 | 27,536 |
| Increase related to positions taken in prior period | 2,187 |
| Increase related to positions taken in current period | 2,654 |
| Reductions related to expiration of statute of limitations | (1,709) |
| Unrecognized tax benefits at October 31, 2016 | \$ 30,668 |

As of October 31, 2016 and 2015, Ciena had accrued \$4.6 million and \$4.3 million of interest and penalties, respectively, related to unrecognized tax benefits within other long-term liabilities in the Consolidated Balance Sheets. Interest and penalties of \$1.2 million, \$0.9 million and \$2.0 million were recorded to the provision for income taxes during fiscal 2016, fiscal 2015

and fiscal 2014 respectively. If recognized, the entire balance of unrecognized tax benefits would impact the effective tax rate. Over the next 12 months, Ciena does not estimate any material changes in unrecognized income tax benefits.

Ciena has not provided for U.S. deferred income taxes on the cumulative unremitted earnings of its non-U.S. affiliates, as it plans to indefinitely reinvest these foreign earnings outside the U.S. As of October 31, 2016, the cumulative amount of such temporary differences for which a deferred tax liability has not been recognized totaled approximately \$307 million. If these earnings were distributed to the U.S. in the form of dividends, or otherwise, or if the shares of the relevant foreign subsidiaries were sold or otherwise transferred, Ciena would be subject to additional U.S. income taxes (subject to an adjustment for foreign tax credits) and foreign withholding taxes. Determination of the amount of unrecognized deferred income tax liability related to these earnings is not practicable. Additionally, there are no other significant temporary differences for which a deferred tax liability has not been recognized.

Ciena provides a valuation allowance for its deferred tax assets in excess of deferred tax liabilities because management has concluded that it is more likely than not that such deferred tax assets will ultimately not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income (including the reversals of deferred tax liabilities) during the periods in which those deferred tax assets will become deductible. Management assesses available positive and negative evidence regarding Ciena’s ability to realize its deferred tax assets and records a valuation allowance when it is more likely than not that deferred tax assets will not be realized. To form a conclusion, management considers its recent financial results and trends, and makes judgments and estimates related to projections of profitability, the timing and extent of the utilization of net operating loss carryforwards and tax planning strategies. At October 31, 2016, Ciena was not in a three-year cumulative loss position. However, management determined that a valuation allowance is still necessary, due to, among other things, the relatively low level of cumulative pre-tax income during this period — which was only initially achieved in the second half of fiscal 2016 — and Ciena’s history of operating losses. Management will continue to evaluate future financial performance to determine whether such performance is both sustained and significant enough to provide sufficient evidence to support reversal of all or a portion of the valuation allowance. Any future release of valuation allowance may be recorded as a tax benefit increasing net income or as an adjustment to paid-in capital, based on tax ordering requirements. The valuation allowance balance at October 31, 2016 was \$1.5 billion.

The following table summarizes the activity in Ciena’s valuation allowance against its gross deferred tax assets (in thousands):

| Year ended October 31, | Beginning Balance | Additions | Deductions | Ending Balance |
|---------------------------|----------------------|-----------|------------|-------------------|
| 2014 | \$ 1,487,299 | \$ 9,536 | \$ — | \$ 1,496,835 |
| 2015 | \$ 1,496,835 | \$ — | \$ 1,163 | \$ 1,495,672 |
| 2016 | \$ 1,495,672 | \$ — | \$ 5,892 | \$ 1,489,780 |

As of October 31, 2016, Ciena had a \$2.5 billion net operating loss carry forward and a \$0.1 billion income tax credit carry forward which begin to expire in fiscal year 2020 and 2019, respectively. Ciena’s ability to use net operating losses and credit carry forwards is subject to limitations pursuant to the ownership change rules of the Internal Revenue Code Section 382.

The income tax provision does not reflect the tax savings resulting from deductions associated with Ciena’s equity compensation and the call spread option associated with Ciena’s convertible debt. The cumulative tax benefit through October 31, 2016 of approximately \$84.0 million will be credited to additional paid-in capital when realized. For deductions associated with Ciena’s equity compensation, credits to paid-in capital will be recorded when those tax benefits are used to reduce taxes payable.

(21) SHARE-BASED COMPENSATION EXPENSE

Ciena has outstanding equity awards issued under its 2008 Omnibus Incentive Plan, as well as certain legacy equity plans and equity plans assumed as a result of previous acquisitions. In connection with its acquisition of Cyan during the fourth quarter of fiscal 2015, Ciena assumed the Cyan, Inc. 2006 Stock Plan and Cyan, Inc. 2013 Equity Incentive Plan and exchanged Cyan stock options and unvested restricted stock unit awards outstanding thereunder at closing for options to acquire approximately 2.4 million shares of Ciena common stock and 1.0 million Ciena restricted stock units. Ciena grants equity awards under its 2008 Omnibus Incentive Plan and makes shares of its common stock available for purchase under its Amended and Restated Employee Stock Purchase Plan (“ESPP”). These plans were approved by stockholders and are described below.

2008 Plan

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The 2008 Plan authorizes the issuance of awards including stock options, restricted stock units (RSUs), restricted stock, unrestricted stock, stock appreciation rights (SARs) and other equity and/or cash performance incentive awards to employees, directors and consultants of Ciena. Subject to certain restrictions, the Compensation Committee of the Board of Directors has broad discretion to establish the terms and conditions for awards under the 2008 Plan, including the number of shares, vesting conditions, and the required service or performance criteria. Options and SARs have a maximum term of ten years, and their exercise price may not be less than 100% of fair market value on the date of grant. Repricing of stock options and SARs is prohibited without stockholder approval. Certain change in control transactions may cause awards granted under the 2008 Plan to vest, unless the awards are continued or substituted for in connection with the transaction. As of October 31, 2016, the total number of shares authorized for issuance under the 2008 Plan is 25.1 million and approximately 3.7 million shares remained available for issuance thereunder.

Stock Options

Outstanding stock option awards to employees are generally subject to service-based vesting conditions and vest over a four -year period. The following table is a summary of Ciena's stock option activity for the periods indicated (shares in thousands):

| | Shares Underlying Options Outstanding | Weighted Average Exercise Price |
|--------------------------------|---|---------------------------------------|
| Balance as of October 31, 2015 | 2,293 | \$ 24.45 |
| Granted | — | — |
| Exercised | (565) | 10.53 |
| Canceled | (341) | 37.57 |
| Balance as of October 31, 2016 | <u>1,387</u> | <u>\$ 26.90</u> |

The total intrinsic value of options exercised during fiscal 2016, fiscal 2015 and fiscal 2014 was \$5.7 million, \$11.8 million and \$1.0 million, respectively. There were no stock options granted by Ciena during fiscal 2016, fiscal 2015 or fiscal 2014. The weighted average fair value of each stock option granted by Ciena in exchange for Cyan awards was \$13.04.

The following table summarizes information with respect to stock options outstanding at October 31, 2016, based on Ciena's closing stock price on the last trading day of Ciena's fiscal 2016 (shares and intrinsic value in thousands):

| Range of Exercise Price | Options Outstanding at October 31, 2016 | | | | | Vested Options at October 31, 2016 | | | | |
|-------------------------------|--|--|--|---------------------------------|--------------------------------------|--|--|---------------------------------|--|--|
| | Number of Underlying Shares | Weighted Average Remaining Contractual Life (Years) | Weighted Average Exercise Price | Aggregate Intrinsic Value | Number of Underlying Shares | Weighted Average Remaining Contractual Life (Years) | Weighted Average Exercise Price | Aggregate Intrinsic Value | | |
| | | | | | | | | | | |
| \$ 0.05 — \$ 11.16 | 158 | 2.67 | \$ 6.63 | \$ 2,035 | 157 | 2.62 | \$ 6.60 | \$ 2,023 | | |
| \$ 11.34 — \$ 17.24 | 291 | 5.55 | 13.23 | 1,825 | 278 | 5.45 | 13.14 | 1,769 | | |
| \$ 17.50 — \$ 30.52 | 370 | 1.27 | 26.54 | 49 | 353 | 0.95 | 26.93 | 27 | | |
| \$ 31.93 — \$ 37.10 | 324 | 2.35 | 35.19 | — | 318 | 2.29 | 35.18 | — | | |
| \$ 37.82 — \$ 55.63 | 244 | 4.84 | 45.83 | — | 217 | 4.61 | 45.86 | — | | |
| \$ 0.05 — \$ 55.63 | <u>1,387</u> | 3.21 | \$ 26.90 | <u>\$ 3,909</u> | <u>1,323</u> | 3.02 | \$ 26.72 | <u>\$ 3,819</u> | | |

Assumptions for Option-Based Awards

Ciena recognizes the fair value of stock options as share-based compensation expense on a straight-line basis over the requisite service period. Ciena did not grant any option-based awards during fiscal 2016, fiscal 2015 or fiscal 2014. Ciena used the following assumptions for option-based awards issued in exchange for Cyan options:

| | |
|-------------------------|-----------|
| Expected volatility | 35.87% |
| Risk-free interest rate | 1.26% |
| Expected term (years) | 0.72-6.88 |
| Expected dividend yield | 0.0% |

Restricted Stock Units

A restricted stock unit is a stock award that entitles the holder to receive shares of Ciena common stock as the unit vests. Ciena's outstanding restricted stock unit awards are subject to service-based vesting conditions and/or performance-based vesting conditions. Awards subject to service-based conditions typically vest in increments over a three or four -year period. Awards with performance-based vesting conditions require the achievement of certain operational, financial or other performance criteria or targets as a condition of vesting, or the acceleration of vesting, of such awards. Ciena recognizes the estimated fair value of performance-based awards, net of estimated forfeitures, as share-based compensation expense over the performance period, using graded vesting, which considers each performance period or tranche separately, based upon Ciena's determination of whether it is probable that the performance targets will be achieved. At each reporting period, Ciena reassesses the probability of achieving the performance targets and the performance period required to meet those targets.

The following table is a summary of Ciena's restricted stock unit activity for the period indicated, with the aggregate fair value of the balance outstanding at the end of each period, based on Ciena's closing stock price on the last trading day of the relevant period (shares and aggregate fair value in thousands):

| | Restricted Stock Units Outstanding | Weighted Average Grant Date Fair Value Per Share | Aggregate Fair Value |
|--------------------------------|------------------------------------|--|----------------------|
| Balance as of October 31, 2015 | 4,886 | \$ 20.02 | \$ 117,951 |
| Granted | 2,277 | | |
| Vested | (2,519) | | |
| Canceled or forfeited | (364) | | |
| Balance as of October 31, 2016 | 4,280 | \$ 19.96 | \$ 83,511 |

The total fair value of restricted stock units that vested and were converted into common stock during fiscal 2016 , fiscal 2015 and fiscal 2014 was \$50.3 million , \$50.5 million and \$48.1 million , respectively. The weighted average fair value of each restricted stock unit granted by Ciena during fiscal 2016 , fiscal 2015 and fiscal 2014 was \$19.81 , \$19.41 and \$21.82 , respectively. The weighted average fair value of each restricted stock unit granted by Ciena in exchange for Cyan awards was \$25.39 .

Assumptions for Restricted Stock Unit Awards

The fair value of each restricted stock unit award is based on the closing price on the date of grant. Share-based expense for service-based restricted stock unit awards is recognized, net of estimated forfeitures, ratably over the vesting period on a straight-line basis.

Share-based expense for performance-based restricted stock unit awards, net of estimated forfeitures, is recognized ratably over the performance period based upon Ciena's determination of whether it is probable that the performance targets will be achieved. At each reporting period, Ciena reassesses the probability of achieving the performance targets and the performance period required to meet those targets. The estimation of whether the performance targets will be achieved involves judgment, and the estimate of expense is revised periodically based on the probability of achieving the performance targets. Revisions are reflected in the period in which the estimate is changed. If any performance goals are not met, no compensation cost is ultimately recognized against that goal and, to the extent previously recognized, compensation expense is reversed.

Because share-based compensation expense is recognized only for those awards that are ultimately expected to vest, the amount of share-based compensation expense recognized reflects a reduction for estimated forfeitures. Ciena estimates forfeitures at the time of grant and revises those estimates in subsequent periods based upon new or changed information.

Amended and Restated Employee Stock Purchase Plan (ESPP)

Under the ESPP, eligible employees may enroll in a twelve -month offer period that begins in December and June of each year. Each offer period includes two six -month purchase periods. Employees may purchase a limited number of shares of Ciena common stock at 85% of the fair market value on either the day immediately preceding the offer date or the purchase date, whichever is lower. The ESPP is considered compensatory for purposes of share-based compensation expense. Pursuant to the ESPP’s “evergreen” provision, on December 31 of each year, the number of shares available under the ESPP increases by up to 0.6 million shares, provided that the total number of shares available at that time shall not exceed 8.2 million . Unless earlier terminated, the ESPP will terminate on January 24, 2023 .

During fiscal 2016 , fiscal 2015 and fiscal 2014 , Ciena issued 1.1 million , 1.0 million and 0.9 million shares under the ESPP, respectively. At October 31, 2016 , 5.9 million shares remained available for issuance under the ESPP.

Share-Based Compensation Expense for Periods Reported

The following table summarizes share-based compensation expense for the periods indicated (in thousands):

| | Year Ended October 31, | | |
|---|------------------------|-----------|-----------|
| | 2016 | 2015 | 2014 |
| Product costs | \$ 2,457 | \$ 2,400 | \$ 2,531 |
| Service costs | 2,479 | 2,156 | 2,216 |
| Share-based compensation expense included in cost of goods sold | 4,936 | 4,556 | 4,747 |
| Research and development | 13,870 | 10,665 | 9,682 |
| Sales and marketing | 15,138 | 15,539 | 14,958 |
| General and administrative | 17,342 | 17,018 | 13,568 |
| Acquisition and integration costs | 714 | 7,588 | — |
| Share-based compensation expense included in operating expense | 47,064 | 50,810 | 38,208 |
| Share-based compensation expense capitalized in inventory, net | (7) | (26) | (25) |
| Total share-based compensation | \$ 51,993 | \$ 55,340 | \$ 42,930 |

As of October 31, 2016 , total unrecognized share-based compensation expense was \$70.2 million : (i) \$0.6 million , which relates to unvested stock options and is expected to be recognized over a weighted-average period of 1.5 years ; and (ii) \$69.6 million which relates to unvested restricted stock units and is expected to be recognized over a weighted-average period of 1.4 years.

