

RAMBUS INC
Form 10-K
February 22, 2019
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UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 10-K

(Mark
One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT
OF 1934
For the fiscal year ended December 31, 2018
or
 TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE
ACT OF 1934
For the transition period from _____ to _____

Commission file number: 000-22339

RAMBUS INC.
(Exact name of registrant as specified in its charter)

Delaware	94-3112828
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification Number)

1050 Enterprise Way, Suite 700
Sunnyvale, California 94089
(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code:
(408) 462-8000

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

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, \$.001 Par Value	The NASDAQ Stock Market LLC (The NASDAQ Global Select Market)

Securities registered pursuant to Section 12(g) of the Act:
None

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

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.
Large accelerated filer Accelerated filer Non-accelerated filer Smaller reporting company
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

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

The aggregate market value of the Registrant's Common Stock held by non-affiliates of the Registrant as of June 30, 2018 was approximately \$1.0 billion based upon the closing price reported for such date on The NASDAQ Global Select Market. For purposes of this disclosure, shares of Common Stock held by officers and directors of the Registrant and persons that may be deemed to be affiliates under the Act have been excluded. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

The number of outstanding shares of the Registrant's Common Stock, \$.001 par value, was 109,042,945 as of January 31, 2019.

DOCUMENTS INCORPORATED BY REFERENCE

Certain information is incorporated into Part III of this report by reference to the Proxy Statement for the Registrant's annual meeting of stockholders to be held on or about April 25, 2019 to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Form 10-K.

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NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K (“Annual Report on Form 10-K”) contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. These forward-looking statements include, without limitation, predictions regarding the following aspects of our future:

- Success in the markets of our products and services or our customers’ products;
- Sources of competition;
- Research and development costs and improvements in technology;
- Sources, amounts and concentration of revenue, including royalties;
- Success in signing and renewing license agreements;
- Terms of our licenses and amounts owed under license agreements;
- Technology product development;
- Dispositions, acquisitions, mergers or strategic transactions and our related integration efforts;
- Impairment of goodwill and long-lived assets;
- Pricing policies of our customers;
- Changes in our strategy and business model, including the expansion of our portfolio of inventions, products, software, services and solutions to address additional markets in memory, chip, mobile payments, smart ticketing and security;
- Deterioration of financial health of commercial counterparties and their ability to meet their obligations to us;
- Effects of security breaches or failures in our or our customers’ products and services on our business;
- Engineering, sales and general and administration expenses;
- Contract revenue;
- Operating results;
- International licenses, operations and expansion;
- Effects of changes in the economy and credit market on our industry and business;
- Ability to identify, attract, motivate and retain qualified personnel;
- Effects of government regulations on our industry and business;
- Manufacturing, shipping and supply partners and/or sale and distribution channels;
- Growth in our business;
- Methods, estimates and judgments in accounting policies;
 - Adoption of new accounting pronouncements, including adoption in 2018 of the new revenue recognition standard on our financial position and results of operations;
- Effective tax rates, including as a result of the new U.S. tax legislation;
- Restructurings and plans of termination;
 - Realization of deferred tax assets/release of deferred tax valuation allowance;
- Trading price of our common stock;
- Internal control environment;
- The level and terms of our outstanding debt and the repayment or financing of such debt;
- Protection of intellectual property;
- Any changes in laws, agency actions and judicial rulings that may impact the ability to enforce intellectual property rights;
- Indemnification and technical support obligations;
- Equity repurchase plans;
- Issuances of debt or equity securities, which could involve restrictive covenants or be dilutive to our existing stockholders;
- Effects of fluctuations in currency exchange rates;

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Outcome and effect of potential future intellectual property litigation and other significant litigation; and

Likelihood of paying dividends.

You can identify these and other forward-looking statements by the use of words such as “may,” “future,” “shall,” “should,” “expects,” “plans,” “anticipates,” “believes,” “estimates,” “predicts,” “intends,” “potential,” “continue,” “projecting” or the negative terms, or other comparable terminology. Forward-looking statements also include the assumptions underlying or relating to any of the foregoing statements.

Actual results could differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth under Item 1A, “Risk Factors.” All forward-looking statements included in this document are based on our assessment of information available to us at this time. We assume no obligation to update any forward-looking statements.

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PART I

Rambus and CryptoManager™ are trademarks or registered trademarks of Rambus Inc. Other trademarks or copyrights that may be mentioned in this Annual Report on Form 10-K are the property of their respective owners.

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Item 1. Business

Dedicated to making data faster and safer, Rambus is a leading semiconductor company that creates innovative hardware, software and services that drive technology advancements across the data center, edge and connected end points. Our architecture licenses, IP cores, chips, software, and services span memory and interfaces, embedded security, and key management technologies to positively impact the modern world. We collaborate with the industry, partnering with leading chip and system designers, foundries, and service providers. Integrated into a wide array of devices and systems, our products power and secure diverse applications, including data center and networking, artificial intelligence and machine learning, IoT, and automotive.

Building upon the foundation of technologies for memory, SerDes and other chip interfaces, we have expanded our portfolio of inventions and solutions to address chip and system security, as well as device provisioning and key management. We intend to continue our growth in leading-edge, high-growth markets, consistent with our mission to create value through our innovations and to make those technologies available through the shipment of products, the delivery of services, and licensing business models. Key to our efforts is continuing to hire and retain world-class inventors, scientists and engineers to lead the development and deployment of inventions and technology solutions for our fields of focus.

Rambus is aligning the research priorities in Rambus Labs on innovation and patent development in these key areas as well. Our patents remain foundational to our industry. By reinforcing our commitment to invention and advancing semiconductor technology, we enhance our value and relevance in our target markets and create a platform for investment in product development. Our inventions and technology solutions are offered to our customers through patent, technology, software and IP core licenses, as well as product sales and services. Today, our primary source of revenue is derived from patent licenses, through which we provide our customers a license to use a certain portion of our broad portfolio of patented inventions. Royalties from licenses accounted for 56%, 74% and 79% of our consolidated revenue for the years ended December 31, 2018, 2017 and 2016, respectively.

Our strategy is to optimize the company for operational efficiency and profitability, leveraging synergies across our businesses and customer base. There is significant overlap in our ecosystem of customers, partners and influencers. By focusing on hardware and software solutions for secure, connected semiconductors, we are able to bring better value to our customers and improved profitability for the company.

We demonstrated execution across our product teams in 2018, with record annual product revenue for our IP cores and server DIMM chipsets. Our DDR4 server DIMM chipset continues to gain market share for the current generation server platform and we anticipate even greater market share on the upcoming CPU refresh as we have more than twice the number of OEM and data center qualifications versus the previous generation. In addition to the steady growth in DDR4, we maintained our leadership position for next-generation DDR5 server DIMM chips as the first supplier with silicon at the top-end speeds for both the Register Clock Driver (RCD) and Data Buff (DB) chips.

We continued our leadership position in high-end and high-bandwidth SerDes and memory IP cores in advanced process nodes with the tape out of the industry's first GDDR6 memory PHY in a leading-edge process node. As demand for high memory bandwidth extends beyond graphics, we see expanding customer engagement in a wide range of high-performance applications.

Turning to our Cryptography business, 2018 saw the importance of semiconductor device-level security grow in the industry, resulting in increased traction and opportunities for our embedded security cores and provisioning capabilities in market segments like IoT, automotive, networking and government. We launched the programmable CryptoManager Root of Trust, which combines our deep security expertise with a modern open architecture, RISC-V, to create an easy-to-consume, secure processing core and have ongoing engagements with semiconductor manufacturers, OEMs and cloud providers. We believe our CryptoManager programmable, secure core and

provisioning platform will play an increasingly important role in securing special-purpose computing use cases at the edge, driving increased customer interest across our target segments including automotive, artificial intelligence, machine learning, and government.

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Organization

We have organized our business into three operational units:

Memory and Interfaces (MID)

Security (RSD)

Emerging Solutions (ESD)

As of December 31, 2018, MID and RSD met quantitative thresholds for disclosure as reportable segments. Results for the remaining operating segments are shown under “Other.” For additional information concerning segment reporting, see Note 6, “Segments and Major Customers,” of Notes to Consolidated Financial Statements of this Form 10-K.

Memory and Interfaces

The Rambus Memory and Interfaces Division develops IP cores and memory buffer chips that solve the power, performance, and capacity challenges of the communications and data center computing markets. Rambus standards-compatible memory and SerDes solutions include server DIMM memory interface chips, architectures, and IP cores for high-speed memory and SerDes interfaces. Developed through our system-aware design methodology, Rambus products deliver leading-edge performance with improved time-to-market and first-time-right quality.