(22) SEGMENT AND ENTITY WIDE DISCLOSURES

Segment Reporting

During the first quarter of fiscal 2016, Ciena reorganized its internal organizational structure, the management of its business, and the reporting of its operating segments. This resulted in three new operating segments: Networking Platforms, Software and Software-Related Services, and Global Services. Ciena’s previous Converged Packet-Optical, Packet Networking and Optical Transport segments were realigned to form the Networking Platforms segment under a single operating segment manager. Ciena’s previous Software and Services operating segment was reorganized into two separate operating segments: (i) Software and Software-Related Services, and (ii) Global Services. Segment revenue and segment profit for fiscal 2015 and fiscal 2014 have been restated to reflect the new operating segments adopted in fiscal 2016.

- *Networking Platforms* reflects sales of Ciena’s Converged Packet Optical, Packet Networking and Optical Transport product lines .
 - Converged Packet Optical — includes the 6500 Packet-Optical Platform and the 5430 Reconfigurable Switching System, which feature Ciena’s WaveLogic coherent optical processors. Products also include the Waveserver stackable interconnect system, the family of CoreDirector® Multiservice Optical Switches and the OTN configuration for the 5410 Reconfigurable Switching System. This product line also includes sales of the Z-Series Packet-Optical Platform acquired from Cyan.
 - Packet Networking — includes the 3000 family of service delivery switches and service aggregation switches and the 5000 family of service aggregation switches. This product line also includes the 8700 Packetwave Platform and the Ethernet packet configuration for the 5410 Service Aggregation Switch.

- Optical Transport — includes the 4200 Advanced Services Platform, 5100/5200 Advanced Services Platform, Common Photonic Layer (CPL) and 6100 Multiservice Optical Platform. Ciena's Optical Transport products have either been previously discontinued, or are expected to be discontinued during fiscal 2016, reflecting network operators' transition toward next-generation converged network architectures.

The Networking Platforms segment also includes sales of operating system software and enhanced software features embedded in each of the product lines above. Revenue from this segment is included in product revenue on the Consolidated Statement of Operations.

- *Software and Software-Related Services* reflects sales of Ciena's network virtualization, management, control and orchestration software solutions and software-related services, including subscription, installation, support, and consulting services.
 - This segment includes Ciena's element and network management solutions and planning tools, including the OneControl Unified Management System, ON-Center® Network & Service Management Suite, Ethernet Services Manager, Optical Suite Release and Planet Operate. As Ciena seeks adoption of its Blue Planet software platform and transition features, functionality and customers to this platform, Ciena expects revenue declines for its existing element and network management solutions.
 - This segment includes Ciena's Blue Planet network virtualization, service orchestration and network management software platform, including the multi-domain service orchestration (MDSO), network function virtualization (NFV) management and orchestration (NFV MANO), and Ciena's SDN Multilayer WAN Controller and its related applications.

Revenue from the software platforms portion of this segment is included in product revenue on the Consolidated Statement of Operations. Revenue from software-related services is included in services revenue on the Consolidated Statement of Operations.

- *Global Services* reflects sales of a broad range of Ciena's services for consulting and network design, installation and deployment, maintenance support and training activities. Revenue from this segment is included in services revenue on the Consolidated Statement of Operations.

Ciena's long-lived assets, including equipment, building, furniture and fixtures, finite-lived intangible assets, and maintenance spares, are not reviewed by the chief operating decision maker for purposes of evaluating performance and allocating resources. As of October 31, 2016, equipment, building, furniture and fixtures totaling \$288.4 million primarily supports asset groups within Ciena's Networking Platforms and Software and Software-Related Services segments and Ciena's unallocated selling and general and administrative activities. As of October 31, 2016, \$69.6 million of Ciena's intangible assets were assigned to asset groups within Ciena's Networking Platforms segment and \$77.1 million of Ciena's intangible assets were assigned to asset groups within Ciena's Software and Software-Related Services. As of October 31, 2016, all of the maintenance spares totaling \$49.5 million were assigned to asset groups within Ciena's Global Services segment.

Segment Revenue

The table below (in thousands, except percentage data) sets forth Ciena's segment revenue for the respective periods indicated:

| | Year Ended October 31, | | |
|--|------------------------|--------------|--------------|
| | 2016 | 2015 | 2014 |
| Revenue: | | | |
| Networking Platforms | | | |
| Converged Packet Optical | \$ 1,779,932 | \$ 1,661,702 | \$ 1,455,501 |
| Packet Networking | 252,862 | 229,223 | 244,116 |
| Optical Transport | 35,989 | 73,004 | 127,215 |
| Total Networking Platforms | 2,068,783 | 1,963,929 | 1,826,832 |
| Software and Software-Related Services | | | |
| Software Platforms | 48,689 | 38,466 | 38,994 |
| Software-Related Services | 76,380 | 61,821 | 49,070 |
| Total Software and Software-Related Services | 125,069 | 100,287 | 88,064 |
| Global Services | | | |
| Maintenance Support and Training | 228,982 | 224,079 | 217,032 |
| Installation and Deployment | 130,916 | 115,531 | 112,417 |
| Consulting and Network Design | 46,823 | 41,843 | 43,944 |
| Total Global Services | 406,721 | 381,453 | 373,393 |
| Consolidated revenue | \$ 2,600,573 | \$ 2,445,669 | \$ 2,288,289 |

Segment Profit

Segment profit is determined based on internal performance measures used by the chief executive officer to assess the performance of each operating segment in a given period. In connection with that assessment, the chief executive officer excludes the following items: selling and marketing costs; general and administrative costs; acquisition and integration costs; amortization of intangible assets; restructuring costs; interest and other income (loss), net; interest expense; and provisions for income taxes.

The table below (in thousands) sets forth Ciena's segment profit and the reconciliation to consolidated net income (loss) during the respective periods indicated:

| | Year Ended October 31, | | |
|---|------------------------|------------|-------------|
| | 2016 | 2015 | 2014 |
| Segment profit: | | | |
| Networking Platforms | \$ 544,744 | \$ 515,550 | \$ 412,383 |
| Software and Software-Related Services | 7,123 | 4,174 | 9,498 |
| Global Services | 157,915 | 141,638 | 125,291 |
| Total segment profit | 709,782 | 661,362 | 547,172 |
| Less: non-performance operating expenses | | | |
| Selling and marketing | 349,731 | 333,836 | 328,325 |
| General and administrative | 132,828 | 123,402 | 126,824 |
| Amortization of intangible assets | 61,508 | 69,511 | 45,970 |
| Acquisition and integration costs | 4,613 | 25,539 | — |
| Restructuring costs | 4,933 | 8,626 | 349 |
| Add: other non-performance financial items | | | |
| Interest expense and other income (loss), net | (69,451) | (76,684) | (72,377) |
| Less: Provision for income taxes | 14,134 | 12,097 | 13,964 |
| Consolidated net income (loss) | \$ 72,584 | \$ 11,667 | \$ (40,637) |

Entity Wide Reporting

Ciena's operating segments each engage in business across four geographic regions: North America; Europe, Middle East and Africa ("EMEA"); Asia-Pacific ("APAC"); and Caribbean and Latin America ("CALA"). North America includes only activities in the United States and Canada. The following table reflects Ciena's geographic distribution of revenue principally based on the relevant location for Ciena's delivery of products and performance of services. For the periods below, Ciena's geographic distribution of revenue was as follows (in thousands):

| | Year Ended October 31, | | |
|---------------|------------------------|--------------|--------------|
| | 2016 | 2015 | 2014 |
| North America | \$ 1,689,263 | \$ 1,598,328 | \$ 1,477,329 |
| EMEA | 393,705 | 400,294 | 417,399 |
| CALA | 195,085 | 201,499 | 212,018 |
| APAC | 322,520 | 245,548 | 181,543 |
| Total | \$ 2,600,573 | \$ 2,445,669 | \$ 2,288,289 |

North America includes \$1.58 billion, \$1.48 billion and \$1.32 billion of United States revenue for fiscal years ended October 31, 2016, 2015 and 2014, respectively. No other country accounted for at least 10% of total revenue for the periods presented above.

The following table reflects Ciena's geographic distribution of equipment, building, furniture and fixtures, net, with any country accounting for at least 10% of total equipment, building, furniture and fixtures, net, specifically identified. Equipment, building, furniture and fixtures, net, attributable to geographic regions outside of the United States and Canada are reflected as "Other International." For the periods below, Ciena's geographic distribution of equipment, building, furniture and fixtures, net, was as follows (in thousands):

| | October 31, | | |
|---------------------|-------------|------------|------------|
| | 2016 | 2015 | 2014 |
| United States | \$ 103,018 | \$ 96,292 | \$ 73,420 |
| Canada | 173,885 | 84,318 | 42,015 |
| Other International | 11,503 | 11,363 | 11,197 |
| Total | \$ 288,406 | \$ 191,973 | \$ 126,632 |

While we have benefited from the diversification of our business and customer base, our ten largest customers contributed 51.1% of fiscal 2016 revenue, 52.5% of fiscal 2015 revenue and 56.4% of fiscal 2014 revenue. AT&T accounted for greater than 10% of Ciena's revenue in Ciena's fiscal years ended October 31, 2016, 2015 and 2014, with total revenue of \$479.1 million, \$487.8 million and \$423.5 million, respectively. AT&T purchases products and services from each of Ciena's operating segments.

(23) OTHER EMPLOYEE BENEFIT PLANS

Ciena has a Defined Contribution Pension Plan that covers a majority of its Canada-based employees. The plan covers all Canada-based employees who are not part of an excluded group. Total contributions (employee and employer) cannot exceed the lesser of 18% of participant earnings and an annual dollar limit (CAD \$25,370 for 2016). This plan includes a required employer contribution of 1% for all participants and a 50% matching of participant contributions up to a total annual maximum of CAD \$3,000 per employee. During fiscal 2016, 2015 and 2014, Ciena made matching contributions of approximately CAD \$4.5 million, CAD \$4.3 million and CAD \$4.1 million, respectively.

Ciena has a 401(k) defined contribution profit sharing plan. Participants may contribute up to 60% of pre-tax compensation, subject to certain limitations. The plan includes an employer matching contribution equal to 50% of the first 6% an employee contributes each pay period. Ciena may also make discretionary annual profit contributions up to the IRS regulated limit. Ciena has made no profit sharing contributions to date. During fiscal 2016, 2015 and 2014, Ciena made matching contributions of approximately \$5.4 million, \$4.7 million and \$4.5 million, respectively.

(24) COMMITMENTS AND CONTINGENCIES

Foreign Tax Contingencies

Ciena is subject to various tax liabilities arising in the ordinary course of business. Ciena does not expect that the ultimate settlement of these liabilities will have a material effect on its results of operations, financial position or cash flows.

Litigation

From May 15 through June 3, 2015, five separate putative class action lawsuits in connection with Ciena's then-pending acquisition of Cyan, Inc. ("Cyan") were filed in the Court of Chancery of the State of Delaware. On June 23, 2015, each of these lawsuits was consolidated into a single case captioned *In Re Cyan, Inc. Shareholder Litigation*, Consol. C.A. No. 11027-CB. On July 9, 2015, the plaintiffs filed a verified amended class action complaint, which named as defendants Ciena, a Ciena subsidiary created solely for the purpose of effecting the acquisition ("Merger Sub"), and the members of Cyan's board of directors. On August 5, 2015, the defendants filed motions to dismiss the amended complaint. On October 1, 2015, the plaintiffs filed a second amended complaint which named as defendants the members of Cyan's board of directors. Cyan, Ciena, and Merger Sub were not named as defendants. On July 15, 2016, the plaintiffs filed a third amended complaint, which generally alleges that the Cyan board members breached their fiduciary duties by engaging in a conflicted and unfair sales process, failing to maximize stockholder value in the acquisition, taking steps to preclude competitive bidding, and failing to disclose material information necessary for stockholders to make an informed decision regarding the acquisition. The third amended complaint seeks (i) a declaration that the plaintiffs are entitled to a quasi-appraisal remedy, (ii) rescissory damages, (iii) recovery through an accounting of all damages caused as a result of the alleged breaches of fiduciary duties, (iv) compensatory damages, and (v) costs including attorneys' fees and experts' fees. On August 5, 2016, the defendants filed a motion to dismiss the third amended complaint. Ciena believes that the consolidated lawsuit is without merit and intends to defend it vigorously.

As a result of the acquisition of Cyan in August 2015, Ciena became a defendant in a securities class action lawsuit. On April 1, 2014, a purported stockholder class action lawsuit was filed in the Superior Court of California, County of San Francisco, against Cyan, the members of Cyan's board of directors, Cyan's former Chief Financial Officer, and the underwriters of Cyan's initial public offering. On April 30, 2014, a substantially similar lawsuit was filed in the same court against the same defendants. The two cases have been consolidated as *Beaver County Employees Retirement Fund, et al. v. Cyan, Inc. et al.*, Case No. CGC-14-538355. The consolidated complaint alleges violations of federal securities laws on behalf of a purported class consisting of purchasers of Cyan's common stock pursuant or traceable to the registration statement and prospectus for Cyan's initial public offering in April 2013, and seeks unspecified compensatory damages and other relief. On May 19, 2015, the proposed class was certified. On August 25, 2015, the defendants filed a motion for judgment on the pleadings based on an alleged lack of subject matter jurisdiction over the case, which motion was denied on October 23, 2015. On May 24, 2016, the defendants filed a petition for a writ of certiorari on the jurisdiction issue with the United States Supreme Court, to which the plaintiffs filed a brief in opposition. On November 18, 2016, the parties each filed motions for summary judgment. Ciena believes that the consolidated lawsuit is without merit and intends to defend it vigorously.

On May 29, 2008, Graywire, LLC filed a complaint in the United States District Court for the Northern District of Georgia against Ciena and four other defendants, alleging, among other things, that certain of the parties' products infringe U.S. Patent 6,542,673 (the "'673 Patent"), relating to an identifier system and components for optical assemblies. The complaint seeks injunctive relief and damages. In July 2009, upon request of Ciena and certain other defendants, the U.S. Patent and Trademark Office ("PTO") granted the defendants' *inter partes* application for reexamination with respect to certain claims of the '673 Patent, and the district court granted the defendants' motion to stay the case pending reexamination of all of the patents-in-suit. In December 2010, the PTO confirmed the validity of some claims and rejected the validity of other claims of the '673 Patent, to which Ciena and other defendants filed an appeal. On March 16, 2012, the PTO on appeal rejected multiple claims of the '673 Patent, including the two claims on which Ciena is alleged to infringe. Subsequently, the plaintiff requested a reopening of the prosecution of the '673 Patent, which request was denied by the PTO on April 29, 2013. Thereafter, on May 28, 2013, the plaintiff filed an amendment with the PTO in which it canceled the claims of the '673 Patent on which Ciena is alleged to infringe. The case currently remains stayed, and there can be no assurance as to whether or when the stay will be lifted.

In addition to the matters described above, Ciena is subject to various legal proceedings and claims arising in the ordinary course of business, including claims against third parties that may involve contractual indemnification obligations on the part of Ciena. Ciena does not expect that the ultimate costs to resolve these matters will have a material effect on our results of operations, financial position or cash flows.

Lease Commitments

Ciena has certain minimum obligations under non-cancelable leases expiring on various dates through 2032 for equipment and facilities. The following table summarizes our future annual minimum lease commitments under non-cancelable leases that are not recorded on the balance sheet as of October 31, 2016 (in thousands):

| | 2017 | 2018 | 2019 | 2020 | 2021 | Thereafter | Total |
|--|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|
| Operating leases | \$ 36,133 | \$ 22,884 | \$ 17,573 | \$ 14,915 | \$ 12,256 | \$ 37,812 | \$ 141,573 |
| Other lease commitments ⁽¹⁾ | 848 | 5,094 | 5,094 | 5,094 | 5,094 | 63,068 | 84,292 |
| Total | \$ 36,981 | \$ 27,978 | \$ 22,667 | \$ 20,009 | \$ 17,350 | \$ 100,880 | \$ 225,865 |

(1) Represents the expected timing and amounts of payments for rent associated with capital and build-to-suit lease arrangements that have not yet been placed into service. For future payments related to capital leases that have been placed into service, see Note 13 above.

Rental expense for fiscal 2016, fiscal 2015 and fiscal 2014 was approximately \$26.6 million, \$25.7 million and \$22.9 million, respectively. In addition, Ciena paid approximately \$0.8 million, \$0.8 million and \$0.5 million during fiscal 2016, fiscal 2015 and fiscal 2014, respectively, related to rent costs for restructured facilities and unfavorable lease commitments, which were offset against Ciena's restructuring liabilities and unfavorable lease obligations. The amount for operating lease commitments above does not include variable expenses relating to insurance, taxes, maintenance and other costs required by the applicable operating lease. These costs are not expected to have a material impact on Ciena's financial condition, results of operations or cash flows.

(25) SUBSEQUENT EVENT

On December 21, 2016, Ciena repurchased approximately \$46.3 million in aggregate principal amount of its outstanding 2017 Notes in a private repurchase transaction, for an aggregate purchase price of approximately \$46.3 million. Following the transaction, \$185.3 million in aggregate principal amount of 2017 Notes remained outstanding.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

As of the end of the period covered by this report, we carried out an evaluation under the supervision and with the participation of management, including our Chief Executive Officer and Chief Financial Officer, of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended). Based upon this evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of the end of the period covered by this report.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934, as amended) during the most recently completed fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Report of Management on Internal Control Over Financial Reporting

The management of Ciena Corporation is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934).

The internal control over financial reporting at Ciena Corporation was designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America. Internal control over financial reporting includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of Ciena Corporation;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with accounting principles generally accepted in the United States of America;
- provide reasonable assurance that receipts and expenditures of Ciena Corporation are being made only in accordance with authorization of management and directors of Ciena Corporation; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of assets that could have a material effect on the consolidated financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements.

Management of Ciena Corporation assessed the effectiveness of the company's internal control over financial reporting as of October 31, 2016. Management based this assessment on criteria for effective internal control over financial reporting described in "COSO 2013 Internal Control — Integrated Framework" issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, management determined that, as of October 31, 2016, Ciena Corporation maintained effective internal control over financial reporting. Management reviewed the results of its assessment with the Audit Committee of our Board of Directors.

PricewaterhouseCoopers LLP, independent registered public accounting firm, who audited and reported on the consolidated financial statements of Ciena Corporation included in this annual report, has also audited the effectiveness of Ciena Corporation's internal control over financial reporting as of October 31, 2016, as stated in its report appearing in Item 8 of Part II of this annual report.

/s/ Gary B. Smith

Gary B. Smith

President and Chief Executive Officer

December 21, 2016

/s/ James E. Moylan, Jr.

James E. Moylan, Jr.

Senior Vice President and Chief Financial Officer

December 21, 2016

Item 9B. Other Information

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information relating to our directors and executive officers is set forth in Part I of this annual report under the caption “Item 1. Business—Directors and Executive Officers.”

Additional information responsive to this item concerning our Audit Committee and regarding compliance with Section 16(a) of the Exchange Act is incorporated herein by reference from our definitive proxy statement with respect to our 2017 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

As part of our system of corporate governance, our board of directors has adopted a code of ethics that is specifically applicable to our chief executive officer and senior financial officers. This Code of Ethics for Senior Financial Officers, as well as our Code of Business Conduct and Ethics, applicable to all directors, officers and employees, are available on the “Corporate Governance” page of our website at <http://www.ciena.com>. We intend to satisfy any disclosure requirement under Item 5.05 of Form 8-K regarding an amendment to, or waiver from, a provision of the Code of Ethics for Senior Financial Officers, by posting such information on our website at the address above.

Item 11. Executive Compensation

Information responsive to this item is incorporated herein by reference from our definitive proxy statement with respect to our 2017 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

Information responsive to this item is incorporated herein by reference from our definitive proxy statement with respect to our 2017 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

Item 13. Certain Relationships and Related Transactions, and Director Independence

Information responsive to this item is incorporated herein by reference from our definitive proxy statement with respect to our 2017 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

Item 14. Principal Accountant Fees and Services

Information responsive to this item is incorporated herein by reference from our definitive proxy statement with respect to our 2017 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

PART IV

Item 15. Exhibits and Financial Statement Schedules

- (a)
 - 1. The information required by this item is included in Item 8 of Part II of this annual report.
 - 2. The information required by this item is included in Item 8 of Part II of this annual report.
 - 3. Exhibits: See Index to Exhibits, which is incorporated by reference in this Item. The Exhibits listed in the accompanying Index to Exhibits are filed herewith or incorporated by reference as part of this annual report.
- (b) Exhibits. See Index to Exhibits, which is incorporated by reference in this Item. The Exhibits listed in the accompanying Index to Exhibits are filed herewith or incorporated by reference as part of this annual report.
- (c) Not applicable.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized on the 21st day of December 2016 .

Ciena Corporation

By: /s/ Gary B. Smith

Gary B. Smith

President, Chief Executive Officer and Director

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

| Signatures | Title | Date |
|--|---|-------------------|
| <u>/s/ Patrick H. Nettles, Ph.D.</u> Patrick H. Nettles, Ph.D. | Executive Chairman of the Board of Directors | December 21, 2016 |
| <u>/s/ Gary B. Smith</u> Gary B. Smith (Principal Executive Officer) | President, Chief Executive Officer and Director | December 21, 2016 |
| <u>/s/ James E. Moylan, Jr.</u> James E. Moylan, Jr. (Principal Financial Officer) | Sr. Vice President, Finance and Chief Financial Officer | December 21, 2016 |
| <u>/s/ Andrew C. Petrik</u> Andrew C. Petrik (Principal Accounting Officer) | Vice President, Controller | December 21, 2016 |
| <u>/s/ Harvey B. Cash</u> Harvey B. Cash | Director | December 21, 2016 |
| <u>/s/ Bruce L. Claflin</u> Bruce L. Claflin | Director | December 21, 2016 |
| <u>/s/ Lawton W. Fitt</u> Lawton W. Fitt | Director | December 21, 2016 |
| <u>/s/ Patrick T. Gallagher</u> Patrick T. Gallagher | Director | December 21, 2016 |
| <u>/s/ T. Michael Nevens</u> T. Michael Nevens | Director | December 21, 2016 |
| <u>/s/ Judith M. O'Brien</u> Judith M. O'Brien | Director | December 21, 2016 |
| <u>/s/ Michael J. Rowny</u> Michael J. Rowny | Director | December 21, 2016 |

INDEX TO EXHIBITS

| Exhibit Number | Exhibit Description | Incorporated by Reference | | | Filed Here- with (X) |
|-------------------|--|---|---------|-------------|----------------------------|
| | | Form and Registration or Commission No. | Exhibit | Filing Date | |
| 3.1 | Amended and Restated Certificate of Incorporation of Ciena Corporation | 8-K (000-21969) | 3.1 | 3/27/2008 | |
| 3.2 | Amended and Restated Bylaws of Ciena Corporation | 8-K (000-21969) | 3.1 | 8/28/2008 | |
| 4.1 | Specimen Stock Certificate | 10-K (000-21969) | 4.1 | 12/27/2007 | |
| 4.2 | Indenture dated June 11, 2007 between Ciena Corporation and The Bank of New York, as trustee, for 0.875% Convertible Senior Notes due 2017, including the Form of Global Note attached as Exhibit A thereto | 8-K (000-21969) | 4.7 | 6/12/2007 | |
| 4.3 | Indenture dated October 18, 2010 between Ciena Corporation and The Bank of New York Mellon Trust Company, N.A., as trustee, for 3.75% Convertible Senior Notes due 2018, including the Form of Global Note attached as Exhibit A thereto | 8-K (000-21969) | 4.1 | 10/21/2010 | |
| 4.4 | Indenture dated December 27, 2012 between Ciena Corporation and The Bank of New York Mellon Trust Company, N.A., as trustee, for 4.0% Convertible Senior Notes due 2020, including the Form of Global Note attached as Exhibit A thereto | 8-K (000-21969) | 4.1 | 12/31/2012 | |
| 10.1 | 2008 Omnibus Incentive Plan* | 8-K (000-21969) | 10.1 | 3/27/2008 | |
| 10.2 | Amendment (No. 1) to Ciena Corporation 2008 Omnibus Incentive Plan dated April 14, 2010* | 8-K (000-21969) | 10.1 | 4/15/2010 | |
| 10.3 | Amendment (No. 2) to Ciena Corporation 2008 Omnibus Incentive Plan dated March 21, 2012* | 8-K (000-21969) | 10.1 | 3/23/2012 | |
| 10.4 | Amendment (No. 3) to Ciena Corporation 2008 Omnibus Incentive Plan dated April 10, 2014* | 10-Q (001-36250) | 10.1 | 6/11/2014 | |
| 10.5 | Amendment (No. 4) to Ciena Corporation 2008 Omnibus Incentive Plan dated March 24, 2016* | 10-Q (001-36250) | 10.2 | 6/8/2016 | |
| 10.6 | Form of 2008 Omnibus Incentive Plan Restricted Stock Unit Agreement (Employee)* | 10-K (000-21969) | 10.18 | 12/22/2011 | |
| 10.7 | Form of 2008 Omnibus Incentive Plan Non-Qualified Stock Option Agreement (Employee)* | 10-Q (000-21969) | 10.2 | 6/4/2009 | |
| 10.8 | Form of 2008 Omnibus Incentive Plan Restricted Stock Unit Agreement (Director)* | 10-Q (000-21969) | 10.3 | 6/4/2009 | |
| 10.9 | Amended and Restated 2003 Employee Stock Purchase Plan* | 8-K (000-21969) | 10.2 | 3/23/2012 | |
| 10.10 | Employee Stock Purchase Plan Enrollment Agreement* | 10-K (000-21969) | 10.33 | 12/22/2011 | |
| 10.11 | Cyan, Inc. 2006 Stock Plan* | S-1 (333-187732) | 10.2.1 | 4/4/2013 | |