As data rates continue to rise to meet that growing demands for faster data delivery, it becomes increasingly difficult to maintain signal integrity and power efficiency at the speeds required to support more powerful, multi-core processors. To address these challenges and enable the continued improvement of electronics systems, ongoing innovation is required. The many contributions and patented innovations developed by Rambus scientists and engineers have been, and continue to be, critical in addressing some of the most difficult chip and system challenges. The foundations of the Memory and Interfaces Division are world-class memory architectures and high-performance SerDes technologies that are brought to market through three main business initiatives: (1) patent licensing; (2) silicon IP core licensing; and (3) chipsets.

Patent Licensing

Our traditional patent licensing program remains our primary source of revenue. Our patent licenses provide our customers a license to use a certain portion of our portfolio of patented inventions in the customer’s own digital electronics products, systems or services. The licenses may also define the specific field of use where our customers may use or employ our inventions in their products. License agreements are structured with fixed, variable or a hybrid of fixed and variable royalty payments over certain periods ranging up to ten years. Leading consumer product, industrial, semiconductor and system companies such as AMD, Broadcom, Cisco, Freescale, Fujitsu, GE, IBM, Intel, LSI, Micron, Nanya, NVIDIA, Panasonic, Qualcomm, Renesas, Samsung, SK hynix, STMicroelectronics, Toshiba, Western Digital, Winbond and Xilinx have licensed our patents for use in their own products. The vast majority of our patents were secured through our internal research and development efforts across all of our business units.

Silicon IP Core Licensing

Our IP core licensing program offers a suite of high-speed memory and SerDes PHY solutions designed to meet the growing performance needs of data center, networking, communications, machine learning and automotive. Due to the complex nature of implementing our technologies, we provide engineering services under certain of these licenses

to help our customers successfully integrate our technology solutions into their semiconductor and system products. Licensees may also receive, in addition to their license agreements, patent licenses as necessary to implement the technology in their products with specific rights and restrictions to the applicable patents elaborated in their individual contracts. Our solutions are designed into systems bought by OEMs. We license both directly to ASIC design houses and semiconductor foundries that, in turn, sell to OEMs, or to OEMs directly.

Chip Sets

Made for high speed, reliability and power efficiency, our DDR memory buffer chipsets for RDIMM, LRDIMM and NVDIMM server modules deliver top-of-the-line performance and capacity for the next wave of enterprise and data center servers. Rambus offers DDR3 and DDR4 server DIMM chipsets to enable increased memory capacity, while maintaining peak

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performance for data-intensive work loads. We are the first provider to offer a silicon-proven server DIMM buffer chipset including both the RCD and DB capable of achieving the speeds expected for next-generation DDR5.

We sell our semiconductor products directly and indirectly to module manufacturers and OEMs worldwide through multiple channels, including our direct sales force and distributors. We operate direct sales offices in the United States, Japan, Korea, Taiwan, China, and employ sales personnel that cover our direct customers and manage our channel partners.

We operate a fabless business model and use third-party foundries and assembly and test manufacturing contractors to manufacture, assemble and test our semiconductor products. We also inspect and test parts in our U.S. based facilities. This outsourced manufacturing approach allows us to focus our resources on the design, sale and marketing of our products. Outsourcing also allows us the flexibility needed to respond to new market opportunities, simplifies our operations and significantly reduces our capital requirements.

Security

Rambus Security is dedicated to providing a secure foundation for a connected world. Our innovative solutions include embedded secure cores, software, and key provisioning, spanning areas including tamper-resistant electronic devices and systems, network security, mobile payment, smart ticketing and trusted transaction services. Rambus' foundational technologies protect a substantial amount of licensed products annually, providing secure access to data and creating an economy of digital trust between our customers and their customer base.

Security challenges are increasingly prevalent in a multitude of industries, including high-growth sectors such as mobile, Internet of Things (IoT), automotive and the data center, providing a variety of opportunities for our security technologies and services. We believe robust security starts with the design of the SoC and continues through the manufacturing supply chain to end-user applications. In line with this thinking, RSD offers a suite of products and services from DPA countermeasures and cores to our CryptoManager™ Platform, mobile payments and smart ticketing.

DPA Countermeasures and Cores

We own a portfolio of patented inventions and technology solutions that are needed for creating secure tamper-resistant electronic devices and systems. These patented DPA countermeasures are critical in protecting devices against side channel attacks such as differential power analysis, which involve monitoring the variations in power consumption or electromagnetic emissions of a device. In addition, our hardware-based cores provide a robust hardware-based solution to protect electronics systems from side-channel attacks, counterfeiting, piracy, and other forms of attack.

For DPA countermeasures, our business model is to provide a combination of patent licenses, technology, consulting services (training, evaluation, and design), and test equipment as well as DPA resistant cores and software libraries. We are recognized worldwide for our expertise in this area, and our strategy is to strengthen our offering beyond stand-alone patent licensing. We discovered the existence of SPA and DPA vulnerabilities in the 1990s, and patented the fundamental techniques for preventing against this method of attack. DPA protections are a critical security ingredient in tamper-resistant products, and are important or required for a broad range of applications and devices (including smart cards, mobile devices, FPGAs, government/defense applications, consumer set-top boxes, postage meters and security tokens).

In addition to the DPA countermeasures portfolio, we have developed technologies, expertise, advanced designs, and development tools for building highly secure cryptographic semiconductor cores. We have successfully deployed our

semiconductor cores in two primary application areas where effective security is valued and paid for by customers: content protection and anti-counterfeiting.

CryptoManager Platform

As the amount of valuable data stored and communicated across devices continues to grow in the mobile, automotive and IoT segments, the need for robust security services is becoming increasingly necessary. Robust security starts with the design of the SoC and continues with the manufacturing supply chain. The Rambus CryptoManager Platform includes a hardware root of trust, key provisioning, software and hosted security services, capable of supporting a variety of configurations via a hardware core or secure software, to provide a scalable and flexible security solution for chip-to-cloud-to-crowd security.

The CryptoManager platform provides chip and device companies with an advanced hardware root-of-trust for their SoCs, as well as an Infrastructure Suite for end-to-end security throughout the SoC design and manufacturing process. The

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CryptoManager platform has been developed with a services-based architecture that enables a secure, two-way communication channel across the manufacturing stages. This extensible solution is built on a foundation that simplifies, automates, and reduces costs for global enterprise IT, manufacturing, and operations functions. The platform is designed to support the enablement of in-field provisioning and hosted security services.

Mobile Payments

Tokenization technology and software continues to expand beyond card and mobile EMV payments to ecommerce, account-to-account and blockchain transactions to reduce fraud and improve trust. NFC-based mobile payments offer many advantages to consumers, retailers and financial institutions alike. For consumers, mobile wallets provide a convenient, “tap-and-go” frictionless commerce experience, seamlessly integrating credit cards, loyalty points and gift cards, while leveraging enhanced security features like multi-factor authentication and biometrics. For retailers, mobile wallets offer businesses the ability to engage users with an immersive, “in-app” experience that bridges the gap from digital to physical with profile-based shopping to offer customized recommendations and coupons to customers. Finally, for banks and retailers, mobile wallets enhance protection from fraud and greater customer engagement and loyalty, and blockchain tokenization protects a broad range of financial services leveraging blockchain technology including cryptocurrency transactions and trading.

Our technology adapts to any mobile payments ecosystem - whether card credentials are stored on the device or in the cloud using host card emulation - and ensures security through tokenization. With our software, customers can fulfill the role of a token service provider, securing transactions by removing vulnerable card data from the payment network. Our mobile payment solutions are offered to financial institutions and retailers through software license agreements.

Smart Ticketing

Smart ticketing is changing the way people travel by bringing greater convenience and security to travelers and transport operators alike. Through the use of smart cards and smart phones, travelers can download and store their tickets electronically, eliminating the need for ticket vending machines and paper tickets, enabling users to simply tap their smart card or device on a gate or validator to access their travel. Our smart ticketing technology combines back-office processing and analytics systems with web portals, smart cards and mobile applications to deliver comprehensive solutions to transport operators and local authorities. Data analytics enable improved profitability and optimization of smart transport schemes through access to real-world travel data, with easy management of transaction data to ensure accurate reimbursements. ITSO certified and interoperable with existing transport providers, our smart ticketing solutions are easy to integrate across multiple modes of travel, simplifying customer journeys at lower cost. Currently, our smart ticketing solutions are primarily offered to public transit authorities in the United Kingdom and we are working to expand our offerings into the broader international markets.

Emerging Solutions

ESD encompasses our long-term research and development efforts in emerging technologies, primarily focused on next-generation memory solutions. ESD programs are generally at the research and pre-commercial stages and may involve collaboration with government entities, universities and industry partners.

Lighting

On January 30, 2018, we announced our plans to close our lighting division and manufacturing operations in Brecksville, Ohio. We believe that such business was not core to our strategy and growth objectives. As of December 31, 2018, the lighting division has been wound down. Refer to Note 15, “Restructuring Charges” of Notes to

Consolidated Financial Statements of this Form 10-K for additional details.