| Exhibit Number | Exhibit Description | Incorporated by Reference | | | Filed Here-with (X) |
|----------------|---|---|---------|-------------|---------------------|
| | | Form and Registration or Commission No. | Exhibit | Filing Date | |
| 10.12 | Cyan, Inc. 2013 Equity Incentive Plan* | S-1 (333-187732) | 10.3.1 | 4/4/2013 | |
| 10.13 | Ciena Corporation 2000 Equity Incentive Plan (Amended and Restated ONI Systems Corp. 2000 Equity Incentive Plan)* | 10-K (000-21969) | 10.37 | 12/11/2003 | |
| 10.14 | Form of Stock Option Award Agreement for executive officers under Ciena Corporation 2000 Equity Incentive Plan* | 8-K (000-21969) | 10.1 | 11/4/2005 | |
| 10.15 | Form of Non-Statutory Stock Option Award Agreement for directors under Ciena Corporation 2000 Equity Incentive Plan* | 8-K (000-21969) | 10.4 | 11/4/2005 | |
| 10.16 | Form of Restricted Stock Unit Award Agreement for directors under Ciena Corporation 2000 Equity Incentive Plan* | 8-K (000-21969) | 10.5 | 11/4/2005 | |
| 10.17 | World Wide Packets, Inc. 2000 Stock Incentive Plan, as amended* | S-8 (333-149520) | 10.1 | 3/4/2008 | |
| 10.18 | Deferred Compensation Plan, effective as of November 1, 2016* | S-8 (333-214594) | 10.1 | 11/14/2016 | |
| 10.19 | Ciena Corporation Directors Restricted Stock Deferral Plan* | 10-Q (000-21969) | 10.1 | 8/31/2007 | |
| 10.20 | Ciena Corporation Amended and Restated Incentive Bonus Plan, as amended December 15, 2011* | 10-K (000-21969) | 10.26 | 12/22/2011 | |
| 10.21 | U.S. Executive Severance Benefit Plan* | 10-Q (000-21969) | 10.1 | 6/9/2011 | |
| 10.22 | Form of Indemnification Agreement with Directors and Executive Officers* | 10-Q (000-21969) | 10.1 | 3/3/2006 | |
| 10.23 | Change in Control Severance Agreement dated November 1, 2016, between Ciena Corporation and Gary B. Smith* | — | — | — | X |
| 10.24 | Change in Control Severance Agreement dated November 1, 2016 between Ciena Corporation and Executive Officers* | — | — | — | X |
| 10.25 | Lease Agreement dated as of March 19, 2010 between Ciena Canada, Inc. and Nortel Networks Technology Corp.# | 10-Q (000-21969) | 10.1 | 6/10/2010 | |
| 10.26 | Lab 10 Lease Amending Agreement dated February 13, 2012 between Her Majesty the Queen in Right of Canada, as Represented by the Minister of Public Works and Government Services, and Ciena Canada, Inc. | 8-K (000-21969) | 1.1 | 2/15/2012 | |
| 10.27 | Second Lease Amending Agreement dated August 29, 2013 by and between Her Majesty the Queen in Right of Canada, as Represented by the Minister of Public Works and Government Services, as landlord, and Ciena Canada, Inc., as tenant | 8-K (000-21969) | | 8/3/2013 | |
| 10.28 | Third Lease Amending Agreement dated July 11, 2014 by and between Her Majesty the Queen in Right of Canada, as Represented by the Minister of Public Works and Government Services, as landlord, and Ciena Canada, Inc., as tenant | 8-K (001-36250) | 10.1 | 7/11/2014 | |
| 10.29 | Lease Agreement by and between Ciena Canada, Inc. and Innovation Blvd. II Limited dated as of October 23, 2014+ | 10-K (001-36250) | 10.36 | 12/19/2014 | |
| 10.30 | Amendment No. 1 to the Lease Agreement dated October 23, 2014, between Innovations Blvd II Limited and Ciena Canada, Inc., dated April 15, 2015. | 8-K (001-36250) | 10.3 | 6/3/2015 | |

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| Exhibit Number | Exhibit Description | Incorporated by Reference | | | Filed Here- with (X) |
|-------------------|---|---|---------|-------------|----------------------------|
| | | Form and Registration or Commission No. | Exhibit | Filing Date | |
| 10.31 | Lease Agreement between Ciena Canada, Inc. and Innovation Blvd. II Limited, dated April 15, 2015 | 8-K (001-36250) | 10.4 | 6/3/2015 | |
| 10.32 | Lease Agreement dated November 3, 2011 between Ciena Corporation and W2007 RDG Realty, L.L.C. ++ | 10-K (000-21969) | 10.34 | 12/22/2011 | |
| 10.33 | ABL Credit Agreement, dated August 13, 2012, by and among Ciena Corporation, Ciena Communications, Inc. and Ciena Canada, Inc., as the borrowers, the lenders party thereto, Deutsche Bank AG New York Branch, as administrative agent and collateral agent, Bank of America, N.A., as syndication agent, and Morgan Stanley Senior Funding, Inc. and Wells Fargo Bank, National Association, as co-documentation agents ++ | 10-Q (000-21969) | 10.1 | 9/5/2012 | |
| 10.34 | Amendment to ABL Credit Agreement, dated August 24, 2012, by and among Ciena Corporation, Ciena Communications, Inc. and Ciena Canada, Inc., as the borrowers, and Deutsche Bank AG New York Branch, as administrative agent ++ | 10-Q (000-21969) | 10.2 | 9/5/2012 | |
| 10.35 | Omnibus Second Amendment to ABL Credit Agreement and First Amendment to U.S. Security Agreement, Canadian Security Agreement, U.S. Pledge Agreement, U.S. Guaranty and Canadian Guaranty, entered into as of March 5, 2013, by and among Ciena Corporation, Ciena Communications, Inc., Ciena Canada, Inc., and Deutsche Bank AG New York Branch | 10-Q (000-21969) | 10.2 | 3/13/2013 | |
| 10.36 | Third Amendment to ABL Credit Agreement, dated July 15, 2014 by and among Ciena Corporation, Ciena Communications, Inc., Ciena Government Solutions, Inc. Ciena Canada, Inc., Deutsche Bank AG New York Branch, as administrative agent and collateral agent, and the lenders party thereto. | 10-Q (001-36250) | 10.1 | 9/9/2014 | |
| 10.37 | Omnibus Fourth Amendment to Credit Agreement and First Amendment to U.S. Pledge Agreement and Canadian Pledge Agreement, dated April 15, 2015. | 8-K (001-36250) | 10.2 | 6/3/2015 | |
| 10.38 | Fifth Amendment to ABL Credit Agreement dated July 2, 2015, by and among Ciena Corporation, Ciena Communications, Inc., Ciena Government Solutions, Inc. Ciena Canada, Inc., Deutsche Bank AG New York Branch, as administrative agent and collateral agent, and the lenders party thereto. | 10-Q (001-36250) | 10.2 | 9/9/2015 | |
| 10.39 | Sixth Amendment to ABL Credit Agreement dated January 8, 2016, by and among Ciena Corporation, Ciena Communications, Inc., Ciena Government Solutions, Inc. Ciena Canada, Inc., Deutsche Bank AG New York Branch, as administrative agent and collateral agent, and the lenders party thereto. | 10-Q (001-36250) | 4.1 | 3/9/2016 | |
| 10.40 | Joinder Agreement under ABL Credit Agreement and Related Agreements as of March 15, 2013 by and between Ciena Government Solutions, Inc. and Deutsche Bank AG New York Branch, as Administrative Agent and as Collateral Agent, for the benefit of the Secured Creditors++ | 10-Q (000-21969) | 10.2 | 6/12/2013 | |
| 10.41 | Amended and Restated Security Agreement, dated August 13, 2012, amended and restated as of July 15, 2014, by and among Ciena Corporation, Ciena Communications, Inc., Ciena Government Solutions, Inc., and Deutsche Bank AG New York Branch, as Collateral Agent++ | 10-Q (001-36250) | 10.2 | 9/9/2014 | |

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| Exhibit Number | Exhibit Description | Incorporated by Reference | | | Filed Here- with (X) |
|-------------------|---|---|---------|-------------|----------------------------|
| | | Form and Registration or Commission No. | Exhibit | Filing Date | |
| 10.42 | Amended and Restated Pledge Agreement, dated August 13, 2012, amended and restated as of July 15, 2014, by and among Ciena Corporation, Ciena Communications, Inc., Ciena Government Solutions, Inc., and Deutsche Bank AG New York Branch, as Pledgee++ | 10-Q (001-36250) | 10.3 | 9/9/2014 | |
| 10.43 | U.S. Guaranty, dated August 13, 2012, by and among Ciena Corporation and Ciena Communications, Inc., as guarantors, and Deutsche Bank AG New York Branch, as administrative agent ++ | 10-Q (000-21969) | 10.5 | 9/5/2012 | |
| 10.44 | Canadian Guaranty, dated August 13, 2012, by and between Ciena Canada, Inc., as guarantor, and Deutsche Bank AG New York Branch, as administrative agent ++ | 10-Q (000-21969) | 10.7 | 9/5/2012 | |
| 10.45 | Amended and Restated Canadian Security Agreement, dated August 13, 2012, amended and restated as of July 15, 2014, by and among Ciena Canada, Inc., each other assignor from time to time party thereto, and Deutsche Bank AG New York Branch, as Collateral Agent.++ | 10-Q (001-36250) | 10.4 | 9/9/2014 | |
| 10.46 | Amended and Restated Canadian Security Agreement, dated August 13, 2012, amended and restated as of July 15, 2014 and further amended and restated as of January 8, 2016 by and among Ciena Canada, Inc., each other assignor from time to time party thereto, and Deutsche Bank AG New York Branch, as Collateral Agent.++ | 10-Q (001-36250) | 4.2 | 3/9/2016 | |
| 10.47 | Credit Agreement, dated July 15, 2014, by and among Ciena Corporation, the lenders party thereto, and Bank of America, N.A., as Administrative Agent++ | 10-Q (001-36250) | 10.5 | 9/9/2014 | |
| 10.48 | First Amendment to Credit Agreement, dated July 15, 2014 and First Amendment to Certain Pledge Agreements (U.S. Pledge Agreement, dated July 15, 2014 and Canadian Pledge Agreement, dated December 12, 2014), dated April 15, 2015.++ | 8-K (001-36250) | 10.1 | 6/3/2015 | |
| 10.49 | Second Amendment to Credit Agreement, dated July 2, 2015, by and among Ciena Corporation, the lenders party thereto, and Bank of America, N.A., as Administrative Agent. ++ | 10-Q (001-36250) | 10.1 | 9/9/2015 | |
| 10.50 | Incremental Joinder and Amendment Agreement under the Credit Agreement and Related Agreements dated as of April 25, 2016 by and between Ciena Corporation, Bank of America, N.A. as Administrative Agent, Ciena Communications, Inc. and Ciena Government Solutions, Inc. | 10-Q (001-36250) | 10.1 | 6/8/2016 | |
| 10.51 | Guaranty, dated July 15, 2014, by and among Ciena Communications, Inc., Ciena Government Solutions, Inc. and Bank of America, N.A., as Administrative Agent.++ | 10-Q (001-36250) | 10.6 | 9/9/2014 | |
| 10.52 | Term Loan Security Agreement, dated July 15, 2014, by and among Ciena Corporation, Ciena Communications, Inc., Ciena Government Solutions, Inc., and Bank of America, N.A., as Collateral Agent. ++ | 10-Q (001-36250) | 10.7 | 9/9/2014 | |
| 10.53 | Term Loan Pledge Agreement, dated July 15, 2014, by and among Ciena Corporation, Ciena Communications, Inc., Ciena Government Solutions, Inc., and Bank of America, N.A., as Pledgee.++ | 10-Q (001-36250) | 10.8 | 9/9/2014 | |
| 10.54 | Intellectual Property License Agreement dated as of March 19, 2010 between Ciena Luxembourg S.a.r.l. and Nortel Networks Limited# | 10-Q (000-21969) | 10.3 | 6/10/2010 | |
| 12.1 | Computation of Earnings to Fixed Charges | — | — | — | X |
| 21.1 | Subsidiaries of registrant | — | — | — | X |

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| Exhibit Number | Exhibit Description | Incorporated by Reference | | | Filed Here- with (X) |
|-------------------|--|---|---------|-------------|----------------------------|
| | | Form and Registration or Commission No. | Exhibit | Filing Date | |
| 23.1 | Consent of Independent Registered Public Accounting Firm | — | — | — | X |
| 31.1 | Certification of Chief Executive Officer Pursuant to Rule 13a-14(a) under the Securities Exchange Act of 1934 as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 | — | — | — | X |
| 31.2 | Certification of Chief Financial Officer Pursuant to Rule 13a-14(a) under the Securities Exchange Act of 1934 as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 | — | — | — | X |
| 32.1 | Certification of Chief Executive Officer Pursuant to 18 U.S.C. Section 1350 as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 | — | — | — | X |
| 32.2 | Certification of Chief Financial Officer Pursuant to 18 U.S.C. Section 1350 as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 | — | — | — | X |
| 101.INS | XBRL Instance Document | — | — | — | X |
| 101.SCH | XBRL Taxonomy Extension Schema Document | — | — | — | X |
| 101.CAL | XBRL Taxonomy Extension Calculation Linkbase Document | — | — | — | X |
| 101.DEF | XBRL Taxonomy Extension Definition Linkbase Document | — | — | — | X |
| 101.LAB | XBRL Taxonomy Extension Label Linkbase Document | — | — | — | X |
| 101.PRE | XBRL Taxonomy Extension Presentation Linkbase Document | — | — | — | X |

- * Represents management contract or compensatory plan or arrangement
- + Pursuant to Item 601(b)(2) of Regulation S-K, certain schedules and exhibits referenced in the table of contents have been omitted. Ciena hereby agrees to furnish supplementally a copy of any omitted exhibit or schedule to the SEC upon request. In addition, representations and warranties included in these agreements, as amended, were made by the parties to one another in connection with a negotiated transaction. These representations and warranties were made as of specific dates, only for purposes of these agreements and for the benefit of the parties thereto. These representations and warranties were subject to important exceptions and limitations agreed upon by the parties, including being qualified by confidential disclosures, made for the purposes of allocating contractual risk between the parties rather than establishing these matters as facts. These agreements are filed with this report only to provide investors with information regarding its terms and conditions, and not to provide any other factual information regarding Ciena or any other party thereto. Accordingly, investors should not rely on the representations and warranties contained in these agreements or any description thereof as characterizations of the actual state of facts or condition of any party, its subsidiaries or affiliates. The information in these agreements should be considered together with Ciena’s public reports filed with the SEC.
- ++ Representations and warranties included in these agreements, as amended, were made by the parties to one another in connection with a negotiated transaction. These representations and warranties were made as of specific dates, only for purposes of these agreements and for the benefit of the parties thereto. These representations and warranties were subject to important exceptions and limitations agreed upon by the parties, including being qualified by confidential disclosures, made for the purposes of allocating contractual risk between the parties rather than establishing these matters as facts. These agreements are filed with this report only to provide investors with information regarding its terms and conditions, and not to provide any other factual information regarding Ciena or any other party thereto. Accordingly, investors should not rely on the representations and warranties contained in these agreements or any description thereof as characterizations of the actual state of facts or condition of any party, its subsidiaries or affiliates. The information in these agreements should be considered together with Ciena’s public reports filed with the SEC.
- # Certain portions of these documents have been omitted based on a request for confidential treatment submitted to the SEC. The non-public information that has been omitted from these documents has been separately filed with the SEC. Each redacted portion of these documents is indicated by a “[*]” and is subject to the request for confidential treatment submitted to the SEC. The redacted information is confidential information of the Registrant.

CIENA CORPORATION
CHANGE IN CONTROL SEVERANCE AGREEMENT

This Change in Control Severance Agreement (the “Agreement”) is made by and between **Ciena Corporation**, a Delaware corporation, and **Gary B. Smith** (the “Executive”), and shall become effective on November 1, 2016.

WHEREAS, the Company (as hereinafter defined) considers it essential to foster the continuous employment of key management personnel and recognizes that the possibility of a Change in Control (as hereinafter defined) of the Company exists and that such possibility, and the uncertainty that it may cause, may result in the departure or distraction of key management personnel of the Company, to the detriment of the Company and its stockholders;

WHEREAS, the Executive is a key management employee of the Company; and

WHEREAS, the Company desires to encourage the continued employment of the Executive by the Company and wants assurance that it will have the continued dedication, loyalty and service of, and the availability of objective advice and counsel from, the Executive notwithstanding the possibility, threat or occurrence of a Change in Control.

NOW, THEREFORE, in consideration of the mutual covenants and representations contained herein and the mutual benefits derived herefrom, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company and the Executive hereby agree as follows:

1. Certain Definitions. In addition to those terms defined elsewhere herein, when used herein, the following capitalized terms shall have the meanings indicated:

1.1. “*Board*” means the Board of Directors of the Company, as constituted from time to time.

1.2. “*Cause*” means the occurrence of any one or more of the following:

(i) the Executive’s willful and continued failure substantially to perform the duties of the Executive’s position (other than as a result of Disability or as a result of termination by the Executive for Good Reason) after written notice to the Executive by the Governance and Nominations Committee of the Board (or any other special committee or subcommittee appointed by the Board for such purpose) (the “Governance Committee”) specifying such failure, provided that such "cause" shall have been found by a majority vote of the Governance Committee after at least seven days' written notice to the Executive specifying the failure on the part of the Executive and after an opportunity for the Executive to be heard at a meeting of the Governance Committee;

(ii) any willful act or omission by the Executive in connection with his or her responsibilities as an employee of the Company constituting dishonesty, fraud or other malfeasance, immoral conduct or gross misconduct;

(iii) any willful material violation by the Executive of the Company’s Code of Business Conduct and Ethics or the Proprietary Information, Inventions and Non-Solicitation Agreement between the Company and the Executive; or

(iv) the Executive’s conviction of, or plea of nolo contendere to, a felony or a crime of moral turpitude under the laws of the United States or any state thereof or any other jurisdiction in which the Company conducts business.

For purposes of this definition, no act or failure to act by the Executive shall be deemed “willful” unless effected by the Executive not in good faith and without a reasonable belief that such act or failure to act was in or not opposed to the Company’s best interests.

1.3. “*Change in Control*” means the occurrence of any one of the following events:

(i) the direct or indirect sale or exchange by the stockholders of the Company of all or substantially all of the stock of the Company where the stockholders of the Company before such sale or exchange do not retain, directly or indirectly, at least a majority of the beneficial interest in the voting stock of the surviving, continuing, successor, or purchasing corporation or parent corporation thereof, as the case may be (the “Acquiring Company”) after such sale or exchange;

(ii) a merger or consolidation where the stockholders of the Company before such merger or consolidation do not retain, directly or indirectly, at least a majority of the beneficial interest in the voting stock of the Acquiring Company after such merger or consolidation;

(iii) the sale, exchange, or transfer of all or substantially all of the assets of the Company (other than a sale, exchange, or transfer to one or more subsidiary corporations of the Company);

(iv) a change in the composition of the Board occurring within a two year period, as a result of which less than a majority of the directors are Incumbent Directors. "Incumbent Directors" shall mean directors who either (A) are directors of the Company as of the date hereof or (B) are elected, or nominated for election, to the Board with the affirmative votes of at least a majority of the directors of the Company at the time of such election or nomination (but will not include an individual whose election or nomination is in connection with an actual or threatened proxy contest relating to the election of directors to the Company);

(v) a liquidation or dissolution of the Company; or

(vi) any other event that the Board, in its reasonable discretion, shall determine constitutes a Change in Control.

In each case the determination of whether or not a “Change in Control” is deemed to have taken place shall be made without regard to whether such events or occurrences constituting the Change in Control were hostile or against the position of the Board, or were approved or concurred in by the Board.

1.4. “*Code*” means the Internal Revenue Code of 1986, as amended.

1.5. “*Company*” means Ciena Corporation, its affiliates and subsidiaries, and any successor as provided in Section 7.5.

1.6. “*Disability*” means either (i) “total disability” as defined for purposes of the Company’s long-term disability benefit plan; or (ii) the Executive’s inability, as a result of physical or mental incapacity, to perform the Executive's duties for a period of six consecutive months or for an aggregate of six months in any 12 consecutive month period.

1.7. “*Effective Date*” means the date on which a Change in Control becomes effective. In the event of a subsequent Change in Control within one year of the prior Change in Control, “Effective Date” shall be adjusted to mean the date on which the subsequent Change in Control occurs.

1.8. “*Good Reason*” means;

(i) removal from, or failure to be reappointed or reelected to the Executive’s principal position immediately prior to the Effective Date or the date of a Triggering Event, as applicable (other than as a result of a promotion);

(ii) material diminution in the Executive’s position, duties or responsibilities, or the assignment to the Executive of duties that are inconsistent, in a material respect, with the scope of duties and responsibilities associated with the Executive’s position immediately prior to the Effective Date or the date of a Triggering Event, as applicable;

(iii) material reduction in base salary or award opportunity under any corporate incentive plan (or any successor to any such plan), or a material reduction in the level of participation in long-term incentive, benefit and other plans for senior executives as in effect immediately preceding the Effective Date or the date of a Triggering Event, as applicable, or their equivalents;

(iv) relocation of the Executive's principal workplace without the Executive's consent to a location which is more than 50 miles from the Executive's principal workplace on the Effective Date or the date of a Triggering Event, as applicable; or

(v) any failure by the Company to comply with and satisfy the requirements of Section 7.5, provided that the successor shall have received at least ten days' prior written notice from the Company or the Executive of the requirements of Section 7.5;

provided, however, that (A) the Executive has provided notice to the Company of any of the foregoing conditions within 90 days of the initial existence of the condition; (B) the Company has been given at least 30 days following receipt of such notice to cure such condition; and (C) the Executive actually terminates employment within one year following the initial existence of the condition.

1.9. "*Options*" means the Executive's options to purchase common stock of the Company (or to receive cash or property the amount or value of which is determined by reference to the price of the Company's common stock) that are (i) validly issued under any of the Company's equity incentive or stock option plans and (ii) outstanding as of the Effective Date or the date of a Triggering Event, as applicable.

1.10. "*Performance-Based Restricted Stock*" means the Executive's restricted stock (including "restricted stock units" or other rights to receive common stock of the Company) that is (i) validly issued under any of the Company's equity incentive plans, (ii) outstanding as of the Effective Date or the date of a Triggering Event, as applicable, and (iii) subject to performance-based vesting.

1.11. "*Time-Based Restricted Stock*" means the Executive's restricted stock (including "restricted stock units" or other rights to receive common stock of the Company) that is (i) validly issued under any of the Company's equity incentive plans, (ii) outstanding as of the Effective Date or the date of a Triggering Event, as applicable, and (iii) subject to time-based vesting.

1.12. "*Triggering Event*" means termination of the Executive's employment with the Company without Cause by the Company, or for Good Reason by the Executive, either (i) within 90 days prior to the Effective Date or (ii) on or within 18 months after the Effective Date. For purposes of this definition, an Executive's employment with the Company will be deemed to have terminated on the earlier of the date the Executive's employment with the Company ceases or the date that written notice of any such termination is received by the Executive or by the Company, as the case may be, even though the parties may agree in connection therewith that the Executive's employment with the Company will continue for a specified period thereafter. The failure by the Executive or the Company to set forth in any such notice sufficient facts or circumstances showing Good Reason or Cause, as the case may be, shall not waive any right of the Executive or the Company or preclude either party from asserting such facts or circumstances in the enforcement of any such right.

2. Term of Agreement.

This Agreement shall commence on the date of its execution by the Executive and shall continue in effect through November 30, 2019 (the "Term"), and may be extended upon mutual written consent of the Executive and the Company (as authorized by the Board or the Compensation Committee of the Board). Notwithstanding the foregoing:

- (a) the Term shall be automatically extended without any further action if the Company is in active negotiations for, or has entered into, a definitive agreement regarding a Change in Control (a "Pending Transaction"), until the earliest to occur of (i) the date on which such negotiations have terminated
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without entry into a definitive agreement, (ii) the date on which such definitive agreement has terminated pursuant to its terms without occurrence of a Change in Control, or (iii) 12 months following the Effective Date of such Pending Transaction;

- (b) in the event that a Change in Control occurs during the Term, this Agreement shall continue in effect for a period of 12 months following the Effective Date; and
- (c) if the Executive becomes entitled to severance benefits under Section 3 during the Term, this Agreement will not terminate until all of the obligations of the parties hereto with respect to this Agreement have been satisfied.

3. Severance Benefits Upon Triggering Event.

Provided that the Executive satisfies the conditions precedent set forth in Sections 4.1 and 4.2 hereof, upon a Triggering Event the Company shall pay the Executive the amounts and provide the Executive with the benefits set forth in this Section 3 (subject to the exclusivity and non-duplication provisions of Section 6 hereof):

3.1. Severance Payment. The Company shall pay to the Executive a lump sum severance payment, subject to any applicable payroll or other taxes required to be withheld, equal to two and one-half times the sum of (i) the Executive's annual base salary as in effect immediately prior to either the date of the Executive's termination of employment with the Company or the Effective Date, whichever is higher, and (ii) the Executive's annual target bonus or sales commissions amount(s) under any incentive plan(s) or program(s) in which the Executive participated immediately prior to either the date of the Executive's termination of employment with the Company or the Effective Date, whichever is higher. The above bonus or commissions amount shall be based on an assumed achievement of 100% of the targeted performance goal(s) for such award. Upon receipt of the above bonus amount, and subject to Section 6.2(iii) hereof, neither the Executive nor any other person claiming any payment by reason of the Executive's participation in the applicable annual bonus plan or annual sales incentive compensation plan shall have any right to any additional payment under such plan(s) or program(s) with respect to any applicable award thereunder;

3.2. Welfare Benefit and D&O Insurance. The Company shall continue the Executive's (and, where applicable, the Executive's spouse and eligible dependents') participation in the group medical, dental and vision plans maintained by the Company, on substantially the same basis as if the Executive were an employee of the Company, until the earlier of 18 months following the Executive's termination of employment with the Company or the last day of the month in which the Executive commences employment with another employer following the Executive's termination of employment with the Company (the "Coverage Period"). In the event that the Company is unable for any reason to provide for the Executive's (and, where applicable, the Executive's spouse and eligible dependents') continued participation in one or more of such plans during the Coverage Period, the Company shall pay or provide at its expense equivalent benefit coverage for the remainder of the Coverage Period. The Coverage Period shall be taken into account as a period of continuation coverage for purposes of Part 6 of Title I of the Employee Retirement Income Security Act of 1974, as amended ("ERISA"), and for purposes of any other obligation of the Company to provide any continued coverage to the Executive (and, where applicable, the Executive's spouse and eligible dependents) under any group medical, dental or vision plan. In the event that any payments under this Section 3.2 violate the non-discrimination rules under the Affordable Care Act ("ACA"), then the parties agree to modify this section as necessary in order to comply with the ACA. The Company shall continue to maintain director and officer insurance covering the Executive, and shall maintain in effect any indemnification agreements providing for indemnification of the Executive by the Company, until the applicable statute of limitations has ended;

3.3. Options and Restricted Stock. Notwithstanding the terms of any plan, program or arrangement maintained by the Company:

- (a) upon the Effective Date, (i) the Executive's Options that are subject to performance-based vesting and for which the applicable performance period has not yet expired shall immediately be converted into Options with time-based vesting conditions, and (ii) the Executive's Performance-Based Restricted Stock, and any other similar instruments of equity-based compensation that are subject to performance-
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based vesting, for which the applicable performance period has not yet expired shall immediately be converted into Time-Based Restricted Stock; in each case, with vesting as to the equity awards converted above being deemed to have commenced on the date of grant and vesting as to 1/16th of the grant on each March 20, June 20, September 20 and December 20 following the date of grant;

- (b) upon a Triggering Event, all of the Executive's Options, Performance-Based Restricted Stock and Time-Based Restricted Stock (including any performance-based equity awards converted pursuant to Section 3.3(a) above), to the extent unvested, shall become immediately vested and exercisable in full; and
- (c) upon a Triggering Event, the Executive must elect to exercise any unexercised and exercisable Options within the time period set forth in the applicable plan, program or arrangement under which they were granted, subject to the following requirements:
 - (i) If the exercise of any Option within the time period described in this Section 3.3 is prevented by the requirements of federal or state securities laws or as provided under the terms of the applicable plan, program or arrangement, then the Option shall remain exercisable until three months after the date the Executive is notified by the Company that the Option is exercisable, but in no event later than ten years after the date of grant of the Option; and
 - (ii) If the exercise of any Option within this time period would subject the Executive to suit under Section 16(b) of the Securities Exchange Act of 1934, the period for exercise shall be extended until the earliest to occur of (a) the tenth day following the date on which the Executive would no longer be subject to such suit, (b) the 190th day after the end of the salary continuation period, or (c) ten years after the date of grant of the Option.

3.4. Section 409A. Each of the cash payments provided pursuant to Article 3 of the Agreement shall be treated for purposes of Section 409A of the Code as a right to a series of separate and distinct payments. If the Executive is a "specified employee," as such term is defined pursuant to Section 409A of the Code and the regulations and guidance issued thereunder, and an amount payable under this Agreement constitutes deferred compensation (within the meaning of Section 409A of the Code) the payment of which is required to be delayed pursuant to the six-month delay rule set forth in Section 409A of the Code in order to avoid taxes or penalties thereunder, then such payments shall not be made until the earlier of the Executive's death or six months and one day after the Executive's last day of employment. With respect to any amounts for which cash payment has been delayed in accordance with this Section 3.4, such amounts shall accrue interest at the applicable U.S. Treasury rate for the corresponding maturity period in effect as of the date of the Triggering Event.