Competition

Our industries are intensely competitive and have been impacted by rapid technological change, short product life cycles, cyclical market patterns, price erosion, increasing foreign and domestic competition and market consolidation. We believe the principal competition for our technologies may come from our prospective customers, some of whom are evaluating and developing products based on technologies that they contend or may contend will not require a license from us. Some of our competitors use a system-level design approach similar to ours, including activities such as board and package design, power and signal integrity analysis, and thermal management. Many of these companies are larger and may have better access to financial, technical and other resources than we possess.

To the extent that alternatives might provide comparable system performance at lower or similar cost to our technologies are perceived to require the payment of no or lower royalties, or to the extent other factors influence the industry, our customers and prospective customers may adopt and promote alternative technologies. Even to the extent we determine that such alternative technologies infringe our patents, there can be no assurance that we would be able to negotiate agreements that would result in royalties being paid to us without litigation, which could be costly and the results of which would be uncertain. In the past, litigation has been and in the future may be required to enforce and protect our intellectual property rights, as well as the substantial investments undertaken to research and develop our innovations and technologies.

Research, Development and Employees

Our growth strategy will be substantially dependent on our ability to develop key innovations that meet the future needs of a dynamic market. To this end, we continue to invest substantial funds in research and development and have assembled a team of highly skilled inventors, engineers and scientists whose activities are focused on continually developing new innovations within our chosen technology fields. Using this foundation of innovations, our technical teams develop new solutions that enable increased performance, greater power efficiency, increased levels of security, as well as other improvements and benefits. Our solution design and development process is a multi-disciplinary effort requiring expertise in multiple fields across all of our operational units.

As of December 31, 2018, we had approximately 560 employees in our engineering departments, representing approximately 70% of our total number of 796 employees. None of our employees are covered by collective bargaining agreements. As noted, we believe our future success is dependent on our continued ability to identify, attract, motivate and retain qualified personnel. In order to attract qualified employees, we have created an environment and culture that encourages, fosters and supports research, development and innovation in breakthrough technologies with significant opportunities for broad industry adoption. To date, we believe we have been successful in recruiting qualified employees and that we have a good relationship with our employees.

A significant number of our scientists and engineers spend all or a portion of their time on research and development. For the years ended December 31, 2018, 2017 and 2016, research and development expenses were \$158.3 million, \$149.1 million and \$129.8 million, respectively. We expect to continue to invest substantial funds in research and development activities. In addition, because our customer agreements often call for us to provide engineering support, a portion of our total engineering costs are allocated to the cost of contract and other revenue.

Intellectual Property

We maintain and support an active program to protect our intellectual property, primarily through the filing of patent applications and the defense of issued patents against infringement. As of December 31, 2018, our technologies are covered by 2,094 U.S. and foreign patents, having expiration dates ranging from 2019 to 2037. Additionally, we have 557 patent applications pending. Some of the patents and pending patent applications are derived from a common parent patent application or are foreign counterpart patent applications. We believe our patented innovations provide our customers with the ability to achieve improved performance, lower risk, greater cost-effectiveness and other benefits in their products and services.

We have a program to file applications for and obtain patents in the United States and in selected foreign countries where we believe filing for such protection is appropriate and would further our overall business strategy and objectives. In some instances, obtaining appropriate levels of protection may involve prosecuting continuation and counterpart patent applications based on a common parent application. In addition, we attempt to protect our trade secrets and other proprietary information through agreements with current and prospective customers, and

confidentiality agreements with employees and consultants and other security measures. We also rely on copyright, trademarks and trade secret laws to protect our intellectual property.

Backlog

Our product sales are generally made pursuant to short-term purchase orders. These purchase orders are made without deposits and may be, and often are, rescheduled, canceled or modified on relatively short notice, without substantial penalty. Therefore, we believe that purchase orders or backlog are not necessarily a reliable indicator of our future product sales.

Corporate and Other Information

Rambus Inc. was founded in 1990 and reincorporated in Delaware in March 1997. Our principal executive offices are located at 1050 Enterprise Way, Suite 700, Sunnyvale, California. Our website is www.rambus.com. The inclusion of our website address in this report does not include or incorporate by reference into this report any information on our website. You can obtain copies of our Forms 10-K, 10-Q, 8-K, and other filings with the SEC, and all amendments to these filings, free of charge, from our website as soon as reasonably practicable following our filing of any of these reports with the SEC. In addition, you may read and copy any material we file with the SEC at the SEC's Public Reference Room at 100 F Street NE, Room 1580, Washington, D.C. 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains a website that contains reports, proxy, and information statements, and other information regarding registrants that file electronically with the SEC at www.sec.gov.

Information concerning our revenue, results of operations and revenue by geographic area is set forth in Item 6, "Selected Financial Data," in Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations," and in Note 6, "Segments and Major Customers," of Notes to Consolidated Financial Statements of this Form 10-K, all of which are incorporated herein by reference. Information concerning identifiable assets and segment reporting is also set forth in Note 6, "Segments and Major Customers," of Notes to Consolidated Financial Statements of this Form 10-K. Information on customers that comprise 10% or more of our consolidated revenue and risks attendant to our foreign operations is set forth below in Item 1A, "Risk Factors."

Our Named Executive Officers

Information regarding our named executive officers and their ages and positions as of February 22, 2019, is contained in the table below. Our named executive officers are appointed by, and serve at the discretion of, our Board of Directors. There is no family relationship between any of our named executive officers.

Name	Age	Position and Business Experience
Luc Seraphin	55	<p>Mr. Seraphin is President & Chief Executive Officer. With over 20 years of experience managing global businesses, Mr. Seraphin brings the overall vision and leadership necessary to drive future growth for the company. Prior to this role, Mr. Seraphin was the senior vice president and general manager of the Memory and Interface Division, leading the development of the company's innovative memory architectures and high-speed serial link solutions. Mr. Seraphin also served as the senior vice president of Worldwide Sales and Operations where he oversaw sales, business development, customer support and operations across the various business units within Rambus.</p> <p>Mr. Seraphin started his career as a field application engineer at NEC and later joined AT&T Bell Labs, which became Lucent Technologies and Agere Systems (now Avago Technologies). During his 18 years at Avago, Mr. Seraphin held several senior positions in sales, marketing and general management, culminating in his last position as executive vice president and general manager of the Wireless Business Unit. Following this, Mr. Seraphin held the position of general manager of a GPS startup company in Switzerland and was vice president of Worldwide Sales and Support at Sequans Communications. During his career, Mr. Seraphin has advised and supported companies in both the product and IP markets.</p> <p>Mr. Seraphin holds a bachelor's degree in Mathematics and Physics and a master's degree in Electrical Engineering from Ecole Supérieure de Chimie, Physique, Electronique, based in Lyon, France where he majored in Computer Architecture. Mr. Seraphin also holds an MBA from the University of Hartford and has completed the senior executive program of Columbia University.</p>
Rahul Mathur	45	<p>Senior Vice President, Finance and Chief Financial Officer. Mr. Mathur joined us in his current position in October 2016. Prior to joining us, Mr. Mathur served as senior vice president of finance at Cypress Semiconductor Corp., a provider of embedded memory, microcontroller, and analog semiconductor system solutions, from March 2015 to September 2016, where he was responsible for financial planning and investor relations. From August 2012 to March 2015, Mr. Mathur served as vice president of finance at Spansion, Inc. (later acquired by Cypress Semiconductor Corp.). Mr. Mathur served as vice president of finance at Picaboo Corporation from January 2012 to August 2012 and vice president of finance at CDNetworks Inc. from January 2011 to December 2011. Prior to January 2011, Mr. Mathur held senior finance positions at Telesis Technologies, Inc., NetSuite Inc. and KLA-Tencor Corporation. Mr. Mathur holds a Bachelor of Arts in applied mathematics from Dartmouth College and an M.B.A. from the Wharton School of Business at the University of Pennsylvania.</p>
Jae Kim	48	<p>Senior Vice President, General Counsel and Secretary. Mr. Kim has served as the senior vice president, general counsel and secretary since February 2013 and as our vice president, corporate legal since July 2010. Prior to his tenure at Rambus, Mr. Kim held senior legal positions at Aricent Inc., a privately-held communications technology company and Electronics for Imaging Inc., a digital printing technology company. Mr. Kim has also had significant experience in private practice with the law firm of Wilson Sonsini Goodrich & Rosati, P.C., where he advised high technology and emerging growth companies on mergers and acquisitions, private financings, public offerings, securities</p>

compliance, public company reporting and corporate governance. Mr. Kim began his legal career as an attorney with the United States Securities and Exchange Commission, Division of Corporation Finance, in Washington, D.C. Mr. Kim is a member of both the California State Bar and New York State Bar, and received a J.D. from the American University, Washington College of Law, and his bachelor's degree from Boston University.