4. Conditions Precedent.

4.1. Release and Waiver. The parties agree that, as a condition to the Executive's right to receive the severance payments and benefits set forth in Section 3, the Executive shall execute a general waiver and release (a "Release"), in form and substance reasonably satisfactory to the Company, within 45 days following the last day of the Executive's employment with the Company, of all claims relating to the Executive's employment by the Company and the termination of such employment, including but not limited to discrimination claims, employment-related tort claims, contract claims and claims under this Agreement (other than claims with respect to benefits under the Company's tax-qualified retirement plans, continuation of coverage or benefits solely as required by Part 6 of Title I of ERISA, or any obligation of the Company to provide future performance under Section 3). No severance payments or benefits will be paid or provided until after the last day on which the Executive could rescind all or any part of the Release and the Release has become effective, and the Company will make the lump sum severance payment pursuant to Section 3.1 within ten days thereafter; provided, however, that if the period during which the Release could be signed and

become effective begins in one taxable year and ends in another taxable year, then the severance payment will not be made until the beginning of the second taxable year.

4.2. Non-Competition and Non-Solicitation. The parties agree that, as a condition to the Executive's right to receive the severance payments and benefits set forth in Section 3, the Executive agrees that, for a period of 12 months following the Executive's last day of employment with the Company, the Executive will not, whether alone or as a partner, officer, director, consultant, agent, employee or stockholder of any company or other commercial enterprise, directly or indirectly, without the prior written consent of the Company:

- (a) be employed or engaged by or associated with, or engage or invest in, own, manage, operate, finance, control or participate in the ownership, management, operation, financing or control of, any business or other commercial activity whose products directly compete, in whole or in part, with the products of the Company; provided, that the Executive may purchase or otherwise acquire as a passive investment up to (but not more than) one percent of any class of security of any enterprise (but without otherwise participating in the activities of such enterprise) if such securities are listed on any national or regional securities exchange or have been registered under Section 12(g) of the Securities Exchange Act of 1934; or
- (b) (i) solicit or induce any employee of the Company to leave the employ of the Company, (ii) solicit business of the same or similar type being carried on by the Company from any person known by to the Executive to have purchased products or services from the Company within the 12 months prior to the Executive's last day of employment with the Company, (iii) unlawfully interfere with the Company's relationship with any person, including any person who was an employee, contractor, supplier or customer of the Company, or (iv) disparage the Company or any of its shareholders, directors, officers, employees or agents.

4.3. Construction. Section 4.2 is intended to provide the greatest restriction allowable under Cal. Bus. & Prof. Code §16601. In the event any provision hereof is determined by a court of competent jurisdiction to violate any provision of Cal. Bus. & Prof. Code §16601, that provision shall be modified to the least extent necessary to render it enforceable and the remainder of the Agreement shall remain in full force and effect.

4.4. Remedies. In the event of a breach of Section 4.1 or Section 4.2 by the Executive, then the Executive shall immediately reimburse the Company the entire gross amount of the severance benefits paid to the Executive pursuant to Section 3 up to the date of such breach. The forfeiture provisions of this Section 4.4 shall be in addition to, and not in limitation of, any other remedies available to the Company at law or in equity.

5. Limitation on Payments by the Company.

5.1. In the event it shall be determined that any payment or distribution by the Company to or for the benefit of the Executive (whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise) ("Payment" or "Payments") (i) constitutes a "parachute payment" within the meaning of Section 280G of the Code and (ii) but for this Section 5, would be subject to the excise tax imposed by Section 4999 of the Code, or any interest or penalties with respect to such excise tax (such excise tax, together with any such interest or penalties, are hereinafter collectively referred to as the "Excise Tax"), then the Payments shall be either:

- (a) paid or distributed in full, or
- (b) paid or distributed as to such lesser extent which would result in no portion of such Payments being subject to the Excise Tax,

whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the Excise Tax, results in the receipt by the Executive (on an after-tax basis) of the greatest amount of Payments, notwithstanding that all or some portion of such Payments may be taxable under Section 4999 of the Code.

5.2. Unless the Company and the Executive otherwise agree in writing, all determinations required to be made under this Section 5 shall be made in writing by the independent public accountants appointed for this purpose by the Company (the “Accountants”) immediately prior to the Triggering Event, whose determination shall be conclusive and binding upon the Company and the Executive for all purposes. For purposes of making the calculation required by this Section 5, the Accountants may make reasonable assumptions and approximations concerning applicable taxes and may rely on reasonable, good faith interpretations concerning the application of Sections 280G and 4999 of the Code. The Company and the Executive shall furnish to the Accountants such information and documents as the Accountants may reasonably request in order to make a determination under this Section 5. The Company shall bear all costs the Accountants may reasonably incur in connection with any calculations contemplated by this Section 5.

6. Exclusivity and Non-Duplication.

6.1. Exclusivity. Notwithstanding any other agreement to the contrary, the parties acknowledge and agree that the severance payments and benefits provided by the Company under this Agreement:

- (a) shall be the only severance or severance-related payments payable and benefits provided by the Company under any plan, program, policy or agreement, including but not limited to the Company’s U.S. Executive Severance Benefit Plan, and are in full and complete satisfaction of all such liabilities of the Company; and
- (b) shall be deemed to be inclusive of any notice, payments or benefits to which the Executive may be entitled under the federal Worker Adjustment and Retraining Notification (WARN) Act or other applicable plant or facility closing or mass layoff law, the *Employment Standards Act, 2000* or other applicable employment standards legislation, or any other statutory or regulatory requirement to provide notice of employment termination or entitlement to severance payments.

6.2. Non-Duplication. Notwithstanding any other agreement to the contrary, the parties acknowledge and agree that the severance payments and benefits provided by the Company under this Agreement shall be in addition to any other non-severance or non-severance-related payments or benefits under any plan, program, policy or agreement with the Company to which the Executive may otherwise be entitled as of the Triggering Event, including but not limited to (i) unpaid base salary (including accrued and unused paid time off days), (ii) unreimbursed business expenses, (iii) unpaid bonus or sales commission amounts earned under any incentive plan(s) or program(s) (provided that, in the case of the Company’s Amended and Restated Incentive Bonus Plan or any successor plan, such amounts shall be limited to any unpaid bonus amounts for any then-completed performance period in accordance with the terms of such plan), and (iv) amounts payable under any retirement plans or stock purchase plans of the Company in which the Executive may participate.

7. General.

7.1. Inconsistent Provisions. This Agreement shall be in addition to, and have no effect on, the provisions of any other agreements, including without limitation indemnification agreements, confidentiality agreements and proprietary information, inventions and non-solicitation agreements, which may exist between the Company and the Executive. Notwithstanding the foregoing, to the extent that the terms and conditions of this Agreement are inconsistent with those found in any other agreement or plan to which the Company and the Executive are each a party, the terms and conditions of this Agreement shall control. Notwithstanding the provisions of any existing confidentiality and similar agreements between the Company and the Executive, the parties acknowledge and agree that the Executive shall not be held criminally or civilly liable under any federal or state trade secret law for the disclosure of a trade secret that is made (i) in confidence to a federal, state or local government official or to an attorney solely for the purpose of reporting or investigating a suspected violation of law and (ii) in a complaint or other document filed in a legal action, suit or proceeding, if such filing is made under seal.

7.2. Amendment. This Agreement may not be amended or terminated after the Effective Date or the date of a Triggering Event, as applicable. Prior to such date, the Board may, in its sole discretion, modify or amend this Agreement in any respect, provided such actions do not reduce the amount or defer the receipt of any payment or benefit provided under this Agreement.

7.3. Payment Obligations; Overdue Payments. Subject to satisfaction of the conditions precedent set forth in Sections 4.1 and 4.2, the Company's obligations to make the payments and provide the benefits to the Executive under this Agreement shall be absolute and unconditional and shall not be affected in any way by any circumstances, including, without limitation, any offset, counterclaim, recoupment, defense or other right which the Company may have against the Executive or anyone else. Each and every payment made hereunder by the Company shall be final and the Company will not seek to recover all or any part of such payment from the Executive or from whosoever may be entitled thereto, except as otherwise provided in Section 4.4. The Executive shall be entitled to receive interest at the prime rate of interest published from time to time by The Wall Street Journal on any payments under this Agreement that are 30 days overdue, provided, however, that no payments shall be deemed to be overdue until the Executive executes the Release and any rescission period with respect to such Release has expired.

7.4. At-Will Employment. The Company and the Executive acknowledge and agree that the Executive's employment by the Company is and shall continue to be at-will, as defined under applicable law, except as may otherwise be specifically provided under the terms of any written formal employment agreement or offer letter between the Company and the Executive.

7.5. No Duty to Mitigate. The Executive shall not be required to mitigate any amounts payable or arrangements made under this Agreement, nor shall any such payment or arrangement be reduced by any earnings that the Executive may receive from any other source (except as provided in the first sentence of Section 3.2).

7.6. Successors. All rights under this Agreement are personal to the Executive and, without the prior written consent of the Company, shall not be assignable by the Executive otherwise than by will or the laws of descent and distribution. This Agreement shall inure to the benefit of and be enforceable in the event of the Executive's death or disability by the Executive's legal representative. This Agreement shall inure to the benefit of and be binding upon the Company and its successors and assigns. The Company will require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company to assume expressly and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform it if no such event resulting in a successor had taken place.

7.7. Controlling Law. This Agreement shall in all respects be governed by, and construed in accordance with, the laws of the State of Delaware (without regard to the principles of conflicts of laws).

7.8. Arbitration. DISPUTES REGARDING THE EXECUTIVE'S EMPLOYMENT WITH THE COMPANY, INCLUDING, WITHOUT LIMITATION, ANY DISPUTE HEREUNDER, WHICH CANNOT BE RESOLVED BY NEGOTIATIONS BETWEEN THE COMPANY AND THE EXECUTIVE SHALL BE SUBMITTED TO, AND SOLELY DETERMINED BY, FINAL AND BINDING ARBITRATION CONDUCTED BY JUDICIAL ARBITRATION AND MEDIATION SERVICES ("JAMS") OR ANY SUCCESSOR THERETO, IN ACCORDANCE WITH JAMS' ARBITRATION RULES FOR EMPLOYMENT DISPUTES THEN IN EFFECT, AND THE PARTIES AGREE TO BE BOUND BY THE FINAL AWARD OF THE ARBITRATOR IN ANY SUCH PROCEEDING. THE ARBITRATOR SHALL APPLY THE LAWS OF THE STATE OF DELAWARE WITH RESPECT TO THE INTERPRETATION OR ENFORCEMENT OF ANY MATTER RELATING TO THIS AGREEMENT. ARBITRATION MAY BE HELD IN BALTIMORE, MARYLAND OR SUCH OTHER PLACE AS THE PARTIES HERETO MAY MUTUALLY AGREE, AND SHALL BE CONDUCTED SOLELY BY A FORMER JUDGE. JUDGMENT UPON THE AWARD BY THE ARBITRATOR MAY BE ENTERED IN ANY COURT HAVING JURISDICTION THEREOF. The prevailing party in the arbitration, as determined by the arbitrator, shall be entitled to reimbursement of reasonable attorney's fees and disbursements incurred in such proceedings by the non-prevailing party. **BY SIGNING THIS AGREEMENT, THE PARTIES ARE GIVING UP ANY RIGHT THEY MIGHT HAVE TO SUE EACH OTHER IN COURT AND HAVE THEIR CASE DECIDED BY A JUDGE OR JURY, AND AGREE TO RESOLVE ANY AND ALL DISPUTES BY ARBITRATION.**

7.9. Severability. Any provision in this Agreement which is prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective only to the extent of such prohibition or unenforceability without invalidating or affecting the remaining provisions hereof, and any such prohibition or unenforceability in any jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction.

7.10. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together will constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed and delivered this Agreement on the date written below.

CIENA CORPORATION

By: /s/ David M. Rothenstein
Name: **David M. Rothenstein**
Title: Senior VP and General Counsel

EXECUTIVE

/s/ Gary B. Smith
Gary B. Smith

Date: November 1, 2016

CIENA CORPORATION
CHANGE IN CONTROL SEVERANCE AGREEMENT

This Change in Control Severance Agreement (the “Agreement”) is made by and between **Ciena Corporation**, a Delaware corporation, and <<EXECUTIVE>> (the “Executive”), and shall become effective on November 1, 2016.

WHEREAS, the Company (as hereinafter defined) considers it essential to foster the continuous employment of key management personnel and recognizes that the possibility of a Change in Control (as hereinafter defined) of the Company exists and that such possibility, and the uncertainty that it may cause, may result in the departure or distraction of key management personnel of the Company, to the detriment of the Company and its stockholders;

WHEREAS, the Executive is a key management employee of the Company; and

WHEREAS, the Company desires to encourage the continued employment of the Executive by the Company and wants assurance that it will have the continued dedication, loyalty and service of, and the availability of objective advice and counsel from, the Executive notwithstanding the possibility, threat or occurrence of a Change in Control.

NOW, THEREFORE, in consideration of the mutual covenants and representations contained herein and the mutual benefits derived herefrom, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company and the Executive hereby agree as follows:

1. Certain Definitions. In addition to those terms defined elsewhere herein, when used herein, the following capitalized terms shall have the meanings indicated:

1.1. “*Board*” means the Board of Directors of the Company, as constituted from time to time.

1.2. “*Cause*” means the occurrence of any one or more of the following:

(i) the Executive’s willful and continued failure substantially to perform the duties of the Executive’s position (other than as a result of Disability or as a result of termination by the Executive for Good Reason) after written notice to the Executive by the Governance and Nominations Committee of the Board (or any other special committee or subcommittee appointed by the Board for such purpose) (the “Governance Committee”) specifying such failure, provided that such "cause" shall have been found by a majority vote of the Governance Committee after at least seven days' written notice to the Executive specifying the failure on the part of the Executive and after an opportunity for the Executive to be heard at a meeting of the Governance Committee;

(ii) any willful act or omission by the Executive in connection with his or her responsibilities as an employee of the Company constituting dishonesty, fraud or other malfeasance, immoral conduct or gross misconduct;

(iii) any willful material violation by the Executive of the Company’s Code of Business Conduct and Ethics or the Proprietary Information, Inventions and Non-Solicitation Agreement between the Company and the Executive; or

(iv) the Executive’s conviction of, or plea of nolo contendere to, a felony or a crime of moral turpitude under the laws of the United States or any state thereof or any other jurisdiction in which the Company conducts business.

For purposes of this definition, no act or failure to act by the Executive shall be deemed “willful” unless effected by the Executive not in good faith and without a reasonable belief that such act or failure to act was in or not opposed to the Company’s best interests.

1.3. “*Change in Control*” means the occurrence of any one of the following events:

(i) the direct or indirect sale or exchange by the stockholders of the Company of all or substantially all of the stock of the Company where the stockholders of the Company before such sale or exchange do not retain, directly or indirectly, at least a majority of the beneficial interest in the voting stock of the surviving, continuing, successor, or purchasing corporation or parent corporation thereof, as the case may be (the “Acquiring Company”) after such sale or exchange;

(ii) a merger or consolidation where the stockholders of the Company before such merger or consolidation do not retain, directly or indirectly, at least a majority of the beneficial interest in the voting stock of the Acquiring Company after such merger or consolidation;

(iii) the sale, exchange, or transfer of all or substantially all of the assets of the Company (other than a sale, exchange, or transfer to one or more subsidiary corporations of the Company);

(iv) a change in the composition of the Board occurring within a two year period, as a result of which less than a majority of the directors are Incumbent Directors. "Incumbent Directors" shall mean directors who either (A) are directors of the Company as of the date hereof or (B) are elected, or nominated for election, to the Board with the affirmative votes of at least a majority of the directors of the Company at the time of such election or nomination (but will not include an individual whose election or nomination is in connection with an actual or threatened proxy contest relating to the election of directors to the Company);

(v) a liquidation or dissolution of the Company; or

(vi) any other event that the Board, in its reasonable discretion, shall determine constitutes a Change in Control.

In each case the determination of whether or not a “Change in Control” is deemed to have taken place shall be made without regard to whether such events or occurrences constituting the Change in Control were hostile or against the position of the Board, or were approved or concurred in by the Board.

1.4. “*Code*” means the Internal Revenue Code of 1986, as amended.

1.5. “*Company*” means Ciena Corporation, its affiliates and subsidiaries, and any successor as provided in Section 7.5.

1.6. “*Disability*” means either (i) “total disability” as defined for purposes of the Company’s long-term disability benefit plan; or (ii) the Executive’s inability, as a result of physical or mental incapacity, to perform the Executive's duties for a period of six consecutive months or for an aggregate of six months in any 12 consecutive month period.

1.7. “*Effective Date*” means the date on which a Change in Control becomes effective. In the event of a subsequent Change in Control within one year of the prior Change in Control, “Effective Date” shall be adjusted to mean the date on which the subsequent Change in Control occurs.

1.8. “*Good Reason*” means;

(i) removal from, or failure to be reappointed or reelected to the Executive’s principal position immediately prior to the Effective Date or the date of a Triggering Event, as applicable (other than as a result of a promotion);

(ii) material diminution in the Executive’s position, duties or responsibilities, or the assignment to the Executive of duties that are inconsistent, in a material respect, with the scope of duties and responsibilities associated with the Executive’s position immediately prior to the Effective Date or the date of a Triggering Event, as applicable;

(iii) material reduction in base salary or award opportunity under any corporate incentive plan (or any successor to any such plan), or a material reduction in the level of participation in long-term incentive, benefit and other plans for senior executives as in effect immediately preceding the Effective Date or the date of a Triggering Event, as applicable, or their equivalents;

(iv) relocation of the Executive's principal workplace without the Executive's consent to a location which is more than 50 miles from the Executive's principal workplace on the Effective Date or the date of a Triggering Event, as applicable; or

(v) any failure by the Company to comply with and satisfy the requirements of Section 7.5, provided that the successor shall have received at least ten days' prior written notice from the Company or the Executive of the requirements of Section 7.5;

provided, however, that (A) the Executive has provided notice to the Company of any of the foregoing conditions within 90 days of the initial existence of the condition; (B) the Company has been given at least 30 days following receipt of such notice to cure such condition; and (C) the Executive actually terminates employment within one year following the initial existence of the condition.

1.9. "*Options*" means the Executive's options to purchase common stock of the Company (or to receive cash or property the amount or value of which is determined by reference to the price of the Company's common stock) that are (i) validly issued under any of the Company's equity incentive or stock option plans and (ii) outstanding as of the Effective Date or the date of a Triggering Event, as applicable.

1.10. "*Performance-Based Restricted Stock*" means the Executive's restricted stock (including "restricted stock units" or other rights to receive common stock of the Company) that is (i) validly issued under any of the Company's equity incentive plans, (ii) outstanding as of the Effective Date or the date of a Triggering Event, as applicable, and (iii) subject to performance-based vesting.

1.11. "*Time-Based Restricted Stock*" means the Executive's restricted stock (including "restricted stock units" or other rights to receive common stock of the Company) that is (i) validly issued under any of the Company's equity incentive plans, (ii) outstanding as of the Effective Date or the date of a Triggering Event, as applicable, and (iii) subject to time-based vesting.

1.12. "*Triggering Event*" means termination of the Executive's employment with the Company without Cause by the Company, or for Good Reason by the Executive, either (i) within 90 days prior to the Effective Date or (ii) on or within 12 months after the Effective Date. For purposes of this definition, an Executive's employment with the Company will be deemed to have terminated on the earlier of the date the Executive's employment with the Company ceases or the date that written notice of any such termination is received by the Executive or by the Company, as the case may be, even though the parties may agree in connection therewith that the Executive's employment with the Company will continue for a specified period thereafter. The failure by the Executive or the Company to set forth in any such notice sufficient facts or circumstances showing Good Reason or Cause, as the case may be, shall not waive any right of the Executive or the Company or preclude either party from asserting such facts or circumstances in the enforcement of any such right.

2. Term of Agreement.

This Agreement shall commence on the date of its execution by the Executive and shall continue in effect through November 30, 2019 (the "Term"), and may be extended upon mutual written consent of the Executive and the Company (as authorized by the Board or the Compensation Committee of the Board). Notwithstanding the foregoing:

- (a) the Term shall be automatically extended without any further action if the Company is in active negotiations for, or has entered into, a definitive agreement regarding a Change in Control (a "Pending Transaction"), until the earliest to occur of (i) the date on which such negotiations have terminated
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without entry into a definitive agreement, (ii) the date on which such definitive agreement has terminated pursuant to its terms without occurrence of a Change in Control, or (iii) 12 months following the Effective Date of such Pending Transaction;

- (b) in the event that a Change in Control occurs during the Term, this Agreement shall continue in effect for a period of 12 months following the Effective Date; and
- (c) if the Executive becomes entitled to severance benefits under Section 3 during the Term, this Agreement will not terminate until all of the obligations of the parties hereto with respect to this Agreement have been satisfied.

3. Severance Benefits Upon Triggering Event.

Provided that the Executive satisfies the conditions precedent set forth in Sections 4.1 and 4.2 hereof, upon a Triggering Event the Company shall pay the Executive the amounts and provide the Executive with the benefits set forth in this Section 3 (subject to the exclusivity and non-duplication provisions of Section 6 hereof):

3.1. Severance Payment. The Company shall pay to the Executive a lump sum severance payment, subject to any applicable payroll or other taxes required to be withheld, equal to one and one-half times the sum of (i) the Executive's annual base salary as in effect immediately prior to either the date of the Executive's termination of employment with the Company or the Effective Date, whichever is higher, and (ii) the Executive's annual target bonus or sales commissions amount(s) under any incentive plan(s) or program(s) in which the Executive participated immediately prior to either the date of the Executive's termination of employment with the Company or the Effective Date, whichever is higher. The above bonus or commissions amount shall be based on an assumed achievement of 100% of the targeted performance goal(s) for such award. Upon receipt of the above bonus amount, and subject to Section 6.2(iii) hereof, neither the Executive nor any other person claiming any payment by reason of the Executive's participation in the applicable annual bonus plan or annual sales incentive compensation plan shall have any right to any additional payment under such plan(s) or program(s) with respect to any applicable award thereunder;

3.2. Welfare Benefit and D&O Insurance. The Company shall continue the Executive's (and, where applicable, the Executive's spouse and eligible dependents') participation in the group medical, dental and vision plans maintained by the Company, on substantially the same basis as if the Executive were an employee of the Company, until the earlier of 18 months following the Executive's termination of employment with the Company or the last day of the month in which the Executive commences employment with another employer following the Executive's termination of employment with the Company (the "Coverage Period"). In the event that the Company is unable for any reason to provide for the Executive's (and, where applicable, the Executive's spouse and eligible dependents') continued participation in one or more of such plans during the Coverage Period, the Company shall pay or provide at its expense equivalent benefit coverage for the remainder of the Coverage Period. The Coverage Period shall be taken into account as a period of continuation coverage for purposes of Part 6 of Title I of the Employee Retirement Income Security Act of 1974, as amended ("ERISA"), and for purposes of any other obligation of the Company to provide any continued coverage to the Executive (and, where applicable, the Executive's spouse and eligible dependents) under any group medical, dental or vision plan. In the event that any payments under this Section 3.2 violate the non-discrimination rules under the Affordable Care Act ("ACA"), then the parties agree to modify this section as necessary in order to comply with the ACA. The Company shall continue to maintain director and officer insurance covering the Executive, and shall maintain in effect any indemnification agreements providing for indemnification of the Executive by the Company, until the applicable statute of limitations has ended;

3.3. Options and Restricted Stock. Notwithstanding the terms of any plan, program or arrangement maintained by the Company:

- (a) upon the Effective Date, (i) the Executive's Options that are subject to performance-based vesting and for which the applicable performance period has not yet expired shall immediately be converted into Options with time-based vesting conditions, and (ii) the Executive's Performance-Based Restricted Stock, and any other similar instruments of equity-based compensation that are subject to performance-
-

based vesting, for which the applicable performance period has not yet expired shall immediately be converted into Time-Based Restricted Stock; in each case, with vesting as to the equity awards converted above being deemed to have commenced on the date of grant and vesting as to 1/16th of the grant on each March 20, June 20, September 20 and December 20 following the date of grant;

- (b) upon a Triggering Event, all of the Executive's Options, Performance-Based Restricted Stock and Time-Based Restricted Stock (including any performance-based equity awards converted pursuant to Section 3.3(a) above), to the extent unvested, shall become immediately vested and exercisable in full; and
- (c) upon a Triggering Event, the Executive must elect to exercise any unexercised and exercisable Options within the time period set forth in the applicable plan, program or arrangement under which they were granted, subject to the following requirements:
 - (i) If the exercise of any Option within the time period described in this Section 3.3 is prevented by the requirements of federal or state securities laws or as provided under the terms of the applicable plan, program or arrangement, then the Option shall remain exercisable until three months after the date the Executive is notified by the Company that the Option is exercisable, but in no event later than ten years after the date of grant of the Option; and
 - (ii) If the exercise of any Option within this time period would subject the Executive to suit under Section 16(b) of the Securities Exchange Act of 1934, the period for exercise shall be extended until the earliest to occur of (a) the tenth day following the date on which the Executive would no longer be subject to such suit, (b) the 190th day after the end of the salary continuation period, or (c) ten years after the date of grant of the Option.

3.4. Section 409A. Each of the cash payments provided pursuant to Article 3 of the Agreement shall be treated for purposes of Section 409A of the Code as a right to a series of separate and distinct payments. If the Executive is a "specified employee," as such term is defined pursuant to Section 409A of the Code and the regulations and guidance issued thereunder, and an amount payable under this Agreement constitutes deferred compensation (within the meaning of Section 409A of the Code) the payment of which is required to be delayed pursuant to the six-month delay rule set forth in Section 409A of the Code in order to avoid taxes or penalties thereunder, then such payments shall not be made until the earlier of the Executive's death or six months and one day after the Executive's last day of employment. With respect to any amounts for which cash payment has been delayed in accordance with this Section 3.4, such amounts shall accrue interest at the applicable U.S. Treasury rate for the corresponding maturity period in effect as of the date of the Triggering Event.

4. Conditions Precedent.

4.1. Release and Waiver. The parties agree that, as a condition to the Executive's right to receive the severance payments and benefits set forth in Section 3, the Executive shall execute a general waiver and release (a "Release"), in form and substance reasonably satisfactory to the Company, within 45 days following the last day of the Executive's employment with the Company, of all claims relating to the Executive's employment by the Company and the termination of such employment, including but not limited to discrimination claims, employment-related tort claims, contract claims and claims under this Agreement (other than claims with respect to benefits under the Company's tax-qualified retirement plans, continuation of coverage or benefits solely as required by Part 6 of Title I of ERISA, or any obligation of the Company to provide future performance under Section 3). No severance payments or benefits will be paid or provided until after the last day on which the Executive could rescind all or any part of the Release and the Release has become effective, and the Company will make the lump sum severance payment pursuant to Section 3.1 within ten days thereafter; provided, however, that if the period during which the Release could be signed and

become effective begins in one taxable year and ends in another taxable year, then the severance payment will not be made until the beginning of the second taxable year.