Item 1A. Risk Factors

RISK FACTORS

Because of the following factors, as well as other variables affecting our operating results, past financial performance may not be a reliable indicator of future performance, and historical trends should not be used to anticipate results or trends in future periods. See also “Note Regarding Forward-Looking Statements” at the beginning of this report.

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Risks Associated With Our Business, Industry and Market Conditions

The success of our business depends on sustaining or growing our licensing revenue and the failure to achieve such revenue would lead to a material decline in our results of operations.

Our revenue consists mainly of patent and technology license fees paid for access to our patents, developed technology and development and support services provided to our customers. Our ability to secure and renew the licenses from which our revenues are derived depends on our customers adopting our technology and using it in the products they sell. Once secured, license revenue may be negatively affected by factors within and outside our control, including reductions in our customers' sales prices, sales volumes, our failure to timely complete engineering deliverables, and the terms of such licenses. In addition, our licensing cycle for new licensees as well as renewals for existing licensees is lengthy, costly and unpredictable. We cannot provide any assurance that we will be successful in signing new license agreements or renewing existing license agreements on equal or favorable terms or at all. If we do not achieve our revenue goals, our results of operations could decline.

We have traditionally operated in, and may enter other, industries that are highly cyclical and competitive.

Our target customers are companies that develop and market high volume business and consumer products in semiconductors, computing, data centers, networks, tablets, handheld devices, mobile applications, gaming and graphics, high-definition televisions, cryptography and data security. The electronics industry is intensely competitive and has been impacted by rapid technological change, short product life cycles, cyclical market patterns, price erosion and increasing foreign and domestic competition. We are subject to many risks beyond our control that influence whether or not we are successful in winning target customers or retaining existing customers, including, primarily, competition in a particular industry, market acceptance of such customers' products and the financial resources of such customers. In particular, DRAM manufacturers, which make up a significant part of our revenue, are prone to significant business cycles and have suffered material losses and other adverse effects to their businesses, leading to industry consolidation from time-to-time that may result in loss of revenues under our existing license agreements or loss of target customers. As a result of ongoing competition in the industries in which we operate and volatility in various economies around the world, we may achieve a reduced number of licenses or may experience tightening of customers' operating budgets, difficulty or inability of our customers to pay our licensing fees, lengthening of the approval process for new licenses and consolidation among our customers. All of these factors may adversely affect the demand for our technology and may cause us to experience substantial fluctuations in our operating results.

We face competition from semiconductor and digital electronics products and systems companies, and other semiconductor intellectual property companies that provide security cores that are available to the market. We believe the principal competition for our technologies may come from our prospective customers, some of which are evaluating and developing products based on technologies that they contend or may contend will not require a license from us. Some of our competitors use a system-level design approach similar to ours, including activities such as board and package design, power and signal integrity analysis, and thermal management. Many of these companies are larger and may have better access to financial, technical and other resources than we possess.

To the extent that alternatives might provide comparable system performance at lower or similar cost to our technologies, or are perceived to require the payment of no or lower royalties, or to the extent other factors influence the industry, our customers and prospective customers may adopt and promote alternative technologies. Even to the extent we determine that such alternative technologies infringe our patents, there can be no assurance that we would be able to negotiate agreements that would result in royalties being paid to us without litigation, which could be costly and the results of which would be uncertain.

In addition, our expansion into new markets subjects us to additional risks. We may have limited or no experience in new products and markets, and our customers may not adopt our new offerings. These and other new offerings may

present new and difficult challenges, which could negatively affect our operating results.

We may have to invest more resources in research and development than anticipated, which could increase our operating expenses and negatively impact our operating results.

If new competitors, technological advances by existing competitors, and/or development of new technologies or other competitive factors require us to invest significantly greater resources than anticipated in our research and development efforts, our operating expenses could increase. If we are required to invest significantly greater resources than anticipated in research and development efforts without an increase in revenue, our operating results would decline. We expect these expenses to increase in the foreseeable future as our technology development efforts continue.

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Our revenue is concentrated in a few customers, and if we lose any of these customers through contract terminations or acquisitions, our revenue may decrease substantially.

We have a high degree of revenue concentration. Our top five customers for each reporting period represented approximately 49%, 55% and 63% of our revenue for the years ended December 31, 2018, 2017 and 2016, respectively. For 2018, revenue from Broadcom and NVIDIA each accounted for 10% or more of our total revenue. For 2017 and 2016, revenue from Micron, Samsung and SK hynix each accounted for 10% or more of our total revenue. We expect to continue to experience significant revenue concentration for the foreseeable future.

In addition, our license agreements are complex and some contain terms that require us to provide certain customers with the lowest royalty rate that we provide to other customers for similar technologies, volumes and schedules. These clauses may limit our ability to effectively price differently among our customers, to respond quickly to market forces, or otherwise to compete on the basis of price. These clauses may also require us to reduce royalties payable by existing customers when we enter into or amend agreements with other customers. Any adjustment that reduces royalties from current customers or licensees may have a material adverse effect on our operating results and financial condition.

We continue to negotiate with customers and prospective customers to enter into license agreements. Any future agreement may trigger our obligation to offer comparable terms or modifications to agreements with our existing customers, which may be less favorable to us than the existing license terms. We expect licensing fees will continue to vary based on our success in renewing existing license agreements and adding new customers, as well as the level of variation in our customers' reported shipment volumes, sales price and mix, offset in part by the proportion of customer payments that are fixed. In particular, under our license agreement with Samsung, the license fees payable by Samsung are subject to certain adjustments and conditions, and we therefore cannot provide assurances that the revenues generated by this license will not decline in the future. In addition, some of our material license agreements may contain rights by the customer to terminate for convenience, or upon certain other events, such as change of control, material breach, insolvency or bankruptcy proceedings. If we are unsuccessful in entering into license agreements with new customers or renewing license agreements with existing customers, on favorable terms or at all, or if they are terminated, our results of operations may decline significantly.

Our business and operations could suffer in the event of security breaches.

Attempts by others to gain unauthorized access to our information technology systems are becoming more sophisticated. These attempts, which might be related to industrial or other espionage, include covertly introducing malware to our computers and networks and impersonating authorized users, among others. We seek to detect and investigate all security incidents and to prevent their recurrence, but in some cases, we might be unaware of an incident or its magnitude and effects. While we have not identified any material incidents of unauthorized access to date, the theft, unauthorized use or publication of our intellectual property and/or confidential business information could harm our competitive position and reputation, reduce the value of our investment in research and development and other strategic initiatives or otherwise adversely affect our business. To the extent that any future security breach results in inappropriate disclosure of our customers' confidential information, we may incur liability.

Failures in our products and services or in the products of our customers, including those resulting from security vulnerabilities, defects, bugs or errors, could harm our business.

Our products and services are highly technical and complex, and among our various businesses our products and services are crucial to providing security, payment and other critical functions for our customers' operations. Our products and services have from time to time contained and may in the future contain undetected errors, bugs defects

or other security vulnerabilities. Some errors in our products and services may only be discovered after a product or service has been deployed and used by customers, and may in some cases only be detected under certain circumstances or after extended use. In addition, because the techniques used by hackers to access or sabotage our products and services and other technologies change and evolve frequently and generally are not recognized until launched against a target, we may be unable to anticipate, detect or prevent these techniques and may not address them in our data security technologies. Any errors, bugs, defects or security vulnerabilities discovered in our solutions after commercial release could adversely affect our revenue, our customer relationships and the market's perception of our products and services. We may not be able to correct any errors, bugs, defects, security flaws or vulnerabilities promptly, or at all. Any breaches, defects, errors or vulnerabilities in our products and services could result in:

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• expenditure of significant financial and research and development resources in efforts to analyze, correct, eliminate or work around breaches, errors, bugs or defects or to address and eliminate vulnerabilities;
• financial liability to customers for breach of certain contract provisions, including indemnification obligations;
• loss of existing or potential customers;
• delayed or lost revenue;
• delay or failure to attain market acceptance;
• negative publicity, which would harm our reputation; and
• litigation, regulatory inquiries or investigations that would be costly and harm our reputation.

Some of our revenue is subject to the pricing policies of our customers over which we have no control.

We have no control over our customers' pricing of their products and there can be no assurance that licensed products will be competitively priced or will sell in significant volumes. Any premium charged by our customers in the price of memory and controller chips or other products over alternatives must be reasonable. If the benefits of our technology do not match the price premium charged by our customers, the resulting decline in sales of products incorporating our technology could harm our operating results.

Our licensing cycle is lengthy and costly, and our marketing and licensing efforts may be unsuccessful.

The process of persuading customers to adopt and license our chip interface, lighting, data security, and other technologies can be lengthy. Even if successful, there can be no assurance that our technologies will be used in a product that is ultimately brought to market, achieves commercial acceptance or results in significant royalties to us. We generally incur significant marketing and sales expenses prior to entering into our license agreements, generating a license fee and establishing a royalty stream from each customer. The length of time it takes to establish a new licensing relationship can take many months or even years. We may incur costs in any particular period before any associated revenue stream begins, if at all. If our marketing and sales efforts are very lengthy or unsuccessful, then we may face a material adverse effect on our business and results of operations as a result of failure to obtain or an undue delay in obtaining royalties.

Future revenue is difficult to predict for several reasons, and our failure to predict revenue accurately may result in our stock price declining.

Our lengthy license negotiation cycles could make our future revenue difficult to predict because we may not be successful in entering into or renewing licenses with our customers on our anticipated timelines.

In addition, while some of our license agreements provide for fixed, quarterly royalty payments, many of our license agreements provide for volume-based royalties, and may also be subject to caps on royalties in a given period. The sales volume and prices of our customers' products in any given period can be difficult to predict. In addition, we began applying the new revenue recognition standard (ASC 606) during the first quarter of 2018, as required, and we anticipate that our revenue will vary greatly from quarter to quarter. As a result of the foregoing items, our actual results may differ substantially from analyst estimates or our forecasts in any given quarter.

Also, a portion of our revenue comes from development and support services provided to our customers. Depending upon the nature of the services, a portion of the related revenue may be recognized ratably over the support period, or may be recognized according to contract revenue accounting. Contract revenue accounting may result in deferral of the service fees to the completion of the contract, or may result in the recognition of service fees over the period in which services are performed on a percentage-of-completion basis.

In addition, once we commercially launch our products, the sales volume of and resulting revenue from such products in any given period will be difficult to predict.

We may fail to meet our publicly announced guidance or other expectations about our business, which would likely cause our stock price to decline.

We provide guidance regarding our expected financial and business performance including our anticipated future revenues, operating expenses and other financial and operation metrics. We enhanced our guidance following implementation of Accounting Standards Update (ASU) No. 2014-09, Revenue from Contracts with Customers in Accounting Standards Codification (ASC) Topic 606 (“ASC 606”, “the New Revenue Standard”) in the first quarter of 2018.

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Correctly identifying the key factors affecting business conditions and predicting future events is an inherently uncertain process. Any guidance that we provide may not always be accurate, or may vary from actual results, due to our inability to correctly identify and quantify risks and uncertainties to our business and to quantify their impact on our financial performance. We offer no assurance that such guidance will ultimately be accurate, and investors should treat any such guidance with appropriate caution. If we fail to meet our guidance or if we find it necessary to revise such guidance, even if such failure or revision is seemingly insignificant, investors and analysts may lose confidence in us and the market value of our common stock could be materially adversely affected.

Changes in accounting principles and guidance could result in unfavorable accounting charges or effects.

We prepare our financial statements in accordance with accounting principles generally accepted in the United States and these principles are subject to interpretation by the SEC and various bodies. A change in these principles or application guidance, or in their interpretations, may have a material effect on our reported results, as well as our processes and related controls, and may retroactively affect previously reported results. For example, the New Revenue Standard, as amended, is effective for us on January 1, 2018. We adopted the New Revenue Standard on a modified retrospective basis, with a cumulative-effect adjustment to the opening balance of accumulated deficit on January 1, 2018. The New Revenue Standard materially impacted the timing of revenue recognition for our fixed-fee intellectual property (IP) licensing arrangements (including certain fixed-fee agreements that license our existing IP portfolio as well as IP added to our portfolio during the license term) as a majority of such revenue would be recognized at inception of the license term, as opposed to over time as is the case under prior U.S. GAAP, and we are required to compute and recognize interest income over time for certain licensing arrangements as control over the IP generally transfers significantly in advance of cash being received from customers. The impact of the adoption of the New Revenue Standard did not have a material impact on our other revenue streams. We have also enhanced the form and content of some of our guidance metrics that we provide following implementation of the New Revenue Standard. We expect that any change to current revenue recognition practices may significantly increase volatility in our quarterly revenue, financial results and trends, and may impact our stock price.

We have in the past made and may in the future make acquisitions or enter into mergers, strategic investments, sales of assets or other arrangements that may not produce expected operating and financial results.

From time to time, we engage in acquisitions, strategic transactions, strategic investments and potential discussions with respect thereto. Many of our acquisitions or strategic investments entail a high degree of risk, including those involving new areas of technology and such investments may not become liquid for several years after the date of the investment, if at all. Our acquisitions or strategic investments may not provide the advantages that we anticipated or generate the financial returns we expect, including if we are unable to close any pending acquisitions. For example, for any pending or completed acquisitions, we may discover unidentified issues not discovered in due diligence, and we may be subject to liabilities that are not covered by indemnification protection or become subject to litigation. Achieving the anticipated benefits of business acquisitions depends in part upon our ability to integrate the acquired businesses in an efficient and effective manner. The integration of companies that have previously operated independently may result in significant challenges, including, among others: retaining key employees; successfully integrating new employees, business systems and technology; retaining customers of the acquired business; minimizing the diversion of management's and other employees' attention from ongoing business matters; coordinating geographically separate organizations; consolidating research and development operations; and consolidating corporate and administrative infrastructures.

Our strategic investments in new areas of technology may involve significant risks and uncertainties, including distraction of management from current operations, greater than expected liabilities and expenses, inadequate return of capital, and unidentified issues not discovered in due diligence. These investments are inherently risky and may not be successful.

In addition, we may record impairment charges related to our acquisitions or strategic investments. Any losses or impairment charges that we incur related to acquisitions, strategic investments or sales of assets will have a negative impact on our financial results and the market value of our common stock, and we may continue to incur new or additional losses related to acquisitions or strategic investments.

We may have to incur debt or issue equity securities to pay for any future acquisition, which debt could involve restrictive covenants or which equity security issuance could be dilutive to our existing stockholders.

From time to time, we may also divest certain assets. These divestitures or proposed divestitures may involve the loss of revenue and/or potential customers, and the market for the associated assets may dictate that we sell such assets for less than what we paid. In addition, in connection with any asset sales or divestitures, we may be required to provide certain

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representations, warranties and covenants to buyers. While we would seek to ensure the accuracy of such representations and warranties and fulfillment of any ongoing obligations, we may not be completely successful and consequently may be subject to claims by a purchaser of such assets.

A substantial portion of our revenue is derived from sources outside of the United States and this revenue and our business generally are subject to risks related to international operations that are often beyond our control.

For the years ended December 31, 2018, 2017 and 2016, revenues received from our international customers constituted approximately 44%, 58% and 64%, respectively, of our total revenue. We expect that future revenue derived from international sources will continue to represent a significant portion of our total revenue.

To the extent that customer sales are not denominated in U.S. dollars, any royalties which are based on a percentage of the customers' sales that we receive as a result of such sales could be subject to fluctuations in currency exchange rates. In addition, if the effective price of licensed products sold by our foreign customers were to increase as a result of fluctuations in the exchange rate of the relevant currencies, demand for licensed products could fall, which in turn would reduce our royalties. We do not use financial instruments to hedge foreign exchange rate risk.

We currently have international business operations in the United Kingdom and the Netherlands, international design operations in Canada, India, Finland and France, and business development operations in Australia, China, Japan, Korea, Singapore and Taiwan. Our international operations and revenue are subject to a variety of risks which are beyond our control, including:

- hiring, maintaining and managing a workforce and facilities remotely and under various legal systems, including compliance with local labor and employment laws;
- non-compliance with our code of conduct or other corporate policies;
- natural disasters, acts of war, terrorism, widespread illness or security breaches;
- export controls, tariffs, import and licensing restrictions and other trade barriers;
- profits, if any, earned abroad being subject to local tax laws and not being repatriated to the United States or, if repatriation is possible, limited in amount;
- adverse tax treatment of revenue from international sources and changes to tax codes, including being subject to foreign tax laws and being liable for paying withholding, income or other taxes in foreign jurisdictions;
- unanticipated changes in foreign government laws and regulations;
- increased financial accounting and reporting burdens and complexities;
 - lack of protection of our intellectual property and other contract rights by jurisdictions in which we may do business to the same extent as the laws of the United States;
 - potential vulnerability to computer system, internet or other systemic attacks, such as denial of service, viruses or other malware which may be caused by criminals, terrorists or other sophisticated organizations;
- social, political and economic instability;
- geopolitical issues, including changes in diplomatic and trade relationships; and
- cultural differences in the conduct of business both with customers and in conducting business in our international facilities and international sales offices.

We and our customers are subject to many of the risks described above with respect to companies which are located in different countries. There can be no assurance that one or more of the risks associated with our international operations will not result in a material adverse effect on our business, financial condition or results of operations.

Weak global economic conditions may adversely affect demand for the products and services of our customers.

Our operations and performance depend significantly on worldwide economic conditions. Uncertainty about global or regional economic and political conditions poses a risk as consumers and businesses may postpone spending in response to tighter credit, negative financial news and declines in income or asset values, which could have a material negative effect on the demand for the products of our customers in the foreseeable future. If our customers experience reduced demand for their products as a result of global or regional economic conditions or otherwise, this could result in reduced royalty revenue and our business and results of operations could be harmed.