4.2. Non-Competition and Non-Solicitation. The parties agree that, as a condition to the Executive's right to receive the severance payments and benefits set forth in Section 3, the Executive agrees that, for a period of 12 months following the Executive's last day of employment with the Company, the Executive will not, whether alone or as a partner, officer, director, consultant, agent, employee or stockholder of any company or other commercial enterprise, directly or indirectly, without the prior written consent of the Company:

- (a) be employed or engaged by or associated with, or engage or invest in, own, manage, operate, finance, control or participate in the ownership, management, operation, financing or control of, any business or other commercial activity whose products directly compete, in whole or in part, with the products of the Company; provided, that the Executive may purchase or otherwise acquire as a passive investment up to (but not more than) one percent of any class of security of any enterprise (but without otherwise participating in the activities of such enterprise) if such securities are listed on any national or regional securities exchange or have been registered under Section 12(g) of the Securities Exchange Act of 1934; or
- (b) (i) solicit or induce any employee of the Company to leave the employ of the Company, (ii) solicit business of the same or similar type being carried on by the Company from any person known by to the Executive to have purchased products or services from the Company within the 12 months prior to the Executive's last day of employment with the Company, (iii) unlawfully interfere with the Company's relationship with any person, including any person who was an employee, contractor, supplier or customer of the Company, or (iv) disparage the Company or any of its shareholders, directors, officers, employees or agents.

4.3. Construction. Section 4.2 is intended to provide the greatest restriction allowable under Cal. Bus. & Prof. Code §16601. In the event any provision hereof is determined by a court of competent jurisdiction to violate any provision of Cal. Bus. & Prof. Code §16601, that provision shall be modified to the least extent necessary to render it enforceable and the remainder of the Agreement shall remain in full force and effect.

4.4. Remedies. In the event of a breach of Section 4.1 or Section 4.2 by the Executive, then the Executive shall immediately reimburse the Company the entire gross amount of the severance benefits paid to the Executive pursuant to Section 3 up to the date of such breach. The forfeiture provisions of this Section 4.4 shall be in addition to, and not in limitation of, any other remedies available to the Company at law or in equity.

5. **Limitation on Payments by the Company.**

5.1. In the event it shall be determined that any payment or distribution by the Company to or for the benefit of the Executive (whether paid or payable or distributed or distributable pursuant to the terms of this Agreement or otherwise) ("Payment" or "Payments") (i) constitutes a "parachute payment" within the meaning of Section 280G of the Code and (ii) but for this Section 5, would be subject to the excise tax imposed by Section 4999 of the Code, or any interest or penalties with respect to such excise tax (such excise tax, together with any such interest or penalties, are hereinafter collectively referred to as the "Excise Tax"), then the Payments shall be either:

- (a) paid or distributed in full, or
- (b) paid or distributed as to such lesser extent which would result in no portion of such Payments being subject to the Excise Tax,

whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the Excise Tax, results in the receipt by the Executive (on an after-tax basis) of the greatest amount of Payments, notwithstanding that all or some portion of such Payments may be taxable under Section 4999 of the Code.

5.2. Unless the Company and the Executive otherwise agree in writing, all determinations required to be made under this Section 5 shall be made in writing by the independent public accountants appointed for this purpose by the Company (the “Accountants”) immediately prior to the Triggering Event, whose determination shall be conclusive and binding upon the Company and the Executive for all purposes. For purposes of making the calculation required by this Section 5, the Accountants may make reasonable assumptions and approximations concerning applicable taxes and may rely on reasonable, good faith interpretations concerning the application of Sections 280G and 4999 of the Code. The Company and the Executive shall furnish to the Accountants such information and documents as the Accountants may reasonably request in order to make a determination under this Section 5. The Company shall bear all costs the Accountants may reasonably incur in connection with any calculations contemplated by this Section 5.

6. Exclusivity and Non-Duplication.

6.1. Exclusivity. Notwithstanding any other agreement to the contrary, the parties acknowledge and agree that the severance payments and benefits provided by the Company under this Agreement:

- (a) shall be the only severance or severance-related payments payable and benefits provided by the Company under any plan, program, policy or agreement, including but not limited to the Company’s U.S. Executive Severance Benefit Plan, and are in full and complete satisfaction of all such liabilities of the Company; and
- (b) shall be deemed to be inclusive of any notice, payments or benefits to which the Executive may be entitled under the federal Worker Adjustment and Retraining Notification (WARN) Act or other applicable plant or facility closing or mass layoff law, the *Employment Standards Act, 2000* or other applicable employment standards legislation, or any other statutory or regulatory requirement to provide notice of employment termination or entitlement to severance payments.

6.2. Non-Duplication. Notwithstanding any other agreement to the contrary, the parties acknowledge and agree that the severance payments and benefits provided by the Company under this Agreement shall be in addition to any other non-severance or non-severance-related payments or benefits under any plan, program, policy or agreement with the Company to which the Executive may otherwise be entitled as of the Triggering Event, including but not limited to (i) unpaid base salary (including accrued and unused paid time off days), (ii) unreimbursed business expenses, (iii) unpaid bonus or sales commission amounts earned under any incentive plan(s) or program(s) (provided that, in the case of the Company’s Amended and Restated Incentive Bonus Plan or any successor plan, such amounts shall be limited to any unpaid bonus amounts for any then-completed performance period in accordance with the terms of such plan), and (iv) amounts payable under any retirement plans or stock purchase plans of the Company in which the Executive may participate.

7. General.

7.1. Inconsistent Provisions. This Agreement shall be in addition to, and have no effect on, the provisions of any other agreements, including without limitation indemnification agreements, confidentiality agreements and proprietary information, inventions and non-solicitation agreements, which may exist between the Company and the Executive. Notwithstanding the foregoing, to the extent that the terms and conditions of this Agreement are inconsistent with those found in any other agreement or plan to which the Company and the Executive are each a party, the terms and conditions of this Agreement shall control. Notwithstanding the provisions of any existing confidentiality and similar agreements between the Company and the Executive, the parties acknowledge and agree that the Executive shall not be held criminally or civilly liable under any federal or state trade secret law for the disclosure of a trade secret that is made (i) in confidence to a federal, state or local government official or to an attorney solely for the purpose of reporting or investigating a suspected violation of law and (ii) in a complaint or other document filed in a legal action, suit or proceeding, if such filing is made under seal.

7.2. Amendment. This Agreement may not be amended or terminated after the Effective Date or the date of a Triggering Event, as applicable. Prior to such date, the Board may, in its sole discretion, modify or amend this Agreement in any respect, provided such actions do not reduce the amount or defer the receipt of any payment or benefit provided under this Agreement.

7.3. Payment Obligations; Overdue Payments. Subject to satisfaction of the conditions precedent set forth in Sections 4.1 and 4.2, the Company's obligations to make the payments and provide the benefits to the Executive under this Agreement shall be absolute and unconditional and shall not be affected in any way by any circumstances, including, without limitation, any offset, counterclaim, recoupment, defense or other right which the Company may have against the Executive or anyone else. Each and every payment made hereunder by the Company shall be final and the Company will not seek to recover all or any part of such payment from the Executive or from whosoever may be entitled thereto, except as otherwise provided in Section 4.4. The Executive shall be entitled to receive interest at the prime rate of interest published from time to time by The Wall Street Journal on any payments under this Agreement that are 30 days overdue, provided, however, that no payments shall be deemed to be overdue until the Executive executes the Release and any rescission period with respect to such Release has expired.

7.4. At-Will Employment. The Company and the Executive acknowledge and agree that the Executive's employment by the Company is and shall continue to be at-will, as defined under applicable law, except as may otherwise be specifically provided under the terms of any written formal employment agreement or offer letter between the Company and the Executive.

7.5. No Duty to Mitigate. The Executive shall not be required to mitigate any amounts payable or arrangements made under this Agreement, nor shall any such payment or arrangement be reduced by any earnings that the Executive may receive from any other source (except as provided in the first sentence of Section 3.2).

7.6. Successors. All rights under this Agreement are personal to the Executive and, without the prior written consent of the Company, shall not be assignable by the Executive otherwise than by will or the laws of descent and distribution. This Agreement shall inure to the benefit of and be enforceable in the event of the Executive's death or disability by the Executive's legal representative. This Agreement shall inure to the benefit of and be binding upon the Company and its successors and assigns. The Company will require any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company to assume expressly and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform it if no such event resulting in a successor had taken place.

7.7. Controlling Law. This Agreement shall in all respects be governed by, and construed in accordance with, the laws of the State of Delaware (without regard to the principles of conflicts of laws).

7.8. Arbitration. DISPUTES REGARDING THE EXECUTIVE'S EMPLOYMENT WITH THE COMPANY, INCLUDING, WITHOUT LIMITATION, ANY DISPUTE HEREUNDER, WHICH CANNOT BE RESOLVED BY NEGOTIATIONS BETWEEN THE COMPANY AND THE EXECUTIVE SHALL BE SUBMITTED TO, AND SOLELY DETERMINED BY, FINAL AND BINDING ARBITRATION CONDUCTED BY JUDICIAL ARBITRATION AND MEDIATION SERVICES ("JAMS") OR ANY SUCCESSOR THERETO, IN ACCORDANCE WITH JAMS' ARBITRATION RULES FOR EMPLOYMENT DISPUTES THEN IN EFFECT, AND THE PARTIES AGREE TO BE BOUND BY THE FINAL AWARD OF THE ARBITRATOR IN ANY SUCH PROCEEDING. THE ARBITRATOR SHALL APPLY THE LAWS OF THE STATE OF DELAWARE WITH RESPECT TO THE INTERPRETATION OR ENFORCEMENT OF ANY MATTER RELATING TO THIS AGREEMENT. ARBITRATION MAY BE HELD IN BALTIMORE, MARYLAND OR SUCH OTHER PLACE AS THE PARTIES HERETO MAY MUTUALLY AGREE, AND SHALL BE CONDUCTED SOLELY BY A FORMER JUDGE. JUDGMENT UPON THE AWARD BY THE ARBITRATOR MAY BE ENTERED IN ANY COURT HAVING JURISDICTION THEREOF. The prevailing party in the arbitration, as determined by the arbitrator, shall be entitled to reimbursement of reasonable attorney's fees and disbursements incurred in such proceedings by the non-prevailing party. **BY SIGNING THIS AGREEMENT, THE PARTIES ARE GIVING UP ANY RIGHT THEY MIGHT HAVE TO SUE EACH OTHER IN COURT AND HAVE THEIR CASE DECIDED BY A JUDGE OR JURY, AND AGREE TO RESOLVE ANY AND ALL DISPUTES BY ARBITRATION.**

7.9. Severability. Any provision in this Agreement which is prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective only to the extent of such prohibition or unenforceability without invalidating or affecting the remaining provisions hereof, and any such prohibition or unenforceability in any jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction.

7.10. Counterparts. This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together will constitute one and the same instrument.

IN WITNESS WHEREOF, the parties have executed and delivered this Agreement on the date written below.

CIENA CORPORATION

By: /s/ David M. Rothenstein
Name: **David M. Rothenstein**
Title: Senior VP and General Counsel

EXECUTIVE

Date: November 1, 2016

Statement of Computation of Ratio of Earnings to Fixed Charges

| | Year Ended October 31, | | |
|---|------------------------|-----------|-------------|
| | 2016 | 2015 | 2014 |
| Pre-tax earnings (loss) from continuing operations | \$ 86,718 | \$ 23,764 | \$ (26,673) |
| Fixed charges: | | | |
| Interest expense | 56,656 | 51,179 | 47,115 |
| Portion of rental expense representative of interest factor | 8,788 | 8,491 | 7,550 |
| Total fixed charges | 65,444 | 59,670 | 54,665 |
| Pre-tax earnings (loss) from continuing operations plus fixed charges | \$ 152,162 | \$ 83,434 | \$ 27,992 |
| Ratio of earnings (losses) to fixed charges | \$ 2.33 | \$ 1.40 | \$ — |

(1)

(1) Earnings for the year ended October 31, 2014 were inadequate to cover fixed charges by \$26.7 million.

| <u>Subsidiary</u> | <u>Jurisdiction of Incorporation or Organization</u> |
|----------------------------|--|
| Ciena Communications, Inc. | Delaware |
| Ciena Canada, Inc. | Canada |

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statement on Form S-8 (Nos. 333-91294, 333-103328, 333-123509, 333-123510, 333-149520, 333-149929, 333-166125, 333-180332, 333-180333, 333-195498 and 333-214594) and on Post Effective Amendment No. 1 on Form S-8 to Form S-4 (No. 333-204732) of Ciena Corporation of our report dated December 21, 2016 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

Baltimore, Maryland

December 21, 2016

CIENA CORPORATION
CERTIFICATION OF CHIEF EXECUTIVE OFFICER

I, Gary B. Smith, certify that:

1. I have reviewed this annual report of Ciena Corporation;
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.

Date: December 21, 2016

/s/ Gary B. Smith

Gary B. Smith

President and Chief Executive Officer

CIENA CORPORATION
CERTIFICATION OF CHIEF FINANCIAL OFFICER

I, James E. Moylan Jr., certify that:

1. I have reviewed this annual report of Ciena Corporation;
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.

Date: December 21, 2016

/s/ James E. Moylan Jr.

James E. Moylan Jr.

Senior Vice President and Chief Financial Officer

CIENA CORPORATION

**Written Statement of Chief Executive Officer
Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002**

The undersigned, the Chief Executive Officer of Ciena Corporation (the "Company"), hereby certifies that, to his knowledge, on the date hereof:

(a) the Report on Form 10-K of the Company for the year ended October 31, 2016 filed on the date hereof with the Securities and Exchange Commission (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(b) information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ Gary B. Smith

Gary B. Smith

President and Chief Executive Officer

December 21, 2016

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging, or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to Ciena Corporation and will be retained by Ciena Corporation and furnished to the Securities and Exchange Commission or its staff upon request.

CIENA CORPORATION

**Written Statement of Chief Financial Officer
Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002**

The undersigned, the Chief Financial Officer of Ciena Corporation (the "Company"), hereby certifies that, to his knowledge, on the date hereof:

- (a) the Report on Form 10-K of the Company for the year ended October 31, 2016 filed on the date hereof with the Securities and Exchange Commission (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (b) information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ James E. Moylan Jr.

Senior Vice President and Chief Financial Officer

December 21, 2016

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging, or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to Ciena Corporation and will be retained by Ciena Corporation and furnished to the Securities and Exchange Commission or its staff upon request.