If our counterparties are unable to fulfill their financial and other obligations to us, our business and results of operations may be affected adversely.

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Any downturn in economic conditions or other business factors could threaten the financial health of our counterparties, including companies with which we have entered into licensing and/or settlement agreements, and their ability to fulfill their financial and other obligations to us. Such financial pressures on our counterparties may eventually lead to bankruptcy proceedings or other attempts to avoid financial obligations that are due to us. Because bankruptcy courts have the power to modify or cancel contracts of the petitioner which remain subject to future performance and alter or discharge payment obligations related to pre-petition debts, we may receive less than all of the payments that we would otherwise be entitled to receive from any such counterparty as a result of bankruptcy proceedings.

If we are unable to attract and retain qualified personnel, our business and operations could suffer.

Our success is dependent upon our ability to identify, attract, compensate, motivate and retain qualified personnel, especially engineers, senior management and other key personnel. The loss of the services of any key employees could be disruptive to our development efforts, business relationships and strategy, and could cause our business and operations to suffer.

Recently, we have experienced significant changes in our management team, including in the role of chief executive officer and other senior executives. Our future success depends in large part upon the continued service and enhancement of our management team and our employees. If there are further changes in management, such changes could be disruptive and could negatively affect our sales, operations, culture, future recruiting efforts and strategic direction. Competition for qualified executives is intense and if we are unable to compensate our key talent appropriately and continue expanding our management team, or successfully integrate new additions to our management team in a manner that enables us to scale our business and operations effectively, our ability to operate effectively and efficiently could be limited or negatively impacted. In addition, changes in key management positions may temporarily affect our financial performance and results of operations as new management becomes familiar with our business, processes and strategy. The loss of any of our key personnel, or our inability to attract, integrate and retain qualified employees, could require us to dedicate significant financial and other resources to such personnel matters, disrupt our operations and seriously harm our operations and business.

We are subject to various government restrictions and regulations, including on the sale of products and services that use encryption technology and those related to privacy and other consumer protection matters.

Various countries have adopted controls, license requirements and restrictions on the export, import and use of products or services that contain encryption technology. In addition, governmental agencies have proposed additional requirements for encryption technology, such as requiring the escrow and governmental recovery of private encryption keys. Restrictions on the sale or distribution of products or services containing encryption technology may impact our ability to license data security technologies to the manufacturers and providers of such products and services in certain markets or may require us or our customers to make changes to the licensed data security technology that is embedded in such products to comply with such restrictions. Government restrictions, or changes to the products or services our customers to comply with such restrictions, could delay or prevent the acceptance and use of such customers' products and services. In addition, the United States and other countries have imposed export controls that prohibit the export of encryption technology to certain countries, entities and individuals. Our failure to comply with export and use regulations concerning encryption technology could subject us to sanctions and penalties, including fines, and suspension or revocation of export or import privileges.

We are subject to a variety of laws and regulations in the United States, the European Union and other countries that involve, for example, user privacy, data protection and security, content and consumer protection. A number of proposals are pending before federal, state, and foreign legislative and regulatory bodies that could significantly affect our business. For example, in 2016, a new EU data protection regime, the General Data Protection Regulation

("GDPR") was adopted, with it fully effective on May 25, 2018. The GDPR may require us to modify our existing practices with respect to the collection, use, and disclosure of data. The GDPR provides for significant penalties in the case of non-compliance of up to €20 million or four percent of worldwide annual revenues, whichever is greater. The GDPR and other existing and proposed laws and regulations can be costly to comply with and can delay or impede the development of new products, result in negative publicity, increase our operating costs and subject us to claims or other remedies.

In accordance with the Dodd-Frank Wall Street Reform and Consumer Protection Act, the SEC established new disclosure and reporting requirements for those companies that use "conflict" minerals mined from the Democratic Republic of Congo and adjoining countries in their products, whether or not these products are manufactured by third parties. These requirements could affect the sourcing and availability of minerals that are used in the manufacture of our products. We have to date incurred costs and expect to incur significant additional costs associated with complying with the disclosure requirements, including for example, due diligence in regard to the sources of any conflict minerals used in our products, in addition to the cost of remediation and other changes to products, processes, or sources of supply as a consequence of such verification activities.

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Additionally, we may face reputational challenges with our customers and other stakeholders if we are unable to sufficiently verify the origins of all minerals used in our products through the due diligence procedures that we implement. We may also face challenges with government regulators and our customers and suppliers if we are unable to sufficiently verify that the metals used in our products are conflict free.

Our operations are subject to risks of natural disasters, acts of war, terrorism, widespread illness or security breach at our domestic and international locations, any one of which could result in a business stoppage and negatively affect our operating results.

Our business operations depend on our ability to maintain and protect our facilities, computer systems and personnel, which are primarily located in the San Francisco Bay Area in the United States, the United Kingdom, the Netherlands, India and Australia. The San Francisco Bay Area is in close proximity to known earthquake fault zones. Our facilities and transportation for our employees are susceptible to damage from earthquakes and other natural disasters such as fires, floods and similar events. Should a catastrophe disable our facilities, we do not have readily available alternative facilities from which we could conduct our business, so any resultant work stoppage could have a negative effect on our operating results. We also rely on our network infrastructure and technology systems for operational support and business activities which are subject to physical and cyber damage, and also susceptible to other related vulnerabilities common to networks and computer systems. Acts of terrorism, widespread illness, war and any event that causes failures or interruption in our network infrastructure and technology systems could have a negative effect at our international and domestic facilities and could harm our business, financial condition, and operating results.

We do not have extensive experience in manufacturing and marketing products and, as a result, may be unable to sustain and grow a profitable commercial market for new and existing products.

We do not have extensive experience in creating, manufacturing and marketing products, including our CryptoManager platform and new offerings that have resulted from our acquisition of SCS in the mobile credential and smart card solution spaces, and our acquisitions of the assets of the Snowbush IP group and the Memory Interconnect Business. These and other new offerings may present new and difficult challenges, and we may be subject to claims if customers of these offerings experience delays, failures, non-performance or other quality issues. In particular, we may experience difficulties with product design, qualification, manufacturing, marketing or certification that could delay or prevent our development, introduction or marketing of new products. Although we intend to design our products to be fully compliant with applicable industry standards, proprietary enhancements may not in the future result in full conformance with existing industry standards under all circumstances.

If we fail to introduce products that meet the demand of our customers or penetrate new markets in which we expend significant resources, our revenues will decrease over time and our financial condition could suffer. Additionally, if we concentrate resources on a new market that does not prove profitable or sustainable, it could damage our reputation and limit our growth, and our financial condition could decline.

We rely on a number of third-party providers for data center hosting facilities, equipment, maintenance and other services, and the loss of, or problems with, one or more of these providers may impede our growth or cause us to lose customers.

We rely on third-party providers to supply data center hosting facilities, equipment, maintenance and other services in order to provide some of our services, including in our offerings of our advanced mobile payment platform and smart ticketing platform, and have entered into various agreements for such services. The continuous availability of our service depends on the operations of those facilities, on a variety of network service providers and on third-party vendors. In addition, we depend on our third-party facility providers' ability to protect these facilities against damage or interruption from natural disasters, power or telecommunications failures, criminal acts, cyber-attacks and similar

events. If there are any lapses of service or damage to a facility, we could experience lengthy interruptions in our service as well as delays and additional expenses in arranging new facilities and services. Even with current and planned disaster recovery arrangements, our business could be harmed. Any interruptions or delays in our service, whether as a result of third-party error, our own error, natural disasters, criminal acts, security breaches or other causes, whether accidental or willful, could harm our relationships with customers, harm our reputation and cause our revenue to decrease and/or our expenses to increase. Also, in the event of damage or interruption, our insurance policies may not adequately compensate us for any losses that we may incur. These factors in turn could further reduce our revenue, subject us to liability and cause us to issue credits or cause us to lose customers, any of which could materially adversely affect our business.

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We rely on third parties for a variety of services, including manufacturing, and these third parties' failure to perform these services adequately could materially and adversely affect our business.

We rely on third parties for a variety of services, including our manufacturing supply chain partners and third parties within our sales and distribution channels. Certain of these third parties are, and may be, our sole manufacturer or sole source of production materials. If we fail to manage our relationship with these manufacturers and suppliers effectively, or if they experience delays, disruptions, capacity constraints or quality control problems in their operations, our ability to ship products to our customers could be impaired and our competitive position and reputation could be harmed. In addition, any adverse change in any of our manufacturers and suppliers' financial or business condition could disrupt our ability to supply quality products to our customers. If we are required to change our manufacturers, we may lose revenue, incur increased costs and damage our end-customer relationships. In addition, qualifying a new manufacturer and commencing production can be an expensive and lengthy process. If our third party manufacturers or suppliers are unable to provide us with adequate supplies of high-quality products for any other reason, we could experience a delay in our order fulfillment, and our business, operating results and financial condition would be adversely affected. In the event these and other third parties we rely on fail to provide their services adequately, including as a result of errors in their systems or events beyond their control, or refuse to provide these services on terms acceptable to us or at all, and we are not able to find suitable alternatives, our business may be materially and adversely affected. In addition, our orders may represent a relatively small percentage of the overall orders received by our manufacturers from their customers. As a result, fulfilling our orders may not be considered a priority in the event our manufacturers are constrained in their ability to fulfill all of their customer obligations in a timely manner. If our manufacturers are unable to provide us with adequate supplies of high-quality products, or if we or our manufacturers are unable to obtain adequate quantities of components, it could cause a delay in our order fulfillment, in which case our business, operating results and financial condition could be adversely affected.

Warranty, service level agreement and product liability claims brought against us could cause us to incur significant costs and adversely affect our operating results as well as our reputation and relationships with customers.

We may from time to time be subject to warranty, service level agreement and product liability claims with regard to product performance and our services. We could incur material losses as a result of warranty, support, repair or replacement costs in response to customer complaints or in connection with the resolution of contemplated or actual legal proceedings relating to such claims. In addition to potential losses arising from claims and related legal proceedings, warranty and product liability claims could affect our reputation and our relationship with customers. We generally attempt to limit the maximum amount of indemnification or liability that we could be exposed to under our contracts, however, this is not always possible.

Any failure in our delivery of high-quality technical support services may adversely affect our relationships with our customers and our financial results.

Our customers depend on our support organization to resolve technical issues and provide ongoing maintenance relating to our products and services. We may be unable to respond quickly enough to accommodate short-term increases in customer demand for support services. Increased customer demand for these services, without corresponding revenues, could increase costs and adversely affect our operating results. In addition, our sales process is highly dependent on our offerings and business reputation and on positive recommendations from our existing customers. Any failure to maintain high-quality technical support, or a market perception that we do not maintain high-quality support, could adversely affect our reputation, our ability to sell our solutions to existing and prospective customers, and our business, operating results and financial position.

Certain software that we use in certain of our products is licensed from third parties and, for that reason, may not be available to us in the future, which has the potential to delay product development and production or cause us to incur

additional expense, which could materially adversely affect our business, financial condition, operating results and cash flow.

Some of our products and services contain software licensed from third parties. Some of these licenses may not be available to us in the future on terms that are acceptable to us or allow our products to remain competitive. The loss of these licenses or the inability to maintain any of them on commercially acceptable terms could delay development of future offerings or the enhancement of existing products and services. We may also choose to pay a premium price for such a license in certain circumstances where continuity of the licensed product would outweigh the premium cost of the license. The unavailability of these licenses or the necessity of agreeing to commercially unreasonable terms for such licenses could materially adversely affect our business, financial condition, operating results and cash flow.

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Certain software we use is from open source code sources, which, under certain circumstances, may lead to unintended consequences and, therefore, could materially adversely affect our business, financial condition, operating results and cash flow.

We use open source software in our services, including our advanced mobile payment platform and smart ticketing platform, and we intend to continue to use open source software in the future. From time to time, there have been claims challenging the ownership of open source software against companies that incorporate open source software into their products or alleging that these companies have violated the terms of an open source license. As a result, we could be subject to lawsuits by parties claiming ownership of what we believe to be open source software or alleging that we have violated the terms of an open source license. Litigation could be costly for us to defend, have a negative effect on our operating results and financial condition or require us to devote additional research and development resources to change our solutions. In addition, if we were to combine our proprietary software solutions with open source software in certain manners, we could, under certain open source licenses, be required to publicly release the source code of our proprietary software solutions. If we inappropriately use open source software, we may be required to re-engineer our solutions, discontinue the sale of our solutions, release the source code of our proprietary software to the public at no cost or take other remedial actions. There is a risk that open source licenses could be construed in a way that could impose unanticipated conditions or restrictions on our ability to commercialize our solutions, which could adversely affect our business, operating results and financial condition.

Our business and operating results could be harmed if we undertake any restructuring activities.

From time to time, we may undertake restructurings of our business, including discontinuing certain products, services and technologies and planned reductions in force. There are several factors that could cause restructurings to have adverse effects on our business, financial condition and results of operations. These include potential disruption of our operations, the development of our technology, the deliveries to our customers and other aspects of our business. Loss of sales, service and engineering talent, in particular, could damage our business. Any restructuring would require substantial management time and attention and may divert management from other important work. Employee reductions or other restructuring activities also would cause us to incur restructuring and related expenses such as severance expenses. Moreover, we could encounter delays in executing any restructuring plans, which could cause further disruption and additional unanticipated expense.

Problems with our information systems could interfere with our business and could adversely impact our operations.

We rely on our information systems and those of third parties for fulfilling licensing and contractual obligations, processing customer orders, delivering products, providing services and support to our customers, billing and tracking our customer orders, performing accounting operations and otherwise running our business. If our systems fail, our disaster and data recovery planning and capacity may prove insufficient to enable timely recovery of important functions and business records. Any disruption in our information systems and those of the third parties upon whom we rely could have a significant impact on our business. Additionally, our information systems may not support new business models and initiatives and significant investments could be required in order to upgrade them. For example, in connection with our adoption of the New Revenue Standard, we plan to augment our systems with new revenue accounting software, utilizing internal and third party resources. Delays in adapting our information systems to address new business models and accounting standards could limit the success or result in the failure of such initiatives and impair the effectiveness of our internal controls. Even if we do not encounter these adverse effects, the implementation of these enhancements may be much more costly than we anticipated. If we are unable to successfully implement the information systems enhancements as planned, our operating results could be negatively impacted.

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Risks Related to Capitalization Matters and Corporate Governance

The price of our common stock may continue to fluctuate.

Our common stock is listed on The NASDAQ Global Select Market under the symbol "RMBS." The trading price of our common stock has at times experienced price volatility and may continue to fluctuate significantly in response to various factors, some of which are beyond our control. Some of these factors include:

- any progress, or lack of progress, real or perceived, in the development of products that incorporate our innovations and technology companies' acceptance of our products, including the results of our efforts to expand into new target markets;
- our signing or not signing new licenses and the loss of strategic relationships with any customer;
- announcements of technological innovations or new products by us, our customers or our competitors;
- changes in our strategies, including changes in our licensing focus and/or acquisitions or dispositions of companies or businesses with business models or target markets different from our core;
- positive or negative reports by securities analysts as to our expected financial results and business developments;
- developments with respect to patents or proprietary rights and other events or factors;
- new litigation and the unpredictability of litigation results or settlements;
- repurchases of our common stock on the open market;
- issuance of additional securities by us, including in acquisitions; and
- changes in accounting pronouncements, including implementation of the New Revenue Standard.

In addition, the stock market in general, and prices for companies in our industry in particular, have experienced extreme volatility that often has been unrelated to the operating performance of such companies. These broad market and industry fluctuations may adversely affect the price of our common stock, regardless of our operating performance.

We have outstanding senior convertible notes in an aggregate principal amount totaling \$172.5 million. Because these notes are convertible into shares of our common stock, volatility or depressed prices of our common stock could have a similar effect on the trading price of such notes. In addition, the existence of these notes may encourage short selling in our common stock by market participants because the conversion of the notes could depress the price of our common stock.

We have been party to, and may in the future be subject to, lawsuits relating to securities law matters which may result in unfavorable outcomes and significant judgments, settlements and legal expenses which could cause our business, financial condition and results of operations to suffer.

We and certain of our current and former officers and directors, as well as our current auditors, were subject from 2006 to 2011 to several stockholder derivative actions, securities fraud class actions and/or individual lawsuits filed in federal court against us and certain of our current and former officers and directors. The complaints generally alleged that the defendants violated the federal and state securities laws and stated state law claims for fraud and breach of fiduciary duty. Although to date these complaints have either been settled or dismissed, the amount of time to resolve any future lawsuits is uncertain, and these matters could require significant management and financial resources. Unfavorable outcomes and significant judgments, settlements and legal expenses in litigation related to any future securities law claims could have material adverse impacts on our business, financial condition, results of operations, cash flows and the trading price of our common stock.

We are leveraged financially, which could adversely affect our ability to adjust our business to respond to competitive pressures and to obtain sufficient funds to satisfy our future research and development needs, to protect and enforce our intellectual property, and to meet other needs.

We have material indebtedness. In November 2017, we issued \$172.5 million aggregate principal amount of our 2023 Notes, the entire amount of which remains outstanding. The degree to which we are leveraged could have negative consequences, including, but not limited to, the following:

- we may be more vulnerable to economic downturns, less able to withstand competitive pressures and less flexible in responding to changing business and economic conditions;
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our ability to obtain additional financing in the future for working capital, capital expenditures, acquisitions, litigation, general corporate or other purposes may be limited;
• a substantial portion of our cash flows from operations in the future may be required for the payment of interest and principal when due at maturity in February 2023; and
• we may be required to make cash payments upon any conversion of the 2023 Notes, which would reduce our cash on hand.

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A failure to comply with the covenants and other provisions of our debt instruments could result in events of default under such instruments, which could permit acceleration of all of our outstanding 2023 Notes. Any required repurchase of the 2023 Notes as a result of a fundamental change or acceleration of the 2023 Notes would reduce our cash on hand such that we would not have those funds available for use in our business.

If we are at any time unable to generate sufficient cash flows from operations to service our indebtedness when payment is due, we may be required to attempt to renegotiate the terms of the instruments relating to the indebtedness, seek to refinance all or a portion of the indebtedness or obtain additional financing. There can be no assurance that we will be able to successfully renegotiate such terms, that any such refinancing would be possible or that any additional financing could be obtained on terms that are favorable or acceptable to us.

Compliance with changing regulation of corporate governance and public disclosure may result in additional expenses.

Changing laws, regulations and standards relating to corporate governance and public disclosure have historically created uncertainty for companies such as ours. Any new or changed laws, regulations and standards are subject to varying interpretations due to their lack of specificity, and as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

Our certificate of incorporation and bylaws, Delaware law, our outstanding convertible notes and certain other agreements contain provisions that could discourage transactions resulting in a change in control, which may negatively affect the market price of our common stock.

Our certificate of incorporation, our bylaws and Delaware law contain provisions that might enable our management to discourage, delay or prevent a change in control. In addition, these provisions could limit the price that investors would be willing to pay in the future for shares of our common stock. Pursuant to such provisions:

- our board of directors is authorized, without prior stockholder approval, to create and issue preferred stock, commonly referred to as “blank check” preferred stock, with rights senior to those of common stock, which means that a stockholder rights plan could be implemented by our board;
- our board of directors is staggered into two classes, only one of which is elected at each annual meeting;
- stockholder action by written consent is prohibited;
- nominations for election to our board of directors and the submission of matters to be acted upon by stockholders at a meeting are subject to advance notice requirements;
- certain provisions in our bylaws and certificate of incorporation such as notice to stockholders, the ability to call a stockholder meeting, advance notice requirements and action of stockholders by written consent may only be amended with the approval of stockholders holding 66 2/3% of our outstanding voting stock;
- our stockholders have no authority to call special meetings of stockholders; and
- our board of directors is expressly authorized to make, alter or repeal our bylaws.

We are also subject to Section 203 of the Delaware General Corporation Law, which provides, subject to enumerated exceptions, that if a person acquires 15% or more of our outstanding voting stock, the person is an “interested stockholder” and may not engage in any “business combination” with us for a period of three years from the time the person acquired 15% or more of our outstanding voting stock.

Certain provisions of our outstanding Notes could make it more difficult or more expensive for a third party to acquire us. Upon the occurrence of certain transactions constituting a fundamental change, holders of such Notes will have the right, at their option, to require us to repurchase, at a cash repurchase price equal to 100% of the principal amount plus accrued and unpaid interest on such Notes, all or a portion of their Notes. We may also be required to increase the conversion rate of such Notes in the event of certain fundamental changes.

Unanticipated changes in our tax rates or in the tax laws and regulations could expose us to additional income tax liabilities which could affect our operating results and financial condition.

We are subject to income taxes in both the United States and various foreign jurisdictions. Significant judgment is required in determining our worldwide provision for income taxes and, in the ordinary course of business, there are

many transactions and calculations where the ultimate tax determination is uncertain. Our effective tax rate could be adversely affected by changes in the mix of earnings in countries with differing statutory tax rates, changes in the valuation of deferred tax assets and liabilities, changes in tax laws and regulations as well as other factors. Our tax determinations are regularly subject to audit by tax authorities and developments in those audits could adversely affect our income tax provision, and we are currently undergoing such audits of certain of our tax returns. Although we believe that our tax estimates are reasonable, the final

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determination of tax audits or tax disputes may be different from what is reflected in our historical income tax provisions which could affect our operating results.

Litigation, Regulation and Business Risks Related to our Intellectual Property

Adverse litigation results could affect our business.

We may be subject to legal claims or regulatory matters involving consumer, stockholder, employment, competition, intellectual property and other issues on a global basis. Litigation can be lengthy, expensive and disruptive to our operations, and results cannot be predicted with certainty. An adverse decision could include monetary damages or, in cases for which injunctive relief is sought, an injunction prohibiting us from manufacturing or selling one or more of our products or technologies. If we were to receive an unfavorable ruling on a matter, our business, operating results or financial condition could be materially harmed.

We have in the past, and may in the future, become engaged in litigation stemming from our efforts to protect and enforce our patents and intellectual property and make other claims, which could adversely affect our intellectual property rights, distract our management and cause substantial expenses and declines in our revenue and stock price. We seek to diligently protect our intellectual property rights and will continue to do so. While we are not currently involved in intellectual property litigation, any future litigation, whether or not determined in our favor or settled by us, would be expected to be costly, may cause delays applicable to our business (including delays in negotiating licenses with other actual or potential customers), would be expected to discourage future design partners, would tend to impair adoption of our existing technologies and would divert the efforts and attention of our management and technical personnel from other business operations. In addition, we may be unsuccessful in any litigation if we have difficulty obtaining the cooperation of former employees and agents who were involved in our business during the relevant periods related to our litigation and are now needed to assist in cases or testify on our behalf. Furthermore, any adverse determination or other resolution in litigation could result in our losing certain rights beyond the rights at issue in a particular case, including, among other things: our being effectively barred from suing others for violating certain or all of our intellectual property rights; our patents being held invalid or unenforceable or not infringed; our being subjected to significant liabilities; our being required to seek licenses from third parties; our being prevented from licensing our patented technology; or our being required to renegotiate with current customers on a temporary or permanent basis.

From time to time, we are subject to proceedings by government agencies that may result in adverse determinations against us and could cause our revenue to decline substantially.

An adverse resolution by or with a governmental agency could result in severe limitations on our ability to protect and license our intellectual property, and could cause our revenue to decline substantially. Third parties have and may attempt to use adverse findings by a government agency to limit our ability to enforce or license our patents in private litigations, to challenge or otherwise act against us with respect to such government agency proceedings.

Further, third parties have sought and may seek review and reconsideration of the patentability of inventions claimed in certain of our patents by the U.S. Patent and Trademark Office (“USPTO”) and/or the European Patent Office (the “EPO”). Any re-examination proceedings may be reviewed by the USPTO's Patent Trial and Appeal Board (“PTAB”). The PTAB and the related former Board of Patent Appeals and Interferences have previously issued decisions in a few cases, finding some challenged claims of Rambus' patents to be valid, and others to be invalid. Decisions of the PTAB are subject to further USPTO proceedings and/or appeal to the Court of Appeals for the Federal Circuit. A final adverse decision, not subject to further review and/or appeal, could invalidate some or all of the challenged patent claims and could also result in additional adverse consequences affecting other related U.S. or European patents, including in any intellectual property litigation. If a sufficient number of such patents are impaired, our ability to enforce or license our intellectual property would be significantly weakened and could cause our revenue to decline substantially.

The pendency of any governmental agency acting as described above may impair our ability to enforce or license our patents or collect royalties from existing or potential customers, as any litigation opponents may attempt to use such proceedings to delay or otherwise impair any pending cases and our existing or potential customers may await the final outcome of any proceedings before agreeing to new licenses or to paying royalties.

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Litigation or other third-party claims of intellectual property infringement could require us to expend substantial resources and could prevent us from developing or licensing our technology on a cost-effective basis.

Our research and development programs are in highly competitive fields in which numerous third parties have issued patents and patent applications with claims closely related to the subject matter of our programs. We have also been named in the past, and may in the future be named, as a defendant in lawsuits claiming that our technology infringes upon the intellectual property rights of third parties. As we develop additional products and technology, we may face claims of infringement of various patents and other intellectual property rights by third parties. In the event of a third-party claim or a successful infringement action against us, we may be required to pay substantial damages, to stop developing and licensing our infringing technology, to develop non-infringing technology, and to obtain licenses, which could result in our paying substantial royalties or our granting of cross licenses to our technologies. We may not be able to obtain licenses from other parties at a reasonable cost, or at all, which could cause us to expend substantial resources, or result in delays in, or the cancellation of, new products. Moreover, customers and/or suppliers of our products may seek indemnification for alleged infringement of intellectual property rights. We could be liable for direct and consequential damages and expenses including attorneys' fees. A future obligation to indemnify our customers and/or suppliers may harm our business, financial condition and operating results.

If we are unable to protect our inventions successfully through the issuance and enforcement of patents, our operating results could be adversely affected.

We have an active program to protect our proprietary inventions through the filing of patents. There can be no assurance, however, that:

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